ARUP

Beeston Castle and Tarporley Station Reopening Group

Beeston and Tarporley Station Reopening

Feasibility Study and Preliminary Business Case

Final Issue

April 2022

Job number 284162-00

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1. Executive Summary

Like many other stations across the country, Beeston Castle and Tarporley station was a victim of the 'Beeching Cuts' in the 1960's, a decision made at a time when the rail industry was in significant decline. Fast forward to 2022, we have seen decades of increased patronage on the rail network. The network is the fastest growing in Europe. Recognising the significant impacts to demand due to COVID-19 aside, rail usage for both commuting and leisure trips is growing faster in the North of England than most other parts of the country. Passenger journeys have increased by 30% in the last ten years as enhancements have increased both capacity and quality of services for customers.

The policy landscape for investment in enhanced rail infrastructure is also stronger than ever. To support economic growth and the UK Governments levelling up agenda, complementing the need to respond to the climate emergency, at a local and national level, modal shifts from car to public transport modes are required across urban and rural communities alike.

There is a clear and compelling strategic case for the re-opening of Beeston and Tarporley Station, supported by national, regional and local policy alignment, to contribute to a transformation in local connectivity and inclusive, sustainable growth.

A re-opened Beeston and Tarporley Station would:

- Substantially improve journey times to the key regional centres of Chester and Crewe – increasing connectivity and mobility for residents without needing to own a car;
- Provide opportunities to enhance the connectivity to the HS2 Crewe Hub by rail, maximising the benefits of investment;
- Reduce road-based traffic flows, mitigating CO_2 emissions impacting climate change as well as associated pollutants, including carbon monoxide, particulate matter and nitrogen oxides which are damaging to the health of the local population;
- Improve access for communities and business of Tarporley, Beeston, Bunbury and surrounding villages such as Tarvin, Duddon, Caveley, Alpraham, and Wardle, to work, education, health care and social opportunities; and
- Open up inward investment opportunities, particularly sustainable access to Beeston Castle and Woodland Park, one of the UK's most dramatically sited medieval castles, which attracts over 50,000 visitors a year, as well as Peckforton Castle.

The findings of this feasibility and preliminary business case study have concluded:

- There is a compelling demand case, with initial assessments indicating around 60,000 to 85,000 passengers per year could use Beeston and Tarporley Station; strategically filling a major gap in the rail and public transport network; significantly reducing journey times; and enabling a park and ride, reducing congestion on the road network;

- It is feasible and relatively simple to introduce a scheduled one Transport for Wales train per hour service at the Station in each direction, with minimal changes to the current Chester – Crewe shuttle timetable, subject to the introduction of 90mph rolling stock,

- The opportunity for an inclusive, accessible station design, which has embedded Network Rail and DfT guidance, with associated costs in line with recent investments made at new and re-opened stations across the national network, and

- The indicative Value for Money assessment has demonstrated that a positive value for money cases could be produced, subject to developer led contributions. The value for money case could be further increased with the addition of wider economic benefit analysis.

Coupled with strong local resident, business and political support, there is a compelling and robust case to support the further development of the station proposition through the entry into the Rail Network Enhancements Pipeline (RNEP).

2. Purpose of the report

Like many other stations across the country, Beeston and Tarporley station was a victim of the 'Beeching Cuts' in the 1960's, a decision made at a time when the rail industry was in significant decline.

Fast forward to the 2022 however and we are seeing a resurgence in rail demand in Britain: the network is the fastest growing in Europe and is busier now than at any time since the 1920s. The impacts of COVID-19 aside, rail usage for both commuting and leisure trips is growing faster in the north than most other parts of the country. Passenger journeys have increased by 30% in the last ten years as enhancements have increased both capacity and quality of services for customers.

Despite these demand increases, too many people still don't view train travel as an attractive or viable alternative to driving. When making their modal choices, a key barrier for many is accessibility to the rail network. Where access is lacking, the option to use private cars is, for many, unavoidable, moreover the lack of a station in the vicinity of Beeston and Tarporley acts as a barrier to sustainable economic development, limits access to healthcare and education, and restricts access to leisure and cultural opportunities.

Beeston and Tarporley was an old station located on the railway line between Crewe and Chester stations. It is located approximately 10.75 miles North-West of Crewe station and approximately 10.4 miles South-East of Chester station. The station primarily served the villages of Beeston and Tarporley, but also served other neighbouring villages such as Bunbury, Tarvin, Delamere, Rushton and Tilstone. On the present-day network, two trains an hour operate on this line section: an hourly Transport for Wales shuttle service between Crewe and Chester and an hourly Avanti West Coast Service between Crewe and Chester or Holyhead.

There has been a longstanding local ambition to reopen this station. Previous petitions and campaigns have led to a number of local studies assessing the feasibility of reopening Beeston and Tarporley station, such as the *Beeston Station Feasibility Study* commissioned by Cheshire County Council. This local ambition has culminated in a successful Restoring Your Railway feasibility funding application, which partially funds this preliminary business case study.

Figure 1 - Previous Beeston Castle and Tarporley Station (source: Google)

To support economic growth and unlock opportunities for communities across Cheshire, a significant increase in trips needs to be delivered using rail-based modes. Re-opening of stations such as Beeston will be key, as they provide an access point to the public transport network, increasing the catchment of rail-based modes and supporting modal shift away from congested roads, such as the A51 and A49. This will help to make public transport the ‘go to’ mode for travel.

The aim of this study — commissioned by the Beeston and Tarporley Station Reopening Group with funding from the Department for Transport Restoring Your Railway fund, the Cheshire and Warrington Local Enterprise Partnership, and other stakeholders — is to investigate the feasibility of reinstating the station at Beeston and Tarporley, summarising the opportunities and issues, and making a series of recommendations around future development work.

Figure 2 - Existing signal box at the site

3. Strategic context

3.1 Study area and station

Beeston is a residential village in Cheshire located approximately 16 km from both Chester and Crewe. A residential area sits south of the proposed station site and access from it is fairly unobstructed. The area in the immediate vicinity of the station contains a mixture of small businesses and residential housing.

Tarporley is located north of the proposed station site, with a population of 2,614 according to the 2011 census, although in recent years the area has seen increased residential development and associated population increases. The residential area of Tarporley is separated from the station site by both the A49 and the Shropshire Union Canal.

As can be seen in Figure 3, both Chester and Crewe are significant destinations for people travelling to work to/from Tarporley, a trend that will continue to grow as further housing development around the station is delivered.

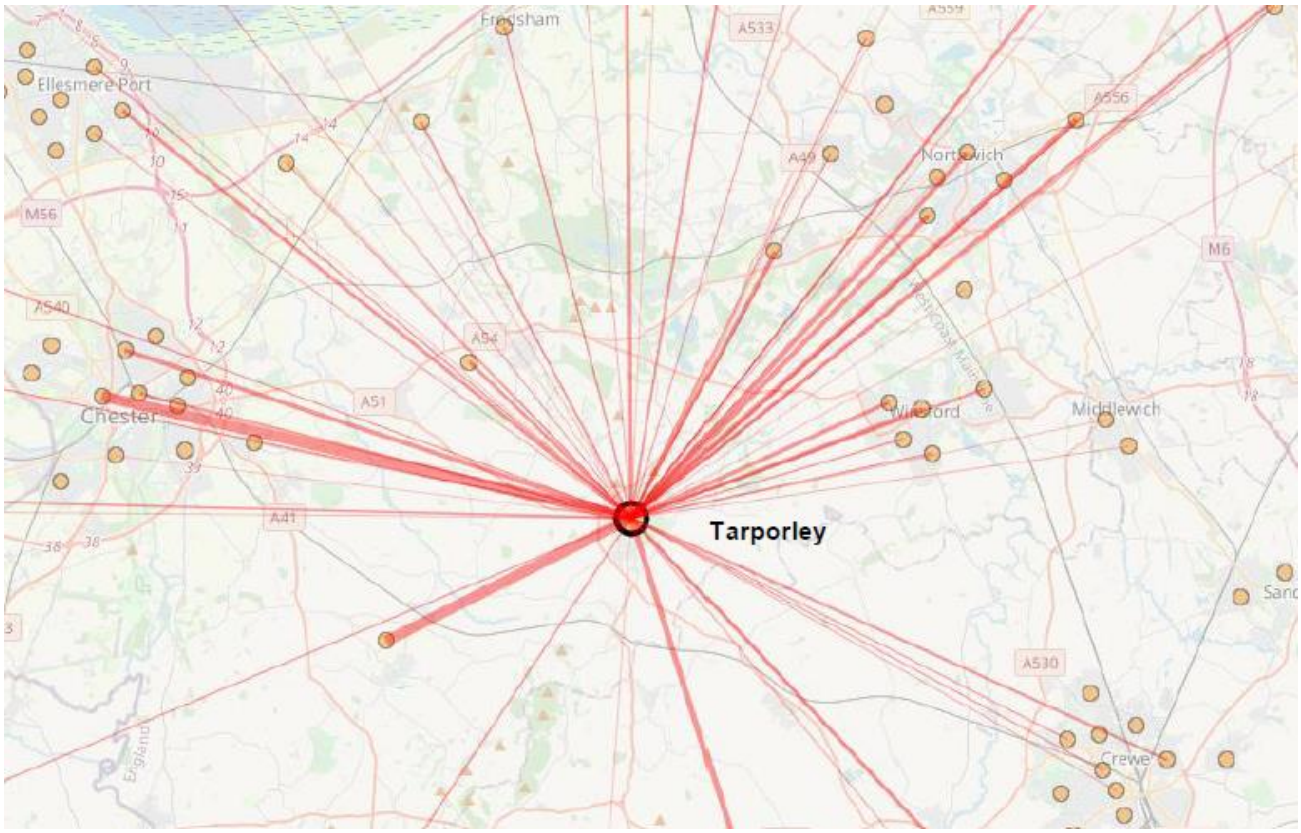


Figure 3 - Largest commuter flows from Tarporley (source: datashine.org.uk)

A new station at Beeston and Tarporley could cater for demand, enabling people to choose low carbon, sustainable rail travel for their journeys with the potential for longer journeys to regional economic powerhouses of Manchester and Liverpool – as well as to London.

In addition, Crewe will be served by HS2 services from 2032, providing connectivity for people wishing to travel by train from the local area to London in circa80 minutes — a transformation in rail connectivity that could bring significant benefits to people and businesses with Beeston, Tarporley, Bunbury and the surrounding local neighbourhoods.

3.2 Understanding the challenges and opportunities

Currently, Beeston and Tarporley are poorly served by public transport. This has led to a high level of car dependency and social exclusion for those in the community without access to a private car.

Poor public transport accessibility and significant road congestion

The A51, which connects both Beeston and Tarporley to Crewe, has been named as one of the most congested roads in the country due in part to high numbers of heavy goods vehicles using the A51/A500 as a route from the M6 to the Chester, Wrexham, North Wales and onwards to Holyhead ferries. This can make journey times by both bus and car long and unpredictable.

Journey times from Tarporley to Chester and Crewe via the A51 both take approximately 30 minutes. These journey times can often double during the morning commuter peak periods and are particularly susceptible to delays due to the predominantly single carriageway layout.

In order to guarantee catching onward rail services from either Crewe or Chester, local residents are advised to give themselves a minimum of 45 minutes, which does not account for any out of the ordinary delays or planned roadworks.

There is no existing access to the rail network in the immediate area around Beeston and Tarporley.

Both areas also have very limited bus service provision. Tarporley is served hourly by the number 84 bus that runs between Crewe and Chester. Journey times by bus are double that than by using a private car – namely due to the nature of the service being as much about connecting local villages and communities along the route, as it is providing access to the regional economic centres.

Beeston has no direct bus link to Tarporley, limiting access to education, skills and amenities for resident of Beeston and Bunbury. Whilst it is possible to get from Beeston to Crewe via the number 70 bus service interchanging at Nantwich to the number 85 service, this trip can only be made twice daily and is not a viable service to support local planned development and economic development.

Reopening of Beeston and Tarporley Station would provide consistent, reliable, integrated and low-carbon trips for local residents to the regional economic centres of Chester and Crewe, providing a complimentary service to that provided by the route 84 bus.

Climate Emergency

Cheshire West and Chester Council unanimously declared on 21 May that the borough is in a Climate Emergency. The Council agreed that:

- Climate change presents a threat to our way of life
- There is a need to act in-line with worldwide agreements on climate change and the best available evidence, which states that to limit emissions to 1.5°C, there is a requirement to reach 'net zero' by 2045; and that
- the Council must play its part by evidencing leadership on this issue.

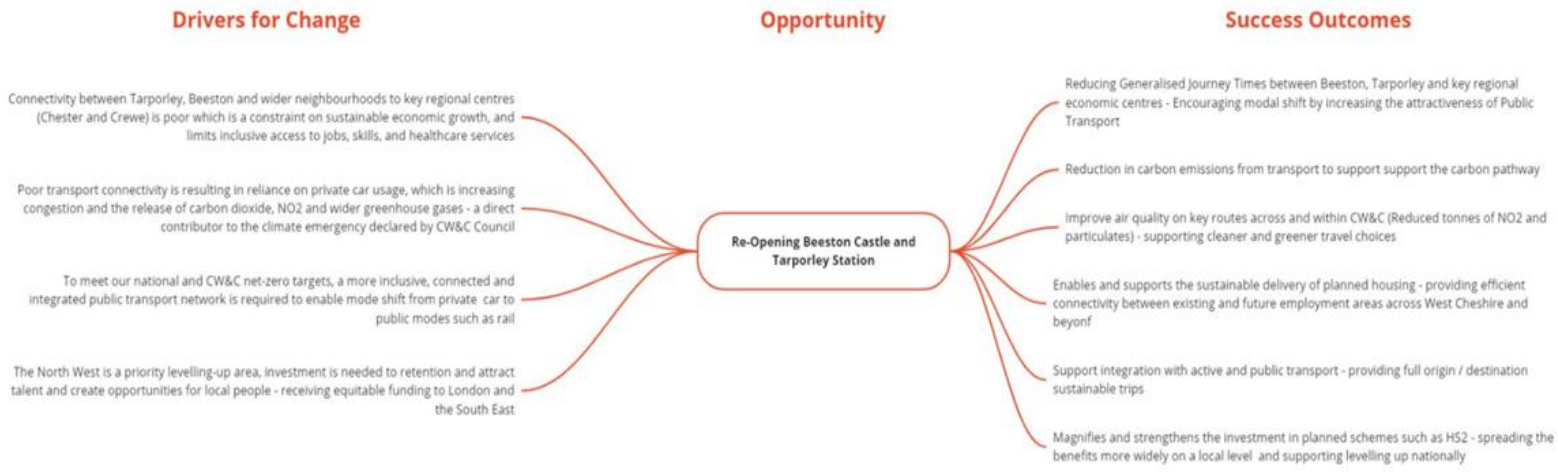
Tarporley has a higher-than-average carbon emission from transport compared to both the England average and the county average for Cheshire West and Chester as demonstrated by Figure 4 below. Much of the carbon emissions from residents will be associated with their reliance on private cars to access jobs, skills, shops and leisure. Re-opening Beeston and Tarporley station would enable people to choose a low carbon mode of travel helping Cheshire West and Chester respond positively to the climate emergency.

Figure 4 - Carbon emissions from transport per person (source: Carbon Place)

Summary of Opportunity

A re-opened Beeston and Tarporley Station would therefore:

- Substantially improve journey times to the key regional centres of Chester and Crewe – increasing connectivity and mobility for residents without needing to own a car;
- Reduce road-based traffic flows, mitigating $C0_2$ emissions impacting climate change as well as associated pollutants including carbon monoxide, particulate matter and nitrogen oxides which are damaging to the health of the local population;
- Improve access for residents of Tarporley, Beeston, Bunbury and surrounding villages such as Tarvin, Duddon, Caveley, Alpraham, and Wardle to work, education, health care and social opportunities; and
- Open up inward investment opportunities, particularly sustainable access to Beeston Castle and Woodland Park, one of the UK's most dramatically sited medieval castles, which attracts over 50,000 visitors a year.

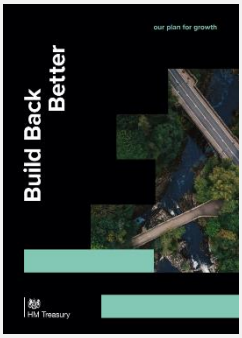


3.3 National, regional, and local policy alignment

There is strong policy alignment underpinning the case for re-opening Beeston and Tarporley Station – aligned to national, regional, and local policy drivers.

The key policy documents are listed below, with the relevance to the station highlighted.

National Policy



Build Back Better, HM Government

Build Back Better sets out the government's plans to support economic growth through significant investment in infrastructure, skills, and innovation.

The plan builds on the National Industrial Strategy of 2018 and sets out the vision for the United Kingdom's post-pandemic future. The plan includes three core pillars of growth (infrastructure, skills, and innovation) which will drive the following aims to level up the whole of the UK; support the transition to Net-Zero; and support a global Britain.

Relevance to the scheme:

Reopening Beeston and Tarporley station would connect communities that are currently isolated from existing transport opportunities, allowing them to better access economic opportunities in economic centres such as Chester and Crewe as well as London and Manchester. By offering commuters and leisure passengers in the area a viable rail option as opposed to using the private car, the station reopening will help reduce carbon emissions in the region and support the transition to Net-Zero.

Levelling Up White Paper, DLUHC

The *Levelling Up White Paper* sets out the steps the government will take to "supercharge city regions, revitalise struggling towns and support industrial growth clusters". The prospectus covers funding for transport, town and city centre regeneration, and cultural investments.

The government is supporting schemes that "reduce carbon emissions, improve air quality, cut congestion, support economic growth and improve the experience of transport users."

Relevance to the scheme:

The government has committed to addressing the regional inequalities in social and economic opportunity which exist across the country, caused in part by a lack of investment in infrastructure. The North West region, which includes Tarporley has historically received less investment in its transport networks than London and the South East of England.

Beeston and Tarporley Station will support the Levelling-Up Agenda by address regional inequalities in economic performance through investment that provides higher quality connections between people, businesses, and other opportunities across Cheshire, the North West and beyond.

Reopening Beeston and Tarporley station would directly support the reduction of carbon emissions, improve air quality, cut congestion, support economic growth and improve the experience of transport users – directly addressing the aims of the Levelling Up White Paper.

The associated service would offer a viable public transport option for journeys into Crewe and Chester which currently require use of the highly congested A49 and A51 roads. Encouraging mode shift from car to rail through the station reopening would reduce both road congestion and carbon emissions.

The station reopening would also offer options for those currently unable to drive, or with no access to a car, the same opportunities to access regional city centres and wider economic powerhouses like

Manchester, Birmingham and London, as those who can drive, or those who live in better connected areas by public transport.

With future direct interchange to the HS2 network via the Crewe 'Super Hub', passengers from Beeston and Tarporley will have single interchange to London in circa 80 minutes, with onward connectivity across London, as well as faster services to Manchester City Centre and Airport.

As well as providing local residents with faster travel to destinations, the connectivity boost that HS2 provides will open Cheshire's heritage delights, green spaces and specialist trades in engineering and manufacturing to new business and leisure markets, supporting the region's tourism sector and wider economic growth.

Delivery of complimentary schemes like the reopening of Beeston and Tarporley Station will maximise the governments investment and value for money in the new HS2 networks, by magnifying and expanding the networks economic reach and ensuring the country levels up as a whole.

Restoring Your Railway Programme, DfT

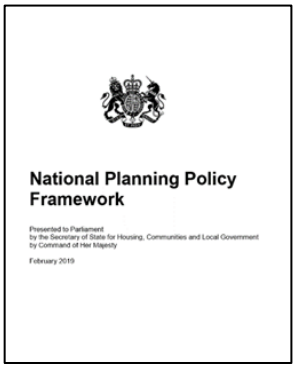
As part of the Levelling Up agenda, in January 2020, the Government pledged £500 million for the Restoring Your Railway Programme to deliver its manifesto commitment and start reopening lines and stations.

The Department for Transport (DfT) invited MPs, local councils and community groups across England and Wales to propose how they could use funding to reinstate axed local services and restore closed stations.

The focus now is on realising the benefits of those schemes in order to regenerate local economies and improve access to jobs, homes and education.

Relevance to the scheme:

The Beeston Castle and Tarporley Reopping Group were successful in securing funding from the Restoring Your Railway fund. Reopening Beeston and Tarporley station will have the potential to super charge the local economies of Beeston, Tarporley, Bunbury and other surrounding villages by providing a direct rail link to major centres in Crewe and Chester as well as a link to other major centres such as Manchester, Liverpool and London via interchange. This access to major centres would result in increased access to jobs, healthcare and other opportunities for residents of the area – as well as bringing in revenues from tourism and leisure.



National Planning Policy Framework, DLUHC

National Planning Policy Framework (NPPF) states that the purpose of the planning system is "to contribute to achieving sustainable development" and planning is required to perform the following three specific roles:

- An economic role: contributing to building a strong, responsive and competitive economy;
- A social role: supporting strong, vibrant and healthy communities;
- An environmental role: protecting and enhancing the natural, built and historic environment.

The NPPF sets out twelve core land-use planning principles that should be considered when making planning decisions including:

"Planning should …. actively manage patterns of growth to make fullest possible use of public transport, walking and cycling and focus significant development in locations which are or can be made sustainable"

The NPPF refers to the following which are of relevance to the scheme proposals:

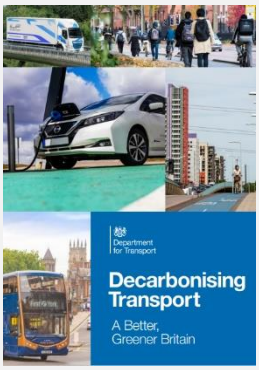
- Building a strong, competitive economy – identify areas for economic regeneration, infrastructure provision and environmental enhancement;

	• Planning policies should recognise and seek to address potential barriers to investment, including a poor environment of any lack of infrastructure, services or housing; • Local Planning Authorities should … support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport.

Relevance to the scheme:

Reopening Beeston and Tarporley station has the potential to rejuvenate and create vibrant and healthy places in what are currently relatively isolated communities in the area such as Beeston, Tarporley, Bunbury, Tarvin and Tilstone. It will also facilitate the sustainable enhancement of any future development opportunities in the area, which will contribute to building a stronger and more sustainable economy.

The scheme also has the potential to encourage a mode shift to public transport, thereby reducing the negative impact on air quality and climate change from road transport.



Decarbonising Transport, A Better Greener Britain, DfT

The *Decarbonising Transport Plan* is a key Government policy for driving forward the UK's transition to a net zero economy.

The plan sets out:

- the countries pathway to net zero transport in the UK
- the wider benefits net zero transport can deliver
- the principles that underpin our approach to delivering net zero transport

Decarbonising our railways forms a core part of the Plan – with the aim to have zero emission rail network by 2050 through further electrification of the network, or delivery of battery powered and Hydrogen trains.

The plan states the government are building extra capacity on our rail network to meet growing passenger numbers and providing more choice and better efficiency in rail journeys.

Relevance to the scheme:

Schemes such as the Beeston and Tarporley station reopening can form a key part of the Government's ambitions to reduce carbon emissions by supporting modal shift and increasing rail trips across the North.

Providing new local passenger services which are frequent and reliable will attract transport users to switch to rail for their daily commute, increasing labour markets and connecting businesses to skilled labour. This will contribute towards achieving the DfT's goal to increase the mode share of public transport and accelerate the transition to sustainable transport – especially as the network itself decarbonises through more efficient use of technology, such as battery and hydrogen trains.

Regional Policy

Transport Strategy, Cheshire and Warrington LEP

The Cheshire and Warrington Transport Strategy was created to support the delivery of Cheshire and Warrington Local Enterprise Partnerships strategic economic plan.

In order to address the transport challenges the transport network needs to provide the following:

- Fast, frequent connectivity between subregional centres for people and freight;
- Travel by sustainable modes within 30 minutes between key centres;
- Reliable journey times, with all growth areas within 1 hour, door-to-door, from all parts of Cheshire and Warrington, and key economic centres;
- Support existing areas of success through: Dedicated, high-quality inter-urban corridors to Manchester, Liverpool, Wales, Birmingham and Yorkshire; Direct links to London and the UK's top city economies; and
- Fast, reliable connectivity to key international gateways.

Relevance to the scheme:

Reopening Beeston and Tarporley station will provide local residents, commuters and leisure passengers with quick, reliable access to Chester and Crewe Stations – providing dual gateways to access growth areas across the whole of Cheshire and Warrington utilising sustainable modes.

The station will also facilitate a simple, single interchange to the UK's top city economies such as Manchester, Birmingham, Liverpool and London, as well as key international gateways such as Manchester and Birmingham Airports.

With future direct linkages to the HS2 network at Crewe, the above benefits will be super-charged, including inward economic benefit, matching the Levelling Up White papers strategic vision, aims and objectives.

Strategic Economic Plan, Cheshire and Warrington LEP

The Cheshire and Warrington SEP sets out that following key policy areas:

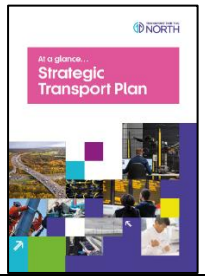
- Transport: setting out the priority transport investments at a local and strategic level which will be required to support the needs of a £50 billion a year economy. This includes improvements and additions to the road and rail network and better, more coordinated public transport services.

- Skills and Education: setting out plans for working with businesses and skills providers to make sure that our workforce has the skills needed to remain productive and are connected to opportunities. This includes encouraging employers to work with young people to inspire them about career opportunities so they understand what skills and education they need to progress in the careers they choose.

