

Annex A (to Appendix B): WLTB Business Case Pro-Forma for Non-Major Schemes

Note

Non-Major Local Transport Schemes are those with a cost of less than £5m or greater. For these schemes there are two stages of assessment:-

1. Outline Business Case (to determine whether the scheme is a candidate for funding)
2. Full Approval Business Case – the key decision to confirm that the business case for the scheme is sound and to confirm the principle that it will be funded.

This pro-forma is to be used for the Full business case.

January 2016

STRATEGIC CASE

Kepax Bridge

September 2020 (costs and programme updated March 2021)

Case for Change

Summary of Strategic Case

Worcestershire County Council (WCC) is working in partnership with Worcester City Council in the delivery of a new pedestrian and cycle bridge across the River Severn in Worcester from Gheluvelt Park to the Kepax site in St Johns.

The scheme comprises of a number of improvements to the network, split into two phases. Phase 1 incorporates construction a new bridge river crossing (see figure below, plus appended Layout Plan), as well as direct access via:

- A new access path provided over the Kepax landfill site; and,
- Connection to the existing NCN46 in Gheluvelt Park.

Phase 2 incorporates wider active mode links as part of a holistic walking and cycling strategy for Worcester, and could include the following upgrades:

- Improvements to the existing Severn Way path to the south of the bridge.
- Improvements to a route to the east of the river from Gheluvelt Park to the City Centre.
- Providing pedestrian/cycle links from the bridge to the National Cycle Network, route 45.

The scheme will open up the opportunity for people to walk and cycle much more quickly between the Henwick Park area (and further afield like Hallow\Broadheath) on the west and Barbourne, Claines and associated areas in the east. In addition, improvements to the existing adjoining walking and cycling network will connect residents to wider leisure, employment and education opportunities via the National Cycle Network.

A step change in the levels of walking and cycling in North Worcester will be facilitated and opportunities for riverside leisure walks and access to a Green Flag Park will be enhanced. Improved leisure and tourism opportunities will increase visitor spending in the area and expand the number of jobs offered in this sector.

The scheme will encourage the use of active modes for journeys around the city generally. This mode shift will result in improved health and wellbeing, reduced levels of congestion and improved safety and air quality. As a result, it is expected that the scheme will help to resolve the following range of accessibility and transport-related problems affecting North Worcester and Worcester more generally:

- Congestion: The River Severn constrains east/west movements through Worcester and south Worcestershire and is a significant contributor to congestion, particularly in the city centre. Relieving congestion is a key priority for Worcester. As well as the physical barrier of the River Severn, congestion can be partially attributed to the high levels of car dependency in Worcester, and particularly in north Worcester where it is higher than the national

average. In addition, the Worcestershire Local Transport Plan (LTP) 4 notes that car usage, particularly for shorter trips of up to 3 miles, is at the highest it has ever been. The scheme will provide an alternative option for crossing the River Severn and promote an increase in walking and cycling for commuting and other purposes, reducing the number of vehicular trips on the network and dependency on car travel.

Area	Cycling to work (%)	Walking to work (%)	Driving or passenger in car
Worcestershire	2%	10%	80%
Worcester City	4%	17%	70%
North Worcester	5%	12%	75%
England	3%	11%	66%

Walking and cycling to work in Worcestershire (Source: 2011 census)

- Connectivity:** The River Severn acts as a barrier to movements in an east-west direction across Worcester. Provision of a pedestrian and cycle bridge would encourage existing car journeys to switch modes to sustainable options. For residents in North Worcester, the nearest existing pedestrian crossing of the River Severn is Sabrina Bridge approximately 1 mile south of the proposed location of the scheme and the nearest northern river crossing is at Holt Fleet approximately 5 miles away. The scheme will reduce the severance impacting north Worcester’s communities. The scheme will also help to connect residents in the north of Worcester to destinations such as the city centre and University.
- Resilience:** Some of Worcester lies within the floodplain of the River Severn, with many riverside roads and walks experiencing flooding on an annual basis. Major flood events impacted the transport network in early 2020 and in 2007 (the estimated economic impact of which was £6.4 million per week). Also, existing footpaths in proximity to the River Severn and the proposed scheme location are susceptible to flooding; the scheme will offer alternative routes and improve resilience of the network. The scheme will provide additional river crossing and wider improvements to walking and cycle links in the north of Worcester offering alternative transport routes and improve resilience of the wider network. Further, the scheme will support efforts to make Worcester’s economy more resilient, providing an additional route to link employment (east) and residential (east and west) areas across the River Severn.
- Air Quality:** Poor air quality is outlined as a priority within the Healthy Worcester Plan, which outlines that *“modelled estimates showed that in 2018, 31% of males and females and 33% of males and females in Worcester city live in areas of high levels of fine particulate matter (PM2.5) and NO2”*. Kepax Bridge will encourage residents to switch journeys to walking and cycling, thus reducing car journeys and improving air quality within Worcester.
- Health:** Within Worcester, the percentage of physically active children and young people is lower than the national and regional average. The scheme will promote healthier lifestyles by encouraging walking and cycling activity. Further, safety for cyclists and pedestrians will

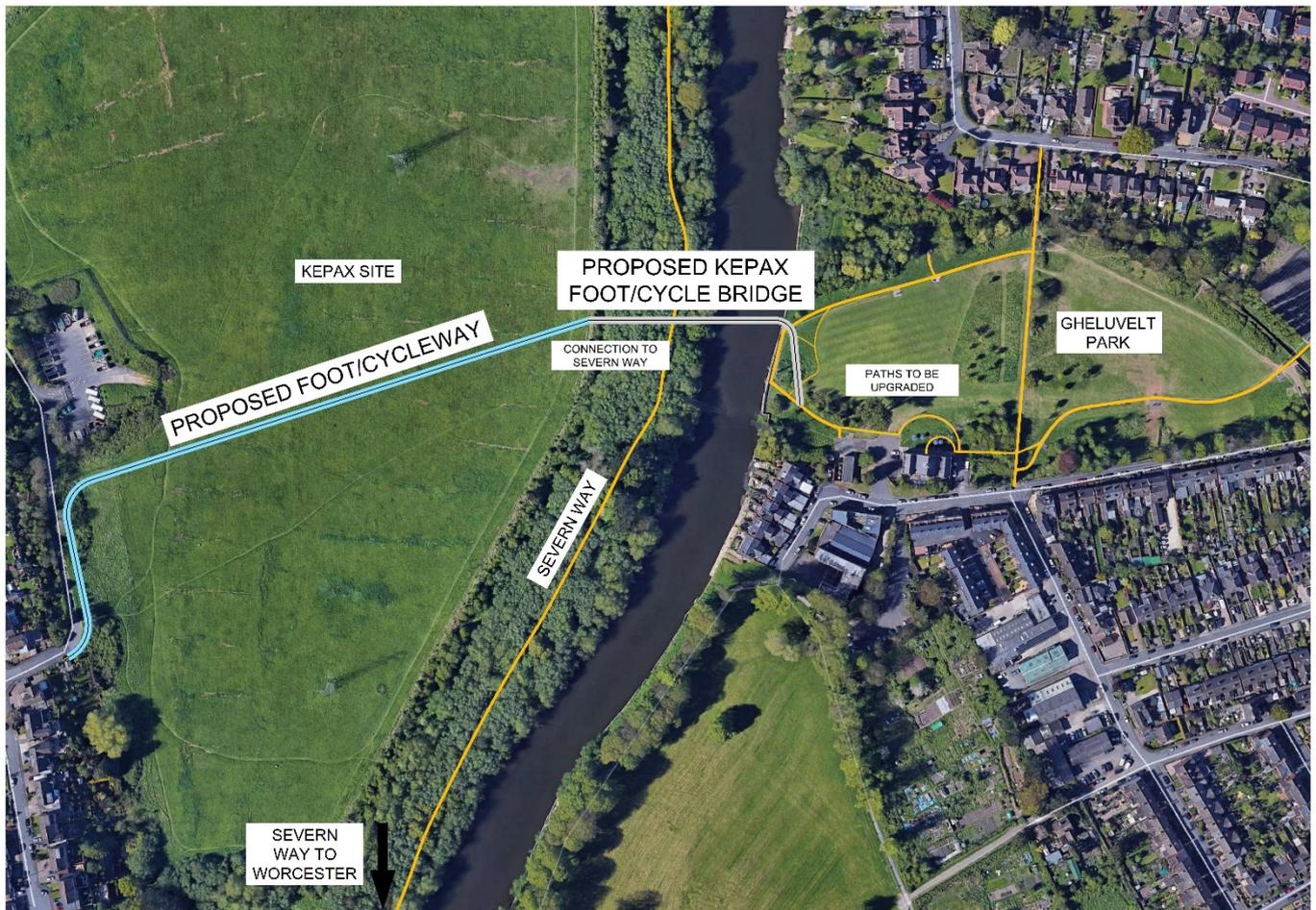
be enhanced through provision of a new off-road bridge and improvements to existing links

- Access to Open Space: The riverside is an important area of leisure and tourism for Worcester. There has been investment in South Worcester around Diglis but the South Worcestershire Open Space Assessment outlines a deficiency of parks and recreation space on the west of the river in North Worcester. The scheme will increase accessibility to key assets such as Gheluvelt Park, helping to resolve these deficiencies. Residents would be linked with the open green spaces, including green fields to the west and Gheluvelt Park which is a Green Flag Park and War Memorial. Further, the riverside is an important area of leisure and tourism for Worcester – there has been investment to the south due to Diglis and surrounds but now there is a need for focus to shift to the northern area of Worcester.

In light of the issues and potential impacts of a scheme as outlined above, the provision of an additional pedestrian and cycling crossing point across the River Severn in North Worcester could go a significant way to resolving long-standing challenges facing Worcester's transport network. An Options Assessment exercise was undertaken to determine the different routes to resolve such issues. A number of options were considered as part of the scheme development and full details are presented in the Options Assessment Report, included as Appendix A. In summary, the Options Assessment for the scheme included the following stages:

- High level optioneering which considered whether a bridge or ferry would be most suitable. A ferry was discounted for a number of reasons, including: ease of access, seasonal and time restrictions to the service, payment at point of use, the need to carry cycles/pushchairs and difficulty with finding an appropriate location on the riverside.
- As part of the Kepax Bridge Pre-Feasibility Study, two locations for the bridge were then considered: Gheluvelt Park /Kepax site and Northwick. Gheluvelt Park was chosen as it was found to comprise the least design and construction constraints and can be easily tied into the existing footpath network.
- As part of the bridge optioneering process, a number of structures were considered in detail for the bridge, including cable stayed, truss and tied arch bridges, and a cabled stayed bridge was ultimately selected as the most appropriate solution for the scheme.
- For the purpose of Phase 2 of the scheme, a number of alignments for access paths and wider links were considered, with four options ultimately recommended for inclusion in the scheme design based on cost, directness of route, ability to leverage existing infrastructure (including the National Cycling Network, NCN).

The selected bridge was progressed and subject to Public Information Exercise in July 2020. This solution forms the basis of the latest cost estimate and, therefore, appraisal in the economic case. This preferred scheme, which relates to Phase 1 only, is presented in the figure below and Appendix B.



The scheme will interact with existing and planned investments in Worcester’s active travel and open space networks. It will facilitate improvements to several ‘pinch points’ on the existing active travel network, for example crossing the Barbourne Road between Gheluvelt Park and the canal network. The scheme will connect residents to the Regional and National Cycle Network for longer distance journeys. Further, the scheme will form a critical part of two Strategic Active Travel Corridors outlined in LTP4 SWAT12 (Worcester North East – North West Active Travel Corridor) and SWAT13 (Worcester River Severn Active Travel Corridor).

The scheme will also enhance accessibility to two of Worcester’s key open spaces: Gheluvelt Park and Riverside Park. The proposed scheme will connect to the East bank of the River Severn in Gheluvelt Park, realising the Gheluvelt Park Management Plan’s *“aspiration to build a new pedestrian bridge between Kepax Park and Gheluvelt Park”*. Further, the Worcester Riverside Park Management Plan recommends development of Kepax Bridge to *“encourage greater use of the parks by enabling circular routes along the Riverside, Gheluvelt and Cripplegate parks”*. In effect, Kepax Bridge will enable a riverside loop (via Sabrina or Diglis bridges) through use of existing paths.

In addition to the explicit alignment of the scheme with Worcester’s open space and active travel agendas as outlined above, Kepax Bridge is well-aligned with local, sub-regional and wider strategies for transport, sustainability and public health:

- The scheme is recommended in both the South Worcestershire Development Plan (SWDP, 2016) and Local Transport Plan 4 (LTP4, 2017).

- The scheme is also included within the Worcestershire Strategic Economic Plan in relation to supporting development in West Worcester and removing a barrier over the River Severn.
- The Worcester City Plan (2016 – 2021) identifies the need for *“increasing opportunities to walk, run and cycle alongside and across the river”* and suggests that *“the building of a new bridge linking Gheluvelt and Kepax parks”* could support this objective.
- Shaping Worcestershire's Future: Corporate Plan 2017 – 2022 outlines the Council’s core priorities: open for business, environment, families and children and health and wellbeing. By improving accessibility across Worcester and providing more direct links to places of employment, leisure/recreation and education and by encouraging physical activity in the form of walking and cycling, the scheme is fully aligned with all four priority areas specified in the corporate plan.
- The South Worcester Open Space Assessment, a Community and Stakeholder Consultation demonstrated that better footpaths, bridleway and cyclepath provision was the highest priority open space intervention demanded by Worcester’s residents; suggesting latent demand for active mode travel if infrastructure such as Kepax Bridge is provided.
- Worcestershire’s Joint Health and Well-being Strategy identifies *“being active at every age”* as one of its main priorities; not least because at least a third of people in Worcestershire do not meet the recommended guidelines for being physical active. Kepax Bridge will encourage uptake of walking and cycling and provide better connectivity to open space assets in Worcester, providing a twin boost to encouraging healthier, more active lifestyles.
- The Healthy Worcester Plan seeks to tackle priorities include poor air quality and access to community assets. The scheme will support the city council in providing leisure services and access to high-quality green spaces.

At a national level, the National Planning Policy Framework (NPPF), strongly requires investment in walking and cycling, insisting that Local Authorities must promote healthy and safe environments, specifically by *“layouts that encourage walking and cycling”*. Opportunities to promote walking must be prioritised; and investing in cycling and providing travel mode choice reduces congestion, improves air quality and benefits public health. The proposed scheme is consistent with these principles.

Objectives and Outputs

In light of the background and context established above, the objectives for the scheme are as follows:

- Minimise the impact of any new infrastructure on the natural environment and ecology and, where possible, deliver opportunities for environmental enhancement.
- Bridge and access paths to be designed to standard, with the safety and security of all users being a key priority throughout the design process. The bridge, ramps and access paths are to be accessible to all.
- To improve connectivity within Worcester by foot and cycle, thus improving the physical health and wellbeing of north Worcester residents, employees and visitors.
- Provision of a direct route for short journeys over the river and to provide a link into the wider network for longer trips. This will improve access to jobs, services and leisure activities.
- Provide an alternative walk and cycle link over the river thus increasing transport resilience.
- Increase visitor numbers to Worcester, through the provision of new walking and cycling infrastructure including a riverside leisure 'loop', resulting in additional visitor spend and increased visitor economy jobs.
- Contribute to improving the public realm and public spaces around the bridge and help to activate these areas.

Objective 1	Minimise the impact of any new infrastructure on the natural environment and ecology and, where possible, deliver opportunities for environmental enhancement.
Measure of Success	Scheme granted planning permission, in liaison with statutory environmental bodies.
Timescale	To align with planning application submission and monitoring
Indicators	Environmental indicators in line with impacts/mitigation
Dependencies, Risks, Constraints	Formal section of Gheluvelt Park is a designated war memorial and grade 2 listed Kepax is currently disused landfill site
Objective 2	Bridge and access paths to be designed to standard, with the safety and security of all users being a key priority throughout the design process. The bridge, ramps and access paths are to be accessible to all.
Measure of Success	Scheme granted planning permission, in liaison with statutory bodies such as WCC Highways and Police.
Timescale	To align with planning application submission and monitoring Also, one and five years after opening
Indicators	Intercept surveys – to determine perception of safety and security, crime statistics
Dependencies, Risks, Constraints	Presence of hazardous water warning sign near proposed scheme landfall location on east bank of River Severn (Gheluvelt Park). Further investigation required. Kepax is currently a disused landfill site

Objective 3	To improve connectivity within Worcester by foot and cycle, thus improving the physical health and wellbeing of North Worcester residents, employees and visitors.
Measure of Success	Provision of a new pedestrian and cycle river crossing Connection to wider links within Worcester, including NCN and RCN
Timescale	One and five years after opening
Indicators	Pedestrian and cycle count data Intercept surveys – to determine journey origin and destination
Dependencies, Risks, Constraints	A number of schemes presented in LTP4, including Active Travel Corridors to promote walking and cycling. Wider improvements to infrastructure and services for walking and cycling.
Objective 4	Provision of a direct route for short journeys over the river and to provide a link into the wider network. This will improve access to jobs, services and leisure activities.
Measure of Success	Provision of a new pedestrian and cycle river crossing Connection to wider links within Worcester, including NCN and RCN
Timescale	One and five years after opening
Indicators	Pedestrian and cycle count data Intercept surveys – to determine journey origin and destination
Dependencies, Risks, Constraints	A number of schemes presented in LTP4, including Active Travel Corridors to promote walking and cycling. Wider improvements to infrastructure and services for walking and cycling.
Objective 5	Provide an alternative walk and cycle link over the river thus increasing transport resilience.
Measure of Success	Provision of a new pedestrian and cycle river crossing Connection to wider links within Worcester, including NCN and RCN
Timescale	One and five years after opening
Indicators	Pedestrian and cycle count data Intercept surveys – to determine journey origin and destination
Dependencies, Risks, Constraints	A number of schemes presented in LTP4, including Active Travel Corridors to promote walking and cycling. Wider improvements to infrastructure and services for walking and cycling.
Objective 6	Increase visitor numbers to Worcester, through the provision of new walking and cycling infrastructure including a riverside leisure 'loop', resulting in additional visitor spend and increased visitor economy jobs.
Measure of Success	Provision of a new pedestrian and cycle river crossing Connection to wider links within Worcester, including NCN and RCN Connection to the Severn Way and the riverside (creation of a 'riverside loop')
Timescale	One and five years after opening
Indicators	Intercept surveys – to determine journey origin and destination Worcestershire tourism data
Dependencies, Risks, Constraints	Gheluvelt and Riverside Park Management Plans Wider improvements to infrastructure and services for walking and cycling. Worcester City Centre Masterplan, including enhanced routes along the river.
Objective 7	Contribute to improving the public realm and public spaces around the bridge and help to activate these areas.
Measure of Success	Improvements to Gheluvelt Park Improvements to Kepax site
Timescale	One and five years after opening
Indicators	Intercept surveys – to determine perception of public spaces Gheluvelt and Riverside Parks Management Strategy monitoring – visitor numbers
Dependencies, Risks, Constraints	Gheluvelt and Riverside Park Management Plans Worcester City Centre Masterplan, including enhanced routes along the river.

The following table outlines how the scheme's objectives (numbered as per the tables above) address the problems identified and align with the Worcester's strategic aims.

Problems	Scheme Objective	Organisation's Objective	Contribution of Scheme Proposal
Congestion	4	<p>WLEP SEP: Create a World Class business location</p> <p>WLEP SEP: Provide individuals with World Class skills</p> <p>LTP: To support Worcestershire's economic competitiveness and growth through delivering a safe, reliable and efficient transport network.</p> <p>LTP: To contribute towards better safety, security, health and longer life expectancy in Worcestershire, by reducing the risk of death, injury or illness arising from transport and promoting healthy modes of travel.</p> <p>LTP: To optimise equality of opportunity for all of Worcestershire's citizens with the desired outcome of creating a fairer society.</p> <p>SWDP: Economic Success that is Shared By All</p>	By providing more opportunities for walking and cycling travel east/west across the River Severn, the scheme will improve reduce pressure on the highway network, resulting in increased economic competitiveness, contribute to safer and healthier travel and provide greater equality of opportunity for travel. A more reliable and efficient transport network will improve perceptions of Worcester as a business and residential location, supporting the drive for economic prosperity.
Connectivity	3, 4	<p>As per 'congestion' plus:</p> <p>LTP: To enhance the quality of life for Worcestershire's residents by promoting a healthy, natural environment, for people, wildlife and habitats, conserving our historic built environment and preserving our heritage assets.</p> <p>SWDP: Stronger Communities</p> <p>SWDP: A Better Environment for Today and Tomorrow</p> <p>SWDP: Improving Health and Well-being</p>	By providing more opportunities for walking and cycling travel east/west across the River Severn, the scheme will support strong communities, a healthy natural environment and improve public health and wellbeing.
Resilience	3, 4, 5	As per 'connectivity'.	An additional east/west link across the River Severn supports the resiliency of Worcester's transport network.
Air Quality	4	As per 'congestion'.	Mode shift from car to walking/cycling will improve air quality, contributing to enhanced public health, reduced risk of premature death and longer life expectancy
Health	2, 3	As per 'connectivity'	Increased walking and cycling will increase physical activity, contribute to healthier lifestyles and therefore enhance public health, reduced risk of premature death and longer life expectancy
Access to Open Space	1, 4, 6, 7	As per 'congestion', plus LTP: To limit the impacts of transport in Worcestershire on the local environment	The scheme will facilitate use of Gheluvelt Park and enhance Worcester Riverside Park.

The scheme does not directly unlock any development in the form of residential units or employment floorspace. However, by providing improved and sustainable transport infrastructure, the scheme could improve perceptions of Worcester as a place to live, work and visit, thus indirectly contributing to increased demand for housing and employment in the area.

Delivery of Development	Houses	Jobs / Employment Floor Space	Retail Floor Space
Development delivered / unlocked by scheme	N/A	N/A	N/A
Development that scheme would contribute to delivering	N/A	N/A	N/A

Stakeholders

The scheme has been the subject of engagement with key stakeholders which has informed the overall design and this planning submission. In general, stakeholders have been supportive of the proposals and the applicant has worked to reduce the impacts of the scheme whilst working within constraints of the site. The key findings of the stakeholder engagement exercise are as follows:

- WCC Planning Officers: No significant issues were raised
- Worcester City Council Street Scene: No significant issues were raised
- Duckworth Worcestershire Trust: Additional cycle parking and a shelter will be provided close to the Pumphouse in response to discussion with the Trust.
- Canal and River Trust: The requirements for the bridge deck soffit level were considered no more onerous than the level stated in the screening opinion.
- Friends of Gheluvelt Park: Supportive of the bridge overall. Following feedback, additional cycle parking and a shelter will be provided close to the Pumphouse.
- Severn Waste: Requested ongoing liaison regarding delivery of materials to site to reduce disruption. Discussion also led to inclusion of fencing between the pedestrian and the recycling centre access road and the gate at the top of access path close to the junction of Horsford Road and Riverview Close is retained.
- Cycling UK and Ramblers: Expressed surprise that the project was being given priority over Active Travel Corridors listed in LTP4; however, these schemes are being progressed separately, and in parallel to this project. Further, in line with expectations, the bridge, ramp and access paths have all been designed to standard and are a minimum of 3.5 metres wide, with no barriers for cyclists (similar to Diglis Bridge). This width should be adequate to accommodate slightly larger vehicles such as electric bikes. To meet expectations regarding wider links, an additional shared footpath and cycle path is to be provided between the bridge ramp and NCN 46. Further options for improvements for active mode infrastructure around Barbourne Road are currently being progressed outside of this scheme.

A Public Information Exercise was also undertaken via online and face-to-face events. This exercise demonstrated that the scheme has the support of the local community, with 79% of respondents supporting the scheme and a further 12% commenting but not objecting. The most common comments made by respondents are summarised in the table below:

Comment	Number
Concerns that the bridge might exacerbate/cause parking problems.	38
It is important that walking and cycling links to and from the bridge are improved.	33
Concerns about potential impact on the environment/wildlife.	26
Concerns about anti-social behaviour/security.	24
The money should be spent on something else.	24
Comments on the design of the bridge.	12
Other comments referenced the need for litter/dog waste bins, concern re “overlooking”, observations re flood risk, design and suggestions that there is insufficient demand for another footbridge. There were further miscellaneous comments.	No more than 5 people submitted comments for each of this type.

In response to these comments, WCC are of the view that parking issues are not expected to worsen on either side of the river due to the scheme. Following implementation of the scheme, WCC will monitor parking on residential streets on either side of the river and implement measures if deemed necessary.

Wider links to the bridge on either side of the river have been considered for improvement and those which will be progressed are included in the scheme proposals.

Impacts on the environment and wildlife have been considered and details are included in the Environmental Assessment Report (for further information refer to the EAR documentation included in planning application for Kepax Bridge on the planning portal; www.worcestershire.gov.uk/eplanning_reference_20/000035/REG3).

WCC is aware of issues with antisocial behaviour and has liaised with the police but there is no reason to believe that this will increase. Ecologically sensitive lighting will be provided as part of the scheme, and where appropriate fencing will be provided between residents’ properties and the access path. It is considered that nearly all further comments are considered within the supporting planning application (see link to planning portal above), which is comprehensive and includes a landscape and visual assessment, flood risk assessment and drainage strategy.

WCC will continue to work with the relevant WCC departments, the adjoining landowners, and consultees to ensure that their requirements continue to be met as far as possible.

ECONOMIC CASE

Kepax Bridge

September 2020 (costs and programme updated March 2021)

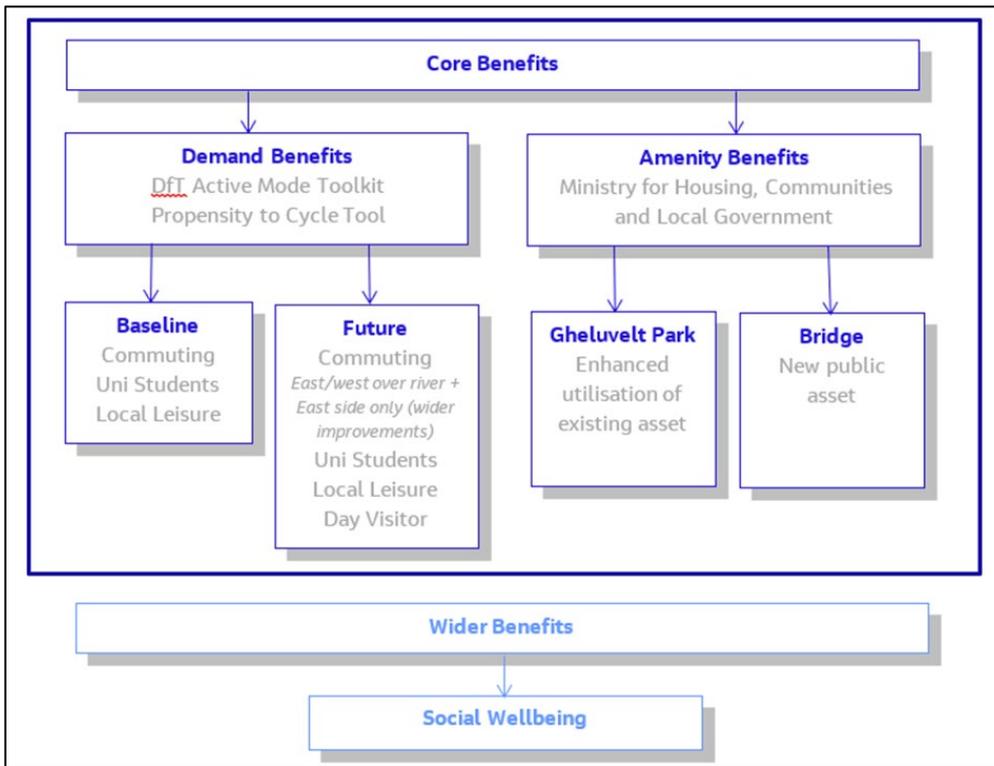
Economic Summary:		Value for Money Category
PV Benefits (£m)	18.013	High
PV Costs (£m)	8.065	
BCR	2.23	

Assessment Approach and Assumptions

Appraisal of benefits has largely been undertaken using the DfT Active Mode Appraisal Toolkit (AMAT) but also includes amenity benefits from the additional use of Gheluvelt Park.

- Commuting bottom-up baseline and future demand assessment undertaken utilising the DfT's Propensity to Cycle Tool – journeys to work – east to west and west to east over the River Severn.
- Commuting bottom-up baseline and future demand assessment undertaken utilising the DfT's Propensity to Cycle Tool – journeys to work – wider improvements to the east of the River Severn e.g. Stephenson Road / Stephenson Terrace).
- Student bottom-up baseline and future demand assessment undertaken utilising University of Worcester Travel Plan survey data – students only (assumed staff counted within 'commuting').
- Local leisure demand – based on National Travel Survey leisure trips undertaken in the cycling and walking catchment.
- Day visitor leisure demand / wider tourism – based on information within Worcester City Council's 'Economic Impact of Tourism' study (2018, The Research Solution) and the Great Britain Day Visitor Survey (2019).
- Amenity benefits relating to enhanced utilisation of an under-utilised public asset (Gheluvelt Park).
- Amenity benefits relating to availability of a new public asset (bridge and access path).
- Wider impacts relating to monetary value of social wellbeing, enhanced by increased participation in cultural, community and sporting activities at Gheluvelt Park as a result of the scheme.

The methodology applied to assessing scheme benefits is summarised in the figure below:



Based on the approach to quantifying cycling demand specified above, the table below presents the total estimated baseline and forecast demand for commuting, university and leisure trips. These figures have been used within the DfT AMAT in order to calculate the present value of benefits. The approach to modelling, and results are presented in Appendix C (Economic Appraisal Report).

Summary Trips		Annual Walking Trips	Annual Cycling Trips
West-East Commuters	Baseline	0	0
	Forecast	115,368	49,841
	Net	115,368	49,841
East Commuters	Baseline	813,648	177,606
	Forecast	895,114	195,316
	Net	81,466	17,710
University Trips	Baseline	0	0
	Forecast	6,840	3,040
	Net	6,840	3,040
Local Leisure Trips	Baseline	0	0
	Forecast	194,180	26,645
	Net	194,180	26,645
Wider Leisure Trips	Baseline	0	0
	Forecast	83,585	40,880
	Net	83,585	40,880
Total Forecast Trips		1,295,087	315,722
Total Forecast Trips over the bridge		399,973	120,406

Based on the demand figures above, value for money of the scheme has been calculated. Assessment has been undertaken using the DfT's AMAT following the principles of DfT's Tag Unit A5.1 Active Mode Appraisal guidance. The benefits are captured across commuters, students of the University of Worcester, and leisure users. The appraisal period for all three users is 30 years, which is considered robust for a scheme given the bridge's design life of 120 years.

Amenity benefits generated by the scheme have been calculated for the following:

- Current under-utilisation of a public asset, Gheluvelt Park. With a direct connection to the west riverbank, access to Gheluvelt Park will be significantly enhanced and the potential of the Green Flag Park will be realised.
- Creation of a new public asset, the bridge and path over the Kepax site. This asset will provide recreation and leisure opportunities in addition to views of the riverside.

Based on the above benefit categories, the core impact of the scheme is outlined in the table below.

Theme	Trip Purposes	PVB (PV,2010) in £'000s
Active Mode Benefits	West to East Commuting	5,274
	East Commuting	2,198
	University Trips	148
	Local Leisure	4,837
	Day Visitor Leisure	3,728
Amenity Benefits	Gheluvelt Park, new bridge and path	1,827
	Total	18,013

An appraisal was also undertaken to calculate the value of the scheme to local residents' social wellbeing. The methodology follows the approach set out in the Department for Culture, Media and Sport guidance document 'Quantifying and Valuing the Wellbeing Impacts of Culture and Sport' which:

- Identifies the impacts of culture and sport engagement on individuals' wellbeing; and
- Estimates monetary values for those wellbeing impacts using the Wellbeing Valuation approach.

As outlined in the table below, the total present value of social wellbeing benefits over a 25 year period is **£2.9 million**. This reflects enhanced social wellbeing due to increased visitation to Gheluvelt Park to participate in cultural, community and sporting events.

Social wellbeing benefit	
Visitors to Gheluvelt Park (source: Gheluvelt Park Management Plan)	424,237
Additional Visitation to Gheluvelt Park with better access to west side of River Severn	126,720
Proportion of additional visitors engaging in sporting events	1.6%
Proportion of additional visitors engaging in cultural events	3.7%
Additional visitors engaging in sporting events (per annum)	1,968
Additional visitors engaging in cultural events (per annum)	4,719
Additional value of sporting events (per annum)	£19,822
Additional value of cultural events (per annum)	£239,103

Present Value of social wellbeing benefit (25 year appraisal period)

£2.9 million

A more detailed overview of appraisal methodology is provided in Appendix C.

Scheme costs for the basis of economic appraisal were derived following the approach specified in DfT's Transport Appraisal Guidance (TAG) Unit A1.2 'Scheme Costs'. Base scheme costs in outturn (nominal) prices are estimated at £9.3 million as detailed in the table below.

	Q4 2020 Baseline Cost	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
Preparation	£1,575,734	£340,433	£850,159	£389,956	£0	£0	£1,580,548
Land/Legal Costs	£64,327	£0	£30,000	£25,000	£10,000	£0	£65,000
Bridge Only Construction Costs	£4,728,660	£0	£192,400	£3,607,500	£1,010,100	£0	£4,810,000
Link Costs	£475,288	£0	£19,339	£362,597	£101,527	£0	£483,463
Wider Link Improvements	£1,934,322	£0	£0	£132,862	£1,090,509	£800,290	£2,023,661
Supervision	£319,658	£0	£6,000	£250,000	£40,000	£30,000	£326,000
Total (excluding QRA)	£9,097,988	£340,433	£1,097,897	£4,767,915	£2,252,136	£830,290	£9,288,672
QRA	£1,478,115	£0	£41,592	£922,179	£467,868	£79,685	£1,511,323
Total (including QRA)	£10,576,103	£340,433	£1,139,489	£5,690,094	£2,720,004	£909,975	£10,799,995

Converting to a 2020 price base using the GDP deflator, the real cost estimate for the purpose of economic appraisal amounted to £9.1 million once general inflation was controlled. As noted in the table above, the quantified risk assessment estimated £1.5 million of risk associated with the project, resulting in a risk-adjusted scheme cost of £10.6 million (2020 real prices). Applying optimism bias at 6% for bridge construction (a detailed outline price has been received from Contractor) and 23% for all other costs (as per DfT guidance for outline business case stage appraisal), the adjusted scheme costs increased to £11.9 million. In line with DfT requirements, re-basing the scheme costs to a 2010 price base lowered the scheme cost estimate to £10 million. Discounting at the prevailing rate (3.5% per annum) further reduced the scheme cost estimate to £6.8 million. A final adjustment to convert scheme costs to market prices (via a 19% tax correction factor) generated the final present value of costs, estimated at £8.1 million.

Key Risks, Sensitivities and Uncertainties

All project risks are outlined in the QRA (Appendix D); key risks include:

- Major flooding occurring during construction phase, resulting in access restrictions to the site, major impact on programme.
- Unmapped underground features encountered during construction leading to delay to construction programme, redesign and extra costs.
- Underestimation of costs associated with access provided across landfill including provision of crane access for main bridge beam lifting operation.
- Demand not materialising at extent forecasted.

Reflecting these key risks, the following sensitivity tests have been undertaken:

- Diglis Bridge demand as a proxy.
- Reduced active mode demand (fifty percent reduction in walking and cycling).
- Increase in scheme costs (twenty percent increase in PVC).
- Reduction in overall level of benefits (twenty percent reduction in PVB)

The impact of these adjustments on the BCR is outlined in the table below. The sensitivity analysis suggests that the scheme's economic appraisal is resilient to significant changes in costs and benefits, reporting BCRs greater than 1.0 in most scenarios outlined above.

Scenario	Benefits (£m)	Costs (£m)	BCR
Core	18.01	8.06	2.23
Diglis Bridge Demand	7.43	8.06	0.92
50% Lower Active Mode Demand	9.92	8.06	1.23
20% Higher Costs	18.01	9.68	1.86
20% Lower Benefits	14.41	8.06	1.79

Further, a switching values assessment was undertaken to understand the proportional increase in costs (with fixed benefits) required to reduce the BCR to 1.0. Based on the PVB of £18.01 million, PVC would need to more than double to reduce the BCR to 1.0. This provides further confidence regarding the resiliency of value for money metrics to significant changes in costs.

Overall assessment - Appraisal Summary Table

An Appraisal Summary Table (AST) is provided in Appendix E. The AST demonstrates that no residual negative impacts are generated by the scheme following mitigation measures. All impacts presented in the AST are monetised and included within the BCR, with the exception of severance, as per the table below.

Impacts	Positive Impacts not Included in BCR	Scale of Impact
Severance	The scheme will remove a significant physical barrier (i.e. the River Severn), which prevents travel and cohesion between communities in North Worcester.	Large, positive, particularly for residents in North West Worcester who will be able to access amenities in East Worcester (e.g. Gheluvelt Park, City Centre) more easily.
Further Comments:		

Value for Money Statement

Based on the present value of benefits and costs outlined in the sections above, the estimated benefit-cost ratio (BCR) for the scheme is estimated at above 2.0 when active mode and amenity benefits are considered, implying high value for money based on DfT's value for money assessment criteria.

PVB	£m
Active Mode Benefits	16.19
Amenity Benefits	1.83
Social Wellbeing Benefits	2.92
PVC	£m
Scheme Costs	8.06
BCRs	
Active Mode vs. Costs	2.01
Active Mode + Amenity vs. Costs	2.23
All Benefits vs. Costs	2.60

Based on the AST analysis, no residual negative impacts not captured in the BCR are identified. Hence, the scheme is believed to represent high value for money based on the BCRs outlined above.

FINANCIAL CASE								
Scheme Name:	Kepax Bridge			Date:	September 2020 (costs and programme updated March 2021)			
Summary Financials								
Overall Cost of Scheme	£10.80 m	LTB Contribution	£1.00 m	Available Budget	£ 5.82 m	Contingent Liabilities	£4.98 m	
Scheme Costs								
Main Expenditure Items (include project income separately) (£m)	Previous Years	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	Total
PHASE 1								
Scheme preparation costs including design and project management	0	0	0.340	0.850	0.190	0	0	1.381
Land and compensation including Part 1 claims	0	0	0	0.030	0.010	0	0	0.040
Bridge only construction costs	0	0	0	0.192	3.608	1.010	0	4.810
Other works costs including links, stats costs and risk	0	0	0	0.061	1.262	0.523	0	1.846
Site supervision and other external costs	0	0	0	0.006	0.245	0	0	0.251
PHASE 1 SUB TOTAL	0	0	0.340	1.139	5.314	1.533	0.000	8.327
PHASE 2								
Scheme preparation costs including design and project management	0	0	0	0	0.200	0	0	0.200
Land and compensation including Part 1 claims	0	0	0	0	0.015	0.010	0	0.025
Works construction including stats costs (including risk)	0	0	0	0	0.156	1.137	0.888	2.173
Site supervision and other external costs	0	0	0	0	0.005	0.040	0.030	0.075
PHASE 2 SUB TOTAL	0	0	0	0	0.376	1.187	0.910	2.473
PHASE 1 AND PHASE 2 TOTAL COST	0	0	0.340	1.139	5.690	2.720	0.910	10.800

Budgetary Impact Summary

Forecast Net Budget profile (£m)	Previous years	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	Total
PHASE 1								
Total Required Budget	0	0	0.340	1.139	5.314	1.533	0	8.327
Total Contribution (Secured)	0	0	0.340	1.139	4.245	0.095	0	5.820
PHASE 1 FUNDING GAP SUB TOTAL	0	0	0	0	1.069	1.438	0	2.507
PHASE 2								
Total Required Budget	0	0	0	0	0.376	1.187	0.910	2.473
Total Contribution (Secured)	0	0	0	0	0	0	0	0.000
PHASE 2 FUNDING GAP SUB TOTAL	0	0	0	0	0.376	1.187	0.910	2.473
PHASE 1 AND 2 TOTAL REQUIRED BUDGET	0	0	0.340	1.139	5.690	2.720	0.910	10.800
PHASE 1 AND 2 SECURED FUNDING TOTAL	0	0	0.340	1.139	4.245	0.095	0.000	5.820
PHASE 1 AND 2 FUNDING GAP TOTAL	0	0	0	0	1.445	2.625	0.910	4.980

Anticipated Funding & Financing Arrangements

Funding allocated to the scheme to date is primarily for Phase 1 works. Worcester City Council have provided the following funding thus far:

- City Plan Funds: £150,000 allocated to progress feasibility work in February 2017, of which £55,000 was spent prior to 2019/20.
- City Plan Funds: £500,000 allocated towards delivery of the project if taken forward in July 2018.

- PED Committee: £225,000 motion at February 2019 PED Committee to be allocated for delivery.

Funding allocated to the scheme by WCC to date includes:

- WCC Capital funding: £4.0 million.

In addition, £1.0 million was allocated from the Local Enterprise Partnership ‘Getting Building Fund’ in 2020. £500,000 is to be spent in FY 2020/2021 and the remaining £500,000 is to be spent in FY 2021/2022.

Beyond the secured funding outlined above, there is a funding gap of £4.98 million, £2.507 million associated with Phase 1 and £2.473 million associated with Phase 2. Possible funding sources being explored to fill this funding gap include:

- Additional Local Enterprise Partnership monies
- S106 contributions
- Community Infrastructure Levy
- National bidding opportunities
- Lottery / Sustrans (funded Diglis Bridge, unsure of recent availability)

A tabulated breakdown of funding arrangements is provided in Appendix F

Scheme Cost Estimate and Key Financial Risks

The table below summarises the key risks to cost forecasts and budgetary impacts, based on the quantified risk assessment undertaken in August 2020 and updated in February 2021. Further detail is provided in Appendix D.

Risk	Mitigation status	Calculated Risk Value
------	-------------------	-----------------------

Major flooding occurs during construction phase, resulting in access restrictions to the site, major impact on programme	Programme to construct flood sensitive elements outside flood plain as far as practical. Construct foundations in period less prone to flooding.	£146,250
Underestimation of costs associated with access provided across landfill including provision of crane access for main bridge beam lifting operation.	Include additional prelims allowance in Cost Estimation for this item. Engage with ECI contractor to gain improved understanding of risk.	£145,833
Unmapped utilities encountered during construction leading to delay to construction programme, redesign and extra costs	Include allowance in QRA.	£104,167
Scheme costs greater than allocated in cost estimate.	Site investigations to reduce the number of unknowns. Early identification of potential increases in scheme costs via engagement of ECI contractor.	£94,900
Protection and/or Assessment/Strengthening Works required to existing retaining Wall adjacent to pylon	Undertake early investigations to understand constraints and potential risks. Allow for in QRA.	£80,000

Accounting and Budgeting Issues

The scheme, prioritised by WCC and Worcester City Council, is expected to cost approximately £10.8 million to deliver. The major component of costs (i.e. 75%) are associated with Phase 1 works, with the remainder relating to Phase 2 works.

Currently, around £5.82 million of the budget requirement is funded with a residual £4.98 million funding gap remaining. The councils are actively exploring funding opportunities to resolve this gap.

COMMERCIAL CASE

Kepax Bridge

September 2020 (costs and programme updated March 2021)

Introduction

The Kepax Bridge scheme is jointly promoted by WCC and Worcester City Council who are working in partnership. The new pedestrian and cycle bridge will deliver an additional link across the River Severn in Worcester from Gheluvelt Park to the Kepax site in St Johns.

The need for the scheme is presented in a number of policy documents as it will provide a vital link between two parts of Worcester, reduce severance caused by the River Severn and encourage the use of active modes for journeys around the city. The scheme proposal builds upon the huge success experienced at Diglis Bridge (which has seen far more use than was originally forecast) and would provide a welcome addition to the family of bridges already in place in the City.

The scheme set out in Section 1 includes construction of a new bridge, an access path across Kepax Country Park, tie in with existing paths in Gheluvelt Park and improvements to a number of wider links. Key constraints include geotechnical and geoenvironmental issues associated with construction on the Kepax site, ecological matters and drainage and flooding. Additionally, the construction methodology needs to manage the safety risks associated with working at height, near to and above water, contaminated ground, and the design must be optimised to allow the bridge to be built economically.

The Commercial Case for the project takes into account the resources available to WCC, the risks associated with the delivery and the procurement routes available to achieve the project in the most efficient way possible. This section describes the commercial strategy for delivering the Kepax Bridge scheme.

Capability, Skills and Evidence of Previous Project Delivery

WCC has considerable experience of:

- Delivering major transport schemes on time and on budget;
- Successfully obtaining consents for major infrastructure schemes;
- Developing and maintaining good working relationship with key partners and stakeholders; and
- Internal resourcing and governance requirements for major schemes.

Previous bridge schemes successfully delivered by WCC include:

- Eastham Bridge (£2.5 million) – Grade II listed Eastham Bridge collapsed in May 2016 after one of the bridge piers was victim of scour.
 - Two pairs of steel beams, 33m (108ft) long and weighing 84 tonnes, were lifted across the river as part of the new bridge's construction.
 - The bridge reopened to traffic in April 2017 and construction was fully completed in September 2017.
- Hoobrook Link Road (£8 million) - The Hoobrook Link Road is situated within the South Kidderminster Enterprise Park which is one of Worcestershire's Local Enterprise

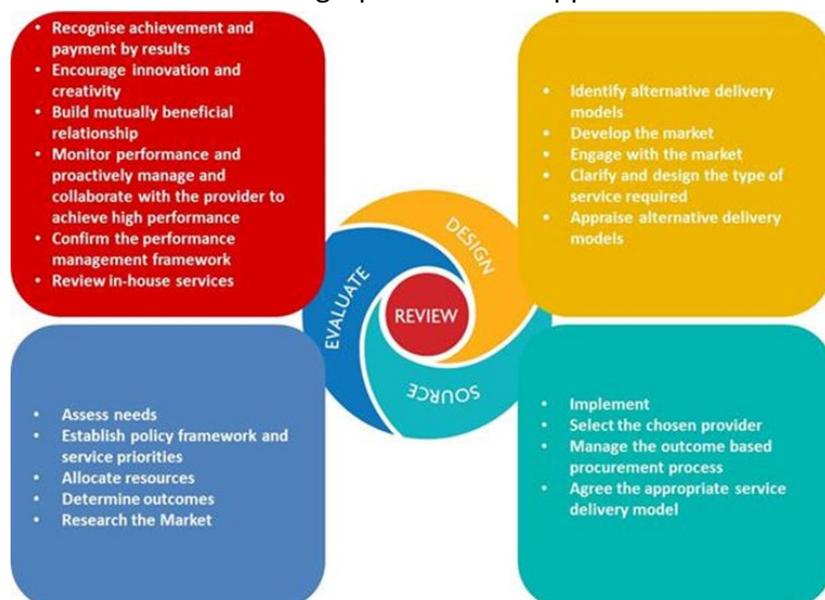
Partnership's (WLEP) Strategic Employment sites.

- Pre-existing traffic congestion was a barrier to economic growth in the immediate and wider Kidderminster area.
- The new link road provides improved access, connects two key employment corridors, promotes much needed economic growth and relieves traffic congestion.
- Diglis Bridge (£2.5 million, completed 2010) - Single span cable stayed bridge over the River Severn to the south of Worcester City which has opened up the riverside since installation in 2010. The structure is seen as a success as the current usage is higher than anticipated at construction.
- Crookbarrow Way (£2.5 million) - Delivery of new footbridge over Crookbarrow Way to connect a new development to St Peters and local services.

These projects were all complex and demanding and required new ways of working with partners and stakeholders.

Procurement Strategy & Sourcing Options

WCC has extensive in-house strategic and technical procurement expertise and a wealth of knowledge and experience, with a proven track record of delivery with different types of contracts. WCC is a strategic commissioning organisation and has a commercial vision to *"drive commercial excellence through developing an open, challenging and pro-active culture and deploying effective commissioning strategies to source the right service from the right provider at the right cost."* The figure below shows WCC's approach to commissioning and procurement and has influenced the choice of the strategic procurement approach to the scheme.



The recommended/preferred option for procurement for this scheme is to use the existing WCC Infrastructure Engineering Term Contract (IETC) which delivers highway improvement and civil engineering projects. This project falls within the nature, scope and value of projects for which this IETC contract is intended.

The contractor, being a term contractor, is familiar with the Council's aims and objectives, the Local Transport Plan and the Worcestershire Economic Plan and works collaboratively to achieve those

goals.

The IETC is an NEC4 Engineering and Construction Contract, with Option C Target Cost. This contract is designed to deal effectively with risk by using contractor experience early in projects to mitigate risk and allocate it to the party most able to control it. This directly and beneficially affects outturn costs and the programme.

The IETC contract is in place and is with a single supplier tendered in compliance with the Public Contract Regulations and EU Directives.

The IETC procurement route also maximises the potential for Early Contractor Involvement (ECI). This involves the creation of a Contractor/Consultant/Client team, led by the Project Manager, which caters for the consideration of buildability and value issues earlier in the design process, leading to shorter construction periods and reduced impacts during construction.

The benefit of ECI is that it utilises contractors' unique understanding of construction processes to optimise the design and delivery process. The difference is, as the name implies, that ECI involves the contractor far earlier. With ECI, the contractor joins the team early and is involved with planning, assessing buildability, cost estimating and value engineering.

ECI is the key to ensuring both programme and cost certainty for WCC. The Contractor is expected to be involved in a project as early as possible. A strong team ethos is critical in producing the most cost-efficient project.

The goal of ECI is to provide the possibility for forecasting project results with more certainty. It should prepare all parties to jointly solve problems, address unknowns in difficult environments and avoid or resolve conflicts more effectively. There are a range of benefits gained by participating in ECI:

- Early creation of delivery team
- More scope for innovation
- More flexibility and better value
- Integrated and incentivised supply chain
- Improved risk management with fair allocation of risks
- Improved Health and Safety
- Shorter construction periods and reduced impacts during construction
- Maintaining a competitive and sustainable supply chain
- Clear points of responsibility, no unnecessary layers of supervision
- Good and appropriate quality of design to meet project objectives
- Partnership approach and team ethos based on long-term relationships

- Performance measurement with continual improvement targets
- Improved communications and liaison with the key stakeholders during consultation and construction

Financing Arrangements and Payment Mechanisms

Target Prices are derived using tendered prices and a basket of labour, equipment and materials rates. This basket of prices is benchmarked against prices and inflation indices agreed at the outset of the contract to ensure they remain competitive and maintain cost-effective pricing. Contract performance is driven by KPIs.

The Contractor's Share is 50% below 110%, which means that the employer's liability is limited to 5% above target prices and both the Employer and Contractor equally share gains below 100%. Cost control is therefore incentivised. For each project under the IETC, an Individual Project Integrated Management System (IMS) Plan is prepared by our contractor and reviewed and accepted by Worcestershire County Council's Scheme Project Manager. This details the significant site risks, that are best controlled by the Contractor, which typically include:

- Services including Temporary Electrical Installation
- Traffic Routes and Vehicle/Pedestrian Segregation
- Storage of Hazardous Materials
- Hazard Risk Register
- Reducing Noise and Vibration
- Using Hazardous Materials & Monitoring Health
- Dealing with Contaminated Land
- Removal of Asbestos
- Work on Excavations and Work where there are Poor Ground Conditions
- Work on or Near Water where there is a Risk of Drowning
- Accommodating Adjacent Land Use
- Removal of Waste
- Delivery & Removal of Materials and Work Equipment

Risk Allocation and Transfer

WCC has undertaken an assessment of how the types of risk might be apportioned or shared, with risks allocated to the party best placed to manage them, subject to achieving value for money. The contract includes clauses to facilitate the transfer of appropriate risks from WCC to the contractor, such as risks associated with ground conditions.

The risk of costs being higher than currently predicted remains until the tendering process is complete,

which is the point that this risk can be transferred to the contractor (on contract award). The indicative allocation of risks resulting from the contractual and procurement arrangements is summarised in the table below. At this stage, ticks have been provided to indicate where each risk type rests. A more detailed view on key risks is provided in the QRA summary analysis provide in Appendix D.

