Turnford Station

Strategic Outline Business Case Addendum

Broxbourne Borough Council

Project number: 60557650

31 July 2020

DRAFT

Quality information

Prepared by	Checked by	Verified by	Approved by
Andrew Coates Principal Consultant Simon Pierce Consultant	Jeffrey Asante Consultant	Caroline Moore Associate Director	Caroline Moore Associate Director

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Revision	Revision date	Details	Authorized	Name	Position

Distribution List

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Prepared for:

Broxbourne Borough Council

Prepared by:

Andrew Coates
Principal Consultant
T: 01727 535412
M: 07799 099612
E: andrew.m.coates@aecom.com

AECOM Limited
AECOM House
63-77 Victoria Street
St Albans
Hertfordshire AL1 3ER
United Kingdom

T: +44(0)1727 535000
aecom.com

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1. Introduction

1.1 Purpose of Report

AECOM was appointed by Broxbourne Borough Council (BBC) in 2018 to identify the potential for a business case for a new railway station at Turnford, an area between Cheshunt and Broxbourne on the West Anglia Mainline (WAML). Initial work in 2018 focused on the station being delivered as part of Crossrail 2 (CR2), whilst subsequent work (during 2019 and 2020) considered the situation where CR2 is not implemented, or whether the new station could be brought forward and opened in advance of CR2.

The work has culminated in the development of an early Strategic Outline Business Case (SOBC) which was reported to BBC in 2018 and focuses on the situation 'with CR2', whilst subsequently including economic case analysis for a situation without CR2. All of the previously reported work in the SOBC uses version 2 of an AECOM-developed transport model called COMET, which was applied to calculate demand and scheme benefits, and was the current version at the time of starting the work.

Since then, enhanced versions of the model have been developed, with the latest version being version 5. This report covers a summary of the updated economic case for the scheme in a number of scenarios based on this latest model version.

In additional, a detailed capital cost estimate for the station has been prepared by AECOM, to provide a greater degree of confidence in the cost being assumed. This also feeds into the revised economic case calculation. The previous work assumed a broad capital cost estimate based on other recently opened similar sized stations across the country.

This addendum also provides an updated and more detailed Strategic Case for a new station at Turnford, covering the full range of items required in the Strategic Case as defined by the Department for Transport (DfT). This sets out more of the context for the need for intervention in the local area.

2. Strategic Case Update

2.1 Introduction

The Strategic Case demonstrates the need for the scheme considering factors such as constraints on the transport network, policy context and future economic growth in the area. It sets the scheme objectives and context for the need for investment.

TAG Requirements for the Strategic Case

DfT's TAG guidance[1] sets out what should be covered in the SOBC documentation. This is summarised in Table 1 below.

[1] The Transport Business Cases

Table 1: Strategic Case Requirements

Issue	Description	SOBC Status
Study area	define scheme study area for which analysis has been undertaken	Complete
Business strategy	provide the context for the business case by describing the strategic aims and responsibilities of the organisation responsible for the proposal	Complete
Problem identification	describe the problem identified. What is the evidence base for underpinning this? is there justification for Government intervention?	Complete
Impact of not changing	what is the impact of not changing?	Complete
Internal drivers for change	what is driving the need to change e.g. improved technology, new business/service development as result of policy?	N/A
External drivers for change	what is driving the need to change e.g. legislation, pressure from public/other government departments?	N/A
Objectives	establish specific, measurable, achievable, realistic and time-bound objectives that will solve the problem identified. Ensure that they align with the organisation's strategic aims	Complete
Measures for success	set out what constitutes successful delivery of the objectives	Complete
Scope	explain what the project will deliver and what is out of scope	Complete
Constraints	high level internal/external constraints e.g. technological environment, is there capability to deliver in-house, major contracts with the provider etc	Outline
Inter-dependencies	internal/external factors upon which the successful delivery of project is dependent	Outline
Stakeholders	outline the main stakeholder groups and their contribution to the project. Note any potential conflicts between different stakeholder groups and their demands	Outline
Options	set out all the options identified (including do nothing) and evaluate their impact on the proposal's objectives and wider policy objectives. Risks associated with each option should be identified as should any risks common to all options	Outline

The study corridor falls within the Lea Valley. This is focused on the Lee Valley Regional Park which extends through the northeast of Greater London into Essex and Hertfordshire from the River Thames to Ware. The corridor is radial in nature, with the A10/M11 and WAML providing key north-south links and with the linear park limiting east-west movements. The A10/M11 Growth Area has been identified as growing more slowly than other areas of Hertfordshire, based on historic growth trends. Of particular importance is the area around Turnford, which lies approximately equidistant

between Broxbourne and Cheshunt, both of which, as part of the London fringe, are constrained spatially.

In developing this SOBC, work had already been done by others to identify issues, constraints and opportunities in the Turnford area, and a new station at Turnford has been identified as a scheme to develop. As such, this document does not detail the optioneering stage.

2.2 Policy Context

In Hertfordshire's Transport Vision[2] the A10/M11 corridor (with the West Anglia route) is identified as a major transport corridor, particularly in relation to harnessing relationships with London. The vision identifies several schemes which have been assessed in relation to achieving wider objectives. The criteria against which schemes were initially assessed included: transport outputs; fit with wider objectives; scale of impact; and delivery risk. The schemes included increased rail frequencies on the WAML, four-tracking of the WAML Crossrail 2 and several highway improvements across the A10/M11 corridor.

Of relevance to Turnford station are increased frequency of services in the Lea Valley on the WAML and four-tracking of the WAML. These are identified as contributing to strategic objectives to protect and increase capacity and connectivity, to improve journey times and provide enough transport capacity to support new development and related travel.

The draft Hertfordshire Local Transport Plan 2017[3] identifies Turnford station as a new station location to investigate and outlines that Hertfordshire County Council (HCC) is working with BBC and Network Rail (NR) to examine the feasibility of the station.

Hertford's Rail Strategy[4] has identified development objectives for the WAML, which are supporting competitiveness; enabling economic growth; supporting the environment and sustainability; and supporting population growth. The conditional outputs that this resulted in related to addressing existing capacity constraints, adding additional capacity to accommodate future demand between local growth areas and for London-based demand. Specific interventions include four tracking of the WAML and Crossrail 2. The Rail Strategy (revised in 2019) identifies several improvements which are needed at existing stations. At Broxbourne station platform lengthening is required and number of disabled car parking spaces increased, whilst at Cheshunt, there is currently no bus service serving the station due to difficulty turning a vehicle around, and thus onward connectivity is limited to walk.

The Broxbourne Local Plan[5] highlights the vision and objectives for the borough between 2016 and 2031. The Borough anticipates the strengthening of the local economy through the provision of additional job opportunities throughout the Borough, particularly high-value jobs proposed at Brookfield, Park Plaza North and Park Plaza West.

It is recognised that future development will generate additional trips on the local transport system. One of the objectives of Broxbourne Borough Council therefore is that the growth and regeneration can be accommodated on local highway links, the A10 corridor and the West Anglia rail corridor. The objectives include the encouragement of as many travellers as possible to use more sustainable modes such as rail, bus, walk and cycle, and the Borough is supportive of the CR2 proposals. Therefore, the implementation of a new station at Turnford conforms to local policy through additional transport provision to support growth and regeneration at Brookfield, as well as an alternative mode of transport to support existing and future land attractors in the local area.

[2] Hertfordshire County Council: Hertfordshire's 2050 Transport Vision Stage 2: Technical Report, Steer Davies Gleave, September 2015
[3] https://www.hertfordshire.gov.uk/media-library/documents/about-the-council/consultations/ltp4-local-transport-plan-draft.pdf
[4] Hertfordshire Rail Strategy, Arup, April 2015
[5] Broxbourne Local Plan: A Framework for the Future Development of the Borough, October 2015

2.3 Problem Identification

This section provides an overview of the current conditions in the study area and considers the key development sites within the corridor that are relevant to the scheme. This has been used to identify problems that the scheme would address and input into the option assessment.

There are several key attractors in the Turnford area, including the Hertford Regional College, with future year developments in the area being discussed later in this section. Access to Hertford Regional College is either through walk or via bus on the A1170 corridor, with rail demand using Broxbourne or Cheshunt stations having to take bus or walk.

The 310 bus service runs along the A1170 corridor from Hertford East to Waltham Cross. Journey times between Broxbourne and Turnford are scheduled to be around 8 minutes and from Turnford to Cheshunt a further 9 minutes. Both stations are currently used by passengers travelling to Hertford Regional College. The bus journey times will be dependent upon the level of congestion on the A1170. It should be noted that the 310 does not directly serve either Broxbourne or Cheshunt stations, with a walk to the A1170 required in both cases, plus wait time for services which operate at a frequency of 3-4 buses per hour. In addition, the coordination between bus and rail timetables at Broxbourne is poor. Passengers walking to Hertford Regional College from either station face a walk of around 40-50 mins.

A high car mode share and car accounting for most journeys to work outside the area leads to congestion on the A1170, particularly in the peaks, and queuing traffic causes congestion and delays at junctions, contributing to air quality issues. Work undertaken for Broxbourne[6] documents forecast traffic conditions under Local Plan development assumptions.

