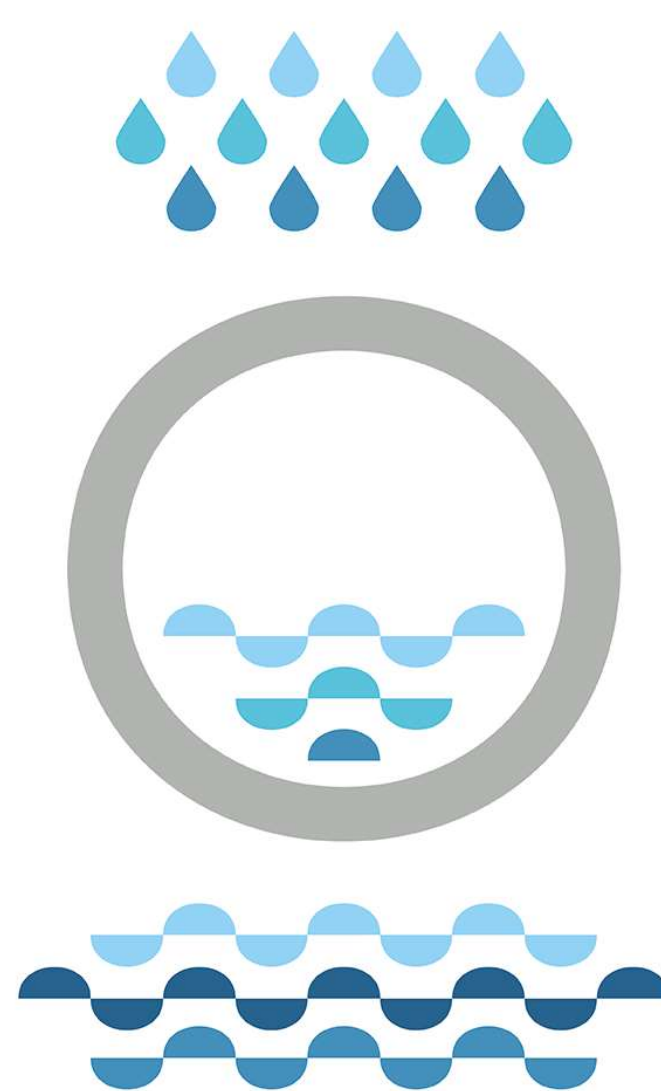


# Lisbon Drainage Master Plan

[planodrenagem.lisboa.pt](http://planodrenagem.lisboa.pt)



Project description

## Lisbon Drainage Master Plan



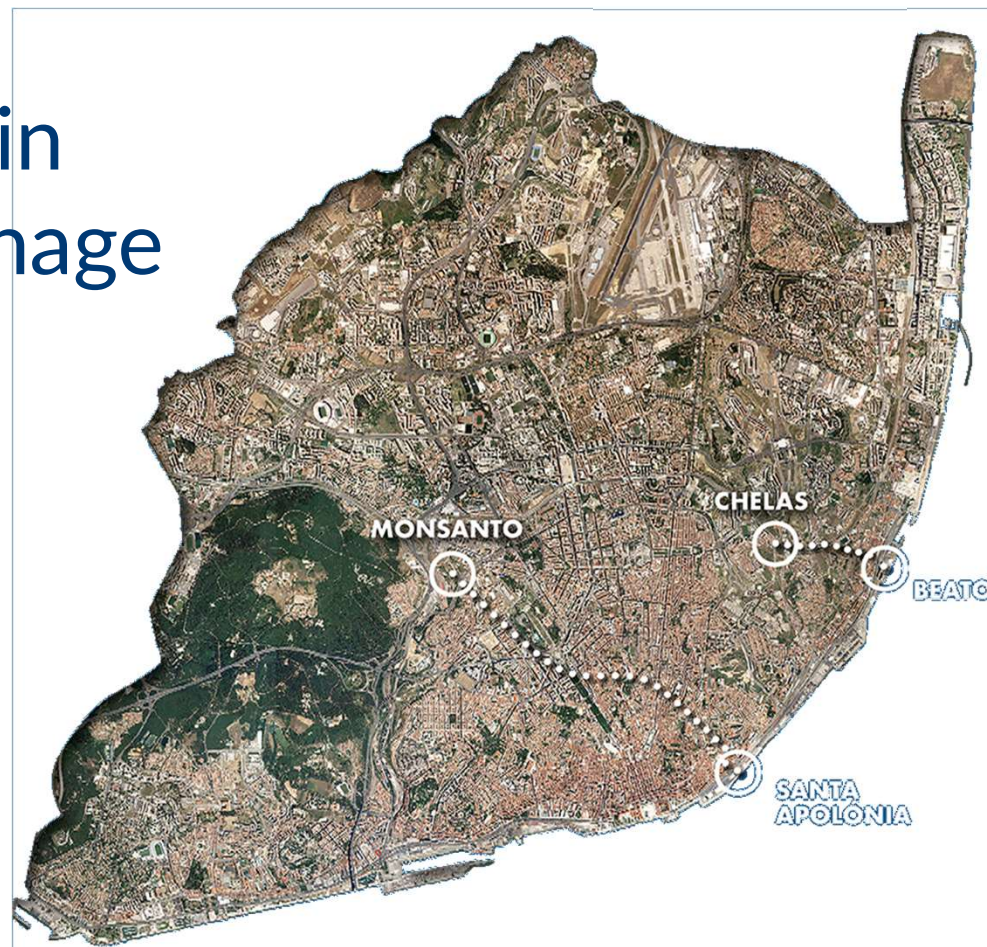
# The role of procurement in Lisbon's Sustainable Drainage System



**PGDL**  
PLANO GERAL  
DE DRENAGEM  
LISBOA

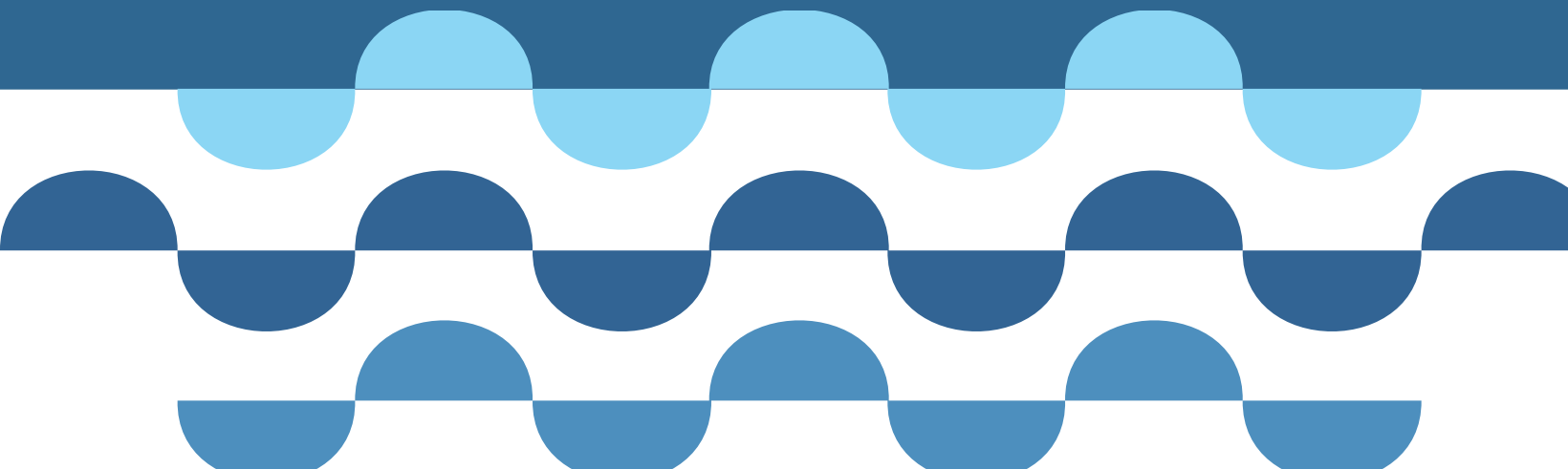
13/03 | 14h Session | Procura+ Lisbon Conference 2024

José Silva Ferreira / Gonçalo Diniz Vieira





# Why



## Lisbon Drainage Tunnels – brief resume





The problem  
In Lisboa



1967 Extreme Rainfall Event



1983 Extreme Rainfall Event



2008 Extreme Rainfall Event



2014 Extreme Rainfall Event



LESLIE HORN (2018)

