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Chapter 15: Chadwell St Mary ward

This chapter summarises the activities in Chadwell St Mary ward relating to the project's construction and its operational phase (when the new road is open). It also explains the measures intended to reduce the project's impacts on the local area. For more information about the assessments in this chapter and other information available during this consultation, see chapter 1, which also includes a map showing all the wards described in this document.

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 the 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.

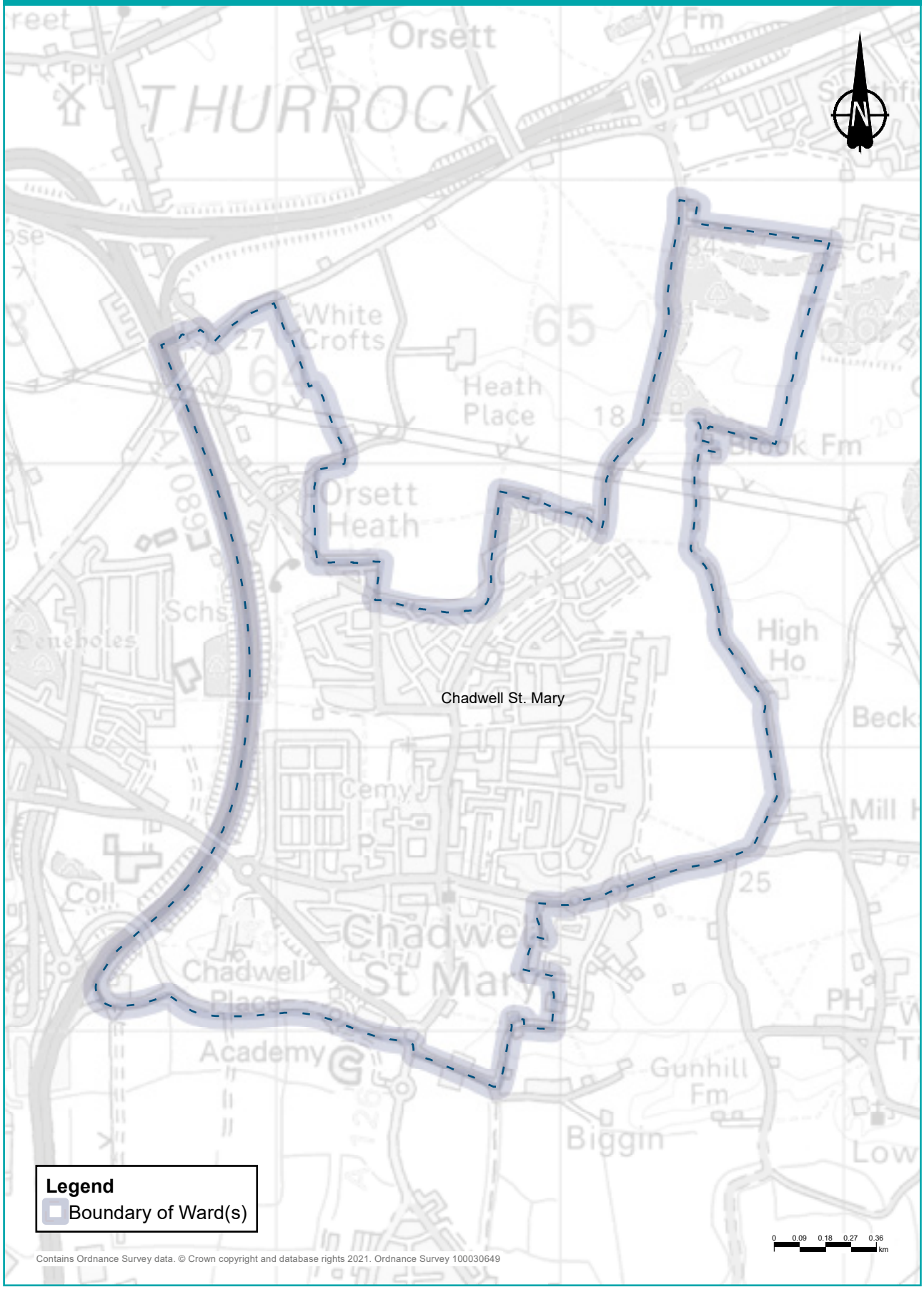
15.1 Overview

15.1.1 About this ward

Chadwell St Mary is located to the west of East Tilbury ward and to the north of Tilbury St Chads ward in the borough of Thurrock. The ward is also south of Orsett ward and east of Little Thurrock Blackshots and Rectory ward. It has an area of around 3.6km^2 and an estimated population of 10,274[1]. The ward is predominantly residential (Chadwell St Mary and Orsett Heath) with some agricultural land to the north and east. Allotments and green space are located within the residential areas of Chadwell St Mary. An outline application for residential development of up to 230 dwellings was approved in 2019 at Star Industrial Estate, Linford Road. The A1089 (Dock Approach Road) runs north-south along the western side of the ward.

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

Figure 15.1: Ward boundary map for Chadwell St Mary ward



15.1.2 Summary of impacts

Table 15.1: Summary of impacts during the project's construction and operation

Topic	Construction	Operations
Traffic	**Impacts** There will be additional traffic on the A1089 which may lengthen journey times along this route. There may be delays when lane closures are in place on the local road network. **Mitigation** There are several mitigation measures to reduce construction impacts on local residents, such as minimising the use of local roads by construction vehicles. Further information can be found in the Traffic section of this chapter.	**Impacts** The predicted change in traffic flows in this ward would occur along the route from the Orsett Cock junction southbound through Chadwell St Mary along Brentwood Road and Chadwell Hill, and westbound along Marshfoot Road to the junction with the A1089. In addition, the very western end of the A126 Marshfoot Road, from the junction with the Old Dock Approach Road, which goes over the A1089. Further details about the impacts on journey times can be found in the traffic section. **Mitigation** Throughout the design process several mitigation measures have been developed to reduce the road's impact on local residents. More information can be found in the Traffic section later.
Public transport	**Buses** Additional traffic along the A1089 and traffic management measures on local roads may impact journey times for a number of local bus routes. **Rail** Throughout construction there may be some increases in journey times to Tilbury Town and East Tilbury stations, associated with increased traffic through the area and traffic management on local roads.	**Buses** It is expected there would be minor changes to journey times for several buses, including the 5X, 73, 83 and Z4. **Rail** Once the project is complete, there would be no discernible changes in local access times to the nearby train stations and it would be easier to access Ebbsfleet International Station.

Topic	Construction	Operations
Footpaths, bridleways and cycle routes	**Impact** Utilities diversion works, the realignment of the A1013 and High House Lane, and construction of the project main line would require both short and long term closures of footpaths and cycle routes in this ward. **Mitigation** Where footpaths and bridleways require temporary closure to allow the construction of the northern tunnel, new road, or viaduct, these closures would be as short as possible.	**Impact** Two footpaths would be open along realigned routes once the project is operational. All three footpaths affected during construction would be upgraded to bridleways. One new off-road cycle track with an adjacent grass verge for horse-riding would also be opened. **Mitigation** These realigned footpaths would be resurfaced and designated as bridleways, crossing the project by a new bridge designed to be safe for horse riding. All three footpaths affected during construction would be upgraded to bridleways. One new off-road cycle track with an adjacent grass verge for horse-riding would also be opened.

Topic	Construction	Operations
Visual	**Impacts** Construction activities would be visible from the northern edge of Chadwell St Mary including road construction, overhead power line diversion and multi-utility works. The Brentwood Road Compound and the Hornsby Lane and Brentwood Road Utility Logistics Hub would be visible from the north. Views from footpaths are likely to be similar with intermittent southerly views from Orsett Golf Club. **Mitigation** Temporary earth bunding on the southern boundary of the Brentwood Road Compound would be used to reduce views of construction activity from properties within this ward. Visual impacts would be controlled through the range of good practice measures within the project's CoCP and REAC.	**Impacts** Once the project is complete and in operation, the views from most residential properties along the northern edge of Chadwell St Mary would include the tops of HGVs and gantries above the false cuttings, and views of Brentwood Road overbridge. Diverted overhead lines would look similar to those in existing views. Properties along the eastern edge of Chadwell St Mary would include distant views of the top of HGVs and gantries. The project would be visible from local footpaths along the north and eastern edges of the settlement. **Mitigation** The false cutting and a wide belt of proposed woodland planting would reduce views of the project from the north and east of Chadwell St Mary.

Topic	Construction	Operations
Noise and vibration	**Impacts** Construction activity would include the A1089 upgrade, building the new road, utility works, and activities in and around compounds in adjacent 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, except for Hornsby Lane and the westbound exit from A13 on to Dock Approach Road, where there would be minor increases. There is one structure that is expected to be constructed using vibratory or percussive piling. **Mitigation** Construction noise levels would be controlled by mitigation measures set out in the REAC. There are also measures presented in the CoCP.	**Impacts** There would be increased levels of noise in the northern section of the ward as a result of the widening of the existing A13. Noise levels would also increase from existing roads due to the changes in traffic flow, speed and vehicle type. **Mitigation** The design of the new road has been kept low in the environment, which would help reduce the noise. There would also be a six-metre high noise barrier near Brook Farm Cottage within this ward.

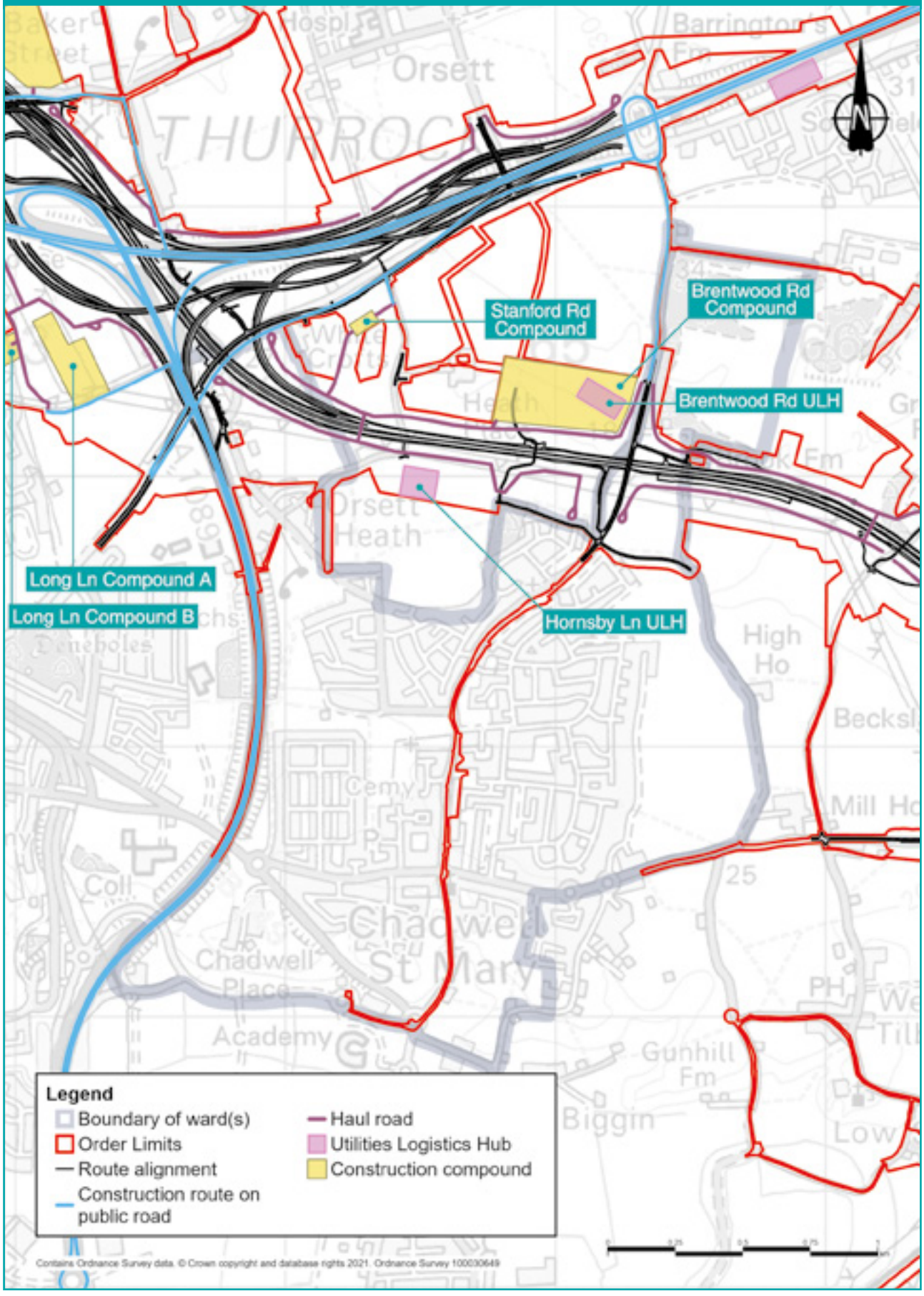
Topic	Construction	Operations
Air quality	**Impacts** There is likely to be dust and emissions from construction equipment and traffic during the construction phase. Between 2025-27 there would be a minor worsening in air quality at receptors closest to the A1089. This would be temporary. **Mitigation** 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.	**Impacts** There are no predicted exceedances of NO_2 or PM_{10}. **Mitigation** As there are no predicted exceedances, no mitigation has been proposed.

Topic	Construction	Operations
Health	**Impacts** The construction phase of the project would present opportunities to access work and training. There is likely to be changes in the area that may result in negative impacts on health, including mental health and wellbeing. These include changes in accessibility of local resources and amenity as a result of road closures. Noise would increase as a result of construction, construction traffic and vibration caused by piling. **Mitigation** The negative impacts would be mitigated through the good practice construction measures presented in the CoCP and REAC relating to dust emissions, working hours and visual screening, traffic management measures and community engagement. This includes the establishment of Community Liaison Groups.	**Impacts** Residents may experience positive health benefits through accessibility improvements, better access to services, jobs and training, and to open space including new recreational areas. There would be increases in road traffic noise. Some residents within the ward may experience anxiety around perceived air quality and noise. **Mitigation** Low-noise road surfaces would be installed on all new and resurfaced roads. Acoustic screening (noise barriers) has been incorporated into the design where necessary.

Topic	Construction	Operations
Biodiversity	**Impacts** The construction of the project would involve the removal of areas of habitat, both temporarily and permanently. These habitats are home to a range of protected and notable species which would be impacted. **Mitigation** Vegetation clearance would be undertaken during the winter where possible. Protected species would be moved away outside of the construction working area under a Natural England licence. Boxes to support dormice and birds would be put up within the retained habitats. Impacts would also be controlled through a range of good practice measures set out in the project's CoCP and REAC.	**Impacts** The operation of the new road could cause mortality of species by encountering road traffic, habitat fragmentation, and disturbance from traffic. **Mitigation** Landscape planting would provide strong links for animals to move and forage along. A green bridge (over Hoford Road to the east of the ward boundary) would also be installed. Newly created habitat would be managed to ensure they provide a high-quality environment for plants and animals. Biodiversity impacts would also be controlled through good practice measures set out in the CoCP and REAC.

Topic	Construction	Operations
Built heritage	**Impacts** Construction of the project would result in the demolition of the Grade II listed 1 and 2 Grays Corner Cottages. The setting of Church of St Mary as well as Grade II listed Heath Cottage, Chadwell House, Sleepers Farmhouse would be temporarily impacted by construction activity and traffic. **Mitigation** The demolition of listed buildings would be mitigated by historic building recording in line with industry standards. The design and layout of Long Lane Utility Logistics Hub would avoid light pollution during night-time construction and would be appropriately screened as set out in the Design Principles. Dust and noise reduction measures are presented in the REAC.	**Impacts** There would be impacts to the setting of Grade II listed Heath Cottage due to visual and audible changes. **Mitigation** Earthworks alongside the new road and the establishment of native hedgerow and trees would soften the visual and audible changes impacting the setting of Heath Cottage.
Contamination	**Impacts** There is the possibility for existing contamination within the ground to become mobilised. There is also a potential risk of accidental oil, cement and fuel spills from construction traffic and the storage of materials. **Mitigation** To reduce this risk, the contractor would follow good practice construction measures.	**Impacts** None identified. **Mitigation** If during operation any incident were to occur which resulted in localised contamination, soils which had become significantly affected would be assessed and, if necessary, removed to reduce the risk of contamination migrating across a wider area or entering controlled waters.

