The Greater Copenhagen Light Rail

Planning, decision-making, design

Agenda

- Introduction
- Metroselskabet and Greater Copenhagen Light Rail
- Project background
- The programme study and principal agreement
- The economic case of the LRT vs the Metro

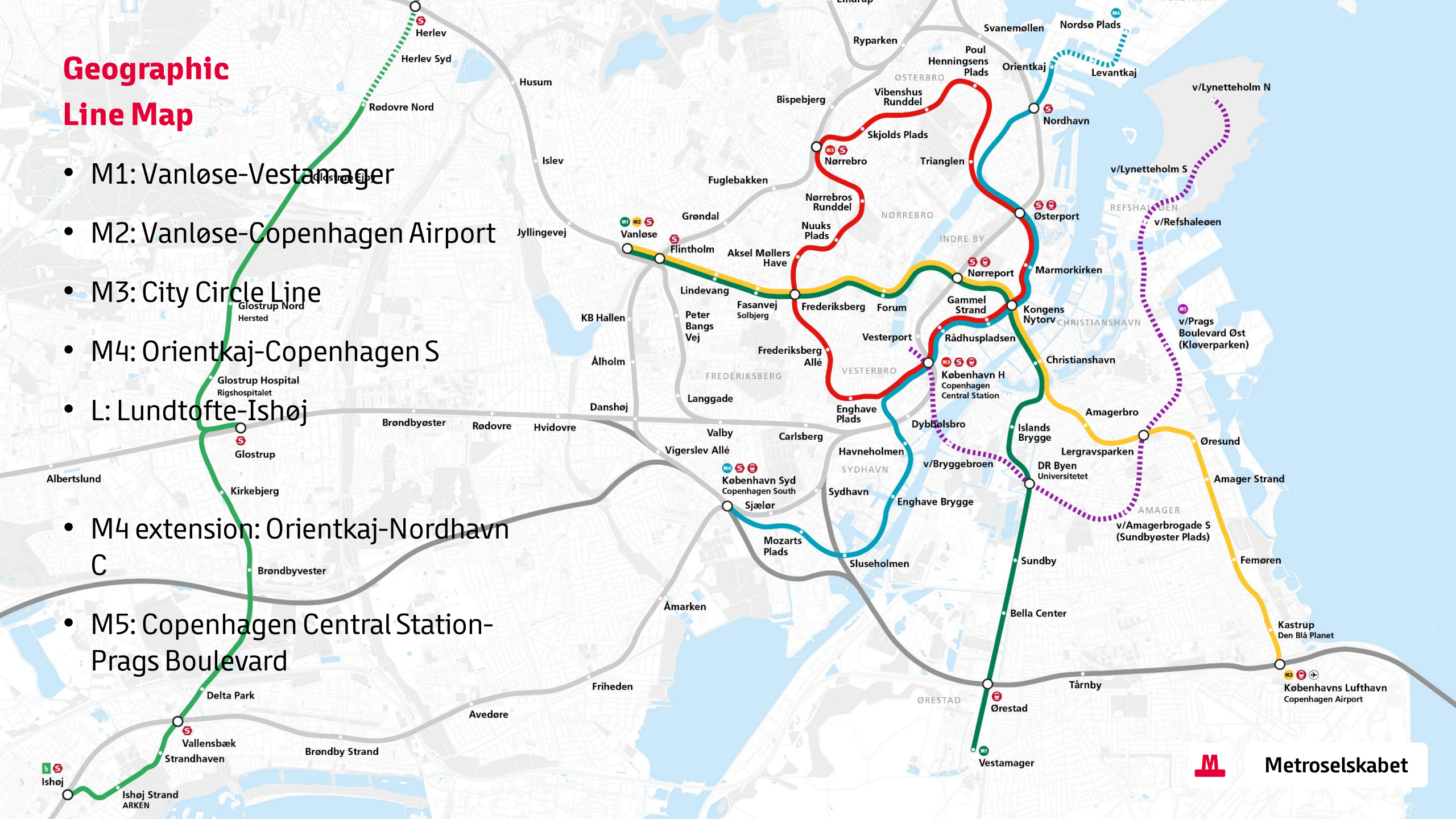
Metroselskabet

The greatest possible value to society with the smallest possible carbon footprint

