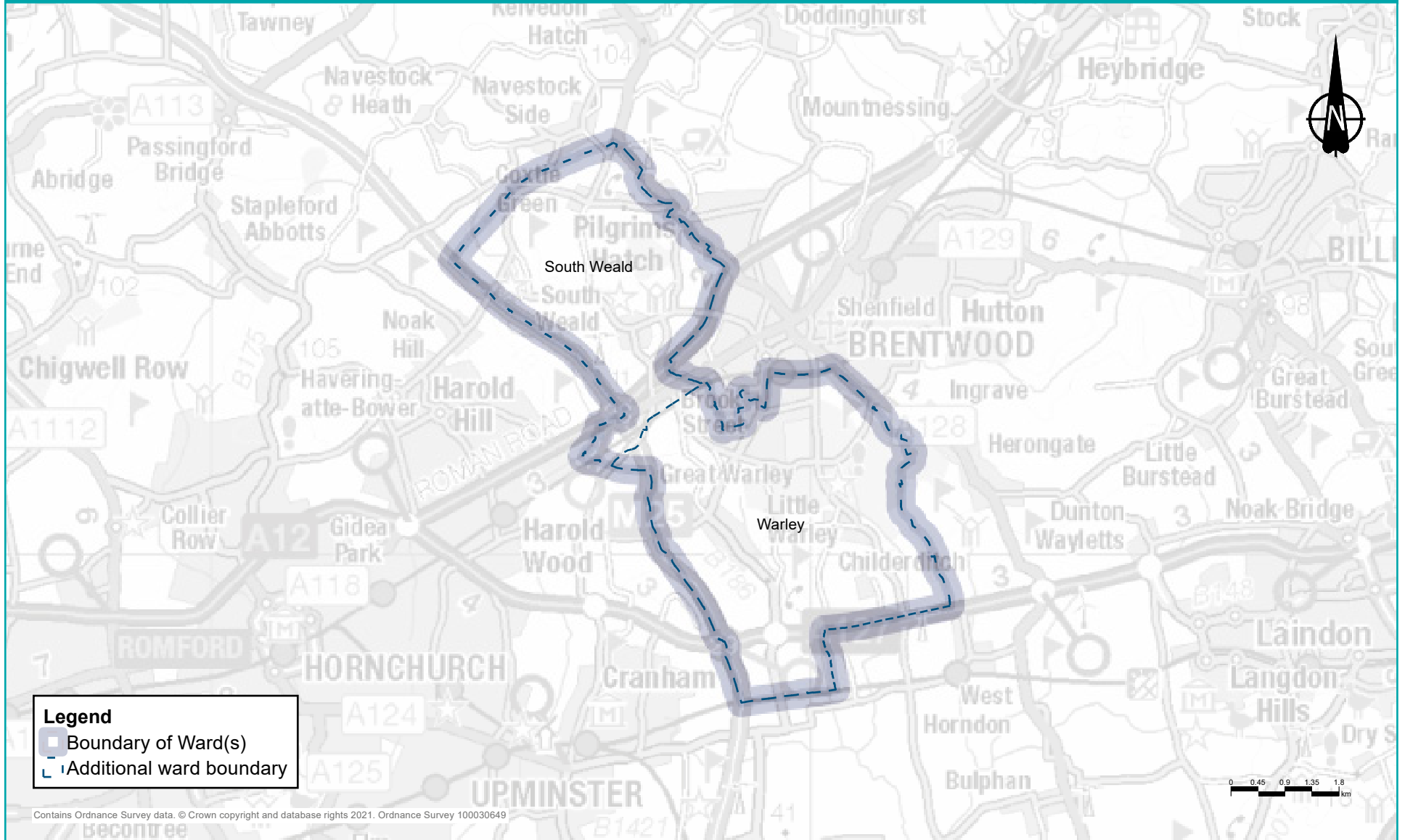


## Chapter 23: Warley and South Weald wards

This chapter summarises the activities in Warley and South Weald wards relating to the project's construction and its operational phase (when the new road is open). It also explains the measures intended to reduce the project's impacts on the local area. For more information about the assessments in this chapter and other information available during this consultation, see chapter 1, which also includes a map showing all the wards described in this document. The activities and impacts in these two wards are similar, which is why we have presented them in the same chapter.

Within this document, we sometimes advise where additional information can be found in other consultation documents, including the Construction update, Operations update, You said, we did, Register of Environmental Actions and Commitments (REAC), Code of Construction Practice (CoCP), Outline Traffic Management Plan for Construction (OTMPfC) and Design principles. To find out more about these documents, see chapter 1. References to these documents provide an indication as to how our proposals to reduce the project's impacts will be secured in our application for development consent.

Figure 23.1: Ward boundary map for Warley and South Weald wards



## 23.1 Overview

### 23.1.1 About these wards

Warley is north of Upminster ward and east of Cranham ward, in the borough of Brentwood. It covers an area of around 18km<sup>2</sup> and has an estimated population of 6,399<sup>1</sup>. The ward is predominantly farmland, woodland and open space, with the residential area of Warley in the north. Childerditch Industrial Park and Warley Park Golf Club are in the south of the ward. The Great Eastern Main Line railway runs along the northern boundary of the ward. The M25 is on the western boundary, with suburbs of Brentwood town to the north.

South Weald is located to the north of Warley in the borough of Brentwood. The ward covers an area of approximately 12km<sup>2</sup> of mainly of farmland, woodland and open space, with an estimated population of 1,920<sup>2</sup>. There are some isolated residential properties throughout the ward. The M25 runs along the western boundary, with the A12 and A1023 perpendicular to this. A high-pressure gas pipeline runs north-to-south in the west of the ward.

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1, 2 Office for National Statistics, 2018 ward-level population estimate

## 23.1.2 Summary of impacts

**Table 23.1: Summary of impacts during the project’s construction and operation**

| Topic                          | Construction   | Operations  |
|--------------------------------|--|---|
| <p><b>Traffic</b></p>          | <p><b>Impacts</b></p> <p>It is predicted that there would be an increase in journey times on the A127 and Warley Street while traffic management measures are in place. Further details can be found in the traffic section of this chapter.</p> <p><b>Mitigation</b></p> <p>Construct haul roads off the public highway at the earliest opportunity, so that construction traffic can operate away from public roads. Ban construction traffic from using some local roads.</p> | <p><b>Impacts</b></p> <p>Within Warley the changes in traffic flows would be on the M25 and the A127. In South Weald ward the change in flows would be on Brentwood Road and Brook Street. Further details of the predicted impacts to traffic flows during the operational phase can be found in the traffic section of this chapter.</p> <p><b>Mitigation</b></p> <p>Once the project is operational, traffic impacts on the affected road network would be monitored, including local roads.</p> |
| <p><b>Public transport</b></p> | <p><b>Buses</b></p> <p>While traffic management measures are in place, there may be an increase in journey times on the 269 bus route.</p> <p><b>Rail</b></p> <p>There would be no discernible change in local access times to Harold Wood station and no change to the rail services at this station.</p>   | <p><b>Buses</b></p> <p>There would be no changes required to bus routes through the ward, nor any discernible changes to bus journey times.</p> <p><b>Rail</b></p> <p>There would be no discernible change in local access times to Harold Wood station during the construction period and no change to rail services at this station.</p>  |

| Topic  | Construction  | Operations  |
|--|---|---|
| <p><b>Footpaths, bridleways and cycle routes</b></p> | <p><b>Impact</b></p> <p>Two footpaths, one bridleway and one pedestrian-cycle track would be impacted during construction to allow utilities diversion works, the Warley Street Compound, and the construction of new slip roads to the M25 junction 29.</p> <p><b>Mitigation</b></p> <p>Closures of these two footpaths, bridleway and pedestrian-cycle track would be as short as possible to reduce the impact on the existing public right of way network. The DCO will require Highways England to provide reasonable access for walkers, cyclists and horse riders affected by the temporary closure, alteration, diversion or restriction.</p> | <p><b>Impact</b></p> <p>The bridleway affected by construction would reopen with surface upgrades and a small realignment around the upgraded M25 junction 29. The pedestrian-cycle track would be severed by new slip roads, utilities diversion works and a construction compound.</p> <p><b>Mitigation</b></p> <p>The A127 pedestrian-cycle track would cross the route via a new bridge to the east of the M25 junction 29 roundabout where crossing improvements would be provided. The pedestrian-cycle track to the east of the new bridge on the south side of the A127 would be widened.</p> |

| Topic                | Construction  | Operations   |
|----------------------|---|--|
| <p><b>Visual</b></p> | <p><b>Impacts</b><br/>Views towards construction activities from local footpaths north and south of the A127 would be of the M25 widening construction works and close-range views of the Warley Street Compound and Utility Logistics Hub. The footpath south of Coombe Wood would pass Beredens Lane Utility Logistics Hub.</p> <p><b>Mitigation</b><br/>None identified.</p> | <p><b>Impacts</b><br/>None identified.</p> <p><b>Mitigation</b><br/>None identified.</p> |

| Topic                             | Construction  | Operations  |
|-----------------------------------|---|---|
| <p><b>Noise and vibration</b></p> | <p><b>Impacts</b></p> <p>The construction activity associated with M25 upgrade works and utility works is expected to create noise in this ward. There would be no percussive or vibratory works proposed. There would also be 24-hour, seven-day construction working in some locations. There would be negligible changes in noise from road traffic for a majority of roads within this ward during the construction period, except for the southbound M25 carriageway south of junction 28, where a minor increase in noise level has been predicted.</p> <p><b>Mitigation</b></p> <p>Construction noise levels would be controlled through the mitigation measures set out in the REAC. There are also measures presented in the CoCP.</p> | <p><b>Impacts</b></p> <p>Once the project is built, there would be direct noise impacts on the western section of Warley ward from the upgrade works on the existing M25/A127 junction and M25. There would be indirect noise impacts in both wards from the changes in the traffic flow and speed on the existing road network.</p> <p><b>Mitigation</b></p> <p>Low-noise road surfaces would be installed on new and resurfaced roads, and noise barriers would be installed.</p> |

| Topic                     | Construction   | Operations   |
|---------------------------|--|--|
| <p><b>Air quality</b></p> | <p><b>Impacts</b></p> <p>There are a few properties within Warley and South Weald that may experience dust and emissions from construction equipment and traffic during the construction phase. Analysis of the construction phase traffic flows show that there would be a minor improvement in air quality in the area around the M25 from 2025 to 2028.</p> <p><b>Mitigation</b></p> <p>The contractor would follow good practice construction measures which are presented in the CoCP and REAC to minimise the dust. Construction vehicles would need to comply with emission standards. An air quality management plan would be designed in consultation with the relevant local authorities. The plan would include details of monitoring which would ensure measures are effectively controlling dust and exhaust emissions.</p> | <p><b>Impacts</b></p> <p>There would be no exceedances of NO<sub>2</sub> or PM<sub>10</sub> threshold levels predicted in this ward as a result of the project.</p> <p><b>Mitigation</b></p> <p>None required.</p> |



| Topic                | Construction  | Operations   |
|----------------------|---|--|
| <p><b>Health</b></p> | <p><b>Impacts</b></p> <p>In Warley and South Weald, there are likely to be health benefits as a result of access to work and training opportunities. There would also be a minor improvement in air quality in the area around the M25 between 2025 to 2028.</p> <p>Changes in the area may result in negative impacts on health, including mental health and wellbeing. There are also likely to be temporary, but negligible, increases in road traffic noise.</p> <p><b>Mitigation</b></p> <p>The negative impacts would be mitigated through the good practice construction measures presented in the CoCP and REAC relating to noise and community engagement.</p> | <p><b>Impacts</b></p> <p>There would be positive health benefits, including improvements in accessibility to open space. In Warley, there would be beneficial changes in road traffic noise.</p> <p>In Warley, there would be direct noise impacts experienced in the western part of the ward from the new road and the upgraded M25/A127 junction and M25.</p> <p>In South Weald, there would be indirect noise impacts as a result of changes in traffic flow, the number of HGVs, and traffic speeds on the existing road network.</p> <p><b>Mitigation</b></p> <p>None required beyond those relating to noise impacts described above.</p> |

| Topic                        | Construction  | Operations  |
|------------------------------|---|---|
| <p><b>Biodiversity</b></p>   | <p><b>Impacts</b></p> <p>The construction of the project would involve the removal of habitat both temporarily and permanently for the new road. This habitat consists of landscape planting and grassland which supports protected and notable species including reptiles.</p> <p><b>Mitigation</b></p> <p>Vegetation clearance would be undertaken in winter to avoid affecting breeding birds. Protected species would be relocated. Boxes to support bats and birds would be erected. Areas of woodland planting are proposed within Warley ward to offset woodland lost.</p> | <p><b>Impacts</b></p> <p>There is the potential to cause mortality of species by encountering road traffic as well as habitat fragmentation and disturbance from traffic.</p> <p><b>Mitigation</b></p> <p>In Warley, screening vegetation would be planted alongside the M25 to reduce disturbance. In South Weald, landscaping planting would screen the road from existing and newly created habitat. All newly created habitat would be managed to ensure they provide high-quality environments to support a broad range of plants and animals. Refer to good practice measures set out in the CoCP and REAC.</p> |
| <p><b>Built heritage</b></p> | <p><b>Impacts</b></p> <p>None identified.</p> <p><b>Mitigation</b></p> <p>None identified.</p>  | <p><b>Impacts</b></p> <p>None identified.</p> <p><b>Mitigation</b></p> <p>None identified.</p>  |
| <p><b>Contamination</b></p>  | <p><b>Impacts</b></p> <p>None identified.</p> <p><b>Mitigation</b></p> <p>None identified.</p>  | <p><b>Impacts</b></p> <p>None identified.</p> <p><b>Mitigation</b></p> <p>None identified.</p>  |

## 23.2 Project description

### 23.2.1 Construction

#### Construction activities

More information about how the area would look during construction, including construction visualisations, can be found in the Construction update.

