

16<sup>TH</sup> INTERNATIONAL CONFERENCE

# UNDERGROUND CONSTRUCTION PRAGUE 2026

MAY 25–27, 2026 | CLARION CONGRESS HOTEL PRAGUE



## High-Speed Rail Network tunnels in Poland - overview and challenges

**Monika Mitew-Czajewska, Dominik Rybka**

Warsaw University of Technology, Polish Tunnelling Association

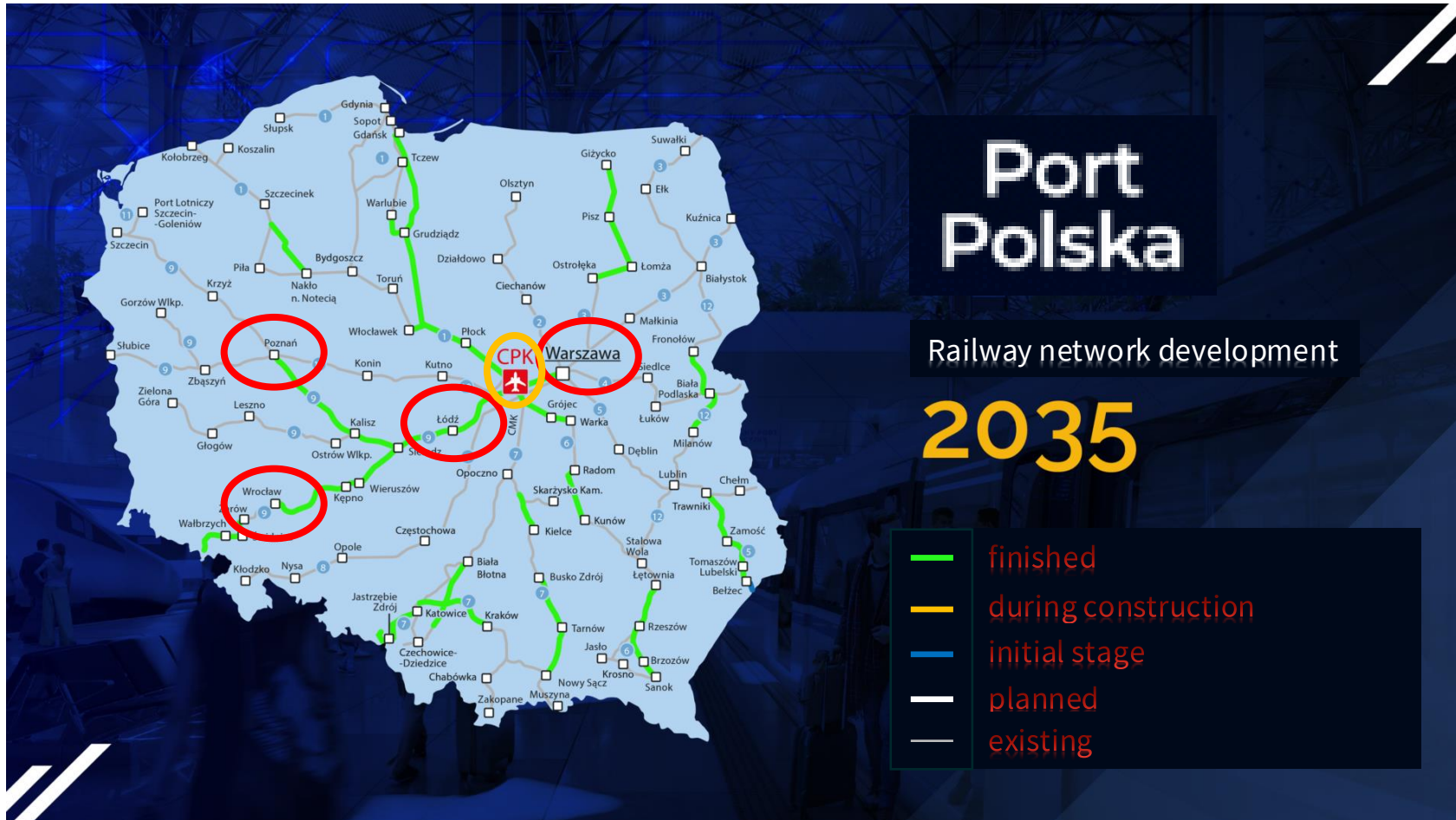


ČESKÁ TUNELÁŘSKÁ  
ASOCIACE  
ITA-AITES  
CZECH TUNNELLING  
ASSOCIATION  
ITA-AITES





# High-Speed Rail Network in Poland





# High-Speed Rail Network in Poland

shallow cut&cover tunnels

4,6 km single bore TBM tunnel in Łódź (under construction)

