



Statens vegvesen



Improved and ferry free E39

Progress and development strategy,

Kjartan J Hove and Kjetil Strand, Norwegian Public Roads Administration

Teknologidagene 2018 Trondheim





Statens vegvesen



Strategic work towards the National Transport Plan (NTP) 2022–2033

Teknologidagene 2018

Coastal Highway Route E39 Ambitions

- NTP 2010–2019
 - Improved and ferryfree E39 within 20 years
- NTP 2014–2023
 - Improved and ferryfree E39 within 20 years
- NTP 2018–2029
 - E39 will be improved and ferryfree
 - Progress planned in accordance with financial planning and technological development
- NTP 2022–2033
 - ?



St.meld. nr. 16

(2008–2009)

Nasjonal transportplan 2010–2019



DET KONGELIGE
SAMFUNDSLISTERPARTIET

Meld. St. 26

(2012–2013)
Melding til Stortinget

Nasjonal transportplan 2014–2023



Meld. St. 33

(2016–2017)

Melding til Stortinget

Nasjonal transportplan 2018–2029



Coastal Highway Route E39

Development plan for the project

- The plan from 2016
 - To show how the project could be realized, and to study whether the Storting's ambition was realistic
 - Planning
 - Technology
 - Funding
 - Construction market
- Next plan to be published in 2019
 - Revised in accordance to NTP 2018–2029
 - Assessment of future progress and budgets
 - Updated facts and figures