- Quality of Place: to ensure that our strengths in terms of quality of place – including high quality public services - are used to attract and retain the inward investment, skilled workers and visitors that we need to grow our economy, whilst maintaining and enhancing the area's built and natural environment. This will include a Place Marketing Strategy which will set out the benefits of locating in Cheshire and Warrington.

Relevance to the scheme

Restoring Beeston and Tarporley station would support the delivery of transport, economic and skill enhancements for communities in the heart of Cheshire through a high quality public transport service. With links to both regional and national gateways via Crewe and Chester stations, the restored station would support access to labour markets, as well as attracting and retaining inward investment in a manner that is in keeping with the built and natural environment.



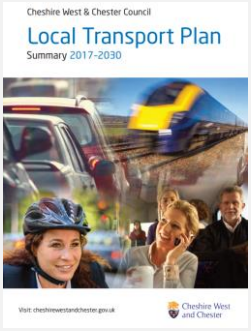
Strategic Transport Plan, Transport for the North

The Transport for the North *Strategic Transport Plan* sets out how TfN aims to transform economic performance; increase efficiency, reliability, integration, and resilience in the transport system; improve inclusivity, health, and access to opportunities; and promote and enhance the environment.

Relevance to the scheme

Beeston and Tarporley station reopening would strongly align with many of the policy positions and evidence set out in the *Strategic Transport Plan*. The line would serve several communities surrounding the station site that have been cut off from the rail network for many years, increasing inclusivity and equitable access to skills, jobs and health services in an integrated, reliable manner that enhances the local and regional environment.

Local Policy



Local Transport Plan, Cheshire West and Chester

The CW&C *Local Transport Plan* vision is to create an enabled transport system that connects people to places and allows people, goods and services to move easily within and through the Borough.

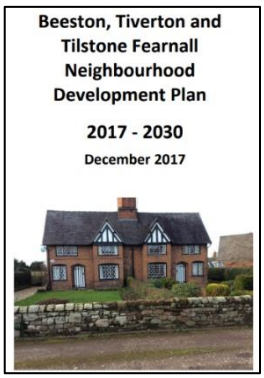
A key goal of the plan is to plan, provide and promote a well maintained, safe, integrated and sustainable transport network for the future that will support our wider social, economic and environmental goals to provide a well-connected and accessible borough.

Relevance to the scheme

For residents of Tarporley, Beeston, Tiverton and Bunbury without access to a car, it is not currently easy to move within and through the local area, and there is a disconnect between people, places and the environment.

Congestion on the A51 and A49 is impacting the reliability of bus and car journey times, impacting productivity and sustainable economic growth.

Reopening Beeston and Tarporley station will better connect people of all ages across and through the Borough – via the gateway station of Chester. With greater public transport options, the station will offer a safer, better integrated and sustainable transport network supporting increased social, economic and environmental outputs of the local area.



Cheshire West and Chester Local Plan (and Beeston, Tiverton and Tilstone Fearnall Neighbourhood Development Plan)

The Beeston, Tiverton and Tilstone Fearnall Neighbourhood Development Plan is a statutory document setting out the vision for the local area, supporting the underlining evidence base to support future planning policies for land-use and development of the area.

The Neighbourhood Plan makes it clear that future development must remain in keeping with the character of the whole area and is sustainable, particularly in terms of the well-being of residents and protection of the quality of both current and future built and natural environments.

Relevance to the scheme

The Beeston, Tiverton and Tilstone Fearnall Neighbourhood Development Plan supports the re-opening of Beeston and Tarporley station – noting that the site of the former station and immediate environs is to be protected from development that could compromise the future provision of a new rail station and associated facilities.

In consultation in 2013, the vast majority of residents (95%) supported the reopening of Beeston and Tarporley Station, coupled with adequate car parking provision. Enhanced local bus connectivity could also be generated as a result of the station development, increasing connectivity widely across the parish and beyond.

The Neighbourhood Development Plan also notes that planning permission has been granted for 129 new homes in the area (currently under development) and that there is support for further managed housing and other development beyond this.

Reopening Beeston and Tarporley train station is an opportunity to sustainably accommodate this projected increase in travel demand.

3.4 Supporting modal shift, improving connectivity to economic centres through clean and green public transport

The switch to rail could provide significant travel time benefits to users to key centres of work, education, leisure, and health facilities. The table below shows the current journey times by car and bus between key origin destination pairs along the proposed route and the associated potential journey times.

This shows that direct rail connectivity could provide better journey times for some key trips. The line would also provide better connectivity for communities along the route with other destinations via interchange opportunities available at both Crewe and Chester but with a specific focus on Crewe.

Table 1: Current and potential journey times for selected origin-destination pairs

Journey	Current travel time by car (without congestion)	Current travel time by bus / rail interchange	Potential travel time by rail
Beeston and Tarporley Station - Chester	30 minutes	55 minutes (34 minutes on bus + 20 minute walk to Red Fox Stop)	12 minutes
Beeston and Tarporley Station - Crewe	30 minutes	1 hour 5 minutes (84 minutes on bus + 20 minute walk to Red Fox Stop)	14 minutes
Beeston and Tarporley Station – Manchester (via Crewe)	1 hour – 1 hour 30 minutes dependent on time of travel	2 hours 12 mins average	1 hour 4 minutes*
Beeston and Tarporley Station – Manchester Airport (via Crewe)	48 minutes	2 hours 32 mins average	1 hour 8 minutes*
Beeston and Tarporley Station – Birmingham	1 hour 31 minutes – 2 hour dependent on time of travel	2 hours 30 mins average	1 hour 30 minutes*
Beeston and Tarporley Station – London (via Crewe without HS2)	3 hours 27 minutes – 4 hours dependent on time of travel	n/a	2 hour 6 minutes*
Beeston and Tarporley Station – London (via Crewe with HS2)	3 hours 27 minutes – 4 hours dependent on time of travel	n/a	1 hour 25 minutes*

All travel time assuming a 12:00 departure from the Beeston and Tarporley station site

*15 minute interchange penalty has been applied

The case for public transport investment in the area is clear, with future business cases continuing to set out the need to provide strong evidence as to why rail is the best choice to achieve this as opposed to other modes of public transport.

Owing to the congestion on the road network, particularly on the A49 and A51 as mentioned in previous sections, there is limited scope for improving the journey times and reliability of buses in the scheme area without significant capital investment and costly disruption during construction. It should also be noted that the significant highway improvements that would be required to deliver competitive journey times for buses would find it challenging to gain any traction during the planning stages due to the environmental sensitivities in the area such as the climate emergency declared by Cheshire West and Chester council.

In stark contrast to this, rail can deliver direct access to town and city centres from several isolated communities with a relatively modest investment in the network, and negligible impact on the local environment.

HM Government has recently released an *Integrated Rail Plan for the North and Midlands*. HS2 and Northern Powerhouse Rail will serve Crewe, and there is an opportunity to connect the residents of Beeston, Tarporley, Bunbury and the wider area to the Crewe Hub. This will increase rail patronage and demand and allow communities to access opportunities in major economic centres.

3.5 The proposed station and service

The proposed Beeston and Tarporley station site lies 17.3km North-West of Crewe station and approximately 16.7 km South East of Chester station on the Chester to Crewe section of the North Wales

Mainline. Currently, the only passenger services that operate along this line section are operated by Transport for Wales and Avanti West Coast with limited freight services using the corridor across the day. In terms of interchange opportunities at Chester there is the opportunity to interchange to Liverpool using Transport for Wales services.

At Crewe there is the opportunity to interchange to both Manchester using either Transport for Wales, Avanti West Coast or Northern services, and to Birmingham/London Euston using either Avanti West Coast, West Midlands Trains or in the future HS2 services.

Figure 5 below outlines how the proposed station is at the heart of the Norths' rail network, with onward connections via existing and future high speed services.

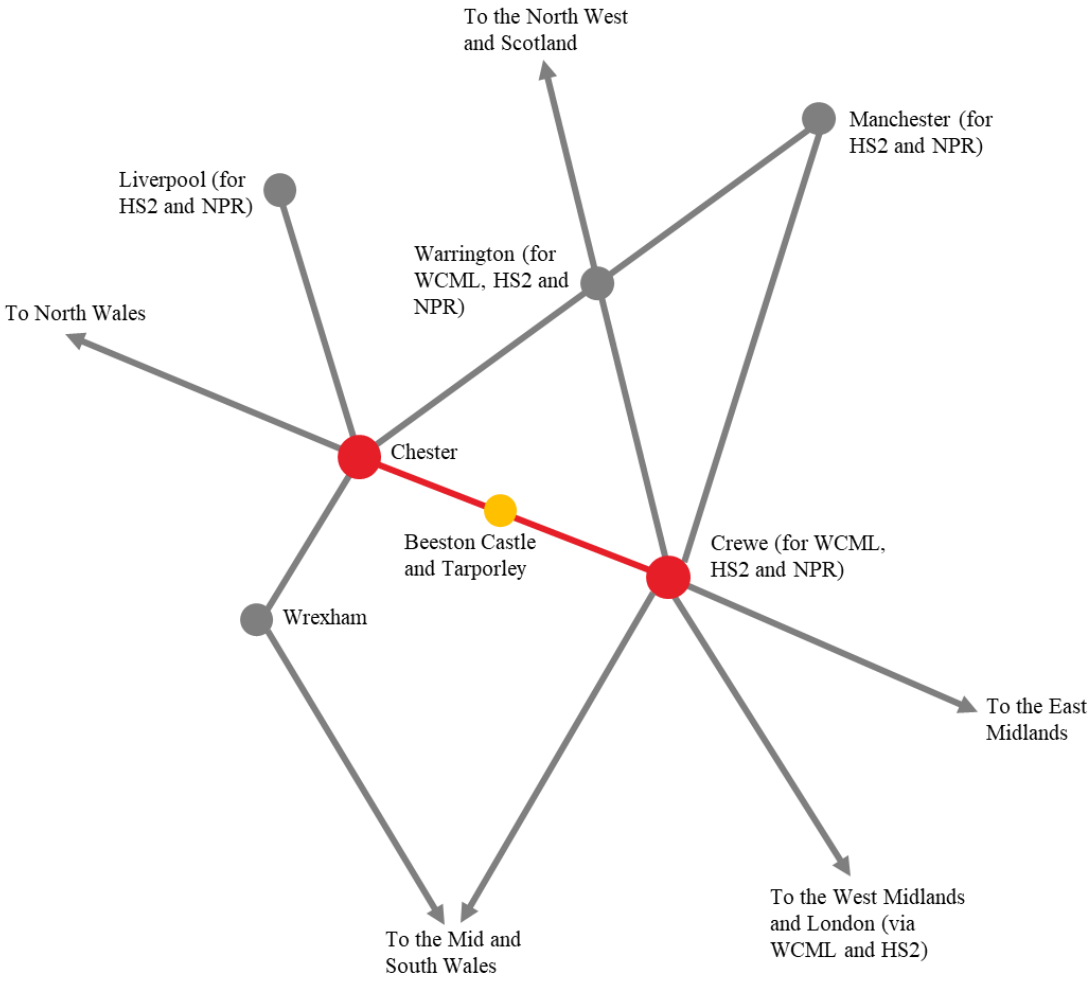


Figure 5 - Schematic of the rail network across Cheshire and the location of the proposed station

Sustainability and environmental context

The proposed Beeston and Tarporley station site has a flood zone nearby, specifically north of the embankment due to parallel running of the River Gowy.

As shown in Figure 6 below, Environment Agency data shows that the station site is located adjacent to a Flood Zone 3 area. Land within Flood Zone 3 are shown in dark blue on the flood map and pose a 1 in 100 or greater annual probability of river flooding.

Any development of station related earthworks to the embankment will need to be cognisant of this potential risk, which will require mitigation and assessment detailed assessment as detailed designs become known.

Figure 6 - Flood plains nearby to the proposed Beeston and Tarporley station site (source: Environment Agency)

Additionally, Defra data shows that the proposed Beeston and Tarporley station site is located nearby both a scheduled monument, coloured orange in Figure 7 below, and an area of woodland improvement with a high spatial priority (coloured brown). No Ramsar, Sites of Special Scientific Interest (SSSI), Priority Woodland or wider designations have been identified from high level searches.

Figure 7 - Scheduled monuments and areas of woodland improvement near the proposed Beeston and Tarporley station site (source: Defra).

It is important to note that both the initial construction and any further developments of this station will need to be cognisant of any local constraints and designations.

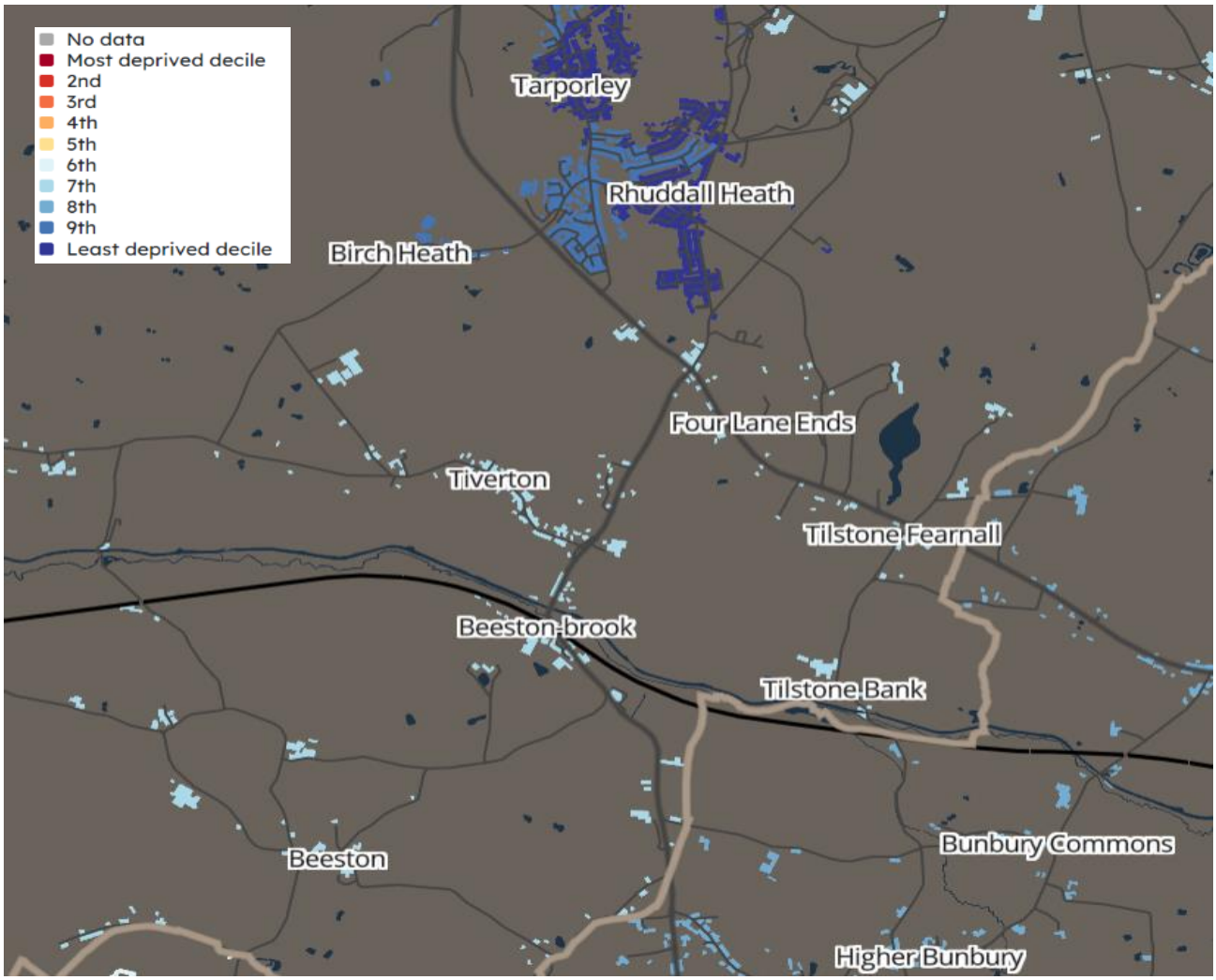


Figure 8 - Indices of multiple deprivation (source: consumer research centre)

The communities surrounding the station are some of the least derived in the country, with strong economic performance. Residents in least deprived communities also have the greatest propensity to travel by rail, making the case for a rail station in the heart of the area an important asset for continued strong economic performance and opportunities.

4. Station location and design

Options have been developed to identify the potential concept design solution for a station at Beeston and Tarporley. This chapter sets out the design considerations and requirements, the site-specific considerations, and the options developed.

4.1 Design considerations and requirements

Below we have set out the design considerations and requirements for a new station. This is based on guidance from DfT, Network Rail, as well as best practice.

Railway specific considerations

- Two platforms are required serving the up and down lines. It is deemed to have too great an impact on the operation of the railway to provide an additional crossover to the north of the site, using the existing crossover to access a single platform to the south of the alignment (along the up main).
- Whilst the designs are at concept stage only, they have been developed within the technical guidance of Network Rail design standards. In particular:
    - Platforms must have a minimum width of 3.30m (+50mm construction tolerance) to ensure compliance with the Persons with Reduced Mobility National Technical Specification Notice (PRM NTSN, formally the PRM Technical Specification for Interoperability (TSI)). This allows for a 1.8m boarding ramp to be unloaded from a train with a 1.5m wide clear turning area on the platform, along the full length of the platform (train stopping positions and door configurations are unknown).
- It is assumed that the existing foot crossing can be removed subject to access being maintained via the station access / station footbridge.

Footbridge requirements

- A new station footbridge is required where direct access to both platforms cannot be made from a car park area.
- The footbridge must have step-free access. Both lift and ramp options are to be assessed for spatial planning purposes.
- The minimum clearance to the soffit of the footbridge is to be 6.2m from rail level so as not to preclude any future installation of OLE along the railway in this location. As such, the steps will be configured to have 2 flights of 19 steps with 170mm risers and 300mm goings (BS 8300).

Car park requirements

- The car park will be designed to NR/L2/CIV/160 and BS 8300, including the requirement to have 5% blue badge spaces and an additional 5% oversized spaces.
- Standard car parking spaces are sized at 2.4m x 4.8m
- Aisle widths are to be 6m for one way circulation and 6.9m for two-way circulation.
- Footway widths are to be a minimum of 2.0m.

Highway requirements

- Access roads will be designed in accordance with the Manual for Streets or the Design Manual for Roads and Bridges. This will be stated clearly on the option layout drawing.

- Bus access is limited by the railway underbridge and will be excluded from the site unless requested by project stakeholders on the basis that a single-decker bus can access the site.
- Footway / cycleway gradients are limited to 5% (BS8300).

Site requirements

- The land to the north of the railway lies within Flood Zone 3. An FRA is recommended at a later project stage.
- All earthworks are proposed at a gradient of 1 in 2.
- Site levels are taken from Department for the Environment, Food and Rural Affairs (DEFRA) open access LiDAR with a 2m resolution.

4.2 Site layout options

Common elements

The four site options set out in the following sections contain the following common elements:

- 2no. 150m long side platforms constructed from pre-cast riser wall units and engineered backfill. The surfacing is assumed to be a flexible bituminous build-up designed for pedestrian and light vehicle loading. The width is a minimum 4.15m (wider where buildouts are required for the footbridge and shelters).

  NB: Options 4a and 4b present 75m long platforms on the basis that the three-car rolling stock used by Transport for Wales along this route is maintained.
- 2no. waiting shelters per platform (4 in total), assumed to be a mace main type shelter or similar.
- 1no. ticket vending machine situated in the station car park.
- An LMS-type steel u-deck footbridge as per Network Rail standard design details.
- 2no. Type 2 lift shafts suitable for 8 passengers with through entry *(excluding Option 3).*
- An earthwork embankment is required to facilitate the construction of Platform 1. Based on the DEFRA LiDAR data, this will comprise approximately 10,000m³ of engineered fill material (assuming lift access to Platform 1) *(excluding Options 4a and 4b).*
- Lighting for the platforms, car park and access road.
- Power and telecommunications connections to the station from the A49.
- Covered hooped (Sheffield) cycle stands with capacity for 20no. cycles (10no stands), located within the station forecourt area.
- Infrastructure for 1no EV charging point.

4.3 Discounted option

Prior to the outline station design, considerations were made as to whether to locate the station to the east of the A49 (around the location of the previous station) or to the west of the A49 (where the car park and railway side access to the signal box is located). The option to locate 150m long platforms to the east of the existing signal box was discounted on the following basis:

- The existing topography would require embankments or retaining walls to be constructed on both sides of the railway.

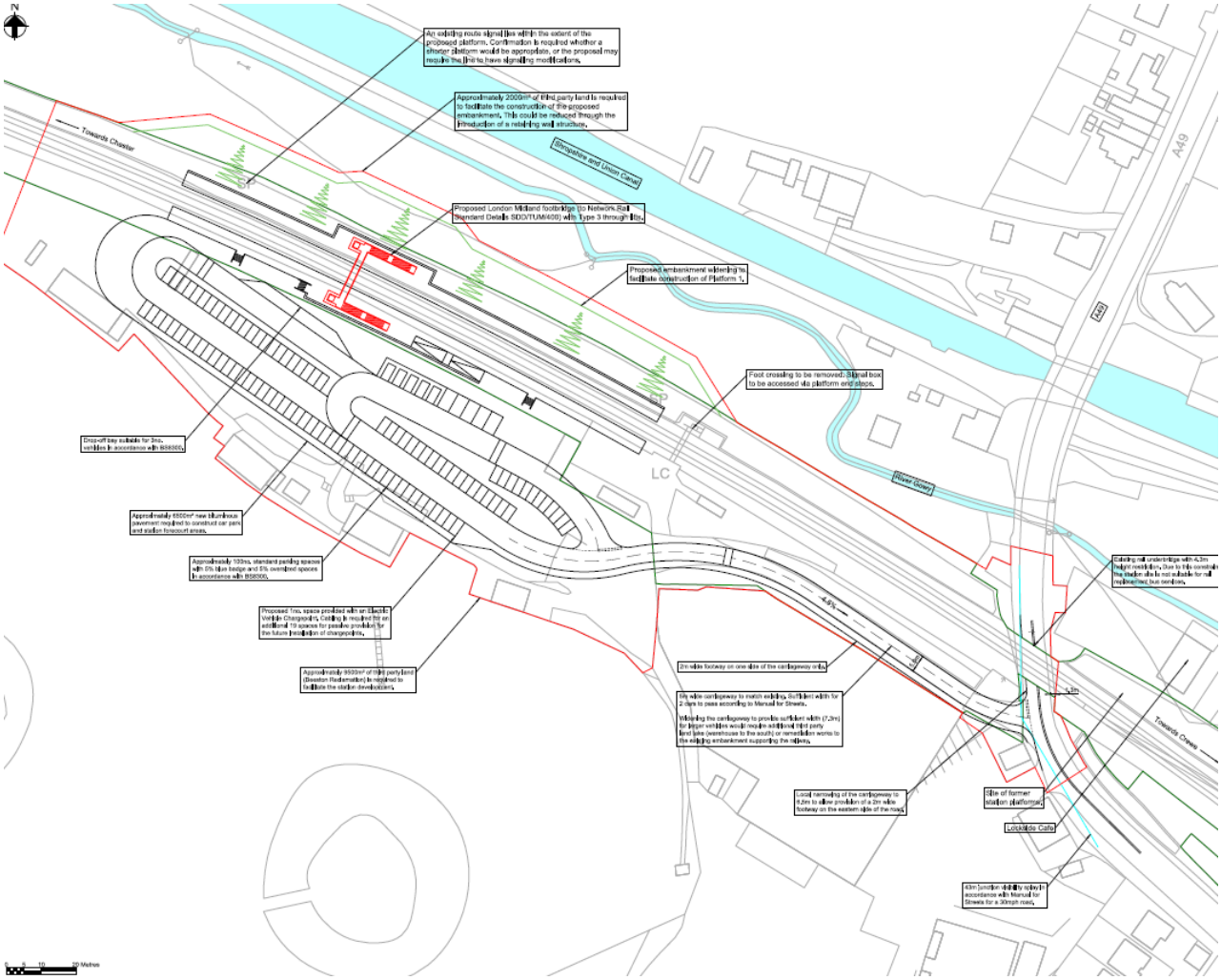
- It is likely that the existing railway underbridge would require widening to facilitate the provision of platforms.
- There are more third-party land plots to the east of the underbridge, meaning there is no obvious site for a station car park / forecourt without requiring the purchase of multiple third-party sites.
- Constrained site between the highway and railway line.

4.4 Options for the preferred way forward

The following options presented set out variations in the site located to the west of the road bridge. Different platform designs, lengths, highway access, and car park considerations have been made for consideration by decision makers.

Full-size drawings for all the options are included in Appendix A.

