



Land East of Rayleigh Road, Thundersley

Transport Assessment

November 2022

On behalf of **This Land Development Limited**



Project Ref: 332210105/001 | Date: November 2022

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Document Control Sheet

Project Name: Land East of Rayleigh Road, Thundersley, Essex

Project Ref: 332210105

Report Title: Transport Assessment

Doc Ref: 001

Date: November 2022

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Revision	Date	Description	Prepared	Reviewed	Approved

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1 Introduction

1.1 Background

- 1.1.1 Stantec has been commissioned by This Land Development Limited to prepare this Transport Assessment (TA) to accompany an outline planning application with all matters reserved except access for a residential development on Land East of Rayleigh Road, Thundersley, Essex.
- 1.1.2 The description of the proposed development is as follows:
- The development of up to 455 new homes, a multi-use community hall, land for the provision of a healthcare facility, land for a stand-alone early years and childcare nursery, new vehicular/pedestrian access points from Stadium Way in the north and Daws Heath Road in the south, new greenways and green links, multi-functional open space, green infrastructure, surface water attenuation, landscaping and associated infrastructure. All matters reserved except access.*
- 1.1.3 The application is due to be submitted in late 2022 and the development is planned to be fully complete and occupied from 2026.
- 1.1.4 The site was included in the now withdrawn Castle Point Borough Council (CPBC) Pre-submission Local Plan (December 2019) as allocation site HO13 and identified as a suitable site for delivering up to 455 dwellings. Whilst the Local Plan was withdrawn on 15 June 2022, the Pre-submission New Local Plan was subject to independent Examination in Public in May – June 2021. Following this, the Inspector concluded that the Local Plan provides an appropriate basis for the planning of the Borough subject to a number of main modifications and was therefore sound. The evidence base supporting the withdrawn Local Plan remains relevant for this planning application (weight to be given to policies and evidence base documents is considered within the Planning Statement submitted with the planning application).
- 1.1.5 The TA forms part of the supplementary documentation that accompanies the planning application for the proposed development. It should be read alongside the Residential Travel Plan which has also been prepared to accompany the planning application.

1.2 Scoping and Report Structure

- 1.2.1 The Government's National Planning Policy Framework (NPPF, July 2021) requires that a TA is prepared for developments which are likely to generate significant amounts of movement, so that the likely impacts of the proposal can be assessed. A Transport Scoping Note was therefore prepared setting out the proposed scope and assessment methodology of the TA, and is attached at Appendix A. This was discussed and agreed with officers of Essex County Council (ECC), the local highway authority for local roads in the vicinity of the site, and their response is also included at Appendix A.
- 1.2.2 Section 2 describes the development proposals in terms of the site layout, access and parking provision, and Section 3 discusses the local and national transport policy context in which the proposals will be assessed.
- 1.2.3 Existing conditions on the local transport networks in the vicinity of the site, and future baseline transport conditions for 2026 and 2031, are assessed in Section 4, these assessment years being agreed with ECC, and taking into account nearby committed developments and transport improvements.

- 1.2.4 Development trips are assessed in Section 5, including trip generation, trip distribution, mode share and assignment to surrounding transport networks. The predicted transport impacts of the development, and improvements to mitigate these impacts, are then assessed in Section 6, compared to the future baseline scenarios in 2026 and 2031. Section 7 summarises construction traffic implications of the proposed development, and Section 8 concludes the TA.

2 Development Proposals

2.1 Site Location

- 2.1.1 The site is located on land east of Rayleigh Road, Thundersley, which is in the north of Castle Point Borough, in southeast Essex. The site location is shown on Figure 1. The site is 27.89ha in area and is currently known as Claydon Farm and is used as arable farmland, with existing access only via a farm access on Daws Heath Road.
- 2.1.2 To the north, the site is bounded by Rayleigh Retail Park and to the east by Little Haven Nature Reserve and a Hospice. To the south is Daws Heath Road and to the west is Rayleigh Road (A129). There are a number of residential dwellings on both Daws Heath Road and Rayleigh Road, which also border the site.
- 2.1.3 The centre of the Site is located about 1.2 miles south of Rayleigh town centre, and about 1.4 miles north of Hadleigh town centre. There are a number of local facilities in both Rayleigh and Hadleigh, including schools, leisure, retail, and employment. These meet many of the day-to-day needs of existing local residents in Hadleigh, reducing the need to travel outside the Borough. The wider site context is shown on the plan at Figure 2.

2.2 Proposed Uses

- 2.2.1 The description of the proposed development is as follows:

The development of up to 455 new homes, a multi-use community hall, land for the provision of a healthcare facility, land for a stand-alone early years and childcare nursery, new vehicular/pedestrian access points from Stadium Way in the north and Daws Heath Road in the south, new greenways and green links, multi-functional open space, green infrastructure, surface water attenuation, landscaping and associated infrastructure. All matters reserved except access.

- 2.2.2 The indicative layout of the proposed development has been submitted with the planning application, and parameter plans showing the land uses are attached at Appendix B. The development is planned to be fully complete and occupied from 2026.

2.3 Brief Planning Background

- 2.3.1 The site was included in the now withdrawn Castle Point Borough Council (CPBC) Pre-submission Local Plan (December 2019) as allocation site HO13 and identified as a suitable site for delivering up to 455 dwellings. Whilst the Local Plan was withdrawn on 15 June 2022, the Pre-submission New Local Plan was subject to independent Examination in Public (EiP) in May – June 2021. Following this, the Inspector concluded that the Local Plan provides an appropriate basis for the planning of the Borough subject to a number of main modifications and was therefore sound. The evidence base supporting the withdrawn Local Plan remains relevant for this planning application (weight to be given to policies and evidence base documents is considered within the Planning Statement submitted with the planning application).
- 2.3.2 Following the EiP and the Inspector's report including Main Modifications, Policy HO13 noted that the development would be permitted if the masterplan delivered the following (amongst others):
- Access arrangements for the site, which also addresses peak time congestion at nearby junctions;

- The provision of greenways providing multi-user access through the site, linking to the existing network of green infrastructure which provide opportunity for active travel and recreation, but which avoid or otherwise manage additional recreational disturbance to sensitive wildlife assets nearby;
- Main vehicular access will be taken from Stadium Way in the north and Daws Heath Road in the south;
- Improvements to active and sustainable infrastructure, facilities and services should be secured within and as part of the development to promote modal shift and improve connectivity. This should include a public transport only route through the site, bringing all new homes on the site within 400m of public transport provision.

2.3.3 A transport technical evidence base was prepared by CPBC for the now withdrawn Local Plan and reviewed by the Inspector. This evidence base comprises the following:

- The Castle Point Transport Evidence for the New Local Plan – Transport Phase 2, prepared by Aecom, November 2015;
- The Castle Point Transport Evidence Refresh Interim Report, prepared by Mott MacDonald, November 2018;
- The Castle Point Transport Evidence Refresh Report, prepared by Mott MacDonald, January 2019;
- The Castle Point Transport Evidence Refresh Mitigation and Sensitivity Analysis Report, prepared by Mott MacDonald, May 2019;
- The Proposed Allocations Castle Point Transport Evidence Refresh Report, prepared by Mott MacDonald, May 2020;
- The Proposed Allocations Addendum Castle Point Transport Evidence Refresh Report, prepared by Mott MacDonald, March 2021;
- Essex County Council Highways' Castle Point Local Plan Proposed Allocations Model Audit Report, prepared by Ringway Jacobs, April 2021; and
- The Castle Point Transport Evidence Refresh Proposed Allocations HO13 Sensitivity Briefing Paper, prepared by Mott MacDonald, April 2021.

2.3.4 The above technical evidence assessed in detail the transport impacts of the proposed Land East of Rayleigh Road development, along with its mitigation. This mitigation is presented in CPBC's Infrastructure Delivery Plan (IDP), September 2020.

2.3.5 Following the review of this evidence base, the Inspector advised at paragraph 181 of their Report on the Local Plan EiP (March 2022) that:

I am satisfied that given the technical evidence, the level of growth proposed in the Plan is such that any significant impacts which would arise from it on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree. There is no convincing evidence to the contrary.

2.4 Proposed Site Accesses

2.4.1 The proposed points of access are shown on the parameter plans at Appendix B. There will be two points of vehicular access to the site:

- Via a new priority T-Junction on Stadium Way to the north; and
 - Via a new priority T-Junction on Daws Heath Road to the South.
- 2.4.2 Preliminary designs of the proposed site accesses are shown on the drawings attached at Appendix C. These points of access have been agreed with ECC Highways officers as indicated in their scoping response at Appendix A, and designed in accordance with Manual for Streets and the Essex Design Guide. Each access will serve 50% of the scale of proposed development.
- 2.4.3 An independent Stage 1 Safety Audit of the site access designs has been undertaken and is attached at Appendix D. Items raised in the Audit, and how the designs have been updated in response, are summarised below. Text in square brackets has been added to audit recommendations for context.
- Audit recommendation (Point 3.3): it is recommended that appropriate visibility splays for the type / speed of traffic are agreed with the local highway authority;
 - Designers' response: the ECC highways officer response to the Scoping Note, attached at Appendix A, advises that visibility splays of 2.4m by 43m are provided at both site accesses. These splays are shown on the site access drawings at Appendix C;
 - Audit recommendation (Point 3.4): Removal of any bollards within the splays [on Stadium Way] is recommended;
 - Designers' response: these bollards have been removed as shown on the site access plan at Appendix C. The removal also assists with pedestrian accessibility to the site;
 - Audit recommendation (Point 3.5): A minimum refuge width of 1.8m is recommended [for an uncontrolled pedestrian crossing on Stadium Way west of the site access];
 - Designers' response: this pedestrian refuge was shown on an earlier iteration of the Stadium Way site access design. It is now removed, and replaced by improved footway provision westwards along Stadium Way towards the controlled pedestrian crossing facilities at the junction with the A129;
 - Audit recommendation (Point 3.6): It is recommended that the shared-use facilities [on both proposed site access roads] terminate clearly at a point where cyclists can safely re-join the carriageway;
 - Designers' response: These are shown on the proposed site access drawings at Appendix C.
- 2.4.4 In addition to the Stadium Way and Daws Heath Road accesses, there will be additional points of access for pedestrians and cyclists, to connect with the internal walking and cycling network within the site. This includes access pedestrian and cycle access via Asquith Avenue, Claydon's Farm on Daws Heath Road (opposite Napier Gardens), and the A129 Rayleigh Road slightly to the south of Starling Close on the opposite side of the A129. There is also additional pedestrian only points of access with Daws Heath Road to the west of the proposed vehicular access, Firfield Road and the A129 Rayleigh Road south of the pedestrian and cycle access. There will be a pedestrian connection to Public Footpath No.7 at Claydon's Lane near Stadium Way / Phoenix Way. This Public Footpath is an existing Public Right of Way that runs along the northern boundary of the site, south of the existing commercial properties fronting Stadium Way east of its junction with Phoenix Way.
- 2.4.5 The pedestrian and cycle accesses are to enable logical connections between the site and existing areas of Hadleigh, and therefore provide non-car permeability and connectivity so that the site becomes integrated with the surrounding urban area.

- 2.4.6 Following the agreement with ECC Highways officers on the principle of the Stadium Way and Daws Heath Road site accesses, and the findings of the Stage 1 Road Safety Audit, it is considered that the site accesses shown at Appendix C, along with the non-car accesses described above, will provide safe and suitable access to the site for all users.

2.5 Potential Link Road Through Site

- 2.5.1 There will be an internal spine road through the site linking the Stadium Way and Daws Heath Road proposed site accesses. During the preparation of the transport evidence for the allocation of the site in the now withdrawn Local Plan, CPBC and ECC considered the potential for this internal spine road to be a link road through the site, open to all traffic and connecting Stadium Way with Daws Heath Road. Both CPBC and ECC assessed the potential for this link road to reduce congestion and delay on the A129 Rayleigh Road and its junctions with the A127 'Rayleigh Weir', Stadium Way, Daws Heath Road / Hart Road 'Woodman's Arms' junction, and the A13 / B1014 'Victoria House Corner' junction. The locations of these are shown on Figure 3. The anticipated benefit was anticipated be observed most at the Woodman's Arms junction, as A129 North – Daws Heath Road traffic would be able to re-route to the new link road, thereby avoiding the Woodman's Arms junction.
- 2.5.2 The technical assessments of the link road by CPBC and ECC were initiated before the Covid-19 pandemic, and based on traffic data collected prior to the pandemic. The Transport Evidence for the New Local Plan – Transport Phase 2 report, prepared for CPBC by Aecom in November 2015, undertook a spreadsheet traffic modelling exercise of future year flows including the draft Local Plan HO13 site allocation amongst other Local Plan growth. This indicated that the link road would slightly improve the operation of the Woodman's Arms junction, compared to the scenario without the link road, but that this junction would still be above capacity. The link road would have negligible impact on the operation of the Victoria House Corner junction and the Rayleigh Weir junction.
- 2.5.3 The Transport Evidence Refresh Report prepared by Mott MacDonald in May 2020 updated this spreadsheet modelling to investigate the potential of the link road further, although still based on traffic data collected before the pandemic. It found that the link road would have negligible impact at the Rayleigh Weir and Victoria House Corner junctions. It would slightly improve the operation of the A129 Stadium Way and Woodman's Arms junctions because it would reduce flows through the Woodman's Arms junction and reduce flows on the A129 South arm of the Stadium Way junction. However, both these junctions would still be above capacity with or without the link road.
- 2.5.4 Mott MacDonald provided a further Transport Evidence Refresh report in March 2021, following comments on the May 2020 Evidence Refresh by ECC Highways on the Woodman's Arms and Victoria House Corner junctions. These comments related to the setup of the junction capacity models rather than the spreadsheet modelling of the assignment of traffic flows. No post-pandemic traffic data was collected for this Refresh. It found that the Woodman's Arms junction would be over capacity in all scenarios without and including the link road and irrespective of the HO13 proposed allocation. Likewise for the Victoria House Corner junction, the junction would be over capacity regardless of the development or the link road being delivered.
- 2.5.5 ECC's Proposed Allocations Model Audit Report, April 2021, presented its review of the Mott MacDonald Evidence Refresh work. ECC found that the A129 Stadium Way junction would operate better with the link road in place, but that for the Rayleigh Weir, Woodsman's Arms and Victoria House Corner junctions:

The modelling does not show any significant difference in terms of junction performance between the three development scenarios [i.e. link road only, link road plus HO13 development, and HO13 development only without link road]. Given that allowing access through the HO13 site will improve accessibility for HO13 residents . . . it is our initial conclusion that through traffic through the HO13 site should be permitted (page 21).

