Castle Point Plan (CPP) **05/12/2025**

Reference number GB01T23H92

TRANSPORT ASSESSMENT

SYSTRA

CASTLE POINT PLAN (CPP)

TRANSPORT ASSESSMENT

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1. INTRODUCTION

1.1.1 SYSTRA has been appointed by Castle Point Borough Council (CPBC) to prepare a Transport Assessment (TA) as part of the evidence base to support the Castle Point Plan (CPP).

1.1.2 The TA has been prepared to identify and appraise the local transport context within Castle Point, and to assess the expected transport impacts which will be associated with the development proposed as part of the CPP.

1.1.3 A TA Scoping Report formed part of the evidence base supporting the Regulation 18 Consultation (Issues and Options), which was held between July and September 2024. A Regulation 19 Transport Assessment (dated 28 July 2025) and a Transport Assessment Addendum (dated 22 August 2025) were prepared to assess the impacts of the Preferred Option for development which forms the basis for the Regulation 19 Consultation.

1.1.4 This Transport Assessment brings together the relevant material from the Regulation 19 TA and TA Addendum into a single document. It also provides additional analysis and clarification on a number of issues in response to comments provided during the Regulation 19 consultation, both on the TA itself and the Regulation 19 Draft Local Plan document.

2. BACKGROUND

2.1 Description of Castle Point

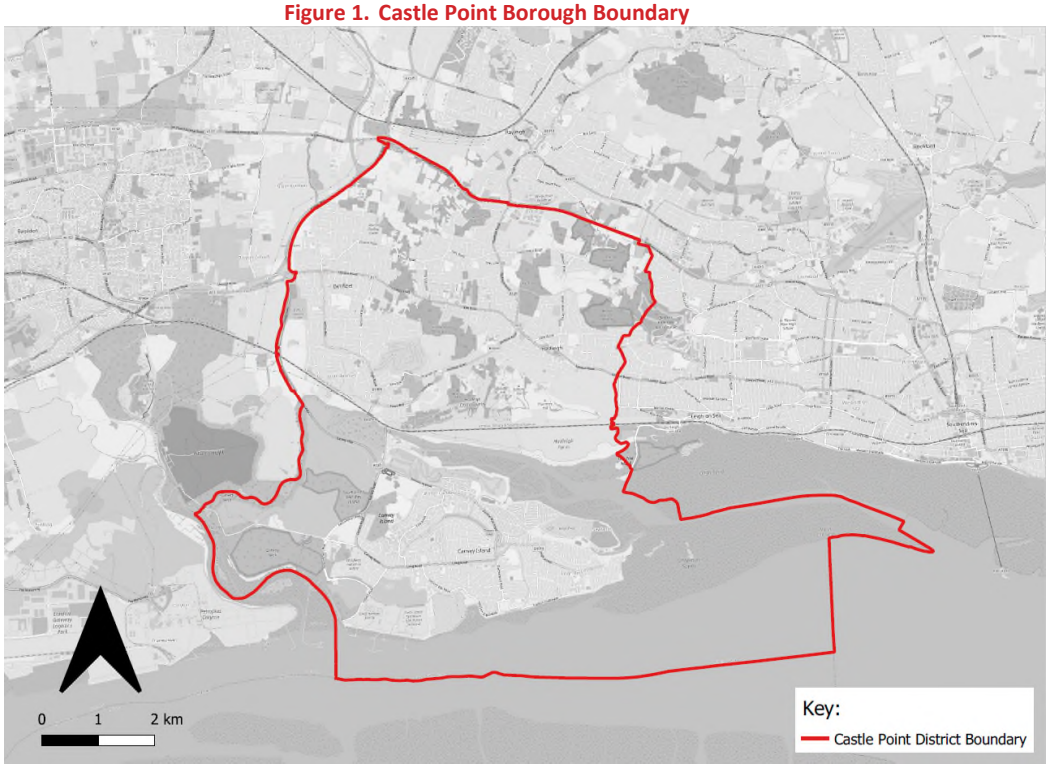
2.1.1 The borough of Castle Point is located in the East of England within the region of South Essex. The Local Planning Authority is Castle Point Borough Council (CPBC) and Essex County Council (ECC) is the Highways Authority. The borough is comprised of Canvey Island to the south and the mainland areas of Benfleet, Thundersley, Daws Heath and Hadleigh. The east-west A13 and north-south A129 run through the borough, and the A127 and A130 run along the northern and western parts of the borough. The Castle Point region is served by a series of existing bus routes, providing connection to Basildon, Southend and surrounding areas. The area is also served by the Benfleet rail station, which provides services to London and Shoeburyness via Southend. Services to London depart approximately every 10 minutes during peak hours, and the journey time is approximately 43 minutes.

2.1.2 The population of Castle Point is approximately 89,600 people as of the 2021 Census. Approximately 31.6% of the residents of the borough are aged 60 or above. 85% of households in the area own at least one car or van. The primary mode of travel to work is driving a car or van, with 52.8% of residents using this method of travel. The 2021 Census showed that 28.5% of residents mainly work from home. It is noted that the 2021 Census took place during COVID-19 restrictions and therefore does not necessarily present an accurate depiction of travel-to-work data. However, as it presents the most recent Census surveys, it is deemed that it is a good starting point for analysis.

2.1.3 Due to the high reliance on car usage in Castle Point, the assessment will explore measures to encourage a shift to active and public transport throughout the borough. Additionally, it will identify mitigations for key areas of congestion as part of the options appraisal included in this Transport Assessment.

2.1.4 The Castle Point boundary is indicated in Figure 1 below.

Figure 1. Castle Point Borough Boundary



2.2 Background to the Castle Point Plan

2.2.1 The Castle Point Plan sets out how Castle Point will grow and change into the future, allocating sites for development and setting out policies which protect the environment from harm. The Department for Transport indicates the importance to the Local Plan of establishing a robust transport evidence base to support the preparation of that Plan. A robust transport evidence base ensures that new development is supported by the transport infrastructure needed to mitigate its effects on traffic conditions and ensure that residents have access to the jobs and services they require to meet their everyday needs.

2.2.2 It is important for local planning authorities to undertake an assessment of the transport implications in developing or reviewing their Local Plan so that a sustainable transport network can be put in place, encouraging a modal shift from private car usage, toward travel through public transport and active modes as well as identifying any necessary junction improvements, which may still arise to facilitate this.

2.3 What is a Transport Assessment

2.3.1 This Transport Assessment (TA) aims to inform the identification and undertake an initial assessment of development options which could be brought forward in the new CPP.

2.3.2 Throughout the following chapters, SYSTRA have undertaken a series of assessments to inform the development of CPP options. This has included assessment of existing transport infrastructure throughout the Castle Point region, analysis of previous CPP highway capacity testing, and analysis of potential urban development clusters to determine their potential to deliver improvements to the existing transport network and to understand their impact on the highway.

2.3.3 This TA has been prepared to reflect the development proposals which are set out in the submission Local Plan document prepared by CPBC. The submission Local Plan has been developed via a number of consultation stages, including Issues and Options (Regulation 18) and Proposed Submission (Regulation 19). The final submission version of the Local Plan incorporates responses to the Regulation 19 consultation and is therefore considered to be in conformity with the key tests of soundness set out in the National Planning Policy Framework (NPPF) (December 2024); these are that the plan be positively prepared, justified, effective and policy compliant.

2.3.4 The submission Local Plan and its supporting evidence base considers the various local area development options, with a range of sites across the various regions throughout the borough considered in order to meet the needs of development within the Borough until the end of the CPP period in 2043, taking into account the opinions and views expressed in the consultation exercises.

2.3.5 This TA seeks to assess the expected impact of the Council's preferred spatial development option against the existing transport networks and services within the borough, and to define the supporting transport mitigation measures which will be required to enable the developments proposed within the Local Plan to be delivered in a manner which meets the required tests as defined in the NPPF.

3. POLICY CONTEXT & TRANSPORT CONDITIONS REVIEW

3.1 National Policy

National Planning Policy Framework

3.1.1 The National Planning Policy Framework (NPPF) is Planning Practice Guidance which was first published in March 2012 and the latest update was issued in December 2024. It sets out the government's planning framework for England and how strategic policies within Local Plans should be prepared.

3.1.2 The NPPF provides comment on the way in which plans should "provide a positive vision for the future of each area; a framework for meeting housing needs and addressing other economic, social and environmental priorities; and a platform for local people to shape their surroundings." (paragraph 15)

3.1.3 Paragraph 16 states the way in which plans should:

> a) Be prepared with the objective of contributing to sustainable development;
>
> b) Be prepared positively, in a way that is aspirational but deliverable;
>
> c) Be shaped by early, proportionate and effective engagement between plan-makers and communities, local organisations, businesses, infrastructure providers and operators and statutory consultees;
>
> d) Contain policies that are clearly written and unambiguous, so it is evident how a decision maker should react to development proposals;
>
> e) Be accessible through the use of digital tools to assist public involvement and policy presentation; and
>
> f) Serve a clear purpose, avoiding unnecessary duplication of policies that apply to a particular area (including policies in this Framework, where relevant).

3.1.4 Paragraphs 61 to 84 consider the way in which a sufficient housing supply should be delivered. It is stated that "The overall aim should be to meet an area's identified housing need, including with an appropriate mix of housing types for the local community." (para 62)

3.1.5 The NPPF stresses the importance of the town centre at the heart of local communities. This includes the requirement for planning policies to:

> "define a network and hierarchy of town centres and promote their long term vitality – by allowing them to grow and diversify in a way that can respond to rapid changes in the retail and leisure industries, allows a suitable mix of uses (including housing) and reflects their distinct characteristics." (paragraph 9(a))

3.1.6 Paragraphs 109 to 118 consider the promotion of sustainable transport and note that "transport issues should be considered from the earliest stages of plan-making".

3.1.7 It continues by stating that:

> "The planning system should actively manage patterns of growth …. 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. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making." (paragraph 110)

3.1.8 Paragraph 111 (a) considers that planning policies should "support an appropriate mix of uses across an area, and within larger scale sites, to minimise the number and length of journeys needed". It also notes the importance of "attractive and well-designed walking and cycling networks and supporting facilities" (paragraph 111 (d)).

3.1.9 Paragraph 115 provides the criteria for assessing sites for development allocation, stating that it should be ensured that:

> a) Sustainable transport modes are prioritised taking account of the vision for the site, 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 through a vision-led approach.

3.1.10 Paragraph 116 reflects upon the highway impact of development, noting that:

> "Prevention or refusal on highways grounds should only be prevented or refused on highway grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network, following mitigation, would be severe, taking into account all reasonable future scenarios."

3.1.11 Paragraph 132 discusses the importance of well-designed places and how design policies should be developed with local communities so they reflect local aspirations, and are grounded in an understanding and evaluation of each area's defining characteristics.

3.1.12 Paragraph 135 sets out some of the criteria that planning policies and decisions should adhere to, ensuring that developments will function well and add to the overall quality of area; optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development; and create places that are safe, inclusive and accessible.

3.1.13 The NPPF also discusses proposals affecting the green belt. Where major development involving the provision of housing is proposed on land released from the Green Belt. Paragraph 155 cites the development of homes within the green belt as inappropriate where the development would utilise grey belt land elsewhere, and there is a demonstrable unmet need for the type of development proposed.

Transport Evidence Bases in Plan Making and Decision Taking (Reference 54-001-20141010)

3.1.14 Transport Evidence Bases in Plan Making and Decision Taking (Reference 54-001-20141010) is Planning Practice Guidance which was published in March 2015. First it asks why should a planning authority establish a transport evidence base for Local Plans?

> "It is important for local planning authorities to undertake an assessment of the transport implications in developing or reviewing their Local Plan so that a robust transport evidence base may be developed to support the preparation and/or review of that Plan. A robust transport evidence base can facilitate approval of the Local Plan and reduce costs and delays to the delivery of new development, thus reducing the burden on the public purse and private sector." (Paragraph 001)

3.1.15 It explains what a robust transport impact assessment of the Local Plan will aid, namely, improving sustainability of transport provision, enhancing accessibility, providing a choice of modes, improving health and wellbeing, supporting economic vitality, improving public understanding of the transport implications of development, enabling authorities to deliver appropriate transport infrastructure and supporting shops and the high street.

3.1.16 A transport evidence base should assess the existing situation and trips over time, assess the opportunities to facilitate sustainable transport and reduce the need to travel, consider cumulative impacts of development on transport networks and the ability of existing infrastructure to meet demand, as well as identifying proposals for transport to meet the needs of the area in the short, medium and long term.

Travel Plans, Transport Assessments and Statements (Reference 42-001-20140306)

3.1.17 Planning Practice Guidance Travel Plans, Transport Assessments and Statements, Reference 42-001-20140306 states that Transport Assessments may be useful in plan making if local planning authorities are of the view that Transport Assessments can beneficially inform their Local Plans" (Paragraph 001).

3.1.18 Paragraph 006 continues by noting that:

> "Travel Plans, Transport Assessments and Statements can positively contribute to: encouraging sustainable travel; lessening traffic generation and its detrimental impacts; reducing carbon emissions and climate impacts; creating accessible, connected, inclusive communities; improving health outcomes and quality of life; improving road safety; and reducing the need for new development to increase existing road capacity or provide new roads. They support national planning policy which sets out that planning should actively manage patterns of growth in order to make the

> fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable."

The Strategic Road Network and the Delivery of Sustainable Development (Circular 01/2022)

3.1.19 While there is no part of the Strategic Road Network (SRN) which falls within Castle Point, National Highways (NH) will likely review any growth which impacts on the SRN. Given that the A13 to the West of Castle Point is part of the SRN the delivery of the plan will likely impact on wider elements of the SRN such as the M25 to the west, significant transport elements such as the Lower Thames Crossing and London Southend Airport. Therefore guidance pertaining to the SRN remains relevant.

3.1.20 Circular 01/2022 was issued in December 2022 and replaced the previous Circular 02/2013, bringing in a number of changes to the way in which National Highways engages with the Local Plan process. Paragraph 35 states that:

> "Local plans and spatial development strategies should seek to better integrate the SRN with the wider road network and other transport modes to enhance connectivity, maximise opportunities to facilitate economic growth and support transport decarbonisation across the country. "

3.1.21 Paragraph 19 considers the requirement for sustainable travel to be promoted through all forms of development, stating:

> "[National Highways] will need to be satisfied that all reasonable options to deliver modal shift, promote walking, wheeling and cycling, public transport and shared travel to assist in reducing car dependency, and locate development in areas of high accessibility by sustainable transport modes (or areas that can be made more accessible) have been exhausted before considering options for new connections to the SRN. "

Decarbonising Transport – A Better, Greener Britain

3.1.22 This report was published in July 2021 and sets out the government's commitments and the actions needed to decarbonise the transport system in the UK. It explains the:

- Pathway to net zero transport in the UK
- The wider benefits net zero can deliver
- The principles that underpin the approach to delivering net zero transport

3.1.23 The plan has three strategic principles; accelerating modal shift to public and active transport, decarbonising road transport and decarbonising how we get our goods.

> "Local authorities will have the power and ambition to make bold decisions to influence how people travel and take local action to make the best use of space to enable active travel and transform local public transport operations."

Cycling Infrastructure Design Local Transport Note (LTN 1/20)

3.1.24 Any design of new cycle routes will be required to be consistent with the Government's Department for Transport Cycling infrastructure design (LTN 1/20) and to be coherent (allow people to reach day-to-day destinations easily); direct, safe, comfortable and attractive. ECC will seek compliance to be demonstrated throughout any scheme; in particular at junctions and proposed pedestrian and cyclist crossing structures. If full compliance is not achievable the reasoning should be provided, and these departures should be agreed on a case-by-case basis.

Bus User Priority (LTN 1/24)

3.1.25 LTN 1/24 was published by the Government in March 2024 and focuses on how to deliver priority for bus services in England, building on the National Bus Strategy (NBS) which set out the vision for bus services in England outside London. The main aim of the strategy is to increase bus journeys, firstly by returning the overall number of journeys made by bus to pre-Covid levels, and then to further grow bus journey numbers. Through Bus Service Improvement Plans (BSIPs) and the establishment of statutory Enhanced Partnerships (EPs) or franchising local communities will benefit from the delivery of more services, simpler and cheaper fares, greener and more accessible buses, and appropriate bus priority measures. This approach was developed to increase passenger numbers and help reduce congestion.

Bus Back Better

3.1.26 Bus Back Better was published by the Government in 2021 and sets out the vision to deliver a better bus service for all in Britain after the COVID-19 pandemic. The strategy seeks to make buses more frequent, reliable, easier to understand and use, and to reduce congestion and pollution levels with increased users.

3.1.27 The Strategy notes the importance of the role of Local Transport Authorities in establishing partnerships with bus operators, and in producing Bus Service Improvement Plans to deliver a reliable bus service which caters to the entirety of the region.

3.2 Local Policies

Previous Castle Point Local Plan

3.2.1 The existing Castle Point Local Plan was adopted in November 1998. Having been saved in its totality until September 2007, only certain policies have remained in place since. Those of relevance to the developing Castle Point Plan are described below.

3.2.2 Chapter 7 of the Saved Local Plan considers Transport Policy throughout the Borough.

3.2.3 Policy T2 considers the intensification of access that comes through development, stating:

> "Proposals which would result in the intensification of the use of existing accesses or the creation of new accesses onto any trunk, principal or other classified road will, in appropriate cases, require the submission of a Traffic Impact Study demonstrating the ability of the highway network to accommodate the proposed development."

3.2.4 Policy T11 considers the construction of cycleways throughout the borough, stating:

> "The council will seek the provision of cycleways within the construction of new roads, where appropriate, with the long-term intention of securing a borough-wide network of cycleways."

3.2.5 Policy T12 considers the improvements toward bus networks throughout the borough. It is noted:

> "Where appropriate, the council will seek to secure improvements to bus services in the borough through the use of appropriate traffic management measures, subject to the availability of resources. The council will also encourage the highway authority to take into account opportunities for improved public transport infrastructure when considering highway schemes."

Essex Local Transport Plan 3

3.2.6 The third Essex Local Transport Plan (LTP3) was published in June 2011. The Plan sets out a vision to plan for longer term provision of adequate services to support the Essex region through public and active modes of transport.

3.2.7 It is acknowledged that the fourth Essex Local Transport Plan (LTP4) is in development. With the progression of the emerging LTP4, it is acknowledged there will be updates surrounding the Local Plan policy section and next iteration of the Transport Assessment which will be amended with further communication from Essex County Council.

3.2.8 Walking and cycling through the main towns of Essex is commented on in the LTP 3, with the continued development of local footpaths and cycle routes. In particular, it is noted that a priority is the addressing of current gaps in routes and improving signage, in order to improve connectivity between residential and employment areas, schools and public transport interchanges (p.45).

3.2.9 As part of Policy 4 – Public Transport, the LTP provides a framework for improving the local bus network throughout Essex, the Enhanced Partnership agreement focuses on the cooperation between the Council and local bus operators to improve the punctuality of buses on routes, including the use of cost-effective bus priority measures, and to ensure accurate and up-to-date bus information is provided (p.53-54). This policy is expanded upon with the Essex Bus Service Improvement Plan and related Castle Point Area Review.

3.2.10 As a noted priority, providing bus services across the region is in part to provide an integrated public transport network across the Thames Gateway South Essex area, connecting homes with jobs, retail, healthcare, leisure and education facilities through sustainable modes of transport (p.58).

3.2.11 Policy 14 of the LTP is based around cycling, and the County Council is to promote the benefits of cycling, improve the cycling facilities throughout the region, develop existing networks, work with schools to promote cycling, and integrate Public Rights of Way to form continuous routes.

3.2.12 Policy 15 is based around walking and the public rights of way. This policy is built around promoting the benefits of walking, facilitating a safe walking space for all who use it, and creating a signage system which furthers the ease of navigation and routing.

3.2.13 Given the timescales since the adoption of LTP3, the ECC transport policy is currently comprised of the following:

- The Local Transport Plan (2011) is the Essex Transport Strategy (LTP3);
- Given policy evolution since the adoption of LTP3, due consideration should be given to more recent documents such as Net Zero: Making Essex Carbon Neutral (ECAC) and the Transport East: Transport Strategy (endorsed by ECC in July 2022). These place a greater emphasis on the provision and use of sustainable transport and the decarbonisation of the transport network.

Essex Local Transport Plan 4

3.2.14 LTP4 has recently completed its second round of public consultation. It comprises a number of activity-based documents including the Bus Service Improvement Plan (BSIP); Sustainable Travel Planning; EV Charging Strategy; Essex Cycling Strategy, Local Cycling and Walking Infrastructure Plans (LCWIPs); Transport Technology Strategy; Network Management Plans and Maintenance Strategies.

3.2.15 LTP4 seeks to reflect and formally incorporate the revised policy framework contained within Net Zero: Making Essex Carbon Neutral (ECAC) and the Transport East: Transport Strategy LTP4 addresses the following three strategic themes:

- Supporting People, Health, Wellbeing, and Independence;
- Creating Sustainable Places and Communities
- Connecting People, Places and Businesses

3.2.16 The FRH is being revised to better reflect the new ECC Safer, Greener, Healthier campaign through a new Place and Movement Framework (PMF). This focuses on the function of a place and priority given in the first instance to pedestrian and cycle movements, and then access to high-quality public transport. The PMF is based on different street and road types recognising the variation in function across Essex. Each street and road type will perform a different function and modal priority, each with different priorities.

3.2.17 The ECAC recommendations further endorse the decarbonisation of transport and seek to achieve net zero carbon transport emissions in Essex by 2050. Transport strategy now comprises an Avoid, Shift, and Improve approach:

- **Avoid**: to encourage residents to avoid or reduce unnecessary private car journeys through changing travel behaviour with regards to how and why we are travelling.
- **Shift**: to embrace a shift in the use of active and sustainable modes of transport such as walking, cycling, and taking the bus or train to encourage their use and reduce pollution and congestion.
- **Improve**: where road journeys are essential vehicle efficiency needs to be improved by making alternatively fuelled options, such as electric vehicles. It must be made easier for people to take alternative methods of transport and to improve their reliability and quality.

3.2.18 Castle Point is covered by the South Essex Area Implementation Plan. The main strategy for the whole area makes reference to creation of a rapid transit system to connect key transport hubs and improve connectivity in the area. It is also stated that addressing the monetary costs of public transport to users (such as fare levels) will be important in improving uptake and use of services, particularly bus services.

3.2.19 The "severance" effect of the major east-west transport routes (the A13, the A127 and the Liverpool Street and Fenchurch Street – Southend railway lines is identified as a major issue which the strategy seeks to address. This would undoubtedly assist in making north-south movement through Castle Point easier but is likely to be challenging if this reduces the overall east-west capacity of these routes, especially in the peak hours.

3.2.20 Thames Freeport / London Gateway is identified as a key driver of travel demand over the LTP period; links to Canvey are specifically identified for potential improvement, as are more general capacity upgrades on the A13 and A127. It is recognised that such proposals are at a very early stage as ECC has not been in a position to supply any corresponding details during the preparation of the Regulation 19 TA.

3.2.21 The planned upgrades to Fairglen Interchange are identified as a key component of the main area strategy and for the adjacent local authority areas. (The upgrades are now understood to be funded and as such are included in the future year scenarios of the SE Model).

3.2.22 The major commitments proposed in the area strategy which would either be delivered within Castle Point, or which would benefit journeys in and through the borough, are:

- The bus rapid transit corridor (precise location to be identified through future work; the table at appendix A indicates that this could also consider tram services)
- A second bus corridor along the A129 to improve connections between Castle Point and Rochford, and specifically Rayleigh rail station
- Improvements to sustainable connections between Canvey Island and the rest of Castle Point (walking, cycling and public transport)
- A focus on mobility for older Castle Point residents via expansion of community transport services (CPP developments could actively contribute to supporting these efforts and they could form an important additional tool for early-stage site access to non-car options)
- Wider improvements on the A13 and A127 corridors around north-south movement across the borough

3.2.23 It is recognised that, at present, there is little in terms of actual design proposals to support the key measures identified in the LTP and that significant work would need to be done to bring these to a point where their potential impacts, costs and benefits can be assessed. Nonetheless, there is a strong degree of correlation between the location of the major proposed measures and the expected impacts of travel demand which would arise as a result of the proposed CPP spatial strategy. With joint working, there is good potential for CPP sites to contribute to the delivery of these schemes which are of a scale and ambition which the CPP in isolation cannot support.

3.2.24 It is envisaged that the CPP (and its main site allocations) will need to bring forward a selection of improvements in their own right, which are discussed subsequently in this TA report. These

improvements would not be expected to conflict with the aims and proposals in the LTP, in many cases acting as a "first step" or precursor that the ECC proposals can then build upon. As individual sites are progressed, it may be the case that some proposals are modified or "rolled into" the ECC schemes, depending on how and when these are delivered; such decisions will need to be underpinned by appropriate assessments and guided by ECC's appraisal of the most effective way to use CPP developments as an opportunity to support the wider projects set out in the draft LTP4 and area strategy.

Transport East Strategy

3.2.25 Transport East is the sub-national Transport Body for Norfolk, Suffolk, Essex, Southend and Thurrock, formed in 2018 . Transport East's role is to set a regional transport strategy, provide a single regional voice for transport investment, and support the acceleration of regional transport priorities.

3.2.26 Transport East adopted its Transport Strategy to 2050 on 11th July 2022, which has been formally endorsed by ECC, as the relevant Transportation and Highway Authority. This Strategy sets a single regional voice for transport investment and supports the acceleration of regional transport priorities. It identifies the following four priorities.

- Goal 1 - Reduce demand through local living by making it easier for people to access services locally or by digital means
- Goal 2 - Shift modes by supporting people to switch from private car to active and passenger transport, and goods to more sustainable modes like rail
- Goal 3 - Switch fuel with all private, passenger transport, fleet and freight vehicles switching to net zero carbon fuels at the earliest opportunity
- Goal 4 – Zero carbon growth by supporting authorities and developers to plan, locate and design new development that reduces the need for people to make carbon intensive transport trips in the future

Essex Bus Strategy

3.2.27 The Essex Bus Strategy was published in February 2015. This Strategy sets out the planned growth of the local bus network surrounding the region, with the aim of delivering a high quality service which can carry more passengers.

3.2.28 Proposal 3 of the Strategy centres around better, well used services, with proposals such as:

- Linking transport operators into the local transport highways panels to establish infrastructure measures, as well as improving direct liaison with ECC;
- Maximising the inclusion of bus infrastructure and funding for new and improved services into development frameworks; and
- Seeking to identify and nurture new services with the aim of these eventually reaching a point of commercial viability.

3.2.29 Proposal 8 centres around focused Local Planning, with the aim of developing services which meet the needs of local communities. Proposals include:

- Joint reviews with local authorities, community groups and operators to look at each area, identifying opportunities for a better network, including routes and frequency;

- Using digital information from communities to identify demand for new bus routes; and
- Supporting the growth of key commuter and inter urban routes in the commercial sector to provide a strong base for the broader network.

Essex Bus Service Improvement Plan

3.2.30 The Essex Bus Service Improvement Plan (BSIP) was published in 2021 and sets out the local issues across Essex County relating to the bus network and how local authorities will be able to tackle them until 2026.

3.2.31 The plan sets out the vision to encourage Essex residents to rethink their modal choice of travel, with guidance to create a high-quality environment with the improvement of air quality and reduction of emissions, contributing to independence for residents of all ages, and to provide an accessible connection to key local areas.

3.2.32 The BSIP sets out the process for the subsequent, more localised Area Reviews throughout Essex County.

Castle Point Bus Network Review

3.2.33 As part of the response to the Bus Back Better strategy, a series of local area studies were undertaken by Essex County Council to review the local bus network, from which to inform future developments and guide future partnerships.

3.2.34 The Review establishes a number of issues and opportunities surrounding Castle Point's bus network; most notably seen through issues of congestion and reliability of service – particularly on the main entries to Canvey Island and on the A13.

3.2.35 A series of aspirational corridors are identified by the Review; noting that the core layout of the network is not to be altered given the way in which it is well-suited to support core networks. As such, proposed core networks are most notably centred east-west along Long Road, north-south along Canvey Road to the north of Canvey Island, and east-west along London Road.

Essex Cycling Strategy

3.2.36 The Essex Cycling Strategy was published in November 2016. The purpose of the strategy is to set out the key elements which will lead to a significant and sustained increase in cycling in Essex, establishing it to be a 'normal' mode of travel for the public.

3.2.37 The main objectives of the strategy are cited to:

- Double the number of cycling trips in Essex from 2014 levels by 2025 at monitored sites and key routes;
- Cultivate a mindset that sees cycling as a normal, enjoyable and everyday activity for the majority of short trips; and
- Establish cycling as an enjoyable participation activity for health gain and a popular competitive sport.

3.2.38 The Strategy is to be enacted through the establishment of cycling facilities to segregate cycle routes from motor vehicles and pedestrians; the implementation of "Quietways" through

urban areas to inter-connect cycle routes on quiet residential streets; encouraging cycle awareness through Bikeability training for both adults and youth; and encouraging employers to offer a salary sacrifice cycle to work scheme for their workers.

3.2.39 A revised Draft Essex Cycling Strategy has been subject to public consultation in June 2024 and seeks to support more people to cycle more often. The strategy is part of a wider set of plans to make Essex safer, greener and healthier, and to provide more sustainable travel choices for everyone. This strategy will help ECC secure funding to improve and maintain cycling facilities and infrastructure across the county, which will transform cycling into a natural and attractive option for travel and leisure.

3.2.40 It incorporates the following vision:

> "To see more people, of all abilities, ages and backgrounds, cycling in Essex more safely and more frequently."

3.2.41 The draft Strategy proposes six outcomes to guide future actions and investment for cycling in Essex, namely:

- Changing Perceptions – Cycling is a natural and attractive option for people and businesses in Essex
- The Cycle Network – The current and future cycle network in Essex is safe, convenient, and accessible for all types of trips
- Communities, Health and Equality – Cycling helps to create more inclusive and connected communities, as well as improving health and reducing inequalities
- The Economy – Cycling contributes to the economy and brings jobs and employment to local communities
- The Environment – Cycling improves the environment in Essex by reducing emissions, noise, congestion and enhancing quality of life
- Leisure Cycling – Essex is a popular destination for leisure, cycling and tourism.

3.2.42 To achieve these outcomes, a range of activities and actions that ECC will deliver with our partners are identified in the strategy consultation.

Castle Point Borough Cycle Action Plan

3.2.43 The Castle Point Borough Cycling Action Plan (CAP) was published in January 2018, in order to identify how cycling levels can be increased in the Borough prioritising funding for new cycle schemes throughout Castle Point to connect residential areas with employment hubs, and creating opportunities to increase recreational cycling in the Borough.

3.2.44 The Action Plan assesses the potential barriers to further cycle networks through the Borough, and determines a series of potential on-road and off-road cycle routes in order to enhance cycle accessibility throughout the Borough. These schemes still need to progress through the design and feasibility stages.

Castle Point Issues & Options Consultation Document July – September 2024

3.2.45 The Castle Point Issues & Options Consultation Document provides the context and areas of discussion surrounding the recently completed Regulation 18 consultation.

3.2.46 The document presents the overall vision for Castle Point, defined as making the borough a region in which:

- All residents have the opportunity to fulfil their potential and live happy, healthy, productive lives;
- Everyone will have a warm, safe home they can afford to live in, on a street that is safe to walk down, and has access to local services and amenities;
- Green spaces in local areas will be pleasant places to rest and play and will be connected into the wider network of green infrastructure, providing opportunities to connect with nature;
- These green spaces alongside community buildings and other community spaces will be busy with communities, community groups and organisations engaged in social, physical and cultural activities, delivering health and well-being outcomes and creating a vibrant buzz about the place;
- Our high streets, seafront, shopping parades and business areas will provide good quality spaces, the right environment and the infrastructure needed by businesses to attract customers and investment. There will be strong links between local businesses and local education providers to enable local people to work locally in good quality jobs;
- To support the economy and ensure good access to training, jobs, services and amenities for local people, the transport network will be enhanced so that residents have more choice as to how and where they travel; and
- The impacts of climate change are managed and mitigated to reduce potential disruption to day to day life by introducing green infrastructure and other natural processes. Other infrastructure will be adapted and enhanced to accommodate a changing climate, and homes, businesses and other buildings will be built or adapted to reduce their impact on the climate and to be resilient to extreme weather.

3.2.47 A series of challenges and opportunities are identified throughout the borough across the four towns of Canvey, Benfleet, Hadleigh and Thundersley, in addition to the town of Daws Heath. In relation to transport, these are defined as:

- **Canvey**: There is a need to improve access on and off Canvey Island to improve capacity for the community and for businesses. Whilst a new access road to the island is considered, due to the cost alternatives discussed include capacity improvements to Canvey Way, the provision of multi-user off-road route to Thurrock utilising existing infrastructure and improvements to cycling and public transport provision, including better access to rail services at Benfleet station. In addition to this, other transport improvements are noted to include:
    - Improve pedestrian crossings along the Central Wall Road and Dovervelt Rd-Mitchells Avenue area;
    - Widen crossings of Canvey Dyke;
    - Improved surface quality and footpath width;
    - Improve on street cycle routes in places such as Furtherwick Rd, Eastern Esplanade and High St/Point St and north-south cycle routes such as Marcos Rd/Lottem Rd, and/or east-west cycle routes such as Odessa Rd/Crescent Rd;
    - Extend the segregated cycle routes through Smallgains Recreation Park to Canvey Heights Country Park;
    - Improve on-road cycle infrastructure to enhance access to Labworth

- Recreation Ground and connecting to off-road routes along Foksville Rd;
- Implement cycle routes along Waarden Rd/Cedar Rd and Denham Rd north-south and increase size of the cycle path along Canvey Bridge towards Benfleet;
- Divert the 21C bus route northbound along Maurice Rd, eastbound along Crescent Rd and south to Eastern Esplanade;
- Divert the 22 bus along Denham Road and Waarden Road to increase catchment;
- Increase the frequency of the 21 bus to every 15 minutes;
- Increase the frequency of service on the 22 and 27 to improve access to Benfleet station; and
- Delivering the proposals in the Cycle Action Plan to improve access to Benfleet Station.

- **Benfleet**: It is noted that Benfleet hosts the borough's only train station, offering an opportunity to expand the area into a transport hub. Identified issues include a high level of on-street parking within the town centre, and difficulty for pedestrians in crossing between the four parts of the centre due to the large junction at High Road/Rushbottom Lane. The potential transport improvements highlighted are:

    - Improved pedestrian crossings along Essex Way;
    - Smoothing and widening footpaths of residential roads in the Tarpots area and to the north;
    - Introduce a further cycle route running east-west along Church Road;
    - Improved cycle facilities at Benfleet station;
    - Improved north-south cycle route along Kents Hill Road;
    - Improvements to the shared use cycle route along London Road;
    - Improved bus frequency (10-15 minute service) of the 22 bus route;
    - Re-route 28 bus along Church Road and Kenneth Road;
    - Potential for interventions to improve bus reliability along the A13, this could include selective detection on the bus fleet so that buses get priority at junctions;
    - Junction improvements in the Essex Way/High Road/ School Lane area; and
    - Potential junction improvement at the London Road/ Rushbottom Lane junction.

- **Hadleigh**: The town of Hadleigh is identified as a place of importance to visit as opposed to travel through as it is currently utilised. A high level of traffic is noted to be along the A13, and due to an older than average population, services are required to enable existing residents to remain active and self-sufficient. Potential transport improvements are identified as:

    - Additional pedestrian crossings on Rayleigh Road;
    - Addition of on-road cycle infrastructure along New Road and Scrub Lane and potential for cycle routes on Woodfield Rd and Church Rd;
    - Increased frequency of the number 3 bus from 120 minutes to 60 minutes;
    - Possible junction improvements in the Rectory Road/ A13 area; and
    - Possible improvements to the A129 (Rayleigh Rd)/ A13 junction.

- **Daws Heath:** It is noted that Daws Heath is considered a semi-rural village by its residents. Transport-related issues identified within the Regulation 18 consultation include the fact that

local roads are used as a cut through to and from the A127, which is linked to congestion at the Woodmans Arms junction. Potential transport improvements are identified as:

- Additional pedestrian crossings of Rayleigh Road and Western Road;
- Introduce further cycle routes east/north along New Road/ Daws Heath Road to provide additional access to Belfairs Nature Reserve and West Wood; and
- Increased frequency of the number 3 bus from 120 minutes to 60 minutes.

- **Thundersley:** Due to no local centres being located in Thundersley, residents are required to travel in order to access a full range of services. It is noted that there may be scope to consider policies which support its growth and development as a local centre. Potential transport improvements are identified as:

  - Addition of demarcated pedestrian crossings along Hart Road;
  - Improved cycle accessibility east-west along Common Lane/Triton Approach/Hart Road;
  - Add an on-road cycle route along Vicarage Hill/ Benfleet Road;
  - Potential improvements to cycling access along Shipwrights Drive and The Chase;
  - Increase the frequency of the number 27 bus to every 10 minutes;
  - Possible improvements to the A13/ Kenneth Road junction;
  - Possible improvements to the A127/A129 (Rayleigh Rd) junction; and
  - Possible improvements to the Hart Rd/A129 (Rayleigh Rd) junction.

Infrastructure Delivery Plan Baseline Review (2024)

3.2.48 The Infrastructure Delivery Plan (IDP) provides information regarding the infrastructural needs surrounding the Borough, considering Social, Green and Transportation requirements, acting as an evidence base for the forthcoming CPP.

3.2.49 The IDP identifies a series of projects to address existing highway issues within the Castle Point borough. These include:

- Improvements along Somnes Avenue and Canvey Road/Long Road;
- New access for Canvey Island;
- Improved access to Canvey Island;
- A127 corridor for growth and route management strategy;
- A127/A130 Fairglen Interchange junction improvements;
- A129 route improvements; and
- Canvey Way/A13 slip.

3.2.50 Sustainable travel is encouraged through the document through mobility hubs located at neighbourhood centres and public interchange locations ensuring that they are attractive, complement the aesthetics of the public realm and street environment and maximise accessibility and utility.

3.2.51 A series of improvement schemes are indicated in other plans such as the Bus Service Improvement Plan and the Local Cycling Walking Infrastructure Plan.

Development Options Technical Paper (2024)

3.2.52 The Development Options Technical Paper provides further information on the call-for-sites process, detailing the scale of the urban capacity options to be taken forward. Mapping is provided of the potential development clusters within the Castle Point borough, along with a list of assumed densities for the various sites.

3.2.53 Whilst a series of quantities are provided for the various sites, it is acknowledged that these may be superseded by the Strategic Land Availability Assessment (SLAA).

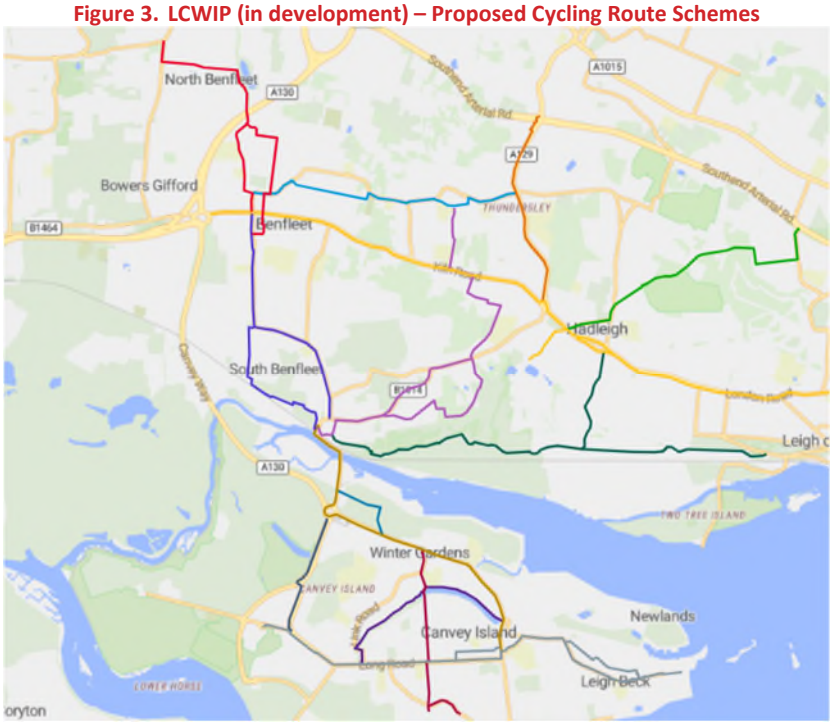
Castle Point Local Cycling and Walking Infrastructure Plan (LCWIP)

3.2.54 ECC are currently in the process of developing a new Local Cycling and Walking Infrastructure Plan (LCWIP) which is an infrastructure plan intended to help guide active travel policies and priorities as well as provide a framework and context to secure investment for new and upgraded walking and cycling routes within the borough on roads and streets managed by ECC or CPBC as local highway authority.

3.2.55 The figures below show the walking and cycling corridors which are currently being considered for inclusion in the LCWIP. Whilst these are not yet finalised and are subject to future design, feasibility and funding, it is considered that the coverage of the routes and the destinations served are reasonably well matched to existing demand and/or locations with the potential for increased levels of trip-making by active modes.

Figure 2. LCWIP (in development) – Potential Walking Corridors

Figure 3. LCWIP (in development) – Proposed Cycling Route Schemes



3.2.56 Tables which set out the start and end points of each route, and provide a description of the intermediate destinations served, have been provided by ECC and these are appended to this TA report for reference.

3.2.57 The walking route proposals are focused around Canvey Island and the northern areas of the borough; it is considered that this is due to the pedestrian network being relatively well developed in the central area. The cycling coverage which encompasses the whole borough is more comprehensive and reflects the need to fill gaps in existing provision to enable a wide range of local journeys to be made utilising these routes.

3.2.58 It is highly likely that, as options for the CPP spatial strategy develop, there will be opportunities to build upon the current LCWIP corridor proposals and strengthen connections to the potential allocation sites. Where appropriate, these sites will be required to provide and fund links into these corridors and/or provide new/enhanced routes therein. This has been considered as part of the TA work which is described in subsequent sections of the report.

3.3 Summary

3.3.1 The purpose of this Transport Assessment is to establish the current transport infrastructure and usage and explore what are the most sustainable options for future development in the borough and how transport infrastructure could be enhanced to better serve the proposals in the emerging CPP. Within the policies reviewed there are a number of common themes of which the assessment must be cognisant:

- Locating development in a way which optimises the use and value of existing and planned active and sustainable transport infrastructure,

- Reducing the need to travel through designated land use and development policy areas as a through-route,
- Enhancing active travel and public transport networks,
- Decarbonising the impact of transport through new technology for journeys which must be undertaken by road,
- A proportionate use of traffic data and models, with a move away from predict and provide to decide and provide (sometimes known as vision and validate), and
- Develop a robust evidence base to explain the current and future challenges and transport's role in meeting these.

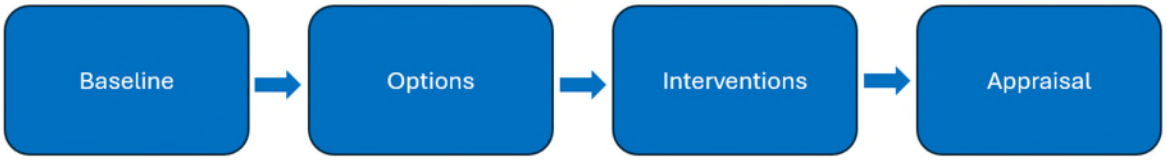
3.3.2 In line with decide and provide principles, this Transport Assessment tests options in transport and land use terms which can facilitate active and sustainable travel patterns and sustainable development. It does not seek to merely alleviate the highway impacts of development through piecemeal highway junction or link upgrades. Instead, it indicates where specific active transport infrastructure could be located, and public transport routing can be altered through a suite of interventions to promote sustainable mobility and the reduced need to travel through the location of development.

4. METHODOLOGY

4.1 Assessment Timeline

4.1.1 An indication of the assessment process is displayed in **Figure 4** below.

Figure 4. Castle Point CPP Assessment



4.1.2 The process shown above is identified as:

- **Baseline:** The establishment of the existing transport conditions and context throughout the Castle Point region.
- **Options**: Consideration of the Development Options as defined by Castle Point Borough Council, and the impacts of developing their identified clusters.
- **Intervention:** The identification of "gaps" or "missing links" in specific areas within the Castle Point borough, and what might be required to rectify them.
- **Appraisal**: A conclusion is reached on the most effective option to pursue, considering the previously discussed Baseline, and Schedule of Interventions relating to the localised areas.

4.2 CPP Options

4.2.1 Since the initial Regulation 18 consultation, Castle Point Borough Council have developed their preferred option which incorporates a number of sites for residential, employment and mixed-use development. This forms the basis of the development proposals assessed within this TA report.

4.2.2 The sites list identifies a total of 4,913 dwellings. This is comprised of a "urban sites" list which incorporates 1,988 dwellings, and four "broad locations" which are expected to accommodate up to 2,925 dwellings.

4.2.3 The Urban Sites are distributed across a range of previously identified clusters, including:

- Canvey Town Centre (Canvey TC);
- Hadleigh Town Centre (Hadleigh TC);
- Canvey;
- Benfleet;
- Hadleigh;
- Tarpots;
- Thundersley; and
- Kiln Road.

4.2.4 The broad locations are identified as Canvey Town Centre, Hadleigh Town Centre, Manor Trading Estate (each having a capacity of 200 dwellings) and Land at West Canvey which has a capacity of up to 2,325 dwellings.

4.2.5 By undertaking a series of assessments, SYSTRA has sought to identify the cumulative transport impacts of the preferred CPP spatial option, and where necessary, identify potential options to mitigate that impact.

4.3 Site Assessment Criteria

4.3.1 Sites identified within the Urban Sites list have been split into clusters for assessment in this report. The clusters represent potential developments within similar geographical locations and have transportation characteristics which imply they may be suitable for co-ordinated policy approaches within the Plan. A series of criteria was used to establish the most effective approach for development, and those sites which are likely to create a significant impact on the surrounding transport networks.

4.3.2 The criteria which have been considered to determine the overall development impact on the transport network are:

- Proximity to bus stops/bus routes;
- Residential density;
- Proximity to cycle routes;
- Road safety; and
- Overall capacity of the clusters.

4.3.3 The previous Red, Amber, Green (RAG) assessment was undertaken by transport consultants Mott MacDonald in 2019 using standalone junction models they assessed key junctions on the network to determine the impact of the now withdrawn plan. Following a review of this process, SYSTRA have determined that this previous assessment was suitable to provide an initial high-level assessment of the highway network and give an indication the potential future base of transport conditions surrounding the Castle Point region in the 2033 Reference Case scenario.

4.3.4 It should be stressed that the previous RAG assessment was only used to undertake an initial assessment. Now that a preferred development strategy has been identified the South Essex Model has been used to fully assess the proposals.

4.3.5 Through the assessment of these various criteria, SYSTRA has identified those development clusters which are predicted to have the greatest impact on the surrounding transport network due to their uplift in congestion. Where necessary potential schemes have been developed in order to mitigate a cluster's impact on the network.

4.4 Assessment Scenarios

4.4.1 With the development of the Castle Point Plan, there is the requirement to consider future years for assessment. In order to align with this, the end year of the CPP (2043) has been used as the future year for the creation of the Reference Case and "With CPP" models. Further details of the scenarios are given in the respective sections of this TA report.

4.5 Assumptions/Limitations of the Assessment

4.5.1 Across the Transport Assessment process, several limitations and assumptions are noted regarding the usage of previous survey data:

- Junction data has been derived from previous Essex survey data, across various years between 2016 and 2021. To gain the most complete indication of the data in current and CPP future year scenarios, TEMPRO 8.0 growth factors have been applied to the various assessment years. Whilst this is an industry-standard practice, it is noted that there are certain limitations to this, with it not necessarily providing an accurate depiction of the level of development anticipated across local authorities and districts.
- It is understood that access to Canvey Island is a contentious issue in the borough. Several studies have been undertaken looking into the possibility of improving general access and egress from the Island. The most recent report published in 2017, assessed several options at a high level to improve access between Benfleet and Canvey Island. It is assumed that providing an entirely new access is unlikely to be feasible solely through CPP development funding at any of the growth options. It is identified in the Transport East strategy in the `Ideas pool' as a project that could deliver strategic priorities but is not yet sufficiently advanced in terms of identified concepts, feasibility studies or Pre-Strategic Outline Business Cases; similarly, it is identified as an issue for further consideration in LTP4 but is not identified specifically as a scheme for implementation; the scheme may be brought forward through work being undertaken at a South Essex level but this remains speculative. Meanwhile, other options to improve transportation to and from the island will be explored within this assessment. Such a concept solution has been considered from not just a transport perspective but also from an industrial and resilience point of view in a wider context keeping in mind the industrial activity on Canvey Island.

