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CHAIR OF FLUID MECHANICS

International Architectural and Urban Design Workshop
WATERFRONT REDEVELOPMENT: IZOLA EAST

Legal regimes, technical and operation boundary conditions of constructing islands in Slovenian sea

prof.dr. Franci STEINMAN, dr. Leon GOSAR

IZOLA, 24th September 2012

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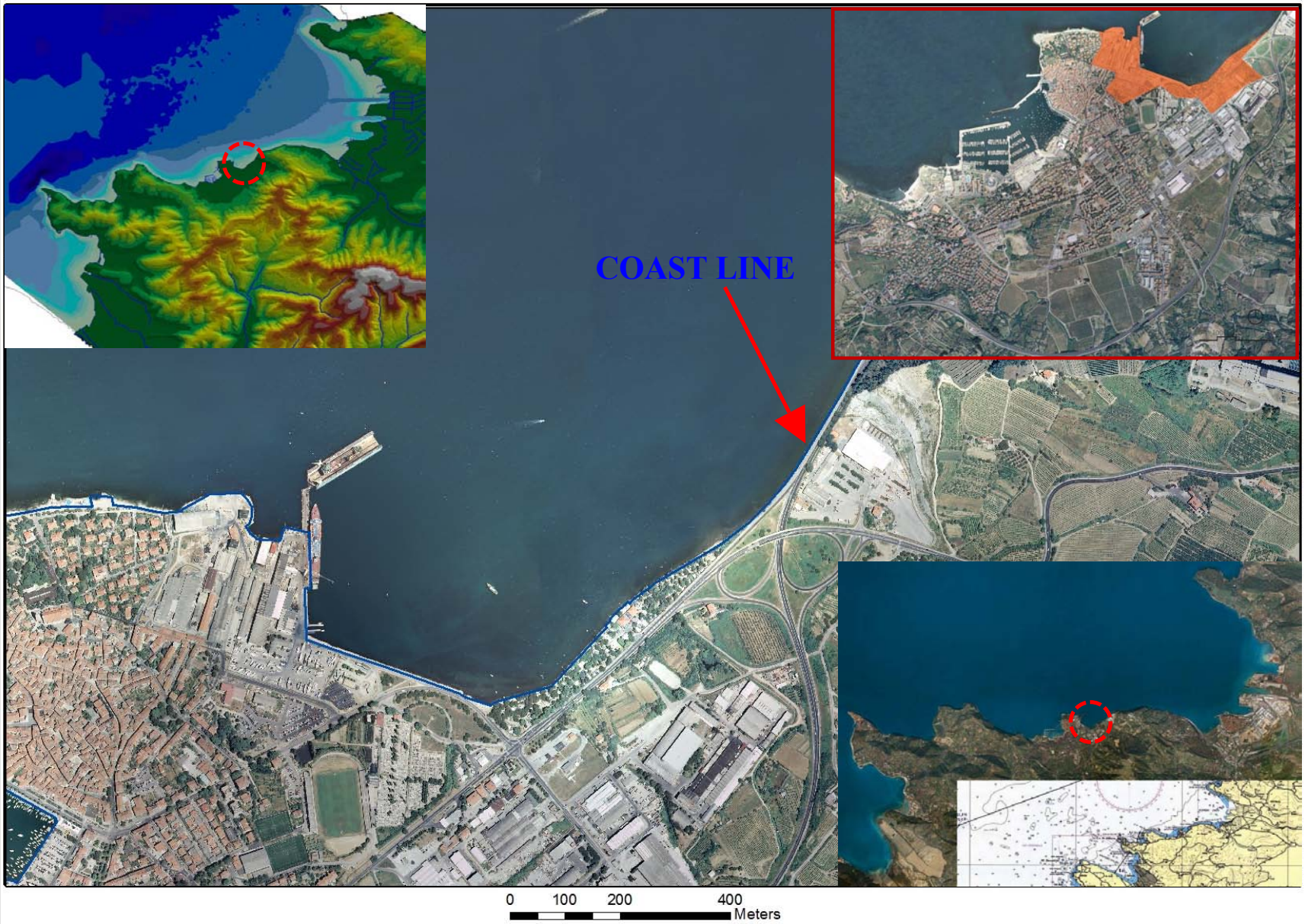
PROJECT AREA – VILIŽAN BAY



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BOUNDARY CONDITIONS

Before the construction of island (or any other structure in the sea), it is necessary to examine:

- law regulations (i.e. common legal aspects of public good, free access to water),
- curent legal regimes and granted water rights,
- technical and operation boundary conditions (general, exceptional and extreme condition),
- economic aspects,
- other aspects to enable the assessment of the acceptability of such a structure e.g. marine water ecological status.

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REGULATIONS

Law regulations:

- common legal aspects – marine public good; spatially defined by coastline (administrative)
- free access to water
- sea parcel is state owned
- marine side land (25 m) can be private or public owned; only building in public interest allowed
- ICZM Protocol: construction is not allowed in 100 m marine side zone (exceptions allowed)
- flood protection: highest tide + waves

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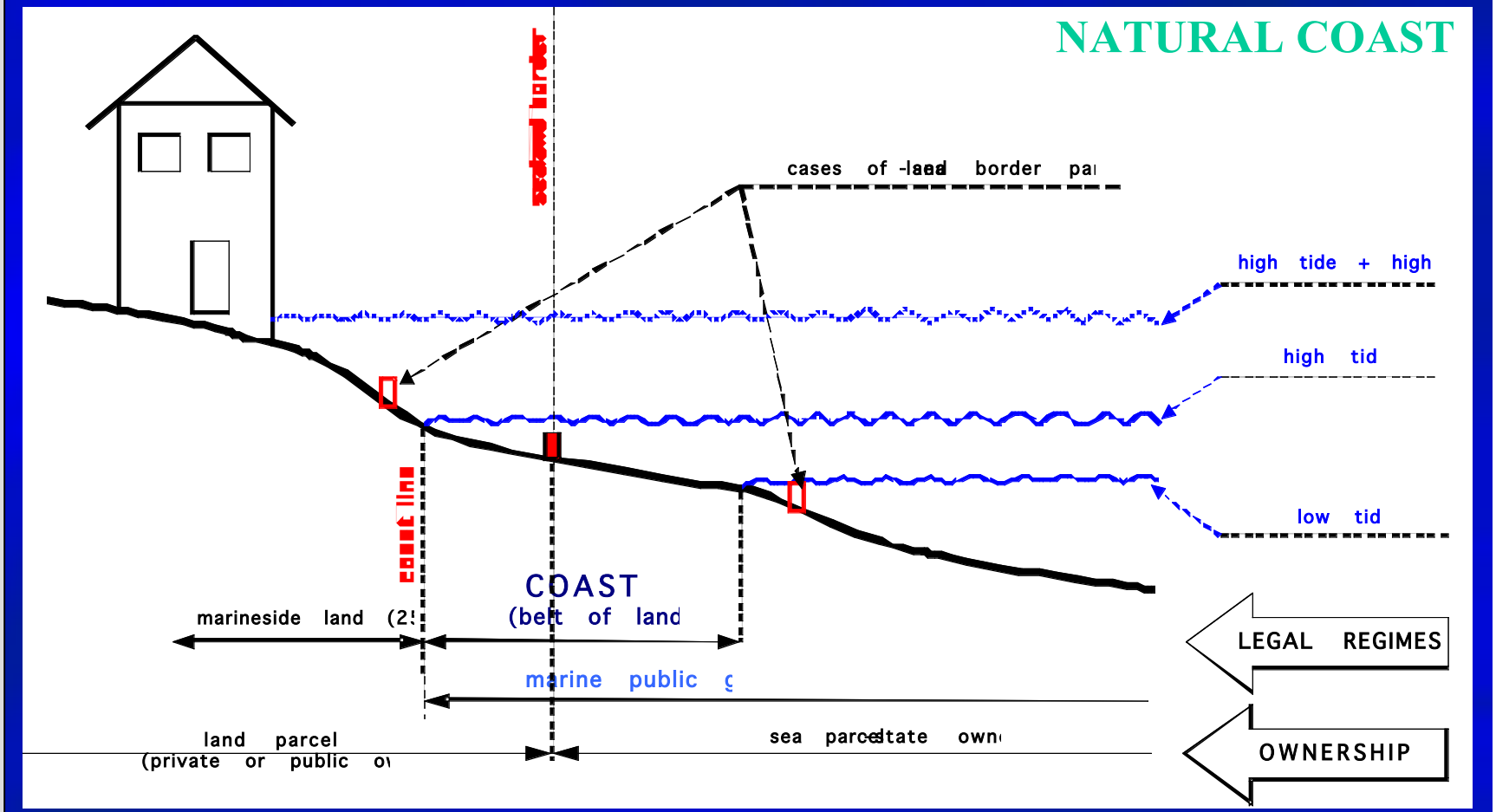
REGULATIONS



