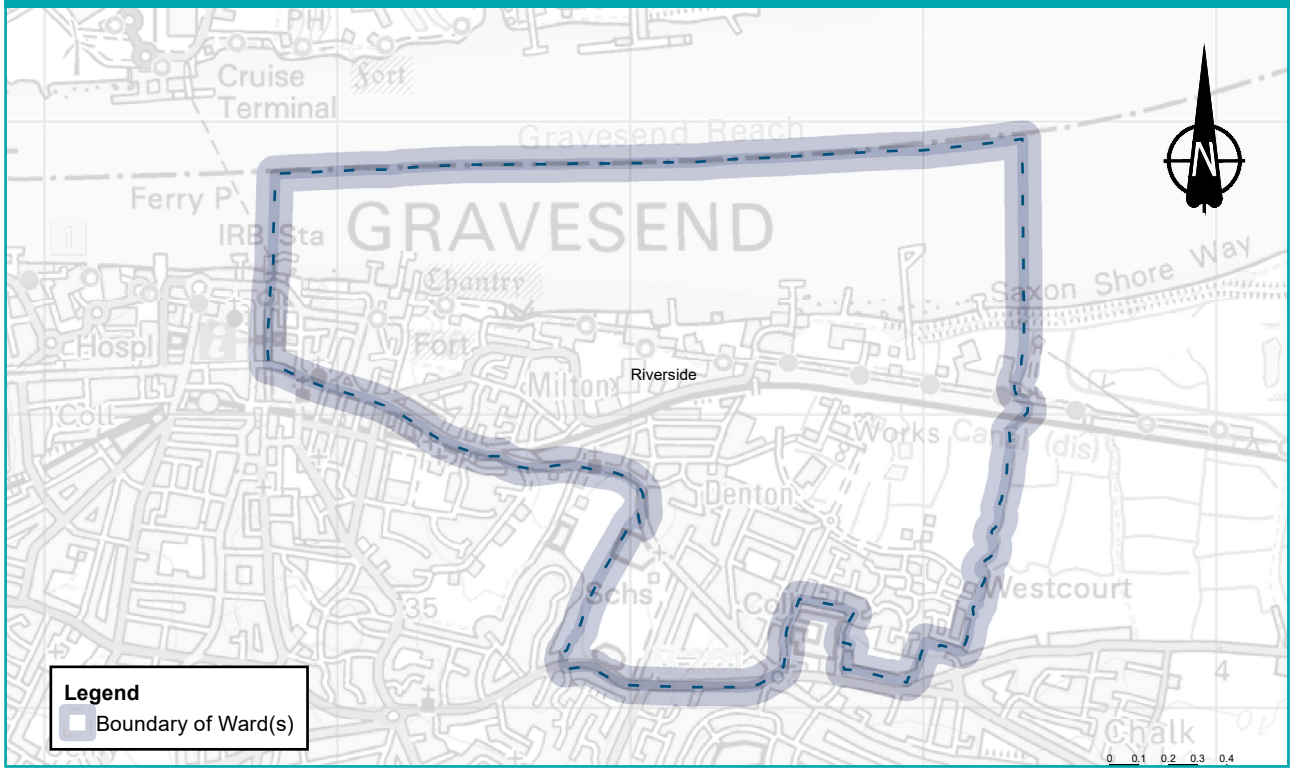
5

Chapter 5: Riverside ward

This chapter summarises the activities in Riverside 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 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 5.1: Ward boundary map for Riverside ward



5.1 Overview

5.1.1 About this ward

Riverside ward is located in the town of Gravesend, on the south bank of the Thames and within the borough of Gravesham. It lies directly to the west of Chalk ward. The ward has an area of around 4.5km^2 and an estimated population of 5,650[1]. The residential areas of Milton and Denton are situated in the west and south of the ward. The A226 runs through part of the ward.

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

5.1.2 Summary of impacts

Table 5.1: Summary of impacts during the project's construction and operation

Topic	Construction	Operations
Traffic	**Impact** There should be only a very slight impact on the conditions on the highway network in Riverside as a result of the construction of the project. **Mitigation** We have moved the location of the southern tunnel entrance to reduce the impact of construction traffic. We have also reduced the number of HGVs by re-using as much excavated material as possible on site, instead of removing it by road.	**Impact** There would be very little change in traffic on the roads in Riverside as a result of the new road. Further details of changes to traffic flows once the project is operational can be found in the traffic section of this chapter. **Mitigation** Once the project is operational, traffic impacts on the affected road network would be monitored, including local roads.
Public transport	**Buses** There would be no changes to bus journey times during construction as a result of activities in Riverside ward. However, there may be some increases to journey times on the 190, 416 and 417 buses due to activities in adjacent wards. **Rail** There would be no discernible change in local access times to Gravesend station and no change to the rail services there either.	**Buses** There would be no changes to bus routes through the ward once the new road opens, and no discernible change to bus journey times. **Rail** There would be no discernible change in local access times to Gravesend station and no change to the rail services there either.

Topic	Construction	Operations
Footpaths, bridleways and cycle routes	**Impacts** One footpath would be affected during construction of the project. This footpath would need to be closed for less than a month to allow utility works proposed for providing power to a construction compound. **Mitigation** Closure of this footpath would be kept as short as possible to reduce the impact on the local public rights of way network.	**Impacts** There would be no impacts on footpaths, bridleways or cycle routes in this ward once the project is operational. **Mitigation** No mitigation would be required.
Visual	**Impacts** There are likely to be limited views of construction activity from a small number of homes on the edge of Denton. Views of Milton Compound would be possible from National Cycle Network (NCR) route 1 and the Thames and Medway Canal towpath. The landscaping in front of the northern tunnel entrance and its compound would be visible north of the Thames. **Mitigation** The visual impacts of the project would be controlled through the range of good practice measures set out in the CoCP and the REAC.	**Impacts** Once the project is built, changes in views would be minimal. **Mitigation** None required.

Topic	Construction	Operations
Noise and vibration	**Impacts** The construction works in Milton Compound (in Chalk), specifically vehicle movements, are expected to create noise in this ward. There would be negligible changes in noise from road traffic. There are no percussive and vibratory works proposed in this ward. **Mitigation** Construction noise levels would be controlled through the mitigation measures set out in the REAC. There are also measures presented in the CoCP.	**Impacts** Once the project is built, there would be no direct noise impacts in this ward. There would be negligible noise impacts as a result of changes in traffic flow and speed on the existing road network. **Mitigation** None required.

Topic	Construction	Operations
Air quality	**Impacts** The properties to the north-eastern side of Denton and near Wharf Road may experience dust and emissions from construction equipment and traffic during the construction phase. Analysis of the construction phase traffic flows associated with the project indicate that there would be a minor worsening in air quality in the area around the B261 Old Road East between 2024 to 2027. **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** No essential mitigation is required.

Topic	Construction	Operations
Health	**Impacts** There are likely to be health benefits as a result of access to work and training opportunities. There are likely to be changes in the area that may result in negative impacts on health, including mental health and wellbeing. There is also likely to be temporary air quality, visual and noise impacts from construction works in Milton Compound and from construction traffic. **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, noise and visual screening, traffic management measures and community engagement.	**Impacts** There would be positive health benefits associated with improved accessibility to jobs, secondary schools, hospitals and opens spaces. **Mitigation** None required.
Biodiversity	**Impacts** There may be some disturbance to species from construction traffic using the road running parallel with the Thames and Medway Canal. **Mitigation** Traffic on this road would be minimised during the construction period to limit disturbance to the surrounding habitat.	**Impacts** None identified. **Mitigation** None required.

Topic	Construction	Operations
Built heritage	**Impacts** The scheduled New Tavern Fort and associated listed buildings would experience additional noise from construction traffic. The North Kent Line railway and Thames and Medway Canal and Riverside conservation area would experience temporary impacts to their setting from visible and audible construction activity. **Mitigation** The design of the project has taken into account the setting of heritage assets and seeks to avoid light pollution. The good practice measures associated with air quality, noise and cultural heritage are presented in the REAC.	**Impacts** None identified. **Mitigation** None required.
Contamination	**Impacts** None identified. **Mitigation** None required.	**Impacts** None identified. **Mitigation** None required.

5.2 Project description

5.2.1 Construction

Construction activities

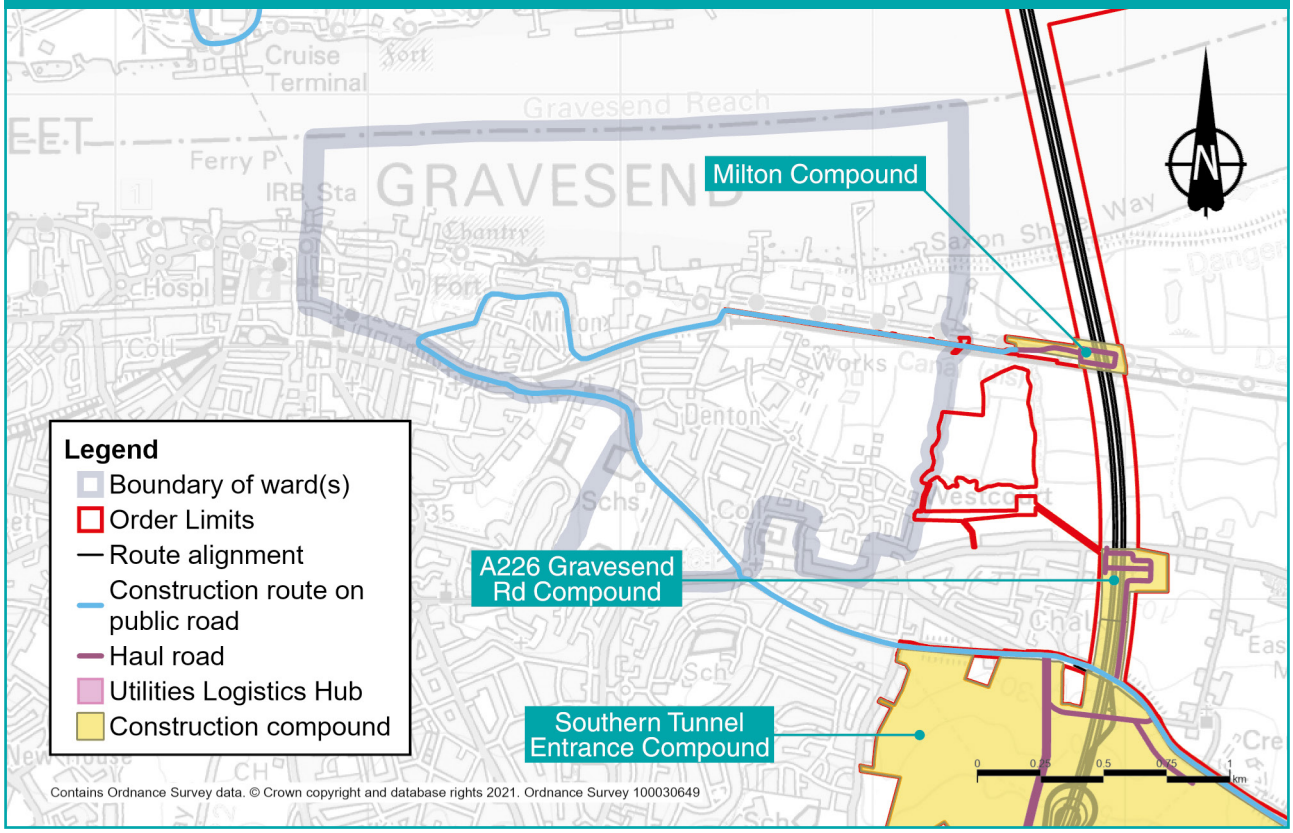
More information about how the area would look during construction, including construction visualisations, can be found in the Construction update. There would be very little construction in Riverside ward as part of the project. Within the Order Limits, (the area of land required to construct and operate the project, formerly known as the development boundary), we have included provision for road-widening along the north side of the Thames and Medway Canal in case construction vehicles need a wider access route to reach the Milton Road Compound in Chalk ward.

Construction compounds and Utility Logistics Hubs

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

There would be no construction compounds or Utility Logistics Hubs (ULHs) in Riverside ward.

