

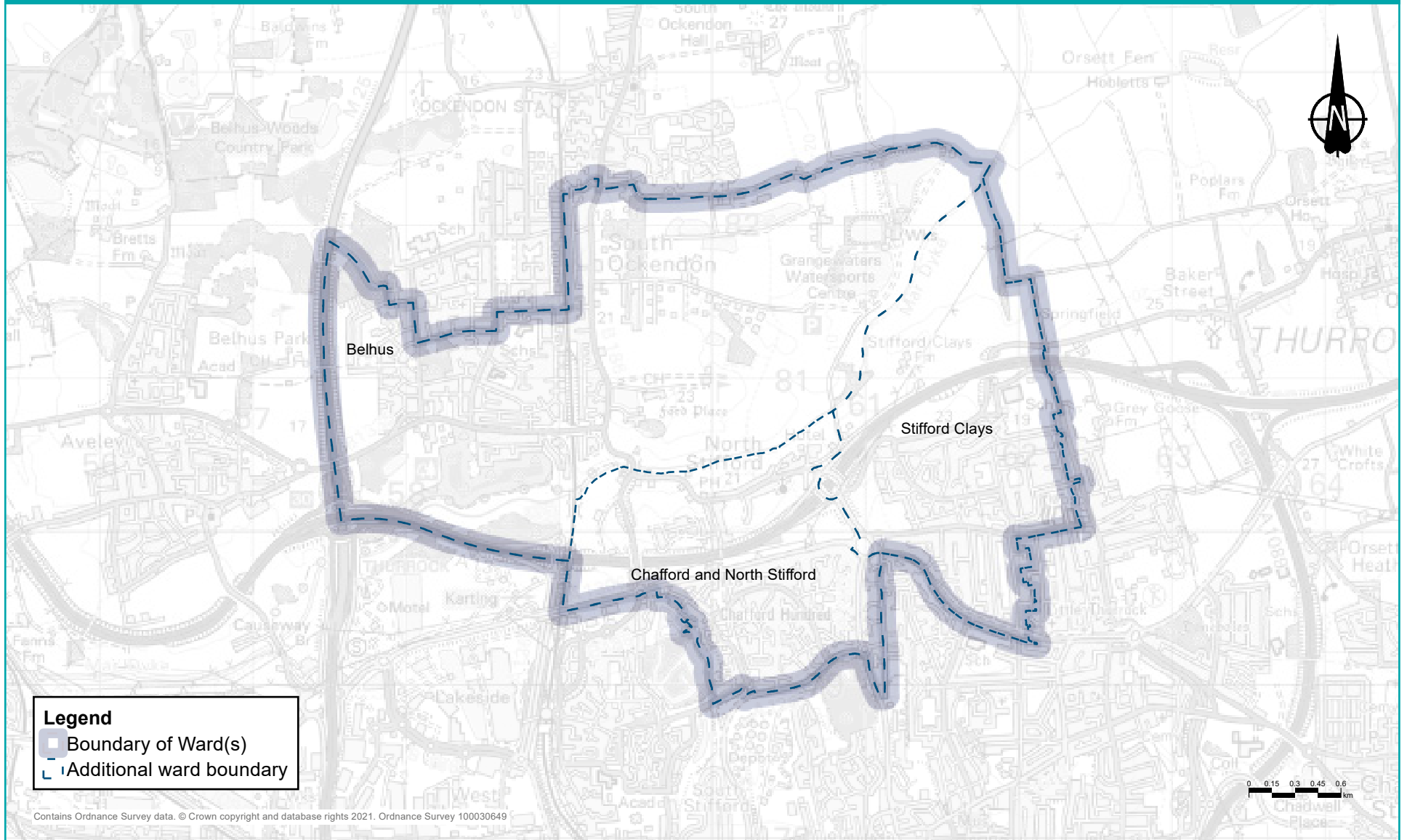
Chapter 18: Stifford Clays, Chafford and North Stifford, and Belhus wards

This chapter summarises the project's construction and operational activities in Stifford Clays, Chafford and North Stifford, and Belhus wards, which are situated in the borough of Thurrock. It also explains the measures intended to reduce the project's impacts on local communities. 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 three wards are presented together in one chapter because these wards are 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 18.1: Ward boundary map for Stifford Clays, Chafford and North Stifford, and Belhus wards



18.1 Overview

18.1.1 About these wards

Stifford Clays ward is located to the west of Little Thurrock Blackshots and Orsett wards. The ward has an area of around 2.8km² and an estimated population of 6,754¹. To the south of Stifford Clays Road it is predominantly residential, and there are agricultural fields north of the road. A section of Cats Mede, a Local Wildlife Site (LWS), is situated to the north-west of the ward. The Mardyke River, an Environment Agency designated main river, runs along the northern boundary of the site and through it. High-pressure gas mains and overhead power lines are located in agricultural fields to the north of the ward. The A13 runs east-west through the ward.

Chafford and North Stifford ward is west of Stifford Clays and south of Belhus ward. It has an area of around 2.3km² and an estimated population of 8,257². The ward is residential to the south of the A13, which runs east-west through the ward. North of the road is the A13, with further residential housing to the north along High Road, Clockhouse Lane, Stifford Hill and Guardian Avenue. The majority of the area to the north of the A13 is made up of open space. The Mardyke runs along the ward's northern boundary. A high voltage overhead electricity line is on land immediately south of the A13. The A13 runs east-west through the ward.

Belhus ward is north of Chafford and North Stifford ward and west of Stifford Clays ward. It has an area of around 6.3km² and an estimated population of 10,696³. The ward is residential in the west, with agricultural land to the east. The Mardyke River runs along the southern boundary. Buckles Lane traveller site is in the east of the ward, north of the Mardyke Valley Golf Club. It is made up of nine distinct 'sub-yards' containing a total of 109 plots. A high-voltage overhead power line is on land immediately south of the A13. The A13 runs along the southern ward boundary.

1, 2, 3 Office of National Statistics, 2018 ward-level population estimate

18.1.2 Summary of impacts

Table 18.1: Summary of impacts during the project’s construction and operation

Topic	Construction	Operations
<p>Traffic</p>	<p>Impacts</p> <p>The traffic impacts in the ward are likely to be restricted to the roads where there are traffic management measures in place and the A13. Further details about the proposed traffic management can be found in the Construction section of this chapter.</p> <p>Mitigation</p> <p>There are several mitigation measures to reduce the impact of the construction process on local residents, including avoiding using local roads where possible. More information about the mitigation measures can be found in the Traffic section of this chapter.</p>	<p>Impacts</p> <p>Within these wards, there would be decreases in traffic flows on the M25 north of junction 30 in both northbound and southbound directions and on the A13 eastbound and westbound. There would also be changes in traffic flow on local roads such as Stifford Clays Road, the A1012 and the West Thurrock Arterial Way. See the Traffic section for more information.</p> <p>Mitigation</p> <p>Regular reporting would take place once the project is operational. Further details about the mitigation measures for Stifford Clays, Chafford and North Stifford and Belhus wards can be found in the traffic section of this chapter.</p>
<p>Public transport</p>	<p>Buses</p> <p>Journey times on the Z2 bus may increase due to the increased traffic flows on the A13. Traffic management may affect buses using local roads.</p> <p>Rail</p> <p>During construction, there may be some increases in journey times to Grays and Ockendon stations, associated with increased traffic through the area and traffic management on the local roads.</p>	<p>Buses</p> <p>While there would be no impacts on journey times for most bus routes, there would be changes to journey times for three buses: the 25 from Stifford Clays through Grays to Purfleet, the 51 from Prittlewell to Grays and Chafford, and the 265 from West Horndon to Grays.</p> <p>Rail</p> <p>There would be no discernible change in access times to Ockendon station and no change to rail services once the project is operational.</p>

Topic	Construction	Operations
<p>Footpaths, bridleways and cycle routes</p>	<p>Impacts</p> <p>Two bridleways and one footpath would need to be closed during the construction period, while one cycle route would be affected by the realignment of the Stifford Clays Road.</p> <p>Mitigation</p> <p>Where closures of footpaths and bridleways are necessary to allow for construction works, these closures would be reduced as much as possible. The Stifford Clays Road would be diverted adjacent to the existing road, which would remain open other than a short period when the road is realigned and bridges over the project constructed.</p>	<p>Impacts</p> <p>One bridleway and one cycle route impacted by construction would have been upgraded and have new connections, once the project is operational.</p> <p>Mitigation</p> <p>No mitigation is required.</p>

Topic	Construction	Operations
<p>Visual</p>	<p>Impacts</p> <p>Construction traffic using Stifford Clays Road would be visible from the northern edge of Stifford Clays. From the local cycle route along Stifford Clays Road and the bridleway along Green Lane there would be views of Green Lane Utility Logistics Hub and more distant views towards Stifford Clays Road West and East compounds, overhead line diversion works and construction of Green Lane green bridge. From Mardyke Way, there would be distant views of road construction and Orsett Fen Viaduct, as well as construction traffic using Medebridge Road.</p> <p>Mitigation</p> <p>The visual impacts of the project would be controlled through the range of good practice measures set out in the CoCP and the REAC.</p>	<p>Impacts</p> <p>From Mardyke Way, there would be views of the Lower Thames Crossing and Orsett Fen Viaduct. The diverted section of overhead line would be similar to the current view and glimpses of traffic on the A13/A1089 junction would be possible from the bridleway along Green Lane.</p> <p>Mitigation</p> <p>False cuttings and landscaping would help to screen the views of the new road and traffic, integrating the project in to the surrounding landscape.</p>

Topic	Construction	Operations
<p>Noise and vibration</p>	<p>Impacts</p> <p>The construction activity associated with upgrades to the A13/A1089 junction and utilities works is expected to create noise in these wards. Within Stifford Clay ward, there is anticipated to be night-time or weekend road closures for highways works. There would be negligible changes in noise from road traffic for most roads in the ward during the construction period, except for Stifford Clays Road and High Road where major increases in road traffic noise are predicted. In these wards there would be no percussive or vibratory works.</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 noise impacts from the road in the north-eastern edge of the Stifford Clays and the eastern edge of Belhus. There would be no noise impacts on Chafford and North Stifford. In all wards there would be an indirect noise impact from the changes in traffic flow and speed on the existing road network.</p> <p>Mitigation</p> <p>Low-noise road surfaces would be installed on all new and affected resurfaced roads, plus noise barriers would be installed.</p>

Topic	Construction	Operations
<p>Air quality</p>	<p>Impacts</p> <p>Properties more than 200 metres from the worksite, which is the majority of properties within these wards, are outside the area likely to be affected by construction dust or emissions from the worksite. There are only a few properties within 200 metres of the worksite in the Stifford Clays and Chafford and North Stifford wards. Analysis of the construction phase traffic flows associated with the project indicate a temporary minor worsening in air quality around the A13 corridor (Stifford Clays and Chafford and North Stifford wards) and a temporary minor improvement around the M25 (within Belhus ward).</p> <p>Mitigation</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>Impacts</p> <p>There would be no exceedance of NO₂ and PM₁₀.</p> <p>Mitigation</p> <p>No mitigation is required.</p>

Topic	Construction	Operations
<p>Health</p>	<p>Impacts</p> <p>The construction phase of the project would present opportunities to access work and training. There are likely to be changes in the area that may result in negative impacts on health, including mental health and wellbeing. There is also likely to be perceivable changes in the levels of noise from the construction of the new road and construction traffic. There would also be temporary visual impacts as set out in this table earlier and changes in accessibility.</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 dust emissions, working hours, noise and visual screening, traffic management measures and community engagement. This includes the establishment of Community Liaison Groups.</p>	<p>Impacts</p> <p>The project would improve access to work and training, and access to open space and accessibility of local resources and amenities. Potential noise impacts have been identified within Stifford Clays ward.</p> <p>Mitigation</p> <p>No essential mitigation is required for health other than those measures described in the Noise mitigation and Visual sections.</p>

Topic	Construction	Operations
<p>Biodiversity</p>	<p>Impacts</p> <p>The construction of the project would involve the removal of areas of habitat, both temporarily and permanently for the new road. This habitat supports a range of protected and notable species (reptiles and potential bat roosts).</p> <p>In Chafford and North Stifford, a small area of scrub would be removed next to Stifford Clays Road and Medebridge Road, and another next to Medebridge Road. This would cause the loss of a small area of reptile habitat.</p> <p>Mitigation</p> <p>Vegetation would be cleared during the winter where possible to avoid any impact on breeding birds.</p> <p>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.</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>Mitigation measures include landscape planting, which has been designed to allow animals to move and forage, and guides them to safe crossing point such as the green bridge over Green Lane. 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>

Topic	Construction	Operations
Built heritage	There would be no impacts to built heritage.	
Contamination	There are no known medium or high-risk sources of contamination that could be at risk of disturbance during construction of the project within the Stifford Clays, Chafford and North Stifford and Belhus wards.	<p>Impacts None identified.</p> <p>Mitigation Once the road opens, if an incident occurs that results in localised contamination (for instance a traffic accident), we would assess and if necessary remove any affected soils to reduce the risk of further contamination across a wider area or entering water courses. More information on these controls can be found in the REAC.</p>

18.2 Project description

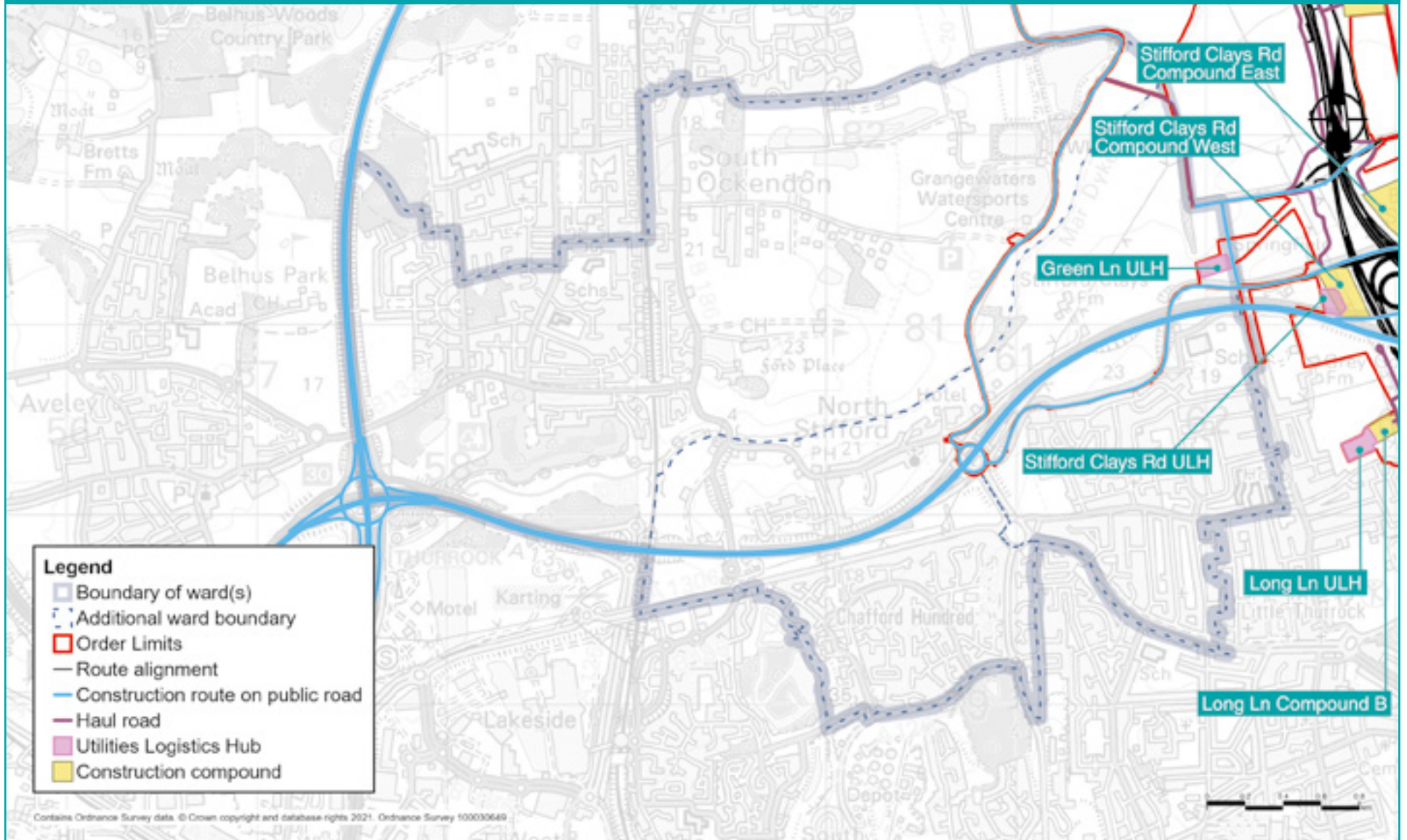
18.2.1 Construction

Construction activities

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

Construction activities in these three wards would include the provision of roads for construction traffic to access the worksite, which lies to the east and north-east of Belhus and Stifford Clays wards.