5. REFERENCE CASE/BASELINE

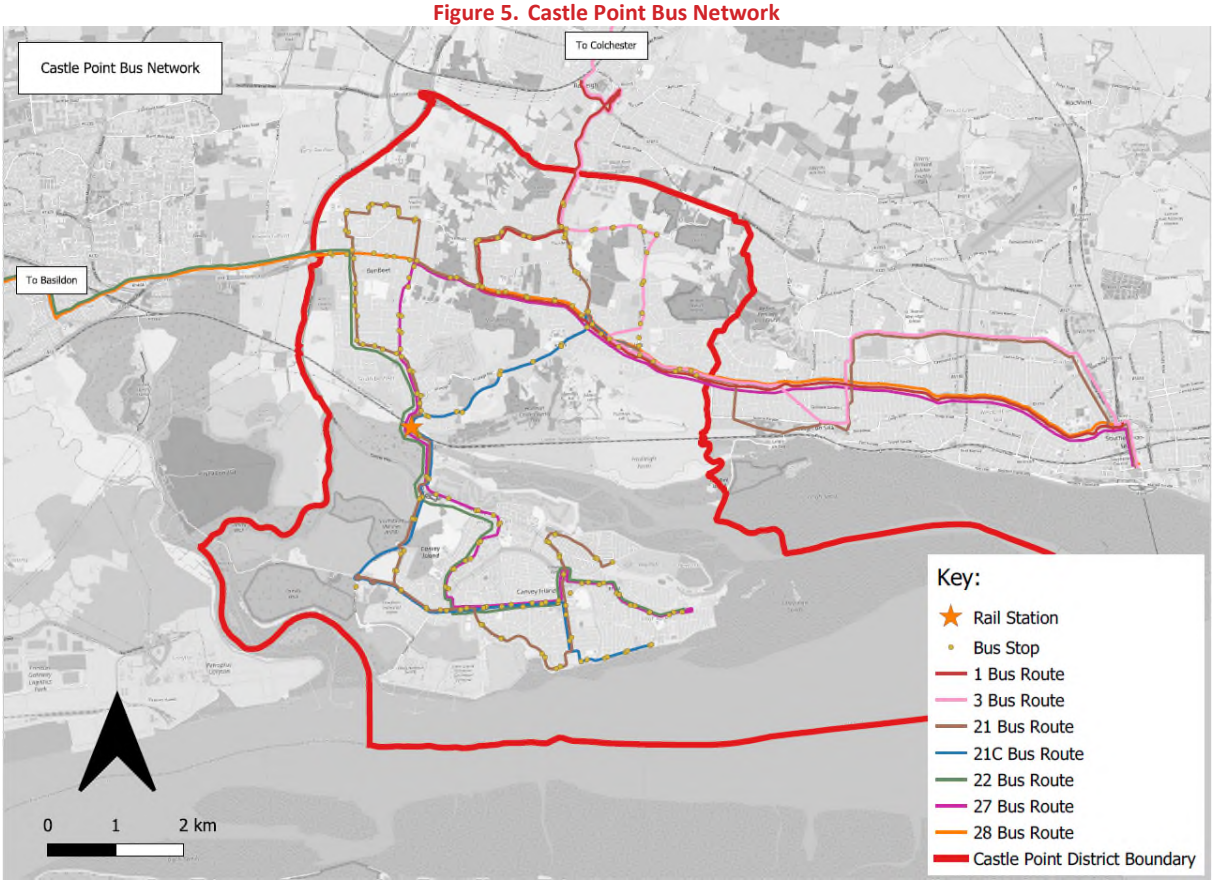
5.1.1 In order to appraise the baseline accessibility of Castle Point borough, SYSTRA have undertaken desk-based research to understand the existing transport links, infrastructure and services within the CPBC area. This has considered the various modes of Public Transport, Walking, and Cycling, as well as road infrastructure and accident data.

5.2 Public Transport

Bus

5.2.1 It is noted that there are seven available bus routes through the Castle Point region. A map of the routes and bus stops are indicated in **Figure 5** below.

Figure 5. Castle Point Bus Network



5.2.2 The frequency of the bus services is indicated in **Table 1** below.

Table 1. Castle Point Bus Frequency

BUS ROUTE	ROUTING	FREQUENCY (WEEKDAY)	FREQUENCY (WEEKEND)
1	Rayleigh – South Benfleet - Hadleigh - Southend	10 mins	15 mins (Sat) 30 mins (Sun)

BUS ROUTE	ROUTING	FREQUENCY (WEEKDAY)	FREQUENCY (WEEKEND)
3	Southend – Rayleigh – Sandon - Chelmsford	120 mins	120 mins (Sat) No Service (Sun)
21	Canvey – Castle Point - South Benfleet – Thundersley – Hadleigh – Prittlewell – Southend-on-Sea	30 mins	60 mins (Sat) 90 mins (Sun)
21C	Canvey – South Benfleet – Hadleigh	60 mins	No Service (Sat and Sun)
22	Canvey – Douth Benfleet – Pitsea - Basildon	20 mins	20 mins (Sat) 30 mins (Sun)
27	Canvey – Southend	20-30 mins	20 mins (Sat) 30 mins (Sun)
28	Basildon – Pitsea – South Benfleet – Hadleigh – Southend	10 mins	30 mins (Sat and Sun)
827	Canvey – South Benfleet – Hadleigh – Prittlewell – Southend	Single Departure (15:30)	No Service (Sat and Sun)

Source: FirstBus Schedules

5.2.3 The most frequent bus services are routes 1 and 28, with a service departing every 10 minutes throughout the week to Rayleigh, Southend and Basildon from their available access points. The services which serve Canvey Island itself include the 21,21c, 22, and 27.

5.2.4 Whilst there is reduced service on the weekends, route 1 provides service at relatively frequent intervals; every 15 minutes on Saturdays, and every 30 minutes on Sundays.

5.2.5 Bus stops are located throughout Castle Point, with particular clusters located along key routes of the A13 London Road, Long Road, and Canvey Road. Notably, a vast majority of the bus stops in the local area do not feature bus shelters or RTPI screens, mostly comprising a bus pole and flag.

Rail

5.2.6 Castle Point contains Benfleet Station on the line operated by C2C, which provides a service to London Fenchurch Street, Southend and Shoeburyness and linkages with other mainline services operated by Greater Anglia.

Table 2. Rail Service Regularity

TRAIN SERVICE	WEEKDAY SERVICE REGULARITY	WEEKEND SERVICE REGULARITY
London Fenchurch Street	5-24 min	5-24 min (Sat) 30 min (Sun)
Southend Central	4-26 min	4-13 min (Sat) 8-22 min (Sun)
Shoeburyness	30 min	4-13 min (Sat) 8-22 min (Sun)

Source: National Rail

5.2.7 Benfleet Station has step-free access, ramps for train access for the disabled, accessible toilets and waiting rooms.

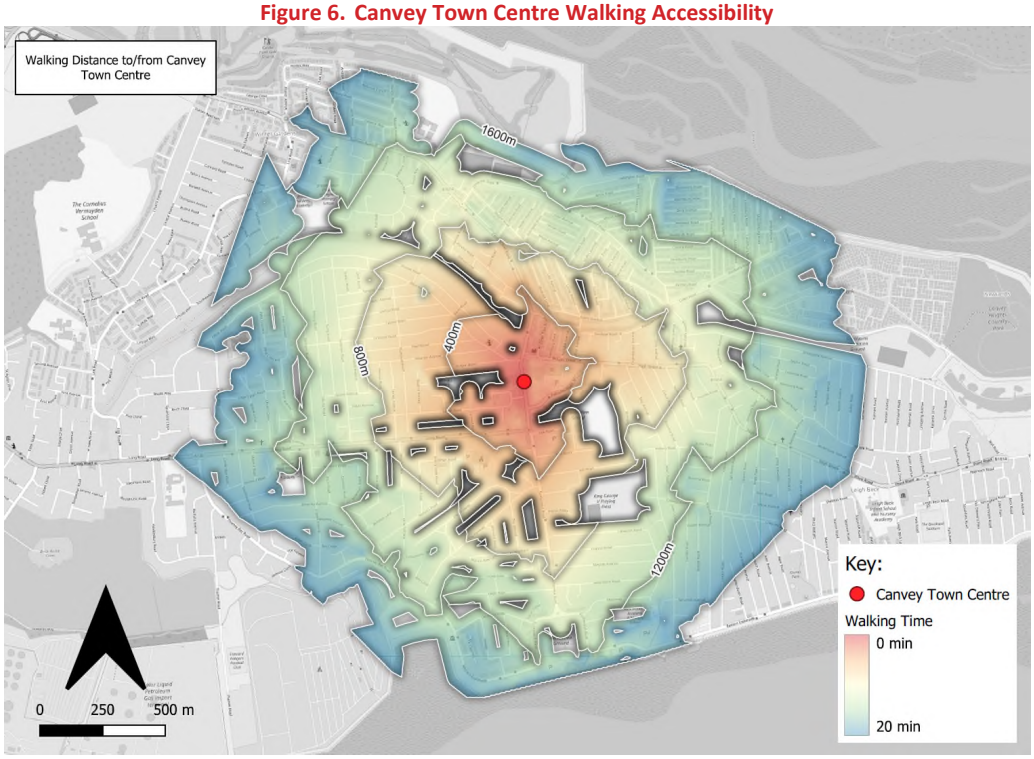
5.2.8 As indicated in Figure 6, Benfleet Station is accessible through four bus routes; the 21, 21C, 22 and 27. These routes provide connectivity to the station from Canvey Island, Benfleet, Thundersley, and Hadleigh.

5.3 Walking

5.3.1 Walking in Castle Point is generally well-catered for. Footpaths are generally constructed to relevant standards, wide and smooth to facilitate walking as a mode of transport. However, there are areas which may benefit from widening to enhance their use and safety, for example, sections of Long Road on Canvey Island are less than 1m wide. Further detail of specific locations is provided in **Section 6.2**.

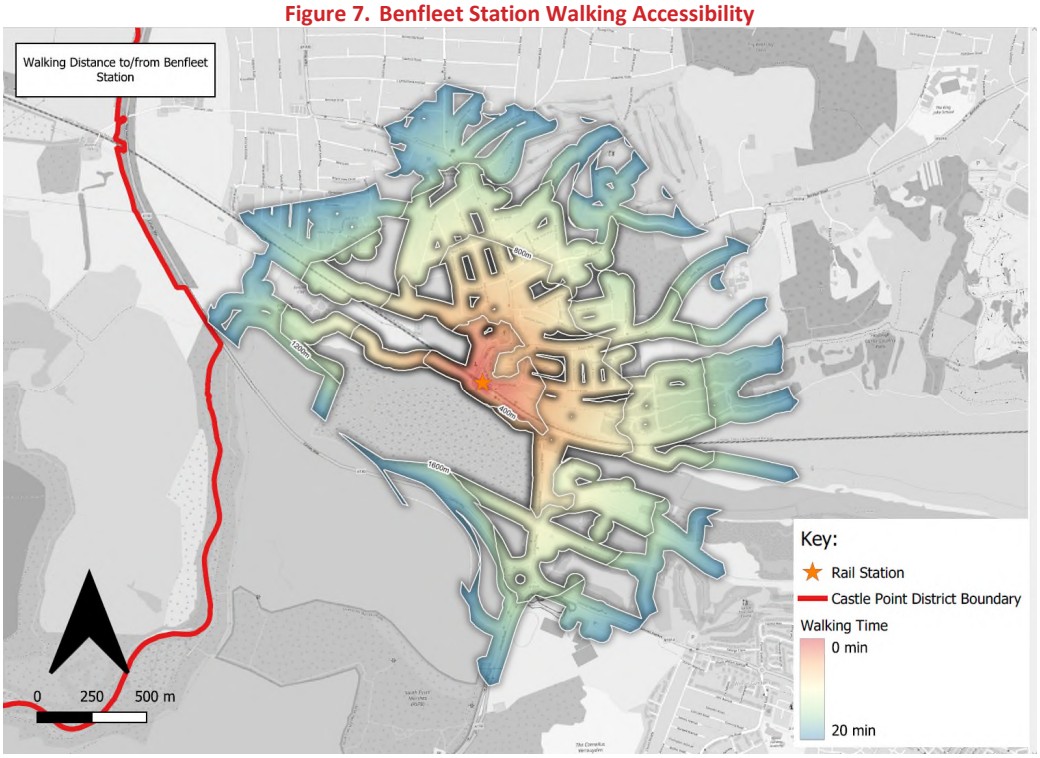
5.3.2 **Figure 6** indicates the walking distances from Canvey Town Centre. **Figure 7** below indicates the walking distances from Benfleet Station, whereas **Figure 8** indicates the walking distances from the central region of the northern Castle Point region, as identified from the central region of Kiln Road.

Figure 6. Canvey Town Centre Walking Accessibility



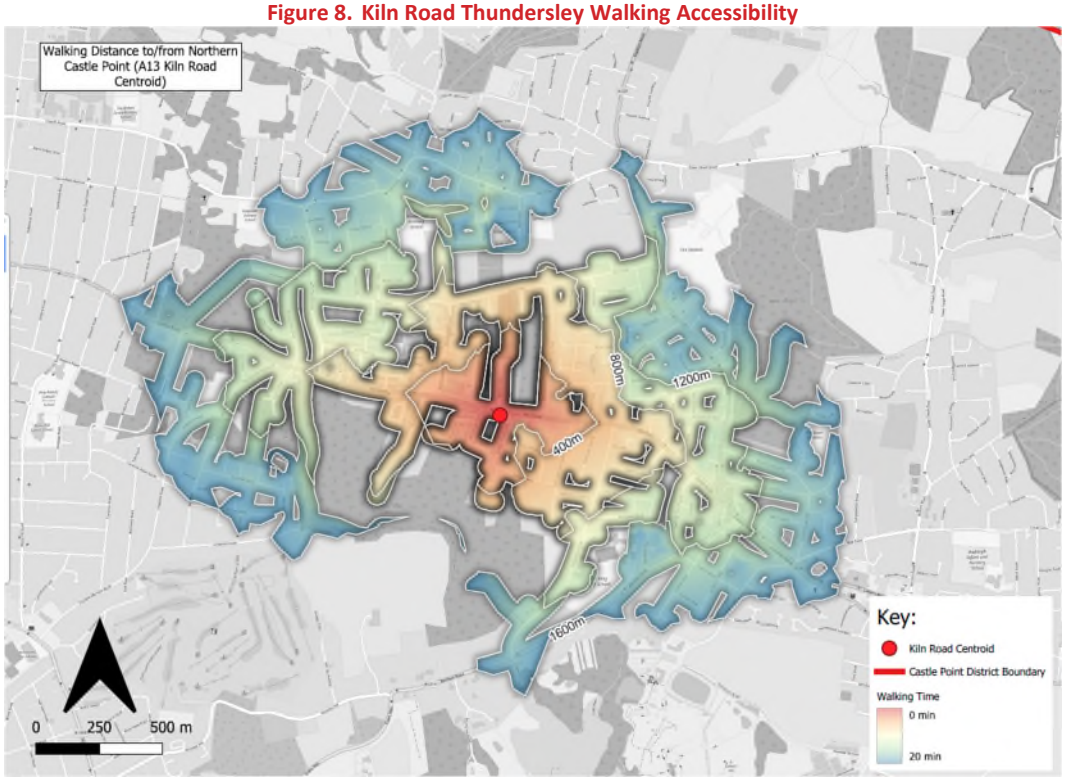
5.3.3 Canvey High Street, most of Long Road and the beachfront are accessible within a 20-minute walk providing access to shops, leisure and key services. The eastern and western ends of the Island are inaccessible within a 20-minute walk of the town centre, including Charfleets Industrial Estate to the west and Canvey Island Football Club to the east.

Figure 7. Benfleet Station Walking Accessibility



5.3.4 **Figure 7** indicates the accessibility by walking surrounding Benfleet Station. It is indicated that the station is beyond a reasonable 20-minute walking distance for most of Canvey Island. However, the station is accessible within a 20-minute walk from a series of residential areas in South Benfleet to the east and west.

Figure 8. Kiln Road Thundersley Walking Accessibility



5.3.5 **Figure 8** above indicates the walking accessibility from the A13 Kiln Road within the northern region of Castle Point. This centroid has been selected due to its central location within the northern area of the wider borough, and the fact that the A13 is a main arterial road through the region. As is evident from the isochrone, Thundersley Primary School lies approximately 15 minutes to the north, and Daws Heath Road is accessible within 20 minutes to the north of the Kiln Road centroid. London Road/New Road junction is accessible approximately 20 minutes to the southeast, providing access to a number of amenities including a range of bus routes, with Morrisons supermarket and Hadleigh Library falling just beyond the 20-minute radius.

5.4 Cycling

5.4.1 An indication of the cycle accessibility surrounding both the Canvey Town Centre and Benfleet Station is indicated in **Figure 9** and **Figure 10** below.

Figure 9. Benfleet Station Cycling Accessibility

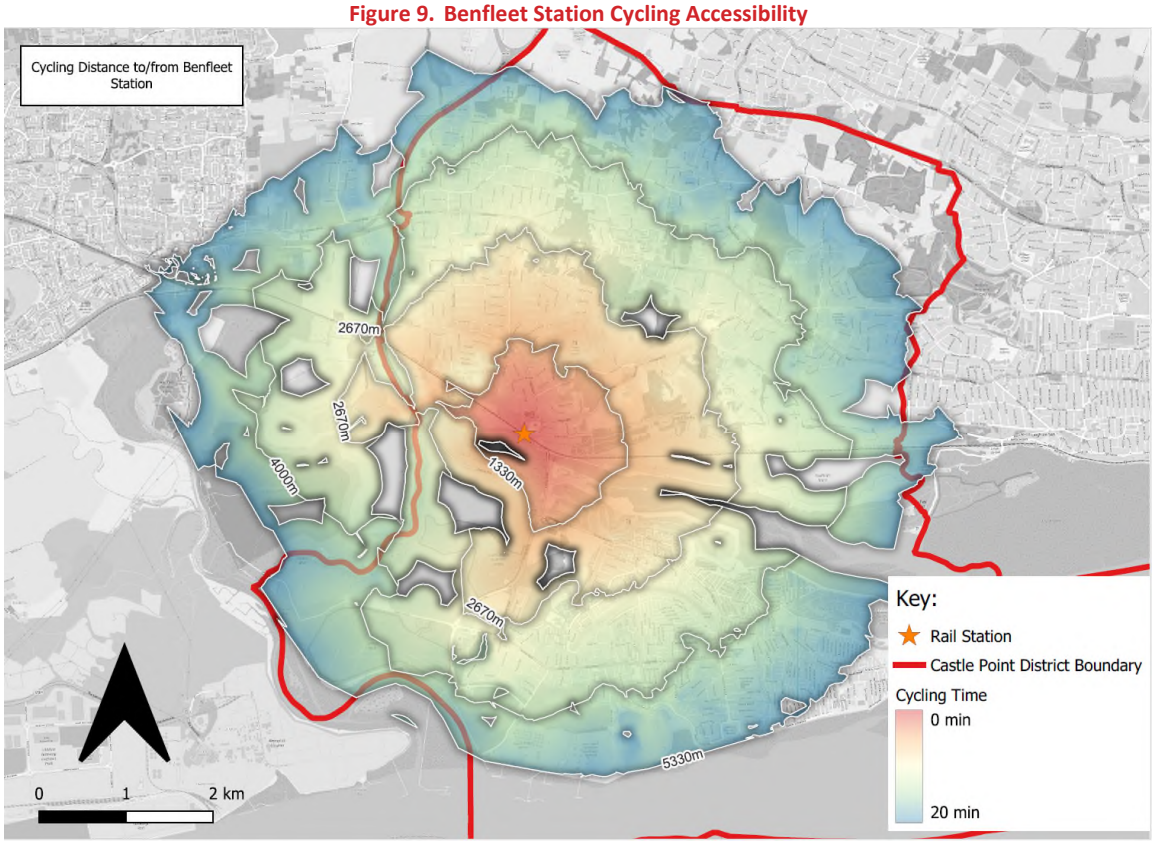


Figure 10. Canvey Town Centre Cycling Accessibility

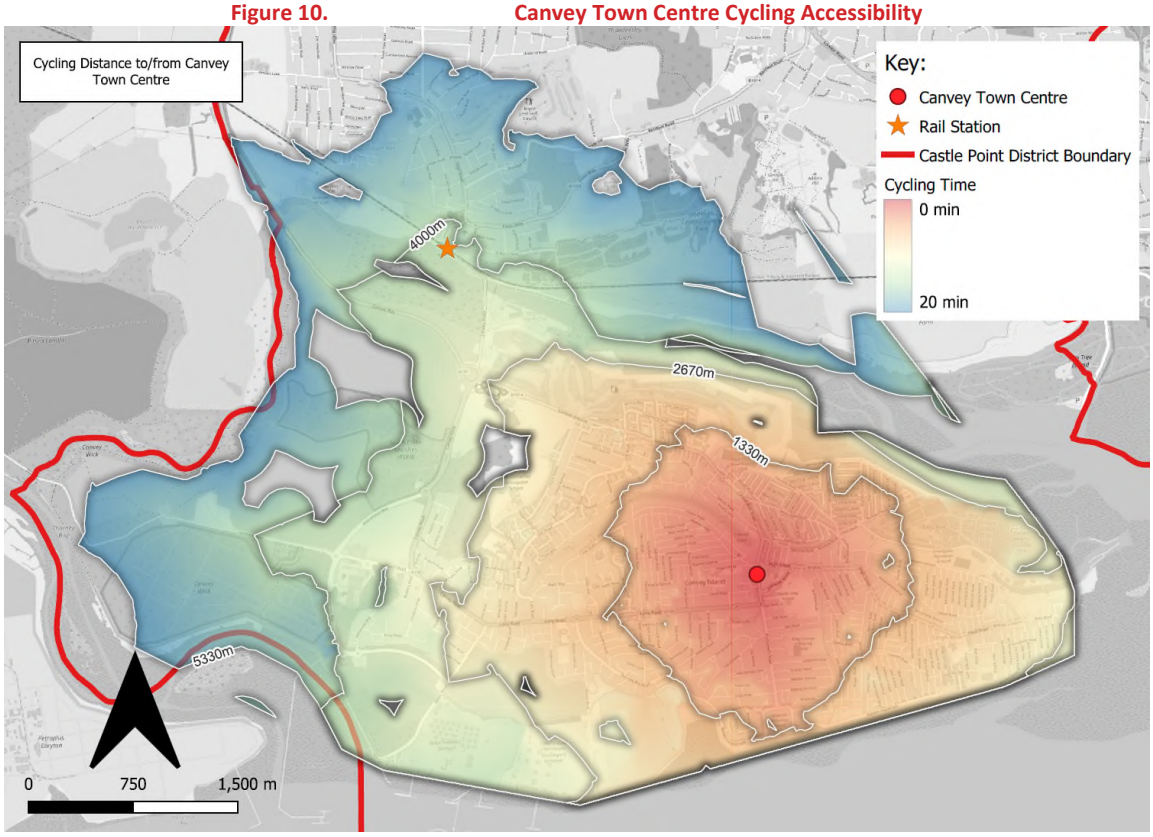
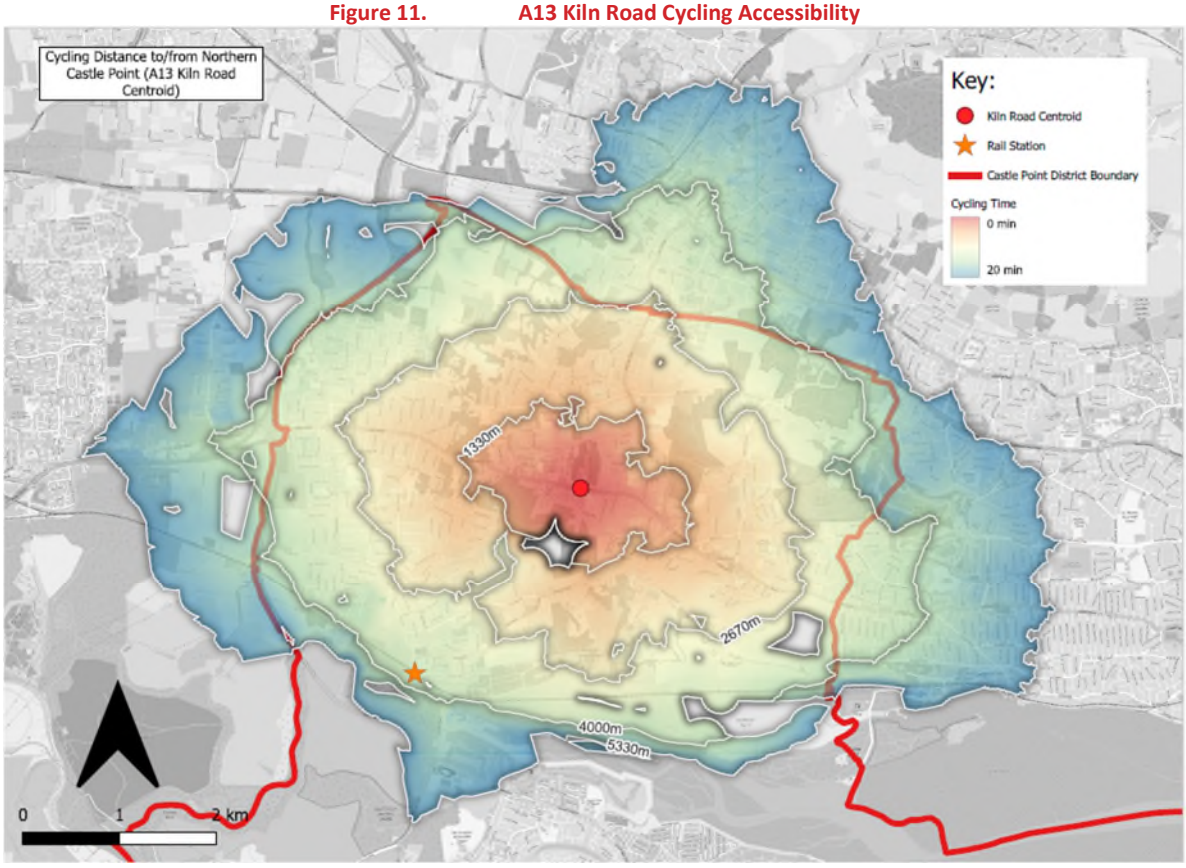


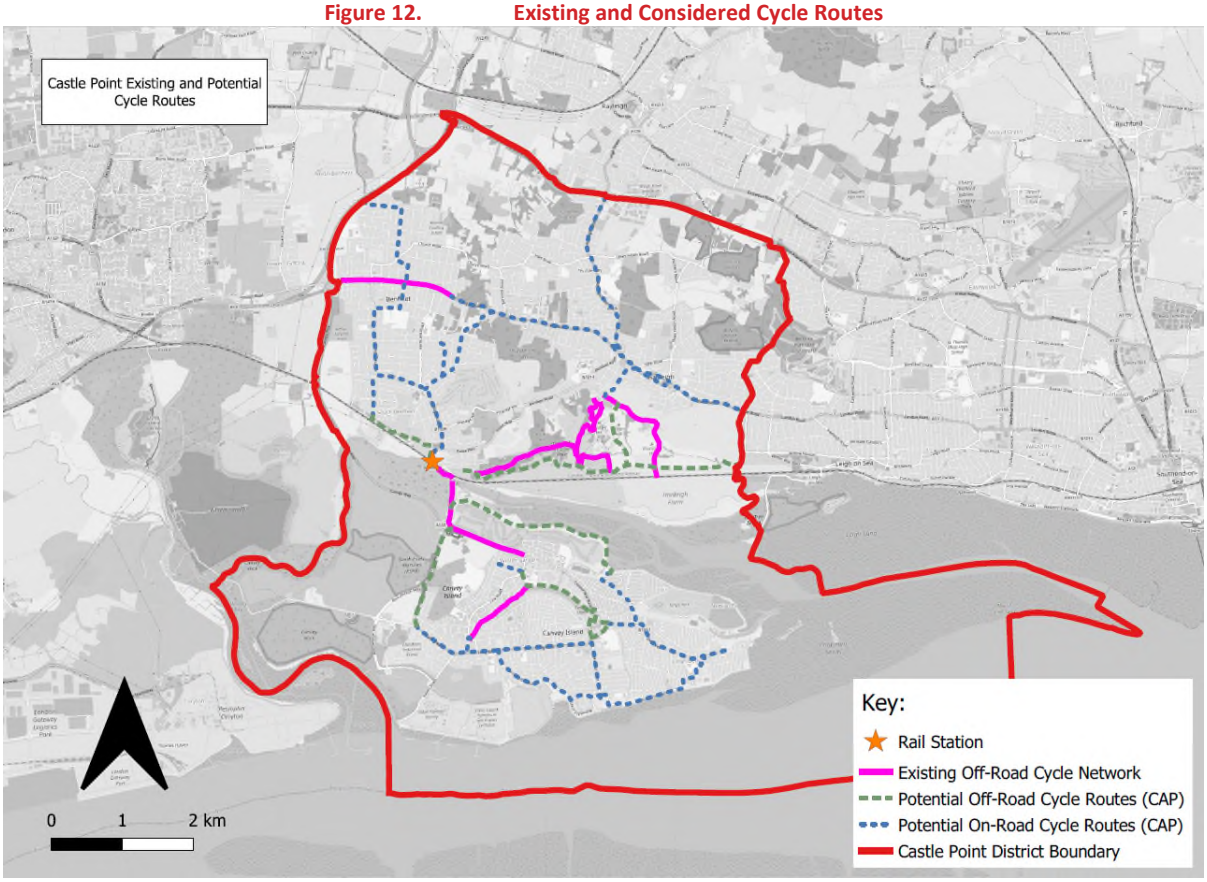
Figure 11. A13 Kiln Road Cycling Accessibility



5.4.2 As indicated in **Figure 9**, Benfleet Station is accessible within a 20-minute cycle of almost the entirety of Castle Point borough including all major residential areas, key services and employment areas, with the southeastern corner of Canvey Island shown as the only inaccessible residential area. **Figure 10** indicates that Canvey Town Centre is accessible within a 20-minute cycle to all of Canvey Island, with the northern side of Canvey Bridge and Benfleet Station accessible within 15 minutes to the northwest. **Figure 10** indicates that Benfleet Station is accessible within a 15-minute cycle to the southwest of the Kiln Road centroid, and Canvey Island is accessible approximately 20 minutes to the south. The entirety of the borough to the north of Canvey Island is accessible within a 20-minute cycle, as are the wider regions of Basildon to the west and Leigh-on-Sea to the east.

5.4.3 There is currently a lack of cycle infrastructure throughout Castle Point. Existing cycle routes are limited to off-road routes surrounding Hadleigh Country Park, Canvey Road, London Road and Canvey Dyke.

Figure 12. Existing and Considered Cycle Routes



5.4.4 Through analysis of the Castle Point Cycling Action Plan (CAP), Figure 6.2, it is evident that there are a series of potential cycle routes which could enhance the connectivity of the borough through the cycling mode of transport. The potential new cycle routes identified in the CAP all require further feasibility assessment before they can be finalised or confirmed. In some cases, the alignment of the routes may need to be amended to ensure that the safest scheme design, in terms of operation, construction design and management, is identified. This work is being built upon by the LCWIP corridors, which is an infrastructure plan to guide active travel policies and priorities; as well as provide a framework and context to secure investment which will be commensurate with the aims and objectives of the CAP. With the potential additional cycle routes, greater connectivity would be provided throughout Castle Point. This would be provided particularly through potential on-road routes, extending throughout London Road towards Thundersley, and in the southern Canvey Island region, throughout Long Road and High Street.

5.5 Highway Capacity

5.5.1 A series of key traffic flows have been identified on the Castle Point local road network. From initial hotspot research on Google Maps, congestion is noted to be significantly greater in the PM peak than in the AM peak. Areas which are noted to be of the highest congestion include the A130 Canvey Way in the vicinity of the Waterside Farm roundabout, east-west London Road, the A129 north of Thundersley around the Woodmans Arms and Rayleigh Weir junctions, the Fairglen Interchange roundabout, and Canvey Road/Long Road on Canvey Island.

Previous Flow Data

5.5.2 **A130 Canvey Way** – To gauge the level of congestion expected on the road network, 2019 junction surveys from the A130/A1245 have been assessed to understand the congestion towards the north of the borough boundary. The majority of traffic in the AM peak is directed northeast-bound along Canvey Way (2584 PCU), whereas in the PM peak, the majority is directed southwest-bound along Canvey Way (2723 PCU).

5.5.3 **A13 London Road –** A junction survey from 2016 has been interpreted, with the movements across A13 Tarpots Corner observed. Here, it is apparent that in the initially observed highly congested west-east movement in the PM peak, 810 Passenger Car Units (PCU)are recorded. Whilst the Google Maps study did not suggest a similarly high level of congestion in the AM peak, the survey data suggests a similarly high-level east-westbound, with a total of 822 PCU.

5.5.4 **A129 Rayleigh Weir –** 2019 Junction survey data has been gathered from the Rayleigh Weir A127/A129 junction to give an understanding of the congestion to be anticipated on the A129 towards the north of the Castle Point borough boundary. In the 2019 AM peak, it is apparent that the most common direction of northbound traffic along the A129 is subsequently westbound along the A127 (467 PCU), and in the PM peak the most common direction of northbound traffic along the A129 is subsequently eastbound along the A127 (393 PCU). Total southbound traffic is significantly higher in the PM peak (1298 PCU) than in the AM peak (1097 PCU).

5.5.5 **A127A130 Fairglen Interchange** – Junction survey data from the Fariglen Interchange is available from 2019, in which it is indicated that the highest level of traffic northbound along the A1245 is seen in the AM peak, with 2570 PCU compared to 1995 PCU in the PM peak. Total traffic southbound into the A1245 arm is 2032 PCU in the AM peak, and 2095 PCU in the PM peak.

5.5.6 **Long Road** - It is noted that whilst there is significant congestion indicated along Long Road, previous survey data has not been provided.

Previous RAG Assessment findings

5.5.7 Junction testing was undertaken by Mott McDonald in 2019 as part of the transport evidence supporting the withdrawn local plan. This testing analysed the level of congestion at key junctions throughout the borough with both Reference Case and Local Plan scenarios for the future year of 2033. The results were presented as a Red, Amber, Green (RAG) assessment.

5.5.8 The RAG assessment provides a simplified way of expressing how well a junction operates in a given scenario i.e. with or without the Local Plan in place in the AM or PM peak. The following is a description of the possible classifications:

- **Red** - Junction has been shown to operate over capacity with significant queueing during the peak period.
- **Amber** - junction is considered to be approaching capacity with some queuing likely during the peak period.
- **Green** - Junction has been shown to operate within capacity during peak periods with little to no queuing reported.

5.5.9 The results are summarised in the figures below.

Figure 13. 2033 Reference Case AM RAG

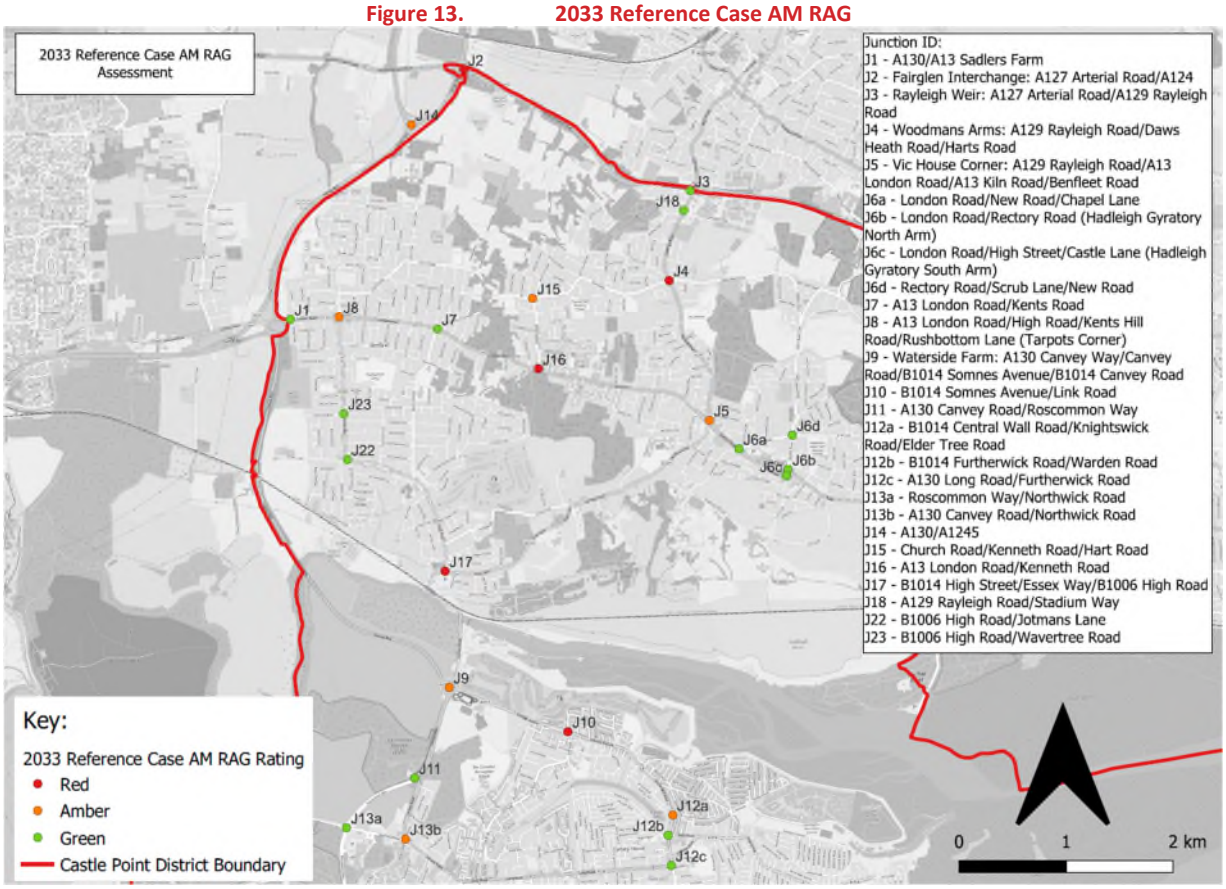
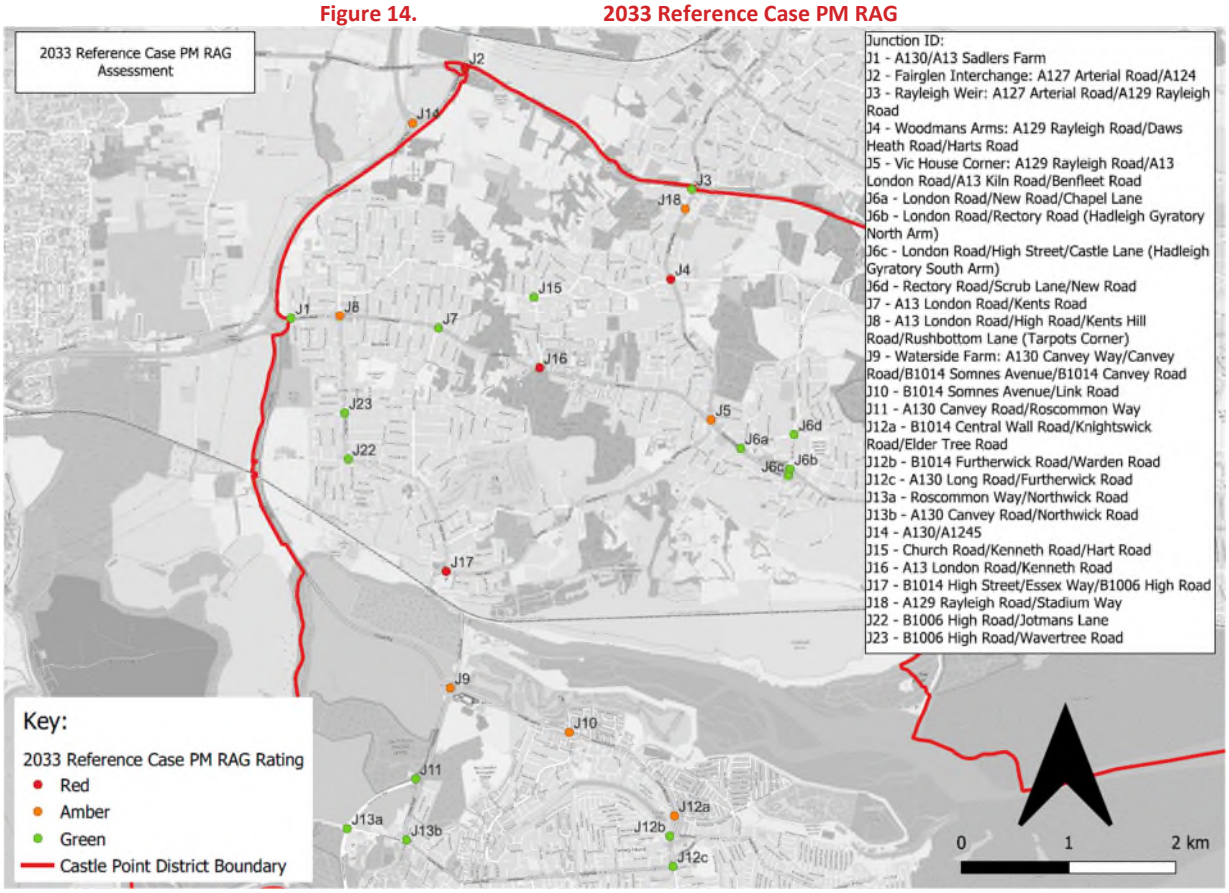


Figure 14. 2033 Reference Case PM RAG



5.5.10 Through this analysis, SYSTRA has noted certain junctions, based on either their "Red" score throughout scenarios or the fluctuating scores "Amber" and "Red" between AM and PM. Particular junctions of interest following this analysis were noted to be:

- Junction 2 - Fairglen Interchange: A127 Arterial Road/A124;
- Junction 4 – Woodmans Arms: A129 Rayleigh Road/Daws Heath Road/Hart Road;
- Junction 10 – B1014 Somnes Avenue/Link Road;
- Junction 16 – A13 London Road/Kenneth Road; and
- Junction 17 – B1014 High Street/B1014 Essex Road/B1006 High Road.

5.6 Highway Safety

5.6.1 All types of transport should be covered by safety considerations and accident analysis, taking into account the objective of facilitating, where reasonable to do so, the use of all modes of transport including sustainable and non-motorised users.

5.6.2 As a means of understanding the safety conditions surrounding the borough , the Essex Highways Interactive Map has been obtained. **Figure 15** and **Figure 16** below indicate the general clusters surrounding the borough.

Figure 15. Canvey Island Collision Map

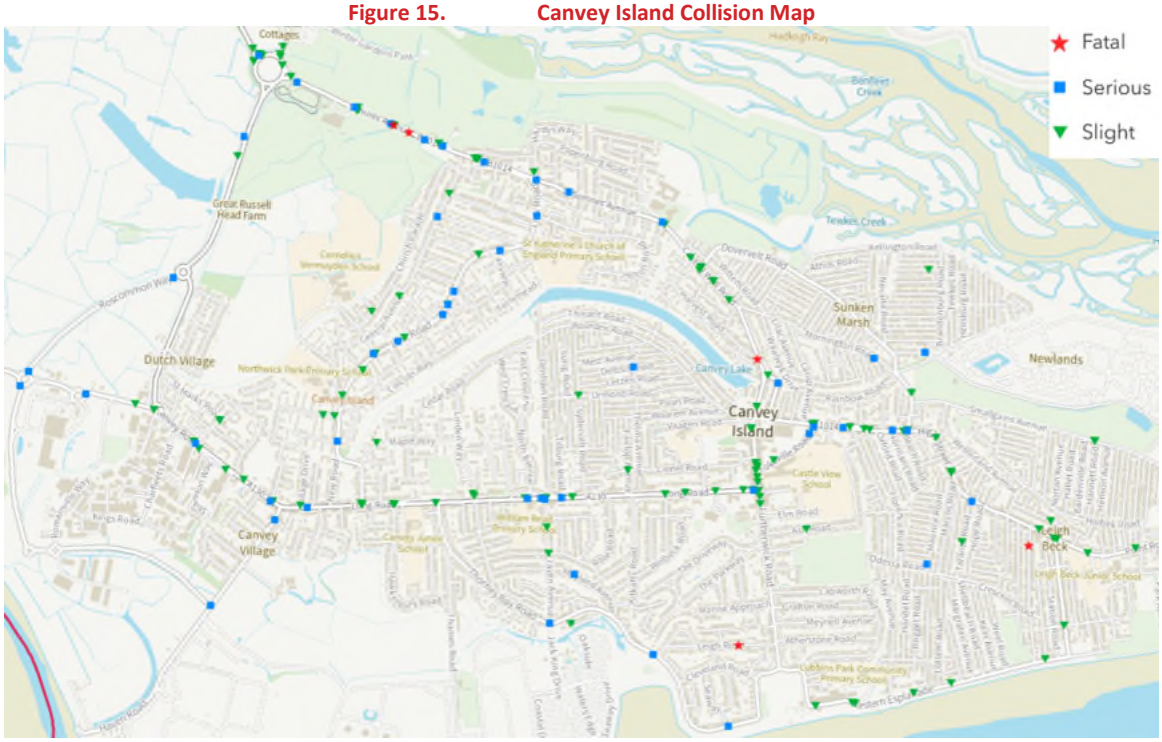
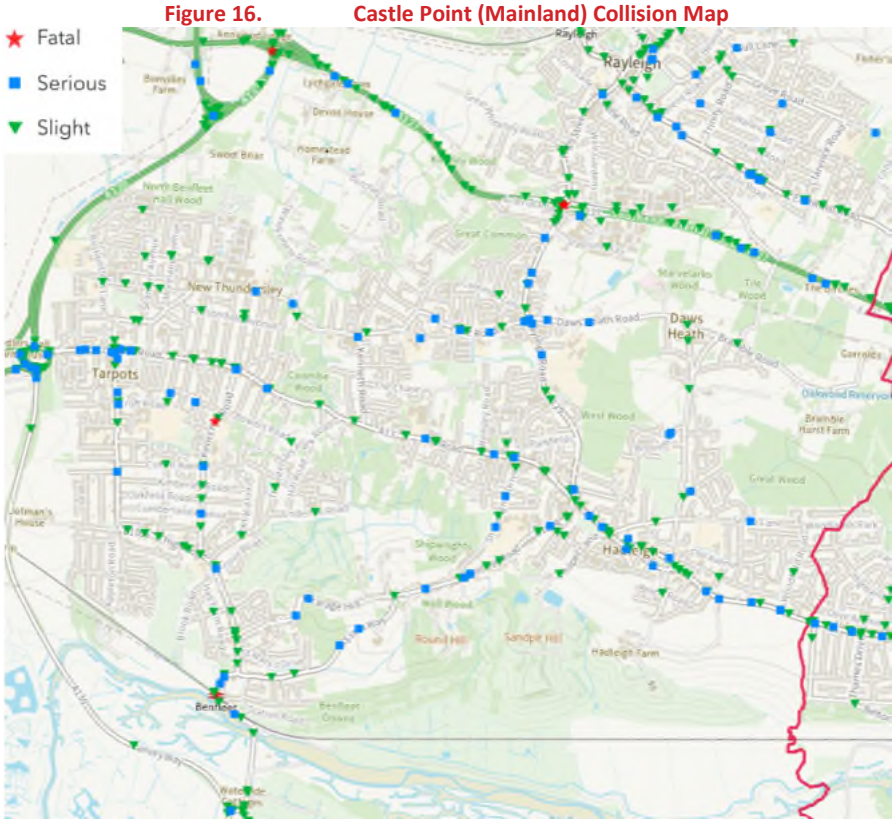


Figure 16. Castle Point (Mainland) Collision Map



5.6.3 Whilst it is acknowledged that further data is to be forthcoming, initial evidence suggests clusters of accidents surrounding the Furtherwick Road/Foksville Road junction on Canvey Island, Sadlers Farm Roundabout and Tarpots Corner, and A127/A129.

5.6.4 **Furtherwick Road/Long Road**: 13 slight and one serious accidents were recorded surrounding the junction. The serious accident is noted to have occurred as a result of a vehicle failing to see a pedestrian using the zebra crossing at the junction of Long Road and colliding. Collisions involving pedestrians using crossings is seen as a recurring theme throughout the cluster, accounting for a series of slight collisions both on Long Road and on Furtherwick Road.

5.6.5 **Sadlers Farm Roundabout:** 22 slight 9 serious are noted to have occurred within the last 5 years surrounding the junction. Five of the serious collisions are recorded as having taken place within the circulatory of the roundabout. These collisions are largely the result of vehicles failing to see each other changing lanes at the traffic signals surrounding each entry arm.

