

Tide Mills Level Crossing Replacement

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The site for this project is located in the South Downs National Park (SDNP) between Newhaven and Seaford in the lower valley of the River Ouse. The Seaford branch rail line, from Newhaven to Bishopstone station, cuts across the river valley just north of a large shingle beach stretching from the chalk cliffs at Seaford Head to Newhaven Fort. The site's natural beauty, rich cultural heritage, archaeological character and variety of wildlife form a precious and unique landscape.

The existing pedestrian level crossing over the single-track line is one of the main access points to Seaford Bay and Tide Mills (ruined 18th century settlement) and is widely used by recreational users. The risk at the crossing together with the high number of users has led Network Rail to determine that this pedestrian level crossing should be replaced with a footbridge as a priority. Initial stakeholder engagement indicated that a standard solution would not be accepted in such a sensitive natural setting and Network Rail recognised this as an opportunity to work with the local stakeholders and to create an exemplar project.

This project brought together the unique needs and aspirations of both the South Downs National Park and of Network Rail. The need for improved safety cannot be ignored whilst the precious and unique landscape deserve a site-specific and sensitive response.

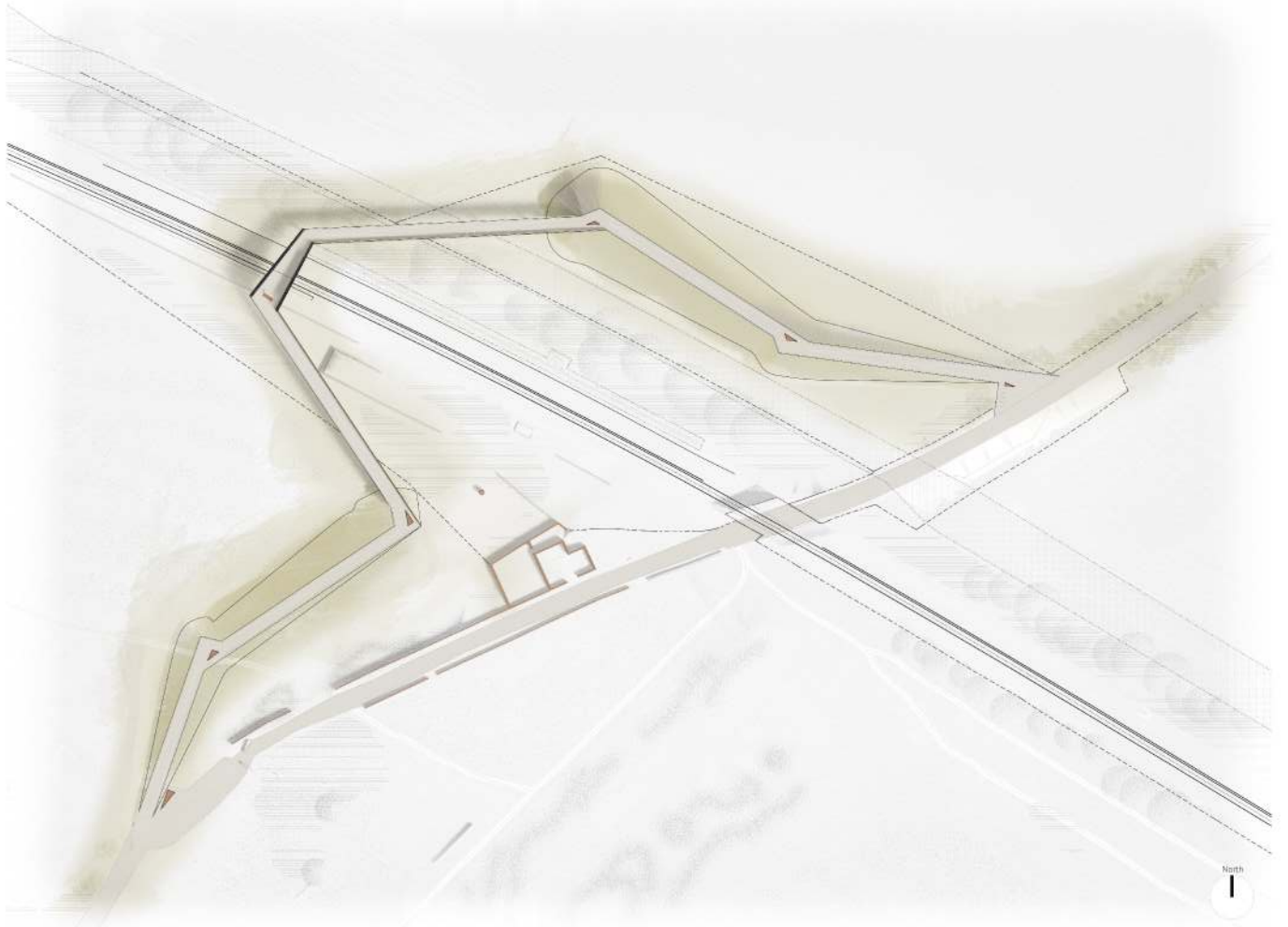
In order to develop the design of the footbridge Knight Architects worked with various stakeholders including the SDNPA in parallel to site research and the production of a Landscape and Visual Impact Appraisal. This intensive process-built trust between the designers and the SDNPA, identifying a key set of objectives for the bridge:

Safe and Accessible: In support of safe access for all users, Network Rail requirements could not be compromised but needed to be approached creatively. The structure will improve accessibility at the site for all users using universal design values.

Visually Light: The landscape surrounding the proposal is largely flat with a lack of vertical elements and far-reaching views across the open floodplain; the footbridge, requiring 5.1m clearance above the rail, will be widely visible. This was a



1. 3D Printed Site Model - downs and residential development in the north and seaford bay in the south.



2. Footbridge Plan - route is broken into comfortable segments with rest points and viewing areas



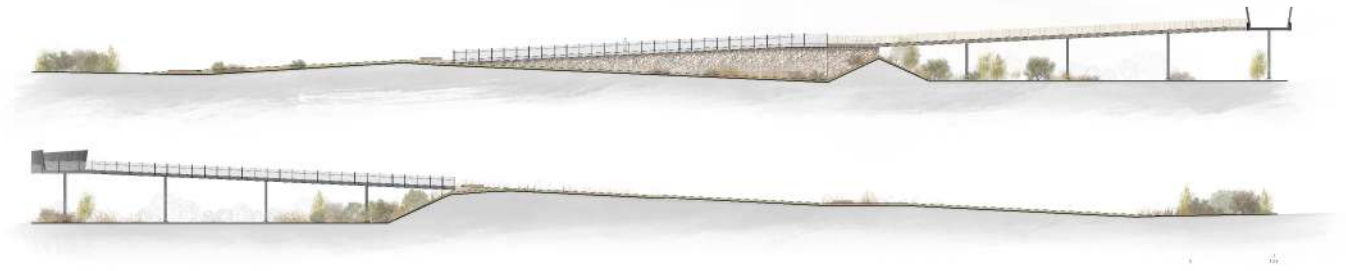
3. Footbridge View

concern for the planners and the public therefore it was key to create a design that reduces the visual weight of the structure and its intrusion on the landscape.

