LBR 2.74

CROSSRAIL URBAN INTEGRATION

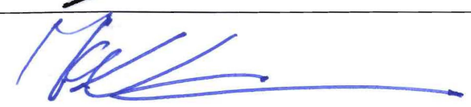
Chadwell Heath Station

Urban Realm Study

Document Number: CRL1-XRL-T2-RGN-CR117-50001

Document History:

Revision:	Date:	Prepared by:	Checked by:	Authorised by:	Reason for issue:
1.0	20/09/12	G. Tripodi	A. Punekar	S. Richards	For Approval

Date:	Organisation:	Approved by:	Signature:
09/26	Transport for London	Tim Thomas	
09/26	LB Barking & Dagenham	Timothy Martin	
09/26	LB Redbridge	Mark Lucas	

CHADWELL HEATH URBAN INTEGRATION STUDY

STAGE C MASTERPLAN

LBR 2.74

SEPTEMBER 2012

London Borough of Barking & Dagenham

London Borough of Redbridge

Transport for London

Crossrail

Document Number: CRL1-XRL-T2-RGN-CR117-50001

Revision	Date	Prepared by:	Checked by:	Authorised by:	Reason for Issue:
0.1	06-08-12	G.Tripodi		S.Richards	For Review
0.2	30-08-12	G.Tripodi		S.Richards	For Review
1	14-09-12	G.Tripodi	A. Punekar	S.Richards	For Sign-off

Urban Integration Team
Land and Property

Crossrail Ltd
25 Canada Square
Canary Wharf
London
E14 5LQ

Contents

1

Introduction

1.1 Background

Crossrail is a major new cross-London rail link project which has been developed to serve London and the southeast of England. Crossrail will support and maintain the status of London as a ‘World City’ by providing a world class transport system.

The Crossrail ‘experience’ will go beyond a reliable and punctual train journey and high quality station design. Future Crossrail passengers will also judge the success of the railway by their experience of using the spaces outside the stations as they arrive and leave. CRL, together with its key stakeholders, therefore intends to set high standards for the immediate surroundings of the stations in terms of the design and functionality of the transport interchange and the urban realm. For the areas outside the stations to be successful they will need to be planned and implemented by a number of public bodies. Funding may also come from a variety of sources.

To reflect this need for a joint commitment, in October 2010 Crossrail and all its major partners (all the Crossrail local authorities, Transport for London, Department for Transport and Network Rail) agreed, through the Crossrail Planning Forum, A Memorandum of Understanding (MoU) for the Urban Realm and Transport Interchange at Crossrail Stations . The MoU recognised that Crossrail’s funding for improving areas outside stations is limited and therefore that funding over a wider area would need to be provided from other sources. It included the principle of joint working to agree designs for improvement schemes and delivery mechanisms.

This study has been drawn up with the MoU as background and in accordance with its principles.

A number of existing stations outside the central section of Crossrail will be served by Crossrail and Chadwell Heath is one of them.

The station provides access to the district centre and offers interchange opportunities with numerous bus routes.

The current Crossrail design for the station proposes utilising the existing building; a number of localised improvements will be made (including full step free access as part of the Access for All Programme) and platforms will be extended; this work is still subject to design development by Network Rail (known as GRIP 4, equivalent to RIBA Stage D). An updated Transport Assessment is also being undertaken by CRL to asses any potential impacts of the new service on the local area.

The Crossrail ‘experience’ will go beyond a reliable and punctual train journey and good station design. Future passengers will also judge the success of the service by their experience through the wider interchange zone, including outside the station, as they arrive and leave. Crossrail and its key stakeholders therefore aspire to set high design standards for the immediate surroundings of Crossrail stations.

This study is a key step towards provision of improvements around the station. The project team comprised of representatives of the following organisations:

- Crossrail

- LB Redbridge

-LB Barking & Dagenham

- Transport for London

- Network Rail

1.2 Purpose and scope

The primary purpose of this study is to develop the design of the urban realm for the Chadwell Heath station area to RIBA Stage C. Further development of the design and supporting material to RIBA Stage D and beyond will be taken forward at a later date.

In order to promote the integration of the station with the area it serves and to enhance the jouney experience it is important that the urban realm design recognises the key issues and opportunities in the wider surroundings.To that end, a wider design has been developed, identifying a wide set of improvements that go beyond the immediate station area.

This study has taken into consideration local issues specific to Chadwell Heath and its local centre as well as its transport links.

Crossrail Limited (CRL) in partnership with TfL, the London Borough of Barking & Dagenham and the London Borough of Redbridge has developed feasibility design proposals (equivalent to RIBA Stage C) for the urban realm and transport interchange in the vicinity of Chadwell Heath Station.

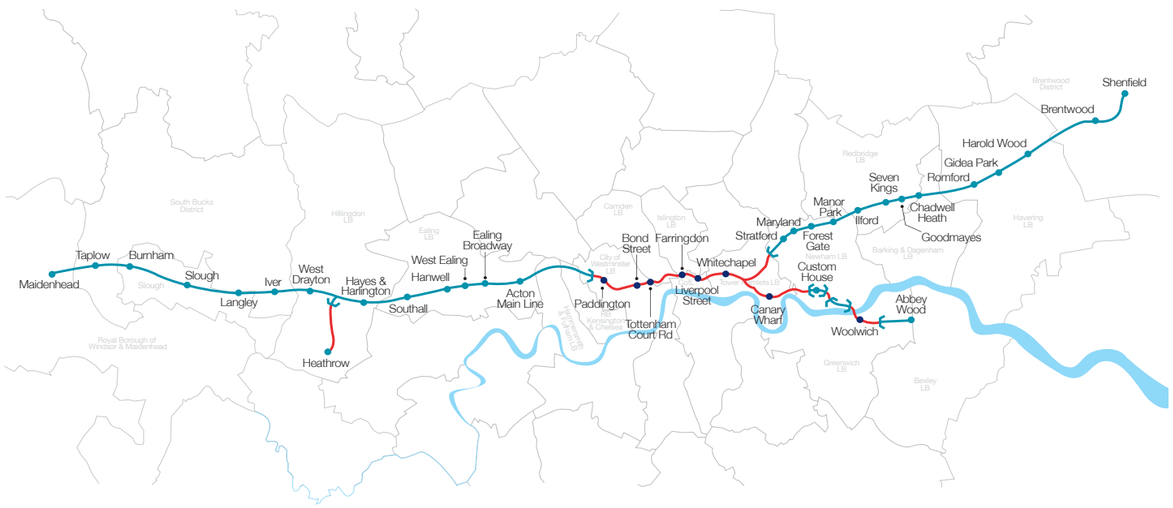
Crossrail and Network Rail are also progressing the design for the improvements to the station building and infrastructure which will be required for operation.

The urban realm design process has involved additional stakeholders, including Network Rail, in order to produce an integrated design

It should be noted that the boundary between two London Boroughs, Redbridge and Barking & Dagenham, runs through the study area and splis the district centre of Chadwell Heath into two parts.

In particular, whilst the station building itself is located in LB Redbridge, much of the urban realm is actually in LB Barking and Dagenham. For this reason both authorites have been fully involved in this study.

Regional Map



2

Policy Context

2.1 Planning Policy Documents

This section outlines the key policy documents relevant to the improvement of the urban realm and local transport facilities brought about by the arrival of the new Crossrail services at Chadwell Heath. A number of policy documents have informed this study and the design process. From top down these include national, regional and local planning policy documents.

In March 2012 the Government published the New Planning Policy Framework (NPPF) superseding more than forty planning policy documents including Planning Policy Statements and Guidance (PPS and PPG). The NPPF sets out a range of planning principles with a presumption in favour of sustainable development, including the delivery of new and improved transport infrastructure.

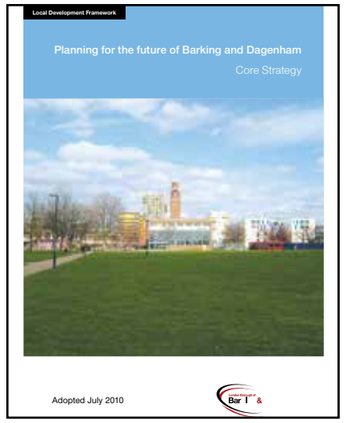
At a regional level, key policies are contained in The London Plan and The Mayor's Transport Strategy; these include more detailed provisions for London and its local areas both in terms of development opportunities and transport enhancements. Some areas have been given specific designations. Chadwell Heath is not one of these and but it is classified in the London Plan as a district centre. Nearby areas, such as Ilford and the southern part of Barking & Dagenham, have been identified as *Opportunity areas*; the links from Chadwell Heath to these areas will be considered later in this study.

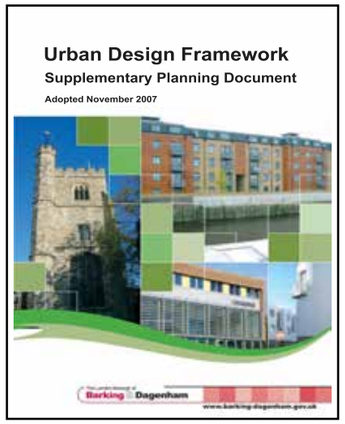
The local boroughs, Barking& Dagenham and Redbridge, have recently adopted their (Local Development Framework) Core Strategies, which set out the key spatial policies and strategies for the entire boroughs. LBR has also adopted a Crossrail Corridor Area Action Plan, with a specific focus on the areas along the railway corridor. The AAP includes a section on Chadwell Heath on which the two boroughs have worked collaboratively. Development opportunities, streetscape improvements and transport enhancement are all central to the proposed strategy. A summary of LBR policies and issues has been included in the Appendix.

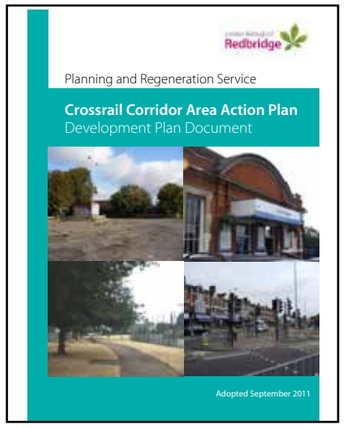
Finally, LBBD have produced an Urban Design Framework, which includes specific guidance for Chadwell Heath.

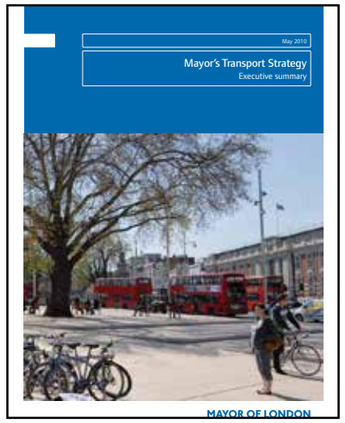
For the purposes of this study TfL have also produced a Transport Input Study which summarises current transport issues in the area and looks ahead in terms of future opportunities and modal requirements. A full list of documents reviewed during the course of the study is shown below

- New Planning Policy Framework (March 2012);
- The London Plan (July 2011);
- The Mayor's Transport Strategy (2010);
- TfL Input Study (and all related TfL Guidance (June 2012);
- LBR Core Strategy (March 2008);
- LBR Crossrail Corridor Area Action Plan (September 2011);
- LBBD Core Strategy (July 2010);
- LBBD Urban Design Framework (November 2007);
- LBBD LIPs Bid Design Proposal and supporting Information (2011) .
- LBR Chadwell Heath Context Report (June 2012);









2.2 Previous Schemes

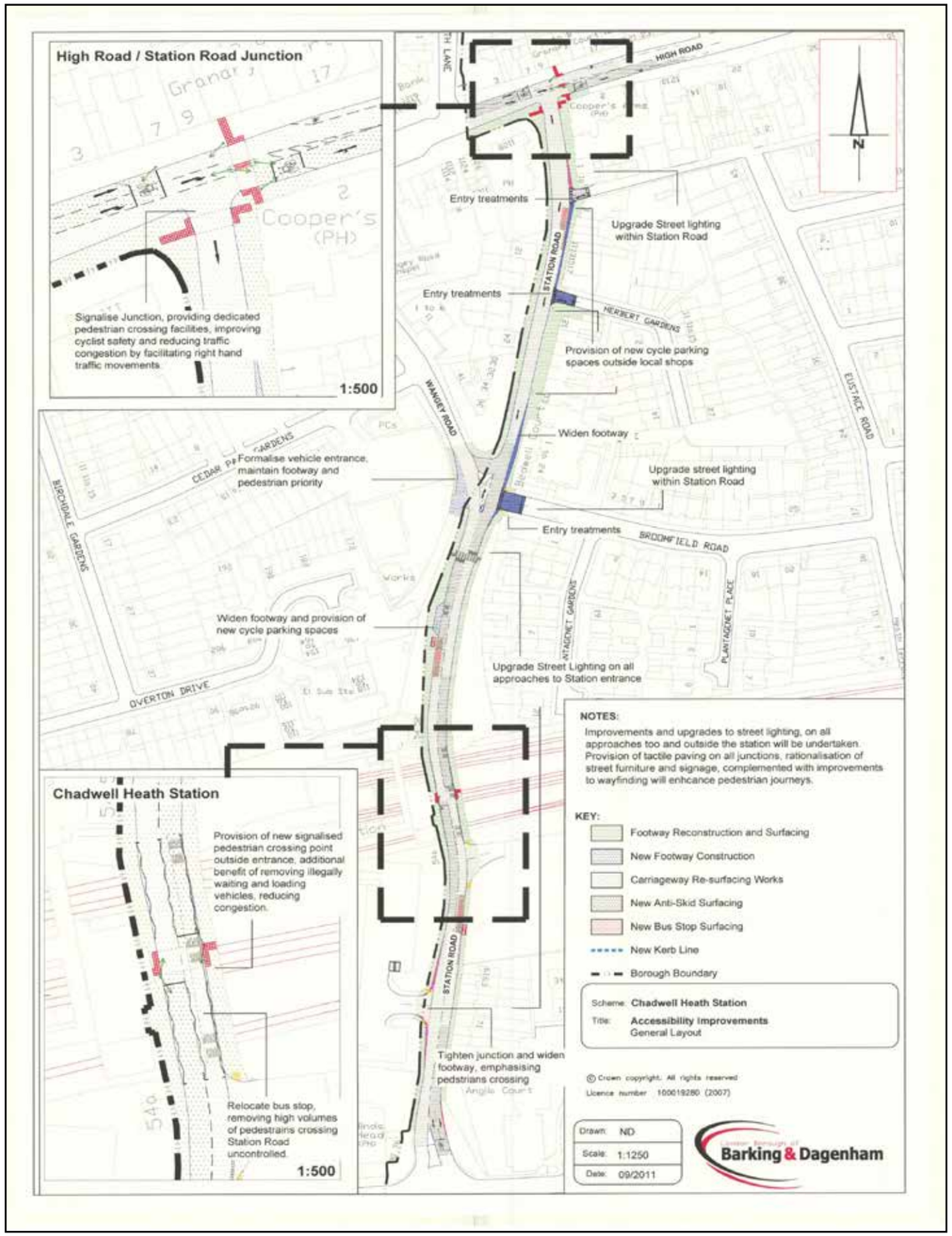
More recently LBBD has also put together a proposal for a set of improvements to the area. The scheme was submitted to Transport for London as part of LIP (Local Implementation Plan) Major Scheme Fund bidding process.

Although the bid wasn't successful, the overall approach was considered to be robust and it has formed the basis for this work.

The scheme included a range of improvement to both footways and junctions, including changes to the local highway signals.

A CAD sketched version of these proposals is shown on the right.

More details on this can be found in section 9.2 of the Appendix.



3

Study Area and Area Context

3.1 Study and Design Area

Two distinct geographical areas have been defined in the course of the study: a wider study area for the contextual analysis and a more focused design area, for which proposals have been developed.

The wider study area, shown in blue on the adjacent diagram, forms the wider context within which the key features of Chadwell Heath can be found.

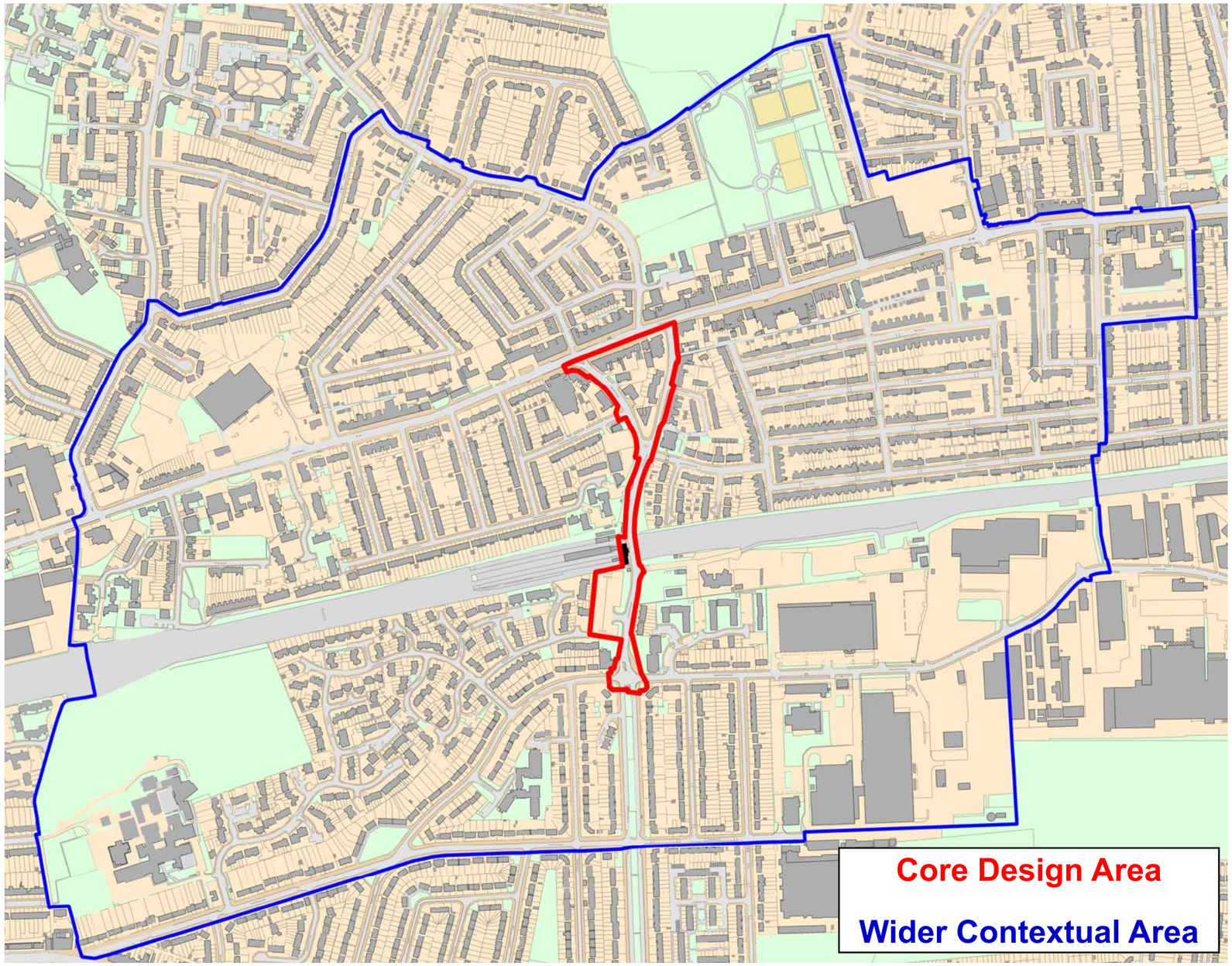
In this case an area of approximately 800m radius from the station has originally been considered and it has then been converted into a more pertinent shape to include a number of development sites, main local employers, important green spaces and other factors which could influence the design process and contribute to enhancing the local area.

The design area is illustrated here within the red line. Design proposals have been developed for this area and will be illustrated in the following chapters of this report.

This study consolidates this work into a single narrative of analysis, strategic and conceptual thinking, all of which will feed into a series of design proposals for the public realm and transport interchange.

The design proposals contained in this report have been developed to a level commensurate with RIBA design stage C.

The design area includes the area outside the station entrance on Station Road, extending southwards to the Junction with Valance Avenue / Freshwater Road and northwards to the High Road and the junctions with Wangey Road and Station Road.



3.2 Wider Context

The focus of this study is the area around Chadwell Heath station and its links to the district centre and the other key locations in the sub-region and beyond.

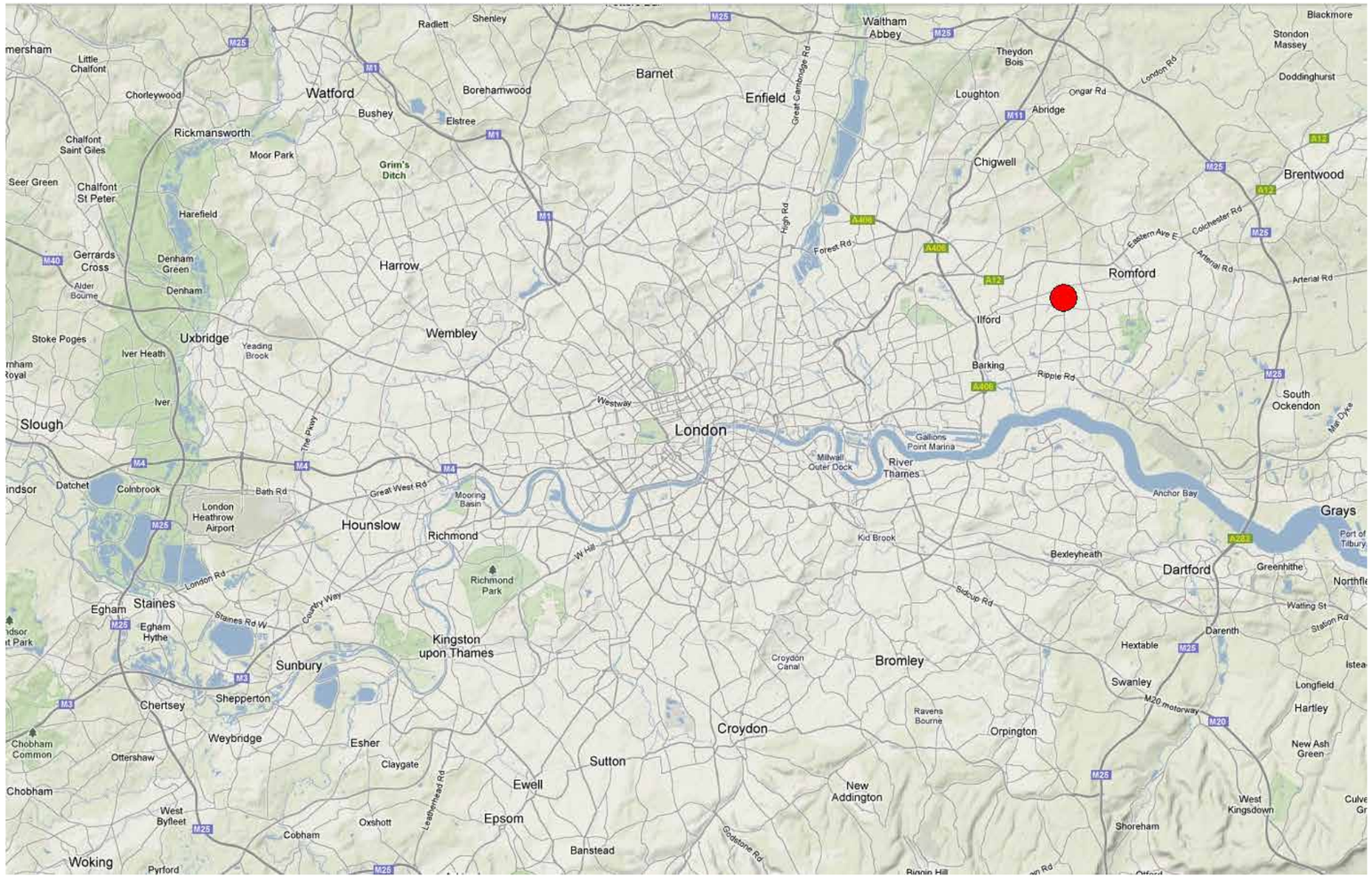
Consideration has also been given to the opportunities arising with the arrival of the Crossrail programme, which can positively influence the dynamics of the area. Chadwell Heath is one of the suburban surface stations, extending east of Crossrail's 'central section' stations onto parts of the existing surface railway infrastructure (see Crossrail Line below).

Suburban stations like Chadwell Heath present a different and much smaller scale of intervention for station works to that proposed for the 'central section' stations' such as Bond Street and Whitechapel, and even for the other larger outer London stations, such as Ilford or Romford.

Chadwell Heath is a local district centre in East London located roughly half-way between two key town centres in east London: Ilford and Romford. It is also not too distant from Barking and Dagenham town centres.

It should be noted that the administrative boundary between the boroughs of Redbridge and Barking & Dagenham runs through the middle of the area. Therefore both authorities have contributed to this study and often work collaboratively to address issues affecting Chadwell Heath.

The High Road is located around 300m north of the station and include a range of services and shops and some commercial and light industrial uses.



3.3 Chadwell Heath Station

The station is located in Travelcard Zone 5 and is served by the main Liverpool Street to Shenfield Line currently operated by Abellio. Train services operated along this line form the only direct public transport service in this area to central London.

The station building is a small brick building, built in the early 20th century, sited on top of a road bridge which crosses the railway. The station has four platforms, two for the fast services and two for the stopping commuter services. There are three access points to the station, one of which, however, has been permanently closed. No access to the station is provided from the car park.

The station is served by two bus routes (number 62 and 368) with several other routes within 5-10 minutes' walk.

The station is located around 300m south of the High Road (A118), home to a wide range of shops/businesses which serve the locally important District Centre of Chadwell Heath.

There are various waiting and loading restrictions in force along Station Road. A pay and display car park however, lies 100m south of the station and acts as the main off-street parking facility for the station.

Station Road is a key north-south cycle link, with no cycle lanes; Limited cycle parking is provided on street, while off-street provision includes spaces within the LBR car park and a very small number of racks on the station platform 2/3.

Pedestrian facilities in the area are poor, with narrow, uneven footways.

Unlike many of the other suburban stations, Chadwell Heath is some distance away from the High Road and wayfinding should be an important consideration. At present however there is a lack of signage and wayfinding may prove challenging for a visitor.

In 2012 as part of the "Access for All" scheme several improvements were made to the station. A new footbridge and lifts to platforms were installed, improving accessibility. A new waiting shelter has been provided on the "down" platform; on the "up" platform some redundant builldings have been removed and the canopy remains.

Further improvements to the station will be delivered as part of the Crossrail works.

These include:

- Complete Re-branding
- Platforms extension
- Minor ticket hall improvements

These works are expected to take place in the second part of 2015.

Finally, as agreed as part of the Crossrail Act process, CRL will update its original transport assessment for this station and will confirm any proposed mitigation measures, should they be required This may include items such as a zebra crossing, station travel information, cycle parking etc

3.4 History of the area

The arrival of the railway can be considered the main event which changed the character of Chadwell Heath and its land uses.

As shown in the first map (top), until the 1850s Chadwell Heath was a hamlet in the ancient parish of Dagenham. The London to Colchester Roman Road caused some early ‘ribbon’ development while much of the rest of the parish remained rural.

With the arrival of the railway in 1864 settlments started to appear along the main corridor. This process is clearly viible in the second map (center).

Suburban growth commenced in 1900 and proceeded rapidly until World War I and then increasing thereafter.

Chadwell Heath was the end of the line for both the London tram system and later the electric trolley bus service from Aldgate. The trolley buses turned around at Station Road and Wangey Road.