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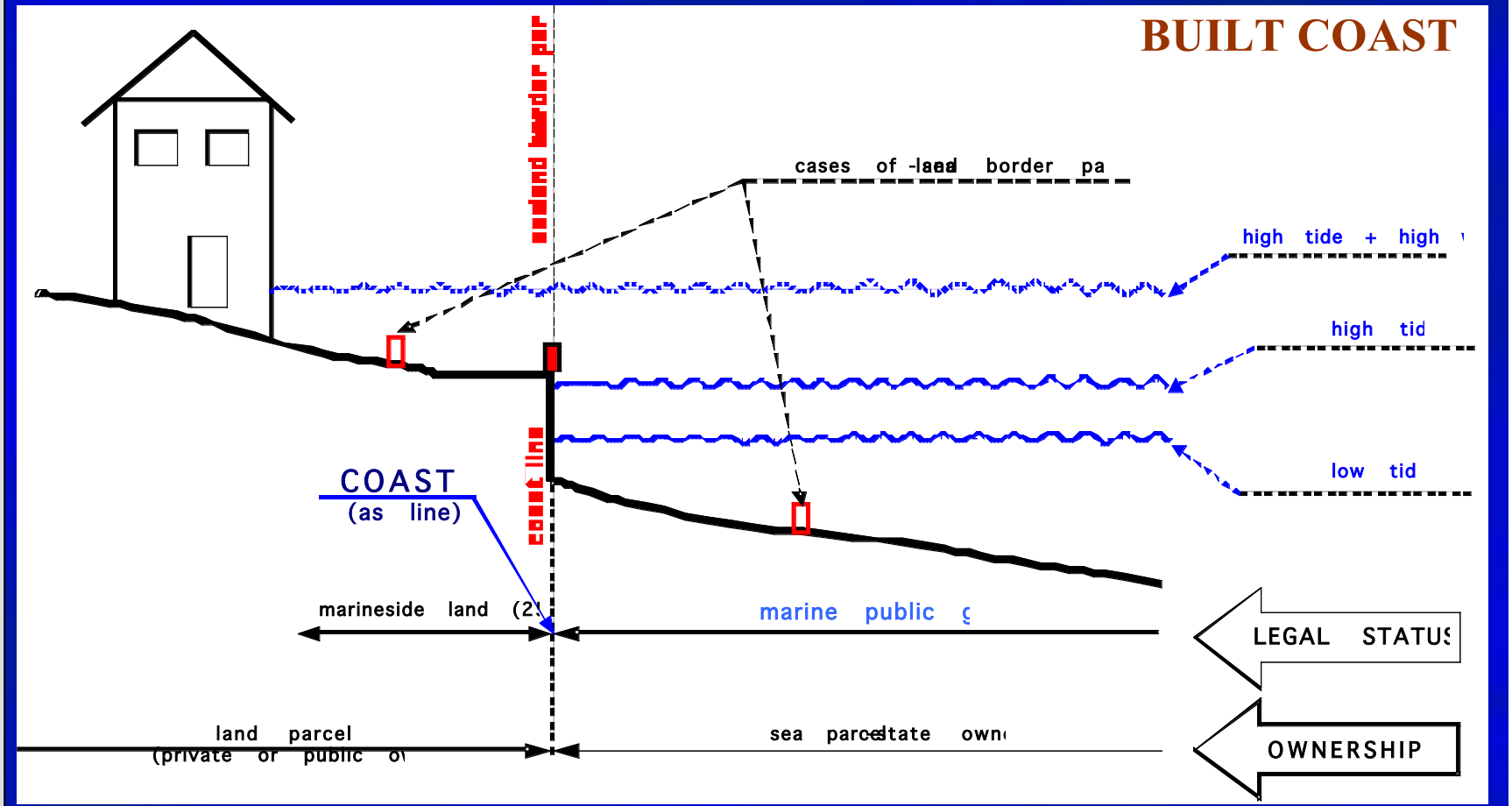