Figure 18.2: Main construction areas in Stifford Clays, Chafford and North Stifford, and Belhus wards



We would also carry out the installation of temporary utilities along Medebridge Road to allow the Stifford Clays Road West Compound to operate and we would divert existing telecommunications networks along Stifford Clays Road to accommodate this compound.

We are proposing to use Medebridge Road to allow construction traffic to access the worksite, with part of that road passing through Belhus ward. The only construction activity within the ward would be the creation and subsequent removal of a temporary haul road off Medebridge Road to provide this access. Once in place, this haul road would help keep construction traffic delivering equipment and materials off local roads, reducing the impact on nearby communities.

Stifford Clays and Chafford and North Stifford are included within our Order Limits, (the area of land required to construct and operate the project, formerly known as the development boundary), because Medebridge Road is accessed via Stifford Clays Road, which runs through both wards. Whilst no construction activity is proposed within Stifford Clays or Chafford and North Stifford wards, a temporary water pipeline installation from Grangewater to Stifford Clays Road Compound West is proposed within Belhus ward.

Construction compounds and Utility Logistics Hubs

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 vehicles leaving the compound do not dirty local roads.

There are no construction compounds in any of these wards. The Green Lane Utility Logistics Hub (ULH) would be located in Stifford Clays ward. Access to it would be via Stifford Clays Road and Green Lane. This ULH would provide an area from which utility diversions could be organised and delivered, including the diversion of two high-pressure gas pipelines, one north of Green Lane and one around the north of the A13. It would share an access route with Stifford Clays Road Compound West in Orsett ward.

Construction related traffic

There will be a few HGVs going to the Green Lane ULH but this will be less than 20 vehicles a day.

Construction routes on public roads

Medebridge Road, Stifford Clays Road and Green Lane would be used for construction traffic. Where these roads are currently part of the public road network, they would remain open to the public during the construction period, except for periods when specific traffic management measures are required (see below). Part of Medebridge Road is privately owned and would remain off limits to the public.

Construction schedule

Construction of the entire project is scheduled to last for around 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 can be found in chapter 5 of the Construction update.

Construction working hours

Most construction activities in this ward would take place during core hours, from 7am to 7pm on weekdays and 7am to 4pm on Saturdays. However, there would be circumstances when our working hours would need to be extended. For example, widening roads and connecting new roads to existing ones would be carried out when there is less traffic, so it is safer for both construction workers and road users. Working outside of the core hours can 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 following traffic management measures would impact Stifford Clays ward and Chafford and North Stifford ward. There would be no traffic management affecting Belhus ward.

Table 18.2: Main traffic management measures in Stifford Clays, Chafford and North Stifford, and Belhus wards

Road(s) affected	Traffic management	Purpose	Duration
Medebridge Road	Lane restrictions	Install traffic measures for construction vehicles	4 months between January and August 2024
Stifford Clays Road	Lane reductions and traffic lights (in 300 metre sections)	Utility diversions and installation of utility connections to Stifford Clays Road West Compound	Nights and weekends only between January and August 2024

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. All traffic management measures are based on an indicative construction programme, which would be finalised by the appointed contractor. The contractor's final traffic management plans will be subject to final approval by the Secretary of State for Transport, following consultation with the local highways authority.

18.2.2 Operations

The completed project

There would be no operational activities in Stifford Clays, Chafford and North Stifford, or Belhus wards once the new road is open.

For more information about the completed project, see the Operations update, as well as the large-scale figures in Map Book 1: General Arrangements.

Changes to the project since our design refinement consultation

There have been no changes to the project or Order Limits in Stifford Clays, Chafford and North Stifford, or Belhus wards since our design refinement consultation in July 2020.

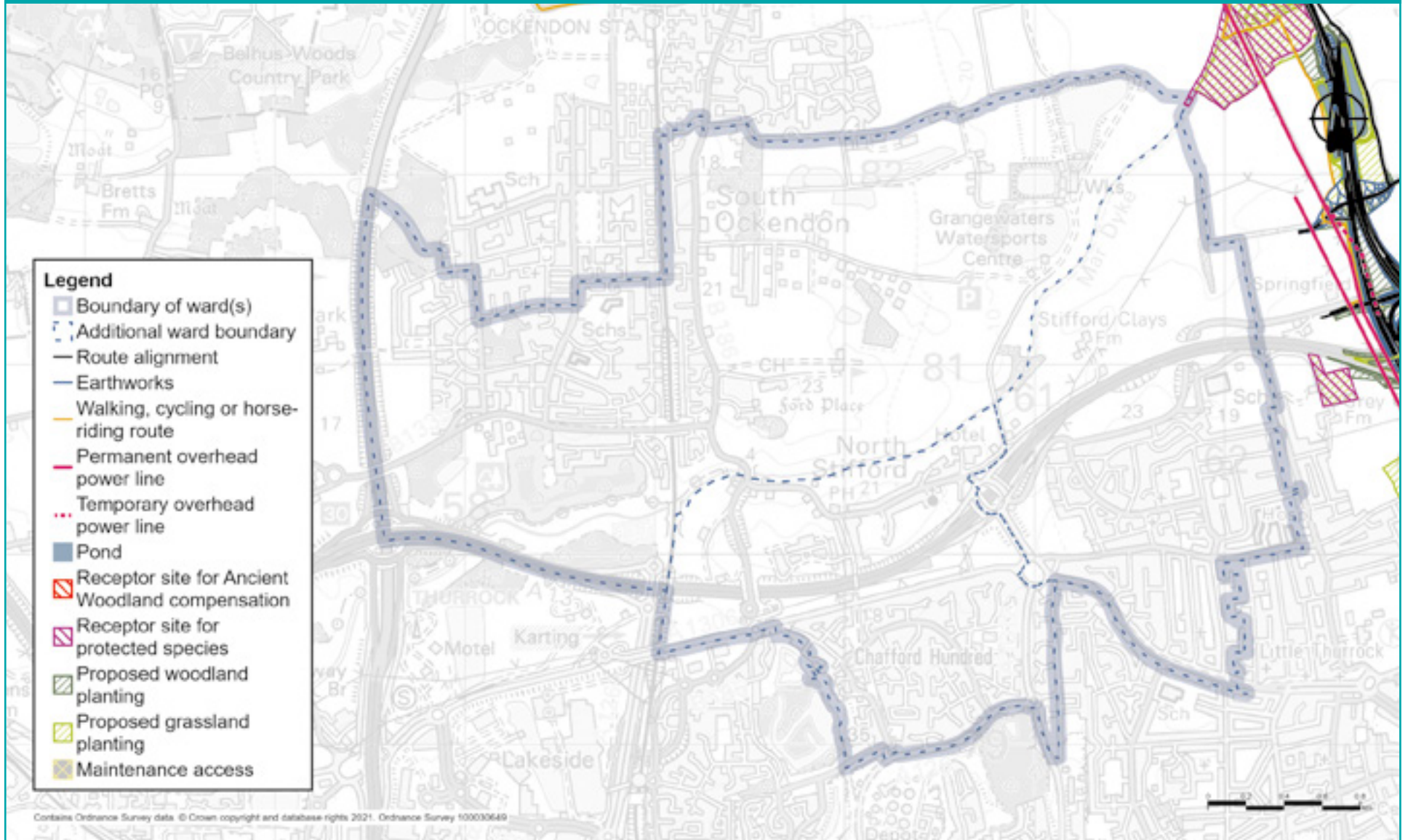
Impacts on open space and common land

Within Stifford Clays, Chafford and North Stifford and Belhus wards, there are no proposals to remove or replace open space land. More information about our proposals for compensating 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.

Impacts on private recreational facilities

Within Stifford Clays, Chafford and North Stifford and Belhus wards we propose to use an area of the Grangewaters Outdoor Education Centre car park for utility connection works. The use of the car park would be temporary while the connection is established and we would keep disruption to a minimum. This means some of the car park bays would be out of use for a short period of time.

Figure 18.3: The main features of the project once it is operational



18.3 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.

18.3.1 Construction

The traffic impacts in the ward are likely to be restricted to the roads where there are traffic management measures in place. There will be additional traffic on the A13 in these wards, both HGVs and staff cars but much of this traffic will not be in the same direction as the main morning peak traffic westbound into London and evening peak traffic out of London eastbound.

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 Stifford Clays, Chafford and North Stifford and Belhus, we would carry out measures such as the following:

- Minimise use of the local road network as far as possible 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 practical, new bridge structures have been designed so that they can be built offline to avoid extended road closures. Where offline construction is not possible and space is available to do so, the existing road would be temporarily realigned to facilitate 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.
- Stockpile material within the Order Limits to allow material to be managed on-site rather than offsite, reducing the number of HGVs journeys needed.

18.3.2 Operations

Operational impacts

The project's primary purpose is to relieve congestion at the Dartford Crossing and on its approach roads by providing a new free-flowing, north-south crossing over the River Thames. It would also make the Thames crossings, and key sections of the strategic road network, safer and more resilient.

Traffic modelling has been carried out to predict the change in traffic flows on roads in the area, including those within or on the boundary with these wards for the first year of operation (2029).

Figures 18.4, 18.6 and 18.8 below 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 18.5, 18.7 and 18.9 below 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 information about how we carried out our traffic modelling, see chapter 4 of the Operations update.

In Belhus ward the largest change in traffic flows on the local road network is predicted to be on the B186 South Road, where the traffic flows will decrease northbound by between 50 and 250 PCUs in the morning peak hour. This is a decrease of between 20% and 40%.

On the M25 north of junction 30, the decrease in traffic flow would be between 500 and 1,000 PCUs northbound and southbound in the morning peak hour, and over 1,000 PCUs per hour in the interpeak period and the evening peak.

On the A13, east of the M25 between the motorway and the Stifford interchange, there are predicted to be major decreases in traffic levels. Westbound traffic flows would decrease by between 500 and 1,000 PCUs in the morning peak hour and interpeak period and by over 1,000 PCUs in the evening peak hour. In each time period this represents a decrease of between 10% and 20%. Eastbound, the decrease would be between 500 and 1,000 PCUs per hour in the morning and evening peak hours and between 250 and 500 PCUs in an average interpeak period. This is a decrease of between 10% and 20% in the peak periods and between 0% and 10% in the interpeak period.

Further east on the A13 between the Stifford interchange and the junction with the project, the decrease in traffic westbound is predicted to be over 1000 PCUs in the morning peak period and between 500 and 1000 PCUs in the interpeak and evening peak period. This is a decrease of between 10% and 20% in each of these time periods. Eastbound the decrease is between 500 and 1000 PCUs in each modelled time period. This is a decrease of between 10% and 20% in the morning peak hour and the interpeak and a decrease of between 0% and 10% in the evening peak period.

On Stifford Clays Road there would be a decrease in flows of between 50 and 250 PCUs westbound in each time period which is a decrease of over 40% in the morning peak period and between 20% and 40% in the interpeak and the evening peak hour. The change eastbound in all time periods is less than 50 PCUs.

On the local road network in the Stifford Clays ward there would be a decrease in traffic on Crammavil Street northbound of between 50 and 250 PCUs (over 40%) in the morning peak hour. On Long Lane there is a decrease in traffic flows of between 50 and 250 PCUs westbound in the morning and evening peak hour. This is a decrease of between 20% and 40%. Eastbound the decrease is between 50 and 250 PCUs (between 10% and 20%) in an average interpeak hour and the evening peak hour.

Lodge Lane is predicted to have a decrease in traffic flows in all time periods and both directions. Westbound the decrease is between 50 and 250 PCUs for each modelled hour, which is a decrease of between 20% and 40% in the morning peak hour and between 10% and 20% in the interpeak and evening peak hours. Eastbound there is a decrease of between 50 and 250 PCUs (10% to 20%) in the evening peak hour.

A1012 south of Stifford Clay interchange there is an increase in traffic flows northbound in the morning peak hour of between 250 and 500 PCUs (an over 40% increase) and a decrease of between 50 and 250 PCUs (a 0% to 10% decrease) in the evening peak hour. Southbound on this road, there is a decrease in the morning peak hour of between 50 and 250 PCUs (a 10% to 20% decrease) and an increase in the evening peak hour of between 50 and 250 PCUs (an increase of between 10% and 20%).

Westbound on the West Thurrock Arterial Way, there is a predicted decrease in flows of between 500 and 1000 PCUs in the morning peak, a decrease of between 20% and 40%. In the interpeak and the evening peak the decrease is predicted to be between 50 and 250 PCUs an hour, a decrease of between 10% and 20%.

