

Agenda 14:15 – 16:00

- 14:15-14:25 Welcome and introduction
- 14:25-14:35 Den gode reise/The good journey
- 14:35-14:45 About Bybanen Utbygging
- 14:45-14:50 Introduction Construction stage 5
- 14:50-15:00 BU prepares Construction stage 5
- 15:00-15:10 E41 Railway Signalling, E42 Tele and operation support system
- 15:10-15:25 E43 Overhead Catenary System, E44 Substations, E45 Low voltage, E46 Street signals
E51 Tracks, E52 Turnouts and crossovers
- 15:25-15:30 E55 Vehicle
- 15:30-15:40 Escalators, Elevators
- 15:40-15:50 Procurement

Bybanen Utbygging

Suppliers' day Bybanen in Bergen -
Construction stage 5

City center to Vågsbotn in Åsane

Date: January 10th, 2024

Arve Tjønn Rinde

Project Director

Bybanen Utbygging





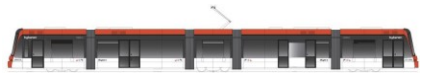
Welcome to suppliers' day Bybanen Utbygging

Purpose of the market day

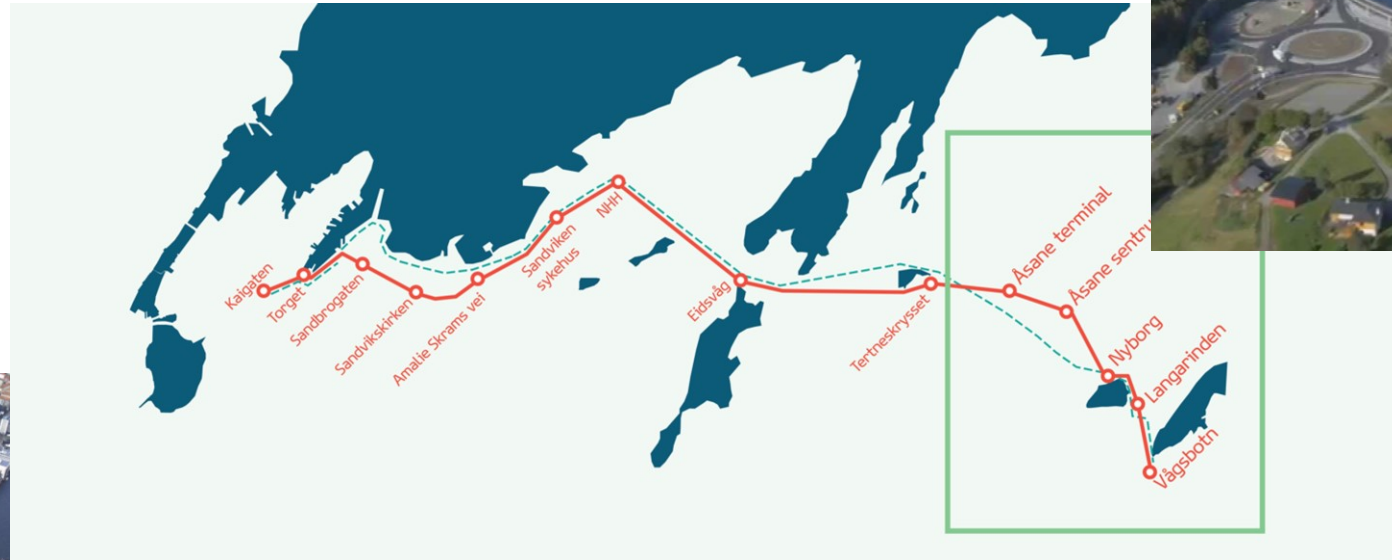
- Overall briefing on the status and progress of the project.
- Share our expectations.
- Challenging the room of opportunity within sustainability.
- Provide guidance on contract strategy, type, scope of work and procurement process.



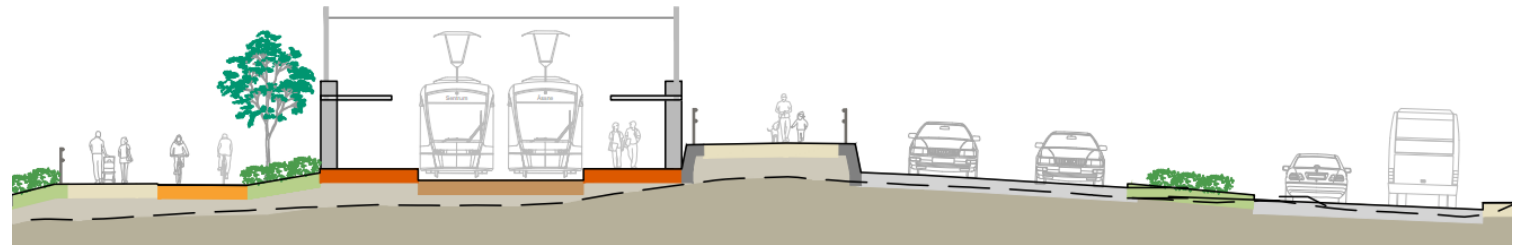
Construction stage 5



Kaigaten



Vågsbotn

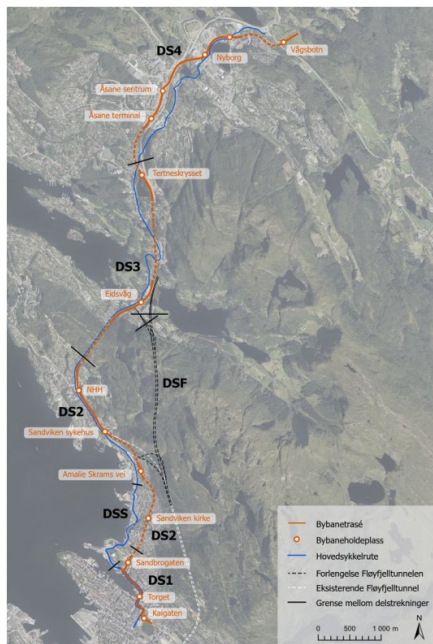


Prop. 11 S (2017–2018)

Proposisjon til Stortinget (forslag til stortingsvedtak)

Finansiering av Bypakke Bergen i Hordaland

*Tilråding frå Samferdselsdepartementet 17. november 2017,
godkjend i statsråd same dagen.
(Regjeringa Solberg)*



Government decision - St.prop 11s (2017-18) – Construction of light rail from Kaigaten to Vågsbotn in Åsane – construction stage 5

City council decision - 2023 – Approval of the zoning plans for the light rail route, the main cycle route and the extension of the Fløyfjell tunnel.

Allocation of money - 2022 - Bypakke Bergen allocated funds for preparatory work for construction stage 5

City council decision - 2020 – Traffic plan centrum

Mission

Challenges:

- New city council request new study of the tunnel alternative for the light rail system
- Norwegian Public Road Administration has to extend the Fløyfjelltunnel to Eidsvåg with completion in 2035
- Priority and financing in NTP 2025 – 36

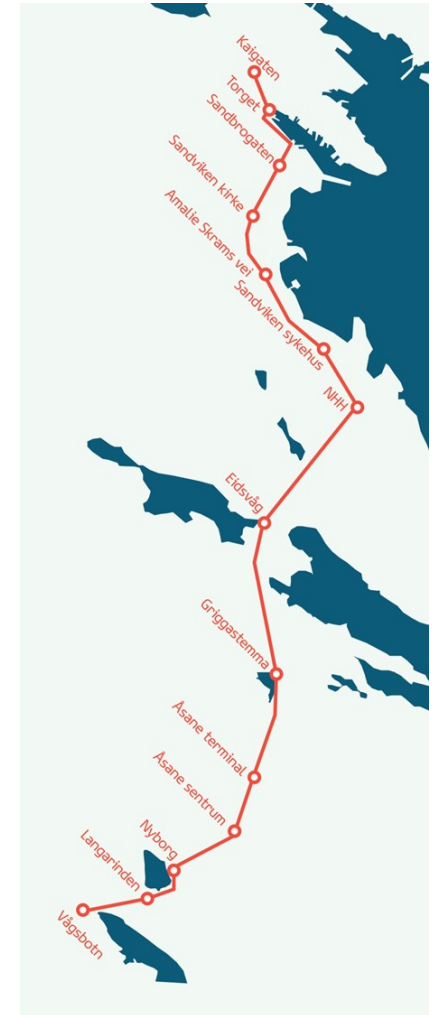
Mission – Vestland county has chosen to take into account the above guidelines and works with planning, engineering, land acquisition and improvement measures for the construction of the section - Kaigaten to Amalie Skrams vei.

