



New Waterbeach Station

Outline Business Case

September 2024

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Glossary of Abbreviations

Abbreviation	Meaning		
AFA	Access For All (footbridge)		
AFC	Anticipated Final Cost		
AiP	Approval in Principle		
AMAT	Active Mode Appraisal Toolkit		
АМСВ	Analysis of Monetised Costs and Benefits Table		
APA	Asset Protection Agreement		
AQMA's	Air Quality Management Areas		
ASR	Appraisal Specification Report		
AST	Appraisal Summary Table		
BCIS	Building Cost Information Service Construction Data		
BCR	Benefit-Cost Ratio		
BNG	Biodiversity Net Gain		
CAS	Common Analytical Scenarios		
ccc	Cambridge County Council		
CCTV	Closed Circuit Television		
СРРВ	Capital Pipeline Programme Board		
CRSTS	City Region Sustainable Transport Settlements		
CSM RA	Common Safety Method for Risk Assessment		
СТР	Concept Train Plan		
DfT	Department for Transport		
DBEIS	Department for Business, Energy and Industrial Strategy		
DLUHC	Department for Levelling Up, Housing and Communities		
ECI	Early Contractor Involvement		
EDGE	Exogenous Demand Growth Estimator		
EPTAN	Electrification & Power Technical Advice Note		
EWR	East West Railway project		



Abbreviation	Meaning
FBC	Full Business Case
FTS	Find a Tender Service
FTPB	Fixed Track Programme Board
GCP	Greater Cambridge Partnership
GTR	Govia Thameslink Railway
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GJT	Generalised Journey Time
GRIP	Governance for Railway Investment Projects
GRP	Gateway Review Panel
GVA	Gross Value Added
Hazid	Hazard Identification
HMT	His Majesty's Treasury
IA	Implementation Agreement
LENNON	Latest Earnings Networked Nationally Overnight
LEP	Local Enterprise Partnership
LoC	Level of Control
MaaS	Mobility as a Service
MND	Mobile Network Data
MOD	Ministry of Defence
NCB	Network Certification Body
NPV	Net Present Value
NPPF	National Planning Policy Framework
NR	Network Rail
NTEM	National Trip End Model
OBC	Outline Business Case
OBR	Office for Budget Responsibility
OLE	Overhead Line Equipment.
OM&R	Operations, Maintenance & Renewal



Abbreviation	Meaning
ONS	Office for National Statistics
ORR	Office of Rail and Road
OSR	Option Selection Report
PACE	Project Acceleration in a Controlled Environment
PCR	Public Contract Regulations 2015
PDFH	Passenger Demand Forecasting Handbook
PEAT	Programme Entry Appraisal Tool
PACE	Project Acceleration in a Controlled Environment
PIN	Prior Information Notice
POSR	Preferred Option Scoping Report
PVB	Present Value of Benefits
PVC	Present Value Costs
QCRA	Quantitative Cost Risk Analysis
RNEP	Rail Network Enhancement Pipeline
RRAP	Road Rail Access Point
RSSB	Railway Safety and Standards Board
SOBC	Strategic Outline Business Case
SFO	Station Facility Owner
SME	Subject Matter Expert
SMOE	Secondary Means of Escape
TAG	Transport Analysis Guidance
TEE	Transport Economy Efficiency
TFPB	Fixed Track Programme Board
тос	Train Operating Company
UTX	Under Track Crossing
VfM	Value for Money
WEB	Wider Economic Benefits
WebTAG	Transport Analysis Guidance website



Document Control

Version Control

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Approvals

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V.1	Nathan Campsall	Director - SLC Rail	29.02.2024



Executive Summary

This document presents the Outline Business Case (OBC) for the construction of a new railway station to serve the planned housing and commercial development at Waterbeach New Town. The provision of the new railway station will result in the closure of the existing Waterbeach railway station located approximately 1.25 miles to the south of the proposed new station site.

An OBC was produced by WSP in 2016 but since then the project delivery has transferred from the developer to Greater Cambridge Partnership. This, in addition to the potential impacts of Covid on future rail demand, led to the decision to revise the OBC rather than going from the previous OBC straight to Full Business Case (FBC). The intention is to move quickly towards FBC with a re-baselined cost plan and associated updates to the five business case dimensions.

Strategic Dimension

- The closure of the existing Waterbeach station and the provision of a new station just to the north is a response to a significant shift in the centre of gravity of population that will occur once the housing development is completed.
- The existing station is ill-equipped to handle the growth in demand that is expected to come from the development and the site of the existing station cannot be upgraded without considerable expense. The expected costs of upgrading the existing station outstrip the costs of building a new station.
- By relocating the station, conditions are set to maximise the propensity to use rail to/from the new development and the wider catchment. Furthermore, the new station will encourage much higher use of active travel modes to access the station. Both factors will contribute significantly to reducing car traffic on the busy A10.

Economic Dimension

- The central case scenario has a Benefit Cost Ratio of 2.32 representing 'High' value-for-money in accordance with DfT categorisation.
- Sensitivity tests around the central case indicate that value-for-money generally remains high and is no worse than 'medium' illustrating that the economics of the scheme are robust.
- The new station is forecast to generate around 400,000 additional annual journeys by 2050 compared to the do-minimum scenario of retaining the existing station.

Financial Dimension

- The Financial Dimension presents updated Anticipated Final Cost (AFC), and Operations, Maintenance and Renewal costs for the preferred scheme option identified in the GRIP 3A Optioneering Report.
- The AFC incorporates a new project risk contingency of £5.9m determined through a team risk workshop and QCRA process. The AFC has also been updated to reflect industry inflation indices.
- The financial appraisal, which takes account of forecast revenue and costs, demonstrates the scheme is financially viable and will generate an increasing net operational revenue surplus from year 1 onwards.



• GCP has secured £37m of funding through the Greater Cambridge City Deal, thus there is a current budget shortfall of £1.4m against the AFC of £39.4m. The AFC is based on a risk contingency set at 90% and will be revisited again at the FBC stage. Furthermore, during the next Design Stage value engineering options will also be assessed with the aim of reducing the AFC to within the committed funding envelope.

Commercial Dimension

- The Commercial Dimension demonstrates the relocation of Waterbeach station is a commercially viable project, that can be effectively and efficiently procured through existing suppliers in the market.
- The project is not anticipated to require any new or innovative scope or methods of construction thus providing confidence the physical works can be delivered safely and securely.
- GCP (through Cambridgeshire County Council as its overseeing organisation) as funder and promoter will let a Design & Build Contract under a NEC4 Form A. In railway terms this means they will be acting as a "Third Party", and Network Rail's role will be to protect the safety of the railway and its assets under an Asset Protection Agreement.
- Upon opening, the station will pass into the long-term ownership of Network Rail who will then lease it to the Train Operator in the normal fashion. The division of maintenance responsibilities between Network Rail and the Train Operator is set out in standard form lease agreements in use across the industry.

Management Dimension

- The Management Dimension presents the project organisation structure that will govern, assure, and manage the project during the current Develop Stage and next Design Stage.
- GCP has appointed SLC Rail as its specialist rail consultant to bring necessary capability and expertise. SLC Rail also has responsibility for day-to-day project management activities and successful completion of the OBC and FBC stage outputs.
- The governance structure has clear levels of management, with well-defined decision-making responsibilities. A Project Board is in place, chaired by GCP, with attendance from key interested local stakeholders from the rail industry to discuss and agree matters with the aim of identifying and managing cross party issues at the earliest stage.
- A holistic project programme has been developed capturing activities and key decision gateways to progress the project through the current Develop, and onto the next Design, Deliver & Deploy stages, ultimately leading to a new relocated operational Waterbeach Station in 2027.
- A comprehensive project risk register and management process is in place. Project risks continue to be identified, assessed, quantified, and mitigated through agreed strategies with specified owners, and with active participation from project members across the chain of governance.



1 Introduction

New Waterbeach station is a proposal to relocate the existing Waterbeach railway station a short distance to the north, better to serve the significant new housing development of Waterbeach New Town.



Figure 1 Context Map Showing Existing & Proposed Stations

Waterbeach New Town is a development of some 11,000 new homes on two adjacent areas of brownfield land to the north of Waterbeach village. The site has been split into eastern and western portions reflecting two distinct forms of land ownership. The western land lies on the site of a former barracks and is owned by the Ministry of Defence (MoD). This land is being developed on behalf of the MoD by Urban & Civic (U&C) and will provide 6,500 housing units. The land to the east of the former barracks has multiple landowners and is being developed on their behalf by RLW. The eastern side of the development will supply 4,500 housing units.



Waterbeach New Town is flanked on the east by the Fen Line (railway) and on the west by the A10 trunk road. These two transport corridors provide the main access points to/from the new town development. The A10 is a single-carriageway road which currently experiences very heavy levels of traffic. This leads to significant journey time variability for journeys into Cambridge.

Because of the variability of road journey times, rail services are an attractive option for travel into Cambridge as well as London. Usage of Waterbeach station was in decline pre-Covid but this was in large part due to the opening of Cambridge North just a few miles to the south which has abstracted some demand from Waterbeach. Post-Covid recovery at Waterbeach has been slightly better than the average for stations in the Eastern Region.

The total of 11,000 housing units compares to 2,410 households reported for Waterbeach parish in the 2021 census. With the new town being developed at a higher level of density than the existing village the future local area population's centre of gravity will move north towards the new town. This demand-side change prompted the need to consider the need for a new railway station that better serves the increased population of Waterbeach. The outline planning permission for the 4,500 homes on the eastern side (on land closer to the railway) stipulates that none of these homes can be occupied before a new railway station is built. The same applies to the western site where 1,600 homes can start to be occupied.

Project History & Document Status

The station relocation project was initially promoted by RLW Estates, who led the development and production of the GRIP 3 Optioneering Report and original Outline Business Case in 2016. In the intervening period, the role of promoter for the project formally transferred from RLW Estates to GCP in June 2022, with responsibility for ongoing project development, funding and delivery.

GCP has appointed specialist rail consultants and formed an integrated project team to take the development of the project forward. It was considered prudent to undertake a refresh of the original OBC, so that past assumptions, benefits, and costs could be re-validated to confirm the project remains value for money and can be funded within GCP's committed budget envelope.

This OBC will be developed into a FBC in advance of GCP's November 2024 Executive Board and will incorporate re-baselined costs and any necessary adjustments to the economic, financial, commercial and management dimensions.



2 The Strategic Dimension

2.1 Strategic Context

Waterbeach village is located approximately 9km to the north of Cambridge city centre and within South Cambridgeshire local authority. The centre of the new town development lies a further 1.25km north of Waterbeach village (so, approximately 10.5km north of Cambridge centre). In regional terms it lies within England's Eastern Region.

South Cambridgeshire is part of the internationally important OxCam (Oxford Cambridge) Arc which is home to over 4 million people and supports over 2 million jobs, together generating economic output worth around £111bn per annum. The OxCam Arc is conceptually based around the knowledge base of 9 universities (including the internationally renowned Universities of Oxford and Cambridge) and a unique set of educational, research and business assets. Its aim is to be a global hub for innovation and at the heart of green development.

The economic potential of the OxCam Arc led to a development strategy which has increased the level of housebuilding and planning for housing within the corridor. Aligned with major transport interventions including East West Rail, the area's economic value is forecast almost to treble.

Within the UK context, the area around South Cambridgeshire is relatively prosperous. Gross Value Added (GVA) is a measure of economic value that reflects the profitability of businesses and the income of residents. Figure 2 below shows GVA per head for 391 local authorities across England & Wales ranked and converted to deciles.



Figure 2 GVA per Head by Local Authority



The City of Cambridge ranks in the highest 10% of local authorities with South Cambridgeshire in the highest 20%. The historic county of Cambridgeshire is also part of the strategic transport body England's Economic Heartland which stretches from Swindon in the south west through to Cambridgeshire in the east. At a wider geographic scale, as shown in Figure 3, this 'economic heartland' becomes very apparent.



Figure 3 GVA per Head (UK Scale)



2.2 Local Context

Population

The existing Waterbeach village is located 9.5km north of Cambridge city centre. The village and its immediate environs are covered, in census geography terms, by a single MSOA (South Cambridgeshire 004) which had 2,785 households and a population of 6,521 in the 2021 census. The local population, both in Waterbeach and in the wider area, has low levels of deprivation with small pockets of Cambridge in the higher deciles as shown in Figure 4.



Figure 4 Index of Multiple Deprivation

Car ownership around Waterbeach is relatively high as shown in Figure 5 below. It is interesting that Waterbeach village has moderate levels of car ownership – lower than one might normally expect in a rural village. This may in part reflect the fact that Cambridge is not an attractive place to, and within which to drive, and some people may choose not to own a car if much of their activity takes place in Cambridge. Within Cambridge itself there are relatively low levels of car ownership (despite relatively high levels of affluence) which reflects to a large degree the difficulty or driving around the city and the strong cycling culture that consequently exists. Within the city, cycling and bus services can offer an alternative to car use. In Waterbeach, some 9–10km outside the city, cycling is less of an attractive option and rail services become more important as a car alternative.





Figure 5 Household Car Ownership (2021 Census)

Travel to work from the Waterbeach area is focused very much on Cambridge as shown in Figure 6 below. We continue here to use 2011 census data as the 2021 data set is significantly affected by Covid-19. The data shown in Figure 6 excludes work destinations within the Waterbeach area (i.e. within the MSOA) as in 2011 this was dominated by the people living and working in Waterbeach Barracks.





Figure 6 Travel to Work Destinations from Waterbeach

Table 2-1Table 2-1 Distribution of Travel to Work Journeys from Waterbeach below summarises the travel-to-work destinations from Waterbeach.

Destination	Proportion Of Trips	Rail Mode Share
Cambridge	48%	11%
South Cambridgeshire	30%	2%
Rest of (Historic) Cambridgeshire	9%	1%
London	4%	73%
Other	8%	9%

Table 2-1 Distribution of Travel to Work Journeys from Waterbeach

Public Transport

Cambridge is a major rail transport hub in the Eastern Region. It is well connected to London and has direct services to other parts of the Eastern Region and the adjacent Midlands regions. It also has direct services to the nearby Stansted Airport and is linked to Gatwick Airport via central London. Waterbeach is served by two trains per hour of this set of train services. By mid-2030, the East West Rail project is proposing that Cambridge will form part of a new and upgraded railway line that will connect with Bedford, Bletchley (Milton Keynes), Bicester, Oxford and Swindon – a route which passes along the heart or the main 'arc' of the Economic Heartland. Further details will be known during 2024 as part of EWR's Statutory Consultation process. EWR is a very important component of the economic strategy for the Economic Heartlands and OxCam Arc. Figure 7 below illustrates the train pattern from Cambridge both now and future projected.





Figure 7 Train Service Pattern

As detailed in Figure 7 above, Waterbeach station is served by two trains each hour operated by Great Northern:

- London Kings Cross to Ely;
- London Kings Cross to King's Lynn.

During peak hours additional trains calls at Waterbeach and run to London Liverpool Street (starting in Ely) operated by Greater Anglia. Journey time to Cambridge is 10 minutes. Journey time to London is 69 minutes (Great Northern) and 85 minutes (peak Greater Anglia). Rail journey times are generally competitive against drive times as illustrated in Table 2–2.

Destination	Journey Time	Trains/hr	Interchanges	Drivetime (Peak)	Drivetime (Off Peak)
Cambridge	10	2	0	22-50	18-35
London	69	2	0	110-190	90-140
Stansted Airport	57	1	1	45-60	45-65
Gatwick Airport	137	2	1	110-150	100-130

Table 2-2 Rail vs Road Journey Opportunities



Passenger usage of Waterbeach station was in decline before Covid impacted in 2020/21. Table 2-3Table 2-3 contains entries/exits data from the Office of Rail & Road (ORR). In the two full years prior to Covid-19, rail use in the Eastern Region as a whole increased by 1.7% and 2.6%. 2019/20 has a small part of March which was affected by the first national lockdown and as such exhibits a small decline in rail use. Waterbeach station usage declined in each of the two full years prior to Covid-19 and its decline in 2019/20 was higher than the decline across the region as a whole.

In 2015/16 and 2014/15 Waterbeach saw significant growth, out-stripping growth across the wider region. In May 2017 Cambridge North station opened and this coincides with the beginning of the decline in Waterbeach's usage. Cambridge North is just under 5km from Waterbeach station (approximately halfway between Waterbeach station and Cambridge station). Cambridge North has a significantly better service offer than Waterbeach (as shown in Figure 7 above) and has undoubtedly abstracted some demand from Waterbeach.

