



**PAUL WURTH**  
**GEPROLUX**



# STRATEGIC PLANNING OF HOSPITALS ACCORDING TO LIFE CYCLES



**Design & Health**  
WORLD CONGRESS & EXHIBITION

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## WHO ARE WE?



**Heinrich Limacher**

Healthcare Consultant



**Jean-Marc Zahnen**

Project Manager, Paul Wurth Geprolux



Definition of  
project objectives  
and strategies

Feasibility  
studies

Organisation of  
architectural  
contest

Operational &  
functional  
concepts

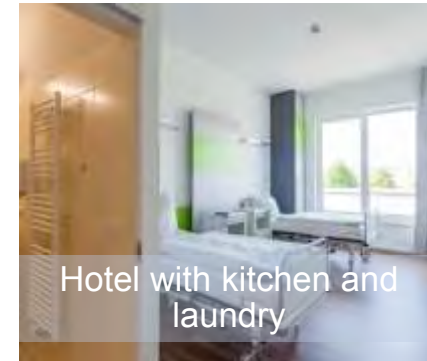
Detailed  
space allocation  
planning

Healthcare  
Consulting

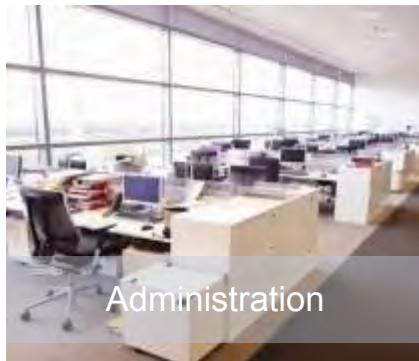
## THE HOSPITAL – A VERY SPECIAL BUILDING!



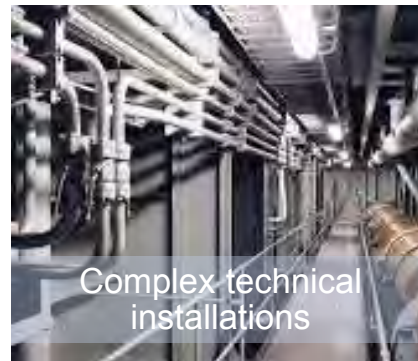
Complex examination and treatment areas



Hotel with kitchen and laundry



Administration



Complex technical installations



Sophisticated logistics

→ Different operational requirements!

→ Different technological and functional evolution!

## TODAY'S SITUATION OF HEALTHCARE INFRASTRUCTURES

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- Hospitals have grown over a long time (often not very structured)
- Large investments have been and are being made continually

### Changing conditions

- New patient needs
- Evolution in medicine, new examination and treatment methods
- Technological progress
- Reduction of the need for beds, increase of ambulatory treatments

**→ Restructuring is necessary in even shorter time intervals**

## IMPACT ON HOSPITAL PLANNING

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- High demands on spatial and structural design
- Quickly changing spatial needs and requirements

### Current problems

- Offer and arrangement of rooms are insufficient
- Buildings need to be repaired and renewed
- The life cycle of a buildings technical installations and its exterior casing has expired
- Room sizes and standard beds are nowadays inadequate
- Reconstruction during operation causes too big emissions
- Old location is not developable

## STRUCTURAL DIFFICULTIES IN TODAY'S HOSPITALS

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### Different life cycles

- Life cycle building: > 40 years
  - Life cycles of individual functional units:
    - Highly installed units: appr. 20-25 years
    - Examination and treatment units: appr. 30-35 years
    - Care areas/bed units: appr. 30-35 years
    - Supply and disposal: appr. 30-40 years
    - Administration: appr. 30-40 years
  - Life cycles of buildings and the included functional units are not identical!
- The life cycle of the whole complex is determined by the building part with the shortest service time!**

## STRUCTURAL DIFFICULTIES IN TODAY'S HOSPITALS

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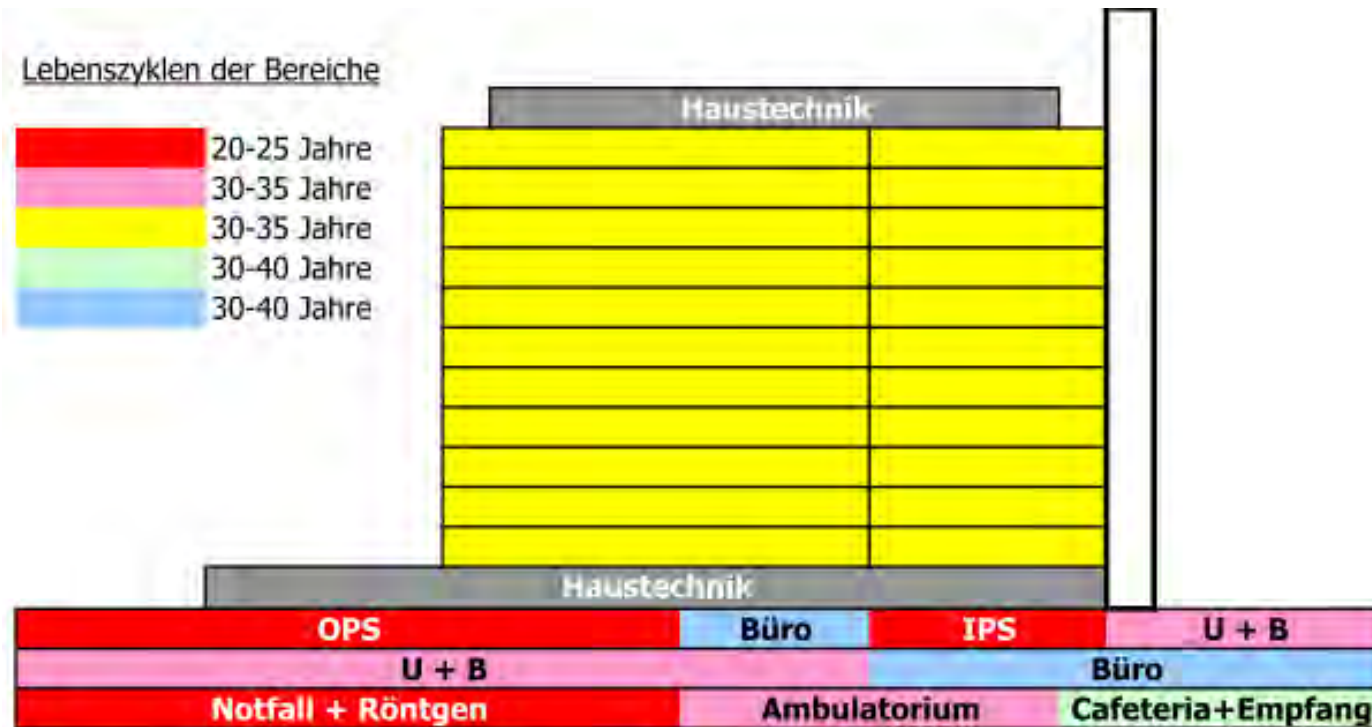
### Structural mixture