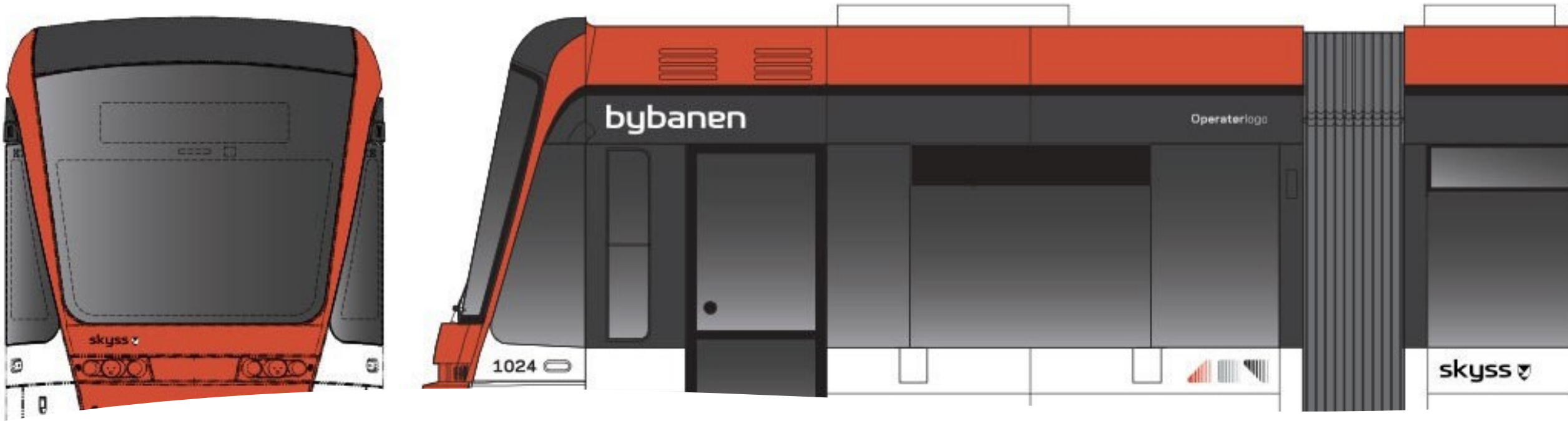
Prerequisite – no physical construction activities carried out before the tunnel alternative has been clarified.

Startup of construction - tentative 2025/26.

Ongoing work

- Quality assurance (KS2) for large infrastructure projects
- Land acquisition – immediate redemption of properties
- Planning, engineering, mapping and improving activities
 - Kaigaten – Amalie Skrams vei
- Establish contracts with municipality, public organisations, private companies
 - Bergen municipality, Bergen Vann, BKK, Eviny termo, mm
- Prepare tender documentations, prequalification and procurement processes
 - Signalling, Tele and Operation support system, etc





Procurement process new vehicles

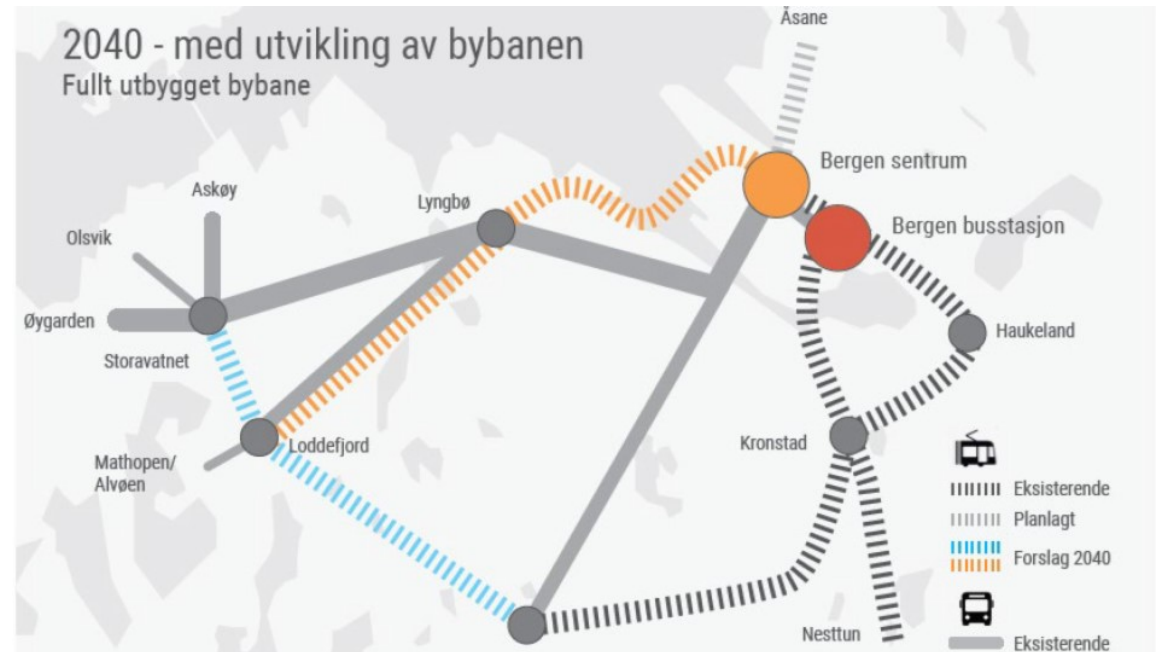
Today's light rail vehicles are out of production and Bybanen Utbygging must start a procurement process for new light rail vehicles with requirements for battery operation over Bryggen.

Ongoing work

- Prepare technical specification and documentation
- Recruit project manager
- Procurement process starts 2024/25

Strategisk agenda

- Light rail system is pointed out to be the main system in public transport in Bergen.
- The collective plan towards Bergen west has been delivered by Bergen municipality in 2023 and start of more detail planning are in process.



Who is Bybanen Utbygging?

Project execution team

- Organised as a part of Vestland county in the division Property and Construction
- 35 employees
- Well skilled team with experts of leading light rail projects with planning, procurement, development and handover of built infrastructure
- Professional and demanding

Task based on assignment form:

- City package Bergen and Environment Initiative
- Vestland - county roads, pedestrian and bicycle path
- Bybanen AS – operating operator
- NPRA - pedestrian and bicycle paths
- Other infrastructure owners such as Bymiljøetaten Bergen municipality, Bergen vann, BKK

OPEN, BRAVE and COMPETENT



2 Fyllingsdalen

210

210

5

veier og trykkeskommune

Bybanen Utbygging

Suppliers' day Bybanen in Bergen - Construction stage 5

Date: January 10th, 2024

Ole Wilhelm Mortensen

Director of procurement and turn-key contracts

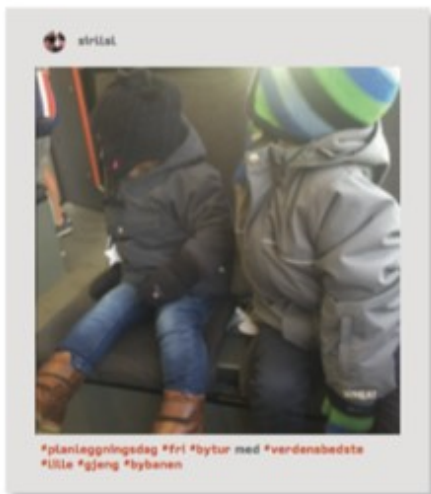
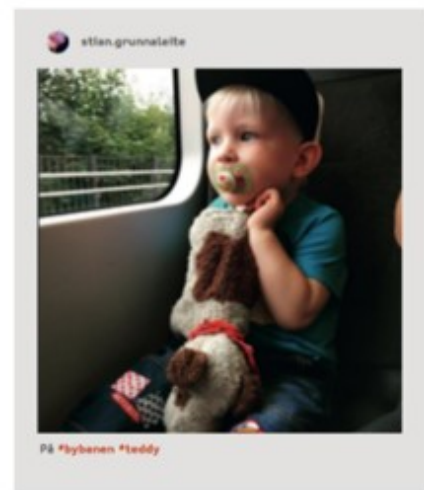
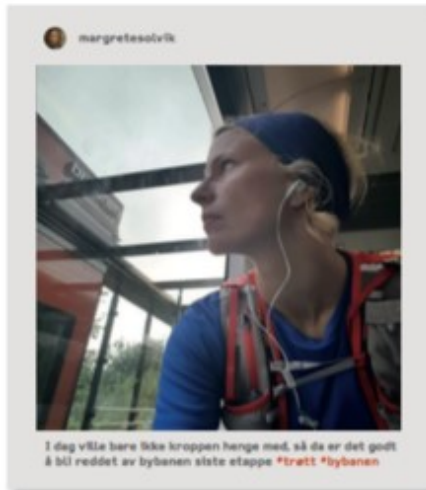
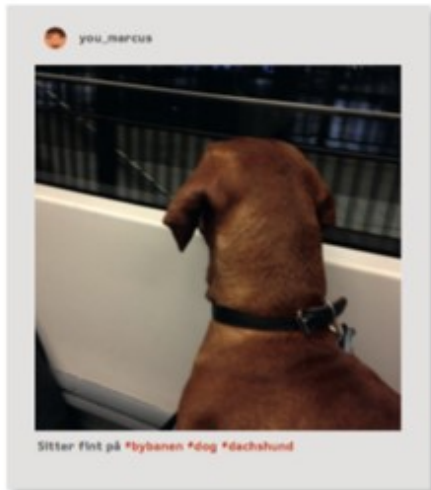
Bybanen Utbygging



Quality at all levels— «the good journey»



The light rail has become ours!