Figure 15.2: Main construction areas in Chadwell St Mary ward



15.2 Project description

15.2.1 Construction

Construction activities

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

Most of Chadwell St Mary ward is outside the Order Limits (the area required to deliver the project), however, there would be a significant amount of construction work carried out in the north of the ward, as shown in figure 15.2 left. Works within this ward would include construction of parts of the proposed A13/A1089 junction, realignment of Brentwood Road, and a section of the main carriageway north of Chadwell St Mary settlement. Hornsby Lane would be permanently closed.

We would build haul roads in this area to allow construction vehicles to move machinery and materials around the worksite without using public roads. East of the A1089 and south of the A13, haul roads would run along the alignment of the proposed new road, connecting compounds, hubs and worksites.

Partly in this ward, the proposed A13/A1089 junction with the new road would make substantial changes to the existing junction at this location, requiring the construction of new structures and roads. For more information, see chapter 16 (Orsett ward) of this document and chapter 5 of the Construction update.

Within this ward, the new road has been designed to be as low as possible, keeping within the natural contours of the landscape. Where possible, the new road would be built within a false cutting (sitting inside a raised and landscaped embankment) to screen it for nearby communities. A new bridge over the new road would be built at Brentwood Road.

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 vehicles leaving the compound do not dirty local roads.

There are no construction compounds located here. However, roads within here would be impacted by traffic to three compounds, the Northern Tunnel Entrance Compound, Station Road Compound and Brentwood Road Compound. These compounds, located in adjacent wards, are described in more detail in the Construction update and the relevant ward summaries.

There would be construction related traffic going to the northern tunnel entrance, Station Road Compound and Brentwood Road Compound along the A1089. There would also be some construction traffic, mainly cars, using Brentwood Road in the ward to access the Brentwood Compound.

The average daily number of vehicles going to these compounds is shown in table 15.2. 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.

Utilities

There would be no Utility Logistics Hubs in this ward. However, there would be substantial works in this area to divert utilities away from the area required for the new road. In the north-west of the ward, we would carry out part of the diversion of the 272kV overhead power line, building two new pylons and removing two existing ones. In the north-east of the ward, we would carry out part of the realignment of the 400kV overhead power line, also removing two existing pylons and building two new ones as part of restringing works.

There would also be works to divert a high-pressure gas pipeline, 0.27km in length, that runs alongside Brentwood Road. In addition, a new underground power cable would be installed, 3km of which goes along Marshfoot Road and Brentwood Road.

Table 15.2: Average daily vehicle numbers going to compounds located near Chadwell St Mary ward

Time period	Northern Tunnel Entrance Compound		Station Road Compound		Brentwood Road Compound	
	HGV	Cars	HGV	Cars	HGV	Cars
January to August 2024	90	377	2	27	52	57
September 2024 to February 2025	105	580	13	38	56	90
March to May 2025	133	593	20	35	76	52
June to October 2025	133	466	20	35	102	113
November 2025 to March 2026	133	506	18	35	99	140
April to August 2026	132	611	21	35	82	140
September 2026 to March 2027	132	670	16	24	82	140
April to November 2027	131	720	4	18	78	114
December 2027 to March 2028	131	684	0	0	45	68
April to July 2028	122	619	0	0	21	47
August 2028 to December 2029	39	73	0	0	0	0

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

Construction routes on public roads

Access to Brentwood Road Utility Logistics Hub would be through Chadwell St Mary along Brentwood Road. The A1089 on the eastern boundary of the ward would also be a construction route. These roads would be used by HGV and workforce construction traffic but would remain open to the public.

Construction schedule

Construction of the entire project is scheduled to last for around six years from 2024 to 2029. To deliver our construction programme efficiently, we would divide activities into coordinated packages of work. Maps and programmes for the packages north of the river can be found in chapters 4, 5 and 6 of the Construction update.

Construction working hours

Most construction activities would take place during the core construction hours, which are from 7am to 7pm on weekdays and from 7am to 4pm on Saturdays, with additional repair and maintenance periods (if required) from 8am to 5pm on Sundays.

There may be circumstances when hours would need to be extended beyond core hours. Typically, this would be to reduce the impact to road users by working at night when there is less traffic. Activities that would involve longer working hours include implementing traffic management measures, joining new roads to existing ones, overhead power line works, under-road utility works, and resurfacing existing carriageways.

In addition, there may be extended working hours for ground preparation when days are longer (spring to autumn) and during periods of fine weather. Typically, noisier works such as piling or bridge-building would not take place outside core hours. More information about working hours is set out in the Noise and vibration section later and in the CoCP.

Traffic management

The main traffic management measures in Chadwell St Mary are listed below:

Table 15.3: Main traffic management during construction in Chadwell St Mary ward

Road(s) affected	Proposed traffic management	Purpose	Duration
Marshfoot Road, Chadwell Hill and Brentwood Road	Lane closure and traffic lights	To facilitate the installation of power supplies for the compounds at the A13 junction	12 months
Brentwood Road	Closure	To carry out bridge works and modifications to local utility networks and installation of the Brentwood Road Compound	Nights and weekends over short periods associated with specific works activities
Brentwood Road	Crossing point	To allow construction vehicles to cross	January 2024 and August 2026
Brentwood Road	Lane closures and traffic lights in 300m sections	To modify utilities and install temporary compound connections	6 months between January 2024 and August 2024
Brentwood Road	Closure	Switchover to new road alignment	Nights and weekends between June and October 2025
A1013 Stanford Road	Lane closures and traffic lights	To carry out nearby works and modifications to local utility networks	8 months between June and March 2026
A1013	Closures	For works on overhead power lines	Nights and weekends over short periods associated with specific works activities
A1013	Closures	Switchover to new road alignment	Occasional nights and weekends between December 2027 and March 2028
A1089	Lane closures and full closures	To facilitate bridge demolition works, removal of overhead power lines	Nights and weekends over short periods associated with specific works activities
A13 westbound to A1089 southbound	Closure	To carry out nearby works	Nights and weekends over short periods associated with specific works activities
Heath Road	Lane restrictions	To carry out nearby works and utilities	1 month between November 2025 and March 2026
Rectory Road	Closure	Diversion of a high pressure gas main	2 weeks between December 2027 and March 2028
Rectory Road	Closure	Works associated with replacing the Rectory Road bridge over the A13	7 months between September 2027 and March 2028

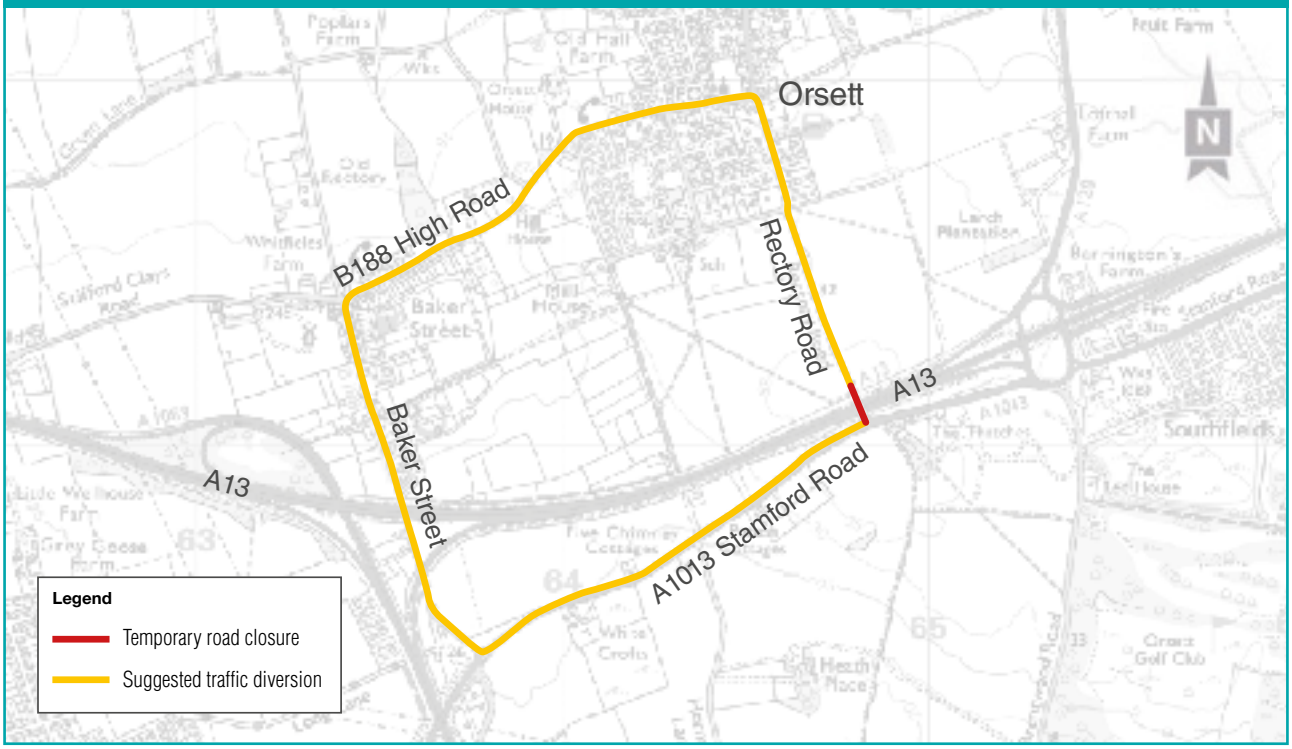
Rectory Road would be closed twice during the construction period. Initially it would be closed early on in the programme for two weeks to allow for the diversion of a high-pressure gas main. The replacement bridge over the A13, which is part of Rectory Road, would be at the same location as the current bridge. This means that later in the programme it will be necessary to close Rectory Road at this point for seven months. The diversionary route is shown in figure 15.3 below and runs through the north of Chadwell St Mary ward.

Rectory Road diversion route

An existing 7.5 tonne ban at the north end of Brentwood Road would be removed throughout the construction period to allow access to the Brentwood Road Compound.

Construction traffic going to the Brentwood Road Compound would need to approach it from the north, so no HGVs would go further south than the proposed Brentwood Road bridge over the new road. They would not go through the residential areas of Chadwell St Mary.

Figure 15.3: Rectory Road closure diversion



We have sought to minimise traffic management measures wherever practical, but these would be necessary in some locations to allow construction traffic and local communities to move around 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 OTMPfC. 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 would be subject to final approval by the Secretary of State for Transport, following consultation with the local highways authority.

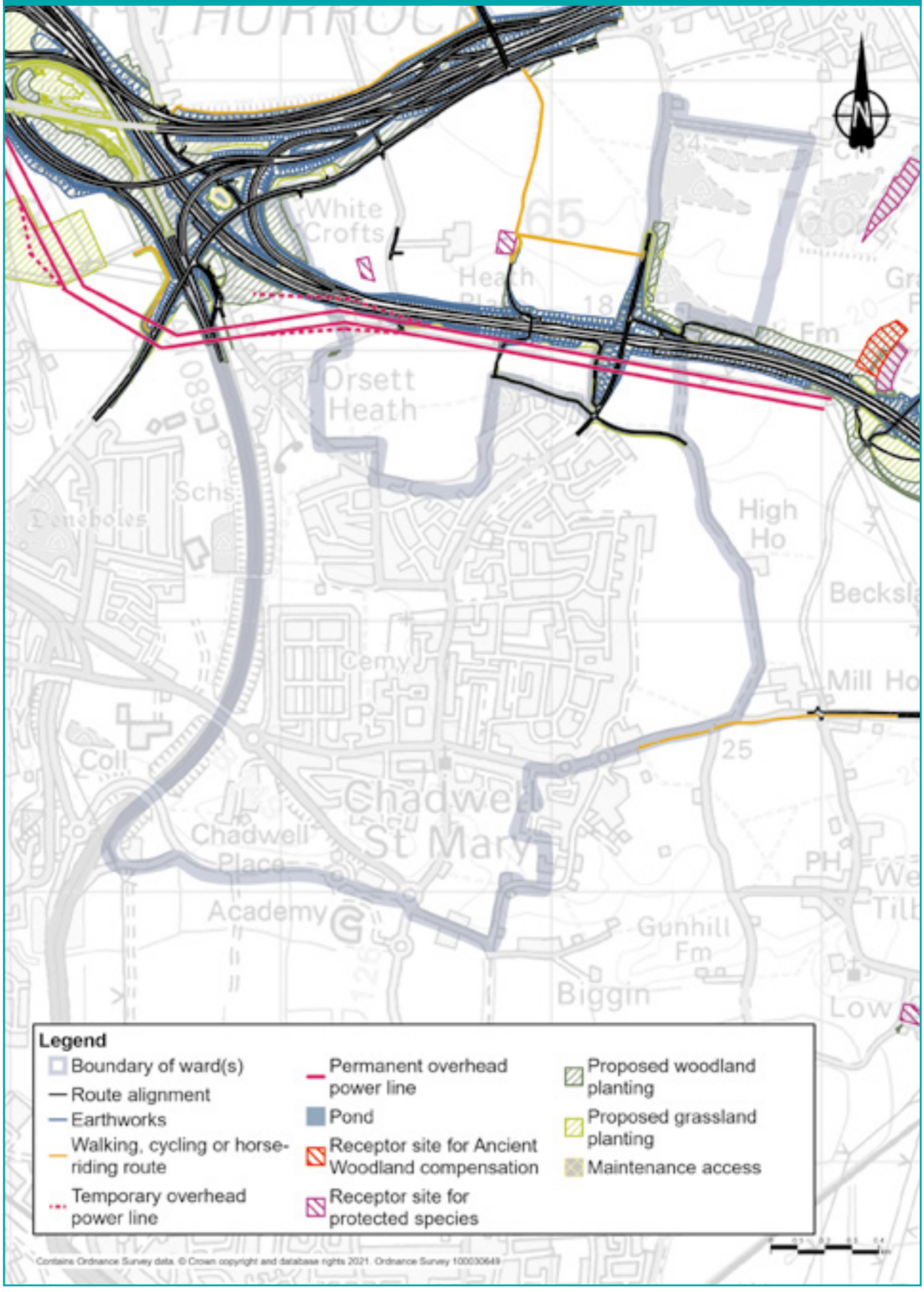
15.2.2 Operations

The completed project

This section sets out elements of the project that would feature permanently in Chadwell St Mary ward once construction is complete and the new road is open. For more information about the completed project, see the Operations update, as well as the figures in Map Book 1: General Arrangements.

- The new A13/A1089 junction would be a permanent feature in this ward, as would a section of the new road north of Chadwell St Mary. The area around the junction would be landscaped with species-rich grassland running along the roads and the edges of the junction to woodland edges. The majority of new roads that form the new junction would be cut into the landscape to reduce their visual and noise impacts, with the A13 remaining at its current height above the new roads.
- Realigned overhead power lines would run parallel to the south of the new road.
- Some footpaths and bridleways would be rerouted permanently as part of our proposals for 46km of upgraded or entirely new walking paths, cycle paths and bridleways that would benefit communities along the route. For more information, see the Footpaths, bridleways and cycle routes section below.
- There would be sections of two overhead power line diversions in the north of the ward, a 275kV line and a 400kV line. The former diversion, in the north-west, involves removing two existing pylons and building two new ones.

Figure 15.4: Main features of the operational project in Chadwell St Mary ward



Impacts on open space land

Within Chadwell St Mary ward, 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 the Chadwell St Mary ward the project is proposing to permanently acquire the rights of a small area of land to the south west of the Orsett Golf Club for construction of the Brentwood Road bridge and diversion of a gas pipeline. The golf course would remain open during construction and any impact would be kept to a minimum. Permanent rights would be acquired over a limited corridor of land within this site, to operate and maintain the gas pipeline.

Within Chadwell St Mary ward there are no proposed changes to the private recreational facilities as previously consulted. More information about how our proposals impact private recreational facilities can be found in chapter 3 of our Operations update.

15.3 Traffic

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

15.3.1 Construction traffic impacts

There would be additional traffic on the A1089 from vehicles going to the northern tunnel entrance, Station Road and Brentwood Compounds which may lengthen journey times along this route. There would be delays whenever there are lane closures in place on the road network such as on Marshfoot Road, Chadwell Road and Brentwood Road for the delivery of the new electricity supply to the compounds in Orsett ward, and on the A1013 when utility diversions take place along that stretch of road.

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 Chadwell St Mary, we would:

- minimise use of the local road network as far as practical through construction of temporary offline haul roads directly from the strategic road network
- re-use excavated materials, where possible, to substantially reduce the need to dispose of them via the road network. This would reduce the number of HGV journeys from the public road network during construction
- build new bridge structures offline (off site), where practical, to avoid closing local roads for extended periods. Where this is not possible, and if space is available, the existing road would be temporarily realigned to allow for construction
- ban HGVs associated with construction of the project on some local roads where possible (following discussion with key stakeholders)
- stockpile material within the Order Limits to allow material to be managed on-site rather than offsite, reducing the number of HGVs journeys needed

15.3.2 Operations

Traffic impacts

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 East Tilbury ward for the first year of operation, 2029.