3,0 km cut&cover tunnel in Łódź extension of the TBM tunnel

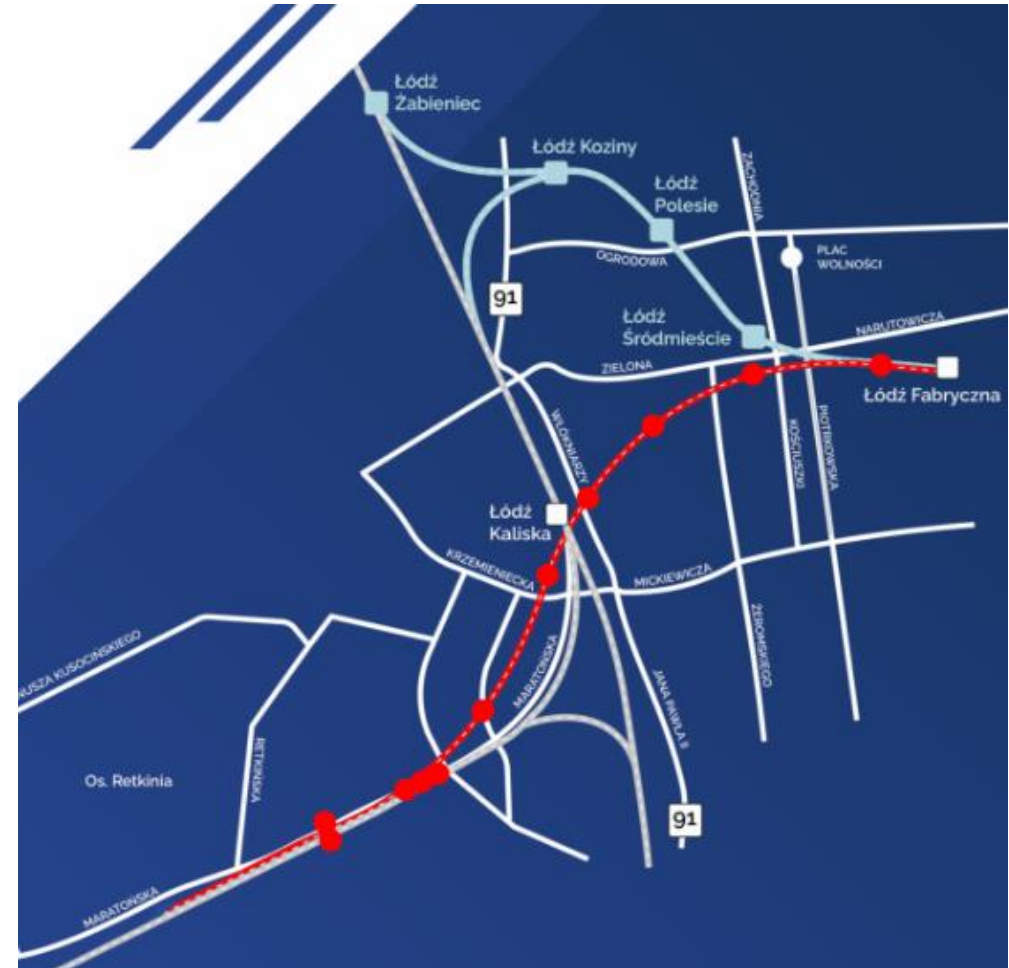
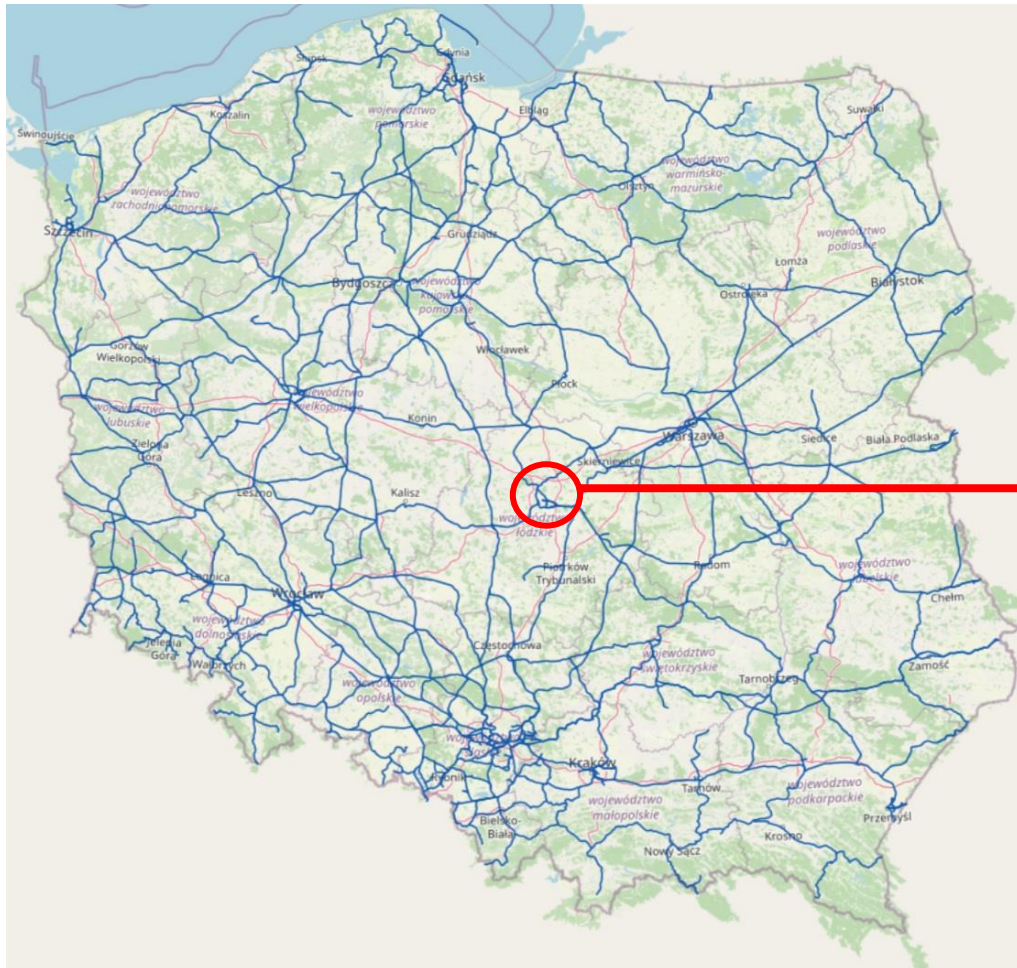


9,2 km dual bore tunnel in Warsaw  
7,6 km TBM  
+1,6 km cut&cover  
Design stage