Option 1A – 150m Platform Station with larger park and ride provision



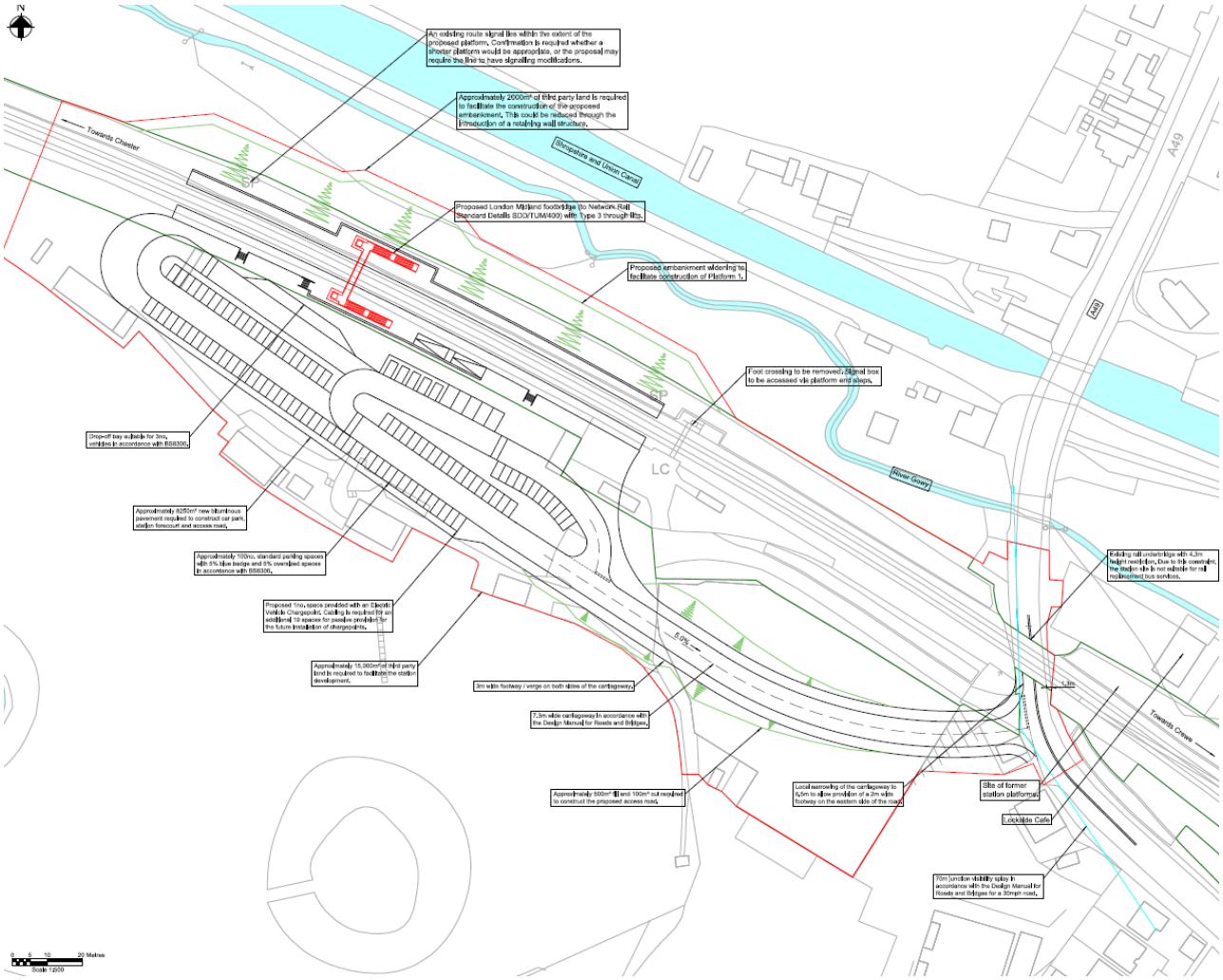
Option 1A aims to present the minimum viable product with car parking, based on the assumption that the entire Beeston Reclamation site is required to be purchased to facilitate provision of a station to the west of the A49.

Option 1A maintains the existing access to the Beeston Reclamation site. This is a narrow road without any footways. Assuming the existing width constraints (an existing building and the embankment supporting the railway) are maintained, there is enough space for a 5m carriageway and a 2m footway to the south side. This (according to the Manual for Streets) is appropriate for two-way car and small van traffic. Cycles would be required to travel on the carriageway with no segregated facilities. The existing gradient of approximately 5% is maintained.

The junction with the A49 would be modified to provide 6m junction radii, and to widen the western footway under the railway bridge to 2m. This requires a local narrowing of the carriageway on the mainline route from 7.3m to 6.5m. Junction visibility is maintained for 43m in both directions as set out in the Manual for Streets for a 30mph highway. Cross platform access is enabled by stairs and lifts to each platform.

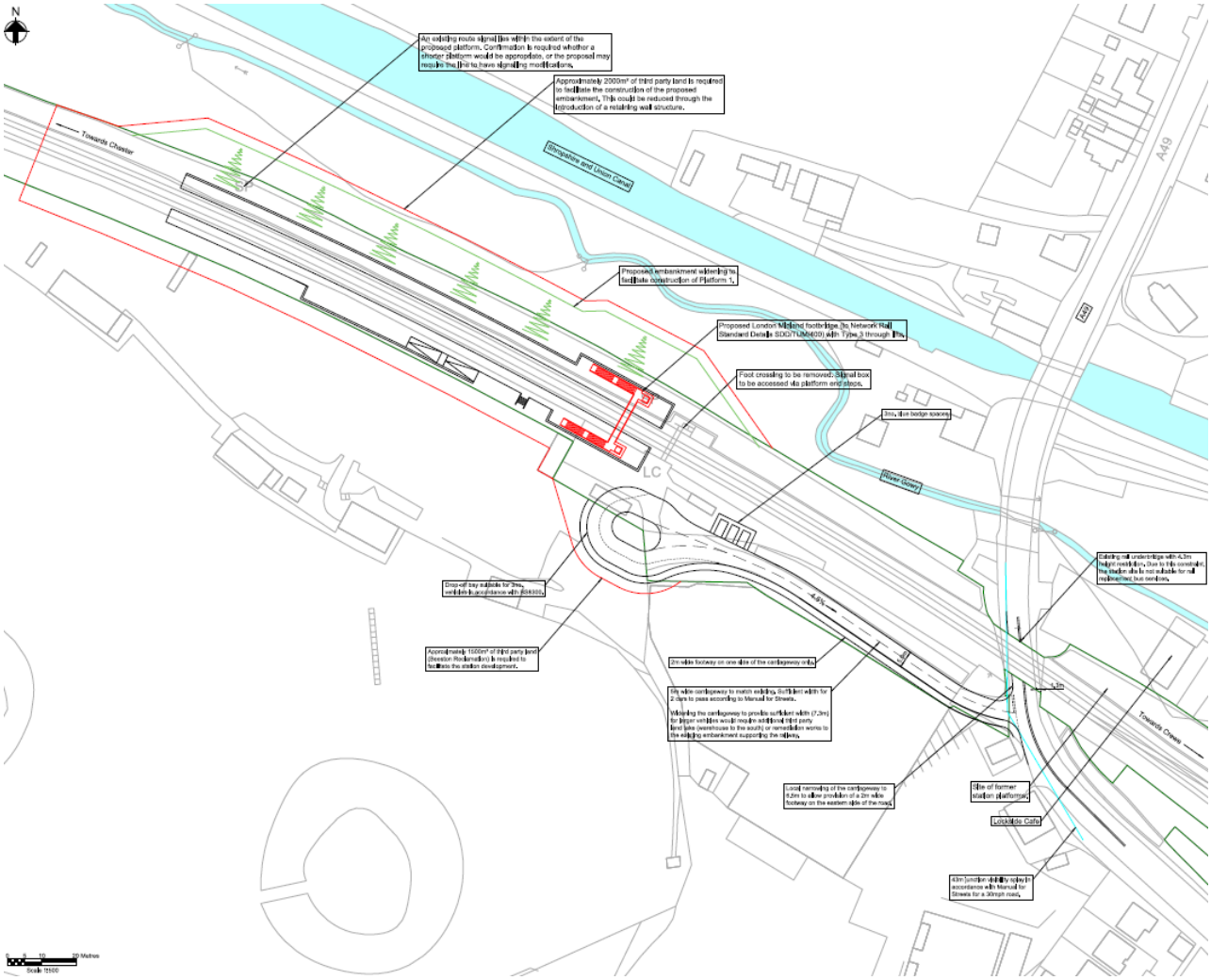
NB - it has been estimated that utilising lifts to access the footbridge, rather than ramps, is the cheapest capital expenditure option. This is due to additional third-party land take as well as significant earthworks required to facilitate the construction of an embankment to the north of the railway to cater for the ramp structure. It must be noted, lifts will require greater operational expenditure to operate and maintain. More information is set out in Option 3.

Option 1B – 150m Platform Station with large park and ride, and enhanced highway access



Option 1B sets out the access layout subject to the requirements set out in the Design Manual for Roads and Bridges to ensure efficient highway access into / out of the site. The enhanced highway access would require additional third-party land take and additional earthworks. The car park and station layout remain as detailed in Option 1A. Cross platform access is enabled by stairs and lifts to each platform.

Option 2 – 150m Platform Station with no car parking provision



Option 2 presents the minimum viable product based on the assumption that the Beeston Reclamation site can remain operational if the land take required for the proposed station is minimised (with an allowance for reconfiguration of the site to account for the station layout).

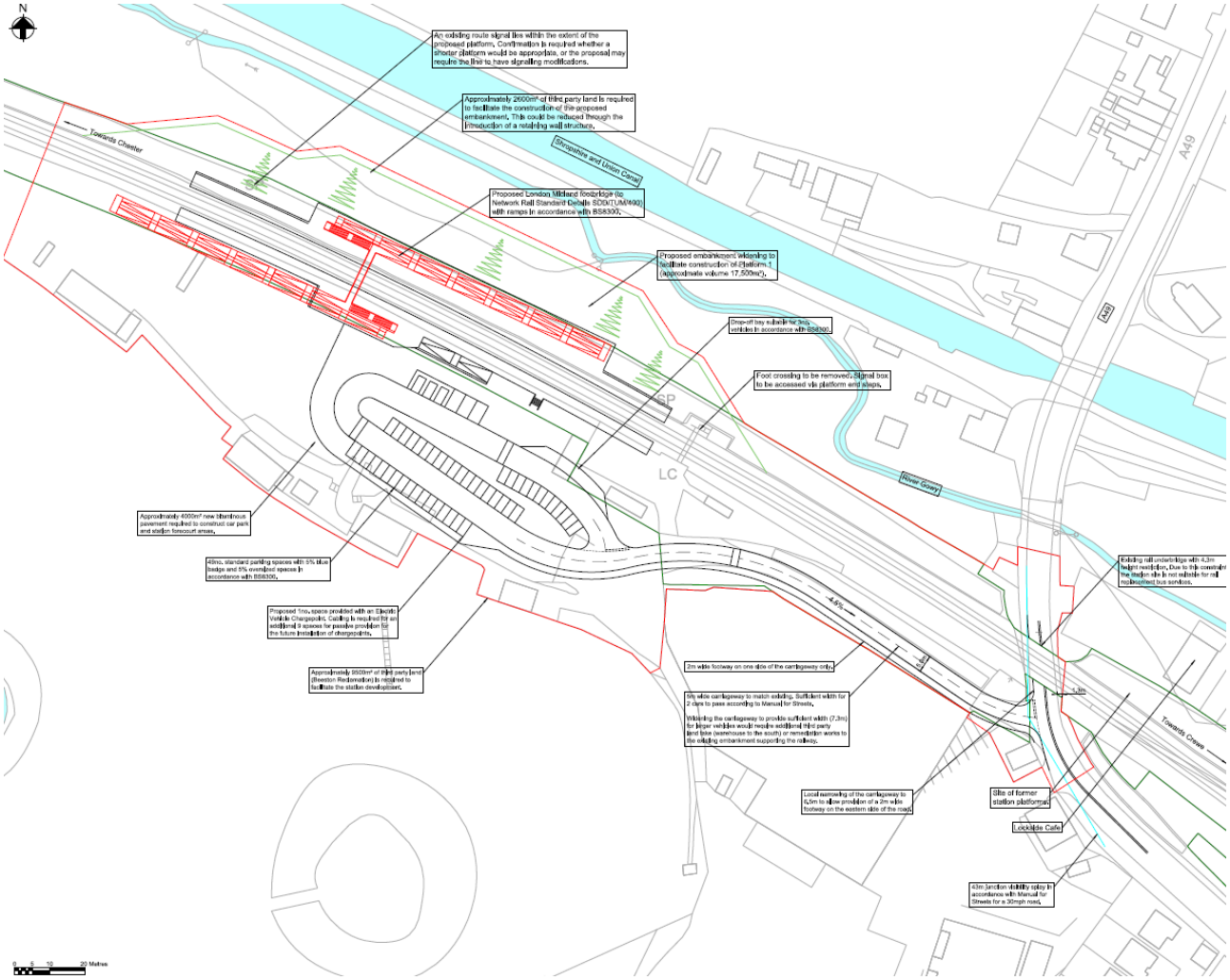
The access from the A49 remains as detailed for Option 1. The car parking is reduced to a nominal 3 blue badges spaces and a drop off bay sized in accordance with BS8300 for 3no vehicles. This could result in parking issues nearby the station location

To reduce land take within the Beeston Reclamation site it is proposed that the footbridge is relocated to the eastern end of the platforms. Further demand modelling is required to inform if end loading the platforms would have a negative impact on crowd loading or emergency evacuation requirements.

The turning head shown is sized for cars and small vans only.

Cross platform access is enabled by stairs and lifts to each platform.

Option 3 – 150m Platform Station with small park and ride, and ramped platform crossing

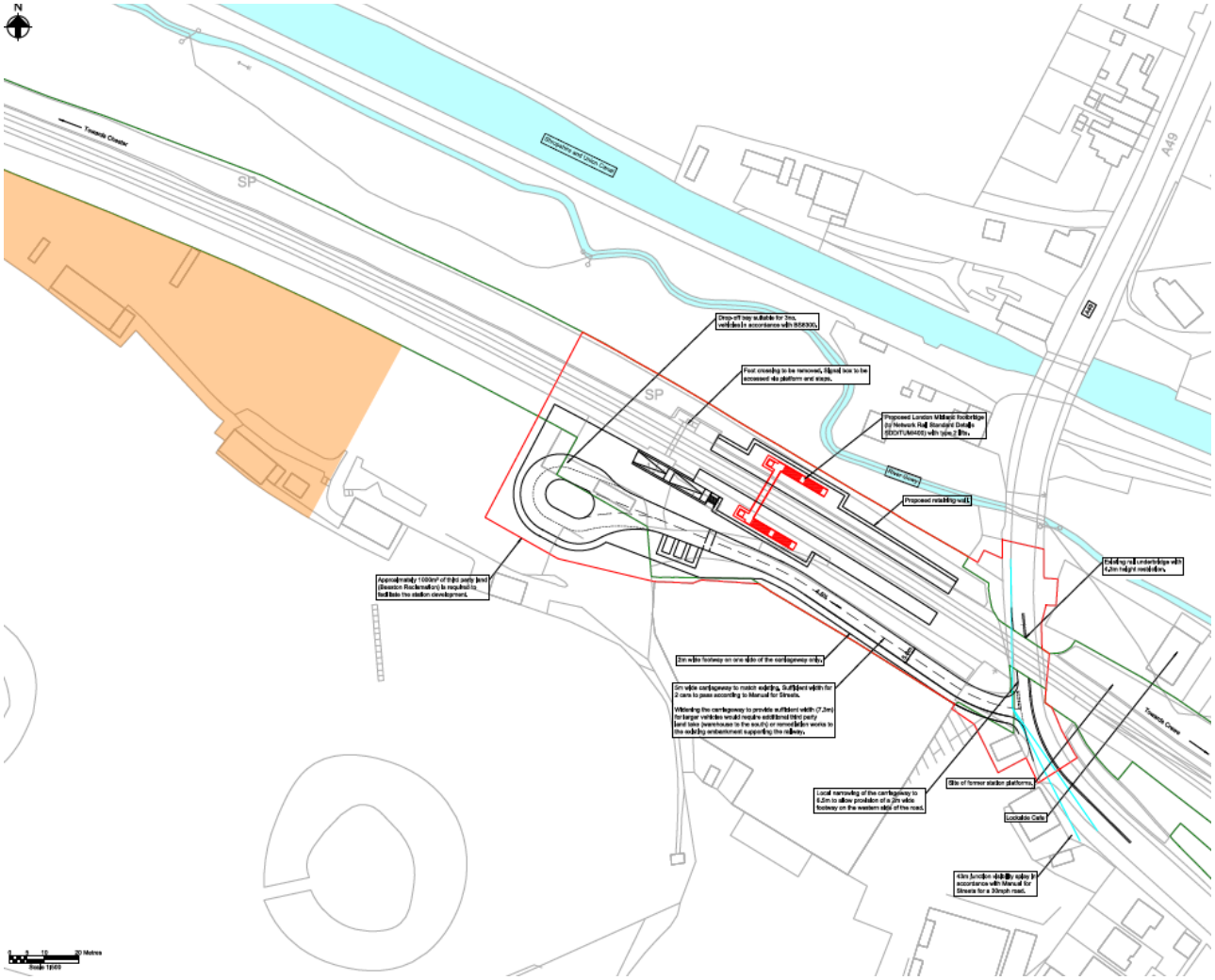


Option 3 sets out the layout if ramps are used to access the station footbridge as opposed to the lifts detailed in the previous options. Ramps can be an option where a station is unstaffed but are generally unpreferred to lifts according to BS8300, which states '*where a level difference is greater than 2m, lifts should be provided instead of ramped accesses.'*

To comply with the requirements for ramps in BS8300, each ramp has a total of 12no. 500mm risers at a maximum gradient of 5%. Landings are provided between each riser, and each ramp has a total length of approximately 150m between platform and footbridge level.

This means that the ramps have a greater spatial footbridge than their lift equivalent. On Platform 1, this requires an additional 600m² of third-party land and an additional 7,500m³ of earthworks to facilitate the construction of the embankment required to the north of the railway. To the south of the railway, the ramp footprint reduces the available space for car parking, which has been reduced to approximately 50 spaces in this option.

Option 4a – 75m Station with no park and ride facility



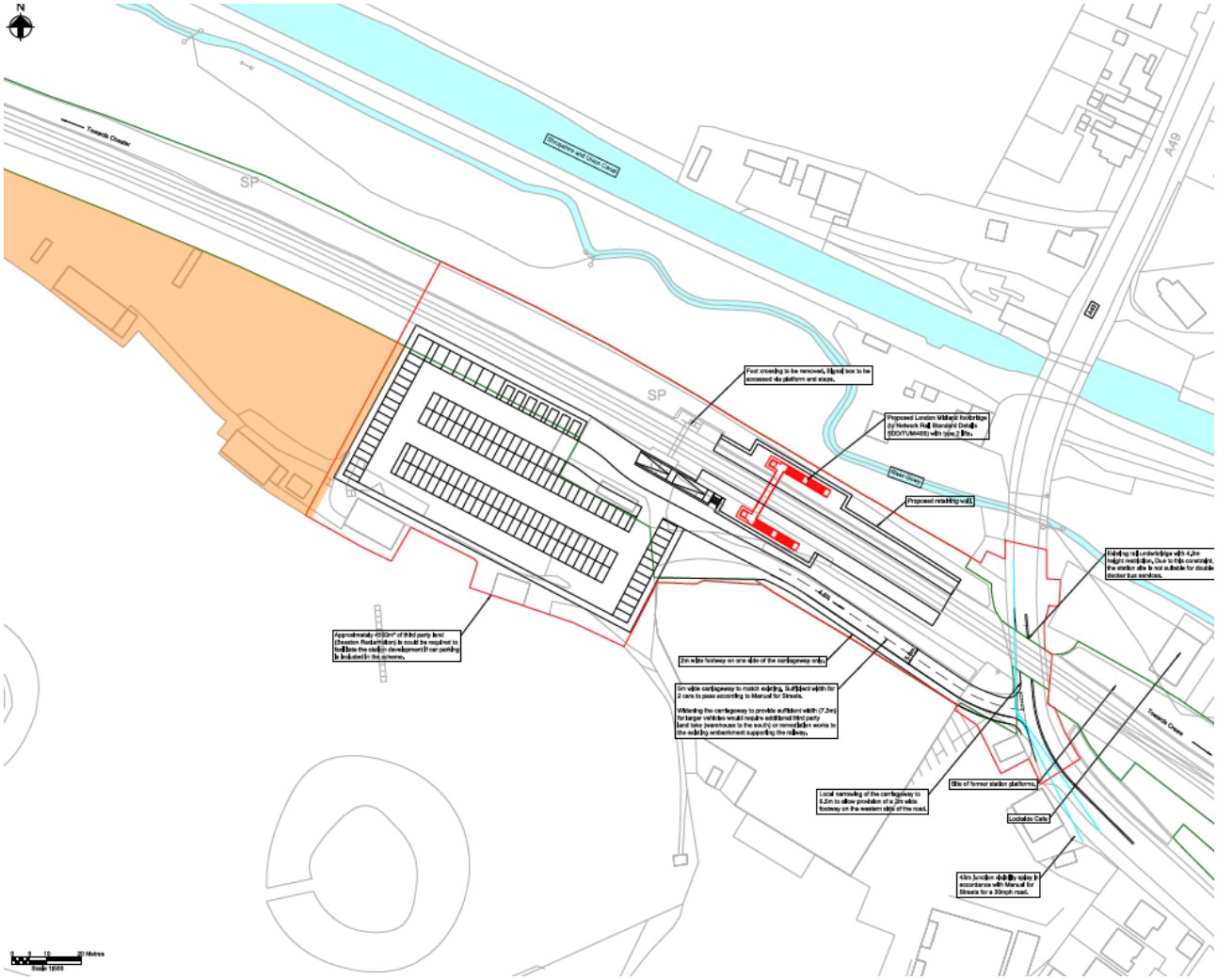
Option 4a presents the minimum viable product, aiming to minimise the land acquisition within the Old Coal Yard (Beeston Reclamation site). The extents of a proposed housing development are shown in orange to the west of the proposed station site.

In line with the existing rolling stock used by the Transport for Wales services, the platform lengths are reduced to 75m long and have been moved to the east. This relocation brings in a requirement for a retaining wall structure along the back of the northern platform to avoid building over the River Gowy. The retained height is approximately 7m.

A drop off bay is provided in accordance with BS 8300 alongside three accessible parking spaces. The existing access road is maintained at a width of 5m. Again, consideration would need to be made on parking mitigation measures in the area surrounding the station.

The footbridge remains as presented in Options 1 and 2.

Option 4b – 75m Station with park and ride facilities within current Railway land



Option 4b aims to maximise the space available to the east of the proposed housing development (shown in orange) for a park and ride facility with approximately 130 spaces, plus 5% accessible spaces and 5% oversized spaces.

The platforms and footbridge are as presented in Option 4a (75m long with a retaining wall required along the back of the northern platform).

This layout could be modified at a later design stage to provide a bus turning circle (for the loss of a small number of parking spaces). Bus access would be feasible from the south of the site subject to small junction alterations at the junction with the A49.

5. Operational review

5.1 Operations introduction

The following section sets out a high-level operational review and analysis of the Crewe to Chester line, of which the reopened Beeston and Tarporley Station would be located.

At this stage, the operational review is indicative and based on available information. Whilst the findings have been reviewed at a high level by Transport for Wales, is recommended that the findings are also discussed via engagement with Network Rail to clarify potential issues around turnaround times, prior to a detailed Capacity Study being undertaken at the SOBC stage of programme development.

The Beeston and Tarporley Station site lies 10.75 miles North West of Crewe station and approximately 10.4 miles South East of Chester station on the Crewe to Chester line between Crewe and Chester stations.

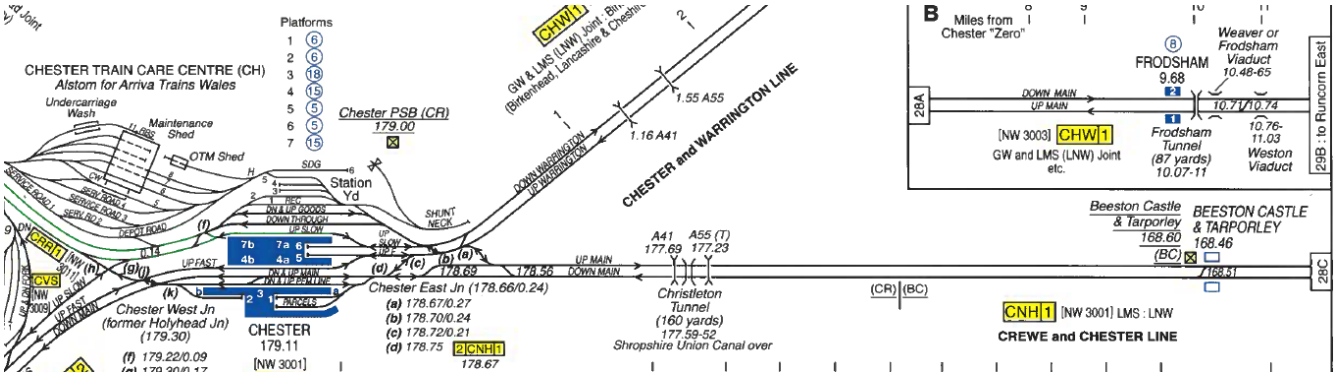


Figure 9 – Quail map extract showing the Beeston and Tarporley station site

Beeston and Tarporley Station is proposed to have 2 platforms. These platforms are proposed to be approximately 150m in length.

The line between Crewe and Chester is almost exclusively a 2-track section aside from a brief four track section just outside of Crewe. All up services (from Chester to Crewe) will use the same line and all down services (from Crewe to Chester) will use the same line. The top line speed on this route is 90 mph but this is not universal across the entire route.

5.2 Current services

There are currently 2 passenger services an hour between Crewe and Chester.

- Avanti West Coast operate a service in each direction between Crewe and Holyhead that has no standard pattern but is made up of approximately 7 trains a day
- Transport for Wales operate a 1 tph shuttle service between Crewe and Chester

Table 2: Services passing Beeston and Tarporley as of February 2022

Operator	Frequency	Departure Time from Chester	Departure Time from Crewe	Service Group	Calling Points
Avanti West Coast	N/A (no defined pattern)	N/A (no defined pattern)	N/A (no defined pattern)	Crewe to Holyhead	Crewe, Chester, Flint, Prestatyn, Rhyl, Colwyn Bay, Llandudno Junction, Bangor, Holyhead
Transport for Wales	1tph	XX:54	XX:24	Crewe to Chester	Crewe, Chester

In addition to passenger service, there are a number of freight services that pass through the proposed Beeston and Tarporley station. Across a day there are approximately 4 freight paths in each direction running through the proposed station site. However, these paths do not conform to a standard pattern.

