Project title: New Grønmo park

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1. Site background

Waste material collection centers layout in Oslo

Facilities around Grønmo
Grønmo is located in the south eastern part of Oslo, in the district of Søndre Nordstrand, approximately 12km southeast of the Oslo Centre. The size of the project site is around 42.5 hectar, approximately 1.5 times the size of the Frogner Park. This area is close to Sørliaveien and E6 highway on the west and Grønmo golf course on the north. On the south, east and partly north, this area is surrounded by Østmarka. It is an important gateway to the forest since many hiking trails start from here. It serves as good meeting places between the noisy city life and the quiet forest.

The district is highly multi cultural with 600 000 inhabitants. 47.7% are immigrants or have parents who are immigrants. 30% are less than 20 years old and 6% are more than 67 years old.

The Grønmo landfilled used to be the largest one in Northern Europe. Having functioned as Oslo’s main spot for the unwanted since 1969, Grønmo covered over 8 million cubic meters of trash, more than 3 times of the volume of the Cheops pyramid. It was an enormous, artificial landscape built up from household waste, industrial waste, asbestos, hydroxide sludge, fly ash and etc.. It was closed in 2009. Today the waste is covered by a thin, green dressed, top cover preventing surface water from reaching in. Over 200 gas wells are built in Grønmo, making sure the continuous methane are directed transported into the nearby incinerator rather than leak out in the open air due to the anaerobic digestion of the waste.

Grønmo was entirely covered by forest in the past. The landscape within the area is hilly and characterised by low hills from the period of waste disposal. Part of the outskirts of the area are forest areas, where vegetation is high density with pine trees and some hardwoods. The landfilled area is partly grassy. It could rather be regarded as ugly scar in the beautiful natural Marka forest.

Right now, after the closure of the landfilled place, there are a recycling station, a sorting area and a composting plant on site.

Grønmo is one of the few areas in Oslo where it is possible to set up efficient area for the future oriented waste management.
2. Architectural vision

In the new Grønmo park, Grønmo will be strengthened as an attractive gateway to Østmarka; Grønmo will be a meeting place with good recreational and natural experiences for all age groups, year-round; Through different experiences, Grønmo will inspire public for greater environmental commitment.

On the level of architecture and on the level of landscape, Gronmo will be constructed as a new meeting area between the natural environment and the man-made artificial landscape. Gronmo will be given new identity through good coexistence between recreation, learning, municipal engineering facilities and new recycle material treatment.
3. Program

A. Visitor center, 810 m²

- Restaurant and Cafe
- Small auditorium
- Small exhibition space
- Office

B. 2nd hand flea market, 1336 m²

- Outside space: temporary market space
- Inside space: market shops
- offices
- meeting rooms
- storage
- equipment rooms

C. Material recycling area, 9100 m²

- Outside space: roof
- Inside space: material collection containers area
- administration office
- storage
- equipment rooms

D. Composting area, 21385 m²

- Operational equipment space
- Curing and compost storage
- Raw material storage
- Composting pad

E. Material sorting and treatment area, 9700 m²

- Outside space: roof
- Inside space: Material sorting and treatment area
- Operational office

F. Landscape areas

- Public area: parking area
- scenery platform
- gathering space
- skating plate
- landfilled park

- Infrastructural landscape: warm water pond
- oxidation pond
- enhancement pond
- leachate water pond
- clean water pond
- wetland area

List of new activities in Grønmo

- Kids’ learning path
- 2nd hand flea market
- Compost soil market
- Waste material recycling
- Birds watching
- Scenery viewing
- Cafe & restaurant
- Composting visit
- Hiking
- Bicycle group meeting
- Campfire festival

- Winter activities: Christmas tree market
  - skiing
  - skating

- Summer activities: picnic
  - swimming
  - fruit pick up
  - kite festival
4. Scientific research

Research about composting process and organization

- Diverted runoff
- Diversion channel and dike
- Composting pad (pad slope graded to 2-4%)
- Infiltration area
- Pad runoff collection channel
- Building pond or clarification area
- Raw material storage
- Curing and compost storage
- Diverted runoff
- Dike
- Diversion channel and dike
- Diverted runoff

Research about the landfill

- Primary material
- Mixing
- Raw material storage
- Window or pile formation
- Repetitive operation
  - Active composting
    - Aeration, turning, monitoring, ordoe control, and so on
  - Curing
  - Oversized materials from screen
  - Screening or shredding
  - Bagging and shipping
- Compost storage
- End use

- Amendments
- Sorting
- Grinding or shredding

- Planting soil
- Barrier protection material
- Landfill cap
- Landfill gas
- Gas vent layer
- Impermeable plastic liner
- Drainage layer
- Intermediate soil layer
- Trash
- Leachate pipe
- Infiltration of sewage into groundwater
- Pre-treatment purification
- Oslo Fjord
- Drying stroke