- 2.5.6 The spreadsheet modelling undertaken for CPBC, based on traffic data collected pre-pandemic and reviewed by ECC Highways, indicated that some benefit would be generated from the introduction of the link road through the site and help mitigate the impact of the HO13 site allocation. However, these benefits would not bring the local highway network along the A129 between and including its junctions with Rayleigh Weir and Victoria House Corner to within capacity.
- 2.5.7 New highway infrastructure can induce more traffic to the affected highway network. Pre-pandemic, the existing highway network was operating at capacity during peak periods based on the above assessments, and where this occurs it can indicate that there is additional demand to use the highway network which is being suppressed because of the capacity constraints. This means that potential road users avoid the network during peak periods because of the delays that would be imposed on them. By providing new highway infrastructure, additional highway capacity is released, which then releases the constraints suppressing this demand, resulting in additional vehicular trips being made through the area. National transport policies seek to reduce the use of cars and facilitate modal shift to public and active transport, and this means carefully considering the need for new highway capacity, because it can result in additional highway demand and car use.
- 2.5.8 National and local transport policies place the needs and ease of movement of pedestrians, cyclists, and public transport users rather than protecting the convenience of the private car user, and so providing additional highway capacity through the formation of a new link road may prejudice the delivery of these transport policies. Furthermore, the spreadsheet and stand-alone junction capacity modelling undertaken by CPBC does not demonstrate clear benefits at the Woodman's Arms junction. It is also considered that new highway infrastructure could induce new car traffic to the area.
- 2.5.9 The conclusion of CPBC on the potential for the link road through the site is set out at paragraph 10.39 of the now withdrawn Local Plan, which is supporting text to Policy HO13 and was not subject to any Main Modifications by the Inspector, and states that:
- Access to the site should be from Stadium Way in the north and Daws Heath Road in the south. No through road should be created for vehicles other than public transport and emergency services. This is to avoid the creation of a high-volume short cut from users from the A127 to Hadleigh and eastwards through the relatively quiet settlement of Daws Heath.*
- 2.5.10 The development therefore proposes a spine road through the site linking the Stadium Way and Daws Heath Road proposed vehicular accesses that will only be open for pedestrians, cyclists, public transport, and emergency vehicles. There will be no through route for private cars. This accords with the objective of achieving a modal shift away from the use of the car.
- 2.5.11 The development's internal street layout will be designed in accordance with Manual for Streets and the Essex Design Guide. These note that well-designed streets have a crucial role to play in the delivery of sustainable communities. The objective for the proposed development on Land East of Rayleigh Road, Thundersley will be to provide an internal layout that prioritises movements by foot and cycle rather than the private car. The detailed design of the internal layout would follow at a later stage, with the designs to be agreed with Essex County Council.

2.6 Servicing and Delivery Strategy

- 2.6.1 Servicing and delivery vehicles will access the site via the site's vehicular accesses with Stadium Way and Daws Heath Road. The proposed bin stores will be located within 15m of where the refuse collection vehicle will stop. The refuse produced by the proposed development would be general residential waste. The provision of refuse for any recyclable and non-recyclable waste will be designed in accordance with British Standards. At this stage, it is anticipated that refuse collection for the residential waste will take place from storage held at ground level within the development. Within the site all roads will be designed to accommodate all relevant refuse and service vehicles.

2.7 Parking

- 2.7.1 The car and cycle parking at the site will be provided in accordance with ECC's 'Parking Standards: Design and Good Practice' (2009) and the 'Interim Policy for Parking Standards and Garage Sizes' (2014). The parking standards set out in the Supplementary Planning Guidance (SPG) for residential developments are presented in Table 1.

Use	Vehicle	Cycle	PTW	Disabled
	Minimum	Minimum	Minimum	Minimum
1 bedroom	1 space per dwelling (excluding garage if less than 7m x 3m internal dimension)	1 secure covered space per dwelling. None if garage or secure area is provided within curtilage of as Visitor/ unallocated	N/A	N/A if parking is in curtilage of dwelling, otherwise as Visitor/ unallocated
2+ bedroom	2 spaces per dwelling (excluding garage if less than 7m x 3m internal dimension)			
Visitor / unallocated	0.25 spaces per dwelling (unallocated) (rounded up to nearest whole number)	If no garage or secure area is provided within curtilage of dwelling then 1 covered and secure space per dwelling in a communal area for residents plus 1 space per 8 dwellings for visitors	1 space, + 1 per 20 car spaces (for 1st 100 car spaces), then 1 space per 30 car spaces (over 100 car spaces)	200 vehicle bays or less = 3 bays or 6% of total capacity, whichever is greater, Over 200 vehicle bays = 4 bays plus 4% of total capacity

Table 1: SPG Maximum Car Parking Standards

3 Planning Policy Context

3.1 Introduction

3.1.1 This TA has been prepared in line with relevant national and local policies and guidance. The relevant policies and guidance have been identified and detailed in this section of the report. The policies and guidance covered are as follows:

- National policies and guidance:
 - National Planning Policy Framework (2021);
 - Decarbonising Transport;
 - Gear Change: A Bold Vision for Cycling and Walking;
- Local policies and guidance:
 - Essex Transport Strategy: The Local Transport Plan for Essex (2011)
 - Saved Policies of the Castle Point Local Plan (adopted 1998, reviewed 2007)
 - The withdrawn Castle Point Local Plan 2018-2033
 - Essex Design Guide (2018)

3.2 National Policies and Guidance

National Planning Policy Framework (2021)

3.2.1 An aim of the National Planning Policy Framework (NPPF) is to promote and achieve sustainable development. This aim is highlighted in Paragraph 10 which states that '*at the heart of the Framework is a presumption in favour of sustainable development*'.

3.2.2 The NPPF advises at paragraph 105 that:

Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health.

3.2.3 In assessing sites for development, the NPPF notes at paragraph 110 that:

- a) *Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;*
- b) *Safe and suitable access to the site can be achieved for all users;*
- c) *The design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code; and*
- d) *Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.*

3.2.4 At paragraph 111, the NPPF advises that:

Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

Decarbonising Transport (Department for Transport)

3.2.5 In March 2020, the Department for Transport (DfT) published 'Decarbonising Transport – Setting The Challenge', describing how the DfT would prepare a Transport Decarbonisation Plan (TDP) to achieving carbon budgets and net zero emissions across every single mode of transport by 2050. It contains the following six strategic priorities for the TDP:

- Accelerate modal shift to public transport and active transport:
 - Help make public transport and active travel the natural first choice for daily activities;
 - Support fewer car trips through a coherent, convenient and cost-effective public network; and explore how we might use cars differently in future;
 - Encourage cycling and walking for short journeys;
 - Explore how to best support the behaviour change required;
- Decarbonising how we get our goods:
 - Consider future demand and changing consumer behaviour for goods;
 - Transform 'last-mile' deliveries – developing an integrated, clean and sustainable delivery system;
 - Optimise logistics efficiency and explore innovative digitally-enabled solutions, data sharing and collaborative platforms;
- UK as a hub for green transport technology and innovation
 - Utilise the UK's world-leading scientists, business leaders and innovators to position the UK as an internationally recognised leader of environmentally sustainable technology and innovation in transport;
 - Build on expertise in the UK for technology developments and capitalise on near market quick wins
- Decarbonisation of road vehicles
 - Support the transition to zero emission road vehicles through:
 - regulatory framework
 - strong consumer base
 - market conditions
 - vehicle supply
 - refuelling and recharging infrastructure

- energy system readiness
 - Maximise benefits through investment in innovative technology development, and development of sustainable supply chains
 - Place-based solutions
 - Consider where, how and why emissions occur in specific locations;
 - Acknowledge a single solution will not be appropriate for every location;
 - Address emissions at a local level through local management of transport solutions;
 - Target support for local areas, considering regional diversity and different solutions;
 - Reducing carbon in a global economy
 - Lead international efforts in transport emissions reduction;
 - Recognise aviation and maritime are international by nature and require international solutions;
 - Harness the UK as a global centre of expertise, driving low carbon innovation and global leadership, boosting the UK economy.
- 3.2.6 'Setting the Challenge' was followed by the DfT's 'Decarbonising Transport – A Better, Greener Britain' in July 2021. It sets out the government's commitments and the actions needed to decarbonise the entire transport system in the UK, and includes:
- The pathway to net zero transport in the UK
 - The wider benefits net zero transport can deliver
 - The principles that underpin the DfT's approach to delivering net zero transport
- 3.2.7 'A Better, Greener Britain' includes commitments to decarbonise all forms of transport through:
- Increasing walking and cycling, with the aim that half of all journeys in towns and cities will be cycled or walked by 2030;
 - Supporting the development of zero emission buses and coaches across the country;
 - Decarbonising the railway, through electrification of lines and removal of diesel-powered trains, and increase rail capacity to encourage modal shift from road and air;
 - Making mandatory a zero emission fleet of cars, vans, motorcycles and scooters;
 - Embedding transport decarbonisation principles in spatial planning and across transport policymaking;
 - Taking action to increase average road vehicle occupancy by 2030, with support for shared car ownership and shared occupancy schemes and services, including car clubs that are fully zero emission.

Gear Change: A Bold Vision for Cycling and Walking (DfT)

- 3.2.8 In July 2020, the DfT published 'Gear Change: A Bold Vision for Cycling and Walking', on the role of cycling and walking under the following themes:
- Better streets for cycling and people
 - Cycling and walking at the heart of decision-making
 - Empowering and encouraging local authorities
 - Enabling people to cycle and protecting them when they do
- 3.2.9 The document notes that increasing walking and cycling can improve air quality, tackle climate change, improve health and wellbeing, address inequalities and tackle road congestion. The physical activity of walking and cycling can help prevent and manage over 20 chronic conditions, and 20 minutes of physical activity per day can cut risks of developing depression by 31% and increases the productivity of workers.
- 3.2.10 'Gear Change' presents data that, where roads have been upgraded to include cycle routes (for example the east-west and north-south cycle routes in London), the cycle route itself moves 46% of the total number of users of the road, despite the cycle route only taking up 30% of the road space. Cycling is therefore a more efficient use of space than travel by private car.
- 3.2.11 Modal shift to walking and cycling will improve air quality through reduced private car use, improving environments and providing opportunities for biodiversity. It is also cost-effective in tackling climate change by reducing transport carbon emissions. Furthermore, well-planned improvements to the walking environment in shopping areas can increase footfall by 40%, for the benefit of local businesses.
- 3.2.12 The document repeats the 'Decarbonising Transport' ambition of achieving half of all journeys in towns or cities walked or cycled. It notes that 58% of car journeys in 2018 were under 5 miles, and in urban areas, more than 40% of journeys were under 2 miles. It advises that, for many people, these journeys are perfectly suited to walking and cycling.
- 3.2.13 'Gear Change' includes a vision that cycling and walking is at the heart of transport policy and planning, and not an afterthought. It also states that:
- We will ensure that all new housing and business developments are built around making sustainable travel, including cycling and walking, the first choice for journeys.*
- We will work with the Ministry of Housing, Communities & Local Government and the Local Government Association to place cycling and walking provision at the heart of local plan making and decision taking for new developments. One of Active Travel England's functions will be as a statutory consultee within the planning system to press for adequate cycling and walking provision in all developments of over a certain threshold, and provide expert advice on ways in which such provision can be improved.*
- 3.2.14 Active Travel England is a new government executive agency that became operational in 2022, and is responsible for guiding government investment in walking and cycling infrastructure.

3.3 Local policies

Essex Transport Strategy: The Local Transport Plan for Essex (2011)

- 3.3.1 The Third Local Transport Plan describes Essex County Council's transport strategy for the period 2011 to 2025.
- 3.3.2 The LTP overall vision for the Essex area is:
- “A transport system which supports sustainable economic growth and helps deliver the best quality of life for the residents of Essex.”*
- 3.3.3 The strategic approach within the LTP is to provide connectivity for Essex Communities, to reduce carbon dioxide emissions and improve air quality, to improve safety on the transport network, secure and maintain all transport assets, and provide sustainable access and travel choice for Essex residents.
- 3.3.4 There are three broad approaches that come through within the LTP, these are:
- a focus on investment in the local economy – with priority given to improving transport links within and between our main towns;
 - a focus on carbon reduction – with priority given to improving travel choices and encouraging less car use; and
 - a focus on making Essex a better place to live – with investment more evenly spread across each of the five outcomes of this strategy with the aim of improving access to work, education, vital services, and leisure activities.
- 3.3.5 The LTP acknowledges that Essex is one of the most rapidly growing areas in the UK and recognizes the importance of:
- Ensuring that new developments are well connected with their surrounding areas;
 - Providing the transport improvements needed to support housing and employment growth.

Adopted Castle Point Local Plan (1998)

- 3.3.6 The Adopted Local Plan was prepared prior to the publication of the NPPF, and only certain policies of the Plan remain in place. These include Policy T2 'Intensification of Access Use', which requires a Traffic Impact Study to be undertaken demonstrating the ability of the highway network to accommodate the proposed development.
- 3.3.7 Traffic Impact Studies / Assessments, focussing primarily on vehicular traffic, were replaced with Transport Assessments, focussing on all modes of travel, by Planning Policy Guidance Note 13: Transport in 2001, and so the adopted Local Plan's transport policies are dated. However, Policy T4 'Large Scale Development' does note that the Council will have regard to the need to minimise the extent of car travel and maximise opportunities for the use of alternative means of transport. This policy also notes that any large-scale development which would overburden the highway network will be refused.

The withdrawn Castle Point Local Plan (2018 – 2033)

- 3.3.8 The vision set out by the now withdrawn version of the draft Local Plan was as follows:

“By 2033, Castle Point will play a pivotal role in the South Essex sub-region by providing communities where people want to live, and a high-quality environment, supporting economic growth opportunities in both Castle Point and neighbouring districts”

- 3.3.9 The Local Plan outlined eight objectives. Objective 5 directly relates to transport planning of developments and is as follows:

“To promote more sustainable travel patterns within Castle Point through the location of development, and the provision of public transport and cycling infrastructure to complement the existing highway network.”

- 3.3.10 Policy TP2 covers Improvements and Alterations to Carriageway and Infrastructure. It outlines the aim to manage congestion on key routes in Castle Point, and this includes route improvements along the A129 Rayleigh Road between the Rayleigh Weir and Victoria House Corner junctions. The Infrastructure Delivery Plan which accompanies the withdrawn Local Plan assigns site HO13 to route improvements along the A129 project, as a ‘site that either requires the completion of the project to address the impact of increased traffic from the site and / or is physically close to the project and will therefore benefit from its completion.’

- 3.3.11 Encouraging sustainable development is an important consideration which runs throughout the Local Plan, and it is also noted in Policy TP6 ‘Safe and Sustainable Access’. So that development proposals offer safe and sustainable access, either directly or via appropriate mitigation, the Policy sets out the following:

- a. ‘Safe access to the highway network, having regard to the highway access policies of the Highway Authority;*
- b. Safe access to the site for cyclists and pedestrians, including the approach to the site from the nearest public transport node; and,*
- c. Access to public transport services within 800m of the site.’*

- 3.3.12 The site was included as an allocation for residential development of up to 455 units within the withdrawn Local Plan under Policy HO13 – Land East of Rayleigh Road, Thundersley.

- 3.3.13 The draft Local Plan was supported by an extensive evidence base on transport matters as described in this report, which has informed the Council’s Infrastructure Delivery Plan (IDP), dated September 2020. The IDP assessed the existing provision of infrastructure throughout the Borough and considers what additional infrastructure will be required in the future to support growth being allocated in the draft Local Plan. The IDP also considers how required infrastructure and services should be delivered, and if there are any gaps in information or funding which need to be addressed.