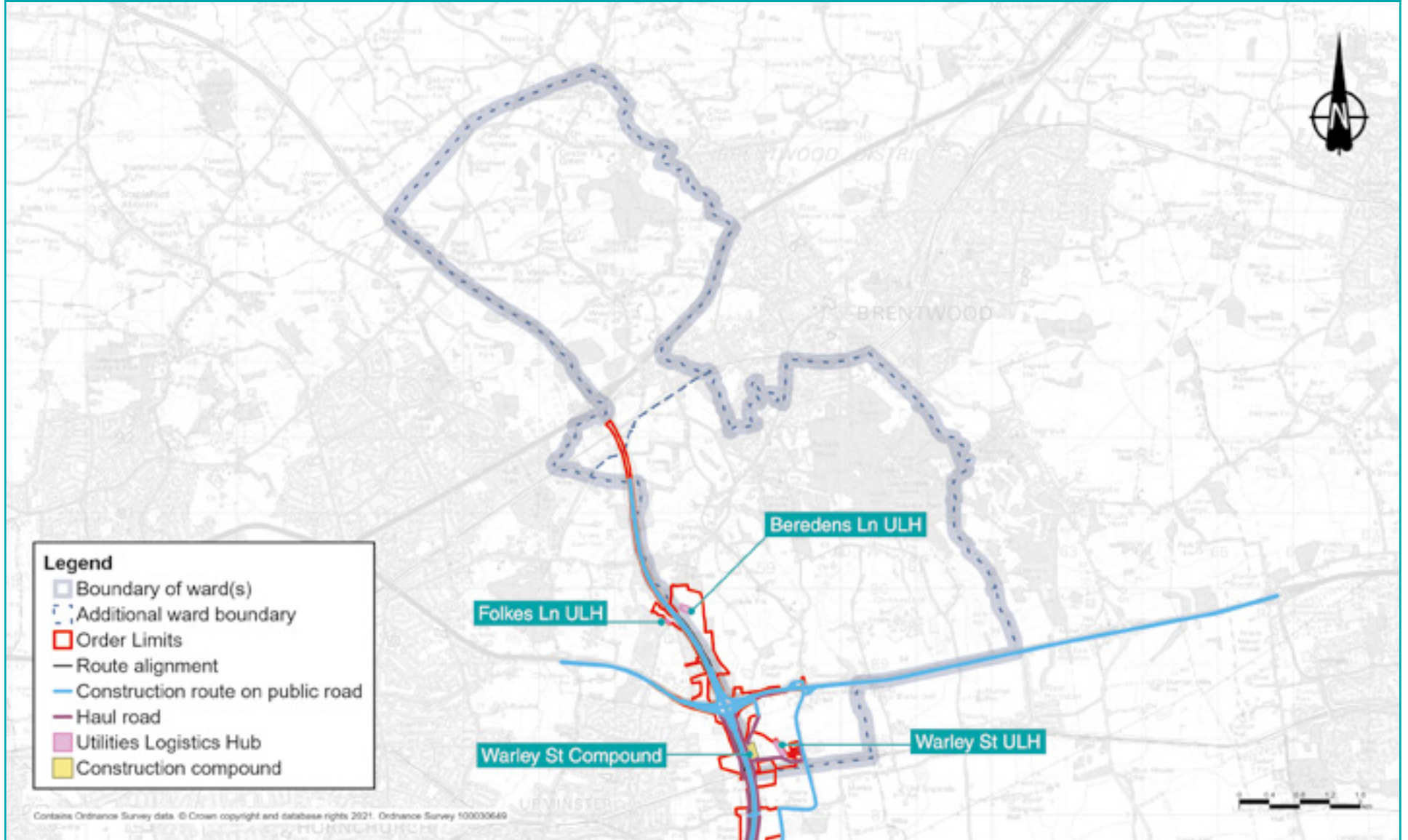
There would be a large amount of construction activity on the western side of Warley ward and at the southern end of South Weald ward as part of the M25 widening works, upgrades to junction 29 and utility diversions.

Works to widen the M25 would take up to three years. Some traffic management would be necessary, including lane reductions and reduced speed limits. These would be phased to reduce the impacts to traffic.

At junction 29, the M25 main carriageway would be increased to four lanes in each direction. This would involve widening the existing viaduct over the roundabout and the A127, and modifying connections north and south of junction 29. The M25 in this ward, including junction 29, would remain open throughout the works. In adjacent wards to the south, there would likely be occasional night-time closures of the M25 for specific works, such as connecting new to existing carriageways and installing a new footbridge.

Construction access to the Warley Street Compound and the area east of the M25 would be provided via Warley Street. Access to the area west of the M25 would be provided by a new slip-road located between the Shoeburyness railway line and M25 junction 29. The new slip-road would be constructed early in the construction period and would provide direct access between the worksite and the M25 northbound allowing HGVs to access this part of the project without using local roads. Short-term traffic management measures would be required for the construction of both the Warley Street access and M25 slip-road.

Figure 23.2: Main construction areas in Warley and South Weald wards



## **Construction compounds**

Construction compounds are fenced-off areas, accessible to construction traffic, which provide facilities to allow the project to be built efficiently. For example, compounds would provide parking, storage for machinery and materials, offices, welfare facilities, refuelling, and vehicle and wheel-washing facilities (to make sure vehicles leaving the compound do not dirty local roads).

In Warley ward, the Warley Street Compound would be located north of the Shoeburyness railway and east of the M25. This compound would support the M25 widening works, particularly around junction 29. Access would be primarily offline from Warley Street along temporary haul roads. More information about works in this area is provided in chapter 6 of the Construction update. Table 23.2 below shows the daily average number of vehicles going to the Warley Street Compound and the Warley Street Utility Logistics Hub, which shares an access route on public roads. These are the number of vehicles going to each compound and there would be the same number of vehicles, on an average weekday, leaving each compound.

**Table 23.2: Daily average number of construction vehicles going to the Warley Street Compound and the Warley Street ULH**

| Time period                     | Warley Street Compound and Warley Street ULH |      |
|---------------------------------|--|------|
|                                 | HGVs   | Cars |
| January to August 2024          | 8  | 27   |
| September 2024 to February 2025 | 9  | 30   |
| March to May 2025               | 12   | 103  |
| June to October 2025            | 18   | 107  |
| November 2025 to March 2026     | 15   | 107  |
| April to August 2026            | 19   | 107  |
| September 2026 to March 2027    | 16   | 107  |
| April to November 2027          | 11   | 80   |
| December 2027 to March 2028     | 2  | 53   |
| April to July 2028              | 0  | 0    |
| August 2028 to December 2029    | 0  | 0    |

### Utilities

Two Utility Logistics Hubs (ULHs) are proposed in Warley ward. Beredens Lane ULH would be east of the M25 and north of junction 29. Initially, access would be along Beredens Lane until a haul road could be built. In addition, the Warley Street ULH would be east of the Warley Street Compound and accessed via Warley Street.

At the Beredens Lane ULH, there are expected to be less than 30 daily trips by staff to the hub during the period from April 2026 to March 2027, and 15 staff vehicles per day during the period April to November 2027. There would be no staff based at this ULH at other times. There would be no more than 20 HGVs on average per working day going to the ULHs and they would not be in continual use throughout the construction period.

Chapter 2 of the Construction update provides an overview of how existing utilities would be affected by our plans to build the new road, with further detail including maps in chapter 6. Chapter 2 of the Operations update also describes the project's impacts on utilities, including a map showing the utilities that would be repositioned to accommodate the new road.

Utility works in these wards would include:

- Diversion of 0.67km of high-pressure gas pipeline in the field south-east of junction 29.
- Diversion of 0.63km of high-pressure gas pipeline north of junction 29, requiring a trenchless crossing of the M25. For more information about trenchless construction techniques, see chapter 2 of the Construction update.
- Diversion of utility networks along the A127 and at junction 29 to accommodate proposed new structures. The junction works required would also use trenchless construction methods.

### **Construction routes on public roads**

The M25 and Warley Street would be designated as construction routes, with Beredens Lane used for utility traffic for an initial period.

### **Construction schedule**

Construction of the entire project is scheduled to last for six years from 2024 to 2029. To deliver the construction programme efficiently, activities would be divided into packages of work and delivered in a coordinated way. Maps and programmes for the work packages in this area can be found in chapter 6 of the Construction update.

### **Construction working hours**

Most construction activities in this ward would be carried out during core hours, from 7am to 7pm on weekdays and 7am to 4pm on Saturdays. However, there would be circumstances when our working hours need to be extended. For example, widening existing roads and connecting new roads to existing ones would

need to be carried out when the road is less busy to create safer conditions for roads users and construction workers. Working outside core hours would also benefit road users by reducing the need for traffic management measures during peak times. More information about working hours is set out in the Noise and vibration section below and in the CoCP.

### Traffic management

The main traffic management measures for Warley and South Weald wards are listed below.

**Table 23.3: Main traffic management measures in Warley and South Weald wards**

| Road(s) affected              | Proposed traffic management                   | Purpose   | Duration                                      |
|-------------------------------|---|---|---|
| <b>B186</b>                   | Temporary contraflow                          | For construction access and utility modifications   | Four weeks between January and August 2024    |
| <b>A127 westbound offslip</b> | Closure                                       | To carry out nearby works                           | Nights and weekends for specific activities   |
| <b>A127</b>                   | Long-term narrow lanes and 50mph speed limits | To carry out nearby works and utility modifications | 27 months between June 2025 and November 2027 |
| <b>A127</b>                   | Closure                                       | To carry out bridge works and utility modifications | Some nights and weekends                      |
| <b>M25 northbound</b>         | Narrow lanes                                  | To carry out nearby works to widen the M25          | 7 months between March and October 2025       |
| <b>M25 southbound</b>         | Narrow lanes                                  | To carry out nearby works to widen the M25          | 7 months between March and October 2025       |



There would be construction works at the M25 junction 29 and modifications to the local utility networks near the A127 in Warley. This would require introducing narrow lanes and a reduction in the speed limit to 50mph on the A127 in both directions through the junction with the M25. The narrow lanes would be implemented over a 400-metre section on each side of the A127, and would be in place for 27 months from May 2026 to July 2028.

Contraflow traffic management would be used on the Warley Street, B186, to allow the construction of the access to Warley Street Compound and modifications to local utility networks. The contraflow would be in place over a four-week period at the start of the construction programme.

A night/weekend temporary road closure of the A127 would be necessary for bridge works and modifications to local utility networks.

The access route to the Warley Street Compound would be from the A127 and then Warley Street. The access would be on the B186 Warley Street and traffic signals, or similar, may be required to manage construction vehicles turning off and on Warley Street from the construction site.

There are no traffic management measures planned in South Weald ward.

Traffic management measures required across the project would include narrow lanes, reduced speed limits, contraflows and temporary traffic lights. We have tried to minimise traffic management measures wherever possible, but these would be necessary in some locations to allow construction traffic and local communities to move around safely, while providing construction workers with space to operate. An overview of the traffic management required across the project can be found in chapter 1. All traffic management measures are based on an indicative construction programme, which would be finalised by our appointed contractor. An overview of the traffic management required across the project can be found in the Outline Traffic Management Plan for Construction. Our contractor's final traffic management plans would be subject to final approval by the Secretary of State for Transport, following consultation with the local highways authority.

## 23.2.2 Operations

### The completed project

For more information about the completed project, see the Operations update, as well as the figures in Map Book 1: General Arrangements. The main features of the new road in Warley and South Weald wards once it is operational are listed below:

- Part of BR183 bridleway would be rerouted permanently. For more information, see the Footpaths, bridleways and cycle routes section below.
- Open space replacement land would be connected to Folkes Lane Woodland by the existing footbridge over the M25. This replacement land would be part of Hole Farm and would connect to the proposed compensatory Ancient Woodland planting.

### Changes to the project since our design refinement consultation

As part of our design development and discussions with utility companies, we have made two changes to the project and its Order Limits (the area of land required to construct and operate the project, formerly known as the development boundary), within Warley and South Weald wards since our design refinement consultation in July 2020. More information about these proposed changes, including maps showing changes to the Order Limits, can be found in chapter 3 of the Operations update.

- To avoid impacting a local business, the woodland planting and environmental mitigation proposals in the area around Folkes Lane Woodland have changed. Woodland planting is now proposed on the east of the M25 which is more than three times the size of our previously proposed area. This would include replacement open space connected to Folkes Lane Woodland by the existing M25 footbridge. An alternative area for great crested newt mitigation has also been proposed to the north of the Folkes Lane Woodland car park.
- South-east of M25 junction 29, the Order Limits have been increased slightly to allow better access to the construction compound.

### **Impacts on open space and common land**

Within Warley and South Weald wards, we propose providing replacement open space land on the eastern side of the M25 within a new area of woodland planting as part of Hole Farm.

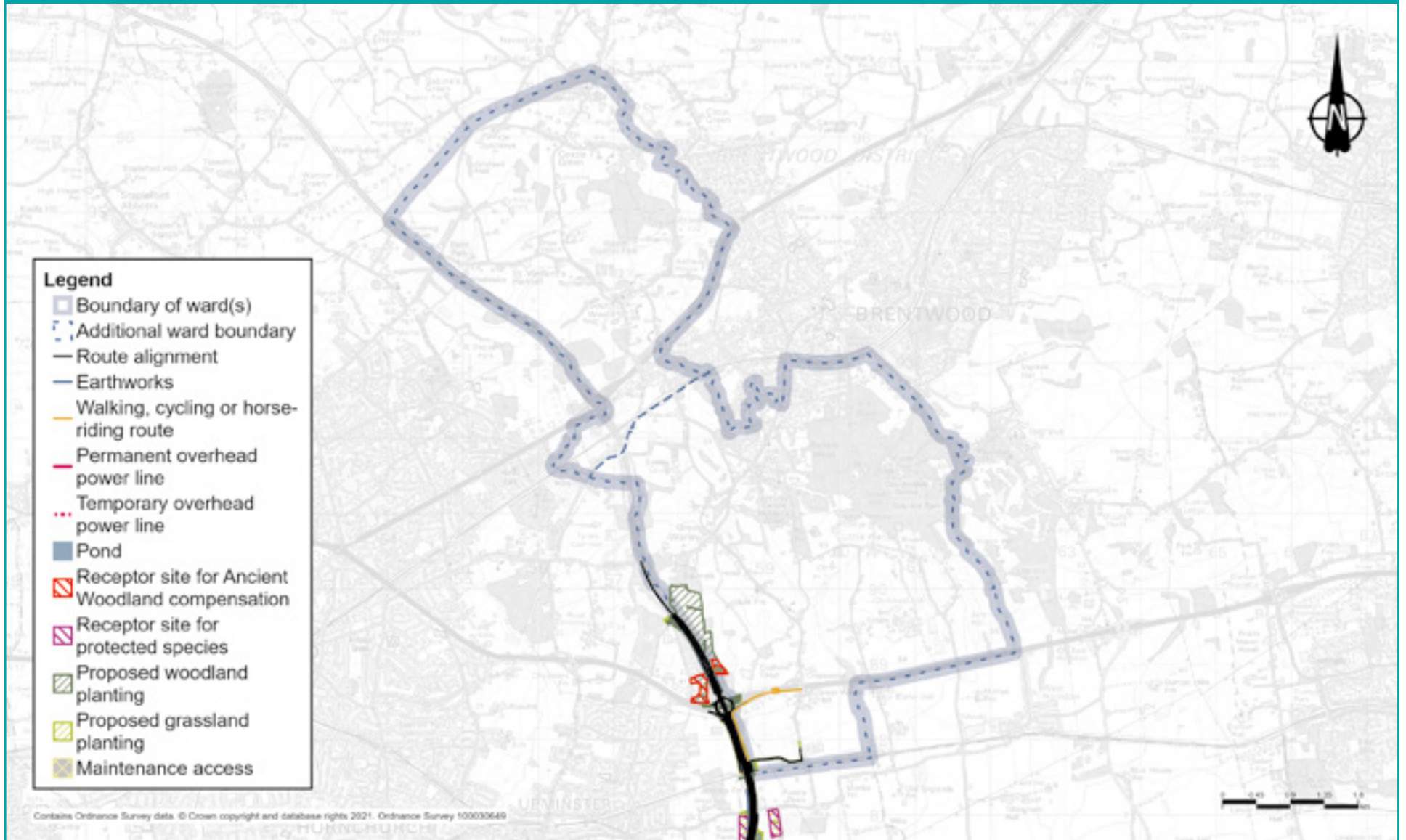
This would be to replace land within Cranham ward that is being permanently acquired within Folkes Lane Woodland for the diversion of a gas pipeline. This may limit public use of the area above the diverted pipeline. Replacement land would be linked to the current area by the existing bridge over the M25. New landscaping would complement the existing site, linking the two.

More information about our proposals to compensate for impacts on open space land (which includes special category and recreational land), including proposals we have consulted on previously, can be found in chapter 3 of our Operations update.

### **Did you know?**

Highways England recently purchased Hole Farm for our wider sustainability and legacy aspirations, and we intend to plant a community forest in collaboration with Forestry England.

Figure 23.3: Main features of the completed project in Warley and South Weald wards



## 23.3 Traffic

We carried out traffic assessments to understand how roads in the vicinity of the project would be affected during the new road's construction and once it is operational, compared with the situation if the new road was not built. Information about how we carried out these assessments can be found in chapter 4 of the Operations update.

### 23.3.1 Construction

#### Construction impacts

Information about construction activities in these wards, including construction routes on public roads, can be found in the Project description section above, with table 23.3 setting out our proposed construction traffic management.