Only 50 years later, in the 1950s, a much more dense and urbanised landscape is visible (bottom). This is not too dissimilar from its current urban grain.

Some buildings and site in Chadwell Heath were severely damaged or destroyed during World War 2 bombings.

3.5 Land uses and development opportunities

This section highlights the main land uses in the study area.

The area is predominantly residential but it has a significant industrial and commercial presence. Residential buildings are largely consisting of terraced housing dating back to the early 20th century and to the 1930's particularly in the north and the east of the study area. The areas to the south east and the south west include a number of more recent low rise developments in *cul de sac* style. A large business park / industrial site is located immediately to the east of the station and is currently in use.

Three key employers are also located in Chadwell Heath or marginally closer to Goodmayes: they are Redbridge College, King George Hospital and Goodmayes Hospital. These sites may present future development potential as a result of relocation and/or rationalisation of assets.

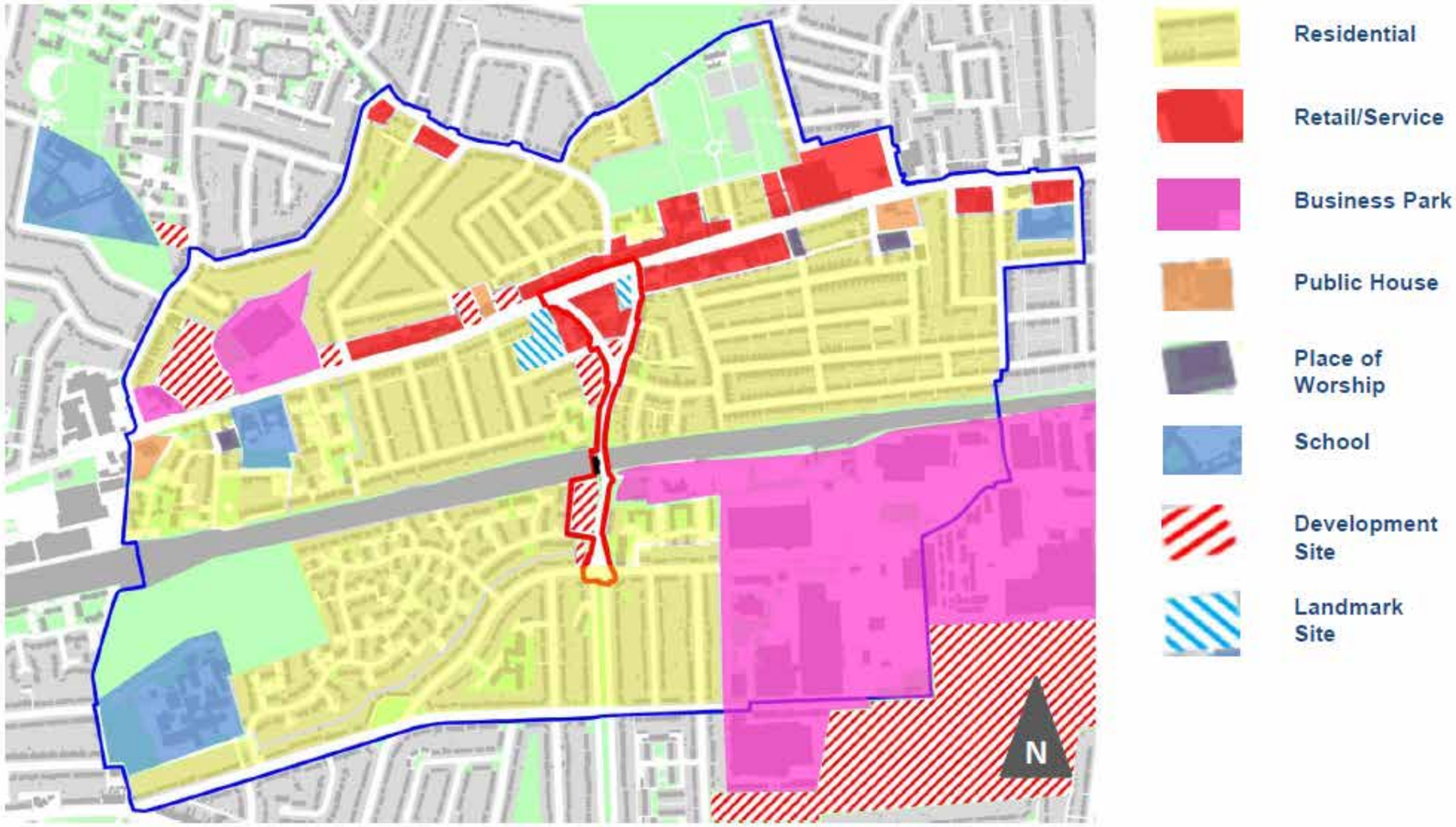
The main green open space is St Chad's Park, located to the north of the study area, which features a recently upgraded pedestrian and cycle link to Marks Gate.

The following diagrams highlight current ground floor uses in the study area and in the design area.

The High Road and Station Road include the majority of retail, services and food & drink uses, while some light industrial sites can be found on the western boundary of the design area.

The area to the south of the station includes a vacant public house and a couple of small, low rent commercial units.

Within the study area there are a number of sites earmarked for redevelopment. LBR's Crossrail



Corridor Area Action Plan identifies more than 40 opportunity sites, of which eight are located within the Chadwell Heath Character Area. (See appendix section 9.1).

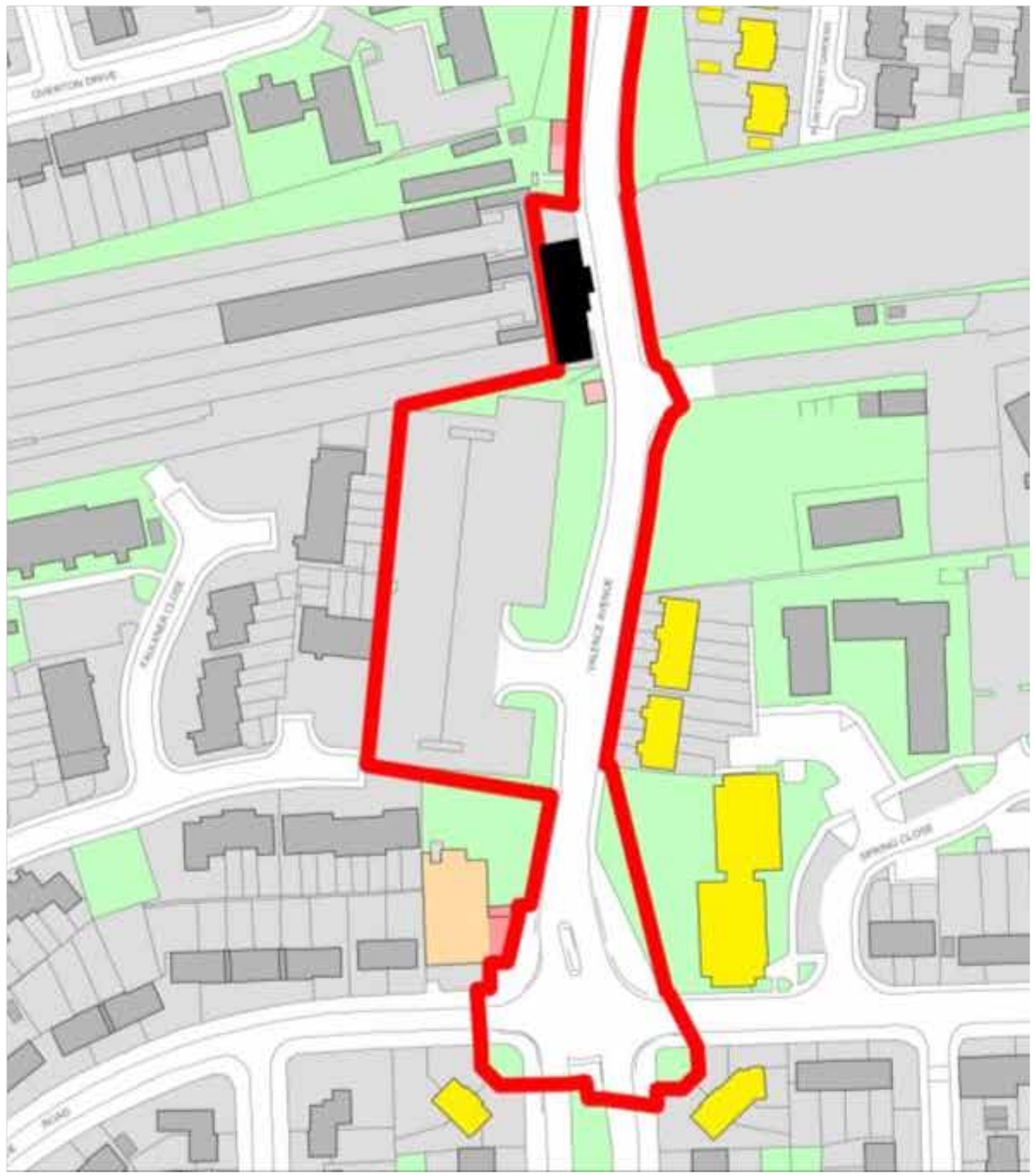
In particular the two car parks and the triangular site at the junction of Wangey Road and Station Road could make a more positive contribution to the built environment and the local centre.

A large development is already under construction on the High Road at Grove Farm, with a residential led mixed use development by SWAN, comprising of 104 dwellings across a range of dwelling types and tenures.

A much larger site, Lymington Fields, is being developed south east of the station, in LBBD.

Lymington Fields has outline permission for 602 homes, in three phases, the first of which is substantially complete and comprises 193 homes.At present, the detailed permission for the next two phases is being reviewed with the GLA.A planning application is likely to be submitted later this year.

Finally, there are a couple of buildings of architectural merit, the Eva Hart public house (a former police station building) and the 1930's bingo hall, both located along the High Road.



Use Classes A1 - Retail
Use Class A2 - Professional Services
Use Classes A3-A5 - Food and Drink
Use Classes B1-B8 - Business and Industry
Use Classes C1-C2 - Accommodation
Use Classes C3-C4 - Dwellinghouses
Use Classes D1-D2 - Health Education and Leisure
Use Classes Sui Generis

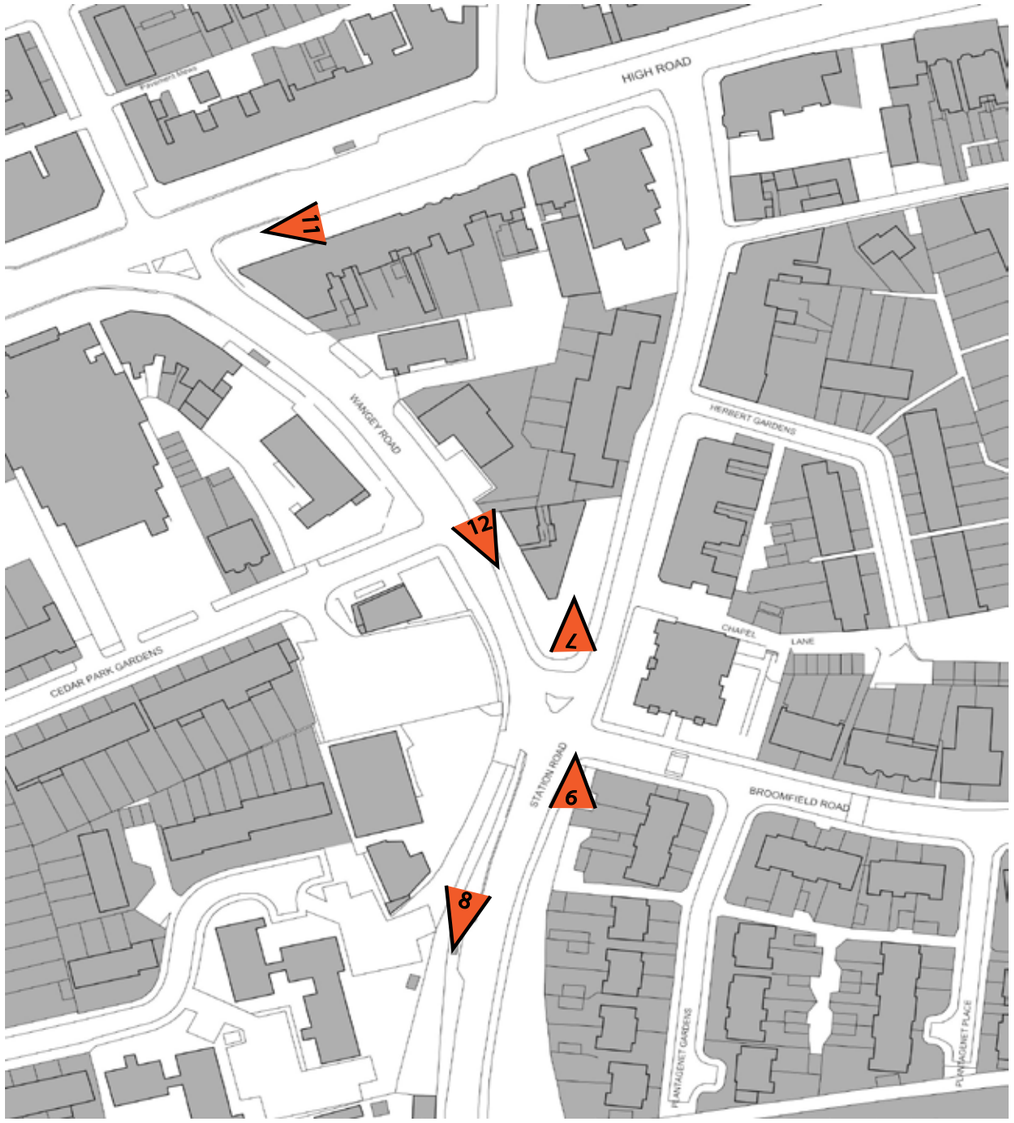
4

Visual and Photographic Analysis

4.1 Photographic Analysis

This section includes a number of photographs of the study area. The view point for each of the photos is marked on the plans below.

These photographs illustrate the current level of provision and state of repair of existing facilities and highlight some of the urban realm issues in the area. The photographic analysis should be read in conjunction with the findings of the visual analysis presented in section 4.2.



1


2

3


4

5

6


7


8


9


10


11


12

4.2 Visual Analysis

A number of issues have been identified as a result of a detailed observation of the area. These are presented below by location.

4.2.1 Station Area

The station building is a brick built building, around 100 years old, and is sited on top of a road bridge which crosses the railway. Station Road is a single carriageway road, around 10m wide, although it narrows significantly outside the station as it crosses the railway and at a number of other points. There is no pedestrian crossing immediately outside the station, although people cross informally to / from the southbound bus stop, indicating a clear desire line. Footways are narrow, and this represent an issue particularly around the bus stop. Traffic congestion is often experienced outside the station, particularly at peak times. This is exacerbated by vehicles stopping or parking illegally on the highway.

To the south of the station lies a pay and display car park owned by LB Redbridge. No direct access exists between the car park and the station. Wayfinding in the area is very poor with little signage indicating the direction to the station or the High Road and Chadwell Heath District Centre.

4.2.2 Southern Section

The section of the study area between the station and the Valence Avenue Junction features a very small letting agency building, extensive passive frontages and narrow footways, some of which in poor state of repair. There are also two unpleasant crossing points for pedestrians, whilst there is generous highway access to the station car park and access road to the industrial site on the southern side of the railway There is scope to improve pedestrian movement at these locations. At the southern end there is a disused public house, a building which could make a positive townscape contribution, and a local grocery shop. The crossing point is unattractive and its layout not particularly convenient. with a staggered two-stage crossing and a large amount of pedestrian guard rails (PGR).

4.2.3 Middle Section

The section between the station and the junction with Broomfield Road features extensive PGR and some street clutter. This area features no active frontages with the exception of two low-rent units hosting the local minicab office and a newsagent.

The only cycle parking in the area is in the form of cycle hoops mounted on the PGR, in the vicinity of the northbound bus stop.

From both observation and anecdotal evidence it is clear that the loading bay is not well used, hence constraining unncecessarily the footway. This is probably due to its distance from the station. Furthermore, street furniture is placed inconveniently in the middle of the pavement. Some of the footways are in a poor state of repair.

The area is vehicle dominated and the junction with Wangey / Station Road has a very complex arrangement resulting in an unpleasant environment for pedestrians.

4.2.4 Northern Section

The section between Broomfield Road and the High Road is a one-way street with very narrow pavements and a generous carriageway. Some footways are in poor condition. This section features many active frontages (mainly shops, food and services) due to its proximity to the High Road. The area is devoid of street trees in this section.

Finally, the area between Wangey Road and the High Road is another one-way highway link (but in the opposite direction) which has recently been the object of streetscape improvements by LB Redbridge. Similarly, the recent improvements are also visible on the section of the High Road between Wangey Road and Station Road. Here footways are in good condition, entry treatments have been laid and new trees planted where possible. Two types of modern lighting columns have been installed by LBR and LBBD, on the High Road. The contrast in style is evident.

The high-level findings of this exercise are summarised below, while a more detailed illustration can be found on the diagram overleaf.

Key Issues

A number of key issues have been identified along the study area:

Extensive clutter and pedestrian guard-railing: they restrict pedestrian flow and do not make a positive contribution to the streetscape.

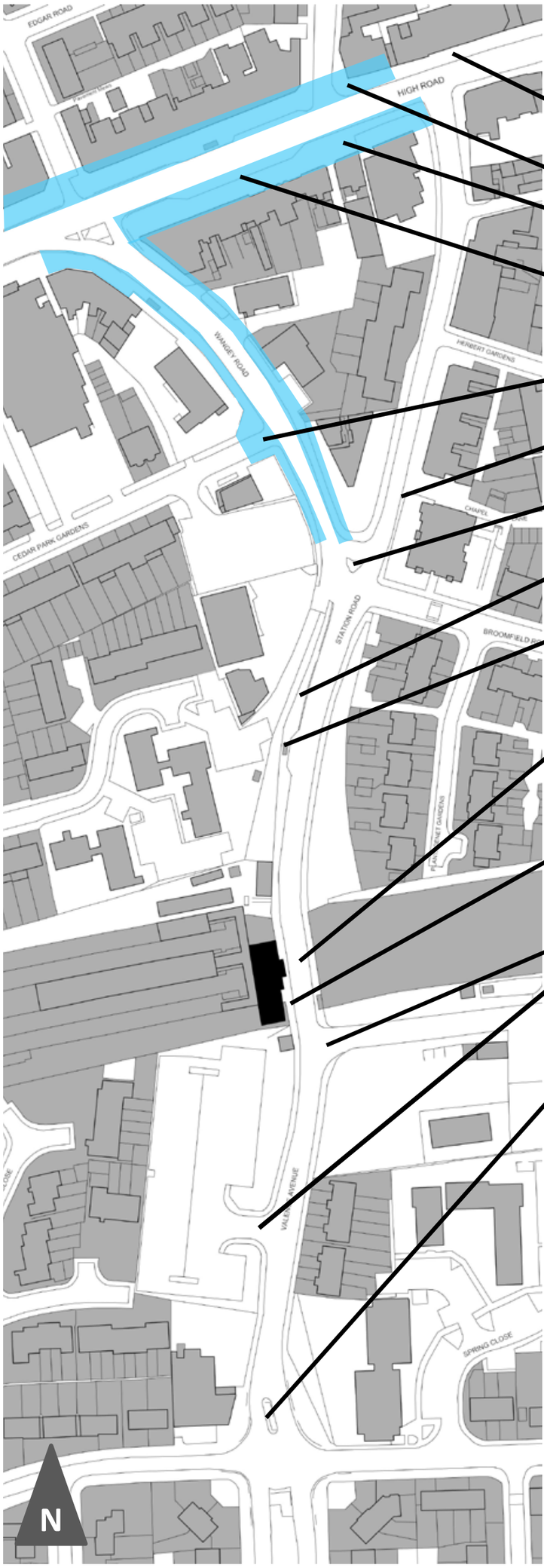
Lack of adequate facilities for pedestrians and cyclists – including poor signage, poorly located crossing facilities and lack of secure cycle storage.

Lack of dedicated convenient vehicle drop off/pick up point often leads to overcrowding outside station and congestion, both on the footways and Station Road.

Footways on either side of road are narrow and in poor condition, with cracked/uneven paving. Lack of dedicated pedestrian crossing facilities and complex junctions.

Incongruous lighting columns: at least 3 types can be found along the study area, some modern and in contrasting styles, and some in poor conditions.

Lack of street trees and soft landscaping.



Area Issues:

Other style of lighting

LBR Upgraded Footways and Lighting

Loading Bay Treatments

Raised Entry Treatment

Narrowest Pavements

Complex Crossing Point

Limited Cycle Parking

Street Clutter

No Pedestrian Crossing at key desire line

Narrow Pavements

Wide Access / Poor Pedestrian Crossing Facilities

Two Stage Crossing with Pedestrian Guard Rail

5

Movement and Interchange Analysis

This chapter gives an overview of the transport facilities and services in Chadwell Heath.

The first section deals with highway issues, vehicular movements and traffic, whilst the second addresses public transport and the third focuses on pedestrians.

5.1 Vehicular movements

5.1.1 Road Hierarchy

In terms of road hierarchy, the A118 High Road is the main arterial road in the area and the only A road within the immediate study area. The A118 is a busy east-west connection into London and forms part of the former Roman road between London and Colchester.

Running perpendicular to the A118, Station Road and Valance Avenue are the key components of the important north-south link on which Chadwell Heath Station is located.

Chadwell Heath Lane is another north-south link locally well used to reach the A12 as well as leading to the Redbridge College and King George Hospital.

There are also a number of local roads running through the residential areas and some minor access roads serving the industrial estates.

5.1.2 Highway Performance

In addition to the conditions observed at time of the site visit (July 2012), two key data sources have been used in this study to assess general performance of the highway through the study area. A traffic survey was undertaken by Halcrow in 2003 and more recently counts in Station Road were undertaken in September 2010. The data can be found in section 9.5 of the appendix.

In general terms, this section of highway is busy but it works relatively well. About 18,000 vehicles use Station Road on a daily basis, with peaks in the early morning and during late afternoon. Evidence suggests that congestion occurs along Station Road at peak hours, particularly in the vicinity of the station where the road narrows as it crosses the railway. The problem is exacerbated by the siting of bus stops and by the lack of dedicated taxi waiting and loading areas.

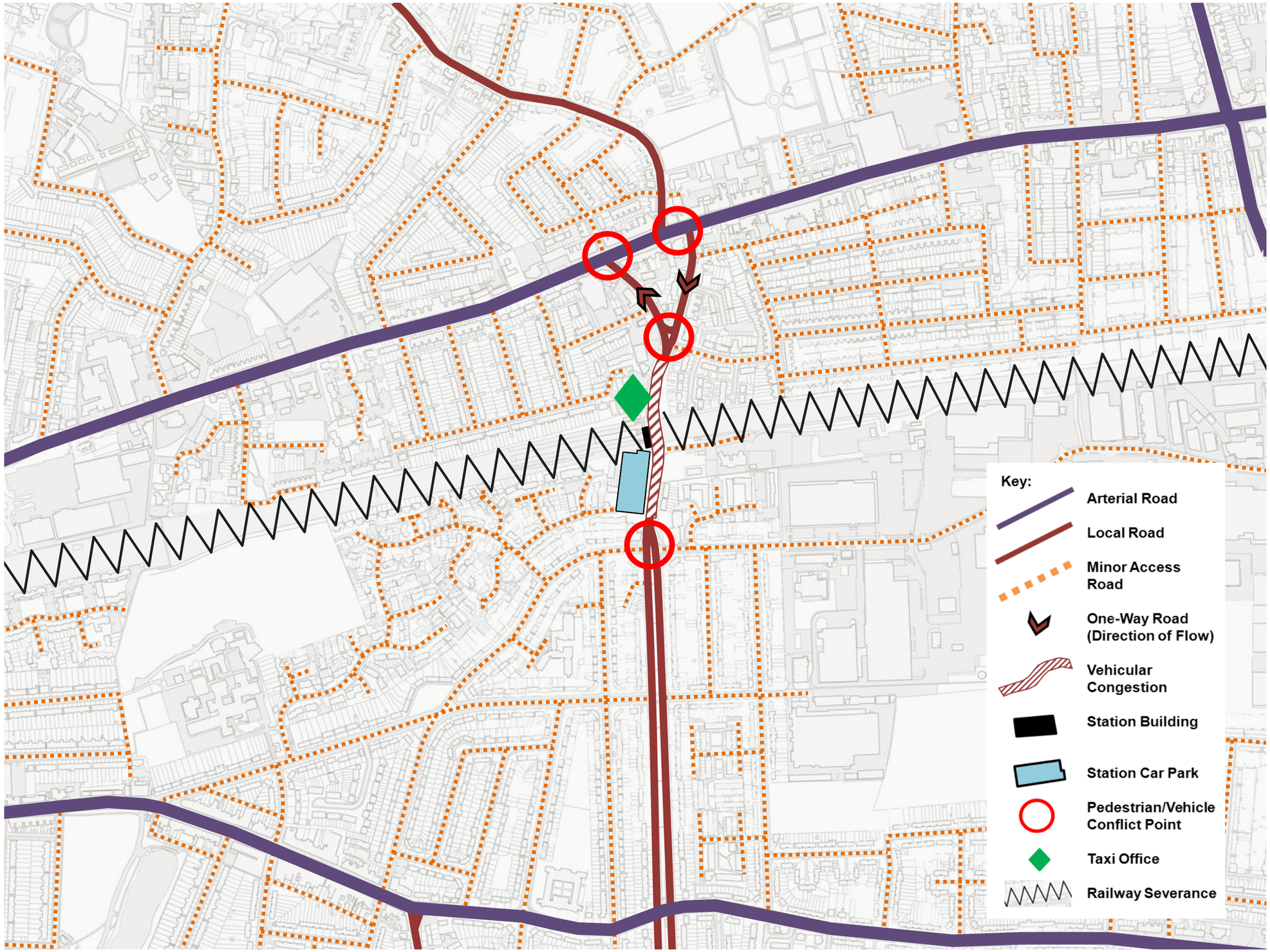
Of the junctions within the study area, the most congested is the one between the High Road and Station Road, which experience significant queuing on the right turn movement into Station Road. The other junctions work under or nearing capacity. Speeding can be an issue at times, outside of peak hours, when traffic levels are lower.

5.1.3 Safety

In the last three years there have been 20 recorded accidents in the area. Of these, 2 were serious and 18 caused slight injuries. In all cases the accidents appear to be caused by driver, rider or pedestrian error rather than the road condition.

The information shows that most accidents occur on or around the junction of Valence Avenue, Freshwater Road and Burnside Road, with the remainder on various locations along Station Road, particularly at the Wangey Road / Station Road junction and at the Station Road / High Road junction (see collision map appended to this report).

The main features of the vehicular movement network are illustrated on the diagram opposite.


Key:
Arterial Road
Local Road
Minor Access Road
One-Way Road (Direction of Flow)
Vehicular Congestion
Station Building
Station Car Park
Pedestrian/Vehicle Conflict Point
Taxi Office
Railway Severance

5.2 Public transport

The main features of the public transport movements are illustrated in the diagram on the opposite page.

5.2.1 Bus

The station is served by two bus routes, although another three stop within 5 minutes' walk, providing around 27 buses per hour in the morning peak.

Routes 62 and 368 serve the station directly on Station Road, while bus routes 86, 173, 362 serving the High Road 300 metres north of the station. These provide a good range of links to the surrounding area; main destinations include King's George Hospital, Ilford, Barking, Dagenham, Stratford, Romford, Marks Gate and Hainault.

