

sauerbruch hutton

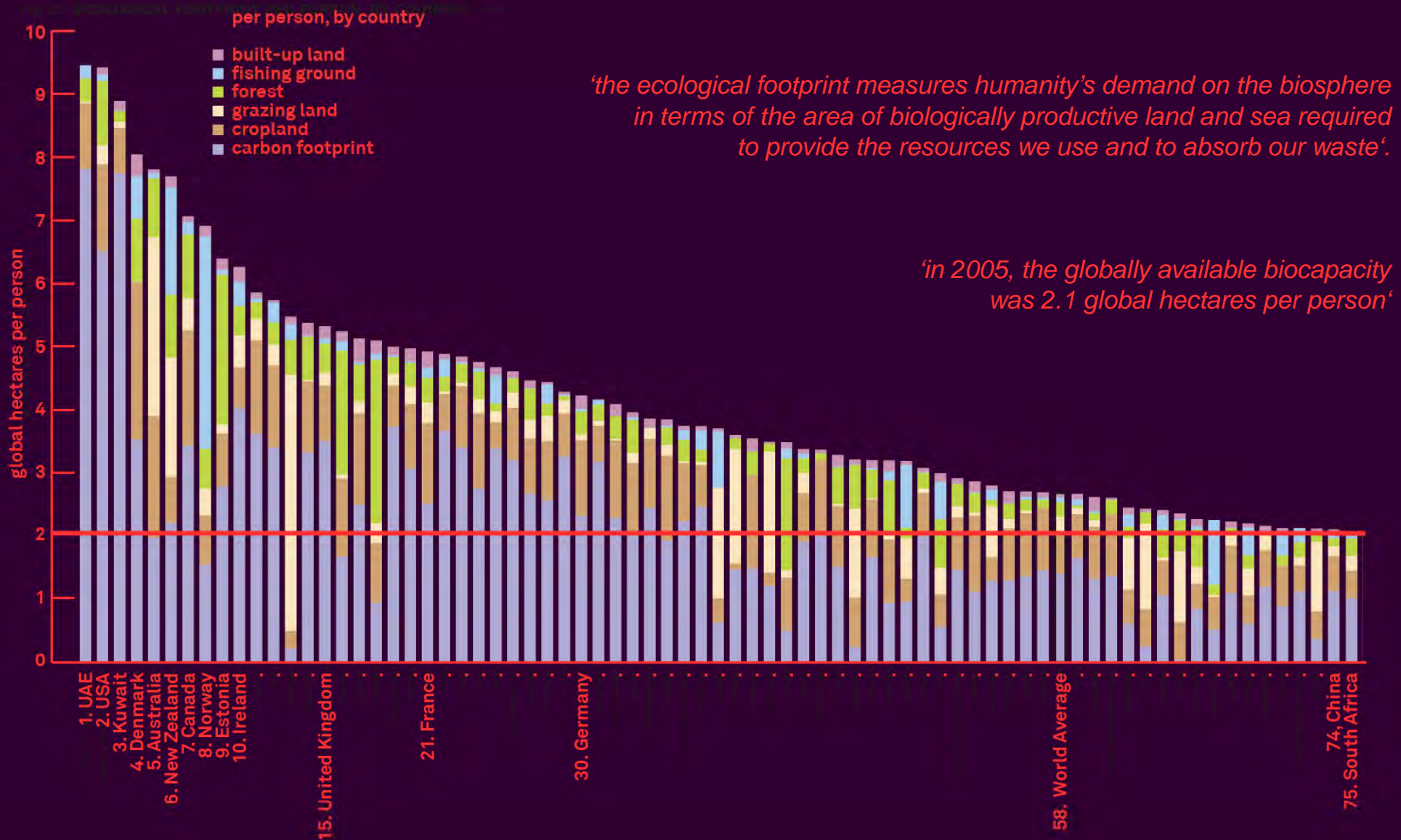


integrated design and detail for sustainable buildings

Andrew Kiel
sauerbruch hutton

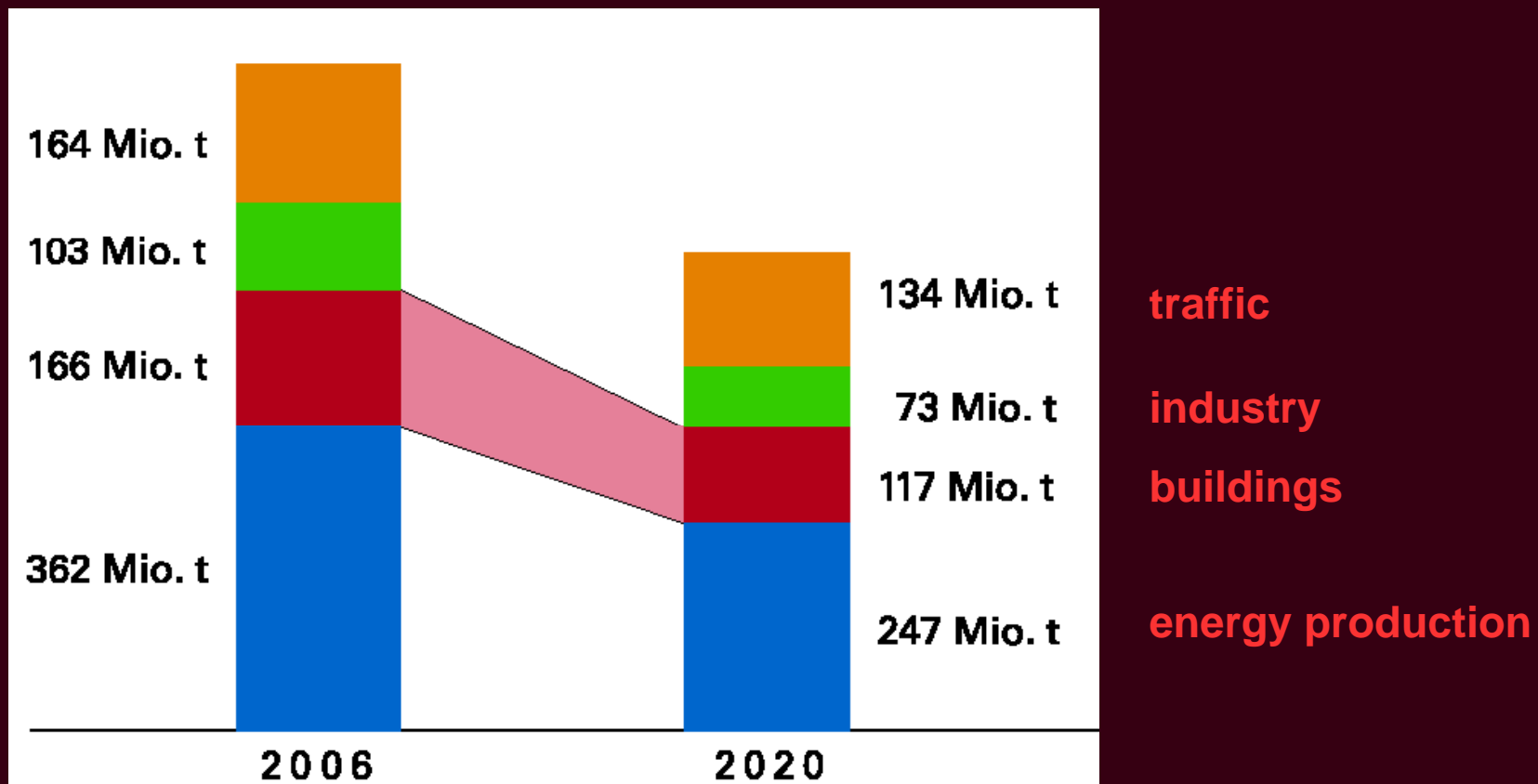
ecological footprint of nations

as published in 'Living Planet Report 2008' by World Wildlife Fund



building industry plays a key role

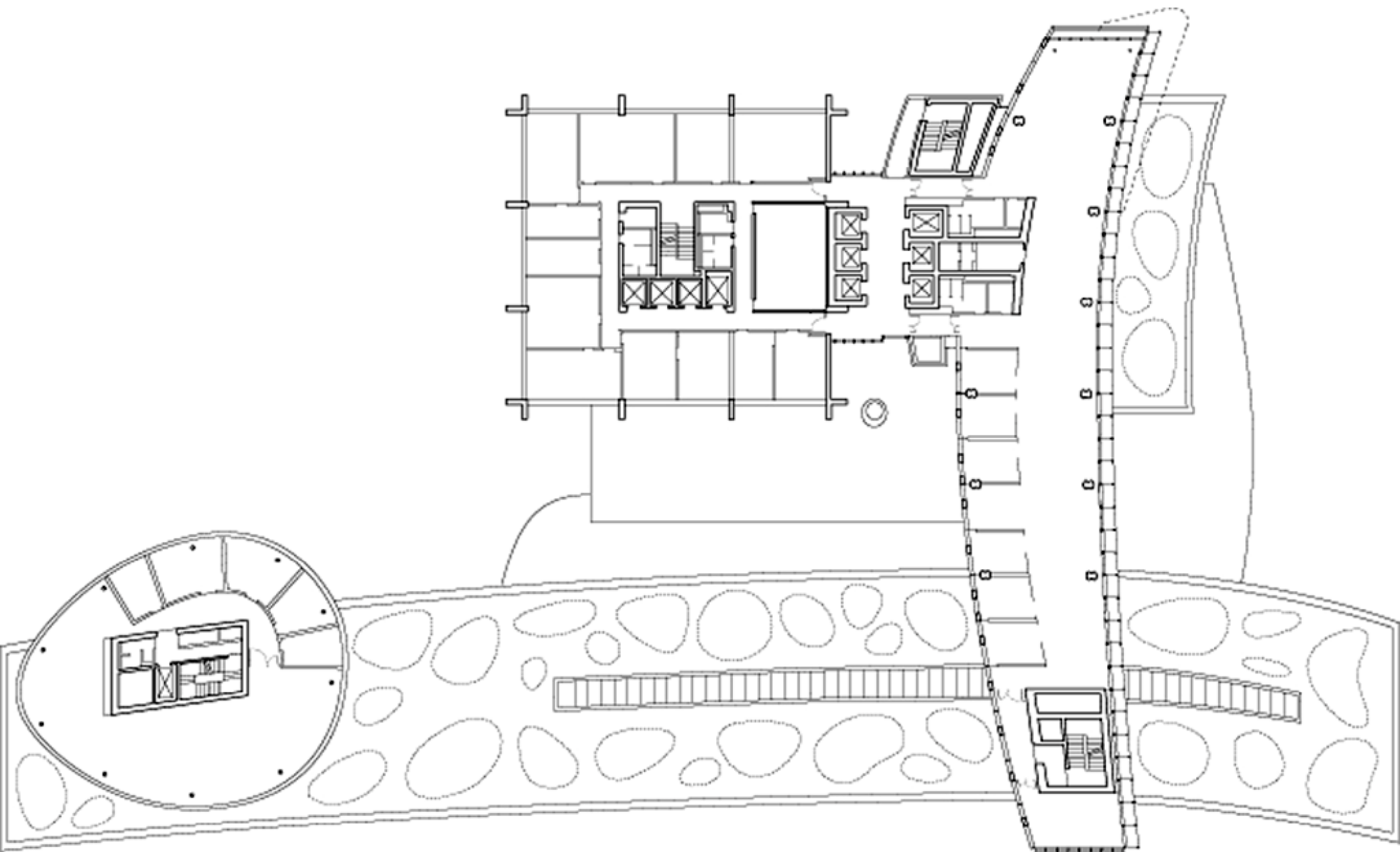
CO₂-emissions (in Germany)