Figure 5.2: Main construction areas in Riverside ward



Vehicles going to Milton Compound would go through Riverside. Also, a small proportion of staff cars going to the A226 Gravesend Road Compound and the southern tunnel entrance would use the Milton Road and Rochester Road if they are local traffic coming from near the centre of Gravesend. The number of construction vehicles going to the Milton Compound is shown in table 5.2 below. 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 5.2: Average daily vehicle numbers going to Milton Compound and passing through Riverside ward

Time period	Milton Compound	
	HGVs	Cars
January to August 2024	10	10
September 2024 to February 2025	4	9
March to May 2025	2	6
June to October 2025	2	6
November 2025 to March 2026	1	6
April to August 2026	5	6
September 2026 to March 2027	5	6
April to November 2027	0	0
December 2027 to March 2028	0	0
April to July 2028	0	0
August 2028 to December 2029	0	0

Construction routes on public roads

The A226 Gravesend Road would be a designated construction route, which means it would be used by HGVs and other workforce traffic during the construction period, largely to access the A266 Gravesend Road Compound. The Milton Road Compound would also be accessed via the A226 Gravesend Road/Rochester Road, via Milton Road, Prospect Grove, Norfolk Road and Mark Lane, and the road alongside the Thames and Medway Canal. These roads would remain open to the public throughout the construction period. More information about the forecasted impacts on these roads can be found in the Traffic section below.

Construction schedule

Construction of the project is scheduled to last for six years, from 2024 to 2029. To deliver a coordinated and efficient construction programme, we have divided activities into packages of work. Maps and programmes for the work packages south of the river can be can be found in chapters 3 and 4 of the Construction update.

Construction working hours

Most construction activities in this ward would be carried out during core hours, from 7am to 7pm on weekdays and 7am to 4pm on Saturdays. However, there would be circumstances when our working hours would need to be extended. For example, connecting new roads to existing ones would be carried out when there is less traffic so it is safer for road users and construction workers. Working outside core hours would also benefit road users by reducing the need for traffic management measures during peak times. More information about working hours can be found in the Noise and vibration section below and in the CoCP.

Traffic management

There are no specific traffic management measures proposed in Riverside ward.

The HGV route through Riverside is the A226 Rochester Road (from the east), then Milton Road, Ordnance Road, Canal Road, Norfolk Road and via the road alongside the Thames and Medway Canal.

Traffic management measures required across the project would include narrow lanes, reduced speed limits, lane closures and temporary traffic lights. We have tried to minimise traffic management measures wherever practical. However, they would be necessary in some places to allow construction traffic and local communities to travel safely, while providing construction workers with sufficient space to operate. An overview of the traffic management measures 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 our 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.

5.2.2 Operations

The complete project

There would be no roads or features associated with the completed Lower Thames Crossing in Riverside ward.
For more information about the completed project, see the Operations update, as well as the figures in Map Book 1: General Arrangements.

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 Riverside ward, the changes would be limited to amendments to the Order Limits in Chalk, some of which lie on the boundary with Riverside. A previously proposed water outfall (drain into the Thames) has been removed from the project so it would not affect the Ramsar site.

5.3 Traffic

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

5.3.1 Construction

Construction impacts

Information about construction activities in this ward, including construction routes on public roads, can be found in the Project description section above.

There should be only a very slight impact on the conditions on the highway network in Riverside as a result of the construction of the new road.

Measures to reduce construction traffic impacts

Our approach to construction has been refined after further investigation and feedback. A summary of the measures to reduce the volume of construction materials transported in and out by road can be found in chapter 2 of the Construction update.

The proposed location of the southern tunnel entrance has been moved south twice, reducing the construction impact on Chalk village and the surrounding area. More information about our measures to reduce the impact of tunnel construction can be found in chapter 4 of the Construction update.

The A226 Gravesend Road construction route would be used for works north of Thong Lane, which involve significant excavation. Our proposals allow for re-use of excavated materials and would substantially reduce the need to dispose of this material via the public road network, reducing the number of HGV movements on the A226 Gravesend Road. For more information about HGV movements, see the Construction update.

5.3.2 Operations

Operational impacts

We have carried out traffic modelling to forecast the change in traffic flows on roads in the area, including those within or on the boundary with Riverside ward for the first year of operation (2029).

Figures 5.3, 5.5 and 5.7 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 5.4, 5.6 and 5.8 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.

As can be seen in figures 5.3 to 5.8, there would be very little change in traffic on the roads in Riverside as a result of the new road. There is predicted to be a decrease of between 50 and 250 PCUs in the morning peak hour westbound on Milton Road. This is a decrease of between 0% and 10% compared with the predicted travel flow without the project.

Figure 5.3: Predicted change in traffic flows (PCUs) with the project during the morning peak in 2029

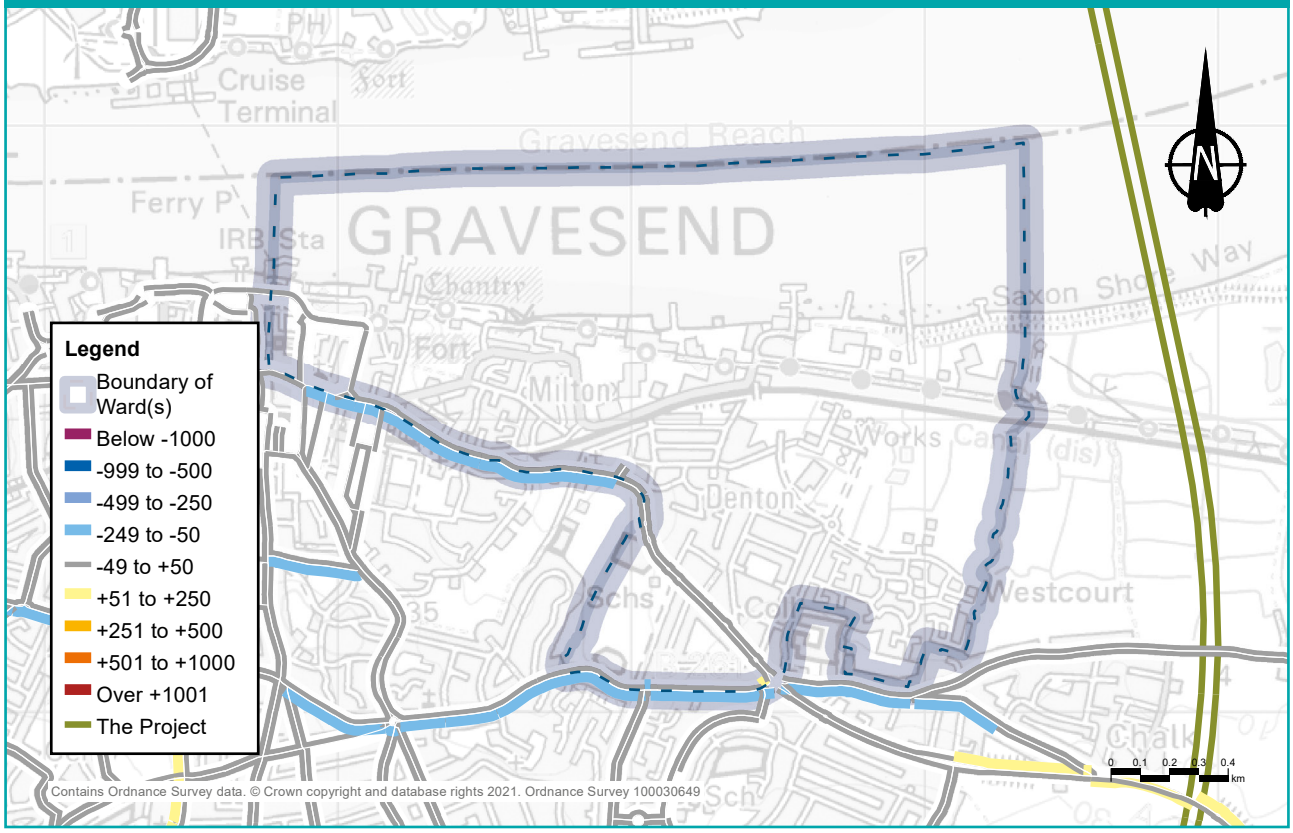


Figure 5.4: Predicted percentage change in traffic flows with the project during the morning peak in 2029

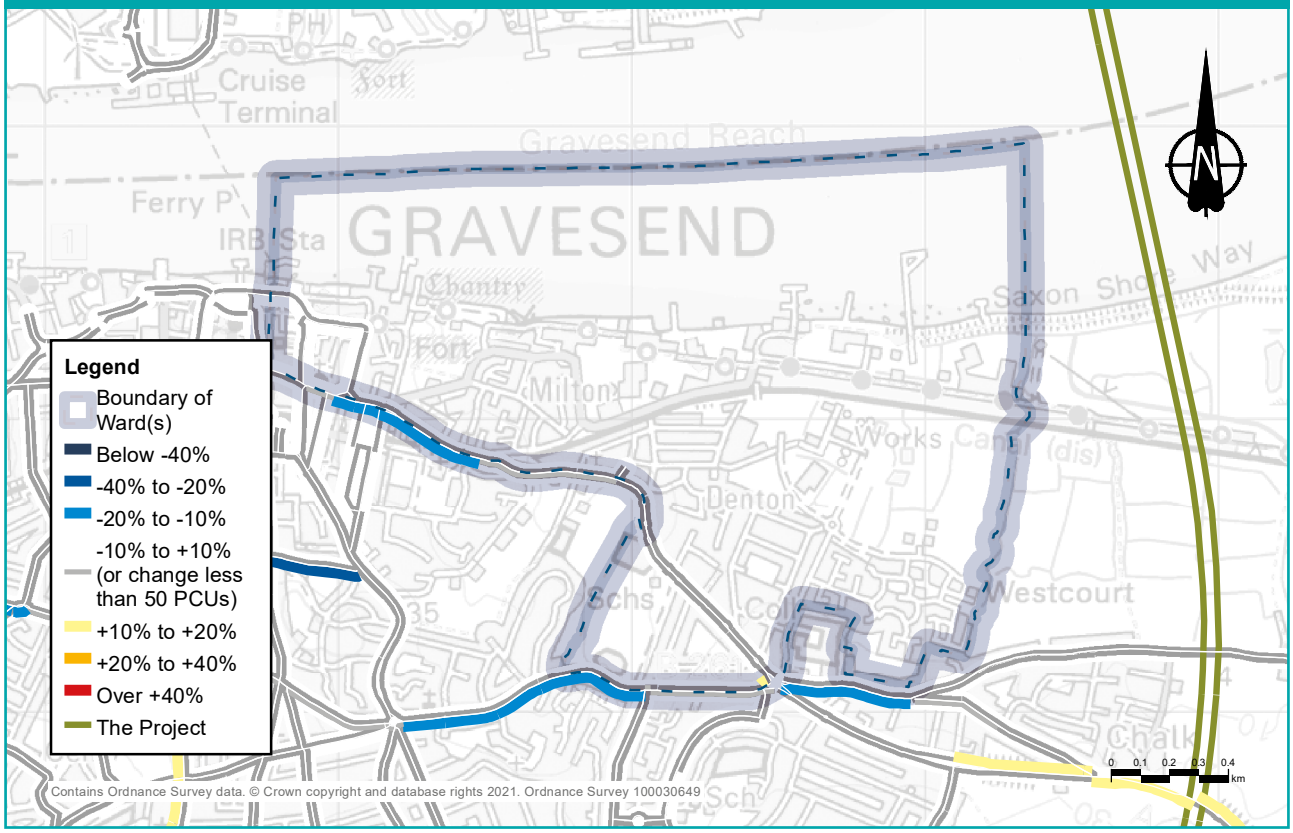


Figure 5.5: Predicted change in traffic flows (PCUs) with the project during the interpeak period in 2029