2.4 Population and Employment Growth

Hertfordshire Transport Vision[7], and the Draft Hertfordshire Local Transport Plan[8] published November 2017, provide details of the wider population and employment across the county. These contain broadly similar data and forecasts, and the information from the Transport Vision are presented here whilst the Hertfordshire Local Transport Plan is still in draft.

Table 2 highlights the forecast growth for Broxbourne in comparison with that for Hertfordshire as a whole. This shows that population in Broxbourne is predicted to grow by a slightly lower percentage than Hertfordshire as a whole, whereas jobs are predicted to grow by a slightly higher percentage than the county.

[6] Broxbourne Local Plan Development Forecasting Report, JMP Consultants Ltd, 2015
[7] Hertfordshire 2050: Transport Vision Stage 2, Technical Report, Steer Davies Gleave, September 2015
[8] https://www.hertfordshire.gov.uk/media-library/documents/about-the-council/consultations/ltp4-local-transport-plan-draft.pdf

Table 2: Population and Employment Growth in Broxbourne and Hertfordshire, 2014 – 2031

	Hertfordshire (All)	Broxbourne
Population 2014	1,150,800	95,800
Population 2031	1,303,200	107,900
Growth Absolute	152,400	12,100
Growth Percentage	13.2%	12.6%
Employment 2014	640,870	49,100
Employment 2031	717,000	55,900
Growth Absolute	76,130	6,800
Growth Percentage	11.9%	13.8%

Table 3 shows the population and employment within a 2 km catchment[9] of a proposed location of the new station, with equivalent data for Broxbourne and Cheshunt included for reference, from the DfT's Tempro Forecasts. It should be noted that the 2 km catchment for the new station overlaps the catchments of Broxbourne and Cheshunt, as shown in Figure 1, and therefore it is likely that there will be some abstraction of demand from either or both of the existing stations if a new station is implemented.

Table 3: Population and Employment Growth within a 2 km Catchment

	Turnford	Cheshunt	Broxbourne
Population <2km 2015	27,508	20,393	22,864
Population Growth to 2030 <2 km	4.69%	4.58%	4.63%
Workers <2km 2015	13,672	17,105	11,717
Workers Growth to 2030 <2 km	-3.07%	-3.18%	-3.07%

[9] 2 km is generally considered as the maximum distance people will walk to access to public transport services. For example, in the DfT Transport Connectivity Travel Time Indicators: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/435911/connectivity-statistics-guidance-notes.pdf

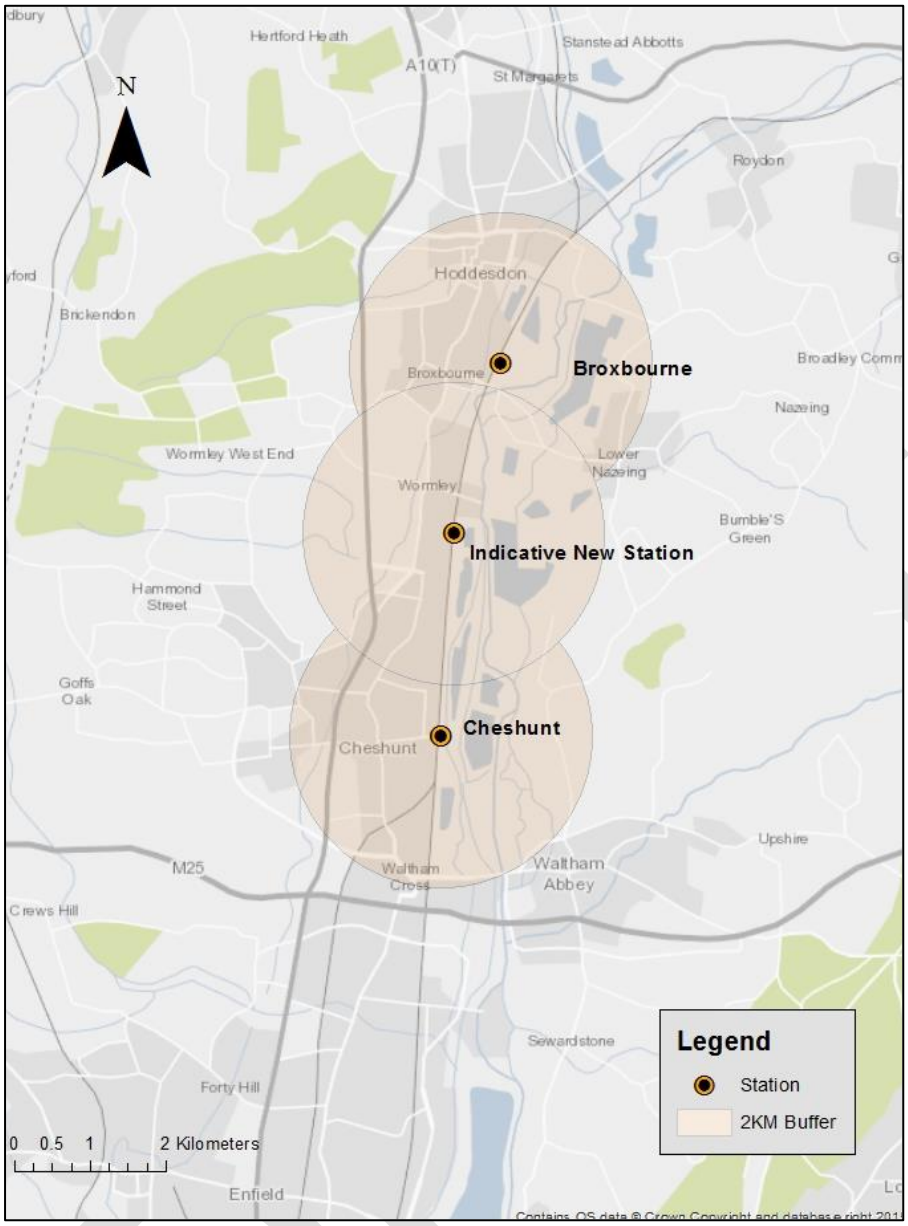

Figure 1: 2km Catchment Areas for the Potential New Station, Broxbourne and Cheshunt

2.5 Development Plans in the Turnford Area

Along with the existing settlement at Turnford described above, there are notable development plans for the area. The full modelling and forecasting process is covered is Section 3 but highlighted here within the context of Turnford station are the large Brookfield Riverside and Brookfield Garden Village developments to the west of the A10, which are included in the Draft Local Plan[10]. These comprise:

- **Brookfield Riverside:** Extending Brookfield northwards up to and beyond the Turnford junction on the A10. It will include modern shopping and leisure facilities including a department store, cinema, cafes and restaurants, and feature a civic centre, a business campus, health centre, bus station, and about 250 apartments and elderly people's accommodation within a mixed use and green environment; and

[10] http://consult.broxbourne.gov.uk/portal/planning/reg19/reg19?pointId=4653994

- **Brookfield Garden Village:** including 1,250 homes north and west of Brookfield Riverside, comprising walkable neighbourhoods and one or more new primary schools, linked by a tree-lined boulevard.

An indicative concept plan for these developments is shown in Figure 2, which is taken from the Draft Local Plan[11]. Direct walk and cycle access to the Hertford Regional College and potential location of the new station are considered within the scheme, and Turnford would be the closest railways station to these developments.

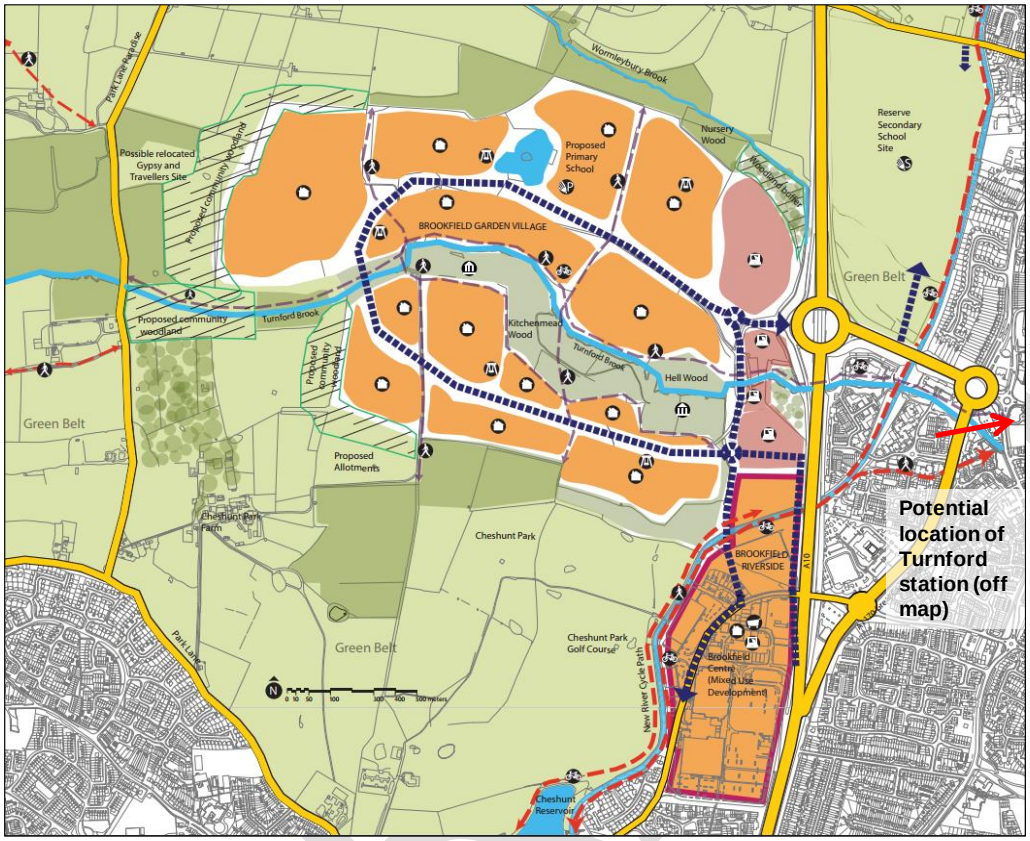

Figure 2: Concept Plan for Brookfield Riverside and Brookfield Garden Village Developments

