

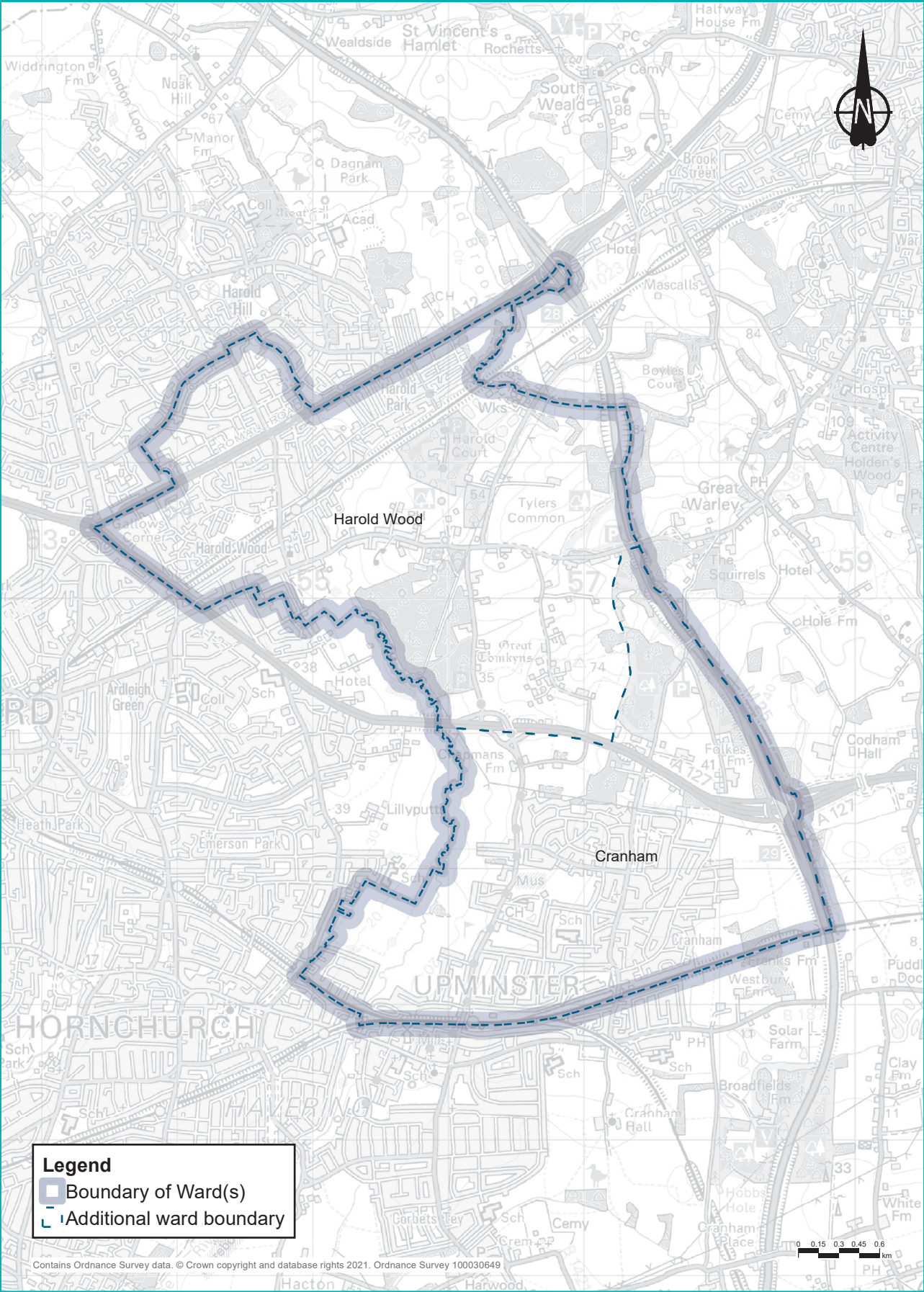
Chapter 22: Cranham and Harold Wood wards

This chapter summarises the activities in both Cranham and Harold Wood wards relating to the project's construction and its operational phase (when the new road is open). It also explains the measures we propose to reduce the new road'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 within and impacts on these two wards are presented together in one chapter because they are both on the fringes of the area directly affected by the project and the impacts on the wards are similar.

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 within our application for development consent.

Figure 22.1: Ward boundary map for Cranham and Harold Wood wards



22.1 Overview

22.1.1 About these wards

Cranham ward is located in the London Borough of Havering, to the north of Upminster ward and west of Warley ward. The ward has an area of around 66km² and an estimated population of 12,862¹. The ward is mostly residential with some open space and agricultural land to the north and east, with Upminster Golf Club to the west. The M25 runs along the eastern ward boundary and the A127 runs east-west through the ward. Upminster Depot is located to the south, off Deyncourt Gardens, and the London, Tilbury and Southend railway line runs along the ward's southern boundary.

Harold Wood ward is also in the London Borough of Havering, to the north of Cranham ward and west of Warley ward. This ward has an area of approximately 76km² and a population of around 14,908². Harold Wood is residential to the north-west, otherwise it is predominantly open space, woodland and farmland. The Great Eastern Main Line railway runs through the ward from the south-west to the north-east, with Harold Wood station off Station Road. The M25, A12 and A127 run through the ward.

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

22.1.2 Summary of impacts

Table 22.1: Summary of impacts during the project’s construction and operation

Topic	Construction	Operations
<p>Traffic</p>	<p>Impacts</p> <p>It is predicted that the traffic management measures on the M25 and on the A127 will add to the journey times for vehicles travelling along these roads.</p> <p>Mitigation</p> <p>Several mitigation methods, including minimising the use of local roads where possible, would be used throughout the construction process to reduce the impact on local residents. Further details about the mitigation measures can be found in the Traffic section of this chapter.</p>	<p>Impacts</p> <p>Most roads within the wards are not predicted to see changes to traffic flows once the project is operational, except for the A12, A127 and Front Lane. Further details about predicted changes to traffic flows can be found in the Traffic section of this chapter.</p> <p>Mitigation</p> <p>Once the project is operational, traffic impacts on the affected road network, including local roads, would be monitored. Further details on proposed mitigation can be found in the Traffic section of this chapter.</p>
<p>Public transport</p>	<p>Buses</p> <p>Local bus routes in these wards would not be affected. Journey times may increase on regional coach services using the M25 while traffic management is in place.</p> <p>Rail</p> <p>There would be no impact on rail services within either Cranham or Harold Wood wards during construction.</p>	<p>Buses</p> <p>There would be no changes to bus routes through the wards once the project opens and no discernible change to bus journey times.</p> <p>Rail</p> <p>There would be no noticeable changes to journey times or station access times expected once the project is operational.</p>

Topic	Construction	Operations
<p>Footpaths, bridleways and cycle routes</p>	<p>Impacts</p> <p>Two footpaths would be impacted during the construction of the project in Cranham and Harold Wood wards. Closures of these paths would be eight months to allow utilities diversion works and three years to allow utilities diversion works and main work construction. A bridleway would also be affected.</p> <p>Mitigation</p> <p>Closures of these two footpaths would be as short as possible to reduce the impact on the existing public right of way network.</p>	<p>Impacts</p> <p>A cycle route would be impacted once the project is operational, changing the way M25 junction 29 is crossed.</p> <p>Mitigation</p> <p>Improvements to the crossing at M25 junction 29 would be made once the project is operational.</p>
<p>Visual</p>	<p>Impacts</p> <p>Views of construction activities from a small number of residential properties on the eastern edge of Cranham are unlikely to be noticeable. There are likely to be close range views of construction activity, M25 widening works and views of the taller structures in the Warley Street Compound from the nearby footpath.</p> <p>Views of construction activities from Harold Wood are likely to be limited to views from Tylers Wood open access land.</p> <p>Mitigation</p> <p>Visual impacts would be controlled through the range of measures within the CoCP and the REAC</p>	<p>Impacts</p> <p>There would be no visual impacts from the project following the establishment of new planting along the M25 corridor.</p> <p>Mitigation</p> <p>The landscaping along the M25 corridor would help to integrate the motorway into the adjoining landscape.</p>

Topic	Construction	Operations
<p>Noise and vibration</p>	<p>Impacts</p> <p>The construction activity associated with the M25 upgrade and utilities works is expected to create noise in these wards. 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 northbound entrance slip-road on to the M25 at junction 29 and the northbound exit slip road off the M25 at junction 29, where increases in noise levels have been predicted. There are no percussive or vibratory works proposed in these wards.</p> <p>Mitigation</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>Impacts</p> <p>Once the project is built, there would be direct noise impacts in the eastern sections of the wards from the new road and upgrades to the existing M25. There would be an indirect noise impact as a result of changes in traffic flow, vehicle composition and speed on existing roads in the wards.</p> <p>Mitigation</p> <p>Low-noise road surfaces would be installed on new and resurfaced roads.</p>

Topic	Construction	Operations
<p>Air quality</p>	<p>Impacts</p> <p>There is likely to be dust and emissions from construction equipment and traffic during the construction phase.</p> <p>Analysis of the construction phase traffic flows show that the impacts on most roads in this ward would be negligible. There would be a minor improvement in air quality close to the M25 between 2026 to 2028.</p> <p>Mitigation</p> <p>The contractor would follow good practice construction measures which are presented in the CoCP and the 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>Impacts</p> <p>There are no exceedance of NO₂ and PM₁₀ predicted in these wards.</p> <p>Mitigation</p> <p>No mitigation is required.</p>

Topic	Construction	Operations
<p>Health</p>	<p>Impacts</p> <p>In both wards, the construction phase of the project would present opportunities to access work and training.</p> <p>In Cranham, there are likely to be changes in the area that may result in negative impacts on health, including mental health and wellbeing. These include perceivable changes in the levels of noise from the construction works. There would also be temporary visual impacts as set out in this table above.</p> <p>Mitigation</p> <p>The negative impacts would be mitigated through the good practice construction measures presented in the CoCP and REAC relating to working hours, noise and visual screening and community engagement.</p>	<p>Impacts</p> <p>In Cranham, once planting has established, there would be no visual impacts from residential properties on the eastern edge of the ward, or the nearby footpath parallel with the M25.</p> <p>Mitigation</p> <p>The landscaping along the M25 corridor is the primary mitigation measure in Cranham. No essential mitigation is required for health.</p>

Topic	Construction	Operations
<p>Biodiversity</p>	<p>Impacts</p> <p>The construction of the project would involve the removal of areas of habitat in the Cranham ward, both temporarily and permanently, for the new road. This habitat supports a range of protected and notable species (great crested newts, reptiles and potential bat roosts).</p> <p>In Harold Wood ward, a small area of woodland and scrub would be removed next to the M25.</p> <p>Mitigation</p> <p>Vegetation would be cleared during the winter where possible to avoid any impact on breeding birds. Protected species would be relocated, carried out under a Natural England licence. Boxes to support bats and birds would be erected. Habitat lost temporarily (including the scrub) for construction works would be reinstated. Woodland planting would be carried out within Cranham to offset woodland habitat loss around the M25.</p>	<p>Impacts</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>Mitigation</p> <p>Newly created habitats would be managed to ensure they provide high quality habitat to support a broad range of plant and animal species. Impacts would also be managed through the range of good practice measures set out in the CoCP and REAC.</p>
<p>Built heritage</p>	<p>Impacts</p> <p>None identified.</p> <p>Mitigation</p> <p>None identified.</p>	<p>Impacts</p> <p>None identified.</p> <p>Mitigation</p> <p>None required.</p>
<p>Contamination</p>	<p>Impacts</p> <p>None identified.</p> <p>Mitigation</p> <p>None required.</p>	<p>Impacts</p> <p>None identified.</p> <p>Mitigation</p> <p>None required.</p>

22.2 Project description

22.2.1 Construction

Construction activities

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

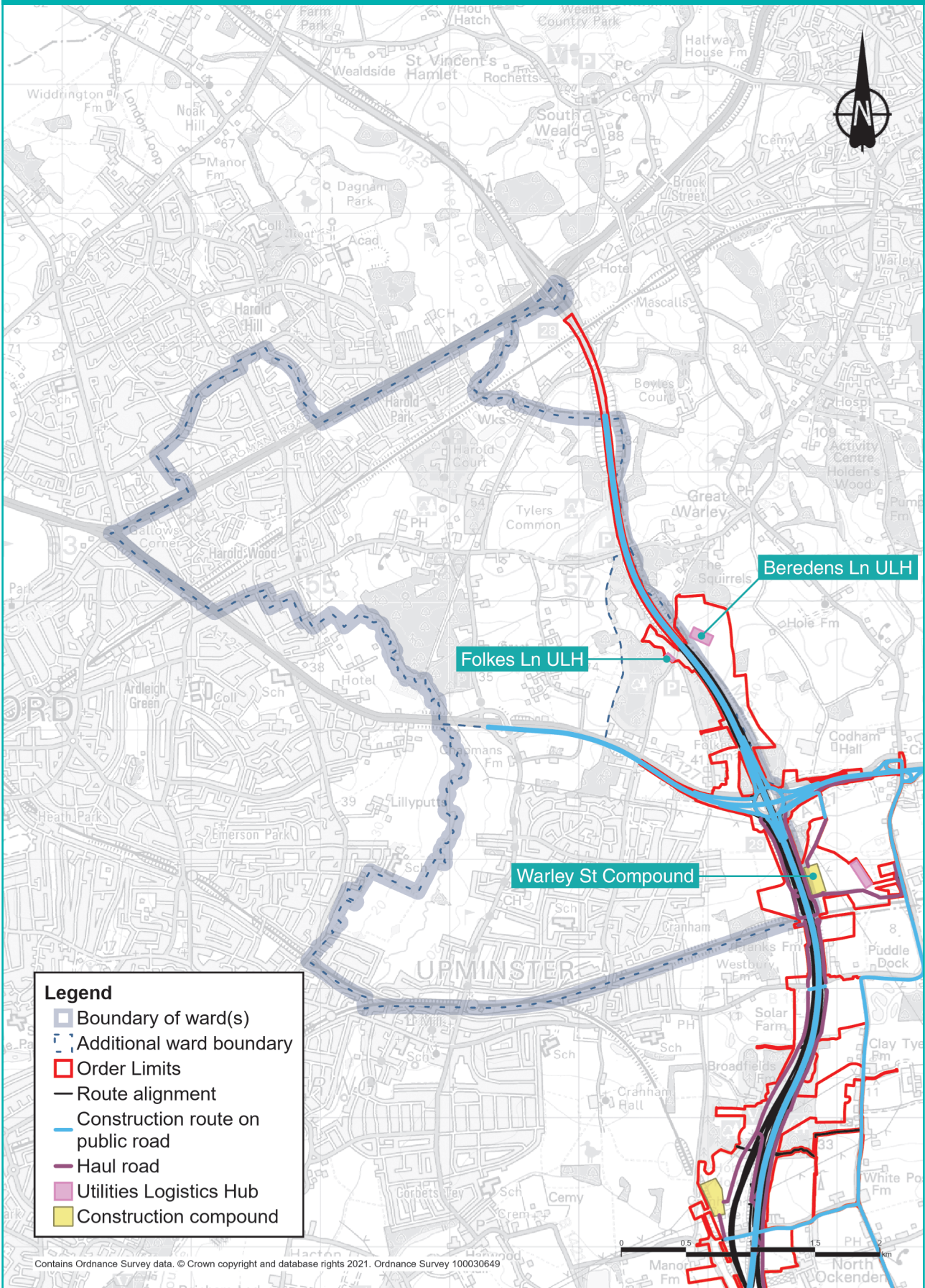
The main construction activities in these wards are the widening of the M25 north and south of junction 29. We would also build new slip roads linking the M25 and the project to junction 29. To accommodate these new carriageways, we would need to divert existing utilities and widen the railway bridge south of junction 29.