Risk Category	WCC	Supplier	Shared
Design		✓	
Construction		✓	
Implementation			✓
Operations	✓		
Termination			✓
Financing	✓		
Legislative			✓

The NEC Target Price contract will ensure that all parties share in the ownership of project risks and that they are motivated to minimise costs. The party best able to manage the risk is assigned to manage and mitigate the risk but the associated costs are shared. The benefit of savings (i.e. costs are lower than the target price) is shared equally by WCC and the contractor. If costs exceed the target, the Parties share up to a maximum of 10% and any costs above this are borne by the contractor. Thus, WCC's exposure is limited to 5% above target except for any agreed variations, as defined by the contract.

MANAGEMENT CASE

Kepax Bridge

September 2020 (costs and programme updated March 2021)

Introduction

The delivery of Kepax Bridge is a priority for WCC and its partner, Worcester City Council. The scheme is aligned with national, regional and local priorities, in particular in terms of promoting active travel thus improving health and wellbeing, air quality and journey choice.

The scope of Phase 1 of the scheme, to be delivered by Autumn 2022, includes:

- Provision of a new cycle and walking bridge over the River Severn. This will be 3.5m wide and 160m long including approach ramps.
- A direct access path to be provided over the Kepax site. This will connect users to the west side of the river via Hallow Road.
- Connection to NCN 46 in Gheluvelt Park.

Phase 2 of the scheme covers:

- Upgrade of the Severn Way to the south of the bridge. To create a riverside loop (via Sabrina or Diglis bridges).
- Walk and cycle improvements to routes on the eastern side of the river. This includes:
- Enhancement to the existing alternative NCN 46 route (Stephenson Road, Stephenson Terrace).
- Upgrade of connection from the scheme to NCN 45 (Gheluvelt Park to Pipe Iron Road and Somer's Road – upgrade of existing A38 crossing facility and signage).

The Management Case for the scheme will set out how the scheme will be delivered. It provides evidence of similar projects and programmes to show that the proposed governance, organisational structure and roles are appropriate. The programme assurance and approval processes oversee delivery to ensure risks are identified and mitigated. The Management Case is ultimately about delivering the scheme's objectives with the benefits being realised, assessed and monitored.

Governance, Organisational Structure & Roles

Senior Responsible owner: Rachel Hill

Project Manager: Mark Broomby

The project management for the major scheme is based on the structure and processes that have been successfully applied by WCC on other major schemes, for example on the Worcester Southern Link Road.

The structure is based on PRINCE2 principles and the Project Management Handbook for Local Authorities: Programme, Project and Change Management. It also considers the Office of Government Commerce (OGC) guidelines for delivering projects. Specific attention has been given to governance, to provide a clearly defined structure for the role of the Cabinet, Project Board, Project Manager and Project Teams. Specific attention has been given to Governance, to provide a clearly

defined structure for the role of the cabinet, project board and project team.

WCC's Cabinet has ultimate authority for the project. The Cabinet meets on a monthly basis.

During the delivery stage, the scheme is overseen by a Project Board comprised of officers with responsibility for delivery of the scheme. Officers from a wide delivery team will be involved in a number of elements of the project including the risk workshop, package sifting and public consultation. The Project Board meet regularly throughout the life of the project to ensure Project Assurance objectives are met. The Project Board also specifically meet at key milestones during the project, tying in with their role in procurement, design and financial approval in the next stages of the project.

The role of the Senior Responsible Officer is to lead the management and delivery teams and provide the interface with the executive team. In this instance, the Senior Responsible Officer is required to:

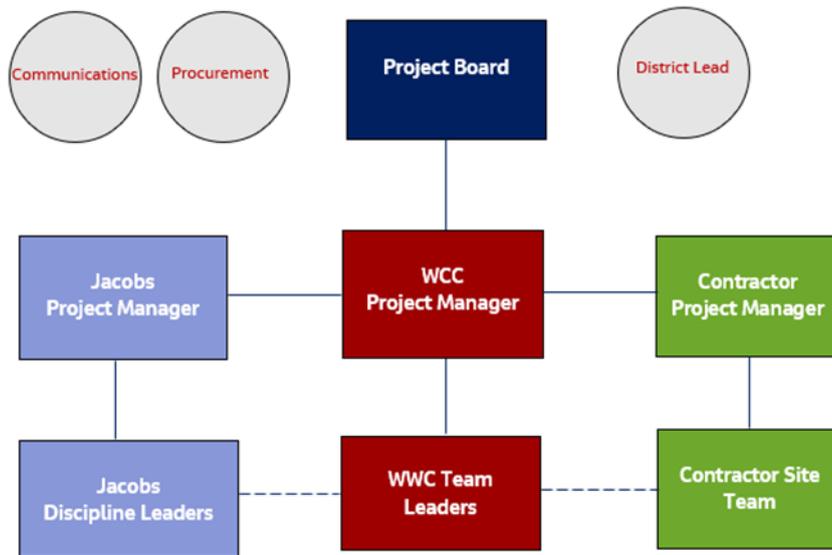
- Report to and receive feedback from the Project Board;
- Ensure the appropriate resources, project management and technical expertise are in place for the project;
- Make decisions and approve changes within agreed tolerances or seek authorisation if required;
- Monitor and evaluate project progress against milestones and assess outcomes; and
- Provide guidance, support and direction to the Project Manager and project team.

The Project Manager will manage the project using PRINCE 2 methods within set tolerances as agreed by the Project Board. He will lead the work of the Project Teams and will be a member of the Project Board. The role of the Project Manager is to:

- Lead and coordinate the project team and its work-streams;
- Procure consultants and contractors;
- Prepare and report project budgets;
- Manage project risks and issues;
- Report to and receive feedback from the responsible officer; and
- Produce periodic progress reports to relevant committees.

The Project Manager is supported by a project team covering all related disciplines. In most cases a discipline has a lead officer or consultant who is, where relevant, supported by a co-ordinator and wider team. The high level Project Organogram is shown in the figure below.

Kepax Bridge Scheme
High Level Project Organogram



Member	Key Roles and Responsibilities	Resourced
Cabinet	Simon Geraghty Adrian Hardman Alan Amos Marcus Hart Lucy Hodgson Karen May Tony Miller Ken Pollock Andy Roberts John Smith	Leader of the Council and Cabinet Member with Responsibility for Finance Deputy Leader and Cabinet Member with Responsibility for Adult Social Care Cabinet Member with responsibility for Highways Cabinet Member with responsibility for Education and Skills Cabinet Member with responsibility for Communities Cabinet Member with responsibility for Transformation and Commissioning Cabinet Member with Responsibility for Environment Cabinet Member with responsibility for Economy and Infrastructure Cabinet Member with Responsibility for Children and Families Cabinet Member with responsibility for Health and Wellbeing
Project Board	Rachel Hill Lynsey Keir Andy Maginnis Nick Twaite Kristy Thomas Richard Woodward Miriam Gorman Nick Kay Mark Broomby	Member / Senior Responsible Officer Member / Project Office Member Member / Procurement and Contract Member / Land and Waste Member / Land and Waste Project Support Member Member / Partner Member / WCC Project Manager

Risk Management Strategy

Appendix D provides a QRA Risk Register for the scheme, outlining a full list of potential risks and mitigation measures designed to reduce the scheme's risk exposure. The key risks and proposed mitigation strategy are outlined in the table below.

The key risks that have been identified are:

Risk	Mitigation status	Calculated Risk Value
Major flooding occurs during construction phase, resulting in access restrictions to the site, major impact on programme	Programme to construct flood sensitive elements outside flood plain as far as practical. Construct foundations in period less prone to flooding.	£146,250
Underestimation of costs associated with access provided across landfill including provision of crane access for main bridge beam lifting operation.	Include additional prelims allowance in Cost. Engage in ECI.	£145,833
Unmapped utilities encountered during construction leading to delay to construction programme, redesign and extra costs	Include allowance in QRA.	£104,167
Scheme costs greater than allocated in cost estimate.	Undertake site investigations to reduce the number of unknowns. Early identification of potential increases in scheme costs via engagement of ECI contractor.	£94,900
Protection and/or Assessment/Strengthening Works required to existing retaining Wall adjacent to pylon	Undertake early investigations to understand constraints and potential risks. Allow for in QRA.	£80,000

Project Plan

A detailed programme for the delivery of the Bridge scheme is provided in Appendix G. Key milestone within the programme are outlined below:

Milestone	Target completion date
Planning Application Submission	Submitted August 2020
Land and Legal Agreements	May 2021
Planning application determined	March 2021
Cabinet Approval	March 2021
Final Delegated Approval	June 2021
Procure Construction Contract	June 2021
Award construction contract	June 2021
Start on Site	June 2021
Scheme Completion	Autumn 2022

Following planning application submission, ongoing business case work to secure funding will proceed. There is a risk that business case development could be abortive work in the absence of planning approval. Similarly, a delay in securing planning approval could impact on the project plan and programme.

Communications and Stakeholder Management

Appreciating how important the balance of communication and stakeholder management is, a specific communications and stakeholder management strategy has been prepared (see Appendix H). This identifies the different categories of stakeholder and sets out the proposed engagement plan for each category of stakeholder.

There will be ongoing engagement with stakeholders throughout the scheme's development. This engagement commenced in Summer 2020 and is detailed in the Strategic Case section 'Stakeholders'.

A Communications and Engagement Stakeholder Plan has been prepared for the scheme which outlines different audiences, engagement to be undertaken and key messages. The Plan will continue to be developed to outline a process for engagement which will help to:

- Increase the number of stakeholders aware of the proposals and allow them early opportunity to comment so that any reasonable requests for mitigation measures can be considered at an appropriate time.
- Ensure that the need for the scheme and the expected benefits are understood within the context of wider improvements – this will be achieved through managing key messages effectively.
- Promote advocacy for the proposals from key external stakeholders.
- Ensure local residents are aware of any planned disruption as a result of the works, in good time.
- Ensure that there is an opportunity for stakeholders to feedback about the effectiveness of the implementation of the major scheme.

The key stakeholders fall into a number of categories, as follows:

- Project Partners - stakeholders who have a high level of both influence and interest in the scheme and ultimately have the ability to decide whether it goes ahead. This includes those organisations who may fund the scheme, those who will approve the spending and those that will ultimately approve any statutory process.
- Key consultees – stakeholders who are directly affected and likely to have strong views or have the ability to significantly influence either the design of the scheme or the approvals process. The scheme could go ahead without the agreement of these stakeholders, but if they do not input or their support is not secured there could be cost or programme implications.
- Wider community – These stakeholders may not be directly impacted by the scheme but are likely to take a broader interest and would appreciate regular communication.

Online and face to face public information events have been held to inform local residents, employees and other interested parties about the scheme. Staff from WCC and other technical staff from the term consultant were present to answer any questions (see Strategic Case section 'Stakeholders' for more detail).

WCC will ensure local media are aware of project developments. A press release including supportive statements from stakeholders will be used to announce and provide updates of the project. If necessary, site visits and personal briefings will be used to inform key media, highlighting positive achievements and the benefits to local residents and businesses.

WCC has a dedicated press/communications officer in place supported by a wider team for the duration of the project to handle press enquiries.

Assurance & Approvals Plan

The Project Board is responsible for Project Assurance, ensuring that the project remains on target in terms of business, user and technical objectives. Assurance and approvals processes are directed by the Governance Framework Process (Appendix I). This Process outlines the interaction between various WCC teams, project development and approval gateway. Following project proposal, a combination of Strategic Infrastructure Group, Delivery Programme Board and Project Boards/Steering Groups govern the project through the following stages, with an assurance/approval gateway between each step:

- Project mandate
- Initiating development
- Implementation, completion, and handover
- Monitoring and evaluation

Project Board members receive regular Highlight Reports from the Project Manager to aid them in this process. The scheme has also been subject to continuous Peer Review by the Delivery Programme Board, which includes officers from a range of disciplines including business, user, and technical officers.

Statutory Powers and Acquisitions

A planning application for the scheme was submitted in August 2020 (ref: 20/000035/REG3), with expected determination by April 2021. Further, in advance of construction, the following consents will need to be granted:

- Exercising powers under Section 106 (3) of the Highways Act 1980 to construct the bridge to form a footpath/cycle track (with a right of way on foot) over the navigable waters of the River Severn; and
- Environment Agency Consent.

In addition to the above, the following may be required in relation to access and wider links:

- Consent to Construct a Bridge over Navigable River;
- Environment Agency permits;
- Traffic and Works Act;
- Traffic Regulation Orders;
- Compulsory Purchase Orders; and
- Creation of Rights of Way.

Relevant timescales have been incorporated into the bridge programme to cater for consents required.

Under Phase 1 the majority of land required is within the existing highway boundary or under other public ownership. These are:

- Title: WR 19650 – South Section of the landfill - Private Owner
- Title: HW 93142 – Worcester County Council – Leased from WR 19650

Contract Management

Essential to the successful running of the contract are high-quality project management skills, complemented by specialist cost control expertise and sufficient support resources. These are required from the outset of tender development and evaluation, through project development and up to post-completion.

This team will be supplemented by a project governance structure more fully described in Management Case section 'Governance, Organisational Structure & Roles'.

Key Issues for Implementation

The key issues likely to affect delivery and implementation include:

- **Funding Shortfall:** There is currently a funding shortfall. Outline Business Case developed in preparation for further funding opportunities.
- **Land Ownership:** The area of land to secure to deliver the bridge scheme is a relatively small part of the landfill. Discussions have commenced with the landowner and are positive. These will continue to secure negotiated agreements at earliest opportunity (subject to planning/funding). Other land includes land owned by Worcester City Council, who are partners in the scheme, and discussions are ongoing regarding this.
- **Brexit:** Delays and increase on costs caused by Brexit related issues.
- **Covid-19:** Loss of key staffing at critical points in programme due to Coronavirus resulting in delay to completion. Sharp increase in costs beyond those reasonably anticipated due to impact of

pandemic.

- Unknown/unsuitable ground conditions: Ground Investigation is complete informing the design and construction although potential for adverse ground conditions to impact on construction methodology & costs remains.
- Obtaining Statutory Act to construct a crossing over the River Severn.

Benefits Realisation and Monitoring and Evaluation Plan

The Kepax Bridge Benefits Realisation and Monitoring Strategy (BRMS) has been prepared to show how the impacts of the scheme deliver the desired benefits and overarching objectives. It incorporates the scale and type of the scheme plus the resources available. Appendix J contains the BRMS document.

WCC's commitment to monitor and evaluate the impact of the major scheme once implemented is based on WebTAG guidance to bidders for major transport schemes. The guidance requests details on the likely benefits and how they will be measured and reported. It is proposed that this will broadly follow the 'standard monitoring' approach set out in the 'Monitoring and Evaluation Framework for Local Authority Major Schemes', although this effort will be adjusted accordingly, to be appropriate, proportionate, and cost effective. "Standard monitoring" should include measures covering inputs, outputs, outcomes and impacts of the scheme.

The scheme build will be monitored, including procurement, achievement of timescale and key milestones, risk outcomes, and stakeholder feedback. The actual scheme as delivered will be assessed, including success of the design and materials used. Outturn costs will be compared to forecasts and on-going maintenance costs, ensuring the scheme remains affordable and demonstrates value for money. This could include indicative outturn BCR based on final costs and benefits outcomes.

As no link currently exists over the River Severn in the Kepax area, 'before' monitoring at this location would yield a nil result. Instead, it will be necessary to understand the level of abstraction from existing alternative bridge crossings (specifically, the Sabrina Bridge to the south) to clarify how much 'new' demand the construction of a bridge at Kepax would release. It is recommended that any new bridge is fitted with permanent walking and cycling traffic counters, so that monitoring can be undertaken on all east-west movements in the area, to understand changes to uplift in demand.

Comprehensive monitoring should be undertaken 1 year before scheme opening, 1 year after scheme opening, and five years after scheme opening for a single calendar month (June may be the most appropriate for this) as a minimum, but continuous monitoring would be far preferable to understand the pattern of demand throughout the year. Funding should be set aside from the construction funding to allow for this essential monitoring to take place. The results of this monitoring should be prepared in a short report and made available to the Project Office for scrutiny and for use in evidencing delivery of benefits to project funders.

Objective	Delivery of objective	Data collection	Timescales
Improve connectivity within Worcester, and in particular facilitate east-west movements in the north of the city.	<ul style="list-style-type: none"> Provision of a new pedestrian and cycle river crossing Connection to wider links within Worcester, including NCN and RCN 	<ul style="list-style-type: none"> Pedestrian and cycle count data Intercept surveys – to determine journey origin and destination 	<ul style="list-style-type: none"> One and five years after opening
Improvements to the physical health and wellbeing of North Worcester residents, employees and visitors by affecting a mode shift from car to walking and cycling.	<ul style="list-style-type: none"> Provision of a new pedestrian and cycle river crossing Connection to wider links within Worcester, including NCN and RCN 	<ul style="list-style-type: none"> Pedestrian and cycle count data Intercept surveys – to determine journey origin and destination 	<ul style="list-style-type: none"> One and five years after opening
Provide an alternative walk and cycle link over the river thus increasing transport resilience.	<ul style="list-style-type: none"> Provision of a new pedestrian and cycle river crossing Connection to wider links within Worcester, including NCN and RCN 	<ul style="list-style-type: none"> Pedestrian and cycle count data Intercept surveys – to determine journey origin and destination 	<ul style="list-style-type: none"> One and five years after opening
Increase visitor numbers to Worcester, through the provision of new walking and cycling infrastructure and routes, resulting in additional visitor spend and an increased number of visitor economy jobs.	<ul style="list-style-type: none"> Provision of a new pedestrian and cycle river crossing Connection to wider links within Worcester, including NCN and RCN Connection to the Severn Way and the riverside Racecourse path (creation of a 'riverside loop') 	<ul style="list-style-type: none"> Passenger survey – to determine journey origin and destination Intercept surveys – to determine journey origin and destination General Worcestershire tourism data 	<ul style="list-style-type: none"> One and five years after opening
Creation of an additional riverside leisure 'loop' (walk and cycle), via Sabrina Bridge or Diglis Bridge).	<ul style="list-style-type: none"> Provision of a new pedestrian and cycle river crossing Connection to Severn Way on west side and Gheluvlet Park on east side 	<ul style="list-style-type: none"> Pedestrian and cycle count data Intercept surveys – to determine journey origin and destination 	<ul style="list-style-type: none"> One and five years after opening
Contribute to improving the public realm and public spaces around the bridge and help to activate these areas.	<ul style="list-style-type: none"> Provision of a new pedestrian and cycle river crossing Compliance with planning application CEMP and LEMP 	<ul style="list-style-type: none"> Planning condition discharge Intercept surveys – to determine journey origin and destination 	<ul style="list-style-type: none"> Shortly after opening

Contingency Plan

The costs presented in the economic and financial cases include contingency. The risk management strategy for the project accounts for contingency planning. In cost terms, risk of cost overruns are managed through contract management. As established in the Commercial Case, the IETC is an NEC4 Engineering and Construction Contract, with main Option C Target Cost. This contract is designed to deal effectively with risk by using contractor experience early in projects to mitigate risk and allocate it to the party most able to control it. This directly and beneficially affects outturn costs and the programme.

Appendices Provided:

- A) Option Assessment Report
- B) Figures, including Location and Layout plans
- C) Economic Appraisal Report
- D) Quantified Risk Assessment
- E) Appraisal Summary Table
- F) Finance Summary
- G) High Level Programme
- H) Stakeholder Management Plan
- I) Governance Framework Plan
- J) Benefits Realisation Plan

Senior Responsible Owner DECLARATION

As Senior Responsible Owner for [scheme name] I hereby submit this request for funding consideration to the Worcestershire Local Transport Body.

Name:

Signed:

Position:

Section 151 Officer DECLARATION

As Section 151 Officer for Worcestershire County Council I declare that the scheme cost estimates quoted in this bid are accurate to the best of my knowledge and that [name of authority] has allocated sufficient budget to develop and deliver this scheme on the basis of its proposed funding contribution

Name:

Debra Goodall

Signed:

Position:

Senior Finance Business Partner

CONTACT DETAILS FOR FURTHER ENQUIRIES

Lead Contact:

Position:

Tel:

E-mail:

Alternative Contact:

Position:

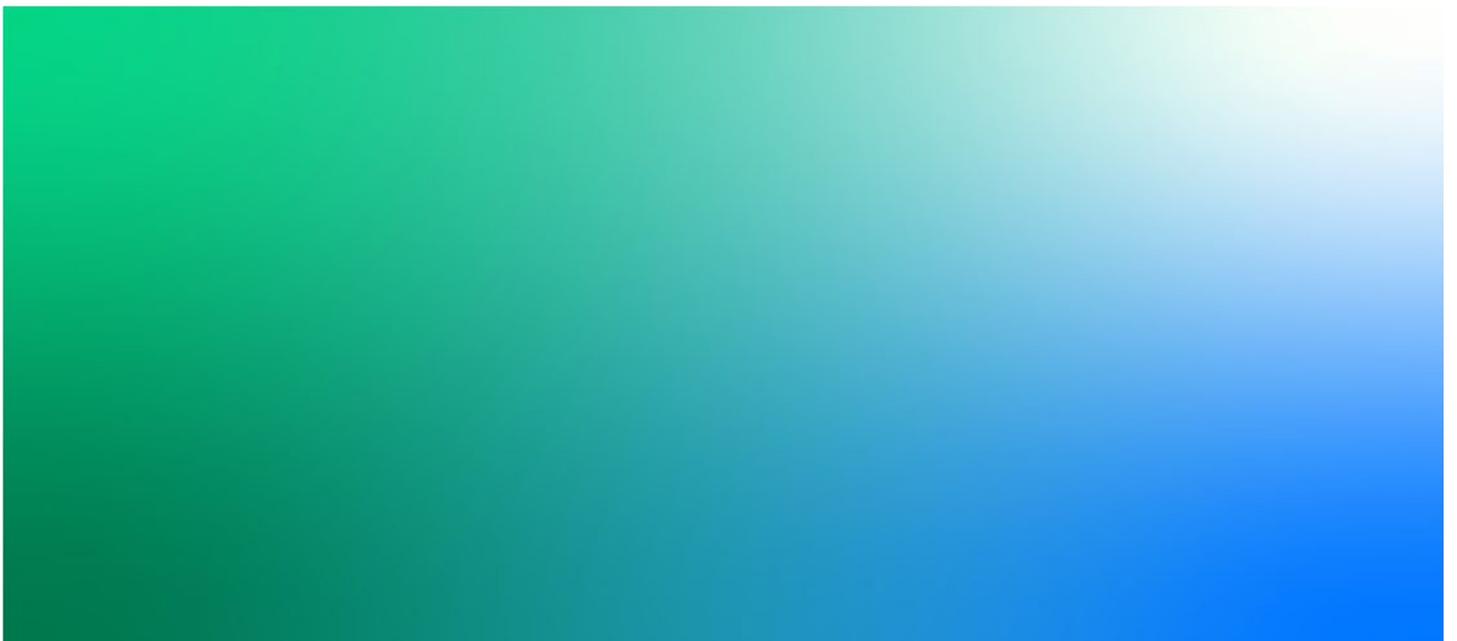
Tel:

E-mail:



Kepax Bridge OBC
Option Assessment Report

September 2020
Worcestershire County Council



Kepax Bridge OBC

Project No: B2367216
 Document Title: Option Assessment Report
 Document No.:
 Revision: 3
 Document Status: For WLEP
 Date: September 2020
 Client Name: Worcestershire County Council
 Client No: Client Reference
 Project Manager: Martyn Booth
 Author: Victoria Edge
 File Name: \\UWOFPP01\Transportation\B23672 - WMHA Term Contract\16 - STR Kepax Footbridge\005 - Technical Working Area\5.13 Outline Business Case

Jacobs U.K. Limited

NONE

www.jacobs.com

© Copyright 2019 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
	March 2020	Working Draft	VE / DM			
V1	June 2020	Draft for internal comment	VE / DM			
V2	September 2020	Updated draft for client issue, with detailed demand	VE			
V3	September 2020	Updated in line with client comments	VE			

Contents

1.	Introduction.....	6
1.1	Background.....	6
1.1	Scheme Location and Description.....	6
1.2	Business Case Requirements.....	7
1.3	Approach to Option Development.....	8
1.4	Purpose of this Report.....	9
2.	Policy Context.....	11
2.1	Introduction.....	11
2.1.1	Worcestershire LEP SEP.....	11
2.1.2	“Shaping Worcestershire's Future” - Corporate Plan 2017 - 2022.....	12
2.1.3	Worcestershire LTP4 (2018 to 2030).....	13
2.1.4	South Worcestershire Development Plan (2016).....	14
3.	Need for intervention and scheme objectives.....	16
3.1	Introduction.....	16
3.2	Scope of Study.....	16
3.3	Problems Identified.....	16
3.4	Scheme Objectives.....	17
3.5	Scheme Outcomes.....	17
4.	High-level Optioneering.....	19
4.1	Introduction.....	19
4.1.1	Discontinued Kepax Ferry.....	19
4.2	Example ferry crossings.....	19
4.2.1	Worcestershire.....	19
4.2.2	Other comparator ferries.....	21
4.3	Example bridge crossings.....	22
4.3.1	Worcestershire.....	22
4.3.2	Other comparator bridges.....	23
4.4	High-level assessment.....	23
4.5	Red amber green matrix.....	23
4.6	Conclusion.....	28
5.	Option Development and Sifting – Location.....	29
5.1	Scheme Location.....	29
5.2	Pre-Feasibility Study.....	29
5.2.1	Location 1 – Gheluvelt Park / St Johns.....	29
5.2.2	Location 2 – Northwick.....	30
5.2.3	Conclusion.....	30
6.	Land Use and Constraints.....	31
6.1	Land use - east bank.....	31
6.2	Land use - west bank.....	32

6.3	Constraints	32
6.3.1	Planning Considerations.....	32
6.3.2	Ecological and Environmental constraints	33
6.3.3	Existing Services	34
6.3.4	Land ownership	34
6.3.5	Transport Planning	35
6.3.6	Loading and Headroom	36
6.3.7	Parapet Height and Structure Width.....	36
6.3.8	Approach Gradients, Landings and Path Alignment.....	36
6.3.9	Flood Risk	37
6.4	Geoenvironmental Issues.....	38
6.5	Construction Issues	39
6.5.1	Interfacing with Existing Infrastructure.....	39
6.5.2	Site access	40
7.	Option Development and Sifting – Structure	42
7.1	Introduction.....	42
7.2	Types of Structure Considered - Long List	42
7.3	Types of Structure Considered -Short List.....	43
7.3.1	Cable stayed	43
7.3.2	Truss	44
7.3.3	Tied Arch	44
7.4	Detailed Design	46
8.	Option Development and Sifting – Wider Links.....	62
8.1	Background and Scope	62
8.1.1	West bank existing provision	64
8.1.2	East bank existing provision	66
8.2	Long list of enhancement options.....	68
8.3	Wider Links Recommendations.....	70

Figures

Figure 1.1: Location Plan.....	6
Figure 1.2: Scheme proposed wider links	7
Figure 1.3: DfT Appraisal Process	8
Figure 1.4: Option assessment process	9
Figure 2.1: SEP Proposed Transport Schemes (number 8 in the centre of Worcester is the Kepax Bridge scheme).....	12
Figure 2.2: Active Travel Corridors (ATCs) and Kepax Bridge	14
Figure 4.1: Kepax Ferry	19
Figure 4.2: Worcester Cathedral Ferry	20
Figure 4.3: Lower Lode Ferry	20
Figure 4.4: Hampton Ferry.....	21
Figure 4.5: Shields Ferry.....	21
Figure 4.6: Gosport Ferry.....	22
Figure 5.1: Possible Bridge Locations.....	29
Figure 6.1 and Figure 6.2: Archaeological Sensitive Area (left) and Conservation Area (right).....	33

Figure 6.3 and Figure 6.4: Green Infrastructure (left) and Green Space (right)	33
Figure 6.5 and Figure 6.6: Flood Fluvial Zones (left) and Ares Susceptible to Surface Water Flooding (right).....	33
Figure 6.7: Land Ownership Plan	35
Figure 6.8: Flood levels taken from Flood Information Service on Gov.uk.....	37
Figure 6.9: Flood Map source: Flood Map for Planning Service	38
Figure 6.10: Grade II Listed Buildings (MAgiC Map, Defra, 2020).....	39
Figure 6.11: Public Rights of ways and footpaths. Source: WCC	40
Figure 6.12 and Figure 6.13: View over pipe culvert (left) and footpath between overhead cable pylon and ditch drain (right)	41
Figure 7.1: Example of a Cable Stayed Bridge - Diglis Bridge.....	43
Figure 7.2: Example of a Truss Bridge – Arley Footbridge	44
Figure 7.3: Example of a Tied Arch Bridge – Abbey Bridge.....	45
Figure 8.1: Wider links option assessment process.....	62
Figure 8.2: Existing walking and cycle routes (© Crown Copyright Ordnance Survey Open Data 2019)	63
Figure 8.3: A443 Hallow Road.....	64
Figure 8.4: Severn Way south	65
Figure 8.5: Severn Way link to A443	65
Figure 8.6: Severn Way north	66
Figure 8.7: A38 / A449 Barbourne Road	67
Figure 8.8: Pitchcroft Race Course path	67
Figure 8.9: Alternative route to Pitchcroft Race Course.....	67
Figure 8.10: Long list of wider link options.....	69
Figure 8.11: Plan of recommended wider links	71

Tables

Table 2.1: Snapshot from Worcestershire SEP List of Transport and Infrastructure Schemes.....	11
Table 2.2: WCC Corporate Priorities	13
Table 4.1: Estimated demand for Sabrina Bridge	22
Table 4.2: Demand for Diglis Bridge (source: Route Intercept Survey Report – Connect2, 2012)	22
Table 4.3: Strategic fit of ferry and bridge.....	26
Table 4.4: Commercial and Management Case of ferry and bridge	27
Table 5.1: Pros and cons of Location 1	30
Table 5.2: Pros and cons of Location 2	30
Table 6.1: Environmental and Engineering Constraints.....	31
Table 6.2: Summary of potential pollutant pathways to be considered in a Piling Risk Assessment.....	38
Table 7.1: Structure Form Advantages and Disadvantages	43
Table 7.2: Options Comparison	46
Table 7.3: Option Matrix – detailed design Options 1 - 4.....	54
Table 7.4: Option Matrix – detailed design Options 5 - 8.....	61
Table 8.1: Long list option summary.....	70
Table 8.2: Recommended wider links.....	70

1. Introduction

1.1 Background

The Kepax Bridge scheme is jointly promoted by Worcestershire County Council (WCC) and Worcester City Council who are working in partnership. The new pedestrian and cycle bridge will deliver an additional link across the River Severn in Worcester from Gheluvelt Park to the Kepax site in St Johns.

The scheme is included within a number of policy documents as it will provide a vital link between two parts of Worcester, reduce severance caused by the River Severn and encourage the use of active modes for journeys around the city. The scheme proposal builds upon the huge success experienced at Diglis Bridge (which has seen far more use than was originally forecast) and would provide a welcome addition to the family of bridges already in place in the City.

1.1 Scheme Location and Description

Kepax Bridge is a proposed pedestrian and cycle bridge over the River Severn, approximately 110m in length. Provision of the bridge, access paths to the local highway on either side of the river and some improvements to wider pedestrian and cycle links is hereafter referred to as 'the scheme'.

The proposed location of the structure is between Gheluvelt Park on the east side of the river, and the site of a disused landfill site, formally owned by Kepax, on the west side of the river and to the north of the City Centre, as shown in Figure 1.1.

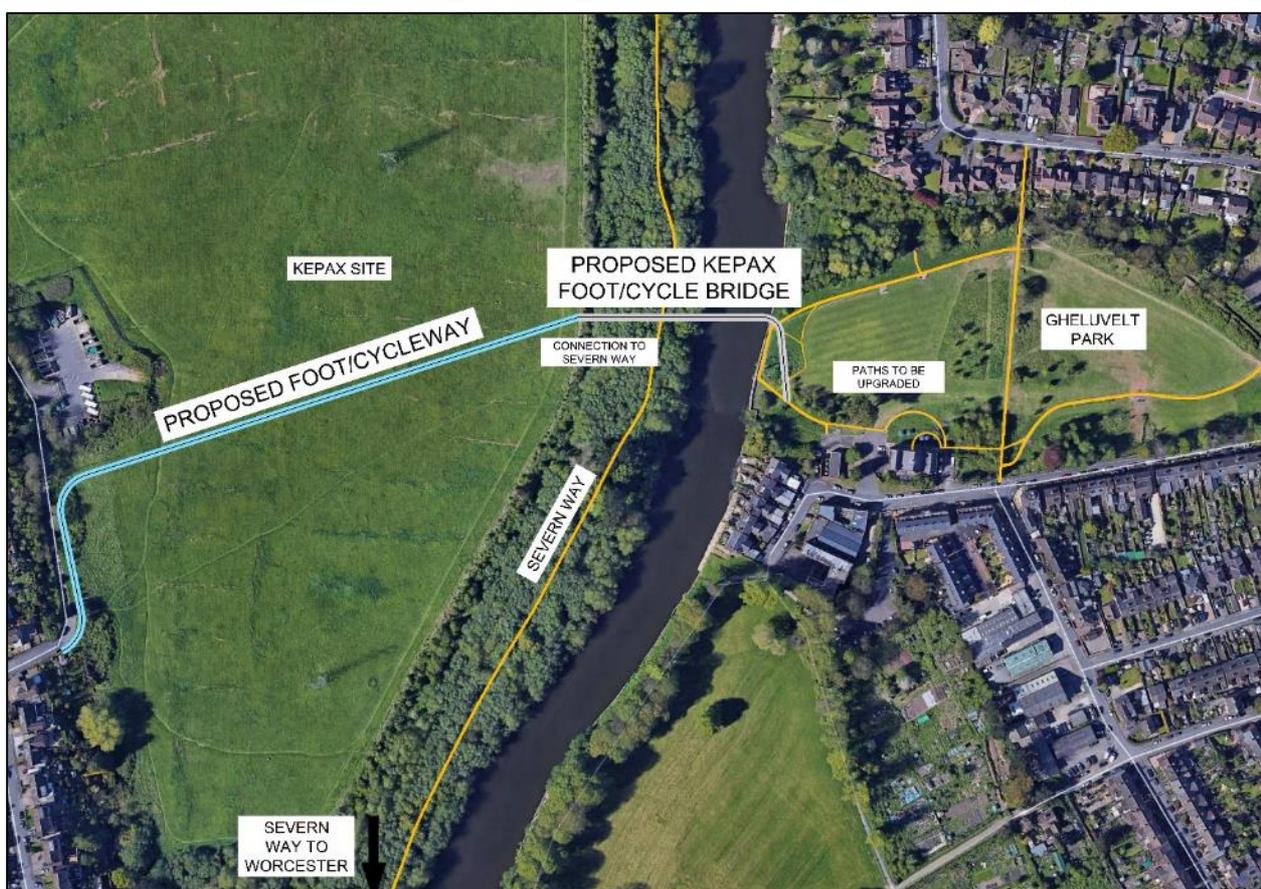


Figure 1.1: Location Plan

The scheme includes a direct access path over the Kepax site, connecting users to the west side of the river via Hallow Road. On the east side of the river, the bridge will sensitively tie in with existing pathways, connecting users to Waterworks Road and Barbourne Road via Gheluvelt Park.

A riverside loop will be created (via Sabrina or Diglis bridges) through use of existing paths. It is intended that the Severn Way to the south of the bridge will be improved by upgrading the surface, street lighting, signage and vegetation clearance. On the eastern side of the river, some additional walk and cycle routes will be improved, including enhancement of the existing NCN 46 route (Stephenson Road, Stephenson Terrace – vegetation clearance, footpath widening, signage and street lighting) and upgrade of connection from the scheme to NCN 45 (Gheluvelt Park to Pipe Iron Road and Somer's Road – upgrade of existing A38 crossing facility and signage).

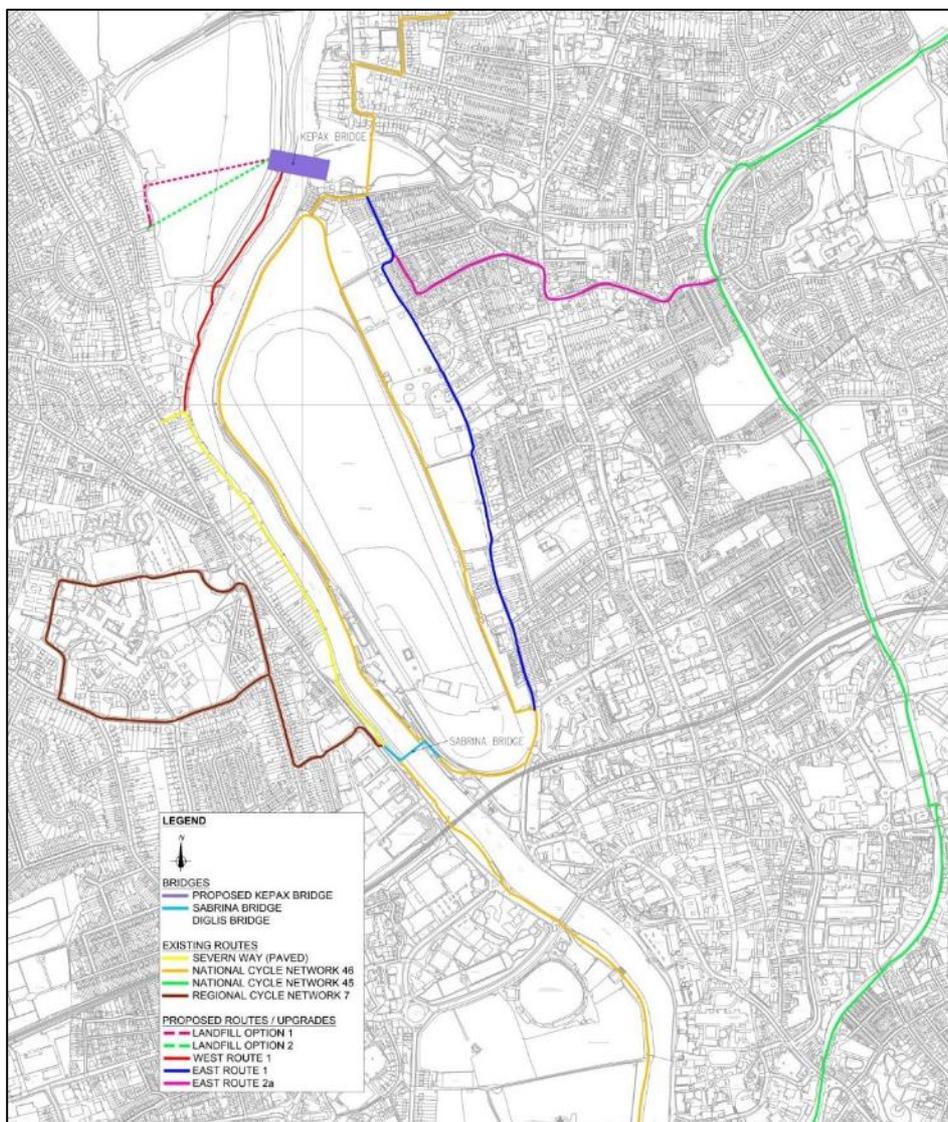


Figure 1.2: Scheme proposed wider links

1.2 Business Case Requirements

A Strategic Outline Business Case (SOBC) was prepared for the scheme and presented to Cabinet in November 2019. Recommendations agreed at the Cabinet meeting included:

- Development of a Full Business Case;
- Preparation of a Planning Application; and

- Submission of funding bids to third parties for the completion of the scheme.

Preparation of the Outline Business Case (OBC) has followed the WebTAG guidance on the process for appraisal work. The study work is divided into distinct phases:

- Phase 1 – WebTAG Appraisal Stage 1, Steps 1-4 – identifying objectives (within the SOBC, to be refined in the OBC);
- Phase 2a – WebTAG Appraisal Stage 1, Steps 5 – 8 - option development and sifting and Option Assessment Report (OAR) (the focus of this report);
- Phase 2b – WebTAG Appraisal Stage 1, Step 9 – Appraisal Specification Report; and
- Phase 3 – Preparation of OBC.

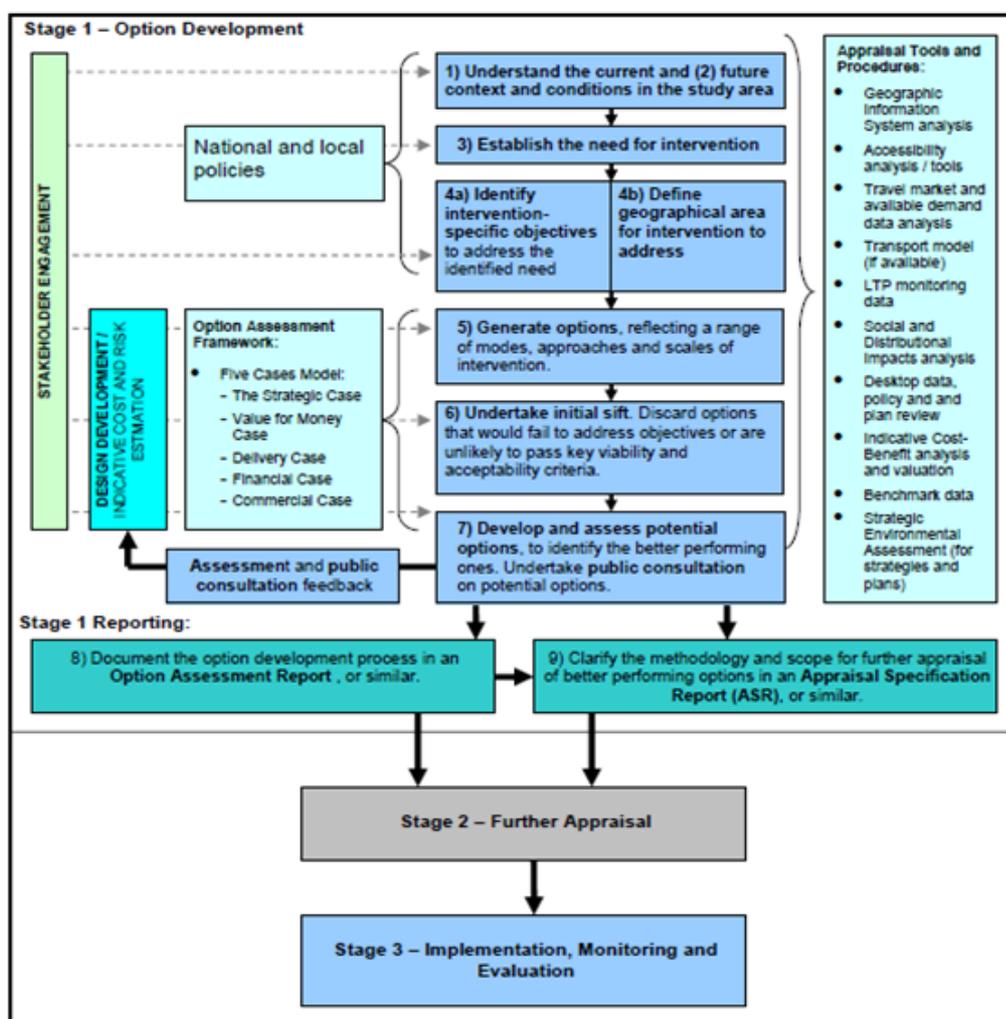


Figure 1.3: DfT Appraisal Process

1.3 Approach to Option Development

The high-level approach to identifying options is presented in the figure below. Option development has given regard to a number of sources, including:

- Design Standards outlined within 'Design Manual for Roads and Bridges'

- Policy review undertaken for SOBC;
- Consideration of constraints including environmental, geotechnical and structural;
- Engagement with stakeholders including the Planning Officer and Environment Agency;
- Consideration of wider connections;
- Jacobs previous experience and expertise.

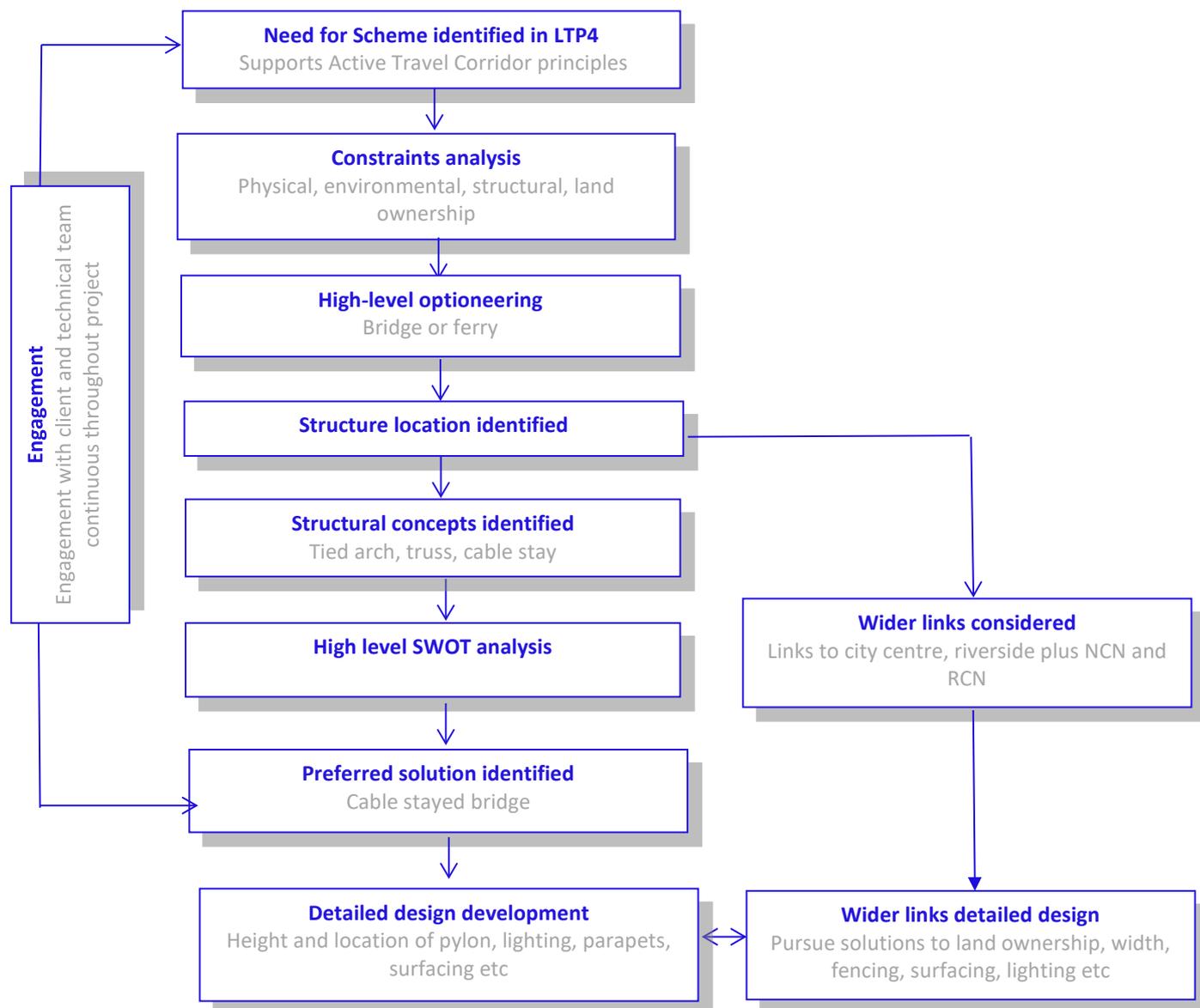


Figure 1.4: Option assessment process

1.4 Purpose of this Report

The Kepax Bridge OAR documents the process of identifying the need for a transport intervention and the process of option development and selection. This is a requirement of the DfT's Transport Analysis Guidance: The Transport Appraisal Process.

The OAR aims to address the following requirements:

- Present a sound body of analysis to provide evidence of the problems and challenges;
- Clearly state the study objectives and intended outcomes, including background on the wider context of improvements within which this scheme falls;
- Define the future 'without intervention' scenario, considering potential scenarios;
- Document the process of option generation, sifting, and assessment;
- Document the work undertaken to ensure that the scheme design(s) going forward to full business case development represent the optimum scheme when considered against the Option Assessment Framework;
- Summarise the headline results across all options considered and provide conclusions on the comparative performance of options; and
- Identify the better performing option(s) to be taken forward for further, more detailed appraisal.

2. Policy Context

2.1 Introduction

The national, regional and local policy context for improving walking and cycling opportunities to provide health, transport and planning benefits is well established. The National Planning Policy Framework, strongly requires investment in walking and cycling including suggestions that:

- Local Authorities must promote healthy and safe environments – specifically by 'layouts that encourage walking and cycling';
- Opportunities to promote walking must be prioritised; and
- Investing in cycling and providing travel mode choice reduces congestion, improves air quality and benefits public health.

The Kepax Bridge scheme is included within the Worcestershire Strategic Economic Plan (SEP), Worcestershire’s adopted Local Transport Plan (LTP4) and the South Worcestershire Development Plan (SWDP) and associated Infrastructure Table (Annex I). It is a key element of Worcester’s transport strategy designed to accommodate east-west walking and cycling movements and support a number of Active Travel corridors in the city.

The scheme is aligned with a number of overarching policy objectives, in particular in terms of supporting travel choices alternative to the private car, improving air quality and improving health and wellbeing.

2.1.1 Worcestershire LEP SEP

The SEP, prepared by the WLEP in 2014, aims to create a world class location, world class skills and world class innovation in order to achieve the overall vision for Worcestershire which is *“to build an internationally recognised, highly competitive, innovative business location with better productivity and sustainable economic growth.”* The ten year strategy sets ambitious targets: 25,000 new jobs, 10,000 apprenticeships, 9,400 homes and a £2.9 billion increase in GVA by 2025 – overall growing the economy over the 10 year period by a third.

Supporting economic growth is a key priority. The SEP recognises that pinch points to the strategic transport networks are constraining economic growth and that investment in Worcestershire’s transport infrastructure is essential to provide businesses with improved access to markets and employees to encourage economic growth.

The SEP includes a crossing in Worcester at Gheluvelt Park (SEP Scheme Number 8, the subject of this OAR). It outlines that the rationale for the scheme includes supporting development in West Worcester and removing a barrier over the River Severn.

