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MEDITERRANEAN COAST AND MACRO-REGIONAL STRATEGIES WEEK
Izola, Slovenia
16 – 20 September 2024

Consultation within TSG 3:
Construction Activities in the Sea and on the Seashore and Achieving good environmental status of the Sea

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

FLOOD SAFETY IN PIRAN IN THE PERSPECTIVE OF CLIMATE CHANGES

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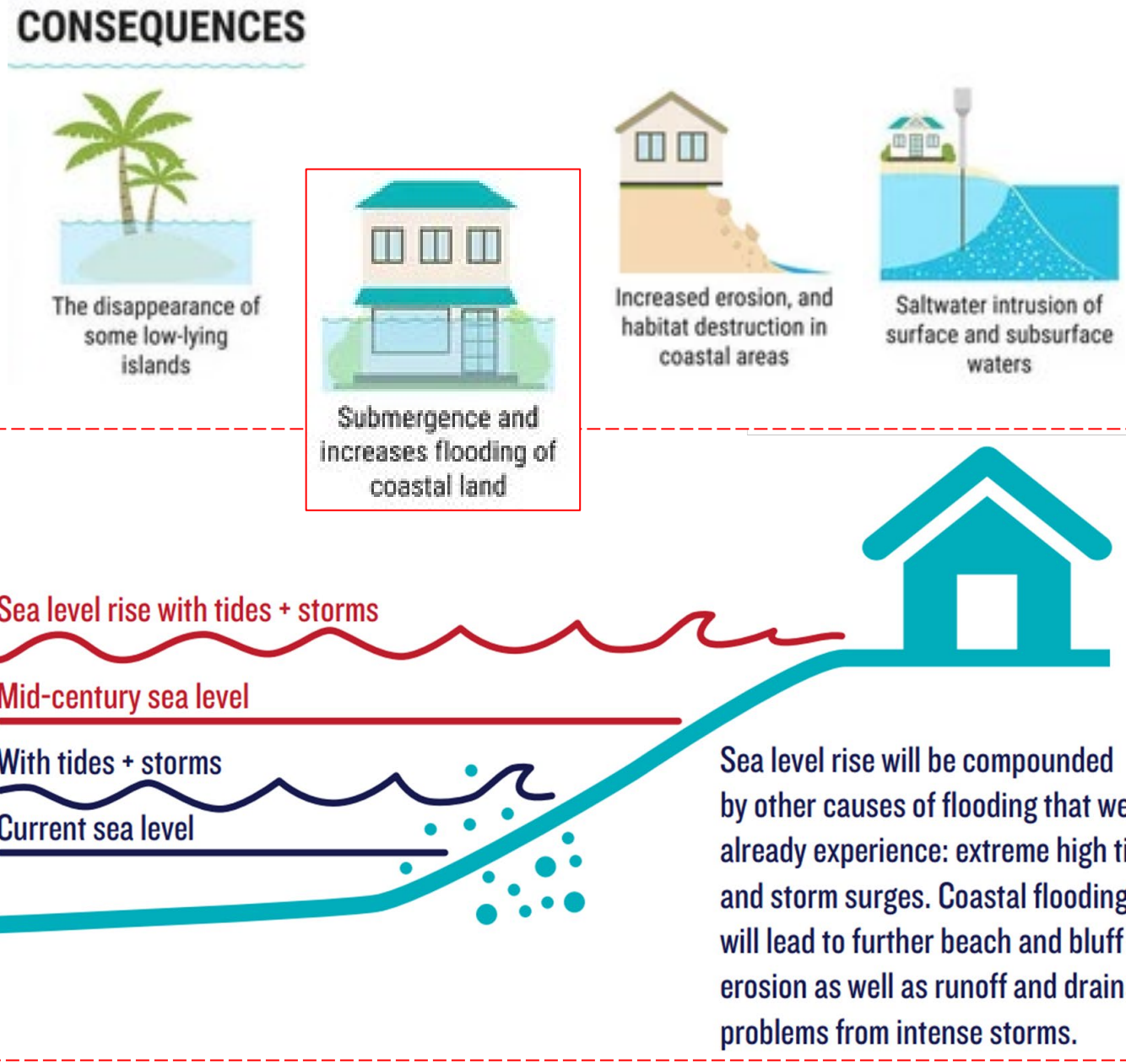
Introduction

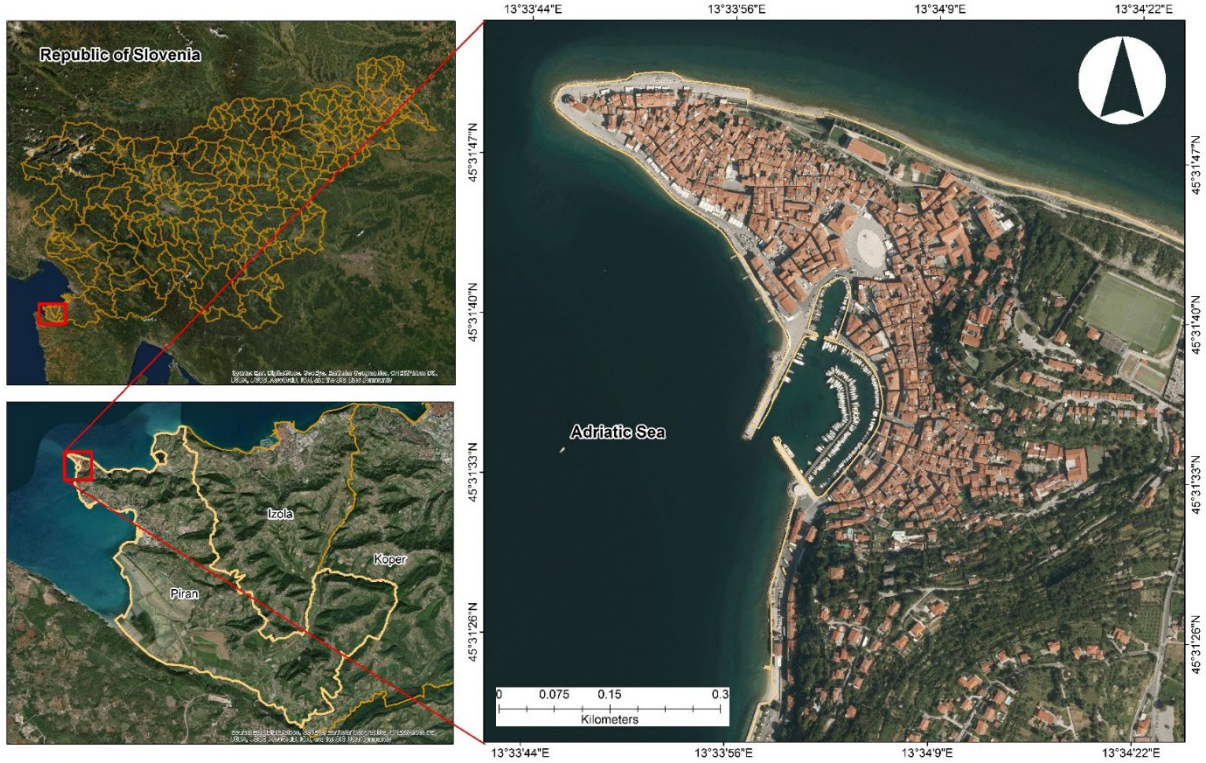
Global mean sea level rise (GMSL) is being recorded at an accelerated rate of 5 mm/year over the five-year period of 2014 to 2019, which is significantly faster than the average rate of 3.2 mm/year recorded between 1993 and 2010 (WMO, 2019).

