Apartment building in Albertslund, DK

PROJECT SUMMARY

14 apartment houses, in total 631 flats, were renovated in the period from 2007-2009. The renovation of the facade respects the original architecture and uses environmentally benign materials.

SPECIAL FEATURES

Renovation of the building envelope incl. mounting of balconies and merging of small apartments into larger family flats.

ARCHITECT

Nova5 Architects, DK

ENERGY CONSULTANT

Niras Consulting Engineers, DK

OWNER

Bo-Vest, DK on behalf of Albertslund Housing Company and Vridsløselille Housing Co-operative.

SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

IEA – SHC Task 37
Advanced Housing Renovation with Solar & Conservation

Before

After

BACKGROUND

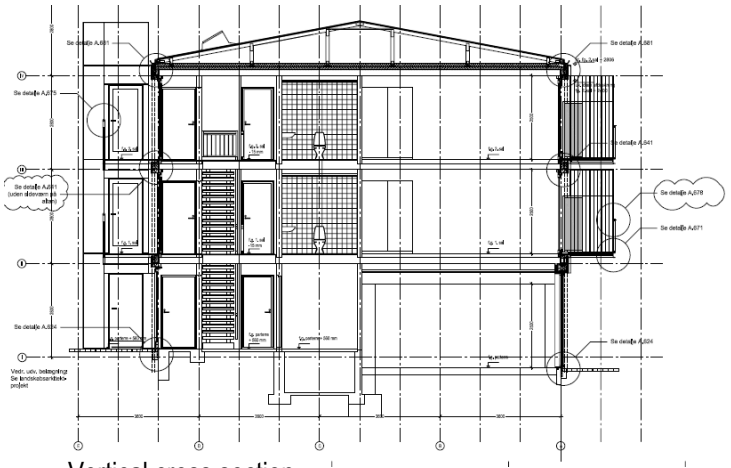
The 14 buildings with 631 apartments were build in 1966-69. Since then they have had technical problems primarily with the building envelope. Also the units were depreciated due to the large number of small apartments, occupied for short periods and resulting in a frequent transit of people. Therefore, it was decided to make a comprehensive renovation.

AIMS

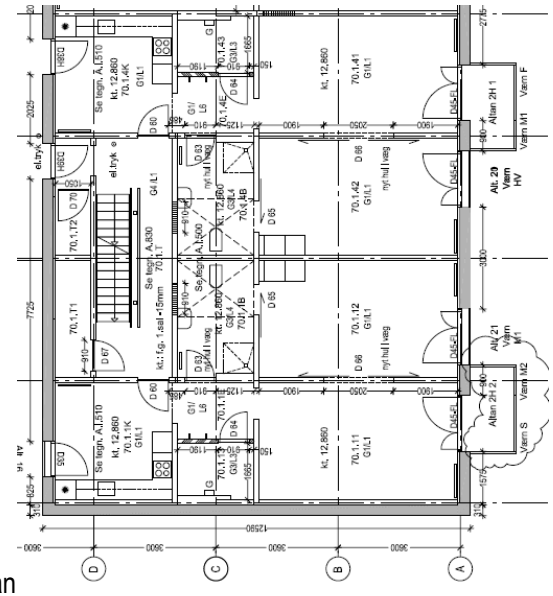
Renovate the facade respecting the architecture by using dark Spanish slate. To give the units identity and variety new balconies were added. Residents were involved during the planning.

SUMMARY OF THE RENOVATION

- Merging of flats, making flats suitable for families, elderly and physically disabled people.
- Focusing on daylight and functionality in the new design of the apartment.
- Renovation and adding insulation of facades
- Mounting balconies and gardens
- Common room for social purposes
- Exchange of water pipes and installation of water meters
- New entrances
- New doors and windows in wood/aluminium



