

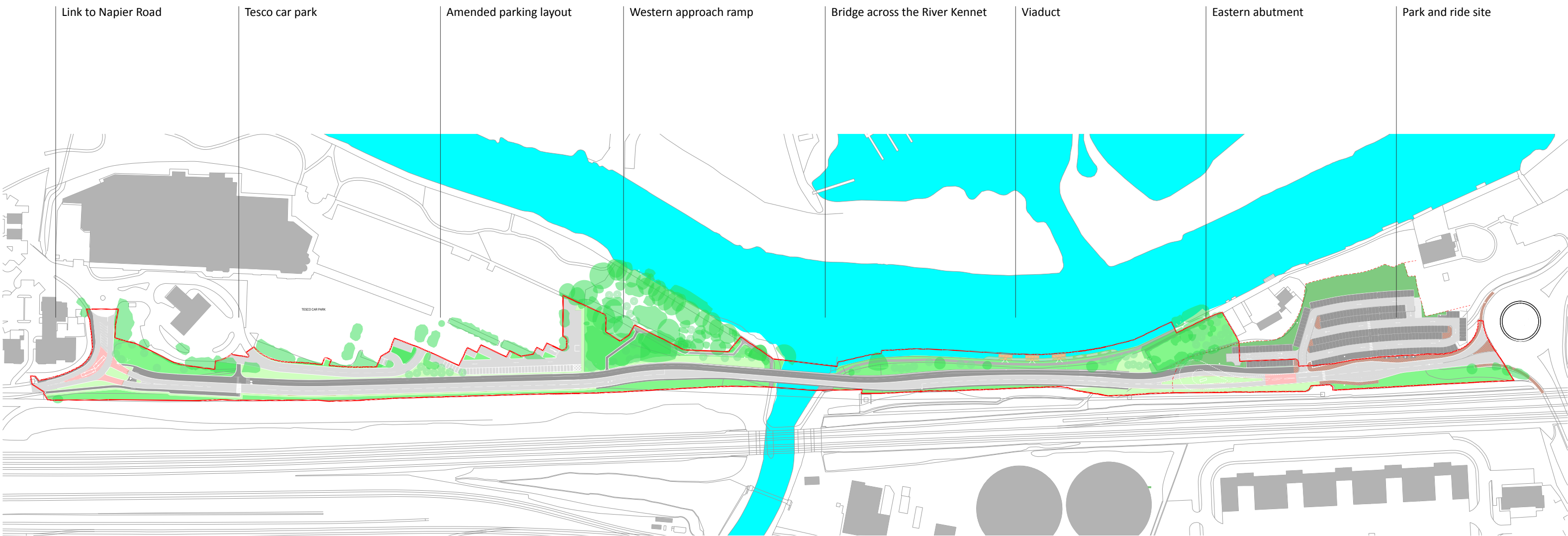
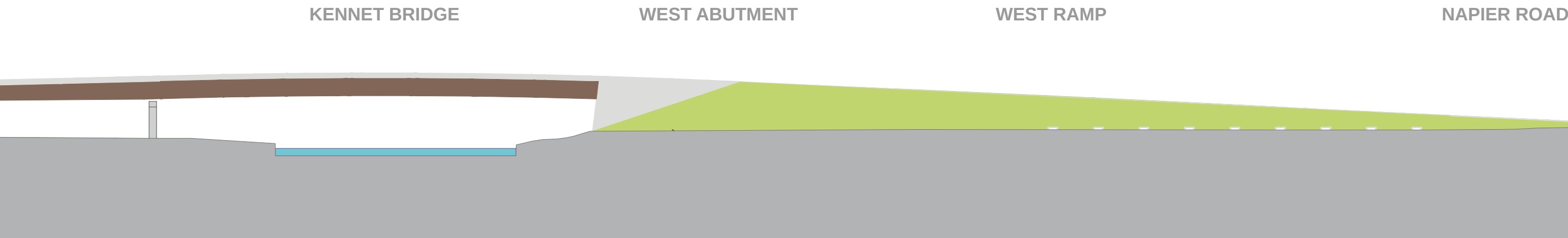


Figure 57. Revised proposed scheme

14 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

- 14.1
- There is an approximate relationship between span and superstructure type. The proposed main river span is nearly 60m. This is a relatively short span that points towards a pre-stressed concrete or steel girder structures.
- 14.2
- The span is shorter than that which would normally point towards more complex bridge forms such cable stayed and suspension structures that are typically needed for spans in excess of 200m.
- 14.3
- 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.
- 14.4
- The ratio between bridge height and span is an important consideration. As a general rule, the higher the bridge, the wider the span.
- 14.5
- 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.
- 14.6
- 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

- 14.7
- 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
- 14.8
- The aim has been to minimise the profile of the bridge to allow the landscape setting to dominate the view and be appreciated from all viewpoints.
- 14.9
- 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

- 14.10
- 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 LWS. Therefore, an exploration of pleasing asymmetrical composition has been explored instead.



