

# Ealing Broadway Station Area and Interchange

## Assessment of Improvement and Development Options

### Final Report



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## **1. Executive Summary**

### **1.1 The commission**

Urban Studio Team was commissioned by LB Ealing in October 2009 to “produce a study of the options for Ealing Broadway Station Forecourt and Haven Green Transport Interchange”. The work took into account three major changes that had occurred since the last review of options for Transport for London by Halcrow in 2006:

- Crossrail had been given the go ahead
- Intensive development for the Arcadia site had been refused
- The West London Tram proposal had been dropped

### **1.2 The method**

Options from a number of sources were reviewed, along with policy and background documents, and then distilled to a manageable number for assessment and comparison. The Team produced an additional two options and included them in the assessment. The assessment was undertaken in the form of an objectives-achievement matrix. Each option was ranked in terms of its ability to satisfy each of seven objectives, thus enabling an overall score.

A wide range of documents and consultations was used to derive objectives for improving Ealing Broadway in three categories:

- Ealing Broadway as a strategic interchange
- Ealing Broadway as a destination / place
- Deliverability

A total of 14 were defined for assessment, and categorised by the level of intervention required to implement them:

- Upgrading and minor works
- Involving significant reconfiguration of the area
- Involving significant development and/or reconfiguration

### **1.3 The options compared**

The options were scored for their ability to satisfy the defined objectives. The overall scores enabled the options to be placed in one of three categories (labelled as green, amber, red) according to how well they met the objectives, and their ease of deliverability. None of the options were free of issues, however.

Generally, options involving “on-street” bus facilities scored better than options involving an off-street bus station.

The two highest-ranked (“green”) options were:

- Bus stops and stands concentrated at Haven Green East (Option 4)
- The “Bus Mall” proposal generated by the project team (Option 12).

Options ranked in the “amber” category are judged worthy of further consideration. These include, in descending order of merit:

- Bus facilities at the station forecourt,
- Pedestrianisation of Station Broadway (with another bus option)
- Bus station on the south side of Haven Green, with and without taking the ex-BBC car park
- Large bus station over Underground tracks, with exit to The Mall
- Improved and upgraded current facilities
- Bus station over District Line tracks, accessed from Haven Green

Options ranked lowest (“red” category) either failed to offer sufficient benefits, or were judged to be undeliverable, or both. It is recommended that these options should not be taken further:

- Doing nothing (Option 0)
- Options involving net loss of Haven Green (Options 2 and 3a)
- Options for off-street “mini” bus stations (Options 9, 10, 11) and
- Options involving rafting over National Rail tracks (Options 6 and 8)

#### **1.4 Knowledge gaps, further work and action steps**

The report identifies a number of important gaps in knowledge that need to be filled in order to make a robust judgment as to the most appropriate longer term option for Ealing Broadway. These include:

- a) Bus capacity of existing and possible future bus facilities
- b) Future passenger demand with Crossrail, and the capacity required to cope
- c) Bus route reshaping plan: objectives, opportunities, programme, to meet wider Borough transport needs
- d) Bus station versus on-street bus facilities operational pros and cons
- e) Over the Underground tracks bus station options funding and viability
- f) Design of off-street bus station: access and internal layout

The report also sets out actions needed in the short term and beyond:

##### *Short term*

- Improvements to the station forecourt to be implemented
- Set up a project group to fill knowledge gaps and coordinate further option development, appraisal and delivery
- Urgent liaison with Crossrail about station redevelopment
- Urgent consideration of highway requirements at Springbridge Road in relation to Arcadia redevelopment
- Decision on what use is to be made of land south of Haven Green
- Detailed design of two new options (bus “mall” and bus station at forecourt)

##### *Medium to long term*

- Programming of works to provide improved bus-rail interchange
- Coordination with Crossrail and private developments in the area
- Major improvements to Haven Green and public realm, realising the benefits from better interchange arrangements
- Secure reduced traffic impact at Station Broadway, and resolve impact on other parts of the local road network

## **2. Project brief and interpretation**

### **2.1 The commission**

Urban Studio Team (then part of Tribal Group) were commissioned by LB Ealing in October 2009 to “*produce a study of the options for Ealing Broadway Station Forecourt and Haven Green Transport Interchange*”.

The study “*should provide a critique of all schemes proposed to date and the potential for financing and delivering them*”.

Specifically the study should:

- “*Review all schemes that have been proposed to date and set out reasons why schemes have not/can not be pursued to date.*”
- *Examine the land opportunities and constraints for delivering a new interchange at Ealing Broadway.*
- *Identify viable design and regeneration option/options for the station forecourt and transport interchange.*
- *Set out an action plan for delivery and financing the viable option/options.”*

### **2.2 Study outputs**

Outputs from the study have comprised an initial summary report to inform internal debate at LB Ealing, this Final Report, and an accompanying assessment matrix. These can form the basis of partner and public consultation if required.

### **2.3 Study approach and report coverage**

To meet this brief, reports have been reviewed (summarised at Appendix 1), and meetings with LB Ealing officers have been held, including site visits, to develop an understanding of the issues, and to consider the options and objectives. Also, the study focus shifted somewhat from the original brief, in particular by including an appraisal by specialist sub-consultants of the property development implications of off-street bus interchange options, and also by giving consideration to options beyond those provided in reports and documents to date.

Three key tasks have been undertaken:

- firstly to identify and agree a set of objectives for the improvement of Ealing Broadway (sections 4 & 5);
- secondly to identify the options that have been put forward or considered for the interchange, and to modify these and add new options (section 6);
- and thirdly to assess the options using an objectives-achievement matrix (section 7).

The assessment process suggests a number of conclusions that will help the decision process (section 8) but also gives rise to a range of issues that deserve fuller consideration, including modification of existing options, consideration of new options and suggestions as to next steps (sections 9 & 10).

### **3. Policy and Planning Context**

#### **3.1 Planning Context**

Three major changes have occurred since a review of interchange options was undertaken by Halcrow for TfL in 2006.

1. Crossrail has been given the go-ahead. This could mean a substantial increase in bus-rail interchange activity, which in turn could require an increase in bus capacity and/or restructuring.
2. Intensive development on the Arcadia\* site has been refused. The refusal casts serious doubt as to the acceptability of development with sufficient intensity to fund it.
3. The West London Tram proposal has been dropped. Some previous bus station options over the station made provision for tram stops. These options can now be recast without such provision.

*\*Note: Unless otherwise stated, in this report “Arcadia site” refers to the entire area covered by the 2007 Glenkerrin planning application, and includes the National Rail tracks and the former BBC car park to the south of Haven Green.*

Two other points to note are that there are other key development proposals for Ealing town centre, which could impact on Ealing Broadway, in particular those for Dickens Yard; and that a planning application to focus Haven Green bus facilities on the eastern side of the Green was refused planning permission in 2008; a variant of this concept is however included for assessment in this report.

#### **3.2 Planning Policy**

Planning policy at national, London and Ealing levels all promote the use of public transport and a reduction in the reliance on private cars. It is also recognised that full use of public transport requires integration between modes, and the provision of high quality multi-mode interchanges is a way of achieving this. There is also promotion of higher density and mixed use developments at major public transport nodes, of which Ealing Broadway is a good example, scoring as it does 6b on the PTAL scale, the highest rating available.

A review of some of the more important policy documents, including extracts from the Glenkerrin/Arcadia Public Inquiry reports, is provided at Annex C.

## **4. A vision for the future Broadway**

### **4.1 Context for decision - the wider role of Ealing Broadway**

In large part, decisions about the development of the Ealing Broadway area depend on the view that is taken about its role, and the vision for its future character. Ealing lies mid-way between central London and the western edge of London (say, the M25). It marks the outer edge of what might be regarded as inner London (demarcated by the terminus of the District and Central Lines), and at the beginning of outer suburban west London. Its character could therefore be defined as either inner or outer London, and its future direction of change could follow one or the other.

Given the likely population increase in London, and the arrival in the next decade of a major increase in rail accessibility and capacity at Ealing Broadway, and given also the Borough's view that retail and other facilities need to be enhanced in the town centre, it would seem that focusing on higher densities, mixed use, and high public transport use would be appropriate. This would mean that in future, Ealing Broadway could become a more significant destination and interchange, and less of a "suburban interlude". Against such an aspiration for Ealing, and its Broadway, to become a bigger player, the current on-street infrastructure in support of the public transport interchange function is regarded as unworthy.

A further factor that could influence a decision on the Ealing Broadway interchange is wider consideration of how transport works in the Borough. For example, there is both public and Borough support for better north-south public transport links. Ealing Broadway could be one of the main locations served by such links, and this could impact on the number of bus movements. There are also (very) long term aspirations for an orbital rail link through Ealing Broadway. However, the wisdom of routing all north south routes through Ealing Broadway was questioned during public consultation. There might be potential to re-configure bus and rail inter-relationships in the Borough, which could again impact on bus movements, perhaps in a way beneficial to Ealing Broadway. For example, bus-rail interchange at West Ealing and Acton Mainline at present is virtually non-existent, yet both will be Crossrail stations. Moreover, following Crossrail in 2017, Greenford rail services will no longer run direct to Paddington via Ealing Broadway, but will terminate at West Ealing.

Ealing Broadway (Haven Green) has become a major bus terminus over the years. The number of terminating routes has increased from 3 in 1964 to 8 in 2009. The 65 from Kingston in 1964 ran through Ealing Broadway to terminate at Cleveland Park, thus avoiding layover at Haven Green. The Brentford-Greenford service ran through as it still does today (then numbered 97, now E2). Overall, the increase in routes serving Haven Green/Broadway from 5 in 1964 to 9 today inevitably has meant greater pressure on the limited space available. This pressure has been taken up by extra bus stops and stands on the diagonal road, and by taking part of the Common land for other interchange facilities including bus lay by and taxi rank.



Any review or restructuring of bus services at Ealing Broadway would no doubt address the apparent imbalance between services north of Uxbridge Road (6 terminating routes) and south of it (2 terminating routes).

Given the broader vision and context described above, the objectives set out in the assessment matrix may appear rather functional and dry. Behind them, however, lies a range of often strongly held opinions about what should be done to improve and develop Ealing Broadway. A particular and speculative look into the future is therefore offered by way of illustration.

#### **4.2 Imagining the future Ealing Broadway**

Ealing Broadway is the main gateway for the town centre. Its role as a transport interchange should not obscure the fact that it is also a major destination and arrival point for Ealing as a metropolitan centre. In fact most passengers are arriving and leaving rather than interchanging. At present the station area gives a poor sense of arrival at a place, and station Broadway in particular is awkward to navigate, frequently congested or obstructed, and visually chaotic. Although nearby areas have attractive features in themselves, with a major open space, a conservation area, and a variety of attractive shops, restaurants and facilities, none of this character is reflected in the arrival experience.

Plans for the regeneration of Ealing Broadway need to follow a vision for the area that matches and enhances the essential character of Ealing. Providing a high quality transport interchange experience in the midst of this presents a major challenge, but it would be unfortunate indeed if focusing too narrowly on bus operations were to prejudice wider regeneration potential.

Can it be right for the future that Ealing's busiest area for pedestrian and public transport traffic also plays host to a one-way gyratory system for general north-south traffic? Can it be right for the future that Ealing's most central and popular open space is both divided by and occupied by standing space for buses, taxis and cycles? It is this instinctive feeling that something is wrong that has prompted calls for a radical solution for the interchange, in particular finding a way of providing for buses off the street.

So what should Ealing Broadway be like in 10 or 15 years time? The approved policies at Borough and London level clearly establish Ealing Broadway as a centre of metropolitan importance. With this comes an aspiration and expectation for substantial change in the next decades, and for significant improvements to the public realm and interchange in the near future. The multi-mode interchange will increase in importance, partly due to strengthening public transport demand and services, but also as part of regeneration involving more retail and other facilities, more employment, and more town centre living. In other words, Ealing Broadway will experience more people coming to and using the town centre as well as more people passing through.

The December 2009 rejection by the Secretary of State of intensive development proposals for the Arcadia site, and a legal challenge to the Dickens Yard proposals, illustrate the need to strike a balance between development intensity and retention of local character that is widely acceptable as well as viable.

### **4.3 What expectations might there be for Ealing Broadway?**

This section paints a picture of the station and its setting might evolve over time. It is speculative, but it is based on the potential which already exists.

Within a few years, the arrival experience will have been greatly enhanced by a new layout of the station forecourt area. This will provide much needed circulation space for pedestrians, a more convenient crossing towards Central Chambers and Haven Green, and a less cluttered environment with attractive paving and landscaping. Gone will be the physical and visual barrier created by the parking lot outside the station that currently takes half of the space to serve less than 5% of users. Gone will be the frequent obstruction of the station entrance by servicing activity, which will be suitably relocated.

Before the end of the decade, Crossrail services will be operating from Ealing Broadway, accessed through a rebuilt station. The new station portal will be spacious and well able to handle the increased number of passengers coming and going. Emerging under the bright and airy canopy on to the beautifully paved forecourt, there will be a chance to pause and take in the surroundings. Opposite will be the smart new development of small shops and restaurants with apartments or offices above. Ahead will be an inviting new pedestrian route towards Uxbridge Road and the town hall. To the left the Station Broadway will have little traffic apart from buses and taxis and cycles, and there will be broad footways leading down the to Uxbridge Road and The Mall. Turning to the right, there is the prospect of restful recreation with Haven Green refurbished to a high landscape standard, and a direct and spacious pedestrian route to reach it. The attractive buildings forming Haven Green East conservation area will connect easily with the Green, and some café tables are spilling out to take advantage of the fine day. Also within sight, and easily reached from the station portal are bus stops offering onward journeys to other places.