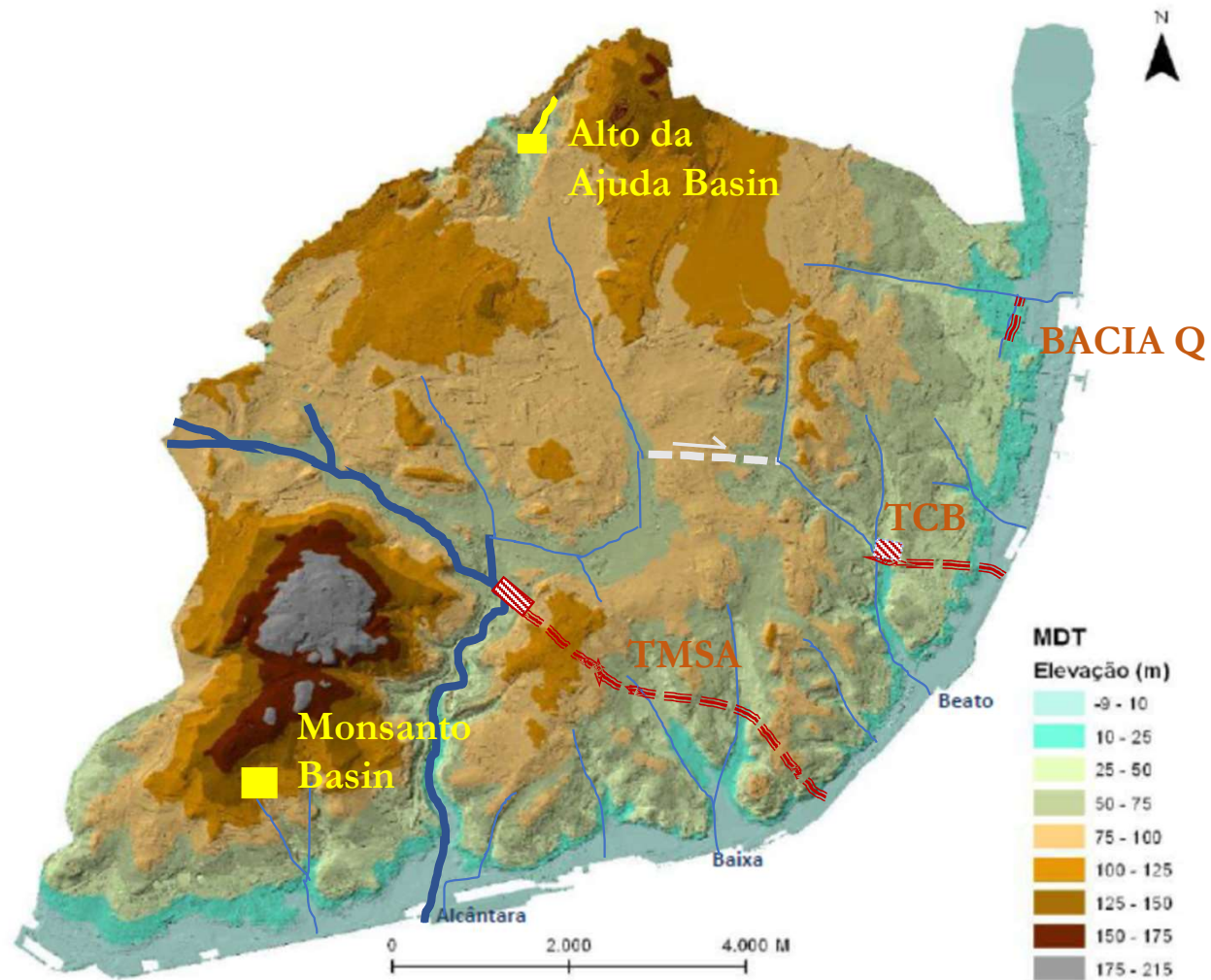


# The causes



# LISBON

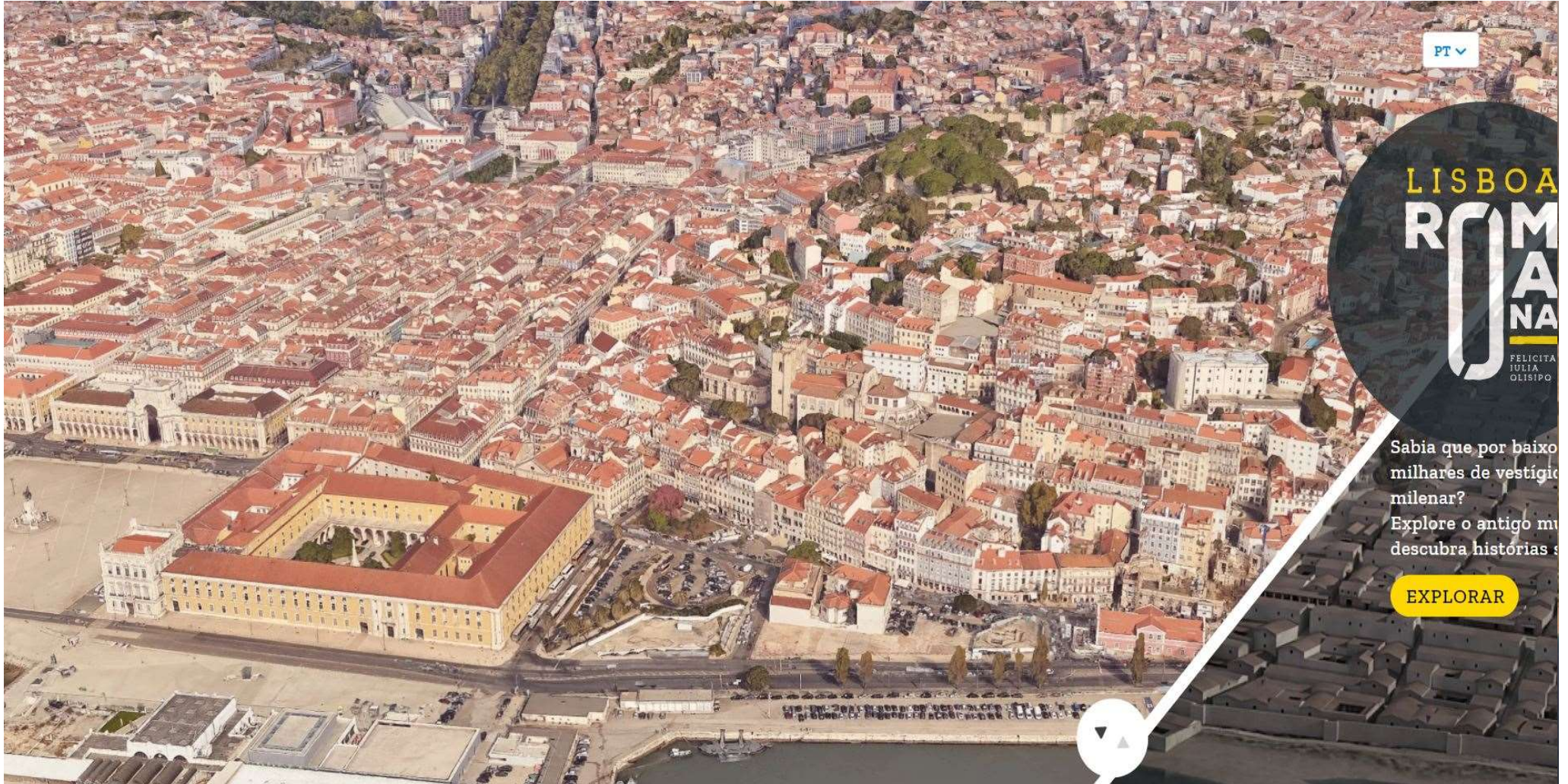
## OROGRAFY & LDMP Works





The causes

## Development



PT

LISBOA  
ROMANA  
FELICITA  
IULIA  
OLISIPONENSIS

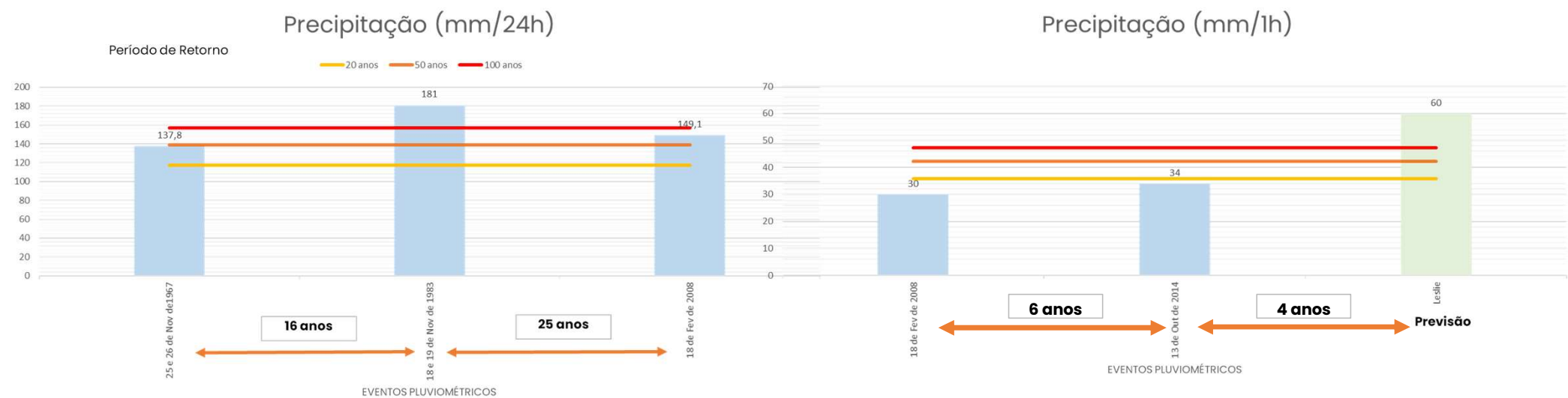
Sabia que por baixo  
milhares de vestígios  
milénar?  
Explore o antigo mu  
descubra histórias s

