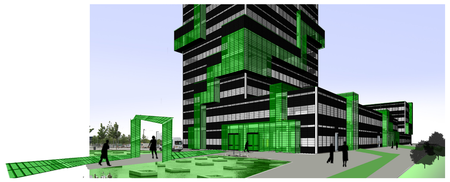
Twisting Traces



Trace => spaces

The Trace reflects the importance of the rooms and spaces for the employees and compagny.
The trace runs through outside spaces like the roof terrace and patio in the hart of the base building - spaces for social intimacy.
And meeting areas, laboratories andopen offices - spaces for professional immersion

11080 Advanced Building Design

DTU

23.01.2009 Team 7

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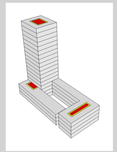
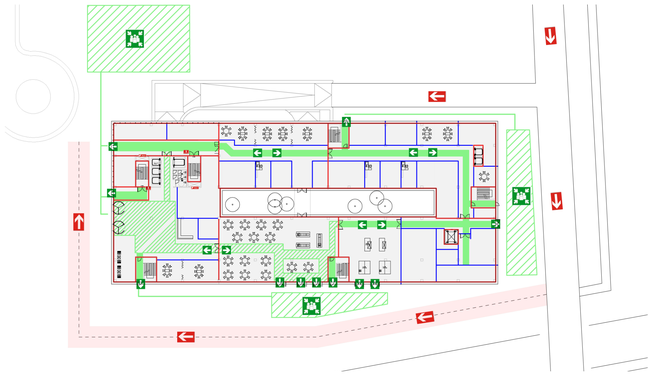
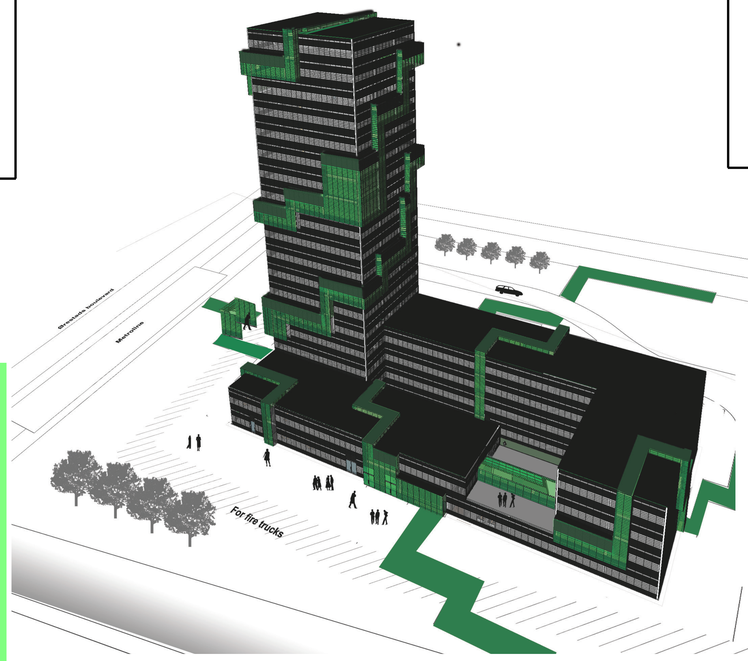
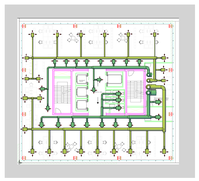


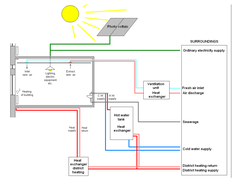
Volume and areas

- Different room height studied regarding daylight
- Volume design in order to minimize "dark" areas
- Gross area above ground 17195 m2



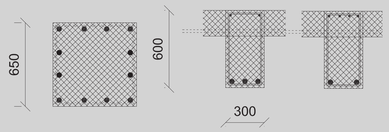






Services

- Mechanical ventilation with heat recovery and variable air flows
- Ventilation systems supply either northern or souther rooms
- Indoor air quality: class 2
- Energy performance without photo voltaic: 47,9 kWh/m² => class 1
- Energi performance with photo voltaic: 45,6 kWh/m² => class 1
- Daylight conditions: DF > 2 % in all workstations as required



Construction

- Members of reinforced cast in place concrete
- Continous beams reinforced diff. at supports and midspan.
- Dimensions based on hand calculations and checked in SAP 2000 (finite elements)

Fire safety

Fire safety in the building have been considered by doing passive inititives in the design of the interior regarding means of egress.