© Broxbourne Borough Council Draft Local Plan

2.6 Turnford Station Location and Definition

Broxbourne Borough is currently served by five stations, but there is not one in the area which serves Turnford, located between Cheshunt to the south and Broxbourne to the north. The residential areas of Turnford and Wormley are located on the north-south A1170, with the A10 dual carriageway to the west and the WAML acting as a barrier to the east. Figure 3 shows the location of Turnford. To the east of the railway line is the Lee Valley Regional Park, a predominantly wetlands area with restrictions on development.

To the west of the A10 at the south end of Turnford is a large retail development called the Brookfield Centre, located along both sides of Halfhide Lane.

[11] http://consult.broxbourne.gov.uk/portal/planning/reg19/reg19?pointId=4653994

Figure 3: Location of Turnford

Given the proximity of Hertford Regional College, the proposed expansion of the Brookfield Centre and proposed housing development at Brookfield (discussed in section 2.5), the new station proposed at Turnford lies approximately equidistant between Broxbourne and Cheshunt on the WAML.

This falls within the A10/M11 corridor which is identified as one of the major transport corridors in Hertfordshire's Strategic Economic Plan. This scheme would provide rail access to a range of current and future attractors in the local area, including Hertford Regional College.

The site identified for a potential station at Turnford and tested as part of this report is located close to Hertford Regional College in the centre of Turnford. The station would provide access to this site for students from Cheshunt, Broxbourne and beyond, as well as providing access from the local residential areas to rail services to London and Cambridge in particular.

BBC provided a detailed drawing of the access arrangements for the station, and potential location of entrances, which is shown in Figure 4. The main access road is to the south side of the college where a private staff road / car park for the college already exists. This would continue through current waste land between housing developments through to the main station entrance at the north end of the station. The access road would allow for drop off and bus stops only, no parking provision is planned or considered in the business case. An additional entrance at the south end of the station, from Landau Way is also assumed. This would give pedestrian access from the local housing estate and be a closer access from the existing bus stops on the High Road in this location.

Figure 4: Location and Access Plan for Turnford Station

2.7 Context of Turnford in the Rail Network

The proposed location of the new station at Turnford is on a currently two-track section of line. All passenger services through the location are currently operated by Abellio Greater Anglia, with a mix of faster 'outer' services from London Liverpool Street to Stansted Airport (Stansted Express), Cambridge and Kings Lynn, 'inner' stopping services between Hertford East and London Liverpool Street / Stratford, as well as semi fast services between Bishop's Stortford and Stratford.

South of Turnford is Cheshunt station, where the route splits, with most services continuing south via Tottenham Hale to London Liverpool Street and Stratford. There is also the route west of this via Seven Sisters, to London Liverpool Street. TfL-specified London Overground services operate southbound from Cheshunt to London Liverpool Street via Seven Sisters, calling all stations.

At present, there is little capacity available on the two-track line. However, analysis of the timetable using NR timetable planning rules shows that, with a stop at Turnford, a workable solution can be provided, with a few assumptions around slight adjustments to timings and where trains lay over. This full analysis is provided in a separate Technical Note[12]. In the 'with CR2 scenario', the CR2 project would provide an additional two tracks in this location, from Broxbourne to Coppermill Junction to the south of Tottenham Hale. This would allow fast services to run on two new dedicated tracks laid to the east of the current two tracks. The existing two tracks would then be used solely by the slower

[12] "Turnford Timetable Analysis Technical Note", AECOM

stopping services – the existing two trains per hour Hertford East to Stratford service and the proposed 12tph CR2 services from Broxbourne, through Central London to South West London. This scheme is not currently committed / funded but is well developed and has a current planned opening year of 2033.

It is assumed that platforms would be provided on the two existing tracks (that become the 'slow' tracks in the 'with CR2 scenario' and allow the CR2 and Hertford East to Stratford services to stop at Turnford. These would provide rail connectivity within the West Anglia corridor and direct services to Central and South West London.

The business cases presented in this report are based on the above assumptions, with the assumed opening year for the station being 2033 in all scenarios for consistency with previous work. Figure 5 shows the CR2 route.

2.8 Expected Benefits

The potential benefits of a new station at Turnford are summarised below:

- Serve potential major mixed-use development as well as existing land uses;
- Reduce access/ egress time to key attractors in the area e.g. Hertford Regional College;
- Could improve house values in the area between Broxbourne and Cheshunt;
- Could reduce throughput at Broxbourne and Cheshunt stations and potentially alleviate access concerns at Broxbourne Station; and
- Provide additional local connectivity and a linkage to central London.

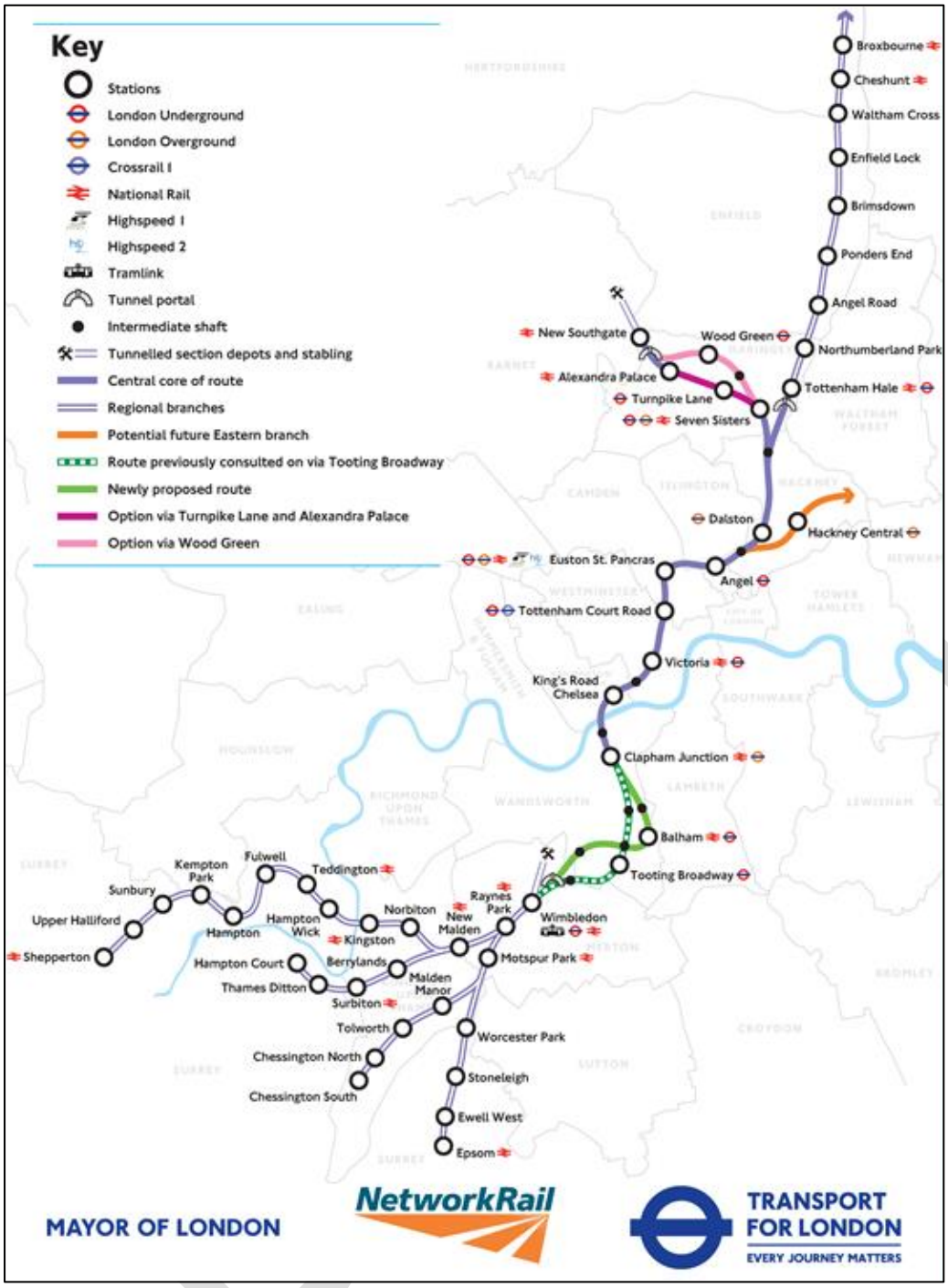

Figure 5: Crossrail 2 Scheme (as of October 2015)

2.9 Opportunities and Constraints

Table 4 presents a summary of the opportunities and constraints relating to a new station at Turnford.