 Nasjonal transportplan 2018 - 2029

VEDLEGG 4

Utviklingsstrategi for ferjefri og utbetra E39

Februar 2016



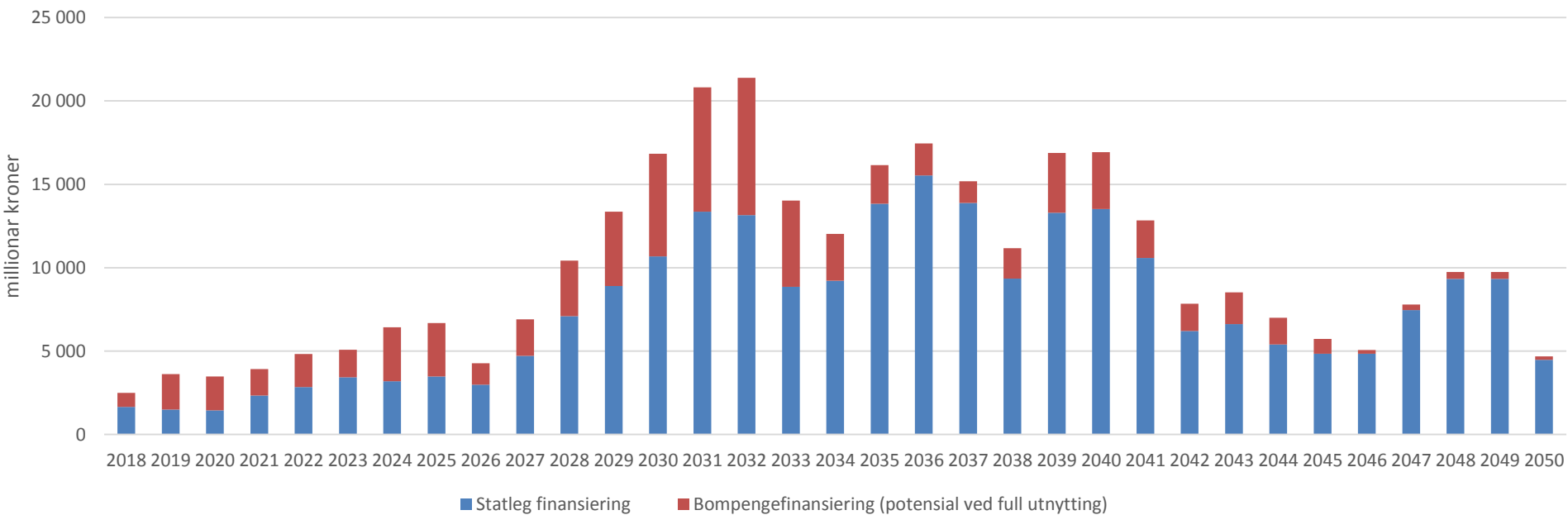
Illustrasjon: Statens vegvesen



Coastal Highway Route E39

Example of possible funding plan for the project

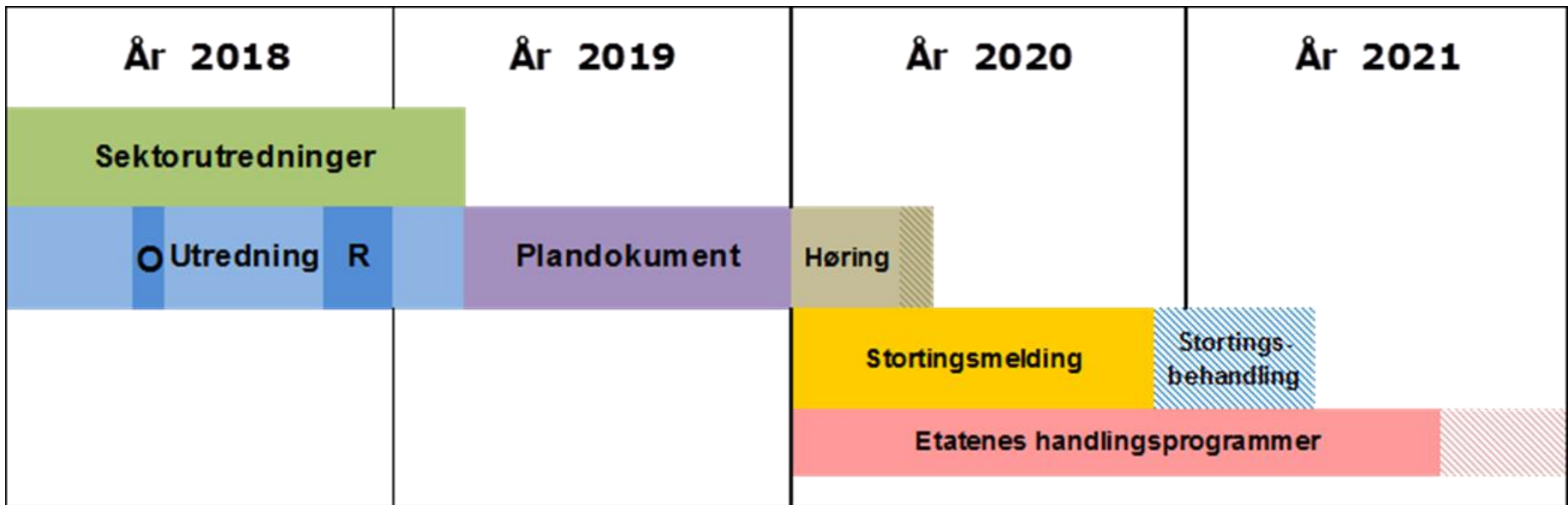
Statlege investeringar og bompengebrauk i





National Transport Plan 2022–2033

The revising process



Coastal Highway Route E39

Plan for Norwegian national roads and the development plan

- First draft for NTP 2022–2033
 - The E39–plan is the template for the Norwegian national road plan
 - Ensure that the two documents have the same basis
- Several parallell studies in the other transport departments
 - Consider the effects of frequent ferries



The Coastal Highway Route E39 project

- National transport ambitions in Norway are essential for the E39-plan
- Sub-projects all aim to achieve the overall ambitions
- Regional and local political ambitions may differ from National ambitions



Coastal Highway Route E39 and National Road Plan 2019

Measures to achieve the ambitions

- Social benefits and reduced travel times
- Laws and regulations
 - Tunnel Safety Regulation
- «Poor road standard»
 - Width (yellow markings)
 - Module trucks (curvature/climb)
 - Traffic safety
- Landslide prevention
- Other factors





Coastal Highway Route E39

Cost reduction

- The Storting expects a significant reduction in costs
- How to achieve:
 - Developing new and improved technology
 - Incremental constructions
 - Optimal planning in accordance with existing plans

Har funnet kostnadsutt som sender Hordfast-prisen under 30 milliarder

Billigere broer og utsatt firefeltvei på Stord kan barbere kostnadene til Hordfast med mange milliarder, viser nye beregninger fra Vegvesenet.



Simen Sundfjord Otterlei
@simenso
Journalist

Publisert 27. sep. kl. 06:00
Oppdatert 27. sep. kl. 14:23

KAN KUTTE KOSTNADER: Skissen viser alternativet med endeforankret bro over Bjørnøfjorden på Hordfast. Broen her og over Langenuen kan bli flere milliarder billigere, viser beregninger fra Vegvesenet.
FOTO: STATENS VEGVESEN

Bedre og billigere kryssløsning på Otrøya

SKRIV UT

Statens vegvesen har forbedret kryssløsningen på Otrøya for kryssinga av Romsdalsfjorden. [23.11.2017]