Year	Entries/Exits per Year	Waterbeach Change	Eastern Region Change
2022/23	309,130	16.6%	30.5%
2021/22	265,180	164.7%	159.2%
2020/21	100,176	-73.5%	-76.5%
2019/20	377,660	-7.4%	-3.7%
2018/19	407,650	-5.2%	2.6%
2017/18	430,050	-2.3%	1.7%
2016/17	440,142	4.6%	3.2%
2015/16	420,730	10.4%	4.3%
2014/15	381,202	10.6%	4.3%
2013/14	344,726	2.7%	3.5%
2012/13	335,660		

Table 2-3 Waterbeach Station Usage Time Series

Local bus services passing through or close to Waterbeach village are:

- 9 Cambridge-Ely-Littleport (every 2 hours)
- X9 Cambridge-Ely-Littleport (early morning/early evening only)
- 19 Cambridge-Landbeach (2 return journeys per day M-F only)
- PR5 Cambridge–Milton P&R (every 30 minutes)



The extended P&R bus is the principal route serving the village of Waterbeach and linking Waterbeach by road with Cambridge. Whilst the bus journey time to the centre of Cambridge is around 30 minutes, the train station is not well-situated with respect to the city centre. Once the walking time from the station is factored in, the journey time by train and bus to the centre of Cambridge are not dissimilar. The local bus service is more convenient for accessing the northern part of the city centre and rail for the southern portion.

The case for a busway is being promoted by GCP and its proposal is based on a review of pre-Covid bus journey times between Waterbeach village and Cambridge city centre takes approximately 45 minutes. In comparison, the free-flow journey time via car is 18 minutes. Providing a segregated busway will enable bus services to provide more reliability and journey times comparable to private vehicles;

Waterbeach to Cambridge Public Transport Scheme

In addition to the station relocation scheme to support the 4,500 new homes for Waterbeach New Town, GCP is also responsible for a range of public and active travel schemes in the Waterbeach to Cambridge corridor. This includes Greenways, all of which will build on the success of the existing Cambridgeshire Guided Busway.

The GCP commissioned the *Waterbeach to Cambridge Public Transport Scheme* OBC in August 2023 this proposed to provide new:

- segregated busway between Waterbeach New Town and north Cambridge via Landbeach and Milton Park & Ride,
- travel hub west of the A10 near Denny End Road in Waterbeach,
- path for walkers, cyclists and horse riders along the new busway.
- In Waterbeach New Town, it would link to Cambridge Research Park and the relocated Waterbeach railway station.
- In Cambridge it would link via the existing busway to Cambridge Regional College, Cambridge Science Park, Cambridge North Station and the city centre.

Without investment, it is likely the local transport network, including A10 and Milton Interchange, will experience significant road congestion.

Waterbeach Greenway

There are twelve greenways being proposed that aim to make local walking and cycling journeys. They will connect villages along the route to each other and will enable a direct connection with Cambridge. The Waterbeach Greenway project team have been working with the teams working on the A10 corridor, the Waterbeach New Town development, the Waterbeach Public Transport Corridor, and the Waterbeach Railway Station relocation to make sure that the projects complement each other.

The above schemes are currently in development at various stages. Further updates will be added at the FBC stage.



The Highway Network

The A10, which runs along the western flank of the New Town site is a heavily trafficked route linking King's Lynn and Ely with Cambridge. The section between Ely and Cambridge is singlecarriageway and reaches a particularly busy interchange at Milton where it intersects with the east-west running A14 (an important link between the east coast ports and the Midlands and heavily used by HGVs).

The Local Transport Plan for the Combined Authority of Cambridgeshire & Peterborough includes plans to increase capacity along the A10 within South Cambridgeshire and at the Milton Interchange.

2.3 Waterbeach New Town

When fully built-out the New Town will comprise 11,000 new housing units accommodating around 25,000 people. The population of Waterbeach (defined as census MSOA South Cambridgeshire 004) is currently 6,525 (in 2,785 households) so the new development will increase the local area population by around 400%.

The new town will be developed at a much higher level of density than the existing village and so the local area population centre of gravity will move to the north which is the basis of the rationale for relocating the railway station. The modelling work that underpins the economic dimension considers the location of the local population with respect to both the existing station and the new station. It is driven by an assumed decline in propensity to use rail as distance from the station increases and therefore acknowledges that there are 'winners and losers' from relocating the station.

At a high-level, Figure 8 shows that there are people living within 800m (traditionally thought of as the 'walk-in' catchment) of the existing station that will be further away from the new station. Those people living in the northern parts of Waterbeach village will be broadly equidistant from the existing and new stations.





Figure 8 Station Catchment Buffers

2.4 The Current Waterbeach Station

The existing station has several operational features that are sub-optimal for a modern railway. The platforms are staggered either side of a level crossing meaning passengers need to cross the level crossing to access platforms adding to operational risk. The car park has 83 spaces and limited cycling parking and overall there is little opportunity for expansion. Some users of the station currently park in village streets either due to the car park being full or to avoid paying the charges. This has led to tensions within the village which would likely be exacerbated if the existing station were to seek to serve the population from the new development to the north. Fundamentally, however, the existing station is sufficiently distant from the focus of the new town development, that it will not attract as many rail users nor promote active travel access to rail than a new station closer to the new town.

2.5 The Case for Change

The development of Waterbeach New Town with 11,000 homes and around 25,000 people increases the local area population by 400% and increases the population of South Cambridgeshire by c.15%. This will create significant numbers of new journeys to and from the town. The nearby city of Cambridge will be a destination for a large proportion of those journeys. Analysis of census travel to work data suggests that, if existing commuting patterns persist, an additional 3,500 to 4,000 peak journeys into Cambridge will be generated.

The historic city centre is heavily constrained for traffic and consequently transport policies over recent years have focused on measures to minimise the impact of car traffic on the city. Bus park & ride schemes operate around the fringe of the city and cycling is actively encouraged.



The A10 trunk road which skirts the western flank of the development is heavily used and journey times are subject to considerable variability. Future plans to increase capacity on the section of the A10 on its approaches to north Cambridge (in part to cater for the anticipated traffic generated by Waterbeach New Town) will reduce delays and improve air quality. The pressing need for Cambridge City will continue to be to minimise the amount of vehicular traffic in the historic core of the city. To that end, schemes to promote use of public transport and active travel modes to/from the new town are vital.

The existing railway station is located c.1.25km south of the New Town. It has a constrained car park that currently forces or encourages many rail users to park in the streets of the village. The current station does not meet modern design standards for railway stations and would require significant investment to cater for the volumes of traffic that would be expected to use the station following the build out of New Waterbeach.

The LEP-led OxCam Arc (of which South Cambridgeshire is a component part) seeks to double GVA across its area by 2050. The Combined Authority of Cambridgeshire & Peterborough has a target of doubling GVA by 2040. Making rail services easier to access for a greater proportion of the New Town population will improve connectivity, bring people closer to a greater number of jobs and improve business efficiency.



2.6 Meeting Local, Regional & National Priorities

National Level

The project supports several national priorities summarised under the following broad headings:

- building a strong, competitive economy
- decarbonising the economy



- promoting sustainable travel
- supporting housing development

The **Department for Business, Energy & Industrial Strategy** (BEIS) 2021 "Net Zero Strategy: Build Back Greener" sets out the steps the Government will take to cut emissions, seize green economic opportunities, and leverage further private investment into net zero. The policies and proposals for transport in the Net Zero Strategy include investment in the rail and bus networks and investment in towns and cities to increase walking and cycling.

The *DfT's Transport Decarbonisation Plan*, published in 2021, outlines the stages required to decarbonise the transport sector to meet net zero targets by 2050. Principal areas of focus within the plan include accelerating modal shift to public and active transport, decarbonising road vehicles including buses, decarbonising freight transport, developing place-based solutions, positioning the UK as a hub for green transport innovation and reducing carbon in the global economy.

The Ministry of Housing, Communities & Local Government's (now Department for Levelling Up, Housing and Communities-DLUHC) **National Planning and Policy Framework** sets out the Government's planning policies for England, with an underlying presumption in favour of sustainable development. The framework states that developments should aim to be sustainable through location consideration, reducing the need to travel and offering genuine mode choice.

The government's cross-departmental *Clean Air Strategy* (2019) outlines the actions required across government and society to improve air quality. The strategy sets out how the nation's health and environment will be protected; how clean growth and innovation will be achieved and how emissions from transport will be reduced.

The 2017 *Housing White Paper* considered the challenges facing Britain's housing market. It proposed three objectives: plan for the right homes in the right places, deliver homes more quickly and in conjunction with ancillary public infrastructure to help communities thrive; and diversify the housing market, opening it up to more competition and to innovative and efficient building methods. The relocation of Waterbeach Station supports this housing strategy by opening up land for up to 11,000 homes and high-quality urban infrastructure at a location near a nationally and internationally significant economic area, where demand for housing outstrips supply. The scheme will also help address affordability issues currently present in the Greater Cambridge area.

Regional Level

The Waterbeach area lies within several regional agglomerations. In transport terms it is part of **England's Economic Heartland** – a sub-national transport body covering an area from Swindon to Cambridgeshire. It advises government on transport infrastructure, services and policy framework to support economic growth plans and the move towards Net Zero. Population and job growth supported by enhanced rail and road infrastructure are important elements of a strategy that seeks to build on an already relatively strong (in UK terms) regional economy. Relocating the station in Waterbeach to be nearer the centre of gravity of the widened population will better link people to jobs and promote sustainable travel choices.



The **OxCam Arc** is a concept promoted by several Local Enterprise Partnerships that seeks to build on the unique knowledge base and the concentration of research/innovation hubs in an area running broadly between Oxford and Cambridge. The prospectus sets out a vision for 2050 which envisages the arc as a "world-leading place for high-value growth, innovation and productivity". Major transport schemes such as East West Rail are important enablers that will assist in creating the agglomeration benefits across the arc that will drive the economic growth and productivity. The new station at Waterbeach will bring rail services closer to more people, thereby improving links between businesses and giving businesses access to a larger workforce.

South Cambridgeshire forms part of the Mayoral Combined Authority of Peterborough & Cambridgeshire. The Combined Authority is currently developing a *Local Transport & Connectivity Plan* (LTCP). New Waterbeach station is supportive of a broad strategy vision which seeks to "support a more prosperous, fairer, more accessible, better connected, less polluting and lower carbon transport network, which also delivers better public health". The plan was formally approved in November 2023. The LTCP builds upon the *Local Transport Plan* which was adopted in 2020. This earlier document sets out plans that aim to deliver a "*world-class transport network for Cambridgeshire and Peterborough that supports sustainable growth and opportunity for all*". The relocation of Waterbeach station is an identified scheme within the transport plan. It is complemented by capacity improvements to the A10 running alongside Waterbeach New Town and the development of a Greenway linking Waterbeach with Cambridge and designed to promote active travel (see Figure 9 below). The plan also aims to improve train frequency to Stansted Airport from the north which potentially creates opportunities to increase the number of train calls at the new Waterbeach station (though it is worth noting that additional calls are not currently being considered by train operator Greater Anglia).



Figure 9 Transport Schemes in Gtr Cambridge (Source: Local Transport Plan)



The Combined Authority's *Economic Growth Strategy* was published in 2022 and takes account of the post-Brexit and post-Covid landscape. Its overarching target is to double GVA by 2040 and reduce levels of economic inequality across the area. Better linking people to jobs and improving links between businesses, something that the new station affords, will help to achieve these goals.

Local Level

In 2018 South Cambridgeshire and City of Cambridge joined forces to produce a joint local plan. The *Greater Cambridge Local Plan* will build upon the *South Cambridgeshire Local Plan* (itself adopted in 2018). The South Cambridgeshire Local Plan identified a need for 19,500 new homes by 2031 and Waterbeach New Town is earmarked as a strategic site to help meet those targets. The draft GCLP indicates 5,330 homes to be built at Waterbeach by 2041.

2.7 Options for Testing

For the economic appraisal the following options have been considered.:

- Do nothing this provides the base against which the following options are compared. In this scenario the existing Waterbeach station remains as it is currently with no investment in additional car parking or passenger facilities. Under this scenario, some people will find a way to use the rail network in part this will be absorption of some additional demand at Waterbeach and some people using Cambridge North as a nearby alternative.
- Expand/enhance the existing station in this option some additional car parking is provided thereby raising the point at which the station's capacity is reached. Passenger facilities are also improved in line with Network Rail's passenger-volume based categorisation.
- Close the existing station and build a new station closer to the New Town development. Within this scenario we have considered as the central case a replication of the service levels at the existing station. It is worth noting that there are aspirations to extend both of the GN trains from Ely to Kings Lynn (currently only one of the two goes to Kings Lynn). This has not been explicitly modelled as the incremental gain will be relatively small. It is worth noting also that there would be an option to include a stop on the Greater Anglia service between Norwich and Cambridge (which intermittently serves Stansted airport) but GA has told us that it is not currently pursuing this option and that operationally it would be challenging to accommodate a Waterbeach stop within existing resource constraints.

2.8 Theory of Change Analysis

Theory of change logic maps are an established and recognised way of summarising the need for, and the potential impacts of, a transport intervention. Context and objectives are relatively easy to understand. Inputs relate to the resources required to deliver the scheme and outputs are the details of the scheme deliverables. The difference between outcomes and impacts Is most readily explained thus. Outcomes accrue more Immediately following the delivery of a scheme. The outcomes can, furthermore, be more easily attributable to the intervention and as such can be measured. Impacts are generally more long-term positive benefits to which the project will contribute but the scale of that contribution cannot readily be identified.



Figure 10 below has been developed in conjunction with Greater Cambridge Partnership, with specialist advice from Centre for Cities, as we moved through the process of developing a Monitoring & Evaluation (M&E) plan for the scheme. The numbers adjacent to each of the outcomes relate to a specific way of capturing and evaluating data pertaining to the scheme once it is operational. The M&E plan is described in the following sub-section.



Figure 10 Theory of Change Logic Map

2.9 Monitoring & Evaluation (M&E) Plan

Throughout 2023, the logic map and M&E plan have been developed in conjunction with Greater Cambridge Partnership and with the advice and assistance of Centre for Cities. The challenge facing this project is two-fold:

- 1. The development of the New Town means that the baseline against which a scheme would ordinarily be evaluated is moving, and in a significant way; and
- 2. Because the project involves the relocation of a transport facility there is a counter-factual position in which the old (existing) station is retained in effect an alternative future-baseline.

Demand Data Sources

As part of the station closure process, we will undertake passenger surveys at the existing Waterbeach station that will establish (among other things) journey origin and mode of access. We can use this in conjunction with rail industry data to establish a baseline.



We are also in discussion with Network Rail to establish how we can access and make use of newly collated Mobile Network Data (MND) which tracks phone users between cells and therefore can identify origin-destination and, by virtue of average speed determine access mode. Our understanding at this point is that the data covers all modes of travel and therefore it is possible to derive a rail mode share for any O-D pair. This data will be used to refine/corroborate the baseline position with respect to origin and access mode.

Economic Data Sources

The Office for National Statistics has recently begun publishing GVA (Gross Value Added) data at LSOA level. The first publication was earlier this year and we have received confirmation that it is intended to release annual updates of the dataset. This data will allow us to reflect economic activity in the evaluation. We will also reference the Business Register & Employment Survey (BRES) which is produced annually by ONS and which gives job totals down to LSOA level.

The M&E plan is revisited in the Management Dimension section of this OBC and the full plan is appended to the document.

Summary

The closure of existing Waterbeach station and the provision of a new station just to the north is a response to a significant shift in the centre of gravity of population that will occur once the housing development is completed.

The existing station is ill-equipped to handle the growth in demand that is expected to come from the development and the site of the existing station cannot be upgraded without considerable expense. The expected costs of upgrading the existing station outstrip the costs of building a new station.

By relocating the station, conditions are set to maximise the propensity to use rail to/from the new development and the wider catchment. Furthermore, the new station will encourage much higher use of active travel modes to access the station. Both factors will contribute significantly to reducing car traffic on the busy A10.



3 The Economic Dimension

3.1 Introduction

Within the economic dimension we set out a summary of the approach to forecasting demand for the station in its new location before moving on to present the economic appraisal of the scheme and its value for money.

The scheme is unusual in that it is a relocation of an existing station rather than a new station and, as such, much of the demand for the station will be transferred from the existing site. The implication of this is that the profile of benefits is different from many new stations and the value for money achieved is lower than might be expected for a scheme of this nature.

The station relocation supports the Waterbeach New Town development, a proposal for 11,000 new homes and supporting public infrastructure located on land just north of the village of Waterbeach. The location of the existing Waterbeach station in relation to the proposed development can be seen on Figure 11 below. The proposed scheme to relocate the station to the north of its current location places it closer to the new centre of the enlarged Waterbeach conurbation, with current timescales planning for the relocated station to open in 2027.