EXPLORAR



The causes

# Climate change





# The Solution



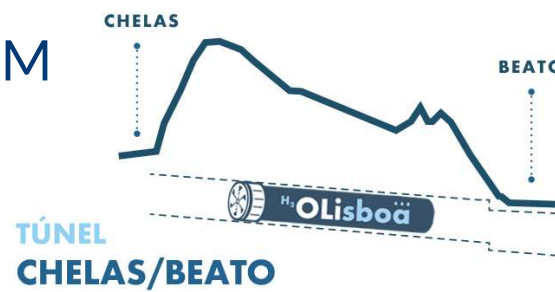
Project description

## Tunnels TMSA and TCB

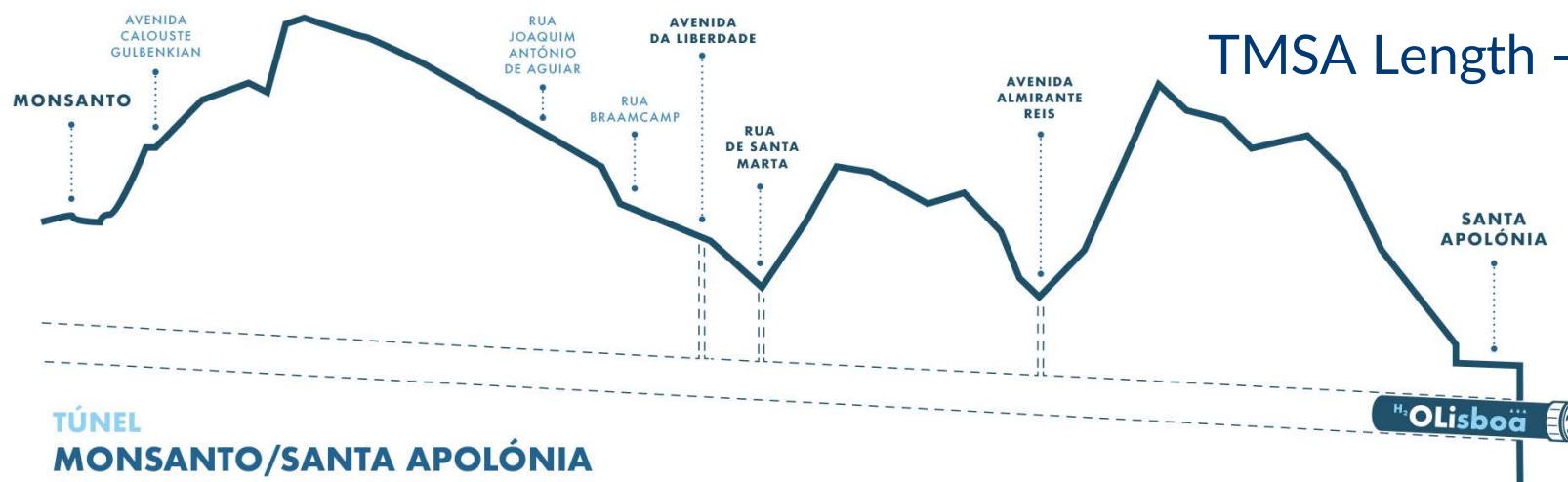


5.5 m internal  
diameter both tunnels

TCB Length - about 1KM

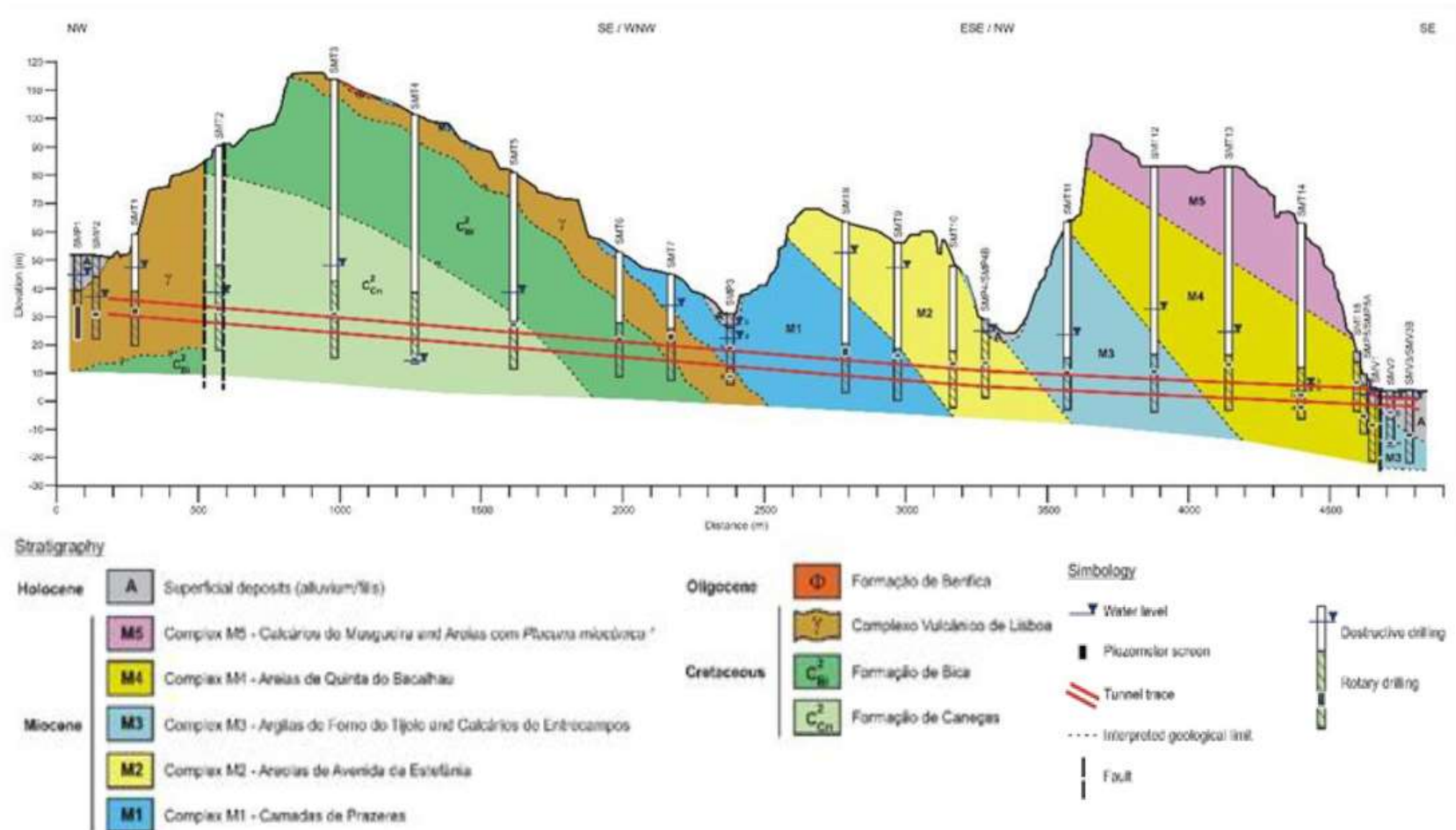


TMSA Length - about 5KM



# LDMP

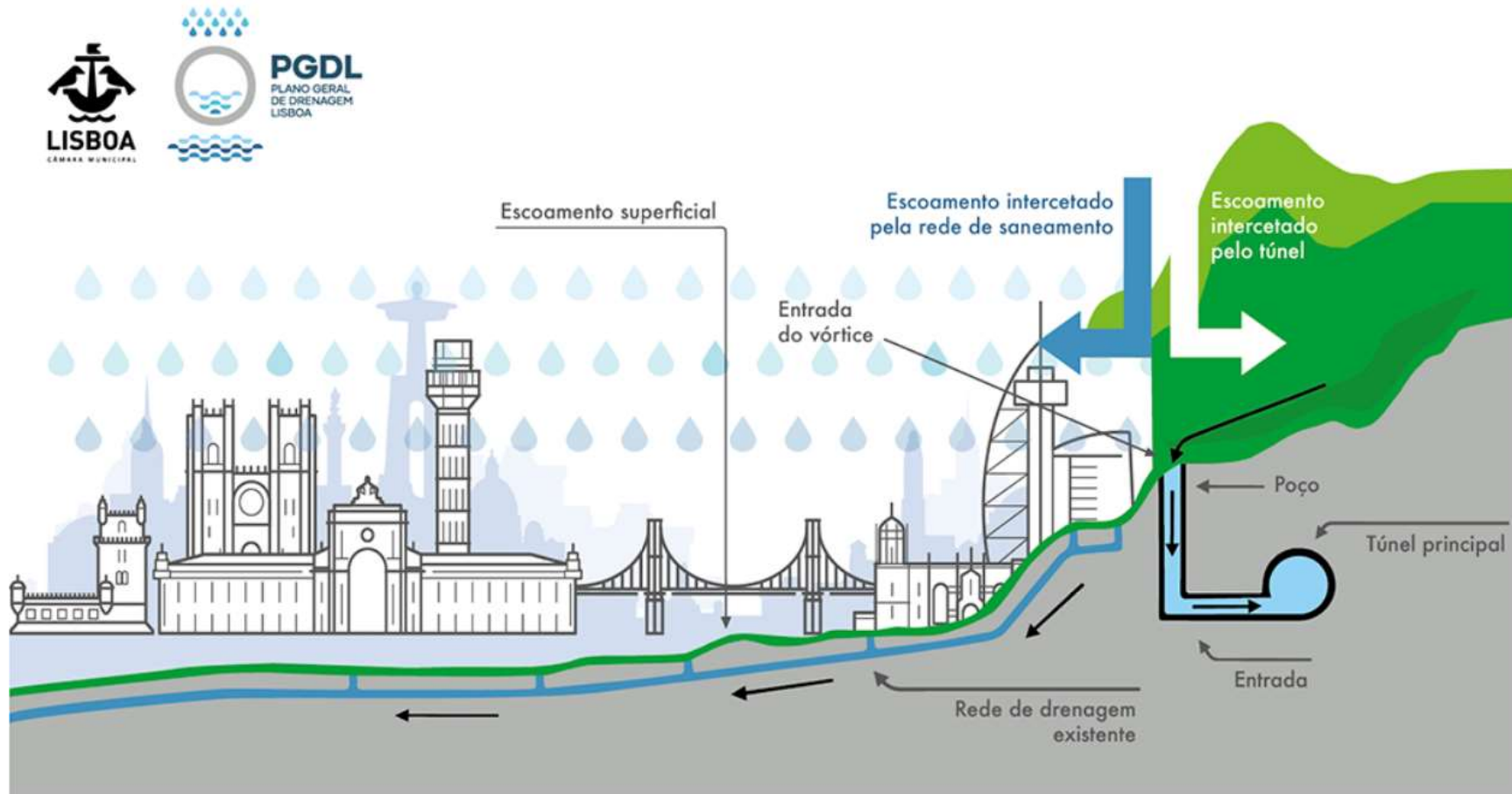
## TMSA cross section





Project description

## How do they work?







TMSA

TCB



Project description

How do they work?