SEA LEVEL RISE WILL TRIGGER MORE FREQUENT AND CHRONIC COASTAL FLOODING.

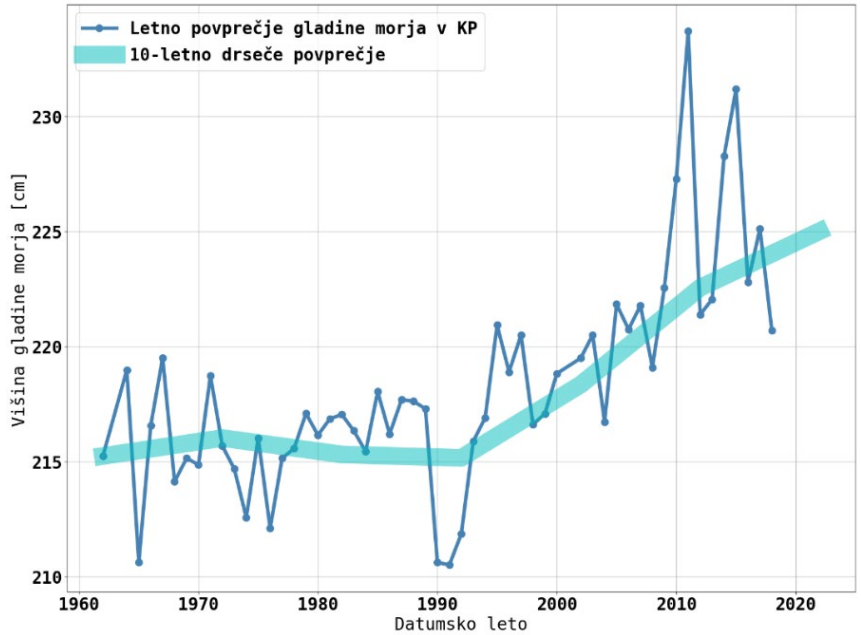


Study area

The historic town center of Piran, Slovenia, which is under a full monumental protection and home to some of the most important historic-cultural treasures of Slovenia

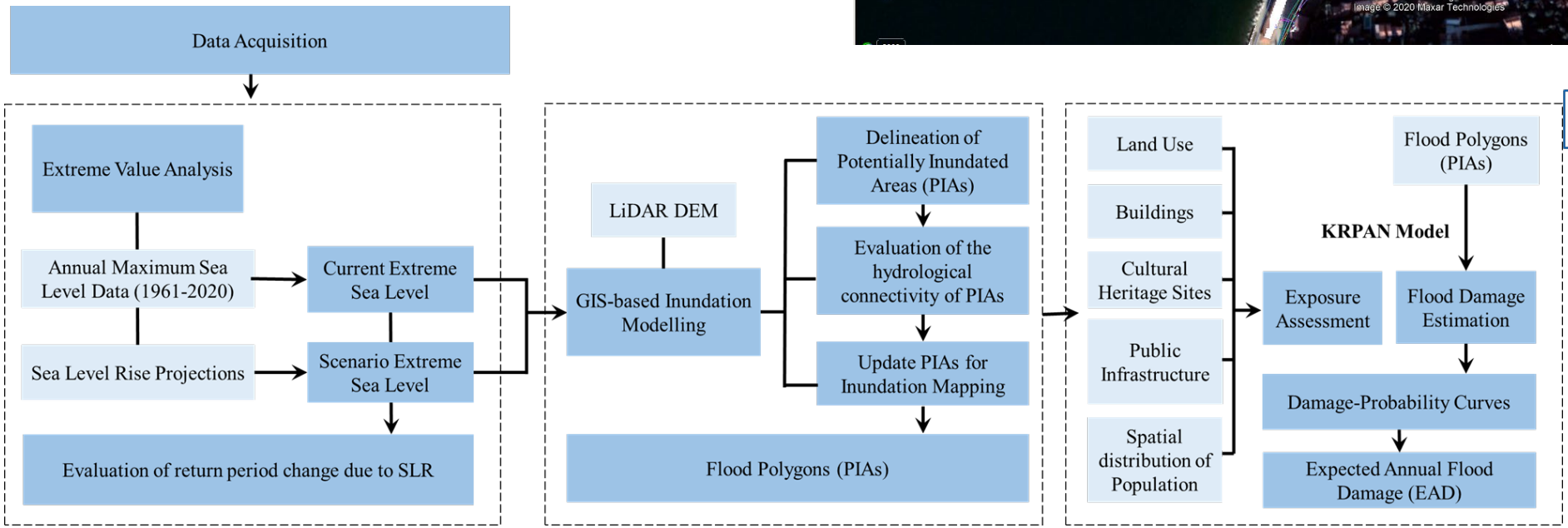


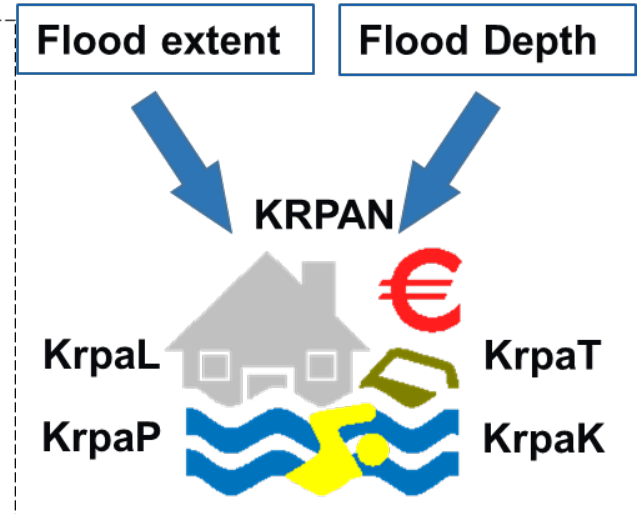
Data on sea levels on the Slovenian coast from the period 1960-2015 show that the the local mean sea level has risen by **10 cm** at a rate of **1.7 mm/year**.



