

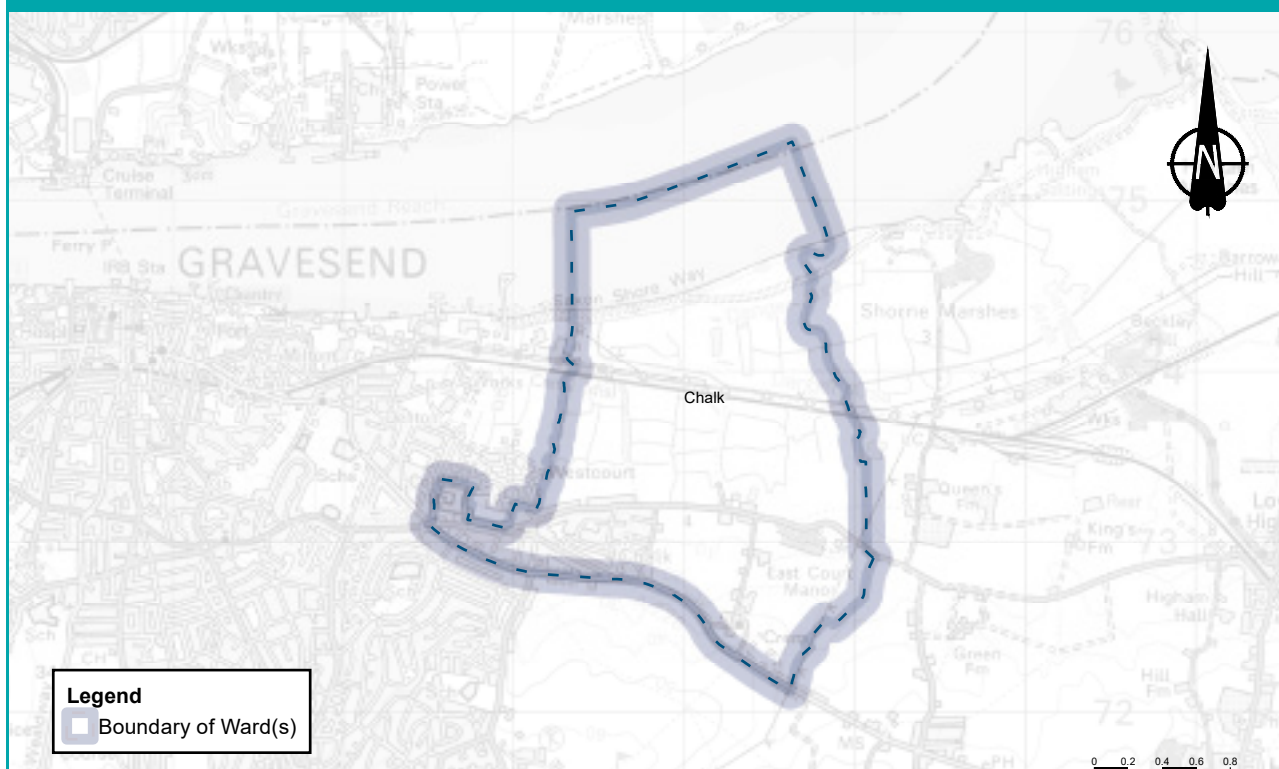
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Chapter 4: Chalk ward

This chapter summarises the activities in Chalk 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.

Figure 4.1: Ward boundary map for Chalk ward



4.1 Overview

4.1.1. About this ward

Chalk ward is located to the south of the River Thames in the borough of Gravesham, to the west of Shorne, Cobham and Luddesdown ward, north of Westcourt ward and east of Riverside ward. It has an area of approximately 3.5km² and an estimated population of 2,176¹. Chalk ward includes a residential area between the Lower Higham Road and Rochester Road. Train services run through the ward to Higham station. St Mary's Church lies to the south-east of the ward with North Kent College to the north-west. There are footpaths, bridleways and farmland to the south.

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

4.1.2 Summary of impacts

Table 4.1: Summary of impacts during the project’s construction and operation

Topic	Construction	Operations
<p>Traffic</p>	<p>Impacts</p> <p>Construction traffic accessing the compounds would use the A226 (Higham Road), leading to slower journey times along the A226. Temporary lane closures would also lead to slower journey times along the A226 and Lower Higham Road for short periods.</p> <p>Mitigation</p> <p>Several mitigation decisions have been taken to reduce the impacts during the construction period such as only using one construction route for HGV traffic to arrive from the strategic road network – the A226 Gravesend Road via the A289 – during the construction process. Additional measures are outlined in the traffic section of this chapter.</p>	<p>Impacts</p> <p>An increase in traffic flows is expected on the A226 Gravesend Road once the project is operational. There are only small changes in flows predicted on other minor roads within the ward. Analysis on the traffic flow increases and impacts can be found in the traffic section of this chapter.</p> <p>Mitigation</p> <p>A previously proposed junction between the project and the A226 Gravesend Road was removed after consultation because it had a negative impact on traffic levels east of Gravesend, including roads in Chalk ward.</p>

Topic	Construction	Operations
<p>Public transport</p>	<p>Buses</p> <p>Due to the impacts on journey times along the A226, bus services along the A226 Higham Road may experience delays. Local buses that would be impacted include the 111, 190, 311, 417, 668, 735 and the 736.</p> <p>Rail</p> <p>There would be no impact on train services passing through Chalk ward, and access to Gravesend Station for the residents of Chalk ward would not be affected during construction.</p>	<p>Buses</p> <p>There would be no changes to bus routes through the ward required once the project opens and no discernible change to bus journey times.</p> <p>Rail</p> <p>There would be no discernible change in local access times to Gravesend and Higham train stations and no change to the rail services at these stations when the project is operational.</p>

Topic	Construction	Operations
<p>Footpaths, bridleways and cycle routes</p>	<p>Impacts</p> <p>One footpath and one cycle route would be impacted during the construction period, to allow for utilities works and the construction of access to construction compounds.</p> <p>Mitigation</p> <p>Closure of the footpath would be kept as short as possible to reduce the impact on the local public right of way network. The cycle route would remain open, with impacts only during the first year of construction.</p>	<p>Impacts</p> <p>The footpath from Albion Parade along the Thames and Medway Canal would be widened.</p> <p>Mitigation</p> <p>No mitigation would be required.</p>
<p>Visual</p>	<p>Impacts</p> <p>Construction activities would be visible from edges of Chalk’s residential area and some properties along Church Lane, as well as from local footpaths, National Cycle Network Route 1, east of Chalk and from Saxon Shore Way long distance footpath.</p> <p>Mitigation</p> <p>Taller structures within A226 Gravesend Road Compound would be located as far away as possible from homes in Chalk and materials excavated on site would be used to create earth bunds to provide visual screening for Castle Lane. The contractor would also follow good practice construction measures as set out in the CoCP and REAC.</p>	<p>Impacts</p> <p>When the new road opens, it would be underground in this ward. The most noticeable change would be the new landscaping on the north bank of the River Thames, forming a new landmark feature in views across the river from Saxon Shore Way.</p> <p>Mitigation</p> <p>The land used temporarily for construction would be reinstated to its former use and the operational project would not be visible as it would be underground.</p>

Topic	Construction	Operations
<p>Noise and vibration</p>	<p>Impacts</p> <p>The construction activity associated with the advanced tunnel grouting works and utilities works are expected to create noise and vibration impacts in this ward. There would also be 24-hour, seven-day construction working. There would be negligible changes in noise from road traffic.</p> <p>Mitigation</p> <p>Construction noise levels would be controlled by implementing Best Available Techniques (BAT) such as installing acoustic screening around the construction areas likely to generate noise and turning off plant and machinery when not in use.</p>	<p>Impacts</p> <p>The changes in road traffic noise as result of the new road are predicted to range from minor reductions in noise to minor increases in noise levels. Direct noise impacts from the new road would be confined within the tunnel structure. The majority of noise impacts within this ward would be as a result of changes in traffic flow, traffic composition, traffic speed or physical alterations on the existing road network within the ward itself.</p> <p>Mitigation</p> <p>The new road would be confined within the tunnel structure when it opens. Low-noise road surfaces would be installed on new and resurfaced roads.</p>

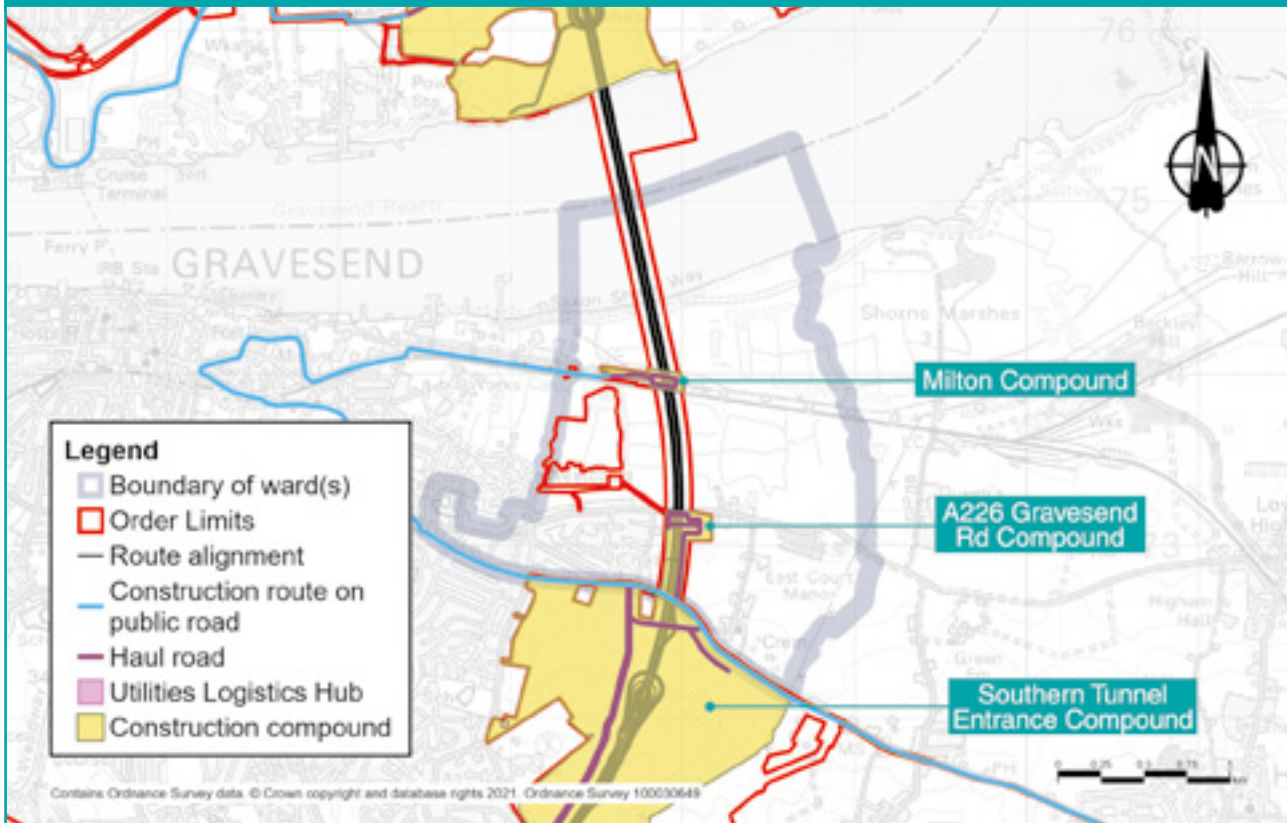
Topic	Construction	Operations
<p>Air quality</p>	<p>Impacts</p> <p>There is likely to be dust and emissions from construction equipment and traffic during the construction phase.</p> <p>Our analysis of construction traffic predicts that the impact on most roads in this ward would be negligible, although there would be a temporary minor worsening in air quality in the area around the A226 Gravesend Road that runs through Chalk from 2026 to 2027, as well as an area around Higham Road from 2025 to 2027. In both, instances these areas would see a temporary minor worsening in air quality due to a predicted increase in traffic.</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 are no predicted exceedances of NO₂ or PM₁₀ in this ward.</p> <p>Mitigation</p> <p>As there are no predicted exceedances, no mitigation has been proposed.</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.</p> <p>There are 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 construction traffic using the A226. Noise would increase as a result of construction traffic and from construction traffic locations. Access to open spaces, like Claylane Woods, Michael Gardens Play Area and various footpaths, could be impeded during construction.</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 and visual screening, traffic management measures and community engagement. This includes the establishment of Community Liaison Groups.</p>	<p>Impacts</p> <p>There would be improvements to accessibility of open space, such as the new Chalk Park.</p> <p>There would be increases in road traffic noise at Riverview Park and Thong Lane to the north of the A2. Some residents within the ward may experience anxiety around perceived change to air quality and noise.</p> <p>Mitigation</p> <p>Low-noise road surfaces would be installed on all new and affected roads.</p>

Topic	Construction	Operations
<p>Biodiversity</p>	<p>Impacts</p> <p>The construction of the project, including two compounds, would involve the removal of areas of habitat, both temporarily and permanently. These habitats are home to protected and notable species including water vole, reptile, great crested newt, birds and invertebrates. Habitats would also be fragmented.</p> <p>Mitigation</p> <p>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. An area of farmland to the south of the Thames and Medway Canal would be managed to encourage use by birds particularly for wintering wetland birds.</p>	<p>Impacts</p> <p>No significant impacts are expected; there may be negligible disturbance to species of habitats.</p> <p>Mitigation</p> <p>The land used to accommodate the compounds would be returned to the reasonable satisfaction of its owner on completion of construction. New wetland features would also be created to enhance the area.</p>

Topic	Construction	Operations
<p>Built heritage</p>	<p>Impacts</p> <p>Construction activity would impact on the setting of some heritage assets through an increase (although minor) in noise, and lighting during night-time working.</p> <p>Mitigation</p> <p>The design and layout of Southern Tunnel Entrance Compound would take in to account the setting of heritage assets and avoid light glare, light spill, and light pollution during night-time construction.</p>	<p>Impacts</p> <p>There would be a negligible impact on built heritage in this ward once the project construction is finished.</p> <p>Mitigation</p> <p>Southern Tunnel Entrance Compound would be reinstated after construction to reflect existing field patterns and the surrounding landscape character as outlined under Design principle S3.05.</p>
<p>Contamination</p>	<p>There are no identified sources of contamination that could be at risk of being disturbed during construction or operation of the project within Chalk ward.</p>	

Figure 4.2: Order Limits and construction areas in Chalk ward



4.2 Project description

4.2.1 Construction

Construction activities

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

Works within Chalk ward are associated with the construction of the tunnels through which the project road would run. These works include both the construction of the tunnels themselves, and ground preparation works to support the tunnelling. Information on how the tunnels would be constructed is provided in chapter 4 of the Construction update.