Figure 58. A selection of different bridge types considered

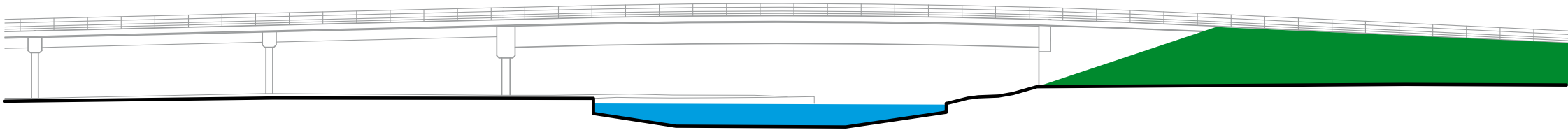


(Images: Stel Construction Info.)

Figure 59. Bridge form selection

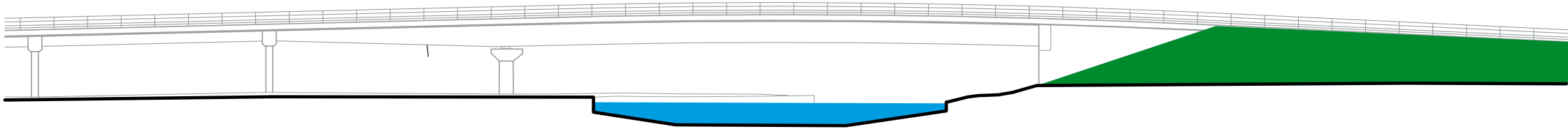
1 (rejected)

- Shortest steel span
- Simple design
- Significantly lower cost



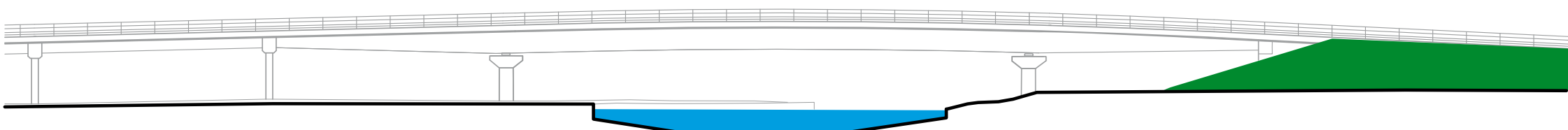
2 (selected)

- Wider steel span with off-set support column
- Assymetric bridge design
- Attractive design
- Smoother transition between bridge and viaduct structures



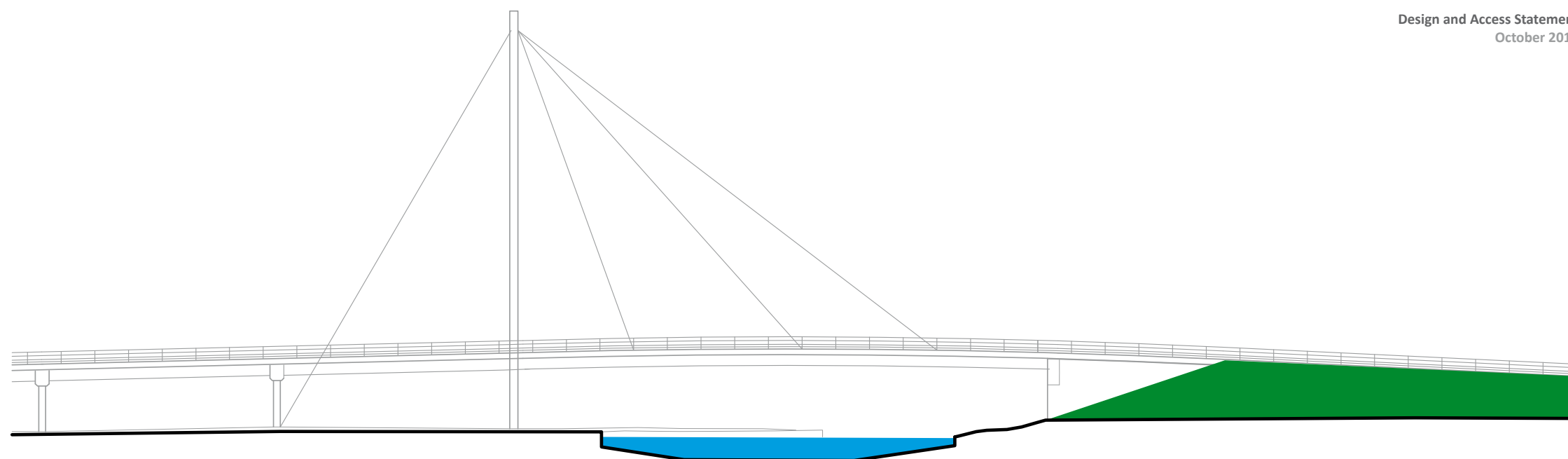
3 (rejected)

- Wider steel span with off-set support column
- Symmetrical bridge design with slimline appearance
- More open views
- Improved views to listed bridge
- Significantly more expensive
- Security/use for shelter beneath additional span