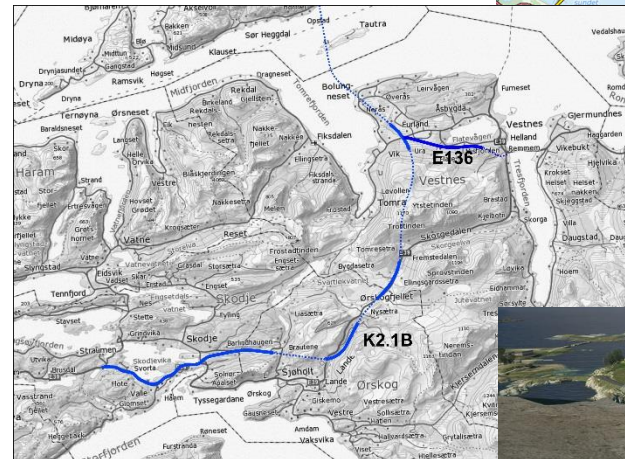
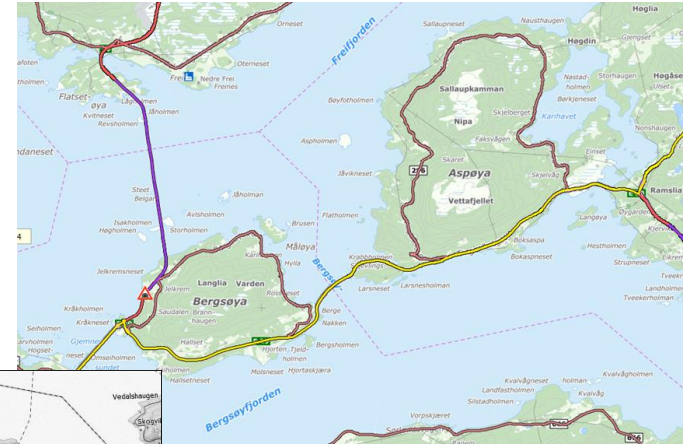
Det nye krysset er behandlet og godkjent av Midsund kommune.

- Vi jobber hele tiden for å optimalisere løsningene og redusere kostnadene, forteller prosjektleder Harald Inge Johnsen om den nye løsningen for trafikken fra den planlagte undersjøiske tunnelen under Romsdalsfjorden og hengebrua over Julsundet.



Coastal Highway Route E39 «Acceptable» standard?

- Minor improvements to existing roads
 - Krifast
- Incremental construction
 - E39 Digernes–Vik
- New roads fulfilling the road standard in Norway
 - Fjord crossings

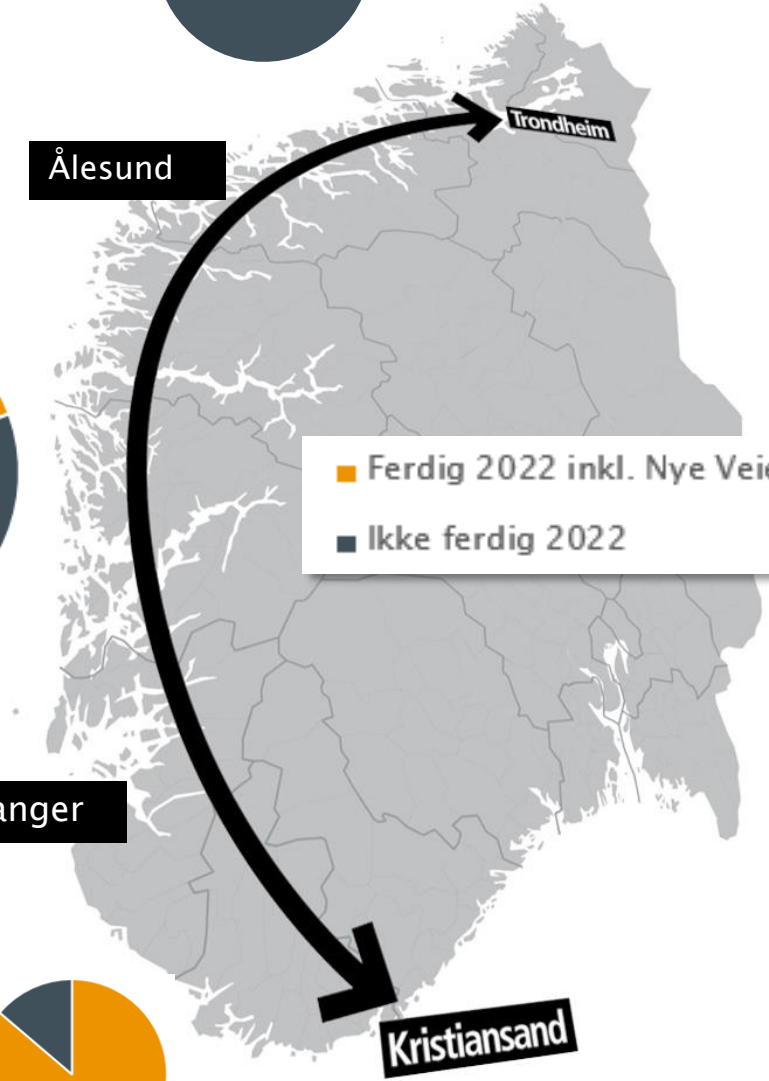
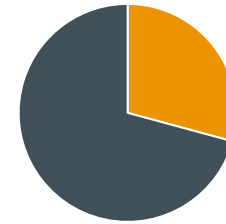
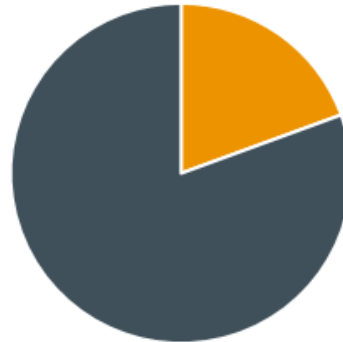




