Bergen Line Projects – UVM

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PROJECT PORTFOLIO

• UAF – Arna Fløen development

• NBF – Nygårdstangen Bergen Fløen

• UAS – E16/Voss Line Arna Stanghelle
Arna-Fløen
Main facts

- Cost: 4.4 billion
- Planning phase: Construction phase
Arna-Fløen

• Double track on the section from Arna station to Fløen by building a new, parallel tunnel through Ulriken.

• 7.8 km tunnel, 7 km of which will be bored using a tunnel drilling machine, with fixed track.

• Extensive refurbishment of Arna station in two construction phases.

• 2 new, parallel railway bridges in Fløen.

• Upgrading of existing Ulriken tunnel.

• Major requirements for coordination during the construction period due to operations on existing track.

• The track from Bergen station to Arna's northern Europe's busiest single track. When the double track is complete, it will be possible to double the frequency of train services on the section.
Arna Fløen development

- UUT21 New Ulriken tunnel
- UUT25 Arna Station
- UUT31 Railway engineering
- UUT41 Signal
- UUT23 Existing Ulriken tunnel

Existing Ulriken tunnel
New Ulriken tunnel
K04 Arna Fløen development
UUT 31 Railway engineering

- Multidisciplinary railway engineering contract
  - Track/points
  - Overhead line
  - Electrical, high-voltage installations
  - Electrical, low-voltage installations
  - Telecoms installations
Low-voltage system work scope

- Low-voltage system scope
  - Point heating and lighting
  - Emergency lighting in the tunnel and emergency power for critical systems (signalling, telecommunications and emergency lighting)
  - Power supply to fire ventilation and electrical installations in the high-voltage kiosks
  - Control for regulation and monitoring of technical systems in tunnel (SCADA system)
  - Interface to NOS (National Operations Centre, Marienborg)
High-voltage system work scope

- High-voltage system scope
  - Installation of a high-voltage system (11kV) extending from Arna to Fløen
  - High-voltage kiosks (technical building in Arna and 9 utility rooms in tunnel) and cables
  - Protection and monitoring systems
  - Interface with FJEL (remote control, electrical power)
Telecoms work scope

- Telecoms scope
- Construction of new systems for train radio system (GSM-R), emergency communications network (TETRA), mobile and internet (MIT), and data transmission (NGN)
- Installation of fibre cable in new and existing tunnels
- Installation of 2 radiation cables in new and existing tunnels
- New customer information system for loudspeakers, monitors, markers and video surveillance system
Overhead contact line

- OCL work scope
- Demolition of the OCL system (Arna station, Fløen and parts of the existing tunnel)
  - Construction of a new OCL system
  - The overhead contact line system will be built as System 20
  - Speed in the new tunnel is 160 km/h
- Earthing system
- Interface with FJEL (remote control, electrical power)
Nygårdstangen – Bergen – Fløen
Main facts

• Cost: 2.9 billion
• Time: 2018-2024
• Planning phase: Detailed plan
Nygårdstangen – Bergen – Fløen

- Double track on the Bergen – Fløen section
- Electronic interlocking system for Bergen station
- Modernisation of the Nygårdstangen freight terminal – including direct departures
- Increased depositioning capacity at Bergen station
- Establish temporary transshipment location for new vehicles from freight trains at Koengen
- Extensive coordination with surrounding projects:
  - Bergen Light Rail development
  - Construction of a new workshop at Bergen station
- Major complexity with earlier project design documentation and slightly restricted area operational
- Efficient transport of passengers and freight to/from Bergen and increased capacity at freight terminal
E16/Voss LineArna – Stanghelle
Main facts

- Cost: 22 billion
- Time: 2018-2032
- Planning phase: Detailed plan and regulation plan
E16/Voss Line Arna – Stanghelle

- Joint project with the Norwegian Public Roads Administration.
- Landslide protection project with more than 90% of the section in a tunnel with a joint evacuation concept.
- 27 km section and 2 new stations, at Vaksdal and Stanghelle.
- Planned programme for consultation in 2018, estimated to be adopted in spring 2019.
- Start of detailed project design in January 2019.
- Construction plan and contract signing up to the first possible commencement of construction for the line in 2024. Estimated construction time 8 years.
- The objective is safe transport, shorter travelling time, and increased train capacity and speed on the section.
## Investments for unit/project UVM 2019

<table>
<thead>
<tr>
<th>Proj. no.</th>
<th>Project name/assignment</th>
<th>Line section</th>
<th>Contract signing (years)</th>
<th>Construction start (years)</th>
<th>Duration (number of years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>96520001</td>
<td>Project design contract NBF</td>
<td>Fløen – Bergen on the Bergen Line</td>
<td>2019</td>
<td>2021</td>
<td>2 years + options</td>
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<tr>
<td>96520002</td>
<td>Release of Mindemyren – re-establish Koengen/Skansen tunnel</td>
<td>Koengen/Skansen on the Bergen Line</td>
<td>2018</td>
<td>2018-2019</td>
<td>1 year</td>
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<tr>
<td>960242</td>
<td>UUT31 Railway engineering UAF</td>
<td>Arna Fløen on the Bergen Line</td>
<td>2018</td>
<td>2019-2022</td>
<td>2 years</td>
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<tr>
<td>77003301</td>
<td>Regulation and detailed planning contract UAS</td>
<td>Arna Stanghelle, Bergen Line</td>
<td>2018</td>
<td>2022/2024</td>
<td>2 years</td>
</tr>
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## Investments for unit/project UVM 2020-2022

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<tbody>
<tr>
<td>960242</td>
<td>UUT23 Existing Ulriken tunnel</td>
<td>Bergen – Arna, Bergen Line</td>
<td>2020</td>
<td>2021</td>
<td>1-2</td>
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<tr>
<td>96520001</td>
<td>Executing contracts for construction NBF</td>
<td>Fløen – Bergen, Bergen Line</td>
<td>2020-2022</td>
<td>2022</td>
<td>3-4 years</td>
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## Investments for unit/project UVM after 2020-2022

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<tr>
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<th>Contract signing (years)</th>
<th>Construction start (years)</th>
<th>Duration (number of years)</th>
</tr>
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<tr>
<td>77003301</td>
<td>Turnkey contract or construction contracts for UAS</td>
<td>Arna Stanghelle, Bergen Line</td>
<td>2021-2024</td>
<td>2022/2024</td>
<td>8-10 years</td>
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</table>
Drilling of new tunnel in Fløen, 29 August 2017