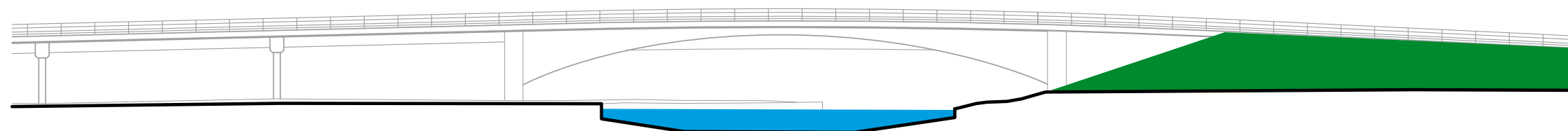
4 (rejected)

- Elegant design with slim appearance maximising open views.
- Short span does not justify cost and complexity of cable stayed structure
- Significantly higher costs
- Visual impact due to height



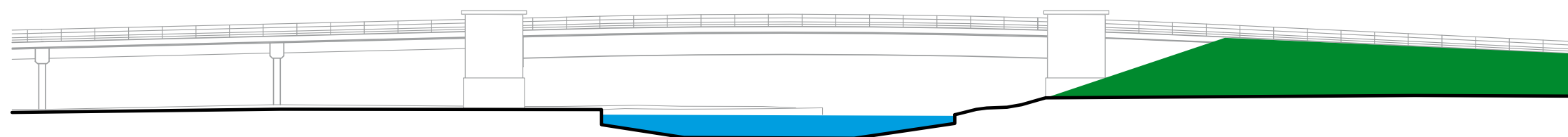
5 (rejected)

- Concrete panel system partly screens bridge structure behind.
- Describes an elegant curve
- Greater mass results in greater obstruction of views
- Significantly higher cost



6 (rejected)

- Simple balanced appearance with matching abutments.
- Industrial quality echoes adjacent railway bridge
- Less open views
- Greater impact on floodplain and greater flood compensation requirements.



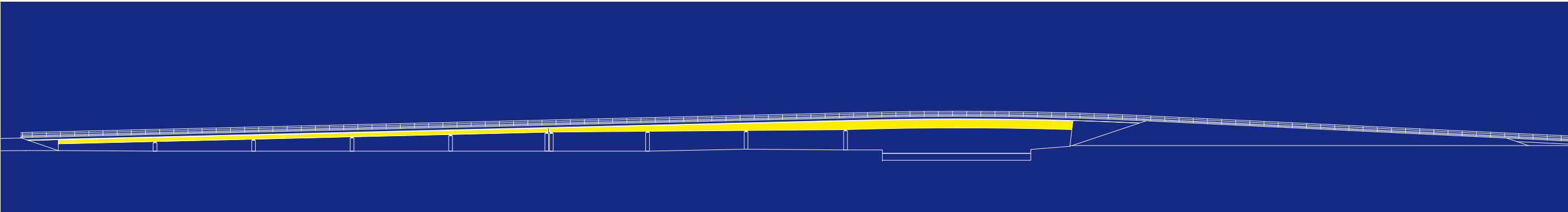


Figure 60. The weathered steel beam forms a blade like feature that emphasises the horizontal sweep of the new bridge structure