Figure 11 Waterbeach New Town Development Boundary



This section details the demand forecasting and economic appraisal undertaken as part of the Waterbeach Station Relocation Outline Business Case (OBC), detailing the data sources and methodologies used and the demand forecasting and appraisal results.

3.2 Demand Forecasting

This section sets out the data sources used, and the methodology employed to estimate demand for the relocated station.

Scenarios

As part of the appraisal, a counterfactual, enhanced 'do minimum' scenario has been modelled against which the relocation of Waterbeach station has been compared. This scenario considers the station staying in its existing location with minimal improvements to be facilitated by private funding up to the value of £1million, currently estimated to cost £300,000. The counterfactual scenario therefore involved minimal changes that would generate no changes to passenger demand. The costs of these improvements have been deducted from the station relocation.

A further proposal has been considered to rebuild the existing station to increase parking capacity and meet current accessibility standards, as well as addressing issues with other modern standards. The costs of this option have been estimated at around £49m. This proposal is not currently being progressed, but we have included it as a sensitivity test.

Market Segments

Three market segments have been identified that would be impacted by the station relocation, as set out below:

- Local catchment demand demand generated by the population/employment currently within the catchment of the station.
- Abstracted demand passengers currently using other stations who would switch to use Waterbeach station.
- New development demand demand generated by proposed development within the catchment of the station.

The methodology for calculating the size of each market segment is set out in the following subsections. In most station schemes the impact of additional journey time imposed on 'through passengers' (from an additional station call) is assessed and included as a disbenefit in the appraisal. At Waterbeach the existing train service will transfer to the new station, and therefore there will be no additional calls and therefore no impact on through passengers.



Sources of Data

The main sources of data for the demand forecasting element of this work are:

- National Rail Travel Survey (NRTS) data
- Govia Thameslink Railway (GTR) MOIRA data
- Census data

National Rail Travel Survey

NRTS data provides a detailed source of information on the trip patterns of rail users. The data has some limitations which were relevant within the context of this study, the most prominent being that the data is now very old with surveys having taken place between 2001 and 2005 (depending on location), though adjustments can be made to the data.

The data has been used for two purposes, the first being to provide data on trip distribution for the station which in turn informs trip rates, and secondly to inform access mode share. Access mode data was collected for Ely, Huntingdon, Sandy and, St. Neots as well as Waterbeach, whilst trip distribution data was used only for Waterbeach.

With a trip distribution and up-to-date data on demand at the station, an estimate of trip rates can be made. To address the issue around the age of the data, the trip distribution was scaled to allow for changes in population in the catchment since the data was collected. The main change was to the 800m-2km catchment band where there has been considerable population growth. The overall impact of this was to lower the total number of trips generated in the 0-800m catchment and increase the number in the 800m-2km catchment, though there have been some minor changes in other catchment bands.

Distance Bands	NRTS Rates
Less than 800m	44.3
800m - 2km	17.2
2 - 5km	7.7
5 - 10km	3.0
10 - 15km	0.4
15 - 20km	0.0
20 - 25km	0.0
Over 25km	0.0

The estimated trip rates per person per annum are presented below:

Table 3-1 Trip Rates



GTR MOIRA

A copy of the MOIRAI programme was provided for the project by Govia Thameslink Railway. MOIRA is a software programme utilised by the rail industry to understand the impact of timetable changes on demand and revenue. The programme operationalises the guidance on demand forecasting, including demand elasticity values, found within the Rail Delivery Group (RDG) Passenger Demand Forecasting Handbook (PDFH) which is the rail industry's standard guidance on demand forecasting.

The version provided covered both trips and revenue and was used to understand the trip distribution from Waterbeach station as well as estimating average fares per flow for use within the revenue modelling.

As the MOIRA dataset was very detailed and provided flows across the UK, the trip distribution was simplified to make the dataset more manageable. Key stations which are served directly by Waterbeach were included as individual stations. All other stations were allocated to Government Office Regions with a proxy station allocated for each region. For example, all flows to Yorkshire and the Humber were classified as Leeds.

Census Data

Census data was used to provide an understanding of demographics within the Waterbeach station catchment to assist with deriving trip rates. The following datasets were used:

- TS001 Number of Usual Residents in Households and Communal Establishments, 2021
- WP001 Workplace Population, 2021

All data were analysed at Lower Super Output Area (LSOA) level. Both datasets were from the 2021 Census, therefore they were inflated using growth factors for 2021–2023 at Middle Super Output Area (MSOA) level from TEMPro.

Local Catchment Demand

The local catchment demand includes trips at Waterbeach station generated by those *currently* living or working within the station catchment. This has been calculated using a trip-rate based approach using the NRTS, GTR MOIRA data and Census data. The approach is described below:

- 1. The NRTS Data was used to understand the distribution and proportion of trips generated by each LSOA surrounding Waterbeach station.
- 2. The distribution of trips was applied to the demand data for the station extracted from MOIRA and combined with the Census demographic data to estimate a trip rate per LSOA for Waterbeach station.
- 3. TRACC software was used to assign the distance from each LSOA to Waterbeach station, from which a total trip rate per catchment band (0-800m, 800m-2km and 2-5km) could be derived.



- 4. TRACC software was then used to allocate LSOA's to their closest station to allow for population/employment figures to be assigned to station catchments, repeated for both Waterbeach station locations. Figure 12 Catchment Areas displays the 'up to 5km' catchment for both station locations for relevant LSOAs. It should be noted that the distance to each LSOA is measured to an LSOA centroid and as such parts of each LSOA may be a higher or lower distance than the average from the station.
- 5. The trip rates calculated in step 3 were then applied to the demographic data for the local catchment (up to 5km) at Waterbeach to generate an estimate of existing annual demand at the station. This was then scaled to the 2022/23 total demand for Waterbeach station from MOIRA. An equivalent estimate of base demand for the relocated station was also calculated using this methodology.



Figure 12 Catchment Areas

Abstracted Demand

Abstracted demand represents users that would transfer to using Waterbeach station who are currently using other stations. The provision of a 200-space car park at New Waterbeach would offer more than double the capacity of the current car park and could serve to attract demand from other stations such as Cambridge North or Ely.



The impact was estimated using a logit choice model, the process for which is set out below:

- 1. For the LSOA's within the wider catchment (above 5km) of Waterbeach station, the total trips to other stations were calculated using the same methodology as was utilised for the local catchment demand outlined above. Trips in this wider catchment were assumed to have the potential to be abstracted from other stations to Waterbeach station.
- 2. The stations used in the trip distribution were chosen as the destinations for use in the logit model, a selection that represented most of the demand as well as a station within each government office region.
- 3. The total generalised cost from each LSOA to each of the destinations was calculated based on the following:
 - Monetised access time to the origin station.
 - Vehicle operating cost to the origin station.
 - Monetised rail generalised journey time.
 - Parking charges.
- 4. Additional time valuations were then applied to the generalised costs to reflect the difference in parking provision between the two Waterbeach station locations, taken from PDFH Table B9.5. In the generalised costs representing the existing Waterbeach location, a negative time valuation was applied to reflect the constrained parking provision whereas in the generalised costs for the new station site, a positive weighting was applied to reflect the increased parking provision.
- 5. Station switch sensitivity parameters from the Planet Framework Model (PFM 4.4, pg. 59) were then used within a logit function to determine the proportion of passengers that would switch to use Waterbeach station.

From this point, the total abstracted passengers calculated were appraised separately from the new demand in terms of revenue impacts and socio-economic impacts, as these trips will only be providing marginal change in revenue relatively to entirely new to rail trips, for example revenue change for a Cambridge North – London trip moving to Waterbeach would only be the uplift in fare between Waterbeach and Cambridge North.

Development Demand

As previously discussed, the proposed relocation of Waterbeach station is to support the Waterbeach New Town development plans for 11,000 new homes, employment, and associated supporting infrastructure to be located immediately north of the existing Waterbeach village. The trip rates calculated for the local catchment were applied to the additional population generated by the development to determine trip generation.



The development site was allocated to catchment bands (0-800m, 800m-2km, 2-5km) and converted to population figures using national average household size data (2.36). Phasing information sourced from the Greater Cambridge Housing Trajectory and Five-Year Housing Land Supply Report was utilised. This results in an expected residential population of 17,568 by 2040 and 26,550 by 2050.

Information on the proposed employment land for the Waterbeach New Town was obtained from the Greater Cambridge Employment Land and Economic Development Evidence Study converted into a number of jobs using factors from the Employment Densities Guide.

As with the previously discussed market segments, the demand to be generated from the Waterbeach New Town development was calculated for both the existing station location and the relocated station site. Figure 13 below demonstrates the location of the development boundary in relation to both station locations, highlighting that whilst the relocated station will still be at the eastern boundary of the development it will be closer than the existing station location, and will be accompanied by purpose-built access arrangements.



Figure 13 Waterbeach New Town Relative to Existing & Relocated Stations



The process as outlined above was also conducted for additional developments proposed within the Waterbeach catchment, data on this having been obtained from the Local Plan.

Lost Passengers

As part of the appraisal, it has been assumed that the train service at Waterbeach would stay the same following the relocation and therefore no impact upon existing passengers on board services that pass through the station has been assumed as no additional dwell time will be incurred.

Car Park Demand

As well as estimating total patronage at the station sites, demand forecasts have been produced for the station car park. The existing station car park is managed by APCOA and has a capacity of 83 spaces, with primary evidence suggesting this capacity to be reached on a regular basis.

The relocated station proposals include provision for a 200-space car park.

To calculate the car park occupancy generated from the local catchment demand, access distance mode splits per catchment band (derived from NRTS data) were used. The values for Waterbeach itself were used for the 0-800m and 800m-2km catchment bands. For 2-5km, an average of the values for Ely, Huntingdon, Sandy and St. Neots were used. The value for Waterbeach at 2-5km was 100% which was deemed too high compared to 5-10km which was recorded at 45%.

These figures were applied to the existing local catchment demand to determine the proportion of annual demand accessing the station via car and parking at the station, before being converted to daily occupancy figures using the following assumptions:

- Annual demand was divided by two to account for return journeys.
- The above was divided by 312 to estimate daily demand.

Growth

Background growth, to forecast future change in demand driven by exogenous factors, was applied using factors from the DfT's EDGE software. The values were provided by the DfT at flow and ticket type level meaning an accurate factor could be applied.

Following TAG guidance, EDGE forecasts were applied to the first twenty years from the appraisal year. Beyond this point and for the remainder of the appraisal period projected population growth from the TAG Databook was applied to the level of demand.


3.3 Demand Forecasting Results

This sub-section presents the results of the demand forecasting work, with scenarios defined as follows:

- Existing Location = Waterbeach station stays in its existing location.
- Relocated Station = Waterbeach station is relocated further north.

Demand at the Station

The table below presents the forecast volume of trips for Waterbeach in both scenarios broken down by market segment. The figures are presented in four forecast years – for the first full year of operation of the relocated station, 2030, 2040, and 2050.

	2027	2030	2040	2050
Local Catchment	364,541	393,173	465,383	470,781
Abstracted	-	-	-	-
Development – Waterbeach New Town	22,527	59,614	218,331	303,780
TOTAL	387,068	452,787	683,714	774,561

Table 3-2 Forecast Demand at Existing Waterbeach Station Location

	2027	2030	2040	2050
Local Catchment	387,694	418,144	501,938	512,644
Abstracted	10,305	11,153	11,153 13,512	
Development – Waterbeach New Town	37,620	113,375	455,143	638,762
Other Developments	1,466	2,437	5,913	8,822
TOTAL	437,084	545,108	976,506	1,174,036

Table 3-3 Forecast Demand at Relocated Waterbeach Station

A comparison of Table 3–2 and Table 3–3 indicates that the relocated station is expected to generate around 38,000 additional passengers than the current station with a further 10,000 abstracted from other stations. The figures below show the build-up in station footfall for each station site from the assumed opening year of the relocated station of 2027. This increases to a difference of nearly 400,000 by 2050. Development trips ultimately grow to a point where they exceed local catchment demand, reflecting the scale of the development. Abstraction from other stations is limited as the changes in access time/distance from the wider catchment area are limited, the only major change for access from the wider catchment is that there is a greater car park capacity.





The figures below present he demand profiles for the existing and relocated stations.

Figure 14 Existing Waterbeach Location Demand Profile



Figure 15 Relocated Waterbeach Location Demand Profile

The figure below presents the difference in demand between the relocated and existing stations, showing how by the point that development is completed the new station would generate over 400,000 extra trips per annum, even allowing for the suppression of abstracted demand and demand from the wider catchment as car park capacity reduces.





Figure 16 Difference in Demand Between Station Options

Car Park Demand

As can be seen in Table 3-4, the demand forecasting shows that the existing car park size of 83 spaces at the existing Waterbeach station location site is sufficient, but occupancy will continue to increase. The car park modelling currently suggests the car park is not fully utilised, through this is likely to be a function of the modelling representing the average of maximum occupancy across the week, rather than peak occupancy. Peak occupancy is likely to be highest on Tuesday, Wednesday and Thursdays, when commuting demand is highest, and the current car park is likely to reach maximum capacity on those days. The modelling does however suggest that the car park at the new station reaches capacity by around 2050 and is likely to be exceeded on peak days in earlier years.

	Car Park Capacity	2027	2030	2040	2050
Existing Station Location and Existing Car Park	83	59	68	83	83
Relocated Station	200	82	99	165	199

Table 3-4 Car Park Daily Demand Forecasts



3.4 Appraisal Methodology

This section sets out the approach to scheme appraisal for the various demand components. The appraisal methodology follows the most up to date DfT TAG guidance, that published in May 2023.

General Assumptions / Parameters

In developing this appraisal, a number of assumptions were made:

- Opening Year of Relocated Station: 2027.
- Background Growth Cap: 2042.
- Inflation Cap: 2042.
- Appraisal Period: 60 Years.
- Background Growth Approach: EDGE.

Where applicable, the costs and benefits were deflated and discounted to the Department's base year (2010) in line with TAG.

Sources of Benefit and Disbenefit

The following benefits have been assessed as part of the appraisal:

- Revenue
- Marginal External Cost
- Generalised Cost Savings

Rail Revenue

It has been assumed that the fares for the new Waterbeach station location will be the same as at the existing site, therefore MOIRA data was used to calculate average fares per ticket type for each flow.

For local catchment and development passenger trips the full revenue was claimed. For abstracted passengers, the revenue impact is incorporated within the generalised cost calculations.

All values were inflated using values from TAG Table A5.3.1, then deflated to 2010 prices using the GDP deflator values from the TAG databook.



Bus Revenue

The impact upon bus revenue for existing services as a result of this scheme has been calculated as part of the appraisal (this excludes the Busway project referenced above in the Strategic section, which is undergoing Transport Works Act Order, and can be modelled at the time of the FBC). The . We have not yet considered the impact of the proposed Waterbeach Busway project referenced above in the Strategic Dimension (currently subject of a Transport Works Act Order) but will incorporate this in further modelling at the FBC stage).

The impact on existing bus services is based upon two assumptions:

- Some of the newly generated demand for the station will be abstracted from bus resulting in a loss of revenue to the bus operator.
- A proportion of any of the demand who will no longer travel by rail as a result of the station relocation will switch to use bus services resulting in a gain in revenue to the bus operator.

The rationale for the above is that relocating the station will discourage rail use for existing users in the south of the village but encourage it in areas to the north of the village. The flows most likely to be impacted by this are Waterbeach to Cambridge and to Cambridge North as these have the lowest rail in-vehicle time and access time to the station is therefore a larger component of generalised cost. This will be less of an issue for longer distance flows, for example to London. DfT Diversion factors were used to estimate the transfer between rail and bus and vice versa.

These impacts, upon the Park and Ride service that operates between Milton and Cambridge, have been calculated for travel between Waterbeach, Cambridge North and Cambridge. To estimate the impact of this scheme upon bus operator revenue, an estimated single fare per passenger of £1.75 was sourced from the Cambridge Park and Ride website (derived from the £3.50 return price advertised). A concessionary fare adjustment was applied to the base fare using data from the DfT Bus Statistics Table BUS0105 with a rate of reimbursement then applied from the Concessionary Bus Travel Reimbursement Calculator. Revenue was inflated using the Consumer Prices Index then deflated and discounted following TAG.

Car Park Revenue

In addition to the rail and bus revenue impacts, the revenue generated by the station car park was appraised based on a charge of \pm 1.70 per day per single trip (a \pm 3.40 all day charge). It has been assumed that the car park at the relocated station site will operate with the same daily car park charge as the existing station car park.