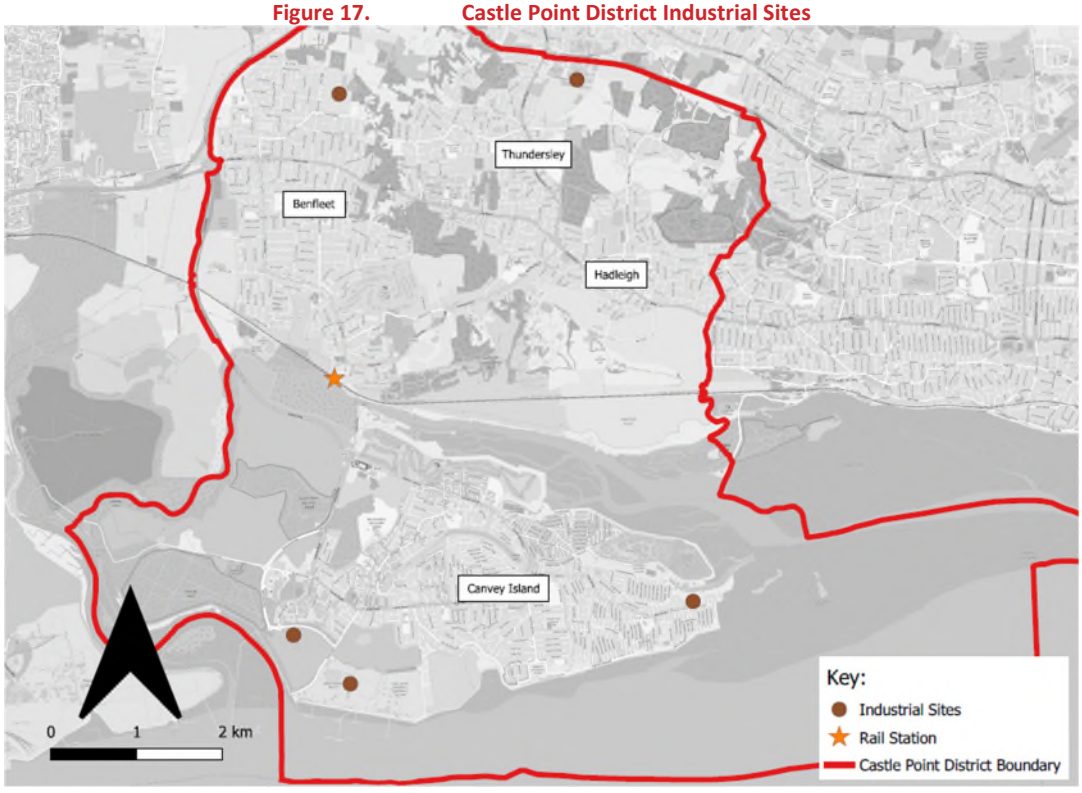
5.6.6 **Tarpots Corner:** 6 slight and 4 serious accidents are noted to have occurred surrounding the junction. The four serious accidents are all noted to be the result of drivers failing to look properly at surrounding vehicles at the entry arms of the junction. All six slight accidents are noted to have taken place at the centre of the junction. There is no consistent theme between the causation of the slight accidents.

5.6.7 **A127/A129:** The junction is noted to have featured 12 slight and 2 fatal collisions. The two fatal collisions are noted to have occurred within the underside of the junction and with no discernible theme between them. A majority of the slight accidents are noted to be the result of vehicles failing to see others when switching lanes.

5.7 Freight Movements

5.7.1 **Figure 17** below indicates the industrial sites within the Castle Point district.

Figure 17. Castle Point District Industrial Sites



5.7.2 It is likely that the freight movements throughout the Castle Point borough are to be directed largely towards areas in which industrial estates are located. The most significant estates are located to the southwest of Canvey Island to the east of Haven Road, and storage facilities located to the south of Roscommon Way. Prout Industrial Estate is located to the east of Canvey Island, to the east of B1014/Point Road roundabout.

5.7.3 Additionally, further industrial areas of Manor Trading Estate to the northwest of Thundersley are surrounded by a high density of residential areas located via Church Road. Stadium Way Industrial Estate at Rayleigh is located to the northeast of the region, to the east of Rayleigh Road, containing large supermarkets, homeware stores and car dealerships.

5.7.4 As a result, it is likely that there will be an increased level of HGV movements north-south along the A130 Canvey Road, and east-west along the B1014 due to the industrial estates on Canvey Island. Throughout the northern areas of the region, an increased level of HGV movements are likely to be generated north-south along the A129 and east-west along the A13.

5.8 SRN Commentary

5.8.1 The Strategic Road Network (SRN) is a network of motorways and A-roads that connect towns and cities in England. The SRN is managed by `National Highways' (NH). The A13 running west from Sadlers Farm roundabout to the west of the Castle Point district boundary is one of the routes falling within the SRN.

5.8.2 The A13 links to the wider area of Southend, and as such the resultant congestion from development within this region will impact the operation of the A13. National Highways are party to the A127 task force, and it is noted there is a committed and funded short-term scheme for the A127/A130 Fairglen Interchange to increase the capacity through mitigations such as longer slip lanes on both A127 on-slips and improvements at Rayleigh Spur Roundabout.

5.8.3 When considering the impact on the SRN, it is recommended that as few cars are directed onto the A13 as possible, in order to minimise impact. When it comes to Castle Point, it is noted that due to the high proportion of travel which takes place by car, and the road network largely leading into the A13, it is deemed that it is not reasonable for a degree of impact to be avoided entirely, and that in several locations this is expected to represent a significant change in comparison to current anticipated future demand.

5.8.4 As such, development will need to prioritise active and public transport modes where possible, practicable and attractive in order to lower the impact on both strategic and local networks, with the acknowledgement that there will be an inevitable impact from the residual car-based transport demand associated with Local Plan sites.

6. DEVELOPMENT CLUSTERS

6.1.1 Castle Point Borough has undertaken an appraisal of the potential urban capacity within Castle Point, and have split a significant number of the potential development sites from this appraisal into a series of "clusters" (the remaining sites are categorised as "un-clustered" and are discussed below). There are eight urban "clusters", which together form the Urban Sites as defined previously in this report.

6.1.2 In addition, a series of four "Broad Locations" have been identified by which to assess further potential residential and mixed use development sites. At this stage, the Broad Locations are defined generally by their location and an initial residential capacity, again as previously described in this report.

6.1.3 Using this information, SYSTRA have produced an initial Schedule of Interventions which is a list of potential schemes/projects which could improve the various modes of transport in and around Castle Point and enable the proposed allocations to come forward. This schedule has subsequently been used to identify the most appropriate measures which would be required to support the development of each cluster and/or broad location.

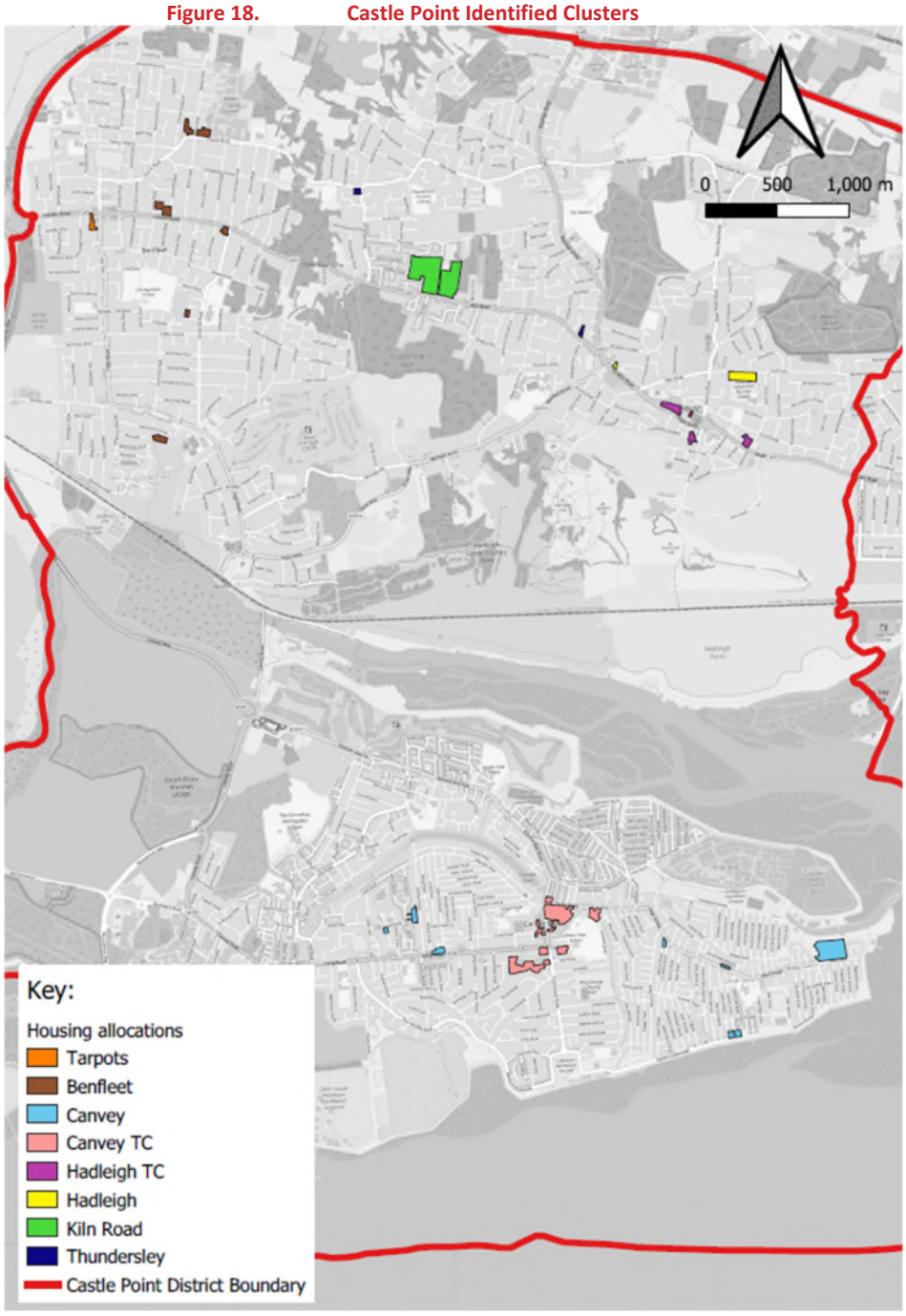
6.2 Cluster Analysis

6.2.1 A series of clusters have been identified by the Council for future development to be considered. The clusters identified are:

- Tarpots;
- Benfleet;
- Canvey;
- Canvey TC;
- Hadleigh TC;
- Hadleigh;
- Kiln Road; and
- Thundersley

6.2.2 **Figure 18** below indicates the location of the proposed CPP site clusters within Castle Point.

Figure 18. Castle Point Identified Clusters



6.2.3 The allocations represent the urban sites as proposed for allocation by Castle Point Borough Council. SYSTRA has analysed the identified clusters throughout the borough, considered the accessibility and transport characteristics of each cluster, determined by proximity to public transport, availability of public transport services, collision data and previous RAG testing while bearing in mind the scale and likely impact of the proposed development on the highway network.

6.2.4 In terms of cluster housing capacity, the figures provided by Castle Point Borough Council as part of the CPP Preferred Option have been used.

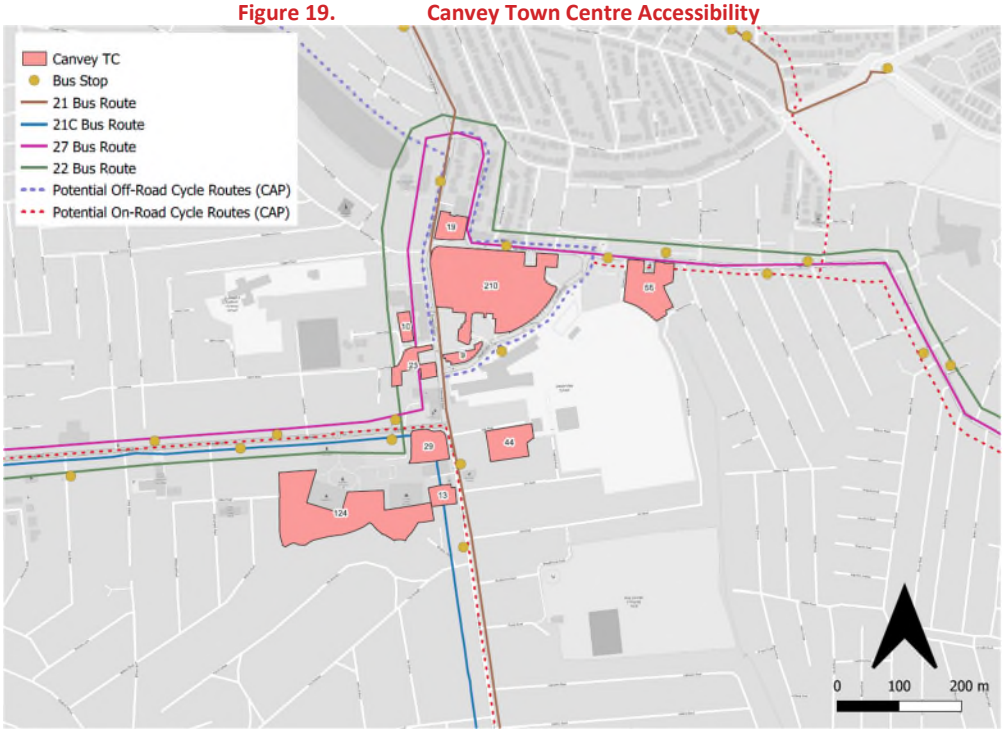
6.2.5 Where reference is made to the Initial Schedule of Interventions (ISI) table, this can be viewed in the following section of the report, with associated mapping at Figures 36 to 38. It is noted that any interventions suggested within the following chapter are subject to further appraisal, and are not to come to the detriment of existing services or public transport networks.

Canvey Town Centre

6.2.6 The Canvey TC cluster is formed of 10 sites surrounding the Furtherwick Road area to the east of Canvey Island. The cluster is comprised of 536 dwellings, with the largest being the Knightswick Shopping Centre site, containing 210 dwellings (an additional 200 dwellings are also proposed as part of the Broad Sites which are discussed in Section 6.3). All sites meet the active travel criteria of being located within 400 metres walking distance of a bus stop.

6.2.7 The surrounding accessibility for the cluster is indicated in **Figure 19** below.

Figure 19. Canvey Town Centre Accessibility



6.2.8 The public transport accessibility within the Canvey TC cluster is strong, with the 21, 21C, 22 and 27 bus routes all routing through the cluster. The cluster is served by six bus stops, of which five have a shelter, and one is comprised of a bus pole and flag. These developments would be expected to contribute towards further enhancement of the local bus network. There is also likely to be a requirement for a Mobility Hub to be created in this area – funded through pooled developer contributions.

6.2.9 A series of potential cycle routes surrounding the cluster were identified in the Cycle Action Plan, including on-road routes along Long Road/Furtherwick Road to the east and south of the cluster, and along High Street to the northeast. Additionally, potential off-road routes are along Foksville Road surrounding the Knightswick Shopping Centre site, and along Canvey Lake to the northwest.

6.2.10 All of the sites within the cluster are located along Furtherwick Road, with the three previously tested junctions located on the north-south Knightswick/Furtherwick Road to the west of the road. Most notable to the cluster are:

- **Junction 12a, B1014 Central Wall Road/Knightswick Road/Elder Tree Road,** located approximately 180 metres to the north of the Knightswick Shopping Centre site (amber across all scenarios);
- **Junction 12b, B1014 Furtherwick Road/Waarden Road** located adjacent to the west of the Knightswick Shopping Centre site (green across all scenarios); and
- **Junction 12c, Long Road/Furtherwick Road** located adjacent to the northeast of the Longwick and Furtherwick Road Cluster site (green across all scenarios).

6.2.11 The performance of the junction within the 2033 Reference Case, in addition to the four bus routes operating through the cluster, demonstrate that this is an area with a strong development potential at the scale proposed from a transport and accessibility perspective. These developments would be expected to make an proportionate contribution towards the further development of the public transport network.

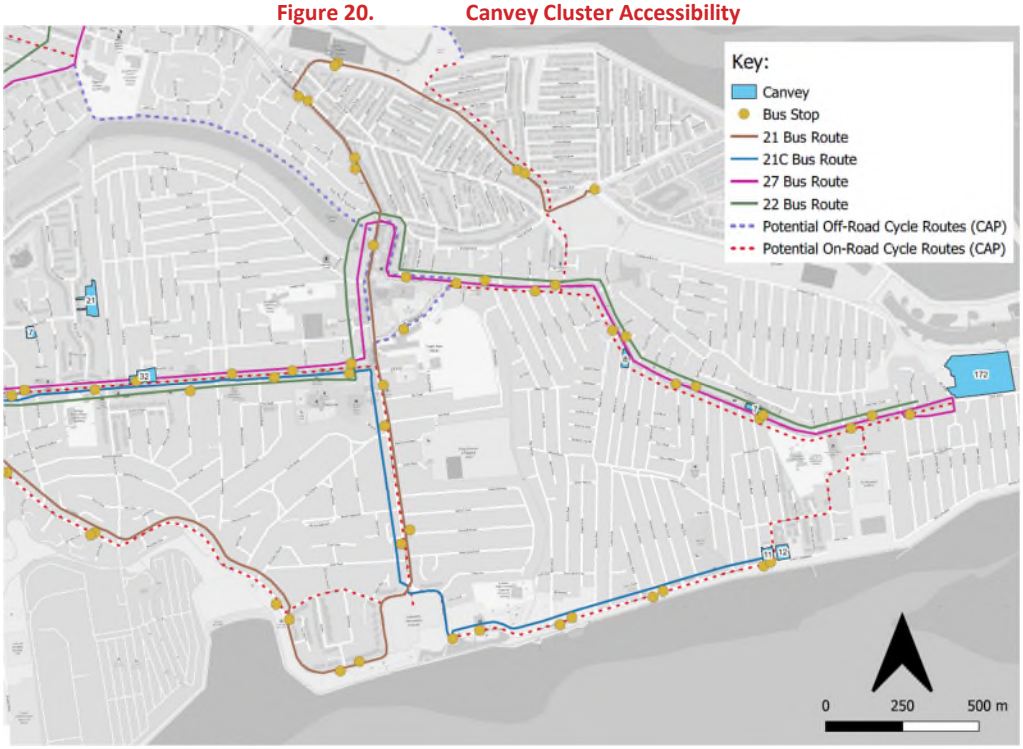
6.2.12 Falling within the identified sub-regions 1, 3 and 4 of SYSTRA's schedule of intervention it is suggested that improved cycle links along Canvey Lake are needed to further improve accessibility through active and sustainable modes of travel surrounding the cluster.

Canvey

6.2.13 The Canvey cluster is formed of eight sites located across Canvey Island. The capacity of the cluster as a whole is around 271 new homes, with the highest individual site capacity being the Land at the Point site, comprised of 172 dwellings.

6.2.14 The accessibility of the Canvey Cluster with the associated residential capacities of the sites is indicated in **Figure 20** below.

Figure 20. Canvey Cluster Accessibility



6.2.15 The cluster is served by four bus routes; the 21, 21C, 22 and 27. The cluster area contains a wide range of bus stops, with all sites located within 400 metres of a bus stop.

6.2.16 A potential on-road cycle route is proposed in the CAP, routing centrally through the cluster; east-west along Long Road, and southeast-bound along B1014 High Street.

6.2.17 The nearest previously assessed junctions are **junctions 12a, b, and c**, in proximity to Furtherwick Road. These junctions are distant from the Canvey cluster, with the nearest site being between the Former Council Offices and Long Road site located approximately 750 metres to the west of junction 12c. These junctions are noted to perform well under the previous RAG testing, with 12a being amber (approaching capacity with some queueing) in both AM and PM Reference Case scenarios, and 12b and 12c green (operates within capacity) in both scenarios.

6.2.18 Considering the aforementioned factors such as a high level of bus accessibility, effective performance of the nearby junctions within the 2033 Reference Case and high capacity in comparison to other clusters, it is deemed that the Canvey cluster is an effective cluster to develop; however due to the potential scale of the development, further investigation is required prior to development.

6.2.19 Falling within sub-regions 1, 2 and 4 of SYSTRA's schedule of intervention, it is suggested that alteration to the 21C bus route to loop northbound along Maurice Road and Crescent Road would benefit the sites to the west of the cluster. The addition of cycle routes along Marcos Road/Lottem Road and Odessa Road/Crescent Road would further improve accessibility via active modes. Whilst this intervention is a potential mitigation to improve servicing to the wider area, the alteration is not to come at the detriment of the existing service and is required to be considered in line with wider policy and feasibility.

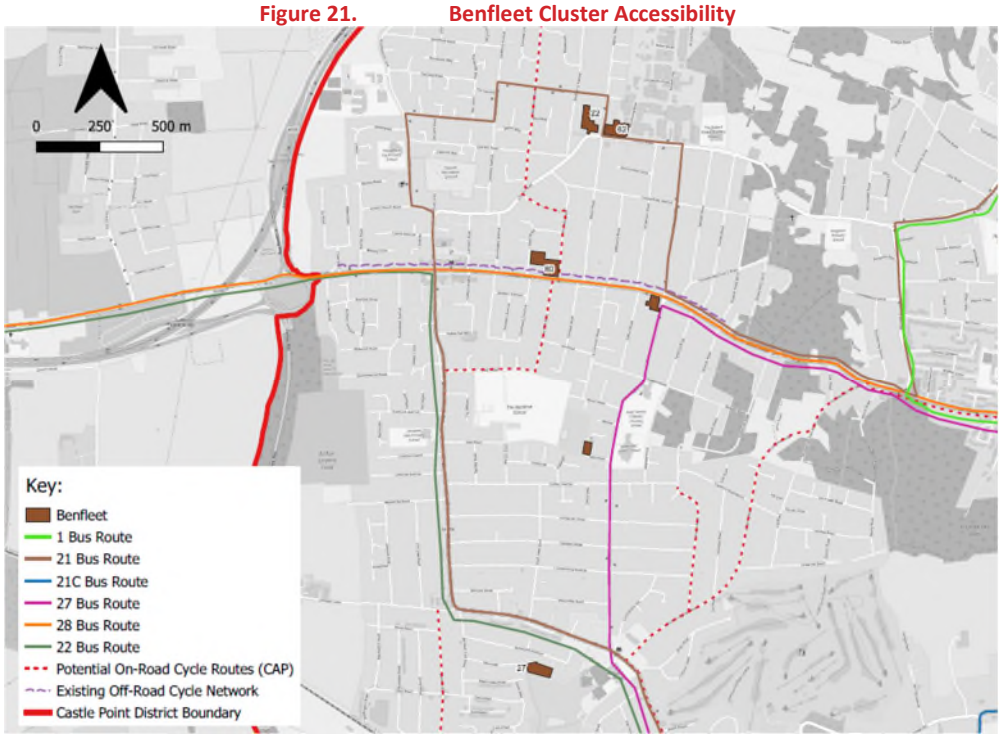
Benfleet

6.2.20 The cluster is comprised of six sites, located across Benfleet from as far north as Manor Trading Estate, to adjacent to the High Road/Kents Hill Road in South Benfleet. The total capacity of the cluster is around 225, with the highest capacity of 80 located at the Canvey Supply, 223 London Road site. (an additional 200 dwellings are also proposed as part of the Broad Sites which are discussed in Section 6.3).

6.2.21 All sites within the cluster are within 400 metres of the nearest bus stop, and the Richmond Avenue Car Park site is within 2km of actual walking distance from Benfleet rail station.

6.2.22 The wider accessibility surrounding the Benfleet cluster and the residential capacity of the individual sites is indicated in the figure below.

Figure 21. Benfleet Cluster Accessibility



6.2.23 The 21, 22, 27 and 28 bus routes all operate through the Benfleet cluster. Seven bus stops are located directly adjacent to the sites of the cluster, of which 2 have a bus shelter, and 5 have a bus flag and pole. None of the bus stops feature live service updates (RTPI Screens). These developments would be expected to contribute to further enhancements to the local bus network, to improve accessibility and the attraction of public transport locally.

6.2.24 As part of the Cycle Action Plan, potential on-road cycle routes are identified north-south along High Road. Additionally, a potential off-road cycle route northwest-bound route is identified between Benfleet Station and Woodham Road, South Benfleet. This is located approximately 600 metres to the south of the Richmond Avenue Car Park site.

6.2.25 **Junction 7 – A13 London Road/Kents Road** is located adjacently to the northeast of the 312-320 London Road (Queen Bee's) site, and **Junction 22 – High Road/Jotmans Lane** is located 300 metres to the northwest of the Richmond Avenue Car Park site. Both of these junctions

throughout previous testing performed as `Green' (within capacity with no queuing) throughout all 2033 Reference Case scenarios.

6.2.26 Considering the performance of the previously tested local junctions, and the sizeable distance between the six sites within the cluster, it is determined that the cluster is suitable for development.

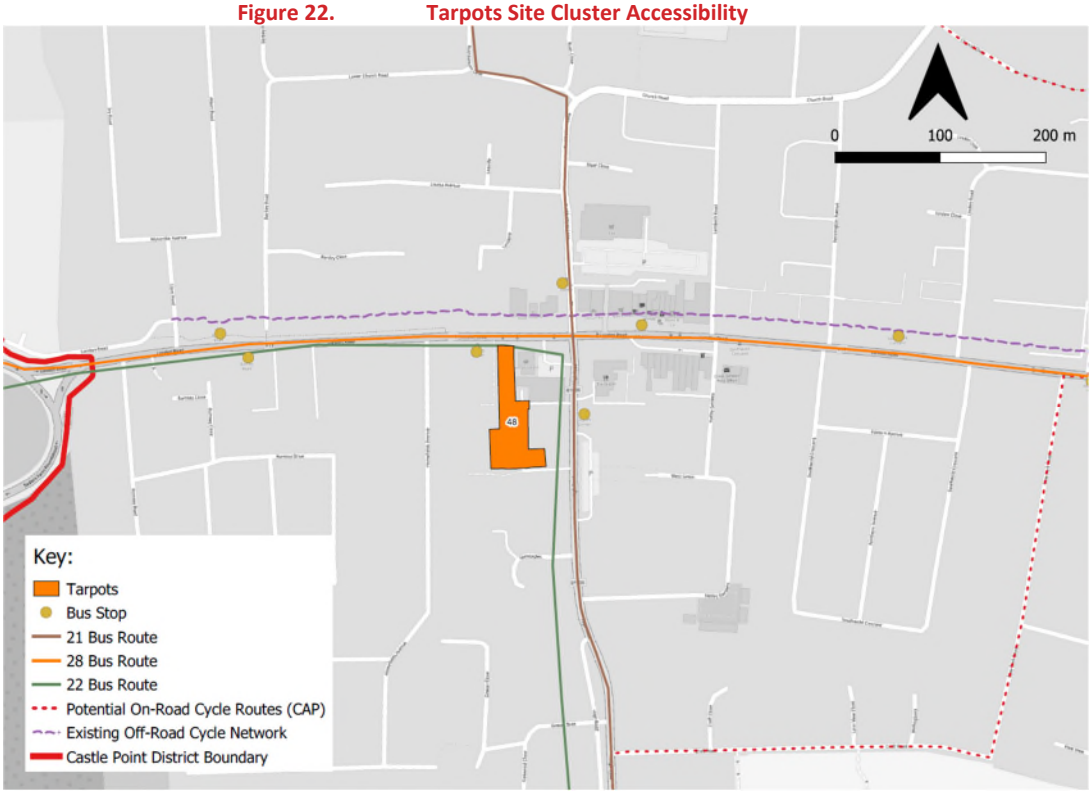
6.2.27 Falling within regions 6 and 7 of SYSTRA's schedule of intervention, it is suggested that accessibility to the region through active and sustainable means could be improved through the implementation of cycle routes northbound along Kents Hill Road to the North Benfleet area, the improvement of pedestrian facilities along Woodside Avenue, Eversley Road and Overton Road; and the enhancement of local bus services.

Tarpots

6.2.28 The Tarpots cluster is comprised of one site, located in the southwestern corner of the London Road/High Road junction. The total capacity of the site, Furniture Kingdom, is 48 dwellings. The site is located adjacent to the west and south of the nearest bus stops.

6.2.29 The wider accessibility of the Tarpots site and its associated residential capacity is indicated in the figure below.

Figure 22. Tarpots Site Cluster Accessibility



6.2.30 The 21, 22 and 28 bus routes all operate directly through the cluster. Four bus stops surround the Rushbottom Lane/London Road/High Road junction, of which three comprise a bus shelter and one a bus pole and flag. Tarpots Corner northbound on Rushbottom Lane comprises a bus flag and pole. These developments would all be expected to contribute towards bus infrastructure and/or further enhancement of the local bus network.

6.2.31 There is an existing off-road cycle route east-west along London Road. A potential on-road cycle route is suggested in the CAP, which intersects the existing off-road route, and provides access northbound along Waverley Road towards North Benfleet, and southbound along High Road toward Benfleet Station.

6.2.32 The previously tested Junction 8 – London Road/Rushbottom Lane/High Road junction is located to the northeast of the site. Through the Reference Case scenarios, the RAG score is noted to be `Amber' (approaching capacity with some queuing), with the performance as `Red' (overcapacity with significant queuing) in the CPP scenarios. Given the enlarged protruding corner along the Rushbottom Lane/London Road footpath, physical capacity mitigation could be considered through the potential widening of the highway along London Road eastbound.

6.2.33 Given Junction 8 is operating overcapacity with significant queuing , development in this cluster may prove problematic to deliver from a highway capacity perspective. Any mitigation would need to consider the cumulative impact of growth and its ability to fund any improvements. However, there are possibilities to deliver active and sustainable transport improvements which may assist in mitigating the overall impact of the cluster to nil detriment.

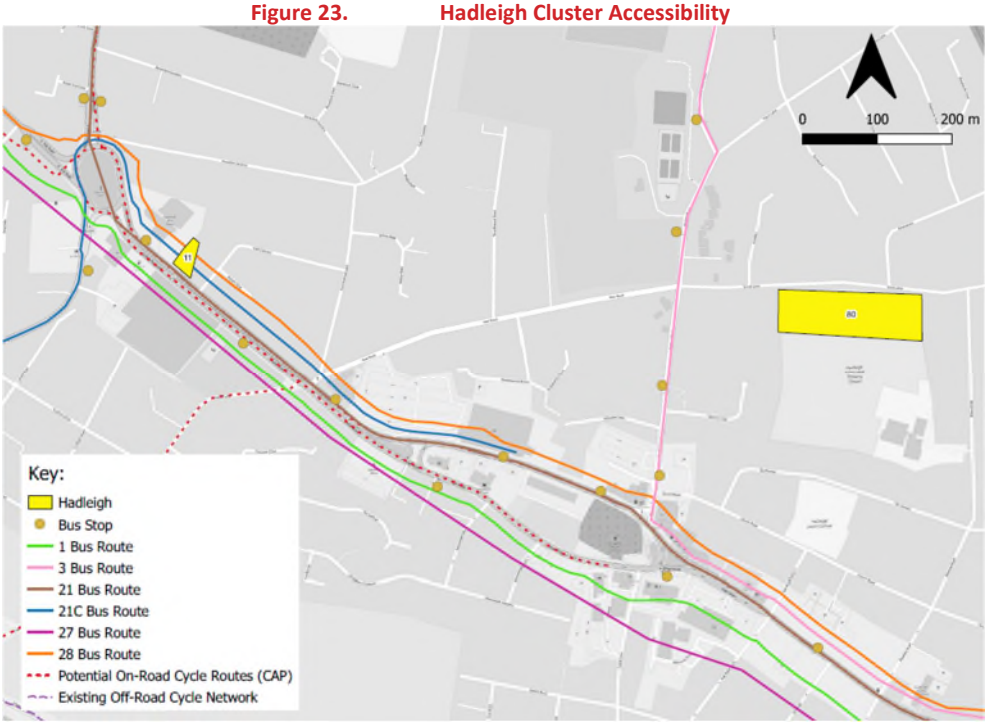
6.2.34 Falling within sub-regions 6 of SYSTRA's schedule of intervention (Figure 35), the Tarpots cluster would be located adjacent to the alteration of the 28 bus route northbound along Rushbottom Lane, improving accessibility to other residential areas to the north and east. Whilst this intervention is a potential mitigation to improve servicing to the wider area, the alteration is not to come at the detriment of the existing service and is required to be considered in line with wider policy and feasibility.

Hadleigh

6.2.35 The cluster is formed of two sites, located in close proximity to New Road, Hadleigh. The capacity of the cluster is around 91 new homes, with the highest capacity in the Land South of Scrub Lane, with a noted capacity of 80. Both sites are located within 400 metres walking distance of the nearest bus stop.

6.2.36 The transport accessibility surrounding the Hadleigh cluster is indicated in **Figure 23** below.

Figure 23. Hadleigh Cluster Accessibility



6.2.37 Six bus routes are operating through the cluster; namely the 1, 3, 21, 21C, 27 and 28. The cluster contains four bus stops in close proximity to the two sites, at the Bus Depot on the southeast-bound side of London Road, and at Queens Lodge, on the southbound side of Benfleet Road. The Bus Depot stop includes a shelter and seating, whereas the Scrub Lane stop has a bus pole and flag. Any developments in this area would be expected to contribute to the enhancement of the local bus network and potentially the A13 sustainable transport corridor.

6.2.38 A potential on-road cycle route is identified by the Cycle Action Plan, northbound towards Thundersley, westbound toward Benfleet and south toward Hadleigh Country Park. If implemented, the cluster would be connected to a series of other regions throughout the borough and green spaces but would need to consider the range of local, national and international designations along the route.

6.2.39 The Hadleigh Clinic site is located adjacent to the southeast of **Junction 5 - Rayleigh Road/London Road/Benfleet Road/Kiln Road**. The junction results in previous RAG testing is `Amber' (approaching capacity with some queuing) in both AM/PM Reference Case scenarios; indicating the performance of the junction and surrounding road network could increase beyond capacity with further development. Additionally, the Land South of Scrub Lane site is located approximately 220 metres to the east of **Junction 6d - Rectory Road/Scrub Lane/New Road**, which performs as 'Green' across all scenarios.

6.2.40 Whilst the cluster is well-served by public transport routes, the previous RAG scoring indicates Junction 5 would be approaching capacity in 2033. However, the 91 homes in this cluster alone is unlikely to significantly impact on junction performance. Further investigation is recommended surrounding the junction to ensure that the additional homes do not increase congestion surrounding the junction to overcapacity.

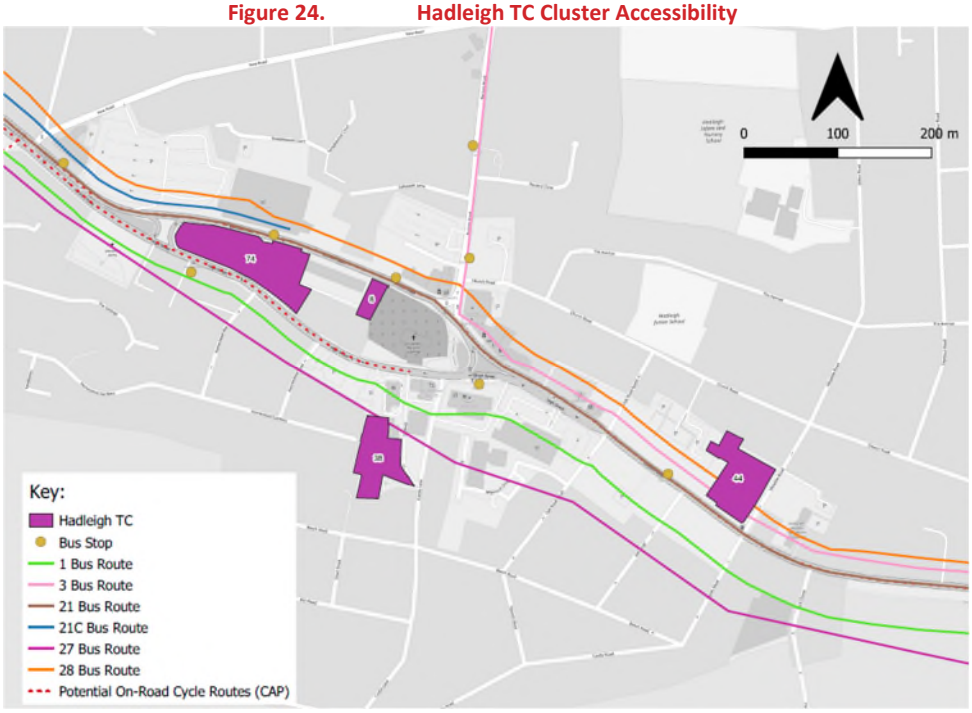
6.2.41 Falling within the western corner of Region 11 and to the north of Region 12 of SYSTRA's schedule of intervention, it is suggested that accessibility of the cluster through active and sustainable modes could be enhanced through the implementation of cycle routes along Benfleet Road southwest bound toward Benfleet Station. As with the other clusters along the A13, there may also be the potential for a bus priority scheme along the A13. However, this could be to the detriment of other vehicles on the network. Lighter measures could include improved bus waiting facilities to encourage increased use of public transport.

Hadleigh Central

6.2.42 The Hadleigh Central cluster is formed of four sites surrounding London Road/High Street in Hadleigh. The capacity of the area is 165 new homes, with the greatest capacity in The Island site, comprised of 74 dwellings. All four sites are located within 400 metres of a bus stop.

6.2.43 The accessibility to the Hadleigh Central cluster and the residential capacities associated with each site is indicated in the figure below.

Figure 24. Hadleigh TC Cluster Accessibility



6.2.44 The cluster is well served by the local bus network, with six services operating through the cluster – the 1, 3, 21, 21C, 27 and 28 – and dedicated bus lanes westbound along the A13 stretching from the London Road/Manor Road junction to London Road/Kents Hill Road junction, additionally eastbound along the A13 between London Road/Morrisons Supermarket and 251 London Road. The cluster is served by five bus stops, of which three have a bus shelter and two a bus post. The Morrison's bus stop has live timetable service updates. There would be an expectation that developments in this area would contribute towards the provision of a mobility hub, the A13 sustainable transport corridor and the enhancement of the local bus network.

6.2.45 As part of the Cycle Action Plan, potential on-road cycle routes are identified along the High Street and connecting to potential off-road cycle routes through Hadleigh Country Park to the south.

6.2.46 The cluster is in close proximity to four previously tested junctions:

- **Junction 6a London Road/New Road/Chapel Lane**, located approximately 190 metres to the northwest of the Island site (Green across all scenarios);
- **Junction 6b London Road/Rectory Road**, located approximately 80 metres to the south of the Osborne Motor Company site (Green across all scenarios);
- **Junction 6c London Road/High Street/Castle Lane**, located approximately 120 metres to the north of the Castle Lane Car Park site (Green across all scenarios); and
- J**unction 6d Rectory Road/Scrub Lane/New Road**, located approximately 350 metres to the north of the Osborne Motor Company site (Green across all scenarios).

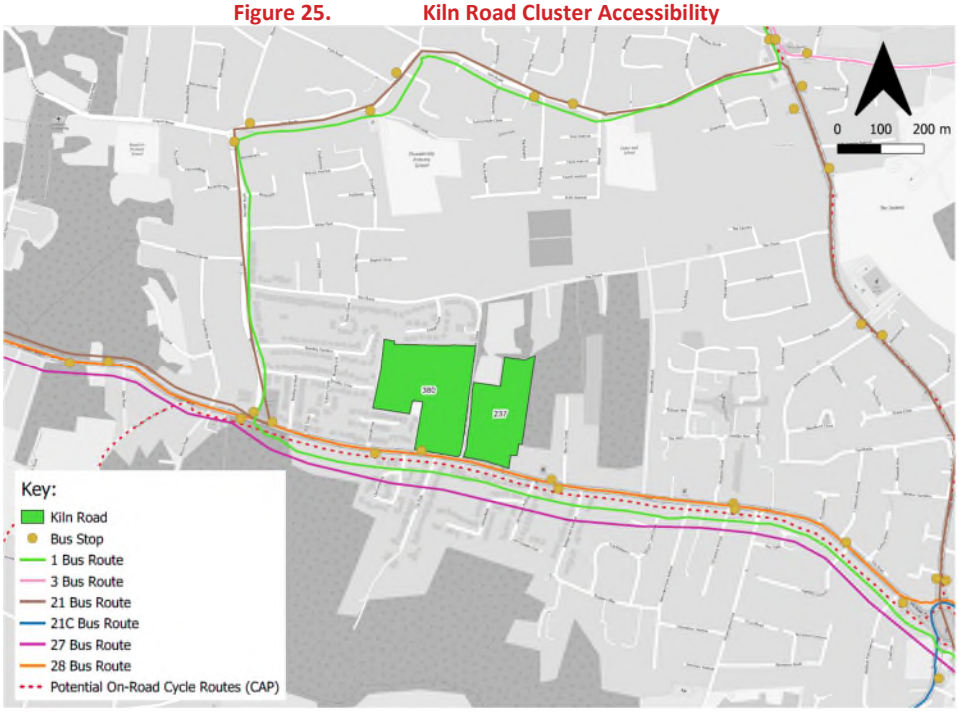
6.2.47 Falling within region 12 of SYSTRA's schedule of intervention, it is suggested that the accessibility of the cluster through active and sustainable modes could be enhanced through the implementation of cycle routes along New Road and northbound along Daws Heath Road. This would leave the potential to be expanded towards residential areas to the northeast of the cluster. As with the other A13 clusters, there may also be the potential for a bus priority scheme along the A13. However, this would likely be to the detriment of other vehicles on the network.

Kiln Road

6.2.48 The cluster is formed of two sites to the north of Kiln Road, adjacent to Runnymede Chase. The capacity of the cluster is around 617, and the USP College site has the highest capacity, of 380 dwellings.

6.2.49 The accessibility to the Kiln Road cluster, and the residential capacity of each site is indicated in **Figure 25** below.

Figure 25. Kiln Road Cluster Accessibility



6.2.50 The Kiln Road cluster is served by four bus routes - the 1, 21, 27 and 28. The cluster is served by four bus stops in its direct vicinity, of which all four have shelters and seating. None of these bus stops have live service timetable updates (RTPI screens).

6.2.51 A potential on-road cycle route is identified by the Cycling Action Plan east-west along Kiln Road along the southern perimeter of the cluster, providing active travel connections between Benfleet Station to the southwest and Hadleigh to the southeast.

6.2.52 The closest previously tested junction is the Kiln Road/Kenneth Road junction located approximately 400 metres to the west of the USP College site, which is "Red" across both AM and PM future year scenarios, and therefore operating overcapacity with significant queueing.

6.2.53 As such, it is likely that further investigation will be needed surrounding the suitability of this development cluster, given the existing high level of congestion seen at the Kiln Road/Kenneth Road junction and the proposed 617 dwellings for development around the road network likely adding to the strain surrounding the junction.

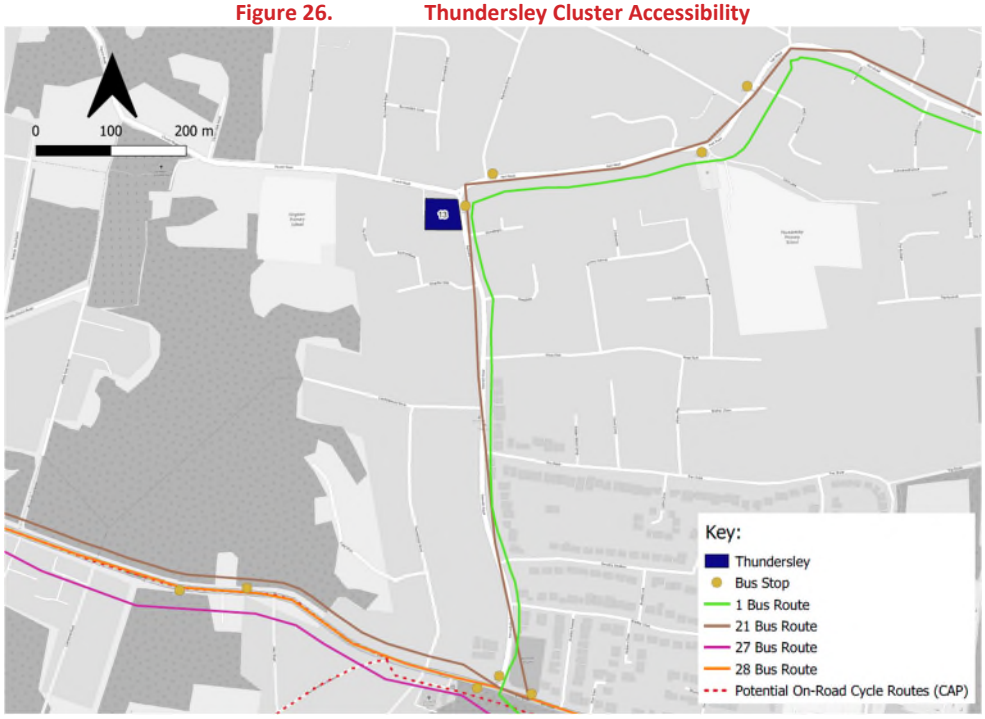
6.2.54 Falling within region 10 of SYSTRA's schedule of intervention, it is suggested that the accessibility of the cluster through active modes could be enhanced through the implementation of cycle routes southwest-bound along Shipwrights Drive/B1014. This proposed cycle routing is located approximately 450 metres to the east of the Council Offices site and would act to further improve the on-road cycle infrastructure along Kiln Road as proposed within the CAP.

Thundersley

6.2.55 The Thundersley cluster is comprised of one site, Thundersley Clinic, located to the southwest of the Church Road/Kenneth Road/Hart Road junction. The site is comprised of a capacity of

13 dwellings. The location of the site, its residential capacity and its surrounding infrastructure, are indicated in the figure below.

Figure 26. Thundersley Cluster Accessibility



6.2.56 The Thundersley cluster is served by two bus routes, the 1 and 21. The 27 and 28 bus routes are also accessible approximately 650 metres to the south. Two bus stops are located immediately to the east of the Site. Both bus stops feature a bus shelter and seating.

6.2.57 A potential cycle route is also identified within the CAP east-west along the A13 Kiln Road, providing access between Hadleigh to the east and South Benfleet to the southwest.

6.2.58 The closest previously tested junction is Junction 15, located immediately to the east of the site. Across the previous 2033 RAG junction testing, it is “green” in the AM and “amber” in the PM. Additionally, the site is approximately 650 metres to the north of junction 16, which is “red” across both scenarios.

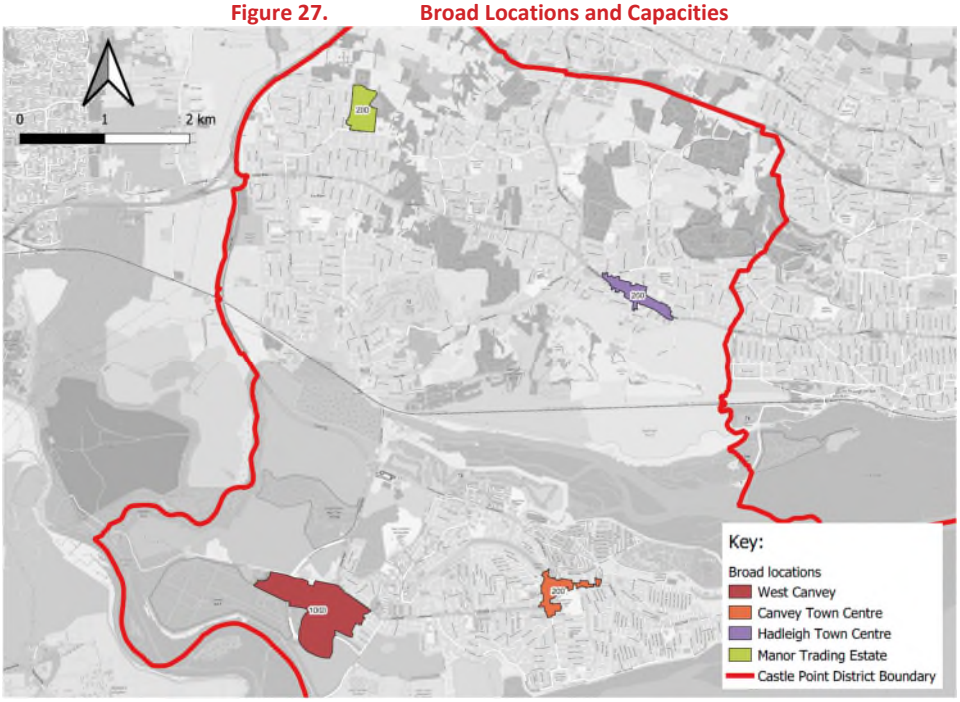
6.2.59 Whilst in close proximity to the previously described junctions, due to the low level of development associated with the cluster, it is likely that it will not cause significant additional congestion onto the local road network. Whilst this is the case, it is also likely that junction 16 will require further investigation due to its “red” scoring.

6.2.60 Located within Region 7 of SYSTRA’s proposed regions for intervention, a series of mitigations have been identified, such as the redirection of the 28 bus route southbound through the Church Road/Kenneth Road/Hart Road junction, and the introduction of a pedestrian crossing to the east of the junction.

6.3 Broad Locations

6.3.1 In addition to the specific clusters within The Preferred Option, a series of Broad Locations have been identified in their general area, with an initial housing capacity attributed to them for further study. The Broad Locations and their capacities is indicated in **Figure 27** below.