Within the immediate interchange, the southbound bus stop lies directly opposite the station entrance, and the northbound bus stop lies around 75m north of the station. Each bus stop is served by 11 buses per hour. Footway widths at the bus stops are relatively narrow.

An initial review of the impacts of Crossrail on bus demand by TfL suggests that the High Road could see a substantial drop in demand, due to route 86 paralleling Crossrail services. Stations are relatively close together on this section compared with further east, so local journeys on route 86 are more likely to be affected. A slight increase in demand is likely to occur southbound on Whalebone Lane North (routes 62 and 362) from Marks Gate, where some additional capacity may be required. There is expected to be no substantial change on the other corridors.

Most areas without a direct link to Chadwell Heath have a service to or close to Goodmayes station, which is less than 1,500 metres from Chadwell Heath, or Romford. Improving links to Marks Gate is a local priority, as greater demand from this area to Chadwell Heath may support enhancement to the bus network. Chadwell Heath is also the closest Crossrail station to the South Dagenham part of the London Riverside Opportunity Area. Route 62 provides links from some parts of this area and routes 174 and 175 provide links to Romford.

5.2.2 Taxi

There are no taxi ranks located in close proximity to the station; however there is one Private Hire Vehicle (PHV) office adjacent to the station. Many of the vehicles associated with the private hire office queue on the bridge outside of the station resulting in limited available carriageway width for other traffic. When there are parked cars outside that station there is effectively one lane available for both directions. When a bus is at the southbound stop, other traffic is also unable to pass.

5.2.3 Cycling

The surrounding area has reasonable cycling infrastructure, with Station Road providing a quiet route suited to cyclists, which links to two signed cycling routes to the north and south of the station.

As a 'biking borough', Redbridge has made a commitment to increasing levels of cycling in their area with funding from TfL to 2014. This will be considered in the recommendations for cycle parking at this station. Cycle parking is provided at the station via two wheel-grips on platforms 2 & 3, four cycle hoops fixed to guard railing outside the station entrance and four Sheffield stands in the station car park.

This provides capacity for fourteen bicycles. Observed occupancy of the cycle parking spaces was approximately 29%.

Buses from Chadwell Heath

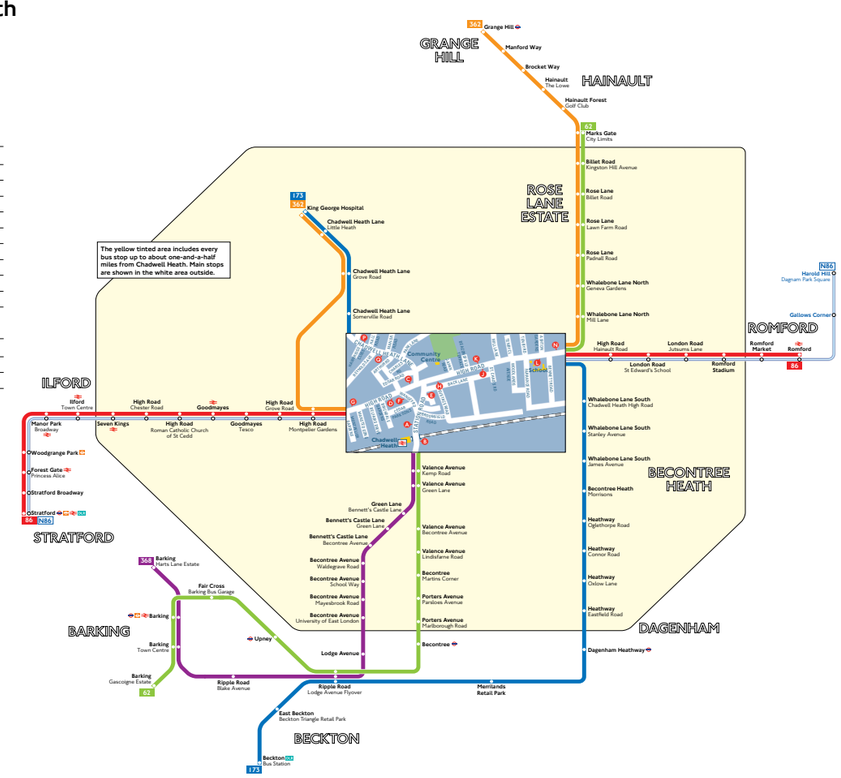
Route finder

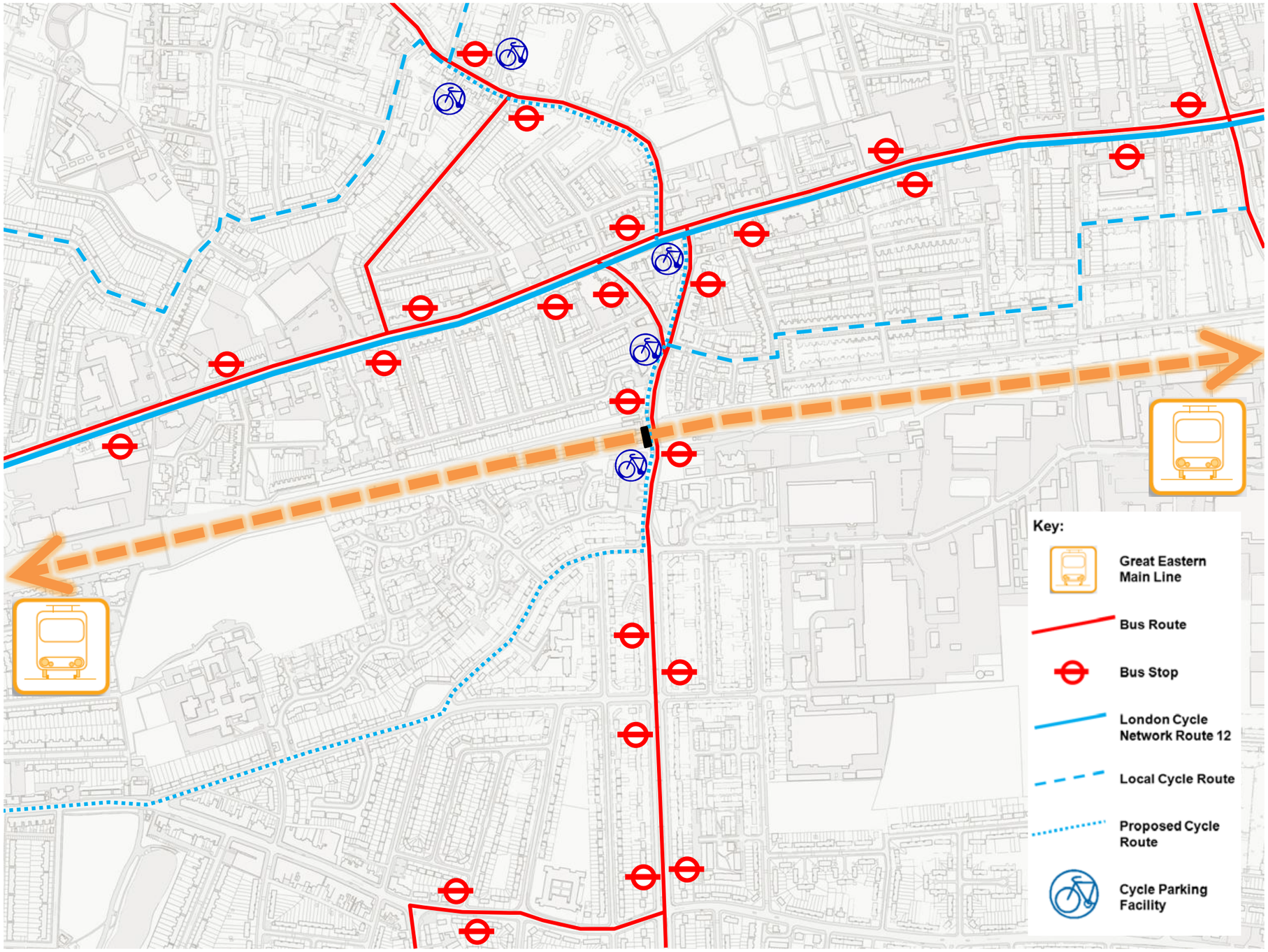
Day buses

Bus route	Towards	Bus stops
62	Barking Gascoigne Estate	E B H J L
	Marks Gate	A C K N
86	Romford	C G K N
	Stratford	D H J L
173	Beckton	C E F P
	King George Hospital	C B H J L Q
362	Grange Hill	C G K N
	King George Hospital	D H J L
368	Barking Harts Lane Estate	E E F

Night buses

Bus route	Towards	Bus stops
N86	Harold Hill	C G K N
	Stratford	D H J L




Key:
Great Eastern Main Line
Bus Route
Bus Stop
London Cycle Network Route 12
Local Cycle Route
Proposed Cycle Route
Cycle Parking Facility

5.3 Pedestrians

There is one main pedestrian route running north-south along Station Road. However, there is very limited to no signage to the station from any of the main pedestrian routes - and footways around the design area are relatively narrow and in a poor state of repair.

Considerable numbers of pedestrians cross Station Road outside the station on the brow of the bridge, despite the fact that there are no formalised crossing facilities in place here. The closest crossing facilities are north and south of the station, some 150m away.

The High Road, which is a busy local high street offering a good range of amenities, lies 300m north of the station along Station Road. Pedestrians also move to and from the residential areas to the south of the station along Valence Avenue.

In the long term increased pedestrian flows are likely to add pressure to the already narrow footways.

The following table illustrates current usage estimated on the basis of 2003 survey data and uplifted to reflect the growth trend occurred in recent years.

Evidence of this growth can be found in the ORR annual station data, which rose from 1.6m passengers in 2004 to just over 2m in 2011. Although the ORR data is based on ticket sales and can't be easily converted into morning peak data, the general growth trend is evident.

YEAR	IN	OUT	TOTAL
2003 (Survey)	2300	400	**2700**
2012 (Estimate)	2555	445	**3000**

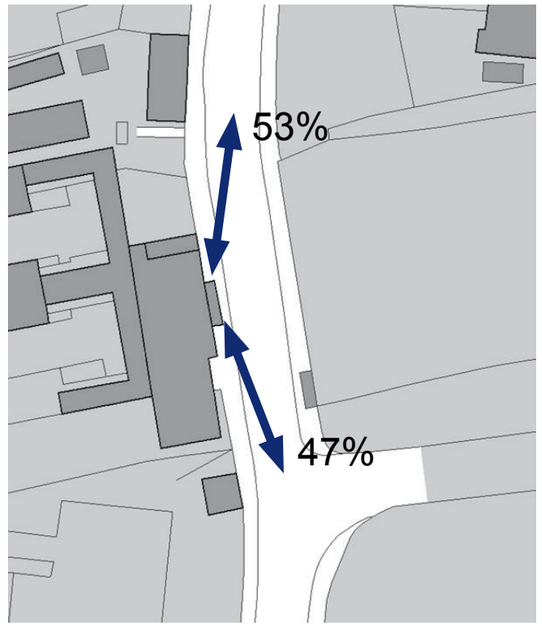
5.3.1 Directional and Modal Split

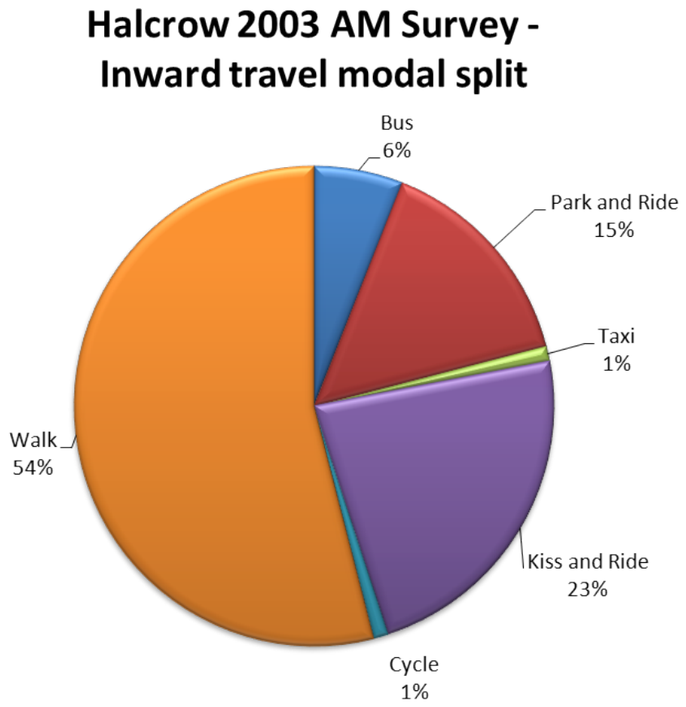
The 2003 survey also provided a directional split of 53% from/to north and 47% from/ to the south. In the morning peak these are predominantly movements from the catchment area to the station. Recent observations confirmed this almost even split.

In addition, the survey recorded the modal split. This indicates the mode of transport by which passengers reach or leave the station.

As shown in the pie chart, the majority of people arrive by walking but a significant share uses Park & Ride and Kiss & Ride facilities.

The bus and cycle shares are relatively low at the present time





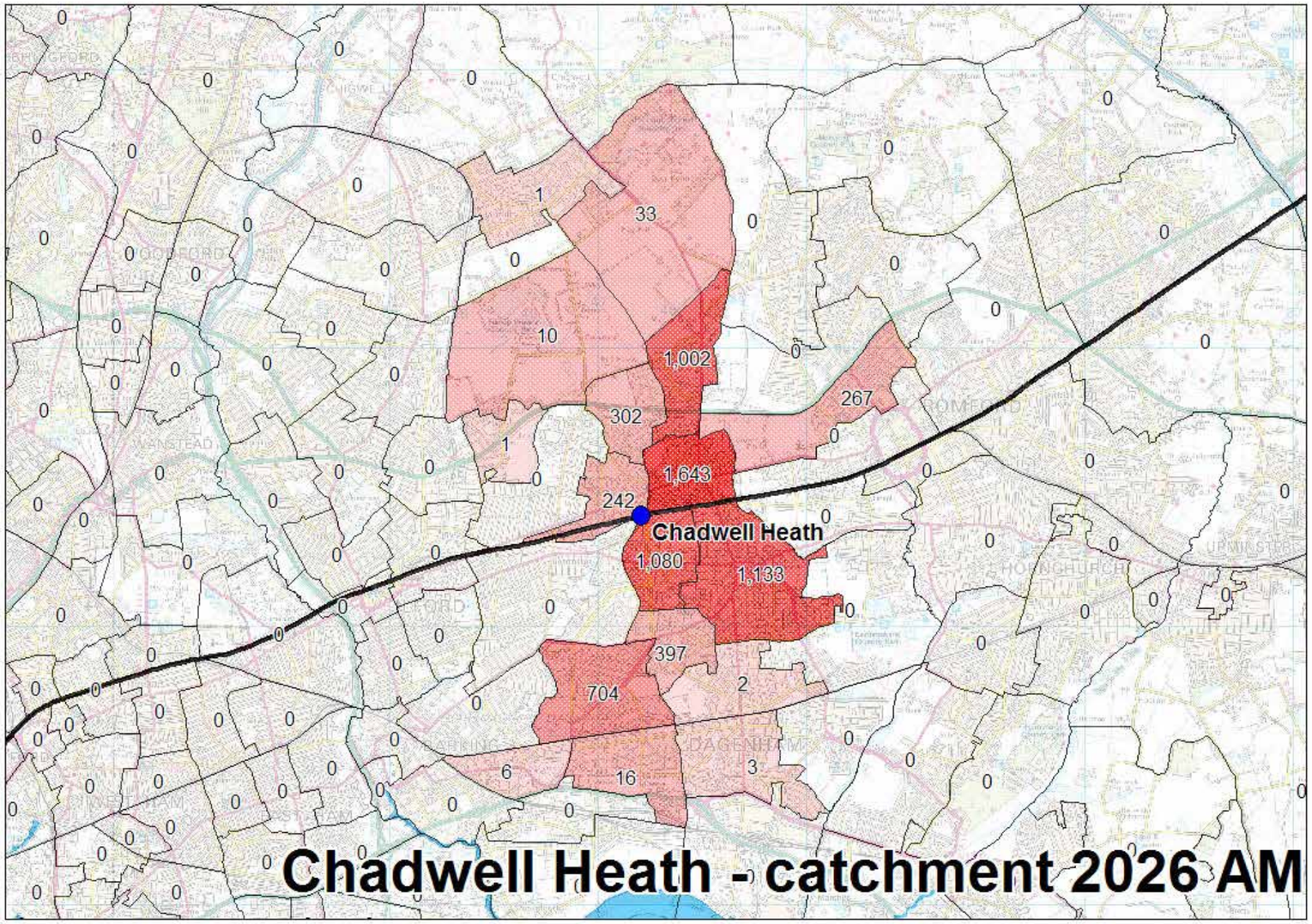
5.3.2 2026 and 2056 Forecasts

Data for 2026 forecasts has been provided by Crossrail (official forecasts produced by CRL Joint Sponsor Team) and 2056 forecast have been calculated on the basis of long term growth assumption in line with the standard TfL and CRL Urban Integration studies.

As the table below illustrate pedestrian numbers are forecast to more than double from 2012 to 2026.

YEAR	IN	OUT	TOTAL
2012	2555	445	**3000**
2026	5390	1480	**6870**
2056	6145	1687	**7832**

An estimate of the catchment area by zone is also shown adjacent. This has been calculated using the Railplan model.



Chadwell Heath - catchment 2026 AM

5.4 Pedestrian Comfort Levels

An analysis of pedestrian comfort levels of the Chadwell Heath station area is shown in this section. The main purpose is to assess crowding levels on the footways within the immediate urban realm and transport interchange zone. The findings will be used to inform the design proposals and identify pinchpoints.

In 2010 TfL have published a guidance document to calculate footway comfort levels. The levels are obtained through a static calculation on the basis of pavement widths and any street furniture restricting the free flow of people.

The passenger forecast data from the table on the previous page (AM peak 2012, 2026 and 2056) has been used to test current and future comfort levels.

For the purposes of this excercise the pavements in the vicinity of the station have been broken down into relatively homogenous sections to assess comfort levels in each of these zones. A number of assumptions have been made:

- Directional split: 53% from/to north to/from station and 47% from/to south.
- A simplified modal split has been applied: 10% arriving/departing by bus and as a combined share of 30% has been assigned to Park & Ride and Kiss & Ride.
- 70% of passengers walk from/to station on the western pavement. 30% use the eastern pavement (based on site visit evidence and experience).
- 50% of people cross at existing crossing on Station Road (north).

The findings of this exercise are explained below for each of the forecast years, and illustrated opposite.

2012

Most sections show very low levels of crowding with the exception of the two segments where the bus stops are located. Here the lowest possible comfort level (F) indicates that these footways are uncomfortable. The location of the southbound bus stop on a very narrow and relatively busy pavement explains its performance. In the case of the northern bus stop there is additional street furniture in the middle of the pavement restricting the flow, such as a post box and a phone box.

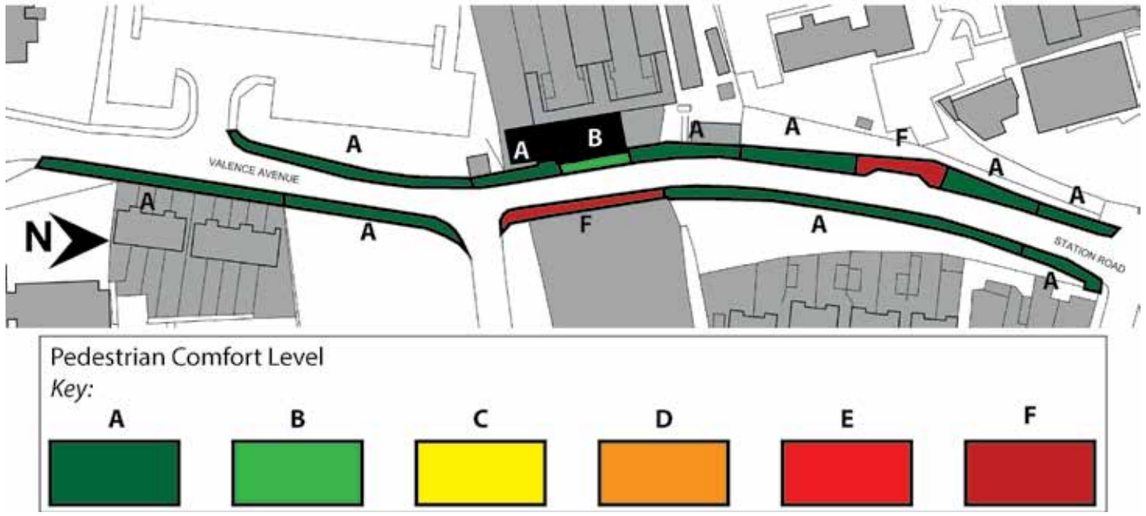
2026

With the 2026 data some of the western footways close to the station entrance show increasing crowding levels up to comfort level C, which is, however, still an acceptable level for transport interchanges. The crowding on the two sections with the bus shelters worsens too although they stay at level F as this is already the lowest score on the scale.

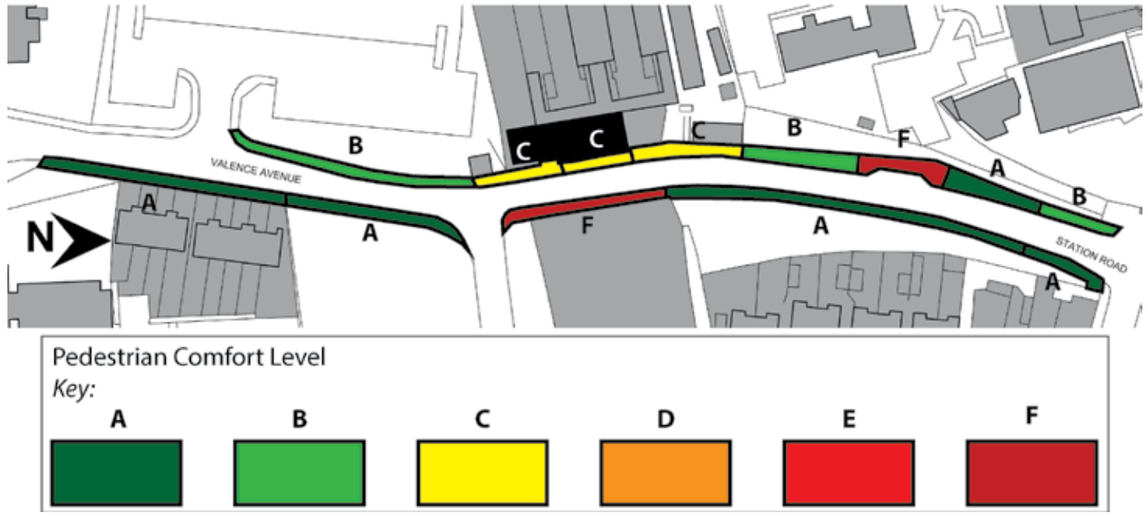
2056

The long term scenario depicts a similar situation with crowding levels increasing further and a new section of pavement just north of the station entrance becoming uncomfortable (level D).

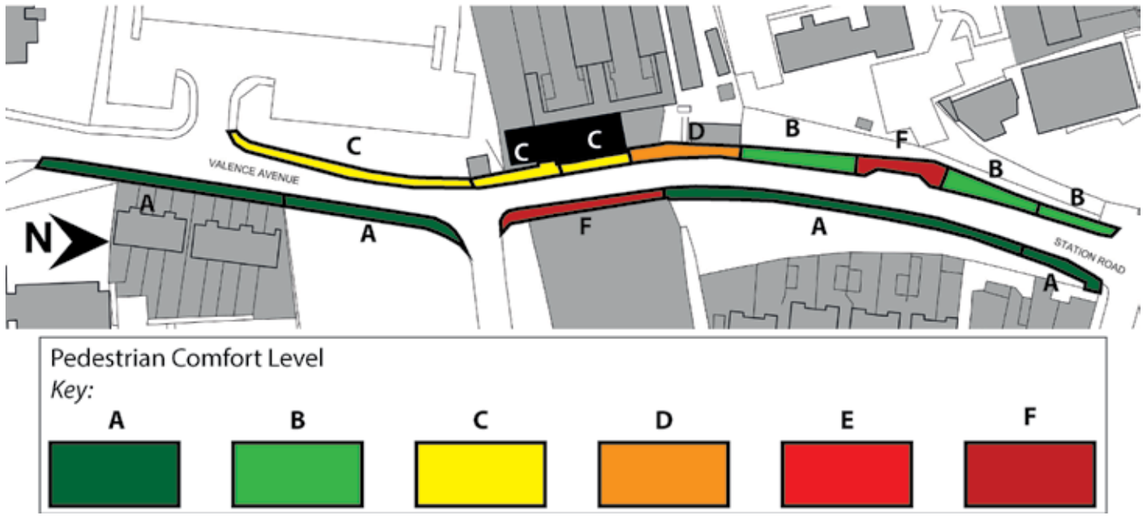
2012



2026



2056



6

Design Strategy

6.1 Key Objectives

This section identifies the key design objectives and the high level and detailed spatial strategies which have informed the design proposals.

A number of more detailed design issues are then considered and finally an overall Masterplan is presented. The analysis in the previous sections has identified important issues that need to be addressed to enhance the integration of the station and interchange with the surrounding local area.

Key Objective 1:

A continuous and positive pedestrian experience between the station, the High Road and the junction with Valance Avenue to the south.

Improving circulation and the experience of pedestrians will be crucial. It is clear from the visual and photographic evidence that pavements are too narrow and cluttered along Station Road with congestion already observed around bus stops and pinch points. In the long term, congestion will increase as the station becomes more attractive and development opportunities are brought forward within the town centre.

Pedestrian comfort is likely to be improved through a variety of measures, including footway resurfacing and widening, removal of guard railing and rationalisation of items of street furniture such as sign posts, advertising panels and telephone boxes.

Minor adjustments to the location of bus stops positions could also help achieve this.

A pedestrian crossing should be facilitated outside the station entrance for the safety of pedestrians and to address this important desire line.

As a main approach to / from the High Road, Station Road serves both pedestrian and vehicular movement and would benefit from measures that reduce this conflict. At some locations footway widths are significantly sub-standard and reducing width of carriageway and refining its alignment should be considered

Key Objective 2:

Enhance the transport interchange and address congestion outside the station.

Additional interchange facilities such as pick up and drop off and covered cycle parking could be located within the station car park.

These new facilities would become even more attractive if access from the car park to the station were to be implemented in the future. This has been discussed with the relevant stakeholders, and it is considered feasible, subject to funding and detailed discussions with the station operator.

Similarly, traffic congestion outside the station could be improved by turning a small number of parking spaces in the car park into minicab waiting bays, associated with a higher level of enforcement on Station Road.

Key Objective 3:

Minimise street clutter, whilst increasing the provision of cycle parking, street trees and soft landscaping.

