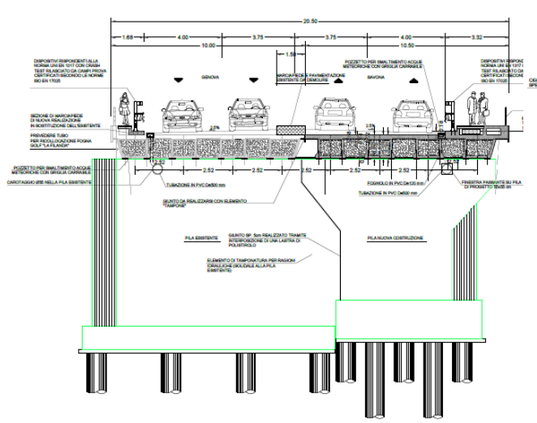
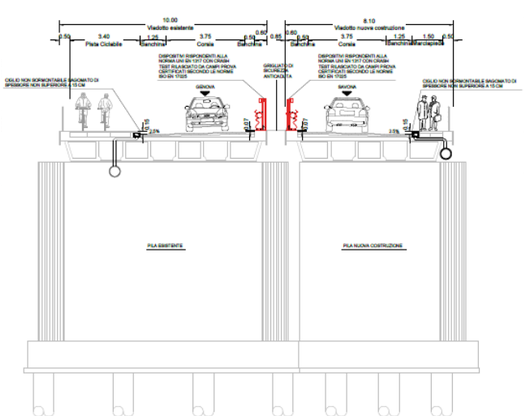
FEATURE OF TECHNICAL SERVICE

Subject	Executive Project – Detailed executive design and variant construction design of - ANAS GE 34/08 S.S. 1 «Nuova Aurelia» - Access to the port hub in Savona interconnection between the A10 toll booths of Savona and Albisola and the ports of Savona and Vado: Variant at S.S. 1 Aurelia in the stretch between Savona Letimbro creek and Albissola Marina and Albisola Superiore
Carried out by	SGAI S.r.l. of E. Forlani & C.
Client	Letimbro scarl
Service length PE-PC	2012 – 2019
Value of works PE-PC	€ 145’373’827,00
Categories value PC	S.03 € 553’405,37 S.04 € 3’661’579,06 S.05 € 5’785’766,34 S.06 € 850’217,45 D.04 € 1’437’574,66 V.03 € 80’749,00

SANSOBBIA VIADUCT – Design issues and their resolution

There are three viaducts in the variant Executive Project: **La Rusca Viaduct**, which crosses the Letimbro creek, built with a metal deck with a first span in simple support (32m) and 2 continuous spans of 75m each, is a lower street structure with main trusses to limit the overall visual impact; the **Grana Viaduct** in order to bypass the existing industrial area, with a mixed steel-concrete structure with a static continuous beam pattern on seven bays (span length 20 + 25 + 25 + 25 + 25 + 25 + 20 = 165m); the **Sansobbia Viaduct**, which crosses the stream of the same name, initially envisaged the enlargement on the mountain side of the existing Pertini bridge, 115m long and consisting of 5 spans of 23m in simple support, with 4 prefabricated pre-compressed beams for each bay (box type with collaborating slab cast in situ) with a final width of 20.50m of the deck of which 5m at the sidewalk. Expansion is expected from one side only. During the executive design, following the new requirements, of the construction company and the Municipality of Albisola Superiore, to maintain the cycle/pedestrian path and at the same time optimize the execution of the Sansobbia viaduct, both in terms of costs and time was evaluated the technical feasibility of a hypothetical variation of the bridge configuration. A new hypothesis has been developed that foresees the adoption of separate decks for the two directions of travel, in such a way as to avoid all the operations of solidarization of the decks, adjustment of bearings, joints and at the same time guaranteeing the necessary dimensions for the cycle-path route. In this way it is also possible to keep the traffic open even during the realization phases of the new viaduct and the optimizations on the existing one.