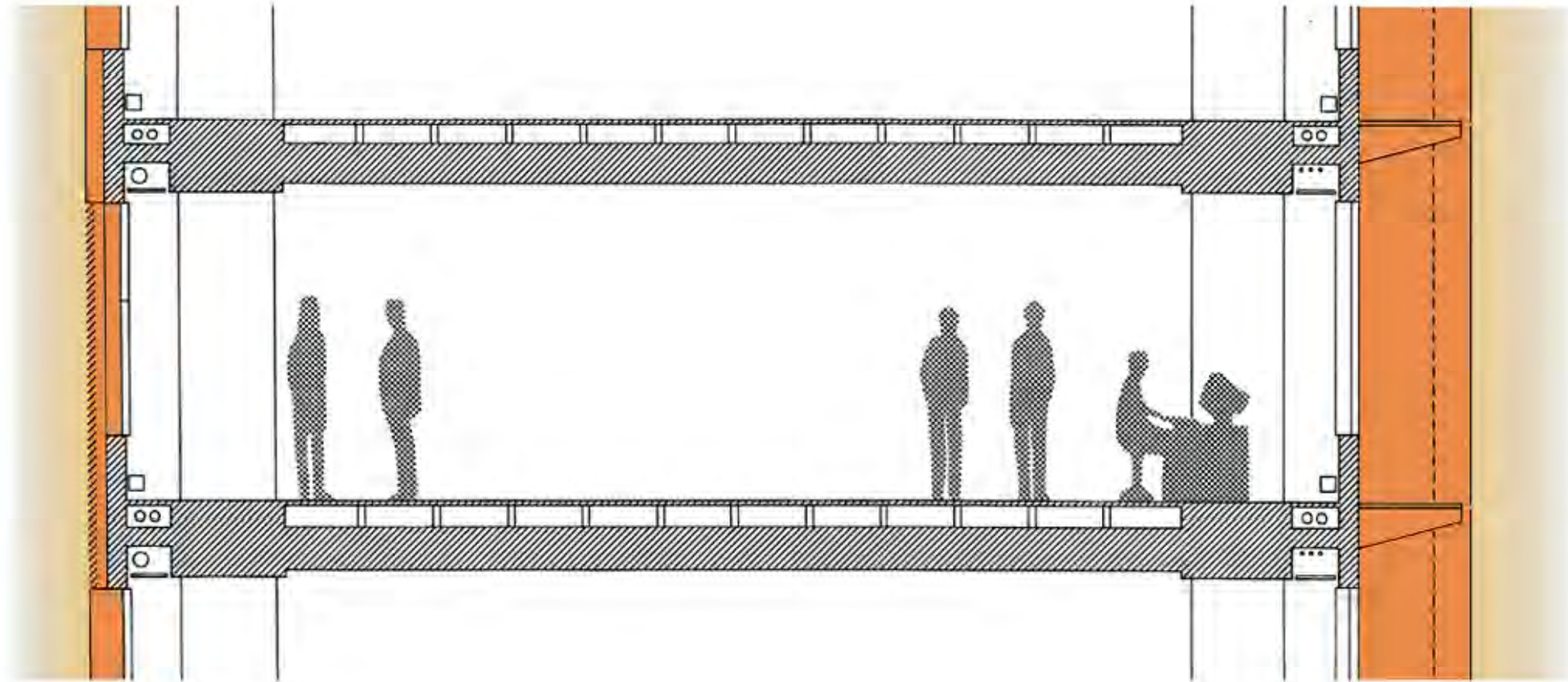


what does sustainability look like ?

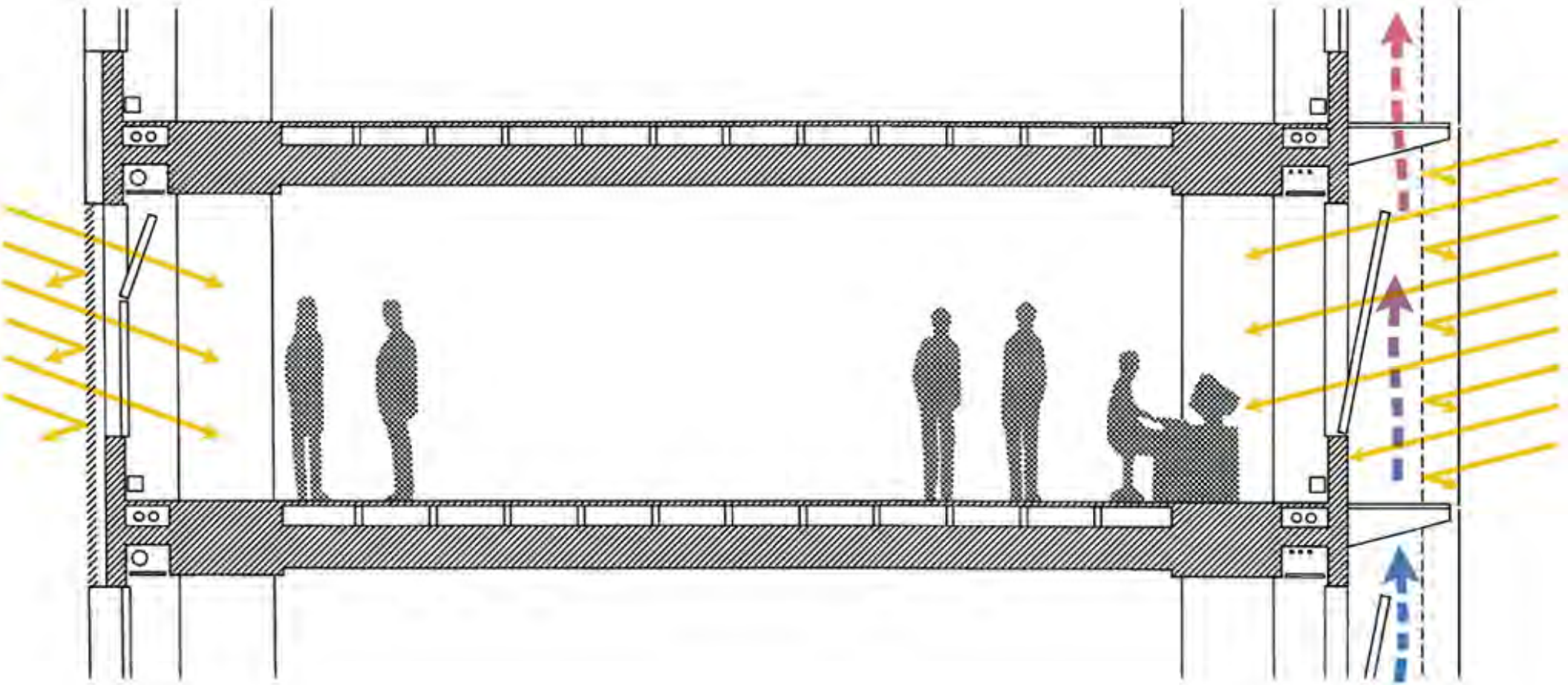


gsw headquarters berlin

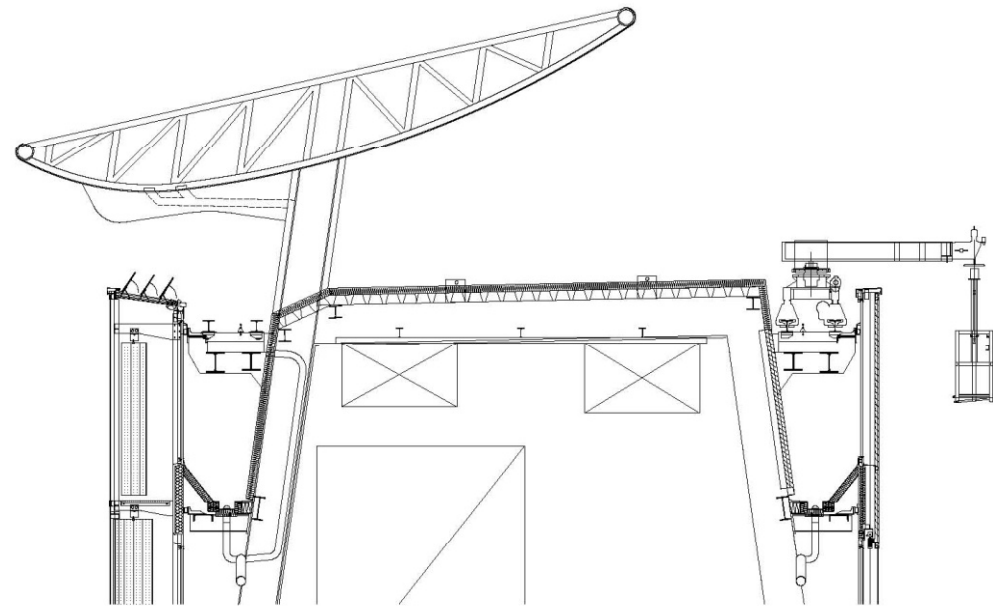
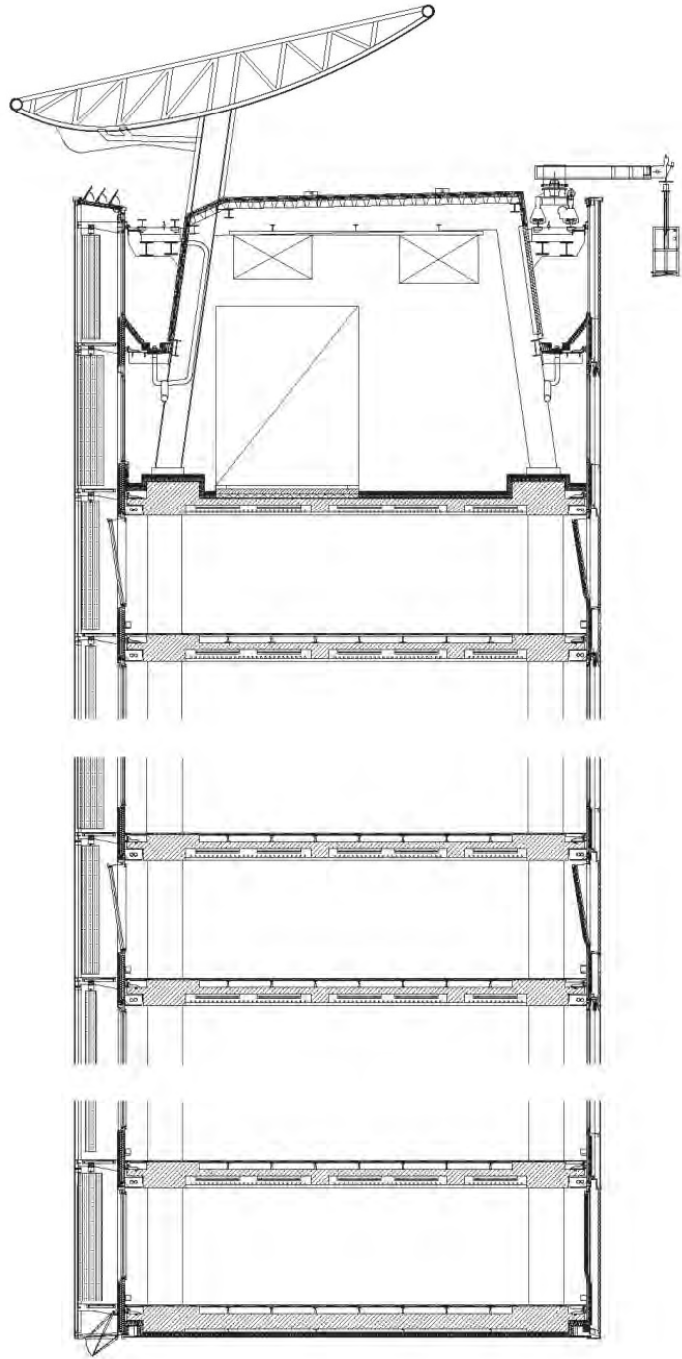