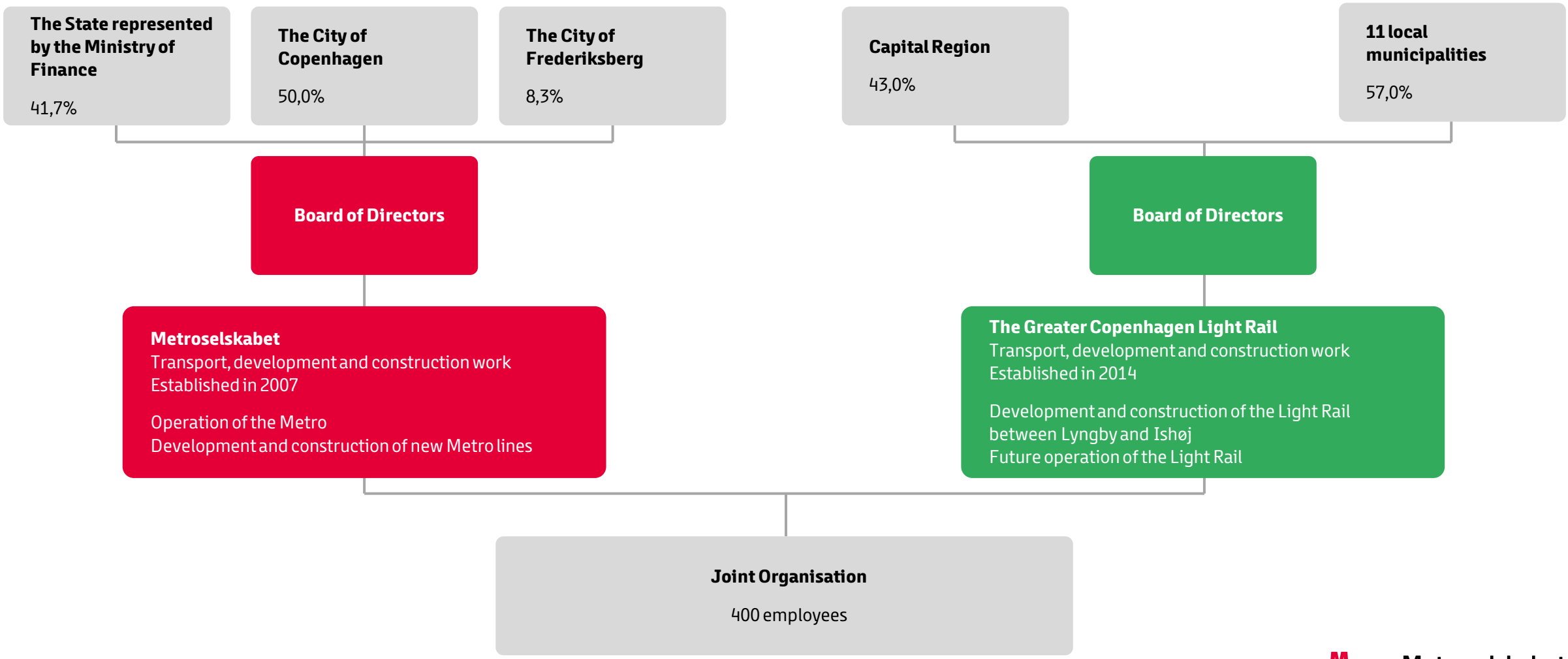
Metroselskabet

Geographic Line Map

- M1: Vanløse-Vestamager
- M2: Vanløse-Copenhagen Airport
- M3: City Circle Line
- M4: Orientkaj-Copenhagen S
- L: Lundtofte-Ishøj
- M4 extension: Orientkaj-Nordhavn C
- M5: Copenhagen Central Station-Prags Boulevard