Figure 18.4: Predicted change in traffic flows (PCUs) with the project during the morning peak in 2029

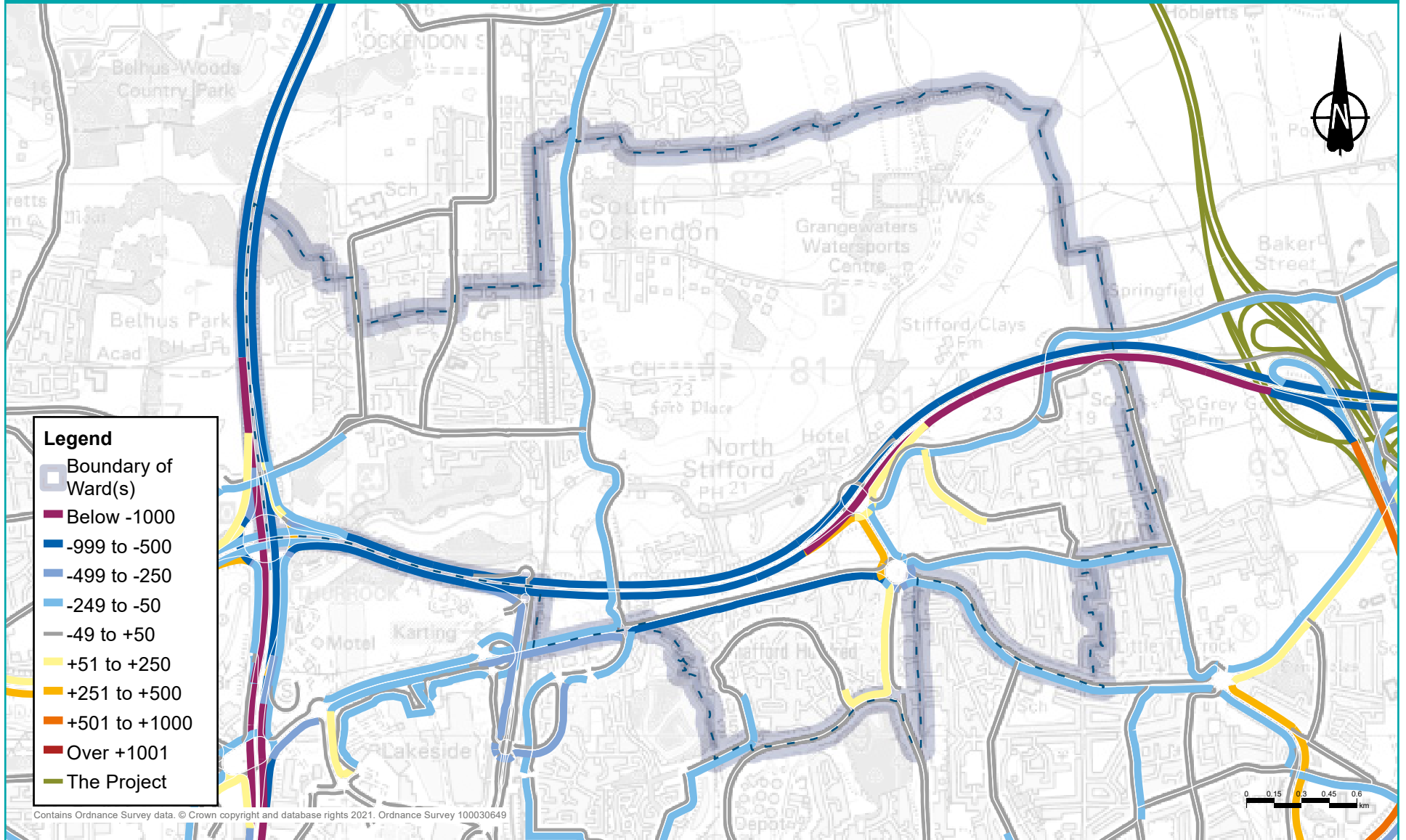


Figure 18.5: Predicted percentage change in traffic flows with the project during the morning peak in 2029



Figure 18.6: Predicted change in traffic flows (PCUs) with the project during the interpeak in 2029

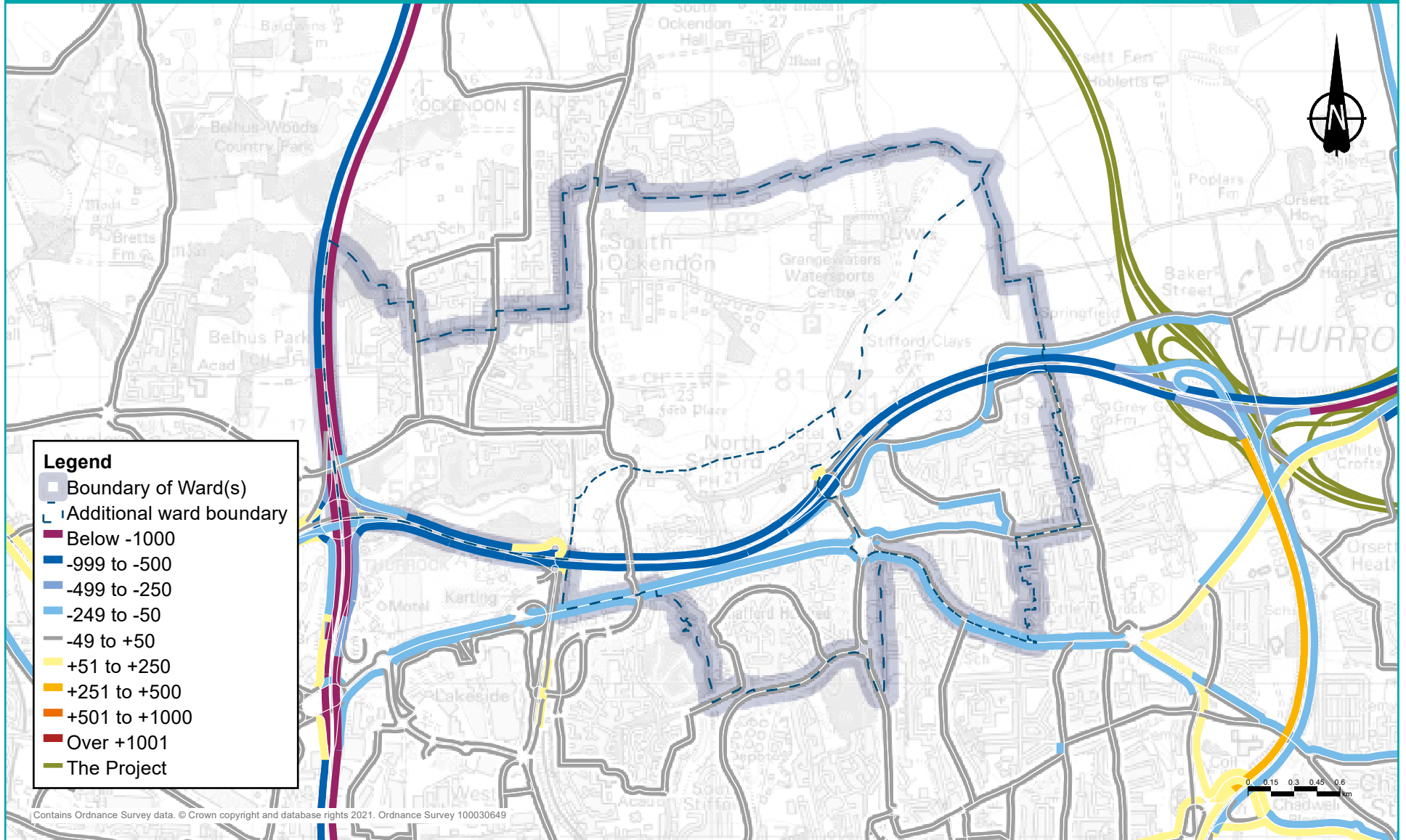


Figure 18.7: Predicted percentage change in traffic flows with the project during the interpeak in 2029

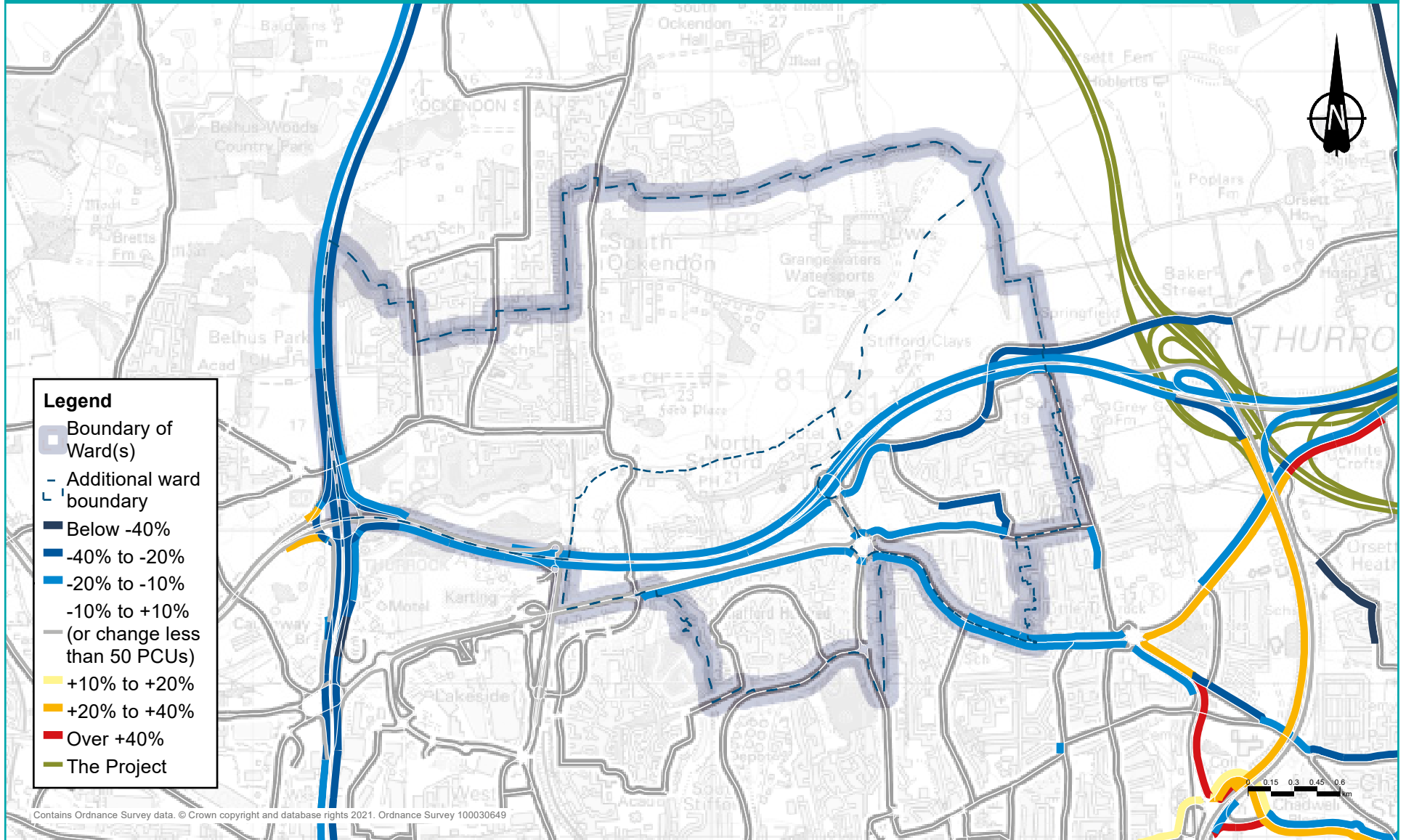


Figure 18.8: Predicted change in traffic flows (PCUs) with the project during the evening peak in 2029

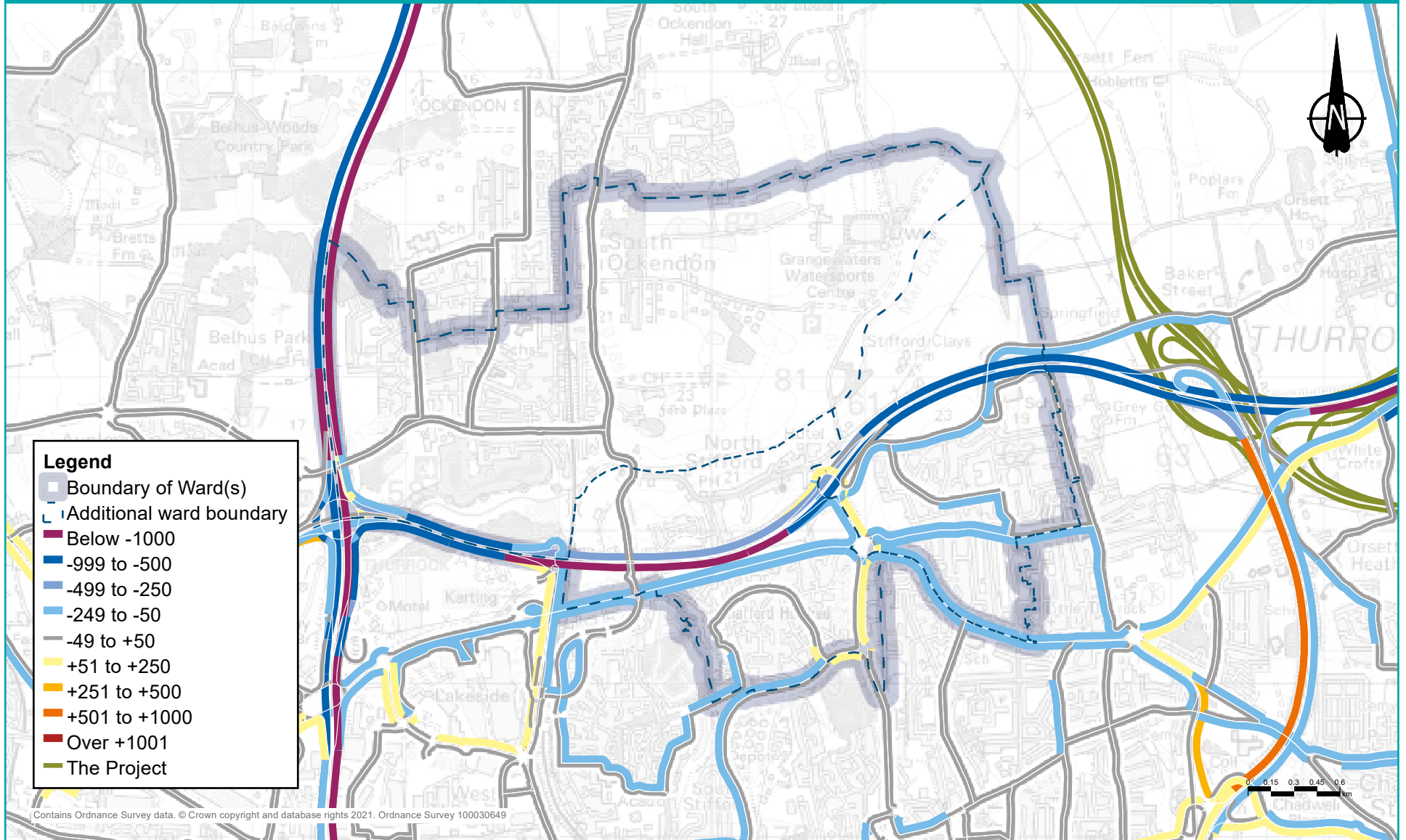
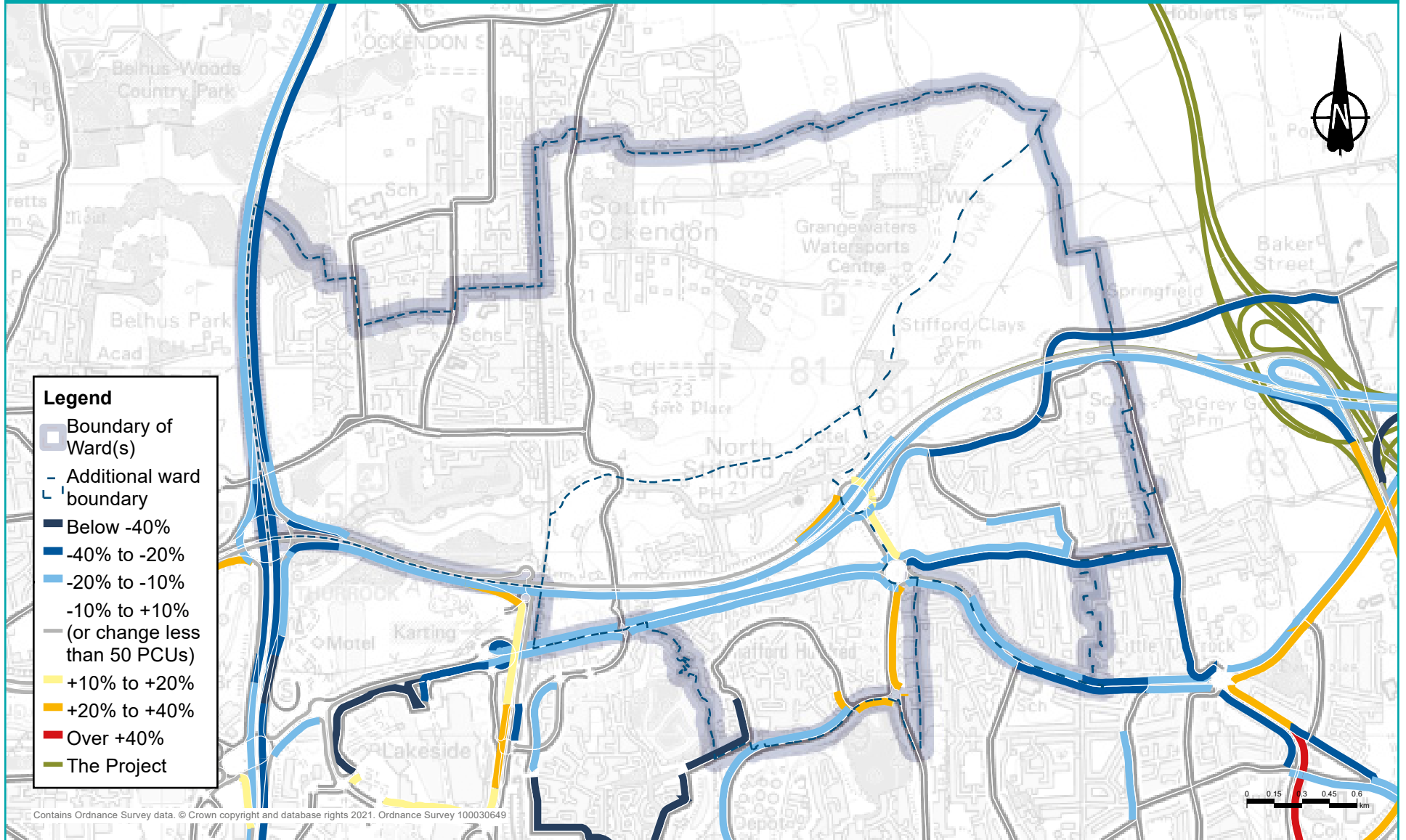