Scheme Number	Scheme name	Scheme description	Rationale (linked to growth)	Est Total Cost of Scheme	BCR	Est Jobs Created
8	Worcester Crossing – Gheluvelt Park	New pedestrian / cycle footbridge over the River Severn	Sustainable Transport – creates sustainable transport modes which support development to West Worcester –housing and development growth. River Severn creates a barrier to sustainable transport trips in the Gheluvelt Park area of Worcester.	£2m	4.3 (Part of wider Worcester Package)	20

Table 2.1: Snapshot from Worcestershire SEP List of Transport and Infrastructure Schemes

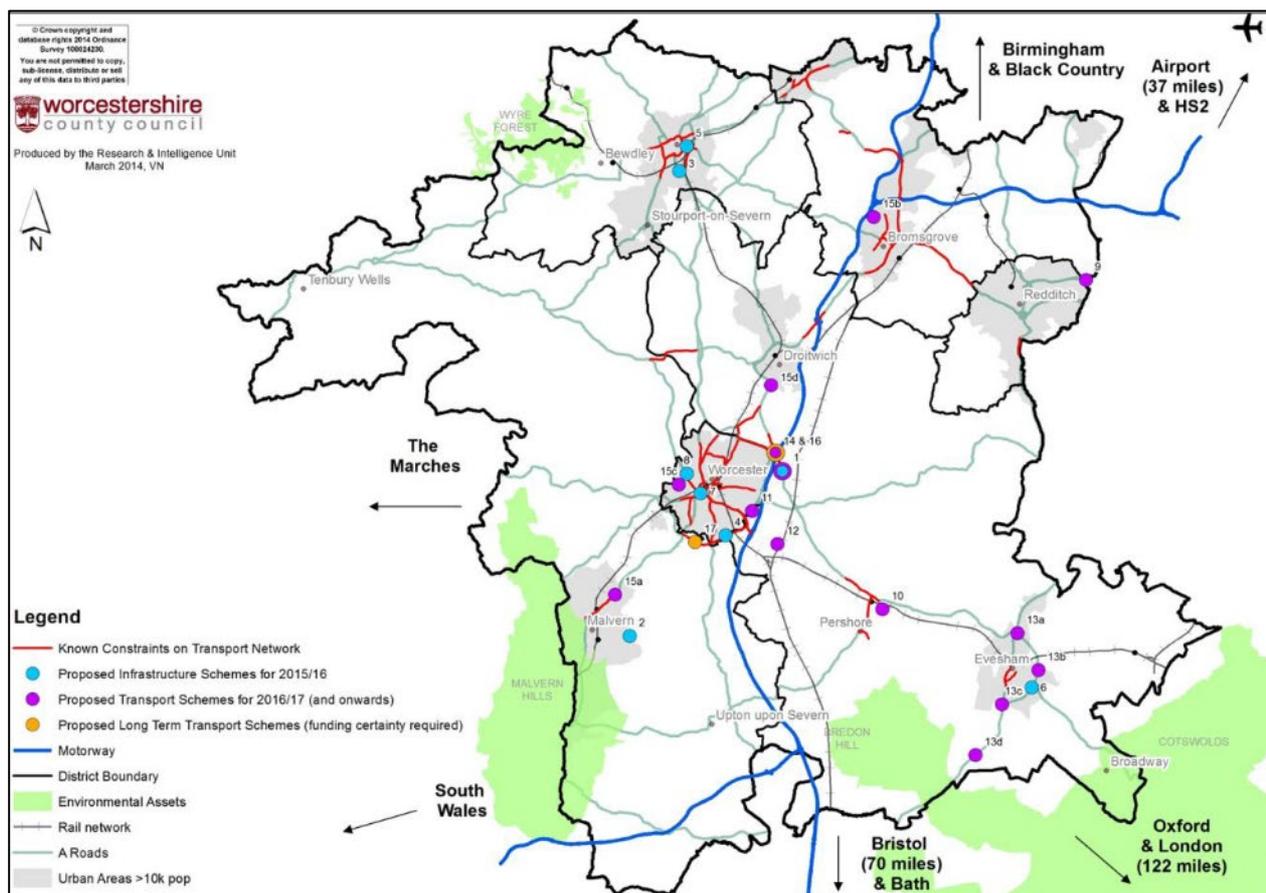


Figure 2.1: SEP Proposed Transport Schemes (number 8 in the centre of Worcester is the Kepax Bridge scheme)

2.1.2 “Shaping Worcestershire's Future” - Corporate Plan 2017 - 2022

‘Shaping Worcestershire’s Future’ is a Corporate Plan to guide the Council’s work to achieve the best for individuals, families, communities and partners over the next five years. The Plan has four key priorities which are supported by a number of objectives. These are:

- **Open for Business:** As one of the fastest growing local economies in the country, being “open for business” remains the key priority for the Council. This is vital if both individuals and businesses are to achieve their full potential and if Worcestershire is going to continue to prosper.
- **Children and Families:** This priority includes objectives of children and young people achieving their full potential in education and more young people moving successfully into employment.
- **The Environment:** The environment is one of the county’s key features, providing easy access to the countryside and a wealth of stunning scenery. Objectives include being a responsible custodian of the county’s environment and a commitment to improve transport network and deliver resilient infrastructure.
- **Health and Well-Being:** The Council wants to ensure that Worcestershire residents are healthier, live longer, have a better quality of life and remain independent for as long as possible. The plan states ‘Our natural environment, green spaces and areas of outstanding natural beauty - including riverside locations and canal networks with towpaths - offer numerous walking, cycling and recreational options across the county and will be promoted as providing accessible opportunities for better health’.

The Kepax scheme would play an important role in achieving Corporate Plan priorities. It would provide a more direct link between the Henwick Park area and Barbourne, Claines and associated areas and improve access to open space and a Green Flag park. In addition, improvements to the existing adjoining walking and cycling network will connect residents to wider leisure, employment and education opportunities via the National Cycle Network.

Table 2.2 outlines how the Kepax scheme aligns with the Corporate Plan.

<p>Open For Business</p> <ul style="list-style-type: none"> • Local Multiplier Effect • Local Job Creation • Additional visitor spending • Tourism sector opportunities • Creation of skills and training opportunities • Apprenticeships • Work placement scheme for NEETs (Not in Education, Employment & Training) • Opportunities for long term unemployed 	<p>Children & Families</p> <ul style="list-style-type: none"> • Opportunities for NEETs (Not in Education, Employment & Training) • Promoting & encouraging community engagement and building community resilience • Improved access to education and training
<p>Environment</p> <ul style="list-style-type: none"> • Additional walking and cycling trips • Reduction in car trips • Waste minimisation / recycling • Landscaping proposals 	<p>Health & Wellbeing</p> <ul style="list-style-type: none"> • Healthier communities through additional walking and cycling opportunities • Healthier workforce through additional walking and cycling opportunities

Table 2.2: WCC Corporate Priorities

2.1.3 Worcestershire LTP4 (2018 to 2030)

Worcestershire's LTP4 sets out the issues and priorities for investment in transport infrastructure, technology and services to support travel by all relevant modes of transport, including walking and cycling. LTP4 recognises that transport networks have a finite capacity and that planned development growth not only brings challenges for this but also for air quality and road safety. Investment within the plan is targeted in three broad areas:

- Transport Technology - including managing demand on network, managing traffic flows and ultra-low emission vehicle technology.
- Travel Choice - including prioritised investment in alternative modes of travel including continuous corridors for active travel modes and improvements to the public realm in urban areas.
- Capacity Enhancement – including enhancements at key pinch points to support development growth, tackle congestion, improve road safety and air quality.

LTP4 goes on to state that “... 85% of our population in Worcestershire live in our urban areas and on interurban corridors, yet car usage, particularly for shorter trips of up to 3 miles, is at the highest it has ever been in our history (Census 2011). One of the key opportunities to tackle congestion is to encourage use of other modes of transport (travel choice), particularly for these shorter trips. Nationally and at the local level, evidence and experience consistently proves that even small shifts away from single-occupancy car use to walking, cycling, motorcycling and passenger transport can deliver significant improvements to traffic flow and wider benefits, including reduced ambient air pollution which improves public health”.

The scheme will directly support the second LTP4 area (travel choice) by increasing the attractiveness of walking and cycling and facilitating a number of active travel corridors (ATCs) within Worcester, including:

- SWAT12 - Worcester North East- North West Active Travel Corridor (Lower Broadheath to Worcester Six, **via new river bridge**); and
- SWAT13 - Worcester River Severn Active Travel Corridor (Sabrina Bridge to Kepax).

Strategic Active Travel Corridor Schemes for South Worcestershire

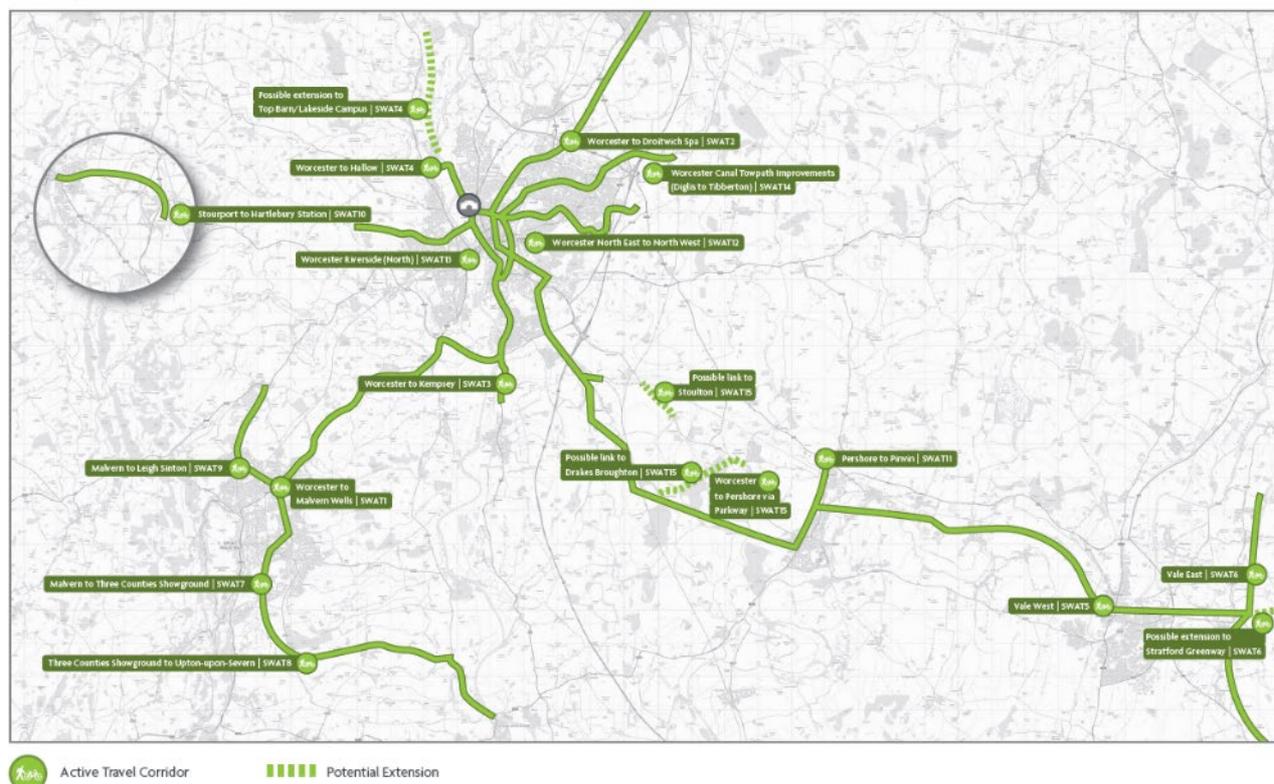


Figure 2.2: Active Travel Corridors (ATCs) and Kepax Bridge

2.1.4 South Worcestershire Development Plan (2016)

The SWDP is the Joint Local Plan of Malvern Hills, Worcester and Wychavon district councils. The SWDP sets out a series of objectives which are:

- Economic success that is shared by all;
- Stronger communities;
- A better environment for today and tomorrow;
- Improving health and wellbeing; and
- Communities that are safe and feel safe.

The SWDP outlines the land allocations for various housing, employment and mixed-use development schemes over the plan period. It makes provision for 280 hectares of employment land and 28,400 dwellings during the plan period.

Policy SWDP 4 relates to Moving Around South Worcestershire and states that *“Priority will be given to improving public and community transport provision, walking and cycling infrastructure during the plan period”*. LTP4 outlines that Phase 1 of the Worcester Transport Strategy only addresses existing transportation needs at 2010 and there will therefore be a requirement for the phased implementation of additional elements of the Worcester Transport Strategy, including additional walk and cycle route enhancements.

Policy SWDP 7 relates to Infrastructure and outlines that *“Development will be required to provide or contribute towards the provision of infrastructure needed to support it”*.

Policy SWDP 45 includes details of Worcester urban extensions, including SWDP45/2 Temple Laugherne (Worcester West urban extension). Development in this location includes provision for 5 hectares of employment land and 2,150 dwellings and the SWDP outlines that *“Proportionate contributions directly related to the development will be sought to support and safeguard the implementation of relevant schemes set out in the Worcestershire Local Transport Plan 3, including... improved accessibility by non-car modes to Worcester city centre”*.

3. Need for intervention and scheme objectives

3.1 Introduction

This section of the report summarises the need for the scheme and scheme objectives, which were presented in the SOBC. Objectives for the scheme have been developed in order to:

- Align with national and local policies, issues and priorities;
- Understand impacts of a scheme; and
- Define ‘success’.

The location for the proposed structure has been determined by WCC and Worcester City Council to improve walking and cycling routes to the north of Worcester City in accordance with the plans set out in Worcestershire’s Local Transport Plan 4 (LTP4) 2018-2030, including Active Travel Corridors. The scheme is also included within the Worcestershire SEP in relation to supporting development in West Worcester and removing a barrier over the River Severn.

Any future east-west link and possible pedestrian and cycle crossing of the River Severn would have utility value in this location with the employment (east) and residential (east and west) areas being linked. A new crossing point would also enable circular leisure walks and bike rides from the existing Sabrina Bridge and beyond making Worcester a more attractive riverside destination. This would create transport, health and tourism opportunities.

Residents would also be linked with the university and open green spaces, including green fields to the west and Gheluvelt Park which is a Green Flag Park and War Memorial.

3.2 Scope of Study

This study involves the assessment of options for a new pedestrian and cycle bridge over the River Severn in the north of Worcester, and appropriate wider links which will connect residents to facilities and services.

As outlined in the previous section, current policy documents have established the need for the bridge in order to improve accessibility and support Active Travel Corridors. Therefore, this is the only option considered within this report. Complementary cycling and walking schemes are being provided through LTP4, alongside a number of highway and public transport schemes (see Figure 2.2).

3.3 Problems Identified

The problems that the scheme is seeking to address were reported in the SOBC. In summary, these are:

- Poor connectivity within north Worcester – The River Severn acts as a barrier to movements in an east-west direction.
- Poor connectivity for pedestrians and cyclists - The nearest existing pedestrian crossing of the River Severn is Sabrina Bridge approximately 1 mile south of the proposed location and the nearest northern river crossing is at Holt Fleet approximately 5 miles away.
- Safety for cyclists and pedestrians will be enhanced through provision of a new off-road bridge and improvements to existing links.
- Poor legibility of the cycling network - Improvement of wider links, including those alongside the river to the south of the bridge will connect residents in the north of Worcester to destinations such as the city centre and University.
- ‘Pinch points’ on the existing network to be improved for pedestrians and cyclists - For example crossing the Barbourne Road to get between Gheluvelt Park and the canal network.

- Riverside paths are susceptible to flooding – Wider improvements to walking and cycle links in the north of Worcester will offer alternative routes and improve resilience of the network.
- The riverside is an important area of leisure and tourism for Worcester – There has been investment to the south due to Diglis and surrounds but now there is a need for focus to shift to the northern area of Worcester.
- Lower levels of walking and cycling in Worcestershire – The scheme will promote active modes generally across Worcestershire, reducing the proportion of residents driving to work in a car (only 66% in England but 80% in Worcestershire).
- Poor air quality is outlined as a priority within the Healthy Worcester Plan, which outlines that *“modelled estimates showed that in 2018, 31% of males and females and 33% of males and females in Worcester city live in areas of high levels of fine particulate matter (PM2.5) and NO2”*.
- Improving the health of Worcester residents by increasing activity levels is a priority outlined in a number of strategy documents within the city – improved pedestrian and cycle infrastructure will help to achieve this.
- Access to open space - there is a lack of parks and recreation space on the west of the river in north Worcester (St Clement ward).

3.4 Scheme Objectives

A number of objectives were presented within the SOBC. These objectives have been refined following engagement (an internal workshop with wider WCC staff) and closer consideration of wider strategic aims of WCC, Worcester City Council and WLEP.

OBC objectives for the scheme are:

- Minimise the impact of any new infrastructure on the natural environment and ecology and, where possible, deliver opportunities for environmental enhancement.
- Bridge and access paths to be designed to standard, with the safety and security of all users being a key priority throughout the design process. The bridge, ramps and access paths are to be accessible to all.
- To improve connectivity within Worcester by foot and cycle, thus improving the physical health and wellbeing of north Worcester residents, employees and visitors.
- Provision of a direct route for short journeys over the river and to provide a link into the wider network for longer trips. This will improve access to jobs, services and leisure activities.
- Provide an alternative walk and cycle link over the river thus increasing transport resilience.
- Increase visitor numbers to Worcester, through the provision of new walking and cycling infrastructure including a riverside leisure ‘loop’, resulting in additional visitor spend and increased visitor economy jobs.
- Contribute to improving the public realm and public spaces around the bridge and help to activate these areas.

3.5 Scheme Outcomes

Expected benefits of the scheme, which were presented within the SOBC are:

- Increased use of active modes, particularly in north Worcester, resulting in:
 - Improved physical health of residents
 - Improved mental wellbeing of residents

- Reduced congestion
- Improved local air quality
- Improved accessibility and transport choice
- Reduced severance and increased network resilience through the provision of an additional river crossing.
- Increased leisure use of the riverside area.
- Increased tourism and visitors to attractions such as Worcester racecourse and the Pump House Environment Centre.
- Increased use of Green Flag park which includes a splash pad to the east of the river.
- A safer pedestrian and cycle network in the north of Worcester, with more off-road provision.
- A more legible cycling network from the north of Worcester to destinations such as the canal, city centre and university.
- Improved connections to National Cycle Network Routes 45 (Chester to Salisbury via Worcester and Birmingham Canal) and 46 (Bromsgrove to Neath via Gheluvelt Park and the Racecourse).
- Improved connections to Regional Cycle Network Routes 3 and 7.

4. High-level Optioneering

4.1 Introduction

A number of scheme objectives, including improving connectivity and providing an alternative walk and cycle link across the River Severn could be achieved by either the provision of a ferry or bridge, and therefore both have been considered at a high level.

A ferry could provide not only a service between both sides of the river but also some flexibility in serving other locations along the river. It could result in lower construction costs and be at less risk of flooding, with a smaller impact on local ecology. However, a ferry requires the construction of decks and a company to run and maintain the service. It is also more restrictive for people since they usually have to pay a fare to use the service. Bridges provide better benefits in terms of time, capacity, safety, and ease of use, which is why ferry services have been becoming less popular with many services being stopped or replaced.

There are a range of options available for both bridges and ferries, for example from a cable/chain ferry to a larger motor engine ferry and a truss, cable stay or arch bridge. A red, amber, green assessment of the two options has been undertaken, based on the DfT Early Assessment and Sifting Tool².

4.1.1 Discontinued Kepax Ferry

A ferry began operating in the Kepax location in around 1882 and by the 1920's this had become a very popular way of crossing the river for people using the riverside paths to Hallow and the Camp Inn. It is thought that the ferry operated from the end of Park Avenue, to the north of Gheluvelt Park.

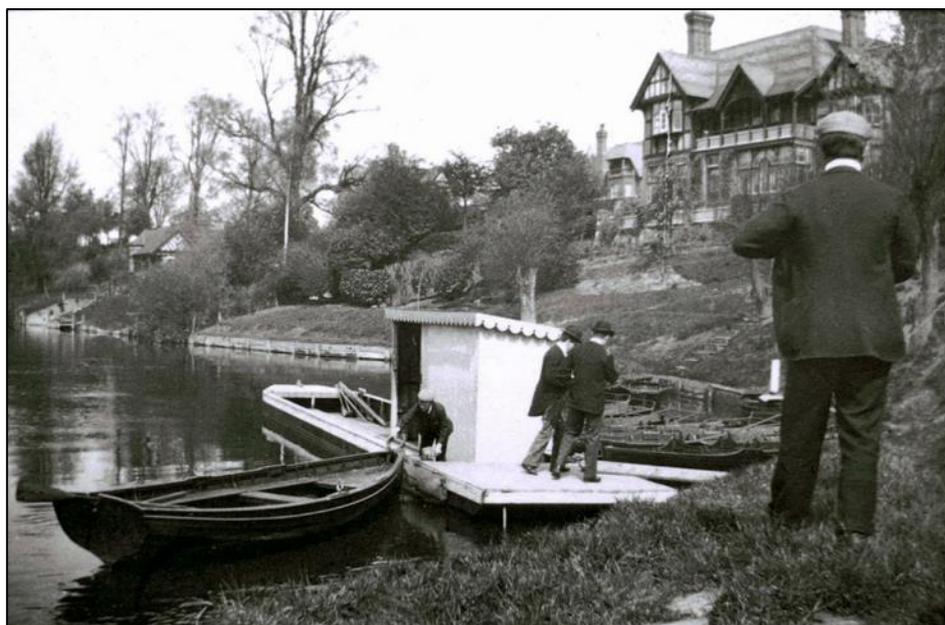


Figure 4.1: Kepax Ferry³

4.2 Example ferry crossings

4.2.1 Worcestershire

Cathedral Ferry

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/882868/east-tool-guidance.pdf

³ Source: <https://www.cfow.org.uk/picture.php?/5242>

Worcester Cathedral Ferry crosses between the Worcester Cathedral riverbank and Chapter Meadows, on Saturdays, Sundays and Bank Holidays. The ferry service is restricted to the summer because of changing river levels and falling demand in the colder seasons.

It costs 40p to cross the river and proceeds go to local charities, with a team of nine ferrymen operating the service. The ferry operated daily for centuries until the late 1950s and was restarted in 1984.



Figure 4.2: Worcester Cathedral Ferry⁴

Lower Lode (Tewkesbury) ferry

Tewkesbury Lower Lode Ferry crosses the River Severn between Easter and September. It is a fairly informal service which takes bikes.



Figure 4.3: Lower Lode Ferry⁵

Hampton (Evesham) Ferry

The Hampton Ferry is a pedestrian cable ferry that has been operating between the village of Hampton and the town of Evesham for almost 800 years. The fare charged is £1 for adults and 50p for children (each way). It serves a holiday caravan site with boat moorings, angling facilities and a licensed restaurant.

⁴ Source: <https://www.worcesternews.co.uk/news/11468350.last-calls-of-the-season-for-cathedral-ferry/>

⁵ Source: <https://www.tewkesbury.town/tewkesbury-ferry-lower-lode/index.htm>

The ferry is manually operated by pulling on a cable that is suspended across the river. When the ferry is docked at either bank the cable is allowed to sink to the river bottom, so as not to interfere with navigation.



Figure 4.4: Hampton Ferry⁶

4.2.2 Other comparator ferries

In order to achieve scheme objectives, any ferry service would need to be able to accommodate cyclists and operate all day (for the benefit of commuters). To avoid long waiting times, the ferry would need to operate at a regular frequency. On this basis, additional case studies have been considered, over and above ferries already operating in Worcestershire.

The **Shields Ferry** has been operated by Nexus, the Tyne and Wear Passenger Transport Executive since 1972 when it became part of the Metro system. The ferry service makes just under 25,000 journeys and carries nearly 400,000 passengers a year. Normally, the services run every 30 minutes and takes 7 minutes to cross the river. Both ferry landings are 5 and 10 minute walk from the metro South Shields Interchange and North Shields Metro Station respectively.



Figure 4.5: Shields Ferry⁷

The **Gosport Ferry** has been operating since 1875 and is the quickest way to get between Portsmouth and Gosport. The service carries over 3 million passengers a year and accepts bicycles. The service runs every 7.5 minutes (during peak times) and is a 4 minute crossing, removing the need for a 14-mile journey by road. A range of rickets are available for single trips, multiple journeys or season tickets of varying length.

⁶ Source: <https://www.visitevesham.co.uk/do/river-ferry/hampton-ferry/>

⁷ Source: <https://www.bbc.co.uk/news/uk-england-tyne-36270428>



Figure 4.6: Gosport Ferry⁸

4.3 Example bridge crossings

4.3.1 Worcestershire

Sabrina bridge

Sabrina Bridge is a cable-stayed bridge footbridge in Worcester which was built in 1992. Below is a table which estimates the average daily flow on the bridge, using monthly count figures from July and November 2018 (counts provided by WCC).

Year	Daily average pedestrian	Daily cyclist pedestrian	Annual pedestrian	Annual cycle
2018	3,212	492	1,172,417	179,531

Table 4.1: Estimated demand for Sabrina Bridge

Diglis Bridge

Diglis Bridge opened in July 2010, having cost £1.8 million to construct, £3.5 million total⁹. It is a shared use bridge over the River Severn in Worcester, built to increase connectivity for pedestrians and cycle users in the south of Worcester. It creates a circular cycle path between Worcester's main Sabrina Bridge and the Diglis Locks.

Diglis Bridge was developed as part of the Sustrans Connect2 programme, funded through the BIG Lottery. Sustrans was responsible for surveying the area and making demand estimations pre-construction and monitoring post-construction. In 2012 Sustrans released a Route User Intercept Survey which gave the levels of demand in 2009 and 2011. Also, the council performed a pedestrian count during 2018. The pedestrian counts in 2018 provided by the council are based on an average daily demand for each month. The demand figures are summarized in the table below.

Year	Daily average pedestrian	Daily average cyclists	Annual pedestrian	Annual cycle
2018	887	170	323,937	61,692
2011	795	387	290,470	141,397
2009 (initial forecast)	56	27	20,696	10,091

Table 4.2: Demand for Diglis Bridge (source: Route Intercept Survey Report – Connect2, 2012)

⁸ Source: <https://www.gosportferry.co.uk/>

⁹ <https://www.gov.uk/government/case-studies/new-cyclist-and-pedestrian-bridge-diglis-bridge-worcester>

The provision of Diglis Bridge extended the traffic-free network in the south of the city, linking to employment, leisure and educational centres. Additionally, wider improvements were made to links across the city radiating from Diglis Bridge, including new stretches of traffic-free path, toucan crossings and signing.

4.3.2 Other comparator bridges

Tees Valley

The Infinity Bridge is a public pedestrian and cycle footbridge across the River Tees. It opened in May 2009 at a cost of £15 million and links Teesdale Business Park to the University of Durham Queen's Campus. It was anticipated that 4,000 people a day would use the bridge.

York

Millennium Bridge in York was built in 2001 for £4.2 million. Following the opening, annual usage of connecting bicycle and pedestrians paths and other routes at each end of the crossing increased from 430,000 pedestrians to 740,000, from 220,000 cyclists to 290,000 and from 650,000 to overall to 1,030,000. These increases reflected both presence of the pedi-bike bridge and further developments of the feeder route system. It was reported that over half of all new trips were to and from destinations such as workplaces and shops¹⁰.

4.4 High-level assessment

The location of any crossing point (bridge or ferry) must consider a number of factors, including:

- Construction of any infrastructure;
- Access to the crossing;
- Close to centres of population;
- Proximity to other crossings (for example, if too close to Sabrina demand will be split);
- Existing connections.

A ferry can provide access in locations where it is not feasible or possible to build a bridge, if good access to the riverside is achievable.

4.5 Red amber green matrix

A high-level assessment of the two options (bridge and ferry) has been undertaken. This has been based on the DfT Early Assessment and Sifting Tool, considering scheme objectives and information from case studies.

Red/Amber/Green (RAG) scores are presented for each option for a number of categories in order to provide a visual guide as to the option's impact and a record for future reference. It is not intended that they are aggregated or averaged to provide a final RAG status for each indicator as the overall impact will depend on the strength of individual impacts. The RAGs have been weighed up and a view has been formed as to the likely overall impact of the option, justifying whether to continue to proceed.

¹⁰ https://books.google.co.uk/books?id=OupkRMUPTuAC&pg=PT132&lpq=PT132&dq=york+millennium+bridge+number+users&source=bl&ots=v_hOCOUS-9&sig=ACfU3U13-etSRmb61pRjWjvYMu1Cfirvow&hl=en&sa=X&ved=2ahUKEwj8s6nLq8rgAhU0onEKHU6ABJEQ6AEwDHoECAMQAQ#v=onepage&q=york%20millennium%20bridge%20number%20users&f=false

Definitions	
	Contradicts or hinders achievement of objectives/significant constraint to delivery
	No change/ no or negligible impact on objective/constraints could be overcome within scope of project
	Would deliver benefit against objective/achievable and deliverable

Strategic fit (policy and scheme objectives)								
Option	Overall fit with adopted policy objectives	Minimise the impact of any new infrastructure on the natural environment and ecology and deliver enhancement.	Safety and security of all users to be a key priority throughout the design process. Provision to be accessible to all.	To improve connectivity within Worcester by foot and cycle, thus improving physical health and wellbeing.	Provision of a direct route for short journeys over the river and to provide a link into the wider network for longer trips.	Provide an alternative walk and cycle link over the river thus increasing transport resilience.	Increase visitor numbers to Worcester, through the provision of new walking and cycling infrastructure including a riverside leisure 'loop'.	Contribute to improving the public realm and public spaces and help to activate these areas.
Ferry	Will encourage walking and cycling and support Active Travel Corridor principle. Support delivery of Worcester West Urban Extension. Improve health and wellbeing. Increase access to open space.	Minimal impact on the environment, depending on scheme location. Connections to the riverside will need to be created along with any supporting infrastructure such as piers/waiting facilities.	Possible issue with access – in particular access paths to the riverside and boarding and disembarking the ferry. Some H&S issues including Severn Bore, debris in the river, pull of the water during non-flooding and flooding periods. A smaller ferry, such as those operating in Worcestershire may not be accessible to all (disabilities, pushchairs, elderly). Any ferry service would need to accommodate cycles.	Possible difficulty with providing for multiple cycles. Any waiting (due to timetabling or high demand) would increase journey times and could cause frustration.	Timetabling of services could be an issue. Any wait would add to overall journey time, making short trip times less competitive. Provision may not be sufficient for high-traffic events such as the Worcester Show.	Issues around operation during flood events. Other H&S issues such as Severn Bore and debris in the river channel. Jetty's would be located adjacent to the riverside and could be unavailable during flood events. Could be issues around staffing the service.	Connection to the riverside is key to delivering this objective. Kepax ferry unlikely to be delivered adjacent to Gheluvelt Park due to levels either side of the river. Previous Kepax Ferry was provided further north. Connection to Severn Way in this location are ideal, but difficulties connecting on east side.	Opportunities for improvement limited. Ferry unlikely to operate from Gheluvelt Park. No path across Kepax Country Park provided.
Bridge	Will encourage walking and cycling and support Active Travel Corridor principle.	Some impact on the natural environment and ecology. Construction impacts likely to be more significant than a	Bridge and ramps would be designed to standard and Equality Act compliant. The bridge deck and ramp width would	Connectivity will be improved by walk and cycle. Shared use bridge deck and access paths would	Bridge ramps could link into NCN. Shared paths would adequately cater for forecast levels of cyclists and	Bridge ramps could be designed to land above current flooding levels, providing an alternative river	Provision of direct connections to the riverside on both sides should be possible.	Additional possibilities for improving Kepax Country Park, particularly in the future.

	Support delivery of Worcester West Urban Extension. Improve health and wellbeing. Increase access to open space.	ferry option. Where these occur, mitigation will be included within the scheme.	accommodate cyclists, disabilities, and pushchairs. Lighting would be considered as part of the scheme.	be designed to relevant standards. The bridge would always be accessible, in some cases making journey times quicker than by car.	pedestrians (use at Diglis).	crossing during any events.		Improved access to Gheluvelt Park and Riverside Park, key assets for WCC.
--	--	---	---	---	------------------------------	-----------------------------	--	---

Table 4.3: Strategic fit of ferry and bridge

Commercial and Management Case								
Option	Connectivity and reliability	Local environment	Well-being	Practical feasibility	Deliverability (including safety and engineering)	Consenting and land (planning, environment or land)	Affordability	Potential delivery models
Ferry	Any timetabling will need to be frequent in order to provide a reliable service. Services will need to operate all year round and accommodate commuters (early and later services). Could take a flexible route or make multiple stops. Services may need to be suspended during flood events, Severn Bore, debris in river channel.	Minimal impacts to the local environment. Riverside is designated a Conservation Area and Site of Wildlife Importance.	Will encourage physical activity. Tie in with local highways, but connections to east riverside may not be possible and connection to NCN may be convoluted. Reducing crime and fear of crime will be considered in scheme development. Reduction in severance caused by River Severn.	In relation to a ferry service there are uncertainties around: <ul style="list-style-type: none"> - Access from the local highway - Private or public operation of the ferry - Funding of the service - Charge to the public - Insurance/liabilities - Maintenance of boats - Staffing - Weather constraints and river conditions 	Possible sites for a ferry would need to be investigated further. Likely to be a number of deliverability issues to overcome, namely giving residents access to the riverside on either side. Land ownership issues on east side.	Permission will be required from the Canals and River Trust. Other permissions may be required for access paths and connection to the highway.	Structures would be required at both berths., for docking and also possibly for waiting passengers. It would vary depending on the size of the vessel, but this option is likely to be lower cost over a 30 or 60 year appraisal period.	A range of delivery models available from full public sector operation to local authority contract with private operator. Existing models in Worcestershire could be reproduced.

<p>Bridge</p>	<p>A bridge will be free at the point of use for all users. Will be in operation 365 days a year, 24 hours a day.</p>	<p>Impacts on air quality and noise during construction. These would need to be mitigated as part of any scheme. Any bridge would need to consider the setting of Gheluvelt Park (war memorial and grade 2 listed) and other local listed buildings. Riverside is designated a Conservation Area and Site of Wildlife Importance.</p>	<p>Will encourage physical activity. Tie in with local highways, riverside (both sides) and NCN. Reducing crime and fear of crime will be considered in scheme development. Reduction in severance caused by River Severn.</p>	<p>In relation to provision of a bridge there are uncertainties around: - Access from the local highway - Funding of the bridge - Maintenance</p>	<p>A number of deliverability issues to be overcome. Possible unstable and contaminated land issues on Kepax Country Park.</p>	<p>A number of permissions will be required, including planning consent and permission from Canals and River Trust and Environment Agency, in order to cross a navigable waterway.</p>	<p>Higher construction costs would be incurred. Maintenance costs will be incurred over the lifetime of the project.</p>	<p>Would be delivered and maintained by the local authority.</p>
---------------	---	---	--	---	--	--	--	--

Table 4.4: Commercial and Management Case of ferry and bridge

4.6 Conclusion

It has been concluded that the option of ferry provision will not be progressed as not all scheme objectives can be met. Specific issues with a ferry option include:

- Ease of access, particularly onto the boat.
- Affordability of the service - public would need to pay to access.
- The need to carry cycles, and for the journey time to be competitive with cars (frequency of ferry services may prohibit this).
- Difficulty with finding an appropriate location on the riverside, close to population centres and far enough from Sabrina Bridge.

5. Option Development and Sifting – Location

5.1 Scheme Location

As previously discussed, the need for the scheme is presented in current policy documents. For example, Figure 3.1 shows how a bridge in the north of Worcester supports two active travel corridors included within the LTP4. Two possible locations within the north of Worcester were investigated within a WCC Pre-Feasibility Study in 2017:

- Location 1 - Gheluvelt Park to the Kepax site; plus
 - Secondary option of Pitchcroft to the Kepax site; and
- Location 2 - Northwick Lido.

The possible locations are shown in the figure below, in the context of existing river crossings in the city and the existing NCN.

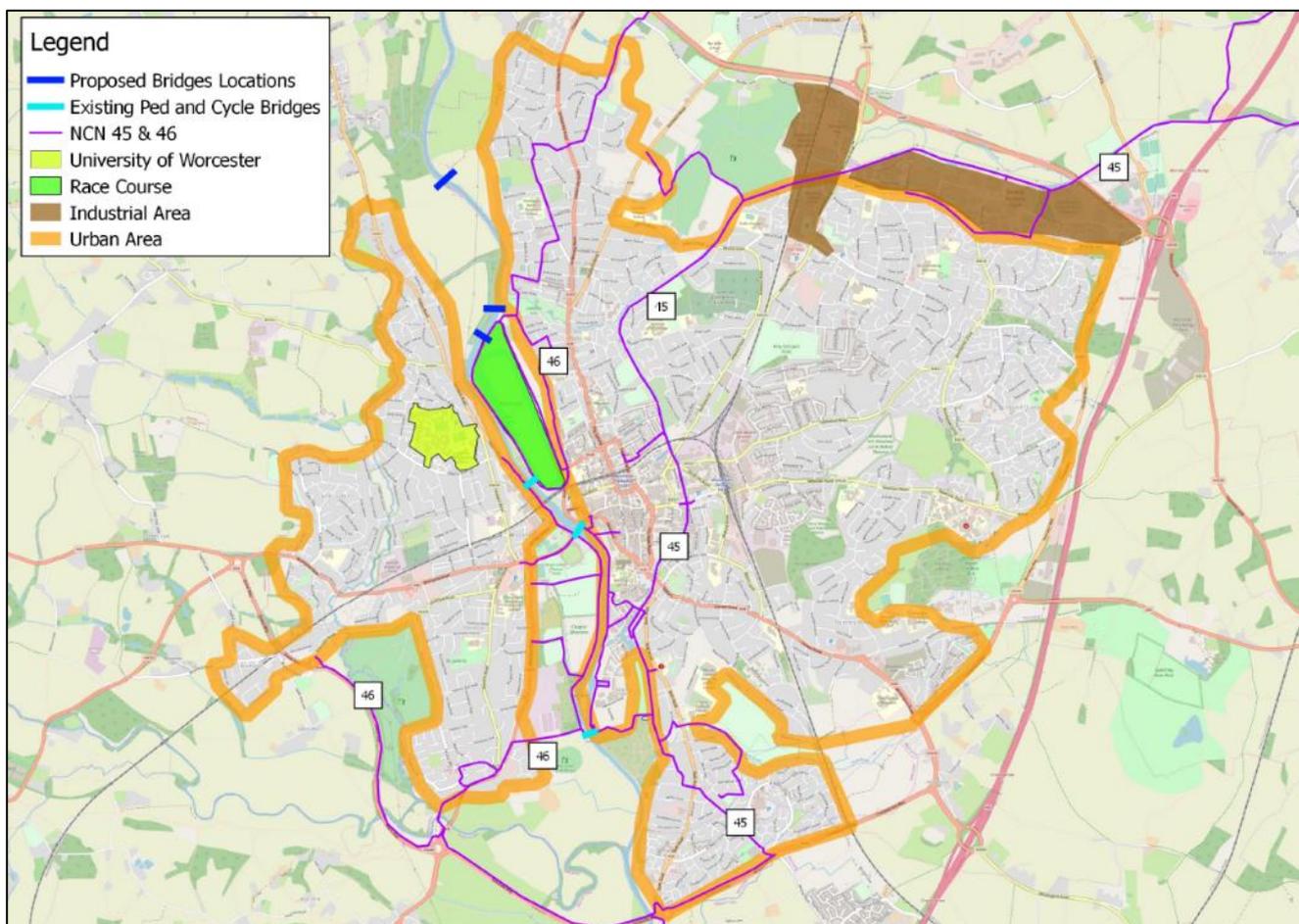


Figure 5.1: Possible Bridge Locations

5.2 Pre-Feasibility Study

5.2.1 Location 1 – Gheluvelt Park / St Johns

The first proposed site is approximately 1 mile north of Sabrina Bridge and located between the well-used Gheluvelt Park, on the east side of the river, and the site of a disused landfill site, formally owned by Kepax, on the west side of the river. The pros and cons for Location 1, as presented in the Pre-Feasibility report are presented in the table below:

Pros	Cons
Close to centres of population	Construction on Kepax very difficult
Existing connections in use	Construction access restrictions
Landownership is held between two Local authorities	Connections to west bank problematic
Fewer ecological constraints than location 2	Construction compound not identified
The use of Pitchcroft as a backup location	Unstable ground for landing site
	Erosion of river bank
	Localism
	Pitchcroft shut on racing days

Table 5.1: Pros and cons of Location 1

5.2.2 Location 2 – Northwick

The second proposed site is situated approx. 1.8 miles north of Sabrina Bridge and would be located in the area of Northwick Lido on the east side of the river and farmland on the west.

Northwick Lido is an area of flat open grassland located at the bottom of a stone track approximately 3m wide. The track is bordered on both sides by hedges and fences and towards Old Northwick Road. The area is low-lying with a gradual incline back towards Northwick.

The proposed landing area on the west bank is generally agricultural pasture then changing into a woodland travelling north. Both compartments of land rise are flat but then rise quickly towards the village of Hallow. The pros and cons for Location 2, as presented in the Pre-Feasibility report are presented in the table below:

Pros	Cons
Field in Trust encourages facilities if the ancillary use is to the outdoor arena	Serious ecological concerns - Very close proximity to SSSI
Public education could be incorporated into the site with regards to the SSSI	Landownership negotiations with possibly 3 landowners (higher cost)
Good access for construction on east bank (west bank not accessible – private land)	Not near centres of large population
Construction compound identified	Limited connectivity on west bank of river
Potential links to Grimley and Top Barn Farm and Activity Centre (expansion of Worcester University)	Connectivity back into Worcester not easy/safe or

Table 5.2: Pros and cons of Location 2

5.2.3 Conclusion

Following a review of the pre-feasibility study conducted by Worcestershire County Council, Location 1 was chosen for a number of reasons. On the east side, the structure can be sited on the higher ground near the retaining wall for two reasons; it is less likely to cause obstruction during flood and the height corresponds more closely with the land to the west bank, limiting the requirement to raise the abutment and approaches by importing fill material to make up the ground to a suitable height. Additional made up ground and lower headroom clearance over the River Severn could present numerous difficulties and have a negative effect on the land drainage both locally and increase the flood risk downstream through Worcester City centre.

On the west side, the option to move the structure location south to avoid the area of landfill has been considered however, access would still be required via the landfill site. There are concerns about the height difference between the ground levels either side of the river and the requirement for ramp design. The incorporation of ramps will significantly increase the cost of design and construction and would land the structure in, or very close to the racetrack of Pitchcroft and will open many security issues with the racetrack.

Location 1 comprises the least design and construction constraints and can be easily tied into the existing footpath network in Gheluveld Park.

6. Land Use and Constraints

A Kepax Bridge Feasibility Study was prepared in 2018. This document presented constraints and requirements in relation to the scheme being located at Location 1 (Gheluvelt Park). Constraints which were considered include the following:

Environmental / Planning Constraints	Engineering Constraints
Land ownership	Existing land uses
Effect on property	Existing structures
Effect on landscape including designations	Topography
Effect on ecology	Geology
Effect on public rights of way	Ground conditions
Effect on heritage	Connection to existing transport network
Visual impact	Ability to construct structure
Flooding and drainage	Ability to maintain structure
Conservation of the Riverside	Existing services
Former landfill and waste	Design standards
Gheluvelt Park	Willow Carr
Safety and security / lighting	

Table 6.1: Environmental and Engineering Constraints

6.1 Land use - east bank

On the east side of the river, Gheluvelt Park is owned by Worcester City Council and is split into two main areas; the more formal grounds that run from Barbourne Road to Barbourne Brook, and the less formal parkland west of Barbourne Brook to the River Severn. It is this second area that the report will focus.

The area closer to the river is flat and made up of short grassland with small areas of immature trees, shrubbery and sparsely spread outdoor gym equipment around the perimeter of the park. A surfaced path approx. 1.2 m wide skirts around the edge of the parkland creating a circular walk.

The North-West corner of the Park gently slopes away from a pump house forming two distinct levels to the land that borders the Severn. A drainage channel running along the northern edge of the park discharges surface water Barbourne brook into the River Severn. The brook has a hazardous water warning sign and is fenced off to prevent access. It is suspected the signs refer to the culvert under the B4482 Bilford Road that was repaired in 2016 after leachate from the former landfill site at Perdiswell had entered the watercourse through the damaged culvert. The signs are still in place and will require further investigation to confirm the nature of the hazard. Although not in immediate vicinity of the proposed structure location, it should be captured on the site risk assessment and may require additional health and safety measures are put in place on the site.

The Pump House Environment Centre was constructed in 1857 to draw and filter water from the River Severn. The existing retaining wall at the south-east corner of the park is believed to have been constructed to facilitate the water inlet for the pump house and the route of the inlet will need to be traced. Although the pump house building, equipment and adjacent land is not listed or recognised as having significant historic value, the formal section of the park is a designated war memorial and grade 2 listed due to the landscape interest and group value of several assets in close proximity. Consultation should be made with Worcester City and Historic England to confirm the listing does not extend to the proposed structures location. An assessment may be required to ensure the inlet pipe is capable of withstanding construction vehicle loading and/or is not damaged during the installation of deep pile foundations for the proposed structure.

It is proposed to site the structure upon the higher ground near the retaining wall for two reasons; it is less likely to cause obstruction during flood and the height corresponds more closely with the land to the west bank, limiting the requirement to raise the abutment and approaches through structures lower headroom clearance over the River Severn could present numerous difficulties and have a negative effect on the land drainage both locally and increase the flood risk downstream through Worcester city centre.

6.2 Land use - west bank

On the opposite side of the river (west side), the area of interest is comprised of several features. The Severn Way (a national walking trial), extends along the length of the river and passes through an area of Willow Carr, behind this the land to be discussed landfill site formally managed by Kepax.

The land is generally flat with several monitoring stations situated throughout the landfill site and surrounding area that measure conditions of gasses from the degrading waste. The land is accessed by the general public and “goat tracks” can be seen where members of the public frequently walk, however there are no surfaced paths in this area.

The land on the west bank is level with the willow carr extending between 40 and 55 m between the riverbank and the landfill site. The area is generally wet woodlands and has an open drain that dissects the land. There are some further monitoring stations and what appears to be an old covered well in the nearby area.

The option to move the structure location south to avoid the area of landfill has been considered, however access would still be required via landfill site. There are concerns with the height difference between the ground levels either side of the river and the requirement for ramp design. The incorporation of ramps would land the structure in, or very close to the racetrack of Pitchcroft and will open many security issues with the racetrack owners and landownership issues with private land owners both sides of the river and disruption and/or loss of income to the racetrack.

6.3 Constraints

6.3.1 Planning Considerations

The maps below are taken from the SWDP interactive policies map¹¹ (the location of the bridge is indicated by a blue dot). Planning designations within the site area include:

- Archaeological Sensitive Area;
- Riverside Conservation Area;
- Green Infrastructure;
- Historic Park and Garden;
- Site of Regional or Local Wildlife Importance;
- Green Space;
- Flood Fluvial Zones;
- Area Susceptible to Surface Water Flooding; and
- Policy Areas (Red and Blue).

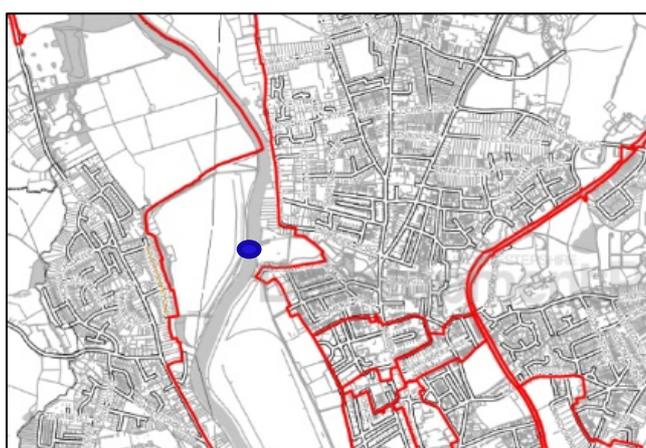


Figure 6.1 and Figure 6.2: Archaeological Sensitive Area (left) and Conservation Area (right)



Figure 6.3 and Figure 6.4: Green Infrastructure (left) and Green Space (right)

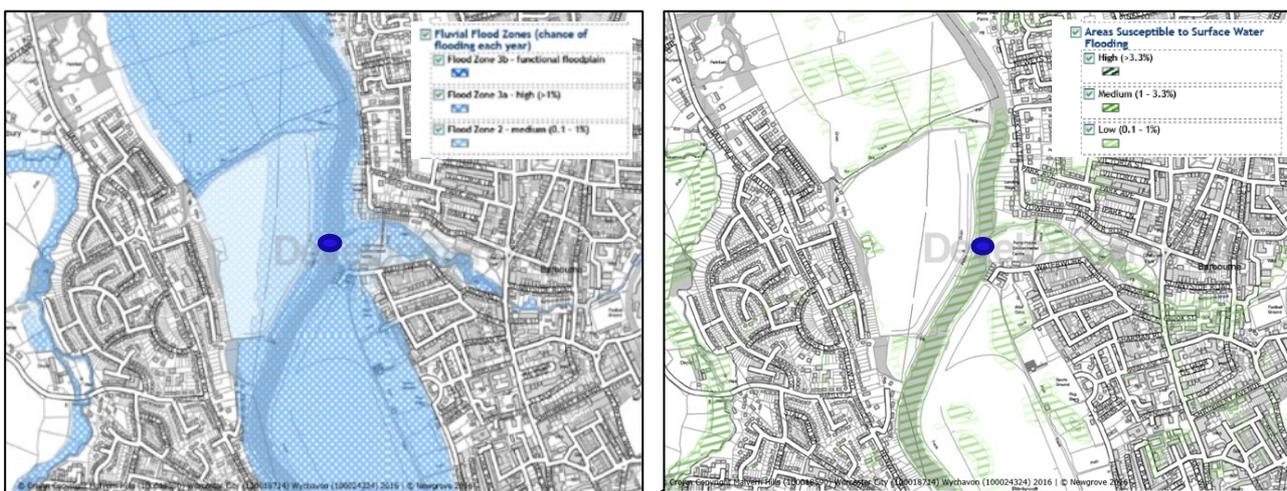


Figure 6.5 and Figure 6.6: Flood Fluvial Zones (left) and Areas Susceptible to Surface Water Flooding (right)

6.3.2 Ecological and Environmental constraints

- The bridge must be designed to not affect water flow and the river is highly sensitive to water pollution. As such the structure is to be designed as a single span over the river with no piers in the watercourse and abutments set well back from the embankments
- The design of cycle ways and footpaths and associated drainage must be sensitive to wildlife to avoid impact by entrapment in drains and severance of habitats by surfacing paths in the presence of reptiles.

- The bird breeding season (March-August inclusive) restricts when work can be carried out on vegetation or structures supporting active nests.
- Reinstatement of habitat/relocation of certain protected species and/or mitigation measures to reduce the impact of construction, operation and maintenance.

6.3.3 Existing Services

- **Water:** STW apparatus roughly follows the line of the Severn Way walking trail. The information received from the statutory undertaker's return does not show the type or size of equipment. Trial holes will need to be hand dug to determine the size, depth and location of the equipment.
- **Overhead Power Lines:** Existing 11kV overhead cables owned by WPD cross the river within 30m of the proposed structure location. This will impact on potential crane operations and consideration of this will be required with regards to design and buildability.

It is envisaged that pile driving machinery will be required on both sides of the river to install deep pile foundations in the soft silt sediment ground conditions. The 11kV overhead lines may be affected by ground vibrations caused during the installation of pile foundations and advice must be sought from the utility owner to mitigate.

To the west of the river running in a north south direction, 132kV overheads cut through the middle of the Kepax landfill, however these are considered to be at a safe and sufficient distance from the proposed locations.

- **Buried Power Lines:** The 11kV overheads that span the river adjacent to the proposed structure location appear to be linked to underground. The power cable appears to surface to cross the river on poles and then return to the earth as a buried underground cable. A CAT survey or similar alternative should be conducted and trial hole hand dug to locate prior to construction works commencement.

6.3.4 Land ownership

A search of the landownership records indicates that title WR51603, Gheluvelt Park, is owned by Worcester City Council with the section adjacent to the river leased to Severn Trent and the south west corner leased to a third party. Title WR13079 and title HW93142 are owned by Worcestershire County Council. Title 19650 is owned by a third party and leased to Worcester City Council for a period of 99 years beginning October 16th, 1990, as shown in Figure 6.7. The land is accessed via a gate near the entrance to the landfill which must be maintained for the purposes of monitoring and controlling gas from the landfill.