5.3 Utilisation

There is currently no timing point at the proposed Beeston and Tarporley Station. The nearest timing point to the old Beeston Castle and Tarporley station is the 'Beeston Castle & T. S. B', based on train times passing this point, the capacity utilisation of the line at the station platforms can be calculated.

Assuming that all services from Chester to Crewe use the up/down line and the Crewe to Chester services use the down/up line, the current daily utilisation at the site is 47% on both the up and down line (based on 4 daily freight paths in each direction).

5.4 Beeston and Tarporley – Potential future services

The planned platform lengths and timetable structure would dictate which services would be able to stop at the new station. Designs have been considered for both 150m and 75m platform lengths..

This would preclude any Avanti West Coast service using Pendolino rolling stock as the train length is greater than 150m. However, the vast majority of Avanti services using this line section use 5-car Voyager rolling stock which is approximately 116m in length and would therefore would not be precluded from calling at Beeston and Tarporley.

If the station were to be rebuilt it would be logical to stop the Crewe to Chester shuttle services operated by Transport for Wales over the Avanti services from Crewe to Chester/Holyhead, as this would lead to less disruption across the wider rail network. All current and potential future Transport for Wales and Merseytravel rolling stock would be able to stop at the station in the 75m platform length design options.

Including Beeston and Tarporley station as a stop in the Transport for Wales service would offer a 1 tph service at the station in each direction.

If further demand is required, an option could be discussed with Avanti to stop their Crewe to Chester/Holyhead services. This would give the station a 2 tph service in each direction in line with Network Rail aspirations for new stations. However, this option is not analysed in this piece of work and would be the subject of further work.

5.5 Planned future changes to services and rolling stock

Having undertaken high-level desktop research, there do not appear to be any concrete future service planning aspirations pertaining to this corridor.

There will however be future changes to the rolling stock, as the current British Rail Class 153 'Super Sprinter' units, which entered service over 30 years ago in 1991 become life expired. Engagement with Transport for Wales in support of this study indicated no plans have currently been made, however the likely options include:

Transport for Wales and Transport for Wales Rail Services as the TOC may look to replace the current Class 153 Units with either cascaded British Rail Class 158 'Express Sprinter' diesel multiple units (DMU), or newly procured British Rail Class 197 diesel multiple unit (DMU) passenger trains, which have been recently procured to modernise and upgrade the TfW rolling stock fleet. Both of these units are 90 mph capable and would provide an attractive offering from both a railway operations and passenger experience perspective in advance of the current rolling stock deployed.

Alternatively, there is an aspiration that future rolling stock changes may see British Rail Class 230 D-Train diesel electric multiple unit (EMU) or battery EMU units operate the Transport for Wales service. TfW are trialling the diesel-battery-electric units on the Borderlands Line between Wrexham in North Wales and Bidston, with the trail commencing in May 2022.

Via engagement with Merseytravel, it was noted that there is future aspirations for Merseyrail services to run beyond the current network boundary at Chester, and onwards to Crewe. The service would be operated by British Rail Class 777 'Metro' battery electric multiple units, utilising the battery capability for the non-electrified track section between Chester and Crewe.

5.6 Operational constraints

To ensure operational feasibility of delivering services at Beeston and Tarporley, Arup has undertaken a high-level operational constraints study that sets out the impact of stopping services at the station on existing services.

5.6.1 Journey time impacts

Stopping services at Beeston and Tarporley will increase the overall journey time of services by approximately 2½ to 3 minutes, assuming that the Crewe to Chester shuttle services are the ones stopped. This time is the difference between a train running non-stop through the area and the deceleration time, stopping time, dwell time and acceleration time for a stopping service. Details of the calculation can be found in Table 3.

Referencing the Network Rail RailSys 2022 official standards, we have assumed that the standard braking rate of 0.78 m/s^2 for DMU/EMU vehicles is applicable to all services using this corridor. Based on this figure, at the maximum permitted line speed of 90mph, a train would take 52 seconds to come to a stop.

Station dwell times often vary between stations and for different types of rolling stock and are defined in the Timetable Planning Rules published by Network Rail. This considers the number of passengers using the station as well as technical timings such as door cycle times.

Class 390 Pendolinos operated by Avanti West Coast have a standard station dwell time of 120 seconds which allows for the increased door cycle times caused by the folding steps.

Class 221 Voyager services operated by Avanti West Coast have a standard station dwell time of 90 seconds.

Both Class 153 and Class 158 Sprinters services operated by Transport for Wales have a minimum dwell time of 30 seconds

Using RailSys we have managed to extract the acceleration profiles of the rolling stock used on this corridor. Going from 0mph to the maximum line speed of 90mph, a Class 390 unit has an average acceleration rate of

0.302m/s^2, meaning it would take 133 seconds to fully accelerate. Going from 0mph to the maximum line speed of 90mph, a Class 221 unit has an average acceleration rate of 0.304m/s^2, meaning it would take 132 seconds to fully accelerate. Going from 0mph to the maximum line speed of 90mph, a Class 158 3-car unit has an average acceleration rate of 0.253m/s^2, meaning it would take 159 seconds to fully accelerate. Going from 0mph to the maximum line speed of 90mph, a class 158 2-car unit has an average acceleration rate of 0.224m/s^2, meaning it would take 180 seconds to fully accelerate. Going from 0mph to its maximum speed of 75mph, a class 153 unit has an average acceleration rate of 0.198m/s^2, meaning it would take 170 seconds to fully accelerate. The total time increase from adding a station call at Beeston and Tarporley for each unit can be found in table 3 below.

The increase in journey time over a non-stop service was calculated by subtracting the time taken for a train to travel at line speed between the point where deceleration starts and acceleration ends for a stopping service, from the time required to slow down, stop at the station, and speed up again.

Table 3: Operational characteristics and impact on journey time of train unit classes

Unit Class	Top Speed	Deceleration	Dwell	Acceleration	Existing non-stop time running at line speed	Total Increase (columns 2+3+4-5)
Class 390 (11 Car)	Design: 140 mph Service: 125 mph	52s	120s	133s	92s	213s
Class 390 (9 Car)	Design: 140 mph Service: 125 mph	52s	120s	133s	92s	213s
Class 221	125 mph	52s	90s	132s	92s	182s
Class 153	75 mph	52s	30s	159s	106s	135s
Class 158 (2 Car)	90 mph	52s	30s	180s	116s	146s
Class 158 (3 Car)	90 mph	52s	30s	170s	105s	147s

The total increase in journey time shown in the final column of Table 3 above is a calculated technical value. The final value used to plan the timetable would be determined by the Operator and Network Rail agreeing on Sectional Running Time Values rounded to 30second intervals.

We have assumed that for a Class 158 an appropriate conservative assumption is that the journey time increase will be 3 minutes due to the close proximity of the technical value to the 2½ minute interval (150seconds). At a high level, this review has been reviewed and confirmed by Transport for Wales.

5.6.2 Platform lengths

The proposed platform length at Beeston and Tarporley station is 150m. This is following Network Rail's design standards, but as shown below, could be reviewed in light of the likely rolling stock that would serve the station at future stages of scheme development.

Transport for Wales currently operate 2 car class 153 sprinters on the Crewe to Chester shuttle service. The length of a 2-car train is approximately 46m and as such, would comfortably be able to serve the proposed station.

Similarly, either 2-car or 3-car formation class 158 trains (46.4m and 69.6m length respectively) would also be able to feasibly operate from the station.

The vast majority of Avanti West Coast services between Crewe and Chester are operated with class 221 multiple units. A full length 5-car unit is approximately 116m meaning that it would be feasible to stop these services at Beeston and Tarporley, should it be necessary.

However, a minority of Avanti West Coast services between Crewe and Chester are operated with class 390 Pendolino multiple units. A full length 9-car set is 217.4m and an 11-car unit is 265m. This length is significantly greater than the proposed platform length of 150m meaning that it is not feasible to stop these services at Beeston and Tarporley.

Table 4: Train lengths at Beeston and Tarporley

Current Train Operating Company	Unit Class	Train Formation	Total train length (approx.)	Can stop at Beeston and Tarporley
Avanti West Coast	390	9 car	217.4m	No
Avanti West Coast	390	11 car	265m	No
Avanti West Coast	221	5 car	116m	Yes
Transport for Wales	153	2 car	46m	Yes
Transport for Wales	158	2 car	46.4m	Yes
Transport for Wales	158	3 car	69.6m	Yes
Transport for Wales	197	2 car	48m	Yes
Transport for Wales	197	3 car	71.4m	Yes
Merseyrail	777	4 car	65m	Yes

5.6.3 Delays to services

Based on the current timetable the shortest gap between services is 18 minutes (including the 4 minute headway allowance). This allows 14 minutes of contingency for delays to services and poses little risk to operation of following services. The impact on the Crewe-Chester service group itself would be dependent on turnround times but would be low risk if the introduction of additional units as proposed later in this report occurs.

5.6.4 Turning around services short

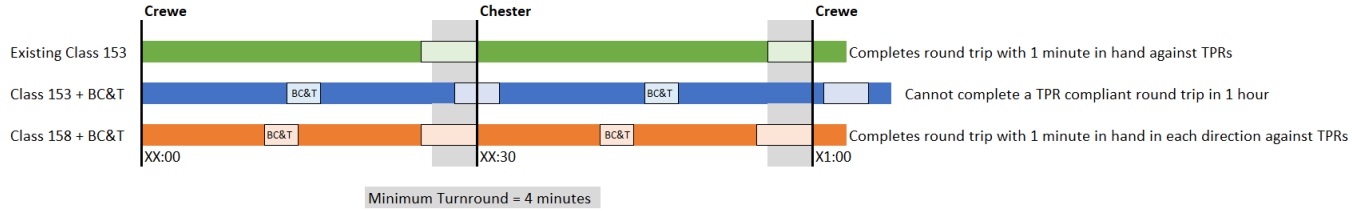
Turning round services short of their destination is not an applicable risk to this piece of analysis, as we are not considering altering any of the Avanti West Coast services at this stage of analysis and the Transport for Wales shuttle services contain no other intermediate stations between Beeston and Tarporley and Crewe and Chester.

5.6.5 Chester Station impacts

Platform allocations

The Transport for Wales Crewe to Chester shuttle service is currently allocated to depart from and arrive at Crewe from a mixture of platforms 9,10 and 11 throughout the day. It is also allocated to depart from and arrive at platform 1 at Chester.

This service currently operates using the minimum turnround times (as specified in the Timetable Planning Rules) at Chester station of 4 minutes and typically only operates a minute over the minimum turnround times at Crewe. Therefore, adding an additional station call at Beeston and Tarporley, and an assumed 3 minutes onto the overall journey time, does not allow the current service to operate compliantly, as illustrated in the diagram below:



Note - There is 1 minute of engineering allowance time for these services at Crewe Steel Works which our assessment has left unchanged, as engineering allowances in a timetable are typically inflexible.

An intuitive answer to try to resolve this problem would be to reallocate Class 158 rolling stock to this route as it can run at the maximum line speed of 90mph, which is a faster top speed than the currently operated class 153, which has a maximum speed of 75mph. The higher top speed would therefore lead to journey time savings.

A high-level assessment of this option, using values for a Class 158 taken from BPlan, and validated against the occasional service using this rolling stock in the timetable and Arup's own desktop calculations, has led us to conclude that on average 3 minutes of journey time savings could be achieved by using class 158 stock instead of class 153 stock.

This change negates the additional journey time introduced through the inclusion of a stop at Beeston and Tarporley and would, subject to detailed timetable and capacity analysis at future stages of SOBC programme development, feasibly accommodate a stop within the current end-end service operation.

Therefore, in order to provide a 1tph service at Beeston and Tarporley using the Transport for Wales shuttle service there are two main options:

1) Continue to operate using Class 153 rolling stock and allocate an additional unit of rolling stock to the service group.

2) Operate the service using Class 158 rolling stock or other equivalent 90mph capable rolling stock (such as the new Transport for Wales British Rail Class 197 DMUs scheduled to operate elsewhere on the network across the North West).

NB - Class 230 D-Train units have a maximum speed on 60mph. Discussions with Transport for Wales is advised to discuss potential opportunities and challenges operations with this unit in the future may cause.

Our recommendation, considering cost and the also the impact on station capacity of operating an additional unit of rolling stock, is for the Crewe-Chester shuttle to be operated using Class 158 (or equivalent 90mph capable) rolling stock.

Engagement with Transport for Wales on 90mph Unit Feasibility

Following engagement with Transport for Wales in March 2022, the above findings of the Operations Review were shared and reviewed by TfW, who were supportive of the methodology findings, noting the feasibility of service using a 90mph unit.

TfW recommended that during future phases of programme development, assessment is undertaken using Class 197 units operating the Crewe-Chester Shuttle. TfW advised that due to the age and life expectancy of the class 15x fleet, it is a most likely assumption that Class 197 units would be used on the service in the future rather than a Class 158.

As both the Class 158 and 197 units have a top speed of 90mph, both will feasibly be able to operate the service.

High level analysis undertaken by Arup post engagement with TfW demonstrates that where both Class 158 and Class 197 operate on over the same track sections, the class 197 has a higher performance level. While the impact of utilising a class 197 on the Crewe-Chester service has not been undertaken given the feasibility of class 158 operations, high level analysis suggests a further additional 1 minute of journey time saving could be realised, primarily due to better acceleration.

5.7 Wider network operations impact

In order to properly evaluate the operational solution we have suggested to implement a service at Beeston and Tarporley station we would need to consider the wider network impact of this potential solution.

If we were to diagram this service using an additional class 153 unit, as per todays operations, we would need to use an additional platform at Chester in order for the service to meet minimum turnround times. Turnrounds at Chester would now be 65 minutes as services arriving at Chester at XX:49 would form the XX:54 service in the next hour, significantly changing platform occupation during each hour.

It is important to note that the assumption that the unit arriving at Chester at XX:49 will stay in the platform to form the next XX:54 service is a pessimistic one and that in reality the operator may be able to rationalise their diagramming to make it more efficient and reduce this platform occupation. As such, engagement with Transport for Wales Rail as the operator is recommended.

Following a high-level desktop analysis of the present-day timetable it looks like platform 2 could potentially be available, but this would need to be investigated in more detail to check for potential timetable and headway conflicts. We would also need to consider the cost of an additional unit. At a high level we estimate that the indicative cost of an additional class 153 unit would be approximately £7000 a month capital rental charge, plus the following additional charges

- A light maintenance charge of approximately 30 pence per vehicle mile
- A non-capital rental charge of £4,000 a month
- A fuel consumption charge of 6.6 miles per gallon per vehicle
- A variable usage charge of 8.63 pence per vehicle mile

It is important to note that in the event of a subsequent rolling stock cascade, likely class 158 or 197 units, these figures would be invalid as the alternative rolling stock that would be likely to form any subsequent rolling stock cascade would likely have a higher capital rental and other charges – though importantly less units would required to operate the service.

5.8 Key findings of the operational review

The findings of the operational review demonstrate the following:

1) Under the current timetable and rolling stock allocations for the route stopping the Transport for Wales Class 153 Sprinter service from Crewe to Chester is not feasible, as it would break the minimum turnround times at Chester and Crewe which are currently at the minimum value.
2) Operating with the use of an additional Class 153 rolling stock unit, would require use of an additional platform. A high level desktop assessment of the current timetable suggest that platform 2 would be the most logical platform to use and could potentially be done with minimal alterations to the timetable though this would have to be assessed in more detail at the next stage of this project. This solution would also require use of an additional rolling stock unit which would have an indicative cost of £7,000 for the capital rental charge plus other monthly associate costs.
3) Reallocating higher performing Class 158, or alternative 90mph rolling stock to this route would offset the additional journey time expended making a passenger call at Beeston and Tarporley, allowing the service to operate within the Timetable Planning Rules.

   Engagement with TfW indicates this option is realistic and represents the most feasible option for introducing services at the new Beeston and Tarporley station.

6. Cost estimates

The costing exercise has been conducted for all the four options discussed in Chapter 2. The results of this exercise are presented below in Table 5 – as well as presented in the context of a wider station openings, benchmarked over the last 8 years.

6.1 Basis of Costing

This cost estimates are based upon high level concept designs which have not included site survey or detailed modelling.

The cost estimate is based upon price levels prevailing at Q1 2022. Cost Data has been derived from:

- Prevailing market rates determined from current projects;
- Historic rates from past projects;
- Benchmark cost data from published cost information; and
- Market enquiries from suppliers and contractors

Cost information has been adjusted to reflect variances in price levels from the timing and location of the source cost data to the price basis stated above and the location of this project to recognise regional cost variances.

However, no provision has been included for inflation from the base date of this estimate to the midpoint of construction. This adjustment would need to be made once the timing of the proposed project is identified. Similarly, unit rates may be affected by the method of procurement / contract packing strategy and the scale of measures to be undertaken.

Preliminaries

Main Contractors Preliminaries are very dependent on programme duration and methodology. At this stage neither of these matters has been evaluated and hence the following range has been included to reflect potential outcomes:

Low	High
20%	30%

These allowances are deemed to include provision for Temporary Works.

Main Contractor's Overheads and Profit

Main Contractors Overheads and Profit reflect the prevailing market conditions and vary over time. At this stage no knowledge of the intended programme is given to identify what these conditions might be and hence a range has been included to reflect potential outcomes:

Low	High
5%	7.5%

Risk, Contingency and Optimism Bias

Given the nature and stage of the design information, provision has been included for Risk, Contingency and Optimism Bias at the following level:

Low	High
40%	60%

Summary Cost Basis

The current level of design is very conceptual and hence a range of quantum has been assessed for each of the proposed measures. Similarly, for the scope and content of each of the measures a range of potential cost has been assessed to reflect variance in specification.

Together, therefore, four estimated values have been generated for each location, to provide a range of estimated cost:

Lower Band	Low quantity x Low Unit Rates + Low Preliminaries + Low OH&P + Low Risk, Contingency and Optimism Bias
	High quantity x Low Unit Rates + Low Preliminaries + Low OH&P + Low Risk, Contingency and Optimism Bias
Higher Band	Low quantity x High Unit Rates + Low Preliminaries + Low OH&P + Low Risk, Contingency and Optimism Bias
	High quantity x High Unit Rates + High Preliminaries + High OH&P + High Risk, Contingency and Optimism Bias

6.2 Assumptions and exclusions

In the absence of detailed information, the following assumptions have been made in deriving this estimate:

Assumptions

- Works will be carried out at each site in a single continuous contract period with no requirement for weekend or night working.
- Materials arising from excavations will generally be re-used.
- The allowance for Preliminaries covers temporary works and traffic management. This should be considered provisional only and subject to detailed design, assessment of methodology and programme.
- Works can be undertaken without the need for track possessions.
- Platforms include a waiting shelter only.
- Station amenities include a toilet facility and ticket machine only. (i.e. no ticket office).
- The existing Beeston Antiques and Reclamation Centre at the junction with the A49 will be removed as part of the proposed housing development.
- The lift to the footbridge will accommodate 8 persons, with enclosure.

Exclusions

The following are excluded from the scope of this estimate:

- Land Purchase costs have not been considered within this study, as the majority of the land required for the station and associated car parking facilities are within railway owned land.

Where land beyond the current railway boundary is required, the Beeston Castle and Tarporley Station Reopening Group sponsors have advised on offers from developers to gift land at zero cost to support the stations development.

- Professional Fees associated with Design and Project Management (including any Site Supervision and Contract Administration).
- Client direct costs (e.g. internal management).
- Geotechnical and Environmental Surveys.
- Dealing with any contaminated arisings or invasive species.
- Inflation beyond the base date of this estimate.
- Works to any rail signalling or control systems.
- Works to existing permanent railway such as realignment, lowering or raising, switches and crossings.
- Flood protection / mitigation measures or dealing with existing watercourses.
- Retaining structures for earthworks.
- Works to existing rail over road bridge or to existing A49 highway.
- Statutory Charges and Fees - (e.g. Planning Fees, Building Control Fees and the like).
- S106, S278 Agreements / Contributions.
- Community Infrastructure Levy.
- Track possessions and TOC Compensation.
- Utility Diversions / Raising, Lowering or repositioning chambers and manholes.
- VAT.

6.3 Summary Cost Estimates

Table 5: Summary Cost Estimates

Option		Base Construction Cost Estimate Total (Excluding Prelims, OH&P & Risk & OB)	Gross Construction Cost Estimate Total (Including Risk & OB)
Option 1A 150m Platform Station with large park and ride provision	Lower Band	£3,411,000	£6,017,000
	Upper Band	£7,495,000	£17,403,000
Option 1B 150m Platform Station with large park and ride, and enhanced highway access	Lower Band	£3,532,000	£6,230,000
	Upper Band	£7,853,000	£18,235,000
Option 2 150m Platform Station with no car parking provision	Lower Band	£3,089,000	£5,449,000
	Upper Band	£7,013,000	£16,285,000
Option 3 150m Platform Station with small park and ride, and ramped platform crossing	Lower Band	£6,625,000	£11,687,000
	Upper Band	£14,023,000	£32,562,000
Option 4A 75m Station with park and ride facilities within current Railway land	Lower Band	£2,181,000	£3,847,000
	Upper Band	£4,760,000	£11,053,000
Option 4B 75m Station with park and ride facilities within current Railway land	Lower Band	£2,487,000	£4,386,000
	Upper Band	£5,215,000	£12,109,000

Note: Summary Cost Estimates Rounded to nearest £'000

For the cost estimates shown in table 5 above, Option 4a bears the least cost at approximately £7.5m when averaged between the lower and upper band of gross cost contingency. This provides the minimum viable product of a 75m double platform with drop of facilities only.

As Option 4A does not provide full car parking facilities, which will be a key demand attractor, Options 4B (£8.2m) for 75m long platform with car parking within the existing railway boundary looks to be optimal at this stage.

Option 3 would be the most expensive at circa £22.1m, driven by the additional land and earthworks requirements to accommodate the ramp structure over the embankment. It would also deliver a lower quantum of car parking spaces than options 1A or 1B.

At this stage, no preferred option requires selection, rather the options should be used to demonstrate a range of cost profiles in consideration of future stages of feasibility and business case development.

6.4 Cost Benchmarking

A cost estimate benchmarking exercise has been carried out to compare the indicative costs of Beeston and Tarporley station against other recently opened rail stations across the north and wider UK rail network (see Table 6).

The outturn cost of James Cook University Hospital Station in Middlesbrough was found to be £2.2m for a single platform unstaffed station (the cheapest delivered in the UK in the recent past, but noting 8 years of cost inflation subsequent). This was a single platform station with minimal passenger facilities and no associated car parking arrangements.	
Low Moor Station in Bradford and Ilkeston Station in Derbyshire, delivered in 2017 had outturn costs of £10.8m and £10.0m respectively for full length two platform stations, each with an overbridge and car parking facilities. These stations have similar design concepts to those proposed for Beeston and Tarporley. Low Moor Station has lift access to the footbridge, whilst Ilkeston utilises ramp access.	 

Table 6: Cost estimates for recent rail station projects in the UK

Station	Opened	Project cost	Overview of facilities
James University Hospital Cook	2014	£2.2m	1x platform, passenger shelter, CCTV, electronic screen, PA, no car parking
Pye Corner	2014	£3.5m	1x platform, passenger shelter, CCTV, electronic screen, PA, Small Car Park
Newcourt	2015	£4m	1x platform, passenger shelter, CCTV, electronic screen, PA, Drop Off area and disabled parking.
Apperley Bridge	2015	£15.9m combined	2x platforms, highway / pedestrian overbridge, passenger shelters, CCTV, electronic screens, PA, 297-space car park, a pickup/drop off point.
Kirkstall Forge	2016		2x platforms, passenger overbridge and lifts, passenger shelters, CCTV, electronic screens, PA, 127-space car park, a pickup/drop off point.
Low Moor	2017	£10.8m	2x platforms, pedestrian overbridge and lifts, passenger shelters, CCTV, electronic screens, PA, 128-space car park, a pickup/drop off point.
Ilkeston	2017	£10.0m	2x platforms, highway / pedestrian overbridge, passenger shelters, CCTV, electronic screens, PA, 96-space car park and pickup/drop off point.
Maghull North	2018	£13.0m	2x platforms, pedestrian overbridge and lifts, passenger shelters, CCTV, electronic screens, shop, PA, 300-space car park, a pickup/drop off point.
Warrington West	2019	£20.5m	2x platforms, pedestrian overbridge and lifts, passenger shelters, CCTV, electronic screens, PA, Bus Interchange, 287-space car park, a pickup/drop off point.
Horden	2020	£10.55m	2x platforms, pedestrian overbridge, passenger shelters, CCTV, electronic screens, PA, 139-space car park, a pickup/drop off point.
Bow Street	2021	£8m	1x platforms, passenger shelters, CCTV, electronic screens, PA, Bus stop, 69-space car park, a pickup/drop off point.
New Stations Planned for opening in 2022 onwards			
Portway Park and Ride	2022	£4.2m	1x platforms, passenger shelters, CCTV, electronic screens, PA, Bus Interchange and Car Parking linked to adjacent Park and Ride Facility.
Marsh Barton	2022	£16m	2x platforms, pedestrian overbridge, passenger shelters, CCTV, electronic screens, PA, drop off point and 3 disabled car spaces.
Reston	2022	£20m	2x platforms, pedestrian overbridge and lifts, passenger shelters, CCTV, electronic screens, PA, Bus Interchange, 70-space car park, a pickup/drop off point.
Reading Green Park	2022	£20m	2x platforms, pedestrian overbridge and lifts, passenger shelters, CCTV, electronic screens, PA, multi-modal interchange including bus interchange, decked park and ride facility, short stay car park (kiss and ride), taxi drop-off, disabled parking facility, access road, landscaping, and associated works.