Total of 6 km cut&cover tunnels - part of airport railway station and node

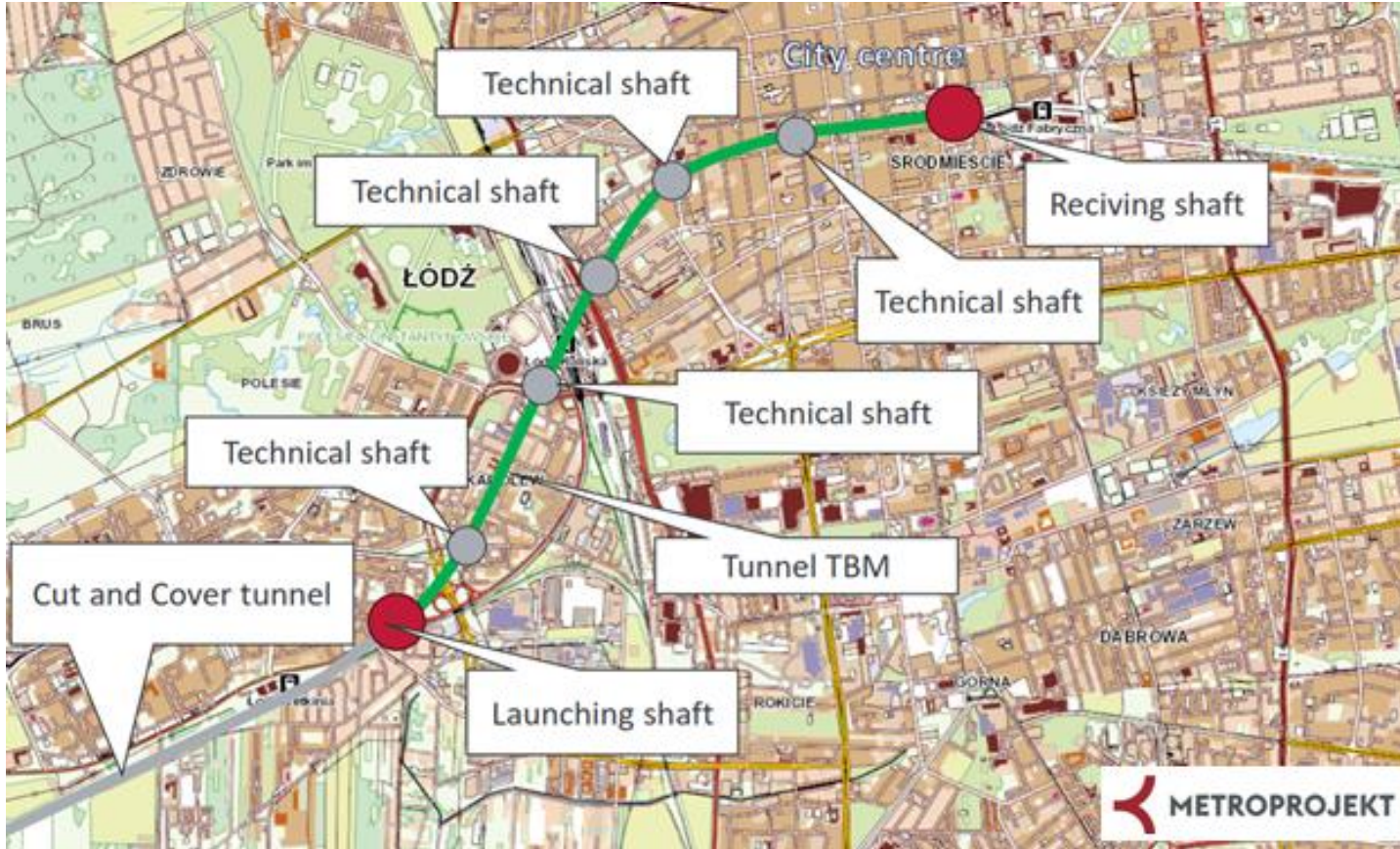


# High-Speed Rail Tunnel in Łódź





# High-Speed Rail Tunnel in Łódź



## HSR Tunnel in Łódź

**Total length of the tunnel 7,6 km**  
including:  
**4,6 km TBM  $\Phi 13,7$  m**  
**3 km cut&cover**

TBM type: **Variable Density**

General contractor - the TBM tunnel:  
PORR Poland & PORR GmbH



# HSR Tunnel in Łódź

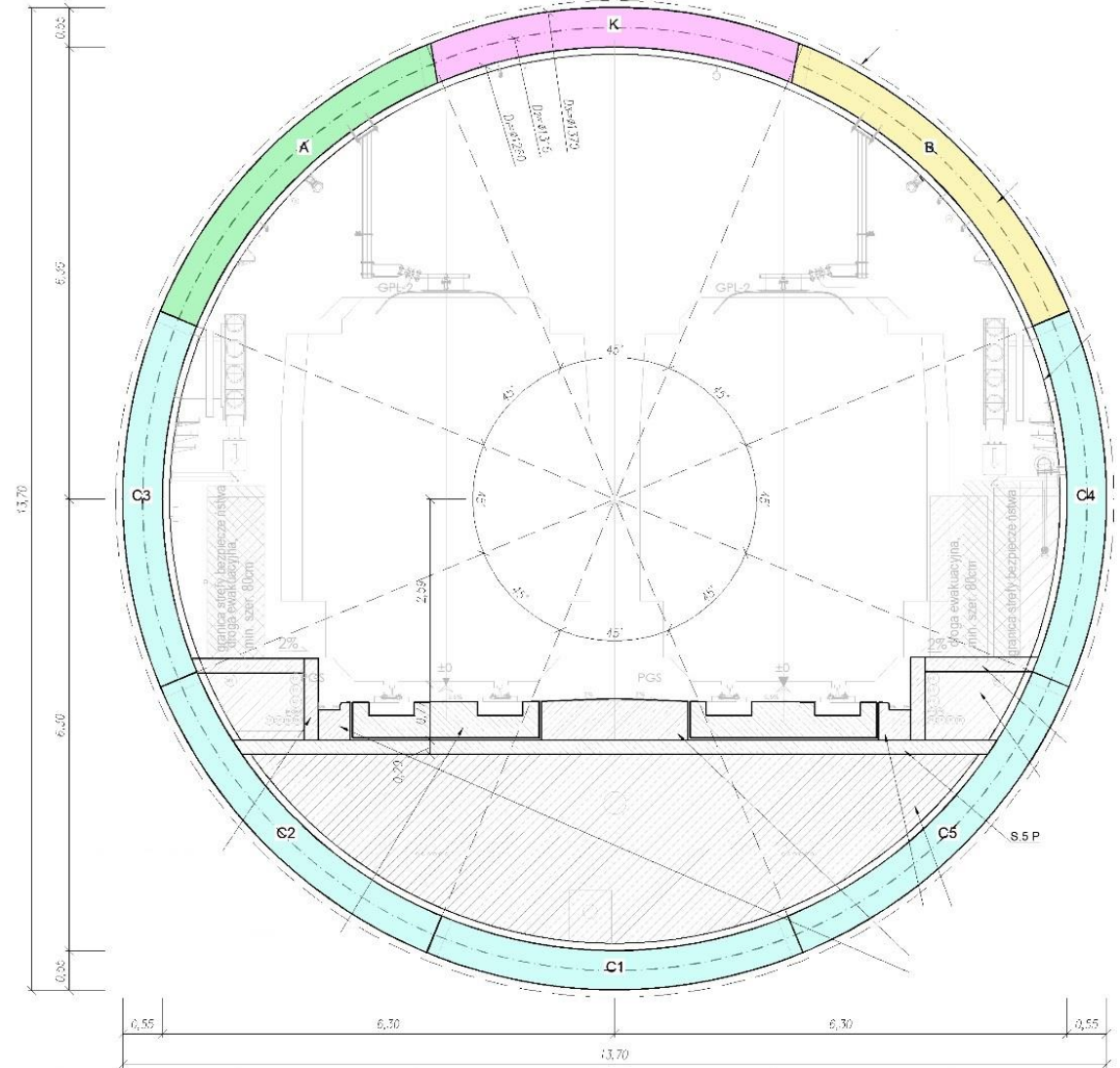
## HSR Tunnel in Łódź

**Total length of the tunnel 7,6 km**  
including:

**4,6 km TBM  $\Phi 13,7$  m Variable Density**  
**3 km cut&cover**

**(rings: 7+1 segments, 55cm thickness)**

General contractor for the TBM tunnel:  
PORR Poland & PORR GmbH



TBM launch planned for late 2026, with finish scheduled on 3rd quarter of 2028.  
The entire line is scheduled to be put into service in 2032 (including Port Polska airport)



# High-Speed Rail Tunnel in Łódź

shaft contour line

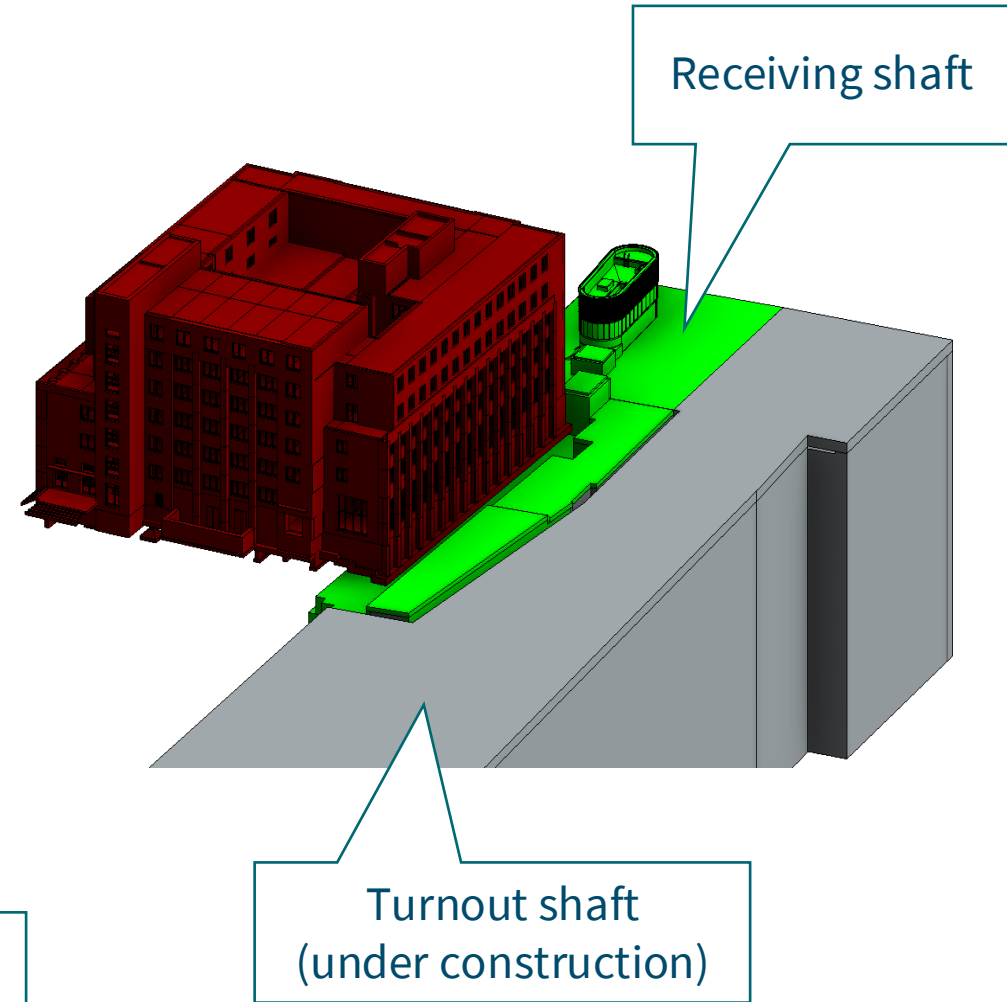
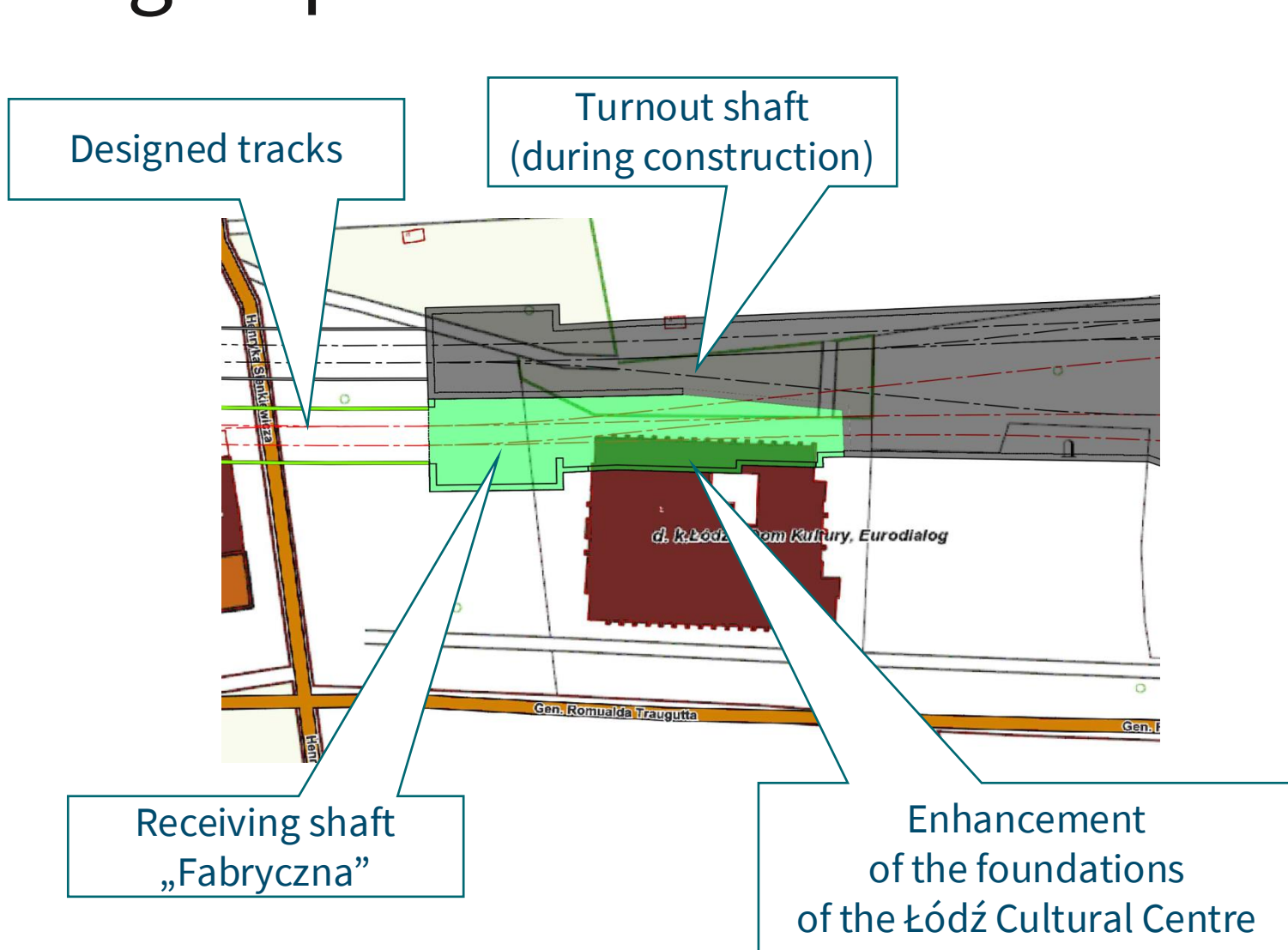