Figures 15.5, 15.7 and 15.9 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 15.6, 15.8 and 15.10 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.

The largest change in traffic flows in the ward would occur on the northern section of the A1089 on the western boundary of the ward. In the northbound direction the traffic flows would increase by between 500 and 1,000 PCUs an hour in the morning and evening peak hour and by between 250 and 500 PCUs an hour in an interpeak hour. This represents an increase in flows of over 40% in the morning peak hour and between 20% and 40% in the interpeak and evening peak hour. The change in traffic flows would be a result of some traffic from the Stifford Clays and Grays area changing their routes, for example by driving eastwards to use the A1089 rather than joining the A13 at the Stifford interchange. There would be a decrease in traffic flows southbound on this section of the A1089, with a decrease of between 250 and 500 PCUs (between 10% - 20%) in the morning peak hour, and a decrease of between 50 and 250 PCUs (a decrease of under 10%) in the interpeak and evening peak period.

The A1013 Stanford Road passes through the north western corner of the ward. Here the traffic flows would decrease northbound by between 50 and 250 PCUs in the morning peak hour, the interpeak hours and the evening peak hour (a decrease of between 10% and 20% in each hour). There would be an increase in flows of between 50 and 250 PCUs in the morning peak hour, the interpeak hours and the evening peak hour (an increase of between 20% and 40%).

The Chadwell bypass lies to the east of the A1089. Here the traffic flows would decrease westbound by between 50 and 250 PCUs in the morning peak hour (a decrease of between 10% and 20% in each hour). Eastbound, towards the A1089 there would be an increase in flows of between 50 and 250 PCUs in the morning peak hour (an increase of between 20% and 40%). In all other time periods, and in both directions, any change in traffic flows would be less than 50 PCUs an hour.

On Marshfoot Road, east of the A1089, there would be an increase in traffic flows westbound and a decrease of traffic flows eastbound. In the westbound direction the increase in traffic flows would be between 50 and 250 PCUs in all of the modelled time periods. This would be an increase of between 20% and 40% in the morning peak hour and the average interpeak hour. The increase would be over 40% in the evening peak hour. The decrease in traffic eastbound would be between 50 and 250 PCUs in each modelled hour. This would be a reduction in traffic flows of between 20% and 40% in the morning peak hour and between 10% and 20% in the average interpeak hour and the evening peak hour.

The Brentwood Road passes through Chadwell St Mary. North of the junction with Heath Road the change in traffic flows northbound would be less than 50 PCUs an hour in the morning peak hour and in an average hour in the interpeak period, and between 50 and 250 PCUs in the evening peak hour. This would be an increase in traffic of between 20% and 40%. Traffic flows are predicted to increase southbound in all modelled time periods by between 50 and 250 PCUs an hour, an increase of over 40%.

Linford Road is in the east of Chadwell St Mary. The traffic flows on this road, east of the junction with Brentwood Road and Chadwell Hill would mainly remain unchanged with the exception of westbound traffic flows in the evening peak hour which are predicted to increase by between 50 and 250 PCUs an hour, an increase of between 10% and 20%.

Figure 15.5: Predicted change in traffic flows (PCUs) with the project during the morning peak in 2029

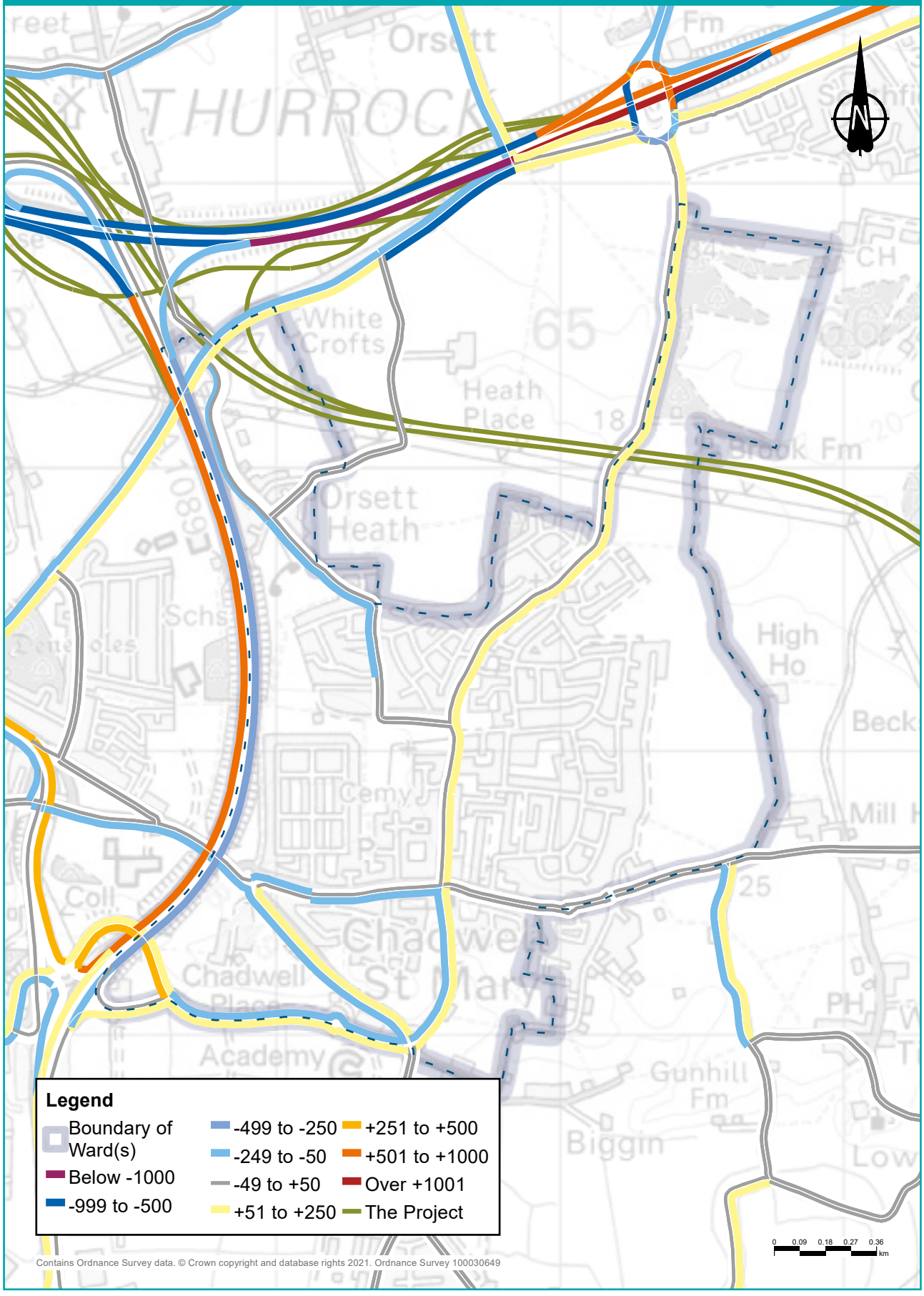


Figure 15.6: Predicted percentage changes to traffic flows during the morning peak in 2029

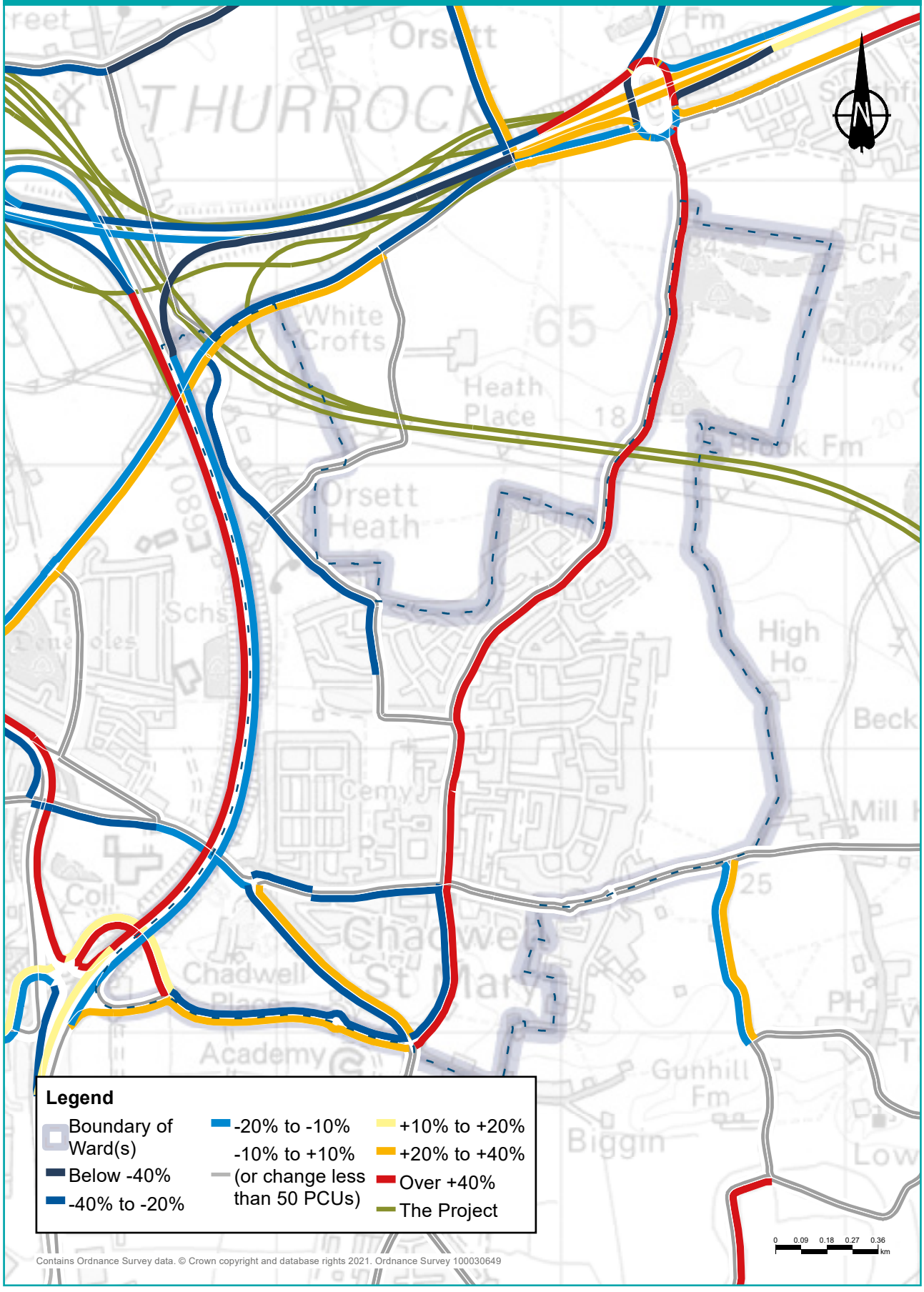


Figure 15.7: Predicted change in traffic flows (PCUs) with the project during the interpeak in 2029

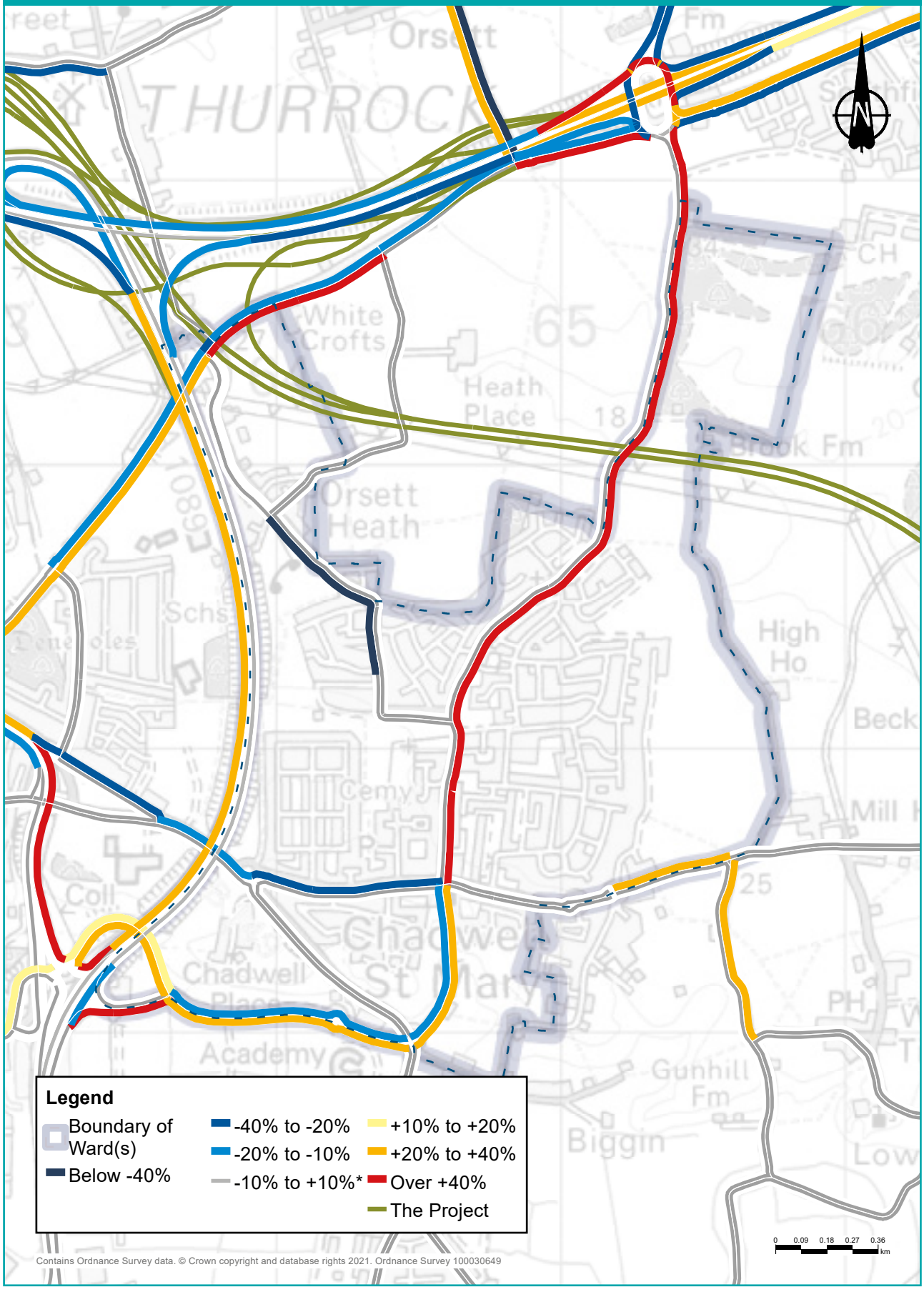


Figure 15.8: Predicted percentage changes to traffic flows during the interpeak in 2029