Marginal External Cost

The marginal external cost impacts of the scheme have been calculated and as with bus revenue, these impacts are two-fold:

- Some of the newly generated demand for the station will be abstracted from bus / car resulting in marginal external cost benefit.
- A proportion of any of the demand who will no longer travel by rail as a result of the station relocation will switch to use car / bus resulting in marginal external cost disbenefit.



To calculate the marginal external cost impact associated with users transferring from/to car, diversion factors from car to rail were acquired from TAG Table A5.4.5. Each OD pair was assigned one of the categories in the TAG table, for example a trip between Waterbeach and London was categorised as 'Outside South East to/from London <100 miles' with a diversion factor of 25%. Rail distances were used as a proxy for car distances to determine the total distance abstracted from car each year.

To calculate the impact associated with users transferring from/to bus services to travel between Waterbeach, Cambridge North, and Cambridge, diversion factors from rail to bus were acquired from Table 28 of Dunkerley et al (2018) 'Bus fare and journey time elasticities and diversion factors for all modes' and combined with vehicle occupancy factors from TAG Table A1.3.3.

Marginal external cost values from the TAG databook Table A5.4.2 for both car and PSV were then applied to the relevant calculations to determine the overall marginal external cost impact.

Generalised Cost Savings

For passengers abstracted from other railway stations, the generalised cost impact of switching to use Waterbeach station was calculated. The generalised cost of the journey from the existing station was calculated including: monetised access time to the station, vehicle operating cost, any parking charges at the station, and the rail ticket fare. This was compared to the equivalent for a journey from Waterbeach and the difference claimed as a benefit.

3.5 Costs

Capital Costs

Base capital cost estimates for the scheme were provided by SLC Rail, both for the enhancements to the existing station location and for the construction of the relocated station. The itemised costs provided included risk, for the purposes of the economic appraisal, this risk has been excluded and optimism bias included, in line with TAG Unit A1-2. In line with TAG Unit A5.3 Rail Appraisal the base cost estimates were used as the basis for the appraisal.

In 2023 prices, the base cost estimate for the existing station enhancements equalled £300,000, expected to be funded using a contribution of up to £1m by private funding. In 2023 prices, the base cost estimate for the construction of the relocated station equalled £30,957,219. The table below shows how the costs were processed for the economic case.



Cost Stage	Existing location	Relocated station	Note
Base Cost	£0.3	£30.957	* including preliminaries, construction, design and project management fees
Inflation	£0	£2.567	*excluded from base costs
Risk	£0	£5.886	in economic due to figures being inflated
Base Cost (Excluding Risk and Inflation)	£0.3	£30.957	
Market Price	£0.357	£36.482	
Optimism Bias (30%)	£0.464	£47.427	
Inflated	£0.533	£54.432	
Deflated (to 2010 prices)	£0.386	£39.438	
Discounted (2010 prices)	£0.226	£23.134	

Table 3-5 Capital Cost Appraisal (£m)

Operating Costs

Operating cost estimates for the scheme were provided by SLC Rail. In 2023 prices, the estimated additional annual operating cost for the 'do minimum' (i.e. enhancements to the existing station location) equalled £136,000 and for the relocated station equalled £250,000. Optimism Bias of 1% was applied and then the values were converted to market prices, inflated, deflated, and discounted for each year in the appraisal period in line with TAG guidance.

3.6 Appraisal Results

Using the demand forecasting results the appraisal following the principles set out in TAG guidance. The appraisal was conducted over a 60-year period with an assumed opening year of the relocated station of 2027.

Revenue Impacts

The tables below summarise the net revenue impacts of the demand forecasting work, broken down by demand element, for rail revenue.



Revenue Source	Do Minimum	Relocated station	Net Revenue impact
Local Catchment	£193.51	£209.49	£15.98
Development – Waterbeach New Town	£101.27	£211.48	£110.21
Other Developments	£0.00	£3.09	£3.09
TOTAL	£294.78	£424.06	£129.28

Table 3-6 Net Rail Revenue Impact (2023 Prices, £m) – Relocated Waterbeach Station

Table 3-6 shows that the additional revenue with a relocated station, in particular an additional £129.28m through passengers from the Waterbeach New Town development.

Other Benefits

The table below presents a breakdown of benefits discounted over a 60-year period, showing that the net impact of the station relocation generates an additional £40.17m. This reflects that the developer contribution remains a cost to society and its value is therefore deducted from the PVB.

Benefit type	Do Minimum	Relocated station	Net Impact
Rail Revenue	£60.16	£84.13	£23.97
Bus Revenue	-	-£0.42	-£0.42
Car Park Revenue	£0.46	£0.94	£0.48
Marginal External Cost	-	£23.02	£23.02
Generalised Cost Savings	-	£0.03	£0.03
Developer contribution (Cost to society)	-£0.61	-£7.51	-£6.91
Present Value of Benefits (PVB)	£60.01	£100.19	£40.17

Table 3-7 Benefits Breakdown – Discounted Values Over 60 Years (£m)

Present Value of Costs

The table below summarises the present value of costs for the scheme for each site. In line with guidance in TAG unit A5.4, the infrastructure component of the Marginal External Cost benefit represents a reduction in highway maintenance costs and is therefore presented as an investment cost saving.



Cost type	Relocated station			
Capital Cost	£23.13			
Operating Costs	£1.52			
Infrastructure Component of MEC	£0.07			
Present Value of Costs (PVC) Total	£24.72			
Present Value of Costs (PVC) Deducting Private Funding	£17.07			
Table 3-8 Cost Breakdown – Discounted Values Over 60 Years (£m)				

As shown in Table 3-8, the total PVC is calculated at £24.72m. In consideration of the £17m (in 2023 prices) private funding contribution from housing developers the PVC is reduced to £17.07m and is the value used in the core scenario as this reflects the costs to the transport budget (i.e. cost to central and local government only).

Appraisal Results

The table below presents a summary of the scheme appraisal for both sites. Two versions of the BCRs have been presented. The first 'conventional' scenario has the revenue presented as a benefit, meaning that the revenue is retained by public transport operators. The second presents revenue as a negative cost in line with DfT TAG guidance (Unit A5-3) which requires all franchise revenues generated after the completion of the existing franchise to accrue to central government. This is assumed to be the position going forward for the foreseeable future as DfT currently takes the revenue risk on all services operated by National Rail Contract operators.

Appraisal Type	PVB	PVC	NPV	BCR	VfM Category		
Revenue to Operator	£39.56	£17.07	£22.49	2.32	High		
Revenue to DfT	£15.53	-£6.95	£22.49	-2.23	Very High (and Financially Positive)		
Table 3-9 Appraisal Results (£m)							

The table above indicates that the scheme is predicted to generate high value for money when the conventional appraisal. When revenue is treated as a negative cost, the revenue generated by the scheme is predicted to lower to cost. The value for money remains in the high category.



3.7 Sensitivity Tests

This section presents the results of sensitivity tests conducted on the appraisal. The following sensitivity tests have been conducted:

- Scheme cost variations
- Full public sector funding
- Theoretical existing station upgrade
- Unconstrained Car Park
- Delayed build out of the Waterbeach development

Further detail of each sensitivity test is provided below.

Sensitivity Test Scenarios

Due to the uncertainty of certain assumptions and parameters, several sensitivity tests have been undertaken to support the robustness of the appraisal conclusions.

Scheme cost variation

At FBC stage the scheme cost breakdown usually has a high level of certainty due to the stage of design. The optimism bias level applied for rail projects remains at 30% for CapEx and 1% for OpEx. At this stage, the risk layer should also be well developed and evidenced. Therefore, the following scenarios have been tested:

Quantified risk (rather than the optimism bias);

- +25% costs
- -25% costs

Collectively these tests will demonstrate the variance and sensitivity that the scheme costs have on the BCR and value for money outcomes. The results of the test are presented below.

Full public sector funding

The core scenario is based on the commitment of a £17m developer contribution (Section 106), the value of which is deducted from the Present Value of Costs as it is not a cost incurred by the public sector. This test demonstrates the value for money under a scenario where that private funding doesn't come forward. The results of the test are presented below.

Theoretical existing station major upgrade

The previous business case developed by WSP in 2016 estimated that a theoretical Do Minimum scenario was a viable option. Under this scenario the New Waterbeach Town development would be constructed but the station remains at its present location. To accommodate the anticipated demand increase, the following improvements were proposed:



- expansion of the existing car park was proposed to 280 spaces;
- a new footbridge; and
- station platforms provided with 25% canopies.

The 2016 business case forecasted that the cost of these improvements would be £49.4 million. We have undertaken a sensitivity test that compares the relocated station scheme with the existing station major upgrade. To do this we replaced the do-minimum assumption with the following:

- Increase car park capacity to 280 spaces; and
- Include amended costs (i.e. £49.4m inflated to 2023 prices to be consistent with the core scenario and also deducting the £17m private contribution and assumes a similar level of operating costs (i.e.£250k per annum)).

The results of the test are presented below.

Delayed housing phasing

The test highlights the impact of a 5-year delay on the delivery on the housing development being completed; thereby impacting the early appraisal year passenger demand and revenue.

Sensitivity Test Results

Table 3-10 below summarises the results of these tests.

	PVB	PVC	NPV	BCR	VfM Category
Core Scenario	£39.56	£17.07	£22.49	2.32	High
Scheme cost variation (risk)	£39.56	£15.15	£24.41	2.61	High
Scheme cost variation (+25%)	£39.56	£21.34	£18.22	1.85	Medium
Scheme cost variation (-25%)	£39.56	£12.80	£26.75	3.09	High
Public sector funding 100%	£47.07	£24.58	£22.49	1.91	Medium
Theoretical existing station upgrade	£32.81	-£28.76	£61.57	-1.14	Very High (and Financially Positive)
Delayed housing phasing	£39.74	£17.07	£22.67	2.33	High

Table 3-10 Sensitivity Test Results (Conventional BCR) (£m)



As Table 3-10 shows, the value for money category remains fairly consistent between almost all the sensitivity tests undertaken, demonstrating a level of robustness in the results. The 25% cost increase tests highlights that the scheme is sensitive to changes in funding requirements dropping from the high to medium value for money category.

The existing station major upgrade test makes the relocated station option appear very strong as the upgrade at the existing station would cost considerably more and generate fewer benefits, thus suggesting that relocating the station is the appropriate approach to take.

3.8 Summary

This economic case indicates that relocating the station at Waterbeach is predicted to deliver high value for money, with the core scenario returning a BCR of 2.32. This result is dependent on the delivery of the associated housing development that will form the core catchment area of the station. The scale of the development in the area more than offsets reductions in demand caused by the relocation of the station and its move from the south east side of the current village.



4 The Financial Dimension

4.1 Introduction

The Financial Dimension concentrates on the affordability of Waterbeach Station, focusing on the estimated costs for the scheme based on engineering work described in the GRIP 3A Optioneering Report, dated June 2018 located in Appendix A. The financial viability of the scheme is appraised by considering forecast operational revenues and costs, which are presented alongside the proposed funding approach. At OBC stage the minimum requirements for the Financial Dimension are to have completed a full assessment of both the project costs and funding cover and it is confirmed that this has been undertaken.

4.2 Design Development

An OBC was produced for the relocation of Waterbeach Station in October 2016 by WSP on behalf of RLW Estates. Significant change has occurred since the original OBC was produced in 2016 particularly with regards to the project governance structure, proposed funding plan, and delivery model, which has necessitated the production of this updated OBC document.

The GRIP 3A Optioneering Report produced by WSP in 2016 formed a basis of the original OBC. The document describes the optioneering process undertaken to progress from the conceptual brainstorming stage to identification of station layout options. During this process three station layout options were shortlisted for consideration, summarised as follows:

- Layout Option 1 Comprising two 12-car length side platforms, with a single Access For All (AFA) footbridge bridge located centrally, with lifts. This option proposes a back of Up platform emergency escape footpath that leads to Bannold Road.
- Layout Option 2 Comprising two 12-car length side platforms, with two footbridges. This
 option proposes a centrally located AFA bridge with lifts, and a Second Means of Escape
 (SME) footbridge located at the southern end of the platforms.
- Layout Option 3 Comprising two 8-car length side platforms (passive provision for 12car length), with two footbridges. This option proposes an AFA bridge with lifts located to the north end of the platform adjacent to a station building, and a Second Means of Escape (SME) footbridge located at the southern end of the platforms.

The option assessment process concluded with Option 3 as the preferred station layout concept. Further stakeholder consultation and design development led to the production of a set of drawings for Option 3 that were included in the station planning application submitted to the local planning authority in 2018.



Based on the above, therefore, the contents of this Financial Dimension include:

- A description of how the capital cost estimate for Layout Option 3 has been updated since the original OBC and the basis of the updated scheme Anticipated Final Cost (AFC)
- A description of the new relocated station operating cost assumptions and how these have been developed into an operational cost estimate.
- Results from of the project financial appraisal that incorporates updated scheme AFC and operational cost estimate for central and sensitivity case.
- A discussion around the proposed project funding strategy, considering sources of funding to meet the estimated development and delivery project costs.

4.3 Development of Base Cost Estimate

This section presents the capital costs that have been estimated for the scheme, including context around how these have been updated since the previous OBC issued in October 2016. SLC Rail was commissioned by GCP in 2023 to produce a re-baselined Base Cost Estimate for the preferred Option 3 station layout and this was completed in May 2023.

The Base Cost Estimate format is in accordance with the 'Rail Method of Measurement l' which is aligned with rail industry standards. This is the most suitable Method of Measure for the project given the current level of design.

The re-baselined Base Cost Estimate has been produced on a unit basis by taking-off quantities from layout drawings incorporated within the GRIP 3A Optioneering Report. Quantities have been priced using rates from SLC Rail's internal benchmarked rates database and then incorporated into the estimate using the Rail Method of Measure 1.

Due to the high-level nature of the current design, it was necessary to make several assumptions and exclusions, which are listed in the detailed breakdown of the new Base Cost Estimate located in Appendix C. Notable key assumptions are listed below and will influence the cost. These will be clarified and validated during the next stage of design development:

- No earthworks are required to the embankments to allow construction.
- No underground services or utilities require diversion.
- Existing power network holds capacity for new DNO substation.
- Tamping is required, which can be completed in 8 shifts.
- No works are required to level crossings.
- Two new trees will be planted for each tree removed from site.
- Existing OLE members will be taken down and disposed of by Network Rail.
- Quantities for OLE adjustments are as per previous estimate.



• Possession and Schedule 4 costs are as previous estimate, and subject to validation.

Commensurate with the previous format, the re-baselined Base Cost Estimate is broken down into two separately costed components, comprising the Rail Works and Non-Rail Works. The scope for the Rail Works includes the platforms, footbridges, lift and stairs, platform access including maintenance routes and all works within the rail boundary. A station building is not included in the Rail Works scope; however, a concrete slab foundation has been included in the scope as passive provision for future construction of a building.

The Non-Rail Works are included in the appropriate Group Elements section of the Base Cost Estimate for ease of reference, and are split into the following elements:

- Access road to proposed new station,
- Bus stop, taxi rank and drop off points,
- Car park,
- Bannold Drive;
- Drainage,
- Associated Highway Works,
- Sundry Items including new sub-station.

To complete the Base Cost Estimate, allowances for Prelims, Overheads & Profit, Design, Project Management, TOC costs and Network Rail costs were included. These were calculated using benchmarked percentages from historic projects. Based on experience from previous projects, allowances have also been included for Temporary Works, Traffic Management, Possessions, Surveys and Environmental works.

In terms of notable exclusions, Land costs for both permanent and temporary land take were not assessed as part of the remit, and costs in relation to interfaces with other projects, i.e. Network Rail signalling and adjacent housing development work are also excluded from the Base Cost Estimate.

4.4 Anticipated Final Cost (AFC) Estimate

The scheme AFC estimate incorporates two further components layered onto the Base Cost Estimate (i) a risk allowance to account for project uncertainties based on a QCRA, and (ii) inflation to uplift the base cost estimate from present day pricing to the midpoint of the construction programme. These components have been considered in the AFC as follows:

<u>Risk allowance (created through a risk identification workshop and QCRA process):</u>

• The objective of a QCRA is to support the estimating of cost and project management of a project. Understanding of the key assumptions, risks, opportunities, and uncertainties that drive the cost forecast are an integral part of the exercise.