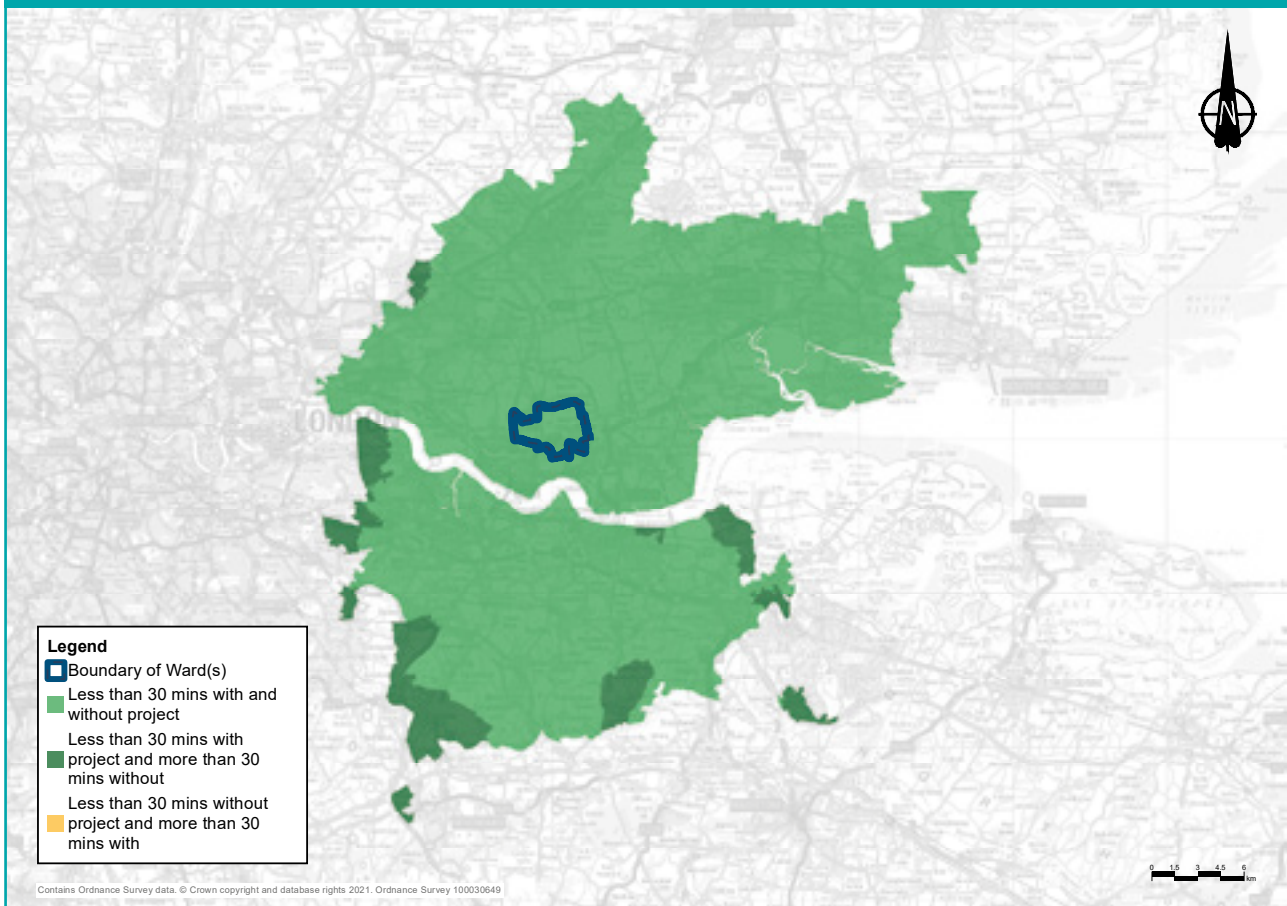
Figure 18.9: Predicted percentage change in traffic flows with the project during the evening peak in 2029



Changes to journey times

Figure 18.10 below shows the change in the area that could be reached within a 30-minute drive from the centre of the ward both without the project and with the project. Figure 18.11 shows the change in area that can be reached within a 60-minute drive. The areas have been calculated for the morning peak hour (7-8am). The number of jobs within a 30-minute catchment area would increase by 8% with the project which would provide access to 42,800 additional jobs. The number within a 60-minute drive would decrease by 1%, which would provide access to 35,000 fewer jobs. Despite the project providing a substantial net gain in access for motorists within these wards, there is an area (shown in orange in Figure 18.11) that would no longer be accessible by car within 60 minutes because of changes to traffic flows on the wider road network.

Figure 18.10: Change in the area that motorists could drive to within 30 minutes

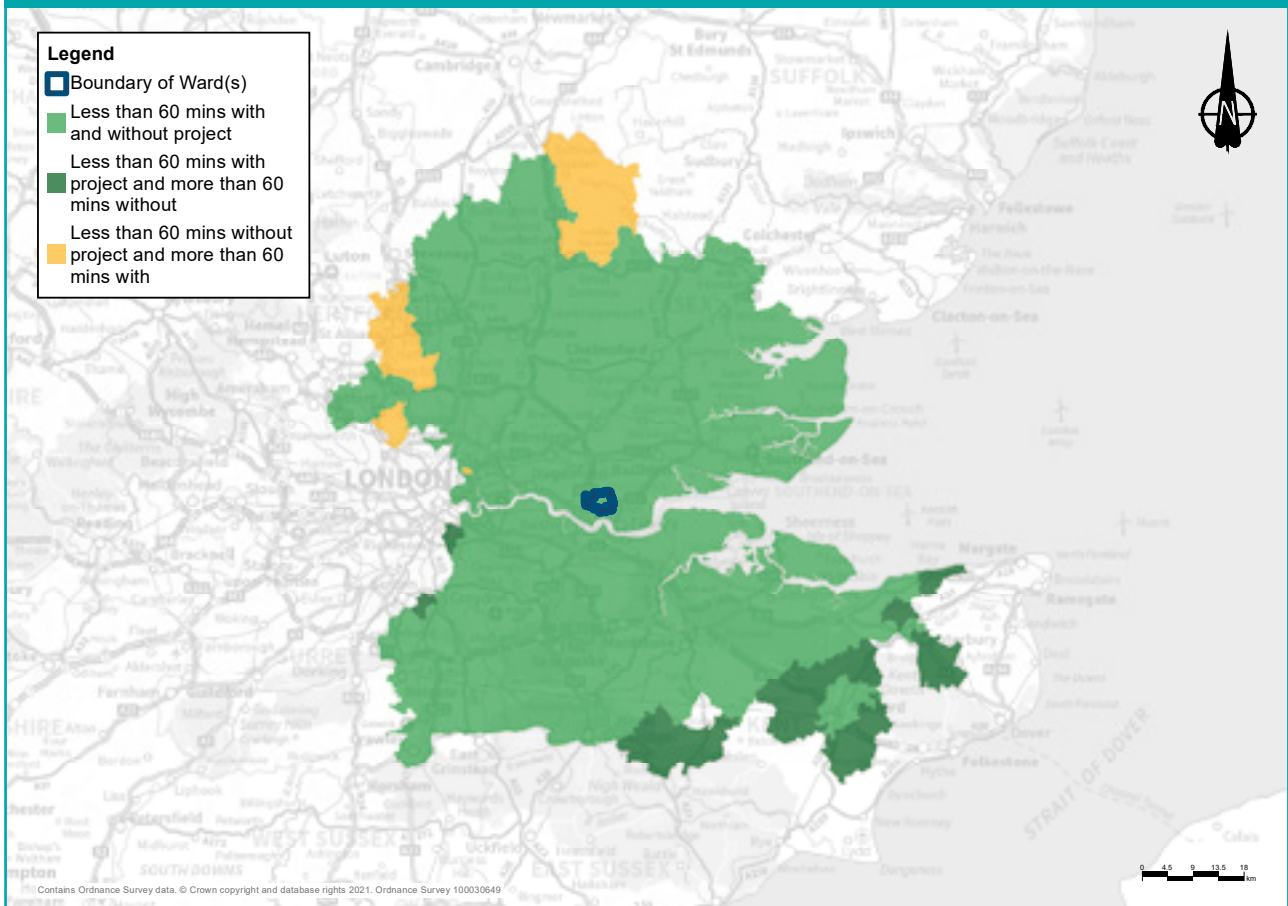


Operational traffic flows

The new road has been designed with fast, free-flowing junctions connecting to the strategic road network, including at the A13 and A1089, which would help maintain traffic flow. There would be no roundabouts or traffic lights on the main route, although these would be necessary when connecting to the local road network, such as at the Orsett Cock junction. Connections between the project and the local road network have been limited to those that would provide the optimum balance between maximising economic benefits and minimising traffic impacts for local communities.

Once the project is operational, traffic impacts on the affected road network would be monitored, including on local roads. Where appropriate, we would work with the relevant highway authority to seek funding from the Department for Transport for further interventions.

Figure 18.11: Change in the area that motorists could drive to within 60 minutes



18.4 Public transport

Existing situation

Rail

The Tilbury Loop railway line skirts the edge of Chafford and North Stifford ward, while passing through Belhus ward. The nearest stations are Ockendon and Grays.

Buses

There are several bus routes that run within these wards including: 10; 11; 22; 25; 265; 269; 33; 370; 37A; 51; 77; 77A; 7A; 7B; 7C; 88; 88A; X1; X80; Z1 and Z2.

18.4.1 Construction

Buses

Journey times on the Z2 bus may increase due to the increased traffic flows on the A13.

Traffic management works may affect buses using local roads, leading to increased journey times while the measures are in place. Affected buses would include the 11, 25, 88, and the 269.

Rail

There would be a series of night-time rail possessions of the Tilbury Loop railway. These possessions would be agreed with the network operator. It is intended that the works will take place outside train operational times, and so services to Grays and Ockendon stations would not be disrupted.

Throughout construction there may be some increases in journey times to Grays and Ockendon stations, associated with increased traffic through the area and traffic management on the local roads.

18.4.2 Operations

Rail

There would be no discernible change in local access times to Ockendon or Grays stations and no change to the rail services at those stations.

Buses

There would be no changes to bus routes through these wards once the new road opens and no discernible change to most bus journey times. The following buses would experience changes to journey times:

- The 25 bus from Stifford Clays through Grays to Purfleet. Westbound services would be predicted to experience a quicker journey time by up to two minutes in the morning peak hour.
- The 51 bus from Prittlewell to Grays and Chafford Hundred would have an increased journey time of nearly seven minutes in the westbound direction along the entire route in the morning peak hour. There would only be a slight change in other time periods and directions.
- The 265 bus from West Horndon to Grays would run around two minutes quicker southbound in the evening peak hour.

18.5 Footpaths, bridleways and cycle routes

Existing situation

Stifford Clays, Chafford and North Stifford and Belhus wards are characterised by suburban and rural areas with a small network of local footpaths connecting to South Ockendon and Bulphan. The following sections set out how these would be affected by construction of the project and which routes would be in place once construction is complete. For other potential impacts, see the other topic areas in this chapter, such as Visual and Noise and vibration.