Starting shaft „Retkinia”  
Works for TBM assembly and launching in progress

Receiving shaft „Fabryczna”  
Foundation slab completed

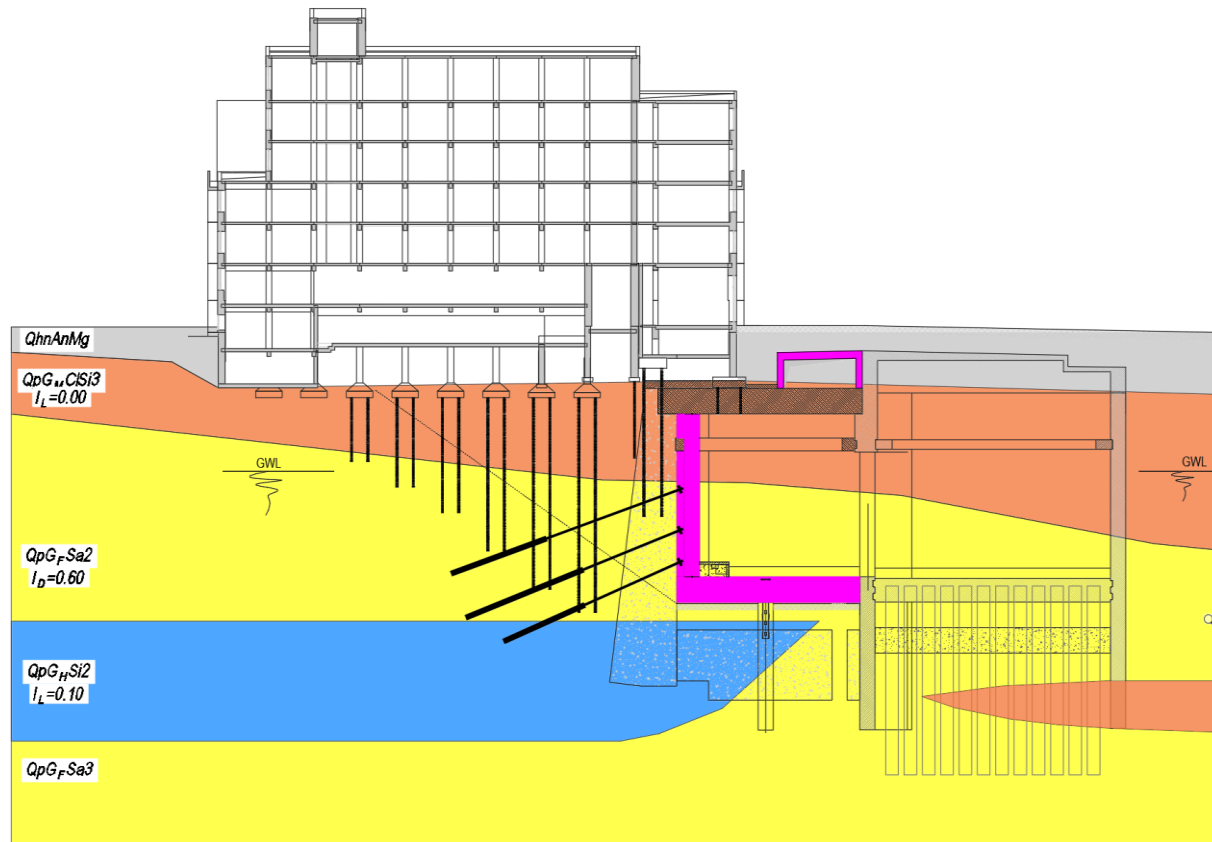


# High-Speed Rail Tunnel in Łódź



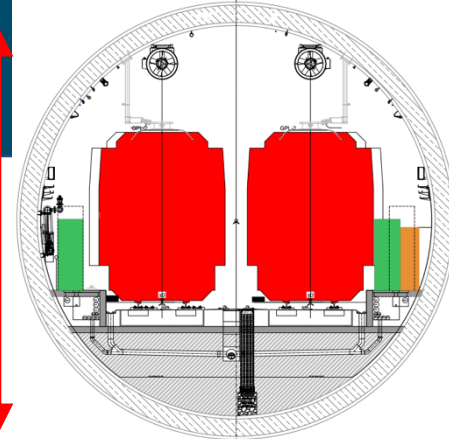


# High-Speed Rail Tunnel in Łódź





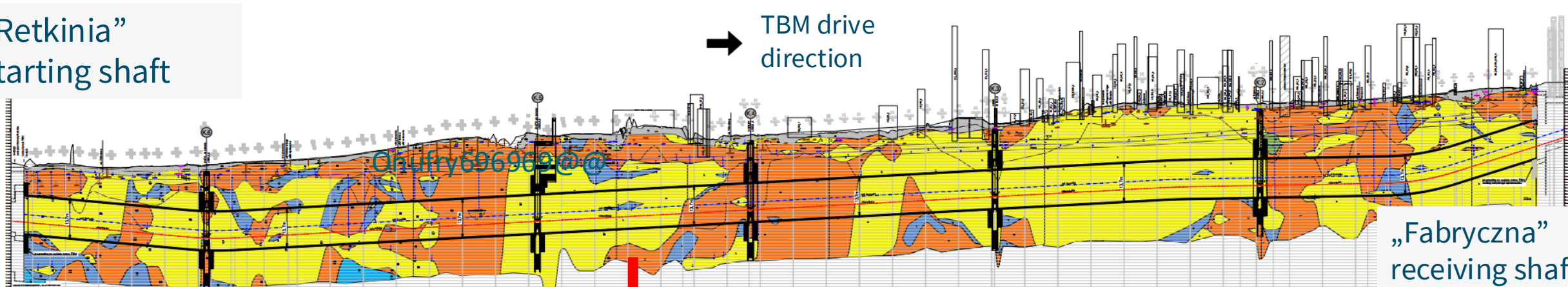
# High-Speed Rail Tunnel in Łódź



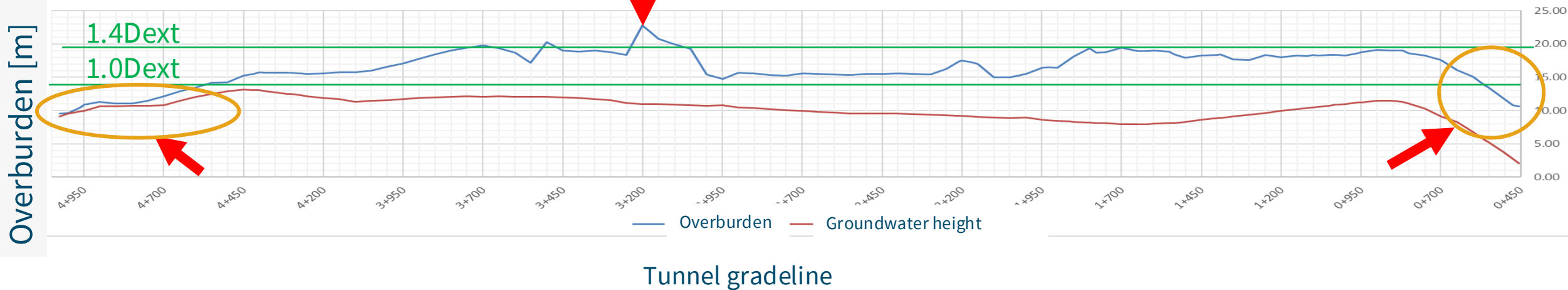
