Navis

Navis connects to a rich and proud history of water and timber in Lillestrøm. In this proposal, the two come together to form a strong architectural work that will contribute to the growth and change of the area moving forward. The design of the bridge is deeply referential to the boats and ships that are so central to this site, the Nitelva, and Norwegian culture more broadly. Different viewers see different boat like elements, such as oars, sails and keels. While the bridge allows viewers to draw from their own influences, much of it's design is based off the simple yet graceful structural concept of underspanned suspension bridges. The efficiency of this bridge type allows for a delicate yet striking architectural contribution to the growing community of Lillestrøm, that will be a landmark for years to come.

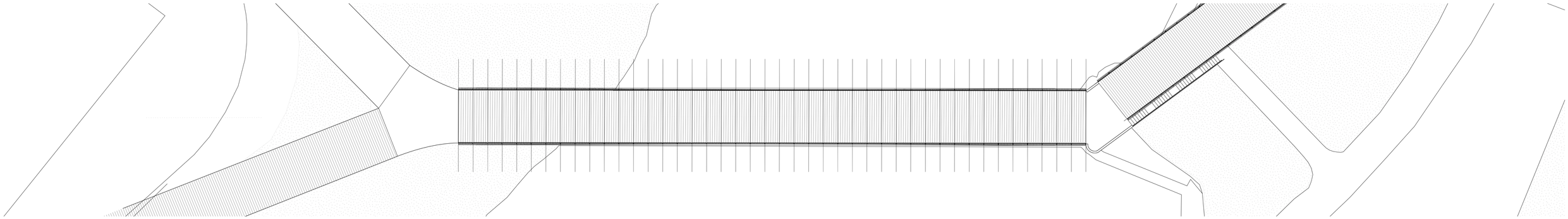
The material of the bridge takes much from the rich timber history of Lillestrøm. It used throughout the project, in recognition of the relevance of timber, not just historically, but moving forward in an environmentally aware era. Because of this, several innovative timber technologies such as cross laminated and glue laminated timber are used, as well as more traditional expressions. The innovative timber technologies work with the efficiency of the structure to greatly reduce material use for a deeply sustainable proposal.

At the pedestrian level, a robust yet warm material language is used to create a great environment for recreation and commuting. Bridge railings span the length of the bridge, at legally mandated heights. A sliver of perforated aluminium mirrors the bridges arc on the deck level. This visuals connects above and below, while also serving as an element that reflects bridge lighting onto the deck, while letting some out like a lantern.

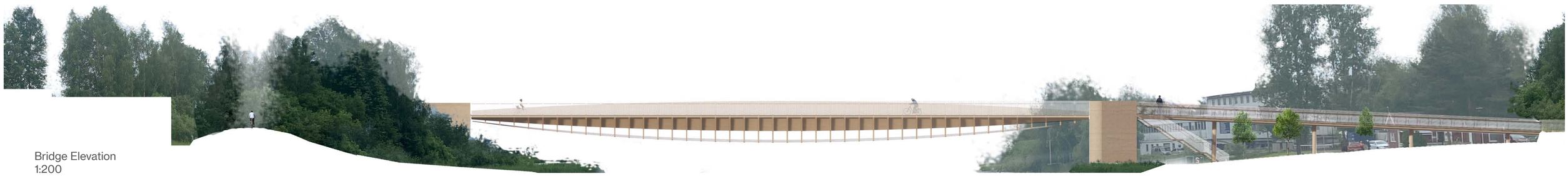
The alignment of the bridge was selected based upon provided documentation and site study. This route provides great user amenity through directness and increased safety. One of the strongest reasons for an underspanned suspension bridge on this site is the big spans it can allow for. With this alignment and structural type, the bridge can completely avoid the nature conservation zone and needing to place a pier in the water.