- Vertical and horizontal mixing of units with different life cycles
- Still operational units must be shut down for the renovation of other areas

→ **Cost-intensive in the long run!**

## STRUCTURAL DIFFICULTIES IN TODAY'S HOSPITALS

### EXAMPLE





## CONSEQUENCES FOR RENOVATION / RECONSTRUCTION

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Renovation during operation:

- Is associated with large emissions
- Often requires expensive interim solutions
- Has a negative impact on patients and employees health

**→ Cost-intensive from an operational perspective**

## CONCLUSION

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- Adjustment of healthcare infrastructures service life to the life-cycles of their containing functional units
- Anticipation of renovation and upgrading measures by building new healthcare infrastructures which are up to date
- Consideration of functional relations between the different units

**→ New hospital structures must be the result!**

## THE LIFE CYCLE APPROACH

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### Thesis 1

The life cycle of the building is not identical with the installations

- Life cycle building > 40 years
- Life cycle installations 20 – 30 years



## THE LIFE CYCLE APPROACH

### Thesis 2

#### Different functional units have different life cycles

- High-installation units (OP, IPS, emergency, Rx) 20 - 25 years
- Ambulatory, Examination and treatment 30 - 35 years
- Care units (bed units) 30 - 35 years
- Supply and disposal 30 - 40 years
- Administration 30 - 40 years

## THE LIFE CYCLE APPROACH

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### Thesis 3

#### Pre-investment is not worthwhile

- Pre-investments for later use – «flexible building» – are often no longer up-to-date at the time of realization
- Conversion, even in so-called flexible buildings, necessitates expensive interim solutions



## THE LIFE CYCLE APPROACH

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### Thesis 4

The existing and also today`s plans of hospital buildings don`t take enough into account the different life cycles of the areas

- Vertical and horizontal mixing of areas with different life cycles in the same building are the rule in practice



## THE CONSEQUENCE FOR HOSPITAL DESIGN

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### The consideration of different life cycles

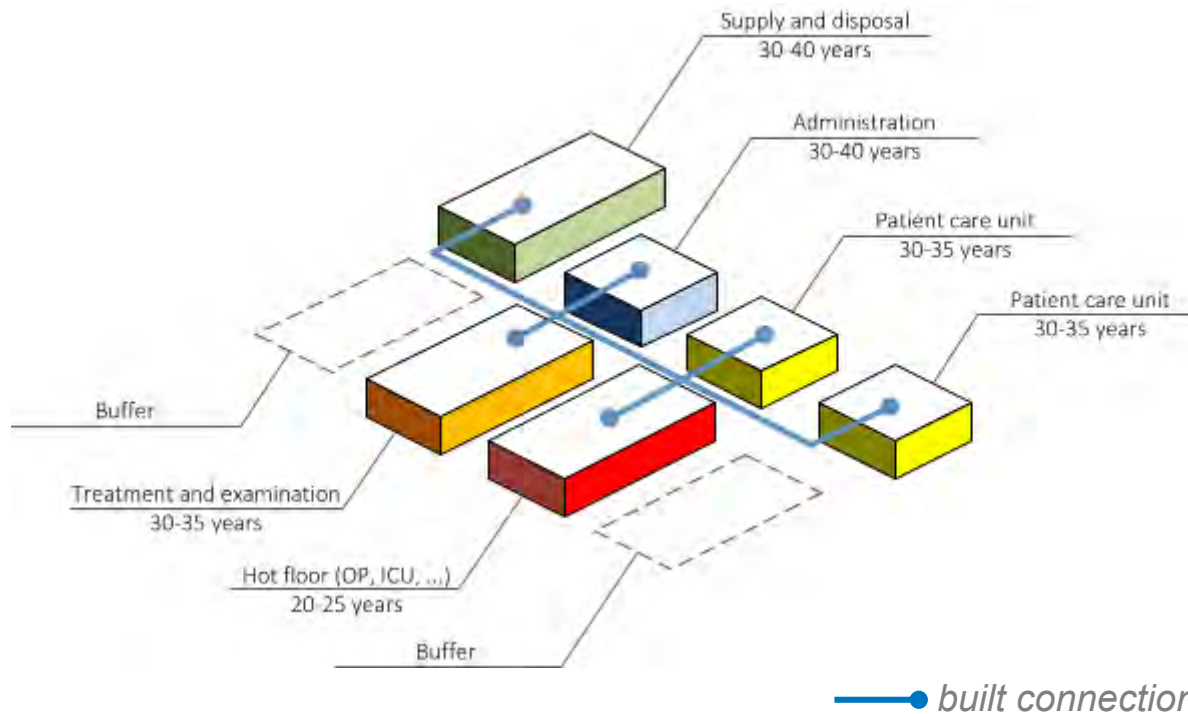
- Combine functions with the same life cycles in individual buildings (building parts)
- Modular hospital structure
- Buffer land areas for replacement of buildings
- Respect the functional connections of different departments