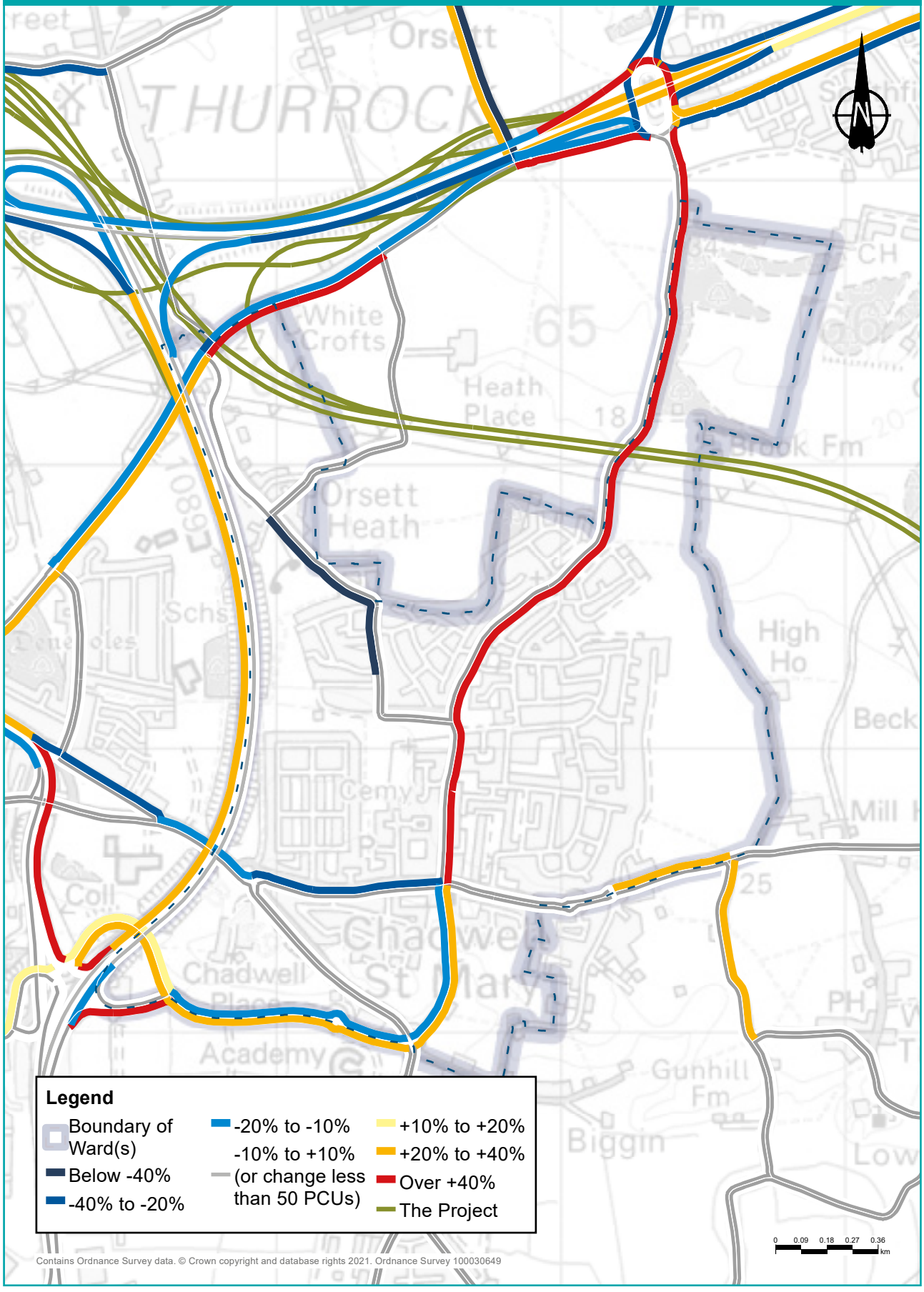


Figure 15.9: Predicted change in traffic flows (PCUs) with the project during the evening peak in 2029

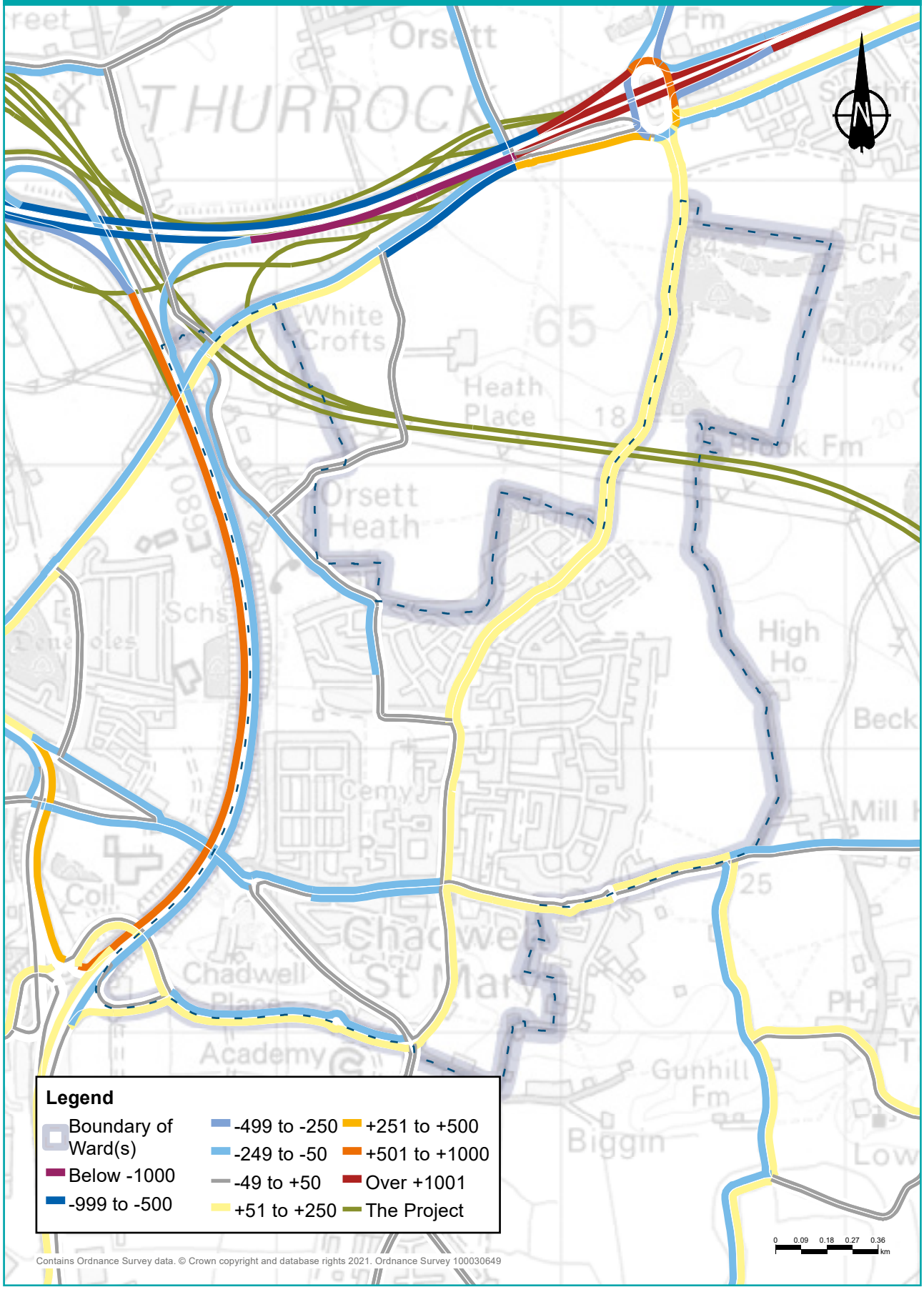
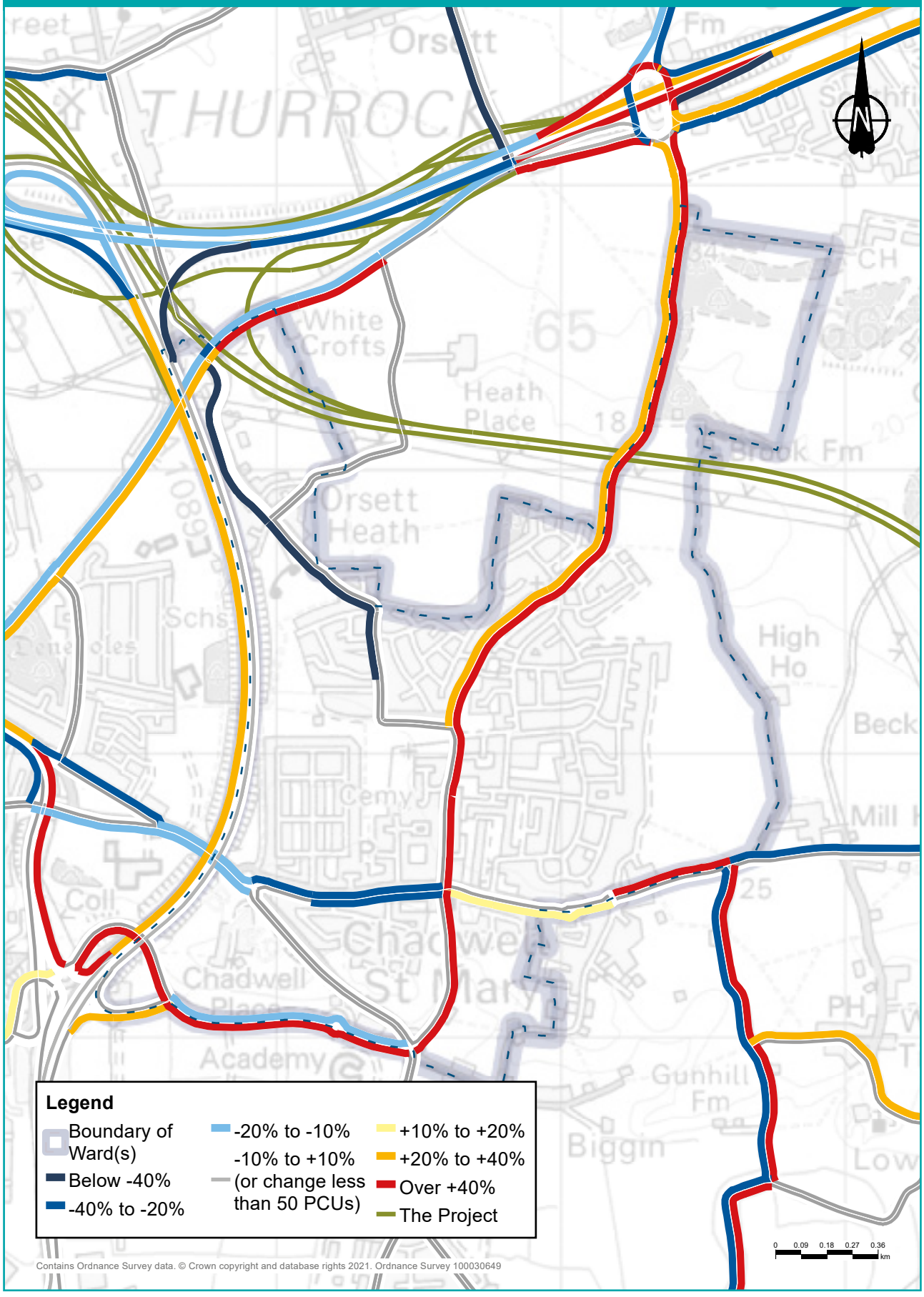


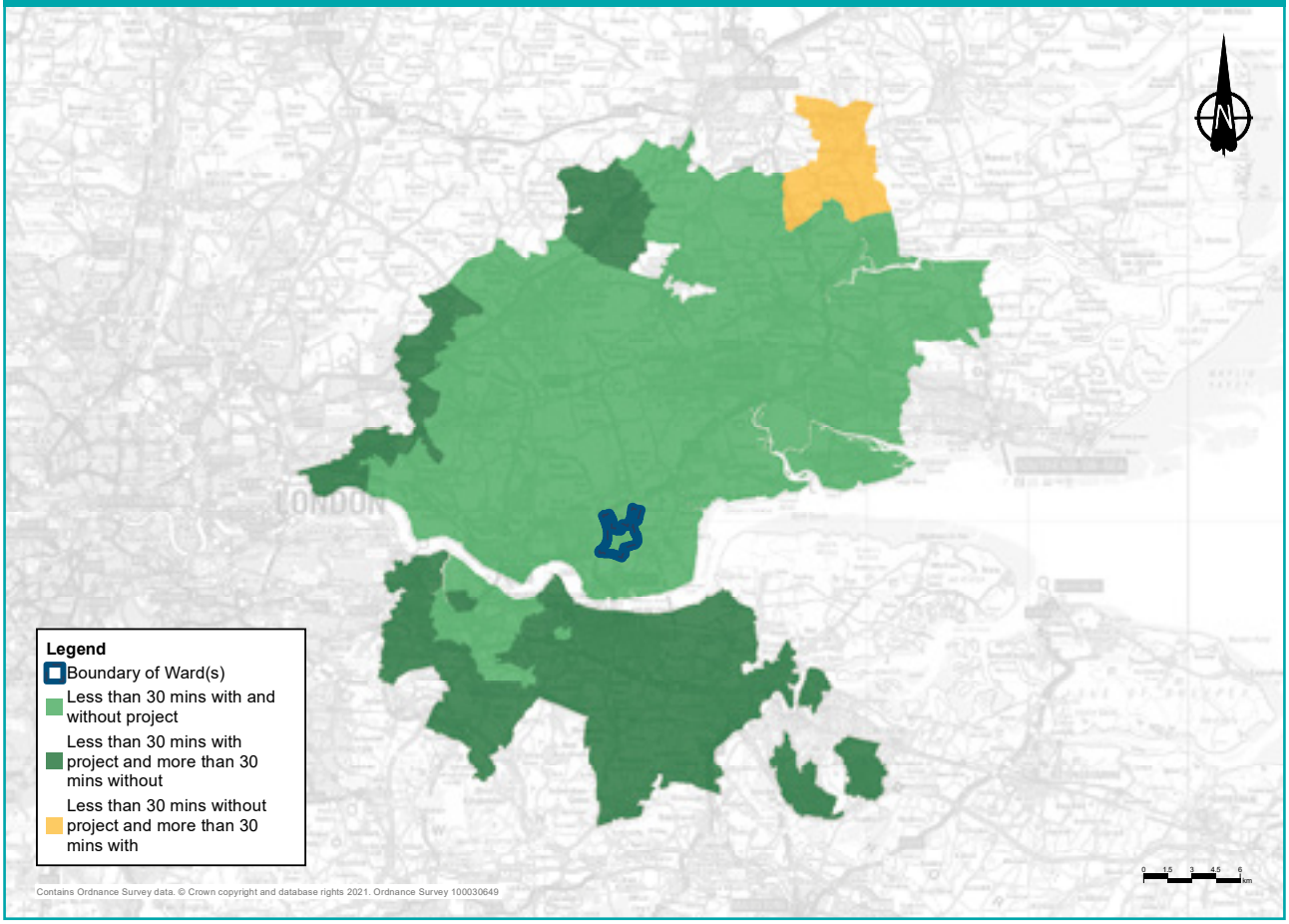
Figure 15.10: Predicted percentage changes to traffic flows during the evening peak in 2029



Changes to journey times

Figure 15.11 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 15.12 shows the change in areas that could be reached 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 with the project in place would increase by 49%, which would mean access to an additional 181,000 jobs. Within a 60-minute drive, the number would increase by 18%, which would mean access to an additional 430,000 jobs.

Figure 15.11: Change in area that motorists could drive to within 30 minutes from Chadwell St Mary ward



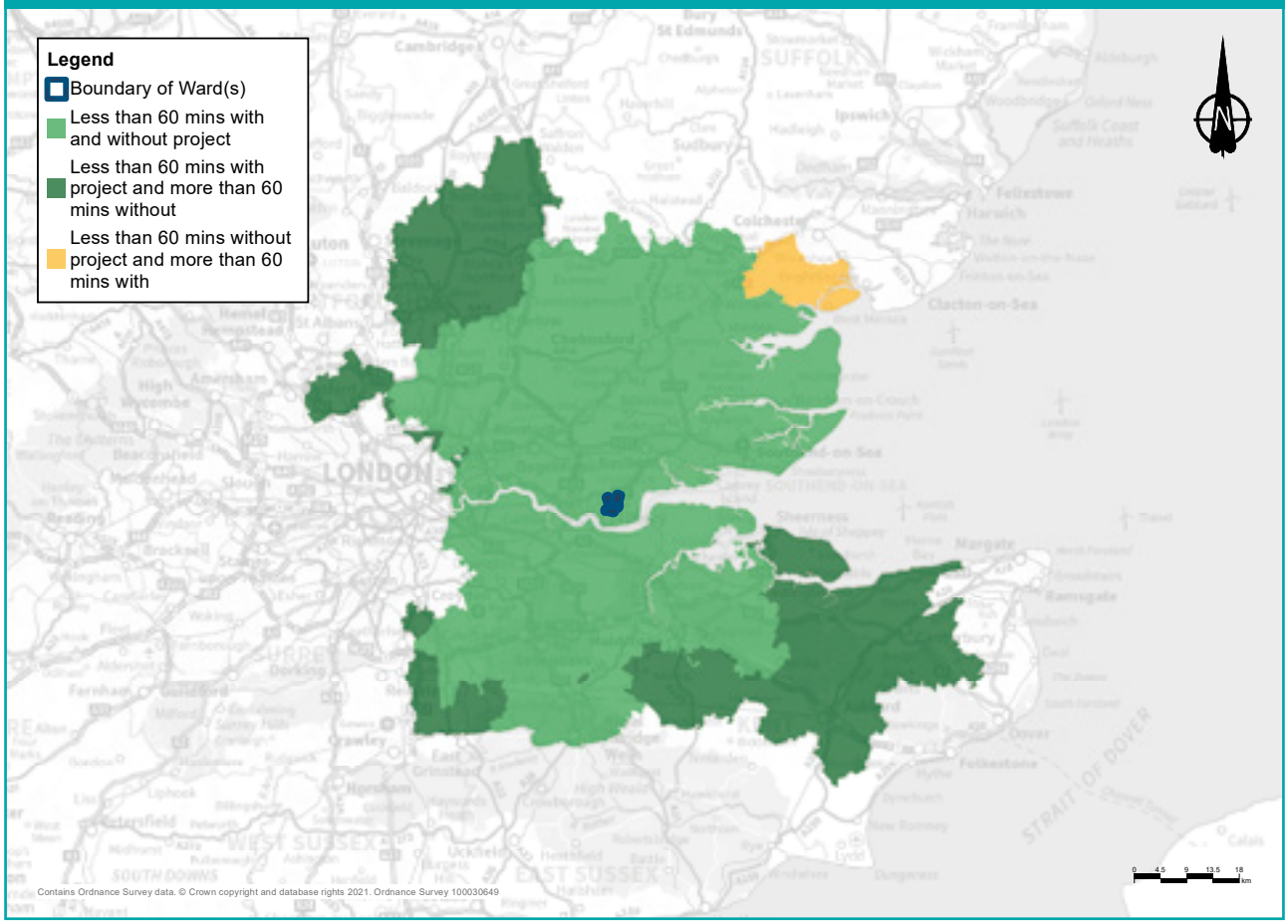
Operational traffic flows

The project has been designed to optimise its impacts on traffic, including the design of free-flowing connections with the A13/A1089 and the M25. In addition, the main route would have no traffic lights or roundabouts to ensure continuous traffic flow, although traffic lights or roundabouts would be necessary at some minor junctions away from the main route where traffic meets local roads. All new junctions would be designed to the latest safety standards.