Vertical cross section



Plan

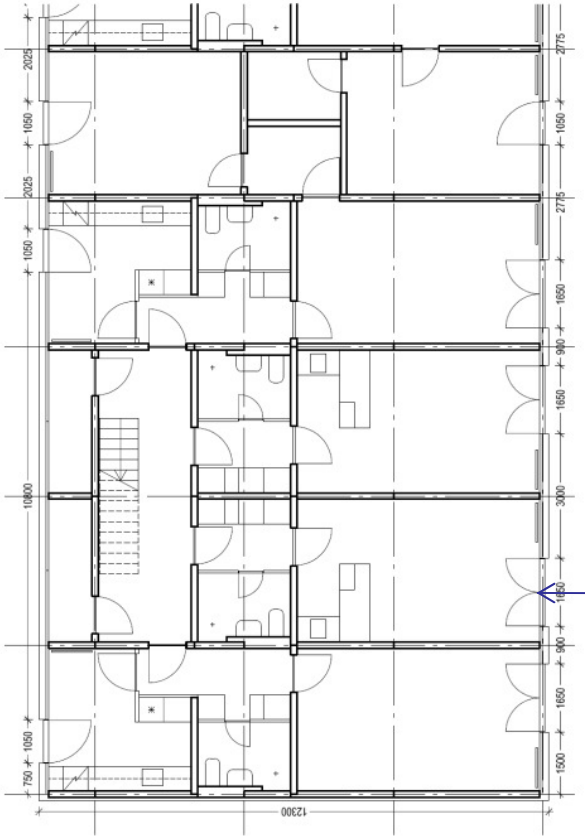
After

Before

After

Photos: NOVA5

Before



IMPROVED PLANS

As part of the renovation small flats were merged into lager flats to improve the living quality and better meet demand.

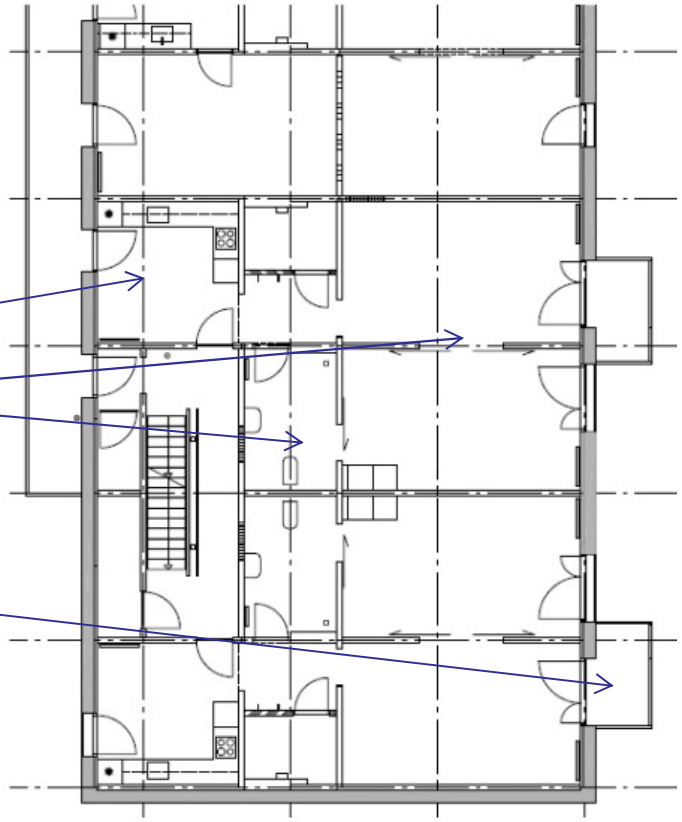
New flats were designed for elderly people (plans to the right).

Each flat was supplied with a separate kitchen, large bathroom and sliding double doors to admit more light into the room.

The flats benefit from new balconies, in contrast to the former French windows.

See the next page for photos.