Works between the project's proposed M25 junction and junction 29 would take up to four and a half years. Traffic management measures on the M25 would be necessary for most of this time, including lane reductions and reduced speed limits.

Works to widen the Shoeburyness railway line bridge would be carried out in agreement with Network Rail towards the end of our construction programme, and would take around 12 to 14 months. Most works would take place offline, away from the railway line. Works to connect the new and existing structures would take place at night and at weekends to minimise impacts on rail passengers.

At junction 29, the M25 main carriageway would be increased from three lanes to four lanes in each direction to accommodate predicted increases in traffic flows. The existing junction 29 roundabout would be increased to three lanes to allow it to accommodate the larger predicted traffic flows associated with the project. We would modify the slip-roads north of junction 29 and construct a new northbound slip road from the proposed M25 junction linking directly to junction 29. These works would take around two to three years.

Figure 22.2: Main construction areas in Cranham and Harold Wood wards



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Site access points located within these wards to link the project worksite with the road network include a new slip-road on the M25 northbound carriageway between the Shoeburyness railway and junction 29, along with temporary access routes from the A127 and junction 29 roundabout. We would need temporary traffic management in the form of narrow lanes to connect the proposed access routes to these existing roads (see the Traffic management section below).

Folkes Lane Woodland consists of open fields, walking tracks and a mix of vegetation. We propose to permanently acquire rights for the diversion of a high-pressure gas pipeline around 700 metres in length, which may limit public use of the area. To offset this, we would provide replacement land adjacent to the existing woodland with landscaping to match the existing site and use, and to allow the spaces to link together. Further information on our proposed measures is provided in the Operations section below.

Construction compounds

Construction compounds are fenced-off areas, accessible to construction traffic, which provide the facilities for our 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 that vehicles leaving the compound do not dirty local roads.

Part of the Warley Street Compound would be in the Cranham ward on the western side of the M25. There are no other construction compounds located within this ward or within the Harold Wood ward. For more information about this, see chapter 23.

Table 22.2 shows the daily average number of vehicles going to the Warley Street Compound. They would not all be going to the part of the compound that is located to the west of the M25. 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 22.2: Daily average number of vehicles going to the Warley Street Compound

Time period	Warley Street Compound	
	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

There would be no more than four staff vehicles a day (on average) based at the Folkes Lane Utility Logistics Hub between April 2026 and November 2027. Less than 20 HGVs a day would be going to this hub, mainly between April 2026 to November 2027.

Utility Logistics Hub

The Folkes Lane Utility Logistics Hub would be located within Cranham ward, close to the M25. This would be used to support utility diversions. Access for utility companies would be along Folkes Lane. An additional Utility Logistics Hub, Beredens Lane ULH, would be required east of the M25 in Warley ward (see chapter 23).

Utility works include the 0.63km diversion of a high-pressure gas pipeline under the M25 north of Folkes Lane. Diversions also include electrical networks along the M25 to accommodate the carriageway widening and gas pipelines and communication networks in the junction 29 roundabout area to accommodate the Codham Hall structure works.

Construction routes on public roads

The M25 and A127 would be used as construction routes, with direct access to compounds and worksites via dedicated haul roads built off the M25. This would reduce the amount of construction traffic on local roads. Utility companies would use Folkes Lane to access the Utility Logistics Hub.

Construction phasing

Construction of the whole project is scheduled to last for six years from 2024 to 2029. To deliver our construction programme efficiently, we would divide activities into packages of work, 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 work would take place during the core construction hours, 7am to 7pm on weekdays, and 7am to 4pm on Saturdays. Additional repair and maintenance periods (if required) would be 8am to 5pm on Sundays. Noise-generating works would not be carried out outside core hours wherever practicable. However, there would be circumstances when hours may be extended. Typically, this would be to reduce inconvenience to road users by working at night or at weekends when there is less traffic. Activities involving works outside core hours within these wards would include implementing traffic management measures, joining new roads to existing ones, resurfacing existing carriageways, demolition of structures, and removal or re-stringing of overhead power lines over roads. For safety reasons it would be necessary to carry out work close to railway lines outside core hours when trains are not in service. There may be extended working hours for earth works when days are longer (spring to autumn) and during periods of fine weather. 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 Cranham and Harold Wood wards are listed below.

Table 22.3: Main traffic management measures in Cranham and Harold Wood wards

Road(s) affected	Proposed traffic management	Purpose	Duration
M25 southbound	Narrow lanes and 60mph speed limit	Carry out nearby works on the M25	38 months between June 2025 and July 2028
M25 northbound	Narrow lanes and 60mph speed limit	Carry out nearby works on the M25	28 months between November 2025 and July 2028
M25 and A127	Narrow lanes or short-term lane closures	Connect the new lanes to the existing road	Nights and weekends over short periods associated with specific works activities
M25 southbound onslip and northbound offslip	Closure	Carry out nearby works	Nights and weekends over short periods associated with specific works activities
A127 westbound offslip	Closure	Carry out nearby works on the A127 slip-roads.	Nights and weekends over short periods associated with specific works activities
A127	Narrow lanes and 50mph speed limit	Carry out nearby and modifications to local utilities	27 months between June 2025 and November 2028
A127	Closure	Bridge works and modifications to local utilities	Nights and weekends over short periods associated with specific works activities

There will be construction works near the M25 in Cranham that will require the implementation of narrow lanes and a reduction in the speed limit to 60mph on the M25 in both directions. The timings of these traffic management measures are:

- M25 northbound, 5.1km in length, over 28 months from November 2025 and July 2028.
- M25 southbound, 5.8km in length, over 38 months from April 2025 to July 2028.

There will be construction works and modifications to the local utility networks near the A127 in Cranham that will require the implementation of narrow lanes and a reduction in the speed limit to 50mph on the A127 in both directions. The narrow lanes will be implemented over a 400-metre section of the A127 and will be in place for 27 months from May 2026 to July 2028.

There will be some night-time/weekend temporary road closure on the M25 junction 29 southbound onslip, the M25 J29 northbound offslip and the A127 westbound offslip to carry out construction works close to these roads.

There will be occasional night-time/weekend temporary road closure of the A127 for bridge works and modifications to local utility networks.

There are no traffic management measures planned within Harold Wood ward.

Measures required across the project would include narrow lanes, reduced speed limits, lane closures and temporary traffic lights. We have sought to minimise traffic management measures wherever practical. However, they would be necessary in some places to allow construction traffic and local communities to travel safely, while providing construction workers with sufficient space to operate. An overview of the traffic management required across the project can be found in the Outline Traffic Management Plan for Construction document. All traffic management measures are based on an indicative construction programme, which would be finalised by the appointed contractor. The contractor's traffic management plans will be subject to final approval by the Secretary of State for Transport, following consultation with the local highways authority.

22.2.2 Operations

The completed project

For more information about the completed project, see the Operations update, and the large-scale figures in Map Book 1: General Arrangements. Below, we set out the main features of the new road in Cranham and Harold Wood wards once it is open.

The main feature of the project in these wards would be the widened M25 to accommodate increased traffic flow and the upgrades to the existing junction 29, including new slip roads and increased capacity on the roundabout. We would also build a dedicated slip road from the project's proposed M25 junction to link with the relocated offslip for northbound traffic on the M25 to connect to junction 29. This arrangement would improve safety while maintaining traffic flow. The slip roads north of junction 29 would also be lengthened to improve traffic flow.

On land between the M25, Folkes Lane, the A127 and Woodlands Farm we would introduce new woodland planting to offset the loss of Ancient Woodland. A second area would also be planted with woodland in the northern third of the land at Beredens Farm, between the two forks of Folkes Lane to the west of the M25.

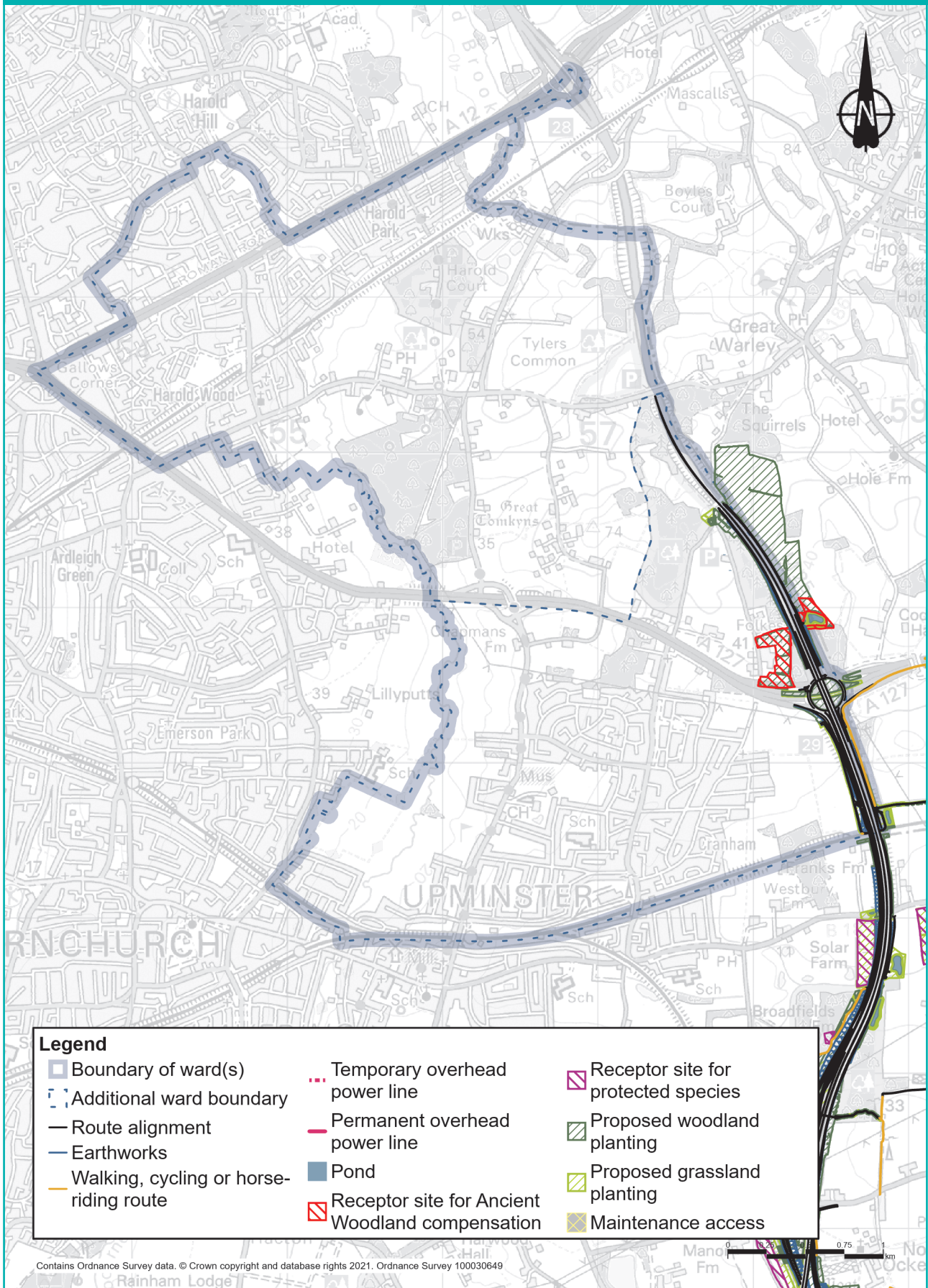
A number of public rights of way would be affected by construction and some would be rerouted permanently once the new road is open. For more information, please see the Footpaths, bridleways and cycle routes section below.

Changes to the project since our Design Refinement Consultation

As part of our ongoing 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) in Cranham and Harold Wood wards since our Design Refinement Consultation in July 2020. More information about these changes, including maps showing changes to the Order Limits, can be found in chapter 3 of the Operations update.

Utilities access south-west of junction 29 is currently in Ancient Woodland. A new access route would be provided off the M25 collector road further south to avoid disturbing this woodland area and Laburnham Gardens.

Figure 22.3: The main features of the completed project in Cranham and Harold Wood wards



To reduce impacts on a local business, we have changed the woodland planting and environmental mitigation proposals in the area around Folkes Lane Woodland. We now propose woodland planting on the east of the M25. This would be more than three times the size of our earlier proposal, and includes replacement open space connected to Folkes Lane Woodland by the existing M25 footbridge. We have also arranged an alternative area for great crested newts to the north of the Folkes Lane Woodland car park.

Impacts on open space and common land

We are proposing to permanently acquire rights within Folkes Lane Woodland for the diversion of a gas pipeline which may impact the area above the diversion. We are proposing to provide replacement open space land on the eastern side of the M25 within a new area of woodland planting as part of Hole Farm (within the Warley and South Weald wards). This replacement land would be linked to the current area by the existing over bridge over the M25. Landscaping would complement the existing site and allow the spaces to link together.

Within these wards, the only change from proposals we have consulted on previously are that we have provided open space replacement land to the east of the M25, within Warley and South Weald wards, whereas during our Design Refinement Consultation we consulted on using land to the west of the M25. The 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 connect to the proposed compensatory Ancient Woodland planting. We have recently purchased Hole Farm for our organisation's wider sustainability and legacy aspirations to build a community forest in collaboration with Forestry England.

22.3 Traffic

We carried out traffic assessments to understand how construction and operation would affect nearby roads, compared with the situation if the project was not implemented. For more information, see chapter 4 of the Operations update.

22.3.1 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 22.3 setting out the proposed construction traffic management.

The narrow lanes on the M25 and on the A127 through the M25 junction 29 will increase journey times for vehicles travelling along these roads. The narrow lanes on the M25 are designed to a standard that will permit the speed limit to be reduced to 60mph, rather than the 50mph limit more commonly used. This will serve to reduce the impact on the vehicles using this section of the M25.

Measures to reduce construction traffic impacts

Our approach to construction has been refined after further investigations and feedback. A summary of the proposed measures introduced to reduce the volume of construction materials transported in and out by road can be found in chapter 2 of the Construction update. To reduce the construction traffic impacts in Cranham and Harold Wood wards, we would carry out measures such as the following:

- Minimise use of the local road network as far as practicable through construction of temporary offline haul routes directly from the strategic road network.
- Our proposals allow for re-use of excavated materials, and would substantially reduce the need to dispose of excavated material via the road network, thereby reducing the number of HGV movements from the public road network during the construction phase.
- Where practicable, new bridge structures have been designed so that they can be built offline to avoid the need to close local roads for extended periods. Where offline construction is not possible, and space is available to do so, the existing road would be temporarily realigned to facilitate the construction of new bridges.

- Following discussion with key stakeholders and where possible, HGVs associated with construction of the project would be banned from using some local roads.
- We would stockpile material within the Order Limits, to allow material to be managed on-site rather than offsite, thereby reducing the number of HGVs journeys needed.

22.3.2 Operations

Operational impacts

We have carried out traffic modelling in the wards to predict changes in traffic on the roads, including those within or on the boundary with these wards for the first year of the project's operation, 2029.

Figures 22.4, 22.6 and 22.8 show the predicted changes in traffic during the morning peak (7am to 8am), interpeak (an averaged hour between 9am and 3pm) and evening peak (5pm to 6pm) measured in passenger car units (PCUs), where 1 PCU is equivalent to a car, and 2.5 PCUs is equivalent to an HGV. For information about how we assessed operational traffic impacts, see chapter 1. For more information about how we carried out our traffic modelling, see chapter 4 of the Operations update.

Along the A12 Colchester Road west of the M25, there would be a decrease in traffic flows westbound and an increase eastbound of between 50 and 250 PCUs in the morning peak hour (less than a 10% increase). The change in flows is less than 50 PCUs in both directions for the other modelled time periods.

On the M25 between junction 28 and 29 on the eastern boundary of the Harold Wood and Cranham wards there would be an increase in traffic flow northbound of between 500 and 1,000 PCUs in each of the modelled time periods. This would be 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 traffic flows also increase by between 250 and 500 PCUs in each modelled time period, an increase of between 0% and 10%.