Gone will be the shack and taxi area and cycle parking that presently contrive to make the Green less of a “haven”. These facilities will have been provided in a convenient and less intrusive way. Cycle parking will be in a secure covered facility near the station portal, with much greater capacity than today.

What will be the expectations of people interchanging between bus and rail services? Arriving at Ealing Broadway by bus, a short walk to the new station from a convenient set-down point will be expected by over 3,000 people in the morning peak period. Most will hurry to the train, but there will also be opportunities to pause to buy a paper or to have a coffee. On the return journey, people will want to be able to find their bus within a short walk, and

all buses going in the same direction will be expected to leave from the same stop. The stop itself will be reached either by a short walk out into the Broadway, or into a new bus station over the tracks, easily reached at concourse level. For people interchanging between rail services, all platforms will be reached by no more than one change in level (served by escalators and lifts).

## **5. Objectives of an improved Broadway**

### **5.1 The agreed assessment objectives and criteria**

The objectives have been derived from a number of sources, and agreed with LB Ealing officers for the purpose of broad assessment of options. The objectives used to assess performance of the main options are set out in Table 1 below. Although the wording has been generated by the project team and LB Ealing officers, the substance of the objectives themselves is derived from the following sources:

- Transport for London Interchange Best Practice Guidelines
- Transport for London Ealing Broadway Interchange Feasibility Study (Halcrow, May 2006)
- Ealing Borough Transport Strategy, 2009
- Save Ealing's Centre report received November 2009
- Ealing Town Centre Strategy 2002 – 2012 (Ealing SPG)
- Ealing Metropolitan Centre Spatial Development Framework, Tibbalds, May 2008.
- LB Ealing UDP (2004)
- Reports from public meetings and consultations
- Haven Green East bus station planning application Design and Access Statement (Michel Desvignes / Saxell Bird Axon *et al* for Glenkerrin) 2008

The agreed set of objectives to act as the criteria for options assessment (Table 1) are arranged in seven groups relating to the multi-modal interchange, to Ealing Broadway as a destination, and to the deliverability of any improvements.

**Table 1: Objectives**

<b>Main objectives (assessment matrix criteria)</b>	<b>Components</b>
<b>Objectives for Ealing Broadway as a strategic interchange</b>	
Create interchange benefits for users (all modes, but priority to rail, bus and pedestrians)	Consolidate the bus stops close to the station portal (i.e. good pedestrian links between the station and bus stops)
	Legible layout of interchange and facilities
	Range of facilities (retail, café, toilets, etc) within or near station
	Secure waiting area(s) for buses as well as station (preferably single area for buses)
	Covered and step-free transfer between all forms of transport, without any road to cross.
	Convenient access to the station from surrounding areas (or potential for)
	Provide an area for “kiss and ride” and taxi drop offs close to the station
Create interchange functionality for operators (all modes but priority to rail and bus)	Maintain the number of bus stops
	Buses able to arrive, depart and wait without delays
	Provide bus stands for terminating services (if any)
	Ability, space for buses to turn (both directions)
	Taxi access, ranking. Plus pick up and drop off close to station portal
	Provide facilities (insofar as necessary) for bus and taxi drivers
Ensure interchange capacity for growth or potential for growth	Increase the number of bus stops and stands post Crossrail to meet growth forecast, or provide potential to achieve this
	Pedestrian space for circulation and sojourn sufficient for growth up to 20 years (or providing potential for this)

*continued*

Table 1, continued

<b>Objectives for Ealing Broadway as a destination / place</b>	
Improve local accessibility to station, Haven Green, town centre (i.e. other than interchange)	Enhance the visual and physical connections between the station and town centre/Haven Green
	Provide adequate and quality pedestrian routes from surrounding areas to the station
	Ensure convenient servicing for all properties
	Group bus stops convenient for centre
	Ensure there is no adverse impact on traffic flow and movement in the area
	Avoid unnecessary traffic in the area due to one-way streets (e.g. access to car parks Stonebridge Rd, access to the station)
Protect and enhance local environment and assets	No net loss of open space to Haven Green
	Good pedestrian connections to Haven Green (not severed by vehicle movement/parking) including from Uxbridge Road (Broadway)
	Protect mature trees
	Protect / respect listed buildings and conservation area
Enhance regeneration potential and value	Create a high quality station forecourt providing a sense of arrival, and worthy of Ealing centre's main gateway
	High quality streets and spaces appropriate to a town centre (potential for)
	Development potential for commercial, retail and mixed use
<b>Objectives for Implementation</b>	
Ensure that scheme can be implemented	Show costs proportionate to benefits. Cost of works, property values, development costs, extent of benefit
	Capable of being funded Funding opportunities, developer interest, state of the market, development surplus
	Deliverable in realistic timescale
	Deliverable without major barriers. Third party cooperation, Borough willingness to compulsory purchase, political will, etc

## **6. Options for assessment**

### **6.1 Sources for options**

A large number of options and variants have been put forward for the creation or improvement of bus-rail and multi-modal interchange at Ealing Broadway.

The sources provided by LB Ealing for these options include:

- a) Transport for London and Halcrow May 2006 report
- b) Glenkerrin and Savell Bird Axon, 2008
- c) LB Ealing and Tibbalds, May 2008
- d) LB Ealing UDP, 2004
- e) Save Ealing's Centre, 2009

In addition the project team has devised two further possible options that do not feature in documents to date.

### **6.2 Specification and variations**

It should be noted that the source documentation refers to many variants of basic options, and also includes options that are not fully specified. For the purpose of assessment, therefore, the options have been re-cast to form a simplified list. This is to make the assessment matrix more manageable, but more importantly to ensure that the options are as discrete as possible, which assists in making comparisons. It is also important to note that assumptions have been made about certain aspects of the options, in particular technical issues regarding the operational capacity and management of the bus and other elements of the designs. This latter part of the assessment should be re-visited as and when more precise information is available on bus demand and capacity.

Refusal of planning permission for proposals by Glenkerrin for development between Haven Green and the Broadway (the "Arcadia site") in theory re-opened the possibility for the location of a bus station within this site, and three variants have therefore been included in the assessment matrix. These include: the possibility of using the ex BBC car park (Option 3c); and rafting over the National Rail tracks as well (Option 8); and a smaller bus station on part of the Arcadia site itself (Option 9). In broad terms, these options were investigated by the consultants to Glenkerrin, the developers of the site, but eventually rejected by Glenkerrin in favour of an option to provide bus facilities at Haven Green east (included in this assessment as Option 4. In addition, Transport for London's stated position to the Arcadia inquiry (10<sup>th</sup> June 2009) was that development without a bus station included was "not likely to prejudice the delivery of a new, or improvement of the existing, bus interchange". This process appears to have satisfied the requirement for the bus station use to be "considered" for this site (as set down in the 2004 UDP, regarding Site 63, LP1, Table 10.21 Development Sites, and reiterated in the Ealing Town Centre Strategy supplementary planning guidance).

All the options included in the assessment are listed in Table 2 and are placed in three categories in terms of degree of effort and resources to deliver them.

### **6.3 Common elements for any viable scheme**

The items listed below are important for a high-quality interchange, but are assumed either to be provided whichever option is taken forward, or are 'stand-alone' measures that have similar potential regardless of the main option chosen. Such measures have a neutral effect in broad option assessment and comparison, and they are therefore excluded from the assessment matrix; they must nevertheless be allowed for in any scheme or layout.

- A new station building, entrance, concourse and DDA-compliant platform access as part of Crossrail
- Good quality detail design of public realm and landscape architecture
- Good passenger and user information
- Range of facilities (retailing, toilets, travel information, etc) within or near the station
- Secure covered cycle parking both within the station and close to the station portal (ease of doing this might vary with options, but this is not possible to evaluate at this level of assessment)
- Safe cycle routes to and through the interchange area
- Transfer between lines / services (within rail station)
- Covered waiting areas for all forms of transport
- Staff facilities for Underground/National Rail



**Table 2: Options for assessment**

Category and number	Description	Source and status at December 2009
<i>A. Upgrading and minor works</i>		
Option 1	Improved and upgraded facilities on current layout	Based on Halcrow Option 2
Option 2	Widen diagonal road to provide additional stops	Concept from SBA work for Glenkerrin (rejected)
<i>B. Involving significant reconfiguration of the area</i>		
Option 3 a	Bus station on south side of Haven Green, north of trees (plus stops on HG east and Broadway)	SBA for Glenkerrin + Ealing TC Spatial Development framework (rejected)
Option 3 b	Replacement bus station on south side of Haven Green, north of BBC car park boundary (plus stops on HG east and Broadway)	Halcrow Option 3b
Option 3 c	Replacement bus station on south side of Haven Green taking car park (plus stops on HG east and Broadway)	Taking 7-10 Central Chambers Halcrow Option 3c. Taking car park only Halcrow Option 3d.
Option 4	Bus stops and stands relocated to the east side of Haven Green, and closure of diagonal road (plus stops on Broadway)	Similar in concept to Glenkerrin planning application, refused 2008

*continued*

Table 2, continued

<i>C. Involving major redevelopment &amp; reconfiguration of the area</i>		
Option 5	Bus station above Underground tracks (5 sub options considered) (One Broadway stop retained)	Halcrow Option 5 (+ Considered but rejected by SBA for Glenkerrin)
Option 6	Bus station over National Rail platforms (not specified)	Halcrow option 6 (Rejected)
Option 7	Bus station over District and Central Line tracks plus bus exit to The Mall (One Broadway stop retained)	Save Ealing's Centre
Option 8	Bus station over NR tracks and BBC car park; Central Chambers and Broadway stops retained	Halcrow Option 9 + Save Ealing's Centre
Option 9	Bus station (mini) on part of Arcadia site (3 sub options considered but not detail spec.) providing 4-5 stops (Existing stops retained)	SBA for Glenkerrin (Rejected) Halcrow Option 8 (Rejected)
Option 10	Mini bus station to rear of Haven Green east side (not specified) (Existing stops retained)	Halcrow Option 4 (Rejected)
Option 11	Mini bus station on NE corner of Broadway/Mall junction (Not specified) (Existing stops retained)	Halcrow Option 7 (Rejected)
Option 12	Creation of public transport mall Haven Green East and Station Broadway. General traffic 2-way on Springbridge Road. Diagonal closed.	Project team
Option 13	Broadway closed (pedestrians and cycles only) plus option 7	Halcrow options E, 3, 5, 9
Option 14	Replacement bus station at station forecourt, reposition Crossrail station entrance	Project team

#### **6.4 Comparing and combining options**

There are numerous combinations of elements and sub options that could be devised. In particular various traffic management arrangements are possible with various combinations of bus stops, routes and bus stations. The possibilities would be further widened if the bus route pattern were to be re-cast, for example if buses terminated elsewhere, thus eliminating the need for bus "layover" stands in the area. The off-street bus station designs are open to interpretation as to their operational aspects, for example the split between stops and stands, or between labelled stops and their capacity. Assumptions

about these issues have been necessary in order to fill the assessment matrix.

The options listed in the table above are not entirely comparable with one another in the sense that the capacity of bus facilities created varies. Not all of the options would cater for existing services as currently operated, and not all options would allow for growth that is likely to arise in the future, especially following the opening of Crossrail services. Moreover, the capacity of many of the options could be subject to increase through the use of creative design alterations and/or management.

The assessed options include two that have been suggested by the project authors. One is the creation of a high quality bus “mall” or boulevard along Haven Green East and Station Broadway. The other is a mixed on- and off-street bus station immediately in front of the new station entrance. It is important to note that these have not been subjected to peer review, nor to discussion with operators, and as such are speculative at this stage.

A further option to close the Station Broadway to traffic has also been included in the assessment, but is not in itself a complete option, as it would require one of the other options to provide a solution for bus and other traffic.

### **6.5 Refinements and improvements to options**

The options presented in the source documentation may not incorporate the optimum designs and concepts that could be achieved. For example, key variants and modifications might include:

- An all-out effort to improve the station area by reducing vehicle traffic and creating a bus-only route at Station Broadway, and use of alternative routes (including Springbridge Road) for general traffic, and consequent revision of the options to fit this.
- Use of the BBC car park for bus stands rather than bus stops.
- Changing the access arrangements for any or all of the options over the station, including access to The Mall, or split entry/exit onto Haven Green East and Station Broadway.
- Changing the internal layout of the off-street bus station options for greater capacity or more efficient operation.
- Converting some or all bus routes to through operation, reducing the need for bus stands and bus movements to and from the stands.
- Alternative ways of providing for other modes at the interchange including taxi, mini-cab, kiss and ride, and cycling, to avoid impact on vehicle and pedestrian activity.

### **6.6 Other possible options**

It is possible that other option details could come forward as a result of further engagement with Transport for London, Crossrail, National Rail, and bus operators, although it is unlikely that any wholly new approach could be found.