Table 4: Opportunities and Constraints Analysis for Proposed Turnford Station

Opportunities	Constraints
• Serve potential major mixed-use development as well as existing land uses • Reduces access/egress time to key attractors in the area e.g. Hertford Regional College • Could improve house values in the area between Broxbourne and Cheshunt • Could reduce throughput at Broxbourne and Cheshunt stations and potentially alleviate access concerns at Broxbourne Station. • Could reduce congestion on the A10 corridor.	• Capacity on existing two-track railway for new station – potential performance impacts are being assessed • Reliance on CR2/ 4- tracking of Lea Valley for significant capacity release is being assessed • Adds additional journey time to users of existing services from Broxbourne due to extra stop • Catchment area of 2 km overlaps with that of both Broxbourne and Cheshunt • Proximity of residential areas to the existing double track • Access through residential areas not suitable for large volumes of passengers and residential on-street parking evident • Likely to have residential opposition • Lack of space for rail user parking • Station location not on direct pedestrian and cycle routes • Already a good level of bus provision between other stations in the corridor to the main attractors

2.10 Stakeholders

The following stakeholders summarised in Table 5 have been identified at this stage of the project. This list and the roles, responsibilities and contributions should be kept up to date as the project progresses. Any potential conflicts should be identified, to allow early engagement of associated parties.

Table 5: Identified Stakeholders

Stakeholder	Role
Broxbourne Borough Council	Promoter of the Scheme
Network Rail (including joint Crossrail 2 team with TfL)	Anticipated to own the station and be responsible for incorporating the station into the existing network
Transport for London (including joint Crossrail 2 team with NR)	Anticipated to become the Station Facility Owner and responsible for most services from the station in the 'with CR2' scenario. In the 'without CR2' scenario would still have interaction with London Overground services to Cheshunt
Hertfordshire County Council	Supporting BBC with development of the scheme. Scheme fits with HCC transport plan objectives
Department for Transport	Responsible for overall national rail strategy
Office of Rail and Road	Rail Regulator which has responsibility for issuing licences to operate stations and trains
Abellio Greater Anglia	Current operator of rail services through the area and potentially operator of services which could call at Turnford. Anticipated to become the Station Facility Owner in the 'without CR2' scenario.
Hertford Regional College	Owner of land required as part of the current plan for access to the station
Local Residents	Impacted by changes in local traffic flow and access arrangements, noise and construction activity

3. Detailed Capital Costing

Previous Business Case work developed to date for BBC has only used an indicative Capital Cost Estimate of £15m (2017 prices), due to the early stage nature of the Business Case. This was based on the Capital Costs of similar sized stations which had recently been implemented.

As part of the update to the modelling and business case, a more detailed Capital Costing for the station has been derived, based on the indicative layout designs provided by BBC. This includes key elements such as the access road, drop off point and Bus Stop, two entrances including footbridges and lifts. The estimate has been divided into two options, both in 2019 prices, which exclude any risks and contingencies (these are added as optimism bias in the business case using DfT TAG recommended values):

- **Option 1 (£11,415,932):** including Station building + new platforms + Access Road + 1 footbridge (including 2 no. lifts)
- **Option 2 (£13,123,531):** including Station building + new platforms + Access Road + 1 footbridge (including 2 no. lifts) + 1 footbridge (including a secondary entrance and 2 no. lifts)

Option 2, with entrances at both the North and South end of the station has been identified as the preferred option and the associated Capital Costs incorporated into the updated economic cases which are presented in Section 4.

The full line by line breakdown which makes up these cost estimates is included in Appendix A, and provides the details of all costed items.

4. Updated Economic Case Results

COMET, Hertfordshire County Council's (HCC) Strategic Transport Model developed by AECOM, has been used to test the impact of Turnford station. Original work made use of the then latest COMET available, version 2 (v2). This version of the model allocated public transport demand as either bus or rail, with no option for passengers to use different modes for different legs e.g. feeder bus to access rail stations. Since 2017, the COMET model has been further developed, with the most-recent version being version 5 (v5). V5 allows multi-modal public transport travel for the first time, with three public transport modes in the model: bus, which models only bus users; rail, which models only rail users; and "busrail", which allows a combination of bus and rail use.

COMET v5 has two "off-the-shelf" 2036 future year scenarios. These are the Local Plan and the Reference Case. The Local Plan represents HCC's transport strategy to cater for the county's housing and employment demands. This includes a range of development assumptions, on a sliding scale of uncertainty, and upgrades to transport infrastructure and provision. The Reference Case is a future year scenario using TEMPro growth and including a smaller number of transport schemes. As such, demand growth is not as numerically and geographically accurate as that in the Local Plan and the network will not include all development related transport interventions. Neither of these scenarios include Crossrail 2.

In the context of the Turnford station assessment, the Reference Case does not include Brookfield development, whereas the Local Plan does. The Local Plan proposes that the Brookfield development will provide 1,250 homes and support 2,000 jobs.

Both COMET v5 Local Plan and COMET v5 Reference Case have been used to model Turnford station, each with two sub-scenarios as described below. These scenarios are slightly different to those modelled in v2 as at the time of that model development it was assumed there would be additional Hertford East to Stratford services in the future, and these were assumed to serve Turnford.

The latest model is based on the assumption that local services passing Turnford are made up of existing Hertford East to Liverpool Street and Bishop's Stortford to Stratford services, and each of these has been tested with stops at Turnford. Note that with the Bishop's Stortford to Stratford Reference Case / Local Plan scenarios, Hertford East to Stratford services were also assumed to call at Turnford. These latter services replaced some Bishop's Stortford to Stratford services in the peak direction for AM / PM.

The first scenario for each of the Reference Case / Local Plan assumes that Turnford is served by the Hertford East – Liverpool Street service, and the second assumes the Bishops Stortford – Stratford service. Table 6 details the four tests undertaken in the assessment of Turnford station.

Table 6: Description of Turnford Tests

Test No.	Future Year Scenario	Service calling at Turnford
Test 1	Reference Case	Hertford East – Liverpool Street
Test 2	Reference Case	Bishops Stortford – Stratford
Test 3	Local Plan	Hertford East – Liverpool Street
Test 4	Local Plan	Bishops Stortford – Stratford

Table 7 shows the costs and benefits associated with each test.

Comparing the two Local Plan tests with the two Reference Case tests shows that the benefit of the scheme using the Local Plan assumptions is higher. The added demand at Brookfield development in the Local Plan results in more people benefiting from the station's introduction.

Comparing the Bishops Stortford – Stratford tests with the Hertford East – Liverpool Street tests shows that the benefit to Rail for the Liverpool Street tests is greater. This is because the Hertford East – Liverpool Street tests provide quicker journey times to Central London for demand at Turnford.

Therefore, unsurprisingly, the test with the greatest Benefit:Cost Ratio (BCR) is Test 3, "Local Plan, Hertford East – Liverpool Street". The BCR stands at around 8:1.

A point worth noting is that Busrail revenue has been included in the table below on its own line separate from Bus-only and Rail-only revenue. This is because it contains an element of both bus service revenue and rail service revenue from multi-leg trips and it is difficult to separate these out for the purposes of the table and the business case reporting required by DfT.

Table 7: Summary of Benefits and Costs for Turnford Station

	Item	Test 1	Test 2	Test 3	Test 4
Benefits	Rail Revenue	£33.38	£23.71	£72.36	£81.56
	Bus Revenue	-£3.66	-£1.43	-£5.16	-£2.88
	BusRail Revenue	-£13.79	-£11.93	-£20.11	-£37.33
	User Time Savings	£22.83	£15.22	£45.90	£37.90
	Road decongestion	£6.60	£2.77	£9.47	£4.36
	Accidents	£0.92	£0.39	£1.32	£0.61
	Greenhouse gases	£0.18	£0.08	£0.26	£0.12
	Noise	£0.06	£0.03	£0.09	£0.04
	Indirect Taxation	£1.75	£1.20	£3.66	£3.98
	Operating Costs	-£5.37	-£5.37	-£5.37	-£5.37
	Present Value of Benefits	**£39.41**	**£22.27**	**£95.11**	**£75.03**
Costs	Capital Cost	£11.86	£11.86	£11.86	£11.86
	Infrastructure	-£0.03	-£0.01	-£0.04	-£0.02
	Present Value of Costs	**£11.83**	**£11.85**	**£11.82**	**£11.84**
Net Present Value (NPV)		**£27.58**	**£10.42**	**£83.29**	**£63.19**
Benefit:Cost Ratio		**3.33**	**1.88**	**8.05**	**6.34**

Notes:
All values in £m other than Final Ratio.
Capital Cost is based on the updated detailed 2020 cost estimate (option 2), plus impacts of optimism bias, cost inflation to the construction year, rebasing to 2010 values, discounting and tax correction.

Appendix A Detailed Capital Costing

On the following pages, the full detailed Capital Cost breakdown for Turnford station is set out, for each of the two options discussed in Section 3.

