

## WATER SYSTEMS

As the research within "STORIA" shows, the city of Padua and other Veneto communities have been characterized with unique hydrological circumstances. As populations have increased and residential and commercial land uses have developed and expanded into former agricultural areas, engineers and planners have had to design complicated water systems in an attempt to control natural hydrology. During heavy rains it is even possible to reverse water flow through some of the canals.

The regional canal network is finely tuned to regulate flooding as rainfall flows west to east from the mountains to the Venice lagoon. The canals have two primary functions:

- (1) conveyance systems that move water through the landscape
- (2) detention areas that hold back excessive flows and store flood waters

Despite these engineering efforts, flooding is still a problem, as indicated by the map below. In addition water quality is also a problem. The data shown in the table below indicates the level of pollution of Padua's waterways. In general, the trend is that water is relatively clean when it arrives from upstream mountains and towns and dirty when it leaves. The contamination is caused by two primary sources:

- (1) runoff from streets, parking lots, and other impervious areas, which increases heavy metals, nutrient loading, and suspended solids
- (2) untreated waste water, which increases biological oxygen demand (BOD) and bacteria levels (e.g. fecal coliform)

The principal wastewater problem is shown in the map at bottom center. In the map, the blue oval overlies the approximate unsewered area of the city of Padua. Sanitary wastes from homes and commercial buildings in this area are piped directly into the canal system, rather than a wastewater treatment plant. The Fossetta River is the waterway which receives this wastewater. As the diagram illustrates, the Fossetta is piped underground below the ZIP industrial area, and flows in an open channel into Roncagette Park. Here, it mixes with the water from the Roncagette Canal and flows downstream. The long-term contamination of this water has also led to the problem of sediment toxicity in the local canals.