6.5 Key Findings of the Cost Estimations

The outcome of the costing exercise puts the total cost of most viable options for a 75m platform station (Options 4A and 4B) at approximately £7.4m - £8.2m – and a 150m platform station (Options 1A and 1B) at approximately £11.7m - £12.2m.

These indicative costing are either lower or comparable to some of the recently opened stations reviewed in the benchmarking exercise, particularly Low Moor and Ilkeston at £10.8m and £10.0m respectively, when inflation and contingency costs are accounted for given the high-level stage the project is at.

Future studies will need to undertake analysis on ongoing maintenance and wider operational expenditure costings, for example lifts, car parking facilities, lighting, and Ticket Vending Machines.

7. Passenger Demand Assessments

This section summarises the high-level assessment of passenger demand that could be generated by a new Beeston and Tarporley station.

The method used follows DfT guidance and recognised industry approaches for feasibility assessments, has been undertaken to explore the potential demand from as wide a range of sources as possible, whilst applying a robust evidence-based approach.

Given the rural location of the proposed station, alongside the potential transformational connectivity impacts the service would offer, both for short distance commuting and seamless interchange to long-distance connections to London, Manchester and Birmingham for leisure and business trips, a number of demand profiles have been generated to demonstrate the potential of Beeston and Tarporley station.

The demand at the new station would be made up from a combination of the following – in line with DfT guidance:

- Newly generated trips due to the additional transport offer;
- Abstraction from competing modes (bus and car); and
- Newly generated trips from proposed housing and business development sites situated within a 1k, 3km and 5km radius of the station.

The following sources of demand have been examined for the study:

- Population within a core 3km and wider 5km catchment, the wider catchment reflecting the rural location of the station and the fact the nearest alternative is almost 12km away;
- Abstraction from car, bus and rail;
- Long distance trips;
- Development generated trips; and
- Inbound leisure trips to Beeston Castle.

DfT Trip End Model Presentation Program (TEMPro)[1] and National Trip End Model (NTEM)[2]

Following DfT guidance we have utilised TEMPro and NTEM data, which represent the Department's best estimate of the long-term response to demographic and economic trends.

TEMPro is a programme developed by the Department providing traffic growth projections used in transport models and is intended to act as a nationwide standardised distribution of growth in trip ends. The growth projections in TEMPro are taken from the National Trip End Model (NTEM) model and allows consistency in analysis between different areas of the country when justifying transport proposals.

The NTEM model forecasts the growth in trip origin-destinations (or productions-attractions) up to 2051 for use in transport modelling. The forecasts take into account national projections of population, employment, housing, car ownership, and trip rates.

As noted by the DfT, NTEM forecasts and projections are subject to uncertainty, especially when disaggregated to local zones or travel modes.

Version 7.2c of TEMPro is based on the 2011 Census population and travel to work data, with updates expected from DfT in 2023.

TEMPro utilises the 2011 Census as a baseline – and grows based on set ONS and local development assumptions. Following DfT guidance and recognised industry methodology, we have used TEMPro to uplift the population estimates and disaggregated population growth figures for the Middle Layer Super Output Area (MSOAs) where the station is located, as well as calculations on future trips from origins/to destinations. This data comes from the departments National Trip End Model (NTEM).

Regarding population growth in the area surrounding the potential Beeston and Tarporley station, this equates to around a 9% increase on 2011 Census levels as a baseline.

Utilising a TEMPro+ Approach

We recognise that there are a number of further factors, beyond the TEMPro baseline to consider for calculating the potential demand for Beeston and Tarporley station.

This includes the rural nature of the station, the transformational connectivity potential, the fact the closest alternative station is almost 12km away and the ease of interchange to long distance services at Crewe station.

Therefore, we have undertaken a 'TEMPro+' approach, utilising sensitivities to extend the catchment to 5km to reflect the rural nature of the station and lack of alternative public transport journeys.

It must be noted that this study has been carried out in a time of impact on rail demand due to COVID-19. This demand assessment has not considered the impact of the pandemic on passenger demand.

It is also important to highlight the underlying assumptions of the demand assessment:

- The station will be served by an hourly Crewe - Chester stopping service in both directions.
- The potential detrimental impact of slowing down the Crewe - Chester has been ignored for the purposed of this assessment.

[1] Trip End Model Presentation Program (TEMPro) download - GOV.UK (www.gov.uk)

[2] National Trip End Model (NTEM) - data.gov.uk

- The current supply and demand of transport services and the road network will remain unchanged.
- Inbound commuting trips and abstraction of short-distance trips from rail are expected to be negligible and were not considered in the study; and
- An annualisation factor of 300 is used to convert between an average weekday and a whole year of demand.

7.1 Travel to Work data

As per guidance, travel to work data from the 2011 Census was analysed to observe commuting patterns in the study area. Most people from the area surrounding the proposed station (i.e., with place of usual residence located in LSOAs E01018458, E01018723, E01018724 and E01018372) worked in both Cheshire districts. This includes at the time 261 people working in Chester and 109 working in Crewe.

Table 7: The place of work for residents of selected LSOA areas by LA districts, 2011 Census

Place of work	Population total	Percentage of all travelling to work from selected LSOAs
Cheshire West and Chester	1,196	48.7%
of which is Chester	*261*	*10.6%*
Cheshire East	537	21.9%
of which is Crewe	*109*	*4.4%*
Flintshire	81	3.3%
Manchester	70	2.8%
Wrexham	61	2.5%
Warrington	59	2.4%
Liverpool	49	2.0%
Halton	47	1.9%
Wirral	40	1.6%
Other	317	12.9%

The above data suggest that in 2011, most of the catchment population worked locally, either in Cheshire West or Cheshire East districts. Only 15.0% of the work force commuted to Crewe and Chester. Whilst we recognise travel to work patterns and flows will likely have changed due to population growth, diversification, and COVID-19, there is currently limited data to infer any major changes.

Therefore, future studies and assessments as the case for the station progress though the development stages should look to consider this, in part using updated 2021 Census data when available.

7.2 Demand breakdown – population within the catchment

Catchment of Beeston and Tarporley

Tarporley is a large market town with a population of 2,614 (2011 Census), located in the unitary authority of Cheshire West and Chester. The centre of the village is located around 2.9 km from the proposed location of the station.

Part of the village of Tiverton (overall population 318, 2011 Census) is located within walking distance of the proposed station (using a catchment of up to 1km).

A number of other settlements are within a 3km catchment including Bunbury (population 1,195), Spurstow (413), Beeston (188) and Tilstone Fearnall (150). The station location would be an attractive offer increase connectivity for this population.

Overall, in 2011 there were 278 people living within a 1km catchment, 4,049 within 3km catchment and 6,825 within 5km catchment of the proposed station.

With an estimated 9% population uplift from 2011 as assessed for the MSOA areas in the TEMPro scenario, this gives a **potential population estimate of around 7,421 in 2022 within a 5km catchment of the station.**

For a potential station opening in 2026, this is the baseline population figure that has been used for the following demand analysis.

Figure 9 - Catchments of the proposed Tarporley station – 1km, 3km and 5km

7.3 Using Benchmarking to develop demand estimates

Passenger demand has been forecast by benchmarking against similar stations on the network, using the Office of Rail and Road (ORR) data to account for station attributes and taking local-socio economic factors (from Census 2011 data) into account.

A total of 119 stations with potentially similar attributes have been considered and categorised into five classes based on how closely the attributes (total population, proximity to major economic centre, car ownership, professional qualifications) of these stations and the population within their catchment match those of Beeston and Tarporley. This was used to produce a shortlist of eight stations with catchment areas similar to Beeston and Tarporley (e.g., with low population in the inner catchment of 1km, and the key population/economic activity centre located 2-3km from the station) that were used for the analysis.

For each of the eight comparable stations, the total station entries/exits from 2019-20 ORR data were obtained and an assumption made about the proportion of trips that would be accounted for by population within each distance catchment.

The assumed number of journeys per head were then adjusted to account for the characteristics of the proposed service at Tarporley (including a frequency penalty using Passenger Demand Forecasting Handbook[3] (PDFH) guidance) to understand how many journeys per head that would equate to at Tarporley. The average figure across the eight stations (shown in Table 8) was then used as the trip rate for Tarporley.

Table 8: Population and station entries and exists for selected stations in the UK

Benchmark Station	Economic centre	Population within catchment			ORR Entries & Exits (2019/20)	Penalised entries per head		
		1km	3km	5km		<1km	1-3km	3-5km
Brampton (Cumbria)	Carlisle	122	4536	1260	7,925	21	2	1
Cheddington	Leighton Buzzard. Milton Keynes	373	3770	6308	39,347	26	9	5
Dean	Salisbury, Southampton	107	1138	3173	11,876	35	12	4
Gomshall	Guildford	730	2863	4119	27,075	8	7	5
Mortimer	Reading, Basingstoke	369	4403	11157	88,980	49	14	6
Mouldsworth	Chester	230	3112	9346	14,895	13	3	1
Whatstandwell	Derby, Matlock	319	4058	8970	13,526	11	3	1
Yorton	Shrewsbury	202	1606	3900	3,772	6	2	1
				Overall trip rate		**20**	**7**	**3**

Finally, the total annual trips at Beeston and Tarporley have been derived by multiplying the benchmarked 'entries per head' by the population living within 1km, 3km and 5km catchments. The calculation assumes the station opening year to be 2026. Catchment population in 2026 was estimated as follows:

- For the 1km catchment, the existing population was increased by the number of expected households (see 'Proposed developments' section) multiplied by average household size in the area,
- For 1-5km catchment, TEMPro data for relevant MSOAs was used as a multiplier.

Table 9: Population within catchment in 2026 and calculated rail demand

Station	Year	Population < 1km	Population 1-3km	Population 3-5km	Rail demand (based on trip rate)
Beeston and Tarporley	2026	562	3,841	3,018	**46,188**

The total number of trips originating from 1km, 1-3km, and 3-5km catchments has been calculated to be **46,188.**

[3] About the Passenger Demand Forecasting Handbook | Rail Delivery Group

Assumptions Used

- Based on train frequency of 1tph and journey times to Chester of 12 minutes, as per Operational Review.
- Based on journey times towards Chester – the Travel to Work analysis shows that the main commuting flow from the area is towards Chester. However, it is expected that calculated trip rate will also reflect journeys towards Crewe as rail demand at most comparator stations is driven by more than one main economic centre.

7.4 Demand breakdown – abstraction from rail and bus

An assessment has been made of the extent to which demand at the new station is likely to represent abstraction from other modes.

For abstraction from rail, there is a no overlapping catchment from other stations, even if 3km catchments are considered (see Figure 10).

The closest stations in the area (i.e. Mouldsworth, Winsford and Nantwich) are located at different lines and mostly serve different markets. For this reason, abstraction from other rail trips can be considered negligible and is not considered further within the study.

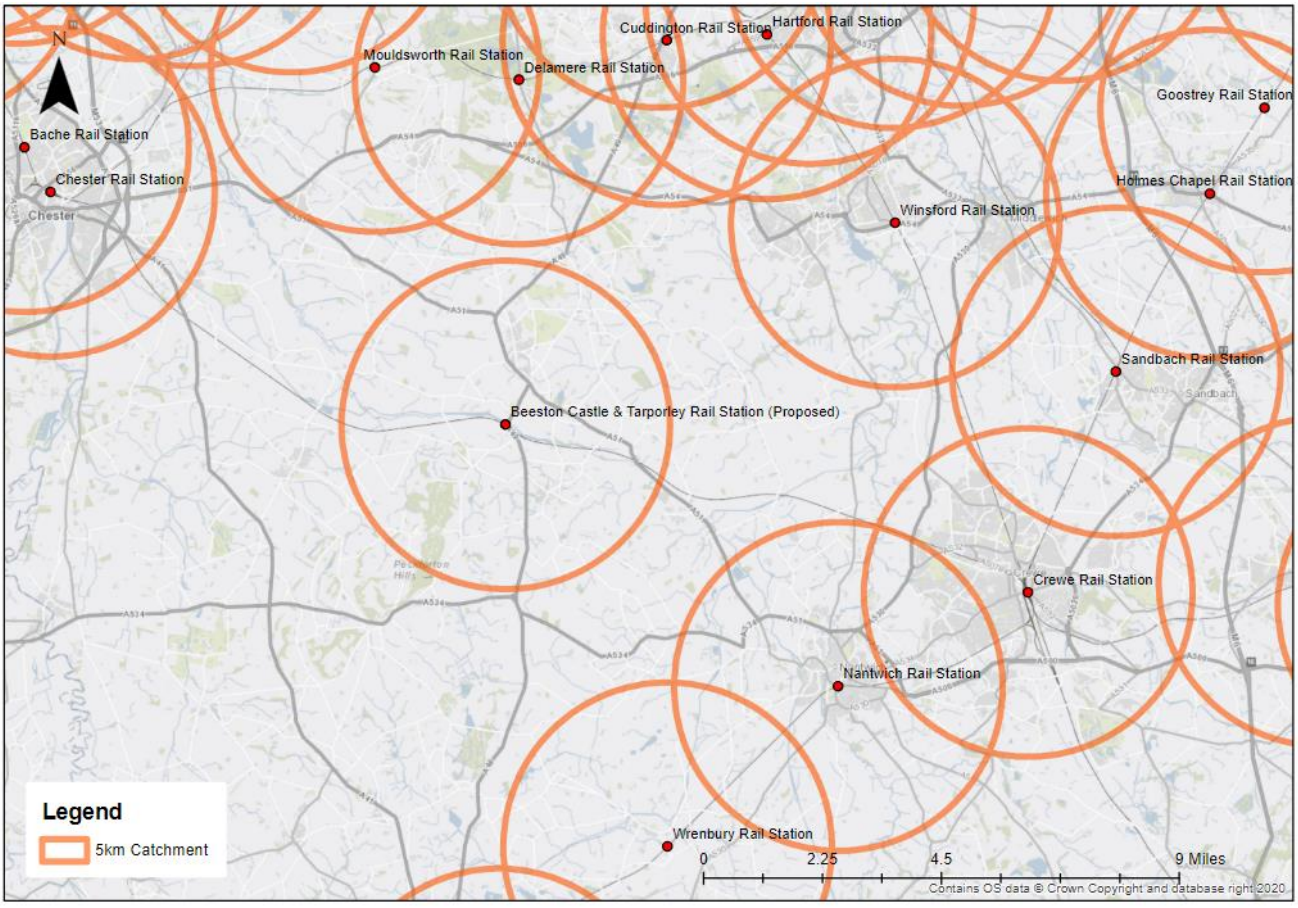


Figure 10 - Catchments of rail stations in the area

Figure 10 also shows that there is a wide area between Chester and Crewe not covered by any of the catchments. This could suggest that Beeston Castle and Tarporley has a potential to attract demand from the wider area i.e., from beyond 5km catchment. This is further covered in 'Demand breakdown – long distance trips' section below.

For abstraction from bus, the current bus provision was considered by comparing attractiveness of combined bus-train connections against existing bus connectivity.

Tarporley is located on the route of 84 Arriva North West service from Chester through Nantwich to Crewe. Bus services run hourly, with journey times approximately 31 minutes to/from Chester and 51-52 minutes to Crewe. However, the 84 service currently does not go near the proposed station, with its nearest stop located at Red Fox 1.5km north of the station. On the other hand, bus service 70 between Tiverton and Nantwich calls in proximity of the proposed station location, but only runs two times a day and does not link to Tarporley village.

The 2011 Travel to Work data suggests that only 16 people commuted from the Tarporley area to the centre of Chester, although it is probable to conclude in 11 years this has changed. It is unlikely that combined bus-train journeys would provide a viable alternative for those already travelling by bus to Chester even if the station was to be linked by a regular bus connection. This is due to the combined bus-train journey time to Chester being similar to that of existing bus connection, but requiring one interchange. Bus-train connection could potentially provide a viable alternative for travelling to Crewe, provided the station would be linked with Tarporley village by bus. Additionally, the Travel to Work data suggests that the passenger numbers on this flow were negligible.

Table 10: Comparison of bus and combined bus-train journey times

Flow	Current JT by bus (mins)	Future JT by bus-train (mins)[4]
Tarporley – Chester	31	5 + 12 + interchange time
Tarporley – Crewe	51-52	5 + 13 + interchange time

For the above reasons, abstraction from bus was not considered within the study.

7.5 Demand breakdown – long distance trips

It is assumed that station could also attract long distance demand towards key destinations. Chester and Crewe stations are both currently used for trips to London, and this will continue with the arrival of HS2 trains in Crewe.

[4] Based on the assumption of station would be connected with Tarporley by a frequent, direct bus connection

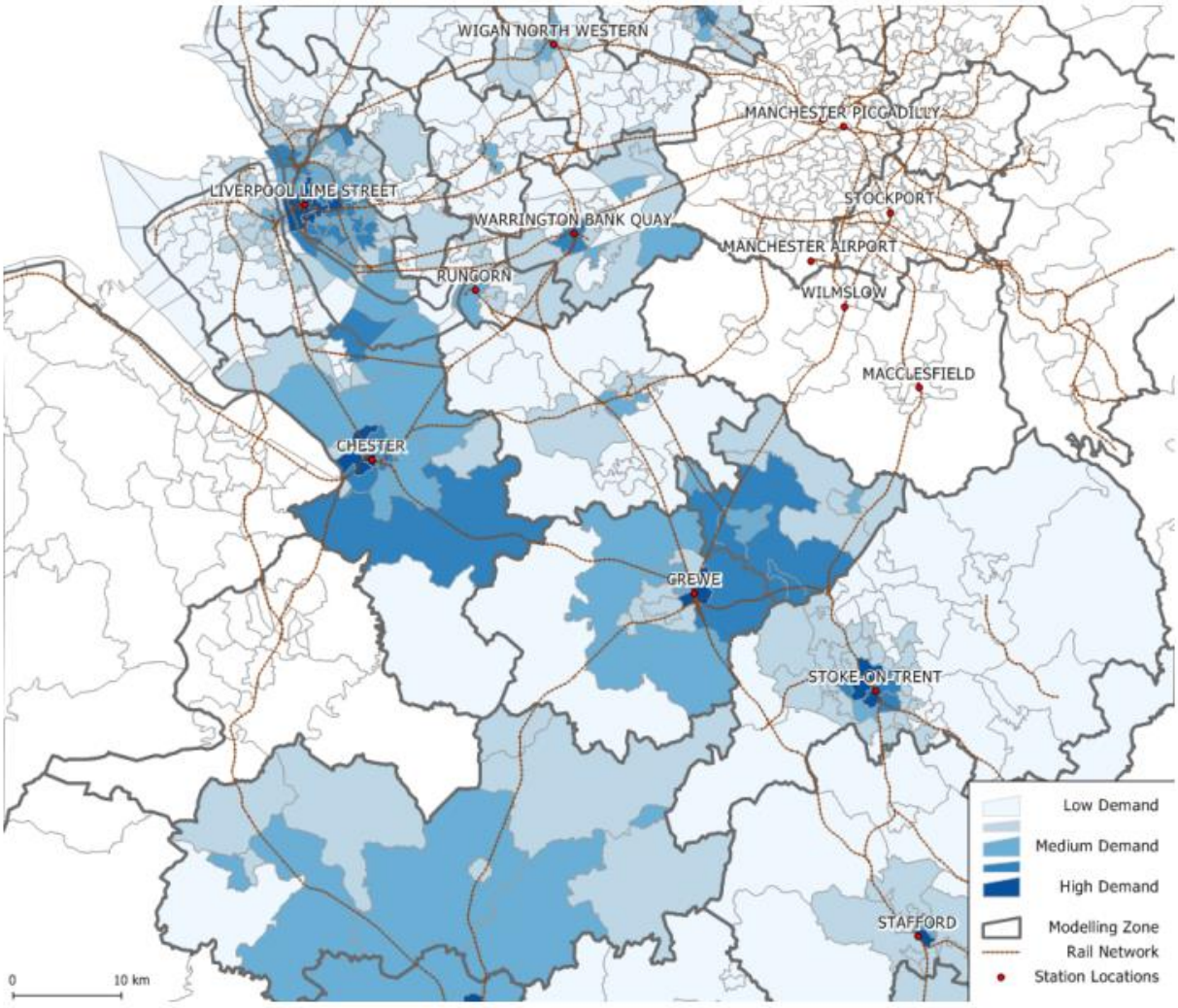


Figure 11 - Long-distance rail demand in Liverpool and the wider North West (Source: MVA Consultancy, 2013, Options for Phase Two of the high speed rail network – demand and appraisal report)

Figure 11 shows that there are pockets of long-distance demand located between Crewe and Chester, with high demand south east of Chester. The proposed station will be an entry point to the rail network for these areas, competing locally with stations at Chester and Crewe. The arrival of HS2 to Crewe in 2028 is likely to enhance the station potential to attract long distance trips.

Long distance trips have been calculated by using specific long-distance trip rates from the 'Long Distance Market Study' produced by Network Rail, and Census data for households in the affected MSOAs. Trip rates have been refined based on income bands for each of the MSOAs (which affect the propensity to travel by rail), and then a factor applied for those likely to use Beeston and Tarporley Station based on generalised journey times (GJTs).

Trips have also been factored to focus on the trips towards the south (e.g., London) noting the seamless interchange at Crewe. Please note, only those trips coming from outside the walking / cycling catchment have been included.

Assumptions Used

- Free parking at Beeston and Tarporley station, with unconstrained parking capacity.
- Based on the Network Rail 'Long Distance Market Study' from 2013 (i.e., pre-Covid), so does not factor the current impact of the pandemic on long-distance travel.

- Apart from the new station, we have assumed the same transport supply as today (e.g. train frequencies, current journey times, parking costs). In practice, many of these are likely to change.
- Long distance trips are likely to be abstracted from existing stations (e.g. Chester, Crewe, also at nearby Winsford).

Based on the analysis described above, the total number of long-distance trips that Beeston and Tarporley station may attract has been estimated to be **13,606.**

7.6 Demand breakdown – proposed developments

Additional demand that can be generated by future developments consists of additional trips associated with planned housing:

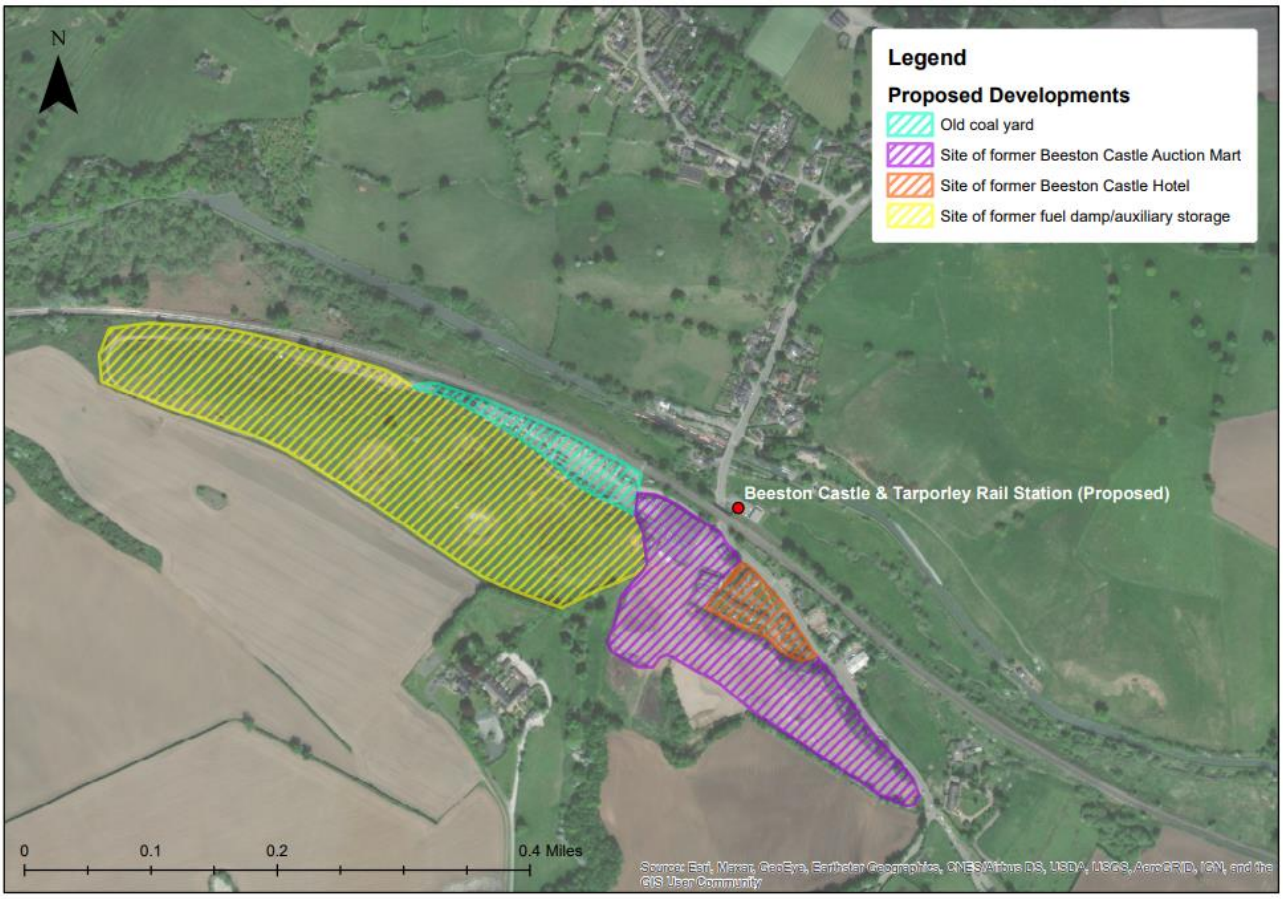


Figure 12 - Proposed development sites near the location of the proposed station

Site	Description	Number of proposed households	Additional population
1	The site of former Beeston Castle Hotel, granted permission with properties sold during 2016-19	21	48
2	The site of former cattle auction Beeston Castle Auction Mart, with planning permission granted in 2015, and first properties to be completed in early 2022	103	236
Total for Sites in 2026 (to be included in 1km catchment)		124	284
3	The site of old coal yard, with outline permission submitted in 2019, awaiting adjudication	25	57
4	The site of a former fuel damp from WWII, subsequently used as auxiliary storage, currently owned by a consortium of Manchester-based property developers	230 (indicative)	526
Total beyond 2026 (to be treated as additional demand)		255	583

Figure 12 shows proposed development sites around the station. Sites 1 and 2 are assumed to be fully operational for the station opening year (i.e., 2026) and have been included in the 2026 population estimate for the 1km catchment. Two remaining sites (i.e., Site 3 and Site 4) are at earlier development stages. It is estimated that, once fully delivered, they will result in additional 583 people living within the 1km catchment. This in turn would result in **11,385** trips from/to the proposed station.

