

**La Città e l'Ambiente**

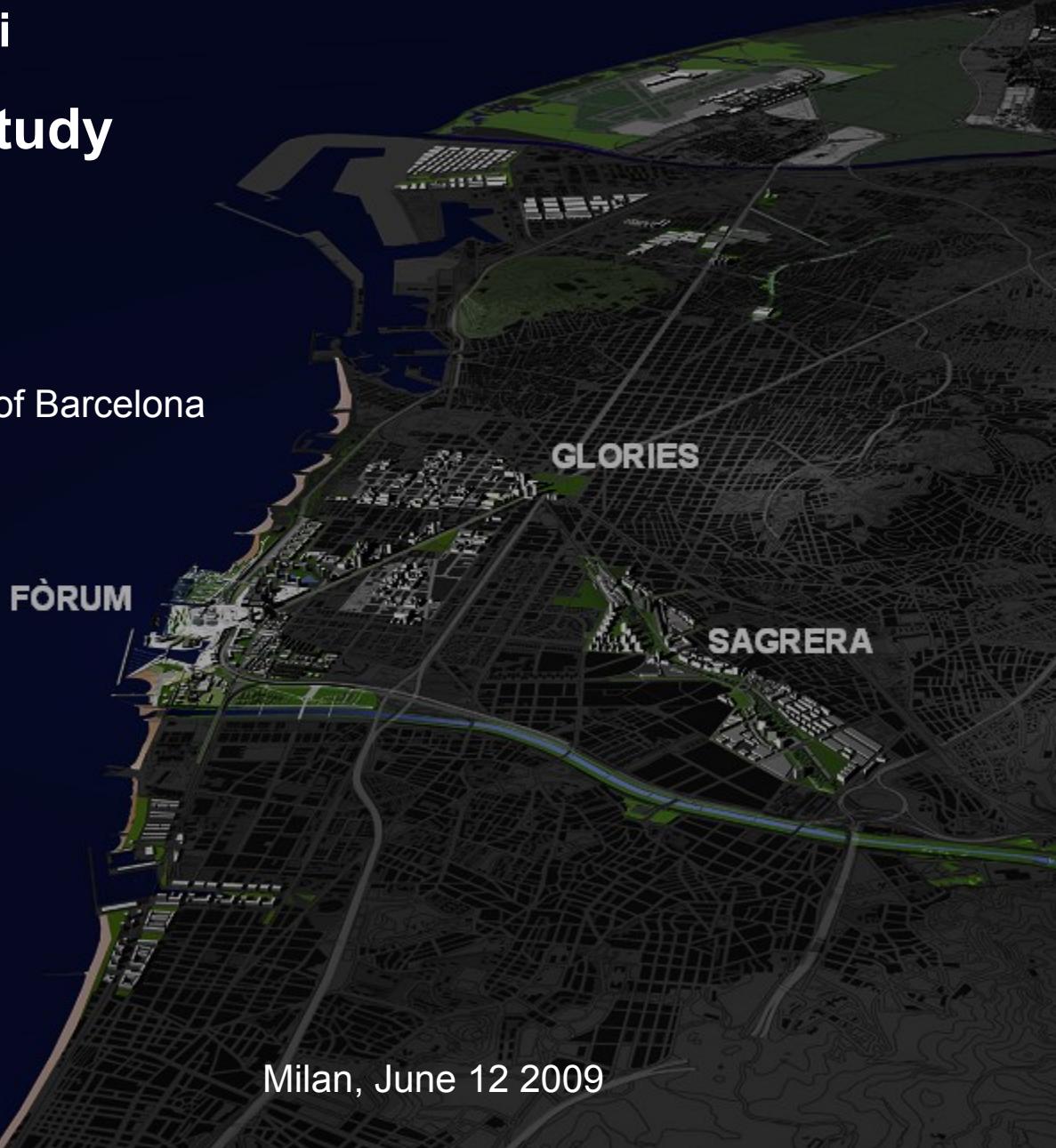
**Costruire città sostenibili**

# **BARCELONA case study**

**Josep Acebillo**, Architect

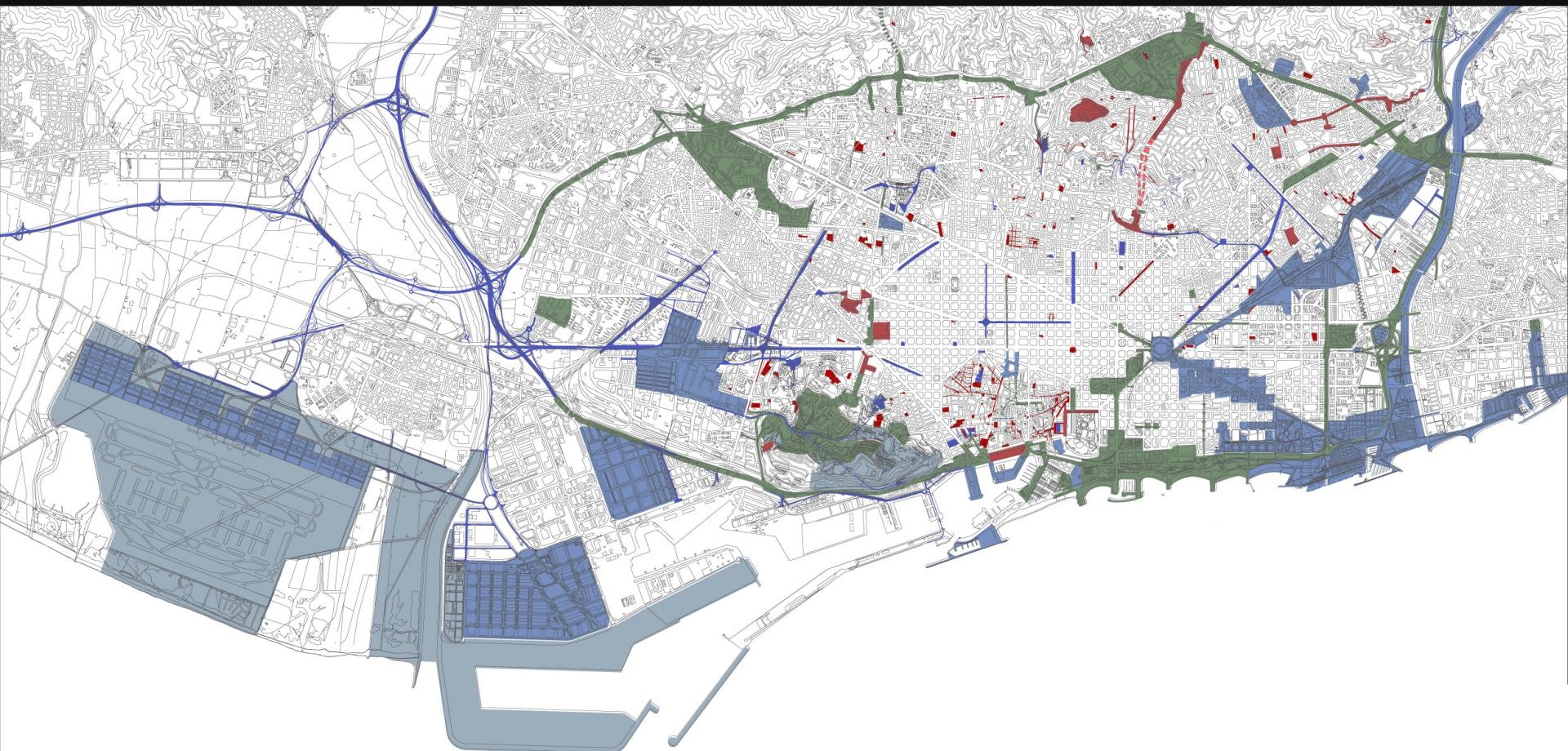
CEO Barcelona Regional  
former Chief Architect of the City of Barcelona

Milano, June 12th 2009



Milan, June 12 2009

# THREE PERIODS OF URBAN RENEWAL

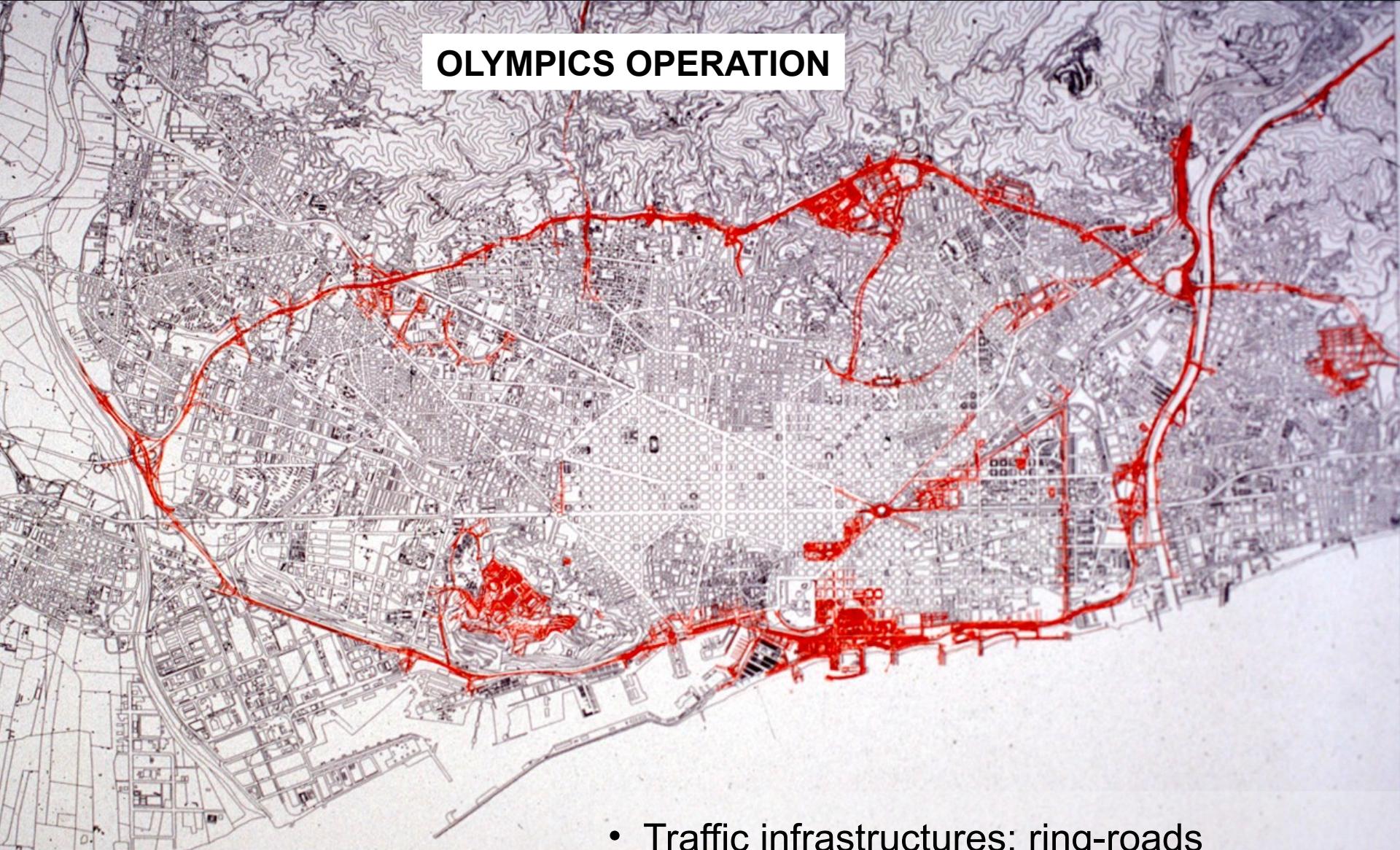


1980 - 1986. Small scale. Squares, streets & parks.

1986 - 1992. Larger scale. Sea front, residential and sport areas.

1992 - 2004. Metropolitan scale. Infrastructure & strategic areas.