- 3.3.14 Following the review of this evidence base, the Inspector advised at paragraph 181 of their Report on the now withdrawn Local Plan (March 2022) that:

I am satisfied that given the technical evidence, the level of growth proposed in the Plan is such that any significant impacts which would arise from it on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree. There is no convincing evidence to the contrary.

Essex Design Guide (2018)

- 3.3.15 The Essex Design Guide (EDG) sponsored by the Essex Planning Officer Association, was conceived in recognition of the need to create great places to live, work, and enjoy as well as address growth. The aim was to ensure both the quality a “place making”, and the pace of development became a shared objective.
- 3.3.16 The EDG includes new socio-economic themes alongside best practise design standards to form a comprehensive guide. These new design themes address:
- Active Design Principles;
 - An Aging Population;
 - Digital and Smart Technology;
 - Health and Wellbeing; and
 - Garden Communities.

3.4 Summary

- 3.4.1 The emphasis of transport policy guidance for new developments from national policies and guidance, the adopted Local Plan and the now withdrawn draft Local Plan is to reduce the need to travel before then prioritising non-car modes of travel, focussing on accessibility by walking, cycling and public transport. Travel by the private car is at the bottom of the transport-user hierarchy. This is so that new developments help tackle issues of climate change and carbon emissions, improve health and wellbeing through better air quality and encouragement of active travel, and promotion of social mobility and inclusive growth through equitable travel choices. Policy is not to protect the convenience of the private car user. Policies and guidance also recognise that new residential allocations can help achieve housing needs in a sustainable manner, assuming they provide sufficient access to services and employment opportunities with the surrounding area. Meeting these transport policy objectives will help address concerns related to increasing traffic congestion, climate change and people’s health and well-being.

4 Existing and Future Baseline Transport Conditions

4.1 Introduction

- 4.1.1 This section of the TA provides detail of the existing and future baseline transport networks around the site including road and sustainable modes such as bus, rail, pedestrian and cycling links. These baseline scenarios, i.e. without the development, are as follows:
- 2022 – existing baseline;
 - 2026 – future baseline corresponding to full opening year of the proposed development;
 - 2031 – future baseline corresponding to a future design year of five years after the full opening year.
- 4.1.2 These assessment years have been agreed by ECC Highways officers, as noted in their scoping advice at Appendix A.
- 4.1.3 The review includes the accessibility of the site by public transport services, walking and cycling. The following infrastructure has been audited and is detailed within this TA:
- Existing and pedestrian and cycle infrastructure within the immediate area surrounding the site.
 - Bus routes, nearby stops and bus service frequency.
 - Accessibility to Rayleigh train station and the frequency of trains at this station.
 - Local cycle routes and facilities within the area.
- 4.1.4 In addition, this TA describes the accessibility to important local amenities, including access to primary and secondary schools, health centres, convenience stores and post offices.

4.2 Existing Travel Patterns of Residents Near the Site

- 4.2.1 The 2011 Census journey to work data on existing residents near the Site (the most recently available travel to work dataset at the time of writing) indicates that about 72% travel to work by private car. About 10% travel by train, and 7% walk. Only 3% travel by bus and only 2% by cycle. The main employment destination is Castle Point itself, with about 29% of local residents working in the Borough. Southend-on-Sea and Basildon are the other main employment destinations, each with 15% of residents working in the respective districts. About 8% work in the City of London. The remainder are spread primarily across South Essex and East London.
- 4.2.2 The main employment areas within Castle Point Borough are Hadleigh, Thundersley and Benfleet, of which all within 2 miles of the site. Southend-on-Sea and Basildon are about 5 – 6 miles to the east and west of the site respectively.
- 4.2.3 The evidence base for the withdrawn Local Plan includes a RAG (Red Amber Green) appraisal of the site's accessibility to local services and facilities, and rates this as Green, meaning these services and facilities are available within a reasonable 1.5km walking distance of the site.

4.3 Walking and Cycling Accessibility

- 4.3.1 There are footways on roads around the site but limited cycle infrastructure provision, as illustrated on the plan of existing cycle infrastructure taken from Essex County Council's Castle Point Cycling Action Plan, 2018, and attached at Appendix E.
- 4.3.2 The site is within a reasonable walking and cycling distance of key employment destinations such as Hadleigh, Benfleet and Thundersley, along with the railway stations at Rayleigh, Benfleet, and Leigh-on-Sea. Walking isochrones are set out on Figure 4 along with the location of local amenities, and show that the site is accessible to amenities including education, medical centres, and shops, with Rayleigh Town Centre being an approximate 20-minute walk away.
- 4.3.3 Footways of up to 2m wide are provided along both sides of Daws Heath Road, to the south of the site close to the proposed site accesses (both vehicular and pedestrian). These footways provide access westwards, to Thundersley and Rayleigh.
- 4.3.4 Further east of the proposed site there is no footway for approximately 180m to the north of Daws Heath Road. The 2m wide footway remains to the south of the Road and provides pedestrian access to Daws Heath Village.
- 4.3.5 Footways of up to 2m wide are provided along both sides of Stadium Way, to the north of the site and close to the sites proposed northern vehicular access. These footways provide access to Thundersley and Rayleigh.
- 4.3.6 The Department for Transport's Local Transport Note 1/20 'Cycle Infrastructure Design' advises that a journey of five miles is an achievable distance to cycle for most people, which would mean parts of Basildon and Southend-on-Sea – other key employment locations for local residents of Castle Point – would be within cycling distance of the site.
- 4.3.7 Cycling isochrones are set out in Figure 5 along with the location of key local amenities. This plan shows that the site is accessible to all main essential amenities including education, medical centres, and shops, with Rayleigh Town Centre being an approximate 10-minute cycle away.
- 4.3.8 There is therefore potential for the cycling mode share for residents of the development to be appreciably higher than that recorded in the 2011 Census. However, there is no dedicated cycle infrastructure in the immediate proximity of the Site along Daws Heath Road, the A129 and Stadium Way.
- 4.3.9 ECC's Cycling Action Plan for the Borough (January 2018), part of the Essex Cycling Strategy, seeks a significant and sustained increase in cycling, establishing it in the public's mind as a 'normal or regular' mode of travel, especially for short A-to-B trips, and as a major participation activity and sport for all ages.
- 4.3.10 Key measures of the Cycling Action Plan include better signage and lighting, improved cycle parking at railway stations, and providing new cycle infrastructure, including a high-quality cycle route along the A129 to the west of the site, between Rayleigh Weir and Victoria House Corner. This is described in the Action Plan as follows:

New N-S hybrid cycle route along Rayleigh Road from A127 to London Road (A13). Reallocation of carriageway central hatching/ footway for new segregated cycle lanes on each side of the road- continental standard. Sustrans recommends physical segregation. Consider footway conversion to shared use around the A129/London Rd roundabout. Enhance the roundabout for cyclists as this location has been identified as a cycle accident cluster. Further investigation into improving conditions for cyclists is required at the A127/ A129 roundabout which is identified as a cycle accident cluster. Consideration also to be given to potentially improving the signalised junction of Rayleigh Road with Stadium Way to improve conditions for cyclists.

- 4.3.11 The cycle infrastructure improvement schemes set out in ECC's Cycling Action Plan are shown in Appendix F, identifying the new North-South hybrid cycle route along Rayleigh Road as Scheme No 13.
- 4.3.12 The draft Local Plan's RAG (Red Amber Green) appraisal of the site's proximity to the existing pedestrian and cycle network rates this as Amber, meaning there is some access to existing unpaved pedestrian and cycle networks.

4.4 Access to key amenities

- 4.4.1 The NPPF highlights the need for developments to be located in areas where the requirement for travel is minimised, and residents can easily access local services and facilities for employment, shopping, leisure, education, and other activities by sustainable modes of transport, including walking and cycling.
- 4.4.2 The local amenities and their approximate distance to the site is set out in Table 2, which also estimates the walking and cycling times to the amenities from the Site based on a walking speed of 1.4 m/s and a cycling speed of 4.4 m/s. The distance and estimated walking and cycling speeds are taken from the amenity, to the closest of the site accesses (should one be significantly closer).

Type of amenity	Name of amenity	Closest Access	Distance (metres)	Walking time (min)	Cycling time (min)
Education	The Deanes secondary school	Daws Heath Road pedestrian access	160	3	1
	Thundersley primary School	Daws Heath Road pedestrian access	1440	17	5
	Rayleigh Primary School	Stadium Way	1440	17	6
	Cedar Hall special learning needs school	Daws Heath Road pedestrian access	480	6	2
Health	Hart Road Surgery	Daws Heath Road pedestrian access	1280	18	5
		Stadium Way	1930	22	6
	Hart Road Dental Surgery	Daws Heath Road pedestrian access	1440	20	6
	Bupa Dental Car Rayleigh	Stadium Way	1200	15	5
Pub / restaurant	Woodmans Arms pub	Daws Heath Road pedestrian access	160	5	2
	McDonalds	Stadium Way	160	1	2
	Ocean Fish Bar	Daws Heath Road pedestrian access	160	5	2
Retail	Sainsburys superstore & petrol station	Stadium Way	160	2	1
	Annies Minimarket	Daws Heath Road vehicular access	480	6	1
	Post Office	Daws Heath Road pedestrian access	1600	21	6

Leisure	Thundersley Common Park	Stadium Way & Daws Heath Road	800	16	6
	Kingley Woods Playing Fields	Stadium Way	600	11	4
	The Deanes Sports Centre	Daws Heath Road	160	3	1
	Pure Gym Rayleigh	Stadium Way	100	1	2
Travel	Rayleigh Railway Station	Stadium Way	2200	25	8
	Benfleet Railway Station	Daws Heath Road	4900	58	15
	Leigh-On-Sea Railway Station	Daws Heath Road	5400	65	21
	Rayleigh Market Town Centre	Stadium Way	1770	21	7
	Hadleigh Town Centre	Daws Heath Road	2300	27	9
Pharmacy	Superdrug	Stadium Way	1700	21	7
	Rishi Pharmacy	Daws Heath Road	1200	15	5

Table 2: Local Facilities

4.4.3 These services and facilities are therefore within reasonable walking and cycling distance of the site. Residents of the proposed development will therefore be able to meet many of their day-to-day needs using the services and facilities within the town and which are within an easy walking and cycling distance of the site. This means that reliance on the private car for these trip purposes is minimised, particularly so for education purposes which make up 50% of AM peak hour trips based on the National Travel Survey. The Deanes secondary school is within a 5-minute walk or 5-minute cycle of the site, and the Thundersley Primary School is within a 20-minute walk of the site.

4.4.4 Furthermore, for travel further afield to Southend-on-Sea and London, Rayleigh railway station is within a reasonable 25-minute walk or 8-minute cycle ride from the site.

4.4.5 The routes to these schools and the railway station are described below.

The Deanes Secondary School more description – crossings – footway widths – lighting etc

4.4.6 The Deanes Secondary School is quickest accessed via the Daws Heath Road access. The school is directly opposite the site, accessed via the southern side of Daws Heath Road. Regular lighting and footways are provided on either side of the road throughout the route. There are no junctions to cross.

Primary Schools

- 4.4.7 Thundersley Primary School can be accessed by two main routes. The first route uses the Stadium Way access. The route uses footways along Stadium Way, Rayleigh Road, Sandown Road, Common Approach, Hart Road and Dark Lane. Regular lighting and footways are provided on either side of the roads throughout the route. Either dropped kerbs, pedestrian islands and signalised crossings are provided at each junction on route to facilitate pedestrians to cross the junctions.
- 4.4.8 The second route uses the Daws Heath Road access. The route uses Daws Heath Road, Hart Road and Dark Lane. Regular lighting and footways are provided on either side of the roads throughout the route. Dropped kerbs and a zebra crossing is provided at the one junction on route to the school, to facilitate pedestrians to cross the junction.
- 4.4.9 Residents of the north of the site might want to consider Rayleigh Primary school as it is the same distance from the north access onto Stadium Road as Thundersley Primary School is to the south access on Daws Heath Road. This can be accessed along the footways on both sides of the road along the A129 or by taking the Number 1 bus 3 stops from the Sainsburys store to the Paul Pry public house. There are controlled, signalised crossings/ zebra crossings with dropped kerbs at all major junctions along the route and with the exception of Stadium Way, the route is fully lit by streetlights.

Rayleigh Railway Station

- 4.4.10 Rayleigh Railway Station is quickest accessed from the access located on Stadium Way. The route uses Rayleigh Road, High Road, Love Lane, Leasway and Crown Hill. Regular lighting and footways are provided on either side of the roads throughout the route. A signalised crossing fitted with dropped kerbs and tactile paving is provided at the Rayleigh Road / A129 / Southend Arterial Road roundabout, which facilitates pedestrians to cross the junction. This is the only major junction on the route to the station.

4.5 Public transport

Bus

- 4.5.1 The nearest bus stops to the site are on the A129 Rayleigh Road immediately west of the site and Daws Heath Road immediately south of the site. These would be within a 5-minute walk (400m) of most of the site. The stops on Rayleigh Road are served by Arriva's No 1 and Essex & Suffolk DaRT's No 3 service, while the stops on Daws Heath Road are served by the No 3 service only.
- 4.5.2 The No 1 service connects the site with Southend-on-Sea, Rayleigh including the railway station, South Benfleet, Hadleigh and Leigh-on-Sea, with a weekday frequency from early morning to late evening of up to every 10 minutes. This route therefore provides a high quality, frequent service to key destinations, with typical journey times to Rayleigh Station and South Benfleet of only 7 minutes to each, and to Southend Travel Centre of about 39 minutes. The No 3 service is less frequent, at every 2 hours, linking the site with Southend and Chelmsford. The No 1 and No 3 bus routes are shown on the plans at Appendix G.
- 4.5.3 Further detail of the bus services that serve the bus stops is set out in Table 3.

Service	Bus Stops	Operator	Route	One-way frequency		
				Mon-Fri	Sat	Sun
3	Daws Heath Road, Rayleigh Road	Essex and Suffolk DaRT	Southend - Leigh on Sea - Rayleigh - East Hanningfield - Chelmsford	Every 2 hours	Every 2 hours	N/A
1	Rayleigh Road	Arriva Herts and Essex	Travel Centre – Railway Station	Every 10 minutes	Every 12 minutes	Every 30 minutes

Table 3: Local Bus Services

- 4.5.4 The site therefore has good accessibility to high quality and frequent bus services that connect with key employment destinations, indicating there is potential to increase the bus mode share for the development's residents from the relatively low level recorded at the 2011 Census. Furthermore, the draft Local Plan's RAG (Red Amber Green) appraisal of the site's proximity to the existing bus network rates this as Green.

