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Hills Road / CB1 to Cambridge Leisure Park Access Improvements

Feasibility Study Report

March 2015

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Hills Road / CB1 to Cambridge Leisure Park Access Improvements Feasibility Study Report

Cambridgeshire County Council

March 2015

This document has 46 pages.

This document and its contents have been prepared and are intended solely for Cambridgeshire County Council's information and use in relation to the named project above.

Document History

Job number: 5040122		**Document ref:** 5040122/300/320/Feasibility_Study				
Rev	**Purpose description**	**Originated**	**Checked**	**Reviewed**	**Authorised**	**Date**
1	Draft	NKS	NKS	JLG	JS	02/02/2015
2	Final Issue	JLG	JLG	JS	KMcW	12/03/2015

Change Log

Rev	**Section**	**Description**
2		Minor formatting changes as requested by client

Hold List

Rev	**Section**	**Description**

Client Sign-Off

Client	Cambridgeshire County Council
Project	Hills Road / CB1 to Cambridge Leisure Park Access Improvements
Document title	Feasibility Study Report
Job number	5040122
Copy no.	
Document reference	5040122/300/320/Feasibility_Study

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Executive Summary

Skanska Infrastructure Services was commissioned by Cambridgeshire County Council to investigate the feasibility and value in providing a new footbridge over the railway between the Busway / CB1 development, Hills Road, and the Cambridge Leisure Park. Consideration of access improvements from Hills Road to the Cambridge Leisure Park also formed part of the scope.

Purpose

The main objective of a potential new route would be to improve access and reduce journey time for pedestrians, for users with impaired mobility and for users with pushchairs between Cambridge Railway Station and the Cambridge Leisure Park, or between the Hills Road / Brookgate junction and the Cambridge Leisure Park. It is understood that it is not intended that the new footbridge or access improvements would provide for cyclists.

An annotated location plan is included in Appendix A.

Existing Route and Options Considered

The present route from the station would take approximately 12 minutes 40 seconds on foot, at a pace of 4km/h, whilst travelling to the Leisure Park from the corner of Brookgate and Hills Road would take 7 minutes 3 seconds. However, for pedestrians capable of using the existing stairs, journey time would reduce to 11 minutes 7 seconds from the station, or 5 minutes 25 seconds from Brookgate.

The following options were considered:

- A new bridge over the railway joining the CB1 development east of the Cambridge Signal Box with the multi-storey car park along Clifton Way (Option 1);
- A new bridge from Hills Road just north of the Busway underpass to Clifton Way, alongside The Junction nightclub (Option 2);
- A new ramp from the top of the existing stairs along Hills Road south of the railway bridge, extending over the access to the hotel car park at the end of Clifton Way and heading towards the Leisure Park (Option 3A);
- A new ramp from the top of the aforementioned stairs, running along the existing Hills Road retaining wall and returning upon itself before finishing near the base of the existing stairs (Option 3B);
- A new lift provided at the location of the existing stairs, as proposed elsewhere as part of Project Cambridge (Option 3C);
- A new built-up ramp immediately south of the hotel (Option 4).

Drawings illustrating an indicative route for each option are included in Appendix C.

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Costs

Based on cost estimates produced recently for similar projects, and based on the cost of other recently completed projects, the following indicative cost estimates have been determined:

- Either bridge options (Option 1 or 2) over the railway would cost in excess of £3.3m;
- A ramp extending over the existing hotel car park access (Option 3A) would cost approximately £1.6m;
- A “scissor” ramp along Hills Road (Option 3B) would cost approximately £1.3m.
- A lift within basic amenities but of a suitable size and with vandal-resistant controls and finishes would cost approximately £500k; and finally,
- A new access south of the hotel building would cost approximately £100k.

All of the above cost estimates are approximate only at this stage. These costs could increase significantly depending upon the number of buried utilities services that require diverting and upon the cost to achieve this. In addition, an allowance should be made in case of risks materialising.

Options Appraisal

A significant travel time reduction could be achieved between the Railway Station and the Leisure Park if a bridge was provided between the CB1 development and the multi-storey car park (Option 1). However, this benefit could be significantly eroded depending on the lift waiting time.

A significant reduction in travel distance and travel time would also apply for users with impaired mobility or users with pushchairs by providing a lift at the location of the existing stairs along Hills Road (Option 3C). Whilst this is also dependent upon lift waiting time, the cost of providing such a facility would be considerably less than that of a bridge over the railway, with significantly less risks involved.

Apart from Option 1, none of the options offered a significant saving in travel time for those capable of using the existing stairs. Users with impaired mobility or with pushchairs would also not benefit from a significant travel time reduction from options other than those described above.

Recommendation

Based on the high estimated costs and risks and disruption involved in delivering the works, and as there may not be a great reduction in the travel time perceived by users, it is recommended that none of the bridge or ramp options are carried forward. This could be revisited if redevelopment of the Leisure Park was to take place, particularly around The Junction nightclub.

Further consideration of the provision of a lift facility could be justified, particularly in light of local plans to provide an improved gateway at the location of the existing stairs along Hills Road. However, a more detailed estimate of ongoing operation and maintenance costs will be required before an informed decision can be taken in this regard.

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1.0 Introduction

1.1 The Present Study

Skanska Infrastructure Services has been commissioned by Cambridgeshire County Council to investigate the feasibility and value in providing a new footbridge over the railway in Cambridge in an area bordered by the Busway and CB1 development, Hills Road and the Cambridge Leisure Park. As part of this study, other improvements to accessibility of the Leisure Park from Hills Road or from the CB1 development will also be considered. The area of interest is shown on Figure 1 and a location plan is included in Appendix A.

The need for this structure or for these improvements stems from a desire to improve connectivity and better integrate access to the Cambridge Leisure Park from Cambridge Station, from the CB1 development and from Hills Road itself. This has been linked in some cases to Project Cambridge, which aims to complete the integration between the station, the CB1 development, nearby amenities and the City Centre.

The report considers the existing site and surrounding area and the effects a bridge development or access improvements may have on it, along with the following issues:

- Site constraints;
- The present route between the railway station, the intersection of Hills Road with Brookgate, and the Cambridge Leisure Park;
- New routes or access improvement locations;
- Bridge or ramp structure options;
- Cost estimates, programmes and risk.

The study concludes with a discussion of the implications of a new footbridge or access improvements, and recommendation in terms of a preferred option and on the early actions required to take the related construction project forward, if appropriate.

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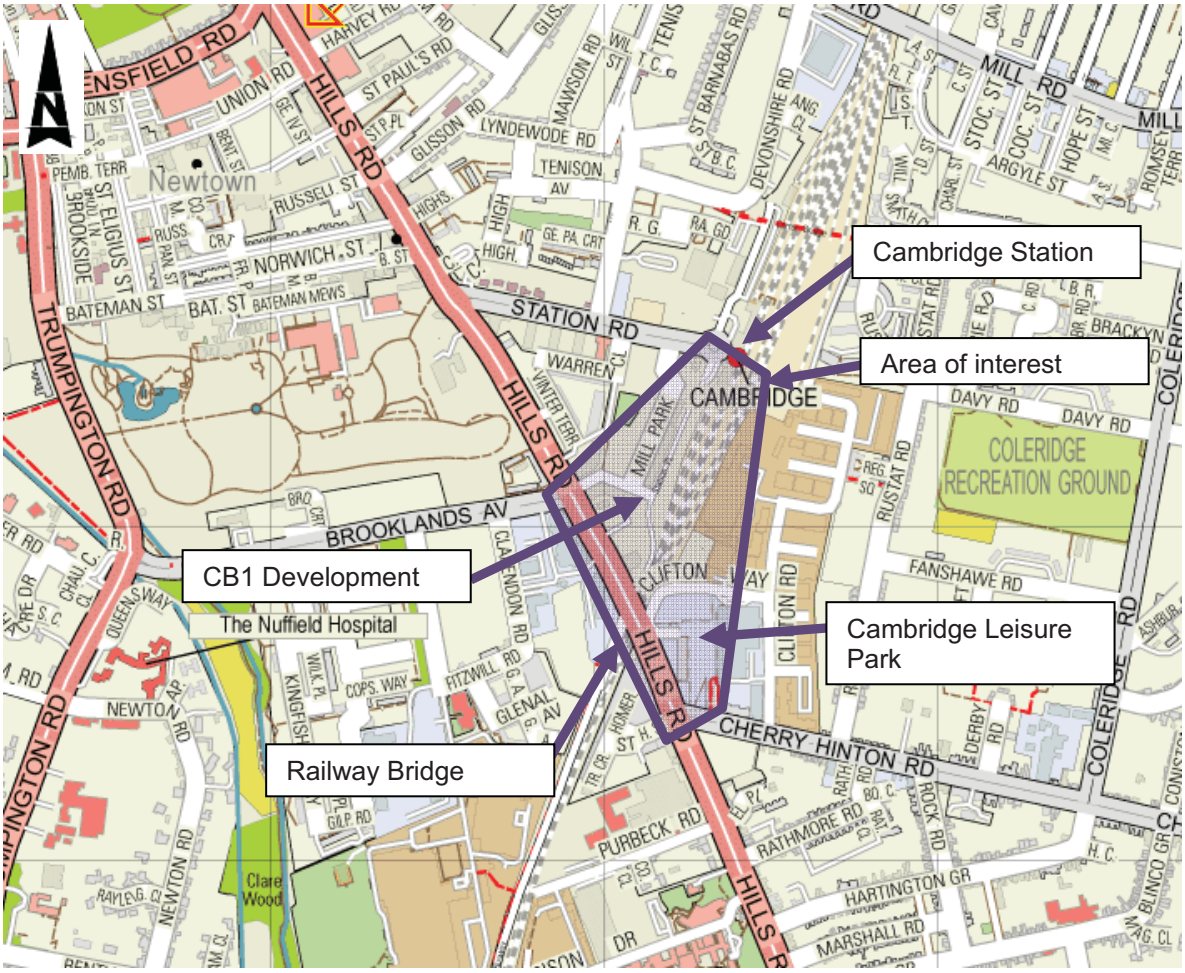

Figure 1 – Area of Interest

1.2 Background

Major mixed-use redevelopment works are currently under way around Cambridge Railway Station as part of the CB1 development, making use of the formerly derelict triangle site between Station Road, Hills Road and the Cambridge to London railway line. This includes a new transport interchange, 58,000 m² of residential space (including 1,250 student accommodation and affordable housing units), 54,000 m² of office space, a 120 bed hotel and a high quality mix of leisure, retail and restaurant space[1].

The provision of a new crossing of the railway between the CB1 development and the Cambridge Leisure Park was envisaged as part of the developments surrounding the site, and proposed approximately 10-15 years ago as a way to improve connectivity and access and reduce pedestrian journey time from Cambridge Railway Station to the Cambridge Leisure Park. Indeed, at the time, and up to not so long ago, the pedestrian route between the two was either relatively long, via the length of Station Road and its intersection with Hills Road, or via Carter Bridge and Rustat Road. A lesser known path via Warren Close did exist, but was not widely used, particularly for out-of-town visitors, or well signposted.

[1] *Rogers Stirk Harbour + Partners LLP*

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The location of this new bridge was never fixed but appears in the Cambridge Local Plan from July 2006, and in some early CB1 masterplan documents. With the construction of the CB1 development and of the Busway, pedestrian access between Cambridge Railway Station and Hills Road has been significantly improved. However, there remains a stated desire for a more direct and better integrated access that has not been further investigated. This was highlighted as part of Project Cambridge, which was discussed with a view to submit funding request to Central Government, and has recently also been discussed as part of the City Deal and the Cambridge Local Plan 2014.