~13,7 m

„Retkinia”  
starting shaft

→ TBM drive  
direction



„Fabryczna”  
receiving shaft





# High-Speed Rail Tunnel in Łódź

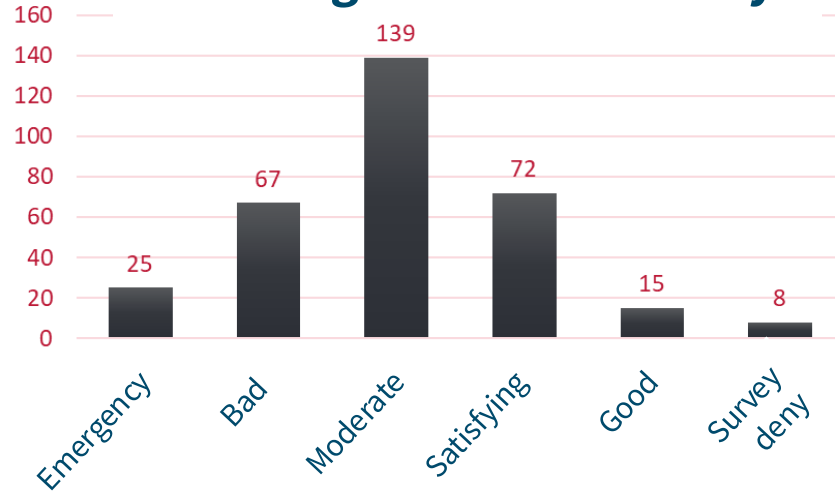


~135 buildings in the influence zone  
19 directly above the tunnel

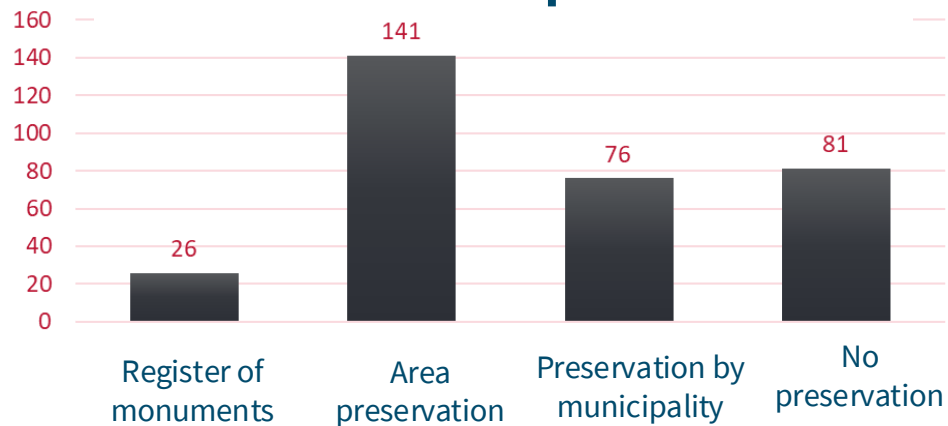


## High-Speed Rail Tunnel in Łódź

### Building Condition Survey