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 two construction compounds located within Chalk ward. These are the A226 Gravesend Road Compound and the Milton Compound. The entrance/exit to the Southern Tunnel Entrance Compound is on the A226 in Chalk ward although the compound itself lies south of the ward.

The main tunnel boring machines (TBMs) would be assembled in a compound north of the River Thames and launched towards the south, passing under the River Thames and Chalk ward via the route shown in figure 4.2. The TBMs would emerge into the Southern Tunnel Entrance Compound, which is located just to the south of Chalk ward.

Tunnelling activities would largely take place out of sight under Chalk ward. However, to support the tunnel construction, two smaller construction compounds (A226 Gravesend Road Compound and Milton Compound) would be required in Chalk ward.

The A226 Gravesend Road Compound would be located north of the main Southern Tunnel Entrance Compound, while the Milton Compound would be north of the Thames and Medway Canal and the North Kent Railway line. Any impacts on the canal or the railway would be managed and agreed with asset owners.

As part of the tunnel construction, a smaller TBM would be launched north from the A226 Gravesend Road Compound to the Milton Compound to allow ground improvement work to take place ahead of the arrival of the two TBMs making the main tunnels. More information about tunnel construction can be found in chapter 4 of the Construction update. In figure 4.2, the section of Order Limits, (the area of land required to construct and operate the project, formerly known as the development boundary), running from the west along Norfolk Road into the Milton Compound would allow for road widening should this be necessary for construction vehicles to access to the compound.

On completion of the ground improvement works, the A226 Gravesend Road and Milton Compounds would be removed. The Southern Tunnel Entrance Compound would remain in place until the completion of construction in 2029.

No road construction or tunnelling activity would take place at Great Clane Lane Marshes (the three fields north of the A226 Gravesend Road), although treated water from our compound would be discharged there during construction. This area would temporarily be turned into new habitat for birds as part of our measures to reduce the construction period's environmental impacts on the Thames Estuary and Marshes Special Protection Area and Ramsar. Access to the area would be between houses on Lower Higham Road.

The average daily weekday number of HGVs and cars expected to go to the three compounds either in or close to Chalk ward, during the 11 representative construction phases are shown in table 4.2. 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.

Table 4.2: Average daily vehicle numbers going to compounds in or near Chalk ward

Time period	Southern Tunnel Entrance Compound		A226 Gravesend Road Compound		Milton Compound	
	HGVs	Cars	HGVs	Cars	HGVs	Cars
January to August 2024	30	77	13	21	10	10
September 2024 to February 2025	36	201	13	40	4	9
March to May 2025	39	201	11	40	2	6
June to October 2025	39	281	9	30	2	6
November 2025 to March 2026	39	335	4	14	1	6
April to August 2026	39	317	6	14	5	6
September 2026 to March 2027	39	358	5	20	5	6
April to November 2027	39	378	0	0	0	0
December 2027 to March 2028	39	310	0	0	0	0
April to July 2028	30	209	0	0	0	0
August 2028 to December 2029	8	25	0	0	0	0

The main route into the Southern Tunnel Entrance Compound would be via the A2, the A289 and then the A226, with the entrance and exit being on the southern side of the A226 in Chalk ward, between Castle Lane and Church Lane. The shift patterns at this compound would include standard shifts, extended shifts and in some periods shifts across whole 24-hour days.

Access to the A226 Gravesend Road Compound for HGVs would be from the A226, just east of Chalk village, between Castle Lane and Chalk Lane. There would be a ban on HGVs along Castle Lane and the Lower Higham Road. Cars would be able to use the Lower Higham Road to access the A226 Gravesend Road Compound from the A226. The route to the Milton Compound for HGVs would be along the A226 Rochester Road and then Ordnance Road and Norfolk Road.

Utilities

There would be no Utility Logistics Hubs within Chalk ward. Utility works within this ward are limited to the temporary provision of utilities to the three compounds, which would be removed during compound demobilisation. Permanent works include the diversion of a water pipeline along the Lower Higham Road and placing an overhead electricity power line underground within the Southern Tunnel Entrance Compound.

Construction routes on public roads

HGV access to the Southern Tunnel Entrance Compound would be from the east via the A226 Gravesend Road. HGV access to the A226 Gravesend Road Compound would be via the A226 Gravesend Road from the east and then north along a haul road built across private land. HGV access to Milton Compound would be via the A226 Gravesend Road/Rochester Road/Milton Road, then east along Prospect Grove, Norfolk Road and the road along the north side of the Thames and Medway Canal. All HGV traffic serving these three compounds would access the A226 via the A289 and A2/M2, while staff traffic (cars) would use any suitable public road.

Construction schedule

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

the work to build the tunnel can be found in chapter 4 of the Construction update. New habitats would be created early in the construction programme to provide space for protected species to be moved into. Establishment of the A226 Gravesend Road and the Milton Compounds and works on the ground preparation tunnel would be during the first two years of construction (January 2024 to late 2025) to ensure the main tunnelling works could be carried out safely. It is expected that these two compounds would be decommissioned in 2027.

Construction working hours

Tunnelling would take place 24/7 with some surface activities supporting the underground work. More information about working hours is set out in the Noise and vibration section below and in the CoCP.

Traffic management

The main traffic management measures within Chalk ward are listed below.

Table 4.3: Main traffic management measures in Chalk ward

Road(s) affected	Proposed traffic management	Purpose	Duration
A226 Gravesend Road	Lane closure and traffic lights	To facilitate the construction of access to the Southern Tunnel Entrance and the A226 Gravesend Road Compounds as utility works	9 months between September 2024 and May 2025
A226 Gravesend Road	Lane closure and traffic lights	To facilitate construction access and modifications to local utilities	4 weeks between January 2024 and August 2024
Lower Higham Road	Lane closures and traffic lights	For construction access works and modifications to local utilities	2 occasions, each being 2 weeks duration, between January 2024 and August 2024

Lane closures would be required on the A226 to construct the access to the Southern Tunnel Entrance Compound and the A226 Gravesend Road Compound and for carrying out modifications to the local utility networks. This is expected to take around nine months early in the construction period. The affected stretch of road is 1.3km but the contraflow would operate over much shorter sections at a time. During the lane closures, a short section of road is closed on one side, while the other side remains open. Access to the open side of the road from each direction would be controlled by temporary traffic signals.

There would be two short periods, of around two weeks each, when a lane closure would be required on Lower Higham Road to construct an access to the A226 Gravesend Road Compound and for carrying out modifications to the local utility networks.

While the compounds are in use, the access points to the compounds may require traffic signals to allow public traffic to be managed while construction traffic enters and leaves the compounds.

A ban on HGVs delivering materials and moving excavated material for the project would be in place on Castle Lane and Lower Higham Road. This would not affect other HGVs using these roads.

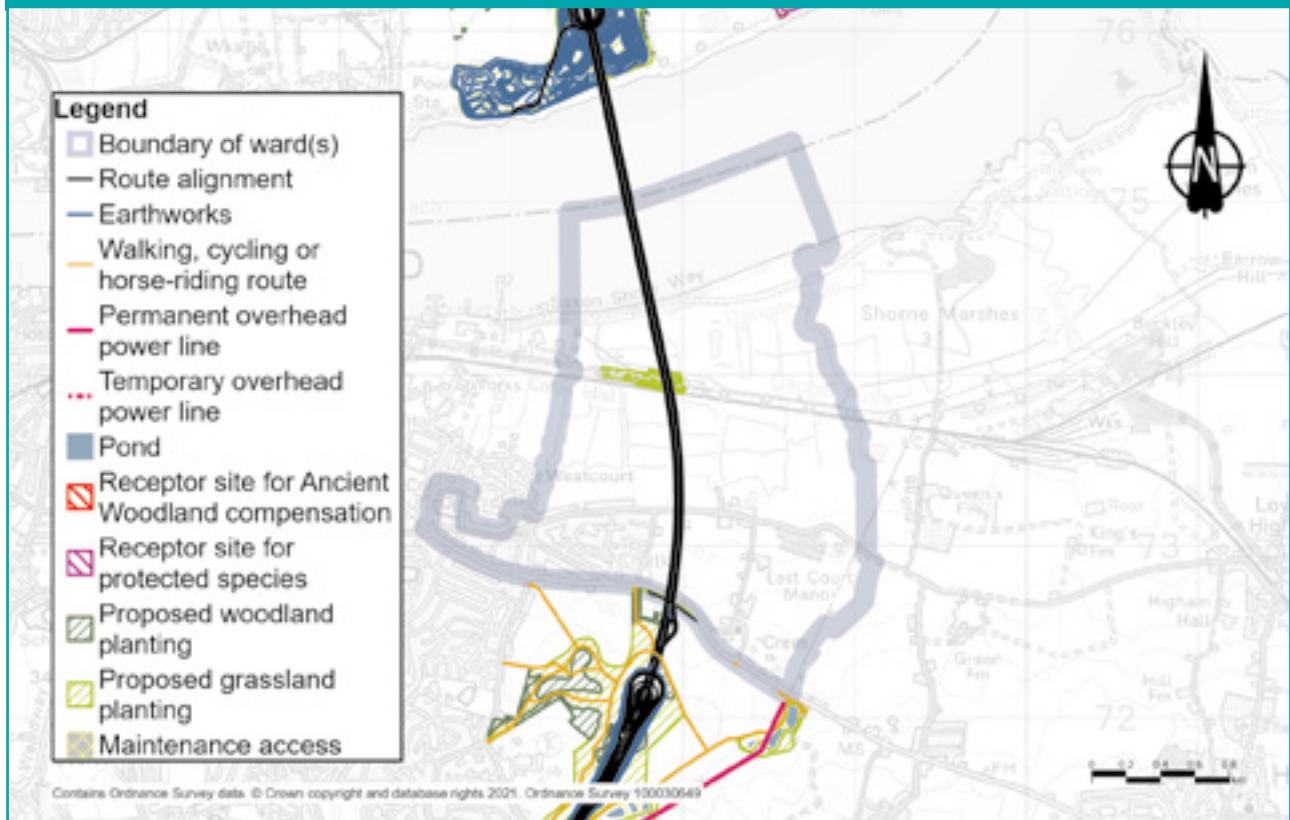
We have sought to minimise traffic management measures wherever practical, but these would be necessary in some locations to allow construction traffic and local communities to move around safely while providing construction workers with sufficient space to operate. An overview of the traffic management required across the project can be found in the 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 would be subject to final approval by the Secretary of State for Transport, following consultation with the local highways authority.

4.2.2 Operations

The completed project

This section sets out the elements of the project that would feature permanently in Chalk 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.

Figure 4.3: Main features of the completed project in Chalk ward



- The main alignment of the new road would pass through Chalk ward, but would be underground at this point and not visible.
- There would be provision within the Order Limits to widen the section of Norfolk Road running parallel to the Thames and Medway Canal in order to accommodate construction traffic. If the works are required for the project, they would be retained permanently, benefiting road users accessing the industrial sites near the canal.
- Footpaths and bridleways would be rerouted permanently once the project is operational ensuring that communities in Chalk can stay connected with the surrounding area. For more information, see the Footpaths, bridleways and cycle routes section.
- To reduce impacts in Chalk ward, the southern entrance of the tunnel has been moved, in line with community feedback, further south out of the ward. The tunnel was extended 600 metres after our Options Consultation and by an additional 350 metres after Statutory Consultation, lengthening the tunnel by a total of 950 metres and moving it away from Chalk village. By moving the southern tunnel entrance closer to the A2/M2 junction, we reduced the potential environmental impacts on the nearby Ramsar site, reduced the visual and noise impacts locally, and ensured that Chalk village is not divided by the new road.
- Waste generated by the project (for example, spoil from excavation) would be reused where possible on-site to reduce the number of HGV journeys on public roads that would be needed to move materials in or out of the construction site. At Statutory Consultation, the proposed figure was an average of 17,500 HGV journeys a month across the project, whereas at Supplementary Consultation, this figure had been reduced to an average of 13,300 HGV movements per month. Now, the average number of HGVs per month is expected to be 10,350 per month. For more information about HGV movements, see the Construction update.
- One area where spoil would be reused is in a new area of landscaping at Chalk Park, near the southern tunnel entrance, which would provide a new recreational area for local communities and would be accessible on foot from Chalk ward. Covering around 38 hectares, Chalk Park would feature woodland planting and grassland with views to nearby Areas of Outstanding Natural Beauty and the River Thames. Chalk Park would form part of a total of 84 hectares of open space land in the areas north of Claylane Wood and around the southern tunnel entrance. A map showing Chalk Park and other areas of open space can be found in chapter 3 of the Operations update.

Changes to the project since our Design Refinement Consultation

As part of our ongoing design development, including discussions with utility companies, we have made several changes to the project and its Order Limits since our Design Refinement Consultation in July 2020. Within this ward the changes would be as follows.