- A risk identification workshop was held in January 2023 facilitated by SLC Rail's risk analysis team with participation from project and client team members. The workshop assembled data gathered both prior to and during the workshop, surrounding the scope, programme, costs, and associated risks pertaining to the preferred Layout Option 3 works. This included a review of assumptions and exclusions relating to the capital cost estimate to ensure risk items were captured and appraised during the workshop.
- As project risks were identified, the group agreed the probability of the risk occurring, the minimum cost of the risk, the most likely impact of the risk and the maximum likely cost impact to the project.
- The identification of risks during the workshop process made no distinction between the Rail Works and Non-Rail Works scope packages. This was because of the assumption that the works would be undertaken around a similar time. This allowed a risk that affected several site areas to be treated as a single project risk, rather than having the same risk repeated for each project location.
- Following the workshop, all risks were collated into a Risk Register and resulting information was inputted into Palisade @Risk Software which ran a Monte Carlo Analysis to produce costs of the P80 Risk Contingency. The analysis ran 10,000 iterations for the simulation and probability of each risk, along with the likely cost of its impact.
- Following the running of the simulation, the data produced showed the risks likely to occur and what the likely cost impact of these risks will be to the project at varying probability levels. The chosen probability level for this project was P90 or 90% probability of the total risk amount NOT being exceeded. The risk analysis advised a contingency of £5.9m (15% of the AFC value) be included in the project budget. The QCRA output is in Appendix D for reference.

Application of inflation:

- The Estimate has been priced using rates at 3Q 2022. The Estimate includes for an uplift of costs from this Base Date for inflation. Different elements of the works have been uplifted using different indices to produce a more accurate inflation calculation. Professional fees, including Designer, Project Management and Network Rail Costs, have been uplifted using CPI indices.
- Designer fees have been uplifted to the start of the tender period, while Project Management and Network Rail costs are uplifted to the Mid-point in construction which at the time of producing the estimate was forecast to be March 2025.
- All estimated costs excluding the professional fees have been uplifted to the start of the tender period using the Tender Price Indices from BCIS December 2022 Report.
 Construction, prelims and OH&P costs are then uplifted to the Mid-point of construction, planned at March 2025, using the General Building Cost Indices also from the December 2022 publications.



Upon conclusion of re-baselining the Base Cost Estimate, and incorporation of the new project risk contingency amount (at P90) and inflation, the project AFC estimate for delivering a relocated Waterbeach Station is £39.4m in accordance with the preferred Layout Option 3. A summary of the AFC breakdown is shown in Table 4-1 and a detailed cost breakdown including estimating assumptions and exclusions is provided in Appendix C for further reference. These costs will be reassessed at FBC.

The total AFC of £39.4m includes direct costs at £14.2m (36% of AFC) indirect costs ay £5.2m (13% of AFC) and design, management, and other costs at £11.6m (29% of AFC) alongside risk contingency at £5.9m (15% of AFC) and inflation to programme delivery £2.6m (7% of AFC).

The direct construction works value of \pm 14.2m is largely driven by civil engineering scope elements which is estimated at \pm 6.6m (46% of total direct construction works).

		Rail Scope		Non-Rail Scope		Total	
Ref	Item Description		Value (£)		Value (£)	Value (£)	
1	Direct Construction Works Costs						
1.01	Railway Control Systems	£	937,246	£	-	£	937,246
1.02	Train Power Systems	£	556,187	£	-	£	556,187
1.03	Electric Power and Plant	£	299,821	£	352,722	£	652,542
1.04	Permanent Way	£	71,747	£	-	£	71,747
1.05	Operational Telecommunication Systems	£	651,352	£	232,281	£	883,633
1.06	Buildings and Property	£	3,748,486	£	80,000	£	3,828,486
1.07	Civil Engineering	£	2,306,587	£	4,255,461	£	6,562,048
1.08	Enabling Works	£	555,649	£	103,407	£	659,056
	DIRECT CONSTRUCTION WORKS COST TOTAL	£	9,127,075	£	5,023,871	£	14,150,946
2	Indirect Construction Works Costs						
2.01	Preliminaries	£	3,891,510			£	3,891,510
2.02	Overheads and Profit (Main Contractor)	£	1,344,340			£	1,344,340
	INDIRECT CONSTRUCTION WORKS COST TOTAL	£	5,235,850	£	-	£	5,235,850
	CONSTRUCTION COST TOTAL	£	14,362,925	£	5,023,871	£	19,386,796
3	Design, Project Management & Other Costs						
3.01	Design Team Fees	£	3,412,297			£	3,412,297
3.02	Project Management Team Fees	£	2,587,176			£	2,587,176
3.03	Other Project Costs	£	5,570,951			£	5,570,951
	DESIGN, PM & OTHER COSTS TOTAL	£	11,570,424	£	-	£	11,570,424
	BASE COST ESTIMATE	£	25,933,349	£	5,023,871	£	30,957,220
4	Risk						
4.01	Risk	£	5,885,560			£	5,885,560
5	Inflation						
5.01	Inflation	£	2,566,712			£	2,566,712
5	Taxation and Grants						
6.01	Taxation and Grants	£	-			£	-
	RISK, INFLATION, TAX & GRANTS TOTAL	£	8,452,272	£	-	£	8,452,272
	ANTICIPATED FINAL COST	£	34,385,621	£	5,023,871	£	39,409,491

Table 4-1 AFC Estimate for Preferred Station Layout Option 3



4.5 **Station Operations, Maintenance & Renewal Costs**

A station operations, maintenance, and renewal (OM&R) cost estimate has been produced for the preferred station layout option 3, with input provided during the process from GTR particularly with regards to the station elements. The GTR asset management team independently reviewed the OM&R estimate and found it to be comprehensive, with costs aligned to benchmarks for similar sized stations that are currently operated by GTR.

The OM&R costs for the project are broken down into two scope components, (i) the station element comprising of platforms, footbridges, lifts, entrance with ticket vending machines and passive provision for a future station building, and (ii) the car park element, comprising a 200 space at grade car park with ancillary taxi and drop off area.

Long term ownership and OM&R activities for the car park element of the project has not been confirmed at OBC Stage, thus the working assumption is that this element is managed and operated by the SFO in conjunction with the station element. Long term property ownership and OM&R responsibilities for the car park element will be confirmed at FBC stage.

OM&R responsibilities are assumed to be split between the Station Facility Owner (expected to be GTR) and the Landlord (Network Rail), and for the station and car park car park elements.

The split between Station Facility Owner and Landlord responsibilities has been assumed to be commensurate with other stations on the route. This approach will streamline several workstreams including agreement of property documentation during the next development stage, staff training and sub-contractor procurement activities during mobilisation and prior to entry into service. This will allow efficient integration of the new Waterbeach Station into the GTR station asset portfolio.

The total OM&R cost comprising the station and car park elements for the new relocated station are estimated to be £250,000 per annum in 2023 prices, as shown in Table 4–2. To put this into context, the total OM&R cost for the existing station is £136,000 per annum, thus indicating there is an estimated total OM&R cost increase of £114,000 per annum to manage the new station asset.



Item Description	Estimated Cost (p.a) in 2023 prices		
STATION FACILITY OWNER SCOPE (ASSUMED TO BE GTR)			
1 Station Element Costs			
Routine Maintenance	£ 62,122		
Reactive Maintenance	£ 2,950		
Utility Services	£ 41,200		
Renewals	£ 8,742		
Sub Total	£ 115,014	46%	
2 Car Park Element Costs			
Routine Maintenance	£ 10,963		
Operations	£ 71,277		
Sub Total	£ 82,240	33%	
3 General Management			
General HQ Admin / Management	£ 17,252		
Sub Total	£ 17,252	7%	
STATION FACILITY OWNER TOTAL (p.a)	£ 214,506		
LANDLORD SCOPE (ASSUMED TO BE NETWORK RAIL)			
4 Landlord Property Costs			
Station element renewals	£ 17,484		
Car park element renewals	£ 18,010		
Sub Total	£ 35,494	14%	
	£ 35.404		
	L 33,434		
STATION & CAR PARK OM&R TOTAL (p.a)	£ 250,000	100%	

Table 4-2 OM&R cost estimate summary for new relocated station

Key assumptions that inform the principal components of the OM&R cost estimate are summarised below:

- **General management:** A cost provision has been included for GTR central management overheads to administer safety and regulatory policies and procedures related to the ongoing operation of the new station. The estimate corresponds to advice received from GTR and reflects benchmarks for existing similar sized stations to Waterbeach.
- **Station staffing:** The relocated Waterbeach Station will not have a station building and it is assumed that it will initially not be staffed. The option remains in the future to construct a staffed station building once demand reaches a level that justifies further investment to enhance the facility.
- **Property element:** Station and car park property management activities will be split between the SFO and Landlord in a manner consistent with other station property structures along the GTR route. The management of routine and reactive maintenance activities will rest with the SFO, and responsibility for most renewals will rest with the Landlord, apart from passenger information, ticketing, and security systems.



4.6 Capital cost spend profile.

A project capital cost spend profile has been produced which captures development costs, alongside forecast future project capital expenditure against key milestone dates extracted from the current project Master Programme (located in Appendix G).

Table 4-3 shows the anticipated expenditure profile to develop the scheme through each of GCP decision points aligned with the DfT RNEP stage gate process. Total expenditure corresponds to AFC reported in Section 4.4.

				Layout Option 3				
RNEP Stage	Year	Activites	Status	Forecast Expenditure				
					(£m p.a)		
Determine Stane	2015	Design concept /	Complete		01	0.0%		
Determine stage	2015	Strategic Outline Business Case	Complete	£	0.1	0.2%		
Dovelon Stage	2016	GRIP 3A Optioneering Report	Complete	4	0.2	0.9%		
Develop stuge	2010	Outline Business Case	Complete	£	0.5	0.0%		
Develop Stage Pefresh	2022/24	OBC approval	Underway	c	0.7	1.9%		
Develop stuge kellesit	2023 / 24	Complete outline design	onderway	2 0.7		1.070		
Design Stage	2024 / 25	FBC approval.	Pending	¢	12	3.0%		
(commence)	2024/20	Contractor procurement	i onanig	1		0.070		
Design Stage	2025/26	Detailed design & mobilisation	Pending	£	19.7	50.0%		
(conclude)	2020/20	botalioù abolgit a mobilioation	i onanig	2 13.7		00.070		
Deliver Stage	2026/27	Construction & commissioning	Pending	£	17 3	44 0%		
Deploy Stage	2020/2/	Station entery into service	i onanig	1	17.0			
			Anticipated Final Cost	£	39.4	100%		

Table 4-3 Anticipated expenditure profile



The costs for the next Design stage have been estimated based on a combination of issued (and approved) proposals from the specialist rail advisor team supporting GCP to undertake Develop Stage work, and benchmarks of similar schemes. Key activities and outputs in the next Design Stage will include single option design development, network change approval, outline planning consent, specification and procurement of advanced works, production of a FBC and procurement of the major works contracts to deliver the project.

4.7 Financial Appraisal

This section presents the scheme's financial appraisal and focuses on the estimated impacts of the relocation of Waterbeach Station by comparing the estimated incremental passenger farebox revenues generated by the relocated station with the estimated incremental total project OM&R costs.

This analysis therefore determines whether the relocation of Waterbeach Station might lead to a net operating surplus, and if so, whether the magnitude of the surplus could support ongoing OM&R costs of the station. The potential for commercial returns attributed to the new station scheme can be identified under two primary areas:

- Farebox revenue, via concession operator uplift the net farebox revenue impact of the new station, although accruing initially to the train operator, represents a change in concession value which can be utilised through commercial agreement with DfT to support the repayment of ongoing O&M costs.
- **Station retail income** The relocated station has the potential to attract modest income from other sources, including advertising and small retail tenants, such as a portable coffee shop kiosk. At OBC stage however, a conservative position has been taken to not assume revenue income from these sources.

The outputs from this analysis are presented in Table 4–4 for the preferred station layout Option 3, indicating the estimated level of surplus income each year in totality. The result of the appraisal indicates all additional OM&R costs are covered by the forecast net operating passenger farebox revenues. The table shows the financial position in the first three years of operations, then year 5, 10 and 20. It should be noted that for years 1 to 3 the impacts of demand 'ramp-up' have been incorporated into the revenue forecast.

Based on the OBC stage financial appraisal it is anticipated the scheme will be commercially viable and generate a financial surplus from year 1 onwards. The appraisal shows a positive financial position, whereby the forecast net operational farebox revenues are of a magnitude to meet the estimated total incremental project OM&R costs (station and car park elements).

Furthermore, the project generates an ongoing surplus income after incremental OM&R costs are accounted for, starting at a surplus of c. £255k at year 1, and growing to c. £3.75m surplus by year 20 of operations.



RPI GROWTH (YR ON YR)	2.849	6		2.86%		3.12%		2.00%		2.00%		2.00%		2.00%
Preferred Option 3 Layout														
Financial Year	20	27/28		2028/29		2029/30		2031/32		2036/37		2041/42		2046/47
Operational Year		1		2		3		5		10		15		20
Proportion of Year Operational		33%		100%		100%		100%		100%		100%		100%
Project Revenues														
Net New Farebox Revenue	£ 29	8,342	£	396,765	£	503,759	£	810,716	£	1,733,518	£	2,896,316	£	3,882,116
Net New Car Park Revenue	-£	770	£	2,653	£	6,374	£	14,700	£	38,236	£	66,667	£	88,564
Total Net New Revenue (p.a.)	£ 29	7,573	£	399,418	£	510,132	£	825,416	£	1,771,754	£	2,962,983	£	3,970,680
Project OM&R Costs														
New Relocated Station Asset														
Station Facility Owner OM&R Costs														
Station Property	£ 4	2,566	£	132,677	£	136,821	£	142,349	£	157,165	£	173,523	£	191,583
Car Park Property	£ 3	0,437	£	94,871	£	97,834	£	101,786	£	112,380	£	124,077	£	136,991
General	£	6,385	£	19,902	£	20,523	£	21,352	£	23,575	£	26,028	£	28,737
	£ 7	9,388	£	247,450	£	255,178	£	265,488	£	293,120	£	323,628	£	357,311
Landlord OM&R Costs														
Station Property	£	6,471	£	20,169	£	20,799	£	21,639	£	23,891	£	26,378	£	29,123
Car Park Property	£	6,666	£	20,776	£	21,425	£	22,291	£	24,611	£	27,173	£	30,001
	£ 1	3,136	£	40,945	£	42,224	£	43,930	£	48,502	£	53,550	£	59,124
Existing Station Asset														
Station Facility Owner OM&R Costs	£ 4	3,187	£	134,613	£	138,817	£	144,425	£	159,457	£	176,054	£	194,377
Landlord OM&R Costs	£	7,146	£	22,274	£	22,970	£	23,898	£	26,385	£	29,131	£	32,163
	£ 5	0,333	£	156,887	£	161,787	£	168,323	£	185,842	£	205,185	£	226,541
Total Net New OM&R Costs (p.a.)	£ 4	2,191	£	131,508	£	135,616	£	141,095	£	155,780	£	171,993	£	189,895
Project Financial Position														
Surplus (+ve) / Subsidy (-ve) Position	£ 25	5,382	£	267,563	£	373,538	£	681,658	£	1,606,676	£	2,771,227	£	3,750,436

Table 4-4 Financial appraisal of holistic project asset (station and car park elements)

4.8 Funding

GCP has secured £38m of funding through its Greater Cambridge City Deal that will meet the development costs required to complete the ongoing OBC refresh and forecast cost to complete the next Design Stage. Based on the Anticipated Final Cost of £39.4m there remains a current budget shortfall of £1.4m (3.6% of AFC) to complete the project and deliver a new relocated Waterbeach Station.

It should be pointed out that in 2022 RLW had difficulty in raising enough money, and in order to "unlock" the new housing, GCP committed to fund the entire £37/38m but including a £17m loan that RLW is due to pay back. To date, the commercial agreement associated with this is still under negotiation.

As described in the Economic Dimension, the Core Scenario BCR for the scheme is 2.32, which continues to show the project represents high value for money based upon the DfT appraisal criteria. The strong economic case presents GCP with the opportunity to source external funding through government grant sources. It is a significantly competitive and challenging environment to obtain government funding for rail transport schemes, thus GCP will focus efforts at the next Design Stage on the assessment and identification of value engineering initiatives with the aim of reducing the AFC to fit into the current £38m committed budget envelope.

Subsequently, the capital costs to progress the scheme through the next Design Stage which is anticipated to be c. £1.2m will continue to be funded through its committed Greater Cambridge City Deal funding resources. Approval will be sought by the GCP committee to proceed with the



Design Stage at risk, in parallel with seeking rail industry endorsement of the Outline Business Case to conclude the Develop Stage.

Table 4–5 shows funding sources and anticipated amounts, as a proportion of the preferred station layout Option 3 AFC. Funding has been secured by GCP to meet the c. 96% of the AFC through the Greater Cambridge City Deal. Should value engineering initiatives be successful in the next Design Stage to reduce the AFC by £1.4m, the project up front capital costs can be fully funded by GCP, without the requirement to apply for external third-party funding.