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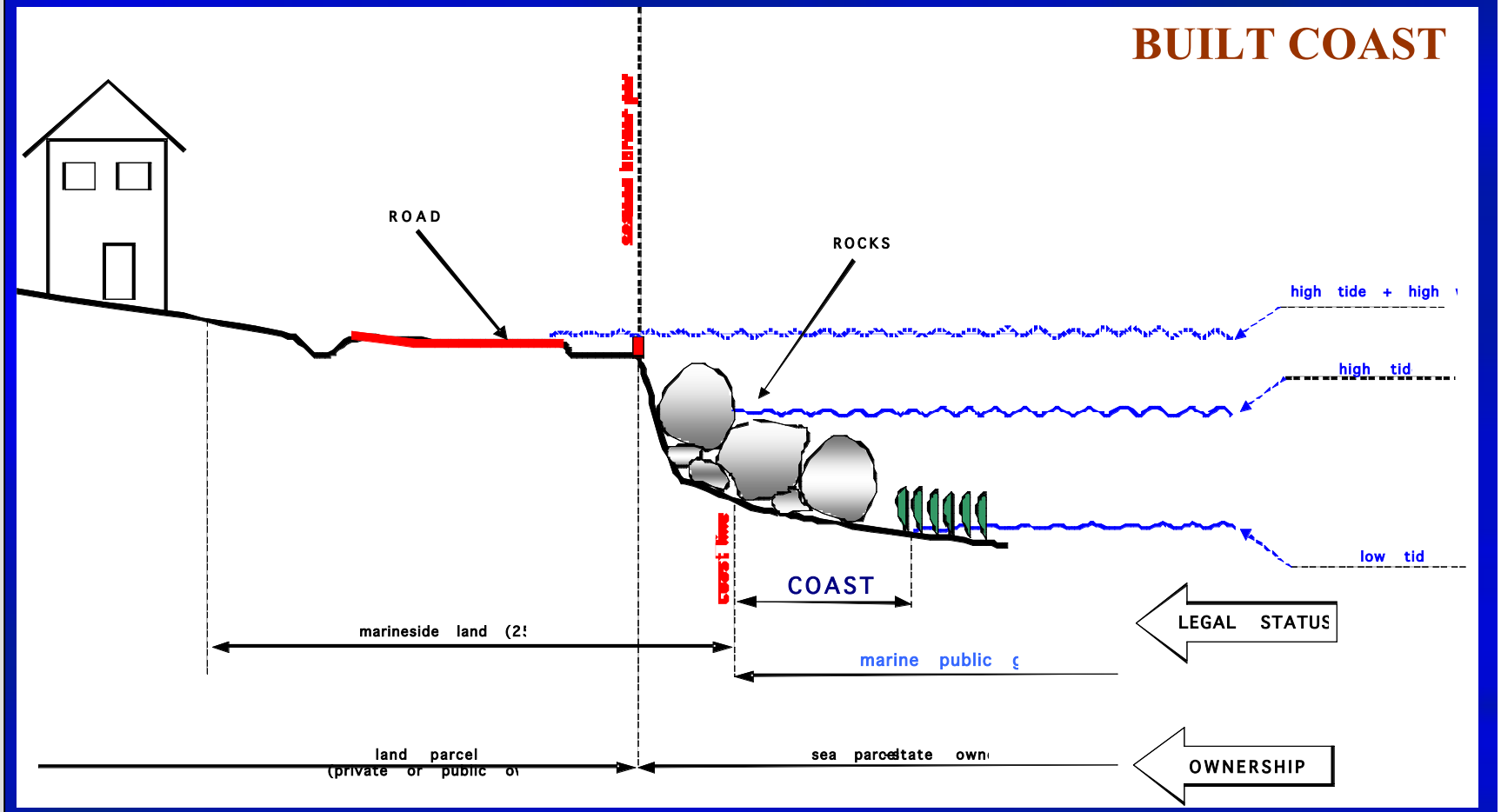

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LEGAL REGIME

The legal regime could be defined as a set of legal norms enforced by an act, whereby the method of exercising given rights of use and subsequent obligations (or limitations) is codified for a uniformly defined area.

- Water rights
- Area with limitation of use
- Area defined by land area uses

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Legal regimes of Slovenian sea

- water rights
- protected area - nature preservation,
- protected area - cultural heritage,
- aquatory of ports, anchorages areas, nautical routes - reervation for shipping,
- beaches and bathing waters – recreation and leisure,
- fishing reserves and mariculture aquatories – fisheries.

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Legal regimes of Viližan Bay

Data source: ARSO (2012)

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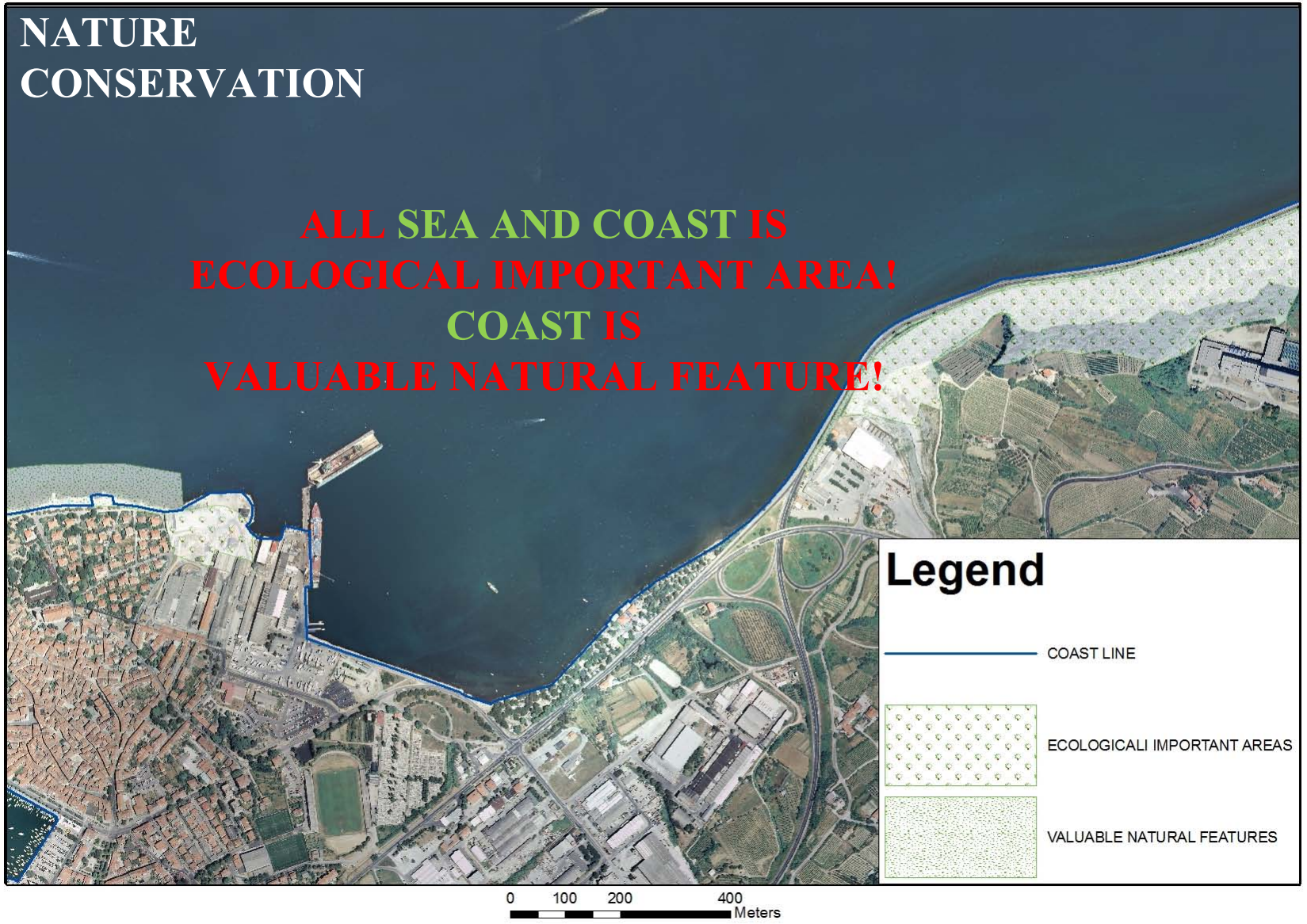

