

NKS, New Karolinska Solna

-A new university hospital in Stockholm

Brandkonsulten AB

- Founded by Kjell Fallqvist in 1990
- 27 Fire safety engineers
- Office in Stockholm
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New Karolinska Solna

- The New Karolinska Solna is the largest project ever by the Stockholm County Council as well as being one of the largest and most innovative healthcare projects worldwide.

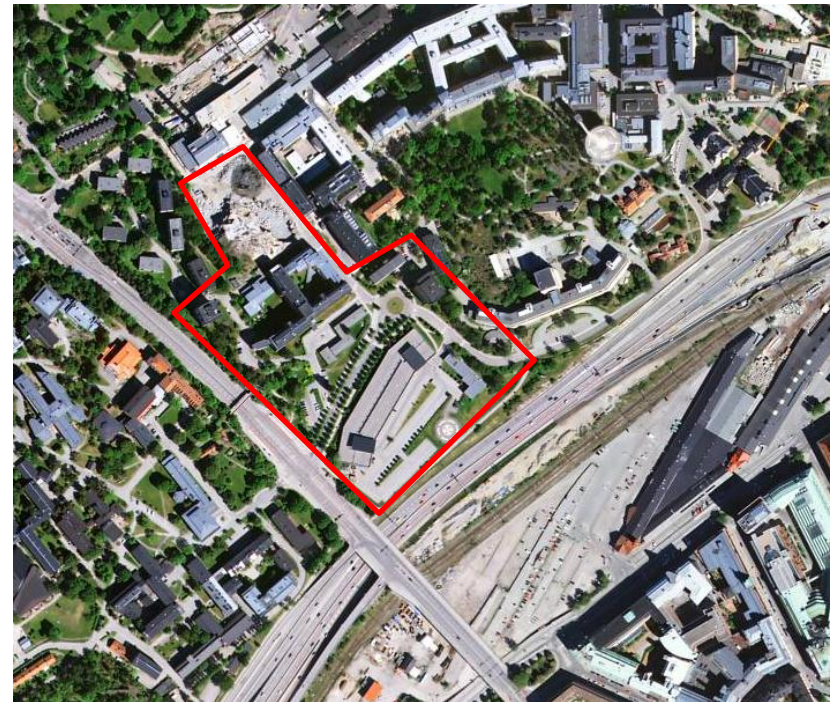
The New Karolinska Solna university hospital will provide specialized healthcare in close collaboration with education and research. The new hospital is planned to open in 2016.

The new university hospital shall also contribute to the goal of the Stockholm region as a world-leader in life sciences.

New Karolinska Solna



New Karolinska Solna



NKS- short facts

- The hospital will be highly specialised and with a focus on having an effective flow of patients and high patient safety. There are for instance only single rooms and a close link between medical care, research and education.
- The hospital floor area (BTA) is roughly 320 000 sq m incl a patient hotel.
- The hospital buildings are 9-11 floors + a helipad (for two helicopters) and 2 basement levels and car park and goods handling area.
- There are 550 patient beds (of which 69 for intensive care, 51 intermediate care and 63 pre-/postop spaces). On top of that the hospital has can handle 100 "day care" patients and there are an additional 100 rooms in the patient hotel.
- 36 surgical rooms, including three "hybrid surgical rooms", 8 radiation rooms and 165 treating rooms
- The building cost is 14,5 billion sek (~1,7 billion euro).
- The hospital opens in 2016 and will be fully completed in 2017.
- Largest building site in Europe(?). There are around 2000 ccnstruction workers on site.

New Karolinska Solna

The New Karolinska Solna University Hospital has been subject to the procurement process as a PPP project.

Establishing a new hospital with a PPP solution (Private Public Partnership) is a method developed in the UK and successfully implemented in several other countries around the world.

The agreement does not only include the construction of the hospital but also the technical operation and maintenance of the hospital and maintenance of the hospital for 25 years.

SHP- Swedish Hospital Partners (Skanska + Innisfree) won the bid from SLL. SHP have an agreement with SHC- Skanska Health Care (Skanska Sweden + Skanska UK) for the construction of the hospital and with Coor (Skanska owned...) for the maintenance of the hospital.

White and Tengbom are joint

New Karolinska Solna

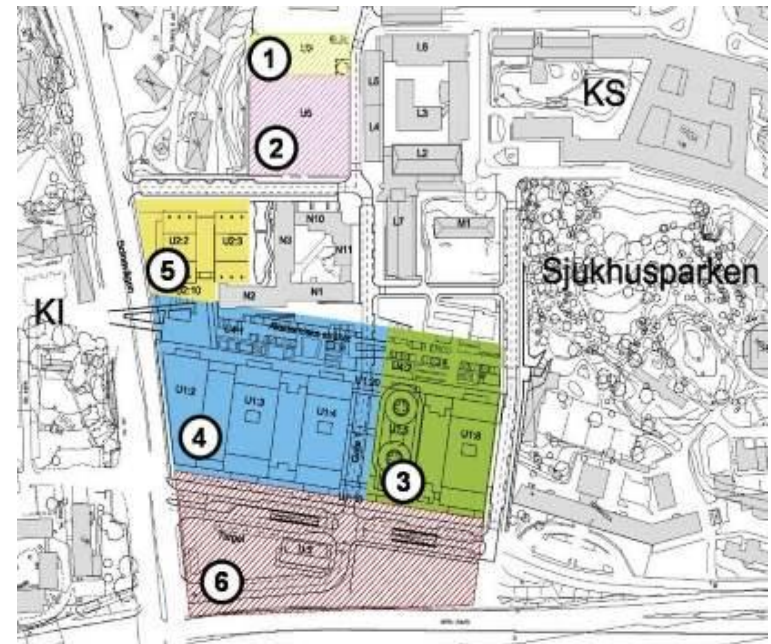
Timeframe for completion

BUILDING

1. Technological Building
2. Garage Car Park
3. Hospital Part 1
4. Hospital Part 2
5. Research Laboratory
6. Patient hotel and garage