We are proud!



Bybanen tar av på Flesland:

- Vi slipper å planlegge eller vente på noe som helst



GÅR: Mattias Olsson og Anita Mala tar ofte beina fatt i hverdagen. – Jeg går alltid på jobb, sier Mala. FOTO: GEIR MARTIN STRANDE

Stadig flere bergensere dropper bilen

Ny undersøkelse viser at andelen som reiser med bil går ned i Bergen. Samtidig sliter man med å få fart på syklingen.

- An average of 90 000 daily boardings
- Rounded 100 million ascents since 2010 in autumn 2019
- Reduces car traffic and helps achieve climate goals
- Upgrades pedestrian and bicycle paths



bybanen utbygging 



Bergen Light rail is award-winning

- Worldwide project of the year 2011
- Red Dot Design Award 2011
- Vakre veiers pris 2012
- SRF-prisen 2012
- Kollektivprisen 2012
- BOBY – byutviklingspris 2012
- Bymiljøprisen 2012
- Årets anlegg 2013
- Innovasjonsprisen for universell utforming 2014



Status January 2024

- In operation: City Centre - Flesland (airport)
 - Construction stage 1-3, approx. 20 km
 - Opening BT1 – 22. June 2010, total cost 2,25 billion NOK
 - Opening BT2 – 21. June 2013, total cost 1,35 billion NOK
 - Opening BT3 - 15. Aug. 2016 and April 2017, total cost 3,6 billion
- In operation: City Centre - Fyllingsdalen
 - Construction stage 4, approx. 10,8 km,
 - **Opening date 21st of November 2022**
 - Total cost: 7,6 billion NOK
- Work on zoning plan: City Centre - Åsane
 - Construction stage 5, approx. 12,8 km
 - Opening in 2039
 - Total cost: 21 billion NOK

Bybanen Utbygging

Suppliers' day Bybanen in Bergen - Construction stage 5

Date: January 10th, 2024

Åge Haga

Director of Construction

Bybanen Utbygging

How is it working with BU?

- Several separate Construction only contracts
- Several milestones where other contractors do work (ex: Ready for track construction)
- We are in a hurry!

..which means...it is challenging working for us, but it is inspirational, fun for the ones who encourage cooperation



How do we behave?

- We are rightful!
- We make quick decisions!
- We are agile!
- We have fun!

It is attractive working for us!



«Cooperation – agreement»

- 1 % of the Contract sum is reserved for bonuses based on HSE and cooperation
- Every contract appoints one «HSE representative of the period» who will receive a gift card from the Project Director



Bybanen Utbygging

Sustainable light rail construction

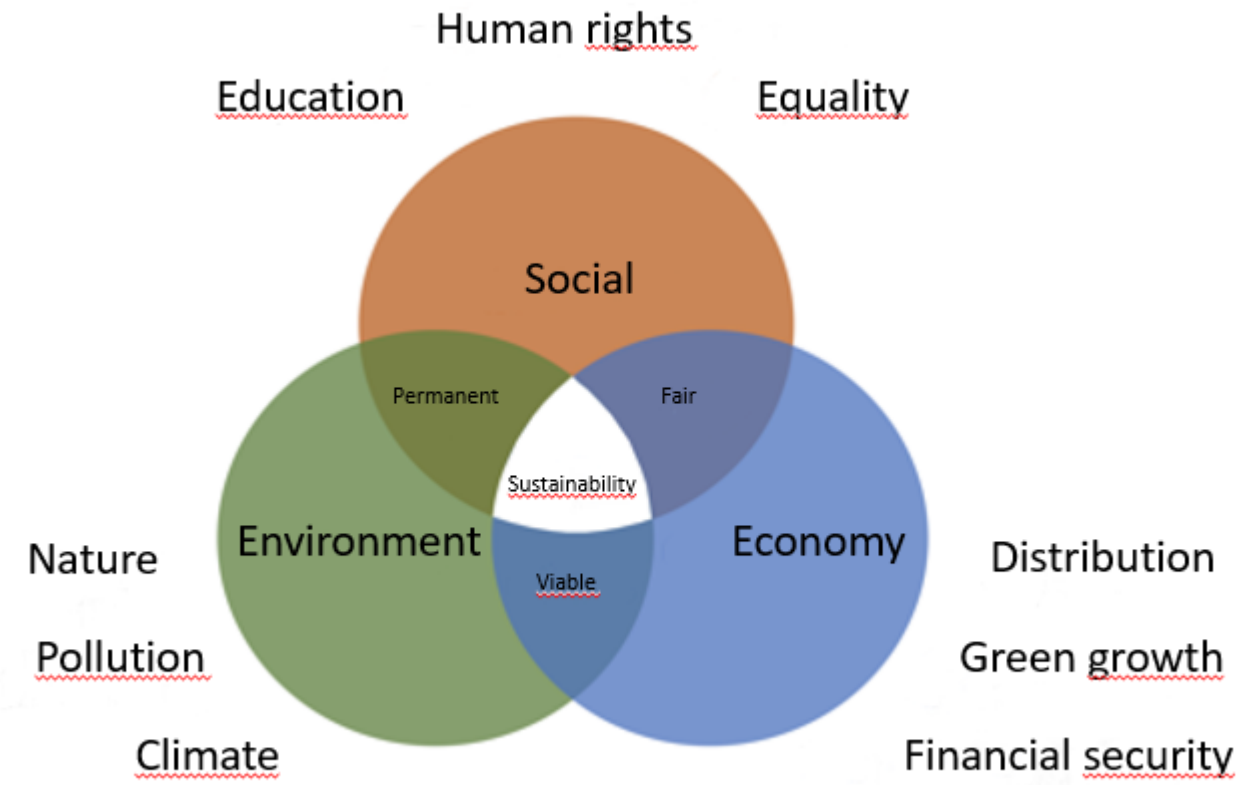
Date: January 10th, 2024

Marianne K. Hufthammer

Q-HSE manager

Bybanen Utbygging

Sustainability!



Sustainability strategy

Main goals:



We create the good journey for everyone



We reduce our climate footprint in design, construction and operation



We know our environmental impact and work to reduce it



We contribute to a good and serious working life for everyone



We develop a sustainable delivery chain and pull the industry in a greener direction

Instruments

- Greener light rail
- Decent work practice requirements and et provisions
- Innovation and development



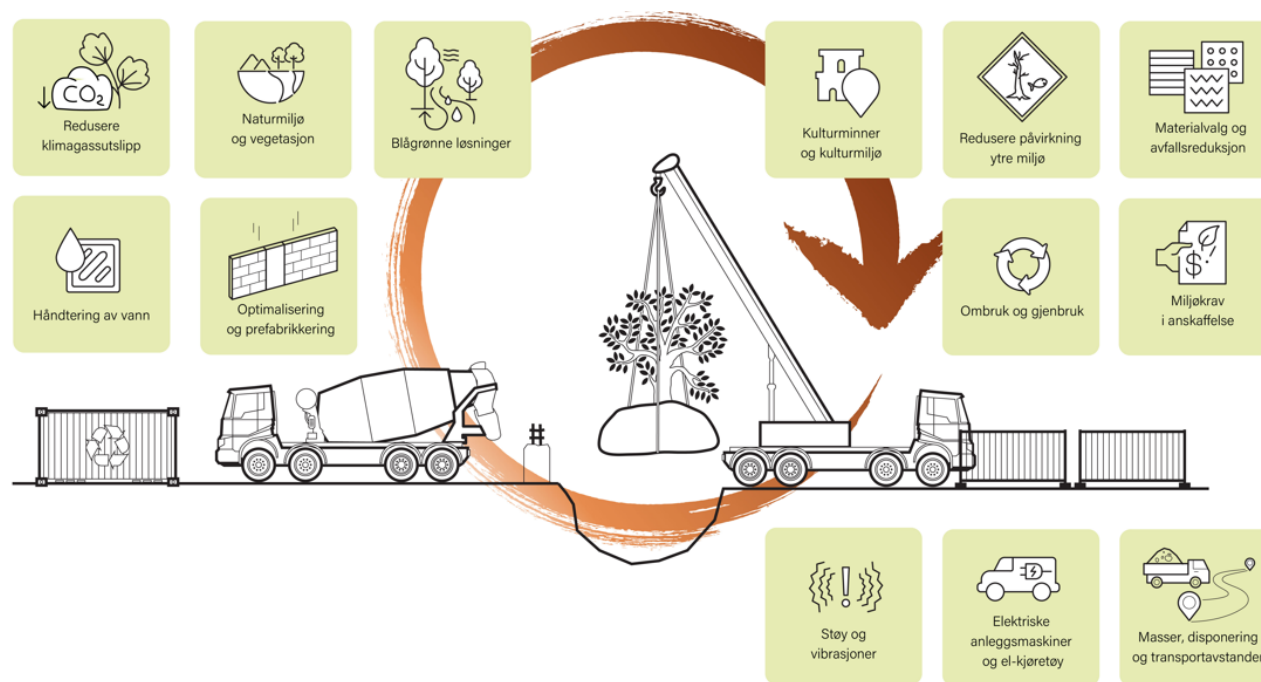
What's in it?