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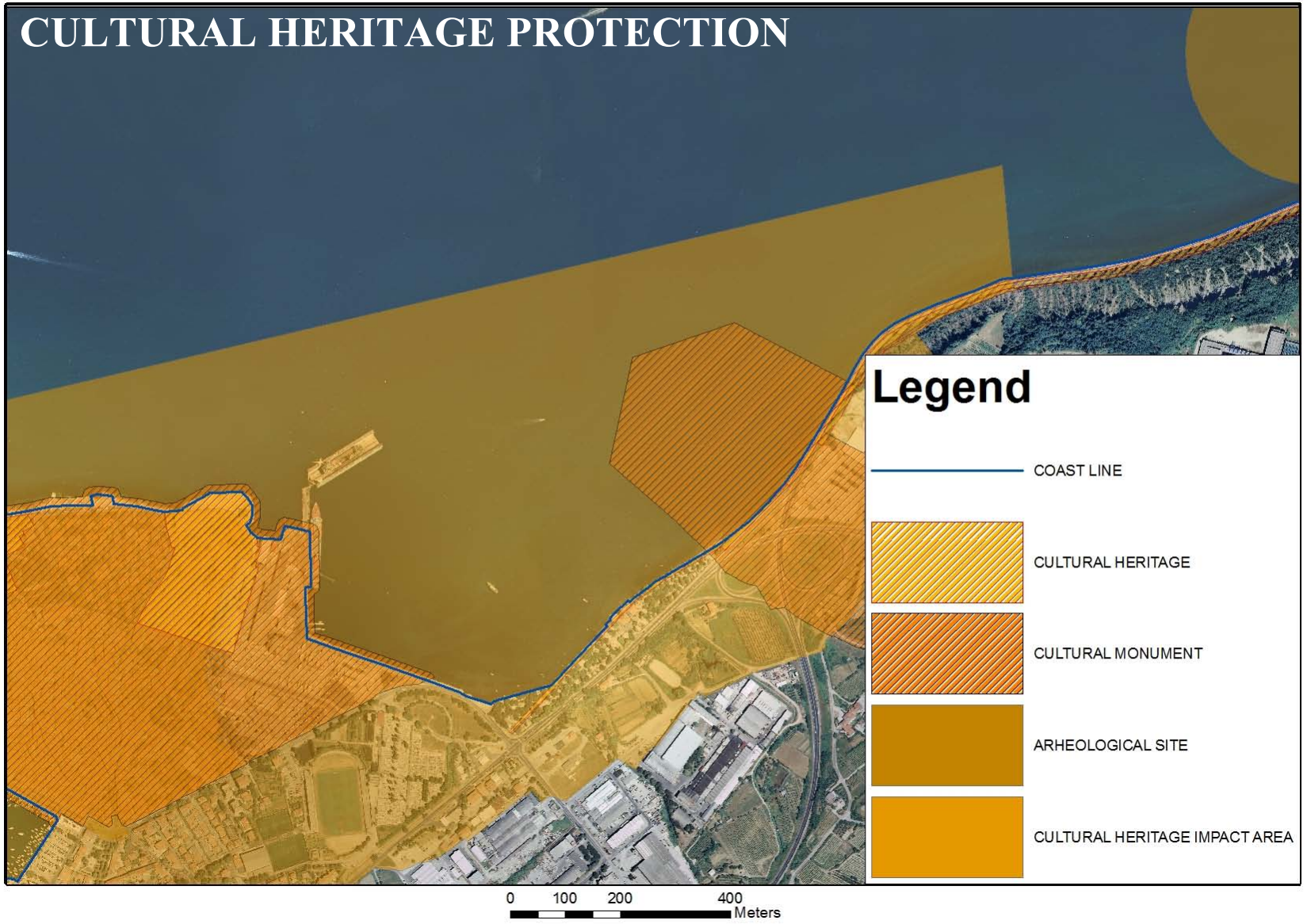

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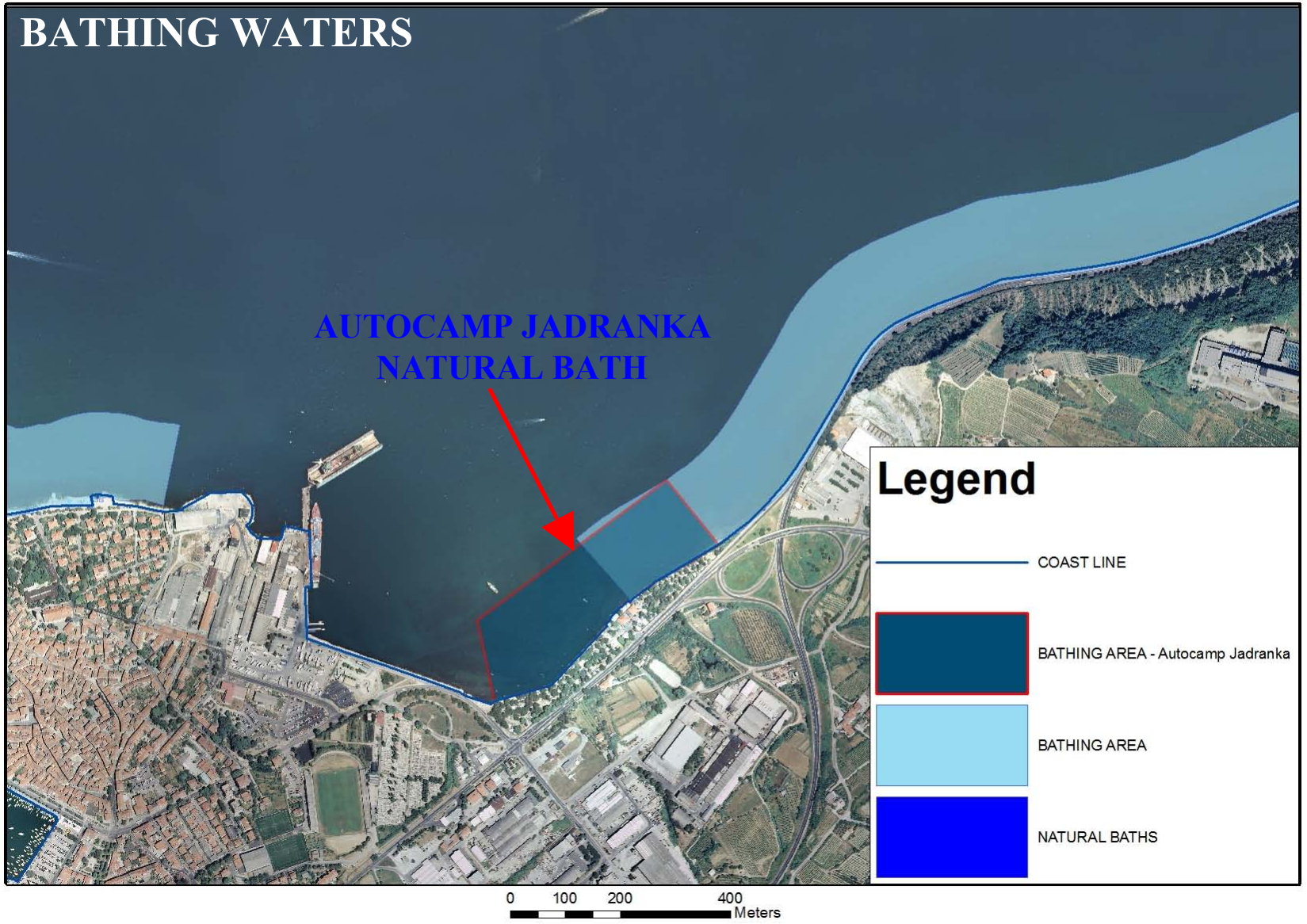
Legal regimes of Viližan Bay