COMPLETION:

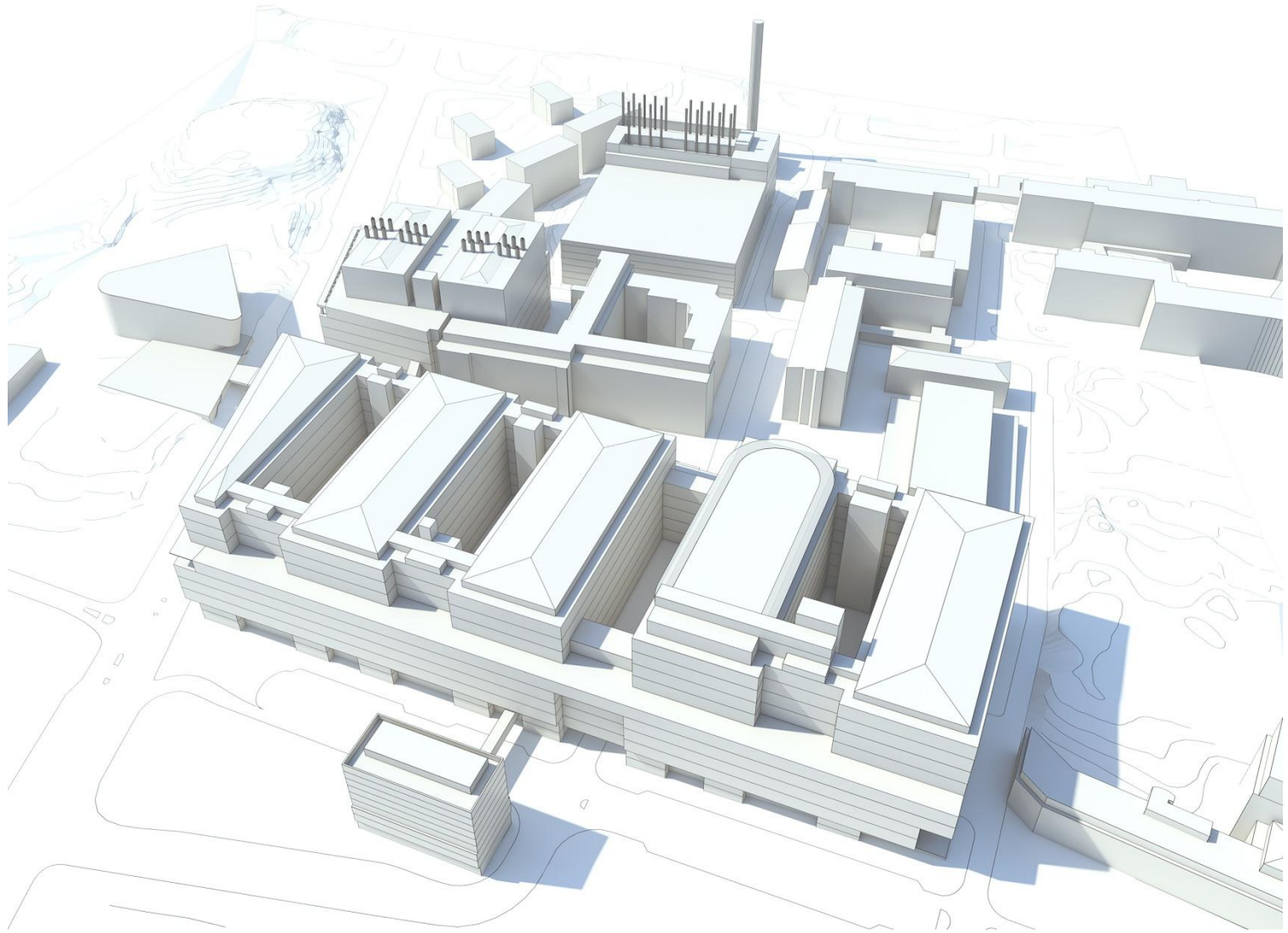
- May 2014
December 2012
Start of Operations 2016
October 2017
September 2016
July 2016







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Construction site 120614- Car park and technical building



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Construction site 120614- Main hospital buildings



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- Brandkonsulten AB:s role
 - Validation of proposed fire safety design to see if it fulfill legislation and demands from the orderer
 - Propose alternative solutions for the fire safety design which fulfill above and who gives a more robust fire protection over time
 - Verify alternative solutions
 - Outside expert in fire protection
- Brandkonsulten AB:s goal
 - NKS will have a fire protection which is cost effective, fulfill legislation and with a small operation cost
- Important for us to fulfill our goal
 - Coordination thru fire meetings
 - Dialogue with involved consultants and Skanska
 - Dialogue with other stakeholders such as the fire department

Designing fire safety in NKS

- Swedish building code (BBR 16)
- PPP-agreement (between Skanska and NKS)
 - Technical standards
 - Locum guidances (joint technical standards for hospitals within Stockholm council- Greater-Stockholm)
- Redundancy requirements (part of the PPP-agreement)

Designing fire safety in NKS

- Sprinkler (except open car park and lift shafts)
- Care rooms with potential non-mobile patients are separate fire compartments (EI 60)
(This includes bedrooms, operations rooms, pre-/postop, surgical rooms, radiationbunkers, dialysis etc.)
- Doors EW 30 (EI 30)
- Horizontal escape in two directions
- Ventilation system in operation as part of the protection against smoke spread via the ventilation system (fire rated "back valves", Hagab or Bevent-Rasch, on the supply air.

