

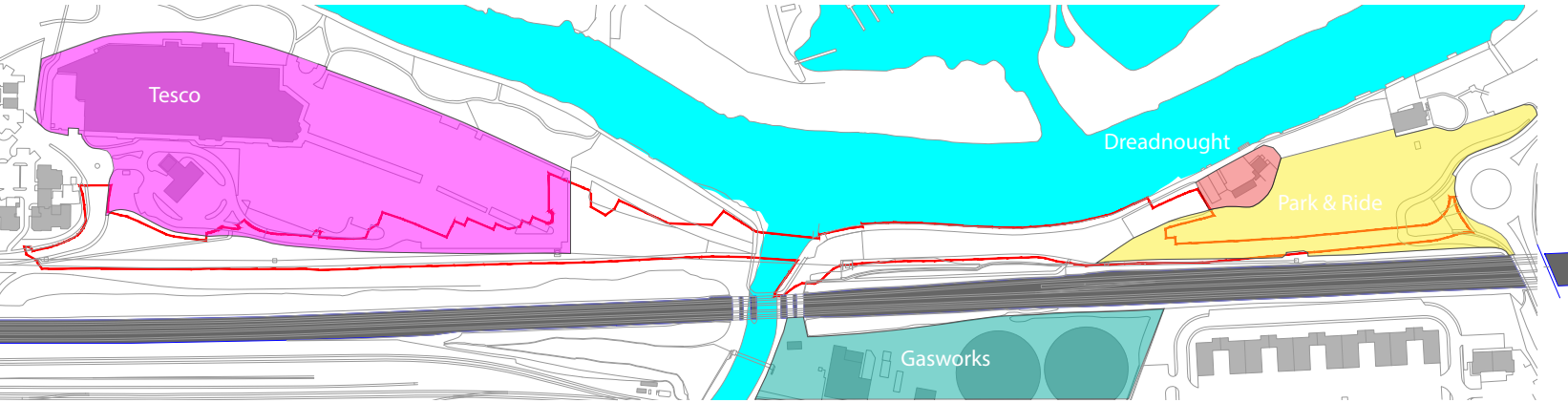


Figure 13. Adjacent planning units

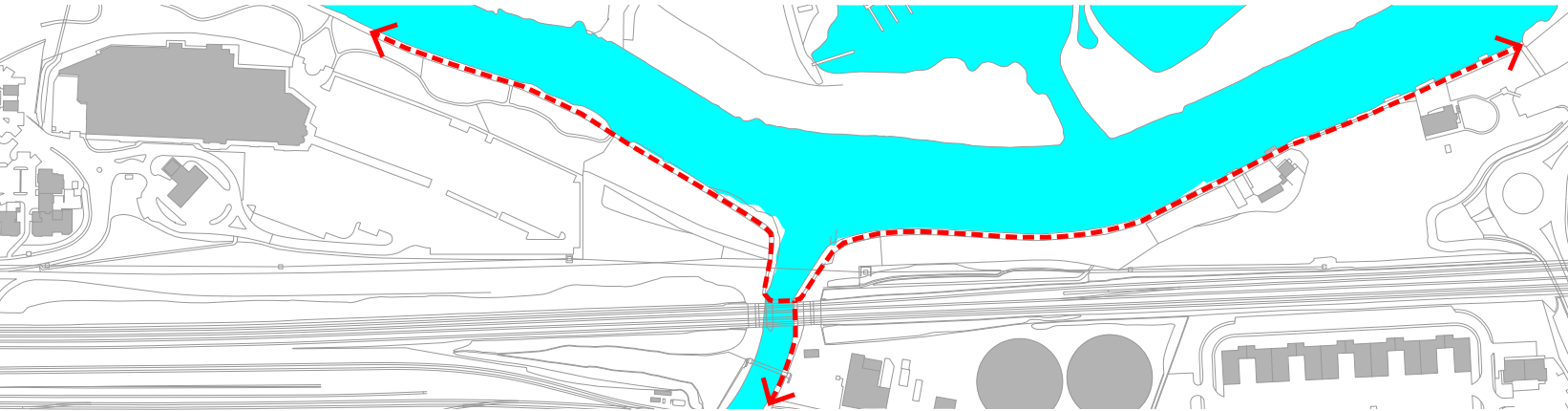


Figure 14. Strategic cycle routes (Sustrans).

Tesco

6.17 The Tesco store is a single storey, high-bay building with tiled roof. There is an extensive surface car park with petrol filling station. Access is solely from the west, via Napier Road.

Pylons

6.18 Medium and high voltage power lines and posts/pylons traverse the area from east to west.

Embankment

6.19 The riverbanks typically comprise brick or concrete retaining walls that are broken down in parts. The adjacent footpath is close in level to the water-mark. There are areas of semi-natural riverbank between the footpath and waters edge where silt has built up against the banks and a marginal/riparian habitat has become established. The banks are lined with a number of stairs and landing stages for boats to launch with temporary mooring generally permitted.

Existing footpaths and cycleways

6.20 A towpath runs east-west along the southern side of the River Thames. This is designated as part of the Thames Path, although cycling is prohibited along some sections of the route.

6.21 The path is made, with a basic asphalt surfacing over most of its length.

Strategic cycle routes

6.22 Reading stands at the hub of the National Cycle Network (NCN) in the Thames Valley, with direct links via Routes 4 and 5 to London Oxford and Bristol.

6.23 Sustrans Route 4 travels east-west along the south bank of the Thames and immediately to the north of the proposed route. Route 23m travels along the Kennet and meets Route 4 adjacent to the proposed new bridge.

Railway

6.24 The Great Western Railway traverses from east to west rising above the level of adjacent land and supported on a mix of embankments and brick retaining structures.

6.25 The embankment forms a significant visual barrier.

River Crossings

6.26 There are three river crossings of the Kennet in the immediate area comprising two rail bridges and a footbridge.

6.27 The adjacent railway bridge and attached accommodation bridge over the River Kennet is listed Grade II.

6.28 Isambard Kingdom Brunel for The Great Western Railway originally constructed the bridge in 1839-1840. The bridge was widened to the north, probably in 1892, with the accommodation bridge also probably attached (or rebuilt) at the same time.

6.29 The railway bridge is of red brick widened in engineering brick with ashlar dressings. The accommodation bridge is of steel and timber.

6.30 The railway bridge is built on a skew with a central elliptical arch flanked by pilasters and pairs of round flood arches to either side.

6.31 A gas pipe line in truss frame traverses the river located between the main railway bridges.

Riverside strip

- 6.32 The site largely consists of low-lying but gently undulating ground with some scrub and tree cover. It is not a high quality landscape, but does function as a buffer between the existing built up areas to the south of the railway line and the sensitive riverside landscape of the River Thames, which is recognised as important for local amenity and the many users of the Thames National Trail.

Trees

- 6.33 The Site is currently largely an area of scrubland with many young self- sown trees. There are a few mature trees on the northern and eastern boundaries, these are situated between young tree groups that have developed from a past planting scheme. Several self- sown trees are situated on the edge of the railway embankment, immediately beyond the southern boundary of the Site.



Figure 15. Photographs of context

1. Railway bridge from the riverside.
2. Mature planting along the river front.
3. Wokingham Waterside Centre.
4. Railway bridge and accommodation bridge.
5. Reading bridge across the Thames.
6. High Bridge across the Kennet in Reading.

7 Aims and objectives

Over arching objectives		Objectives			
7.1	The following over arching objectives have been established for the scheme as a whole:	Transport	Sustainability, health and wellbeing	Walking and Cycling Objectives	Construction and Maintenance
		- Promote sustainable transport alternatives to cars and encourage a modal shift to public transport. - Improve access to and from Reading eastwards for buses, pedestrians and cyclists. - Complement the proposed Park and Ride facility at Thames Valley Park by offering a modal interchange from cars to sustainable transport modes. - Provide quicker, reliable journey times to central Reading. - Ease forecast traffic congestion, particularly along the heavily congested A4 corridor in east Reading. Economic Objectives - Support the local economy, facilitate economic development and enhance access to employment and other essential services. - Encourage sustainable economic growth by promoting public transport usage and reducing car trips.	- Promote sustainable transport alternatives to cars - Reduce carbon emissions by bringing about an increase in the volume and proportion of journeys made by lower carbon, more sustainable means of travel, including walking and cycling. - Help to deliver wider social and economic benefits, including accessibility and social inclusion for the community. - Bring about improvements to air quality and increased compliance with air quality standards, and wider environmental benefits such as noise reduction. - Actively promote increased levels of physical activity such as walking, cycling and exercise. - Contributing to improving Reading’s air quality through reducing the use of the private car. - Promote heathy living, well-being and active lifestyles by providing opportunities for walking and	- Improve pedestrian and cyclist safety through the provision of a fast track and dedicated cycle and pedestrian routes directly into the centre of Reading. - Connect the cycle hire schemes at Thames Valley Park to the central areas of Reading. - Provide ecological enhancements adjacent to the route, which will increase biodiversity and species diversity. - Provide a recreational route to encourage interest within the River Corridor and wider locality. - Provide a safe, and direct route option for pedestrians and cyclists to and from the town centre east Reading and Wokingham, which seeks to minimise associated journey times. - Connect with existing and planned cycle routes and pedestrian paths. - Help facilitate greater pedestrian and cycle permeability across the network, particularly on the key movement corridors. - Improve connections to strategic pedestrian and cycle routes such as Thames Path and ‘Sustrans’ NCN routes. - Meet current anticipated future growth in pedestrian and cycle journeys, particularly to and from the station, town centre and future town centre development areas. - Provide a route of sufficient width and capacity to provide an alternative pedestrian and cycle route between east and central Reading a that is both attractive and direct.	- Determine which areas of available land will be needed on a temporary basis for assembly of the bridge sections. - Minimise any detrimental effect upon the existing riverbank and other structures. - Ensure elements requiring maintenance are easily accessible from the deck surface or ground in order to allow inspection, adjustment and maintenance throughout the life of the structure. - Consider ease of maintenance and the long term management of the bridge throughout the design process to ensure that the quality of the bridge can be maintained; including measures such as low energy, low carbon and low maintenance lighting. - Consider through the design stage the most suitable off-site fabrication, transport and on-site assembly options and the wider management of any construction impacts. - Determine the most cost-effective structural form for the length of crossing and context. - Where appropriate, select standard and propriety products. - Consider the most cost-effective construction methods.