Under the RCP4.5 scenario, the Adriatic Sea is projected to rise by **30 to 40 cm**, which will **increase the frequency of sea inundation along the Adriatic coast by a factor of 26 to 50** by the end of the 21st century.

Methodology



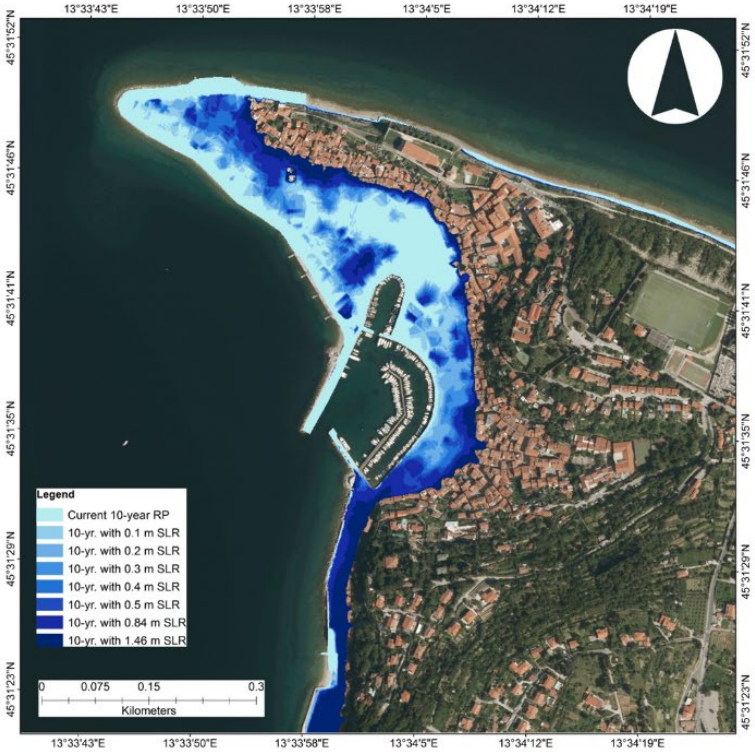


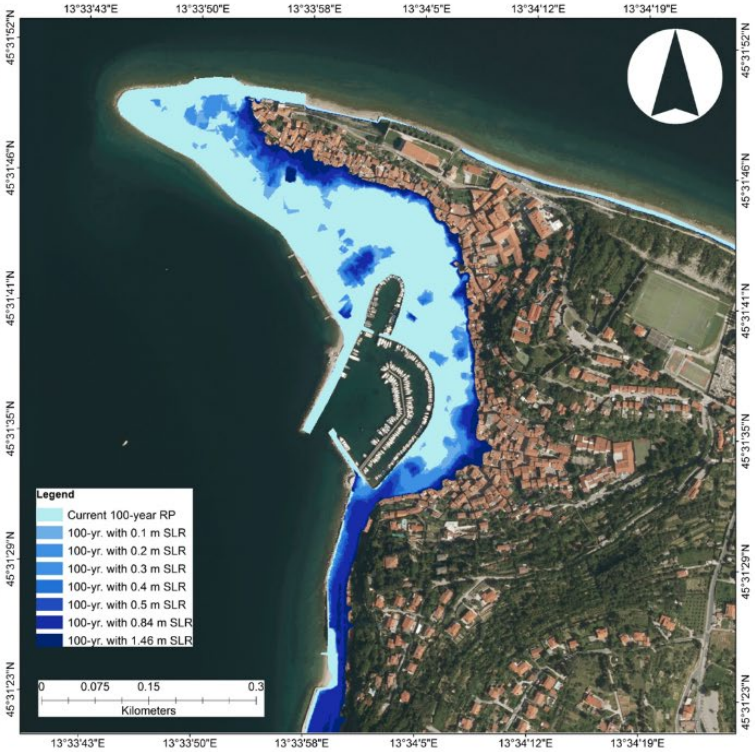
Exposure analysis

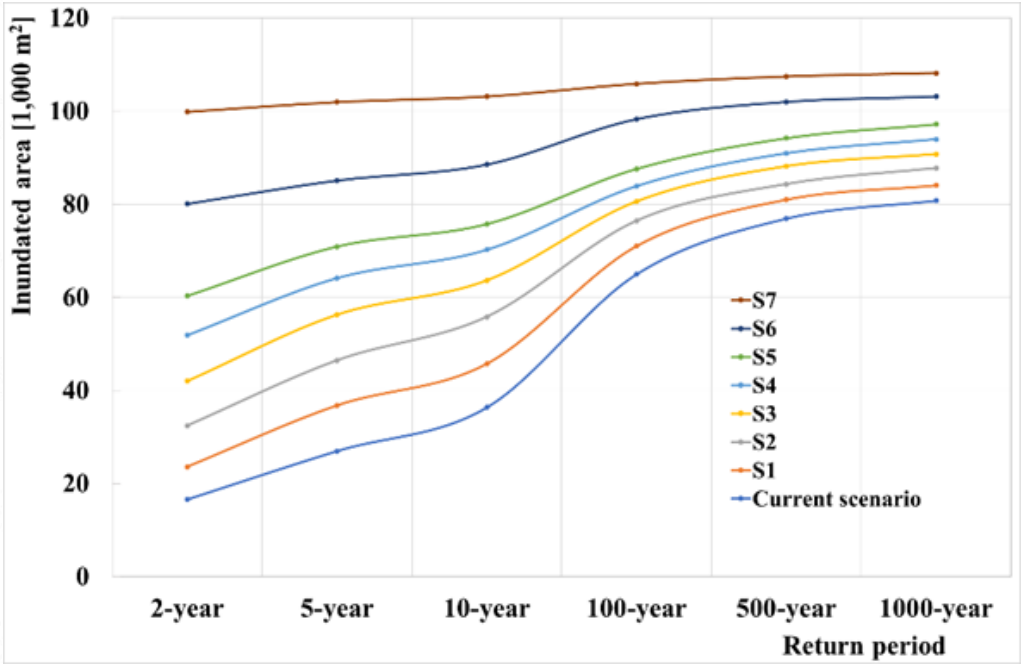
Extent of nundation zones in Piran for the 10- and 100-year flood event considering different SLR scenarios