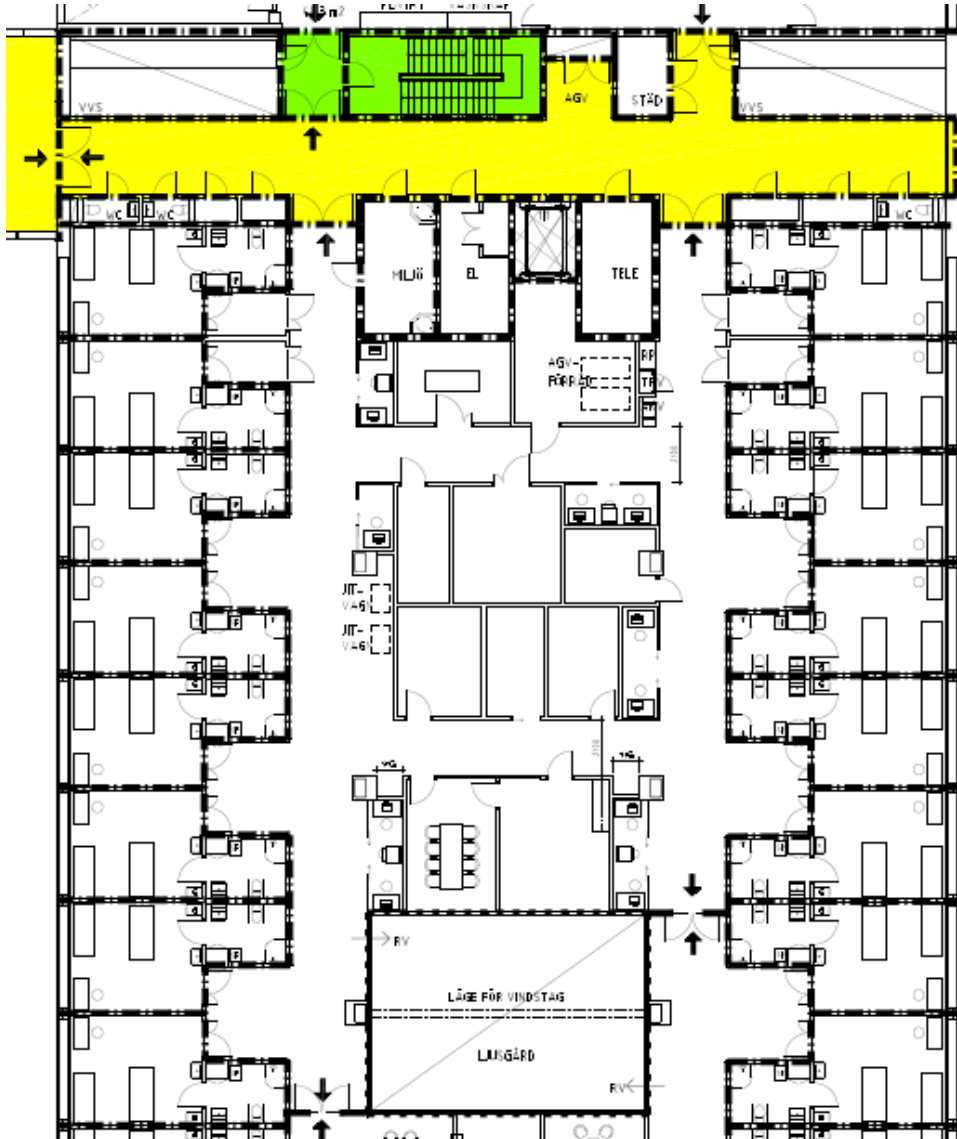
Performance based design (examples)

- Analytical verification of the fire safety design of areas where patients are treated.
- Glass between patient wards and atria, U1
- Glass to liftshafts and between lobby and staircase
- Fire compartments open in three stories, U1
- Structure fire safety protection R60
- Analysis of "synergi effects"
- Analytical design of entrance halls and assembly areas.