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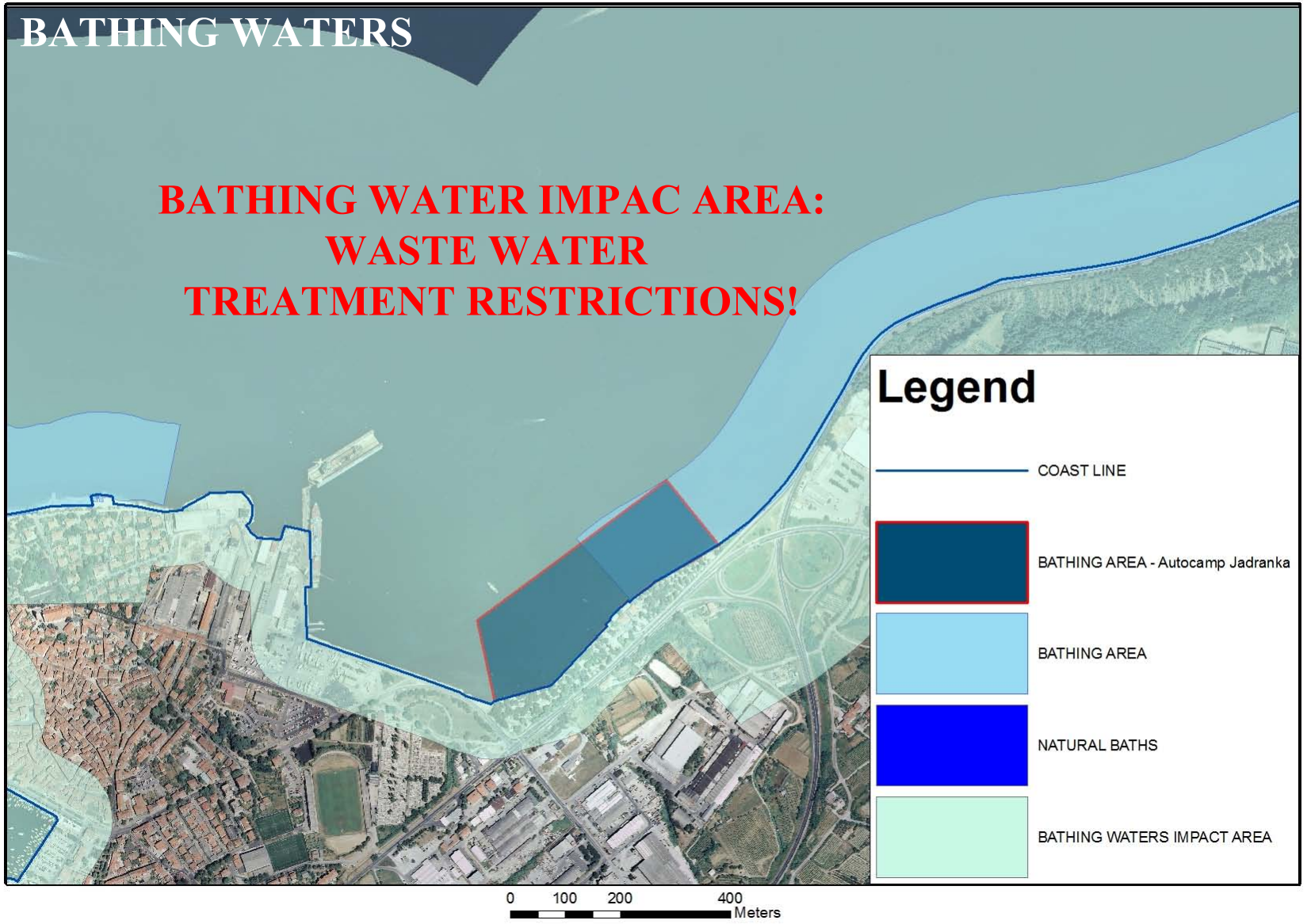

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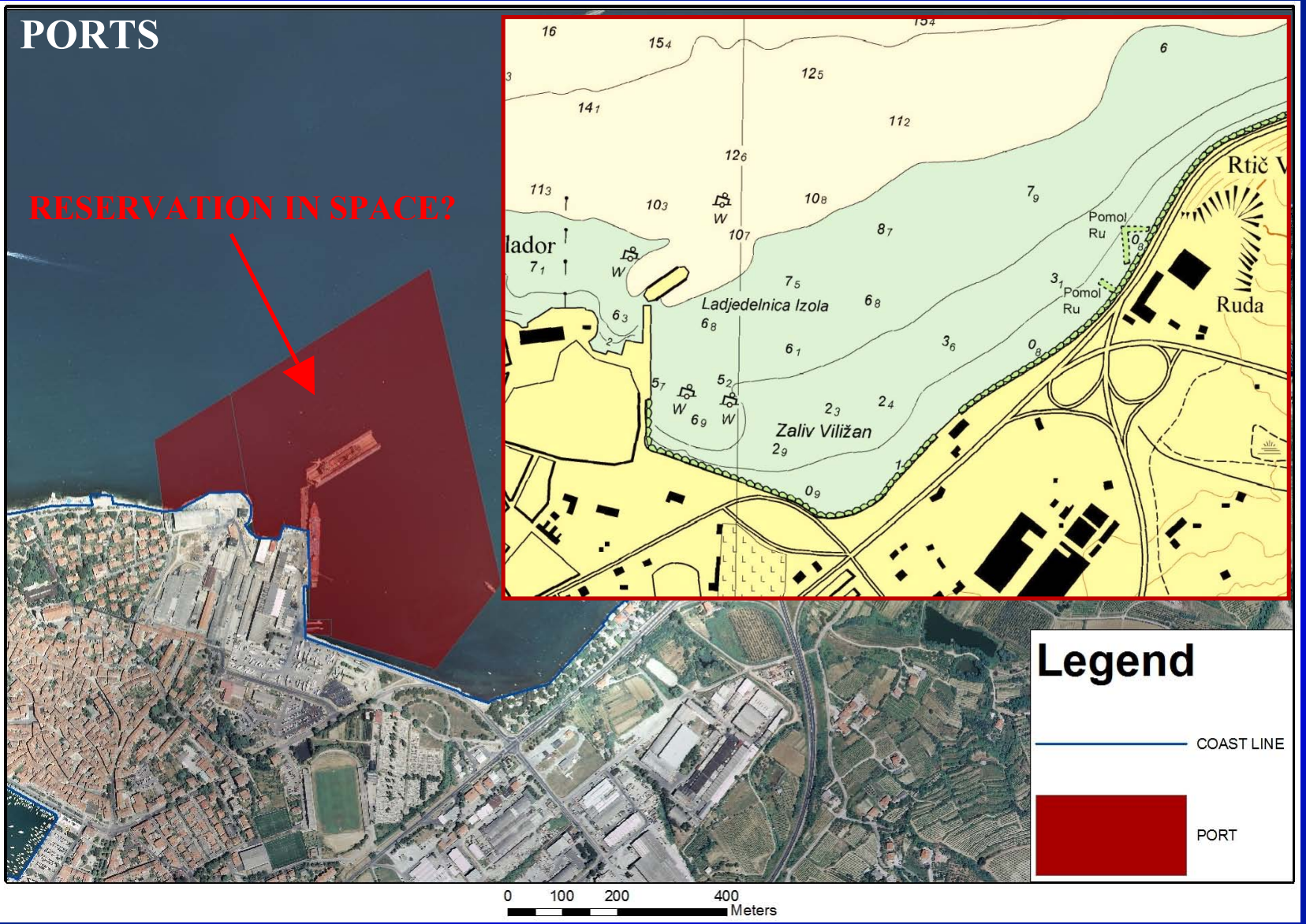