Figure 27. Broad Locations and Capacities



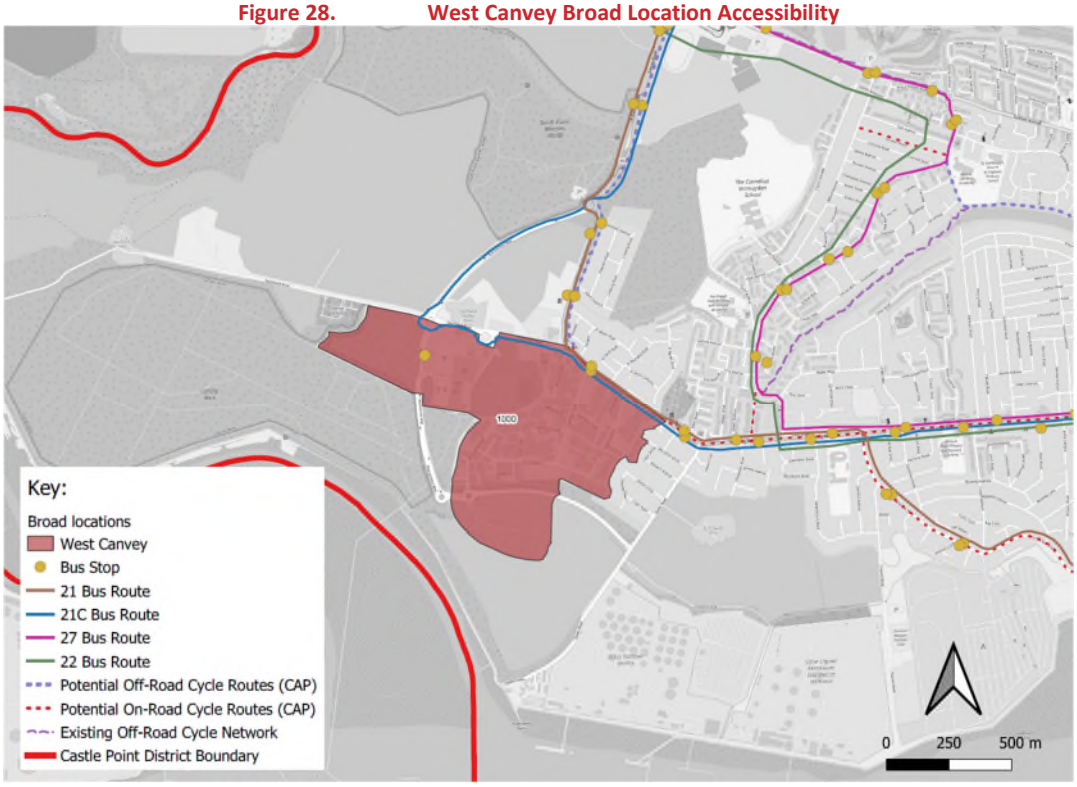
West Canvey

6.3.2 The West Canvey broad location is located to the southwest of the Castle Point region. The area has an identified maximum capacity of 2.325 dwellings.

6.3.3 The broad location currently accommodates mixed employment uses. It is intended to largely retain this floorspace, albeit in a significantly reconfigured form, which will be achieved through masterplanning and sequential redevelopment of the broad location site.

6.3.4 The Broad Location and its surrounding transport infrastructure is indicated in Figure 28 below.

Figure 28. West Canvey Broad Location Accessibility



6.3.5 The broad location is served directly by two bus routes, the 21 and 21C, both accessible from the bus stops immediately to the north of the site along Canvey Road. Both bus stops feature shelter, seating and a flag and pole.

6.3.6 A potential off-road cycle route is also proposed stretching northbound from the site along Canvey Road, providing accessibility toward the north of Canvey Island. Potential on-road cycle routing is proposed in the CAP to the east of the site, along Long Road, providing access to the east of Canvey Island, and to existing off-road cycle routing along Canvey Dyke.

6.3.7 The closest previously tested junctions are Junction 13a and 13b, both located immediately to the north of the Broad Location at the Roscommon Way/Northwick Road and Canvey Road/Northwick Road junctions. Junction 13a is "Green" across all 2033 scenarios, and 13b is "Amber" in the AM peak and "Green" in the PM peak.

6.3.8 Considering the "Amber" scoring of Junction 13b in the 2033 AM peak, additional mitigation is expected to be needed, given the potential for 2,325 dwellings associated with the Broad Location. This work is currently being undertaken and will be presented in the TA Addendum report.

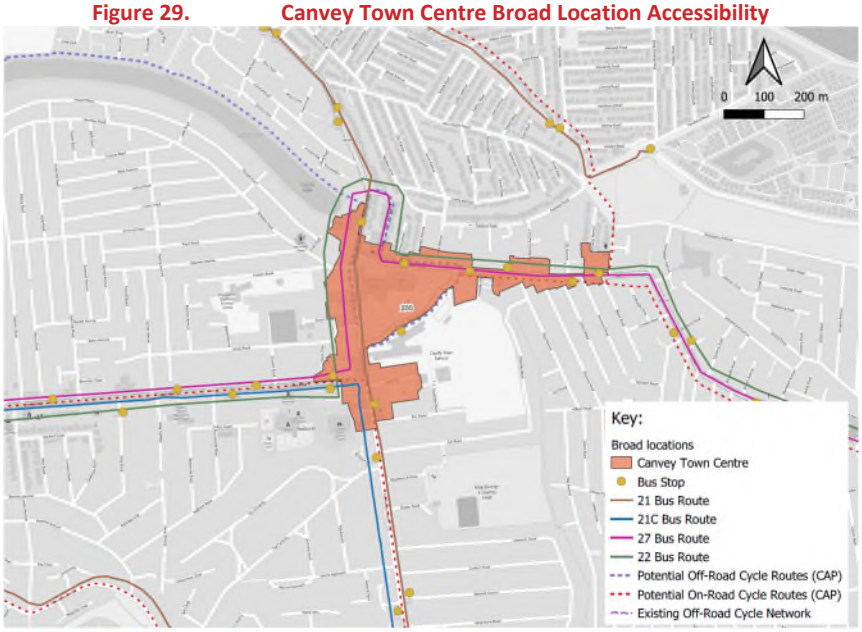
6.3.9 Located within Region 3 of SYSTRA's proposed regions for intervention, the Broad Location is located immediately to the west of Long Road which has been highlighted in the ISI as a road for investigation of future mitigation (ISI ref. A3). This is due to the level of congestion and collisions occurring along the road.

Canvey Town Centre

6.3.10 The Canvey Town Centre broad location is located to the east of Canvey Island, along Furtherwick Road and High Street. The broad location has a proposed capacity of 200 dwellings.

6.3.11 The Broad Location and the surrounding transport infrastructure is indicated in **Figure 29** below.

Figure 29. Canvey Town Centre Broad Location Accessibility



6.3.12 The broad location is served directly by four bus routes, the 21, 21C, 22 and 27; which are all accessible from the range of bus stops located within the site location. All bus routes are accessible from the Haystack Corner bus stop to the west of the site along Long Road. The bus stop comprises a bus shelter, seating and a flag and pole.

6.3.13 Potential off-road cycle routing is proposed north-south along Furtherwick Road within the CAP, and on-road cycle routing is proposed along Long Road to the west of the site, to the south along Furtherwick Road and along High Road to the east. This is to significantly improve active travel accessibility surrounding the broad location.

6.3.14 The previously tested Junction 12b and 12c are both located within the site's perimeter along Furtherwick Road, at the Furtherwick Road/Waarden Road and Furtherwick Road/Long Road junctions. Both junctions are recorded as "Green" across all scenarios.

6.3.15 Due to the "Green" scoring across all scenarios for the previously tested junctions within the site's perimeter, it is unlikely that mitigation will be required surrounding the location. Additionally, with the proposed cycle routing in the surrounding area, modal shift to active travel is to be encouraged.

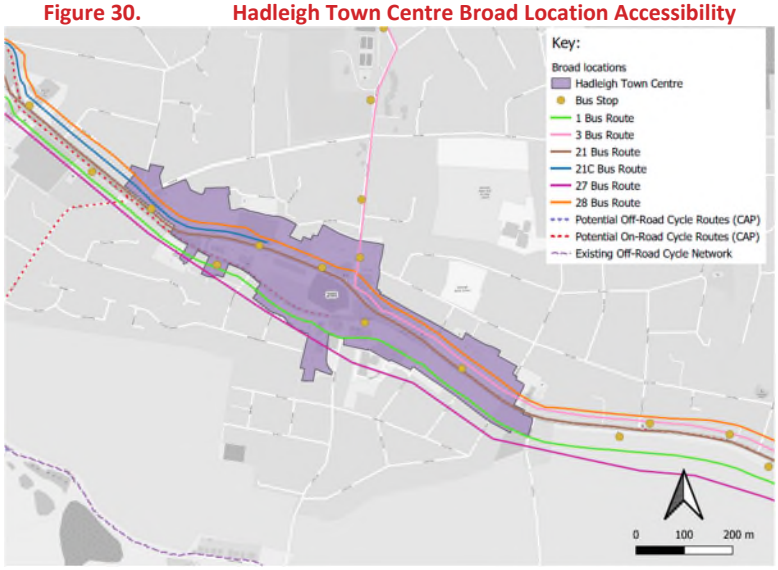
6.3.16 Located within Region 1 of SYSTRA's proposed regions for intervention, the Broad Location is located immediately to the east of proposed cycle routing and bus rerouting along Waarden Road (ISI ref C4, B4). Additionally, it is located a short distance to the northwest of proposed cycle routing along Marcos Road (ISI ref C1).

Hadleigh Town Centre

6.3.17 The Hadleigh Town Centre Broad Location is located to the east of the Castle Point region, surrounding the High Street/London Road junction. The broad location has a proposed capacity of 200 dwellings.

6.3.18 The broad location site and its surrounding transport infrastructure is indicated in **Figure 30** below.

Figure 30. Hadleigh Town Centre Broad Location Accessibility



6.3.19 The broad location is served by six bus routes: the 1, 3, 21, 21C, 227 and 28. All bus routes are accessible from within the broad location's perimeter. The bus stops located within the central High Street/London Road junction are varied in their quality with the Church stop to the southeast and the Morrisons stop to the northwest both comprising a shelter and seating, whereas the Homestead Way bus stop to the west is comprised of a flag and pole.

6.3.20 Potential on-road cycle routing is proposed to the northwest along Long Road and to the south along Chapel Lane. This is to improve cycle connectivity to Thundersley to the west and to the existing cycle routes to the south through Hadleigh County Park and toward Benfleet Station.

6.3.21 The previously tested junctions 6a, 6b and 6c are located within the broad location's perimeter. All junctions are noted to operate with a "Green" score across all 2033 scenarios.

6.3.22 Due to the "Green" scoring across all scenarios for the previously tested junctions within the site's perimeter, it is unlikely that mitigation will be required surrounding the location. Additionally, with the proposed cycle routing in the surrounding area, modal shift to active travel is to be encouraged.

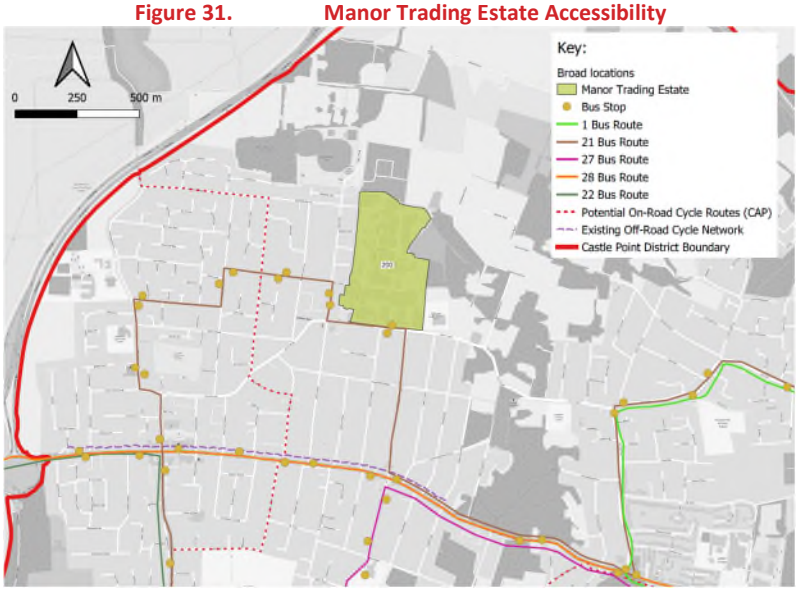
6.3.23 Located within region 12 of SYSTRA's Schedule of Interventions, the broad location is located immediately to the south of proposed cycle routing along North Road and Church Road (ISI ref C12). If these routes are to be implemented, this is to further the cycle routing provided in the CAP, further encouraging modal shift to active travel.

Manor Trading Estate

6.3.24 The Manor Trading Estate broad location is located to the northwest of the Castle Point region, immediately to the north of Church Road. The broad location is proposed to comprised up to 200 dwellings.

6.3.25 The broad location and its surrounding transport infrastructure is indicated in Figure 31 below.

Figure 31. Manor Trading Estate Accessibility



6.3.26 The Manor Trading Estate broad location is served by the 21 bus route immediately to the south. This is accessible through the Hazelmere Road bus stops to the south of its boundary, which is comprised of flag and pole.

6.3.27 A potential on-road cycle route is proposed in the CAP approximately 450m to the southwest of the broad location. This north-west route connects the northwest of the Castle Point region to Benfleet Station to the south.

6.3.28 The previously tested Junction 7 is located approximately 550m to the south of the broad location perimeter, at the Kents Hill Road/London Road junction. This is “Green” in the 2033 AM peak scenario, and “Amber” in the PM peak.

6.3.29 Given the access to the site coming through London Road, which is noted to be a congested route, it is recommended that further study takes place surrounding the broad location prior to development. However, due to the close bus route proximity and the proposed cycle routing surrounding the site, modal shift is encouraged.

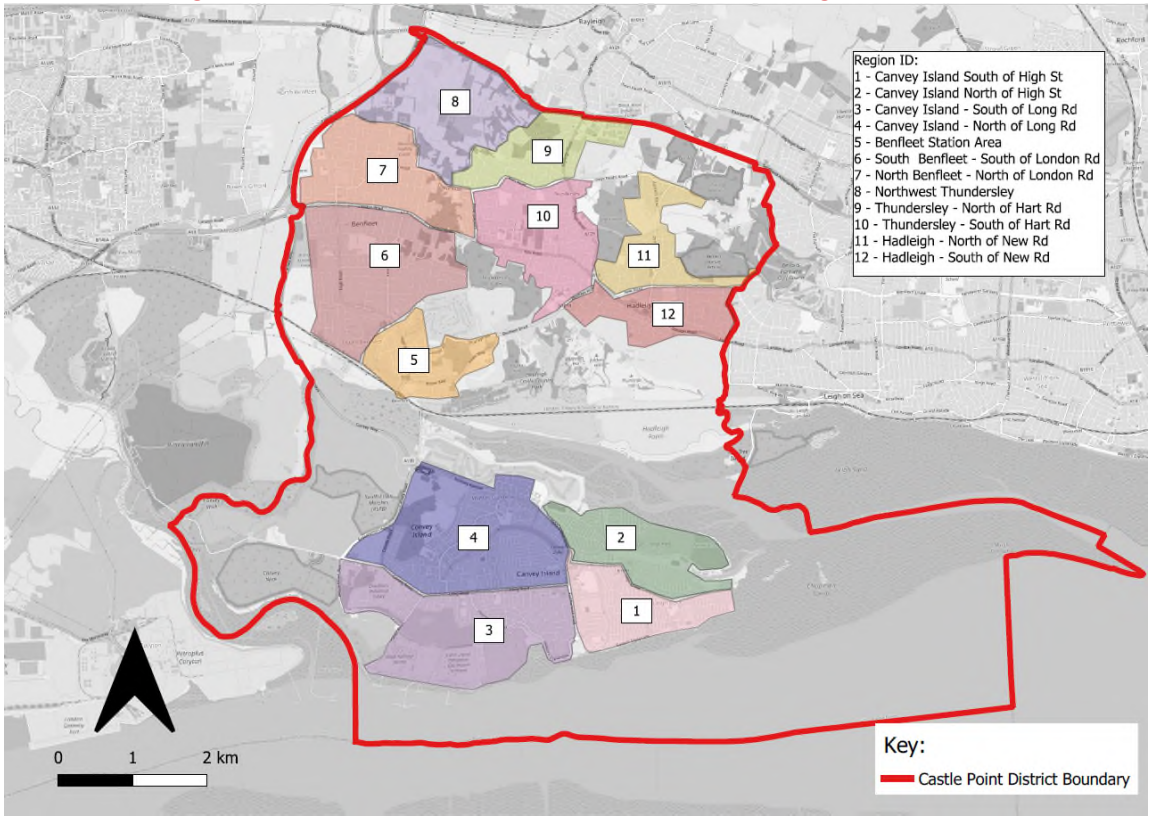
6.3.30 Located in region 7 of SYSTRA’s Schedule of Interventions, there are a series of mitigations proposed in the surrounding area. This includes the improvement of walking facilities along Woodside Avenue, Overton Road and Eversley Road to the west, and the redirection of the 28 bus route along Church Road immediately to the south of the perimeter.

7. INITIAL SCHEDULE OF INTERVENTIONS (ISI)

7.1.1 The Initial schedule of Interventions (ISI) has been developed as a long list of potential mitigations which could be brought forward to enhance the transport network and enable allocation sites to be brought forward. The ISI has been developed to provide a suitable context for the understanding of the impacts of Local Plan development, and how provision to facilitate delivery of these sites can best integrate with the needs of existing residents and businesses to provide overall improvements in transport reliability and choice for journeys within and through the borough.

7.1.2 In order to demonstrate which interventions impact which clusters, the borough has been divided in to 12 sub-regions so that clusters can be grouped and assessed together. **Figure 32** below indicates the regions throughout Castle Point to be considered as the Schedule of Interventions was developed.

Figure 32. Castle Point Schedule of Interventions Sub-Region ID



7.1.3 **Table 4** to **Table 15** identify a series of interventions suggested as a means of improvement to walking, cycling, bus, rail and highway accessibility. **Figure 33** and **Figure 34** below indicate the suggested improvements in the Canvey Island and Mainland areas of Castle Point.

Figure 33. SYSTRA Schedule of Intervention (southern region)

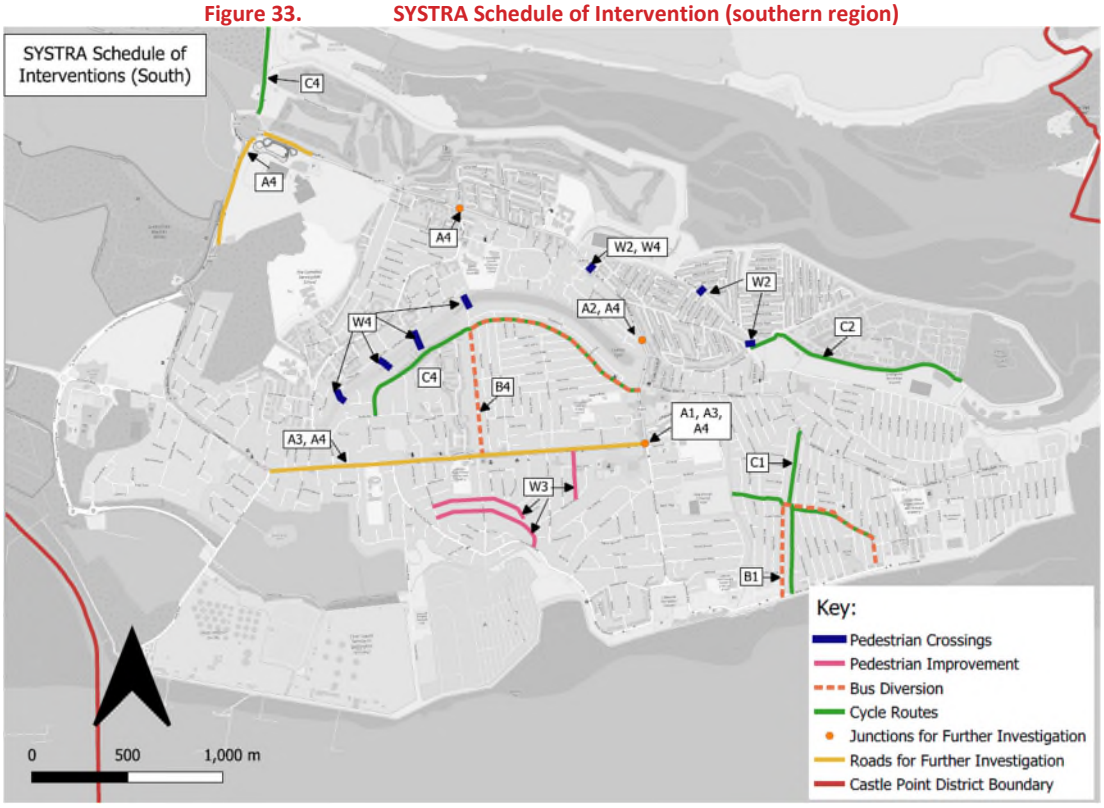


Figure 34. SYSTRA Schedule of Interventions (northern region)

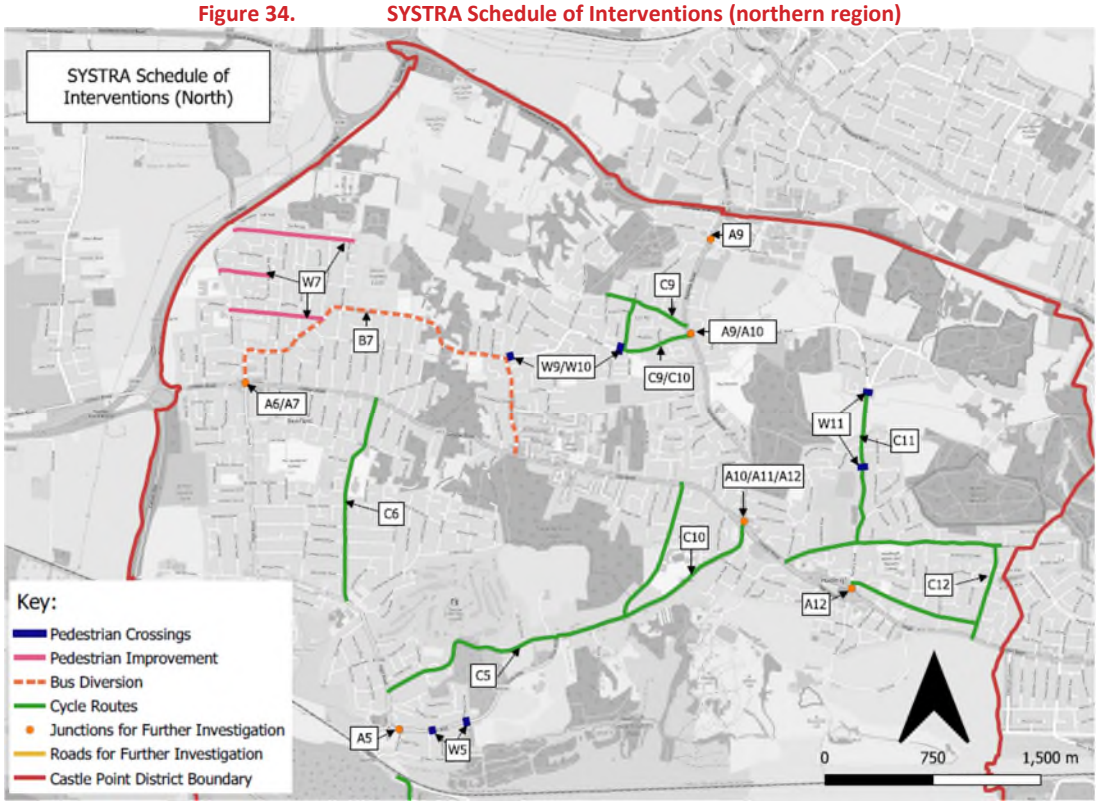


Table 3. (Region 1) |Canvey Island – South of High Street Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W1	Walk	It is noted that a series of amenities are accessible within the region. These are largely playing fields, schools, and the Brockwell Stadium. The Eastern Esplanade also provides access to the beachfront. A majority of the roads within the region are residential, and the footpaths are generally widened, with smooth surface quality. A series of zebra crossings are present on Furtherwick Road and High Street.	The region is generally well-served by pedestrian infrastructure. It is deemed that no further intervention is required.	N/A
C1	Cycle	Whilst no existing cycle routes are directed through the region, potential on-road routes as indicated through the CAP are directed along High Street, Furtherwick Road to the east, and Eastern Esplanade to the south, with a connecting route southbound through South Parade. The emerging LCWIP includes corridors which would also serve this area.	In order to improve the cycle accessibility throughout the region, it is recommended that further routes are developed through the central area of the region, with strategic routes on the main through routes such as Furtherwick Road, Eastern Esplanade and High Street/Point Street, as identified in the CAP. Backstreet routes are recommended to serve north-south axes such as Marcos Road/Lottem Road as well as east-west axes such as Odessa Road/Crescent Road. As a result, this could ensure that the residential areas of the region are adequately served by cycle links.	N/A
B1	Bus	Four bus routes operate along the boundary of the region and are all accessible from Furtherwick Road on the western boundary. Two bus routes (22 and 27) are accessible from High Road to the north, and one route (21C) is accessible from Eastern Esplanade to the south. The most frequent bus route serving the area is the 22, which departs approx. every 20 minutes, and serves Canvey – Basildon.	To improve accessibility to bus services for the residential area between Eastern Esplanade and Point Street, the 21C bus route could be diverted to loop northbound along Maurice Road, eastbound along Crescent Road then southbound to Eastern Esplanade. It is noted that some of these roads allow unrestricted parking on both sides, changes to parking arrangements may be required to allow for bus route diversions.	N/A
R1	Rail	All of the bus routes through the sub-region serve Benfleet Station. Rail services depart approximately at 5–30-minute intervals.	Rail accessibility from the region is deemed to be adequate, with the 22 bus service departing every 20 minutes. Other services could be increased in frequency to improve access to the rail station – such as increasing the frequency of the 27 to 20 minutes.	Increasing the frequency of the 27 bus route is also of benefit to proposals for the Thundersely – South of Hart Road region. (Region 10)
A1	Congestion/Accident Data	The level of congestion throughout the region is noted to be relatively low through both AM and PM peaks. It is notable that the Furtherwick Road/Long Road junction (J12c) has experienced a series of accidents, largely of a slight severity, with one serious. Whilst no recent traffic surveys in the location, 2018 ATC data surrounding Furtherwick Road north of Foksville Road records an AM peak average of 709 PCU, and a PM peak average of 841 PCU.	Further investigation is to be undertaken in the local junction modelling section surrounding Furtherwick Road/Long Road in order to establish the need for potential mitigations to improve road safety surrounding the junction.	Furtherwick Road/Long Road junction also falls to the east of Canvey Island South and North of Long Road regions (Regions 3 & 4).

Table 4. (Region 2) Canvey Island – North of High Street Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W2	Walk	A series of open spaces are accessible within short walking distance of the centre of the region, such as Smallgains Recreation Ground, and Canvey Heights Country Park accessible within 15 minutes. Additionally, retail opportunities are available on Foksville Road within a 15-minute walk of the centre of the region. Castle View School is also within a 15-minute walk of the central point of the region. Footways throughout the region are generally wide and smooth.	There is generally good walking accessibility to a series of amenities throughout the region. Suggested improvements include the provision of further pedestrian crossings along the Central Wall Road and Dovervelt Road – Mitchells Avenue axes.	Improvements to Central Wall Road fall along the boundary with Canvey Island North of Long Road (Region 4).
C2	Cycle	No existing cycle routes are directed through the region. However, the CAP suggests a potential cycle route northwest-south along Dovervelt Road/Mitchells Avenue. The northern end of this suggested route ties into a potential off-road route linking to Canvey Bridge. The emerging LCWIP includes corridors which would also serve this area.	To improve cycle accessibility throughout the region, it is suggested that on-road segregated cycle routes are continued east through Smallgains Recreation Park and to Canvey Heights Country Park to the east. This will encourage further use of active and sustainable travel modes, with green areas fully accessible through cycle routes.	N/A
B2	Bus	The 21 bus route serves the region, routing along Dovervelt Road, and terminating at Creek Road. Additionally, the 22 and 27 routes operate along the southern boundary of the region along High Street. The 21 departs at an approximate frequency of 30 minutes and provides a connection between Canvey and Southend.	Potential options to improve the bus servicing throughout the region would hinge on frequency – currently the only route serving the central area of the region is the 21, departing approximately at a frequency of 30 minutes. Increasing the frequency to 15 minutes would significantly improve bus accessibility, with access also available to the south of the region to two further bus routes – the 22 and 27.	Increasing the frequency of the 21 bus route also is of benefit to proposals for the Canvey Island – South of Long Road and Hadleigh North of New Road regions (Regions 3 & 11).
R2	Rail	The 21 bus route through the sub-region serves Benfleet Station. Rail services depart approximately at 5 – 30-minute intervals.	To improve accessibility to Benfleet Station, as previously noted, increasing the service frequency of the 21 bus route to 15 minutes would significantly improve connectivity throughout the region.	N/A
A2	Congestion/Accident Data	The level of congestion throughout the region is noted to be relatively low throughout both AM and PM peaks. The northwest-south Central Wall Road sees a small cluster of slight accidents adjacent to the junction with Dovervelt Road, and one fatal collision at the junction with Harvest Road.	Further investigation is to be undertaken in the local junction modelling section surrounding Central Wall Road/Harvest Road to assess the cause of the collisions and requirement for mitigation.	Data concerning Central Wall Road also falls along the boundary with Canvey Island North of Long Road (Region 4).

Table 5. (Region 3) Canvey Island – South of Long Road Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W3	Walk	A series of amenities are accessible within walking distance within the Canvey South of Long Road region. From the central area of the region, Long Road and William Read Primary School are accessible within a seven-minute walk, and Thorney Bay is accessible within a 20-minute walk. Whilst many of the residential roads such as Thorney Bay Road have smooth surfacing quality and widened footpaths, a series of roads such as Runnymede Road, Beverley Avenue and Mayland Avenue are subject to significant wear and inconsistent paving quality.	It is recommended that pedestrian-focused interventions could be made surrounding many of the residential roads through improvement of surfacing quality and footpath width, as seen through examples such as Runnymede Road, Beverley Avenue and Maryland Avenue. Further investigation is necessary regarding the availability of highway land to enable widening.	N/A
C3	Cycle	No existing cycle lanes are directed through the region. The CAP identifies potential on-road cycle routes along Long Road to the north of the region, and southeast through the region, along Thorney Bay Road. The emerging LCWIP includes corridor which would also serve this area.	Potential on-road cycle lanes would significantly improve the cycle accessibility of the region, providing enhanced access to the Labworth Recreation Ground to the southeast and connecting to potential off-road routes to the northeast along Foksville Road.	N/A
B3	Bus	Whilst three bus routes operate east-west along Long Road, only the 21 service operates through the region, southeast along Thorney Bay Road, departing approx. every 30 minutes, serving Canvey and Southend.	It is recommended that to improve bus accessibility through the region, the frequency of 21 bus route is increased from the existing 30 minutes to every 15 minutes.	Increasing the frequency of the 21 bus route also is of benefit to proposals for the Canvey Island – North of High Street and Hadleigh North of New Road regions (Regions 2 & 11).
R3	Rail	The 21 bus route through the region serves Benfleet Station. Rail services depart approximately at 5–30-minute intervals. The potential on-road cycle routes along Long Road connect to further potential routes to the north of Canvey Bridge to Benfleet Station.	Rail accessibility could be improved through the increased frequency of the 21 bus service. Additionally, it is recommended that the potential cycle routes through the region are implemented to facilitate access through active modes.	Increasing the frequency of the 21 bus route also is of benefit to proposals for the Canvey Island – North of High Street and Hadleigh North of New Road regions (Regions 2 & 11).
A3	Congestion/Accident Data	Long Road westbound is noted to experience some congestion particularly in the AM peak. The previous assessment determined that the impact from the withdrawn plan would not significantly impact the junctions along this road. A cluster of accidents is noted to have taken place historically surrounding the Long Road/Craven Avenue and Long Road/Furtherwick Road (J12c) junctions.	Further investigation is to be undertaken in the following sections surrounding Long Road to the north of the region. Previous survey data should be provided if available. Impact is heavily dependant on the amount of development proposed on Canvey Island. Additionally, due to the noted high level of collisions surrounding the Long Road/Craven Avenue and Long Road/Furtherwick Road junctions, additional mitigations will be investigated surrounding these junctions.	Data surrounding Long Road is also prevalent to the Canvey Island – North of Long Road region (Region 4).

Table 6. (Region 4) Canvey Island – North of Long Road Schedule of Intervention

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W4	Walk	Existing walking accessibility is noted to be limited to/from the north and south of Canvey Dyke due to footpaths being narrow in width. From the north side of the Dyke, the Cornelius Vermuyden School is accessible within 10 minutes, and the south side of Canvey Bridge is accessible within a 20-minute walk. From the southern side of Canvey Dyke, St Joseph's Catholic School is accessible 15 minutes walk to the east, and Castle View School is accessible 20 minutes to the east.	Whilst a series of crossings are available across Canvey Dyke, these are impeded by narrow gateways, limiting access. It is recommended that crossings are widened to improve accessibility. Crossings recommended across Central Wall Road in Region 2 are also of benefit to Region 4 accessibility.	Crossing over Central Wall Road is also of benefit to Region 2.
C4	Cycle	Existing off-road cycle lanes are in place through the region southwest bound along Canvey Dyke. This connects to the potential off-road cycle links to the northeast, and to potential on-road lanes at the southwestern end along Long Road. Access to Benfleet along Canvey Bridge to the north is currently narrow. The LCWIP includes a corridor which could enhance cycle provision in this location.	It is notable that with the potential cycle routes, there are many residential roads throughout the south and centre of the region with no access to cycle routes. This could be improved through the implementation of cycle routes along Waarden Road/Cedar Road east-west and Denham Road north-south. A widened cycle path/extension along Canvey Bridge would improve access to Benfleet to the north.	Implementing of the cycle route along Canvey Bridge is also of benefit to Region 5 to the north.
B4	Bus	Two bus routes operate through the region along Link Road, the 22 and 27. Additionally, the 21 and 21C route along the west/south boundary of the region. The 22 departs 81 approx. every 20- minutes and serves Basildon and Canvey.	In order to improve bus accessibility from the residential areas in the south and centre of the region, it is recommended that the 22 bus route is redirected along Denham Road to the north of Long Road, and eastbound along Waarden Road. The 27 will continue to operate eastbound along Long Road.	N/A
R4	Rail	Benfleet Station lies approximately 1.1 km to the north of the region and is served by all of the bus routes serving the region. Potential and existing cycle routes through the region provide direct access to the station through active modes of travel.	It is recommended that the potential cycle routes in the CAP are implemented in order to increase access to Benfleet Station.	N/A
A4	Congestion/Accident Data	Significant congestion is experienced on the southbound stretch of Canvey Road particularly in the PM peak. Somnes Avenue experiences delay in the PM peak. Significant delay is experiencedat Sommes Avenue / Link Road (J10). A series of collisions are noted throughout Somnes Avenue to the north of the region, including two fatal collisions. As previously noted in the Canvey Island – North of Long Road region, Long Road itself is of note, and discussed in this previous section.	Depending on the amount of development proposed on Canvey Island Sommes Avenue / Link Road junction may require mitigation. However, limited available land surrounding the junction may make mitigation challenging. Previous study suggested localised widening but considered it would have limited impact on the operation of the junction in capacity terms. The potential signalisation of the junction would be costly as an option. Further investigation is to be undertaken in the following sections surrounding Canvey Road to the west of the region. 2018 Junction Count Data indicates that 1136 PCU are directed southbound through this area. Additionally, due to the noted fatal collisions surrounding Somnes Avenue to the north of the region, additional mitigation may be required.	Data surrounding Long Road is also prevalent to the Canvey Island – North of South Road region (Region 3).

Table 7. (Region 5) Benfleet – Station Area Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W5	Walk	Current walking access through the region facilitates access to a series of restaurants and retail opportunities within a 5-minute walk. The southern side of Canvey Bridge is accessible within 20 minutes, and amenities such as Boyce Hill Golf Course is accessible 20 minutes to the northeast. The surrounding road network generally has wide and smooth footpaths. Pedestrian crossings are available along the length of High Road, however there are limited crossings available along the east-west Essex Way.	Following relevant studies of the surrounding road safety, it is recommended to enhance accessibility to the east of the region, further pedestrian crossings are implemented along the east-west Essex Way.	N/A
C5	Cycle	There are currently no existing cycle routes available in the region. The CAP suggests potential on-road routes along High Road and off-road routes along the northern side of the London, Tilbury & Southend Railway line. Access to Canvey along Canvey Bridge to the south is currently narrow. The emerging LCWIP includes a number of corridor which would also serve this area.	Along with the CAP-potential off-road cycle routes, it is recommended that further cycle routes are implemented northeast bound along Vicarage Hill/Benfleet Road, to improve connectivity between the wider areas of Thundersley and Hadleigh with the Benfleet station. A widened cycle path/extension along Canvey Bridge would improve access to Canvey to the south.	Implementing of the cycle route along Canvey Bridge is also of benefit to Region 4 to the south.
B5	Bus	Four bus routes operate through the region. The 21, 22, 27 operate north-south along High Road, and the 21C operates northeast-bound along Essex Way. These routes provide connections to Southend, Hadleigh and Basildon, and the most frequent service is the 22, departing approximately every 20 minutes. A large bus layby is located outside Benfleet station with multiple shelters present.	Whilst this region is well-served by a series of bus routes, it is recommended to improve the accessibility, the frequency of bus arrivals is increased to a frequency of approximately 10-15 minutes where possible. The most feasible for this improvement would likely be the 22 bus route, which departs at a frequency of approximately 20 minutes.	Increasing the frequency of the 22 bus route is also of benefit to the South Benfleet – South of London Road and North of London Road regions (Regions 6 & 7).
R5	Rail	Benfleet Station is located to the south of the region. Services are available to London, Southend and Shoeburyness every 5-30 minutes. Whilst the station has a series of accessibility measures, namely step-free access, ramps for train access for the disabled, accessible toilets and waiting rooms, it is noted that there are very few cycle racks surrounding the station, with four unsheltered stands provided.	It is recommended that sheltered cycle racks are provided to encourage the use of cycle facilities at Benfleet station.	N/A
A5	Congestion/Accident Data	A high level of congestion is noted southbound along High Road, and westbound along Essex Way in the PM peak. The junction of Essex Way / High Rd / School Ln (J17 experiences significant delay. Previous 2019 junction count data indicates that in the PM peak, 523 PCU is recorded southbound along High Road, and 742 PCU is recorded westbound along Essex Way. Two serious collisions are noted to the north of the Station area, and a cluster of collisions are noted on High Road to the north of the region, all slight in severity.	Depending on the preferred LP option Sommes Essex Rd / High Rd / School Ln may require mitigation. However, limited available land surrounding junction may make mitigation challenging. Previous study considered localised widening to Essex Way East had limited impact on the operation of the junction. Possible signalisation would be costly to implement . Further investigation is to be undertaken in the following sections surrounding High Road to the south of the region. Additionally, due to the noted serious collisions to the north of the station area, additional mitigations are to be considered surrounding the area.	N/A

Table 8. (Region 6) South Benfleet – South of London Road Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W6	Walk	Amenities such as South Benfleet Library and Richmond Pre-School are accessible within a 10-minute walk of the centre of the region. London Road is accessible within a 20-minute walk to the north of the central point of the region, and St Mary the Virgin Church is accessible 20 minutes to the south of the region. A majority of the main roads through the region have widened and smooth footpaths. Zebra crossings are present across the length of High Road.	Due to the high level of pedestrian infrastructure surrounding the region, and the adequate number of pedestrian crossings throughout the main roads of London Road to the north and High Road to the south, it is deemed that no further intervention is required.	N/A
C6	Cycle	There are currently no dedicated cycle routes located within the region, although the CAP identifies potential on-road routes along Thundersley Park Road, New Park Road and Appleton Road. The potential cycle route along New Park Road connects to further potential northbound cycle routes through the North Benfleet region; the LCWIP builds on these potential routes and provides additional corridors to enhance connectivity.	It is recommended that these potential cycle routes identified in the CAP are implemented. As a potential further on-road cycle route, it is suggested that the north-south running Kents Hill Road could be utilised as a backstreet quiet route to serve the adjoining residential areas, following relevant safety and feasibility study.	N/A
B6	Bus	The 21, 22 and 27 operate north-south through the region. Additionally, the 28 operates west-east along London Road on the northern boundary of the region. The most frequent bus route is the 22, departs approximately every 20 minutes.	The area is well-served by bus routes, with all areas being within close proximity of the four bus routes. In order to improve the accessibility, frequency could be improved of bus route 22 to approximately 10 – 15 minutes. A further intervention suggested to improve the frequency of bus services along the A13 would be to implement selective detection on the bus fleet.	Increasing the regularity of the 22 bus route is also of benefit to the Benfleet Station Area and North Benfleet - North of London Road regions (Regions 5 & 7).
R6	Rail	Benfleet Station is located approximately 1 km to the south of the region. Services are available to London, Southend and Shoeburyness departing every 5-30 minutes. Potential cycle routes are directed southbound along Underhill Road and Clarence Road/High Road providingdirect connection to Benfleet Station.	Benfleet rail station is generally well-served by potential cycle routes and the bus network. It is recommended that the potential cycle routes in the CAP are implemented within the region so as to enhance the accessibility to the rail station.	N/A
A6	Congestion/Accident Data	Congestion level is generally low throughout the region. However, area borders A13 London Road which experiences significant delay in AM and PM peaks. In 2018 junction count surveys, a total of 1969 PCU are recorded eastbound from the Sadlers Farm Roundabout (J1) across a two-day average in the PM peak. A cluster of accidents is noted surrounding the London Road/Rushbottom Lane junction (J8), including three serious collisions.	The London Rd / High Rd / Rushbottom Rd junction is shown to experience significant delay. However the issue is understood to be A13 corridor rather than specific junction, therefore mitigation is unlikely to be effective. Further analysis surrounding the London Road/Rushbottom Lane junction is to take place in the following sections in order to establish the cause of the three serious collisions and if further mitigation would limit the risk of collision.	The London Road/Rushbottom Lane junction lies on the boundary with the North Benfleet – North of London Road region (Region 7).

Table 9. (Region 7) North Benfleet – North of London Road Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W7	Walk	London Road is accessible within a 10-minute walk to the south of the centre of the region. North Benfleet Hall Wood and Woodside Park are both accessible 20-minutes to the north of the centre of the region. It is noted that a series of residential roads throughout the region are of poor quality . Examples of this include the east of Eversley Road, Woodside Avenue, and Overton Road.	Recommended interventions surrounding the walking accessibility of the region are focused surrounding the smoothing and widening of footpaths, particularly to the north of the region, such as Eversley Road, Woodside Avenue, and Overton Road.	N/A
C7	Cycle	Existing shared use cycle routes are located along the southern boundary of the region along London Road, although it is noted this infrastructure does not meet current LTN 1/20 standards and is subject to frequent obstructions. The CAP identifies a potential on-road cycle route southbound along Moreland Avenue, connecting to the A130 to the north and to the existing off-road London Road cycle route and the South Benfleet region to the south. This route appears to be incorporated into the draft LCWIP corridors, subject to minor amendments.	Improvements to the shared use cycle route along London Road are recommended. A further cycle route running east-west along Church Road could be implemented to facilitate active transport further.	N/A
B7	Bus	The 21 bus route operates through the region. The 22, 27 and 28 bus routes all operate west-east along London Road. The 28 route has the most frequent service through the area, departing every 10-minutes.	In order to increase the number of services operating through North Benfleet, it is recommended that the 28 bus route is rerouted along Church Road and Kenneth Road to better serve the residential areas to the north. As noted through other regions, increasing the service frequency of the 22 bus route is likely to improve bus accessibility throughout the Castle Point borough. A further intervention to improve the frequency of buses along the A13 would be to implement selective detection on the bus fleet.	Increasing the frequency of the 22 bus route is also of benefit to the Benfleet Station Area and South Benfleet - South of London Road regions (Regions 5 and 6).
R7	Rail	Benfleet Station is located approximately 3 km to the south of the region. Services are available to London, Southend and Shoeburyness departing every 5-30 minutes.	With the previously recommended alteration to the 28 bus route, and further cycle route implementation, Benfleet Station would become more accessible by the wider North Benfleet region.	N/A
A7	Congestion/Accident Data	Congestion occurs in the AM peak on Rushbottom Lane, southbound due to the volume of traffic on the A13 corridor making it difficult to exit from Rushbottom lane. No collision hotspots are noted through the region, aside from to the south at the London Road/Rushbottom Lane junction (J8).	It may be possible to increase highway capacity to Rushbottom Lane. However, this will likely detriment the operation of the A13 therefore this is not recommended. Further investigation is to take place in the following sections surrounding Rushbottom Lane/London Road junction to the south of the region.	The Rushbottom Lane/London Road junction falls on the boundary with the South Benfleet – South of London Road region (Region 6) and should be considered of concern to both regions.

Table 10. (Region 8) Northwest Thundersley Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W8	Walk	Currently, there is a lack of walking infrastructure throughout the Northwest Thundersley region. Current roads through the region, for example Burches Road and Farne Road, feature no footpaths, and rely on shared use between pedestrians and vehicles impacting upon safety.	Further investigation is required into the walking accessibility throughout the region, along with the process of development site identification throughout the sub-region.	N/A
C8	Cycle	No existing cycle routes are directed through the Northwest Thundersley region. Potential on-road cycle routes are located to the west along Woodside Avenue, and southbound along Moreland Avenue, through the North Benfleet region (Region 7); these are carried through into the draft LCWIP corridor proposals.	Further investigation is required, however cycle routes through the west of the region would potentially link to further cycle routes as noted by the CAP through Region 7 to the south.	N/A
B8	Bus	With future development, there is the requirement for bus accessibility to the region. Currently, the most accessible bus route is the 21, which is accessible approximately 300 metres to the south of the western boundary of the region, along Eversley Road.	Further investigation is required into the feasibility of expanding bus route provision and frequency through the region.	N/A
R8	Rail	Benfleet Station is located approximately 4.1 km to the south of the Northwest Thundersley region. Current accessibility to the region is gained through the 21 bus route accessible 300 metres to the south of the region's border, and through potential cycle routes southbound beginning to the north of Region 7.	Further investigation is required into the potential expansion of existing and potential new bus routes and cycle networks through the Northwest Thundersley region.	N/A
A8	Congestion/Accident Data	It is noted that congestion is indicated along the A130/AA1245 (J14) to the northwest/north of the region, particularly in the PM peak. Previous 2019 survey data indicates that in particular the southbound arm of the A130/A1245 is subject to congestion, with an inbound flow of 2723 PCU in the PM peak.	Further investigation is to be provided in the following sections surrounding mitigation along the A130/A1245 with the development of the Benfleet cluster.	N/A

Table 11. (Region 9) Thundersley – North of Hart Road Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W9	Walk	From the centre of the region, it is notable that Claydons Lane retail opportunities are available at an approximate 20-minute walk to the northeast, with signalised pedestrian crossings present across Rayleigh Road. Thundersley Primary School is accessible through walking approximately 10 minutes to the south, and SEEVIC College is accessible approximately 20 minutes to the south. Footpaths are generally of a smooth and wide condition throughout the region. It is notable that there is a lack of pedestrian crossings through the length of east-west Hart Road to the south of the region.	It is recommended that demarcated pedestrian crossings are implemented along Hart Road in order to improve pedestrian safety.	Hart Road falls on the northern boundary of the Thundersley – South of Hart Road region (Region 10).
C9	Cycle	Currently there are no existing cycle routes through the region. The CAP identifies a potential on-road cycle route along the A129, connecting to the potential on-road cycle route east-west along London Road; as referenced in the LCWIP.	It is proposed that to improve cycle accessibility throughout the region, cycle routes should be implemented east-west along Common Lane/Triton Approach/Hart Road. This is to enhance the accessibility to the residential areas of the region, and Thundersley Common to the north.	N/A
B9	Bus	The 1 and 3 bus routes operate along London Road through the region, to Rayleigh and Chelmsford respectively. Bus route 1 departs approximately every 15 minutes, and bus route 3 every 120 minutes approximately. The 21 bus route also operates along the southern perimeter of the region.	Due to a series of dead-end streets throughout the region, it is determined that redirecting bus routes through the region is likely to be unfeasible. As a means of improving the frequency of the existing services through the region, it is recommended that the 3 bus route is improved in frequency to hourly, from the current regularity of every 120 minutes.	N/A
R9	Rail	Benfleet Station is located approximately 3.7km to the southwest of the southern border of the region. The 21 bus route to the south of the region serves the station directly. Additionally, potential cycle routes along London Road and southwest bound along Underhill Road provide access to the station.	It is recommended that the potential cycle routes along Common Lane/Triton Approach/Hart Road are implemented through the central area of the region in order to improve cycle accessibility to the station from the residential areas of the region.	N/A
A9	Congestion/Accident Data	High levels of congestion are experienced southbound along the A129 Rayleigh Road to the east of the region, in the PM peak, due to capacity issues at the A129 / Hart Road / Daws Heath Road junction. A127 /A129 (J3) interchange and mainline merge experiences delay in peak hours. Previous study determined A127 /A129 interchange would not be significantly impacted by the distribution of growth in the withdrawn LP. A cluster of three serious accidents are noted at the Hart Road/Daws Heath Road/A129 junction at the southeast corner of the region.	If previous surveys have taken place surrounding the Hart Road/A129 junction, it is requested. Limited land surrounding the junction limits opportunities for effective mitigation. Possible cost of signalisation may prove prohibitive. Additional assessment of the A127/A129 junction should be undertaken regarding the Merge/Diverge assessment required to understand operation of A127 eastbound on Slip in AM peak. Further investigation is to be undertaken in the following sections surrounding the A129 to the east of the region. 2018 Junction Count data surrounding the A129/Stadium Way junction indicated 1326 PCU southbound movements along the A129.	Hart Road/A129 falls on the northeastern boundary of the Thundersley – South of Hart Road region (Region 10).