## OLYMPICS OPERATION

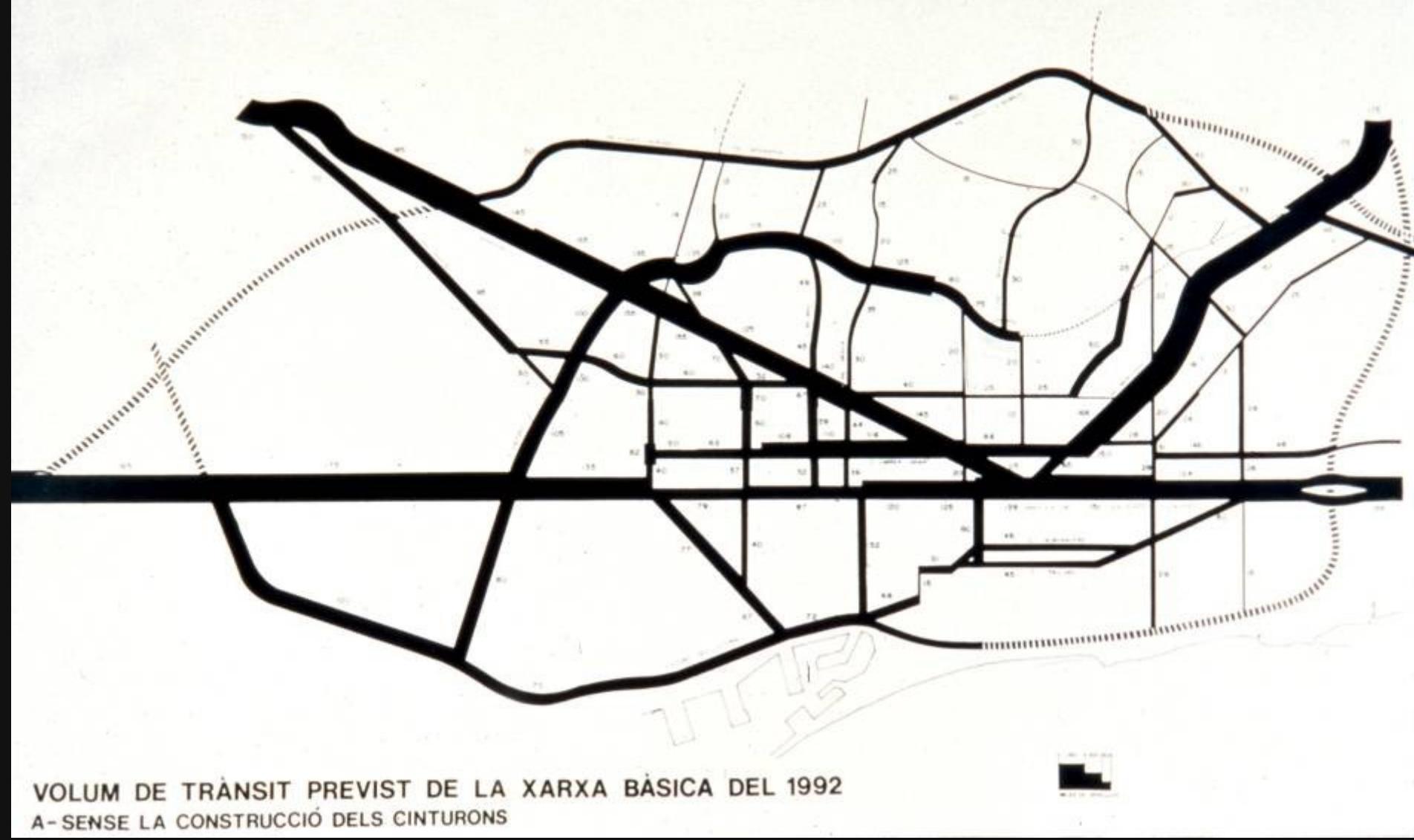


- Traffic infrastructures: ring-roads
- Utilities: 35 km Service galleries



0 0.5 1 Km

## Ring Roads: before



Traffic ADV before Ring Roads. Passing traffic flows on the streets

## Ring Roads: after



VOLUM DE TRÀNSIT PREVIST DE LA XARXA BÀSICA DEL 1992  
B-AMB LA CONSTRUCCIÓ DELS CINTURONS

Traffic ADV after Ring Roads. Streets freed from passing traffic flows

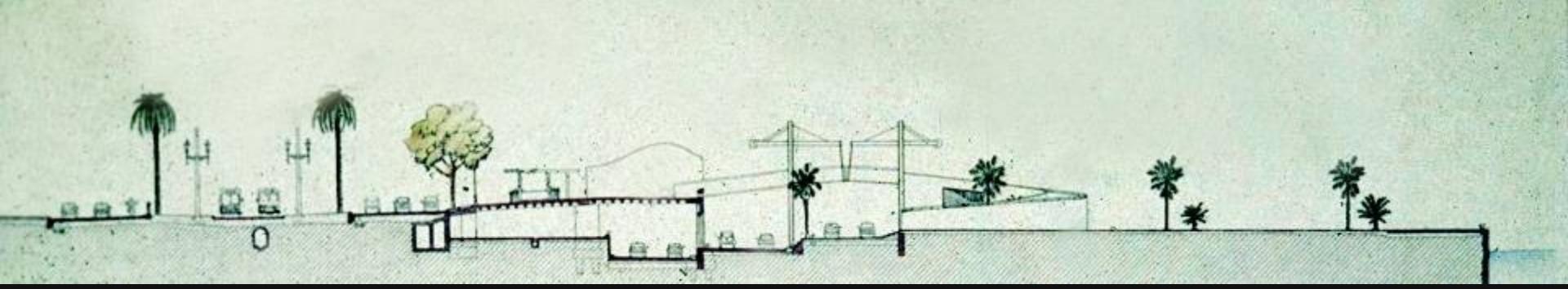
# SERVICE GALLERIES





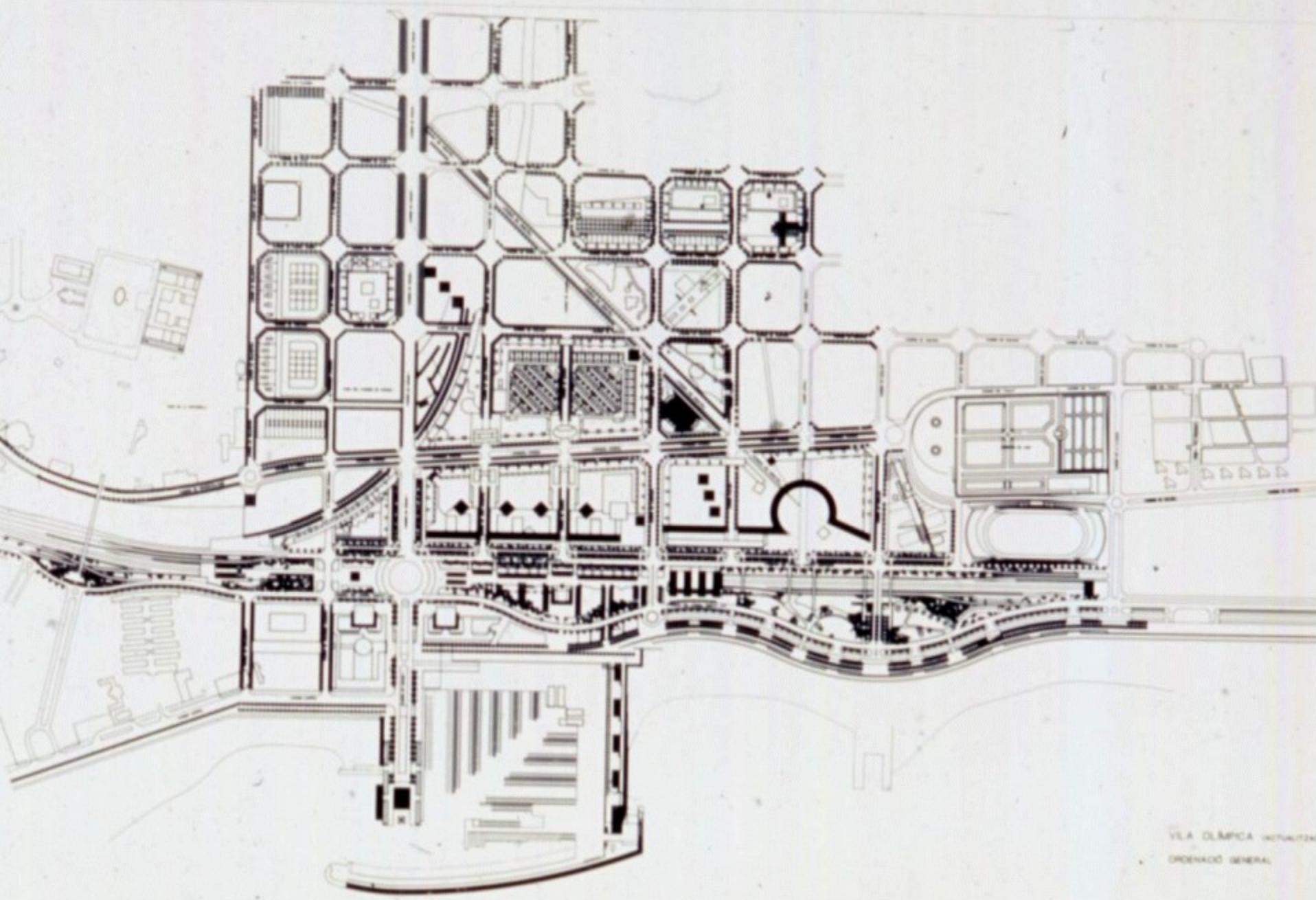
Parks and facilities upon covered areas in dense neighborhoods