**Life-Cycle-Hospital**

## LIFE CYCLE HOSPITAL

### EXAMPLE: LIFE CYCLE SETUP

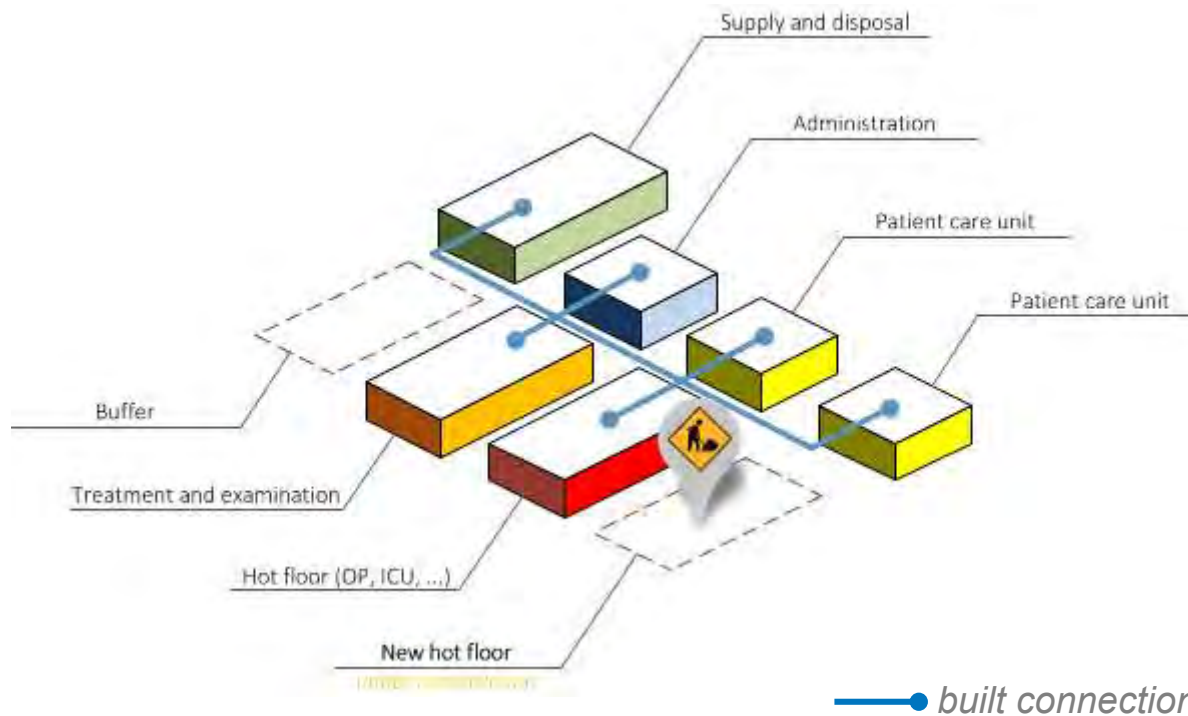


- ✓ Same life-cycles in same buildings
- ✓ Buffer areas for reconstruction
- ✓ Functionality



## LIFE CYCLE HOSPITAL

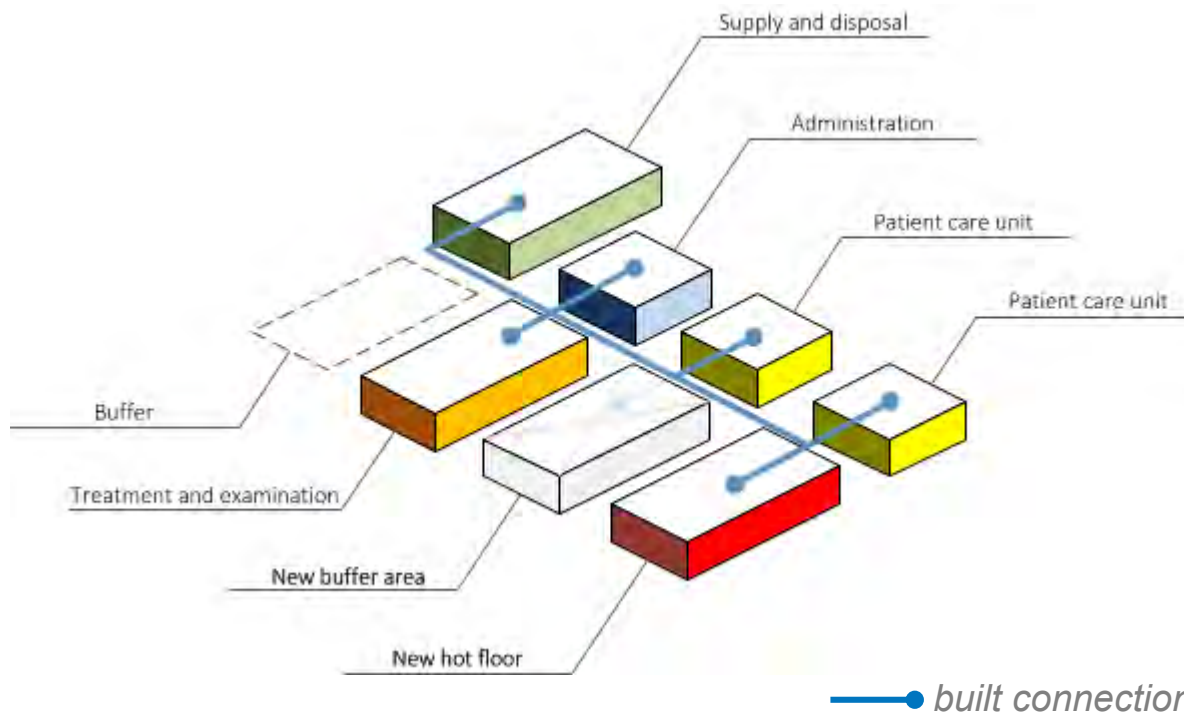
### EXAMPLE: RECONSTRUCTION OF THE HOT FLOOR (AFTER +/-20 YEARS)