A Section 106 contribution is anticipated to be secured by the planning authority with the developer of the adjacent property development. The timing and value of the committed Section 106 contribution has yet to be confirmed. GCP is currently proceeding based on securing necessary funding to meet the total up front capital costs through the Greater Cambridge City Deal.

RNEP Stage	Year	Funding Source	Funding Status	For	Layout Option 3 Forecast Expenditure (£m p.a)		
Determine	2015	Developer Funded	Committed (fully utilised)	£	0.1	0.2%	
Develop	2016 to 2024	Part Developer Funded / Part City Region Sustainable Transport Settlement (CRSTS)	Committed (fully utilised)	£	1.1	2.7%	
Design	2024 to 2025	City Region Sustainable Transport Settlement (CRSTS)	Committed (not utilised)	£	1.2	3.0%	
Deliver & Deploy	2026 to 2027	City Region Sustainable Transport Settlement (CRSTS)	Committed (not utilised)	£	33.3	90.5%	
	2023102027	To be confirmed	To be sourced	£	3.8	3.6%	
		·		£	39.4	100%	

Table 4-5 Summary of funding sources and amounts



5 The Commercial Dimension

5.1 Introduction

The purpose of the Commercial Case is to establish whether the Project is commercially viable and sets out the proposed procurement strategy that will be used to engage the market. In assessing commercial viability, the conclusion is whether the Project can be delivered on viable terms for all parties and makes commercial sense.

The previous business case was produced in 2016 on behalf of the developer. When Greater Cambridge Partnership (GCP) took on promotion of the scheme the business cases and the assessment of its commercial viability needed to be updated - hence this document, which has been developed and updated based on different assumptions, including changes caused by the passage of time, such as the pandemic and recent construction inflation.

Work undertaken by the Greater Cambridgeshire Partnership (GCP) and the project team during the Develop Stage provides supporting evidence on the commercial viability of the Waterbeach Station scheme and the emerging design and build procurement strategy for GCP to engage with the market.

At OBC stage consideration has been given to the contractual options and payment mechanisms available for GCP to procure the project works, which have been appraised and preferred options identified for development at the next Design Stage.

5.2 Approach to Assessing Commercial Viability

This is not a novel project. It involves the construction of a new railway station, car park, bus interchange, taxi and drop off area and access road. It also includes some improvement works on some of the local highways. A potential complexity is that the existing station must be closed through a statutory procedure as part of the project.

The standard rail industry development and governance methodology is being used through PACE (Project Acceleration in a Controlled Environment). The project is currently in PACE Stage ES4, moving to Approval in Principle Design (AIP).

The updated AFC of £39.4m incorporates a new project risk contingency amount that has been created through a multi-disciplinary risk identification workshop and subsequent QCRA process. On the basis the GCP has secured £38m funding through the Greater Cambridge City Deal, the project has a current funding gap of £1.4m. The project was subject to soft market testing and Early Contractor Involvement (ECI) during early 2024, giving GCP and the project team confidence in the project programme and constructability.



5.3 Output-Based Specification

Waterbeach New Settlement is a development, proposed by Waterbeach Development Company LLP Ltd (4,500 new homes) and Urban and Civic (6,000 new homes) to the immediate north of the existing Waterbeach Village which is located approx. 9.5km North of Cambridge and lies on the Cambridge to Kings Lynn Fen Line. To support this development, and improve the existing transport infrastructure, a new station is proposed to replace the existing Waterbeach Station which is already the subject of proposed future upgrade and improvement by Network Rail.

The Waterbeach Station scheme will consist of 3 phases:

- Development Phase 1 consists of two 'Equality Act 2010' compliant, 8-car platforms with connecting footbridges (one with lifts), 200 space car park (including disabled bays and accessible child + parent bays), cycle parking for up to 450 cycles, and completion of an access road that links the site to the existing village (Cody Road).
- Development Phase 2 includes a multi-use transport hub building, station plaza, public welfare facilities, ticket barriers, additional cycle parking, a multi-storey car park, walking and cycle routes and a dedicated car park for the Waterbeach village residents; and
- Development Phase 3 is the northern extension of the platforms to accommodate 12-car trains.

The scope of works for this Project is Development Phase 1 with a requirement to 'not-to-preclude' Development Phases 2 & 3 that will be constructed later.

The work carried out to date had shown that the scheme will deliver a range of outputs that are aligned with the strategic transport objectives at local, regional, and national levels. From these, the proposed new Waterbeach Station will deliver the following key strategic objectives:



Table 5-1 Project objectives



A Requirements Schedule has been developed by the project team with input from all the main stakeholders, including (Network Rail, Train Operators and GCP). This can be found at Appendix B.

5.4 Procurement Strategy

The procurement strategy for the project is included at Appendix J. In identifying the most suitable procurement route for Waterbeach Station scheme, the strategy has been established based on the ability to achieve the following outcomes:

- Achieve cost certainty, or certainty that the scheme can be delivered within the available funding constraints.
- Minimise further preparation costs with respect to scheme design by ensuring best value, and appropriate quality.
- Obtain contractor experience and input to the construction programme to ensure the implementation programme is robust, achievable and minimises the impact of the works on the travelling public during construction.
- Obtain contractor input to risk management and appraisals, including mitigation measures, to capitalise at an early stage on opportunities to reduce construction risk and improve out-turn certainty thereby reducing risks to a level that is 'As Low as Reasonably Practicable'.

Promoter

The Promoter of the project is GCP (Cambridgeshire County Council), who have committed significant internal funding and resource to progress the scheme through the development stages reach the current point of seeking endorsement of the OBC from all key stakeholders within the project.

Delivery model

There are essentially two delivery models that have been considered during the development of the OBC, comprising:

- Option 1: Promoter contracts with Network Rail to deliver all project works via implementation agreement.
- Option 2: Promoter delivers all project works as a Third Party, enters into the construction contract, and Network Rail play an asset protection role.

A hybrid approach has also been considered, with the station Promoter (GCP) delivering the offnetwork works and Network Rail delivering on-network works. Each option has advantages and disadvantages as shown in the tables below.



Nature	Advantages	Disadvantages		
Promoter enters into an	Promoter pays a fee to	Does not relieve the Promoter		
Implementation Agreement	Network Rail manage all of the	from the burden of raising		
with Network Rail, in which	challenges associated with	funds to meet the outturn cost		
promoter specifies the	project management,	of delivery.		
outcomes it wants to see,	construction, and delivery of			
which Network Rail then	the new station project.	Promoter does not have direct		
designs and delivers.		control of the conduct of the		
	The Implementation	project, and continues to bear		
Promoter raises the funds	Agreement is a template form	the consequences of cost and		
required for the capital cost of	of contract with regulatory	programme risk e.g. if Network		
the station	approval	Rail advise that the outturn		
		cost exceeds the level of		
Network Rail procures the	Network Rail has the ability to	funding which the promoter		
construction contractor and	use its existing framework	has sourced, then the		
project manages the works.	contracts, which can	promoter has to find further		
	streamline procurement	funding.		
The completed station is	timelines			
owned by Network Rail and is		Deviations from the standard		
usually leased to the local	The process of managing	form Implementation		
train operating company who	handover can be simple as	Agreement are difficult to		
provides the staff, cleaning,	the Implementation	negotiate.		
maintenance etc and collects	Agreement assumes the			
the farebox revenues which	works are owned by Network	Promoter does not have any		
the station's passengers	Rail once complete	long-term stake in the		
provide.		completed station thus has		
		less control over future		
		expansion and improvement		
		of the asset.		
The recently recent new small station at Soham in Cambridgeshire was delivered by Network				

Rail for Cambridgeshire & Peterborough Combined Authority for a budget of £18.6m under this model.

Table 5-2 Option 1: Network Rail delivery



Nature	Advantages	Disadvantages		
Promoter procures the construction contractor(s)	Promoter has a high degree of control and ownership of the	Promoter needs to be 'competent' to act as Client		
and project manages the works	scheme design so can tailor it to meet local / customer	for railway works.		
	needs	Cost overruns must be borne		
Network Rail approve designs,	Promoter has control over the	by Promoter.		
station into its asset base.	cost and transfer of delivery risk by managing a	The process of gaining Network Rail acceptance of		
Once accepted, the	competitive tendering	the completed works can be		
completed station is owned	process and employing the	protracted. This could lead to		
by Network Rail and is then usually leased to the local	construction contractor	tension where it causes delay to opening and cost		
train operator who provides	Promoter has a higher degree	escalation.		
maintenance etc and collects	programme than option 1	Promoter does not have any		
the farebox revenues which	because it is directly project	long-term stake in the		
the station's passengers	managing the works	completed station, making		
provide.		future expansion or		
		improvement harder to achieve		
This model was used for Worcestershire Parkway station, which SLC Rail managed on behalf of				

This model was used for Worcestershire Parkway station, which SLC Rail managed on behalf of Worcestershire County Council. The station opened in February 2020.

Table 5-3 Option 2: Third party delivery and hand over

In this instance GCP, as promoter of the project, has decided to use the third-party delivery model. The reasons for this are that:

- It is a well understood "standard" project with limited innovative features.
- A significant proportion of the works are off-network.
- Conversely the rail infrastructure elements of the project are minor.
- GCP has experience of managing design and construction risk and is employing a specialist railway project team to support it.
- The project was previously promoted by the housing developer. GCP took over promotion of the project in order to facilitate its delivery and the assembly of funding.

However, there are also advantages in the hybrid model, under which GCP would directly deliver the 'station works' package (platforms, footbridge, lifts, and station building) and engage Network Rail to deliver the 'rail corridor' works package (track, overhead line equipment, and signalling), and further consideration of this approach may be necessary before a final decision is made. This approach would allocate responsibility for the scope packages based on party resource, skills, and expertise, and is a similar structure deployed recently for delivery of the Brent Cross West Station project situated on the Midland Main Line.



Identified benefits of the hybrid model include:

- Responsibility to directly procure and manage the delivery of rail corridor infrastructure works including track, signalling and OHLE scope would rest with Network Rail. The scope aligns with its core capabilities and experience and once delivered would be retained by the Network Rail route asset maintenance teams, thus simplifying the handover process.
- Opportunity for Network Rail to secure possessions more efficiently to deliver the rail corridor infrastructure works and leverage internal knowledge of other planned works in the region to optimise delivery pathways.

Market engagement

Early Contractor Involvement (ECI) is being undertaken (in early 2024) during the Develop/OBC stage to provide the relevant expertise to reduce construction risks and shape the procurement process and tender strategy. ECI will assist by providing market input in the determining of the most appropriate contract form, based on the risk profile generated and encapsulated in the cost and schedule risk analysis exercises.

The preferred procurement strategy and form of contract are set out below, and these will be confirmed towards the end of Outline Design, based on the ECI and additional market engagement feedback sought, together with further discussion with the promoters on their role in delivery. The market is being tested to establish its appetite for the project and the preferred procurement approach and to gain feedback from the market over its capacity to deliver these works. Furthermore, this will also help shape the risk allocation, terms and conditions, and our understanding into the current material market.

The format and content of these activities has been developed by the project team in consultation with GCP and will aim to satisfy both team and promoter that a suitable route to market, risk profile, contract type and pricing mechanism is being used.

Procurement Route: Option Selection

Initial discussions between GCP and the project team presented several suggestions and ideas toward to overall procurement strategy for Waterbeach Station. The following have been discussed and recommended not for use on the scheme:

- Term Maintenance Framework framework unable to provide contractors and/or capacity necessary to fulfil requirements.
- Eastern Highway Alliance Framework framework capped at £20m, although there is
 option to increase this threshold via board approval. However, the framework does not
 provide the number of contractors and/or financial capacity necessary to fulfil
 requirements.
- Pagabo Framework Based upon a desktop study of this framework, the project team anticipate a similar supply base when approaching the market under an open tender and would therefore not be worthwhile adopting such a framework that would prevent other entrants to market.



• SCAPE – Based upon a desktop study on the SCAPE framework, it was concluded that its usage would require a single source tender exercise, and therefore remove any competition during the tender process.

The project team has considered the procedures under the Public Contract Regulations (PCR) 2015, and these findings are presented below with general background to the procedure, followed by its suitability for the development of Waterbeach Station.

Tendering Strategy: Option Selection

The options considered for the procurement of this scheme include build-only, design & build, and two-stage.

Build-only tenders cover only the construction and are typically adopted when all pricing information (including design) is available upon commencement of the tendering period. The benefit of such approach would be greater cost certainty due to the tendering process commencing once design has been complete. However, as the tender documents are not issued until the detailed design stage has been completed, the programme will be pushed out as there will be no overlap of the detailed design and construction phases and there will also be limited opportunity for cost efficiency/value engineering. This approach would require a commercial model that would interface both the design and construction contracts to protect the Client. Early works risk would also lie with the client. Furthermore, it might also be necessary to engage the Contractor under an early works order to ensure delivery of any pre-works activities, which would result in higher preliminary costs, as well as a greater level of Client resource to manage any commercial and technical issues.

In contrast to a build-only contract, a Design & Build (D&B) provides greater efficiencies in cost and programme through the overlapping design and construction phases, the design of temporary works and the passing of responsibility for the management of design, resulting in the mitigation of risks associated with design delays. The competition for D&B is likely also to deliver the most efficient construction programme, taking into account technical complexity, constraints (such as highways and pedflow), supply chain and long lead material availability. This approach also allows for early procurement of materials and identification of any high lead time items. This ultimately reduces risk to the programme, supply issues and of exposure to inflation.

In a two-stage procurement process the Contractor is awarded the contract in the first instance based upon the submittal of their fee, OH&P, preliminaries and if requested, programme. This would provide an opportunity to incorporate the preferred Contractor into the design team employed by either the Client or Project Manager to develop the design. The second stage of this process is the development of a price for the construction works on the basis of the design output from stage 1. However, with a two-stage process the ability to re-procure in the event the second stage price is not suitable would be lost.

The project team is aware that the station opening date is a key driver for the project. This precludes the use of a build only contract. **Therefore, a D&B approach is preferred**.



Tendering Strategy: Design & Build Contract

It is proposed to appoint a Contractor under a Design & Build contract to undertake PACE stages ES5, ES6, ES7 and ES8. This will include the production of construction ready design, completion of construction, demobilisation and handover, and formal project closeout. In contrast to a construct only contract covering stages ES6, ES7 and ES8, a design and build will provide greater efficiencies in cost and programme through overlapping design and construction, design of temporary works and overall construction methodology from Contractor input. Other benefits from this approach allows for early procurement of materials and identification of any high lead time items such as (but not limited to) the footbridges, lifts, Overhead Line Equipment and Ticket Vending Machines.

Benefits of a Design & Build approach would include:

- The designs are adopted, so the contractor and its designer are passed the scope and design risk liability.
- Value engineering is achieved both through the tender process (where the contractor takes the initiative to win the work), and in the subsequent detailed design stage (where the Employer can also be engaged), so opportunity for this is not lost.
- Possessions and disruption are easier to understand and plan (as this can be done by the Employer and D&B contractor in parallel with detailed design completion).
- Long lead items and critical plant can be procured in parallel with design conclusion, reducing programme risk.
- A price and delivery package is created that provides price certainty and confirms that programme requirements can be met earlier than the traditional route.

Traditionally, to make this approach as effective as possible, the tender documents and tender process should be programmed at a point in time where specification uncertainties are at an absolute minimum and the design has reached 'Approval in Principle'. However, given that the station opening date is a key driver on the project, consideration should be given to opportunities to bring forward the tender process, although this could increase the risk of post-tender change due to deficiencies in the design for which the liability would remain with the Client.

Procurement Route: Procurement under The Public Contract Regulations 2015 (PCR 15)

It is recommended the market is approached under the Public Contract Regulations 2015 (PCR 2015) to ensure the tendering process is competitive, and Greater Cambridge Partnership can set out risk allocation, structure, and tailor to any specific needs. The specific procurement route requires input from the market engagement process, although options include the following.



Open Procurement Procedure. Under an open procurement procedure any interested organisation may submit a tender in response to a Contract Notice and download/request any procurement documentation, with a minimum time limit for response of 35 days from which the contract notice was published. This procedure would typically cover any grounds for exclusion and requirements for qualitative selection, with all tenders being evaluated in line with the criteria and methodology depicted within the procurement documentation. Usage of an open procurement procedure is best utilised where a smaller market size is expected, and where requirements of the tender are considered straightforward, and the selection/award process simple.

Restricted procurement procedure. In contrast to an open route procurement procedure, a restricted procurement procedure uses a two-stage process constituting of an initial selection questionnaire (stage 1) and a subsequent invitation to tender (stage 2). Use of a restricted procurement procedure would be best utilised where a larger market size is anticipated in response to the Contract Notice or PIN, and/or where the contract requirements are generally considered complex and would benefit from a detailed selection criteria covering (but not limited to) capabilities of fulfilling the contract works, the economic and financial standing, and technical and professional ability (Article 58; Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014).

