

Scope of work

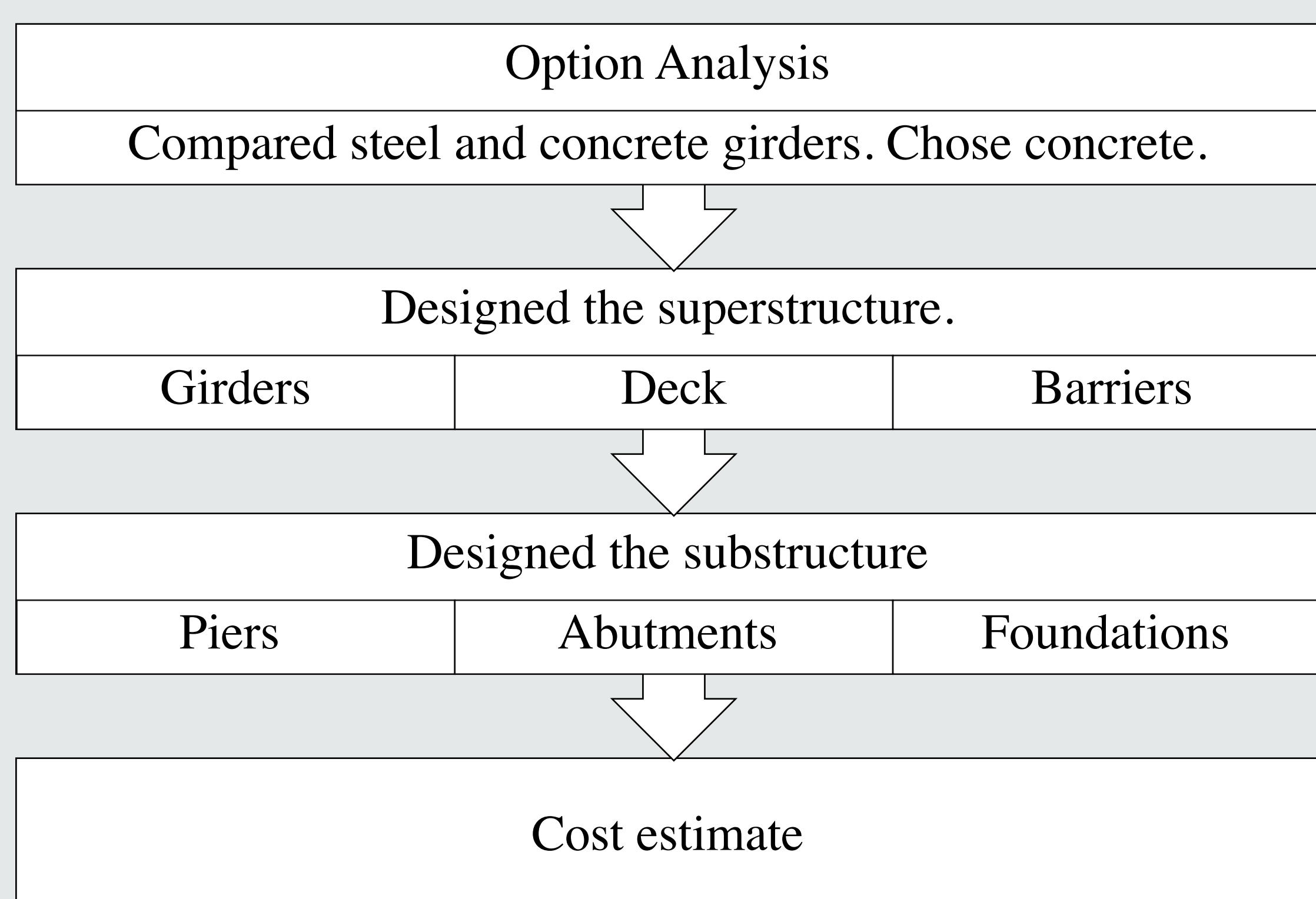
Our design team was tasked with replacing an overpass so that the province could twin the section of the highway that passes under the overpass. The new bridge is semi-integral and has a reinforced concrete deck composite with two-span concrete New England Bulb Tee girders.

Project Location

The site is just past the town of Windsor, Nova Scotia on Highway 101 at Exit 7 where the Falmouth Connector Road crosses the highway.