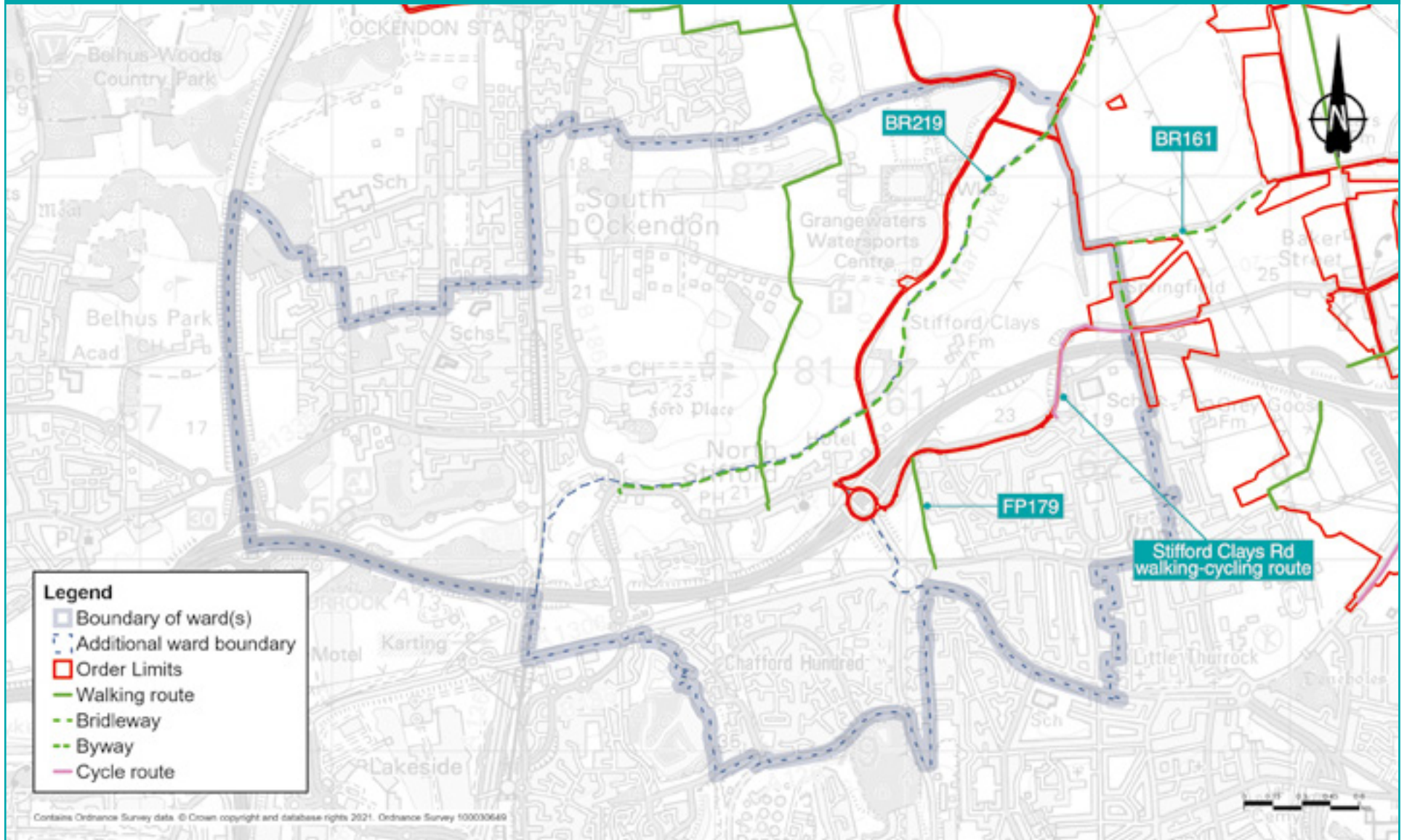
18.5.1 Construction

Construction impacts

Due to the proximity of these wards to the A13 junction works, there would be a small amount of disruption during construction. More information about the proposed network of footpaths, bridleways and cycle routes after completion of the project can be found in the Operational impacts section.

- Bridleway BR161 would need to be closed for six months for overhead power line realignment works.
- A section of Bridleway BR219 to the north-east of the ward would need to be closed for five years to allow utilities diversion works and the construction of the Mardyke Viaduct. See chapters 16 and 20 for more information. We are currently working on a potential temporary diversion for this route, so that some or all of the amenity currently provided would be retained during the construction period.
- Stifford Clays Road would remain open along its existing alignment for the majority of the construction period. We would build the bridges carrying Stifford Clays Road over the new road alongside the existing route to minimise impacts on the road and its walking-cycling facilities.

Figure 18.12 Footpaths, bridleways and cycle routes in the vicinity of the project in Stifford Clays, Chafford and North Stifford, and Belhus wards



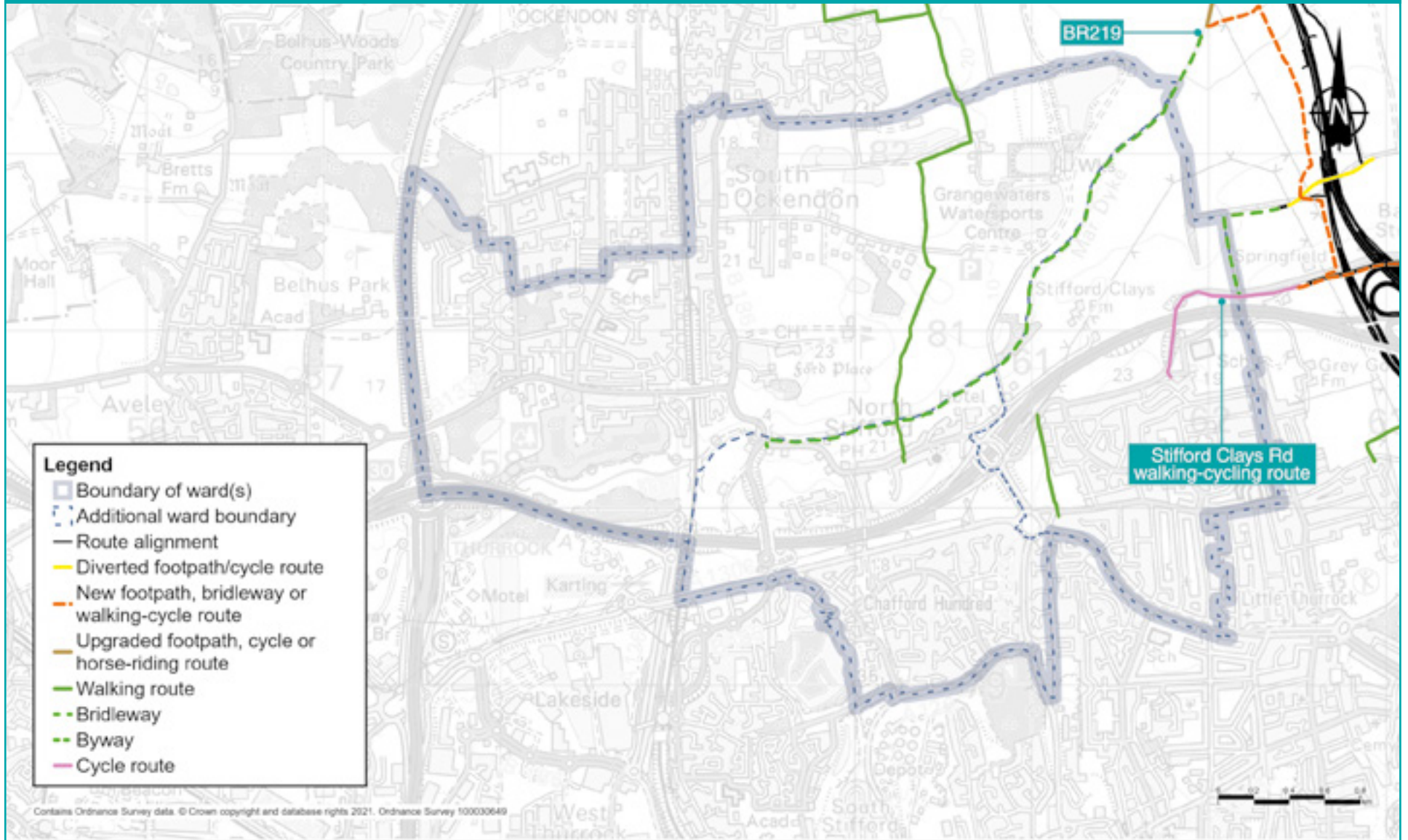
18.5.2 Operations

Operational impacts

Overall, 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, see chapter 2 of the Operations update.

- A section of bridleway BR219 north-east of Belhus ward would be upgraded and resurfaced, with a new bridge over the Mardyke River, suitable for walking, cycling and horse-riding. See chapter 16 and 20 for more information.
- The existing walking-cycling route on Stifford Clays Road would connect to a new walking-cycling route to the east. This would continue over the newly constructed bridges over the new road.

Figure 18.13: Proposed footpaths, bridleways and cycle routes



18.6 Visual

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

Existing situation

Stifford Clays ward

Of the main populated areas, only the northern edge of the Stifford Clays urban area would have views towards the land on which the project would be built. Other views would come from a bridleway along Green Lane, a section of local cycle route along Stifford Clays Road, and from the Mardyke Way bridleway.

Existing views towards the land on which the project would be built are set out below:

- From homes along Stifford Clays Road, on the northern boundary of Stifford Clays, there are views of arable land bounded by roadside vegetation along the A13 corridor.
- From the local cycle route along Stifford Clays Road, and from the bridleway along Green Lane, views are of flat, open arable landscape, punctuated by woodland and crossed by overhead power lines.
- From Mardyke Way, the view is of largely flat, open arable land and overhead power lines. There are also views towards Medebridge Road.
- Views towards the proposed new road, encompassing the A13 roundabout junction in the north-east of Chafford and North Stifford ward, are screened by mature roadside vegetation.

Belhus ward

Views towards the land on which the project would be built from Belhus ward are limited to the eastern edge of the ward, primarily experienced from Mardyke Way.

- From Mardyke Way, views are of a largely flat, open arable landscape and overhead power lines. There are also views towards Medebridge Road.

Chafford and North Stifford ward

There would be no views of the land on which the project would be built from this ward.

18.6.1 Construction

Construction impacts

More information about how the area would look during construction can be found in the Construction update consultation document. There are visualisations of the construction period in chapter 8.

The main construction activities likely to cause visual impacts on these wards are:

- building the project's main route
- building the proposed A13/A1089 junction
- construction of Orsett Fen Viaduct
- constructing the Green Lane green bridge
- establishing and operating the Stifford Clays Road East and West Compounds
- establishing and operating Green Lane ULH and Stifford Clays Road ULH
- utilities works, including overhead power line diversion

More information about construction activities can be found in the Project description section of this and adjacent wards.

Views from the northern edge of the Stifford Clays urban area would be limited to construction traffic using Stifford Clays Road. Views from the local cycle route along Stifford Clays Road and from the bridleway along Green Lane would include Green Lane ULH, as well as more distant views towards construction of the Stifford Clays Road West and Stifford Clays Road East Compounds, overhead power line diversion works, and construction of Green Lane green bridge.

From Mardyke Way, there would be distant views of road construction, including the taller elements within the Stifford Road East Compound, and building of the Orsett Fen Viaduct. Construction traffic using Medebridge Road would also be visible.

Measures to reduce visual impacts during construction

Due to the limited nature of views, and types of receptors affected, specific construction mitigation was not deemed appropriate. The visual impacts of the project would be controlled through the range of good practice measures set out in the CoCP and the REAC.

18.6.2 Operations

When the new road opens, construction of the Lower Thames Crossing/A13 junction, the project route to the north and Green Lane green bridge would be complete. The construction compounds and ULHs would have been removed and the land restored to its former use.

More information about the completed project can be found in the Project description section above.

There would be no visual impacts from the local cycle route along Stifford Clays Road. The main visual impacts from this, and the bridleway along Green Lane, would be limited to glimpsed traffic on the proposed A13/A1089 junction, with the junction and Green Lane green bridge made substantially less intrusive by proposed planting. The diverted section of overhead line would be similar to the current view.

From Mardyke Way, there would be views of the project and Orsett Fen Viaduct, partially softened by woodland mitigation planting.

The main visual impacts from Mardyke Way would be views of the project and Orsett Fen Viaduct, again partially softened by woodland planting.

Measures to reduce visual impacts during operation

False cutting (earthworks to partially hide the road) and landscaping along the route would be the primary mitigation measures in these wards. This would help to screen views of the new road and traffic and integrate the project into the surrounding landscape.

18.7 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 the proposals presented during this consultation.

Existing situation

The existing noise environment in these wards is mainly traffic noise within:

- Stifford Clays, from the A13 and the A1012
- Chafford and North Stifford, from the A1306, A13, A126 and the A1012
- Belhus, from the M25, A13, B186 and the B1335

There is also noise from railways in Belhus and Chafford and North Stifford wards.

As part of our environmental assessment process, we carried out surveys of existing background noise at seven locations in these wards, which were agreed with the local authority:

- Stifford Clays – at two locations, we recorded average noise levels in the range of 60 to 77 dB(A)² during the day.
- Chafford and North Stifford – at two locations, we recorded average noise levels in the range of 54 to 60 dB(A) during the day.
- Belhus – at three locations, we recorded average noise levels in the range of 47 to 53 dB(A) during the day and 46 to 47 dB(A) during the night.

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.

In order 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 (2029), noise levels without the project are predicted to range, on average:

- from 41 to 75 dB(A) during the day, and from 30 to 60 dB(A) during the night, at the locations within the Stifford Clays ward
- from 40 to 79 dB(A) during the day, and from 29 to 65 dB(A) during the night, at the locations within the Chafford and North Stifford ward
- from 49 to 73 dB(A) during the day, and from 34 to 59 dB(A) during the night, at the locations within the Belhus ward

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.

18.7.1 Construction

Daytime construction noise impacts

The main construction activities expected to create a slight increase in noise and vibration levels in these wards relate to the A13/A1089 junction upgrades and utilities works.

There are no main works compounds and only one ULH located in the Stifford Clays, Chafford and North Stifford and Belhus wards. These are described in the project description section above.

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

Within these wards, there wouldn't be percussive or vibratory works proposed to be undertaken.

Construction noise levels have been predicted at three locations across the Stifford Clays ward only (the other two wards do not have population centres close to construction activities), chosen to provide a representation of the level of noise communities are expected to experience during construction. For more information about the methodology, 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 18.14: Construction noise assessment locations in Stifford Clays ward

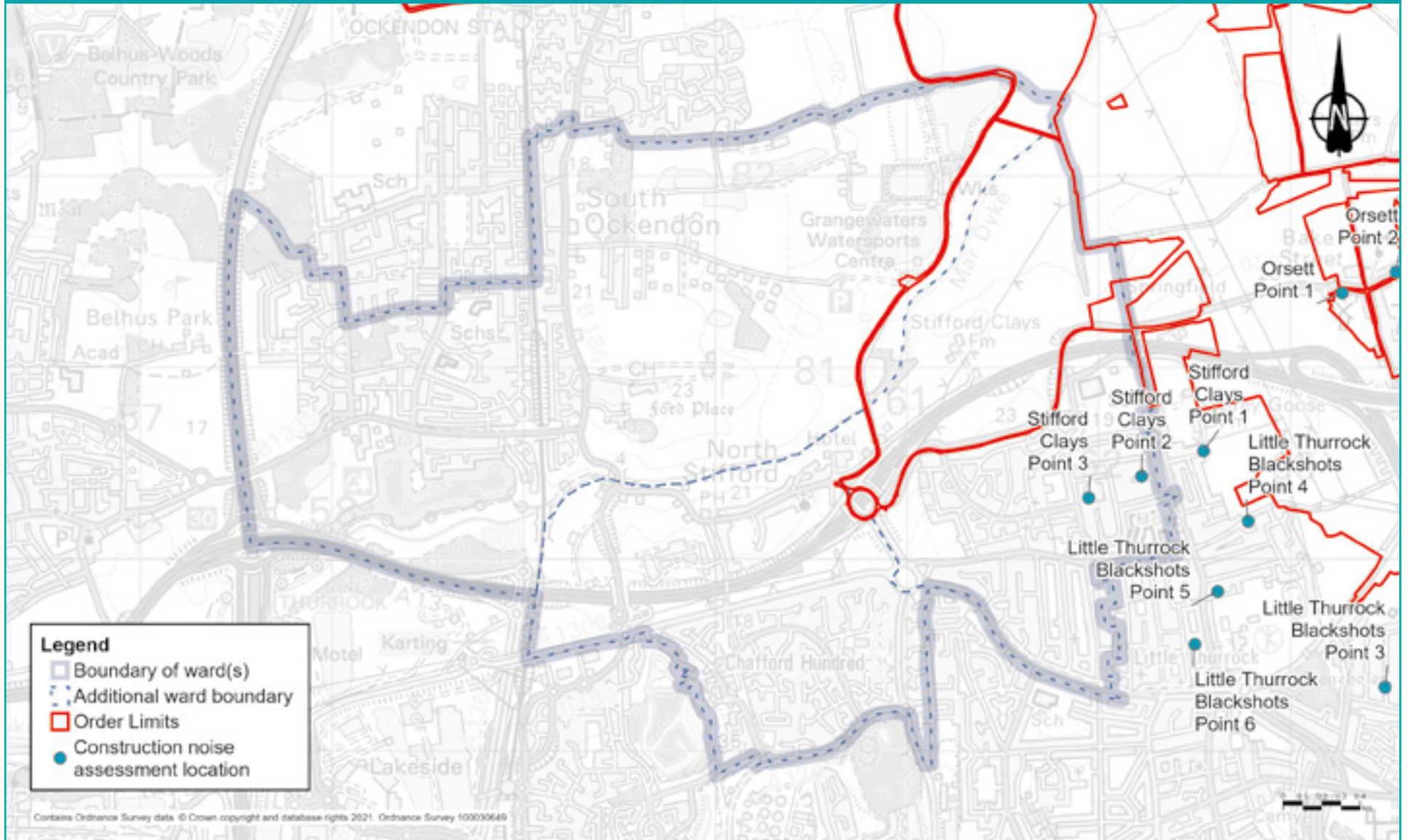


Figure 18.14 shows the locations at which we have predicted daytime construction noise levels.