Lighting, Detailing and Materials

- Realise opportunities to enhance the scheme overall through lighting design and landscaping, recognising the related artistic and aesthetic value these features can have.
- The scheme design should provide for general amenity lighting.
- Possibly consider a scheme to illuminate the bridge, without causing light pollution.

Navigation

- Limit development within and encroachment upon water spaces.
- Limit impacts upon navigation, moorings and other river transport related activity; including ferries.
- Determine and safeguard the ‘navigation envelope’ of the Kennet.
- If needed, consider ways to protect the bridge and its support structures from impacts.

Setting

- Respond to the practicalities and constraints of the site.
- Respond positively to the local context, maintaining and enhancing the character and appearance of the riverside setting.
- Contribute towards a high quality public realm and the distinct character, appearance, landscape and amenity of the river, island and open spaces.
- Develop a design that is appropriate and attractive and enhances the relationship between buildings, spaces and routes.

Landscape and ecology

- Protect native flora and fauna: sustain, improve and, where possible, create new species rich habitats.
- Protect, as far as practicable, individual trees, groups of trees, hedges and woodlands from damage and limit the need for removal.
- Retain and improve the quality of waterside vegetation, recognising its contributions to ecology and landscape character.
- Strengthen the role of the Thames and adjacent open spaces as important landscape features and wildlife corridors: promote improvements to the quality of the waterway environment.

Access

- Improve access to green space, such as safe off-road routes to parks especially in areas under-served by green space, such as Central Reading.
- Maximise waterside areas as a destination for leisure and recreation, balancing access and openness with protecting and enhancing wildlife habitats.
- Offer a safe and accessible environment for all.

Heritage

- Protect and enhance the historic environment; protect features with local or national designation including sites and features of archaeological importance and historic parks and gardens.

Flooding

- Minimise effects upon the capacity of the flood plain to store floodwater and floodwater flow,
- Do not increase flood risk.

Aesthetics

Consideration should be given to a range of potential design qualities which may help to determine the final design through an option appraisal process. These may include the following:

- Structure;
- Functional;
- Elegantly engineered;
- Lightweight appearance;
- Visual energy and life; expressing the structural forces which flow through it;
- A structure that is easily understood and enjoyed by a wide audience;
- A distinctive identity, unique and memorable;
- A visible landmark with presence in the landscape;
- Framing limited vistas to and from the bridge and the approaches;

User experience

- Consider the experience of the bridge user; maximising opportunities to connect with the structure above and the water below;
- A dynamic civic space above the water to encourage people to appreciate the views.
- A night time appearance that offers safety for pedestrians and cyclists.

Deck

- Aim to create the appearance of slenderness with a thin and lightweight structure
- A simple, single clear span free of obstructions or complex engineering.

Balustrade

- Maximum transparency in long views to the bridge.
- Provide a feeling of safe enclosure for the bridge user.
- Continuous top rail with an additional handrail provided at lower level for pedestrians as appropriate.

Approaches

- Gentle and shallow gradient approaches (balanced against excessive ramp length and in line with appropriate standards and guidance) with sweeping/sinuous alignments in line with main flows.
- As far as possible create a sense of connection with the river bank, rather than sweeping over and past.

8 Higher level option appraisal

Study	Option development and appraisal
8.1 An evaluation of route options has been undertaken to inform a bid to secure the allocated funding. The route options study led to the identification of a preferred scheme.	8.4 The two-stage option appraisal process involved the assessment of ten options in stage one that were reduced to four options for more detailed appraisal in stage two, leading to the identification of two hybrid preferred options.
8.2 The study clarified the need and justification for a transport intervention and the process of option identification, development and selection undertaken.	8.5 The first stage options examined both wider transport options within Reading and the Thames Valley as well as specifically looking at the eastern route into Reading town centre from A4 and A3290 at Thames Valley Park.
8.3 Options were compared with a ‘do nothing’ option where the following outcomes were identified: • Ever increasing congestion and worsening transport conditions will act as an inhibitor to growth with private sector investment attracted to other areas with better accessibility; • Air Quality issues will be exacerbated without the mitigation afforded by intervention; and • The resident population will be disadvantaged by restricted accessibility to jobs services.	8.6 The first stage options were subject to robust assessment using the Department for Transport’s Early Assessment and Sifting Tool (EAST). The tool is designed to compare and refine options; highlight adverse impacts and unanticipated consequences; identify trade-off between competing objectives; filter and discount ‘non runner’ options at an early stage; and highlight uncertainties that should be the focus of further analysis.



Option 1 – Segregated MRT route between Napier Road and the A3290 roundabout.

This route option passes through RBC land over the meadows. The route bridges the River Kennet mouth and connects to the proposed TVP Park & Ride.

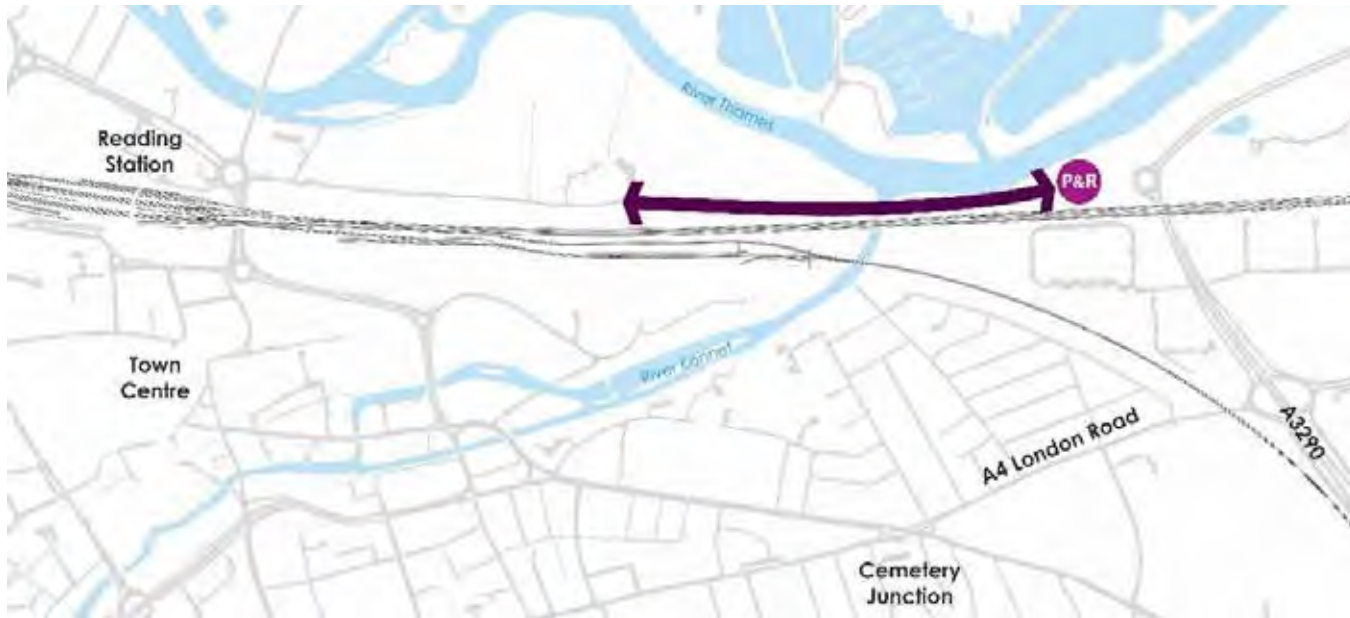
This option was selected for further appraisal in stage 2.