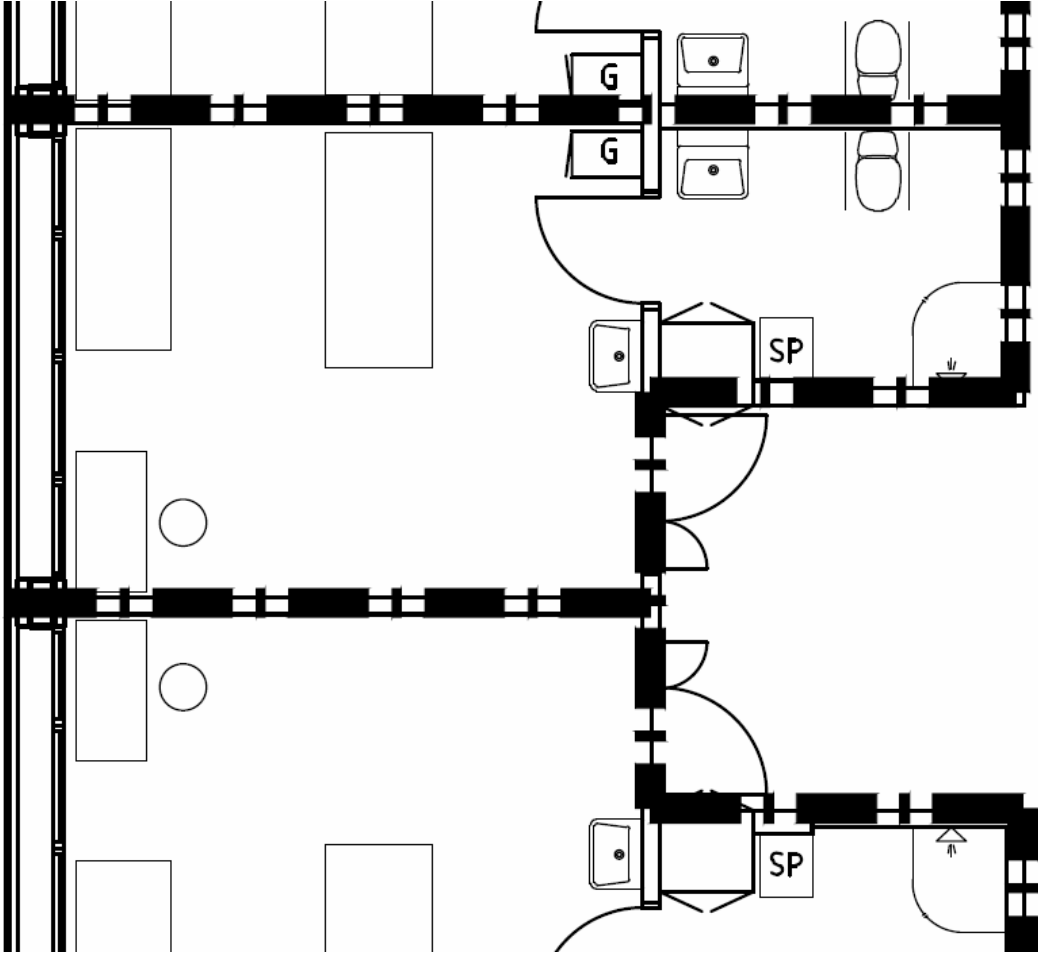
Fire safety for patients



Fire safety for patients

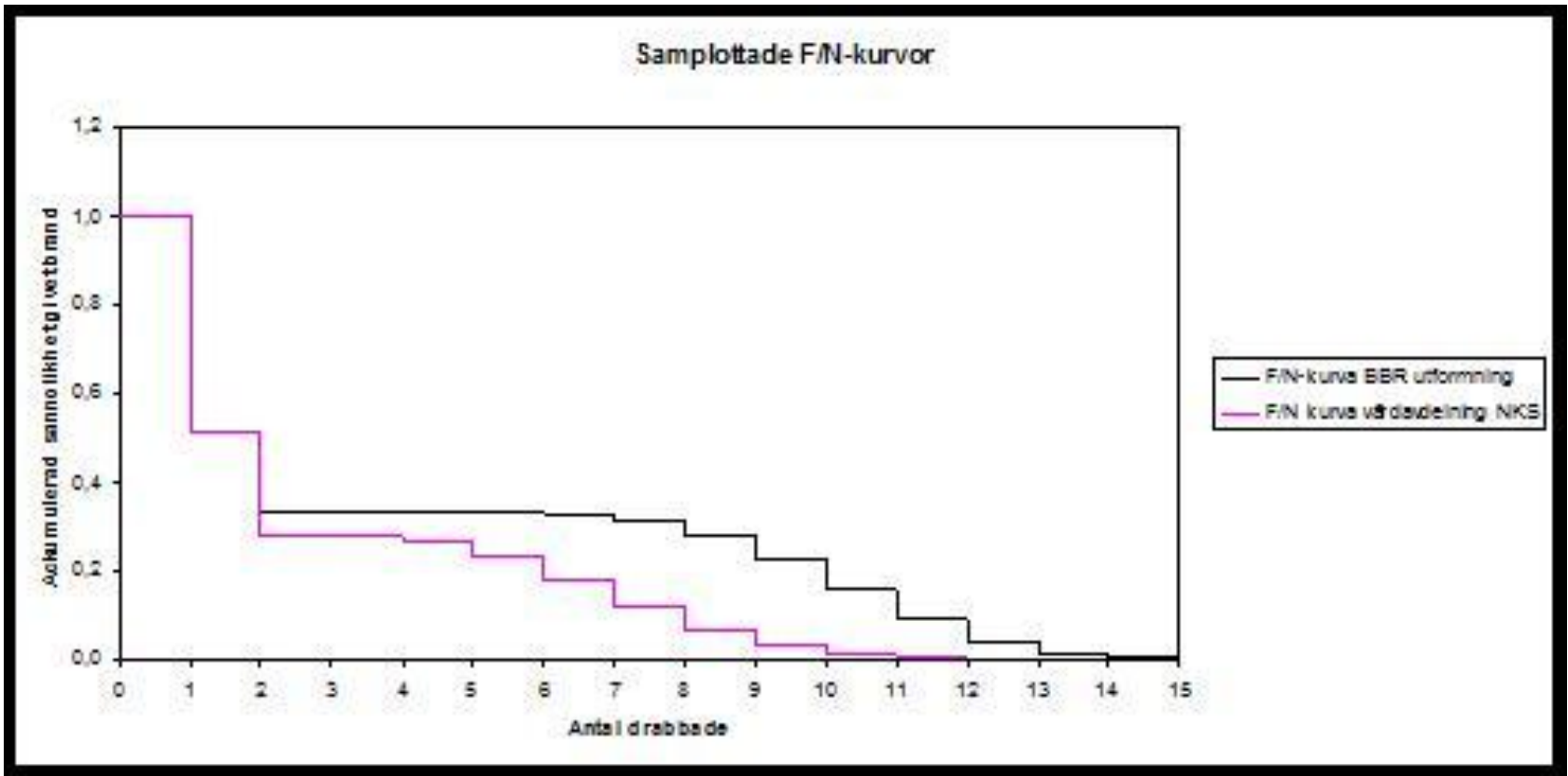


Fire safety for patients