Each vertical bar in Figure 18.15 shows the predicted noise levels for that month of the construction period (months 1 to 72). 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 defined 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 show 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 18.15 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 20 to 52dB 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 15 to 36dB 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 12 to 40dB LAeq (12hour). Construction noise would exceed the existing background daytime noise level for approximately eight months. However, it would not breach the defined threshold.

Figure 18.15: Construction noise by month for points 1, 2 and 3 in Stifford Clays ward

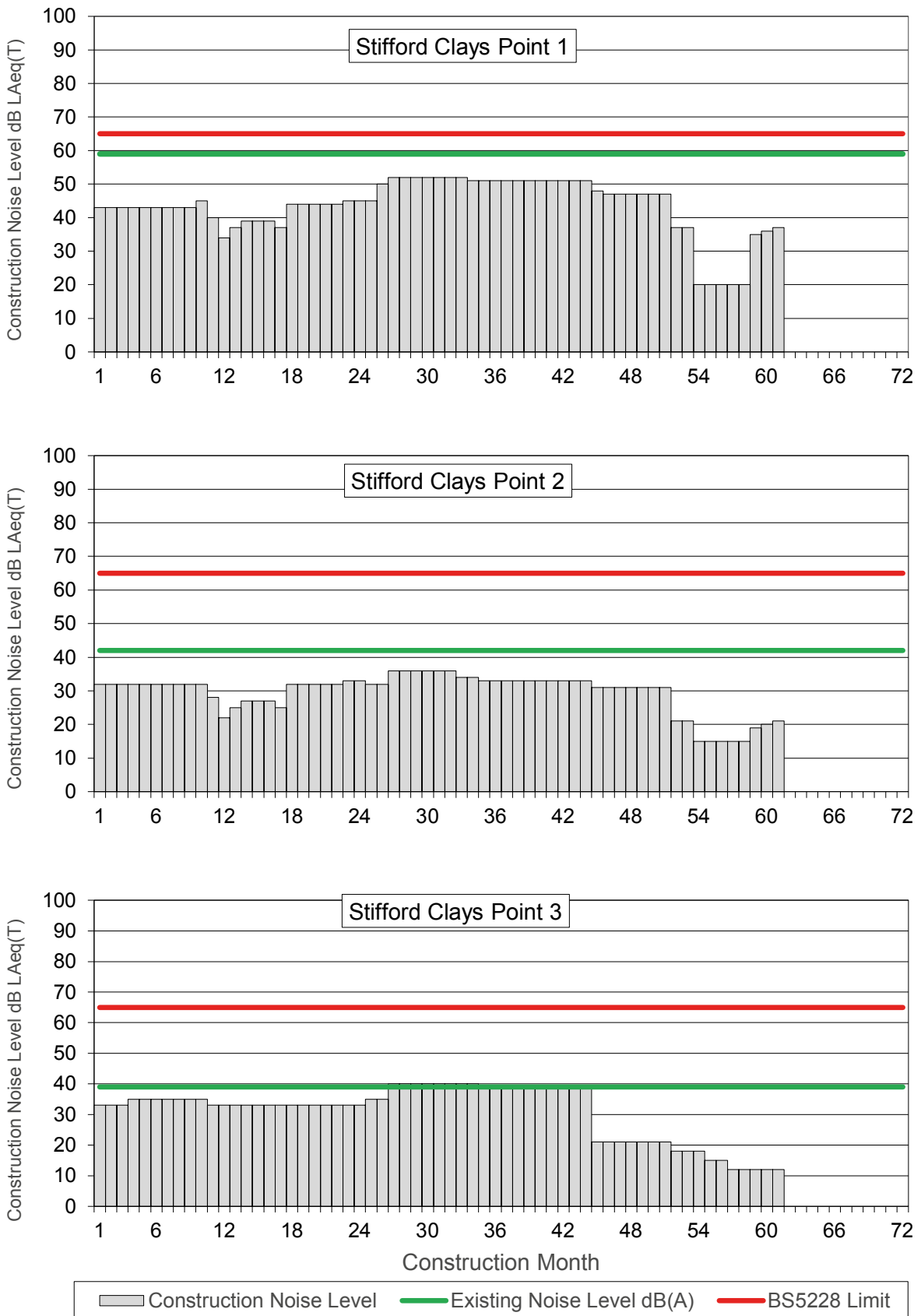
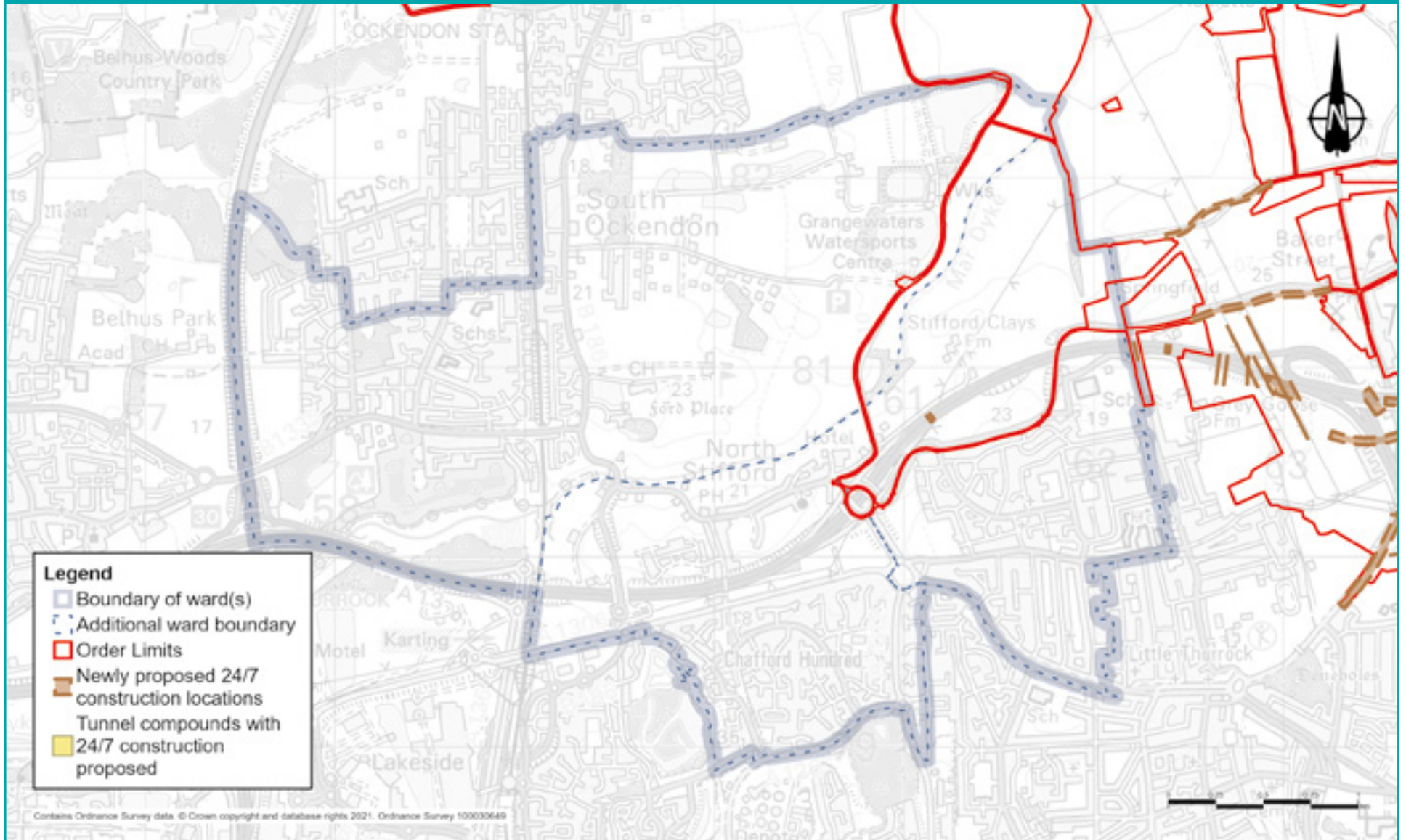


Figure 18.16: Newly proposed and tunnel 24/7 working locations in Stifford Clays, Chafford and North Stifford and Belhus wards



24/7 construction working

In addition to the changes to daytime noise presented in the section above, 24-hour seven-day construction working is proposed at the locations shown in figure 18.16 above.

These works have been identified as they may need to take place at night to maintain safety and reduce disruption to road and utility networks. The duration for the works is anticipated to be night-time or weekend road closures for highways works within Stifford Clays ward only. These works could have an impact on local communities and we would work with the local authority to manage these impacts.

Construction traffic noise impacts

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

Table 18.3: Construction traffic noise impacts in Stifford Clays, Chafford and North Stifford, and Belhus wards

Ward	Affected road(s)	Predicted noise impact	Construction year(s)
Chafford and North Stifford ward	Stifford Clays Road	Major increase in noise levels	1, 2, 3, 4, 5 and 6
Stifford Clays ward	High Road	Major increase in noise levels	1, 2, 3, 4, 5 and 6
Belhus ward	Stifford Clays Road	Major increase in noise levels	1, 2, 3, 4 and 5

Measures to reduce construction noise and vibration

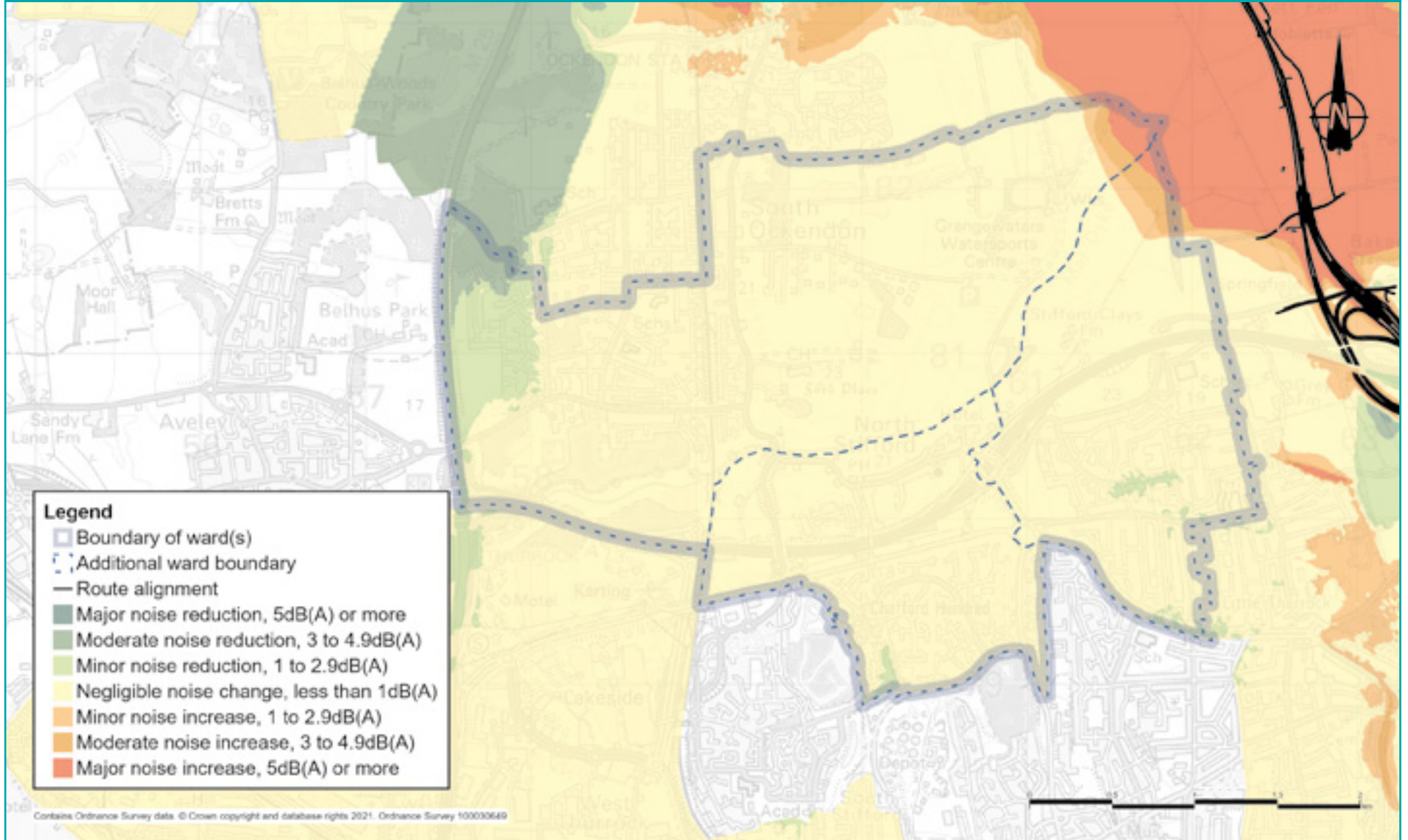
Construction noise levels would be controlled by using Best Available Techniques (BAT), with specific measures used at certain locations such as:

- 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 condition assessments onsite to inspect for defects such as potholes
- turning off plant and machinery when not in use
- maintaining all vehicles and mobile plant such that loose body fittings or exhausts do not rattle or vibrate
- using silenced equipment where available, in particular silenced 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 as opposed 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.

Figure 18.17 Noise impacts during operation in Stifford Clays, Chafford and North Stifford and Belhus wards



18.7.2 Operations

Operational traffic noise and vibration impacts

Stifford Clays ward

This ward is approximately 700 metres to the west of the project route. Noise impacts from the new road would be confined to the north-eastern edge of the ward.

Chafford and North Stifford ward

Located around 2km to the west of the route, there wouldn't be any noise impacts from the project route.

Belhus ward

This ward is approximately 700 metres to the west of the project route. There would be noise impacts in the eastern edge of the ward.

There would be noise impacts as a result of changes in traffic flow and speed on the existing roads in Stifford Clays, Chafford and North Stifford and Belhus wards.

