Network Rail

Chesterton Interchange Station

Design and Access Statement
ISSUED FOR INFORMATION
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Chesterton Interchange Station

Design and Access Statement

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EXECUTIVE SUMMARY

Network Rail (NR) are in the process of designing and procuring a new station at Chesterton Sidings. The early design stages were a joint project with Cambridgeshire County Council (CCoC). The scheme will be delivered under the Governance for Railway Investment Projects (GRIP) process. In conjunction with the works proposed by the Cambridgeshire Guided Busway Works (CGB) Order 12 this will also provide access to the well developed wider public transport network in Cambridgeshire.

The application site lies predominantly within South Cambridgeshire District Council (SCDC), and partly within Cambridge City Council (CCiC) land. The planning application will be submitted to and processed by CCoC but determined by the Joint Development Control Committee – City Fringes, which is made up by locally elected members of SCDC, CCiC and CCoC. This document has been produced in consideration of local planning policy and guidance provided by SCDC, CCiC and CCoC, and relates to the works to be carried out on and around Chesterton Sidings by NR and CCoC as promoter and relating to Chesterton Interchange Station.

The existing station at Cambridge suffers from platform and passenger congestion problems; a new island platform has provided some redress for railway operations, but the passenger throughput far exceeds that for which the station buildings were designed. In addition to providing crowding relief to the existing station, the location of the new station supports current and future development sites associated with sub-regional growth, a significant proportion of which are located on the northern boundaries of the city and further afield along the A14 and A10 corridors. The choice of location is further enhanced by its proximity to major employment areas, notably Cambridge Science Park.

The station interchange design encompasses: functional efficiency (combining the 5 key modes of transport into one legible and elegant space); sustainability: structural integrity; lifetime costing and flexibility as well as a responsiveness to site and setting which has been developed in partnership with CCoC, SCDC and CCiC. The proposed interchange designs have also been developed to ensure that any future development of the wider Chesterton sidings site is not inhibited by its location or implementation.

The ambition of NR, the local authorities and the wider public is for a proposal which provides a gateway not only to Cambridge but also to the northern fringes and looks to the heritage and future of scientific endeavour in the region. Our intention, as set out in this document, is to provide a solution which both reflects this ambition and is echoed by the four themes for driving higher standards for new developments as set out in the Cambridgeshire Quality Charter for Growth:

- Connectivity
- Character
- Climate
- Community

Fig.1: Chesterton Interchange Station Location Plan
1.0 INTRODUCTION
1.1 Scope of the statement and the relationship with the Network Rail Permitted Development rights and the Town and Country Planning Act

1.1.1 This document supports the full planning application submitted under the Town and Country Planning Act 1990 for the provision of a new transport interchange at Chesterton Sidings.

1.1.2 NR propose to build a new station building and transport interchange on Chesterton Sidings beside the now redundant Chesterton Junction.

1.1.3 Chesterton Sidings lies within the jurisdiction of SCDC, with smaller elements (e.g. Cowley Road, Bramblefields Local Nature Reserve (LNR) and Moss Bank) in CCIC.

1.1.4 These works will provide interchange facilities between the five main modes of transport (rail, bus, cycle, pedestrian and car) which will allow:
- a reduction in congestion at Cambridge Station,
- a reduction in car journeys from the northern fringes to Cambridge Station through the historic centre,
- improved access to the rail and bus network to Chesterton and Cambridge Science Park,
- minimised journey times.

1.1.5 It is intended to be a project under the Governance for Railway Investment Projects (GRIP) process. It is anticipated that a detailed application will be submitted to both South Cambridgeshire District Council and Cambridge City Council, as joint Local Planning Authority (LPA), seeking planning permission for so much of the Development as is not authorised by the planning permission conferred in connection with the CGB Order 2005 or by way of Part B permitted development rights in respect of Network Rail’s statutorily authorised railway.

1.1.6 Works out with this application include:
- Lifting and relaying of existing Freightliner siding to the north of the siding away from the new station development,
- 400mm track lift to the platform areas to allow level access and maintain current operational speed limits on the main line,
- Relocated DNO generator building to the west of the site,
- Relocated Signal Supply Point building to a dedicated NR compound to the south of the site.