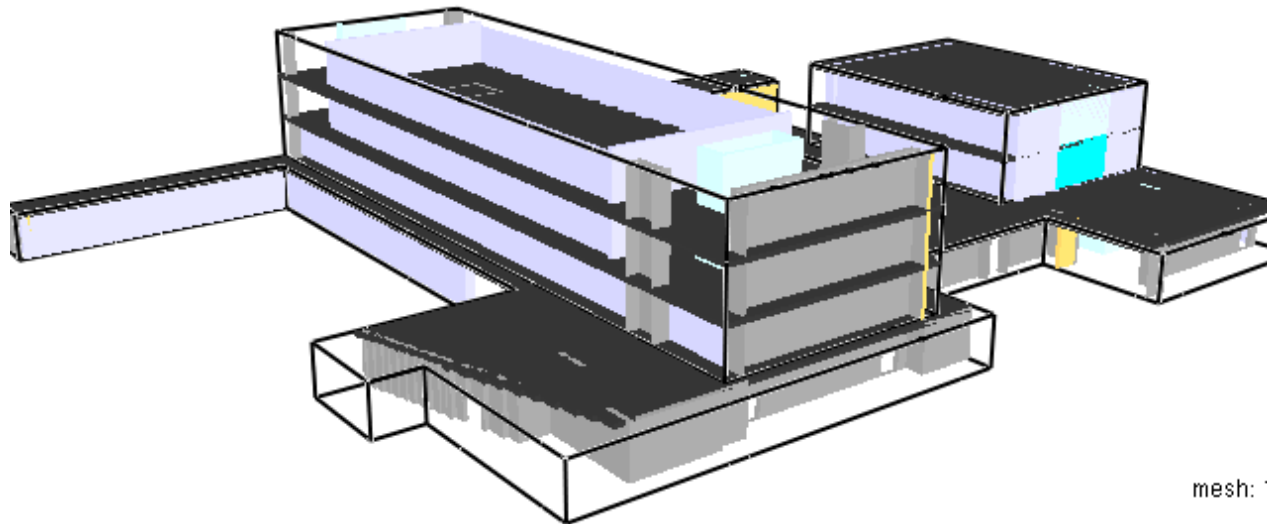
Fire safety for patients

Comperative analysis- Prescriptive design-NKS-design



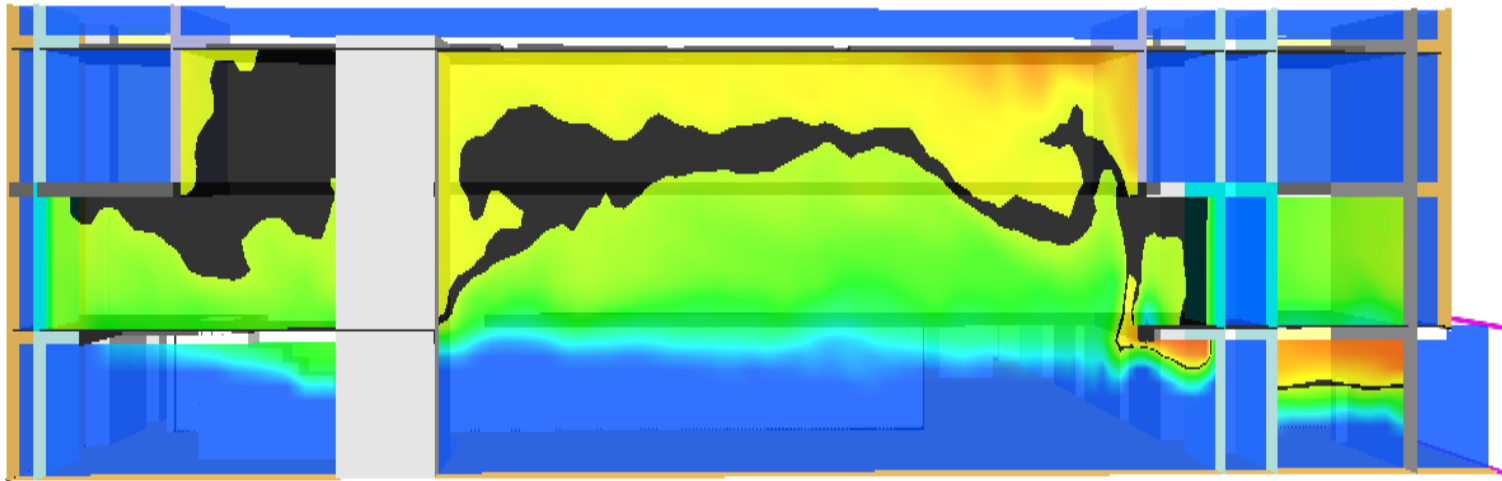
Fire safety for visitors