buffer zones

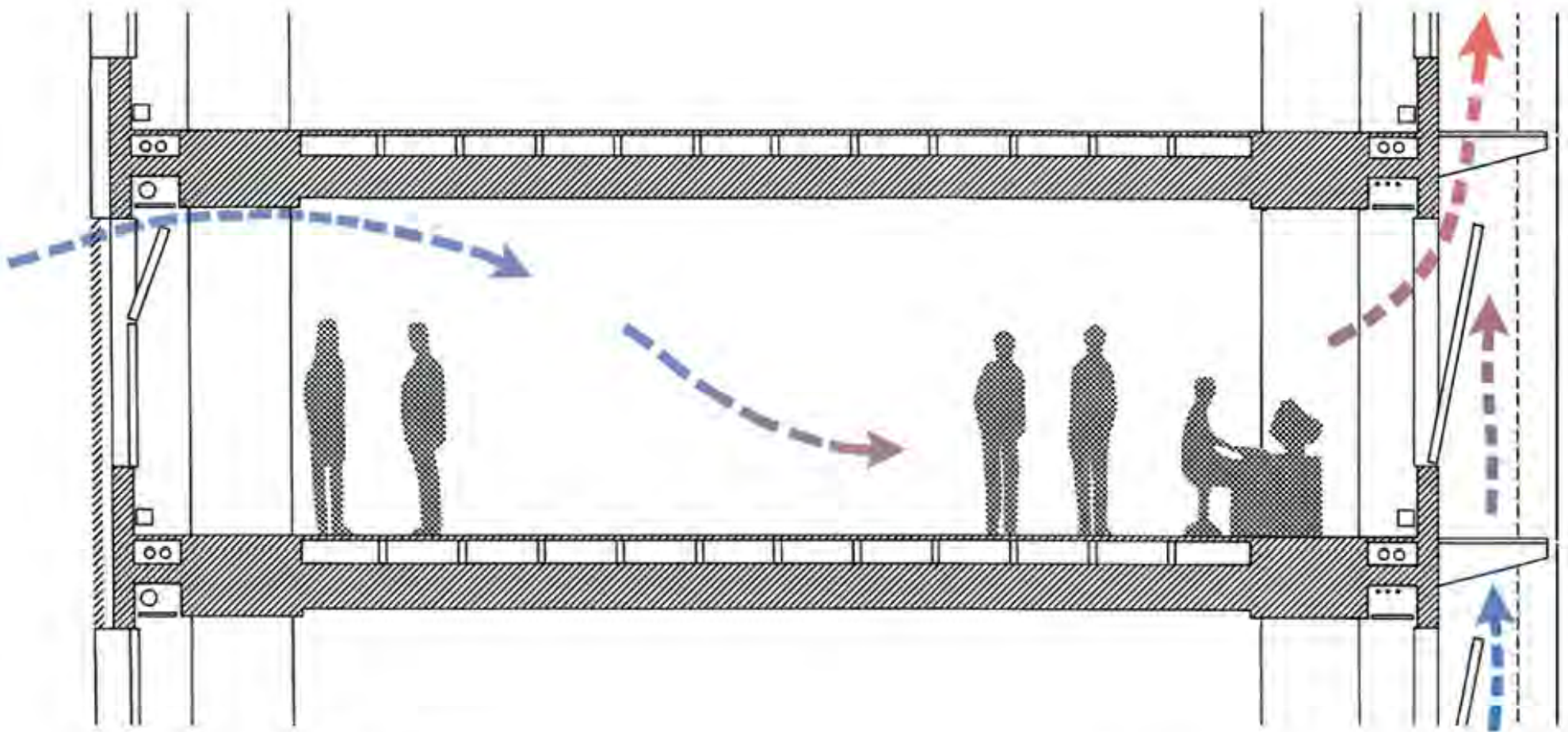


sun protection

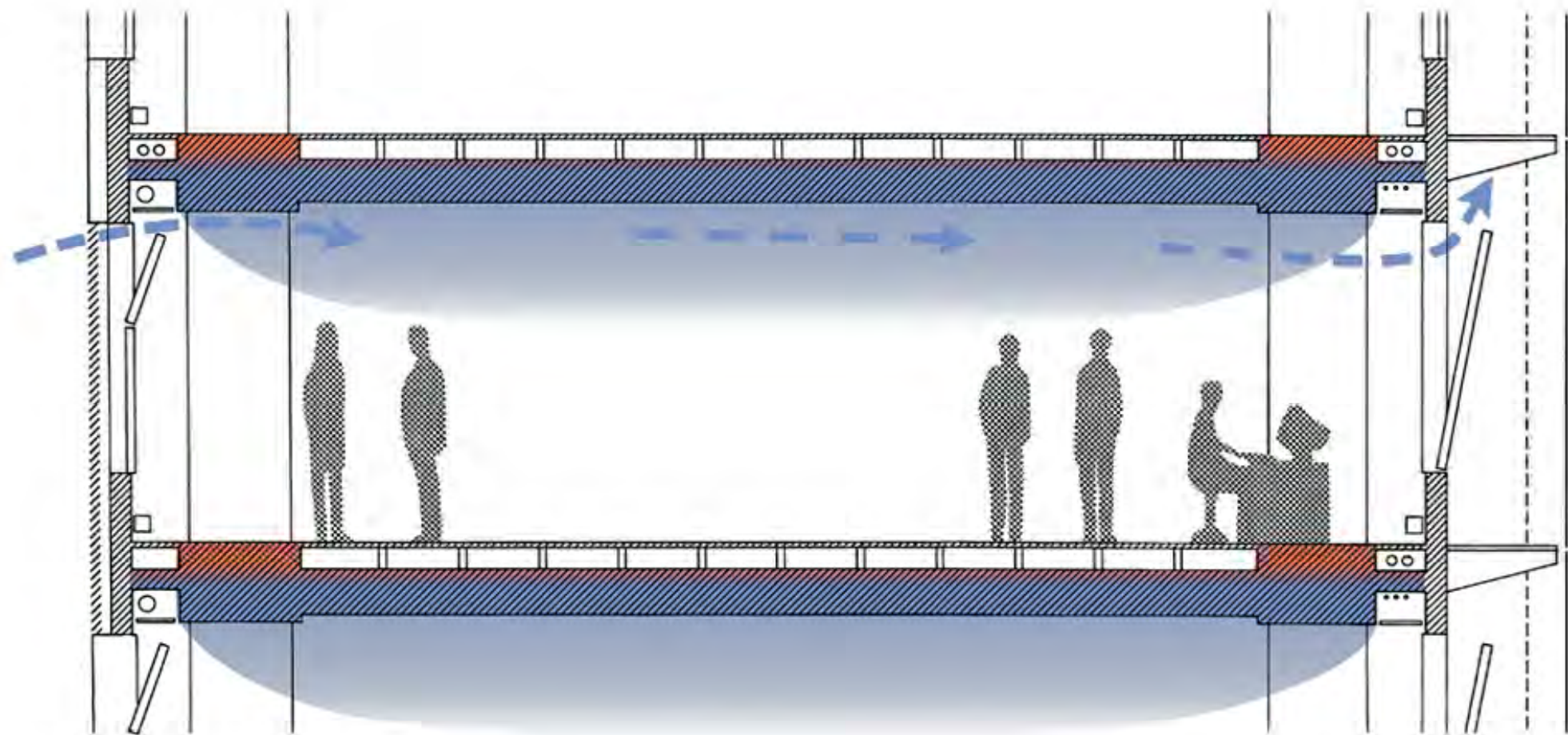


gsw headquarters berlin: section details depicting facade construction and venturi wing





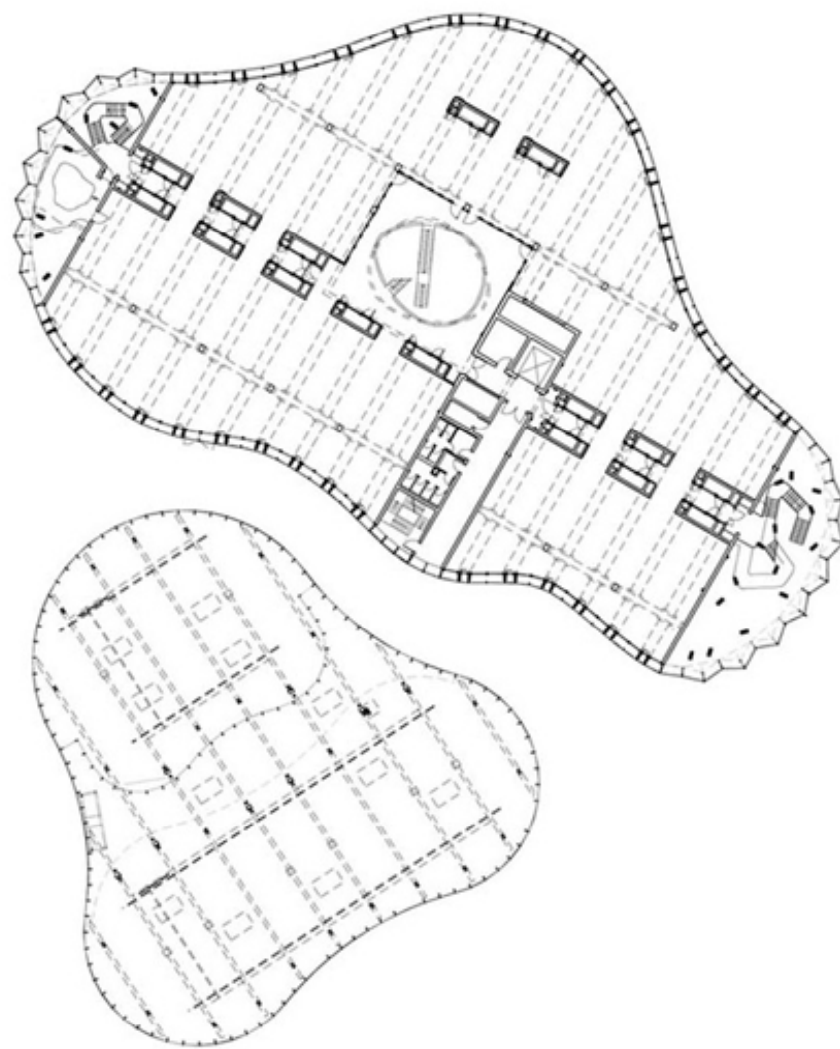
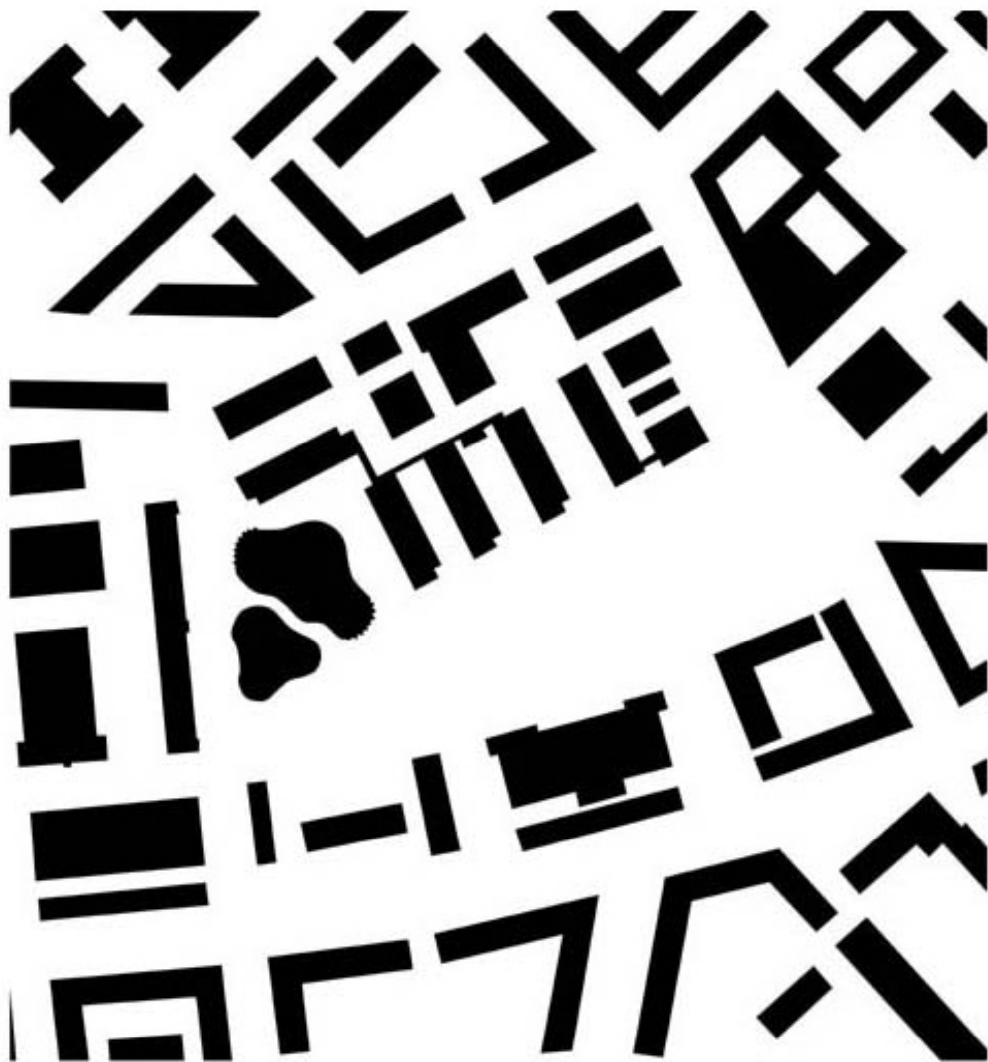
cross ventilation - open plan