Picture source: New York City Sanitation Department
This project aims to transform the Gronmo area with large existing rubbish collection zones into a recreational park. At the same time, the current rubbish functions, material recycling, material composting and material sorting will be kept and be converted sustainable within the idea of the public park. The whole Gronmo area is around 42.5 hectar. This transformation will reaffirm the qualities of river, forest, field site with the concept to infill new experiences into the area. There could be new activities in this area, including recycling learning classroom, birds watching, hiking, campfire festival, bicycle group gathering, picnic, Christmas tree market etc. This transformation project includes new organisation system of material collection, 2nd hand market, new organisation system of material sorting, new organisation system of material composting, visitor centre and new system of contaminated water filtering. To be able to connect the area to the existing morphology and natural environment of South eastern of Oslo, this project is part of the effort to turn the contaminated areas around Oslo into a new landscape scenery. The task of the thesis is on the crossing section of landscape design, architecture infrastructure design and architecture design.
Design concept: boundary around the site

Design concept: deviation about the function zones

Design concept: man-made slope

Design concept: inserted functions inside of the man-made landscape
6. Architectural drawings
1. Material recycling building
2. 2nd hand flea market
3. Material sorting and treatment building
4. Visitor center
5. Scenery platform
6. Composting building
Master plan

01. Parking for public
02. Material recycling building
03. Parking for staff in material recycling building
04. 2nd hand flea market
05. Parking for 2nd hand flea market
06. Entrance for material sorting and treatment building
07. Material sorting and treatment building
08. Exit for material sorting and treatment building
09. Operational office
10. Toilet
11. Wheelchair Accessible restroom
12. Equipment room
13. Warm clean water pond
14. Visitor center
15. Man-made scenery platform
16. Forest
17. Oxidation pond
18. Oxidation pond
19. Enhancement pond
20. Enhancement pond
21. Leachate water pond
22. Wetland pollution collection area
23. Tunnel for composting
24. Operational equipment space
25. Raw material storage
26. Composting pad
27. Curing and compost storage
Material recycling building plan

01. Entrance for private cars
02. Entrance for trucks
03. Collection area for Hazardous waste
04. Collection Container for Plaster
05. Collection Container for Mattresses
06. Collection Container for Impregnated wood
07. Collection Container for Metal
08. Collection Container for Plastic
09. Collection Container for Waste electricity equipments, appliances, cables
10. Collection Container for cardboard and paper
11. Collection Container for combustion
12. Collection Container for normal wood
13. Collection Container for hard shell
14. Collection Container for vinyl flooring and vinyl insulation
15. Collection Container for garden waste for composting
16. Collection Container for fluorescent lights
17. Collection Container for glass
18. Containers collection and storage area
19. Tracks for private cars
20. Exhibition and guidance area
21. Administration office and supervision area
22. Toilet
23. Wheelchair accessible restroom
24. Equipment room
25. Exit for trucks
26. Exit for private cars

Material recycling building section
Material recycling building interior view
Plantings
Soil
Filter fabric
Resevoir layer
Moisture-retention layer
Aeration layer
3 layers of xps rigid insulation; joints staggered horiz and vert
Drainage layer
Root barrier
Protection course
Air, water, vapour barrier
250mm concrete structure
25mm metal furring
12mm gypsum board (painted on interior side)

Mullion
Double glazed curtain wall
100mm ventilation space
Zinc panel cladding
50mm air space
12mm gypsum board
100mm fiberglass batt insulation
Air, water and vapour barrier
250mm concrete structure
Air, water and vapour barrier
100mm fiberglass batt insulation

Exterior
Interior

3mm aluminum papapet capping
Fiberglass batt insulation
Metal flashing
Sealant bead
Perforated panel
Aluminum ventilation flaps
Sealant bead
Metal flashing
Retention tee

Detail
1:20
Material sorting and treatment building plan

01. Entrance for trucks
02. Material sorting and treatment area
03. Tracks for trucks
04. Entrance for staff
05. Administration office
06. Toilet
07. Wheelchair accessible restroom
08. Equipment room
09. Exit for trucks

Material sorting and treatment building section
1. Small auditorium
2. Kitchen
3. Restaurant and Cafe
4. Toilet
5. Small exhibition space
6. Entrance
7. Platform
8. Temporary market space (Christmas tree market, compost soil market)
9. Entrance
10. Lobby and Reception
11. 2nd hand market space
12. Storage
13. Workshop and repair room
14. Management office
15. Wheelchair Accessible restroom
16. Toilet
17. Kitchen
18. Cafe
19. Outside cafe
Wetland area view
7. Model photos

1:3000 Site model
1:200 2nd hand flea market model