Option 2 - Segregated MRT route between Napier Road and the A3290 roundabout.

This route option passes through RBC land over the meadows and adjoins the public highway at Tesco’s access roundabout. The route bridges the River Kennet mouth and connects to the proposed TVP Park & Ride.

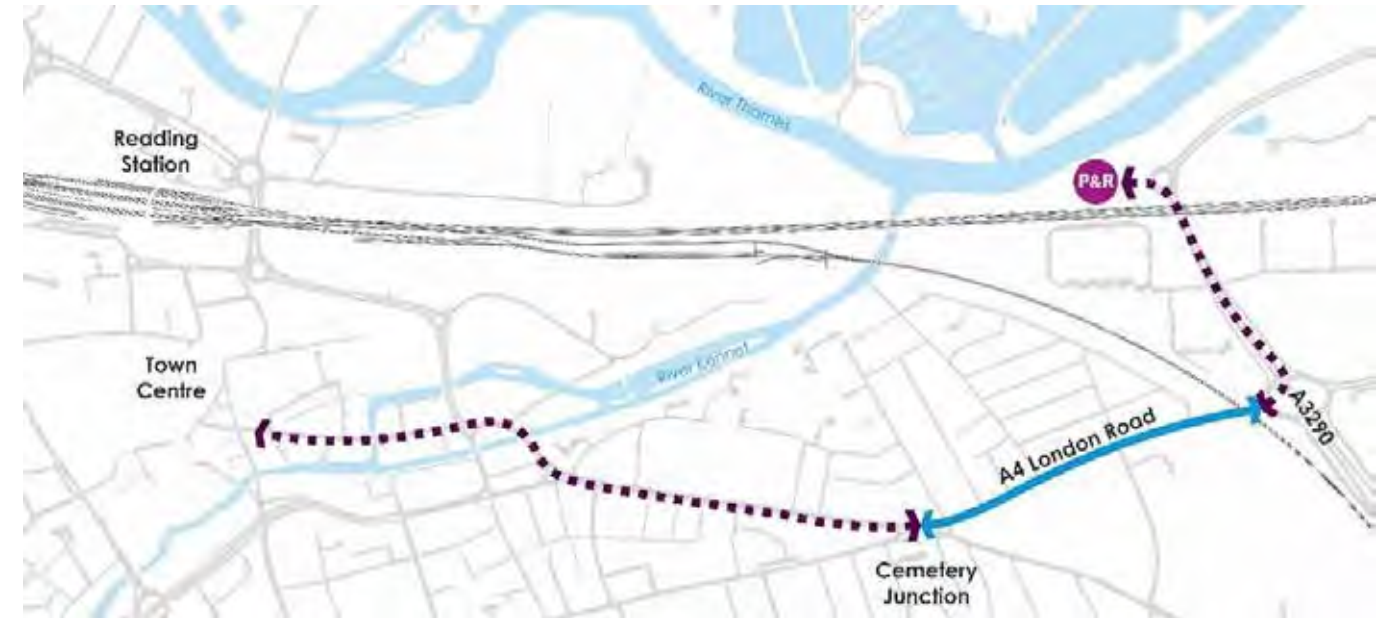
This option was selected for further appraisal in stage 2.



Option 3 - Segregated MRT route between Napier Road and the A3290 roundabout.

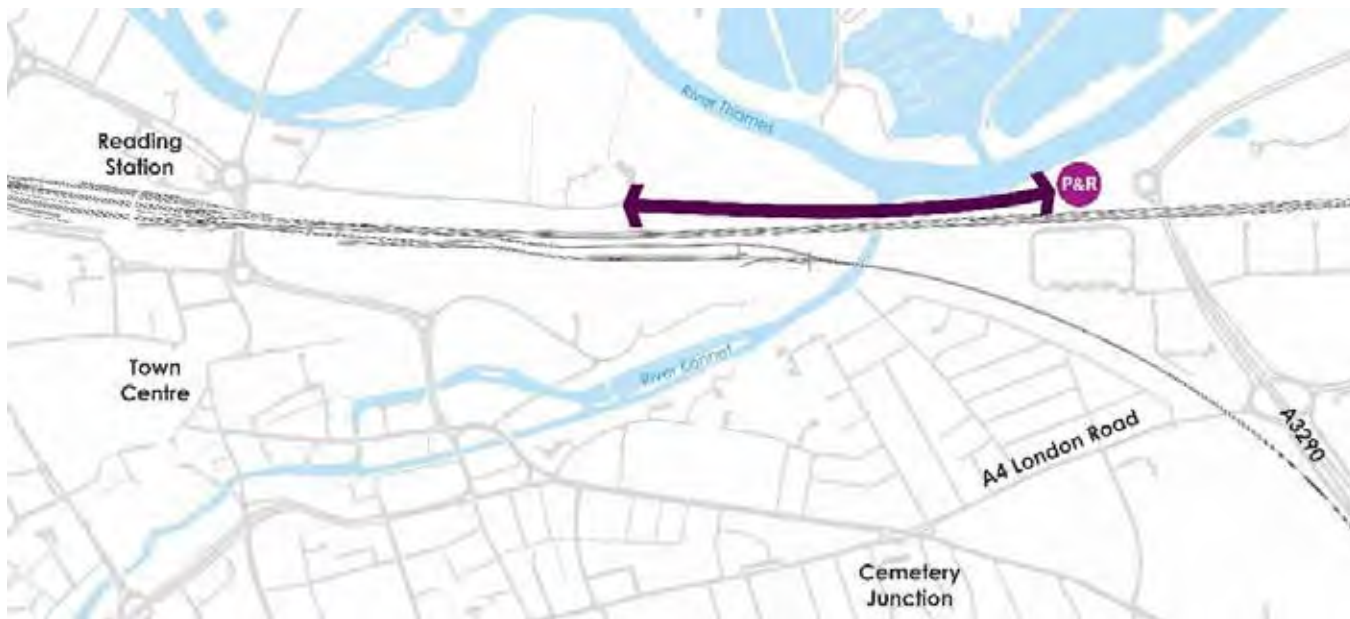
This route option passes through the edge of the superstore car park, land owned by Tesco's. The route bridges the River Kennet mouth and connects to the proposed TVP Park & Ride.

This option was selected for further appraisal in stage 2.



Option 5 – A tidal flow scheme on the A4 London Road.

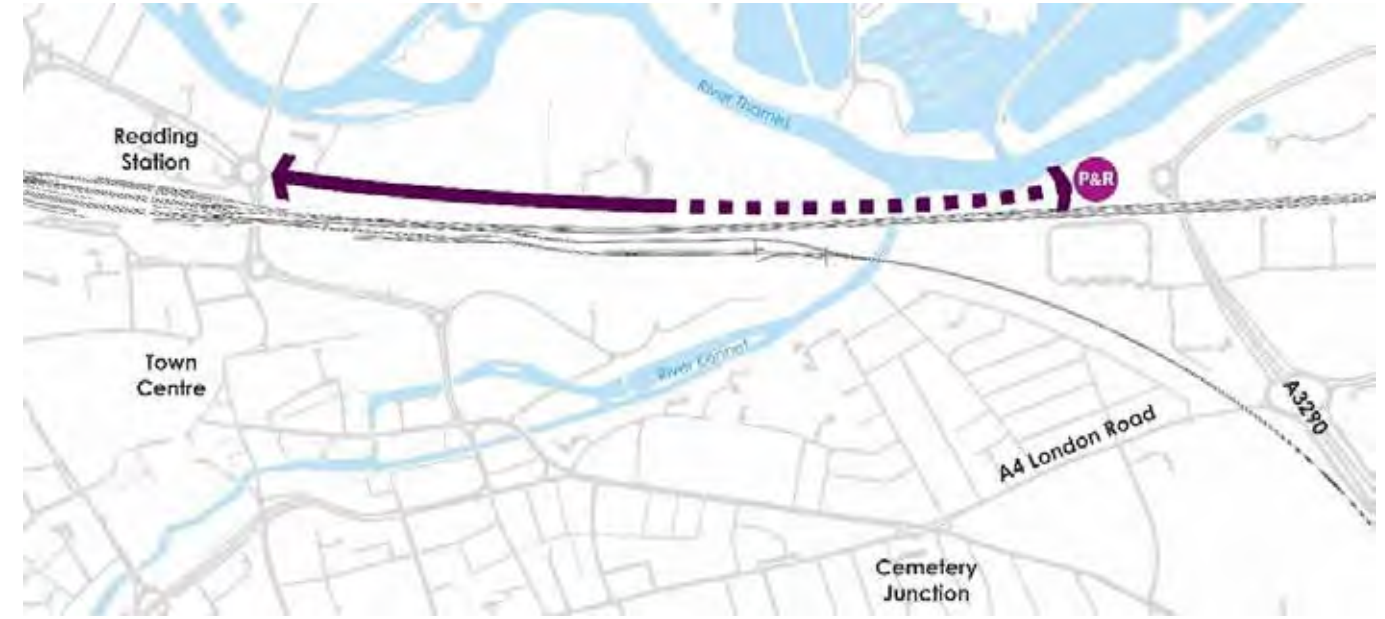
This option provided insufficient economic benefits and did not offer significant environmental benefits such as reducing carbon emissions, when compared to the alternative options. The option was therefore discounted.