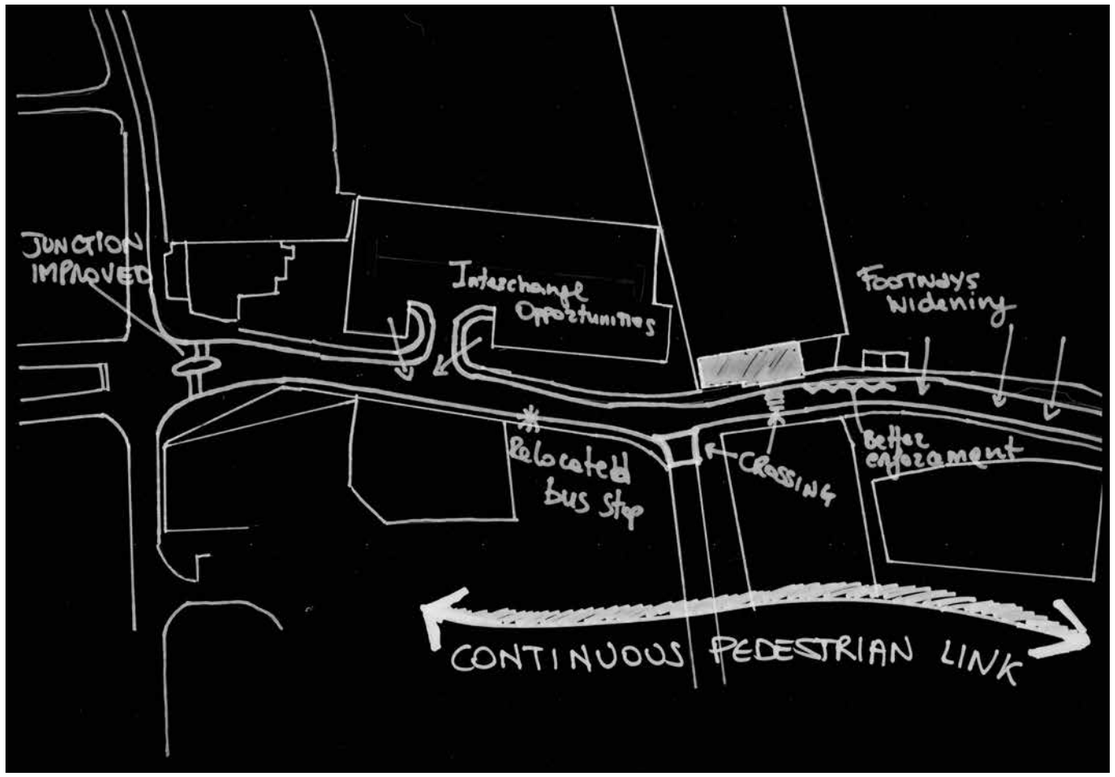
The study area suffers generally from low quality materials that have often been poorly arranged and/or poorly installed. There has been limited co-ordination or rationalisation of street furniture, lighting and signage and it is often poorly positioned.

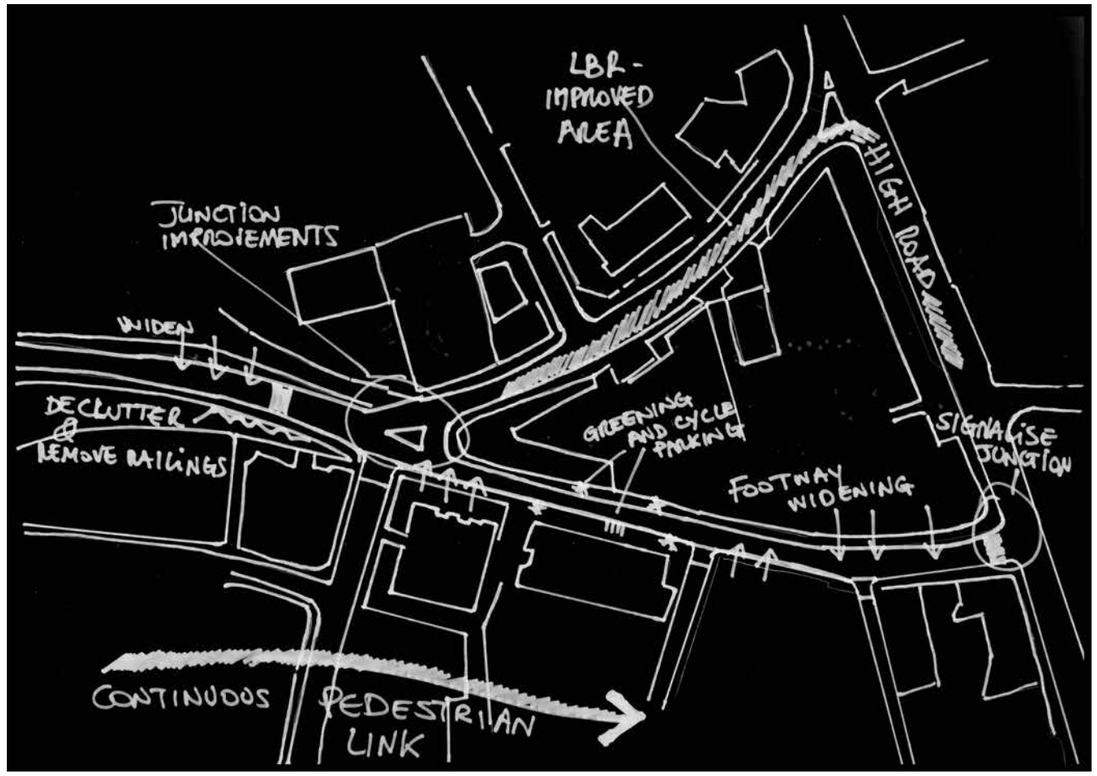
All materials should be rationalised to ensure a consistency in appearance, less clutter and the provision of a higher quality environment in which people are comfortable and encouraged

The analysis also illustrates that the local area would benefit from additional trees particularly in the section of Station Road closer to the High Road. There is an opportunity to introduce street trees, help enliven the public realm and improve biodiversity.

6.1.1 Sketches

The early sketches shown below summarise the conceptual approach behind the design process. In the following sections it will be explained how the proposals have been developed over the course of the study.





6.2 High level spatial strategy

Four geographical areas of interventions have been identified, each with a specific approach but unified by a holistic design strategy.

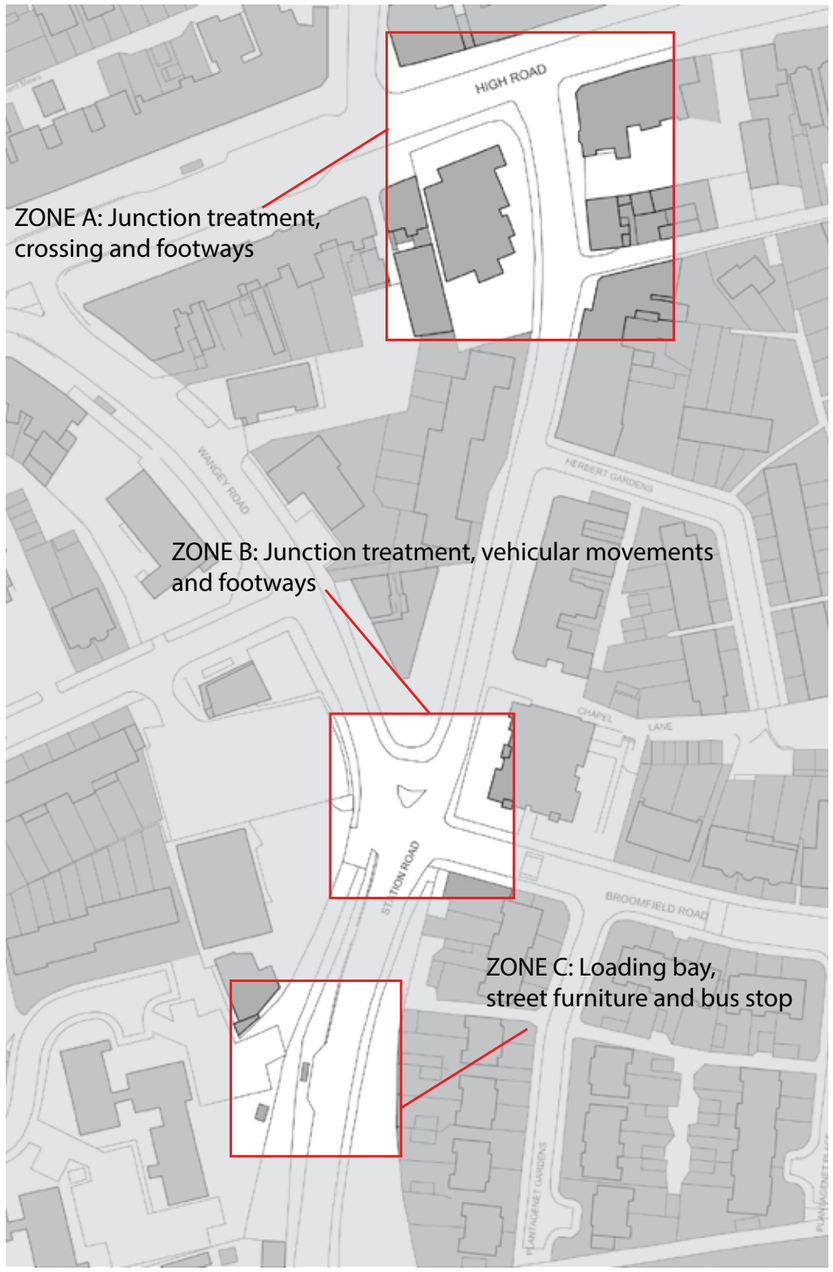
The area to the north of the station (shown in blue (1)) is an integral part of the district centre. Currently Station Road is the only section of the one-way system that hasn't been upgraded. To avoid a piecemeal approach it is proposed to replicate many features of the works recently implemented by LB Redbridge on Wangey Road/ High Road, including lighting and paving style, but with the exception of the grey imprint sett (raised junction treatments). The High Road has already a number of inconsistent furniture items, in particular lighting column, and it is paramount to increase consistency and develop a common language across the area.

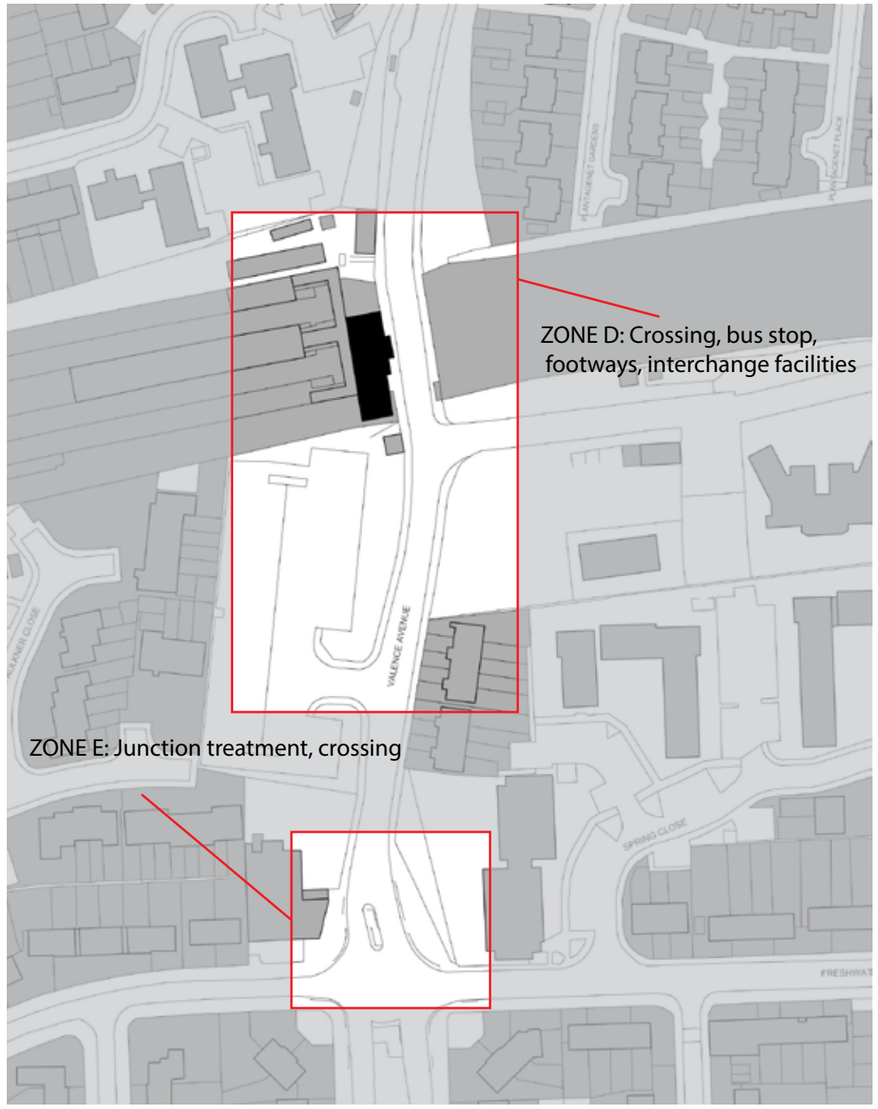
The two sections in yellow (2 and 4) show the two approaches to the station. The treatment here will need to be robust and functional, with simple and modern lighting columns, clutter free footways and a simpler paving style.

Finally, shown in red (3) on the diagram, the interchange area will be enhanced with better use of the car park to accommodate additional facilities, such as covered cycle parking and pick up and drop off. Congestion relief measures will be considered on the highway, through better enforcement and an additional zebra crossing immediately outside the station.

6.3 Detailed design issues

A number of key zones within the design area have been highlighted in this section. These parts of the design area need more detailed consideration and the proposed approach is explained below in greater detail. In the top half of the design area (see right) three zones have been identified. Two more are located in the bottom half (see page 40).





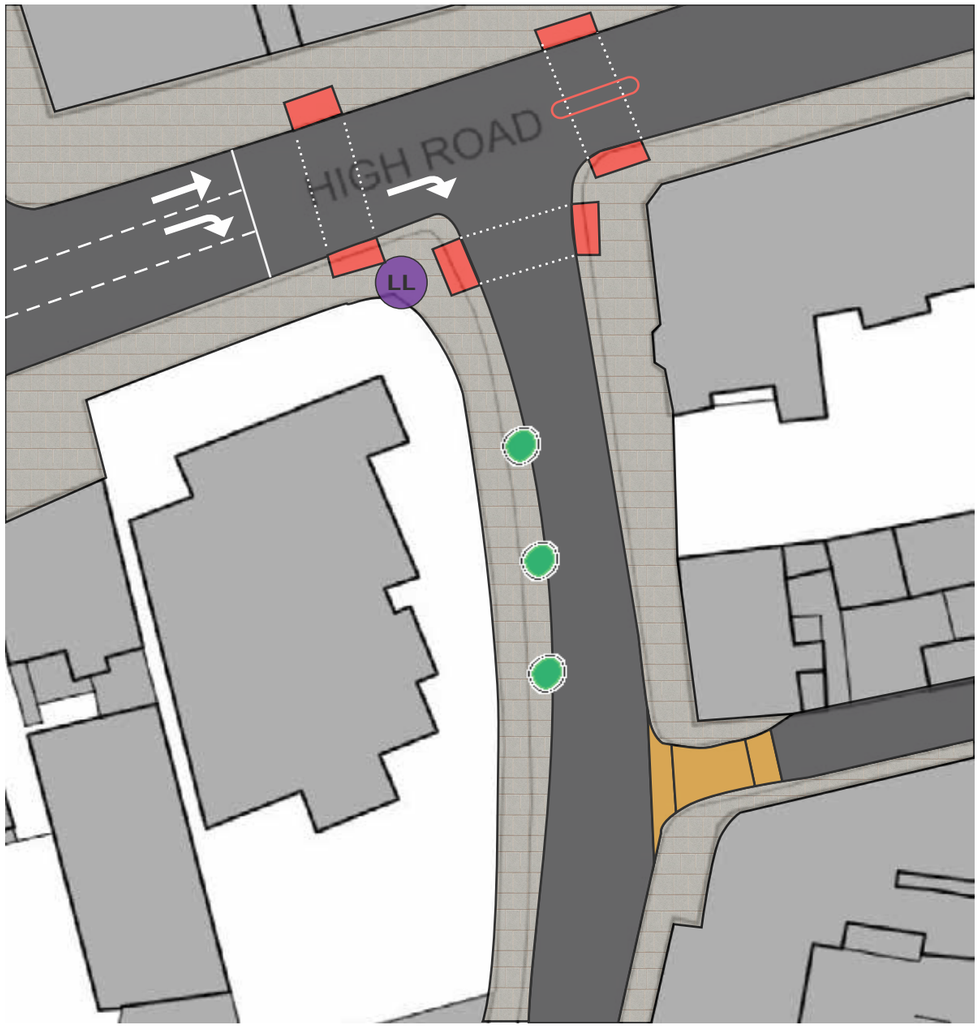
6.3.1 Zone A

This zone covers the junction between the High Road and Station Road. Due to the large number of vehicles on the High Road performing a right turn into station Road (and to the significant number of pedestrians trying to cross the road at the same point) a signalised junction is proposed, subject to additional modelling work showing that the impact of introducing signals/ crossing does not adversely affect other road users. This will improve the pedestrian crossing experience and address safety at one of the key safety hotspots in the study area. Details of the signalisation and the final road markings will need to be developed at the next stage of design.

In addition, StationRoad features excessive carriageway width for a one way street, which often results in speeding and uncontrolled parking.The widening of the pavement along the side of the Eva Hart public house is therefore proposed with a realignment of the kerb line.

Opportunities to introduce street trees in this area are considered later in the report.

More radical improvements to this section of Station Road could be achieved as part of an overall reconfiguration of the highway system; this issue is discussed in more detail in the next section.



6.3.2 Zone B

This zone is currently a complex junction with sub-standard footways resulting in an unfriendly place for pedestrians.

Proposals for this area include the creation of two new zebra crossings north of the junction, respectively on Wangey Road and Station Road. These new crossings replace the existing one located south of the junction. This in combination with the widening of the northern footway of the juncion helps create an orientation space and provides an opportunity for cycle parking and signage at a key decision point.

Street trees could also be included on the northern pavement, subject to a highway visibility check.

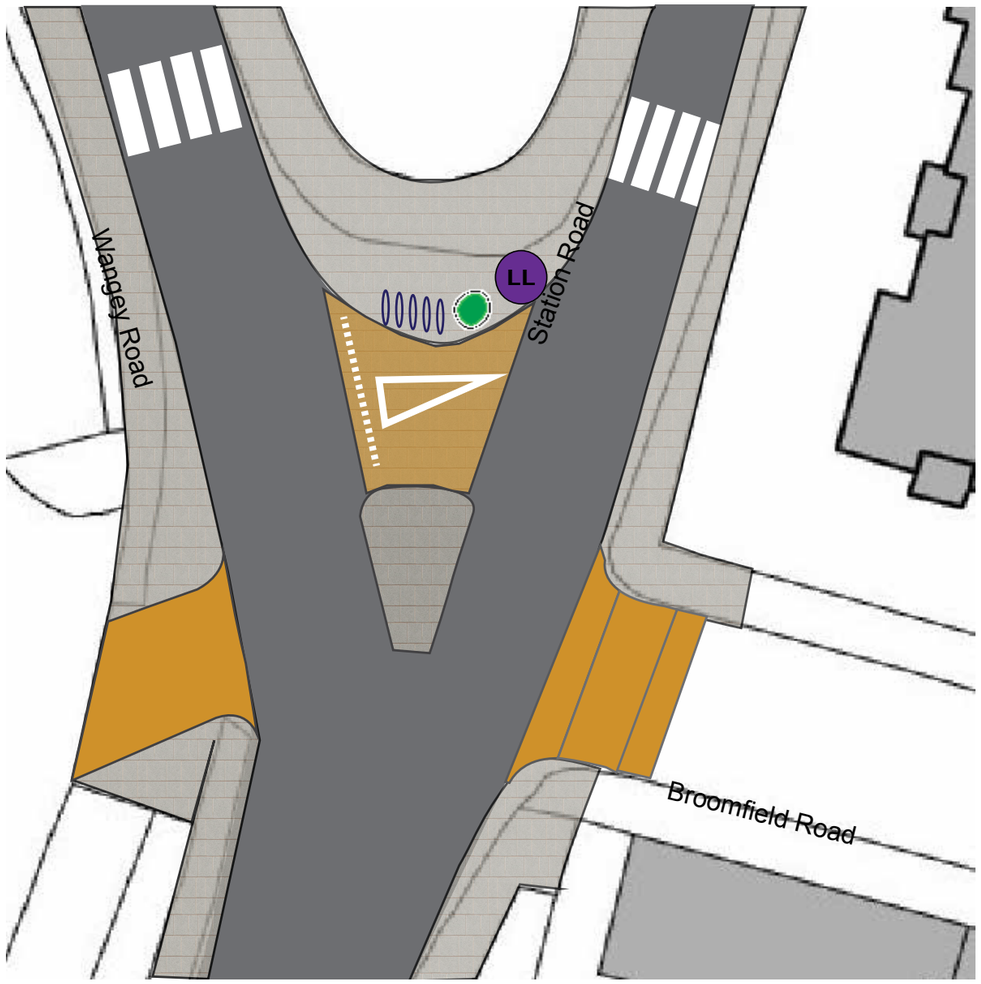
The eastern footway of Station Road, the narrowest in the study area, is doubled in width.

A new traffic island, longer and wider than the existing, is visually connected to the northern footway with a setted treatment of the slip road, thus resulting in additional space for pedestrians and improving the perception of a traffic dominated area.

Other options for this junction have been considered and are shown later in the chapter in the technical drawing section. These options are reflecting respectively a pedestrian focused and a traffic focused approach.

As mentioned in the paragraph above (Zone A) a more radical transformation of this area could be achieved through removal of the one-way gyratory system currently in place in Wangey Road and Station Road and facilitated by this junction. The option of implementing wider highway changes (such as two-way traffic flow) has been considered and is unlikely to be feasible at this stage.

Wangey Road could potentially operate two-way with the opportunity to part-pedestrianise the northern section of Station Road. However, the removal of the gyratory would have a knock on impact on highway and bus movements and its consideration is beyond the remit of this study. The feasibility of this option, however, should be explored further in conjunction with the required traffic modelling.



6.3.3 Zone C

This section of the study area includes the northbound bus stop and the disorganised street furniture currently obstructing pedestrian flows. The proposal for the area is to infill the unused loading bay to increase footway width locally and gain further usable space for pedestrians through the rationalisation of street furniture. As part of this strategy removal of the phone box and relocation of the post box are proposed.

A slight change in the position of the bus stop helps maximise the increase in pedestrian comfort levels. It is key that the same level of service (e.g. waiting facilities, cage length) as the current bus stops is maintained. Dropped kerbs should be considered to ensure extended MIP access from bus stops to platform level.

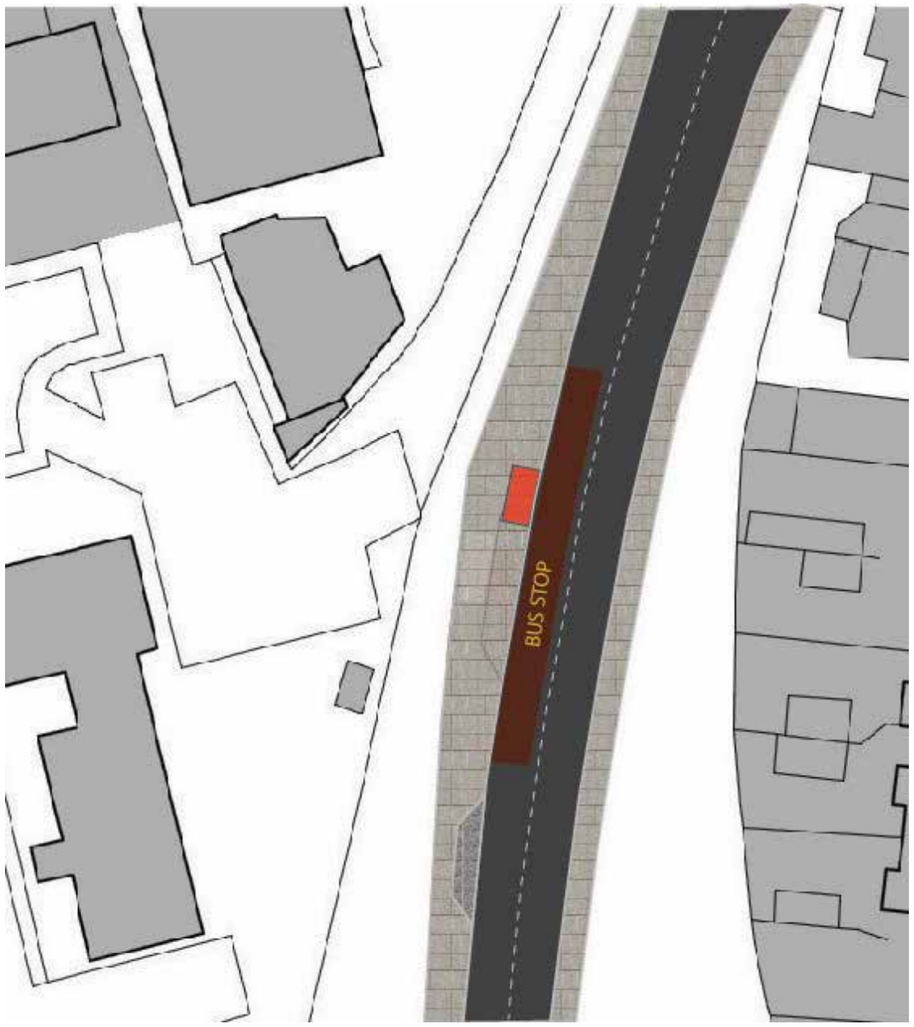
As explained in section 6.3.2 the pedestrian crossing has been re-located.

Removal of the railings on the kerb edge it is also proposed.

LB Barking & Dagenham has indicated that some of the pedestrian guard-railing had been erected to prevent vehicles from damaging the structure of the bridge retaining wall. In this area it is suggested to replace the railings with slim bollards, which are less visually intrusive and more permeable.

A a short-stay disabled drop-off bay is proposed just south of the bus stop to enhance disabled access to the station. Ideally this should be built at footway level to retain footway space when the bay is not in use. Its feasibility however is subject to footway width and detailed design considerations. Should this not be feasible an alternative option would be to provide this on the carriageway.

Finally, as this section features extensive passive frontages on both sides of the road, at the next stage of design it is recommended to explore opportunities to enliven the retaining wall panels on the eastern side and to remove (subject to feasibility) or replace sections of the back fence on the western side in order to integrate the established greenery into the streetscape and improve the setting of the station approach.



6.3.4 Zone D

Zone D includes Chadwell Heath Station and the immediate transport interchange. The main proposals for the area include a zebra crossing immediately outside the station and the consequential relocation of the southbound bus stop slightly further south. It is key that the same level of service (e.g. waiting facilities, cage length) as the current bus stops is maintained. Dropped kerbs should be considered to ensure extended MIP access from bus stops to platform level.

The provision of a zebra crossing will help enforce a no waiting/no stopping zone on the carriageway, thus contributing to relieving congestion on the section of highway outside the station.

Footways in this section are also narrow and in the long term they will be subject to increasing pressure. However, with the tightening of the service road (providing access to the industrial area) and the introduction of an entry treatment there is an opportunity to reconsider the kerb alignment of the south eastern footway. Additional information on this is presented later in the report.