Cheshire West and Chester's *Local Plan (Part One)* makes provision for at least 4,200 new dwellings and 10ha of additional land for employment development to be provided across the unitary authority before 2030. From the overall figure, at least 300 dwellings are to be provided specifically in Tarporley. This would result in additional **4,511** trips from/to the proposed station. No further details are given in the Local Plan for Beeston or Tiverton.

Assumptions used:

- All additional housing from the Local Plan is provided within 1-5km distance band
- The additional housing is not accounted elsewhere e.g., does not include proposed developments as per above.

As planned developments provide limited additional employment, in-commuting trips associated with future employment sites have not been considered within the study.

7.7 Demand breakdown – Beeston Castle

Beeston Castle is a former Royal Castle from the 13th century, located 2.2 km SE of the proposed station location. It regularly attracts more than 50,000 visitors annually, being the twelfth most visited paid tourist attraction in NW England (2019 Visit England). It is currently accessible by road (car), with limited connectivity to public transport.

It may be expected that the proposed station could be used by visitors to the castle, resulting in additional trips to/from the proposed station. Modal split of a tourist attraction depends on a unique set of circumstances, from visitors' characteristics through local infrastructure to wider awareness of available travel options. Therefore, potential rail modal share for Beeston Castle can vary, depending on the number of factors beyond the rail provision.

The list of local characteristics factors that may contribute towards attraction of leisure trips to the area includes the following:

- Proximity of Sandstone Trail and Peckforton Hills with the station providing good entry/exit point to the area,
- Limited parking provision at the castle (i.e., 100 parking spaces).
- Limited public transport connectivity to the area.

To estimate the number of leisure rail trips to/from the castle, three rail modal shares scenarios to have consider in the study as set out in Table 11 below. The calculation is based on the overall number of visitors in 2019. The proximity of a rail station in the area is likely to grow the overall number of visitors to the castle.

Assumptions Used

- Due to unavailability of data, origins of trips have not been analysed – it is likely that rail will only be an attractive option for those living in proximity of rail station at the trip origin.
- Peckforton Castle has not been considered as a separate trip attractor.

Table 11: Beeston Castle rail modal share scenarios

Scenario	Scenario description	Assumed rail modal share for the scenario	Total number of trips
1	Do minimum – no interventions	1%	581
2	Achievable – some interventions to encourage trips by rail e.g., signage at the station, upgrades to walking and cycling infrastructure in the area	5%	2,903
3	Optimistic – the series of interventions to encourage trips by rail e.: upgrades to walking/cycling links, signage, promotional campaigns, a dedicated bus shuttle	15%	8,712

Based on the above scenarios, the total number of rail trips to/from Beeston Castle ranges between **581** and **8,712.**

7.8 Demand forecast summary

This section summarises all the demand forecasting calculations.

The overall passenger demand at the station consists of a combination of demand from within the station catchment (using TEMPro uplifted population) and long-distance trips, as per Table 12 below).

Other segments of demands (i.e., abstracted trips from buses, employment in-commuting) were found to be negligible and were excluded. The calculated figure constitutes the calculated demand in 2026.

Table 12: Demand forecast summary – calculated demand

Demand segment	Annual trips in 2026	Diurnal trips
1km catchment demand	10,960	37
1-3 km catchment demand	25,239	84
3-5km catchment demand	9,989	33
Total catchment demand (a)	**46,188**	**154**
Long distance demand (b)	13,606	45
Overall demand in 2026 (a+b)	**59,795**	**199**

However, there are other segments of demand that have a higher degree of uncertainty and depend on factors beyond rail provision.

Table 13: Demand forecast summary – additional demand

Demand segment	Annual trips	Comment
Proposed developments demand (c)	Between 0 and 11,385	Depending on completion of proposed developments (i.e., Site 3 and Site 4 and additional housing from the Local Plan)
Local Plan allocated housing demand (d)	Between 0 and 4,511	Depending on provision of the housing as per Local Plan
Beeston Castle inbound trips (d)	Between 581 and 8,712	Depending on future rail modal share for trips to/from the castle
Additional demand (c+d)	**Between 580 and 24,608**	

The overall demand at the station (i.e. sum of the calculated demand in 2026 and additional demand) has therefore been estimated to be between **60,375 (lower TEMPro estimate)** and **84,402 (TEMPro+ higher estimate).**

Table 14: Demand forecast summary – additional demand

TEMPro (Lower Demand Estimate)	TEMPro+ (Upper Demand Estimate)
60,375	**84,402**

7.9 Benchmarking potential demand against other local and new build stations

In order to validate the forecast demand calculations, a benchmarking exercise has been carried out against stations in the surrounding area. The ORR station usage estimates for 2019/20 were used as the baseline data comparison. The outcome of this exercise is presented in the table below:

Table 15: Outcome of passenger demand benchmarking exercise

Station	Why Benchmarked?	Opening year	Number of one-directional services*	Annual trips (2019/20)
Hartford	Local comparator	1837	2	283,000
Greenbank	Local comparator	1870	1	231,198
Winsford	Local comparator	1837	1	206,492
Low Moor	Recently opened	2017	1	163,000
Ilkeston	Recently opened	2017	1	123,160
Pye Corner	Recently opened	2014	4	111,858
Cuddington	Local comparator	1869	1	87,252
Beeston and Tarporley (upper TEMPro+ estimate)		***2026***	***1***	***84,402***
Beeston and Tarporley (lower TEMPro estimate)		***2026***	*1*	***60,375***
Goostrey	Local comparator	1891	1	44,250
Delamere	Local comparator	1870	1	43,554
James Cook University Hospital	Recently opened	2014	1	40,226
Mouldsworth	Local comparator	1870	1	29,790
Acton Bridge	Local comparator	1837	2	27,976

**per hour, 8-9am*

The table above shows that for its level of service, the forecast level of demand for Beeston and Tarporley is comparable with similar stations in the area (e.g. Mouldsworth, Goostrey), but lower when compared with some new stations recently delivered with similar cost such as Low Moor and Ilkeston. This is due to the lower number of people living within the catchment.

7.10 Areas for future demand generation consideration

Whilst significant demand has for a potential Beeston and Tarporley station, as the calculated rail demand at the station would be driven by the wider than the immediate (i.e. to 1km) catchment, and noting the unique and potential transformational connectivity that Beeston and Tarporley station it is recommended that a future detail Demand Report is commissioned to support the next phases of assessment at SOBC stage.

We recommended that the following should be considered in future studies to ensure the number of people using the station is fully being maximised and the potential for the station and wider local population and economy is maximised:

- Linking the station with key trip generators (Tarporley, possibly Tarvin) by a regular (e.g. hourly) bus connection that is coordinated with rail timetable (e.g. arrives to the station before the train arrival time and departs afterwards). For this reason, engagement with local bus operators is highly recommended;

- Provide attractive interchange environment at the station (e.g. bus shelters, shelters at platforms);
- Linking the station with Tarporley village by high quality walking and cycling infrastructure;
- Improvements to walking and/or cycling infrastructure between the proposed station and Beeston;
- Right parking policy for station car park (i.e., allocation of spaces), with parking price set up to attract the right balance of local users and those from the wider area; and
- Engagement with Beeston Castle to consider further (than infrastructure upgrades) measures to attract its visitors to rail.

8. Expected Value for Money Case

Using the findings from the earlier cost and demand sections in this report, an indicative Value for Money (VfM) assessment has been carried out for the proposed station, to which we have calculated a Financial Business Cost Ratio (FBCR).

The following key inputs have been used to calculate the FBCRs:

- Initial high level capital cost of six concept station design options (see Chapter 5.1);
- Forecast net rail passenger demand from three development and two service level options (see Chapter 7).

This 'Financial Benefit Cost Ratio' (FBCR) compares the expected revenue, based on the demand numbers, against the expected capital and operating costs over a 60-year appraisal period.

It is important to note that the FBCR calculations have been carried out subject to the following assumptions and caveats:

- Any rolling stock / staff requirements for extending or adding services (including future frequency enhancements as demand grows) are not included in the operating cost for the new station;
- Costs of additional infrastructure required to introduce the service (e.g., additional platform at Chester) are not included in the capital cost;
- There is no impact on through passengers;
- Based on half of a return ticket from Mouldsworth - Chester (£3.30), a single yield factor has been used for all trips, even though a variety of trips would be made in reality;
- Welfare benefits (including Wider Economic Benefits) have not been undertaken at this stage of development;
- Demand growth has been set to follow ONS 2018-based subnational population projections for Cheshire West and Chester for 20 years and has then been pegged to TAG population growth for the remainder of the appraisal period;
- Abstraction of trips from other stations has zero impact;
- Demand and station operational costs are not dependent on parking provision; and
- Assumptions on parking (e.g., no parking fee for Beeston and Tarporley, uncapped number of parking spaces) are consistent with those in Chapter 7.

8.1 Financial Business Cost Ratios (FBCRs)

Table 16 below shows the outcome of the VfM calculations demonstrating a range of FBCRs that encapsulate the potential:

- **Station Design Options**
    - And associated Lower / Upper cost estimates
- **Demand Scenarios explored**
    - Both TEMPro (Lower estimate) and TEMPro+ (Upper estimate)
- **Potential Developer Contributions towards station costs**
    - Representing the indicative private sector, developer led contributions that the Beeston Castle and Tarporley Station Reopening Group have been engaged upon.

A range of potential FBCRs have therefore been calculated to reflect the early feasibility nature of both the cost and demand assessments undertaken to date.

The FBCRs will mature as more detailed and granular analysis is undertaken as the station concept develops through the SOBC stage to detailed optioneering and design at OBC / GRIP Stage 2-4 level design.

Table 16 - Outcome of VfM FBCR calculations

Indicative Demand		**Low**				**High**			
Indicative Developer Contribution		£0m	£3m	£6m	£9m	£0m	£3m	£6m	£9m
Station Design Option	**Indicative Cost Profile**	***Indicative FBCRs***							
Option 1A	Lower	0.44	0.66	0.85	0.85	0.62	0.93	1.19	1.19
	Upper	0.26	0.32	0.42	0.61	0.36	0.44	0.58	0.85
Option 1B	Lower	0.43	0.65	0.85	0.85	0.61	0.91	1.19	1.19
	Upper	0.25	0.30	0.39	0.56	0.35	0.42	0.55	0.78
Option 2	Lower	0.46	0.71	0.85	0.85	0.65	1.00	1.19	1.19
	Upper	0.27	0.33	0.45	0.68	0.37	0.47	0.63	0.95
Option 3	Lower	0.30	0.40	0.57	0.85	0.43	0.55	0.79	1.19
	Upper	0.16	0.18	0.21	0.25	0.22	0.25	0.29	0.34
Option 4A	Lower	0.53	0.85	0.85	0.85	0.75	1.19	1.19	1.19
	Upper	0.34	0.46	0.71	0.85	0.48	0.65	0.99	1.19
Option 4B	Lower	0.51	0.83	0.85	0.85	0.71	1.15	1.19	1.19
	Upper	0.32	0.43	0.64	0.85	0.45	0.60	0.89	1.19

Department for Transport Value for Money Categorisation

The following categories come from the established DfT guidance on transport scheme appraisal[5]:

- Poor value for money if BCR is below 1.0
- Low value for money if BCR is between 1.0 and 1.5
- Medium value for money if BCR is between 1.5 and 2.0
- High value for money if BCR is between 2.0 and 4.0
- Very high value for money if BCR is greater than 4.0

With a range of potential FBCRs, which range from:

- 1.19 in the Upper (TEMPro +) Demand, Medium Developer Contribution, Lower Cost for design Option 4A and 4B; to

[5] Value for money: supplementary guidance on categories (publishing.service.gov.uk)

- 0.85 in the Lower (TEMpro) Demand, Medium Developer Contribution, Lower Cost Option Cost for design Option 1A, 1B and Option 2.

The result of the indicative value for money assessment demonstrates that there is merit for further detailed demand and cost analysis to be undertaken on re-opening Beeston and Tarporley station.

Please note, it is not possible to achieve a higher FBCR than 1.19 at this stage, without the addition of wider economic and societal benefits.

This is because in certain scenarios, the developer contribution would cover the capital cost of delivering the station, and as such only the benefits to the public purse calculated from changes to operational cost and revenue from demand are currently captured at this stage.

The FBCR would likely increase once the wider benefits were identified at future stages of development.

8.2 Future factors to consider in developing the detailed Economic Case

In the next stages of work, we recommend that the following factors should be considered when interpreting the above FBCRs, and where further work could be undertaken to improve the return on investment, specifically though detailed economic and wider benefit analysis and appraisal:

- No impact on through journeys is based on assumption that, while there is some impact on passengers using Chester to Crewe service, it will be largely offset by availability of Avanti Coast services between these places. Therefore, how these trains will be timetabled against each other is likely to have much higher impact on which services are chosen by users than an increase in running times for TfW services. Due to uncertainty about future timetables post-2026 (e.g., in the context of arrival of HS2 trains to Crewe in 2027, it is not possible to be model this with accuracy within the project timescales)
- The FBCR is based on the same assumption as demand calculation; that majority of new flows will be between Tarporley and Chester/Crewe with additional new flows from long distance travel as well as for leisure trips to/from Beeston Castle. However, it is expected that additional trips will materialise that are not included in demand calculation (e.g. in-trips to Tarporley, trips abstracted from other stations that provide better journey opportunities through Crewe and Chester, trips from the wider catchment),
- The long-distance model is based on trips from selected OAs around Tarporley. The extent of this catchment is unknown. It may be expected that Beeston and Tarporley station, located 12 minutes from the future high-speed rail hub in Crewe, becomes an attractive entry point to the national rail network and attracts long distance demand from the wider catchment e.g. from places on Mid Cheshire Line from which rail connectivity with Crewe is limited.
- Forecasts based on trip models are known to be out by a factor of two at individual stations, with the outturn being higher than forecast in the majority of cases[6]
- There may be some scope of revising the station design to reduce the cost and deliver the station in stages e.g. to expand parking provision at later stages. This has not been considered within the study.
- The inclusion of user and wider (particularly environmental) benefits may improve the business case.

8.3 Considerations for the future business case development

Based on the initial findings from this study, it is considered that the following could be considered to strengthen the likely economic case and should therefore be included in future feasibility work:

- Further detailed station design and costing work, to identify options to engineer out cost – such as reducing platform lengths;

[6] PDFH 6.0, Chapter B9 *New Services and Stations*, page 7

- Additional provision for active travel modes that can attract demand from outside the catchment;
- Working to deliver and even accelerate the local development proposals based on the arrival of the station;
- Adequate parking provision that is priced to attract parking users while generating additional revenue;
- Consideration of how the Transport for Wales service that calls at the station is timetabled against long distance services at Chester and Crewe to minimise the impact on existing passengers;
- Discussions with Beeston Castle to consider further (than infrastructure upgrades) measures to attract its visitors to rail;
- Discussions with bus operators on how to best serve the new station; and
- Discussion with Avanti West Coast on stopping 5-car Avanti West Coast trains to attract additional long distance demand to the station.

9. Other Constraints and Impacts

This chapter summarises some of the other key constraints and impacts of the proposed rail station at Beeston and Tarporley Station, though it should be noted none have been identified at this stage that would preclude future development through the Network Rail Governance for Railway Investment Projects (GRIP) or Project Acceleration in a Controlled Environment (or PACE) processes.

The categories presented represent the key issues that have been identified through the study.

Table 16: Potential key constraints and impacts of the proposed project

Category	Description	Potential Mitigation
Environmental Constraints	Flood risk at foot of the existing embankment – the site is located adjacent to a Flood Zone 3	Engage early with the Environment Agency to ensure impacts are known and mitigated for embankments earthworks and understand any requirements for compensatory storage.
	Ground Condition of Reclamation site is currently unknown and may have contamination issues	Undertake ground investigation surveys at next stage of design.
	Hazardous materials exposed or disturb in demolition of warehouse to make space for highways work for Option 1B	Undertake building investigation surveys at next stage of design.
Highway Constraints	Existing access road to site is approximately 5meters wide and would not meet Design Manual for Roads and Bridges (DMRB) standards.	Potential land take for enhanced highway access Option 1B. Alternatively apply a less rigorous standard, with agreement from the Council and Network Rail to Manual for Streets standard.
	A49 Bridge Height / Clearance for Buses	The current road bridge under the Railway is circa 4.3m and does not give clearance for double decker buses, if they were to be used to connect the station in the future.
Public Transport Accessibility and safety	Existing route 70 bus stops are located between 500m (0.3m) and 1.1km (0.7m) away from the site.	Move the existing bus stops closer to the site mitigating walking times / distance: • Huxley Lane stop is circa 5-minute walk. • Beeston Gate Farm stop is circa 16-minute walk.
	Enhance public transport connectivity by bus to Tarporley	• The current bus service passing the station site is limited – with no direct bus connections to Tarporley.

		• The Route 70 runs Nantwich to Tiverton, Bunbury twice daily on weekdays and weekends. • The Route 84 runs Crewe to Chester hourly – via Tarporley High Street. The nearest stop is at the Red Fox, a circa 1.5km (0.9mile) which would take approximately 20 minutes to the station site.
Active Travel Connectivity and safety	Limited provision for pedestrians. The current pavement width is circa 1.3m under the railway bridge which is non-compliant with current highways standards (circa 2m minimum)	Widen the footpaths, especially under the railway bridge to compliant standards and ensure elements of the following are delivered on walking routes to key bus stops, Tarporley and potentially Beeston Castle: • pavement widening, • guardrails, • pedestrian crossings, • street lighting.
	Cycle network not connected to National Networks	Connect existing station through signage to National Cycle Route 45, which runs from Chester to Salisbury via Beeston Castle. Cyclist would benefit from segregation from the enhanced highways access alignment provided by Option 1B.

10. Risk Register

The following section presents a comprehensive early-stage risk register, presenting the key risks associated with the proposed programme and Construction, Design and Management (CDM) / Health and Safety Risks for the next stages development of Beeston and Tarporley Station.

This is designed to inform decision makers and it is proposed that it is updated and refined as the development work progresses. Anticipated risks at a programme have been categorised under the following headings:

1. **Economic risks** such as cost escalation, passenger forecasts not being realised, competing investment priorities, evolving funding models and economic downturn
2. **Political risks** such as a lack of stakeholder support, lack of alignment with policy and political cycles
3. **Technical risks** such as the inability to serve the station due to timetabling conflicts and a lack of capacity (further work required)
4. **Legal risks** such as franchise complications and land acquisition
5. **Social risks** such as local opposition to the scheme and a lack of local skills to deliver the scheme
6. **Environmental risks** such as statutory designations.

Table 17: Early-stage risk register

	Description	Impacts	Proximity	Mitigation Measures
Economic	Project cost escalation	Project becomes unaffordable / returns poor VfM	Pre-funding	Inclusion of optimism bias and early assessment of costs.
	Passenger projections prove to be inaccurate	Project is unable to fulfil anticipated benefits	Beyond construction	Undertake robust forecasting of passenger demand and update at each stage of decision-making process. *Please note, the demand exercise undertaken in this study is pre-feasibility level, and will need to incremented with future MOIRA / fully demand modelled runs.*
	Competing investment priorities	Funding prioritised elsewhere	Pre-funding	Secure programme entry for scheme to Rail Network Enhancements Pipeline (RNEP), Restoring Your Railway, or TfN / TfW investment programme to provide greater degree of funding certainty.
	Private sector model for rail project investment still evolving leading to inefficiencies in funding stream	Threatens project cost and timescales	Pre-funding	Define potential funding routes and commercial models in more detail and establish attractiveness of scheme for private sector investment. Liaise with DfT private finance team, TfW and Network Rail early on. Consider and assess potential funding options
	Post-COVID-19 or wider economic downturn during next stages of design	Reduces funding opportunities and potentially renders project financially / economically unviable	Pre-funding	Scenario test the impact of Covid-19 and potential wider economic uncertainties on future passenger demand and factor this into future business case development.

	Description	Impacts	Proximity	Mitigation Measures
Political	Lack of stakeholder support	Project lacks momentum and ultimate approval	Imminent	Develop Stakeholder Management Plan. Undertake regular and appropriate stakeholder engagement to build consensus and support for the scheme. Address feedback received in a timely manner.
	Alignment of local, regional and pan-Northern policy	Divergent policy approaches risk undermining the case for investment	Imminent	Continue to work with TfN, DfT and TfW to promote the scheme. Maintain and strengthen the current policy position which is broadly supportive of the scheme.
Technical	Timetabling	Inability to serve station by rail due to timetabling conflicts / lack of network capacity Inability to service timetable turnarounds at Chester / Crewe Stations – or associated platform capacity requirements	Beyond Construction	Undertake detailed timetabling exercise. Work with DfT, TfW and industry partners to build proposed rail services into future timetables prior to scheme opening.
Legal	Uncertain procedures and cost of land acquisition required for station	Threatens project cost and timescales	Pre-funding	Seek advice on cost and procedure for land acquisition and include in business case.
Social	Local objections to new railway	Project may be considered unacceptable	Pre-funding	Consider options to minimise negative impacts throughout project (including optioneering stage) and undertake pro-active and timely consultation process. Design Stakeholder Management Plan to communicate the benefits of the scheme to local communities.
Environmental	Statutory designations restrict new alignment	Potential for project to be considered unacceptable or add additional cost and time for mitigation	Pre-funding	Assess environmental designations and associated restrictions. Avoid or build time to mitigate into project process.

10.1 High Level Construction, Design and Management (CDM) / Health and Safety Risks

In addition to the programme level risks, we have undertaken a designer's risk assessment covering the 5 site layout options in accordance with our responsibility as designer under the Construction (Design and Management) Regulations 2015. At this stage, the risks highlighted are generally high level but will provide a basis for communication of the health and safety risks associated with the project if the scheme moves through to later design stages and construction.

Table 18: High Level Construction, Design and Management (CDM) / Health and Safety Risks

Area / location of risk exposure	Description of hazard and risk exposure	Mitigation of risk (potential or achieved)	Further action	By	Status (Active / closed
Existing railway embankment.	Building the proposed embankment adjacent to a level difference of 7m could lead to staff falling from height.	Suitable edge protection is required. Potential to oversize working platform to increase separation from edge.	Size of working platform to be reviewed as design progresses.	Designer	Active
Proposed station footbridge	Lifting new footbridge elements over live railway could lead to objects falling onto the tracks and causing damage / derailment to trains.	Possessions are required (assumed 1no. 56-hour possession) to install bridge deck.	Possessions to be included in project cost and risk registers to inform client of requirement.	Designer	Active
Proposed station car park	Some excavation will be required to form the car park build up. Former use of site unknown and could expose contaminated ground.	Ground investigation should be undertaken at later design stages to inform design and mitigation requirements.	Designer to undertake appropriate ground investigation.	Designer	Active
Proposed station car park	No utility information has been made available during feasibility study so there is a high risk of utility strike (gas / water / HV electricity).	Site investigation (C2 requests) should be made at the next design stage to inform design and allow risks to be highlighted.	Designer to request C2 information and buried services record for the full site boundary area.	Designer	Active
Junction with A49	Construction of new junction will require interface with traffic along A49 which could lead to collisions with plant / people.	Works are to be undertaken with appropriate traffic management to segregate highway traffic and construction activities.	Contractor to identify traffic management requirements as part of pre-construction activities and get approvals from local authority.	Contractor	Active
Site Option 1B: Proposed access junction and highway connection.	Demolition of the existing warehouse building to form the proposed highway could lead to the disturbance of hazardous materials including asbestos.	No works are to be undertaken without a demolition survey of the existing material.	Designer to specify a demolition survey during later design stages.	Designer	Active

Area / location of risk exposure	Description of hazard and risk exposure	Mitigation of risk (potential or achieved)	Further action	By	Status (Active / closed
Site Options 1A, 1B, 2, 3, 4A, 4B: Proposed access highway.	Works to formalise the existing highway could lead to instabilities within the existing railway embankment to the north, leading to collapse.	Designer to refine road alignment to ensure adequate separation and a topographical survey should be commissioned to understand the existing slope extents in detail.	Further design development required at a later stage following topographical survey.	Designer	Active

11. Summary of Opportunity and Next Steps

There is clear strategic case and national, regional and local policy alignment supporting the case for the re-opening of Beeston and Tarporley Station.