On the A127 Southend Arterial Road, to the west of M25 junction 29, there would be an increase in traffic flows westbound of between 500 and 1,000 PCUs (between 20% and 40%) in the morning peak hour. In the other modelled time periods, the increase in flows is between 50 and 250 PCUs, an increase of less than 10%. There would also be an increase in traffic eastbound of between 250 and 500 PCUs in the morning peak hour, an increase of between 10% and 20%. In an average interpeak hour and in the evening peak, the increase in traffic flows would be between 50 and 250 PCUs, which is less than 10% of the current flow.

There is predicted to be an increase in traffic flows on the northern section of Front Lane in the southbound direction in the morning peak hour. The increase in traffic is between 50 and 250 PCUs, which represents an increase in traffic of between 20% and 40%. On the northern section of Hall Lane, the traffic flows increase in the northbound direction in the morning peak hour, with an increase of between 50 and 250 PCUs, which is an increase of between 10% and 20% in flow compared to the traffic levels expected without the project.

Figure 22.4: Predicted change in traffic flows (PCUs) with the project during the morning peak in 2029

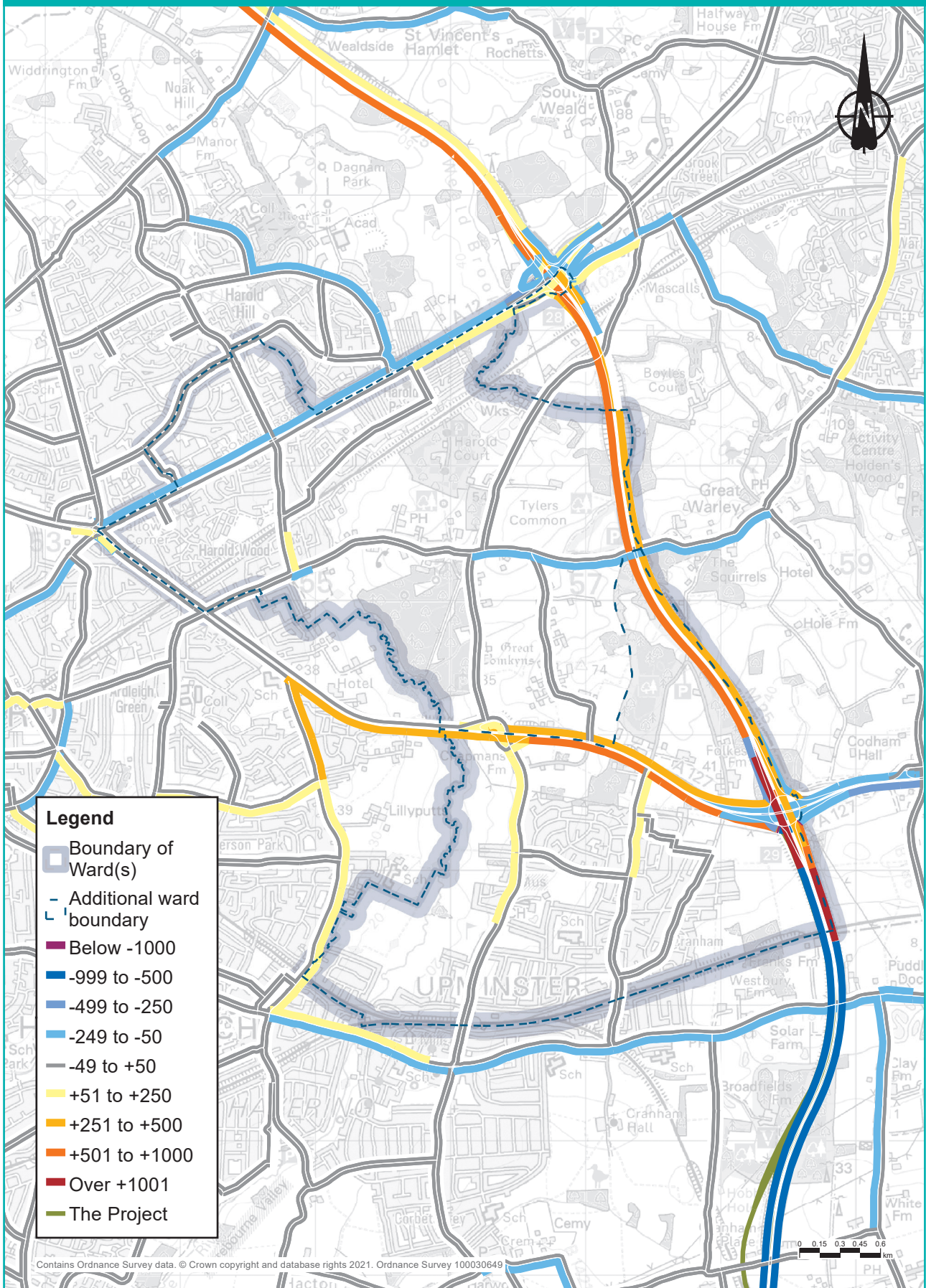


Figure 22.5: Predicted percentage change in traffic flows with the project during the morning peak in 2029

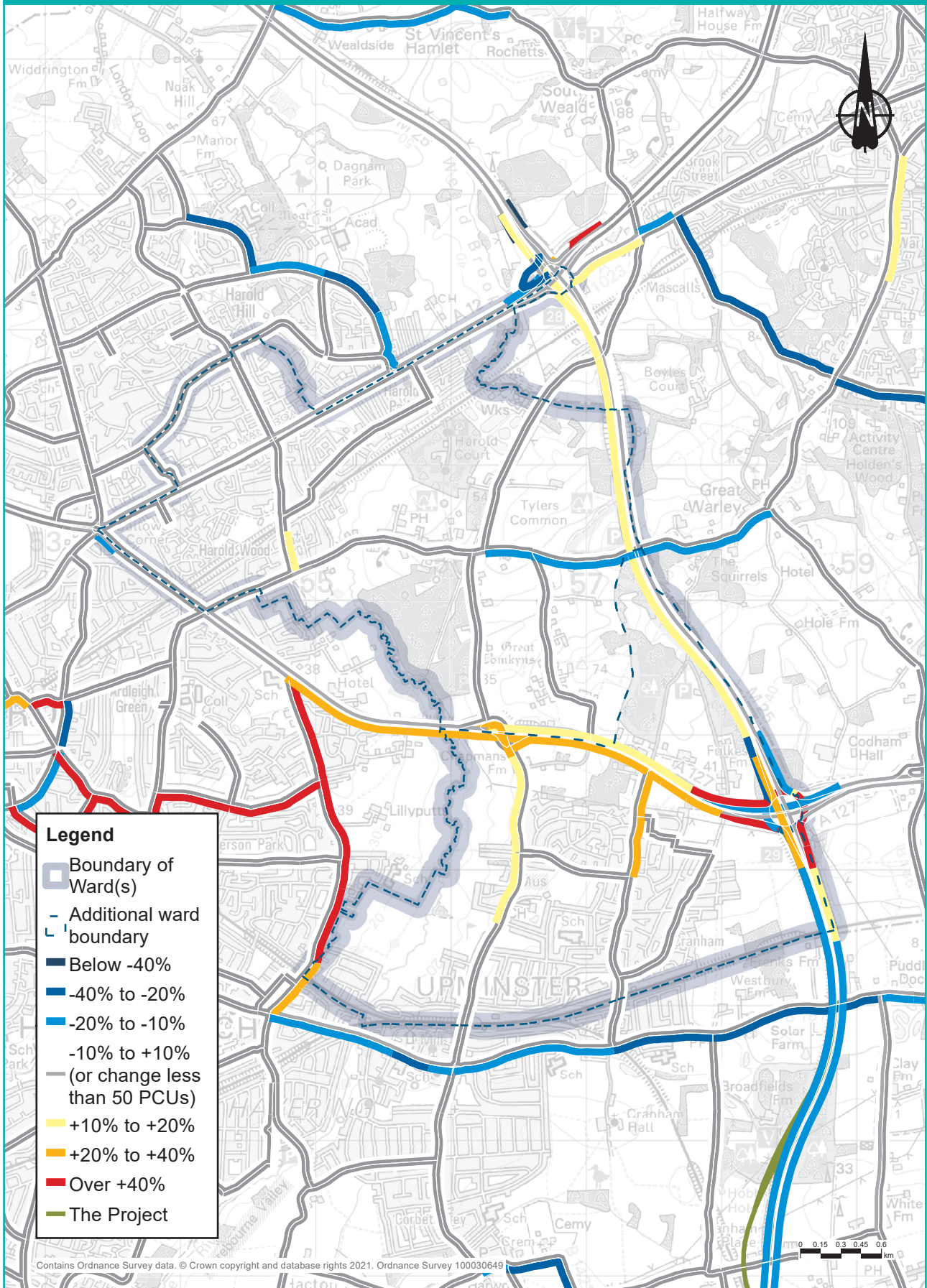


Figure 22.6: Predicted change in traffic flows (PCUs) with the project during the interpeak period in 2029

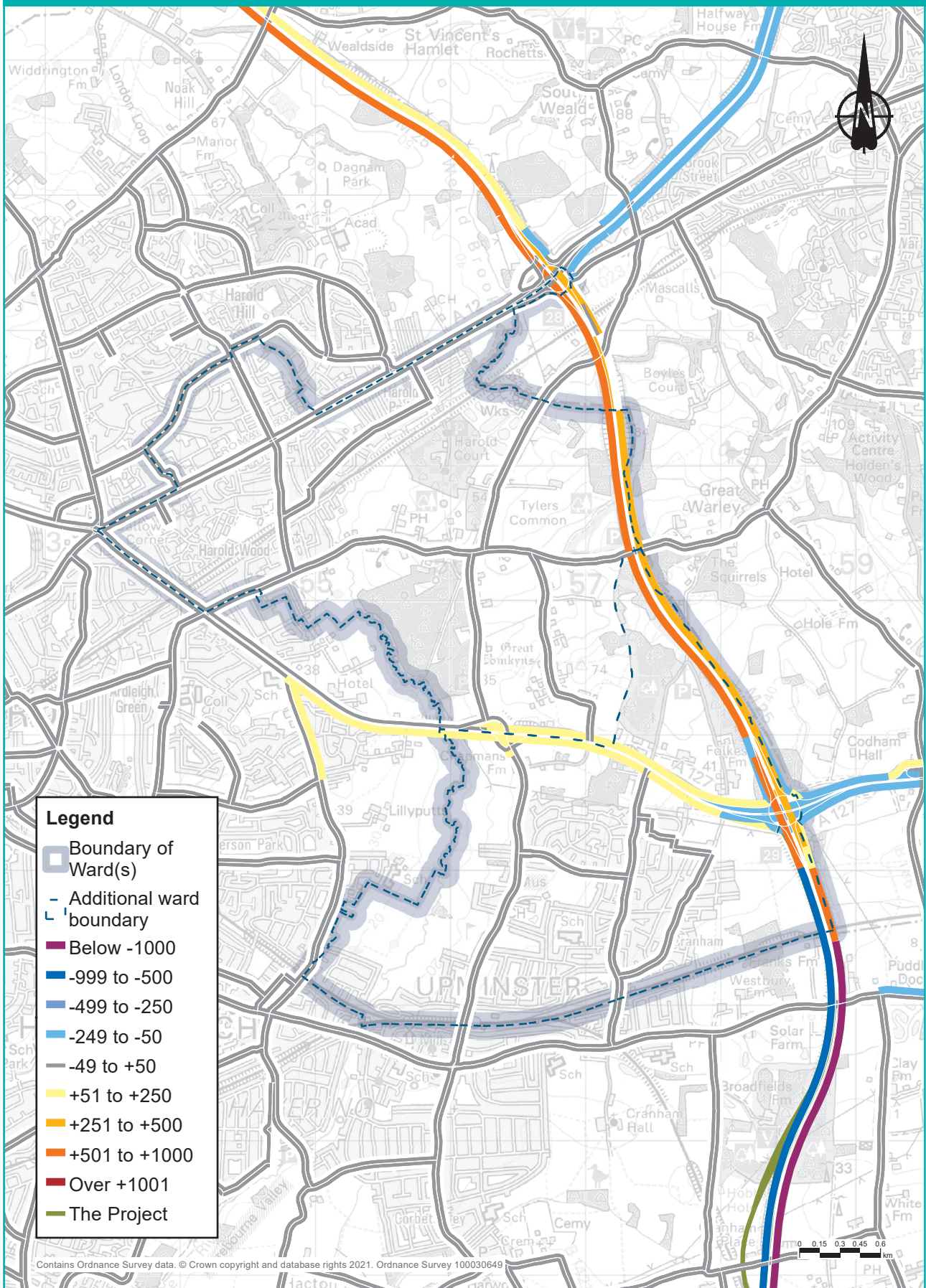


Figure 22.7: Predicted percentage change in traffic flows with the project during the interpeak period in 2029

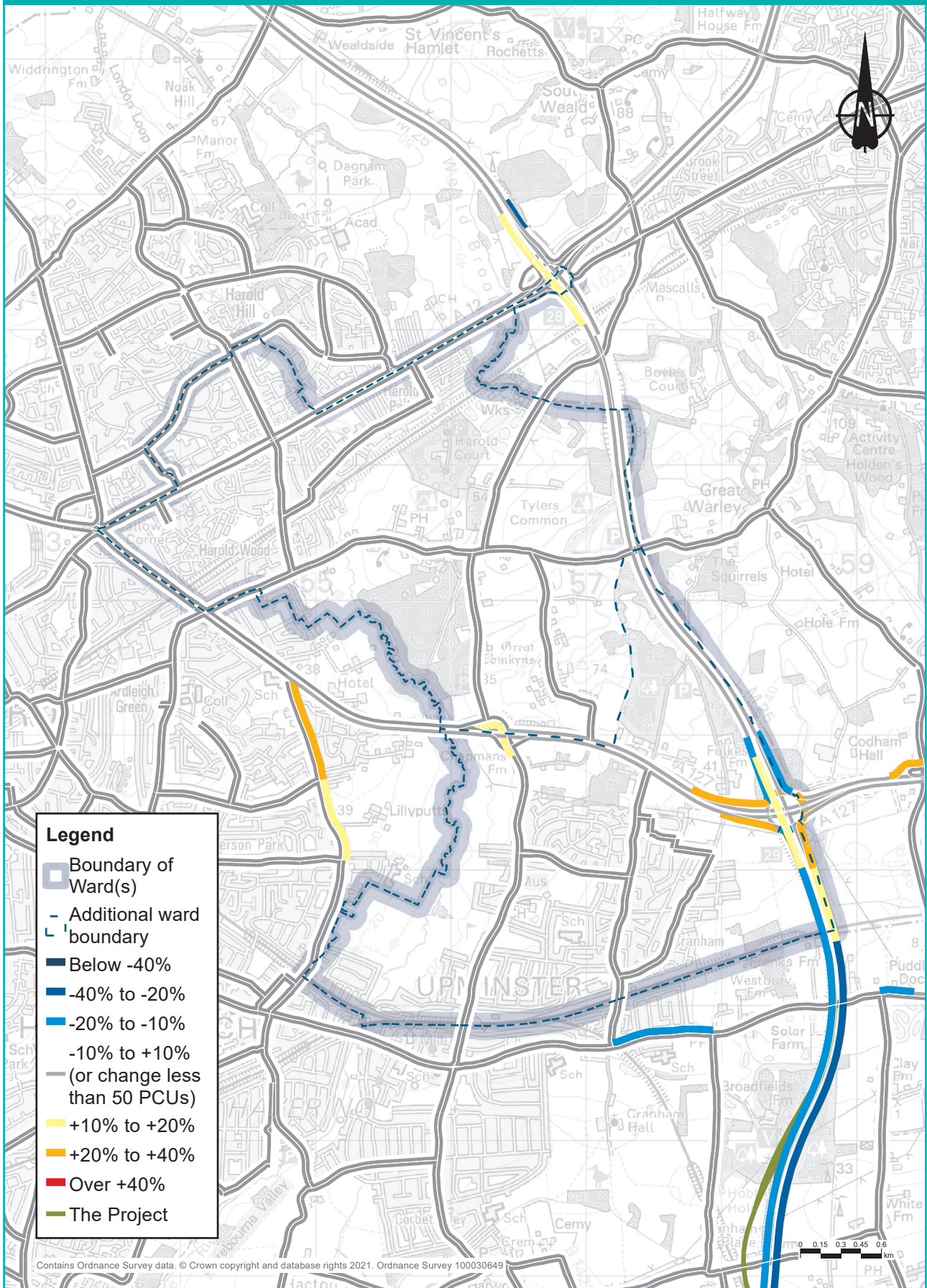


Figure 22.8: Predicted change in traffic flows (PCUs) with the project during the evening peak in 2029