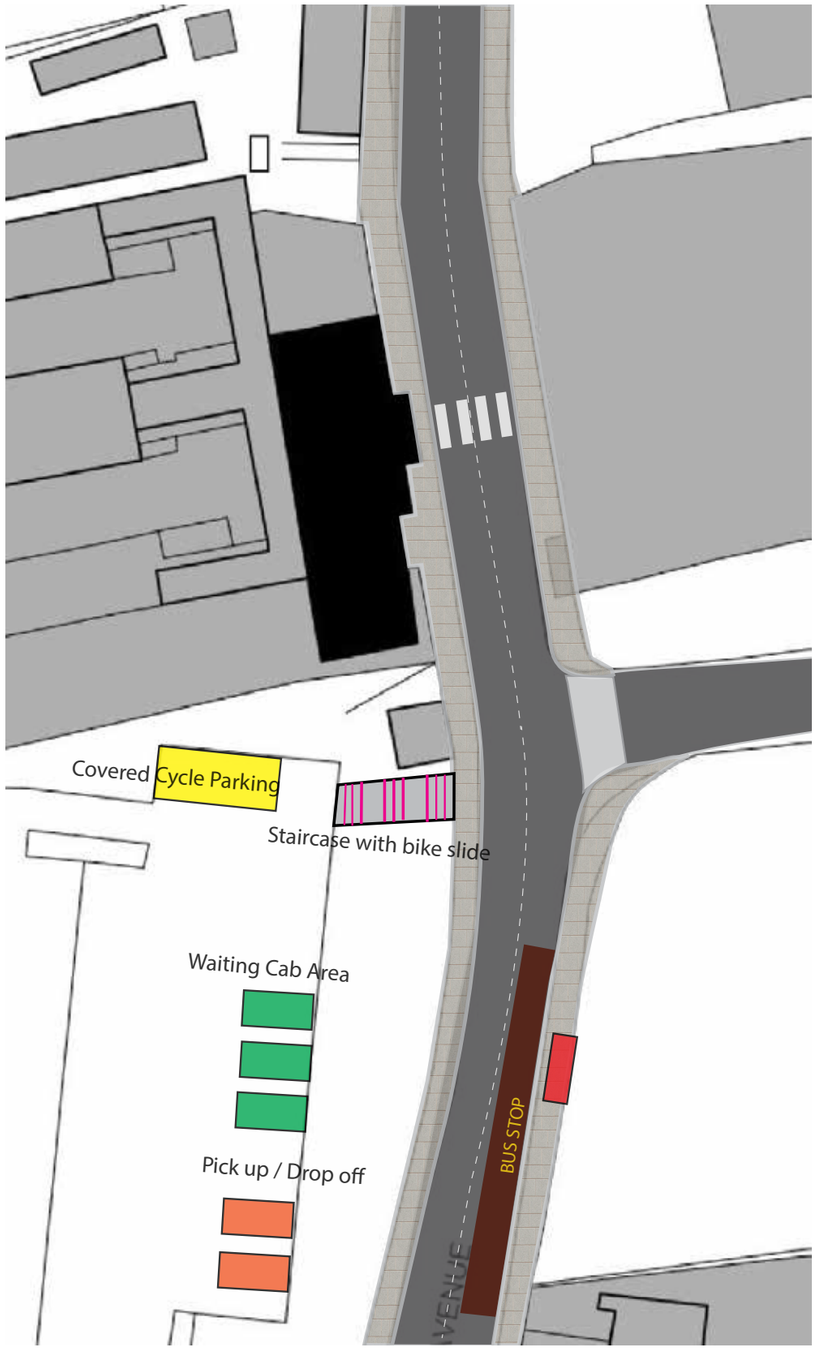
The LB Redbridge owned car park to the south of the station provides significant potential to improve and enhance interchange facilities in this location. Notwithstanding this, the car park is a designated opportunity site in the Redbridge Local Plan and any proposals should not prejudice the future development potential of the site.

The proposals also include the tightening up of the access into the car park and potentially a raised entry. Additional covered cycle parking can be provided in the car park, in line with TfL's recommendations that 40 new cycle parking spaces should be created. Usage should be continually monitored and when usage reaches 80% capacity additional parking should be installed. Cycle parking should supplement parking in the station and not be used to offset provision that could be reasonably located within the station.

CCTV coverage in the car park should be checked to ensure the cycle shed is covered.

The car park has also the potential to accommodate pick up & drop off facilities, minicab waiting bays and help facilitate station servicing. A longer term opportunity to provide access to the station from the car park has also been considered, as this would enhance even further the links to the interchange facilities. This however was considered unfeasible by RfL with the current station layout due to operational and heath & safety issues. As a more viable option a staircase with a bike channel has beeen proposed instead, linking the car park to the station entrance and providing a similar range of benefits to passengers.

At the next stage of design consideration should be given to landscaping this part of the car park to enhance accessibility and improve the setting of the interchange.



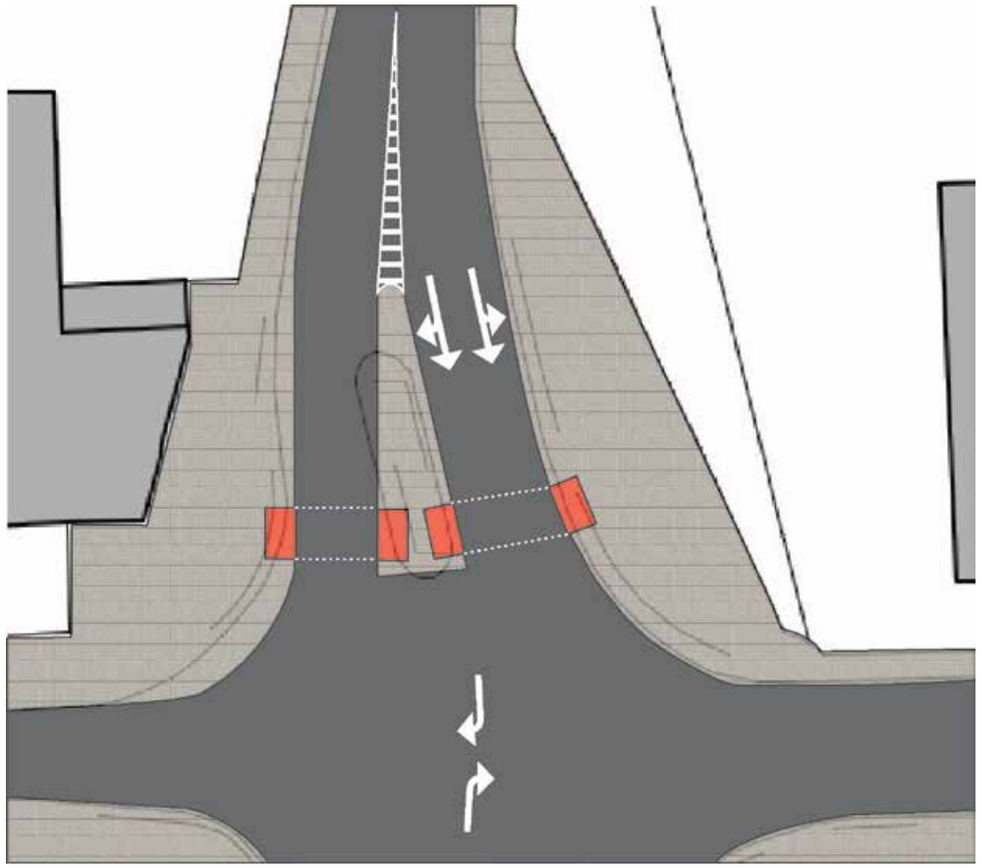
6.3.5 Zone E

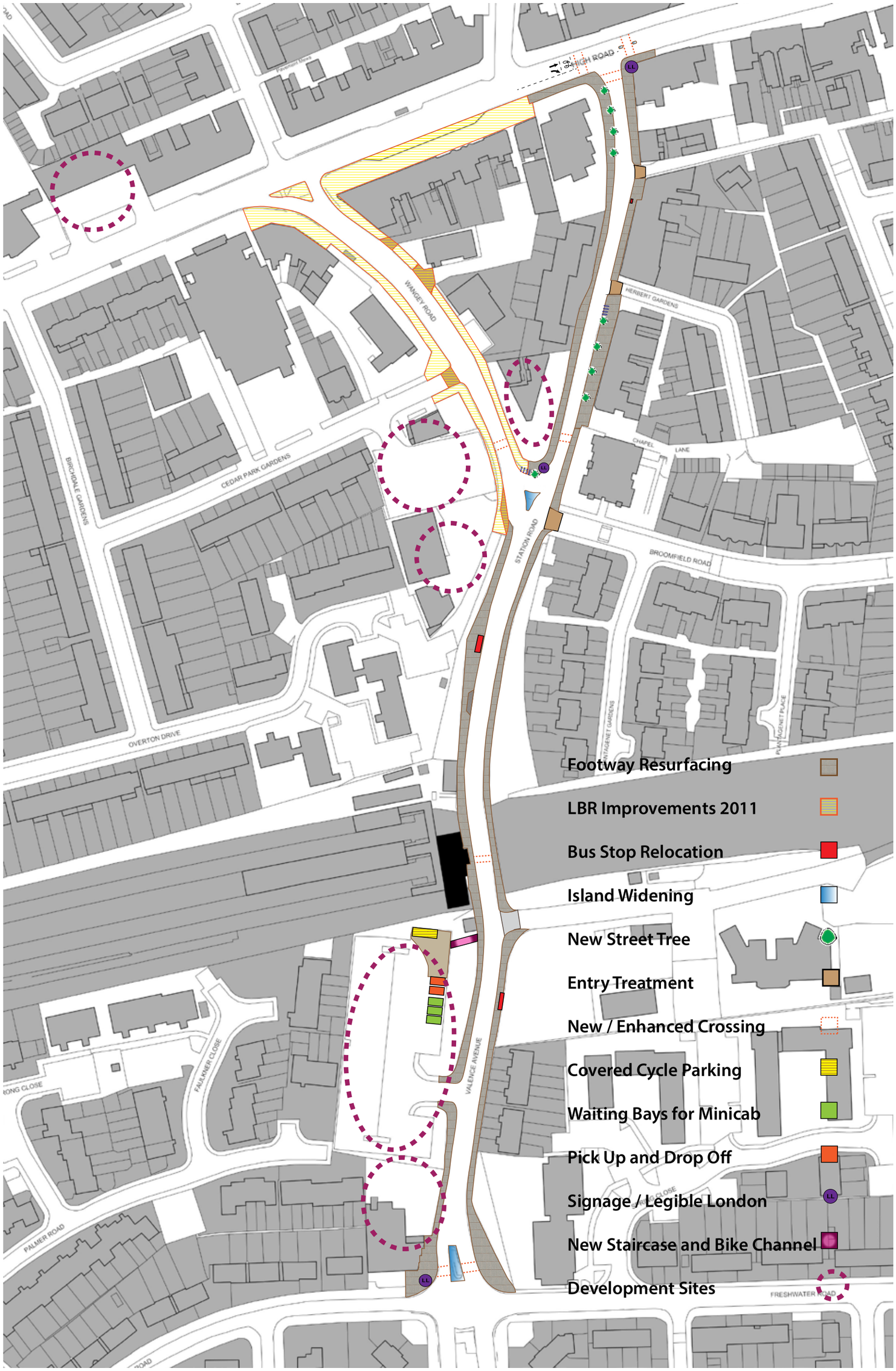
This zone includes the southernmost part of the design area and the two-stage crossing at the Valence Avenue junction. Proposals are not yet finalised for this junction.

Ideally the two stage crossing would be converted into a single stage crossing, with removal of the railings and narrowing of the carriageway. This however is subject to further highway modelling to assess changes to signals and queue lengths and in general highway performance terms.

Further design development will need to be informed by the findings of the highway modelling. This will be developed following the completion of this study.

The proposals described above, along with the more general improvements listed in the previous sections, form a cohesive design as shown in the concept masterplan opposite.




HIGH ROAD
WANGEY ROAD
HERBERT GARDENS
CHAPEL
LANE
STATION ROAD
BROOMFIELD ROAD
CEDAR PARK GARDENS
BIRCHDALE GARDENS
OVERTON DRIVE
FAULKNER CLOSE
VALENCE AVENUE
PALMER ROAD
FRESHWATER ROAD
Footway Resurfacing
LBR Improvements 2011
Bus Stop Relocation
Island Widening
New Street Tree
Entry Treatment
New / Enhanced Crossing
Covered Cycle Parking
Waiting Bays for Minicab
Pick Up and Drop Off
Signage / Legible London
New Staircase and Bike Channel
Development Sites

6.4 Materials

The design, construction and maintenance of ground surfacing materials will be instrumental in improving this important link in Chadwell Heath.This section introduces a moodboard with the materials to be used in the delivery of the proposed improvements.

6.4.1 Paving

The general aspiration is for the paving of the design area to be formed by a combination of:

- Modular concrete paving units 400x400mm with red edge trim (style used in the recent LBR improvement works) in the northern section of Station Road;
- Modular concrete paving 400x400mm on the remaining footways;
- Raised entry treatments in modular blockwork (or setts) natural colour, and /or alternatively in coloured macadam;
- Carriageway blacktop resurfacing with anti-skid at bus stops.
- Surveys will be required to determine below ground constraints (structure, bearing capacity, utilities, etc).

6.4.2 Street Furniture

In order to help pedestrians move through the area smoothly it is recommended to avoid the installation of unnecessary street furniture. In particular, it is recommended:

- To use Sheffield type Cycle stand, consistent with or similar to those recently installed on the High Road
- The removal of the phone box near the northbound bus stop
- The relocation of the Post Box near the northbound bus stop
- The removal of all unnecessary railings
- The replacement of railings protecting the bridge wall structure with slim stained steel bollards

6.4.3 Lighting

The main aim is to reduce the number of lighting columns in the study area and ensure consistency in treatment and adequate lighting levels.

Given the precedent set by LBR around the Wangey Road /Station Road mini gyratory, it is recommended that the LBR adopted column is used in the remaining part of the gyratory (Station Road).

Two types of lighting columns are therefore proposed for the design area:

- Lighting type 1: LBR column to be used in the northern section of Station Road

- Lighting type 2: simple and robust highway column to be used along the rest of the design area.

Additional consideration should be given to the lighting of the area immediately outside the station, and whether lighting generated by the station or building mounted can contribute to create the right amount of ambience lighting.At present there are no proposals for lighting on the station facade.

6.4.4 Wayfinding

Wayfinding is an important element of this overall strategy. It is proposed to create an integrated wayfinding system based on Legible London style mapping.

Integrated Legible London totems will be located at the north and south points of the study area, respectively on the High Road corner (Station Road junction) and at the Valence Avenue southern junction. There is an opportunity to provide an additional totem at the junction of Station Road / Wangey Road. These totems will be supplemented by Legible London style maps at the two bus stops and posters inside the station.

6.4.5 Street Trees

Finally, there is an opportunity to introduce small street trees in the northern section of the study area. Use of local species is recommended. Trees should be sufficiently set back to prevent interference with bus services and pruned regularly.

6.5 Pedestrian comfort for preferred option

Pedestrian comfort levels have been re-assessed on the basis of the proposals illustrated earlier in this chapter.

With the rationalisation of the street furniture, the conversion of the loading bay to footway, the relocation of bus stop and the junction improvements most of the pedestrian flow pinchpoints see a significant improvement.

However, two pedestrian comfort issues remain.

The relocation of the southbound bus stop to next section of pavement (to the south) means this footway will become uncomfortable (level F), given that it is as narrow as the previous one.

Also, in the longer term the pinchpoint immediately to the north of the station entrance, where the pavement narrows next to two small retail units (see photographs right), will become increasingly under pressure (level D).

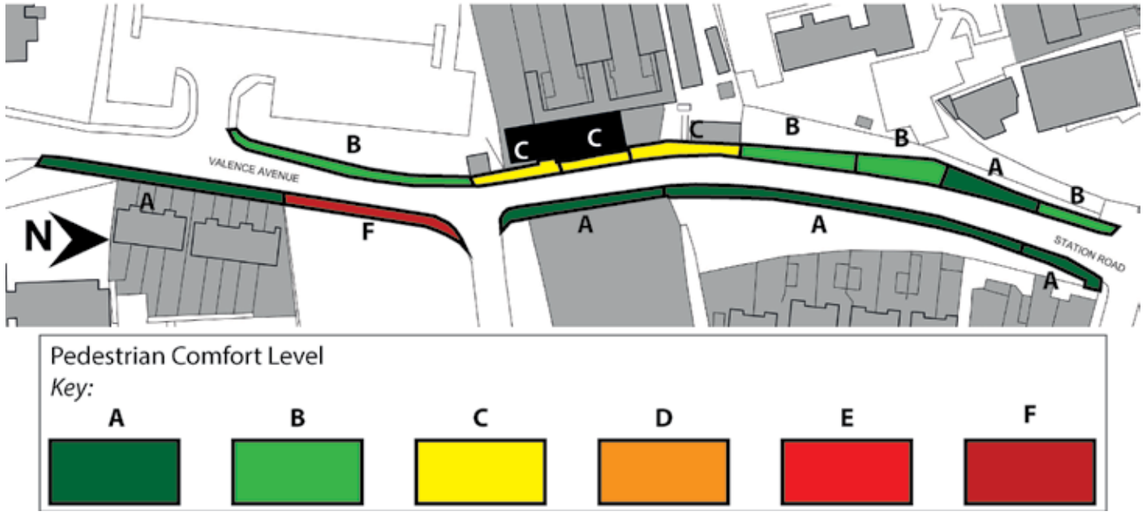
Network Rail have indicated that both retail units are part of the Network Rail lease portfolio and are on railway land. As a result, an action plan to relieve the pinch point could be put together by the borough in cooperation with the Network Rail Property team.

Under this scenario, an alternave location for the private hire facility may need to be considered, as it provides a key service to passengers.

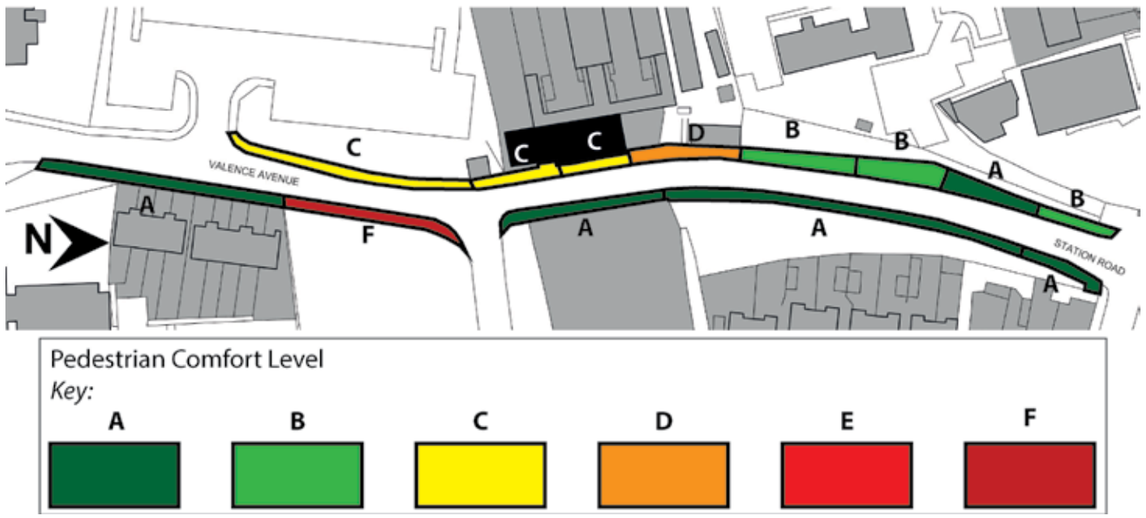
In order to address these two remaining issues it proposed to explore additional footway widening at these locations.

This is illustrated opposite.

2026



2056



As explained on the previous page, additional footway widening is recommended in the immediate interchange zone to ensure comfort levels are acceptable in the longer term.

This proposed footway widening is illustrated indicatively on the plan on the right in red.

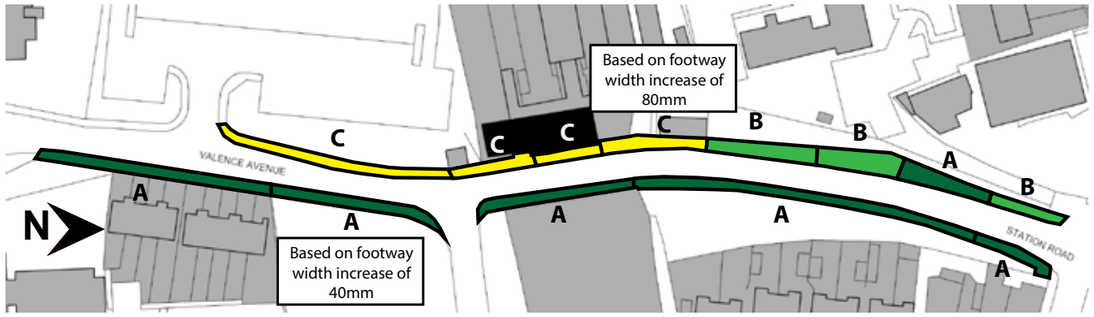
The carriageway has been measured and an additional 800mm could be gained on the western footway, with the largest increase at the existing pinchpoint next to the two retail units.

On the eastern footway, in order to address the pinchpoint on the section of footway with the relocated bus stop, footway widening is proposed in conjunction with the tightening of the access to the service road.

The impact of this additional measures is clear on the diagram below. As a result of this there are no uncomfortable sections of footway in 2056.

More accurate CAD plans are shown on the following pages.

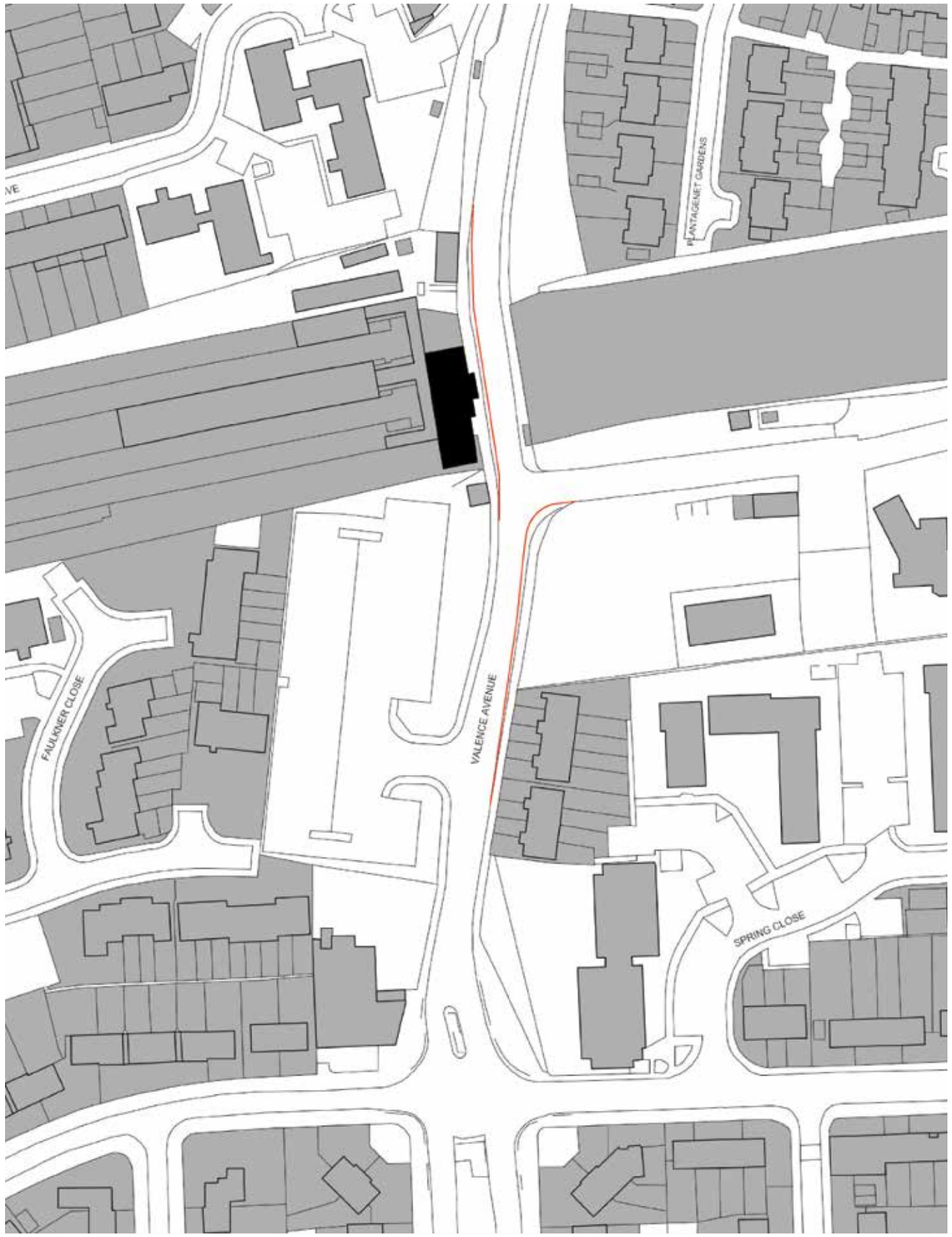
2056 with footway widening



Pedestrian Comfort Level

Key:

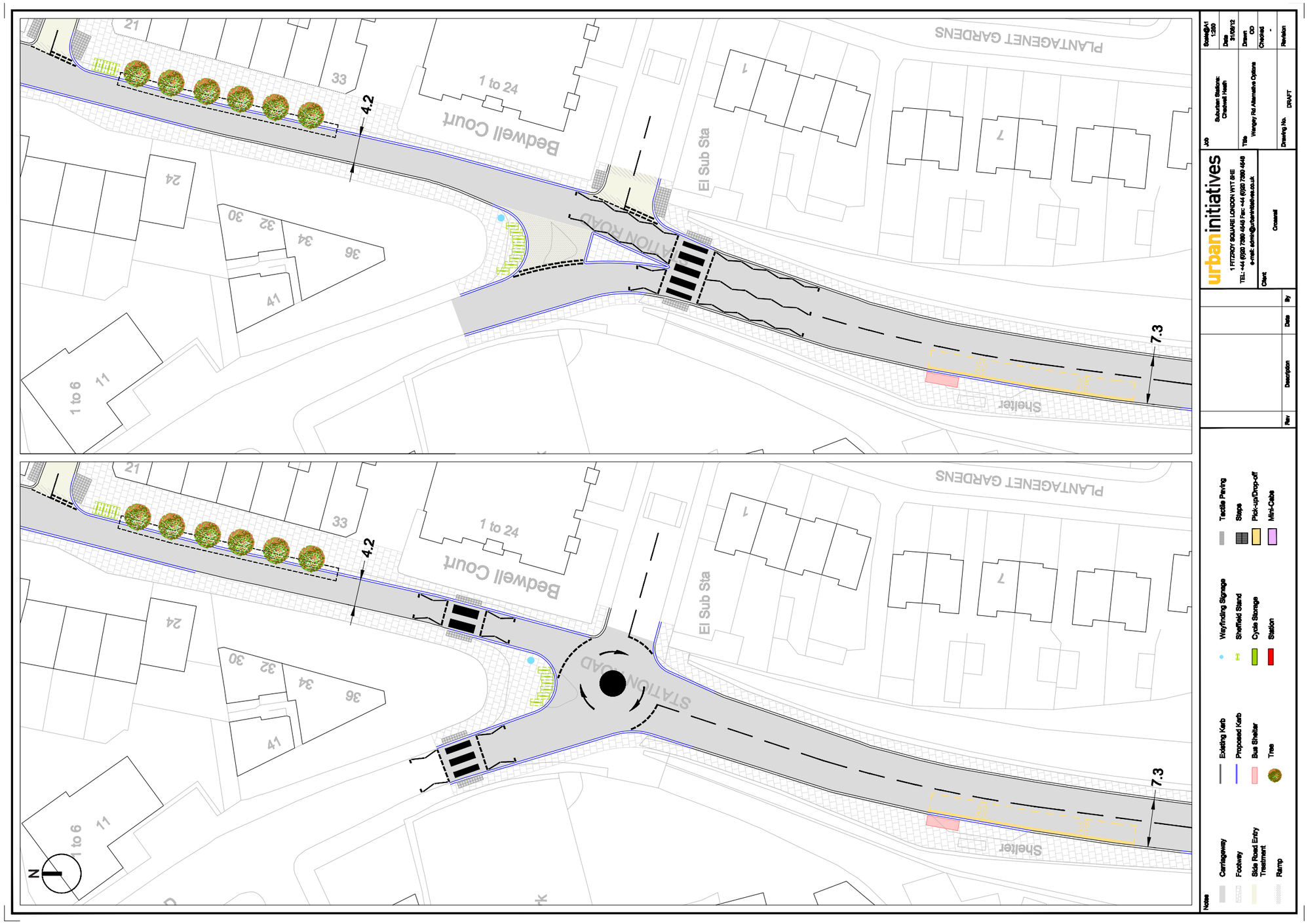
A B C D E F



6.6 CAD Plans


HIGH Rd
WANGEY ROAD
STATION ROAD
CHAPEL LANE
HERBERT GARDENS
BROOMFIELD RD
PLANTAGENET GARDENS
Bedwell Court
Anglia Court
Maple Court
Cooper's Arms (PH)
The Eva Hart PH
Hinds Head (PH)
Wangey Road Chemist
Daisy Mews
Gallery Court
Chatsview Court
Footbridge
Shelter
El Sub Sta
Works
Car Park
PCs
For continuation see left
For continuation see right
4.75
6.0
4.2
7.3
2.5
6.5
2.8
3.4
N
Suburban Stations: Chadwell Heath
General Arrangement
Wangey Rd Junc Alternative
Crossrail
urbaninitiatives
1 FITZROY SQUARE LONDON W1T 6HE
TEL: +44 (0)20 7580 4646 Fax: +44 (0)20 7580 4646
e-mail: admin@urbaninitiatives.co.uk
Tactile Paving
Steps
Pick-up/Drop-off
Mini-Cabs
Wayfinding Signage
Sheffield Stand
Cycle Storage
Station
Existing Kerb
Proposed Kerb
Bus Shelter
Tree
Carriageway
Footway
Side Road Entry Treatment
Ramp
Notes

Alternative options for middle junction



7

Implementation and Costs

This chapter provides an estimate for the cost of the proposed improvements and then discusses the implementation strategy for the delivery of the overall scheme.