The narrow lanes on the A127, together with the reduced speed limit would result in longer journey times on this section.

There would be some delay to traffic using Warley Street when the lane reductions and traffic lights are in place.

Access is required for around one year along Beredens Lane to allow construction traffic to enter the Utility Logistics Hub located along Beredens Lane, in Warley ward. Occasionally, there would be escorted large vehicles and manually operated 'stop and go' boards to manage the traffic on the road. This would provide some delay to the affected traffic.

## Measures to reduce construction traffic impacts

To reduce the construction traffic impacts in Warley and South Weald, we would carry out the following measures:

- Minimise the use of the local road network, as far as reasonably practicable, through the construction of temporary slip roads from the M25 to provide direct access between the construction site and strategic road network. These temporary slip roads would be constructed at the earliest opportunity to maximise the benefit.
- Include extensive landscaping, such as false cuttings, to allow material excavated as part of the construction works to be re-used onsite. The result would be a significant reduction in the disposal of excess material offsite, removing thousands of HGV journeys from the public road network during the construction phase.
- Construct temporary haul roads within the Order Limits, at the earliest opportunity, to provide improved access to the strategic road network for construction traffic and allow materials to be moved offline.
- Following discussion with key stakeholders, and where possible, HGVs associated with construction of the project would be banned from using some local roads.
- The use of design options, construction methods and construction phasing to allow a larger proportion of the M25 capacity improvement works to be constructed either without or with less-disruptive traffic management measures.
- Where practicable, new bridge structures would be designed to be built offline to avoid closing local roads for extended periods. Where offline construction is not possible and space is available, the existing road would be temporarily realigned to allow the construction of new bridges.
- Stockpile material within the Order Limits to allow material to be managed on-site rather than offsite, reducing the number of HGV journeys needed.

## **23.3.2 Operations**

### **Operational impacts**

Figures 23.4, 23.6 and 23.8 show the predicted changes in traffic in the morning peak (7am to 8am), interpeak (an average hour between 9am and 3pm) and evening peak (5pm to 6pm) measured in Passenger Car Units (PCUs per hour), where 1 PCU is equivalent to a car, and 2.5 PCUs is equivalent to an HGV. Figures 23.5, 23.7 and 23.9 show the predicted percentage changes in traffic flow during the morning, interpeak and evening peak. For information about how we assessed operational traffic impacts, see chapter 1. For more about how we carried out our traffic modelling, see chapter 4 of the Operations update.

On the M25 between junction 29 and junction 28, there would be an increase in traffic flows northbound of between 500 and 1,000 PCUs an hour during each of the modelled time periods which cover the morning peak hours, the interpeak period and the evening peak hour. This is an increase of between 10% and 20% in the morning and evening peak hours, and between 0% and 10% in an average interpeak hour. Southbound, the increase in traffic flows would be between 250 and 500 PCUs an hour in each of the modelled time periods. This represents an increase of between 0% and 10%.

On the M25 between junction 28 and junction 27 northbound, the increase in traffic flows would be between 500 and 1,000 PCUs in each modelled hour. This is an increase of between 0% and 10%. Southbound the increase in traffic flows would be between 50 and 250 PCUs in the morning peak hour and an average interpeak hour. In the evening peak hour, the increase in flows would be between 250 and 500 PCUs. In each time period, this is an increase in flows of between 0% and 10%.

In South Weald ward, just to the east of M25 junction 28, the change in flows on the A12 Brentwood Road would decrease between 50 and 250 PCUs an hour in an average interpeak hour both westbound and eastbound. This is a decrease of between 0% and 10%.

Through Brook Street on the A1023, between the junctions with Wigley Bush Lane and Mascalls Lane, there would be a decrease in traffic of between 50 and 250 PCUs eastbound in the morning peak hour. This is a decrease of between 20% and 40%.

In Warley ward, flows on the A127 to the east of the M25 and east of the junction with Great Warley Street would decrease westbound by between 250 and 500 PCUs in the morning peak hour (between 10% and 20%) and by between 50 and 250 PCUs in the interpeak and evening peak hour (a decrease of between 0% and 10%). Eastbound, the decrease in traffic flows would be between 50 and 250 PCUs, a decrease of between 0% and 10% in the morning peak, interpeak and evening peak hours.



Figure 23.4: Predicted change in traffic flows (PCUs) with the project during the morning peak in 2029

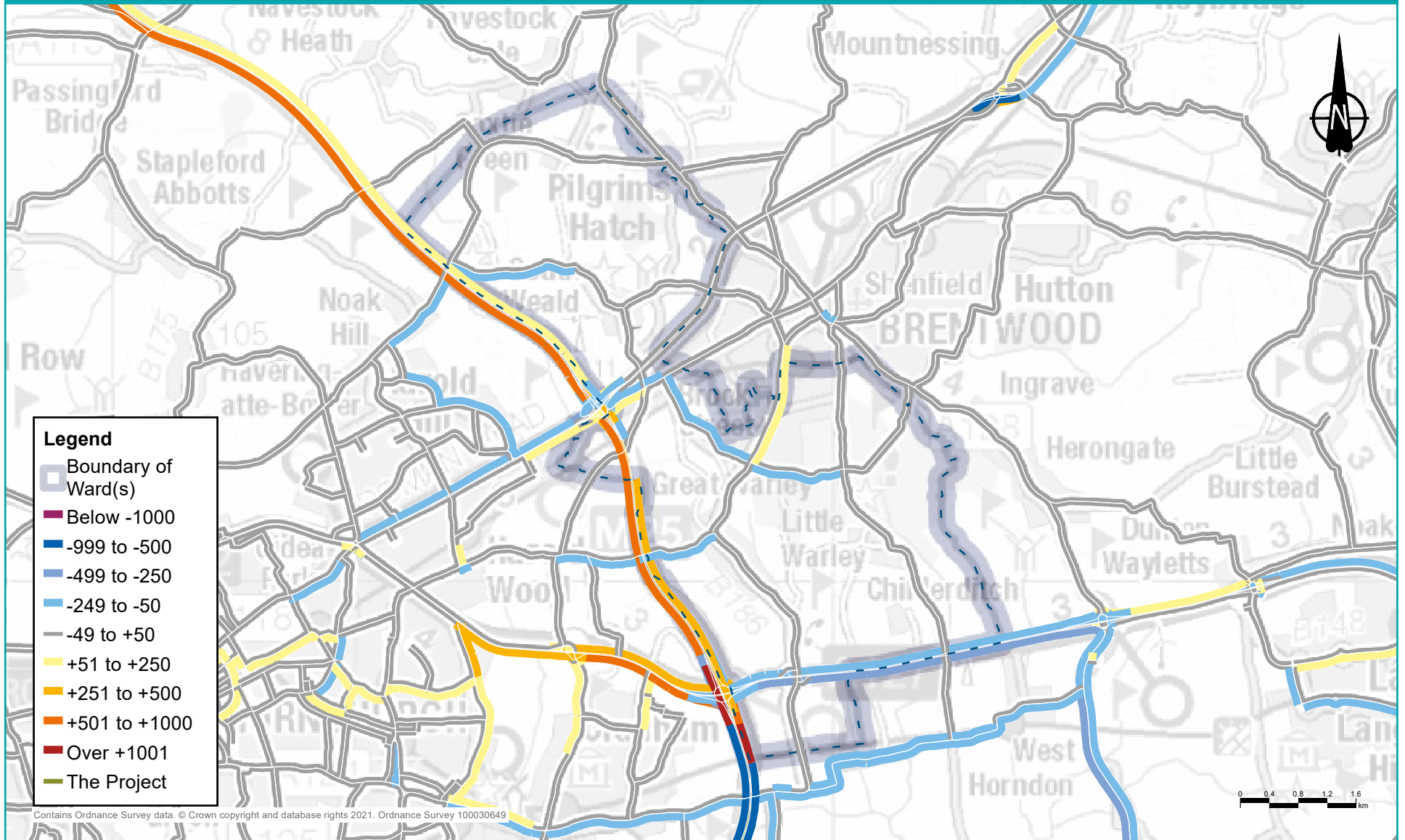


Figure 23.5: Predicted percentage change in traffic flows with the project during the morning peak in 2029

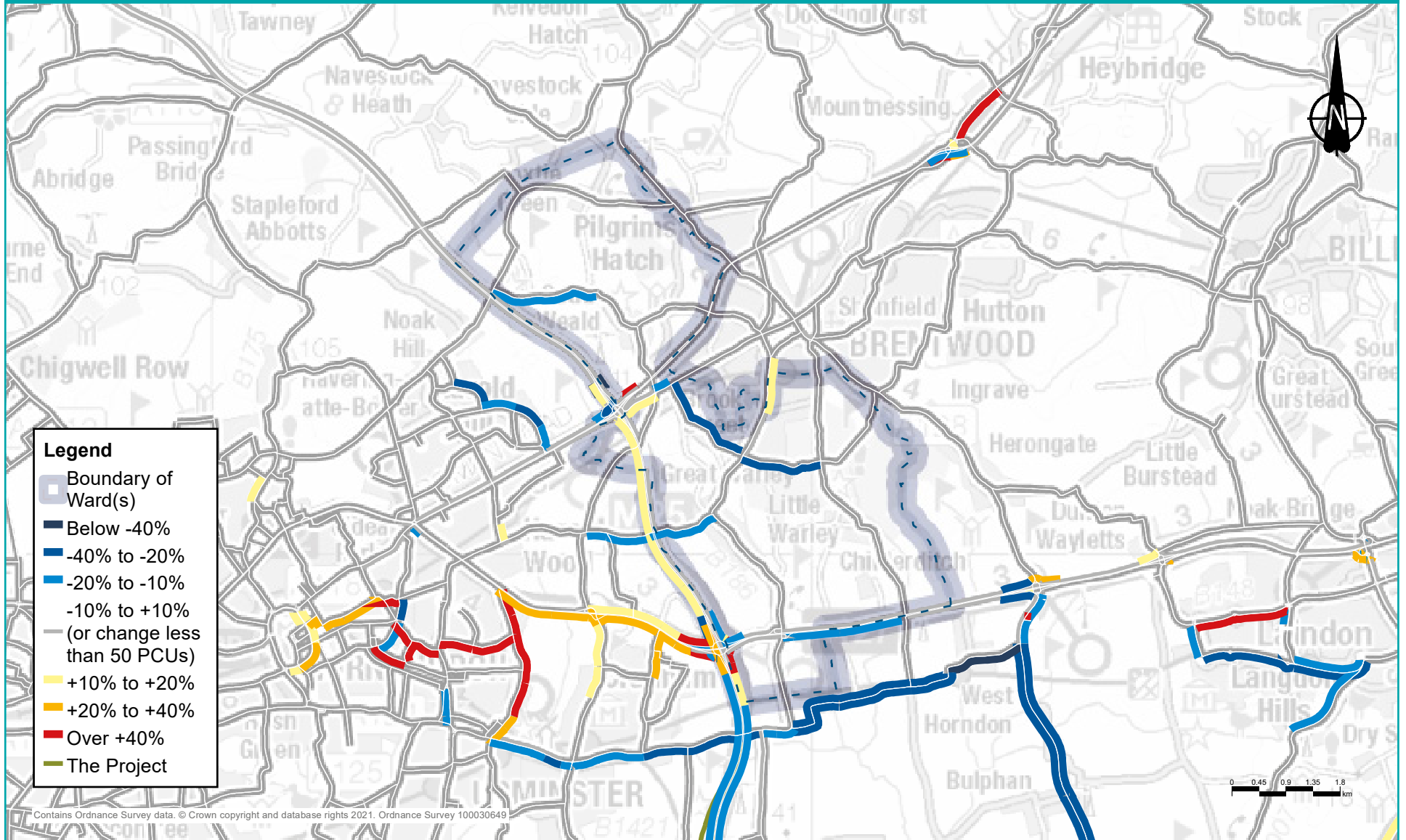


Figure 23.6: Predicted change in traffic flows (PCUs) with the project during the interpeak period in 2029



Figure 23.7: Predicted percentage change in traffic flows with the project during the interpeak period in 2029

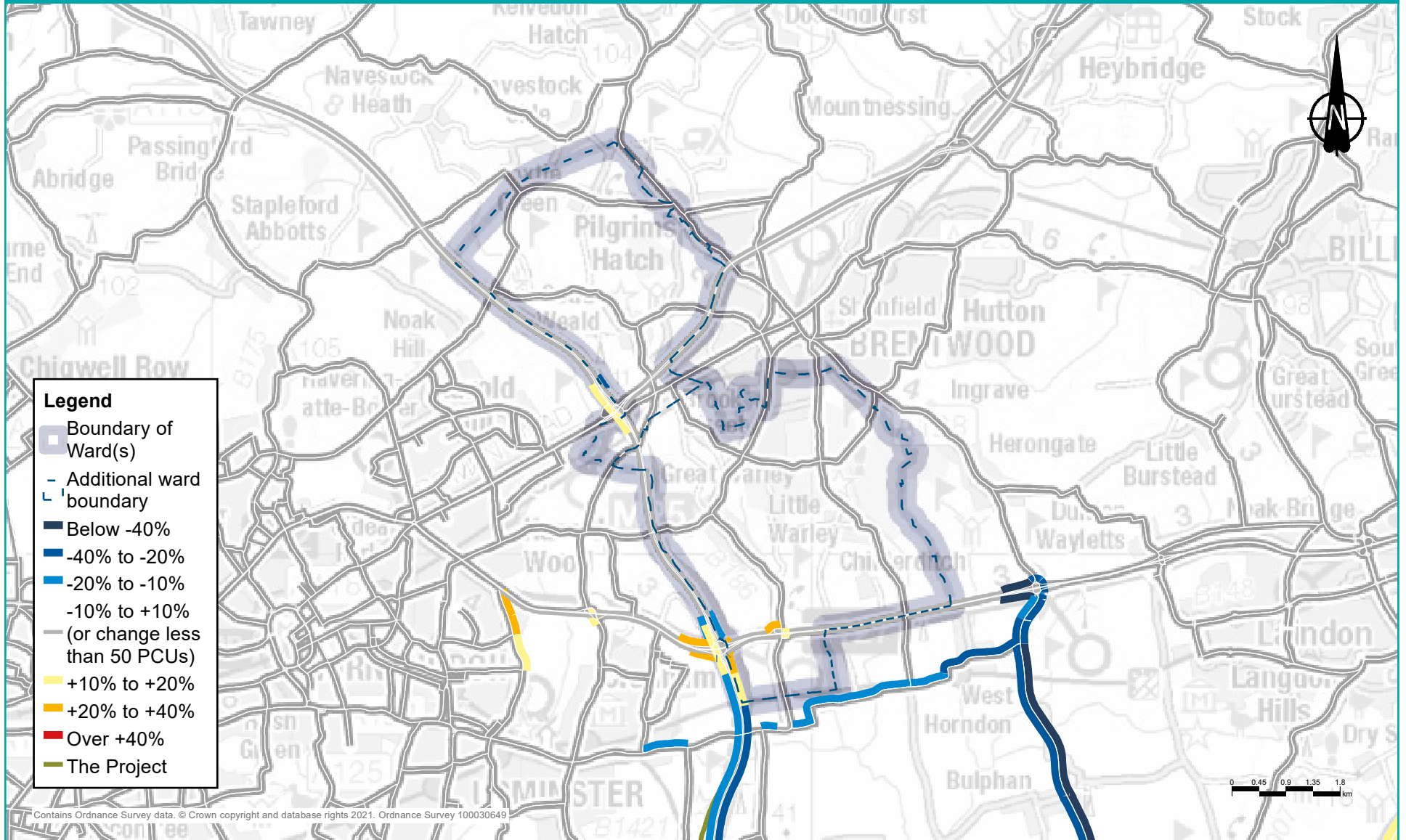


Figure 23.8: Predicted change in traffic flows (PCUs) with the project during the evening peak in 2029