Broxbourne Borough Council

Turnford Station
Strategic Outline Business Case

21 May 2020

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Broxbourne Borough Council
Turnford Station
Strategic Outline Business Case

Option 1 - One entrance and footbridge

AECOM

Backup Cost Plan

	Cost Estimating			Base Date :	
	Description	Qty	Unit	**Rate £**	**Total £**
	ESTIMATE SUMMARY				
A	**Total construction base cost less Preliminaries**				**5,254,983.67**
	Add-Ons				
	Add 1:				
B	Main contractor's preliminaries	35	%	1,840,000	
C	Main contractor's Overhead	6.5	%	341,574	
D	Main contractor's profit	2.5	%	131,375	
				2,312,949	
				Total including Add 1:	**7,567,932.20**
	Add 2:				
E	Broxbourne Borough Council - Management Costs	12	%	909,000	
F	Design costs, including site surveys & investigations	12	%	909,000	
G	Signal move/Signal sighting allowance	I	Item	130,000	
H	Ground investigation	1	Item	50,000	
I	27h weekend possession - two track	7	£220,000.00	1,540,000	
J	Extra over for Premium Working (Nights and Weekends)	1	Item	210,000	
K	Traffic Management	1	Item	100,000	
				3,848,000	
				Total including Add 1 & Add 2:	**11,415,932.20**
	Add 3:				
L	Risk Contingency Allowance	40	%	4,567,000	
				Total incl. Add1, Add 2 & Add 3:	**15,982,932.20**
M	Inflation (excluded)	0.00	%	0	**-**
				COST ESTIMATE	**15,983,000.00**
	SUMMARY OF WORKS				
A	Enabling works (Option 1)				265,750.00
B	Enabling works (Option 2)				282,500.00
C	New station building				1,915,212.33
D	Footbridge 1 (including lifts) - New station side (Option 1)				1,335,336.00
E	Footbridge 2 (including secondary entrance) - Landau Way (Option 2)				939,762.88
F	Construction of new platforms				1,387,536.00
G	Access road and urban realm				351,149.34
				Option 1	**5,254,983.67**
				Option 2	**6,211,496.55**

Broxbourne Borough Council
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Option 1 - One entrance and footbridge

AECOM

	Enabling works (Option 1)				
	1) Site Preparation				
	2) Demolition				
	3) Temporary works				
	4) Miscellaneous items				
	Site Preparation				
A	Stageworks. Supply and install 2.4m high hoarding from the formation level to protect the works and public, including provision of signage appropriate to the works generally.	1	item	110,000	110,000.00
B	Clear and prepare site	3,750	m2	18	67,500.00
				Sub Total	177,500.00
	Demolition				
C	Take out existing fencing (2m high approximately) including associated foundation/footing and remove from site, preparing area to receive new work	10	m	250	2,500.00
D	Allow for the preparation of the area to receive new works	1	Item	5,000	5,000.00
E	Plane off existing asphalt road and remove debris from site and make good all work disturbed preparing remaining areas to receive new work	1500	m2	20	30,000.00
F	Break out existing concrete kerb and remove debris from site. Make good all work disturbed preparing remaining areas to receive new work	150	m	25	3,750.00
				Sub Total	41,250.00
	Temporary Works				
G	Crane foundations	150	m3	100	15,000.00
				Sub Total	15,000.00
	Miscellaneous items				
H	Install temporary services to site	1	item	32,000	32,000.00
				Sub Total	32,000.00
	Enabling works summary				
	Site preparation				177,500.00
	Demolition				41,250.00
	Temporary works				15,000.00
	Miscellaneous items				32,000.00
				Carried to Main Summary	**265,750.00**

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Option 1 - One entrance and footbridge

AECOM

	Enabling works (Option 2)				
	1) Site Preparation				194,250.00
	2) Demolition				41,250.00
	3) Temporary works				15,000.00
	4) Miscellaneous items				32,000.00
				Carried to Main Summary	**282,500.00**
	Site Preparation				
A	Stageworks. Supply and install 2.4m high hoarding from the formation level to protect the works and public, including provision of signage appropriate to the works generally.	1	item	120,000	120,000.00
B	Clear and prepare site	4,125	m2	18	74,250.00
				Sub Total	194,250.00
	Demolition				
C	Take out existing fencing (2m high approximately) including associated foundation/footing and remove from site, preparing area to receive new work	20	m	250	2,500.00
D	Allow for the preparation of the area to receive new works	1	Item	5,000	5,000.00
E	Plane off existing asphalt road and remove debris from site and make good all work disturbed preparing remaining areas to receive new work	1500	m2	20	30,000.00
F	Break out existing concrete kerb and remove debris from site. Make good all work disturbed preparing remaining areas to receive new work	150	m	25	3,750.00
				Sub Total	41,250.00
	Temporary Works				
G	Crane foundations	150	m3	100	15,000.00
				Sub Total	15,000.00
	Miscellaneous items				
H	Install temporary services to site	1	item	32,000	32,000.00
				Sub Total	32,000.00
	Enabling works summary				
	Site preparation				194,250.00
	Demolition				41,250.00
	Temporary works				15,000.00
	Miscellaneous items				32,000.00
				Carried to Main Summary	**282,500.00**

Broxbourne Borough Council
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Option 1 - One entrance and footbridge

AECOM

	New station building				
	1) Construction of Station Building - Concourse area				1,186,417.33
	2) Mechanical and Electrical Installation				728,795.00
				Carried to Main Summary	**1,915,212.33**
	1) Construction of Station Building - Concourse area				
	Foundations				
A	Provisional sum for local diversion of utilities.	1	Item	50,000	50,000.00
	Bored Piles				
B	450mm dia reinforced concrete grade C40/50 and single bored piles including setting out, rebar & disposal of excavated materials etc. 12m deep	192	m	450	86,327.81
C	Cut off top of 450mm diameter reinforced concrete and bored pile (approx. 500mm length) and insert post fixed starter bars for capping beam including hydrophilic strip.	6	nr	570	3,418.80
D	Provision of all plant (1nr Rig); including setting up; maintenance, erection and dismantling at each pile position	6	Item	435	2,610.72
E	Test & report per pile as per specifications.	2	nr	885	1,770.00
	Pile Caps				
F	4 x Reinforced Concrete pile cap 2100mm x 750mm x 600mm slab deep including any necessary excavation and disposal off site.	0.000	m^3	490	-
G	Reinforcement to pile cap slab - 200kg/m^3.	0.00	tonne	3,630	-
H	Allow for standing time rig/crew for obstructions	1	Prov Sum	3,630	3,630.00
				Sub Total	147,757.33
	Steel Structure				
I	Allow for any torque joints, on site welding, cutting, adaptations required to allow the steel frame to be installed. N.B. most of the steel frame is pre-fabricated off site with the intention to minimise on-site welding.	1	item	10,880	10,880.00
J	400 x 400mm Base plates for roof columns (provisional)	10	nr	830	8,300.00
K	Allow for all steelwork to be installed by mobile crane.	1	item	7,770	7,770.00
L	Allow for pre fabrication of steelwork off site generally.	1	item	7,770	7,770.00
	Steel Columns				
M	Columns	16.000	Tonnes	4,770	76,320.00
	Steel Beams				
N	Beams	16.000	Tonnes	4,770	76,320.00
O	Provision of holding down bolt assemblies, to suit columns, including mortises, washers etc.	1	sum	10,000	10,000.00
P	Allow for on site finishes to steelwork, including touching up factory finishes as required	1	item	15,000	15,000.00
				Sub Total	212,360.00

	Floor Slabs				
Q	275mm ground bearing concrete slab	300	m²	145	43,500.00
R	Platform Level 200mm concrete slab (precast units with bedding mortar)	50	m²	150	7,500.00
				Sub Total	51,000.00
	Roof structure				
S	138mm thick composite roof panel with integral single ply membrane finish for main roof and lift lobby roof	300	m²	750	225,000.00
T	22mm marine plywood with single ply membrane finish for canopy	45	m²	350	15,750.00
U	Allow for 500mm wide PPC Aluminium fascia to elevated roof structure.	105	m	160	16,800.00
V	Allow for the painting of the steelwork to the roof decking system as required (provisional).	1	item	32,000	32,000.00
W	Intumescent painting to steelwork, spray application.	1	item	12,500	12,500.00
X	Apply flashing to interface with existing station wall	40	m	40	1,600.00
Y	Allow for installation of fall arrest system on roof	50	m	250	12,500.00
				Sub Total	316,150.00
	Floor finishes				
Z	Quick drying sand and cement screed, as per specifications, laid to concrete, complete with all preparations and the like required for the installation, depth to suit adjoining floor construction.	300	m2	290	87,000.00
AA	Allow for making good the floor.	1	item	2,500	2,500.00
				Sub Total	89,500.00
	Ceiling finishes				
AB	Allow for finishes to ceilings	300	m2	393	117,900.00
				Sub Total	117,900.00
	Wall Finishes				
AC	Allow for internal finishes to walls. Supply and build perforated brick cladding to station building approx	300	m2	365	109,500.00
AD	Station building extrernal clading. Supply and build brick cladding to station building	100	m2	230	23,000.00
AE	Station building extrernal clading. Supply and fix PPC aluminium cladding building	200	m2	275	55,000.00
AF	Supply and install high level 440mm ventilation louvres above glazing around building perimeter.	50	m	285	14,250.00
				Sub Total	201,750.00
	Building Drainage				
AG	Allow for Building drainage	1	u	25,000	25,000.00
				Sub Total	25,000.00
	Shutter door				
AH	Supply and installation of Standard Shutter door on the front of the station, complete with foundations etc.	1	Nr	25,000	25,000.00
				Sub Total	25,000.00
	Summary				
	Foundation				147,757.33
	Steel Structure				212,360.00
	Floor Slab				51,000.00
	Roof Structure				316,150.00
	Floor Finishes				89,500.00
	Ceiling Finishes				117,900.00
	Wall Finishes				201,750.00
	Building Drainage				25,000.00
	Shutter Door				25,000.00
				Carried to New station building Summary	**1,186,417.33**