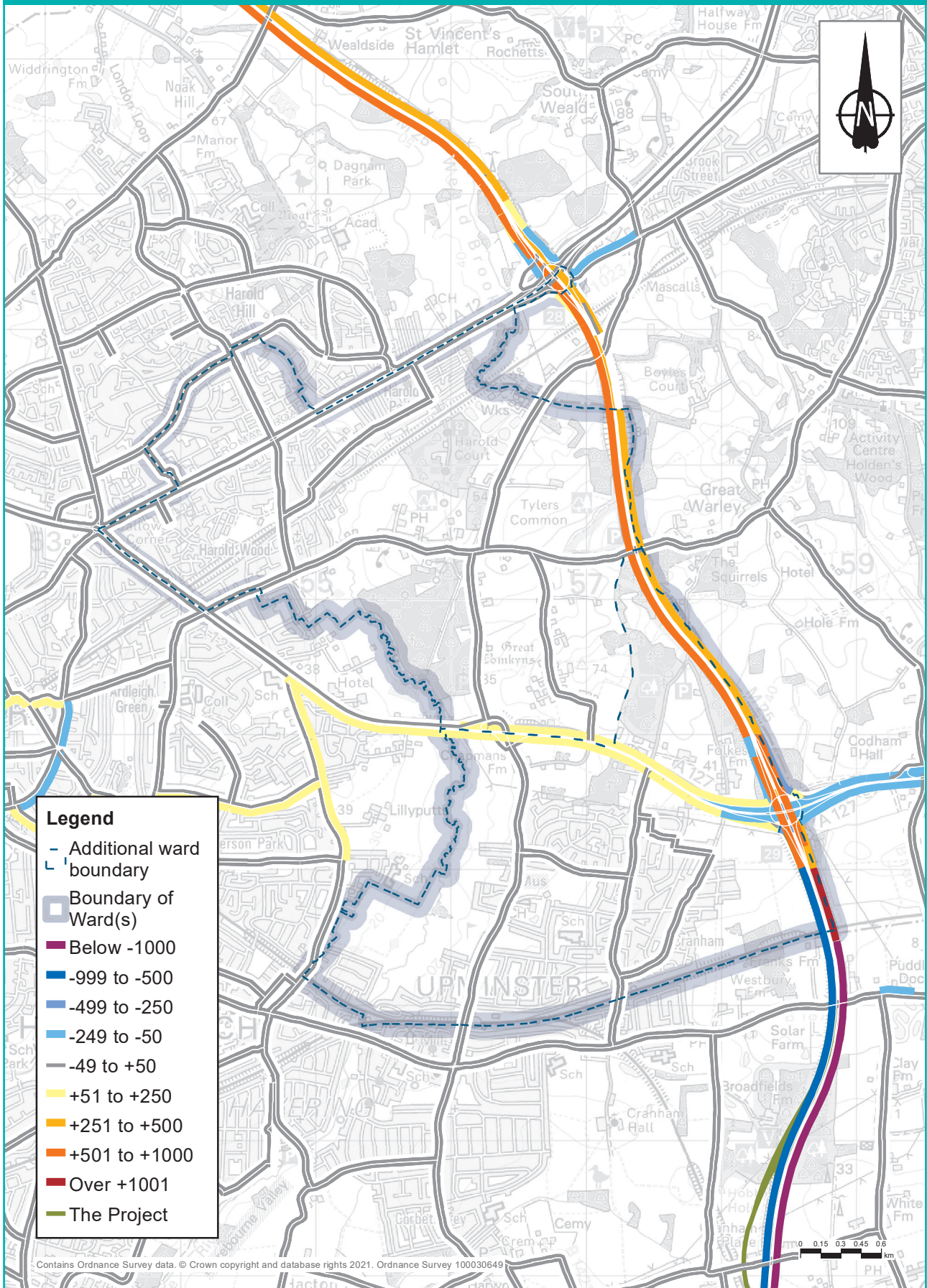
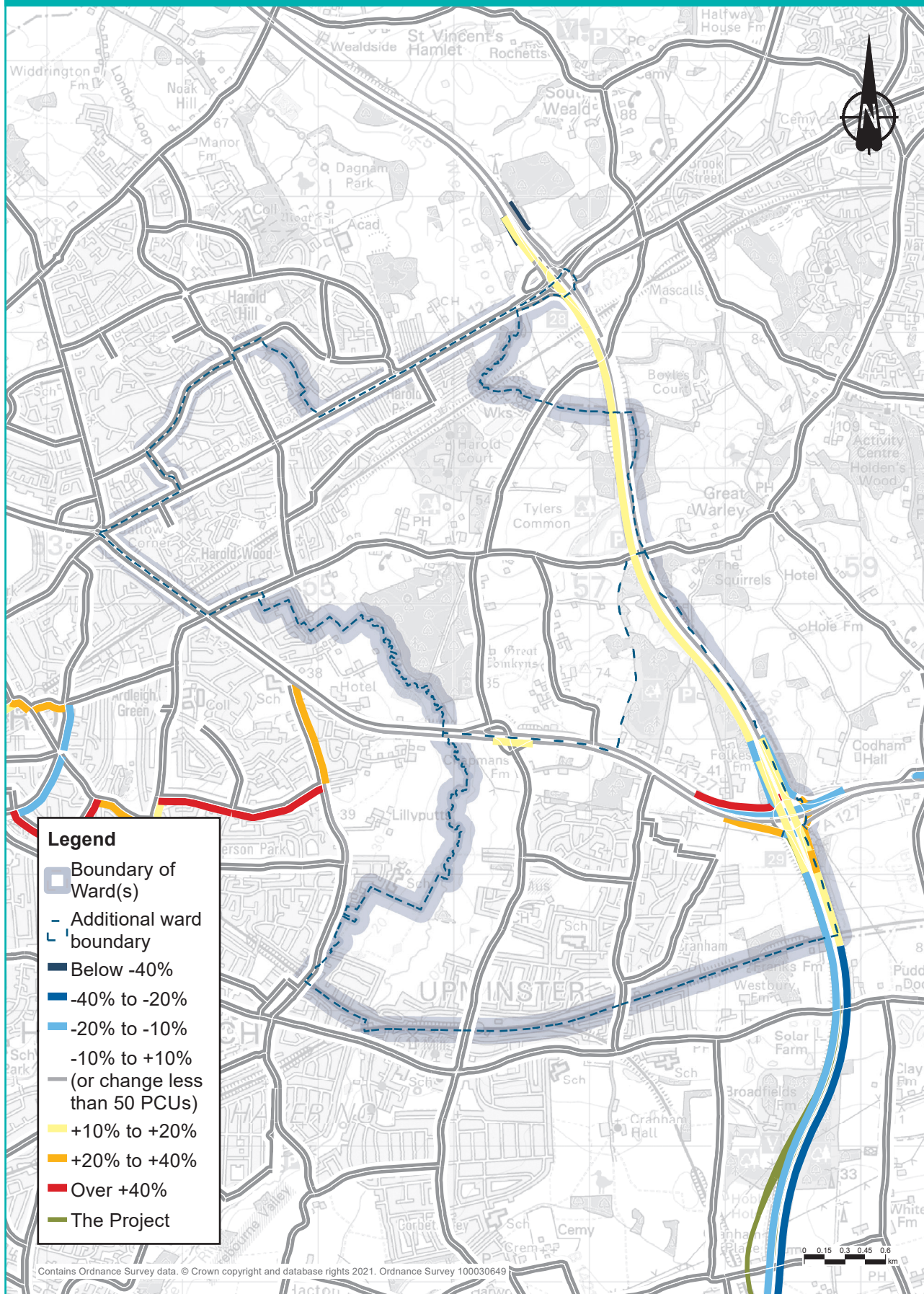


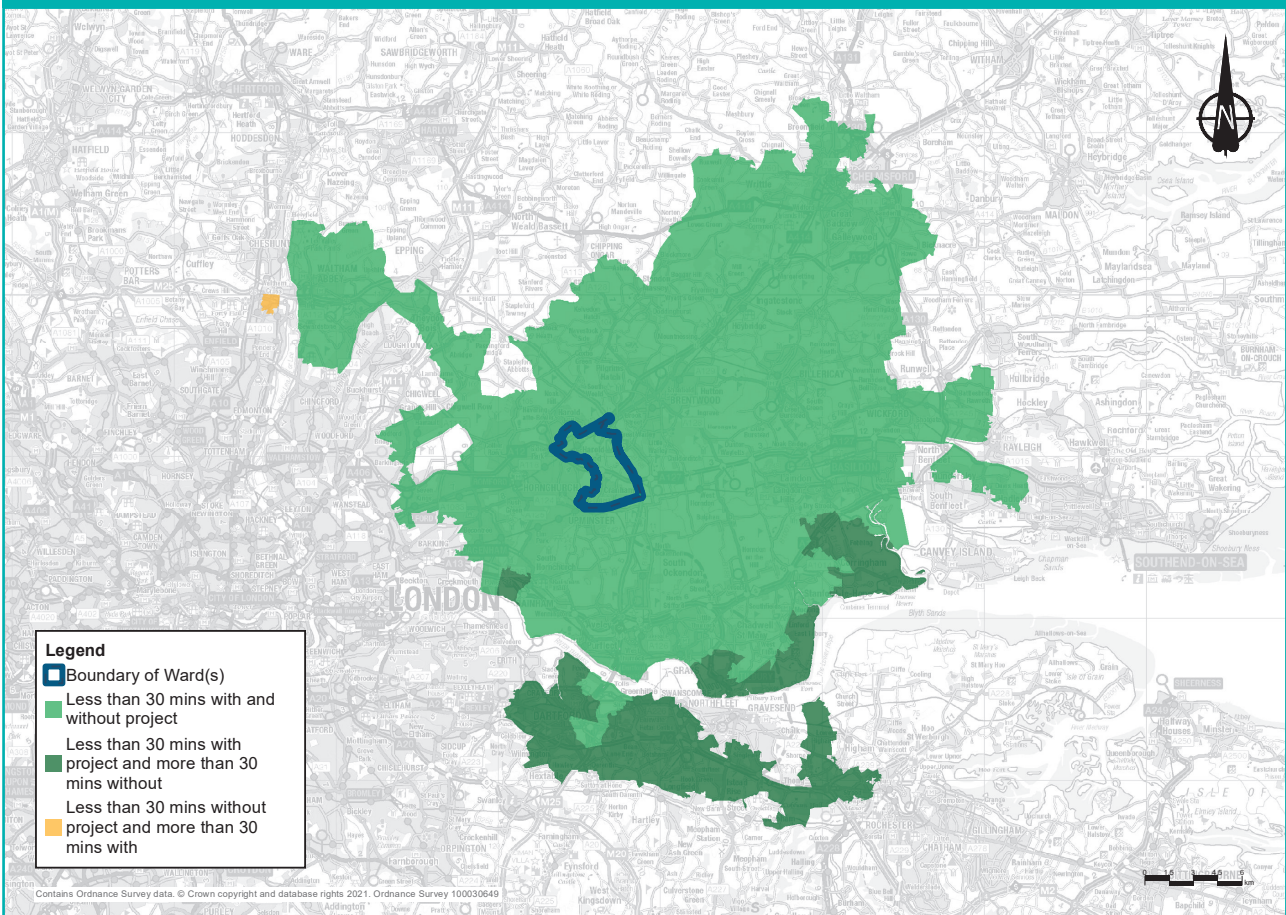
Figure 22.9: Predicted percentage change in traffic flows with the project during the evening peak in 2029



Changes to journey times

Figure 22.10 shows the change in the area that could be reached within a 30-minute drive from the centre of the wards both without the project and with the project. Figure 22.11 shows the change in areas within a 60-minute drive. The areas have been calculated for the morning peak hour (7am-8am). The number of jobs within a 30-minute drive would increase by 13%, which provides access to an additional 64,400 jobs. Within a 60-minute drive the number would increase by 7%, which provides access to an additional 205,000 jobs. Despite the project providing a substantial net gain in access for motorists within Cranham and Harold Wood wards, there are areas (shown in orange on the maps below) that would no longer be accessible by car within 30 or 60 minutes because of changes to traffic flows on the wider road network.

Figure 22.10: Change in area that motorists could drive to within 30 minutes from Cranham and Harold Wood wards



Operational traffic flows

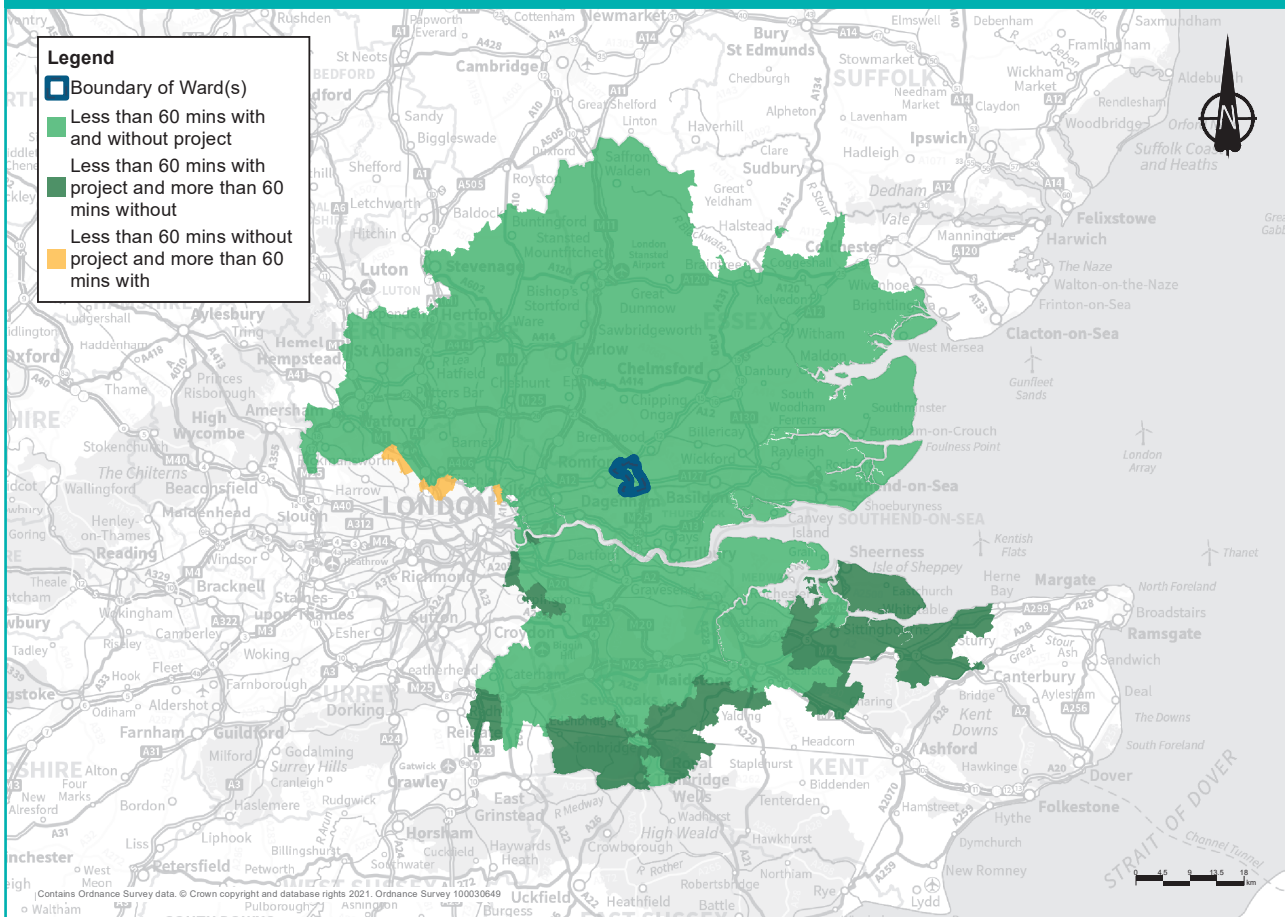
The project road and connections have been designed to maintain traffic flows on local roads, wherever possible. The relocated off-slip for northbound M25 traffic connecting to junction 29 would help traffic merge safely with northbound traffic from the Lower Thames Crossing, reducing the likelihood of high-speed collisions. Collisions are a major cause of congestion on the strategic road network.