Option 4 - Segregated MRT route between Napier Road and the A3290 roundabout.

This route option runs adjacent to the railway line on Network Rail land and through a small parcel of land owned by Tesco. The route bridges the River Kennet mouth and connects to the proposed TVP Park & Ride.

The construction costs of option 3 and 4 are the lowest of the four options and result in the lowest impact on the environment compared to remaining options, particularly in relation to ecology, flood risk, visual impact, landscape impact. This would improve public acceptability over the other remaining options. Option 4 requires less third party land than option 4, and is therefore considered more deliverable and potentially a lower cost.



Option 6 - Segregated MRT route between Napier Road and the A3290 roundabout.

This route option passes through the edge of the superstore car park, land owned by Tesco. The route is via a tunnel under the River Kennet mouth and connects to the proposed TVP Park & Ride.

This option offered high delivery costs when compared with the potential benefits. The option was therefore discounted.



Option 7 – Park and Ferry. A new ferry route to be created between Reading Station, and the proposed TVP Park & Ride.

It is proposed that this route will follow the River Thames to a new jetty provided adjacent to Christchurch Bridge.

This option provided insufficient economic benefits and did not offer significant environmental benefits such as reducing carbon emissions, when compared to the alternative options. The option was therefore discounted.



Option 9 – Segregated MRT route between Sutton Park Avenue and Alexander Turner Close, across the River Kennet and beneath the Reading to Waterloo railway line.

This option offered high delivery costs when compared with the potential benefits. The option was therefore discounted.



Option 8 – Park and Rail.

A new rail station to be provided at Thames Valley Park to serve both the business park, and provide a direct rail connection between the proposed TVP Park & Ride and Reading Railway Station.

This option offered high delivery costs when compared with the potential benefits. The option was therefore discounted.



Option 10 - A tidal flow bus lane scheme on the A4 London Road.

This option was selected for further appraisal in stage 2.

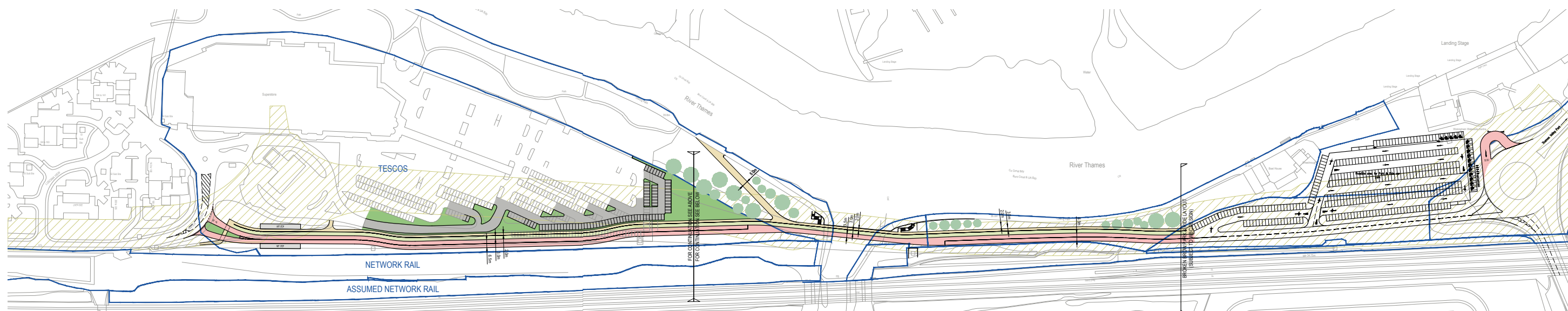


Figure 16. Preferred option

Stage 2

- 8.7 The construction costs of option 3 and 4 were found to be the lowest of the four short-listed options. These options also resulted in the lowest impact on the environment compared to four remaining options, particularly in relation to ecology, flood risk, visual impact, landscape impact; which would improve public acceptability over the other remaining options.
- 8.8 The stage 2 assessment incorporated alternative approaches to bus priority as follows:
- Bus priority Option 1 – Nearside bus lane on approach to Vastern Road Roundabout along with a fully segregated cycle route and landscape enhancements.
 - Bus priority Option 2 - Segregated MRT route between Napier Road and the A329(M) roundabout along with fully segregated cycle route and landscape enhancements. This option uses land owned by Tesco's and Network Rail).
- 8.9 Bus priority Option 2 was found to be most complementary. It improved the journey times for bus services, other vehicles and cyclists, and improved the visual impacts and deliverability.

Preferred option

- 8.10 Option 3 (combined with Bus Priority Option 2) was identified as the preferred option on the basis of its quantitative and qualitative scores on strategic, economic, managerial, financial and commercial aspects.
- 8.11 The preferred route runs adjacent to the existing railway line, to the south of the River Thames.
- 8.12 The preferred option includes:
- a new route for public transport only, including cycle path and footway between Napier Road and the proposed Park & Ride at Thames Valley Park;
 - the erection of a new bridge over the River Kennet and route avoiding the food plain, with associated improvement works to the towpath;
 - creation of a recreational route with public open space and ecological habitats;
 - formation of a new T-junction with Napier Road; and
 - formation of a new three-arm roundabout junction between Thames Valley Park Drive and A3290 (also forms part of the Park & Ride facility).

9 Site development constraints

Constraints	Thames Path	Overall environmental impacts	Landscape	Water and flooding
9.1	9.6	9.13	9.21	9.30
The main Site development constraints are summarised under the following headings. Further details on these and other relevant constraints are provided in the Environmental Statement submitted with the application.	The Thames Path is a National Trail following the River Thames from its source near Kemble in Gloucestershire to the Thames Barrier at Charlton, south east London.	The proposed development (by virtue of its nature, scale, size or location) may give rise to significant environmental impacts and is therefore subject to environmental impact assessment.	A landscape and visual impact assessment and tree survey has been commissioned for the immediate area and is submitted with the application. Whilst the proposed orientation of the bridge has evolved to minimise disturbance to existing trees, there will be a degree of required tree removal	Part of the eastern section of the Application site (i.e. east of the River Kennet crossing) is located within an area at ‘High’ probability of river flooding (Flood Zone 3).
	9.7	9.14	9.22	9.31
Narrowness of the riverside strip	The path travels beside the planned route. The route includes Horseshoe Bridge, which crosses the mouth of the Kennet and Avon Canal as it joins the Thames.	A formal ‘Screening Opinion’ request was submitted to the Local Planning Authority who confirmed that the proposed development may give rise to significant environmental effects by virtue of its nature, size or location. An Environmental Statement therefore accompanies the planning application.	Full details along with relevant landscape and tree protection and mitigation proposals are outlined in the Environmental Statement.	However, the western section of the Application site (i.e. west of the River Kennet crossing) is located within an area at ‘Medium’ probability of river flooding (Flood Zone 2) and lies outside the 1 in 100 annual probability River Thames floodplain.
9.2	9.8			9.32
The planned route corridor east of Kennet mouth is constrained by the Great Western Railway to the south and the River Thames to the north. The width of the corridor typically ranges from 23 to 28m whilst the planned route ranges from 9 to 13m in width. The potential route alignment is further constrained by trees and utilities, including electricity pylons (see below).	The Thames path will be safeguarded, whilst the new pedestrian and cycle route and river crossing will supplement and relieve congestion on the towpath.		Moorings	A Flood Risk Assessment (FRA) has been prepared in consultation with the Environment Agency and is submitted with this application. A Surface Water Drainage Strategy (SWDS) has also been prepared in accordance with the requirements of RBC and WBC as the Lead Local Flood Authorities over the Application Area.
9.3	9.9	9.15	9.23	9.33
The route is aligned to take account of the riverside setting, avoid utility corridors that cannot be moved, and minimise and mitigate impacts overall, including the need to soften and screen the impact of the elevated sections of the route.	Utilities The planned route corridor is traversed by high voltage power lines suspended between pylons which cannot be realigned or removed. There are further utilities buried below ground as well as lower a voltage above ground electricity transmission corridor supported on poles that can be realigned.	The site is not covered by any statutory nature conservation designation. Part of the Site is designated as a Local Wildlife Site for the mosaic of habitats it supports, which include woodland, scrub, tall herb and rough grassland.	There are a number of informal mooring places along the length of the river bank.	The studies demonstrate how flood risk and surface water drainage will be managed and the measures proposed to mitigate any potential detrimental flood risk impacts.
	9.10	9.16	9.24	
Network rail land	Service/supply infrastructure has been carefully mapped and the main utilities are marked on the context plan submitted with the application. The route and bridge have been aligned in order to avoid underground utilities and minimise impacts on any utilities in proximity to the scheme.	Surveys have been undertaken to allow mapping of the habitats present within the Application Site and to determine any signs of, or potential for, protected or notable species.	The new route and bridge will not obstruct moorings. The provision of a new pedestrian and cycle route will relieve congestion along the riverbanks and towpaths that will lessen potential conflicts with moored boats.	
9.4		9.17	9.25	9.34
The alignment of the route through Network Rail land is not considered viable for the project or feasible due to railway maintenance and safety requirements.		Please refer to the Environmental Statement submitted with the application for further details.	The adjacent railway bridge and the attached accommodation bridge are listed Grade II.	There is currently only one street light north of the railway and the setting is potentially sensitive to light effects.
	9.11	9.18	9.26	9.35
Other Third Party land ownership	It is both impractical and financially prohibitive to divert the alignment or place the above ground high voltage cables underground. The route is therefore aligned to skirt around the pylon structures, which necessarily constrains the overall alignment.	Visual impact	A heritage appraisal and archaeological desk based assessment has been prepared and submitted with the application.	A lighting assessment has been prepared and is submitted with this application.
9.5		9.19	9.27	9.36
Adjacent sites are in private ownership including Tesco, University of Reading, and Network Rail. The route has been planned to minimise incursion into third party land.		There are a limited number of places from where the bridge can be seen.	Whilst the scheme does not physically impact upon the listed bridge structures, it will affect their setting.	The MRT will incorporate low-level lighting to meet highway standards.
	9.12	9.20	9.28	9.37
		A Visual Impact Assessment (LVIA) has been commissioned and is submitted with this application. The results of these assessments are included in the Environmental Statement and briefly summarised in the Visual Impact Chapter of this document.	The preferred bridge design has been selected to reduce impact on views towards and through the listed structures.	No other lighting is proposed.
			9.29	
			There is low potential for archaeological remains.	