- We have clear requirements/expectations regarding social sustainability
- Regarding climate/environment – we don't know exactly yet... but we know that requirements and technology in CS5 will be different from CS4
- We want initiatives from you
- Achieving the sustainability goals will be essential to our success



What we think (but do not know)

- Battery technology will develop, and a lot could happen electrically, but supplement will still be important
 - BU will make sure electricity is available
 - Other energy carriers (hydrogen, biogas)
- There will be stricter requirements on materials (origin, EPD etc.)
- Mass handling will be more demanding... reuse versus moving... polluted masses... transport reduction etc.
- ...and we believe unexpected things will happen and we will have to adapt, and those best at this will profit from it.



But this we know:

- It is a goal of net zero emissions by 2030
- Large civil contracts will be environment certified
- It will be a mix between «requirements» in the contracts, and evaluation on climate/environment
- We will be «reasonable» - measures must have a good effect (cost/benefit)
- We will contribute in pulling the industry in the right direction
- We can participate on exciting things where appropriate (ex. testing of new technology)
- We believe that contractors with a green profile and who dares to go green will profit from this during the procurement process



Foto: Ruben Saltvedt

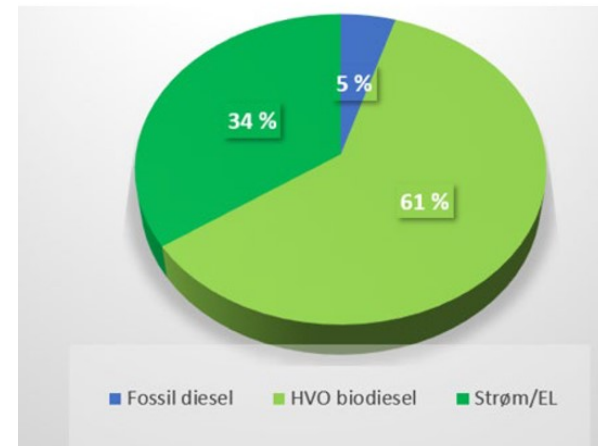
Vedtatt i fylkestinget
15.12.2022

REGIONAL PLAN FOR KLIMA

2022–2035

Examples from Construction stage 4 Fyllingsdalen

- Biofuel:
First contracts negotiating advantage, later contractual requirement
- Electrical spunt rig:
No large emission savings for one machine... but creates positive attention, pulls the industry in the right direction and develops new technology
- Nearly fossil-free in CS4





Blue sign with a white figure of a person and a bicycle, indicating a pedestrian and bicycle path.

2 Bergen centrum

Bybanen Utbygging

Preparations - Construction stage 5

Date: January 10th, 2024

Ole Wilhelm Mortensen

Director of procurement and turn-key contracts

Bybanen Utbygging

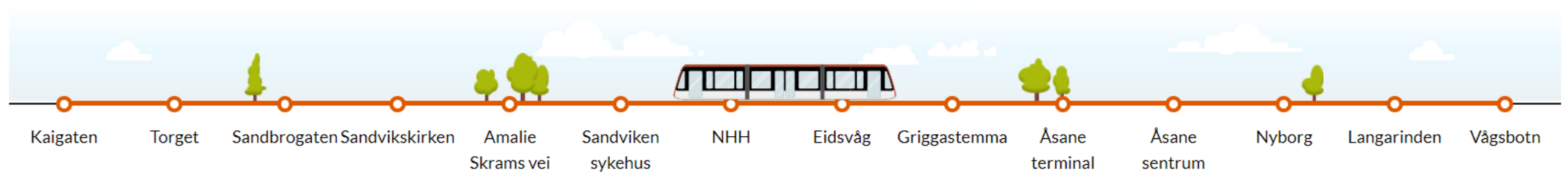


Construction stage 5 - sentrum - Åsane

REGULERING AV BYGGETRINN 5

BERGEN SENTRUM - ÅSANE

Bergen kommune er regulerende myndighet



<https://www.youtube.com/watch?v=FmTGmFxXA04>

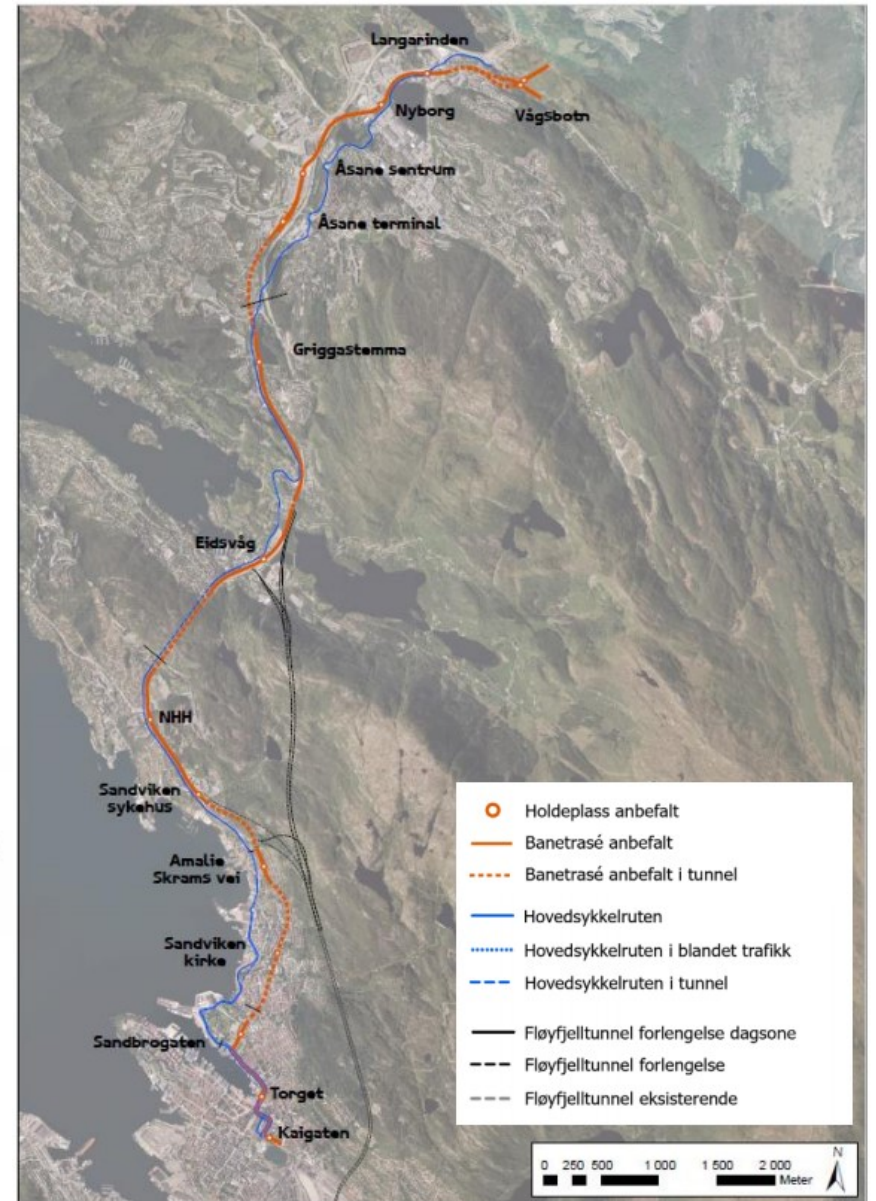
Construction stage 5 – zoning plan



↑
Tunnelutredning -
Dersom tunnel i sentrum blir valgt må fremdrift endres

2024-25

- The zoning plan is approved, but a study to be delivered for city tunnel considerations.