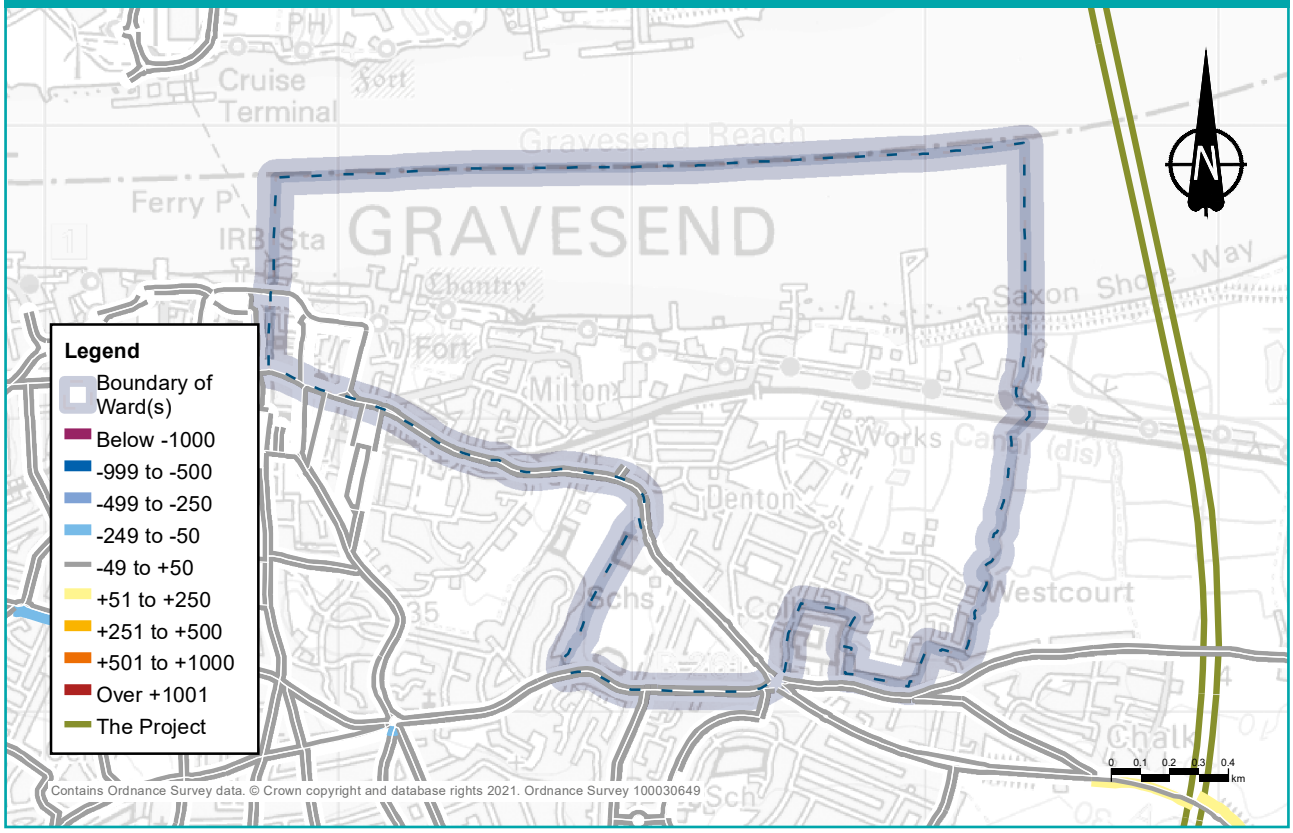


Figure 5.6: Predicted percentage change in traffic flows with the project during the interpeak period in 2029

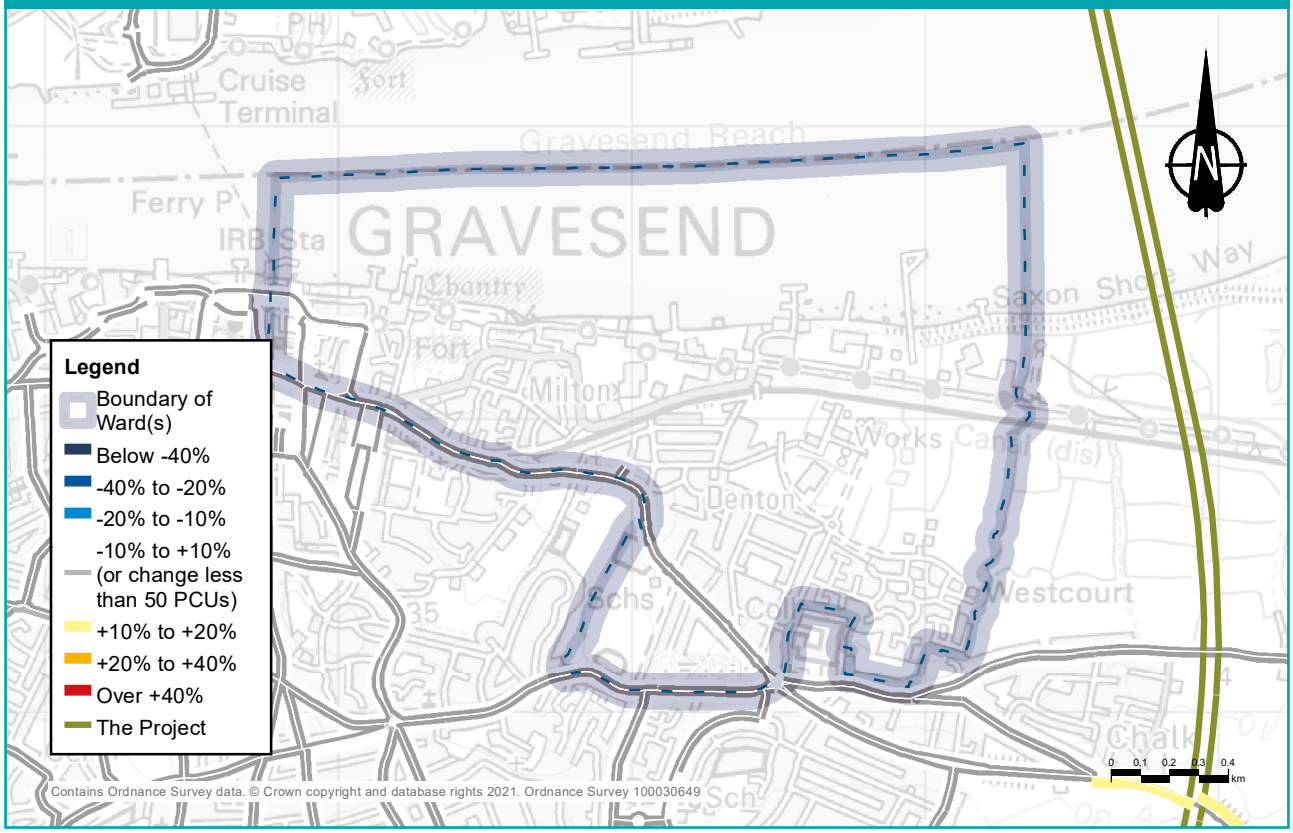


Figure 5.7: Predicted change in traffic flows (PCUs) with the project during the evening peak in 2029

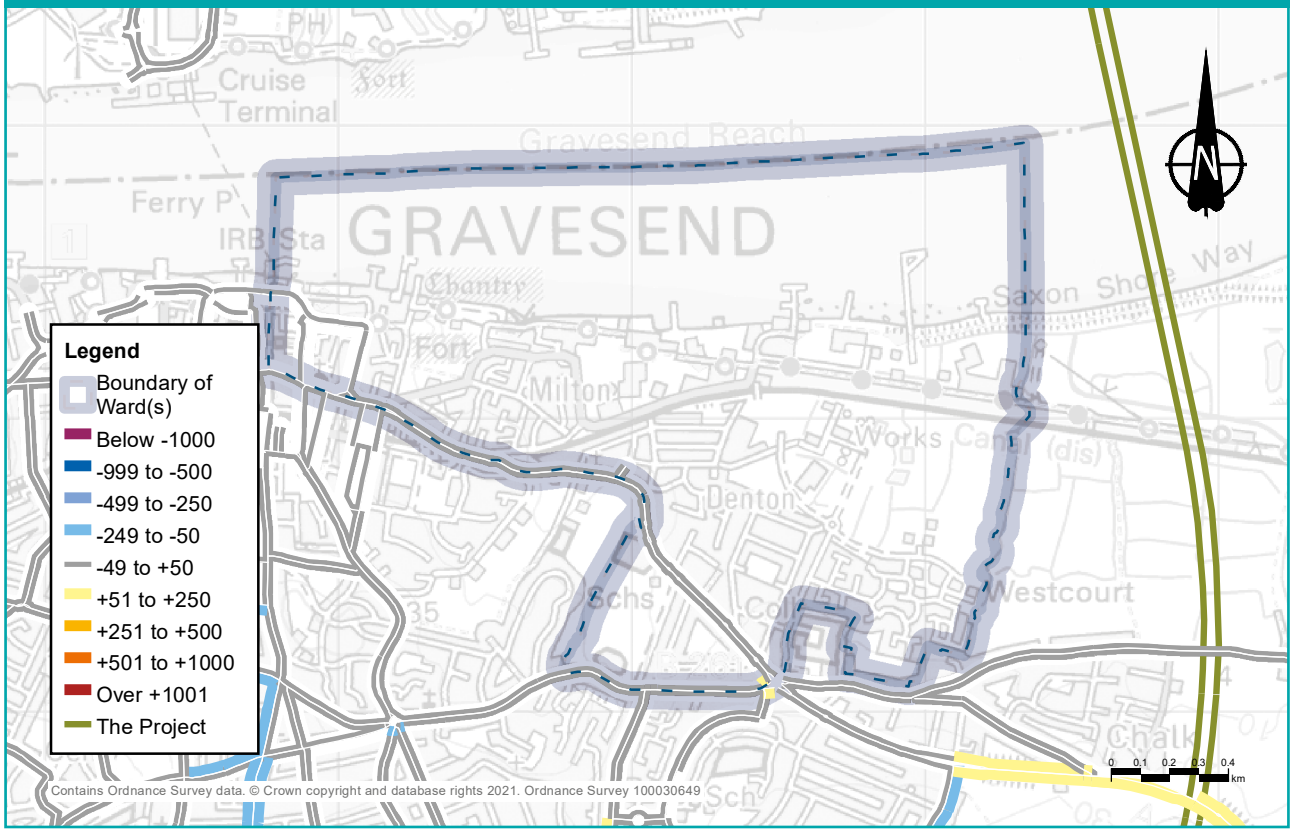
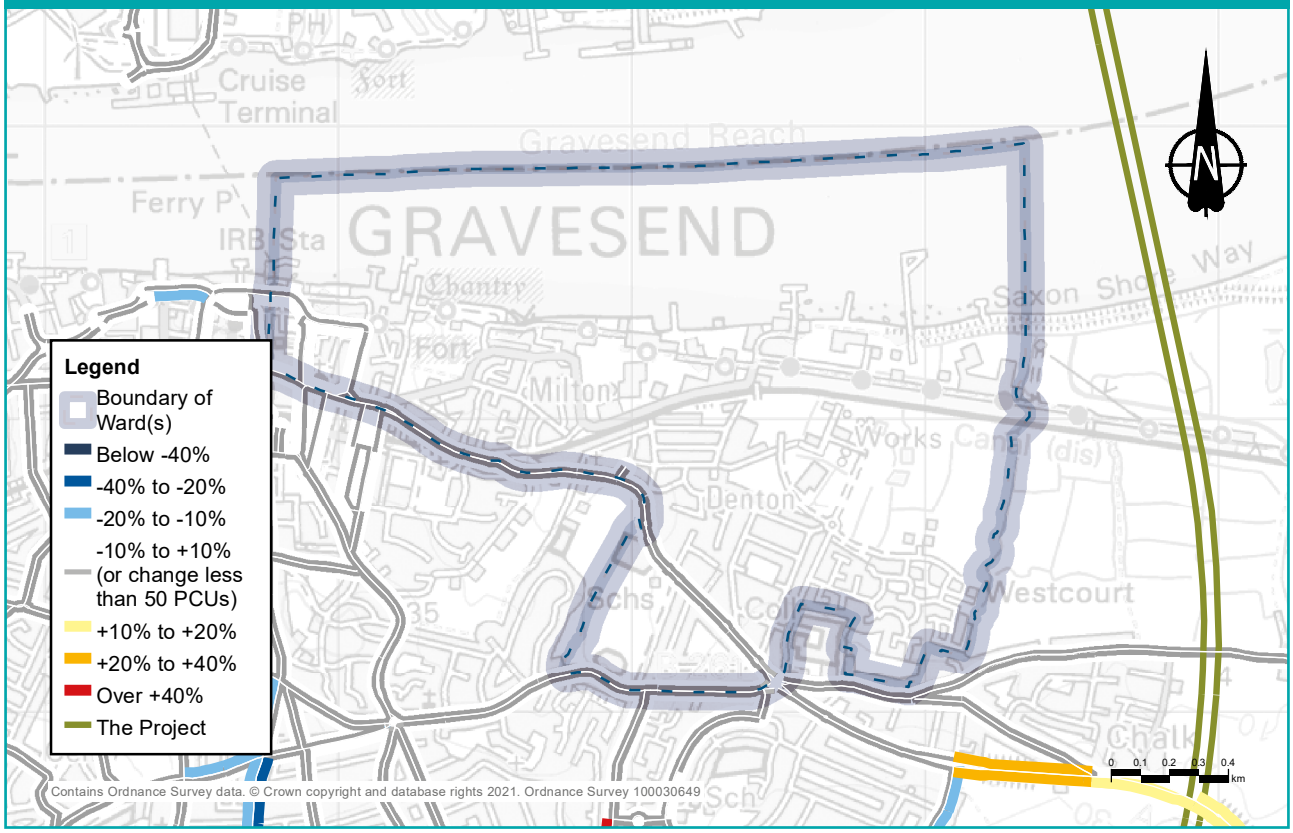