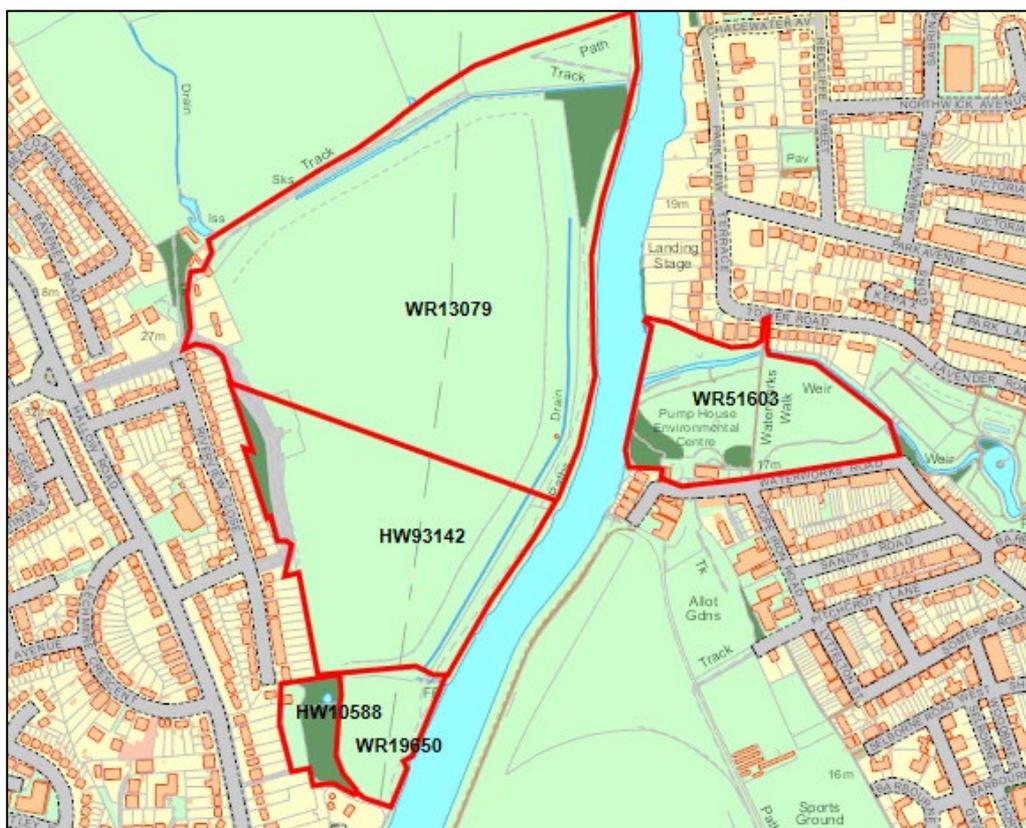


Figure 6.7: Land Ownership Plan

The river embankment retaining wall to the south east of Gheluvelt Park is believed to be owned and maintained by Worcester City Council when they purchased the Pump House and adjacent land in 2005. Attached to the retaining wall is a flood monitoring station owned and maintained by The Environment Agency. At the base of the retaining wall is an inlet believed to form part of the Pump House system decommissioned in 1995.

6.3.5 Transport Planning

The client for the new structure is to be pedestrians and cyclists. The structure must be designed for inclusivity of all types of pedestrian and cyclists in accordance with BS 8300-1:2018; Design of an Accessible and Inclusive Built Environment.

The largest volumes of pedestrian traffic are likely to be from Northwick, Merrimans Hill and the Barbourne areas east of the river and, Hallow and Henwick Grove to the west of the river. It is thought most traffic will be heading towards the city centre to the east and Worcester University St Johns Campus to the west. A detailed traffic analysis will determine the projection of use, likely types of users, and any upgrades required to the wider transport network which will affect the design of the structure.

Although the purpose of the new crossing is intended for recreational users making journeys for leisure purposes, goal orientated users making journeys to specific destinations are likely to take the shortest route from A to B, also called the desire line. The design of any proposed new footpaths and cycleways will need to facilitate both types of user and direct routes will reduce pedestrians and cyclists straying from the path.

A new footpath route over the landfill will require extensive ground works to surcharge the land and reduce the displacement of the waste below the surface ground level. There is scope to further increase the footpath links on the Severn Way walking trail. The trail is currently an uneven dirt track running adjacent to the river with pinch points of 0.8 m in places and steep muddy slopes close to the edge of the river embankment. To upgrade the walking trail further investigation works is required to determine the extents and options available.

The existing footpaths in Gheluvelt Park will require a status change of use and potential upgrades to facilitate the use by cyclists and either a or Public Path Creation Order will be required under The Highways Act 1980. As the land in the area is

owned by Local Authorities, Worcestershire County Council and Worcester City Council, an application for a Public Path Creation Agreement following consultation between the authorities is applicable assuming an agreement is made. Notice of the dedicated footpath must also be published in at least one local newspaper circulating in the area.

Other connections to wider links such as National Cycle Networks and Regional Cycle networks have also been considered.

6.3.6 Loading and Headroom

The loading of the structure shall be calculated in accordance with CD 350 and Eurocode 1.

The minimum air draft (headroom) clearance for structures over a water course is the 1 in 100-year flood level +600 mm. The minimum headroom to soffit level is proposed to be 8 m above average water level. This is based on figures for adjacent bridge structures at Holt and Diglis at summer river levels and will require confirmation from the Canals and Rivers Trust as the River Severn is classed as a navigable water course at the location. The navigation arch levels at Worcester and Diglis bridge are 6.2 m and 8 m respectively and the highest recorded flood level is 5.74 m.

The minimum headroom required for pedestrians and cyclists in an enclosed structure is 2.7 m. The minimum headroom for dismounted equestrians and pedestrians is 2.7 m or 3.7 m if mounted.

6.3.7 Parapet Height and Structure Width

The structure is to be designed for pedestrian and cyclist use. In the interests of safety, it is recommended by Highways England to separate cyclists and pedestrians where possible however, this decision is at the discretion of the Overseeing Organisation. It is proposed for pedestrians and cyclists to share the same space as segregation can be visually intrusive and reduce the manoeuvrability for passing pedestrian traffic and both wheelchair and mobility scooter users. Additionally, there is no evidence to suggest segregation reduces the potential for conflicts and it is not anticipated that the route will take significant volumes of cyclists travelling at high speeds.

The requirements for combined use by pedestrians and cyclists in CD 353 states the minimum unsegregated total path width is 3.5 m, or when separated by a kerb or railings the minimum total path width is 4.7 m and 5 m respectively. Local Transport Note 2/08 advises an additional 250 mm width be added for comfort of cyclists where a bridge parapet is over 1.2 m. The proposed structure width is to be 4 m. Details of exact dimensions will need to be confirmed at the preliminary design stage.

The minimum parapet height required for cyclists and pedestrian use is 1.4 m in accordance with CD 353.

By comparison, Diglis Bridleway Bridge has an internal path width of 3.5 m between parapets and total structure width of 4 m. Sabrina Pedestrian Cycleway Bridge has an internal path width of 3 m and total structure width of 3.25 m. It is important to note Sabrina has a parapet height of 1.2 m which does not meet the current design standards, implying the structure was originally designed for pedestrian use only. Both these structures were designed prior to updates in design guidance and codes, in particular the minimum width of the structures has been increased from 2 m minimum for an unsegregated footbridge designed for pedestrians and cyclists in BD 29/04, to 3.5 m in CD 353.

The design of the visual aesthetics of the parapet and any guard railings should be designed with the perspective of the user and Inclusive Mobility Guidance.

6.3.8 Approach Gradients, Landings and Path Alignment

Approach ramps and the gradient over the structure shall be no steeper than those adopted for the access ramps. Ramp gradients shall be designed to be no more than 1 in 20 in accordance with CDC 353 Design Criteria for Footbridges. Where compliance creates design difficulties as specified in CD 353, a relaxation can be made with the acceptance of the overseeing organisation but may not be steeper than 1 in 12.

Horizontal landings shall be incorporated into the design of ramps at equal intervals of 2.5 m rise for a 1 in 20 slopes, if the gradient is flatter than 1 in 20 no landings are required, any steeper and further landings are required.

The ground levels at Gheluvelt park and the top of the embankment to the Kepax site appear to be very similar. A full topography survey will be required to confirm levels and enable the detailed design of ramps and approaches. On the East side of the river at Gheluvelt park, approach ramps and gradient can be incorporated and built into the existing embankment and tied into the existing ground level.

The Western structure landing on the Kepax site requires more thought and will depend on the if ramp access to the Severn Walking trail is also to be incorporated into the design of the structure. The approach ramps to the structures landing location can be incorporated into the design of the structures abutments to tie into the ground level at the Kepax site. This may present difficulties working in or near contaminated land.

Connecting the landfill and structures to the walking trail adjacent to the river will add considerable cost to design and construction and the walking trail will also require extensive upgrade works to the path and river embankments. It is thought the difference in height between the top of the embankment at the edge of the Kepax site to the ground level in the willow carr area extends approximately 24m from the edge of the Kepax embankment to the edge of river. It is recommended to limit the works in the willow carr as the area is prone to flooding and additional works will be required to create access down the steep embankment from the edge of the landfill.

The minimum inside radius of curved or spiral ramps for a cycle path is 5.5 m.

All paths, gradient and ramps are to be designed in accordance with BS 8300-1:2018 Design of an accessible and inclusive built environment. External environment – code of practice and CD 239 Footway and cycleway Design.

6.3.9 Flood Risk

The location suffers from regular flooding and rapidly fluctuating water levels. The Environment Agency have a flood monitoring station in close proximity to the proposed structure location and levels typically vary from 0.55 m to 3.35 m with the highest recorded level at the location as 5.74 m in February 2014, Figure 6.8.

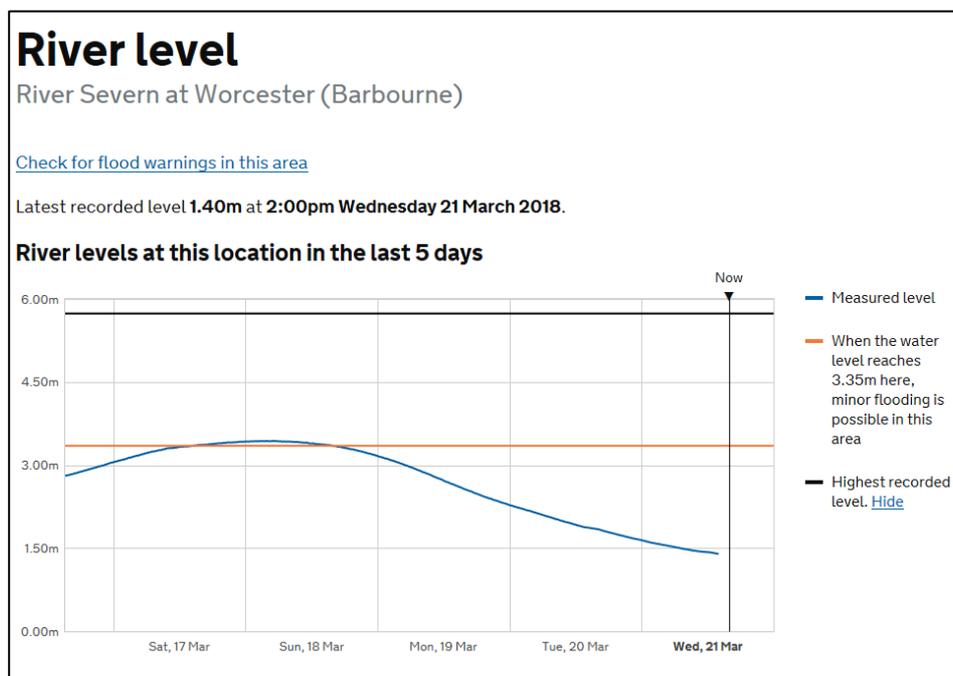


Figure 6.8: Flood levels taken from Flood Information Service on Gov.uk

Figure 6.9 shows the current flooding zone for the area around the proposed structure. The installation of a structure and paved footpaths on a flood plain will increase the area of hard standing and decrease the area of permeable surface and flood capacity. This could have a negative effect of flooding downstream and increase flood risk and risk of pollution entering the river both during and post construction phase. Consultation with the Environment Agency will provide further information into the types of mitigation measures that can be incorporated into the design of the structure to minimise or negate flood risk.



Figure 6.9: Flood Map source: Flood Map for Planning Service

6.4 Geoenvironmental Issues

The western part of the site is underlain by landfilled material of unknown origin. It is assumed however, that while the deposited wastes would have likely been routinely compacted during the landfill site’s operation, it is unlikely that the material would have been compacted to any specification. Further, it is unknown whether the site accepted wastes which would degrade over time. As a result, it is anticipated that the site will be susceptible to ground movement which would lead to intolerable movements of any shallow foundations, and as such, a piled foundation solution will be required. However, there are constraints associated with this foundation type; the Environment Agency’s document Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention, National Groundwater & Contaminated Land Centre report NC/99/73 (May 2001), describes six scenarios which may potential impact on the environment from piling activities. Table 6.2 presents a summary of the considerations for adopting a piled foundations solution.

Potential pathway	Description
Creation of pollutant pathways	Pathways may be created by piles penetrating the basal liner of the landfill (if present), leading to a pathway for downward migration of landfill leachate. Pathway may be created by piles penetrating the capping liner of the landfill (if present), leading to a pathway for the upward migration of landfill gases.
Advancing contaminated materials	There is a risk that some forms of displacement piling (such as driven precast piles) may advance a “plug” of contaminated material below the level of the landfilled material.
Disposal of contaminated arisings	Non-displacement forms of piling, such as CFA (continuous flight auger) bring arisings to the surface. Depending on the nature of the material, this may pose a risk to site operatives during piling operations, and may also be problematic and potentially costly to dispose of.
Cementitious fluids bleeding from wet concrete	Cast in-situ forms of piling may need particular consideration if undertaken near sensitive surface water or groundwater bodies, as the concrete may bleed cementitious fluids during the curing process.
Aggressive ground conditions within the made ground	Concrete piles may be susceptible to degradation from contact with leachate or soils, ultimately reducing their integrity and load-carrying capacity.

Table 6.2: Summary of potential pollutant pathways to be considered in a Piling Risk Assessment

It is anticipated that, based on the available data, all of the pathways referred to above are pertinent to the Hallows Road Landfill site. A Piling Risk Assessment would be required, in order to develop a suitable pile design and specification, to deliver the required technical performance, whilst mitigating the risk of creating hazards to the environment from piling operations.

The historical sewage works, which is no longer present on the site of Gheluvelt Park could potentially have contaminated the site. This area may therefore have made ground present, with the potential for metals, inorganic ions (cyanides, sulphates, chlorides etc.), organics, fuel oils, treatment chemicals, asbestos and pathogens (salmonella etc.). It therefore should be recognised that the Made Ground beneath Gheluvelt Park on the east side of the river may also fall within the same EA constraints detailed above.

There are a number of Grade II Listed Buildings within the vicinity of the site, with the majority being located to the east of the site, however one is located directly north west of the western boundary of the site. (MAgiC, 2020).

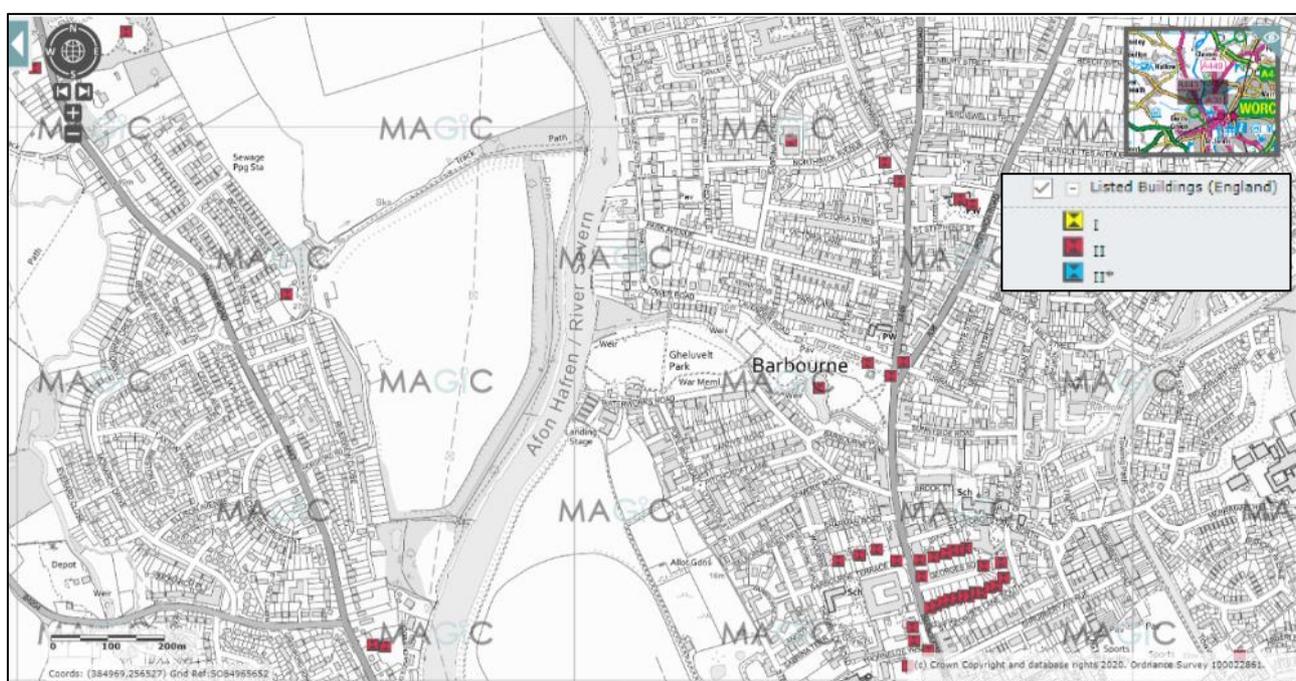


Figure 6.10: Grade II Listed Buildings (MAgiC Map, Defra, 2020)

6.5 Construction Issues

6.5.1 Interfacing with Existing Infrastructure

Gheluvelt Park has existing footpaths running the perimeter of the park (shown in Figure 6.11). Gheluvelt Park is well maintained with easy access for pedestrians and cyclists from Barbourne Road and flat paved footpaths approx. 1.2. m wide.

The land to the west appears to be used heavily by dog walkers. A National Walking Trail, The Severn Way runs parallel along the length of the river and connects the existing public rights of way 502(B) to the North and 634(A) to the south. The National Walking Trail is an uneven dirt path less than 0.8 m wide in places through dense woodland and unsuitable for wheelchair and pushchair access at present. It is recommended to review the access from the West of the proposed site to upgrade the existing network to allow construction vehicle access.

Beyond the immediate footpath connections, Gheluvelt Park has good existing connections to Pitchcroft and Worcester Racecourse green public spaces and residential areas north of the city. The western bank has potential to upgrade existing links and improve connections.

Additional thought has been given to the existing road crossing points. The existing links on the east of the river are close to the edge of the park and convenient for foot traffic. There are also existing cycle lanes incorporated in the highway and the traffic lights allow enough room for cyclists to cross comfortably.

To the west of the river, the pedestrian crossing points are not as easily accessible. The north west crossing point near Monarch Drive, is approx. 300 m north from the proposed link. However, the area in the central reserve is not wide enough for a bicycle and the crossing point relies on human awareness to cross live vehicular traffic. The traffic lights south west of the proposed structure are considered a safer crossing but are over 750 m away from the footpath link.

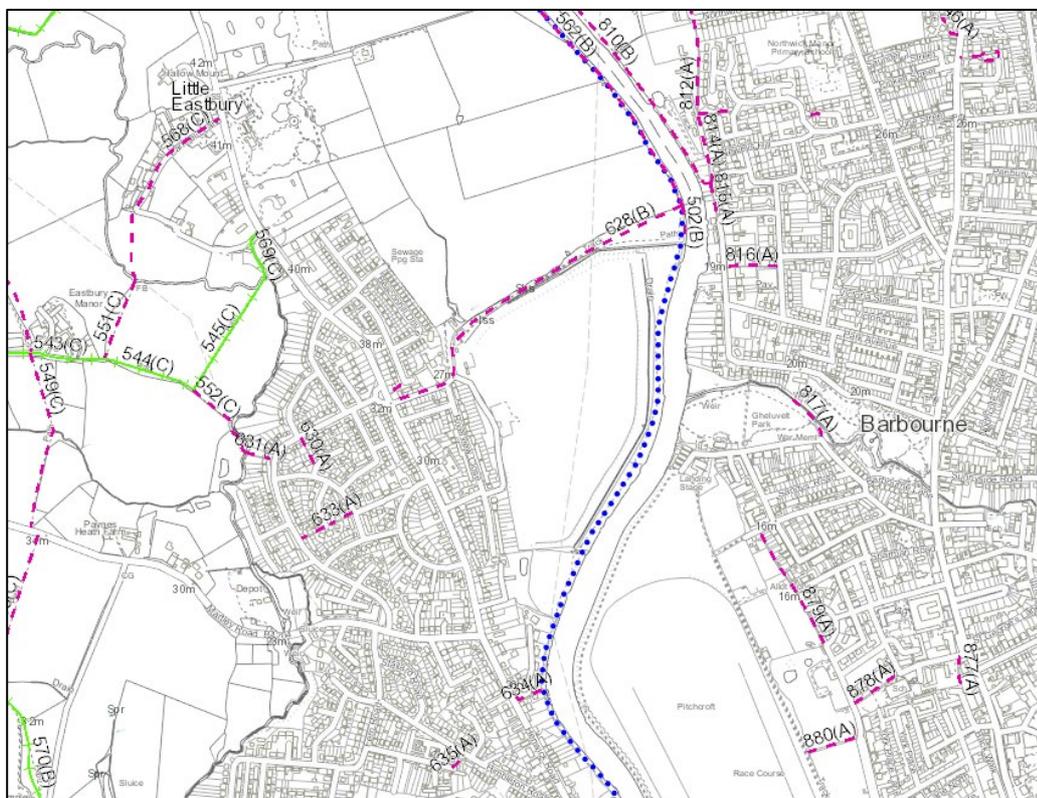


Figure 6.11: Public Rights of ways and footpaths. Source: WCC

6.5.2 Site access

Access from the east via Gheluvelt Park and the Pump House Environment Centre is obtainable through the Pump House's gated access and would require permission from Worcester City Council and the Pump House Environment centre to use. The existing road network to the Pump House provides suitable access for construction vehicle from the A449 Barbourne Road. If, however, crane access or abnormal load vehicle are required on site, parking suspensions may be required to restrict off road parking temporarily.

Access from the west is difficult and unsuitable for vehicles at present. The Severn way footpath 628(B) linking the Severn Way walking trial and A443 Hallow Road is comprised of 3 main sections. The first section from Hallow Road to the properties to the north of the site is surfaced hard and approx. 2.5 wide at the narrowest point however, the private property access shared by the footpath has a vehicle height restriction barrier suspected to have been installed when the landfill site was in operation. The second section of the footpath from the property to approx. 200 m before the Severn Way trial is a wide flat dirt path leading up to an electrical overhead power line tower where the path narrows between the tower base and a stream/drain. The last section from the pylon tower to the river trail is a narrow and uneven ground conditions typical of walking trail and narrows to approx. 2 m in places.

Construction access from the west of the river will require significant works to allow for construction vehicle traffic. The ground must be stable enough to support construction vehicles and preferably paved to reduce the risk of vehicles becoming embedded in the soft soil condition. Three options have been considered as detailed below.

1. Use the access from the East only (via Gheluvelt park) and construct a temporary crossing, temporary crane to lift materials or make use of pontoons to float construction materials to the western half of the site. The River Severn is well known for its strong currents and regular floods. Further consultation will be required to determine if the use of pontoons can be fully considered. It is an unlikely option as there is currently no suitable landing position on the western side of the river within and some form of temporary or permanent stricture will be required to safely unload materials.

- Upgrade the existing footpath links to make suitable for construction traffic. The existing footpath network on the western side of the river has pinch points of approx. 0.8 m near the riverbank. Extensive de-vegetation works will be required to widen the path and fill material deposited to level uneven ground. Sheet piling may be required to strengthen the river embankments in some areas and prevent the access route from sliding towards the river.

A pipe culvert (Figure 6.12), drains into the river along the walking trail. The culvert will require a structural assessment and potential strengthening works before construction traffic can be permitted. Dependent on results of the structural assessment, this could be as simple as overarching the culvert with concrete fill or as complex as replacing the pipe and redesigning the structure to take construction traffic loads. The culvert is approximately 7 m in length with a 1 m span with the footpath above 4.5 m wide. The asset owner is assumed to be Worcestershire County Council as they are the current landowners of the title WR13079. The width of the path between the existing overhead cable tower and drainage ditch, is approximately 8 m to the ditch side fence line and would require construction of some form of protection to reduce the risk and/or consequences of damage to the pylons from construction traffic.

- Create new access point across/around the Kepax landfill area. From discussions with geotechnical and hazardous waste specialists, the creation of a new route via a gated access point south of Hallow Recycling Centre is possible. A route through the land fill will require a large amount of fill compacted over the designated route before excavating back the top layer of fill and laying surfacing. This technique will reduce the amount of settlement before construction vehicles use the route but must be done well in advance before use by construction vehicles.

Access for abnormal loads carrying specialist plant and/or materials to the site should be considered and a suitable route determined. There is a known issue at Barbourne Bridge with a weight limit of 40 tonnes, this will affect the deliveries to site and structural strengthening works may be required to upgrade the existing network.



Figure 6.12 and Figure 6.13: View over pipe culvert (left) and footpath between overhead cable pylon and ditch drain (right)

7. Option Development and Sifting – Structure

7.1 Introduction

It was determined that due to plant access and risks to flooding that the structure would need to span the river along with the wooded marsh area, known as the willow carr adjacent to it. It is estimated that the span of the structure will be approx. 110 m.

The air draft for boats travelling under the structure will need to be confirmed by the Canals and Rivers trust, however from a review of the surrounding structures it is anticipated to be the greater of either 8 m above summer river level, or the 1 in 100 years flood level (5.74 m) with an additional 600 mm (6.34 m).

7.2 Types of Structure Considered - Long List

The following types of structure were all considered within the Feasibility Study.

Construction type	Advantages	Considerations
Masonry arch	<ul style="list-style-type: none"> Natural materials Aesthetically pleasing 	<ul style="list-style-type: none"> Unachievable span length Maximum span to rise ratio of 10:1 Intermediate supports required in the river. Method of construction (formwork required) Slow construction Limiting water capacity when in flood
Concrete/Steel Arch	<ul style="list-style-type: none"> Iconic High strength Minimal materials 	<ul style="list-style-type: none"> Limiting water capacity when in flood Difficult to inspect all elements post construction Formwork required (if concrete) Large self-weight and require robust foundations.
Beam and Slab	<ul style="list-style-type: none"> Simple form of construction Low cost Simple to design Low maintenance Long life span Fast construction 	<ul style="list-style-type: none"> Not considered aesthetically pleasing Slenderness ratio should be 20-30 Maximum span of 80 m before deck depth and aesthetics significantly compromised Formwork may be required
Truss	<ul style="list-style-type: none"> High strength Fast construction Variable span length 	<ul style="list-style-type: none"> High maintenance Visually intrusive
Tied Arch	<ul style="list-style-type: none"> Iconic Aesthetic High strength Can be installed in sections 	<ul style="list-style-type: none"> Heavy sections to lift into place requiring large crane equipment. High cost of construction and materials Substantial foundations required to take the large self-weight of the structure Difficult to perform maintenance Construction sequence and deformation of the arch.
Suspension	<ul style="list-style-type: none"> Iconic Aesthetically pleasing Variable span length Construction method and lifting of bridge deck sections achievable 	<ul style="list-style-type: none"> Two anchorages required to be constructed, one in the contaminated land fill site not recommended. Difficult to perform maintenance Uneconomical for short spans Installation of tower of western embankment unfeasible.

Construction type	Advantages	Considerations
Cable Stayed	<ul style="list-style-type: none"> • Iconic • Cantilever form of construction and construction sequence • Can be designed with only 1 tower on east of river. • Aesthetically pleasing • Variable span length • Construction method and lifting of bridge deck sections achievable • Greater stiffness • One anchorage required which is achievable in Gheluvelt park 	<ul style="list-style-type: none"> • High cost of construction and materials • Difficult to perform maintenance

Table 7.1: Structure Form Advantages and Disadvantages

7.3 Types of Structure Considered -Short List

Following on from the long list presented above, three types of structure were considered in depth as part of the Pre-Feasibility Study, as these were the only types capable of spanning the required distance (110m) in a single span. These were a tied arch bridge, truss bridge and cable stayed bridge.

7.3.1 Cable stayed

The most iconic and aesthetically pleasing of the suitable available options selected, as shown in Figure 7.1. The form of construction has additional installation and construction sequence benefits. The use of one pylon or tower to be installed on the eastern side at Gheluvelt Park will limit the foundation size required at the Kepax site, reduce the amount of excavation required and hence associated construction issues.

The design of the cables is complex with many issues to be considered such as pylon location and design, cable stay arrangement, the cable types and wire configurations, cable protection and inspection and maintenance access.



Figure 7.1: Example of a Cable Stayed Bridge - Diglis Bridge

A cable stayed structures deck is often constructed in segments as it is unlikely that the deck could be lifted in one single section. The deck should be designed for each segment to act as a cantilever lifted into place before the suspension cables are attached and tensioned to increase the strength. The next section of deck can then be lifted into place and the process repeated in a similar methodology to that used for the Diglis Bridge. The design for temporary works and temporary actions on the structure during the construction sequence often result in the completed structure being overdesigned to withstand the temporary forces acting during the construction. To accommodate for a crane to lift deck sections, it is likely temporary foundations will be required to support the lifting plant as the ground conditions near the river are suspected to be of poor quality and subject to settlement.

The number and length of cables can significantly increase the cost of construction and consideration should be made to minimise the materials and number of attachments required.

7.3.2 Truss

Truss structures, see Figure 7.2, are typically installed in steel sections and bolted, welded or riveted together on site. This form of construction is most likely to cause sparks during construction and could be extremely dangerous due to the methane emitting from the land fill. Truss construction is simple and quick to install but requires regular maintenance and can be expensive to repair and maintain when compared to other structure forms.



Figure 7.2: Example of a Truss Bridge – Arley Footbridge

Steel is prone to corrosion from water damage which causes rust to occur and weakens the structural strength. The design on the steel should avoid or seal crevices and avoid the collection of debris which may trap moisture and increase the rate of corrosion whilst allowing access for maintenance to the members.

7.3.3 Tied Arch

The Stockton-On-Tees infinity bridge is a steel tied arch with a span of 120 m and weight of 450 tonnes and was successfully completed in 2009. It is of a similar span to the proposed structure.

Tied arch construction (Figure 7.3) usually involves the assembly of the arch on site as the sections and materials are too large and heavy to transport to site prefabricated. The arches are lifted into place using large cranes in either whole sections, or temporary support towers are erected either side of the structure to support the arch as sections are constructed from the abutments towards the centre as cantilevers. Both erection methods are heavily affected by the wind with difficulties lifting large sections in high winds and vibrations when constructing in segments. Once the main arches are installed, the hangers and deck can then be installed and tensioned as required.

One of the main difficulties with large span tied arch construction and design, is the wind loading. The design of the deck should be of a shallow depth to aid the aesthetics of the structure; however, this weakens the structures strength and so the deck should be deigned to the minimum depth allowable for both during and post construction.

Tied arches also require large foundations as the forces acting at the connections and foundations are substantial compared to suspension bridge construction. This means installing large piled foundations at both Gheluveld Park and in the Kepax site in contaminated made up ground.



Figure 7.3: Example of a Tied Arch Bridge – Abbey Bridge

The design and shape of the arch arrangement should be suitable for the location. As the location is within the flood plain, it is suggested that all the arch elements should be above the flood level and a deck arch and half through arch forms of construction avoided.

Table 7.2 below summarises the suitable options.

Design factor	Tied Arch	Truss	Cable Stayed
Temporary Works	<ul style="list-style-type: none"> Foundations required for lifting machinery. Temporary structure support towers to be erected if constructed in two or more segments. Excavation supports may be required 	<ul style="list-style-type: none"> Foundations required for lifting machinery. 	<ul style="list-style-type: none"> Foundations required for lifting machinery.
Foundation Requirements	<ul style="list-style-type: none"> Large amounts of excavation required for large foundations and large number/diameter of piles on both sides of the river. High risk of releasing leachates from the landfill site and working in contaminated land. Deep and bulky foundations to be able to take large forces and turning moments at connections. 	<ul style="list-style-type: none"> Medium amount of excavation required on both sides of the river. Deep foundations required both sides of the structure. High risk of releasing leachates from the landfill site and working in contaminated land. 	<ul style="list-style-type: none"> Large foundations only required on the side of the pylon. Minimal excavations required in landfill. Foundations still required on the western side of the river but can be limited due to the construction type Minimal risk of exposure to contaminants
Construction Machinery and equipment	<ul style="list-style-type: none"> Large cranes required both sides of the river if constructed in segments. Large pile driving/boring machinery 	<ul style="list-style-type: none"> Large crane on one side of the river required. Large cranes require large temporary works foundations Site access for crane machinery and delivery vehicles; turning radius and weight limits on the existing network. 	<ul style="list-style-type: none"> Large crane on one side of the river required. Large cranes require large temporary works foundations Site access for crane machinery and delivery vehicles; turning radius and weight limits on the existing network.

Design factor	Tied Arch	Truss	Cable Stayed
Foundations	<ul style="list-style-type: none"> Largest foundations required 	<ul style="list-style-type: none"> Strong foundations required on both sides of the river 	<ul style="list-style-type: none"> Pile foundations required Large foundations on the east side of the river.
Maintenance	<ul style="list-style-type: none"> Low maintenance Long lifespan with minimal repairs High level of difficulty performing maintenance Option to install more dampers at a later date usually designed in. 	<ul style="list-style-type: none"> High maintenance High level of difficulty performing maintenance 	<ul style="list-style-type: none"> Medium maintenance requirements. Specialists required to inspect the tension cables
Construction Type Specific Risks	<ul style="list-style-type: none"> Working at height Working over fast flowing water Bolting/fixing techniques causing sparks Lifting large sections and wind movement Installation of tensioned hangers 	<ul style="list-style-type: none"> Bolting/fixing techniques causing sparks Lifting large sections and wind movement Working at height Working over fast flowing water 	<ul style="list-style-type: none"> Lifting of sections and wind movement Installation of cables and tensioning Working at height Working over fast flowing water
Aesthetics	<ul style="list-style-type: none"> Most attractive form Open view over the river from the structure Large and eye-catching form 	<ul style="list-style-type: none"> Most intrusive View over the river obscured by members 	<ul style="list-style-type: none"> Attractive form of construction Open view over the river from the structure Least intrusive form
Ease of inspection	<ul style="list-style-type: none"> Specialist inspection equipment required to inspect the arch and hangers Loading for inspection machinery to be included in design calculations 	<ul style="list-style-type: none"> Difficult to inspect thoroughly if protective paint systems are used. 	<ul style="list-style-type: none"> Specialist inspection equipment required to inspect the pylon Loading for inspection machinery to be included in design calculations

Table 7.2: Options Comparison

Three types of structure were considered in depth, as these were the only types capable of spanning the required distance in a single span. These were:

- Tied Arch Bridge – Discounted due to large foundations required which substantially increase the total cost of the structure
- Truss Bridge– Discounted due to large foundations required which substantially increase the total cost of the structure
- Cable Stayed Bridge – Preferred Option

A single pylon cabled stayed bridge will be able to either span the full distance or alternatively span the main river with the addition of a secondary structure over the willow carr. This will reduce the required foundations on the west side of the river within the landfill area. It is anticipated the foundations will need to be piled, with the potential of an end bearing pile as the made ground on both sides of the river will not be able to provide sufficient shaft friction. An estimate of the depth and size of the piled foundation has not been determined, however they are expected to be wider and deeper than the Diglis footbridge foundations.

7.4 Detailed Design

Moxon Architects were commissioned to undertake detailed design the bridge in early 2020, following a competitive tendering exercise. Based on the feasibility work already undertaken, eight options for the bridge were put forward. Further information on each of these options is presented in the following table.

Each option was scored under a number of categories.

Three options were advanced to more detailed discussion: Options 6, 7 and 8 in the table below. These were progressed as they included the two highest scoring cable stayed bridges (Options 6 and 7) and the highest scoring alternative (Option 8).

After engagement with technical staff, architects and the client, Option 7 was chosen for the following reasons:

- Aesthetically pleasing;
- Opportunity for an iconic pylon design;
- Fit with the family of bridges over the Severn;
- Less intrusion upon residents;
- Connection to path above flood level (Gheluvelt Park); and
- Avoids Culvert.

Criteria	Option 1	Option 2	Option 3	Option 4
				
Environment and visual impact				
Impact on the park	Straight alignment requires removal of willow tree. Otherwise minimal impact on park with tower on west bank.	Central location of tower along east bank potentially blocks connections between park and river.	Tucked into the south west corner this scheme has minimal impact on the park. However as currently modelled the tower substructure might be too close to the existing river wall.	Straight alignment requires removal of willow tree. Pairs of low towers have less impact than single tall towers.
Impact on ecology	Pylon will cause significant interference with ecology movements within corridor of willow carr.	Viaduct through willow carr but no significant obstacles.	Viaduct through willow carr but no significant obstacles.	Pylon/abutment will cause moderate interference with ecology movements within corridor of willow carr.
Impact on west bank vegetation	Significant access required to erect tower although back span could mean minimal impact between tower and landing.	Assume low impact approach viaduct through canopy.	Assume low impact approach viaduct through canopy.	Some access required to erect low Y tower although back span could mean minimal impact between tower and landing.
Bridge visibility	Tower on west bank could be more visible to neighbours.	Bridge and tower very visible from the park. Tower set back from river edge would be less visible from the river and neighbouring properties.	Potential overlooking issues into neighbouring gardens. Tower and bridge may be more visible to neighbours than park users.	Lower overall structure would be less visible from most views.
Potential Visual Impact	Mainstay on western bank may be more intrusive upon the visual amenity of the residents of Waterworks Rd.	Mainstay location on park side is more appropriate in terms of its location within a formalised park setting and its proximity and position from the visual receptor of the residents on Waterworks Rd. This is less intrusive compared to option 1 as the tall dominating element is not in the immediate view of the residents' outlook upon the River Severn.	Mainstay located at higher point in park therefore overall height potentially greater. Mainstay located close to river edge on eastern bank and leans toward end house of residential block on Waterworks Rd. Has potential to intrude/shadow over residents' outlook of river.	Lower overall structure is less of a statement than other options. Retention of trees and scrub north of residents' aids in screening between the two.

Criteria	Option 1	Option 2	Option 3	Option 4
				
Impact on floodplain (Viaduct through willow carr is common to all options no not considered within appraisal of options)	Pylon in floodplain. East approach is perpendicular to river flow which makes it unfavourable, especially if on an earth embankment.	No need for removal of trees/scrub between residents and bridge. Could be bolstered with further planting. Pylon in floodplain. East approaches are short and land within floodplain and perpendicular to river flow which make them unfavourable, especially if on an earth embankment.	Nearly all elements out of floodplain.	Pylon in floodplain. East approach is perpendicular to river flow which makes it unfavourable, especially if on an earth embankment.
Transport planning and connectivity				
Impact on existing paths	Approach ramp required to raise bridge over existing riverside path on the eastern bank.	Bridge easily clears low level riverside path. North approach fork creates second connection.	Approach ramp either replaces or runs parallel to an existing path. No need to clear riverside path.	Approach ramp required to raise bridge over existing riverside path.
Access during flood at east side (all options land outside of flood plain on west side)	Extension and raising of approach ramp required to maintain access in the most severe flood events.	Extension and raising of approach ramp required to maintain access in the most severe flood events. Stairs would not be useable.	Access maintained as connects to existing path above flood level.	Extension and raising of approach ramp required to maintain access in the most severe flood events.

Criteria	Option 1	Option 2	Option 3	Option 4
<p>Connectivity to existing pedestrian walkways, amenity areas and facilities within the park</p>	<p>Single connection to NCN Route 46 midway across the Gheluveit Park</p> <p>Offers opportunities to maintain and link the circular path, direct access to the Pump House and Amenity areas.</p>	<p>Dual ramps, skew to the bridge. Southern ramp landing midway along NCN Route 46 across Gheluveit Park. Northern ramp lands next to the amenity path around the park.</p> <p>Offers opportunities to maintain and link the circular path, direct access to the Pump House and Amenity areas.</p>	<p>Single sweeping ramp landing to the west of the Pump House.</p> <p>Limits opportunities to maintain and link to the circular path. Could create a conflict area in front of the Pump House.</p>	<p>Single straight ramp landing to the west of the Pump House.</p> <p>Offers opportunities to maintain and link to the circular path. Could create a conflict area in front of the Pump House.</p>
<p>Connectivity to existing walking and cycle network, comprising NCN46 North (Tower Rd entrance), NCN46 South (Waterworks Rd entrance), Pump House visitor entrance (most direct link to NCN46 South, The Pitchcroft, Waterworks Parking)</p>	<p>Reasonable connection to NCN Route 46 midway across the Gheluveit Park.</p> <p>Good connection to NCN46 but does not integrate naturally with the most direct route south via the Pump House visitor entrance</p>	<p>Dual ramps, skew to the bridge. Southern ramp landing midway along NCN Route 46 across Gheluveit Park. Northern ramp lands next to the amenity path around the park.</p> <p>Very good connection to NCN46 and reasonable connection to the most direct route south via the Pump House visitor entrance.</p>	<p>Single sweeping ramp landing to the west of the Pump House.</p> <p>Very good connection to NCN46 south and Pump House visitor entrance but connection to NCN north is slightly less convenient.</p>	<p>Single straight ramp landing- to the west of the Pump House.</p> <p>Good connection to NCN46 but does not integrate naturally with the most direct route south via the Pump House visitor entrance.</p>
<p>User experience</p>	<p>Clear views upstream and downstream. Cables along both edges could create sense of enclosure.</p>	<p>Clear views upstream and downstream. Cables along both edges could create sense of enclosure.</p>	<p>Torsion box with potential upstand and cables along one side of the deck favour views to the north. This may not be appropriate.</p>	<p>Minimal above deck structure over middle of the river could be exciting to users. Fewer above deck elements but larger/more prominent.</p>
<p>Potential for deliverable/simplified sub-options</p>	<p>High</p>	<p>High</p>	<p>High</p>	<p>Low</p>

Criteria	Option 1 	Option 2 	Option 3 	Option 4 
Geotechnical/geoenvironmental				
Susceptibility to buried hazards	Tower on west bank removes known constraints associated with former Water Treatment Works, however due to the lack of GI in Willow Carr further constrains here cannot be ruled out.	Avoids culvert (based on current assumptions) but could still clash with former 'Rapid Gravity Filter Block (RGFB)'.	Tower likely to be positioned in line with Culvert (based on current assumptions). Cost of moving or straddling culvert could be high.	Avoids culvert (based on current assumptions), smaller tower may avoid buried RGFB.
Interaction with Retaining Wall in Gheluveit Park	Virtually None	Retaining wall at reduced height at this location and tower positioned away from wall, minimal impact	Retaining wall at greatest height, (greater susceptibility), and positioned in close proximity to allow alignment to work.	Retaining wall at greatest height, (greater susceptibility) but Tower position away from wall in current sketch.
Interface with landfill and associated earth bund	If cable backstays support the bridge deck to the landing on the landfill then minimal impact. But if end of bridge deck is bearing on landfill then the is likely to be associated settlement and potential for slope instability due to loading. In addition if backstays land within the landfill footprint, piling through landfill will be required with associated environmental impacts.	If multiple piers in Willow Carr the landing would need to be cantilevered to avoid potential settlement and slope instability at landfill boundary.	If multiple piers in Willow Carr the landing would need to be cantilevered to avoid potential settlement and slope instability at landfill boundary.	If cable backstays support the bridge deck to the landing on the landfill then minimal impact. But if end of bridge deck is bearing on landfill then the is likely to be associated settlement and potential for slope instability due to loading.
Impact on Phase 2 Ground Investigation Works and associated design	Within Gheluveit Park, GI will be limited as alignment is within root protection zones of numerous trees. Additional GI required across the proposed access route within the landfill	GI for tower and cable stay tension piles outside root protection zones. Proposed Vegetation clearance within Willow Carr to be amended.	GI likely to be impacted by root protection zones and culvert. No impact in Willow Carr.	Within Gheluveit Park, GI will be limited as alignment is within root protection zones of numerous trees. GI will need to

Criteria	Option 1	Option 2	Option 3	Option 4
				
	to confirm the thickness of landfill cap to assess viability of access for large equipment.			be tweaked to account for two towers and two sets of tension piles.
Construction				
Access and impact on area (west)	Access would require substantial temporary works (i.e. more significant haul roads than on the east side to construct the mast).	Substantial haul roads and temporary works still required due to piling rigs, however less so.	Substantial haul roads and temporary works still required due to piling rigs, however less so.	Access would require substantial temporary works equal to those required on east side therefore impact is two-fold.
Access and impact on area (east)	Much less impact on the park with the mast constructed to the West. Lighter plant and lesser materials delivery could shorten the programme impact on the local residents and park users. Less significant temporary works and remediation.	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. Construction traffic would be very evident to the residents during the works. Parking restrictions may apply. Remediation of the car park would be required on completion of the works.	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. Construction traffic would be very evident to the residents during the works. Parking restrictions may apply. Remediation of the car park would be required on completion of the works.	This option presents the greatest impact on the local communities with access required to a significant level on both sides of the river. Both installation and remediation costs for access to be considered.
Suitability for compound	Access for main compound on the West is easier and less obtrusive on the surrounding residents. Local roads create less issues with movement of major construction components. The compound could also be set at a level so that it is not impacted by a flood event.	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. The site compound would need to be on higher ground to the South of the park in case of a flood event.	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. The site compound would need to be on higher ground to the South of the park in case of a flood event.	The site compound could be located to the West to reduce the impact on the local community and park users. Also easier to keep it above a flood event.

Criteria	Option 1	Option 2	Option 3	Option 4
Relative flood susceptibility	High	Medium	Low	High
Ease of construction	<p>Given the area of the existing landfill site laydown areas etc are more readily available for material storage however a significant haul road will be required to get down to willow carr.</p>	<p>Significant temporary works would be required to provide access and sufficient construction space to construct the main mast on the East.</p>	<p>Significant temporary works would be required to provide access and sufficient construction space to construct the main mast on the East.</p>	<p>Increases the construction risks. Doubles most of the requirements for the works.</p>
Impact on landfill	<p>Temporary works required to provide access (large crane to erect the Tower in Willow Carr and increased general works (concrete etc.)) via the landfill, with potential requirement for a piled access route and lifting platform, resulting in significant environmental impacts. Potential for the bund integrity to be compromised due to large volumes of construction traffic, allowing leachate breakthrough from the landfill.</p>	<p>Works required to provide access to Willow Carr (likely across the landfill), however if works limited to construction of piers and lifting of short section of deck, works required anticipated to be proportionally reduced.</p>	<p>Works required to provide access to Willow Carr across the landfill, however if works limited to construction of piers and lifting of short section of deck, works required anticipated to be proportionally reduced.</p>	<p>Works required to provide access to Willow Carr across the landfill, however if works limited to construction of piers and lifting of short section of deck, works required anticipated to be proportionally reduced.</p>
Impact of buried structures associated with historic water treatment works and existing retaining wall	<p>Minimal impact.</p>	<p>Piling rig and crane platforms will need to be constructed away from the retaining wall to prevent additional loading. Distribution and type of made ground in combination with buried structures would likely result in differential settlement of piling and crane platforms under loading.</p>	<p>Piling rig and crane platforms will need to be constructed away from the retaining wall to prevent additional loading. Distribution and type of made ground in combination with buried structures would likely result in differential settlement of piling and crane platforms under loading.</p>	<p>Piling rig and crane platforms will need to be constructed away from the retaining wall to prevent additional loading. Distribution and type of made ground in combination with buried structures would likely result in differential settlement of piling and crane platforms under loading.</p>

Criteria	Option 1	Option 2	Option 3	Option 4
Cost				
Relative construction cost	Significant works and risk within willow carr potentially impacting costs.	Two approaches to construct.	Typical	Significant works and risk within willow carr potentially impacting costs.
Maintainability	Long structure and pylon difficult to access.	Two approaches to more so maintain.	Typical	Unconventional elements potentially more difficult to maintain.
Average Score	62%	66%	62%	53%
Decision	Disregard	Disregard	Disregard	Disregard

Table 7.3: Option Matrix – detailed design Options 1 - 4

Criteria	Option 5	Option 6	Option 7	Option 8
				
Environment and visual impact				
Impact on the park	Tucked into the south west corner this scheme has minimal impact on the park.	Approach ramp angles to the north to avoid existing willow tree. Relatively central location of tower along east bank potentially blocks connections between park and river.	While the tower is tucked into the north west corner of the park the approach ramp running parallel to the river might limit connections between the park and river.	Straight alignment requires removal of willow tree. Otherwise minimal impact on the park.
Impact on ecology	Viaduct through willow carr but no significant obstacles.	Viaduct through willow carr but no significant obstacles.	Viaduct through willow carr but no significant obstacles.	Abutment will cause moderate interference with ecology movements within corridor of willow carr.
Impact on west bank vegetation	Diagonal route through trees would require slightly more clearing. Otherwise assume low impact approach viaduct through canopy.	Assume low impact approach viaduct through canopy.	Assume low impact approach viaduct through canopy.	Some access required to erect single support although back span could mean minimal impact between support and landing.
Bridge visibility	Potential overlooking issues into neighbouring gardens. Tallest tower of all would be visible to neighbours and park users.	Bridge and tower very visible from the park. Tower set back from river edge would be less visible from the river and neighbouring properties.	The tucked away tower would be less visible to neighbours and from within the park. The approach span would be very visible, potentially blocking river views.	Sleek below deck structure would be least visible from most locations.
Potential Visual Impact	Takes a direct route from existing path and creates a diagonal angle across the river. Possibility of more deck being seen from residents' perspective. Mainstay at high point in park and located in close proximity to residents. Potential for intrusion or overshadowing. Removal of trees and scrub between residents and bridge may result in more	This is aesthetically pleasing, creates a landmark feature which will be seen from within the park in transit towards the bridge. Will require new footpath arrangement to tie into bridge ramp within park. May obscure open aspect towards the river from within the park. Mainstay and bridge deck further north	This is aesthetically pleasing, creates a landmark feature which will be seen from within the park in transit towards the bridge. Design of bridge locates deck at most northern point away from residents of Waterworks Road - potentially being the least intrusive upon the residents visual amenity of all options.	Low visibility likely with potential to be even less visible to residents on Waterworks Road if moved further north into park and tied into northern path/cycle route. Not as much a statement landmark design as other options but low key.