Internal design of high rise

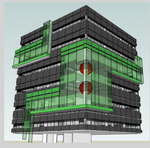
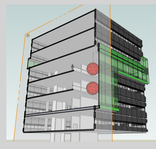
- Square floor plan => walking distances shortened
- Open/cell offices prop. to the amount of trace
- Core is designed symmetric for western wind regarding structural stability
- Optimal plazing of ventilation units to east facade every fourth floor

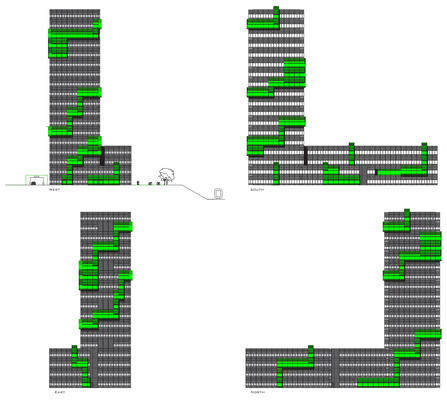
Internal design of base building

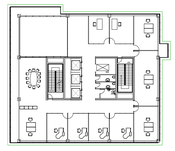
- Zoning for best logistics
- "Typical" office layout with a connecting passageway in the middle
- Stair cores places in correlation to basement

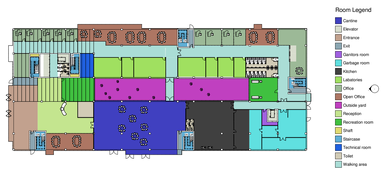
Trace: facades and skylights

- No external solar shading - overheating is avoided by 2 + 1 window, integrated solar shading and ventilated cavity
- Structural glazing : The closed and open parts of the cantilevered trace are in plane and joints are less visible
- The trace is cantilevered in order to give the facade depth and "bay windows" for extended view to Ørestaden
- Cantilevering: No thermal bridge and no moisture issues
- The reinforced concrete decks supports the cantilevering. No need of additional reinforcement or cantilevered beams.
- Trace opens up for atriums.
- In base trace turns into skylights on the top floors.

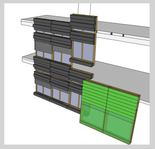


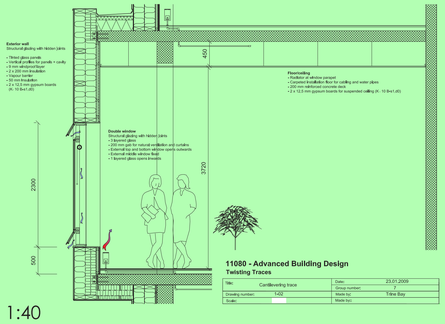
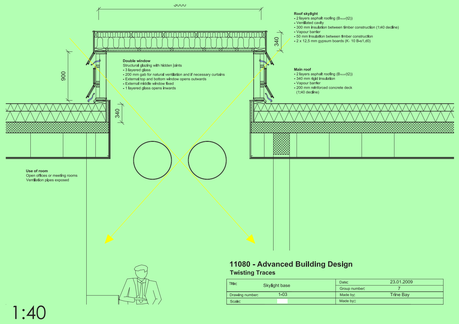
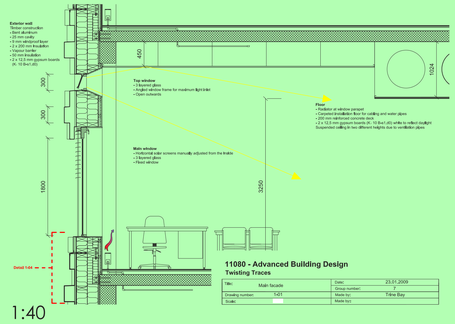
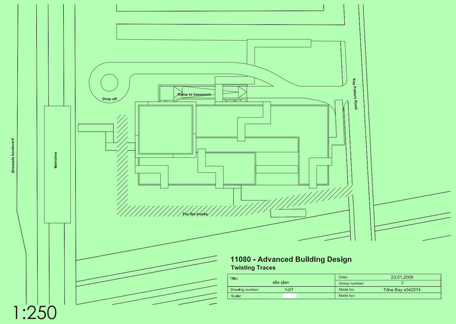
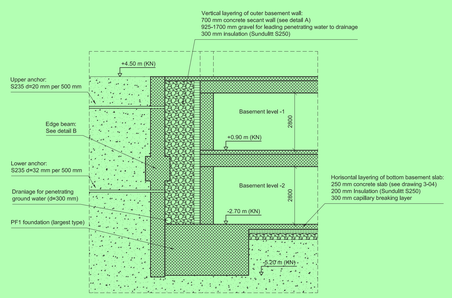




Main facades

- The size of window is based on the direction - south is largest
- Top window beneath suspended ceiling for better daylight conditions
- Designed for low U-values by means of: insulation and 3 layers of glass
- External solar shading to avoid overheating => less energy for cooling
- Mounted as curtain wall with elements suspended from slaps
- Whether screen mat aluminiun with variation of narrow "grooves"



Soil and water

- - The project is designed with regard to the existing structures on the surrounding sites. For instance, the vibration impact on the metro line during construction has been taken into account.
- The soil is remarkably strong thus not introducing the need for special solutions regarding foundations.
- A comprise between structural optimum and easy maintenance has been made as the outer drainage is placed as high as possible in the soil.