Rail

- 4.5.5 The nearest railway station is Rayleigh, about 1.2 miles to the north of the site and therefore within a reasonable walking and cycling distance. It is also accessible via the high quality and frequent No 1 bus service, as described above. Rayleigh station is served by Greater Anglia trains connecting Rayleigh with Southend Victoria, Stratford, and London Liverpool Street. Weekday frequencies are about every 20 minutes in each direction, with journey times to Stratford of about 35 minutes, to Liverpool Street of about 43 minutes, and to Southend Victoria of about 17 minutes.
- 4.5.6 Benfleet station is about 2.5 miles to the south west of the site, therefore within a reasonable cycling distance. c2c operate services at Benfleet which call at London Fenchurch Street, Basildon and Southend Central. Weekday frequencies are about every 15 minutes in each direction, with journey times to Fenchurch Street of about 45 minutes, to Basildon of about 6 minutes, and to Southend Central of about 9 minutes.
- 4.5.7 These high quality and frequent train services to key employment destinations of Castle Point residents is reflected in the mode share of travel to work, at 10%. Furthermore, the draft Local Plan's RAG (Red Amber Green) appraisal of the site's proximity to the existing rail network rates this as Green, meaning train services are within a 2km walk of the site.
- 4.5.8 Figure 2 shows the location of nearby railway stations and railway lines. The rail services provided by Rayleigh railway station is set out in Table 4.

Destination	Journey Time	Frequency		
		Mon-Fri	Sat	Sun
London Liverpool Street	43 minutes	Every 20 min	Every 20 min	Every 30 min
Southend Victoria	17 minutes	Every 20 min	Every 20 min	Every 30 min

Table 4: Rayleigh Station Services

4.5.9 Rayleigh Railway Station has the following facilities:

- 424 car parking bays + 3 disabled bays
- Bicycle Parking
- ATM machine
- Toilets
- Accessibility and mobility access
- Refreshment facilities

4.6 Highway network

4.6.1 The local highway network has been described in Section 2 and shown on Figure 3.

4.6.2 Traffic survey data for the following junctions near the site was collected in June 2022 for the following junctions:

- The A127 / A129 'Rayleigh Weir' signalised roundabout junction;
- The A129 Rayleigh Road / Stadium Way signalised T-junction;
- The A129 Rayleigh Road / Daws Heath Road / Hart Road 'Woodman's Arms' double mini-roundabout junction; and
- The A129 / A13 / B1014 'Victoria House Corner' roundabout junction.

4.6.3 The survey data is attached at Appendix H, and the corresponding traffic flows for the weekday AM and PM peak hours or 8-9am and 5-6pm respectively are shown on Diagrams 1 and 2 at Appendix I.

4.6.4 To derive future baseline flows for 2026 and 2031, background traffic growth factors have been applied to the 2022 observed data. The traffic growth is based on the Department for Transport's (DfT's) National Transport Model's (NTM's) Road Traffic Forecasts, adjusted for local growth using the DfT's National Trip End Model (NTEM) available from the DfT's Trip End Model Presentation Program (TEMPro).

4.6.5 TEMPro growth rates are based on changes in trip-ends derived from the numbers of households and jobs in an area, along with changes in car ownership. Changes in households are based on information provided by local authorities on progress in delivering planned housing in Local Plans, and on government data on employment projections. NTM growth factors consider increases in average trip lengths.

4.6.6 The resulting combined TEMPro / NTM growth in origin / destination car driver trips for urban principal roads in Castle Point from 2022 to 2026 and 2031 are shown in Table 5 below.

TEMPro / NTM Growth Factors, Castle Point	AM Peak Period	PM Peak Period
2022 – 2026	1.0407	1.0415
2022 – 2031	1.0611	1.0628

Table 5: TEMPro / NTM Growth Factors for Castle Point

- 4.6.7 These growth factors have been applied to 2022 surveyed traffic flows to derive the 2026 and 2031 baseline flows, and the resulting baseline AM and PM peak hour flows are shown on Diagrams 3 – 6 within Appendix I.

4.7 Junction Capacity Assessments

- 4.7.1 The capacity of the junctions described above has been assessed for the 2022 observed flows and 2026 and 2031 future baseline flows using the computer program Junctions 10 for priority non-signalised junctions, and LinSig for signalised junctions. These models have been prepared by CPBC as part of their transport evidence base for the draft Local Plan, including the 'Transport Evidence Refresh Addendum' report from March 2021 and 'Sensitivity Analysis Briefing Paper' from April 2021. The models have been audited by ECC as part of their 'Proposed Allocations Model Audit Report, dated April 2021, and ECC's comments on the models have been incorporated for this Transport Assessment.
- 4.7.2 The capacity assessments of existing priority and roundabout junctions are presented below, indicating queue lengths in passenger car units (PCUs) and Ratios of Flow to Capacity (RFC), which is a measure of operating conditions on junction arms for priority and roundabout junctions. An RFC of 0.85 is generally considered an acceptable upper limit for new priority junctions, and for roundabout junctions an RFC of 0.9 is generally considered an acceptable upper limit for new junctions. These values are considered the recommended operational capacity threshold of a junction.
- 4.7.3 For signalised junctions, RFCs are presented instead as Degrees of Saturation (DoS), with a maximum DoS of 90% generally being considered acceptable for new junctions and considered the recommended operational capacity threshold.
- 4.7.4 RFCs / DoSs of up to 1.0 / 100% are viewed as acceptable for the operation of existing junctions in peak periods, although the pattern of queuing is also important. These values are considered the theoretical capacity threshold of a junction. When RFCs / DoSs exceeds 1.0 / 100%, the respective program capacity and queue length predictions become increasingly unreliable, tending to over-estimate predicted queue lengths.
- 4.7.5 The junction capacity program printouts are attached at Appendix J and are summarised below.

A127 / A129 'Rayleigh Weir' Signalised Roundabout

- 4.7.6 This junction is a 4-arm signalised roundabout, with the north arm forming the A129 High Road, the east arms providing access to the A127 East via on- and off-slips as well as Brook Road to the northeast of the junction, the south arm forming the A129 Rayleigh Road and the west arms providing access to the A127 West via on- and off-slips.
- 4.7.7 The LinSig junction capacity assessments for baseline weekday AM and PM peak hour flows are summarised in Tables 6 – 8 below. The cycle times have been optimised by LinSig for each scenario and shown in the corresponding summary table.

2022 Observed Flows, Rayleigh Weir Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
Arm	Lane / Movement	Max DoS	Queue	Max DoS	Queue
A127 eastbound off-slip entry (Arm 1)	Nearside Left and Ahead	47.7%	5.5	55.7%	5.2
	Offside Ahead	68.4%	10.0	72.9%	8.7
A129 North entry (Arm 2)	Nearside Left and Ahead	84.3%	12.4	76.3%	6.4
	Middle and Offside Ahead	84.1%	12.4	73.4%	5.2
A127 westbound off-slip entry (Arm 3)	Nearside Left and Ahead	70.2%	7.4	72.8%	6.3
	Offside Ahead	70.3%	7.9	72.9%	6.8
A129 South entry (Arm 4)	Nearside Left	58.6%	7.3	47.8%	3.9
	Middle and Offside Ahead	76.2%	10.0	63.0%	5.0
Circulatory in advance of A127 eastbound off-slip entry (Arm 9)	Nearside Ahead	43.0%	4.4	64.5%	5.8
	Middle Ahead and Right	50.5%	4.4	51.3%	4.7
	Offside Right	33.6%	4.7	61.4%	4.6
Circulatory in advance of A129 North entry (Arm 10)	Nearside Ahead	33.7%	2.2	7.2%	0.7
	Middle Ahead and Right	58.6%	5.6	70.7%	5.7
	Offside Right	32.5%	4.1	40.0%	5.3
Circulatory in advance of A127 westbound off-slip entry (Arm 11)	Nearside Ahead	62.3%	3.0	65.6%	5.2
	Middle Ahead and Right	70.6%	7.6	77.7%	6.7
	Offside Right	18.6%	0.1	19.6%	2.0
Circulatory in advance of A129 South entry (Arm 12)	Nearside Ahead	44.4%	2.8	32.0%	2.4
	Middle Ahead and Right	48.4%	4.7	50.6%	3.4
	Offside Right	26.7%	4.1	39.8%	0.5
DoS over all lanes: AM = 84.3%; PM = 77.7% Total Delay over all lanes: AM = 43.15 pcu Hrs; PM = 38.40 pcu Hrs Cycle Time: AM = 66 seconds; PM = 46 seconds					

Table 6: LinSig Capacity Summary for the A127 / A129 Rayleigh Weir Junction, for 2022 Existing Weekday AM and PM Peak Hour Flows

2026 Future Baseline Flows, Rayleigh Weir Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
		Max DoS	Queue	Max DoS	Queue
Arm	Lane / Movement				
A127 eastbound off-slip entry (Arm 1)	Nearside Left and Ahead	50.8%	6.6	67.5%	8.3
	Offside Ahead	72.8%	12.1	88.4%	15.5
A129 North entry (Arm 2)	Nearside Left and Ahead	77.4%	12.1	73.0%	7.6
	Middle and Offside Ahead	80.8%	12.0	72.8%	6.2
A127 westbound off-slip entry (Arm 3)	Nearside Left and Ahead	78.1%	9.6	84.8%	10.0
	Offside Ahead	71.8%	8.9	80.7%	9.6
A129 South entry (Arm 4)	Nearside Left	59.2%	8.4	54.9%	5.9
	Middle and Offside Ahead	78.7%	12.4	74.5%	7.6
Circulatory in advance of A127 eastbound off-slip entry (Arm 9)	Nearside Ahead	38.0%	4.8	51.9%	6.4
	Middle Ahead and Right	60.8%	5.9	63.3%	7.6
	Offside Right	30.8%	5.1	29.7%	3.2
Circulatory in advance of A129 North entry (Arm 10)	Nearside Ahead	40.0%	2.6	23.5%	3.1
	Middle Ahead and Right	58.2%	5.7	55.2%	5.0
	Offside Right	37.5%	6.4	40.8%	0.6
Circulatory in advance of A127 westbound off-slip entry (Arm 11)	Nearside Ahead	58.9%	2.9	60.2%	5.0
	Middle Ahead and Right	65.3%	7.5	65.1%	7.4
	Offside Right	31.5%	0.4	28.7%	0.7
Circulatory in advance of A129 South entry (Arm 12)	Nearside Ahead	32.0%	2.4	17.0%	1.1
	Middle Ahead and Right	60.9%	4.9	54.1%	6.4
	Offside Right	35.3%	6.0	37.3%	2.5
DoS over all lanes: AM = 80.8%; PM = 88.4% Total Delay over all lanes: AM = 46.65 pcu Hrs; PM = 48.83 pcu Hrs Cycle Time: AM = 74 seconds; PM = 60 seconds					

Table 7: LinSig Capacity Summary for the A127 / A129 Rayleigh Weir Junction, for 2026 Future Baseline Weekday AM and PM Peak Hour Flows

2031 Future Baseline Flows, Rayleigh Weir Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
		Max DoS	Queue	Max DoS	Queue
Arm	Lane / Movement				
A127 eastbound off-slip entry (Arm 1)	Nearside Left and Ahead	55.6%	6.2	66.3%	9.9
	Offside Ahead	79.6%	11.7	86.8%	17.9
A129 North entry (Arm 2)	Nearside Left and Ahead	88.7%	14.1	87.7%	12.1
	Middle and Offside Ahead	86.9%	13.6	88.8%	12.9
A127 westbound off-slip entry (Arm 3)	Nearside Left and Ahead	88.5%	10.4	84.1%	11.5
	Offside Ahead	85.9%	10.2	84.0%	12.3
A129 South entry (Arm 4)	Nearside Left	73.3%	9.2	50.1%	6.5
	Middle and Offside Ahead	92.6%	16.3	73.4%	9.8
Circulatory in advance of A127 eastbound off-slip entry (Arm 9)	Nearside Ahead	56.5%	5.6	52.6%	6.4
	Middle Ahead and Right	57.5%	7.1	48.0%	3.1
	Offside Right	22.1%	2.1	52.9%	9.3
Circulatory in advance of A129 North entry (Arm 10)	Nearside Ahead	53.5%	3.6	7.2%	0.8
	Middle Ahead and Right	58.5%	6.2	70.4%	6.1
	Offside Right	34.5%	4.6	38.3%	6.8
Circulatory in advance of A127 westbound off-slip entry (Arm 11)	Nearside Ahead	69.8%	4.4	65.4%	2.2
	Middle Ahead and Right	73.4%	7.8	74.0%	3.1
	Offside Right	17.5%	0.1	18.0%	0.1
Circulatory in advance of A129 South entry (Arm 12)	Nearside Ahead	48.1%	3.5	33.5%	3.0
	Middle Ahead and Right	55.3%	6.6	46.8%	4.7
	Offside Right	16.2%	0.4	42.7%	5.2
DoS over all lanes: AM = 92.6%; PM = 88.8% Total Delay over all lanes: AM = 59.04 pcu Hrs; PM = 57.68 pcu Hrs Cycle Time: AM = 62 seconds; PM = 72 seconds					

Table 8: LinSig Capacity Summary for the A127 / A129 Rayleigh Weir Junction, for 2031 Future Baseline Weekday AM and PM Peak Hour Flows

- 4.7.8 The above junction modelling shows that the Rayleigh Weir junction is operating within the operational capacity threshold during both weekday AM and PM peak hours in the 2022 and 2026 baseline scenarios. The queue lengths highlighted in **bold italics** indicate where the queue length on the circulatory arms of the roundabout exceed the length of those arms, and therefore there is likely to be queuing back through the junction which may affect the capacity of the entry arms to the junction, as either traffic that is waiting to enter the roundabout cannot do so, or traffic already circulating on the roundabout cannot exit because the exit arms are blocked. By the 2031 future baseline, the junction is predicted to be operating above the operational capacity threshold but within the theoretical capacity threshold during the AM peak hour, and within the operational capacity threshold during the PM peak hour.
- 4.7.9 The above modelling reflects the findings of Castle Point's Transport Evidence Refresh Report (January 2019 and May 2020), prepared as part of the draft Local Plan's evidence base, and the subsequent review of the model by ECC in their Model Audit Report (April 2021). Castle Point's Transport Evidence Refresh Report (May 2020) included a RAG (Red Amber Green) assessment of the junction for 2033 baseline flows with or without the potential link road and found that the junction would be Amber in both scenarios, i.e. with DoS's above 90% but below 100%.

A129 Rayleigh Road / Stadium Way Signal-Controlled T-Junction

- 4.7.10 This junction is a 3-arm signal-controlled T-junction. The LinSig junction capacity assessments for baseline weekday AM and PM peak hour flows are summarised in Tables 9 – 11 below. The cycle times have been optimised in LinSig.