Oversiktskart over anbefalt bybanetrase, hovedsykkelrute og forlengelse av Fløyfjelltunnelen

Zoning plan in numbers

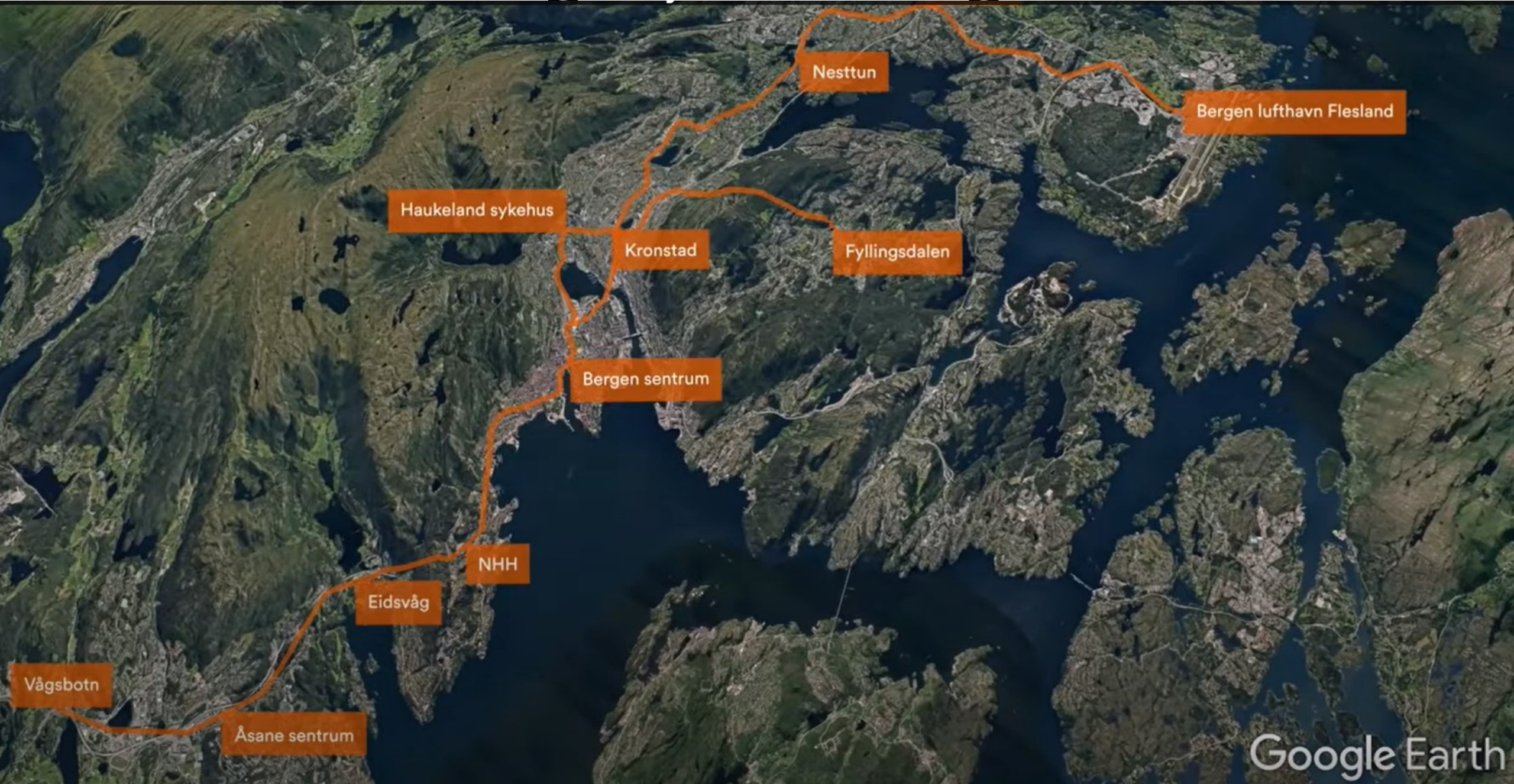
- Tack approx. 12,8 km long, approx. 4,6 km in tunnel
- Travel time from Torget to Åsane terminal approx. 17 min, and approx. 24 min to Vågsbotn
- 14 stops
- Bicycle main road approx. 12,7 km long, approx. 1,2 km in tunnel
- Fløyfjelltunnelen extended by approx. 2,5 km, in total approx. 5,3 km

- Total cost approx. 2 billion euro

Finance

- Approved zoning plan summer 2023
- Initial finance approved for 2023 and 2024, in total 35 mill Euro
- Quality assurance proses before final finance ongoing
- Final finance approval in 2025

Construction stage 5 and the light rail network



Vågsbotn

Åsane sentrum

Eidsvåg

NHH

Bergen sentrum

Kronstad

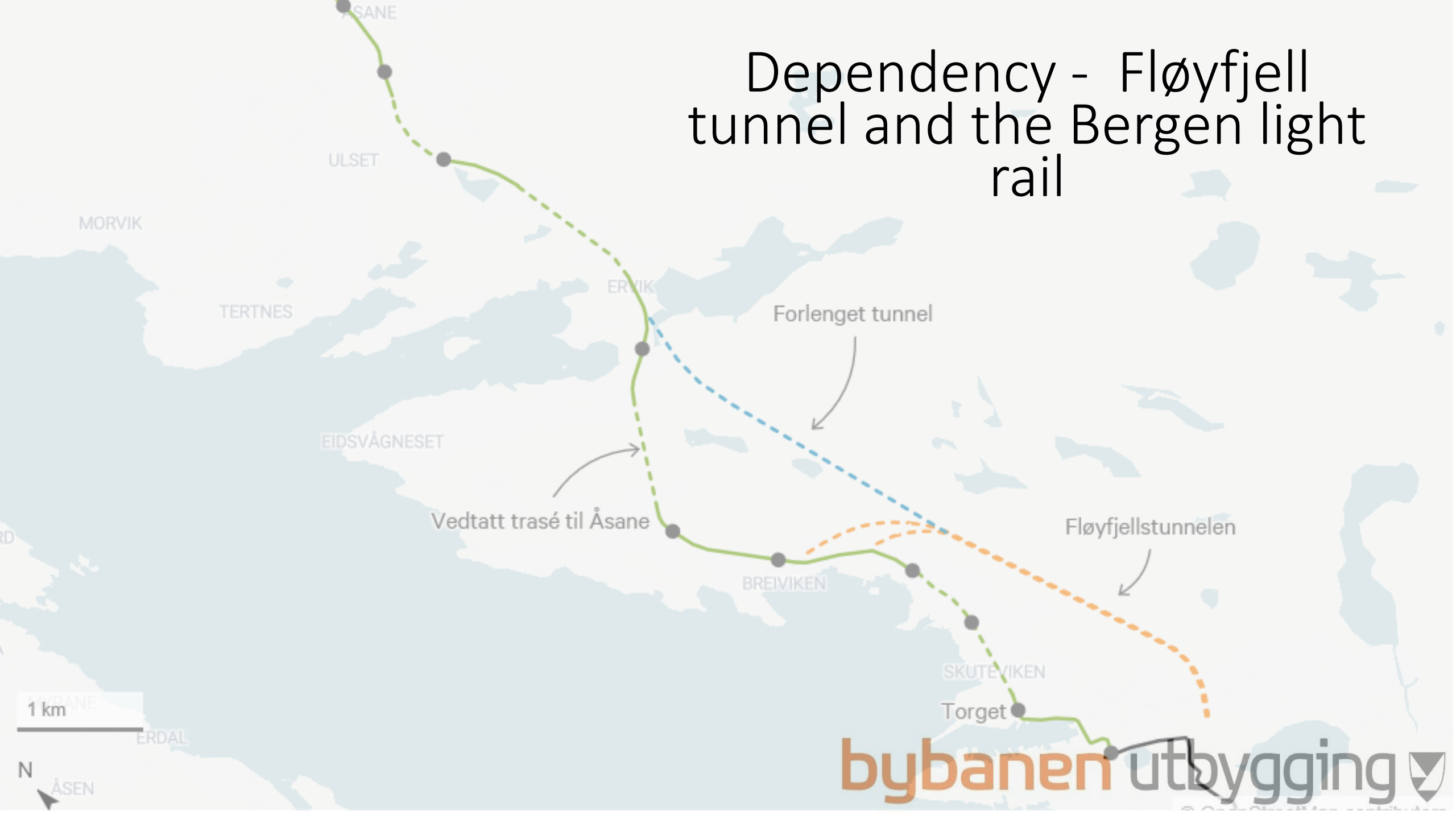
Haukeland sykehus

Fyllingsdalen

Nesttun

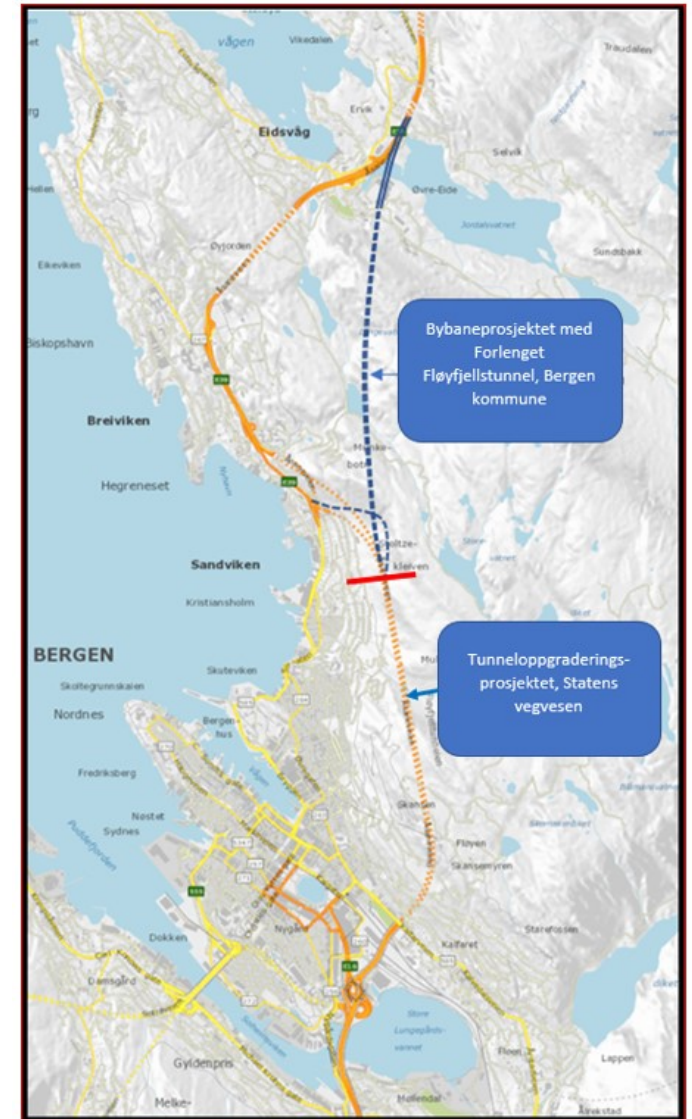
Bergen lufthavn Flesland

Dependency - Fløyfjell tunnel and the Bergen light rail



Fløyfjelltunnelen

- The Norwegian Public Roads Administration (NPRA)
- Fløyfjell north extension part of the Bergen Light rail project
- Fløyfjell south refurbishment part of the safety project for the tunnel
- Progress, traffic and technical interface important



