

Jernbaneverket

The Follo Line Project

A presentation: Norway's largest transport project



LONGEST. URBAN. COMPLEX. FASTER.



Background

The Follo Line will be built to meet the increased demand for rail capacity south of Oslo.

- 1,1 million residents in the Oslo region
- 30 % population increase by 2025
- Currently no spare capacity on neither rail nor road
- 150 000 passengers every day
- Potential for increased freight traffic



Connection to Oslo Central Station

- Extensive works at Oslo Central Station
- The Follo Line will be constructed with connections to several platforms
- A total relocation of the existing Østfold Line within this area
- The work shall be carried out with minimum conflict with other traffic
- Special attention shall be paid to a Medieval Park





Oslo S: Four tracks through «Klypen»





Tunnel: Tunnel TBM and Tunnel D&B

- The longest railway tunnel in Norway approximately 20 km
- Two separate tubes with cross-passage approx. every 500 meters
- Main excavation method is TBM, but also by drill & blast/drill & split
- Close to Oslo Central Station the Follo Line and the inbound Østfold Line is to be excavated by Drill and Blast





Inbound FB

Inbound ØB



Outbound FB







Åsland rigg area: Four TBMs

Sketch: The rig area at Åsland between Oslo and Ski





Ski: The scope

- The new Ski station shall be built with six tracks and three central platforms
- The scope includes new pedestrian underpass, new road bridge and bus terminal
- The scope includes an open section of approximately 1,5 km containing retaining walls and culverts.
- The total length of new tracks in the Ski area is ~ 16,5 km.





The Follo Line Project: Time line



- 1 Three track tunnel
- 2 Crossings of the existing E6 road tunnels
- 3 Follo Line tunnels
- 4 Inbound Østfold line, part 1

- 5 Inbound Østfold line, part 2
- 6 South portal
- 7 Rerouting of the Alna river
- 8 Pumping station





EPC Drill&Blast

- EPC design and build
- All works to be performed from Sydhavna
- Apx 420.000 m3 rock to be excavated
- Separate contract to reduce total construction time for the Follo Line





- 140 m long cavern
- Low overburden to the existing Grønlia tunnel
- Three tracks -> apx 300 m2 cross-section
- Crossing a fault line in the tunnel opening
- Alum shale
- Entire excavation to be done from the inside
- Rock anchors to be installed from outside



- Very low overburden to the existing E6 tunnels
- 3D modelling of expected deformation in the road tunnels
- Restrictions on blasting
 - Risk for damage to infrastructure in E6 tunnels
 - Closing of tunnels will have huge impact on traffic
- Constructing concrete pillar to support E6 tunnels





- The new IØL crosses the existing Alna river
- River must be re-routed before full excavation is possible
- To maintain progress a temporary passage should be established





- The IØL and the Folloline passes on either side of Ekeberg Oil Cavern
- Very low overburden to caverns
- Restriction on blasting due to sensitive infrastructure in the oil caverns
- Groundwater level must be obtained
- Grouting forbidden due to closeness to caverns







- Work to be performed very close to existing Østfold line and E18 Mosseveien
- Restrictions on what affect work can have on rail and road
- Demolishing and reconstructing bridge for the E18 and integrating this into the South portal
- New railroad bridge over the entrance to Ekeberg hallene





Drill & Split

- Due to large areas of the new tunnel having heavy restrictions on blast induced vibration
- Search for a method for mechanical breaking of the rock mass
- Reports from Asia where the method "Drill&Split" have been used with success















Takk for oppmerksomheten