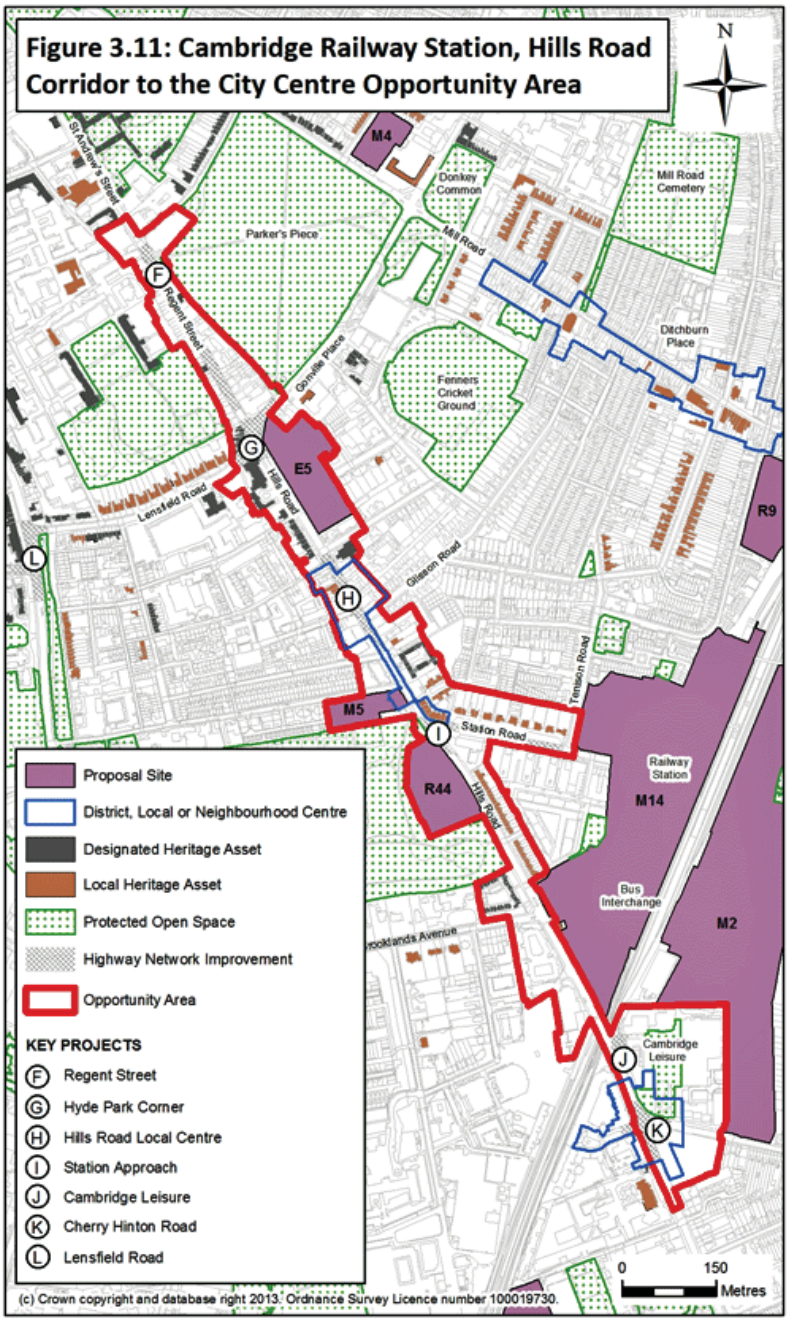

Figure 2 – Proposals for Railway Station and Hills Road Corridor in Cambridge Local Plan[2]

[2] *Cambridge Local Plan 2014, Cambridge City Council*

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2.0 Constraints

2.1 Land / Location

The site in question is bordered by the Cambridge Leisure Park, Hills Road, and the CB1 development up to Cambridge Railway Station (approximate OS Grid Reference TL 461 569). Two existing pedestrian crossing points are currently provided:

- Hills Road Railway Bridge, west of the CB1 development and of the station; and
- Carter Bridge, east of the station and development.

Possibilities to install a footbridge from Station Place or from Hills Road Railway Bridge to the Leisure Park have been identified as the most suitable locations for the bridge. The reasons behind this are stated in the constraints section of this document.

A Constraints Plan is included in Appendix B. This illustrates, amongst other things, the extent of the active railway land, which places severe constraints on the design and implementation of the footbridge. This is described further in section 2.3.

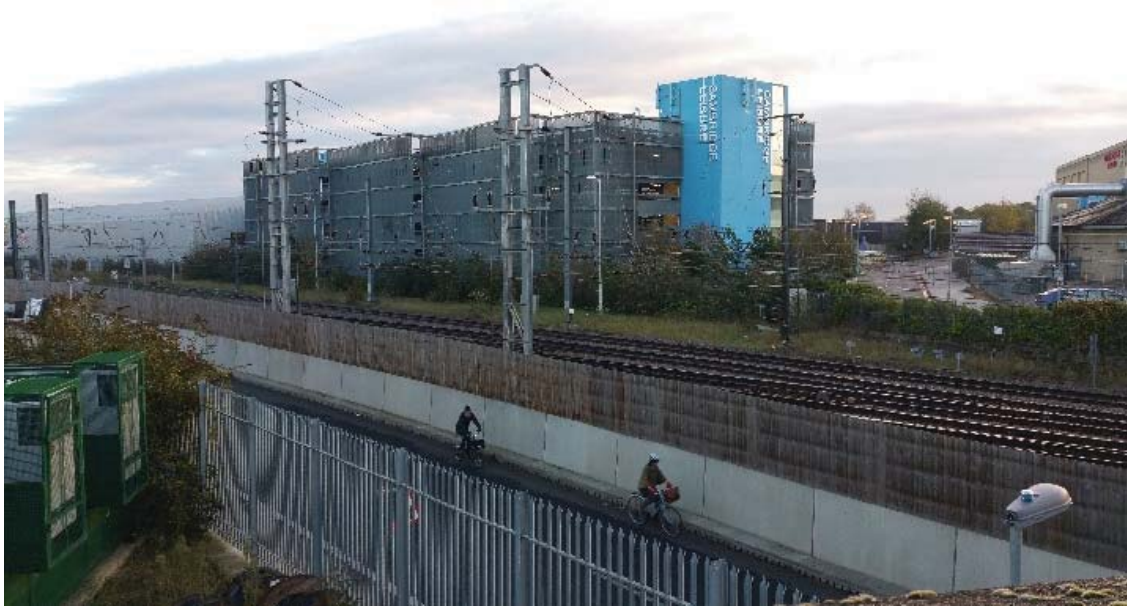

Photo 1 – Busway and railway with multi-storey car park in background, looking East from Hills Road

2.2 Planning Requirements

Depending upon what the preferred options is and where it is located, it is possible that the new footbridge or access improvements would be deemed Permitted Development under Part 13 of the General Permitted Development Order (GDPO) 1995 (as amended), and therefore would not require planning permission. This would be the case if it was situated on land within or adjoining the highway, has no detrimental effect upon pedestrians, has little or no impact upon the visual setting, and if it does not require an Environmental Impact Assessment.

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For the options considered later in this report, it is likely that access improvements not including bridges over the railway would fall within the above provisions. However, it is anticipated that provisions including such bridges would need Planning Permission.

The Permitted Development provisions are, however, open to some interpretation, particularly if use or appropriation of private land away from the highway is required for the footbridge, or if it had a major impact on the external appearance of the area. The views of the Local Planning Authority should be sought as to whether this falls outside the scope of Permitted Development in the GDPO.

If Planning Permission is required, based on previous experience of a project of a similar nature, it would take approximately 2 to 3 months to prepare the application, depending upon what is required, and 2 to 4 months for its determination. These timescale are estimates only and, in particular, the determination may take longer if objections are raised.

2.3 Network Rail

Legal Procedures

An Asset Protection Agreement between Cambridgeshire County Council and Network Rail will be required prior to undertaking any works that may affect the railway infrastructure. Network Rail requirements included in the agreement would then be binding and would need to be adhered to by Cambridgeshire County Council. Generally, these requirements are for the protection of the railway infrastructure itself but, given the presence of the Cambridge Signal Box and of the station, additional requirements may be present.

Railway Possessions

In order to be able to work within the operational railway, or for any work that may be outside of the railway but could have a direct impact upon it, possessions will be required. This will need to be agreed with Network Rail.

Such work activities would include installation of the main bridge span or constructing piers and their foundations within or immediately adjacent to the railway, as well as any activity that may affect the track support zone. Different types of possessions are available, each having different limits on the amount of working time available and on the type of work that can be carried out. The actual working time allowed is also subject to the discretion of the Network Rail co-ordinator on site (eg usually the Co-ordinator of Site Safety (COSS)), and there have been numerous instances where the site was handed over late or taken back early by Network Rail. This will seriously constrain the construction programme and increase costs. Therefore, an important consideration in the preliminary design stage, if the scheme proceeds, will be to strike a balance between the cost of the structure and the need for possessions.

Headroom Clearance

The current headroom at the existing Hills Road Railway Bridge is 4.63m above the top of the highest rail, according to record drawings. However, it is unlikely that Network Rail would accept this for the new footbridge as the overhead line equipment (OLE) at the existing road bridge is fixed to the soffit of the structure and is at its lowest point there. Fixing OLE to the soffit of a new bridge is generally not permitted. Furthermore, the OLE rises up after the existing Hills Road Bridge, such that the soffit of a new structure would need to be even higher.

Current standards require a minimum headroom of 4.86m above the highest rail or of at least 1m above the OLE. It is understood that any new structure would need to comply with this requirement.

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Costs

Costs associated with disruptive possessions of the railway, eg where the possession lasts at least one or more days, can be substantial, especially as a possession in this location may effectively shut down Cambridge Railway Station. This would require payment of Network Rail costs, including any compensation to Train Operating Companies (TOC) for loss of revenue, delays or the cost of providing bus replacement services. Information from Network Rail to this effect is that a 48 to 72 hour possession could cost in excess of £200k to £250k per possession.

If the work is not completed in time and further delay in returning the railway in operation are experienced, additional costs and penalties imposed by Network Rail would likely apply. Such costs and penalties can be substantial.

Railway Infrastructure

There are a number of assets or obstructions within the railway boundary. These include the OLE, rails and sleepers, but also the OLE stanchions/masts, numerous signals and signalling cables, track returns, points, service troughs, both above ground and buried.

In the area considered, the railway goes from four tracks to seven. There are also numerous cables servicing the Cambridge Signal Box. In addition, two main stanchions, closer together than typical, demarcate electrification north and south of the signal box.

2.4 Utilities

There are a number of utilities services buried within the area under consideration, in addition to services specifically for Network Rail. These are shown on a drawing in Appendix B and summarised below.

Services around Leisure Park

- A medium pressure gas main crossing from the Signal Box area, underneath the railway then following along Clifton Way and the Hills Road wall, alongside a second, lower pressure, gas main.
- Three relatively large cast iron water mains running along the Hills Road wall and along a short section of Clifton Way.
- A number of electrical cables running in the car park alongside the hotel, then in and out of the adjacent substation.
- A concrete foul sewer along the Hills Road wall
- BT cables along Clifton Way and along the low side of the Hills Road Wall.

Services around Signal Box / Busway

- Global Crossing relocatable equipment building (REB) between the Signal Box and the Busway. A number of cables then run out of the REB, underneath the Busway and connect to the service trough running along the north side of the railway.
- A medium pressure gas main as described above, with cathodic protection
- A low pressure gas main immediately adjacent Hills Road.
- Two large diameter water mains running between the REB and Hills Road Bridge, underneath the Busway, then crossing the railway as described above.
- A medium pressure gas main crossing from the Signal Box area, underneath the railway then following along Clifton

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- An electric cable running alongside the main pressure gas main
- BT ducts running along Hills Road and around the REB
- Network Rail signalling cables running from the Signal Box, underneath the Busway, into the service trough.

Services within east side of Hills Road

A number of services are present along the east side of Hills Road. These include:

- Redcentric communication plant in the east footway
- A large diameter low pressure gas main in the east footway
- Three power cables in the east footway

Photo 2 – REB and services adjacent Cambridge Signal Box

2.5 Health and Safety / Environment

There are higher than usual health and safety risks due to working in a congested urban and railway environment. However, this can usually be managed adequately by a suitably reputable and experienced contractor and therefore, there does not appear to be any extraordinary health, safety and environmental constraints to proposed works in this location. These matters would need to be considered during the development phase of any proposed scheme to be taken forward.

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3.0 Design Criteria

Access improvements, whether via a footbridge or direct ramped access from Hills Road to the Cambridge Leisure Park, will need to comply with relevant legislation, codes and standards, along with good industry practice.

The design criteria is described in the following sections:

3.1 Proposed use

It is proposed that the improvements considered herein will be for pedestrian use only, with provision for people with impaired mobility, in wheelchairs or for users with pushchairs. Provision for cyclists has not been requested and is presumed not required.

3.2 Durability and Maintenance

Materials and appropriate detailing to minimise maintenance of the structure during its service life will be essential, particularly where maintenance would require access within the railway corridor.

Where mechanical means of access are considered (ie lifts), these would need to be equipped with vandal proof and weather proof features (eg buttons, controls, etc)

3.3 Structural Requirement and Design Life

Compliance with structural Eurocodes will be required, with a 120 years design life for bridge or ramp structures.

In the case of a lift, this would be much less and probably in the order of 20 years, depending upon the usage and robustness of the lift specified, and subject to routine maintenance and parts replacement. The building housing the lift would be designed for 50 years.

3.4 Alignment

Standards require an absolute maximum vertical gradient of 1 in 12 for ramps; however, to ease access for people with disabilities, in particular for people using wheelchairs, it is recommended and typical to provide gradients of 1 in 20 or shallower. Horizontal landings may also be required at intervals depending upon the gradient selected, unless the gradient is shallower than 1 in 20, where landings are not required.

For a footbridge without provision for cyclists, there are few criteria for the horizontal alignment. In most cases the alignment is dictated by the available space and, in the case of ramps that return upon themselves, by the headroom clearance required to the upper portion of the ramp.