Figure 5.8: Predicted percentage change in traffic flows with the project during the evening period in 2029



Changes to journey times

Figure 5.9 shows the change in the area that could be reached within a 30-minute drive from the centre of the ward without the new road and with it. Figure 5.10 shows the change in areas within a 60-minute drive. These times have been calculated for the morning peak hour (7am-8am). The number of jobs within a 30-minute catchment area would increase by 14%, an additional 39,700 jobs, and within a 60-minute drive this would rise by 32%, creating an additional 605,000 jobs. Despite the project providing a substantial net gain in access for motorists, there is an area (shown in orange in the map below) that would no longer be accessible by car within 30 minutes due to changes in traffic flows on the wider road network.

Figure 5.9: Change in area that motorists could drive to within 30 minutes from Riverside ward

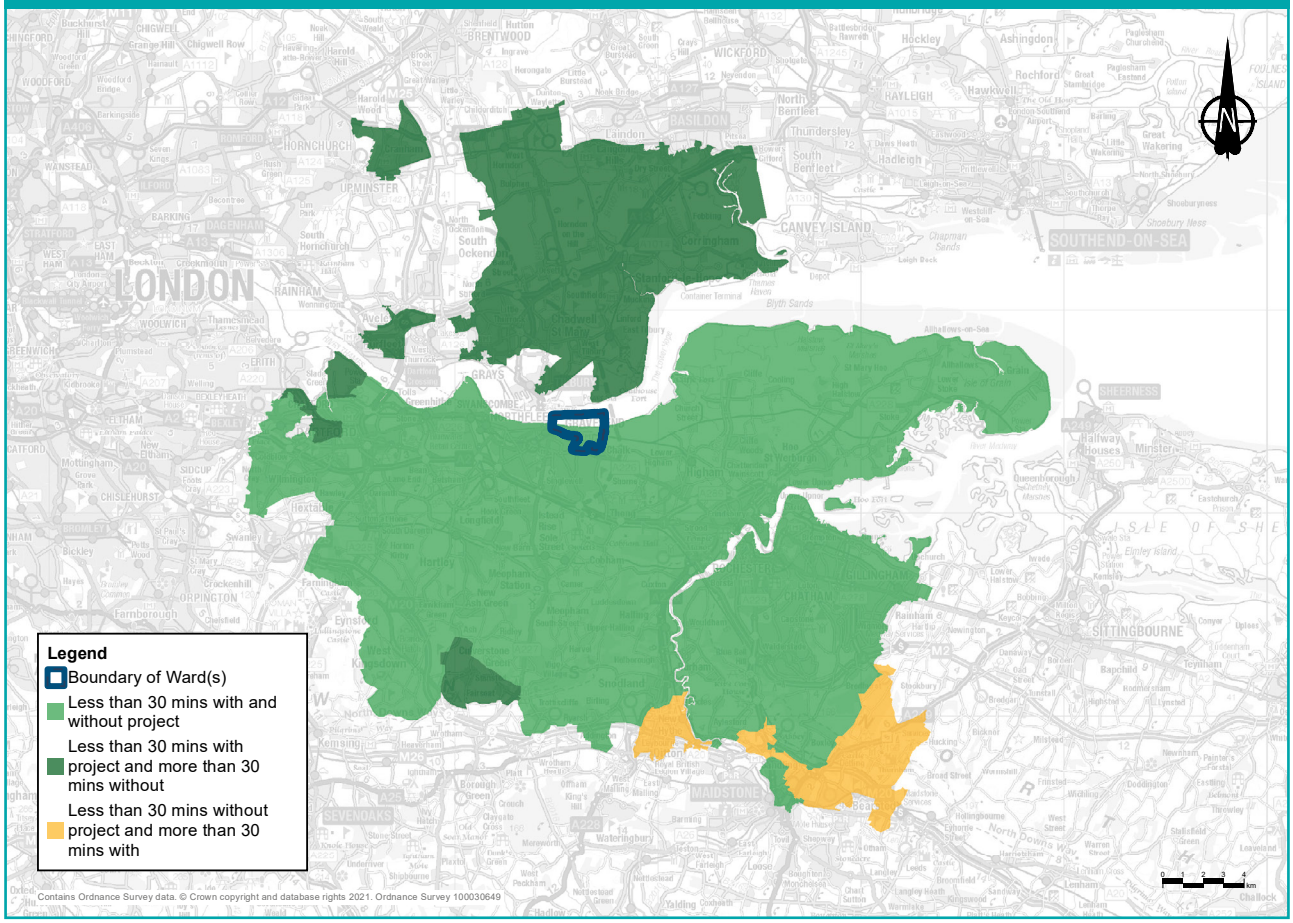
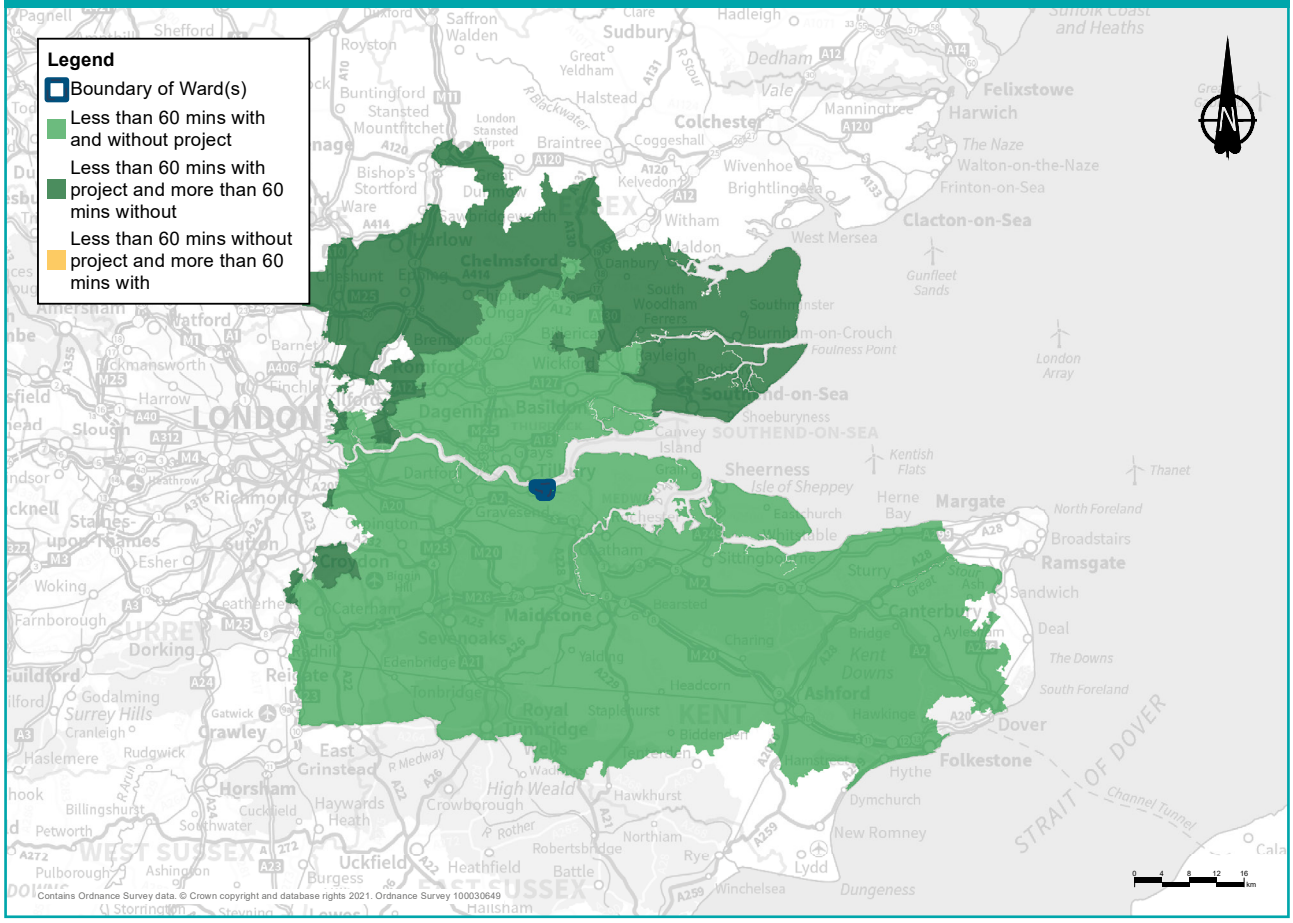


Figure 5.10: Change in area that motorists could drive to within 60 minutes from Riverside ward



Operational traffic flows

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

5.4 Public transport

Existing situation

There are no railway stations in Riverside, but Gravesend station is close to the ward's western boundary.

Riverside ward is serviced by several bus routes, including the 190, 416, 417, 480, 481, 489, 490, Fastrack B, and the school bus routes Meopham1, VIGO1 and NAG1.

5.4.1 Construction impacts

Buses

There would be no changes to bus journey times during construction as a result of activities in Riverside ward. However, there may be some increases to journey times on the 190, 416 and 417 buses due to activities in adjacent wards.

Rail

There would be no discernible change in local access times to Gravesend station and no change to the rail services there either.

5.4.2 Operational impacts

Buses

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

Rail

There would be no discernible change in local access times to Gravesend station and no change to the rail services there either.

5.5 Footpaths, bridleways and cycle routes

Existing situation

Riverside ward is a largely suburban ward bordering the Thames to the north, with a network of footpaths that connects it to Higham, Shorne and areas south of the A2. For other potential impacts, see the other sections in this chapter, such as Visual and Noise and vibration.

5.5.1 Construction

Construction impacts

Due to the construction activities in this ward, there would be minor disruptions during the construction period:

- Footpath NG2 (which also shares a route with Sustrans NCR 1 cycle route) would be affected for less than a month by utility works in Chalk ward that are necessary to provide power to the Milton Compound (see chapter 4).
- Cycle lanes along the A226 would be affected during the first year of construction while the haul roads to the construction compounds are built in neighbouring wards. During this period, the A226 would be subject to traffic management (see chapters 2, 3 and 4).

5.5.2 Operations

Operational impacts

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

Within Riverside, there would be no permanent changes to footpaths, bridleways or cycle routes once the project is operational.