### Form of historic preservation

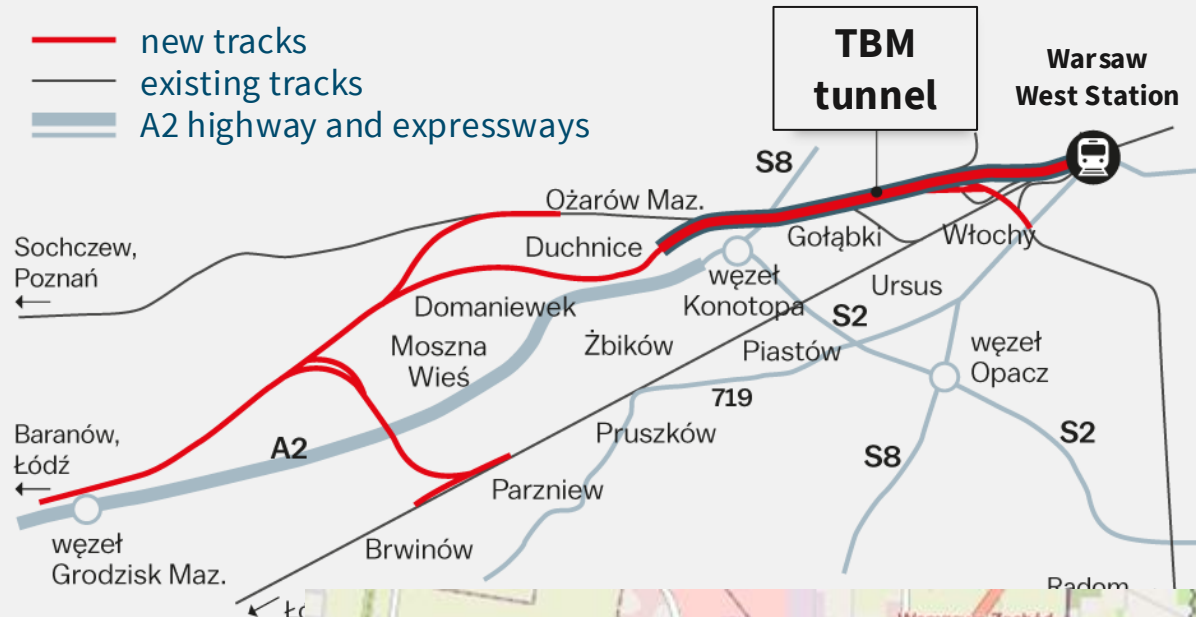




# High-Speed Rail Tunnel in Warsaw

## High-Speed Railway Warsaw-Lódź

- new tracks
- existing tracks
- A2 highway and expressways



© GAZETA WYBORCZA

**HSR Tunnel in Warsaw (9,2 km)**

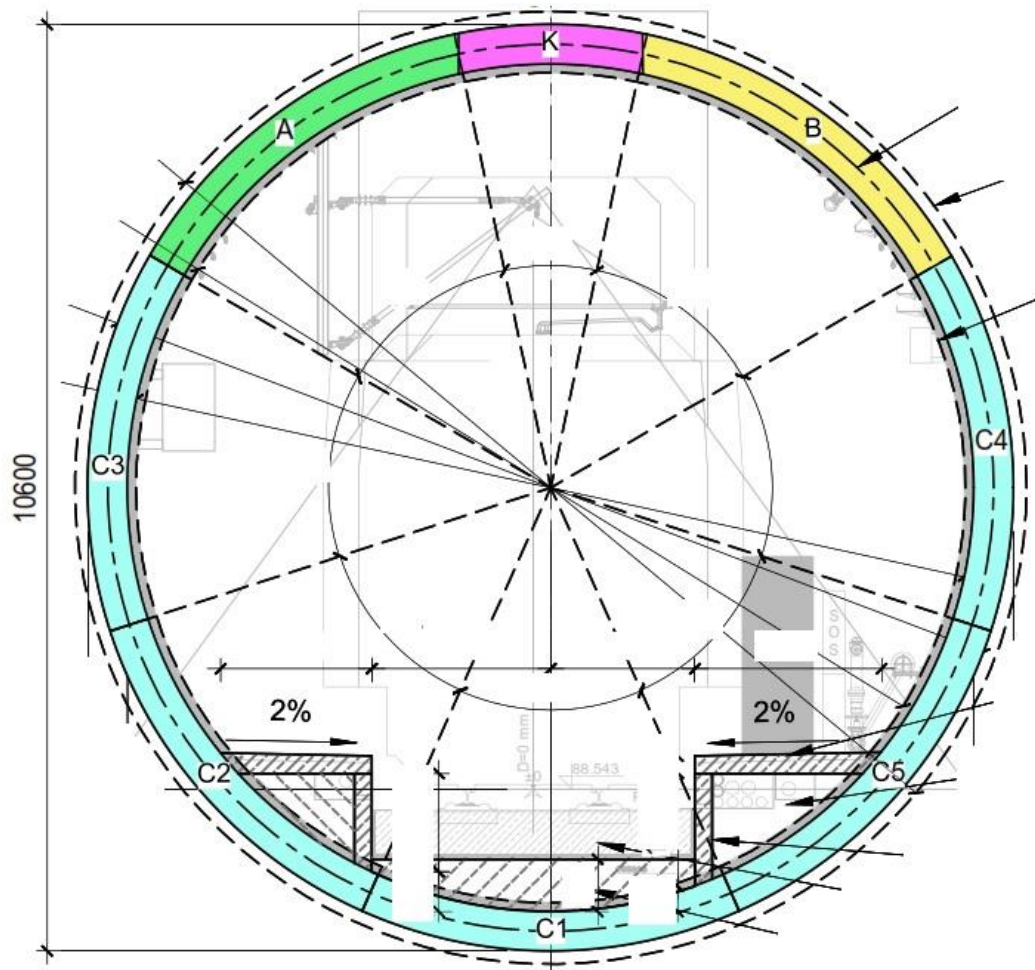
**Dual bore 7,6 km long tunnel – Slurry TBM,  
external diameter 10,6 m**