In the case of spiral or curved ramps, the minimum radius, measured at 900mm from the inside edge of the walking surface, should not be less than 5.5m, in accordance with the Design Manual for Roads and Bridges' (DMRB) BD 29 – Design Criteria for Footbridges.

3.5 Headroom clearance

The minimum clearance to any roads below should be 5.7m, in accordance with the DMRB's TD 27 – Cross Sections and Headroom. However, headroom can be reduced to 3.8m over the Busway, as the headroom is currently restricted by the Hills Road Underpass.

The minimum clearance over the railway is described in section 2.3.

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3.6 Cross-section

The minimum clear width required by standards for a pedestrian footbridge is 2.0m as recommended in BD 29 – Design Criteria for Footbridges, although this standard, and other documents or guidance notes, do suggest this width should be increased where significant usage is expected.

An allowance for shyness from obstacles along the route, in addition to the clear width, is often beneficial. In the current case, handrails will be provided, from which the clear width is defined. These will be pulled in from the parapets themselves, hence providing some “parapet-shyness”. An allowance beyond this has not been made and an overall structure width of 2.6m has been assumed.

3.7 Parapets and Enclosure

For structures over railways, standards require parapets that are solid, without footholds, and extend at least 1.5m above the adjacent finished level.

In some circumstances, Network Rail requires a full enclosure to the bridge. This mitigates the risk of vandals throwing objects from the bridge onto the railway below. It is not certain if this would be required here, as there are no throw screens at Hills Road Bridge. However, the new footbridge accessing the new island platform at Cambridge Station is enclosed, and this was also required for the new footbridge along Coldham’s Lane.

As any new bridge would necessarily be away from the main Hills Road carriageway, making potential vandals less visible from the road. It would seem reasonable to expect that Network Rail would request an enclosure to be provided over the live railway.

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4.0 Crossing Location

4.1 Original Route

When the idea for the scheme was originally proposed, the route between the railway station and the leisure centre either involved walking east to Carter Bridge to cross over the railway, then walk back along Rustat Road to reach the Leisure Centre via Cherry Hinton Road. Alternatively, the route would go from the station to the corner of Station Road and Hills Road, then along Hills Road and over the bridge, accessing the Leisure Centre either using the steps or via the Cherry Hinton Road access. Some alternative unposted routes through estate roads and car parks were available, but did not offer a great saving in walking time.

The shortest of these routes would have been approximately 1200m and take approximately 18 minutes at a walking pace of 4km/h.

4.2 Present Route

With construction of the Busway and of the CB1 development, it is now possible to travel from Cambridge Railway Station (A on Figure 3 below), down Station Place, reaching Hills Road via Brookgate (B on Figure 3), over Hills Road Railway Bridge, accessing the Cambridge Leisure Park (C on Figure 3) via Cherry Hinton Road.

This route is 845m long, taking approximately 12 minutes 40 seconds at a pace of 4 km/h.

Alternatively, there is a stepped access immediately south of Hills Road Bridge that can shorten the route to 730m, taking 11 minutes 7 seconds, avoiding the journey to Cherry Hinton road and back. This route, however, is only suitable for pedestrians capable of climbing a full flight of stairs however.

For users coming from the Hills Road / Brookgate junction, the route would be 470m or 350m depending upon the use of access stairs or not, taking 7 minutes 3 seconds or 5 minutes 25 seconds, respectively, at the same pace.

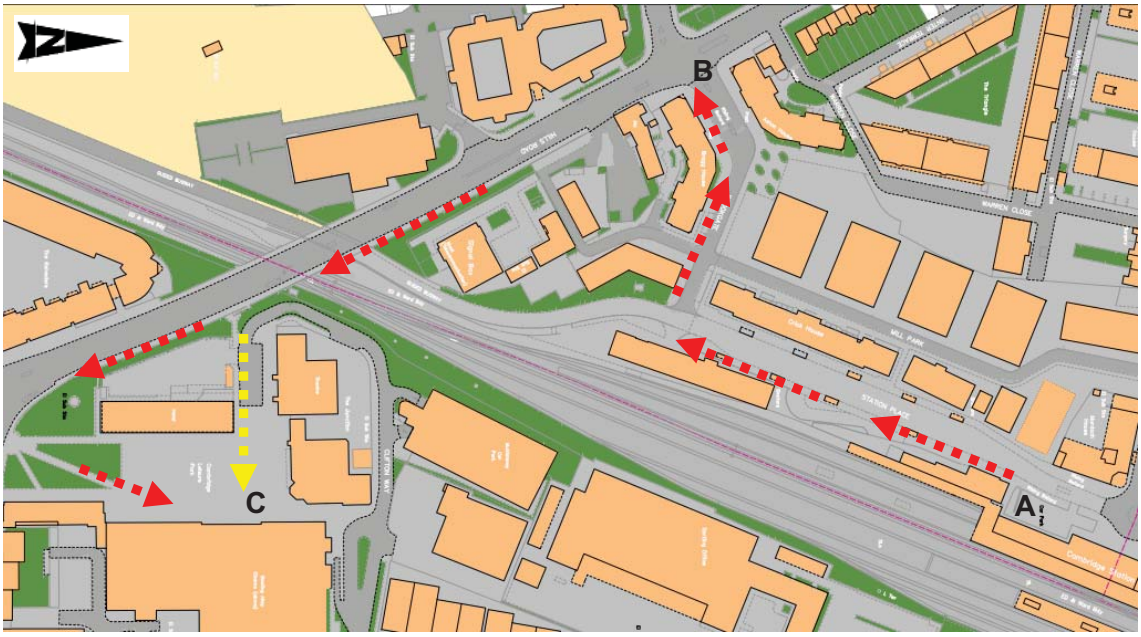

Figure 3 – Existing route (showing stepped access in yellow)

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4.3 Possible New Routes

4.3.1 Option 1 – Signal Box Area to Multi-Storey Car Park

Proposed Route

This route will follow the present route but continue to the Cambridge Signal Box area accessible from Station Place, where a proposed footbridge and ramp will extend over and across the railway to the multi storey car park off Clifton Way. Users can then use the car park's lift or stairs to come down to ground level, from where they can continue across to the Cambridge Leisure Park. The route is shown on Figure 4 below, and on a drawing included in Appendix C.

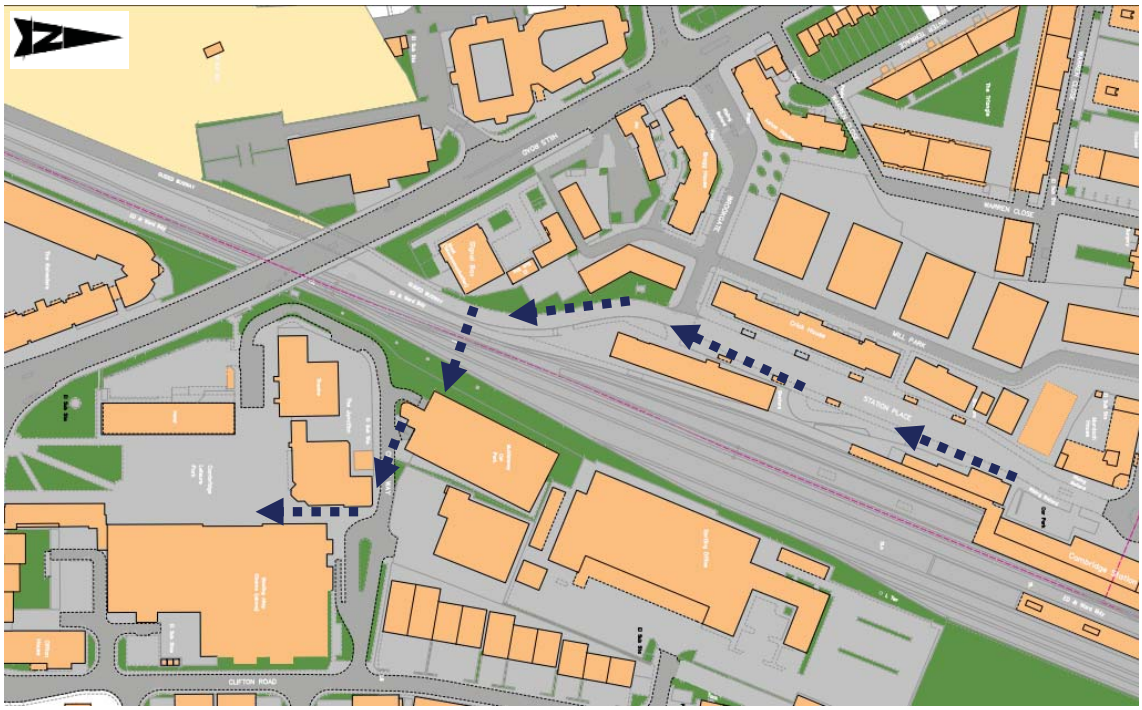

Figure 4 – Option 1: Footbridge Crossing the Railway from CB1 to multi-storey car park

Length and travel time

This proposed route length is 575m, which takes approximately 9 minutes 8 seconds, allowing some time waiting for the lift and then travelling in the lift, and assuming an otherwise uninterrupted trip. Alternatively, a pedestrian could use the stairs, which would take approximately the same time. Users from the Hills Road / Brookgate junction would take 6 minutes 39 seconds to complete the 410m trip, which is actually one of the longest of all the options considered.

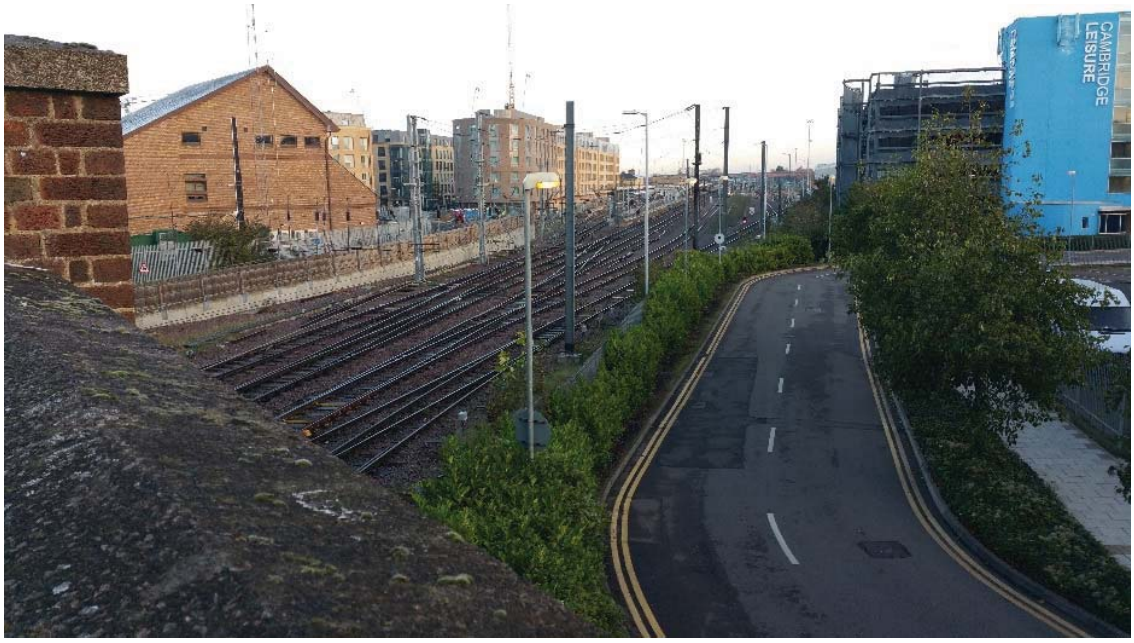

Photo 3 – Clifton Way and railway from Hills Road, south of bridge. Multi-storey car park in distance (light blue tower)

Key benefits

- This option presents a considerably shorter route between the railway station and the leisure park than any of the other options considered.

Main issues

- It is likely that, of the options considered, this option would incur the most disruption to the running of the railway. This is because of the position of the proposed bridge, near to stanchions and with limited working space between the north of the car park structure and the railway itself.
- The long span bridge would be more expensive and difficult to construct. It would be difficult to provide intermediate piers to reduce the span of the bridge as the tracks and sleepers themselves would be in the way and it would likely be excessively disruptive to remove them whilst work takes place.
- At the north side, the buried foundations for the parapet wall and the retaining wall either side of the Busway would obstruct piers or foundations and may need to be modified to accommodate these. This would be very disruptive to the Busway. A diversion of the Busway via Brookgate and around the Unix building development is, in theory, possible although this may generate negative publicity.
- The proposal relies on the use of the car park stairs and lift, which are privately owned and operated. An agreement would need to be reached between the owners/operators and the Council in order to permit use of the car park building and to ensure the hours of opening do not restrict the usage of the bridge. At the moment the building is closed at night. Similarly, issues surrounding liability of the public using a private facility would need to be addressed.