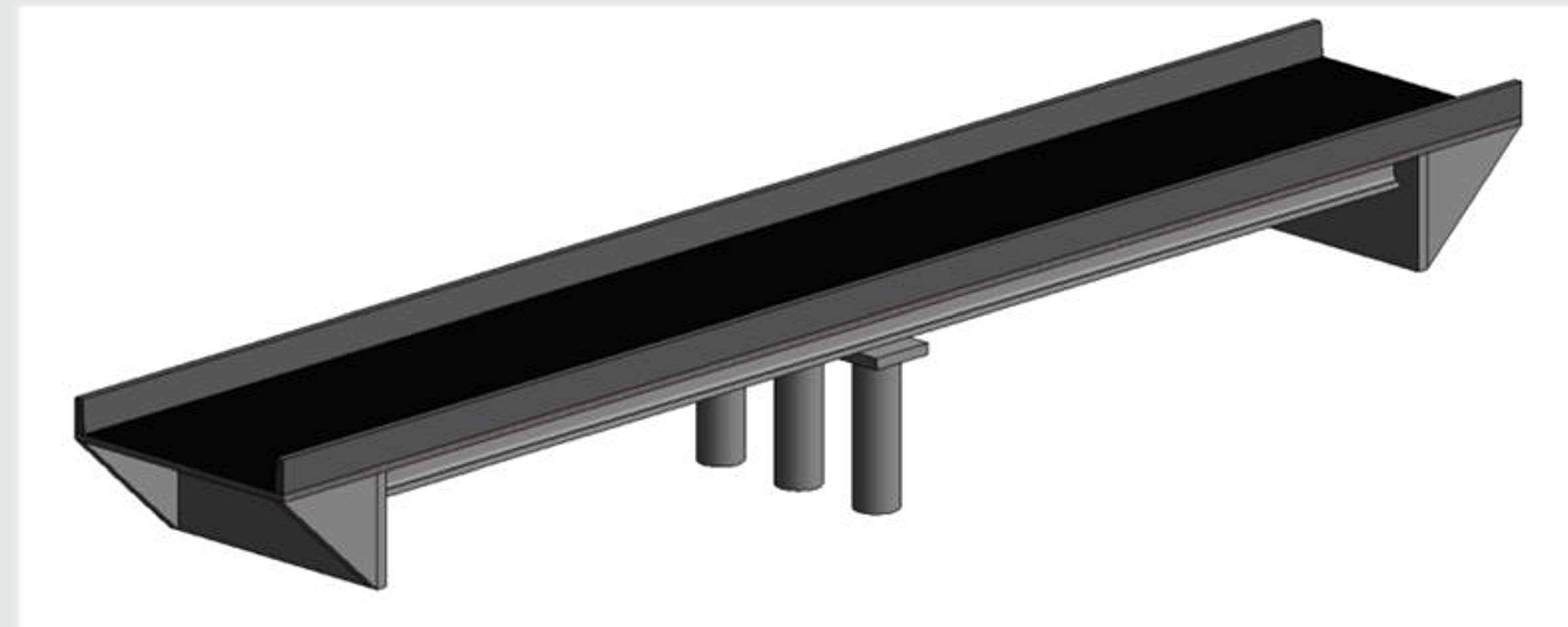


Design Process



Design Overview

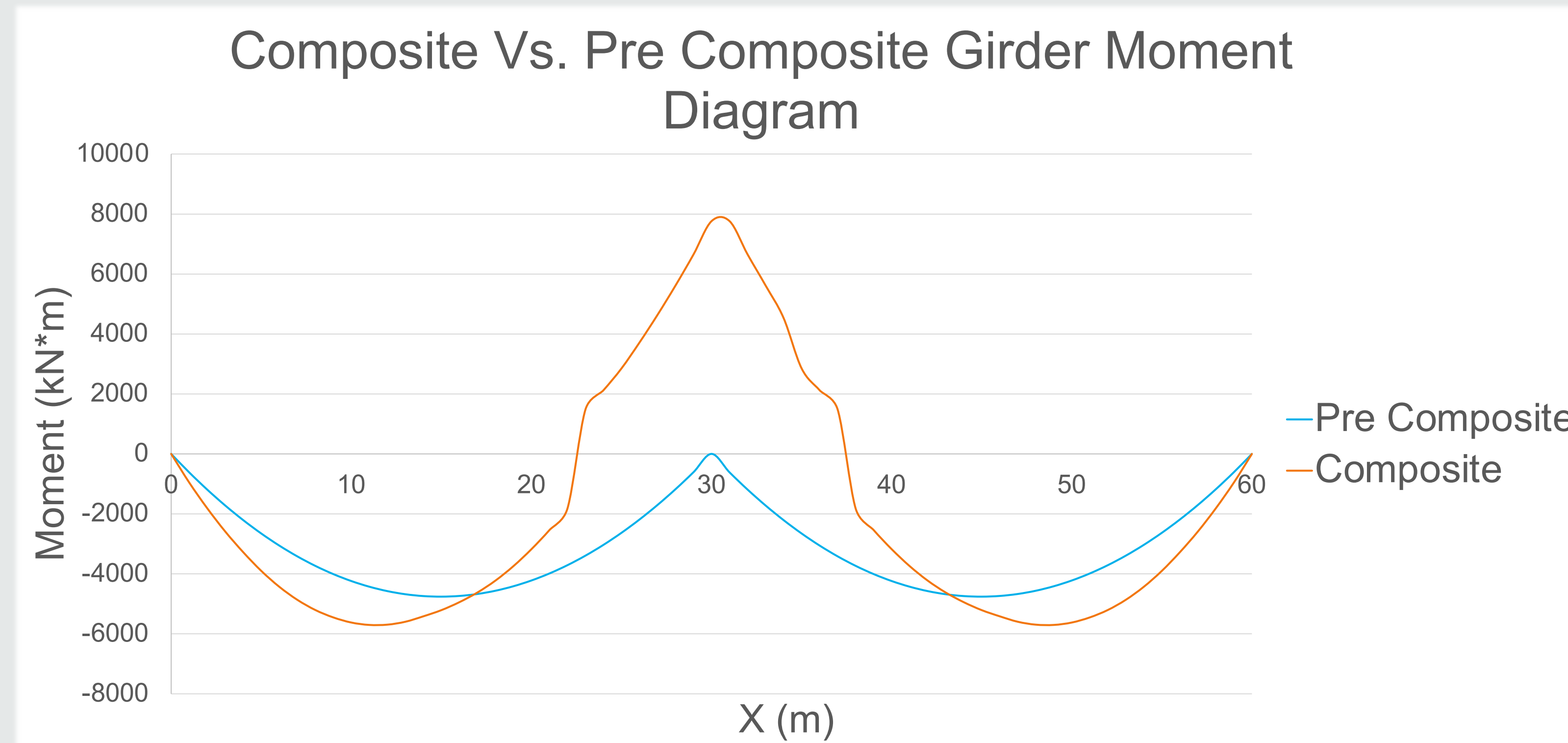
The team designed a 60-meter semi-integral bridge. The bridge is 12 meters wide and has 2 lanes. Semi-integral bridges don't require expansion joints and are attractive options because of their relatively low maintenance costs.



Load Analysis

Dead loads acting the girders and substructure include the following:
- The girders, deck, asphalt, barriers, and haunch.

The live loads used in the design of the bridge are the loads coming from a CLW-625 truck passing over the bridge. The girders had to be designed to withstand both the composite (deck formed) and non-composite (deck not-formed) forces.