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Option 1 - One entrance and footbridge

AECOM

	2) M & E				
A	Allow for the installation of PA systems, etc.	1	item	15,000	15,000.00
B	Allow for the installation of CCTV systems, etc.	1	item	70,000	70,000.00
C	Allow for Installation of M & E services to new works	1	item	31,000	31,000.00
D	Allow for test and commissioning	1	item	114,000	114,000.00
E	Allow for the installation of customer help points	3	item	7,795	23,385.00
F	CIS displays for train arrivals	2	item	12,000	24,000.00
G	Provisional sum for software updates to CIS system for new CIS screens to be visible to the operator.	1	item	8,000	8,000.00
H	Allow for illuminated station signs, posters etc.	1	item	11,400	11,400.00
I	Allow for installation of TVM	2	item	50,000	100,000.00
J	Supply and installation of gate line include all required IT connection etc	3	item	37,500	112,500.00
K	Supply and installation of wide gate line include all required IT connection etc	2	item	47,000	94,000.00
L	Supply and installation of new ticket hall Station Control Unit (SCU)	1	item	75,000	75,000.00
M	Supply and installation of new PA speaker and Junction box	14	item	365	5,110.00
				Sub Total	683,395.00
	Lighting				
N	Supply and installation of internal lighting systems	14.00	item	800	11,200.00
O	Supply and installation of external lighting systems	7.00	item	510	3,570.00
P	Provisional sum for installation of lighting control system.	1.00	item	3630	3,630.00
				Sub Total	18,400.00
	Fire System				
Q	Fire System	1	item	16,000	16,000.00
				Sub Total	16,000.00
	Heating and Ventilation				
R	Heating and Ventilation	1	item	11,000	11,000.00
				Sub Total	11,000.00
	Summary				
	Mechanical & Electrical				683,395.00
	Lighting				18,400.00
	Fire System				16,000.00
	Heating and Ventilation				11,000.00
				Carried to New station building Summary	**728,795.00**

	Footbridge 1 (including lifts) - New station side				
	1) New footbridge and staircases				543,974.00
	2) New lift shaft and lift				752,362.00
	3) Mechanical and Electrical Installation				39,000.00
				Carried to Main Summary	**1,335,336.00**
	1) New footbridge and staircases				
	Excavation/Foundations				
A	Excavate 150mm thick to reduce levels on site as necessary and disposal of excavated materials off site.	95	m2	48	4,560.00
	Bore piling				
B	450mm dia reinforced concrete grade C40/50 and single bored piles including setting out, rebar & disposal of excavated materials etc; (Piling for C5 columns)				
	Average 12m deep.	22	nr	2,850	62,700.00
C	Cut off top of 350mm diameter reinforced concrete and bored pile (approx. 500mm length) and insert post fixed starter bars for capping beam including hydrophilic strip.	22	nr	450	9,900.00
D	Set up/move to pile positions.	6	nr	350	2,100.00
E	Allow for standing time rig/crew for obstructions - removed by others.	1	Prov Sum	2,500	2,500.00
F	Test & report per pile as per specifications.	8	nr	680	5,440.00
G	Reinforced Concrete pile cap slab 1700mm long x 1530mm wide x 800mm deep including any necessary excavation and disposal off site.	19	m3	420	7,980.00
H	Reinforcement to pile cap slab - 200kg/m3.	4	tonne	3,360	12,768.00
I	Allow for all necessary temporary propping.	1	Item	3,000	3,000.00
J	Provide a temporary working platform on both south and north bound platforms.	1	item	5,000	5,000.00
K	Making good existing area.	1	item	2,000	2,000.00
				Sub Total	117,948.00
	Elevated Walkway Floor Slab				
L	Reinforced insitu ready mixed designated concrete; C35 - 20mm aggregate; elevated floor slab thickness 250mm including 25 x 25 chamfer to all arises.	67	m3	350	23,450.00
M	Temporary formwork to sides of insitu concrete; height to soffit 3.00 - 4.50m; fixing to steel work with self tapping screws at 300mm maximum spacing.	67	m	83	5,561.00
N	Allow for expansion joint between the abutment of lift shaft, concourse and walkway.	1	Item	1,000	1,000.00
				Sub Total	30,011.00
	Structural Steel Structure				
O	Elevated Walkway and Staircase: Steel frame, complete with all braces, intermediate glazing supports, designed to be fabricated off site in units for assembly on site:				
P	Allow for any torque joints, on site welding, cutting, adaptations required to allow the steel frame to be installed. N.B. most of the steel frame is pre-fabricated off site with the intention to minimise on-site welding. Provision of holding down bolt assemblies, to suit columns, including mortises, washers etc.	1	item	18,600	18,600.00
Q	Allow for vertical movement joints , complete with in tumescent seals.	1	item	2,000	2,000.00
	Allow for the provision of a lighting protection system to the elevated walkway structure, including all pits, lighting rods, tapes and the like required to protect the structure and occupants	1	item	5,000	5,000.00
R	Allow for the provision of localised additional connections as required to suit the location of the installation	1	item	1,000	1,000.00
S	Allow for all steelwork to be installed by mobile craned located in the designated station compound.	1	item	6,000	6,000.00
T	Allow for pre fabrication of steelwork off site generally.	1	item	5,000	5,000.00
U	PPC UKC Columns, 356 x 406 x 325 kg/m (R12), 5mm thick fabrication and erection below ground as well as nuts and bolts	23	Tonnes	1,750	40,250.00
V	Allow for on site finishes to steelwork, including touching up factory finishes as required.	1	item	2,000	2,000.00
W	Allow for roof structure steel works, including factory and site finishes as required.	1	item	17,500	17,500.00
				Sub Total	97,350.00

	Roof structure to Elevated Walkway.				
X	130mm lightweight single ply membrane roof covering to elevated walkway with PPC aluminium soffit fixed on steel section beams and purlins including support plates. etc.	75	m2	675	50,625.00
Y	Elevated walkway finishes including painting of steekwork, rain gutters, down pipes, 500mm wide PPC fascia to elevated roof structure…	1	Item	11,300	11,300.00
				Sub Total	61,925.00
	Cladding				
Z	Supply and fix Pilkington frameless glass screen (silicone butt jointed) to foot bridge approx. size 16 x 3m.	72	m2	295	21,240.00
AA	Allow for staircase openings at each end of the walking way leading to platforms.	2	nr	2,000	4,000.00
				Sub Total	25,240.00
	Staircase complete				
AB	Supply and install prefabricated steel with toughened glass staircase, assembled off site complete with finishes and roof.	2	Nr	100,000	200,000.00
				Sub Total	200,000.00
	Allow for Floor finishes				
AC	Allow for Floor finishes	1	Item	5,600	5,600.00
				Sub Total	5,600.00
	Allow for finishes to ceilings				
AD	Allow for finishes to ceilings	1	Item	5,900	5,900.00
				Sub Total	5,900.00
	Summary				
	Foundation				117,948.00
	Elevated Walkway Floor Slab				30,011.00
	Structural Steel Frame				97,350.00
	Roof Structure				61,925.00
	Cladding				25,240.00
	Staircase				200,000.00
	Floor Finishes				5,600.00
	Ceiling Finishes				5,900.00
				Carried to Footbridge 1 Summary	**543,974.00**
	2) New lift shaft and lift				
	Foundations				
A	Provision of all plant (1nr Rig); including setting up; maintenance, erection and dismantling at each pile position, Break through the existing floors and hand excavate for the installation of the lifts including disposal from site.	1	Item	5,000	5,000.00
B	450mm dia reinforced concrete grade C40/50 and single bored piles including setting out, rebar & disposal of excavated materials etc.	18	Item	2,850	51,300.00
C	Cut off top of 450mm diameter reinforced concrete and bored pile (approx. 500mm length) and insert post fixed starter bars for capping beam including hydrophilic strip.	18	Item	450	8,100.00
D	Set up/move to pile positions.	4	nr	350	1,400.00
E	Allow for standing time rig/crew for obstructions - removed by others.	1	Prov Sum	1,500	1,500.00
F	Test & report per pile as per specifications.	4	nr	680	2,720.00
G	Reinforced Concrete pile cap slab 3300mm long x 4800mm wide x 800mm deep including any necessary excavation and disposal off site. including reinforcement (250kg/m3).	26	m3	420	10,920.00
H	Reinforcement to pile cap beam - 200kg/m3.	5	tonne	3,360	17,472.00
				Sub Total	98,412.00