An iterative design process, including successive stages of traffic modelling and extensive consultation and engagement, has ensured that only the optimal links to the existing road network would be provided. For more information about how the project has developed, see the You said, we did consultation document.

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 15.12: Change in area that motorists could drive to within 60 minutes from Chadwell St Mary



15.4 Public transport

Existing situation

There are no stations within Chadwell St Mary ward but Grays, Tilbury Town and East Tilbury stations are all nearby. These are serviced by c2c, with trains between London and destinations in Thurrock and Essex.

There are a number of bus routes in the ward, including the 5A, 5B, 5X, 7, 7A, 7B, 7C, 11, 51, 66, 66A, 73, 77, 77A, 83, 100, 374, 474, 475, and the Z1, which run through the ward, and the Z2 and Z4 which run along the A1089.

15.4.1 Construction

Rail

There would be a series of night time rail possessions of the Tilbury Loop railway line over a period of two months, in the adjacent East Tilbury ward while the Tilbury Viaduct is constructed. These possessions would be agreed with the network operator. It is intended that the works would take place outside train operational times, and so services would not be disrupted.

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

Buses

Additional traffic along the A1089 and traffic management measures on local roads may impact journey times for a number of local bus routes.

15.4.2 Operations

Rail

There would be no discernible change in local access times to Grays, Tilbury Town or East Tilbury stations and no change to the rail services at these stations. It would be quicker to access HS1 services at Ebbsfleet International Station from this ward, with the journey time decreasing by around six minutes in the morning and evening peaks.

Buses

It is expected that during the operational phase there would be a minor increase in journey time on certain sections of the route for these buses:

- Bus 5X from Wickford to Grays, there would be a predicted increase of around seven minutes on the time for this bus route, westbound in the morning peak. The other time periods and direction would not be affected. The 51 bus from Prittlewell to Grays and Chafford Hundred would have a predicted increased journey time of nearly seven minutes in the westbound direction in the morning peak hour. There would only be a slight change in other time periods and directions.
- The 73 bus runs from Tilbury through Grays to Lakeside Shopping Centre. The journey times westbound in the morning peak hour would decrease by around two minutes.
- The 83 bus from Chadwell St Mary through Grays to Lakeside would also run slightly quicker in the morning peak westbound, with a predicted decrease in journey time of 1-2 minutes.
- The Z4 service from the Amazon distribution centre to Basildon and Pitsea would take two minutes longer in the northbound direction in the evening peak hour.

15.5 Footpaths, bridleways and cycle routes

Existing situation

Chadwell St Mary is a largely suburban ward, surrounded by a more rural area. It is host to a network of footpaths and bridleways that connect Grays and East Tilbury. For other potential impacts, see the other topic areas in this chapter, such as Visual and Noise and vibration.

15.5.1 Construction

Due to the close proximity of construction works, there would be minor changes to the network of footpaths and bridleways in the Chadwell St Mary ward during the construction period. For more information about the proposed network of footpaths and bridleways in place once the project is complete (including a map), see the Operational impacts section below.

- Footpath FP78 would need to be closed for nine months for utility diversion works. Later, it would also be closed for three months to upgrade the route, creating part of a new bridleway link between High House Lane, Brentwood Road.
- Footpath FP79 would need to be closed for five years for utilities diversion works and construction of the Lower Thames Crossing main line. 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.
- Footpath FP95 would be impacted by works to divert overhead lines in the area and would need to be closed for intermittent periods over three years for this work before closure of less than a month while the path is resurfaced.
- The pedestrian-cycle track that runs along the south side of the A1013 Stanford Road would need to be closed for less than a week when traffic is diverted onto the new bridges over the project.

Figure 15.13: Footpaths, bridleways and cycle routes in the vicinity of the project in Chadwell St Mary Ward

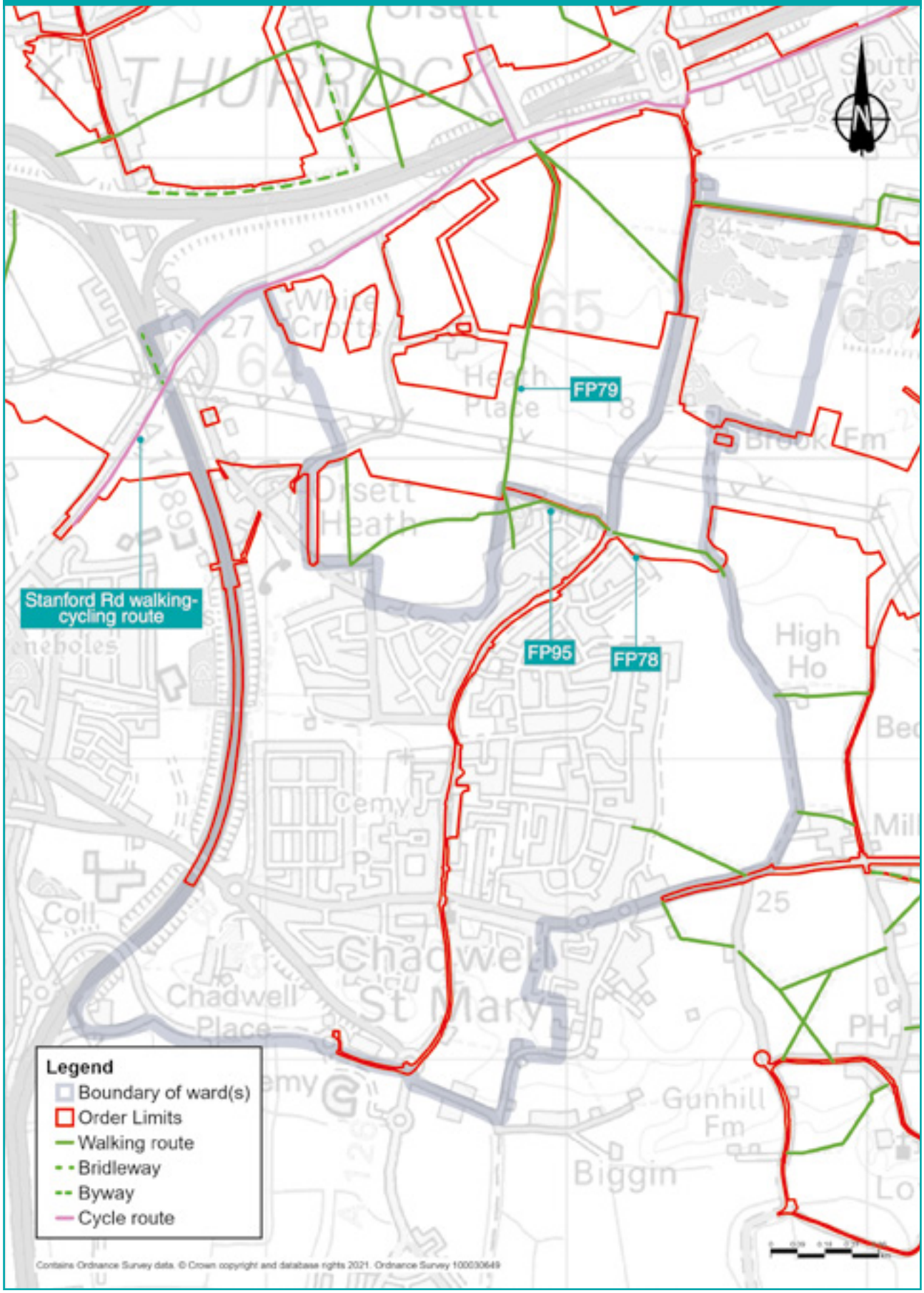
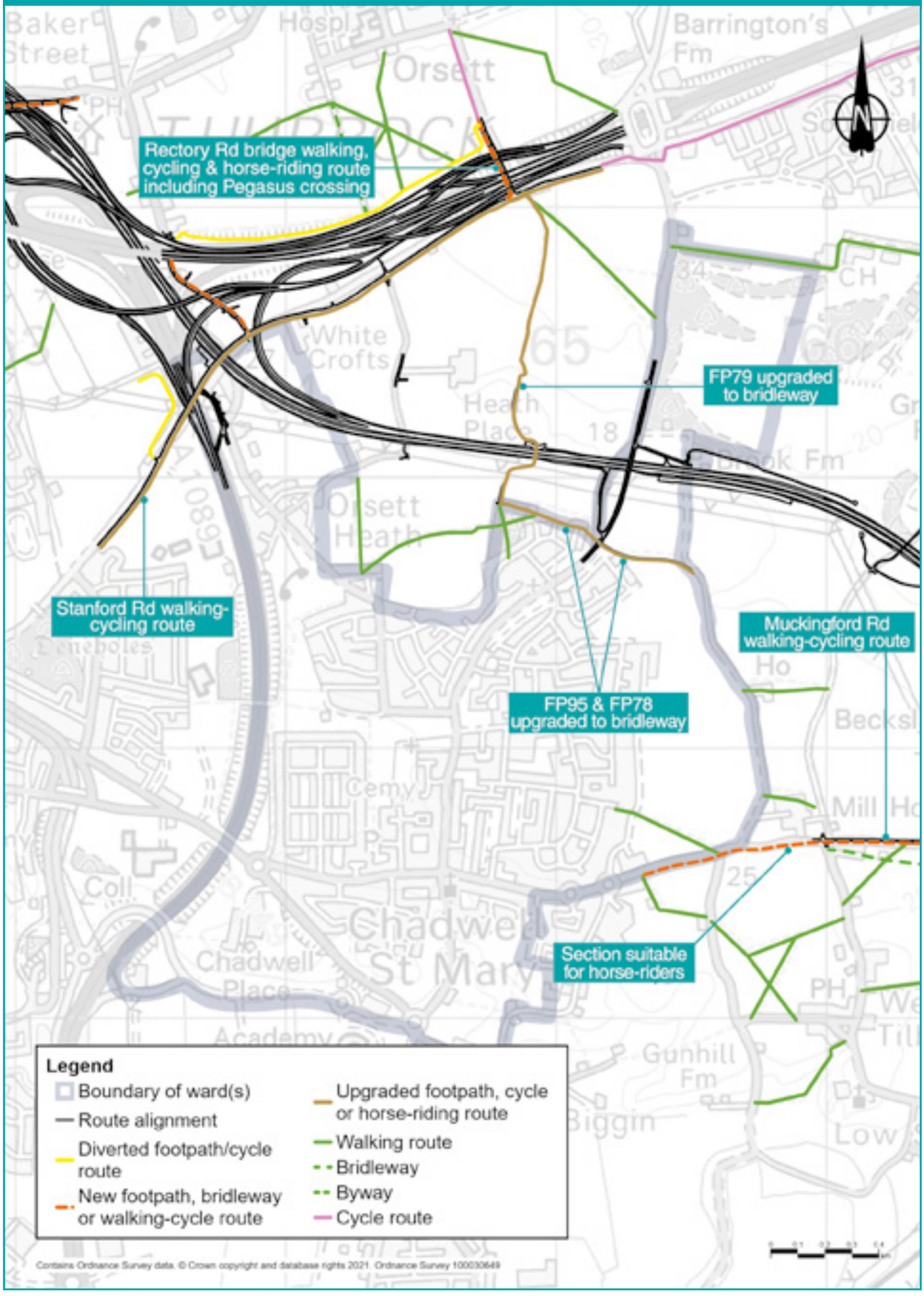


Figure 15.14: Proposed footpaths, bridleways and cycle routes



15.5.2 Operations

The project's proposals include the creation of over 46km of extended, diverted, upgraded or entirely new footpaths, bridleways and cycle routes. The proposals were developed after consultation with local communities and stakeholders, including walking, cycling and horse-riding groups. For information about changes to footpaths and bridleways across the project, see chapter 2 of the Operations update.

- Footpath FP78 would be realigned with High House Lane, which is to be permanently closed where it crosses the project route. The section south of the project route would be diverted to the west along the alignment of FP78 to join Brentwood Road. FP78 to be upgraded and designated as bridleway.
- Footpath FP79 would be realigned via a new bridge and resurfaced and designated as a bridleway as well as a footpath. The bridge over the project would be designed to equestrian standards.
- Footpath FP95 would reopen after resurfacing and upgraded to a bridleway from Old House Wood to Brentwood Road.
- There would be a new walking-cycling track parallel to the A1013 Stanford Road on its southern side. The section of Stanford Road between Rectory Road and the upgraded FP79 would include a grass verge for horse-riding use. The walking/cycling/horse-riding routes on Stamford Road would connect to Rectory Road bridge via a new Pegasus crossing (one suitable for horse-riders, as well as walkers and cyclists). Rectory Road bridge would include a walking-cycling track and a separate horse-riding surface.

15.6 Visual

Existing situation

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

Views towards the land on which the project would be built from the main populated areas are mainly limited to residents living in the north and east edges of Chadwell St Mary. There are also likely to be views from the west part of Orsett Golf Course and from some local footpaths.

The current view of the land on which the project would be built from the northern edge of Chadwell St Mary is of large-scale, gently undulating arable farmland, crossed by two sets of prominent overhead lines. From the eastern edge of Chadwell St Mary, the view is of relatively flat farmland. Vegetation along the edge of the settlement and intervening field boundaries screens or filters some views towards the land on which the project would be built.

Views from local public rights of way are similar in character to those from homes in Chadwell St Mary, albeit slightly more open. Views from the west part of Orsett Golf Course towards the project are limited by trees.

15.6.1 Construction

Construction impacts

The main construction activities likely to be seen in Chadwell St Mary are:

- construction of the A13 junction and project route to the south
- construction of Brentwood Road bridge
- establishment and operation of the Brentwood Road and Stanford Road Compound
- establishment and operation of the Hornsby Lane and Brentwood Road Utility Logistics Hubs
- utilities works including overhead power line diversions.

More information about construction activities are provided in the project description section earlier.

There are likely to be close to mid-range views of construction activities from homes on the northern edge of Chadwell St Mary, including road construction, overhead power line diversions and multi-utility works. The Brentwood Road Compound, as well as the Hornsby Lane and Brentwood Road Utility Logistics Hubs, would also be visible from the north. From the eastern edge of Chadwell St Mary, there are likely to be distant views of road construction and overhead line diversion, partially filtered by existing vegetation.

Views of construction activities from local public rights of way are likely to be similar to those from homes on the north and eastern edges of Chadwell St Mary. There would be intermittent southerly views of road construction and overhead power line diversions from Orsett Golf Club and views of other utility works on its western edge.

Measures to reduce visual impacts of construction

Mitigation would include forming temporary earth bunding on the southern boundary of the Brentwood Road Compound, where reasonably practical, to reduce views of construction activity within the compound for homes within Chadwell St Mary.

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.

15.6.2 Operations

Operational impacts

By opening year, the former construction compounds and Utility Logistics Hubs would have been removed and the land restored.

Further details of the completed project are provided in the project description section above.

The changed views for homes along the northern edge of Chadwell St Mary would include the tops of HGVs and gantries above the new grassed slopes (called false cuttings), as well as views of Brentwood Road overbridge. The diverted overhead lines would be similar to those in existing views. A short section of the new crossing would be more prominent to the north-east, where the route emerges from the false cuttings and traffic would be visible. From properties along the eastern edge of Chadwell St Mary, there would also be filtered, distant views of the tops of HGVs and gantries, seen above grassed false cuttings (a landscaped mound placed alongside the new road to reduce views).