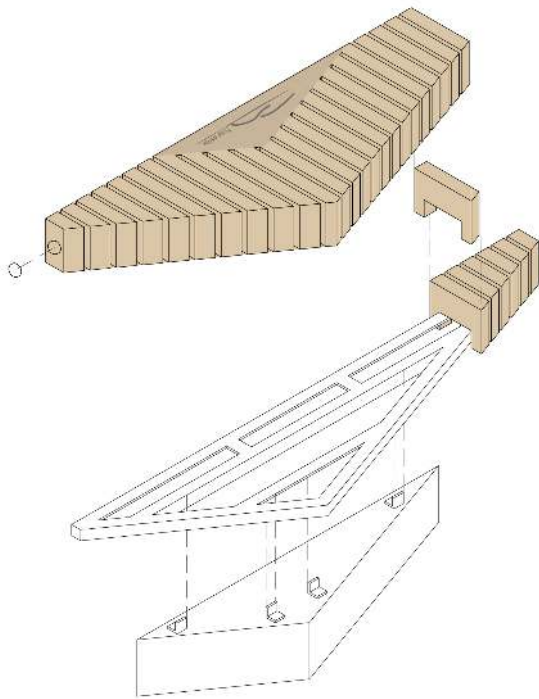
Journey: The recreational nature of the site means people who come here are 'time rich' and are not simply trying to get quickly from point A to point B. The footbridge should be integrated into the journey, promote understanding of the site and not simply an interruption on the existing route to the sea.

These key objectives guided the design of the footbridge from the high-level arrangement of the walkways and embankments to the selection of materials and finishes. They have similarly guided the stakeholder engagement process, allowing us to base the design on principles which had the backing of all parties.

The route over the rail line is carefully arranged to enhance the journey through the landscape while at the same time minimising the visual intrusion within the flood plain. The meandering plan alignment reduces the intimidating appearance of these necessarily long walkways while offering varied, choreographed views to the surroundings.



4. Elevations – vegetated embankments reduce the overall appearance of the steel structure.

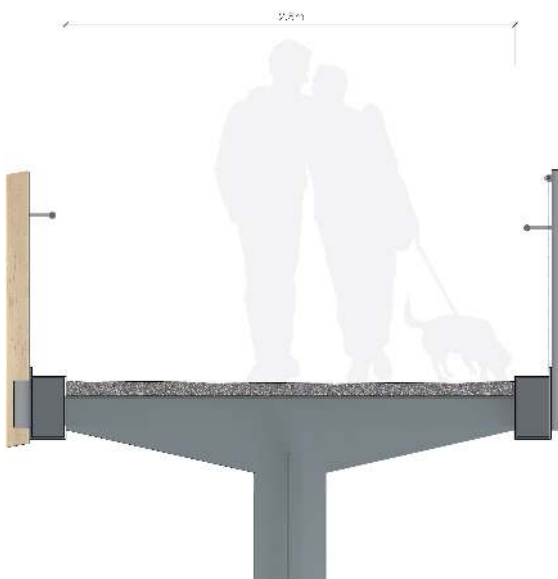


5. Benches – timber bench with engraved portion to promote understanding of the site.

Sloped earth embankments, used for the lower portion of the walkway, form a natural extension of the landscape and reduce the apparent size of the new structure. The embankment height is comparable to the height of the existing hedgerows next to the rail. The shallow slope of the walkways (less than 1 in 20) together with vegetated earth embankments (1 in 2 slope) eliminated the need for fall protection and handrails over two-thirds of the route. This was a significant reduction in the perceived size of the structure and visual clutter within the landscape.

In consultation with Network Rails' Built Environment Accessibility Panel rest points and benches were added along the route to increase comfort and accessibility. These benches also provided an opportunity to work with the SDNPA to integrate signage and interpretation in the bridge furniture. This closely aligned with the SDNP's purpose to 'to promote opportunities for the understanding and enjoyment of the special qualities of the National Park by the public.'