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- There would be a high reliance on the car park lift, which may not have been designed for such patronage. There would also be a significant increase in the number of people using the stairs within the car park building, which may cause delays to users.
- Working space on the south side of the railway is very limited, particularly between the car park building and the railway or between Clifton Way and the railway, and plant would likely have to stand on Clifton Way during the works. This might make it difficult to ensure continuous access to the car park entrance. However, compensation for any closure of the car park would likely be expensive.
- Working space on the north side of the railway is also limited. In this location, the Busway is running immediately against the railway, and a small car park is planned for the area at higher level, immediately north of the Busway.

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4.3.2 Option 2 – Hills Road at CGB to Clifton Way / The Junction

Proposed Route

This options consists of installing a new footbridge from north of the Hills Road Busway bridge, over and across the railway and Clifton Way, landing in the existing car park behind 'The Junction' nightclub and Clifton Way.

To accommodate the level difference at the south end of the bridge, a ramp would be built. This would either be as an indirect three-tier arrangement returning on itself (eg in a "scissor" arrangement) on land behind The Junction, or a direct ramp following the existing footpath, turning into the Leisure Park access from Clifton Way.

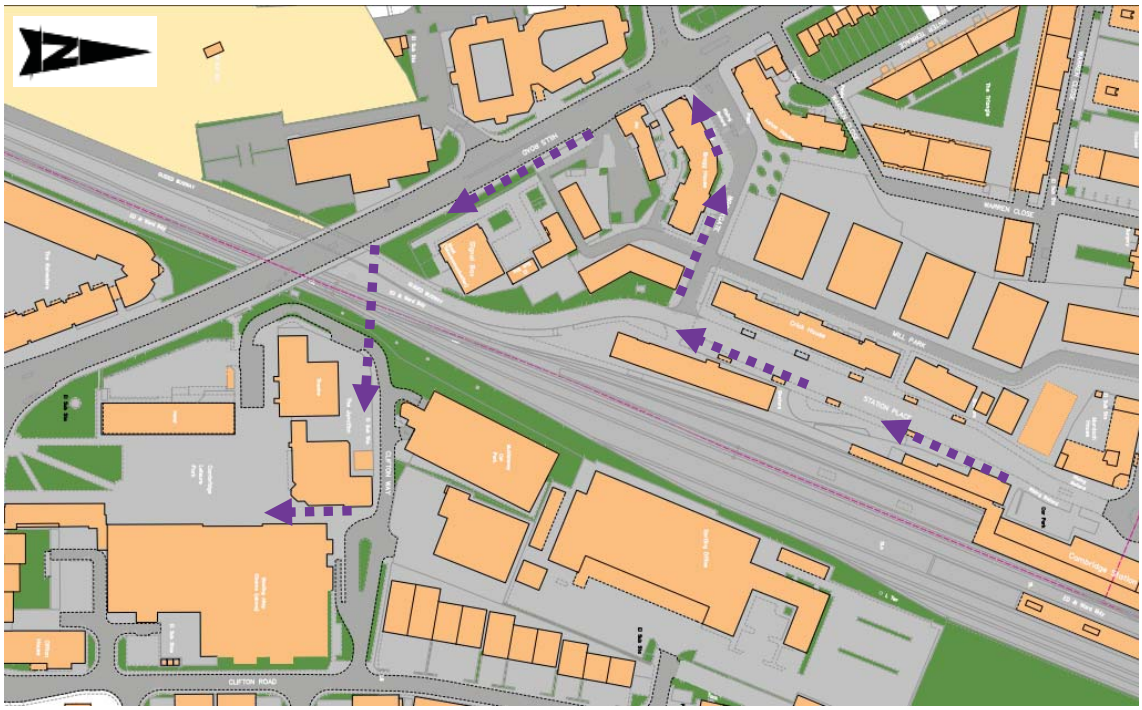

Figure 5: Option 2 - Footbridge from Hills Road to The Junction / Leisure Park

Length and travel time

The length of the proposed option is approximately 750m from the railway station to the main entrance of the Leisure Park, or 11 minutes 35 seconds, with a direct ramp. The indirect ramp route would be 820m, which is 12 minutes 18 seconds at a pace of 4km/h, assuming an uninterrupted trip. Distances and lengths for users coming from the Hills Road / Brookgate corner are given on tables 3 and 4, later in this document.

Key benefits

- This route can provide a direct ramped access to the main Leisure Park building for users with a disability or with impaired mobility who may find stairs difficult.

Main issues

- There is limited space to locate a new abutment north of the bridge over the Busway due to the number of services present in the area so it is likely diversion of services would be required, in particular the low and medium pressure gas mains and the BT service. Modification of the existing Hills Road wall such that the north end of the new footbridge would be supported on top of it or on top of the existing Busway bridge could be possible. However, numerous difficulties were experienced during construction of the Busway bridge due to the number of services within the footways. Significant further investigation would be required to ensure this was viable.
- There is limited working space between the Signal Box, the Busway and Hills Road and therefore construction would be significantly impeded.
- This proposal would require making an opening through the existing Hills Road brick parapet. Due to the alignment of the new footbridge forming a relatively narrow angle with Hills Road, the opening size would be relatively large, sufficient to allow an errant vehicle to penetrate through and cause damage to the new footbridge or fall onto the Busway below.
- If no landing is provided at the north end, the narrow angle between the new footbridge and the existing east footway along Hills Road, combined with the height of the parapet, may result in reduced visibility and conflicts at that junction.
- The OLE rises up from a low point at Hills Road Bridge. This would mean that a new footbridge at this location may need to have a steeper grade than the existing Hills Road alignment in order to provide the required clearance.
- As it crosses Clifton Way, the new structure would need to be 5.7m above the road, unless a restricted headroom was accepted in this location. Allowing for the depth of the structure itself underneath the users, a ramp approximately 120m long would be required. This means that the structure would need to curve around the north-east corner of The Junction building, then continue towards the entrance to the Leisure Park. This would make it complex to build and would considerably disrupt the flow of pedestrians coming through this access route.
- If the above structure was constructed, it would take up much of the existing footpath. The remaining width would be too narrow to be used as a footpath, and an alternative route would need to be found.
- As an alternative to the long ramp described above, a ramp returning on itself over three sections could be built within part of the existing car park between the Junction and Clifton Way. This would make the route 80m longer and would require land to be purchased from the owners of this car park. Furthermore, this location is not currently very inviting and may need enhancing to encourage users along this route.
- A further alternative would extend the bridge at high level into the stairwell of the multi-storey car park. Disadvantages of this are as per Option 1.
- There is very limited space between Clifton Way and the railway to locate a north abutment or intermediate supports. Because of this, a support at this location would need to be designed to be strong enough to resist loads resulting from the impact of an errant vehicle or a derailed train, which would make it a substantial size in itself. This would also probably mean having to pile the foundations, and because of proximity to the track, it is possible this would need to be done during a possession of the railway, or at least overnight with track monitoring equipment in place.

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- Supports for a ramp following along the footway would also need either to be protected from impact by errant vehicles, or to be design to resist the loads resulting from an errant vehicle impacting upon them. This would make each support substantial, and any effect on the adjacent building would need careful monitoring.
- The works along Clifton Way would significantly disrupt the flow of traffic to and from the multi-storey car park, and may discourage patronage during the works. This may raise serious objections from the owners and operators of the car park and/or Leisure Park.

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4.3.3 Options 3A and 3B – New Ramp at Hills Road Access Steps

Proposed Route

Option 3 requires a new ramp to be installed to replace the original stepped access, with new access steps provided in a convenient location alongside the ramp, preferably along the desire line.

There are two alternatives for this option. The first possibility (Option 3A) is that the new ramp would cross over the entrance to the Travelodge car park and continue onto the main plaza towards the main Leisure Park entrance. The other possibility (Option 3B) is that the new ramp would follow the existing Hills Road wall before returning along itself.

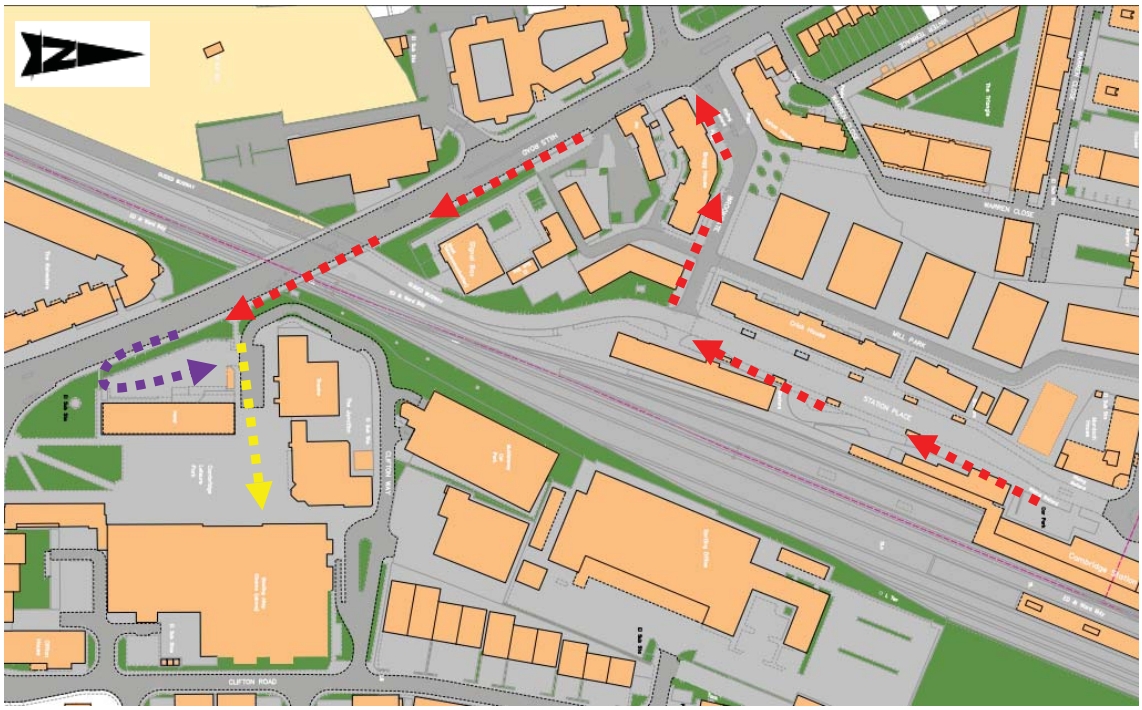

Figure 6 – Option 3A (yellow) and 3B (purple and yellow)

Length and travel time

From a height of approximately 4.1m above Clifton Way, the ramp will have to run 84m in length including landings. In total the trip from Cambridge Station to the main Leisure Park entrance along this route, using the most direct option (Option 3A), would be 770m long and take 11 minutes 33 seconds to complete. Pedestrians able to use the stairs could complete the 725m trip in 10 minutes 54 seconds.

If the indirect option, following the existing Hills Road wall (Option 3B) was preferred, this would be 795m, taking 11 minutes and 56 seconds to complete. Distance and travel time from the Hills Road / Brookgate junction are given on Tables 3 and 4.

Key benefits

- This route provides an alternative to the use of the Hills Road footway and would be cheaper to construct than Options 1 and 2 as there are no, or at least much fewer, impacts upon the operation of the railway.
- Option 3A provides a direct route to the Leisure Park from Hills Road.

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Main issues

- Option 3A requires the bridge to cross over the access to the Travelodge and Sainsbury's car park, which also acts as their service access for deliveries, etc. As the height of Hills Road at that location is only 4.1m above the car park level, it would not be practicable to provide the full 5.7m headroom. However, the headroom provided would accommodate most box vans and a range of rigid lorries, including fire engines. Providing greater headroom at this location would be difficult.
- Unfortunately, the length of ramp required, once the structure has crossed the car park entrance, is greater than the space available to the front of the cinema building, so a ramp that changes direction would be needed. This would increase the distance to the front of the building further.
- Due to the restriction above the car park access, lengthy discussions may be required with the owners or operators of the Leisure Park, particularly with Travelodge and Sainsbury's, with regards access by larger vehicles.
- For both alternatives, the ramp would be fairly imposing. Option 3A in particular may dominate the middle of the central Leisure Park plaza. Because of this, it would need to be designed with more aesthetic flair, which may increase the cost.
- Option 3B would seem at first to be much simpler. However, there are numerous services running in the grassed verge between the car park and Hills Road and these may well be affected by the proposal. This would need to be confirmed at a later stage, but if the large diameter water mains present needed diverting, the cost could be significant.
- Construction of either alternative would be disruptive for the hotel and convenience store, and would likely require a large part of the car park to be closed off during construction.

Photo 4 – The Junction, Hotel and access to hotel car park, with Leisure Park cinema building in background

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4.3.4 Option 3C – New Lift at Hills Road Access Steps

Proposed Route

As part of Project Cambridge, a variation on Option 3 is proposed by which the area immediately surrounding the stepped access would be improved and the steps would be supplemented or replaced with a lift to provide a gateway access to the Leisure Park from Hills Road. Visualisations produced to support this idea also suggest the area at the bottom of the wall would be modified to enhance this gateway and make it more inviting.