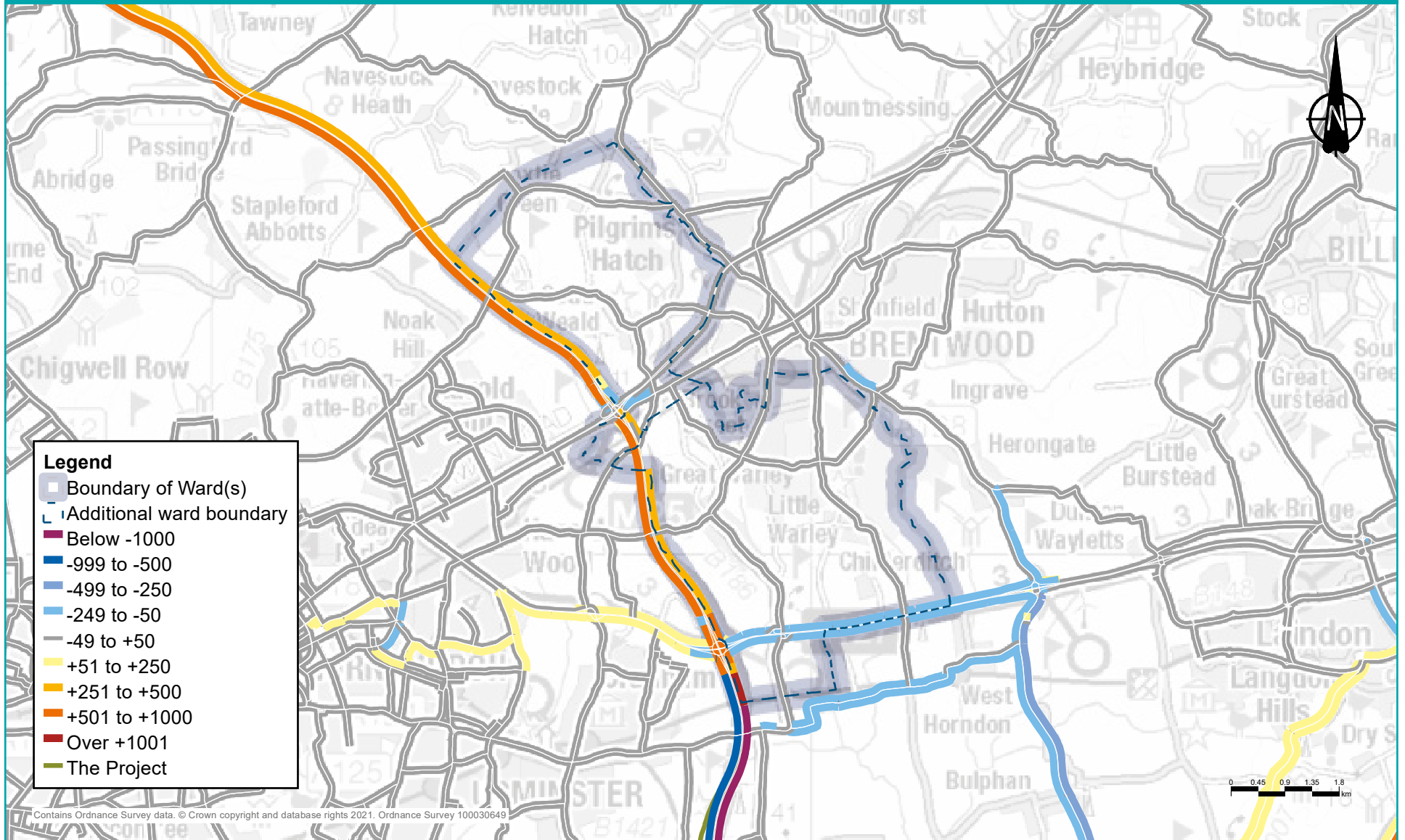
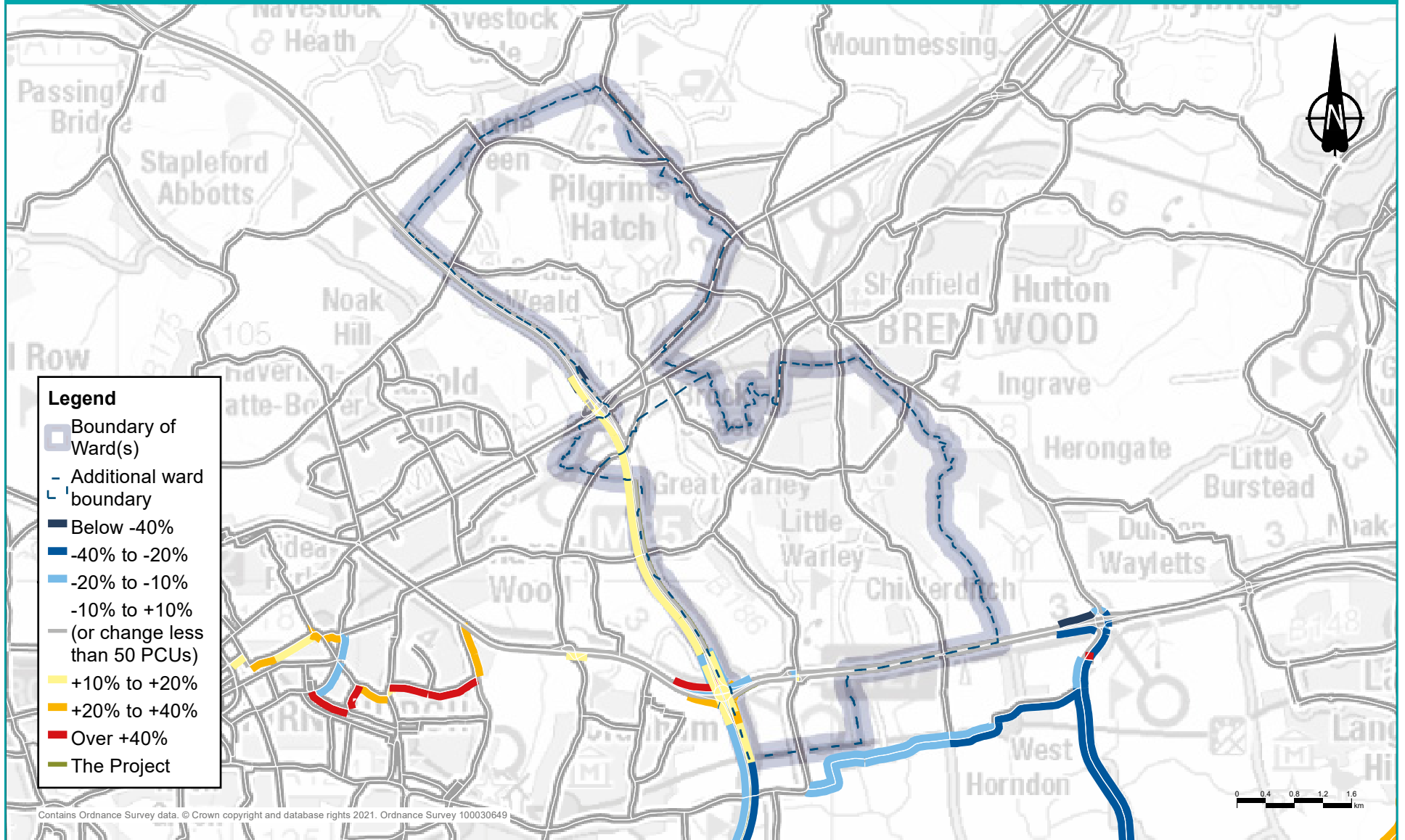


Figure 23.9: Predicted percentage change in traffic flows with the project during the evening peak in 2029



### Changes to journey times

Figure 23.10 shows the change in the area that could be reached within a 30-minute drive from the centre of the ward without the new road and with it. Figure 23.11 shows the change in areas within a 60-minute drive. The drive times have been calculated for the morning peak (7am-8am). The number of jobs within a 30-minute drive would increase by 11%, an increase of 52,200. Within a 60-minute drive, there would be a less than 1% increase, with an additional 1,000 jobs. Despite the new road providing a substantial net gain in access for motorists within Warley and South Weald wards, there is an area (shown in orange on the map below) that would no longer be accessible by car within 60 minutes because of changes to traffic flows on the wider road network.

**Figure 23.10: Change in area that motorists could drive to within 30 minutes from Warley and South Weald wards**

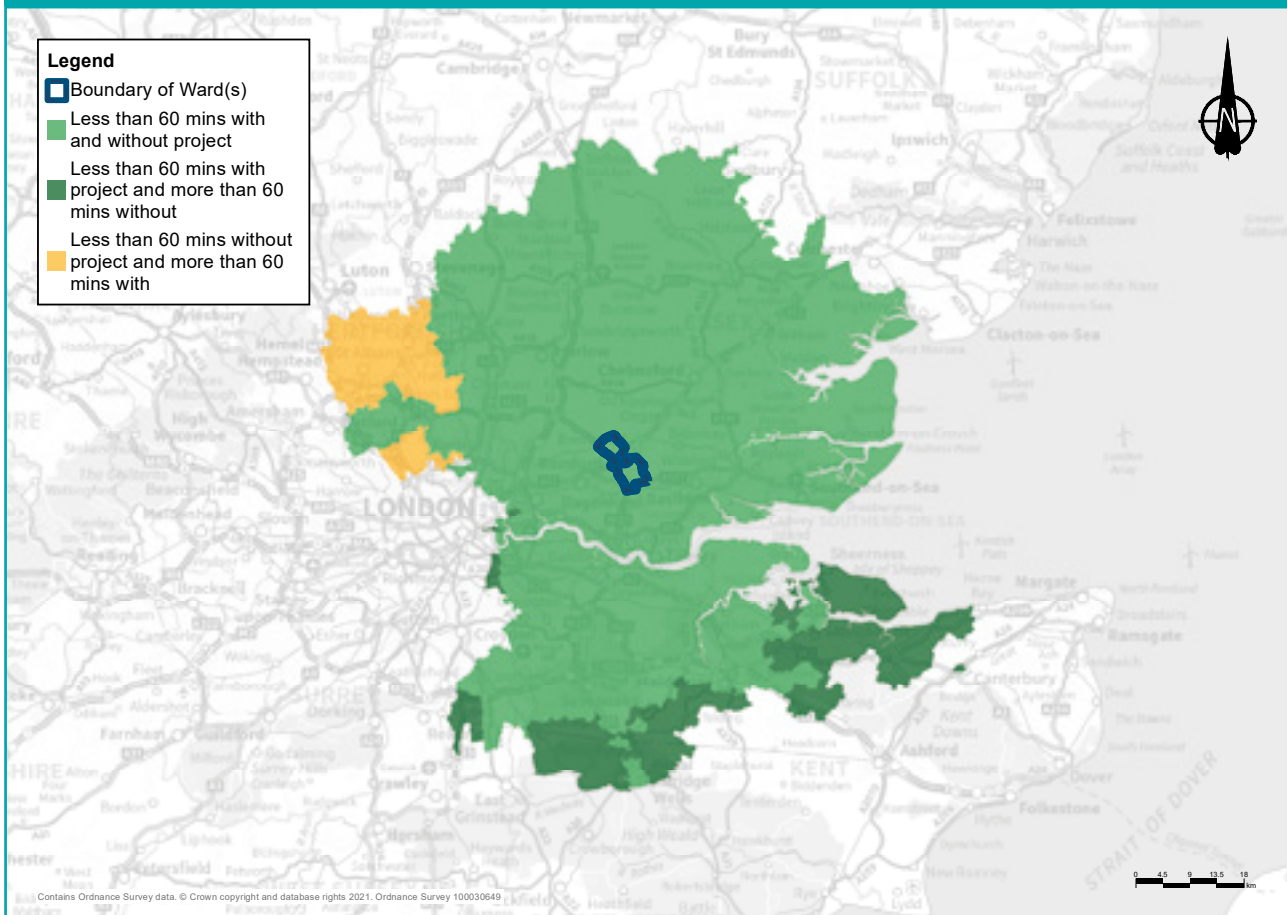


## Operational traffic flows

Once the project is operational, traffic impacts on the affected road network would be monitored, including local roads.

Where appropriate, we would work with the relevant highway authority to seek funding from the Department for Transport for further interventions.

**Figure 23.11: Change in area that motorists could drive to within 60 minutes from Warley and South Weald wards**





## 23.4 Public transport

### Existing situation

There are no train stations within these wards but Harold Wood station is nearby in Harold Wood ward. Both wards are served by several bus routes, including: the 21; 37; 71; 71C; 72; 82; 269; 339, 351, 434, 473, 474, 483, 484, 498, 808; and the Z69.

### 23.4.1 Construction impacts

#### Buses

While traffic management measures are in place, there may be an increase in journey times on the 269 bus route.

#### Rail

There would be no discernible change in local access times to Harold Wood station and no change to the rail services at this station.

### 23.4.2. Operational impacts

#### Buses

There would be no changes to bus routes through the wards once the new road opens and no discernible change to bus journey times.

#### Rail

There would be no noticeable change in local access times to Harold Wood station and no change to the rail services at the station. Accessing HS1 services at Ebbsfleet International station would be quicker, with a decrease in journey time of around five minutes in the morning peak hour and four minutes in the evening peak hour.

## 23.5 Footpaths, bridleways and cycle routes

### Existing situation

Warley and South Weald are largely rural wards with suburban areas towards the centre of Brentwood connected by a large network of footpaths and bridleways. The wards are bordered by the M25, which runs through part of this area for a short section. For potential additional impacts, see the other topic areas in this chapter, such as Visual and Noise and vibration.

### 23.5.1 Construction

#### Construction impacts

- Footpath FP179 would need to be closed for four to five years to allow utilities diversion works, main works construction, and as part of the works for the Warley Street Compound.
- Footpath FP180 would need to be closed for four to five years to allow utilities diversion works, main works construction and as part of the works for the Warley Street Compound.
- A section of bridleway BR183 that runs parallel to the M25 from just south of junction 29 to the crossing that links the bridleway to FP176 would need to be closed for four to five years for utility diversion works and as part of the works for the Warley Street Compound. The DCO will require Highways England to provide reasonable access for walkers, cyclists and horse riders affected by the temporary closure, alteration, diversion or restriction.
- The A127 walking-cycling track would need to be closed for five years where it crosses the M25. A section along the southern side of the A127, east of the M25, would also be closed due to the construction of new slip-roads and utility works.

## 23.5.2 Operations

### Operational impacts

Overall, the proposals for walking, cycling, and horse riding include more than 46km of new, diverted, extended or upgraded footpaths, bridleways and cycle routes. These would provide greatly improved connections across the project. We developed our proposals after consultation and engagement with local communities and stakeholders. For an overview of the proposed improvements to footpaths and bridleways across the Lower Thames Crossing, see chapter 2 of the Operations update.

- We would build a new walking-cycling bridge over the A127 east of junction 29 to maintain connectivity for the A127 east-west walking-cycling route. The bridge would allow walkers and cyclists to cross between the south and north side of the A127. Crossing improvements on the north side of the junction 29 roundabout would facilitate east-west journeys. In addition, a section of the existing walking-cycling track on the south side of the A127, east of the new walking-cycling bridge, would be widened. Walkers and cyclists would cross back to the south side of the A127 west of junction 29 using an existing crossing near the junction with Front Lane and Folkes Lane.
- The section of bridleway BR183 closed during construction would reopen after three years with surface upgrades and some minor realignments around the upgraded junction 29.