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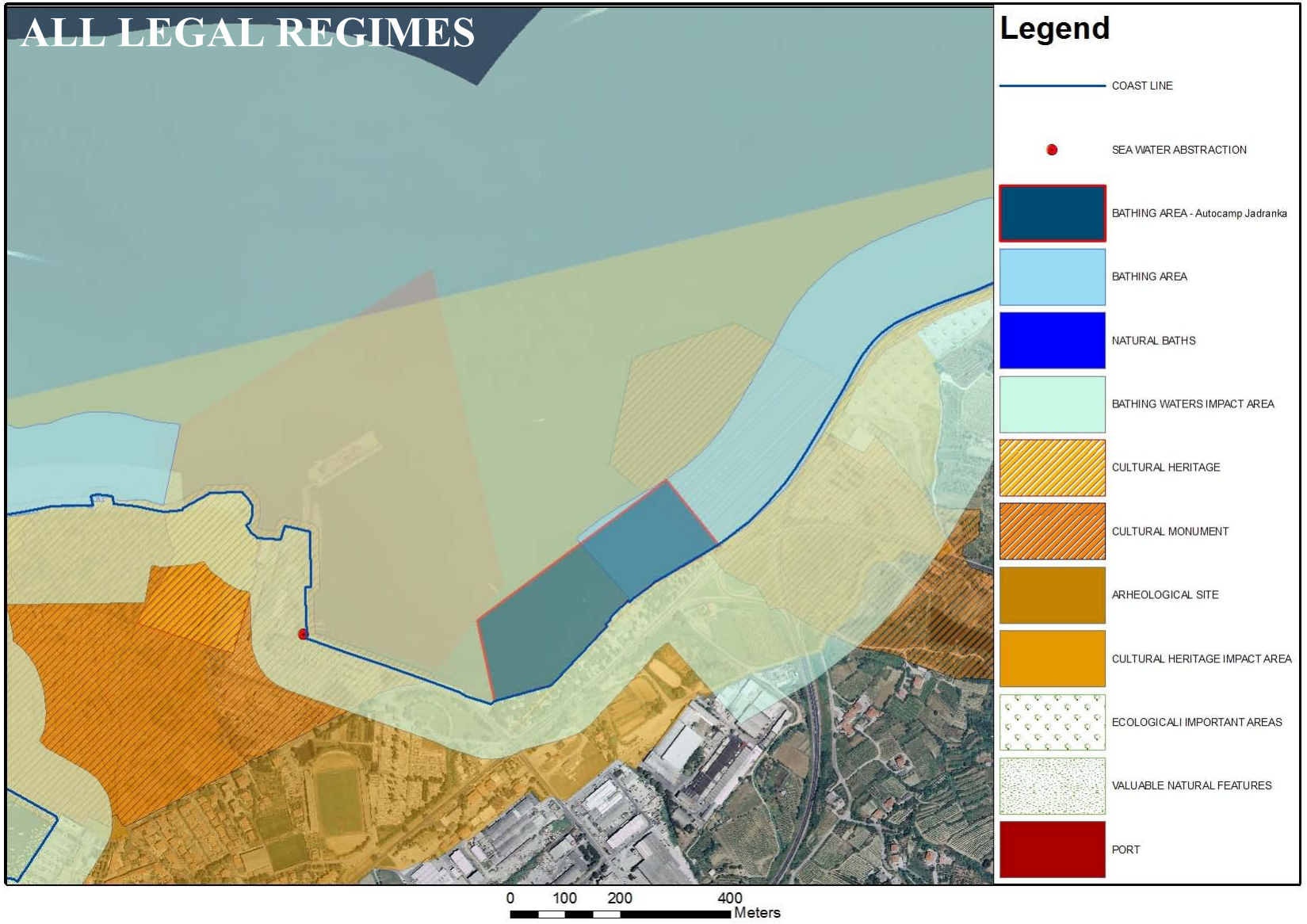

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TECHNICAL AND OPERATION BOUNDARY CONDITIONS

Technical boundary conditions
(specific for marine environment!):

- currents (tide and wind induced, 3D!)
- winds (bura, tramontana, etc.)
- waves (wind and marine traffic induced waves)
- flood protection: highest tide 1,73m a.s.l. + waves (50% probability)

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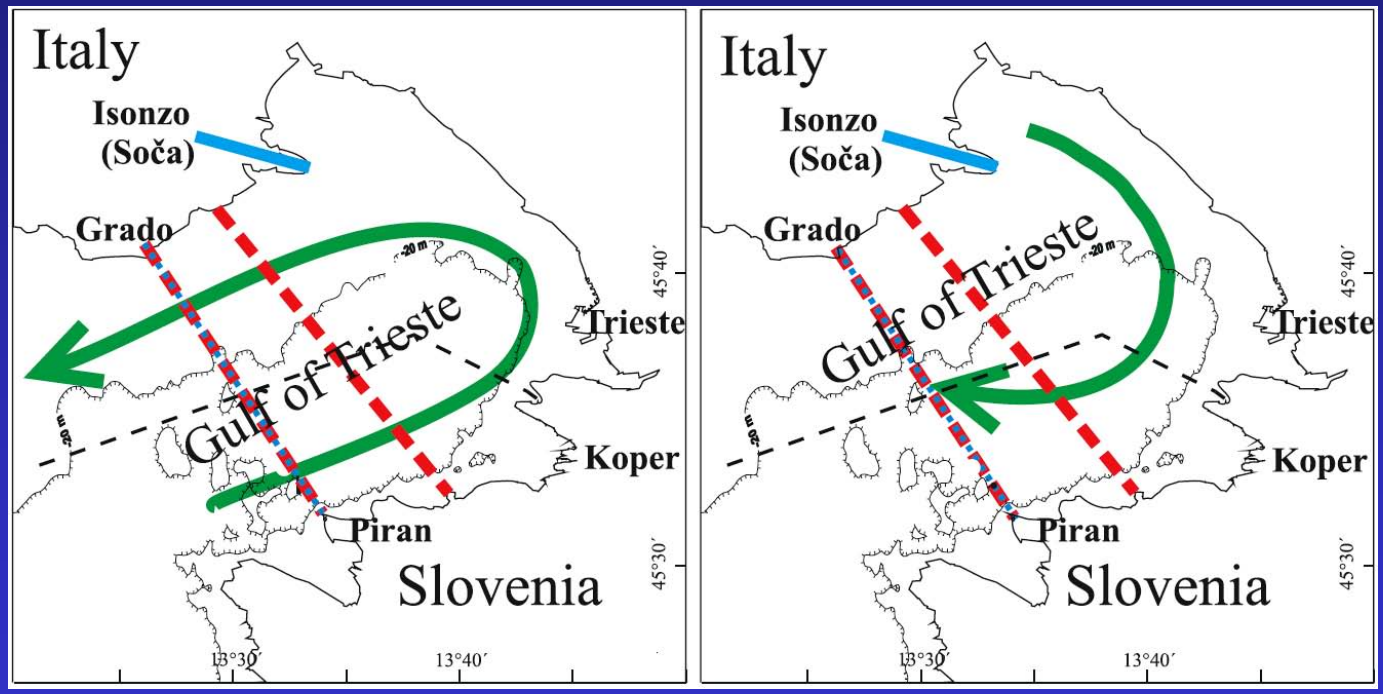

Malačič, V., and B. Petelin (2009), Climatic circulation in the Gulf of Trieste (northern Adriatic), J. Geophys. Res., 114, C07002