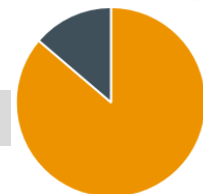
Coastal Highway Route E39

What remains?

- 2/3 av E39 (680 km) will not be completed within 2022
- Different progress on the various stretches
 - Nye Veier AS



■ Ferdig 2022 inkl. Nye Veier AS
■ Ikke ferdig 2022





Further progress for the local projects

Kjartan Hove, Director, Projects Department
NPRA Western region

Teknologidagene 2018



Progress and development

- Approximately 11 000 km of road to cover
- 248 tunnels – 7 of these under the sea
- 11 bridges
- Text signs
- Signal equipment





Progress

Kristiansand til Stavanger

- Planning south of Stavanger, design and cost
- Two parts
- Building Stavanger sentrum/Eiganes (picture), opening 2019
- Stavanger north, start subsea tunnel under Boknafjorden





Statens vegvesen

Progress Stavanger – Bergen

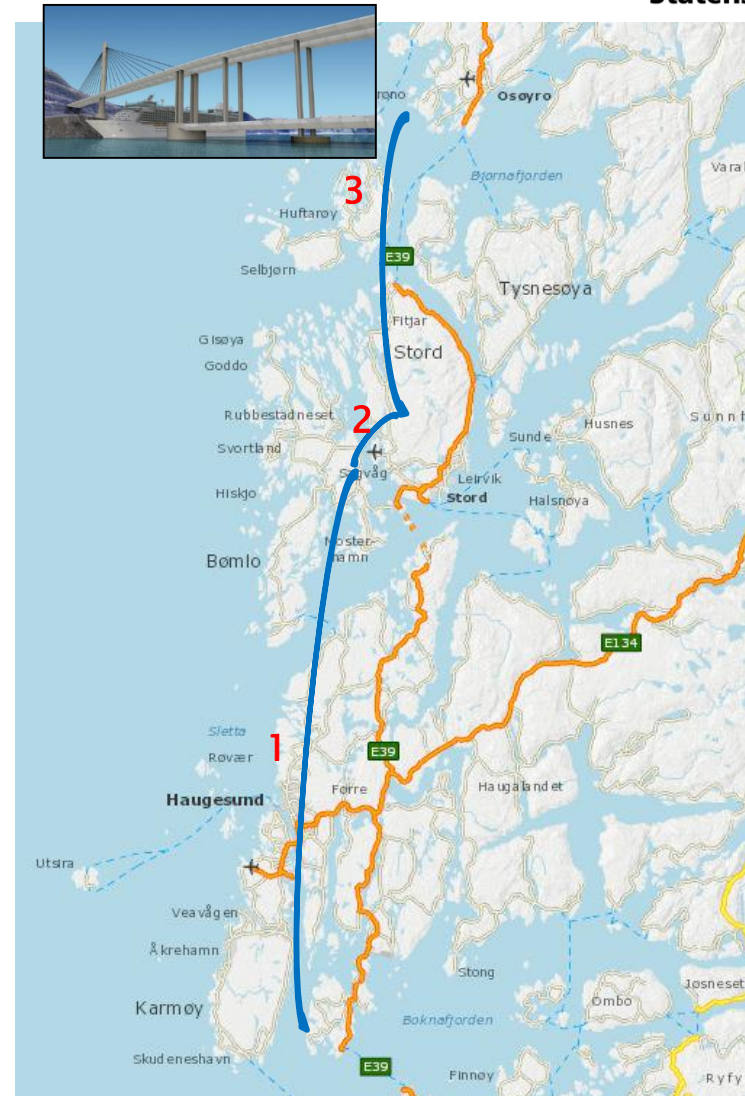


Photo: Statens vegvesen

- Boknafjorden
- Start 4th Jan
- Access
- Main tunnel
- 27 km long
- 395 mbl
- Rogfast