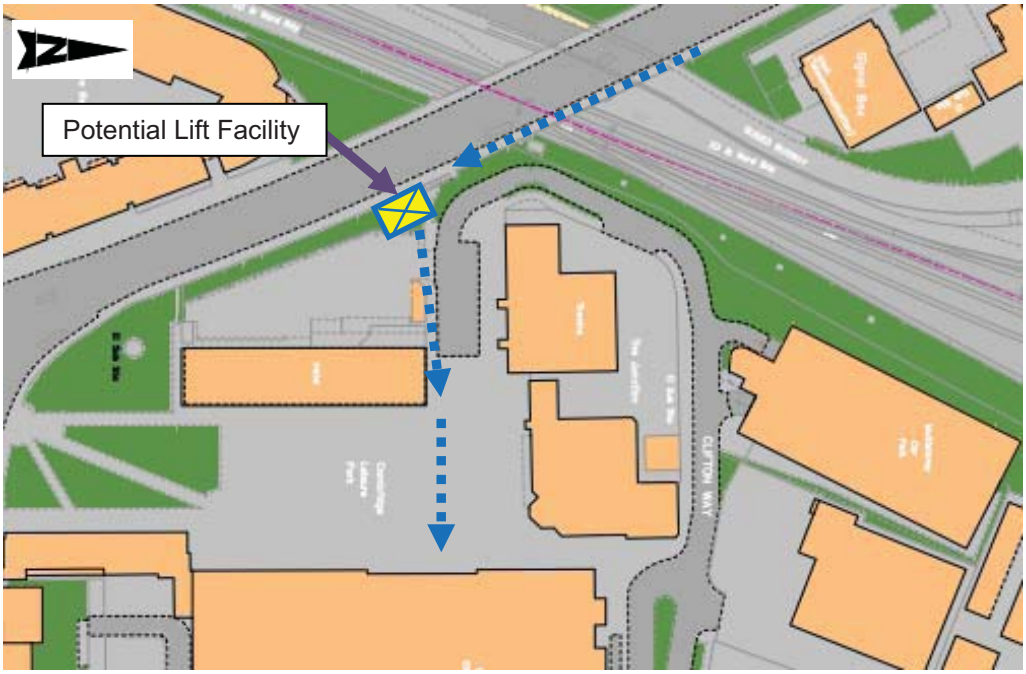

Figure 7 – Option 3C – Lift provision at existing stairs

Length and travel time

If this options was taken forward, it would take approximately 11 minutes 15 seconds to cover the 715m distance, allowing some time for the lift. From the Hills Road / Brookgate junction, this would be a 340m trip, taking 5 minutes 36 seconds.

Key benefits

- The main benefit of this sub-option is that it provides a shorter route for all, including people with impaired mobility, within a very limited footprint, which does not affect access to the hotel car park and requires no space within the existing Leisure Park plaza.

Main issues

- The key disadvantage of this proposal is the need for ongoing maintenance to the lift and its equipment, as well as the potential for breakdowns, even with regular maintenance. This would be particularly the case here as the lift would be outside and exposed to the elements. Sheltering the lift within a larger building would provide some relief.

- Whilst the footprint of any lift building and access platform would be smaller, it would still be located in an area where there are numerous buried services. It may be possible, however, to locate the lift shaft itself in a location where only one or two of these services are affected and require diverting. Alternatively, it could be possible to provide access to these services within the building itself. Accurately locating the services within trial investigations would be required before confirming with Statutory Undertakers what is or isn't practicable.
- The capacity of the lift in terms of people carried depends upon its size. In this location a lift accommodating up to 20 people would likely be the minimum desirable size as this would also accommodate up to three wheelchair users or three pushchairs with accompanying adult, or three pushchairs with adult. Allowing for loading, unloading, and time in the lift, the overall capacity would likely be less than that of a ramp. Stairs would therefore need to be retained to ensure the existing provision is improved and not made worse.
- Due to people being out of view in the lift, it may have a higher potential for vandalism. More robust equipment/button panels and vandal-resistant finishes would be required, although these still aren't completely vandal-proof. Consideration could be given to glazing, such that people inside the lift are visible, but this would increase the cost up even further.
- A public lift could be seen as providing overnight shelter and therefore may need to be locked at night, which means people would need to use the current route.

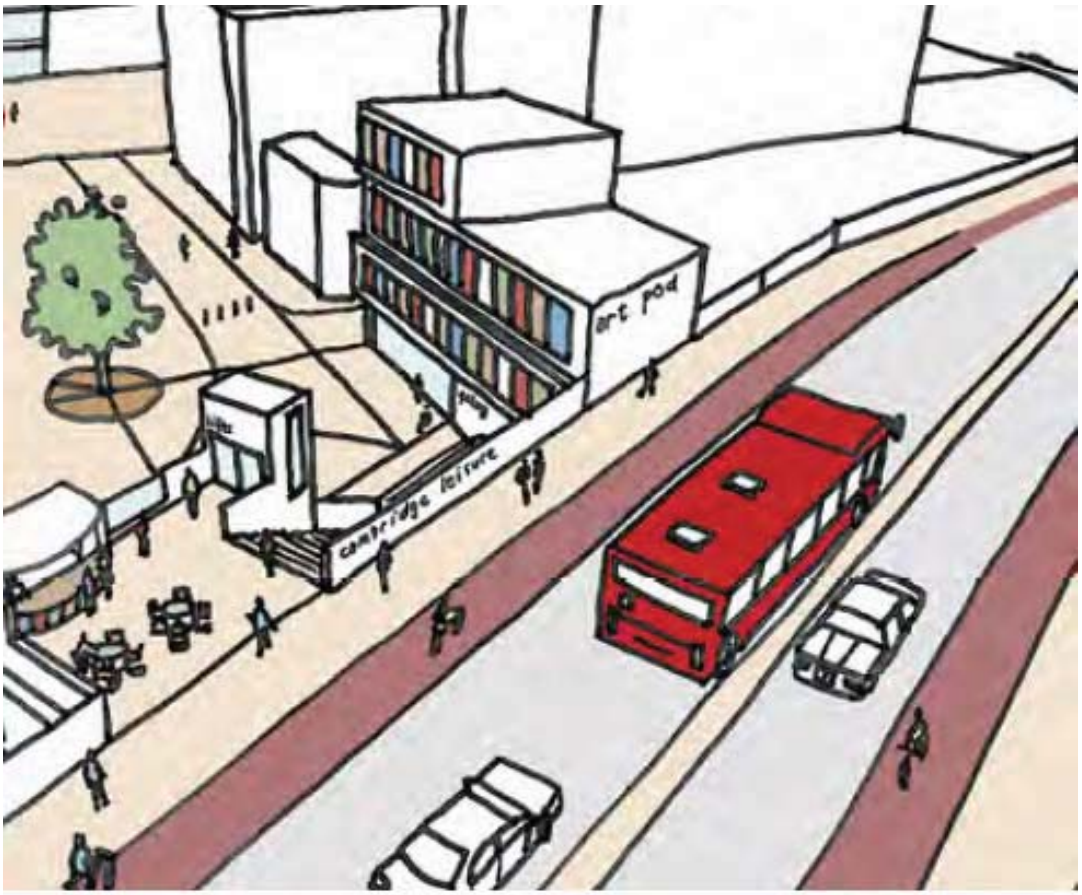

Figure 8 – Visualisation of lift facilities at location of existing steps[3]

[3] *Reproduced from "Project Cambridge – tax increment financing prospectus", September 2009, Cambridgeshire County Council and Cambridge City Council*

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4.3.5 Option 4 – New Access at Hotel

Proposed Route

This proposal provides a new ramp and pathway along the south side of the hotel, close to Cherry Hinton Road, effectively cutting the corner of the route. The level difference to be made up at this area is only approximately 1m therefore it would only require a 20m ramp structure or built-up pathway to accommodate the suitable slope. This will also require an opening to be cut in the existing brick parapet, and cutting back vegetation at the location in question.

The construction cost for this option will be relatively inexpensive compared to the other options as the amount of work required is significantly reduced. The exact location could be adjusted to avoid existing utilities, in particular an electricity sub-station.

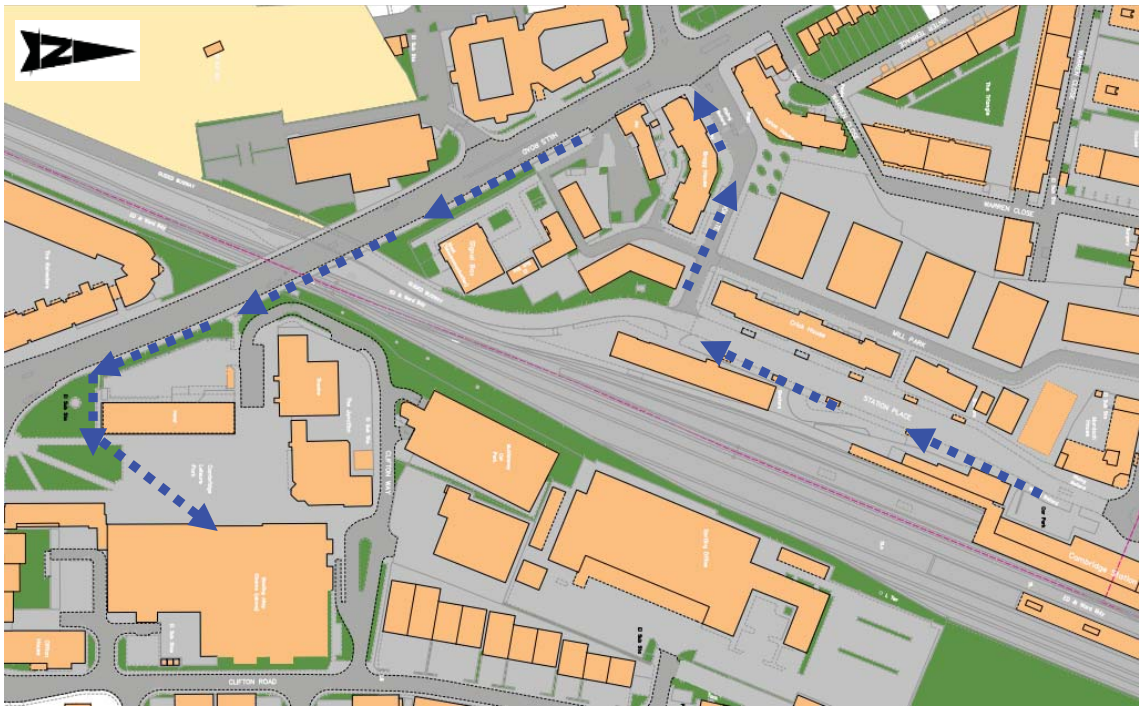

Figure 9 – Option 4 – New route south of hotel

Length and travel time

The length of this route from Cambridge Railway Station is approximately 800m, and travel from the station to the front door to the Cinema / Ten Pin Bowling should take 12 minutes. From the Hills Road / Brookgate junction, the 425m trip should take 6 minutes 22 seconds.

Key benefits

- By cutting the corner to Cherry Hinton Road, this will make the route from the station or from Hills Road on the north side of the railway marginally quicker, although a significant time saving is unlikely.
- The construction cost, duration and construction risk is likely to be lower than for other options. Accordingly, disruption to the public would be much less than for the other options, although there will still need to be some disruption to the Hills Road footway and perhaps to Hills Road itself.
- Lower construction risk (away from roads and railways).

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Main issues

- The route runs alongside the service exit to hotel/shop and therefore is not the most inviting of routes. It is partly hidden from view, which may detract some users unless the vegetation is cut back sufficiently and located sufficiently away from the hotel building.
- The electrical sub-station located within the green bed is serviced by a number of underground cables, and a number of other buried services run between it and Hills Road. Whilst it should be possible to identify a location that does not affect these, it will not be possible to confirm this until additional details relating to these services are known and trial pits have been dug to confirm their depth, size and location.
- Whilst there is a saving in travelling time along the desire line, this will be small and may not be significant enough to be perceived by users.

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5.0 Structures Options

5.1 Bridge Options

The type of structure to be provided over the railway depends upon the potential location for supports and abutments. Construction of supports between any of the existing lines would result in such a severe disruption to the railway that it would likely not be permitted by Network Rail or it would incur prohibitive costs. It would also be reasonable to expect that foundations to any support would need to be outside of the track support zone, ie a line extending downwards at an angle of 45 degrees from the edge of the nearest running line, unless these are piled.

On that basis, the minimum span length for either of the two bridge options would be in the order of 44m. To avoid having to unnecessarily raise the level of the footpath to allow for the depth of the structural members underneath, a through or half-through steel truss or steel girder type of structure would be the most suitable options over this length of span. A steel girder would have solid wall and may feel cramped. A truss would give the option of using transparent parapets (eg glass or plexiglass), which would mitigate this, albeit at additional cost.