Competitive dialogue. Competitive dialogue procurement procedures are a multi-stage process, that provide opportunity for the contracting authority to enter into dialogue with candidates, following success in an initial selection process. The purpose of this dialogue is to identify and define the means best suited to satisfying contract requirements. It is important for the contracting authority to ensure equal treatment of all Tenderers during dialogue, and no change to the tender must occur from the results of these conversations. No information can be provided in a discriminatory manner which may favour one Tenderer over another. Use of competitive dialogue procurement is most beneficial on contracts where requirements are complex, requiring input from specialist organisations and/or where scope cannot be fully defined.

Competitive procurement procedures with negotiation allow for the contracting authority to fully clarify and negotiate bids with multiple Tenderers upon submission of an initial fully formed tender, and ultimately award based upon the awarding criteria of any revised and/or new bid following negotiation. This process does provide the contracting authority flexibility in whether they wish to proceed with any negotiations or go direct to contract award upon this initial submission.

A meeting was held on 15 November 2023 between GCP and the project team at which it was agreed that the most suitable procurement route for the Waterbeach Station project was via a restricted procurement procedure, with consideration being given as to the optimum time to go out to market, weighing up the potential programme benefits against the possible increase in change and cost uncertainty. Having reached agreement on the preferred route, timing of the issue of the ITT documents was then discussed. The two principal options were either after agreement of the Approval in Principle design or following the Inter-Disciplinary Check (IDC) but in advance of attaining AiP sign off.



The project team had undertaken a review of the likely programme implications of the two options and based on this exercise it appeared that following the route of achieving AiP of the design prior to issue of the ITT documents would result in a station opening of 2nd July 2027. However, under the option of issuing ITT documents after the IDC but before AiP would give a station opening of 24th March 2027. At this stage the second option is preferred for this reason.

Form of contract

It is proposed that GCP would use the NEC4 Engineering and Construction (ECC) Form of Contract, which is the standard form of contract for engineering and construction work in the UK, including any level of design responsibility.

The form of contract has been agreed as Option A : Priced Contract with Activity Schedule. The contractor is paid monthly on certifying completion against the activity schedule. The advantages of, and reasons for using Option A in the case are:

- Streamlined processes and updated definitions
- Improved contract administration and reduced administration costs
- Greater clarity and reduced potential for problems
- Provision for building information modelling and early contractor involvement
- Improved risk opportunity and risk management
- Simplified payment process based on activity schedule
- Greater cost certainty at contract award

5.5 Managing risk

To achieve successful delivery of schemes, management policies, processes and procedures are required to be followed accurately. An important aspect of the management process is identifying risks associated with scheme delivery and funding early in the process to allow mitigation to be identified.

The risks associated with the scheme have been considered and a QCRA has been completed for the project which has defined a 'risk pot' for the scheme by determining the likelihood of a risk occurring and attributing a cost to these. The QCRA output can be found in Appendix D. These monies can then be drawn down should the risk be realised to prevent it impacting on total scheme cost.

Identified risks are not just accounted for through financial provisions but are managed and mitigated against in the first instance. Risks have been allocated owners and where appropriate, owners are responsible for eliminating the risks or, where possible, identifying mitigation measures for residual risks. Following approval of the OBC, it is anticipated that several final risk reduction, value engineering and detailed design activities will commence to support the delivery of the scheme. These will help increase price certainty.



Risk Allocation

As part of the Commercial Dimension, the general principle that will be adopted is that the risks should be managed by the party best able to manage them. As the project moves to delivery, most of the delivery and financial risk will be transferred to the supplier through the contract.

A strategic aim and objective of GCP management of the contract is that risk is appropriately proportioned through the careful management of relationships within, and throughout the project. This is also important from a delivery and resilience point of view.

Key aspects are:

- Risk will be managed proactively at both a programme and project level.
- Remaining risks will be proactively monitored and managed throughout the delivery of the project using the working risk register.
- The risk register will continue to be developed and updated as the project progresses.
- Monthly risk reduction and opportunity meetings.
- Established GCP approach to contractual management of risk.
- NEC4 contract to be used has defined processes for managing, preventing, and controlling cost increases and time overruns.
- Incentivising risk allocation transfer has been successful on other projects within GCP

The following risk allocation table illustrates the indicative allocation of risks resulting from the contractual and procurement arrangements. This ensures that all risks are assigned to the party best placed to manage them, achieving value for money. At this OBC stage, ticks have been provided to indicate where each risk type rests: with the public sector (the Council / Government Treasury) or the private sector (the contractors), or whether these risks are shared between the two.

Once the project is fully designed, complete details of risk transfer will be provided, along with a revised risk transfer matrix, within the Full Business Case (FBC) submission.



Risk Category	Public	Private	Shared
1. Design Risk			Х
2. Construction Risk		Х	
3. Transition and Implementation Risk			Х
4. Availability and Performance Risk			Х
5. Operating Risk (post completion)	Х		
6. Variability of Revenue Risk	Х		
7. Termination Risks			Х
8. Financing Risks	Х		
9. Legislative Risks			Х

Table 5-4 Risk Allocation

Risk transfer

In the NEC4 contract, each option (labelled A to E) allocates risk differently between the Employer and the Contractor resulting in a sliding scale of risk allocation. The contract conditions are designed to encourage a collaborative relationship. It is proposed to use Option A in this contract.

At the procurement stage, the tender pack will contain a risk register that will identify which risks sit with the contractor and those that are for the Client to manage. The biggest risk a contractor will face will be at procurement stage when they price its risk register that will form part of its Lump Sum Fixed Price contact.

GCP has an established approach to the contractual management of risk. The NEC contract will be used for the procurement and subsequent management of a contractor to deliver the scheme. Risk will be managed proactively at both a programme and project level throughout the development and delivery stages of the project. Remaining risks will be proactively monitored and managed throughout the delivery of the project using the working risk register, which is available to all team members on a collaborative Sharepoint site. The risk register will continue to be developed and updated as the project progresses. Monthly risk reduction and opportunity meetings will be held throughout the design and construction phases.



5.6 **Procurement programme and contract length**

The programme below (and in Appendix G) shows the proposed procurement programme in the context of the wider project programme and assumes:

•	Preparation of ITT	02-May-24 -	06-Nov-24
•	Client Sign Off		08-Nov-24
•	ITT Period	11-Nov-24 -	17-Jan-25
•	Final ITT Evaluation	10-Feb-25	21-Feb-25
•	Draft Award Recommendation Report	31-Mar-25	02-Apr-25
•	Client Sign Off	03-Apr-25 -	09-Apr-25
•	Award Decision Notice		15-Apr-25
•	Standstill Period	16-Apr-25 -	29-Apr-25
•	EEC Contract Signed		Apr-2025
•	PACE ES5 Design Stage Start		May 2025 onwards.

5.7 The Station Closure Arrangements

A key element of the project is the closure of the current Waterbeach station which is situated to the south of the existing village. The Closing of Rail Stations is Governed by the 1993 Railways Act (and subsequent amendments). Section 41 of the Act sets out the requirements and process for Closure. The DfT Guidelines for Closure are available on the DfT Website. The decision to close a station is made by the Secretary of State for Transport and is further ratified by the Regulatory Body (The Office of Road & Rail).

The Closure of Waterbeach will be proposed by Network Rail as the Statutory Body as defined in the Railways Act. The timescales for Closure are 12 to 18 months and process is set out below. There is some risk that Closure will not be achieved but early discussions have shown wide industry support for the Closure of the existing station to be replaced by a better located, safer more accessible station at the heart of the new settlement.


Appraisal

The project will follow the statutory process that mandates carrying out an initial appraisal that will be approved by NR and sent to DfT. The appraisal must cover the following five criteria, as well as a value for money assessment:

- 1. Environmental impact
- 2. Safety
- 3. Economy
- 4. Accessibility
- 5. Integration

On the basis of this document, the DfT will enable the process and will commence industry and public consultation.

Consultation

The project with Network Rail and the DfT will undertake a period of consultation, whereby the positives of the scheme will be emphasised, and stakeholders will be invited to comment. The project will need to mitigate any objections and keep records of all engagement.

At the end of the consultation, the resulting document will be submitted to the SoS for approval, if approved it will be sent to ORR for ratification, if ratified timescales for closing the station will be agreed.

Timescales

It is a requirement that the current station closes concurrently with the opening of the new facility. It is expected that the process will take 12 to 18 months but there are no set timescales.

5.8 Summary

This Dimension has shown that Waterbeach station is a commercially viable project with no major items of innovation. It is proposed that GCP will act as promoter and will let a Design and Build Contract under a NEC4 Form A. In railway terms this means they will be acting as a "Third Party", and Network Rail's role will be to protect the safety of the railway and their assets under an Asset Protection Agreement.

Upon opening the station will pass into the long-term ownership of Network Rail who will lease it to the Train Operator in the normal fashion. The division of maintenance responsibilities between Network Rail and the Train Operator are set out in standard form lease agreements in use across the industry.



6 The Management Dimension

6.1 Introduction

This section of the Business Case presents the Management Dimension for the delivery of the proposed Waterbeach New Station scheme. As per the DfT guidance document, '*The Transport Business Case: Management Case'*, this Management Dimension will present details of:

- Project planning
- Governance structure
- Risk management
- Stakeholder management & communications
- Benefits realisation through monitoring and evaluation

GCP has a track record of delivering public transport schemes and will draw on this experience for the Waterbeach New Station. It has already developed strong working relationships with external stakeholders, notably Network Rail who will be involved in the delivery of the project and whose input is required to make it a success. GCP is confident that it has the resource, capability and systems required to deliver this project successfully, to time and budget.

The following table summarises the principal organisations responsible for the project's planning and delivery.

Roles and Responsibilities
Promotor and project funding
Project management, governance, business case and consenting.
Development and Approval in Principle Design Services
Technical, Principal Designer and engineering assurance.
Rail industry sponsor and asset protection.
Train Operating Company & SFO

Table 6-1 Delivery Partner Organisations

Evidence of Similar Projects

The GCP has appointed SLC Rail to act as the Client's Representative for the early design stage, and it proposed SLC will continue to remain in this role throughout the next stage covering detail design and delivery.



GCP and CCC have delivered, or are delivering, several comparable construction projects of similar complexity and scale, and therefore have established confidence and arrangements for project management and delivery, such as:

- **Cambridgeshire Guided Busway**, a £150m scheme that opened in 2011. The scheme was for a 42km public transport route that consisted of a 25km guided busway and 17km of onstreet provision including bus priority measures, and
- **GCP Corridor schemes** that included Histon Road, a new bus lane and improved walking and cycleways that was opened in 2021. Also included was the Milton Road scheme (currently under construction) that is delivering a package of improvements to public transport, walking and cycling and is part of the wider Waterbeach to Cambridge Public Transport Scheme.

With reference to delivering rail related projects, Cambridgeshire County Council recently managed the delivery of the following:

• **Kings Dyke Crossing** – a bridge over the railway line that covered significant earthworks, ground stabilisation and bridge construction. Opened in July 2022 the scheme's budget was £32m.

SLC Rail, in previous specialist rail advisory roles, has experience of developing and delivering new and upgraded railway stations, such as:

- Stratford Parkway Client Warwickshire County Council, Opened May 2013
- Coventry Arena Client Coventry City Council, Opened January 2016
- Bermuda Park Client Coventry City Council, Opened January 2016
- Kenilworth Client, Warwickshire County Council, Opened April 2018
- Worcestershire Parkway Client, Worcestershire County Council, Opened 2020
- Kidderminster Client, Worcestershire County Council, Opened 2021
- University and Perry Barr Client Birmingham City Council, Opened 2024 & 2022.

6.2 Governance, Organisational Structure & Roles

This section describes the key roles and lines of accountability and how they will be resourced. The organisation structure and responsibilities for Waterbeach New Station is illustrated in Figure 17.





Figure 17 Governance structure and responsibilities for the project

The high-level role and responsibility of each of these groups is as follows, with more detail provided in subsequent sections:

- The overall scope of the project is set by the GCP Executive Board;
- The project is governed by a Programme Board that will receive reports on project activity including spend, quality, programme and risks;
- The Programme Board can request from the Project Manager all the information required for it to perform its governing role;
- The Project Manager must present all information to the Programme Board that is required for the Board to perform its governing role; and
- The Project Manager has full day-to-day responsibility for delivery of technical work streams and is employed by GCP.

A key project governance document is the Project Execution Plan (PEP), and this was produced by SLC at the outset of the project. This sets out the need and aims of the project and the method for achieving the outcomes.



Executive Board

The GCP Executive Board consists of the Leader, or equivalent of each of the partner organisations, as the key decision-making group, illustrated in Figure 17. The Board meets at least four times a year to discuss the major schemes being completed by GCP.

A key role of the Executive Board is to agree and oversee the delivery of a programme of major schemes that will help achieve the GCP aims and support the sustainable growth and continued prosperity of the Greater Cambridge region, in line with national and local policy objectives and the Local Enterprise Partnership's (LEP) overarching economic strategy for the area. In particular, the Executive Board:

- Takes responsibility for ensuring value for money is achieved;
- Identifies a prioritised list of investments within the available budget;
- Makes decisions on individual scheme approval, investment in decision making and release of funding, including scrutiny of individual scheme Business Cases;
- Monitors the progress of the scheme delivery and spend;
- Actively manages the budget and programme to respond to changed circumstances (delay to programme, scheme alteration, cost increases etc).

For the Waterbeach New Station scheme, the Executive Board will:

• Be appraised of the details of the scheme's Full Business Case at its November 2024 meeting and thence grant delegated authority to the GCP Transport Director to the award of the main contract for the design and delivery stage.

Joint Assembly

There is also a Joint Assembly, with appropriate representation from the Local Authorities and other Stakeholders, which meets at least four times a year and plays an advisory and scrutineering role in decision making.

For the Waterbeach station, the Joint Assembly will advise and make recommendations to the Executive Board and bring in wider stakeholders.

Programme Board

GCP is focussed on both programme and project-level governance with the principle that issues of key importance are addressed at the highest levels of governance and that issues of a more technical nature are addressed by officers.



At the GCP Transport programme level, an officer technical group (Programme Board) made up of key officers, including the Transport Director, Strategic Finance Manager, Assistant Director Place & Economy, City and the Access Programme Director as well as stakeholders. The Programme Board seeks to develop the overall scheme prioritisation and to manage programme-level risks and capture shared benefits. This Board, in consultation with Chief Executives, meets monthly to raise programme level issues with the GCP Executive Board and Joint Assembly as required.

For the Waterbeach station scheme, the Programme Board discuss and advise on any exceptional items of progress. These may include:

- The project not delivering the objectives agreed with the Executive Board;
- The forecast overall cost of the project exceeding what has been reported to the Executive Board;
- The forecast completion of the project exceeding the date reported to the Executive Board;
- When a key decision milestone is forecast to be missed by 3 months (in line with the Executive Board cycle of meetings); and
- A project being at risk of causing significant reputational damage to GCP or its partners.

Project Team

At the project level, a Project Team works up the scheme details and reports to the Client Project Manager who reports directly to the Programme Board which will guide the overall development of the project at the technical level. At key project milestones, reports are made to the Executive Board on progress to seek decisions on key matters which will allow the project to progress, *Figure 18* below sets out the project management team that reports to GCP.





Figure 18 Project Team Organisation Chart

Project Reporting

The Project Manager and the delivery team will continue to report to the Project Board and GCP Executive Board as described in this section and provide regular updates to the GCP website. The Consultant Project Manager will produce; monthly project progress reports containing key activities that have been undertaken and are planned for the upcoming period, a budget update and a risk review as well as identifying any changes requiring early warnings or compensation events. The Client Project Manager will then produce monthly project reports to inform the Programme Board and escalate the early warnings and/or compensation events as necessary. Subsequent change following these events is identified by the consultant and client Project Managers during regular project meetings and updates from the technical disciplines. As such the Client Project Manager determines which of the following four categories a decision is classified as:

Key decision: these decisions are major gateway decisions to allow the project to continue. These decisions form the outer scope of the project and define the 'project parameters'. Key decisions are the sole responsibility of the GCP Executive Board with advice provided from the GCP Assembly and Chief Executives.



- **Scope change decisions:** these decisions take the project out of scope of the 'project parameters' agreed at the key decision-making stage. They will impact on cost, quality time and/or will require a change of the project scope and the PEP. As such, these decisions are the sole responsibility of the GCP Executive Board with advice provided from the GCP Assembly and Chief Executives;
- **Major decisions within scope:** these decisions are within the 'project parameters' but are still considered major decisions because they have an impact on cost, quality time and/or will require a change of the Project Instruction / PID. A major decision is the sole responsibility of the Project Board; and
- **Project management decisions:** these are decisions which do not impact cost/quality or time for example, a technical decision on detailed options. These decisions include moving budget between work streams and are the responsibility of the Project Manager.