Contract strategy determined

- Not one big EPCI contract
- One framework agreement for detailed engineering of single objects
- One contract for the detailed engineering of Bergen Light Rail construction stage 5 awarded COWI, Rambøll and Asplan Viak (CORAV)
- Preliminary contracts for establishing crosscut in tunnel and handling of rock material

Contract strategy and progress

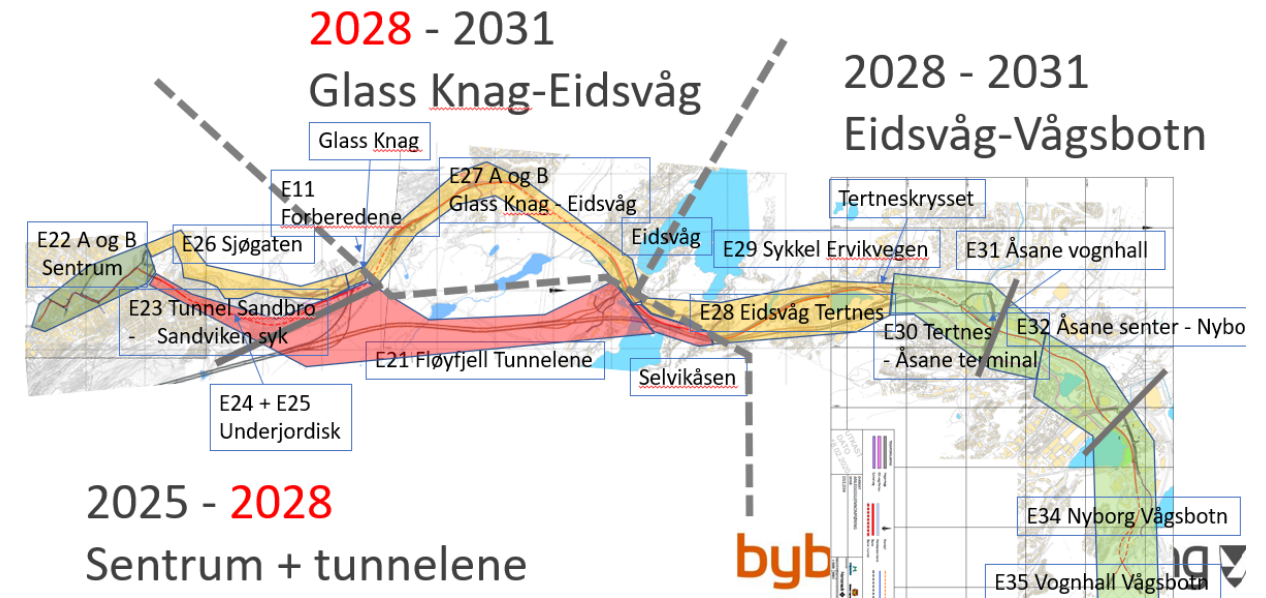
Bergen Utbygging has decided to:

- Enable many attack points by dividing the construction stage into several civil works contracts - spread over time, secure critical line
- Have different sizes of contracts that gives different contractors the opportunity to participate
- Technical contracts mainly throughout the entire construction phase
- Technical contracts focused on subject area

Division of contracts

Discussions so far:

- Different sizes
- Preliminary contracts
- Large main contracts
- Interface
- Separate contracts within railway subjects



So far:

- 7 preliminary contracts
- 18 civil works
- 10 technical contracts
- 2 buildings

Timeframe stage 5

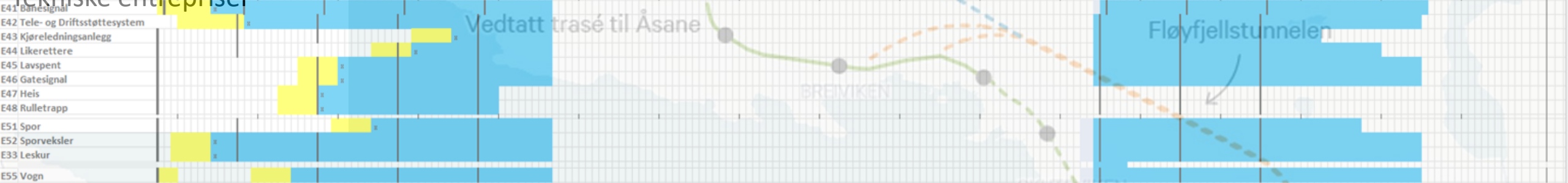
Forberedende

E64 Trafikktiltak sentrum
E61 Påhugg Sandbrogaten
E63 Amalie Skram

Grunnentrepriser



Tekniske entrepriser



1 km

Åsane, Eidsvågneset, Breiviken, Skuteviken, Torget

bybanen utbygging

Turn-key : E41 Rail signalling, E42 Telecom

E43 OCS, E44 Substations, E45 low voltage, E46 Traffic signals, E51 Tracks, E52 Track switches



- E27 Vågsbotn
- E24 Sykkel Vågsbotn
- E26 Langarinden
- E23 Nyborg
- E24 Sykkel Åsane
- E22 Åsane Senter
- E21 Åsane Terminal

- E20 Stamskartunnelen
- E19 Erviksvingene sykkel
- E18 Åstveitunnelen
- E17 Eidsvåg
- E16 Eidsvågtunnelen
- E15 Helleveien
- E14 Tunnel Munkebotn

Amalie Skrams vei, before Fløyfjell tunnel

- E31 Sandviken (technical)
- E12 Sandviken
- E11 Sentrum

Existing Line 1 and 2
Centre - Airport / Fyllingsdalen

Bybanen Utbygging

EPCI Kontrakts - Construction stage 5

Date: January 10th, 2024

Ole Wilhelm Mortensen

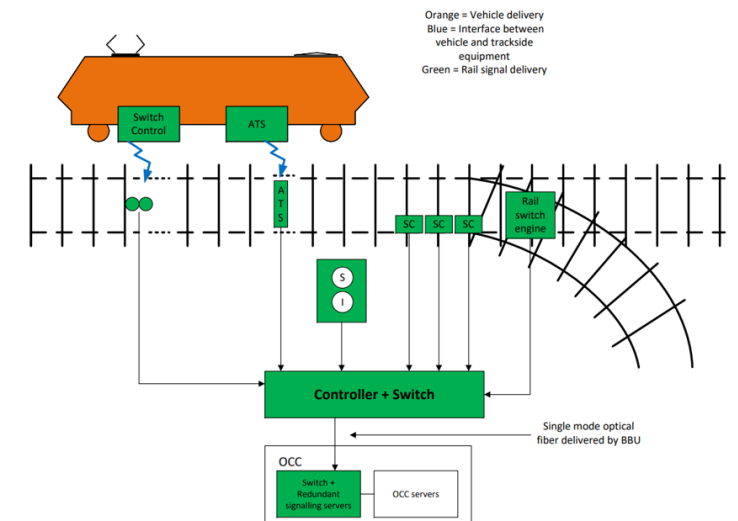
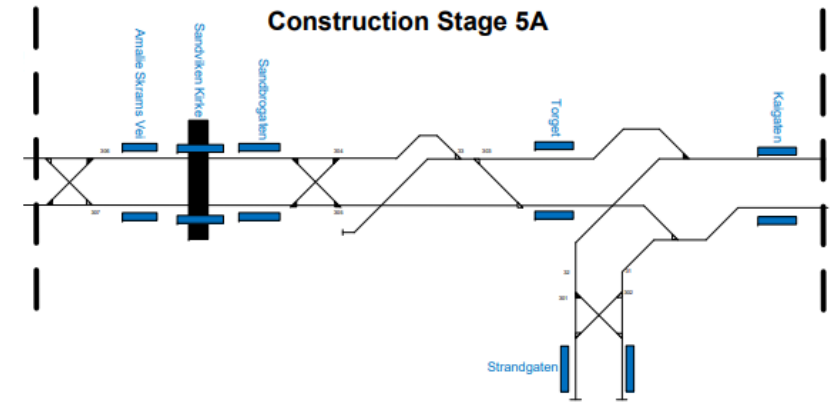
Director of procurement and turn-key contracts