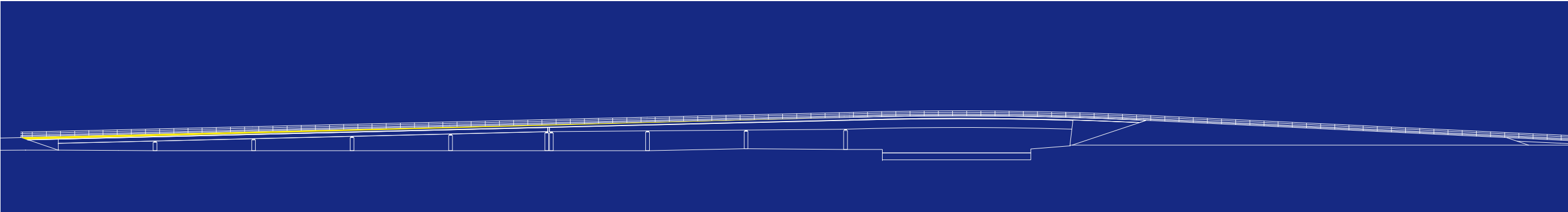
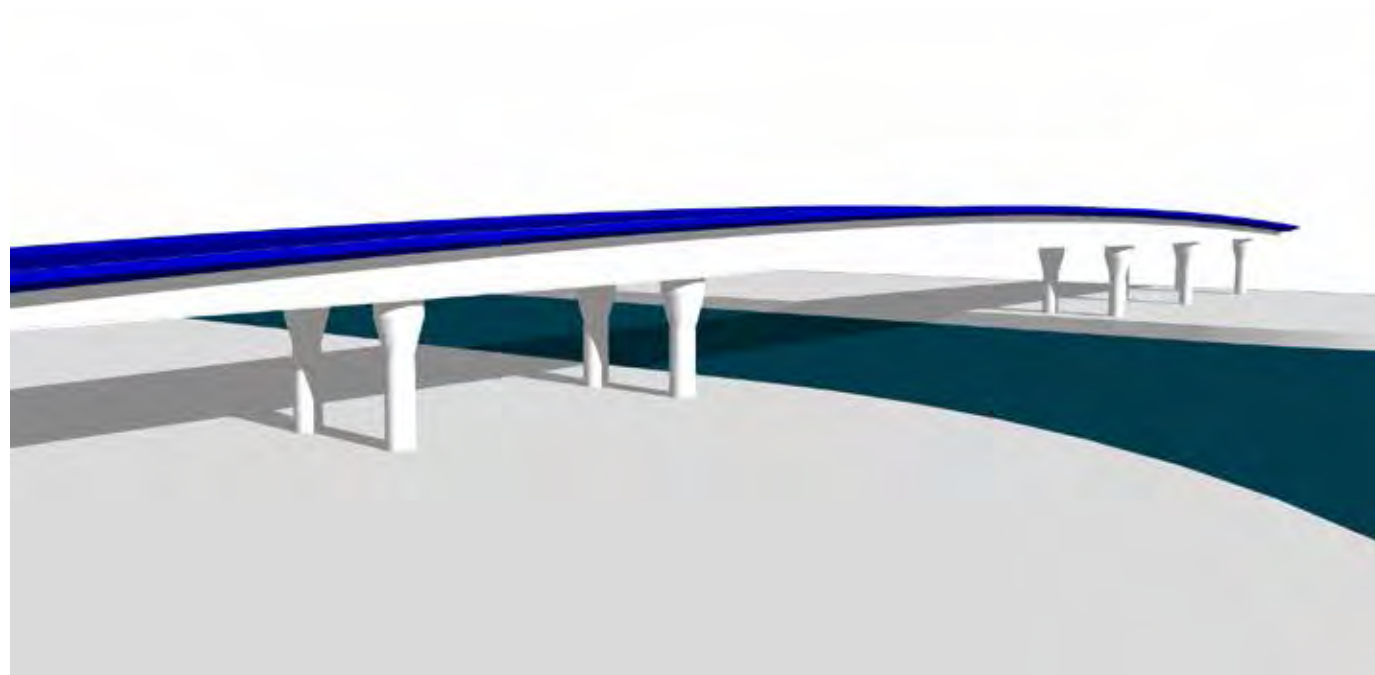


Figure 61. The in situ concrete deck also describes the sinuous sweep of the new bridge structure

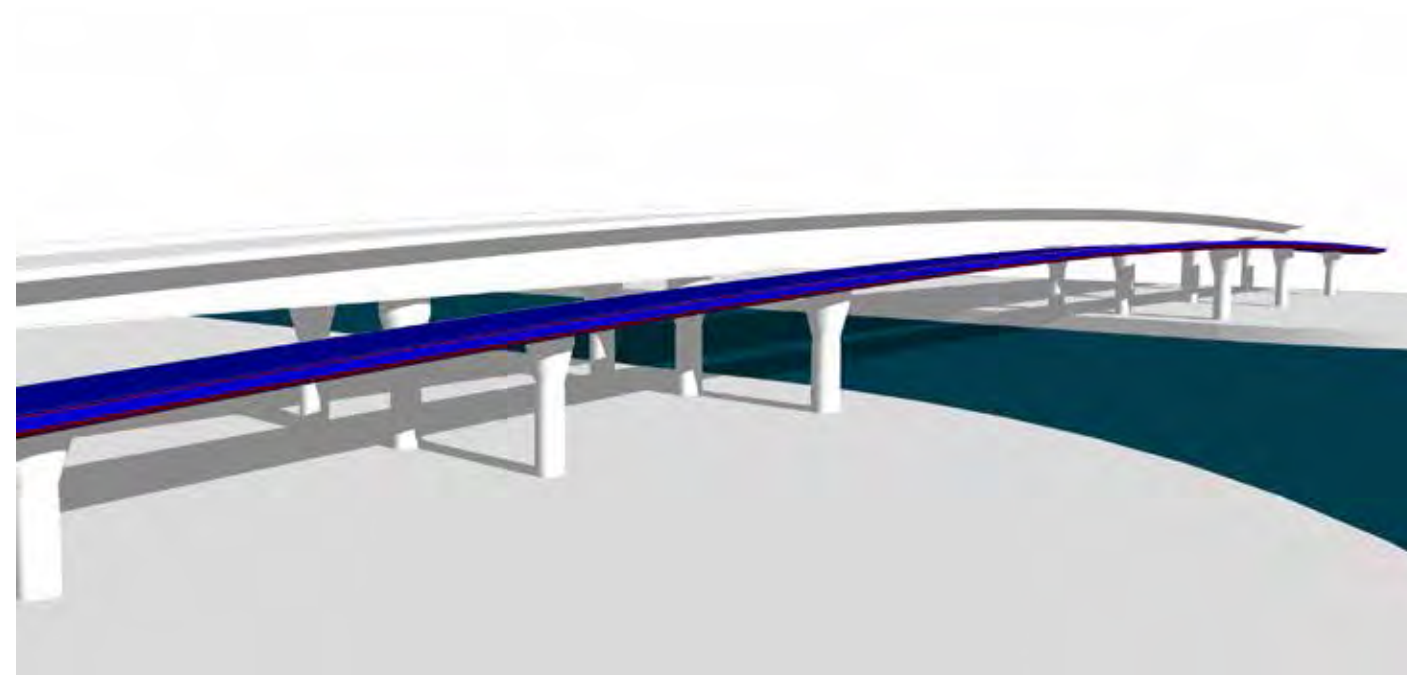
Proportions and scale	
14.11	Cost envelope and construction constraints have led the design team to propose a well proportioned, neat structure that is basically utilitarian in design, but with pleasing proportions and details. The basic approach is as follows: • A simple form (minimal visual complexity). • Minimal facets and simple shapes to avoid visual clutter. • Expressing the essential structural anatomy of the bridge to reveal a simple beauty in the engineered form of the bridge. • Accentuating the primary structural elements of the bridge (column and beam) with greater emphasis upon the horizontal elements (the beam, the bridge and parapet rails). • Avoiding embellishment and ornamentation.
	• The deck is thinner (as a proportion of its span). • The lines (particularly horizontal lines) of the structure are continuous. • The shapes and dimensions of the structural members reflect the forces acting on them. • The elements of the bridge are well-related to one another to create a unified form (main River Kennet span, viaduct, abutments and ramps). • A common palette of materials, colours and details, consistently applied. • Reducing road furniture, signage etc. to the barest minimum. • The curving horizontal and vertical alignment allows a more sinuous form.