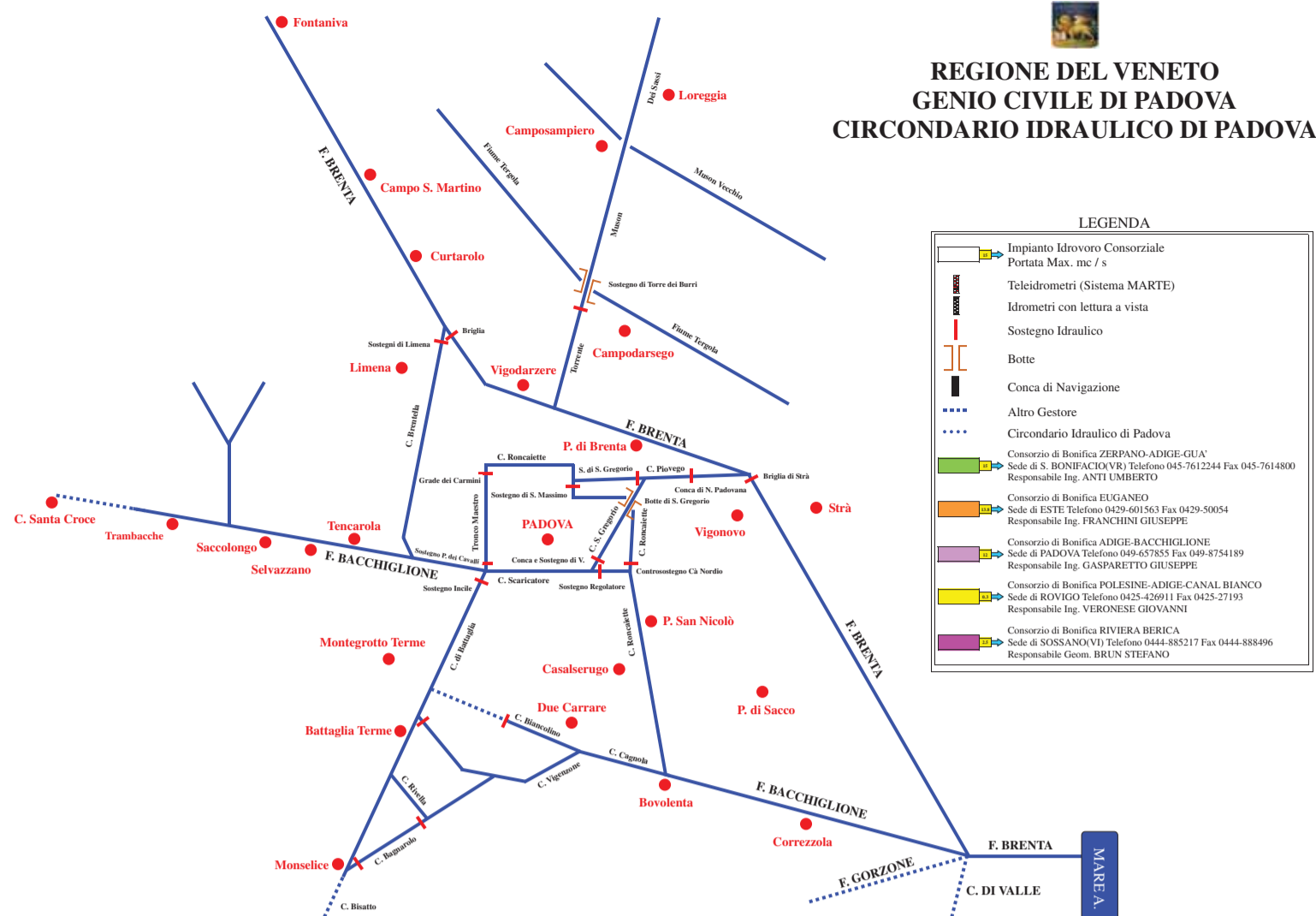


diagram of canal systems: canals provide water supply and flood control



original zip property & straight canal



transition from urban to rural



canals provide water and flood control throughout the landscape

## ZIP PROPERTIES

Just as water changes in character through the Padua region, land uses also vary. The right-hand column of this poster illustrates the range of land uses from industrial to agricultural. The existing industrial properties owned by the ZIP consortium are shaded in purple (comprising approximately 9.7 million m<sup>2</sup>). The primary activities in these industrial zones are logistics, storage and shipping, and manufacturing. Emerging activities include computer engineering, science, technology, and research. ZIP has proposed expanding their activities to the south into the neighboring communities of Ponte San Nicolo, Polverara, and Legnaro. They are interested in acquiring up to 2 million m<sup>2</sup> of land for industrial activities. Presently, the area shaded in yellow-green below (approx. 4 million m<sup>2</sup>) is predominantly agriculture and residential development, adjacent to the University research station at Agripolis.