## **7. Assessment of options against objectives:**

### **7.1 Assessment matrix**

The accompanying assessment matrix assesses the options as described against the agreed objectives (a combination of the headings of Tables 1 and 2 to form a matrix). Each “cell” within the matrix receives a rating according to performance against the objective, together with a brief statement of the reasons for that rating. Each option is then rated overall in the final column. The objectives have not been ranked in terms of importance, thus allowing maximum transparency in the assessment process.

Based on the overall rating, the options are placed into one of three categories:

Green – satisfies most criteria well

Amber – has potential to satisfy criteria

Red – fails to satisfy most criteria

### **7.2 Handling bus capacity in the assessment**

One of the biggest limitations of the assessment exercise relates to bus capacity. The current number of stops and stands, and details of all the routes and frequencies is known, but information on the capacity of the current arrangement was not available. Still less is known about the bus capacity of the various alternative options, given different traffic and bus movement configurations. These matters will need to be the subject of more detailed study. Meanwhile, some assumptions have been necessary in order to come to a view on which option(s) are worthy of assessment.

We have assumed, based on current provision, that the following are necessary to handle effectively the bus services which now run via Haven Green:

- A minimum of 11 places at stops (arranged as 4-6 stops)
- A minimum of 8 layover stands accessible from point of drop-off and to point of departure
- Plus 2 drop-off stops for terminating services
- No diversion of routes on Uxbridge Road (A4020) into Haven Green.

The Crossrail Transport Assessment suggests that the number of bus passengers could increase by 65% (from 2006). It is assumed here that bus passenger capacity could be increased by 33% without additional infrastructure, by increasing bus frequencies. (Some increase could be achieved by conversion of single-deck to double deck buses, but this is estimated to amount to no more than 10%, and in any case would not guarantee that the increased capacity matched routes with increased demand.) Increasing capacity by a further 33% is assumed to require additional frequencies that would require additional stops and stands. This is assumed to amount to:

- 3 additional spaces at bus stops

- 2 additional layover stands (except those options that rely on mostly through routes)

This means that the total provision for growth (post Crossrail) would be

- A minimum of 15 places at stops arranged as 4-6 stops  
These to be arranged as through stops, involving no reversing  
(Alternatively a minimum of 16 “head on” single-space stops requiring reversing)
- A drop-off stop(s) for terminating services with 2 spaces.
- A minimum of 10 layover stands accessible from point of drop-off and to point of departure (or a lower number for options with less terminating routes).

In assessing options for their ability to provide for future growth in bus passenger demand, the assessment matrix has thus taken account of whether or not the additional stop and stand capacity is provided, or has the potential to be provided. More creative bus station design or management could alter the ability of options to meet demand, for example, reconfiguration to accommodate more stops, or adoption of a “dynamic” bus station arrangement whereby buses are allocated to stops immediately prior to their arrival, rather than using dedicated stops.

The assessment is broad brush because there are a number of sub issues and sub options that would be complex to assess in detail. Some detailed objectives cannot easily be incorporated in the matrix without obscuring the main points. In addition, there are issues of impact on pedestrian and vehicle movement that are not possible to investigate in the timeframe of this study, beyond the modelling results for some of the options produced by others. A further issue is that the options available for testing are not fully specified in relation to all the objectives. For example, details of how cycle movement or cycle parking would be handled are not set out in detail. These aspects therefore are not rated in the matrix.

### **7.3 Assessment of property and development**

#### *7.3.1 General approach*

A very broad view has been taken of the feasibility of development to help fund an off-street bus station over railway tracks/station. None of these bus station options has yet been sufficiently detailed to allow a full costing exercise to be undertaken. The nature of development in relation to any bus station is also not established. In the light of this, a rough assessment has been undertaken of the factors likely to determine the value of development in the station area, and the residual values that would be called upon to subsidise the construction of a bus station.

The residual value generated will be dependent on:

- a) The amount of development available and the demand for such
- b) The mix of uses
- c) The size and floor plate of each unit.

In terms of retail potential, there is a considerable difference between creating a new commercial centre and building an *ad hoc* retail unit: the size and use of each unit can have a major impact, and hence greatly affect the rental value. For example Tesco may be interested in a 'metro' store unit, but only at 25,000 sq.ft. If 25,000 sq.ft is not available then there is no value, rather than a reduced value. Similarly with offices, if the floor-plate is not in tune with current occupation requirements then there simply will be no value.

A development brief would therefore be necessary to establish

- a) The approximate amount and GIA of new development
- b) The frontages and access arrangements for the units
- c) The mix of uses and whether this includes residential.

The following broad brush estimates are therefore simply to give an indication of feasibility, and are not intended to form the basis for decision making.

### *7.3.2 A bus station in any of the over-the-tracks positions*

A transfer slab (depending on size and capacity) to house a bus station would cost (for construction) in the region of £1.0 - £1.5m at today's values, assuming 800m deep reinforcement. Note that if residential and/or office development were added to the requirement, this would require further engineering solutions and the cost of the slab would then depend on the loads. The cost could therefore be significantly higher.

To the basic slab cost must be added the cost of enabling construction over rail infrastructure, including "possession" costs. There is likely to be a substantial difference in these costs between construction over Underground tracks and over Network Rail tracks. An overall cost for the slab over the tracks could thus fall within a range of £1.5 - £4 million.

In addition, the slab must be accessed from the street for both pedestrians and buses. This will involve property acquisition, perhaps through use of CPO powers, and further construction. These costs also cannot be determined without a fully specified scheme, but are likely to be substantial.

### *7.3.3 A credible Arcadia "post-Glenkerrin-decision" development?*

The refusal of permission in December 2009 implies that planning policy for the Arcadia site will need to be amended, and in particular that lower intensity development will be needed to achieve acceptability. This in turn implies lower residual values from development on the site, which reduces the potential to fund bus station facilities on the site (or off it). Moreover, the presence of a bus station would substantially reduce the development area, and importantly would reduce not only the ground floor development area, but would also reduce the value of other development around or over it. The potential for the site is considered in the following paragraphs.

Retail development at podium level (i.e. above a bus station) is not commercially viable and is unlikely to attract any commercial interest. The opportunity for retail however does become attractive if planning would allow (and the capacity of the site would accommodate) the bus interchange and a

supermarket use side by side. This use is the value generator for many regeneration schemes but the use in itself is not always attractive to the local planning authority or local stakeholders. Values are largely driven by a fiercely competitive bidding war between operators in order to either safeguard interests or establish a foothold in a trading location. Values could be as high as £15 million if a supermarket use could be accommodated.

For non-supermarket retail, there is insufficient footprint to create a critical mass of retail space to make retail the value driver for development.

Office space could possibly attract interest, but the demand in comparable locations tends towards high quality smaller units with parking. The value that any office development in Ealing would attract is highly dependent on the size of the floor plate and whether a 'grand' entrance could be created at ground floor. A grander entrance will appeal to a HQ type building but this would need a floor plate in the region of 15,000- 20,000 sq.ft. Ealing competes with other Thames Valley centres and is not traditionally a prime location.

#### *7.3.4 Indicative values*

Headquarters office building: assuming demand could be generated in a Crossrail world and that the building would be to a sufficiently high specification, values could be in the region of £20-£25 per sq.ft. (psf). Depending on the covenant strength then it could be possible to create a capital value of up to £295 psf by taking a top-end figure and based on a yield of 8.5%.

Secondary offices: rents could be assumed to be in the region of £17.50 psf with a yield of 9%, resulting in a capital value of £195 psf

#### *7.3.5 Build Costs*

Headquarters office building: assuming a high-quality specification, build costs would be in the region of £150 psf. Adjusting for developers' profit, cost of finance and sales costs, this would give an indicative residual value of approximately £55 psf.

Secondary offices: assuming a lower-quality specification, build costs would be in the region of £130 psf. Adjusting for developers' profit, finance and sales costs, this would give an indicative residual value of approximately £6 psf.

#### *7.3.6 Feasibility*

The following amounts would be required to generate surpluses:

HQ Office

100,000 sq.ft.: £5-6 million

150,000 sq.ft.: £8-9 million

200,000 sq.ft.: £11-12 million

Secondary office

100,000 sq.ft.: £600,000

150,000 sq.ft.: £900,000

200,000 sq.ft.: £1,200,000

These figures are to be taken with great caution, as the office market is very sensitive and is critically dependent on the macro-economic setting, the quality of the build, and the timing of the development. To further assess feasibility, guidance would be needed on the capacity of any chosen site, and whether there is the potential to create a satisfactory development of the size required to generate the surplus.

### *7.3.7 Residential development*

There is demand for residential development in the centre of Ealing, largely in the form of 1- and 2-bedroom flats. At the time of writing the investor market has still to recover, and therefore any new development would need to be aimed at owner-occupiers, and hence larger than the current developer sizes: at least 50m<sup>2</sup> for a 1-bedroom and 70m<sup>2</sup> for a 2-bedroom unit, assuming a 40/60 split. It is assumed that LB Ealing could require housing to include 35% affordable units. The current lack of HCA's NAHP funding could mean that the affordable values can only generate £40,000 per unit from the capitalisation of rents, and hence cost the development say £60- £65,000 per unit. There is currently limited demand for shared-ownership units from RSL's.

Indicative values:

- 1 bedroom £225,000
- 2 bedroom £300- £350,000
- Affordable RSL package price per unit on average £120,000- £140,000, made up of £80,000- £100,000 of grant and on average £30- £40,000 of capitalised rent stream.

Indicative costs:

Build costs, depending on the scheme, could be at £1650/m<sup>2</sup> in buildings up to 12 storeys, or on average £104,000 per home. There are likely to be additional noise attenuation and soundproofing costs.

Developer profit would be in the region of 20-25% of private development value, plus funding costs, fees, sales and marketing etc.

### *7.3.8 Feasibility*

As a rough calculation, assuming the following development, a residual value could be generated.

- A total development of 50 flats: £3.5 - 4.5 million
- A total development of 100 flats: £7.5 - 8.5 million
- A total development of 150 flats: £12 - 15 million

All values exclude transfer-slab costs, and would be dependent on a detailed sales and marketing report, confirmation of HCA funding, a detailed cost and value appraisal and scheme. a further deduction for 'ransom value' from Network Rail (Likely to be between 30-50% of residual value), and allowance for other s106 contributions. As noted above, all of these values are rough estimates and a more precise picture would require development parameters to be set.



### *7.3.9 General remarks on development prospects*

Regarding the prospects for development, a number of basic and quite difficult questions will need to be addressed:

- What kind of use would be attracted to development over a bus station and railway station? The two possibilities are offices and residential.
- What is the likelihood of achieving a “grand entrance” at street level for an HQ office built over a bus station?
- What quality of passenger environment can be achieved with an enclosed bus station, and how is this affected by the type of development above?
- If apartments are built over a bus station over part of the station area, would noise levels from National Rail tracks be acceptable?
- For any large-scale development over the station area, could the design be reconciled with the presence of Villiers House office block?
- If there are height limitations (to avoid overshadowing, loss of amenity), is this reconcilable with the likely height of development over a bus station - whether over the Underground station, or over the National Rail tracks alongside the Arcadia site?

Assessment of the off-street bus station options would need to be re-visited in the light of answers to these questions.

### **7.4 Commentary on assessment**

Table 3 provides additional information on the assessment, and arranges the options into three rating categories based on the traffic-light analogy, i.e. green, amber, and red. These results are abstracted from the assessment matrix. The table also summarises the principal motivation for each option, together with key dependencies and caveats to go alongside the overall rating.

**Table 3: Summary of assessment results**

<i>Rating overall</i>	<i>Option number – bus option</i>	<i>Key motivation</i>	<i>Key factors in rating - caveats and dependencies</i>
<b>Green = Satisfies most objectives and delivery mostly within public authority ambit</b>			
<b>Green</b>	4 - bus stops Haven Green east side	Implementability; improvement of Haven Green; better bus facilities	Depends on redesign to overcome known LBE concerns, and on sufficient long term bus capacity
	12 - Bus-only mall (Haven Green East and Station Broadway)	Implementability; legible, convenient and simple bus interchange; major improvement of Haven Green	Dependent on bus route restructuring and resolution of traffic impact on local road network
<b>Amber = Satisfies important objectives, but issues about efficacy and/or deliverability</b>			
<b>Amber</b>	1 - Upgraded facilities	Improvement at low cost	Insufficient bus capacity long term
	3b - bus sta Haven Green south side	Bring bus facilities together but reduce Haven Green impact	Common land, trees and pedestrian access issues. Operability and capacity would need to be confirmed.
	3c - bus sta Haven Green south side (including car park)	Bring bus facilities together but reduce Haven Green impact	Less impact on common land than 3b, but loss of potential development land (car park)
	5 - bus sta above Underground tracks	Reduce bus activity on street; improve Haven Green; better bus-rail interchange	Depends on efficacy of design in terms of bus capacity and operation and passenger access, and cost/funding. Impact on property and businesses. (Assumes closure of existing bus stops/stands)
	7 - large bus sta over Underground tracks, bus access to the Mall (SEC)	Reduce bus activity on street; improve Haven Green' bus-rail interchange	Restructuring of bus routes required. Cost/funding issues. Impact on property and businesses. (Assumes closure of existing stops/stands.)
	13 - Pedestrianise station Broadway	To provide extra benefits made possible with Option 7	Potential sub-component of Option 7 for station forecourt benefits. Dependent on resolution of traffic issues.
	14 – bus station at station forecourt	Bus-rail interchange; better access to town centre by bus	Dependent on feasibility of design and bus capacity, and route restructuring. Re-think of station portal needed.
<b>Red = Insufficiently effective and/or difficult and costly to implement</b>			
<b>Red</b>	0 - do nothing	Reference option	Insufficient bus capacity (assumed)
	2 – widen diagonal	Increase bus capacity	Loss of common land is inevitable; little increase in bus capacity (assumed).
	3a – bus sta within Haven Green (south)	Bring bus facilities together	Loss of common land is inevitable; doubtful operationally for buses
	6 - bus sta over Nat Rail tracks and platforms	Bring bus facilities together; better bus-Crossrail/NR interchange	Depends on ability to configure bus access, provide sufficient bus capacity, and meet high cost of NR requirements. Impact on property and businesses.
	8 – bus sta over Nat Rail tracks and BBC car park	Reduce bus activity on street; improve Haven Green' bus-rail interchange	Dependence on funding high cost of over-tracks bus station, with little potential for development subsidy. Impact on property and businesses.
	9 – mini bus sta Arcadia site	Extra bus capacity	Design feasibility not demonstrated. Loss of town centre development land. Existing bus stops/stands have to be retained
	10 – mini bus sta rear HG East	Extra bus capacity	Design and operational feasibility not demonstrated. Existing bus stops/stands have to be retained
	11 - mini bus sta NE corner Broadway	Extra bus capacity	Design and operational feasibility not demonstrated. Existing bus stops/stands have to be retained

## 8. Conclusions from the assessment

### 8.1 Headline results

The options satisfying objectives best overall are:

- Option 4 - Bus stops and stands concentrated at Haven Green East (similar in concept to that proposed by Glenkerrin in 2008); and
- Option 12 – the “Bus Mall” proposal generated by the current project team. Both of these suffer a handicap, however.