Criteria	Option 5	Option 6	Option 7	Option 8
				
	<p>visual exposure to bridge. Suggest planted elements remain and be enhanced.</p>	<p>from residents on Waterworks Road likely to be less intrusive to other options.</p>	<p>Mainstay located at lower point of park. Approach ramp ties into existing footpath layout although its alignment could possibly block the open aspect toward the river from the park.</p>	
<p>Impact on floodplain (Viaduct through willow carr is common to all options no not considered within appraisal of options)</p>	<p>Nearly all elements out of floodplain.</p>	<p>Pylon in floodplain. East approach is within floodplain and perpendicular to river flow which makes it unfavourable, especially if on an earth embankment.</p>	<p>Pylon in floodplain. East approach mostly out of floodplain and orientated parallel to the river which is favourable.</p>	<p>West abutment in floodplain. Large cross-sectional area of bridge.</p>
<p>Transport planning and connectivity</p>				
<p>Impact on existing paths</p>	<p>Approach ramp either replaces or runs parallel to an existing path. No need to clear riverside path.</p>	<p>Bridge easily clears low level riverside path. North approach fork creates second connection.</p>	<p>Bridge easily clears low level paths and connects to existing path near Pump House car park.</p>	<p>Approach back span ramp clears riverside path. Shortcut steps form secondary connections.</p>
<p>Access during flood at east side (all options land outside of flood plain on west side)</p>	<p>Access maintained as connects to existing path above flood level.</p>	<p>Extension and raising of approach ramp required to maintain access in the most severe flood events.</p>	<p>Access maintained as connects to existing path above flood level.</p>	<p>Extension and raising of approach ramp required to maintain access in the most severe flood events. Stairs would not be useable.</p>

Criteria	Option 5	Option 6	Option 7	Option 8
Connectivity to existing pedestrian walkways, amenity areas and facilities within the park	 <p>Skew bridge with a single straight ramp landing to the west of the pump house. Limits opportunities to maintain and link to the circular path. Could create a conflict area in front of The Pump House.</p>	 <p>Single ramp, skew to the bridge landing west of the pump house. Secondary steps on the outside of the skew point. Limits opportunities to maintain and link to the circular path. Could create a conflict area in front of the Pump House.</p>	 <p>Single, tight sweeping ramp landing next to the path around Gheluvelt Park at the high river wall. Offers opportunity to maintain the circular route but limits the option to connect to it. Offers opportunity to connect to park amenities with less risk of a conflict point at the Pump House.</p>	 <p>Single straight ramp landing to the west of the pump house. (similar alignments to Option 4, different structural form). Offers opportunities to maintain and link to the circular path. Could create a conflict point in front of the Pump House.</p>
Connectivity to existing walking and cycle network, comprising NCN46 North (Tower Rd entrance), NCN46 South (Waterworks Rd entrance), Pump House visitor entrance (most direct link to NCN46 South, The Pitchcroft, Waterworks Parking)	<p>Skew bridge with a single straight ramp landing to the west of the pump house. Good connection to NCN46 south and Pump House visitor entrance but connection to NCN46 north slightly less convenient.</p>	<p>Single ramp, skew to the bridge landing west of the pump house. Secondary steps on the outside of the skew point. Good connection to NCN46 south and Pump House visitor entrance but connection to NCN46 north slightly less convenient. Provision of steps is an issue for cycle users (potential hazard), careful detailing required</p>	<p>Single, tight sweeping ramp landing next to the path around Gheluvelt Park at the high river wall. Good connection to pump house visitor entrance but this access point is not 24hr. Connections to NCN46 north and south is the least direct of the options identified.</p>	<p>Single straight ramp landing to the west of the pump house. (similar alignments to Option 4, different structural form). Good connection to NCN46 but does not integrate naturally with the most direct route south via the Pump House visitor entrance.</p>
User experience				
Potential for deliverable/simplified sub-options	High	High	High	Medium
Geotechnical/geoenvironmental				

Criteria	Option 5	Option 6	Option 7	Option 8
Susceptibility to buried hazards	 <p>Tower likely to be positioned in line with Culvert (based on current assumptions). Cost of moving or straddling culvert could be high.</p>	 <p>Avoids culvert (based on current assumptions), smaller tower may avoid buried RGFB.</p>	 <p>Avoids Culvert (based on current assumptions) and buried RGFB.</p>	 <p>Avoids Culvert (based on current assumptions) and buried RGFB.</p>
Interaction with Retaining Wall in Gheluveit Park	Retaining wall at greatest height, (greater susceptibility) but Tower position away from wall in current sketch.	Retaining wall at reduced height at this location and tower positioned away from wall, minimal impact	Retaining wall at reduced height at this location however positioned relatively close based on current outline.	Foundation on Park side appears to be positioned on retaining wall which may need significant works (possible re-build/tie-in to foundation) to achieve.
Interface with landfill and associated earth bund	If cable backstays support the bridge deck to the landing on the landfill then minimal impact. But if end of bridge deck is bearing on landfill then the is likely to be associated settlement and potential for slope instability due to loading.	If cable backstays support the bridge deck to the landing on the landfill then minimal impact. But if end of bridge deck is bearing on landfill then the is likely to be associated settlement and potential for slope instability due to loading.	If cable backstays support the bridge deck to the landing on the landfill then minimal impact. But if end of bridge deck is bearing on landfill then the is likely to be associated settlement and potential for slope instability due to loading.	Assuming the landing at landfill is cantilevered then minimal impact on landfill and earth bund at boundary.
Impact on Phase 2 Ground Investigation Works and associated design	GI likely to be impacted by root protection zones and culvert. Vegetation clearance within Willow Carr to be amended.	GI for tower and cable stay tension piles outside root protection zones. Proposed Vegetation clearance within Willow Carr to be amended.	GI for tower and cable stay tension piles outside root protection zones. Proposed Vegetation clearance within Willow Carr to be amended.	Within Gheluveit Park, GI will be limited as alignment is within root protection zones of numerous trees. GI will need to be tweaked to account for two major foundations and further information on retaining wall will be required.
Construction				

Criteria	Option 5 	Option 6 	Option 7 	Option 8 
Access and impact on area (west)	Substantial haul roads and temporary works still required due to piling rigs, however less so.	Substantial haul roads and temporary works still required due to piling rigs, however less so.	Substantial haul roads and temporary works still required due to piling rigs, however less so.	Substantial haul roads and temporary works still required due to piling rigs, however less so.
Access and impact on area (east)	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. Construction traffic would be very evident to the residents during the works. Parking restrictions may apply. Remediation of the car park would be required on completion of the works.	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. Construction traffic would be very evident to the residents during the works. Parking restrictions may apply. Remediation of the car park would be required on completion of the works.	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. Construction traffic would be very evident to the residents during the works. Parking restrictions may apply. Remediation of the car park would be required on completion of the works.	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. Construction traffic would be very evident to the residents during the works. Parking restrictions may apply. Remediation of the car park would be required on completion of the works. Erection of pylon not required.
Suitability for compound	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. The site compound would need to be on higher ground to the South of the park in case of a flood event.	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. The site compound would need to be on higher ground to the South of the park in case of a flood event.	The only viable access is through the existing pump house car park. If allowed alternative parking for their staff would be required. The site compound would need to be on higher ground to the South of the park in case of a flood event.	The site compound could be located to the West to reduce the impact on the local community and park users. Also <u>Also, this would make it</u> easier to keep it above a flood event.
Relative flood susceptibility	Low	Medium	Medium	Low
Ease of construction	Significant temporary works would be required to provide access and sufficient construction space to construct the main mast on the East.	Significant temporary works would be required to provide access and sufficient construction space to construct the main mast on the East.	Significant temporary works would be required to provide access and sufficient construction space to construct the main mast on the East.	Whilst there are no pylons to construct, most of the requirements for the works are still doubled.

Criteria	Option 5	Option 6	Option 7	Option 8
Impact on landfill	 <p>Works required to provide access to Willow Carr across the landfill, however if works limited to construction of piers and lifting of short section of deck, works required anticipated to be proportionally reduced.</p>	 <p>Works required to provide access to Willow Carr across the landfill, however if works limited to construction of piers and lifting of short section of deck, works required anticipated to be proportionally reduced.</p>	 <p>Works required to provide access to Willow Carr across the landfill, however if works limited to construction of piers and lifting of short section of deck, works required anticipated to be proportionally reduced.</p>	 <p>Increase temporary works required to provide access (large crane to erect the cantilevered section within Willow Carr) via the landfill with potential requirement for a piled access route and lifting platform, resulting in significant environmental impacts.</p>
Impact of buried structures associated with historic water treatment works and existing retaining wall	<p>Piling rig and crane platforms will need to be constructed away from the retaining wall to prevent additional loading. Distribution and type of made ground in combination with buried structures would likely result in differential settlement of piling and crane platforms under loading.</p>	<p>Piling rig and crane platforms will need to be constructed away from the retaining wall to prevent additional loading. Distribution and type of made ground in combination with buried structures would likely result in differential settlement of piling and crane platforms under loading.</p>	<p>Piling rig and crane platforms will need to be constructed away from the retaining wall to prevent additional loading. Distribution and type of made ground in combination with buried structures would likely result in differential settlement of piling and crane platforms under loading.</p>	<p>Piling rig and crane platforms will need to be constructed away from the retaining wall to prevent additional loading. Distribution and type of made ground in combination with buried structures would likely result in differential settlement of piling and crane platforms under loading.</p>
Cost				
Relative construction cost	Typical	Two approaches to construct.	Typical	Simplified form however significant works and risk within Willow Carr potentially impacting costs.
Maintainability	Typical	Two approaches to more so maintain.	Typical	No cables to replace, however large surface area to maintain.
Average Score	64%	67%	69%	62%

Criteria	Option 5	Option 6	Option 7	Option 8
Decision	 <p>Disregard</p>	 <p>Develop further – second highest total score</p>	 <p>Develop further – highest total score</p>	 <p>Develop further – highest scoring non-cable stayed option</p>

Table 7.4: Option Matrix – detailed design Options 5 - 8

8. Option Development and Sifting – Wider Links

8.1 Background and Scope

The methodology for appraising wider links required as part of the scheme is presented below.

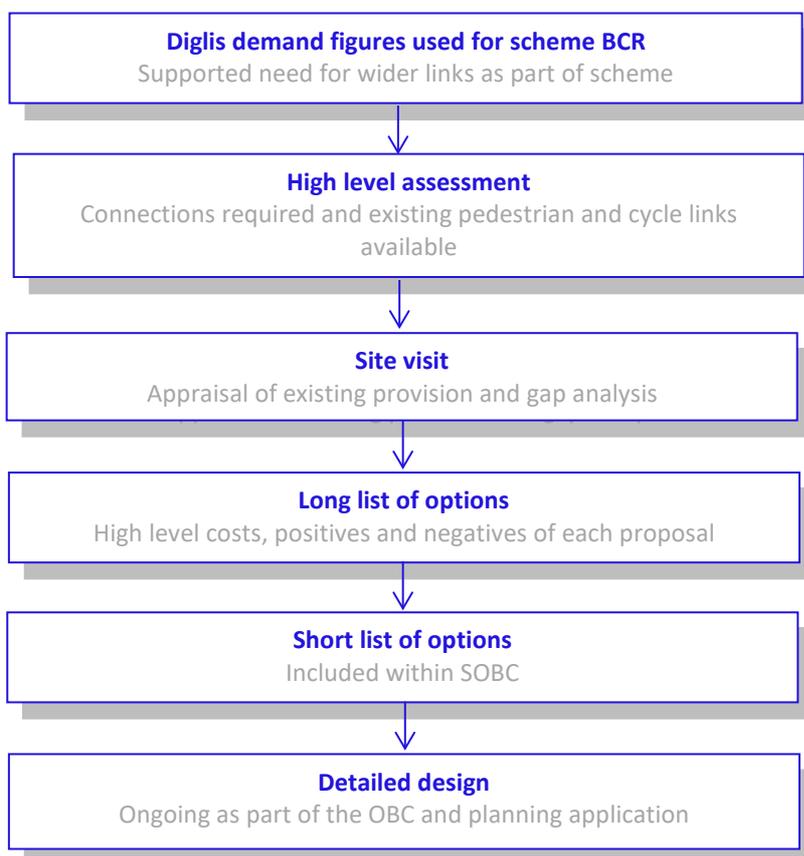


Figure 8.1: Wider links option assessment process

Figure 8.2 shows the existing provision of walking and cycling routes along both sides of the river and further afield in Worcester. It shows the distinction between Public Rights of Way (PROW) and other footpaths. It also shows key destinations in Worcester, such as the city centre, the various University of Worcester campuses and the large retail and employment area to the north-east of the city.

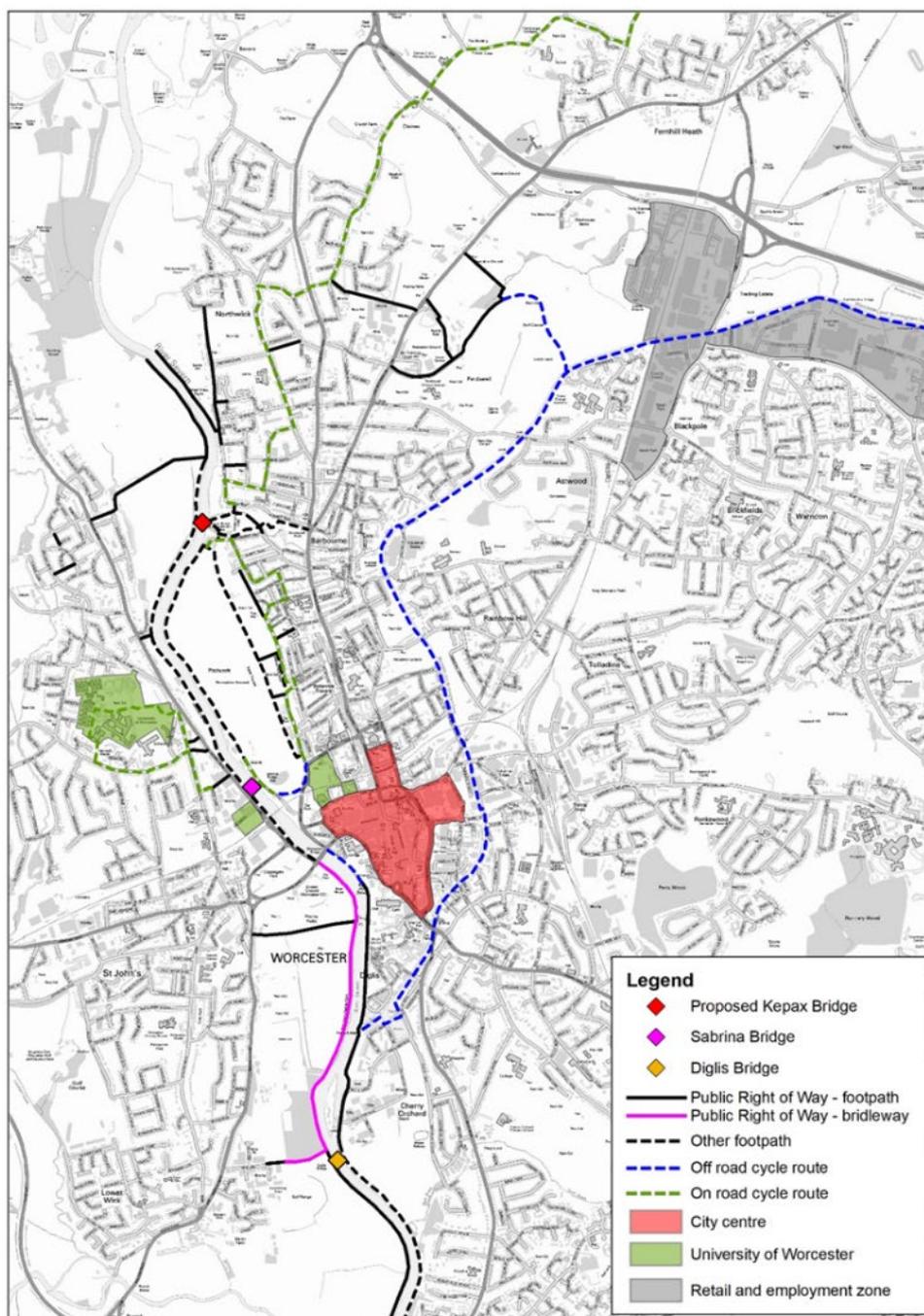


Figure 8.2: Existing walking and cycle routes (© Crown Copyright Ordnance Survey Open Data 2019)

In April 2019, Jacobs produced a note to assess the potential demand for Kepax Bridge. This note concluded that if the demand at Diglis Bridge (approximately 170 cyclists and 887 pedestrians each day) was replicated at Kepax, a medium BCR would be delivered. It was noted that *“Diglis Bridge was provided as part of a wider project to increase levels of walking and cycling and connects to a network of traffic-free routes. In order to achieve a BCR of this scale, it will be important to also connect Kepax Bridge to the wider cycling network.”*

Further work was therefore recommended to develop and cost links from the Kepax Bridge site to the wider network, including:

- Upgrade of Severn Way to provide a riverside circular walk;

- Upgrade of an alternative route for when the racecourse path is closed (on race days). For example, Pope Iron Road, Stephenson Road, The Moors.
- Upgrade of links and provision of signage between Gheluvelt Park and the Worcester and Birmingham Canal;
- Upgrade of links and provision of signage between Gheluvelt Park and the main Barbourne Road.
- Provision of an upgraded route from the Kepax site and Worcester University, for example improved provision on Hallow Road/ Henwick Road.

Following on from these recommendations, a site visit was undertaken in order to appraise the quality of existing links and undertake a 'gap analysis' in order to confirm where investment and improvement could be required.

8.1.1 West bank existing provision

The A443 Hallow Road runs approximately parallel to the River Severn on the west bank, between the proposed location of Kepax Bridge and Sarbina Bridge. It is a single carriageway road, which runs through a residential area. It provides access to various residential zones and two campuses of the University of Worcester, and links them to the A44 Worcester Bridge. It also links the city to various villages to the north, such as Hallow and Holt Heath. It therefore serves as a key distributor road in the city and would generally experience high levels of traffic in peak periods because of this. This makes the A443 Hallow Road unsuitable as a cycle route without additional infrastructure to segregate cyclists from traffic. However, there is insufficient space for such infrastructure to be introduced along most of its length.

There are footways along both sides of the A443 Hallow Road for most of its length. However, some of these footways are of insufficient width for wheelchair users, making them unsuitable as a key pedestrian link. Some parts of the footways are also used for on street parking, which can further narrow the available space for pedestrians if the vehicles are parked on the kerb. It is also a generally unpleasant walking route due to the high presence of vehicles and narrow footways.



Figure 8.3: A443 Hallow Road

The Severn Way northbound from Sabrina Bridge is paved for approximately 1km along the bank of the river. This is a pedestrian only footpath. The majority of this stretch of path is of good quality and sufficient width for two wheelchair users to pass, but some areas are suffering from poor maintenance and overgrown vegetation.



Figure 8.4: Severn Way south

At the north end of the existing paved path, there is a link to the A443 Henwick Road. However, this link is of a very steep gradient so many cyclists would struggle to use it safely. Wheelchair users and pedestrians with pushchairs would likewise have difficulties using this link.



Figure 8.5: Severn Way link to A443

To the north of the A443 Henwick Road link, the Severn Way is unpaved. It firstly passes behind the gardens of residential properties, where the path is a well-maintained grass / dirt path. Beyond the residential properties, the Severn Way path becomes narrow and overgrown with vegetation. Between the residential properties and the site of the Kepax Bridge, there is also a small brook which the path passes over via a narrow bridge, which is not sufficient in width for two cyclists to pass but is only of a short length (approximately 10m).



Figure 8.6: Severn Way north

North of the Kepax Bridge site, the Severn Way continues as an unpaved, narrow and overgrown path. Approximately 450m to the north of the Kepax Bridge site there is a side path which links the Severn Way back to the residential area to the west, along the northern edge of the land fill site. The path is likewise unpaved, narrow and overgrown. This path links to the exit from the Hallow Recycling Centre.

8.1.2 East bank existing provision

The A38 / A449 Barbourne Road runs approximately parallel to the River Severn on the east bank, between the proposed location of Kepax Bridge and Sarbina Bridge. It is a single carriageway road, which runs through a mixed-use area of residential and retail uses. It provides access to various residential zones and links them to the city centre to the south. Further north, the A38 also provides access Droitwich Spa. As with the A443 Hallow Road, it therefore serves as a key distributor road in the city and would generally experience high levels of traffic in peak periods because of this. This makes the A38 / A449 Barbourne Road unsuitable as a cycle route without additional infrastructure to segregate cyclists from traffic. There is a southbound bus lane on the A38 / A449, which cyclists can use, which segregates them from the general traffic. However, there is no existing provision for northbound cyclists and insufficient space to introduce any northbound infrastructure along most of its length.

There are footways along both sides of the A38 / A449 Barbourne Road for most of its length, with frequent signalised pedestrian crossing facilities. The footways are also generally of sufficient width for wheelchair users. The route is therefore suitable for pedestrians to use, just not as a pleasant route due to the high volume of traffic.



Figure 8.7: A38 / A449 Barbourne Road

There is a paved path for pedestrians and cyclists around most of the perimeter of the Pitchcroft Racecourse. However, the first section of the route northbound from Sabrina Bridge is not clear. The route first utilises footpaths along Grand Stand Road and then goes through the car park of the race course, which then provides access to the race course path. Once on the path, it is of good quality and over 2.5m wide.



Figure 8.8: Pitchcroft Racecourse path

At the northern end of the racecourse, the path provides access onto Waterworks Road which in turn provides access to the Gheluvelt Park car park. There is a paved path from the car park to the edge of the river and the site of the Kepax Bridge.

This route between Sabrina Bridge and Gheluvelt Park forms part of route 46 of the National Cycle Network (NCN).

However, the perimeter path around the racecourse is closed on race days, so an alternative route is also needed. There is a signposted alternative to the NCN 46 which utilises a segregated cycle lane along the footway of the A449 and then residential streets along Severn Terrace, Stephenson Street, Barbourne Terrace, Somers' Road and Pope Iron Road. There are pedestrian footpaths which connect some of these residential streets, allowing for a more direct journey for pedestrians compared to cyclists. However, some of these footpaths are of a low quality, with overgrown vegetation and a lack of lighting.



Figure 8.9: Alternative route to Pitchcroft Race Course

8.2 Long list of enhancement options

A number of options were considered to enhance the linkages from Kepax Bridge on the west bank to the wider pedestrian and cyclist network. The options are not mutually exclusive, so all could be implemented.

- Route option 1 - enhance the existing Severn Way path to the south of the proposed Kepax Bridge location, to the point where it joins the existing paved section by the A443 link.
- Route option 2 - enhance the existing Severn Way path to the north of the proposed Kepax Bridge location, to the point where it is met by the side path to the Hallow Recycling Centre. This side path also needs to be enhanced.
- Route option 3 - introduce a new paved link directly between the proposed Kepax Bridge location and the exit of the Hallow Recycling Centre, through the existing landfill site.

In addition, three options were considered to enhance the linkages from Kepax Bridge on the east bank to the wider pedestrian and cyclist network. Again, the options are not mutually exclusive, so multiple options can be implemented. It may also be the case that multiple route options are required on the east bank for added resilience against the Racecourse path flooding and closing on race days.

- Route option 1 - enhance the existing alternative NCN 46 route. The current route for cyclists diverts around various residential streets, with pedestrians able to use a more direct footpath along the edge of the Pitchcroft Allotments and playing fields which re-joins the route on Stephenson Road.
- Route option 2 - providing pedestrian and cyclist links from the proposed Kepax Bridge to NCN 45, which runs along the Worcester to Birmingham canal.
 - Route option 2a – Provision of a short link to NCN 45, via St. George’s Lane North.
 - Route option 2b – Provision of a short link to NCN 45, via Gregory’s Mill Lane.
- Route option 3 - providing pedestrian and cyclist links from the proposed Kepax Bridge to NCN 45 along the canal.
 - Route option 3a – Provision of a long link to NCN 45, via Cornmeadow Road and RCN 3.
 - Route option 3b – Provision of a long link to NCN 45, via Checketts Lane and RCN 3.

The long list of options considered is presented in Figure 8.10. The advantages, disadvantages and cost of each option considered is then presented in Table 8.1.

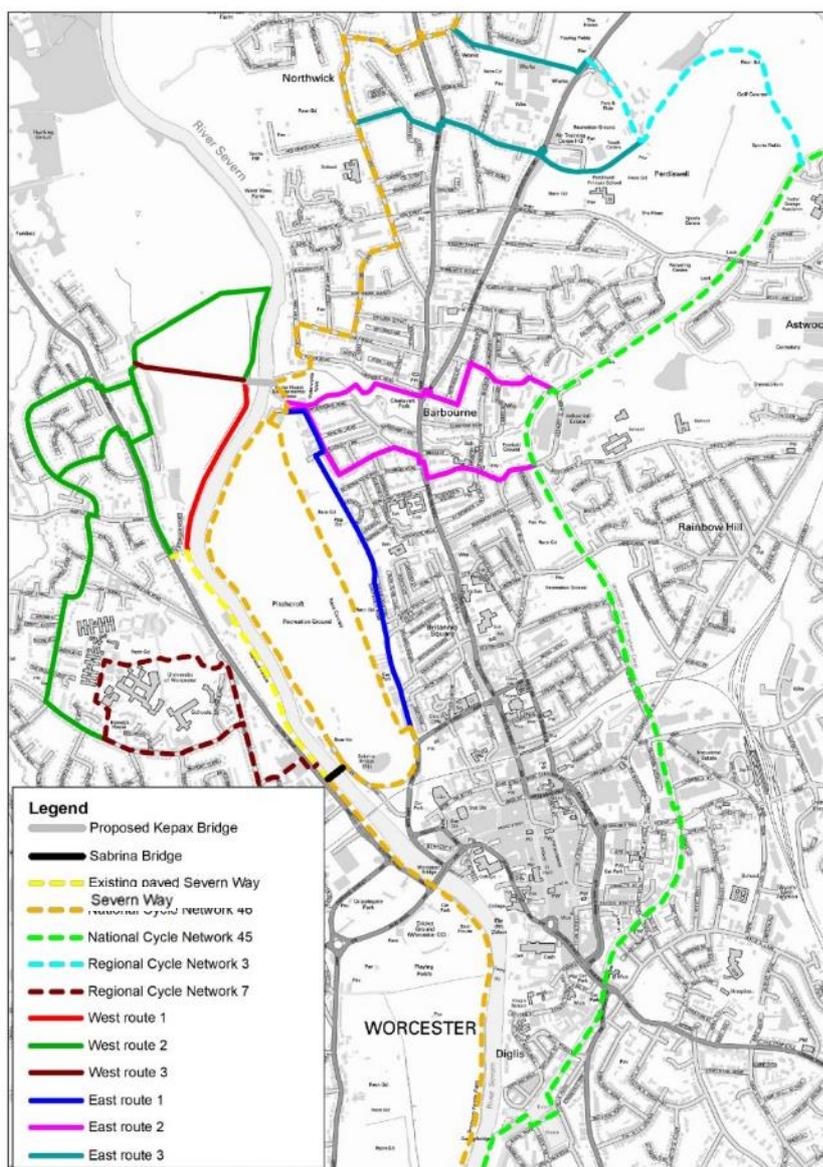


Figure 8.10: Long list of wider link options

Option	Description	Cost	Advantages	Disadvantages
West option 1	Pave existing Severn Way to south of Kepax Bridge	£881,703	Most direct route from Kepax Bridge to an existing route on the west bank	Constraints around the existing narrow bridge and residential properties
West option 2	Pave existing Severn Way to north of Kepax Bridge	£1,088,088	Unconstrained by existing infrastructure or properties	Longer route than option 1. Requires installation of a toucan crossing
West option 3	Introduce new link across the landfill site	£569,595	Most direct route to nearby housing. Less likely to be flooded than other west bank options	Potential issues due to uncapped landfill site. Requires installation of a toucan crossing
East option 1	Improve existing NCN 46 alternative route	£472,302	Minimal new infrastructure required	Requires widening of existing footpath

Option	Description	Cost	Advantages	Disadvantages
East option 2a	Provide short link to NCN 45, via St. George's Lane North	£136,622	Provides access to NCN 45 (for leisure, retail, and employment sites)	Short section along A38, with no northbound provision. Requires upgrade of a puffin crossing
East option 2b	Provide short link to NCN 45, via Gregory's Mill Lane	£358,667	Provides access to NCN 45 (for leisure, retail, and employment sites)	Requires crossing A38 and A449 3 times. Requires upgrade of 3 puffin crossings
East option 3a	Provide long link to NCN 45, via Cornmeadow Road and RCN 3	£319,919	Provides access to NCN 45 (for leisure, retail, and employment sites). Utilises existing toucan crossings	Longer route than option 2a or 2b. Requires widening of existing footpath
East option 3b	Provide long link to NCN 45, via Checketts Lane and RCN 3	£219,594	Provides access to NCN 45 (for leisure, retail, and employment sites). Doesn't require any widening. Shorter route than option 3a	Longer route than option 2a or 2b. Requires installation of a toucan crossing and upgrade of a puffin crossing

Table 8.1: Long list option summary

8.3 Wider Links Recommendations

Following on from the assessment above, four pedestrian and cyclist links were taken forward to a short list of options to link Kepax Bridge with the surrounding area and wider cycle network. Figure 8.11 and Table 8.2 present the four proposed links.

Location	Description	Key Purpose
West route 1	Kepax Bridge to existing Severn Way paved section	Create a circular riverside route, utilising proposed Kepax Bridge, Sabrina Bridge, and Diglis Bridge
West route 3	Kepax Bridge to Hallow Recycling Centre	Provide an alternative route from the west side of the bridge for resilience to flooding events
East route 1	Gheluvelt Park to Worcester City Centre	Provide an alternative route along the east bank for resilience to flooding events and when the path is closed
East route 2a	Gheluvelt Park to canal towpath	Create a link to the NCN 45 along the Birmingham to Worcester Canal

Table 8.2: Recommended wider links

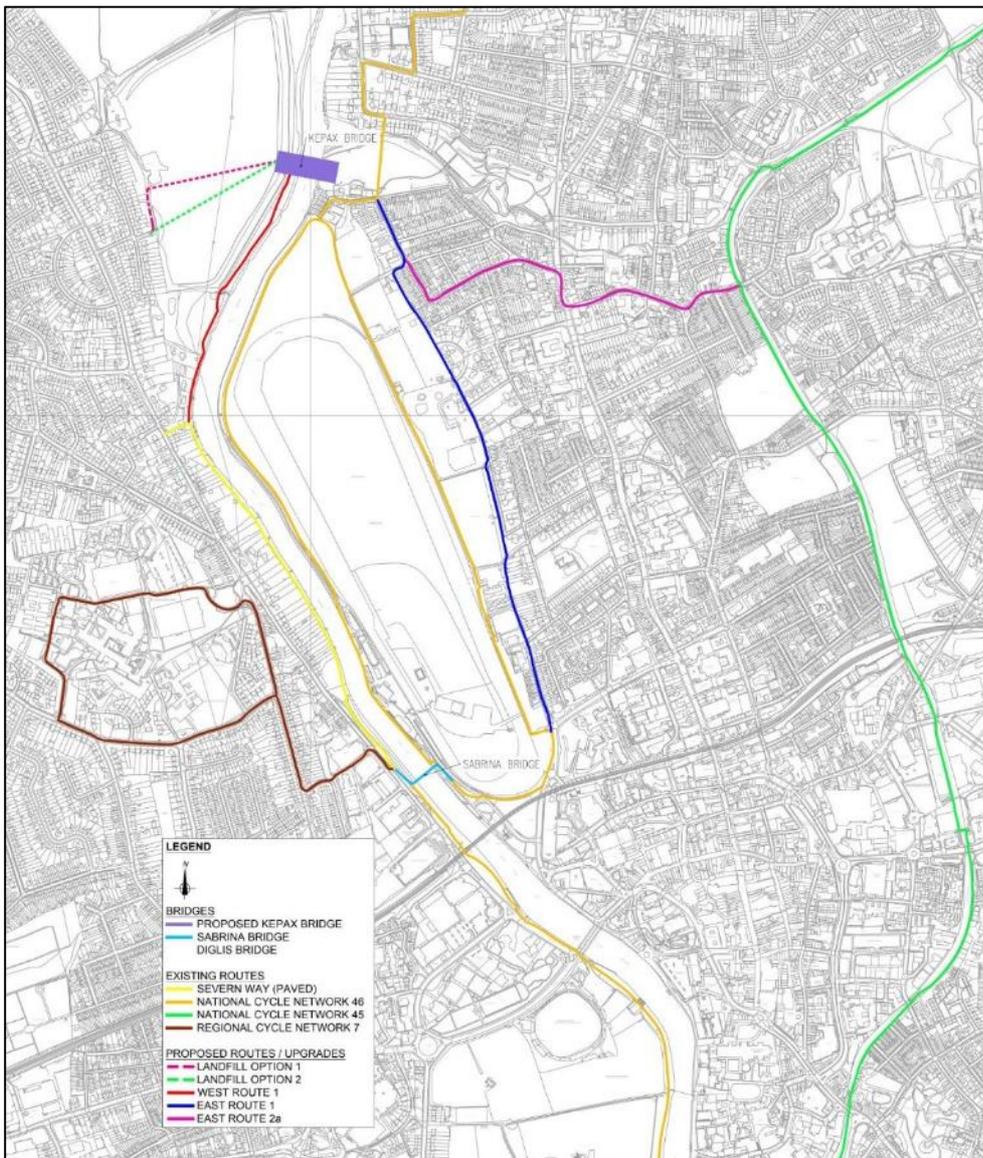
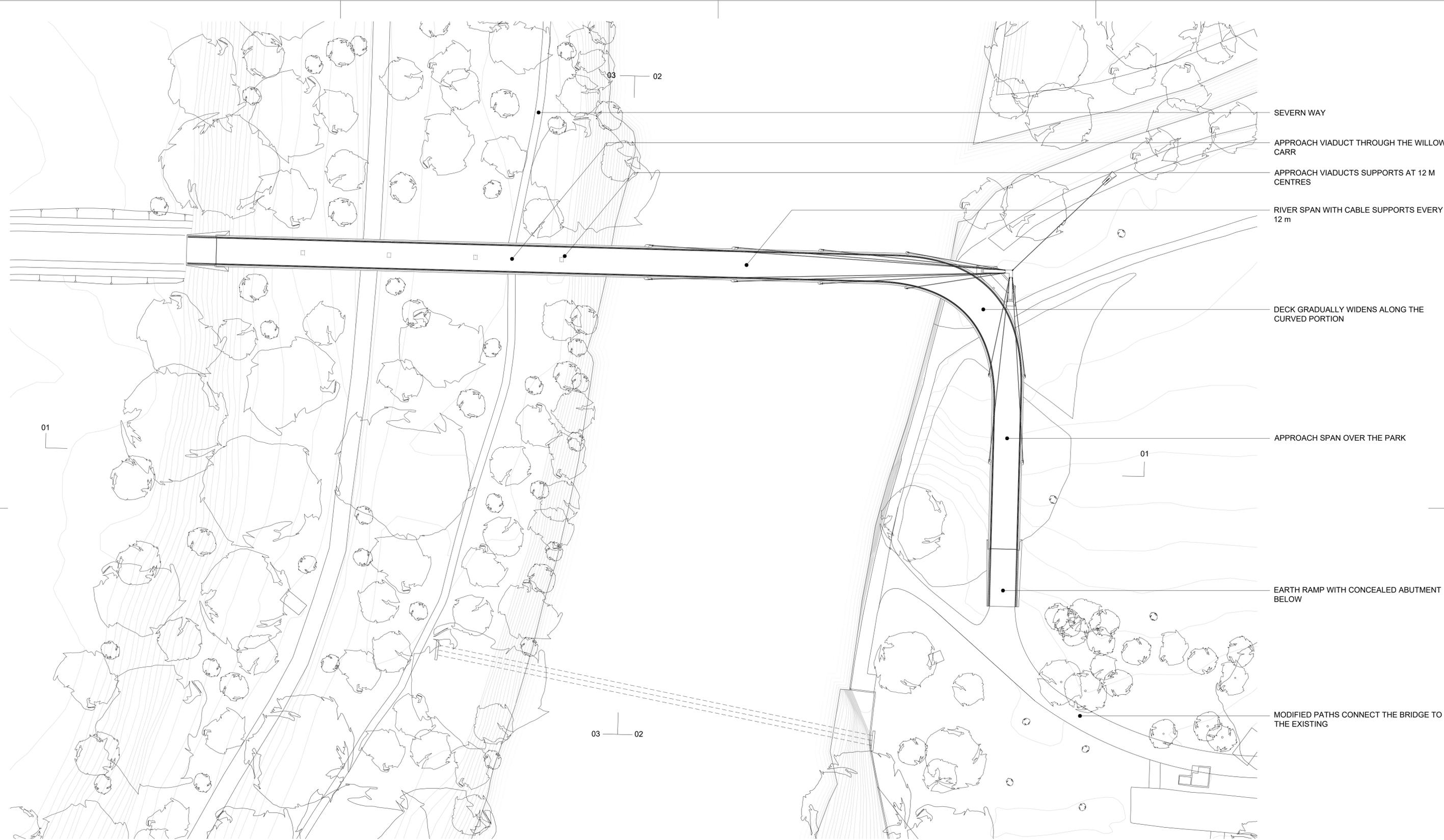


Figure 8.11: Plan of recommended wider links



- SEVERN WAY
- APPROACH VIADUCT THROUGH THE WILLOW CARR
- APPROACH VIADUCTS SUPPORTS AT 12 M CENTRES
- RIVER SPAN WITH CABLE SUPPORTS EVERY 12 m
- DECK GRADUALLY WIDENS ALONG THE CURVED PORTION
- APPROACH SPAN OVER THE PARK
- EARTH RAMP WITH CONCEALED ABUTMENT BELOW
- MODIFIED PATHS CONNECT THE BRIDGE TO THE EXISTING

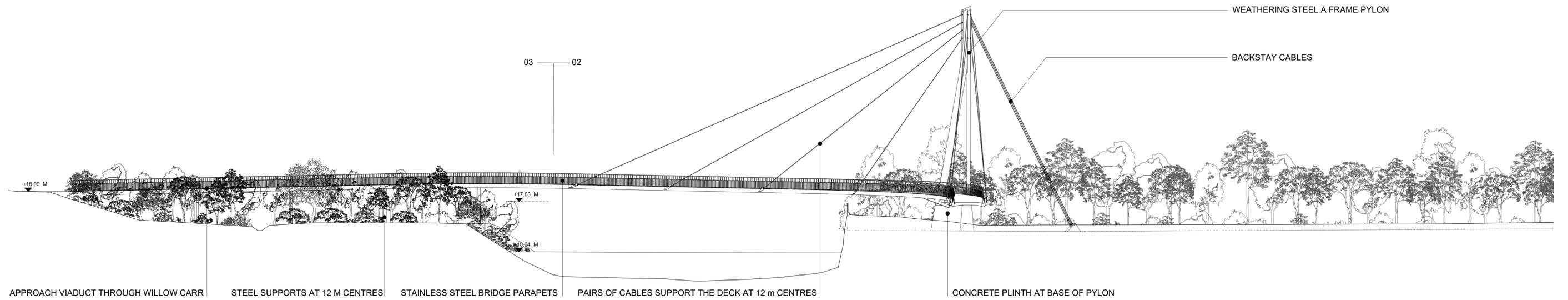
01 BRIDGE PLAN
SCALE 1:250@A1

A PLANNING SUBMISSION EG 18/08/2020

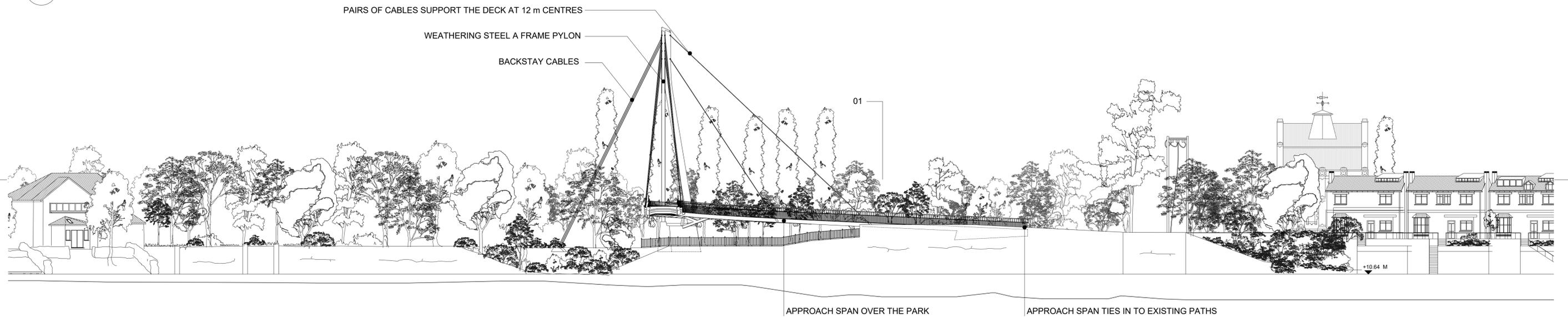
MOXON
LONDON
Great Western Studios, 65 Alfred Road, London W2 5EU
t: 0207 034 0088 | f: 0207 034 0099

SECTITLE: FILE NO.
Architect: Aberystwyth AB35 5LN
t: 0135742047
mail@moxonarchitects.com | www.moxonarchitects.com

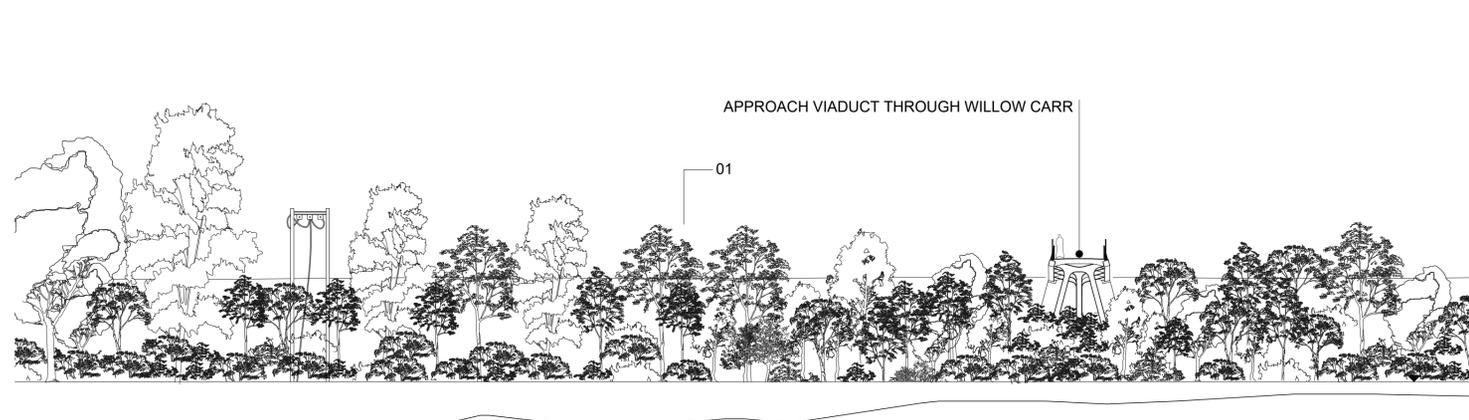
PROJECT TITLE KEPAX BRIDGE					
DRAWING TITLE BRIDGE PLAN OPTION 1					
DWG STATUS FOR INFORMATION					
DRAWN	FILE	DATE	REVISION		
CHECKED	JOB NO	SCALE	DWG NO		
EG	JOB	1:200	KEPAX_M0X_002		



01 SECTION THROUGH RIVER SEVERN LOOKING NORTH
SCALE 1:250@A1

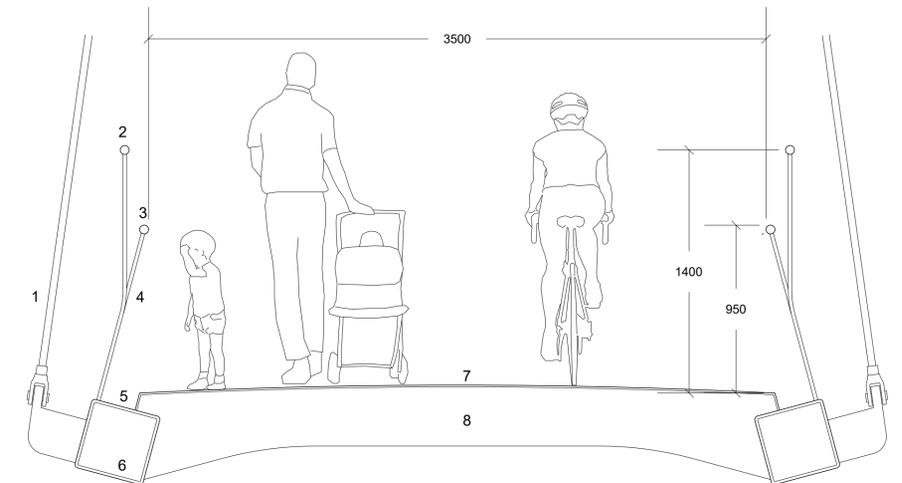


02 SECTION ALONG RIVER SEVERN LOOKING EAST
SCALE 1:250@A1



03 SECTION ALONG RIVER SEVERN LOOKING WEST
SCALE 1:250@A1

- 1 - CABLE ANCHORAGES AT 12 M CENTRES
- 2 - STAINLESS STEEL CYCLE RAIL
- 3 - STAINLESS STEEL HANDRAIL
- 4 - STAINLESS STEEL PARAPET INFILL BARS WITH 100 MM GAPS ARE VERTICAL IN ELEVATION
- 5 - DRAINAGE GUTTER. DETAIL TBD
- 6 - 400 X 400 WEATHERING STEEL SHS
- 7 - DECK PLATE WITH SLIP RESISTANT FINISH DRAINS TO BOTH SIDES
- 8 - WEATHERING STEEL SHAPED TRANSVERSE RIBS AT REGULAR CENTRES



03 TYPICAL CROSS SECTION
SCALE 1:20@A1

WEATHERING STEEL A FRAME PYLON

BACKSTAY CABLES

APPROACH VIADUCT THROUGH WILLOW CARR

STEEL SUPPORTS AT 12 M CENTRES

STAINLESS STEEL BRIDGE PARAPETS

PAIRS OF CABLES SUPPORT THE DECK AT 12 m CENTRES

CONCRETE PLINTH AT BASE OF PYLON

PAIRS OF CABLES SUPPORT THE DECK AT 12 m CENTRES

WEATHERING STEEL A FRAME PYLON

BACKSTAY CABLES

APPROACH SPAN OVER THE PARK

APPROACH SPAN TIES IN TO EXISTING PATHS

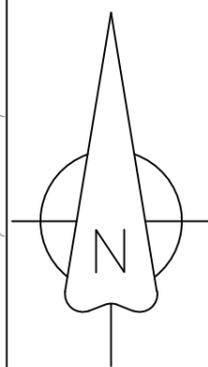
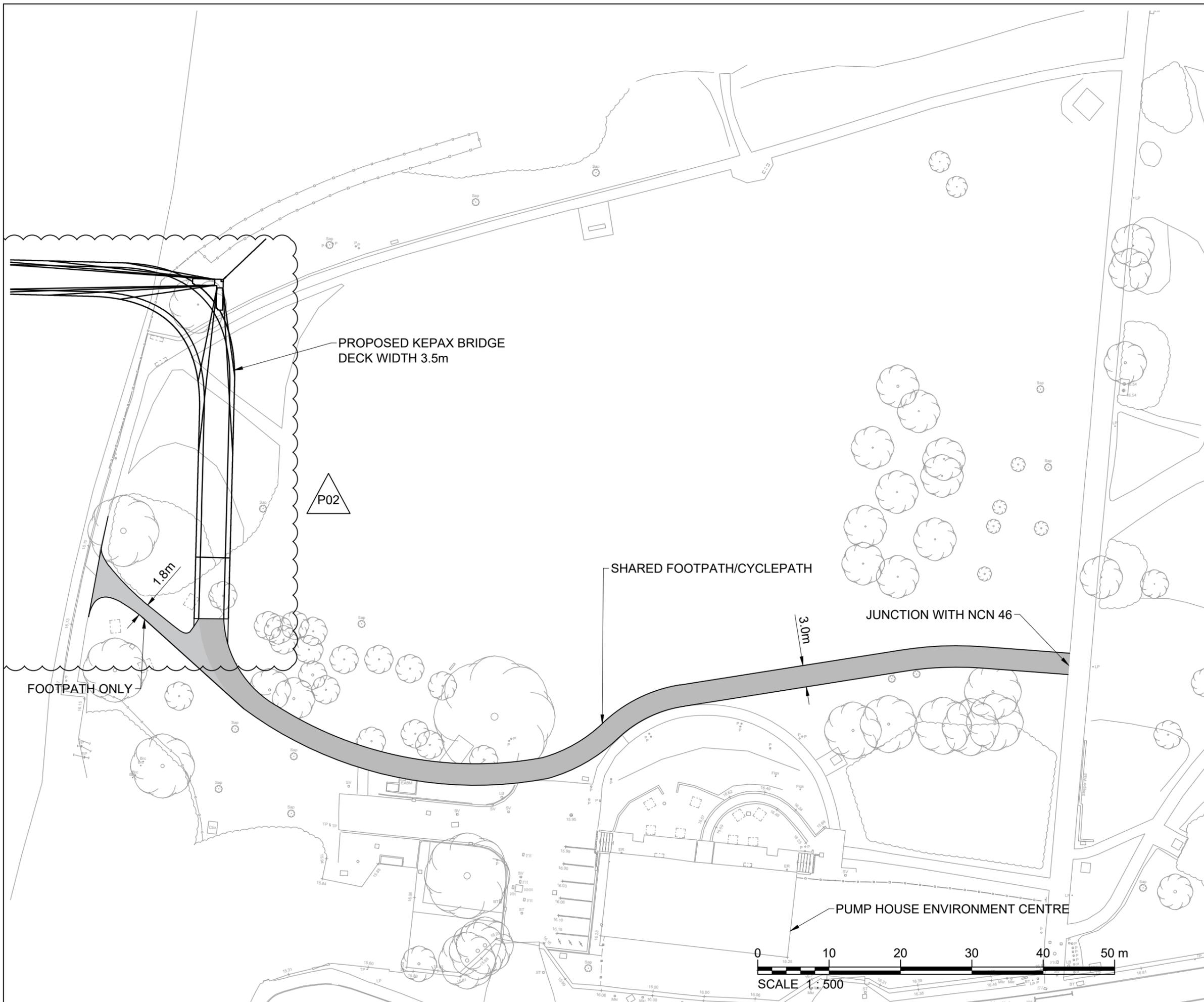
APPROACH VIADUCT THROUGH WILLOW CARR

A PLANNING SUBMISSION

EG 18/08/2020

MOXON
LONDON
Great Western Studios, 65 Abingdon Road, London W2 5EU
t: 0207 034 0088 | f: 0207 034 0099
SICCTLR#110
Architect, Aberystwyth AB35 5LN
t: 0139742047
mail@moxonarchitects.com | www.moxonarchitects.com

PROJECT TITLE		KEPAX BRIDGE	
DRAWING TITLE		SECTIONS	
DRAWING STATUS		FOR INFORMATION	
DRAWN	JM	FILE	FILE
CHECKED	EG	JOB NO	JOB
DATE	18/08/2020	REVISION	A
SCALE	1:200;1:20	DWG NO	KEPAX_MDX_003



PROPOSED KEPAX BRIDGE
DECK WIDTH 3.5m

P02

1.8m

FOOTPATH ONLY

SHARED FOOTPATH/CYCLEPATH

3.0m

JUNCTION WITH NCN 46

PUMP HOUSE ENVIRONMENT CENTRE



SCALE 1:500

P02	06/08/2020	BRIDGE DECK WIDTH REDUCED	BJ	CC	JW	MB
P01	23/05/2020	FIRST ISSUE FOR PLANNING	BJ	CC	JW	MB
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd



Client
KEPAX BRIDGE

Project
GHELUVELT PARK PROPOSED FOOTPATH/CYCLEPATH GENERAL ARRANGMENT

Drawing status
FOR PLANNING

Scale
1:500 @ A3
DO NOT SCALE

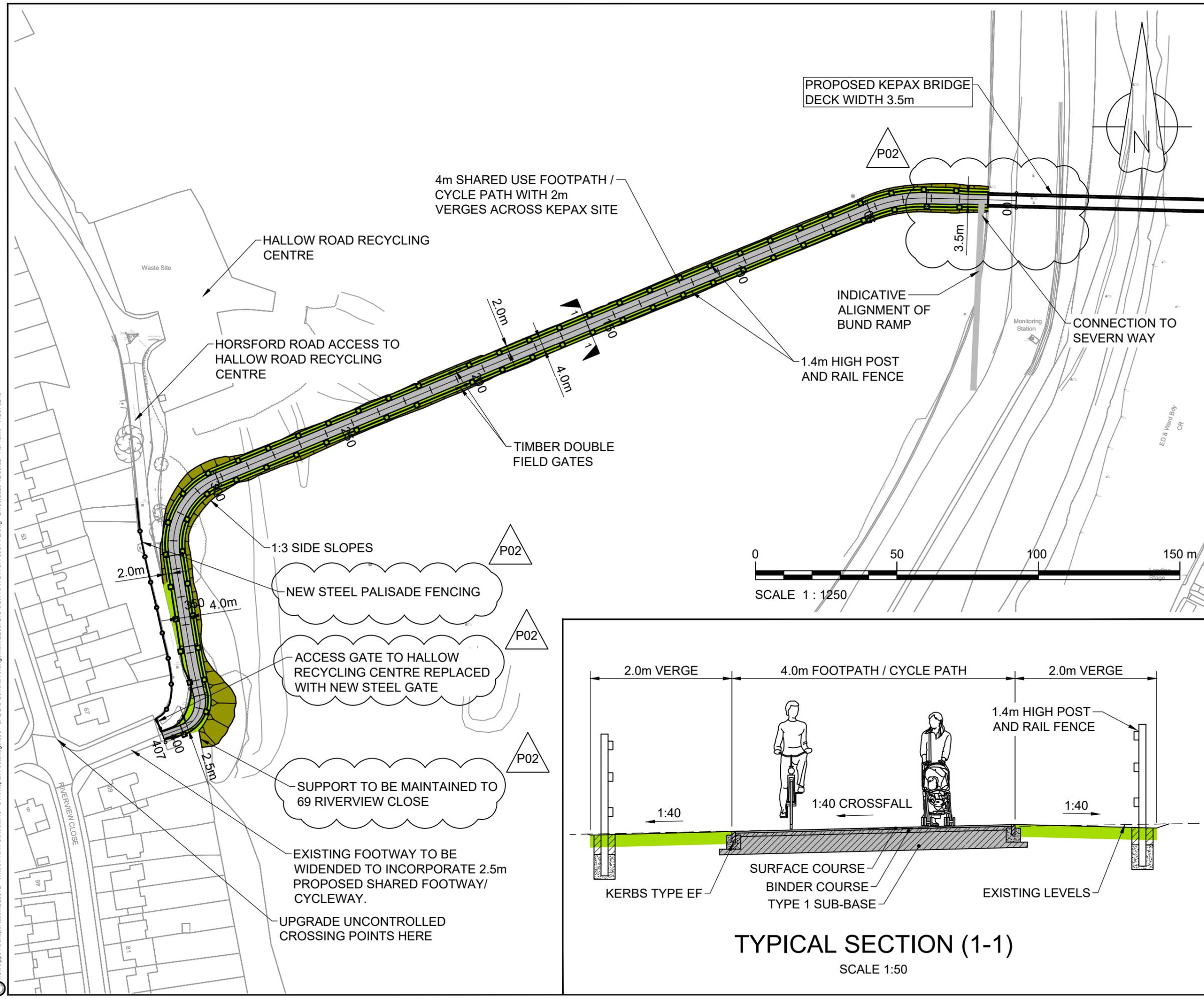
Jacobs No. B2367216
Rev P02

Drawing number
B2367216-SGN-KPX-DR-CH-0003

© Copyright 2018 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of, the Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this drawing by any third party.