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Option 1 - One entrance and footbridge

	Pit and Sump				
I	Excavate, hand dig, sump pits in base of lift pit, including disposal.	33	m3	190	6,270.00
J	Allowance for the provision of plant.	1	Prov Sum	3,000	3,000.00
K	Tanking and damp proofing to external face of lift pits and base, turned up and extended to edges of riser lift.	80	m2	40	3,200.00
L	Permanent Formwork to inside face of lift pits (Assume sheet pile).	54	m2	260	14,040.00
M	Concrete for lift pit	34	m2	420	14,280.00
N	Allow for all necessary temporary propping.	0	Item	6,000	
	Allow for the provision of lift shaft sump pumps complete with power supplies and the like, installed into the sumps, and connected to discharge	2	m	11,000	22,000.00
O	Provision of an ACO channel or similar as required to the ground floor in front of the lift entrance, complete with sump, end and connection to drainage system.	7	m	960	6,720.00
P	Allow for movement joint.	8	m	55	440.00
Q	Allow for the provision of access ladder, galvanised steel, to base of lift pit, approximately 2.5m tall, include for additional works to allow the ladder not to protrude into the lift well, top 1m to be handrails only.	2	item	3,000	6,000.00
				Sub Total	75,950.00
	Lift Shaft & Equipment				
R	Supply and install a complete glazed lift shaft component and allow for all fixings etc.	2	nr	66,000	132,000.00
	Lift Electrical Equipment Room (LEER)				
S	Construction of elevated LEER, approximate size 4450 x 3245mm complete with a standard door and windows; including all foundation works, wall, roof and make good the surrounding area.	2	nr	33,000	66,000.00
T	Supply and install 16nr passenger Lift equipment complete with doors etc.	2	nr	190,000	380,000.00
				Sub Total	578,000.00
	Summary				
	Lift shaft Foundation				98,412.00
	Sump Pits				75,950.00
	Lift Shaft and Equipment				578,000.00
				Carried to Footbridge 1 Summary	**752,362.00**
	3) M & E				
A	Allow for the installation of PA systems, etc.	1	item	25,000	25,000.00
B	Allow for Installation of M & E services to all new works Bridge etc.	1	item	6,500	6,500.00
C	Make good all the existing upon completion of the works	1	item	2,000	2,000.00
D	Allow for alteration to drainage system including connection to existing sewer	1	item	2,500	2,500.00
E	Allow for commission and decommission	1	item	3,000	3,000.00
				Carried to Footbridge 1 Summary	39,000.00

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Option 1 - One entrance and footbridge

AECOM

	Footbridge 2 - Landau Way (Option 2)				
	1) New footbridge and staircases				601,974.00
	2) Mechanical and Electrical Installation				39,000.00
	3) New entrance (including M&E and urban realm)				298,788.88
				Carried to Main Summary	**939,762.88**
	1) New footbridge and staircase				
	Excavation/Foundations				
A	Excavate 150mm thick to reduce levels on site as necessary and disposal of excavated materials off site.	95	m2	48	4,560.00
	Bore piling				
B	450mm dia reinforced concrete grade C40/50 and single bored piles including setting out, rebar & disposal of excavated materials etc; (Piling for C5 columns)				
	Average 12m deep.	22	nr	2,850	62,700.00
C	Cut off top of 450mm diameter reinforced concrete and bored pile (approx. 500mm length) and insert post fixed starter bars for capping beam including hydrophilic strip.	22	nr	450	9,900.00
D	Set up/move to pile positions.	6	nr	350	2,100.00
E	Allow for standing time rig/crew for obstructions - removed by others.	1	Prov Sum	2,500	2,500.00
F	Test & report per pile as per specifications.	8	nr	680	5,440.00
G	Reinforced Concrete pile cap slab 1700mm long x 1530mm wide x 800mm deep including any necessary excavation and disposal off site.	19	m3	420	7,980.00
H	Reinforcement to pile cap slab - 200kg/m3.	4	tonne	3,360	12,768.00
I	Allow for all necessary temporary propping.	1	Item	3,000	3,000.00
J	Provide a temporary working platform on both south and north bound platforms.	1	item	5,000	5,000.00
K	Making good existing area.	1	item	2,000	2,000.00
				Sub Total	117,948.00
	Elevated Walkway Floor Slab				
L	Reinforced insitu ready mixed designated concrete; C35 - 20mm aggregate; elevated floor slab thickness 250mm including 25 x 25 chamfer to all arises.	67	m3	350	23,450.00
M	Temporary formwork to sides of insitu concrete; height to soffit 3.00 - 4.50m; fixing to steel work with self tapping screws at 300mm maximum spacing.	67	m	83	5,561.00
N	Allow for expansion joint between the abutment of lift shaft, concourse and walkway.	1	Item	1,000	1,000.00
				Sub Total	30,011.00

	Structural Steel Structure				
O	Elevated Walkway and Staircase: Steel frame, complete with all braces, intermediate glazing supports, designed to be fabricated off site in units for assembly on site:				
P	Allow for any torque joints, on site welding, cutting, adaptations required to allow the steel frame to be installed. N.B. most of the steel frame is pre-fabricated off site with the intention to minimise on-site welding. Provision of holding down bolt assemblies, to suit columns, including mortises, washers etc.	1	item	18,600	18,600.00
Q	Allow for vertical movement joints , complete with in tumescent seals.	1	item	2,000	2,000.00
	Allow for the provision of a lighting protection system to the elevated walkway structure, including all pits, lighting rods, tapes and the like required to protect the structure and occupants	1	item	5,000	5,000.00
R	Allow for the provision of localised additional connections as required to suit the location of the installation	1	item	1,000	1,000.00
S	Allow for all steelwork to be installed by mobile craned located in the designated station compound.	1	item	6,000	6,000.00
T	Allow for pre fabrication of steelwork off site generally.	1	item	5,000	5,000.00
U	PPC UKC Columns, 356 x 406 x 325 kg/m (R12), 5mm thick fabrication and erection below ground as well as nuts and bolts	23	Tonnes	1,750	40,250.00
V	Allow for on site finishes to steelwork, including touching up factory finishes as required.	1	item	2,000	2,000.00
W	Allow for roof structure steel works, including factory and site finishes as required.	1	item	17,500	17,500.00
				Sub Total	97,350.00
	Roof structure to Elevated Walkway.				
X	130mm lightweight single ply membrane roof covering to elevated walkway with PPC aluminium soffit fixed on steel section beams and purlins including support plates, etc.	75	m2	675	50,625.00
Y	Elevated walkway finishes including painting of steekwork, rain gutters, down pipes, 500mm wide PPC fascia to elevated roof structure…	1	Item	11,300	11,300.00
				Sub Total	61,925.00
	Cladding				
Z	Supply and fix Pilkington frameless glass screen (silicone butt jointed) to foot bridge approx. size 16 x 3m.	72	m2	295	21,240.00
AA	Allow for staircase openings at each end of the walking way leading to platforms.	2	nr	2,000	4,000.00
				Sub Total	25,240.00
	Staircase complete				
AB	Supply and install prefabricated steel with toughened glass staircase, 3000mm wide x 13000mm on plan assembled off site complete with finishes and roof.	2	Nr	129,000	258,000.00
				Sub Total	258,000.00
	Floor Finishes				
AC	Allow for Floor finishes	1	Item	5,600	5,600.00
				Sub Total	5,600.00
	Ceiling Finishes				
AD	Allow for finishes to ceilings	1	Item	5,900	5,900.00
				Sub Total	5,900.00

Broxbourne Borough Council
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Option 1 - One entrance and footbridge

AECOM

	Summary				
	Foundation				117,948.00
	Elevated Walkway Floor Slab				30,011.00
	Structural Steel Frame				97,350.00
	Roof Structure				61,925.00
	Cladding				25,240.00
	Staircase				258,000.00
	Floor Finishes				5,600.00
	Ceiling Finishes				5,900.00
				Carried to Footbridge 2 Summary	**601,974.00**
	2) M & E				
A	Allow for the installation of PA systems, etc.	1	item	25,000	25,000.00
B	Allow for Installation of M & E services to all new works Bridge etc.	1	item	6,500	6,500.00
C	Make good all the existing upon completion of the works	1	item	2,000	2,000.00
D	Allow for alteration to drainage system including connection to existing sewer	1	item	2,500	2,500.00
E	Allow for commission and decommission	1	item	3,000	3,000.00
				Carried to Footbridge 2 Summary	**39,000.00**
	3) New Entrance				
	Excavation/Foundations				
A	Excavate 150mm thick to reduce levels on site as necessary and disposal of excavated materials off site.	20	m2	48	960.00
B	Reinforced Concrete foundation 400mm long x 400mm wide x 1000mm deep including any necessary excavation and disposal off site.	0.6	m3	420	268.80
C	Reinforcement to pile cap slab - 200kg/m3.	0.1	tonne	3,360	430.08
D	Allow for on site finishes to steelwork, including touching up factory finishes as required.	1	item	1,000	1,000.00
E	Making good existing area.	1	item	2,000	2,000.00
F	Allow for all steelwork to be installed by mobile craned located in the designated station compound.	1	item	6,000	6,000.00
G	Allow for pre fabrication of steelwork off site generally.	1	item	5,000	5,000.00
				Sub Total	15,658.88
	Steel Structure				
H	Supply and install prefabricated steel with toughened glazed structure, assembled off site complete with finishes and roof.	1	Nr	60,000	60,000.00
				Sub Total	60,000.00