E39 Bokn–Os/Bergen

- Existing road approx. 140 km + ferry
- We are well underway with the central government zoning plan for 130 km 4-lane road through 7 municipalities, speed limit 110 km/h:
 - Bokn – Stord: 69 km
 - Stord: 7 km
 - Stord–Os: 52 km
- Planning time: 5 years





Progress

Bergen – Stavanger

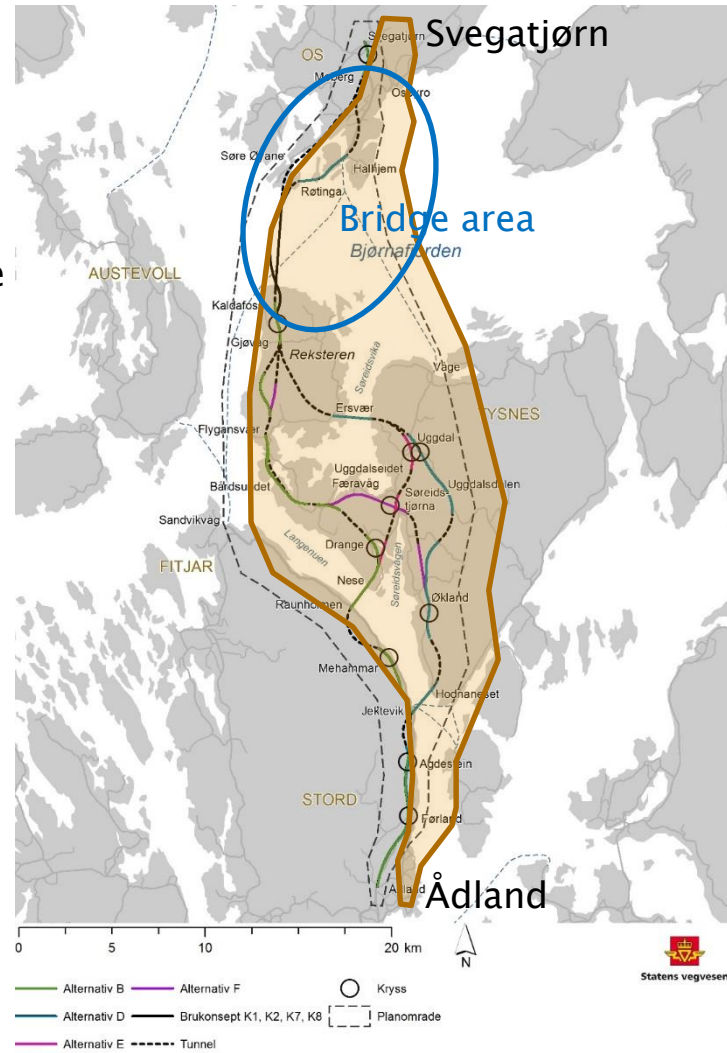
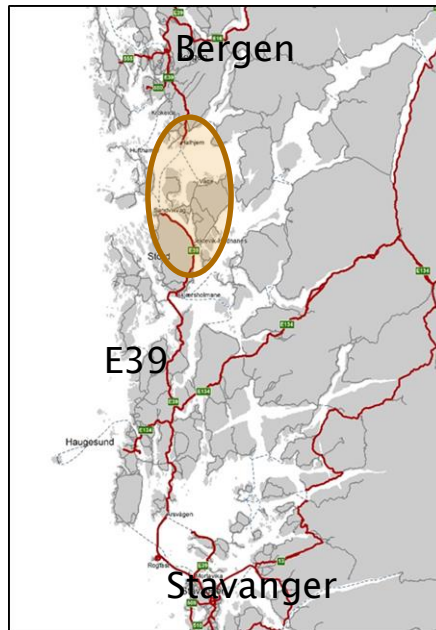
- Bjørnafjorden
 - Status and progress summary
 - Municipal planning
 - Environmental loads
 - Geological conditions
 - Risk assessment, accidents
 - Engineering, concept development
 - Model based project execution
 - Inspection, operation and maintenance