2022 Observed Flows, A129 Stadium Way Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
Arm	Lane / Movement	Max DoS	Queue	Max DoS	Queue
A129 North	Left slip to Stadium Way	19.7%	3.4	23.5%	4.1
	Nearside Ahead	57.4%	12.9	65.9%	14.4
	Offside Ahead	32.2%	6.7	49.3%	10.4
Stadium Way	Nearside Left	82.9%	11.4	70.6%	9.1
	Offside Right	82.9%		70.6%	
A129 South	Nearside and Middle Ahead	84.0%	22.7	70.3%	12.7
	Offside Right	69.7%	6.9	64.8%	5.4
DoS over all lanes: AM = 84.0%; PM = 70.6% Total Delay over all lanes: AM = 24.92 pcu Hrs; PM = 23.63 pcu Hrs Cycle Time: AM = 120 seconds; PM = 120 seconds					

Table 9: LinSig Capacity Summary for the A129 Stadium Way Junction, for 2022 Existing Baseline Weekday AM and PM Peak Hour Flows

2026 Future Baseline Flows, A129 Stadium Way Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
		Max DoS	Queue	Max DoS	Queue
Arm	Lane / Movement				
A129 North	Left slip to Stadium Way	21.0%	3.7	24.9%	4.3
	Nearside Ahead	59.8%	13.7	67.8%	14.9
	Offside Ahead	36.4%	7.6	53.8%	11.7
Stadium Way	Nearside Left	87.6%	12.9	74.6%	10.0
	Offside Right	87.6%		74.6%	
A129 South	Nearside and Middle Ahead	88.6%	27.1	74.2%	14.6
	Offside Right	69.8%	7.2	68.4%	5.9
DoS over all lanes: AM = 88.6%; PM = 74.6% Total Delay over all lanes: AM = 28.61 pcu Hrs; PM = 25.83 pcu Hrs Cycle Time: AM = 120 seconds; PM = 120 seconds					

Table 10: LinSig Capacity Summary for the A129 Stadium Way Junction, for 2026 Future Baseline Weekday AM and PM Peak Hour Flows

2031 Future Baseline Flows, A129 Stadium Way Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
		Max DoS	Queue	Max DoS	Queue
Arm	Lane / Movement				
A129 North	Left slip to Stadium Way	21.9%	3.8	26.0%	4.6
	Nearside Ahead	61.3%	14.1	69.9%	15.7
	Offside Ahead	39.0%	8.3	57.3%	12.6
Stadium Way	Nearside Left	91.3%	14.8	78.0%	10.8
	Offside Right	91.3%		78.0%	
A129 South	Nearside and Middle Ahead	92.5%	32.1	77.7%	16.5
	Offside Right	73.1%	7.7	71.5%	6.2
DoS over all lanes: AM = 92.5%; PM = 78.0% Total Delay over all lanes: AM = 33.11 pcu Hrs; PM = 28.02 pcu Hrs Cycle Time: AM = 120 seconds; PM = 120 seconds					

Table 11: LinSig Capacity Summary for the A129 Stadium Way Junction, for 2031 Future Baseline Weekday AM and PM Peak Hour Flows

- 4.7.11 The above assessment indicates that the junction is operating within operational capacity (DoS below 90%) on all arms during both AM and PM peak hours in the 2022 and 2026 baseline scenarios. The queue lengths highlighted in **bold italics** indicate where the queue length exceeds the length of the corresponding lane, and so the queue may extend back to the upstream junction and block exits from that junction. By the 2031 future baseline, the junction is predicted to be operating above the operational capacity threshold but within the theoretical capacity threshold during the AM peak hour, and within the operational capacity threshold during the PM peak hour.
- 4.7.12 Castle Point's May 2020 Transport Evidence Report noted that the junction would have an Amber RAG rating in the 2033 AM peak hour, consistent with the above findings, but a Red RAG rating in the PM peak hour, so not consistent with the above findings. However, the ECC Audit Report April 2021 recommended changes to Castle Point's junction modelling which ECC noted would provide more favourable capacity results. These changes have been incorporated in the above modelling, and which have resulted in the junction's PM peak performance being improved compared to the Castle Point May 2020 modelling.

A129 Rayleigh Road / Daws Heath Road / Hart Road Double Mini-Roundabout – the 'Woodman's Arms' Junction

- 4.7.13 This is a priority junction in the form of a double mini roundabout, with Zebra crossings on each arm. The Junctions 10 junction capacity assessments for the baseline weekday AM and PM peak hour flows are summarised in Tables 12 – 14 below. This junction had been modelled as a linked double mini-roundabout within Junctions 10.

2022 Observed Flows, Woodman's Arms Junction	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A129 Rayleigh Road North	0.91	8.9	1.08	55.4
Daws Heath Road	0.86	5.5	0.74	2.8
A129 Rayleigh Road South	1.25	67.9	1.21	62.1
Hart Road	1.12	31.8	1.12	34.7

Table 12: Junctions 10 Capacity Summary for the A129 / Daws Heath Road / Hart Road Double Mini-Roundabout 'Woodman's Arms' Junction, for 2022 Existing Baseline Weekday AM and PM Peak Hour Flows

2026 Future Baseline Flows, Woodman's Arms Junction	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A129 Rayleigh Road North	0.93	10.3	1.10	65.1
Daws Heath Road	0.89	6.5	0.76	3.0
A129 Rayleigh Road South	1.27	76.0	1.23	69.5
Hart Road	1.15	36.7	1.16	40.8

Table 13: Junctions 10 Capacity Summary for the A129 / Daws Heath Road / Hart Road Double Mini-Roundabout 'Woodman's Arms' Junction, for 2026 Future Baseline Weekday AM and PM Peak Hour Flows

2031 Future Baseline Flows, Woodman's Arms Junction	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A129 Rayleigh Road North	0.94	11.8	1.12	75.5
Daws Heath Road	0.91	7.7	0.77	3.2
A129 Rayleigh Road South	1.30	88.8	1.25	81.0
Hart Road	1.17	37.9	1.19	43.1

Table 14: Junctions 10 Capacity Summary for the A129 / Daws Heath Road / Hart Road Double Mini-Roundabout 'Woodman's Arms' Junction, for 2031 Future Baseline Weekday AM and PM Peak Hour Flows

- 4.7.14 The above summary indicates that the junction is above capacity during both AM and PM peak hours in all scenarios and with resultant significant queuing. This reflects the findings of Castle Point's Transport Evidence Refresh Report (January 2019), and the subsequent review of the model by ECC in their Model Audit Report (April 2021). Castle Point's January 2019 RAG assessment of the junction for 2018 flows found that the junction would be Amber, i.e. with RFCs between 0.85 and 0.99. ECC's recommendations for revising the model set out in their April 2021 Audit indicate that the changes they suggest to the model setup would result in less favourable results. These recommended changes have been applied for the purposes of this Transport Assessment, and the results in Tables 12 – 14 above show that the maximum RFCs would exceed theoretical capacity thresholds in all baseline scenarios.

A129 Rayleigh Road / A13 / B1014 'Victoria House Corner' Roundabout

- 4.7.15 This is a priority 4-arm roundabout junction. The Junctions 10 junction capacity assessments for baseline weekday AM and PM peak hour flows are summarised in Tables 15 – 17 below.

2022 Observed Flows, Victoria House Corner Roundabout	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A13 London Road	0.85	5.6	0.94	12.3
B1014 Benfleet Road	0.77	3.3	0.72	2.5
A13 Kiln Road	0.62	1.7	0.67	2.0
A129 Rayleigh Road	0.65	1.9	0.68	2.1

Table 15: Junctions 10 Capacity Summary for the A129 / A13 / B1014 'Victoria House Corner' Roundabout, for 2021 Existing Baseline Weekday AM and PM Peak Hour Flows

2026 Future Baseline Flows, Victoria House Corner Roundabout	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A13 London Road	0.87	7.7	0.96	16.0
B1014 Benfleet Road	0.79	3.7	0.74	2.8
A13 Kiln Road	0.64	1.8	0.69	2.2
A129 Rayleigh Road	0.67	2.0	0.70	2.3

Table 16: Junctions 10 Capacity Summary for the A129 / A13 / B1014 'Victoria House Corner' Roundabout, for 2026 Future Baseline Weekday AM and PM Peak Hour Flows

2031 Future Baseline Flows, Victoria House Corner Roundabout	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A13 London Road	0.88	7.4	0.98	21.8
B1014 Benfleet Road	0.82	4.2	0.77	3.2
A13 Kiln Road	0.65	2.0	0.70	2.4
A129 Rayleigh Road	0.69	2.2	0.72	2.5

Table 17: Junctions 10 Capacity Summary for the A129 / A13 / B1014 'Victoria House Corner' Roundabout, for 2031 Future Baseline Weekday AM and PM Peak Hour Flows

- 4.7.16 The above summary indicates that the junction is within operational capacity for the 2022, 2026 and 2031 future baseline AM peak hour. In the PM peak hour for all future baseline scenarios, all arms are within operational capacity except the A13 London Road arm, but this is still within theoretical capacity. This reflects the findings of Castle Point's Transport Evidence Refresh Report May 2020, and the subsequent review of the model by ECC in their Model Audit Report (April 2021), including its recommendations on junction geometry. The Transport Evidence Refresh Report May 2020 found that the junction would have an Amber RAG rating in the 2033 AM peak hour, consistent with the above findings, and a Red RAG rating in the PM peak hour, also consistent with the above findings.

4.8 Road safety assessment

- 4.8.1 The most recently available five years (2016-2021) of Personal Injury Collision (PIC) data has been obtained from ECC to help understand the existing road safety conditions surrounding the Site. The PIC assessment area was determined based on walking routes to public transport facilities in addition to the most relevant local junctions. The road safety record is attached at Appendix K. The following roads and junctions were assessed:

- A127 / A129 roundabout
- Stadium Way
- Rayleigh Road (A129)
- Daws Heath Road
- Hart Road
- A129 / A13 / B1014 roundabout

- 4.8.2 Tables 18 and 19 below provides a summary of the collision statistics.

Year	Slight	Serious	Fatal	Total	Pedestrian	Cyclist
2016	15	2	0	17	1	4
2017	8	3	1	12	2	3
2018	14	1	0	15	2	2
2019	2	0	1	3	0	0
2020	3	2	1	6	3	0
2021	2	0	0	2	0	0
Total Casualties	43	8	3	54	8	9

Table 18: Summary of Road Traffic Accident Record

Link / Junction	Slight	Serious	Fatal	Total	Pedestrian	Cyclist
Southern Article Road roundabout	0	0	2	2	1	0
Hart Road	1	2	0	3	1	2
Hart Road / Rayleigh Road junction	3	1	0	4	0	0
Rayleigh Road (A129)	9	2	1	12	4	4
Stadium Way T Junction	2	3	0	5	1	0
Stadium Way	1	0	0	1	0	0
Daws Heath Road	1	0	0	1	1	0
A13	3	0	0	3	0	3
A129 / A13 / B1014 roundabout	6	0	0	6	0	0

Table 19: Road Traffic Accident Record at Links and Junctions

- 4.8.3 There have been 54 incidents in the assessment area during the last 5 years. There were 68 casualties as a result of these incidents. The severity of the casualties were categorised as 57 slight, 8 serious and 3 fatal.
- 4.8.4 ECC identify the A127 / A129 Rayleigh Weir and A129 / Daws Heath Road / Hart Road 'Woodman's Arms' junctions as accident cluster sites and are considering improvements at these junctions to improve safety. These are discussed in Section 6.

5 Development Trip Modelling

5.1 Development Trip Generation and Mode Share

- 5.1.1 The vehicular trip generation for the proposed development has been assessed from the TRICS database for comparable residential developments in the 'Houses Privately Owned' category, and for comparable healthcare facilities in the 'GP Surgeries' category. The TRICS sites are restricted to suburban and edge of town areas in the South East and East Anglia, to reflect the locational characteristics of the development site.
- 5.1.2 The residential vehicular trip rates, corresponding to 08:00 – 09:00 and 17:00 – 18:00, and the resulting vehicular trip generation for the proposed development of 455 dwellings are shown in Table 20 below, and the database printouts are attached at Appendix L.

Residential Vehicular Trip Generation	AM Peak Hour (0800-0900)		PM Peak Hour (1700-1800)	
	Arrive	Depart	Arrive	Depart
Residential Trip Rate per Dwelling	0.143	0.364	0.349	0.169
No. of Trips	65	166	159	77

Table 20 – Residential Vehicular Trip Generation

- 5.1.3 The TRICS healthcare trip rates are shown in Table 21 below, and applied to an indicative floor area of 1,000sqm. This healthcare facility will serve a population of 10,000 people, of which 1,100 people would be from the development itself. Therefore, the TRICS vehicular trip rates have been discounted by a factor of 0.89 to allow for the internalisation of healthcare trips within the development. The resulting trip rates, and the corresponding vehicular trip generation, are also shown in Table 21 below.

Healthcare Vehicular Trip Generation	AM Peak Hour (0800-0900)		PM Peak Hour (1700-1800)	
	Arrive	Depart	Arrive	Depart
TRICS Trip Rate per 100sqm	4.650	0.364	0.349	0.169
Discounted Trip Rate per 100sqm to allow for internalisation	4.139	2.096	1.937	3.051
No. of Trips	41	21	19	31

Table 21 – Healthcare Vehicular Trip Generation

- 5.1.4 Development trips by mode have been estimated based on the existing mode share information for journeys to work in the 2011 Census for the Castle Point 002 super output area (in which the site is located). The mode shares and the resulting number of development trips by mode in the weekday peak hours is shown in Table 22 below.

Development Trip Generation by Mode	Mode Share	AM Peak Hour (0800-0900)		PM Peak Hour (1700-1800)	
		Arrive	Depart	Arrive	Depart
Train	11%	16	28	26	16
Bus, minibus, or coach	3%	4	8	7	4
Driving a car or van	74%	107	188	178	108
Passenger in car or van	4%	6	10	10	6
Bicycle	1%	1	3	2	1
On foot	7%	10	18	17	10
Total	100%	144	255	240	145

Table 22: Trip Generation for Proposed Development by Mode of Travel

5.2 Vehicular Trip Distribution and Assignment

- 5.2.1 Information on the Census distribution of work locations of existing residents of Castle Point Super Output Area 002 has been analysed to understand the likely distribution of peak hour trips for the proposed development, and the resulting assignment of these trips to the local highway network derived from web-based journey planners. The distribution of workplaces for local residents is shown in Table 23 below.

Workplace Location for Castle Point Residents	% of Residents
London	6%
Thurrock	6%
Chelmsford	5%
Havering	2%
Brentwood	2%
Rochford	11%
Basildon	19%
Southend-on-Sea	24%
Castle Point	25%
TOTAL	100%

Table 23 – Distribution of Workplaces for Local Residents of Castle Point

- 5.2.2 Development vehicular trips are split equally between the Stadium Way and Daws Heath Road accesses because each access will serve 50% of the development. The resulting development vehicular flows only for the weekday AM and PM peak hours are shown on Diagrams 7 and 8 in Appendix I. The proposed development's transport impacts are assessed in the following section.