Figure 23.12: Footpaths, bridleways and cycle routes in the vicinity of the project in Warley and South Weald wards

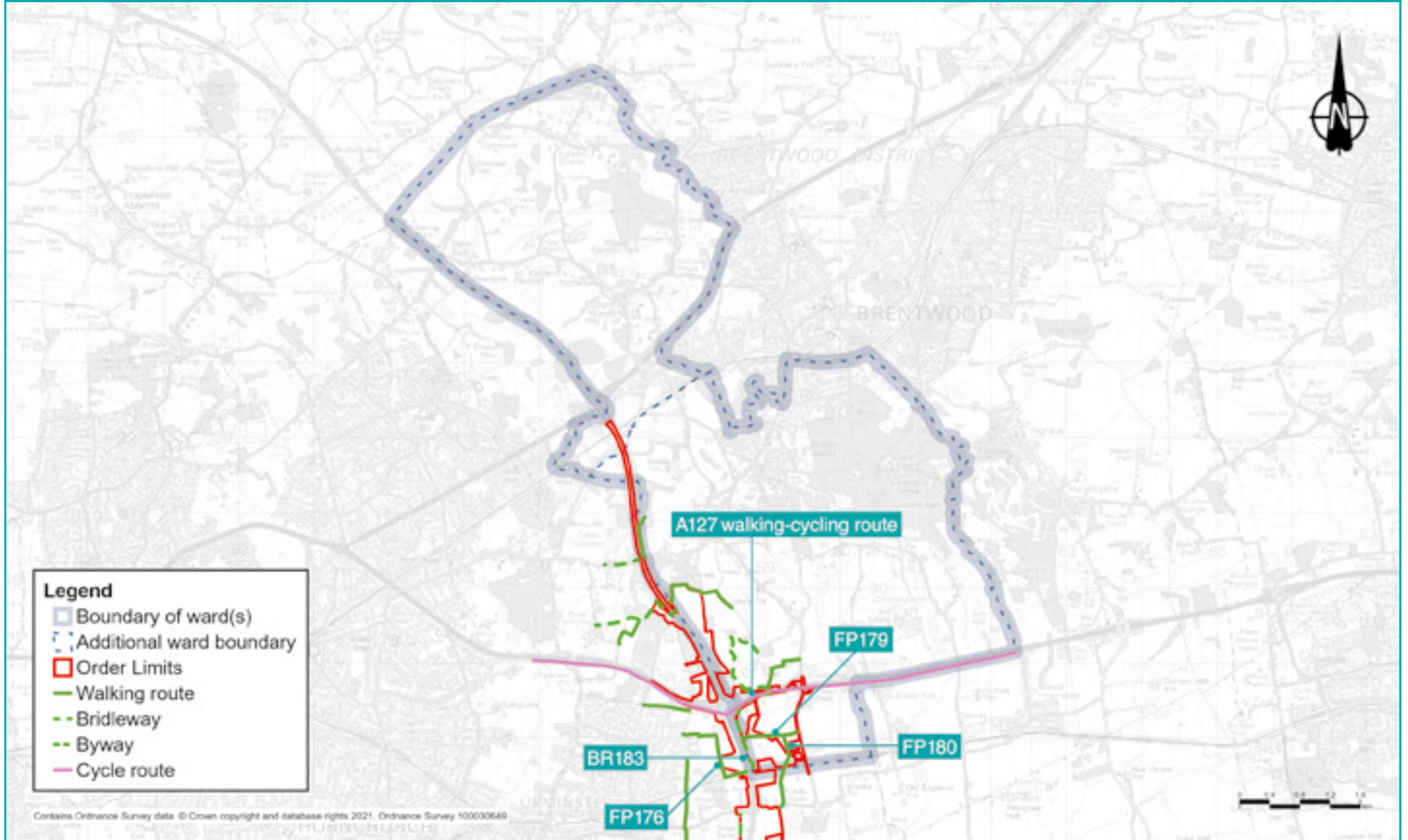
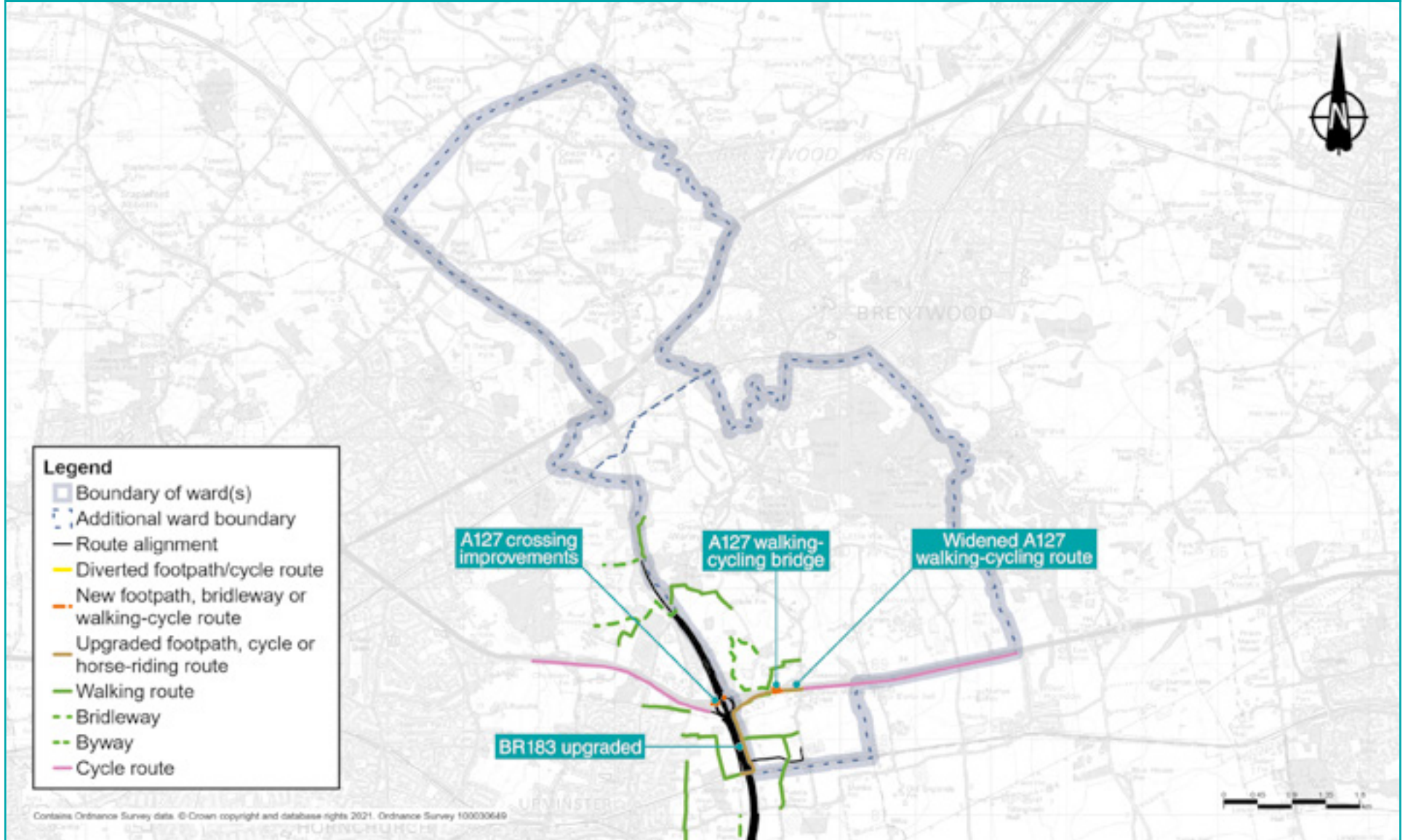


Figure 23.13: Proposed footpaths, bridleways and cycle routes in Warley and South Weald wards



## 23.6 Visual

### Existing situation

In Warley ward, views towards the land on which the project would be built are principally limited to local footpaths. Current views from footpaths south of the A127 are of large-scale open arable land, with the M25 and associated traffic clearly visible on an embankment. North of the A127, views of the M25 within the gently sloping arable landscape are partially screened by landform, cutting or roadside planting. However, north of Warley Road views of the motorway from the few footpaths in the vicinity of the M25 are typically screened by a combination of cutting and intervening woodland.

There are no views towards the land on which the project would be built from publicly accessible locations in the South Weald ward. Views from nearby homes along Nag's Head Lane are screened by a combination of motorway cutting, roadside planting and close-boarded fencing, as well as by garden vegetation.

There would therefore be no visual effects experienced from South Weald ward.

### 23.6.1 Construction

#### Construction impacts

For more information refer to the construction visualisations in the Construction update. The main construction activities likely to be seen from these wards are:

- M25 widening works, including junction 29 improvements.
- Establishment and operation of the Warley Street Compound and the Beredens Lane and Warley Street Utility Logistics Hubs.

Views of construction activities from local footpaths south of the A127 would encompass M25 widening works and close-range views of the Warley Street Compound and Warley Street Utilities Logistics Hub. North of the A127, M25 widening works would also be visible from local footpaths, and the footpath south of Coombe Wood would pass Beredens Lane Utilities Logistics Hub.

### **Measures to reduce visual impacts during construction**

Given the relatively limited views of the project from this ward and effect of the existing motorway on views, no specific mitigation measures are considered necessary.

## **23.6.2 Operations**

### **Operational impacts**

By year of opening, road widening would be complete and the sites of the former construction compound and two Utility Logistics Hubs would have been restored.

There would be no visual impacts from local footpaths following completion of the M25 widening works and associated landscape treatment.

### **Measures to reduce visual impacts during operation**

The proposed landscape treatment along the M25 corridor represents the main measures in these wards to help integrate the motorway widening into the adjoining landscape.

## 23.7 Noise and vibration

We have carried out noise and vibration assessments for both the construction and operational phases of the project. As explained in chapter 1, some of the assessments set out below are based on earlier versions of the project. The information provided still presents a reasonable representation of the likely effects from our proposals presented during this consultation.

### Existing situation

The existing noise environment in South Weald and Warley wards is mostly from traffic noise, with a contribution from railway noise. The main sources of road traffic noise in these wards are from the M25, A12, A128, A127 and the A1023.

As part of our environmental assessment process, we carried out surveys of existing background noise at five locations in the wards, which were agreed with the local authority. The levels monitored at these locations recorded average existing noise levels in the range of 50 to 60dB(A)<sup>2</sup> during the day and 51 to 56dB(A) during the night.

To understand how noise levels would vary with and without the project, we used noise modelling to predict what noise levels would be like in the project's proposed opening year if it was not built. We modelled this because we cannot assume that noise levels when the project opens would be the same as they are now. For example, our assessment of the opening year noise levels takes into account predicted changes in traffic levels.

We also modelled the predicted noise levels for the opening year of the new road. This provides a useful comparison as to how the new road would change the noise levels in its opening year if it were built.

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2 Decibel (dB) is the unit used to measure noise levels, with dB(A) being a standardised way of averaging noise levels that account for how humans hear sounds. The typical level of sounds in the environment ranges from 30 dB(A), which is a quiet night-time level in a bedroom, to 90 dB(A), which is how it would sound by a busy road. See chapter 1 for more information about what decibel levels mean.



In the opening year, noise levels without the project are predicted to range, on average, from 42 to 69dB(A) during the day and from 31 to 55dB(A) during the night at the identified locations within the wards. As such, our noise assessments predict that by opening year noise levels would increase compared to the existing situation even if the road is not built. Information about noise levels with the project, during its construction and its operation, are presented below.

## **23.7.1 Construction**

### **Daytime construction noise impacts**

The main construction activities that would be expected to make noise and vibration in these wards are those associated with M25 upgrade works and utilities works.

One main works compound and two Utility Logistics Hubs would be located in Warley and South Weald. These are described in the Project description section above.

Although not located in the wards, the Folkes Lane Utility Logistics Hub (see chapter 22) may contribute to the noise experienced due to how close it is to the wards' boundary.

There would also be haul roads built and used during the construction period, these are presented in the Project description.

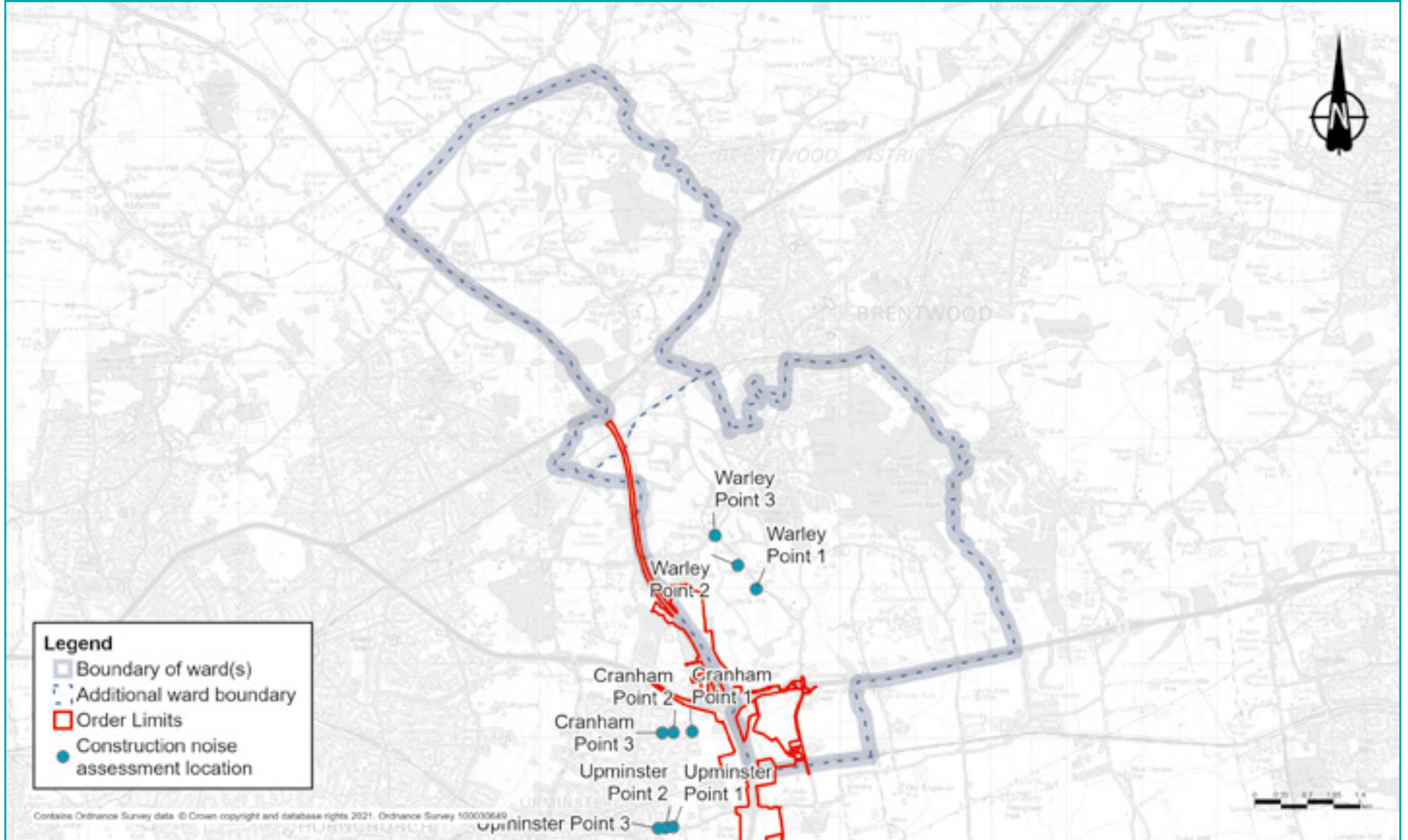
There would be no percussive or vibratory works proposed in these wards.