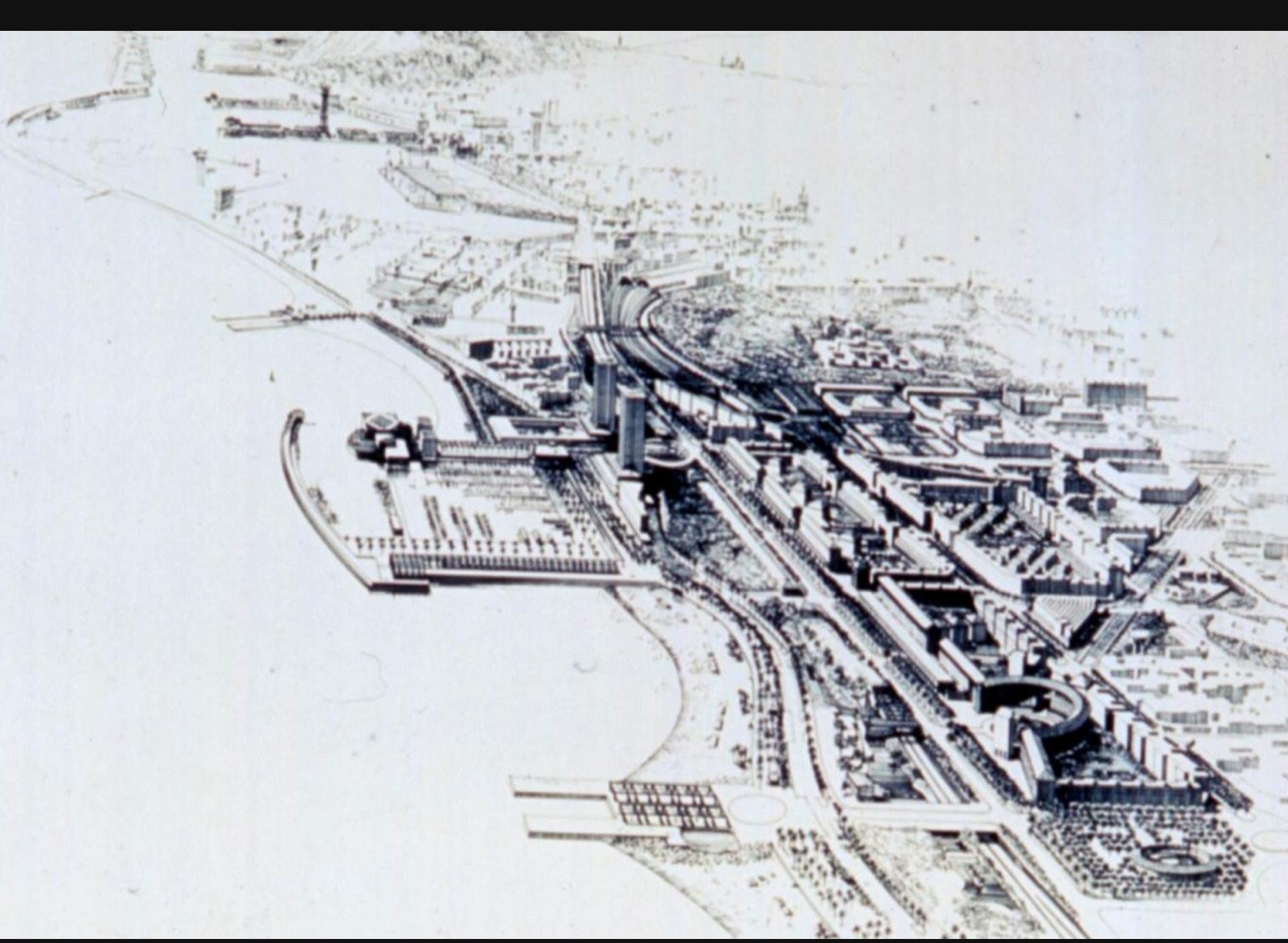








VILA OLÍMPICA  
INSTALACIONES  
ORDENACIÓN GENERAL







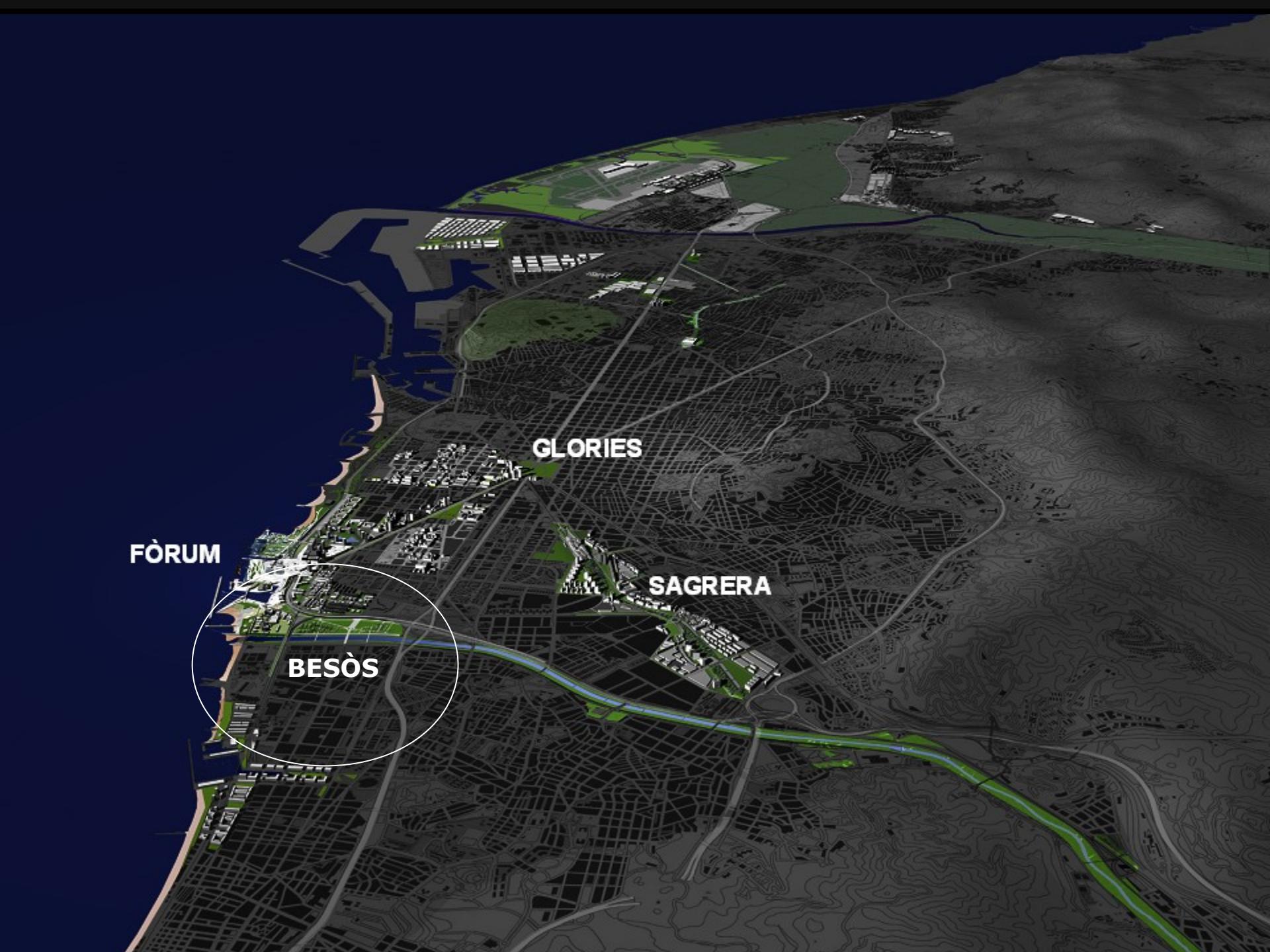




Sagrada Família

Fòrum 2004

22@bcn



**FÒRUM**

**BESÒS**

**GLORIES**

**SAGRERA**

# BACKGROUND

## Degradation of the Besòs surroundings



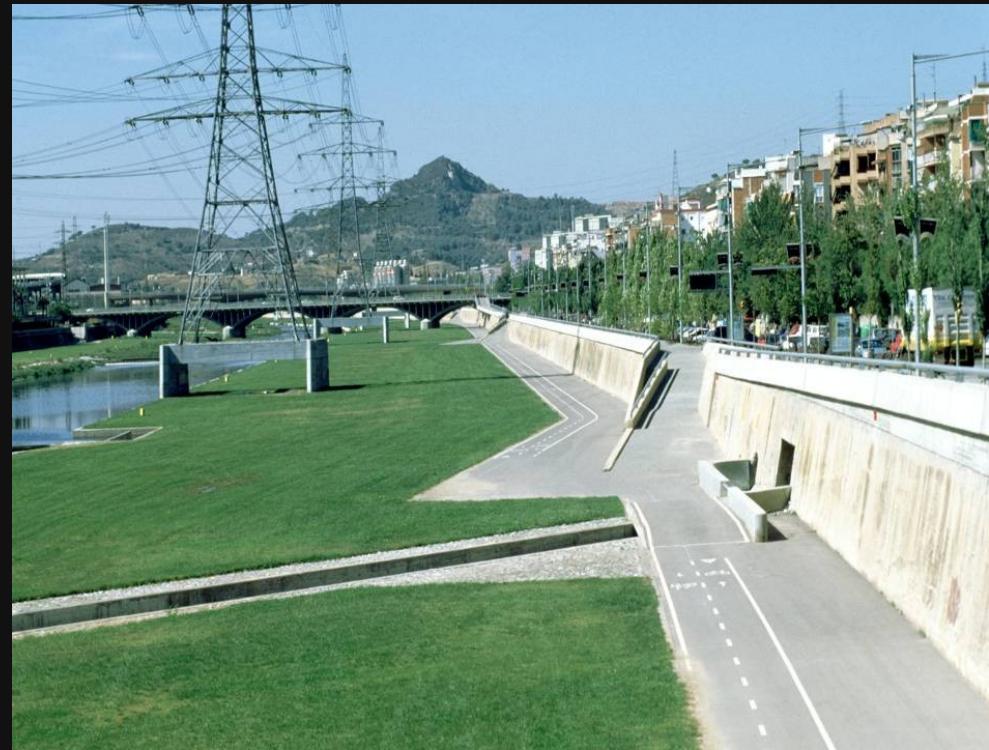
Infrastructures not integrated in the city, Coast regression, Presence of high voltage lines

# BACKGROUND

## Degradation of the Besòs surroundings



Failure on European Community emission/immission limits from the incineration plant



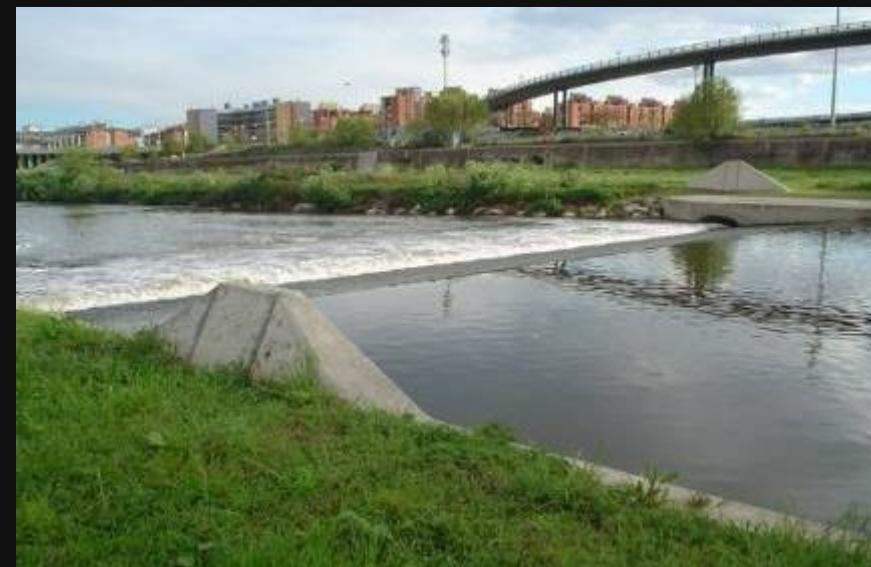




# Environmental restoration of the Besòs River

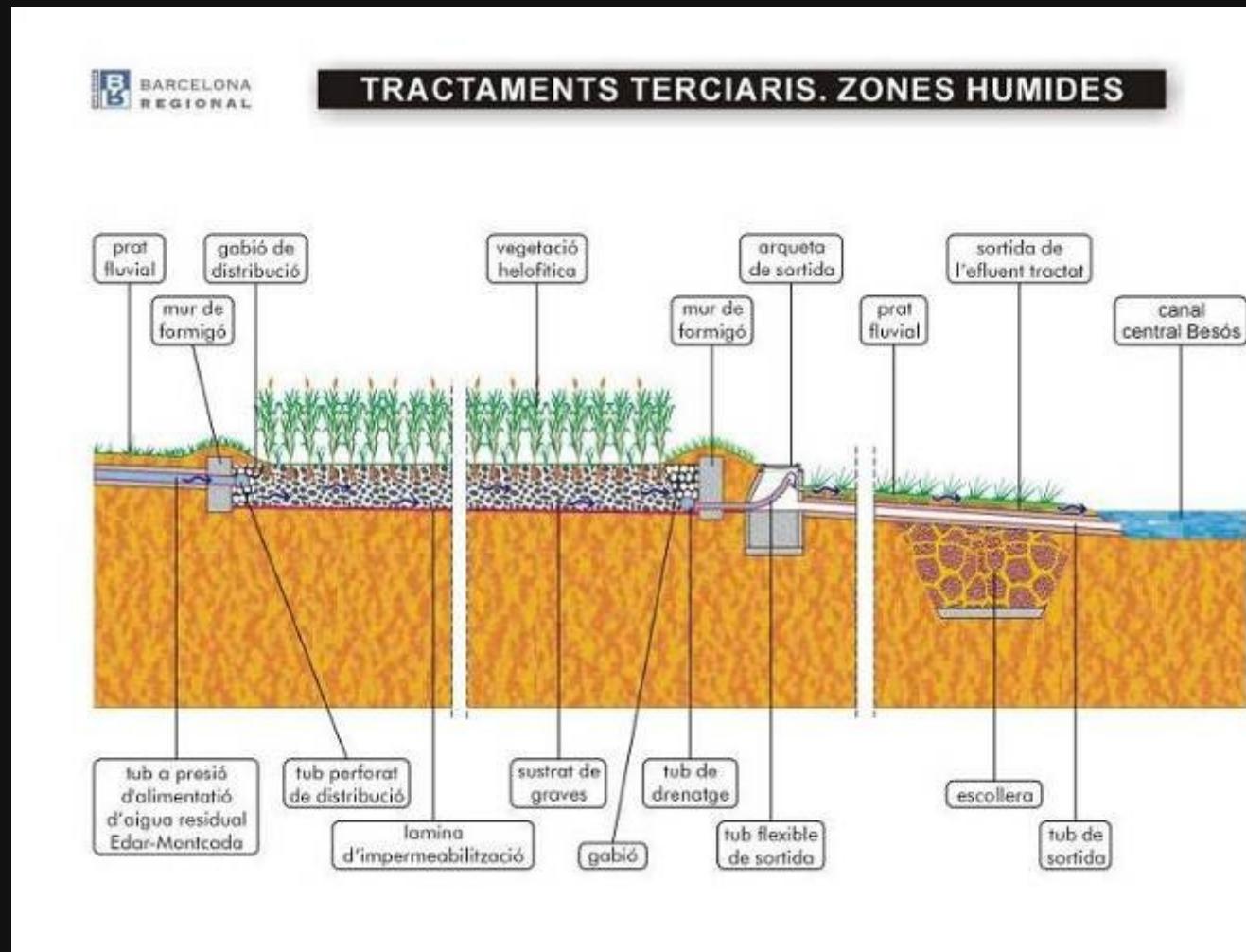
## Environmental restoration of the Besòs river

- ✓ Improve river environment and landscape
- ✓ Tertiary treatment of the wastewater treatment plant using constructed wetlands.
- ✓ Increasing the hydrological capacity
- ✓ Utilization of river areas for the citizens



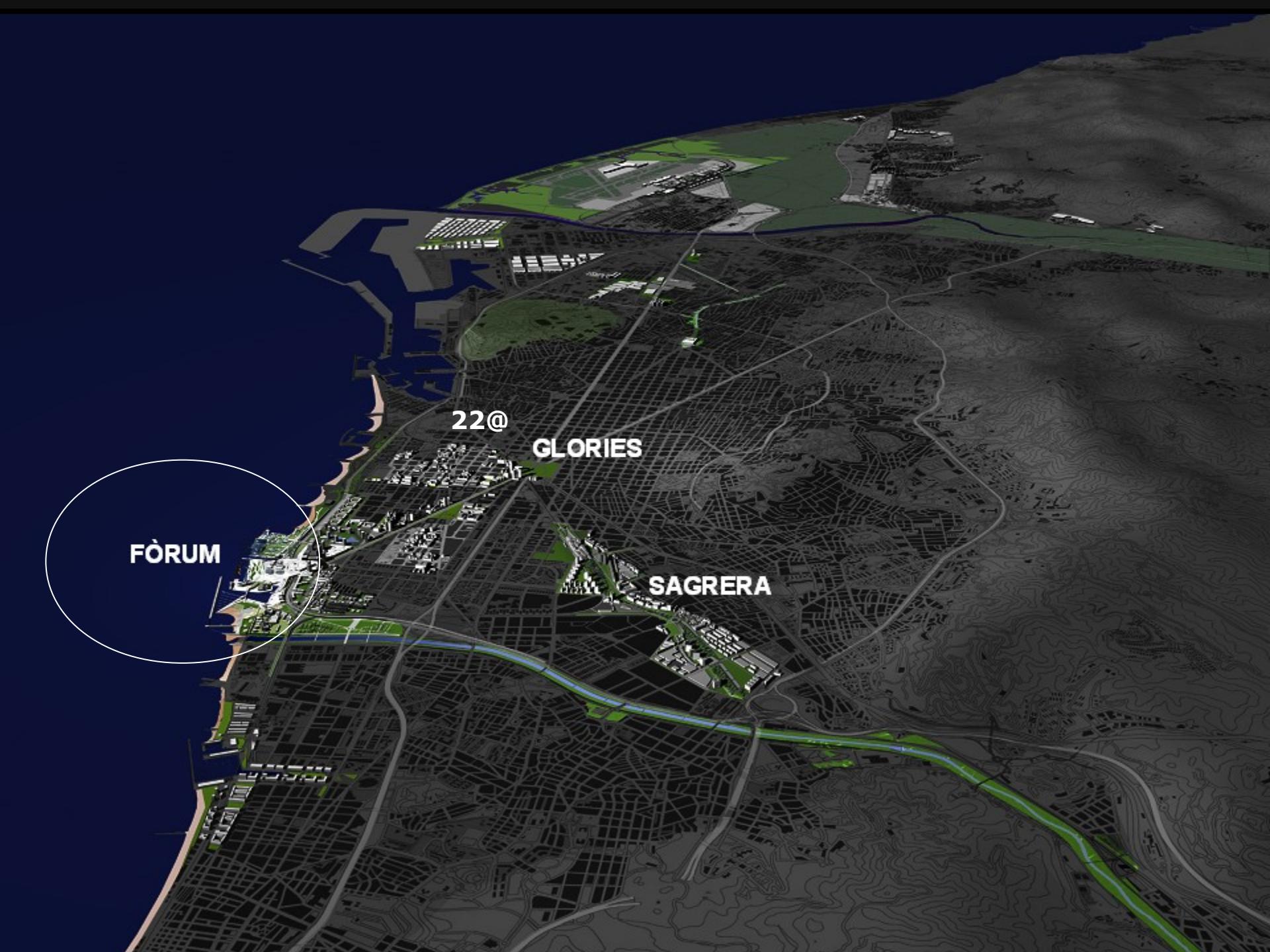
# Environmental restoration of the Besòs River