MSL Rise Scenario:		S1	S2	S3	S4	S5	S6	S7
MSL Rise	[m]	0.1	0.2	0.3	0.4	0.5	0.84	1.46

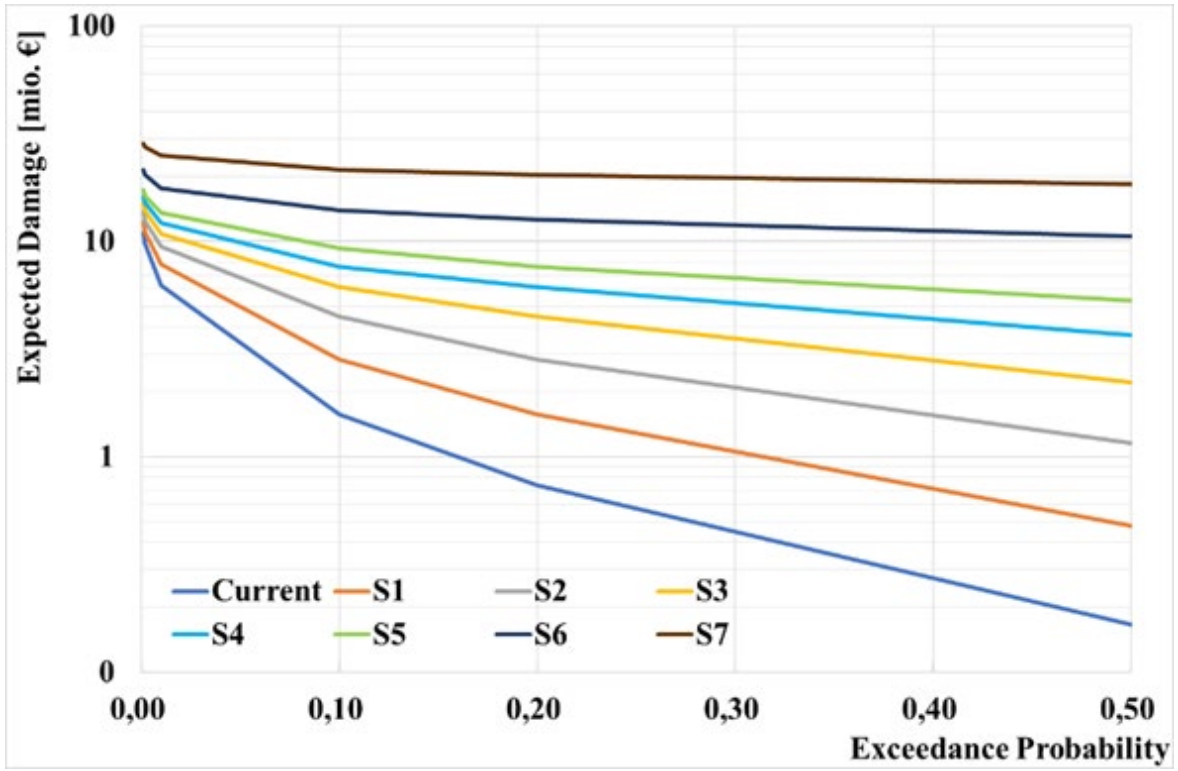
Sea flood return period [year]	Sea level rise [m]	Estimated Sea flood return period, taking into account MSL Rise Scenarios [year]						
2	1.19	<1	<1	<1	<1	<1	<1	<1
5	1.34	2.5	1.2	<1	<1	<1	<1	<1
10	1.44	5.2	2.5	1.2	<1	<1	<1	<1
100	1.75	49.7	24.1	11.7	5.6	2.7	<1	<1
500	1.97	235.0	113.8	55.1	26.7	12.9	1.1	<1
1,000	2.06	458.4	222.1	107.6	52.1	25.3	2.1	<1