Table 12. (Region 10) Thundersley – South of Hart Road Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W10	Walk	A series of green spaces are accessible within a 5-minute walk of the centre of the region. Thundersley Primary School is accessible within a 10-minute walk of the centre of the region. Thundersley Glen is accessible within a 20-minute walk to the south of the region's centre, and Thundersley Common is accessible 20 minutes to the north. Footpaths throughout the region are generally wide and of smooth surfacing. There are very few pedestrian crossings along the east-west Hart Road to the north of the region, with only one located to the east of the road.	As noted in the Thundersely - North of Hart Road interventions, it is recommended to improve pedestrian infrastructure along the main east-west Hart Road with further pedestrian crossings, particularly to the centre and to the west of the road.	Hart Road falls on the northern boundary of the Thundersley – North of Hart Road region (Region 9).
C10	Cycle	There are no existing cycle routes located through the region, however the CAP identifies potential on-road routes southbound along Rayleigh Road, and east-west along Kiln Road, which are also reflected in the LCWIP proposals.	Due to the low number of streets within the region, it is determined that the potential CAP routes are sufficient to support the area. Further on-road routes are recommended along Vicarage Road/Benfleet Road to ensure the entire area is supported for cycle accessibility. Potential exists for backstreet routes enhancing cycle accessibility to residential areas on Shipwrights Drive and The Chase.	N/A
B10	Bus	The 1, 27 and 28 bus routes operate through the region along Kiln Road. All areas are within 550 metres of a bus service. The 1 and 28 bus service depart at a frequency of every 10 minutes, and the 27 bus service departs at a frequency of every 20-30 minutes.	The region is served effectively by bus services and routes. Improvement to the accessibility/service could be made through the increasing of frequency of the 27 bus route to every 10 minutes, to increase the frequency of services to Basildon. Implementing selective detection technology would also improve the reliability of the bus service along the A13.	Increasing the regularity of the 27 bus route is also of benefit to proposals for the Canvey Island – South of High Street region (Region 1).
R10	Rail	Benfleet Station is located approximately 2.8km to the southwest of the southern border of the region. The 21C and 27 bus routes operate through the region and serve Benfleet Station. Potential on-road cycle routes to the station are directed westbound along Kiln Road/Underhill Road/High Road; and additionally, southwest bound through existing off-road routes through Hadleigh Castle Park, a short distance southeast of the region.	It is determined that the bus and cycle accessibility to the rail station are adequate, and no further intervention is required.	N/A
A10	Congestion/Accident Data	Hart Road eastbound experiences congestion in the AM peak at the junction with the A129. If previous traffic surveys have taken place surrounding Hart Road/A129, it is requested. Kenneth Rd experiences some delays in PM peak due to congestion on A13 London Road.	Previous signalisation scheme was proposed at the A13 / Kenneth Road junction, which would improve the operation of the junction. However, its cost was significant. Previous mitigation scheme proposed at the A13 / A129 junction involved localised widening to London Rd, Benfleet Rd and Kiln Rd. The	Hart Road/A129 falls on the southeastern boundary of the Thundersley – North of Hart Road region (Region 9). A13/ A129 Scheme would impact Regions 11 and 12 as junction is located between all three regions.

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
		Previous study determined that A13/ A129 junction (J6b) would require mitigation arising from growth in the withdrawn Local Plan. ATC data from the A13 Kiln Road junction has been analysed, and it sees two-way trips of 1373 PCU in the AM peak, and 1425 PCU in the PM peak. A cluster of accidents is recorded at the Kiln Road/A129 (J5) junction on the northwestern side of the circulatory, comprised of three slight and one major.	study concluded that the scheme provided benefit to the operation of the junction based on growth in the withdrawn local plan. Further investigation is to be undertaken in the following sections surrounding the A13 Kiln Road/A129 junction to the southeast of the region in regard to the cluster of accidents which have taken place there.	

Table 13. (Region 11) Hadleigh – North of New Road Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W11	Walk	From the centre of the region, amenities such as Hadleigh Infant and Primary School is accessible within a ten-minute walk to the south, Belfairs Nature Reserve is accessible within a 15-minute walk to the east, Rayleigh Road is accessible within a 15 minute walk to the west, and Pound Woods is accessible within a 15 minute walk to the northeast. Footpaths are generally wide and in a smooth surfacing condition, however the north-south Rayleigh Road has a lack of east-west pedestrian crossings.	It is recommended that further pedestrian crossings are considered across Western Road and Daws Heath Road to the north of the region to facilitate pedestrian accessibility surrounding the residential areas of the region.	N/A
C11	Cycle	There are no existing cycle routes through the region, nor identified in the CAP. The LCWIP route proposals also do not penetrate this location significantly.	It is recommended that further cycle routes are considered throughout the region; with east/northbound along New Road/Daws Heath Road identified as areas through which to establish cycle routes. This would facilitate active and sustainable travel accessibility through the residential areas of the region and provide access towards the Belfairs Nature Reserve and West Wood.	N/A
B11	Bus	The 3 bus route is accessible through the region, operating north-south along Daws Heath Road. Bus routes 1, 21 and 28 are accessible from London Road at the southwestern boundary of the region	The 3 bus route departs at a frequency of approximately 120 minutes. It is recommended increase its frequency to approximately 60 minutes. This would significantly improve the frequency y of service to Southend and Chelmsford.	Increasing the frequency of the 21 bus route is also of benefit to proposals for the Canvey Island – North of High Street and Canvey Island – South of Long Road regions (Regions 2 & 3).
R11	Rail	Benfleet Station is located approximately 3.4km to the southwest of the southwestern border of the region. It is accessible through the region through bus routes 21, 21C and 27, all of which operate along the south of the region. Additionally, the potential cycle routes southbound through Chapel Lane and existing off-road cycle routes through Hadleigh Castle Country Park provide accessibility through active and sustainable modes.	It is recommended that increased frequencies of the bus routes surrounding the region would facilitate improved accessibility to Benfleet rail station. If the 21 bus route were to be increased in frequency to depart at a regularity of every 20 minutes; both that and the 27 bus route would depart between 20-30 minute intervals.	Increasing the frequency of the 21 bus route is also of benefit to proposals for the Canvey Island – North of High Street and Canvey Island – South of Long Road regions (Regions 2 & 3).

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
A11	Congestion/Accident Data	Low congestion is seen throughout the region across AM and PM peaks. Region Borders A13 to the south which experiences high volumes of traffic including junction of A129/ A13/ Benfleet Rd (J5). No clusters of accidents are identified.	No additional interventions are required.	See region 10

Table 14. (Region 12) Hadleigh – South of New Road Schedule of Interventions

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
W12	Walk	From the centre of the region, areas accessible through walking include the High Street and Hadleigh Infant and Nursery School, both of which are accessible 5 minutes to the south and north respectively; Plumtree Hill, accessible 20 minutes to the south; and Belfairs Nature Reserve, accessible 15 minutes to the north. Footpaths are generally of a good surfacing quality, and High Road to the south of the region is served by a series of signalised pedestrian crossings.	Due to the high-quality pedestrian infrastructure in place throughout the region, it is initially determined that interventions are not required.	N/A
C12	Cycle	There are no existing cycle routes through the region, however the CAP identifies potential on-road cycle routes along High Street and southwest along Chapel Lane, connecting to existing off-road cycle routes to the south surrounding Adders Hill. The draft LCWIP corridor to Leigh on Sea would potentially connect to these locations.	To facilitate improved cycle access throughout the region, it is recommended that further on-road cycle routes are implemented along New Road and Scrub Lane. Potential for backstreet routes is identified for Woodfield Road and Church Road.	N/A
B12	Bus	Bus routes 1, 3, 21, 21C, 27 and 28 operate through the region, and all accessible along High Street. These routes provide connection to Southend, Rayleigh, Chelmsford and Basildon. Bus route 1 is the most frequent service, departing approximately every 15 minutes.	Due to the wide range of bus services accessible through the central area of the region, no further bus interventions are recommended.	N/A
R12	Rail	Benfleet Station is located approximately 2.7km to the southwest of the southwestern border of the region. The station is accessible through potential on-road and existing off-road cycle routes to the south of the region. Bus routes 21, 21C, 22 and 27 all provide access to the station.	To further facilitate accessibility to the station through cycle routes, it is recommended that the previously described cycle routes are considered.	N/A

REF NO.	MODE	EXISTING INFORMATION	SUGGESTED INTERVENTION	OVERLAP WITH OTHER REGIONS
A12	Congestion/Accident Data	Low congestion is seen throughout the region across AM and PM peaks. Region Borders A13 to the north which experiences high volumes of traffic including junction of A129/ A13/ Benfleet Rd (J5). A cluster of five minor accidents is identified at the Rectory Road/A13 junction.	Due to the noted cluster of collisions at the centre of the region, additional mitigations are to be investigated surrounding the Rectory Road/A13 area. If previous accident or traffic survey data is available from this junction, it is requested to be provided.	See region 10

7.1.4 It is recognised that the ISI is not intended to be a “definitive” list of possible transport projects; the projects identified are those which are considered to demonstrably offer improvements to connectivity and modal choice with a focus on sustainability, in accordance with the approach set out in ECC’s LTP4.

7.1.5 It is also important to recognise that the ISI measures do not include larger, cross-boundary projects which would require funding beyond the scope of that realistically deliverable via Local Plan development and other local sources; such projects are more suitably addressed through the LTP South Essex strategy and it is recognised that Local Plan development is likely to be able to contribute to these projects, but should not ultimately be dependent on them.

7.2 Housing Allocations Locations within ISI Regions

7.2.1 **Figure 35** and **Figure 36** below indicate the location of the proposed housing clusters within the previously defined Schedule of Interventions regions.

Figure 35. Housing Allocations within Schedule of Intervention Regions (North)

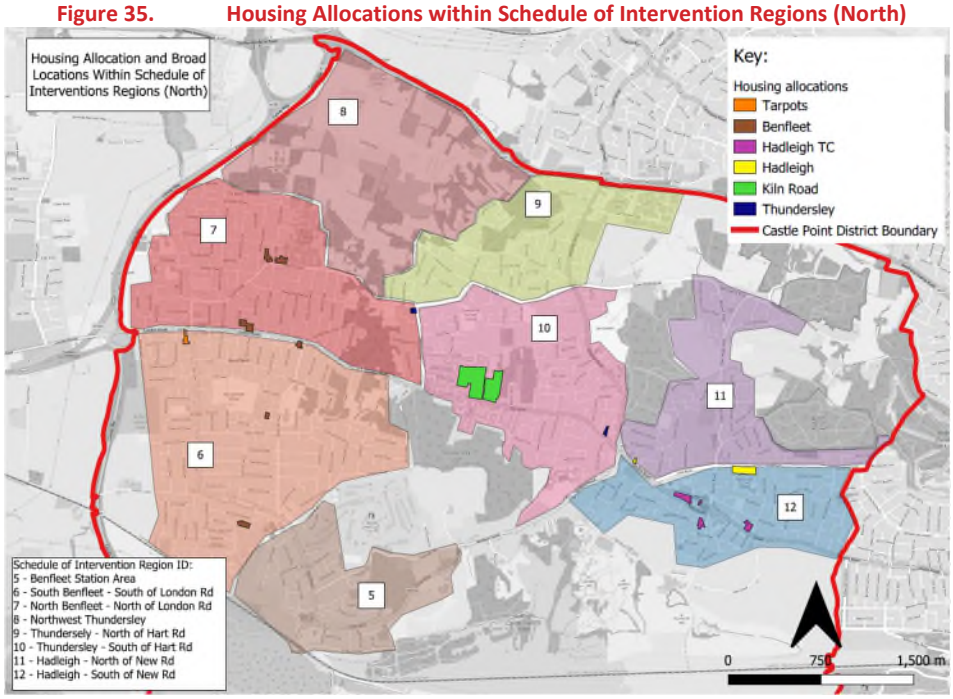
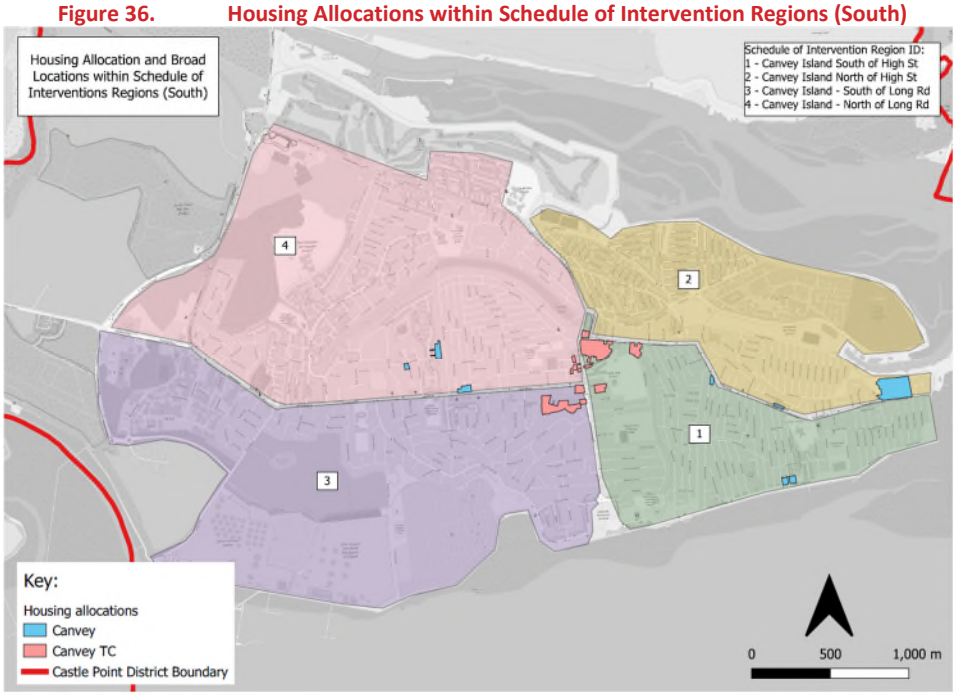


Figure 36. Housing Allocations within Schedule of Intervention Regions (South)



7.2.2 As identified in the figures above, notable areas in which development is proposed within the updated urban housing allocations fall within the North Benfleet – North of London Road; Thundersley – South of Hart Road; Hadleigh – South of New Road; and in the central area between the four Canvey Island regions.

7.2.3 It is also recognised that Area 3 is pivotal in terms of the major West Canvey allocation and that there is also a need to specifically consider how potential improvements in areas 4 and 1 can link up with this to create a bespoke access and connectivity strategy for this location.

7.2.4 As such, these regions within the schedule of interventions have been prioritised in terms of their potential to contribute toward appropriate mitigation of the proposed Local Plan's development impacts. Section 11.3 describes in more detail which ISI measures have been identified as being appropriate parts of the transport mitigation strategy for the clusters and broad locations (this being based on appraisal of the corresponding transport modelling work and application of the relevant policies as described in Section 2 of this TA).

8. TRIP GENERATION & TRIP DISTRIBUTION

8.1 Trip Generation

8.1.1 As part of the assessment of the proposed housing allocations within the Castle Point borough, a trip generation exercise has been undertaken based on the provided sites relevant to their noted cluster/area, using the TRICS software. This has initially been undertaken using a "one-size-fits-all" approach for the various sites identified in the Housing Allocation schedule and existing transport networks and provision, in order to give a high-level indication of the likely trip generation which would be associated with the estimated quantum of development provided for each site by CPBC.

8.1.2 This trip generation exercise is designed to establish trip rates which are consistent with a "business as usual" approach to development, in that they do not seek to account for the various mitigation proposals which will be associated with the CPP transport strategy. This is designed to enable the "with CPP" strategic modelling exercises to provide evidence of where CPP impacts will be felt (in combination with the qualitative analysis presented previously in this report). Amendments have then been made to the trip generation assumptions within the "with mitigation" strategic modelling exercises to allow the benefits of those mitigation measures which cannot be directly captured through changes to the highway network in the model itself to be represented.

8.1.3 A copy of the supporting TRICS output is provided at **Appendix A**.

8.1.4 The search criteria applied within the TRICS database is noted below:

- Residential Land Use;
- Mixed Private Housing (Houses and Flats);
- Dwelling sizes of 15 to 350 units;
- Edge of Town and Neighbourhood Centre areas selected.

8.1.5 The resultant trip rates for different modes are shown in **Table 15** below.

Table 15. Trip Rates (All Modes)

PEAK	TOTAL VEHICLES	CAR DRIVER	CYCLISTS	PEDESTRIAN	BUS/TRAM	RAIL
AM Peak	0.562	0.498	0.022	0.232	0.021	0.007
PM Peak	0.543	0.474	0.017	0.152	0.02	0.004

CPP Scenario Housing Allocation

8.1.6 This trip rate has been applied to the various clusters in Castle Point through their residential capacities as provided by the local authority. The resulting vehicle trips are shown in Table 16 below.

Table 16. Initial Housing Allocation Trip Generation Estimate (by mode)

CLUSTER	CAPACITY	PEAK	TOTAL VEH	CAR DRIVER	CYCLISTS	PEDESTRIAN	BUS/TRAM	RAIL
Canvey TC	536	AM Peak	301	267	12	124	11	4
		PM Peak	291	254	9	81	11	2
Hadleigh TC	165	AM Peak	93	82	4	38	3	1
		PM Peak	90	78	3	25	3	1
Hadleigh	91	AM Peak	51	45	2	21	2	1
		PM Peak	49	43	2	14	2	0
Canvey	271	AM Peak	152	135	6	63	6	2
		PM Peak	147	128	5	41	5	1
Benfleet	225	AM Peak	126	112	5	52	5	2
		PM Peak	122	107	4	34	5	1
Kiln Road	617	AM Peak	347	307	14	143	13	4
		PM Peak	335	292	10	94	12	2
Thundersley	35	AM Peak	20	17	1	8	1	0
		PM Peak	19	17	1	5	1	0
Tarpots	48	AM Peak	27	24	1	11	1	0
		PM Peak	26	23	1	7	1	0

8.1.7 As is evident from the resultant trip generation calculations, the current dominant mode of travel across the region is by car. Due to the Kiln Road cluster providing the largest residential capacity of the sites within the housing allocation, this would be expected to generate the highest number of car trips, with an estimated 307 associated car trips in the AM peak and 292 associated car trips in the PM peak.

8.1.8 Specifically with regard to the West Canvey broad location, it is recognised that this redevelopment will introduce a substantially higher number of new dwellings in a more dense configuration than is expected at the other broad location and allocation sites. The existing employment floorspace is to be retained but will be heavily condensed and large areas currently taken up by surface car parking will be redeveloped, with consolidation of car parking provision for employment uses as a result.

8.1.9 As such, a specific separate trip generation exercise has been undertaken for the West Canvey broad allocation site which seeks to recognise these "inherent" qualities – high density residential provision with a variety of on-site and nearby services and relatively low parking provision for residential uses. This has resulted in car trip rates associated with the West Canvey site being lower than those assumed for other Local Plan sites. For avoidance of doubt, this calculation does not make assumptions around additional mitigation measures (such as localised highway improvements, measures already identified in the Schedule of Interventions, and improvements to public transport services), as these are instead reflected in the "Sustainable" strategic model scenario.

8.1.10 The revised trip generation figures have been developed using TRICS and the corresponding outputs are provided at **Appendix A**.

8.1.11 The site-specific trip rates for the West Canvey strategic site are shown in **Table 15 17** below.

Table 17. West Canvey Trip Rates (All Modes)

PEAK	TOTAL VEHICLES	CAR DRIVER	CYCLISTS	PEDESTRIAN	BUS/TRAM	RAIL
AM Peak	0.440	0.367	0.004	0.129	0.021	0.007
PM Peak	0.473	0.409	0.017	0.056	0.02	0.004

8.1.12 The corresponding trip generation figures are shown in Table 18 below. It is stressed that these calculations **do not** incorporate the expected impacts of either a site-specific transport strategy or the wider transport strategy; this is to ensure that the modelling of the highway impacts arising from this development under the "business as usual" (BAU) scenario is robust.

Table 18. West Canvey Trip Generation Summary

	CAPACITY	PEAK	TOTAL VEH	CAR DRIVER	CYCLISTS	PEDESTRIAN	BUS/TRAM	RAIL
West Canvey	2,325	AM Peak	1023	853	9	300	49	16

	CAPACITY	PEAK	TOTAL VEH	CAR DRIVER	CYCLISTS	PEDESTRIAN	BUS/TRAM	RAIL
Strategic Site		PM Peak	1100	951	40	130	47	9

8.2 Trip Distribution

8.2.1 The trip distribution and assignment for the CPP trips has been carried out using the SE Essex model, which is based on 2011 Census data combined with additional site survey data for calibration and validation purposes. This is discussed further in reference to the CPP scenario model outputs.

9. STRATEGIC MODELLING – BASE AND REFERENCE CASE MODELS

9.1 Strategic Models – Baseline

9.1.1 The strategic modelling work has been undertaken by Jacobs on behalf of CPBC, using the South Essex (SE) Model. The baseline SE Models represent a 2019 year. This is just before the Covid-19 Pandemic took place; accordingly, Jacobs have undertaken an analysis of these models to determine whether there are any elements which have changed materially and which would bring into question the use of the baseline for tasks such as the setup, calibration and validation of required local junction modelling exercises. A copy of the Jacobs analysis (and other supporting modelling reports) is included at **Appendix B**; for the purposes of this commentary, whilst some differences have been identified, these are not considered sufficiently major or extensive to affect the suitability of the models for these purposes.

9.1.2 Traffic Flow data has therefore been provided for the base year for a number of junctions, principally based on the list set out at section 5.5 of the TA report.

9.1.3 The baseline data has primarily been used for the purposes of developing appropriate local junction models for key locations on the local highway network, and as the basis for comparison with the 2043 Reference Case (discussed below). Anticipated changes between the baseline and the 2043 Reference Case models are highlighted in this this section of the report, where this is expected to influence the subsequent impacts of proposed CPP developments.

9.2 Strategic Models – 2043 Reference Case

9.2.1 The 2043 Reference Case model has been prepared for use for the Castle Point Plan modelling via amendments made to an existing version of the SE Model constructed to reflect a future year of 2043. **Appendix B** includes an explanation provided by Jacobs of how this work has been done; the process has included updating of the assumptions in the model regarding expected delivery of known committed developments in Castle Point, based on information provided by the Council for this purpose. It is understood that this information has also been used to inform other technical assessments (such the environmental appraisals) required to support preparation of the Regulation 19 CPP.

9.2.2 It is further noted that an alternative option was considered with regard to the creation of the 2043 reference case model, this being direct modification of the 2019 base model to create a “new” 2043 version. On review of the available models it was considered that the use of the existing 2043 model with appropriate adjustments would provide a greater level of accuracy and prevent any issues arising with committed developments or highway schemes outside of Castle Point itself being omitted.

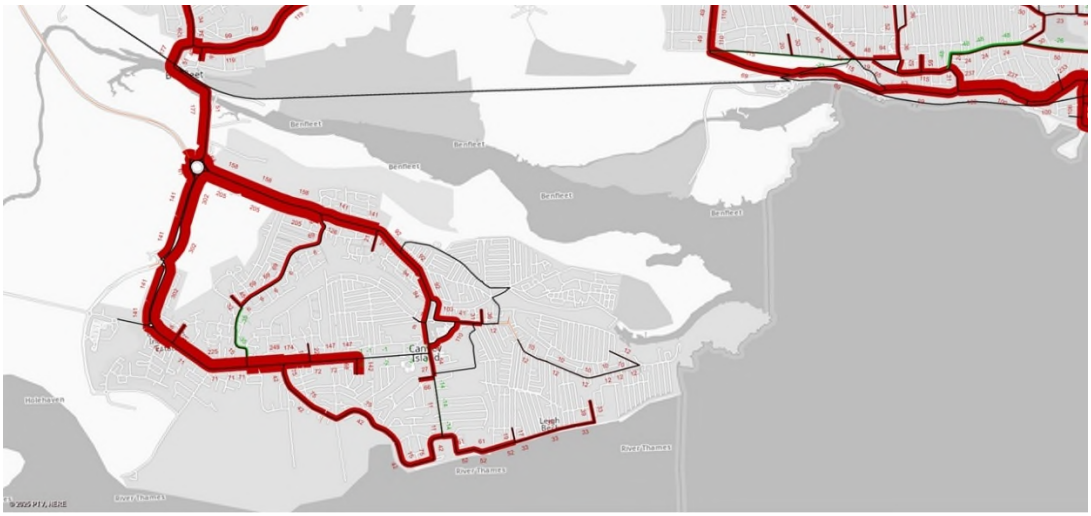
9.2.3 The purpose of appraising the reference case data is to provide an appropriate context for how growth and change associated with existing local plans and development consents is expected to impact upon the highway network. It will be seen that, due to expected growth and associated increases in travel demand, a number of locations within and directly adjacent to Castle Point will experience increases in traffic flow, queuing and delay. The CPP developments are required to (as far as is practicable) address their own impacts; wherever possible, the mitigation strategy (discussed further in section 11 of this report) will seek to

maximise benefits in response to the available data, but in most cases, existing instances of queuing and delay observed in the reference case will not be accepted as reasons in their own right to reduce or prevent development.

Flow Difference Plots

Figure 37. AM Peak Flow Difference Plot (North of Canvey)

Figure 38. AM Peak Flow Difference Plot (Canvey Island)



9.2.4 The AM flow difference plots clearly indicate that the expected growth in vehicle trips between 2019 and 2043 as a result of committed developments will lead to an increase in flows on all of the main corridors. There are only a couple of instances where traffic volumes are expected to fall (primarily around the Fairglen junction); this is broadly indicative of delays increasing in these locations and traffic therefore seeking alternative routes.

9.2.5 For the avoidance of doubt, the 2043 models incorporate currently planned growth in adjacent local authority areas as well as Castle Point; as such, there are significant increases in traffic observed in parts of Rochford and Southend which fall into the plotted extent of the maps, but not all of this traffic arises specifically as a result of growth in Castle Point.

Figure 39. PM Peak Flow Difference Plot (North of Canvey)

Figure 40. PM Peak Flow Difference Plot (Canvey Island)

9.2.6 The PM peak plots show many similarities with the AM peak plots. The green lines on the route via South Benfleet is indicative of increased congestion at the junctions at either end of this route, with a proportion of modelled traffic instead taking the longer route to the A13 and then "doubling back" to travel west towards the A130.

Relative Queue Lengths

9.2.7 The figures below show the queue lengths at junctions within the modelled area, relative to the queuing capacity available. (As such, low percentages indicate short queues, high percentages indicate longer ones. Queues of more than 100% indicate that the modelled

queue is longer than the space allocated in the model and the likelihood of interference with other junctions is high).

Figure 41. Relative Queue Lengths – AM Peak North of Canvey

Figure 42. Relative Queue Lengths – AM Peak Canvey Island

9.2.8 The plots indicate that the main areas of queuing observed in the Reference Case model are found toward the west of the borough, most notably at the Sadlers Farm and Fairglen interchanges. The junction of High Road and Church Road with the A13 shows significant queues on two arms; this is considered to partly reflect the strategic nature of the model which "funnels" demand from a large part of the corresponding areas north and south of the A13 via this junction, when in reality the demand is split across a larger number of side road junctions. The A127 to the east of the borough also shows significant queues at several junctions, although these are largely located physically within Southend.

Figure 43. Relative Queue Lengths – PM Peak North of Canvey

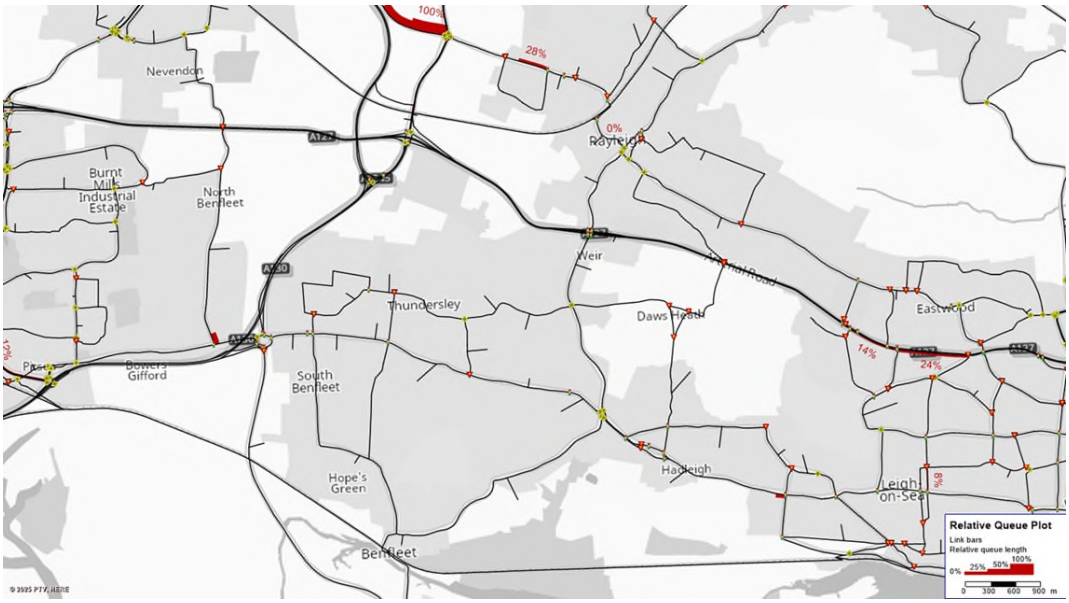


Figure 44. Relative Queue Lengths – PM Peak Canvey Island

9.2.9 The PM peak largely shows less in the way of queuing compared to the AM peak; those queues which are observed are in similar locations to the AM peak.

9.2.10 It should be noted that the queue lengths alone do not disclose all of the locations where traffic flows are at or nearing capacity; greater detail has been obtained via the use of Volume to Capacity plots, which are discussed below.

Volume to Capacity Figures (with associated traffic flows)

9.2.11 The figures below provide an overlay of the Volume to Capacity (V/C) figures for links within the model against key traffic flow numbers (total flow in PCUs). Inset diagrams are provided for areas where the V/C is either over 85% or over 100% (corresponding to orange and red lines on the maps).

9.2.12 These diagrams show where the main vehicular movement corridors are approaching capacity in the reference case, with the corresponding traffic flows provided for additional context.

9.2.13 An inset map is first provided to show the data in the context of the wider borough, with more closely focused extracts then presented for discussion in areas where the V/C is expected to exceed 85% as described above.

Figure 45. V/C Maps – Reference Map (North of Canvey)

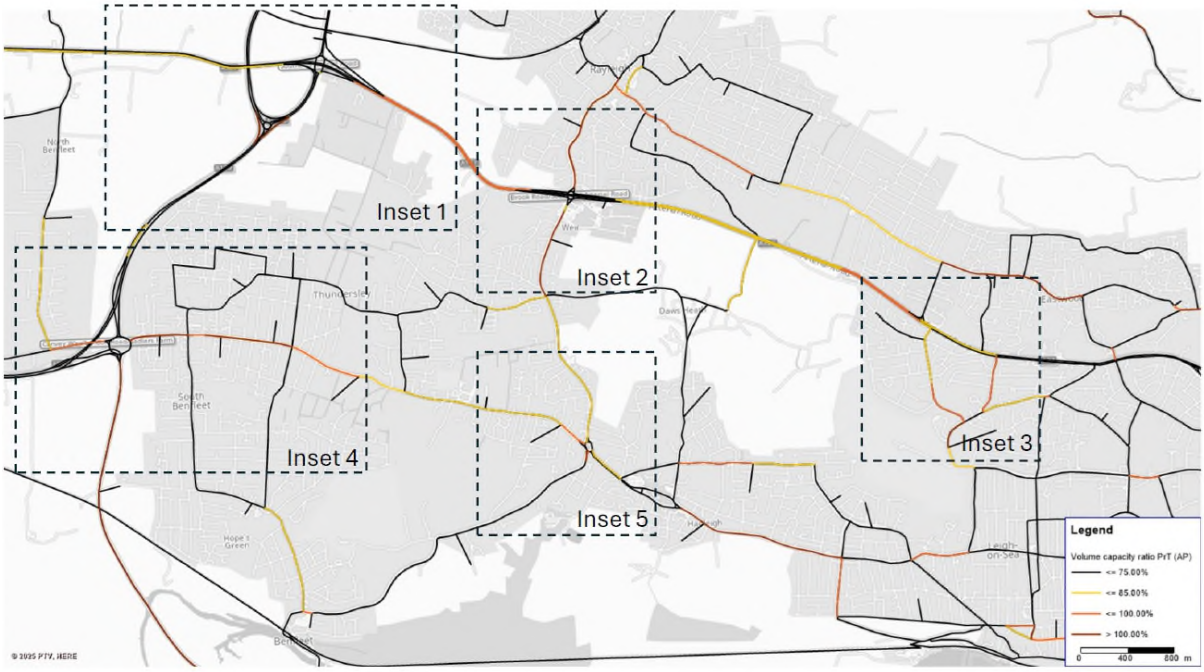
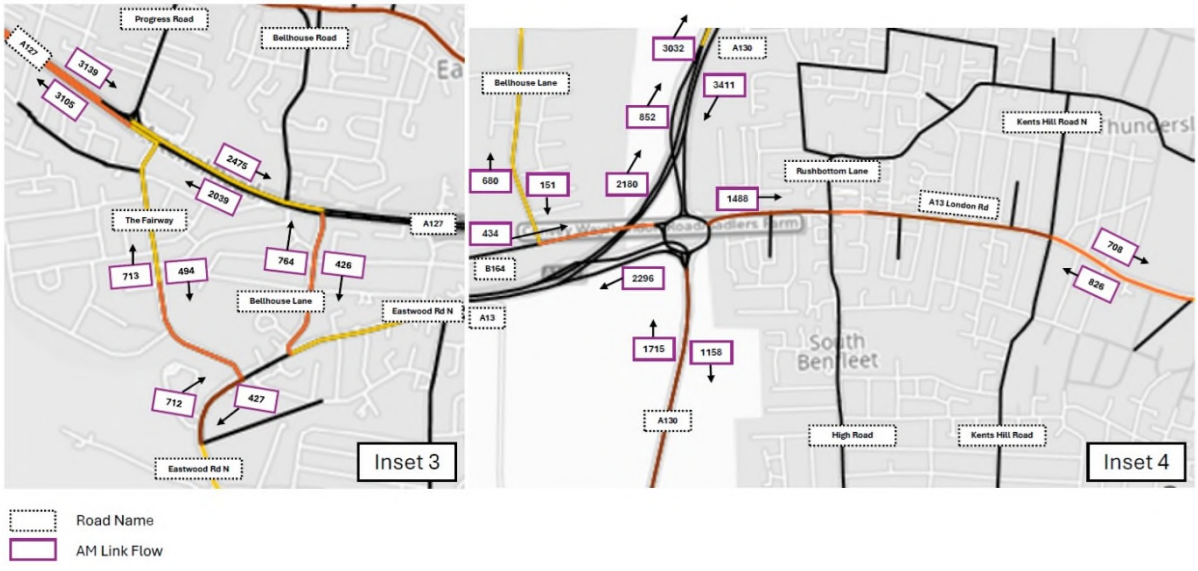


Figure 46. V/C Maps – Inset Maps 1 and 2 AM Peak

9.2.14 Insets 1 and 2 focus on the Fairglen and Rayleigh Weir interchanges respectively. At Fairglen, the areas of orange and red highlighting correspond to the queue length data, and the secondary roundabout is shown to be operating at capacity. Similarly, at Rayleigh Weir, all of the main links leading into the interchange are flagged as approaching capacity, although as the demand is relatively even this does not yet translate to extended queuing in the model. However, the volume of traffic which passes through these junctions in the reference case is very substantial and indicates that relatively minor further increases could lead to theoretical capacities being reached. It must also be recognised that, at present, fluctuations in demand can lead to instances of significantly higher delay and queuing than is evidenced in the strategic models and this pattern is not expected to change as a result of future growth.

Figure 47. V/C Maps – Inset Maps 3 and 4 AM Peak



9.2.15 Inset map 3 covers the area along the A127 at the eastern side of the borough. It can be seen that a significant number of the links on the A127 itself and to the south are approaching

capacity, meaning that this part of the network will be sensitive to further changes as a result of CPP development. Inset 4 covers the Sadlers Farm area in greater detail; this shows clearly the high level of demand being placed upon the A13 corridor leading into the interchange from both the east and west. The flow data also highlights the increase in traffic occurring in this area as a result of traffic joining the A13 corridor from the residential and employment areas directly to the north and south; any CPP development which increases these flows by a further margin would be likely to result in the A13 in this location reaching capacity.

Figure 48. V/C Map 5 AM Peak

9.2.16 The A13 / A129 / B1014 junction highlighted in Inset 5 emphasises the level of demand being experienced on both of these corridors in the reference case. The relative importance of the B1014 link to Benfleet is shown in the relative traffic flows which the link carries. The reference case indicates that this arm of the junction is not directly under capacity pressure but this may change depending on how CPP traffic adds to the flows at the different junction arms.

Figure 49. V/C Maps – Inset Maps 1 and 2 PM Peak

9.2.17 In the PM peak, the pattern of capacity pressures at the Fairglen and Rayleigh Weir interchanges is similar to that observed in the AM peak. The link capacity percentages, in particular, are similar, but as has been observed from the relative queue data, in the PM peak this does not manifest the same degree of static queues. It is thought that this is partly due to the difference in the tidality of the traffic flows and there being considerably less westbound traffic at this time.

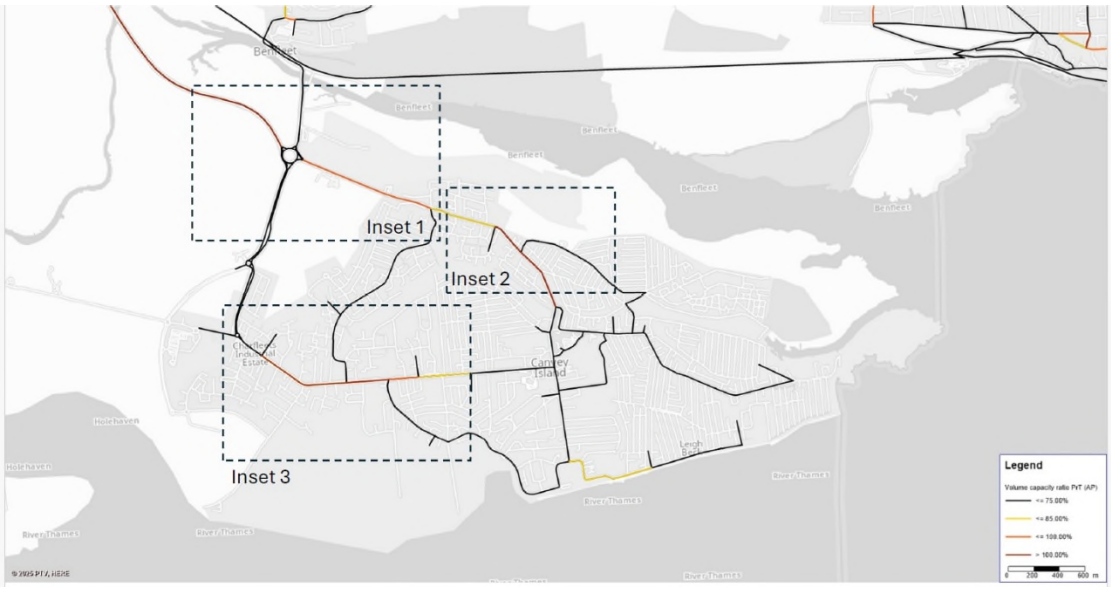
Figure 50. V/C Maps – Inset Maps 3 and 4 PM Peak

9.2.18 The PM peak results for the areas highlighted at insets 3 and 4 are also closely aligned with those observed in the AM peak. This is an indication that the links highlighted in orange are indeed operating close to, or at, capacity in both periods and there is a lack of alternatives available to allow the demand to divert elsewhere.

Figure 51. V/C Map 5 PM Peak

9.2.19 V/C figures for the PM peak in the vicinity of the A13 / A129 / B1014 junction once again largely mirror those observed in the AM peak. The observed traffic flows here are less noticeably influenced by tidality, with actual traffic flows from the model being relatively consistent between the AM and PM peaks.

Figure 52. V/C Maps – Reference Map (Canvey Island)

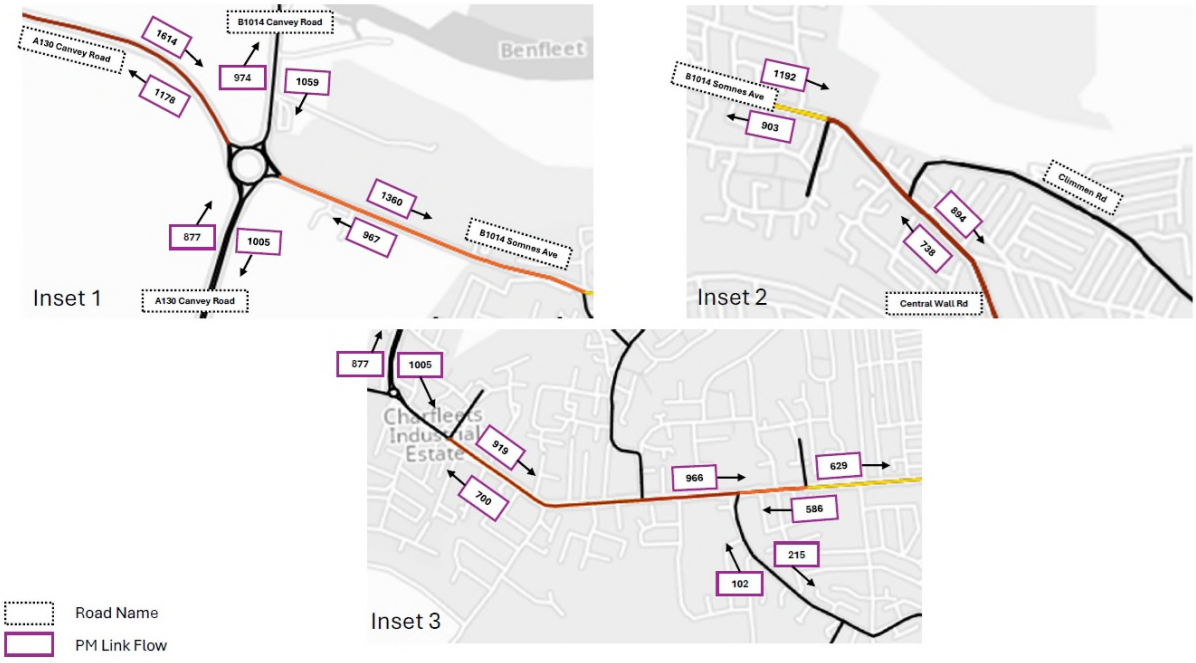


9.2.20 Canvey Island is a relatively self-contained area; as there are only two routes for vehicles to enter and leave the island area, this results in a concentration of traffic on the main "circulatory" route around the island via Canvey town centre.

Figure 53. V/C Maps – Inset Maps 1 to 3 AM Peak

9.2.21 F

Figure 54. V/C Maps – Inset Maps 1 to 3 PM Peak



9.2.22 The inset maps clearly show that the route between the B1014 Canvey Way and the town centre via the north side of the island is at or approaching capacity for a majority of its length, in both the AM and PM peaks. A similar pattern is observed on the alternative southern route via Long Road; this pattern is expected since all traffic carrying out anything other than a very short local trip needs to use one or other of these routes. It is recognised that the relative queue analysis does not presently identify any major static queues at the junctions connecting these routes together, however it is also recognised that variation in demand presently causes regular instances of congestion at these junctions and the capacity of the main Canvey Way link, whilst judged as adequate in the model tests, is frequently put under pressure as a result.

Journey Times

9.2.23 Journey Time routes have been established within the models for a series of corridors within the Castle Point area. For each route, the time taken by a vehicle in the model to traverse the route is recorded and presented as a graph which plots distance travelled by time taken. Separate calculations are undertaken for traffic travelling the route in each direction.

9.2.24 Journey times predict how long it takes to travel between two points on the network considering factors like traffic and road conditions. By comparing journey time in different scenarios it is possible to see the impact of growth on journey time for a given link or corridor.

9.2.25 The routes which have been appraised include the following:

- A127;
- A130;
- A129;
- A13;
- B1006 / B1014; and
- Canvey Road / Long Road / B1014.

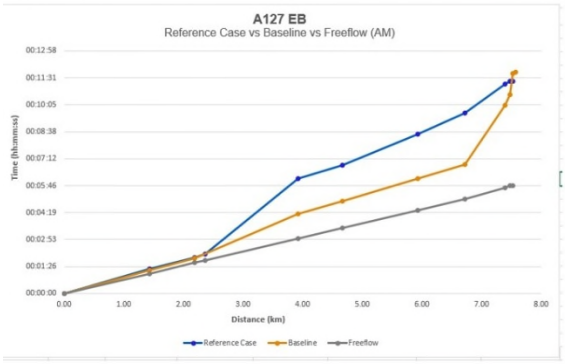
9.2.26 Full outputs from these tests are presented at **Appendix C**. Of the analysed routes, the A127 and A13 are considered to be of particular importance since changes in journey time on these routes will reflect the cumulative impacts of growth in the reference case and CPP scenarios, and enable the relative impact of each to be observed against one another. The relevant plots for these routes are therefore presented and discussed below.

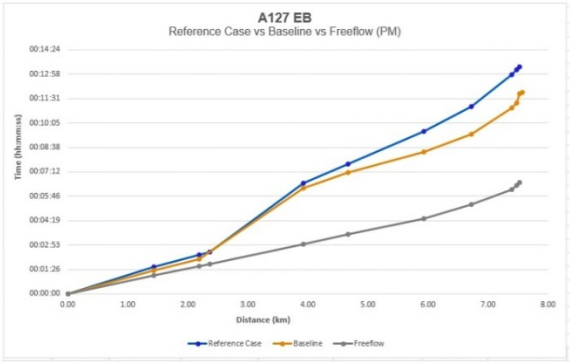
9.2.27 It is important to recognise that, in a majority of cases, the modelled journey times are somewhat shorter than those obtained from actual traffic data (this information is included with the baseline journey time plots at Appendix C). This is due to the fact that, in practice, additional delays accrue to traffic from multiple side road junctions which are too small to be represented in the strategic model. However, we are satisfied that the model accurately represents the major road junctions within the borough and that appropriate flows from committed growth and the proposed CPP sites are generated and represented in the model, such that these flows are joining and leaving the key corridors and that in consequence the expected changes to overall journey times are reflective of what drivers would experience in each scenario.

Figure 55. Journey Times Comparison – A127 Eastbound

A127 Eastbound

Modelled





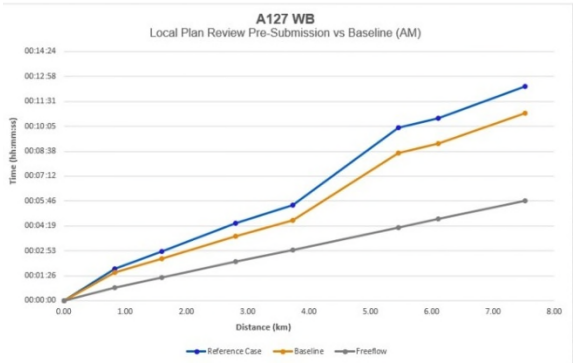
	AM	PM	Freeflow AM	Freeflow PM
Baseline	00:11:49	00:11:52	00:05:50	00:06:30
Reference Case	00:11:20	00:13:24	00:05:45	00:06:35

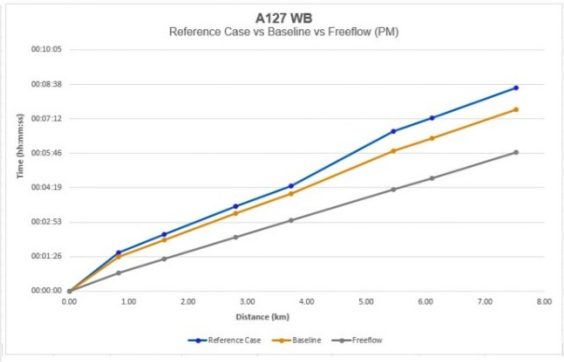
9.2.28 Total journey times on the A127 eastbound are expected to remain similar in the AM peak in relation to the baseline, and slightly higher in the PM peak. It is notable that, in the AM peak, the main increase in journey times occurs in the eastern half of the borough; this pattern is much less pronounced in the PM peak data.

Figure 56. Journey Times Comparison – A127 Westbound

A127 Westbound

Modelled





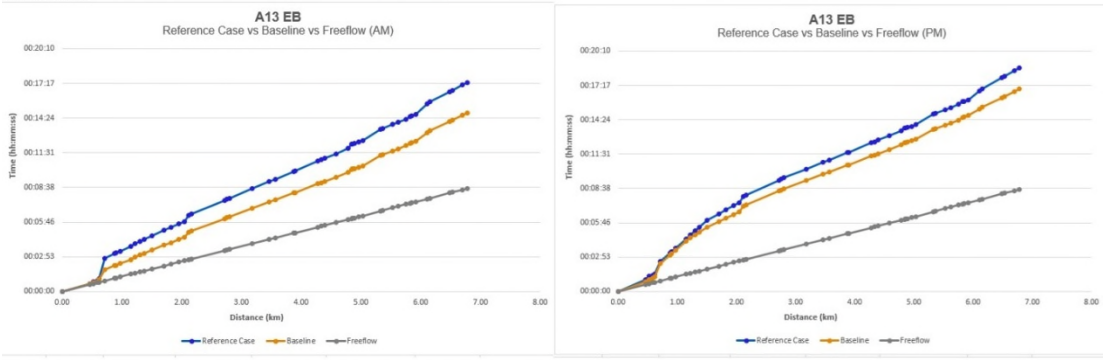
	AM	PM	Freeflow
Baseline	00:10:49	00:07:36	00:05:47
Reference Case	00:12:22	00:08:30	00:05:47

9.2.29 The westbound journey time comparisons indicate that there will be relatively modest increases in journey times between the baseline and reference case scenarios in both the AM and PM peaks. The graphs indicate that this change will occur as a result of minor increases in journey times across the length of the modelled journey, rather than additional delay accruing at specific physical locations on the route.