thermal mass - summer

photonic center berlin



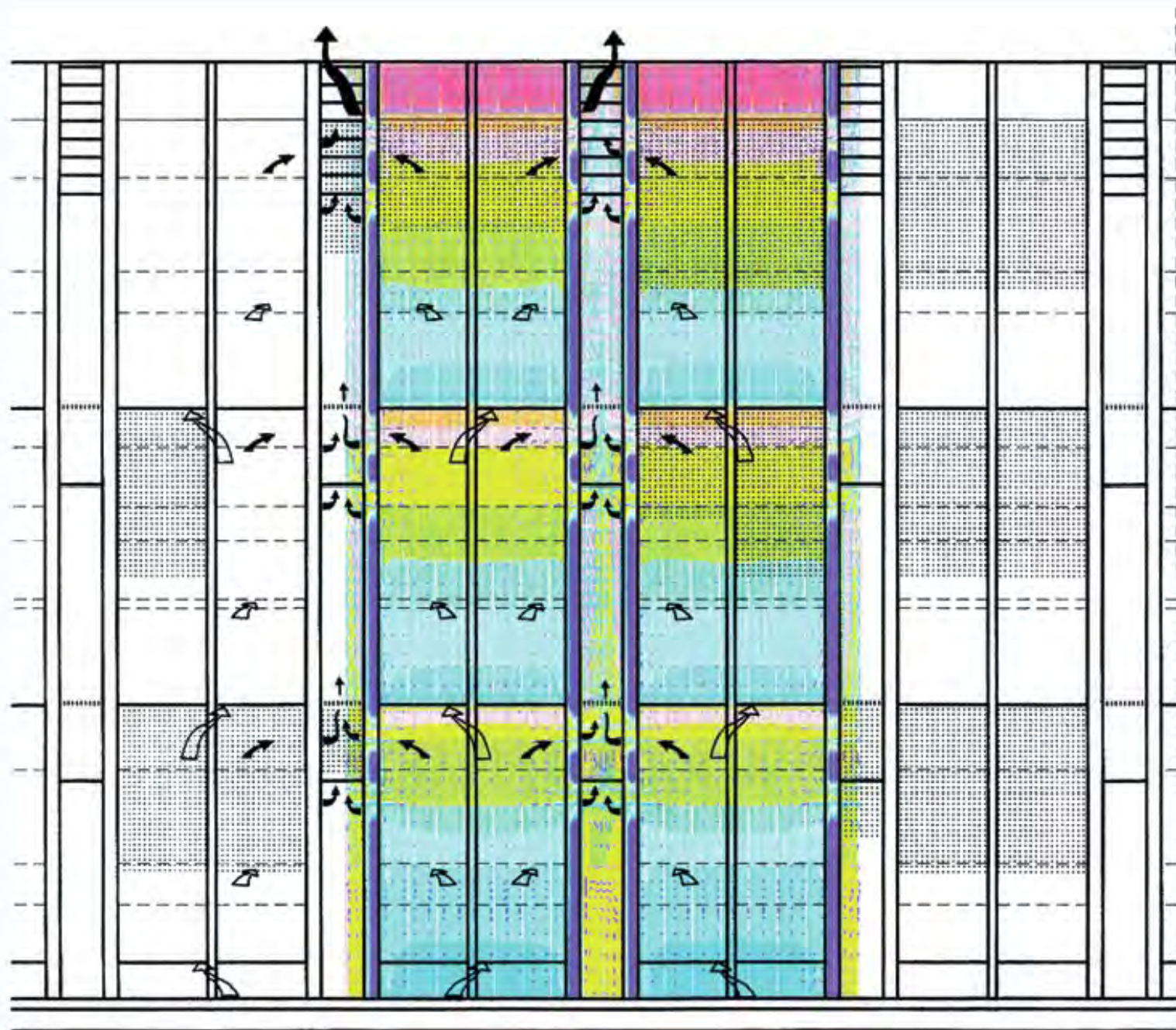


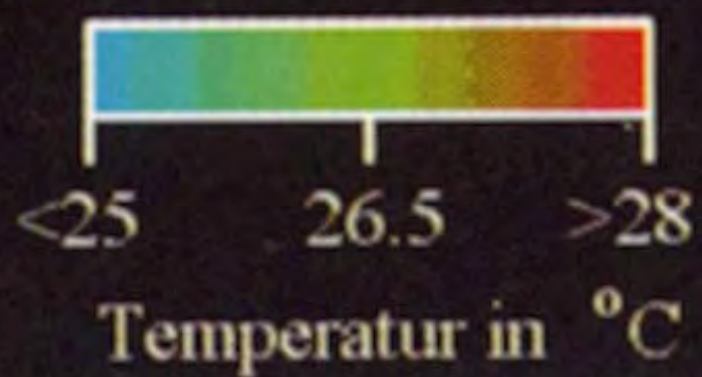
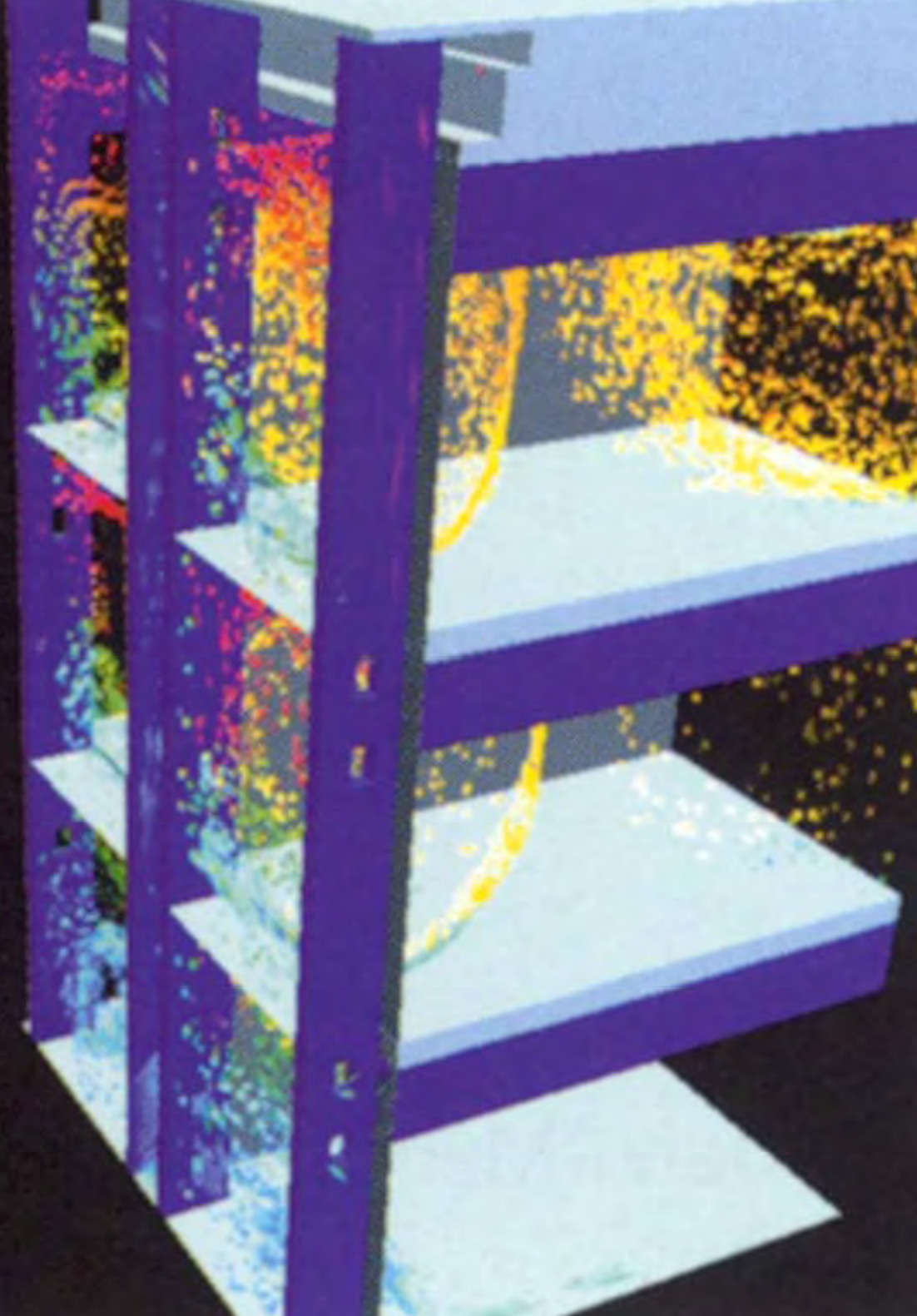
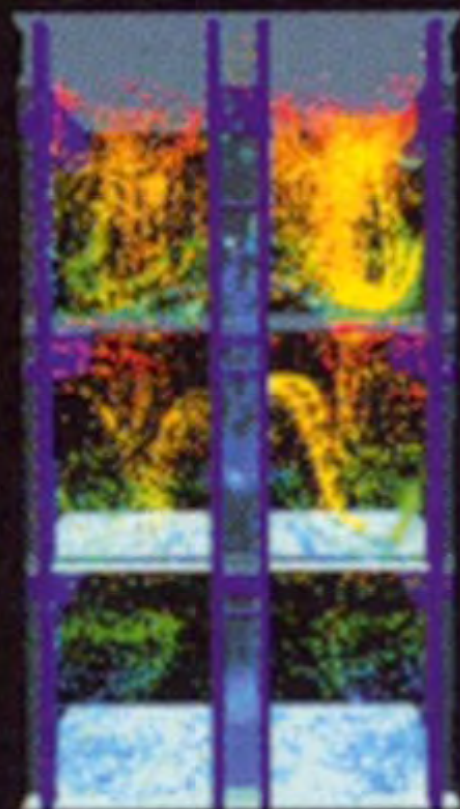
0 10 20m