1.1.7 This submission relates to the plans and specifications for the main phase of the works for Chesterton Interchange Station. The proposed works include:
- Provision of a new station building with associated Train Operating Company (TOC) facilities and retail shell, The station building will be accessed at street level from a new public square which provides a focus for the various modes of transport servicing the interchange,
- Step free access between the new station building and the platforms will be maintained by an integral, covered footbridge served by new lifts and stairs. The lift sizing and stair cycle channel design are being developed through extensive consultation with the Cambridge Cycling Campaign,
- Passive provision to the platforms for future TOC and retail development with passenger waiting facilities integral to the stair and lift towers,
- Covered cycle parking in two dedicated zones to the north and south of the station building for approximately 1000 bicycles,
- Car parking for approximately 450 cars with the aspiration to achieve Park Mark accreditation. The car park has been designed to NR standards, drawing ref 5134906_A_L_004,
- Dedicated taxi and kiss and ride area served from Cowley Road,
- Extension to the busway and associated service path / cycleway along the disused St Ives branch line from Milton Road. The service path will be lit between Milton Road and Moss Bank,
- New access to the busway extension from Milton Road with revised junction layout, pedestrian and cycle crossing points,
- Pedestrian and cycle access points to the west of the site from Nuffield Road Industrial estate, to the north of the Nuffield Road allotments, Bramblefields LNR and Moss Bank connect to the maintenance/ cycleway of the busway extension.

Fig 3. Illustration of Chesterton Sidings c.1959
1.2 Introduction to Chesterton Interchange Station

1.2.1 Proposals for a new station north of Cambridge were first established in the Cambridgeshire and Peterborough Structure Plan in 2003 which identified a station in this location as needed to support growth in the Cambridge Sub-Region and to deliver a cohesive and integrated transport network.

1.2.2 This was re-iterated in the SCDC Site Specific Policy 17 of 2011 which stated that land at Chesterton Sidings is safeguarded for the development of a train station and interchange facility.

1.2.3 A major scheme business case (MSBC) and GRIP stage 2 (feasibility) study were submitted to the Department for Transport (DfT) in 2007 for consideration by CCoC. Since then, the progress of the scheme has been affected by its association with a number of related projects including:

- Plans for wider redevelopment of the Chesterton sidings site (known as the Cambridge Northern Fringes East) which were subsequently stymied by recognition that the railway land needed to be retained for rail uses including more carriage stabilising capacity. The retention of the waste water treatment plant to the North of the site further contributed to this.
- Associated with the above was the inability to relocate existing freight operations away from the Chesterton sidings site and, for a time, the site was also identified as a waste transfer station.
- Congestion charging proposals for Cambridge under a planned Transport Innovation Fund (TIF) submission through which funding for Chesterton was expected. Ultimately the TIF funding was removed.
- Within the term of the new government (2010), the Coalition removed regional planning and associated instruments including the East of England Regional Funding Assessment (RFA) from which Chesterton was expected to be funded.

1.2.4 Throughout this time, housing and employment growth in the sub-region has grown strongly, especially in the northern fringes of the City. Office of Rail Regulation (ORR) data reveals that rail demand across seven of the sub-regional rail stations (Cambridge, Ely, Foxton, Huntingdon, Newmarket, Shelford and Waterbeach) grew by 40% between 2003 – 2009 and although that has been tempered by the recession, Cambridge remains one of the most economically buoyant areas of the country the Cambridge knowledge economy has bucked the recession and continues to drive demand for rail travel. The fundamental reasons for developing a new station north of Cambridge remain as important now as they were in 2005 – to support the growth of the Cambridge Sub-Region and to deliver a cohesive and integrated transport network.

1.2.5 NR (with assistance from CCoC) are therefore prepared to drive the scheme forward using prudential borrowing to fund construction with the debt being repaid by levying access charges on the train operators by the DfT. In this way, the scheme can be brought forward much quicker than would have been the case if the traditional route of gaining DfT Major Scheme Funding approval had been pursued, especially in a period of austerity for public finances.

1.2.6 The proposals comprise of a new station building (with an approximate gross internal area of 550m\(^2\)) with an integrated footbridge linking to two mainline platforms and a bay platform. There will be provision for 1000 covered cycle parking spaces, an interchange with the guided and regular bus services and parking for nearly 450 cars.