Construction Design Management (CDM) issues are also considered here.

7.1 Cost of improvements

The proposals contained in this report cover an extensive area of highway and public realm in the vicinity of Chadwell Heath station.

As the proposals have only been developed to RIBA stage C, detailed costing based on quantity surveying is not part of this report, and will need to be undertaken at detailed design stage.

Nonetheless, high level cost estimates are presented in this section; these have been derived on the basis of three important cost parameters described below.

7.1.1 Cost of LB Redbridge Improvements

Detailed costing is available for the improvements recently delivered by LB Redbridge on Wangey Road and on part of the High Road.

The cost of this works amounts to £500K (not including drainage) and covers an area of approximately 3000m^2,thus resulting in a cost per m^2 in the region of £150 to £200.

Given the similarities in location, scope and materials this forms an important source of information for this exercise.

7.1.2 Cost Estimates for LB Barking & Dagenham LIP Bid

A costing exercise had also been undertaken for the submission of the LIP Major Scheme bid to TfL by LBBD.

The estimate of the LIP bid scheme was £1m.

A breakdown is shown in the table below and more details can be found in the Appendix.

PROPOSED MEASURE	INDICATIVE COST (£)
Pedestrian Facilities	300,000
Public Transport Facilities	100,000
Street Furniture	100,000
Carriageway Resurfacing	200,000
General Costs	300,000
TOTAL	1,000,000

It should be noted that the design contained in this report is a development of the design costed for the LIP scheme and it includes a more extenisve set of improvements. In light of this, the overall cost of the scheme is likely to be higher that the £1m shown above.

It is also worth noting that this area is almost double in size when compared to the LBR improvements, with a surface of nearly 6000m^2.

Again, if calculated on a per m^2 basis the estimated cost would be in the region of £150 to £200.

7.1.3 Crossrail Urban Realm Schemes cost per square metre

CRL has developed high level urban realm cost parameters to undertake similar exercises for other urban realm schemes along the Crossrail line at the early stages of desing.

These parameters are based on schemes completed in recent years and are also calculated on a square metre basis.

In this instance a higher value of £250 per square metre is considered appropriate for regular streetscape improvements with a significant amount of kerb realignment, signage, tree planting and entry treatments.

When applied to the extent of the study area, approximatively 6000m^2, the £250 parameter would result in a total of £1,500,000.

This estimates include contingency.

In summary, based on the information available at present, it is reasonable to assume a conservative cost estimate of £1,500,000 as indicated in the table below, where all headings have been increased proportionally.

PROPOSED MEASURE	INDICATIVE COST (£)
Pedestrian Facilities	450,000
Public Transport Facilities	150,000
Street Furniture	150,000
Carriageway Resurfacing	300,000
General Costs	450,000
TOTAL	1,500,000

7.2 Implementation strategy and funding

It is envisaged that a number of funding sources will be required to deliver the entire set of improvements described in this report.

As shown above it is estimated that the overall cost of the scheme amounts to £1,500,000.

LBBD have secured £300K thorugh the LIP funding allocation for 2011-12 and the borough has indicated this sum would be spent on a first phase of improvements.

In light of the above, a high level strategy is required to close the funding gap of £1.2m.

This should be developed further at the detailed design stage and as soon as additional resources are indentified.

A phased implementation strategy is explained below.

Phase One

Given the recent set of improvements delivered by LB Redbridge around High Road and Wangey Road, it is recommended that the first phase of implementation should cover the northern section of Station Road to complete these part of the design area. The existing funding pot of 300K is likely to cover a significant part of this area, although there is a risk this may not be sufficient. This should be assessed at the next stage of design.

Phase Two

All parties should work collaboratively to identify additional funding sources to deliver the remainder of the improvements.

When additional funding is secured, and ideally prior to the opening of the Crossrail services, the other elements of the design should be implemented. If funding is limited, at this stage priority should be given to the enhancement of the interchange facilities, including the footways and crossing outside the station, the bus stops, the staircase and facilities in the car park and the necessary kerb realignment in the immediate Interchange zone.

If additional funding is secured the entire set of proposal can be delivered at this point.

Phase Three

Finally, if funding secured in phase two is not sufficient, a third and final phase would need to cover the improvements to the southern junction, and the other remaining elements along the approach sections.

7.3 CDM

As part of design process CRL has followed its Construction Design Management procedure.

Hyder Consulting have been appointed as the external CDM-Coordinator for this design study and in co-operation with the project manager they have produced the required CDM documentation.

In particular, two final output documents have been issued: the Risk Register and the Pre-Construction Information Pack.

RISK REGISTER

This includes mainly CDM risks, relating to the construction and maintenance of the proposed improvements. Design risks have also been highlighted. A copy of the risk register can be found in the Appendix.

PRE-CONSTRUCTION INFORMATION PACK

The Pre-Construction Information document includes all the CDM related information collated during the course of the study and it has been issued separately.

It contains structural information on the railway bridge from previous surveys, and the findings of some recent utility searches.

This information will be handed over to the local authorities responsible for the detailed design and implementation of the proposals.

The local authority will be responsible for managing CDM at the next stage of design.

8

Conclusions and Recommendations

8.1 Conclusions and Recommendations

The urban realm scheme design contained in this report seeks to deliver a positive pedestrian experience that integrates Chadwell Heath Station with its wider surroundings and the district centre.

The design has been developed in full cooperation with Network Rail and Crossrail, who are responsible for the improvements to the station itself.

Rail for London are currently exploring layout options in and around the station entrance to help provide a more open customer circulating area. These works are currently conceptual and unfunded. CRL and RfL will work together to ensure coherent designs.

The work in this report has been supervised by the Urban Realm Steering Group led by CRL. The next stages of design are likely to be led or coordinated by the LB of Barking & Dagenham and Redbridge.

The main feature of the urban realm design proposals, a more generous decluttered and pedestrian friendly space along Station Road, aims to create a simple and continuous new streetscape.

The proposed design would reinforce the legibility of the area and make Chadwell Heath a local gateway, through an enhanced transport interchange and urban realm.

This design has been reviewed by Urban Design London /TfL panel on10 September 2012.

The collaborative approach, in line with Crossrail's Memorandum of Understanding, is at the core of this work and captures the opportunity to create a robust new piece of urban improvement from the existing situation.

In light of the large consesus among all parties around the masterplan proposals, it is envisaged that these will form the basis for any further detailed design.

CDM documentation has been produced in the form of a risk register and a Pre-construction Information Pack, in line with CRL's CDM process.

These documents have been issued separately and will be handed over to LB Barking & Dagenham in due course.

As part of the continuing design development to detail, stakeholder discussions will need to be maintained to identify funding opportunities, implementation considerations and a phasing strategy.

CRL, LBR, LBBD and TfL should continue to work together to identify any available funding

Finally, as far as the design is concerned, it is recommended to explore further, supported by the required traffic modelling, the opportunity to remove the one way system gyratory in the northern section of the study area.

Similarly, it is recommended to progress the modelling required to develop the design of the southern junction.

Appendix 9

9.1 LB Redbridge Policies and Plans

London Borough of Redbridge

Chadwell Heath Station Urban Integration Study

Planning Policy and Transport Context

June 2012

1. Introduction

1.1 This briefing note sets out the planning policy and transport context for Chadwell Heath District Centre (in Redbridge) and the area around Chadwell Heath Station. The note will serve as a background document to the Urban Integration Study into public realm improvements in Chadwell Heath, to be undertaken as part of Crossrail's arrival in 2019.

1.2 The Urban Integration Study is being developed in partnership with Crossrail, Transport for London (TfL) and London Borough of Barking and Dagenham, in accordance with the Memorandum of Understanding for the Urban Realm and Transport Interchange at Crossrail Stations (September 2010).

2. Planning Policy

2.1 The Council has a comprehensive range of adopted Local Development Documents, including the Core Strategy, Borough Wide Policies and a number of Area Action Plans. The Chadwell Heath area falls within the Crossrail Corridor Area Action Plan (adopted September 2011).

2.2 *Crossrail Corridor Area Action Plan*
The Crossrail Corridor Area Action Plan (AAP) covers the geographical area running along the High Road (A118) from the east of Ilford Town Centre, through Seven Kings and Goodmayes, to the borough boundary in Chadwell Heath. It sets out an area-specific framework to guide future change and regeneration in some of the most deprived parts of Redbridge, covering the period 2011-2021 and beyond. The Plan also recognises the arrival of Crossrail in 2019 as a unique opportunity that will act as a catalyst for investment and regeneration in this area, particularly around the stations.

2.3 *The Challenges*
In addition to maximising the benefits of Crossrail's arrival, the plan also seeks to address a number of challenges. These include, raising the quality of design, townscape and public realm within the Corridor; improve the energy efficiency of new development; meet the increasing need for housing and other infrastructure; help create opportunities for training and economic development by protecting and enhancing the retail function of the town centres; improve connectivity and movement along the High Road and improved access to community facilities and links to public open space.

2.4 *Character Areas*
The Crossrail Corridor is made up of a number of distinctive neighbourhoods, all with a different townscape character. The AAP identifies these areas and sets out urban design principles for each character area that underpin the specific urban design, public realm and movement and accessibility priorities for each area. Chadwell Heath Character Area covers the Redbridge part of the District Centre and the station area to the south.

3. Opportunity Sites within Chadwell Heath

3.1 The AAP identifies more than 40 opportunity sites[1], of which eight are located within the Chadwell Heath Character Area. Appendix A shows the distribution of opportunity sites in Chadwell Heath. The table below shows the development

[1] Opportunity sites are sites that the Council considers to be suitable for development in principle, subject to all other planning policies being fully satisfied.

potential of each site, its preferred use and indicative phasing. More detailed site information can be found in Table 5.1 (Opportunity Sites), on page 29 of the AAP.

Site Reference	Potential Number of Residential Units	Other Potential Uses and Comments	Phase
CH08	2		2011-16
GM11	19	Safeguarded under Crossrail Act	2016-21
CCOS16/CH10	29		2011-16
CCOS21	8	Plus retail/community	2011-16
CCOS22	15	Plus retail/healthcare	2016-21
CCOS23	12	Plus retail	2016-21
CCOS24	7		2011-16
Total	**92**		

4. Key Policies and Design Principles

4.1 In order to meet the above challenges, the Council, in partnership with the local community has set out 14 corridor-wide policies for guiding development and investment and for the use in determining planning applications in the Corridor.

4.2 Whilst all relevant policies in the AAP and the wider LDF should be considered, for the purposes of this study the key AAP policies are set out below:

- *Policy CC1 (Opportunity Sites)* – Promotes a mixed use approach to development, with a range of uses including, residential, retail, employment, leisure, education, community and healthcare on sustainable, deliverable sites.

- *Policy CC2 (Character Area Design Principles)* – Requires new development and other streetscape improvements to reflect the principles set out in the Character Area Plans in the Character Area section of the AAP. The Chadwell Heath Character Area Plan can be found in Appendix B. The Chadwell Heath Urban Design Principles are summarised below:

  - Improve link between the Station and High Road (Town Centre)
  - Active frontages – streetscape improvements
  - Remove street clutter
  - Potentially turn Wangey Road into 2-way street
  - Key mixed use sites along Station Road/ Wangey Road
  - Station Car Park – could include provision for taxis, cycle parking and bus stop to become a public transport interchange

- *Policy CC4 (Safeguarding Crossrail)* – Ensures that proposed development does not prejudice the delivery of Crossrail and its associated improvements.

- *Policy CC8 (Improving Access to Public Transport)* – In conjunction with Policy CC4 the Plan supports proposals that improve linkages to and from the Crossrail Stations and other public transport services.

- *Policy CC9 (Walking and Cycling)* – Promoting more sustainable forms of transport are a key challenge in the Crossrail Corridor. This policy supports improvements to and the creation of new cycling and walking links between key destinations within and outside the Corridor.

- *Policy CC13 (Improving Quality of and Access to Open Spaces)* – Much of the Crossrail Corridor is designated as being in an area of public open space deficiency. This policy seeks to improve links from within the Corridor to the large areas of open space located to the north and south, including St Chad's Park and Goodmayes Park.

- *Policy CC14 (Improving Public Realm and Streetscape)* – In accordance with the Character Area Design Principles this policy supports improvements to the public realm, particularly in the town centres and around the stations.

5. Transport and Highways

5.1 The Redbridge Local Implementation Plan (LIP) (2011) identifies Chadwell Heath as part of 'Radial Corridor 1: A118 High Road' and seeks to implement *"measures enhancing streetscapes including improved links to local amenities and open spaces, junction upgrades to improve traffic flow and public transport reliability."* Over the period 2011/12 to 2013/14 funding of around £1.3m will be available for highways improvement works in this corridor.

5.2 A schedule of completed highways improvement works for Chadwell Heath (High Road/Wangey Road) are shown on the plan in Appendix C and listed below:

Wangey Road
- Renewed footways in Wangey Road - new town centre paving
- Renewed street lighting in Wangey Road with back lights
- Side road entry treatments
- Removed and rationalised signing
- Single surface (level) treatment to all crossovers
- Improved crossing points at the junction of Wangey Road and Station Road
- Installed new seats
- Removed all guard rail
- Removed redundant SU cabinets
- Planted street trees

High Road Chadwell Heath (from Station Road to Birchdale Gardens)
- Removed all existing guard rail
- Completed footway to Station Road
- Cleaned and repaired existing footways
- Installed new seating
- Improved east bound bus stop so that two buses can stop an the same stop to assist passengers
- Removed unnecessary street furniture
- Brought parking bays up to footway level to give the impression of wider footways
- Improved signage for cyclists on bollards
- Will be installing new street trees in the new planting season
- Removed unnecessary crossovers
- Installed side road entry treatments

5.3 In addition to the above works, a number of other options were considered, but were not taken forward. These included:

- Working with LBBD to improve/renew lighting on the High Rd but funds were not available.

- Making Station Rd/Wangey Rd a one way gyratory but it provided no time benefits for buses.
- Entry treatment into Station Rd but TfL Buses and the Police objected as they thought it may cause delay to right turning manoeuvres.

6. Further information and contact

6.1 For further information please contact:

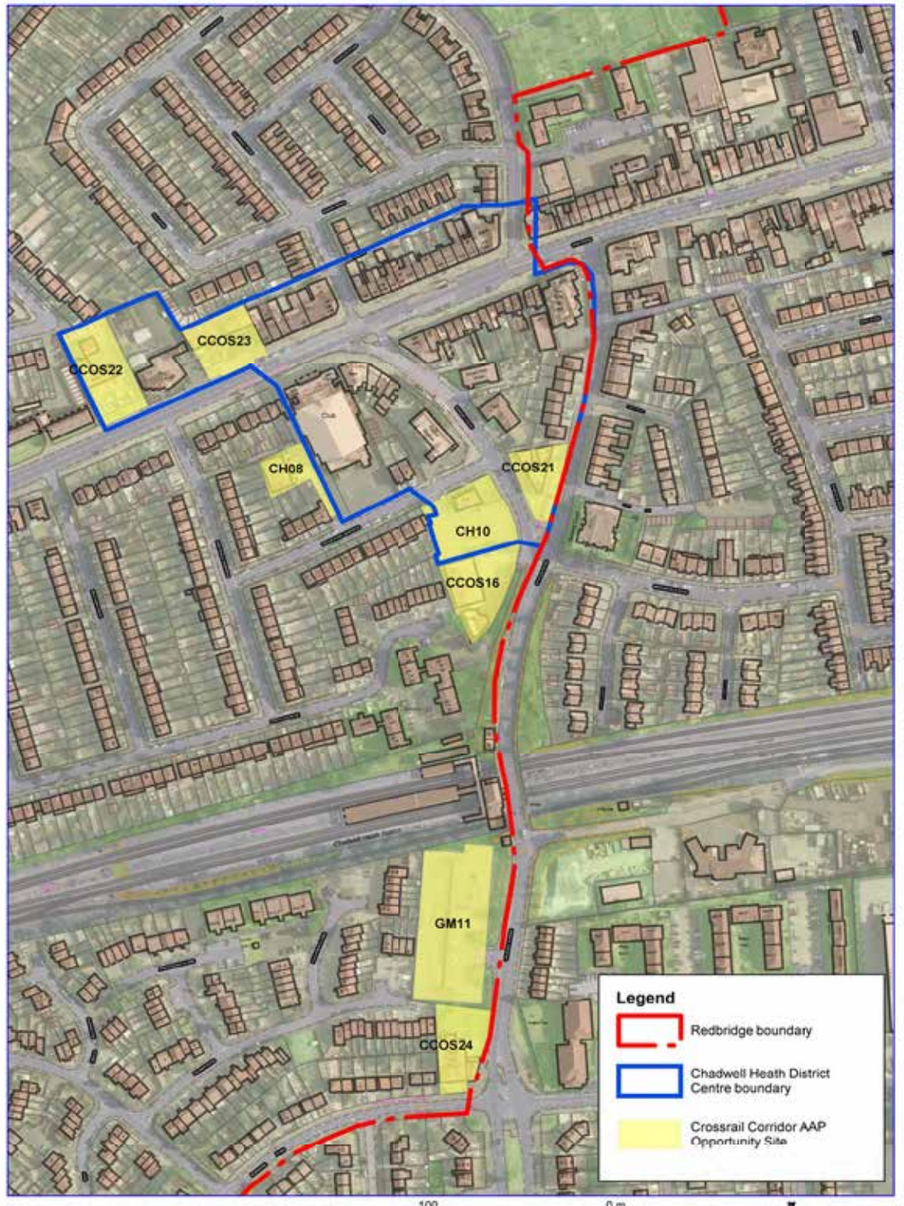
Planning Policy

Ross Whear - Planning Policy Officer
Email: ross.whear@redbridge.gov.uk
Tel: 020 8708 2752

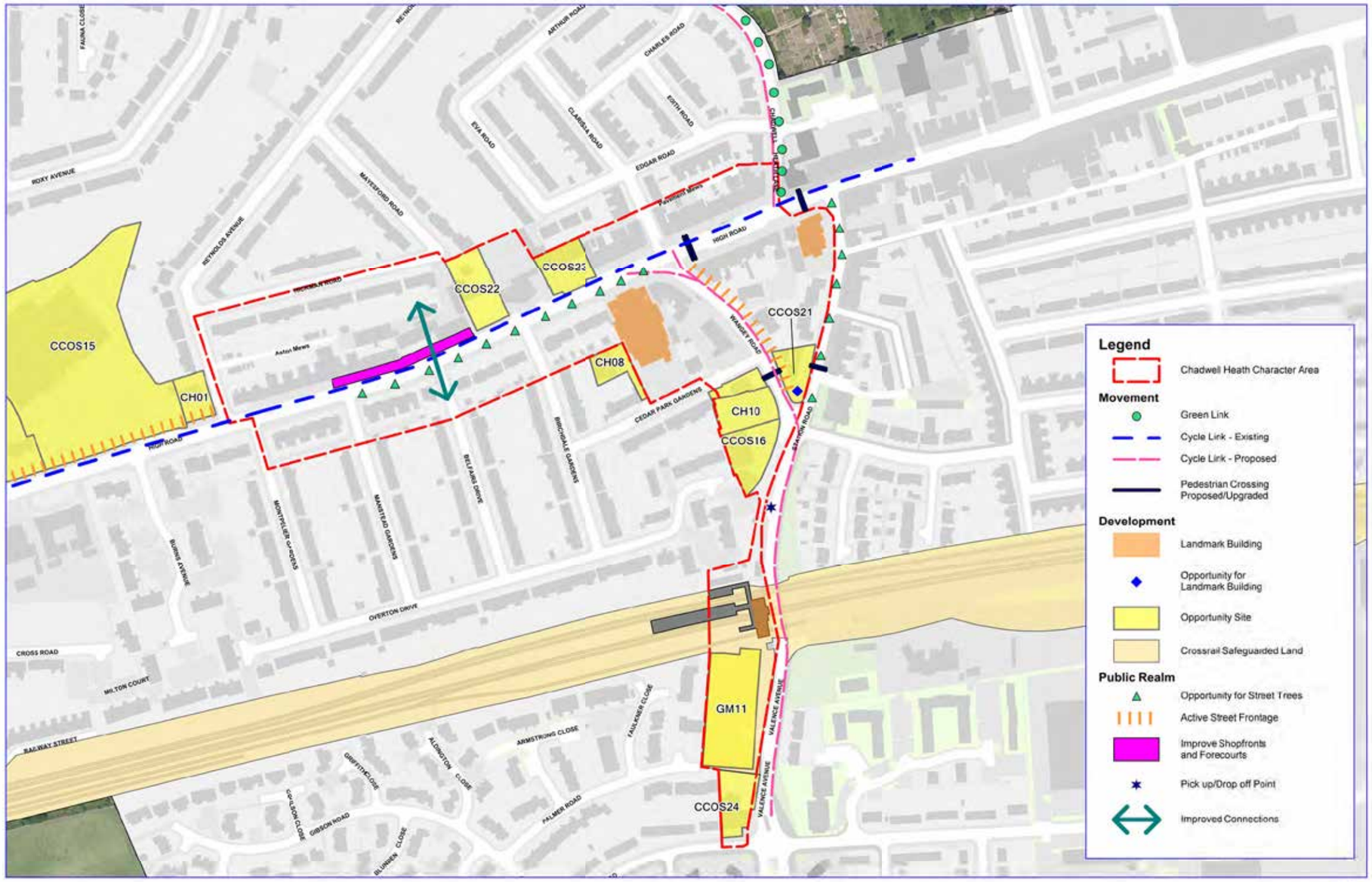
Highways and Transport

Peter Foley – Principal Development Management Officer
Email: peter.foley@redbridge.gov.uk
Tel: 020 8708 3686

Appendix A: Chadwell Heath Context Map



Appendix B: Chadwell Heath Character Area Plan

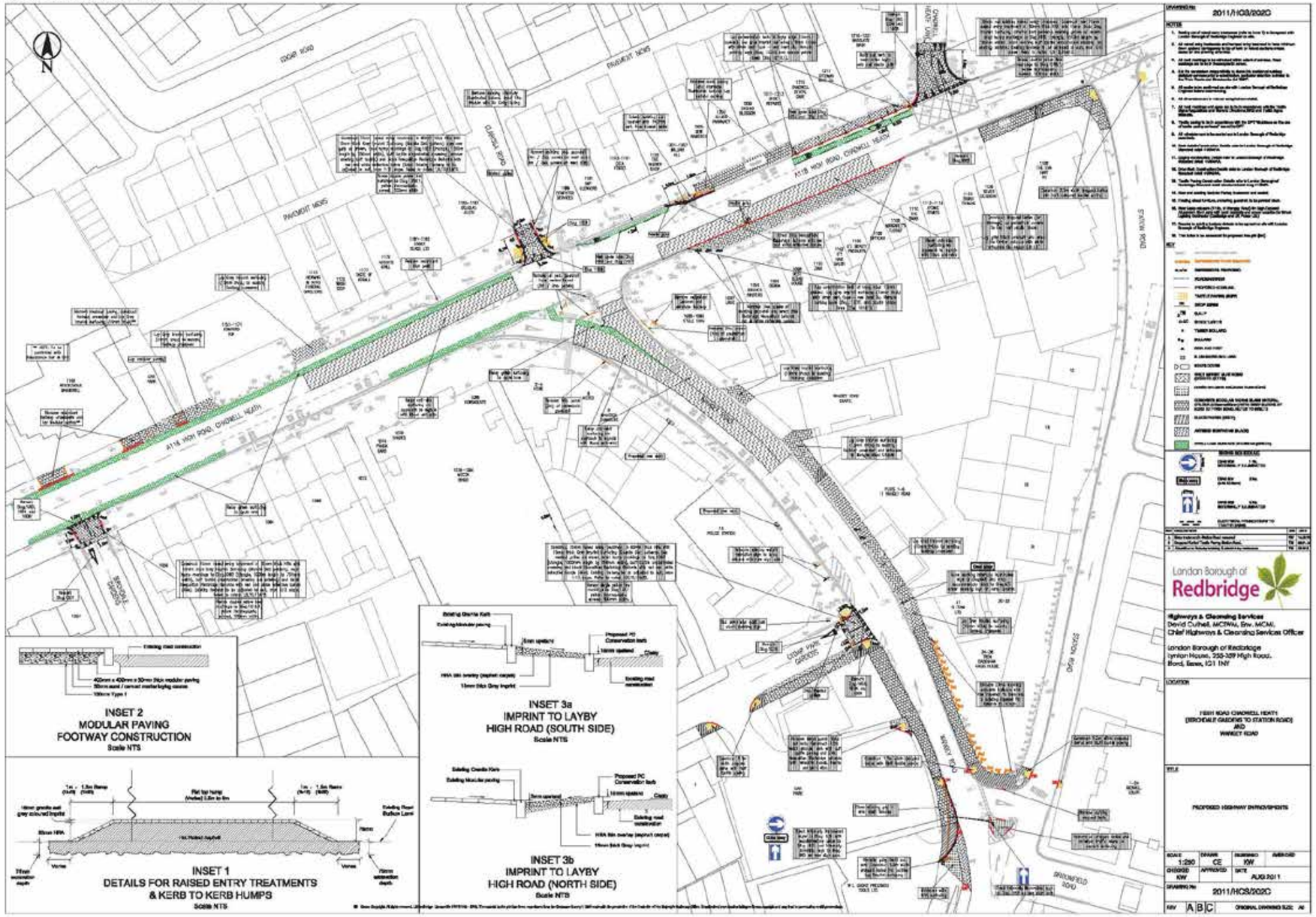


31/05/2012

Scale 1: 2,500

Planning & Regeneration

Appendix C - Chadwell Heath Highway Improvement Works



9.2 Safety: LB Barking & Dagenham LIP scheme

LB Barking & Dagenham **Chadwell Heath Station Access Scheme** **Major Scheme Step 1 Supporting Information**	

1. Introduction and Overview

1.1 This report provides an outline of the key issues/options in support of LB Barking & Dagenham's Step 1 submission to TfL's Major Scheme Programme in 2011/12.