## Current Situation



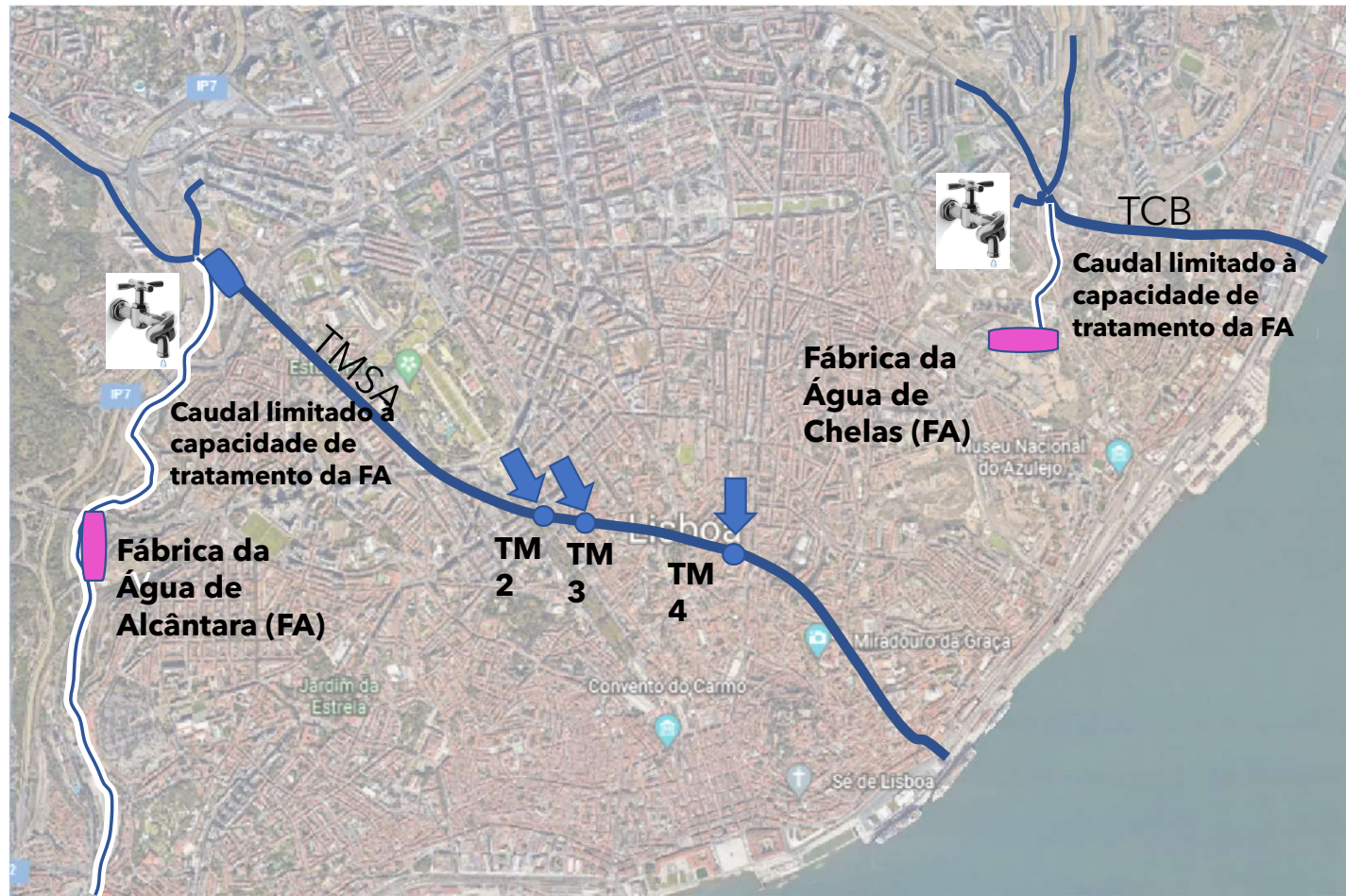


## Tunnels to be built

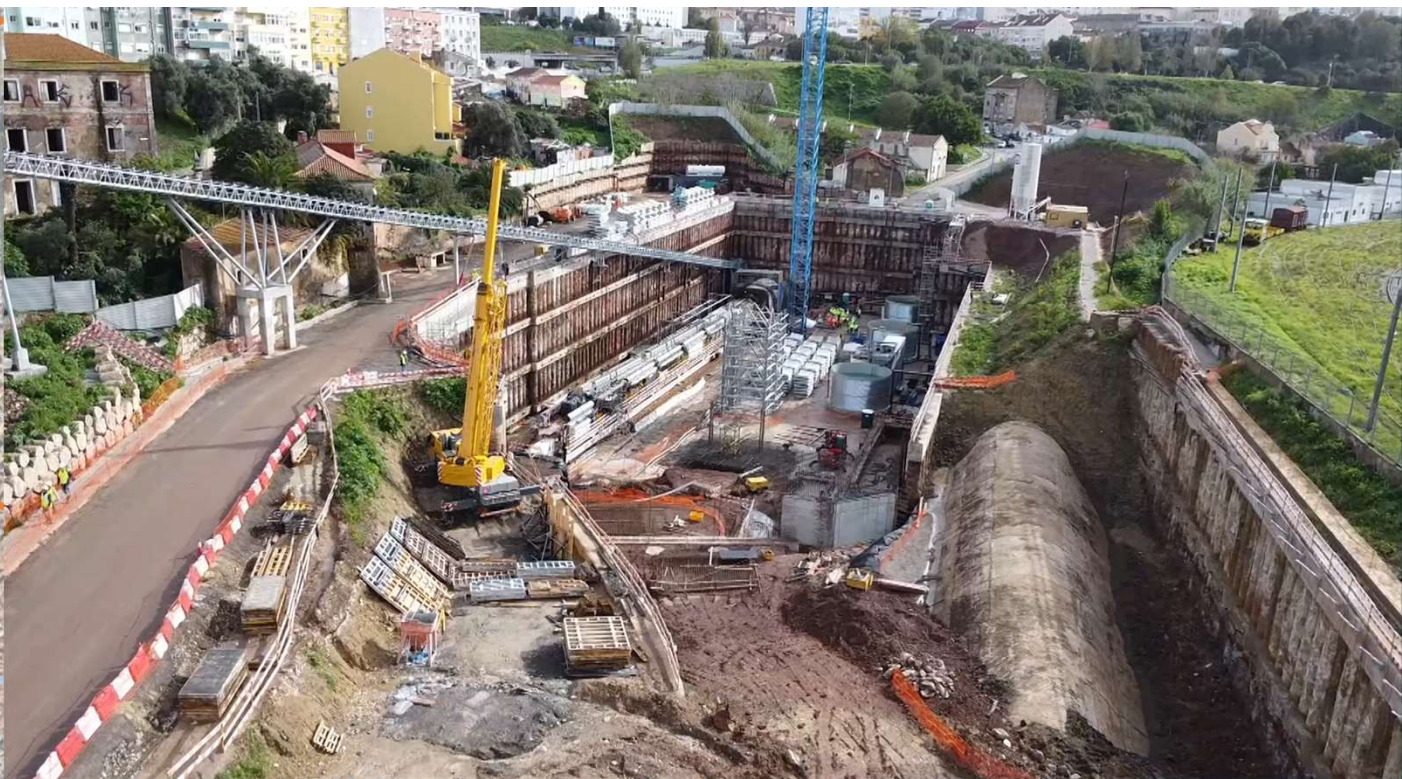




## Future Situation



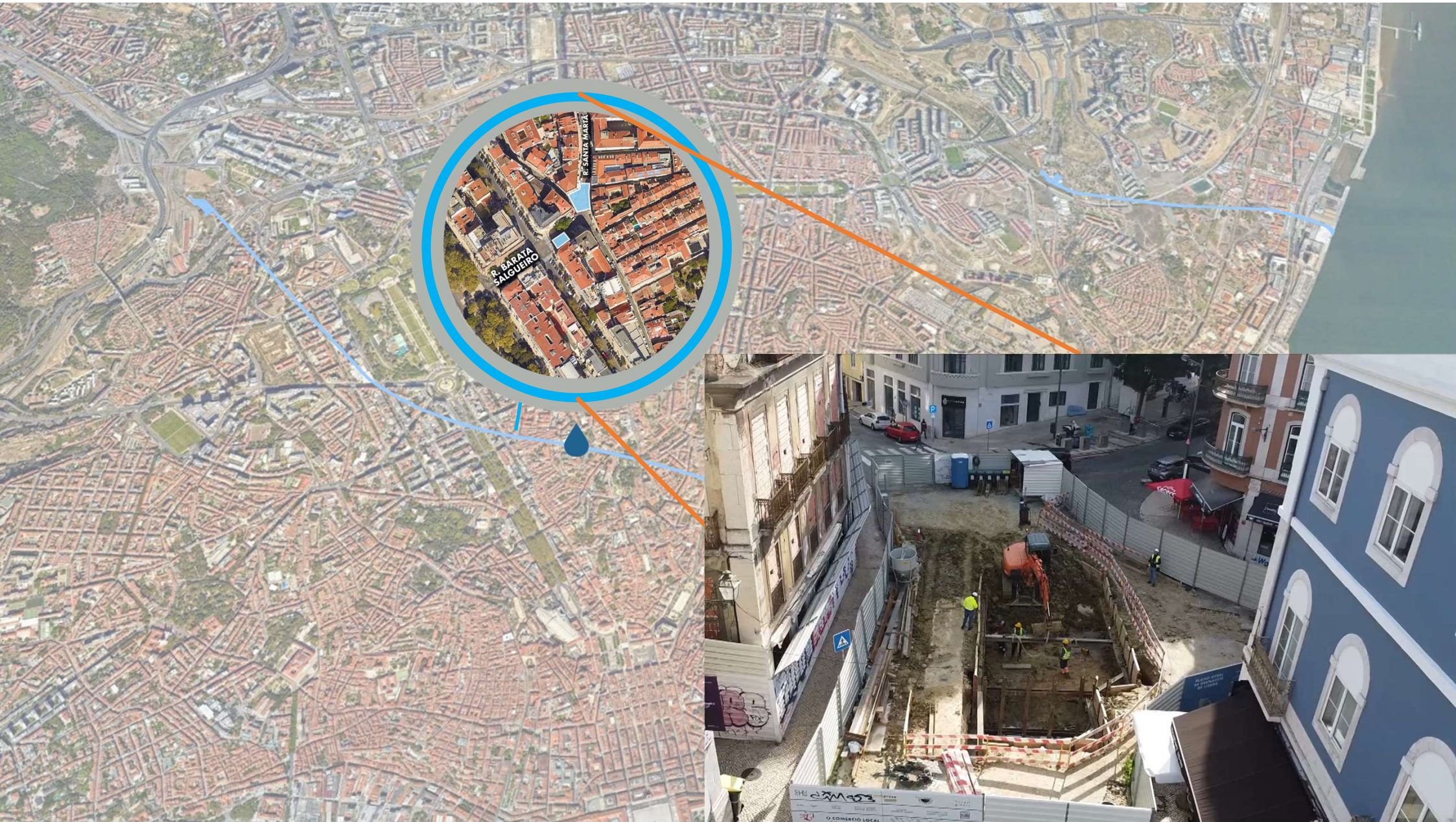
































TMSA

TCB





Project description

## Flood charts



*“... to mitigate,  
between 70% to  
80% of flood  
problems in  
Lisbon...”*



# PROCUREMENT: INNOVATION & SUSTAINABILITY





Project description

## Project premises



Recurrence time: 100 years

Life span: 100 years





# CONTRACTUAL PRACTICES



# HOW & WHEN ?

## Tunnels & Retention Basin

### International Public Tender | Design-build

- Unanimity approved by City Council
- Value € 132.900.000
- Time 38 months

### Contract

- Started 2nd semester 2021

### Works Start date

- Started 2nd semester 2022 (8 months delayed)

### End

- 2025 / 1st semester 2026 (depends on arqueology...)