1.2.7 The Secretary of State for Transport confirmed in January 2012 that the Government is minded to include the proposed Chesterton Station, to be known as “Cambridge Science Park Station”, in the forthcoming train operating franchises.

1.2.8 Three Planning, Architecture and Urban Design sessions were held between the design team and the LPA in August /September 2012 and January 2013 which have been critical in addressing and resolving key concerns of the wider stakeholder groups. A series of analysis diagrams of the site and wider context which informed these sessions and the overall design process are included in figures 5-8.

1.2.9 A period of public consultation was held in November 2012 which involved a number of public exhibitions and presentations at Parish Council, residents association meetings and to other interested groups. The overwhelming response to the scheme was positive, with 90% support for the project from a total number of responses of 1200.

1.2.10 Extensive consultation has also taken place with both statutory and non-statutory consultees. The level of support from these stakeholders is generally commensurate with that gained from the wider public consultation. A full consultation statement can be found in the Environmental Impact Assessment which accompanies this application.

1.2.11 In December 2014 the “National infrastructure Plan 2014” included the project as one of its key objectives stating “Chesterton Rail Station – as announced by the Prime Minister and Deputy Prime Minister the government will provide £44 million between 2014-15 and 2016-17 to build a new rail station at Chesterton, linked to Cambridge Science Park”.

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*Fig 4. Illustration of scale model produced for consultation*
Fig 5. Site Analysis: Connectivity

Fig 6. Illustration showing existing sidings

KEY:
1. Milton Road
2. A14
3. Cambridge Science Park
4. Anglian Water Waste Water Treatment Plant
5. Busway
6. Cowley Road
7. LaFarge Cement Works
8. Cambridge Business Park
9. Freightliner Siding and Throw-Out area
10. Bramblefields LNR
11. Fen Road Level Crossing
12. River Cam
13. Fen Ditton
Fig 8. Illustration showing Proposed Interchange Layout

**KEY:**

1. New access formed from Nuffield Road Business Park
2. New access formed from Nuffield Road to north of Allotments
3. Station Access Road
4. Existing area of dense scrub, bare ground and ephemeral short perennial vegetation with potential for future access to Cowley Road Business Park
5. Car Park Access
6. Landscaped Car Park
7. Ecological enhancement and minor path improvements to Bramblefields LNR
8. New access formed from Bramblefields LNR
9. Shared Surface kiss and ride / taxi drop off
10. 250m single and island platform
11. Landscaped public square with bus stops to the west
12. New station building with integrated footbridge and retail
13. Covered cycle parking
14. NR compound
15. New Screening Planting
16. New access formed from Moss Bank

Fig 7. Movement patterns: cycle/pedestrian
2.0 DESIGN ISSUES
2.1 Layout

The Existing Site

2.1.1 Prior to its enclosure in 1838, the parish of Chesterton was mainly arable, consisting of approximately three fields.

2.1.2 On the eastern boundary of the parish the mainline between Cambridge and Ely was constructed in 1844 and opened in 1845. In 1847 the St. Ives branch line was opened. These two lines form the southern and eastern edges of Chesterton Sidings, the site for these proposals. The St Ives branch line remained operational as a passenger line until 1970 and a freight line until the early 1990s until its closure. The majority of the line has been converted into the Cambridgeshire Guided Busway which will extend into Chesterton sidings to service the new station interchange.

2.1.3 There are currently two operational sidings on the site leased to Freightliner and D.B.Schenker from NR. The sidings service a La Farge Ready Mix Concrete plant and an aggregate storage area respectively.

2.1.4 To the south of the site lies the mainly residential areas of Chesterton with the St Ives branch line forming a distinct boundary in use class. To the West and North West lie Cambridge Business Park and Cambridge Science Park. The North of the site is bound by the Anglian Water Waste Water Treatment Plant. The West Anglia main line forms the eastern boundary of the site.

2.1.5 The nearest buildings of architectural interest lie approximately 1km from the site on the opposite bank of the river Cam in Fen Ditton, those being the Church of St Mary the Virgin and Fen Ditton Hall. These are largely obscured from view by existing mature planting between the site and Fen Ditton and various developments on Fen Road to the north of the level crossing.