## Constructed Wetlands



## Environmental restoration of the Besòs River

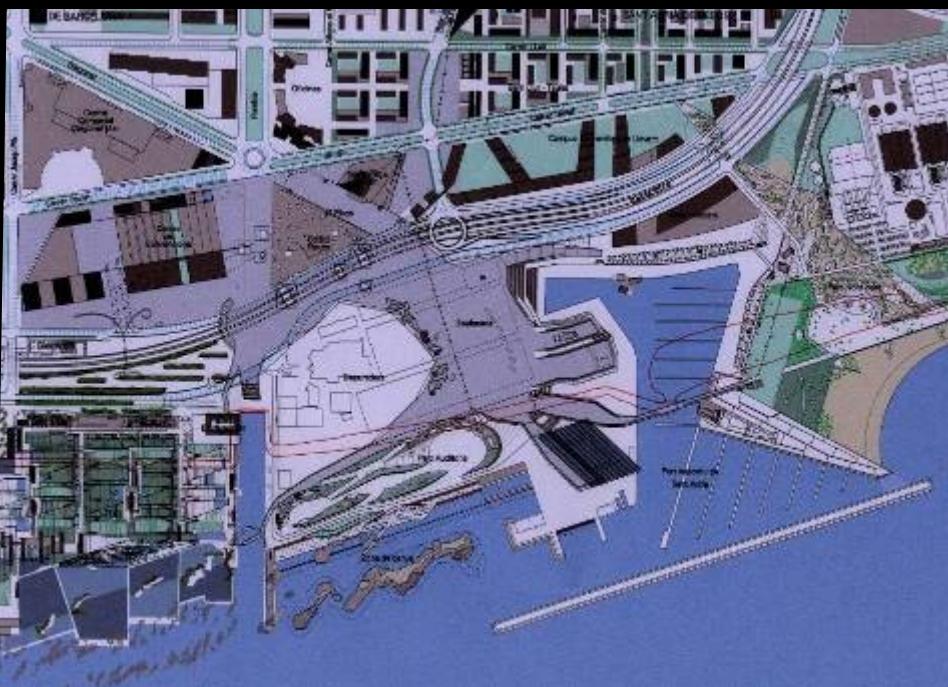




**FÒRUM**

**22@  
GLORIES**

**SAGRERA**





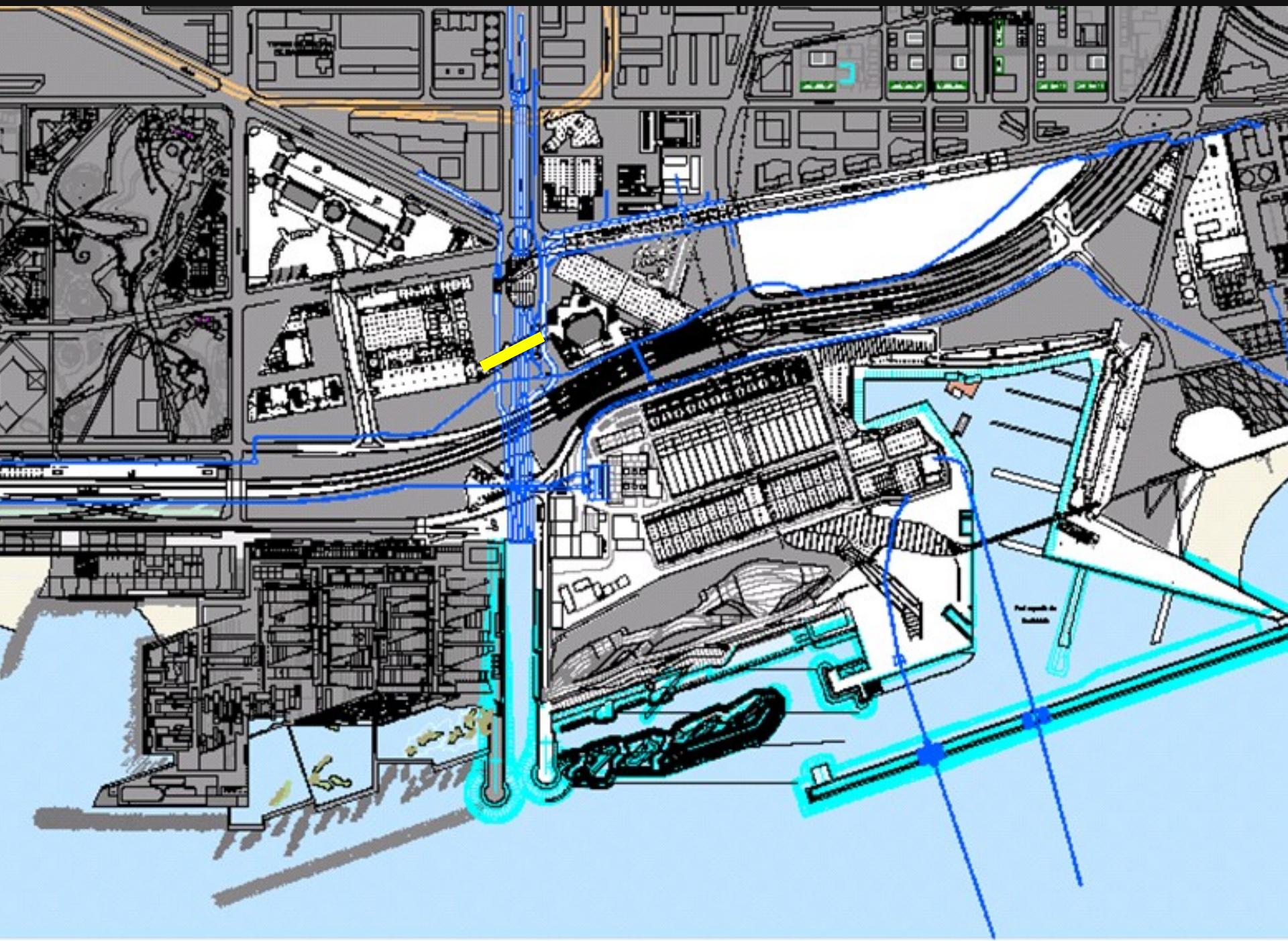
UNDERGROUND L-4  
Tramway of the Diagonal

#### SEA FRONT PROJECTS - FÓRUM 2004

0 175 350m

- |                                                             |                                                                                       |                                                        |                                         |                                                     |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------|-----------------------------------------------------|
| 0. NEW ROAD OF BESÓS                                        | 7. FÓRUM BUILDING AND FÓRUM PLAZA                                                     | 13. ZOO, MARINE INSTALLATIONS                          | 20. NORTH-EAST COASTAL PARK             | 27. HOTEL AREA                                      |
| 1. SERVICE ROAD INFRA. FOR COAST RING ROAD/WATERFRONT       | 8. EAST UNIVERSITY CAMPUS                                                             | 14. ZOO TEMPERATE AVIARY                               | 21. SPORTS HARBOUR SOUTH-WEST AREA      | 28. ECOPARK                                         |
| 2. SERVICE ROAD INFRA. FOR COAST RING ROAD/MOUNTAIN SIDE    | 9. FÓRUM PLAZA HOTEL                                                                  | 15. ZOO, CLIMATE-CONTROLLED TERRARIUM                  | 22. MARINA OF THE NORTH-EAST ZONE       | 29. ELECTRICAL PARK                                 |
| 3. ROAD INFRASTRUCTURES TAULAT STREET / E. MAR STANY BRIDGE | 10. FÓRUM ESPLANADE AND PHOTOVOLTAIC PLANT                                            | 16. BATHING AREA                                       | 23. BLOCK OFFICES AT DIAGONAL-FRIM      | 30. LA CATALANA                                     |
| 4. ROAD INFRASTRUCTURES LLULL-TAULAT RESIDENTIAL AREA       | 11. ZOO, GENERAL PLAN, INFRA. FOR SERVICES, DEVELOPMENT, LANDSCAPE AND LOGISTICS AREA | 17. HARBOURMASTER'S HEADQUARTERS AND FOOTBRIDGE        | 24. BLOCKS OF DWELLINGS AT LLULL-TAULAT | 31. REGENERATION OF THE BESÓS RIVER BED (2ND PHASE) |
| 5. ZOO PLATFORM AND NOVA MAR BELLA BEACH INFRASTRUCTURES    | 12. ZOO PAVILLON BIODIVERSITY                                                         | 18. MARINA CENT. FOR SAILING AND UNDERWATER ACTIVITIES | 25. LLULL-TAULAT RESIDENTIAL AREA       | 32. WATERLANDS                                      |
| 6. CONVENTION BUILDING                                      |                                                                                       | 19. SOUTH-WEST COASTAL PARK                            | 26. REURBANIZING OF LA MA               | 33. RECOVERY OF THE MARINE BIODIVERSITY             |







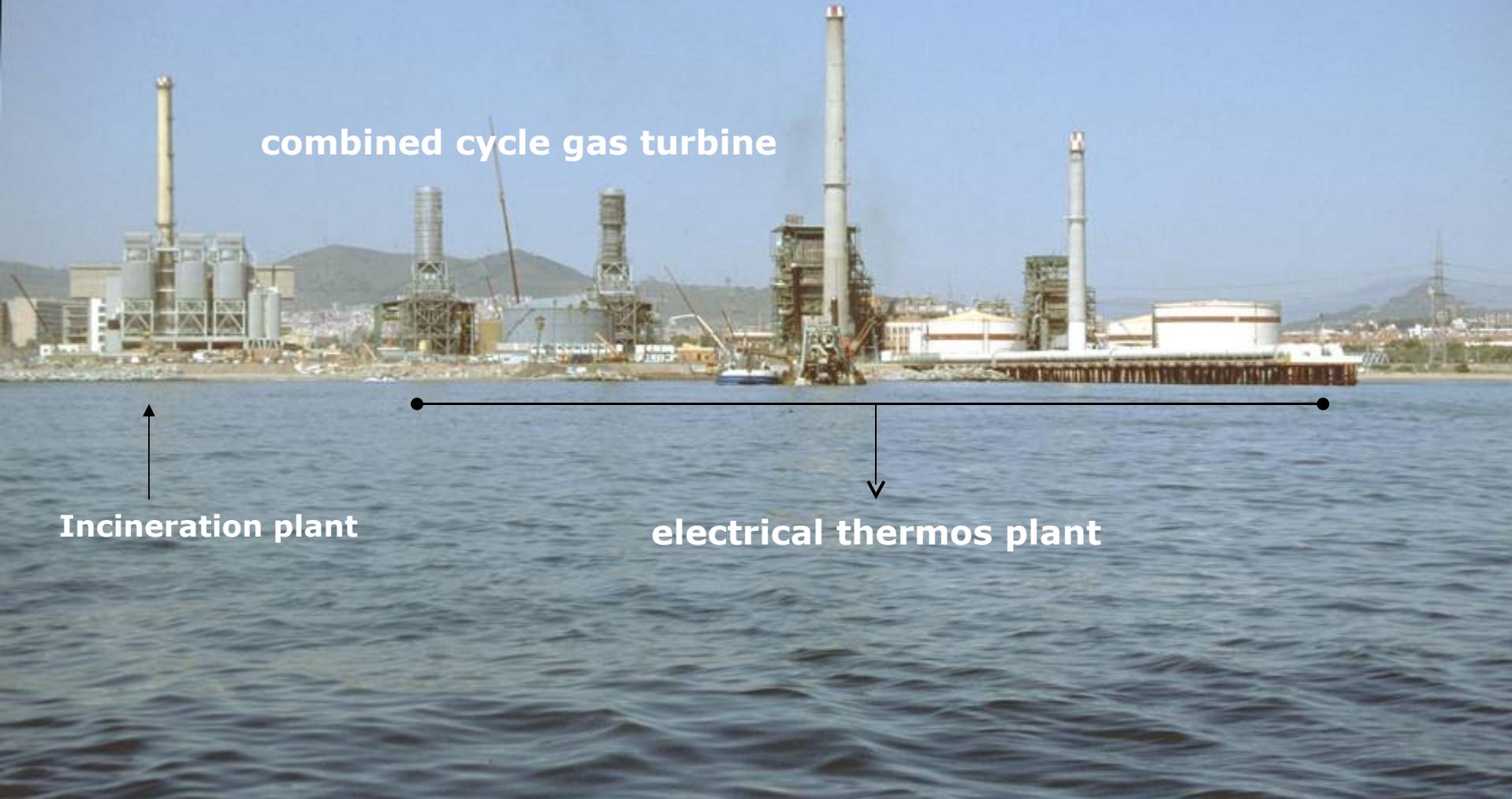




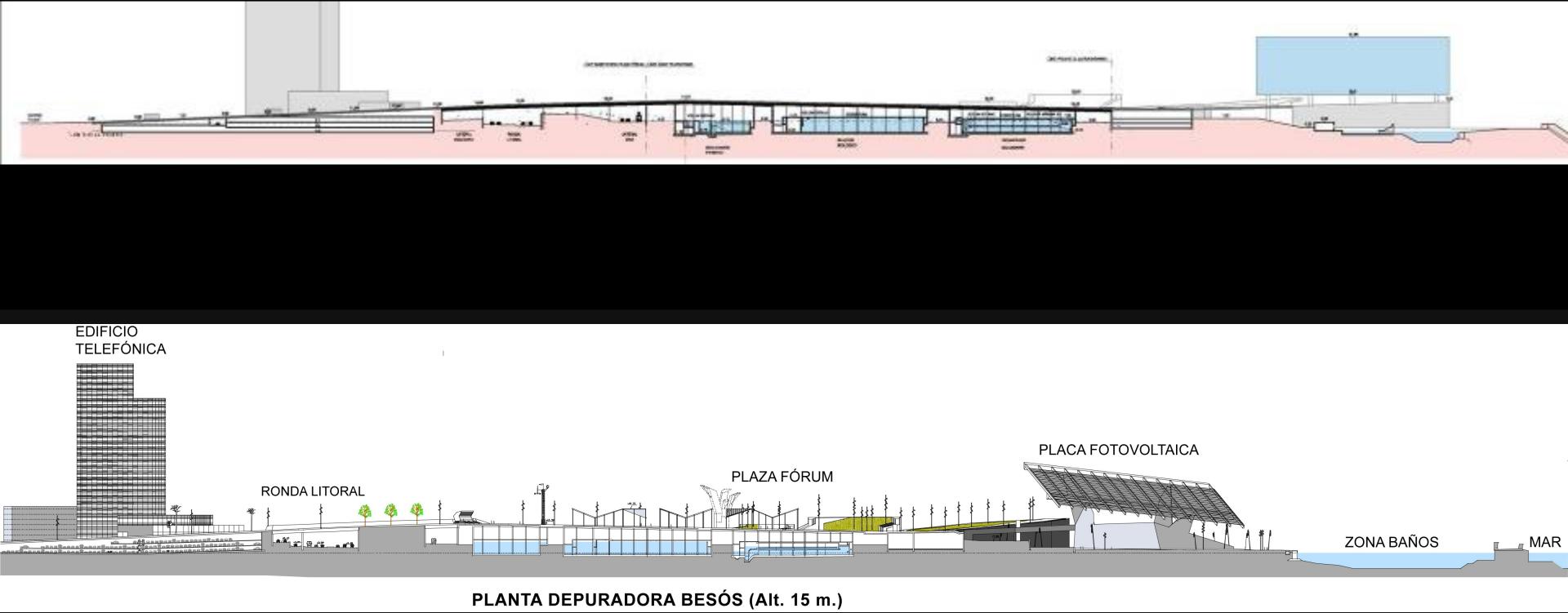


Blaia Cardona © Forum Barcelona 2004

# Air Quality



# Wastewater treatment plant



# Wastewater treatment plant

INTERMEDIATE COVER



BIOLOGICAL  
REACTOR



DECANTER

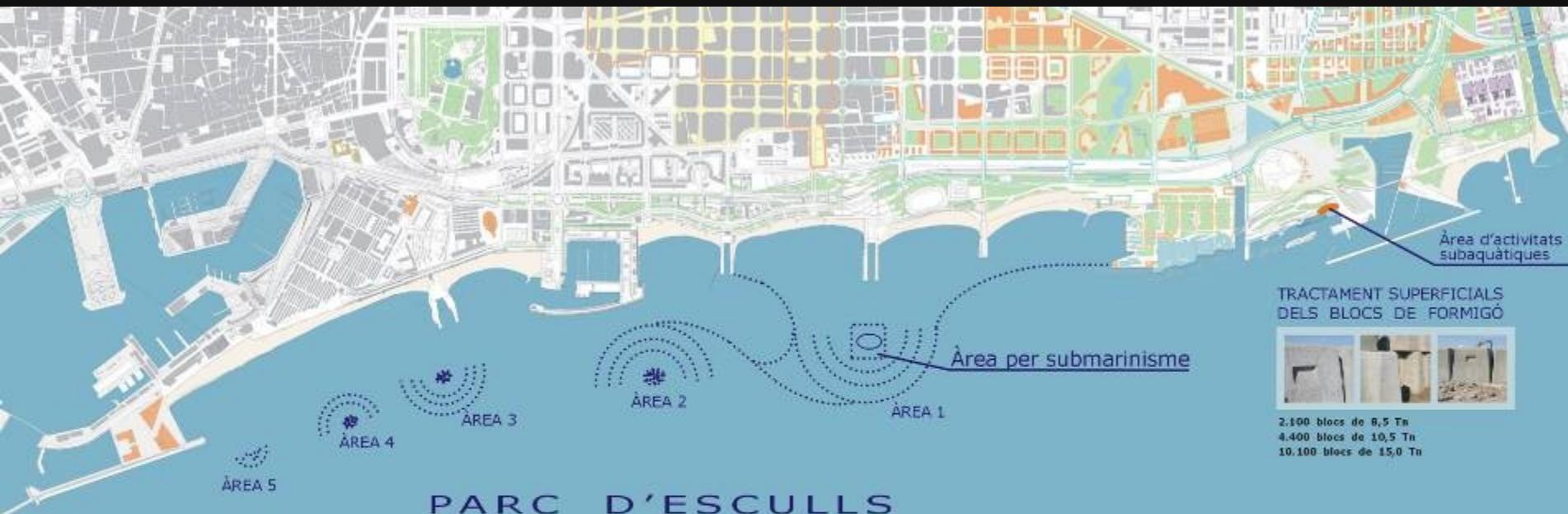


AGITATION TANK



## Litoral – Sea bed recovery Artificial Reef Park

- ✓ Increasing biodiversity in the sea bed, promotion of traditional fisheries and different type of uses for the marine Artificial Reef Park