Figure 57. Journey Times Comparison – A13 Eastbound

A13 Eastbound

Modelled



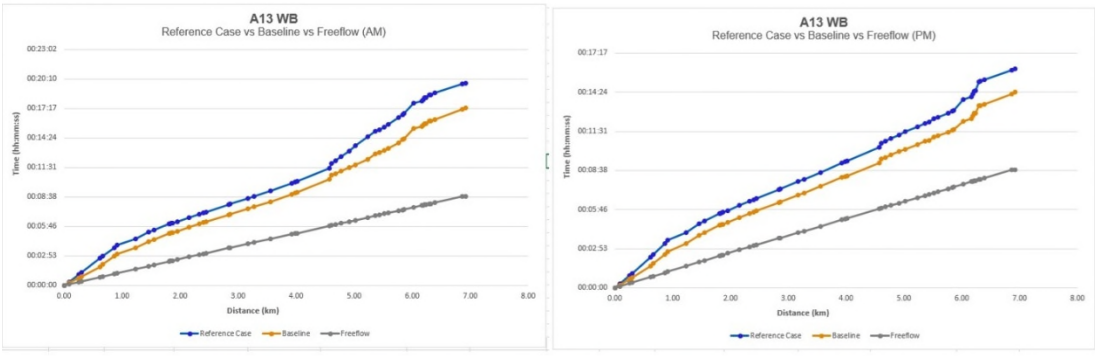
	AM	PM	Freeflow
Baseline	00:14:49	00:16:58	00:08:34
Reference Case	00:17:22	00:18:44	00:08:34

9.2.30 The eastbound A13 journey time comparisons indicate that there will be slightly larger increases in journey times in the AM peak compared to the PM peak; the increases are observed to accrue gradually across the length of the route in both cases, pointing to these being accounted for by generally increased traffic flows rather than pronounced impacts at one or more specific locations.

Figure 58. Journey Times Comparison – A13 Westbound

A13 Westbound

Modelled



	AM	PM	Freeflow
Baseline	00:17:20	00:14:25	00:08:41
Reference Case	00:19:44	00:16:08	00:08:41

9.2.31 The type and magnitude of changes in journey times on the A13 westbound are very similar to those observed on the A13 Eastbound outputs. It is notable that there is a slight "jump" in journey times in the PM peak towards the western end of the route (i.e. approaching Sadlers Farm roundabout) indicating that one of the local junctions here is experiencing increased delay on its westbound arm.

9.2.32 This section of the TA has provided the context against which the impacts of the Preferred spatial option for the CPP can be appraised. The next section of the TA discusses the outcomes of the "With CPP" scenario modelling.

10. CPP SCENARIO & MITIGATION

10.1 CPP Scenario

10.1.1 As previously described, the CPP Scenario has been defined by Castle Point Borough Council, with the identification of the Housing Allocation throughout the region. SYSTRA have identified a series of junctions within the surrounding area by which to test varying forms of mitigation. This has also been considered in line with the previously described Schedule of Interventions.

10.2 "With Development" (Preferred Spatial Option) Strategic Modelling

10.2.1 Using the supplied outputs from the SE Model, this section of the report provides an analysis of the impact of the additional traffic generated by the CPP Preferred Option sites when compared to the reference case. The assessment considers the difference in traffic flows, queue length, capacity and journey time to identify key areas of the network likely to be impacted by the addition of traffic associated with the CPP.

Flow Difference

10.2.2 **Figure 59** to **Figure 62** below show how the traffic flows across the network are expected to change as a result of the implementation of the current allocation proposals within the CPP. These figures address the "Business as Usual" scenario (i.e. with no allowances made for mitigation or additional sustainable transport measures).

Figure 59. Benfleet / Hadleigh Flow Difference AM Peak

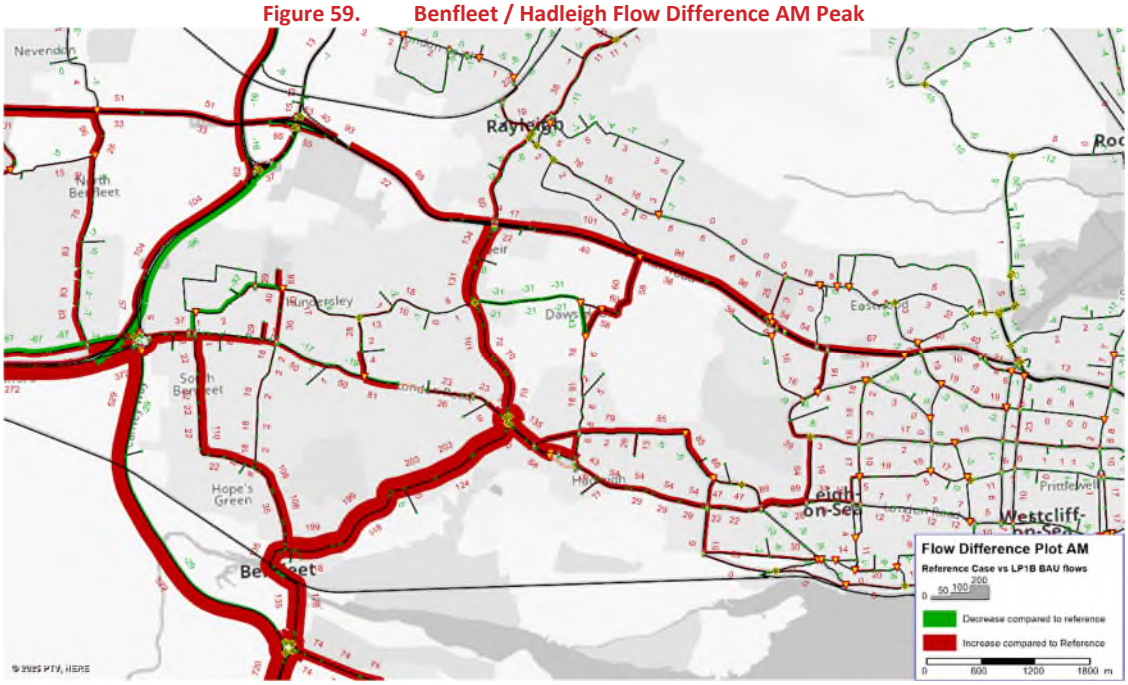
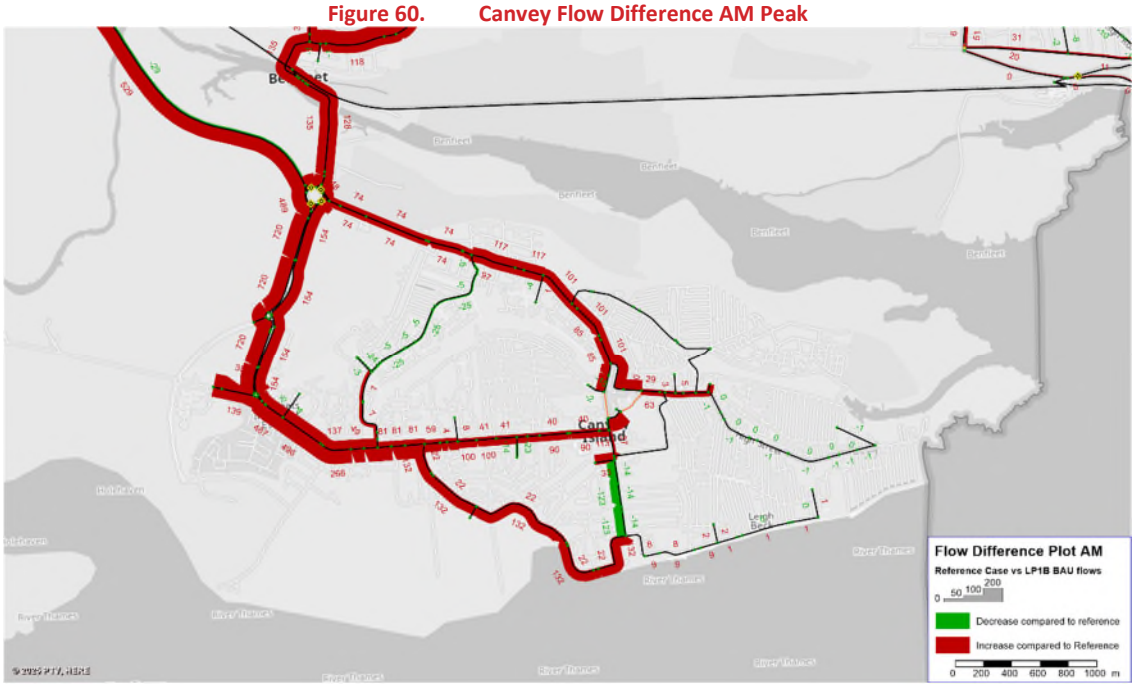


Figure 60. Canvey Flow Difference AM Peak



10.2.3 As would be anticipated, the impacts of the revised CPP proposed allocations are most concentrated in the key distributor routes on and off of Canvey Island, the A130 corridor and the A127 corridor. Proportionately less additional traffic is observed on the A13; this is due to this corridor already being highly saturated with traffic in the reference case, further evidenced by the volume of traffic being assigned by the model to the B1014 corridor.

Figure 61. Benfleet / Hadleigh Flow Difference PM Peak

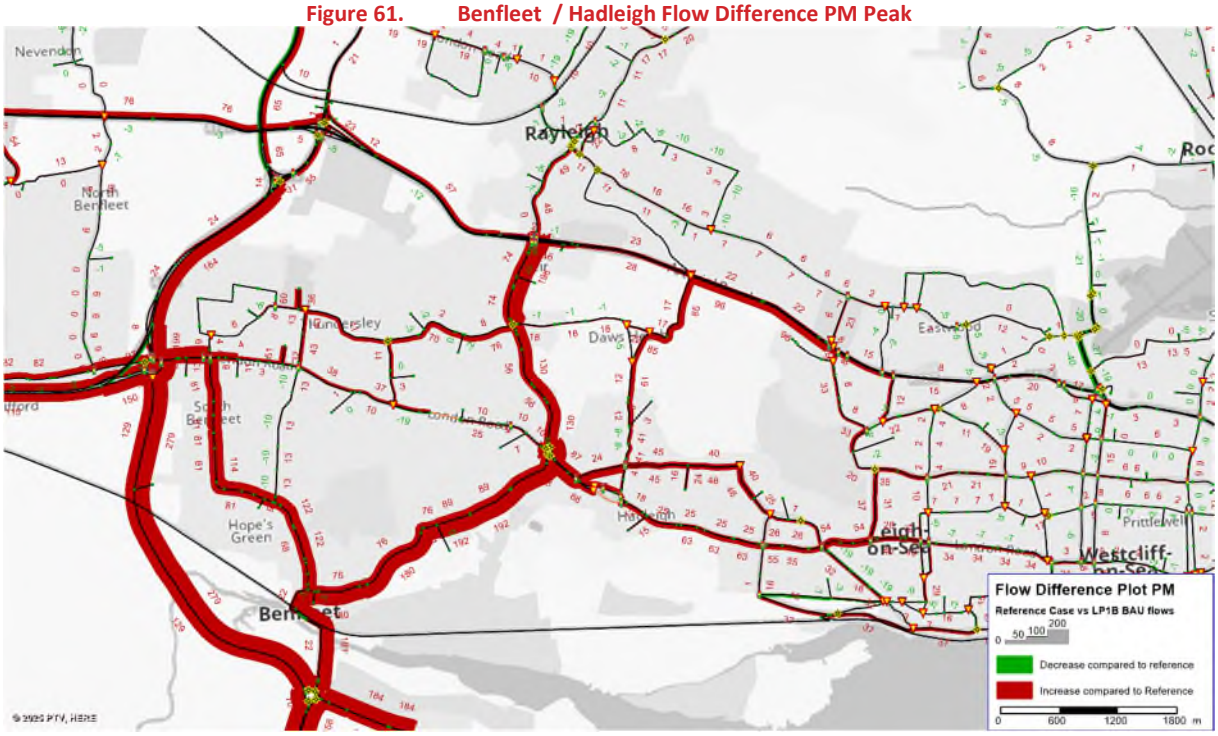
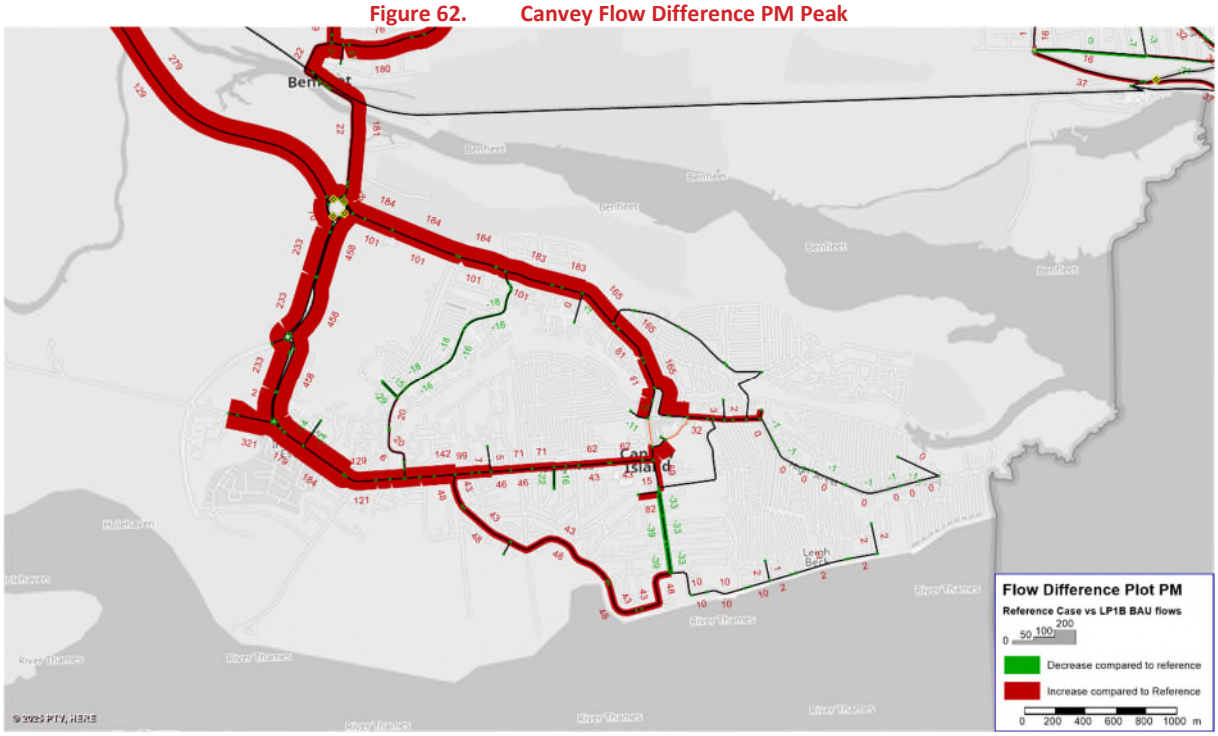


Figure 62. Canvey Flow Difference PM Peak



10.2.4 Similar patterns are observed in the PM peak; it is notable that there is significantly higher use of the route via South Benfleet and Hope's Green compared to the AM peak. Strong tidality is observed in the flows to and from Canvey Island.

10.2.5 Appendix B contains plots which compare the reference case to the Sustainable scenario; as has been described in the TA report this envisages a reduction in car trips of 13% from local plan sites (no additional deductions are made for existing vehicle trips which could be encouraged to switch modes by the Plan's sustainable transport strategies for walking, cycling and public transport. These generally show a modest reduction in overall additional flows but are not sufficient to lead to any material changes in the distribution of traffic within the models.

Queue lengths

10.2.6 The following section summarises the queue length data in the BAU and Sustainable scenarios. "Relative" queue length relates to the amount of space on a given junction arm within the model for vehicles to queue; over 100% means that queues will extend beyond that space, potentially disrupting traffic flows.

Benfleet & Hadleigh

10.2.7 The queue lengths in the BAU and Sustainable with Mitigation scenarios for the Benfleet and Hadleigh regions are indicated in the figures below.

Figure 63. Queue Length Benfleet & Hadleigh BAU AM Scenario

Figure 64. Queue Length Benfleet & Hadleigh Sustainable AM Scenario

10.2.8 As indicated above, the relative queue length is noted to increase with the implementation of the Sustainable scenario, particularly along the A127 south onto the A129, and on London Road to the east of the Sadlers Farm roundabout, south on High Road. In both of these areas, the relative queue lengths are over 100%.

10.2.9 The figures below indicate the queue lengths in the PM peak scenarios.

Figure 65. Queue Length Benfleet & Hadleigh BAU PM Scenario

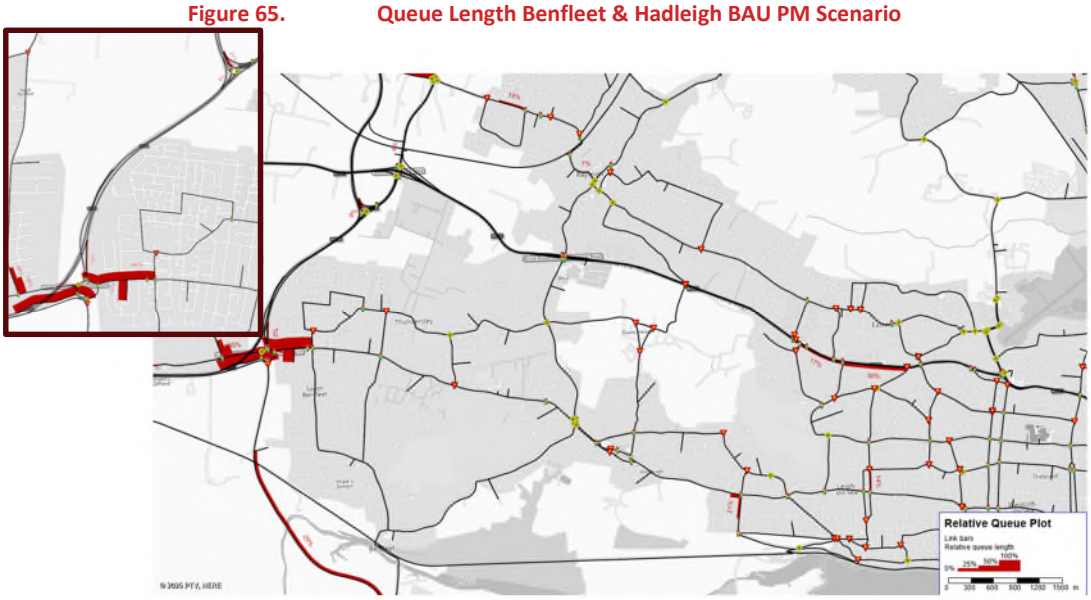
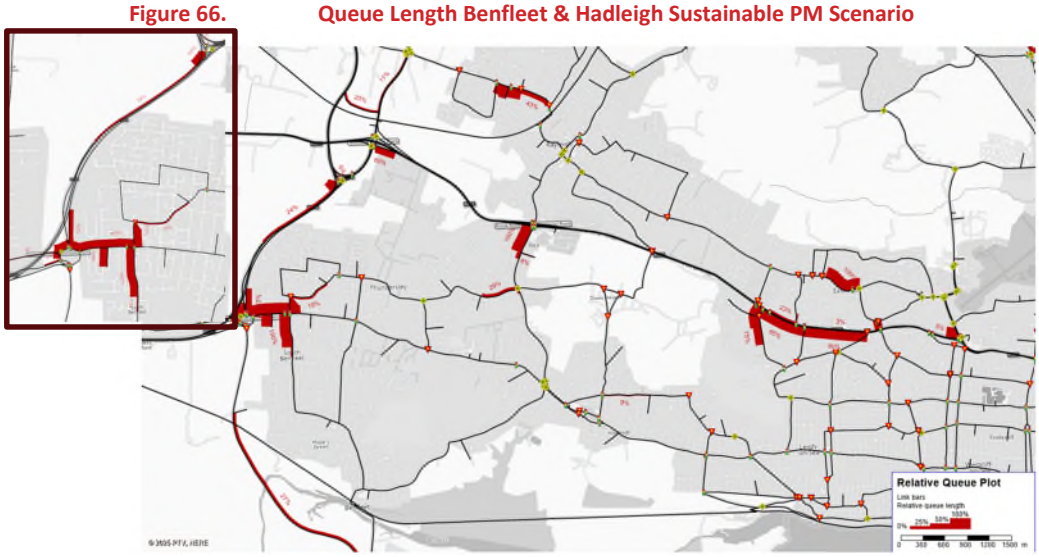


Figure 66. Queue Length Benfleet & Hadleigh Sustainable PM Scenario



10.2.10 In the BAU scenario, the only significant queue lengths are noted to the east of the Sadlers Farm roundabout along London Road. Within the Sustainable scenario, a number of additional queues are seen; along the A129 south of the junction with A127, and east-west along the A127 to the east of The Fairway, both of which see relative queue plots between 90-100%.

10.2.11 The "increase" in queue lengths observed in the sustainable scenario are believed to be caused by localised re-routing of some traffic due to the overall reduction in development traffic relative to the BAU models. This does not mean that the sustainable scenario is "worse" for vehicular traffic as the re-routing indicates that an improved journey time can be obtained for certain trips, even if queues (and delay) at specific locations have increased in comparison to BAU.

Canvey Island

10.2.12 The AM peaks for the BAU and Sustainable scenarios are indicated in the figures below.

Figure 67. Queue Length Canvey Island BAU AM Scenario

Figure 68. Queue Length Canvey Island Sustainable AM Scenario

10.2.13 As indicated above, there is very little difference in queue lengths in the Canvey Island region between the BAU and Sustainable scenarios. The only notable queues in both scenarios is along the B1014 to the east of the Canvey Way/Canvey Road roundabout. In the BAU scenario this is noted to be a relative queue length of 71%, and in the Sustainable scenario, this reduces slightly to 61%. (It should be noted that the "available" space for queues on this roundabout is very substantial due to the lack of adjacent junctions).

10.2.14 The queue lengths in the PM peak are identified for the BAU and Sustainable scenarios in the figures below.

Figure 69. Queue Length Canvey Island BAU PM scenario

Figure 70. Queue Length Canvey Island Sustainable PM scenario

10.2.15 As indicated above, the only notable queue lengths in the Canvey Island region are observed at the Canvey Road/Canvey Way roundabout; to the northwest in both scenarios, and to the southeast along Somnes Avenue in the Sustainable scenario, with a relative queue length of 74%.

Volume / Capacity

10.2.16 The following section summarises the volume/capacity (v/c) level across the BAU and Sustainable future year scenarios.

Benfleet & Hadleigh

10.2.17 The figures below summarise the link Volume/Capacity ratios throughout the Benfleet and Hadleigh region across the BAU and Sustainable scenarios in the AM peak.

Figure 71. Volume/Capacity Benfleet & Hadleigh BAU AM

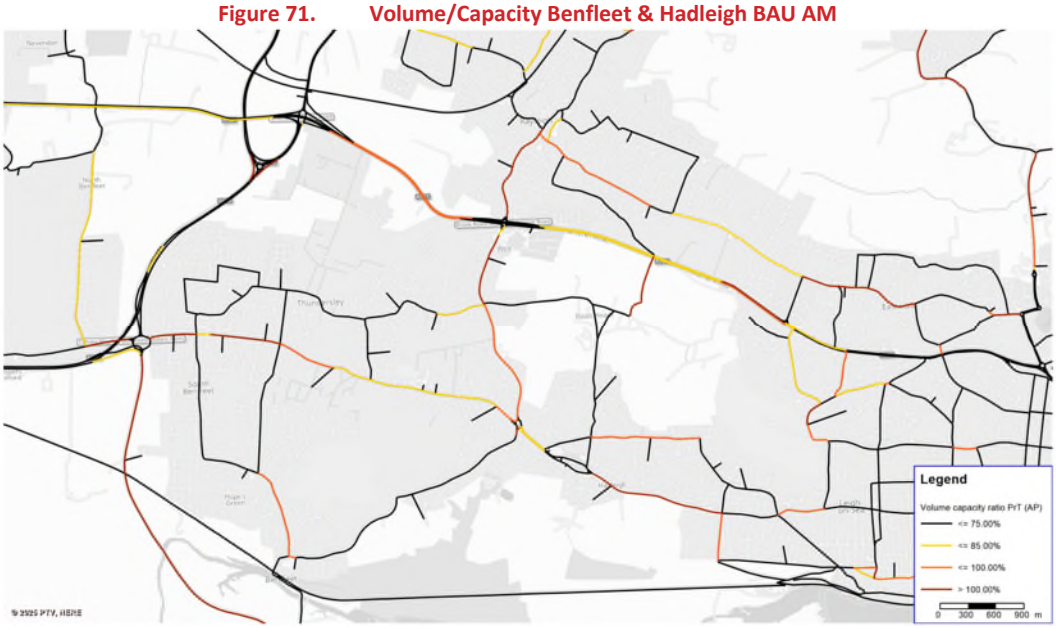


Figure 72. Volume/Capacity Benfleet & Hadleigh Sustainable AM

10.2.18 As indicated above, there is minimal/no difference between the BAU and Sustainable scenarios.

10.2.19 The main points of congestion indicated include the A130 Canvey Road south of the Sadlers Farm roundabout, and to the north of the A127/A129 junction to the north of Thundersley.

10.2.20 It is recognised that in both BAU and Sustainable scenarios, the A130 Canvey Road north of the Sadlers Farm roundabout, and the smaller roads between the A127 and A13 are

approaching capacity; this does not mean that there are not substantial queues and delay in these locations, only that the flow is proportionally less of the theoretical capacity of these links.

10.2.21 The figures below summarise the v/c for the Benfleet and Hadleigh region in the PM peak in the BAU and Sustainable scenarios.

Figure 73. Volume/Capacity Benfleet & Hadleigh BAU PM

Figure 74. Volume/Capacity Benfleet & Hadleigh Sustainable PM

10.2.22 As indicated above, the BAU and Sustainable scenarios indicate very little difference in the PM peak from the AM peak.

10.2.23 Particular points of link congestion (as opposed to junction congestion) are noted to be the A13 south of the Sadlers Farm roundabout, and east of the London Road/High Street junction in Hadleigh, both of which are at capacities over 100%.

Canvey Island

10.2.24 The figures below summarise the volume/capacity ratios in the Canvey Island region between the BAU and Sustainable scenarios.

Figure 75. Volume/Capacity Canvey Island BAU AM

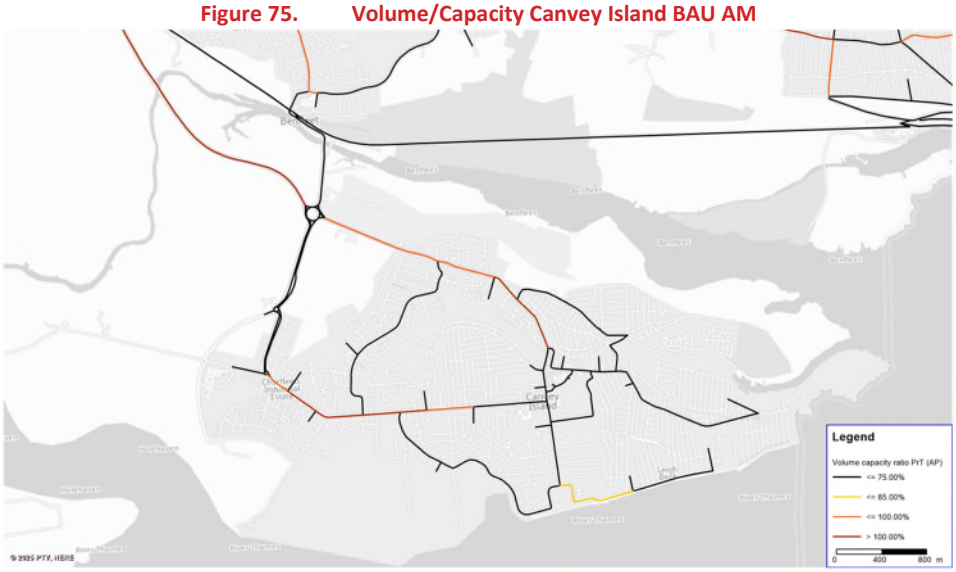
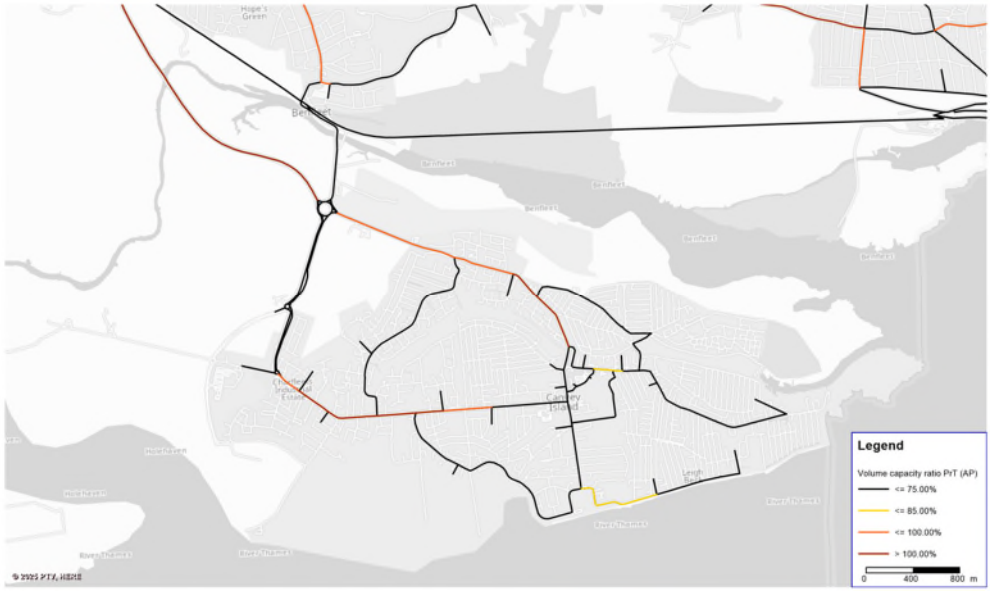


Figure 76. Volume/Capacity Canvey Island Sustainable AM Scenario



10.2.25 As indicated above, the v/c of the region is similar in both the BAU and Sustainable scenarios. The main points of congestion are noted to be the B1014 southeast of the Canvey Road/Canvey Way roundabout, Central Wall Road north-south into the Furtherwick Road junction, and Long Road east-west. All of these routes are indicated to be at capacity of over 100%.

10.2.26 The figures below summarise the v/c of the Canvey Island region in the PM peak across BAU and Sustainable scenarios.

Figure 77. Volume/Capacity Canvey Island BAU PM Scenario

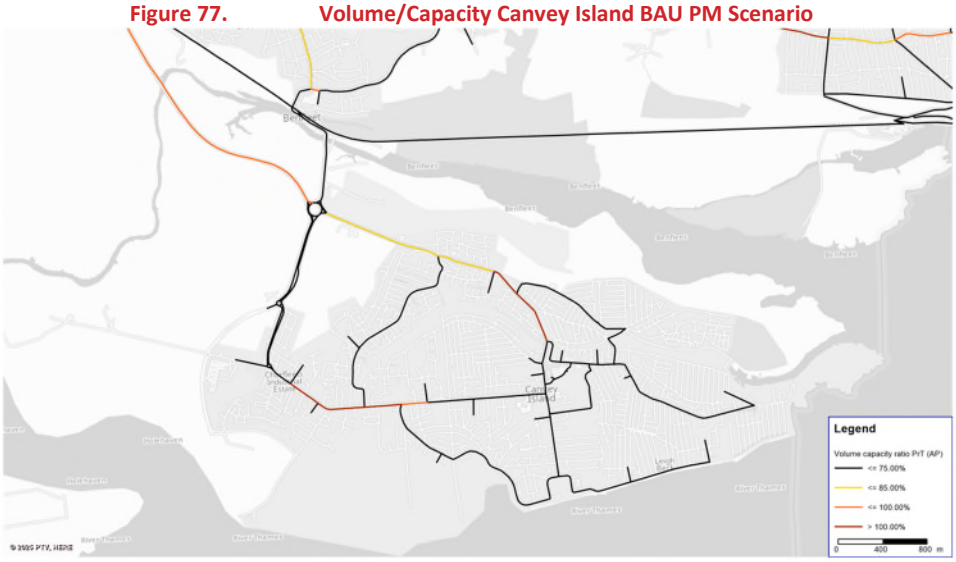


Figure 78. Volume/Capacity Canvey Island Sustainable PM Scenario

10.2.27 The PM peaks in the BAU and Sustainable scenarios show very similar v/c data for the Canvey Island region as the AM peaks. The main points of congestion are the Long Road east-west and Central Wall Road; north-south into the Furtherwick Road junction represent additional areas of congestion which are over 100% v/c.

Journey Times

10.2.28 Table 19 summarises the change in journey time between the reference case and the with CPP scenario along the key routes on the network. (All of the journey time routes have been included in this tabulation for reference).

Table 19. Summary of journey times – Reference case and with CPP scenarios

ROUTE	SCENARIO	AM	PM
A127 East Bound	Reference Case	00:11:20	00:13:24

ROUTE	SCENARIO	AM	PM
	With CPP	00:11:36	00:13:36
	Difference	**00:00:16**	**00:00:12**
A127 West Bound	Reference Case	00:12:22	00:08:30
	With CPP	00:12:26	00:08:31
	Difference	**00:00:04**	**00:00:01**
A130 South Bound	Reference Case	00:10:27	00:11:17
	With CPP	00:13:41	00:14:57
	Difference	**00:03:14**	**00:04:40**
A130 North Bound	Reference case	00:16:51	00:11:44
	With CPP	00:19:56	00:12:12
	Difference	**00:03:05**	**00:00:28**
A129 South Bound	Reference case	00:11:33	00:11:33
	With CPP	00:12:46	00:12:33
	Difference	**00:01:13**	**00:01:00**
A129 North Bound	Reference case	00:13:03	00:12:01
	With CPP	00:14:32	00:12:47
	Difference	**00:01:29**	**00:00:46**
A13 East Bound	Reference case	00:17:22	00:18:44
	With CPP	00:18:58	00:18:50
	Difference	**00:01:36**	**00:00:06**
A13 West Bound	Reference case	00:19:44	00:16:08
	With CPP	00:20:35	00:18:15
	Difference	**00:00:51**	**00:02:07**
B1006 / B1014 Southbound	Reference case	00:12:02	00:13:39

ROUTE	SCENARIO	AM	PM
	With CPP	00:12:24	00:14:47
	Difference	**00:00:22**	**00:01:08**
B1006 / B1014 Northbound	Reference case	00:17:13	00:12:23
	With CPP	00:18:46	00:13:05
	Difference	**00:01:33**	**00:00:42**
Canvey Road / Long Road / B1014 Eastbound	Reference case	00:09.10	00:10:19
	With CPP	00:09:30	00:11:39
	Difference	**00:00:20**	**00:01:30**
Canvey Road / Long Road / B1014 Westbound	Reference case	00:11:09	00:08:44
	With CPP	00:12:09	00:09:02
	Difference	**00:01:00**	**00:00:18**

10.2.29 As shown in Table 19, all the links tested experience some additional delay with the CPP in place. The route showing the longest increase in journey time is the A130 Southbound in the PM peak which experiences additional delay of circa 4 minutes. By referring to the relative queue plot shown as 0 the model suggests that this delay is primarily caused by the increased queues at the A130 / A1245 Rayleigh Spur Roundabout with some impact at the Saddlers Farm Junction, and some additional delay occurring at Fair Glen.

10.2.30 The A13 is shown to experience an additional 1.5 minutes of delay East Bound in the AM peak and around 2 min westbound in the PM. By reviewing the relative queue lengths shown in the model suggests that the majority of the is additional delay is caused by queuing at the Sadlers Farm Roundabout and the A13 London Road/High Road junction.

10.2.31 The full Journey time outputs have been extracted from the strategic model; the outputs are provided in **Appendix C** and **D**.

Summary

10.2.1 As indicated from the SE Model outputs, the 2043 with Mitigation BAU and Sustainable scenarios are relatively similar in both volume/capacity and queue length data. The flow difference plots provide greater clarity on where traffic reduces as a result of the sustainable transport assumptions and measures, however it is recognised that the increase in traffic in both scenarios compared to the reference case is very significant in the west of the borough.

10.2.2 The updated strategic modelling has demonstrated that, even with the "built in" advantages of the West Canvey broad location, the scale of this proposed development still means that there will be very large increases in vehicle trips seeking to move to and from Canvey, and that this demand will affect both the A130 and the route towards Benfleet station. There is also evidence of "knock on" effects of the A13 corridor in particular having very little ability to absorb extra vehicular demand, with the model showing that the B1014 corridor would operate as the most obvious alternative.

10.2.3 The sustainable mode share scenario test indicates that the sustainable mode strategies as currently defined in the main TA report would be capable of reducing overall car demand by a modest amount. However, this estimate is deliberately conservative and focused on the local measures described in the main TA report. Section x of this report considers how public transport (primarily via bus) could play a larger role, in part via the opportunities specifically offered by the West Canvey site, and in part via the return of previously adopted measures to physically safeguard bus movements.

10.2.4 Detailed junction modelling and traffic flow assessment allows a greater understanding of the operation of the key junctions identified and also allow the testing of targeted mitigation schemes to minimise additional delay causes by additional traffic generated from the CPP. The results of this local testing are presented in the following section of the TA report.

10.3 Local Junction Assessments

10.3.1 Through the development of the previously described Schedule of Interventions and data obtained from the strategic models, a series of junctions have been identified for further consideration in order to establish the specific impacts of future year development at key local junctions. The identified junctions are as follows:

- Fair Glen Interchange (including Rayleigh Spur)
- Sadlers Farm Roundabout
- A127 Rayleigh Weir
- Manor Road/Church Road
- Kiln Road/Runnymede Chase
- London Road/High Street
- Scrub Lane/Rectory Road/New Road;
- Rushbottom Lane/London Road/High Road;
- London Road/Kents Hill Road/Kents Hill Road North;
- Northwich Corner Roundabout;
- Long Road/Southwick Road/Linden Way;
- Long Road/Furtherwick Road (partial);
- Furtherwick Road/Foksville Road;
- High Street/Foksville Road;
- Point Road Roundabout;
- Eastern Esplanade/Seaview Road; and
- Rayleigh Road/London Road/Benfleet Road/Kiln Road

10.3.2 The SRTM does not directly represent all of the above junctions. These junctions are:

- Manor Road/Church Road;
- Kiln Road/Runnymede Chase;

- Long Road/Southwick Road/Linden Way;
- Furtherwick Road/Foksville Road;
- High Street/Foksville Road;
- Point Road Roundabout; and
- Eastern Esplanade/Seaview Road

10.3.3 Local Junction modelling has therefore been undertaken for those junctions where sufficient data is available from the strategic model. Commentary is provided for the other junctions based on the available traffic flow data. The output files for the local junction models are included at **Appendix F** of this TA report.

Fair Glen Interchange (including Rayleigh Spur)

10.3.4 The traffic flow data obtained from the SE Model is summarised in the figures below. This includes calculation of the net change in traffic between the reference case and "Business as Usual" scenarios.

Figure 79. Reference Case AM and PM Traffic Flows (Vehicles)

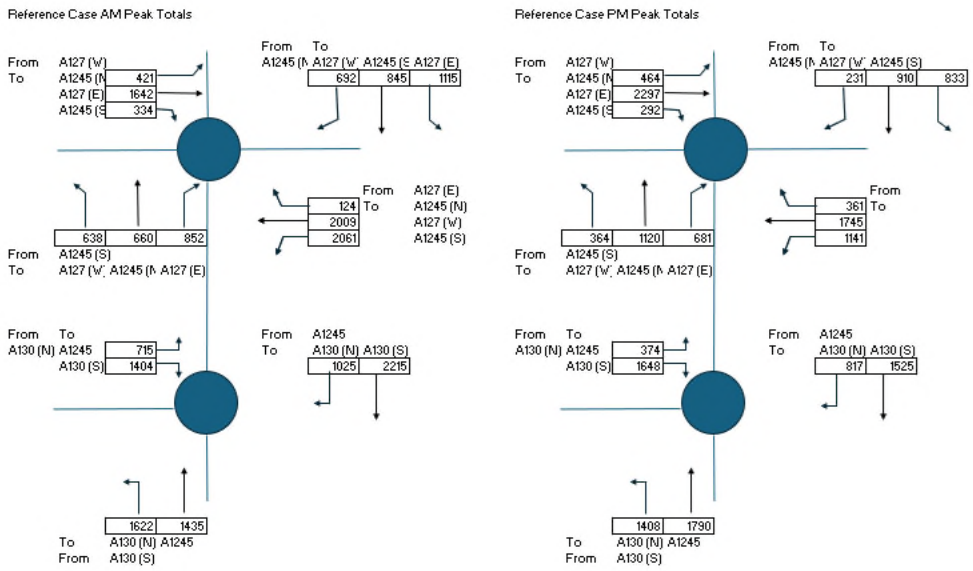


Figure 80. 2043 CPP Traffic Flows (BAU)

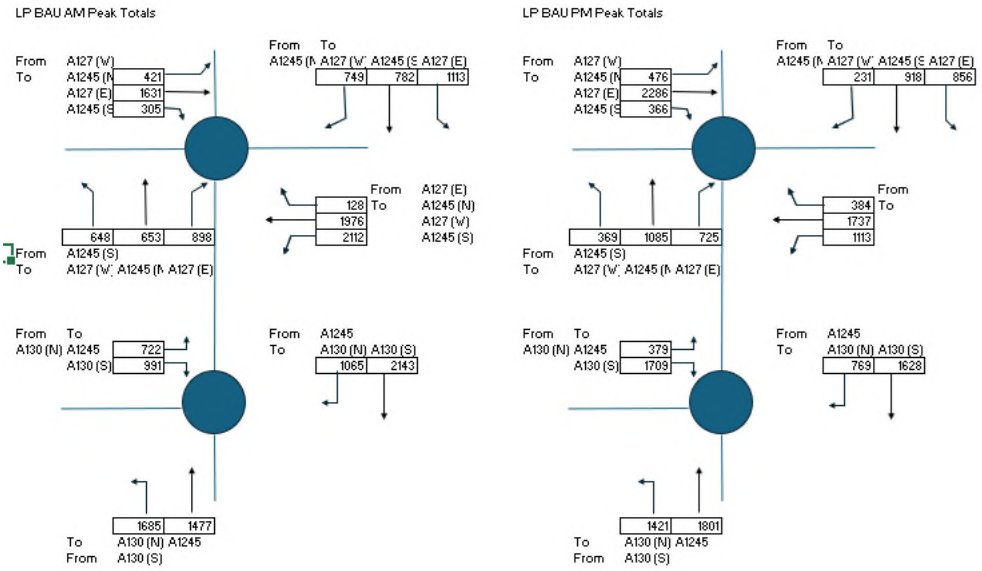


Figure 81. 2043 CPP Traffic Flows (Sustainable)

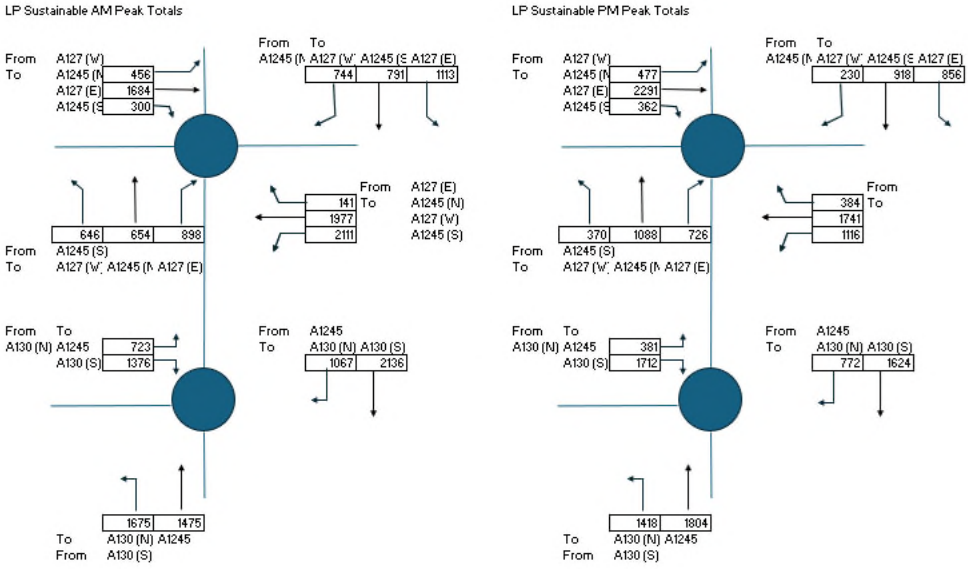
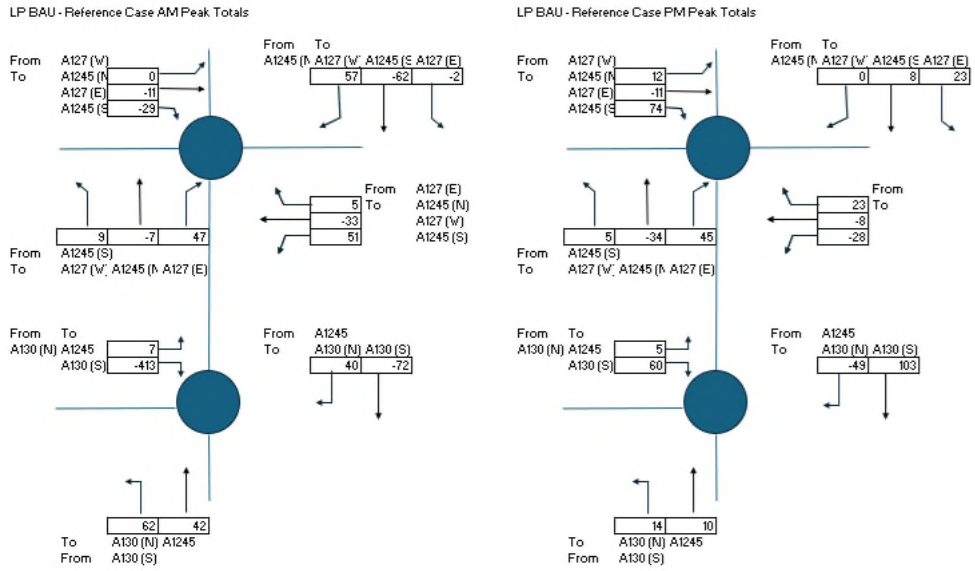


Figure 82. CPP BAU – Reference Case Flow Difference



10.3.5 The traffic flow information generated by the SE Model shows that the net change at the junction resulting from the impacts of the Local Plan proposals is mixed. Due to the volumes of traffic using the junction in the Do Minimum scenario, some re-assignment of traffic and the general impacts of delay are observed in the flow difference calculations; there are issues with traffic accessing the Rayleigh Spur junction from the A130 in the AM peak and a similar (but less pronounced) effect on the A1245 north arm into the Fair Glen junction, also in the AM peak.

10.3.6 The most significant increases in traffic are in arrivals from the A130 (S) and A127 (E) in the AM peak; this is largely reversed in the PM peak. The total additional volume of movements in the context of the overall traffic volumes (as shown in the flow diagrams for the individual scenarios) is relatively modest. As has previously been shown in the strategic model plots, the Local Plan traffic does not in and of itself lead to a material change in demand or operation of the junction. However, it is acknowledged that there is likely to be a requirement for Local Plan developments to either contribute to a potential wider improvement based on impacts from all of the adjacent local authority area's plans being considered, or instead for a proportionate contribution to be made to measures such as the quality bus corridors in the LTP4 (if ECC as Local Highway Authority determines that this would be a more appropriate response to the observed issues and the known physical constraints of the location).

Sadlers Farm Roundabout

10.3.7 The traffic flow data obtained from the SE Model for the Sadlers Farm Roundabout is summarised in the figures below. This includes calculation of the net change in traffic between the reference case and "Business as Usual" scenarios. It is noted that there is a free-flow connection between the A130 and A13 which means that traffic using this route in either direction is not required to pass through the roundabout itself, therefore the corresponding movements in the diagram are recorded either as 0 or a very low figure.