Widening the M25 north and south of junction 29, along with the provision of longer slip roads would increase the capacity of the M25 to help maintain traffic flow. An additional lane on the roundabout at junction 29 would increase capacity, although the roundabout would require additional traffic lights to operate safely.

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 22.11: Change in area that motorists could drive to within 60 minutes from Cranham and Harold Wood wards



22.4 Public transport

Existing situation

Harold Wood station is situated within Harold Wood ward and is serviced by the Great Eastern Main Line railway, managed by Transport for London. Upminster Underground station is on the boundary of Cranham and Upminster wards.

A number of buses run through the ward including: 174, 498, 608, 193, 248, 256, 294, 346, 496, 497, 499, 646, 648, 656, 347 and regional coach services use the M25.

22.4.1 Construction

Buses

Local bus routes within the ward would not be impacted during construction.

Rail

There will be no impact on rail services within either Harold Wood or Cranham wards during construction.

22.4.2 Operations

Buses

There would be no changes to bus routes through the ward once the project opens and no discernible change to bus journey times.

Rail

There would be no discernible change in local access times to Harold Wood station or Upminster Underground station and no change to the services at these stations when the project is operational. It would be quicker for residents in these two wards to access HS1 services at Ebbsfleet International station, with the journey time to that station decreasing by around six minutes in the morning peak hour and four minutes in the evening peak hour.

22.5 Footpaths, bridleways and cycle routes

Existing situation

Cranham and Harold Wood wards are suburban and rural wards bordered to the east by the M25, with a network of footpaths that connect to the other side of the M25. For other potential impacts, see the other topic areas in this chapter, such as Visual and Noise and vibration.

22.5.1 Construction

Construction impacts

- The section of footpath FP176 south-west of M25 junction 29 would need to be closed for four to five years to allow works to take place, including utility diversions and construction of an access track.
- A section of bridleway BR183 (on the boundary with neighbouring Warley ward) that runs parallel to the M25 from just south of junction 29, to the crossing that links the bridleway for 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.

22.5.2 Operations

Operational impacts

Overall, the proposals for walkers, cyclists, and horse-riders include more than 46km of new, diverted, extended or upgraded footpaths, bridleways and cycleways. These would provide much improved connectivity across the project. The proposals were developed following consultation and engagement with local communities and stakeholders. For an overview of the proposed improvements to footpaths and bridleways across the project, see chapter 2 of the Operations update.

- There would be changes at the north side of the M25 junction 29 roundabout to facilitate east-west walking-cycling journeys along the A127. We would also build a new walking-cycling bridge over the A127, linking the north and south sides to allow east-west journeys. We would also widen a section of the existing walking-cycling route east of the new bridge (see chapter 23).
- Bridleway BR183 would have surface upgrades and some small diversions around the upgraded junction 29.

Figure 22.12: Existing footpaths, bridleways and cycle routes near the project in Cranham and Harold Wood wards

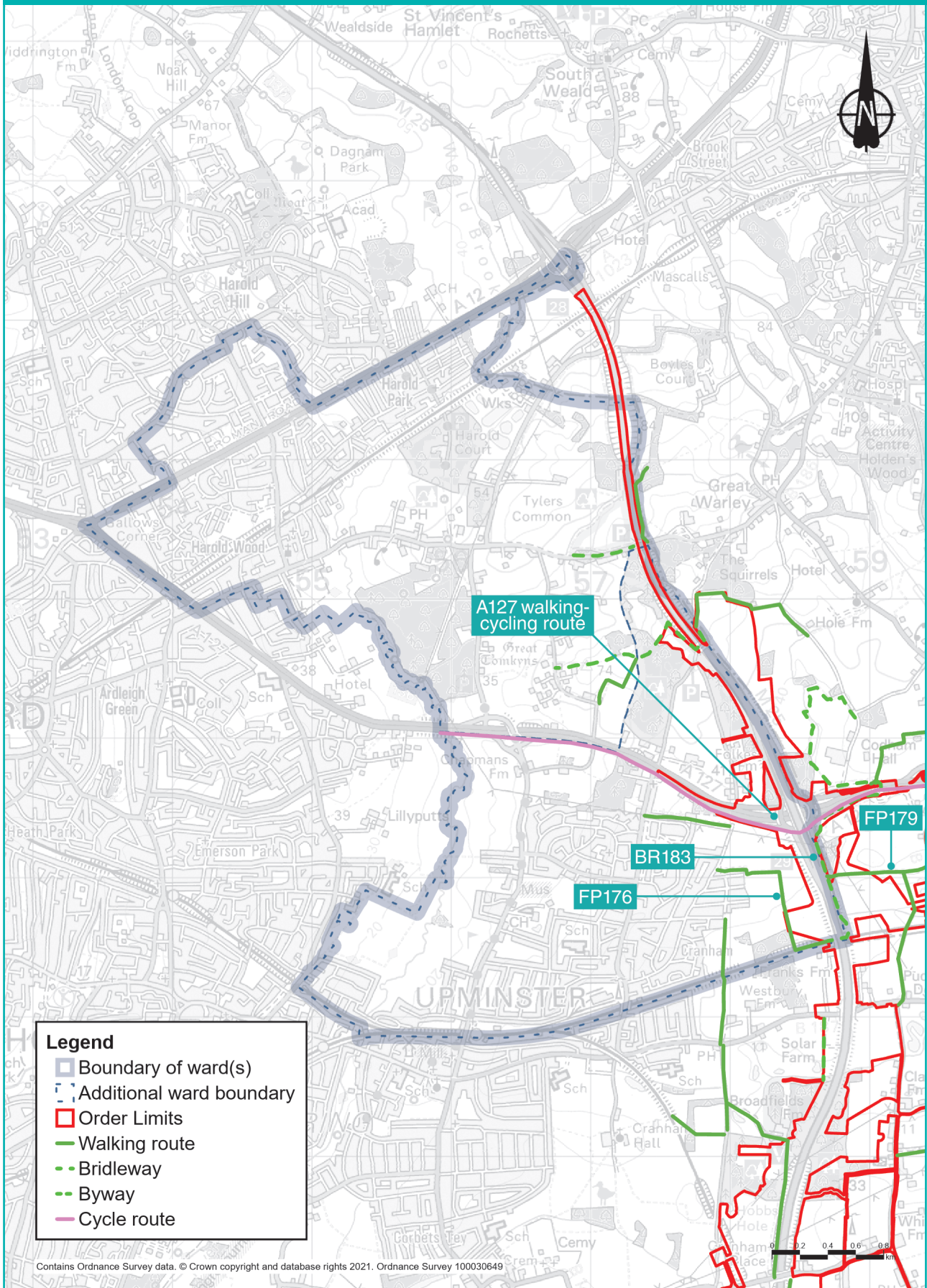
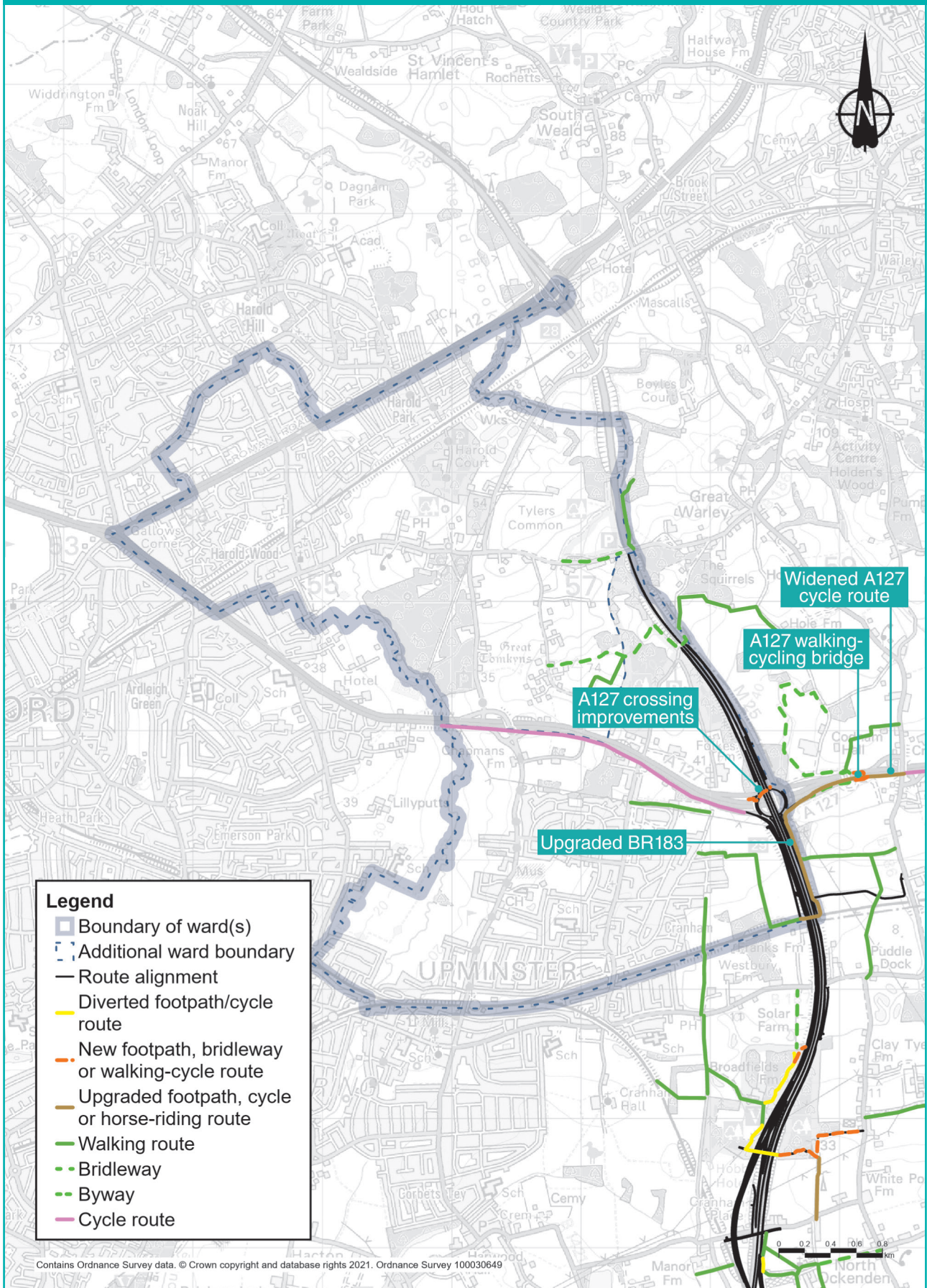


Figure 22.13: Proposed footpaths, bridleways and cycle routes in Cranham and Harold Wood wards



22.6 Visual

Existing situation

Of the main populated areas in Cranham, only a small number of homes on its eastern edge would have views towards the land on which the project would be built. To the south of the A127, other views of the project would come from a footpath between Cranham and the M25.

Current views from homes on the eastern edge of Cranham are mostly screened by existing vegetation. A small number of properties on Laburnham Gardens and Laburnham Close have densely filtered views towards the M25 corridor over Cranham Brickfields Open Space. East of this open space, a footpath running parallel with the M25, before turning east to follow the railway line in the direction of the motorway, provides open views over arable land towards the M25 on an embankment.

In Harold Wood, only recreational users of Tylers Wood open access land and associated footpaths would have views towards the land on which the project would be built. Current views from Tylers Wood are generally screened by tree-planting within the open access land and by roadside planting along the M25 corridor. However, there are glimpsed views towards the project through gaps in the vegetation.

22.6.1 Construction

Construction impacts

More information about how the area would look during construction, including visualisations, can be found in the Construction update. The main construction activities likely to be seen in these wards are:

- M25 widening works
- M25 junction 29 improvements
- Constructing a new bridge across the Shoeburyness railway
- Establishing and operating Warley Street Compound

More information about construction activities is provided in the Project description section above.

Views of our construction activities from the small number of homes on the eastern edge of Cranham would be densely filtered, and therefore unlikely to noticeably alter the existing view. However, from the nearby footpath parallel with the M25, there would be close-range views of construction activity, M25 widening works and possibly views of taller structures in the Warley Street Compound on the other side of the motorway.

From Harold Wood ward, views of construction activities would be limited to potential glimpsed views from Tylers Wood open access land, seen through gaps in existing vegetation.

Measures to reduce visual impacts during construction

Given the limited views of the project from these wards, no specific mitigation measures are considered necessary. The visual impacts of the project would be controlled through the range of good practice measures set out in the project's CoCP and the REAC. See chapter 1 of the Construction update for more information about this and the project's other control documents.

22.6.2 Operations

Operational impacts

By year of opening, road widening would be complete and the Warley Street Compound in the adjacent Warley ward would have been restored. Further information about the completed project is provided in the Project description section above.

Following the establishment of new planting along the M25 corridor, residential properties on the eastern edge of Cranham and the nearby footpath parallel with the M25 would have no visual impacts from the project.

There would be no visual impacts from Tylers Wood open access land.

Measures to reduce visual impacts during operation

Our landscape treatment along the M25 corridor would be among the measures to help integrate the motorway into the adjoining landscape.

22.7 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 is still a reasonable representation of the likely effects from the proposals presented during this consultation.

Existing situation

The existing noise environment in these wards is mainly from traffic where the M25 runs south to north on the eastern boundary. There is also noise from the A127, A12 and the A1023 roads.

As part of our environmental assessment process, we carried out surveys of existing background noise at one location in the wards, which was agreed with the local authority. The levels monitored at this location recorded an average existing noise level of 60dB(A)² during the day.