photonic centre, berlin
first floor plan









environmental agency dessau











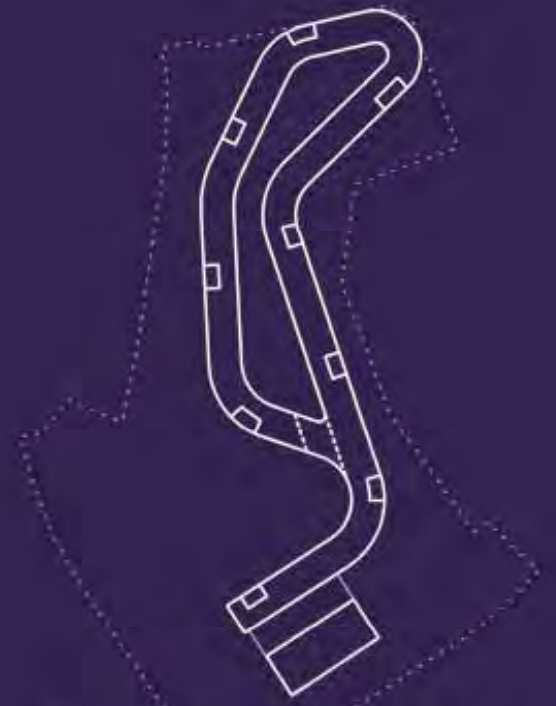
structure of office „cells“



clear access and internal courtyard



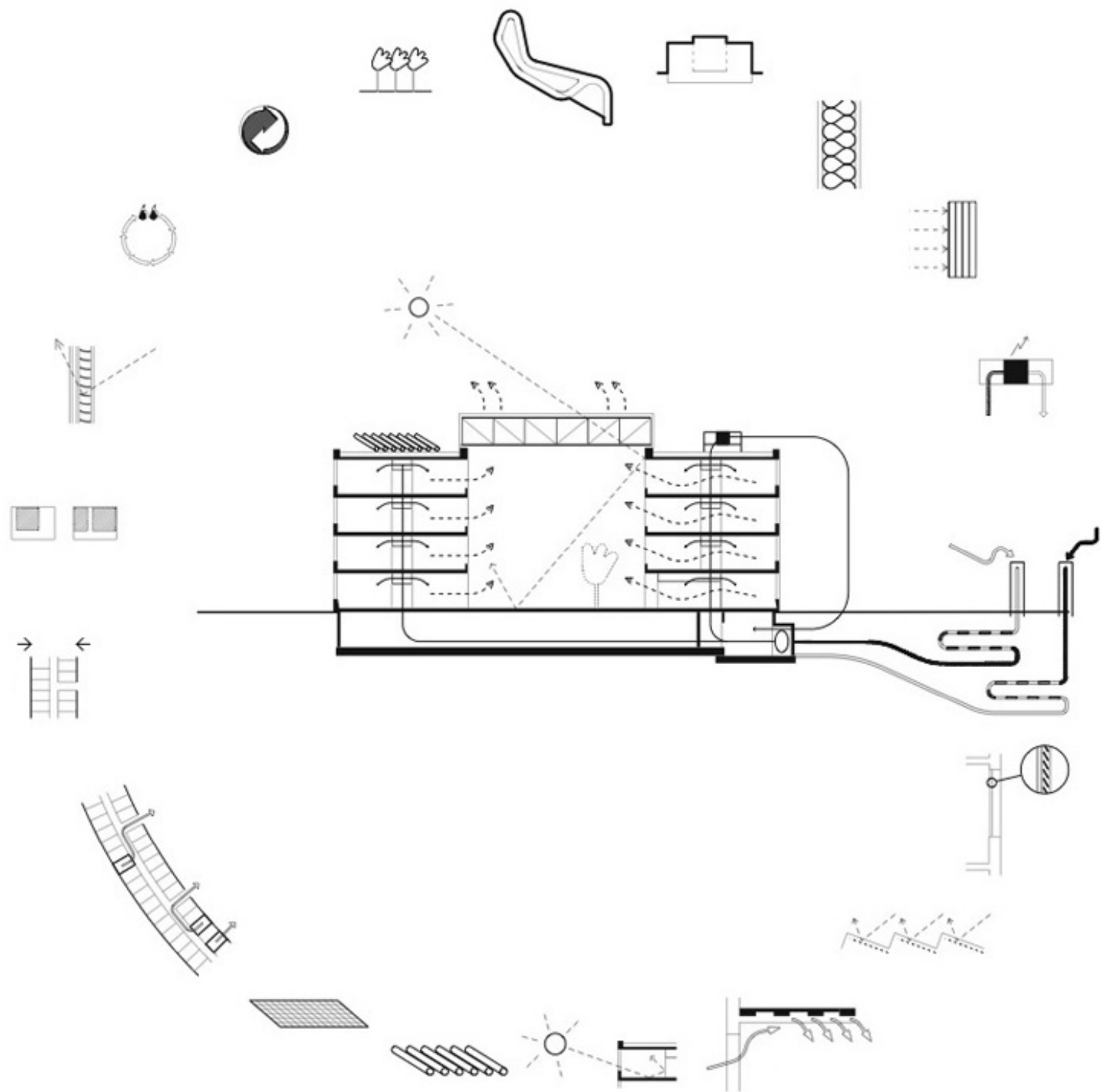
creation of public and private space
and opening to public park

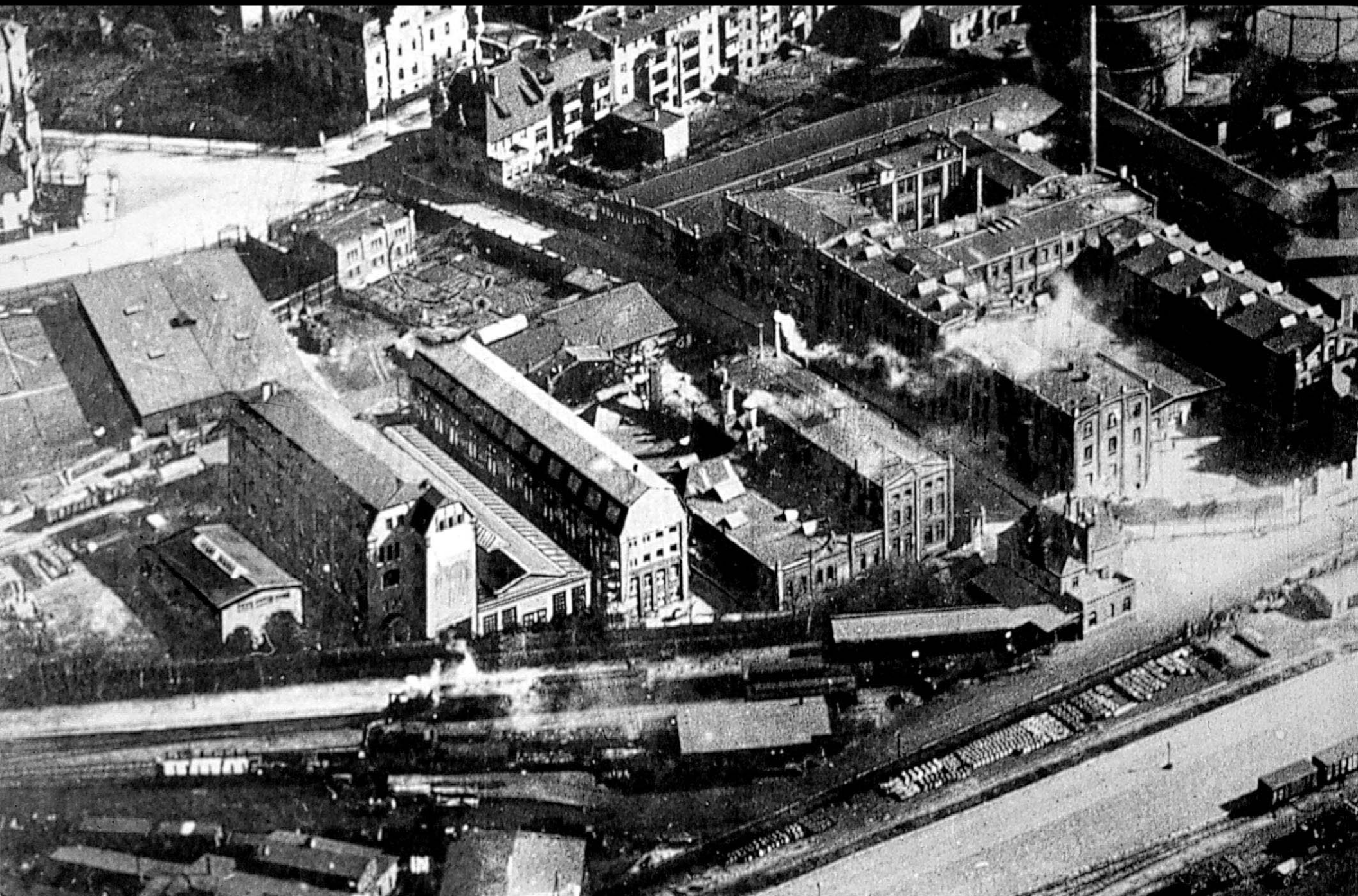


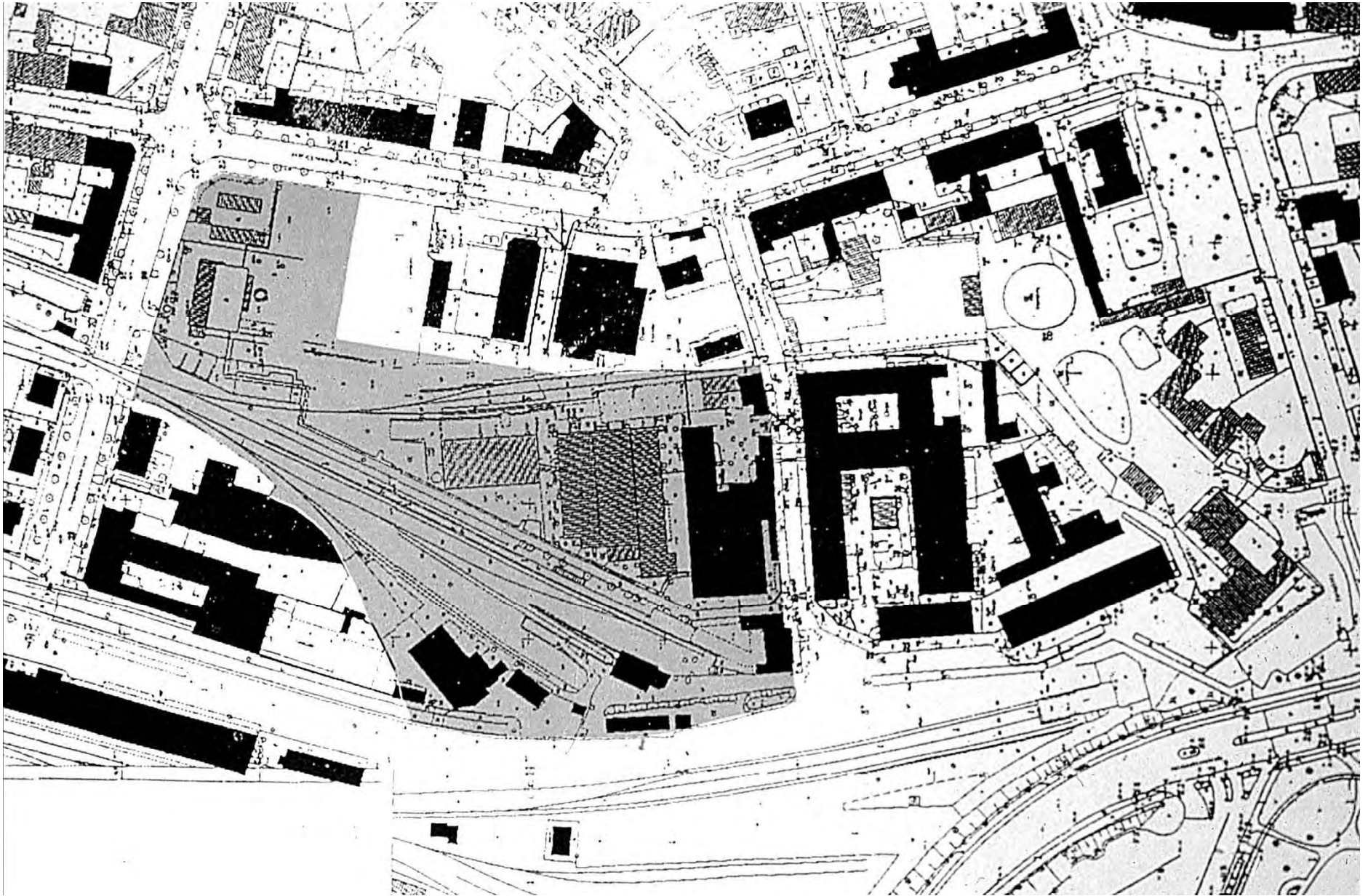
contour to site, existing building
and opening to public park



environmental agency dessau: ground floor plan showing the agency building with atrium, entry (forum), cafeteria, auditorium and library