The former is dependent on known issues being resolved through a revised design; the latter is dependent on traffic management and bus operation restructuring that has not been tested or consulted upon. Both offer significant potential benefits and deliverability, however.

Options that are ranked just below involve a radically different use of the station forecourt area, either pedestrianised (Option 13 as an add-on to Option 7) or as a bus station (Option 14).

Of the various off-street bus station options, the best ranked are the large facility over the District/Central Line tracks with access to The Mall (Option 7, SEC proposal) and the south side of Haven Green (Options 3b and 3c, with and without the use of the ex-BBC car park, but not going over the Network Rail tracks).

At the other end of the scale, it is worth noting that “doing nothing” (Option 0) is not the lowest scoring option! Other options ranked lowest (“red light”) include those taking more land from Haven Green (Options 2 and 3a), and small off-street “mini” bus stations that would require retention of existing bus facilities as well and thus would deliver no improvement for the area (Options 9, 10 and 11).

Costs and delivery issues adversely affect the rating of options involving rafting over National Rail tracks, and these options are also rated “red”. A bus station over the National Rail portion of Ealing Broadway station would be especially problematic because of the need to re-configure bus access and to resolve re-provision of retail and other facilities at the interchange (Option 6). Also, the design of this option has not been specified, and it has not been demonstrated to be operationally feasible in terms of bus movements.

Other options score moderately, though for different reasons:

- Upgrading existing facilities (Option 1) was included alongside the other options, but its objectives are more limited. It is sufficiently freestanding to be worth considering as a short-term approach.
- Haven Green south (Option 3b) has negative pedestrian movement impacts;
- Bus stations located over Underground rail tracks (Options 5, 7) have access impacts and doubts over functionality and viability.

## **8.2 Further comments on assessment results**

The issue of whether bus stations are replacements for, or additional to, existing bus facilities proves to be crucial in determining the result. If, after creating an off-street bus station with all its attendant costs and disruption, the environment of Haven Green and the Broadway cannot be improved, the result is the reproduction of current problems on a larger scale, and hence a very low rating.

A further important factor is the extent to which reconfiguration of the bus facilities allows the creation of an improved Haven Green, and without any net loss of common land. Ideally, the extent of common land would be increased, and access to it would be improved, especially from the town centre and from Haven Green east. Such benefits would derive from the “bus mall” option and the full-size bus station options over the station tracks.

Three options have been included for a replacement bus station to the south side of Haven Green, and they differ in terms of the extent of the Green taken, and (concomitantly) the extent of land taken from the site in Glenkerrin and National Rail ownership. Loss of common land from Haven Green would need replacement, and this would be achieved by closure of the diagonal road and removing other vehicle space on the east side (for example the bus stands and loop, the roundabout at the north east corner, and the taxi waiting loop). There are also variants involving retention of some or all of Central Chambers (opposite the station entrance), although these were not included in the assessment since they appeared to create unreasonable additional disbenefits for vehicle and pedestrian access.

Use of the Green could be avoided of course if the bus station were to be built entirely south of the Green. However, the dimensions required mean that the bus station would need to extend not only over the ex-BBC car park, but also over the National Rail tracks. This option is rated lower than the two south side options (that avoid National Rail tracks) because of the development potential lost, and the much higher construction and other costs. This option is rated “red” overall and can therefore be excluded from further consideration.

There is inevitably some uncertainty about the efficacy of the option put forward by Save Ealing’s Centre (SEC). This would involve a large off-street bus station over Underground tracks and platforms, with bus access to The Mall (A4020) as well as Haven Green east. While this potentially could provide benefits to passengers and interchange, and remove most bus activity from the street and Haven Green, the option has not been specified in terms of bus station layout or access, and the suggested access directly to the Mall raises further issues in terms of deliverability and operational feasibility. However, the option does include a unique feature, which is the provision of a second footbridge connecting platforms at the east end of the railway platforms. Given the length of Crossrail trains in particular, this could greatly increase the convenience of interchange and load-spreading on the trains themselves.

Two other options rated in the second “amber” category also have not been specified in any detail.

The first is a bus station (or set of stops) located in front of the station entrance, which would mean the station entrance being set back and otherwise reconfigured. The advantages of this option would be close interchange between bus and rail, the removal of (most) bus activity from Haven Green, and the greater proximity of bus stops to the town centre. It would require, however, considerable design effort to reconcile property and access issues. It is important to note that without early involvement of Crossrail, this option will be closed by default, as the new Crossrail station building as currently envisaged is progressed from design to construction.

The second option that has not to date been specified in any detail is to pedestrianise station Broadway, which is dependent on other options for alternative bus access and routes for general traffic. It could be feasible with, in particular, the SEC option, and would produce huge benefits in terms of creating a new public square as the main focus of the town centre and point of arrival. It could possibly also work with an option for a bus station on Haven Green south, in which case provision would be needed for two-way traffic (including buses) on Springbridge Road. The impact on general traffic, however, would require investigation.

The assessment could enable the options with the lowest (“red”) rating to be removed from further consideration. These have serious disadvantages that appear incapable of mitigation. They include options that take away from Haven Green, which involve costly use of space over National Rail tracks, or which take valuable development land without resolving the problem of bus activity around Haven Green. The “do nothing” option whose only benefit derives from lack of action and expenditure could also be ruled out.

An overall observation is that finding an appropriate solution, satisfying most of the key objectives, will be highly dependent on the flexibility available for restructuring bus services at Haven Green. Retention and expansion of terminating services inevitably places a huge strain on the space available, and hence the quality of the place. On the other hand, removal of some or all terminating and layover capability probably means that more buses would be routed via part of the A4020. The impact of this on other traffic (including buses on the A4020) would need careful study. Bus route restructuring could enable the “bus mall” option for Station Broadway to be pursued, but again careful analysis would be needed of the wider traffic repercussions. For example, while Springbridge Road would need to accommodate two-way traffic, this would allow direct access to the car park from the north, thus reducing the need for vehicles to use the A4020 and its junctions in the town centre.

Given the broad-brush nature of the assessment exercise, more information and detailed investigation will be required to inform decisions as to the appropriate way forward. The next section therefore sets out the scope of such further study.

## **9. Further considerations and issues requiring further investigation**

### **9.1 Issues needing further investigation**

A number of issues have been raised that it has not been possible to resolve in this study. This section identifies further information and study needed before a decision can be reached as to which option, or options, should be pursued.

#### *9.1.1 Bus capacity*

A limitation of the current assessment exercise relates to bus capacity. The current number of stops and stands, and details of all the routes and frequencies is known (see Annex D and E), but it is not known what the capacity of the current arrangement is. The Haven Green bus stops, for example, currently are required to handle up to about 8 buses per hour per space, which would appear to be a fairly light loading. However, while increased frequencies are theoretically possible, effective handling is highly dependence on regularity of arrivals. Since the arrival times of different routes is not coordinated, regularity and even spacing of arrivals cannot easily be guaranteed. Some data on the potential for increased bus frequencies at existing stops will be important before committing to investment in alternative bus arrangements.

Still less is known as to what the capacity of alternative arrangements (such as a bus station) would be, and how this would be affected given different traffic and bus movement configurations. In particular, the capacity increases possible by converting (some or all) bus routes from terminating to through routes should be explored.

#### *9.1.2 Future demand*

There is no up to date information on likely future demand for bus access, following the opening of Crossrail, and the capacity required to cope with it. Earlier estimates of demand post-Crossrail may already have been exceeded without Crossrail, in line with generally large increases on the London bus network in recent years. If, as appears from existing documents, bus passengers transferring to rail services in the morning (3 hour) peak period amount to less than 20% of the capacity of buses arriving at Ealing Broadway, then even major extra demand arising from Crossrail may be manageable with only a marginal increase in bus services. Such information will have a significant impact on the case for major reconfiguration/

Some indication of post-Crossrail distribution of demand will also be required, and whether and how this might differ from the existing pattern of demand, and hence the suitability of existing routes to handle it. Changed patterns of demand may require some re-structuring of routes, which in turn will have an impact on the parameters for the design of bus facilities at Ealing Broadway.

#### *9.1.3 Wider Borough transport needs*

There is currently no information as to the suitability of present bus routes and interchanges to meet overall future needs, nor as to the potential to restructure them to meet wider Borough needs. Finding a good long-term

solution will be highly dependent on the flexibility available for restructuring bus services at Haven Green. Retention and expansion of terminating services inevitably places a huge strain on the space available, and hence the quality of the place. On the other hand, restructuring routes as through routes would have impacts on the Uxbridge Road (A4020), which is an equally important bus corridor (see Annex E).

By way of example, the proposed route to Chiswick Business Park in the Ealing LIP may offer potential for reducing the number of terminating routes at Ealing Broadway, by linking it with one of the existing routes to the north of the A4020.

#### *9.1.4 Bus station versus on-street bus facilities*

Giving further consideration to an “over the tracks” bus station requires, first and foremost, evidence that such a solution would provide benefits to passengers and the local environment and can meet bus operation requirements. If that test is passed, the key issues will be cost, funding, implementation, and timing.

Perhaps the first issue to be tackled is to discover the split in bus arrivals/departures between those interchanging to bus or rail, and those for whom Ealing Broadway and town centre are the destination. From the limited data available from existing documents, it would appear that bus passengers transferring to rail services in the morning (3 hour) peak period amount to less than 20% of the capacity of buses arriving at Ealing Broadway. If this is indeed the case, then the relocation of bus stops from on-street to an off-street bus station could significantly increase the walking distances and inconvenience experienced by the majority of users.

#### *9.1.5 Over-the-tracks options and development viability*

The costs and benefits of constructing a bus station over railway tracks, and the need for and viability of any enabling development, need to be established in advance of any decision on such an option. An initial view on over-the-tracks options suggests, in descending order of feasibility, that:

- Construction costs of a “slab” with bus station (i.e. without development over) could be within the cost range manageable as a publicly funded project. Preliminary advice suggests costs of the “slab” only could be in the range £1.5 – 3 million, but to this would be added the costs of providing access and the bus station facilities. If such a bus station were to require subsidy from development surplus, there is potentially an important distinction to be drawn between the Underground and National Rail locations.
- A bus station over Underground (station) tracks should avoid “ransom” and track possession costs, but would involve assembly of third party land for bus access. If subsidy were required, enabling development over the bus station could be difficult to conceive, in terms of both form and viability. The preference should therefore probably be for a “bus station only” design that is not dependent on development over the bus station.

- Third-party costs could be substantial over National Rail tracks (whether between Haven Green and Arcadia, or over the National Rail station) requiring substantial development surplus to subsidise the bus station. Recent rejection of the intensive development option, coupled with the loss of development space caused by a bus station, suggests that it is no longer realistic to expect sufficient development surplus to subsidise building a bus station over National Rail tracks.

#### *9.1.6 Design of off-street bus station*

More information would be needed on what form any off-street bus station should take to get an appropriate balance between passenger comfort and convenience, efficient bus operation and the urban setting. The sketch designs available to date are not supported by information as to why these designs were preferred over alternatives, nor are their functionality or impacts well established. Particular issues on which information and clarification would be needed are:

- Engineering of slabs and ramps and levels for bus and pedestrian circulation (over-tracks options)
- Subsidy requirements and need for development contributions (see above)
- Bus access and lay-over arrangements and turning possibilities
- The provision of sufficient stops/stands to meet long term demand
- Potential for access to buses without crossing roadways
- Impact of off-street bus station on bus miles and journey times
- Impact of off-street bus station on passenger journey and interchange times
- Impact of buses turning into and out of a bus station on pedestrian and vehicle traffic on Haven Green East and/or Station Broadway
- Specific land ownership, CPO and ransom issues

It is important that consideration of any off-street bus station option includes not only the requirements placed on the bus station itself, but also the appearance of the scheme and any associated buildings (height, massing, access etc.). This highlights again the importance of understanding what sort of place is being created. There is clearly little point in pursuing a bus station option if it entails levels and types of development that are devised simply to provide s106 subsidy, and that are unlikely to be acceptable from a planning (and public) perspective. For example, a bus station on a raft over the Underground tracks might be feasible as a publicly funded project, but development over the bus station sufficient to provide a worthwhile subsidy would be difficult to conceive, in terms of both urban design and viable use.