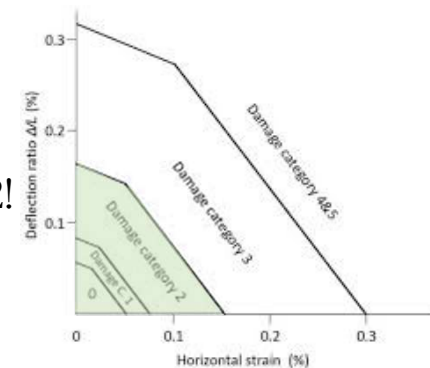


# HOW TO MITIGATE PROBLEMS DURING CONSTRUCTION ?

- Underground Works with Complex Geotechnical Structures
- Urban areas, with existing buildings and superficial infrastructures



- **Burland Criteria:** Damage category always less than 2!



- **Exhaustive Infrastructures investigation**, with every companies and suppliers...

## ACTIVE WORKING GROUPS

WORKING GROUP 2  
Research

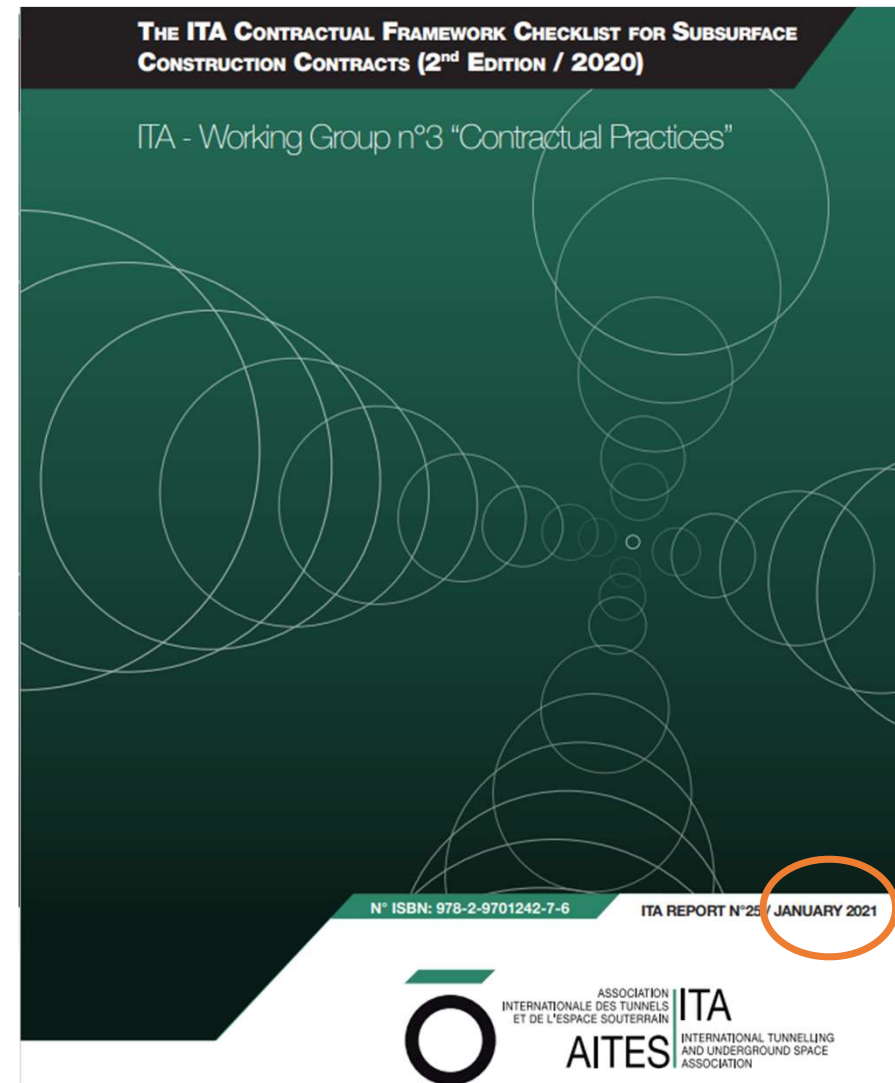
WORKING GROUP 3  
Contractual Practices

WORKING GROUP 11  
Immersed and  
Floating Tunnels

WORKING GROUP 12  
Sprayed Concrete Use

WORKING GROUP 19  
Conventional  
Tunnelling

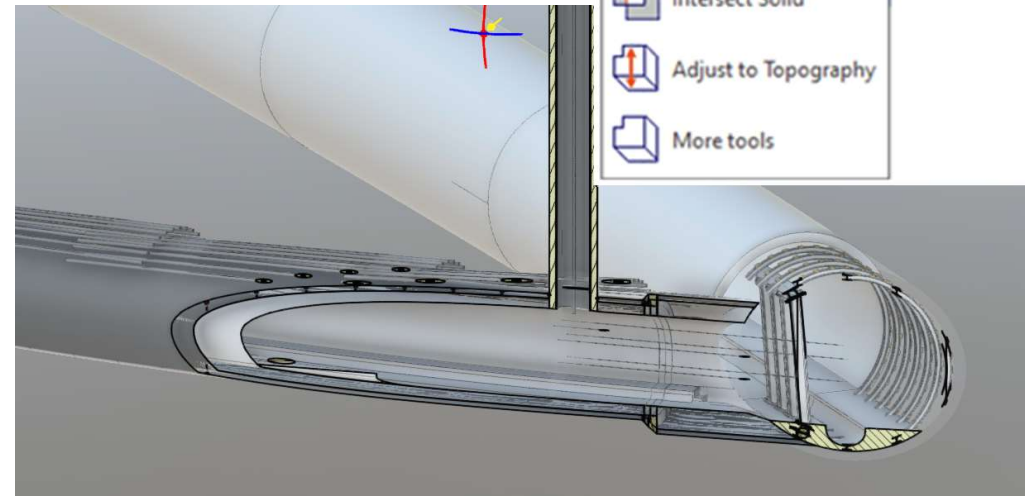
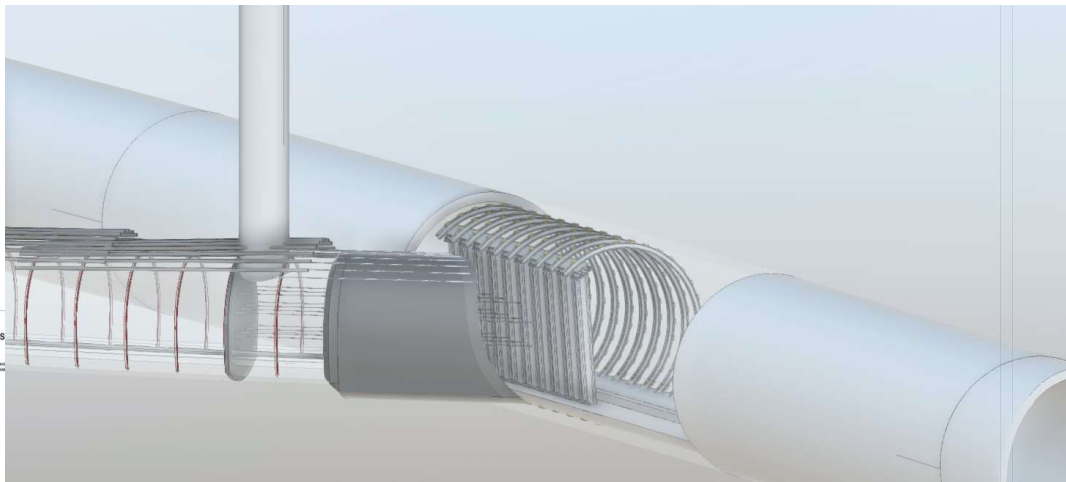
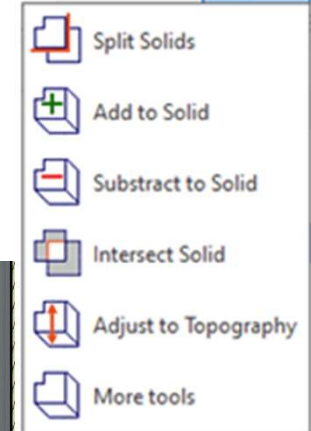
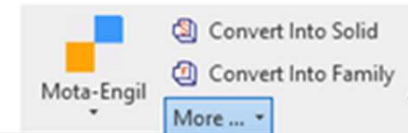
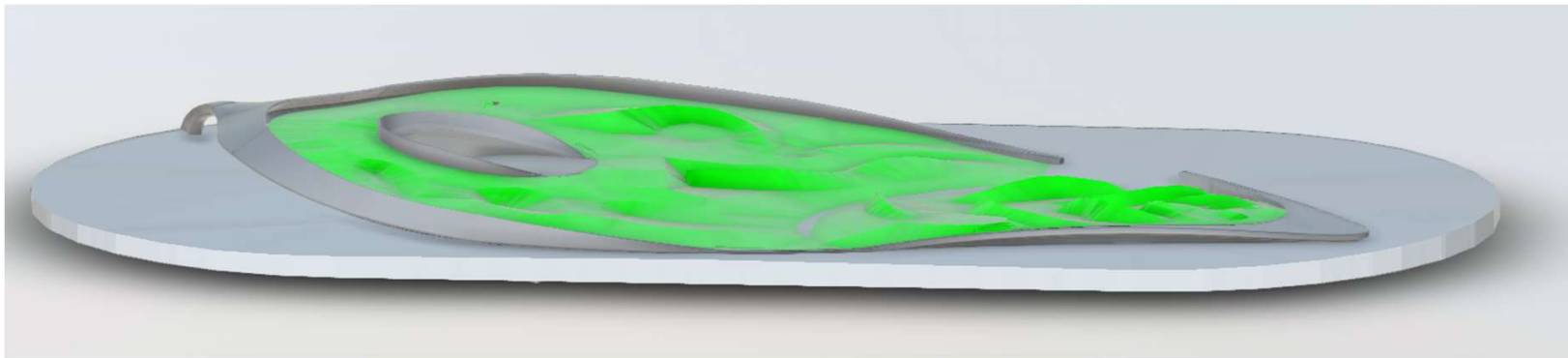
WORKING GROUP 20  
Urban Problems,  
Underground  
Solutions