Bridge	
14.12	Consideration was given to various combinations of bridge forms where the transport route, walkway and cycleway are either fully integrated, arranged in parallel, or entirely separate bridge structures.
14.13	A single, integrated bridge was selected on the basis that this minimised land-take, flood zone impacts and overall prominence.

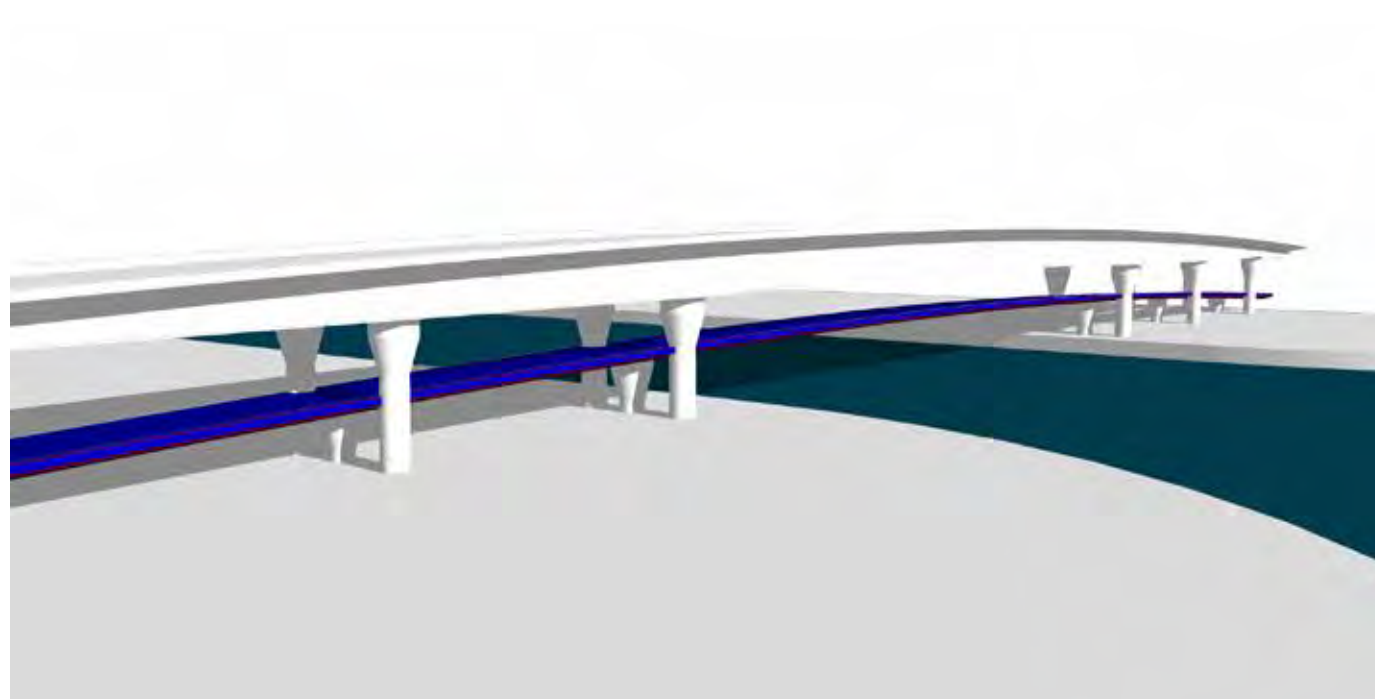
Figure 62. Options for the integration or segregation of the walkway and the cycleway