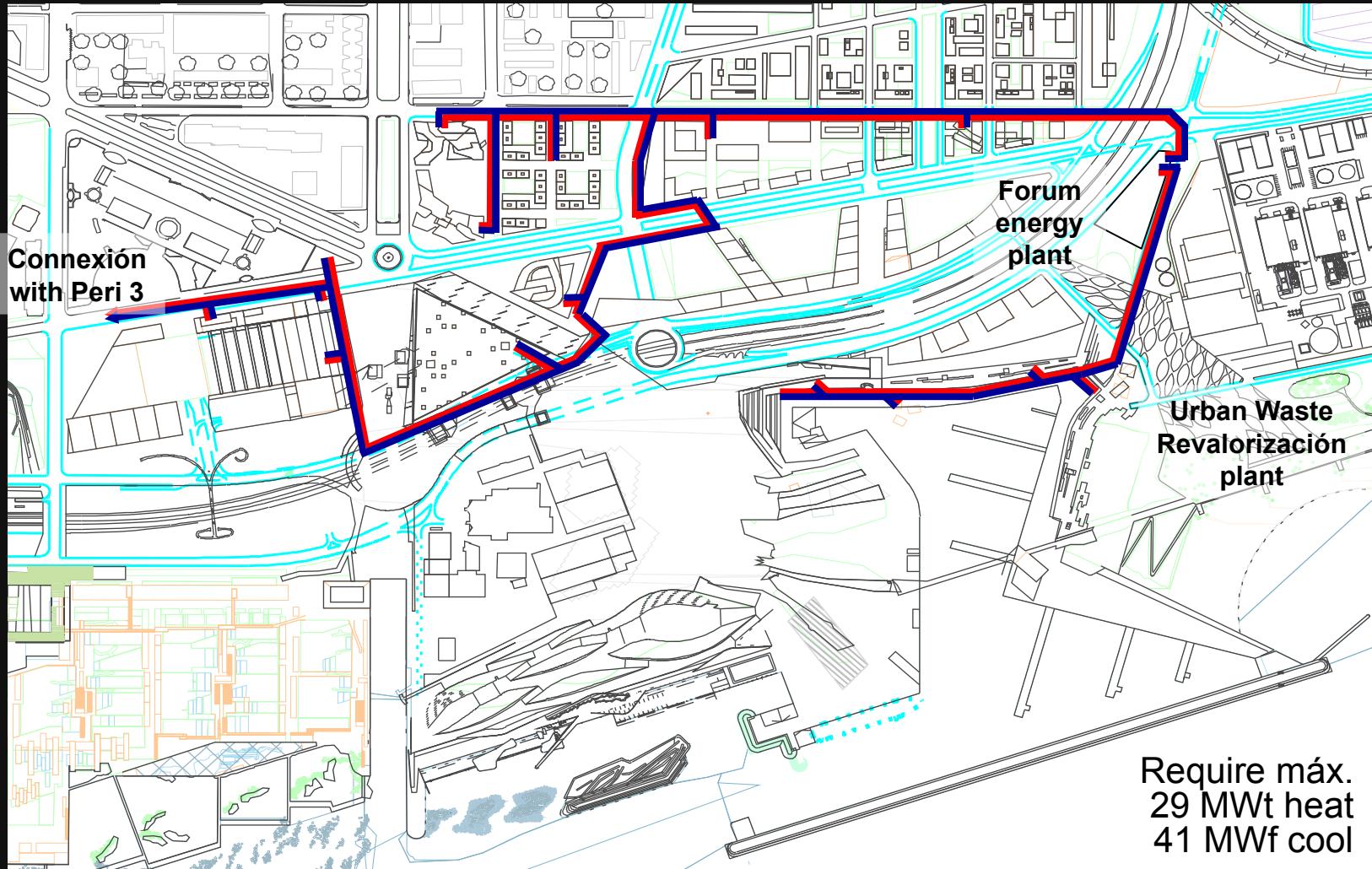


- ✓ 10 Km<sup>2</sup>
- ✓ 5 artificial reef areas
- ✓ 18 – 25 m depth
- ✓ 360 structures deployed
- ✓ Special area for diving and special area for wrecks
- ✓ Other 4 areas for promoting traditional fisheries



# High efficiency District Heating & Cooling System

The aim is 35% primary energy consumption reduction



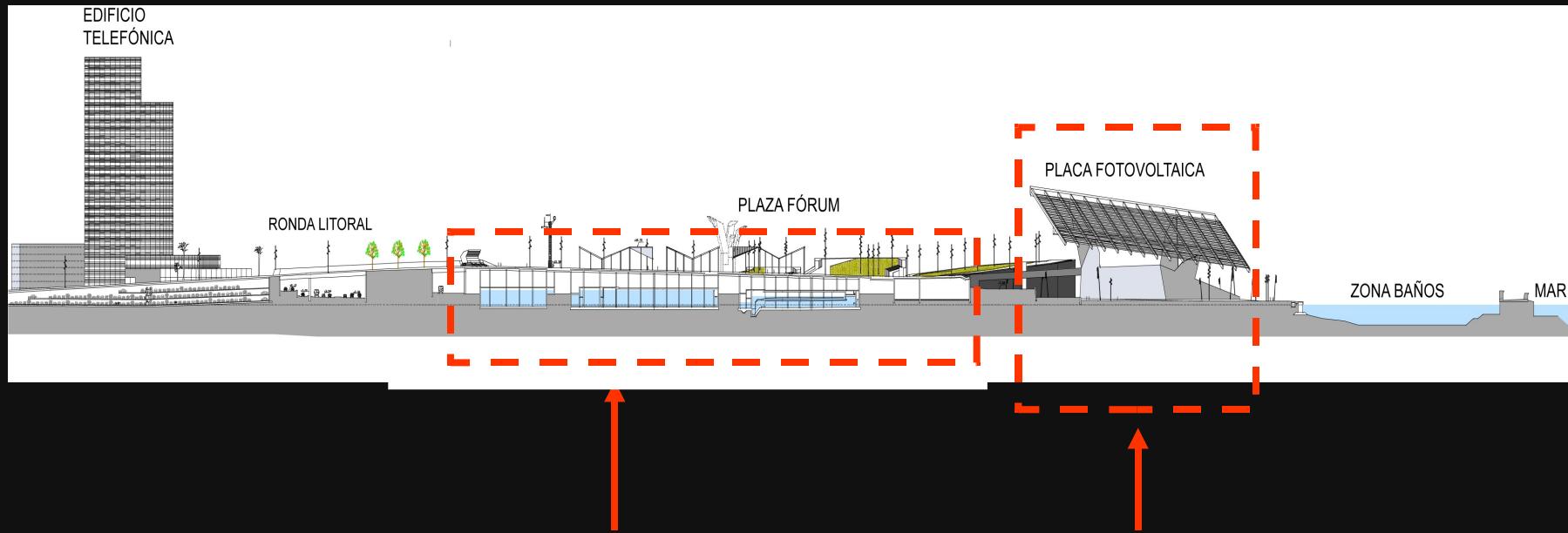
# High efficiency District heating and cooling system

The aim is 35% primary energy consumption reduction



# Urban Photovoltaic System

1,3 MWp (10.600 sqmts)



- two FV structures: PLAZA (0,86 MWp) and PERGOLA (0,44 MWp)
- The FV plant :
  - reduces the emissions of 278 Tons of CO2 equivalent each year
  - saves up to 4 GWh/y of primary energy consumption