NOTES

1. REFER TO DRAWING B2367216-SGN-KPX-DR-CH-0005 FOR LONGITUDINAL SECTION.



TYPICAL SECTION (1-1)
SCALE 1:50

P02	05.08.2020	ACCESS GATE AND FENCING - BRIDGE DECK WIDTH REDUCED	JU	CC	JW	MB
P01	16.06.2020	FIRST ISSUE FOR PLANNING	JU	CC	JW	MB
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd
<p>Red Hill House, 227 London Road, Worcester, WR5 2JG Tel: +44(0)1905 361 361 www.jacobs.com</p>			Client			
<p>worcestershire county council</p>			Project			
KEPAX BRIDGE			Drawing title			
KEPAX SITE PROPOSED SHARED FOOTPATH / CYCLEPATH GENERAL ARRANGEMENT			Drawing status			
FOR PLANNING			Scale			
1:1250 @ A3 OR AS SHOWN			DO NOT SCALE			
Jacobs No. B2367216			Rev			
Client no.			P02			
Drawing number						
B2367216-SGN-KPX-DR-CH-0004						
<small>© Copyright 2019 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for or in respect of any use of, or reliance upon, this drawing by any third party.</small>						

U:\work\p01\transportation\B23672 - WMHA Term Contract\16 - STR Kepax Footbridge\08 - CADD\0 General Arrangement\B2367216-SGN-KPX-DR-CH-0004-P2.dwg - 27/08/2020 12:36:52 - A3Frame - RG073219

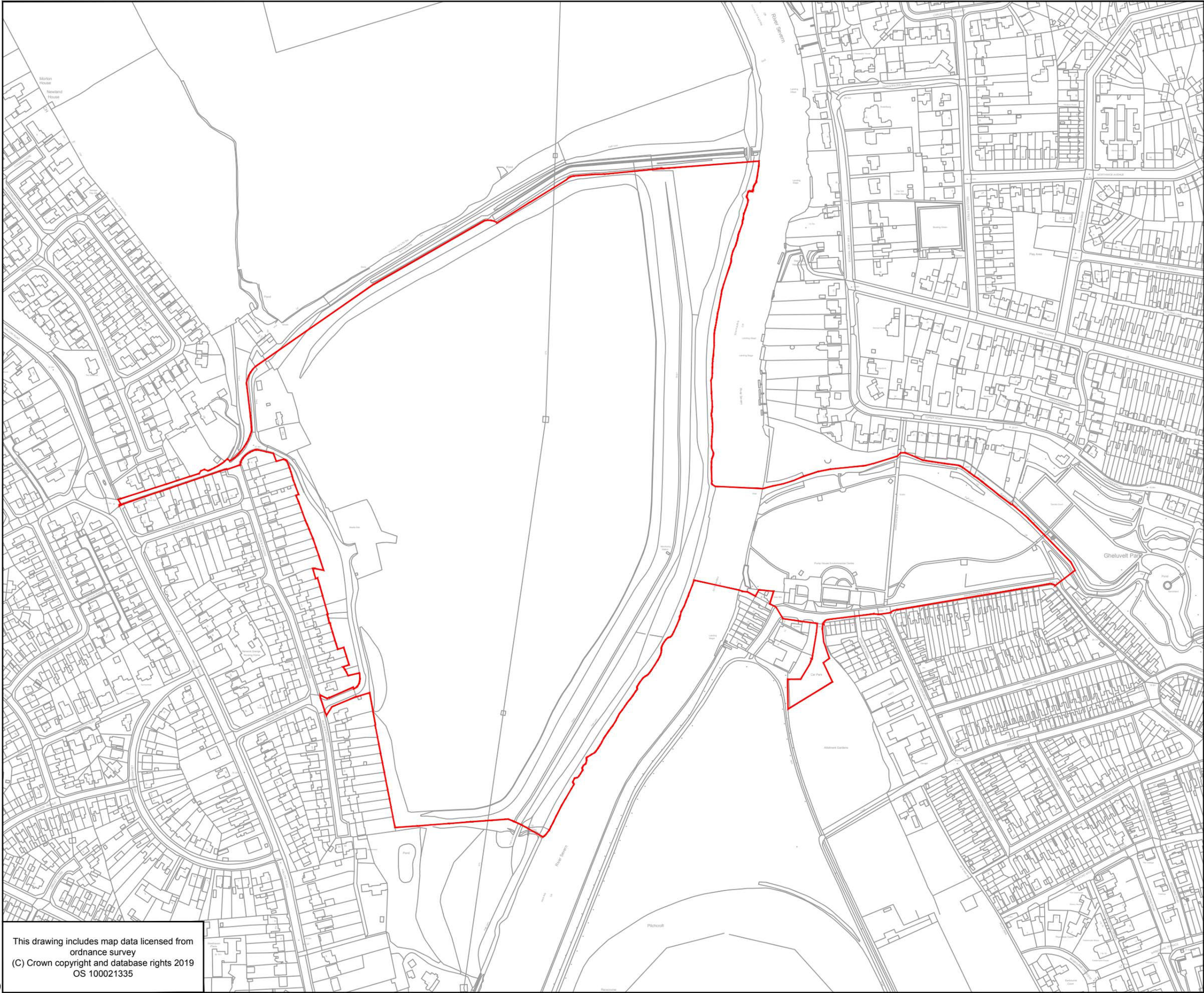


01 SITE LOCATION PLAN
SCALE 1:1000@A1

A PLANNING SUBMISSION EG 18/08/2020

MOXON
LONDON
Great Western Studios, 65 Alfred Road, London W2 5EU
t 0207 034 0088 | f 0207 034 0099
SURREY
Arbico, Crowthorne, Berkshire RG35 5UN
t 0135742047
moxon@arbitractors.com | www.moxonarchitects.com

PROJECT TITLE KEPAX BRIDGE				
DRAWING TITLE SITE LOCATION PLAN				
DRAWING STATUS FOR INFORMATION				
DRAWN	JM	FILE	DATE	REVISION
CHECKED	EG	JOB NO	SCALE	DWG NO
			1:1000	KEPAX_M0X_001



NOTES
 RED LINE BOUNDARY = 25.9 HECTARES

KEY
 — RED LINE BOUNDARY

U:\wfp01\transportation\B23672 - WMHA Term Contract\16 - STR Kepax Footbridge\08 - CADD\0 General Arrangement\B23672XX-GEN-KPX-DR-CB-0001_SCREENING RL BOUNDARY.dwg - 14/08/2020 14:36:59 - A3Frame - R073219

This drawing includes map data licensed from
 Ordnance Survey
 (C) Crown copyright and database rights 2019
 OS 100021335

P01	NOV 2019	PLANNING SCREENING OPINION	MB	IF	IF	MB
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd
 Redhill House, 227 London Road, Worcester, WR5 2JG Tel: +44(0)1905 361361 Fax: +44(0)1905 361362 www.jacobs.com						
Client			 worcestershire county council			
Project			KEPAX BRIDGE			
Drawing title			FIGURE 2 RED LINE BOUNDARY			
Drawing status			FOR ISSUE			
Scale	Not to scale		DO NOT SCALE			
Jacobs No.	B2367216		Rev		P01	
Client no.	PID 1097					
Drawing number			B2367216-GEN-KPX-DR-CB-0001			
<small> © Copyright 2019 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright. Limitation: This drawing has been prepared on behalf of, and for the exclusive use of Jacobs' Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for or in respect of, any use of, or reliance upon, this drawing by any third party. </small>						



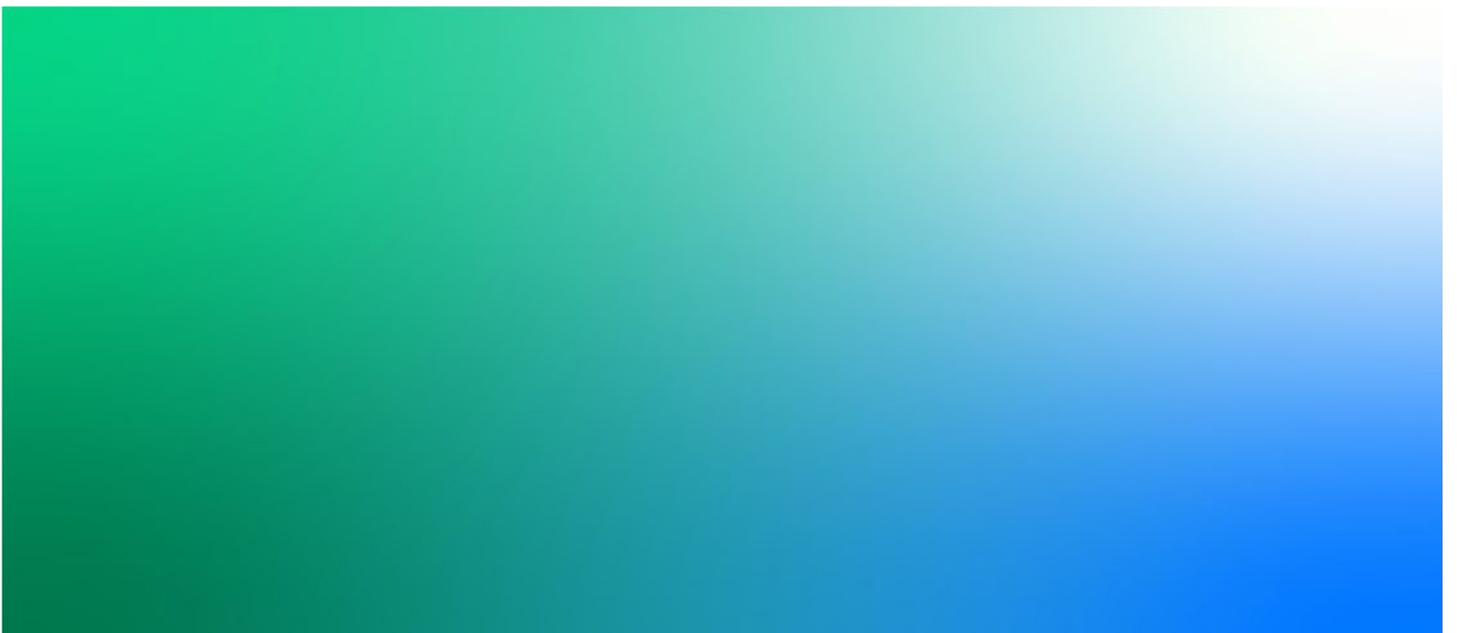
Kepax Bridge

Outline Business Case– Economic Appraisal Report

V2

September 2020

Worcestershire County Council



Kepax Bridge Outline Business Case Economic Appraisal Report

Project No: B2367216
 Document Title: Kepax Bridge Outline Business Case Economic Appraisal Report
 Document No.: N/A
 Revision: V1
 Document Status: Draft for Internal Comments
 Date: September 2020
 Client Name: Worcestershire County Council
 Project Manager: Martyn Booth
 Author: Gary Wilson
 File Name: \\UWOFPP01\Transportation\B23672 - WMHA Term Contract 16 - STR Kepax Footbridge\005 - Technical Working Area 5.13 Outline Business Case\WLTB Proforma

Jacobs U.K. Limited

Redhill House
 227 London Road
 Worcester
 WR52JG

www.jacobs.com

© Copyright 2019 Jacobs U.K. Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
V1	April 2020	Draft for client comment (Strategic Case)	VE			
V1.1	July 2020	Draft for client comment (Strategic Case and Economic Case)	VE / DCG			
V2	August 2020	Draft for Client Comment (Economic Appraisal Report)	GW			

Contents

1. Economic Appraisal Report	4
1.1 Introduction	4
1.1.1 Literature Review	4
1.1.2 Benchmark – Diglis Bridge	6
1.2 Options appraised	7
1.3 Core Analysis	8
1.4 Demand Benefits	9
1.4.1 Commuting Trips	9
1.4.2 University Trips	11
1.4.3 Leisure Trips	13
1.4.4 Summary	16
1.5 Modelling approach	16
1.6 Active Mode Benefits	17
1.6.1 Journey Quality Assumptions	17
1.6.2 Commuting east to west	18
1.6.3 Commuting east	18
1.6.4 University students	19
1.6.5 Local leisure	19
1.6.6 Day visitor leisure	20
1.7 Amenity Benefits	20
1.7.1 Gheluveld Park	21
1.7.2 New Public Asset	21
1.7.3 Monetisation of Amenity Impact	21
1.8 Summary – PVB	22
1.9 Wider Impacts	23
1.9.1 Social Wellbeing Benefits	23
1.10 Construction Stage Benefits	24
1.10.1 Direct job creation	24
1.10.2 Direct GVA	24
1.10.3 Indirect Job Creation	24
1.10.4 Indirect GVA	24
1.10.5 Aggregate Impacts	24
1.11 Sensitivity and Risk Profile	24
1.12 Appraisal Summary Table	Error! Bookmark not defined.
1.13 Value for Money Statement	Error! Bookmark not defined.

Tables

Table 1.1: Case study uplifts (various, including Sustrans, 'The Real Cycling Revolution!')	5.
Table 1.2: Cycling Uplift Recorded (Cycle City Ambition Programme Baseline and Interim Report). Note: see full report for definition of 'city -wide' and where automatic cycle counters were located	6..
Table 1.3: Demand for Diglis Bridge (source: Route Intercept Survey Report– Connect2, 2012)	6..
Table 1.4: Trip purpose of users of Diglis Bridge	7..
Table 1.5: Pedestrian and Cycle Commuting Trips on the east side	Error! Bookmark not defined.
Table 1.6: Walking and Cycling University Trips over the Kepax Bridge	13
Table 1.7: Walking and Cycling Day Visitor Leisure Trips	16
Table 1.8: Summary of Trips	16
Table 1.9: Impacts Assessed for active mode components of the Kepax Bridge scheme	17
Table 1.10: WebTAG Unit A 4.1.6	17..
Table 1.11: WebTAG Unit A 4.1.7	18..
Table 1.12: East west commuter benefits by category	18
Table 1.13: East only commuter benefits by category	19
Table 1.14: University students benefits by category	19
Table 1.15: Local leisure benefits by category	20.
Table 1.16: Local leisure benefits by category	20.
Table 1.17: Amenity Benefits (underutilisation of Gheluveld Park)	22..
Table 1.18: Amenity Benefits (creation of new public asset)	22
Table 1.19: Present value of benefits summary	22..
Table 1.20: Social wellbeing benefits	23.

Figures

Figure 1.1: Calculation of Benefits Methodology	9.....
Figure 1.2: Output from Propensity to Cycle Tool	10..
Figure 1.3: Amenity benefits within MHCLG Appraisal Guide	22
Figure 1.4: Value of engagement in culture and sports per activity (source: Quantifying and Valuing the Wellbeing Impacts of Culture and Sport)	23

1. Economic Appraisal Report

1.1 Introduction

This report provides more detail on the economic appraisal outlined in the economic case of the WLTB proforma seeking funding the Kepax Bridge scheme. The economic assessment presents the options appraised, including the assumptions utilised during analysis, along with a summary of how changes in different variables affect the Net Present Value/ Net Present Cost and a risk profile.

The economic appraisal report also provides an appraisal summary table (AST) and the expected value for money of the scheme.

1.1.1 Literature Review

A DfT report entitled ‘Investing in Cycling & Walking’¹ states that *“In general, the evidence suggests that walking and cycling interventions do increase physical activity levels (rather than acting as substitutes for other activity) but the scale of effect, its duration and its applicability to different groups within the population appears to vary considerably.”*

An iConnect study² found that new infrastructure (such as a traffic -free bridge in Cardiff, a similar bridge over a trunk road in Kenilworth and an upgraded riverside footpath in Southampton) was more likely to be used by existing cyclists and walkers, and that their travel mode tended to remain consistent before and after the intervention. The same study also found that new routes tended to be used by those who lived nearby.

Evaluation evidence for Sustainable Travel Towns programme and Cycling Demonstration Town programme suggests that 26% is the lowest level of growth in cycling achieved through improvements to existing infrastructure.

Evaluation evidence for the Sustainable Travel Towns programme suggests that 10% is the lowest level of growth in pedestrian journeys achieved through improvements to existing infrastructure.

Table 1. 1 outlines results from various case studies, which indicates that cycling and walking uplifts from investment can be as high as 1,400%.

Location	Intervention	Active Mode Uplift Recorded
Manchester	Protected cycle route provision on Wilmslow road and Manchester Oxford road	An increase off 11% on Oxford road Wilmslow road, 86% increase after 12 months and then 103% after two years
London	Two cycle superhighway routes	200% increase on the east-west route and 124% on the north -south route
Leeds to Bradford	14-mile cycle superhighway route	51% increase in the first year and a further 26% increase in the following year
Cambridge	Provision of two protected cycle routes into the city centre	20-30%
London	Improvement to walking routes	98%
Northampton	Installation of one new bridge and replacement of two existing bridges	195% increase in walking 115% increase in cycling

¹ ‘Investing in Cycling & Walking’: Rapid Evidence Assessment A report for the Department for Transport (October 2016)

² Goodman, A., Sahlqvist, S. and Ogilvie, D. (2013) Who uses new walking and cycling infrastructure and how? Longitudinal results from the UK iConnect study. Preventive Medicine 57(5): 518-524.

Location	Intervention	Active Mode Uplift Recorded
Newport	Traffic-free cycle route linking education, railway and residential areas	189% increase in active modes
Swansea	Upgrade of disused railway bridge to cycle use	1,000% increase in commuting 400% increase in education trips
Manchester	Segregated NCN Towpath Provision	340%
Scotland	Rural community links	1,023%
Newport to University	Segregated cycle route	251%
Blairgowrie	Ardblair Trail school path	570%
Worcester	Bridge over River Severn at Diglis	1,400%

Table 1.1: Case study uplifts (various, including Sustrans, 'The Real Cycling Revolution')

In addition to the above, the Cycle City Ambition Programme Baseline and Interim Report has recently been published (2017). Results are summarised in Table 1.2 and show that in Birmingham between 2012 and 2016, cycling volume on upgraded canal towpaths increased by 128%, whereas city-wide cycling volume increased by 32%.³.

Location	Intervention	Cycling Uplift Recorded (between 2012 and 2016)
Birmingham	Canal Routes: 52km of towpath cycle routes upgraded to bonded surfaces across eight canals; including widening where possible, information totems along 2km in the city centre.	Cycling volume on the canal towpaths increased by 128%, whereas city-wide cycling volume increased by 32%.
Cambridge	Huntingdon Road: 1.6km segregated cycle path to the city centre from the north (inbound only). Hills Road: 1.1km segregated cycle path into the city centre from the south (both sides of the road). Trumpington Road: 0.6km segregated uni-directional cycle lane, plus a bi-directional cycle lane on an existing raised bank, into the city centre from the south.	City-wide cycling increased by 27%. The sites where interventions have taken place do not have ACC data from before and after the route improvements.
Manchester	Wilmslow Road / Oxford Road Cycleway: 5km cycle superhighway (both sides, 72% segregated from traffic). Broughton Cycleway: 2.2km mixed strategic cycleway linking residential areas to Salford Quays and Salford University.	City-wide cycling increased by 41%. The sites where interventions have taken place do not have ACC data from before and after the route improvements.
Newcastle	Gosforth Corridor: 4.9km mixed strategic cycle route from the city centre northwards to beyond Gosforth; part of the 'Great North Cycle Route'. John Dobson Street: a 0.4km city centre segregated two-way cycle track and footpaths.	The baseline trend suggests a modest city-wide increase in cycling over time, of around 8%. The sites where interventions have taken place do not have ACC data from before and after the route improvements.
Norwich	Pink Pedalway: 9.2km mixed strategic cycle route: half the route was upgraded, including new on-road cycle lanes	City-wide cycling increased by 46%. Cycle volumes on the Pink Pedalway increased by 29% between 2014 and

³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738307/170912-cycle-city-ambition-stage-2-baseline-report-final.pdf

Location	Intervention	Cycling Uplift Recorded (between 2012 and 2016)
	and cycle tracks, advance stop lines and seven new cycle crossings.	2016, while they only increased by 16% for the comparison group of ACCs. Cycle flows at a counter on the Pink Pedalway rose by 27% between 2014 and 2016
Oxford	The Plain: a remodelled five-arm roundabout on a main approach to Oxford city centre from the east. The scheme included reducing the width of each entry point arm; widening pedestrian islands and upgrading six un-signalised pedestrian crossings; lowering kerbs; and narrowing the roundabout carriageway and removing lane markings.	City-wide cycling increased by 13%. The sites where interventions have taken place do not have ACC data from before and after the route improvements.
West of England	Filwood Quietway: 5km mixed strategic cycle route from the city centre southwards to Hengrove and Filwood; to include a new pedestrian and cyclist bridge, sections of segregated cycle path and sections through green space. North-South City Centre Quietway: 1.3km route through the city centre, connecting radial Quietways East-West City Centre Quietway: 1.1km route through the city centre, connecting radial Quietways; to include improved river crossing at Bristol Bridge.	City-wide increase in cycling Annual Usage Estimates estimated at 84%. The sites where interventions have taken place do not have ACC data from before and after the route improvements.

Table 1.2: Cycling Uplift Recorded (Cycle City Ambition Programme Baseline and Interim Report) Note: see full report for definition of 'city-wide' and where automatic cycle counters were located

1.1.2 Benchmark – Diglis Bridge

Diglis Bridge opened in July 2010, having cost £1.8 million to construct and £3.5 million in total⁴. It is a shared use bridge over the River Severn in Worcester, built to increase connectivity for pedestrians and cycle users in the south of Worcester. It creates a circular cycle path between Worcester's main Sabrina Bridge and the Diglis Locks.

Diglis Bridge was developed as part of the Sustrans Connect2 programme, funded through the Big Lottery Fund. Sustrans was responsible for surveying the area and making demand estimations pre-construction and monitoring post-construction. In 2012 Sustrans released a Route User Intercept Survey which estimated the annual level of demand in 2009 and 2011. These annual figures were used to estimate the daily average pedestrians and cyclists (by dividing the figure by 365).

The council provided daily count data for Diglis Bridge from March 2020 – March 2021 and the figures are summarised in the table below.

Year	Daily average pedestrian	Daily average cyclists	Annual pedestrian	Annual cycle
2018	1,206	257	440,065	93,649
2011	795	387	290,470	141,397
2009 (initial forecast)	56	27	20,696	10,091

Table 1.3: Demand for Diglis Bridge (source: Route Intercept Survey Report – Connect2, 2012 and WCC)

Users of Diglis Bridge were interviewed during four 12-hour survey periods (month of October), a school-holiday weekday, a school-holiday weekend day, a term-time weekday and a term-time weekend day. The total number

⁴ <https://www.gov.uk/government/case-studies/new-cyclist-and-pedestrian-bridge-diglis-bridge-worcester>

of route users counted over the four -day survey period was 708 with 87 people interviewed in 2009 and 3,051 with 159 people interviewed in 2011.

The trip purpose split derived from the 2011 interception survey is shown in the following table:

Trip purpose	Percentage (2011)
Commuting	13.30%
Education	0.00%
Shopping	8.20%
Personal Business	0.30%
Leisure	70.50%
Other	7.70%

Table 1.4: Trip purpose of users of Diglis Bridge

The provision of Diglis Bridge extended the traffic -free network in the south of the city, linking to employment, leisure and educational centres. Additionally, wider improvements were made to links across the city radiating from Diglis Bridge, including new stretches of traffic-free path, toucan crossings and signing.

Kepax Bridge is considered to offer a similar level of provision for pedestrians and cyclists to that at Diglis Bridge and therefore a sensitivity test has been undertaken on the analysis using the demand figures presented in Table 1.3.

1.2 Options appraised

A number of options have been considered as part of the scheme development and full details are presented in the Options Assessment Report, included as Appendix A of this OBC. In summary, Option Assessment for the Kepax scheme has included the following:

- High level optioneering which considered whether a bridge or ferry would be most suitable. A ferry was discounted as not all scheme objectives could be met. Specific issues with a ferry option were found to include ease of access, affordability (payment at point of use, the need to carry cycles/pushchairs and difficulty with finding an appropriate location on the riverside.
- Two locations for the bridge were then considered; Gheluel Park / Kepax site and Northwick. Gheluel Park was chosen as it was found to comprise the least design and construction constraints and can be easily tied into the existing footpath network.
- A number of structures were considered for the bridge: cable stayed, truss and tied arch. A single pylon cabled stayed bridge was chosen as this should be able to span the full distance of the river, reducing the required foundations within the landfill site.
- A number of alignments for access paths and wider links were also considered.

As outlined above, and due to constraints outlined in the Options Assessment Report the location of the bridge, structure type and positioning of the access paths have been determined.

The main purpose of the scheme is to link east and west Worcester on foot and by bike. The detailed design and chosen materials will not have a material impact on demand and therefore only one scheme option has been appraised. Further details of what is included in the scheme are presented in Section 3.7 'Scope'.

1.3 Core Analysis

Appraisal of benefits has largely been undertaken using the DfT Active Mode Appraisal Toolkit (AMAT) but also includes amenity benefits from the additional use of Gheluvelt Park.

- **Commuting** bottom-up **baseline and future demand** assessment undertaken utilising the DfT's Propensity to Cycle Tool – journeys to work – east to west and west to east over the River Severn.
- **Commuting** bottom-up **baseline and future demand** assessment undertaken utilising the DfT's Propensity to Cycle Tool – journeys to work – wider improvements to the east of the River Severn e.g. Stephenson Road / Stephenson Terrace).
- **Student** bottom-up **baseline and future demand** assessment undertaken utilising University of Worcester Travel Plan survey data – students only (assumed staff counted within 'commuting').
- **Local leisure demand** – based on National Travel Survey leisure trips undertaken in the cycling and walking catchment.
- **Day visitor leisure demand / wider tourism** – based on information within Worcester City Council's '*Economic Impact of Tourism*' study (2018, The Research Solution) and the Great Britain Day Visitor Survey (2019).
- **Amenity benefits** relating to enhanced utilisation of an under-utilised public asset (Gheluvelt Park).
- **Amenity benefits** relating to availability of a new public asset (bridge and access path).

The methodology applied to assessing scheme benefits is summarised in Figure 1.1 below.

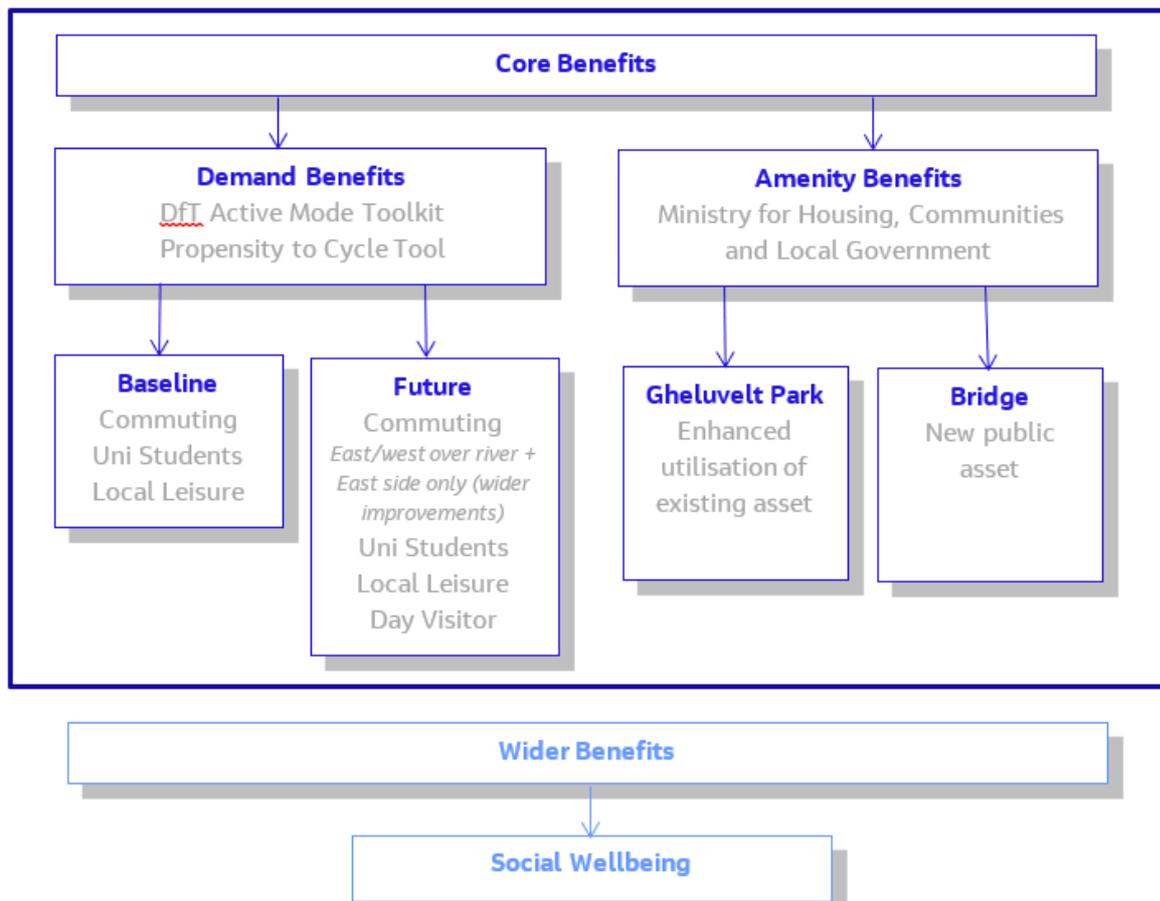


Figure 1.1: Calculation of Benefits Methodology

1.4 Demand Benefits

1.4.1 Commuting Trips

Propensity to Cycle Tool

The DfT’s Propensity to Cycle Tool (PCT)⁵ has been used as the basis for a bottom-up baseline commuting demand assessment and bottom-up future commuting demand assessment.

The PCT allows for the capture of current pedestrian and cycling commuter patterns based on the 2011 UK Census, using LSOA OD pairs and logical routes. Figure 1.2 below presents example straight-line LSOA OD pairs for commuters in Worcester. The thickness of line acts as a proxy for number of commuters travelling between LSOAs. Note that there are large number of lines crossing the River Severn, indicative of existing demand for travel across the River.

⁵ <https://www.pct.bike/>

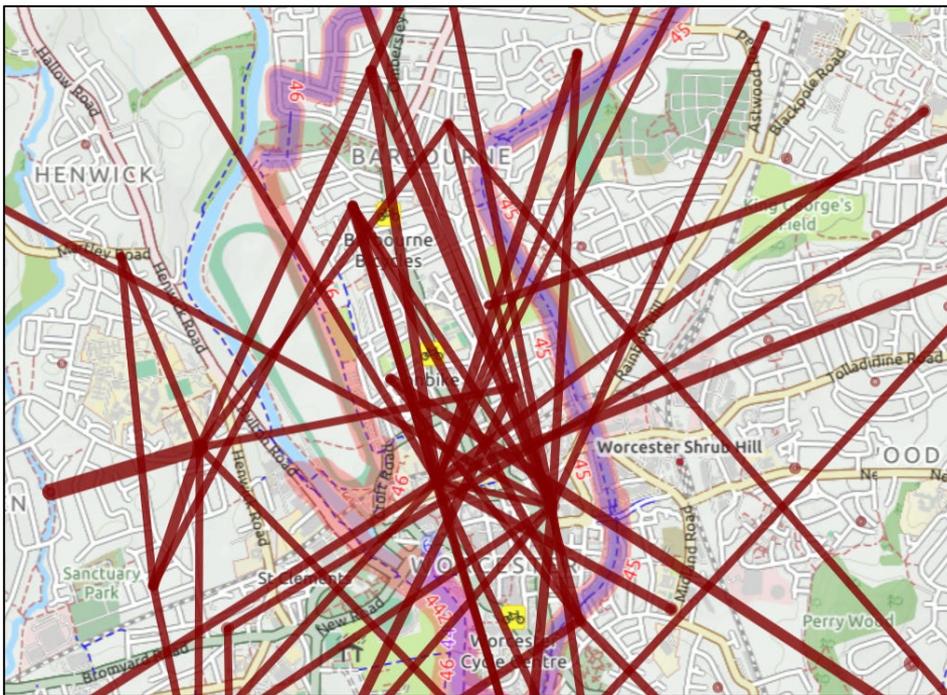


Figure 1.2: Output from Propensity to Cycle Tool

In addition, the PCT provides forecast cycling uplifts in response to strategic policy and infrastructure investment decisions. The Tool estimates growth in cycling between LSOA OD pairs and along key routes using a number of scenarios. For the purposes of this scheme, the ‘Government Target’ scenario was used as a starting point for forecasting future cycle demand. The ‘Government Target’ forecast assumes a doubling of cycling demand nationally, corresponding to the proposed target in the Department for Transport’s draft Cycling Delivery Plan to double cycling in England between 2013 to 2025⁶.

The Government Target scenario generates the most conservative uplifts within the PCT, meaning the commuter cycling demand forecast analysis represents a robust but prudent approach. Also note that the same growth factors derived for cycling uplift under the Government Target scenario were applied to baseline walking demand too. On this basis, the PCT ‘Government Target’ scenario provided a starting point for forecasting future active mode demand in response to installing Kepax Bridge for university student, local leisure and day visitor leisure demand as well as commuting demand. However, various adjustments to the commuting-based forecast were made for other journey types and purposes, as outlined in the relevant section below.

Core pedestrian and cycle uplifts have been taken from PCT. The ‘Government Target’ uplift data was extracted for each relevant OD pair (catchment areas are presented for each journey purpose below) and then an average uplift was applied across the board. The uplifts which have been used are as follows:

- 71% for walking – commuting and university students (across Kepax Bridge); and
- 65% for cycling – commuting and university students (across Kepax Bridge).

In addition to the uplifts being reasonable as they are taken from the PCT, they are also in line with the uplift evidence presented in Section 1.1.

East to West commuting journeys

Baseline and future commuting trips for journeys between the east and west of Worcester (making use of Kepax Bridge) have been extracted from the PCT. The methodology and assumptions are as follows:

⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/364791/141015_Cycling_Delivery_Plan.pdf

- Six MSOAs on the west side and 11 MSOAs on the east side of the River Severn were selected as the possible commuting catchment for the bridge. This was based on an average commuting cycle catchment of 5.7 kilometres in the National Travel Survey 2012-2014.
- Only flows west to east and east to west (crossing the river) have been captured for this section of the analysis.
- Assumptions were made on the proportion of trips which would use Kepax Bridge to cross the river (it is acknowledged that Sabrina Bridge would also be convenient for some east to west journeys).
- Although it is acknowledged that there are commuters currently travelling East-West (and vice versa) across the River Severn using existing bridges, as Kepax Bridge is not currently in place, 0 baseline trips are assumed on the route at present
- The increased demand associated with the proposed scheme are wholly expected to use Kepax Bridge rather than alternative routes. Effectively, the increased demand suggested by the Government Target scenario represents the future demand for commuters at Kepax Bridge.
- Assumed each person makes a trip.
- Only 50% of demand was taken as alternative north-south corridors are available on the east side of Worcester.
- Assumed each person makes a trip 253 days a year.
- Baseline trips have been extracted from the PCT (walking and cycling).
- Given the smaller scale and less extensive intervention (i.e. improvements to existing, rather than new, infrastructure), the uplift has been capped at 10%. This is well below the Government’s target within the PCT.

The resulting figures are summarised in the table below:

O-D Commuting	
Total number of walking trips per day (baseline)	0
Total number of walking trips per day (government Target)	456
Total number of cycling trips (baseline)	0
Total number of cycling trips (government target)	197
Annualisation factor	253
Annual number of walking trips (baseline)	0
Annual number of walking trips (government Target)	115,368
Annual number of cycling trips (baseline)	0
Annual number of cycling trips (government target)	49,841

Table 1.5: Pedestrian and Cycle Commuting Trips over Kepax Bridge⁷

In relation to east/ west journeys to work, the net growth from provision of Kepax bridge is forecast to be 115,368 additional walking trips each year and 49,841 additional cycle trips each year.

⁷ Note there may be slight rounding issues in the table calculations

1.4.2 East side commuting journeys

Baseline and future commuting trips for journeys in the east of Worcester (making use of the improvements to wider links) have been extracted from the PCT. Improvements to wider links on the east side of the River Severn include:

- Improvements to existing NCN 46 alternative route. Upgrade of an alternative route for when the racecourse path is closed (on race days). For example, Pope Iron Road, Stephenson Road, The Moors.
- Provide short link to NCN 45, via St. George’s Lane North. Upgrade of links and provision of signage between Gheluvelt Park and the Worcester and Birmingham Canal via the main Barbourne Road.

The methodology and assumptions for calculating this demand are as follows:

- Six MSOAs on the east side of the River Severn were selected as the possible commuting catchment for improving wider links as above. The MSOAs run linear north to south along the riverside.
- Only 50% of demand was taken as alternative north-south corridors are available on the east side of Worcester.
- Baseline trips have been extracted from the PCT (walking and cycling).
- Given the smaller scale and less extensive intervention (i.e. improvements to existing, rather than new, infrastructure), the uplift has been capped at 10%. This is well below the Government’s target within the PCT.
- The resulting figures are summarised in the table below:

O-D Commuting	
Total number of walking trips per day (baseline)	3,216
Total number of walking trips per day (government target)	3,538
Total number of cycling trips (baseline)	702
Total number of cycling trips (government target)	772
Annualisation factor	253
Annual number of walking trips (baseline)	813,648
Annual number of walking trips (government target)	895,114
Annual number of cycling trips (baseline)	177,606
Annual number of cycling trips (government target)	195,316

Table 1.6: Pedestrian and Cycle Commuting Trips on the east side⁸

In relation to journeys to work on the east side of the River Severn, the net growth from wider works as part of the Kepax Bridge scheme is forecast to be 81,466 additional walking trips each year and 17,710 additional cycle trips each year.

1.4.3 University Trips

The University of Worcester provided home postcode data for staff and students and their mode of travel to campus. This data has been used to estimate the potential demand for Kepax Bridge amongst Worcester University

⁸ Note there may be slight rounding issues in the table calculations

students. As in the previous section, an uplift is applied to the baseline numbers due to the provision of new infrastructure.

To avoid double counting with the demand numbers, only student trips are estimated in this section as potential staff trips overlaps with the previous section: Commuting.

The approach taken to estimate the number of student trips over the bridge for the do - minimum and do - something scenario is based on:

- Undertaking a desk-based GIS analysis to capture the number of surveyed students whose trip length could be reduced by connecting both sides of the river with the Kepax bridge.
- Scaling the sample to the total number of students. The survey undertaken in 2018 captured a sample of 272 students out of a total of 10,455 currently at University of Worcester.
- Assumed each student makes a trip 190 days a year.
- Although it is acknowledged that there are students currently travelling East-West (and vice versa) across the River Severn using existing bridges, as Kepax Bridge is not currently in place, 0 baseline trips are assumed on the route at present
- Applied uplift from government target scenario for students in PCT to estimate number of new walkers/ cyclists induced by Kepax Bridge.
- The increased demand associated with the proposed scheme are wholly expected to use Kepax Bridge rather than alternative routes. Effectively, the increased demand suggested by the Government Target scenario represents the future demand for commuters at Kepax Bridge.

The resulting figures are summarised in the table below:

University Trips	
Total number of walking trips per day (baseline)	0
Total number of walking trips per day (government target)	36
Total number of cycling trips (baseline)	0
Total number of cycling trips (government target)	16
Annualisation factor	190
Annual number of walking trips (baseline)	0
Annual number of walking trips (government target)	6,840
Annual number of cycling trips (baseline)	0
Annual number of cycling trips (government target)	3,040

Table 1.7: Walking and Cycling University Trips over the Kepax Bridge⁹

In relation to university trips, the net growth from provision of Kepax bridge is forecast to be 6,840 additional walking trips each year and 3,040 additional cycle trips each year.

1.4.4 Leisure Trips

Two types of leisure users have been considered for the OBC:

⁹ Note there may be slight rounding issues in the table calculations

- Local leisure trips made by nearby residents, undertaking activities such as dog walkers, families visiting Gheluvelt Park etc; and
- Leisure trips undertaken by day visitors, for example visiting the racecourse, undertaking a longer riverside walk, using the NCN.

Local leisure demand pivots from assessing the leisure patterns of local residents in the defined catchment area for the scheme. This involves utilising benchmark data from the National Travel Survey relating to number and frequency of leisure cycling and walking trips per household and applying such benchmarks to the number of households within the defined catchment area.

Local Leisure Trips

The approach taken to estimate the number of local leisure trips over the bridge is based on:

- Identified LSOAS within the catchment via GIS and used Nomis population projection to 2022 to estimate total population in the catchment. The catchment area for walking and cycling-based local leisure demand was estimated at 1.1 km, in line with the average distance of a pedestrian-based leisure trip. Use of a pedestrian-based catchment for walkers and cyclists could be considered a conservative approach, given average cycling-based leisure trips is much greater (c. 7.1 km)
- Assumed a number of leisure trips per person per annum of 44 and 6 for walking and cycling respectively. Based on National Travel Survey data from 2018 (table 0409).
- Although it is acknowledged that local leisure trips already take place in the vicinity of the proposed scheme, the number of baseline trips is assumed at 0 across the River Severn since there is no route at present to serve local leisure trips.
- A subset of the Government target uplift for commuting traffic was used (c. 50% of the core forecast) to estimate induced local leisure demand. This is potentially a conservative estimate, given the potential for Kepax Bridge to fundamentally improve access to key local leisure facilities at Gheluvelt Park for residents.
- Local leisure trips occur throughout year (365 days). All demand data derived from annual data.

The resulting figures are summarised in the table below:

Local Leisure Trips	
Daily average walking trips (baseline)	0
Daily average walking trips (forecast)	532
Daily average cycling trips (baseline)	0
Daily average cycling trips (forecast)	73
Annualisation factor	365
Annual average walking trips (baseline)	0
Annual average walking trips (forecast)	194,180
Annual average cycling trips (baseline)	0
Annual average cycling trips (forecast)	26,645

Table 1.8: Walking and Cycling Local Leisure Trips¹⁰

¹⁰ Note there may be slight rounding issues in the table calculations

In relation to local leisure trips, the net growth from provision of Kepax Bridge is forecast to be 194,180 additional walking trips each year and 26,645 additional cycle trips each year.

Day visitor trips

There are around 3.5 million annual visitors to Worcester based on the economic impact of tourism report (2018). The Great Britain Visitor Survey¹¹ indicates that 7% of tourism trips involve an outdoor activity (walking, cycling, golf etc). It is assumed that the provision of Kepax Bridge will result in an uplift of day visitors to the city participating in walking and cycling activities, in addition to there being an uplift in local leisure trips, summarised in the previous section. Kepax Bridge will be a leisure destination in itself, in addition to connecting to the riverside and other bridges in the city and will also connect visitors to leisure attractions such as Pitchcroft and Gheluvelt Park.

The approach taken to estimate the number of day leisure trips over the bridge for the do-minimum and do-something scenario is based on:

- 3.5 million annual visitors to Worcester based on economic impact of tourism report (2018).
- Great Britain Visitor Survey outlines that 7% of tourism trips involve an outdoor activity (walking, cycling, golf etc). Therefore, it is assumed that 5% of day visitor trips relate to walking or cycling specifically, with two walking trips for every one cycling trip.
- Assumed Kepax Bridge will induce a Government target scale uplift in walking and cycling leisure activity for day visitors and overnight visitors.
- Although it is acknowledged that walking and cycling activities are undertaken in Worcester by day visitors and overnight tourists already, it is assumed that baseline trips across the River Severn at this location are 0 since there is no bridge facility provided at present.
- The Government target uplift for commuting traffic was adopted and applied to the proportion of tourists to the city currently undertaking walking and cycling activities. Considered a proxy for local leisure boost attributable to Kepax Bridge; appropriate given increased accessibility provided to Gheluvelt Park and other nearby leisure amenities.
- Local leisure trips occur throughout year (365 days). All demand data derived from annual data.

The resulting figures are summarised in the table below:

Day Visitor Leisure Trips	
Daily average walking trips (baseline)	0
Daily average walking trips (forecast)	229
Daily average cycling trips (baseline)	0
Daily average cycling trips (forecast)	112
Annualisation factor	365
Annual average walking trips (baseline)	0
Annual average walking trips (forecast)	83,585
Annual average cycling trips (baseline)	0

¹¹ <https://www.visitbritain.org/gb-day-visits-survey-latest-results>

Annual average cycling trips (forecast)	40,880
---	--------

Table 1.9: Walking and Cycling Day Visitor Leisure Trips¹²

In relation to day visitor leisure trips, the net growth from provision of Kepax Bridge is forecast to be 83,585 additional walking trips each year and 40,880 additional cycle trips each year.

1.4.5 Summary

Table 1.10 presents the total estimated baseline, forecast and resultant demand for commuting, university and leisure trips. These figures have been used within the DfT AMAT in order to calculate the present value of benefits.

Summary Trips		Annual Walking Trips	Annual Cycling Trips
West-East Commuters	Baseline	0	0
	Forecast	115,368	49,841
	Net	115,368	49,841
East Commuters	Baseline	813,648	177,606
	Forecast	895,114	195,316
	Net	81,466	17,710
University Trips	Baseline	0	0
	Forecast	6,840	3,040
	Net	6,840	3,040
Local Leisure Trips	Baseline	0	0
	Forecast	194,180	26,645
	Net	194,180	26,645
Wider Leisure Trips	Baseline	0	0
	Forecast	83,585	40,880
	Net	83,585	40,880
Total Forecast Trips		1,295,087	315,722
Total Forecast Trips over the bridge ¹³		399,973	120,406

Table 1.10: Summary of Trips

Future demand for Kepax Bridge is forecast to incorporate almost 400,000 pedestrians and over 100,000 cyclists each year. This is comparable to the 440,00 pedestrians and 93,000 cyclists estimated to have used Diglis Bridge in 2018 (Table 1.3).

1.5 Modelling approach

Based on the demand figures presented above, value for money of the scheme has been calculated. Assessment has been undertaken as follows:

¹² Note there may be slight rounding issues in the table calculations

¹³ Excluding 'East Commuters'

- **Active Mode Benefits** - Using the DfT’s Active Mode Appraisal Toolkit and the DfT’s Tag Unit A5.1 Active Mode Appraisal guidance.
 - The benefits are split between commuters, students of the University of Worcester and leisure users. The appraisal period for all three users is **30 years**, which is considered robust for a scheme with a design life of 120 years.
- **Amenity benefits** – An approach recommended by the Ministry for Housing, Communities and Local Government’s (MHCLG) Appraisal Guide has been followed.

1.6 Active Mode Benefits

Active Mode benefits have been calculated using the DfT’s Active Mode Appraisal Toolkit (AMAT), 2020. AMAT covers a range of economic, environmental and social impacts. These are summarised in the table below.

Impact	Benefit Estimated
Physical Activity	Yes
Absenteeism	Yes
Accident benefits	Yes
Environmental benefits	Yes
Decongestion and indirect tax	Yes
Journey quality	Yes – WebTAG Data Book values used to define impact on journey quality (Unit A 4.1.6 for cyclists and A 4.1.7 for pedestrians).

Table 1.11 :Impacts Assessed for active mode components of the Kepax Bridge scheme

1.6.1 Journey Quality Assumptions

WebTAG Data Book Unit A 4.1.6 has been used to assess the value of journey quality impacts to cyclists. The value for ‘off-road segregated cycle lane’ has been used as a benchmark for the journey quality impact as the bridge and riverside loop will be off road. This is valued at 7.03 pence per minute, as highlighted in Table 1.12.

Value of journey ambience benefit of cycle facilities (2010 prices & 2010 values)		
Scheme type	Value p/min	Source
Off-road segregated cycle track	7.03	Hopkinson & Wardman (1996)
On-road segregated cycle lane	2.99	Hopkinson & Wardman (1996)
On-road non-segregated cycle lane	2.97	Wardman <i>et al.</i> (1997)
Wider lane	1.81	Hopkinson & Wardman (1996)
Shared bus lane	0.77	Hopkinson & Wardman (1996)
	pence	
Secure cycle parking facilities	98.14	Wardman <i>et al.</i> (2007)
Changing and shower facilities	20.82	Wardman <i>et al.</i> (2007)

Table 1.12: WebTAG Unit A 4.1.6

For pedestrians, WebTAG Data Book Unit A 4.1.7 has been used to assess the value of journey quality impacts. The scheme includes a new river crossing, upgraded segregated paths, dropped kerbs and an improved crossing point. Therefore, the values for ‘kerb level’, ‘crowding’, ‘pavement evenness’, ‘information panels’ and ‘directional signage’ have been added together to give a journey quality value of 6.8 pence per kilometre for pedestrians. Note that for analysis relating to East Worcester commuting, improvements do not include provision of

information panels or directional signage, meaning the overall journey quality value for this journey type is 5.4 pence per kilometre for pedestrians.

Values of aspects in pedestrian environment (2010 values and 2010 prices)		
Scheme type	Value p/km	Source
Street lighting	3.7	Heuman (2005)
Kerb level	2.6	Heuman (2005)
Crowding	1.9	Heuman (2005)
Pavement evenness	0.9	Heuman (2005)
Information panels	0.9	Heuman (2005)
Benches	0.5	Heuman (2005)
Directional signage	0.5	Heuman (2005)

Table 1.13: WebTAG Unit A 4.1.7

1.6.2 Commuting east to west

The analysis suggests that in relation to commuters travelling from east to west over the bridge, the scheme could deliver a present value of benefits (PVB) of **£5.274 million** over an appraisal period of 30 years. The benefits generated are as a result of commuters within the context area switching to an active mode of travel, and also journey ambience benefits for new active mode users induced to use the new bridge. The impacts are summarised in Table 1.14.

Impact Drivers	Estimates (PV, 2010) in £'000s
Baseline demand (average daily trips)	0 trips
Forecast demand (average daily trips)	197 cycling trips and 456 walking trips
Congestion benefit	172.31
Accident	29.26
Local Air Quality	4.20
Noise	1.95
Greenhouse Gases	6.70
Reduced risk of premature death	3840.14
Absenteeism	1124.86
Journey Ambience	109.86
Indirect taxation	-15.32
PVB	5,273.95

Table 1.14: East west commuter benefits by category

1.6.3 Commuting east

The analysis suggests that in relation to commuterstravelling on the east side of the river,the wider improvements connected to the bridge scheme could deliver a present value of benefits (PVB) of **£2.198 million** over an appraisal period of 20 years. The benefits generated are as a result of commuters within the context area switching to an active mode of travel, and also journey ambience benefits for new active mode users induced to use the improved route. The impacts are summarised inTable 1.15.