**+ cut&cover 1,6 km**





# High-Speed Rail Tunnel in Warsaw



**HSR Tunnel in Warsaw (9,2 km)**

**Dual bore 7,6 km long tunnel – Slurry TBM,  
external diameter 10,6 m**

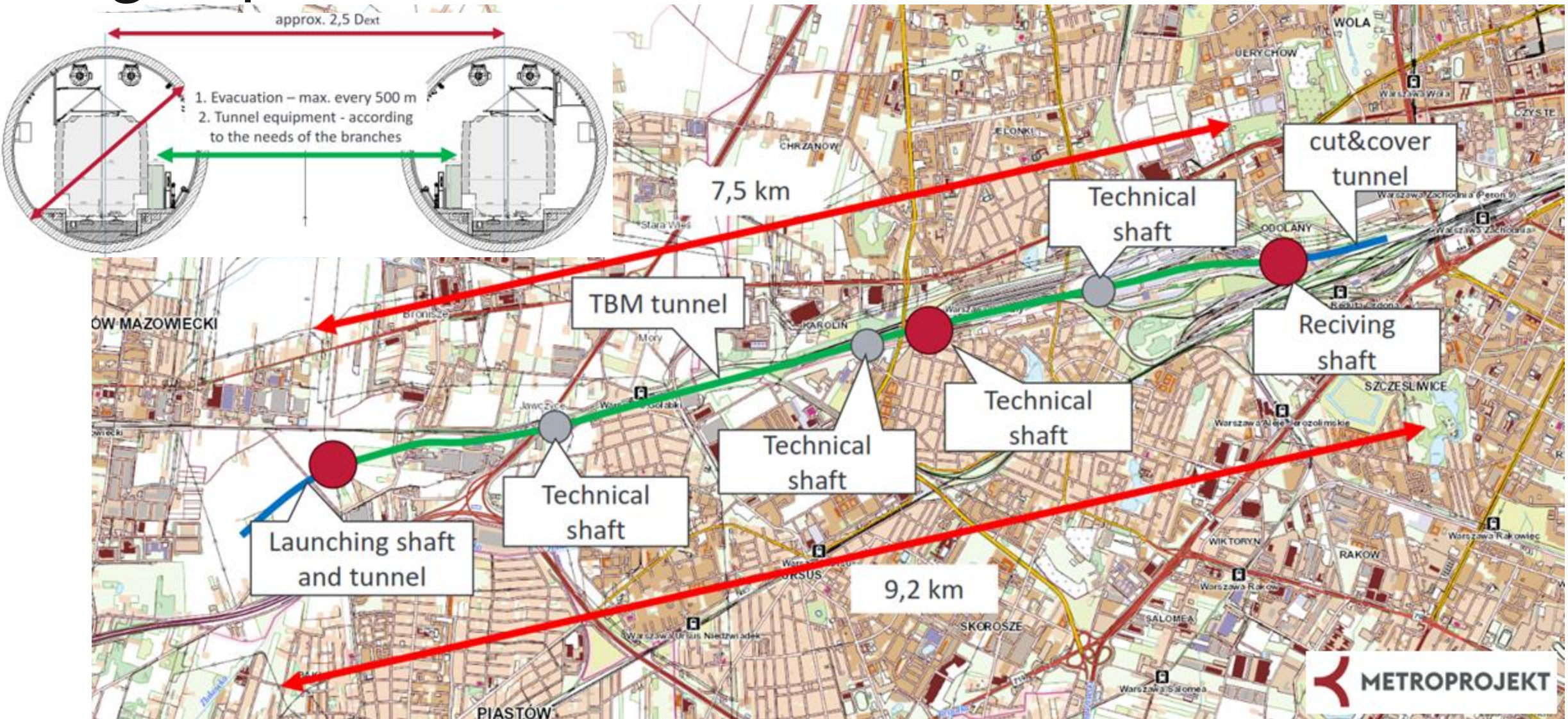
**+ cut&cover 1,6 km**

**Under design**

**Exploitation of railway planned from 2032**



# High-Speed Rail Tunnel in Warsaw





# High-Speed Rail Network tunnels in Poland – overview and challenges

**1** Aerial view of a high-speed rail bridge crossing a river.

**2** Aerial view of a high-speed rail bridge with a blue arch structure.

**3** Aerial view of a high-speed rail viaduct crossing a river.

**4** Aerial view of a high-speed rail viaduct crossing a river.

**5** Aerial view of a high-speed rail viaduct crossing a river.

**6** Aerial view of a high-speed rail viaduct crossing a river.

**7,5 km** Distance marker on the map.

**TBM tunnel** Label for the tunnel section.

**Technical shaft** Labels for shaft locations.

**Receiving shaft** Label for the receiving shaft location.

**OW MAZOWIECKI** Regional label on the map.

**PIASTÓW** Regional label on the map.

**WARSAWA** Regional label on the map.

**SZCZESLIWICE** Regional label on the map.

**ODOLANY** Regional label on the map.

**Warszawa Zachodnia (Peron 5)** Station label on the map.

**Warszawa Zachodnia** Station label on the map.

**Warszawa Al. Niezłomnych** Station label on the map.

**Warszawa Al. Niezłomnych** Station label on the map.



# Summary High-Speed Rail Tunnels in Poland

## Tunnels

- Łódź
  - single bore  $\Phi 13,7$  m
  - Variable Density TBM,
  - 4,6 km
- Warsaw
  - dual bore  $\Phi 10,6$  m,
  - Slurry TBM,
  - total of 15,0 km bored Tunnels
- Other
  - total of ~18 km cut&cover tunnels

## Challenges

- Łódź
  - densely urbanized area
  - buildings under preservation, in poor technical condition
  - low and very low overburden
  - risk of cavities in the soil (e.g. old wells)
  - shaft excavation under existing building
- Warsaw
  - tunneling beneath high-importance railway lines
  - many civil engineering structures above the tunnel
  - tunneling up to 45 m bgl



Thank you for  
your attention!



Faculty of Civil Engineering  
Warsaw University of Technology  
Polish Tunnelling Association

# High-Speed Rail Network tunnels in Poland - overview and challenges

Monika Mitew-Czajewska, Dominik Rybka  
26.05.2026