Organisation chart



The workplace

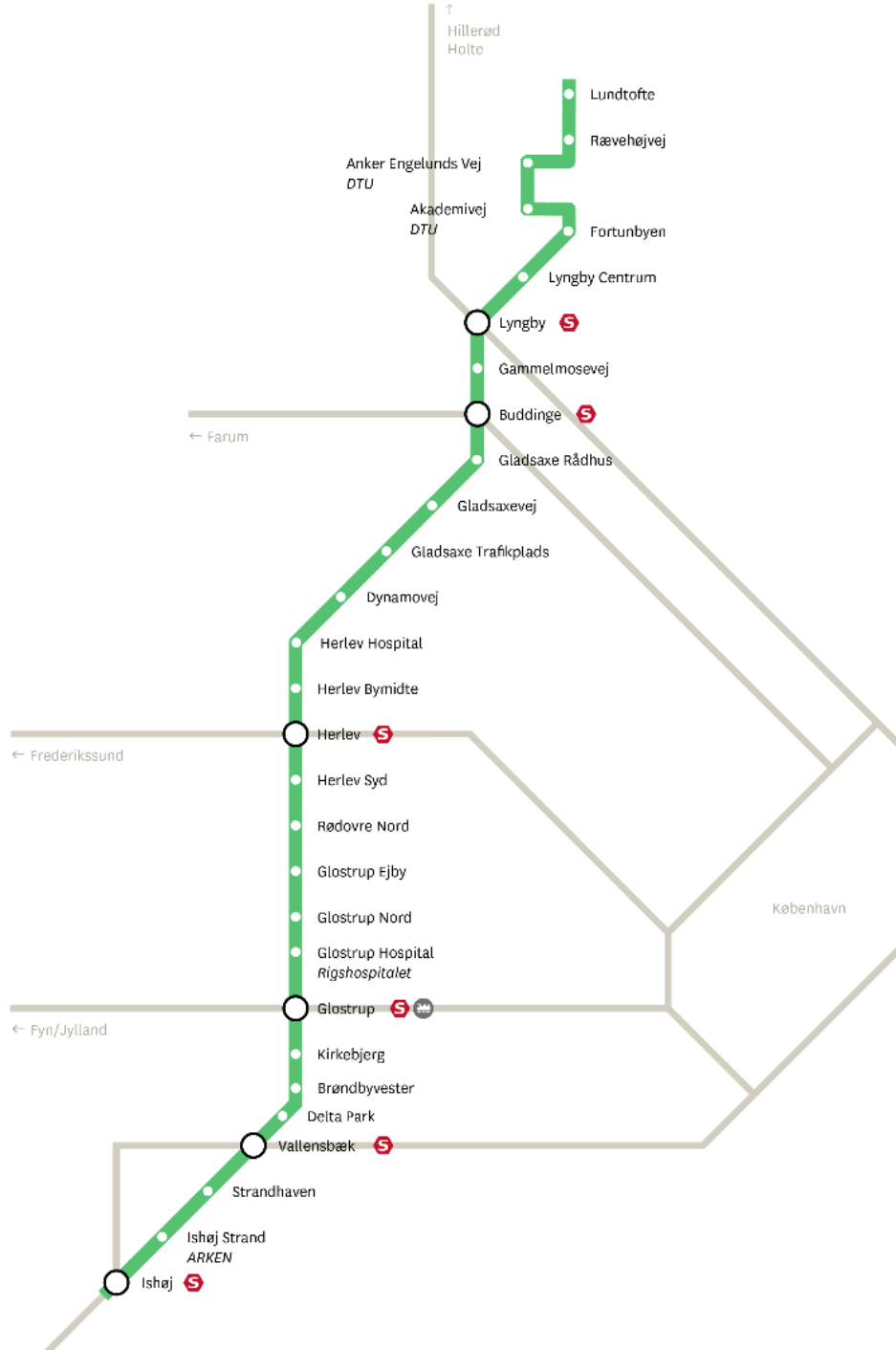
- Approx 400 employees
- International environment:
  - Around 20 different nationalities
  - Combined English & Danish company language
- Many different educational backgrounds:
  - A large engineering company ☺
  - In constant cross-disciplinary collaboration