## 9 >> MANAGEMENT OF INFORMATION IN SUBSURFACE CONSTRUCTION PROJECTS

The **management of large amounts of complex changing data** in subsurface construction projects is a critical part of successful project control and delivery.





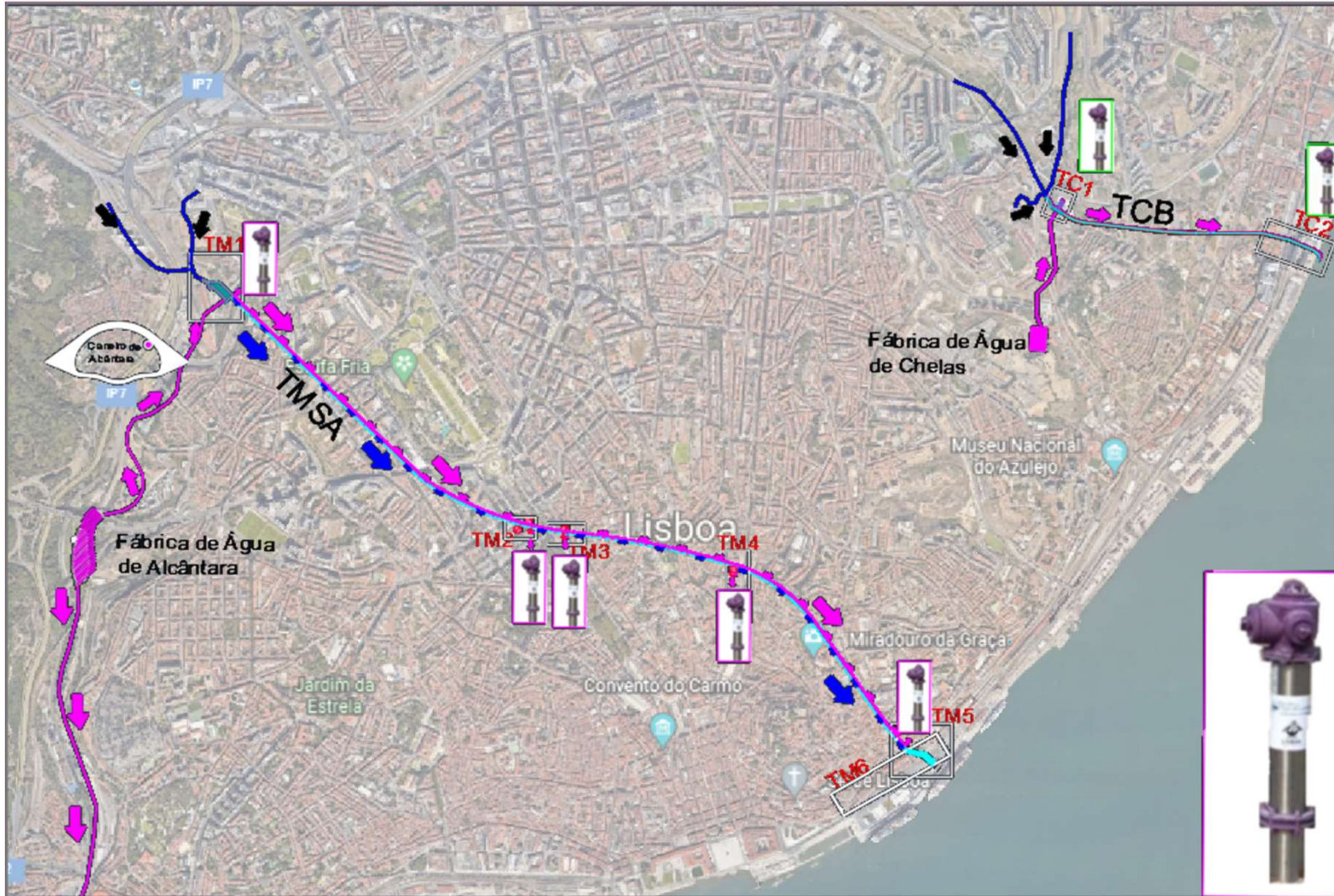
# WATER + [Close water cycle]