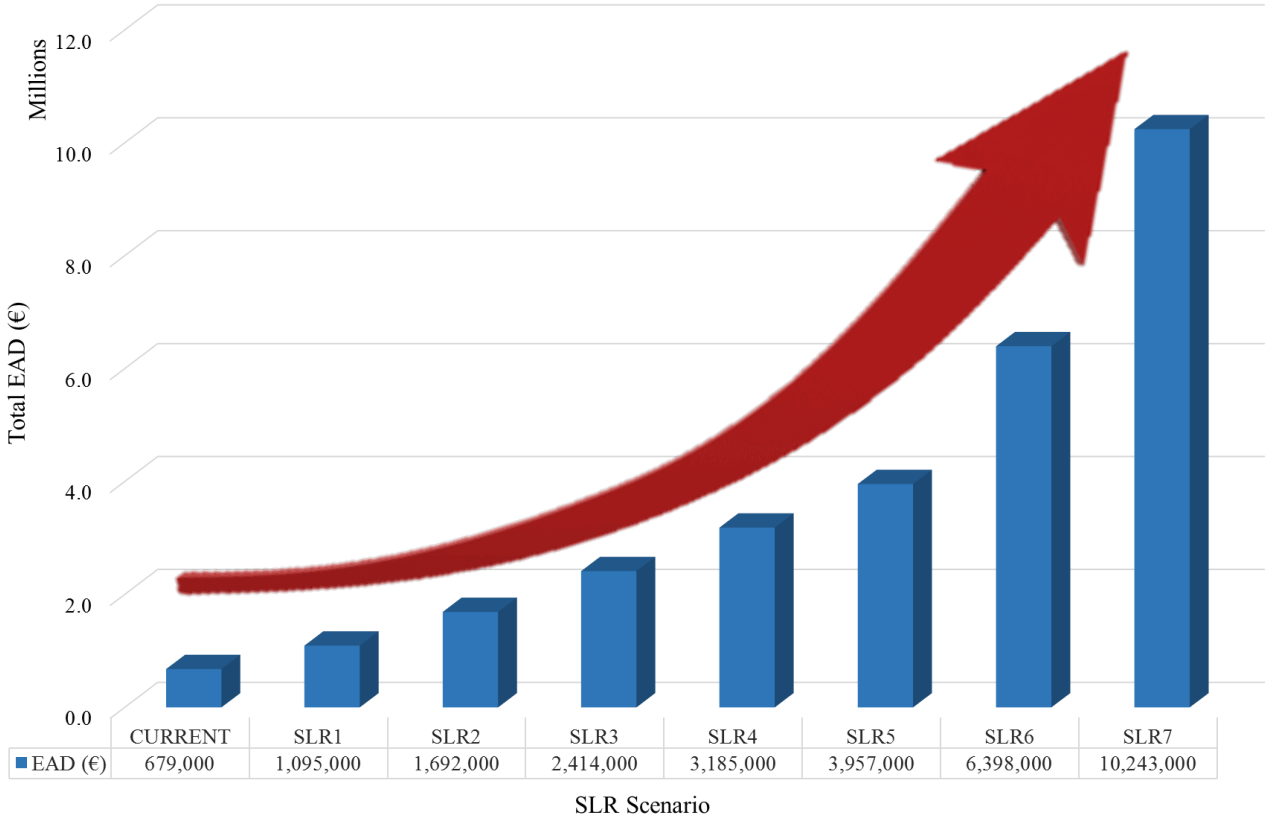


Determining the costs of flooding



Relationship between the probability of a flood event and the expected damage for different scenarios of MSL rise.

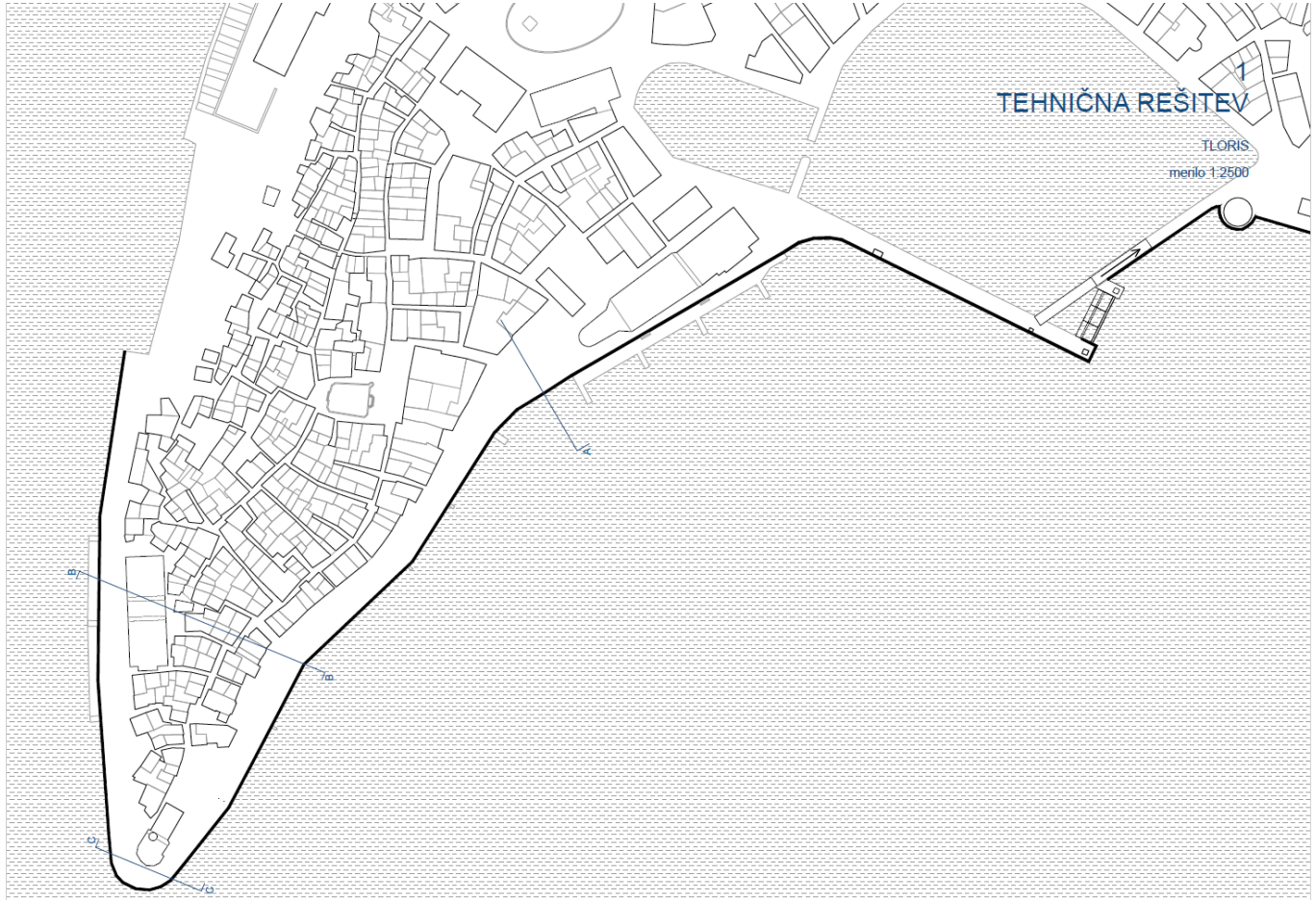
Expected annual damage (EAD) in the Piran area for different MSL rise scenarios.