If delivered the station would present a transformational public transport offering, serving a wide population who are currently primarily car dependent. Supporting local commuting and leisure trips as well as seamless integration with long distance services at Crewe – the station would support further sustainable growth across the geography served, as well as supporting decarbonisation.

Whilst from an operational perspective utilising the current Transport for Wales class 153 units would preclude a stop at Beeston and Tarporley due to tight turnaround times at each trip end in Chester and Crewe, indicative operations analysis reviewed by TfW has demonstrated the feasibility of simply operating 90mph across the route, such as the class 158 or 197 units TfW Rail already operates.

Whilst further work is required at future business case stages, the indicative Value for Money assessment of the Financial Business Cost Ratios (FBCRs) generated has demonstrated that positive value for money cases can be produced, subject to developer led contributions to which the Beeston Castle and Tarporley Station Reopening Group are already in discussions.

11.1 Potential Next Steps

Whilst it is clear that there is a strong strategic case for the re-opening of Beeston and Tarporley station, supported by operational feasibility, we recommend that the next phases of activity, linked to entry to the Rail Network Enhancements Pipeline (RNEP) is for Network Rail / Great British Railway to work closely with the Beeston Castle and Tarporley Station Reopening Group and Cheshire West and Chester Council, in focusing on developing the economic case for investment, particularly the investigation of wider economic benefits. This should include assessment of benefits associated with enhanced natural capital, social capital, increased productivity, as well as property values. Calculating and understanding the full impact and total value of the station's potential will significantly support future value for money calculations.

Further analysis and assessment is also recommended on refining station design costs as well as undertaking a detailed demand forecasting assessment which will again enhance the value for money case.

A1

N

An existing route signal lies within the extent of the proposed platform. Confirmation is required whether a shorter platform would be appropriate, or the proposal may require the line to have signalling modifications.

Approximately 2000m² of third party land is required to facilitate the construction of the proposed embankment. This could be reduced through the introduction of a retaining wall structure.

The station layout shown does not comply with BS9992:2020, which stipulates that there must be at least two exits from a surface platform. In order to facilitate this, a secondary footbridge or escape route down the embankment from Platform 1 and onto the A49 would need to be provided.

Towards Chester

Shropshire and Union Canal

SP

Proposed London Midland footbridge (to Network Rail Standard Details SDD/TUM/400) with Type 3 through lifts.

Proposed embankment widening to facilitate construction of Platform 1.

A49

Foot crossing to be removed. Signal box to be accessed via platform end steps.

SP

Drop-off bay suitable for 3no. vehicles in accordance with BS8300.

LC

River Gowy

Approximately 6500m² new bituminous pavement required to construct car park and station forecourt areas.

Approximately 100no. standard parking spaces with 5% blue badge and 5% oversized spaces in accordance with BS8300.

Existing rail underbridge with 4.3m height restriction. Due to this constraint, the station site is not suitable for access by double decker bus services.

Proposed 1no. space provided with an Electric Vehicle Chargepoint. Cabling is required for an additional 19 spaces for passive provision for the future installation of chargepoints.

4.5%

5.6m

2m

Approximately 9500m² of third party land (Beeston Reclamation) is required to facilitate the station development.

2m wide footway on one side of the carriageway only.

5m wide carriageway to match existing. Sufficient width for 2 cars to pass according to Manual for Streets.

Widening the carriageway to provide sufficient width (7.3m) for larger vehicles would require additional third party land take (warehouse to the south) or remediation works to the existing embankment supporting the railway.

Towards Crewe

Local narrowing of the carriageway to 6.5m to allow provision of a 2m wide footway on the western side of the road.

Site of former station platforms.

Lockside Cafe

43m junction visibility splay in accordance with Manual for Streets for a 30mph road.

0 5 10 20 Metres

Scale 1:500

Do not scale

Notes:

1. All dimensions are shown in metres unless otherwise specified.
2. All levels are shown in metres above Ordnance Datum unless otherwise specified.
3. The existing Network Rail land ownership boundary is indicative based on land registry plans obtained by the project.

Key:

- Existing Features
- Network Rail Boundary
- Proposed Site Boundary
- Proposed Earthworks

Issue	Date	By	Chkd	Appd
A	07/03/22	JT	CW	CW
For Information				

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Client

Beeston Castle and Tarporley Station Re-opening Group

Job Title

Beeston Castle and Tarporley Station

Proposed General Arrangement Site Option 1A

Scale at A1 1:500

Discipline Civil

Job No 284162-00

Drawing Status For Information

Drawing No BCTS-ARP-XX-XX-DR-C-0002

Issue A

\\Global\Europe\Manchester\Jobs\284000\284162-00\4 Internal Project Data\4-03 Drawings\0_Drawings\Civil\A1\BCTS-ARP-XX-XX-DR-C-0002 Proposed Site Plan - Option 1A.dgn

A1

N

An existing route signal lies within the extent of the proposed platform. Confirmation is required whether a shorter platform would be appropriate, or the proposal may require the line to have signalling modifications.

Approximately 2000m² of third party land is required to facilitate the construction of the proposed embankment. This could be reduced through the introduction of a retaining wall structure.

The station layout shown does not comply with BS9992:2020, which stipulates that there must be at least two exits from a surface platform. In order to facilitate this, a secondary footbridge or escape route down the embankment from Platform 1 and onto the A49 would need to be provided.

Towards Chester

Shropshire and Union Canal

SP

Proposed London Midland footbridge (to Network Rail Standard Details SDD/TUM/400) with Type 3 through lifts.

Proposed embankment widening to facilitate construction of Platform 1.

A49

SP

Foot crossing to be removed. Signal box to be accessed via platform end steps.

LC

River Gowy

Drop-off bay suitable for 3no. vehicles in accordance with BS8300.

Approximately 8250m² new bituminous pavement required to construct car park, station forecourt and access road.

Approximately 100no. standard parking spaces with 5% blue badge and 5% oversized spaces in accordance with BS8300.

Existing rail underbridge with 4.3m height restriction. Due to this constraint, the station site is not suitable for double decker bus services.

Proposed 1no. space provided with an Electric Vehicle Chargepoint. Cabling is required for an additional 19 spaces for passive provision for the future installation of chargepoints.

5.0%

Approximately 15,000m² of third party land is required to facilitate the station development.

3m wide footway / verge on both sides of the carriageway.

7.3m wide carriageway in accordance with the Design Manual for Roads and Bridges.

Towards Crewe

Site of former station platforms.

Approximately 500m³ fill and 100m³ cut required to construct the proposed access road.

Local narrowing of the carriageway to 6.5m to allow provision of a 2m wide footway on the western side of the road.

Lockside Cafe

70m junction visibility splay in accordance with the Design Manual for Roads and Bridges for a 30mph road.

0 5 10 20 Metres

Scale 1:500

Do not scale

Notes:

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2. All levels are shown in metres above Ordnance Datum unless otherwise specified.
3. The existing Network Rail land ownership boundary is indicative based on land registry plans obtained by the project.

Key:

- Existing Features
- Network Rail Boundary
- Proposed Site Boundary
- Proposed Earthworks

Issue	Date	By	Chkd	Appd
A	07/03/22	JT	CW	CW
For Information				

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Client

Beeston Castle and Tarporley Station Re-opening Group

Job Title

Beeston Castle and Tarporley Station

Proposed General Arrangement Site Option 1B

Scale at A1 1:500

Discipline Civil

Job No 284162-00

Drawing Status For Information

Drawing No BCTS-ARP-XX-XX-DR-C-0004

Issue A

A1

N

An existing route signal lies within the extent of the proposed platform. Confirmation is required whether a shorter platform would be appropriate, or the proposal may require the line to have signalling modifications.

Approximately 2000m² of third party land is required to facilitate the construction of the proposed embankment. This could be reduced through the introduction of a retaining wall structure.

Towards Chester

Shropshire and Union Canal

SP

Proposed embankment widening to facilitate construction of Platform 1.

Proposed London Midland footbridge (to Network Rail Standard Details SDD/TUM/400) with Type 3 through lifts.

The station layout shown does not comply with BS9992:2020, which stipulates that there must be at least two exits from a surface platform. In order to facilitate this, a secondary footbridge or escape route down the embankment from Platform 1 and onto the A49 would need to be provided.

Foot crossing to be removed. Signal box to be accessed via platform end steps.

SP

LC

3no. blue badge spaces

River Gowy

A49

A49

Existing rail underbridge with 4.3m height restriction. Due to this constraint, the station site is not suitable for rail replacement bus services.

Drop-off bay suitable for 3no. vehicles in accordance with BS8300.

4.5%

Approximately 2500m² of new bituminous hardstanding is required to facilitate the station development.

2m wide footway on one side of the carriageway only.

5.98m

5m wide carriageway to match existing. Sufficient width for 2 cars to pass according to Manual for Streets.

Widening the carriageway to provide sufficient width (7.3m) for larger vehicles would require additional third party land take (warehouse to the south) or remediation works to the existing embankment supporting the railway.

Approximately 1500m² of third party land (Beeston Reclamation) is required to facilitate the station development.

Towards Crewe

Local narrowing of the carriageway to 6.5m to allow provision of a 2m wide footway on the western side of the road.

Site of former station platforms.

Lockside Cafe

43m junction visibility splay in accordance with Manual for Streets for a 30mph road.

0 5 10 20 Metres

Scale 1:500

Do not scale

Notes:

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3. The existing Network Rail land ownership boundary is indicative based on land registry plans obtained by the project.

Key:

- Existing Features
- Network Rail Boundary
- Proposed Site Boundary
- Proposed Earthworks

Issue	Date	By	Chkd	Appd
A	07/03/22	JT	CW	CW

For Information

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Client

Beeston Castle and Tarporley Station Re-opening Group

Job Title

Beeston Castle and Tarporley Station

Proposed General Arrangement Site Option 2

Scale at A1 1:500

Discipline Civil

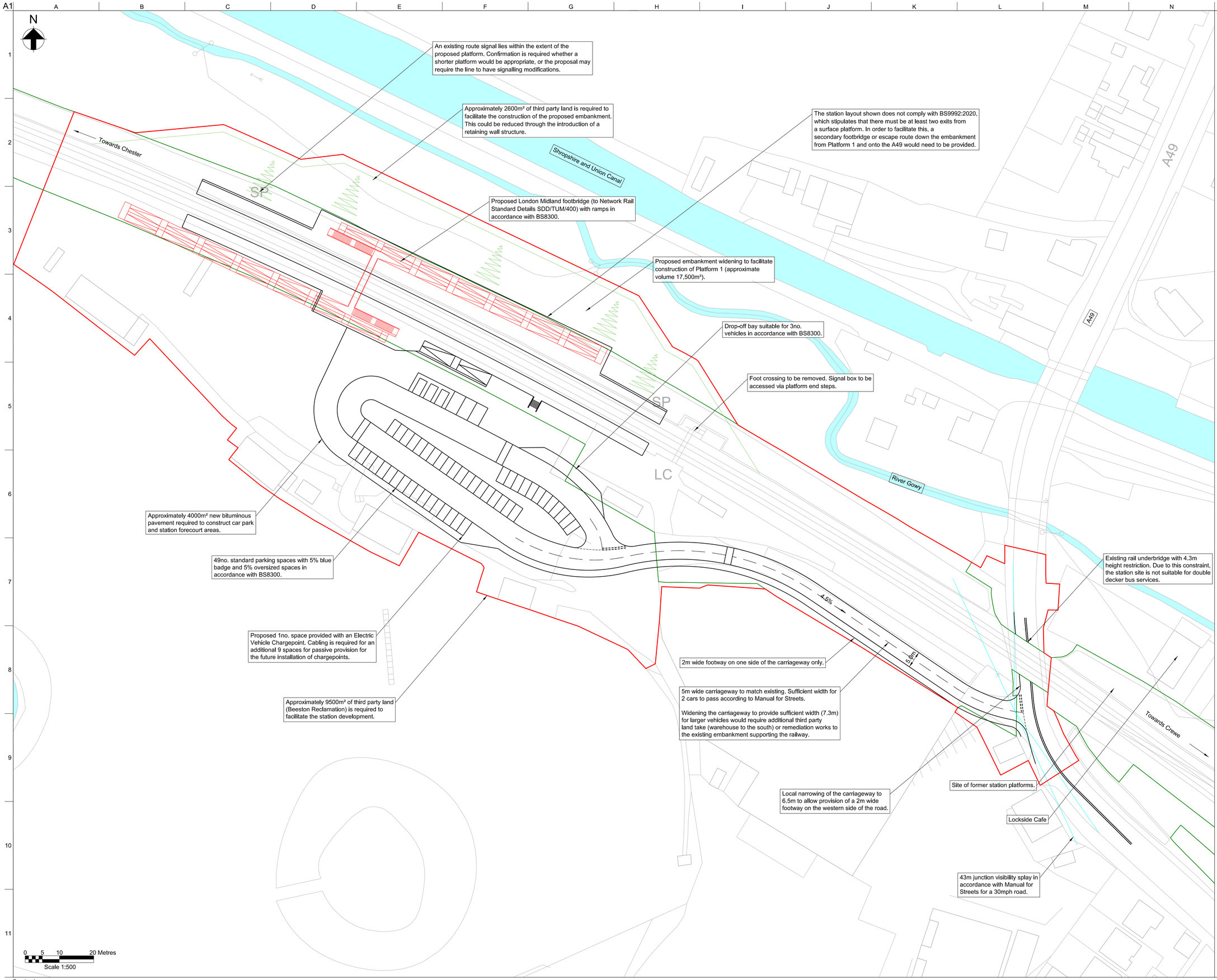
Job No 284162-00

Drawing Status For Information

Drawing No BCTS-ARP-XX-XX-DR-C-0003

Issue A

\\global\europe\Manchester\Jobs\280000\284162-00\4 Internal Project Data\4-03 Drawings\IG_Drawings\Civil\A1\BCTS-ARP-XX-XX-DR-C-0003 Proposed Site Plan - Option 2.dgn



Notes:

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3. The existing Network Rail land ownership boundary is indicative based on land registry plans obtained by the project.

Key:

- Existing Features
- Network Rail Boundary
- Proposed Site Boundary
- Proposed Earthworks

Issue	Date	By	Chkd	Appd
A	07/03/22	JT	CW	CW
For Information				

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Client

Beeston Castle and Tarporley Station Re-opening Group

Job Title

Beeston Castle and Tarporley Station

Proposed General Arrangement Site Option 3

Scale at A1 1:500

Discipline Civil

Job No **284162-00**

Drawing Status **For Information**

Drawing No **BCTS-ARP-XX-XX-DR-C-0005**

Issue **A**

A1

N

Towards Chester

SP

Shropshire and Union Canal

A49

A49

Drop-off bay suitable for 3no. vehicles in accordance with BS8300.

Foot crossing to be removed. Signal box to be accessed via platform end steps.

Proposed London Midland footbridge (to Network Rail Standard Details SDD/TUM/400) with type 2 lifts.

River Gowy

Proposed retaining wall.

Existing rail underbridge with 4.3m height restriction.

Approximately 1000m² of third party land (Beeston Reclamation) is required to facilitate the station development.

4.5%

5.5m

2m wide footway on one side of the carriageway only.

5m wide carriageway to match existing. Sufficient width for 2 cars to pass according to Manual for Streets.

Widening the carriageway to provide sufficient width (7.3m) for larger vehicles would require additional third party land take (warehouse to the south) or remediation works to the existing embankment supporting the railway.

Towards Crewe

Site of former station platforms.

Local narrowing of the carriageway to 6.5m to allow provision of a 2m wide footway on the western side of the road.

Lockside Cafe

43m junction visibility splay in accordance with Manual for Streets for a 30mph road.

0 5 10 20 Metres

Scale 1:500

Do not scale

Notes:

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2. All levels are shown in metres above Ordnance Datum unless otherwise specified.
3. The existing Network Rail land ownership boundary is indicative based on land registry plans obtained by the project.

Key:

- Existing Features
- Network Rail Boundary
- Proposed Site Boundary
- Indicative extents of housing proposals

Issue	Date	By	Chkd	Appd
A	25/04/22	JT	CW	CW
For Information				

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Client

Beeston Castle and Tarporley Station Re-opening Group

Job Title

Beeston Castle and Tarporley Station

Proposed General Arrangement Site Option 4a

Scale at A1 1:500

Discipline Civil

Job No **284162-00**

Drawing Status **For Information**

Drawing No **BCTS-ARP-XX-XX-DR-C-0006**

Issue **A**

A1

N

Towards Chester

SP

Shropshire and Union Canal

A49

A49

SP

Foot crossing to be removed. Signal box to be accessed via platform end steps.

Proposed London Midland footbridge (to Network Rail Standard Details SDD/TUM/400) with type 2 lifts.

River Gowy

Proposed retaining wall.

Existing rail underbridge with 4.3m height restriction. Due to this constraint, the station site is not suitable for double decker bus services.

4.5%

4.5%

Approximately 4500m² of third party land (Beeston Reclamation) is could be required to facilitate the station development if car parking is included in the scheme.

2m wide footway on one side of the carriageway only.

5m wide carriageway to match existing. Sufficient width for 2 cars to pass according to Manual for Streets.

Widening the carriageway to provide sufficient width (7.3m) for larger vehicles would require additional third party land take (warehouse to the south) or remediation works to the existing embankment supporting the railway.

Towards Crewe

Site of former station platforms.

Local narrowing of the carriageway to 6.5m to allow provision of a 2m wide footway on the western side of the road.

Lockside Cafe

43m junction visibility splay in accordance with Manual for Streets for a 30mph road.

0 5 10 20 Metres

Scale 1:500

Do not scale

Notes:

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2. All levels are shown in metres above Ordnance Datum unless otherwise specified.
3. The existing Network Rail land ownership boundary is indicative based on land registry plans obtained by the project.

Key:

- Existing Features
- Network Rail Boundary
- Proposed Site Boundary
- Indicative extents of housing proposals

Issue	Date	By	Chkd	Appd
A	25/04/22	JT	CW	CW
For Information				

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Client

Beeston Castle and Tarporley Station Re-opening Group

Job Title

Beeston Castle and Tarporley Station

Proposed General Arrangement Site Option 4b

Scale at A1 1:500

Discipline Civil

Job No **284162-00**

Drawing Status **For Information**

Drawing No **BCTS-ARP-XX-XX-DR-C-0007**

Issue **A**

ARUP

Beeston & Tarporley Station Reopening Group

Beeston Castle & Tarporley Station

Outline Cost Estimate

Reference: CE-284162-ARUP-Rev02

Rev02 | 27 April 2022

Job Number 284162-00

Ove Arup & Partners Ltd
Blythe Gate
Blythe Valley Park
Solihull
West Midlands B90 8AE
United Kingdom
arup.com

Beeston Castle & Tarporley Station

Outline Cost Estimate

Reference: CE-284162-ARUP-Rev02

Rev02 | 29 April 2022

Section: **Contents**

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Document Verification

Job title	**Beeston Castle & Tarporley Station**
Document title	**Outline Cost Estimate**
Job number	**284162-00**
Document ref	**CE-284162-ARUP-Rev02**
File reference	**4-04**

Revision	Date				
Rev01	**01 -Apr-2022**	**Filename**	CE-284162-ARUP-Rev01		
		Description	Options re-coded ; Option 1 renamed as Option 1A, Option 3 renamed as Option 1B, Option 2 retained as Option 2, Option 4 renamed as Option 3		
			Prepared by	Checked by	Approved by
		Name	Ian Burwood		
		Signature			
Rev02	**29 -Apr-2022**	**Filename**	CE-284162-ARUP-Rev02		
		Description	Options 4a and 4b added		
			Prepared by	Checked by	Approved by
		Name	Ian Burwood		
		Signature			

Scope of Estimate

This document provides an outline order of cost estimate for the Options associated with the proposed measures to enable the re-opening of Beeston and Tarporley Station

This estimate is based upon the design information set out in the following documentation:

Drawings

Ref	Title		Originator
BCTS-ARP-XX-XX-DR-C-0002 Rev A	Proposed General Arrangement	Site Option 1A	Arup
BCTS-ARP-XX-XX-DR-C-0003 Rev A	Proposed General Arrangement	Site Option 2	Arup
BCTS-ARP-XX-XX-DR-C-0004 Rev A	Proposed General Arrangement	Site Option 1B	Arup
BCTS-ARP-XX-XX-DR-C-0005 Rev A	Proposed General Arrangement	Site Option 3	Arup
BCTS-ARP-XX-XX-DR-C-0006 Rev A	Proposed General Arrangement	Site Option 4a	Arup
BCTS-ARP-XX-XX-DR-C-0007 Rev A	Proposed General Arrangement	Site Option 4b	Arup

Reports

Ref	Title	Originator

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Basis of Costing

This cost estimate is based upon high level concept designs which have not included site survey or detailed modelling.

The cost estimate is based upon price levels prevailing at : 1Q2022

Cost Data has been derived from:

- prevailing market rates determined from current projects
- historic rates from past projects
- benchmark cost data from published cost information
- market enquiries from suppliers and contractors

Cost information has been adjusted to reflect variances in price levels from the timing and location of the source cost data to the price basis stated above and the location of this project to recognise regional cost variances

No provision has been included for Inflation from the Base Date of this estimate to the midpoint of construction. This adjustment would need to be made once the timing of the proposed project is identified.

Unit rates may be affected by the method of procurement / contract packing strategy and the scale of measures to be undertaken.

Preliminaries

Main Contractors Preliminaries are very dependent on programme duration and methodology. At this stage neither of these matters has been evaluated and hence a range has been included to reflect potential outcomes:
These allowances are deemed to include provision for Temporary Works.

Low	High
20.0%	35.0%

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Main Contractor's Overheads and Profit

Main Contractors Overheads and Profit reflect the prevailing market conditions and vary over time. At this stage no knowledge of the intended programme is given to identify what these conditions might be and hence a range has been included to reflect potential outcomes:

Low	High
5.0%	7.5%

Risk, Contingency and Optimism Bias

Given the nature and stage of the design information, provision has been included for Risk, Contingency and Optimism Bias at the following level:

Low	High
40.0%	60.0%

Summary Cost Basis

The current level of design is very conceptual and hence a range of quantum has been assessed for each of the proposed measures. Similarly, for the scope and content of each of the measures a range of potential cost has been assessed to reflect variance in specification. Together, therefore, four estimated values have been generated for each location, to provide a range of estimated cost:

Lower Band	Low quantity x Low Unit Rates + Low Preliminaries + Low OH&P + Low Risk, Contingency and Optimism Bias
	High quantity x Low Unit Rates + Low Preliminaries + Low OH&P + Low Risk, Contingency and Optimism Bias
	Low quantity x High Unit Rates + Low Preliminaries + Low OH&P + Low Risk, Contingency and Optimism Bias
Upper Band	High quantity x High Unit Rates + High Preliminaries + High OH&P + High Risk, Contingency and Optimism Bias

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Assumptions

In the absence of detailed information the following assumptions have been made in deriving this estimate:

- Works will be carried out at each site in a single continuous contract period with no requirement for weekend or night working
- Materials arising from excavations will generally be re-used.
- The allowance for Preliminaries covers temporary works and traffic management. This should be consider provisional only and subject to detailed design, assessment of methodology and programme.
- Works can be undertaken without the need for track possessions.
- Platforms include a waiting shelter only.
- Station amenities include a toilet facility and ticket machine only. (ie no ticket office)
- The existing Beeston Antiques and Reclamation Centre at the junction with the A49 will be removed as part of the proposed housing development.
- The line is not electrified.