2.1.6 Bramblefields LNR lies within the site. It has been noted that there are invasive species within pond areas.

2.1.7 Vehicular access to the site is currently through Cowley Road from Milton Road. A NR access road runs parallel to this although it is now overgrown and unused. There is gated access from Moss Bank. Currently there is no dedicated pedestrian access to the site.

**Principal Design Constraints**

2.1.8 The main factors which have determined the size and location of the proposed new station interchange are:

- The Fen Road Level Crossing. This existing crossing has a profound effect on the size and location of the rail infrastructure to the mainline and dictates locations and dimensions of key items such as the most southerly location of the platforms and the minimum height of the footbridge to the platforms due to the raised overhead line equipment (OLE).
- The retention of access to existing sidings and the “up and down loops” to the mainline require that the footbridge location minimises its length while providing an optimum access point to the platforms. This in turn influences the location of the station building as the bridge is integral to the overall design, maximising the development potential of the wider site,
- The requirement to maintain freight operations on site with minimal effect on their operations,
- The extension of the CGB and associated service path / cycle way along the St Ives branch line fixes the location of the busway to the western flank of the site ensuring the possibility of future extension to the South of the site,
- The requirement to optimise the flexibility of the remaining sidings for reconfiguration as operational rail infrastructure and/or redevelopment of some or all of the site in other use,
- The provision for a car park serviced from Cowley Road, designed to NR standards,
- The requirement to provide access for bus services with access from Milton Road,
- The provision of pedestrian and cycle access from the residential area of Chesterton and the city to the south and west of the site,
- The provision of approximately 1000 covered cycle stands,
- The provision of bus stops which service both the busway and regular bus services,
- Taking cognisance of emerging local authority masterplans through discussions with local authorities,
- NR and TOC design standards such as - Accessible Train Station Design for Disabled People: A Code of Practice November 2011 and Station Capacity Assessment Guidance: May 2011.

**KEY:**

1. Pedestrian and Cycle Access from the Chesterton and city residential area
2. DB Schenker leasehold area
3. Cowley Road extension
4. Busway extension with service path / cycleway
5. Existing access to rail infrastructure
6. Optimum zone for station and bridge location
7. Most southerly location of proposed platforms
8. Existing signal
9. Fen Road level crossing

Fig 11. Illustration of Site Constraints
Design Development

2.1.9 In 2006, CCoC and NR considered a number of high level options for a new station at Chesterton sidings to the north of Cambridge. These were:

- Option A - new single platform station on the disused St. Ives Branch Line,
- Option B1 - new three platform station on the main line; to South of Site,
- Option B2 - new three platform station on the main line; to North of Site,
- Option C - new two platform station on the main line,
- Option D - bus-based park and ride service at the same location,
- Option E - two staggered platforms.

2.1.10 Each of these high level options were then assessed with regard to:

- Quantification of Network effects from each of the options,
- Evaluation of capital cost differences between the options,
- Evaluation of operating costs between the options.

2.1.11 It is important to consider the wider circumstances surrounding the station at the time of this feasibility study:

- Freight operations were assumed to be removed from the site although the existing down loops which serve the mainline were to be retained non-necessitating the station to be linked to the platforms by a footbridge,
- The CGB, though policy, had not yet achieved the 2005 Transport & Works Act Order (TWAO),
- An al-grade station car park with capacity for 440 spaces had been identified but with little assessment or thought to location / design, nor to that of the station forecourt area for interchange between modes,
- No assessment of the wider public transport, pedestrian and cycle linkages had been made or designed.

2.1.12 In January 2012, CCoC in conjunction with NR proceeded with an option appraisal study. In reviewing the wider circumstances of the previous work, the following was concluded:

- Freight operations were to remain on the Chesterton sidings site and would need to be accommodated within the emerging design,
- The CGB had been constructed and opened in the summer of 2011 passing near to the site at the junction of Milton Road with the former St Ives branch line, CGB patronage had exceeded expectations and extension of the guide way through to the station was to be provided, in accordance with the powers gained at the TWAO for the residual part of the St Ives branch line,
- A review of the car park location, design and overall capacity was needed to support a planning application for the scheme. In conjunction with this, further work was necessary to improve the accessibility of the station given the constraints of a mainline railway to the east, and the aggregate plant and freight operations to the north. Opportunities for improved access by non-vehicular modes to the employment located in the west (Cambridge Business Park and Cambridge Science Park) as well as to residential areas to the south were to be realised.