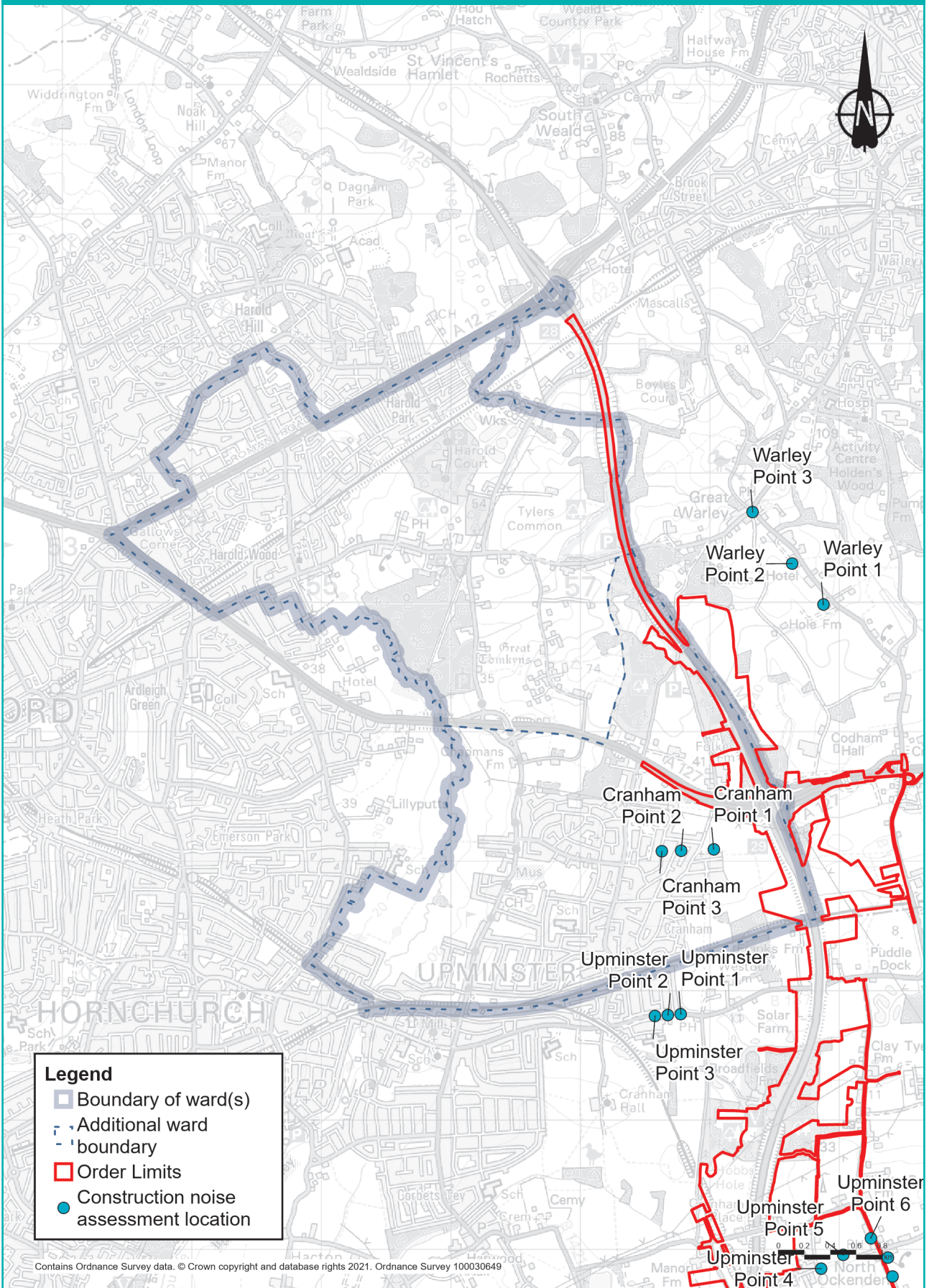
2 Decibel (dB) is the unit used to measure noise levels, with dB(A) being a standardised way of averaging noise levels that accounts for how humans hear sounds. The typical level of sounds in the environment ranges from 30 dB(A), which is a quiet night-time level in a bedroom, to 90 dB(A), which is how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

To understand how noise levels would vary with and without the project, we use noise modelling to predict what noise levels would be like in the project's proposed opening year if the project was not built. We model 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 take into account predicted changes in traffic levels.

We also model the predicted noise levels for the opening year with the project in place. This provides a useful comparison as to how the project would change the noise levels in the project's opening year if it were implemented.

In the opening year, noise levels without the project are predicted to range, on average, from 51 to 75 dB(A) during the day and from 36 to 61 dB(A) during the night at the identified locations in 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 operation, are presented below.

Figure 22.14: Construction noise assessment locations in Cranham ward



22.7.1 Construction

Daytime construction noise impacts

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

There are no main works compounds and only one Utility Logistics Hub within the Cranham and Harold Wood wards. These are described in the Project description section above.

Although not located in these wards, Warley Street Compound and Beredens Lane and Folkes Lane Utility Logistics Hubs (see chapter 9) may contribute to the noise impacts experienced within these wards due to how close they are to the ward boundary.

There are no percussive or vibratory works proposed within this ward.

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

Construction noise levels have been predicted at three locations across Cranham ward, chosen to provide a representation of the level of noise communities are expected to experience 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(12 hour), 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 22.15 below shows the locations at which we have predicted the daytime construction noise during the project's construction period.

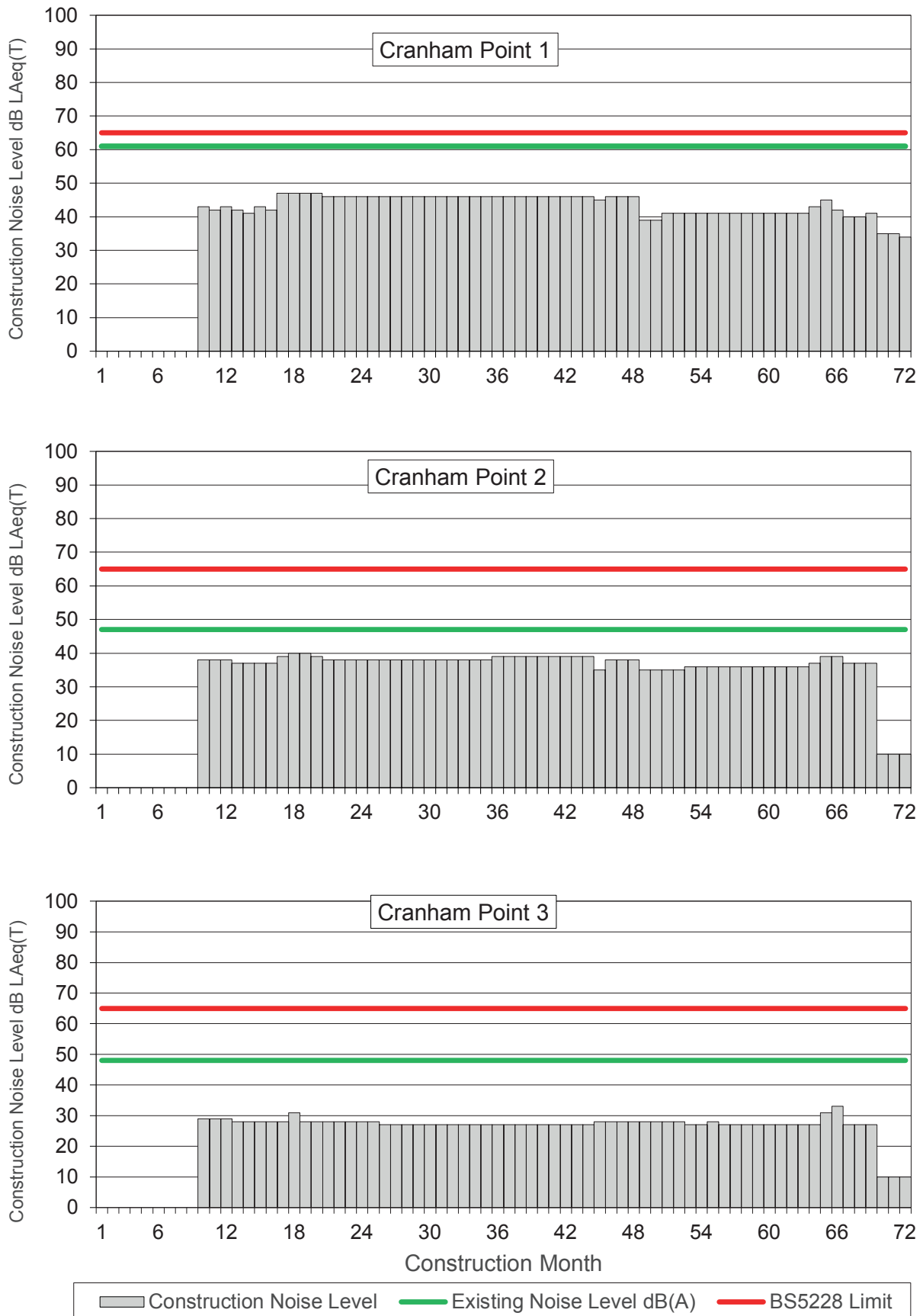
The horizontal green line in each chart shows the existing background noise level at each assessment point without the project. The horizontal red line shows the level at which construction noise would exceed acceptable thresholds (see chapter 1 for more information about these thresholds). If noise is predicted to exceed acceptable levels, then specific measures would be implemented to reduce the noise.

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

With reference to figure 22.15 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 34 to 47dB 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 10 to 40dB 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 10 to 33dB LAeq (12hour). Construction noise is not expected to exceed the existing background noise levels.

Figure 22.15: Construction noise by month for points 1, 2 and 3 in Cranham ward

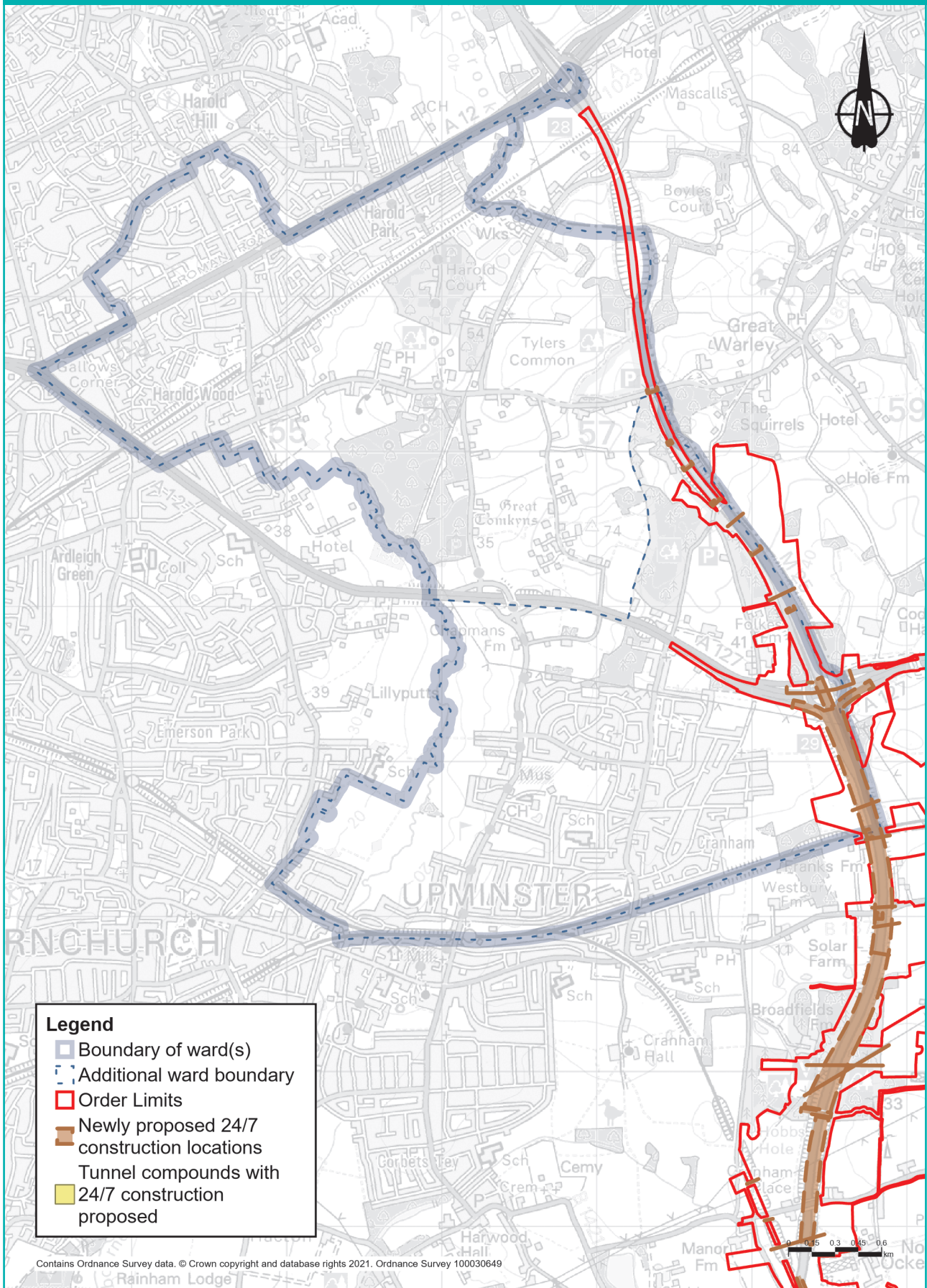


24/7 Construction working

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 22.16.

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 expected to be night-time or weekend highways works. These works could have an impact on local communities, and we would work with the local authority to manage these impacts.

Figure 22.16: Newly proposed and tunnel 24/7 working locations in Cranham and Harold Wood wards



Construction traffic noise impacts

Maps showing the predicted changes in road traffic noise within these wards during each year of 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 within the ward 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 22.4: Construction traffic noise impacts in Cranham and Harold Wood wards

Affected road(s)	Predicted noise impact	Construction year(s)
Northbound entrance slip road on to M25 at junction 29	Moderate increase in noise levels	2
Northbound entrance slip road on to M25 at junction 29	Major increase in noise levels	3, 4 and 5
Northbound exit slip road off the M25 at junction 29	Minor increase in noise levels	1

Measures to reduce construction noise and vibration

Construction noise levels would be controlled by 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 the construction areas likely to generate noise.
- Keeping site access routes in good condition with assessments on site to inspect for defects such as potholes.
- Turning off plant and machinery when not in use.
- Maintaining all vehicles and mobile plant so that loose body fittings or exhausts do not rattle or vibrate.
- Using silenced equipment where available, in particular power generators and pumps.
- No music or radios would be played for entertainment purposes outdoors onsite.

- Site layout would be planned to ensure that reversing is kept to a practicable minimum. Required reversing manoeuvres would be managed by a trained banksman/vehicle marshal to ensure they are conducted safely and concluded quickly to reduce the noise from vehicle reversing warnings.
- Non-percussive demolition techniques would be adopted where reasonably practicable to reduce noise and vibration impact.
- Careful consideration of the location and layout of compounds to separate noise-generating equipment from sensitive receptors, and the use of mains electricity rather than to generators, where possible.
- Minimisation of construction vehicle traffic by, where practicable, selection of local suppliers along the project route, using local workforces, and by minimising material transportation for earthworks construction along the project.

All control measures, including those above, fall under the principles of BAT and are secured in the REAC. For more information, see the 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 appropriate.

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

22.7.2 Operations

Operational noise impacts

In Cranham and Harold Wood wards, the upgraded M25, including the new slip roads, would pass through the eastern part of these wards.

The eastern section of the wards would experience noise from the route and the proposed upgrades of the existing M25. There would also be noise impacts as a result of changes in traffic flow, composition and speed on existing roads in the wards.

Noise impacts within these wards would be as a result of changes in traffic flow, the number of HGVs, and traffic speeds on the existing road network within the wards and because of changes to the M25 in the eastern section of the wards.