Figure 18.17 above shows predicted noise level changes within these wards for the opening year of the project:

- In Stifford Clays ward, predicted changes in traffic noise at identified locations are predicted to range from a moderate decrease in noise levels of between 1.0 and 2.9dB to a major increase in noise levels of greater than 5.0dB.
- In Chafford and North Stifford ward, predicted changes in traffic noise at identified locations are predicted to range from a moderate decrease in noise levels of between 1.0 and 2.9dB to a minor increase in noise levels of less than 1.0dB.
- Belhus – from a major decrease in noise levels of greater than 5.0dB to a major increase in noise levels of greater than 5.0dB.

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). 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).

18.8 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

Within Chafford and North Stifford ward, the A13 and A1306 have been declared an Air Quality Management Area (AQMA) due to annual levels of airborne pollution being above accepted standards. No other areas within the ward have been identified as AQMA.

Within Belhus ward, Thurrock AQMA No.15 lies near the M25. It has also been declared an AQMA due to its yearly levels of airborne pollution being above accepted standards. No other areas within the ward have been identified as AQMA.

Stifford Clays ward is not located within an AQMA.

AQMAs are areas that have been identified by local authorities as areas of poor air quality that require additional monitoring and controls.

18.8.1 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 is the majority of properties within this ward, are outside the area likely to be affected by construction dust or emissions from the worksite. In the Stifford Clays and Chafford and North Stifford wards, there are only a few properties within 200 metres of the worksite, including the south of Stifford Clays Road. There are no properties in the Belhus ward within the 200-metre buffer. 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). 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 temporary minor worsening in air quality in the area around the A13 corridor as a result of traffic increase from 2025 to 2027 and a temporary minor improvement in air quality in the area around the M25 corridor as a result of traffic decrease 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 in place an Air Quality Management Plan to ensure 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 Thurrock Council for consultation (see REAC entry AQ006).

18.8.2 Operations

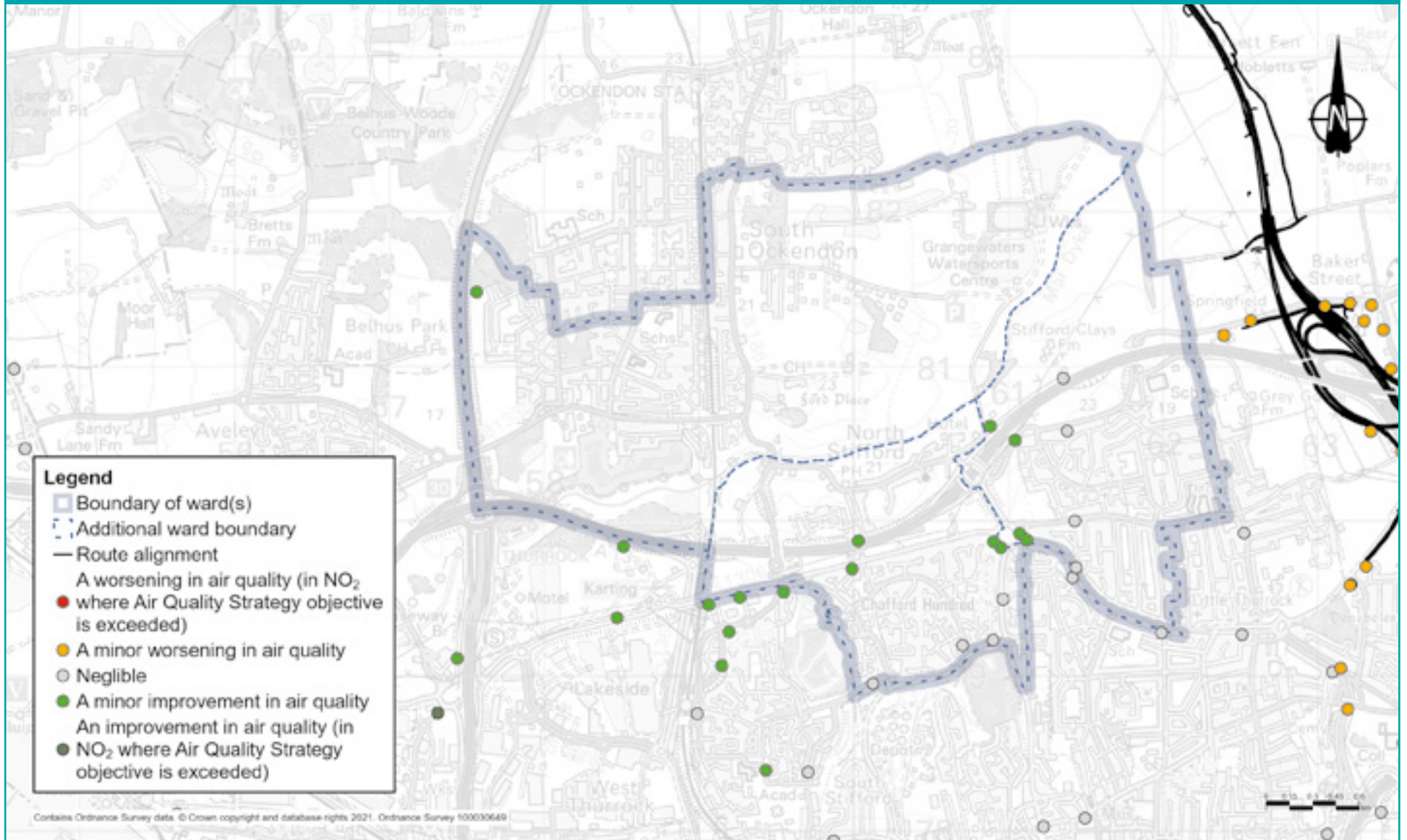
Operational impacts

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.

At all locations within the ward, there are no predicted exceedances of air quality thresholds. There are receptors (properties or habitats that are sensitive to changes in air quality) within the Stifford Clays, Chafford and North Stifford and Belhus wards. These are predicted to experience from a negligible change to minor improvement in air quality for nitrogen dioxide (NO₂), the main traffic-related pollutant³.

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

Figure 18.18: Predicted changes in nitrogen dioxide levels within Stifford Clays, Chafford and North Stifford, and Belhus wards once the new road is open



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- Stifford Clays – the highest modelled yearly average NO₂ concentration within this ward is 32.9 µg/m³, which is below the yearly average threshold of 40µg/m³.
- Chafford and North Stifford – the highest modelled yearly average NO₂ concentration within this ward is 30.3 µg/m³, which is also below the yearly average threshold.
- Belhus - the highest modelled yearly average NO₂ concentration within this ward is 23.2 µg/m³ which, like the other wards, is well 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.

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.

18.9 Health

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

Existing situation – Stifford Clays

When compared with Thurrock as a whole, the Stifford Clays ward has:

- a higher proportion of people aged 60 and over (26.4% compared with 18.3% for Thurrock)
- more white residents (91.3% and 85.9% respectively)
- a higher proportion of residents from an Asian background (4.0% and 3.8% respectively)

Economic activity rates are relatively low in Stifford Clays, when compared with other wards in Thurrock, and Thurrock as a whole (71.1% and 79.1% respectively). However, the number of benefit claimants are also comparatively low when compared with Thurrock overall and its other wards. This reflects the high proportion of older people in Stifford Clays. The ward also has a higher proportion of residents in social grade AB (16.1%) than Thurrock as a whole (15%), with more homes owned outright compared with Thurrock and England as a whole (71.3%, 66.2% and 63.3% respectively). Stifford Clays also has a relatively high proportion of households without a car or van, when compared with Thurrock overall (21.9% and 20.1% respectively).

Stifford Clays residents generally have lower rates of self-reported very good health status, when compared with Thurrock and England (43.9%, 48.2% and 47.2% respectively). In addition, the ward has a relatively high proportion of residents who report their health as 'bad' and 'very bad', when compared to Thurrock and England as a whole (6%, 4.7% and 5.4% respectively). Regarding life expectancy and causes of death, Stifford Clays has better rates than Thurrock across a number of measures. These include higher life expectancy rates, and lower rates of death from respiratory and coronary heart disease, from cancer and from all causes. Using the same measures, Stifford Clays has very similar rates to England as a whole.

Existing situation – Belhus

Belhus has a younger population than Thurrock as a whole and England, with more children aged under 16 (25.2% compared with 24.2% and 20.3% respectively). It also has a more ethnically diverse population, with a higher proportion of black residents than Thurrock (9.6% and 7.8% respectively).

Economic activity rates are relatively low when compared with other wards in Thurrock, and Thurrock as a whole (71.9% and 79.1% respectively) while the number of benefit claimants are significantly higher (4.8%, 3.0% and 2.7% respectively).

Belhus residents generally have lower rates of self-reported very good health when compared with Thurrock and England as whole (45.9%, 48.2% and 47.2% respectively). The ward also has a relatively high proportion of residents who report their health as 'bad' or 'very bad', when compared with Thurrock and England (6.5%, 4.7% and 5.4% respectively). In addition, Belhus has more residents who report that their day-to-day activities are limited a lot when compared to Thurrock as a whole (9.3% and 7.2% respectively). In looking at life expectancy and causes of death, with the exception of life expectancy at birth for males, Belhus performs worse than Thurrock for female life expectancy and deaths from respiratory and coronary heart diseases, cancer and from all causes.

Existing situation – Chafford and North Stifford

Chafford and North Stifford is characterised by a younger population (27% of the population are under the age of 16). Economic activity rates are relatively high when compared to other wards in Thurrock and for Thurrock as a whole. A high proportion of residents own their own home, while the majority of the remaining homes are privately rented.

Chafford and North Stifford generally have very good rates of self-reported health status when compared to Thurrock as a whole (91.8% of residents report very good health and good health, compared to 82.9% for Thurrock as a whole). Regarding life expectancy and causes of death, Chafford and North Stifford has higher rates of life expectancy at birth for men and lower rates of deaths from cancer when compared to Thurrock as a whole. Other measures are similar to that of Thurrock.

18.9.1 Construction

Construction impacts

Construction activities affecting Stifford Clays, Belhus and Chafford and North Stifford are presented in the Project description section.

Primarily, they relate to establishing and operating the following construction compounds:

- Long Lane Compound A
- Long Lane Compound B
- Stifford Clays Road West Compound

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 or footpath closures.

There could be both positive and negative potential impacts on people's health and wellbeing. Through good communications and engagement, providing people with information about when construction works would be taking place and its impacts, then negative impacts on people's mental health and wellbeing would be reduced.

Equally, some residents would see health and wellbeing benefits from improved access to work and training opportunities (see the Traffic section above).

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.

As highlighted at the start of this section, different groups of people may be more sensitive to factors that potentially affect their health. Some of the impacts of our construction activities may, therefore, only affect a small proportion of the population.

Potential impacts include across all wards:

- There are likely to be health benefits as a result of access to work and training opportunities.
- 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).
- There are likely to be mental health and wellbeing impacts associated with stress and anxiety relating to construction of the project.

Stifford Clays ward

- Construction noise levels have been predicted at three locations across the Stifford Clays ward only (the other two wards do not have populations centres close to construction activities). They provide a representation of the noise communities would be expected to experience. For more information about the methodology, see chapter 1.
- There are only a few properties in the Stifford Clays 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.
- Views from the northern edge of the Stifford Clays urban area would be limited to construction traffic using Stifford Clays Road.
- Views from the local cycle route along Stifford Clays Road and from the bridleway along Green Lane would include Green Lane ULH, as well as more distant views towards construction of the Stifford Clays Road West and Stifford Clays Road East Compounds, overhead power line diversion works, and construction of Green Lane green bridge.
- From Mardyke Way, there would be distant views of road construction, including the taller elements within the Stifford Road East Compound, and building of the Orsett Fen Viaduct. Construction traffic using Medebridge Road would also be visible.
- From Mardyke Way, there would be distant views of construction, including the taller elements within the Stifford Clays Road Compound East, and construction of the Orsett Fen Viaduct. Construction traffic along Medebridge Road would also be visible.

- Construction activities have the potential to affect local air quality through the release of dust and emissions from equipment and traffic. Air quality impacts of construction would be temporary, and our assessment is considered to be worst-case. The change in air quality during this time would not be noticeable and there would be no discernible effects on health.

Chafford and North Stifford ward:

- There are few properties in the Chafford and North Stifford ward within 200 metres from the Order Limits and are therefore unlikely to be affected by dust or emissions from the project's construction. Those properties that are within 200 metres have the potential to experience air quality impacts as a result of increased dust and emissions from nearby construction activities.
- There are no main construction works or activities that are expected to cause noise and vibration impacts on this ward.
- The majority of existing road traffic links within this ward would experience negligible changes of less than 1dB(A) with the exception of Stifford Clays Road, which would experience an increase in road traffic noise during the construction phase.
- There would be no views of Lower Thames Crossing construction activities from Chafford and North Stifford.

Belhus ward

- Views of construction activities would be limited to the eastern edge of the ward, primarily from Mardyke Way on the ward boundary.
- There are no properties in the Belhus ward that are within 200 metres of the Order Limits and would likely be affected by dust or emissions from construction. Properties along the M25 corridor could potentially experience a temporary beneficial impact on air quality.
- By the opening year, construction of the junction with the Lower Thames Crossing and the A13, the route to the north and Green Lane green bridge would be complete.
- There are no main construction works or activities that are expected to give rise to construction noise and vibration impacts on this ward.
- Most existing road traffic links in this ward would experience negligible changes of less than 1dB(A). The exception is Stifford Clays Road, which would see an increase in road traffic noise during the construction phase.

Measures to reduce impacts on health during construction

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, 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 make sure communities, stakeholders and any affected parties are updated about the construction works and their progress.

18.9.2 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 Stifford Clays.

- There would be improvements to accessibility, work and training opportunities, and access to open space. Tilbury Fields is a new recreational area that could encourage physical activity.
- Potential noise impacts have been identified within Stifford Clays ward. This could result in adverse health effects, ranging from greater annoyance and sleep disturbance to more serious conditions (typically associated with larger increases).

- The conclusion of the air quality assessment is that particulate matter (PM₁₀ or PM_{2.5}) levels at receptors are unlikely to exceed threshold levels across the study area. Our assessments have shown that there would be a barely noticeable change in air quality.
- Air quality assessments conclude that the project would not result in significant air quality effects.
- There would be no lasting visual impacts from the local cycle route along Stifford Clays Road. The main visual impacts from this, and the bridleway along Green Lane, would be limited to glimpsed traffic on the Lower Thames Crossing and A13 junction. Any intrusion from the junction and Green Lane green bridge would be substantially reduced through proposed planting mitigation. The diverted section of overhead line would look similar to the existing one. From Mardyke Way, there would be views of the Lower Thames Crossing and Orsett Fen Viaduct and, as before, these would be partially softened by woodland planting.

Both positive and negative health outcomes may be experienced by residents of Chafford and North Stifford:

- There would be improvements to accessibility, work and training opportunities, and access to open space. Tilbury Fields is a new recreational area that could encourage physical activity.
- Modelling shows that air quality is predicted to remain well below the thresholds for the key traffic related pollutants NO₂ and particulate matter.
- Air quality assessments conclude that the project would not result in significant air quality effects. This will be confirmed in the Environmental statement following an assessment based on updated traffic data for the opening year.
- Views towards the Order Limits, encompassing the A13 roundabout junction in the north-east of the ward, are screened by mature roadside vegetation. There would, therefore, be no material visual effects.