- ✓ Reconstruction
- ✓ No negative impact on operation
- ✓ Functionality

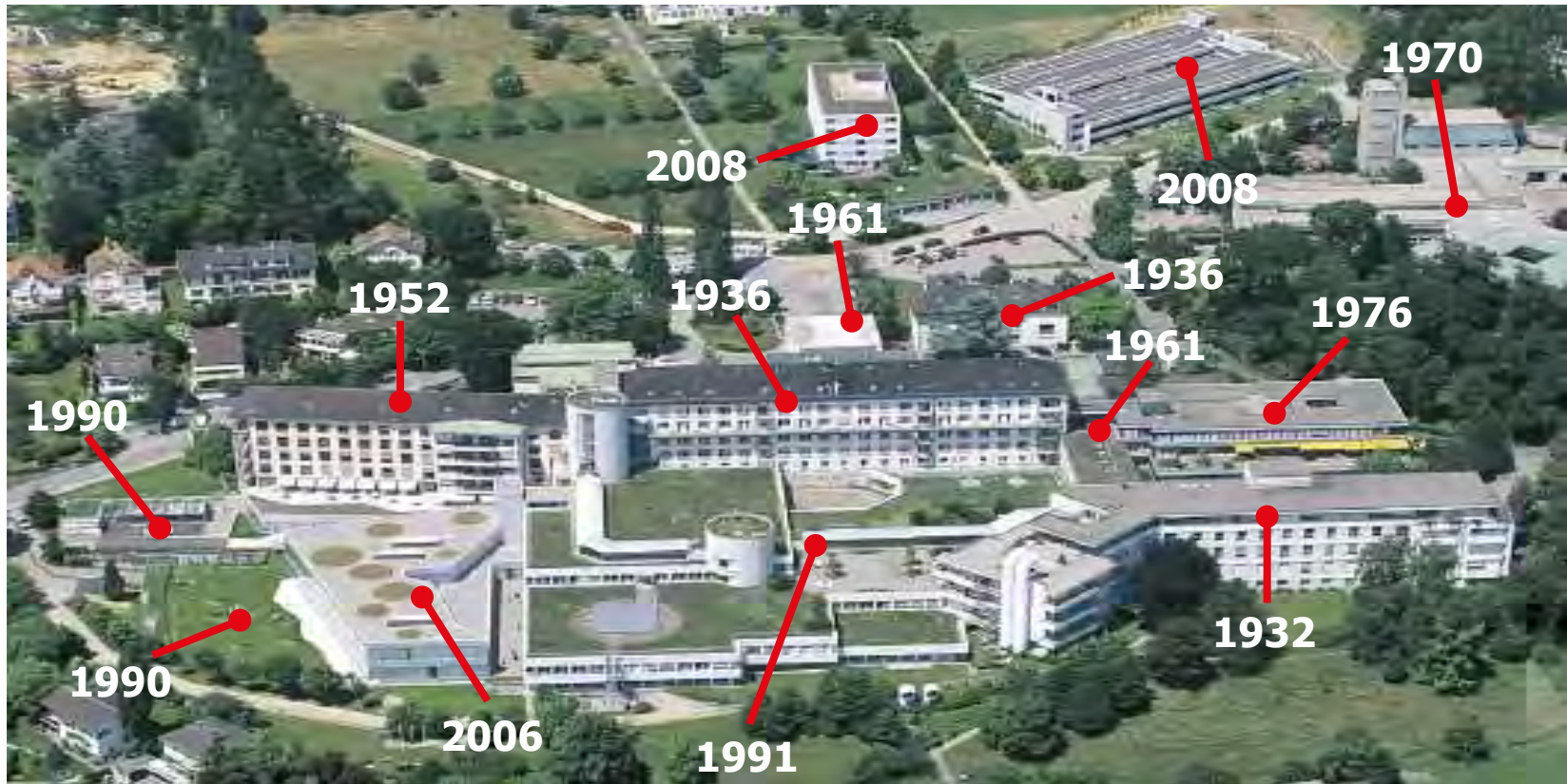
## LIFE CYCLE HOSPITAL

EXAMPLE: NEW SETUP (AFTER +/- 25 YEARS)



- ✓ Up to date infrastructure
- ✓ Functionality
- ✓ New buffer area (built surface or free area)