Metroselskabet

The Light Rail project's background

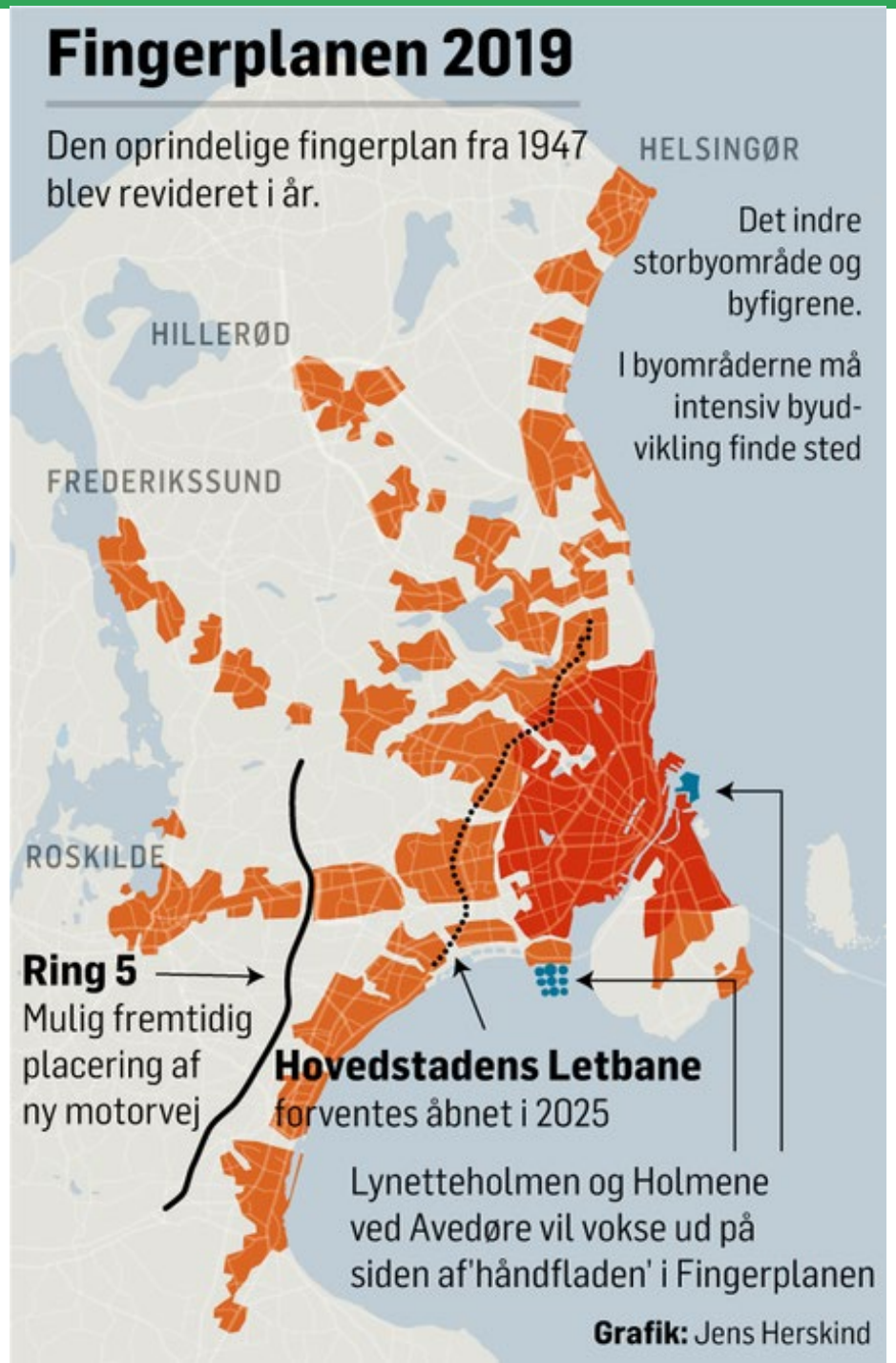
Facts about the light rail

- Will open in 2025 (south) and 2026 (north) and will connect from Ishøj to Lundtofte.
- 28 kilometer double track, 29 stations.
- Will operate at 5 minute intervals in daytime and every 10 minutes in evenings and Sundays.
- Expected 13-14 mill. passengers annually.
- Interchange to suburban / commuter rail lines at 6 stations
- Connects to 2 major hospitals and the Technical University



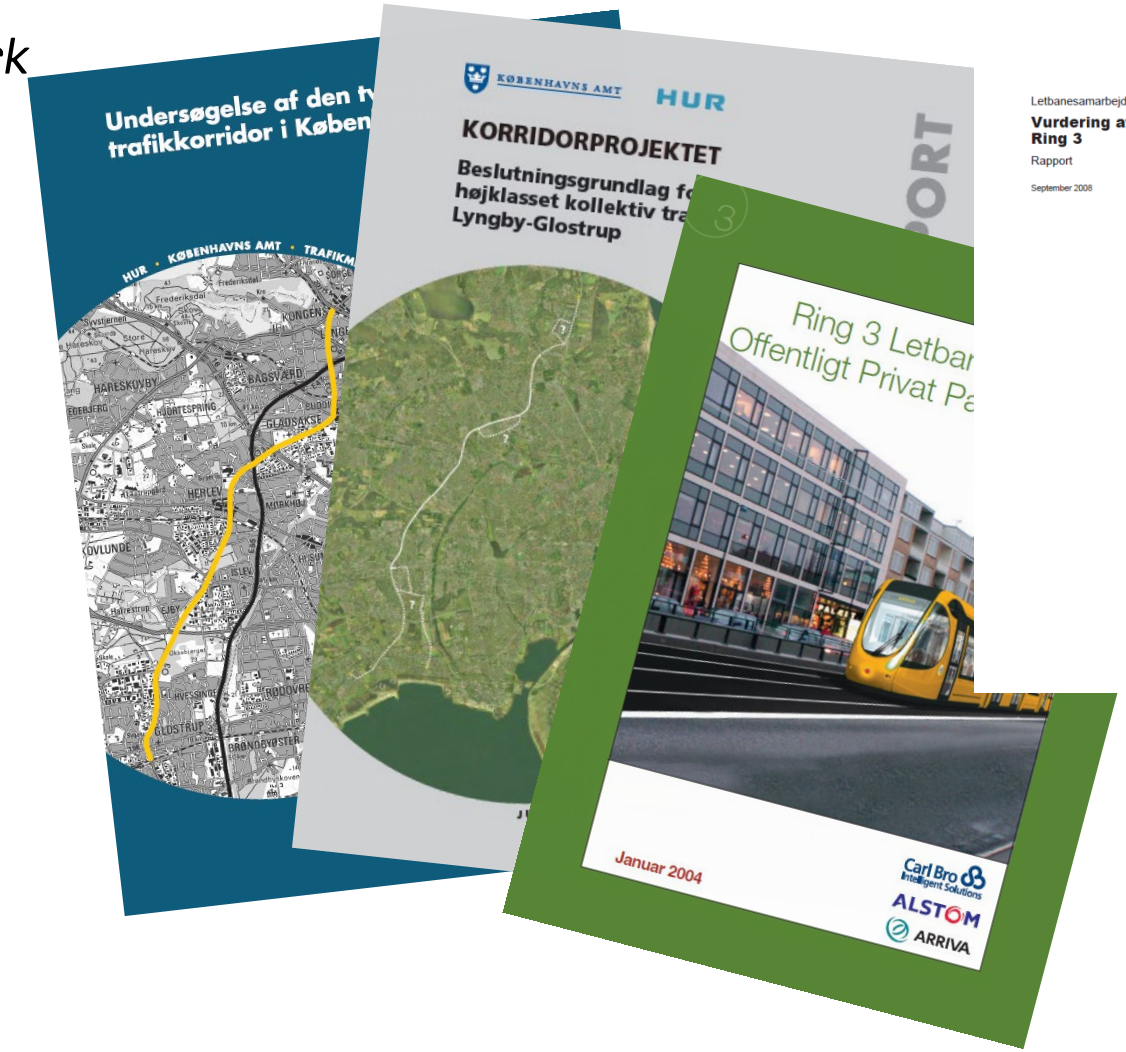
The Why?