Exclusions

The following are excluded from the scope of this estimate:

- Professional Fees associated with Design and Project Management (including any Site Supervision and Contract Administration)
- Client direct costs (eg internal management)
- Geotechnical and Environmental Surveys
- Dealing with any contaminated arisings or invasive species
- Inflation beyond the base date of this estimate
- Works to any rail signalling or control systems
- Works to existing permanent railway such as realignment, lowering or raising, switches and crossings
- Flood protection / mitigation measures or dealing with existing watercourses
- Retaining structures for earthworks
- Works to existing rail over road bridge or to existing A49 highway
- Statutory Charges and Fees - (eg. Planning Fees, Building Control Fees and the like)

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Exclusions (continued)

- S106, S278 Agreements / Contributions
- Community Infrastructure Levy
- Track possessions and TOC Compensation
- Land Purchase
- Utility Diversions / Raising, Lowering or repositioning chambers and manholes
- VAT

Summary Cost

Summary Cost Estimates Rounded to nearest £'000		Base Construction Cost Estimate Total (Excluding Prelims, OH&P & Risk & OB)	Gross Construction Cost Estimate Total (Including Risk & OB)
Site Option 1A	Lower Band	£3,411,000	£6,017,000
	Upper Band	£7,495,000	£17,403,000
Site Option 2	Lower Band	£3,089,000	£5,449,000
	Upper Band	£7,013,000	£16,285,000
Site Option 1B	Lower Band	£3,532,000	£6,230,000
	Upper Band	£7,853,000	£18,235,000
Site Option 3	Lower Band	£6,625,000	£11,687,000
	Upper Band	£14,023,000	£32,562,000
Site Option 4a	Lower Band	£2,181,000	£3,847,000
	Upper Band	£4,760,000	£11,053,000
Site Option 4b	Lower Band	£2,487,000	£4,386,000
	Upper Band	£5,215,000	£12,109,000

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Beeston Castle & Tarporley Station

Outline Cost Estimate

Reference: CE-284162-ARUP-Rev02

Rev02 | 29 April 2022

ARUP

Drw Ref Option1

Section: **Site Estimate Build-Ups**

ARUP

Option 2

Section: **Site Estimate Build-Ups**

ARUP

Option 3

Section: **Site Estimate Build-Ups**

Item Description	UoM	Unit Rate Low	Unit Rate High	Pricing Note / Assumption	Site Option 1A: Proportion of Total	Site Option 1A: Site specific quantities Quantity (Low)	Site Option 1A: Site specific quantities Quantity (High)	Site Option 2: Proportion of Total	Site Option 2: Site specific quantities Quantity (Low)	Site Option 2: Site specific quantities Quantity (High)	Site Option 1B: Proportion of Total	Site Option 1B: Site specific quantities Quantity (Low)	Site Option 1B: Site specific quantities Quantity (High)
Option 3 : 5m wide access carriageway & parking bays	m²	£103.00	£125.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : North Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : South Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1B : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00		0.0%	-	-	0.0%	-	-	7.9%	3,008	3,676
Option 1B : 5m wide access carriageway & parking bays	m²	£103.00	£125.00		0.0%	-	-	0.0%	-	-	9.8%	4,414	5,394
Option 1B : North Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%	-	-	25.3%	705	861
Option 1B : South Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%	-	-	27.2%	758	926
Option 2 : North Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	27.9%	689	842	0.0%	-	-
Option 2 : South Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	35.0%	866	1,058	0.0%	-	-
Option 2 : 5m wide access carriageway & parking bays	m²	£103.00	£125.00		0.0%	-	-	2.6%	1,033	1,263	0.0%	-	-
Option 2 : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00		0.0%	-	-	2.2%	732	894	0.0%	-	-
Option 1A : North Platform	m²	£1,130.00	£2,550.00		26.4%	705	861	0.0%	-	-	0.0%	-	-
Option 1A : South Platform	m²	£1,130.00	£2,550.00		28.4%	758	926	0.0%	-	-	0.0%	-	-
Option 1A : 5m wide access carriageway & parking bays	m²	£103.00	£125.00		10.2%	4,403	5,381	0.0%	-	-	0.0%	-	-
Option 1A : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00		4.8%	1,737	2,123	0.0%	-	-	0.0%	-	-
Option 3 : Remove existing foot crossing	item	£2,000.00	£3,000.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.0%	-	-

Beeston Castle & Tarporley Station

Outline Cost Estimate

Reference: CE-284162-ARUP-Rev02

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Drw Ref Option1

Section: **Site Estimate Build-Ups**

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Option 2

Section: **Site Estimate Build-Ups**

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Option 3

Section: **Site Estimate Build-Ups**

Item Description	UoM	Unit Rate		Pricing Note / Assumption	Site Option 1A			Site Option 2			Site Option 1B		
					Proportion of Total	Site specific quantities		Proportion of Total	Site specific quantities		Proportion of Total	Site specific quantities	
		Low	High			Quantity (Low)	Quantity (High)		Quantity (Low)	Quantity (High)		Quantity (Low)	Quantity (High)
Option 3 : Electric Vehicle Chargepoint	item	£3,500.00	£4,500.00	Provisional Allowance (from HS2 Interchange)	0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : Electric Vehicle Chargepoint (Future Provision)	item	£700.00	£900.00	Provisional Allowance for below ground cabling	0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : Signal Relocation	item	£15,000.00	£20,000.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1A : Signal Relocation	item	£15,000.00	£20,000.00	Provisional Allowance	0.3%	1	1	0.0%	-	-	0.0%	-	-
Option 1A : Remove existing foot crossing	item	£2,000.00	£3,000.00	Provisional Allowance	0.0%	1	1	0.0%	-	-	0.0%	-	-
Option 1B : Remove existing foot crossing	item	£2,000.00	£3,000.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.0%	1	1
Option 3 : Short Platform Access Steps	item	£4,000.00	£5,100.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1B : Short Platform Access Steps	item	£4,000.00	£5,100.00		0.0%	-	-	0.0%	-	-	0.2%	3	3
Option 1B : Signal Relocation	item	£15,000.00	£20,000.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.3%	1	1
Option 1A : Access Bridge Lifts	item	£97,400.00	£116,900.00	8 person lift with enclosure (2Q2015)	3.9%	2	2	0.0%	-	-	0.0%	-	-
Option 2 : Access Bridge Lifts	item	£97,400.00	£116,900.00	8 person lift with enclosure (2Q2015)	0.0%	-	-	4.2%	2	2	0.0%	-	-
Option 1B : Access Bridge Lifts	item	£97,400.00	£116,900.00	8 person lift with enclosure (2Q2015)	0.0%	-	-	0.0%	-	-	3.8%	2	2
Option 1B : Electric Vehicle Chargepoint	item	£3,500.00	£4,500.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.1%	1	1
Option 2 : Short Platform Access Steps	item	£4,000.00	£5,100.00		0.0%	-	-	0.1%	1	1	0.0%	-	-
Option 2 : Signal Relocation	item	£15,000.00	£20,000.00	Provisional Allowance	0.0%	-	-	0.3%	1	1	0.0%	-	-
Option 2 : Remove existing foot crossing	item	£2,000.00	£3,000.00	Provisional Allowance	0.0%	-	-	0.0%	1	1	0.0%	-	-
Option 3 : Fill Volume (17,500 m3)	m³	£59.00	£72.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1B : Fill Volume (10,500 m3)	m³	£59.00	£72.00		0.0%	-	-	0.0%	-	-	12.1%	9,450	11,550

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Option 2

Section: **Site Estimate Build-Ups**

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Option 3

Section: **Site Estimate Build-Ups**

Item Description	UoM	Unit Rate Low	Unit Rate High	Pricing Note / Assumption	Site Option 1A: Proportion of Total	Site Option 1A: Site specific quantities Quantity (Low)	Site Option 1A: Site specific quantities Quantity (High)	Site Option 2: Proportion of Total	Site Option 2: Site specific quantities Quantity (Low)	Site Option 2: Site specific quantities Quantity (High)	Site Option 1B: Proportion of Total	Site Option 1B: Site specific quantities Quantity (Low)	Site Option 1B: Site specific quantities Quantity (High)
Option 2 : Fill Volume (10,000 m3)	m³	£59.00	£72.00		0.0%	-	-	13.0%	9,000	11,000	0.0%	-	-
Option 1A : Fill Volume (10,000 m3)	m³	£59.00	£72.00		12.0%	9,000	11,000	0.0%	-	-	0.0%	-	-
Option 1B : Cut Volume (100 m3)	m³	£5.00	£7.00		0.0%	-	-	0.0%	-	-	0.0%	90	110
Option 1A : Short Platform Access Steps	nr	£4,000.00	£5,100.00		0.3%	3	3	0.0%	-	-	0.0%	-	-
Option 2 : Platform Access Ramp @ grade	m	£1,000.00	£1,250.00		0.0%	-	-	0.5%	20	24	0.0%	-	-
Option 1A : Platform Access Ramp @ grade	m	£1,000.00	£1,250.00		0.5%	20	24	0.0%	-	-	0.0%	-	-
Option 3 : Platform Access Ramp @ grade	m	£1,000.00	£1,250.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1B : Platform Access Ramp @ grade	m	£1,000.00	£1,250.00		0.0%	-	-	0.0%	-	-	0.4%	20	24
Option 1A : Stair Overbridge CL Length	m²	£4,493.00	£6,739.00		10.1%	88	108	0.0%	-	-	0.0%	-	-
Option 2 : Stair Overbridge CL Length	m²	£4,493.00	£6,739.00		0.0%	-	-	10.9%	88	108	0.0%	-	-
Option 1B : Stair Overbridge CL Length	m²	£4,493.00	£6,739.00		0.0%	-	-	0.0%	-	-	9.7%	88	108
Option 3 : Stair Overbridge CL Length	m²	£4,493.00	£6,739.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : Overbridge Ramp CL Length (right)	m²	£4,493.00	£6,739.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : Overbridge Ramp CL Length (left)	m²	£4,493.00	£6,739.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1A : Station Building / Waiting Rooms / Ticket Office and Facilities	item	£12,000.00	£19,000.00		0.3%	1	1	0.0%	-	-	0.0%	-	-
Option 2 : Station Building / Waiting Rooms / Ticket Office and Facilities	item	£12,000.00	£19,000.00		0.0%	-	-	0.3%	1	1	0.0%	-	-

Beeston Castle & Tarporley Station

Outline Cost Estimate

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Option 2
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Option 3
Section: **Site Estimate Build-Ups**

Item Description	UoM	Unit Rate Low	Unit Rate High	Pricing Note / Assumption	Site Option 1A: Proportion of Total	Site Option 1A: Site specific quantities Quantity (Low)	Site Option 1A: Site specific quantities Quantity (High)	Site Option 2: Proportion of Total	Site Option 2: Site specific quantities Quantity (Low)	Site Option 2: Site specific quantities Quantity (High)	Site Option 1B: Proportion of Total	Site Option 1B: Site specific quantities Quantity (Low)	Site Option 1B: Site specific quantities Quantity (High)
Option 1B : Station Building / Waiting Rooms / Ticket Office and Facilities	item	£12,000.00	£19,000.00		0.0%	-	-	0.0%	-	-	0.3%	1	1
Option 3 : Station Building / Waiting Rooms / Ticket Office and Facilities	item	£12,000.00	£19,000.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 4a : North Platform	m²	£1,130.00	£2,550.00										
Option 4a : South Platform	m²	£1,130.00	£2,550.00										
Option 4a : 5m wide access carriageway & parking bays	m²	£103.00	£125.00										
Option 4a : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00										
Option 4b : North Platform	m²	£1,130.00	£2,550.00										
Option 4b : South Platform	m²	£1,130.00	£2,550.00										
Option 4b : 5m wide access carriageway & parking bays	m²	£103.00	£125.00										
Option 4b : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00										
Option 4a : Retaining Wall (North)	m	£4,000.00	£4,500.00	Retained Height 7m									
Option 4b : Retaining Wall (North)	m	£4,000.00	£4,500.00	Retained Height 7m									

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Option 2
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Option 3
Section: **Site Estimate Build-Ups**

Item Description	UoM	Unit Rate Low	Unit Rate High	Pricing Note / Assumption	Site Option 1A: Proportion of Total	Site Option 1A: Site specific quantities Quantity (Low)	Site Option 1A: Site specific quantities Quantity (High)	Site Option 2: Proportion of Total	Site Option 2: Site specific quantities Quantity (Low)	Site Option 2: Site specific quantities Quantity (High)	Site Option 1B: Proportion of Total	Site Option 1B: Site specific quantities Quantity (Low)	Site Option 1B: Site specific quantities Quantity (High)
Base Construction Net Cost Estimate Total (Excluding Prelims, OH&P & Risk) Rounded to nearest £'000				Low Minimum (Low Quantity * Low Rate)		£3,411,000			£3,089,000			£3,532,000	
				High Minimum (High Quantity * Low Rate)			£4,117,000			£3,726,000			£4,263,000
				Low Maximum (Low Quantity * High Rate)		£6,186,000			£5,788,000			£6,479,000	
				High Maximum (High Quantity * High Rate)			£7,495,000			£7,013,000			£7,853,000
Net to Gross Uplifts				Preliminaries 20% 35%									
Net Totals (Excluding OH&P, Risk and Optimism Bias)				Low Minimum (Low Quantity * Low Rate)		£4,093,000			£3,707,000			£4,238,000	
				High Minimum (High Quantity * Low Rate)			£4,940,000			£4,471,000			£5,116,000
				Low Maximum (Low Quantity * High Rate)		£8,351,000			£7,814,000			£8,747,000	
				High Maximum (High Quantity * High Rate)			£10,118,000			£9,468,000			£10,602,000
Net to Gross Uplifts				OHP 5% 8%									
Gross Totals (Excluding Risk & Optimism Bias)				Low Minimum (Low Quantity * Low Rate)		£4,298,000			£3,892,000			£4,450,000	
				High Minimum (High Quantity * Low Rate)			£5,187,000			£4,695,000			£5,372,000
				Low Maximum (Low Quantity * High Rate)		£8,977,000			£8,400,000			£9,403,000	
				High Maximum (High Quantity * High Rate)			£10,877,000			£10,178,000			£11,397,000
Contingencies, Risk and Optimism Bias				40% 60%									
Gross Totals (Including Risk & Optimism Bias)				Low Minimum (Low Quantity * Low Rate)		**£6,017,000**			**£5,449,000**			**£6,230,000**	
				High Minimum (High Quantity * Low Rate)			**£7,262,000**			**£6,573,000**			**£7,521,000**
				Low Maximum (Low Quantity * High Rate)		**£14,363,000**			**£13,440,000**			**£15,045,000**	
				High Maximum (High Quantity * High Rate)			**£17,403,000**			**£16,285,000**			**£18,235,000**

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Option 4

Section: **Site Estimate Build-Ups**

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Item Description	UoM	Unit Rate Low	Unit Rate High	Pricing Note / Assumption	Site Option 3 Proportion of Total	Site Option 3 Site specific quantities Quantity (Low)	Site Option 3 Site specific quantities Quantity (High)	Site Option 4a (Variant to Option 2) Proportion of Total	Site Option 4a (Variant to Option 2) Site specific quantities Quantity (Low)	Site Option 4a (Variant to Option 2) Site specific quantities Quantity (High)	Site Option 4b (Variant to Option 1A) Proportion of Total	Site Option 4b (Variant to Option 1A) Site specific quantities Quantity (Low)	Site Option 4b (Variant to Option 1A) Site specific quantities Quantity (High)
Option 3 : 5m wide access carriageway & parking bays	m²	£103.00	£125.00		3.0%	2,475	3,025	0.0%	-	-	0.0%	-	-
Option 3 : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00		2.4%	1,660	2,028	0.0%	-	-	0.0%	-	-
Option 3 : North Platform	m²	£1,130.00	£2,550.00		23.8%	1,202	1,469	0.0%	-	-	0.0%	-	-
Option 3 : South Platform	m²	£1,130.00	£2,550.00		16.2%	819	1,001	0.0%	-	-	0.0%	-	-
Option 1B : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1B : 5m wide access carriageway & parking bays	m²	£103.00	£125.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1B : North Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1B : South Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 2 : North Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%			0.0%		
Option 2 : South Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%			0.0%		
Option 2 : 5m wide access carriageway & parking bays	m²	£103.00	£125.00		0.0%	-	-	0.0%			0.0%		
Option 2 : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00		0.0%	-	-	0.0%			0.0%		
Option 1A : North Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%			0.0%		
Option 1A : South Platform	m²	£1,130.00	£2,550.00		0.0%	-	-	0.0%			0.0%		
Option 1A : 5m wide access carriageway & parking bays	m²	£103.00	£125.00		0.0%	-	-	0.0%			0.0%		
Option 1A : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00		0.0%	-	-	0.0%			0.0%		
Option 3 : Remove existing foot crossing	item	£2,000.00	£3,000.00	Provisional Allowance	0.0%	1	1	0.0%	-	-	0.0%	-	-

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Option 4

Section: **Site Estimate Build-Ups**

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Item Description	UoM	Unit Rate		Pricing Note / Assumption	Site Option 3			Site Option 4a (Variant to Option 2)			Site Option 4b (Variant to Option 1A)		
					Proportion of Total	Site specific quantities		Proportion of Total	Site specific quantities		Proportion of Total	Site specific quantities	
		Low	High			Quantity (Low)	Quantity (High)		Quantity (Low)	Quantity (High)		Quantity (Low)	Quantity (High)
Option 3 : Electric Vehicle Chargepoint	item	£3,500.00	£4,500.00	Provisional Allowance (from HS2 Interchange)	0.0%	1	1	0.0%	-	-	0.0%	-	-
Option 3 : Electric Vehicle Chargepoint (Future Provision)	item	£700.00	£900.00	Provisional Allowance for below ground cabling	0.0%	1	1	0.0%	-	-	0.0%	-	-
Option 3 : Signal Relocation	item	£15,000.00	£20,000.00	Provisional Allowance	0.2%	1	1	0.0%	-	-	0.0%	-	-
Option 1A : Signal Relocation	item	£15,000.00	£20,000.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.5%	1	1
Option 1A : Remove existing foot crossing	item	£2,000.00	£3,000.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.1%	1	1
Option 1B : Remove existing foot crossing	item	£2,000.00	£3,000.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : Short Platform Access Steps	item	£4,000.00	£5,100.00		0.0%	1	1	0.0%	-	-	0.0%	-	-
Option 1B : Short Platform Access Steps	item	£4,000.00	£5,100.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1B : Signal Relocation	item	£15,000.00	£20,000.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1A : Access Bridge Lifts	item	£97,400.00	£116,900.00	8 person lift with enclosure (2Q2015)	0.0%	-	-	0.0%	-	-	5.6%	2	2
Option 2 : Access Bridge Lifts	item	£97,400.00	£116,900.00	8 person lift with enclosure (2Q2015)	0.0%	-	-	6.2%	2	2	0.0%	-	-
Option 1B : Access Bridge Lifts	item	£97,400.00	£116,900.00	8 person lift with enclosure (2Q2015)	0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1B : Electric Vehicle Chargepoint	item	£3,500.00	£4,500.00	Provisional Allowance	0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 2 : Short Platform Access Steps	item	£4,000.00	£5,100.00		0.0%	-	-	0.1%	1	1	0.0%	-	-
Option 2 : Signal Relocation	item	£15,000.00	£20,000.00	Provisional Allowance	0.0%	-	-	0.5%	1	1	0.0%	-	-
Option 2 : Remove existing foot crossing	item	£2,000.00	£3,000.00	Provisional Allowance	0.0%	-	-	0.1%	1	1	0.0%	-	-
Option 3 : Fill Volume (17,500 m3)	m³	£59.00	£72.00		11.1%	15,750	19,250	0.0%			0.0%		
Option 1B : Fill Volume (10,500 m3)	m³	£59.00	£72.00		0.0%	-	-	0.0%			0.0%		

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Option 4

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Item Description	UoM	Unit Rate		Pricing Note / Assumption	Site Option 3			Site Option 4a (Variant to Option 2)			Site Option 4b (Variant to Option 1A)		
		Low	High		Proportion of Total	Site specific quantities Quantity (Low)	Site specific quantities Quantity (High)	Proportion of Total	Site specific quantities Quantity (Low)	Site specific quantities Quantity (High)	Proportion of Total	Site specific quantities Quantity (Low)	Site specific quantities Quantity (High)
Option 2 : Fill Volume (10,000 m3)	m³	£59.00	£72.00		0.0%	-	-	0.0%			0.0%		
Option 1A : Fill Volume (10,000 m3)	m³	£59.00	£72.00		0.0%	-	-	0.0%			0.0%		
Option 1B : Cut Volume (100 m3)	m³	£5.00	£7.00		0.0%	-	-	0.0%			0.0%		
Option 1A : Short Platform Access Steps	nr	£4,000.00	£5,100.00		0.0%	-	-	0.0%	-	-	0.4%	3	3
Option 2 : Platform Access Ramp @ grade	m	£1,000.00	£1,250.00		0.0%	-	-	0.7%	20	24	0.0%	-	-
Option 1A : Platform Access Ramp @ grade	m	£1,000.00	£1,250.00		0.0%	-	-	0.0%	-	-	0.6%	20	24
Option 3 : Platform Access Ramp @ grade	m	£1,000.00	£1,250.00		0.2%	20	24	0.0%	-	-	0.0%	-	-
Option 1B : Platform Access Ramp @ grade	m	£1,000.00	£1,250.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 1A : Stair Overbridge CL Length	m²	£4,493.00	£6,739.00		0.0%	-	-	0.0%	-	-	14.3%	88	108
Option 2 : Stair Overbridge CL Length	m²	£4,493.00	£6,739.00		0.0%	-	-	15.9%	88	108	0.0%	-	-
Option 1B : Stair Overbridge CL Length	m²	£4,493.00	£6,739.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : Stair Overbridge CL Length	m²	£4,493.00	£6,739.00		5.3%	88	108	0.0%	-	-	0.0%	-	-
Option 3 : Overbridge Ramp CL Length (right)	m²	£4,493.00	£6,739.00		17.4%	288	352	0.0%	-	-	0.0%	-	-
Option 3 : Overbridge Ramp CL Length (left)	m²	£4,493.00	£6,739.00		17.4%	288	352	0.0%	-	-	0.0%	-	-
Option 1A : Station Building / Waiting Rooms / Ticket Office and Facilities	item	£12,000.00	£19,000.00		0.0%	-	-	0.4%	- 1	- 1	0.4%	- 1	- 1
Option 2 : Station Building / Waiting Rooms / Ticket Office and Facilities	item	£12,000.00	£19,000.00		0.0%	-	-	0.4%	1	1	0.0%	-	-

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Option 4

Section: **Site Estimate Build-Ups**

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Item Description	UoM	Unit Rate Low	Unit Rate High	Pricing Note / Assumption	Site Option 3 Proportion of Total	Site Option 3 Site specific quantities Quantity (Low)	Site Option 3 Site specific quantities Quantity (High)	Site Option 4a (Variant to Option 2) Proportion of Total	Site Option 4a (Variant to Option 2) Site specific quantities Quantity (Low)	Site Option 4a (Variant to Option 2) Site specific quantities Quantity (High)	Site Option 4b (Variant to Option 1A) Proportion of Total	Site Option 4b (Variant to Option 1A) Site specific quantities Quantity (Low)	Site Option 4b (Variant to Option 1A) Site specific quantities Quantity (High)
Option 1B : Station Building / Waiting Rooms / Ticket Office and Facilities	item	£12,000.00	£19,000.00		0.0%	-	-	0.0%	-	-	0.0%	-	-
Option 3 : Station Building / Waiting Rooms / Ticket Office and Facilities	item	£12,000.00	£19,000.00		0.2%	1	1	0.0%	-	-	0.0%	-	-
Option 4a : North Platform	m²	£1,130.00	£2,550.00					24.0%	408	498		-	-
Option 4a : South Platform	m²	£1,130.00	£2,550.00						483	591		-	-
Option 4a : 5m wide access carriageway & parking bays	m²	£103.00	£125.00						1,162	1,420		-	-
Option 4a : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00						1,349	1,649		-	-
Option 4b : North Platform	m²	£1,130.00	£2,550.00						-	-		408	498
Option 4b : South Platform	m²	£1,130.00	£2,550.00						-	-		483	591
Option 4b : 5m wide access carriageway & parking bays	m²	£103.00	£125.00						-	-		4,046	4,945
Option 4b : Footway to Carriageway and Station Plaza	m²	£70.00	£200.00						-	-		1,368	1,672
Option 4a : Retaining Wall (North)	m	£4,000.00	£4,500.00	Retained Height 7m					79	97		-	-
Option 4b : Retaining Wall (North)	m	£4,000.00	£4,500.00	Retained Height 7m					-	-		79	97

Beeston Castle & Tarporley Station

Outline Cost Estimate

Reference: CE-284162-ARUP-Rev02

Rev02 | 29 April 2022

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Option 4

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Item Description	UoM	Unit Rate Low	Unit Rate High	Pricing Note / Assumption	Site Option 3 Proportion of Total	Site Option 3 Site specific quantities Quantity (Low)	Site Option 3 Site specific quantities Quantity (High)	Site Option 4a (Variant to Option 2) Proportion of Total	Site Option 4a (Variant to Option 2) Site specific quantities Quantity (Low)	Site Option 4a (Variant to Option 2) Site specific quantities Quantity (High)	Site Option 4b (Variant to Option 1A) Proportion of Total	Site Option 4b (Variant to Option 1A) Site specific quantities Quantity (Low)	Site Option 4b (Variant to Option 1A) Site specific quantities Quantity (High)
Base Construction Net Cost Estimate Total (Excluding Prelims, OH&P & Risk)				Low Minimum (Low Quantity * Low Rate)		£6,625,000			£2,181,000			£2,487,000	
				High Minimum (High Quantity * Low Rate)			£8,090,000			£2,618,000			£2,990,000
Rounded to nearest £'000				Low Maximum (Low Quantity * High Rate)		£11,482,000			£3,942,000			£4,317,000	
				High Maximum (High Quantity * High Rate)			£14,023,000			£4,760,000			£5,215,000
Net to Gross Uplifts				Preliminaries 20% 35%									
Net Totals (Excluding OH&P, Risk and Optimism Bias)				Low Minimum (Low Quantity * Low Rate)		£7,950,000			£2,617,000			£2,984,000	
				High Minimum (High Quantity * Low Rate)			£9,708,000			£3,142,000			£3,588,000
				Low Maximum (Low Quantity * High Rate)		£15,501,000			£5,322,000			£5,828,000	
				High Maximum (High Quantity * High Rate)			£18,931,000			£6,426,000			£7,040,000
Net to Gross Uplifts				OHP 5% 8%									
Gross Totals (Excluding Risk & Optimism Bias)				Low Minimum (Low Quantity * Low Rate)		£8,348,000			£2,748,000			£3,133,000	
				High Minimum (High Quantity * Low Rate)			£10,193,000			£3,299,000			£3,767,000
				Low Maximum (Low Quantity * High Rate)		£16,664,000			£5,721,000			£6,265,000	
				High Maximum (High Quantity * High Rate)			£20,351,000			£6,908,000			£7,568,000
Contingencies, Risk and Optimism Bias				40% 60%									
Gross Totals (Including Risk & Optimism Bias)				Low Minimum (Low Quantity * Low Rate)		**£11,687,000**			**£3,847,000**			**£4,386,000**	
				High Minimum (High Quantity * Low Rate)			**£14,270,000**			**£4,619,000**			**£5,274,000**
				Low Maximum (Low Quantity * High Rate)		**£26,662,000**			**£9,154,000**			**£10,024,000**	
				High Maximum (High Quantity * High Rate)			**£32,562,000**			**£11,053,000**			**£12,109,000**