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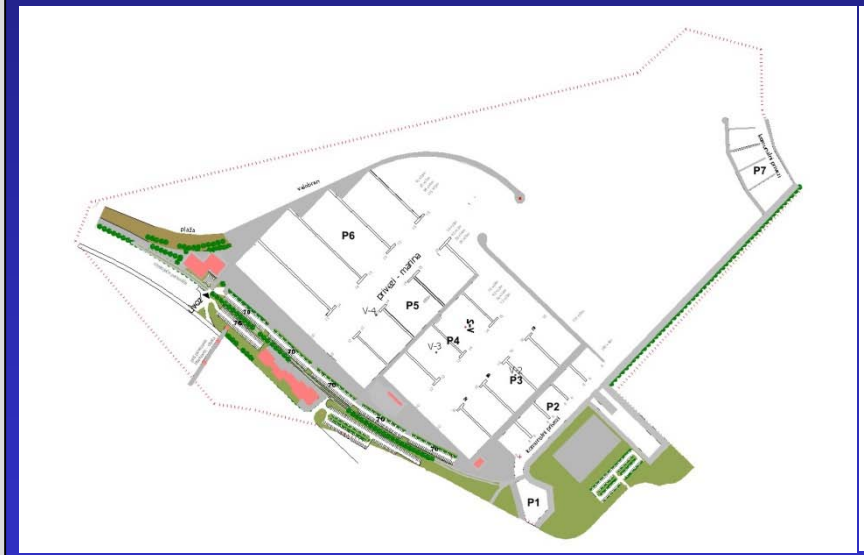
TECHNICAL AND OPERATION BOUNDARY CONDITIONS

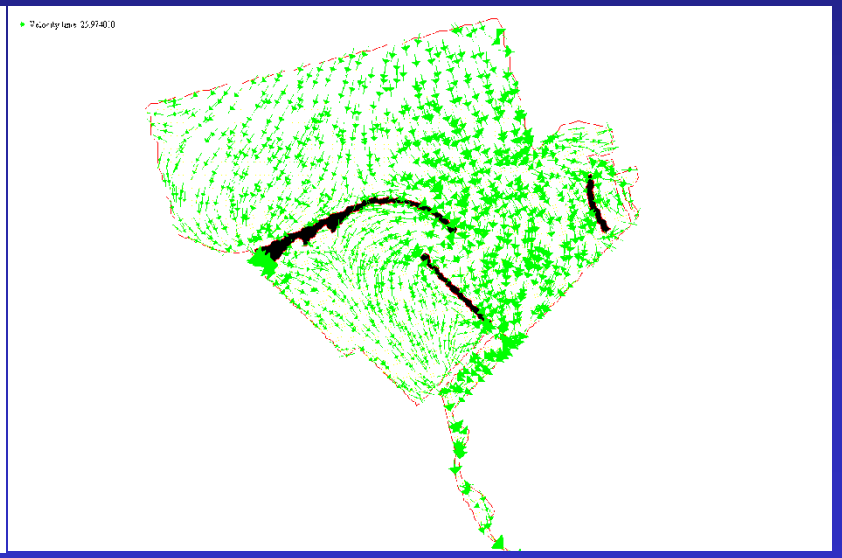
Technical boundary conditions:

- currents (tide, wind and river inflow induced, 3D!)

NEW MARINA IN SEMEDELA BAY



NUMERIC HYDRODINAMIC MODEL OF WATER VELOCITY FIELD



GOSAR, L., POGAČNIK, N., STEINMAN, F.. Hydrodynamic modeling of marine structures : new marina and local port in Semedela bay. Gradb. vestn., maj 2006, letn. 55, str. 103-112

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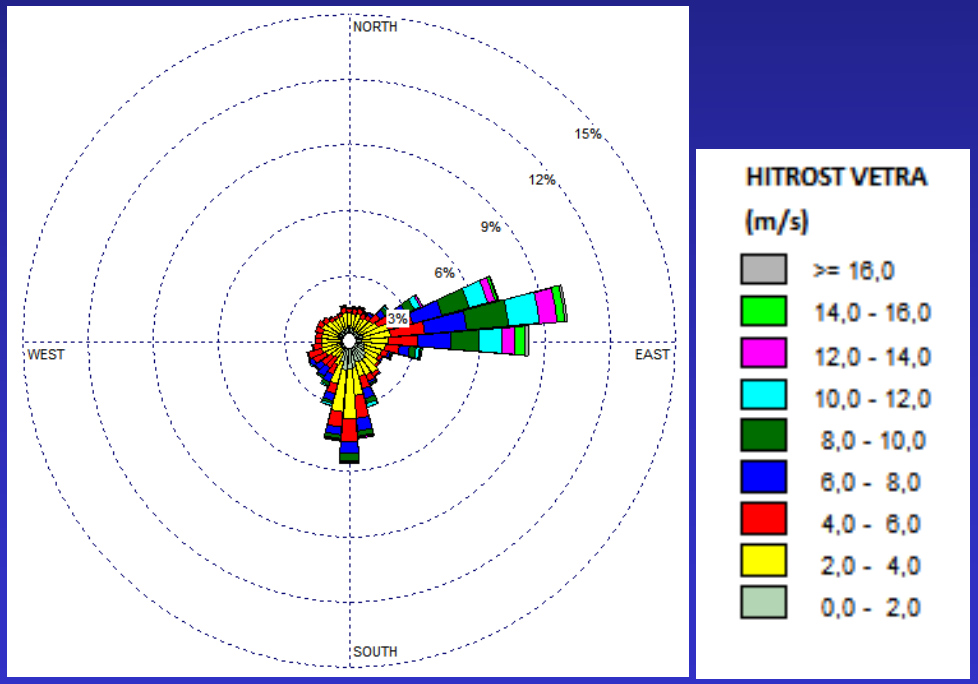
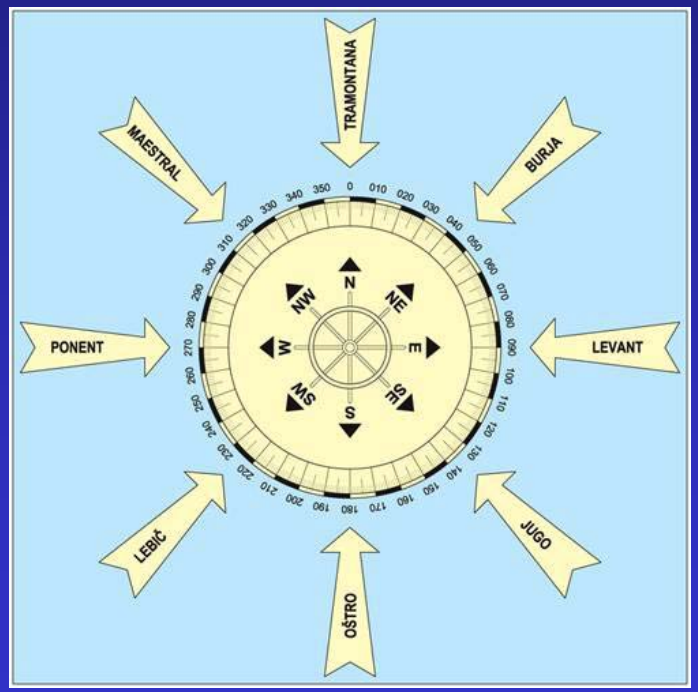
WIND ROSE



CHARACTERISTIC WINDS



HLADNIK, V., MALAČIČ, V.. Roža vetrov in roža valov - kateri valovi se pojavljajo pri določenih vetrovih : študija, Piran: Morska biološka postaja, Nacionalni inštitut za biologijo, junij 2011. 17 str., ilustr.