Figure 83. Reference Case AM and PM Traffic Flows (Vehicles)

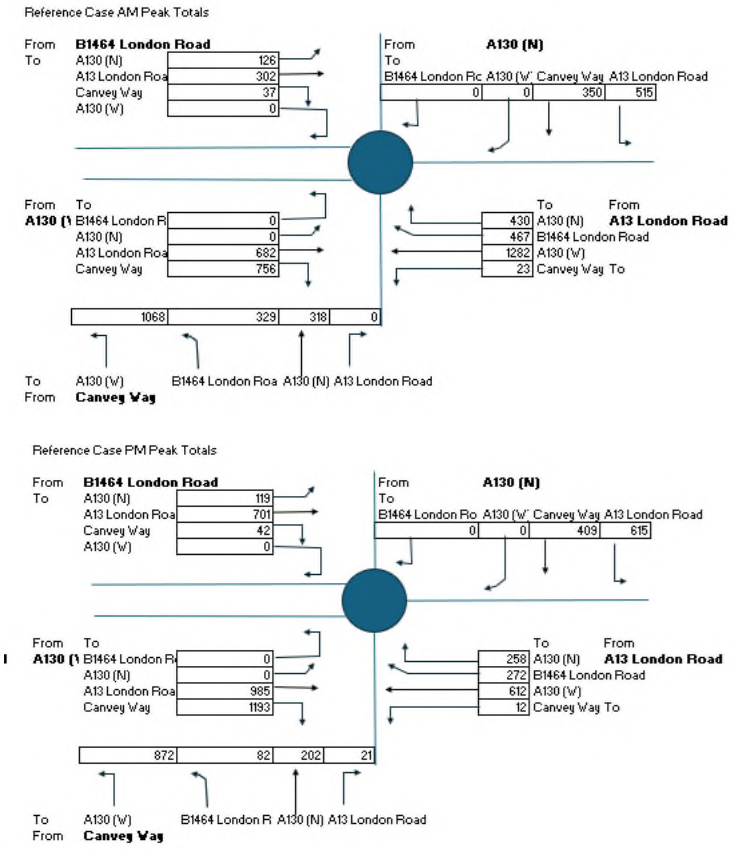
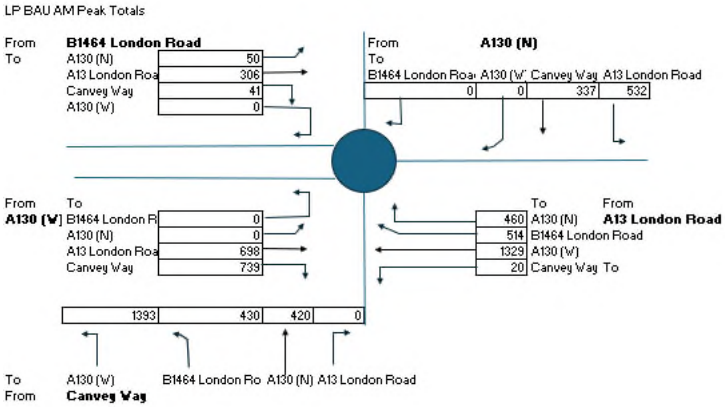


Figure 84. 2043 CPP Traffic Flows (BAU)



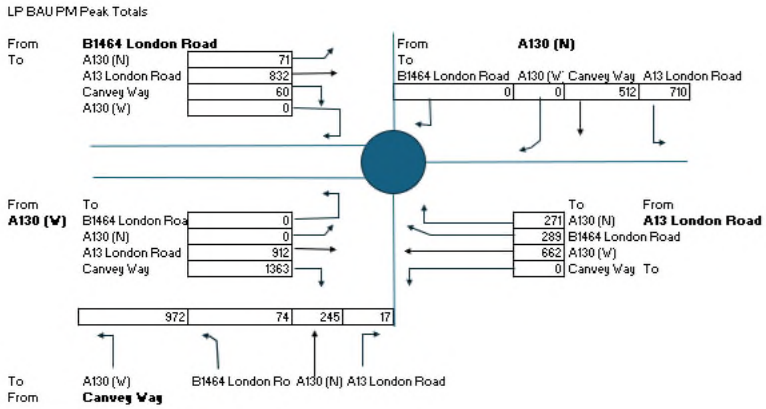
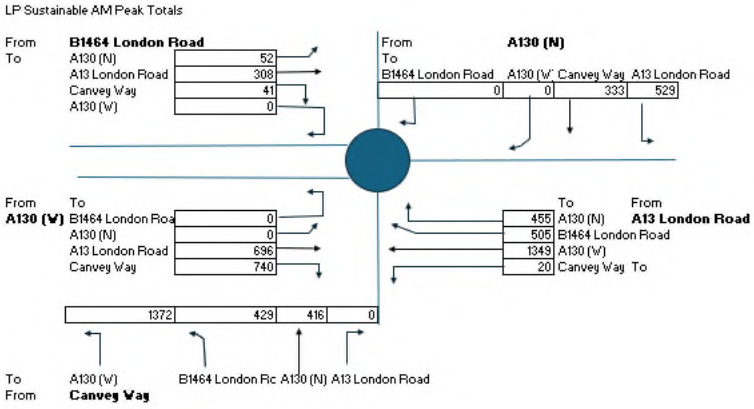


Figure 85. 2043 CPP Traffic Flows (Sustainable)



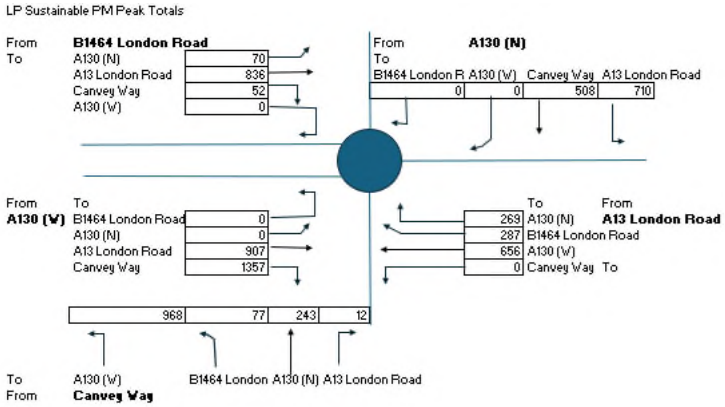
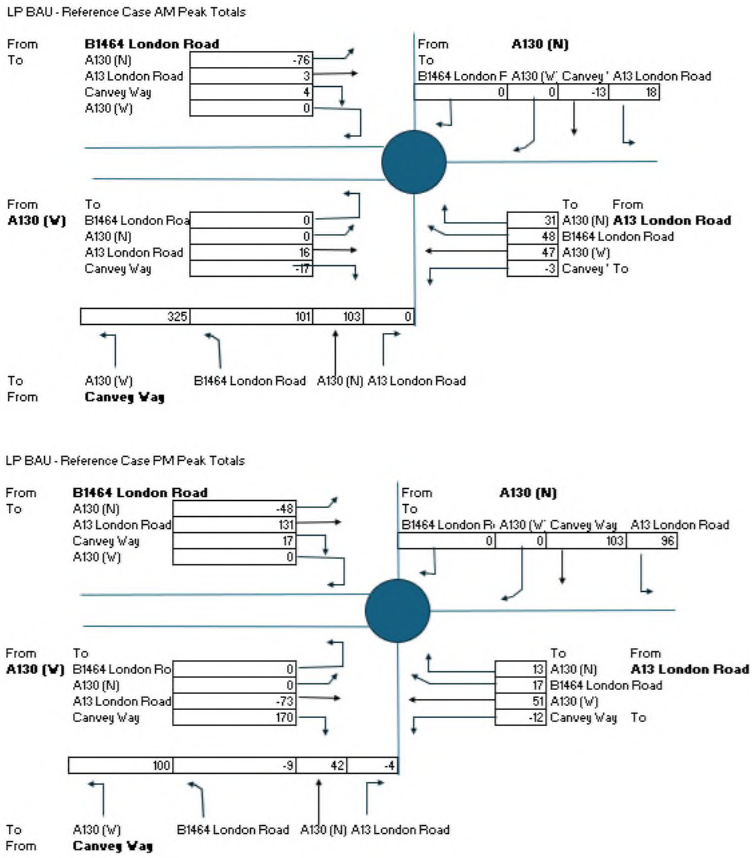


Figure 86. CPP BAU – Reference Case Flow Difference



10.3.8 TBC

10.3.9

Rayleigh Weir Roundabout

10.3.10 The traffic flow data obtained from the SE Model for the Rayleigh Weir roundabout is summarised in the figures below. This includes calculation of the net change in traffic between the reference case and "Business as Usual" scenarios.

Figure 87. Reference Case AM and PM Traffic Flows (Vehicles)

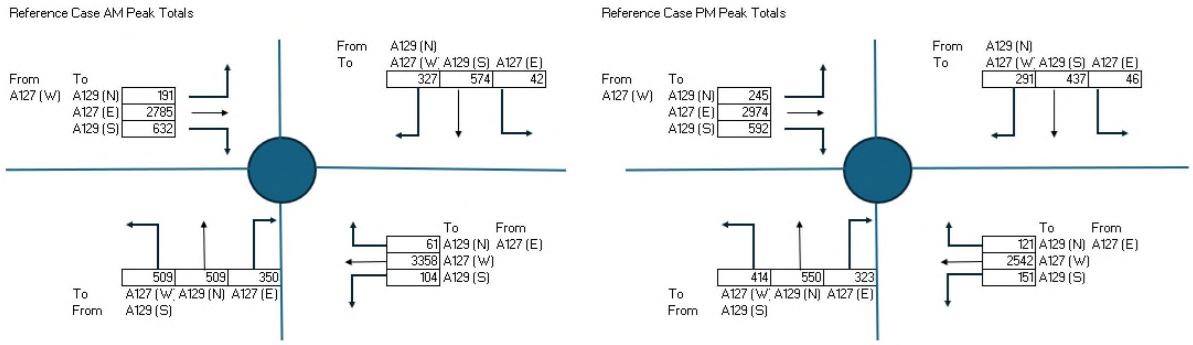


Figure 88. 2043 CPP Traffic Flows (BAU)

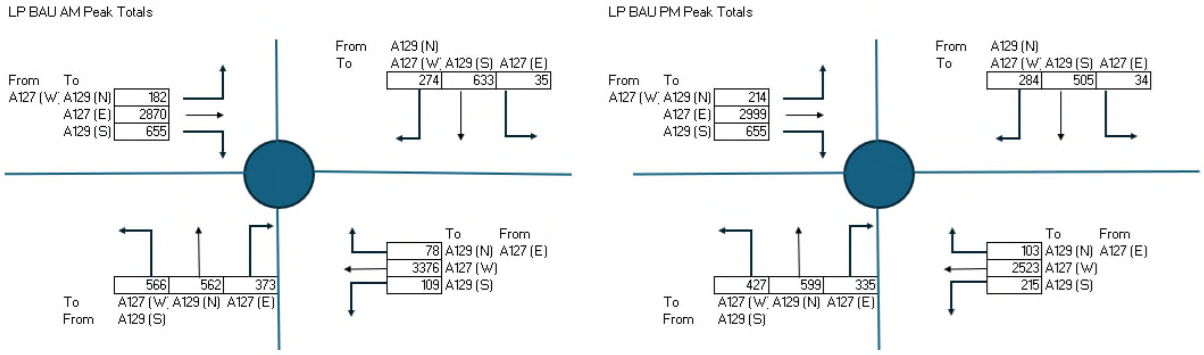


Figure 89. 2043 CPP Traffic Flows (Sustainable)

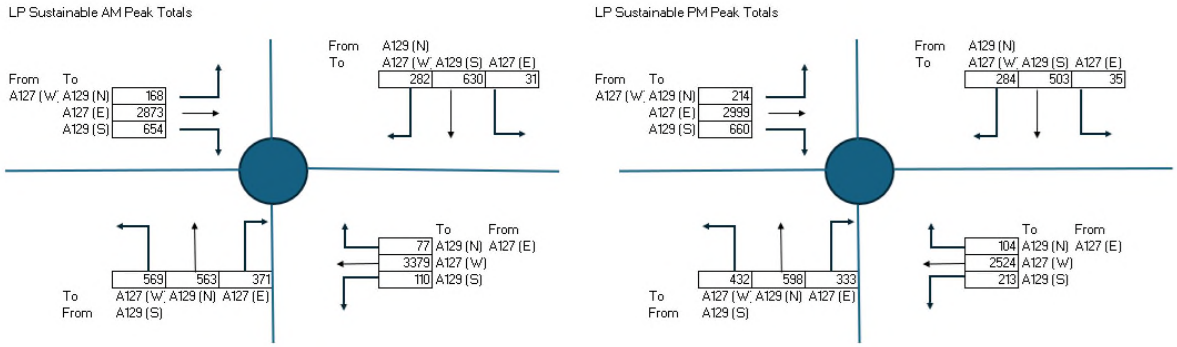
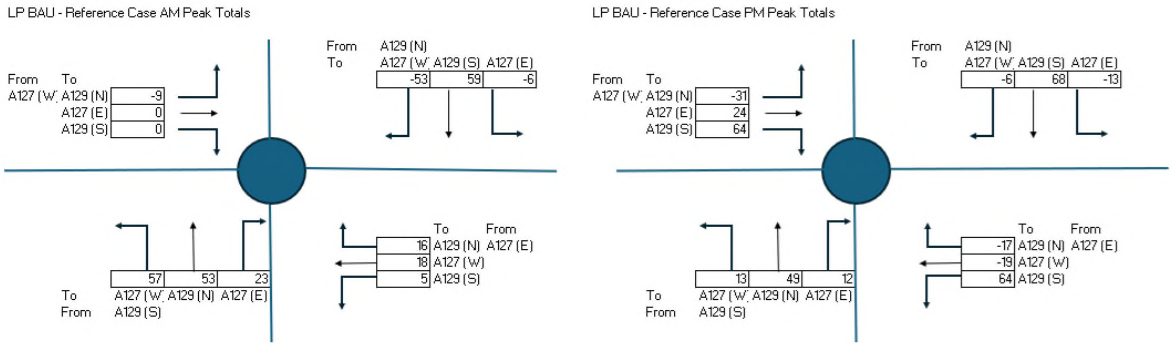


Figure 90. CPP BAU – Reference Case Flow Difference



10.3.11 It can be observed from the flow difference calculations that, whilst the local plan developments do add traffic to certain arms of the junction, these are offset to a degree by falls in other movements. From the strategic model data it appears that this occurs due to congestion on the local networks feeding in from the north and south, which in turn leads to some reductions in the volumes of traffic that can make the movement relative to the Do Minimum scenario.

10.3.12 As has been observed at the Fair Glen junction, the overall change in demand at the junction is relatively small compared to the total traffic flows in each scenario; the journey time changes on the routes passing through this junction are also limited. This is not unexpected, given that the largest concentrations of new development proposed in the CPP are somewhat remote from the junction.

10.3.13 It is therefore not considered that direct physical mitigation of this junction would be proportionate to the impacts observed. However, it is intended to re-visit the junction specifically from the perspective of improving access and reducing delays for buses as part of the further bus strategy development work.

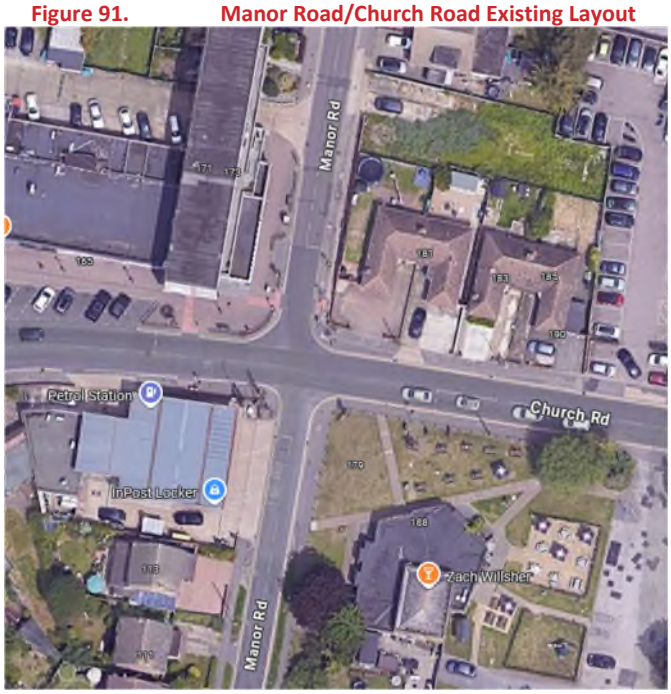
Manor Road/Church Road

10.3.14 Manor Road/Church Road is an signalised four- priority junction, located in the northwest of Castle Point borough. Signalised pedestrian crossings are located on the north and western arms. Within the CPP Preferred Option, the junction is adjacent to the 159-169 Church Road and Rear of 179-181 Church Road developments (combined capacity of 84).

10.3.15 Within the ISI, the junction is located along the potential rerouting of the 28 bus route as identified within the ISI along Church Road (ISI ref. B7) and approximately 180 metres to the east of the pedestrian improvements along Overton Road (ISI ref. W7).

10.3.16 The existing layout of the junction is indicated in **Figure 91** below.

Figure 91. Manor Road/Church Road Existing Layout



10.3.17 The main impacts of the CPP in this location are expected to be a modest increase in traffic associated with nearby CPP sites. There is also potential for these flows to increase further as a result of more substantial growth in traffic on the A13 to the south. However, it is not considered that there are any direct physical changes to the junction which could be made to increase traffic capacity without adversely affecting sustainable modes, which would be contrary to borough and county policy. It is expected that this junction would be re-examined as part of the TA(s) for the nearby proposed CPP allocation sites.

Kiln Road/Runnymede Chase

10.3.18 Kiln Road/Runnymede Chase is an unsignalised T-junction located to the southwest of Thundersley. The junction is located between the Council Offices and USP College development sites within The Preferred Option of the CPP development (combined capacity of 617). In regard to the ISI, the junction is approximately 700 metres to the west of proposed cycle routing southbound along Shipwrights Drive (ISI ref C10), which routes through Thundersley Glen southwest-bound to High Road, north of Benfleet Station.

10.3.19 The existing layout of the junction is indicated in **Figure 92** below.

Figure 92. Kiln Road /Runnymede Chase Existing Layout

10.3.20 The configuration of the Runnymede Chase arm of this junction will need to be reconsidered as part of the future masterplanning work for the proposed CPP allocation sites. For the purposes of this TA report, it is recognised that the capacity of the A13 needs to be preserved, as does the proximity and convenience of existing bus stop infrastructure; on the basis that a right-turn pocket exists and would be expected to be retained, it is not anticipated that the overall capacity of this junction will need to change as the allocation sites will replace significant existing employment activity.

London Road/High Street Junction

10.3.21 London Road/High Street is a five-arm part signalised junction located in central Hadleigh (it is referred to here as London Road / High Street for convenience). The junction features a central island which contains a series of developments within Option 1a of the Plan. Both The Island Site and Osbourne Motor Company development sites are located within the junction area (combined capacity of 82). Additionally, the Castle Lane Car Park site (capacity of 38) is located approximately 110 metres to the south; and the Johnsons Factory site (capacity of 44) is approximately 240 metres to the southeast of the junction.

10.3.22 The ISI also identifies a series of accidents having occurred surrounding the London Road/Rectory Road junction to the east of the island junction (ISI ref. A12), and the potential development of cycle routes along Church Road to the east of the island junction (ISI ref. C12).

10.3.23 The existing layout of the junction is indicated in **Figure 93** below.

Figure 93. London Road/High Street Existing Junction Layout

10.3.24 In line with SE Model data provided, modelling has been provided to the east of the junction at the London Road/Rectory Road junction. The model results for base and future year scenarios are indicated in **Table 20** below.

Table 20. London Road / Rectory Road Model Results

	AM PEAK			PM PEAK		
Arm	**DoS**	**Mean Max Queue (MMQ)**	**Av Delay per PCU (s/PCU)**	**DoS**	**Mean Max Queue (MMQ)**	**Av Delay per PCU (s/PCU)**
2024 Base						
A – Rectory Road	18.5%	1.0	46.8	15.3%	0.8	48.2
B - A13 London Road NW	52.9%	4.6	14.5	35.4%	4.0	8.3
2043 Reference Case						

	AM PEAK			PM PEAK		
A – Rectory Road	16.2%	1.1	40.2	13.3%	0.7	46.0
B - A13 London Road NW	70.2%	6.5	19.7	60.6%	5.0	16.2
2043 With Development BAU						
A – Rectory Road	10.3%	1.0	28.9	12.6%	0.8	42.6
B - A13 London Road NW	80.0%	11.4	26.0	70.3%	6.0	19.3
2043 With Development Sustainable						
A – Rectory Road	10.3%	1.0	28.9	12.6%	0.8	42.6
B - A13 London Road NW	81.0%	11.6	26.6	70.8%	6.0	19.5

10.3.25 As is evident in the results above, all arms are within capacity across all scenarios. There is a notable increase in the Degree of Saturation across all arms between the 2043 Reference Case and with Mitigation scenarios.

10.3.26 The peak DoS level is seen along the London Road NW arm in the 2043 with Mitigation Sustainable scenario; with a DoS of 81.0% in the AM peak. It is notable however that the highest average level of delay in every scenario is seen along the Rectory Road arm in the PM peak. Contrary to the increasing DoS level in the future year scenarios, the average delay time along Rectory Road is highest in the 2024 Base PM peak, of 48.2 s/PCU.

10.3.27 Due to the low level of impact development is anticipated to have on Rectory Road/London Road, it is determined that further mitigation is not required in relation to the junction.

London Road/New Road

10.3.28 London Road/New Road is a three-arm signalised junction located to the northwest of the London Road/High Road junction. Signalised pedestrian crossings are located across all three arms of the junction. The Island Site and Osbourne Motor Company development sites are

located within the circulatory of the London Road/High Street junction (combined capacity of 82), approximately 180 metres to the southeast of the junction.

10.3.29 The existing layout of the junction is indicated in **Figure 82** below.

Figure 94. London Road/New Road Existing Layout

10.3.30 The model results for Base and Future Year scenarios are indicated in **Table 21** below.

Table 21. London Road/New Road Model Results

	AM PEAK			PM PEAK		
Arm	**DoS**	**Mean Max Queue (PCU)**	**Avg Delay (s/PCU)**	**DoS**	**Mean Max Queue (PCU)**	**Avg Delay (s/PCU)**
2024 Base						
A – New Road	75.9%	6.5	61.4	73.3%	6.7	55.0
B – London Road SE	56.9%	9.9	22.7	55.5%	9.4	23.8
C – London Road NW	76.8%	15.1	30.8	72.7%	13.3	30.5
2043 Reference Case						
A – New Road	84.0%	7.7	75.7	78.7%	7.6	60.1

	AM PEAK			PM PEAK		
B – London Road SE	62.2%	11.4	23.2	59.4%	10.2	24.7
C – London Road NW	83.6%	18.1	34.5	83.1%	17.0	36.7
2043 with Development BAU						
A – New Road	93.6%	10.7	103.5	89.3%	11.2	71.1
B – London Road SE	65.7%	12.4	24.2	66.8%	11.9	28.2
C – London Road NW	91.5%	23.2	46.4	93.5%	22.7	57.6
2043 with Development Sustainable						
A – New Road	88.8%	9.4	81.7	89.3%	11.2	71.1
B – London Road SE	67.3%	12.7	25.4	66.4%	11.6	28.1
C – London Road NW	94.1%	25.1	53.6	93.9%	22.8	57.6

10.3.31 As is evident in the results above, all arms are within capacity. Within the 2024 Base Scenario, none of the arms are approaching capacity, with the highest Degree of Saturation of 76.8% on London Road NW arm in the AM peak. This increases in the 2043 Reference Case scenario, in which the London Road NW arm is of a DoS of 83.6%, and the New Road arm is a DoS of 84.0%. Whilst these arms have increased in saturation level, none of the arms in this scenario meet the 85% threshold deemed as "approaching capacity".

10.3.32 In the 2043 With Mitigation (sustainable) scenario, the New Road and London Road NW arms are approaching capacity in both BAU and Sustainable scenarios; with a peak DoS of 94.1% on the London Road NW arm in the Sustainable scenario AM peak, and 93.9% on the London Road NW arm in the PM peak. Peak queues of 25.1 PCU are seen along London Road NW in the Sustainable AM peak with Average Delays of 53.6 seconds. The peak delays are seen along the New Road arm in the Sustainable AM peak, with delays of 81.7 seconds.

10.3.33 As indicated in the results, across the three scenarios the junction operates within capacity; no further mitigation is therefore required from a capacity standpoint.

Scrub Lane/Rectory Road/New Road

10.3.34 Scrub Lane/Rectory Road/New Road is a signalised four-arm junction located to the north of Hadleigh. Signalised pedestrian crossings are located on the east, south and west arms. In regard to proximity to the CPP option 1a development, the junction is located approximately 130 metres to the west of the Land South of Scrub Lane site (capacity of 80 dwellings).

10.3.35 The junction is located on the boundary between regions 11 and 12 within the ISI. In regard to specific interventions recommended within the schedule, cycle routing is proposed east-west along New Road/Scrub Lane, and north-south along Rectory Road (ISI ref C11 and C12).

10.3.36 The existing junction layout is indicated in **Figure 95** below.

Figure 95. Rectory Road/Scrub Lane/New Road Existing Layout

10.3.37 **Table 22** below indicates the junction performance within the base and future year scenarios.

Table 22. Rectory Road/Scrub Lane/New Road Model Results

	AM PEAK			PM PEAK		
Arm	**DoS**	**MMQ (PCU)**	**Avg Delay (s/PCU)**	**DoS**	**MMQ (PCU)**	**Avg Delay (s/PCU)**
2024 Base						
A – Rectory Road N	97.3%	16.9	103.3	90.8%	14.1	66.1
B – Scrub Lane	93.5%	15.9	76.0	91.5%	13.4	74.4

	AM PEAK			PM PEAK		
C – Rectory Road S	69.9%	3.3	71.1	17.6%	0.7	33.9
D – New Road	96.4%	12.0	124.1	90.0%	8.6	98.9
2043 Reference Case						
A – Rectory Road N	103.7%	26.7	161.7	95.7%	86.2	86.2
B – Scrub Lane	106.1%	30.5	192.4	97.1%	100.4	100.4
C – Rectory Road S	108.8%	13.6	287.1	91.9%	142.6	142.6
D – New Road	105.6%	19.8	211.5	93.8%	114.5	114.5
2043 with Development (BAU)						
A – Rectory Road N	90.2%	14.6	60.8	112.5%	47.0	276.7
B – Scrub Lane	128.2%	65.1	477.6	112.4%	43.2	277.3
C – Rectory Road S	133.3%	38.9	552.0	92.0%	6.6	122.0
D – New Road	126.5%	46.7	470.4	112.4%	25.6	300.0
2043 with Development (Sustainable)						
A – Rectory Road N	89.6%	14.4	59.4	112.9%	47.9	281.6
B – Scrub Lane	127.9%	64.5	473.5	112.1%	42.4	272.7
C – Rectory Road S	131.4%	38.1	531.6	91.9%	6.6	120.5
D – New Road	126.4%	46.4	468.9	113.3%	26.5	310.5

10.3.38 As is evident in the results above, the junction is reaching capacity in the 2024 Base Scenario with a peak DoS of 97.3% along Rectory Road N, and 96.4% along New Road in the AM peak. A peak average delay of 124.1 s/PCU is also apparent along New Road.

10.3.39 In the 2043 Reference Case scenario, the junction is over capacity on all four arms in the AM peak. The maximum DoS of 108.8% is seen along Rectory Road S, and an associated average delay of 287.1 s/PCU. In the PM peak, whilst all arms are within capacity, they all have Degrees of Saturation of over 90%.

10.3.40 In the 2043 With Mitigation scenarios, the DoS level increases from the Reference Case scenario across all arms aside from the Rectory Road N arm. All arms are overcapacity in either the AM or PM peak of both the BAU and Sustainable scenarios. The BAU and Sustainable scenarios are relatively similar in their results. The peak DoS of 133.3% is seen in the AM peak along the Rectory Road S arm in the BAU scenario. An average delay per vehicle of 552 seconds is associated with this. In the PM peak, a peak DoS of 113.3% is recorded on the New Road arm. This comes with an associated average delay of 310.5 s/PCU.

10.3.41 There is a lack of available space within the public highway for physical works to increase the capacity of the junction; this is further complicated by the presence of multiple accesses to property. As such, physical mitigation at this location is not considered to be practical. It is considered that additional measures to increase the use of sustainable transport options will need to be examined as part of the development of local plan allocation sites at the planning application stage, as well as within the modal strategies set out in this TA report.

Rushbottom Lane/London Road/High Road

10.3.42 Rushbottom Lane/London Road/High Road is a four-arm signalised junction located to the west of Benfleet. Signalised crossings are located on the northern, western and southern arms of the junction. The junction is located immediately to the east of the Furniture Kingdom development site contained within Option 1a of the CPP, with a capacity of 48 dwellings.

10.3.43 The junction is also highlighted as an area for potential modelling within the ISI, due to the high number of collisions which has occurred there previously (ISI ref. A6/A7). Additionally, the junction falls along the proposed redirection of bus route 28 northbound along Rushbottom Lane (ISI ref. B7).

10.3.44 The existing junction layout is indicated in **Figure 96** below.

Figure 96. Rushbottom Lane/London Road/High Road Existing Layout

10.3.45 The model results for the base and future year scenarios are indicated in **Table 23** below.

Table 23. Rushbottom Lane/London Road/High Road Model Results

	AM PEAK			PM PEAK		
Arm	**DoS**	**MMQ (PCU)**	**Avg Delay (s/PCU)**	**DoS**	**MMQ (PCU)**	**Avg Delay (s/PCU)**
2024 Base						
A – Rushbottom Lane	150.1%	110.9	694.6	110.4%	19.9	280.5
B – London Road E	151.7%	108.9	710.8	46.0%	6.7	28.9
C – High Road	152.2%	83.0	712.4	113.4%	23.7	318.9
D – London Road W	92.4%	18.0	45.3	114.4%	277.1	79.8
2043 Reference Case						
A – Rushbottom Lane	168.2%	103.1	839.5	119.7%	34.3	384.7
B – London Road E	159.0%	134.7	766.2	63.5%	7.3	34.2
C – High Road	169.4%	131.9	843.8	124.1%	34.7	446.1

	AM PEAK			PM PEAK		
D – London Road W	113.8%	78.1	268.0	131.6%	138.9	492.4
2043 with Development (BAU)						
A – Rushbottom Lane	154.3%	91.5	733.2	127.9%	42.3	478.6
B – London Road E	155.8%	141.4	741.4	62.7%	7.6	32.7
C – High Road	151.6%	130.6	739.0	132.5%	47.6	534.4
D – London Road W	104.4%	93.8	705.4	132.9%	152.3	505.2
2043 with Development (Sustainable)						
A – Rushbottom Lane	127.1%	60.3	462.2	126.4%	40.5	462.4
B – London Road E	123.7%	84.2	420.0	62.3%	7.6	32.5
C – High Road	36.1%	1.5	57.4	133.0%	48.1	539.0
D – London Road W	93.0%	21.4	40.5	132.7%	151.8	503.7

10.3.46 As is evident in the results above, aside from the London Road W in the 2024 Base AM peak, and London Road E arm in the PM peaks, all arms are significantly over capacity.

10.3.47 In the 2043 With Development scenarios, all arms are over capacity in either the AM or PM peaks. The peak DoS is seen along the London Road E arm in the BAU scenario in the AM peak, of 155.8%. This comes with an associated average delay of 741.4 s/PCU, and MMQ of 141.4. In the PM peak, the peak DoS of 133.0% is seen along the High Road arm, with an associated delay of 539.0s/PCU, and MMQ of 49.1.

10.3.48 The changes between the reference case and With Development scenarios in this location are relatively limited and in some cases represent an improvement due to changes in the distribution of traffic. As such, physical mitigation has not been considered further at this location.

London Road/Kents Hill Road/Kents Hill Road North

10.3.49 London Road/Kents Hill Road/Kents Hill Road North is a four-arm signalised junction located to the east of Benfleet. Signalised pedestrian crossings are located across all four arms. The junction is immediately to the east of the 312-320 London Road development site as featured in Option 1a of the CPP, comprised of a capacity of 22 dwellings.

10.3.50 Additionally, the ISI identifies the junction to fall along the potential southbound cycle route along Kents Hill Road, connecting London Road in the north to High Road to the south (ISI ref. C6).

10.3.51 The existing layout of the junction is indicated in **Figure 97** below.

Figure 97. London Road/Kents Hill Road/Kents Hill Road North Existing Junction Layout

10.3.52 The junction model results for the base and future year scenarios are indicated in **Table 24** below.

Table 24. London Road/Kents Hill Road/Kents Hill Road North Model Results

	AM PEAK			PM PEAK		
Arm	**DoS**	**MMQ (pcu)**	**Average Delay (s/PCU)**	**DoS**	**MMQ (pcu)**	**Average Delay (s/PCU)**
2024 Base						
A – Kents Hill Road N	85.1%	5.3	110.1	100.1%	10.2	186.4
B – London Road E	90.0%	22.4	43.7	58.2%	9.6	24.8
C – Kents Hill Road S	81.4%	4.9	97.3	105.6%	13.8	238.3

	AM PEAK			PM PEAK		
D – London Road W	85.7%	18.1	36.6	103.3%	43.8	127.9
2043 Reference Case						
A – Kents Hill Road N	115.1%	27.0	337.2	104.4%	12.6	229.0
B – London Road E	109.3%	62.3	215.2	69.5%	12.3	28.9
C – Kents Hill Road S	115.6%	21.6	354.1	110.4%	18.8	288.1
E – London Road W	113.1%	74.8	270.1	112.2%	75.8	255.3
2043 with Development (BAU)						
A – Kents Hill Road N	119.8%	34.4	391.4	108.1%	17.6	258.0
B – London Road E	122.8%	109.5	401.5	72.8%	13.0	31.0
C – Kents Hill Road S	111.7%	20.7	300.9	115.7%	21.4	355.7
E – London Road W	119.3%	93.1	357.2	118.8%	100.0	347.2
2043 with Development (BAU)						
A – Kents Hill Road N	119.0%	33.4	380.9	108.2%	17.7	259.7
B – London Road E	123.2%	111.1	406.7	72.3%	12.9	30.8
C – Kents Hill Road S	115.7%	24.3	349.4	115.8%	21.5	357.5
E – London Road W	119.3%	93.1	257.2	118.4%	98.4	341.9

10.3.53 As is evident in the results above, the 2024 Base scenario is within capacity in the AM peak. In the PM peak, all arms aside from the London Road E arm are overcapacity, with the Kents Hill Road S arm at the highest level of overcapacity, at a DoS of 105.6%.

10.3.54 The 2043 With Development scenarios, all arms are noted to be overcapacity, aside from the London Road E arm in the BAU and Sustainable scenarios in the PM peak. The London Road E arm in the Sustainable scenario AM peak indicates the highest DoS of 123.2%, with associated MMQ of 111.11, and an average delay of 406.7s/PCU.

10.3.55 The changes between the reference case and With Development scenarios in this location are relatively limited and do not represent a material change in traffic conditions. As such, physical mitigation has not been considered further at this location.

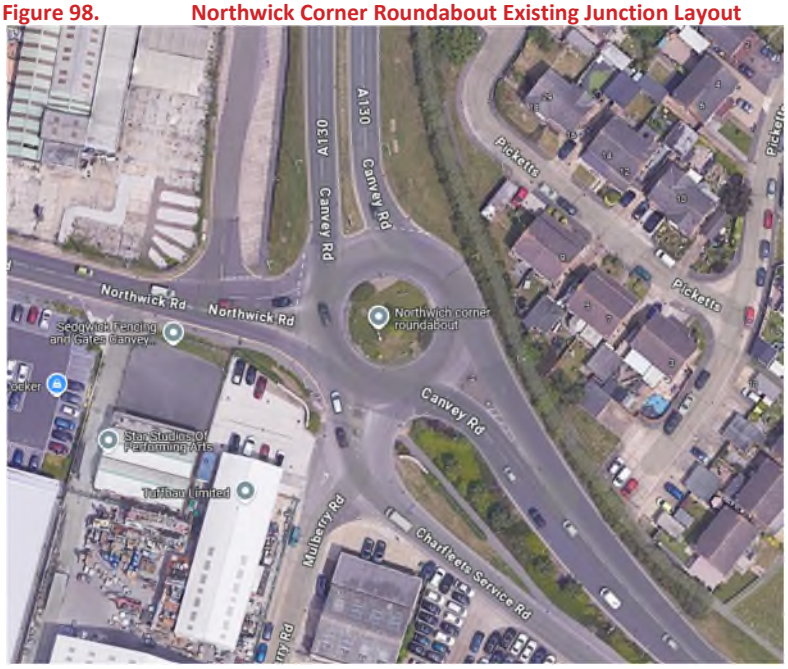
Northwich Corner Roundabout

10.3.56 Northwick Corner is a four-arm priority roundabout located to the southwest of Canvey Island.

10.3.57 Whilst the junction does not fall in close proximity to any of the suggested interventions within the ISI, it is noted that it forms part of the key north-southeast access to Canvey Island.

10.3.58 The existing layout of the junction is indicated in **Figure 98** below.

Figure 98. Northwick Corner Roundabout Existing Junction Layout



10.3.59 The model results for the existing and future year scenarios is indicated in **Table 25** below. Due to the Charfleets Service Road and Northwick Road having no vehicular flow in the strategic model, these arms have been left out of the results.

Table 25. Northwick Corner Roundabout Model Results

	AM PEAK			PM PEAK		
Arm	**RFC**	**Queue**	**Delay**	**RFC**	**Queue**	**Delay**
2024 Base						
A – Canvey Road N	0.3	0.4	2.37	0.42	0.7	2.8
B – Canvey Road SE	0.5	1.0	3.30	0.3	0.4	2.38
C – Charfleets Service Road	N/A	N/A	N/A	N/A	N/A	N/A
D – Northwick Road	N/A	N/A	N/A	N/A	N/A	N/A
2043 Reference Case						
A – Canvey Road N	0.45	0.8	2.98	0.5	1.0	3.26
B – Canvey Road SE	0.57	1.3	3.84	0.44	0.8	2.97
C – Charfleets Service Road	N/A	N/A	N/A	N/A	N/A	N/A
D – Northwick Road	N/A	N/A	N/A	N/A	N/A	N/A
2043 With Development (BAU)						
A – Canvey Road N	0.48	0.9	3.13	0.62	1.6	4.17
B – Canvey Road SE	0.79	3.8	8.02	0.49	1.0	3.23
C – Charfleets	N/A	N/A	N/A	N/A	N/A	N/A

	AM PEAK			PM PEAK		
Service Road						
D – Northwick Road	N/A	N/A	N/A	N/A	N/A	N/A
2043 With Development (Sustainable)						
A – Canvey Road N	0.47	0.9	3.11	0.61	1.5	4.08
B – Canvey Road SE	0.78	3.5	7.58	0.48	0.9	3.21
C – Charfleets Service Road	N/A	N/A	N/A	N/A	N/A	N/A
D – Northwick Road	N/A	N/A	N/A	N/A	N/A	N/A

10.3.60 As is evident in the results above, all arms of the Northwick Corner roundabout which are able to be assessed are within capacity. This is the case across all scenarios, with the highest level RFC of 0.79 indicated along Canvey Road SE arm in the 2043 With Development BAU scenario, with an associated MMQ of 3.8 and average delay of 8.02 s/PCU.

10.3.61 However, the junction is located directly adjacent to the proposed West Canvey strategic allocation site, and the volume of traffic expected to use the junction is therefore predicted to increase substantially. It is therefore recognised that additional survey work and modelling is required for this location to enable the true impacts of development to be assessed. This work will be undertaken as part of additional planned consideration of the West Canvey site within the public transport strategy which is expected to be carried out in early 2026.

Long Road/Southwick Road/Linden Way

10.3.62 Long Road/Southwick Road/Linden Way is a four-arm unsignalised junction located to the centre of Canvey Island. In regard to The Preferred Option of the CPP, the junction is a likely access toward the Corner of Little Gyps Road & Willow Close and Land to the rear of North Avenue sites approximately 300 metres to the north (combined capacity of 28 dwellings), and approximately 350 metres to the west of the Former Council Offices site (capacity of 32 dwellings).

10.3.63 The typical level of traffic during peak hours through the junction is noted to be relatively low, however analysis of nearby traffic patterns suggests the level of congestion increases

significantly within the AM peak further westbound of the junction, with Long Road being considered for further analysis due to this (ISI ref. A3, A4).

10.3.64 The existing layout of the junction is indicated in **Figure 99** below.

Figure 99. Long Road / Southwick Road / Linden Way

10.3.65 Although not directly modelled, this junction is expected to see an increase in delays as a result of the general increase in traffic expected on Long Road as a result of wider CPP development on Canvey. The existing layout of the junction is such that there are not any realistic physical amendments which could be made to increase capacity for drivers without compromising provision for sustainable modes. As such it is considered that the most appropriate way to address these potential impacts is to ensure that the wider modal strategies (including other proposed improvements elsewhere on Long Road) are implemented to help reduce the expected additional demand associated with CPP traffic.

Long Road/Furtherwick Road/Oak Road

10.3.66 Long Road/Furtherwick Road is a four-arm unsignalised junction located to the east of Canvey Island. In regard to Option 1a of the CPP development, the junction is immediately to the north of the Long Road and Furtherwick Road Cluster, Oak Road Car Park and Canvey Job Centre sites (combined capacity of 128 dwellings). The junction is also a likely through-route for the Land adjacent to The Paddocks site (capacity of 124 dwellings).

10.3.67 It is also noted within the ISI that the junction has historically experienced a high number of collisions (ISI ref A1, A3, A4).

10.3.68 The existing layout of the junction is indicated in **Figure 100** below.

Figure 100. Long Road / Furtherwick Road / Oak Road Existing Layout

10.3.69 The model results for base and future year scenarios is indicated in **Table 26** below.

Table 26. Long Road/Furtherwick Road/Oak Road Model Results

	AM Peak			PM Peak		
Arm	**RFC**	**Queue**	**Delay**	**RFC**	**Queue**	**Delay**
2024 Base						
A – Furtherwick Road N	0.75	3.0	18.9	0.76	3.1	19.69
B – Furtherwick Road S	0.8	3.8	23.58	0.75	2.9	18.58
C – Long Road	0.31	0.5	7.51	0.41	0.7	8.53
2043 Reference Case						
A – Furtherwick Road N	0.83	4.5	26.66	0.84	4.9	28.21

	AM Peak			PM Peak		
B – Furtherwick Road S	0.86	5.6	32.41	0.79	3.7	22.38
C – Long Road	0.32	0.5	7.95	0.39	0.6	8.54
2043 With Development (BAU)						
A – Furtherwick Road N	0.91	8.4	45.85	1.00	19.1	89.75
B – Furtherwick Road S	0.89	7.0	40.47	0.81	4.1	25.44
C – Long Road	0.37	0.6	8.07	0.49	0.9	10.07
2043 With Development (Sustainable)						
A – Furtherwick Road N	0.9	7.7	42.51	0.98	16.8	80.99
B – Furtherwick Road S	0.9	7.1	41.1	0.81	3.9	24.27
C – Long Road	0.36	0.6	7.88	0.48	0.9	9.92

10.3.70 As is evident in the results above, all arms are within capacity in both the 2024 Base and 2043 Reference Case scenarios, with a peak RFC of 0.86 along the Furtherwick Road S arm in the 2043 Reference Case AM peak.

10.3.71 In the 2043 with Mitigation scenarios, one arm is at capacity, being the Furtherwick Road N arm in the BAU scenario in the PM peak. All other arms are within capacity, however Furtherwick Road S and Furtherwick Road in the AM peak are approaching capacity.It is considered that the layout of this junction provides greater overall capacity than an alternative (such as a signalised layout) and that the overall impacts of CPP traffic are not sufficiently large to justify a re-design purely on safety grounds. Therefore, physical mitigation measures have not been considered at this junction.

Furtherwick Road/Foksville Road

10.3.72 This junction is located to the north of the previously considered Long Road/Furtherwick Road/Oak Road junction. The existing layout is a forked T-junction, located between the Grouts and Land to the Rear, and Kushi development sites (combined capacity of 32 dwellings).

10.3.73 Located approximately 75 metres north of the Long Road/Furtherwick Road, and 200 metres to the south of the Knightswick Road/Furtherwick Road/Waarden Road, the junction is in close proximity to a series of identified interventions within the ISI, such as those associated with the accident hotspot located to the south (ISI ref. A1, A3, A4), the proposed redirected bus and cycle routing interventions (ISI ref. B4, C4).

10.3.74 The existing junction layout is indicated in **Figure 101** below.

Figure 101. Furtherwick Road/Foksville Road Existing Layout

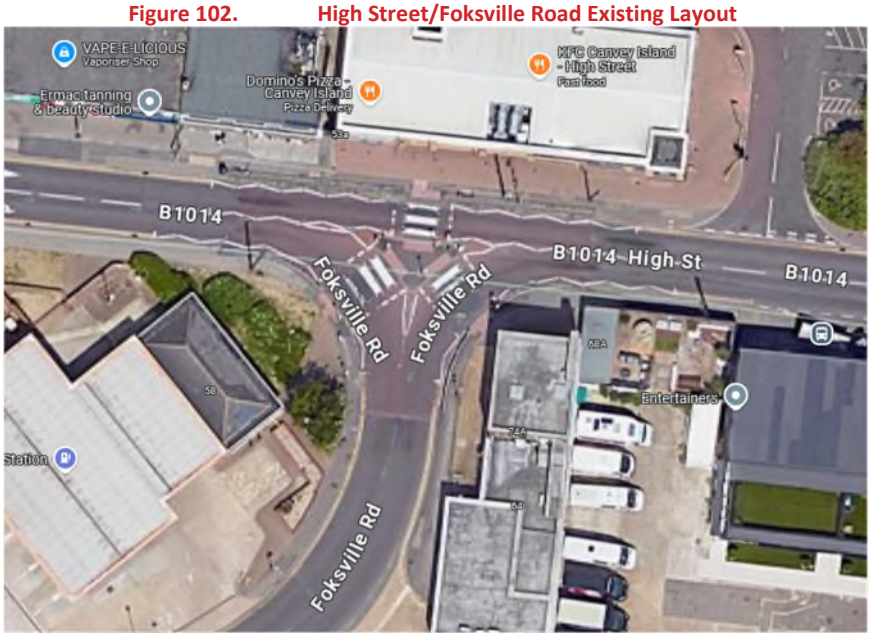
10.3.75 The existing junction layout reflects the one-way nature of Foksville Road. As such, the only points of delay are at the existing zebra crossings. These delays may increase slightly with corresponding increases to walking and cycling associated with the wider CPP strategies, but this is not expected to have any material effect on vehicles. It has been considered whether the current Zebra crossings should be replaced with upgraded crossing types; this is discussed further in section 11 of the TA report.

High Street/Foksville Road

10.3.76 High Street/Foksville Road is a three-arm unsignalised junction located to the east of Canvey Island. The centre of the junction contains a pedestrian island with three zebra crossings. The junction is located between the Knightswick Shopping Centre and Venables Close Cluster development sites (combined capacity of 265 dwellings).

10.3.77 The existing layout of the junction is indicated in **Figure 102** below.

Figure 102. High Street/Foksville Road Existing Layout



10.3.78 The current junction layout reflects the one-way nature of Foksville Road. As such, the only points of delay are at the existing zebra crossings. These delays may increase slightly with corresponding increases to walking and cycling associated with the wider CPP strategies, but this is not expected to have any material effect on vehicles. It has been considered whether the current Zebra crossings should be replaced with upgraded crossing types; this is discussed further in section 11 of the TA report.

Point Road Roundabout

10.3.79 Point Road Roundabout is located to the southeast of Canvey Island. It is an unsignalised three-arm roundabout with a large circulatory. It is located to the southwest of the Land at the Point development site within The Preferred Option of the CPP (capacity of 172 dwellings).

10.3.80 The existing layout of the junction is indicated in **Figure 103** below.

Figure 103. Furtherwick Road/Oak Road/Long Road Existing Junction Layout

10.3.81 The current junction layout evidently deviates from the standards set out in Manual for Streets and the Essex Design Guide; this appears to be due to the need for the roundabout to accommodate large vehicles turning in and out of the industrial site directly adjacent to the junction.

10.3.82 Traffic demands at this location are relatively light due to the junction being positioned at Canvey's south-eastern extent and therefore only needing to serve local demands. It is considered that the addition of CPP traffic will not change the existing capacity or safety environment; however, there may be an opportunity for the junction footprint to be made smaller if the existing industrial use is converted to housing as per the CPP proposals.

10.3.83 Such reconfiguration work is considered to be within the remit of the CPP allocation site and would form part of their access arrangements rather than off-site works, therefore it has not been considered further here and would be expected to be addressed through the eventual planning submission.

Eastern Esplanade/Seaview Road

10.3.84 Eastern Esplanade/Seaview Road is a three-arm unsignalized junction located to the south of Canvey Island. Within The Preferred Option of the CPP, the junction is located between the Station Road and Seaview Road, and Ozonia Gardens allocated sites (combined capacity of 23 dwellings).

10.3.85 The existing layout of the junction is indicated in **Figure 104** below.

Figure 104. Seaview Road/Eastern Esplanade Existing Layout

10.3.86 As is the case with Point Road, existing traffic demand on Eastern Esplanade is light and is not expected to increase significantly as a result of the current CPP proposals. Some minor improvements at this location have been identified via the ISI and these are discussed further in Section 11 of the TA report.

Rayleigh Road/London Road/Benfleet Road/Kiln Road

10.3.87 The junction is located to the east of the Castle Point region. This is located between the Thames Loose Leaf and Hadleigh Clinic sites (combined capacity of 33), and a short distance to the northwest of the Hadleigh Town Centre broad location (estimated upper capacity of 200 dwellings).