#### *9.1.7 Traffic management and highway changes*

Some of the options would result in (and require) a different pattern of movement in the Ealing Broadway area, including both bus and general traffic movement. This applies especially to the option to separate general and bus traffic in order to create a high quality station approach area and bus “mall”.

The immediate questions to be answered include:



- Can general and bus traffic be separated in order to provide reduced traffic and pedestrian conflict in Station Broadway and Haven Green east?
- Would this involve provision on the Glenkerrin (Arcadia) site for widening Springbridge Road to accept two-way traffic, and enlargement of the A4020 junction with Springbridge Road?
- What would be role of and impact on other north-south routes in the area, in particular Longfield Avenue and St Leonard's Road and connecting streets?
- What would be the overall effect on east-west movement on the A4020?
- What changes (if any) would be required to Springbridge Road north of the railway bridge to handle two-way traffic?
- What traffic impact would result from routing buses through Ealing Broadway rather than terminating at Haven Green, and would this impact be manageable?
- Can the demand for pick up and drop-off movement at Ealing Broadway station be handled if northbound return movements (currently handled by the diagonal road) are no longer possible? What options might there be for these movements?
- How can cycle movements best be handled as between Springbridge Road and station Broadway in any of the above possibilities?

## **9.2 The Haven Green East scheme: issues to be addressed**

### *9.2.1 Previous scheme*

The high-scoring option to focus bus facilities on the east side of Haven Green also needs to be addressed in detail. A scheme was considered by the Council but refused in 2008. The concerns raised by that scheme need to be resolved through amended design and further analysis if this option is to be taken further. The following issues have been identified:

### *9.2.2 Loss of trees*

The option would result in a loss of some existing trees on Haven Green. This could be mitigated by the planting of semi-mature trees, not only as replacement but to increase the overall number. (At present the northern half of Haven Green east has few trees. The removal of the Madeley Road roundabout would also provide extra space where trees could be planted. Trees could also be planted on the eastern footway, which currently has only one tree. The planting scheme should be designed with integral landscaping of the open space as a town park, rather than simple like for like replanting on the old pattern.

### *9.2.3 Servicing of Haven Green east properties*

More use could be made of the existing rear service yard, for example by making it accessible to larger vehicles. An alternative (already proposed) would be to trolley from a dedicated lorry stand on the street away from the bus stops. Limiting servicing to quiet periods (probably evening/night) might also be an option.

#### *9.2.4 Drop-off and pick-up at the station forecourt interfering with pedestrian crossing*

This facility could be redesigned or relocated to avoid this problem arising. The location and design of the crossing should be integrated with other facilities including the relocated station entrance and drop off facilities.

#### *9.2.5 The diagonal road across the Green*

Closure of the diagonal road resulting in the displacement of some northbound traffic could increase congestion on Broadway A4020 and Springbridge Road. The only traffic so affected would be private cars engaged in pick-up and drop-off at the station and service vehicles for Haven Green East. This movement is around 100 vehicles per hour in the morning peak hour. This would add around 5% to the existing vehicle flow in front of the station. It might be expected that a proportion of those dropping people off for the station would not venture down Haven Green east, but would drop off north of the Green or in Madeley road (to avoid the one-way loop involving Broadway and Springbridge Road).

#### *9.2.6 Presence of, and design for, bus- and taxi-driver facilities*

An alternative would be to acquire or lease a building on Haven Green east to make provision for driver facilities. Another would be to provide them underground. Removal of the existing hut would be of benefit to the appearance of the area. Any new facilities provided on-street could be specified to a high quality to enhance rather than detract from the area.

## **10. Next steps: delivery, phasing and timing of improvements**

### **10.1 The basic requirements**

The analysis in this report highlights the complexities of the situation at Ealing Broadway. This section attempts to map out a way forward, building on the findings of this and previous studies.

The basic requirements are to:

1. Agree a vision and strategy for the role and appearance of Ealing Broadway as the main gateway to the town centre and as a major multi-modal transport interchange.
2. Plug gaps in data and understanding in order that options can be assessed in detail.
3. Take forward improvements, especially to the station forecourt, that do not prejudice longer-term options and improvements.
4. Develop and refine options that are judged worthy of further consideration, taking into account the assessment in this report.
5. Draw up and manage a phased approach to Crossrail-related measures, including station provision and development, and bus service re-structuring.

### **10.2 A project group for Ealing Broadway**

To achieve this it is recommended that a project group should be established that will provide a focus for action and which can adequately represent the transport operators and other stakeholder interests. The remit of the group should embrace short term (station forecourt) actions, even if a separate group is responsible for delivery, but the main role will be to secure delivery of the four components listed above. The group would also be well placed to handle public involvement as the work progresses.

### **10.3 A possible phased programme of action**

#### *10.3.1 Short term*

- Improvements to the station forecourt could be implemented in the short term to provide major benefits, and without prejudicing any of the bus interchange options in the medium to longer term.
- Plug the gaps in knowledge. This is regarded as essential before commitments are made to any longer term options. The growth potential of existing bus facilities, and the likely demands arising from Crossrail and other growth should be established as a priority.
- Information is needed in the short term as to whether any, and if so what, provision needs to be made within the planned Crossrail new station for development over the tracks and/or for the provision of an off-street bus station.
- Involvement of Crossrail in the immediate short term is needed to consider the impact on the station design of a forecourt bus station option (Option 14 generated in this study).
- A further key output from a project group would be an early recommendation on what use, if any, is to be made of land on and

adjacent to the south side of Haven Green for bus interchange purposes.

#### *10.3.2 Medium term*

- If the concept of developing over parts of Ealing Broadway station (to provide a bus station, or other development) survives the next round of testing, designs will be needed along with details of funding and viability, etc. The timing of such a major scheme would be sensitive to the timing of the major Crossrail works. Upheaval lasting for many years could have a negative impact on Ealing's economy and amenity.
- If an off-street bus station over railway tracks or platforms is ruled out, then major effort could be devoted to on-street solutions, or ones involving reconfiguration of Haven Green. Such solutions could involve significant restructuring of bus services, and as such are unlikely to be feasible in the short term.

#### *10.3.3 Longer term*

- Longer-term options should be considered for when simpler on-street options cannot meet demand, or to allow time to plan and develop complex or expensive solutions, whether on- or off-street.

## Annex A: Options in source documents

Source and brief description	Relationship to options assessed in this report
Halcrow report for TfL "Ealing Broadway Interchange Feasibility Study, Final Report, May 2006	
Option 1 Crossrail ticket hall	Stand alone facility
Option 2 Improvements to interchange	Stand alone short term measures
Option 3b Bus station on south side Haven Green	Option 3b
Option 3c Bus station south of HG + car park	Option 3c
Option 3d Bus station south of HG car park only	Not included, not viable
Option 4 Mini bus station rear HG east	Option 10
Option 5 Bus station over District Line platforms (Four sub options included, but relate to internal design aspects)	Option 5, District and/or Central Line tracks not specified
Option 6 Bus station over National Rail platforms	Option 6
Option 7 Bus station NE of Broadway/The Mall junction	Not included but Option 14 is related
Option 8 Bus station NW of Broadway/The Mall junction	Sub option of Option 9
Option 9a Bus station over NR tracks between Springbridge Rd and Broadway retains Central Chambers	Not included (rejected by Halcrow)
Option 9b Bus station over NR tracks between Springbridge Rd and Broadway, retaining Central Chambers	Option 8
Option A Broadway open, diagonal open, no station layby	Compatible with Option 1
Option B Broadway and diagonal open, no station layby	Compatible with options 5, 6, 10
Option C Broadway open, diagonal closed	Component of Options 3a, 3b, 3c and 6
Option D Broadway open, diagonal closed, no station layby	Compatible with Option 8
Option E Broadway closed, diagonal open, no station layby	Broadway closure element compatible with Option 13
Option F Broadway closed, diagonal open	Broadway closure element compatible with Option 13
Option G Broadway closed, diagonal closed	Potential Option 13 layout
Option H Broadway closed, diagonal closed	Compatible with Option 8, and Broadway closure Option 13
Option I Broadway closed, diagonal closed	Option 13, and compatible with options 5 and 7
Savell Bird Axon / Foster & Partners options for bus facilities at Haven Green and Arcadia, Oct 2008	
Option 1 Bus stops and stands HG east (new northbound, diagonal closed, as applied for)	Option 4
Option 2 Bus station on south side of HG, north of trees	Option 3a
Option 3 Widen diagonal for extra stops and stands	Option 2
Option 4a Mini bus station over part of NR tracks	Option 9 (location within Arcadia site not specified for purpose of assessment)
Option 4b Mini bus station on BBC car park	
Option 4c Mini bus station on south boundary of Arcadia site	
Option 4d Mini bus station on west boundary of Arcadia site (Springbridge Road)	

### Annex A concluded

Ealing Metropolitan Centre Spatial Development Framework. Tibbalds for LB Ealing, May 2008	
Option A Bus sta on south side of HG, north of trees (similar to SBA Option 2)	Option 3a
Option B Similar to A but different landscape	Option 3a
Save Ealing's Centre, report November 2009	
Bus station between rail station and The Mall	Not included
Bus station over Underground tracks with exit to The Mall	Option 7

## Annex B Documents reviewed

November 2009

Report name	Options or alternatives	Other relevant content
TfL Interchanges report, Halcrow Volume 1, May 2006	9 options of which 4 ruled out Various sub-options as part of one or more of the main options	Details of schemes, and pros and cons  Audit of interchange re TfL guidelines
TfL Interchanges report, Halcrow Volume 2	Illustrates options as above	A collection of 28 papers and documents, including plans of some of the interchange options
Glenkerrin Arcadia site Transport Assessment	No (Describes HG east bus station as applied for)	Traffic and trip impact of Arcadia development
Savell Bird Axon / Foster & Partners options for bus facilities at Haven Green and Arcadia, Oct 2008	Yes 3 options for Haven Green itself 4 options for providing a bus drop-off on part of the Arcadia site	Documents part of Transport Assessment for Arcadia site describing options and pros and cons.
Glenkerrin Arcadia appn – Ch 14 Transport and Access	No	Policy context Traffic and PT changes and impacts, mode split for site
Glenkerrin applications supporting documents (EIS, Archeology, etc.)	No	Historic plans, Background to applications and scheme development
Haven Green east Transport and Access statement Ch 4 SBA for Glenkerrin 2008	Yes As proposed, plus alternatives: A Mini bus sta over NR tracks, adds 4 stops B Mini bus sta BBC car park, adds 5 stops C Mini bus sta southern edge of Arcadia site D Mini bus sta western edge of Arcadia site Plus “alternative designs” 1. Bus station south side of HG (north of trees) 2. Widening of diagonal to add 4 stops	Alternatives are assessed qualitatively (pros and cons)
Haven Green east transport interchange, Transport and Access Statement SBA for Glenkerrin(2008)	No (Describes HG east bus station as applied for)	Traffic impacts described. Assumed 2017 with Crossrail, but growth factor for Crossrail (if any) is not stated

Annex B continued

Haven Green Transport Interchange, Transport Assessment, SBA for Glenkerrin, Oct 2008	Haven Green east as per application	Ch 4 describes HG East scheme and impacts Plans Traffic data
Ealing Local Implementation Plan, 2007	No	Emphasises the objective of good bus access to the town centre
Ealing Transport Strategy 2009	No	Supportive of interchange at Ealing Broadway, including provision to meet future demand, and a new orbital rail line.
Crossrail Ealing Broadway Transport Assessment (Sept 2006 Halcrow)	No	Traffic data and forecasts. Numbers and mode split of passengers arriving/leaving, existing and forecast
Glenkerrin "Haven Green Transport Interchange Draft Brief" 21 July 2008 – paper copy	No, but specific requirements set out <ul style="list-style-type: none"> <li>• 23 stops/stands</li> <li>• 17 taxi stands (to standard)</li> <li>• 3 taxi pick up at station</li> <li>• Protect trees and Common land area</li> <li>• Crossrail works compound – relocate?</li> <li>• Road capacity concerns to be met</li> <li>• New northbound bus lane (HG east)</li> <li>• Pavement widths 2.7m min</li> <li>• Drop for cars/disabled at station</li> <li>• Cycle route on diagonal</li> <li>• 50 cycle stands at station + 150 others</li> <li>• Pedestrian crossing needed within bus interchange</li> <li>• Bus/Taxi driver facilities in Arcadia devt</li> <li>• Servicing arrangements for shops</li> <li>• Other: bus shelter design; road surface, lighting, ice rink power; kerb height</li> </ul>	Improve transport facilities for bus and taxi on Haven Green Maintain and improve Haven green New public space in front of Ealing Bdy station