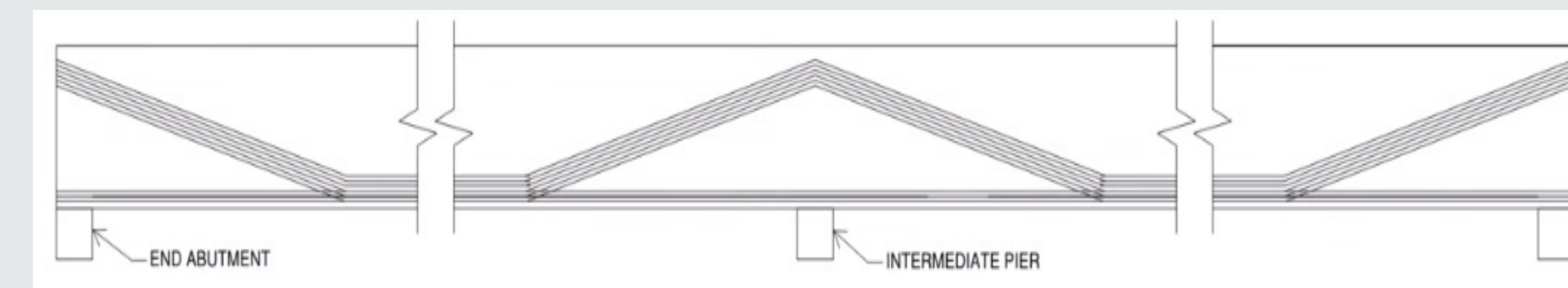
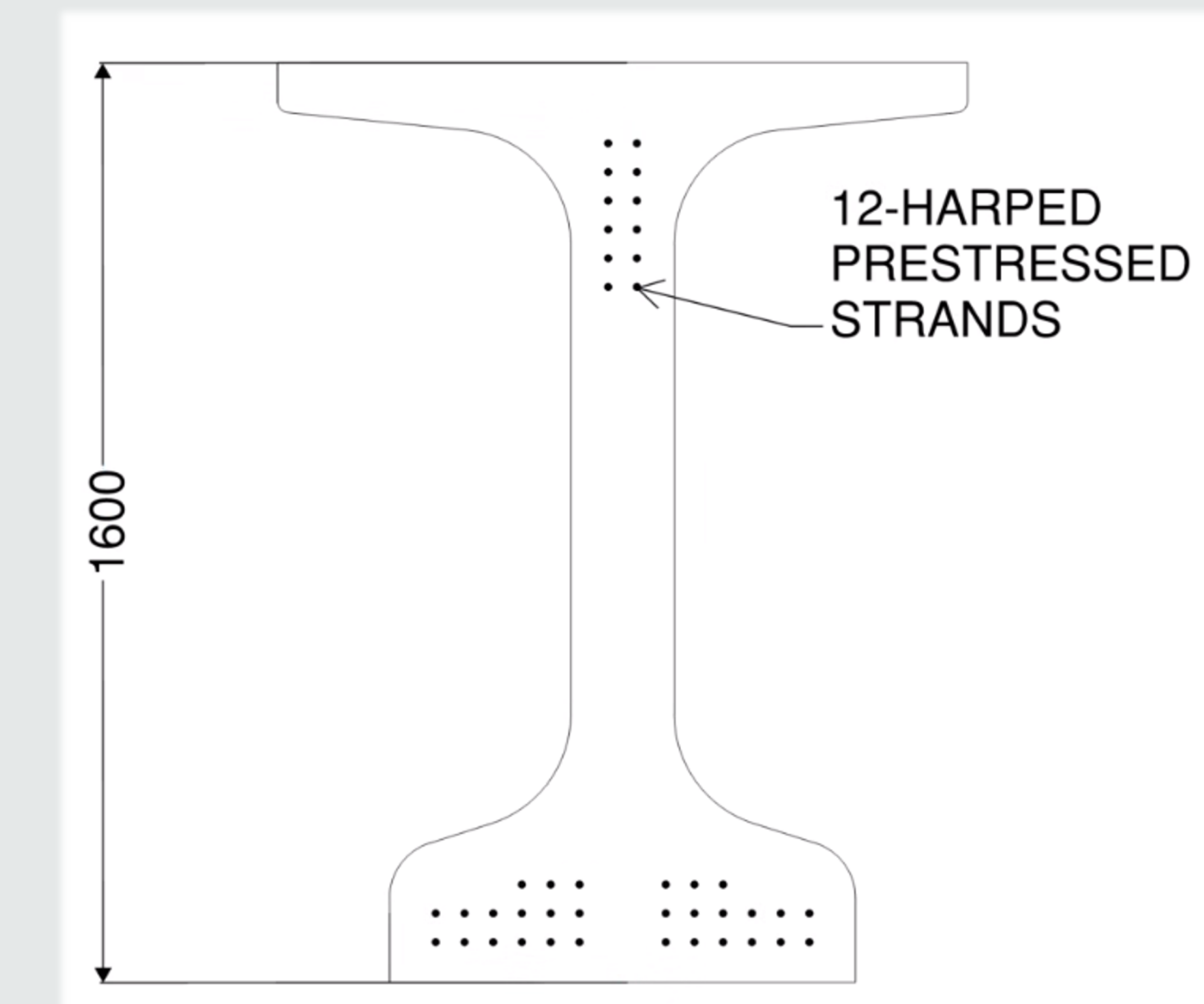


References

- Harbourside Geotechnical Consultants. (2020). Geotechnical Investigation.
- CPCI Design Manual 5th edition.
- CSA S6-19 Canadian Highway Bridge Design Code.

Superstructure Details

The bridge's superstructure consists of 4 pre-stressed New England Bulb Tee's, an approach slab, 250 mm thick reinforced concrete deck, and barriers. Each of the pre-stressed girders have 42 pre-stressed strands, 30 straight across the bottom flange, and 12 that are harped.



Substructure Details

The substructure of the bridge is made of 2 semi-integral abutments. There are also three 2-meter circular piers at the center. The foundations used to carry the bridge are 30-meter-long HP 360x152 steel driven piles.