Smokeyview 5.4.8 - Dec 3 2009

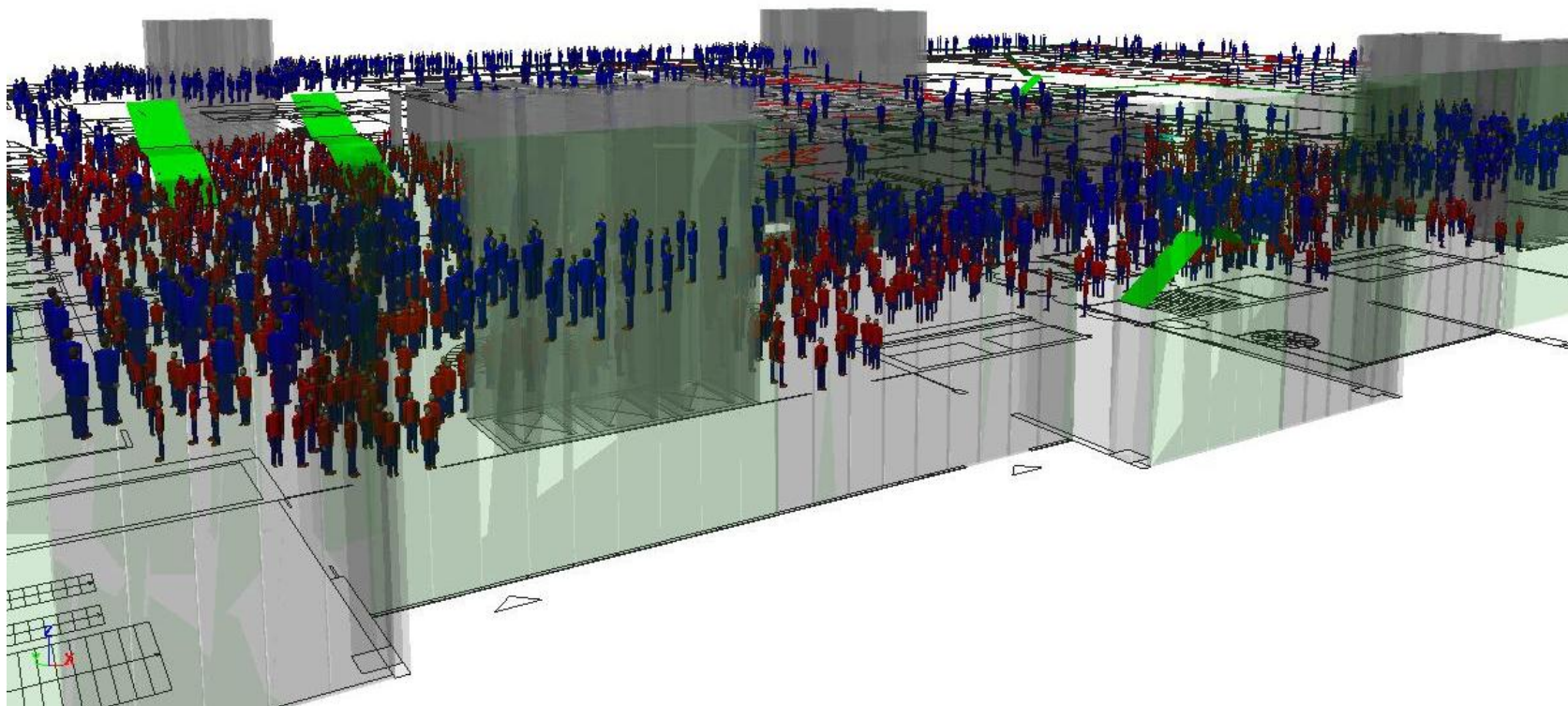


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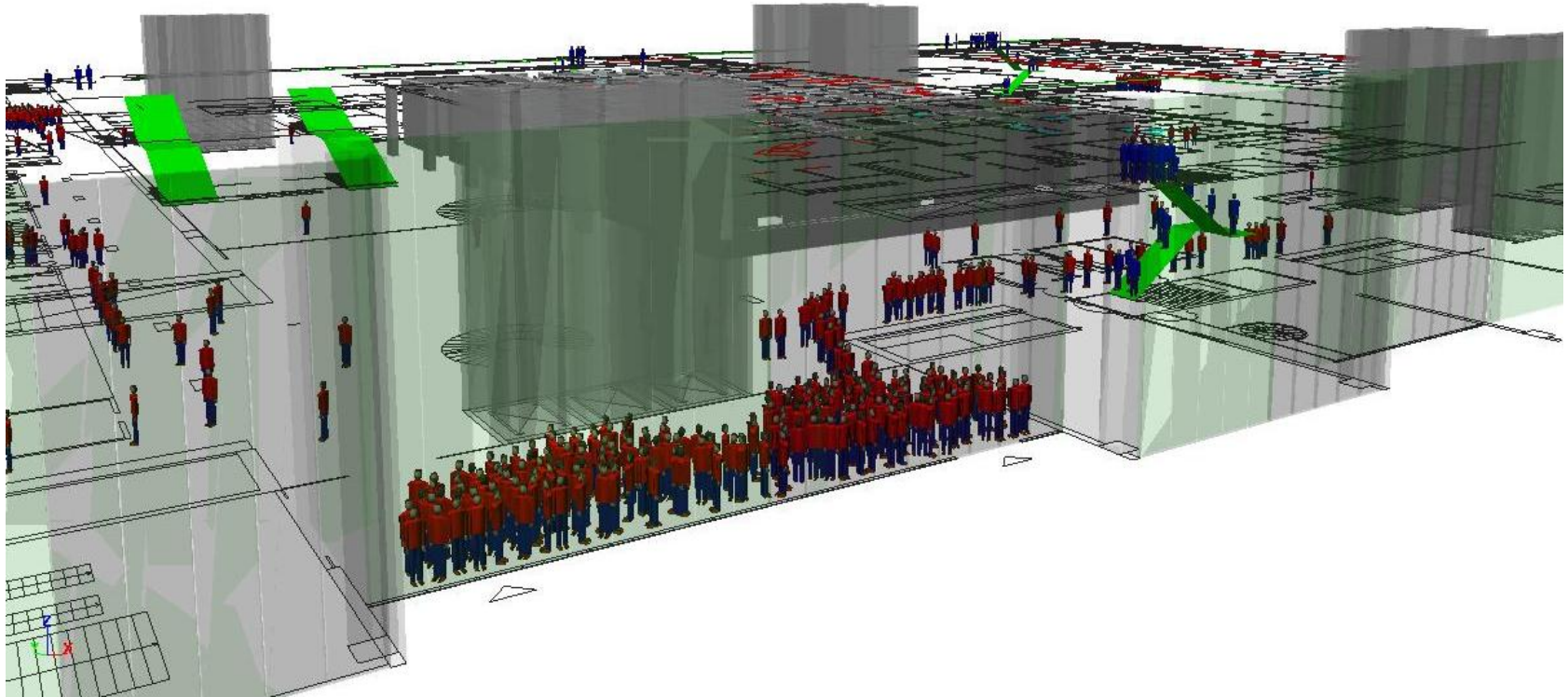
Fire safety for visitors