6 Development Transport Impact

6.1 Walking and Cycling Impacts

- 6.1.1 The development's layout itself will be developed at the detailed design stage so that these pedestrian trips within the site are on routes that are convenient, logical, and more attractive for short distance trips than driving. The layout will be influenced by the guidance in Manual for Streets and the Essex Guide Design. These note that well designed streets have a crucial part to play in the delivery of sustainable communities. The development would also seek to create a highly permeable environment within the site, with links to / from the adjacent built-up areas for pedestrians and cyclists, so that the development is easy to walk and cycle through and integrated with the surrounding areas.
- 6.1.2 The proposed development would generate up to 32 no. walking and cycling trips off-site during any peak hour based on existing travel patterns, which is a minimal increase unlikely to have a noticeable impact on the walking and cycling infrastructure in the vicinity of the site. However, walking and cycling also form the start / end of public transport journeys, particularly by train of which there are up to 44 no. trips predicted during any peak hour based on minimal travel patterns. The majority of these would be via Rayleigh Station, within walking distance and providing connections to London Liverpool Street and Southend Victoria, although Benfleet and Leigh-on-Sea stations are within cycling distance and provide connections to London Fenchurch Street and Southend Central.
- 6.1.3 To assist pedestrian and cycle connectivity and permeability, there are points of access for these modes with Rayleigh Road, Asquith Avenue, Firfield Road, Daws Heath Road and the Public Right of Way Footpath No. 7 at Claydons Lane, in addition to the points of access for all modes via Stadium Way and Daws Heath Road.
- 6.1.4 To assist with pedestrian and cycle connections along Stadium Way to its junction with the A129 Rayleigh Road, the development proposes to remove the existing bollards and widen the footway on the southern side of Stadium Way. In addition, to enhance pedestrian accessibility along Daws Heath Road, including connections for school children to The Deanes secondary school, the development proposes a new Zebra crossing on Daws Heath Road between the site vehicular access and the school. The proposed arrangements for the Stadium Way footway improvement and the Daws Heath Road Zebra crossing are shown on the drawing at Appendix M. These improved pedestrian and cycle connections will link with the north-south hybrid cycle route along Rayleigh Way, planned as part of ECC's Castle Point Cycle Action Plan, along with other A129 Route Improvements planned by ECC as identified in the IDP.
- 6.1.5 The development will provide an appropriate contribution to ECC to assist ECC in delivering the schemes that they are currently investigating for the Rayleigh Weir junction as part of the A129 Route Improvements study, the Cycle Action Plan's north-south hybrid cycle route, and improvements that come forward as part of the A127 Route Management Strategy at the Rayleigh Weir junction.
- 6.1.6 Walking and cycling will be promoted, to reduce reliance on use of the private car for local trips in Hadleigh and the surrounding area, and to assist with walking and cycling accessibility to the nearby train stations. These active modes of travel are also important to help accelerate modal shift from car use in accordance with the DfT's 'Decarbonising Transport – Setting The Challenge', and therefore assist with achieving carbon budgets and net zero emissions across every single mode of transport by 2050. 'A Better, Greener Britain' also includes commitments to decarbonise all forms of transport through increasing walking and cycling, with the aim that half of all journeys in towns and cities will be cycled or walked by 2030.

- 6.1.7 Furthermore, the DfT's 'Gear Change: A Bold Vision for Cycling and Walking' notes that increasing walking and cycling can improve air quality, tackle climate change, improve health and wellbeing, address inequalities and tackle road congestion. It repeats the 'Decarbonising Transport' ambition of achieving half of all journeys in towns or cities walked or cycled.
- 6.1.8 It is apparent from these policy documents that encouraging walking and cycling for the Land East of Rayleigh Road development needs to be an important part of the proposals and decision-making on taking the development forward, for climate, health and inclusivity reasons.
- 6.1.9 The analysis in this TA indicates that key facilities such as Rayleigh Train Station and Town Centres are within convenient walking and cycling distance of the site, so there is good potential to increase the existing shares for these modes of travel. Furthermore, improving pedestrian and cycle infrastructure near the site would serve to attract existing car drivers along the A129 to non-car modes, and therefore the mitigation and improvement along the A129 and its junctions near the site would be focussed on non-car modes rather than providing additional vehicular capacity.
- 6.1.10 The development would assist with the delivery of ECC's Castle Point Cycling Action Plan by providing a contribution to the Action Plan's proposed high-quality north-south hybrid cycle route along the A129 between Rayleigh Weir and the Victoria House Corner junction. This is a designated high priority in the Action Plan. ECC note that the new route will involve reallocation of carriageway / central hatching / footway for new shared use cycle lanes on each side of the A129. Such mitigation would follow the guidance set out in the DfT's Decarbonising Transport documents and the 'Gear Change' document, and would assist with the DfT ambition of achieving net zero by 2050 and that half of all journeys in towns and cities are cycled or walked by 2030.
- 6.1.11 The Action Plan's cycle route scheme will investigate the potential conversion of the existing footway at the Victoria House Corner roundabout to shared use with cyclists, as this location has been identified as a cycle accident cluster. This enhancement could form part of the improvements that Castle Point have identified in their Local Plan transport evidence base to address congestion constraints at the junction as noted in Section 4. It is considered that pedestrian and cycle infrastructure and improvements should take priority over vehicular capacity improvements at this junction, as this would place cycling and walking at the heart of decision making for new developments.
- 6.1.12 The Action Plan notes that further investigation will be undertaken into improving conditions for cyclists at the Rayleigh Weir roundabout, which is also identified as a cycle accident cluster. This could also form part of the improvements that Castle Point have identified for this junction through their transport evidence base for the Local Plan, including pedestrian / cycle crossings facilities around the outer edge of the circulatory carriageway of the roundabout.
- 6.1.13 Castle Point's Infrastructure Delivery Plan (IDP), September 2020, sets out the transport infrastructure required to deliver the scale and location of growth envisaged by the draft Local Plan. It includes the new north-south hybrid cycle route along the A129 and estimates the cost for delivering the route at £0.5m to £1m.
- 6.1.14 The new north-south cycle route will significantly improve conditions for pedestrians and cyclists along the A129 and enhance the site's accessibility to Rayleigh Station to the north through non-car improvements at the Rayleigh Weir junction. Providing a contribution to ECC's Cycling Action Plan to deliver this new cycle route will assist with the development mitigating its transport impacts along the A129 by encouraging more walking and cycling trips not only for residents of the development, but also existing users of the A129.

- 6.1.15 Walking and cycling will be encouraged as part of a Travel Plan that will be prepared for the development. A Travel Plan Co-ordinator will promote the Travel Plan and provide a Personalised Travel Planning (PTP) offer to residents to identify how walking and cycling can meet their travel needs whilst also assisting with healthy and active lifestyles.

6.2 Public Transport Impacts

- 6.2.1 The proposed development would generate up to 44 no. public transport trips by train in any one peak hour, and it would also generate up to 12 no. conventional bus service trips. These assessments are based on existing travel patterns, and so take no account of the encouragement of public transport as set out in the DfT's Decarbonising Transport plan, and the mitigation that the development proposes to encourage public transport and therefore reduce the impact of vehicular traffic on the local highway network.
- 6.2.2 The public transport improvements include the improvement of pedestrian and cycling accessibility to Rayleigh Weir station, via the development providing a contribution to the ECC Cycling Action Plan's north-south hybrid cycle route along the A129 between and including the Rayleigh Weir and Victoria House Corner junctions. This will assist with accessibility to public transport services.
- 6.2.3 The development will also enable improvements to local bus services by the introduction of the spine road through the site, connecting Stadium Way with Daws Heath Road. There will be a bus gate on this spine road so that only buses can pass through the site, along with emergency vehicles, pedestrians, and cyclists. This will therefore provide bus priority and assist with the potential re-routing of the existing No. 3 Essex and Suffolk DaRT service between Southend, Rayleigh, and Chelmsford to avoid the Woodman's Arms junction.
- 6.2.4 The IDP notes that a new bus service could be provided to allow additional services along Daws Heath Road that would serve the site. It estimates a contribution from the site for new or improved bus routes along Daws Heath Road as being £517,045. In accordance with Local Plan Policy HO13 (now withdrawn), this would mean all dwellings will be within 400m of a bus stop.
- 6.2.5 The development's bus gate and contributions to bus services and improved waiting facilities, plus the improved walking and cycling access to Rayleigh Station, will enhance the site's public transport accessibility, further reducing reliance on the private car not only for residents of the proposed development but also existing users of the A129, and therefore further assist with the development mitigating its transport impacts along the A129.
- 6.2.6 The development's Travel Plan will also encourage use of public transport for the development.

6.3 Impact on Highway Flows

- 6.3.1 The previous section has estimated the proposed development vehicle trip generation for the weekday AM and PM peak hours, and the development flows only in the study area are shown on Diagrams 7 and 8 in Appendix I. These development trips have been added to the 2026 and 2031 baseline flows, and the resulting 2026 and 2031 flows including the development are shown on Diagrams 9 – 12 in Appendix I.
- 6.3.2 The impact of the proposed development on the local highway network, compared to the 2026 baseline scenario, is summarised in Tables 24 and 25 below. The comparison for 2031 flows has not been undertaken, as development trips will form a smaller proportion of overall trips and so the development impact will be less than in 2026.

- 6.3.3 It is important to note that these highway impact assessments are based on existing travel patterns, rather than taking into account policies that seek to encourage modal shift to walking and cycling.

Link Location – 2026 AM Peak Hour Flows	Baseline Flow	Flow With Development	% Impact	Absolute Impact
A129 North of Rayleigh Weir	1853	1862	0.5%	8
A127 Eastbound On-slip	703	733	4.4%	31
A127 Westbound Off-slip	669	700	4.7%	31
A129 South of Rayleigh Weir	2457	2589	5.4%	132
A127 Westbound On-slip	1071	1128	5.3%	56
A127 Eastbound Off-slip	843	875	3.8%	32
Rayleigh Road North of Stadium Way	2062	2186	6.0%	124
Stadium Way East of Rayleigh Road	553	678	22.6%	125
Rayleigh Road South of Stadium Way	2132	2252	5.6%	119
Rayleigh Road North of Daws Heath Road and Hart Road	1840	1959	6.5%	119
Daws Heath Road East of Rayleigh Road and Hart Road	878	1024	16.7%	147
Rayleigh Road South of Daws Heath Road and Hart Road	1209	1311	8.5%	102
Hart Road West of Rayleigh Road and Daws Heath Road	909	924	1.6%	15
Rayleigh Road North of A13	1342	1444	7.6%	102
A13 London Road Southeast of Rayleigh Road	2697	2724	1.0%	27
B1014 Benfleet Road South of A13	1556	1589	2.1%	33
A13 Kiln Road Northwest of Rayleigh Road	1783	1825	2.4%	42

Table 24: Development Vehicular Trip Impacts on Link Flows, 2026 AM Peak Hour

Link Location – 2026 PM Peak Hour Flows	Baseline Flow	Flow With Development	% Impact	Absolute Impact
A129 North of Rayleigh Weir	2171	2179	0.4%	8
A127 Eastbound On-slip	545	563	3.3%	18
A127 Westbound Off-slip	828	865	4.5%	37
A129 South of Rayleigh Weir	2566	2700	5.2%	134
A127 Westbound On-slip	817	850	4.0%	32
A127 Eastbound Off-slip	1136	1190	4.7%	54
Rayleigh Road North of Stadium Way	2125	2245	5.7%	121
Stadium Way East of Rayleigh Road	743	865	16.4%	122
Rayleigh Road South of Stadium Way	2379	2495	4.9%	116
Rayleigh Road North of Daws Heath Road and Hart Road	2035	2151	5.7%	116
Daws Heath Road East of Rayleigh Road and Hart Road	875	1018	16.3%	143
Rayleigh Road South of Daws Heath Road and Hart Road	1388	1488	7.2%	100
Hart Road West of Rayleigh Road and Daws Heath Road	903	917	1.6%	14
Rayleigh Road North of A13	1479	1578	6.7%	100
A13 London Road Southeast of Rayleigh Road	2837	2863	0.9%	26
B1014 Benfleet Road South of A13	1564	1597	2.1%	32
A13 Kiln Road Northwest of Rayleigh Road	1843	1884	2.2%	41

Table 25: Development Vehicular Trip Impacts on Link Flows, 2026 PM Peak Hour

- 6.3.4 The greatest percentage impacts of the development, those of about 10% and more, are on Daws Heath Road and Stadium Way, and this is expected as these provide vehicular access to the development. There are also increases in excess of 5% on Rayleigh Road between Rayleigh Weir and Victoria House Corner. Elsewhere, the absolute increases in flows as a result of the development are below 5%, which could be considered to be within the daily variation inherent in traffic flows and therefore unnoticeable to the casual observer. However, the absolute increases in flows are important, and it is typically the junctions within a highway network that determine the network's capacity rather than the links between the junctions.
- 6.3.5 The impact of the development on the capacity of these junctions has been assessed is summarised below.

6.4 Site Access Junction Capacity

- 6.4.1 The development proposes the following site vehicular accesses:
- 6.4.2 There will be two points of vehicular access to the site:
- Via a new priority T-Junction on Stadium Way to the north; and
 - Via a new priority T-Junction on Daws Heath Road to the South
- 6.4.3 Both access designs are included within Appendix C. The capacity of each access has been tested on the basis of each serving 50% of the scale of proposed development.
- 6.4.4 The capacity of each junction has been assessed using the Junctions 10 program, based on the 2026 and 2031 AM and PM peak hour flows including development shown on Diagrams 9 – 12 in Appendix I. The resulting capacity assessments are summarised in Tables 26 – 29 below, and the Junctions 10 capacity assessment printouts are attached at Appendix J.

Stadium Way / Site Access Priority T-Junction

2026 Flows including Development, Stadium Way Proposed Site Access	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
Site Access Arm	0.18	0.2	0.12	0.1
Stadium Way Right Turn into Site Access	0.11	0.2	0.20	0.4

Table 26: Junctions 10 Capacity Summary for the Proposed Stadium Way Site Access, for 2026 Weekday AM and PM Peak Hour Flows including Development

2031 Flows including Development, Stadium Way Proposed Site Access	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
Site Access Arm	0.18	0.2	0.12	0.1
Stadium Way Right Turn into Site Access	0.11	0.2	0.21	0.4

Table 27: Junctions 10 Capacity Summary for the Proposed Stadium Way Site Access, for 2031 Weekday AM and PM Peak Hour Flows including Development

- 6.4.5 The above summary shows that the proposed Stadium Way priority T-junction site access will operate with significant available capacity and minimal queuing for AM and PM peak hours in 2026 and 2031.

Daws Heath Road / Site Access Priority T-Junction

2026 Flows including Development, Daws Heath Road Proposed Site Access	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
Site Access Arm	0.27	0.4	0.16	0.2
Stadium Way Right Turn into Site Access	0.01	0.0	0.02	0.0

Table 28: Junctions 10 Capacity Summary for the Proposed Daws Heath Road Site Access, for 2026 Weekday AM and PM Peak Hour Flows including Development

2031 Flows including Development, Daws Heath Road Proposed Site Access	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
Site Access Arm	0.27	0.4	0.16	0.2
Stadium Way Right Turn into Site Access	0.01	0.0	0.02	0.0

Table 29: Junctions 10 Capacity Summary for the Proposed Daws Heath Road Site Access, for 2031 Weekday AM and PM Peak Hour Flows including Development

- 6.4.6 The above summary shows that the proposed Daws Heath Road priority T-junction site access will operate with significant available capacity and minimal queuing for AM and PM peak hours in 2026 and 2031.

6.5 Off-Site Junction Capacity Assessments

- 6.5.1 The off-site junctions described in the previous sections are tested for capacity in the 2026 and 2031 future assessment years including development flows in Tables 30 – 37 below. The capacity program printouts are attached at Appendix J.