Figure 5.11: Footpaths, bridleways and cycle routes in the vicinity of the project in Riverside ward

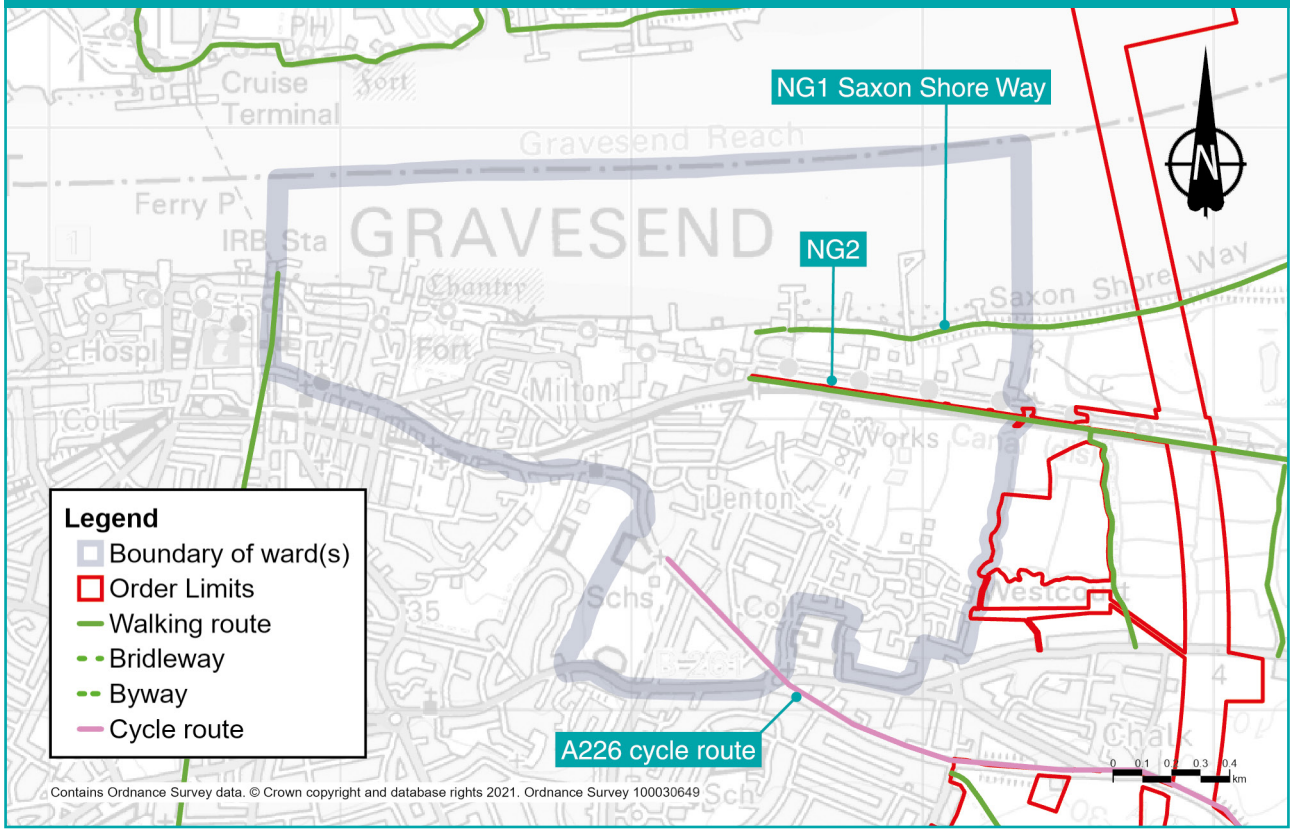
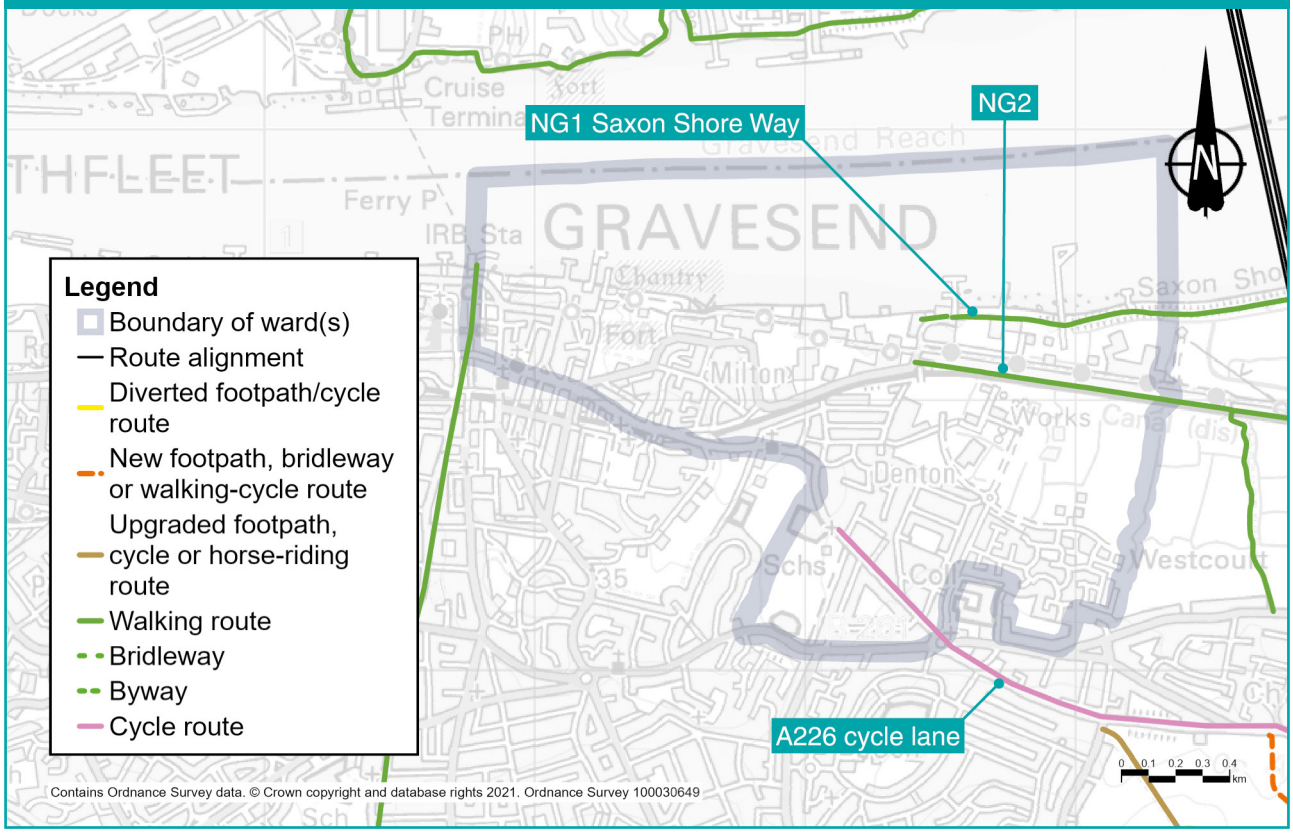


Figure 5.12: Proposed footpaths, bridleways and cycle routes in Riverside ward



5.6 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 area are mostly limited to those experienced from a small number of homes on the eastern edge of the ward, in Denton, Gravesend.

Other views are from National Cycle Route (NCR) 1 and the public footpath along the towpath of the disused Thames and Medway Canal. There are also views towards the project north of the Thames from Saxon Shore Way long-distance footpath.

Current views towards the land on which the project would be built from properties along Cricket Marsh Walk and Malthouse Field look across flat arable land. From NCR 1 and the Thames and Medway Canal towpath, there are intermittent glimpsed views south-east towards the project, beyond the canal and the adjacent railway vegetation, encompassing wasteland, flat pasture and arable fields, seen against a distant backdrop of the Gravesend urban area. Views along the disused canal and neighbouring railway corridor are flanked to the north by industrial development.

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.

5.6.1 Construction

More information about how the area would look during construction can be found in the Construction update, including construction visualisations. The main construction activities likely to give rise to visual effects in this ward are:

- establishing and operating the Milton Compound
- establishing and operating the Southern Tunnel Entrance Compound
- temporary drainage works
- landscaping of Tilbury Fields recreational area on the other side of the Thames near the northern tunnel entrance

More information about construction activities in this ward are provided in the Project description section above and in adjacent ward chapters. Views of construction activities would be mostly seen from a small number of homes on the edge of Denton, comprising temporary drainage works that are visible to the east in Chalk ward.

From NCR 1 and Thames and Medway Canal towpath, there are likely to be views towards the Milton Compound. From Saxon Shore Way long-distance footpath, landscaping in front of the northern tunnel entrance and its compound would be clearly visible north of the Thames.

Measures to reduce visual impact during construction
Given the limited views of the project from this ward, no specific mitigation measures are considered necessary. The visual impacts of the project would be controlled through the range of good practice measures set out in the CoCP and the REAC.

5.6.2 Operations

By the opening year, the new road would be within the tunnel near to this ward and the Milton Compound would have been restored to agricultural use. The proposed landscaping in front of the northern tunnel entrance would form a new backdrop feature to the Thames, east of Tilbury Fort. With the project route in a tunnel, there would be no visual impacts from the edge of the Denton residential area, NCR 1 or the Thames and Medway Canal towpath. The most noticeable change would be the new landscaped recreational area on the north bank of the Thames, forming a new landmark feature in views across the river from Saxon Shore Way.

Measures to reduce the visual impact during operation
Restoring the land used during the construction period once works are completed would be the main mitigation for this ward.

5.7 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 Riverside ward is mainly characterised by traffic noise, with a contribution from railway noise and occasional maritime noise on the Thames and other activity. The main sources of traffic noise in this ward are from the A226 and the B261.

As part of our environmental assessment process, the nearest surveys of background noise have been carried out in the adjacent wards of Westcourt and Chalk because the nearest construction works would be 700 metres away, and the nearest operational impacts would be from the southern tunnel entrance about 1.2km from the ward boundary.

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 new road's proposed opening year if it was not built. We modelled this because we cannot assume that noise levels when the project opens would be the same as they are now. For example, our assessment of the opening year noise levels takes into account predicted changes in traffic levels.

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

In the opening year, noise levels without the project are predicted to range, on average, from 40 to 74 dB(A)[2] during the day and from 29 to 60dB(A) during the night-time period at identified locations in this ward. As such, our noise assessments predict that by opening year noise levels would increase compared to the existing situation even if the road is not built. Information about noise levels with the project, during its construction and operation, are presented below.

5.7.1 Construction

Daytime construction noise impacts

The main construction activities that are expected to make noise and vibration in this ward would be those associated with construction works at Milton Compound (in Chalk ward), specifically vehicle movements.

There are no main works compounds or Utility Logistics Hubs currently proposed for Riverside ward, nor any haul roads.

Although not located in the ward, the A2 West Utility Logistics Hub and Shorne Ifield Road Utility Logistics Hub (see chapter 9) may contribute to the noise impacts experienced in Riverside due to how close it is to the ward boundary.

No percussive or vibratory works are proposed in the ward.