	Mechanical & Electrical				
I	Allow for the installation of PA systems, etc.	1	item	15,000	15,000.00
J	Allow for Installation of M & E services to all new works Bridge etc.	1	item	6,500	6,500.00
K	Allow for installation of TVM	1	item	50,000	50,000.00
L	Supply and installation of gate line include all required IT connection etc	2	item	37,500	75,000.00
M	Supply and installation of wide gate line include all required IT connection etc	1	item	47,000	47,000.00
N	Supply and installation of new PA speaker and Junction box	2	item	365	730.00
O	Allow for commission and decommission	1	item	3,000	3,000.00
				Sub Total	197,230.00
	Urban realm				
P	Allow for installation of hostile vehicle protection (automatic crash bollards)	6	nr	3,885	23,310.00
Q	Allow for reinstatement of paving and tying into existing	20	m²	130	2,590.00
				Sub Total	25,900.00
	Summary				
	Excavation / Foundations				15,658.88
	Steel structure				60,000.00
	M & E				197,230.00
	Urban Realm				25,900.00
				Carried to Footbridge 2 Summary	**298,788.88**
	Construction of new platforms				
	Foundations				
A	400x400x5m Reinforced concrete ground beams at 5m intervals	81.6	m3	460	37,536.00
	Platforms				
B	New Platforms	2550	m2	500	1,275,000.00
	Floor Finishes				
C	Tactile paving for new platform; 400mm x 400mm each	204.0	m2	100	20,400.00
	Fence				
D	Allow for the provision of Palisade Boundary Fence, 2.3m high and approximately 35m long each including all the foundation posts etc.	455	m	120	54,600.00
				Carried to Main Summary	**1,387,536.00**

Broxbourne Borough Council
Turnford Station
Strategic Outline Business Case

Option 1 - One entrance and footbridge

AECOM

	Access road and urban realm				
	1) Footway Paving and Station Entrance				245,229.34
	2) Street Furniture				87,920.00
	3) Mechanical and & Electrical Installation				18,000.00
				Carried to Main Summary	**351,149.34**
	1) Footway Paving and Station Entrance				
	Footway Paving				
A	Spread, level and compact 100mm deep Sub-base	167	m3	60	10,020.00
B	Lay and install white concrete deliniator kerb	516	m	92	47,472.00
C	Lay and install grey concrete upstand kerb	150	m	76	11,400.00
D	Spread, level and compact laying course sand 40mm deep, and screed to correct level.	100	m3	85	8,500.00
E	Lay and install tarcmac paving, finish paving on subbase	1500	m2	105	157,500.00
F	Lay and install Tactile Corduroy paving; alignment, jointing and compacting	50	m2	150	7,500.00
G	Allow for installation of concrete ramp with a gradient of 1:20; lay and install concrete kerb with 140mm upstand and level the footway as appropriate	16	m2	180	2,837.34
				Sub Total	245,229.34
	2) Street Furniture				
A	Allow for Installation of grey stainless steel bollards	20	nr	450	9,000.00
B	Allow for Plantation of proposed Trees	30	nr	1,500	45,000.00
C	Allow for installation of grey concrete and timber brown benches	2	nr	960	1,920.00
D	Installation of new Bus Shelter	1	item	30000	30,000.00
E	Installation of new Bus Stop Bench	1	item	2000	2,000.00
				Sub Total	87,920.00
	3) M & E				
A	Allow for installation of traffic lights for toucan pedestrian crossing	1	item	7,500	7,500.00
B	Make good all the existing upon completion of the works	1	item	7,500	7,500.00
C	Allow for test and commissioning	1	item	3,000	3,000.00
				Sub Total	18,000.00
	Summary				
	Footway paving				245,229.34
	Street furniture				87,920.00
	M & E				18,000.00
				Carried to New entrance Summary	**351,149.34**

Broxbourne Borough Council
Turnford Station
Strategic Outline Business Case

Option 2 - Two entrances and footbridges

AECOM

Backup Cost Plan

Cost Estimating

Base Date :

	Description	Qty	Unit	Rate £	Total £
	ESTIMATE SUMMARY				
A	**Total construction base cost less Preliminaries**				**6,211,497**
	Add-Ons				
	Add 1:				
B	Main contractor's preliminaries	35	%	2,175,000	
C	Main contractor's Overhead	6.5	%	403,747	
D	Main contractor's profit	2.5	%	155,287	
				2,734,035	
				Total including Add 1:	**8,945,531**
	Add 2:				
E	Broxbourne Borough Council - Management Costs	12	%	1,074,000	
F	Design costs, including site surveys & investigations	12	%	1,074,000	
G	Signal move/Signal sighting allowance	I	Item	130,000	
H	Ground investigation	1	Item	50,000	
J	27h weekend possession - two track	7	£220,000.00	1,540,000	
K	Extra over for Premium Working (Nights and Weekends)	1	Item	210,000	
L	Traffic Management	1	Item	100,000	
				4,178,000	
				Total including Add 1 & Add 2:	**13,123,531**
	Add 3:				
K	Risk Contingency Allowance	40	%	5,250,000	
				Total incl. Add1, Add 2 & Add 3:	**18,373,531**
L	Inflation (excluded)	0.00	%	0	-
				COST ESTIMATE	**18,374,000**

Broxbourne Borough Council
Turnford Station
Strategic Outline Business Case

21 May 2020

NOTES, ASSUMPTIONS & EXCLUSIONS

Notes

1. Works have been priced on the basis of working in normal hours.
2. 7 no. 27h possession have been allowed for.
3. All rates are based on various recent railway infrastructure projects, rate build ups, supplier quotations (where relevant) and 2019 price books.
4. This Cost Estimate has been prepared based on the "Turnford Station Strategic Outline Business Case" report.

Assumptions

1. Costs relating to preliminaries are for the construction phase only.
2. A provisional sum has been allowed for traffic management and/or road closures. This includes for materials deliveries, general construction traffic and protecting the general public.
3. The majority of the works will be done in normal working hours.
4. Construction methodology will employ the most effective way of delivering the works.
5. All materials and finishes used to be the most economical.
6. No contaminated waste removal requirement.
7. No Implications for interfaces with other projects.
8. No additional costs related to new technology requirements or change in standards are required.
9. No SSSI & environmental issues.
10. It has been assumed an average of 12m depth 450mm dia. Bored piles.
11. Minor utilities will be required to be diverted.
12. It has been assumed a station building size of approximately 300m2.
13. It has been assumed that the new platforms will be 5m wide and 255m long.
14. It has been assumed a prefabricated steel footbrige(s) of 12m span
15. The size of the gateline at the main station entrance (station building) is based on the minimum gate line requirements, as per the Network Rail Station Capacity Planning Guidance, May 2015.
16. It has been assumed for Option 2 that both footbridges will be built at the same time, and therefore no additional possessions have been allowed for. If the footbridges are built in a different sequence, possesions will need to be increased.
19. The new drainage system will be connected to the existing drainage system in the area.
21. The secondary gate line located at the second footbridge is not compliant with the NR standards, but based on the stations in the area and in order to minimise the secondary entrance dimensions, it has been assumed that this is justified.
22. It has been assumed that the existing signalling scheme will not be affected by the new station location, beyond 1 no. existing signal relocation.
23. Access road to the station includes from the new station building to the collage car park, assuming that the rest of the road will not need any further upgrade.
24. This cost estimate is also based on previous station experience by AECOM as a design is a feasibility design is not yet available for the station.

Exclusions

1. Whole Life costing of the project.
2. Cost associated with frustrated access and possession.
3. Costs associated with 24 hour working with the exception of possession working where the extra over cost of working in the possession is included in the posession cost. An allowance has been made for the extra over cost of night/weekend working.
4. No over and above allowance for Bank Holiday working or allowance for premium working.
5. Structural works to adjoining properties.
6. Constraints by 3rd Parties including English Heritage.
7. Acquisition costs of land, space or property and any associated costs.
8. Major utility diversions.
9. No enhancements to existing finishes. All painting to new works and making good to existing adjoining areas where appropriate has been included.
10. Removal of asbestos.
11. Human Factors Report and its impact on current works information.
12. Taxes and levies, including Value Added Tax.
13. Stability implications during construction of new works.
14. Advertising hoardings and notice boards.
15. Inflation due to inadequate information on construction programme.
16. Optimism bias.
17. Interfaces with other projects
18. Employer provided project insurances.
19. Costs associated with Statutory Fees (e.g. HRMI, Local Authority etc.)
20. Costs associated with licences and all associated costs and fees
21. Pedestrian modelling costs or impacts
22. No allowance has been made for Operation & Maintenance support agreements or for any impact on existing agreements
23. Retail & commercial fit-out

AECOM Limited
AECOM House
63-77 Victoria Street
St Albans
Hertfordshire AL1 3ER
United Kingdom

T: +44(0)1727 535000
aecom.com