- Rising population in Copenhagen Region, an increase of 200.000 expected by 2030.
- Increasing congestion on motorways
- Relatively low market share for public transport
- The Light Rail can support urban development, compacting cities around Copenhagen
- Connection between the ”fingers” of Copenhagen



A long backstory

- *Reports dating back*



Political agreement for cooperation for a light rail

- Agreement to plan for a light rail between Lundtofte and Ishøj on June 29th 2011
- The State, The Capital Region and 11 municipalities
- Agreement refers to concept study comparing LRT and BRT

- Key for split of costs between municipalities takes into consideration:
  - Number of stations
  - Alignment length
  - Area of land obtaining ”station vicinity” status – allowing for a more compact urban development

- The planning and construction will be handled by Metroselskabet I/S

Ownership of Hovedstadens Letbane I/S?

11 municipalities (57 %)

Ishøj, Vallensbæk, Brøndby, Glostrup, Rødovre, Herlev, Gladsaxe, Lyngby-Taarbæk, Hvidovre, Albertslund and Høje-Taastrup

The Capital Region (43 %)

Who pays the construction costs?

- The Danish State (40 %)
- 11 municipalities (34 %)
- The Capital Region (26 %)

The programme study and principal agreement

Project development in MS

Idea and Screening phases

- Rank and select projects for further studies

Programme study

- Rank alternatives
- Technical scope and performance targets
- **Financing**
- **Socio-economic evaluation**

Concept, EIA, Tender design

- Detailing design
- Construction law
- **Political mandate and financing of budget**