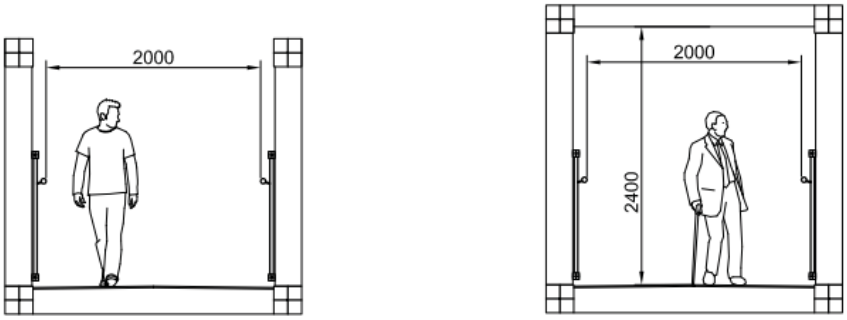

Figure 10 – Typical half-through and through truss sections

Photo 5 – Typical half-through footbridge with solid parapets (photo from CTS Bridges)

Concrete options would be possible, for example, deep rectangular parapet beams supporting a deck in a half-through arrangement. Any concrete option considered for the main span would need to be precast and lifted in during a possession. Because of the length of span required, such a structure would be significantly heavier than a steel alternative, and would require a larger crane for installation. As there is limited space for siting such a crane, concrete options have not been considered further.

Other materials (eg timber, polymer-composites, aluminium) have not been considered in this case as they are either not deemed suitable or have not been proven for such a long span.

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5.2 Ramp Options

In the case of the ramp options, more structure forms or types would be feasible, depending upon the location. For the bridge approach ramps, a steel structure comprising standard sections or fabricated steel girders with spans at between 15 and 20m would be typical. For the slightly curved shape of the north ramp for Option 1 box sections may be required due to the torsion effects generated, which is better accommodated by such sections. No circular or spiral ramps are proposed as there is insufficient space to accommodate these. Steel would be lighter than the concrete equivalent and therefore would require smaller foundations, less piling and a smaller crane for lifting.

Insitu concrete would be feasible but would require extensive temporary works and falsework for support before the concrete hardens. This is considered less practical, and would probably be more expensive.

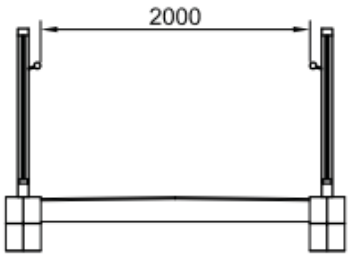

Figure 11 – Typical bridge approach steel ramp section

For the ramp located at the Hills Road stepped access that extends over the car park access, a similar form of structure as that described above would also be appropriate. It may be worth providing a short half-through girder or truss section over the access to reduce the construction depth and avoid having to raise the grade as much. The steel form would provide a better match to the surrounding hotel and cinema buildings.

For the option comprising a ramp along the Hills Road wall, a number of options are possible. This could be built in steel similar to the aforementioned, but could easily be built as a concrete retaining wall and filled with lightweight material. The final form may be largely dependent upon requirements relating to buried utilities services, especially for those options that enable these services to remain into position, avoiding costly diversion works.

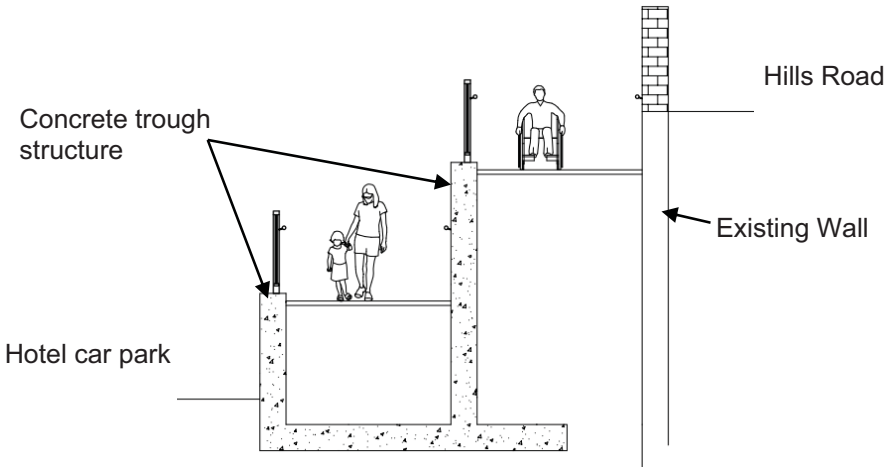

Figure 12 – Potential concrete trough retaining wall for ramp along Hills Road

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6.0 Cost, Programme and Risks

6.1 Construction Cost Estimates

Indicative cost estimates have been produced based on recent estimates for other projects and from the cost of other similar projects. These are purely indicative for comparison purposes at the moment, as a number of assumptions have been made and a considerable amount of additional information would be required to provide the confidence required for budgeting purposes.

The estimated costs are as follows:

Option	Description	Cost
1	Bridge between Signal Box to multi-storey car park	£3.3 million
2	Bridge between Hills Road Busway Bridge to The Junction	£3.3 million
3A	Ramp over car park access to Cinema building	£1.6 million
3B	Ramp along Hills Road wall	£1.3 million
3C	Lift access provision at existing steps	£0.5 million
4	Ramp access south of Hotel	£0.1 million

Table 1 – Approximate Cost Estimates

6.2 Key Assumptions / Allowances

The following key assumptions or allowances have been made in the estimate of costs for the options, as appropriate.

Cost of possessions

It has been assumed that, for the bridge options, a long disruptive possession would be required for installation of the bridge superstructure. A cost of £250k has been allowed for this, due to the extensive disruption to the network and the need to provide bus replacement services over the duration of the possession. This is in line with advice received from Network Rail for similar work elsewhere.

In addition, two separate non-disruptive possessions have been allowed for, at a cost of £25k each. These would allow, for example, the erection of temporary boundary hoardings inside the existing railway boundary, to allow construction of piers, for example.

It has been assumed that the options not including a bridge over the railway will not require possessions.

There may be scope for economies to be realised through sharing possessions with other planned works in the area, for example works planned for Whittlesford Railway Bridge on the A505 or construction of the new railway station at Chesterton. However, these works tend to affect a single line, whereas the location of this current work would require shutting down at least two lines (ie the main line to Bethnal Green and the branch line to Hitchin), and potentially de-energising the OLE in the vicinity of Cambridge Station altogether.

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Construction inflation

An allowance of 3% has been made to account for increases in the cost of construction between now and completion of the project, taken to be three years from now.

Cost of land purchase

A notional allowance of £50k has been made for land purchase within the Cambridge Leisure Park for Options 1 to 3 to enable construction of the ramp. A further allowance of £50k has been made for arrangements allowing use of the car park facility in Option 1. An allowance of £10k has been made for Option 4 as the land take required is considerably reduced.

Cost of planning

An allowance of £50k has been assumed to cover the cost of the planning application for the two bridge options on the assumption that the planning application will be minor and not require extensive documentation or an Environmental Impact Assessment.

An allowance of £10k has been made to cover the same for Option 3 where the ramp goes over the car park access and continues directly towards the cinema building entrance. This assumes that the application would be straightforward and only require completion of standard documents due to the scope of the ramp. No allowance has been made for the provision of a ramp immediately adjacent Hills Road, or at the south end of the Hotel, on the basis that Planning Permission will not be required in these cases.

Legal costs

No allowance has been made for legal costs that may be necessary in preparing an Asset Protection Agreement with Network Rail, for land purchases or licencing, for any lease agreement, etc. However, it is anticipated such costs will be required and therefore, if a scheme does progress, provisions for this should be made.

6.3 Programmes

A fully detailed programme has not been prepared for each option due to the current early stage of the project. However, based on estimated programmes developed recently for similar projects, it would be expected that the bridge options (Options 1 and 2) would take approximately 32 to 36 weeks (eg circa 8 months) to complete. It could be expected that the ramp options (Option 3) could be completed within 20 to 26 weeks.

Option 3C, which includes a lift, could be completed in approximately 16 to 20 weeks, whereas Option 4, would require 4 to 8 weeks of work, depending upon whether any obstacles need to be relocated.

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6.4 Key Risks

Key risks to the project, both before and during construction, have been identified as follows:

- Network Rail delays with review or turnaround of submissions, or in advising their requirements;
- Network Rail requirements become more onerous than originally envisaged, or cannot be well defined at the start and increase throughout the project;
- Possessions cancelled without prior notice or with little prior notice due to unforeseen event;
- Major operations to be done during possessions cannot take place due to unforeseen event (eg wind speed prevents crane lift) resulting in abortive possession and additional possession required;
- Works overrun possession handover time due to mechanical breakdown beyond hold point or due to other unforeseen event;
- Incident during possession damages Network Rail assets or infrastructure;
- Weak ground conditions are found during GI resulting in more extensive foundation works being required;
- Unforeseen ground conditions/ buried obstructions encountered during piling / excavation, particularly given previous sidings works located in proximity;
- Utilities services diversion become prohibitively expensive;
- Service strike during excavation, piling or ground investigation works;
- Planning permission refused or delayed, or planning conditions imposed increase cost of scheme;
- Negotiations with land owners / operators
- Site accessibility / working area and close proximity of live traffic, pedestrian traffic, railway and buildings.

Two scenarios have been considered with regards to the costs associated with risks materialising: a mitigated scenario, whereby some action can be taken to mitigate the effects of the risk having happened, and a worst case scenario, where the risk cannot be mitigated. These have only been considered at a fairly high level only at this stage, and are therefore indicative only, but suggest the following risk allowance be made:

Option	Risk allowance
Bridge options (Options 1 and 2)	£400k to £1.6m
Ramp options (Options 3A and 3B)	£200k to £600k
Lift option (Option 3C)	£100k to £300k
Built-up access (Option 4)	£50k to £150k

Table 2 – Suggested Risk Allowance

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7.0 Discussion

The options have been compared against the present situation in terms of travel distance and travel time, and the results are summarised in the tables below, alongside the cost.

Option	From Cambridge Station			From Hills Road / Brookgate			Cost (£ million)
	Distance (m)	Travel Time	Difference	Distance (m)	Travel Time	Difference	
1	590	9:11**	-1:56	425	6:35**	+1:10	£3.3
2	750	11:35**	+0:28	375	5:57**	+0:32	£3.3
3A	725	10:54**	-0:13	345	5:12**	-0:13	£1.6
3B	795	11:56	+0:49	410	6:09	+0:44	£1.3
3C	720	11:18*	+0:11	340	5:36*	+0:11	£0.5
4	800	12:00	+0:53	425	6:22	+0:57	£0.1
Do Nothing	730	11:07**	-	350	5:25**	-	£0

Table 3 – Distance and journey time using stairs where appropriate

*Includes an allowance of 30 seconds waiting for and travelling in the lift

**Assumes a walking pace of 4km/h and 2km/h horizontally in stairs.

Option	From Cambridge Station			From Hills Road / Brookgate			Cost (£ million)
	Distance (m)	Travel Time	Difference	Distance (m)	Travel Time	Difference	
1	575	9:08*	-3:32	410	6:39*	-0:24	£3.3
2	820	12:18	-0:22	445	6:41	-0:22	£3.3
3A	770	11:33	-1:07	390	5:51	-1:12	£1.6
3B	795	11:56	-0:44	415	6:13	-0:50	£1.3
3C	715	11:14*	-1:26	340	5:36*	-1:27	£0.5
4	800	12:00	-0:40	425	6:22	-0:41	£0.1
Do Nothing	845	12:40	-	470	7:03	-	£0

Table 4 – Distance and journey time without using stairs

*Includes an allowance of 30 seconds for waiting for travelling in the lift

Routes and Journey Time

From the tables above, it can be seen that, whilst there is an opportunity to make an improvement and a reduction in travel time to the Cambridge Leisure Park, the only option that achieves a significant reduction in journey time is Option 1. This is particularly the case for people coming from or going to Cambridge Station and the area immediately near to the station, a desire line served especially well by Option 1. The reverse is, however, also true. Option 1 provides little benefits to people coming from the Brookgate / Hills Road junction. In fact, for people capable of using the existing stairs by the railway bridge, Option 1 would actually increase the journey time by over a minute. It could therefore be said that Option 1 would really be provided to serve the railway station, the Busway stops nearby and the apartment buildings located at the station end of Station Place and Mill Park only.

Amongst the other options for people capable of using the existing stairs, it is likely that none would make an appreciable difference under real-life conditions, with people walking at different pace, congestion on footpaths, people having to wait at road crossings, etc. In fact, apart from the situation with Option 1 described above, the other options would result in an increased journey time, except for Option 3A, which may make the journey 13 seconds quicker (and it therefore unlikely to make a perceptible difference to users).