Navigation

- 9.38 The Thames Navigation Licensing & General Byelaws 1993 and regulations for the avoidance of collisions set down guidance on the safeguarding of the navigation. In particular, the navigation channel must be left unobstructed for through traffic at all times.
- 9.39 Local boating clubs including Reading University, Reading Rowing Club, Reading Canoe Club, and Thames Valley Cruising Club use the rivers in the area.
- 9.40 The Environment Agency (EA) is the navigation authority. They apply a principle of non-detriment on a reach by reach basis with regards to bridge heights. For this reason, any new bridge needs to provide the same available headway as the bridges currently located between the mouth of the Thames and Blakes Lock. Therefore, any new bridge would need to have a minimum headway of 4.77m above normal water level.
- 9.41 This will ensure a sufficiently clear and unobstructed passage for navigation beneath the bridge. The single-span bridge is designed to minimise any disruption to navigation as a result of piers within the waterspace.

Noise, crime, health & safety

- 9.42 It is recognised that the scheme will encourage greater use of this relatively remote area and may therefore increase the frequency of anti—social behaviour within the area and connecting routes, particularly in the evening and at night.
- 9.43 Design measures have been and will continue to be carefully considered in order to minimise this possibility, including: The selection of appropriate, robust, materials; adequate lighting and boundary fencing.
- It is however considered that the bridge may contribute to better personal security through increased foot and cycle traffic.

Construction

- 9.44 There will be a number of temporary impacts resulting from the construction phase of the development including loss of amenity, noise and traffic. Access via Horseshoe bridge and the towpath will be maintained where possible during construction.



Figure 17. Ecology



Figure 18. Moorings



Figure 19. Pylons



Figure 20. Rail corridor



Figure 21. The Thames path

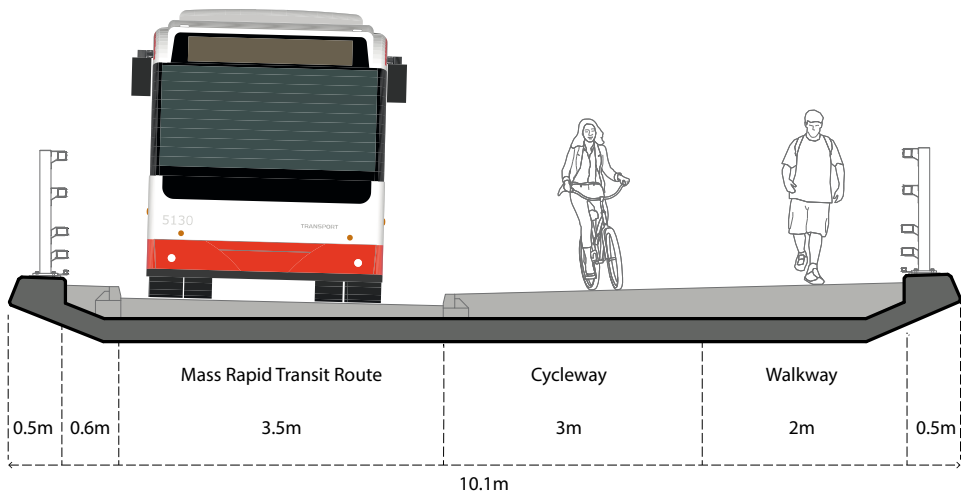


Figure 22. Parameter plan - narrower route cross section across the main bridge span

10 Route parameters

Route		Horizontal alignment		Vertical alignment		River span			
10.1	The broad functions and alignment of the public transport route through the riverside strip has been established through the route option appraisal described in Chapter 6.	10.8	The potential horizontal alignment is highly constrained by the following factors. - Electricity Pylons. - Gas Main. - Listed structures. - Network rail operational land. - The need to set the alignment as far from the riverside as possible. - The need to minimise tree loss. - The need to minimise flood zone impacts.	10.12	Where the route is situated close to the Thames Path and National Cycle Network Route / towpath there will be views of the new viaduct structure in the context of the existing transport corridor and River Thames.	10.18	The potential vertical alignment is constrained by the following factors. - Limit visual impact overall. - Limited impact on views of listed structures. - Maintain a generally open aspect - Maintain navigation headway. - Minimise flood zone impacts.	10.20	The selection of the main River Kennet span (or spans) is determined by the following factors. - Limit visual impact overall. - Limit impact on views towards and through listed bridge structures. - Maintain a generally open aspect. - Limits obstructions to navigation and navigation headway. - Minimise encroachment upon the water environment and marginal habitat. - Minimise flood zone impact. - Keep an open aspect for the footpaths travelling below the bridge.
	Width			10.13	There are a number of appropriate, broad design responses: - Minimising the height, mass and overall scale of the structure. - Planting new trees where possible, to replace those that will be removed to facilitate the structure and to filter views of it from the Thames Path / NCNR / towpath. - Making the bridge as simple and elegant as possible to minimise visual clutter and complexity.				
10.2	The route is typically 11.5m wide comprising a 6.5m two-way carriageway, 3m two-way cycle lane and a 2m footway.								
10.3	The route narrows to 8.5m at the bridge over the Kennet comprising a 3.5m one way carriageway, 3m two-way cycle lane and a 2m footway.					10.19	Design exploration of these factors has determined that the most appropriate vertical alignment comprises: - A viaduct of 204m ascending from east to west at a gradient of 1:43 rising to approximately 6m - A bridge height of 6.77m above normal water level. 112 m western ramp descending from approximately 6m down to general ground level.		
10.4	The width of the route is determined by the need to accommodate two-way bus, cycle and pedestrian movements whilst limiting incursion into third party land.	10.9	The potential alignment of the structure further away from the towpath and river has been considered. However, this would have limited benefits in terms of the release of riverside land for additional planting to lessen visual impact whilst incursion into Network Rail land is not considered viable for the project or feasible due to railway maintenance and safety requirements.	10.14	The approach is to introduce planting and screening to soften the foreground, but with the structure rising above intended to make a positive a visual statement.			10.21	Design exploration of these factors has determined that a single span of 59.5m is appropriate.
10.5	The width may be reduced in one of two ways - Shuttle-working bus route - Combined cycle footway. - Removing the footway and/or cycleway completely.	10.10	Within these constraints, the horizontal alignment is designed to fit in sensitively within the landform and the built, natural, ecological, and cultural/heritage setting.	10.15	Existing vegetation and trees will be protected and augmented as far as practicable.				
10.6	The effect of removing or combining the footway/cycleway would have limited benefits on land-take and visual impact when compared to the significant transport benefits of retaining the segregated footway and cycleway as proposed.	10.11	Visual analysis has demonstrated that the visibility of the new route from the surrounding area will be limited to local views. Visual enclosure of the site is provided by the raised railway embankment to the south and mature trees to the northern side of the River Thames.	10.16	The alignment, width and design of route has been amended and trimmed, to maximise tree retention.				
10.7	Shuttle working along the central bridge section is proposed.			10.17	Structures between the bridge and the surrounding landscape, such as hard surfaces, have been used minimally.				