4 – Water+

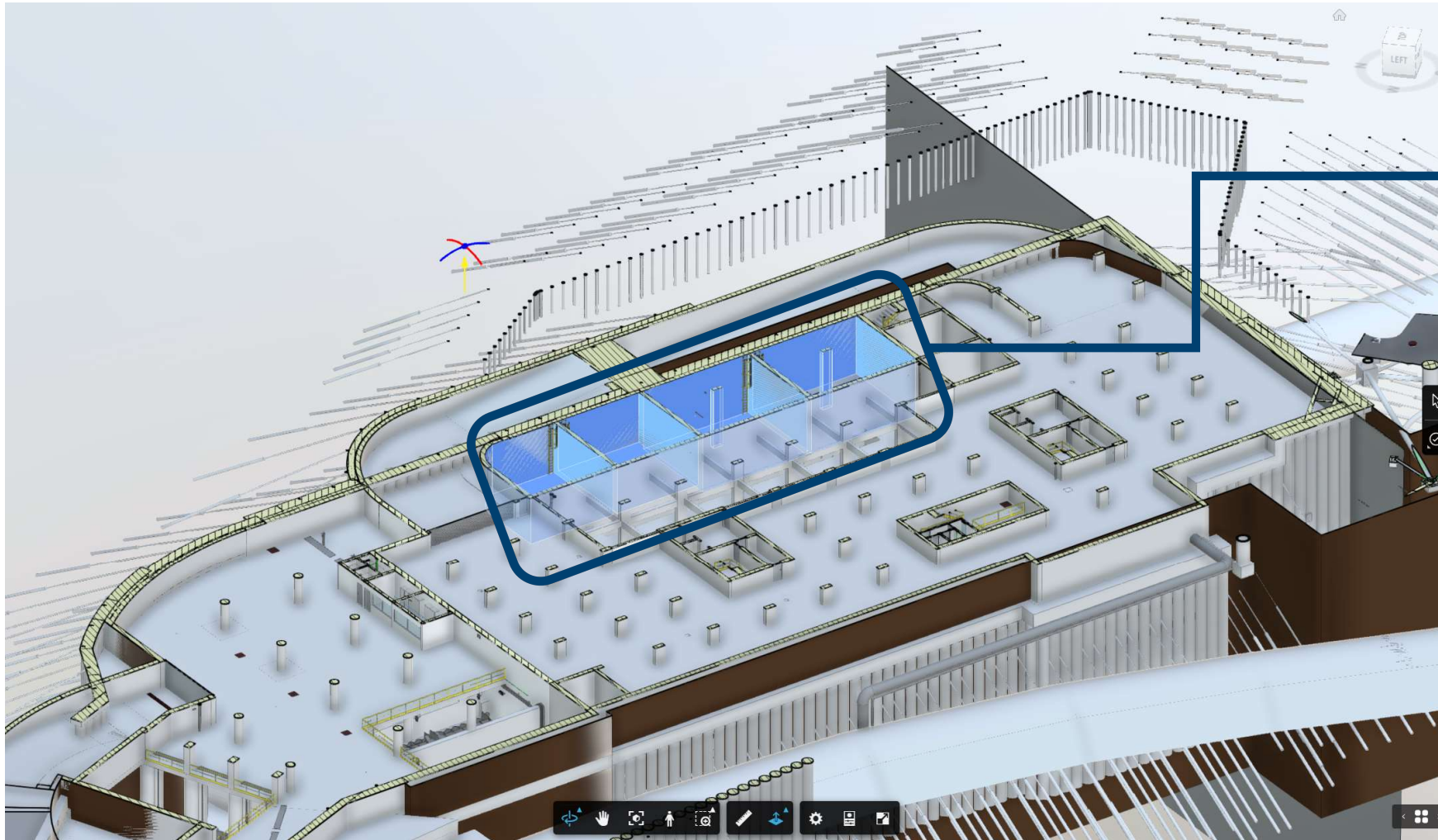
## Water + Network





4 - Water+

## Water + Network

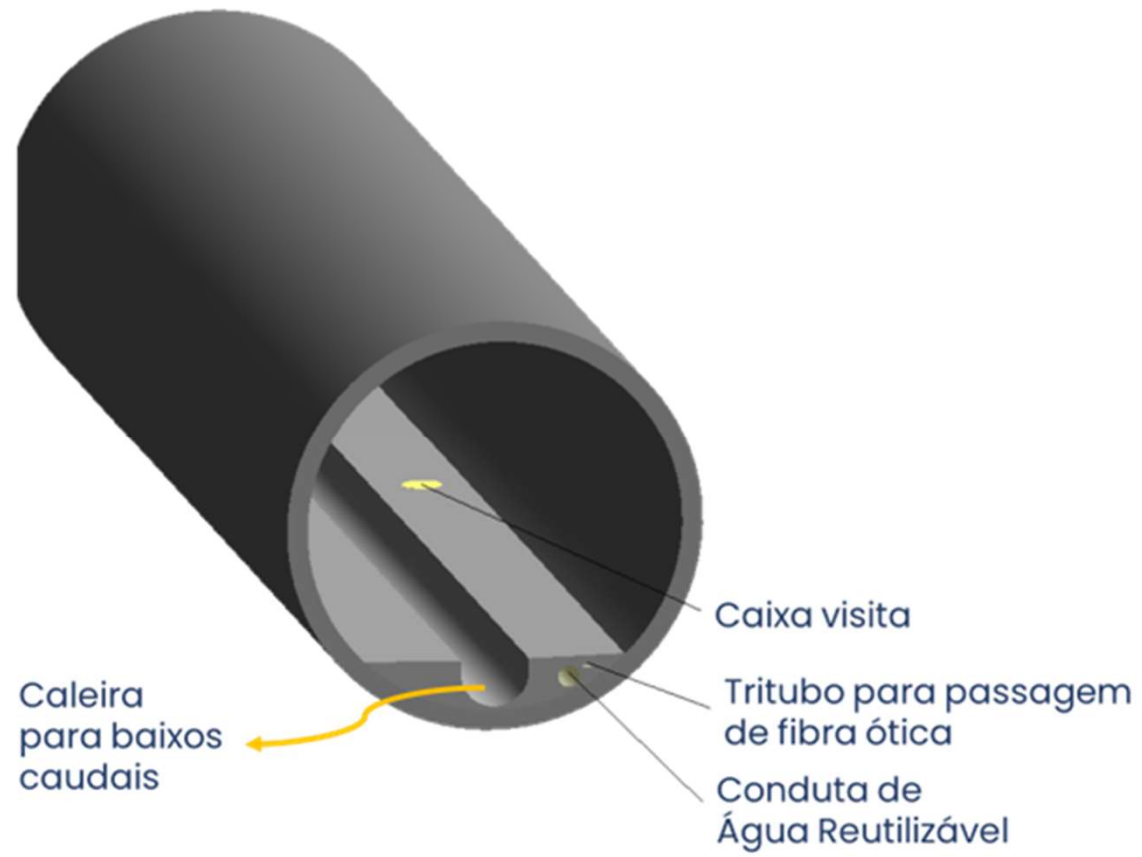


Water +  
Reservoirs



4 – Water+

## Water + Network





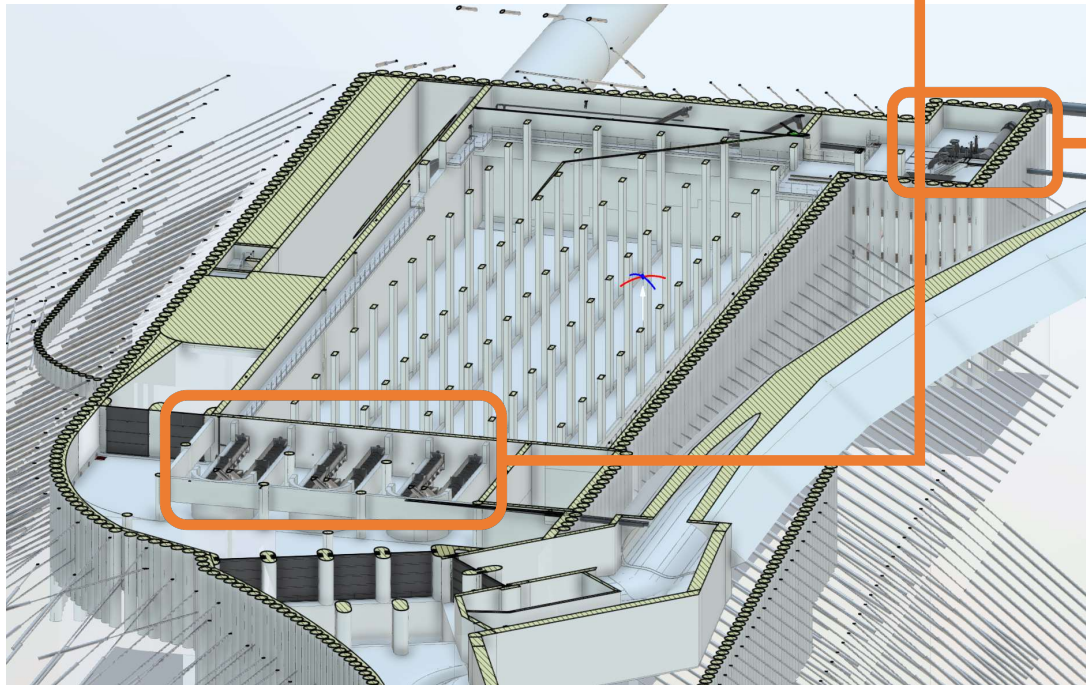
# BIM



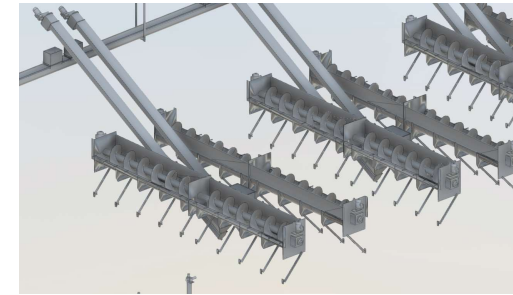


Project description

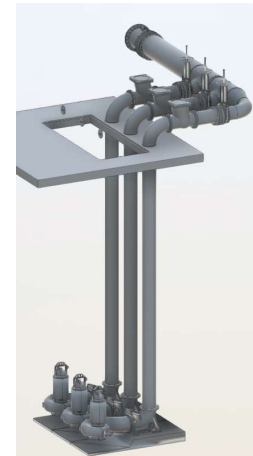
## Why bring BIM to this project?