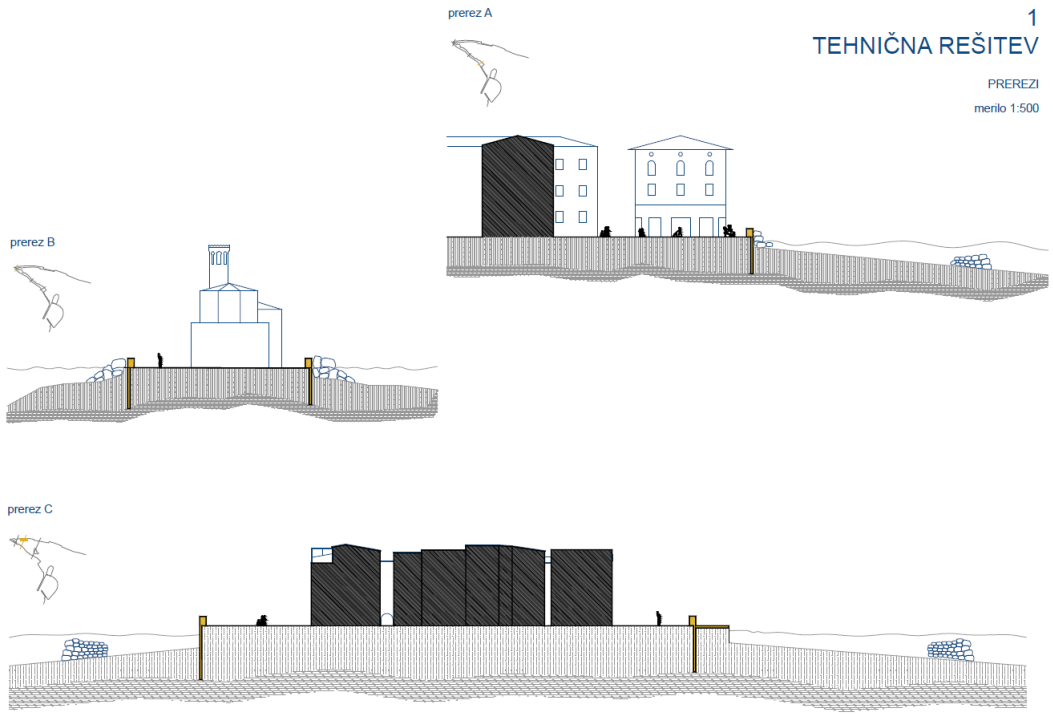


Conclusions

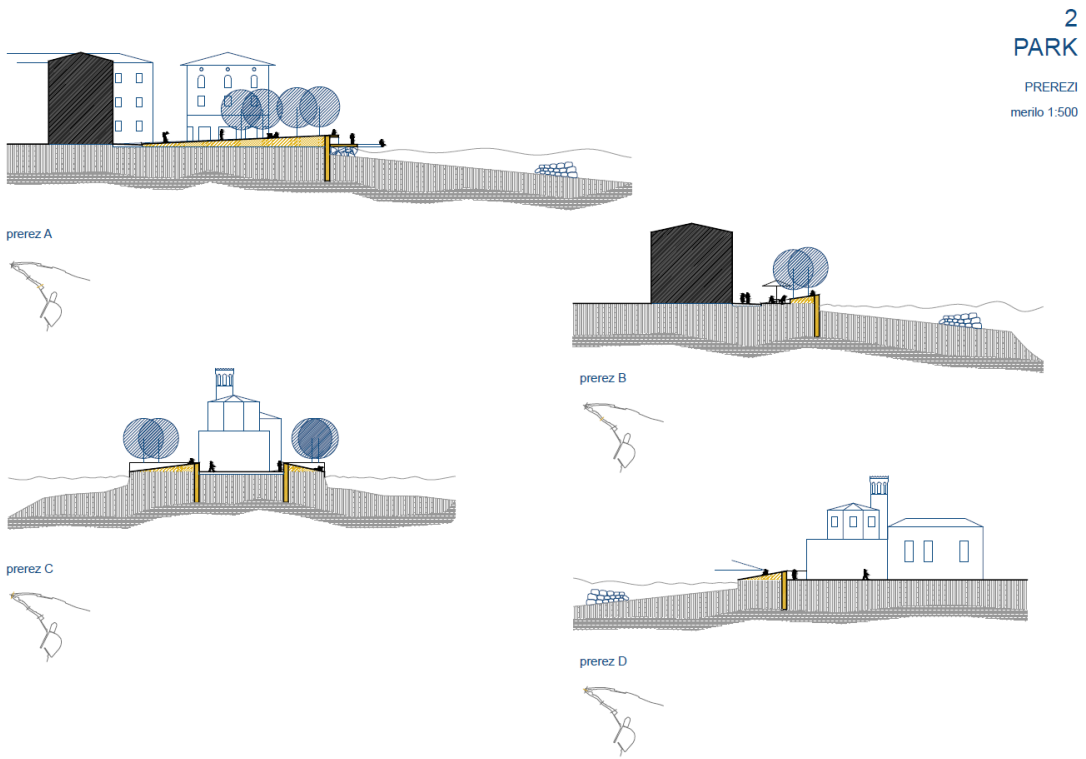
- frequency of flood events will increase by a factor of **2** on average for every **10 cm of MSL rise**, without taking into account the impact of weather events
- estimated values of expected annual damage in Piran shows a marked upward trend with a projected increase in the MSL from an estimated value of **EUR 0.68 million/year** under current conditions up to approx. **EUR 10.2 million/year** in the case of the most extreme scenario of MSL increase
- analysis shows that the most exposed properties are the **residential properties**, which will suffer the most damage from flooding
- it is evident that the repair of flood damage in the area of Piran will represent an increasing financial burden for the residents and the local community in the foreseeable future
- it is therefore urgent to take a comprehensive approach to **planning flood protection measures** as soon as possible in order to significantly limit the extent of flood damage