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TECHNICAL AND OPERATION BOUNDARY CONDITIONS

Technical boundary conditions:

- winds (bura, tramontana, etc.)

Top ten wind gusts

date and time end	gust speed (m/s)	gust dir (deg)	mean speed (m/s)	mean dir (deg)
10.03.2010 07:15	44,5	118,7	21,6	92,2
08.08.2008 22:15	33,6	17,2	22,8	10,1
02.03.2011 08:00	32,4	98,0	21,9	100,8
07.02.2012 19:30	32,0	96,2	22,2	89,0
07.12.2003 03:30	25,6	57,7	18,8	62,1
24.01.2006 01:30	25,2	60,2	18,5	57,8
18.12.2006 19:30	25,1	81,0	17,5	79,1
24.12.2003 18:30	24,9	53,3	19,0	57,7
24.09.2004 12:00	24,8	70,5	18,7	71,9
11.04.2005 05:30	24,7	74,8	19,5	68,2

Top ten powerful Tramontanas that occur in summer

date and time end	gust speed (m/s)	gust dir (deg)	mean speed (m/s)	mean dir (deg)
18.06.2008 01:30	43,9	298,6	3,7	200,8
23.05.2007 14:00	42,7	0,4	3,6	215,8
09.08.2008 00:00	38,9	359,4	11,3	359,0
09.08.2008 00:30	33,6	17,2	20,6	16,9
18.06.2008 01:00	26,1	294,3	5,0	201,0
24.07.2003 18:30	26,0	253,4	7,3	236,9
16.06.2004 16:30	25,3	280,3	9,4	64,1
29.06.2005 20:30	25,3	307,1	7,2	295,1
28.07.2006 21:00	25,1	290,0	11,7	285,2
04.07.2007 15:30	24,9	352,8	8,9	344,4

Oceanographic buoy VIDA (http://buoy.mbss.org)

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TECHNICAL AND OPERATION BOUNDARY CONDITIONS

Technical boundary conditions:

- waves (wind and marine traffic induced waves)

Highest waves (higher than 2 m) from 2006 onwards

Date and time of measurement	wave height (m)	maximum wave height(m)	mean direction (deg)	mean period (seconds)
04.02.2012 05:00	2,4	4,8	40,0	4,4
02.03.2011 09:00	2,4	4,2	37,3	4,6
10.03.2010 06:30	2,4	4,2	46,9	4,7
24.01.2006 02:05	2,4	4,0	12,4	0,0
29.03.2006 04:05	2,2	3,7	216,5	5,0
04.07.2007 15:40	2,0	3,3	29,9	4,2
19.12.2009 12:00	1,8	3,2	45,0	4,1
16.01.2006 20:35	2,1	3,2	103,9	236,9
04.03.2008 16:50	1,6	3,0	37,1	3,9
18.12.2006 18:40	1,8	2,9	52,0	4,1

Oceanographic buoy VIDA (http://buoy.mbss.org)

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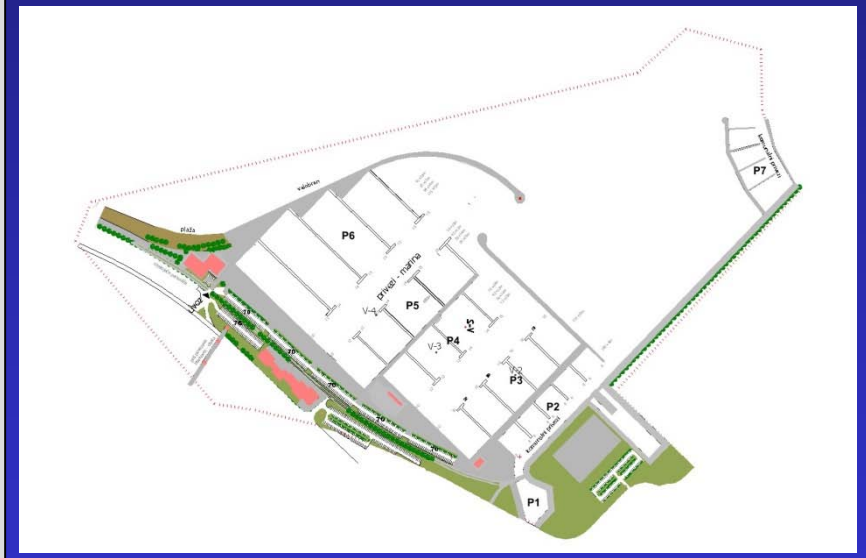
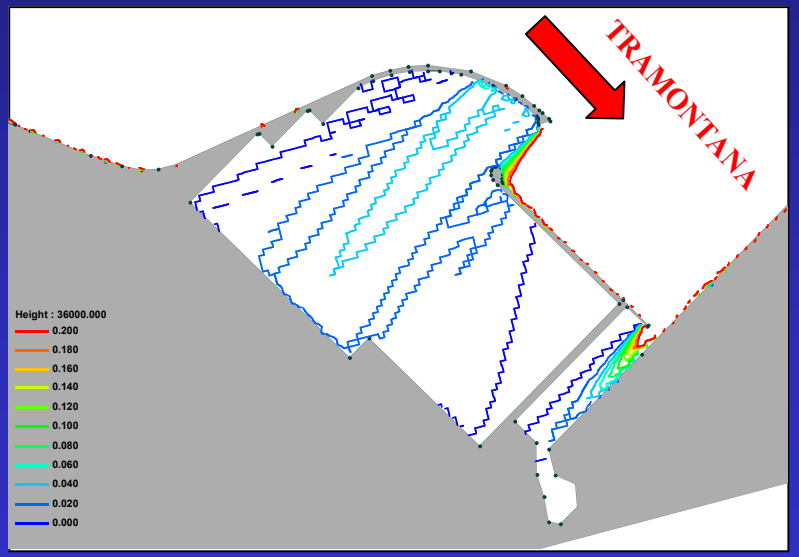


NUMERIC HYDRODINAMIC MODEL OF WAVES – max. 30 cm in marina



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IZOLA, 2008

http://www.mojvideo.com

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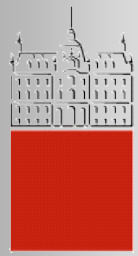

TECHNICAL AND OPERATION BOUNDARY CONDITIONS

Operational boundary conditions of constructions:

- general – normal operation
- exceptional – floods, high wind induced waves
- extreme – marine vessel collision, tsunami

Design construction for events where protection is not possible.

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RIVER BASIN MANAGEMENT PLAN & MARINE STRATEGY

The EU Water Framework Directive (2002):

- River basin management plan (2009-2015)
- surface waters & groundwaters
- good status for all waters till 2015

Marine Strategy Framework Directive (2008):

- achieve good environmental status of the EU's marine waters by 2020

The **Ecosystem Approach**
is considered one of the most
important principles of
sustainable environmental management.

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Developing marine environment use and constructions in the sea requires a comprehensive planning of the sea, the coast and coastal land use.

A numerous functional connections of the activities on the sea with mainland uses and vice versa exist, so, a coordinated planning of both areas is crucial.

The synthesis of legal regimes existed in Viližan Bay will be very illuminating.

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