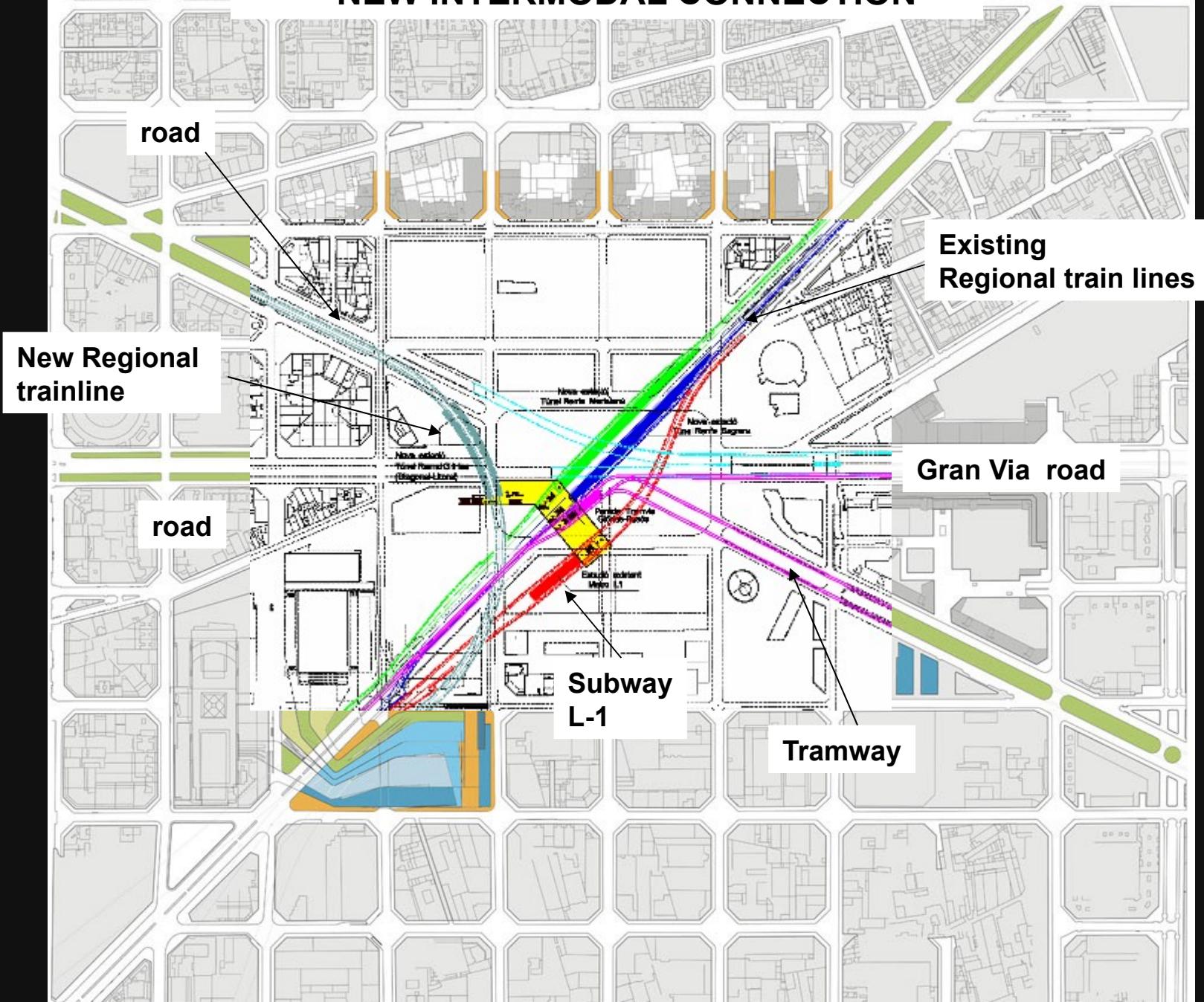


FÒRUM

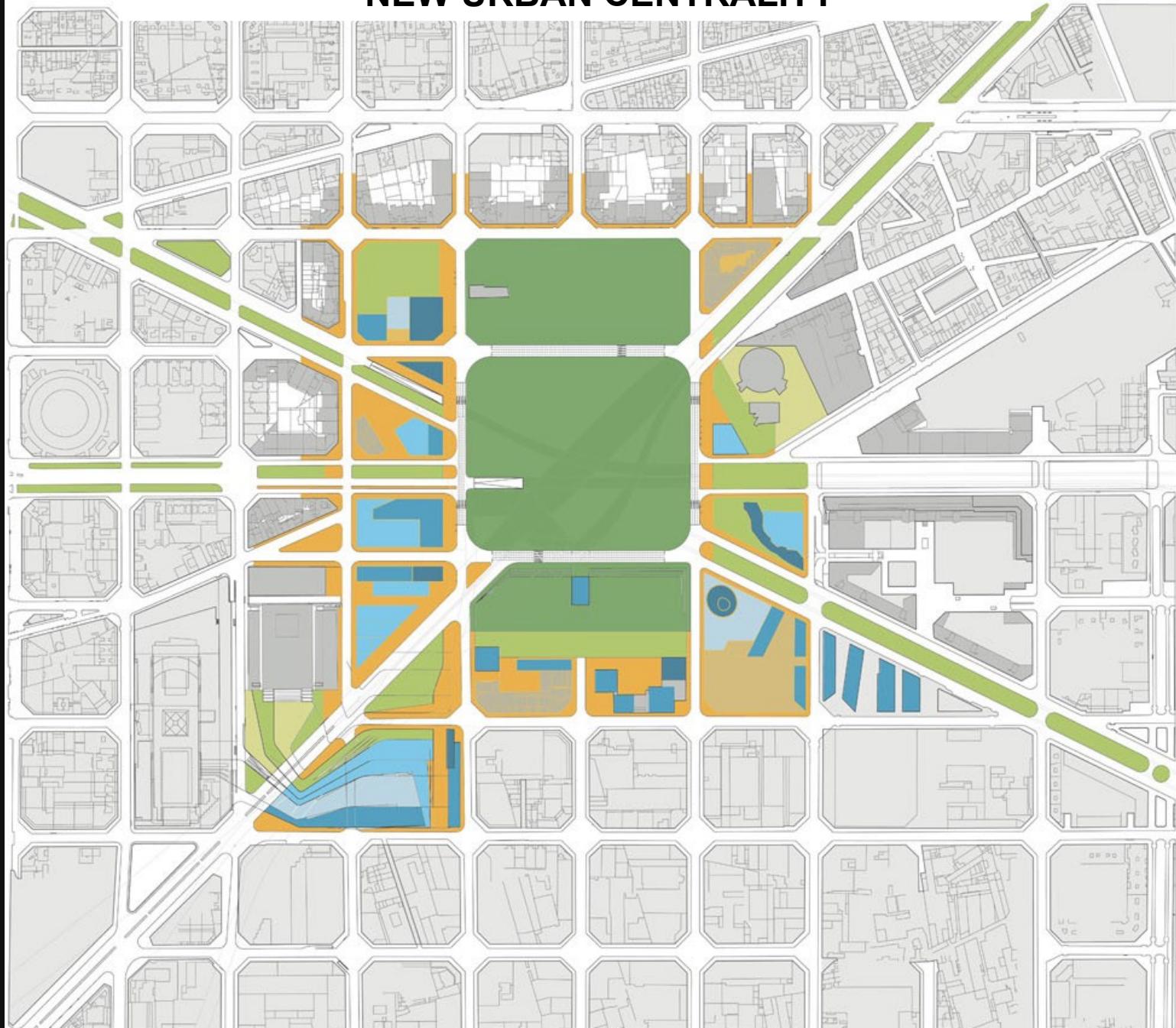
22@  
GLORIES

SAGRERA

# NEW INTERMODAL CONNECTION



# NEW URBAN CENTRALITY



## 22@. THE NEW TECHNOLOGICAL DISTRICT

AREA: 200 Ha. / 115 Blocks / 1,160,000 m<sup>2</sup> surface

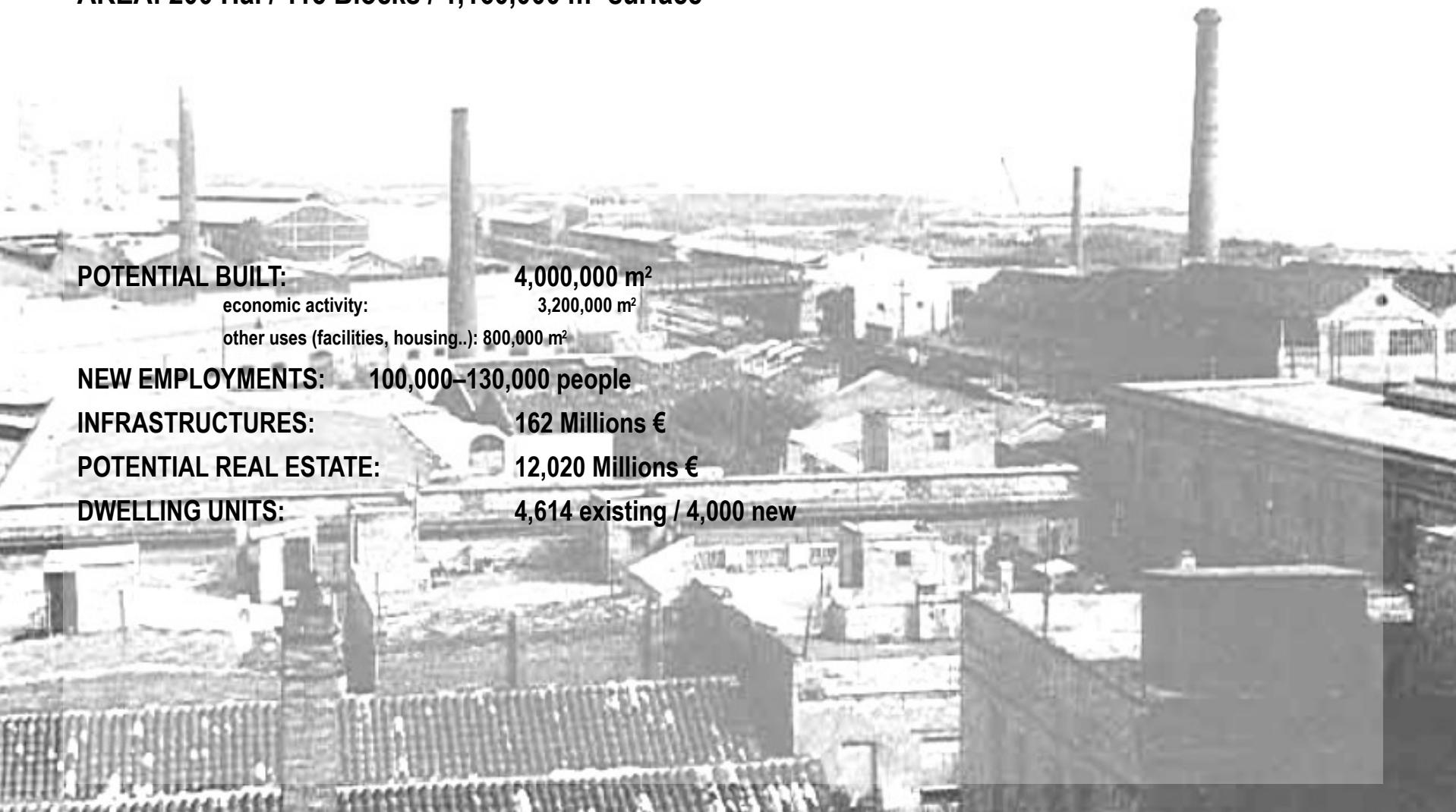
POTENTIAL BUILT:  
economic activity: 4,000,000 m<sup>2</sup>  
other uses (facilities, housing..): 800,000 m<sup>2</sup>

NEW EMPLOYMENTS: 100,000–130,000 people

INFRASTRUCTURES: 162 Millions €

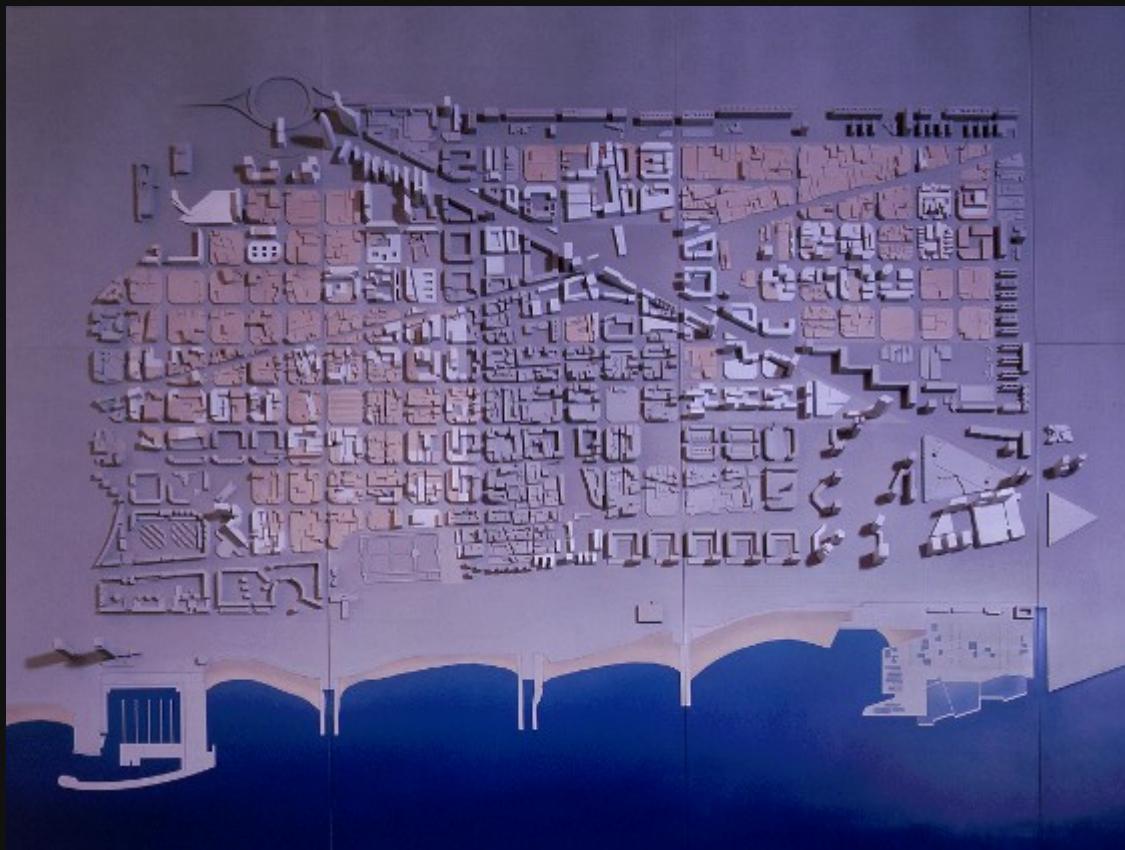
POTENTIAL REAL ESTATE: 12,020 Millions €