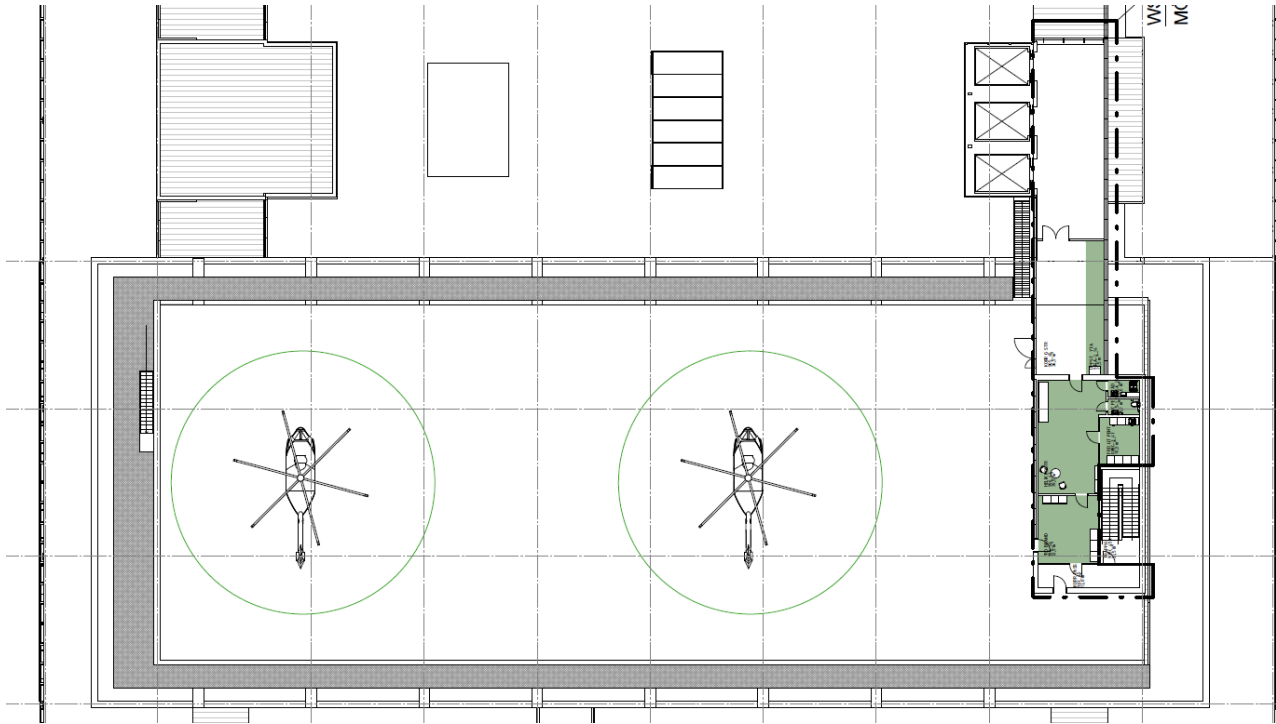
Fire safety for visitors



Fire safety for visitors



Fire safety heli pad



- According to "airport regulations"
- Manually activated foam extinguishing system