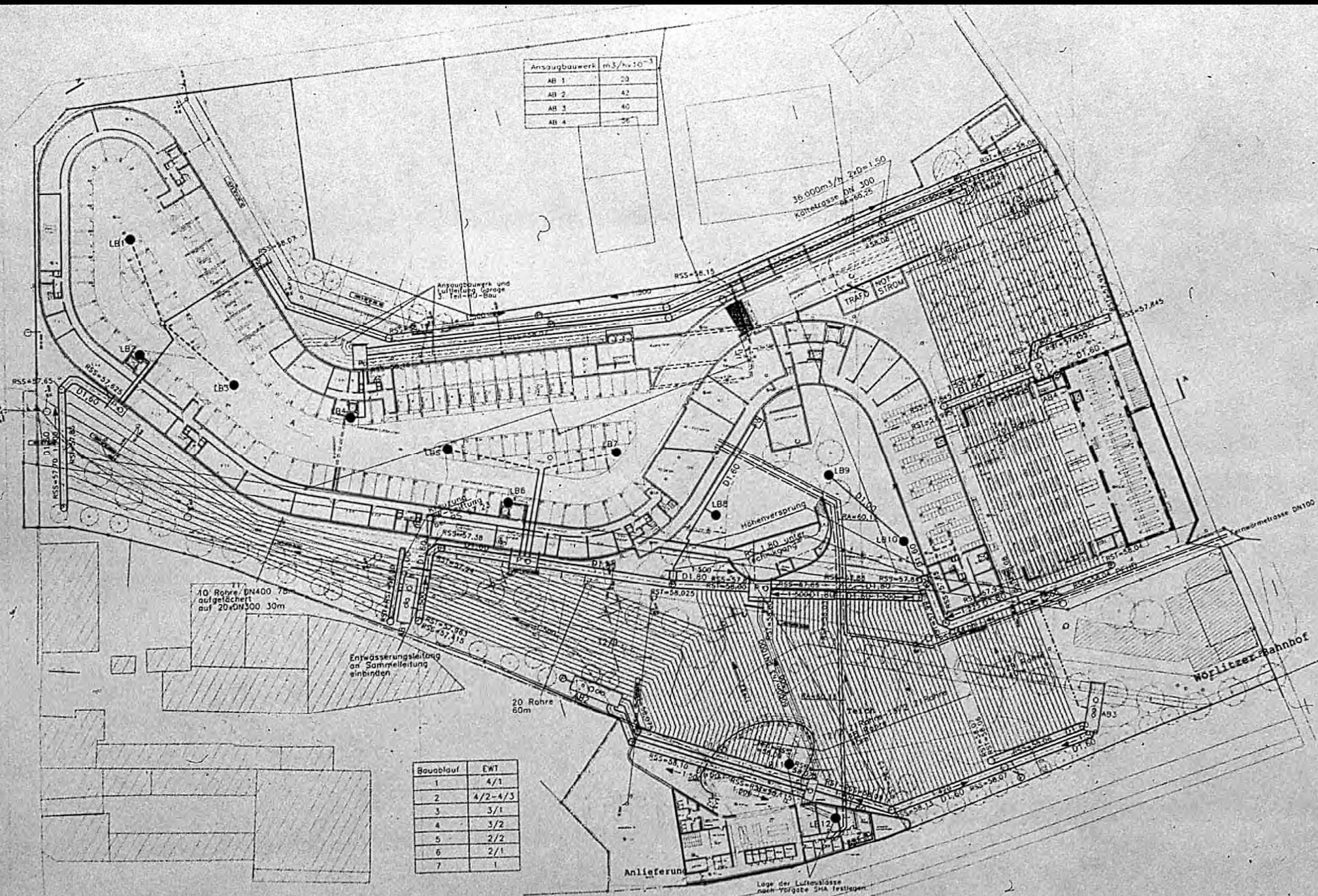






environmental agency dessau: diagram depicting brownfield site with contaminated areas in grey (excavation required to a depth of 10 feet)

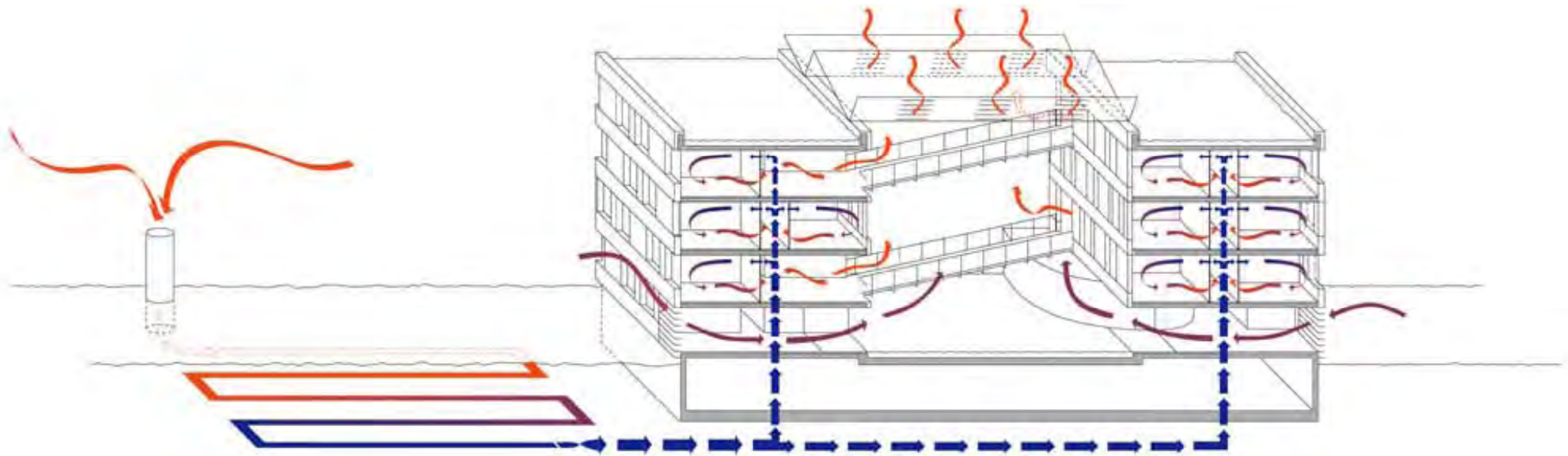
Ansaugbauwerk	m ³ /h x 10 ⁻³
AB 1	20
AB 2	42
AB 3	40
AB 4	26



Bauablauf	EWT
1	4/1
2	4/2-4/3
3	3/1
4	3/2
5	2/2
6	2/1
7	1

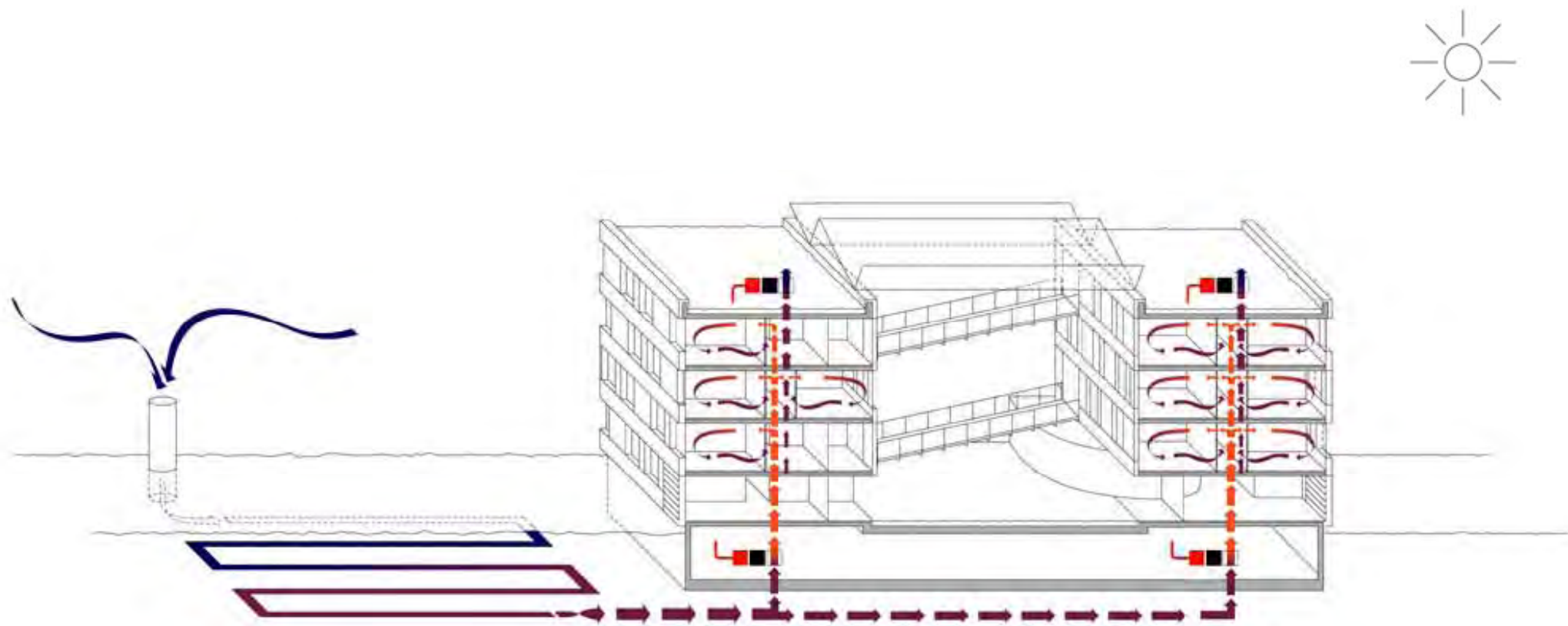






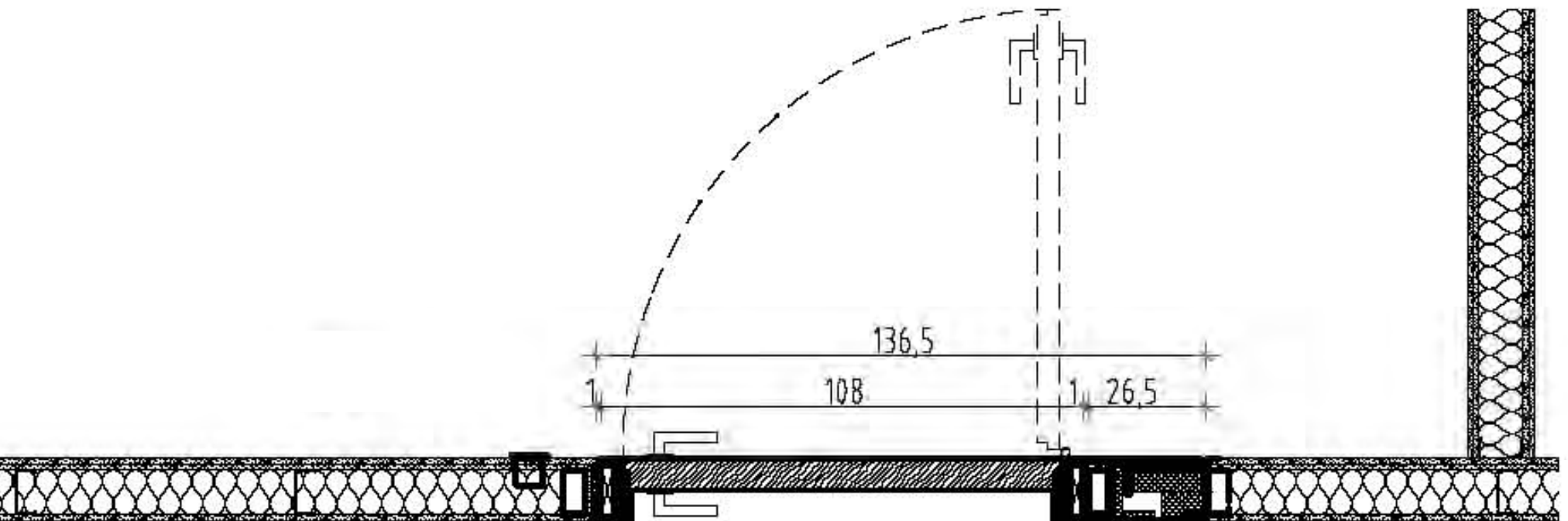
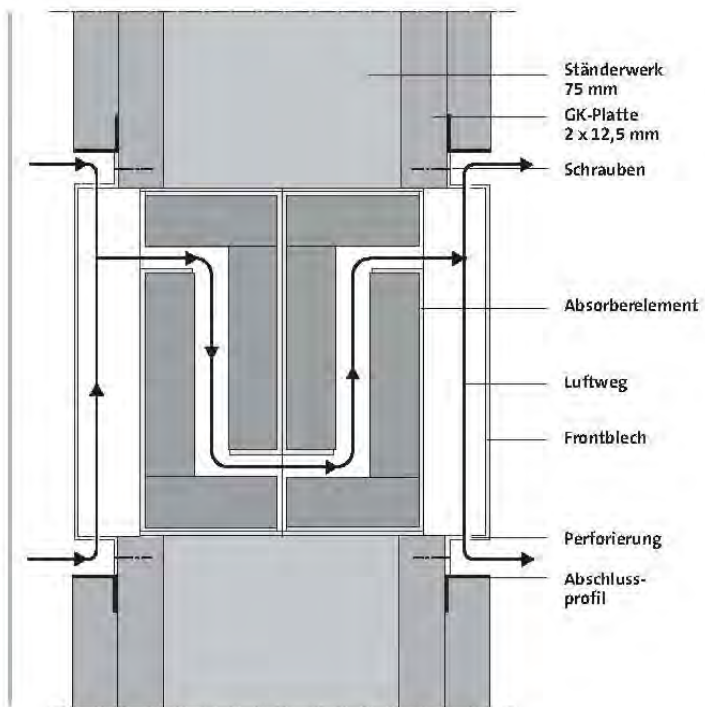
environmental agency dessau: diagram depicting daytime mechanical and natural air flow in summer