- A previously proposed water outfall (drain into the River Thames) has been removed from the project so it would not impact the Ramsar site.
- The temporary bird habitat at Great Clane Lane Marshes, the fields north of the A226 Gravesend Road, has been added to the project since our last consultation. See figure 4.3 for the area of land that would be affected.

More information about any proposed changes can be found in chapter 3 of the Operations update.

Impacts on Open Space land

Within Chalk 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.

4.3 Traffic

We carried out traffic assessments to understand how roads in the vicinity of the project would be affected during the project's construction and once it is operational, compared with the situation if the project was not implemented. Information about how we carried out these assessments can be found in chapter 3 of the Operations update.

4.3.1. Construction

Construction traffic impacts

Journey times along the A226 in Chalk would increase during the construction period, both because of the increased number of HGVs using the road, and because of the traffic signals at the compound access points. When the temporary lane closures are in place on the A226 and Lower Higham Road, these would also impact journey times along these sections of road.

Measures to reduce construction traffic impacts

Our approach to construction has been refined after further investigation and feedback. A summary of the 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.

- For Chalk ward, our plans for the location of the southern tunnel entrance have been moved south twice, reducing the construction impact on Chalk village and the surrounding area. More information about the measures to reduce the impact of tunnel construction can be found in chapter 4 of the Construction update.
- 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 on the A226 Gravesend Road. For more information about HGV movements, see the Construction update.
- The A226 Gravesend Road has been included in the Order Limits to allow temporary road-widening if required to maintain the safety of other road users while it is used by construction traffic. Our design changes, including a reduction in the amount of offsite disposal required, has meant we would seek to minimise these works, reducing the impact on local communities.
- After discussions with the local authority, we are also proposing an HGV ban during the construction period on Castle Lane. For more information, see the OTMPfC.

4.3.2 Operations

Operational impacts

Figures 4.4, 4.6 and 4.8 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 4.5, 4.7 and 4.9 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.

The project is underground in Chalk ward and there would be very little predicted change in traffic levels on Lower Higham Road in Chalk with no road having a change in traffic levels of more than 100 PCUs as a result of the opening of the project.

Figure 4.4: Predicted change in traffic flows (PCUs) with the project during the morning peak, 2029

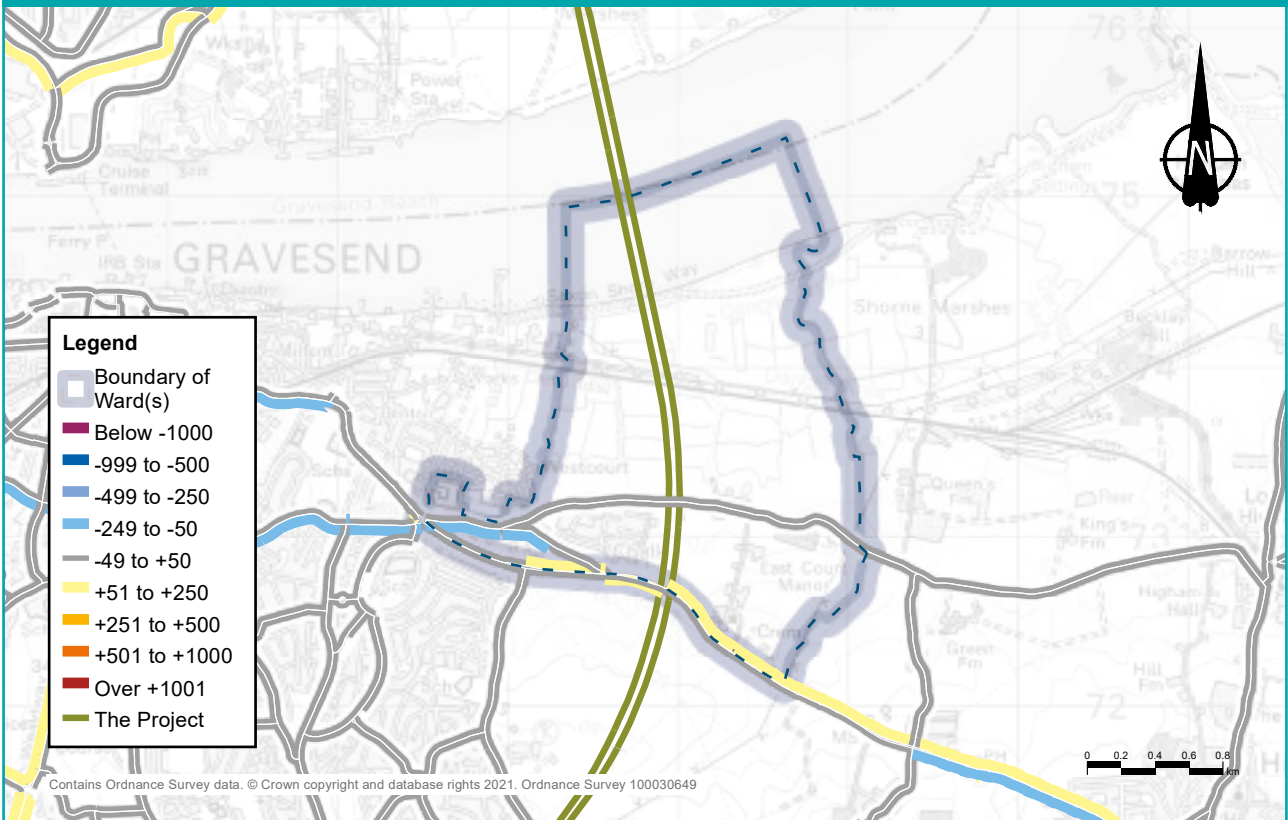


Figure 4.5: Predicted changes to the percentage traffic flows during the morning peak in 2029

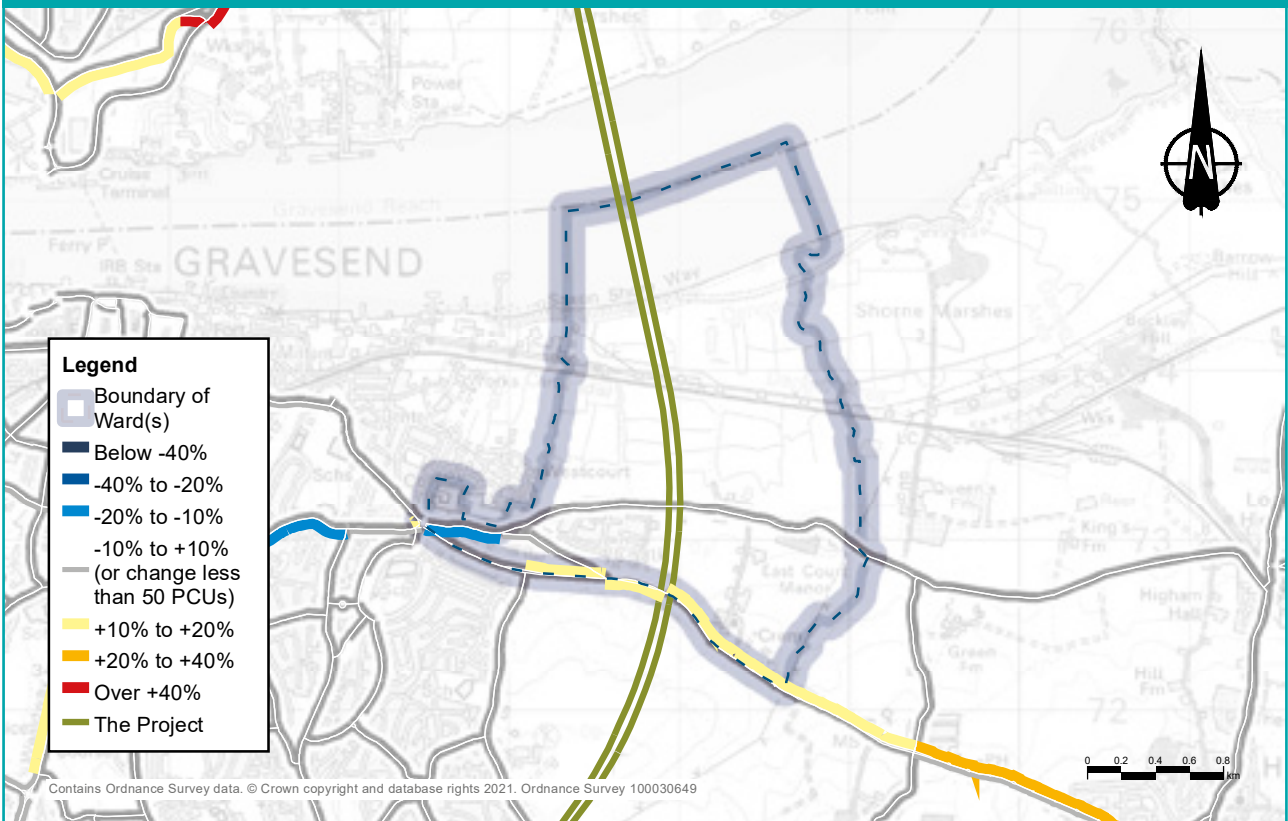


Figure 4.6: Predicted change in traffic flows (PCUs) with the project during the interpeak in 2029

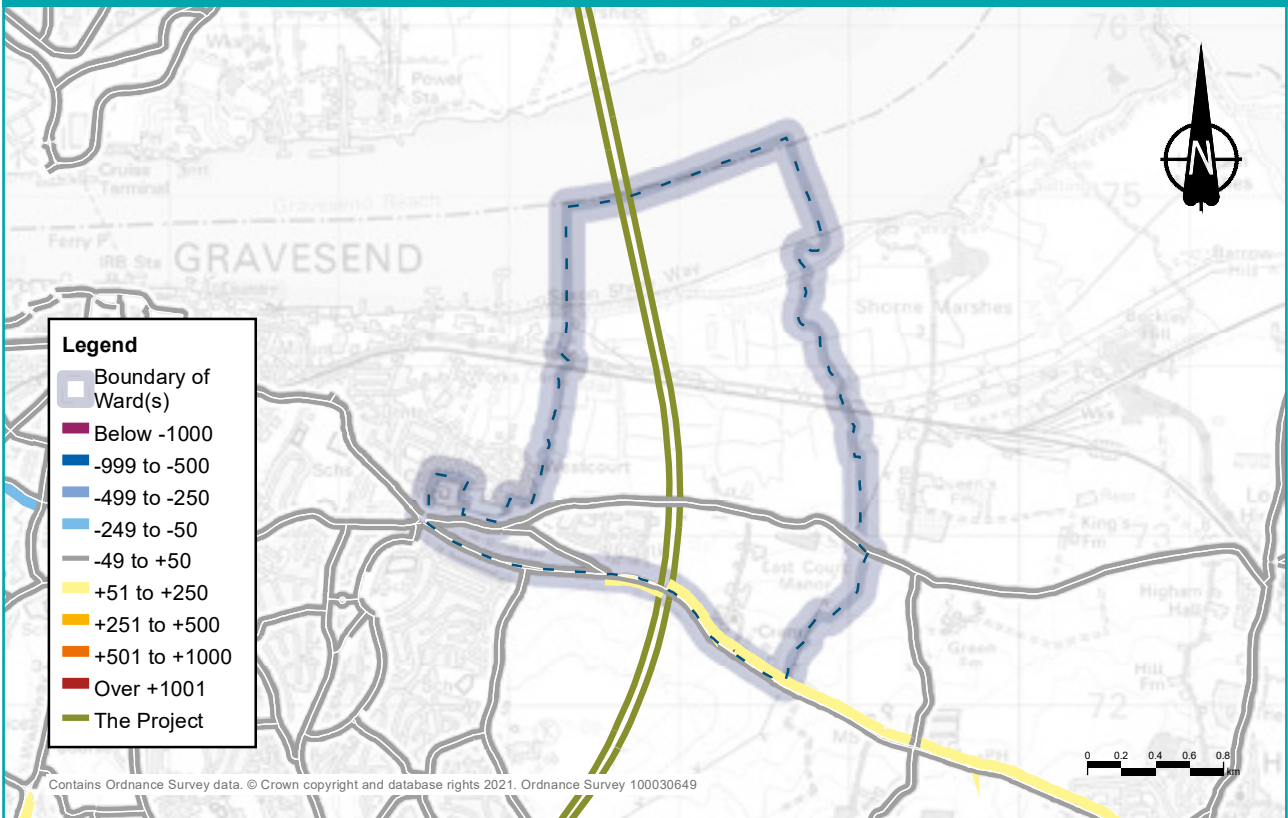


Figure 4.7: Predicted changes to the percentage traffic flows during the interpeak in 2029