10.3.88 The existing layout of the junction is indicated in **Figure 105** below.

Figure 105. Rayleigh Road/London Road/Benfleet Road/Kiln Road Existing Layout

10.3.89 The model results for base and future year scenarios is displayed in **Table 27** below.

Table 27. Rayleigh Road/London Road/Benfleet Road/Kiln Road Model Results

	AM PEAK			PM PEAK		
Arm	**RFC**	**Queue**	**Delay**	**RFC**	**Queue**	**Delay**
2024 Base						
A – Rayleigh Road	0.3	0.4	3.81	0.34	0.5	3.77
B – London Road	0.6	1.5	3.99	0.59	1.4	3.97
C – Benfleet Road	0.61	1.6	5.51	0.47	0.9	3.87
D – Kiln Road	0.47	0.9	4.38	0.44	0.8	3.8
2043 Reference Case						
A – Rayleigh Road	0.38	0.6	4.53	0.4	0.7	4.44
B – London Road	0.67	2.0	4.89	0.63	1.7	4.52
C – Benfleet Road	0.69	2.2	6.93	0.56	1.3	4.7
D – Kiln Road	0.58	1.4	5.82	0.52	1.1	4.6
2043 With Development (BAU)						
A – Rayleigh Road	0.47	0.9	5.77	0.52	1.1	5.74
B – London Road	0.73	2.7	6.23	0.72	2.6	6.25

	AM PEAK			PM PEAK		
C – Benfleet Road	0.86	5.6	15.41	0.62	1.7	5.66
D – Kiln Road	0.86	5.6	23.56	0.55	1.2	5.16
2043 with Development (Sustainable)						
A – Rayleigh Road	0.47	0.9	5.76	0.52	1.1	5.74
B – London Road	0.73	2.7	6.26	0.72	2.5	6.15
C – Benfleet Road	0.83	4.8	13.10	0.62	1.6	5.63
D – Kiln Road	0.68	2.1	8.32	0.55	1.2	5.14

10.3.90 As is evident in the results above, all arms of the junction are within capacity across all scenarios. The highest RFC level of 0.86 is seen along the Benfleet Road and Kiln Road arms in the 2043 With Mitigation BAU AM peak scenario. Associated queue lengths and delays with this scenario are queue lengths along both arms of 5.6 PCU, and delays of 15.41 seconds on the Benfleet Road arm and 23.56 seconds along the Kiln Road arm.

10.3.91 Due to the relatively low impact surrounding the junction in future year scenarios, it is not proposed that the Rayleigh Road/London Road/Benfleet Road/Kiln Road Roundabout should be the subject of additional physical mitigation.

10.4 Summary of Locations potentially requiring Mitigation

10.4.1 Based on the desktop research and baseline / Reference Case highway modelling exercises, in combination with the data generated by the ISI, a total of 14 junctions have been identified as potentially being either in need of, or suitable for, physical mitigation measures. The appraisal process for each site is described in the next section of the TA.

10.4.2 Mode-specific strategies have also been developed which address wider or non-site specific mitigations, including “soft” measures and improvements to public transport. These are also described in the following section of the TA.

11. SITE SPECIFIC AND BOROUGH-WIDE STRATEGIES

11.1.1 Having established the proposed transport mitigations for the Castle Point borough; the following chapter describes the various strategies by which the improvements could be made.

11.1.2 These are to be separated into either mode-specific strategies for the borough (aligned with strategies such as the LCWIP or LTP4 where possible), or where relevant as part of the site-specific strategy for large development.

11.2 Borough-Wide Strategies

11.2.1 The following section identifies the strategies employed to encourage active transport usage through the Castle Point borough, in line with all national and local policies. These strategies are grouped by transport mode.

Walking

11.2.2 Walking is the most sustainable form of transport, and it offers a range of benefits to everyday living including improvements in health, safety, access to services and a sense of community. Although walking distances will vary between individuals and circumstances, the Chartered Institute of Highways and Transportation (CIHT) indicates that the typical length of a walking journey is 800m. Additionally, it suggests an optimal maximum walking distance of 2.0km for commuting or school trips and 1.2km for other destinations.

11.2.3 As part of the CPP development, there is a requirement to promote walking throughout the Castle Point. This comes in line with local and national policy to encourage a modal shift away from private vehicles to active travel.

11.2.4 As described in **Chapter 3**, a series of policies on both a national and local basis promote model shift away from private car, as seen through the Decarbonising Transport by the British Government, which states that local authorities have the power and ambition to influence how people travel and are to take local action to make the best use of space to enable active travel.

11.2.5 On a more regional basis, Goal 2 of the Transport East strategy encourages the modal shift towards active travel. Further to this, the LCWIP identifies a series of corridors which are noted to be potential areas for active travel improvement.

11.2.6 In line with the aforementioned policies, SYSTRA have identified a series of physical interventions to improve the pedestrian accessibility surrounding the Castle Point region including the widening of footpaths and the implementation of crossings at congested junctions, in order to improve pedestrian safety. These have been identified through observation of the existing conditions, in addition to the cycle routing and pedestrian corridors identified in the emerging LCWIP to enhance active travel throughout the local area.

11.2.7 Within SYSTRA's schedule of interventions, strategies are proposed within the northwestern region of the Castle Point borough, with footpath smoothing and widening across a series of roads including Overton Road, Eversley Road and Woodside Avenue. This is to improve the pedestrian facilities surrounding the northern residential area of the Castle Point region.

11.2.8 Additionally, the enhancement of pedestrian infrastructure is also identified along Runnymede Road, Maryland Avenue and Beverly Avenue to the south of the Canvey region. This is to improve pedestrian accessibility to the south of Long Road to more residential areas to the south of Canvey Island, toward Eastern Esplanade.

11.2.9 In order to improve pedestrian safety, a series of crossings are identified within the schedule of interventions. A notable improvement of four footpaths crossing Canvey Lake towards the north of Canvey Island is noted to improve permeability north-south of the island, and this is to be increased with the identified improvement of walking routes to the north of the river within the LCWIP.

11.2.10 Pedestrian crossings are also identified to the southwest of B1014 Essex Way, in order to improve the level of pedestrian safety surrounding the road. Located in close proximity to the Benfleet Station, this would also improve pedestrian accessibility to public transport in the area.

11.2.11 Further pedestrian crossings are identified toward the north of the Castle Point region, including to the east of the Church Road/Hart Road/Kenneth Road junction. Further crossings are also indicated along Western Road and Daws Heath Road to improve pedestrian accessibility along the residential road, encouraging active travel as opposed to solely car travel. This works in tandem with the LCWIP, in which the north-south route along Western Road and Daws Heath Road is identified as a potential walking corridor.

Cycling

11.2.12 Cycling has the potential to cater for many trips and is considered a viable mode of travel for journeys less than five kilometres and further afield in combination with other modes of transport. It is influenced by many of the same factors as walking but will also be influenced by route conditions, traffic levels and secure parking/facilities at the destination.

11.2.13 The bicycle offers numerous advantages over other modes of transport and stands as one of the most sustainable options. It consumes only one-fifth of the energy needed for walking and has minimal impact on climate change, air pollution, and noise. In comparison to motor vehicles, bicycles cause less disruption, require less parking space, and can accommodate higher passenger flows per meter of road width in congested urban traffic conditions than cars.

11.2.14 The plan has set out a series of interventions which support the overall cycling strategy for the borough.

11.2.15 SYSTRA has proposed a series of cycle routes in the Benfleet region of the borough; including northeast-southwest along Kents Hill Road between London Road to the north and High Road to the south, and an additional route north-south between London Road and High Road. Cycle routing is also proposed to the north of High Street in central Hadleigh, along New Road, and further north along Daws Heath Road, tying into proposed on-road cycle routes in the CAP to improve cycle accessibility to the northeast of the region.

11.2.16 Further cycle routing is proposed throughout the Canvey Island region of the borough, including routing north-south along Canvey Road to connect the island with the Benfleet

region, so as to improve cycle accessibility and safety between Canvey Island and Benfleet in addition to the existing off-road cycle routes.

11.2.17 Proposed routing to the south of Canvey Lake would connect with existing off-road cycle routing to the north of the lake, and expand on the cycle routing proposed in the CAP by providing cycle accessibility to the south of the lake in addition to the north. SYSTRA also propose a series of cycle routes throughout the residential and green spaces to the east of Canvey Island. Proposed north-south along Marcos Road south of High Street, and east-west along Canvey Heights Way, both of these routes connect to potential on-road cycle routes as defined by the CAP. The proposed cycling interventions devised to support the strategy are shown indicatively in Figures 28 and 29.

11.2.18 Secure Cycle Parking and Cycling Facilities will be provided in line with ECCs latest guidance at all new developments. Specifics of this will be on a site-by-site basis and will discussed and agreed with applicants and developers as specific sites come forward through the planning process. This will ensure that all development have adequate facilities to support cycling and remove barriers to model shift.

Bus / Public Transport

11.2.19 Bus services in Essex are principally overseen by Essex County Council's public transport team (ECC PT). Whist a majority of services are operated commercially, ECC PT works closely with operators to understand their networks and to identify areas where service enhancements would benefit residents, with a focus on populations less well served by commercial routes so that available resources can be directed to subsidies to deliver contracted services specified by ECC. The amount of funding available for such services has declined over time; as such, planned new development is required to both demonstrate its expected impacts on existing public transport networks (bus and rail) and to contribute proportionately to bus infrastructure and service provision ECC's current preference is for developers to provide the necessary information to allow ECC to take the lead on engaging with PT operators and planning for the impacts of development within their wider remit for the bus and other PT networks.

11.2.20 In terms of how this process needs to interact with the CPP preparation process and production of modal strategies and mitigation, we have sought to identify through the ISI any potential "realistic" modifications to the current bus networks which would help to accommodate expected demand, and wherever possible encourage greater uptake and use of public transport services. This includes both "bus only" trips and "rail connection" trips where buses are used to reach rail stations for onward connections for longer journeys. (The role of walking and cycling as modes for reaching stations has been considered as part of development of the walking and cycling strategy for the CPP, and is also a key consideration in development of ECC's LCWIP).

11.2.21 ECC PT have already undertaken a substantial volume of work to examine the options for maintaining and improving the bus networks in and serving Castle Point, as summarised at section 3 of the TA report. The Bus and public transport strategy associated with this CPP therefore starts from the position of seeking to be compatible with the current bus strategies (including the outcomes of the local bus review and the aspirations of the "bus back better" programme). A key conclusion of these earlier studies is that the current bus network has to contend with the effects of congestion in multiple locations within the borough and that there

is a need to support efforts to maintain and improve the resilience of bus services with regards to performance against timetable and day-to-day variations in traffic conditions, if bus patronage is in turn to be sustained and encouraged to grow.

11.2.22 The Preferred Option scenario is comprised of a number of small and medium-sized housing sites (up to 100 dwellings), with a small number of larger sites (the proposed Canvey and Kiln Road sites being principle among these). As such, a majority of the sites are not large enough to support new bus services or significant diversions of existing services, but are expected to add to demand for use of these services. It is intended that sites identified within the Plan will make contributions toward bus infrastructure and service enhancements, potentially including (but not limited to) the following:

- New bus stops (including shelters and seating where appropriate)
- Service frequency enhancements (routes 1,3,21, 21C, 22, 27 and 28)
- Route amendments / extensions (Route 28)

11.2.23 In addition to the above, the proposed large-scale housing allocation at West Canvey is expected to require a significant upgrade to the local bus network. This is to enable the efficient transport of residents to and from Canvey Island during peak times, without an overreliance on private car. Given the anticipated number of new dwellings, it is considered crucial that the development integrates new, high-quality bus stops as a core element of its infrastructure. Furthermore, existing bus routes should be amended to penetrate the site, thereby ensuring walking distances from new homes to the nearest bus stop are kept to a practical minimum. Not only does this enhance convenience for residents, but it reduces barriers to public transport uptake. The layout of the West Canvey site should be developed as far as possible to create “hub” locations which buses can serve without the creation of excessively extended journey times or additional costs for operators. These hubs would in future have the potential to act as “anchor points” for the proposed new bus corridor between Castle Point and Rochford which is proposed within the current South Essex area strategy in the draft LTP4.

11.2.24 Notwithstanding this, the likely need to divert specific existing services into the new development area means there would be impacts on existing bus service patterns. As a result, it is anticipated that additional buses will have to be deployed, supplementing the timetable to maintain or increase frequency during peak periods. This measure will help prevent any reduction in service quality to other areas while providing for new residents.

11.2.25 Currently, bus services 21 and 21c operate in the vicinity of the West Canvey location. These services are likely to be suitable candidates for diversion to serve the new development. With appropriate upgrades to service frequency and infrastructure—such as improved stops and real-time information displays—the 21 and 21c could deliver a high-quality connection between West Canvey, Benfleet rail station, and further afield, and so integrate with the wider transport network.

11.2.26 Achieving effective integration with rail services will be particularly important. Direct and convenient bus connections to South Benfleet railway station must be prioritised, enabling residents access to mainline rail services. Likewise, providing an optimised connection to Rayleigh railway station would be advantageous, as this facilitates access to London Liverpool Street, opening up employment and leisure opportunities directly into other areas of central London and beyond; this is entirely in alignment with the vision set out in LTP4. Currently, the

journey from Canvey Island to Rayleigh station requires a single transfer: passengers would use the 21 service, then change to the number 1 at Kenneth Road, with a typical journey duration of about an hour. By increasing service frequency, coordinating timetables, and reviewing routing to reduce delays, there is an opportunity to reduce this journey time, thereby making public transport a more attractive option for this route, and creating a basis for a full corridor approach to then be taken forward by ECC.

11.2.27 It is recognised that the scale of development proposed at the West Canvey site and more widely on Canvey has been reflected in the outputs of the SE Model, which is showing large increases in traffic travelling to and from the island, including on the existing route to South Benfleet. It is anticipated that the existing measures on this route to prioritise active and sustainable transport will need to be strengthened, including potentially measures to discourage use of this route by general traffic. This will be challenging (but not impossible) to achieve and in part will rely on the ability of the West Canvey site to internalise as many peak hour trips as possible within the island area. ECC's own work on the South Essex area strategy post-adoption is expected to reach similar conclusions and the LTP4 offers a potentially robust foundation for balancing the needs of different modes and trip types where road space is limited.

11.2.28 To further enhance the efficiency of bus operations throughout the borough, it is proposed that further investigation should be undertaken jointly with ECC in regards to bus priority measures at key congestion points along the A13 corridor. The overall concept would involve fitting buses with transponders that would activate a green traffic signal phase in their favour as they approach key junctions, thus reducing time spent stationary at red lights. While this could extend wait times for vehicles on other arms of the junctions in question, the increased flow and reliability for buses would offer a public transport benefit that could be advantageous particularly during peak periods.

11.2.29 Subsequent to the publication of the Regulation 19 TA report, it has been identified that the availability of information and previous technical assessment undertaken by ECC specifically in relation to bus infrastructure improvements in Castle Point is very limited. Additional work is therefore planned to produce a more detailed set of proposals for bus infrastructure in the borough which will reflect the aspirations of LTP4, and demonstrate how a potentially higher proportion of modal shift to bus can be achieved, particularly for journeys which are indicated to be having the greatest impacts on the existing network. It has not been possible to complete this specific exercise prior to submission of the plan for examination, however it is fully intended that the work will be submitted as further evidence in advance of the issue of the Inspector's MIQs and the subsequent preparation for the Stage 1 hearings.

11.2.30 Specific issues which this work will address are as follows:

- Currently, the A13/Kents Hill Road and A13/High Street (Tarpots) junctions are signalised and experience traffic delays during peak times. Detailed analysis would be required to assess the feasibility and potential benefits of introducing such bus priority measures. However, given that available space along the A13 is limited, signal-based priority measures represent a potentially impactful and realistic improvement on a congested corridor. It is considered that the greatest chance of successfully implementing these types of measures would be via the proposed bus rapid transit corridor, which in practice would need to employ a mix of measures to protect bus

journey times, since creating an "end to end" corridor with reserved carriageway space would not be achievable.

- Historically, the A13 between Catherine Road and Kents Hill Road featured an additional section of bus lane in a westbound direction. It is understood that this was removed due to safety and capacity issues, particularly the challenge faced by vehicles attempting to access side roads without dedicated right turn lanes. It may be possible to reinstate this section of Bus Lane (possibly in advance of a wider BRT scheme) and this would undoubtedly lead to benefits for bus services in this area. However, any consideration of reinstating this bus lane would demand a thorough and intelligent redesign to avoid repeating past issues.
- As has been described above, there is a need for a site-specific bus strategy for the West Canvey strategic site, which also needs to integrate with the other proposed mitigation measures discussed in Section 11.3 (below). This element of the work will need to consider physical amendments to the Northwick Corner roundabout to prioritise bus access, and the assessment will include detailed modelling of the full junction plus proposed improvements to appraise any associated wider impacts to movement and traffic flow in this area.
- The north-south links between Rayleigh, Benfleet and Canvey will be assessed to determine which elements of the proposed corridor to Rayleigh Station can be provided as part of the Local Plan mitigation strategies, and how this will be compatible with ECC's own high-level proposals as set out in LTP4.

Car

11.2.31 Private car use remains a key mode of travel for many households. The UK government's Policy paper "the plan for drivers" states: *" Most households use a car and, for many, life would not be liveable without their car. For some, it is a lifeline. A car can hugely expand the independence of a younger person, as well as keep older people connected to key services and their families".*

11.2.32 Walking, cycling, and public transport are essential components of a multi-modal transport system, and their ongoing expansion is encouraged. However, it is important not to overlook drivers and their needs, particularly with regard to journey time reliability, and access for those for whom active modes and public transport are more difficult or unrealistic to use. The plan has therefore been developed to be sympathetic to these car driver needs whilst continuing to support the growth of more sustainable modes of transport.

11.2.33 As set out in Chapter 9 congestion hotspots have been identified, tested and where possible mitigation schemes have been devised to enable the proposed allocations to come forward in a manner which balances the needs of existing and future residents. In addition, the road safety history of the borough has been reviewed and clusters or trends of collisions have been identified. Locations where identified CPP growth will impact upon areas where there are established patterns of accidents have been identified and, where appropriate, potential mitigation proposed. The continued suitability of these mitigations will be reviewed and updated as specific developments come forward through the planning process.

11.2.34 ECC have recently published updated parking guidance: “Parking Standards Design and Good Practice in September 2024”. This document sets out standards that are intended to guide new development so that the appropriate balance can be achieved between securing a reduced reliance on the private car while needing to make provision for travel by all modes in a way that does not prejudice the safety or the quality of new development. The principal set out in this document are supported by the plan. Overprovision of parking will encourage unnecessary trips using private vehicles. However, under-provision leads to unofficial parking causing disruption and potential safety issues. By applying ECCs latest parking standards to new developments it is intended that the correct amount of parking will be provided so that over or under-provision is avoided.

11.2.35 The delivery and servicing arrangements of specific sites will also be crucial to their successful operation and integration with the highway network. New developments will be required to demonstrate that they have suitable access/egress arrangements for servicing vehicles which will not interfere with the operation of the highway network or cause any road safety issues while servicing activities are taking place.

Summary

11.2.36 This section indicates the strategies to promote the various modes of transportation throughout the Castle Point borough. This has been designed to encourage active and sustainable travel, in line with regional and national policy.

11.2.37 In terms of walking, the mitigations such as footpath widening and smoothing proposed within SYSTRA’s schedule of interventions has been designed to tie in with the corridors proposed in the LCWIP and provide crossings to improve safety in areas which are seen to have a high level of accidents. This section has assessed the way in which these routes could tie in with further mitigations such as bus route alterations to encourage multi-modal sustainable travel. The wider vision of the strategy is to encourage an increased number of journeys to be undertaken by walking and to make the borough more navigable through this mode.

11.2.38 Cycling measures have been proposed to expand upon existing and proposed cycle routes in the LCWIP to encourage a higher number of people to use cycling as a primary mode of transport. This has been undertaken through the proposed routes aligning with existing and LCWIP proposed routing, ensuring that cycle routes are more consistently available throughout the region. This would align with a higher number of residents utilising cycle workshops, and undertaking cycle training.

11.2.39 Bus infrastructure and services will be expanded upon to support the growth in passenger numbers expected to be associated with delivery of the CPP sites. For the majority of the proposed allocations this is expected to take the form of targeted increases to the frequency of existing services and provision of new bus stop infrastructure to ensure that new developments have (as far as possible) access to services within a reasonable walking distance. More comprehensive measures are currently being examined for the West Canvey Broad Location and the A13 corridor based on recent discussions with ECC Highways and Passenger Transport; these are expected to comprise a selection of the possible measures set out in the Public Transport section above.

11.2.40 Car drivers have not been excluded from the plan specific interventions to improve key junctions have been considered. The collision history has been reviewed and improvements suggested where appropriate. In addition, by applying ECCs latest parking standards to new developments it is intended that the correct amount of parking will be provided so that over or under-provision is avoided. All new planning applications will be reviewed on a site-by-site basis to ensure the strategies set out in this report are adhered to.

11.3 Site-Specific Strategies and Selected Interventions

11.3.1 Following from the wider region-defined assessment of the Schedule of Interventions, **Table 28** below indicates the specific clusters, and the interventions in close proximity affecting them. The mitigations below are those which have been identified as beneficial to the proposed development clusters. A number of interventions from the initial schedule have been removed if not directly supporting the proposed clusters or journeys associated with them; this is to ensure that the proposals are feasible to be delivered via Local Plan development.

11.3.2 Additionally, the junctions considered in the previous local junction modelling chapter have all been assigned to the cluster in closest proximity, to assess which junctions are to be affected by development of each specific cluster.

Table 28. Specific Mitigation Measures from the ISI by Cluster

CLUSTER	PROPOSED INTERVENTION	FURTHER DETAIL
Tarpots (including Manor Trading Estate Broad Location)	Alteration of the 28 bus route north-south along Kenneth Road.	With the alteration of the 28 bus route north-south along Rushbottom Lane, direct accessibility will be created for the cluster to Southend, with the bus routing immediately to the north of the Furniture Kingdom site.
	Footpath widening and resurfacing along Eversley Road/Woodside Avenue/Overton Road	The proposed improvements of the pedestrian infrastructure approximately 700 metres to the north of the Furniture Kingdom site is to significantly improve the pedestrian provision for the residential areas in close proximity to the cluster.
Benfleet	Cycle routing proposed along Kents Hill Road to North Benfleet	Proposed improvements would provide cycle accessibility for the cluster immediately to the east of the 312-320 London Rd (Queen Bee's) and L/a Villa Park, Tarmarisk sites. This provides access between the northern Benfleet region, and connecting with proposed routing in the CAP with Benfleet Station.
	Footpath widening and resurfacing along Woodside Avenue, Eversley Road and Overton Road	Proposed improvements to pedestrian infrastructure are located approximately 190 metres to the west of the Church Road sites within the cluster. This is to significantly improve the wider pedestrian accessibility in the residential areas surrounding the sites.
	Church Road/Overton Road/Roseberry Avenue junction	The 159-169 Church Road site is noted to be approximately 140 metres to the northeast of the junction identified within the local junction modelling section.
	Essex Way/School Lane/High Street junction	The Richmond Avenue Car Park is located approximately 1.8 km to the southeast of the junction identified within the local junction modelling section.

CLUSTER	PROPOSED INTERVENTION	FURTHER DETAIL
	the Vicarage Hill/High Road junction	The Richmond Avenue Car Park site is located approximately 1.6km to the northwest of the junction identified within the local junction modelling section.
Canvey TC (including West Canvey Broad Location)	Improved cycle links along Waarden Road	Located to the south of the Canvey Lake, the proposed improvement to cycle infrastructure is to improve the east-west cycle accessibility for the cluster, located immediately to the west of the Canvey Library + Barclays, and the Knightswick Shopping Centre sites. This, in addition to the proposed cycle routing along Long Road/Furtherwick Road and along High Street to the northeast in the CAP would significantly improve cycle infrastructure in the region
	The widening and smoothing of footpaths to the west of the Canvey TC cluster, along Beverley Avenue, Maryland Avenue, and Runnymede Road.	Improvements along Runnymede Road are located approximately 110 metres to the west of the l/a The Paddocks site.
	Long Road/Furtherwick Road junction	The Longwick Road and Furtherwick Road cluster site is located immediately to the southwest of the junction as identified in the previous local junction modelling section.
	Dovervelt Road/Creek Road/Mitchells Avenue/Rainbow Road/Mornington Road junction	The Venables Close Cluster site is located approximately 400 metres to the southeast of the junction as identified within the previous local junction modelling section
Canvey (including West Canvey Broad Location)	Alteration of 21C along Maurice Road/Crescent Road/Marine Avenue	The proposed alteration of the bus routing is to create further access to the residential areas to the north of Eastern Esplanade. This is to have no impact on the proposed Ozonia Gardens or Land between Station Road and Seaview Road proposed sites, with the bus route continuing to access the Seaview Road bus stops.
	The widening and smoothing of footpaths to the west of the Canvey TC cluster, along Beverley Avenue, Maryland Avenue, and Runnymede Road.	Improvements of pedestrian facilities along Beverley Avenue are located approximately 300 metres to the south of the Former Council Offices Site. This is to improve pedestrian connectivity to residential areas to the south.
	Introduction of cycle routing along Marcos Road/Lottem Road, and along Odessa Road/Crescent Road	Located approximately 180m to the northwest of the Ozonia Gardens or Land between Station Road and Seaview Road sites, and immediately to the northwest of the Essex Coachworks sites, these cycle routes provide the cluster with greater cycling accessibility throughout the southeast of Canvey Island. Connection is also made with the potential cycle routing in the CAP east-west along B1014 High Street stretching further west along Long Road to enhance cycle access throughout the cluster.
	Denham Road/Waarden Road junction	The Land to the Rear of North Avenue site is located approximately 200 metres to the south of the junction as identified within the previous local junction modelling section.

CLUSTER	PROPOSED INTERVENTION	FURTHER DETAIL
	Thorney Bay Road/Maryland Avenue junction	The Former Council Offices site is located approximately 700 metres to the north of the junction as identified within the local junction modelling section.
	Odessa Road/Crescent Road junction	The Essex Coachworks site is located approximately 450 metres to the north of the junction as identified in the local junction modelling section.
	Eastern Esplanade/Maurice Avenue junction	The Land Between Station Road and Seaview Road site is located approximately 600 metres to the east of the junction as identified in the previous local junction modelling section.
	Eastern Esplanade/Marine Avenue junction	The Land Between Station Road and Seaview Road site is located approximately 75 metres to the east of the junction identified within the local junction modelling section.
Hadleigh TC (including Broad Location)	Introduction of cycle routing proposed along New Road and Daws Heath Road	The proposed east-west cycle routing is located immediately to the north of the Land South of Scrub Lane site, providing access between High Road to the south and the northeastern corner of the Castle Point Borough.
	Introduction of cycle routing proposed southwest along Benfleet Road.	Located approximately 220 metres to the northwest of the Hadleigh Clinic site, this provides accessibility between the cluster and the southern Benfleet area, north of the Rail Station.
	Woodfield Road/Church Road junction	The Johnsons Factory site is located approximately 650 metres to the west of the junction as identified within the previous local junction testing section.
Hadleigh	Cycle routes are proposed north-south along Benfleet Road.	Located approximately 190 metres to the northwest of the Hadleigh Clinic site, this proposed cycle routing would provide cycle accessibility between the cluster and Benfleet Station, encouraging modal shift towards active travel.
	Western Road/Daws Heath Road junction	The Land South of Scrub Lane site is located approximately 1.5 km to the south of the junction identified within the local junction modelling chapter.
	London Road/Benfleet junction identified	The Hadleigh Clinic site is located approximately 200 metres to the southeast of the junction identified within the local junction modelling chapter.
Thundersley	Redirection of the 28 bus route is proposed through the Church Road/Rushbottom Lane junction.	The proposed redirection is to provide direct accessibility to the Thundersley Clinic site, located immediately to the southeast of the Church Road/Kenneth Road/Hart Road junction.

CLUSTER	PROPOSED INTERVENTION	FURTHER DETAIL
	A formalised pedestrian crossing is proposed to the east of the Church Road/Kenneth Road/Hart Road junction.	Located to the east of the Church Road/Kenneth Road/Hart Road junction, this proposed intervention is to improve pedestrian infrastructure in the immediate vicinity of the Thundersley Clinic site.
	Triton Way/Hart Road junction	The Thundersely Clinic site is located approximately 900 metres to the west of the junction identified within the local junction modelling chapter.
	London Road/Benfleet Road junction	The Thames Loose Leaf site is located approximately 200 metres to the northeast of the junction as identified in the previous section.
	Kenneth Road/Hart Road/Church Road junction	The Thundersley Clinic site is located immediately to the southwest of the junction identified within the local junction modelling section.
Kiln Road	Cycle routing is proposed southwest along Shipwrights Drive/B014.	The proposed routing is located approximately 280 metres to the east of the Council Offices site. The proposals would enhance cycle accessibility from the cluster to Canvey Station, encouraging a modal shift toward active means of travel.

11.4 "With Mitigation" Strategic Modelling Test

11.4.1 In order to undertake an appraisal of the expected impacts of the planned sustainable transport measures, a corresponding test has been undertaken using the LP Option 1 model. For the purposes of this exercise, the development trip rates specifically for CPP developments have been amended, based on consideration of alternative TRICS calculations reflecting the modal strategies discussed at section 11.2, the specific ISI measures set out in Section 11.3, and assumptions previously applied to other CPP work within Essex. Through dialogue with Jacobs, it has been determined that a test applying a 13% reduction in vehicle trips to the CPP development site trip calculations represents a balance between needing to achieve a meaningful change to meet the requirements of the NPPF for vision-led planning, and also reflecting the nature of the proposals for mitigation associated with the Preferred Option sites (i.e. high quality on-site provision for active and sustainable modes, implementation of cycling schemes which are compatible with the aims and concepts set out in the LCWIP, and service frequency upgrades to existing bus routes (including those connecting to rail services and into adjacent authority areas).

11.4.2 It is planned that this initial test will be refined both in terms of proposed physical mitigation measures and adjustments to the current wider assumptions once the additional work relating to the bus proposals has been completed. However, this test provides a quantitative basis for understanding how reductions in car trip generation associated specifically with CPP sites. It is important to also bear in mind that the proposed mitigation measures would also potentially encourage an element of modal shift in the wider community – the current modelling has not sought to include this.

"With Mitigation" Strategic Model – Summary of Findings

11.4.3 The "With Mitigation" strategic model outputs are provided at Appendix D of this TA report. The model represents a 13% reduction in car trips produced by the CPP sites and the following points are noted:

- The effects of the reduction in traffic flows are most evident in close proximity to the larger development sites. However, at present they do not result in any material change to the performance of individual junctions within the strategic model.
- There is a reduction in delay across the model as a result of the traffic reduction but at individual junction level this is limited.
- The reduction in traffic flows does not result in any significant re-distribution of traffic across the networks.
- Changes to journey times are relatively minor but can be observed cumulatively on routes on the A13 where multiple individual junctions see small benefits in journey times.

11.4.4 A further "With Mitigation" model is to be prepared and run to reflect the additional work being done in connection with the West Canvey Broad Location and the expanded bus strategy. This will be reported on following completion of the corresponding bus infrastructure study.

11.5 Local Mitigation Measures

11.5.1 In addition to the borough-wide strategies for the identified different travel modes, the identified potential interventions from the ISI for specific locations have been examined in greater detail, taking into consideration matters such as the existing and expected future traffic conditions at each individual junction, and the expected increases in demand for walking and cycling trips associated with the development of identified CPP allocation sites.

11.5.2 The development of physical mitigation proposals has sought to take account of key constraints, in particular the extent of public highway and the expected volumes of traffic to be accommodated. Consideration has also been given to site-specific issues such as existing vehicular access and on-street parking and servicing, and compatibility with ECC strategies including the LCWIP.

11.5.3 Commentary is provided below on each location, with proposed mitigation measures described where it is considered that these are feasible from both a technical and cost perspective. Where appropriate, concept drawings have been provided and these are included at **Appendix E**.

Junction 1 – Manor Road/Church Road

11.5.4 The Manor Road/Church Road junction is in close proximity to 284 dwellings within The Preferred Option of the CPP.

11.5.5 Within the existing layout, there is a significant pedestrian footway buildout provided to serve retail areas to the west. Widening the road carriageway into this area is considered to be undesirable and contrary to the intent of current sustainable travel policy, However

alternative measures have been identified which have the potential to improve the junction in terms of performance and safety.

11.5.6 Identified measures which have been considered and which would improve the junction for one or more modes include:

- Moving the stop lines closer to the entry points of the junction, in order to reduce inter-phase times and improve junction capacity;
- Movement of the lamp posts along Manor Road to the rear of the footway to increase space and improve accessibility for pedestrians;
- Consideration of speed limit reduction to 20mph to improve safety for pedestrians and cyclists; and
- Implementation of a signalised crossing on the Church Road eastern arm, to improve pedestrian safety.

11.5.7 With the exception of the potential addition of the signalised crossing on the Church Road eastern arm, these changes would not be expected to have any material impacts on traffic flows at this location. An initial estimate of costs for these works has been included in the overall mitigation costings.

Junction 2 – Kiln Road/Runnymede Chase

11.5.8 Current congestion levels in the vicinity of this the junction are noted to be relatively low; as evidenced from the strategic modelling work demand is expected to increase in the Reference Case scenario and due to the junction's location between the two proposed development sites forming the Kiln Road cluster, comprised of 617 dwellings within The Preferred Option of the CPP, it is considered that local demand for both active and vehicle trips will increase and mitigation is therefore likely to be required.

11.5.9 Issues surrounding the junction currently include a lack of provision for pedestrians/cyclist infrastructure when approaching Kiln Road from Runnymede Chase, and a lack of visibility at the approach to the junction.

11.5.10 Identified potential mitigations include:

- Alteration of the unsignalized pedestrian crossing to signalised;
- Reduction of the speed limit on Runnymede Chase to 20mph to allow simplified and safer access for cyclists and pedestrians onto Kiln Road;
- Trimming or removal of the tree foliage directly adjacent to the junction to improve visibility surrounding the junction; and
- Possible introduction of cycle lanes/road markings along Kiln Road.

11.5.11 With the exception of the potential addition of the signalised crossing on the Church Road eastern arm, these changes would not be expected to have any material impacts on traffic flows at this location. An initial estimate of costs for these works has been included in the overall mitigation costings.

Junction 3 – London Road/High Road

11.5.12 The current layout of the junction is complex, with two arms running around a central reserve, containing both residential and retail land-uses. The surrounding area is identified as containing 200+ dwellings within the The Preferred Option of the CPP. Particular congestion is identified at the eastern side of the junction along Rectory Road.

11.5.13 Issues surrounding the junction include the significant reduction in number of lanes eastbound along London Road surrounding the Rectory Road junction. This is noted to reduce from two lanes to one lane within 40 metres of the exit of the junction, which is likely to increase congestion.

11.5.14 Identified potential mitigations include:

- Investigation of the removal of hatching to the north of the A13 London Road exit in order to extend the two lanes exit and reduce congestion; and
- Removal of the right turn storage into Lidl to facilitate the extension of the two lanes along A13 London Road EB and provide more queuing space between the Rectory Road/London Road junction and the London Road zebra crossing.

11.5.15 A concept design drawing has been prepared for these mitigations and is included at **Appendix E.** An initial estimate for these works is included in the overall mitigation costings.

Junction 4 – Scrub Lane/Rectory Road

11.5.16 Whilst current traffic levels surrounding this junction (as observed from the strategic modelling exercises and desktop analysis) are not currently associated with major capacity or safety issues , the proposed 80 nearby dwellings within The Preferred Option of the CPP will to lead to a modest increase in traffic flow at this location.

11.5.17 It is recognised that the four arms of the junction are relatively narrow, with stop lines located up to 18m away from the junction entry. The public highway boundary is also tight against the surrounding properties, and there is therefore very little potential to widen the carriageway or carry out significant physical mitigations of this type.

11.5.18 Potential Identified mitigations include:

- The improvement of inter-phase timings by shifting the stop-lines closer to the junction entry;
- Due to the junction being identified within the ISI for further cycle routing improvements (ISI ref C12), the crossings may potentially be upgraded to toucans, with the potential to introduce a signalised crossing across the Rectory Road northern arm; and
- Banning the left-turn from Rectory Road southern arm to New Road could be considered, enabling the widening of the narrow footway to provide more space for pedestrians and cyclists.

11.5.19 It is considered that the impacts of proposed development observed from the current CPP tests are not sufficient in themselves to necessitate physical changes to the junction, however this would be expected to be explored further when the Preferred Option sites are brought forward as planning applications.

Junction 5 – Rushbottom Lane/London Road/High Road

11.5.20 A significant number of collisions are identified from the PIA analysis to have occurred surrounding this junction, and significant queuing has been identified from the strategic modelling to the south along High Road. At present, 48 dwellings are proposed in the CPP scenario in proximity to this junction and it is also noted that the junction itself is relatively close to the Sadlers Farm roundabout, therefore increased queues and delay at this location has the potential to trigger knock-on impacts. A significant volume of westbound CPP traffic would pass through this junction in addition to the trips associated with the nearby proposed allocation sites.

11.5.21 A particular constraint exists in the form of the narrowness of the public highway alongside the northern and southern junction arms.

11.5.22 Potential identified mitigations include:

- A signal-phasing assessment to identify the most effective adjustment to the junction signalisation;
- Further assessment surrounding the collision severity and causation to inform a safety review;
- Movement of the stop lines closer to the junction entry to increase queueing space; and
- Shifting of the central island on the London Road eastern arm to the south, in order to increase the eastbound arm to two lanes, by combining the westbound left turn lane with the head-on lane.

11.5.23 The impacts of the potential physical mitigations are currently being investigated further via local highway modelling to determine whether any are workable in practice, given the constraints in place.

Junction 6 – London Road/Kents Hill Road

11.5.24 This junction currently has notable queuing northbound on Kents Hill Road in the AM peak; this is expected to continue and become more pronounced in the Reference Case scenario. The CPP proposes 22 new dwellings in the areas nearby to the junction; therefore the impacts of this development specifically are expected to be negligible, although wider CPP traffic growth is expected to increase traffic demand on London Road.

11.5.25 Within the ISI, the Kents Hill Road southern arm is identified for potential improvements to benefit north-south cycle movement. In its current layout, Kents Hill Road is not well suited to this role due to the large amount of kerbside parking taking place. CPP mitigation considerations have therefore sought to address this.

11.5.26 Potential identified mitigations include:

- Removal of the left-turn slip from London Road to Kents Hill Road southern arm to reduce the number of crossing phases for pedestrians;
- Reducing kerbside parking along Kents Hill Road southern arm through revised road markings; and
- Improving the crossing facilities to provide Toucan crossings to provide greater support for cyclists.

11.5.27 It is considered that removal of the left-turn slip would create greater difficulties for traffic circulation which would not be justified by the benefits to be created. Any reduction or changes to kerbside parking would require specific further consultation and it is recommended that this should be progressed as part of the wider process of developing cycle improvements via the LCWIP and / or associated future planning applications. A similar approach is proposed for any crossing upgrades; however, to ensure that these potential works are captured for the purposes of the IDP and viability assessments, an initial costing is included with the wider mitigation costing figures for this purpose.

Junction 7 – Northwich Corner Roundabout

11.5.28 Significant queuing of traffic is identified in the current layout of this junction along the southern arms of the roundabut in the PM peak (and to a lesser extent in the AM peak). The junction lies on one of two main routes from Canvey Island to the bridge crossings; at present the majority of development to the south and west is employment-focused. With up to 1000 dwellings proposed to the south of the roundabout within the CPP Preferred Option scenario, demand at these arms is expected to increase (as evidenced by the strategic modelling work) which will intensify demands at the roundabout and potentially also lead to greater conflicts between traffic flows to and from the western arm of the roundabout.

11.5.29 There is potentially available public highway land surrounding the roundabout which means that there is more scope than in many other locations to consider physical upgrades. For the avoidance of doubt, the introduction of significant new housing development in this area means that the needs of active travel users to cross this junction and travel either towards the bridges or into Canvey town centre need to be given appropriate weight, but that the role of this roundabout in routing traffic to and from Canvey must also be protected.

11.5.30 Potential identified mitigations include:

- Possible signalisation of the junction; and
- Investigating the potential to remove Charfleets Service Road to the south of the roundabout, allowing the realignment of the south of the junction to provide compliant widths for cycle and footways.

11.5.31 A concept layout for the junction improvements is provided at appendix E and is being refined via local highway modelling; the key outcome of these assessments is to determine how overall capacity upgrades can be married with active travel measures in the most appropriate manner.

Junction 8 – Long Road/Southwick Road

11.5.32 This is a signalised junction. At present, no CPP development is proposed within the immediate vicinity of this junction; however up to 60 dwellings are proposed along the neighbouring roads. The strategic models indicate that there is some queuing occurring on Long Road westbound and it is considered that this is related to observed queuing at the Long Road / Thorney Way roundabout located to the west of this junction. The carriageway of Long Road is 6-6.5m wide, limiting the potential for any turning pockets to be introduced.

11.5.33 With regards to active travel modes, the existing crossings on Long Road are 500m apart and it is considered that there may be an opportunity to provide an additional crossing at this junction to reduce the distance required to reach a safe crossing point.

11.5.34 Potential identified mitigations therefore include:

- An additional crossing between the two existing pedestrian crossings to improve pedestrian and cycle accessibility; and
- Consideration of signal phasing of the Long Road/Thorney Bay Road junction in order to improve the westbound congestion along Long Road.

Junction 9 – Long Road/Furtherwick Road

11.5.35 This junction is located in close proximity to a concentration of retail and restaurant premises which attract local trips from the surrounding area. This demand is expected to increase as a result of the significant number of new dwellings (400) which are identified in this area as part of the CPP Preferred Option proposals.

11.5.36 The area around the junction benefits from areas of land within the public highway which have the potential to be used to upgrade the existing pedestrian and cycle facilities, whilst preserving capacity for vehicles.

11.5.37 Potential identified mitigations therefore include:

- Improvement of the crossing and footway facilities for both pedestrians and cyclists through measures such as making all zebra crossings raised; and
- Consideration of reducing the speed limit from 30mph to 20mph through the junction. This would be compatible with the surrounding existing uses and would also assist in maintaining and improving safety for active modes in the context of expected increased demand for both active and vehicular travel as a result of CPP development.

Junction 10 – Furtherwick Road/Foksville Road

11.5.38 This junction is not identified from the modelling exercises to be experiencing specific issues. However, currently proposed CPP development would introduce up to 232 dwellings in close proximity. The junction features a pedestrian island, with three zebra crossings across each arm.

11.5.39 Potential on-road cycle routing is also proposed north-south along Furtherwick Road within the Cycle Action Plan.

11.5.40 Potential identified mitigations therefore include:

- The removal of a lane along Foksville Road and introducing a bidirectional cycleway to join Furtherwick Road eastern footway, with the provision of cycle parking on Furtherwick Road; and

- Potential to restructure the junction into a priority T-junction with a single-stage north-south and east-west toucan crossings to improve facilities for pedestrians and cyclists, whilst also reducing the number of crossings.

11.5.41 A drawing of these potential improvements has been produced and is included at Appendix E.

Junction 11 – High Street/Foksville Road

11.5.42 Located to the northeast of the Furtherwick Road/Foksville Road junction, High Street/Foksville Road is an unsignalized T-junction with a similar pedestrian island in the central interchange featuring three zebra crossings. The proposed CPP development would introduce 232 dwellings in close proximity to the junction.

11.5.43 The junction also acts as an access to the shopping centre car park along Foksville Road.

11.5.44 Potential identified mitigations include:

- The potential widening of High Road, in order to introduce a third lane, and road markings for cyclists.

11.5.45 Based on the modelling data, it is considered that the impacts of the proposed CPP development are not sufficient to require direct mitigation to be identified as part of the Transport Strategy. However, the eventual TA for the proposed allocation should re-visit this matter to determine whether any small-scale improvements are required once the details of those development proposals are known.

Junction 12 – Point Road Roundabout

11.5.46 Point Road Roundabout is a four-arm mini-roundabout. It lies in close proximity to 172 dwellings which are proposed as part of the CPP allocation.

11.5.47 It is noted that the roundabout gyratory is unsymmetrical and widened, and could be reduced to allow space for further development. However the technical work to date has not identified any specific issues requiring direct mitigation at this location.

11.5.48 Potential identified mitigations include:

- The reduction of the carriageway width to allow space for cycle lanes throughout the roundabout gyratory and entry/exit arms; and
- Depending on how the new access to the CPP development is to be configured, the layout of the junction may require further consideration, as to whether to convert roundabout into a priority junction, with Wall Road and the development access as a minor road coming directly off the B1014 Point Road.

11.5.49 We have included consideration of costs of some limited widening and provision of cycle lanes at this junction in our wider cost exercise; this is on the basis that these improvements would support the wider promotion and encouragement of cycle use.

Junction 13 -Eastern Esplanade/Seaview Road

11.5.50 This junction is not currently expected to experience any material change in vehicular demand as a result of CPP development; 23 dwellings are identified within the CPP in its vicinity to the north.

11.5.51 Whilst this development in its own right is not expected to require direct transport mitigation, measures could be taken to improve the general accessibility for active modes of travel in this location, including:

- Utilising the highway verge to widen existing footways to facilitate shared-use with cyclists. This could be provided on the northern side of Eastern Esplanade to avoid the use of pedestrian steps on the southern side of the Esplanade.

11.5.52 We have therefore included consideration of costs for some minor widening of the existing footways within our cost exercise.

Junction 14 – Rayleigh Road/London Road

11.5.53 Rayleigh Road/London Road is a large four-arm unsignalized roundabout with two approach lanes on each arm. The CPP does not identify any development in close proximity, however there are existing safety concerns with a high number of previous collisions in the vicinity of the roundabout and the cumulative impact of other CPP developments on traffic at this location has been identified via appraisal of the "With CPP" models.

11.5.54 Potential on-road cycle routing is proposed east-west along London Road in the Cycle Action Plan, and also identified in the LCWIP.

11.5.55 Potential Identified mitigations therefore include:

- Introduction of signalisation on each of the arms, in addition to improving the existing signage and road markings, such as the addition of a centreline delineation to the gyratory to clarify the lanes; and
- Introduction of crossings across the four arms to improve safety for pedestrians and cyclists.

11.5.56 A concept design for these improvements has been developed (included at Appendix E).

12. COSTINGS

12.1.1 Initial costings have been made for the purposes of this TA report as set out below.

12.1.2 The costings for those junctions with a concept design currently include uplifts for utilities, traffic management and design fees, and a 44% figure for optimism bias. The figures are provided for information only.

Table 29. Initial Cost Estimates – CPP Mitigation Measures

MITIGATION TYPE	DESCRIPTION	ESTIMATE
Junction 3 improvements	Highway improvements as shown on concept drawing 23H92-P-XX-DWG-103-01	£10,000
Junction 10 improvements	Highway improvements as shown on concept drawing 23H92-P-XX-DWG-110-01	£320,000
Junction 14 improvements	Highway improvements as shown on concept drawing 23H92-P-XX-DWG-114-01	£740,000
Other local highway improvements	Includes cycle corridors and other walking/cycling interventions	£450,000
Bus Infrastructure	New bus stops / cage markings and/or upgrades of existing (assume £7,500 per pair of stops)	£75,000
Bus Services	Enhancements to existing bus services / new potential route as identified in Public Transport Strategy	£100,000 for enhancements / £150,000 for new route per year (assume 5 year support) = £750,000

12.1.3 The table above specifically does not include Travel Plan commitments which will be required for larger sites to provide “soft” measures and other support for active and sustainable travel. This will need to be examined further as part of the more detailed planning of these sites.

12.1.4 Additionally, it is expected that there will be an increased requirement for funding of the proposed enhanced bus strategy. The corresponding costings will be prepared and presented as part of this additional work.

13. CONCLUSIONS

13.1.1 This TA report has been prepared to provide a comprehensive assessment of the expected transport and traffic impacts which will be associated with the proposed allocation sites set out in the submission Castle Point Plan (CPP).

13.1.2 It is recognised that Castle Point is a heavily developed borough, and that as such CPP development is split between a large number of smaller sites, three “broad” allocations of 200 dwellings in or adjacent to existing developed areas, and one large strategic allocation at West Canvey.

13.1.3 The South Essex strategic model outputs indicate a significant increase in traffic in the west of the borough, with increases in flow and queuing evident along the A13 London Road to the north of the region, and along Long Road on Canvey Island. There is a clear correlation in terms of the most significant impacts with the West Canvey strategic site, with other impacts more widely dispersed. In particular, the volumes of CPP traffic using the A127 (as opposed to crossing over it when moving north) are relatively low.

13.1.4 The corresponding local junction modelling work reflects these changes; certain locations are expected to experience increases in queuing and delay, however these locations also correspond in a majority of cases with significant physical limitations on junction layout.

13.1.5 The expansion of the West Canvey proposals and the wider impacts of the CPP have led to a re-appraisal and expansion of the public transport strategy, particularly concerning bus operations. The challenges of creating meaningful change are not under-estimated and significant further work is planned with ECC and other stakeholders. However, it is considered that with a joined-up approach, and in particular the scale and potential for change in behaviours associated with the West Canvey site, would be capable of reducing the overall traffic impacts of the CPP in those locations where they are currently evident to an acceptable level.

13.1.6 The spatial strategy proposed in the CPP, and the analysis contained within this TA report, provide evidence of a strong potential positive correlation between the CPP and ECC’s aspirations for future travel in the borough as expressed in their draft LTP4 and South Essex area strategy. The measures proposed as part of the CPP’s transport strategy would, in many cases, represent a firm starting point from which the LTP’s more ambitious proposals could be progressed.

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