The project would be visible from local footpaths along the north and eastern edges of the settlement. A wide belt of proposed woodland planting would help screen views of the new road and infrastructure from Orsett Golf Course.

Measures to reduce visual impacts of the operational project

The primary mitigation in this ward would be the false cuttings to the north and east of Chadwell St Mary and landscape treatment along the project corridor, to screen views and integrate the new road into the surrounding landscape.

15.7 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 Chadwell St Mary ward is mainly created by traffic noise from the A126, A1089, A1013 and the B149. There is also noise from other roads, agriculture and human activities.

As part of our environmental assessment process, we carried out surveys of background noise at two locations in the ward, which were agreed with the local authority. The levels monitored at these locations recorded average existing noise levels in the range of 54 to 59 dB(A)[2] in the day and 52 to 54 dB(A) during the night.

In order to understand how noise levels would vary with and without the new road, we have used noise modelling to predict what noise levels would be like in the project's proposed opening year if the new road was not built. We model this because we cannot assume that noise levels in future will be the same as they are now. For example, our assessment of the opening year noise levels accounts for 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 road would change the noise levels in its opening year if it was built.

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 the opening year, noise levels without the new road are predicted to range from 41 to 77 dB(A) in the day and from 30 to 63 dB(A) during the night at the identified locations in the ward. As such, our noise assessments predict that by opening year noise levels will increase compared to the existing situation even if the road is not built. Information about how noise levels would change with the project in place, during its construction and operation, are presented below.

15.7.1 Construction

Daytime construction impacts

The main construction activities that are expected to create a slight increase in noise and vibration levels in this ward relate to the A1089 upgrade, main alignment and selected utilities works.

There would be no main works compounds or Utility Logistics Hubs (ULHs) located in this ward. For more information, see the project description section above.

Although not located in the ward, Stanford Road Compound, Brentwood Road Compound, Long Lane Compound A, Hornsby Lane ULH and Brentwood Road ULH may contribute to the noise in this ward as they would be located close to the ward boundary.

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

Within the ward, there is one structure expected to be constructed using vibratory or percussive piling, but potential vibration impacts of the structure would be less than 10 days.

Construction noise levels have been predicted at six locations across the ward. These were chosen to convey the level of noise that communities could expect to experience during construction. For more information about how we carried out these assessments, see chapter 1.

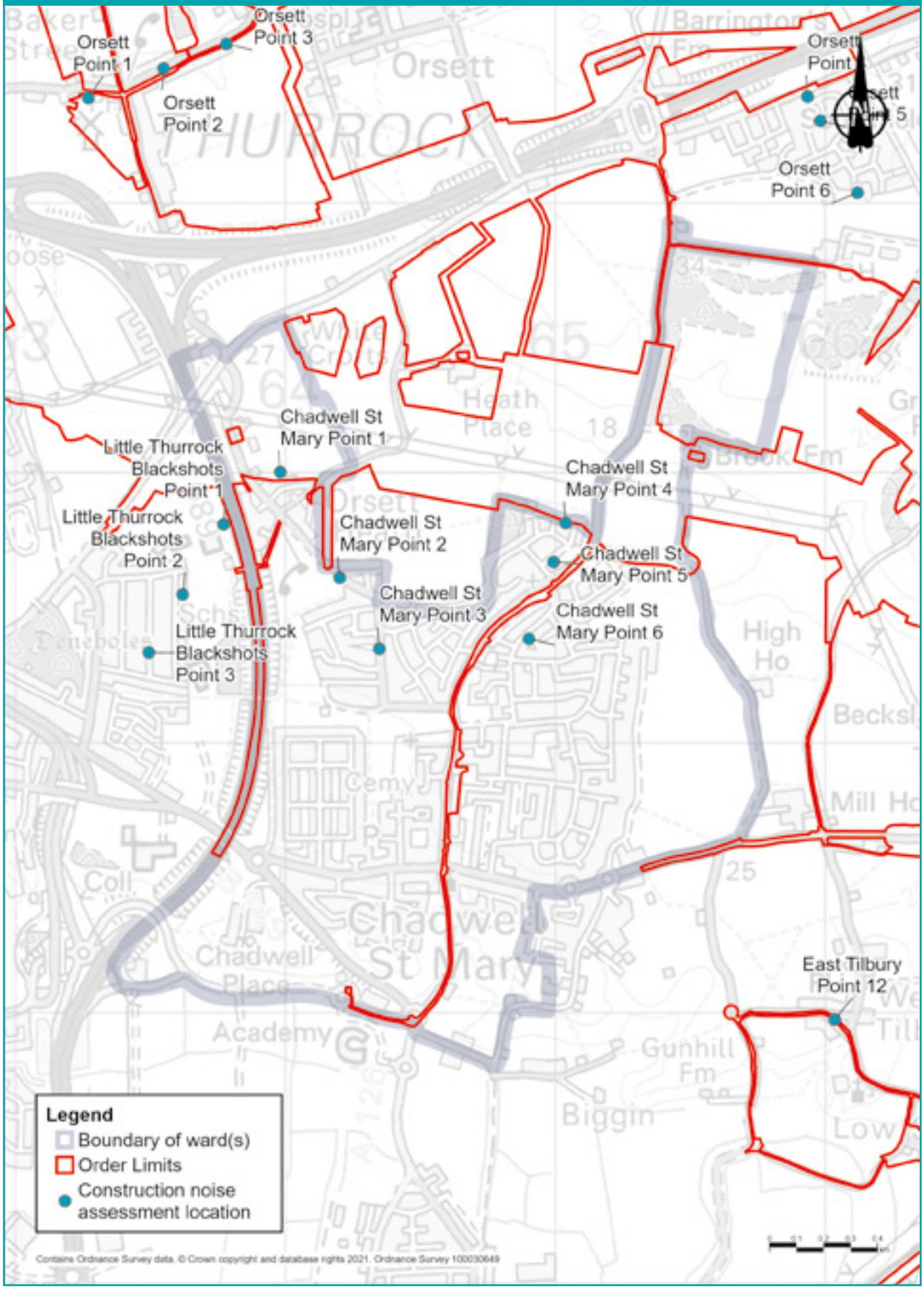
Noise levels are shown using the standard units for major projects, dB LAeq (12 hour), which represent the average noise level for the assessed 12-hour daytime period. While there might be short-term noises that are louder than the noise level shown during the assessed period, the averaged figure provides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

Figure 15.15 shows the locations used to predict daytime construction noise during the new road's construction.

Each vertical bar in figures 15.16 and 15.17 shows the predicted noise levels for that month of the construction period (from month 1 to month 72). The horizontal green bar 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.

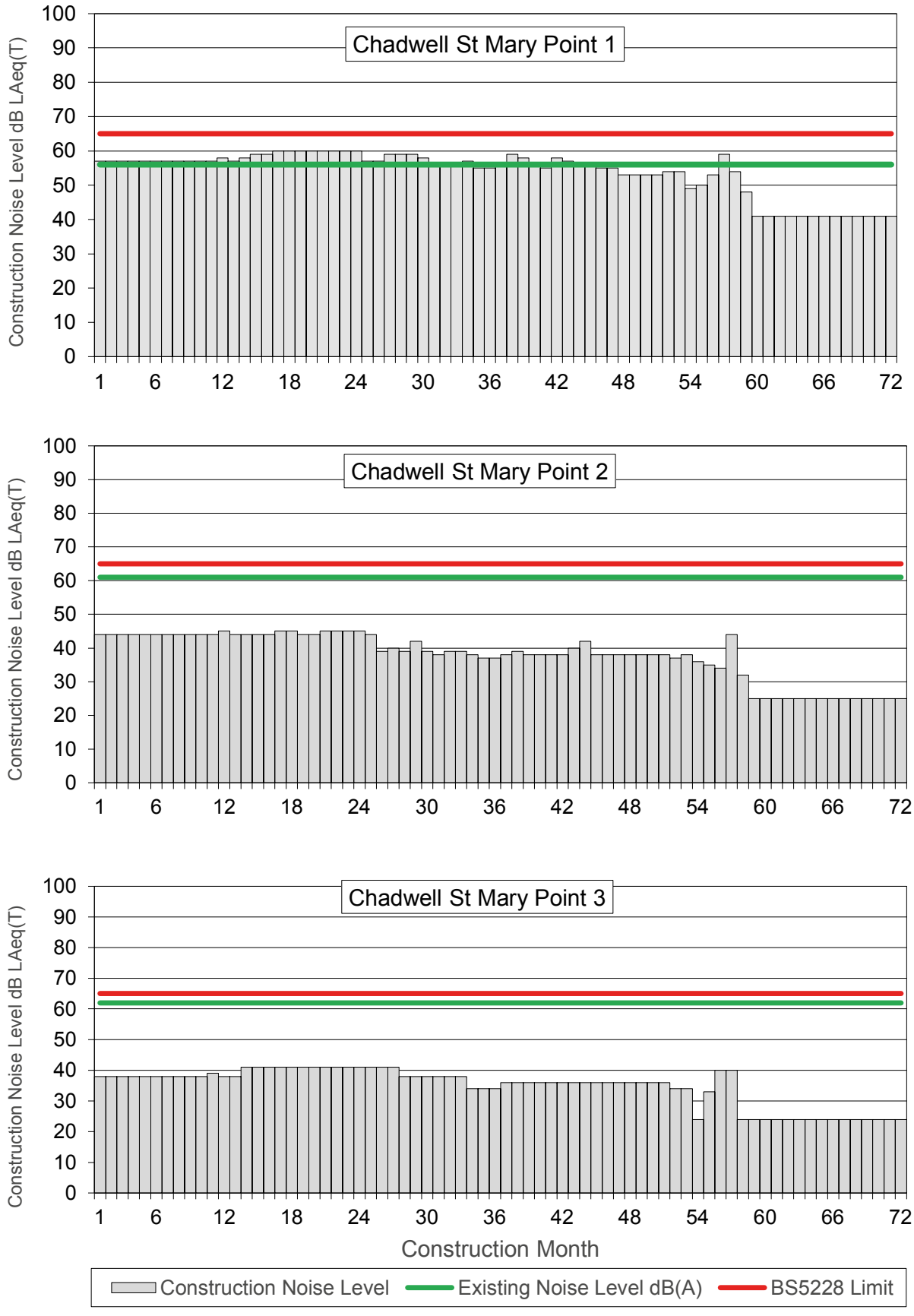
Figure 15.15: Construction noise assessment in Chadwell St Mary ward



With reference to figure 15.16 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 41 to 60 dB LAeq (12hour) during the six-year construction programme. Construction noise levels would exceed the existing background daytime noise level for approximately 36 months. However, they would not breach the defined threshold.
- At point 2, construction noise levels are predicted to range from 32 to 52 dB LAeq (12hour) during the six-year construction programme. Construction noise levels are not predicted to exceed the existing background noise levels at this assessment location.
- At point 3, construction noise levels are predicted to range from 31 to 48 dB LAeq (12hour) during the six-year construction programme. Construction noise levels are not predicted to exceed the existing background noise levels at this assessment location.

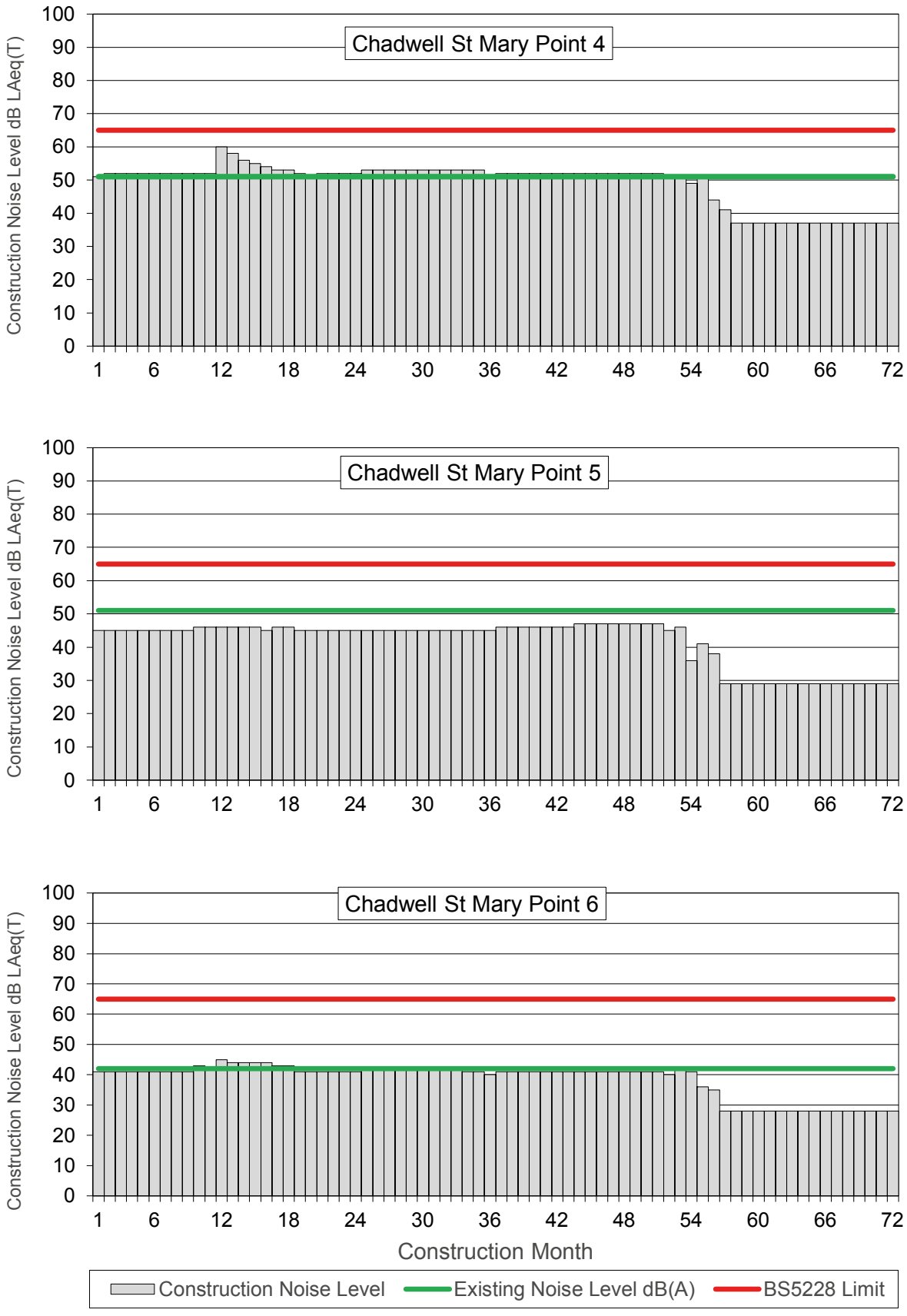
Figure 15.16: Construction noise by month for points 1-3 in Chadwell St Mary ward



With reference to figure 15.17 the following summarises the noise level changes over the construction period for points 4 to 6:

- At point 4, construction noise levels are predicted to range from 37 to 60 dB LAeq (12hour) during the six-year construction programme. Construction noise levels would exceed the existing background daytime noise level for approximately 48 months. However, they would not breach the defined threshold.
- At point 5, construction noise levels are predicted to range from 29 to 47 dB LAeq(12hour) during the six-year construction programme. Construction noise levels are not predicted to exceed the existing background noise levels at this assessment location.
- At point 6, construction noise levels are predicted to range from 28 to 45 dB LAeq (12hour) during the six-year construction programme. Construction noise levels would exceed the existing background daytime noise level for approximately eight months. However, they would not breach the defined threshold.

Figure 15.17: Construction noise by month for points 4-6 in Chadwell St Mary ward



24/7 construction working

In addition to the changes to the daytime noise impacts reported in the section above, 24-hour seven-day construction working is proposed at the locations shown in figure 15.18.
These works have been identified as they may need to be done at night to maintain safety and reduce disruption to road and utility networks. Night-time or weekend activity would also be necessary for highways and utilities works.

These works could affect local communities, and we would work with the local authority to manage these impacts.