Operation



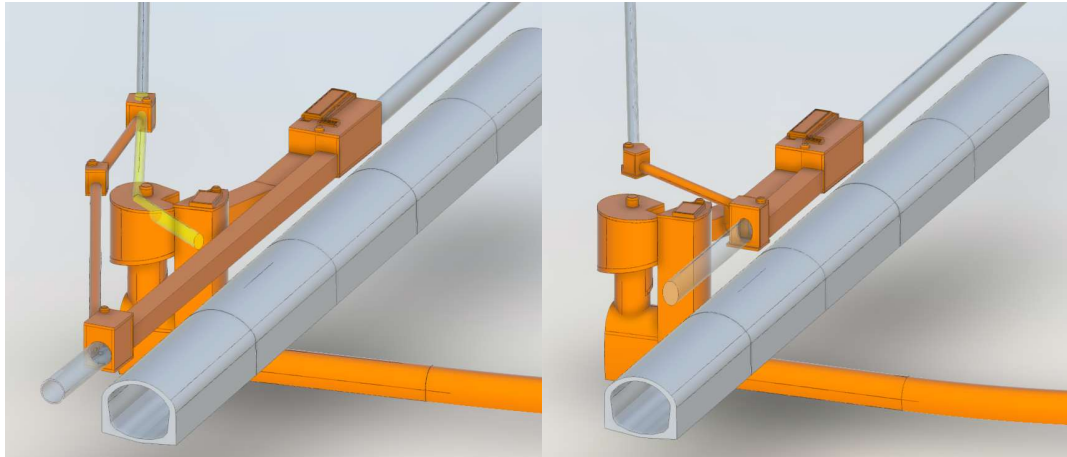
Maintenance



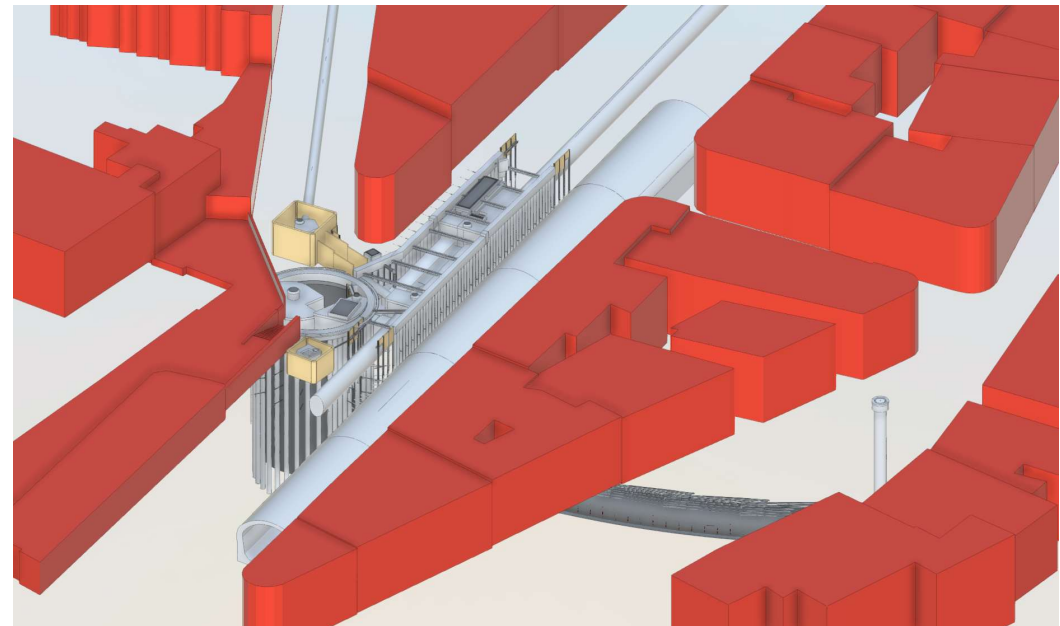
Project description

## Why bring BIM to this project?

Solutions Optimizations



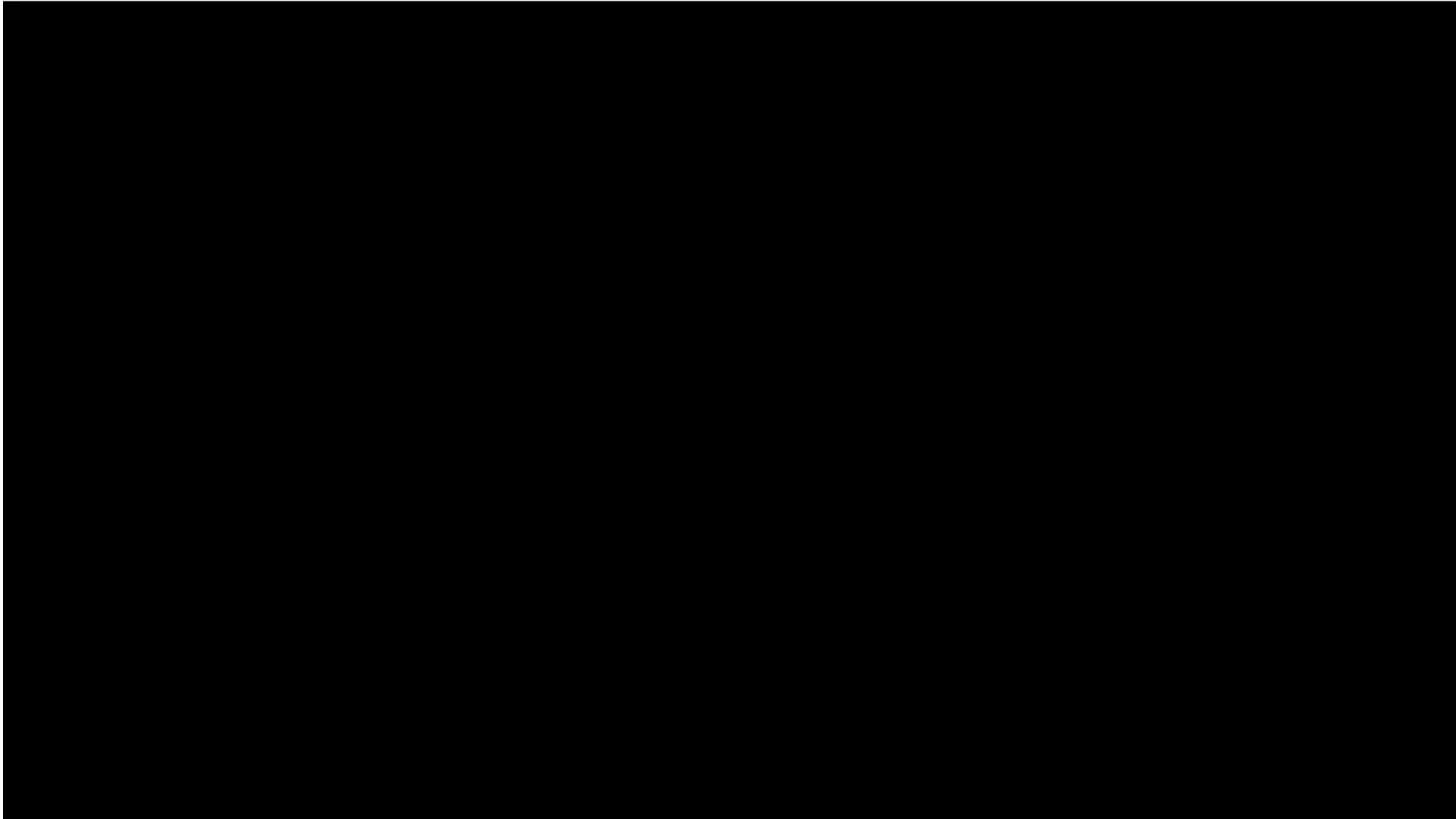
Planning, monitoring  
and control





Project description

# Lisbon Super Drainage Sewers





# BIM and GIS integration





BIM and GIS integration

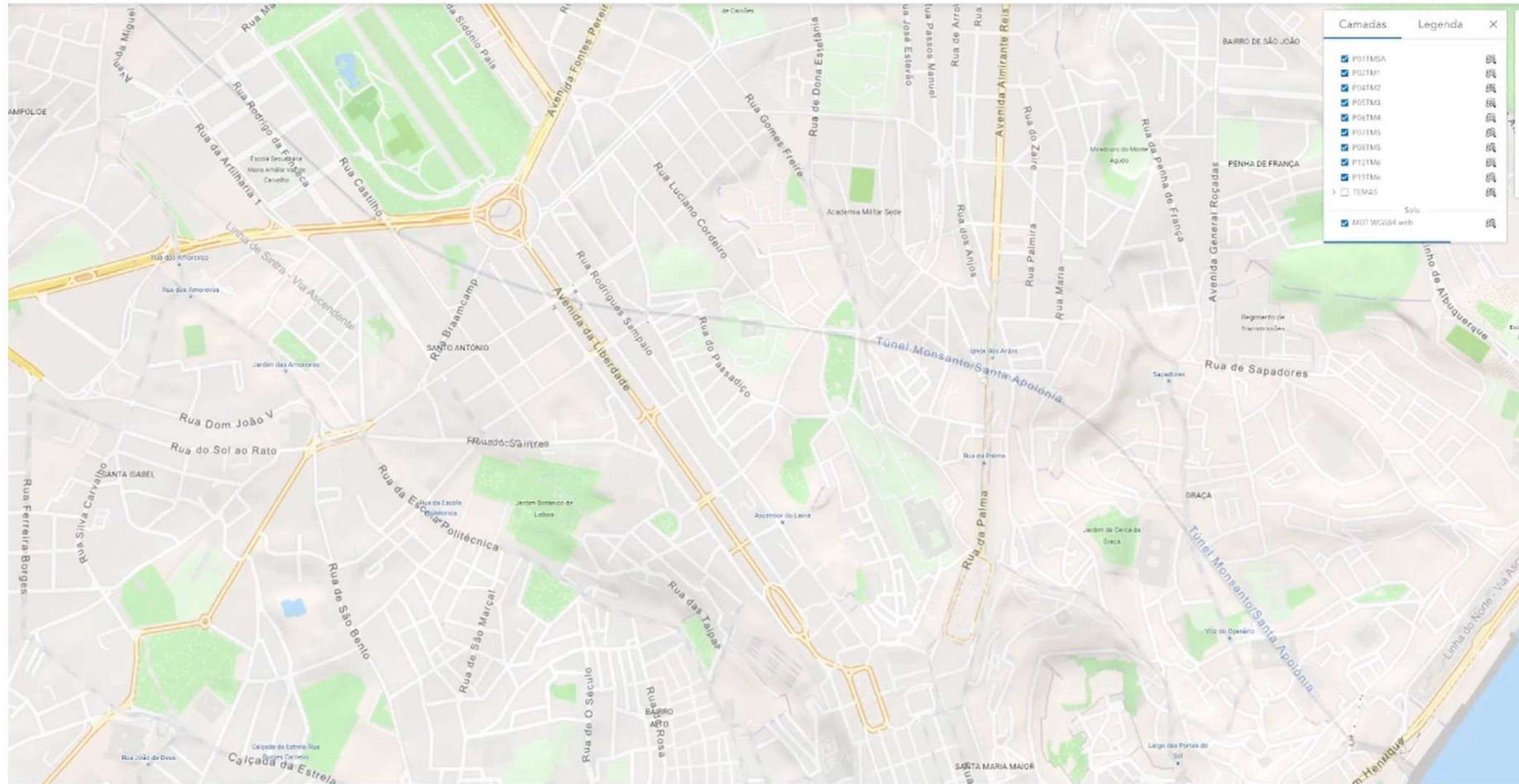
# ArcGIS online / WebScene 3D



cm.maps.arcgis.com/home/webscene/viewer.html?webscene=c2229c46780b4580a01136c9367054f

Webscene\_EUE\_2023

Nova Cena Equip





# WORKS (ongoing)







In Progress...

# Thank You

[planodrenagem.lisboa.pt](http://planodrenagem.lisboa.pt)