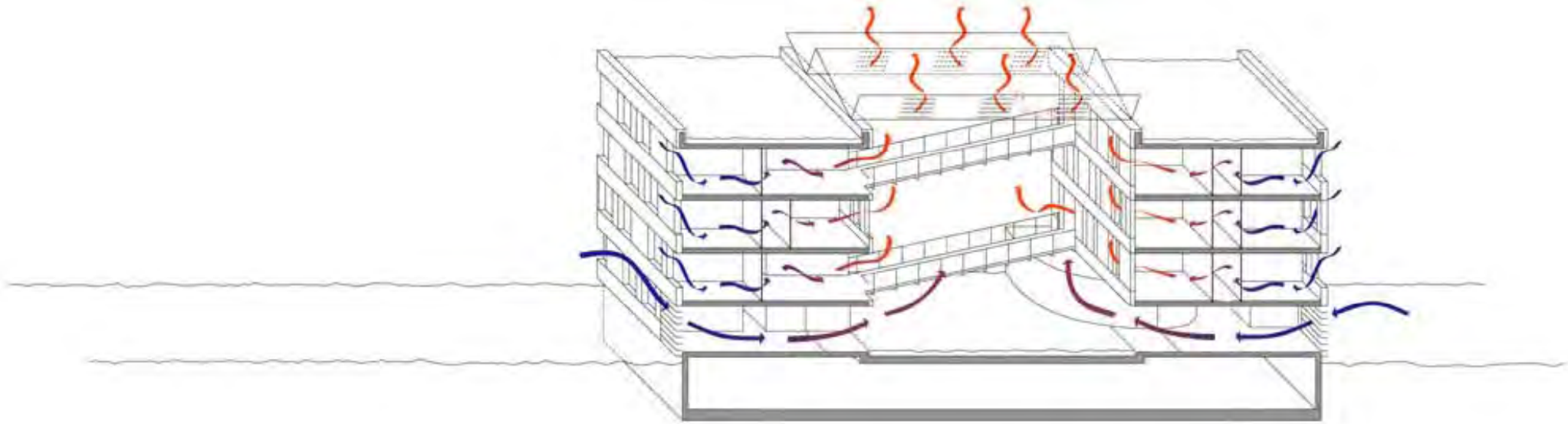


environmental agency dessau: diagram depicting daytime mechanical air flow in winter





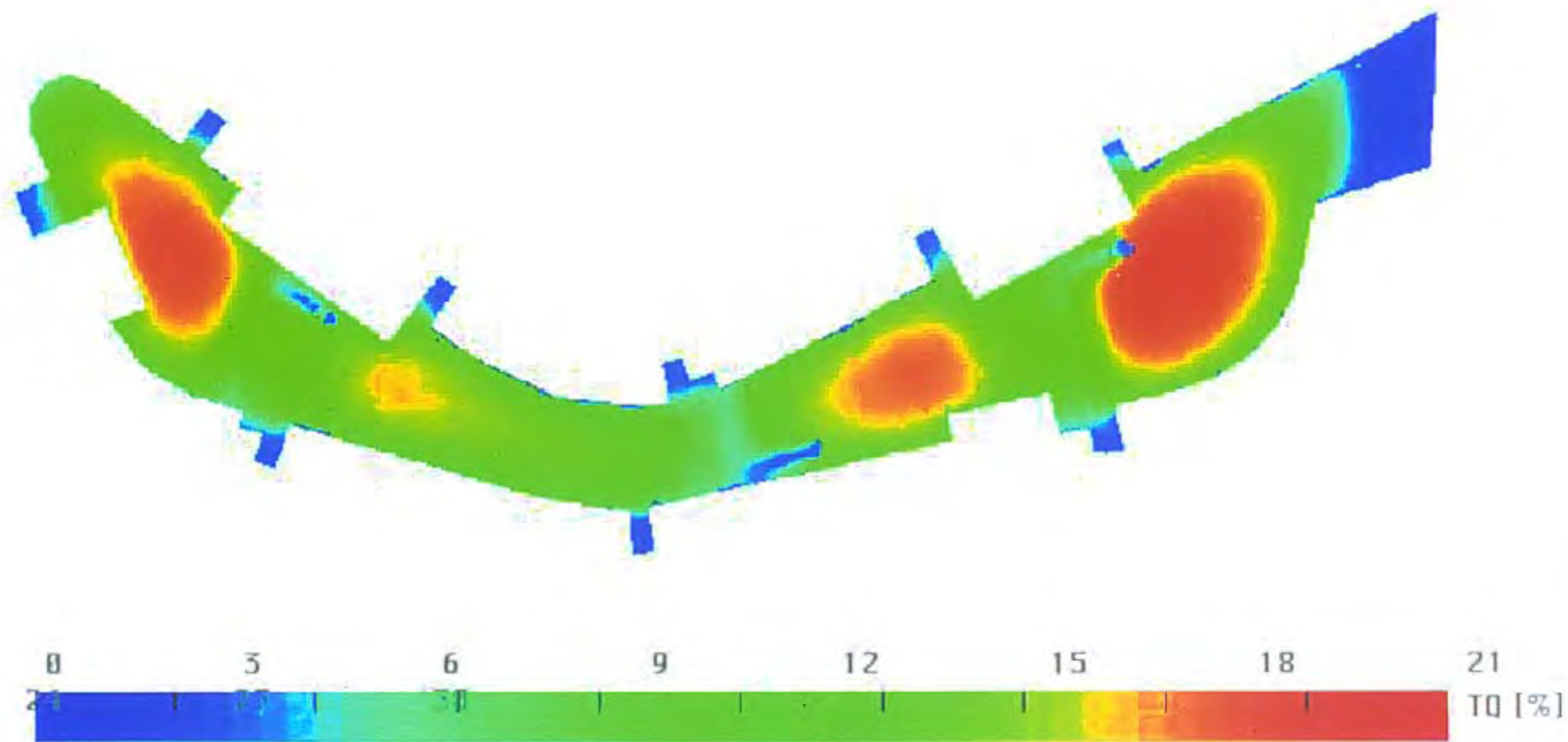
environmental agency dessau: details of acoustic elements for exhaust air flow between office and corridor spaces



environmental agency dessau: diagram depicting air flow during nighttime ventilation in summer

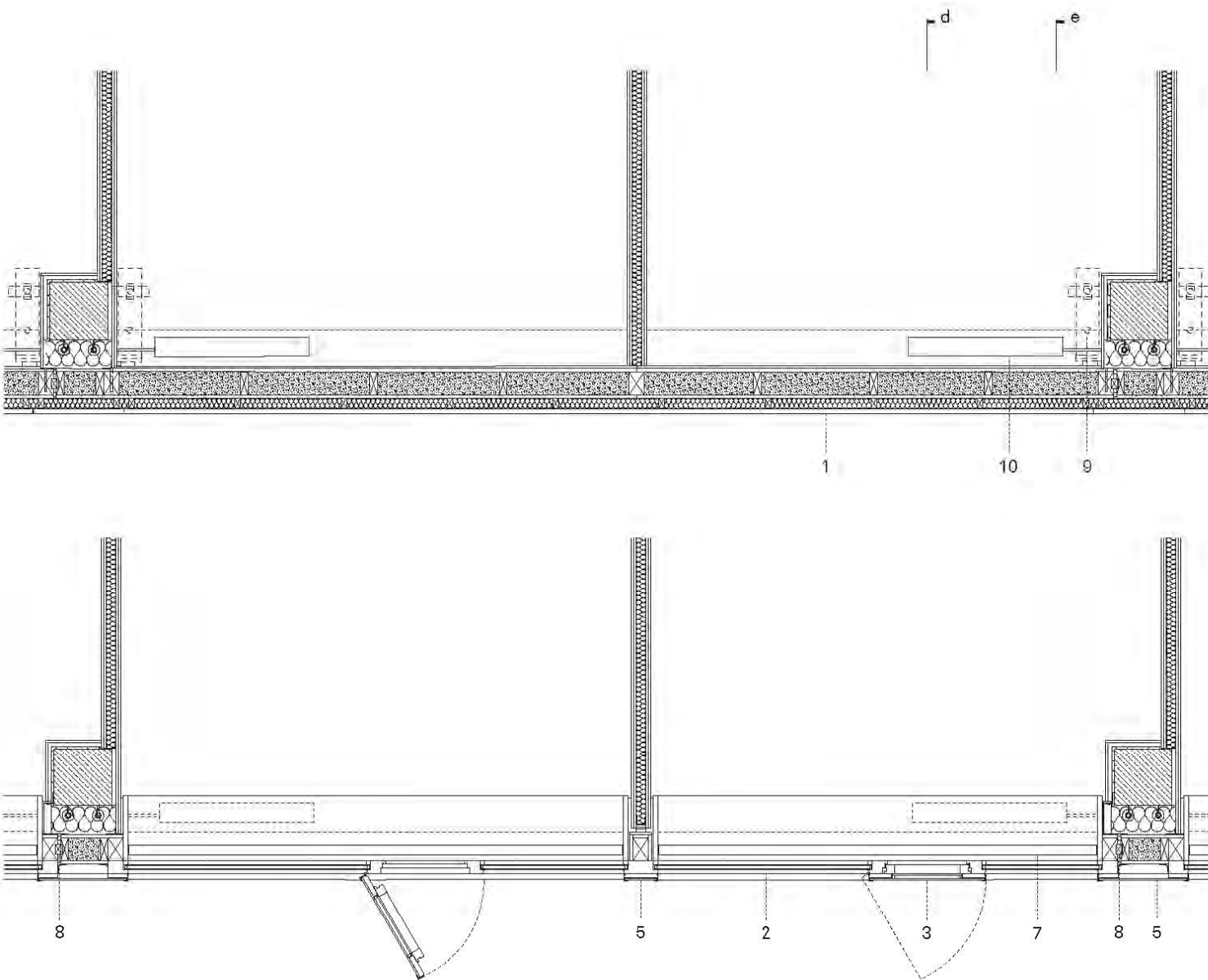






environmental agency dessau: diagram depicting daylight quotients in the atrium space





interior facade: sections and plans

1 spandrel construction from the inside
 gypsum board, mounted onto
 chipboard 18 mm
 laminated timber substructure
 in between cellulose fibre insulation 120 mm
 gypsum fibre board 19 mm
 on timber substructure
 in between melamine resin insulation 50 mm
 larch cladding with fire-protection coating on all sides

2 timber-framed window
 larch veneered casement window

3 casement window
 larch veneered timber frame with double-glazing
 colour strip inside, colour enamelled screen print outside
 integrated opening limiter

4 glare protection
 blinds 25 mm wide, manually operated

5 exterior skin
 single sheet safety glazing 8 mm
 colour enamelled screen print on outer surface
 vertical substructure
 all-round channel fixing