Situation Plan
1:1000

Perspective of the bridge from south east



Bridge Plan
1:200



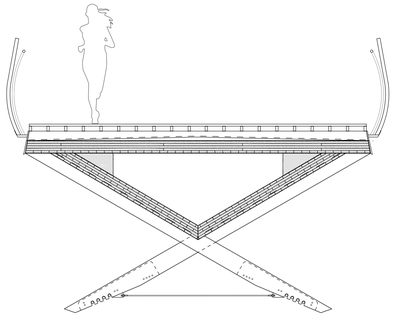
Bridge Elevation
1:200

Consideration was given to universal design to ensure equitable access. The ramps to the north and south have gentle slopes that accommodate wheelchairs without landings that would impact cyclists. The southern pier has a staircase which allows for efficient access for the able bodied, with a small lookout and rest point at its conclusion.

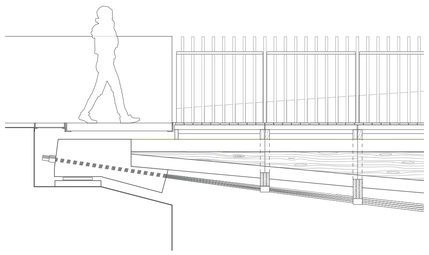
The construction sequence of the bridge is highly logical and efficient. Firstly the landkarer and foundations are constructed. Following this is the laying and prestressing of the cables. Then the structural modules of the bridge can be laid in sequence. Each module includes 2 glue laminated timber struts, and one triangular box section of cross laminated timber. Each module is constructed off site, and may simply be craned in to place. After the first pair of struts are laid, the box section sits above the junction of the struts. When all modules are laid, the deck and cables are connected to each other by the struts in compression.

To quote 'Dynamic behaviour of underspanned suspension road bridges under traffic loads', by J Oliva, J M Goicolea and P Antolín M Astiz, 'Cable forces are transferred into the deck as anchorage reactions that introduce axial compression stresses, and only vertical reactions appear at bearings. Cables are prestressed to neutralise permanent loads. Therefore, tendons are tensioned, the deck is compressed, and bending is reduced due to the upward deviation forces in the deck.

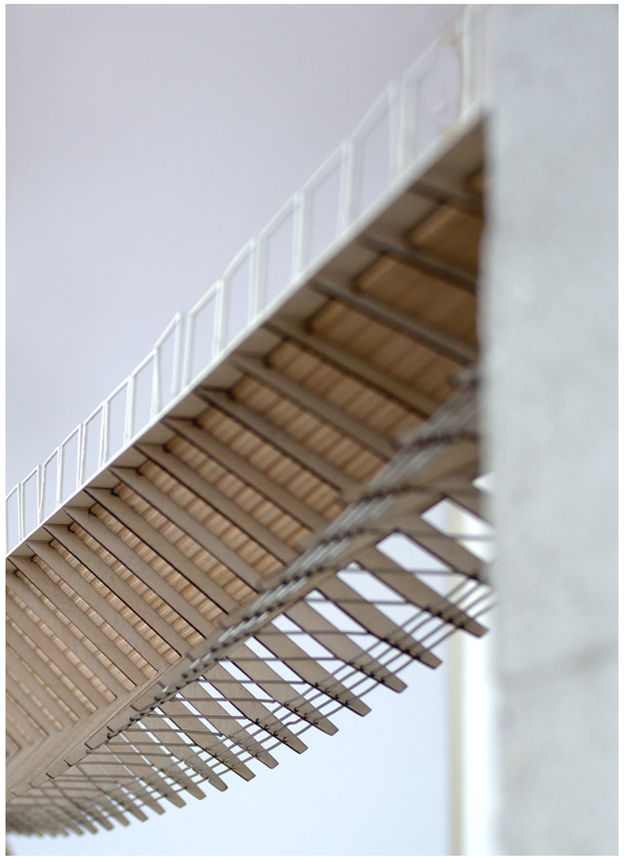
After the bridge's structure is formed, the bridge deck is introduced. It uses the same module size as the bridge deck and sits on the hovedbjelke. The timber surface and balustrade is replaceable to allow for a longer lifespan. A stainless steel handrail follows the same module. The ramps leading up to the bridge have a similar construction system. Instead of using a cable based system, they use simple columns. These columns have been minimised in size to allow for minimal visual and environmental impact.