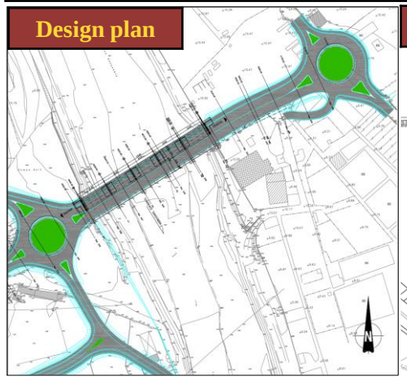




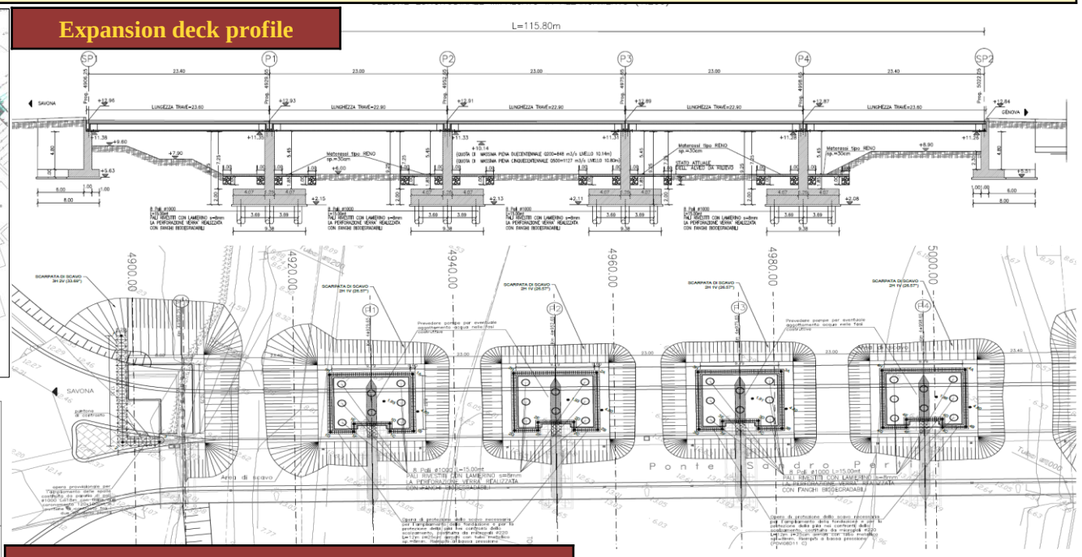
SANSOBBIA VIADUCT - Computational aspects - Simulation, results and checks

The analysis and the study of the static and dynamic behavior of the substructures and of the decks of the different bridges and viaducts was carried out by simulating the structure with a numerical model of three-dimensional finite elements, solved with a PROSAP calculation code (*2.Si Software and services for the 'engineering*) and Midas Civil (*CSPFEA - Engineering solutions*).

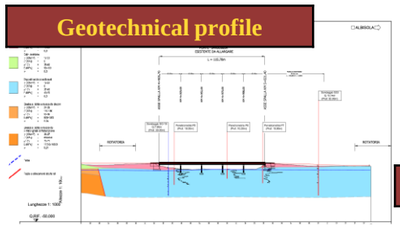
Design plan



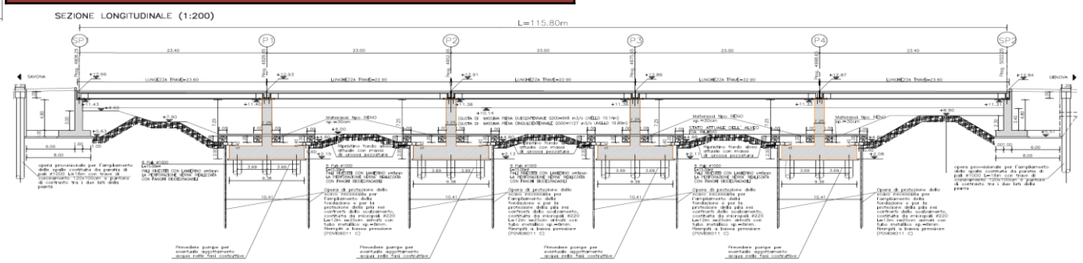
Expansion deck profile



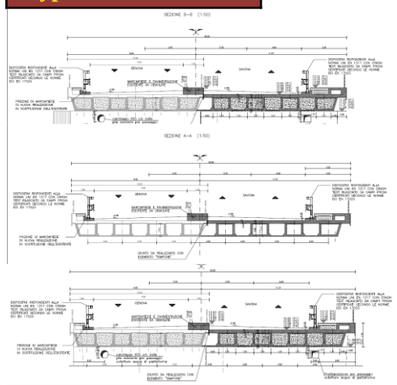
Geotechnical profile



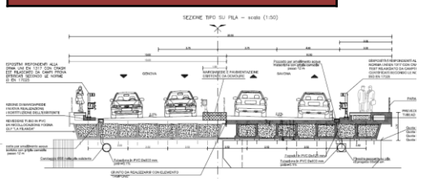
Excavation plan and hydraulic protection of piers



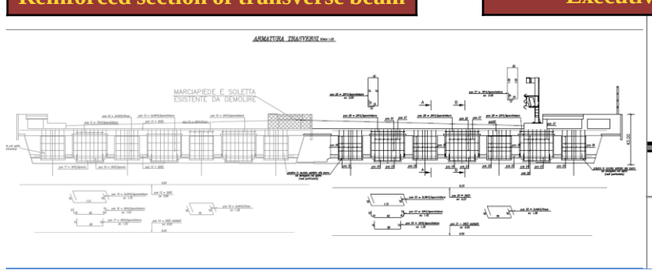
Typical cross sections



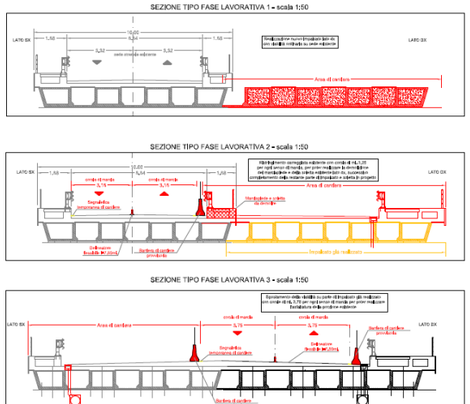
Detailed cross section



Reinforced section of transverse beam



Executive stages



Stages of beam procurement