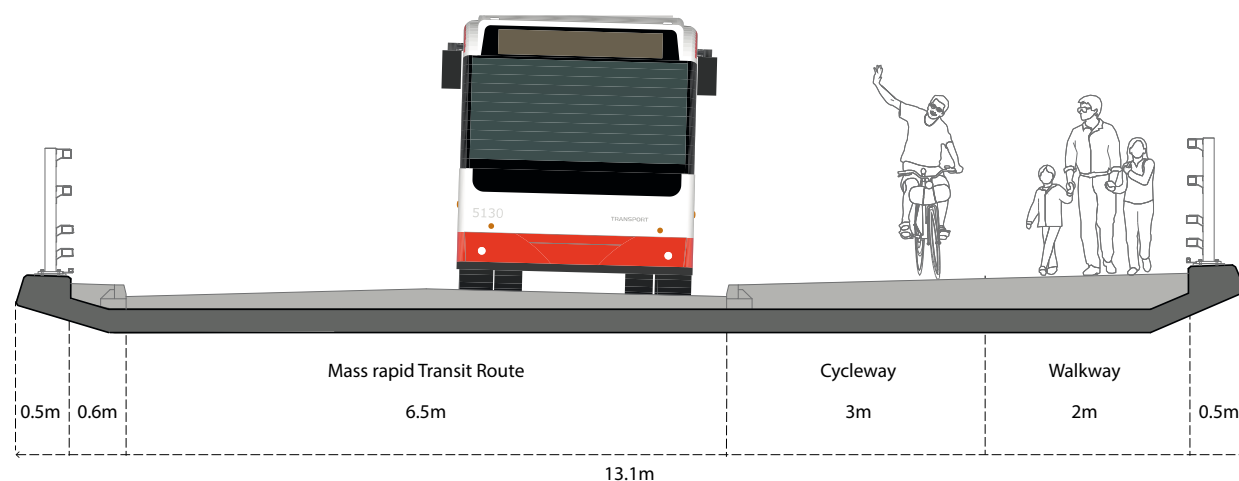


Figure 23. Parameter plan - wider main route cross section across viaduct and approach ramps

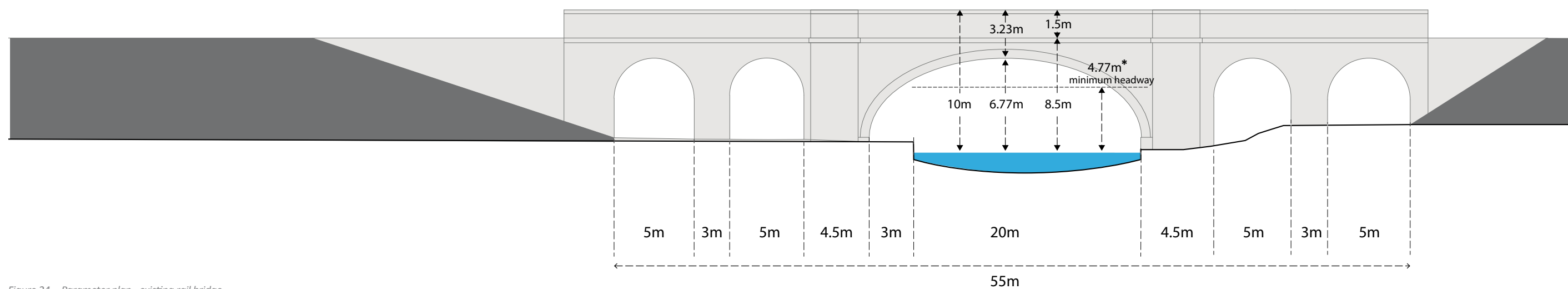


Figure 24. Parameter plan - existing rail bridge

* minimum headway has been determined by the Environment Agency)

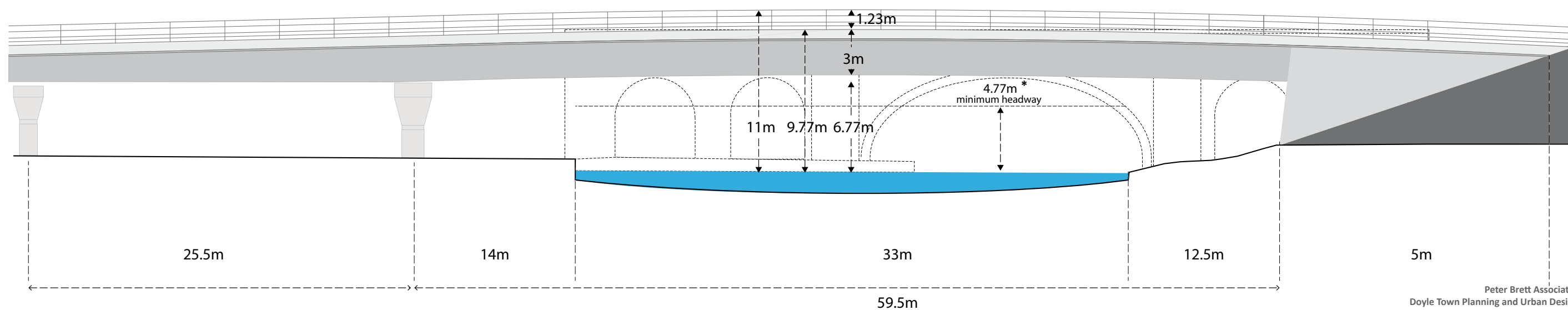


Figure 25. Parameter plan - proposed bridge

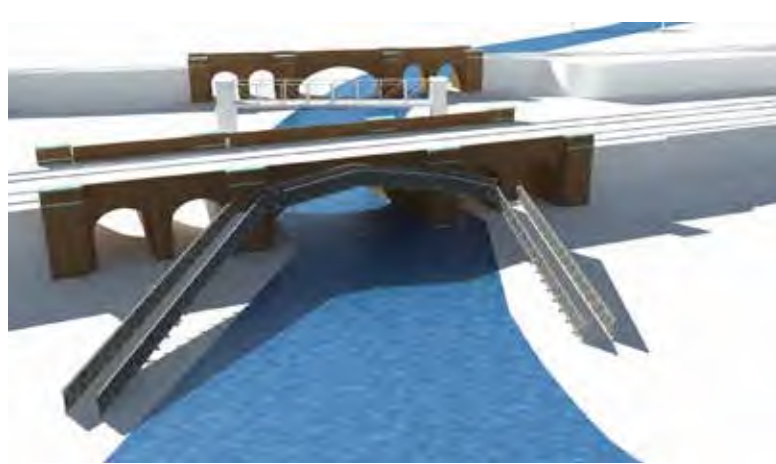


Figure 26. The bridges of the lower Kennet



Figure 27. Horse ferry Horse Ferry at Reavensthorpe (Yorkshire Waterways Museum).



Figure 28. Maidenhead Railway Bridge

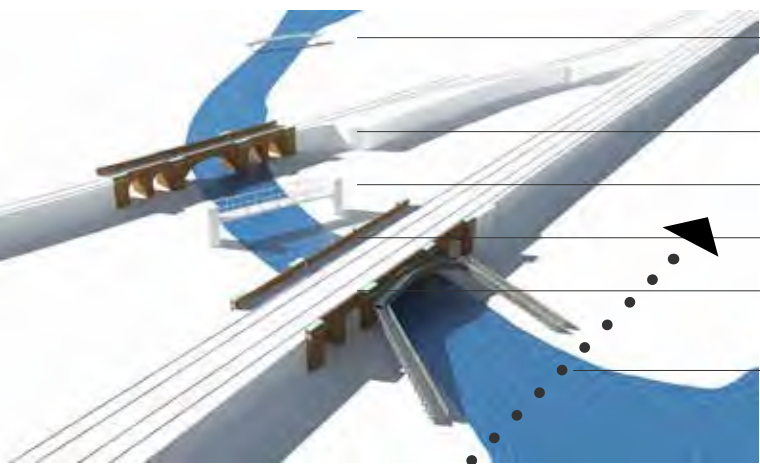


Figure 29. Kennet crossings

11 Bridges and crossings

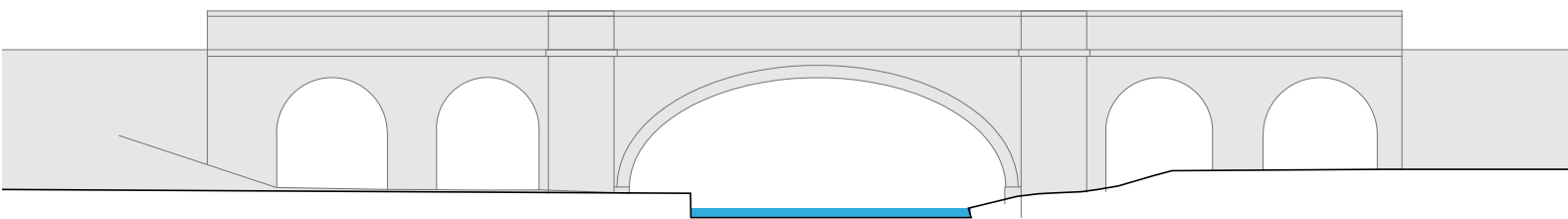


Figure 30. Great Western main line bridge (1839-40)

