

FEATURE OF TECHNICAL SERVICE

Subject	Trans Adriatic Pipeline Project – Gas Compression Stations in Greece and Albania. Job 7920 - Flooding study Fier area with HEC-RAS modeling		
Carried out by	SGAI Srl di E. Forlani & C.		
Client	Joint Venture Renco - Terna - Albania Branch		
Service length	2015 - 2019		
Value of works	€ 40'000'000,00		
Categories value	D.02	€ 15'000'000,00	
	D.05	€ 30'000,00	

TRANS ADRIATIC PIPELINE – TAP – Hydraulic study of the flooding, design issues and their resolution

The **Trans Adriatic Pipeline (TAP)** transports methane from the Turkish-Greek border to Italy, crossing Greece, Turkey and the Adriatic Sea. The infrastructure will allow diversifying the gas supply in European markets, allowing the **transit of 10 to 20 billion m³ of natural gas per year**, depending on the progress of the works. To allow the transportation of gas through the pipes, it must be pressurized in various sites. Therefore, in the first phase of the project, the sites where the two compression stations will be built were identified: one in Kipoi (GCS00 - Greece) and the other in Fier (ACS03 - Albania). The ACS03 compression station is located in a floodable area near the city of Fier. Therefore, the **study of different flooding scenarios** was needed in order to assess flood levels for certain return times. A hydraulic free board was determined on the basis of the flooding scenarios, thanks to define the elevation of the station structures and access road. The design approach was divided into three phases. In the first phase, the one-dimensional study of the flooding was carried out, considering the Seman river and the Hoxhara canal independently of each other, and then considering them simultaneously. In the second phase, the study of the flood was implemented with a **two-dimensional simulation of the transient flow** on the area between the Seman river and the Hoxhara canal. In the third phase, through the **modeling of multiple dynamic simulations, the flood risk, flood extent and flood time** was assessed by combining the effects of rains, sea tides, groundwater and waters from the collapse of the levees. Since the area of interest includes a dense and complex network of irrigation and drainage channels, a **3D terrain model** was created with a 20x20 mesh, on which the levees, canals, roads and cross sections were defined for the hydraulic modeling of the Semani river and the Hoxhara canal.

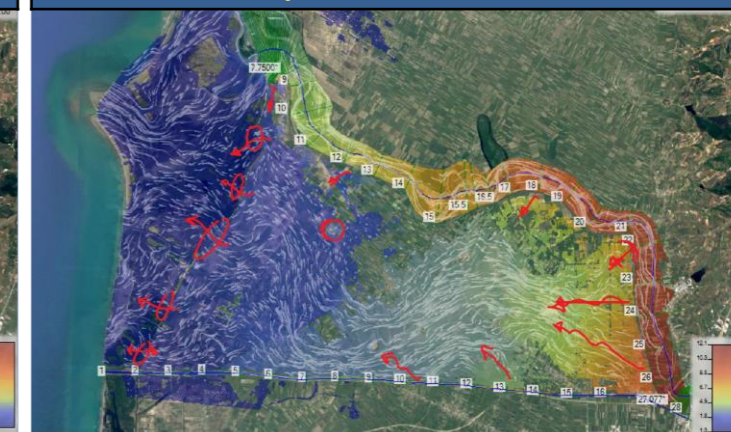
TRANS ADRIATIC PIPELINE – General plan of the infrastructure



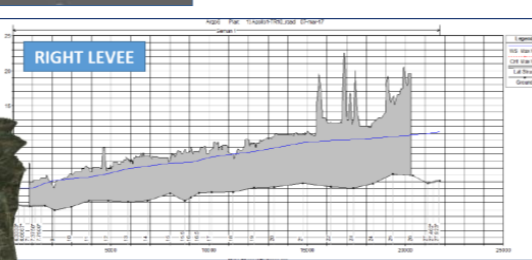
Simulation Tr 200years – Sea tide effect



Simulation Tr 200years – Maximum flood water level

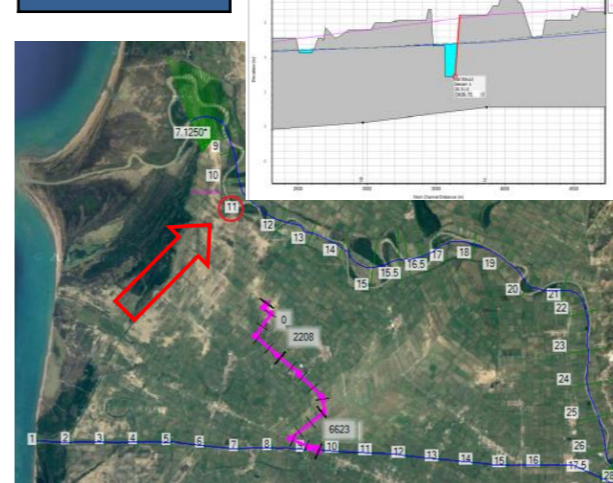


Frequenza [%]	Tempo di ritorno [anni]	Livello idrico [cm]	Frequenza [%]	Tempo di ritorno [anni]	Portata di picco [m ³ /s]
0.2	500	649	0.2	500	3540
0.5	200	621	0.5	200	3100
1	100	601	1	100	2760
2	50	578	2	50	2410
3.33	30	562	3.33	30	2161
5	20	545	5	20	1960
10	10	517	10	10	1620