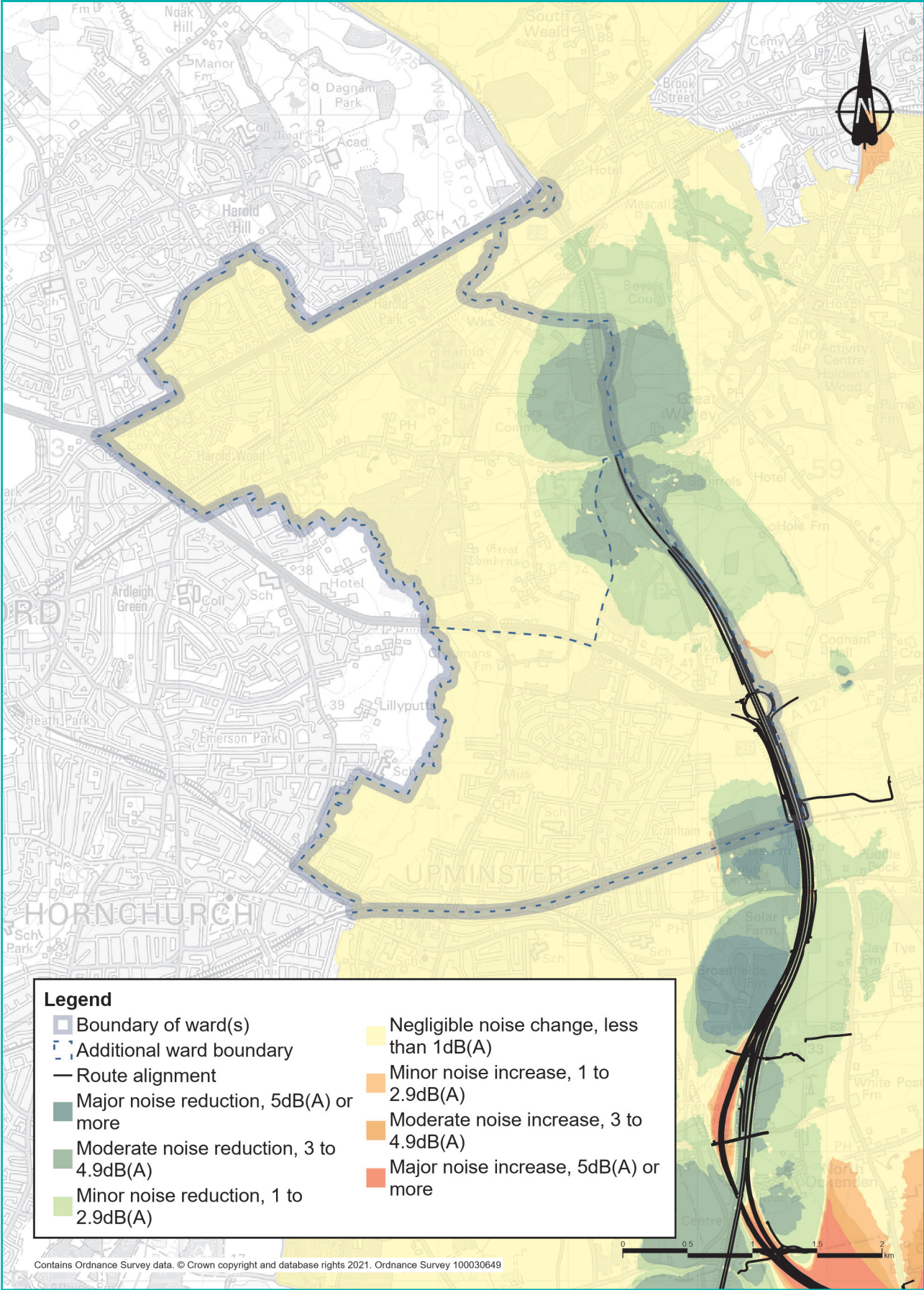
Figure 22.17 shows the predicted changes in traffic noise in the opening year of the project. Within the wards, changes in road traffic noise at identified noise sensitive locations (such as nearby properties) are predicted to range from a moderate decrease in levels of between 3.0 and 4.9dB to a negligible increase of less than 1.0dB. For more information about how we define noise impacts (negligible, minor, moderate and major), see chapter 1.

Measures to reduce traffic noise and vibration during operation

The main methods of controlling noise would be, where practicable, to design the 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 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 22.17: Noise impacts during operation in Cranham and Harold Wood wards



22.8 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 here still presents a reasonable representation of the likely effects from the proposals presented during this consultation.

Existing situation

Cranham and Harold Wood wards are within the London Borough of Havering and the entire area has been declared an Air Quality Management Area due to yearly levels of air borne pollution rising above accepted standards. These areas have been identified by local authorities as a way of monitoring and controlling areas of poor air quality.

22.8.1 Construction

Construction impact

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 these wards, there are only a few properties within 200 metres of the worksite, including north of Cranham near the A127 Southend Arterial Road. Air quality impacts on these properties during construction would be temporary and we would put measures in place to minimise the dust impacts (see below). The proposed measures to reduce dust and emissions are ones that have been 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, although there would be a minor improvement in air quality in the area around close to 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 ensure that 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 London Borough of Havering for consultation (see REAC reference AQ006).

22.8.2 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 roads within 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.

No receptors (properties or habitats that are sensitive to changes in air quality) were modelled in Harold Wood ward. However, there are receptors within Cranham ward, close to the A127 Southend Arterial Road junction and the north part of the Front Lane, that are predicted to experience a minor worsening in the air quality for nitrogen dioxide (NO₂), the main traffic-related pollutant³. The highest modelled yearly average NO₂ concentration within this ward is 37.4 µg/m³, which is below the yearly average threshold of 40µg/m³. 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.

³ NO₂ levels are measured in 'micrograms per cubic metre', or µg/m³, where a microgram is one millionth of a gram.

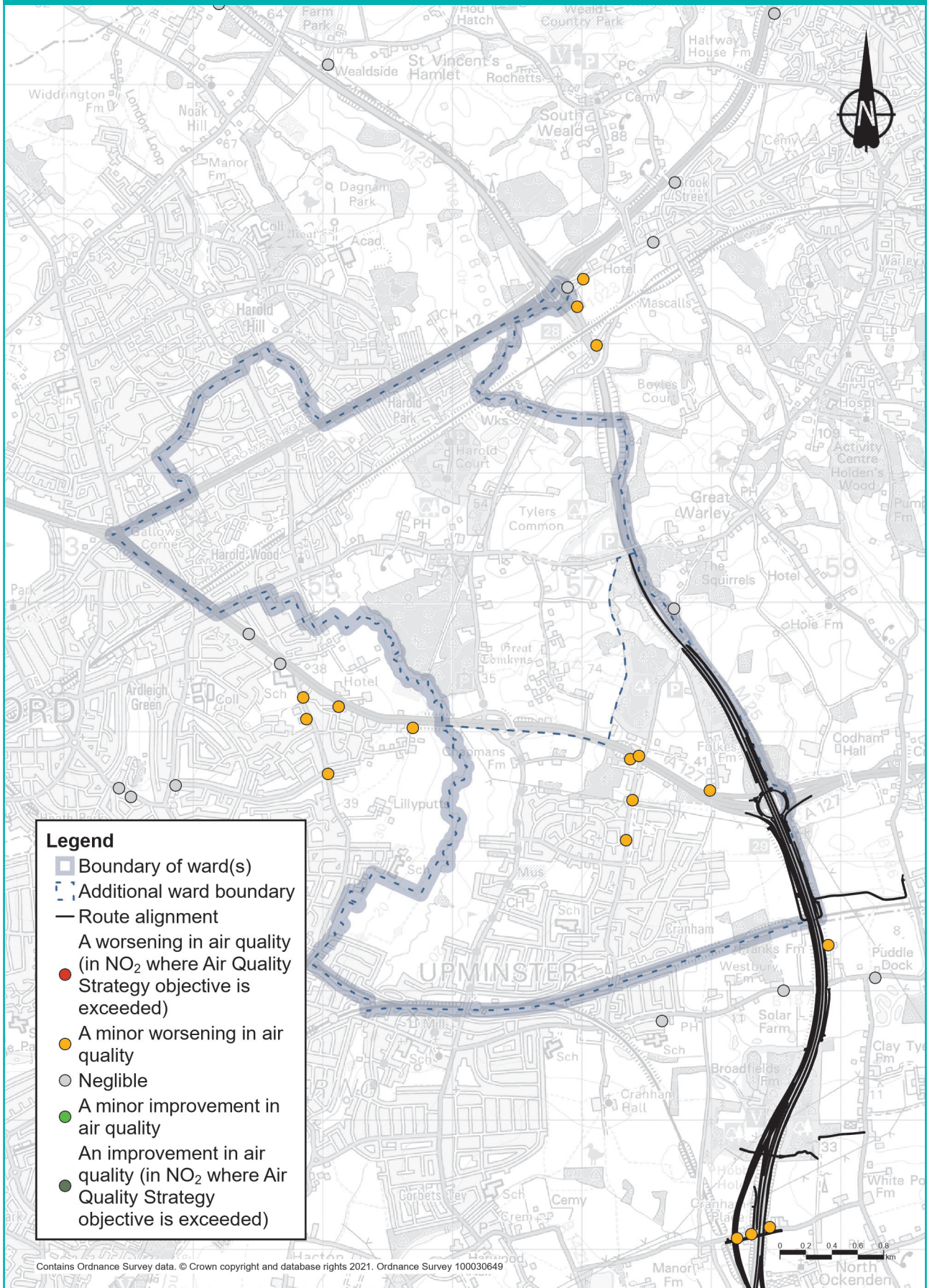
Furthermore, local air quality data shows an overall downward trend in NO₂ over recent years, which means that future air quality improvements at this location are likely (for example, through increased adoption of electric vehicles meaning a reduction in exhaust emissions).

In addition to our assessment of NO₂, our assessment predicts that PM₁₀ 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 project, would not trigger the need for additional monitoring or other mitigation measures once the road is open.

Figure 22.18: Predicted changes in nitrogen dioxide levels within Cranham and Harold Wood wards once the new road is open



22.9 Health

Existing situation

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

Cranham

When compared to Havering as a whole, Cranham ward has:

- A higher proportion of people aged 60 and over (29.4% compared with 23.3% for Havering).
- A lower proportion of young people living in the ward (18.0% and 21.2% respectively).
- A significantly higher proportion of white residents (94.2% and 87.7% respectively).

As a whole, rates of deprivation across Cranham are very low with areas ranked in the least deprived 10% across England according to the English Indices of Deprivation. A high proportion of residents own their home outright.

Residents here generally have higher rates of self-reported very good health compared to Havering as whole, 47.5% and 46% respectively. In addition, a higher proportion of Cranham residents report their day-to-day activities are not limited compared to Havering as a whole, 7.6% and 8.2% respectively.

Regarding male and female life expectancy, death from causes including, respiratory diseases, coronary, coronary heart disease and all cancers, Cranham performs significantly better across each measure compared with Havering. In fact, the ward performs better than England for a number of listed measures.

Harold Wood

When compared to Havering as a whole, Harold Wood has:

- A slightly lower proportion of people aged 60 and over (22.2% and 23.3% respectively).
- A slightly lower proportion of younger people living in the ward (20.1% and 21.2% respectively).

As a whole, rates of deprivation in Harold Wood area are low. However, one area is found to be in the top 20% most deprived in the whole of England according to the English Indices of Deprivation. When compared to other wards found throughout Havering, a low proportion of residents own their own home, with a significantly higher proportion socially rented.

Residents generally have lower rates of self-reported very good health compared to Havering as a whole, 45.5% and 46% respectively. In addition, a higher proportion of Harold Wood residents report their day-to-day activities are limited compared to Havering as a whole, 8.4% and 8.2% respectively.

Life expectancy at birth for men and women is better in Harold Wood than is the case for Havering as a whole. Rates are similar to that for Havering for deaths from all causes (these are causes where all or most deaths could potentially be prevented by public health interventions in the broadest sense), as well as respiratory diseases, coronary heart diseases and cancer.

22.9.1 Construction

Construction health impacts

Construction activities affecting Cranham and Harold Wood are presented in the Project description section. Primarily, they relate to:

- Widening of the M25 and tie-in works.
- Warley Street Compound (located in neighbouring Warley)
- Establishing a Utility Logistics Hub (ULH) near the top of Folkes Lane.
- Construction routes on public roads (M25 and A127).

Elements of these activities have the potential to impact human health (including mental health and wellbeing), whether this is through noise associated with construction activities or construction traffic, air quality (as a result of dust emissions), severance caused by construction traffic, or road and footpath closures.

There could be both positive and negative potential impacts on people's health and wellbeing. With good communication and engagement, any stress or anxiety caused by construction would be reduced. Equally, some residents would see health and wellbeing benefits from improved access to work and training opportunities (see the Traffic impacts section).

The relationship between mental health and unemployment is two-way. Good mental health is a key influence on employability and finding and keeping a job. Unemployment causes stress, which ultimately has long-term physiological effects and can lead to depression, anxiety and lower self-esteem.

A range of personal, social, economic and environmental factors influence our health and these are known as health determinants. They include the physical environment, income levels, employment, education, social support and housing. Different groups within the population may be more sensitive to these health determinants than others – for example, children, older people or those with pre-existing health conditions.

Negative health outcomes may be experienced by some groups in Cranham, these include:

- Temporary adverse visual effects.
- 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 our construction activities.
- There are few properties in Cranham ward within 200 metres from the Order Limits and are therefore unlikely to be affected by dust or emissions from construction. Those properties within 200 metres could experience air quality changes as a result of increased dust and emissions. Analysis of project-related traffic flows indicate that changes in flow and emissions between 2025-2028 along the M25 corridor south of junction 28, could lead to a temporary improvement in air quality at nearby receptors.
- Views of construction activities to the south of the A127 are likely from a small number of residential properties on the eastern edge of Cranham, and from a local footpath and public open space east of the ward boundary.
- To the north of the A127, construction activities would be visible from commercial properties off Folkes Lane, and the local footpath network.
- The main construction activities expected to create noise impacts in this ward during core daytime hours would relate to the M25 and utilities works.

- There are no construction compounds located in the ward. Core daytime working hours are unlikely to create additional impacts in the ward over and above the works on the existing M25, and the present levels of noise in an area dominated by the M25.
- Based on the currently available traffic data (which offers a representative picture of what receptors within the ward 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. Affected roads include the northbound entrance and exit slip road on junction 29 of the M25.
- In addition to the changes to the daytime noise impacts presented in the section above, 24-hour, seven-day construction working is proposed. 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 expected to be night-time or weekend highways works. These works could have an impact on local communities.

Potential impacts in Harold Wood ward include:

- There are only a few properties in Harold Wood ward within 200 metres of the Order Limits, which reduces the impact on air quality of increased dust or emissions from construction. However, those properties that are within 200 metres could be affected.
- There are likely to be health benefits as a result of access to work and training opportunities.
- Views of construction activities would be limited to a small area on the eastern edge of the ward. Construction activities would also be visible from the local footpath network, and by recreational users of Tylers Wood, in places where the views are not restricted by intervening woodland and roadside vegetation along the M25.
- The main construction activities expected to create noise and vibration impacts on this ward are associated with core daytime hours works to the existing M25 and utilities works.
- There are no construction compounds located in the ward. Core daytime working hours are unlikely to create additional impacts here over and above the works on the M25, and present levels of noise in an area dominated by the M25.

- Based on the currently available traffic data (which offers a representative picture of what receptors within the are ward 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.
- In addition to the changes to the daytime noise impacts presented in the section above, 24-hour, seven-day construction working is proposed. These locations are where works may need to be carried out outside of core hours to maintain safety and reduce disruption to road and utility networks. The works in this area are expected to be night-time or weekend highways works. These works could have an impact on local communities.

Negative health outcomes may be experienced by some groups as a result of changes to:

- Accessibility (for example, people who are more dependent on public transport and have less choice about how they travel and the route they take).
- Severance (where road and footpath closures may affect some people's ability to access services or facilities).
- Access to open space (people without access to private cars may have fewer alternatives within a reasonable travel time).
- The noise environment.

Measures to reduce construction health impacts

Proposed measures relating to health and wellbeing (including good practice for dust emissions, hours of working and visual screening) are described in the Visual impacts, Noise and vibration impacts, and Air quality sections. Further information relating to mitigation measures for these areas is set out in the CoCP, the REAC and the package of traffic management plans. The commitments in the REAC include adhering to Best Practicable Means to reduce noise impacts (see NV007 in the REAC) and dust-management good practice (see AQ005 in the REAC). See chapter 1 of the Construction update for more information about this and the project's other control documents.