Impact Drivers	Estimates (PV, 2010) in £'000s
----------------	--------------------------------

Baseline demand (average daily trips)	702 cycling trips and 3216 walking trips
Forecast demand (average daily trips)	772 cycling trips and 3538 walking trips
Congestion benefit	56.84
Accident	9.99
Local Air Quality	1.51
Noise	0.67
Greenhouse Gases	2.25
Reduced risk of premature death	1,361.43
Absenteeism	448.67
Journey Ambience	323.32
Indirect taxation	-6.42
PVB	2,198.25

Table 1.15: East only commuter benefits by category

1.6.4 University students

The analysis suggests that in relation to university students, the scheme could deliver a present value of benefits (PVB) of **£0.148 million** over an appraisal period of 30 years. The benefits generated are as a result of students within the context area switching to an active mode of travel, and also journey ambience benefits for new active mode users induced to use the new bridge. The impacts are summarised in Table 1.16.

Impact Drivers	Estimates (PV, 2010) in £'000s
Baseline demand (average daily trips)	0 trips
Forecast demand (average daily trips)	16 cycling trips and 36 walking trips
Congestion benefit	5.37
Accident	0.91
Local Air Quality	0.13
Noise	0.06
Greenhouse Gases	0.21
Reduced risk of premature death	135.63
Absenteeism	0.00
Journey Ambience	6.63
Indirect taxation	-0.47
PVB	148.47

Table 1.16: University students benefits by category

1.6.5 Local leisure

The analysis suggests that in relation to local leisure, the scheme could deliver a present value of benefits (PVB) of **£4.837 million** over an appraisal period of 30 years. The benefits generated are as a result of additional local leisure trips within the context area undertaken using active modes of travel, and also journey ambience benefits for new active mode users induced to use the new bridge. The impacts are summarised in Table 1.17.

Impact Drivers	Estimates (PV, 2010) in £'000s
Baseline demand (average daily trips)	0 trips
Forecast demand (average daily trips)	73 cycling trips and 196 walking trips
Congestion benefit	160.39
Accident	27.23
Local Air Quality	3.91
Noise	1.82
Greenhouse Gases	6.23
Reduced risk of premature death	3,830.37
Absenteeism	717.23
Journey Ambience	104.03
Indirect taxation	-14.26
PVB	4,836.95

Table 1.17: Local leisure benefits by category

1.6.6 Day visitor leisure

The analysis suggests that in relation to day visitors undertaking leisure trips, the scheme could deliver a present value of benefits (PVB) of **£3.729 million** over an appraisal period of 30 years. The benefits generated are as a result of tourists within the context area participating in active mode activities, and also journey ambience benefits for new active mode users induced to use the new bridge. The impacts are summarised in Table 1.18.

Impact Drivers	Estimates (PV, 2010) in £'000s
Baseline demand (average daily trips)	0 trips
Forecast demand (average daily trips)	112 cycling trips and 229 walking trips
Congestion benefit	153.26
Accident	26.02
Local Air Quality	3.73
Noise	1.73
Greenhouse Gases	5.96
Reduced risk of premature death	2972.73
Absenteeism	492.58
Journey Ambience	86.34
Indirect taxation	-13.16
PVB	3,728.72

Table 1.18: Local leisure benefits by category

1.7 Amenity Benefits

Amenity benefits generated by the scheme have been calculated for the following:

- Current under-utilisation of a public asset, Gheluvelt Park. With a direct connection to the west riverbank, access to Gheluvelt Park will be significantly enhanced and the potential of the Green Flag Park will be realised.
- Creation of a new public asset, the bridge and path over the Kepax site. This asset will provide recreation and leisure opportunities in addition to views of the riverside.

The methodology for calculating these benefits, and the assumptions are listed below.

1.7.1 Gheluvelt Park

Currently, it is assumed that residents in West Worcester are unable to easily access Gheluvelt Park which is a major leisure and recreational asset within the city's urban core¹⁴. Following delivery of Kepax Bridge, access from West Worcester to the park will be significantly enhanced. The amenity benefit of the park will also increase, given that it will provide amenity to a greater number of people. Within this context, the approach to understanding changes in amenity at Gheluvelt Park in response to provision of Kepax Bridge can be summarised as follows:

- Although dated, Worcester City Council's 'PPG17 Open Spaces, Indoor Sports and Community Recreation Assessment' (2006) found that typically, local people travel an average of 10.02 minutes to access the park they use most. This equates to a travel distance of 0.67 miles.
- Adopting the 0.7 mile benchmark for Gheluvelt Park, it is evident that four wards fall within the catchment for the park. Three wards lie to the east of the River Severn (Arboretum, Claines and St Stephen); one to the West (St Clement).
- However, as noted, the population of St Clement ward suffer severance from Gheluvelt Park due to a lack of direct access. As such, the full amenity of the park to its full catchment population is diminished; being limited to the population residing within the catchment in East Worcester only. Given circa 75% of the theoretical catchment population resides in East Worcester, only 75% of the potential amenity value of Gheluvelt Park is assumed to be realised.
- Within this context, Kepax Bridge has the potential to unlock the residual circa 25% amenity benefit of Gheluvelt Park by ensuring direct accessibility to the entire theoretical catchment population of the Park.

1.7.2 New Public Asset

The bridge structure itself and new footway accesses represent additional public assets that extend the urban fabric of Worcester. The bridge structure itself is estimated to span 110m x 4m, with the footway measuring 405m x 8m. This amounts to some 0.36ha of additional 'urban core' land within Worcester.

1.7.3 Monetisation of Amenity Impact

The amenity effects described above were monetised pivoting from approaches recommended by the Ministry for Housing, Communities and Local Government's (MHCLG) Appraisal Guide¹⁵. The value of amenity benefits has been taken from the MHCLG Appraisal Guide (see Figure 1.3 below). The relevant figure was adjusted to 2010 prices and values. Note that benefits have been calculated for 25 years (2022 to 2046), with relevant discounting applied.

¹⁴ Where 'urban core' is defined further in the MHCLG Appraisal Guide as "Central Urban area: examples include public spaces and city parks".

¹⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/576427/161129_Appraisal_Guidance.pdf

Land Type	Amenity Benefit (Real values, 2016 prices/ha)
Urban Core	£109,138
Urban Fringe (Greenbelt)	£1,797
Urban Fringe (Forested Land)	£5,457
Rural	£13,392
Agricultural (Extensive)	£6,366
Agricultural (Intensive)	£208
Natural & Semi-Natural	£13,371

Figure 1.3: Amenity benefits within MHCLG Appraisal Guide

The calculations and resulting benefits are summarised in the following tables.

Amenity Benefit (Gheluvlet Park)	
Value per hectare, per year (2010 prices)	£75,153
Gheluvlet Park hectares (Including conservation area)	7.62
Annual Benefits for Worcester Population	£572,666
Worcester Population	
East (Arboretum, Claines, St Stephen) (76.57%)	19,677 (76.6%)
West (St Clement)	6,018 (23.4%)
Annual benefits	
Annual benefits from west side of the river (23.4% of £572,666)	£134,176

Table 1.19: Amenity Benefits (underutilisation of Gheluvlet Park)

Amenity Benefit (Bridge and path)	
Value per hectare, per year (2010 prices)	£75,153
Kepax bridge and Kepax site path area	0.368
Annual benefits for Worcester population	£27,656

Table 1.20: Amenity Benefits (creation of new public asset)

The total present value of amenity benefits over a 25 year period is **£1.8 million** .

1.8 Summary – PVB

A summary of the present value of benefits from all calculations is included in the table below.

Theme	Trip Purposes	PVB (PV,2010) in £'000s
Active Mode Benefits	West to East Commuting	5,274
	East Commuting	2,198
	University Trips	148.47
	Local Leisure	4,837
	Day Visitor Leisure	3,728.72
Amenity Benefits	Gheluvlet Park, new bridge and path	1,827
	Total	18,013.19

Table 1.21: Present value of benefits summary

1.9 Wider Impacts

1.9.1 Social Wellbeing Benefits

An appraisal has been undertaken to calculate the value of the scheme to local residents’ social wellbeing. The methodology follows the approach set out in the Department for Culture, Media and Sport guidance document *‘Quantifying and Valuing the Wellbeing Impacts of Culture and Sport’*¹⁶ which:

- Identifies the impacts of culture and sport engagement on individuals’ wellbeing; and
- Estimates monetary values for those wellbeing impacts using the Wellbeing Valuation approach.

The document suggests that the value per sporting activity, such as playing football or going swimming, is about £11. For arts attendance, it is about £47 per activity (taking the conservative estimate). These are values in addition to any price paid to participate such as entrance fees.

Table 7. Value of engagement in culture and sports per activity

Model & variables	Coefficient	Average frequency (annual)	Value (annual)	Value per activity
Sports				
All sports	0.052***	104	£1,127	£10.84
Culture				
All audience arts	0.043**	15-20	£935	£46.75 - £62.33

Figure 1.4: Value of engagement in culture and sports per activity (source: Quantifying and Valuing the Wellbeing Impacts of Culture and Sport)

The Gheluvelt Park Management Plan 2020 – 2030 (published January 2020) has been used to estimate the number of sporting and cultural events which take place at Gheluvelt Park (see Appendix C). It has been assumed that by providing the bridge, these events will become far more accessible to residents on the west of the River Severn. The extent of additional participation in such events is a function of the increased visitation to Gheluvelt Park as a result of better access from West Worcester. Increased visitation (i.e. 23% of theoretical attendance) is forecast in line with the relative population of West Worcester residents within Gheluvelt Park catchment (see analysis in Section 4.7.1) compared to total residents within the catchment.

Social wellbeing benefit	
Visitors to Gheluvelt Park (source: Gheluvelt Park Management Plan)	424,237
Additional Visitation to Gheluvelt Park with better access to west side of River Severn	126,720
Proportion of additional visitors engaging in sporting events	1.6%
Proportion of additional visitors engaging in cultural events	3.7%
Additional visitors engaging in sporting events (per annum)	1,968
Additional visitors engaging in cultural events (per annum)	4,719
Additional value of sporting events (per annum)	£19,822
Additional value of cultural events (per annum)	£239,103

Table 1.22: Social wellbeing benefits

The total present value of social wellbeing benefits over a 25 year period is **£2.9 million**.

1.10 Construction Stage Benefits

This section will present the construction stage impacts related to jobs and GVA that could arise as a result of the construction phase of the proposed scheme. Costs presented in this section are in outturn prices and include: an estimate of design and preparation fees, bridge construction costs and the cost of wider improvements including the access path.

1.10.1 Direct job creation

Job creation resulting directly from the construction phase can be estimated by applying a best practice benchmark of £99,814¹⁷ (2020 prices) per full-time equivalent (FTE) to the construction expenditure of £8,074,785 (2020 outturn prices). Based on the construction expenditure, the project is expected to create 81 FTE jobs during the construction phase.

1.10.2 Direct GVA

Direct GVA can be estimated through the application of best practice turnover to GVA benchmarks (2015). Following a turnover-led approach, a turnover to GVA ratio of 0.5 is applied to professional fees of £1,410,457 (2020 outturn prices) and a 0.4 turnover to GVA ratio is applied to construction expenditure of £6,664,328 (2020 outturn prices) to generate £3,370,960 in direct GVA uplift (2020 prices).

1.10.3 Indirect Job Creation

During the construction phase, indirect job creation will occur through a multiplier effect that impacts on the wider economy in two ways:

- Through increase in expenditure by construction firms within their supply chain; and
- Through increased expenditure in the local area by construction workers, leading to a higher demand for goods and services.

This would eventually lead to a multiplier effect in the local economy as local and supply chain businesses expand to cope with the increased demand. To quantify indirect job creation a best practice high end employment multiplier of 1.0² is utilised, based on the assumption that most of the expenditure by construction workers will be contained within Worcestershire. The application of the high-end multiplier to the number of direct FTEs jobs created (81) suggests that 81 FTE indirect jobs will be created for the sub-regional economy.

1.10.4 Indirect GVA

The indirect employment effects will also result in an indirect GVA uplift. To assess the extent of the indirect GVA uplift a best practice output multiplier of 0.9¹⁸ is applied to the direct GVA impact of £3,370,960 (2020 prices) resulting in an indirect GVA uplift of £3,033,864 (2020 prices). This multiplier assumes that most of the spending undertaken by construction firms is retained within the Worcestershire construction supply chain.

1.10.5 Aggregate Impacts

The combined impacts of the indirect construction stage and direct construction stage results in an aggregate construction stage impact of 162 FTE jobs and a GVA uplift of £6,404,823 (2020 prices).

1.11 Scheme Costs

Scheme costs for the basis of economic appraisal were derived following the approach specified in DfT's Transport Appraisal Guidance (TAG) Unit A1.2 'Scheme Costs'. Base scheme costs in outturn (nominal) prices are estimated at £9.3 million as detailed in the table below.

¹⁷ WoE LEPs 'Infrastructure Guidance Note for Infrastructure Projects' (2015) inflated to 2018 prices using WebTAG Databook Annual Parameters" (2018)

¹⁸ WoE LEPs 'Infrastructure Guidance Note for Infrastructure Projects' (2015)

	Q4 2020 Baseline Cost	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
Preparation	£1,575,734	£340,433	£850,159	£389,956	£0	£0	£1,580,548
Land/Legal Costs	£64,327	£0	£30,000	£25,000	£10,000	£0	£65,000
Bridge Only Construction Costs	£4,728,660	£0	£192,400	£3,607,500	£1,010,100	£0	£4,810,000
Link Costs	£475,288	£0	£19,339	£362,597	£101,527	£0	£483,463
Wider Link Improvements	£1,934,322	£0	£0	£132,862	£1,090,509	£800,290	£2,023,661
Supervision	£319,658	£0	£6,000	£250,000	£40,000	£30,000	£326,000
Total (excluding QRA)	£9,097,988	£340,433	£1,097,897	£4,767,915	£2,252,136	£830,290	£9,288,672
QRA	£1,478,115	£0	£41,592	£922,179	£467,868	£79,685	£1,511,323
Total (including QRA)	£10,576,103	£340,433	£1,139,489	£5,690,094	£2,720,004	£909,975	£10,799,995

Converting to a 2020 price base using the GDP deflator, the real cost estimate for the purpose of economic appraisal amounted to £9.1 million once general inflation was controlled. As noted in the table above, the quantified risk assessment estimated £1.5 million of risk associated with the project, resulting in a risk-adjusted scheme cost of £10.6 million (2020 real prices). Applying optimism bias at 6% for bridge construction (as tendered prices are available) and 23% for all other costs (as per DfT guidance for outline business case stage appraisal), the adjusted scheme costs increased to £11.9 million. In line with DfT requirements, re-basing the scheme costs to a 2010 price base lowered the scheme cost estimate to £10 million. Discounting at the prevailing rate (3.5% per annum) further reduced the scheme cost estimate to £6.8 million. A final adjustment to convert scheme costs to market prices (via a 19% tax correction factor) generated the final present value of costs, estimated at £8.1 million.

1.12 Benefit Cost Ratio

Based on the present value of benefits and costs outlined in the sections above, the estimated benefit-cost ratio (BCR) for the scheme is estimated at above 2.0 when active mode and amenity benefits are considered, implying high value for money based on DfT's value for money assessment criteria.

PVB	£m
Active Mode Benefits	16.19
Amenity Benefits	1.83
Social Wellbeing Benefits	2.92
PVC	£m
Scheme Costs	8.06
BCRs	
Active Mode vs. Costs	2.01
Active Mode + Amenity vs. Costs	2.23
All Benefits vs. Costs	2.60

1.13 Sensitivity and Risk Profile

TAG Unit A1.1 outlines that *“since the cost of walking and cycling schemes is often relatively low and the scale of impact relatively small, the cost-benefit analysis is highly sensitive to the quality of these forecasts. Sensitivity tests will be necessary to examine the potential impacts in the face of uncertainty”*.

The following sensitivity tests have been undertaken

- Diglis Bridge demand as a proxy
- Reduced active mode demand (fifty percent reduction in walking and cycling)
- Increase in scheme costs (twenty percent increase in PVC)
- Reduction in overall level of benefits (twenty percent reduction in PVB)

The impact of these adjustments on the BCR is outlined in the table below. The sensitivity analysis suggests that the scheme’s economic appraisal is resilient to significant changes in costs and benefits, reporting BCRs greater than 1.0 in most scenarios outlined above.

Scenario	Benefits (£m)	Costs (£m)	BCR
Core	18.01	8.06	2.23
Diglis Bridge Demand	7.43	8.06	0.92
50% Lower Active Mode Demand	9.92	8.06	1.23
20% Higher Costs	18.01	9.68	1.86
20% Lower Benefits	14.41	8.06	1.79

Further, a switching values assessment was undertaken to understand the proportional increase in costs (with fixed benefits) required to reduce the BCR to 1.0. Based on the PVB of £18.01 million, PVC would need to more than double to reduce the BCR to 1.0. This provides further confidence regarding the resiliency of value for money metrics to significant changes in costs.

DRAFT

Risk No.	T/O	Category		Risk Description: Cause, Threat/Opportunity, and Effect	Control Dates		Before Treatment			Quantified Risk Assessment Input					After Treatment			Action			
		RBS Level 1	Project Objective		Identified/Updated	Treatment Plan	Most Likely Impact	Overall Risk Ranking	Status	Estimated Cost Impact			Probability	QRA	Most Likely Impact	Overall Risk Ranking	Treatment Type	Treatment Plan	Risk Owner		
										Best Case	Most Likely	Worst Case	%	Output							
Stage 1 - Risks arising before implementation																					
001	T	External	Reputation	Lack of funding opportunities results in delay to or non-completion of scheme.	25-Aug-20	Ongoing	Very High	High	High	Active						Very High	Medium	High	Accept	Identify potential funding sources and prepare Business Case in preparation for application for funding.	WCC
002	T	Management	Reputation	Scheme does not get full support from Council Members or the public resulting in delay / abandonment	25-Aug-20	Ongoing	High	Low	Medium	Active						High	Very Low	Low	Mitigate	The scheme has strong support with local council members. Keep Council Members informed at regular intervals. At recent Public Engagement events, public support for the scheme was overwhelmingly in favour. Ensure engagement of local councillors at County, District and parish levels at appropriate times. Keep stakeholders and end-users informed throughout the development of the scheme proposals.	WCC
003	T	Management	Cost	Project Sponsor/key stakeholder key decisions/requirements including planning conditions that affect programme delivery (e.g. amendments to scheme scope).	25-Aug-20	Ongoing	Low	Medium	Medium	Active	25,000	50,000	100,000	50%	£27,083	Low	Low	Low	Mitigate	Ensure active engagement of key stakeholders to maximise understanding of concerns/issues to limit changes that could affect programme delivery.	WCC
004	T	Management	Reputation	Strategic case of scheme loses support during Business Case development (e.g. benefits not as high as anticipated)	25-Aug-20	Ongoing	High	Low	Medium	Active						High	Very Low	Low	Mitigate	Ensure active engagement of key stakeholders to ensure benefits of scheme are clearly understood.	WCC
005	T	Management	Cost	Failure to secure required third party / developer contribution resulting in impact on business case (e.g. decreased BCR)	25-Aug-20	Ongoing	Medium	Medium	Medium	Active						Low	Low	Low	Mitigate	Third party funding identified; to be secured through existing S106 agreements at earliest opportunity. WCC to underwrite scheme costs.	WCC
006	T	Management	Schedule	Land acquisition/rights. Not all land obtained via negotiation requiring a CPO with a risk of Public Inquiry resulting in delay to programme.	25-Aug-20	Ongoing	High	Medium	Medium	Active						High	Low	Medium	Avoid	Engage early with landowners of Kepax Site & Gheluvelt Park to secure necessary land and rights. Seek negotiated settlement to negate need for PI.	WCC
007	T	Commercial	Cost	Increase in land acquisition & compensation costs above those anticipated	25-Aug-20	Ongoing	Low	Medium	Medium	Active	£10,000	£25,000	£50,000	50%	£13,333	Low	Low	Low	Mitigate	Engage early with landowners of Kepax Site & Gheluvelt Park to secure necessary land and rights. Seek negotiated settlement to negate need for PI.	WCC
008	T	Commercial	Cost	Scheme pre-construction costs greater than estimated resulting in inadequate budget available.	25-Aug-20	Ongoing	Low	Medium	Medium	Active	25,000	75,000	150,000	15%	£11,875	Low	Low	Low	Mitigate	Early identification of potential increases in scheme costs. Tie-down Stage 2 scope with ECI Contractor and agree Evaluation Events at earliest opportunity.	WCC
009	T	Management	Reputation	Amendments to scheme scope due to design developments resulting in outdated scheme appraisal (e.g. BCR) increasing costs and putting Final Approval at risk.	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	10,000	15,000	25,000	40%	£6,333	Medium	Low	Medium	Mitigate	Scheme is fairly well defined but small risk of potential change as it goes through the planning process. Actively manage scope change and ensure budgetary constraints are understood. Impact on BC to be monitored.	WCC
010	T	Technical	Cost	Business Case appraisal requires updating ahead of Final Approval leading to higher than anticipated costs to finalise FBC	25-Aug-20	Ongoing	Low	High	Medium	Active	£15,000	£25,000	£50,000	60%	£16,500	Low	Medium	Medium	Mitigate	Ensure requirements are understood as early as possible through active engagement with funders (when identified). Use standard tools to determine impacts/benefits. Develop clear strategy to finalise FBC.	WCC
011	T	Management	Schedule	Statutory and other approvals / agreements leading to delays to programme / Full Approval / construction delay.	25-Aug-20	Ongoing	High	High	High	Active						Medium	Medium	Medium	Mitigate	Identify and prioritise all approvals / agreements required. Approvals to be sought in a timely fashion. Early engagement with relevant bodies to be undertaken. Understand implications of delays to critical path items and establish mitigation strategy.	WCC
012	T	Management	Schedule	Construction within the Flood Plain, leads to long delays with Environment Agency to agree the nature of the scheme, preventing scheme progressing	25-Aug-20	Ongoing	High	High	High	Active						Medium	Medium	Medium	Mitigate	Engagement with Environment Agency undertaken on modelling approach. FRA submitted with Planning Application. Continue consultation with EA to agree mitigation strategy and secure temporary works permits ahead of construction commencement.	WCC
013	T	External	Schedule	Loss of stakeholder (including pressure groups and media) and public support resulting in delay to programme and/or reduction in scope of scheme.	25-Aug-20	Ongoing	Medium	Low	Medium	Active						Medium	Low	Medium	Mitigate	Communications strategy and communication plan to be produced. Stakeholder engagement to continue.	WCC
014	T	Technical	Cost	Site Investigation/survey costs higher than anticipated	25-Aug-20	Ongoing	Low	Medium	Medium	Active	£25,000	£50,000	£100,000	50%	£27,083	Low	Low	Low	Mitigate	Scope & specification for remaining GI work developed and tendered. Sub-contractor quotes received & preferred contractor selected. Monitor.	WCC
015	T	Technical	Cost	Adverse ground conditions affecting design assumptions impacting design (beyond those anticipated before GI undertaken)	25-Aug-20	Ongoing	Low	High	Medium	Active	£20,000	£35,000	£50,000	70%	£24,500	Low	Medium	Medium	Mitigate	Undertake further SI (Phase 2) to increase levels of certainty on ground conditions. Monitor closely & identify key elements impacted by potential issues with Ground conditions. Design to take on board any uncertainty surrounding potential for unknown ground.	WCC
016	T	Technical	Cost	Technical Approval process results in change to design leading to increase in scheme development costs	25-Aug-20	Ongoing	Low	Medium	Medium	Active	£10,000	£25,000	£50,000	50%	£13,333	Low	Low	Low	Mitigate	Early engagement by Designer with TAAs to ensure requirements are clear and incorporated in design at an early stage	WCC
017	T	Technical	Schedule	Environmental surveys identify issues resulting in delay to programme	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	£10,000	£25,000	£50,000	40%	£10,667	Medium	Low	Medium	Mitigate	Continue relevant surveys & ensure active engagement of environmental specialists. Environmental appraisals included in	WCC
018	T	Technical	Cost	Impact on existing Structures, foundations, buried features (e.g. old pump works/culvert/retaining wall) underestimated leading to additional design/assessment costs	25-Aug-20	Ongoing	Medium	High	Medium	Active	£20,000	£35,000	£50,000	70%	£24,500	High	Low	Medium	Mitigate	Clear strategy to be developed to ensure existing structures not impacted by scheme proposals	WCC
019	T	Management	Schedule	Contractor's Target Price higher than budget resulting in delay to award of construction contract	25-Aug-20	Ongoing	High	Low	Medium	Active						High	Very Low	Low	Mitigate	Actively engage in ECI with IETC Contractor to ensure clarity of scope and methods of construction. Work closely to ensure buildability is built-in to the design.	WCC
Stage 2 - Risks during construction																					
020	T	Management	Cost	Construction costs realised from Risk 003 (Project Sponsor/key stakeholder key decisions/requirements including planning conditions that affect programme delivery (e.g. amendments to scheme scope).	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	£30,000	£60,000	£150,000	50%	£35,000	Medium	Low	Medium	Mitigate	Ensure active engagement of key stakeholders to maximise understanding of concerns/issues to limit changes that could affect programme delivery.	WCC
021	T	Commercial	Cost	Scheme costs greater than allocated in cost estimate.	25-Aug-20	Ongoing	Medium	High	Medium	Active	£59,975	£120,000	£273,450	70%	£94,900	Low	Medium	Medium	Mitigate	Mitigation measures include: Undertake level 5 cost build-up by qualified QS - site investigations (e.g. trial holes to establish actual location of services geotechnical investigations) to reduce the number of unknowns. - Early identification of potential increases in scheme costs via engagement of ECI contractor. Hold Risk	WCC
022	T	Commercial	Cost	Scheme cost inflation uncertainty leading to higher than expected out-turn costs resulting in inadequate budget available.	25-Aug-20	Ongoing	Medium	High	Medium	Active	-£120,000	£120,000	£300,000	70%	£77,000	Low	High	Medium	Mitigate	Use latest inflationary predictions. Allow for risk of higher inflation in QRA.	WCC
023	T	Commercial	Cost	Increased price of oil (beyond inflation uncertainty) - impacts on cost of bitumen or bauxite transportation costs leading to an increase in costs	25-Aug-20	Ongoing	Low	High	Medium	Active	£2,000	£5,000	£8,000	70%	£3,500	Low	Medium	Medium	Mitigate	Make allowance in QRA.	Shared
024	T	Commercial	Cost	Contract Management costs higher than expected costs due to programme delays or missed opportunities	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	£25,000	£50,000	£150,000	50%	£31,250	Medium	Low	Medium	Mitigate	Engage experienced NEC PM/Supervisor and QS.	WCC
025	T	Management	Schedule	Slippage of programme so that spending profile not achieved with consequential impact on budget (e.g. inflation) and reputation	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	£19,583	£58,750	£141,000	50%	£32,965	Medium	Medium	Medium	Mitigate	Include allowance for programme delay in QRA. Engage Contractor to ensure clear understanding of scheme and realistic programme produced.	Shared
026	T	Management	Schedule	Adverse (inclusion) weather leading to delay to programme of works, increase in construction/supervision costs	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	£50,000	£100,000	£250,000	50%	£58,333	Low	Medium	Medium	Mitigate	Take into account in contract conditions and prepare contingency plan. Ordinary adverse weather - risk with contractor. 1 in 10 yr events with client.	WCC
028	T	Management	Schedule	Major flooding occurs during construction phase, resulting in access restrictions to the site, major impact on programme	25-Aug-20	Ongoing	High	High	High	Active	£112,500	£225,000	£450,000	60%	£146,250	Medium	Medium	Medium	Mitigate	Programme to construct flood sensitive elements outside flood plain as far as practical. Construct foundations in period less prone to flooding. Retained as uncertain whether Contractor's outline cost allows adequate allowance currently.	Shared
029	T	Commercial	Cost	Potential impact from BREXIT/Covid-19 leading to increase in material prices/ability to agree costs with sub-contractors/delay to material delivery.	25-Aug-20	Ongoing	Medium	High	Medium	Active	£25,000	£50,000	£75,000	70%	£35,000	Low	High	Medium	Mitigate	Allow for in QRA and liaise closely with contractor. Reduced to allow for fact main element (steelwork) covered in risk element in contractor's outline budget cost.	WCC
030	T	Technical	Cost	Statutory undertakers C4 cost estimates higher than anticipated	25-Aug-20	Ongoing	Low	High	Medium	Active						Low	Medium	Medium	Mitigate	Removed as no known diversions required. Next item addresses risk of unmapped services/unknown diversions	WCC
031	T	Technical	Cost	Unmapped utilities encountered during construction leading to delay to construction programme, redesign and extra costs	25-Aug-20	Ongoing	High	Medium	Medium	Active	£100,000	£200,000	£350,000	50%	£104,167	Medium	Low	Medium	Mitigate	Include allowance in QRA.	WCC
032	T	Technical	Cost	Unmapped underground features encountered during construction leading to delay to construction programme, redesign and extra costs	25-Aug-20	Ongoing	High	High	High	Active	£25,000	£50,000	£150,000	75%	£46,875	Medium	Low	Medium	Mitigate	Include allowance in QRA. Reduced to cater for allowance already in Contractor's outline cost.	WCC
033	T	Technical	Environmental	Archaeological finds during construction resulting in delay to project and increase in cost due to archaeological investigation & delay	25-Aug-20	Ongoing	High	Low	Medium	Active	£25,000	£50,000	£100,000	25%	£13,542	Medium	Medium	Medium	Mitigate	Include allowance in QRA. Consider suitable mitigation strategies.	WCC
034	T	Technical	Environmental	Impact on heritage resulting in increase in cost to implement mitigation	25-Aug-20	Ongoing	Low	Low	Low	Active	£50,000	£75,000	£100,000	15%	£11,250	Low	Low	Low	Mitigate	Engagement with key consultees to ensure implications are understood and appropriate mitigation proposed. Reduced to reflect reduced likelihood	WCC

Risk No.	Category			Risk Description: Cause, Threat/Opportunity, and Effect	Control Dates		Before Treatment			Quantified Risk Assessment Input					After Treatment			Action			
	T/O	RBS Level 1	Project Objective		Identified/Updated	Treatment Plan	Most Likely		Overall Risk Ranking	Status	Estimated Cost Impact			Probability %	QRA Output	Most Likely		Overall Risk Ranking	Treatment Type	Treatment Plan	Risk Owner
							Impact	Proba-bility			Best Case	Most Likely	Worst Case			Impact	Proba-bility				
035	T	Management	Environmental	Pollution of water courses from construction activity: Extra cost, legal action. Public perception that scheme impacts are adverse and not being managed.	25-Aug-20	Ongoing	High	Medium	Medium	Active						High	Low	Medium	Mitigate	Contractor to have CEMP / MSs in place before any work in or near to water courses take place. Activities to be closely monitored.	Contractor
036	T	Management	Environmental	Impact on biodiversity not fully mitigated resulting in additional cost of mitigation beyond proposed measures, extra cost due to legal action. Public perception that scheme impacts are adverse and not being managed.	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	£25,000	£125,000	£250,000	35%	£45,208	Low	Low	Low	Mitigate	Ecological surveys & scoping work / environment assessments undertaken and Environmental Statement prepared for planning submission (planning permission received). Continue engagement with key stakeholders to ensure biodiversity mitigation measures are appropriate and acceptable.	WCC
037	T	External	Reputation	Local traffic disruption during construction period resulting in adverse public perception.	25-Aug-20	Ongoing	Medium	High	Medium	Active						High	Medium	Medium	Mitigate	Transport Assessment and Traffic Management Plan to be prepared and updated. Provide advanced publicity (ahead of construction). Contractor to keep affected parties informed.	Shared
038	T	Technical	Schedule	Changes in legislation requiring late amendments to scheme	25-Aug-20	Ongoing	Low	Medium	Medium	Active	£50,000	£125,000	£250,000	35%	£46,667	Low	Low	Low	Mitigate	Monitor & review changes when they occur	WCC
039	T	Technical	Schedule	Impact on Programme from delay caused by late Statutory undertaker works	25-Aug-20	Ongoing	High	High	High	Active						High	Medium	Medium	Mitigate	Actively engage with SUs to understand requirements, obtain C4s at earliest opportunity and ensure works included in programme.	WCC
040	T	Technical	Cost	Adverse Ground conditions affecting scheme costs post GI	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	£50,000	£100,000	£250,000	50%	£58,333	Low	Medium	Medium	Mitigate	Undertake appropriate level of GI to ensure ground conditions are well understood. Make due allowance in QRA.	WCC
041	T	Technical	Cost	Unforeseen ground conditions including contaminated land leading to increase in costs/ programme delay	25-Aug-20	Ongoing	High	Medium	Medium	Active	£25,000	£50,000	£150,000	50%	£31,250	Medium	Low	Medium	Mitigate	Undertake appropriate level of GI to ensure ground conditions are well understood. Make due allowance in QRA.	WCC
042	T	Technical	Cost	Existing Structures not as anticipated/unknown requiring part redesign of substructure during construction phase - design cost	25-Aug-20	Ongoing	Low	Medium	Medium	Active	£25,000	£50,000	£75,000	50%	£25,000	Low	Low	Low	Mitigate	Design to allow for element of uncertainty	WCC
043	T	Technical	Cost	Existing Structures not as anticipated/unknown requiring part redesign of substructure during construction phase - works cost	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	£100,000	£200,000	£400,000	32%	£69,333	Low	Low	Low	Mitigate	Design to allow for element of uncertainty. Identify potential areas and establish strategy to identify early in programme whether there may be a conflict.	WCC
044	T	Commercial	Cost	Protection and/or Assessment/Strengthening Works required to existing retaining Wall adjacent to pylon	25-Aug-20	Ongoing	Medium	Medium	Medium	Active	£100,000	£200,000	£300,000	40%	£80,000	Medium	Medium	Medium	Mitigate	Undertake early investigations to understand constraints and potential risks. Allow for in QRA.	WCC
045	T	Technical	Cost	Underestimation of costs associated due to potential to undertake improvement works to Horsford Road and include the ramp to Severn Way as art of bridge scheme.	25-Aug-20	Ongoing	Medium	High	Medium	Active	£100,000	£200,000	£350,000	70%	£145,833	Medium	Medium	Medium	Mitigate	Include additional prelims allowance in Cost Estimation for this item.	WCC
047	T	Commercial	Schedule	Main contractor goes out of business resulting in increase in costs & delay to programme	25-Aug-20	Ongoing	High	Low	Medium	Active						High	Very Low	Low	Mitigate	Financial health considered as part of tender proces. Ensure Contractor remains financially sound before committing to contract award.	WCC
049	T	Management	Reputation	Fatality/Serious injury during site surveys/works - Reputation suffers cost to manage potential project delay during HSE investigations	25-Aug-20	Ongoing	High	Medium	Medium	Active	£25,000	£75,000	£150,000	35%	£27,708	High	Low	Medium	Mitigate	Ensure competent contractor with good safety track record engaged. Contractor to have safe systems of work in place.	Contractor
050	T	Management	Quality	Specialist skill/knowledge required to administer contract and control costs and programme	25-Aug-20	Ongoing	Medium	Medium	Medium	Active						Low	Low	Low	Mitigate	Engage specialist to administer the contract.	WCC
051	T	Management	Reputation	Specialist skill/knowledge required to administer large contract and control costs and programme	25-Aug-20	Ongoing	Medium	Low	Medium	Active						Medium	Very Low	Low	Mitigate	Engage specialist to administer the contract.	WCC
052	T	Commercial	Cost	Additional Stakeholder Costs (e.g. EA)	25-Aug-20	Ongoing	Very Low	High	Low	Active	£25,000	£50,000	£100,000	70%	£37,917	Very Low	Medium	Low	Mitigate	Allow for in QRA. Engage with early.	WCC
053	T	Commercial	Cost	Accommodation Works beyond those anticipated	25-Aug-20	Ongoing	Low	Medium	Medium	Active	£10,000	£25,000	£50,000	50%	£13,333	Low	Low	Low	Mitigate	Continue engagement with affected parties to ensure requirements of accommodation works are clear.	WCC
055	T	Commercial	Cost	Flood Compensation - additional mitigation (above that anticipated) to fulfil EA & planning policy requirements	25-Aug-20	Ongoing	Low	Medium	Medium	Active	£25,000	£50,000	£100,000	35%	£18,958	Very Low	Very Low	Low	Mitigate	Continue close engagement with EA to finalise requirements.	WCC
056	T	Commercial	Cost	Interpretation boards and other Cultural Heritage elements - cost higher than anticipated	25-Aug-20	Ongoing	Low	Medium	Medium	Active	£10,000	£25,000	£50,000	50%	£13,333	Very Low	Low	Low	Mitigate	Continue liaison with relevant stakeholders to finalise strategy and approach	WCC
Stage 3 - Risks post-implementation																					
057	T	Technical	Reputation	Forecast benefits not realised.	25-Aug-20	Post-const	Medium	Low	Medium	Active						Medium	Very Low	Low	Mitigate	Develop design in line with best practice. Ensure economic appraisal is based on latest data/forecasts and uses suitable established tools to determine potential benefits.	WCC
058	T	Technical	Quality	Higher than anticipated maintenance liability	25-Aug-20	Post-const	Medium	Low	Medium	Active						Low	Low	Low	Mitigate	Design to be developed to minimise maintenance liability wherever practical and affordable.	WCC
059	T	Management	Quality	Vandalism leading to replacement/repair costs	25-Aug-20	Post-const	Low	Low	Low	Active						Low	Low	Low	Mitigate	Use anti-graffiti coatings where appropriate. Prevent access to sensitive areas where relevant.	WCC
060	T	Technical	Reputation	Forecast benefits are exceeded for sustainable modes	25-Aug-20	Post-const	Low	Low	Low	Active						Low	Low	Low	Mitigate	Design developed in line with best practice. Ensure appraisal is based on latest data/forecas	WCC
061	T	Technical	Reputation	Increase in flood impacts on property.	25-Aug-20	Post-const	Medium	Medium	Medium	Active						Medium	Very Low	Low	Mitigate	FRA prepared and submitted as part of planning application indicates negligible impact. Implement an EA approved flood mitigation scheme.	WCC
Notes														£1,478,115							

Notes
RBS: Technical, Management, Commercial, or External
Treatment, Threats: Avoid, Mitigate, Accept, or Transfer
Treatment, Opportunities: Exploit, Share, Enhance, or Accept

Appraisal Summary Table			Date produced: 1 9 2020			Contact:		
Name of scheme:		Kepax Bridge				Name		
Description of scheme:						Organisation		
						Role		Promoter/Official
Impacts	Summary of key impacts	Assessment						
		Quantitative			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp	
Economy	Business users & transport providers	Reduced congestion on highway network due to mode shift to walking and cycling	Value of journey time changes(£)		n/a		Decongestion benefits estimated via Active Mode Appraisal Toolkit	0
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
			n/a	n/a	n/a			
	Reliability impact on Business users	n/a						
	Regeneration	n/a						
	Wider Impacts	n/a						
Environmental	Noise	Reduced noise due to less highway traffic as travellers shift mode to walking and cycling				Noise benefits estimated via Active Mode Appraisal Toolkit	0	
	Air Quality	Reduced air pollution due to less highway traffic as travellers shift mode to walking and cycling				Air quality benefits estimated via Active Mode Appraisal Toolkit	0	
	Greenhouse gases	Reduced greenhouse gas emissions due to less highway traffic as travellers shift mode to walking and cycling	Change in non-traded carbon over 60y (CO2e)		n/a		Greenhouse Gas benefits estimated via Active Mode Appraisal Toolkit	0
			Change in traded carbon over 60y (CO2e)		n/a			
	Landscape	Amenity benefits will be provided through delivery of high quality bridge itself, plus by unlocking the amenity value of Gheluvelt Park for residents of North West Worcester. Landscape proposals for the scheme have been developed to be similar to what is existing and include measures such as planting to screen the existing Recycling Centre.	0.4 ha of high quality public realm associated with bridge and associated paths; plus 7.6ha of Gheluvelt Park unlocked for North West Worcester residents				1,826,911	
	Townscape	Residents on Waterworks Road are located approximately 85 metres from the proposed scheme and the majority of the proposed bridge will be screened from view. Overall it is considered that visibility of the proposed structure will add a landmark and a degree of additional depth to the riverside view.						
	Historic Environment	There are no overarching cultural heritage constraints in respect of the scheme. In addition, no designated heritage assets would be directly physically impacted by the scheme						
	Biodiversity	The scheme has the potential to significantly impact important ecological receptors, particularly the River Severn LWS and the use of the area by a range of bat species. However, following the incorporation of mitigatory measures, it is concluded that there would be no significant residual impacts to ecological receptors						
Water Environment	As a water compatible development, the scheme is appropriate within Flood Zone 3b; it would be safe throughout its design life; and would not increase flood risk elsewhere.							
Social	Commuting and Other users	Reduced congestion on highway network due to mode shift to walking and cycling	Value of journey time changes(£)				Decongestion benefits estimated via Active Mode Appraisal Toolkit. Note the values are a subset of the decongestion benefit outlined above, not additional	229,148
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
	Reliability impact on Commuting and Other users	Improved reliability for commuters who get to work on foot or by cycle. The bridge will provide another option for crossing the river, and will be more resilient to extreme flood events than						
	Physical activity	Increased number of walkers and cyclists result in more physical activity, healthier lifestyles and therefore reduced risk of premature death and reduced absenteeism from work				Physical activity benefits estimated via Active Mode Appraisal Toolkit	0	
	Journey quality	Improved walking and cycling infrastructure means active mode users benefit from better travelling experience.				Journey quality benefits estimated via Active Mode Appraisal Toolkit	0	
	Accidents	Fewer highway trips will contribute to fewer highway accidents.				Accident benefits estimated via Active Mode Appraisal Toolkit	0	
	Security	Low level lighting will be provided as part of the scheme to improve security. This will be sensitive to ecological receptors, including Lesser Horseshoe Bats						
	Access to services	The scheme will improve accessibility across the River Severn between east and west Worcester, particularly for those communities in North Worcester. In particular, residents in North West Worcester will benefit from direct access to Gheluvelt Park	c. 7,000 additional sporting and cultural event participants in Gheluvelt Park originating from West Worcester per annum.				2,922,991	
Affordability	The scheme will be free at the point of use for all users.							
Severance	The scheme will remove a significant physical barrier (i.e. the River Severn), which prevents travel and cohesion between communities in North Worcester.							
Option and non-use values								
Public Account	Cost to Broad Transport Budget							
	Indirect Tax Revenues						0	

Kepax Pedestrian and Cycle bridge - Funding and cost spend profile

	Q4 2020 Baseline Cost	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
Preparation	£1,575,734	£340,433	£850,159	£389,956	£0	£0	£1,580,548
Land/Legal Costs	£64,327	£0	£30,000	£25,000	£10,000	£0	£65,000
Bridge Only Construction Costs	£4,728,660	£0	£192,400	£3,607,500	£1,010,100	£0	£4,810,000
Link Costs	£475,288	£0	£19,339	£362,597	£101,527	£0	£483,463
Wider Link Improvements	£1,934,322	£0	£0	£132,862	£1,090,509	£800,290	£2,023,661
Supervision	£319,658	£0	£6,000	£250,000	£40,000	£30,000	£326,000
Total (excluding QRA)	£9,097,988	£340,433	£1,097,897	£4,767,915	£2,252,136	£830,290	£9,288,672
QRA	£1,478,115	£0	£41,592	£922,179	£467,868	£79,685	£1,511,323
Total (including QRA)	£10,576,103	£340,433	£1,139,489	£5,690,094	£2,720,004	£909,975	£10,799,995

Note: Excludes Costs for Monitoring & Evaluation and Part 1 Claims

Funding Profile

	Funding	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Total
Worcester City Council - City Plan Funds*	£ 94,986	£ 50,000	£ 44,986				£ 94,986
Worcester City Council - City Plan Funds	£ 500,000		£ 55,014	£ 400,000	£ 44,986		£ 500,000
Worcester City Council - PED Committee	£ 225,000			£ 175,000	£ 50,000		£ 225,000
Worcestershire County Council	£ 4,000,000	£ 290,433	£ 539,489	£ 3,170,078			£ 4,000,000
WLEP Getting Building Fund	£ 1,000,000		£ 500,000	£ 500,000			£ 1,000,000
Third Party Contribution							£ -
Total	£ 5,819,986	£ 340,433	£ 1,139,489	£ 4,245,078	£ 94,986	£ -	£ 5,819,986

*Worcester City Council £150k funding reduced to reflect contribution in previous years (£55,014.19)

Spend/Funding Difference

	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Funding Gap
Difference between spend and funding allocation	£0	£0	-£1,445,016	-£2,625,018	-£909,975	-£4,980,009

ID	Task Name	Duration	Start	Finish	2021				2022			
					Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
1	Cabinet/CMR Approvals	126 days	Fri 18/12/20	Mon 21/06/21								
2	Submit draft Cabinet papers	0 days	Fri 18/12/20	Fri 18/12/20								
3	Cabinet Meeting - Final approval delegated to CMR	0 days	Mon 22/03/21	Mon 22/03/21								
4	Delegated Approval	0 days	Mon 21/06/21	Mon 21/06/21								
5	Main Contract Award & Mobilisation	0 days	Wed 23/06/21	Wed 23/06/21								
6	Stakeholder Engagement	337 days	Mon 24/02/20	Wed 23/06/21								
16	Outline Business Case	144 days	Tue 04/02/20	Mon 31/08/20								
65	Outline/Planning Design	193 days	Thu 19/12/19	Tue 29/09/20								
108	Planning Application - Submission and Approval	289 days	Tue 04/02/20	Mon 29/03/21								
241	Discharge of Precommencement conditions	40 days	Tue 30/03/21	Mon 24/05/21								
242	Consent to Construct a Bridge over Navigable River	173 days	Mon 14/09/20	Thu 20/05/21								
249	Order Confirmed	0 days	Thu 20/05/21	Thu 20/05/21								
250	Advance Works (vegetation clearance)	40 days	Mon 04/01/21	Fri 26/02/21								
253	Highways - Discipline	94 days	Mon 12/10/20	Fri 26/02/21								
255	Lighting - Discipline	89 days	Mon 19/10/20	Fri 26/02/21								
257	Geotechnical Design	124 days	Mon 14/09/20	Fri 12/03/21								
258	Ground Investigation Phase 2	104 days	Mon 14/09/20	Fri 12/02/21								
264	Geotechnical Investigation Report	43 days	Mon 14/12/20	Thu 18/02/21								
268	Geotechnical Design	49 days	Mon 21/12/20	Fri 05/03/21								
271	Geotechnical Design Report	30 days	Mon 01/02/21	Fri 12/03/21								
276	Bridge Design and Check	349 days	Tue 04/02/20	Mon 21/06/21								
277	Bridge Detailed Design	105 days	Fri 06/11/20	Fri 09/04/21								
437	CAT III Check	349 days	Tue 04/02/20	Mon 21/06/21								
461	Stage 2 Road Safety Audit	330 days	Mon 02/03/20	Mon 21/06/21								
474	Main Contract procurement	51 days	Fri 09/04/21	Mon 21/06/21								
475	Target Pricing	40 days	Fri 09/04/21	Fri 04/06/21								
479	Delegated Approval	18 days	Thu 27/05/21	Mon 21/06/21								
482	Main Construction Contract	317 days	Wed 23/06/21	Fri 09/09/22								
483	Award of Construction Contract	0 days	Wed 23/06/21	Wed 23/06/21								
484	Steel Work Procurement & Fabrication	197 days	Wed 23/06/21	Fri 25/03/22								
493	Main Works - Foundations & Substructure	78 days	Thu 24/06/21	Mon 11/10/21								
494	Contractor Mobilisation & Compound Prep	18 days	Thu 24/06/21	Mon 19/07/21								
495	Start on Site	0 days	Mon 19/07/21	Mon 19/07/21								
496	Construction Foundations and Substructure	12 wks	Tue 20/07/21	Mon 11/10/21								
497	Demobilise for winter	22 wks	Tue 12/10/21	Mon 14/03/22								
498	Main Works - Superstructure	120 days	Mon 28/03/22	Fri 09/09/22								
499	Installation of Super structure	12 days	Mon 28/03/22	Tue 12/04/22								
502	Completion works	103 days	Wed 13/04/22	Fri 02/09/22								
507	De-mobilise site welfare arrangements	5 days	Mon 05/09/22	Fri 09/09/22								
508	Planned Completion of Bridge Scheme	0 days	Fri 09/09/22	Fri 09/09/22								

Project: Kepax Bridge
Date: February 2021

Task		Inactive Summary		External Tasks	
Split		Manual Task		External Milestone	
Milestone		Duration-only		Deadline	
Summary		Manual Summary Rollup		Critical	
Project Summary		Manual Summary		Critical Split	
Inactive Task		Start-only		Progress	
Inactive Milestone		Finish-only		Manual Progress	

Kepax Cycle / Footbridge Stakeholder Management Plan

Contents:

1. Introduction	4
1.1 Project Overview.....	4
1.2 Scheme Objectives.....	4
1.3 Scheme Benefits.....	5
1.4 Political Support.....	5
1.5 Project Delivery.....	6
1.6 Project Team:.....	6
1.7 Stakeholder Analysis.....	7
2. The Communications Challenge	8
2.1 The Elements.....	8
3. Communications Strategy	9
3.1 Strategy	9
3.2 Audience	9
3.3 Audience Priorities.....	10
3.4 Messages.....	10
4. Consultation undertaken to date	12
4.1 Cabinet.....	12
4.2 Project Board Meetings	12
4.3 Council Officers and Stakeholders	12
4.4 Public Information Exercise	17
4.5 Media	Error! Bookmark not defined.
5. Implementation.....	21
5.1 Regular Progress Meetings	21
5.2 Responding to Any Stakeholder Issues Raised	21
5.3 Delivery of Communications.....	21
5.4 Public Enquiries.....	21
5.5 Website	21
5.6 Documentation Review.....	21
5.7 Budget.....	22
5.8 Project Contacts.....	22
5.9 Communications Log and Commitments.....	22
6. Media.....	23



6.1 Media Relations 23

Appendix B - Communications Log and Commitments 27

1. Introduction

1.1 Project Overview

1.1.1 The Kepax Bridge scheme will provide a new footbridge over the River Severn between the former Kepax landfill site and Gheluvelt Park, approximately 110m in length. The footbridge will link to existing paths within Gheluvelt Park and a new access path will be provided over the Kepax site to the local highway network.

1.1.2 It will open up the opportunity for people to walk and cycle much more quickly between the Henwick Park area (and further afield like Hallow\Broadheath) on the west and Barbourne, Claines and associated areas. In addition, improvements to the existing adjoining walking and cycling network will connect residents to wider leisure, employment and education opportunities via the National Cycle Network.

1.1.3 The scheme is jointly promoted by Worcestershire County Council and Worcester City Council.

1.2 Scheme Objectives

1.2.1 Objectives of the scheme are:

- Minimise the impact of any new infrastructure on the natural environment and ecology and, where possible, deliver opportunities for environmental enhancement.
- Bridge and access paths to be designed to standard, with the safety and security of all users being a key priority throughout the design process. The bridge, ramps and access paths are to be accessible to all.
- To improve connectivity within Worcester by foot and cycle, thus improving the physical health and wellbeing of north Worcester residents, employees and visitors.
- Provision of a direct route for short journeys over the river and to provide a link into the wider network for longer trips. This will improve access to jobs, services and leisure activities.
- Provide an alternative walk and cycle link over the river thus increasing transport resilience.
- Increase visitor numbers to Worcester, through the provision of new walking and cycling infrastructure including a riverside leisure 'loop', resulting in additional visitor spend and increased visitor economy jobs.
- Contribute to improving the public realm and public spaces around the bridge and help to activate these areas.

1.3 Scheme Benefits

1.3.1 The scheme will encourage sustainable and active travel, improving transport options for a number of existing local residents, and future residents. An increase in levels of walking and cycling will improve air quality and improve the health and wellbeing of residents of Worcester.

1.3.2 In summary, the expected benefits and outcomes are as follows:

- A reduction in severance in Worcester, particularly in the north of the city.
- Additional choice for river crossings during exceptional events (e.g. 2020 flooding).
- Increased levels of walking and cycling within the city, and increased travel choice for north Worcester residents.
- Modal shift from private car in Worcester further encouraged.
- Improved travel choice for new residents and employees at West Worcester Urban Extension (SWDP, 2016).
- Assisting key assets within Worcester to reach their full potential, such as the riverside, Gheluvelt Park and the Racecourse.
- Growth in use of the NCN and RCN by north Worcester residents.
- Improved access to key city events such as the Worcester Show (Gheluvelt Park) and horse racing at Pitchcroft.
- Improved access to open space for residents west of the river, including to Gheluvelt Park and Riverside Park
- Improved air quality within the city of Worcester.
- Improved activity levels in nearby wards, improving health of local residents.

