1. Context + Concept

1. Main design question
   - How can a vacant office building be redeveloped into a sustainable multifunctional complex, where urban farming facilities have a significant functional, social and architectural value?

2. Proposed concept
   - Q-Port as a mixed use building in which urban farming unites people on multiple scales

3. Design principles
   - 1. Green horizontal, glass vertical
   - 2. Strong connection to 3 sides (+ activity in the plinth)
   - 3. Stronger connection substructure and superstructure
   - 4. Optimal lighting conditions for green

Amsterdam-Sloterdijk, Teleport 1:5000

3D urban situation

Current state of Q-Port vs. proposed design
2. Low-rise design

Step 1: Two grids are placed over each other. The red grid divides the space in 4, the green grid (45 degrees, perpendicular to the high-rise) in 5. The facade line is formed on the intersections of red and green.

Step 2: A green cascade roof is created to connect the roofs of the left and the right building parts. The heights of the roofs are in accordance with the existing ones. The heights of the roofs are aligned with the existing inner floors, making it possible to create bridges. The space between the roofs is visual and ensures the people on the roof can see the people in the atrium below.

Step 3: A central path from the entrance to the main transportation core is created by highering the floors of the green market and the restaurant. These floors continue to outside and become terraces along the street. The facades are orientated towards two sides, guide the street and are related to the high-rise.

Step 4: The outside terraces are further defined by the overhanging roof construction (a steel box profile grid), which is supported by steel tree columns (red) and vertical trusses along the facade (green). The overhang isn’t filled, to prevent shading on the green planters behind the facade.

Step 5: The roof construction is filled with green roof elements and on all 4 floors a route is created along the offices, bridges in the atrium void (along the green planter facade) and the roof. On two corners of the roofs, special terraces are made for the office people.

2. Construction

The restaurant is heated with floor heating on the ground floor (connected to the existing heat and cold storage of Q-Port). From the ceiling of the first floor of the restaurant, fresh hot air is blown in by a ventilation tube, which is connected through the core to the existing climate installation of Q-Port on floor 5. The other part of the hall is not climatised.

The restaurant is cooled with floor cooling on the ground floor (connected to the existing heat and cold storage of Q-Port). From the ceiling of the first floor of the restaurant, fresh cold air is blown in by a ventilation tube, which is connected through the core to the existing climate installation of Q-Port on floor 5. With opening doors in the facade, in the interior and in the roof, also natural ventilation is stimulated in the hall. The hall becomes one climate zone.
3. High-rise design

1. Design

2. Construction

3. Climatisation and installations

- Winter

- Summer

Floor 5

‘Living’

Floor 6

‘Dining’

Scale 1:200

Scale 1:300

Floor 7, 11

‘Dining’

Floor 8, 12

‘Living’

Floor 9, 13

‘Living’

Floor 10

‘Dining’

Floor 14

‘Dining’

Floor 15

‘Dining’

Floor 16 (Roof)

‘Dining’

Rooftop

The green facade system consists of a climate control system, energy efficient LED illumination, automatic irrigation system for food production and sunshading, and a ventilation system in the suspended ceilings and the entrance. An efficient sewerage and water pipe system is located in the suspended ceilings in the corridor. Everything is transported to/from a main tube in the main transportation core.

1) Every floor plan has an open space such as a greenhouse garden at the south and a corridor at the north.

2) The green double facade space is used to connect two floors with each other, to create maisonettes. The corridor, for every two floors one, is shifted to the middle, with interior allotment gardens for the residents next to it.

3) The apartments are mirrored to each other, with the aim to connect the gardens and so the people. Also the greenhouse cafe on the top gets connected with the floor below.

Except from the lowest floor, which has 5, all floors contain 6 residences. All 18 apartments in total.

These openings are made of prefabricated construction. The following are made, which are filled up by steel windows and doors from the existing facades.

1. Wooden sandwich panel walls (340 mm) are connected to the existing facade, from which 3 window parts are cut out.

2. A wooden sandwich panel floor (370 mm, floor convector integrated) is placed on and connected to the walls.

3. The holes in the existing facade are filled with folding glass doors (2x) and a fire door in the direction of the exit of the apartment. The wooden stairs are placed.

4. The glass facade with sliding green planters (manually controllable) for food production and sunshading is placed. The facade also has sliding glass doors, behind the balustrade.

In the winter fresh cold air is preheated by the floor convectors in the new facade floor, which heats this space. The kitchen and living room are heated by radiators. The bedroom is heated with a ClimaRad, a radiator which preheats fresh cold air from the north facade and filters dirty hot air out again.

In the summer the south facade is ventilated and cooled by opening the sliding doors and the openable windows on the top. The stack effect ventilates the adjacent spaces (kitchen, living room) and the greenhouse provides evaporative cooling. The bedroom is cooled by ventilation from the existing windows.

The allotment garden space has a special climate control system: energy efficient LED lamps provide light, an automated irrigation system provides water, a ventilation system in the suspended ceilings, and a ventilation system in the suspended ceilings controls the air. Also the sewerage and water pipes for the residences are located in the suspended ceilings in the corridor. Everything is transported to/from a main tube in the main transportation core.
4. Facades + Section

Urban farming concept

Food production greenhouse - Public (400 m²)
Café - Public (400 m²)
29 residences (maisons) - Private:
Type 1 - 107 m² (4x)
Type 2 - 162 m² (10x)
Type 3 - 137 m² (5x)
Type 4 - 158 m² (5x)
Type 5 - 153 m² (5x)
Total: 4288 m² (29x)

Collective allotment gardens - Semi-private (1500 m²)

Green market - Public (300 m²)
Restaurant/canteen - Public (1150 m²)
Offices - Private (5500 m²)
Parking - Private (3500 m² - 123 spaces)

VertiCrop greenhouse - 400 m²
Production: 138 kg leafy greens/day
Consumers potential: 2300 people/day
Control: Maintenance team

Design: Café + Restaurant + Market + City markets

Collective allotment gardens - 270 m²
Production: various vegetables, fruits, herbs
Consumers potential: 18 people/day/year
Control: Residents + Maintenance team

Design: Personal use (+ Market)

Vertically sliding hydroponic facade planters - 15 m²/house
Production: small vegetables/crops, herbs, peppers
Consumers potential: 1 person/day/year
Control: Residents

Design: Personal use (+ Market)

Passive' green roofs - 2000 m²
Production: various vegetables, fruits, herbs
Consumers potential: 130 people/day/year
Control: Maintenance team

Design: Café + Restaurant + Market

'Active' green roofs - 600 m²
Production: various vegetables, fruits, herbs
Consumers potential: 40 people/day/year
Control: Office people + Maintenance team

Design: Personal use (+ Market)

Fixed facade planters, hydroponic + soil - 35 m²
Production: small vegetables/crops, herbs, peppers
Consumers potential: 3 people/day/year
Control: Office people + Maintenance team

Design: Personal use (+ Market)

Consumers potential: amount of people that can be provided completely for their daily vegetable/fruit need.