## SOMEWHERE IN SWITZERLAND → AN EXAMPLE



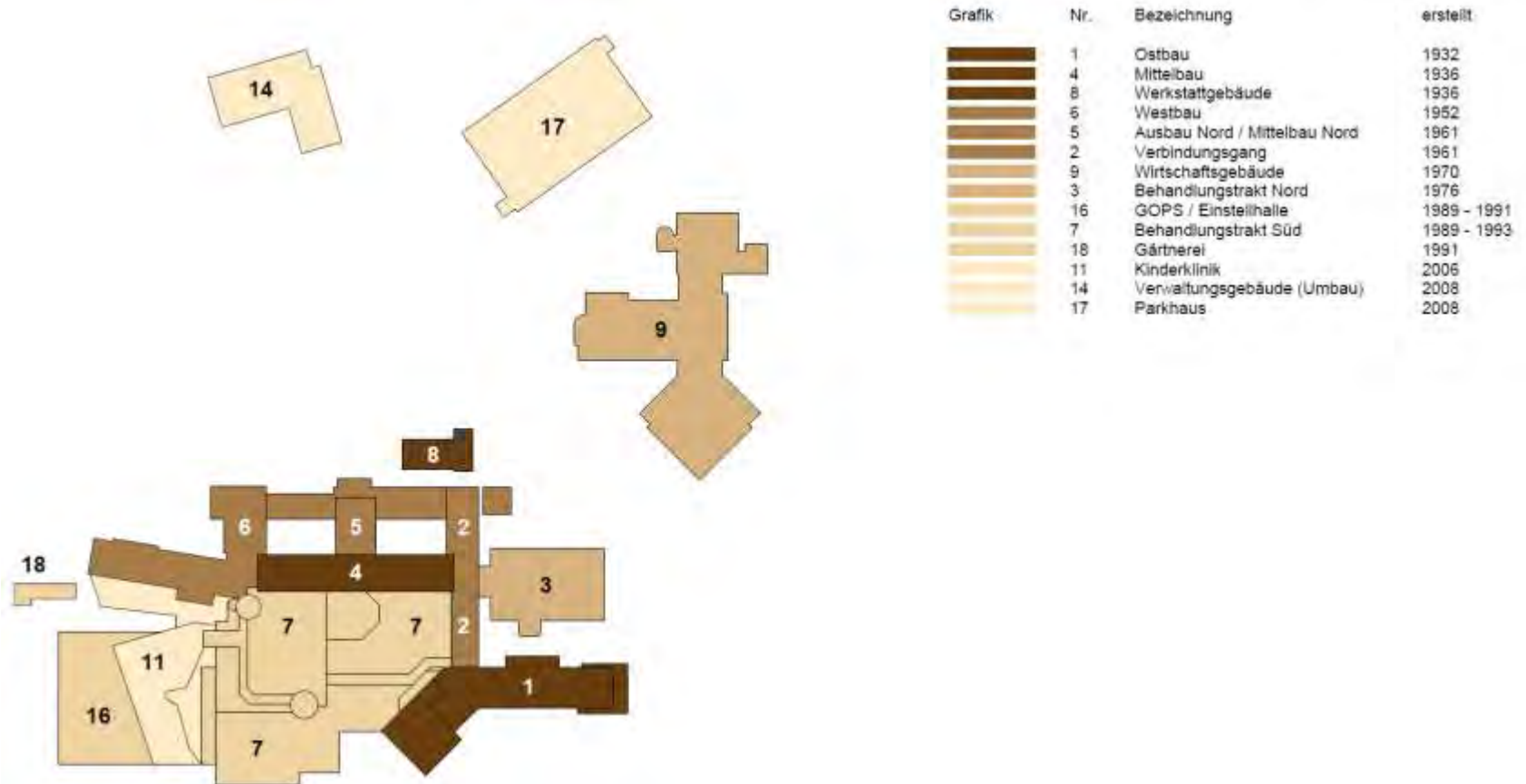
## FROM EXAMPLE TO SOLUTION

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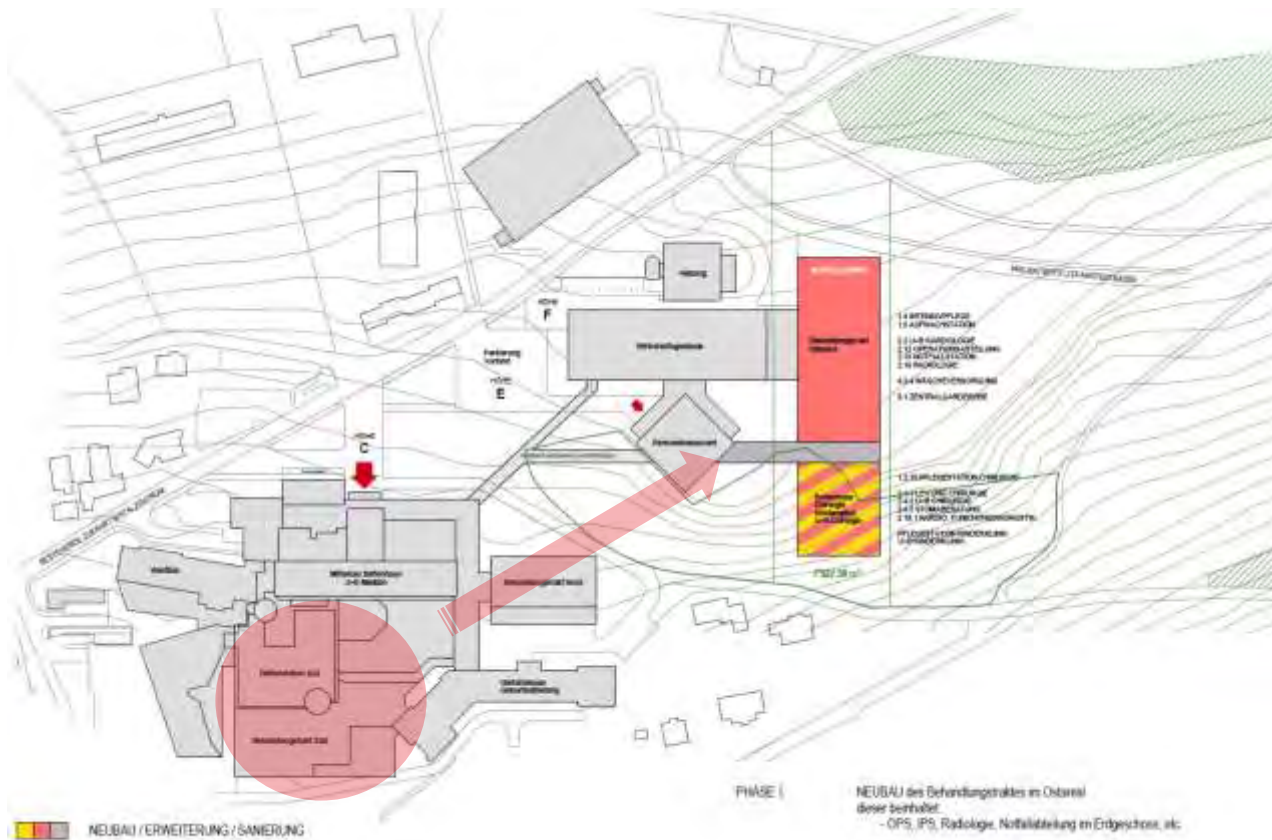
### Objectives

- ☞ Transfer the hospital from the initial grown structure to a modern infrastructure in stages
  - ☞ Guarantee a good connection between old and new during all the phases
  - ☞ Still use existing buildings where recently investments have been made
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- **Step by step renewal has to be financially viable**
  - **lost investments have to be minimized**