Construction noise levels have been predicted at three locations across the wards, chosen to provide a representative level of noise communities would be expected to hear during construction. For more information about how we carried out these assessments, see chapter 1.

Noise levels are shown using the standard units for major projects, dB LAeq (12hour), which represent the average noise level for the assessed 12-hour daytime period. While there might be short-term noises that are louder than the noise level shown during the assessed period, the averaged figure provides a fair representation of what the overall noise impacts would be.

Figure 23.14 shows the locations at which we have predicted the daytime construction noise.

Figure 23.14: Construction noise assessment locations in Warley ward



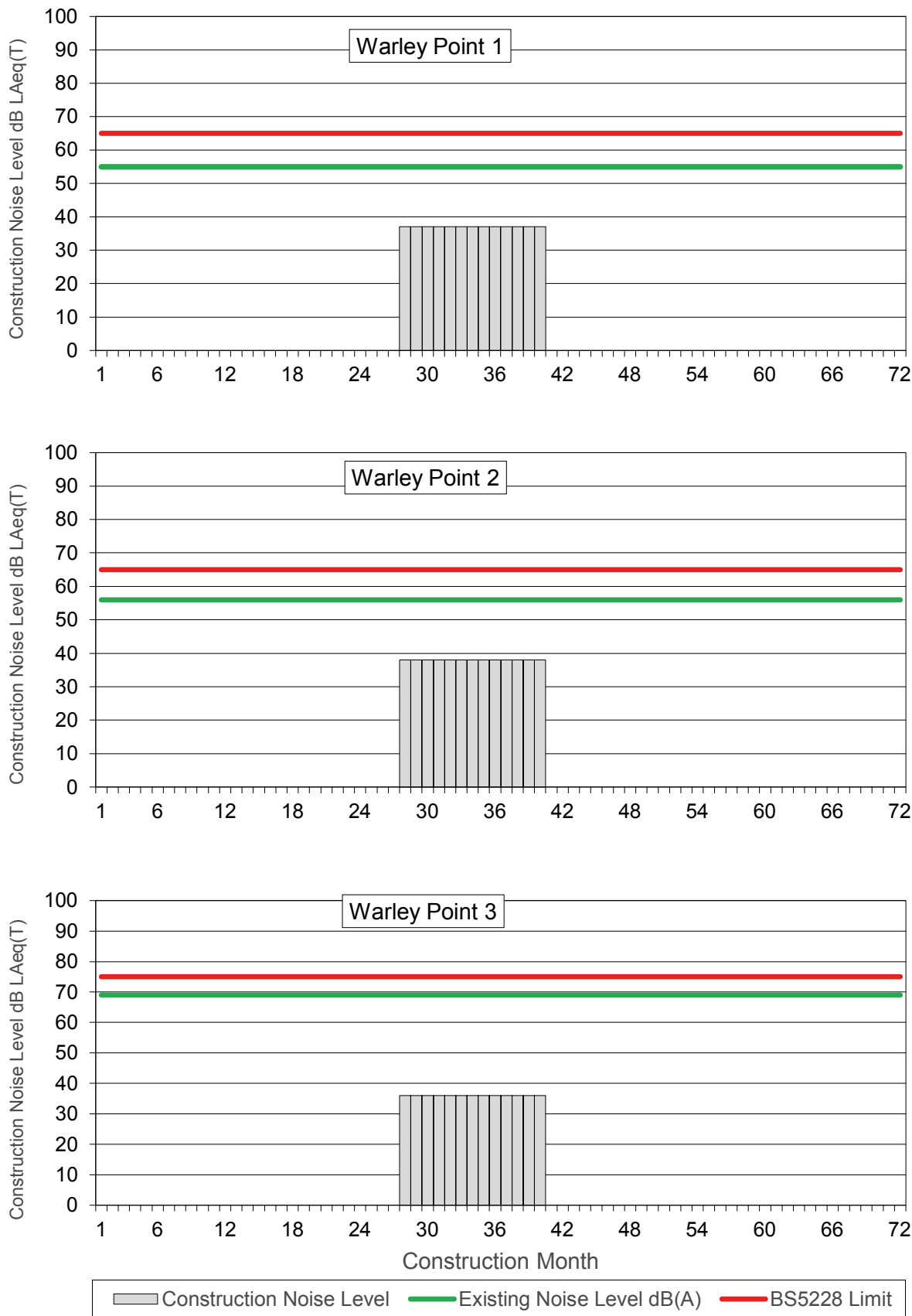
Each vertical bar in figure 23.15 shows the predicted noise levels for that month of the construction period (from months 1 to 72). The horizontal green line in each chart represents the existing background noise level at each assessment point without the project. The horizontal red line shows the level at which construction noise would exceed acceptable thresholds (see chapter 1 for more information about these thresholds). If noise is predicted to exceed acceptable levels, then we would implement specific measures to reduce it.

The predicted construction noise levels show that higher noise levels and disturbance would be experienced closer to construction activity. Levels gradually diminish as a result of increased distance, with additional buildings and other features screening the noise from more distant residential areas.

With reference to figure 23.15 the following summarises the noise level changes over the construction period for points 1 to 3:

- At point 1, construction noise levels are predicted to range from 37 to 37dB LAeq (12hour). Construction noise is not expected to exceed the existing background noise levels.
- At point 2, construction noise levels are predicted to range from 38 to 38dB LAeq (12hour). Construction noise is not expected to exceed the existing background noise levels.
- At point 3, construction noise levels are predicted to range from 36 to 36dB LAeq (12hour). Construction noise is not expected to exceed the existing background noise levels.

Figure 23.15: Construction noise by month for points 1, 2 and 3 in Warley ward

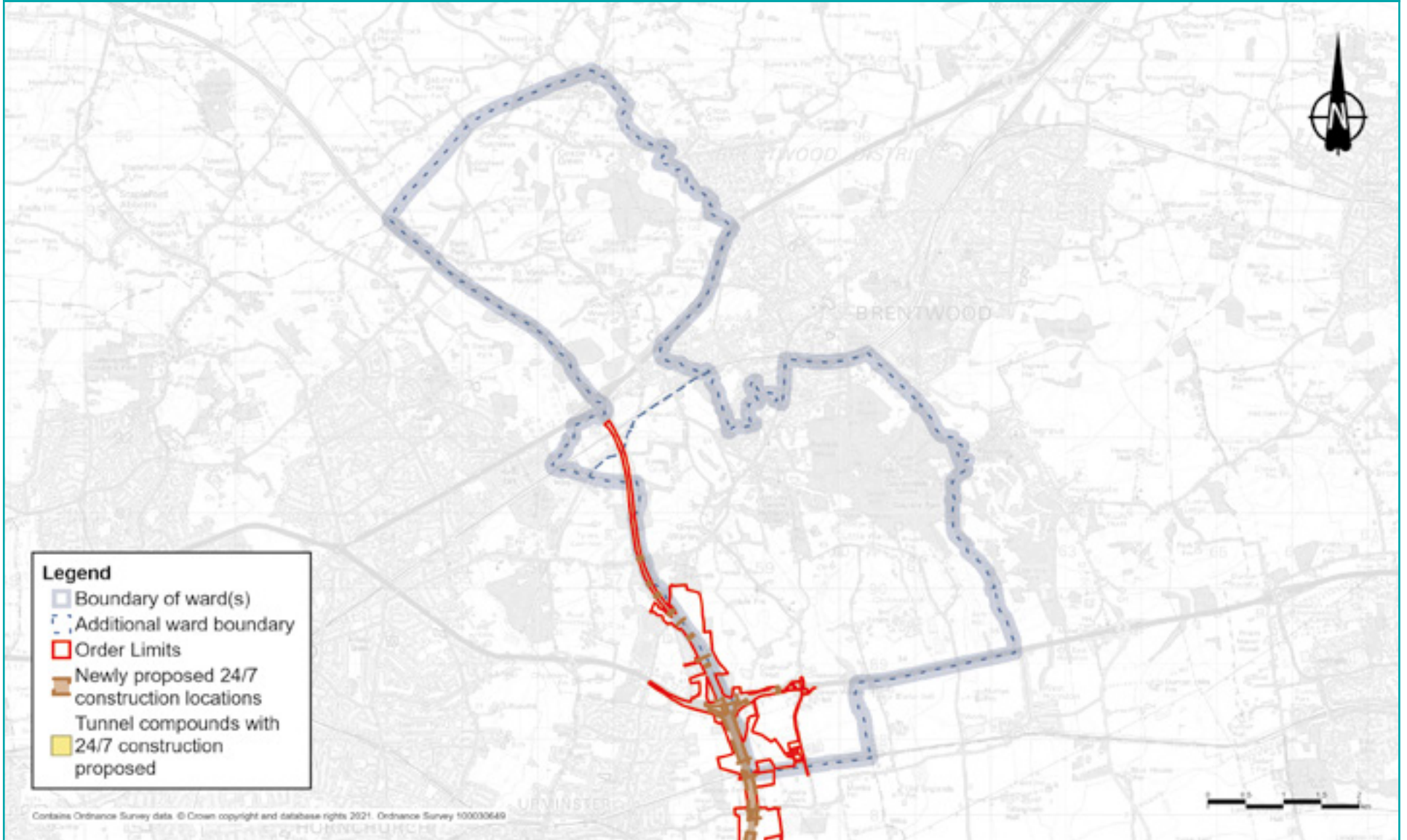


### **24/7 construction working**

In addition to the changes to the daytime noise impacts presented in the section above, 24-hour, seven-day construction working is proposed at the locations shown in figure 23.16.

These locations are where works may need to be carried out at night to maintain safety and reduce disruption to road and utility networks. The works in this area are likely to be night-time or weekend highways works and could affect local communities. We would work with the local authority to manage these impacts.

Figure 23.16: Newly proposed and tunnel 24/7 working locations in Warley and South Weald wards



### Construction traffic noise impacts

Maps showing the predicted change in road traffic noise on roads in Warley and South Weald wards during each year of the construction can be found in chapter 7 of the Construction update. Based on the currently available traffic data (which offers a representative picture of what receptors in the wards are likely to experience), during the construction period there would be negligible changes in road traffic noise (less than 1dB change in noise levels) during all construction years, except along the roads where increases in noise levels have been predicted (see table below). For more information about how we define noise impacts (negligible, minor, moderate and major), see chapter 1.

**Table 23.4: Construction traffic noise impacts in Warley and South Weald wards**

| Affected road(s)                                     | Predicted noise impact         | Construction year(s) |
|--|--------------------------------|----------------------|
| The southbound M25 carriageway, south of junction 28 | Minor increase in noise levels | 4                    |

### Measures to reduce construction noise levels

Construction noise levels would be controlled using Best Available Techniques (BAT), with specific measures used at certain locations such as:

- Installing and maintaining hoarding around the construction compounds.
- Installing temporary acoustic screening around construction areas likely to generate noise.
- Keeping site access routes in good condition with onsite condition assessments to inspect for defects such as potholes.
- Turning off plant and machinery when not in use.
- Maintaining all vehicles and mobile plant so loose body fittings or exhausts do not rattle or vibrate.
- Using silenced equipment where available, specifically silenced generators and pumps.
- No music or radios would be played outdoors onsite for entertainment purposes.

- Site layout would be planned to make sure reversing is kept to a minimum. Reversing manoeuvres would be managed by a trained banksman/vehicle marshal to ensure they are conducted safely and quickly to reduce noise from vehicle reversing warnings.
- Non-percussive demolition techniques would be used, where possible, to reduce noise and vibration impact.
- Careful consideration of compound location and layout to separate noise-generating equipment from sensitive receptors, and the use of mains electricity rather than generators, where possible.
- Minimisation of construction vehicle traffic, where possible, by selecting local suppliers along the project route, using local workforces and reducing the transport of material for earthworks construction.

All control measures, including those above, fall under the principles of BAT and are secured in the REAC. For more information, see sections NV001 to NV010, which set out how we would work under the supervision of the relevant local authorities to implement noise-reduction measures where necessary.

The CoCP sets out additional measures that would be used to reduce noise and vibration during the construction period.

## **23.7.2 Operations**

### **Operational impacts**

In Warley, the project route (see the Project description above) runs through the western part of the ward, with traffic joining the new road at its existing junction with the M25/A127. There would also be changes to the existing M25 to accommodate the predicted changes in traffic flow.

Direct noise impacts from the route, and the upgrade works on the existing M25/A127 junction and M25, would be heard in the western part of the ward.

South Weald is located approximately 1.5km to the north of the main project route and, as such, would experience no direct noise from the project in the ward.

There would be indirect noise impact as a result of changes in traffic flow, traffic composition, and traffic speed on the existing road network in Warley and South Weald.

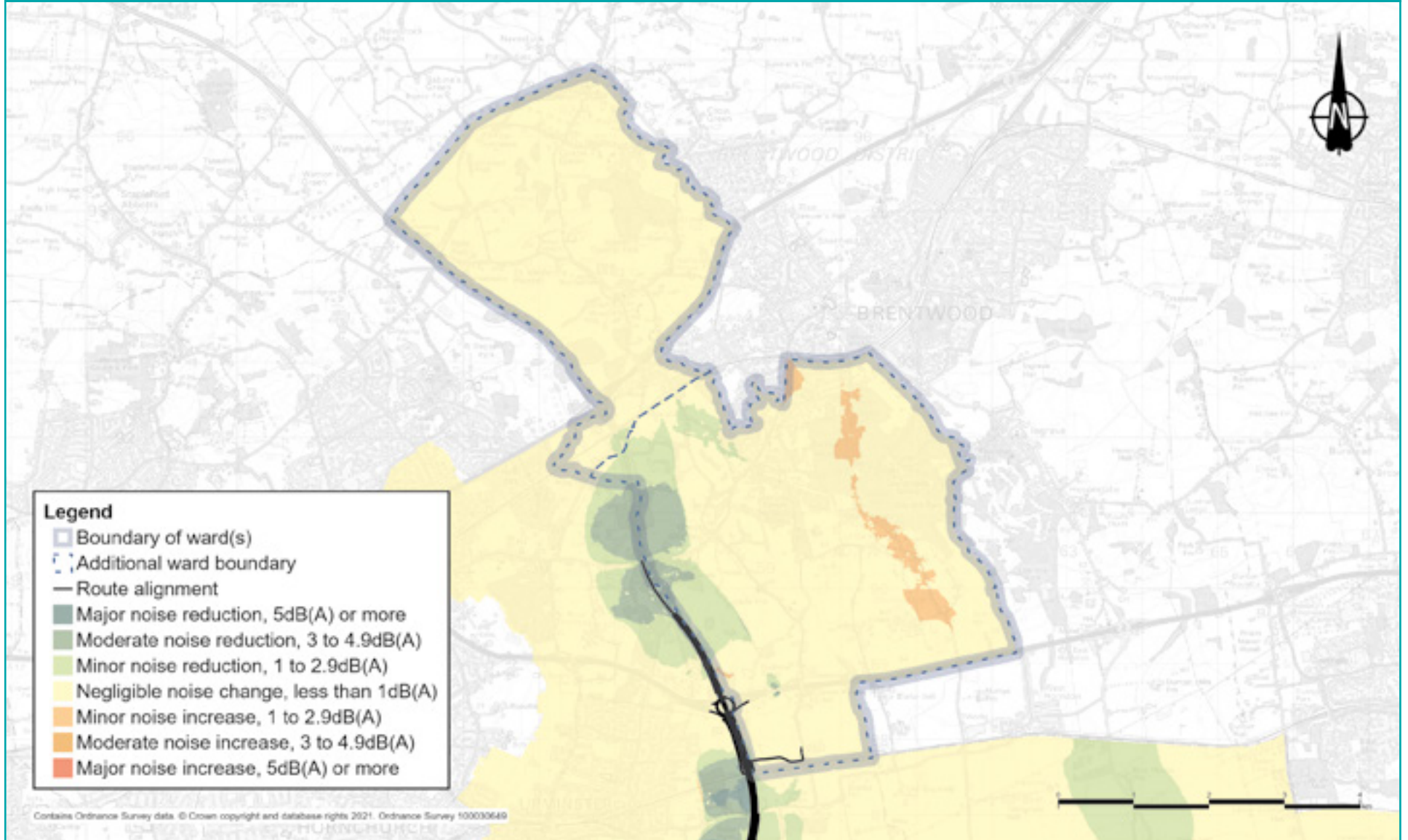


Figure 23.17 shows the predicted changes in traffic noise in the opening year of the project. In these wards, changes in road traffic noise at identified noise sensitive locations (such as nearby properties) are predicted to range from a moderate decrease in noise levels of between 3.0 to 4.9dB to a minor increase in noise levels of between 1.0 to 2.9dB (close to the Childerditch Lane). For more information about how we define noise impacts (negligible, minor, moderate and major), see chapter 1.