Status and progress summary Bjørnafjorden

Additional area for floating bridge development and optimisation





Status and progress summary

Bru over Bjørnafjorden

- Status and progress summary
 - Environmental loads. Measuring local weather conditions, finished june -20.
 - Wind (sustained 10min, -60min, gust evaluations)
 - Waves (height, period, directions)
 - Current (wind and tidal effects, combined)
 - Temperature (extension and contraction)
 - Salinity (argument for material selection)





Progress

Bjørnafjorden

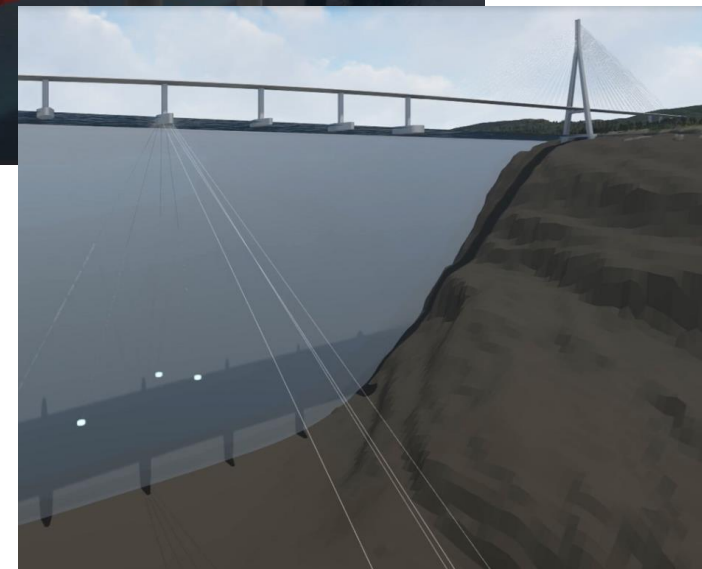
- Status Risk summary
 - Risk assessment, Ship collision
 - Scenario evaluations
 - Mitigating actions and action effects
 - Uncontrollable ship scenario
 - Dimensioning strategy ship impact energy
- Status Geological summary
 - Geological conditions nearly completed. Potentially final surveys for planning 2019.
 - Geophysics (sediment conditions and subsea landslides investigations)
 - Geotechnics (Anchor design parameters)



Progress

Bru over Bjørnafjorden

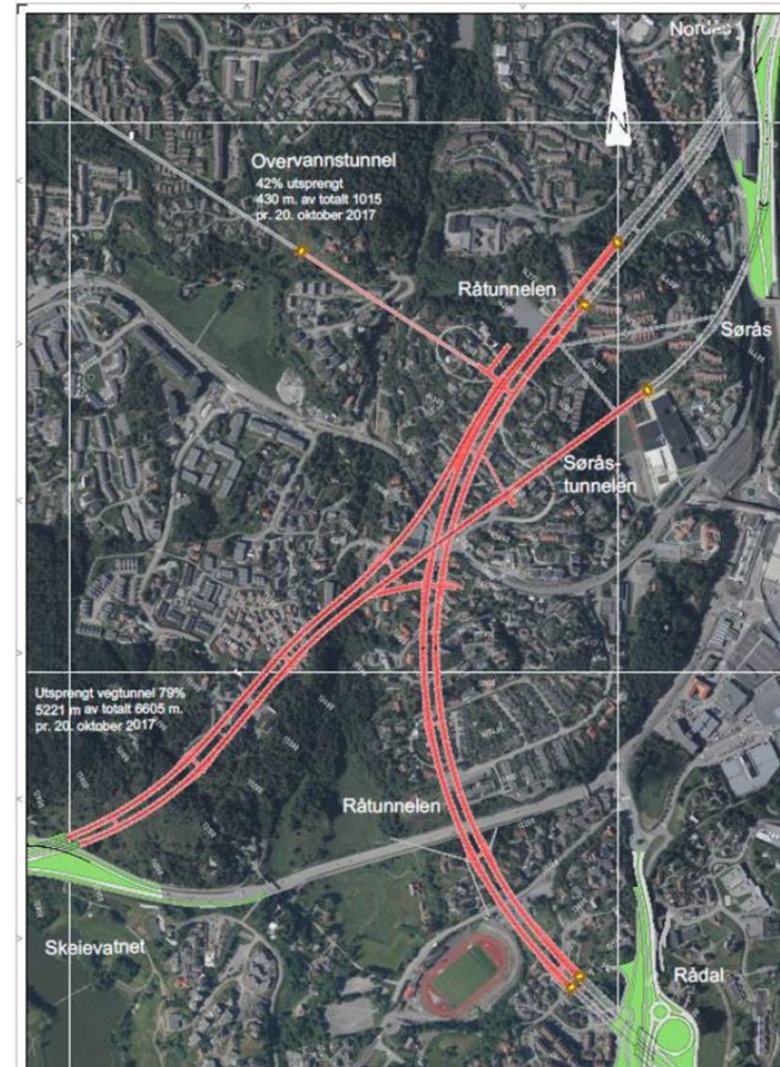
- Status and progress summary
 - Engineering, concept development
 - Continuously improving design basis
 - Concept development of floating bridge through 2019
 - Feasibility study through 2020
 - End anchored or side anchored floating bridge or a best fit combination of those.