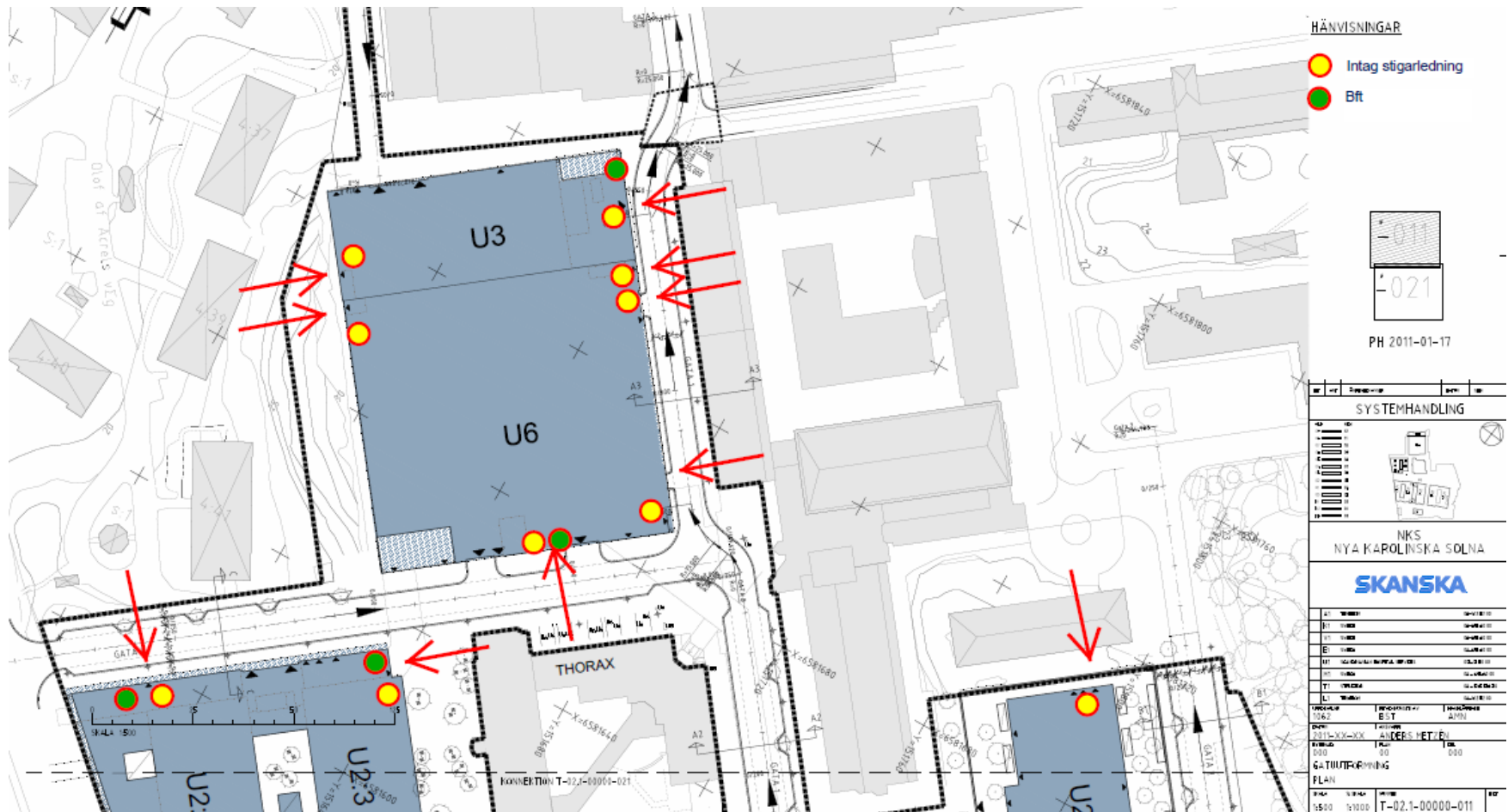
Fire safety for disabled

- Horizontal escape
- Refuge place (place of relative safety),
 - All escape routes with stairs where disabled might have access are fitted with a refuge place within either the staircase or the fire lobby (that will hold at least one wheelchair without impeding the width of the escape route) . Each refuge place has a call button with two-way communication.
- Fire alarm signal are both acoustic and optical
- Access to personnel
- 50 N is maximum allowed force needed to open a door in or to an escape route (normally maximum force is set to 70 N for the lever and 130 N for the door).

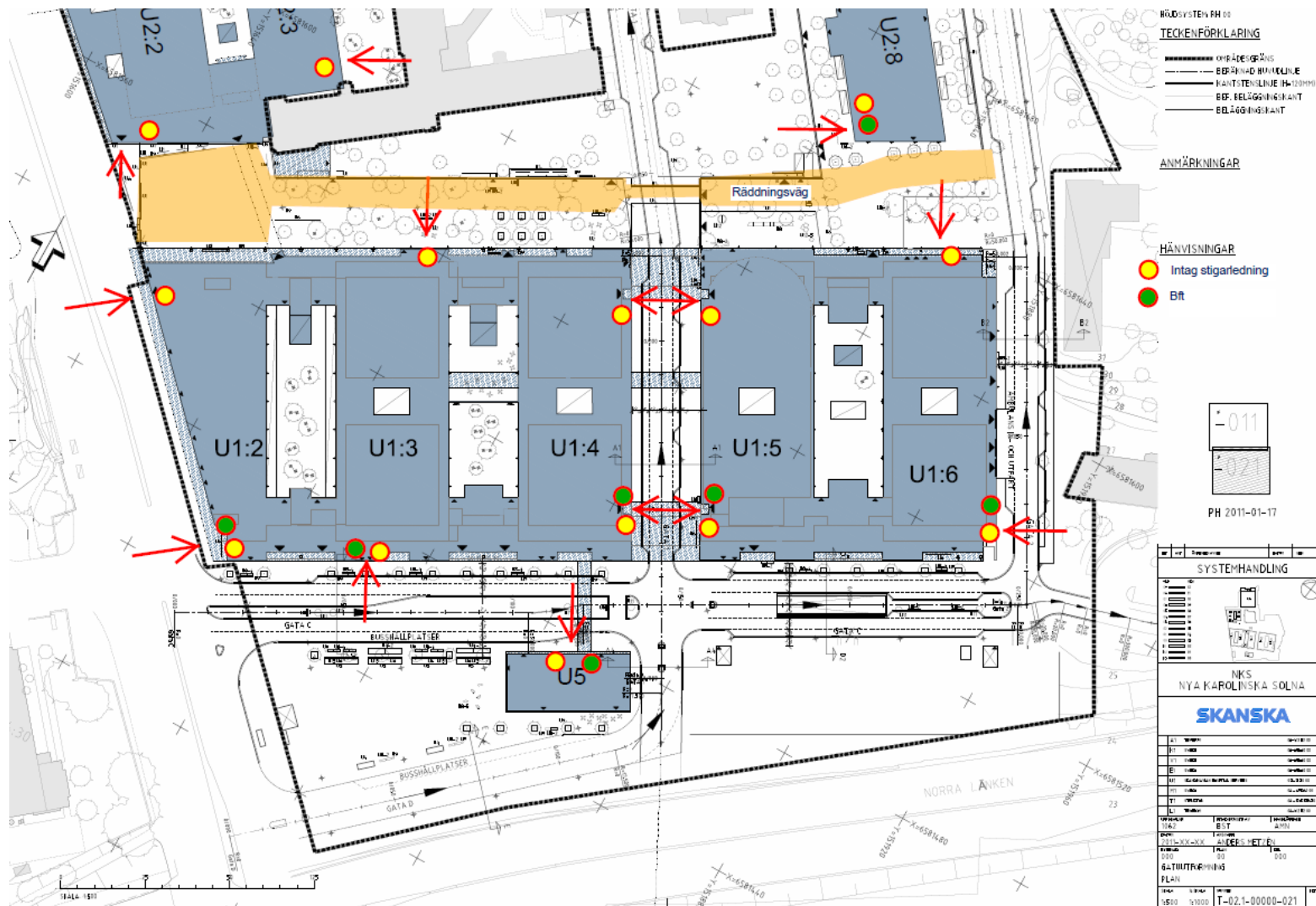
Access and provisions for the fire service

- Fire alarm connected to the fire service (via SOS Alarm)
- Full overview of the entire hospital (all technical systems and CCTV) from the alarm- and operation centre in the technical building. So far the fire service has shown little interest in using this...
- Smoke ventilation for all areas without openable doors/windows, e.g. underground areas (culverts etc)
- Dry risers in all access staircases
- Full radio access in the hospital (digital)
- Early and continuous dialogue with StorStockholm fire service, e.g. position of entry points, alarm addresses etc
- Plans for fire/rescue operations (ongoing)

Access and provisions for the fire service



Access and provisions for the fire service



Other features and risks

- AGV
- Refuse collection system
- PTS (pneumatic tube system)
- Diesel storage and bioethanol (geothermal heat system)
- Other flammable liquids and gases
- Oxygen tanks
- Vulnerability study

Phase completion

- Smoke ventilation
- Dry risers

Fire tender route

- Emergency exits