DWELLING UNITS: 4,614 existing / 4,000 new





# 22 @



# DISTRICT COOLING & HEATING





# BARCELONA MEDIA PARK

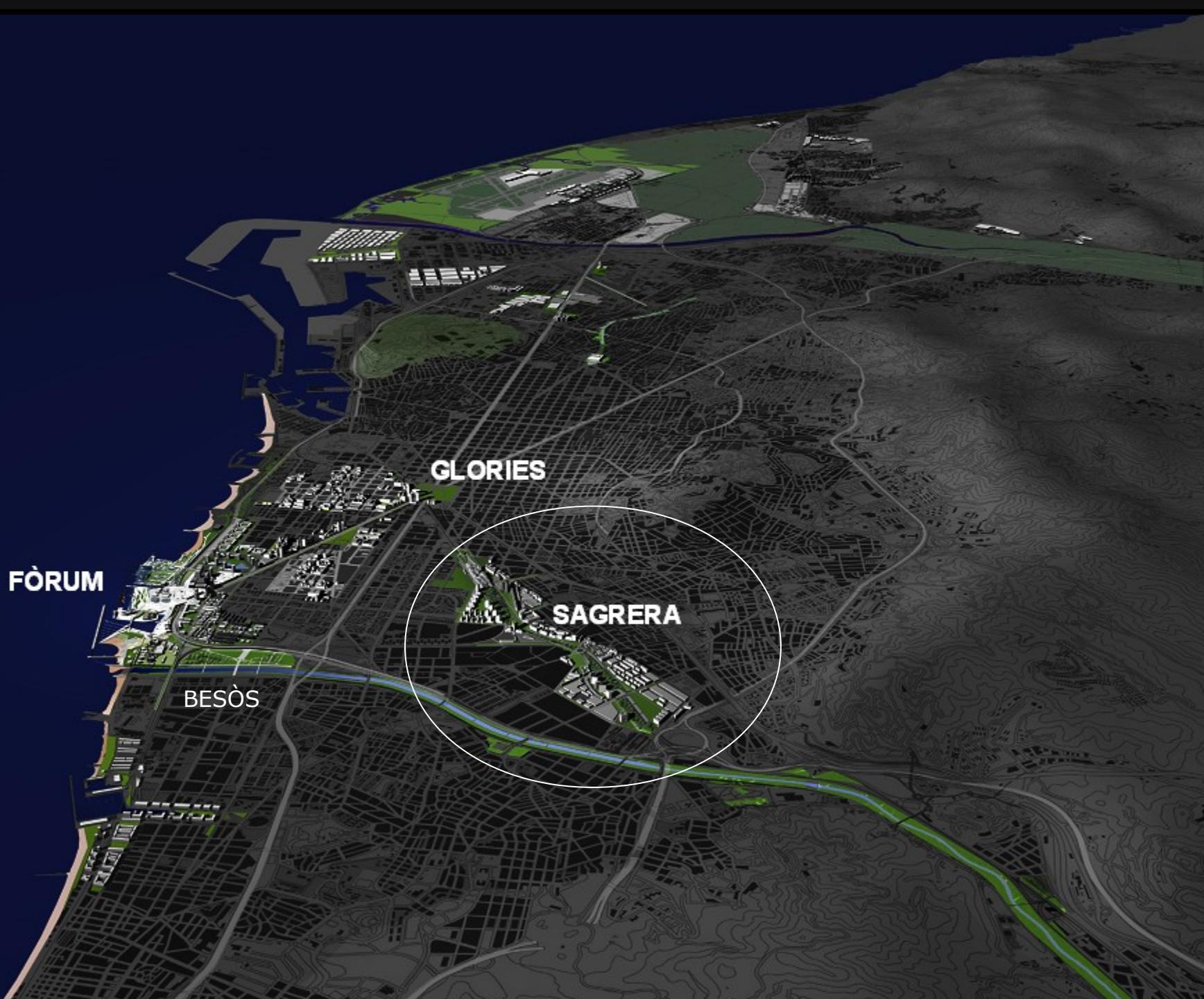


# BARCELONA TIC DISTRICT



# BARCELONA BIOEMPRESA 22@







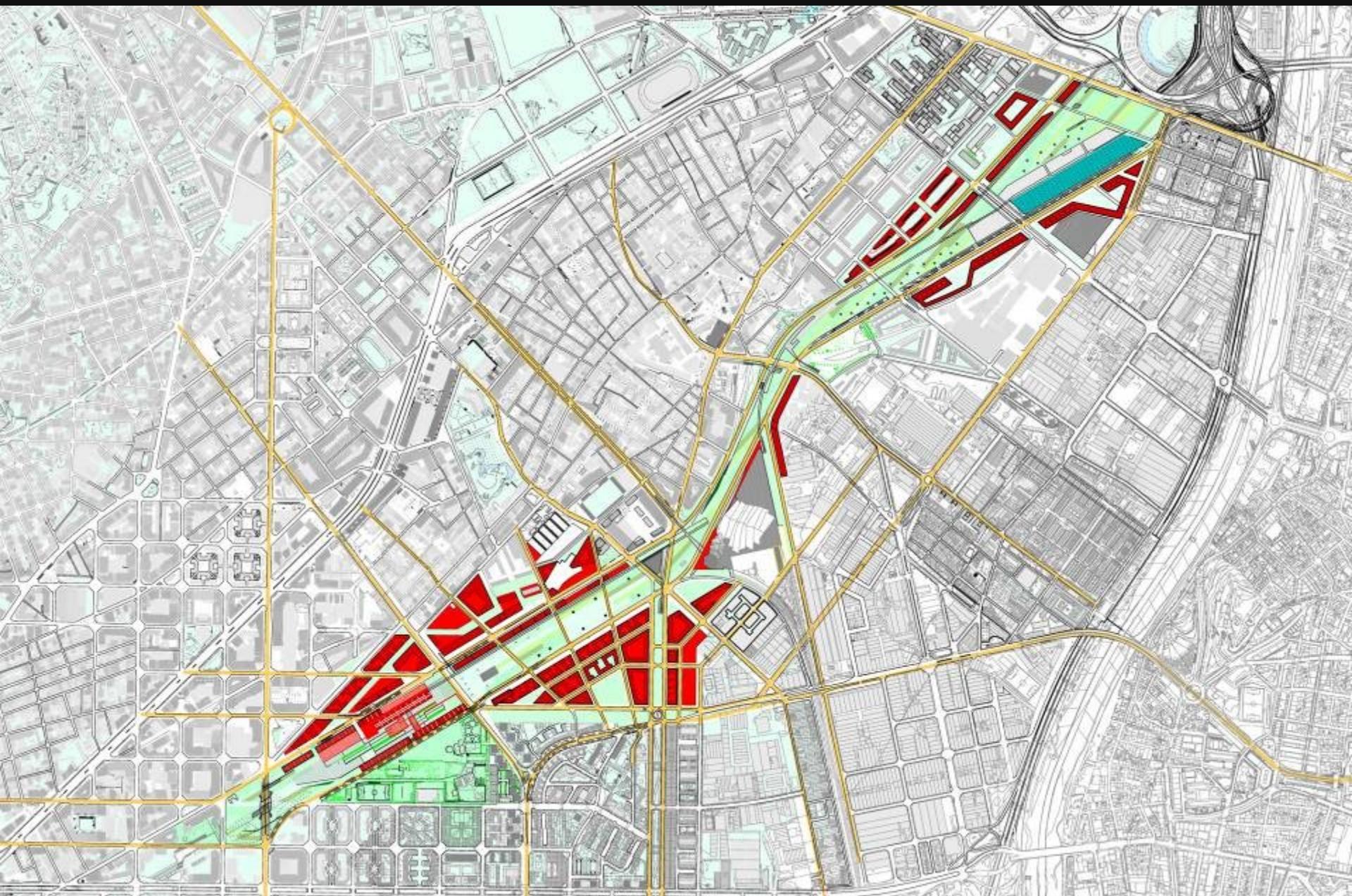
Intermodality: facilitating transfers, sustainable mobility, advanced logistics.

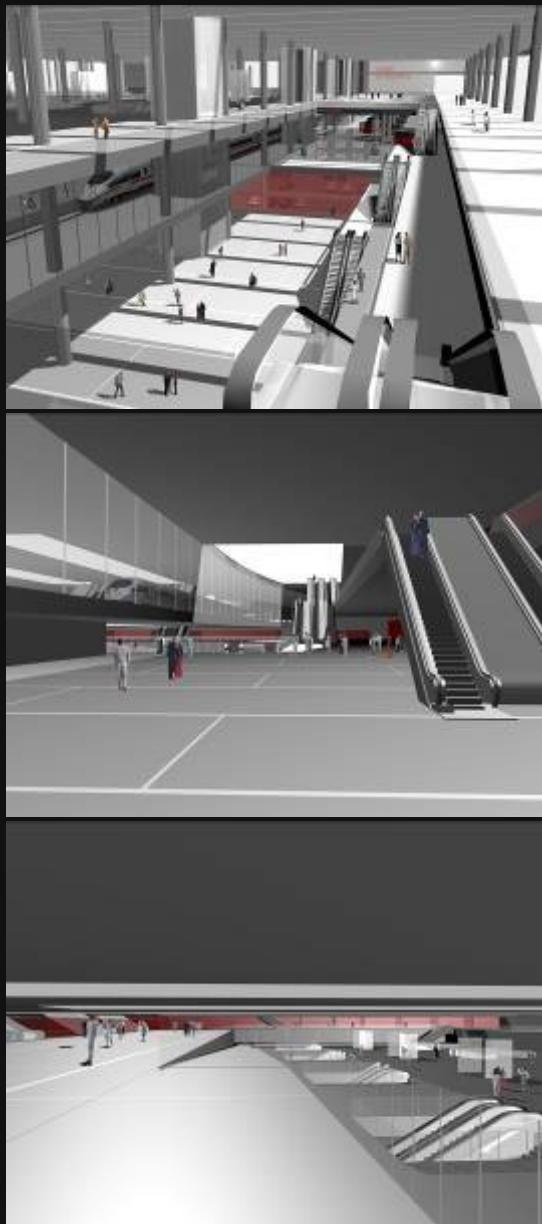


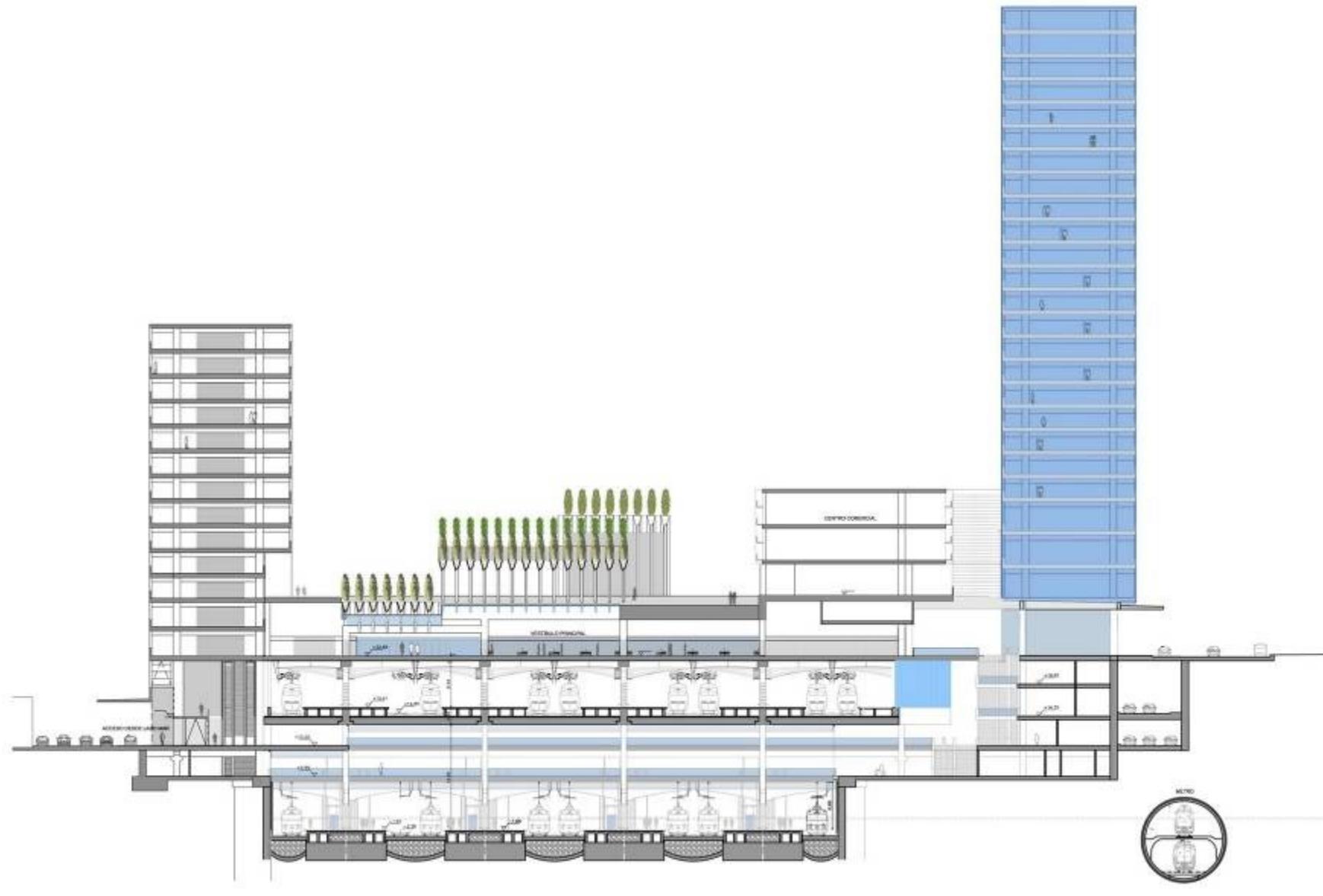
# NEW URBAN METABOLYSM

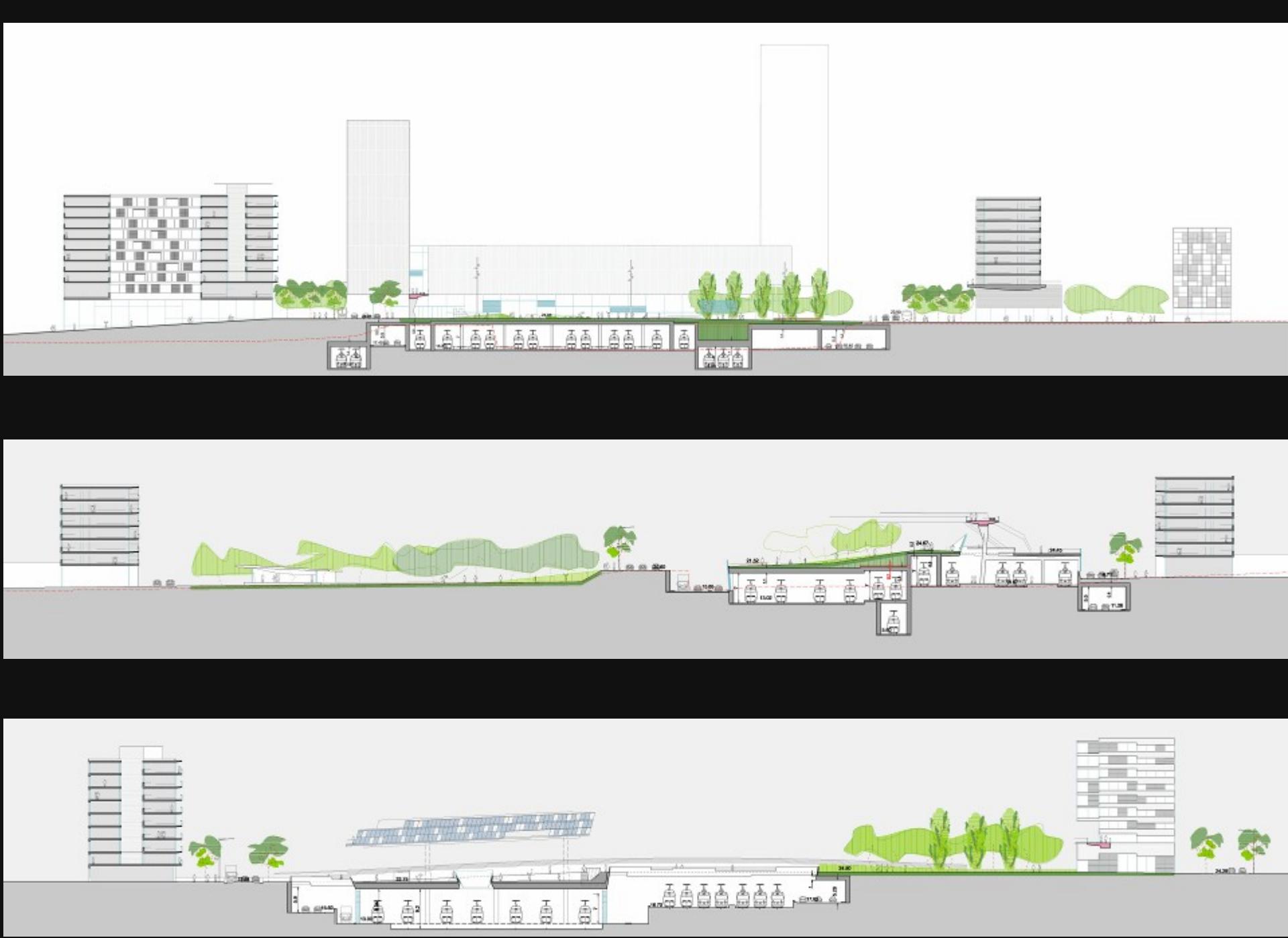
- 1. Intermodal infrastructure: light rail, regional & local trains, metro, regional busses station..
- 2. 50 ha park above the railings
- 3. Compact station building
- 4. Hotel and office buildings
- 5. New residential districts around the park