Detail design, construction

- Execution

Operation & Maintenance

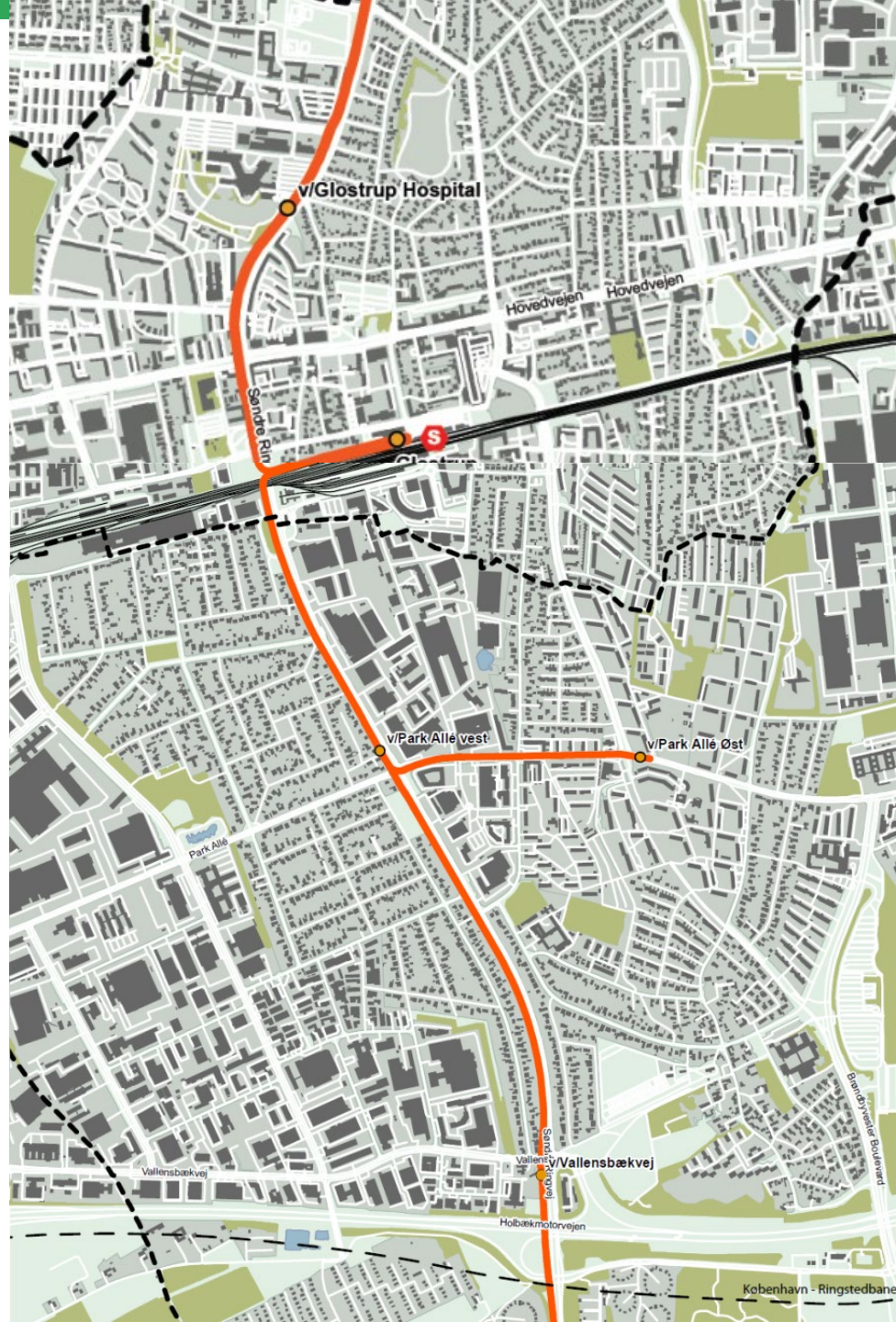
- **Benefit realisation - passengers**

Planning principles

- Light rail on segregated tracks:
  - Avoid other road users in the tracks
  - Avoid unregulated crossings
  - Separation in traffic signals
- Good interchanges:
  - Short distances to conneting public transport
- Standard tram / light rail:
  - Electric with catenary
  - Driving on sight