A127 / A129 'Rayleigh Weir' Signalised Roundabout

2026 Flows including Development, Rayleigh Weir Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
Arm	Lane / Movement	Max DoS	Queue	Max DoS	Queue
A127 eastbound off-slip entry (Arm 1)	Nearside Left and Ahead	51.8%	7.4	58.2%	7.2
	Offside Ahead	76.9%	14.6	81.2%	13.9
A129 North entry (Arm 2)	Nearside Left and Ahead	77.0%	13.4	83.6%	9.1
	Middle and Offside Ahead	81.6%	14.2	87.7%	10.4
A127 westbound off-slip entry (Arm 3)	Nearside Left and Ahead	85.2%	12.0	84.8%	10.5
	Offside Ahead	78.9%	11.0	76.9%	9.1
A129 South entry (Arm 4)	Nearside Left	59.9%	9.8	51.2%	5.6
	Middle and Offside Ahead	77.8%	14.3	71.1%	7.4
Circulatory in advance of A127 eastbound off-slip entry (Arm 9)	Nearside Ahead	36.0%	5.1	58.9%	5.9
	Middle Ahead and Right	59.5%	6.4	63.3%	4.8
	Offside Right	32.3%	6.1	49.7%	6.5
Circulatory in advance of A129 North entry (Arm 10)	Nearside Ahead	39.5%	3.1	13.7%	0.7
	Middle Ahead and Right	61.5%	6.2	67.2%	6.0
	Offside Right	38.2%	5.7	37.4%	5.2
Circulatory in advance of A127 westbound off- slip entry (Arm 11)	Nearside Ahead	57.8%	3.4	68.6%	3.9
	Middle Ahead and Right	63.9%	7.8	75.2%	7.3
	Offside Right	29.1%	0.4	19.8%	0.1
Circulatory in advance of A129 South entry (Arm 12)	Nearside Ahead	34.9%	2.7	32.3%	2.6
	Middle Ahead and Right	63.0%	4.9	48.9%	4.1
	Offside Right	38.5%	7.2	40.8%	0.5
DoS over all lanes: AM = 85.2%; PM = 87.7% Total Delay over all lanes: AM = 52.70 pcu Hrs; PM = 53.10 pcu Hrs Cycle Time: AM = 83 seconds; PM = 60 seconds					

Table 30: LinSig Capacity Summary for the A127 / A129 Rayleigh Weir Junction, for 2026 Flows Including Development, Weekday AM and PM Peak Hour

2031 Flows including Development, Rayleigh Weir Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
		Max DoS	Queue	Max DoS	Queue
Arm	Lane / Movement				
A127 eastbound off-slip entry (Arm 1)	Nearside Left and Ahead	50.7%	6.1	61.9%	8.1
	Offside Ahead	75.1%	11.8	86.0%	16.2
A129 North entry (Arm 2)	Nearside Left and Ahead	89.2%	14.1	78.0%	8.9
	Middle and Offside Ahead	93.4%	16.9	77.4%	7.7
A127 westbound off-slip entry (Arm 3)	Nearside Left and Ahead	85.3%	10.6	88.9%	12.4
	Offside Ahead	73.7%	8.6	79.2%	10.0
A129 South entry (Arm 4)	Nearside Left	75.4%	10.5	60.6%	7.0
	Middle and Offside Ahead	92.8%	17.8	81.6%	10.5
Circulatory in advance of A127 eastbound off-slip entry (Arm 9)	Nearside Ahead	47.1%	4.9	64.9%	7.4
	Middle Ahead and Right	57.7%	4.7	67.2%	6.6
	Offside Right	43.7%	5.8	41.5%	5.3
Circulatory in advance of A129 North entry (Arm 10)	Nearside Ahead	34.1%	2.5	21.1%	1.3
	Middle Ahead and Right	66.4%	6.5	64.8%	5.7
	Offside Right	37.9%	6.1	43.8%	6.3
Circulatory in advance of A127 westbound off- slip entry (Arm 11)	Nearside Ahead	63.2%	3.1	68.6%	7.5
	Middle Ahead and Right	72.8%	7.8	69.4%	7.3
	Offside Right	32.8%	0.4	31.5%	0.4
Circulatory in advance of A129 South entry (Arm 12)	Nearside Ahead	33.4%	2.2	16.9%	0.7
	Middle Ahead and Right	61.0%	5.3	60.0%	4.0
	Offside Right	29.9%	4.5	34.7%	2.9
DoS over all lanes: AM = 93.4%; PM = 88.9% Total Delay over all lanes: AM = 60.75 pcu Hrs; PM = 53.22 pcu Hrs Cycle Time: AM = 66 seconds; PM = 63 seconds					

Table 31: LinSig Capacity Summary for the A127 / A129 Rayleigh Weir Junction, for 2031 Flows Including Development, Weekday AM and PM Peak Hour

- 6.5.2 By the 2031 future baseline, the junction is predicted to be operating above the operational capacity threshold but within the theoretical capacity threshold during the AM peak hour, and within the operational capacity threshold during the PM peak hour.

- 6.5.3 Castle Point's transport evidence base suggests that improvements to the junction could be in the form of:
- Segregated left turn lanes from the A129 northern and southern arms onto the A127 eastern and westbound respective on-slips. This could also incorporate pedestrian / cycle crossings facilities around the outer edge of the circulatory carriageway. Benefits would be anticipated to include increased vehicular capacity on the northern and southern approaches to the roundabout, and potential improvements for non-motorised users using the junction;
 - Dedicated 'Bus Priority Lanes' north and southbound (A129) through the roundabout. Given the available space on the outer edges of A127 overbridge decks, bus lanes could potentially be located within these sections of unused space. The benefits would be anticipated to include improved bus reliability.
- 6.5.4 ECC note that the Rayleigh Weir junction is an accident cluster site and are investigating a Route Management Strategy for the A127, including at the A129 Rayleigh Weir junction, with consideration of future improvements being managed by an A127 Task Force. ECC are also investigating A129 Route Improvements through Thundersley, including the Rayleigh Weir junction, with options currently being considered.
- 6.5.5 The Rayleigh Weir junction also forms part of the ECC Cycle Action Plan's proposed north-south hybrid cycle route, which would significantly improve pedestrian and cycle connectivity with Rayleigh Station to the north.
- 6.5.6 To mitigate its impact, the development will provide an appropriate contribution to ECC to assist ECC in delivering the schemes that they are currently investigating for the Rayleigh Weir junction as part of the A127 Route Management Strategy, the A129 Route Improvements study, and the Cycle Action Plan's north-south hybrid cycle route. Based on transport policy guidance and the identification of the junction by ECC as an accident cluster site, it is considered that improvements at this junction should focus on improving road safety and conditions for walking, cycling and public transport, rather than assisting unfettered growth of vehicular traffic through vehicular capacity enhancements, as this could have negative effects on health, well-being and the climate.
- 6.5.7 The IDP estimates a total cost of the A129 Route Improvements of £3,723,000, noting that this relates to the cost of implementing a link road through withdrawn Local Plan Site HO13. The A129 costs therefore only relate to Site HO13, so if alternative approaches to addressing congestion are identified, transport-related S106 requirements associated with Site HO13 should be re-calculated. The IDP's stated contribution from Site HO13 to the A129 route improvements, which are considered to include the north-south hybrid cycle route, is £3,723,000, which matches the estimated cost.

A129 Rayleigh Road / Stadium Way Signal-Controlled T-Junction

2026 Flows including Development, A129 Stadium Way Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
Arm	Lane / Movement	Max DoS	Queue	Max DoS	Queue
A129 North	Left slip to Stadium Way	22.6%	4.1	28.4%	5.2
	Nearside Ahead	62.4%	14.0	73.7%	16.2
	Offside Ahead	41.2%	8.7	61.0%	13.2
Stadium Way	Nearside Left	94.2%	17.6	77.6%	10.7
	Offside Right	94.2%		77.6%	
A129 South	Nearside and Middle Ahead	94.1%	33.9	77.1%	15.9
	Offside Right	71.6%	7.8	74.8%	7.3
DoS over all lanes: AM = 94.2%; PM = 77.6% Total Delay over all lanes: AM = 37.01 pcu Hrs; PM = 29.31 pcu Hrs Cycle Time: AM = 120 seconds; PM = 120 seconds					

Table 32: LinSig Capacity Summary for the A129 Stadium Way Junction, for 2026 Weekday AM and PM Peak Hour Flows including Development

2031 Flows including Development, A129 Stadium Way Junction		AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
Arm	Lane / Movement	Max DoS	Queue	Max DoS	Queue
A129 North	Left slip to Stadium Way	23.5%	4.2	29.5%	5.4
	Nearside Ahead	64.5%	14.6	76.0%	17.0
	Offside Ahead	43.5%	9.3	64.7%	14.3
Stadium Way	Nearside Left	97.7%	21.1	81.0%	11.6
	Offside Right	97.7%		81.0%	
A129 South	Nearside and Middle Ahead	98.1%	43.2	80.5%	17.9
	Offside Right	74.7%	8.3	77.6%	7.8
DoS over all lanes: AM = 98.1%; PM = 81.0% Total Delay over all lanes: AM = 47.07 pcu Hrs; PM = 31.88 pcu Hrs Cycle Time: AM = 120 seconds; PM = 120 seconds					

Table 33: LinSig Capacity Summary for the A129 Stadium Way Junction, for 2031 Weekday AM and PM Peak Hour Flows including Development

- 6.5.8 The addition of development trips exacerbates the capacity constraints that were observed during the 2031 AM future baseline peak hour. However, the junction would still be within theoretical capacity, i.e. DoS less than 100%. These findings are consistent with the CPBC transport evidence base and the ECC audit of the CPBC junction model, which suggested changes to the model setup that would improve the performance of the junction.
- 6.5.9 These findings are based on robust assessments of the development's vehicular trip generation, not considering the potential for mode shifts to walking, cycling and public transport. The assessments also indicate that it is only in the future 2026 and 2031 AM peak hour flows including development when the junction is above the operational capacity threshold, and the junction is expected to be above this threshold without the development in the 2031 AM future baseline scenario.
- 6.5.10 The development's contribution to ECC's north-south hybrid cycle route along the A129, plus enhanced bus services on Daws Heath Road and the bus gate through the development will provide significantly improved conditions for active travel and public transport and therefore a reduction in the vehicular trip generation not only for the development but also for existing residents. These modes will be encouraged as part of the Travel Plan for the development.
- 6.5.11 CPBC's April 2021 Proposed Allocations HO13 Sensitivity Analysis Briefing Paper presented findings of sensitivity assessments of the A129 / Stadium Way junction's performance to consider the potential effects arising from:
- Travel planning and associated sustainable travel measures which could reduce the vehicular trip generation of development at HO13, by 5% and 10%; and
 - Reductions in background traffic volumes arising from the COVID-19 pandemic and the potential medium to long-term effect this may have on travel and working patterns, including greater amounts of home working for example, by 5%, 10% and 15%.
- 6.5.12 The Briefing Paper summarises the impact of these reductions as follows:
- The sensitivity analysis . . . indicates that reductions in background flows (5%, 10% and 15%) as well as the effects of travel planning and sustainable travel measures (5% and 10%) would all be expected to contribute toward improving the performance of the junction (or maintaining a 'Green' [i.e. within operational capacity] level of performance).*
- Travel planning effects in isolation would not be expected to be sufficient to alter the AM peak performance of the junction from 'Amber' [i.e. above operational capacity but within theoretical capacity] to 'Green', however, this may not be considered to be a significant issue given that the junction is close to 'Green' and that the HO13 development may deliver other mitigation measures.*
- 6.5.13 These other mitigation measures include the north-south hybrid cycle route plus improved bus services. The development will provide an appropriate contribution to ECC's A127 Route Management Strategy schemes and the A129 Route Improvements schemes. As noted above, the IDP estimates a cost and matching contribution of £3,723,000 from HO13 to the A129 route improvements.
- 6.5.14 It is therefore considered that, through a combination of the development's improvements to walking, cycling and public transport with travel planning to encourage these modes, plus the improvements delivered through the A127 and A129 ECC studies, the development will mitigate its impact at the A129 / Stadium Way junction.

A129 Rayleigh Road / Daws Heath Road / Hart Road Double Mini-Roundabout – the ‘Woodman’s Arms’ Junction

2026 Flows including Development, Woodman’s Arms Junction	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A129 Rayleigh Road North	1.00	23.0	1.18	106.1
Daws Heath Road	1.06	28.2	0.84	4.7
A129 Rayleigh Road South	1.36	122.7	1.35	124.6
Hart Road	1.21	47.0	1.26	58.2

Table 34: Junctions 10 Capacity Summary for the A129 / Daws Heath Road / Hart Road Double Mini-Roundabout ‘Woodman’s Arms’ Junction, for 2026 Weekday AM and PM Peak Hour Flows including Development

2031 Flows including Development, Woodman’s Arms Junction	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A129 Rayleigh Road North	1.02	27.2	1.20	117.9
Daws Heath Road	1.08	32.9	0.86	5.2
A129 Rayleigh Road South	1.38	132.1	1.38	137.3
Hart Road	1.24	55.1	1.29	67.5

Table 35: Junctions 10 Capacity Summary for the A129 / Daws Heath Road / Hart Road Double Mini-Roundabout ‘Woodman’s Arms’ Junction, for 2031 Weekday AM and PM Peak Hour Flows including Development

- 6.5.15 The above summary indicates that the junction is above capacity during both AM and PM peak hours in all scenarios and with resultant significant queuing. This reflects the findings of Castle Point’s Transport Evidence Refresh Report (January 2019), and the subsequent review of the model by ECC in their Model Audit Report (April 2021). Castle Point’s January 2019 RAG assessment of the junction for 2018 flows found that the junction would be Amber, i.e. with RFC’s between 0.85 and 0.99. ECC’s recommendations for revising the model set out in their April 2021 Audit indicate that the changes they suggest to the model setup would result in less favourable results. These recommended changes have been applied for the purposes of this Transport Assessment, and the results above show that the maximum RFC’s would exceed theoretical capacity thresholds in all baseline scenarios.
- 6.5.16 CPBC’s May 2020 Transport Evidence Refresh Report considers the following potential improvements to the junction:
- Minor modifications to the existing mini roundabouts, such as providing marked two-lane entries on all arms where practical i.e. left turn and ahead or, left turn and right turn depending on approach arm. This is likely to require localised widening and land take where necessary. This could potentially increase capacity on each approach, however, the benefits in real terms could be negligible due to lane starvation, i.e. the situation where there are two lanes entering the roundabout on each arm but only one lane exiting the junction on each arm, so vehicles tend to utilise only one of the entry arms;

- Conversion of the double mini roundabouts to priority junctions, with short staggered right turn lanes for Hart Road and Daws Heath Road. In this case, priority would then be afforded to Rayleigh Road and through traffic movements north and southbound, however, this could make it difficult for side road traffic to join Rayleigh Road thereby having wider network implications;
- Conversion of the double mini roundabout to a signalised junction. This could potentially improve capacity of each arm of the junction and assign intergreen phasing priority at peak times. It could also introduce the opportunity to provide greater benefit to cyclists in terms of road safety and interaction with turning vehicles i.e. Advance Stop Lines (ASL's) for cyclists at stop lines. Signalisation could also include upgrading of existing crossing provisions to controlled crossing i.e. pelican crossings phased with traffic moments.