Bridges and crossings		Horse ferry		Main Line Great Western Railway Bridge		Wokingham Branch Line Bridge			
11.1	There are a series of bridges across the Kennet in the vicinity of the new route and a long history of bridges and ferry crossings nearby that reflect the wider story of the Thames and the Kennet.	11.4	When the canal link between Newbury and Bath was completed in 1810, a ferryman was appointed to take towing horses across the mouth of the Kennet. The toll was 2d (0.8p).	11.7	The route and bridge travel beside the main line London to Reading Great Western Railway bridge. The railway bridge was the first crossing of the Kennet in the area and is listed Grade II.	11.11	In historical terms, the bridge is significant in reflecting the early development of railways in Britain and also one of its most accomplished engineers, Brunel.	11.14	A second railway bridge of similar form and materials was constructed to the south, to serve the branch to Wokingham and the Blackwater Valley.
11.2	The new route and bridge need to be carefully integrated into this wider riverine, urban and historical context.	11.5	The ferry continued in use up until the installation of the Accommodation Bridge in the 1890's.	11.8	Isambard Kingdom Brunel for The Great Western Railway originally constructed the bridge in 1839-1840. The bridge was widened to the north, probably in 1892, with the accommodation bridge also probably attached at the same time.	11.12	In architectural and technological terms the bridge is significant, reflected in its status as a Grade II listed building. The skewed form and parabolic arch provides a more interesting appearance, particularly when viewed from river level. However, it is not a particularly rare design approach and the span is relatively short when compared with more significant early railway bridges, such as at Maidenhead.	Footbridge	
11.3	The lower reaches on the Kennet stretching from Blakes Lock to the confluence with the Thames is distinct from the narrower, shallower and canalised upper stretches through central Reading. This lower stretch was characterised by marshland and later wharfage.	11.6	The new public transport route is broadly aligned with the former ferry crossing route.	11.9	The railway bridge is of red brick, widened in engineering brick with ashlar dressings.			11.15	A high level footbridge connects Cumberland Road with Kenavon Drive and is approached via ramps.
				11.10	The bridge is built on skew with a central elliptical arch flanked by pilasters, the western one on cutwater, with two round flood arches to either side and broad battered buttresses beyond.	11.13	The bridge remains in relatively unaltered condition. The Bridge is a significant and distinctive landmark in this part of Reading. However, views of the bridge are limited to walkers along the riverside walks.	Gas Works Bridge	
								11.16	The gas works bridge is a relatively high steel truss bridge designed to carry pipes across the river between the two Gas Works sites on either side.

Footbridge

Wokingham Banch Rail Bridge

Gas Works bridge

GWR Main Line Bridge

Accommodation Bridge

Reading East MRT Route

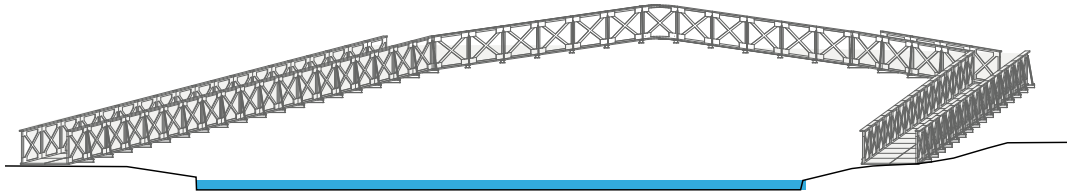


Figure 31. The Accommodation Bridge (or 'Horseshoe' Bridge)

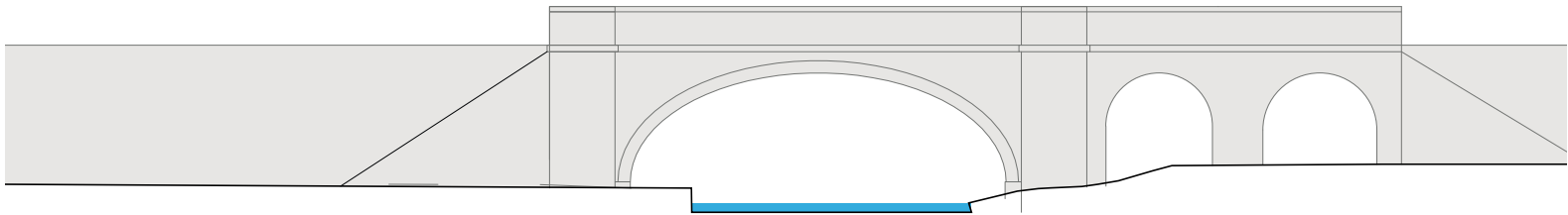


Figure 33. Wokingham Branch Rail Bridge

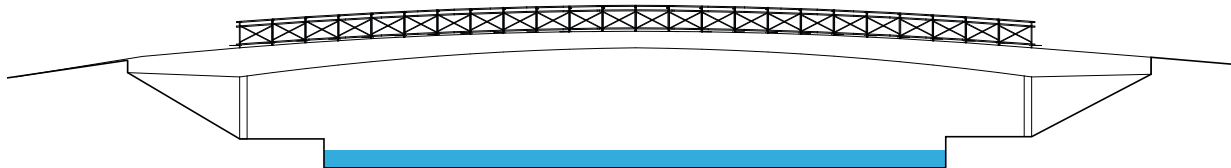


Figure 32. Footbridge

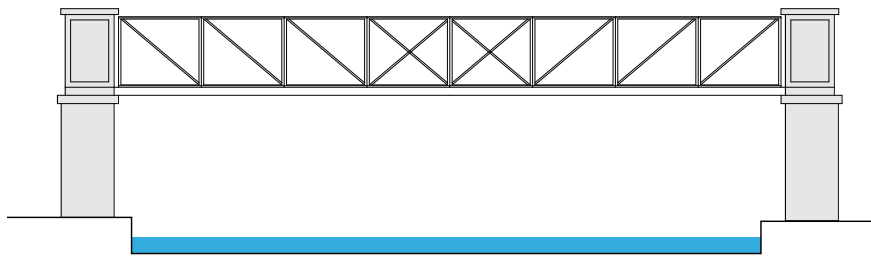


Figure 34. Gas Pipeline Bridge

The Accommodation Bridge

- 11.17 The accommodation bridge was designed to carry people and horses across the river and ensure towpath connections were maintained as the railway expanded. It replaced the horse ferry. The high, (originally wooden) panelled sides are purportedly to prevent horses from being frightened at the high crossing.
- 11.18 The bridge points to the continuing significance of horse-drawn water transport and the continuing importance of commercial navigation roles of the Kennet and Thames in the 'Railway Age'. The bridge also marks the cusp of horse drawn river transport era with the development of steam tugs and motor driven barges at the end of the century and increasing use of the river by leisured classes with rowing and cycling growing in popularity.

- 11.19 The accommodation bridge is made of steel and timber. The bridge has a steel-framed substructure, with girders cantilevered from face of railway bridge; wooden deck; and parapet of vertical boards supported by panelled frame with diagonally-crossed braces, this being of timber to the long, sloping ramps (which are panelled to river) and of steel to the peaked archway.

Responding to context

- 11.20 The new bridge will become the sixth crossing of the Kennet below Blakes Lock and the closest to the confluence with the Thames.
- 11.21 The proposed new bridge across the River Kennet will be situated some 35m away from the railway bridge. The approach ramps to the accommodation bridge will sit closer, but below the new bridge.

- 11.22 The relatively wide 59.5m span (the Kennet is typically 35m wide at this pint) is intended to retain views from the north towards the bridge from the river and riverside paths.

- 11.23 The function of the new bus, pedestrian and cycle bridge will complement the historic transportation purposes of the railway and horse bridge.

- 11.24 Devising an appropriate new bridge form that sits comfortably next to the existing listed railway bridge and accommodation bridge is a significant design challenge.

- 11.25 Competition between structural forms can easily create visual clutter. The geometrical and architectural relationships between the railway bridge and the accommodation bridge are already complex, with the asymmetric and skewed accommodation bridge appearing to collide and also mask the railway bridge. The result is that neither bridge is presented well, irrespective of their individual aesthetic values. The addition of a new bridge can easily turn complexity into confusion and a cluttered appearance.

- 11.26 It might be reasonable to first consider reflecting, even replicating the structural form of the existing bridges, but this approach has been rejected in favour of a distinctly different bridge that speaks to modern engineering approaches.

- 11.27 The aim has been to devise an alignment, scale, structural form and materials that are a complementary: a memorable new structure where the experience of crossing over or beneath the new bridge is enhanced by the view of the adjacent listed bridges, and vice versa.