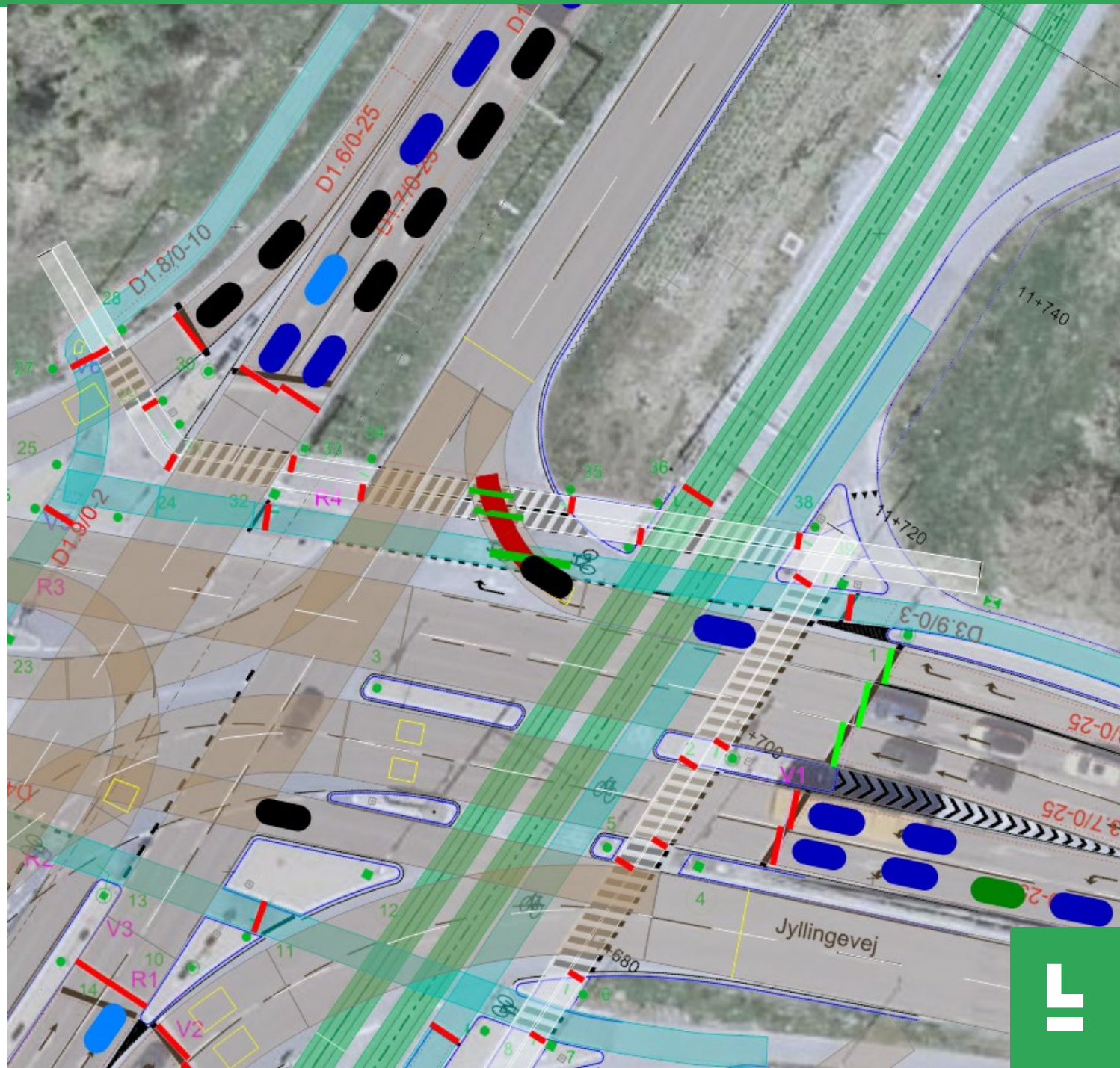
Alignment studies

- Optimization of the light rail alignment
- Study of capacity and traffic flow in major intersections
- Placement of the light rail in the road (middle strip or on the side)