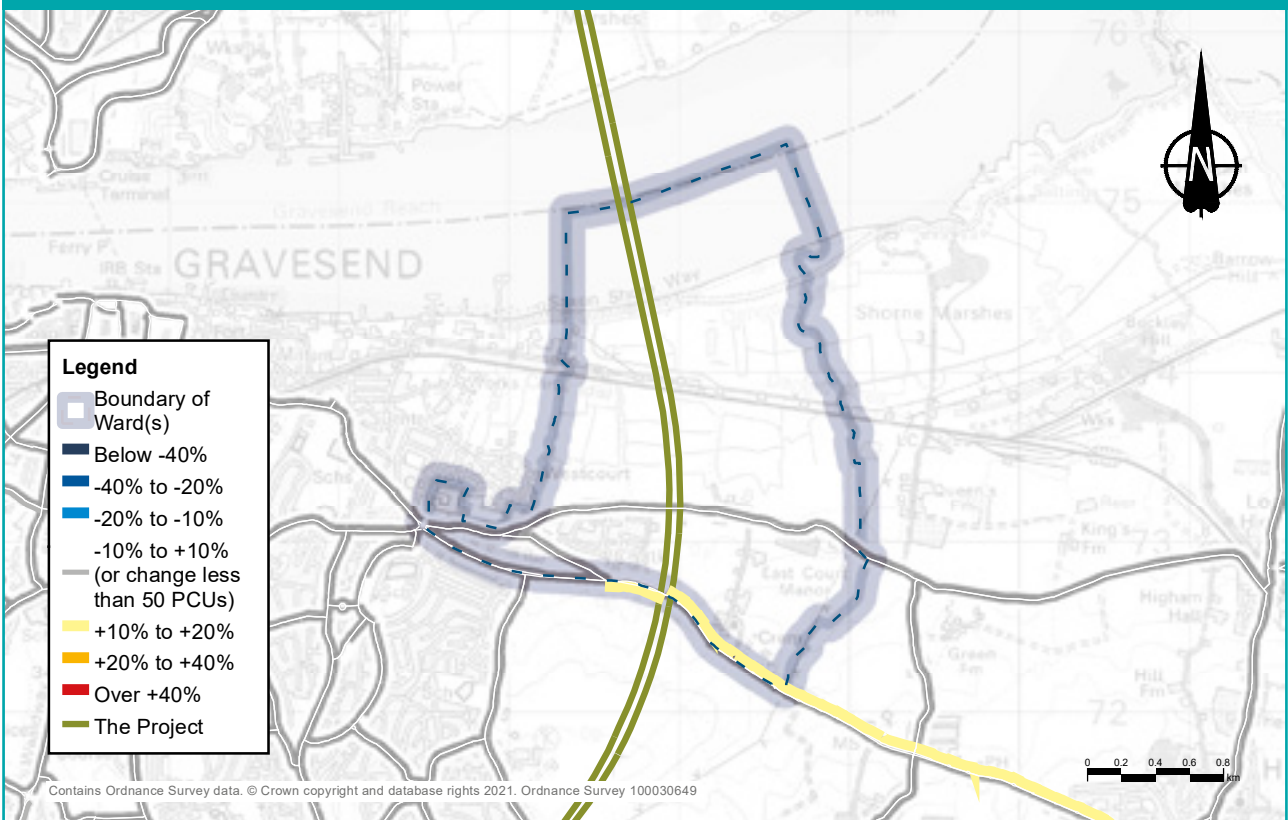


Figure 4.8: Predicted change in traffic flows (PCUs) with the project during the evening peak in 2029

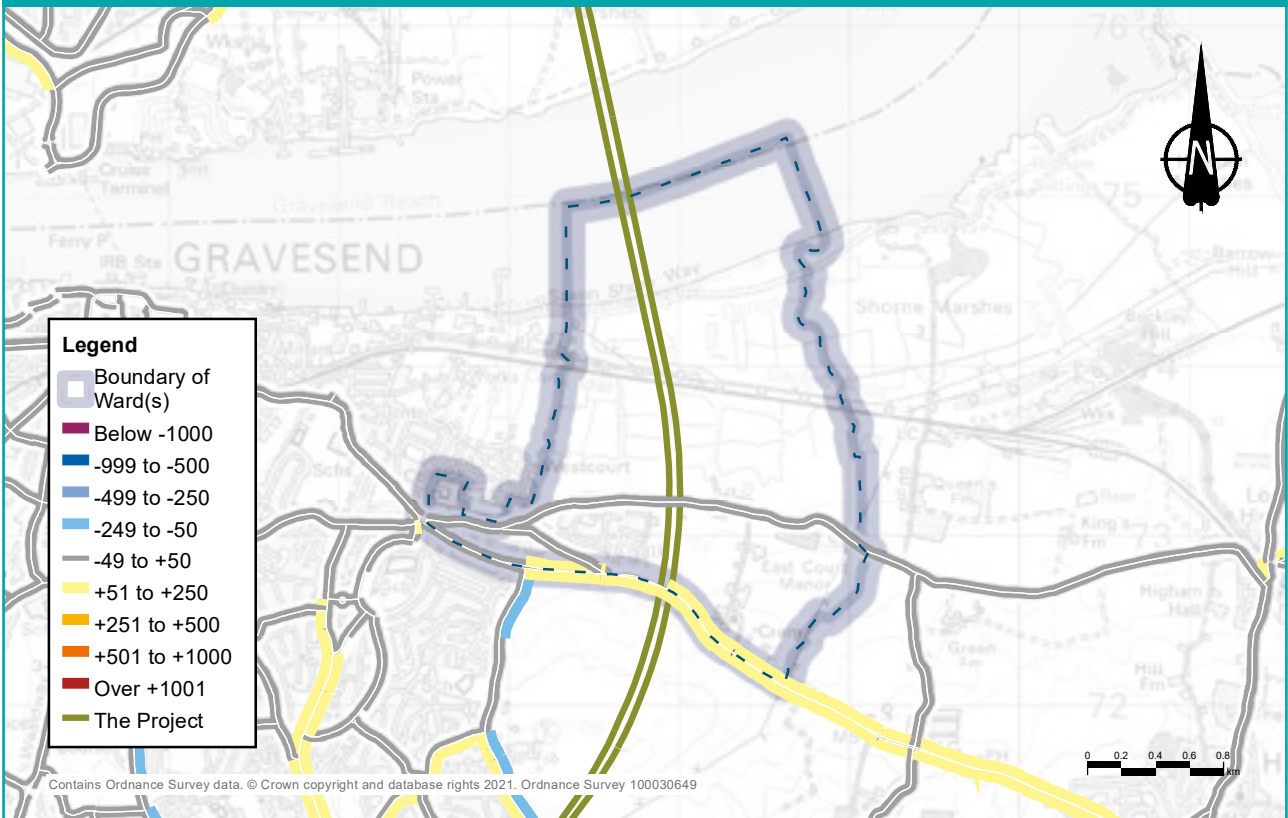
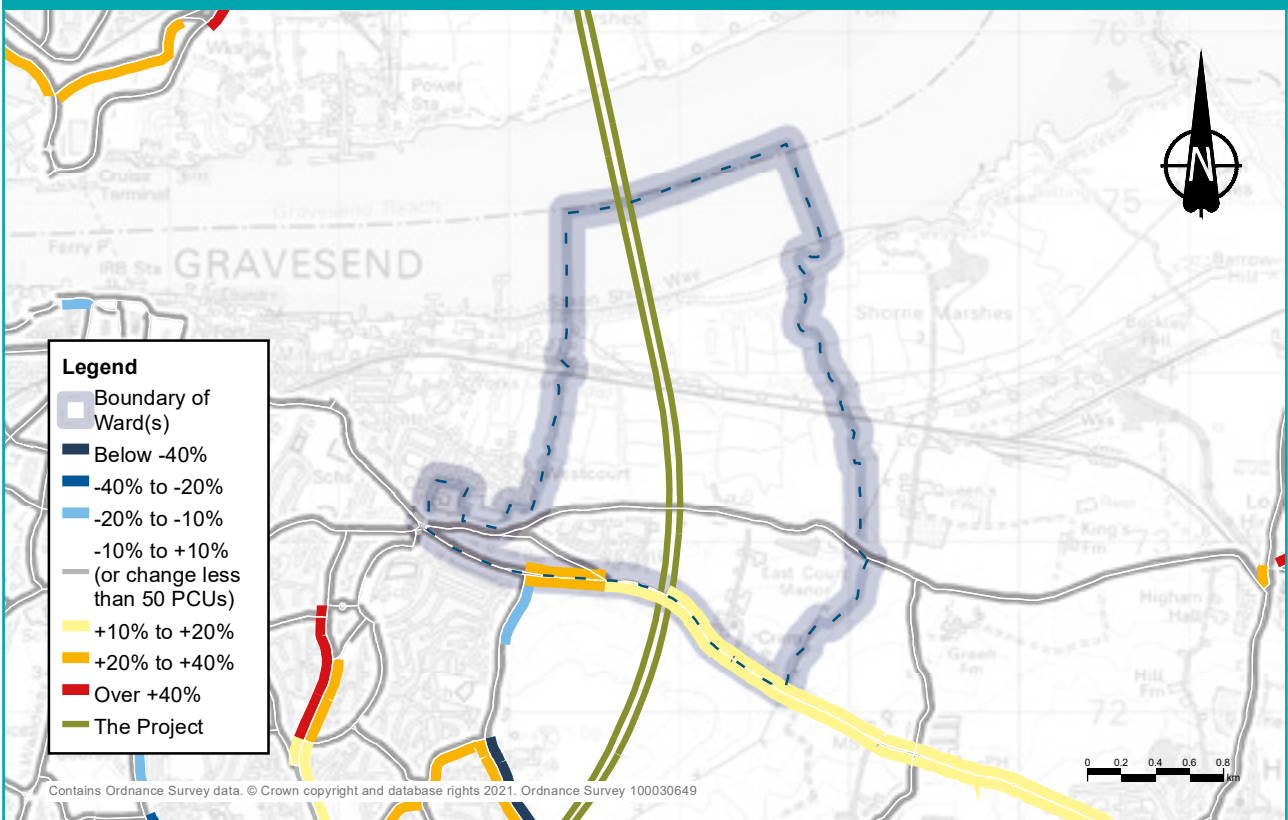


Figure 4.9: Predicted percentage changes to traffic flows during the evening peak in 2029



Changes to journey times

Figure 4.10 shows the change in the area that can be reached within a 30-minute drive from the centre of the ward both without the project and with the project. While figure 4.11 shows the change in areas that can be reached within a 60-minute drive. The drive times have been calculated for the morning peak hour (7am to 8am). With the project, the number of jobs that can be reached within a 30-minute drive increases by 29% which would make an additional 90,200 jobs accessible. Within a 60-minute drive this increases by 42%, which would make an additional 790,000 jobs accessible to people living in Chalk.

Despite the project providing a substantial net gain in access for motorists within the wards, there are areas (shown in orange in the accompanying maps) that would no longer be accessible by car within 30 or 60 minutes because of changes to traffic flows on the wider road network.'

Figure 4.10: Change in area that motorists could drive to within 30 minutes from Chalk ward

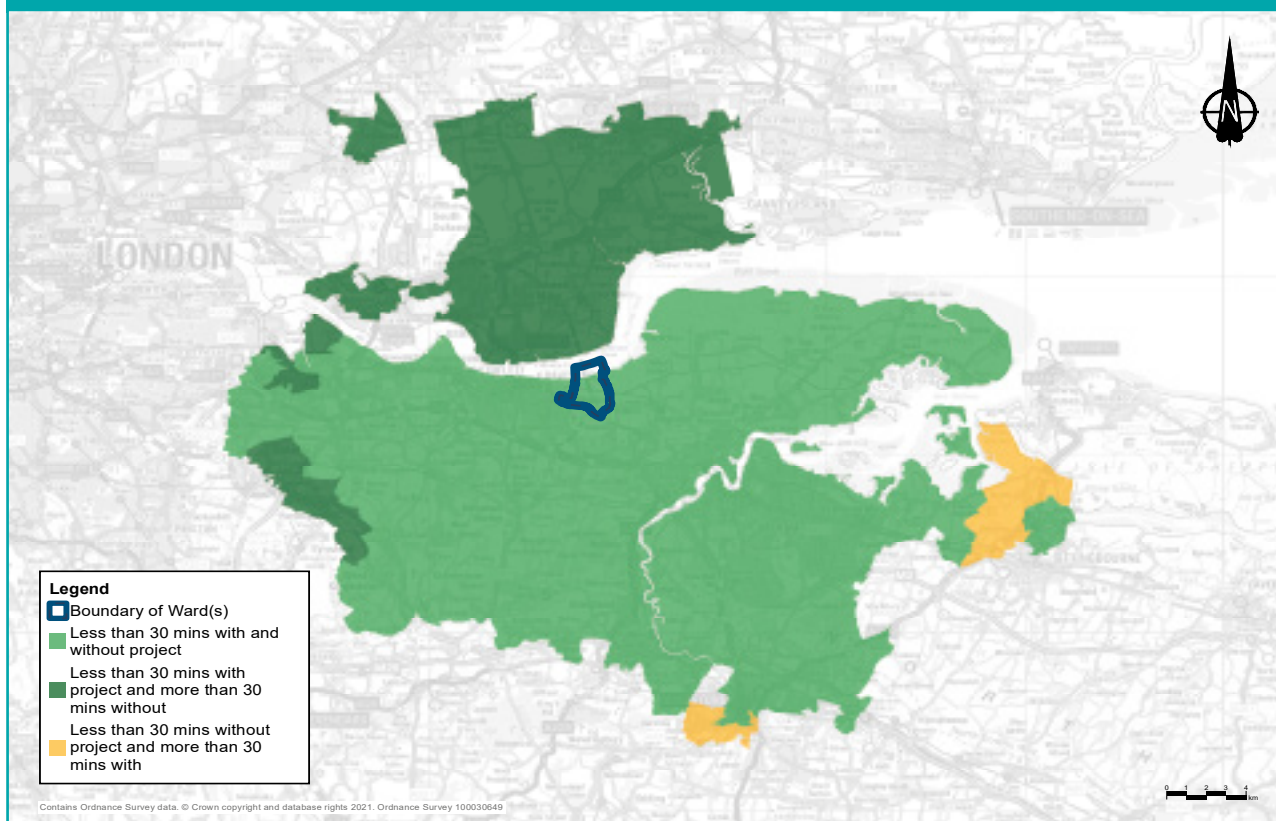
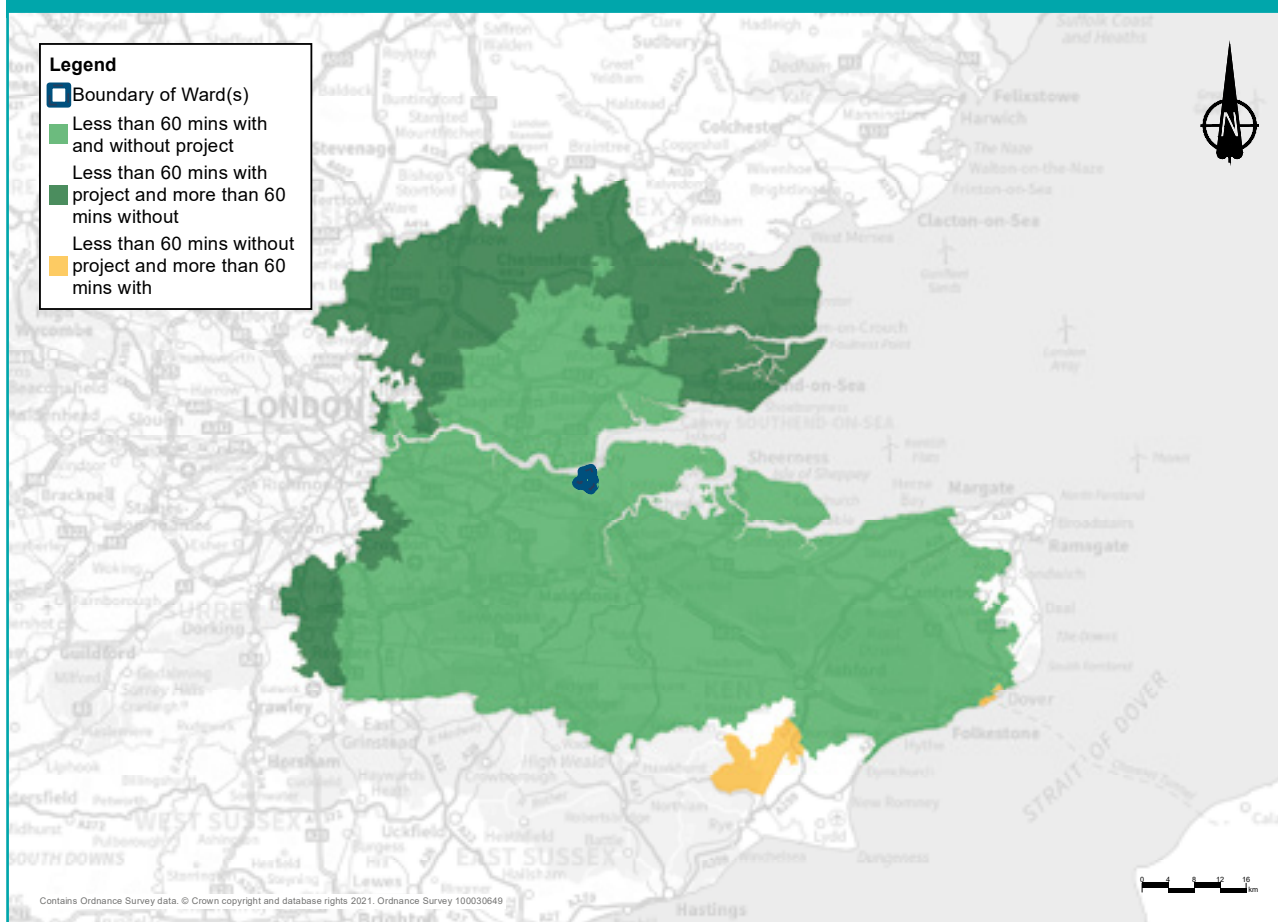