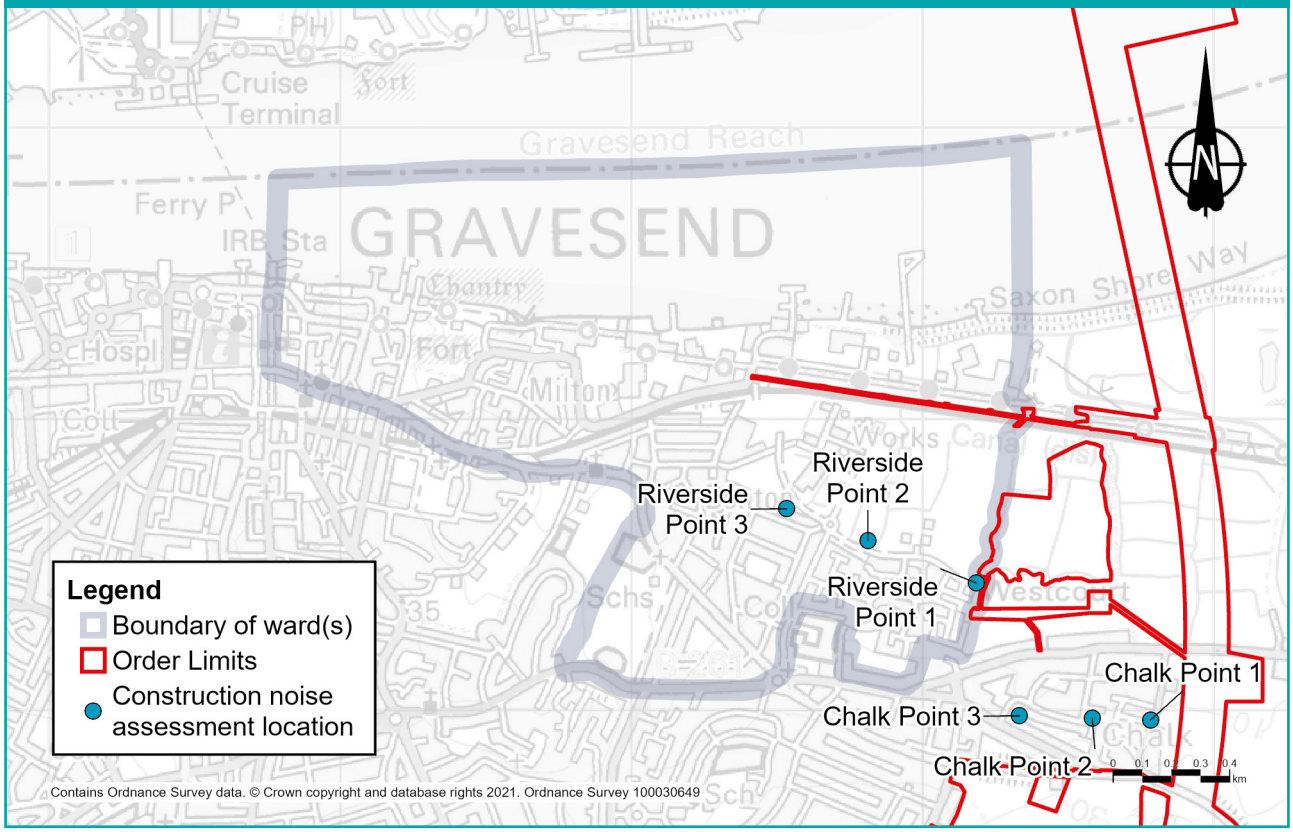
2 Decibel (dB) is the unit used to measure noise levels, with dB(A) being a standardised way of averaging noise levels that account for how humans hear sounds. The typical level of sounds in the environment ranges from 30 dB(A), which is a quiet night-time level in a bedroom, to 90dB(A), which is how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

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

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

Figure 5.13 below shows the locations at which we have predicted the daytime construction noise during the project's construction period.

Figure 5.13: Construction noise assessment locations in Riverside ward



Each vertical bar in figure 5.14 shows the predicted noise levels for that month of the construction period (from month 1 to 72). The horizontal green line in each chart represents the existing background noise level at each assessment point without the project. The horizontal red line shows the level at which construction noise would exceed acceptable thresholds (see chapter 1 for more information about these thresholds). If noise is predicted to exceed acceptable levels, then specific measures would be implemented to reduce it.

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

With reference to figure 5.14 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 26 to 46dB LAeq (12-hour). Levels would exceed current background daytime noise level for about 22 months. However, they would not breach the defined threshold.
- At point 2, construction noise levels are predicted to range from 24 to 40dB LAeq (12-hour). Levels are not predicted to exceed the current background noise levels.
- At point 3, construction noise levels are predicted to range from 21 to 37dB LAeq (12-hour). Levels are not predicted to exceed the existing background noise levels.

Figure 5.14: Construction noise by month for assessment locations 1, 2 and 3 in Riverside ward

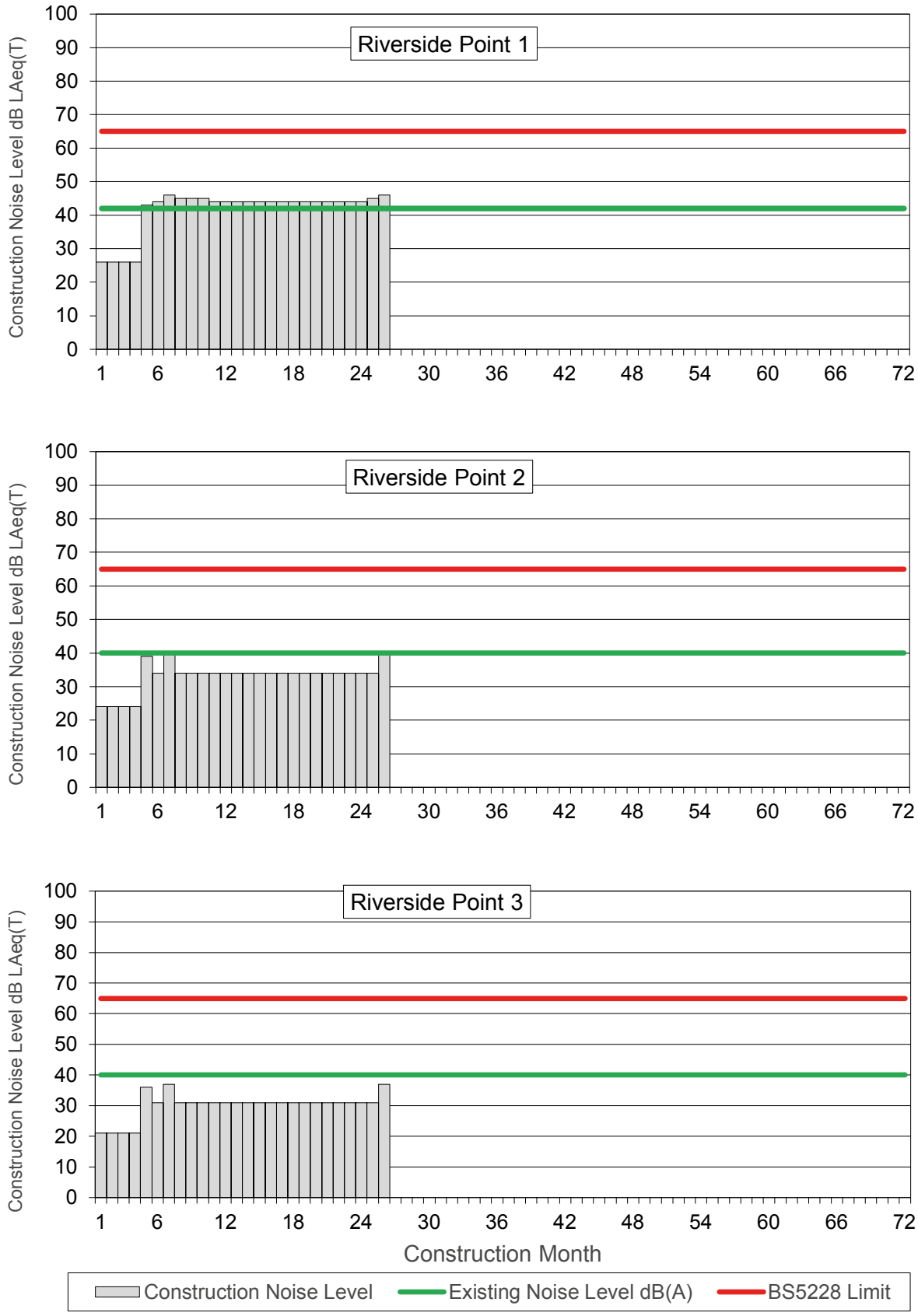
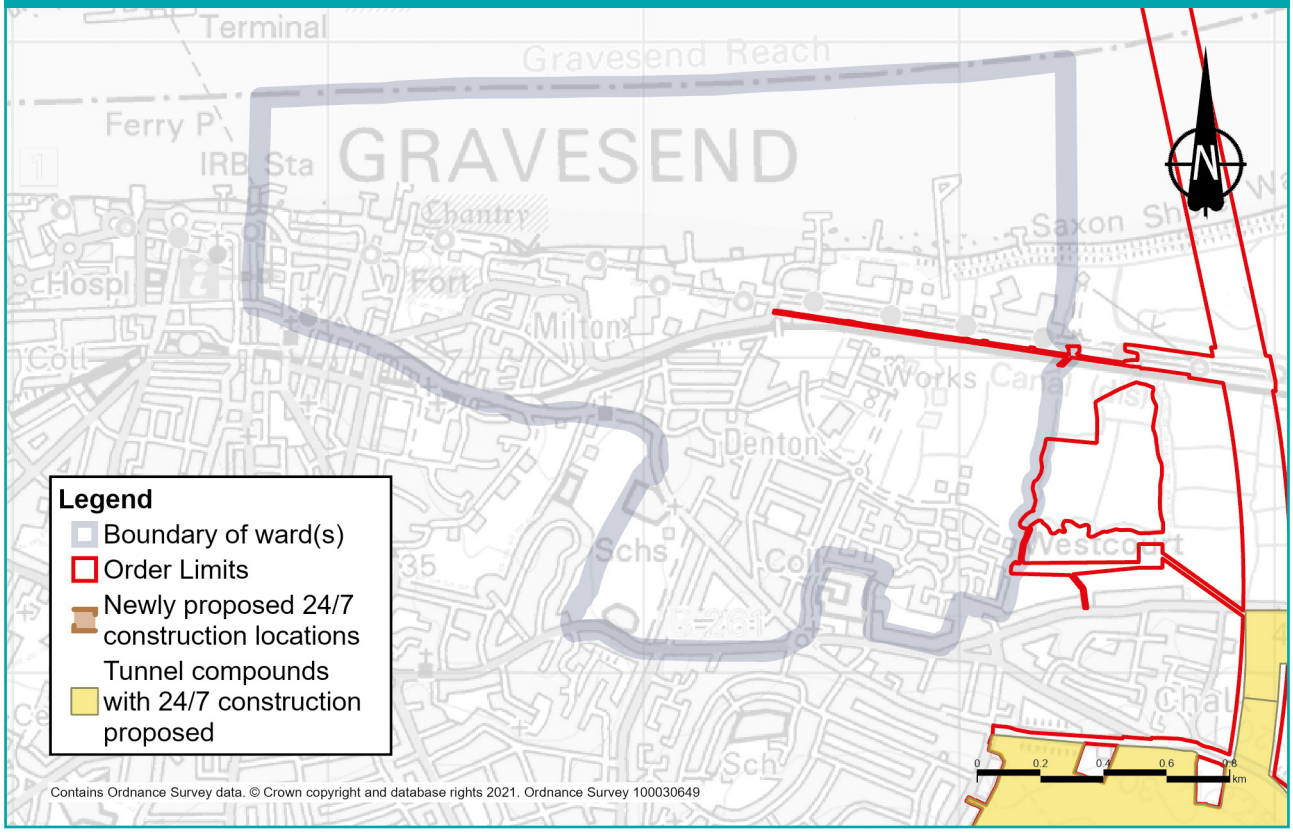


Figure 5.15: Newly proposed and tunnel 24/7 working locations in Riverside ward



24/7 construction working

In addition to the changes to the daytime noise impacts presented in the section above, 24-hour seven-day construction working is proposed at the locations shown in figure 5.15 above.