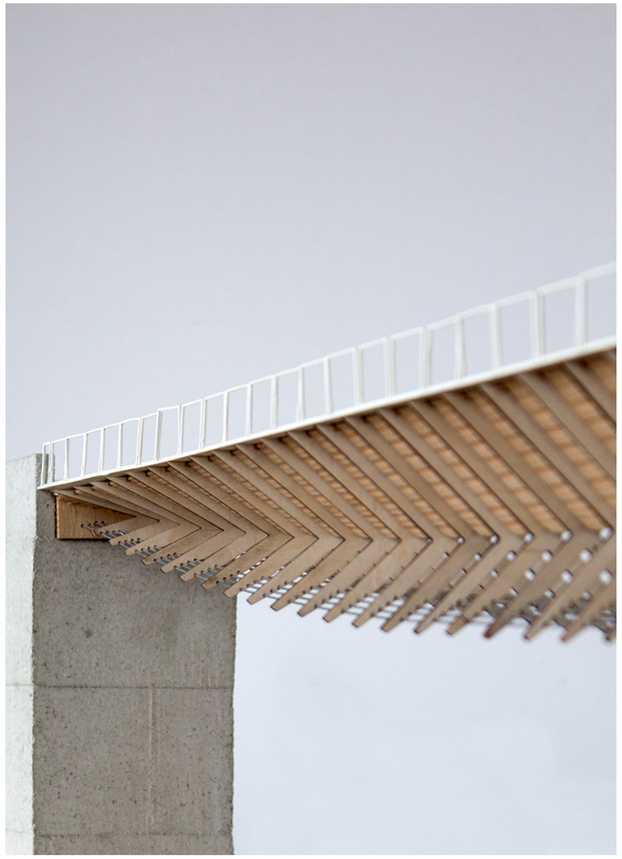
Detailed Section
1:50



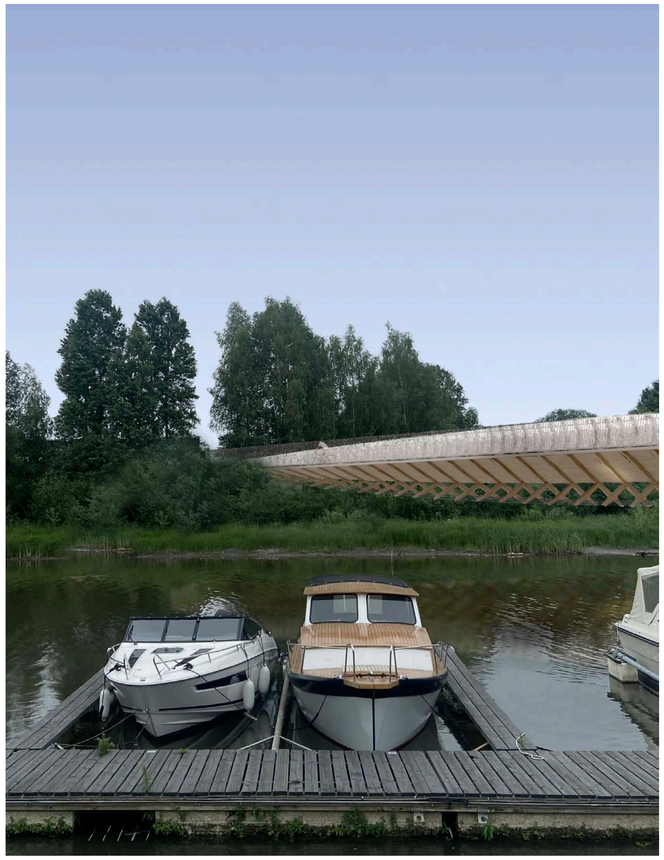
Detail of bridge to pier connection
1:50



Bridge concept
model perspective



Bridge concept
model perspective



Bridge from
south bank

Top deck of
bridge