Alternative 1: Technical solution

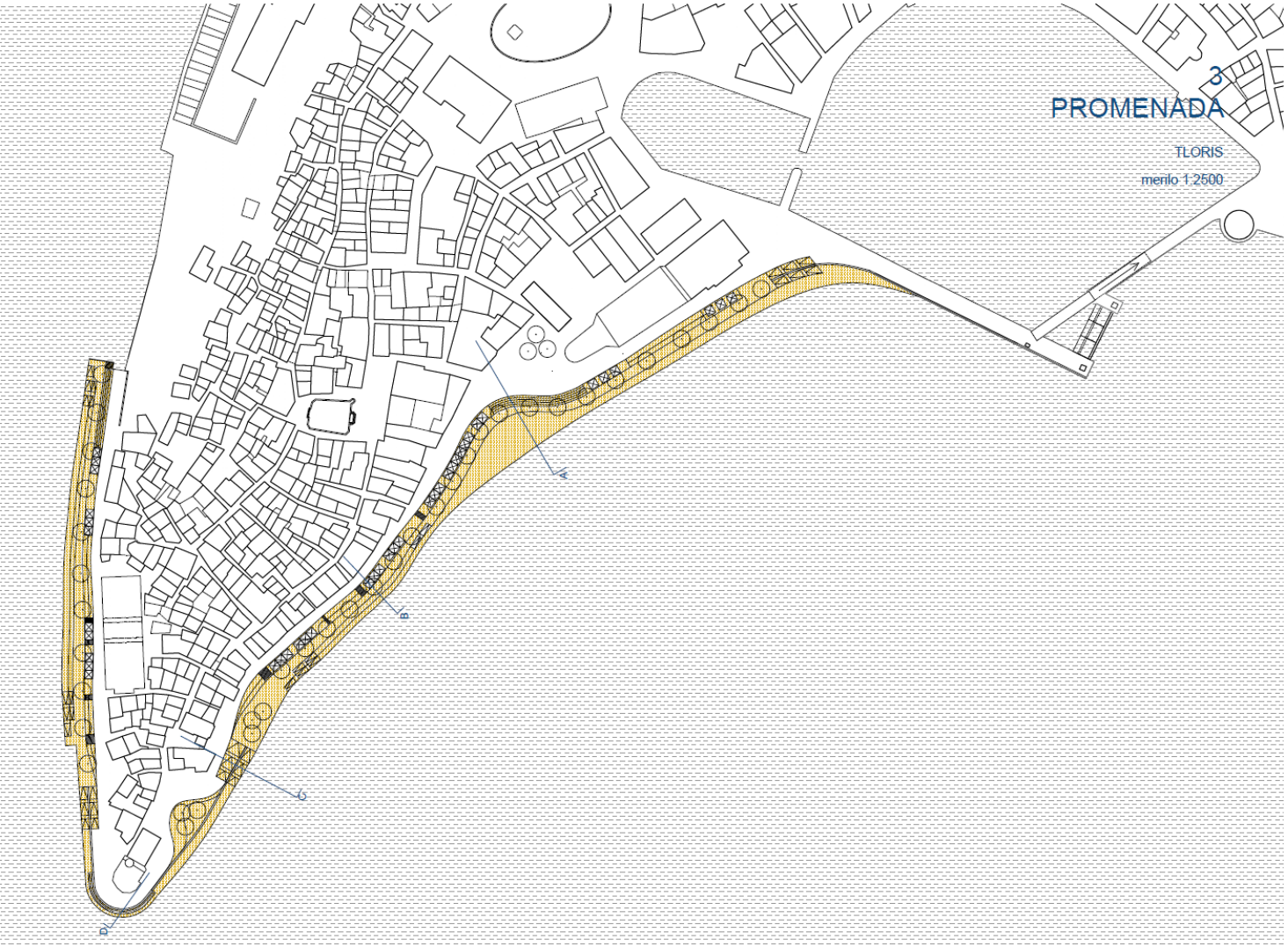


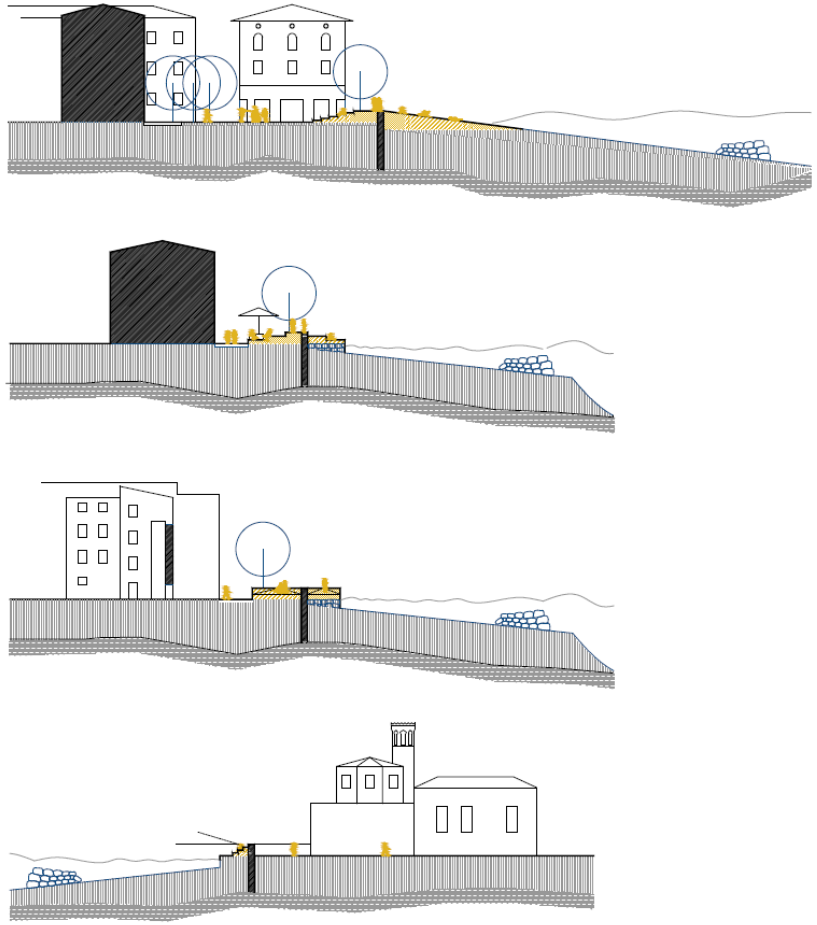


Alternative 2: Park design

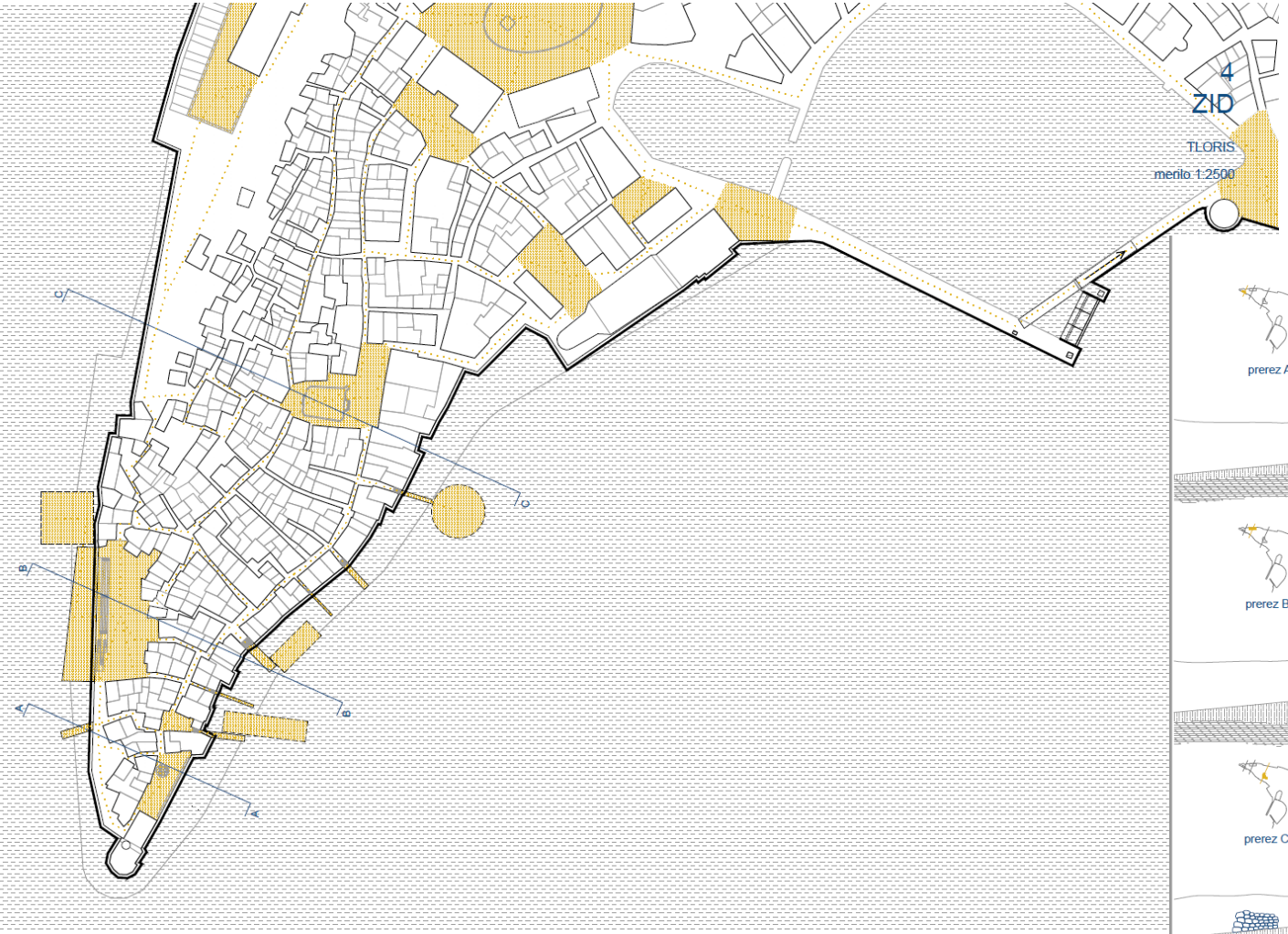