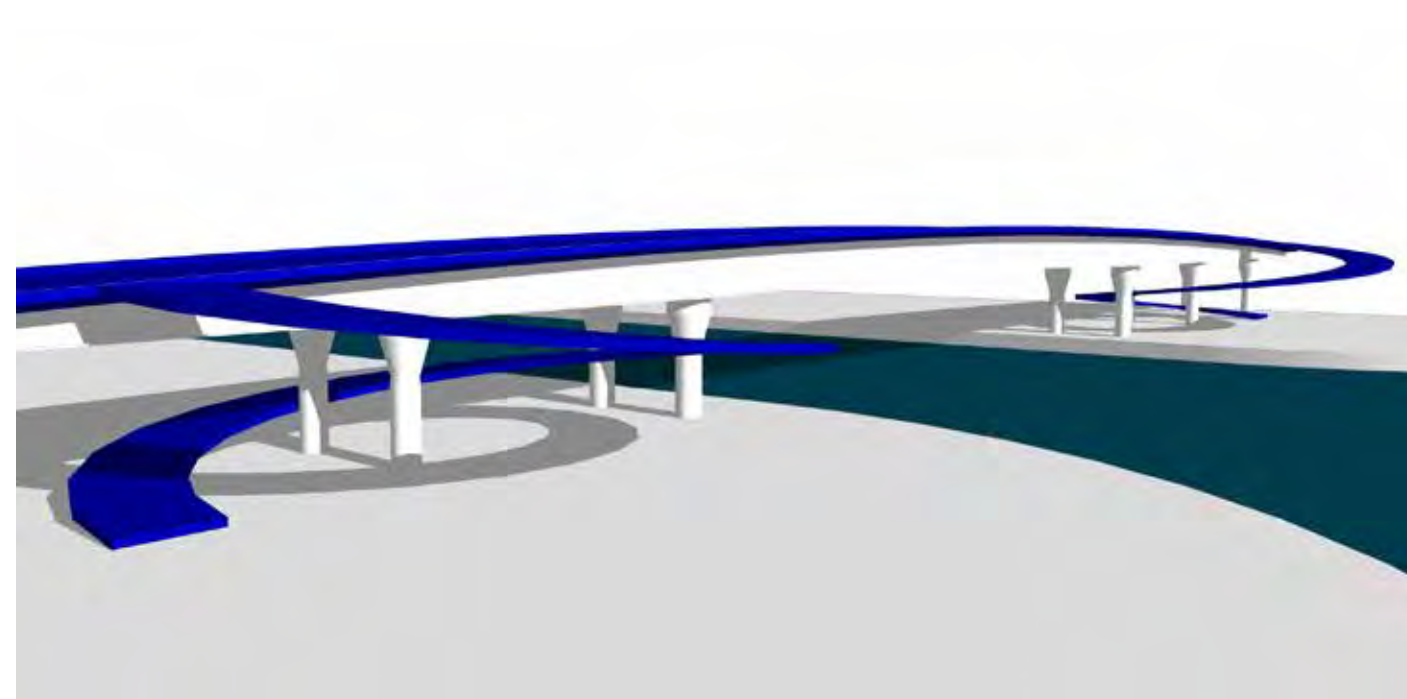
The walkway and cycleway is fully integrated with the main bridge deck. This option has the lowest overall bulk and visual prominence with lower flood zone impacts. The single integrated bridge represents the simplest and most sinuous bridge form.



The walkway and cycleway forms a separate parallel bridge structure that requires a shallower beam, so that the bridge can be set lower than the transport route without impinging on views through to the railway bridge. This option results in a bulkier and more prominent structure.



The walkway and cycleway are placed in parallel and below the main transport route bridge. This option must either impinge upon river navigation and the riverside path below, or result in a taller and more prominent structure that will be more bulky and out of scale with the adjacent listed rail bridge.



The walkway and cycleway is combined with the main bridge span with ramps on either side connecting more directly with the riverside path. These may be helical (as shown) in-line, or switch-back ramps. This option results in a more prominent structure, increases flood zone impacts, and results in a greater loss of mature trees.

Figure 63. Bridge girder forms (shown diagrammatically)



Tapering depth steel girder with open abutments. The bending moment permits a shallower girder at the apex of the bridge.



Deep, gently cambered girder to main river span tapering to the east and west.



Tapering depth steel girder with retained embankment of west side.



Girders of different depths (baseline scheme) with gently cambered main river span.



Deep, gently cambered girder to main river span tapering to the east and west with part enclosed abutment to the west.