2.1.13 In conducting the study, options B2 & C were carried forward and evaluated in the assessments. In doing so, the design team considered their relative merits with regard to the requirements noted in 2.1.10. It soon became clear that the constraints to the site strongly supported the further development of Option B2 as identified in the feasibility study leading to the proposed Option B2+. This option retained all the functionality of option B2 and by moving the proposal slightly to the south allowed retention of the current freight operations on the site. The wider highway and amenity access outside the NR controlled land also supported this location for the station.

2.1.14 This selection process was informed by and also supported a constraints and opportunities exercise carried out for the wider site by the Joint Urban Design Team (comprising of CCiC and SCDC) in 2009. This study also recognised the need to link the proposed station with the CGB towards the south of the site retaining the possibility of future extension of the busway in the future.

2.1.15 The study also identified two options for the station building:

- Option 1 - Station building with integral footbridge, lift and stairs,
- Option 2 - Station building with separate footbridge, lift and stairs.

2.1.16 Through several design forums with the client and presentations to NR and the prospective TOC it became clear that option 1, a building with an integrated footbridge should be taken forward as this provided:

- a more coherent, secure and legible passenger experience,
- the possibility of providing a civic scale to the building by including a third storey element

2.1.17 As the wider site layout was progressed, tight transport constraints and wider urban design needs and opportunities led to a shift of emphasis away from cars / buses and their movement patterns. This led to the development of a public square, whose proportions were defined by those of the station building, to act as a focus to the various modes of transport. This approach to the overall site required the station building to have a more democratic entrance to the square and all the modes it addresses as opposed to being focused towards the north of the site and private car use.

2.1.18 The form of the square allowed for a complex shift in geometry to be developed helping to reconcile the speed and scale of the various modes. This shift in scale is defined by the structural module of the station building and helps inform movement patterns across the new public square. This is reflected in the distorted grid which forms the framework for the landscape design strategy.

2.1.19 The scale of the public square concept was further tested against various college courts within the historic centre of Cambridge. This analysis supported the proposals scale of generally two storeys to the perimeter of the square.
Fig 13 Sketch layouts investigating various interchange proposals – from left to right, Joint Urban Design Forum diagram of 2009, Option A and the final preferred option.
Fig 14 Analysis of Cambridge college courts and the new station square (Gonville and Caius College: Caius Court above, the new station square concept sketches below)
2.2 Scale of Buildings

2.2.1 The minimum dimensions for the internal volumes of the station building have been designed in accordance with the NR document “Station Capacity Assessment Guidance – May 2011”. A Static Pedestrian Flow Assessment was undertaken, based on the available 2011 NR figures with a 40% uplift for future demand, to ensure the spaces are of adequate size to accommodate future demand. The minimum height of the underside of the footbridge is dictated by the existing OLE. By integrating the footbridge into the overall design of the station building the proposal creates a predominantly two storey building with a third storey cupola and footbridge. The cupola and footbridge act as both a lantern, landmark and wayfinding device giving passengers views across the site and the building a scale befitting its civic importance.

2.2.3 The building can be read as a solid, crystallised around movement patterns and carved into to create clear and legible entrances, direct routes and allow natural light to define the journey.

2.2.4 The progression of volumes within the building has been designed to intuitively guide the user through the building. Externally the single story ‘porte cochere’ provides both shelter from the elements and a powerful statement for the main entrance to the new public square. On entering the unpaid concourse the space opens into a double height concourse with views directly through the building to the platform. As movement is compressed through the gateline the space becomes triple height and the user is made aware of both the vertical and upper level routes to the platform. The horizontality of the space is restored on the paid concourse where movement will be more direct and focussed on either moving to the platforms or exiting the station to the other modes of transport served by the square.

2.2.5 To the south of the station building an area of covered cycle parking is served by a single storey shelter with a series of pitched roofs, inspired by the forms of Victorian trains sheds coupled to the grand station building. The scale of the enclosure is defined by the structural and elevational rhythm of the station building. The delicate staccato of the structure and pitched roofs of this enclosure create a strong juxtaposition with the station building while at once being read as part of one coherent whole.