Chadwell Heath Station Overview

1.2 Chadwell Heath Station is located on Station Road, which forms the boundary between LB's Barking & Dagenham and Redbridge. The station is located in Zone 5 and is served by the main Liverpool Street to Shenfield Line operated by National Express East Anglia. Train services operated along this line form the only direct public transport service in this area to central London.

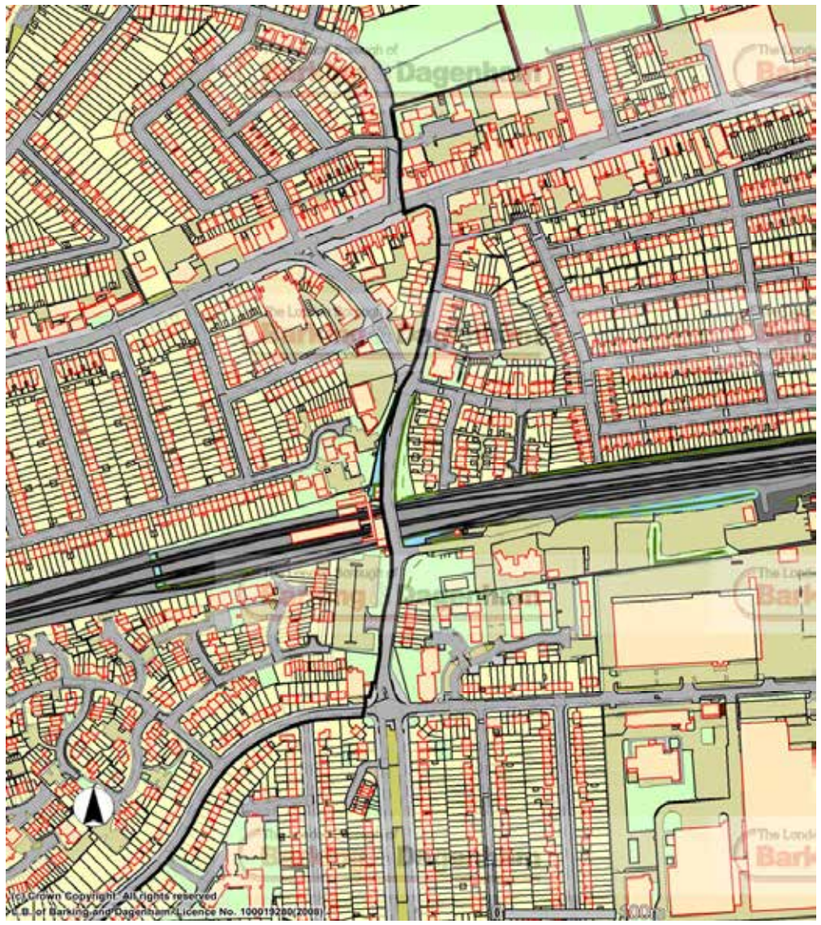
1.3 The station is a brick-built building, around 100 years old, and is sited on top of a road bridge which crosses the railway. The station has generally poor access and limited facilities. Station Road is a single carriageway road, around 10m wide, although it narrows significantly outside the station as it crosses the railway.

1.4 The area around the station is predominantly residential in character, with some industrial use to the south-east. To the north of the station, along Station Road, there are a number of shops. The station is located around 300m south of the A118 High Road – home to a wide range of shops/businesses which serve the locally important District Centre of Chadwell Heath.

1.5 The station is served by 2 bus routes, although another 3 stop within 400m of the station, providing some 27 buses an hour in the morning peak. There are two bus stops on Station Road in close proximity to the station. The station has limited on-site car parking facilities, with various waiting and loading restrictions in force along Station Road. A pay and display car park 100m south of the station acts as the main off-street parking facility for the station in the absence of a dedicated station car park. Station Road is a key north-south cycle link, with some on-street cycle lanes provided, although there are limited cycle parking facilities in the area and none within the station. Pedestrian facilities in the area are poor, with narrow, uneven footways. The location of street furniture further hinders pedestrian movement, and is particularly problematic for disabled people.

1.6 In advance of the start of Crossrail services in 2018, various station refurbishment/improvement works are planned. Work is currently underway to provide step-free access at the station as part of the DfT's 'Access for All' programme and is set to be completed by summer 2012. The launch of Crossrail is anticipated to lead to a 35% increase in the number of passengers using the station, with associated increases in the number of pedestrians, cyclists, bus passengers and car drivers in the area. The works proposed as part of this station access scheme are both in support of the Crossrail works and to facilitate improved access/ease of movement by all those accessing the station.

Figure 1 - Chadwell Heath Station Location Plan



2. Scheme Justification/Key Issues

2.1 A range of additional information is set out in the following section in support of the Step 1 submission to TfL. Information is based on existing data and site observations.

Site Audit/Observations and Supporting Information

2.2 To provide context for the scheme, a site audit was undertaken. The audit examined conditions for pedestrians, cyclists, public transport users as well as drivers in and around the station. In addition, conditions on the main roads around the station were assessed. The audit considered a range of aspects including: footway surfaces, desire lines, pedestrian space, crossing facilities, signage, lighting, cycle lanes, cycle parking, public transport interchange opportunities, car parking, as well as access by private car and taxi. The audit was followed by a meeting with representatives from both LBs Barking & Dagenham and Redbridge to discuss key issues/opportunities. The key findings/recommendations are set out in section 3 of this report.

2.3 In the last three years there have been 20 recorded accidents in the area. Of these two were serious and 18 accidents caused slight injuries. In all cases the accidents appear to be caused by driver, rider or pedestrian error rather than the road condition. However, the information shows that most accidents on or around the junction of Valence Avenue, Freshwater Road and Burnside Road, with the remainder on various locations along Station Road (see attached collision map appended to this report).

2.4 To date, no traffic/pedestrian surveys have been undertaken in the area. However, evidence suggests that congestion often occurs along Station Road at peak hours, particularly in the vicinity of the station where the road narrows as it crosses the railway. The problem is exacerbated by the poor location/siting of bus stops, pedestrian crossings, and lack of dedicated taxi and waiting/loading areas. Narrow footways outside the station mean that pedestrian crowding is a particular issue, especially at peak times and just after trains have arrived at the station. Considerable numbers of pedestrians cross Station road outside the station on the brow of the bridge, despite the fact that there are no formalised crossing facilities in place here. The closest crossing facilities are north and south of the station, some 150m away. Data from National Express, who operate train services from the station indicates that some 2 million passengers used the station in 2010/11.

3. Issues and Options

3.1 The following options are proposed based on recent site observations/discussions and identification of key problems and opportunities. The proposed measures are indicative only, and further work is required to assess whether they represent practical solutions, particularly in terms of cost/buildability. The key elements of the scheme are discussed in turn and are also shown on the accompanying plan.

Station

3.2 The key issues/problems in and around the station include:

- Small, brick built Victorian building located on brow of bridge over railway.
- Station has three entrances, although one is kept permanently locked.
- Internal layout of station concourse poorly arranged which leads to issues of overcrowding/passenger conflict.
- Station building looks tired and scruffy.
- Station lacks facilities such as seating/waiting rooms. Concourse/entrance also poorly signed/lit.
- Lack of dedicated vehicle drop off/pick up point often leads to overcrowding outside station and congestion, both on the footways and Station Road.
- Lack of adequate facilities for pedestrians and cyclists – including poor signage, poorly located crossing facilities and lack of secure cycle storage.

Chadwell Heath station. Building in need of refurbishment and new/improved facilities for passengers/cyclists required.

Station lacks pedestrian crossing facilities and dedicated passenger drop off/pick up are. Lacks also adequate signage/lighting.

3.3 The main options to be considered include:

- Provide sheltered seating outside the station building in the area currently used for industrial waste bin. It may be possible to move this bin to another location within the station.
- Provide extra lighting outside the station building and improved signage/information.
- Provide formalised drop-off facility and taxi stand incorporated into the car park south of the station.
- Provide pedestrian crossing in immediate vicinity to the station on the desire line on the rail bridge.
- Provide secure cycle storage either on station platforms or in public car park.
- Improve look of the station by renovating the external parts of the building (requires Network Rail cooperation).

Station Road (between station and junction with Valence Avenue/Burnside Road/Freshwater Road)

3.4 The key issues/problems in and around this part of Station Road include:

- Footways on either side of road are narrow and in poor condition, with cracked/uneven paving. Lack of dedicated pedestrian crossing facilities.
- Wide entrance/exit splays to public car park located off Station Road. Increases potential for conflict between pedestrians/motorists.
- Major junction at Valance Avenue is poorly designed with crossings not located on pedestrian desire lines, large amount s of guard railing and inadequate/safe facilities for cyclists (e.g. cycle lanes/advance stop lines). Phasing of traffic signals appears to heavily favour motor vehicles.
- Unclear/inconsistent signage.

Wide entrance/exit splays to Station Road car park. Potential for conflict between vehicles/pedestrians.

Poorly designed pedestrian/cyclist facilities at junction with Valance Avenue.

3.5 The main options to be considered include:

- Resurface footways/replace footway paving. Consider implementing new crossing in vicinity of station to aid pedestrian movement and reduce number of collisions between vehicles/pedestrians.
- Narrow car park junction splays and build raised table across junction to assist pedestrians with buggies and disabled people.
- Adjust pedestrian signals to enable pedestrians to cross Valence Avenue in one movement. Relocate crossings to pedestrian desire lines.
- Reduce the amount of guard railing to reduce negative visual effect.
- Improve conditions for cyclists by installing new cycle lanes/ASLs etc.
- Install new/improved signage.

Station Road (between station and junction with High Road)

3.6 The key issues/problems in and around this part of Station Road include:

- Footways on either side of road are narrow and in poor condition, with cracked/uneven paving. Street furniture is often poorly sited and there is an abundance of guardrailing.
- Pedestrian crossings located away from key desire lines. This is a contributory factor to accidents involving vehicles/pedestrians outside the station.
- Poor road layout at junction between Station Road/Wangey Road/Broomfield Road – a contributory factor to a number of accidents. Problems often exacerbated by speeding vehicles on Station Road.
- Unclear/inconsistent signage. Poor lighting.
- A pedestrian desire line linking Station Road with Overton Drive and the residential area to the west is blocked through fencing. There is also a lack of pedestrian crossing facilities at junction of Station Road/High Road.

Narrow, poorly maintained footpaths. Lack of adequate facilities for disabled people or those with prams.

Pedestrian crossing located away from main pedestrian desire line. Poor road layout at junction beyond.

3.7 The main options to be considered include:

- Resurface footways/replace footway paving. Consider widening footways where there is a high footfall. Remove/relocate guardrailing/street furniture.
- Relocate crossings to pedestrian desire lines. Improve conditions for cyclists by installing new cycle lanes/ASLs etc.
- Install new/improved signage/lighting.
- Improve junction layout where Station Road joins Wangey Road/Broomfield Road. Consideration to be given to replacing give way/turnings with new roundabout.
- Restore and formalise pedestrian link between Station Road and Overton Drive via ramp. Implement pedestrian crossing facilities at junction of Station Road/High Road.

Wangey Road

3.8 LB Redbridge is currently finalising plans for a number of improvements to the appearance of Wangey Road to be carried out in 2011/12. Works include upgrading of street lighting, improvements to footways/carriageway, junction entry treatments, new trees and improved signage.

High Road

3.9 The key issues/problems in and around the High Road include:

- Streets, although wide in places, remain cluttered with street furniture, shop displays, etc. and are not particularly pedestrian friendly. Lack of high quality public realm space.
- Poorly defined and enforced parking/loading arrangements.
- Routes to main shopping area poorly defined/signed.
- Concerns over drainage as there is a problem with flooding whenever there is heavy rainfall.

Uneven, cluttered footways on High Road. Inadequate/outdated street lighting.

Lack of dedicated pedestrian crossing facilities at junction – leads to pedestrian/vehicle conflict.

3.10 The main options to be considered include:

- De-cluttering of pavements/footways to make the area more pedestrian friendly and to create better circulation spaces/public realm.
- Upgrading routes to main shopping area to make clearer/more attractive. Installation of Legible London signage and improvements to shop frontages.
- New/improved parking/loading arrangements and better provision for taxis.
- Improvements to key junctions to make them more pedestrian/cycle friendly. Consider provision of new crossing at Station Road/High Road junction.

Other Issues/Opportunities

3.11 Other key issues/problems include:

- Lack of dedicated pedestrian/cycle access to Station Road car park directly from the station.
- Inadequate cycle parking/storage facilities.
- Lack of/poorly located direction signing and limited public transport information at station/bus stops.
- Inadequate/outdated street lighting.

3.12 The main options to be considered include:

- Install dedicated pedestrian and cycle access to Station Road car park in its northeastern corner via a ramp, either into or closer to the station building (requires consent from Network Rail/LB Redbridge).
- Install new, secure cycle shelter/lockers in Station Road car park, together with new lighting/CCTV (require consent from LB Redbridge).
- Improve street/direction signage. Consider roll-out of Legible London signage. Ensure up-to-date timetable/travel information is in place at station/bus stops. Consider installation of real time travel information via Countdown.
- New/improved street lighting to match that recently installed in the High Road.

4. Other Information

Accessibility Statement

4.1 The proposed scheme will lead to the creation of a better balanced, more accessible street, which more closely reflects the areas status as an important District Centre as well as opening the area up as a 'gateway' to the north of the borough and improving links to neighbouring boroughs. This will be achieved through a staged approach of improving footway conditions/crossing facilities, tidying up/reducing street clutter and rethinking some traffic management options.

CDRP Strategy Support Statement

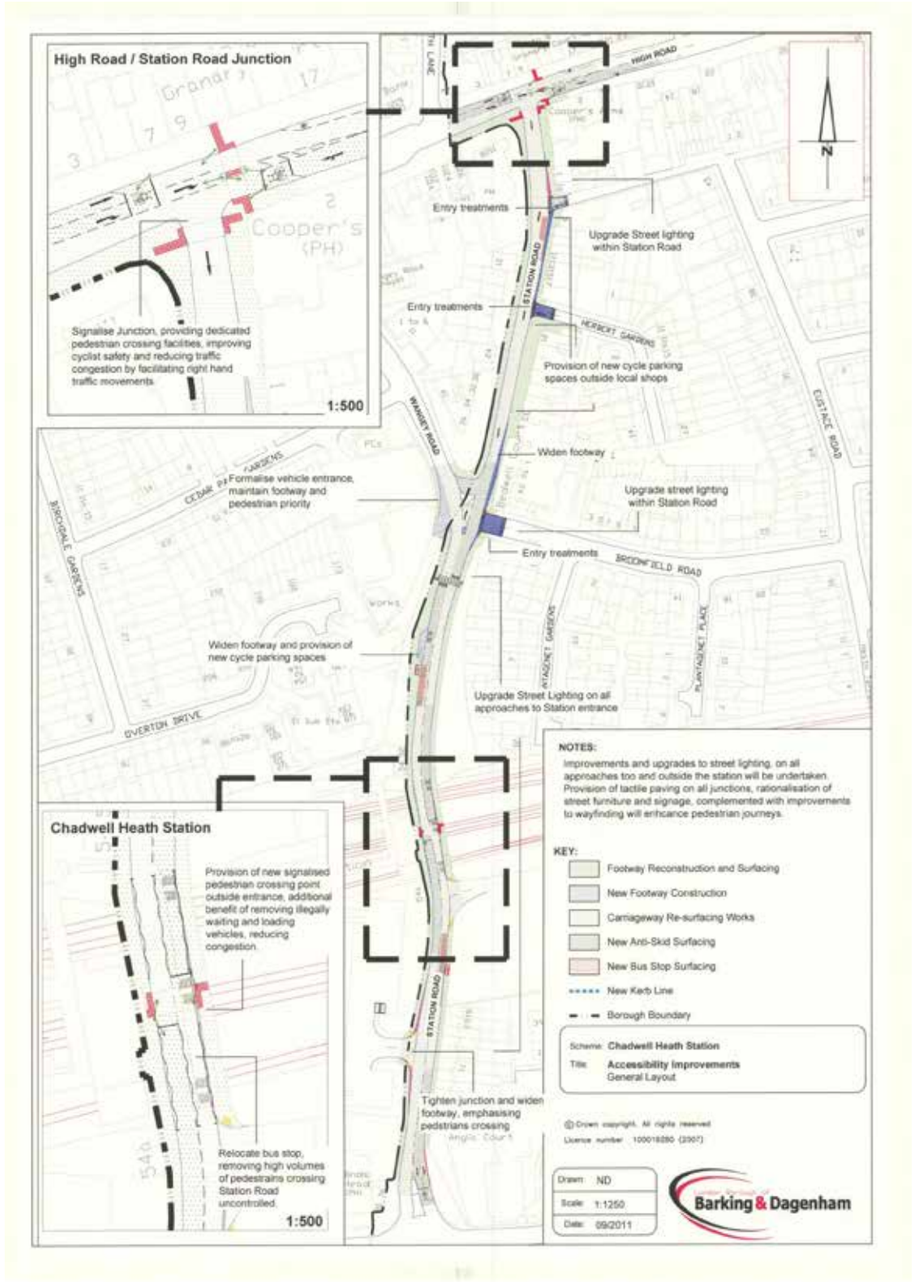
4.2 Despite a fall in recorded crime on the local transport network, crime and the fear of crime remains a concern for many travellers, particularly at night. Safety/security issues resulting from poorly lit/maintained car parks are a particular concern, especially for vulnerable travellers. The Borough's approach to address this includes Station/car park improvements to enhance security and improve passenger safety; Increased presence of staff/police at stations and on train/bus services; Provision of improved cycle parking facilities; and to make sure new developments achieve the Secure by Design standard and car parks achieve the Park Mark award.

5. Indicative Costs/Funding Arrangements

5.1 The indicative scheme costs are set out in table 1, below. The scheme is to be part funded using borough LIP money in 2012/13 and Major Scheme funding from TfL. In addition, LB Redbridge has committed £500,000 over the next two-years to undertake a range of highway/public realm improvements in the High Road/Wangey Road area.

Table 1 – Indicative Scheme Costs

Proposed Measure	Indicative Cost (£)
Pedestrian Facilities	
New/Replacement Paving, Footway Resurfacing	£150,000
Tactile Paving/Drop Kerbs at crossings/junctions	£25,000
Raised tables at key junctions and to Station Road car park	£25,000
New/Upgraded pedestrian crossings and signals	£100,000
Cycling Facilities	
New/Upgraded cycle lanes/markings and signage	£20,000
New secure cycle parking shelter/lockers, lighting and CCTV in Station Road car park	£30,000
Public Transport Facilities	
Timetable/Travel Information, including Real Time Information	£25,000
Bus stop upgrades to ensure DDA compliance	£25,000
Street Furniture	
New/Upgraded street/directional signage – including Legible London signing	£25,000
New/Replacement street/security lighting	£50,000
New/Upgraded street furniture including seating, bins, trees etc.	£25,000
Other Works	
Carriageway resurfacing	£200,000
General Costs	
Design/Consultation	£100,000
Fees	£100,000
Contingencies	£100,000
TOTAL	**£1,000,000**



9.3 Road Safety - Collision data

9.4 CDM Risk Register

Chadwell Heath Urban Realm Design Study

CDM and Design Risk Register

Document Number: CRL1-HYD-O3-LRG-CR117-50001

Document History:

Revision:	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue:
0.3	08/08/2012	John Haines			For Review

CROSSRAIL REVIEW AND ACCEPTANCE STATUS This decal is to be used for submitted documents requiring acceptance by CRL.		
☐	Code 1.	Accepted. Work May Proceed
☐	Code 2.	Not Accepted. Revise and resubmit Work may proceed subject to incorporation of changes indicated
☐	Code 3.	Not Accepted. Revise and resubmit. Work may not proceed
☐	Code 4.	Received for information only. Receipt is confirmed
Reviewed/Accepted by:(signature)		
Print Name:		Date:
Acceptance by CRL does not relieve the designer/supplier from full compliance with their contractual obligations and does not constitute CRL approval of design, details, calculations, analyses, test methods or materials developed or selected by the designers/supplier.		

Document History Continued:

Revision:	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue:
0.1	13/06/2012	John Haines			For Review
0.2	19/06/2012	John Haines			For Review

1 Purpose

This document is to identify hazards and risks identified during the design process. It includes not only CDM issues (construction, maintenance and demolition) but also maintenance and operational issues. The actions in the "Design Mitigation" column have been taken, the Comments column indicates proposed or potential action.

This CDM Risk Register uses the template set out in CR-XRL-Z7-GPD-CR001_Z-50002 Rev. 6.0, Designing for Health and Safety Procedure excluding the "Item affected" column. It was agreed with the Crossrail CDM Advisor on a previous project that this column duplicated information given elsewhere.

There is also a section for design risks. This is used to record significant operational risks that have been addressed in the design.

2 Hazard numbering system

Entry numbers are prefixed "CHC" for CDM items and CHD for Design items. Hazards are grouped by numbering by area or type.

3 Stage

This document has been prepared during the initial design stage - RIBA Stage C.
It is anticipated that the detail design and construction will be taken forward by the London Borough of Barking and Dagenham.

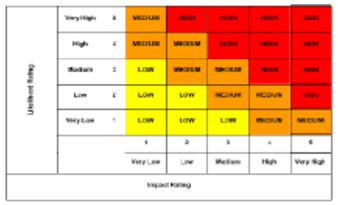
4 Risk Rating

From CR-XRL-Z7-GPD-CR001_Z-50002 Rev. 6.0, Designing for Health and Safety Procedure.

4.1 Guide to Impact and Likelihood Ratings

Code	Rating	Impact	Likelihood
VL	Very Low	Minor Injuries- may require some minor first aid treatment but not requiring medical attention	Improbable, highly unlikely to occur
L	Low	Minor injuries-requiring first aid and/or medical attention	Remote, unlikely to happen but could
M	Medium	Injury or illness incurred reportable under RIDDOR and/or lost time from work	Occasional, increased chance or probability, event could happen or occur
H	High	Major injury or illness with long term health effects, long absence from work	Probable, more likely to happen than not
VH	Very High	Fatality, Fatalities	Frequent, highly likely to happen, almost certain.

4.2 CDM Risk Matrix



Chadwell Heath Urban Realm Design Study - CDM Risk Register | **Location(s) - All** | **Date: 08/08/2012**

Document Number: CRL1-HYD-O3-LRG-CR117-50001, Rev. 0.3

Name of Design Team - Crossrail Urban Integration Team | **CDM Co-ordinator Contact - John Haines** | **Crossrail Project Manager: - Giuseppe Tripodi**

Design Risk Register developed for initial design stage, RIBA C. | **Risk Register under Review to ----** | **Design Team Leader Contact Name: - Giuseppe Tripodi**

Design Risk Register Interface(s) with: None

Ref No	Location	Operation or activity being considered	Hazard	Risk	Current Risk Exposure (Risk Matrix) L	Current Risk Exposure (Risk Matrix) I	Design Mitigation Action (Things done)	Risk Owner	Residual Risk (Risk Matrix) L	Residual Risk (Risk Matrix) I	Residual Risk Owner	Comments and/or details of further development and/or information required (Things proposed or suggested)	Interface with and location
Construction Phase													
General issues													
CHC/101	Station area	**Construction**	Vandalism	Damage to site equipment might cause injury accident later.	L	L	1) Included as issue in Pre-Construction Information, section 7.2.	Designer	L	L	Principal Contractor	1) Works area is well trafficked but parts are not overlooked. 2) Compound area will need to be secure.	
CHC/102	Station area	**Construction**	Trespassers on the railway.	Construction work facilitates illegal access to station or tracks. Possible injury to intruder or damage to rail systems.	L	L	1) This is not considered an issue if the work is restricted to Highway works.	Designer	C	C	Principal Contractor	1) This would have to be reviewed if work to rail boundary (bridge parapet etc.) is considered.	
CHC/103	Station area	**Construction**	Narrow footway outside station.	Difficulty in evacuation. Possible panic & injuries.	L	H	1) Included as issue in Pre-Construction Information, section 7.2.	Designer	L	H	Principal Contractor	1) Ensure CPP includes liaison arrangements between station & Principal Contractor. 2) Ensure CPP emergency arrangements include notification of station and make allowance for station emergencies.	
CHC/201	Road bridge over rail.	**Construction**	Overloading	Structural failure, material falling onto platforms or tracks. Damage to rail infrastucture, major highway disruption, possible fatality.	L	VH	1) Survey / inspection information has been requested. Reports obtained and included in PCI, Appendix. B. 2) Summary in PCI section 6.8.	Designer	VL	VH	Next stage Designer; Principal Contractor	1) Review any further information when received and include in PCIp. 2) Include a SHE Box note if there is anything significant.	
CHC/202	Road bridge over rail.	**Construction**	Vibration	Material falling onto platforms or tracks.	L	H	1) Survey / inspection information has been requested. Reports obtained and included in PCI, Appendix. B. 2) Summary in PCI section 6.8.	Designer	L	H	Next stage Designer; Principal Contractor	1) Review any further information when received and include in PCIp. 2) Include a SHE Box note if there is anything significant.	
CHC/203	Road bridge over rail.	**Construction**	Excavation	Breaking through structure, material falling onto platforms or tracks. Possible injury to staff.	M	H	1) Survey / inspection information has been requested. Reports obtained and included in PCI, Appendix. B. 2) Summary in PCI section 6.8.	Designer	M	H	Next stage Designer; Principal Contractor	1) Review any additional information when received and include in PCIp. 2) There is evidence of previous services excavation and reinstatement (some of it in poor condition). 3) Include a SHE Box note if there is anything significant.	
CHC/221	Generally	**Construction**	Narrow footways.	Overcrowding during works. Possibility of injury accidents if passengers go onto carriageway.	M	H	1) Included as issue in Pre-Construction Information, section 7.2.	Designer	M	H	Principal Contractor		
CHC/222	Generally	**Construction**	Work blocks crossings.	Pedestrians at risk from traffic crossing at alternative locations.	M	H	1) Included as issue in Pre-Construction Information, section 7.2.	Designer	M	H	Next stage Designer; Principal Contractor	1) Phasing of work is allow for maintaining adequate crossing locations.	
CHC/241	Generally	**Construction**	Electricity	Damage to buried cables possibly causing burns and/or electrocution.	M	VH	1) Discussed at start-up meeting with LBBD (they have recently carried out a study into accessibility improvements but did not make any services enquiries). They would normally do this at a later stage.	Designer	M	VH	Next stage Designer; Principal Contractor	1) Obtain utilities records. 2) Determine if further investigation to establish exact position of cables is necessary. 3) Include information in PCI. 4) PC to be responsible for locating services before excavation.	
CHC/242	Generally	**Construction**	Gas	Damage to buried gas pipes causing gas leakage and possible fire/explosion.	L	VH	1) Discussed at start-up meeting with LBBD (they have recently carried out a study into accessibility improvements but did not make any services enquiries). They would normally do this at a later stage. 2) There is a service cover close to the station indicating a gas service in the west footway. 3) The bridge inspection report indicates 2 No. 18" gas mains encased in concrete in the centre of the bridge.	Designer	L	VH	Next stage Designer; Principal Contractor	1) Obtain utilities records. 2) Determine if further investigation to establish exact position of pipes is necessary. 3) Include information in PCI. 4) PC to be responsible for locating services before excavation.	