### **Measures to reduce traffic noise during operation**

The main methods of controlling noise across the project would be, where possible, to design the new road within landscaped features such as cuttings and bunds (walls of earth). However, where noise impacts are greatest, we would install noise barriers (typically, wooden fences) in addition to these earthworks features. The use of low-noise surfacing on new and resurfaced roads would also reduce the traffic noise once the road is in use. For more information about the proposed measures to reduce operational noise, see the REAC (including references NV011 and NV013).

Figure 23.17: Noise impacts during operation in Warley and South Weald wards



## 23.8 Air quality

We have carried out air quality assessments for both the construction and operational phases of the project. As explained in chapter 1, some of the assessments set out here are based on earlier versions of the project. The information provided still presents a reasonable representation of the likely effects from the proposals put forward during this consultation.

### Existing situation

In Warley ward, there are no declared Air Quality Management Areas (AQMAs). These are areas that have been identified by local authorities as areas of poor air quality that require monitoring and controls.

In South Weald, the M25/A12 Brook Street junction has been declared an AQMA due to yearly levels of airborne pollution being above accepted standards. No other areas within the ward have been identified as AQMA.

### 23.8.1 Construction

#### Construction impacts

Construction activities have the potential to affect nearby air quality through the release of dust and emissions from construction equipment and traffic. The areas most likely to be affected are those close to haul roads, compounds and soil storage areas.

Properties more than 200 metres from the worksite, which are the majority of properties within these wards, are outside the area likely to be affected by construction dust or emissions from the worksite. In Warley, there are only a few properties within 200 metres of the worksite, including those around the A127 Southend Arterial Road. Again, in South Weald, there are only a few properties within 200 metres, namely those near Nags Head Lane. Air quality impacts on these properties during construction would be temporary and we would put in place measures to minimise the dust impacts (see below). Our proposed measures to reduce dust and emissions are ones that have proven to be effective when used on similar construction projects in the past. The change in air quality during the construction phase would be negligible, and there would be no discernible effect on health.

Our analysis of construction traffic predicts that the impact on most roads in these wards would be negligible. However, there would be a minor improvement in air quality in the area around the M25 as a result of the traffic management in place from 2025 to 2028. More information about construction traffic impacts on air quality can be found in chapter 7 of the Construction update.

### **Measures to reduce air quality impacts during construction**

The impact of construction machinery and traffic on air quality would be controlled through the range of good practice measures set out in the CoCP and the REAC. For example, there would be measures to suppress dust, such as damping down dry haul roads and spoil heaps, as well as the use of low-emission machinery and vehicles. We would put an Air Quality Management Plan in place to make sure the measures set out in the CoCP and the REAC would effectively monitor and control dust and exhaust emissions. The location and type of monitoring would be submitted in advance to Brentwood Borough Council for consultation (see REAC entry AQ006).

## **23.8.2 Operations**

### **Operational impacts**

We have carried out an assessment of the operational impacts of the new road on air quality. The assessment area includes a 200-metre buffer around the affected road network, with this area being the most likely to experience changes to air quality as a result of the new road. More information about air quality impacts once the new road is open can be found in chapter 5 of the Operations update.

At all locations in South Weald and Warley wards, there are no predicted exceedances of air quality thresholds.

However, there are receptors (properties or habitats that are sensitive to changes in air quality) in Warley ward, close to the west of the M25 that are predicted to experience a negligible change in air quality for nitrogen dioxide (NO<sub>2</sub>), the main traffic-related pollutant<sup>3</sup>. The highest modelled yearly average NO<sub>2</sub> concentration in this ward is 23.9 µg/m<sup>3</sup>, which is below the yearly average threshold of 40µg/m<sup>3</sup>.

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<sup>3</sup> NO<sub>2</sub> levels are measured in 'micrograms per cubic metre', or µg/m<sup>3</sup>, where a microgram is one millionth of a gram.

There are receptors in South Weald ward, close to the east of the M25 that are predicted to experience a minor worsening in air quality for nitrogen dioxide. The highest modelled yearly average NO<sub>2</sub> concentration within this ward is 39.5 µg/m<sup>3</sup>, which is below the yearly average threshold of 40µg/m<sup>3</sup>. Our assessment is based on our opening year model, which represents a worst-case scenario, without accounting for the increase in less-polluting vehicles on our roads over time.

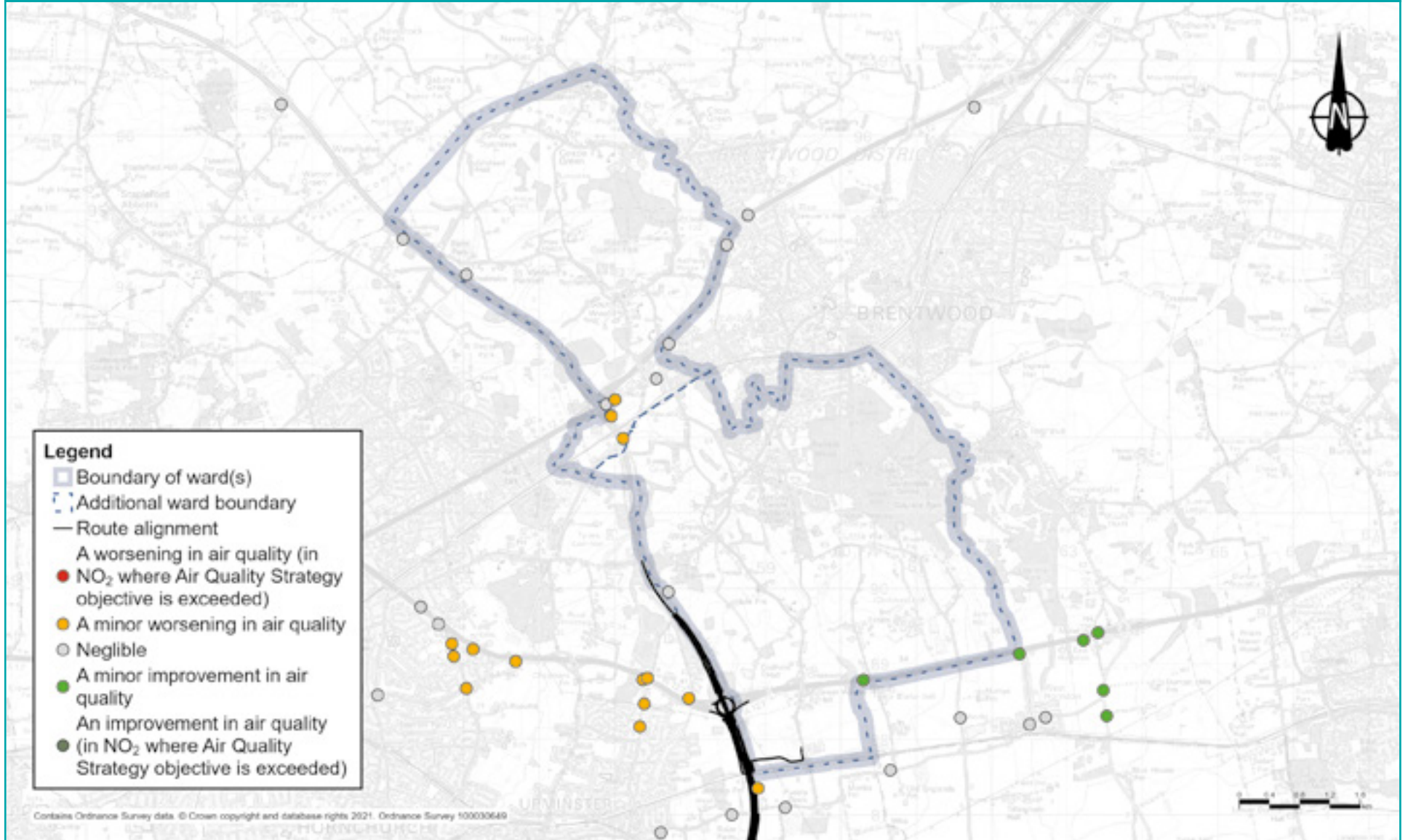
Although the modelled yearly average NO<sub>2</sub> concentration within these wards is close to the air quality threshold, local air quality data shows an overall downward trend in NO<sub>2</sub> over recent years, which means that future air quality improvements at this location are likely (for example, through increased adoption of electric vehicles leading to a reduction in exhaust emissions).

In addition to our assessment of NO<sub>2</sub>, our assessment predicts that PM<sub>10</sub> levels (small particles of dust, mainly from vehicle exhausts and brakes) are unlikely to exceed threshold levels across the assessed area.

### **Measures to reduce air quality impacts during operation.**

The assessed air quality impacts in this area as a result of the new road would not trigger the need for additional monitoring or other mitigation measures once it is open.

Figure 23.18: Predicted changes in NO<sub>2</sub> levels within Warley and South Weald wards once the new road is open



## 23.9 Health

### Existing situation

A range of personal, social, economic and environmental factors influence our health. Different groups within the population may be more sensitive to these factors than others – for example, children, older people or those with pre-existing health conditions.

### Warley

The ward is characterised by a younger population, with the proportion of people under the age of 16 (19.4%) similar to Brentwood as a whole. Warley has a slightly lower proportion of elderly residents aged 60+, when compared with Brentwood as a whole (23.5% and 25.9% respectively). The ethnic diversity of its population is higher, with 4.9% of residents having an Asian background compared with 3.2% for Brentwood.

According to the English Index of Multiple Deprivation, Warley suffers from very low rates of deprivation. Economic activity is similar to that of Brentwood. Home ownership levels are slightly lower than for Brentwood (73.2% and 75.1% respectively), with the majority of the remainder in private and social rented housing (15% and 10.4% respectively).

Self-reported health status is generally good, with more than 83% of residents reporting their health to be very good or good – slightly lower than Brentwood as a whole. A higher proportion of residents (16.4%) report that their day-to-day activities are limited a lot or a little as a result of long-term health problems or disability compared with Brentwood (15.5%). Life expectancy at birth for residents of Warley is 79.4 for males and 82.1 for females, which is lower than for Brentwood as a whole. Rates are also worse in Warley than Brentwood for a number of other health-related measures such as deaths from all causes (these are causes where all or most deaths could potentially be prevented by public health interventions in the broadest sense), respiratory diseases, coronary heart diseases and cancer.

### South Weald

The ward is characterised by a younger population, with the proportion of people under the age of 16 in South Weald (19.3%) similar to Brentwood as a whole. South Weald has the same proportion of elderly residents aged 60+ when compared with Brentwood as a whole (25.9%).

Home ownership levels are slightly lower than for Brentwood (73.2% and 75.1% respectively), with the majority of the remainder in private and social rented housing (15.0% and 10.4% respectively).

Self-reported health status is very good, with more than 85% of residents reporting very good or good health. A lower proportion of residents (12.8%) report that their day-to-day activities are limited a lot or a little as a result of long-term health problems or disability compared with Brentwood (15.5%). Rates are similar in South Weald and Brentwood for a number of health-related measures such as deaths from all causes (these are causes where all or most deaths could potentially be prevented by public health interventions in the broadest sense), respiratory diseases, coronary heart diseases and cancer.

## **23.9.1 Construction**

### **Warley**

- Properties more than 200 metres from the worksite, which is the majority of properties in this ward, are outside the area likely to be affected by construction dust or emissions from the worksite. In Warley, there are only a few properties within 200 metres of the worksite, including those around the A127 Southend Arterial Road. Air quality impacts on these properties during construction would be temporary.
- Our analysis of construction traffic predicts that the impact on most roads in this ward would be negligible. However, there would be a minor improvement in air quality in the area around the M25 as a result of the traffic management in place from 2025 to 2028.
- There are no main construction works or activities that are expected to give rise to construction noise and vibration impacts.
- Increases in road traffic noise during the construction phase are predicted to be less than 1dB(A) on all road traffic links in this ward.
- There may be changes in accessibility for people who are more dependent on public transport and have less choice about method and route travelled.
- In this ward, there may be mental health and wellbeing impacts associated with stress and anxiety relating to construction of the project.
- Conversely, positive health outcomes may be experienced by residents as a result of access to work and training opportunities presented by construction activities.



## South Weald

- Properties more than 200 metres from the worksite, which is the majority of properties in this ward, are outside the area likely to be affected by construction dust or emissions from the worksite. In South Weald, there are only a few properties within 200 metres of the worksite, including those near Nags Head Lane. Air quality impacts on these properties during construction would be temporary.
- There would be no views of Lower Thames Crossing construction activities from South Weald.
- Our analysis of construction traffic predicts that the impact on most roads in this ward would be negligible, although there would be a minor improvement in air quality in the area around the M25 as a result of the traffic management in place from 2025 to 2028.

## 23.9.2 Operations

### Operational health impacts

Positive and negative health outcomes may be experienced by residents in Warley ward:

- Warley residents are predicted to experience improvements in accessibility, including accessibility to open space.
- We have carried out an assessment of the operational impacts of the new road on air quality. The assessment area includes a 200-metre buffer around the affected road network, with this area being the most likely to experience changes to air quality as a result of the new road. More information about air quality impacts once the new road is open can be found in chapter 5 of the Operations update.
- At all locations in the South Weald and Warley wards, there are no predicted exceedances of air quality thresholds.
- There are receptors (properties or habitats that are sensitive to changes in air quality) in Warley, close to the west of the M25 that are predicted to experience a negligible change in the air quality for nitrogen dioxide (NO<sub>2</sub>), the main traffic-related pollutant.
- In Warley ward, the project route (see the Project description above) runs through the western part of the ward, with traffic joining the new road at its existing junction with the M25/A127. There would also be changes to the existing M25 to accommodate the predicted changes in traffic flow.

- Direct noise impacts from the route, and the upgrade works on the existing M25/A127 junction and M25, would be experienced in the western part of the ward.
- Warley residents are predicted to experience beneficial changes in road traffic noise levels.
- Indirect noise impacts in Warley would be as a result of changes in traffic flow, the number of HGVs, and traffic speeds on the existing road network in the ward.
- There would be no visual impacts from local footpaths following completion of the M25 widening works and associated landscape treatment.

Positive and negative health outcomes may be experienced by residents in South Weald:

- South Weald residents are predicted to experience improvements in accessibility, including accessibility to open space.
- We have carried out an assessment of the operational impacts of the new road on air quality. The assessment area includes a 200-metre buffer around the affected road network, with this area being the most likely to experience changes to air quality as a result of the new road. More information about air quality impacts once the road is open can be found in chapter 5 of the Operations update.
- There are receptors in South Weald, close to the east of the M25, that are predicted to experience a minor worsening in the air quality for nitrogen dioxide, the main traffic-related pollutant.
- South Weald is approximately 1.5km to the north of the main project route and, as such, there would be no direct noise impacts from the project in the ward.
- Indirect noise impacts in South Weald would be as a result of changes in traffic flow, the number of HGVs, and traffic speeds on the existing road network in the ward.
- There would be no visual impacts from local footpaths following completion of the M25 widening works and associated landscape treatment.