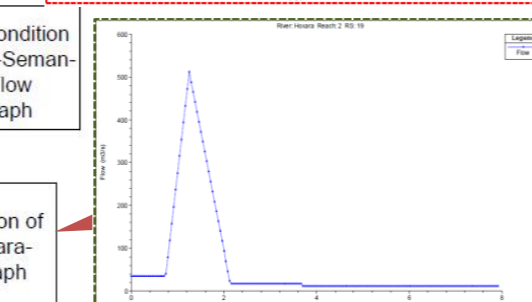
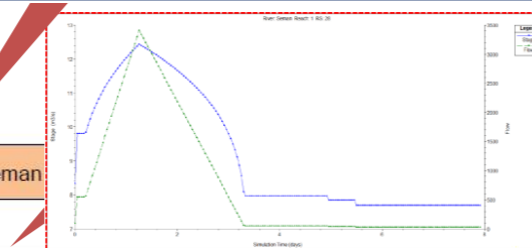
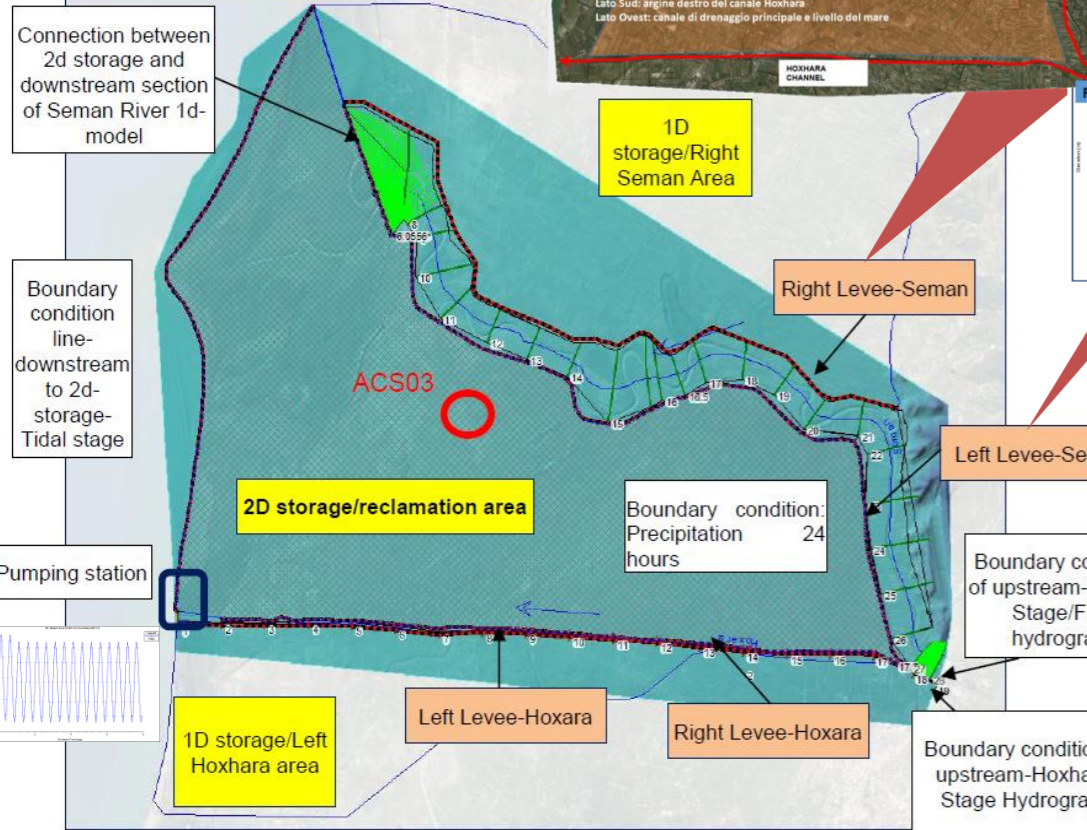
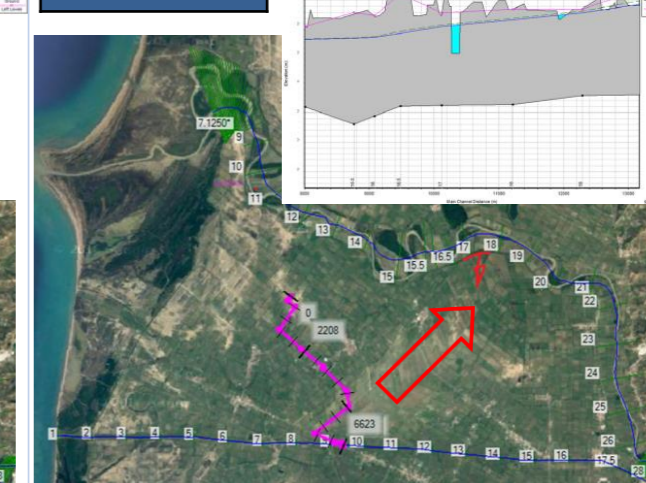


Simulation Tr 200 years - Collapse of the river levee and flood scenarios

Section 11



Section 17



HYDRAULIC STRUCTURES, MARITIME ENGINEERING, DAMS