Figure 4.11: Change in area that motorists could drive to within 60 minutes from Chalk ward



Operational traffic flows

An iterative design process including successive stages of traffic modelling and extensive consultation and engagement has ensured that the most appropriate links to the existing road network would be provided. For example, the previously proposed junction between the project and the A226 Gravesend Road was removed after consultation because it had a negative impact on traffic levels east of Gravesend, including roads in Chalk ward. 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.

4.4 Public transport

Existing situation

Chalk ward is served by the North Kent Railway line from London Charing Cross to Strood which is used by Southeastern services from Kent into London and Thameslink Services which run from Kent and across London to destinations including St Albans, Luton and Bedford. There are no stations serving this line in the Chalk ward. However, the project crosses the railway in Chalk ward, in a tunnel under the North Kent Railway line.

Several bus services pass through this ward, including services along the A226 Higham Road.

4.4.1 Construction

Trains

There would be no impact on train services passing through Chalk ward, and access to Gravesend station for the residents of Chalk ward would not be affected during construction.

Buses

Due to the impacts on journey times along the A226, bus services along the A226 Higham Road may experience delays. Local buses that would be impacted include the 111, 190, 311, 417, 668, 735 and the 736.

4.4.2 Operations

Trains

There would be no discernible change in local access times to Gravesend and Higham train stations and no change to the rail services at the stations when the project is operational.

Buses

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

4.5 Footpaths, bridleways and cycle routes

Existing situation

Figure 4.12 shows the footpaths and cycleways in Chalk ward. Chalk is a relatively small and largely rural ward, which includes five footpaths and one footpath-cycle route (NG2).

4.5.1 Construction

There would be only minor changes to footpaths and bridleways during construction. 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. For other potential impacts, see the other topic areas in this chapter, such as Visual and Noise and vibration.

- Footpath NG2 runs from Albion Parade along the Thames and Medway Canal and would be affected by utility works. These works would provide power to the Milton Compound which, if required, would cause closure of the path for up to one month.
- Footpath NG3 should be able to remain open throughout construction, but may require very short periods of closure while materials are transported to the Milton Compound.
- The cycle lanes along the A226 Gravesend Road would be impacted during the first year of construction while access to work compounds are constructed. During this period, the A226 would require lane closures and traffic lights.

4.5.2 Operations

The project's proposals include more than 46km of new, extended, diverted or upgraded footpaths, bridleways and cycleways. We developed the proposals after consultation with local communities and stakeholders that included 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 NG2 would be widened to allow construction traffic to access Milton Compound, which would be a permanent widening once the project is operational.

Figure 4.12: Footpaths, bridleways and cycle routes in the vicinity of the project in Chalk ward

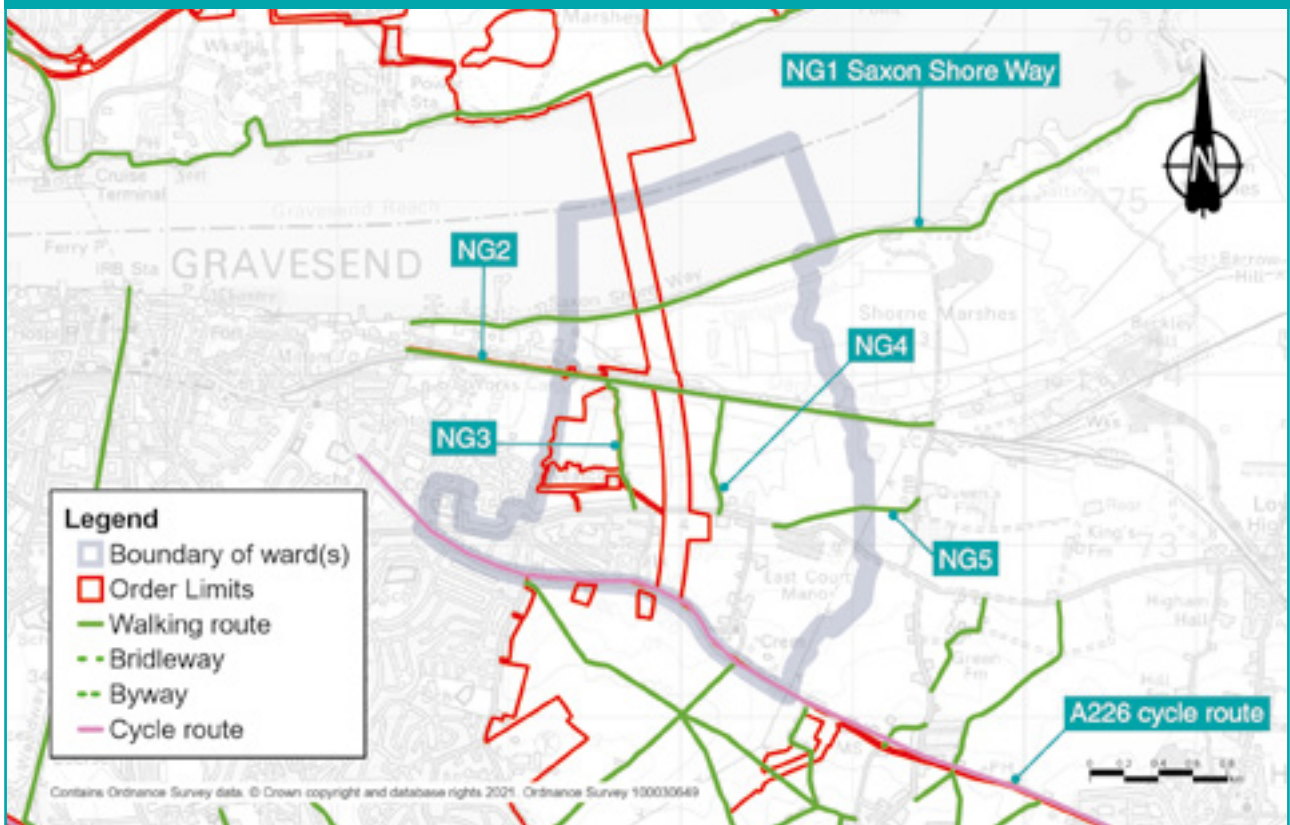
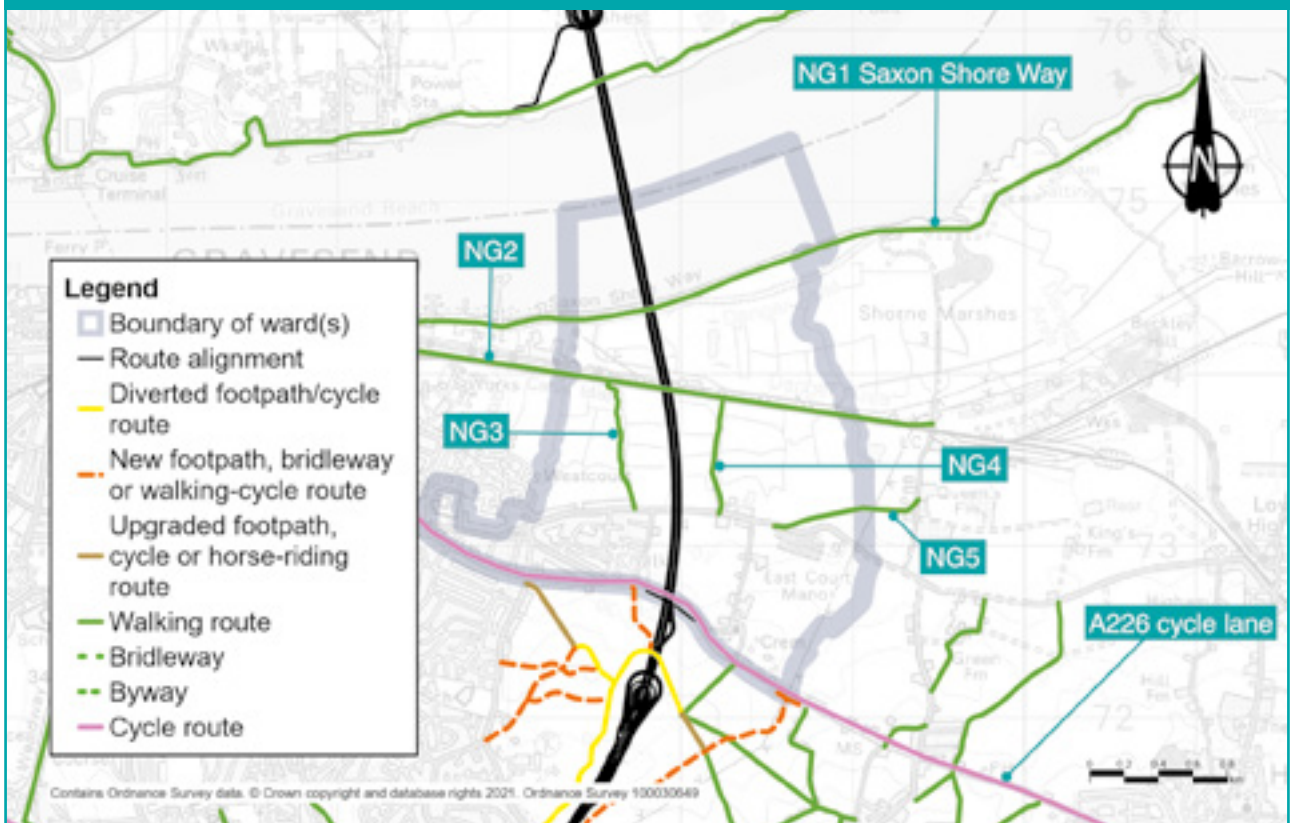


Figure 4.13: Proposed footpaths, bridleways and cycle routes in Chalk ward



4.6 Visual

Existing situation

Views towards the land on which the project would be built from the main populated area are principally limited to the edges of the Chalk residential area and some properties along Church Lane. Other views include those from the local footpath network and National Cycle Network (NCN) Route 1 east of Chalk. There are also views towards the project north of the River Thames from Saxon Shore Way long distance footpath.

Current views towards the land on which the project would be built from the edge of Chalk are in general partially screened by a combination of garden vegetation or hedgerows along the A226 Gravesend Road and Castle Lane. However, more open views over agricultural land are found on the north-east edge of Chalk. From Church Lane, there are intermittent open views over the adjoining farmland.

Views from the local footpath network include large areas of grassland crossed by overhead power lines against a local backdrop of Gravesend town, and the distant backdrop of Shorne Woods Country Park skyline to the south.