Construction traffic noise impacts

Maps showing the predicted change in road traffic noise on roads in Riverside 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 in the are ward likely to experience), during the construction period there would be negligible changes in 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

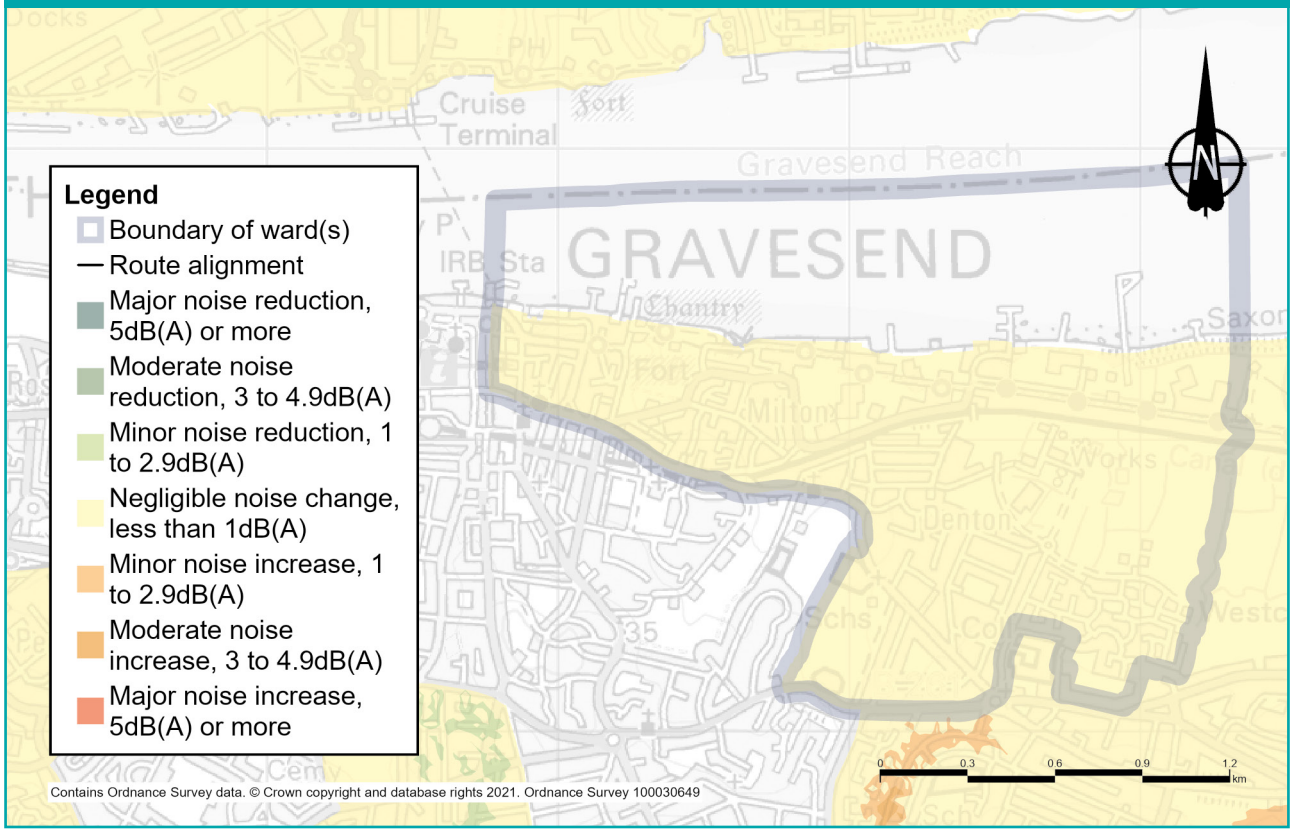
Construction noise levels would be controlled by using Best Available Techniques (BAT), with specific measures at certain locations such as:

- Installing and maintaining hoardings around the construction compounds.
- Installing temporary acoustic screening around construction areas likely to generate noise.
- Keeping site access routes in good condition with onsite condition assessments to inspect for defects such as potholes.
- Turning off plant and machinery when not in use.
- Maintaining all vehicles and mobile plant so loose body fittings or exhausts do not rattle or vibrate.
- Using silenced equipment where available, in particular power generators and pumps.
- No music or radios would be played for entertainment purposes outdoors onsite.
- Site layout would be planned to make sure 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 noise from vehicle reversing warnings.
- Non-percussive demolition techniques would be used where possible to reduce noise and vibration impact.
- Careful consideration of compound location and layout to separate noise-generating equipment from sensitive receptors, and the use of mains electricity rather than generators, where possible.
- Minimisation of construction vehicle traffic, where possible, by selecting local suppliers along the project route, using local workforces and reducing the transport of material for earthworks construction.

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

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

Figure 5.16 Noise impacts during operation in Riverside ward



5.7.2 Operations

Operational noise impacts

Riverside ward is approximately 1.2km to the north-west of the main project route and, as such, there would be no direct noise impacts from the project in the ward.

Figure 5.16 above shows the predicted changes in traffic noise in the opening year of the new road. Within the ward, changes in road traffic noise at identified noise sensitive locations (such as nearby properties) are predicted to be negligible (less than 1dB). For more information about how we define noise impacts (negligible, minor, moderate and major), see chapter 1.

Measures to reduce traffic noise and vibration during operation

There would be no mitigation measures needed in this ward.

5.8 Air quality

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

Existing situation

Within Riverside, the A226 has been declared an Air Quality Management Area (AQMA) due to yearly levels of airborne pollution being above accepted standards. AQMAs are identified by local authorities as areas of poor air quality that require additional monitoring and controls. No other areas in the ward have been identified as AQMA.

5.8.1 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. In this ward, there are only a few properties within 200 metres of the worksite, including those to the north-eastern side of Denton and near Wharf Road. Air quality impacts on these properties during construction would be temporary and we would put measures in place to minimise the dust impacts (see below). The proposed measures to reduce dust and emissions are ones that have been proven effective when used on similar construction projects. 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 minor worsening in air quality in the area around the B261 Old Road East as a result of traffic management from 2024 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 Gravesham Borough Council for consultation (see REAC entry AQ006).

5.8.2 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.

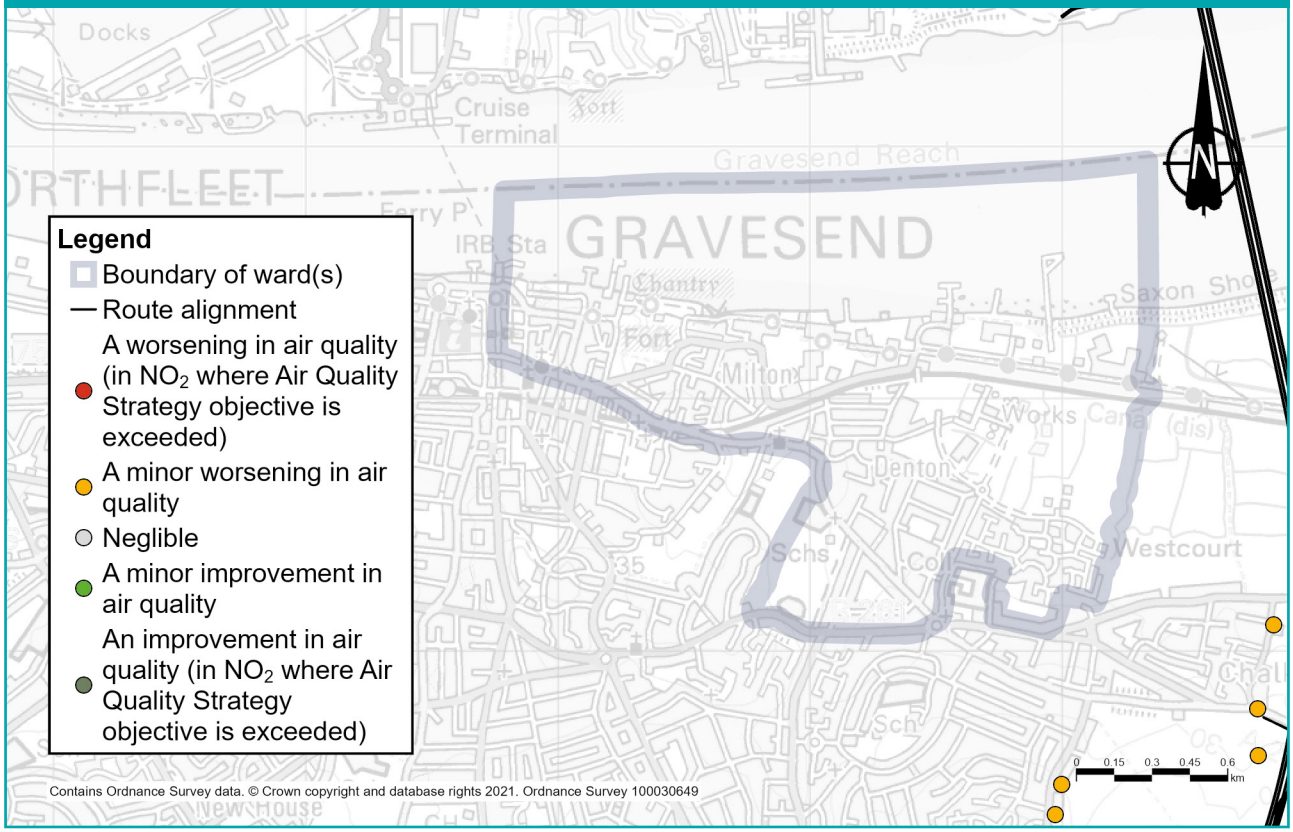
There are no receptors (properties or habitats that are sensitive to changes in air quality) modelled in the Riverside ward. However, there are receptors in Chalk ward close to the eastern side of Chalk, Lower Higham Road and Church Lane. The highest modelled yearly average NO_2 (the main traffic-related pollutant[3]) concentration in this ward is 18.7µg/m³, which is well below the yearly average threshold of 40µg/m³. Our assessment is based on our opening year model, which represents a worst-case scenario, without accounting for the increase in less-polluting vehicles on our roads over time.

Measures to reduce air quality impacts during operation

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

3 NO_2 levels are measured in 'micrograms per cubic metre', or µg/m³, where a microgram is one millionth of a gram.

Figure 5.17: Predicted changes in NO_2 levels within Riverside ward once the new road is open



5.9 Health

Existing situation

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

Riverside ward is characterised by a slightly younger population than Gravesham as a whole and nationally, with a higher proportion of children aged under 16 (25.9% compared with 22.4% for Gravesham and 20.3% for England). The ward also has an ethnically diverse population, with a large proportion of asian and black residents, 17.3% and 6.1% respectively.

Deprivation rates are high in the ward. Two areas are in the top 20% most deprived in the whole of England according to the English Index of Multiple Deprivation. The remaining two areas are in the top 40% most deprived. Economic activity is correspondingly low when compared with Gravesham as a whole. Home ownership levels are also low (44.7% own their own home), with most of the rest (28.8%) in private rented accommodation.

Around 83% of residents report their health to be very good or good (slightly higher than for Gravesham as a whole). A lower proportion of residents say that their day-to-day activities are limited a lot or a little because of a long-term health problem or disability (14.8%). Life expectancy at birth for residents of Riverside is 76.8 for men and 82.7 for women (which are both lower than UK average life expectancy recorded for 2013-2017 of 79.4 years for men and 83.1 for women).

5.9.1 Construction

Construction health impacts

Information about construction works affecting Riverside ward can be found in the Project description section above. Elements of each of these activities have the potential to affect people's health, whether this is through noise associated with construction activities or traffic, changes to air quality (through dust emissions), potential severance caused by construction traffic, or through impacts on mental health and wellbeing.

Riverside ward residents may experience negative effects on health as a result of:

- Temporary closures to the local footpath network to the east of Riverside. This may affect residents' ability to visit open spaces, particularly those without access to private cars and who may not be able to reach alternative venues within a reasonable travel time.
- Increased dust and emissions from nearby construction activities and potential deterioration in air quality. These may affect a small number of properties within a 200-metre buffer (situated in the north-eastern side of Denton and near Wharf Road).
- Stress and anxiety relating to construction.
- Increased traffic noise from construction traffic on public roads and nearby haul roads. However, this would be controlled through the CoCP and the package of traffic management measures.
- Views of construction activities, which would be mainly limited to a small number of homes on the edge of Denton. From NCR 1 and Thames and Medway Canal towpath, there are likely to be views of Milton Compound, and from the Saxon Shore Way long-distance footpath the proposed new landscaping near the northern tunnel entrance would be clearly visible north of the Thames.

Some residents may experience health benefits through access to work and training opportunities presented by construction activities.

5.9.2 Operations

Operational health impacts

Residents in Riverside may experience both positive and negative health outcomes once the new road opens. These could include:

- The project would improve access to jobs and training.
- Improvements in access to open space, with the newly created Chalk Park (see chapters 6 and 7) providing residents with a new landscaped recreational space, including footpaths, which could encourage increased physical activity.

Measures to reduce negative operational health impacts

We have not identified any essential mitigation to address health outcomes over and above the measures relating to noise and visual impacts described elsewhere.

5.10 Biodiversity

Existing situation

Only a small area of Riverside falls within the Order Limits. It is a small road to the north of the Thames and Medway Canal with no habitat. Riverside ward contains one designated site, the South Thames Estuary and Marshes Site of Special Scientific Interest, and one non-designated site, the Canal and Grazing Marsh Local Wildlife Site. For information about marine biodiversity, see chapter 7 of the Construction update.