1.4 Political Support

1.4.1 To date there has been significant political support for this scheme from both Worcestershire County Council and Worcester City Council.

1.4.2 WCC's Cabinet has ultimate authority for the project. The Cabinet meets on a monthly basis. The Cabinet comprises:

Name	Responsibility
Simon Geraghty	Leader of the Council and Cabinet Member with Responsibility for Finance
Adrian Hardman	Cabinet Member with Responsibility for Adult Services
Alan Amos	Cabinet Member with responsibility for Highways
Marcus Hart	Cabinet Member with responsibility for Education and Skills
Lucy Hodgson	Cabinet Member with responsibility for Communities

Name	Responsibility
Karen May	Cabinet Member with responsibility for Transformation and Commissioning
Tony Miller	Cabinet Member with Responsibility for Environment
Ken Pollock	Cabinet Member with responsibility for Economy and Infrastructure
Andy Roberts	Cabinet Member with Responsibility for Children and Families
John Smith	Cabinet Member with responsibility for Health and Wellbeing

Table 1.1: Members of Cabinet (correct September 2020)

- 1.4.3 During the delivery stage, the scheme will be overseen by a Project Board comprised of officers with responsibility for delivery of the scheme. Officers from a wide delivery team will be involved in a number of elements of the project including the risk workshop, package sifting and public consultation. The Project Board will meet regularly and will meet at key milestones throughout the life of the project to ensure Project Assurance objectives are met. The Project Board will also specifically meet at key milestones during the project, tying in with their role in procurement, design and financial approval in the next stages of the project.

Name	Organisation	Role
Rachel Hill	WCC	Member / Senior Responsible Officer
Lynsey Keir	WCC	Member / Project Officer
Andy Maginnis	WCC	Member
Nick Twaite	WCC	Member / Procurement and Contract
Kristy Thomas	WCC	Member / Land and Waste
Miriam Gorman	WCC	Project Support
Nick Kay	Worcester City Council	Member / Partner
Mark Broomby	Jacobs (seconded)	Member / WCC Project Manager

Table 1.2: Membership of Project Board (correct as September 2020)

1.5 Project Delivery

- 1.5.1 Pre-commencement works are expected to start in Spring 2021 and the bridge is expected to be complete and operational in 2022.

1.6 Project Team:

- 1.6.1 The Project Team responsible for delivering the project comprises of;
- Worcestershire County Council and it's contractors responsible for:
 - Overall day to day project management;
 - Leading Project Board;
 - Business relations;
 - Communications and engagement;
 - Delivery of Highway works;
 - Dissemination of project information to Worcestershire County Council members;
 - Funding and procurement;
 - Liaison Officer during works;
 - Planning;

- Production of general publicity during the project;
- Street lighting;
- Traffic management.
- Worcester City Council responsible for:
 - Input to Project Board;
 - Input to bids and some financial backing;
 - Dissemination of project information to Worcester Council members;
- Architects responsible for:
 - Bridge design.
- Design engineers responsible for:
 - Technical work (including the Business Case development and planning application submission); and
 - Programme Management.

1.7 Stakeholder Analysis

- 1.7.1 Details of the stakeholders, their roles and interests in the project are in Appendix A.

2. The Communications Challenge

2.1 The Elements

2.1.1 The elements of the challenge are:

- Creating an environment where project partners and funders are able provide an open and consistent approach to stakeholder management and communications through a clear and up to date Stakeholder Management Plan;
- Achieving advocacy for the proposals from external stakeholders and local residents by engaging on an ongoing basis as the project progresses, communicating and promoting the benefits and dealing with any concerns in a timely way;
- Publicising the project within the context of wider improvements to transport infrastructure and the economy in Worcestershire;
- Ensuring local residents and others (e.g. Hallow Road Recycling Centre) are aware of any planned disruption as a result of the works, in good time to be able to plan alternative arrangements if necessary;
- Presenting a 'united front' between Worcestershire County Council and other partners on the scope and delivery of the project, having resolved any differences prior to presentation to stakeholders / third parties / the public / media etc.

3. Communications Strategy

3.1 Strategy

3.1.1 This Stakeholder Management Plan has been put together to identify the communication channels that should be utilised to ensure all relevant parties are kept informed as the project develops.

3.1.2 Communications will be tailored to meet the needs of each stakeholder and will take into consideration the objectives for the scheme, which are to:

- To deliver a scheme which achieves political traction;
- To deliver a cost effective and maintainable scheme by summer 2022;
- To work with local stakeholders and the contractor through the life of the scheme to ensure that the project delivers the expected outcomes;
- To maintain access to local properties and businesses during the works; and
- To understand other major schemes in the area and programme works in effectively to cause the least disruption to the network.

3.2 Audience

3.2.1 The audience for this strategy includes:

- Worcestershire County Council (Councillors/Staff)
- Worcester City Council (Councillors/Staff)
- Worcestershire Local Enterprise Partnership
- Local Members of Parliament
- Local residents
- Local businesses
- Environment Agency
- Canal and River Trust
- Severn Waste
- Duckworth Worcestershire Trust
- Local media and Trade Press organisations
- Users of Gheluvelt Park (including Friends of Gheluvlet Park)
- Cycling UK and Ramblers
- Landowners
- Natural England

3.3 Audience Priorities

3.3.1 The priority for each audience will be to clearly explain what the project will and will not achieve, increase understanding, create a positive perception of the project, and to minimise any negative publicity for the project.

3.3.2 This will be delivered by Worcestershire County Council in partnership with Worcester City Council and the wider project team.

3.4 Messages

3.4.1 The messages for the project are set out in Table 3.1 below.

Table 3.1 – Messages for the Kepax Bridge scheme.

AUDIENCE	MESSAGE	COMMUNICATION CHANNEL	RESPONSIBILITY
Primary Stakeholders Project Team	Project objectives	Direct communication as required via email / telephone / meetings Monthly Project Board meetings	Worcestershire County Council
Worcestershire County Council Worcester City Council Politicians and Staff Architect Contractor	Confirmation of scope and delivery Project objectives / benefits Value for money case Economic Case Strategic Case	Regular meetings Lead Member briefings Updates on dedicated councillor/information portal Staff briefings and updates on staff intranet (SID) Utilisation of promotional space within County Council buildings such as poster frames, plasma displays and site entrance displays County Council internal staff newsletters	Worcestershire County Council Worcester City Council
Local Enterprise Partnerships	Benefits to the economy of new facilities, better access, scope of project, timescales, wider economic business case. Will encourage investment in the County.	Meetings & correspondence between WCC and LEPs	Worcestershire County Council Worcester City Council

AUDIENCE	MESSAGE	COMMUNICATION CHANNEL	RESPONSIBILITY
Local MP's	Wider and local economic benefits	Meetings & correspondence with the MP	Worcestershire County Council Worcester City Council
Neighbours and local residents	Project objectives / benefits, scope of project, timescales, consultation.	Posters, letters, visits, Media announcements/articles, e-newsletter, updates on dedicated section on WCC website, scheme board announcements/ Leaflets/events	Worcestershire County Council Worcester City Council
Local Businesses	Wider project benefits, scope of project, timescales Wider and local economic benefits	Posters, letters, visits Media announcements/articles, e-newsletter, updates on WCC website, Twitter/Facebook	Worcestershire County Council Worcester City Council
Local media organisations <ul style="list-style-type: none"> • Express & Star • Worcester News • BBC Radio Hereford & Worcester • Free Radio • Touch FM 	Wider project benefits, scope of project, timescales	Press releases, advertisements, Updates via WCC social media channels (Twitter/Facebook) and dedicated web section hosted on www.worcestershire.gov.uk (County Council website)	Worcestershire County Council
Other stakeholders, e.g. Natural England, Environment Agency, Canals and River Trust	Minimise impact on ecology and correct process followed	Statutory consultees to the planning application Meetings & correspondence as required	Worcestershire County Council

4. Consultation undertaken to date

4.1 Cabinet

4.1.1 The Kepax Bridge scheme was discussed at a Cabinet meeting on 14th November 2019. The Strategic Outline Business Case for the scheme was presented and it was explained that this marked the start of the process which would include gaining planning permission, the development of a full business case and the return of a report to Cabinet.

4.1.2 At this meeting it was resolved that Cabinet:

- a) welcomed the contents of the Strategic Outline Business Case and authorised the development of a Full Business Case;
- b) authorised the preparation of a Planning Application for the Kepax Bridge Project and delegated the decision to submit the Planning Application to the Director of Economy and Infrastructure in consultation with the Cabinet Member with Responsibility;
- c) allocated £1.5m from the Capital Programme allocation for Walking and Cycling Bridges towards this scheme;
- d) authorised the submission of funding bids to third parties for the completion of the scheme;
- e) approved the expenditure of the funds necessary to complete the Full Business Case and to prepare the Planning Application up to the parameter for preparation set out in paragraph 19;
- f) authorised the completion of a pre-planning public engagement exercise;
- g) receive a further report regarding the project following the outcome of the Planning Application and with details of the Full Business Case and progress on funding applications; and
- h) noted that commencement of construction would not occur until funding sources have been secured.

4.1.3 Further information, including the agenda and minutes are available to view at <https://worcestershire.moderngov.co.uk/ieListDocuments.aspx?CId=131&MId=2647&Ver=4>.

4.2 Project Board Meetings

4.2.1 Kepax Bridge Project Board meetings are held monthly and are attended by Officers with responsibility for delivery of the scheme. The Project Board includes a Senior Responsible Officer, Project Officer and other Officers with responsibilities including land and waste and procurement.

4.3 Council Officers and Stakeholders

4.3.1 **WCC Planning Officers**

In addition to the pre-application meeting, a virtual meeting was held with WCC

Planning Officers in May 2020 in order to present the preferred design of the scheme and discuss the EAR contents.

- 4.3.2 **Worcester City Council and Malvern Hills District Council Planning**
A virtual meeting was held with an Officer from each authority on Monday 27th July 2020. Proposed layouts and visualisations were presented, and Officers were given an opportunity to ask any questions. No significant issues were raised during the meeting.
- 4.3.3 **Worcester City Council Street Scene**
Street Scene, Environmental Operations were contacted in June 2020 to discuss the design of the footpath / cycle path in Gheluvelt Park. The draft design was discussed, and locations of memorial trees were confirmed. Other stakeholder names were given, including the Duckworth Worcestershire Trust.
- 4.3.4 **Duckworth Worcestershire Trust**
The Duckworth Worcestershire Trust manages the Pump House Environment Centre and were contacted in June 2020 to discuss the design of the footpath / cycle path in Gheluvelt Park. The draft design was discussed, and additional cycle racks (including those for non-standard cycles) was requested.
- Response:** Additional cycle parking and a shelter will be provided close to the Pumhouse and is shown on the accompanying landscaping plan.
- 4.3.5 **Canal and River Trust**
Engagement with the Canal and River Trust was undertaken in April 2020. High level constraints such as navigation limitations and air-draft requirements were discussed. The requirements for the bridge deck soffit level were considered no more onerous than the level stated in the screening opinion.
- 4.3.6 **Environment Agency – Permits**
A meeting was held with a Flood and Coastal Risk Management Officer from the EA in June 2019. It was confirmed that construction of the scheme would require two bespoke EA permits:
- Permanent works – construction of footbridge; and
 - Temporary works – in-channel scaffolding.
- Applying for EA permits is a distinct and separate process, and therefore this will be pursued separately.
- 4.3.7 **Friends of Gheluvelt Park**
Friends of Gheluvelt Park were contacted in June 2020 in relation to the design of

the footpath and cycleway in Gheluvelt Park. They were supportive of the bridge overall, and detailed design. The provision of additional cycle racks was discussed.

Response: Additional cycle parking and a shelter will be provided close to the Pumphouse and is shown on the accompanying landscaping plan.

4.3.8 **Environment Agency – Flooding**

A call was held with the Environment Agency on 2nd July 2020 to discuss the approach to flood modelling.

In order to better represent the potential impacts of the proposed bridge, it was proposed to truncate the existing 1D model at or close to Bevere Lock and to add a 2D domain, to cover Gheluvelt Park and the area immediately upstream and downstream. The hydrology will remain unchanged. There were no concerns raised about this proposed approach.

With regard to floodplain compensation, it was noted that the site has several constraints to the provision of full level for level floodplain compensation including low lying topography and trees within the park and land quality constraints associated with the land-fill site and the former use of the park as a water treatment works.

Whilst the EA would expect to see level for level compensation, it was agreed that a pragmatic approach would be taken in this regard.

4.3.9 **Fields in Trust**

Fields in Trust were invited to a meeting to hear more about scheme proposals but as the red line boundary is outside their protection, they did not feel a need to get involved in advance of the application being submitted.

4.3.10 **Severn Waste**

Severn Waste were consulted about the proposals virtually on 24th July 2020. The comments can be split into those relating to the construction stage and operational stage, as summarised below.

Comments relevant to the construction stage:

- Opening hours of the Severn Waste site are 8am to 4pm Monday to Friday and 8am to 12.30pm on Saturdays. If construction traffic were to need access outside of these times, suitable arrangements would need to be made, and

strict procedures would need to be in place to ensure the recycling site remains secure.

- Concerns about whether abnormal loads will be and can be brought through the recycling centre accesses.
- **Response:** Liaison with Severn Waste regarding delivery of materials to site to reduce disruption

Comments relevant to the operational stage:

- Concerns about fly tipping. Would like to ensure that an overlooked gate to the facility remains in place close to the junction of Horsford Road and Riverview Close.
- Would like to see provision of a fence between the access road to the recycling centre and the pedestrian and cycle path. This would act as a physical deterrent and prevent incidents (for example a pedestrian falling or stepping onto road).
- **Response:** Fencing installed between the pedestrian and the recycling centre access road. Gate at the top of access path close to the junction of Horsford Road and Riverview Close is the retained.

4.3.11 **Cycling UK and Ramblers**

The Worcester representative for Cycling UK and Ramblers attended an engagement event in Gheluvelt Park on Wednesday 22nd July and followed this up with an e-mail to the project team. A number of the comments related to the wider link improvements, rather than the bridge and connections to Kepax site and Gheluvelt Park. A summary of points is included below:

Comments relevant to this application:

- Surprised project is being given priority over the Active Travel Corridors within LTP4.
- Would welcome a copy of the finalised business case to demonstrate that the project is worthwhile.

Response: An Outline Business Case (building on a Strategic Outline Business Case) is currently being prepared for the scheme. This makes use

of the Department for Transport Active Mode Toolkit, and the Propensity to Cycle Tool in order to assess benefits.

Benefits from the scheme are also gained from a reduction in severance over the river, increased leisure and tourism and access to open space and recreational amenities at Gheluvelt Park (to those living west of the river).

Active Travel Corridor (ATC) schemes are being progressed separately, and in parallel to this project. Wherever relevant, developer contributions are being sought to deliver ATCs.

- If progressed, the scheme should be designed to the best design standards for 'Active Travel'. Where possible all routes should be hard surfaced and at least 3.5m wide and unless even wider on a 'Share With Care' rather than segregated basis. There should also be no need for any 'Cyclists Dismount' signs or metal or other physical barriers to deliver the same. They discourage cyclist use, are often not DDA compliant and make it less attractive for pedestrian use and that's even before social distancing imperatives.
- Can I assume your feasibility and design work will see to future proof the scheme in terms of an anticipated growth in the use of disability buggies, hired and privately-owned scooters as well as an increase in the use of electric bikes including the larger ones that are already starting to be used for transporting children to school and for deliveries?

Response: The bridge, ramp and access paths have all been designed to standard and are a minimum of 3.5 metres wide, with no barriers for cyclists (similar to Diglis Bridge). This width should be adequate to accommodate slightly larger vehicles such as electric bikes.

Comments relevant to wider links:

- *The proposed route from Sabrina on the west side of the river to the steps down from Henwick Road has no defined legal right of way... It also can't be made wide enough to meet adopted West Midlands Cycle Design standards and I assume will be repeatedly affected by flooding.*

Formatted: Font: Italic

Response: The Severn Way to the south of the proposed scheme will be improved, and as part of this investigations are being made into the current and future legal status of this route. While it is acknowledged that this route will not be wide enough to meet adopted standards in all places (there are certain pinch points), the ambition is to adhere to standards wherever possible. During flood events, users of the bridge will be directed across the Kepax site and down Hallow Road.

- *As suggested the link from the proposed new bridge to NCN 46 needs to be improved... The existing route isn't wide enough to meet national and newly adopted standards. It also involves the use of a raised wooden section that is*

Formatted: Font: Italic

slippery when wet and a junction with the existing NCN where forward visibility for pedestrians and cyclists is dangerously limited.

Response: An additional shared footpath and cycle path is to be provided between the bridge ramp and NCN 46. Plans of this route were not ready at the time of public engagement as design was still progressing.

- *In terms of the proposed enhanced link eastwards to NCN 45 great care needs to be taken in ensuring a convenient, permeable and safe way of crossing the heavily trafficked Barbourne Road....*

Formatted: Font: Italic

Response: Options for improvements in this location are currently being progressed outside of this application.

4.3.12 Gheluvelt Park Memorial Tree

A memorial tree within Gheluvelt Park will be relocated as part of the scheme. A family member involved in the dedication attended a public engagement event within the park and agreed at the first instance the tree is to be retained. Due to the risks involved with this relocating the tree, cuttings will be taken of the tree.

4.4 Public Information Exercise

- #### 4.4.1 A Public Information Exercise (PIE) for the Kepax Bridge scheme was undertaken during June and July 2020. This was a Pre-Planning Public Engagement Exercise to help inform the formal application and to gauge public opinion.

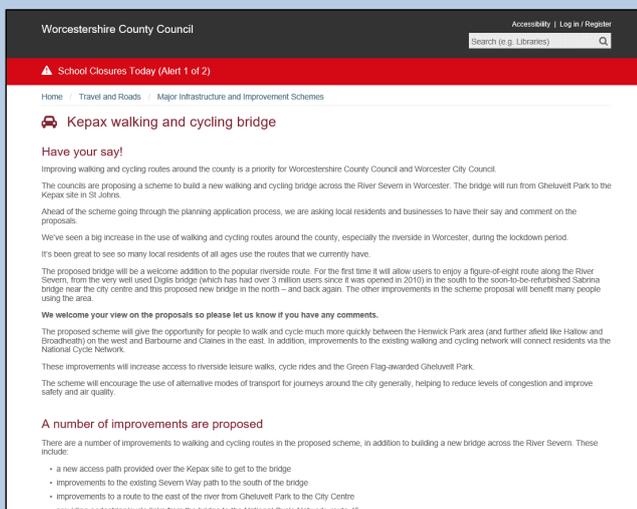


Figure 4.1: Kepax Scheme PIE (www.worcestershire.gov.uk/kepaxbridge)

- #### 4.4.2 The Engagement Exercise formally ran between 17th June and 24th July. It was promoted in print media, on social media and on the County Council website and

letters were delivered to residential properties in the immediate vicinity of the proposed bridge location. Participants were provided with information about the proposed scheme and were invited to email their comments to the County Council's Major Projects Team.

4.4.3 In addition to the virtual Public Information Exercise, four face to face engagement events were held either side of the River Severn between 20th and 22nd July, as follows:

- Event 1: Tesco's Martley Road, Worcester, Monday, July 20th, 9am-11am
- Event 2: Tescos, Martey Road, Worcester, Tuesday, July 21st 4pm -6pm
- Event 3a: Ghulevelt Park, Nr Pump Café, Waterworks Rd, Worcester: Wed 22nd 9am -midday
- Event 3b: Ghulevelt Park, Nr Pump Café, Waterworks Rd, Worcester: Wed 22nd, 3pm-6pm

4.4.4 Around 160 people attended the events and were encouraged to email their comments to the Major Projects Team.

4.4.5 275 email responses were received. Of these, 218 expressed support for the scheme, 24 expressed opposition and a further 33 did not expressly support or oppose the proposed scheme but made comments.

Comment	Number
Concerns that the bridge might exacerbate/cause parking problems.	38
It is important that walking and cycling links to and from the bridge are improved.	33
Concerns about potential impact on the environment/wildlife.	26
Concerns about anti-social behaviour/security.	24
The money should be spent on something else.	24
Comments on the design of the bridge.	12
Other comments referenced the need for litter/dog waste bins, concern re "overlooking", observations re flood risk, design and suggestions that there is insufficient demand for another footbridge. There were further miscellaneous comments.	No more than 5 people submitted comments for each of this type.

Table 4.1: Summary of PIE responses

4.4.6 Response

Parking issues are not expected to worsen on either side of the river due to the scheme (see Section 6.3.3 for more information). Following implementation of the

scheme, WCC will monitor parking on residential streets on either side of the river and implement measures if deemed necessary.

Wider links to the bridge on either side of the river have been considered for improvement and those which will be progressed are included in 2.1.2. Improvement of these links has been split from this main application as planning permission will not be required.

Impacts on the environment and wildlife have been considered and details are included in the Environmental Assessment Report which accompanies this application.

WCC is aware of issues with antisocial behaviour and has liaised with the police but there is no reason to believe that this will increase. Ecologically sensitive lighting will be provided as part of the scheme, and where appropriate fencing will be provided between residents' properties and the access path.

It is considered that nearly all further comments are also considered within this planning application, which is comprehensive and includes a landscape and visual assessment, flood risk assessment and drainage strategy.

4.5 Media

4.5.1 The scheme has been in the local press a number of times since 2017. Articles initially highlighted MP support for the scheme, and then followed progress of the business case and relevant decisions made at Cabinet meetings. A selection of relevant articles is highlighted below.

4.5.2 The following article was published on 6th March 2017, and outlines that a local MP supports the scheme and "*would be prepared to lobby the Government over it*".

<https://www.worcesternews.co.uk/news/15137276.lets-make-this-northern-footbridge-happen-says-worcesters-mp/>

4.5.3 The following article was published on 28th July 2018 and includes a plan of the proposed location of the scheme:

<https://www.worcesternews.co.uk/news/16384343.new-footbridge-plans-across-river-severn-in-north-of-worcester-move-step-closer/>

4.5.4 The following article was published on 7th February 2019 and focusses on funding the early stages of the scheme:

<https://www.worcesternews.co.uk/news/17417325.row-over-225000-down-payment-for-new-worcester-footbridge-rumbles-on/>

- 4.5.5 The following article was published on 31st October 2019 and focusses on funding construction of the scheme:
- 4.5.6 <https://www.worcesternews.co.uk/news/18005172.9-million-footbridge-plans-move-forward--will-money-come/>
- 4.5.7 The following article was published on 7th November 2019 and summarises decisions made at a Worcester City Council Committee:
- 4.5.8 <https://www.worcesternews.co.uk/news/18020444.9-million-bridge-will-open-worcester-tackle-congestion-plans-take-huge-step-forward/>
- 4.5.9 A number of press articles reported on the Public Information Exercise, for example:
- 4.5.10 <https://worcesteroobserver.co.uk/news/views-sought-on-new-bridge-plan/>
- 4.5.11 The following article was published in July 2020 and encourages residents to give their views on scheme proposals.
- 4.5.12 <https://worcesteroobserver.co.uk/news/labour-call-for-residents-to-give-views-on-new-bridge/>

5. Implementation

5.1 Regular Progress Meetings

- 5.1.1 It is vital that any future communication requirements, progress and implementation is discussed as a standing agenda item on the Project Team and Project Board meetings.
- 5.1.2 Going forward the key activities will be related to the determination of the planning application and start of construction works on site. Ahead of any works it will be important to provide Councillors, residents and others with appropriate advance notice and information.

5.2 Responding to Any Stakeholder Issues Raised

- 5.2.1 Worcestershire County Council in conjunction with relevant parties will respond to any issues raised by the general public or stakeholders. This will include any comments received in response to submission of the planning application.

5.3 Delivery of Communications

- 5.3.1 Worcestershire County Council will be required to deliver a range of communications for the scheme. WCC will lead this exercise and will involve all relevant stakeholders to ensure a partnership approach.

5.4 Public Enquiries

- 5.4.1 All general enquiries can be channeled through the Worcestershire HUB in the first instance and information will be provided to the HUB, to assist them in answering calls, prior to any work, which may cause disruption. Alternatively, stakeholders may write to:

Transport Planning & Strategy Team
Worcestershire County Council
Spetchley Road
Worcester
Worcestershire
WR5 2NP

5.5 Website

- 5.5.1 All information will be published on Worcestershire County Council's website, at the following address:
<http://www.worcestershire.gov.uk/kepaxbridge>

5.6 Documentation Review

- 5.6.1 Worcestershire County Council will review of the Stakeholder Management and Engagement Plan every three months.

5.7 Budget

5.7.1 The budget currently assigned to deliver the Stakeholder Management Plan is £3,500.

5.8 Project Contacts

5.8.1 Please refer to the contact list in Appendix A.

5.9 Communications Log and Commitments

5.9.1 Please refer to the Communications Log in Appendix B.

6. Media

6.1 Media Relations

- 6.1.1 Worcestershire County Council will ensure that the media are aware of the project. A press release including supportive statements from stakeholders will be used to announce and provide updates on the project. If necessary, site visits and personal briefings will be used to inform media, highlighting positive achievements and the benefits to residents and businesses which the improvements in public realm will bring.
- 6.1.2 It should be noted that Worcestershire County Council will have a dedicated press/communications officer for the duration of the project to handle press enquiries.
- 6.1.3 All press releases to be jointly agreed by all parties including Worcester City Council.

Appendix A – Key Stakeholder Analysis

STAKEHOLDER	ROLE	ATTITUDE	VESTED INTEREST	INFLUENCE	INTERFACE
Utility companies	Providers of water, electricity	Neutral	Ensure proposals are complaint with supply requirements	High	Jacobs / WCC
Worcester City Council	Scheme promoter	Positive	Economic, health, safety benefits to provision of scheme	High	Jacobs / WCC
WLEP	Proposed funder	Positive	Scheme represents high value for money	High	WCC
Local MPs	Promotion of Project	Positive	Scheme would improve quality of life for a number of local residents	High	WCC
Local media	Promotion of Project	Positive	Scheme would improve quality of life for a number of local residents	High	WCC
Town Council and local Parish Councils	Impact on local area	Positive	Proposal has minimal impact on local residents during construction and offers improvements once completed	High	WCC
Environment Agency	Statutory Consultee	Neutral	Safeguarding Ecology, Environment and Flood Management Ensure sustainability of urban drainage systems Need to ensure flood modelling approach and results are accepted Need to apply for permits to build bridge over the river	High	Jacobs
Canals and River Trust	Statutory Consultee	Neutral	Ensuring access to local rivers and canals Need to ensure design proposals are accepted	High	Jacobs
English Heritage	Statutory Consultee	Neutral	Preservation of archaeology	High	Jacobs
Natural England	Statutory Consultee	Neutral	Preservation of ecology and landscape. Protection of flora and fauna, (badgers, bats, newts, reptiles) Need to ensure that Natural England accept scheme and mitigation	High	Jacobs
Fields in Trust	Consultee	Neutral	Protect an area of Gheluvelt Park outside of the red line boundary Inform of proposals, and how they tie in to their area	Medium	WCC
Friends of Gheluvelt Park	Statutory Consultee	Neutral	Develop and increase the use of Gheluvelt Park	Medium	WCC
Police	Statutory Consultee	Neutral	Need to ensure proposals are acceptable and lighting strategy is understood	High	WCC

STAKEHOLDER	ROLE	ATTITUDE	VESTED INTEREST	INFLUENCE	INTERFACE
Fire and Rescue	Statutory Consultee	Neutral	Need to ensure proposals are acceptable and lighting strategy is understood	High	WCC
Local residents	Potential to be affected by construction (but benefits on completion)	Mostly positive	Need to address concerns as they arise where possible Responses to the PIE were mostly positive and encouraging	High	WCC
Sustrans and Ramblers	Consultee	Positive	Improvement of links to NCN	Low	WCC
Cycling UK	Consultee	Positive	Improvement of wider cycling links	Low	WCC

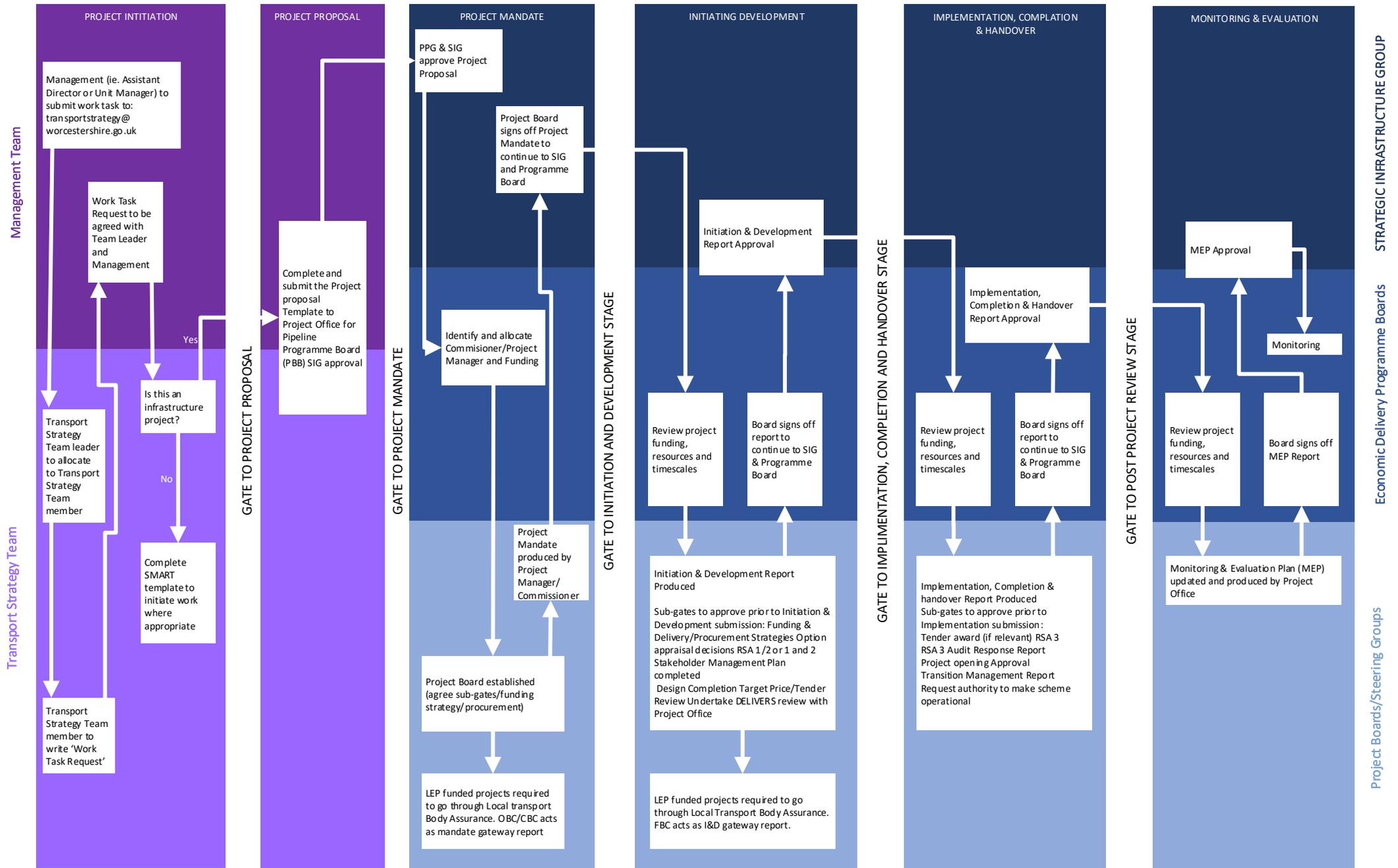
Appendix B – Key Project Contacts

NAME	TITLE	COMPANY	WORK ADDRESS	E-MAIL ADDRESS
Rachel Hill	Project Commissioner and Project Board Member	WCC	County Hall, Spetchley Road, Worcester, WR5 2NP	rhill@worcestershire.gov.uk
Mark Broomby	WCC Project Manager	WCC	County Hall, Spetchley Road, Worcester, WR5 2NP	mbroomby@worcestershire.gov.uk
Martyn Booth	Jacobs Project Manager	Jacobs	Redhill House, 227 London Road, Worcester, WR5 2JG	mbooth@jacobs.com
Lynsey Keir	Project Board Member	WCC	County Hall, Spetchley Road, Worcester, WR5 2NP	lkeir@worcestershire.gov.uk
Nick Kay	Project Board Member	Worcester City Council	The Guildhall, High Street, Worcester, WR1 2EY	nick.kay@worcester.gov.uk
Andy Maginnis	Project Board Member	WCC	County Hall, Spetchley Road, Worcester, WR5 2NP	amaginnis@worcestershire.gov.uk
Nick Twaite	Project Board Member	WCC	County Hall, Spetchley Road, Worcester, WR5 2NP	ntwaite@worcestershire.gov.uk
Richard Woodward	Project Board Member	WCC	County Hall, Spetchley Road, Worcester, WR5 2NP	rwoodward@worcestershire.gov.uk
Michele Jones	Project Comms	WCC	County Hall, Spetchley Road, Worcester, WR5 2NP	mcjones@worcestershire.gov.uk
Tracy Clarke	Project Support	WCC	County Hall, Spetchley Road, Worcester, WR5 2NP	tclarke@worcestershire.gov.uk
Simon Geraghty	Local Member	WCC	County Hall, Spetchley Road, Worcester, WR5 2NP	sgeraghty@worcestershire.gov.uk

Appendix C - Communications Log and Commitments

REF	DATE	RESPONSIBLE	STAKEHOLDER	DETAILS	OUTCOME	STATUS – OPEN/ CLOSED
1	Tuesday every four weeks	MBroomby	No	Project Board Meeting	Please see separate Decision & Action log.	Open
2	August 2020	MJ	Yes	Online PIE	Generally positive feedback. Some specific concerns which will be addressed by the project team where possible.	Closed
3	August 2020	MJ	Yes	Face to face PIE events	Generally positive feedback. Some specific concerns which will be addressed by the project team where possible.	Closed
4	Ad-hoc	MBooth	Yes	Planning Officer meetings	Scope of planning application agreed, and application submitted August 2020.	Closed
5	Ad-hoc	MBooth	Yes	Stakeholder meetings	To discuss technical content of planning application. Application submitted August 2020.	Closed
6	Ad-hoc	MBooth	Yes	Architect and contractor meetings	To progress detailed design of the scheme	Open
7	February 2021	MBooth	Yes	Planning and Regulatory Committee	Determination of planning application	Open
8	February 2021	MBooth	Yes	Cabinet Meeting	Confirm scheme funding	Open

Governance Framework Process – Directorate of Economy & Infrastructure



Regular Project Boards and Major Project Reviews are held throughout the life of the project, with monthly highlight reports submitted and reported on at Programme Boards

4th Floor 2 Colmore Square,
38 Colmore Circus,
Birmingham,
B4 6BN

www.jacobs.com

Subject	Benefits Realisation and Monitoring	Project Name	Kepax cycle and footbridge
Attention	Worcestershire County Council		
From	Victoria Edge		
Date	September 2020		

1.1 Introduction

Jacobs has been commissioned by Worcestershire County Council (WCC) to produce an Outline Business Case (OBC) for the Kepax Bridge scheme which is jointly promoted by Worcestershire County Council (WCC) and Worcester City Council who are working in partnership. The new pedestrian and cycle bridge will deliver an additional link across the River Severn in Worcester from Gheluvelt Park to the Kepax site in St Johns.

The need for the scheme is presented in a number of policy documents as it will provide a vital link between two parts of Worcester, reduce severance caused by the River Severn and encourage the use of active modes for journeys around the city. The scheme proposal builds upon the huge success experienced at Diglis Bridge (which has seen far more use than was originally forecast) and would provide a welcome addition to the family of bridges already in place in the City.

This technical note presents an outline of the benefits realisation and the monitoring and evaluation for the Kepax bridge scheme. It sets out the evaluation strategy and benefits realisation plan for the scheme, covering the monitoring of impacts and the approach to determining the projected benefits, impacts and objectives. In line with HM Treasury's Green Book (Central Government Guidance on Appraisal and Evaluation, 2018) and Magenta Book (Guidance for Evaluation, 2011) the Plan covers two stages of the ROAMEF concept (Rationale, Objectives, Appraisal, **Monitoring, Evaluation** and Feedback). This ensures that the Plan is aligned with the Government's broad policy making and delivery cycle, presented in Figure 1.

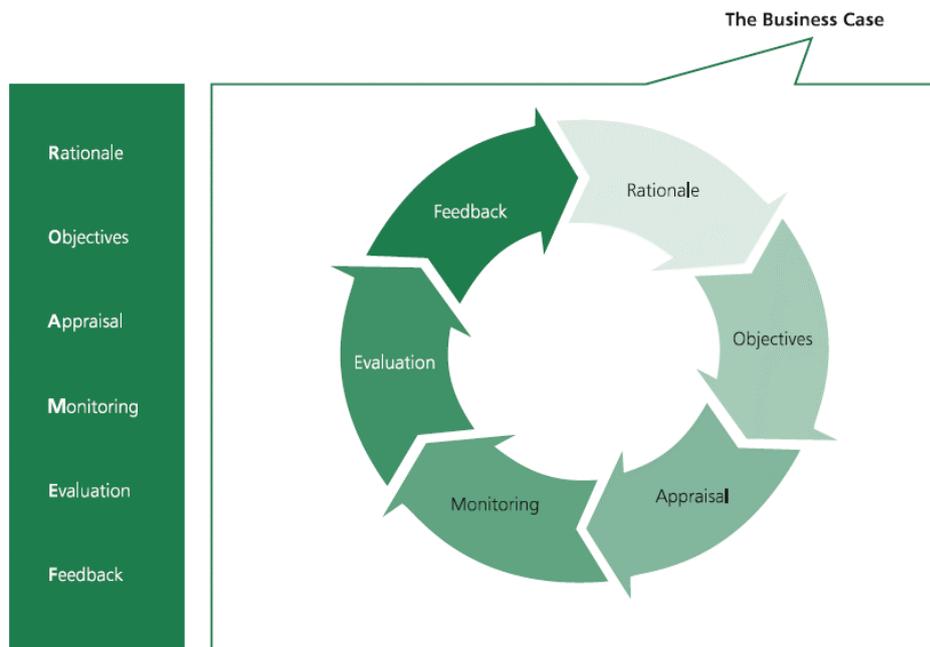


Figure 1: The ROAM/F Concept (source: The Green Book 2018)

The Green Book outlines that “*monitoring is the collection of data, both during and after implementation to improve current and future decision making. Evaluation is the systematic assessment of an intervention’s design, implementation and outcomes. Both monitoring and evaluation should be considered before, during and after implementation*”.

1.2 Summary of Evaluation Approach

The proposed approach is designed to assess whether the outputs and impacts of the scheme deliver the desired benefits and objectives. The approach reflects the scale and type of scheme, plus the resources available to complete an evaluation providing a strong evidence base to feed into the benefits realisation assessment, inform stakeholders and where necessary, refine schemes.

The evaluation will include quantitative and qualitative measures, thereby covering a range of outcomes and impacts. Furthermore, the evaluation strategy will help influence similar schemes. It will comprise both ‘process evaluation’ and ‘impact evaluation’, with the former focusing on the processes by which the scheme was undertaken and the latter focusing on whether the desired impacts of the scheme were realised.

To enable evaluation to take place, a monitoring framework needs to be in place. The requirements of the ‘Standard Monitoring’ outlined in the September 2012 DfT guidance¹ have been used as a guide. The requirements (although not all relevant to this scheme) are:

- Scheme build;
- Delivered scheme;
- Costs;
- Scheme objectives;
- Travel demand, including behavioural change;
- Travel times and reliability of travel times;
- Out-turn value for money;
- Impacts on the economy; and

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/9154/la-major-schemes-monitoring-evaluation.pdf

- Carbon Impacts.

The monitoring, evaluation and benefits realisation plan is defined in two parts, with the first part covering the first three areas listed above, the scheme build, delivery and costs, and the second area covering the scheme outputs, outcomes analysis and impacts to inform the benefits realisation. The second part will draw on the requirements in so far as they are applicable for this scheme.

1.3 Scope of the Scheme

The scope of the scheme includes:

- Provision of a new cycle and walking bridge over the River Severn. This will be 4m wide and 110m long (either single or multiple span).
- A direct access path to be provided over the Kepax site. This will connect users to the west side of the river via Hallow Road.
- Upgrade (surfacing, street lighting, signage and vegetation clearance) of the Severn Way to the south of the bridge. To create a riverside loop (via Sabrina or Diglis bridges).
- Walk and cycle improvements to routes on the eastern side of the river. This includes:
 - Enhancement to the existing alternative NCN 46 route (Stephenson Road, Stephenson Terrace – vegetation clearance, some footpath widening, signage and street lighting).
 - Upgrade of connection from the scheme to NCN 45 (Gheluvelt Park to Pipe Iron Road and Somer's Road – upgrade of existing A38 crossing facility and signage).

Two planning applications are being submitted to enable delivery of the scheme. The first application will cover the bridge structure and access paths (Kepax and Gheluvelt side). A subsequent application will cover any permissions needed for wider link upgrades.

1.4 Process Evaluation

In line with HM Treasury's Magenta Book (2011), process evaluation assesses whether a policy is being implemented as intended, by focussing on the processes, timelines and budgets surrounding the implementation phase.

The following would be assessed to determine the final scheme outcome against the planned process, so providing evidence of the impacts, delivery and costs of the scheme that can be used to understand the case for similar interventions within the City and elsewhere in the UK:

- Scheme Build, covering procurement of the scheme, achievement of timescale and key milestones, risk outcomes, stakeholder feedback.
- Delivered Scheme covering scheme refinements and success of the proposed design and materials used. This will include any measures taken to minimise any identified negative impacts during implementation.
- Outturn Costs will be compared to forecasts covering capital and on-going operating and maintenance costs, ensuring the scheme financial performance is in line with the business case.

Measure	Data to be Used	Assessment
Cost	Detail financial accounts of project.	Success to be classed as actual cost being within +/-X% of forecast. Outside this range more details to be published as to where success/failure occurred.
Delivery	Dates of various completion targets to be documented.	Actual timescale delivery is to be compared with the forecast and any completion outside of a 3-day window is to be detailed.
Risk	Any risks associated with construction found during construction not on the QRA to be identified.	Risks not on QRA to be documents and assessed whether these should have been found pre-construction (qualitative assessment).

Table 1: Process Evaluation

1.5 Impact Evaluation

In line with HM Treasury's Magenta Book (2011), impact evaluation attempts to provide an objective test of what changes have occurred, and the extent to which these can be attributed to the policy.

1.5.1 Scheme objectives

To understand what changes have occurred as a result of the project, it is first necessary to refer to the desired impacts of the intervention, as established through project objectives. The full details of the development process that led to the identification of the scheme are to be found in the OAR and OBC. As part of this process it was established that the scheme should meet the following objectives.

Objectives of the scheme are:

- Minimise the impact of any new infrastructure on the natural environment and ecology and, where possible, deliver opportunities for environmental enhancement.
- Bridge and access paths to be designed to standard, with the safety and security of all users being a key priority throughout the design process. The bridge, ramps and access paths are to be accessible to all.
- To improve connectivity within Worcester by foot and cycle, thus improving the physical health and wellbeing of north Worcester residents, employees and visitors.
- Provision of a direct route for short journeys over the river and to provide a link into the wider network for longer trips. This will improve access to jobs, services and leisure activities.
- Provide an alternative walk and cycle link over the river thus increasing transport resilience.
- Increase visitor numbers to Worcester, through the provision of new walking and cycling infrastructure including a riverside leisure 'loop', resulting in additional visitor spend and increased visitor economy jobs.
- Contribute to improving the public realm and public spaces around the bridge and help to activate these areas.

1.5.2 Desired Impacts

The following desired impacts, established through consideration of the objectives presented above, are considered to be appropriate to evaluate the outcomes of the proposed scheme, and it is these below that should be monitored and assessed for the realisation of benefits as part of this plan:

- D1: Increase walking and cycling levels in Worcester.
- D2: Increase use of areas such as the riverside and Gheluvelt Park.
- D3: Increase visitor numbers to Worcester.
- D4: Improve resilience during extreme events, such as flooding.
- D5: Contribute to the delivery of the SWDP and WLEP.

The wider objective, of improving public health, is not suggested as a desired impact that can be monitored since the impacts will be long term (over lifetimes) and therefore cannot be assessed accurately within a short period of scheme delivery. Improvements in air quality are known to produce improvements in public health (and vice versa), so should the scheme demonstrate compliance with the Limit Values and Objectives an improvement in public health should also have been achieved.

1.5.3 Monitoring Plan

The monitoring plan aims to define a programme of data collection and information collation tasks (labelled M1 to M5) that will provide outputs to assist in determining if the actual impacts of the scheme are as projected. Key questions to answer are listed below:

- Was the scheme delivered to costs and timescale?
- Has the scheme delivered the types and scale of forecast benefits, and show out-turn value for money as projected?
- Has the scheme delivered the desired objectives?
- What lessons can be learnt to help inform construction of future river crossings?

The proposed monitoring plan is intended to be synchronised with wider WCC stakeholder and evaluation programmes, so as to reduce resource and costs to the authority given the current restrictions on budgets. The proposed methods are also linked to the data collection completed as part of the continuing development of walking and cycling policies (Active Travel Corridors etc), so maximising use of the data used to identify the scheme impacts and benefits.

Table 4-1 lists the data collation and collection which will be required to provide inputs to the data monitoring outputs, in the format as specified in the September 2012 monitoring guidance. The areas of data collection are as below:

- M1: Pedestrian and cycle count data (bridges - Kepax Bridge, Sabrina Bridge and Diglis Bridge).
- M2: Pedestrian and cycle count data (Worcester Riverside).
- M3: Intercept surveys (on Kepax Bridge or the ramps / access points).
- M4: Visitor numbers and spend (general as part of wider tourism strategy and more specifically for some local business, e.g. Pumphouse and Racecourse).
- M5: Stakeholder Feedback from Council User Group Forums.

Measure	Data to be Used	Rationale for Inclusion	Data Collection Methods	Frequency of Data Collection
M1: Pedestrian and cycle count data (bridges)	Pedestrian and cycle count over the bridge	To understand use of Kepax Bridge by both pedestrians and cyclists.	Automatic traffic counters to be considered	At least one and five years after scheme opening

M2: Pedestrian and cycle count data (Riverside)	Pedestrian and cycle counts on the east and west bank of the river	To understand use of riverside by both pedestrians and cyclists.	Manual counts	One and five years after scheme opening
M3: Intercept surveys	Surveys of pedestrians and cyclists using the bridge. To include origin, destination, journey purpose, previous route and mode used	To understand reasons for use of the bridge, and previous travel habits	Commissioning of new surveys	One and five years after scheme opening
M4: Visitor numbers and spend	Information collected by Worcester City Council and WCC	To understand any changes in leisure and tourism	Data collected as part of an ongoing process	Annually
M5: Stakeholder Feedback from Council User Group Forums	Stakeholder feedback covering relevant elected members and stakeholder groups.	Understand the views of stakeholders to scheme delivery and impacts, and to understand some of the less quantified effects.	Part of the ongoing consultation process for transport strategies in the City.	One and five years after scheme opening

Table 2: Data Collation and Collection

1.5.4 Monitoring Outputs and Desired Outcomes

The Monitoring Outputs of the monitoring process impacts link to the Desired Impacts and Objectives is summarised in Table 3.

Desired Impacts (D) by Monitoring Outputs (M)	M1: Pedestrian and cycle count data (bridges)	M2: Pedestrian and cycle count data (riverside)	M3: Intercept surveys	M4: Visitor numbers and spend	M5: Stakeholder Feedback
D1: Use of Kepax Bridge (and existing bridges) by pedestrians and cyclists					
D2: Increased walking and cycling levels in Worcester					
D3: Increased use of areas such as the riverside and Gheluvelt Park					
D4: Increased visitor numbers to Worcester					
D5: Improved resilience during extreme events, such as flooding					
D6: Contribute to the delivery of the SWDP and WLEP					

Table 3: Monitoring Outputs for Assessing Desired Impacts (primary links only)

1.5.5 Outcomes Analysis

The Outcome Analysis (defined as O1 to O4) to be derived from the data collated and collected as part of the monitoring exercise is summarised below. These outcomes are the main benefits derived in the Business Case and are closely associated with the desired impacts presented above:

- O1: Active modes - Increase walking and cycling levels within Worcester, improving health and wellbeing of residents. Comparison will be made to baseline scenario (linked to D2 and D3).
- O2: Visitors – Increase number of residents using nearby attractions such as the riverside and Gheluvelt Park. Intercept surveys will give details on user destinations and other leisure and tourism information is already collected (linked to D3 and D4).
- O3: Resilience – Provision of additional access point during extreme flooding events. WCC structure team collates information on closure of bridges during events and counts will be undertaken on Kepax Bridge for cross referencing (linked to D5).

Table 4 shows how the different data monitoring outputs (M1 to M5) will be used to feed the outcome analysis (O1 to O3), and hence the assessments of benefits realisation and the achievement of desired impacts and overarching objectives.

Desired Impacts (D) by Monitoring Outputs (M)	O1: Active modes	O2: Visitors	O3: Resilience
M1: Pedestrian and cycle count data (bridges)			
M2: Pedestrian and cycle count data (riverside)			
M3: Intercept surveys			
M4: Visitor numbers and spend			
M5: Stakeholder Feedback			

Table 4: Monitoring Outputs and Outcomes Analysis(primary links only)

1.5.6 Benefit Realisation

Table 5 shows the linkage between Outcome Analysis (O1 to O3) and the Desired Outcomes (D1 to D6), so completing the loop of the outputs, outcomes and impacts. The loop is iterative and the approach to the package or monitoring process and analysis allows for refinement to optimise benefits, assess all impacts and ensure the full benefits of the package are realised.

Consideration will be given to key exogenous factors, including the impact of Covid-19.

Desired Impacts (D) by Monitoring Outputs (M)	O1: Active modes	O2: Visitors	O3: Resilience
D1: Use of Kepax Bridge by pedestrians and cyclists			
D2: Increased walking and cycling levels in Worcester			
D3: Increased use of areas such as the			

riverside and Gheluvelt Park			
D4: Increased visitor numbers to Worcester			
D5: Improved resilience during extreme events, such as flooding			
D6: Contribute to the delivery of the SWDP and WLEP			

Table 5: Monitoring of Desired Impacts and Outcome Analysis (primary links only)

2. Strategy Delivery

Evaluation costs, covering monitoring and benefits realisation analysis are summarised in this section.

Around £50,000 will be spent on undertaking monitoring, evaluation and benefits realisation. This estimate is included within the project costs supporting the Financial Case of the OBC. The timing of expenditure on monitoring, evaluation and benefits realisation is assumed to be incurred at one year and five years after opening. The cost represents approximately 0.5% of scheme costs.

2.1 Timescales

The timescale for data collection stages are summarised below:

- Stage 1 - 1 year after full opening of the package surveys in 2023; and
- Stage 2 - 5 years after full opening of the package surveys in 2027.

2.2 Reporting

An Evaluation Report will be produced by WCC at stages 1 and 2. This report will be made available too stakeholders via the WCC website. The cost of producing the Evaluation Reports is included within the broad cost estimates above.

2.3 Governance

The evaluation and benefits realisation strategy and reporting will be managed by the WCC Project Manager, with support from relevant officers during the implementation phases. They will ensure the plan is successfully completed in accordance with the quality assurance defined by WCC.

2.3.1 Risks

The main risk identified in the completion of the strategy is maintenance of the current WCC monitoring programme.

2.3.2 New Data Collection

New data to be collected by WCC includes intercept surveys of those using Kepax Bridge. Intercept user surveys will include a selection of questions, including:

- Where did you start your journey?
- Did you walk/ cycle to the bridge, or drive and park (and where did you park)?
- Where are you travelling to?
- What is the purpose of your journey?
- What did you do before the bridge was constructed?
- Did you have a choice of mode?
- Why did you choose to walk/ cycle?
- Are you satisfied with the appearance of the bridge?
- Any general comments.