Engagement and effective two-way communication with communities before and during construction, including sharing information about the programme and impact of works, is important to reduce mental health and wellbeing impacts associated with uncertainty, stress and anxiety. The CoCP sets out proposals for how we would provide communities, stakeholders and any other affected parties with updates about the construction works, their progress and the associated programme.

21.9.2 Operations

Operational impacts

Information about the operational project in these wards can be found in the Project description section:

Both positive and negative health outcomes may be experienced by residents of Cranham ward:

- The operation assessment study area includes a 200-metre buffer from roads within the affected road network. Air quality modelling results indicate deteriorations and improvements in local air quality as a result of the new road and changes in traffic flows.
- The properties modelled in Cranham are predicted to be well below the air quality thresholds for the traffic-related pollutants nitrogen dioxide and particulate matter. The highest modelled annual mean NO₂ concentration at identified locations, based on a 2027 opening year (which is currently being updated to 2029), is 37.4 µg/m³, below the annual mean threshold of 40µg/m³. Our air quality assessment indicates that the new road is unlikely to result in significant air quality changes. This will be confirmed in the Environmental Statement following an assessment based on updated traffic data for a 2029 opening year.
- Once new planting is established along the M25 corridor, there would be no visual impacts from residential properties on the eastern edge of Cranham, or the nearby footpath parallel with the M25.

The following health outcomes may be experienced by residents in Harold Wood:

- Air quality assessments indicated no deterioration in air quality in Harold Wood. However, the annual mean NO₂ concentration at an identified location close to the ward, based on a 2027 opening year (which is currently being updated to 2029) is 37.4 µg/m³, below the annual mean threshold of 40µg/m³.
- The conclusion of the air quality assessment is that the new road is unlikely to result in significant air quality changes.

Measures to reduce operational health impacts

The landscape treatment along the M25 corridor would be the primary mitigation measure in Cranham and Harold Wood, and intended to integrate the motorway into the adjoining landscape.

22.10 Biodiversity

Existing situation

The main habitats within the Order Limits in Cranham ward are areas of arable land, with some rough grassland and a number of watercourses. There are also areas of pasture, scrub, woodland and community woodland.

Within 2km of the Order Limits, in Cranham ward, there is one designated site: Cranham Brickfields Local Nature Reserve. Within 500 metres of the Order Limits, the non-designated sites include:

- Franks Wood
- Cranham Brickfields Site of Importance for Nature Conservation (SINC) and Ancient Woodland
- Pot Kiln Wood
- Sickle Wood SINC
- Hillview SINC
- Tomkyns East Pastures SINC
- Foxburrow Wood SINC and Ancient Woodland
- Cobham Hall Wood Local Wildlife Site (LWS) and Ancient Woodland
- Hobbs Hole LWS
- Coombe Green Wood Ancient Woodland and M25 junction 29 Ancient Woodland

Following surveys to establish a baseline for assessment within the Order Limits and relevant buffer zones, we identified a range of protected and notable species. These included bats, terrestrial invertebrate species, great crested newts and reptiles in Cranham ward.

Only a small part of Harold Wood ward falls within the Order Limits, and this is restricted to a small area of vegetation alongside the M25. The ward contains no designated sites within 2km of the Order Limits. Within 500 metres of the Order Limits in the Harold Wood, the non-designated sites are the following Sites of Importance for Nature Conservation (SINC):

- Foxburrow Wood and Ancient Woodland
- Tomkyns East Pastures
- Tylers Common
- Jer mains Wood
- Tylers Hall Pond
- Ingrebourne Valley

Following surveys carried out across the project to set a baseline for assessment, we recorded no protected and notable species in Harold Wood ward.

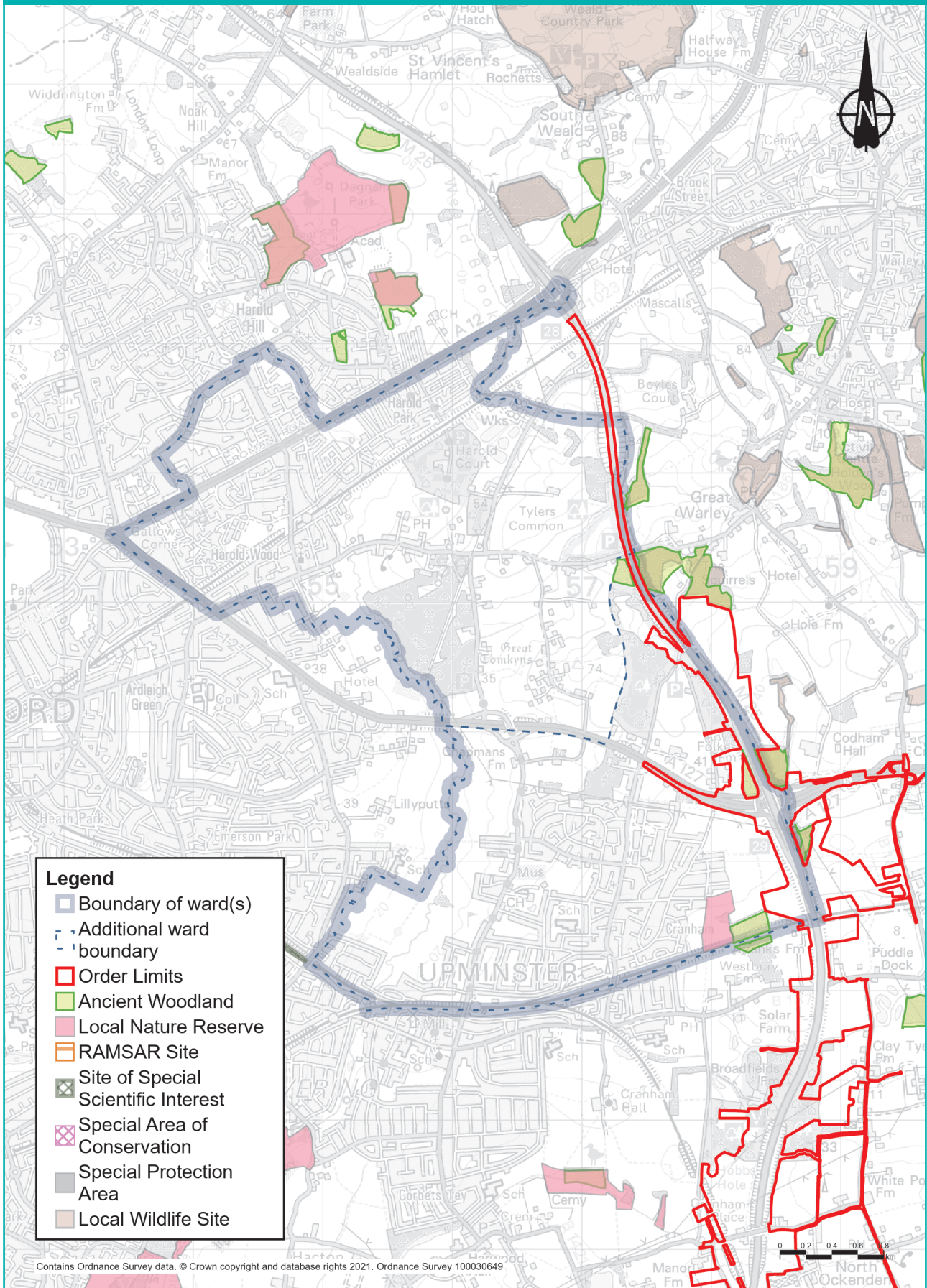
22.10.1 Construction

Construction impacts

Construction of the new road would require the removal of some habitat in Cranham ward, both temporarily and permanently from the route alignment. This habitat consists of arable fields, scrub, rough grassland and woodland. A range of protected and notable species would be affected by construction in terms of direct habitat loss (the loss of bat roosts, reptile, great crested newt and invertebrate habitat), fragmentation of habitat, and disturbance to retained habitat.

We would need to remove a small area of woodland and scrub adjacent to the M25, including a small area of Ancient Woodland in Harold Wood ward.

Figure 22.19: Designated and non-designated biodiversity sites in Cranham and Harold Wood wards



Measures to reduce biodiversity impacts during construction

Vegetation clearance would take place during the winter to avoid disturbing breeding birds. Where this is not possible, clearance would be supervised by an ecological clerk of works to make sure that no nests are disturbed or destroyed. Where protected species are present, these would be moved away from the site before construction, either through habitat manipulation (for example, strimming to reduce the height of vegetation and displace reptiles), or translocation. Where necessary, works affecting protected species would be carried out under a Natural England licence. Boxes to support bats and birds would be set up in retained habitat. The scrub removed would be reinstated during the construction process within the Harold Wood ward.

We would also create areas of open mosaic habitat consisting of grassland, scrub and bare earth, and larger areas of species-rich grassland to provide good quality habitat for a number of species, particularly invertebrates, reptiles and amphibians including great crested newts in Cranham. This habitat would also be suitable for the breeding bird assemblage in this area. We would include ponds in these areas to further diversify the habitats and provide areas for breeding great crested newts. These are shown in a map in the general arrangement drawings.

In addition, we would carry out areas of woodland planting in Cranham to offset woodland habitat being lost adjacent to the Ancient Woodland around the M25 junction 29 and outside of the Harold Wood ward.

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

22.10.2 Operations

Operational impacts

The project's operation has the potential to cause species mortality through habitat fragmentation as well as exposure to, and noise disturbance from, road traffic. It should be noted that these impacts are already present in Cranham and Harold Wood as the M25 is nearby, and it is not anticipated that the project would add to this.

Measures to reduce biodiversity impacts during operation

Newly created habitat including habitat created to support animals moved from the construction area, would be managed to ensure that they provide high-quality environments to support a broad range of different plant and animal species.

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

22.11 Built heritage

Existing situation

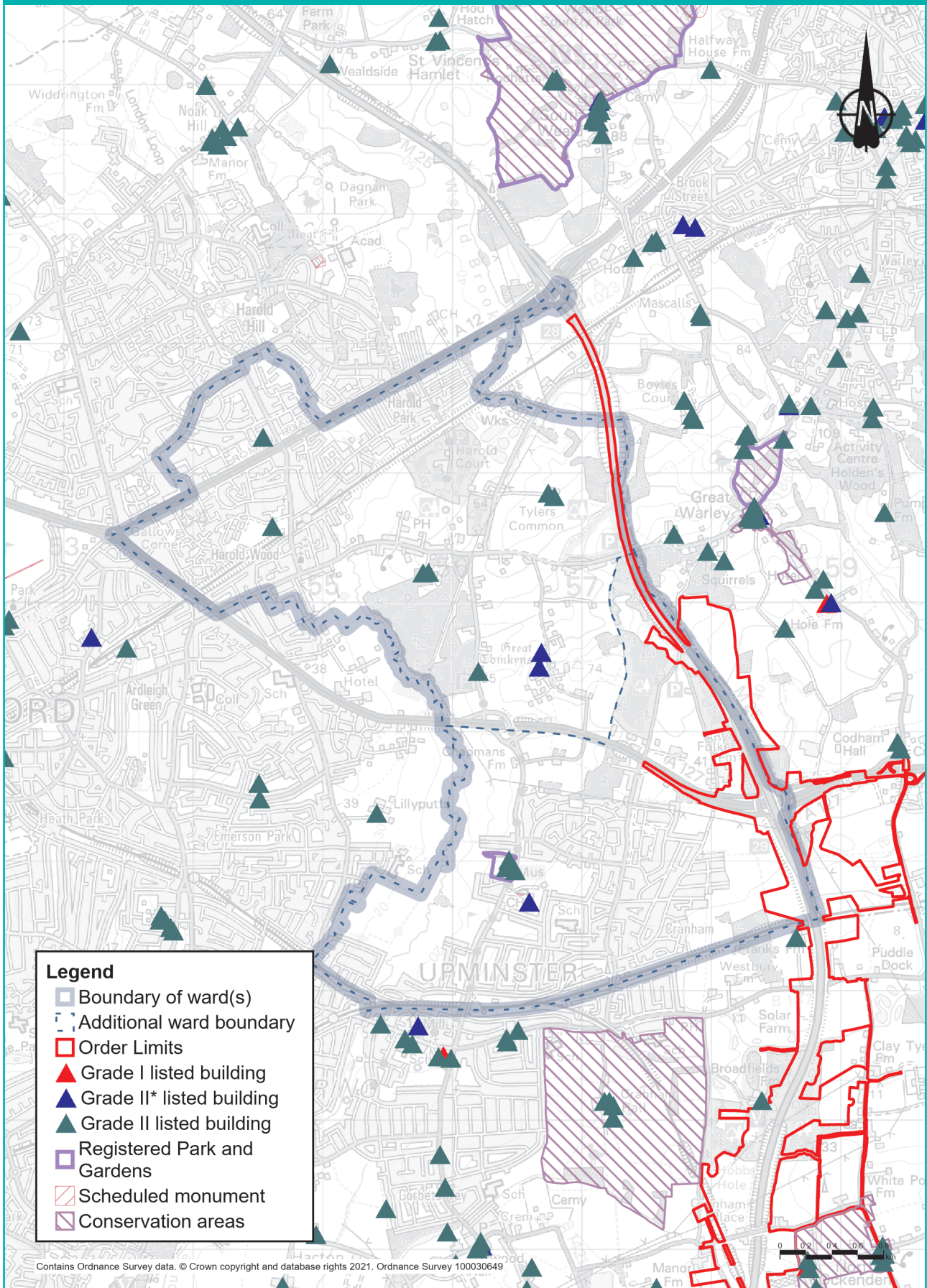
We have identified four listed buildings in Harold Wood ward in relation to the project. Two of these listed buildings are Grade II* listed and two are Grade II listed.

No buildings of historic relevance have been identified in Cranham in relation to the project.

Listed buildings

- Great Tomkyns and the Barn to the north-east of Great Tomkyns are both Grade II* listed and of high heritage value. Both buildings are located on Tomkyns Lane to the west of the M25 and around 800 metres from the project. Great Tomkyns is a 15th-17th century hall house with a full-height hall. It stands within a rectangular moated enclosure which is probably medieval. Part of the moat survives to the north and east of the house. The listed barn, to the south-west of the house, probably dates from the late 13th or 14th century and was repaired and extended around 1727.
- Tylers Hall Farmhouse and timber framed range of weatherboarded outbuildings to Tylers Hall Farmhouse are both Grade II listed and of high heritage value. Both buildings are located around 480 metres west of the M25 and the project.

Figure 22.20: Built heritage in Cranham and Harold Wood wards



22.11.1 Construction

Construction activities

Construction activities affecting Cranham ward relate to establishing the main project route and construction access along the A127 and M25 junction. The construction of Warley Street Compound lies just outside the ward, east of the M25. However, activities relating to establishing and operating it would apply. Further information on the construction activities in this ward are provided in the Project description section.

Construction activities affecting Harold Wood ward relate to establishing the main project route and construction access along the M25. This is likely to result in increased traffic, noise and dust. Further information on the construction activities in this ward are provided in the Project description section.

Listed buildings would not be impacted by the project.

Measures to reduce impacts during construction

Construction mitigation is not required as there would be no impact on built heritage. For general information about heritage mitigation measures, refer to the Design principles (section S326), the CoCP, and the Air quality, Noise and vibration, and Cultural heritage sections of the REAC.

22.11.2 Operations

For more information about the completed project, see the Project description section above.

Operational impacts

There are no anticipated 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 would be affected by the project once operational.

22.12 Contamination

Existing situation

From a desk-based review of historical maps and environmental data, there are no known medium or high-risk sources of contamination that could be at risk of disturbance during construction or operation of the project within Cranham and Harold Wood wards.

22.12.1 Construction

By following a construction management plan and ensuring that, where potential sources of contamination are used (for example, oils, lubes, mechanical plant), an appropriate spill containment and emergency response procedure is in place to prevent adverse environmental impacts from occurring.

22.12.2 Operations

During the operation of the road, should an incident occur (for example a traffic collision) 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.