Chadwell Heath Urban Realm Design Study - CDM Risk Register	Location(s) - All	Date: 08/08/2012
Document Number: CRL1-HYD-O3-LRG-CR117-50001, Rev. 0.3		
Name of Design Team - Crossrail Urban Integration Team	CDM Co-ordinator Contact - John Haines	Crossrail Project Manager: - Giuseppe Tripodi
Design Risk Register developed for initial design stage, RIBA C.	Risk Register under Review to ----	Design Team Leader Contact Name: - Giuseppe Tripodi
Design Risk Register Interface(s) with: None		

Ref No	Location	Operation or activity being considered	Hazard	Risk	Current Risk Exposure (Risk Matrix) L	I	Design Mitigation Action (Things done)	Risk Owner	Residual Risk (Risk Matrix) L	I	Residual Risk Owner	Comments and/or details of further development and/or information required (Things proposed or suggested)	Interface with and location
CHC/261	Lighting columns or signs	**Construction**	Unusual founding arrangements.	Unexpected collapse.	VL	VH			VL	VH	Next stage Designer	1) See HSE Safety Notice FOD 5-2010. 2) LBBD to check to see if they have any records of offset or other unusual base arrangements.	
Workplace Issues													
N/A. No workplace is being modified or created by these works.													
Maintenance / Cleaning													
CHC/501	Lighting colums	**Replacement of lamps.**	Work at height.	Fall	VL	VH		Designer	VL	VH	Next stage Designer; Maintainer	1) Choice of lighting by LBBD?	
CHC/502	Lighting colums	**Replacement of lamps.**	Cherry picker in highway.	Obstruction of carriageway or blocking sightlines. Possibility of traffic accident.	L	H		Designer	L	H	Next stage Designer; Maintainer	1) Choice of lighting by LBBD?	
Demolition / Removal													
No significant issues identified.													

Chadwell Heath Urban Realm Design Study - Design Risk Register	Design Team - Crossrail Urban Integration Team
Document Number: CRL1-HYD-O3-LRG-CR117-50001, Rev. 0.3	Design Team Leader Contact Name: - Giuseppe Tripodi
Date: 08/08/2012	Crossrail Project Manager: - Giuseppe Tripodi
Design Risk Register developed for initial design stage, RIBA C.	

Ref No	Location	Design Feature	Risk	Comments
General issues				
CDD/101	Highway outside the station.	Highway design, space for pick-up and drop-off.	Traffic congestion continues due to poor enforcement.	It is proposed to provide taxi bays in the car park. It is further suggested that there be an entrance to the station at car park level.
CDD/102	Footway at southbound bus stop.	Footway width.	Increasing pressure on space over time.	It is proposed that the bus stop is moved and footway widths are increased where possible.
CDD/103	Footway at northbound bus stop.	Footway width.	Increasing pressure on space over time.	It is proposed that the lay-by is filled in, the post box moved and the telephone kiosk removed.
CDD/104	Wangey Road / Station Road Junction	Layout improvements and safety.	Pedestrians cross informally. This is a complex junction with 4 roads and an entrance.	It is proposed to adjust kerb lines and prohibit the right turn from Station Road to Broomfield Road.
CDD/105	Generally.	Tree planting.	It may not be feasible to plant all trees as shown on the masterplan.	
CDD/106	Generally.	Entire scheme.	There may be a funding gap and the improvements are not delivered in advance of CRL opening.	

9.5 Highway Traffic Counts

Undertaken on 24/09/2010 - Northbound

Virtual Day (10)

Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Time	Vbin 0 10	Vbin 10 15	Vbin 15 20	Vbin 20 25	Vbin 25 30	Vbin 30 35	Vbin 35 40	Vbin 40 45	Vbin 45 50	Vbin 50 60	Vbin 60 70	Vbin 70 80	Vbin 80 90	Vbin 90 100	Mean	Vpp 85	>PSL 30	>PSL% 30	>SL1 35 ACPO	>SL1% 35 ACPO	>SL2 45 DFT	>SL2% 45 DFT
0000	107	1	99	0	7	0	0	0	0	0	0	0000	0	1	5	24	44	26	5	2	0	0	0	0	0	0	27.9	32.7	34	31.3	8	7.1	1	0.5
0100	67	0	65	0	2	0	0	0	0	0	0	0100	1	0	2	10	28	17	6	2	0	0	0	0	0	0	29.1	34.4	26	38.4	9	12.8	0	0.4
0200	40	0	38	0	1	0	0	0	0	0	0	0200	1	1	1	6	15	12	4	1	0	0	0	0	0	0	29.1	34.4	17	42.5	6	13.8	0	0.5
0300	31	0	29	0	2	0	0	0	0	0	0	0300	0	0	0	2	12	10	5	1	0	0	0	0	0	0	30.8	35.8	16	51	7	20.7	1	1.6
0400	33	0	30	0	4	0	0	0	0	0	0	0400	0	0	1	4	12	12	4	1	0	0	0	0	0	0	30.3	34.9	17	49.7	5	15.3	0	1.2
0500	80	1	70	0	8	1	0	0	0	0	0	0500	0	0	1	12	34	23	8	1	0	0	0	0	0	0	29.1	33.8	32	40	9	10.9	0	0.3
0600	200	4	172	1	21	1	0	0	0	0	0	0600	2	3	12	57	87	33	5	0	0	0	0	0	0	0	26.2	30.6	39	19.6	6	2.9	0	0
0700	409	4	372	1	27	2	1	0	1	0	1	0700	22	28	65	145	116	29	4	1	0	0	0	0	0	0	22.5	28.2	34	8.2	5	1.2	0	0
0800	583	7	543	2	23	3	3	1	0	0	1	0800	208	99	75	95	78	22	5	1	0	0	0	0	0	0	15.8	25.9	28	4.8	6	1	0	0
0900	571	4	522	3	38	1	2	1	0	0	1	0900	18	24	74	223	188	38	4	1	0	0	0	0	0	0	23.4	28.2	43	7.6	5	0.9	0	0
1000	547	5	500	3	35	1	1	0	1	0	1	1000	2	6	44	209	232	50	5	0	0	0	0	0	0	0	25.2	28.9	55	10.1	6	1	0	0
1100	590	5	543	3	35	1	1	0	0	0	1	1100	5	16	68	229	224	42	5	1	0	0	0	0	0	0	24.3	28.4	48	8.2	6	1.1	0	0
1200	661	4	612	3	35	2	3	0	0	0	1	1200	15	24	88	274	222	35	3	0	0	0	0	0	0	0	23.4	27.7	38	5.8	3	0.5	0	0
1300	645	5	598	3	34	1	2	1	0	0	1	1300	9	22	77	274	219	40	5	1	0	0	0	0	0	0	23.8	28	45	7	5	0.8	0	0
1400	664	5	619	4	31	2	2	0	0	0	1	1400	6	22	82	268	237	43	5	1	0	0	0	0	0	0	24	28.2	49	7.4	6	0.9	0	0
1500	705	4	658	3	34	1	3	1	1	0	1	1500	95	63	94	239	178	32	4	1	0	0	0	0	0	0	20.6	27.1	37	5.3	5	0.7	1	0.1
1600	667	8	621	4	29	2	2	0	1	0	1	1600	70	72	95	221	168	36	4	1	0	0	0	0	0	0	21	27.5	42	6.2	5	0.8	1	0.1
1700	703	9	660	4	21	3	3	1	0	0	1	1700	206	129	102	141	103	21	2	0	0	0	0	0	0	0	16.4	25.7	23	3.3	3	0.4	0	0
1800	665	7	624	3	21	4	3	1	0	0	1	1800	182	107	104	152	102	16	2	0	0	0	0	0	0	0	16.9	25.5	18	2.7	2	0.3	0	0
1900	590	7	555	2	22	1	3	1	0	0	1	1900	65	59	96	196	148	23	2	0	0	0	0	0	0	0	20.7	27.1	27	4.5	3	0.5	1	0.1
2000	423	3	400	1	16	1	1	0	0	0	1	2000	4	11	47	159	161	36	5	0	0	0	0	0	0	0	24.5	28.9	42	9.9	6	1.3	0	0
2100	352	4	333	1	12	1	1	0	0	0	0	2100	1	5	26	122	148	41	7	1	0	0	0	0	0	0	25.6	29.8	49	14.1	8	2.3	0	0.1
2200	227	2	214	1	10	0	0	0	0	0	0	2200	1	2	12	62	107	35	7	2	0	0	0	0	0	0	26.7	30.6	44	19.4	10	4.2	0	0.2
2300	156	1	146	0	9	0	0	0	0	0	0	2300	0	2	9	36	69	32	6	2	0	0	0	0	0	0	27.1	31.5	40	25.5	8	4.9	0	0.1
07-19	**7410**	**67**	**6872**	**35**	**364**	**23**	**27**	**7**	**4**	**2**	**10**	**07-19**	**838**	**610**	**967**	**2469**	**2065**	**405**	**48**	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**21.3**	**27.7**	**461**	**6.2**	**57**	**0.8**	**3**	**0**
06-22	**8975**	**84**	**8331**	**41**	**434**	**27**	**31**	**8**	**5**	**2**	**12**	**06-22**	**910**	**688**	**1147**	**3003**	**2608**	**539**	**67**	**8**	**2**	**1**	**0**	**0**	**0**	**0**	**21.7**	**28**	**618**	**6.9**	**79**	**0.9**	**4**	**0**
06-00	**9357**	**87**	**8691**	**41**	**452**	**28**	**31**	**8**	**5**	**2**	**12**	**06-00**	**911**	**692**	**1168**	**3101**	**2784**	**605**	**81**	**11**	**3**	**1**	**0**	**0**	**0**	**0**	**21.9**	**28**	**702**	**7.5**	**96**	**1**	**4**	**0**
00-00	**9716**	**90**	**9022**	**41**	**476**	**28**	**32**	**8**	**5**	**2**	**12**	**00-00**	**913**	**695**	**1178**	**3159**	**2929**	**704**	**112**	**20**	**4**	**2**	**0**	**0**	**0**	**0**	**22.2**	**28.4**	**842**	**8.7**	**138**	**1.4**	**7**	**0.1**

Virtual Week (Partial weeks = 1.43)

Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Time	Vbin 0 10	Vbin 10 15	Vbin 15 20	Vbin 20 25	Vbin 25 30	Vbin 30 35	Vbin 35 40	Vbin 40 45	Vbin 45 50	Vbin 50 60	Vbin 60 70	Vbin 70 80	Vbin 80 90	Vbin 90 100	Mean	Vpp 85	>PSL 30	>PSL% 30	>SL1 35 ACPO	>SL1% 35 ACPO	>SL2 45 DFT	>SL2% 45 DFT
Mon	9971	110	9170	37	556	29	31	11	7	4	16	Mon	943	818	1353	3356	2830	576	82	9	2	0	1	0	0	0	21.7	27.7	671	6.7	95	1	4	0
Tue	10191	121	9336	44	591	32	36	7	6	3	15	Tue	1142	1021	1440	3206	2651	595	110	23	0	1	2	0	0	0	21.2	27.7	731	7.2	136	1.3	3	0
Wed	10170	100	9371	34	559	35	34	11	8	5	13	Wed	1758	907	1384	3174	2400	466	62	15	2	0	0	1	1	0	20	27.1	547	5.4	81	0.8	4	0
Thu	10477	101	9649	48	549	45	43	17	2	4	19	Thu	967	857	1620	3606	2725	578	106	12	5	0	0	0	1	0	21.5	27.5	702	6.7	124	1.2	6	0.1
Fri	11100	108	10252	55	560	43	47	11	6	3	15	Fri	1961	1274	1537	3276	2426	510	89	19	6	2	1	1	0	0	19.6	27.1	627	5.6	117	1.1	9	0.1
|Sat	9500	75	8896	36	429	21	27	3	4	1	10	|Sat	176	310	907	3334	3642	955	142	27	5	4	0	0	0	0	24.6	29.1	1132	11.9	177	1.9	8	0.1
|Sun	7576	49	7199	34	263	9	13	2	4	1	5	|Sun	22	88	549	2516	3275	947	150	24	5	2	0	0	0	0	25.8	30	1127	14.9	180	2.4	7	0.1

Southbound

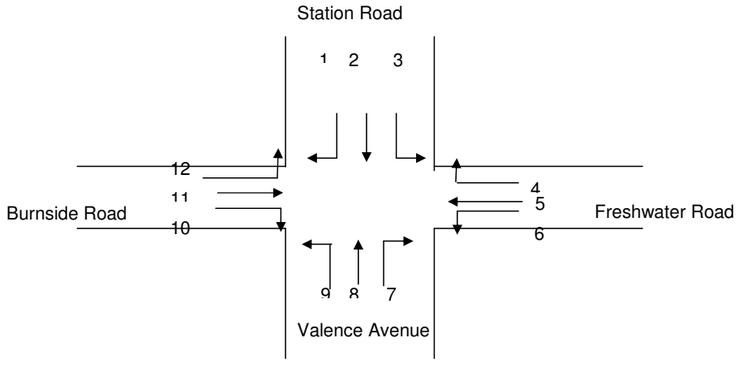
Virtual Day (10)

Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Time	Vbin 0 10	Vbin 10 15	Vbin 15 20	Vbin 20 25	Vbin 25 30	Vbin 30 35	Vbin 35 40	Vbin 40 45	Vbin 45 50	Vbin 50 60	Vbin 60 70	Vbin 70 80	Vbin 80 90	Vbin 90 100	Mean	Vpp 85	>PSL 30	>PSL% 30	>SL1 35 ACPO	>SL1% 35 ACPO	>SL2 45 DFT	>SL2% 45 DFT
0000	112	1	105	0	5	0	0	0	0	0	0	0000	0	1	4	24	52	23	7	1	0	0	0	0	0	0	27.6	32.2	31	27.4	8	7.1	0	0.4
0100	62	1	60	0	1	0	0	0	0	0	0	0100	0	0	1	11	27	16	5	2	0	0	0	0	0	0	28.8	33.1	23	36.5	7	11.1	0	0.5
0200	41	0	39	0	1	0	0	0	0	0	0	0200	0	0	0	5	18	12	4	2	0	0	0	0	0	0	30	34.7	17	42.4	6	14	0	0.5
0300	36	0	34	0	2	0	0	0	0	0	0	0300	0	0	1	4	13	12	5	2	0	0	0	0	0	0	30.6	36.2	19	51.6	7	19.5	0	1.1
0400	43	0	38	0	4	0	0	0	0	0	0	0400	0	0	1	5	14	15	6	1	0	0	0	0	0	0	30.4	35.3	22	52	7	17.4	0	0.9
0500	86	2	74	0	10	0	0	0	0	0	0	0500	0	1	4	14	32	26	8	1	0	0	0	0	0	0	28.8	33.8	35	40.5	9	10.5	0	0.2
0600	187	5	159	1	22	0	0	0	0	0	0	0600	1	1	12	48	81	34	8	1	0	0	0	0	0	0	26.9	31.3	44	23.5	10	5.1	0	0.1
0700	390	4	355	4	22	1	2	1	0	0	1	0700	11	38	94	143	78	22	3	1	0	0	0	0	0	0	21.6	27.3	26	6.6	4	1	0	0.1
0800	499	4	467	4	20	2	1	0	0	0	0	0800	73	126	113	107	59	17	4	1	0	0	0	0	0	0	17.8	25.3	22	4.4	5	1	1	0.1
0900	451	4	412	3	29	1	1	1	1	0	0	0900	6	17	71	191	138	25	3	0	0	0	0	0	0	0	23.3	27.7	28	6.2	4	0.8	0	0.1
1000	477	4	433	4	34	1	1	0	0	0	1	1000	5	16	61	200	164	28	3	0	0	0	0	0	0	0	23.8	28	32	6.7	3	0.7	0	0
1100	499	4	460	4	29	1	1	0	0	0	0	1100	3	17	69	220	161	27	2	1	0	0	0	0	0	0	23.6	27.7	30	6	3	0.7	0	0
1200	548	5	508	5	28	1	0	0	0	0	1	1200	7	28	96	255	140	20	2	0	0	0	0	0	0	0	22.7	26.8	23	4.2	3	0.5	0	0.1
1300	563	5	519	7	29	1	1	0	1	0	0	1300	11	36	99	244	147	24	2	0	0	0	0	0	0	0	22.5	27.1	26	4.6	2	0.4	0	0
1400	565	4	525	5	26	1	2	0	1	0	1	1400	5	25	99	254	155	23	3	1	0	0	0	0	0	0	23	27.1	27	4.8	4	0.7	1	0.1
1500	572	5	533	6	25	1	2	0	0	0	1	1500	13	54	127	223	134	19	2	1	0	0	0	0	0	0	21.7	26.6	23	4	4	0.6	1	0.1
1600	572	4	533	4	26	1	1	0	0	0	1	1600	18	65	137	214	119	17	2	0	0	0	0	0	0	0	21.1	26.2	19	3.4	2	0.4	0	0
1700	602	3	572	6	17	2	1	1	1	0	1	1700	68	130	159	160	71	13	2	0	0	0	0	0	0	0	18.2	24.8	15	2.5	2	0.4	1	0.1
1800	563	4	534	5	16	1	1	1	1	0	1	1800	52	114	139	169	77	9	1	0	0	0	0	0	0	0	18.7	25.1	11	1.9	1	0.2	0	0
1900	516	4	483	5	21	1	1	1	1	0	0	1900	11	43	117	230	99	14	2	0	0	0	0	0	0	0	21.5	25.9	16	3.1	2	0.4	0	0
2000	390	3	371	3	13	0	1	0	0	0	0	2000	2	8	57	170	127	21	3	1	0	0	0	0	0	0	23.8	27.7	25	6.5	4	1.1	0	0
2100	341	3	323	3	11	0	0	0	0	0	0	2100	1	6	36	136	131	27	3	1	0	0	0	0	0	0	24.6	28.6	31	9.1	4	1.1	0	0.1
2200	228	1	215	1	11	0	0	0	0	0	0	2200	0	2	15	83	94	27	6	1	0	0	0	0	0	0	25.9	30	34	15	7	3	0	0.1
2300	161	1	152	1	8	0	0	0	0	0	0	2300	0	1	8	50	73	23	6	1	0	0	0	0	0	0	26.6	30.4	30	18.4	7	4.3	0	0.2
07-19	**6301**	**51**	**5849**	**57**	**301**	**13**	**13**	**5**	**5**	**1**	**7**	**07-19**	**270**	**667**	**1264**	**2376**	**1443**	**243**	**29**	**5**	**2**	**1**	**0**	**1**	**0**	**0**	**21.4**	**26.8**	**282**	**4.5**	**38**	**0.6**	**4**	**0.1**
06-22	**7736**	**66**	**7185**	**68**	**367**	**15**	**15**	**5**	**6**	**1**	**7**	**06-22**	**284**	**725**	**1487**	**2960**	**1882**	**341**	**45**	**8**	**3**	**1**	**0**	**1**	**0**	**0**	**21.8**	**27.1**	**398**	**5.1**	**58**	**0.7**	**5**	**0.1**
06-00	**8125**	**68**	**7552**	**69**	**385**	**15**	**16**	**5**	**6**	**1**	**7**	**06-00**	**284**	**727**	**1510**	**3093**	**2049**	**391**	**56**	**10**	**3**	**1**	**0**	**1**	**0**	**0**	**22**	**27.3**	**462**	**5.7**	**71**	**0.9**	**5**	**0.1**
00-00	**8504**	**73**	**7901**	**69**	**409**	**15**	**16**	**6**	**6**	**1**	**8**	**00-00**	**285**	**730**	**1522**	**3156**	**2205**	**493**	**89**	**19**	**4**	**2**	**0**	**1**	**0**	**0**	**22.3**	**27.7**	**608**	**7.2**	**115**	**1.4**	**7**	**0.1**

Virtual Week (Partial weeks = 1.43)

Time	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Time	Vbin 0 10	Vbin 10 15	Vbin 15 20	Vbin 20 25	Vbin 25 30	Vbin 30 35	Vbin 35 40	Vbin 40 45	Vbin 45 50	Vbin 50 60	Vbin 60 70	Vbin 70 80	Vbin 80 90	Vbin 90 100	Mean	Vpp 85	>PSL 30	>PSL% 30	>SL1 35 ACPO	>SL1% 35 ACPO	>SL2 45 DFT	>SL2% 45 DFT
Mon	8672	84	7944	61	521	21	18	6	5	2	10	Mon	377	833	1596	3272	2059	441	73	16	1	0	1	2	0	0	21.9	27.3	535	6.2	94	1.1	5	0.1
Tue	8937	89	8231	68	486	17	16	9	10	1	10	Tue	406	1080	1750	3172	2025	401	74	19	7	1	1	1	0	0	21.4	27.1	504	5.6	103	1.2	10	0.1
Wed	8886	70	8219	72	453	28	18	9	4	4	9	Wed	787	1197	1704	2927	1841	347	64	14	2	1	0	0	2	0	20.4	26.6	430	4.8	83	0.9	5	0.1
Thu	9221	78	8467	89	518	13	22	7	13	1	13	Thu	334	927	1915	3587	1983	388	70	15	2	0	0	0	0	0	21.5	26.8	475	5.2	87	0.9	2	0
Fri	9514	85	8821	75	467	23	22	6	5	2	11	Fri	344	1116	2218	3467	1863	411	73	18	3	2	1	1	0	0	21.2	26.6	507	5.3	96	1	6	0.1
|Sat	8437	71	7901	78	345	10	15	5	6	1	7	|Sat	101	392	1260	3277	2642	609	125	24	5	3	0	0	0	1	23.7	28.4	766	9.1	157	1.9	9	0.1
|Sun	6713	50	6353	48	245	5	5	2	2	0	4	|Sun	26	122	649	2555	2565	656	109	21	7	3	1	0	0	1	25	29.1	796	11.9	140	2.1	11	0.2

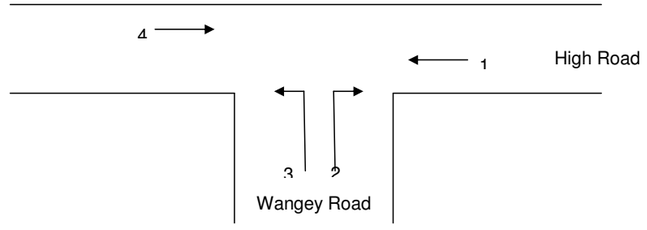
Figure A2.2: Peak Hour Traffic Count at the junction of Freshwater Road/ Station Road



Peak Hour Count (08:00 to 09:00) – (Veh/ hr), Monday 24th February 2003

	1	2	3	4	5	6	7	8	9	10	11	12
Car	93	323	86	129	86	32	118	430	8	172	69	4
LGV	5	6	3	5	1	5	2	11	0	1	1	0
Taxi	0	0	1	2	2	1	1	8	0	1	0	0
Bus	0	10	0	0	0	0	1	1	0	0	0	0
TOTAL	98	339	90	136	89	38	222	450	8	174	70	4

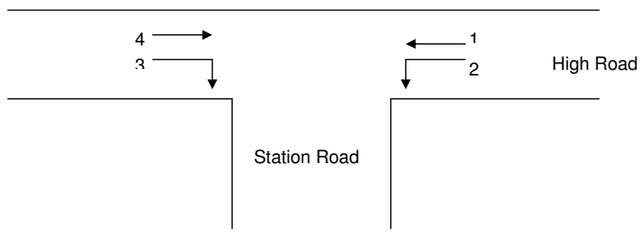
Figure A2.3: Peak Hour Traffic Count at the junction of Wangey Road/High Road.



Peak Hour Count (08:00 to 09:00) – (Veh/ hr), Tuesday 25th February 2003

	1	2	3	4
Car	431	482	335	1002
LGV	17	4	7	22
Taxi	1	0	4	0
Bus	9	14	3	18
TOTAL	458	500	349	1042

Figure A2.4: Peak Hour Traffic Count at the junction of Station Road/ High Road.



Peak Hour Count (08:00 to 09:00) – (Veh/ hr), Tuesday 25th February 2003

	1	2	3	4
Car	431	297	582	420
LGV	17	11	21	14
Taxi	1	3	0	0
Bus	9	10	7	7
TOTAL	458	321	610	441

Table C2.1: LINSIG Assessment of Station Road/ Freshwater Road Junction, 2003 AM Peak Hour

Arm	Traffic Demand (pcu)	Degree of Saturation (%)	Queue (pcu)
Freshwater Road	274	66	5
Valence Avenue(south) straight ahead and left turn	470	68	6
Burnside Road	250	61	4
Valence Avenue (north) straight ahead and left turn	448	65	6

Table C2.2: LINSIG Assessment of Wangey Road and High Road, 2003 AM Peak Hour

Arm	Peak Traffic Demand (pcu)	Degree of Saturation (%)	Queue (pcu)
High Road East straight ahead	484	44	4
Wangey Road left turn	359	65	5
Wangey Road right turn	518	94	12
High Road West straight ahead	1082	93	14

Table C2.3: PICADY Assessment of Station Road/ High Road, 2003 AM Peak Hour (Peak 15 minutes)

Arm	Peak Traffic Demand (vehicles/ minute)	Ratio of Flow to Capacity	Queue (vehicles)
High Road West right turn	11.15	1.33	97

Table C2.4: Car Park Survey, 07:00 to 10:00, 25th February 2003

Time	Station Road Car Park		
	In	Out	Occupancy %
Parked at start.	25	25	20
0700-0715	0	0	20
0715-0730	6	0	24
0730-0745	11	0	34
0745-0800	16	0	46
0800-0815	25	0	66
0815-0830	23	1	84
0830-0845	8	2	89
0845-0900	7	1	94
0900-0915	1	2	93
0915-0930	4	0	96
0930-0945	3	1	98
0945-1000	0	0	98
Net Total	122		

Table C2.6: Pedestrian Crossing Station Road within the vicinity of the Station Entrance

Time	To station	From station	2 WAY
07.15	5	1	6
07.30	23	3	28
07.45	29	3	32
08.00	18	5	23
08.15	21	2	23
08.30	19	2	21
08.45	20	1	21
09.00	14	1	15
09.15	4	2	6
09.30	5	2	7
09.45	6	4	10
10.00	3	2	5

Table C2.7: Accident Data statistics occurring within 750m of Chadwell Heath Station

Year	Fatal	Serious	Slight	Total
1999	0	0	14	14
2000	0	4	9	13
2001	0	2	16	18
2002	0	0	10	10
Total	0	6	49	55

Table C3.4: PICADY Assessment of Station Road/ High Road, 2016, AM Peak Hour (Peak 15 minutes)

Arm	Without Crossrail			With Crossrail		
	Demand (vehs/min)	RFC	Queue (veh's)	Demand (vehs/min)	RFC	Queue (veh's)
High Road West right turn	12.16	1.51	88	13.22	1.67	203

Table C3.5: LINSIG Assessment of Station Road/ Freshwater Road Junction, 2016, AM Peak Hour

Arm	Without Crossrail			With Crossrail		
	Demand (pcu)	Deg. of Sat. (%)	Queue (pcu)	Demand (pcu)	Deg. of Sat. (%)	Queue (pcu)
Freshwater Road	300	77	6	312	80	6
Valence Avenue(south) straight ahead and left turn	514	78	7	553	84	8
Burnside Road	273	70	5	274	70	5
Valence Avenue (north) straight ahead and left turn	490	74	6	555	84	8

Table C3.6: LINSIG Assessment of Wangey Road and High Road, 2016, AM Peak Hour

Arm	Without Crossrail			With Crossrail		
	Demand (pcu)	Deg. of Sat. (%)	Queue (pcu)	Demand (pcu)	Deg. of Sat. (%)	Queue (pcu)
High Road East straight ahead	529	44	6	529	45	7
Wangey Road left turn	393	65	7	415	66	8
Wangey Road right turn	566	93	15	599	95	17
High Road West straight ahead	1183	94	20	1183	96	23

Urban Integration Team
Land and Property

Crossrail Ltd
25 Canada Square
Canary Wharf
London
E14 5LQ