Bybanen Utbygging



E41 Rail signalling

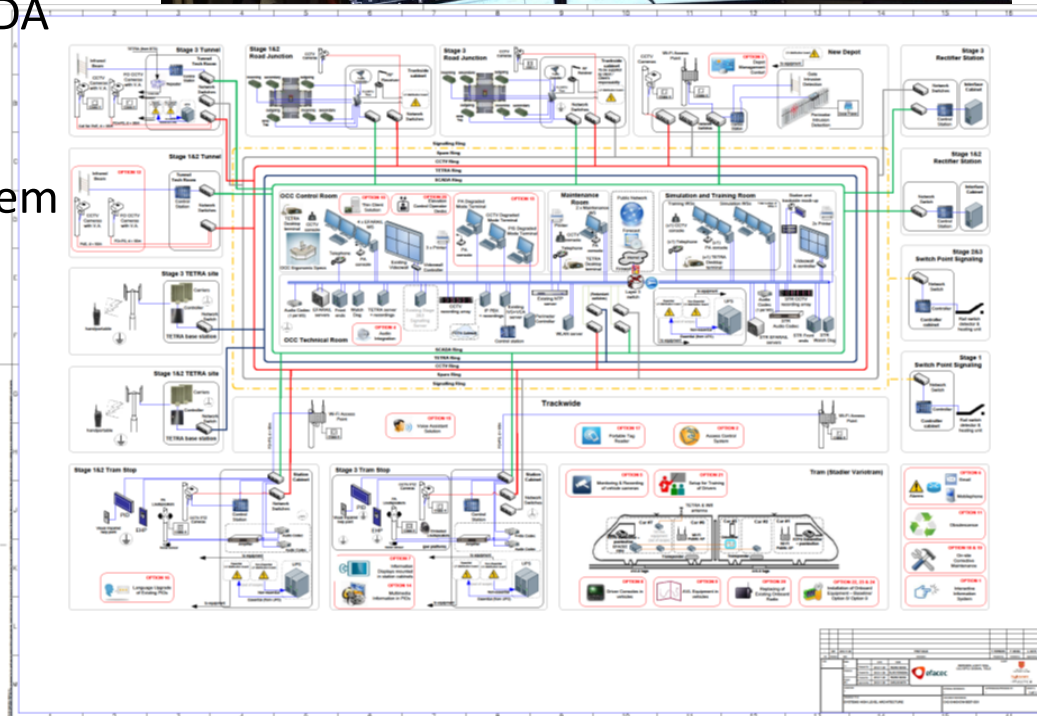
- Turnkey contract (Engineering Procurement Construction and Installation)
- Key figures:
 - Safe point control and heating
 - Point machines
 - Automatic Train Stop tunnel
 - New central system for construction stage 5
 - Approval from the NRI
 - Open for needed changes in existing system
- Options:
 - Replace existing central system
 - Next construction steps
- Interfaces:
 - Design contractor, Civil contractors, Other technical contractors (signal, low voltage etc.), Track contractor



E42

Telecom and Operations System

- Turnkey contract (Engineering Procurement Construction and Installation)
- Key figures:
 - Central Control System, Automatic Vehicle Location, SCADA System, LAN & Fiber Backbone, Radio Network
 - Wireless LAN System, Tunnel Intrusion System, CCTV system, Public Information System, Rail Traffic Priority System, Depot Management System, Access Control System
 - Also, equipment needed onboard Rolling Stock for the system
- Options:
 - Replace existing parts of the system
 - Next construction steps
- Interfaces:
 - Design contractor, Civil contractors, Other technical contractors (signal, low voltage etc.), Track contractor



Bybanen Utbygging

Suppliers' day Bybanen in Bergen - Construction stage 5

Date: January 10th, 2024

Geir Olsvold

Project Manager

Bybanen Utbygging



E43 Catenary System

Scope of Work:

- Delivery of a complete catenary system for the line Total distance for the line: Approx. 13 km – two tracks
- Tunnel distance: Approx 5 km – two tracks
- Approx. 1 km OCS in depot (Vågsbotn or Åsane terminal)
- Sections with Contact wire and Contact Wire + Messenger wire
- Tram operation on batteries at Bryggen (approx. 600 m)
- Foundations to be delivered by civil contractors

Interfaces:

- Civil and other tech. contractors



Bergen light rail operating on batteries alongside Bryggen. Illustration: Bymiljøetaten, Bergen kommune, 2022

E44 Traction Power supply

- Substations

- Turnkey contract
- Buildings delivered by civil contractors
- Scope of Work:
 - 9 substations (approx. 2MVA each)
 - 11kV switchboards
 - Transformers (traction and aux.power)
 - Rectifiers 750 VDC
 - DC switchboards
 - Low voltage switchboards incl “building”-installations in substations

Interfaces:

- Civil, other tech. contractors, Grid owner (BKK) and vehicle supplier



Substation placed neatly as part of a concrete and dry wall construction at Fløen, line 2

E45 Low Voltage installation

- Delivery of complete low voltage installations for the line
- Scope of Work:
 - Installation at 14 tram stops (heating cables, switchboards, lights etc.)
 - Streetlights
 - Technical rooms in tunnels (2-4 for each tunnel)
 - Installation in tunnels (lights, leakage cables etc)
 - Earthing line wide

Interfaces:

- Civil, other tech. contractors, Grid owner (BKK)



Light installations in the Fyllingsdalen pedestrian – and bicycle tunnel

E46 Traffic lights

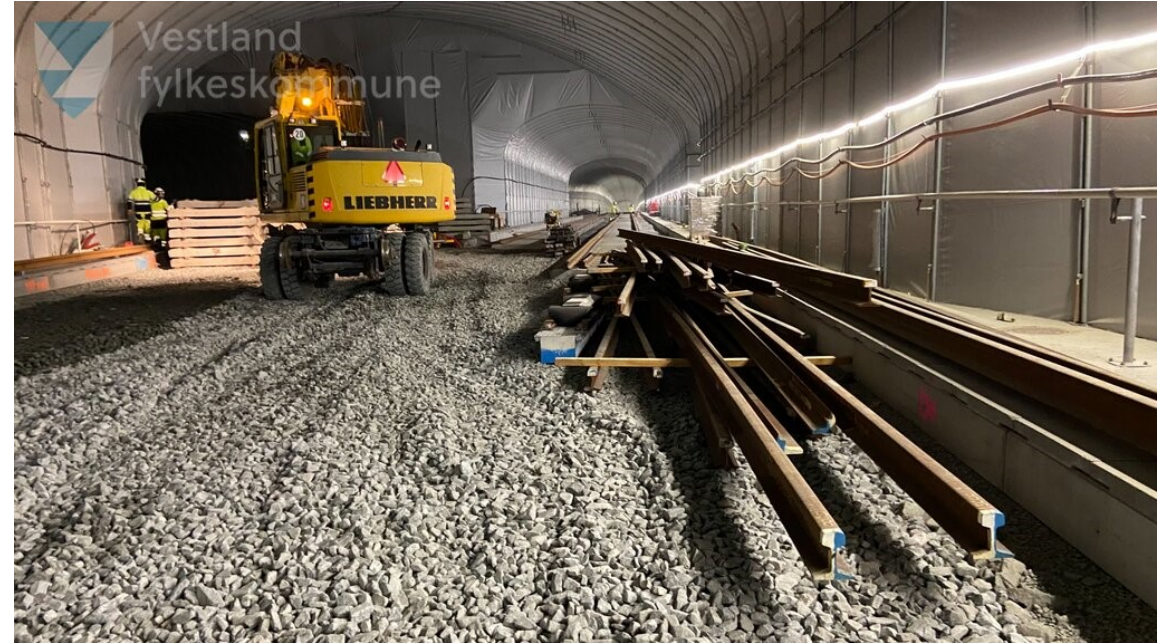
- The delivery of complete traffic light systems
- Scope of Work:
 - 40 systems in total including control cabinets, poles and signals
 - Some existing systems to be modified
 - Foundations etc to be delivered by civil contractors
- Interfaces:
 - Civil, other tech. contractors, Norwegian public road administration (VTS)



Traffic lights for cars, bicycles and pedestrians alongside the Bergen light rail in Bergen city centre

E51 Track works

- The delivery and installation of complete track works for the line
- Scope of Work:
 - Approx. 13 km double track
 - Approx. 5 km in tunnel
 - Approx. 1 km in depot
 - Different track types:
 - Embedded tracks in urban areas – Bryggen area as an example
 - Grass tracks in some areas
 - Ballast track in tunnels and in suburban areas
 - Installation of track switches (delivered by other contractor)
- Interfaces:
 - Civil, other technical contractors, track switch contractor