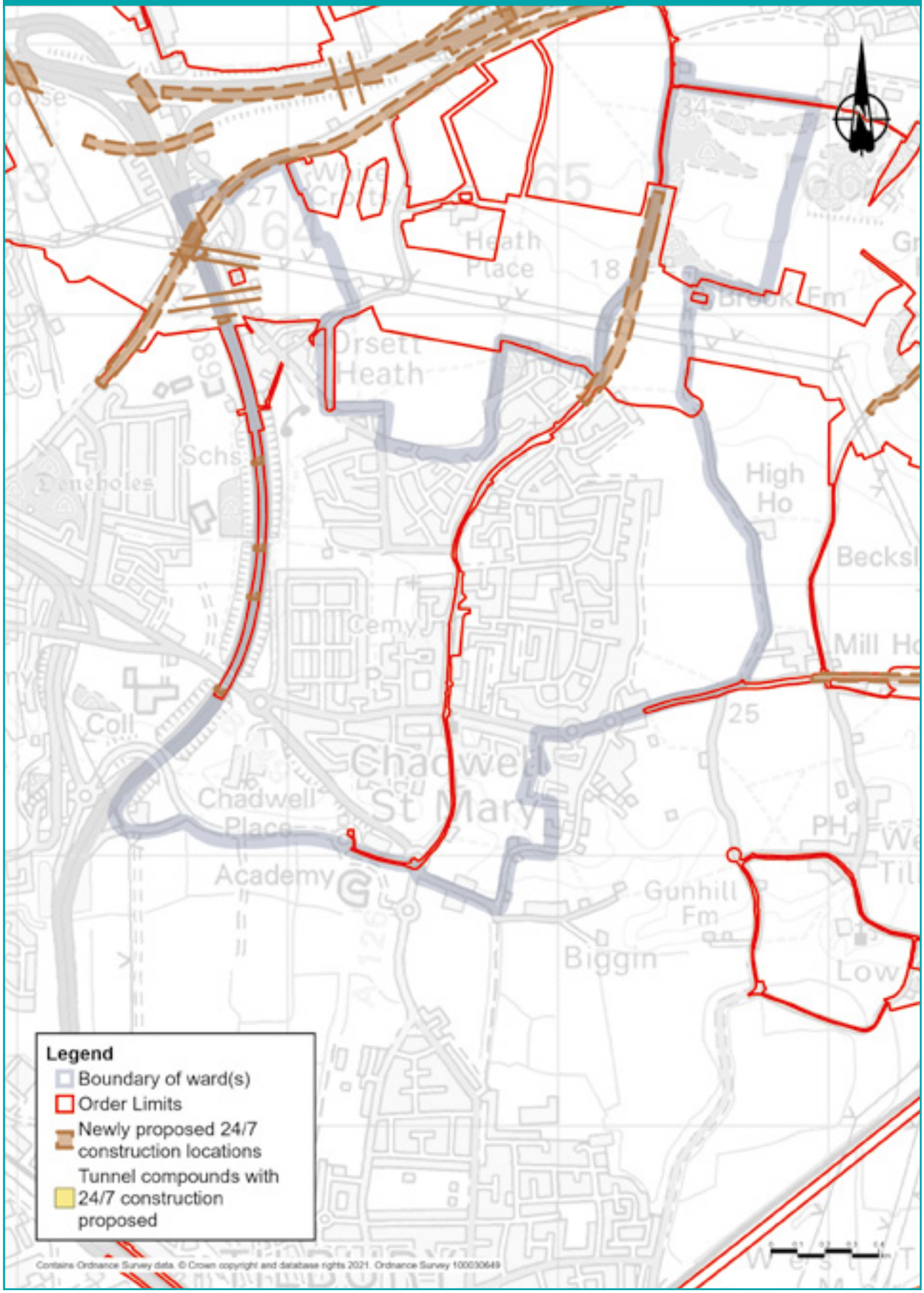
Construction traffic noise impacts

Maps showing the predicted change in road traffic noise within this ward during each year of construction can be found in the Construction update. Based on currently available traffic data (which offers a representative picture of what people 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), except along the roads where increases in noise levels are predicted. For more information about how we define noise impacts (negligible, minor, moderate and major), see chapter 1.

Table 15.4: Construction traffic noise impacts in Chadwell St Mary ward

Affected road(s)	Predicted noise impact	Construction year(s)
Hornsby Lane	Minor increase in noise levels	1
Westbound exit from A13 on to Dock Approach Road	Minor increase in noise levels	1 and 2

Figure 15.18: Newly proposed and tunnel 24/7 working locations in Chadwell St Mary ward



Construction mitigation

Construction noise levels would be controlled by using best available techniques (BAT), with specific measures at certain locations, such as:

- Installing temporary acoustic screening around the construction areas likely to generate noise
- Turning off plant and machinery when not in use
- Maintaining all vehicles and mobile plant so loose body fittings or exhausts do not rattle or vibrate
- Using silenced equipment where available, specifically silenced power generators and pumps
- Not playing music or radios for entertainment purposes outdoors on site
- Keeping construction vehicle traffic to a minimum by selecting local suppliers and a local workforce where possible, and reducing the transport of material for earthworks construction

All control measures, including those above, fall under the principles of BAT and are included 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 these are needed.

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

15.7.2 Operations

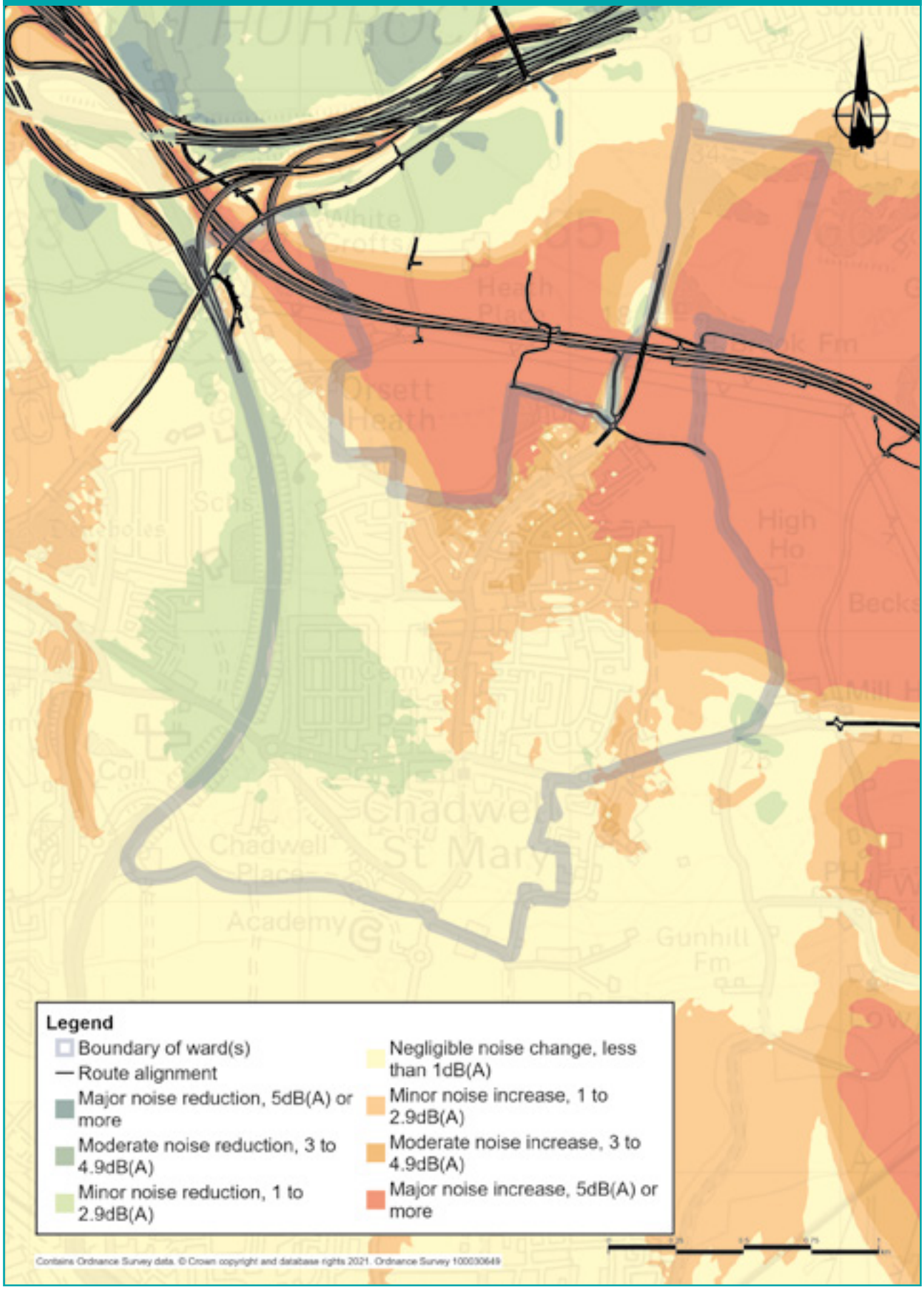
Operational impacts

Within this ward, the project route and the proposed improvements to the A13 junction runs through the northern part of the ward.

Direct noise impacts from the route, the proposed A13 junction and widening of the existing A13 would be experienced in the northern section of the ward. There would also be indirect noise impact as a result of changes in traffic flow, and traffic speed on the existing road network within the ward.

Figure 15.19 above shows the predicted changes in road traffic noise in the opening year of the project. Within the ward, changes in road traffic noise at identified noise sensitive receptors are predicted to range from moderate reductions in noise levels of between 3.0 and 4.9dB to major increases in noise levels of greater than 5dB. For more information about how we define noise impacts i.e. negligible, minor, moderate and major, see chapter 1.

Figure 15.19: Noise impacts during operation in Chadwell St Mary Ward



Measures to reduce impacts during operations

The main methods of controlling noise would be, where practical, 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. Proposed noise barriers are shown in chapter 5 of the Operations update. 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).

15.8 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

Chadwell St Mary ward is not located within an Air Quality Management Area (AQMA). AQMAs are areas that have been identified by local authorities as areas of poor air quality that require additional monitoring and controls.

15.8.1 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 (most of the properties within this ward) are outside the area likely to be affected by construction dust or emissions. In this ward, there are only a few properties within 200 metres of the worksite, those along Brentwood Road. 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 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 this ward would be negligible, although there would be a temporary minor worsening in air quality in the area around the A1089 corridor (such as those on Badgers Mount, Farm Road and Longley Mews) as a result of traffic management in place from 2025 to 2027. 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 of 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).

15.8.2 Operations

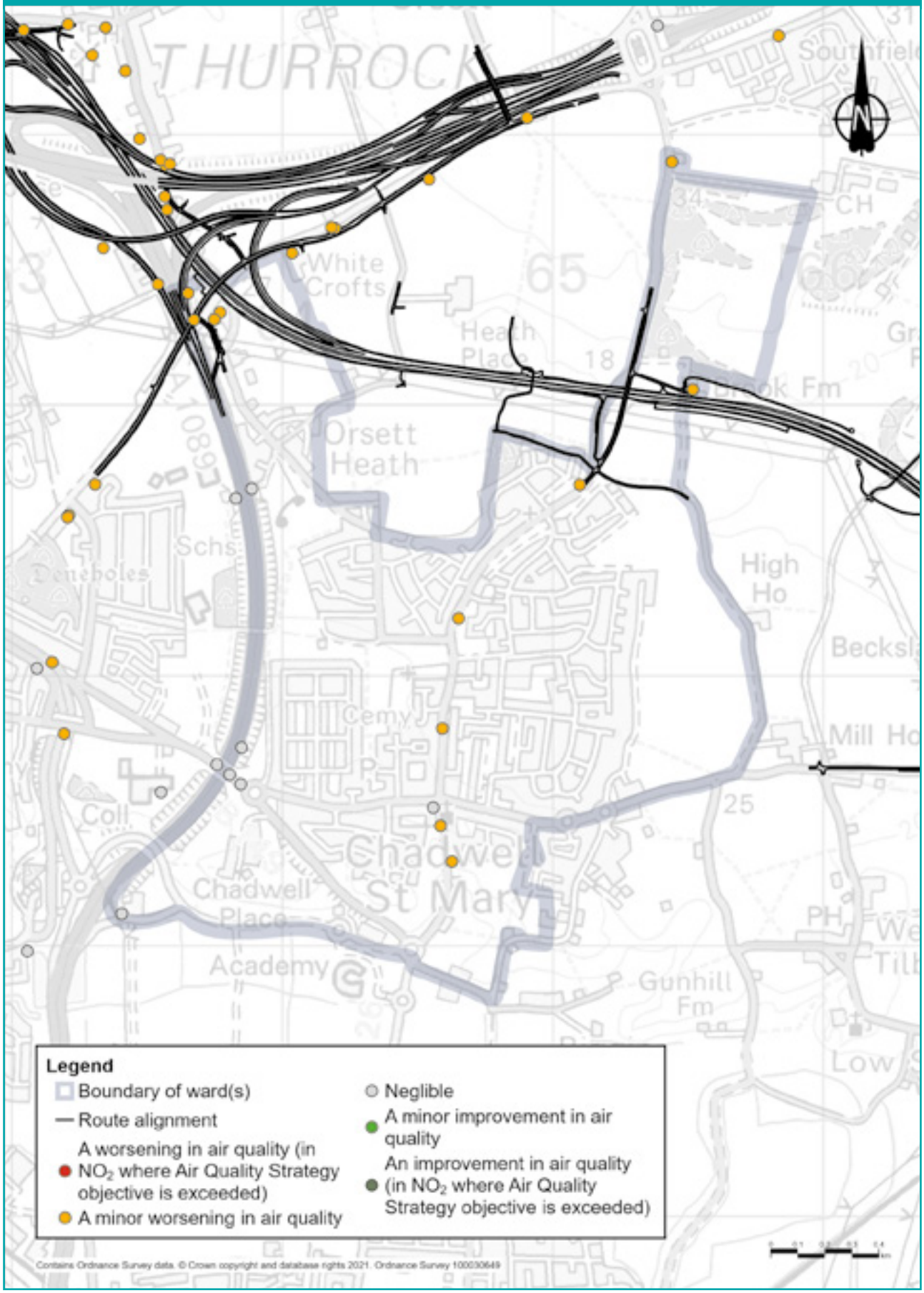
Operational impacts

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.

There are receptors (properties or habitats that are sensitive to changes in air quality) within the ward, along Brentwood Road that are predicted to experience a minor deterioration in the air quality for nitrogen dioxide (NO_2), the main traffic-related pollutant[3]. The highest modelled yearly average NO_2 concentration within this ward is 32.8 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 NO_2 levels are measured in 'micrograms per cubic metre', or µg/m³, where a microgram is one millionth of a gram.

Figure 15.20: Predicted changes in NO_2 levels within Chadwell St Mary ward once the new road is open



Furthermore, local air quality data shows an overall downward trend in NO_2 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 NO_2, our assessment predicts that PM_{10} 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.

15.9 Health

Existing situation

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

The Chadwell St Mary ward is characterised by a younger population, nearly a quarter of its residents are aged under 16 (24.6% compared to 24.2% for Thurrock and 20.3% for England). There are also more older people living alone than the average for Thurrock (14.9% compared to 10.2%).

Parts of Chadwell St Mary are within the top 10% most deprived in England. Economic activity is lower than for other Thurrock wards and lower than for Thurrock and England as a whole, (67.5%, 79.1% and 79.5% respectively). In addition, the number of people claiming benefits is higher than for Thurrock and England as a whole. The ward has a relatively high proportion of residents within social grade D and E, when compared to Thurrock and England as a whole (34.1%, 27.0%, 24.7% respectively). The area also has a higher proportion of social rented housing than Thurrock and England as a whole, (37.1%, 14.1% and 16.8% respectively). The ward has a high proportion of households without access to a car or van, when compared to Thurrock as a whole (23.3% and 20.1% respectively).

Self-reported health status is generally bad, with 7.4% of residents reporting bad health, compared to 4.7% for Thurrock as a whole. Chadwell St Mary has the highest proportion of residents across the whole of Thurrock who report that their day-to-day activities are limited a lot. Life expectancy at birth for residents of Chadwell St Mary is 76.7 for males and 80.8 for females (which is lower than the UK average life expectancy for 2017-2019 of 76.7 for males and 83.1 for females). Regarding deaths from all causes, there are high death rates from respiratory disease and cancer when compared to Thurrock and England as a whole.

15.9.1 Construction

Construction impacts

Construction activities affecting Chadwell St Mary ward residents are presented in the Overview section. Most of Chadwell St Mary ward is outside the Order Limits. However, there would be a significant amount of construction work carried out in the north of the ward, as shown in figure 15.2 above. Works would include construction of parts of the proposed A13/A1089 junction and a section of the main carriageway north of Chadwell St Mary. The proposed A13/A1089 junction with the project would replace the existing junction. This would involve building two underpasses, one to the east of the A1089 and another to the west. There are no construction compounds located within Chadwell St Mary ward. There would be no Utility Logistics Hubs in this ward. However, there would be substantial works in this area to divert utilities away from the area required for the new road. Access to Brentwood Road Utility Logistics Hub would be through Chadwell St Mary settlement along Brentwood Road. The A1089 on the eastern boundary of the ward would also be a construction route. These roads would be used by HGV and workforce construction traffic but would remain open to the public.