Assurance

The scheme will be progressed through the GCP's standard approval processes, with all decisions made by management with the appropriate level of authority depending on the type of decision being made.

The Full Business Case

For Waterbeach station, GCP has confirmed the Executive Board will grant its approval for the scheme to proceed based on the submission of a Full Business Case as defined in the DfT's '*The Transport Business Cases*' (January 2013) approach. The Full Business Case will include an update of the preferred option analysis and confirmation of the final financial, commercial, and management strategies.

6.3 Project Planning

Table 6-2 below presents the baseline programme as at August 2023 and illustrates the key milestones/decision points in respect of the project. It should be noted that various programme activities regularly change and for this reason the whole programme will be re-baselined at the FBC stage.



ActivityDesign & Build ContractAward StartDetail Design EndWinter 2026Haul Road ConstructionSummer 2025 to Winter 2026Station Construction Start2026Station Construction End2027

Table 6-2 Master Headline Programme

RNEP

The project will go through five key stages similar to those that go through the RNEP process. The RNEP process includes five key stages separated by formal investment decision gateways or approvals, and it is envisaged the scheme will follow this process and will include associated assurance requirements. The first three decision points, "Decision to Develop", "Decision to Design" and "Decision to Deliver" reflect the key investment decision gateways. The final decision point, "Acceptance" focuses on the outcome of delivery (Stage 4) and the transfer of the project to deployment or operation. This project is currently at RNEP Stage 2 and is seeking a 'Decision to Design'.



Figure 19 RNEP

To facilitate the potential for the Waterbeach rail scheme to pass through the 'Decision to Design' decision point, this OBC demonstrates:

• A clear description of benefit for rail users, linked directly back to the Government's priorities for rail. This requirement is met through the Strategic & Economic Dimensions, which identify the benefits to rail users, both qualitatively and in quantitative terms.



- A clear plan of action for the "Design" stage for instance, each dimension includes commentary on next steps.
- A capital cost for the project, were it to progress to completion. Capital and operating costs are included within the Financial Dimension.
- Assurance that other transport solutions and interventions have been considered.
- That rail demand has been considered –demand modelling and appraisal outcomes are reported in the Economic Dimension.

PACE & Network Rail Assurance

As Waterbeach is a railway project and the asset will ultimately transfer to Network Rail, the scheme is being project managed in accordance with Network Rail's PACE standard NR/L2/P3M/201. This is a process that features built in processes for checking and assuring progress, including sign-offs and Gateway reviews. The PACE process is a recent new tool that allows Rail Project Managers to adapt their approach, make decisions that best meet the needs of the project, overlay phases and define a single viable option more quickly while mainlining rigour.

Network Rail's PACE standard divides a rail enhancement project into five phases. It provides a flexible delivery framework which Sponsors must use to ensure the arrangements for their projects are fit for purpose. This provides increased focus on client/funder requirements by getting the right balance of time, cost and scope of work. The five phases are:

- 1. Project initiation
- 2. Development and project selection
- 3. Project design
- 4. Project delivery
- 5. Project close

PACE has a readiness review process to provide an assurance that a project is not proceeding "at risk" when it moves into the next phase. The requirements for this review are determined by the required Level of Control (LoC) which is determined from the risk-based assessment that takes account of issues such as project novelty, technology and design complexity, and operational impact. The various phases of the PACE process are aligned with development of the business case. This OBC has been developed to be in line with PACE phase 2 requirements.

Programme/Project Dependencies

The Waterbeach New Station project is a stand-alone project with few programme or project dependencies. Apart from integration with Network Rail's track and signalling infrastructure, there are no other dependencies as the station itself can be constructed in a safe and secure manner without affecting the operational railway.



There are several elements that will need to be considered as part of the delivery of the new station, elements such as:

- **Planning Approval** A Schedule of Conditions will need to be managed prior to the opening of the new station.
- **Anglian Water Planning Application** an interfacing project that proposes to install new waste-water treatment plant within the new station's boundary.
- **Cambridge Area Re-signalling by Network Rail** an interfacing railway programme of work that is being designed and constructed around the same as the new station. The key areas of risk are around sharing designs and coordinating track access opportunities.
- Engineering Track Access the construction of the new station's platforms and footbridge close to the operational railway will require the installation of pile foundations, and this can only be done during a period when no trains are running. Early dialogue with Network Rail's Track Access Planning Team will be important for booking the important track access, not only for the delivery of the station, but also important surveys required to support detail design.
- **Station Closure** authority from DfT will be sought by Cambridge County Council to commence a Closure process as set out in section 41 of the Railways Act 1993.
- **GCP Governance / Assurance etc –** as the project is governed by GCP's Programme Board, there will be a number of assurance reviews required and which will all support the Executive Board in granting funding for the scheme.
- Waterbeach Development Company/ Royal London Waterbeach (RLW) Waterbeach New Town East.
- Urban and Civic (U&C) Waterbeach New Town West.
- Anglian Water New pipeline and pumping station.

Lessons Learned

As detailed in the above Section 6.3 regarding the adoption of the PACE project management process, this will create an opportunity for collaborative and integrated working with Network Rail to streamline the next detail design and delivery stages of the project. The team will explore areas with Network Rail where PACE processes and lessons learned on other relevant schemes can be utilised to reduce costs, timeframes, and risks for Waterbeach plus the opportunity for Network Rail to secure possessions more efficiently and leverage internal knowledge of other planned works along the railway route to optimise delivery pathways that require specialist supply chain capacity and resource, which could reduce activity timeframes and improve programme robustness.



In line with GCP's Governance-Assurance-Framework-2022, the Executive Board will prepare and publish a periodic programme evaluation update that will summarise the evaluation of its various individual schemes. As part of this the Executive Board will consider the performance of the Waterbeach New Station, identify key scheme issues and review the success of the evaluation process. Through this the Executive Board will identify and share best practice to ensure ongoing monitoring and evaluation is efficient and effective, and that key lessons are used to inform scheme development and assessment.

6.4 Stakeholder Engagement & Communications

A full stakeholder plan is provided in Appendix H. This plan outlines the processes involved in communicating and working with stakeholders to meet their needs, manage expectations and deal with issues as they arise. This process allows the project team to engender greater support and minimise resistance and therefore work towards a successful project outcome.

6.5 Risk & Issues Management

The standard risk management process employed on this project is:

- Planning;
- Identification;
- Assessment;
- Evaluation; and
- Treatment.

The remainder of this section will take each of these processes in turn and describe how they have been undertaken on the project.

Planning

The scheme's Project Manager is responsible for planning the risk management process. This was defined at project inception and is in line with the GCP Governance structure. Risks are identified and captured at a project level and escalated through the Governance structure to the Transport Programme Board and the Executive Board as required. Projects across the GCP portfolio use the same risk template for consistency. Within the register, risks are quantified in accordance with their likelihood and impact on cost and project duration. There are nine types of risk:

- 1. Governance;
- 2. Consultation/communications;
- 3. Design;
- 4. Stakeholders;



- 5. Project funding;
- 6. Project scope;
- 7. Scheme development;
- 8. Statutory processes; and
- 9. Supply chain issues.

The Waterbeach new station scheme risk register template was set up at the project inception and is owned by the consultant project manager.

Identification

It is the responsibility of all project team members to identify and report risks throughout the project lifecycle, whether that be on project team calls, through Project Management workshops or whilst undertaking technical work.

All project risks are captured within the project risk register. It is the responsibility of the client and consultant project manager to ensure the risk register is up to date by allowing technical teams the time and opportunity to raise risk items that need to be added. To date on the Waterbeach new station scheme this has been done at bi-weekly technical project team meetings and weekly Project Management meetings.

A wholesale review of the project risk register was undertaken in January 2023 as part of the OBC Stage, which is the basis of the QCRA and current project risk contingency value of £5.9m. The risk register update recognised that the scheme had progressed and was commensurate with the project stage and level of scheme development.

At the workshop, existing risks were reviewed and new risks added. Specific risks were identified by discipline leads using their knowledge of the project stage and experience of similar projects. The second review was undertaken independently by discipline leads and culminated in a QCRA workshop (see Evaluation).

Assessment

Risks are assessed in terms of their likelihood and impact. Impact is assessment based on the likely time and/or cost effect if the risk comes to fruition. Finally, the impact is classified as effecting the 'start of works date' i.e., the risk impacts the planning stage of the project. Or the 'end of works date, i.e., the risk impacts the construction phase of the project.

Impact is assessed on a scale from 1 - 5. A score of 1 means that the impact is negligible and therefore has no impact on programme, minimal inconvenience to the end user, no environmental impact, no reputation impact, or little to no financial loss. A score of 5 means that the risk impact is catastrophic and therefore results in huge programme delay, critical disruption to front line services, customers badly impacted, serious environmental or reputational damage, risk of legal challenge and huge financial impact.



Likelihood is also assessed on a five-point scale, from 1 (very low likelihood) to 5 (very high likelihood). The average of the impact and likelihood score provides an overall risk score.

The assessment of risks is undertaken by the person or team who has identified the risk. This is then verified during the risk workshop. New risks are assessed and verified by the wider project team and existing risks are revisited to understand whether the impact or likelihood has changed as the project has progressed. Risks are also re-assessed following the identification of mitigation measures and actions (see Treatment) to provide a residual risk rating.

Evaluation

The risk register has been subject to a QCRA which consists of the following steps:

- Estimating the minimum, likely and maximum impact of the risk on time and cost;
- Verifying the estimates of time and cost impacts with the project team at a workshop;
- Undertaking an estimating uncertainty assessment to understand the uncertainty attached to project cost assumptions, commensurate with the stage of the project; and
- Undertaking Monte Carlo model to assesses the risk register to provide the QCRA. The overall QCRA value is then considered in the Economic Appraisal.

Treatment

A mitigation measure and subsequent action is identified for each risk, and the actions allocated an owner. Mitigation measures are identified at the 'identification' stage and revisited as the risks are assessed to understand the impact of the mitigation and to assign actions. Mitigation measures often lead to the identification of additional work required, engagement with stakeholders necessary or additional assessments to be factored into future stages of the project. These measures could then become project changes and follow the governance arrangements for reporting and capturing change as identified in section 6.3.

Continual review

The risk register will continue to be monitored and, if necessary, updated at regular workshops and meetings. Roles, responsibilities, and reporting lines for risk management are clearly defined within the project team, with the client Project Manager and consultant Project Manager responsible for regularly reviewing the register, and discipline leads required to provide update as new risks are identified or existing risks changed. As such the risk and issues management procedure detailed in the LAF will be followed. This will include a highlight report being provided to the client project manager and the implementation of mitigation measures if required.

Risks are already being mitigated, where possible, through early engagement with key stakeholders, technical experts, and project teams on those projects which the Waterbeach new station scheme has dependencies.



A summary of the most significant risks (in terms of impact) is shown in Table 6-3. These were contained in the project risk register that was last subject to a QCRA in January 2023 and is attached in Appendix D. It should be noted the next results of the next QCRA will be included in the FBC.

Risk Name	Description	Cause	Impact	Mitigation
Design Maturity	Estimating uncertainty due to the level of design, i.e. outline design, bio-diversity net gain issues	Current AFC Cost Plan is out-of- date and does not contain all likely project costs. Estimating uncertainty.	Increase to Project AFC	AFC is to re-baselined at following completion of 'Single Option Development'; Then again at the end of ES4 with approved ES4 designs.
External Stakeholders	Interfacing Projects/ Maintenance works for NR Signalling works (C3R)	Programme Delay caused by Interfacing with other projects, i.e, NR's C3R re- signalling programme.	Changes to the infrastructure due to enhancement projects/ maintenance activity may impact the design leading to redesign/ additional cost/ programme delay. Possession impacts	Coordination via NR's ASPRO team. Also engagement with C3R project to mitigate interface risks, use updated C3R detailed design to develop station design further.
Environmental	Impact to price and programme due to protected species found on site.	Presence of protected species detected on site.	Delay to works on started on site. Translocation required leading to additional cost and delay. Permits required etc	Ecology survey planned at the earliest survey window opportunity (early 2024).
Project Management	Station Closure process causes a programme delay	Risk is that DfT does not accept the station closure notice	Delay to the station closure process and public consultations	NR & DfT have agreed to manage the process.
Design	Additional land is required to be purchased for the Secondary Means of Escape Route.	Existing Network Rail Standard implies an escape route along track side will be required, thus needing land purchase.	Resulting in cost implications.	Confidence that Network Rail will reissue its Fire Strategy that will allow the designer to avoid land purchase as part of the SME design.

Table 6-3 Principal Risks



The above Risk Management Process is compliant with the requirements of Network Rail's PACE process and the Common Safety Method (CSM) required under European and UK Law.

It is separately noted that a HAZID (Hazard Identification) register has been developed. HAZID is a workshop based qualitative risk analysis technique used by the Project Team for the identification of potential hazards and threats in a process. This process complements the qualitative risk register, and future QCRA and QSRA processes.

6.6 Benefits Realisation Plan

The Benefits Realisation Plan identifies the outputs and outcomes that the project is intended to deliver in order that data can be captured to monitor the scheme's performance against those anticipated outcome deliverables. The owner of the Benefits Realisation Plan is the Project/Programme Manager and will take responsibility for its execution and the successful delivery of the project outputs.

The process follows HM Treasury's Magenta Book guidance which involves the development of a Theory of Change Logic Map. The structure tracks the development of the scheme from initial problem identification through objectives, inputs, outputs, outcomes and longer-term impacts. The scheme's logic map is brought forward and reproduced here from the Strategic Dimension earlier in this OBC.



Figure 20 Logic Map for Benefits Realisation Plan



A monitoring and evaluation plan has been developed in partnership with GCP and with the guidance and expertise of Centre for Cities. Baseline data has been identified and will be supplemented by primary data (passenger surveys) collected as part of the station closure process for Waterbeach station. Going forward, the majority of data needed to monitor the project's effectiveness against its objectives is available as secondary data thus avoiding the need for expensive market research. The full M&E plan is included in Appendix E.

6.7 Data and Information Security

To ensure that data and information is secure during and after the project has been delivered, GCP relies on CCC to provide IT and systems which include processes for the protection of critical systems, digital assets and commercially sensitive data.

6.8 Carbon Management

As part of the current outline (ES4) design stage, the designer, WSP, has held sustainability workshops to identify areas for reducing carbon emissions. A carbon assessment has been developed and will be further developed during the subsequent stages.

6.9 Biodiversity Net Gains (BNG)

Cambridgeshire County Council has commissioned WSP to complete a baseline Biodiversity Net Gain (BNG) Assessment for the proposed Waterbeach station site. This assessment will inform the design phase, including the retention of biodiverse habitats where possible and will identify the areas of most valuable habitat for biodiversity which should be avoided where possible. A Full BNG assessment will then be undertaken at the next design phase to assess if the design will achieve BNG both in line with the BNG Good Practice Principles.

6.10 Summary

As funder and promoter of the scheme, GCP and its specialist rail advisor, SLC, have the relevant experience to ensure the project is designed and delivered at the most efficient economic cost and in accordance with applicable standards. Project risks are no greater than a rail project of similar size and cost and although the project is deemed as 'significant' in safety terms there are no novel or unusual design or construction techniques being proposed.

A comprehensive governance structure has been described in this OBC, which will be implemented going forward with pro-active leadership from GCP to oversee the safe, timely, cost-effective delivery of the station scheme. Furthermore, there is widespread regional and rail industry stakeholder support, which will be important to achieve the key programme milestones of Executive Board approval to appoint a design and build contractor in late 2024 to facilitate a station operational date in 2027.



6.11 Next Steps

At the next FBC stage, the following will be detailed and made available to Executive Board for approval to fund the Waterbeach station proposal:

- A baselined programme
- Confirmation of the anticipated final cost
- A value engineered approved outline design pack
- Confirmed route to assurance,
- Confirmed procurement strategy
- Confirmed stakeholder management plan.,



List of Appendices

Appendix A – GRIP 3A Optioneering Report, June 2018 (WSP)

- **Appendix B** Requirement Schedule (SLC)
- Appendix C Capital Cost Estimate, May 2023 (SLC)
- **Appendix D** Quantitative Cost Risk Analysis (SLC)
- **Appendix E** Monitoring and Evaluation Plan (SLC)
- **Appendix F** Project Execution Plan (SLC)
- **Appendix G** Master Programme (SLC)
- Appendix H Stakeholder Management Plan (SLC)
- **Appendix J** Procurement Strategy (SLC)