Track works inside the Fyllingsdalen tunnel, line 2

E52 Track switches

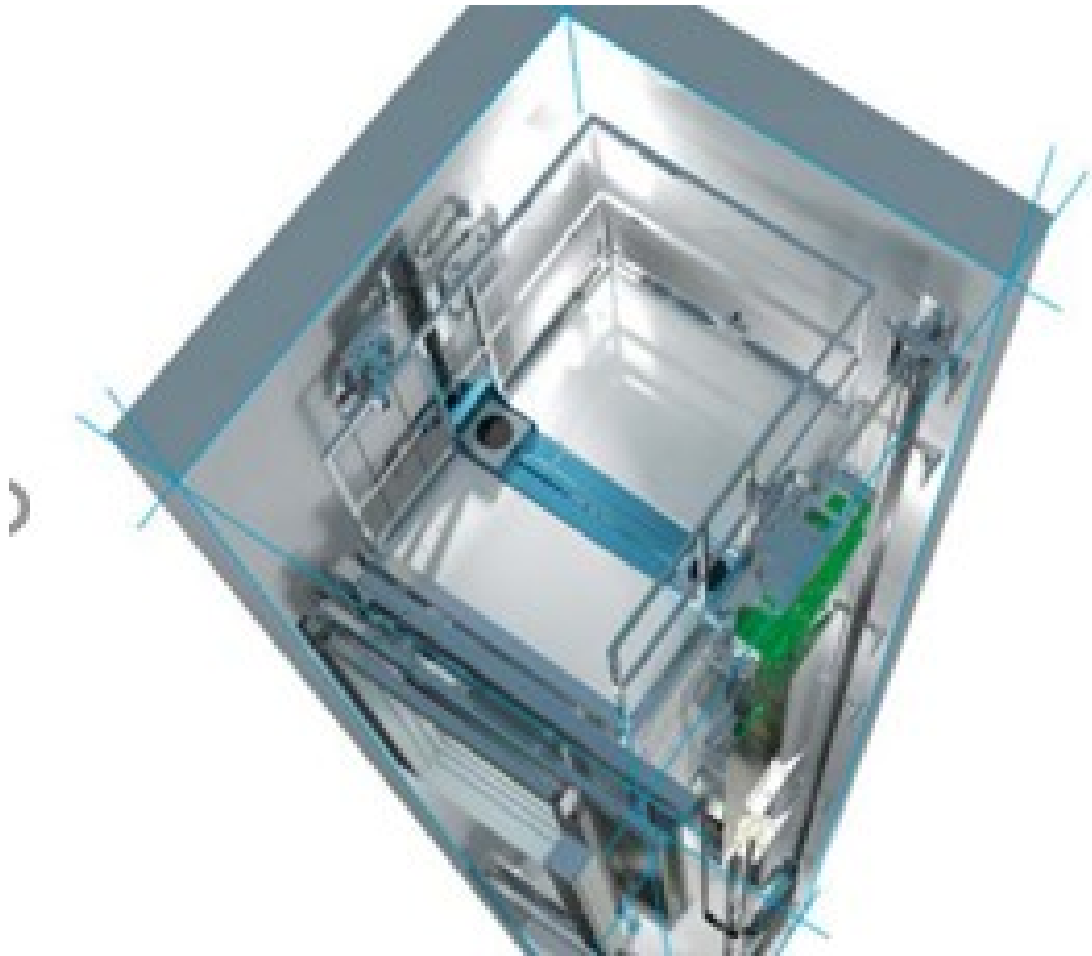
- Turnkey contract (not incl. installation)
- Scope of Work:
 - Approx. 50 switches
 - Switches for grooved and vignol rail
 - Wheel rail study
 - Lubrication systems
 - Point machines to be delivered by track signaling contractor
- Interfaces:
 - Track signaling, track contractor



Track switch at Kronstad line 2



E47 Elevators



- Lifting height 11 meters with few stops
- Demanding environment
 - Moisture
 - Brake dust
 - Road salt
- High requirements for utilization of shafts

E48 Escalators



Life expectancy of 15-30 years. The lifespan of the building means that escalators must be replaced in their entirety in the life cycle of the building.

The client wants an escalator that requires little supervision, and with the highest possible service life and uptime.

Enough space must be set aside for escalators. So that stairs with external roller chains can be delivered

Space must be set aside for external control cabinets. Internal automation and frequency converter present challenges with heat and environment.



H

Fyllingsdalen

skyss

217

TELEGRAFEN

Bybanen Utbygging

Suppliers' day Bybanen in Bergen - Construction stage 5

Date: January 10th, 2024

Daniel Angell Søvik

Project Manager

Bybanen Utbygging

New contract rolling stock

- The original contract used for construction stages 1-4 has now expired
- The current vehicle is not expected to be continued in production from former supplier
- Bybanen Utbygging will therefore have new vehicles further, and have initiated a process to enter into a new agreement for future vehicle deliveries
- Contract expected to be signed in the first half of 2025



Key Info:

- Contract length of at least 20 year, with options, starting 2025
- Includes an increase in the current fleet of vehicles due to new construction stages (5-7), as well as a replacement of the current fleet when they reach their life expectancy
- The project is based on the principal of using well-proven and established technology – Best practice
- Functional specification, not detailed technical specification
- The new rolling stock must be able to run solely on battery in front of Bryggen
- Option for service and maintenance



Bergen light rail operating on batteries alongside Bryggen. Illustration: Bymiljøetaten, Bergen kommune, 2022

Interfaces:

- The rest of The Bergen Light rail project
- Norwegian Railway Act (Jernbaneloven)
- Norwegian Railway Inspectorate (Statens jernbanetilsyn)
- Existing track and infrastructure
- Owner and operator (Bybanen AS, Skyss og Tide)



Progress – Where are we now?

We are now in the process of entering into a contract with a technical consultant (E05).

The main responsibility and activities of the technical consultant will be the development of the specification on rolling stock and to provide assistance during the procurement process under the leadership and coordination of The Bergen Light Rail Project.

- Invitation for prequalification phase were sent out December 2023 – Deadline for prequalification is 29 January 2024



Bybanen Utbygging

Suppliers' day Bybanen in Bergen - Construction stage 5

Date: January 10th, 2024

Ole Wilhelm Mortensen

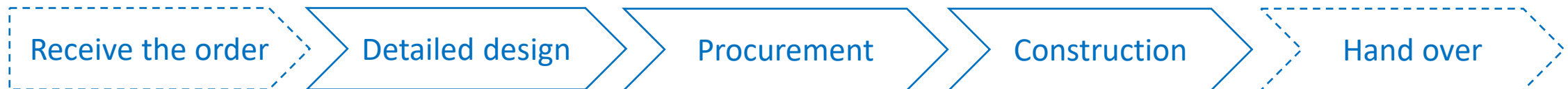
Director of procurement and turn-key contracts

Bybanen Utbygging



Bybanen Utbygging – we see ourselves as ...

- A professional and demanding client
 - ✓ only skilled suppliers are working for us
 - ✓ We want partners
- A client who is concerned about competition and having the abilities to create competition in the market. Our objectives are:
 - ✓ To engage respectable suppliers
 - ✓ To reduce the market uncertainty
 - ✓ To achieve the "right price"



Bybanen Utbygging and the suppliers

The suppliers are important, because

- They're performing the actual construction
- Their understanding of the task is crucial
- Their competence and abilities to perform is essential

BU depends on skilled contractors and suppliers!

Procurement

Bybanen Utbygging want to support this goals in the procurement by:

- Including performance description in the evaluation
- Negotiations with the suppliers to understand and challenge

Procurement

Bybanen Utbygging wants to:

- Establish a good dialog with the suppliers
- Reduce the risk in the project
- High quality on production and final product
- That every worker are safe home and protect the surroundings
- To reduce our carbon emission
- Perform on cost and time

Negotiations

BU invites to negotiations in almost all purchases

- To understand the offer and ensure that the supplier understand the task
- Rectify misunderstandings and enable revised offers
- Can reduce the number of tenders before invitation to negotiations
- Often several negotiation rounds, but reduce the number of tenders between each round

Law and regulations

- Public procurement Laws
- Regulations about procurement within Utilities sector (forsyningsforskriften)
- Above EEA-threshold: Announcement of the enterprises throughout the EU/EEA

Procedure

Negotiated procedure in two steps

1. Prequalification

- The suppliers suitability: Economics/financial position, relevant experience etc.
- European single procurement document (ESPD)

2. Bid phase

- Prequalified suppliers invited to submit tender
- Evaluation and negotiations

Procurement plan

- Now E41 Rail signalling
- Now E05 Technical support vehicles
- February 24 E33 Shelters – market dialogue
- March 24 E42 Telecom and Operations System
- April 24 E86 Building demolition and recycling
- Mai 24 E64 Traffic City Centre
- Winter 24 E52 Track Switches
- Winter 24 E61 Preparatory works Tunnel Sandbrogaten
- Winter 24 E63 Preparatory works Amalie Skrams vei
- Spring 25 E55 Vehicles
- Summer 25 E11 Sentrum
- Summer 25 E12 Sandviken
- 2025-27 Technical contracts

Thank you for attending!

All presentations will be uploaded on www.bybanenutbygging.no

Bybanen Utbygging are looking forward to a good dialog and a fruitful cooperation.