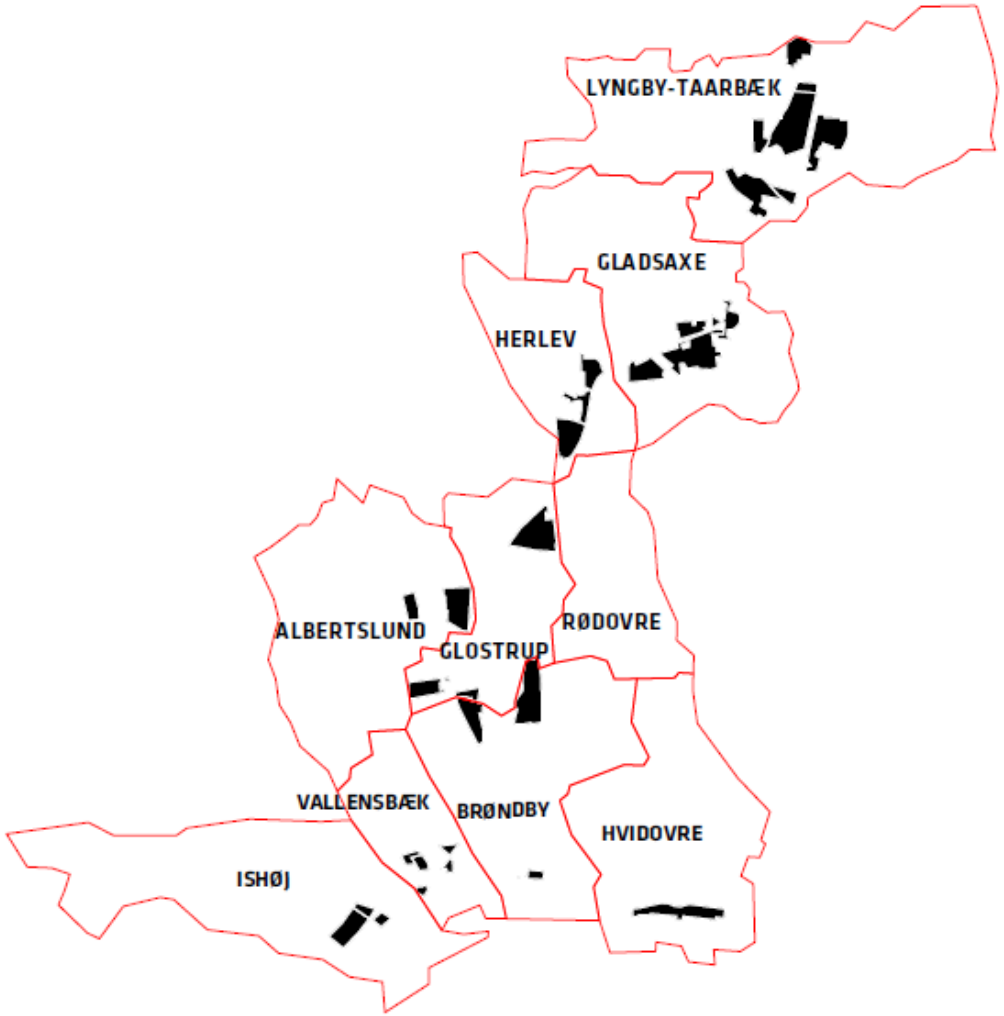
Traffic impact studies

- Simulation of capacity in signalised intersections
- Output: delays, queue lengths for road traffic users and the light rail
- Delays for light rail accounted for in run times / time table
- Delays for road users as input to macroscopic traffic model



Traffic forecasting

- Assumptions of future urban development and growth
  - Large diffences between local expectations and national prognosis
  - To which extend does the light rail attract development?
  - Potential development areas – 11 km^2
- Road traffic and public transport in same model
- Impact of light rail on road traffic flow (overestimation?)



Principal agreement and construction law

- Despite the negative socio-economic impact, the project owners decided to move ahead with the project
- Concept Design and EIA 2015
- Construction Law 2016
- Tender / reference design development

The Light Rail – a democratic project

- Programme study: station in Rødovre Kommune, DTU alignment
- EIA: Changed alignment at Ishøj and Klampenborgvej, Lyngby
- Construction Law: The Government overrules local speed limits, Delay of preparatory works
- Tender Design: Local additions, adjustments to avoid ekspropriation
- Operation: Interface agreements and handover to local road authorities

Engineering disciplines

- Road and rail alignment
- Traffic engineering and road safety
- Bridges and structures
- Rail electrification
- Emergency services planning
- Utility relocations
- Drainage
- Geotechnical
- Site supervision
- Operations planning
- Site health and work safety
- Project and programme management
- Work planning
- Etc. etc. etc. ...

Light Rail Contractors

Civil Works contractors:

- 6 separate contracts: 5 sections plus CMC

M.J. Eriksson A/S
Ishøj

Aarsleff
Vallensbæk, Brøndby & Glostrup

Lyngby-Taarbæk

CG Jensen
Rødovre & Herlev

Gladsaxe

CMC

Transport systems supplier

SIEMENS

AARSLEFF RAIL

Road Traffic Signal System supplier

ITS Teknik

Operator

Metro Service

Station design

- Easily recognizable and uniform design
- Equiped with lighting, info screen, countdown display, loudspeakers, ticket vending machines, benches, and bins.
- Full accessibility – step-free access to train, acoustic signals for crossing tracks and in nearby signalized intersections

LRT Vehicle

- 29 passenger vehicles - Siemens Avenio which also operates in The Hague, München, and Bremen
- Four-car vehicle with capacity for approx. 260 passengers.
- Electric power supply (750 V DC) via overhead catenary .
- Low-floor and step-free entrance, four flex-use areas for wheel-chairs, prams, and bikes
- Maximum speed 70 kph – average operating speed 30 kph incl. Dwell at stations.

Control and Maintenance Center at Glostrup

- Operation is supervised and managed from the control and maintenance center.
- The CMC is located midway on the alignment and will house administrative functions as well as facilities for the tram drivers.
- The building floor surface area of 7.000 m^2 plus a 400 m^2 train wash.
- The CMC will be operative 24 hours a day

Status

- Southern Section Ishøj - Rødovre Nord:
  - In operation since October 26th 2025.
- Northern Section Rødovre Nord – Lundtofte:
  - Tests ongoing
  - Trial Run during summer
  - Opens in August 2026

Site visit: Control and Maintenance Center at Glostrup

- Wednesday 22nd
  - 12.00-13.30 or
  - 13.30-15.00
- Maximum 25 per group
- Bring Safety Vest
- You will be received by
  - Frank Pedersen
  - Alan Kampmann
- Where:
  - Ballerup Boulevard 201, 2600 Glostrup