From Saxon Shore Way long-distance footpath there are expansive views over the Thames Estuary to Tilbury Docks and Tilbury Marshes on the north bank of the river and gently rising ground beyond.

4.6.1 Construction

Construction impacts

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

The main construction activities that would be seen from this ward are:

- Establishment and operation of the Southern Tunnel Entrance Compound, the A226 Gravesend Road Compound and the Milton Compound.
- Earthworks and landscaping to create Chalk Park and other open space areas.
- Establishment and operation of the Northern Tunnel Entrance Compound north of the River Thames.
- New landscaping near the Northern tunnel entrance.

More information about construction activities can be found in the Project description section above and in chapters 3, 4 and 5 of the Construction update. A map of Chalk Park and other open space areas can be found in chapter 3 of the Operations update.

Construction activity is likely to be partially visible from some homes on the south and east edges of Chalk. There are also likely to be some views of construction activity from homes on Church Lane, the local footpath network, and NCN Route 1.

From Saxon Shore Way long-distance footpath, new landscaping by the northern tunnel entrance and Northern Tunnel Entrance Compound would be clearly visible north of the River Thames.

Measures to reduce visual impacts of construction

Measures would include locating taller facilities in the A226 Gravesend Road Compound as far as possible from homes in Chalk. We also propose to form earth bunds within the A226 Gravesend Road Compound, from material excavated on site, to provide visual screening for homes along Castle Lane on the eastern edge of Chalk.

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.

4.6.2 Operations

Operational impacts

When the new road opens it would run underground in this ward, and the land used temporarily for construction would be reinstated to the reasonable satisfaction of the owner of that land. The former Southern Tunnel Entrance Compound to the south of Chalk ward would be restored to a combination of agricultural use and the proposed open space recreational areas, including Chalk Park. The proposed landscaping in front of the northern tunnel entrance would form a new backdrop feature to the River Thames to the east of Tilbury Fort. Further information about the project during operation is provided in the Project description above.

As the Lower Thames Crossing would be in the tunnel in Chalk ward, the visual impacts from residential areas and the local footpath network would be minimal. The most noticeable change would be the new landscaping on the north bank of the River Thames, forming a new landmark feature in views across the river from Saxon Shore Way.

Measures to reduce visual impacts during operation

Within Chalk, the primary measure to reduce the visual impacts of the project during operation would be the landscape restoration of the temporary working areas.

4.7 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 Chalk ward is mainly characterised by traffic noise in the south of the ward. There is also noise from people and agriculture towards the north. The main sources of road traffic noise within the ward of Chalk are from Lower Higham Road and Gravesend Road.

As part of our environmental assessment process, we carried out surveys of existing background noise at three locations in this ward, which were agreed with the local authority. The levels monitored at these locations recorded average existing noise levels in the range of 49 to 54dB(A) during the daytime and 44 to 52 dB(A)² during the night.

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

We also modelled 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.

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, without the project, existing noise environment is predicted to range between an average of 39 to 73dB(A) during the daytime period and 28 to 59dB(A) during the night-time period at the assessed locations within this ward. As such, our noise assessments predict that without the project there would be noticeable change in noise levels by the opening year of the project due to predicted traffic increases. 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.

4.7.1 Construction

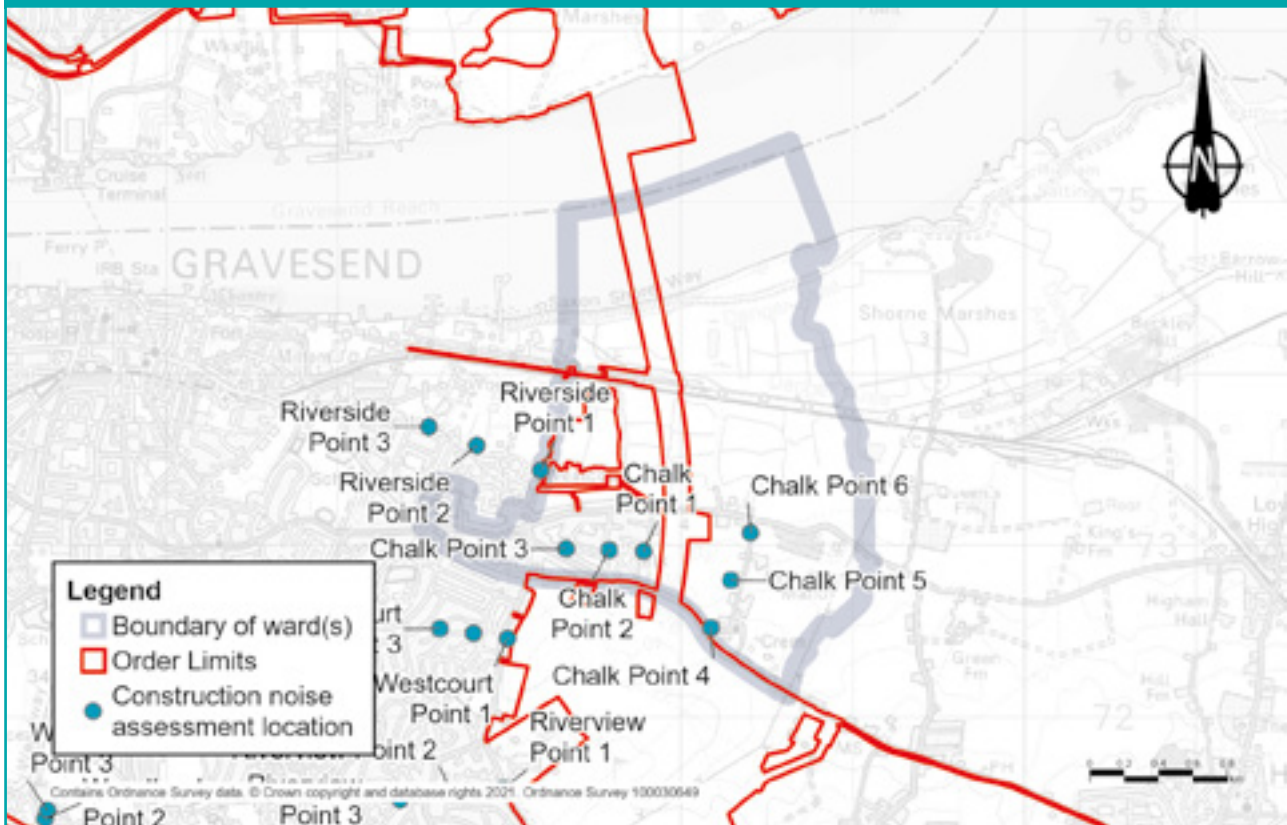
Daytime construction noise impacts

The main construction activities that are expected to create noise and vibration impacts in this ward are those associated with advanced tunnel grouting works and utilities works.

Main works compounds would be located within Chalk ward. There are no Utility Logistics Hubs currently planned within the ward. There would also be haul roads built and used during the construction period. These are shown in the Project description section above.

Construction noise levels have been predicted at six locations across the ward, chosen to provide a representation of the level of noise communities are expected to experience during construction. For more information about how we carried out these assessments, see chapter 1.

Figure 4.14: Construction noise assessment locations in Chalk ward



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.

Figure 4.14 shows the locations at which we have predicted the daytime construction noise during the project's construction phase.

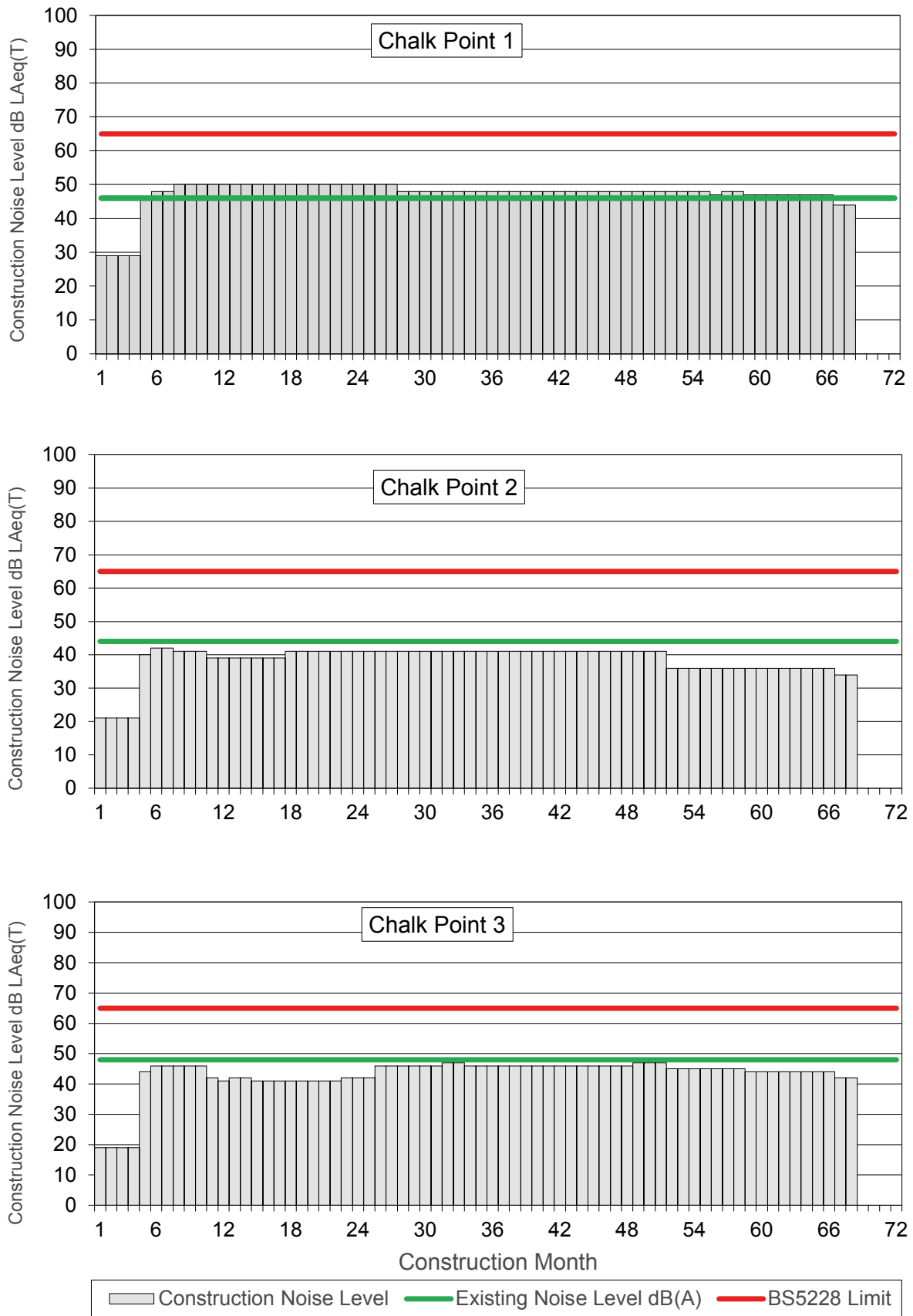
Each vertical bar in figure 4.15 and 4.16 shows the predicted noise levels for that month of the construction period (from month 1 to month 72). The horizontal green line in each chart represents the existing background noise level at each assessment point without the project. The horizontal red line shows the level at which construction noise would exceed acceptable thresholds (see chapter 1 for more information about these thresholds). If noise is predicted to exceed acceptable levels, then 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 4.15, 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 29 to 50dB LAeq (12-hour) during the six-year construction programme. Construction noise levels would exceed the existing background daytime noise level for approximately 61 months. However, they would not breach the defined threshold.
- At point 2, construction noise levels are predicted to range from 21 to 42dB LAeq (12-hour) during the six-year construction programme. Construction noise levels are not predicted to exceed the existing background noise levels at this location.
- At point 3, construction noise levels are predicted to range from 19 to 47dB LAeq (12-hour) during the six-year construction programme. Construction noise levels are not predicted to exceed the existing background noise levels at this location .