NAVIGABILITY OF CANALS



regorio & scaricatore canals



water quality map: water is clean when it enters padova, dirty when it exits



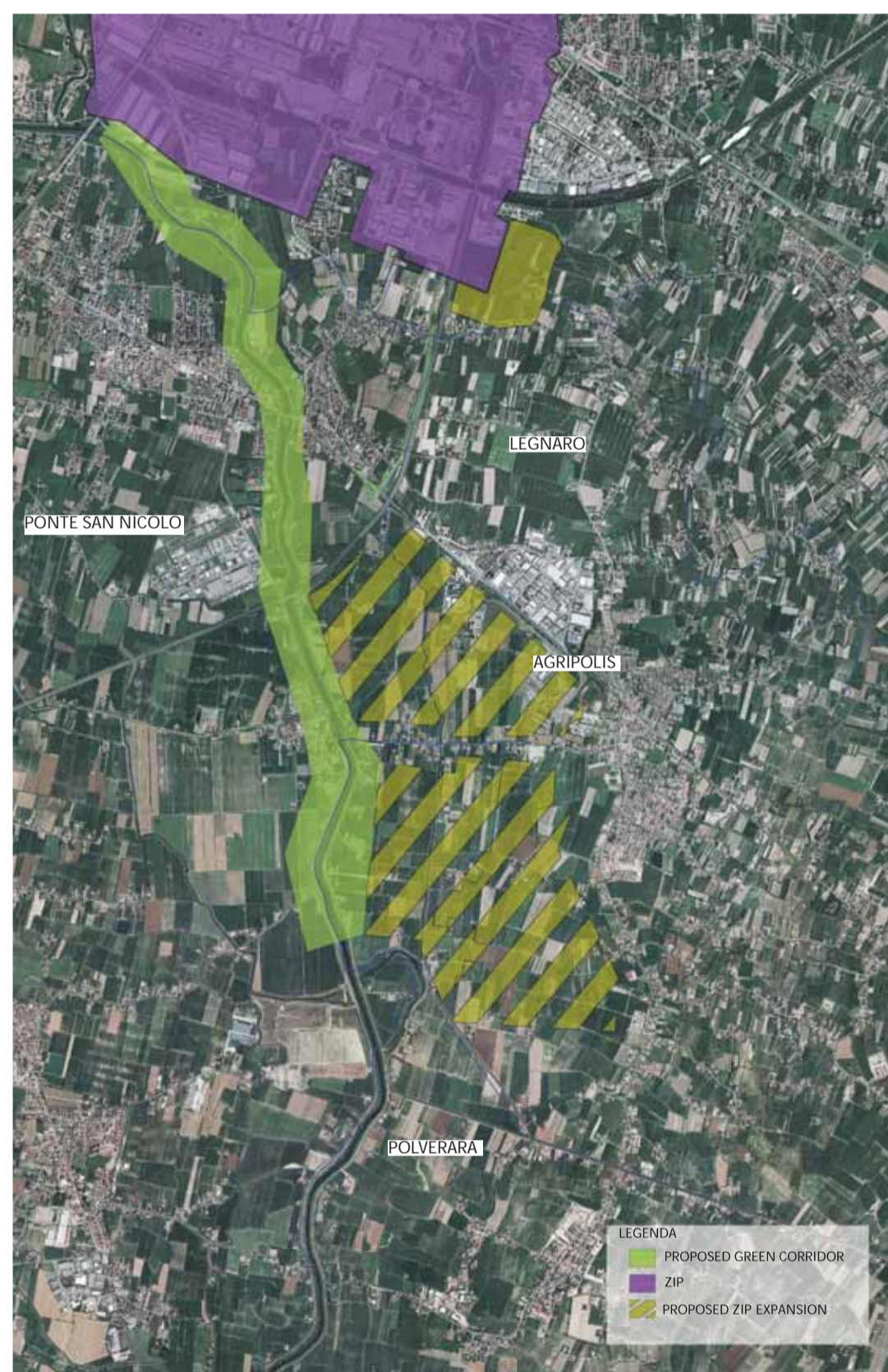
roncagette canal, ponte san nicolo

Parametro	QUALITÀ					DQA
	Livello 1	Livello 2	Livello 3	Livello 4	Livello 5	
100-OD (l/sat) (*)	≤ 10 (8)	≤ 20	≤ 30	≤ 50	> 50	
BOD <sub>5</sub> (O <sub>2</sub> mg/L)	< 2,5	≤ 4	≤ 8	≤ 15	> 15	
COD (O <sub>2</sub> mg/L)	≤ 5	≤ 10	≤ 15	≤ 25	> 25	
NH <sub>4</sub> (N mg/L)	< 0,03	≤ 0,10	≤ 0,50	≤ 1,50	> 1,50	
NO <sub>3</sub> (N mg/L)	< 0,3	≤ 1,5	≤ 5,0	≤ 10,0	> 10,0	
Fosforo totale (P mg/L)	< 0,07	≤ 0,15	≤ 0,30	≤ 0,60	> 0,60	
Escherichia coli (UFC/100 mL)	< 100	≤ 1.000	≤ 5.000	≤ 20.000	> 20.000	
Punteggio da attribuire per ogni parametro analizzato (75° percentile nel periodo di rilevamento)						
LIVELLO DI INQUINAMENTO DAI MACRODESCRITTORI	480-560	249-475	120-235	60-115	< 60	