### **Measures to reduce health impacts during operation**

No essential measures to specifically address health impacts have been identified in these wards beyond those relating to noise and visual impacts described elsewhere.

## 23.10 Biodiversity

### Existing situation

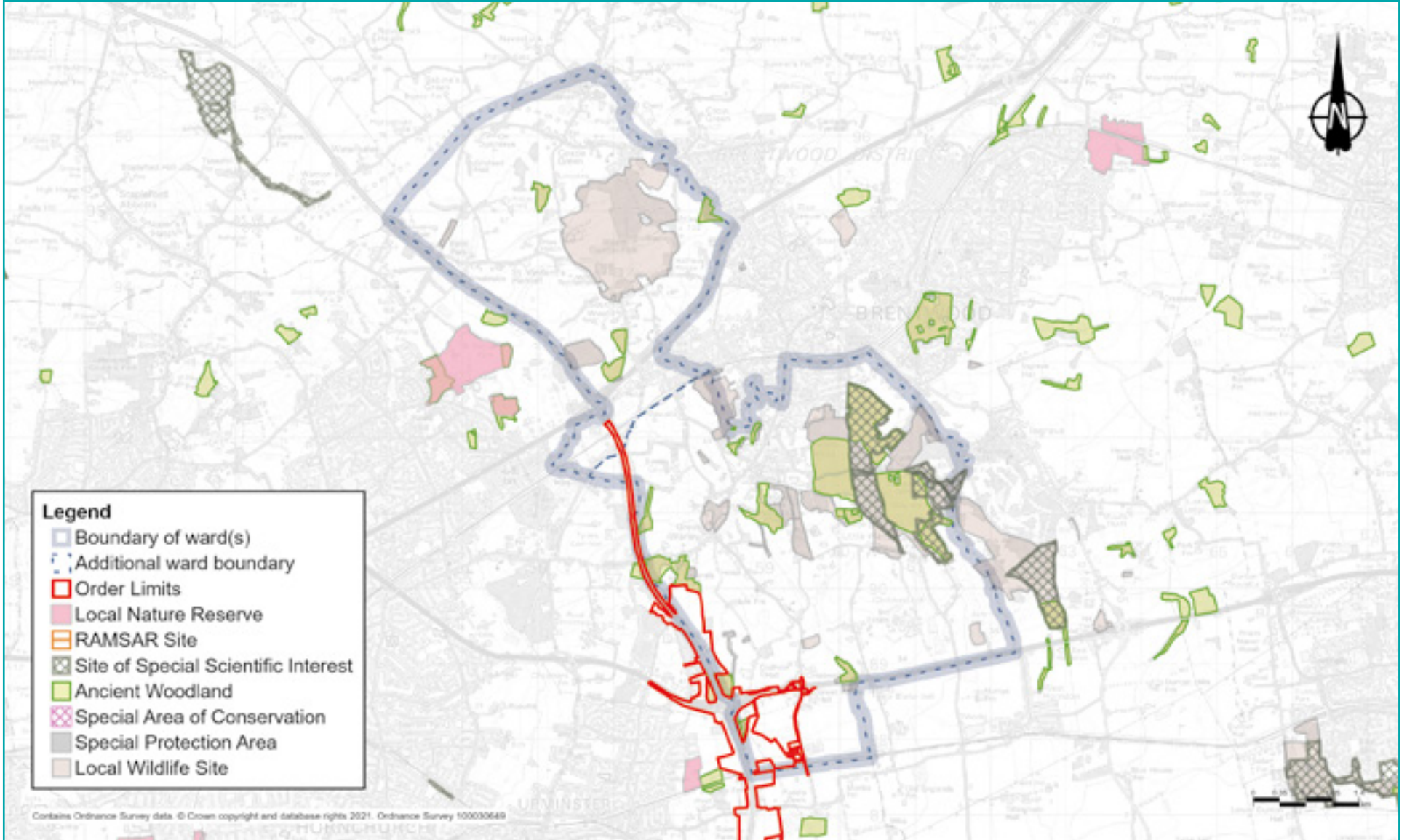
The main habitat in Warley ward is arable fields. In addition, there are areas of rough grassland, scrub and woodland with some watercourses. Warley contains no designated habitat within 2km of the Order Limits. Within 500 metres of the Order Limits, the non-designated sites are: Codham Hall Wood Local Wildlife Site (LWS) and Ancient Woodland, Coombe Wood LWS, Jackson's Wood LWS and Ancient Woodland and Coombegreen Ancient Woodland.

We carried out surveys across the Lower Thames Crossing to set a baseline for assessment, and these identified the presence of a range of protected and notable species, including bats, badgers, terrestrial invertebrates and reptiles in Warley ward.

Only a small area of South Weald ward falls within the Order Limits, and this is restricted to the soft estate (border habitat) alongside the M25. The only habitat present within the Order Limits is some landscape planting and grassland. South Weald contains one designated site within 2km of the Order Limits: The Manor Local Nature Reserve (LNR). Within 500 metres of the Order limits there is one non-designated site: Ingrebourne Valley Site of Importance for Nature Conservation.

We carried out surveys across the project to set a baseline for assessment, and these identified the presence of reptiles within the landscape planting and grassland along the M25, in South Weald ward.

Figure 23.19: Designated and non-designated biodiversity sites in Warley and South Weald wards



## **23.10.1 Construction**

### **Construction impacts**

Construction of the project would require the removal of areas of habitat, both temporarily and permanently from the route alignment. This habitat, consisting of areas of landscape planting and grassland, supports protected and notable species which would be affected by construction in terms of direct reptile habitat loss and disturbance to retained habitat.

### **Measures to reduce biodiversity impacts during construction**

Vegetation clearance would take place during the winter, where possible, to avoid disturbing breeding birds. Where this is not practical, clearance would be supervised by an ecological clerk of works to make sure no nests are disturbed or destroyed. Where protected species are present, these would be moved away from the site before any construction activities, either through habitat manipulation (for example, strimming to reduce the height of vegetation and displace reptiles) or translocation. Habitat removed for temporary construction would be reinstated during the construction process.

Where required, works affecting protected species would be carried out under a Natural England licence. Boxes to support birds and bats would be erected within retained habitat. We would carry out significant areas of woodland planting to offset lost woodland habitat in Warley ward. This would not only increase the overall extent of woodland in the area, but also provide strong connections between existing woodland habitats such as Codham Hall Wood and Coombegreen Wood. These are shown in a map in the General Arrangements drawings.

The impact of construction on biodiversity would be controlled through the range of good practice measures set out in the CoCP and REAC. See chapter 1 of the Construction update for more information about this and the project's other control documents.

## **23.10.2 Operations**

### **Operational impacts**

The new road has the potential to cause mortality for species that encounter road traffic in addition to noise disturbance from traffic, as already occurs with the M25.

### **Measures to reduce biodiversity impacts during operation**

To mitigate the impacts of disturbance in Warley, screening vegetation would be planted alongside the M25 to reduce disturbance to existing habitat and the newly created woodland habitat. New habitat would be managed to ensure it provides a high quality environment to support a broad range of different plant and animal species.

To mitigate impacts in South Weald, landscape planting would screen the road from the surrounding habitats and newly created habitat would be managed to ensure it provides a high quality environment to support a broad range of different plant and animal species.

The impact of operation on biodiversity would be controlled through the range of good practice measures set out in the project's CoCP and REAC. See chapter 1 of the Construction update for more information about this and the project's other control documents.

## 23.11 Built heritage

### Existing situation

#### Registered park and gardens and conservation areas

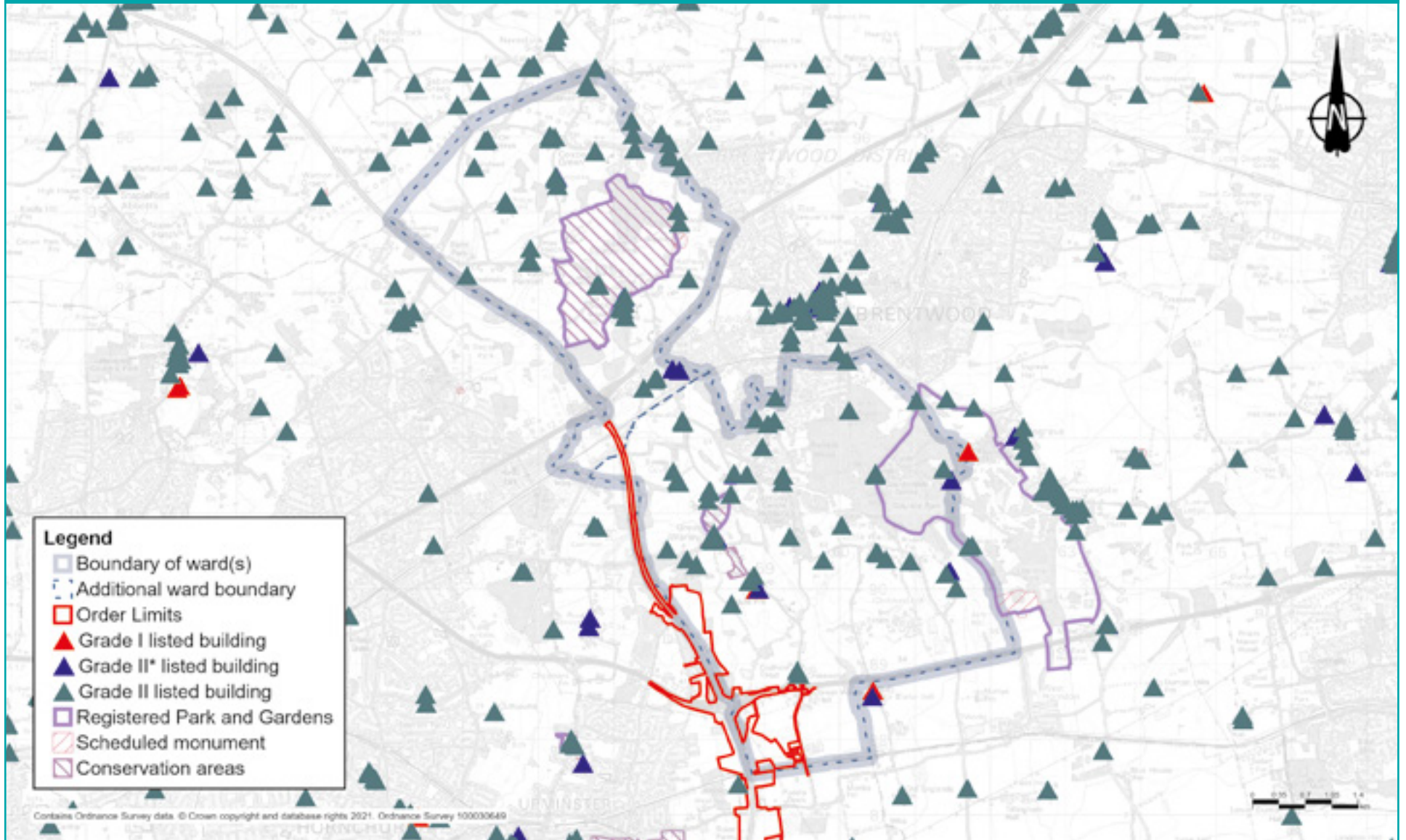
A registered park and garden, two conservation areas, and 25 listed buildings have been identified in Warley ward in relation to the new road. Warley Place is a Grade II registered park and garden and conservation area around 870 metres east of the M25 and the project, in Great Warley. The park and garden were originally part of much larger landholdings dating back to the 16th century and historically associated with the Dissolution of the Monasteries. The park and conservation area are located north of Great Warley village. They are bounded by Warley Road to the east, Dark Lane to the west, and Green Lane to the north.

The Great Warley conservation area includes several listed buildings and a protected lane, Dark Lane. The conservation area encompasses most of the traditional rural settlement of Great Warley. The village is focused along two main roads, Warley Road, running south-west to north-east, and Great Warley Street, running away from the village to the south-east. Almost all the buildings in the conservation area are along these two roads, which join at the northern end of the area, around the village green.

#### Grade I listed buildings

Church of St Mary the Virgin is a Grade I listed church of high heritage value. It is located around 730 metres east from the M25 and the project, in Great Warley. The church was built in 1902-1904 and the exterior was designed by the renowned architect Charles Harrison Townsend. The interior decoration and fittings were designed by Sir William Reynolds-Stephens.

Figure 23.20 Built heritage in Warley and South Weald wards





### **Grade II\* listed buildings**

- Lych Gate at Church of St Mary The Virgin
- Two Door Cottage

### **Grade II listed buildings**

- Hulmers
- Brick House Hotel
- Boyles Court
- Boyles Court Cottages
- Stables at Boyles Court Farm
- Barn at Boyles Court Farm
- Walletts
- Mascalls
- Stable Block eight metres north of Mascalls
- Blake House
- The Red House
- South Lodge to Warley Place
- Thatched Cottage
- Oak Beam Cottage and Warley Green Cottage
- Thatchers Arms Inn
- The Squirrels
- Hole Farmhouse
- Post Office
- K6 Telephone Kiosk Adjacent to Post Office
- Stony Hills Farm
- Fairstead
- Warley Elms

In South Weald, a registered park and garden, conservation area, and three listed buildings have been identified in relation to the project. All three listed buildings are Grade II listed.

### **Registered park and gardens and conservation area**

Weald Park is a Grade II registered park and garden and a conservation area on the south-western edge of Brentwood, around 970 metres north from the project. It is bounded by farmland to the north and west and South Weald village to the south-east. The park and area cover approximately 23 ha and include several listed buildings, formal gardens, pleasure grounds, parkland and woodland. The park and gardens are part of a former estate which dates back to the 11th century. Weald Hall was originally built in the 16th Century and once stood in the south-west corner of the park but was demolished in the 20th century. However, buildings associated with the former hall remain, including the listed chapel, granary and farmhouse. The park and area was designated in July 1987.

### **Listed buildings**

- Nag's Head Inn
- 17, 19 and 21 Brook Street
- The Bull Inn

## **23.11.1 Construction**

### **Construction impacts**

Construction activities include the establishment and operation of Warley Street Compound, along with works to the existing M25 and utilities works. Further details of construction activities affecting these wards are provided in the Project description section. Built heritage would not be impacted by the project.

### **Measures to reduce impacts during construction**

Mitigation is not required as no built heritage is affected.

## **23.11.2 Operations**

### **Operational impacts**

Please refer to the Project description, Operation section of this chapter. There are not anticipated to be any effects on built heritage in these wards once the project is operational.

### **Measures to reduce the impacts during operation**

Mitigation is not required as no built heritage is affected once the project is operational.

## 23.12 Contamination

### Existing situation

From a desk-based review of sources (historical maps and environmental data), there are no known medium- or high-risk sources of contamination that risk being disturbed during construction or operation of the project in Warley and South Weald.

### 23.12.1 Construction

By following a construction management plan, we would make sure that, where potential sources of contamination are used (for example, oils, lubricants, mechanical plant), appropriate spill containment and emergency response procedures are in place to prevent adverse environmental impacts from happening.

### 23.12.2 Operations

During the operation of the road, should an incident occur, such as a traffic accident resulting in localised contamination, significantly affected soils would be assessed and if necessary removed to reduce the risk of contamination migrating across a wider area or entering controlled waters. For more information on these controls, see the REAC.