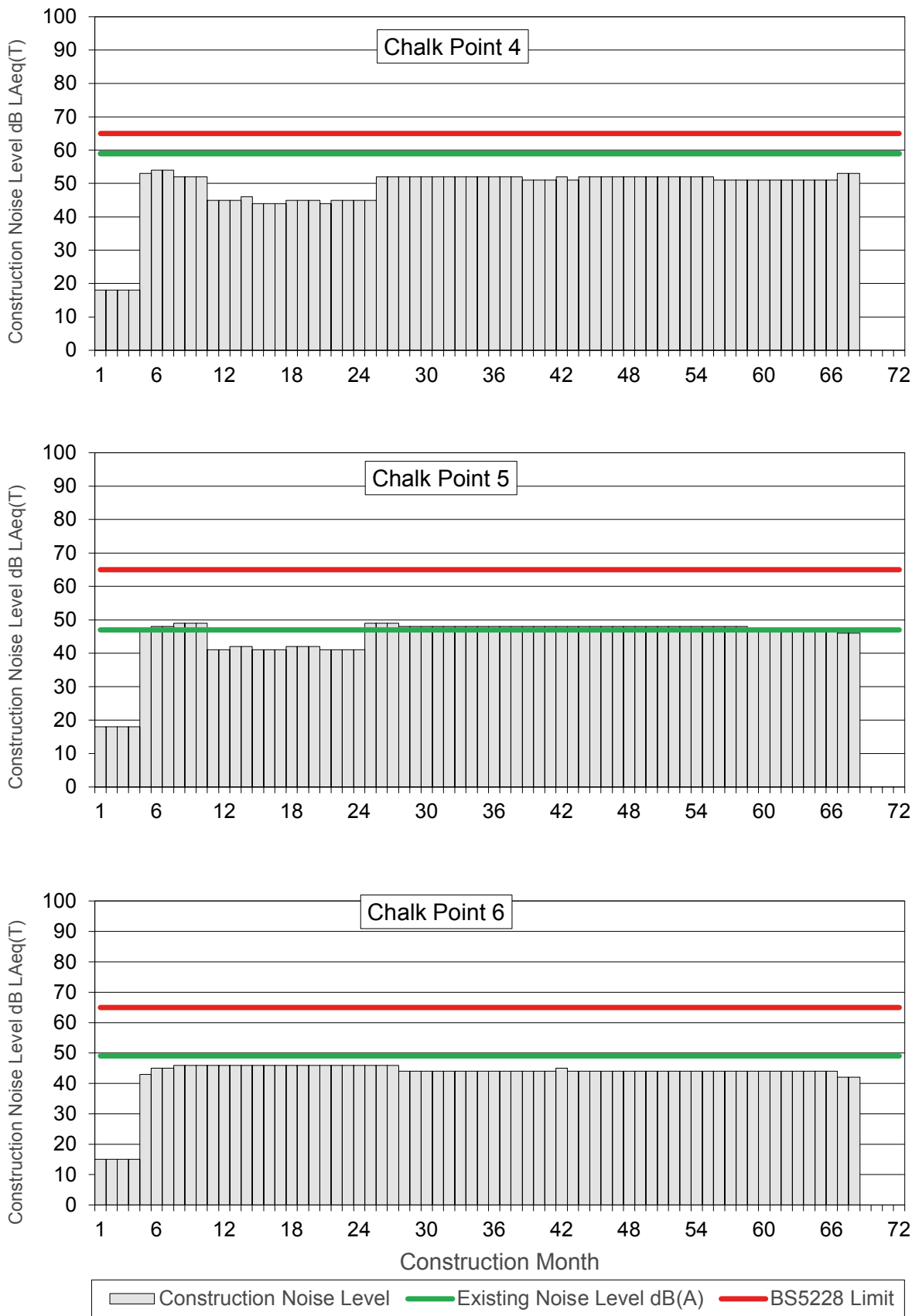
Figure 4.15: Construction noise by month for points 1, 2 and 3 in Chalk ward



With reference to figure 4.16, 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 18 to 54dB LAeq (12-hour) during the six-year construction programme. Construction noise levels are not predicted to exceed the existing background noise levels at this location.
- At point 5, construction noise levels are predicted to range from 18 to 49dB LAeq (12-hour) during the six-year construction programme. Construction noise levels would exceed the existing background daytime noise level for approximately 39 months. However, they would not breach the defined threshold.
- At point 6, construction noise levels are predicted to range from 15 to 46dB LAeq (12-hour) during the six-year construction programme. Construction noise levels are not predicted to exceed the existing background noise levels at this location.

Figure 4.16: Construction noise by month for points 4, 5 and 6 in Chalk ward



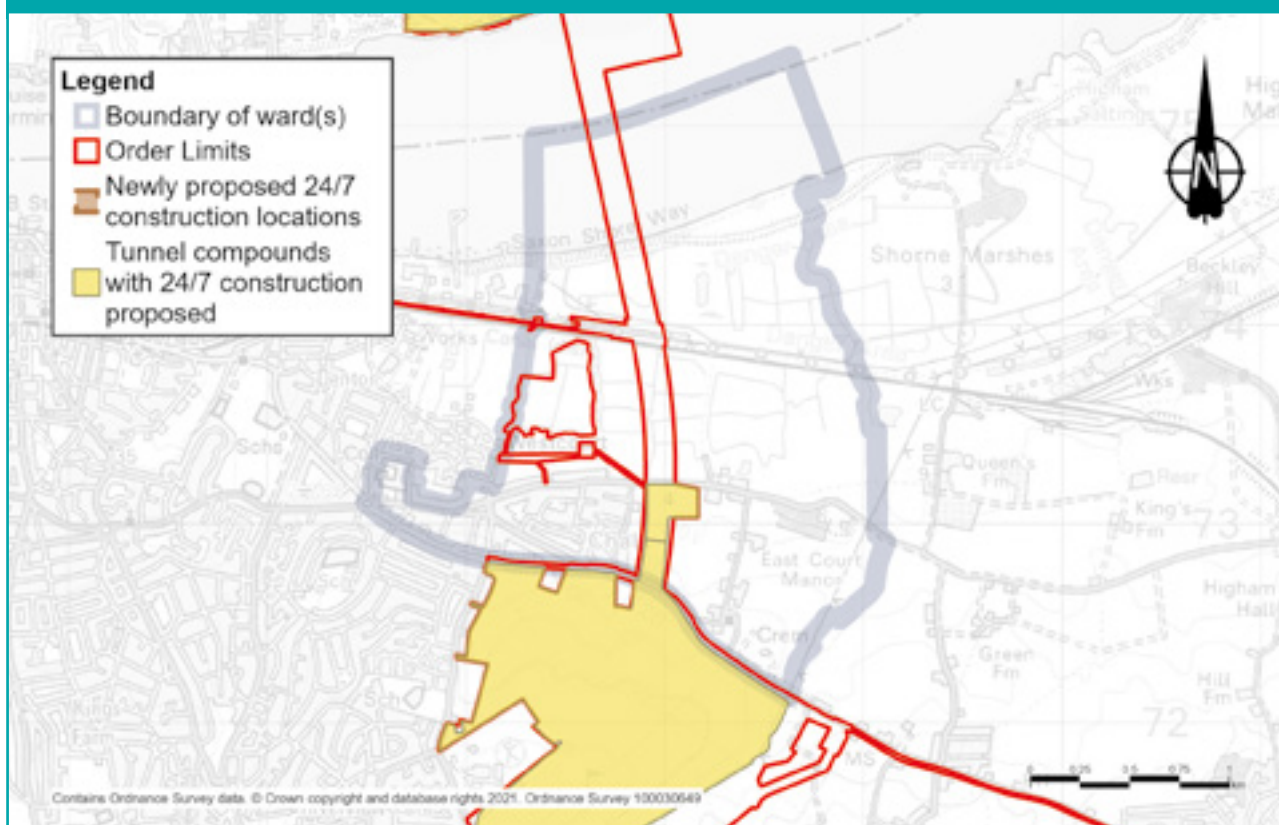
24/7 construction working

In addition to the changes to the daytime noise impacts reported in the section above, night-time, 24-hour, seven-day construction working is proposed at the locations shown in figure 4.17.

The previously proposed 24/7 construction locations referred to in the figure are those 24-hour tunnelling activities that we have outlined during previous consultations and remain part of our current proposals.

These locations are where works may need to be undertaken at night to maintain safety and reduce disruption to road and utility networks. Construction activities requiring 24/7 operations would be from the A226 Gravesend Road Compound and the Southern Tunnel Entrance Compound. These works would have an impact on local communities, and we would work with the local authority to manage these impacts.

Figure 4.17: Newly proposed and tunnel 24/7 working locations in Chalk ward



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 chapter 7 of the Construction update. Based on the currently available traffic data (which offers a representative picture of what receptors within the ward are likely to experience), during the construction period there would be negligible changes in road traffic noise (less than 1dB change in noise levels) during all construction years. For more information about how we define noise impacts (negligible, minor, moderate and major), see chapter 1.

Measures to reduce construction noise and vibration

Construction noise levels would be controlled primarily through the implementation of 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 so 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 used where possible to reduce noise and vibration impact.
- Carefully considering the location and layout of compounds to separate noise-generating equipment from sensitive receptors, and the use of mains electricity rather than generators, where possible.
- Minimising construction vehicle traffic by selecting local suppliers along the project, where possible, using local workforces and reducing the material transported for earthworks construction.

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

4.7.2 Operations

Operational impacts

This ward is located approximately 600 metres to the north of the project's southern tunnel entrance and, as such, direct noise impacts from the route of the project would be confined within the tunnel structure, except at the southern edge of the ward where the road emerges from the tunnel, albeit some 20 metres below current ground levels.

The project has been designed to reduce noise and vibration impacts during operation. The majority of noise impacts within this ward would be as a result of changes in traffic flow, the number of HGVs, traffic speed or physical alterations on the existing road network within the ward itself.

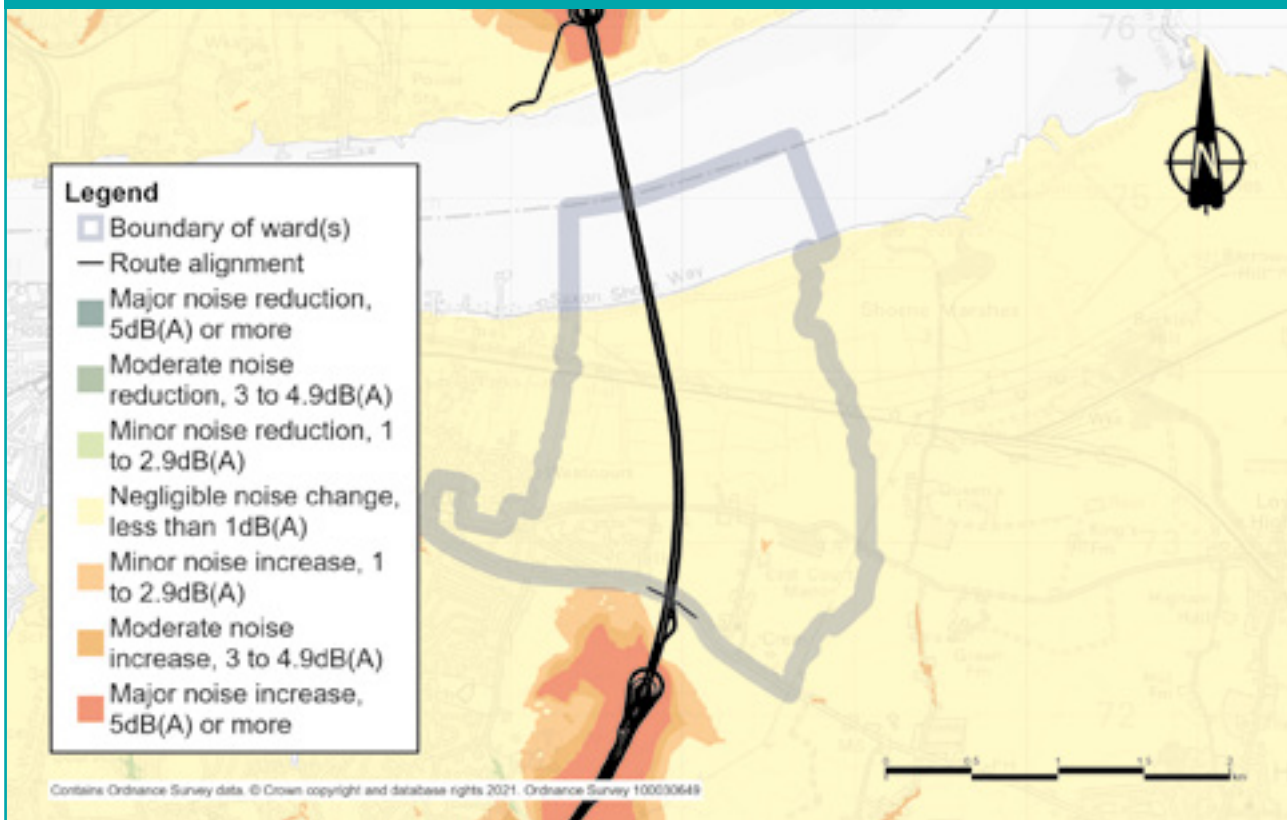
Figure 4.18 shows the predicted changes in operational road traffic noise in the opening year of the project. Within the ward, changes in road traffic noise at identified noise sensitive receptors (such as nearby properties) are predicted to range from minor reductions in noise levels of between 1.0 and 2.9dB to minor increases in noise levels of between 1.0 and 2.9dB. For more information about how we define noise impacts (negligible, minor, moderate and major), see chapter 1.

Measures to reduce traffic noise during operation

The main methods of controlling noise 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).

Figure 4.18 Noise impacts during operation in Chalk ward



4.8 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

Chalk 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.

4.8.1 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 this ward, there are only a few properties within 200 metres of the worksite, including the eastern side of Chalk, Lower Higham Road and Church Lane. Air quality impacts on these properties during construction would be temporary and we would put in place measures to minimise the dust impacts (see below). 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 this ward would be negligible, although there would be a temporary minor worsening in air quality in the area around the A226 Gravesend Road that runs through Chalk from 2026 to 2027, as well as an area around Higham Road from 2025 to 2027. In both instances these areas would see a temporary minor worsening in air quality due to a predicted increase in traffic. 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 Gravesham Borough Council for consultation (see REAC entry AQ006).

4.8.2 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 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.

Figure 4.19: Predicted changes in NO₂ levels within Chalk ward once the new road is open



There are receptors (properties or habitats that are sensitive to changes in air quality) within the ward, for example, the eastern side of Chalk, Lower Higham Road and Church Lane that are predicted to experience a minor worsening in the air quality for nitrogen dioxide (NO₂), the main traffic-related pollutant. The highest modelled yearly average NO₂ concentration within this ward is 18.7µg/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 time³.

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 operational impacts on air quality

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.

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

4.9 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 Chalk ward is characterised by an older population. The proportion of residents aged over 60 is 34.3% for Chalk compared with 22.6% for Gravesham; and 23.6% for England as a whole. A high proportion of older people live alone within the ward (16.5% in Chalk compared with 12.2% for Gravesham). Given the higher proportion of retired people within the ward, economic activity is correspondingly low, and deprivation levels are low. Home ownership levels are high (nearly 83% of residents own their own home) with the majority of the remainder (13.8%) in private rented accommodation.

Around 80% of residents report their health to be very good or good (roughly in line with figures for Gravesham). A higher proportion of residents report their day-to-day activities to be limited “a little or a lot” as a result of a long-term health problem or disability (18.4% of residents).