Fig 15. Illustration of conceptual volumetric study
2.3 Appearance

2.3.1 The proposed railway station and interchange at Chesterton siders is a key gateway into Cambridge and beyond. It is also a public building with a modest budget which requires that any solution balances these two ambitions and creates a robust and cost effective building capable of transcending the ordinary. Our concept seeks to establish a harmonic relationship between the new station building and Cambridge station. By distilling the classical language of Cambridge station we can create a built form befitting of the ambition of the project which in turn dictate the size and proportions of the new station court. With the inspiration of the historic city creating a sense of place, the materiality and detail of the project begin to speak of the Science Park and the advanced technologies that the station will serve.

2.3.2 There are four modes of transport serving the site: rail; bus; car and cycles. There have been grouped around a new public square, defining its scale and creating a clear and legible conversation between the modes. The perimeter of the square is essentially a two storey envelope formed from the civic scale of the covered entrance of the station building to the West and the canopies of new trees flanking the North and South edges. To the East the square is bound by the single story bus stops for the local buses and CGB. The concourse level is completely permeable to pedestrians allowing clear and direct routes between the various modes.

2.3.3 The size and scale of the new square has been further informed by a study of the college courts in the historic centre of Cambridge and in particular Gonville and Caius College which has a variety of courts of a similar scale to the new development bound by one and two storey buildings and walls.

2.3.4 To further emphasise the relationship of the modes across the square a diamond grid has been established which distorts in scale between the modes. This layout is reinforced along the key routes across the square and is allowed to bleed from hard to soft landscaping in a manner reminiscent of the boundary treatments of paths through the college courts.

2.3.5 The key to the design of the new station building is about the legibility of the route from the new public square through to the platforms and vice versa. The building expresses this route in several ways, most notably by the integration of the footbridge between the building and the platforms. Essentially a two storey building, the footbridge allows a third level to be expressed creating both a landmark statement and allowing views across Cambridgeshire for the users. Internally, the horizontal and vertical routes reveal themselves as the passenger moves through the building creating an interesting play in volume from the human scale, single storey space, of the covered entrance through the double height concourse to the city scale, triple height space above the gateline which then contracts back to the single storey height of the bridge.

2.3.6 Externally we were keen to emulage the original form of Cambridge Station. By refining the strong classical proportions and expressed porte cocherie (now filled in with staff and retail accommodation) we have developed a rigorous and robust building form which, while expressing itself in more modern materials, sits comfortably within the rail heritage of Cambridgeshire without being a pastiche of what has come before.

2.3.7 All three levels of building will be clad in metal panels which will be perforated to varying degrees. This modest, modular and industrial solution allows us to create both an interesting texture to the facades and also creates a passively secure way of bringing light and air into the building. The perforations also allow the building skin to transform between day and night from a robust crisp form to a glowing series of planes. The order and scale of the cladding will also be modulated to further highlight the route through the building at the main entrance. Where there are areas of glazing they will continue the module of the panels and may have an applied pattern to mimic the perforations of the panels.

2.3.8 The perforations to the panels have been derived from a system called “cellular automata” which is directly rooted in the history of scientific research in Cambridge. This theory was popularised by John Horton Conway when he began developing the “Game of Life” (Life) during his time at Gonville and Caius college Cambridge in the 1970s. The theory allows players to develop a series of basic rules controlling a fixed number of starter cells which then evolve into complex, self sustaining patterns. Life provides an example of emergence and self organisation and as such has had an influence across all scientific disciplines as it allows one to observe the way that complex patterns can emerge from the implementation of very simple rules. We have taken one of the original rules developed by Conway which was both visually interesting, created a variety of opening sizes and allowed us to concentrate the larger openings at the eye level of users. Our implementation of this theory seemed particularly apt as it mirrored the way in which a single module generated the station building and influenced the scale and detail of all the built elements across the site. As such, the pattern was always inherent in the overall design.

2.3.9 We believe that this approach creates a building rooted in the scale and language of historic Cambridge and its rail heritage while at once being a modern forward looking building reflecting the aspirations of Cambridgeshire and the Science based industries which it will be serving. The variation of the hierarchy of internal spaces combined with an elegantly powerful external form set in a new public square will create a valuable addition to the wider cityscape of Chesterton and Cambridge.

Fig 16. Illustration showing early development of the perforated metal panels
Fig 17. visualisation of the station building from the kiss and ride area to the north west