Progress

Stavanger – Bergen

- Building south of Bergen
- E39 Svegatjørn – Rådal. Opening 2022
- E39: 15 km (4 lanes) Svegatjørn in Os to Fritz C. Riebers street in Bergen. 13 km tunnel – rest approx 1400 m
 - Skogafjellstunnelen: 1,6 km (2 tubes, 4 lanes, 80 km/t)
 - Lyshorntunnelen: 9,2 km (2 tubes, 4 lanes, 100 km/t)
 - Råtunnelen: 2,0 km (2 tubes, 4 lanes, 80 km/t)





Progress

Bergen – Ålesund

- Crossing Sognefjorden
- Nordfjord suspension bridge kfr Julsundet



Photo: Statens vegvesen



E39 Bergen – Ålesund





Progress

Bergen – Ålesund





5

Bergen – Ålesund

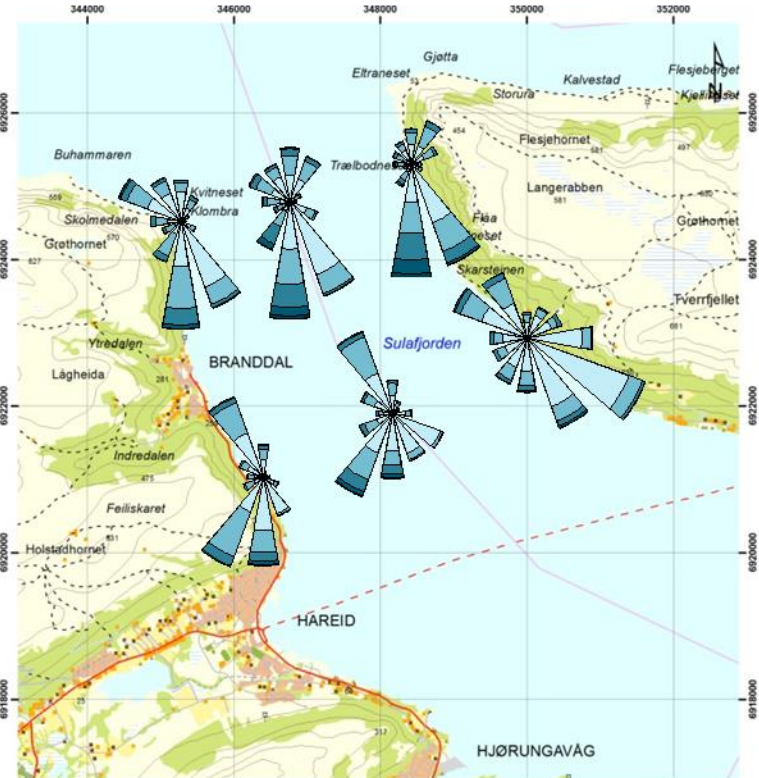
- Sulafjorden
 - Status
 - Environmental loads
 - Geological