Annex B continued

Spatial Development Framework for Ealing Metropolitan Town Centre: Section 5 Transport (Tibbalds Planning and Urban Design, May 2008)	<p>Specific projects</p> <ul style="list-style-type: none"> <li>• Review terminating/through routes to remove bus stands</li> <li>• co-ordinated projects to synchronise timetables, information, marketing and improve physical connections between bus, rail, taxi, cycle</li> <li>• Increasing bus priority measures at Haven Green</li> <li>• Contra-flow cycle lane The Broadway</li> </ul>	<p>Interchange objectives:</p> <p>1.1 Improving interchange from bus to other modes at Haven Green/Ealing Broadway Station</p> <p>1.2 Increasing bus priority measures at Haven Green</p> <p>1.3 Improving Haven Green Interchange through allowing removal/ relocation of bus stands</p> <p>1.4 Increasing capacity and improving access at Ealing Broadway Station</p> <p>1.5 Improving interchange from rail to other modes including drop-off facilities</p> <p>1.7 Improving access to taxi rank at Ealing Broadway</p>
Spatial Development Framework for Ealing Metropolitan Town Centre: Summary (Tibbalds Planning and Urban Design, May 2008)	No	<i>Tibbalds Objectives</i> Better integration of Haven Green with town centre Station area enhancement
Cycle map, Ealing (LCC)	No	Cycle routes
Bus map, Ealing Bdy	No	Bus routes serving Ealing Bdy
TfL Interchange Best Practice Guidelines Jan 2001	No	Basis for assessing interchange functionality and quality
TfL Interchange Best Practice Guidelines 2009 Quick Reference Guide	No	Provides a design and evaluation framework and emphasises importance of quality of place as well as functional interchange.
Crossrail TA, Halcrow Sept 2006	No	Existing (2001/2003) traffic and passenger data Forecast data with Crossrail by mode
Save Ealing's Centres Ealing Broadway Interchange – Options and Issues 11/11/2009	Yes Option over the District/Central tracks, plus entry/exit at Haven Green, and at The Mall	Reviews Halcrow options etc Sets out objectives Gives background info
SDG "Ealing Town Centre Transport Master Plan" Oct 2006	Not obtained	

Annex B concluded

<p>Transport for London, Intermodal transport interchange for London: Best practice guidelines January 2001 Issue 1</p>	<p>No</p>	<p>Provides a comprehensive set of interchange design requirements. These have been reflected in the assessment of options.</p>
<p>Transport for London, Interchange Best Practice Guidelines, 2009, Quick Reference Guide</p>	<p>No</p>	<p>Emphasises the importance of interchanges as part of the wider environment in which they sit, as well as the need for high quality facilities.</p>

## **Annex C: Policy Context**

Relevant policy documents are briefly referred to below.

### ***National Policy***

#### *Planning Policy Guidance Note 13 (PPG13), 2001*

PPG13 promotes high density mixed use development in locations accessible by a choice of means of transport, such as town centres and public transport interchanges. Development should encourage the use of travel by modes other than the private car and to reduce the length of journeys.

The key objectives of transport policy are to:

- Reduce congestion and the dependency on car travel;
- Reduce levels of air pollution and noise from transport;
- Improve the accessibility and encourage the use of environmentally friendly modes of transport;
- Raise awareness of the effect of transport and travel decisions; and
- Promote sustainable growth in terms of economic development and land use planning.

PPG13 encourages development that helps "...to reduce the need to travel, reduce the length of journeys and make it safer and easier for people to access jobs, shopping, leisure facilities and services by public transport, walking and cycling." High density mixed use development at and near Ealing Broadway is clearly consistent with this policy.

### **London Policy**

#### ***Draft replacement London Plan, Spatial Development Strategy for Greater London, Consultation Draft, October 2009***

As with the previous plan, there is support for strengthening interchange locations as a means of strengthening town centres and also promoting non-car modes.

*"Improving interchange between different forms of transport, particularly around major rail and Underground stations, especially where this will enhance connectivity in outer London."*

*"High quality facilities for easy interchange have a major role to play both in ensuring effective working of transport networks and in place-shaping where they are located. They can also provide new development opportunities, enabling efficient use of land in places with high levels of accessibility – and for development to help contribute to the cost of new infrastructure. Realising these benefits requires close working between transport providers, local authorities and, where appropriate, the Mayor."*

*"Enhanced bus services and interchange at selected Crossrail ... stations"*

**London Transport Strategy (Mayors strategy, public consultation draft 2009)**

The plan recognises the importance of interchange in outer London.

*“Because of the relatively low demand for orbital public transport, particularly in Outer London (compared to radial transport to central London), the most value for money approach will be (following the delivery of the London Overground investment) to invest in better journey planning information and improved interchange quality, particularly focusing on strategic interchanges, accompanied by better integration of the National Rail network with other transport modes; and bringing stations, service frequency and quality to minimum standards.”*

**Ealing Policy**

**London Borough of Ealing Unitary Development Plan (UDP): Plan for the Environment, 2004.**

The transport strategy within the UDP aims “...to provide sustainable access from homes to jobs, shops and services, and from business to business, by integrating land-use and transport planning, restraining car traffic, promoting improved public transport and facilities for pedestrians and cyclists...”

Policy 9.1 seeks to maximise access on foot, by bicycle and public transport and the promotion of sustainable transport, including the implementation of a Travel Plan;

Policy 9.5 requires developments to include footpaths that are safe, attractive, well lit and comfortable for all, particularly for those who have mobility difficulties;

Policy 9.6 requires developers to have regard to the safety and ease of movement of cyclists, and to provide appropriate facilities to promote cycling as a mode of travel.

Policy 9.8 encourages the introduction of city car clubs and low car housing, particularly in town centre locations and within 200m of stations.

**Spatial Development Framework for Ealing Metropolitan Town Centre**

Tibbalds Planning and Urban Design, May 2008

This report set out a strategy for Ealing town centre as a whole, and included suggestions for a new bus station on Haven Green. It draws attention to the mode split for people arriving at Ealing town centre, of which the largest group (45%) come by bus. It also provides data showing that people who arrive at the town centre on foot or by bus spend as much or more than those arriving by car. This prompts consideration of giving priority to non-car modes when redeveloping or reconfiguring the Ealing Broadway area.

## **The Local Development Framework (LDF)**

The core strategy and other parts of the LDF are at an early stage of preparation and is not included in this review.

## **Local Implementation Plan (Transport) 2007**

The Ealing LIP emphasises the role of the bus in providing access to the town centre as well as its role as a feeder to rail and Underground services.

*“In 2002, 32% of shopping trips to town centres for example were by bus compared to 31% by car. The sheer number travelling by bus and the proportion of the total travel market in Ealing that they represent in itself demonstrates the importance of ensuring a high quality of service is provided.*

*Bus users also contribute significantly to spend in town centres: a 2004 survey for TfL showed that bus passengers spend an average of £63 per week in town centres compared to £64 per week by car drivers.”* Reducing the need to change buses is also an important factor and the LIP contains proposals for a small but significant number of new and better direct links within the Ealing network.”

*“The council in principle supports the provision of necessary facilities for the efficient operation of bus services. These include garages, driver toilets and ticket machines.”*

A new bus route is postulated serving “Ealing Broadway, Popes Lane, Acton Town Station, Bollo Lane, Chiswick Business Park. This route would create new links to and from Ealing Broadway from residential areas to the south and also create new links to the Piccadilly Line.” This is potentially a candidate for creating a through service at Ealing Broadway, linking with one of the routes that currently terminates from north of Ealing Broadway. (see Section 8)

### *Ealing Broadway Interchange*

*“8.21 Ealing Broadway is the borough’s busiest station and serves the borough’s main town centre. For several years the council has participated in an Ealing Broadway Interchange Group, chaired by TfL, which has drawn up and implemented a range of improvements to access to the station through the West London Transport Strategy. This reflects the importance of the station in west London and the need to demonstrate the importance being given within that strategy to rail and to sustainable access to stations. About 8000 people enter the station in the three hour morning peak.”*

The LIP and the various studies commissioned in the past few years demonstrate the continuing efforts being made by the Borough Council to resolve what is, by any measure, a complex issue for Ealing town centre. The decision to improve the station forecourt in advance of a long term solution for the interchange should provide benefits at an early date.

### ***Ealing Transport Strategy 2009***

The importance of planning Ealing Broadway interchange to cope with future demand is supported by the Transport Strategy; *“Monitor station rebuilding plans to ensure that adequate capacity is provided to take account of the growth in rail users and that consideration is given to the needs of interchange with bus services and for pick up and set down facilities.”* The document also is supportive of exploring changes to the bus network: *“Work with TfL to improve short to medium term bus service planning.”*

### ***London Borough of Ealing Supplementary Planning Guidance, 2004***

Supplementary planning guidance for Ealing Town Centre for the period 2002 through 2012 was adopted in 2004. The document covers Ealing Broadway, Central Ealing and West Ealing, setting out 5 Action Plans. The strategy for the town centre is set out in the document Ealing Town Centre – A Strategy for Sustainable Improvement 2002 – 2012.

Action Plan 2 is entitled “Easier Movement”, and includes objectives to improve pedestrian, cycling and public transport accessibility to the centre, along with traffic and parking. With regard to traffic, it suggests introducing traffic management schemes that strike a balance between movement of traffic and calming, along with a service management strategy. With regard to parking, there is a suggestion to rationalise public parking provision, review pricing structures and improve access to the Spring Bridge Road multi-storey car park.

The Ealing Town Centre Strategy includes further supporting information along with summaries of the development briefs for the allocated sites and a summary of the consultation exercise. It suggests that improvements are required to bus, walking and cycling facilities and the station. It suggests that Ealing Broadway has one of the lowest ratios of parking to retail floor space, and that a balance needs to be struck between the environment and economic viability, with the aim not to increase the overall existing supply.

The UDP specifically allocates the Arcadia site for comprehensive redevelopment for mixed use comprising retail, residential, offices and cinema. The site is also to be “considered” as a site for the development of bus station and interchange with Ealing Broadway Station (see Section 5). Good pedestrian access is called for. The development is *“to link with redevelopment of the Station (EB5) and improved interchange facilities for all modes of transport and strategic rail options”* and to *“improve Haven Green open space and trees and ensure no significant overshadowing.”*

**Arcadia site: Secretary of State's decision on planning application P/2007/4246.**

The application by Glenkerrin for the redevelopment of land between Haven Green and The Broadway (A4020) was refused permission by the Secretary of State in December 2009. While acknowledging the scheme's merits in boosting the profile of Ealing town centre, and providing quality buildings and spaces, the refusal was mostly because *"the bulk, massing and certain aspects of the design of the scheme would be inappropriate in its surroundings"*.

**Arcadia site Inspector's report**

The Inspector's report into the Glenkerrin application for the Arcadia site (P/2007/4246) provides a detailed account of a range of views and consultations, including the following (our emphases):

*Para 288 "With regard to the proposed transport interchange, matters have moved on since adoption of the UDP. The policy requirement to 'consider' the Application Site as an option for 'bus station and interchange' has been met. Despite objectors' scepticism, this issue was fully examined by and on behalf of TfL in 2006. Ealing Broadway Interchange Feasibility Study Final Report, May 2006, Halcrow Group Ltd (MISC1). In their contribution to the GLA Stage 1 Report, TfL 'requested that the Applicants work with them to investigate possible solutions for making some provision for buses within the site'. (SC 1, Appx A, paras 131-140) As explained in the Stage 1 Update Report, such collaborative work was undertaken. The resulting conclusion was 'that the **only realistic or achievable option was to build a new bus interchange on the east side of Haven Green. ...**' (SC 2, Appx A, paras 81-82) – that is, outside the Application Site. The report went on to make clear that the only funding for an interchange would have to come from s.106 contributions, that it would be reasonable for the Arcadia scheme to contribute financially, that the interchange could not come forward before 2016 and that 'if ... the bus interchange cannot be delivered ... TfL requests that Section 106 funds be re-allocated towards general bus facility and network capacity improvements instead. ... The Section 106 agreement will need to be drafted to take account of these requirements in the event that the interchange does not go ahead'. (SC 2, Appx A, para 88) The s.106 Agreement reflects these representations with an obligation to pay a total of £1.3m, phased to occupation of dwellings. Therefore the Application proposals would make a considerable contribution to the achievement of an interchange.*

*Para 349. The proposed uses of site 63, to the intensity proposed, also represents a lost opportunity to provide a use for which only two sites are allocated in the UDP, namely for a 'bus station and interchange with the Station'. **Neither this loss, nor its consequences in practice, should be underestimated.***

*Para 350 The allocation of sites 63 and 64 as alternatives and as linked sites for a bus station / interchange use was reached through a process of full public consultation during the UDP-making process. There cannot have been*

*any serious suggestion at the time of the plan's publication that either one of the sites was inappropriate for such a use; indeed it envisaged that these were the very sites on which to deliver it. The application under consideration would mean both that **only site 64 remained as a planned option and that the possibility for a linked interchange between sites 63 and 64 was removed. An important consideration at this Inquiry is therefore the effect of the proposal on the deliverability of a new bus station / interchange.***

*Para 351 The Applicant has argued that its proposal does not prejudice the delivery of such a use on site 64. There is an important qualification to that argument, explained by SEC's transport witness (SEC 2, paras 8.2 – 8.3). According to the Halcrow report, to provide a bus station on site 64 would involve a benefit/cost ratio of 0.5:1. To provide it, by contrast, over the railway lines on site 63 would involve a benefit/cost ratio of 1.4:1: significantly more costly to achieve the same benefit. All parties accept that the bus station / interchange would have to be privately funded so the using up of site 63 makes it significantly less likely that a developer will be prepared to undertake provision on site 64. The proposed s.106 sum of £1,300,000 for 'Bus / Transport Interchange Contribution' was based on the cost of the (rejected) proposal to build an interchange on the east side of Haven Green; not any cost associated with the provision of such a use on site 64. Therefore, the reality of this application is that it removes one of the two options in the development plan for a much needed use and makes no provision to facilitate the only remaining planned option.*

NB Para 568 sets out the heads of terms of the S106 agreement, including £1.3 million towards the cost of a bus interchange, and £300,000 towards the cost of redesigning the station forecourt.