## PHASE 0

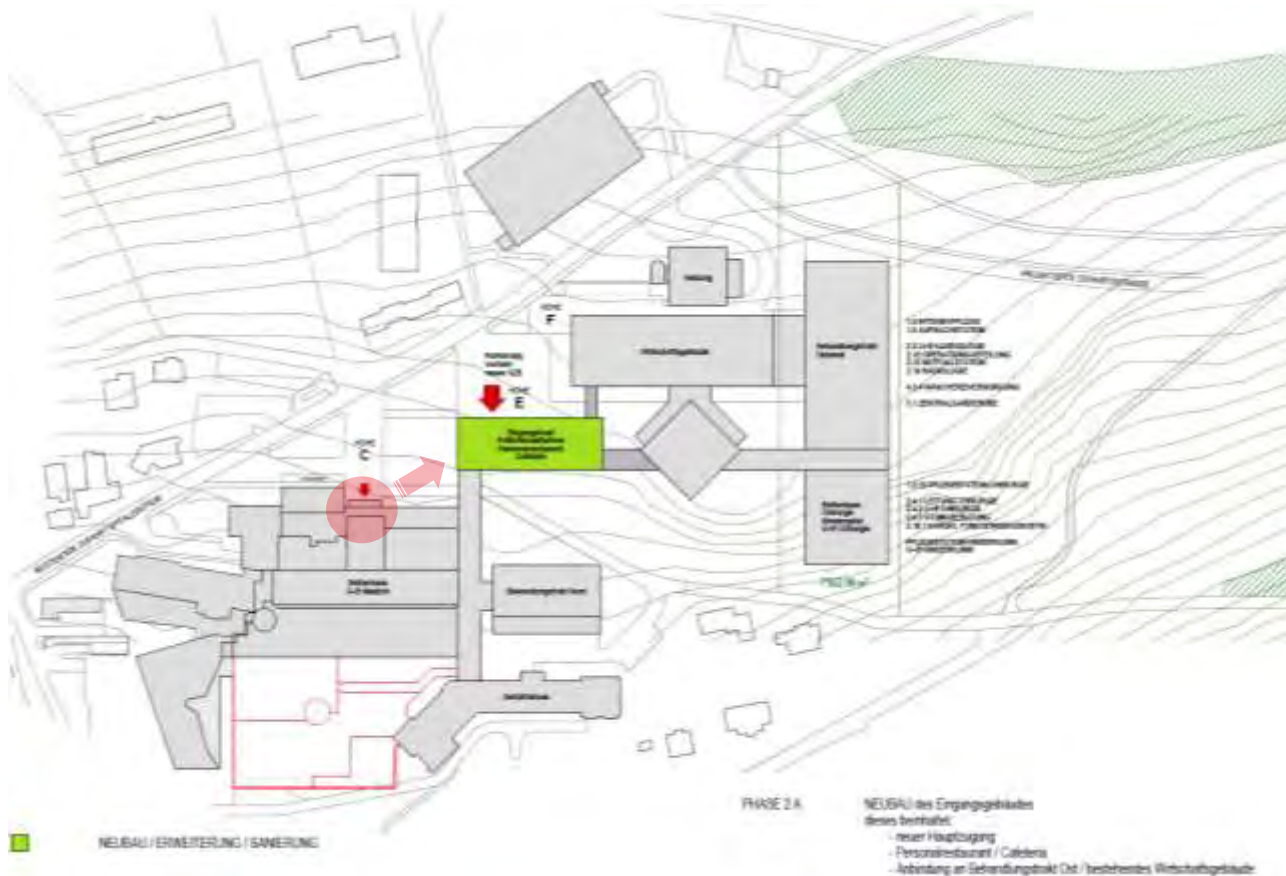


## PHASE 1



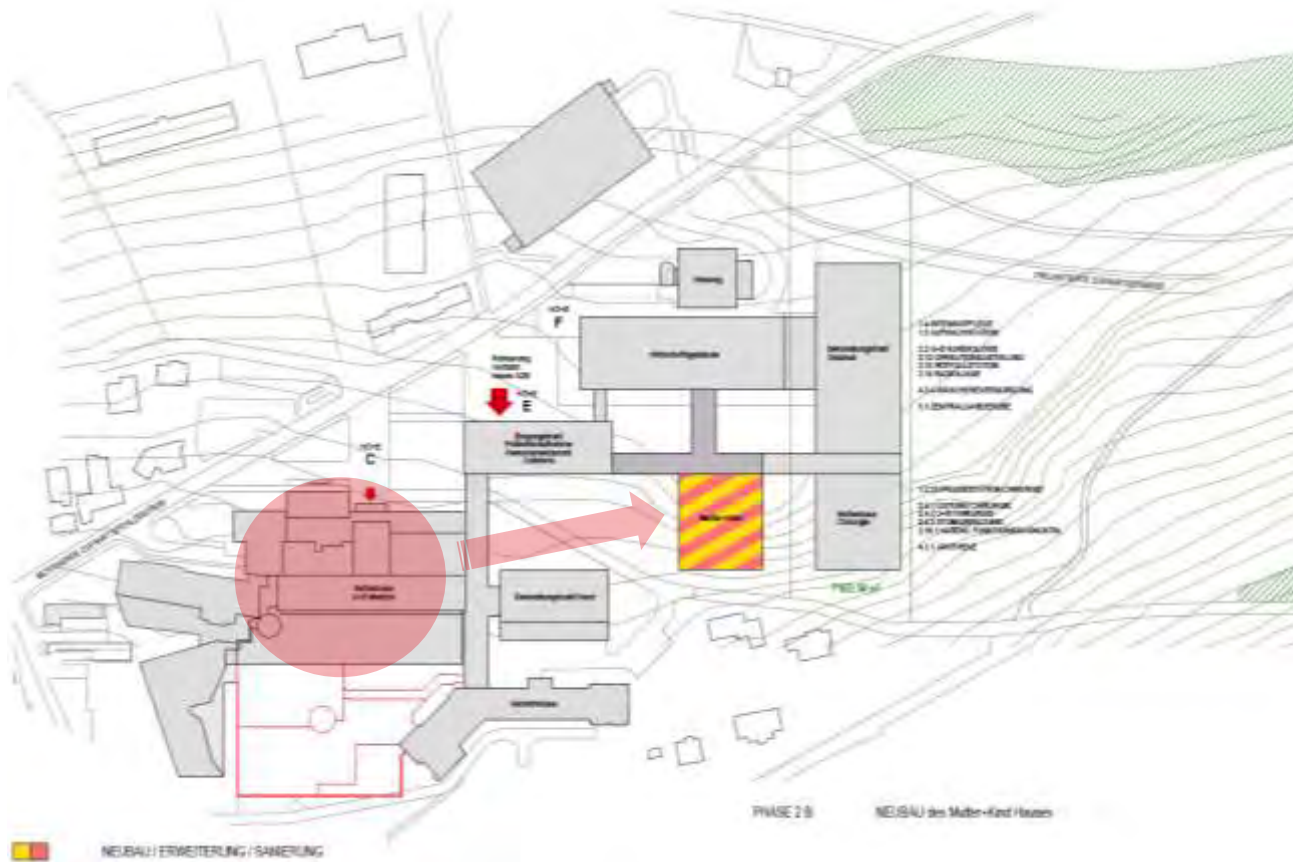
- + Treatment unit  
*incl. Emergency  
Surgery  
Intensive care*  
...
- + Care unit (surgery)