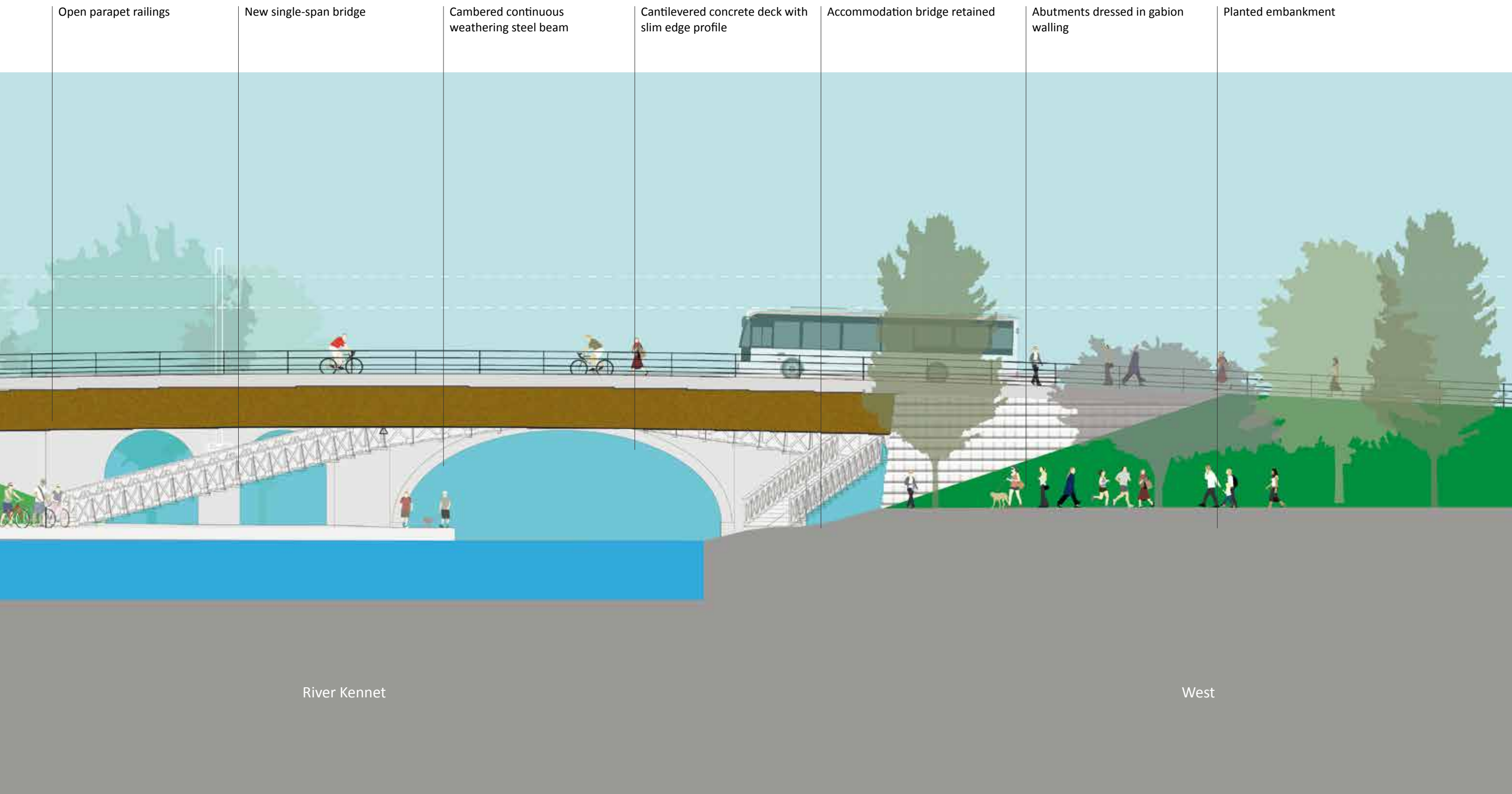


Deep, gently cambered girder to main river span tapering to the east with full enclosed abutment to the west (preferred approach).

15 Selected bridge form



Figure 64. Selected bridge form (tree planting shown indicatively)



16 Viaduct

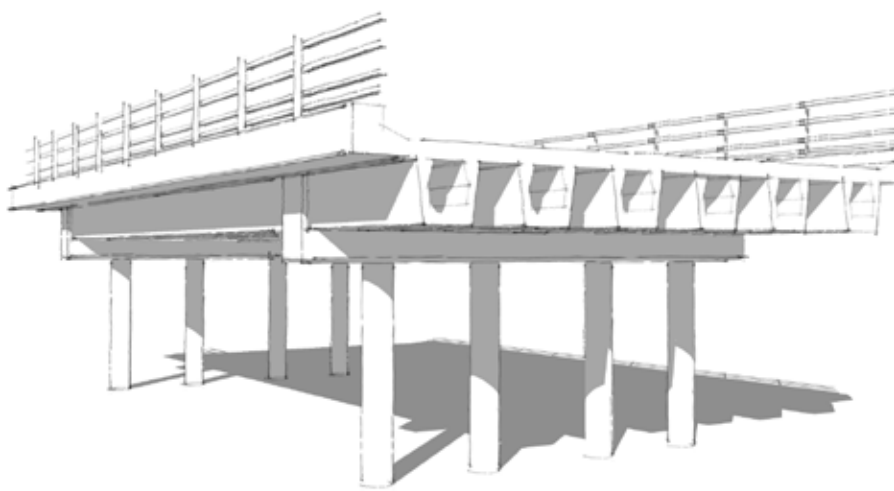


Figure 66. Baseline viaduct with concrete girder, four column support and square edge soffit