- 6.5.17 CPBC previously considered the signalisation option as part of their 2013 evidence base for the then emerging Local Plan. A preliminary scheme for this signalisation is attached at Appendix N. The junction modelling work undertaken at the time by Castle Point indicated that the junction would still be above the theoretical capacity threshold during peak hours, and so the preliminary design was not taken further. It was recognised that the signalisation of the pedestrian crossings could improve pedestrian safety, although this would be at the expense of vehicular delay.
- 6.5.18 The capacity constraint at the Woodman's Arms junction has therefore been investigated in detail by Castle Point, and this has included consideration of the potential for a new link road through the HO13 site so that traffic travelling along the A129 Rayleigh Road (North) and Daws Heath Road can avoid the junction, therefore alleviating delays.
- 6.5.19 For the reasons set out in Section 2, this link road potential has been discounted. Adding new highway capacity where capacity is constrained can induce additional vehicular traffic to an area as the new capacity releases suppressed demand. The resulting capacity benefits of the additional highway capacity infrastructure are therefore often short-lived.
- 6.5.20 The Woodman's Arms junction therefore has and will have capacity constraints for private car users along the A129. Modifications to the junction to make it easier and quicker for the private car driver to travel through this section of the A129 would, however, contradict policy in the DfT's Decarbonising Transport plan, which places the importance of walking, cycling and public transport above the needs of the private car user if the challenges of climate change are to be tackled. Furthermore, the DfT's 'Gear Change' plan stresses the importance of encouraging active modes, for health, well-being and social inclusivity reasons.
- 6.5.21 The NPPF notes at paragraph 111 that "Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe". Enabling easier travel through the Woodman's Arms junction for the private car user by capacity improvements serves as no deterrent to unfettered growth in the use of the private car. Such growth will have detrimental impacts on carbon emissions and the climate, health and well-being, and social inclusivity, and these impacts could be considered severe.
- 6.5.22 It is therefore considered that improvements at this junction to mitigate the development are those which focus on improving road safety as the junction is an accident cluster site, along with conditions for pedestrians, cyclists, and public transport users. This is instead of improving journey times for private vehicular traffic as this would be contrary to pervading transport policies which seek to reduce car use. The development will provide the contribution towards ECC's A129 Route Improvements and the north-south hybrid cycle route and provide the bus gate through the development along with contributions to enhanced bus services on Daws Heath Road, to mitigate its impact at the Woodman's Arms junction.

A129 Rayleigh Road / A13 / B1014 'Victoria House Corner' Roundabout

2026 Flows including Development, Victoria House Corner Roundabout	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A13 London Road	0.89	7.7	0.98	21.5
B1014 Benfleet Road	0.82	4.4	0.78	3.3
A13 Kiln Road	0.65	2.0	0.72	2.5
A129 Rayleigh Road	0.73	2.7	0.74	2.7

Table 36: Junctions 10 Capacity Summary for the A129 / A13 / B1014 'Victoria House Corner' Roundabout, for 2026 Weekday AM and PM Peak Hour Flows including Development

2031 Flows including Development, Victoria House Corner Roundabout	AM Peak Hour (8-9am)		PM Peak Hour (5-6pm)	
	Max RFC	Queue	Max RFC	Queue
A13 London Road	0.91	9.1	1.00	29.6
B1014 Benfleet Road	0.84	5.1	0.80	3.7
A13 Kiln Road	0.67	2.1	0.73	2.7
A129 Rayleigh Road	0.75	3.0	0.76	3.0

Table 37: Junctions 10 Capacity Summary for the A129 / A13 / B1014 'Victoria House Corner' Roundabout, for 2031 Future Baseline Weekday AM and PM Peak Hour Flows

- 6.5.23 The above summary indicates that the development does not change the status of this junction's performance compared with the 2026 and 2031 baseline scenarios, when it was above operational capacity threshold during the 2031 AM peak hour and above the theoretical capacity threshold in the 2031 PM peak hour. This reflects the findings of Castle Point's Transport Evidence Refresh Report May 2020, and the subsequent review of the model by ECC in their Model Audit Report (April 2021).
- 6.5.24 CPBC's May 2019 Transport Evidence Refresh Mitigation and Sensitivity Analysis Report considers the following potential improvements to the junction, as shown on the preliminary junction layout plan attached at Appendix O:
- Increase the entry width on the London Road East approach, to provide three lanes. These would be marked on-street as a short flared lane for left turning traffic on the nearside, an ahead lane (bound for Kiln Road West) and an ahead and right lane on the offside;
 - Increase the entry width on the Benfleet Road South approach, to also provide three lanes. These would be marked on-street as a left turning lane on the nearside, ahead, and right lane and a short flared lane on the offside, for right turning traffic;
 - Introduce minor widening on the Kiln Road West approach to the junction, to allow both existing lanes to be widened to 4m; and
 - Minor amendments to the gyratory of the roundabout, including revised lane and road markings to complement the revisions to the turning lanes provided on the eastern and southern approaches to the junction.

- 6.5.25 The Mitigation and Sensitivity Analysis Report's assessment of these improvements found that the modifications would improve the operation of the junction and bring it within the theoretical capacity threshold, and that:

Overall, this improvement scheme is therefore expected to have a positive effect on the operation of the junction which will enhance performance and reduce queuing, particularly on the more congested approaches.

- 6.5.26 Castle' Point's May 2020 Transport Evidence Refresh indicated that alternative improvements to the junction could include:

- Provision of a 'through-about' (whereby a 'major' road can pass directly through the junction whilst other movements are directed around the gyratory) under signal control for one of the following options:
 - The A13 eastbound through movements are directed 'through' the junction i.e. from Kiln Road to London Road, or
 - A129 Rayleigh Road and westbound movements are directed 'through' the junction to the A13 Kiln Road;
- Conversion of the junction to a signalised roundabout.

- 6.5.27 The development will therefore provide a contribution to ECC for ECC to deliver improvements at Victoria House Corner to mitigate its impact at the junction. This would be part of the total contribution from the site towards A129 Route Improvements. It is considered that this should go towards improvements that enhance pedestrian, cycling and public transport users at the junction.

7 Construction Traffic

- 7.1.1 The project is currently at the outline application stage so there is not the degree of certainty on the quantity and bulk of materials, construction programme and site logistics required for a first principles approach to construction traffic volumes.
- 7.1.2 The precise routing of construction traffic associated with the development will be specified within a Construction Environmental Management Plan. However, it is expected that construction vehicles will access the site via the A127 then A129, so avoiding travelling through residential areas. This construction traffic routing is shown on the plan at Appendix P. A temporary construction access layout via the A129 for the initial phase of development is proposed, and also shown on the drawing at Appendix P.
- 7.1.3 To mitigate the effects of construction traffic, a Construction Environmental Management Plan will be implemented. This will specify appropriate routing of construction vehicles, hours of operation and any driver training requirements.
- 7.1.4 This plan would be included in a construction method statement which would be produced when further information on the quantity and bulk of materials, construction programme and site logistics is available, and would also provide for:
- The parking of vehicles by operatives (remote from the site);
 - Site visitors;
 - The loading, unloading and storage of plant materials;
 - Wheel-washing facilities;
 - The routing of delivery vehicles;
 - A programme of works (Including measures for other traffic management);
 - Car parking for construction staff.
- 7.1.5 The Construction Environmental Management Plan would be submitted to and approved by CPBC and ECC prior to the start of construction of the development. The statement would be secured by means of a suitable worded planning condition.

8 Conclusion

- 8.1.1 This Transport Assessment (TA) report has been prepared to accompany proposals for proposed residential-led development on Land East of Rayleigh Road, Thundersley, Essex. The scope of this TA has been agreed with highway officers at Essex County Council (ECC), the local highway authority for roads around the site.
- 8.1.2 The proposed development is for 455 dwellings, a new multi-use community hall, land for the provision of a healthcare facility (1,000sqm), and land for a stand-alone early years and childcare nursery.
- 8.1.3 The site will take vehicular access via new priority T-junctions on Stadium Way and Daws Heath Road. There will be a spine road through the site linking these two accesses that will be open to pedestrians, cyclists, and public transport, but not private vehicular traffic.
- 8.1.4 The development's trip generation and distribution has been undertaken using the TRICS database and journey to work information from the 2011 Census. Modelling of vehicular trips, including route choice and traffic impacts on roads in and around Hadleigh, has been undertaken for 2026 and 2031 weekday peak hours, based on traffic surveys undertaken in June 2022.
- 8.1.5 Mitigating the transport impacts of the development will be in accordance with local and national transport policies, which prioritise pedestrians, cyclists, and public transport, rather than supplying extra road capacity for the convenience of car borne users. The development therefore proposes transport mitigation that focusses on improving road safety and conditions for walking, cycling and public transport, maximising the use of existing highway infrastructure. This is instead of assisting unfettered growth of vehicular traffic through providing new highway capacity in the form of enlarged junctions or widened roads.
- 8.1.6 The site was included in the now withdrawn Castle Point Borough Council (CPBC) Pre-submission Local Plan (December 2019), as Site HO13. The evidence base supporting the withdrawn Local Plan remains relevant for this planning application, and includes CPBC's Infrastructure Delivery Plan (IDP). Following review of the Pre-submission Local Plan and its evidence base, the Inspector's Report on the Examination of the Local Plan (March 2022) concluded that:
- I am satisfied that given the technical evidence, the level of growth proposed in the Plan is such that any significant impacts which would arise from it on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree. There is no convincing evidence to the contrary.*
- 8.1.7 The development will make a contribution to CPBC towards the A129 Route Improvements as described in the IDP, which is a live document, and may be updated from time to time. This process may identify changes to growth forecasts, and changes to transport improvements to accommodate growth.
- 8.1.8 A Residential Travel Plan has been prepared separately for the proposed development, whose objective will be to encourage non-car modes of travel to the proposed development. This would be in place prior to occupation. The Travel Plan will be monitored, reviewed, and modified as necessary.
- 8.1.9 Through the package of transport measures, along with the Travel Plan for the development, it is considered that the development will cost effectively mitigate its transport impacts on the transport network, so that there is an acceptable impact on highway safety, and the residual cumulative impacts of the development on the road network are not severe.

8.1.10 The proposed development meets transport-related requirements, because:

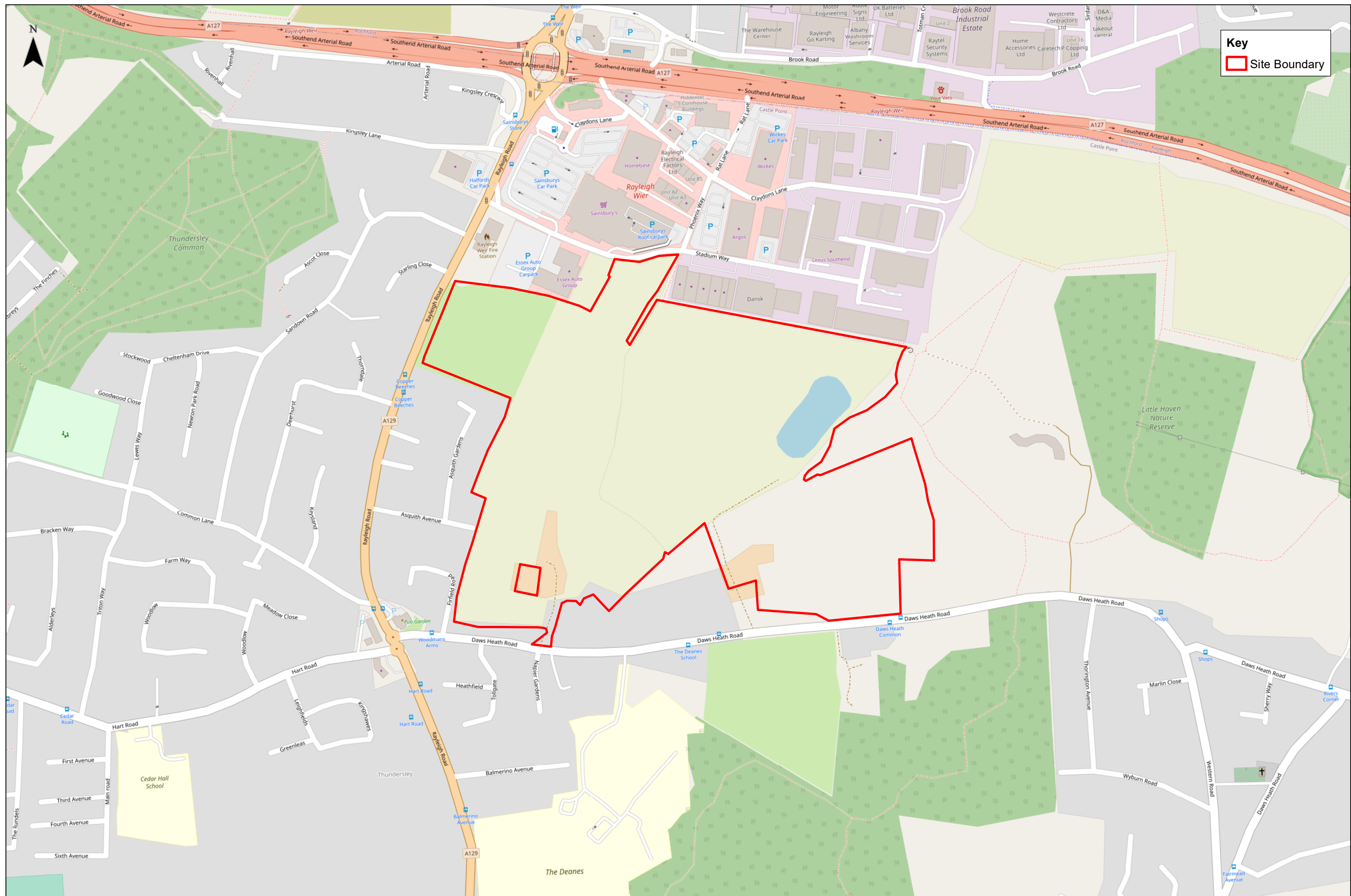
- Access arrangements for the site addressing peak time congestion at nearby junctions through the development's contribution to ECC's A129 route improvements;
- The provision of greenways through the site, linking to the existing network of green infrastructure which provide opportunity for active travel and recreation, but which avoid or otherwise manage additional recreational disturbance to sensitive wildlife assets nearby;
- Main vehicular access will be taken from Stadium Way in the north and Daws Heath Road in the south; and
- Improvements to active and sustainable infrastructure, facilities and services will be secured within and as part of the development to promote modal shift and improve connectivity. This includes the public transport only route through the site, bringing all new homes on the site within 400m of public transport provision.

8.1.11 The proposed development is in accordance with national transport policy objectives contained in the National Planning Policy Framework. The development's proposed transport improvements will be cost-effective in limiting the development's transport impacts and will assist with maximising the site's non-car accessibility. The improvements can also be undertaken within the transport network, i.e. the public highway or land within the control of the applicant, and therefore do not require third party land.

8.1.12 Based on the assessments and mitigation described in this report, it is considered that the residual cumulative impacts of the development are not severe, and therefore there should be no reason on transport grounds why the development should be prevented or refused.

FIGURES AND APPENDICES

Figure 1: Site Location Plan




	Client 	LAND EAST OF RAYLEIGH ROAD, THUNDERSLEY Site Location Plan	 © OpenStreetMap (and) contributors, CC-BY-SA		1:5,000 @ A3	Date: 25/11/2022
					Drawn: JGC	Checked: MJJ
			Figure 1			Rev: 0

Figure 2: Wider Area Plan

Figure 3: Junction Location Plan