## PHASE 2A



- + Main entrance  
*incl. restaurant*

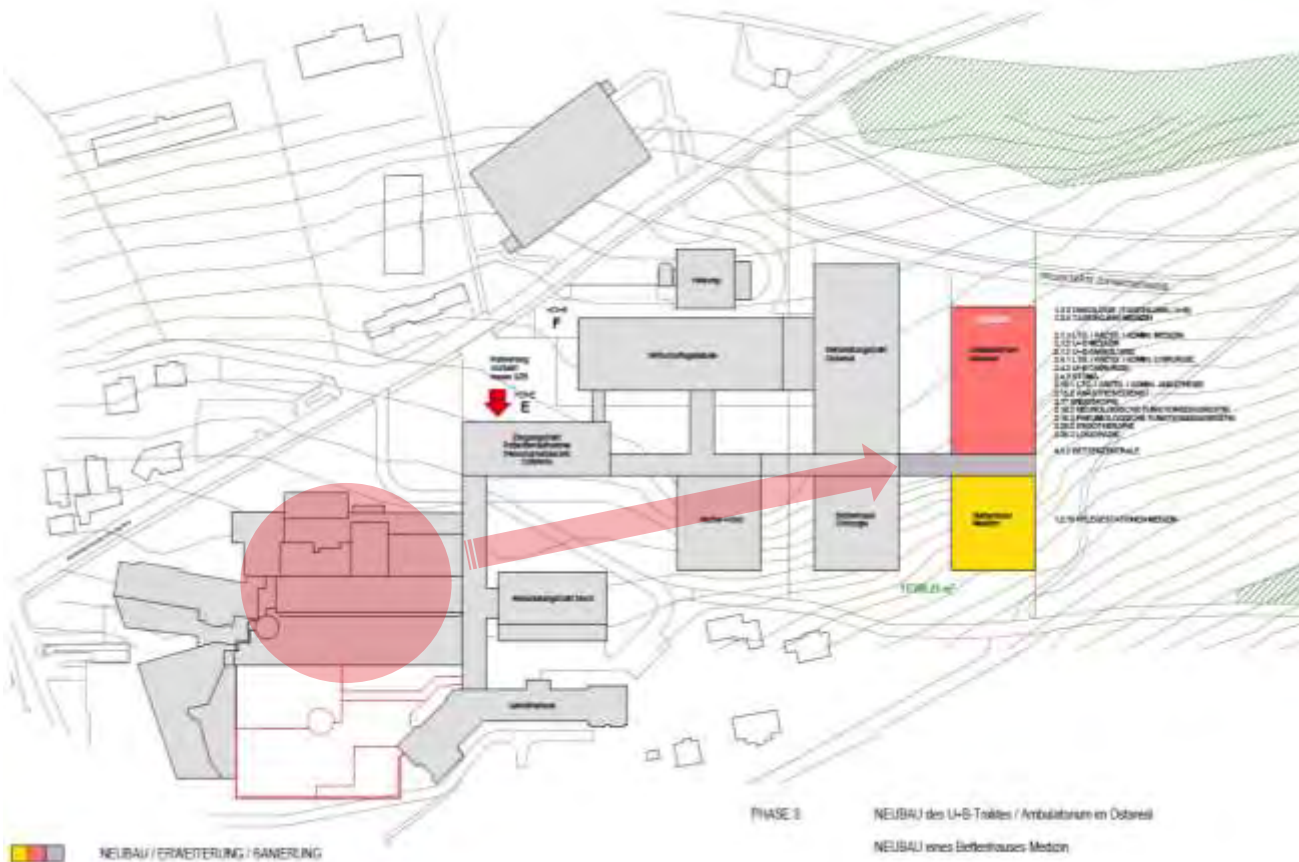
## PHASE 2B



- + Medical center for Mothers and Children

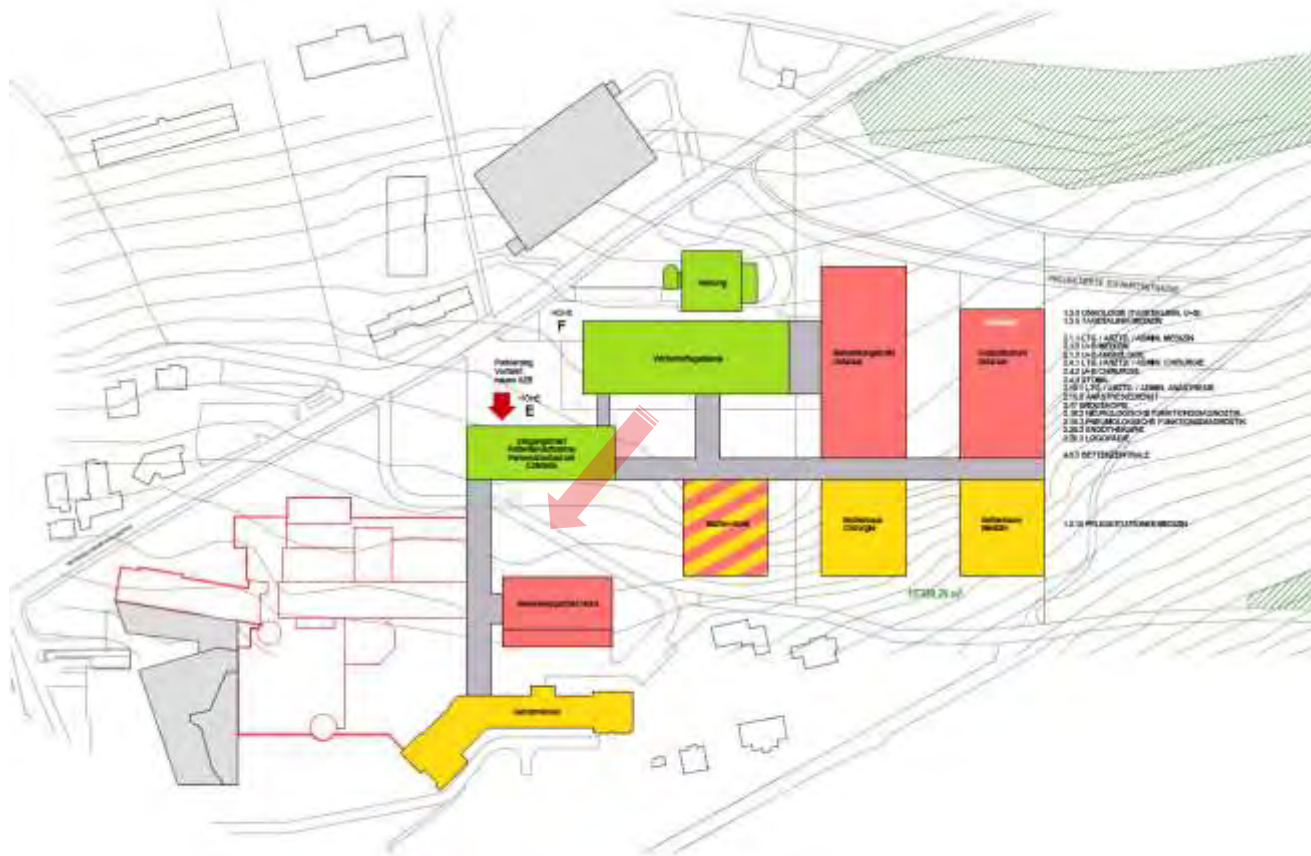


## PHASE 3 (1)

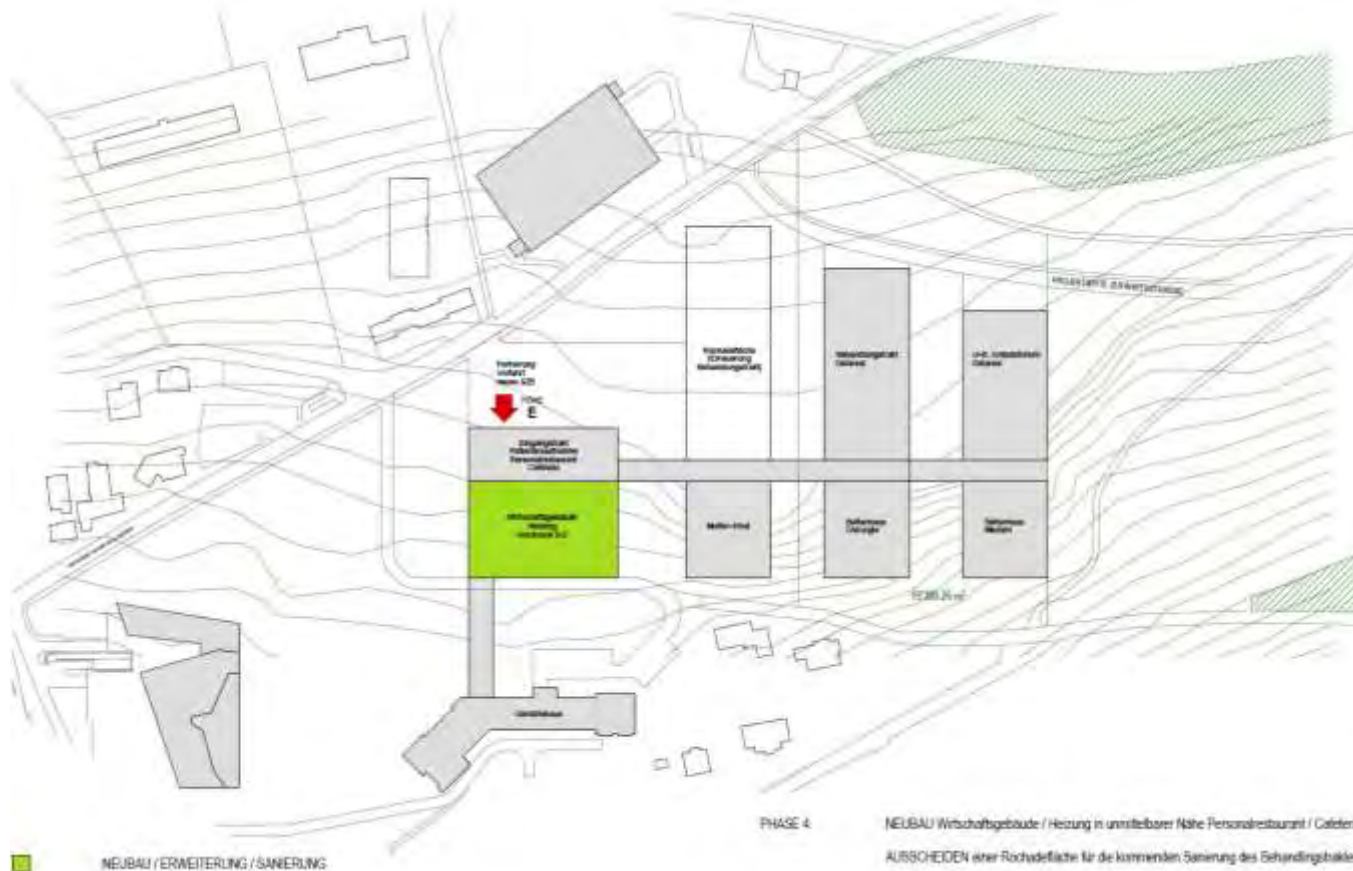


- + Examination and treatment
- + Care unit (medicine)

## PHASE 3 (2)



## PHASE 4 (1)



+ new buffer land area

## PHASE 4 (2)



**Life-Cycle-Hospital Layout**

## SÜDSPIDOL



- Conversion of 3 current hospitals in one 600 bed hospital
- Architectural contest with 26 participants
- Life-cycle-hospital design



HEALTHTEAMEUROPE  
SSL SÜDSPIDOL



## LIFE-CYCLE-HOSPITAL STRUCTURE



Emergency  
Radiology  
Endoscopy  
Surgery

Examination  
& treatment  
Acute care units

Oncology  
Administration

Rehabilitation  
Geriatrics

Buffer land area

## MODERNISATION OF THE HOT FLOOR (AFTER 20-25 YEARS)



Clearing the  
buffer land  
area

- New hot floor**
- Emergency
  - Radiology
  - Endoscopy
  - Surgery

Deconstruction  
or new usage



**THANK YOU FOR YOUR ATTENTION!**

PLEASE VISIT US AT OUR BOOTH @ DESIGN&HEALTH



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