We carried out surveys across the project to understand the existing situation, and these identified the presence of one protected species in this ward, water vole, within the Thames and Medway Canal.

5.10.1 Construction

Construction impacts

None of the designated and non-designated sites listed above would be directly affected by the project and we would not need to remove any habitat. Disturbance from construction traffic using the road to the north of the canal is possible. However, it already adjoins a busy industrial unit and gravel workings.

Measures to reduce biodiversity impacts during construction

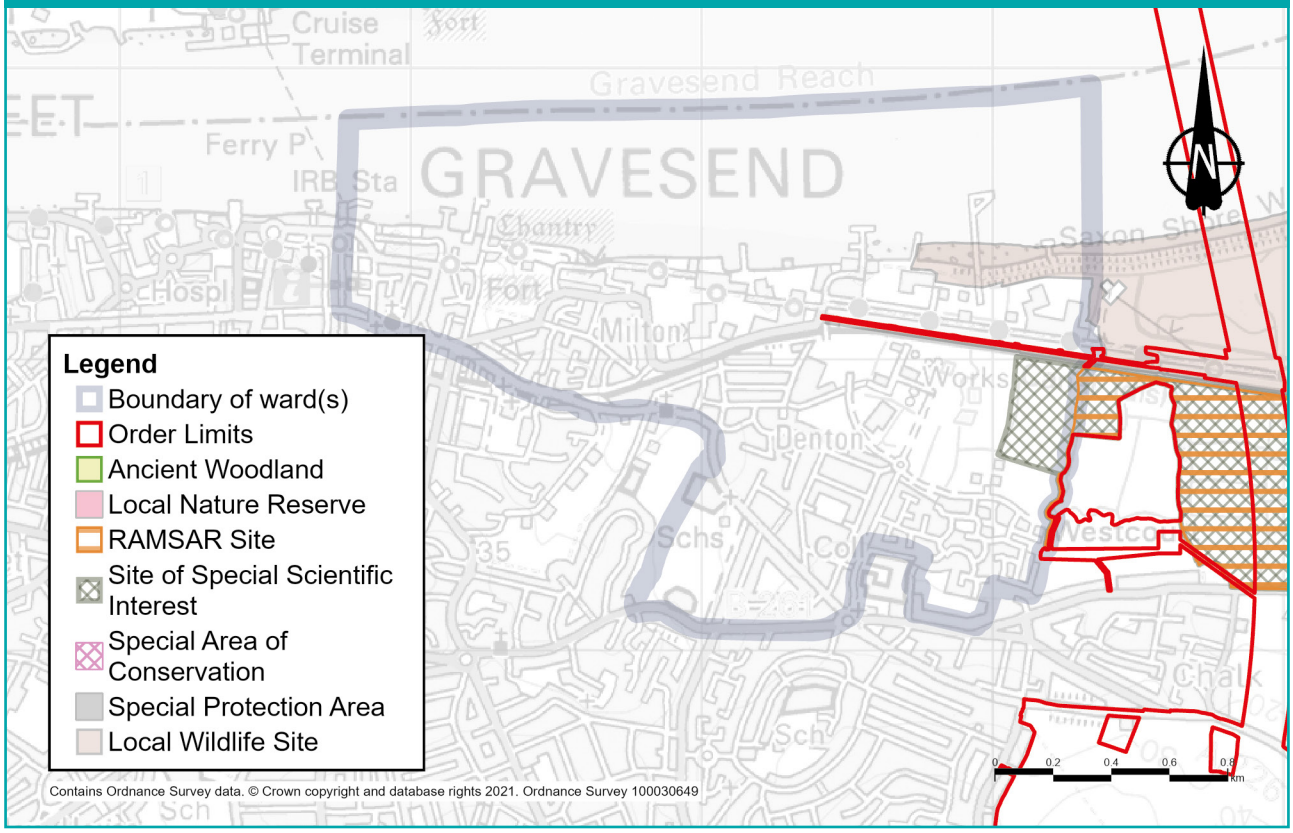
The road would be used to access a small compound, and traffic would be minimised during the construction period to limit disturbance to the surrounding habitat.

5.10.2 Operation

Operational impacts

The new road is unlikely to cause disturbance as the southern tunnel entrance is located more than 1km from Riverside ward. We do not expect any operational impacts.

Figure 5.18: Designated and non-designated biodiversity sites in Riverside ward



5.11 Built heritage

Existing situation

Two scheduled monuments, two conservation areas, 19 listed buildings, and four structures of historical relevance have been identified in Riverside ward in relation to the project. Five of the listed buildings are Grade II* listed and 14 are Grade II listed.

Scheduled monuments

Gravesend Blockhouse, a scheduled monument of high heritage value, is located on Royal Pier Road around 1.4km south and west of the project. This Tudor fortification protected the town for many centuries, although only the partially uncovered foundations of a section remain. The structure forms part of a series of shoreline defences along the Thames which include New Tavern Fort to the east. It also lies within the Riverside conservation area.

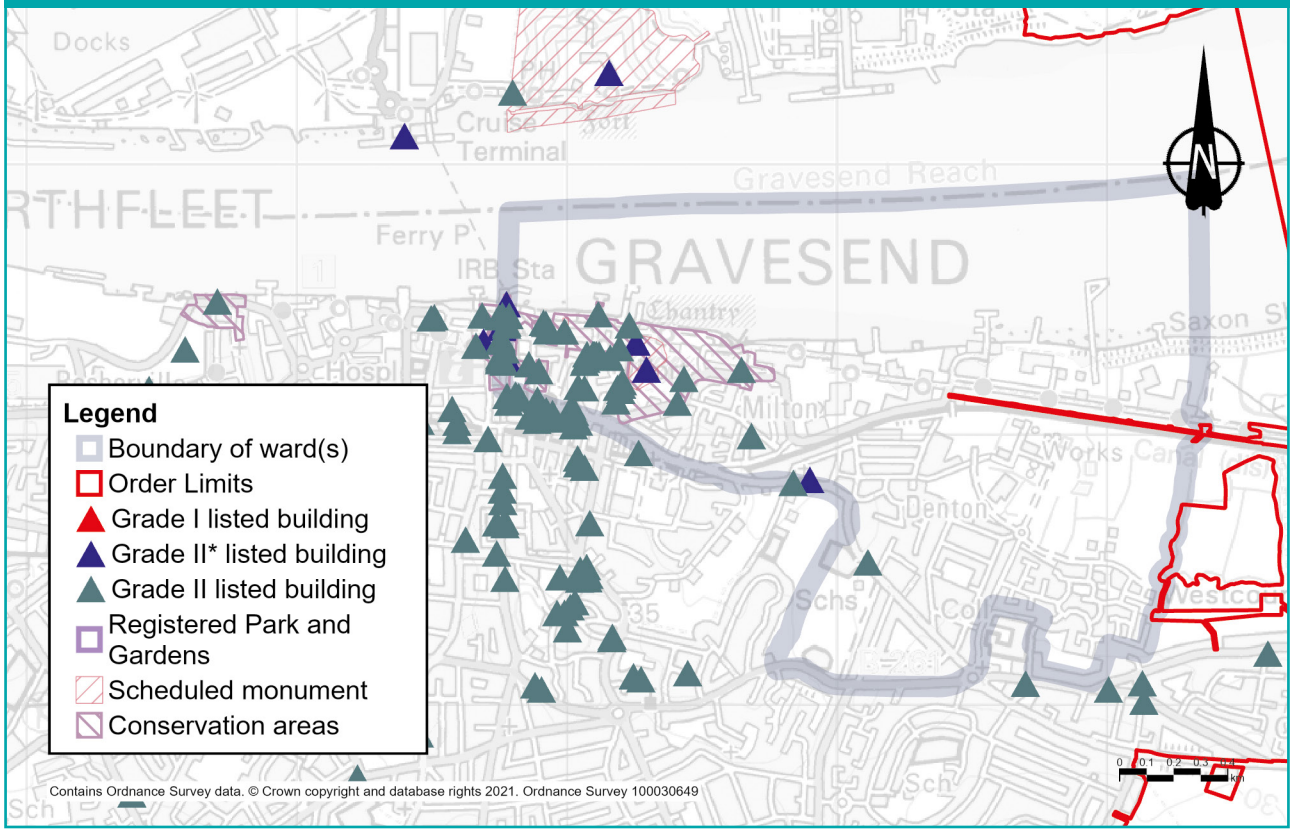
New Tavern Fort, including Milton Chantry, is a scheduled monument of high heritage value. It is situated on the southern bank of the Thames, around 1km west of the project. The structure also forms part of a series of shoreline defences along the Thames. The fort is a Grade II* listed building and is located within the scheduled area, along with the Grade II* listed Milton Chantry. This was used as a 14th century leper hospital, a chapel, public house, Georgian barracks and WWII gas decontamination chamber. It also lies within the Riverside conservation area. New Tavern Fort originally dates to the 1780s but most of the surviving remains date from the 19th and 20th centuries.

Conservation areas

High Street and Queen Street conservation area lies within the historic centre of Gravesend in Kent. It extends to St Andrew's Gardens in the east, Prince Street in the west, the Town Pier in the north and includes the full length of the High Street down to King Street in the south. It includes several listed buildings.

Riverside conservation area includes the Thames south bank riverfront, from the entrance to the Canal Basin in the east to St Andrew's Gardens in the west. It contains several listed buildings along the historic residential streets of Clarendon Road, Royal Pier Road, Commercial Place and the Royal Pier, along with parts of The Terrace and Canal Road. It also includes two scheduled monuments and the Gordon Recreational Ground.

Figure 5.19: Built heritage in Riverside ward



Grade II* listed buildings

- New Tavern Fort (within New Tavern Fort scheduled area)
- Milton Chantry (within New Tavern Fort scheduled area)
- The Town Hall
- The Town Pier
- Church of St Peter and St Paul
- St Mary's Church
- Thames House
- St Andrew's Arts Centre
- 3 and 3A, High Street
- 4 and 5, High Street
- The Mission House
- Three Daws public house
- The Kent Public House
- The Royal Clarendon Hotel and 1-4 Royal Pier Mews
- Two K6 telephone kiosks outside the Old Town Hall
- The Royal Terrace Pier, including the pavilions flanking the entrance
- Statue of General Gordon
- Barrelled Lock Chamber, Sea Walls, Swing Bridge, Locks and Canal Basin
- Milton War Memorial

Buildings/structures of historic relevance

- Wharf, Gravesend
- Two concrete platforms near the National Maritime Training Centre
- Thames and Medway Canal
- North Kent Line railway

5.11.1 Construction

Construction impacts

Our construction activities include setting up and operating the Southern Tunnel Entrance Compounds, A226 Gravesend Road Compound and Milton Compound (the closest to the ward immediately to the east). However, all three would be outside of the ward boundary. Construction traffic along the A226, Ordnance Road/Canal Road/Norfolk Road would result in a temporary increase of noise. Further details of construction activities affecting Riverside ward are provided in the Project description section.

There would be no physical impacts to built heritage. The scheduled New Tavern Fort and its associated listed buildings would experience additional noise from construction traffic on Ordnance Road/Canal Road to the south-east. The North Kent Line railway and Thames and Medway Canal would experience a temporary change to setting (the surroundings in which a heritage asset is 'experienced') with the adjoining Milton Compound. The setting of Riverside conservation area would also experience a slight temporary impact from visual and audible construction activity.

Measures to reduce impacts during construction

The design and layout of A226 Gravesend Road and Milton Compounds would take in to account the setting of heritage assets and seek to avoid or minimise light glare, light spill and light pollution during night-time construction. The A226 Gravesend Road Compound in Chalk ward is one area where 24/7 construction activities would take place and we would put mitigation measures in place above and beyond Best Practice Measures. More information can be found in the Design principles (section S326). Good practice measures, including dust and noise reduction, 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 for more information.

5.11.2 Operations

Operational impacts

There would be no anticipated effects on built heritage in Riverside ward once the project is operational.

5.12 Contamination

A review of historical maps and environmental data has shown no known medium or high-risk sources of contamination would be at risk of disturbance during construction or operation of the new road in Riverside ward.

5.12.1 Construction

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

5.12.2

Operation

There would be no elements of the completed project in this ward, so no risk of contamination during its operation.