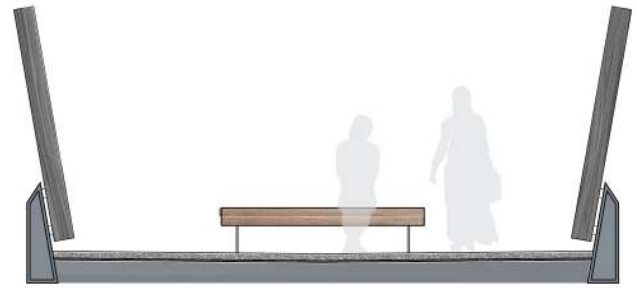
Knight Architects worked with Arup throughout the detail design phase to develop a structural solution for the scheme. This included the steel structure for the upper walkways and main bridge. The footbridge is an integral structure; the cruciform shaped columns have been designed to act as pinned connections at both the top and the bottom, allowing the whole structure to expand and contract from the abutments and eliminating the need for bearings and their associated maintenance requirements. The cruciform shaped columns benefited the key aspiration for a visually light structure; the shape catches the light and shadows in a way which makes the columns appear more slender. The upper portion of the cruciform column transitions to a single steel plate, which is cut to form the transverse support for the two main steel edge beams an elegant yet practical solution for this connection.



6. Steel Walkway Cross Section

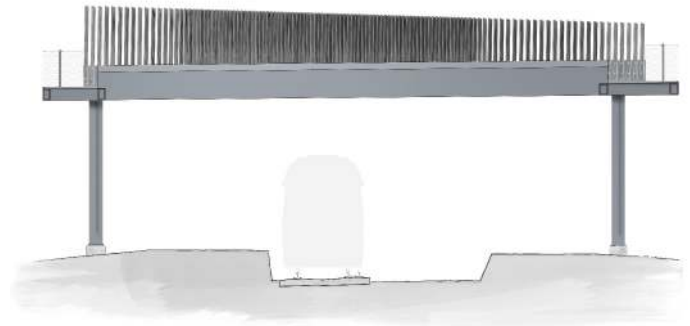
The parapet design was similarly developed to compliment the character of the landscape while

reducing the visual intrusion. The design uses a timber parapet on the rail side of the walkway and a stainless steel mesh on the landscape side. This asymmetrical arrangement protects users from the rail environment while encouraging open views to the landscape. From a distance the Accoya timber parapet's natural colour blends into the surroundings and will weather and change naturally over the structure's lifetime. Accoya timber was chosen for its dimensional stability and exceptional durability. Accoya is a very sustainable acetylated softwood; a process which does not rely on toxic chemicals or the use of old growth hardwood.



7. Footbridge Cross Section

The main bridge structure is similar to the walkways with edge beams supporting a stiffened steel deck. This trough structure allows the deck to be as low as possible which reduces the length of the approach walkways and the visual height of the whole bridge. The beams required to span the 15m over the rail become the anchoring points for the main bridge parapet which was required by Network Rail to be 1.8m high and solid. These requirements can often result in an intimidating and uncomfortable space however, we were able to bring together the requirements for safety with an aspiration for improved user experience. The large walls over the main bridge have been used to frame a spectacular view out to sea and create a unique lookout point along the route. The height of the walls gradually increases from 1.8 to 2.4m as the bridge moves towards the sea. This 'opening up' is also mirrored in the plan of the bridge which opens



8. Footbridge Elevation - solid parapet over rail gradually opens at either end



9. Footbridge Lookout Point - high chamfered timber walls frame the view to the sea

from 2.5 to 5m. The space created is completely unique in the landscape and offers a place to celebrate views of the ruins and landscape.

As the main lookout point will be widely visible, we chose to celebrate this point along the route with a striking material. Large profile timbers which are reminiscent of railway sleepers (alludes to the historic station at this location) are used and each timber element is charred and chamfered to add textural interest. The spacing of the elements varies from a solid parapet over the rail and gradually opens towards the ends (maximum 100mm gap). This fulfils the requirements for a solid parapet only where it is needed and allows a more open arrangement wherever possible.

Underpinning this whole design process was a rigorous study of the landscape conditions and careful consultation with the planners and various stakeholders. This process bolstered the design, taking the project from a potential negative addition to the site to one which enhanced the site by introducing new viewpoints across the landscape and offering new opportunities to understand and connect with the landscape, wildlife and heritage at Tide Mills.



10. Overall View of Journey