Illustration from Sulafjorden: Rambøll/Sweco



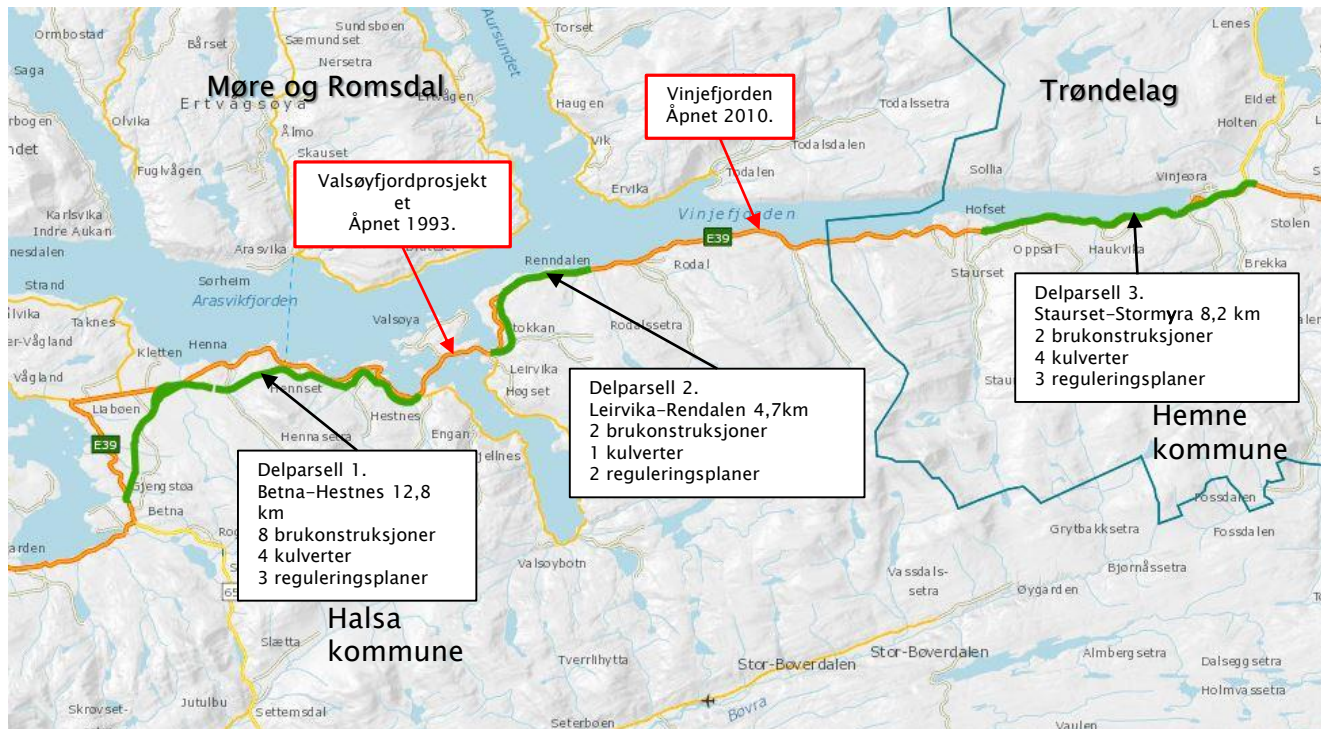
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Gravity based structures

| | |
|-------------------------------------|-----------------------|
| 0 0.5 1 2 km | |
| Ferjerfri E39 - Møre og Romsdal | |
| Figure/Drøining Tittel: Sulafjorden | |
| File Name: Sulafjorden.mxd | |
| By/Town: | Dato/Date: 2014/10/20 |
| Dato/Date: 1/10/2014 | Prosjekt/Project: 02 |
| | |
| | |

E39 Molde – Trondheim



Development strategy

Preferred solution on the following crossings (known technology, but stretched):

- Boknafjorden
- Romsdalsfjorden





Development strategy

- **Development of new technology and more knowledge**

- Five highly challenging fjord crossings
- Looking at offshore methodology for technology development and qualification
- Studying wind, wave and current conditions

- **Building competence**

More than 50 PhDs from the Norwegian University of Science and Technology (NTNU), Chalmers, the University of Stavanger (UiS) and others (including postdocs)

- **Funding**

- Development costs: Requires funds to be allocated at an earlier stage than for traditional road projects

- **Design and Building**

- Contracting practice



Development strategy

- Project delivery
 - Bid – Build (BB)
 - Design – Build (DB)
 - Design – Build – Operate (DBO)
 - Design–Build–Finance–Operate (DBFO),
Private Public Partnership (PPP)

- Competitive dialogue

- Building 2018 – 2045 (?)
- Marked?
- Combination



DBO – Design Build Operate/Competitive dialogue

- Prequalification of tenderers
- Competitive dialogue, qualified tenderers submit proposals
- 1-1 dialogue between NPRA and each tenderer
- Basis for deriving a common platform for the competition
- Design – Build – Operate competition
- Contract award

Development strategy

- Status and progress summary
 - Inspection, operation and maintenance
 - Material selection, recommendations ongoing.
 - New solutions/possibilities, challenges.
 - Review of zone environment properties
 - Anchor zone
 - Mooring line zone
 - Pontoon submerged part
 - Pontoon splash zone
 - Over sea pontoon and column part
 - Bridge girder
 - Tower for cable stayed part