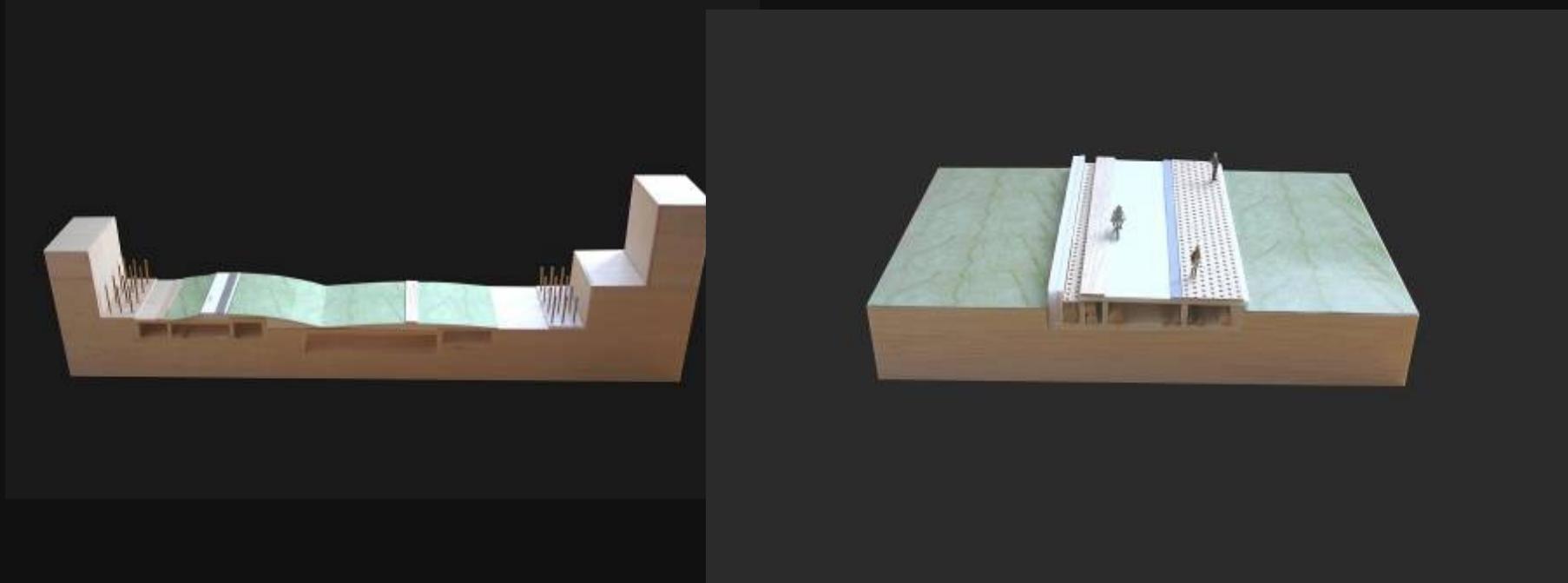


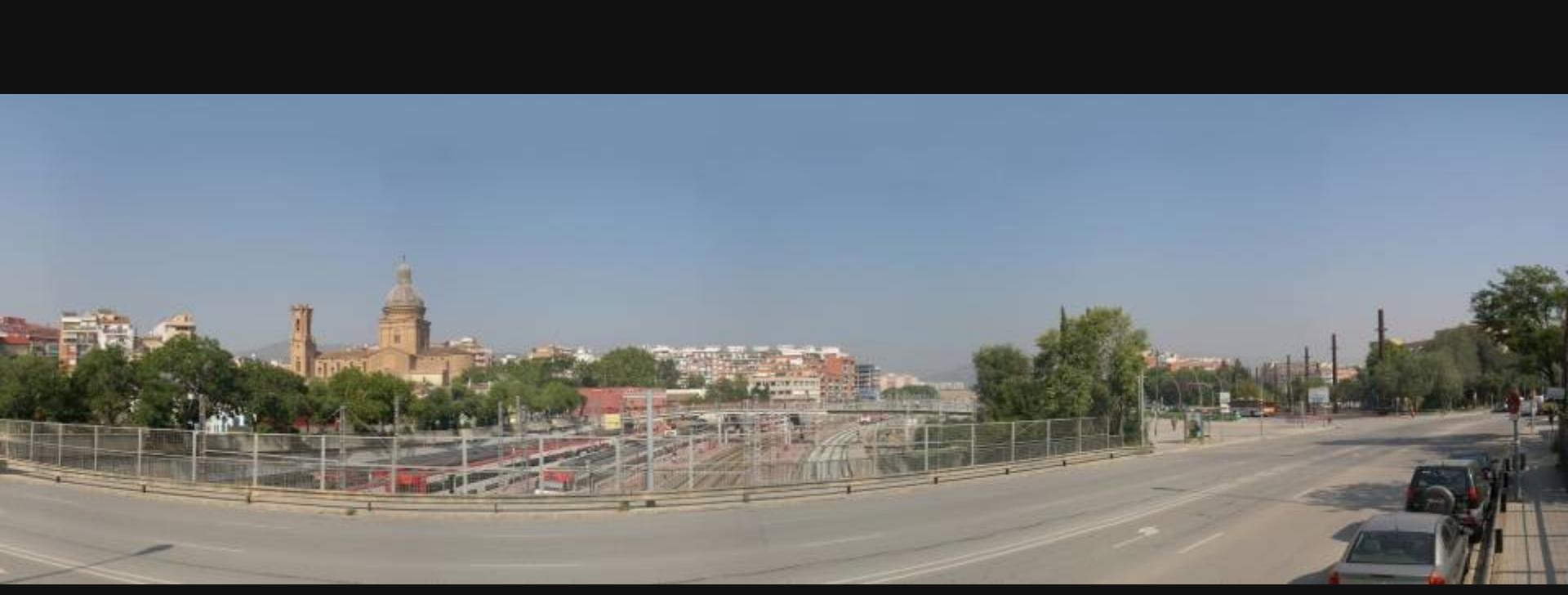






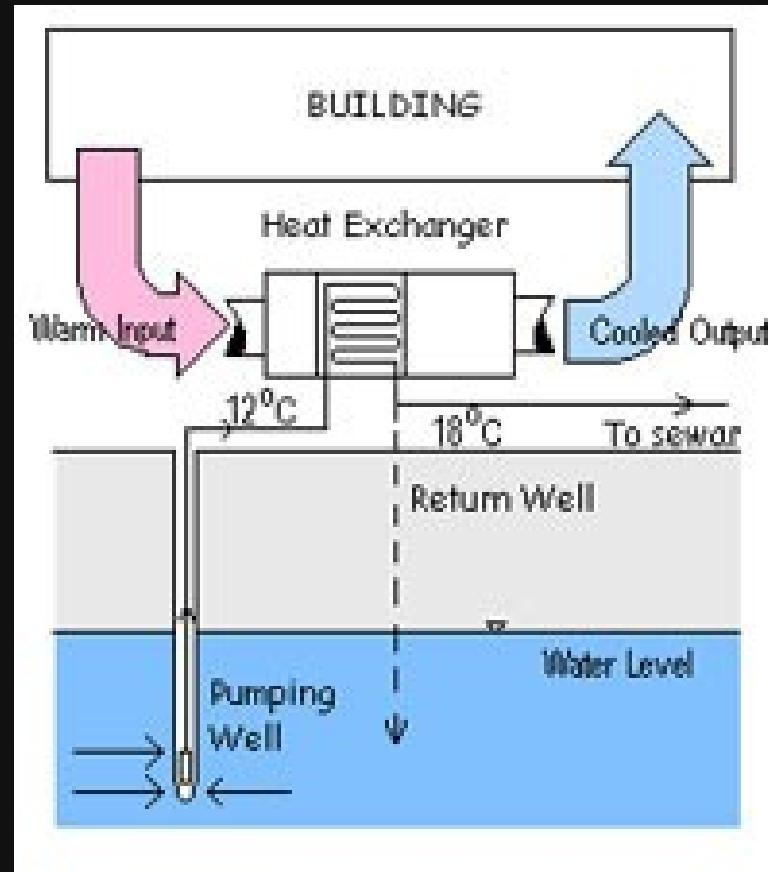




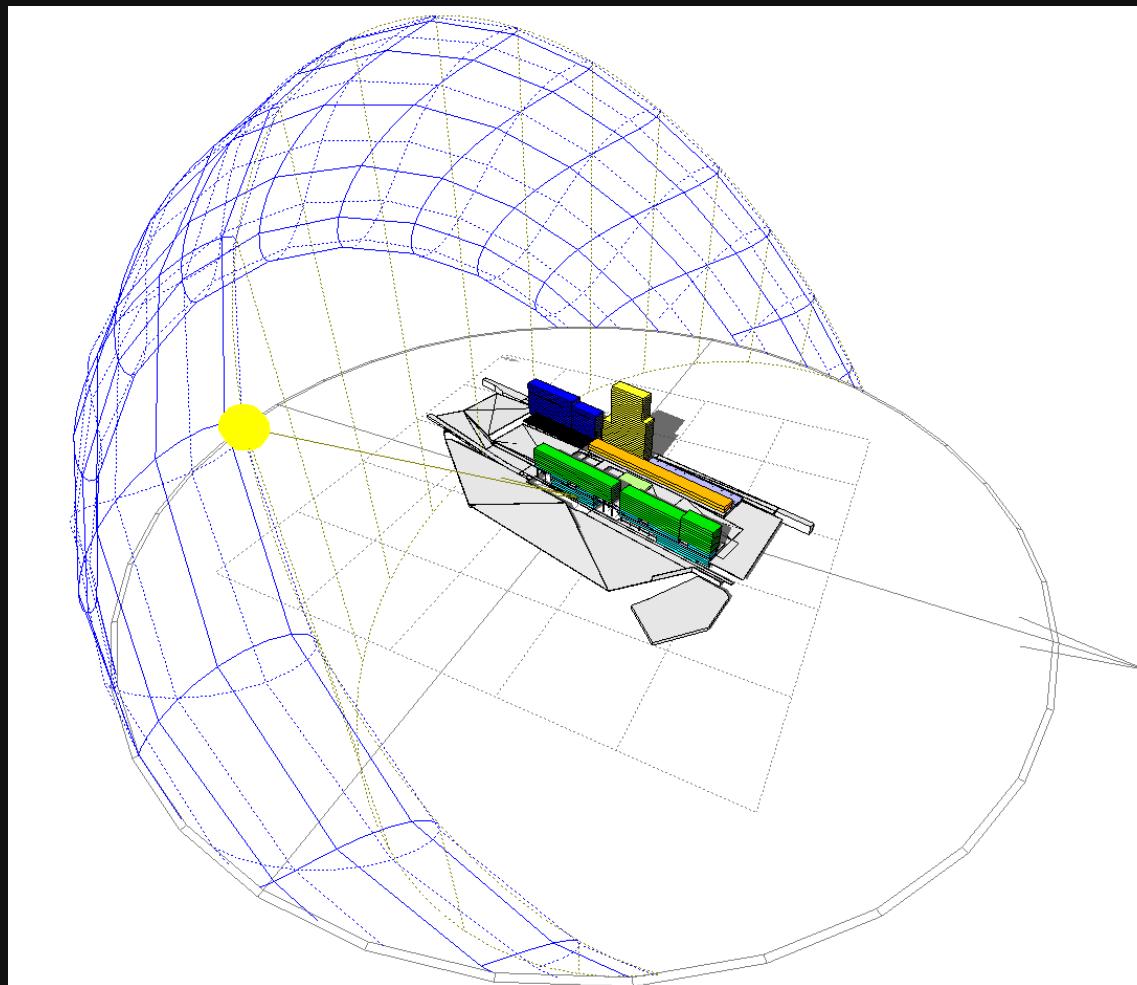


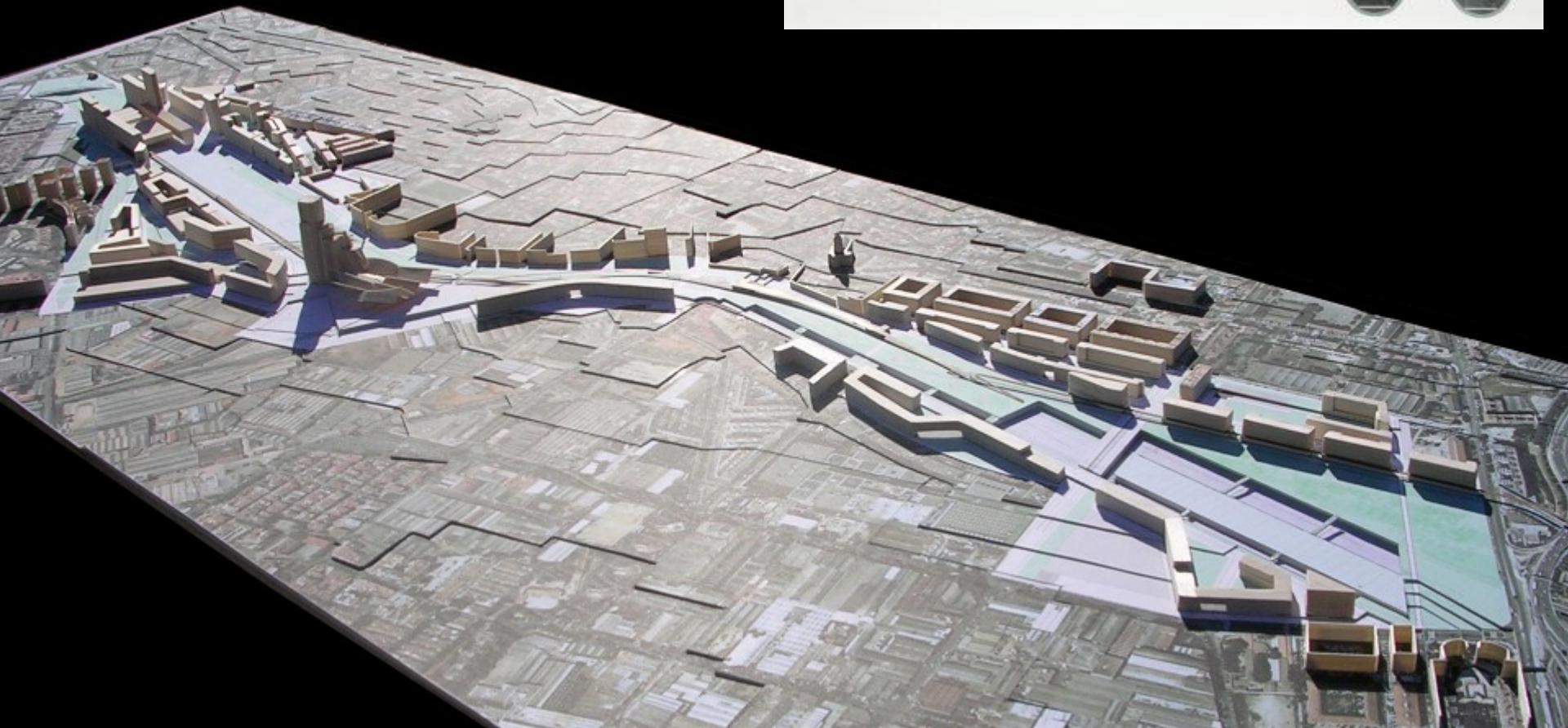
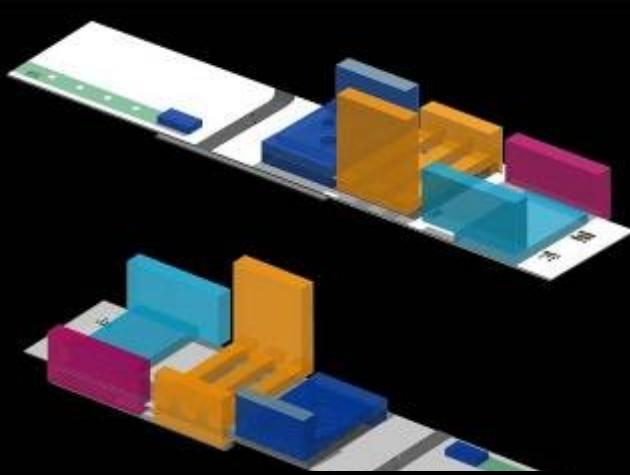


# GEOTHERMAL SYSTEMS FOR HEATING AND COOLING



# HIGH SPEED TRAIN STATION ENVELOPE DAYLIGHT/HVAC OPTIMIZATION





# **La Città e l'Ambiente**

## **Costruire città sostenibili**

### **BARCELONA case study**

**Josep Acebillo**, Architect

CEO Barcelona Regional  
former Chief Architect of the City of Barcelona

Milano, June 12th 2009