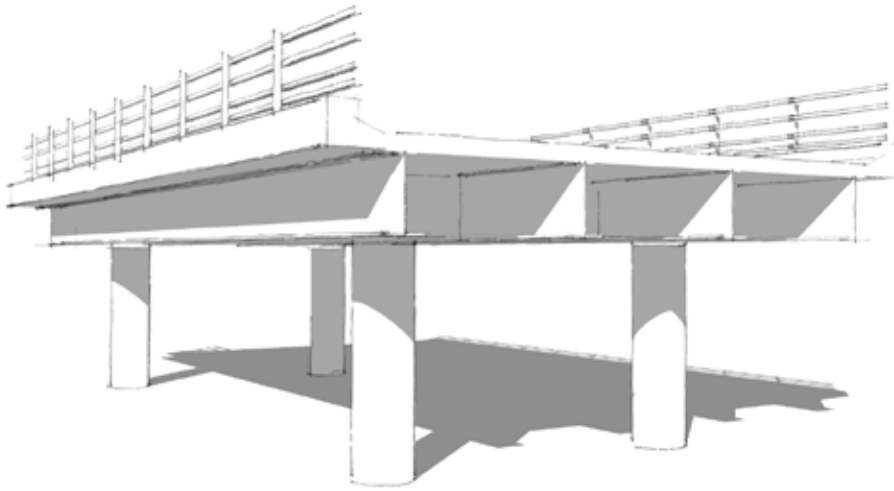


Figure 68. Steel girder with two supporting columns

- Parapet
- 16.1

The outer face of the parapet or deck is considered to be one of the most important aesthetic elements of the bridge. Along with the railings, it is the highest element and therefore more prominent in long distance views.
- 16.2

The bridge deck and parapet will be in situ concrete that allows the profile to be modelled to some extent.
- 16.3

The edge detail of in situ concrete will be formed with a slim faceted profile. A number of options were considered. The junction between each cast element will be formed simply and cleanly in order to ensure that the edge has a sinuous appearance. This will follow and serve to emphasise the sinuous line of the route, the widening and narrowing carriageway width, and the rising and falling levels.
- 16.4

The following principles have determined the parapet design.
 - The deck edge is designed to appear as a continuous, sinuous, and uninterrupted face, extending the full length of the bridge with a generous overlap of the abutments.
 - A continuous neat, sharp edge defines the edge against the weathered steel girder below and the cantilever creates a deep shadow that further accentuates and expresses the form.
 - The deck edge is slender and thin in contrast with the girder below.
 - The bottom half is a single face with the top face angled towards the road, to channel rainwater onto the bridge, minimising staining of the outside face.

- Soffit design
- 16.5

The underside of the bridge and viaduct will be visible in local views from the towpaths and from the south at the River Kennet, beneath the listed railway bridge looking north towards the Thames.
- 16.6

The design intent is to create clean uncluttered surfaces, neat connections, and simple layout of girders to avoid visual complexity and make the structure elegant
- 16.7

The use of horizontally curved steel girders combined with the rising and falling gradient of the route creates a elegant, sinuous appearance when viewed obliquely from below on the towpath and national cycle route.
- 16.8

The upright posts and horizontal rails will be light grey painted galvanised mild steel.
- 16.9

The necessary infill element between horizontal rails will be galvanised wire mesh fixed on the road side in order to ensure the main emphasis in views to the bridge is formed of the horizontal rails. The mesh will deter people from climbing up the rails and retain any debris on the bridge from falling onto the riverside below.
- 16.10

Bridge users will experience a greater sense of openness and feel less enclosed than with parapet systems where the bars are aligned vertically.
- 16.11

The horizontal rails are relatively thin in cross section and spaced sufficiently apart to allow sky to be seen through in views from the riverside.

- 16.12

The design of the bridge parapet railing can influence views to and from the bridge; and also influences the apparent mass and depth of the structure overall and the slender appearance.
- 16.13

Views through the parapet structure have been maximised by specifying an open rail design that is as slender as possible (as opposed to a full height solid concrete or steel parapet). The rails are painted light grey to reduce their prominence when seen against the sky.
- 16.14

A four-rail barrier is specified that gives a strong horizontal emphasis with a neat and simple connection.

- Mesh
- 16.15

A mesh screen needs to be attached to inner face of the parapet railing. This is to deter people from climbing up the railings or jumping from the bridge, and can prevent window-blown litter flying off the structure.
- 16.16

The fine mesh coloured light grey is designed not to detract from the aesthetics of the bridge and the fixings when viewed close-up and designed to appear integrated with the whole design, rather than added on.



Figure 65. Example of sinuous form



Figure 67. Example of simply detailed soffit (Images: Steel Construction Info.)