*Para 600. Bus services are similarly well developed. It is estimated that the development will create a demand of about 224 bus passenger two-way movements in the morning peak hour, 574 in the evening peak hour and 1,197 in the weekend peak hour. Based on TfL's Bus Origin Destination Surveys (BODS) there is **available capacity of about 12,000 seats in the morning peak and 13,000 in the evening peak. In 2005, 14 out of 15 bus routes in Ealing were operating within capacity.** It is estimated that the development will on average add a demand of one to two passengers per bus in the morning peak, and two to three passengers per bus in the evening (GK 7, Section 3)."*

### **Glenkerrin proposal for bus facilities at Haven Green**

LB Ealing Council in 2008 refused permission for a rearrangement of the bus facilities at Haven Green proposed by Glenkerrin (application number P/2008/4025). A number of concerns were expressed in relation to the proposal as set out in the application documents. These included:

- a) The proposal, by virtue of the loss of a significant number of trees, and the design of the bus and taxi driver facilities buildings, would detract



from the character and appearance of the Haven Green Conservation Area, contrary to policies 4.1, 4.5 and 4.8 of the adopted Ealing Unitary Development Plan 'Plan for the Environment' (2004) and the provisions of Section 72(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990, as amended.

- b) The proposal would not improve the provision of loading facilities for local businesses and commercial properties fronting the eastern side of Haven Green, contrary to policy 9.1 of the adopted Ealing Unitary Development Plan 'Plan for the Environment' (2004).
- c) The proposal would have a detrimental impact on the operation of the proposed pedestrian crossing outside the station due to the location of drop off and pick up facilities outside the station, contrary to policies 9.2, 9.5 and 9.7 of the adopted Ealing Unitary Development Plan 'Plan for the Environment' (2004)
- d) The proposed closure of the diagonal road across Haven Green would result in the displacement of some northbound traffic for which sufficient information was not available to adequately quantify any effect on congestion in the Broadway A4020 and Springbridge Road, which would be contrary to policies 9.1 and 9.9 of the adopted Ealing Unitary Development Plan 'Plan for the Environment' (2004)"

### ***Consultation and public involvement***

The EIS for the Glenkerrin interchange proposal pointed out that *"The development of the Transport interchange was in response to previous public consultation for the adjacent Arcadia development held in November 2006 and March 2007. Responses received from these previous public exhibitions highlighted the need for a bus terminus or better integrated facilities between bus routes and the Ealing Broadway Station area. The proposed plans for the Development were then displayed at a public exhibition that was held in the Arcadia Shopping Centre on 25 and 26 July 2008."*

Other issues have been highlighted during public consultation, such as the desirability of enhancing Haven Green as a public space, and achieving a better relationship between the Green and Ealing town centre, which UDP policy reflects. These issues are reflected in the objectives included in the assessment matrix in this study.

**Annex D: Options' Bus Capacities – specified/ assumed (December 2009)**

Category and number	Description	No of "stops "	Stop space capacity	Drop off stop (add)	Stand capacity	Meet existing?	Provides for 66% growth?
Existing		6	11	2	8	Y	N
<i>A. Upgrading and minor works</i>							
Option 1	Improved and upgraded facilities on current layout	6	11	2	8	Y	N
Option 2	Widen diagonal road to provide additional stops	7	15	2	12	Y	Y
<i>B. Involving significant reconfiguration of the area (note 1)</i>							
Option 3 a	Bus station on south side of Haven Green, north of trees (incl stops HG east and Broadway)	10-12	17	2	0 (none shown on drawing)	N	N
Option 3 b	Replacement bus station on south side of Haven Green, north of BBC car park boundary	8	11	2	19	Y	N (Yes if HG east stops retained)
Option 3 c	Replacement bus station on south side of Haven Green taking car park with or without taking 7-10 Central Chambers	8	11	2	20	Y	N
Option 4	Bus stops and stands relocated to the east side of Haven Green	7	17	0	8	Y	N
<i>C. Involving major redevelopment &amp; reconfiguration of the area (note 1)</i>							
Option 5 b	Bus station above District Line tracks	7	9	0	20	N	N
Option 5 e	Bus station above District Line and Central Line tracks	7	9 (13)	2	26 (18)	Y (If redesign)	N
Option 6	Bus station over National Rail platforms (not specified)	-	-	-	-	-	-
Option 7	Bus station over District and Central Line tracks plus bus exit to The Mall	12-13	15	2	34	Y	Y

Annex D concluded

Option 8 a	Bus station over NR tracks and BBC car park, retain Central Chambers <b>Assumes HG east 5 spaces retained</b>	8	12	2	18	Y	N <i>(but redesign possible)</i>
Option 8 b	Bus station mover NR tracks and BBC car park, take Central Chambers <b>Assumes HG east 5 spaces retained</b>	10	16	2	23	Y	Y
Option 9	Bus station (mini) on part of Arcadia site (3 sub options considered but not detail spec.) providing 4-5 stops <b>Assumes existing stops etc retained. Space numbers assumed here.</b>	10	15	3	10	Y	Y
Option 10	Mini bus station to rear of Haven Green east side (not specified) <b>Assumes existing stops etc retained. Space numbers assumed here.</b>	10	14	2	8	Y	N <i>(Spaces gained could be partly offset by spaces lost on HG east)</i>
Option 11	Mini bus station on NE corner of Broadway/Mall junction (Not specified) <b>Assumes existing stops etc retained. Space numbers assumed here.</b>	10	14	2	8	Y	N <i>(Spaces gained could be partly offset by spaces lost on HG east)</i>
Option 12	Creation of public transport mall Haven Green East and Station Broadway. General traffic 2-way on Springbridge Road. Diagonal closed. No terminating services	8 <i>(4 each direction)</i>	10	0 <i>(not required)</i>	0 <i>(not required)</i>	Y	Y
Option 13	Broadway closed (pedestrians and cycles only) plus option 7	-	-	-	-	Y	Y

## Annex E: Ealing Broadway bus interchange - Existing pattern of use (December 2009)

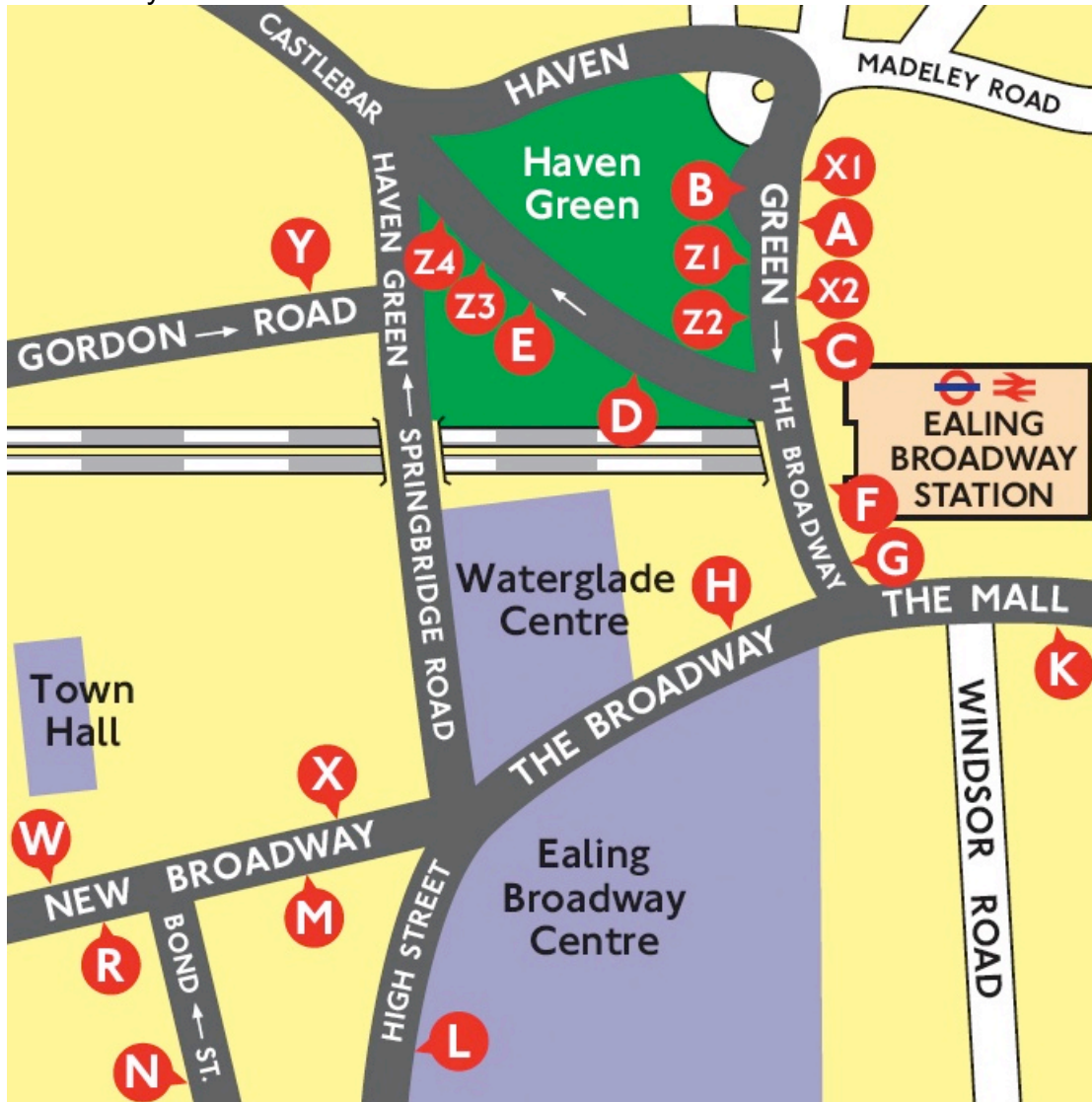
Stop	Routes	Buses per hour	Bus type	Seat capacity increase (est)
Stop letters are as labelled on the street, and in TfL information		Approx max at peak hours (passenger capacity)	S=single D=double B= Bendy M=midi	with conversion to double deck
<i>Haven Green</i>				
A (1 bus capacity)	E7	7 (350)	S	210
C (2 bus capacity)	226	7 (350)	S	210
	297	8 (640)	D	0
D (2 bus capacity)	E1	9 (720)	D	0
	E10	4 (200)	S	not viable
E (3 bus capacity)	E2	9 south (450)	S	270
		9 north (450)	S	270
	E9	6 (300)	S	180
<i>Station Broadway</i>				
F (2 bus capacity)	65	12 (960)	D	0
	E2	9 south (-)	S	270
	E8	15 (1200)	D	0
G (1 bus capacity)	112	4 (200)	S	not viable
<b>Total stop capacity 6 stops taking 11 buses</b>	<b>11 routes</b>	<b>99 buses/hr max</b>		<b>1,410 seats</b>
<i>NB: Max buses per hour per stop Stop F = 36 NB: Some routes drop off at X1 and X2 before picking up at stops D and E</i>		5820 seats		
<b>Number of bus stands (est) = 10</b>				
<i>A4020</i>				
H (5-6 bus capacity)	83	12 (960)	D	0
	207	15 (1800)	B	0
	427	10 (800)	D	0
	607	10 (800)	D	0
	E11	3 (150)	S	not viable
K (unconstrained bus lane)	83	12 (960)	D	0
	207	15 (1800)	B	0
	427	10 (800)	D	0
	607	10 (800)	D	0
	E11	3 (120)	M	not viable
<b>Stop capacity on A4020 2 stops taking 12+ buses</b>	<b>5 routes</b>	<b>100 buses/hr 9,020 seats</b>		
Total arrival capacity at for Ealing Broadway stops (max)		<b>199 buses/hr 15,000 seats approx</b>		1,410 Seats

Note: The maximum capacity assumes all routes operating at the minimum headways shown on the public timetable. In practice the total seats arriving are likely to be considerably lower than the 15,000 shown. A figure of 12,000 was given by TfL's Bus Origin and Destination Surveys (BODS) in 2005.