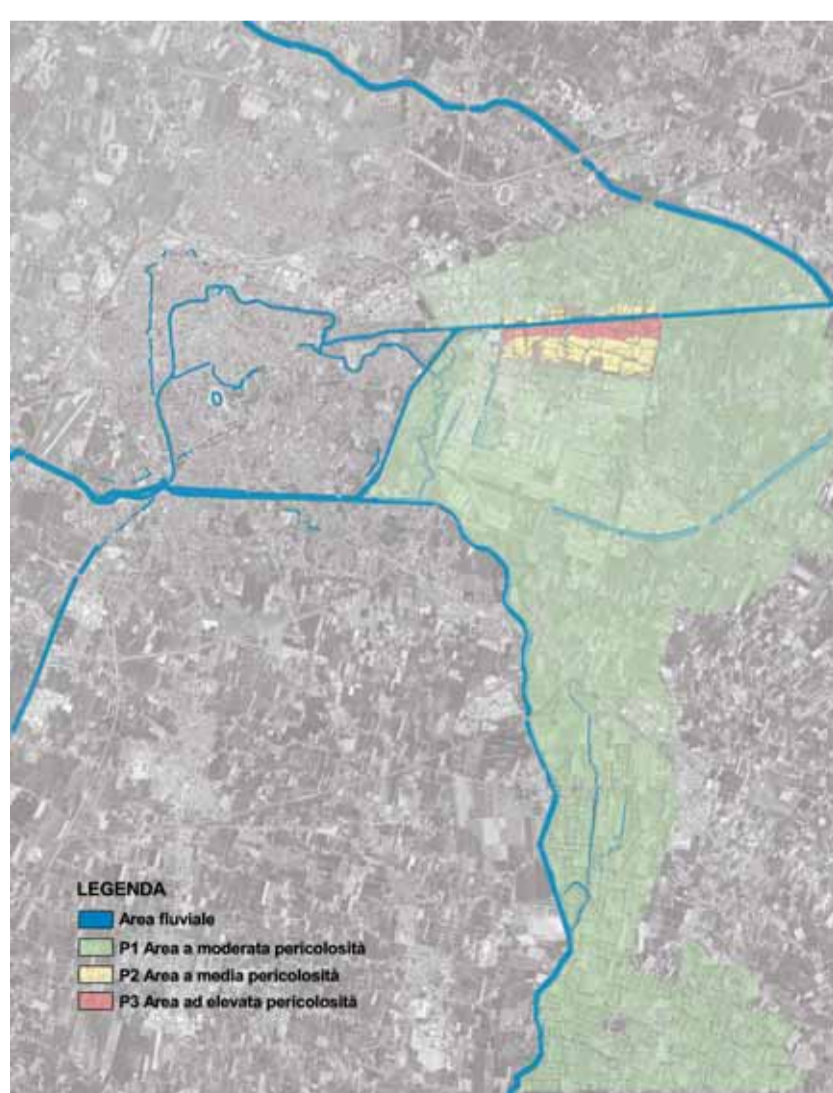
water quality data



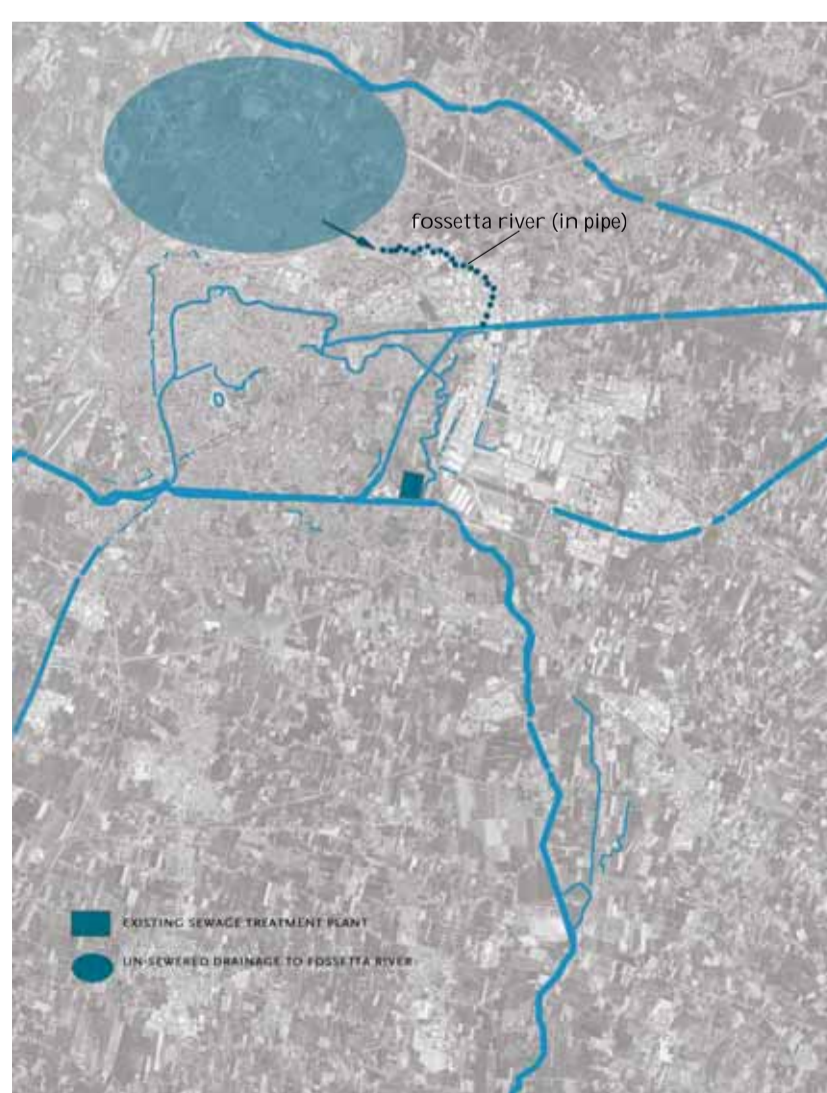
DI PROPOSED ZIP EXPANSION AERIAL VIEW



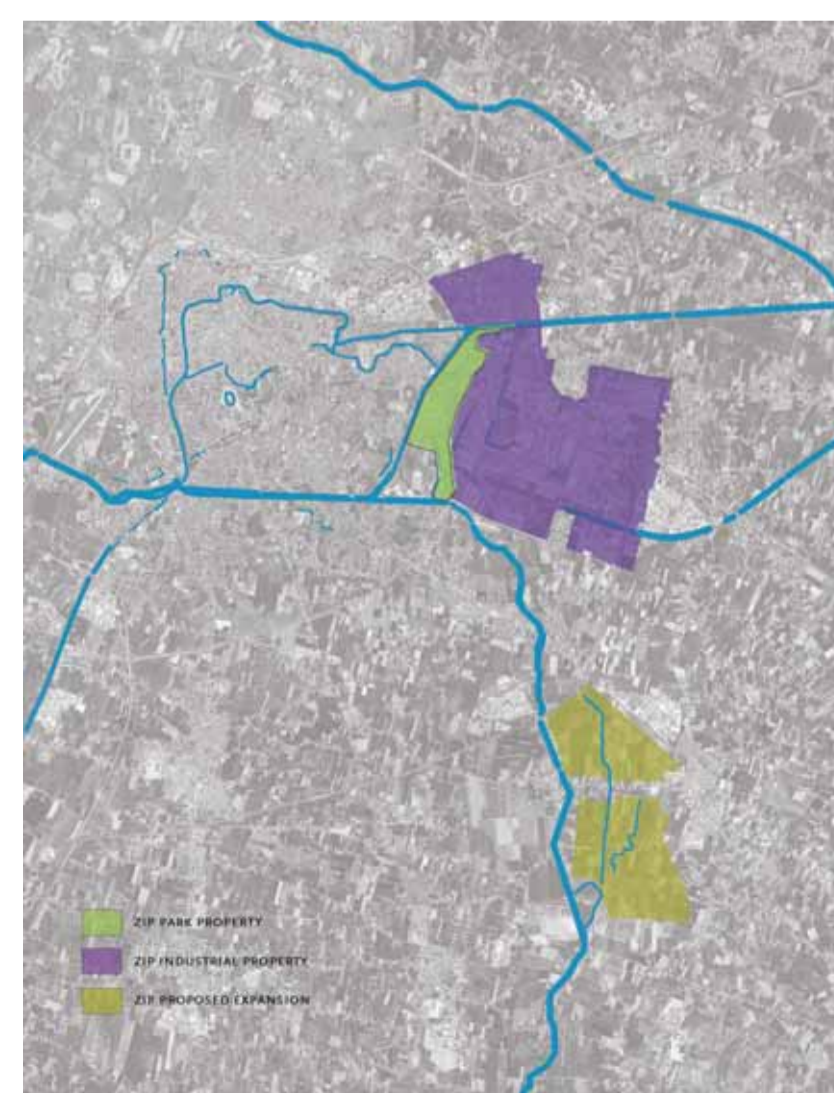
DETAIL OF PROPOSED ZIP SOUTHERN EXPANSION: possible links to agripolis university research & possible future industry in ponte san nicolo, legnaro, and polverara



canals, waterways & flood risk



north padua neighborhood with no sanitary sewer system: water drains untreated into the fossetta river



existing & proposed zip properties