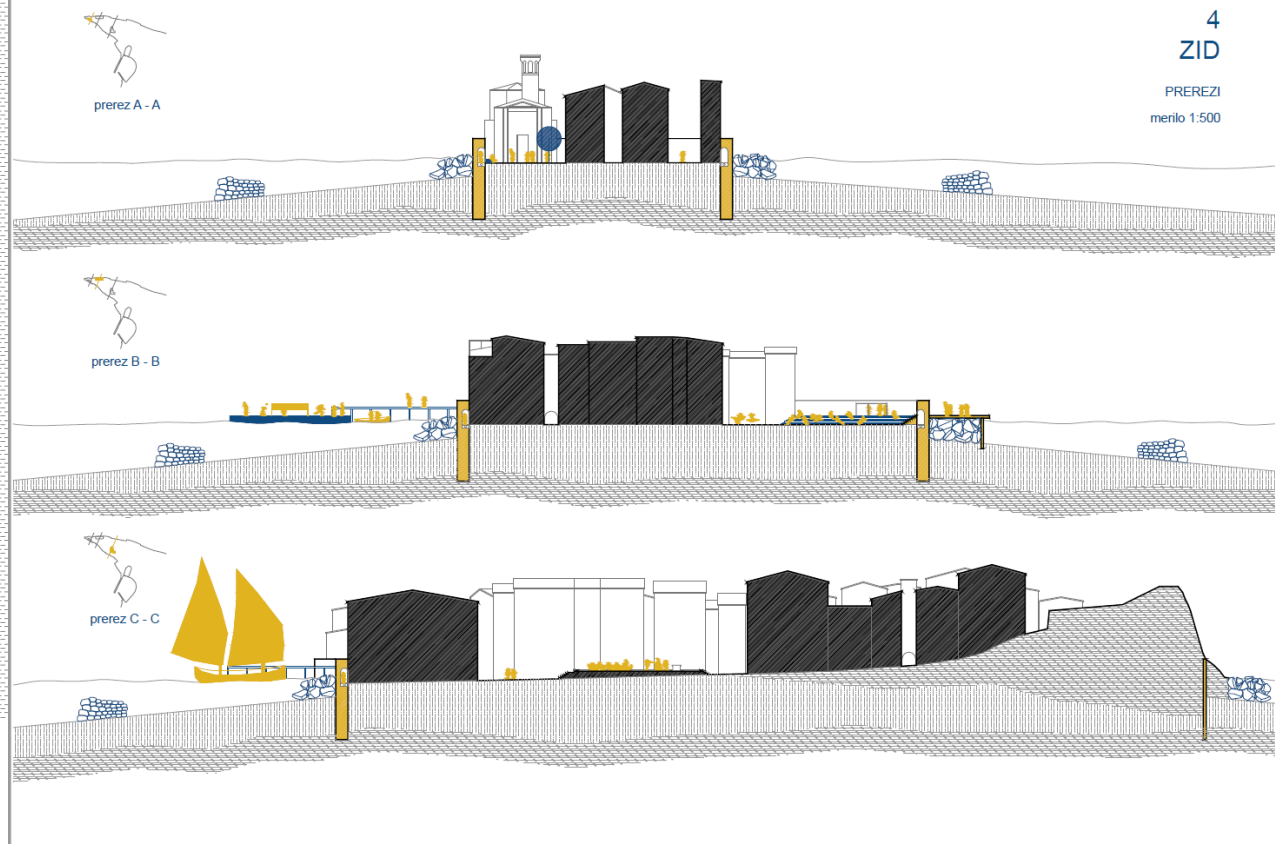
Alternative 3: The promenade





Alternative 4: The wall





Thank you for your attention

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