For people with impaired mobility or with prams or pushchairs that cannot use the stairs, the greatest difference in journey time is also achieved by Option 1. In this situation, all options achieve a reduction in journey time, although it is unlikely that option 2, 3B and 4 would make an appreciable difference. Option 3C, ie the provision of a lift alongside the existing stairs, would give the second largest saving for users from Cambridge Station, and would achieve the best result for users from the Hills Road / Brookgate junction. Option 3A also achieves a reduction in journey time, albeit slightly less than option 3C.

Given they are unlikely to make a notable difference, Options 2, 3B and 4 will not be considered further.

Value

Purely on the basis of time saved in relation to the cost of the improvement, not considering any aesthetic improvement or other less tangible benefits that may be provided alongside the structural improvements, a “value for money” criteria can be determined for the remaining options. This is as follows:

Option	From Station	From Hills Road / Brookgate
1	£0.028m /sec	£0
3A	£0.108m /sec	£0.108m /sec
3C	£0	£0

Table 5 – Cost of time saving (£million spent / second saved) – stair users

Option	From Station	From Hills Road / Brookgate
1	£0.016m /sec	£0.138m /sec
3A	£0.021m /sec	£0.019m /sec
3C	£0.005m /sec	£0.005m /sec

Table 6 – Cost of time saving (£million spent / second saved) – non-stair users

From the latest tables, it can be seen that Option 3C would represent the option with the lowest cost per second of journey time reduction between the three remaining options, at a cost of £5,000 per second saved. This is when looking at provisions for users that cannot use the stairs. For the other group of users, the best saving is achieved by option 1, but only for users from the station.

Overall

The difficulty in selecting one option over another in this case, within the remaining three options or the status quo, is the variation in outcome depending upon the scenario, and the difference in cost. For example, were we to discount Option 3A on the basis that it costs more per second saved than the other two, we would be discounting the only option that achieves a journey time reduction in all cases, albeit, for pedestrians capable of using the stairs, this saving is rather expensive (£108k per second saved).

For £28k and £16k per second saved, a considerable reduction in journey time is achieved by Option 1, but only for people coming from the station. However, in the case of people not using stairs, a significant saving, although less than for Option 1, is realised by using Option 3C.

One thing to note is that both Options 1 and 3C make use of a lift. This allows them to avoid having to send people off course on a long ramp diversion necessary to achieve the desired maximum grade. However, both come with likely greater maintenance considerations than an equivalent steel ramp structure, and this should be born in mind.

Apart from the fact that it only really helps people from the station area, another issue with Option 1 is the disruption it will cause and the potential for risks to be realised, and for the budget to need to increase as a consequence. There are considerable risks in delivery Option 1, and many of these cannot be mitigated in advance. These are typical of a railway setting, but are enhanced further by the tightness of the site surrounding the railway.

The provision of a new lift facility at the location of the existing stairs, by comparison, involves much less potential for the risks highlighted herein to realise themselves. It would therefore appear to provide the best value in terms of reducing travel time and distance for the trips considered as part of this study, along with delivering a more predictable budget for the scheme.

It is expected that, to provide such a lift facility to an acceptable standard would cost in the order of £500k. However, this does not include the cost of ongoing maintenance, monitoring, or indeed running costs such as electricity. As mentioned above, typical maintenance and servicing costs for a lift building would be considerably greater than those for a ramp. Furthermore, during breakdowns or maintenance, the lift would be unavailable and the present route would need to be used.

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On the basis of the above, it would be possible to justify constructing a new lift facility at the location of the existing stairs. However, careful considerations of ongoing and running costs would need to be made to confirm whether it is feasible for Cambridgeshire County Council can not only afford to build this facility but also to maintain it throughout its life.

It is not considered that any of the bridge or ramp options will provide value for money, and given the significant risks and sums involved, excepting the provision of a lift facility, which may warrant further investigation, it is not recommended that any of the options is taken forward.

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8.0 Conclusions

A number of options have been investigated to improve access and reduce travel time between Cambridge Railway Station and the Cambridge Leisure Park, or between the Hills Road / Brookgate Junction and the Cambridge Leisure Park. These include:

- A new bridge between Brookgate and the Cambridge Signal Box area over the railway to the multi-storey car park, making use of the car park's stairs and lifts for access on the south side (Option 1).
- A new bridge from Hills Road Busway bridge over the railway and over Clifton Way, ramping down in the car park behind The Junction nightclub (Option 2)
- A new ramp from the access stairs on Hills Road just south of the railway, over the existing access to the hotel and shop car park, towards the entrance to the cinema building (Option 3A)
- A new staged or "scissor" ramp from the aforementioned stairs, following the existing Hills Road wall and returning onto itself, with pedestrians then crossing the car park access at ground level and walking to the front of the cinema building (Option 3B)
- Supplementing the existing stairs with a new lift facility (Option 3C).
- A new built-up ramp access at the south end of the hotel building (Option 4).

Of all the options considered, only options 1, 3A and 3C of the above are likely to make a noticeable reduction in journey time, and then only in some situations.

Option 1 would achieve a considerable reduction in travel time, but only for users coming from the Cambridge Station or from the station end of Station Place and Mill Bank. This would come at a considerable cost of £3.3m, excluding risk allowances. For this type of work, an allowance for risk of between £400k to £1.6m should be made.

Option 3C on the other hand, would cost significantly less to construct, and would have a considerably smaller risk profile. It will be possible to achieve noticeable savings for users with impaired mobility, wheelchairs or pushchairs from either Cambridge Station or from the Hills Road / Brookgate junction.

In view of the high cost and high risks involved, and because only users coming from the station or from the portion of the CB1 development nearest the station would see any benefit from Option 1, Option 3C, the provision of a lift facility at the existing stairs, is preferred between the two.

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9.0 Recommendations

It is recommended that a bridge crossing the railway within a triangle area bordered by the Busway, Hills Road and the Cambridge Leisure should not be considered further.

It is further recommended that options to construct a ramp access from the location of the existing stairs just south of the railway, to access Clifton Way directly from Hills Road, should also not be considered further.

None of the above options would be considered to offer a significant reduction in journey time for pedestrians, nor a significantly improved route.

Users with impaired mobility, wheelchair users or users with pushchairs would benefit from the installation of a lift alongside the existing aforementioned stairs. However, whilst the capital cost may seem justifiable, there would be ongoing operation and maintenance costs to bear. This option could be taken forward for further consideration, subject to more detailed and accurate cost estimates being produced in the first instance. This would inform the decision as to whether Cambridgeshire County Council could afford the running costs of such an installation.

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Appendices

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Appendix A - Location Plan

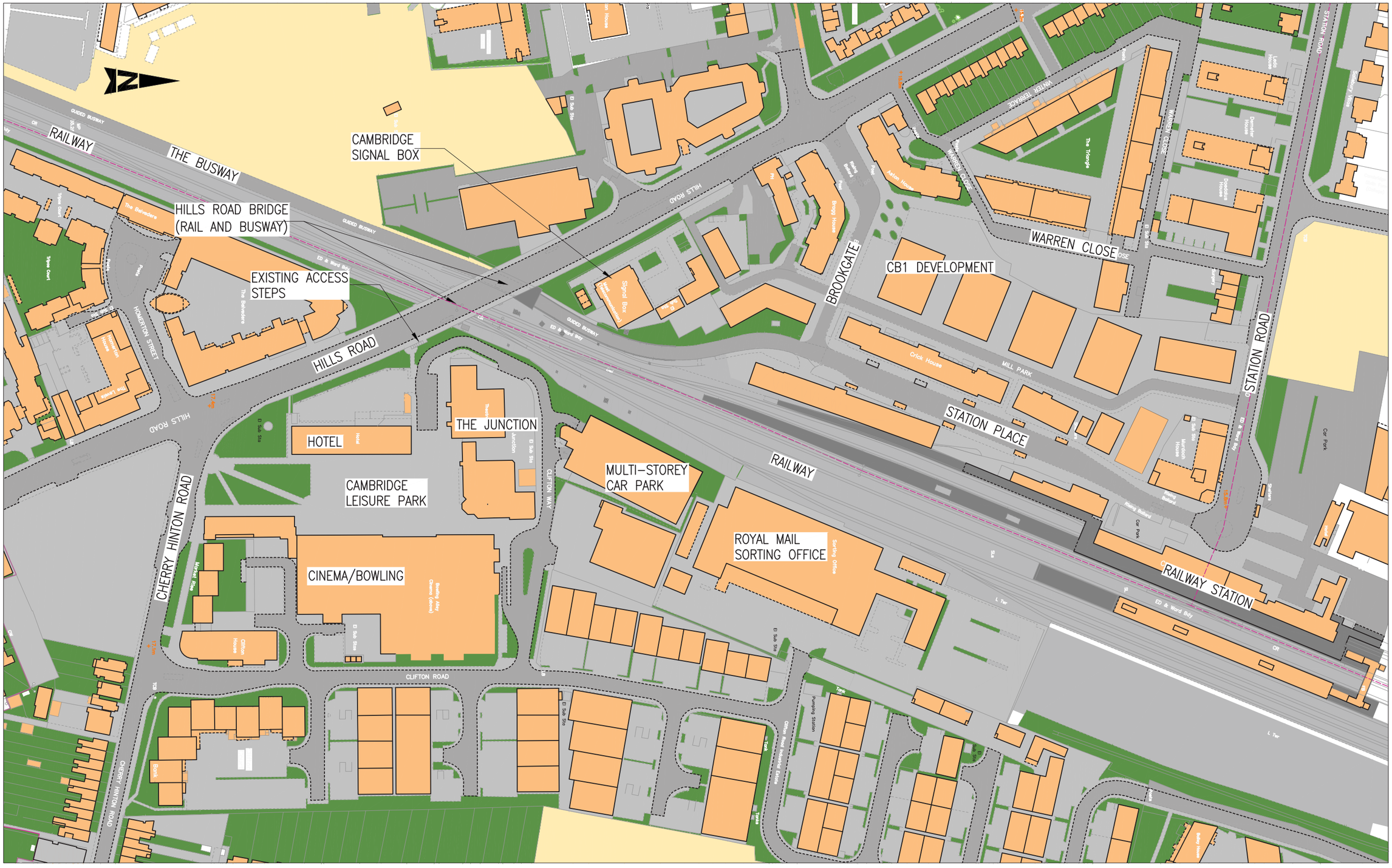
Rev A

Drawing Number 5040122/BR/FS/101

Status P

DO NOT SCALE

A3



PLAN
SCALE 1:2000

NOTES

1. ALL PROPOSALS SHOWN ARE INDICATIVE ONLY.
2. THIS DRAWING SHOULD BE READ IN CONJUCTION WITH "HILLS ROAD / CB1 TO CAMBRIDGE LEISURE PARK ACCESS IMPROVEMENTS – FEASIBILITY STUDY REPORT".

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

Rev	Description	By	Date	Chk'd	Auth
A	FIRST ISSUE	IV	11/14	JLG	JLG

Rev	Purpose of Issue	Date	Auth
A	FOR INFORMATION	11/14	JLG

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Project
HILLS ROAD / CB1 TO CAMBRIDGE LEISURE PARK ACCESS IMPROVEMENTS

Title
LOCATION PLAN

Original Scale	Designed/Drawn	Checked	Authorised
As Shown	IV Date 27/11/14	JLG Date 2711/14	JLG Date 2711/14

Status	Drawing Number	Rev
P	5040122/BR/FS/101	A

File Location: P:\JSB3A1\land\Cambridgeshire Highways\Projects\5040122 Leisure Centre Crossing Feasibility\000 CAD & BIM\910 Drawings\
Drawing Name: 5040122_BR_FS_101-B-Constraints Plan and Services.dwg Date: Mar 06, 2015 - 1:02pm Plotted by: bc962628

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Appendix B - Constraints and Services Plan