Life expectancy at birth for residents of Chalk ward is 83.2 for males and 88.7 for females (above the UK average life expectancy recorded for 2017-19 of 79.4 years for males and 83.1 years for females).

4.9.1 Construction

Construction impacts

Construction activities include the establishment and operation of the Southern Tunnel Entrance Compound, A226 Gravesend Road Compound and Milton Compound, as well as earthworks and landscaping associated with the creation of Chalk Park and other open space. A map showing the proposed open spaces can be found in chapter 3 of the Operations update. Further information about construction activities affecting Chalk ward residents are provided in the Project description section above. Elements of each of these activities have the potential to impact on human health through noise associated with construction activities or construction traffic, changes to air quality (as a result of dust emissions), potential severance caused by construction traffic, or through impacts on mental health and wellbeing.

There would be 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). Evidence from The Health Foundation has demonstrated a link between unemployment and poor mental health.

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. For example, Chalk residents may experience:

- Access to open space. Temporary closures to the local footpath network, to the south of Chalk, would affect residents' access to open space. This could impact people who do not have access to private cars. However these impacts would be limited, given the short-term nature of impacts on the public rights of way network.
- Noise and vibration. Temporary but significant adverse effects in relation to noise have been identified at receptors located at Lower Higham Road to the north of Chalk. A negative health outcome has been identified for sensitive populations here who may be affected by changes to the noise environment, such as older people or those with pre-existing hearing conditions.

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 this chapter in the Visual, Noise and vibration and Air quality sections. Further information relating to mitigation measures for these areas is set out in the CoCP, the REAC and the traffic management measures in the Outline Traffic Management Plan for Construction. The commitments in the REAC include items such as adhering to Best Practicable Means (BPM) to reduce noise impacts (see NV007) and dust-management good practice (see AQ005). For more information about these documents, see Chapter 5 of the Guide to consultation.

Engagement and effective two-way communication with communities both prior to and during construction is important in order 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. This includes setting up Community Liaison Groups.

4.9.2 Operations

Operational impacts

The assessments undertaken for noise and air quality have shown that no adverse impacts are anticipated as a result of the project for people in Chalk ward. However, a proportion of residents may 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 the Chalk population may be more susceptible to anxiety and stress than others.

Positive health outcomes may be experienced by residents as a result of improvements to accessibility, access to work and training, and access to open space. The newly created Chalk Park would provide residents with a new recreational resource which could encourage physical activity.

Measures to reduce operational health impacts

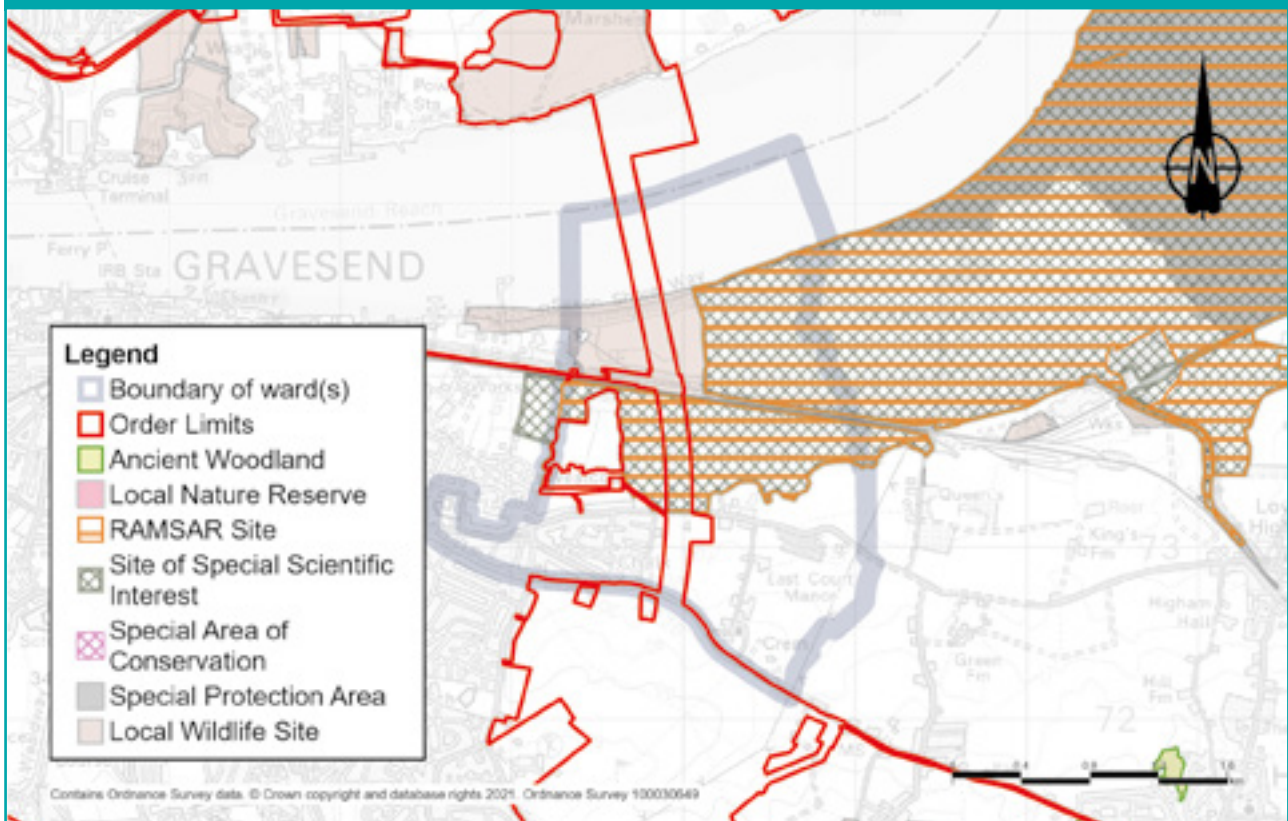
Measures to address health outcomes including those to reduce the risk to noise and visual impacts, are described above.

4.10 Biodiversity

The habitats within the Order Limits in Chalk ward are grazing marsh, reedbed, arable fields, and hedgerows. Chalk ward contains the Thames Estuary and Marshes SPA and Ramsar and the South Thames Estuary and Marshes SSSI. For information about marine biodiversity, please refer to chapter 7 of the Construction update.

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. Within the grazing marsh habitat species present included water vole, great crested newts, aquatic invertebrates, common reptile species, and otter. These areas are also important for both breeding and wintering wetland birds, particularly the area of the Shorne Marshes RSPB reserve which was found to have notable numbers of breeding waders including lapwing and redshank. The arable fields contained minimal terrestrial biodiversity interest.

Figure 4.20 Designated and non-designated biodiversity sites in Chalk ward



4.10.1 Construction

Construction impacts

There would be impacts from the construction of the two compounds used to construct the ground preparation tunnel. Construction of these compounds would result in the loss of a small area of rough grassland and grazing marsh and would require temporary diversion of a watercourse. This habitat supports protected and notable species which would be impacted by a direct loss of habitat (affecting water vole, reptile, great crested newts, birds and invertebrate environments); fragmentation of habitat (temporary diversion of a watercourse); and disturbance to retained habitat.

Measures to reduce biodiversity impacts of construction

Vegetation clearance would be carried out during the winter where possible to avoid the impact on breeding birds. Where this is not practicable, clearance would be supervised by an ecological clerk of works to ensure that no nests are disturbed or destroyed.

Protected species in situ 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. An area of farmland to the north of the A226 would be sympathetically managed during the construction period to encourage its use by birds, particularly for wintering wetland birds. For more information, see the Project description above.

The impact of construction on biodiversity would be controlled through the range of good practice measures set out in the CoCP and the REAC. See chapter 5 of the Guide to consultation for more information about this and the project's other control documents.

4.10.2 Operations

Operational impacts

There are not expected to be any significant negative impacts on this ward when the road is open. Underground (tunnel) activity would bring minimal or negligible disturbance to species or habitats.

Measures to reduce biodiversity impacts of the project during operation

Once the works are complete, the land used for the construction compounds would be returned to grazing marsh. In addition, a number of extra wetland features would be created to enhance the area for terrestrial biodiversity, although these would be outside of Chalk ward. Newly created habitat, including that created to support animals moved from the construction area, would be managed to ensure that they provide high-quality environments to support a broad range of different plant and animal species. For maps showing proposed areas of environmental mitigation, see Map Book 1: General Arrangements.

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

4.11 Built heritage

Existing situation

The 10 listed buildings and seven buildings or structures of historical relevance in Chalk are the receptors in the ward.

The listed buildings are:

- 1 Chalk Road is a Grade II listed building of high heritage value. It is located 222 metres north-west of the project and is known locally as Craddock's Cottage. The building is from the early 19th century and is associated with the author Charles Dickens. It is commonly known as the cottage where the author spent his honeymoon in 1836. Above the door is a tablet with a mask of Dickens and an inscription dedicated to the author. The cottage is a typical example of traditional Kentish housing.
- 44 Chalk Road is a Grade II listed farmhouse of high heritage value. It is located 175 metres north-east of the project and dates to the 18th century. The building is an example of an attractive three-storey farmhouse and also claims connections to Charles Dickens as an alternative location (to 1 Chalk Road) of the author's honeymoon.

Figure 4.21 Built heritage in Chalk ward



- 54-58 Vicarage Lane is a Grade II listed building of high heritage value. It is located 242 metres north-west of the project and dates to the 18th century. The range of cottages were originally a single farmhouse with the northern cottage added at a later date. The building is an example of a traditional farmhouse which was altered in the 19th and 20th centuries.
- The Old Forge is a Grade II listed building of high heritage value. It is located 435 metres north-west of the project and dates to the 18th century or earlier. The building is timber-framed and weatherboarded and is a good example of traditional construction and local style. It is famously associated with the author Charles Dickens and is believed to be the original inspiration for 'The Forge' in his novel *Great Expectations*.
- Readers is a Grade II listed building of high heritage value. It is located 233 metres west of the project on the south side of Lower Higham Road. The house is timber framed and likely dates from the 15th or 16th century. The building has attractive Tudor features which include an arched stone doorcase. It also has a brick extension and a modern extension.
- Filborough Farmhouse is a Grade II listed farmhouse of high heritage value. It is located 174 metres east of the project on the south side of Lower Higham Road. Despite some modern restorations and changes it remains a good example of a late-medieval timber-framed, rural farmhouse. It is the main building of the historic farmstead of Filborough Farm.
- Granary at Little Filborough Farm is a Grade II listed building of high heritage value. It is located 15 metres north of the project on the south side of Lower Higham Road. The building dates to the 18th century and stands on staddle stones which were traditionally used to support timber-framed storage buildings. Although staddle granaries are commonly seen in the South East of England, and are distinctive across the chalklands of the Weald, they are rare in a national context. This detached example is part of the historic farmstead of Filborough Farm.
- Barn to North West of Filborough Farmhouse is a Grade II listed building of high heritage value. It is located five metres west of the project on the south side of Lower Higham Road. The structure dates to the 18th century and is a typical example of a Kentish barn built using local materials. The barn is part of the historic farmstead of Filborough Farm.

- Church of St Mary is a Grade II* listed building of high heritage value. It is located 140 metres north of the project off Church Lane. The church is thought to date back to the late 11th century, with additions from the 12th, 13th and 15th centuries. Original medieval features from the late 11th century and 12th century are still visible in the church. The southern aisle was destroyed in the 18th century but was restored in the 19th century.
- East Court Farmhouse is a Grade II listed farmhouse of high heritage value. It is located 65 metres east of the project on the east side of Church Lane. The 18th century farmhouse is a handsome example of a rural Kentish farmhouse located within a traditional farmstead. The farmhouse is set within attractive gardens located to the north, west and south. Traditional ancillary buildings lie to the east.

Other buildings/structures of historical relevance

- East Court Farm
- East Court Farm World War II road-block buoys
- Filborough Farm
- Mooring post on foreshore by Shorne Marshes
- Thames and Medway Canal
- North Kent Railway
- Milton 19th/20th century Rifle Range

4.11.1 Construction

Construction impacts

Information about construction activities in this ward can be found in the Project description section above. Construction activity along the new route of the A122 Lower Thames Crossing would temporarily introduce barely perceivable noise, lighting and visible construction activity and machinery in the vicinity of known heritage assets.

Measures to reduce construction impacts on built heritage

The design and layout of the Southern Tunnel Entrance Compound 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). The Southern Tunnel Entrance Compound would also be appropriately screened as set out in CoCP. Dust and noise reduction measures are also relevant in mitigating the setting of heritage assets as described in the REAC measure. Please refer to the Air quality, Noise and vibration, and Cultural heritage sections of the REAC. No specific construction mitigation is required for impacted heritage assets as the impacts are non-physical.

4.11.2 Operations

Operational impacts

Information about the operational project in this ward can be found in the Project description section above. Church of St Mary (Grade II*); East Court Farmhouse (Grade II); Filbrough Farmhouse (Grade II); Barn to NW of Filbrough Farmhouse (Grade II); Granary at Little Filbrough Farmhouse (Grade II) are located over 500 metres to the north of the south tunnel entrance. The presence of the project within what is currently a peaceful rural setting would increase the traffic noise and at night the increased lighting would not be directly visible, but would increase the background lighting of the area. The overall impact of this would be negligible.

Measures to reduce operational impacts on built heritage

The engineering and landscape design for the project seeks to avoid or reduce negative impacts on non-designated heritage assets. The Southern Tunnel Entrance Compound would be reinstated after construction to reflect existing field patterns and the surrounding landscape character as outlined under Design principle S3.05.

4.12 Contamination

From the review of desk-based sources (historical maps and environmental data), there are no identified medium or high-risk sources of contamination that could be at risk of being disturbed during construction or operation of the project within Chalk ward.

4.12.1 Construction

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.

4.12.2 Operations

During the operation of the road, should an incident occur, for example, 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.