- 11.28 Within the many site constraints, the new bridge has been designed and situated as a separate built element, which is a modern engineered design, sympathetic to the historic bridges and transport corridor. The bridge is skewed in relation to the railway (to avoid utility corridors) whilst the wider span recognises and emphasises that the new bridge is located closer to the widening mouth of the Kennet where it joins the Thames.

- 11.29 Distinct, modern materials and forms have been adopted that nevertheless fit in sensitively next to, but clearly differentiated from, the old. This reflects the fact that the new and existing bridges must inevitably be considered as related in aesthetic terms. Form, materials and colour are designed to complement, and not visually overpower the character of the old bridges.

- 11.30 The sense of the scale of the existing bridges is reflected in the head height of the new bridge set at the top of the parabolic arch of the railway bridge to protect viewpoints to and through the rail bridge.

- 11.31 The new bridge does not replicate the rhythm of the railway bridge arches. Instead, the single wide span of the new bridge is intended to maintain wide-angle views towards the railway bridge.

12 Main scheme components

- 12.1

Whilst the application scheme is conceived as one integrated whole, it is useful for descriptive purposes to consider it in terms of individual components.
- 12.2

From east to west, the main components are as follows

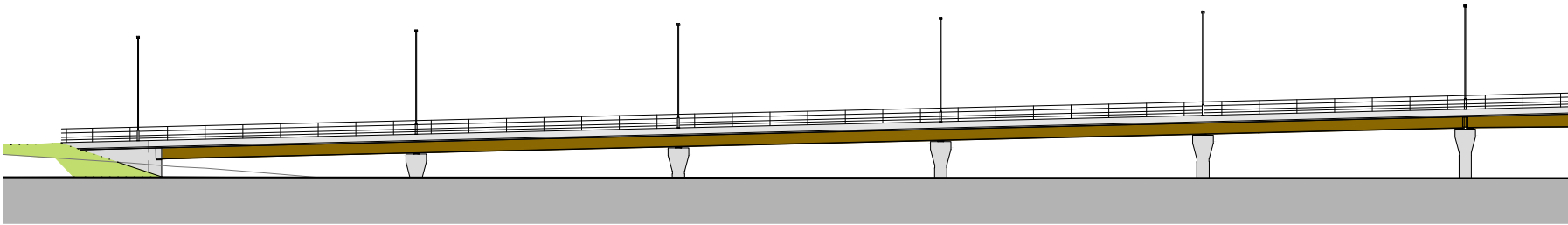


Figure 35. Elevation/section of proposed scheme viewed from the north (Thames Riverside)

Link route from TVP roundabout			Viaduct and undercroft	Bridge and abutments	West ramp
12.3	The route begins at a new spur from the existing roundabout at Thames Valley Park entrance.		12.12	12.16	12.22
12.4	The route then travels to the south and broadly at the same level as the proposed park and ride car park.	12.8		12.17	
12.5	The scheme is designed to complement and integrate with the proposed Park and Ride facility at Thames Valley Park would provide approximately 277 car parking spaces, motorcycle parking and associated vehicular access and landscaping. The East MRT Scheme runs adjacent to and directly connects with the TVP P&R facility.	12.9	12.13	12.18	12.23
12.6	The eastern section of the route serves as the main vehicular entrance to the park and ride for all vehicles, but with exit to the west restricted to bus only.		12.14	12.19	12.24
12.7	The carriageway running adjacent to the committed TVP P&R scheme is 7.3m with a	12.10	12.15	12.20	12.26
		12.11		12.21	

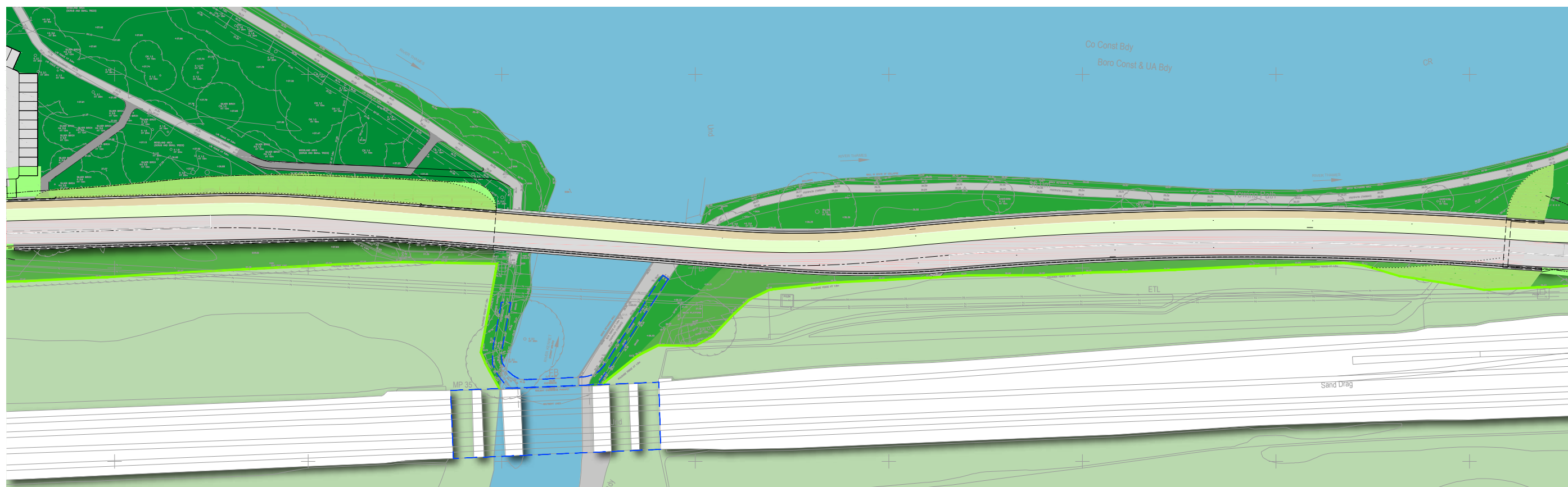
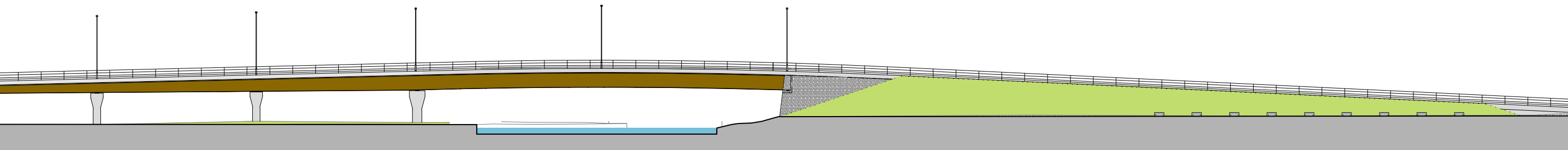


Figure 36. Proposed scheme (central section)

13 Bridge form options

Over-arching design principles	
• A simple but elegant bridge structure that is well proportioned, neat and pleasing. • A structure that complements the forms, styles and materials of the adjoining Kennet bridges. • A structure that largely recede into the established landscape setting, but one that is nevertheless notable and memorable in glimpsed views. • A structure that complements the adjoining riverside setting and open spaces.	
Span	
13.1	There is an approximate relationship between span and superstructure type. The proposed main river span is 60m. This is a relatively short span that points towards a pre-stressed concrete or steel girder structures.
13.2	The span is that which normally points towards more complex bridge forms such cable stayed and suspension structures that are typically need for spans of 400 to 800m.
13.3	The span is wider than the river width at this point because the alignment is skewed whilst there is a need to maintain open towpaths on either side.
13.4	The ratio between bridge height and span is an important consideration. As a general rule, the higher the bridge, the wider the span.
13.5	A study of different bridge heights has demonstrate that the relatively wide span points to a higher height that also corresponds with the height of the adjacent railway bridge and maximises views beneath and through the new bridge.
13.6	The options where the bridge was set closer to river level appear squat, views of the
	railway bridge are occludes, and the riverside paths beneath the new bridge are dark and overbearing.
Piers/columns	
13.7	The relationship between pier form and thickness and superstructure depth has been carefully considered. Bridges with tall thin piers relative to superstructure depth can appear odd, as can the opposite.
Slab depth	
13.8	The aims has been to minimise the profile of the bridge to allow the landscape setting to dominate the view and be appreciated from all viewpoints.
13.9	The deck overhang (cantilever) in relation to the rails above and the beam below has been carefully considered and a satisfactory proportion and relationship arrived at.
Symmetry	
13.10	Symmetrical bridges as a general rule are often more aesthetically pleasing than non-symmetrical bridges, since they appear balanced, refined and also thought about. In this case the bridge cannot be a symmetrical composition due to site constraints and the design objective to retain as many existing trees as possible and minimise effects on the Coal local wildlife site (LWS). Therefore, an exploration of pleasing asymmetrical composition has been explored instead.



Figure 37. A selection of the different of bridge types considered