Positive and negative health outcomes may be experienced by residents of Belhus ward:

- Benefits associated with noise reduction, better access to open space and education and employment opportunities are anticipated.
- Air quality assessments conclude that the project would not result in significant air quality effects.
- The main visual impacts from Mardyke Way (the Lower Thames Crossing and Orsett Fen Viaduct) would be partially softened by woodland mitigation planting.
- Some residents may experience anxiety or stress associated with perceptions of environmental change.

Measures to reduce operational health impacts

False cutting and landscaping along the main route are the primary mitigation measures. They would help to screen views of the new road and traffic and would integrate the Lower Thames Crossing into the surrounding landscape.

The impact of construction and changes in traffic on local air quality would be controlled and minimised through good practice measures set out in the project's CoCP and REAC.

18.10 Biodiversity

Existing situation

We carried out surveys across the project to set a baseline for assessment, and these identified the presence of a range of protected and notable species.

Stifford Clays

Within the Order Limits the main habitats here are arable, with some hedgerows.

There are no designated sites within 2km of the Order Limits. There is one non-designated site within 500 metres, Cats Mede LWS.

Our survey identified a range of protected and notable species including water vole, badgers and reptiles.

Chafford and North Stifford, and Belhus

Only a small area of the Chafford and North Stifford, and Belhus wards falls within the Order Limits, which is restricted to scrub next to Stifford Clays Road and Medebridge Road. These wards contain no designated sites within 2km of the Order Limits. Within 500 metres of the Order Limits in the Chafford and North Stifford ward the non-designated sites are Mardyke LWS, Cats Mede LWS, Palmer's Shaw LWS, Sheepfold Wood ancient woodland and Great Palmer's Shaw ancient woodland.

The survey identified water vole and common reptiles within the Belhus ward, and no presence of protected and notable species within the Chafford and North Stifford ward.

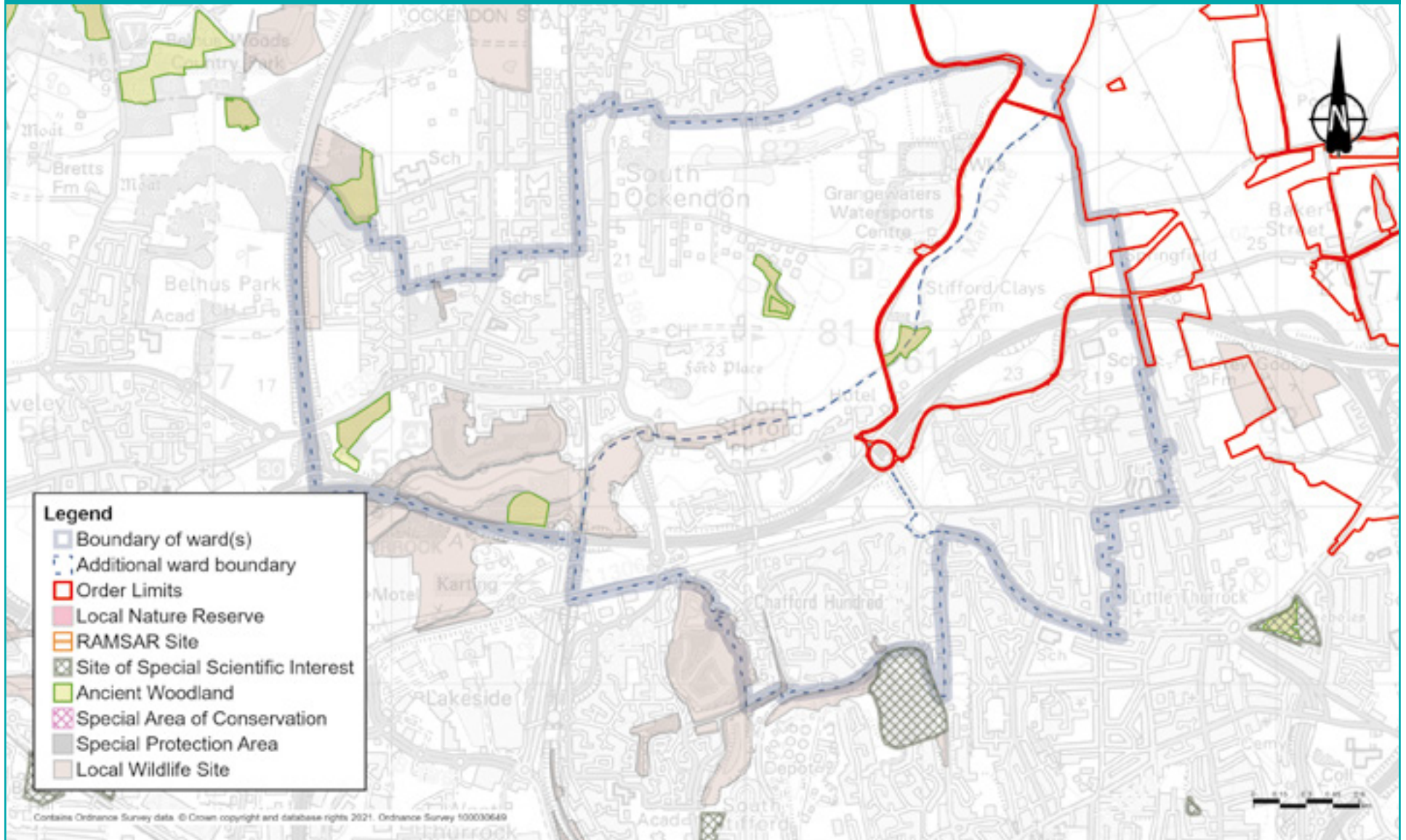
18.10.1 Construction

Construction impacts

To build the new road, areas of habitat (arable fields and hedgerow) would have to be removed temporarily and permanently. This habitat supports a range of protected and notable species that would be impacted by construction through direct habitat loss (reptile habitat and potential bat roosts); and disturbance to retained habitat.

A small area of scrub would be removed next to Stifford Clays Road and Medebridge Road, and another next to Medebridge Road. This would cause the loss of a small area of reptile habitat.

Figure 18.19: Designated and non-designated biodiversity sites in Stifford Clays, Chafford and North Stifford, and Belhus wards



Measures to reduce biodiversity impacts during construction

Stifford Clays ward

Vegetation would be cleared during the winter where possible to avoid any impact on breeding birds. Where this isn't practical, clearance would be supervised by an Ecological Clerk of Works (ECoW) to ensure no nests are disturbed or destroyed. Where protected species are present, such as reptiles, they would be moved from the site before any construction activities take place, either through habitat manipulation (for example strimming to reduce the height of vegetation and displace reptiles) or translocation. Where required, works affecting protected species would be carried out under a Natural England licence. Boxes to support birds and bats would be installed within retained habitat. Any habitat lost for temporary construction works would be reinstated after construction.

Chafford and North Stifford ward

Vegetation clearance would take place during the winter where possible to avoid the impacts on breeding birds. Where this wasn't possible, clearance would be supervised by an ECoW to ensure no nests are disturbed or destroyed. The scrub removed would be reinstated during the construction process.

Belhus ward

Vegetation clearance would be carried out during the winter where possible to avoid the impacts on breeding birds. Where this wasn't possible, clearance would be supervised by an ECoW to ensure no nests are disturbed or destroyed. Where protected species are present, these would be moved away from the site prior to any construction activities either through habitat manipulation or translocation. The scrub removed would be reinstated during the construction process.

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.

18.10.2 Operations

Operational impacts

The new road has the potential to cause species mortality through the separation of habitats as well as exposure to, and noise disturbance from, road traffic. However, as the A13 already causes these impacts on terrestrial biodiversity, it is not anticipated that the project would add any additional operational impacts.

Measures to reduce biodiversity impacts during operation

Landscape planting has been designed to enable animals to move and forage and would guide them to safe crossing points over the new road, specifically the green bridge over Green Lane to the east of the ward boundary. To mitigate traffic disturbance, the new road would be in cutting or false cutting reducing noise and visual impacts.

Newly created areas would be managed to ensure that they provide high quality habitat to support a broad range of different plant and animal species.

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

18.11 Built heritage

Existing situation

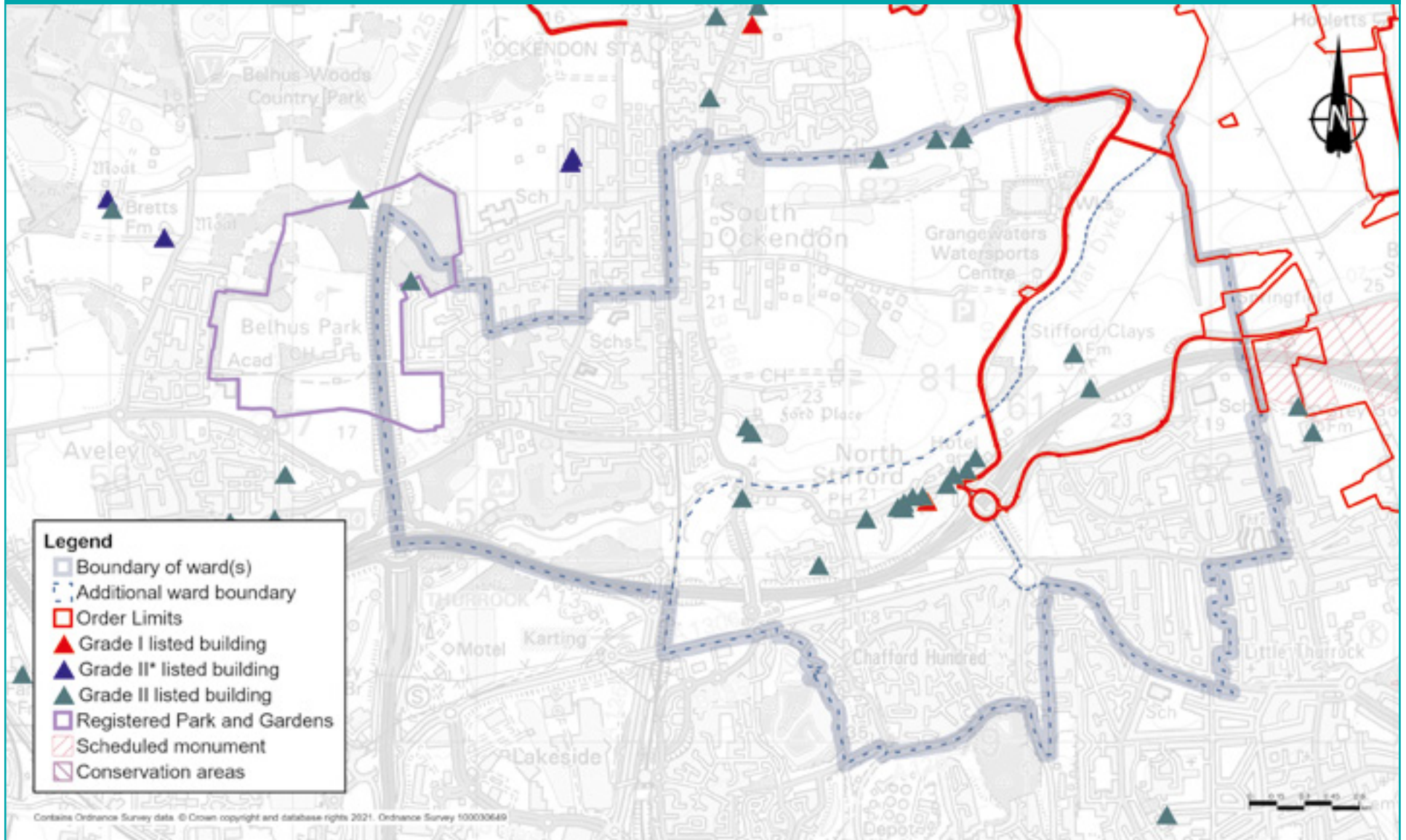
Two listed buildings have been identified within Stifford Clays ward in relation to the project:

- Stifford Clays Farmhouse is a Grade II listed building of high heritage value. It is located immediately north of the A13 West Thurrock Arterial Road, around 330 metres north of the project. It dates back to the early 19th century. An earlier farm once existed 300 metres to the north of the farmhouse but only a thatched barn has survived (see below).
- The thatched barn at Stifford Clays Farmhouse is also a Grade II listed building of high heritage value. It is to the north of the A13 West Thurrock Arterial Road, around 450 metres east of the project and dates to the 17th century. It is the only surviving building of a post-medieval farm that predated Stifford Clays Farmhouse to the south.

A total of 12 listed buildings have been identified within Chafford and North Stifford ward in relation to the project (11 are Grade II listed and one is Grade I listed):

- The Church of St Mary The Virgin (Grade I), which is of high heritage value and is located on High Road along with several other listed buildings. It dates back to the 12th century (the nave), and features 13th, 14th and 19th century alterations and extensions. The church would have been a focal point of the medieval settlement of North Stifford.
- A former granary (now a house) north of Coppid Hall (Grade II)
- Lilac, Viola and Wren Cottages (Grade II)
- Barcris and Honeysuckle Cottages (Grade II)
- Caira Fircot (Grade II)
- Coppid Hall (Grade II)
- Laburnam, Middle Cottage, Old Post Office (Grade II)
- The Thatched Cottage (Grade II)
- Europa Hotel (Grade II)
- A wall enclosing a kitchen garden to the east of Europa Hotel (Grade II)
- Churchview Cottages (Grade II)
- War memorial (Grade II)

Figure 18.20 Built heritage in Stifford Clays, Chafford and North Stifford and Belhus wards



There are four listed buildings of historic relevance within Belhus ward (in relation to the project):

- Little Mollands
- Great Mollands
- Weatherboarded Granary at Great Mollands
- Red Brick Barn at Great Mollands

18.11.1 Construction

Construction impacts

Construction activities affecting these wards relate to establishing the main project route and operating Long Lane compounds A and B and Stifford Clays Road compound west. However, no construction compounds would be located within these wards itself. Activities would also include a construction access route along the existing A13 and Medebridge Road.

There would be no physical impacts in Stifford Clays ward. The closest construction activity to the two listed buildings would relate to the access route along the existing A13 and Medebridge Road, which would not directly or indirectly impact the setting (the surroundings in which a heritage asset is located) of the historic buildings.

Also, there would be no physical impacts in Chafford and North Stifford ward. Construction activities may lead to a slight increase in road traffic, noise and dust but this would not impact the setting.

Measures to reduce impacts during construction

Construction mitigation is not required as there would be no impact to built heritage. For general information about heritage mitigation measures, please refer to Design Principle (S326), the CoCP, and the air quality, noise and vibration and heritage sections of the REAC.

18.11.2 Operations

Please refer to the Project description Operations section of this chapter.

Operational impacts

No built heritage would be impacted by the project.

Measures to reduce impacts during operation

Mitigation is not required as no built heritage would be affected by the project.

18.12 Contamination

Construction

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 of the project within the Stifford Clays, Chafford and North Stifford and Belhus wards. By following a construction management plan and ensuring that, where potential sources of contamination are used (for example oils, lubricants, mechanical plant), that appropriate spill containment and emergency response procedures are in place to prevent adverse environmental impacts from occurring.

Operation

Once the road opens, if an incident occurs that results in localised contamination (for instance a traffic accident), we would assess and if necessary remove any affected soils to reduce the risk of further contamination across a wider area or entering water courses. More information on these controls can be found in the REAC.