Elements of each of these activities have the potential to impact health, whether this be the noise associated with construction activities or construction traffic, changes to air quality (dust emissions), potential severance caused by construction traffic, or through impacts on mental health and wellbeing.

There are both positive and negative potential impacts on people's health and wellbeing as a result of the construction stage. With good communication and engagement, mental health and wellbeing impacts associated with stress and anxiety related to the construction of the project would be reduced. Equally, some residents would see health and wellbeing benefits from improved access to work and training opportunities presented by construction activities (see the Traffic impacts section). The relationship between mental health and unemployment is bi-directional. Good mental health is a key influence on employability, finding a job and remaining in that job. Unemployment causes stress, which ultimately has long-term physiological health effects and can have negative consequences for people's mental health, including depression, anxiety and lower self-esteem.

As highlighted at the outset of this section, different groups of people within the population may be more sensitive to factors which potentially affect their health than others. Some of the changes identified as a result of construction activities may therefore only affect a small proportion of the population. Impacts may include:

- Changes in accessibility, which may impact people who are more dependent on public transport and have less choice about method and routes travelled.
- Significant adverse noise and vibration effects from construction, construction traffic and vibration caused by pile drivers. Given the relatively young population, these groups may be more susceptible to increases in noise levels.
- The majority of existing road traffic links in this ward would experience negligible changes of less than 1dB(A) with the exception of Heath Road and Hornsby Lane which would experience an increase in road traffic noise during the construction phase.
- Temporary visual impacts have been identified.
- There are likely to be mental health and wellbeing impacts associated with stress and anxiety relating to construction of the project.
- Residents located within 200 metres of construction activities may experience air quality impacts as a result of dust, emissions from equipment and traffic.
- Because most of the properties in the ward are more than 200 metres from the construction site, negative impacts from dust and emissions would be limited. However, those properties that are within 200 metres may experience air quality changes as a result of increased dust and emissions from nearby construction activities.

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, Noise and vibration, and Air quality sections above. 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 items such as adhering to Best Practicable Means (BPM) to reduce noise impacts (see NV007 in the REAC) and dust-management good practice (see AQ005 in the REAC).

Engagement and effective two-way communication with communities both prior to and during construction by providing 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 community engagement, including how we would make sure communities, stakeholders and any affected parties are kept informed of the construction works, their progress and associated programme.

15.9.2 Operations

Operational impacts

Information about the operational project in this ward is provided in the project description above.

The assessments undertaken for noise have shown that the project would result in significant adverse permanent noise effects with a number of receptors within the ward predicted to experience an increase in noise levels of 3dB or more. Given the relatively high proportion of younger people living in the area, they may be more susceptible to increase in noise levels. In addition, significant adverse visual impacts in the opening year have been identified. A proportion of residents may also experience anxiety or stress associated with perceptions of environmental change as a result of a major road project. As with the construction stage, different groups in Chadwell St Mary may be more susceptible to anxiety and stress than others.

A proportion of residents may also experience positive health benefits through accessibility improvements, better access to services, jobs (greater than 10%) and training, and to open space, including new recreational areas outside Chadwell St Mary, such as Tilbury Fields.

Measures to reduce health impacts of the operational project

Mitigation measures to address noise and visual impacts have been described above. No further impacts relating to health have been identified for this ward and consequently no specific additional measures are required.

15.10 Biodiversity

Existing situation

The main natural habitats in the parts of Chadwell St Mary ward that fall within the wider construction area are arable, with some pasture, scrub and rough grassland.

There are no designated sites of natural importance within 2km of the Order Limits within this ward. Within 500 metres, there is one non-designated site, the Mucking Heath Local Wildlife Site (LWS).

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, including bats, badgers, terrestrial invertebrates and reptiles.

15.10.1 Construction

Construction impacts

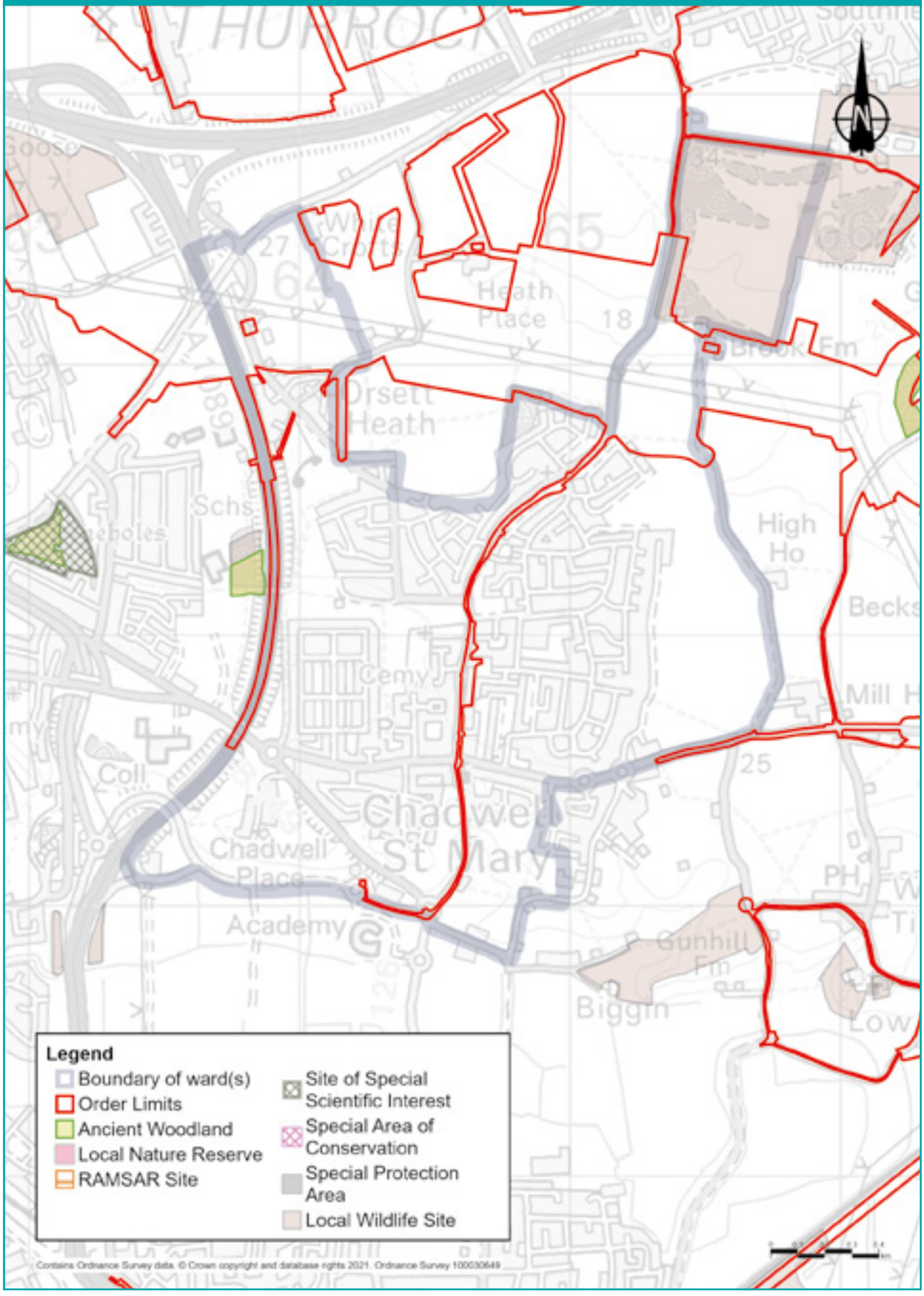
Construction work in this ward would require the removal of areas of habitat, both temporarily and permanently, from the proposed route. This habitat consists of areas of arable fields, pasture, rough grassland and scrub. It supports a range of protected and notable species which would be impacted by construction in terms of direct habitat loss (for example, the loss of badger setts, terrestrial invertebrates and reptile habitat); fragmentation of habitat and disturbance to retained habitat.

Measures to reduce biodiversity impacts of construction

Vegetation clearance would take place during the winter where practical to avoid any impacts on breeding birds. Where this is not practical, clearance would be supervised by an ecologist 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 (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 erected within the retained habitat. Habitat lost for temporary construction works would be reinstated following construction.

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.

Figure 15.21: Designated and non-designated biodiversity sites in Chadwell St Mary ward



15.10.2 Operations

Operational impacts

Building the road tunnel has the potential for causing wildlife mortality, either through traffic accidents, destruction of habitat or noise disturbance.

Measures to reduce biodiversity impacts of the operational project

Landscape planting has been designed to provide strong links for animals to move and forage along, guiding them to safe crossing points over the new road, specifically the green bridge over Hoford Road to the east of the ward boundary. To reduce disturbance from traffic, the new road has been designed, where practicable, in a cutting or false cutting (types of landscaping), reducing the road's noise and visual impacts.

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

The impact of operation of the project on biodiversity in this ward 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 this and the project's other control documents.

15.11 Built heritage

Existing situation

There is one Grade I listed building (the Church of St Mary) and five Grade II listed buildings within the ward. These are all high value assets. The Grade II listed buildings are:

- Heath Cottage
- Chadwell Place
- Chadwell House
- 1 and 2 Grays Corner Cottages
- Sleepers Farmhouse

15.11.1 Construction

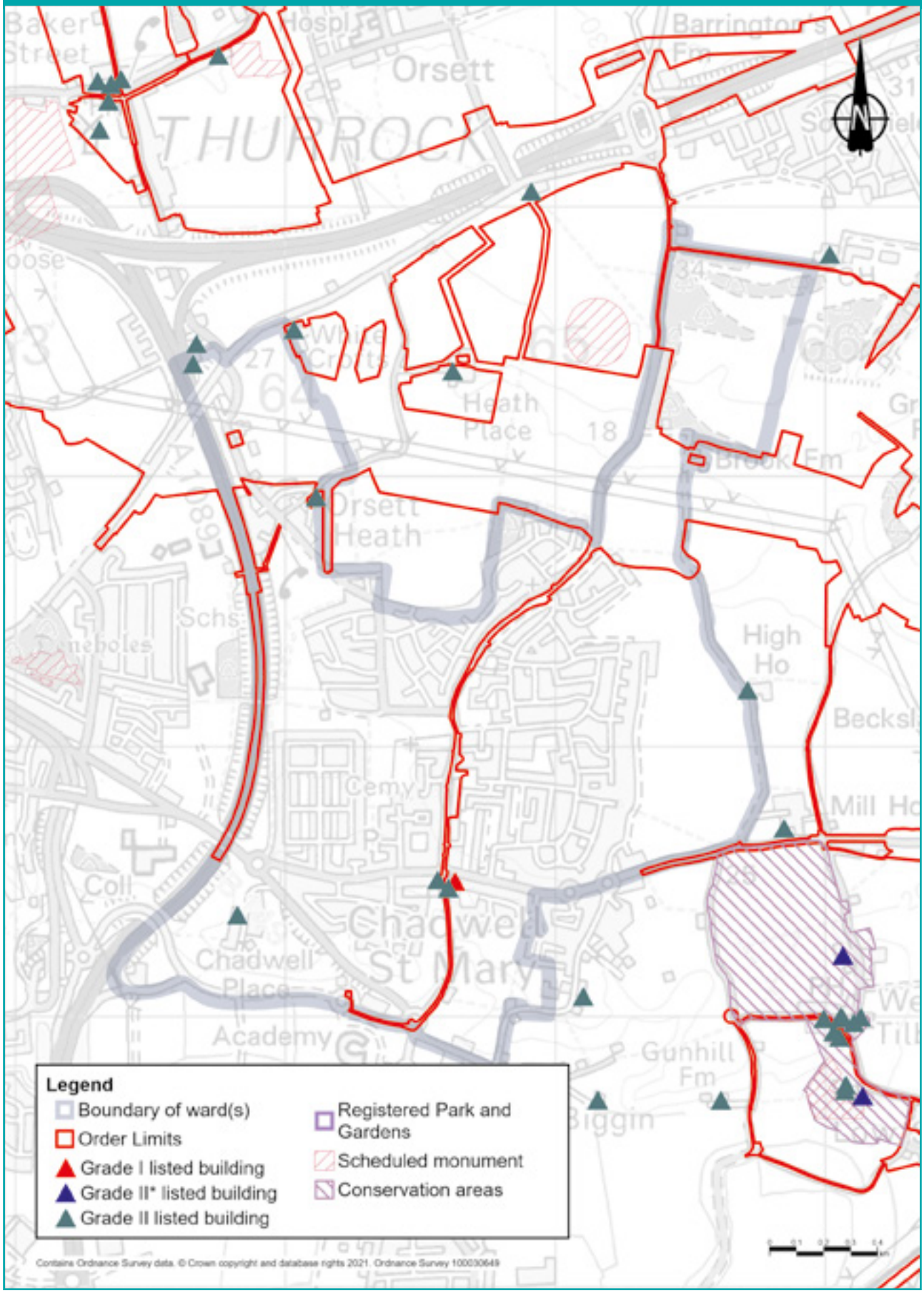
Construction impacts

Construction activities include the establishment of the main road alignment as well as associated earthworks, landscaping and utility diversions. Some existing roads within the ward would be used as utility works access routes, such as the Brentwood Road.

Construction of the project would result in the demolition of the Grade II listed 1 and 2 Grays Corner Cottages, which would have a considerable adverse effect on this high value asset. This would be mitigated by historic building recording in line with industry standards.

Construction activities would also have a temporary, non-physical impact on the Church of St Mary and to the three Grade II listed buildings (Heath Cottage, Chadwell House, Sleepers Farmhouse). This would be caused by construction activity/traffic within their setting and would result in temporary, barely perceivable effects on the setting of the buildings.

Figure 15.22: Built heritage locations within Chadwell St Mary ward



Measures to reduce built heritage impacts of construction

The design and layout of Long Lane Utility Logistics Hub would take in to account the setting of heritage assets, and avoid light glare, light spill and light pollution during night-time construction. More information can be found in the Design Principles (section S326). Long Lane Utility Logistics Hub would also be appropriately screened as set out in the CoCP. Dust and noise reduction measures are also relevant in mitigating the setting of heritage assets. Refer to the air quality, noise and vibration, and cultural heritage sections of the REAC.

15.11.2 Operations

Operational impacts

There would only be an impact to one Grade II listed building, Heath Cottage, as a result of the visible and audible changes to its setting caused by the operation of the road. This would result in a barely perceivable effect.

Measures to reduce impacts during operations

The impacts to the Grade II listed Heath Cottage would be mitigated by the establishment of earthworks alongside the road and the introduction of native hedgerows and trees. This mitigation forms part of the project design which is detailed in the project description section.

15.12 Contamination

Potential sources of contamination have been identified based on land uses from the review of desk-based sources (historical maps and environmental data). Within this ward, the following have been identified:

- A large gravel pit east of Courtney Road, excavated between 1955-67, and potentially infilled between 1973-1991.
- Infilled gravel pits east of Brentwood Road. These pits were excavated in approximately 1915. They were infilled between 1938 and 1954.

The overall impact from these contamination sources is considered to be low, given the mitigation proposed.

15.12.1 Construction

Construction activities in this ward would include topsoil stripping, earthworks/movements and excavations which could cause the mobilisation of contamination (if present).

Construction impacts

During construction, there is the possibility for existing contamination within the ground to become mobilised. There is also a potential risk of accidental oil, cement and fuel spills from construction traffic and the storage of materials.

Measures to reduce contamination during construction

To reduce the impact to an acceptable level, good practice measures would include appropriate storing of equipment and clear soil handling, storage of chemicals and re-use guidance. These would be used during construction to reduce the risk of spreading contamination and spillage or pollution.

To reduce the risk of accidental spillages, procedures would be in place such as designated areas to re-fuel plant, tanks would be bunded, spill kits would be available and incidents would be recorded and managed, with impacted soils being assessed and removed if necessary.

Essential mitigation such as the development of site-specific remediation, where contamination has been identified during ground investigation work, would be completed in consultation with the local authority. During the earthworks, workers would remain vigilant and any suspected contamination would be recorded and assessed accordingly via a watching brief protocol.

Contamination 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.

15.12.2 Operations

Measures to reduce contamination during operation

Verification reports would be prepared for the remediation that is undertaken in site-specific areas and provided to the local authority. During the operation of the road, should an incident occur, such as a traffic accident resulting in localised contamination, significantly affected soils would be assessed and, if necessary, removed to reduce the risk of contamination migrating across a wider area or entering controlled waters. For more information on these controls, see the REAC.