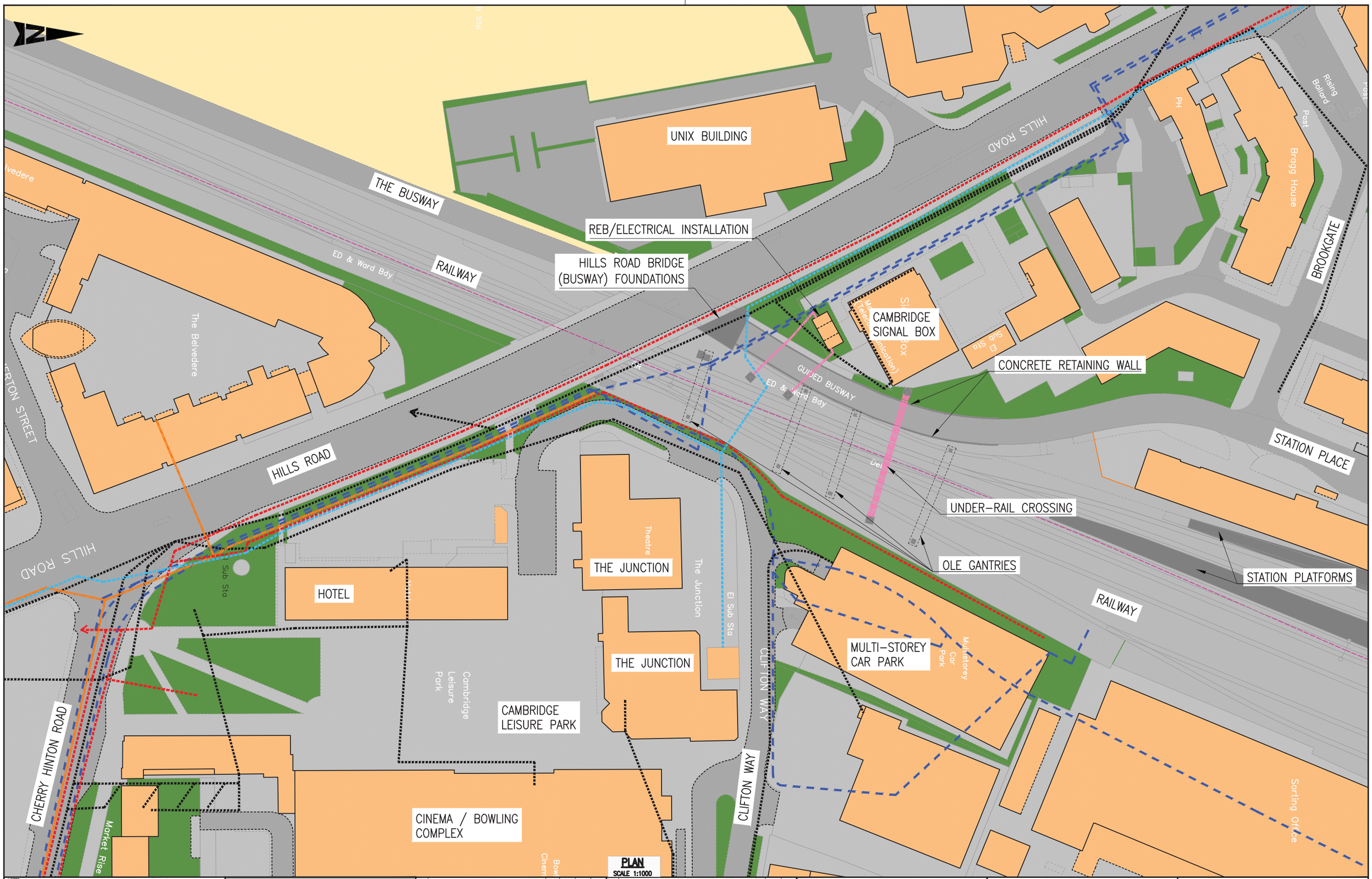
Rev A

Status P

Drawing Number 5040122/BR/FS/102

DO NOT SCALE

A3



PLAN
SCALE 1:1000

NOTES
1. THE LOCATION OF UTILITIES SERVICES IS INDICATIVE ONLY BASED ON RETURNS FROM STATUTORY UNDERTAKERS. NO GUARANTEE CAN BE GIVEN AS TO ACCURACY OF THE LOCATIONS SHOWN. POSITIVE CONFIRMATION OF THE LOCATION AND TYPE OF SERVICES SHALL BE REQUIRED BEFORE WORKS PROCEED.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH "HILLS ROAD/CB1 TO CAMBRIDGE LEISURE PARK ACCESS IMPROVEMENTS FEASIBILITY STUDY REPORT".

BUILDING
RAIL
STREETS
GREEN AREA
CAMBRIDGE WATER COMPANY
BT SERVICE
FOUL SEWER SERVICE
MP MAINS NATIONAL GRID
LP MAINS NATIONAL GRID
RAIL SIGNALING CABLES

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

Rev	Description	By	Date	Chk'd	Auth
A	FIRST ISSUE	IV	01/15	JLG	JLG

Rev	Purpose of Issue	Date	Auth
A	FOR INFORMATION	01/15	JLG

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Project
HILLS ROAD / CB1 TO CAMBRIDGE LEISURE PARK ACCESS IMPROVEMENTS

Title
CONSTRAINTS AND AND SERVICES PLAN

Original Scale	Designed/Drawn	Checked	Authorised
As Shown	IV Date 26/01/15	JLG Date 26/01/15	JLG Date 26/01/15

Status	Drawing Number	Rev
P	5040122/BR/FS/102	A

File Location: P:\CBC8N\Vonf\Cambridgeshire Highways\Projects\5040122 Leisure Centre Crossing Feasibility\900 CAD & BIM\910 Drawings\
Drawing Name: 5040122_BR_FS_101-B-Constraints Plan and Services.dwg
Date: Mar 06, 2015 - 9:46am
Plotted by: bc966208

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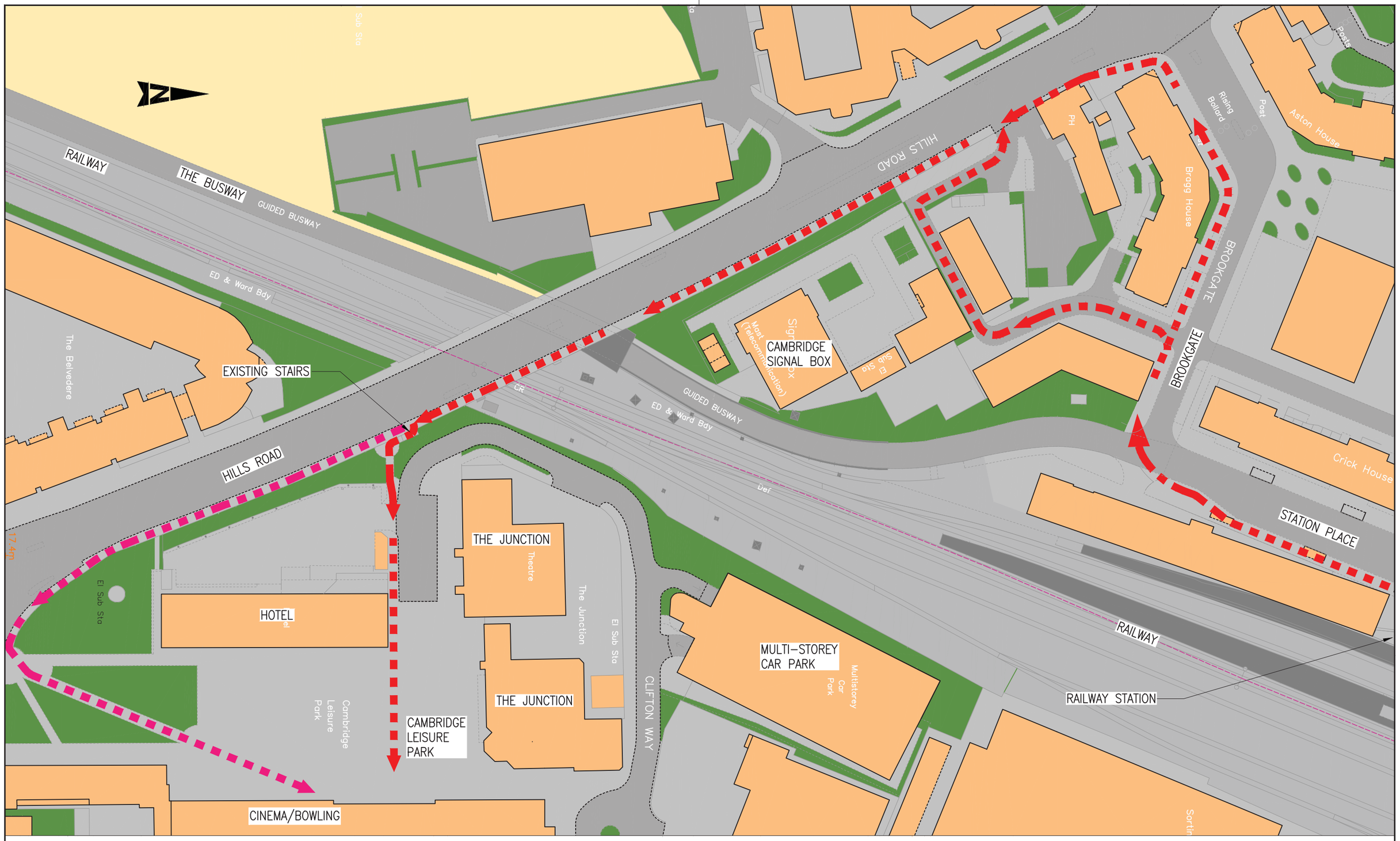
Appendix C - Route Options

Rev A
Status P
Drawing Number 5040122/BR/FS/103

DO NOT SCALE

A3



PLAN
SCALE 1:1000

NOTES

1. ALL PROPOSALS SHOWN ARE INDICATIVE ONLY.
2. THIS DRAWING SHOULD BE READ IN CONJUCTION WITH "HILLS ROAD / CB1 TO CAMBRIDGE LEISURE PARK ACCESS IMPROVEMENTS – FEASIBILITY STUDY REPORT".

KEY

EXISTING ROUTE (NOT USING STAIRS)

EXISTING ROUTE (WITH STAIRS)

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS
CONSTRUCTION
NONE
MAINTENANCE/CLEANING
NONE
USE
NONE
DECOMMISSIONING/DEMOLITION
NONE

Rev	Description	By	Date	Chk'd	Auth
A	FIRST ISSUE	IV	11/14	JLG	JLG

Rev	Purpose of Issue	Date	Auth
A	FOR INFORMATION	11/14	JLG

Client: Cambridgeshire Highways working for

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Project: HILLS ROAD / CB1 TO CAMBRIDGE LEISURE PARK ACCESS IMPROVEMENTS

Title: EXISTING ROUTES

Original Scale	Designed/Drawn	Checked	Authorised
As Shown	IV Date 27/11/14	JLG Date 27/11/14	JLG Date 27/11/14

Status	Drawing Number	Rev
P	5040122/BR/FS/103	A

File Location: P:\CBC8A\Hand\Cambridgeshire Highways\Projects\5040122 Leisure Centre Crossing Feasibility\00 CAD & BMV\910 Drawings\
Drawing Name: 5040122_BR_FS_101-B-Constraints Plan and Services.dwg
Date: Mar 06, 2015 - 3:52pm Plotted by: bc966028

Rev A

Drawing Number 5040122/BR/FS/104

Status P

DO NOT SCALE

A3

0 10 50

HILLS ROAD BRIDGE (RAIL AND BUSWAY)

EXISTING ACCESS STEPS

HILLS ROAD

GUIDED BUSWAY

ED & Ward Bdy

CAMBRIDGE SIGNAL BOX

BROOKGATE

WARREN CLOSE

STATION ROAD

STATION PLACE

MILL PARK

RAILWAY

RAILWAY STATION

HOMERTON STREET

CHERRY HINTON ROAD

HOTEL

CAMBRIDGE LEISURE PARK

THE JUNCTION

CINEMA/BOWLING

MULTI-STOREY CAR PARK

CLIFTON WAY

CLIFTON ROAD

Hills Road Sixth Form College

Tripos Court

The Belvedere

Homerton House

The Lodges

Crick House

Darwin House

Douglas House

Murdoch House

Sorting Office

Clifton Road Industrial Estate

Pumping Station

Tank

El Sub Sta

Mast (Telecommunication)

Signal Box

Def

PLAN
SCALE 1:1000

PLAN
SCALE 1:2000

NOTES

1. ALL THE DIMENTIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. PROPOSAL IS INDICATIVE ONLY.
3. THIS DRAWING SHOULD BE READ IN CONJUCTION WITH "FEASIBILITY STUDY REPORT HILLS ROAD/CB1 TO LEISURE CENTRE CROSSING".

- OPTION 1
- OPTION 2
- OPTION 3A
- OPTION 3B
- OPTION 4

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION	NONE
MAINTENANCE/CLEANING	NONE
USE	NONE
DECOMMISSIONING/DEMOLITION	NONE

Rev	Description	By	Date	Chk'd	Auth
A	FIRST ISSUE	IV	03/15	JLG	JLG

Rev	Purpose of Issue	Date	Auth
A	FOR INFORMATION	03/15	JLG

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Project: HILLS ROAD / CB1 TO CAMBRIDGE LEISURE PARK ACCESS IMPROVEMENTS

Title: POTENTIAL ROUTE OPTIONS

Original Scale	Designed/Drawn	Checked	Authorised
As Shown	IV Date 05/03/15	JLG Date 06/03/15	JLG Date 06/03/15

Status	Drawing Number	Rev
P	5040122/BR/FS/104	A

File Location: P:\GIRSBA\Hond\Cambridgeshire Highways\Projects\5040122 Leisure Centre Crossing Feasibility\000 CAD & BIM\010 Drawings\
Drawing Name: 5040122_BR_FS_101-B-Constraints Plan and Services.dwg Date: Mar 06, 2015 - 6:05pm Plotted by: bc365208

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