Annex E concluded

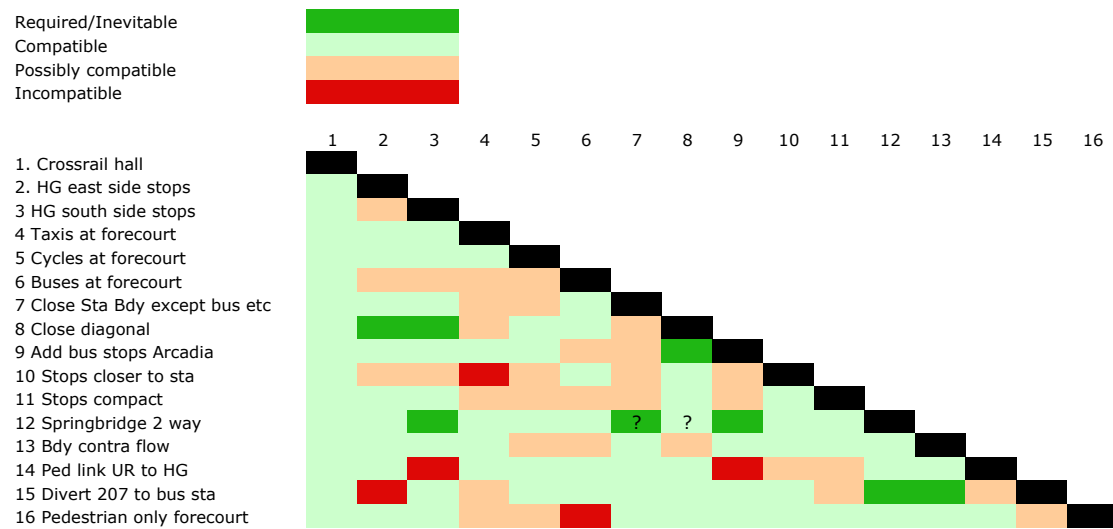
### ***Ealing Broadway bus stops***

Note: X1 and X2 are drop-off only bus stops for terminating services; Z1-Z4 are bus lay-over stands



## Annex F: Level of compatibility between certain option elements

There are various elements to interchange improvement at Ealing Broadway, but not all are part of, or relevant to, every option. The diagram below shows the extent to which various elements are compatible with one another. For example, a pedestrian-only station forecourt (16) is incompatible with a bus station on the forecourt (6), but is compatible with Springbridge Road becoming two-way (12). Provision for cycles at the forecourt is probably compatible with all other measures, but is shown in pale green because it would depend on the manner and quality of provision.



# Annex G Assessment Matrix

	Interchange			Regeneration / Destination			Implementation	Result	KEY FACTORS / ASSUMPTIONS
	Create interchange benefits for users	Ensure interchange functionality for operators	Provide interchange capacity for growth	Improve local accessibility	Protect and enhance local environment and	Enhance regeneration potential and value	Ensure that scheme can be implemented in step with demand		
	All modes, but priority to rail, bus and pedestrians	All modes but priority to rail and bus	Or potential for growth	To station, Haven Green, town centre (i.e. other than interchange)	Open space, public realm, buildings	Enhance destination value of Ealing Bdy	Funding, risk, value, timescale		
Option 0 - Do nothing/little	0 - no change	0 it works, but no better	1 - some growth possible, but not forecast growth	0 - worsening as bus increase	0 - worsening	1 - only by not removing devt sites	4 - no issue	6	Assumes insufficient bus capacity
<b>A. Upgrading, minor works</b>									
Option 1 Improved and upgraded facilities on current layout	1 - some improvement but no detail available	1 - little improve for bus, possible better other modes	1 - some growth possible but not forecast growth	1 - Minor improve possible	2 - Some improve possible	2 - Would add some value to the area	4 - Almost all land public ownership, apart from forecourt	12	Assumes insufficient bus capacity for future growth
Option 2 Widen diagonal road to provide additional stops	0 - Does not bring users closer	1 - Probably eases current operation with stands on east side of diagonal, stops on west	2 - Provides for some growth, but not full growth forecast	0 - Makes diagonal harder to cross	0 - increases visual intrusion of buses on Green	0 - area will look worse, although devt sites will not be touched	1 - all land in public ownership, but loss of common land probably can't be replaced	4	Loss of common land is inevitable
<b>B. Significant reconfiguration</b>									
Option 3 a Bus station on south side of Haven Green, north of trees (plus stops on HG east and Broadway)	1 - marginally better access to stops on Green	0 - design not proven. No stands. Requires 2-way Springbridge Rd	1 - Doubtful capacity to meet forecast growth, and no provision for bus stands	1 - better access to Broadway and Arcadia potentially. Negative traffic impact likely	2 - loss of common, but compensated by unification of Green	3 - Allows full devt of Arcadia site	1 - unlikely to overcome objections re loss of common land	9	Loss of common land is inevitable; doubtful operability for buses
Option 3 b Replacement bus station on south side of Haven Green, north of BBC car park boundary	3 - brings most stops together, one access route to station	3 - should work and keeps buses within the site	3 - allows for some growth, especially if redesigned to give more stops and less stands	0 - pedestrian access more difficult and dangerous due to bus access roads. Poss traffic impact	2 - allows unity of Green, and better HG east but may be net loss of Green. Trees needing replacement	3 - better bus access may enhance devt values	2 - land in public ownership but will be concern about common land	16	Common land, trees and pedestrian access issues
Option 3 c Replacement bus station on south side of Haven Green taking car park	3 - brings most stops together, one access route to station	3 - should work and keeps buses within the site	3 - allows for some growth, especially if redesigned to give more stops and less stands	0 - pedestrian access more difficult and dangerous due to bus access roads. Poss traffic impact	3 - enables unity of green, better HG east, and should be possible for no net loss of common. Trees need replacement	2 - by taking car park, potential development site is lost. But better bus access enhances other sites	2 - much of land in public ownership but will be concern about common land. Car park should be easy to acquire	16	Less impact on common than 3b, but loss of potential development land (car park)
Option 4 Bus stops and stands relocated to the east side of Haven Green	3 - brings stops closer together and thus more legible	4 - should work but tight bus turning could be issue. Taxi and drop-off could be difficult	2 - Room for some limited growth, but maybe not full forecast demand. No potential for expansion	3 - Offers potential for better access across integrated Green, and to Uxbridge Road through Arcadia site	3 - enables unity of Green, but HG east probably worse with more vehicle activity	3 - Preserves development sites, and allows better station environment	4 - All land in public ownership, replacement of common land should be OK	22	Depends on redesign to overcome known LBE concerns, and on sufficient long term bus capacity
<b>C. Major redevelopment &amp; reconfig</b>									
Option 5 Bus station above Underground tracks (5 sub options considered) Bdy stop retained	3 - brings most stops together, one access route to station, under cover. But passengers have to cross bus flow.	1 - bus movement likely to be worse. Current capacity not matched. Taxi & drop off should be easier to provide	1 - some growth possible but may not meet forecast demand	0 - takes people further from their destination, and mixes them with station traffic. Interruption of HG east for bus access	3 - Apart from bus access ways, allows unity of green, better HG east, and could be net gain of common land.	2 - Development over bus station difficult to conceive (use/mass?). Preserves development potential elsewhere	1 - 3rd party land needed for access ways. Need for Underground agreement to raft and access changes. Need for coordination with Crossrail / NR station access	11	Depends on efficacy of design in terms of bus capacity and operation and passenger access, and cost/funding. Assumes closure of existing bus stops/stands
Option 6 Bus station over National Rail platforms (design not specified)	3 - would allow close integration of bus and rail	0 - access problematic for buses	1 - doubts about capacity at reasonable cost. Access issues	0 - takes people further away from destinations. Interruption of Station Broadway for bus access	3 - Apart from bus access ways, allows unity of green, better HG east, and could be net gain of common land.	2 - Development over bus station difficult to conceive (use/mass?) Preserves development potential elsewhere	0 - 3rd party land needed for access ways; cost of raft provision; cost of meeting NR and Crossrail requirements	9	Depends on ability to configure bus access, provide sufficient bus capacity, and meet high cost of NR requirements. Assumes closure of existing bus stops/stands
Option 7 Large bus station over District and Central Line tracks plus bus exit to The Mall (One Broadway stop retained)	3 - Could make interchange a lot easier and under cover. Better end of platform access but ticket control issues	2 - access via The Mall may be unacceptable without route restructuring. But simpler HG East/Broadway access than 5 or 6	4 - should be plenty of capacity to meet forecast growth	1 - takes bus passengers further away from destinations	3 - Apart from bus access ways, allows unity of green, better HG east, and could be net gain of common land.	2 - Development over bus station difficult to conceive (use/mass?). Preserves development potential elsewhere	1 - 3rd party land needed for access ways. Need for Underground agreement to raft and access changes. Need for coordination with Crossrail / NR station access	16	Restructuring of bus routes probably required. Cost/funding issues. Assumes closure of existing stops/stands.
Option 8 Bus station over NR tracks and taking BBC car park and Central Chambers (part)	3 - brings most stops together, one access route to station	2 - should work for bus movement and management	2 - extra capacity would be dependent on finding redesign with more efficient use of space	0 - pedestrian access to town centre and station is poor	2 - some loss of south or Green, but compensated by diagonal closed, and HG east better integration	0 - loss of development opportunity over tracks and on (ex BBC) car park	0 - 3rd party land needed for access ways; cost of raft provision; cost of meeting NR requirements	9	Dependence on funding high cost of over-tracks bus station, with little potential for development subsidy
Option 9 Bus station (mini) on part of Arcadia site (3 sub options considered but no detail spec.) providing 4-5 stops (Existing stops)	0 - splitting of stops removes benefits	0 - bus movements would be much more complex, plus generate extra bus miles	3 - should resolve future capacity issue	1 - some would benefit from closer access to town centre, but split stops negates this	1 - little impact on environment and conservation area	0 - takes valuable development land	1 - loss of development value and 3rd party land issues	6	Design feasibility not demonstrated. Loss of town centre development land. Existing bus stops/stands have to be retained
Option 10 Mini bus station to rear of Haven Green east side (not specified) (Existing stops retained)	0 - little benefit because extra stops are separated, and tucked out of sight	0 - bus movements would be much more complex, plus generate extra bus miles	1 - could add some capacity, but not proven	0 - pedestrian access poor and some stops further from destinations	0 - would intrude on conservation area and private amenity	0 - no regeneration value, and loss of existing value	0 - 3rd party and CPO issues, plus cost for small gain in capacity	1	Design feasibility not demonstrated. Existing bus stops/stands have to be retained
Option 11 Mini bus station on NE corner of Broadway/Mall junction (Not specified) (Existing stops retained)	1 - Brings some bus users closer to station portal, but most buses likely to remain as at present	0 - split stops complicate bus movement and management. Functionality not proven.	1 - would add capacity, but extent not proven	0 - some benefit from closer access to town centre, but split stops negate this. Bus access would disrupt main pedestrian route to town centre	0 - No benefits to the Green. Would involve loss of listed building(s) on NE corner	0 - would take land and/or airpace potentially suitable for development	0 - 3rd party and CPO issues, and loss of locally listed building	2	Design feasibility not demonstrated. Existing bus stops/stands have to be retained

# Annex G concluded

Requiring major reconfig traffic									
Option 12 Creation of public transport mall Haven Green East and Station Broadway. General traffic 2-way on Springbridge Rd. Diagonal closed.	4 - Would be simple and legible in form, and bring most bus users close to station portal. Shelter and facilities might not be concentrated	2 - depends on ability to re-structure routes and management. Format and legibility of kerbside stops is tried and tested.	3 - should resolve future capacity issue. Taxi and drop off might be difficult	3 - More space for footways and crossings. Requires separation of general traffic and buses. Better access to Springbridge Rd car park	4 - Buses likely to be more intrusive in Station Broadway, but less so on Haven Green. Enables closure of diagonal. Conservation area will be enhanced	4 - Preserves development sites, and allows better station environment	2 - All land in public ownership. Requires pro-active partnership with TFL and operators on new bus route strategy for the Broadway. Traffic reconfiguration needed	22	Dependent on bus route restructuring and traffic management changes on local road network
Option 13 Broadway closed (pedestrians and cycles only) plus options 7	3 - Benefits most users apart from diversions resulting (not specified). Big gain for pedestrians and cyclists	2 - should work for all operators but design not specified. Taxi and drop off might be difficult	2 - depends on bus station option chosen	4 - would be a major improvement of the Station Broadway area	3 - Would enhance the area and provide quality public square outside station	3 - Preserves development sites, and better station environment will add value	1 - involves reconfiguration of traffic in town centre, plus bus access to/from The Mall as with Option 7	18	Potential sub-component of Option 7 for station forecourt benefits. Dependent of traffic management issues
Option 14 Forecourt replacement bus station, reposition Crossrail concourse/entrance (not specified)	4 - brings passengers close to station portal, benefitting facilities and time saving	2 - Should be functional but dependent on bus route structure and management	2 - Not certain as to capacity	3 - Brings bus users closer to the town centre	3 - Enables better use and unity of Haven Green and enhancement of conservation area	3 - Preserves main development sites, but station forecourt will not be so attractive	1 - Forecourt in private ownership, and TFL operator and Crossrail active participation needed	18	Dependent on feasibility of design and bus capacity, and route restructuring. Re think of station portal needed.

0 = Little or no enhancement, or ineffective, or unfeasible, or negative  
 1 = Some enhancement but doubts about extent or efficacy or impact  
 2 = Moderate enhancement/potential/feasibility/no adverse  
 3 = Good enhancement but doubts about extent or efficacy  
 4 = Especially good enhancement or