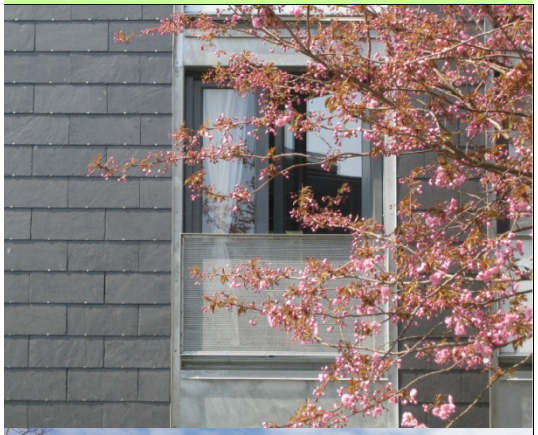
After

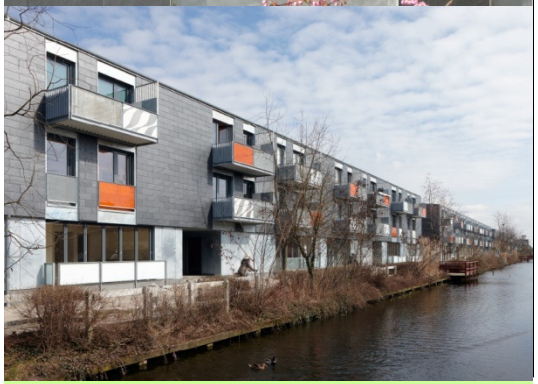


Before

After

DOORS AND DOOR OPENINGS – allowing the light to flow across the rooms





Spanish nature slate is used in the renovation in order to respect the original architecture.

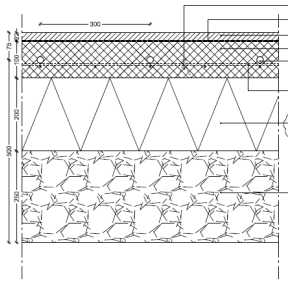
CONSTRUCTION

Floor

U-value: 0.14 W/(m²·K)

(top down)

White oiled parquet (on joists)	22 mm
Vapour barrier with felt	
Concrete (with floor heating)	100 mm
Rigid insulation (mineral wool)	200 mm
Capillary break layer	250 mm
Total	572 mm

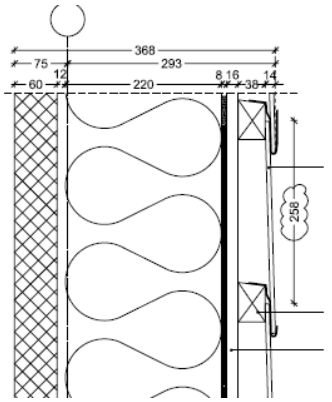


Wall

U-value: 0.19 W/(m²·K)

(interior to exterior)

Existing concrete wall	60 mm
Tolerance	12 mm
Concrete chipboard,	8 mm
Insulation/ridge	220 mm
Distance list	16 mm
Horizontal laths	38 mm
Nature slate	14 mm
Total	368 mm



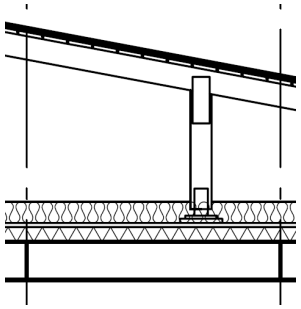
Roof

U-value: 0.19 W/(m²·K)

(inside towards attic)

Concrete slab	215 mm
Insulation	75 mm
Plywood	15 mm
Roofing felt	36 mm
Insulation	100 mm
Total	441 mm

+ attic and asphalt roofing



Summary of U-values W/(m²·K)

	Before	After
Roof*	0.19	0.19
Walls	0.36	0.19
Floor	0.52	0.14
Windows**	3.1	1.5

**Because the roof was renovated earlier it was not part of this renovation so U-values before and after are the same.*

***The U-value is an average for both windows, glass doors and balcony doors*

BUILDING SERVICES

District heating as heating supply. Mechanical ventilation in kitchen and bathroom according to Danish building regulations. Manually operated natural ventilation.

The common rooms have mechanical ventilation with rotating heat exchanger and heating surface.

RENEWABLE ENERGY USE

No use of renewable energy

ENERGY PERFORMANCE

Total transmission loss (primary energy)*

Before:	115.6 kWh/m²
After:	99 kWh/m²
Reduction:	14% (40%)

Because of a previous renovation of the roof the energy performance “before” was relatively good and therefore the reduction is not as significant as expected. It was not cost effective to insulate the roof construction further and therefore the U-value is not as low as could be expected. However, if the “before” is calculated based on original construction, 50 mm roof insulation and a new roof were insulated to 0.08 W/m²K the reduction would have increased to approximately 40%.

*Conversion factor used for district heating: 0.77 based on 70% CHP-coal and 30% oil.

INFORMATION SOURCES

Building Asscciation BoVest - www.bo-vest.dk
Nova5 architects - www.nova5.dk
Niras Consulting Engineers - www.niras.dk

Photos

All photos by NOVA5

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