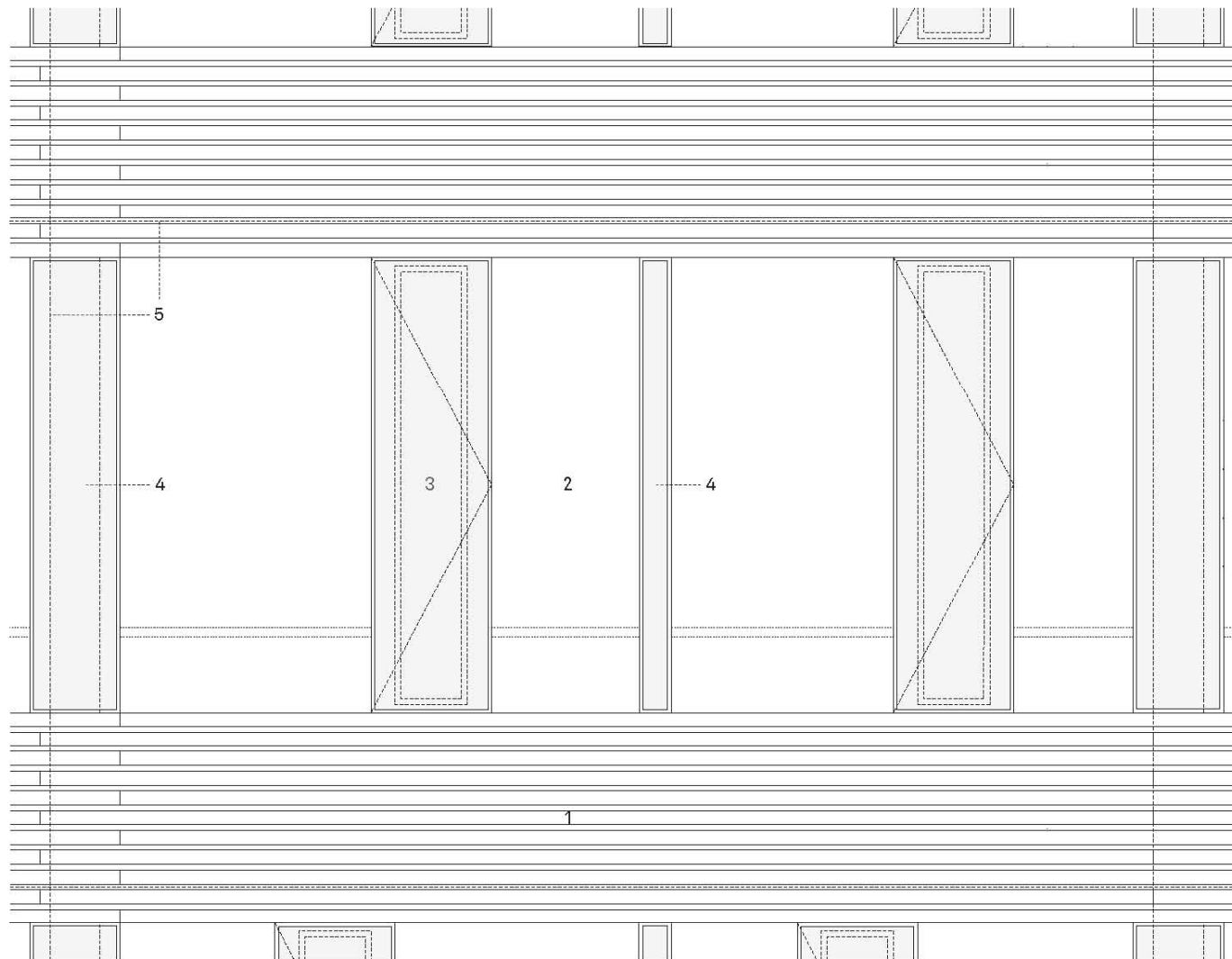
6 internal window sill and reveal
 timber board larch veneered

7 guard rail
 stainless steel tube

8 separation joint between facade elements

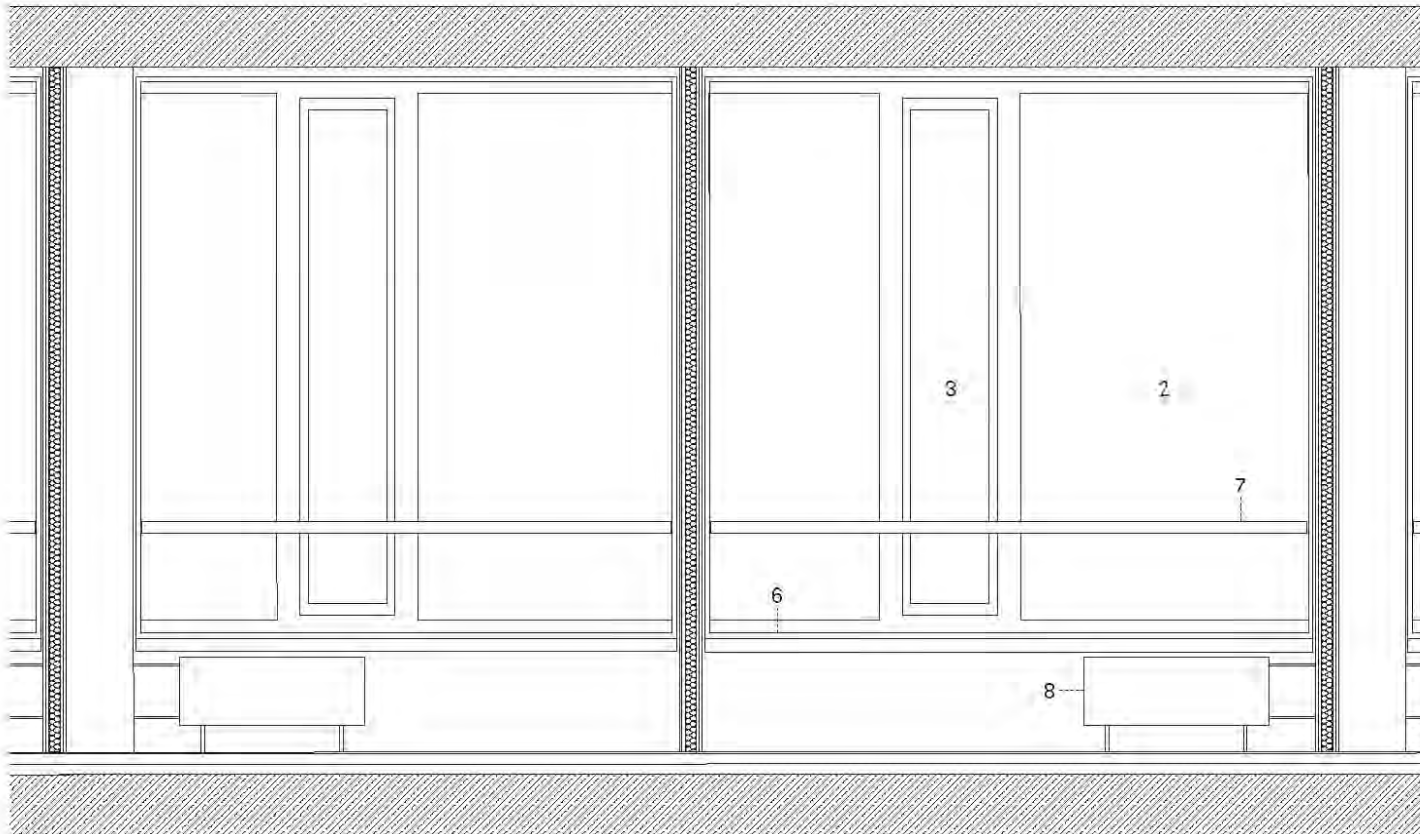
9 fixing of facade elements
 bracket with 30 min. fire-rating on halfen channel

10 radiator

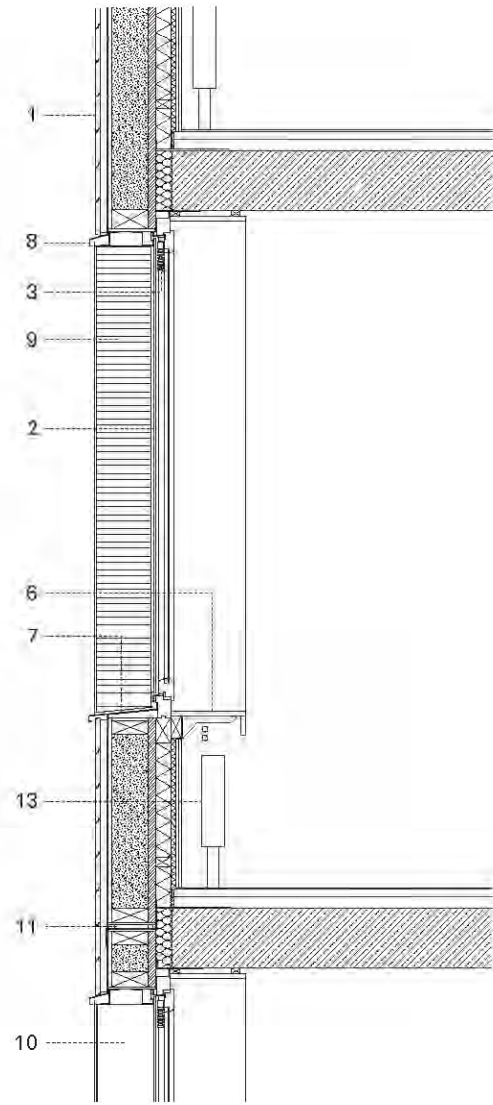


interior facade: elevations

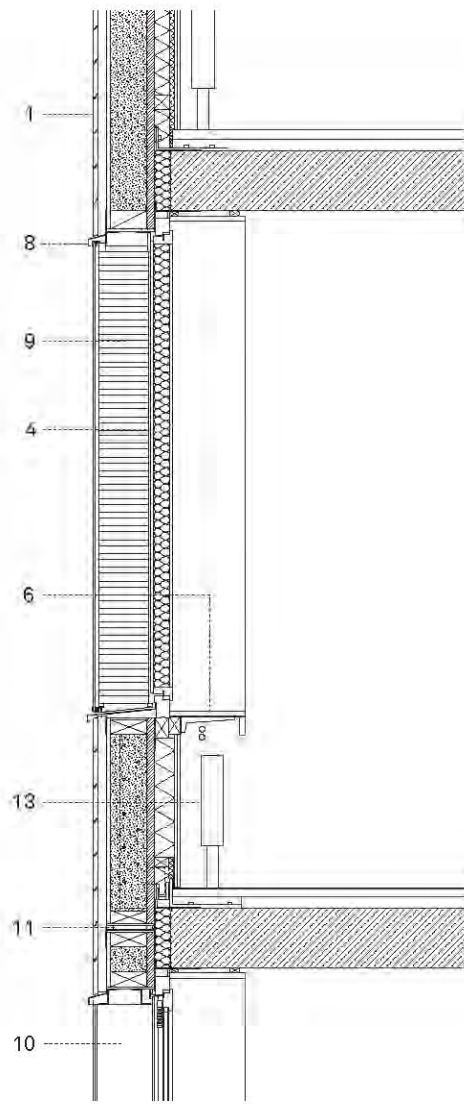
- 1 spandrel
larch cladding with fire-protection coating on all sides
- 2 timber-framed window
larch veneered, casement window
- 3 casement window
larch veneered timber frame with double-glazing
colour strip inside, colour enamelled screen print outside
- 4 exterior skin
single sheet safety glazing 6 mm
colour enamelled screen print on outer surface
all-round channel fixing
- 5 separation joint between facade elements
- 6 internal window sill and reveal
timber board, larch veneered
- 7 guard rail
stainless steel tube
- 8 radiator



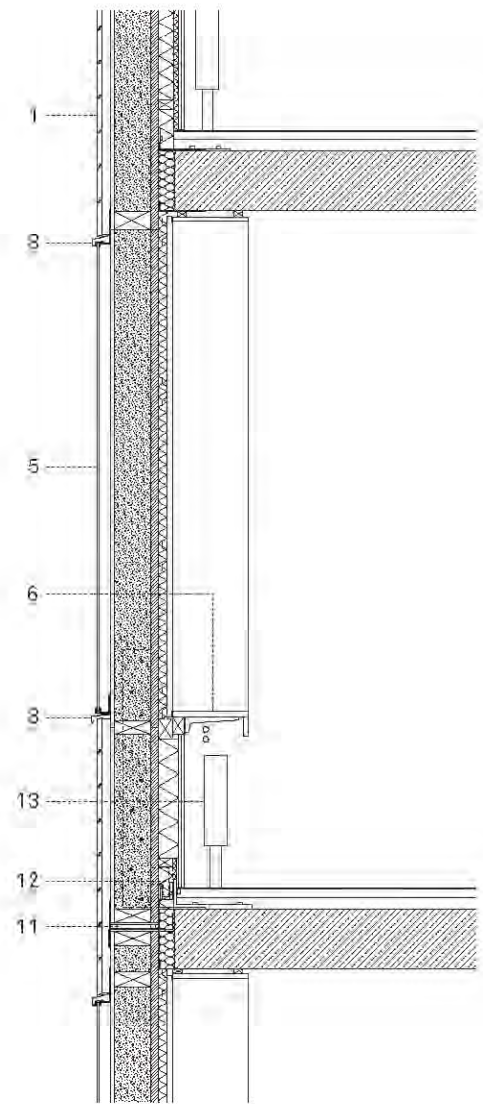




a

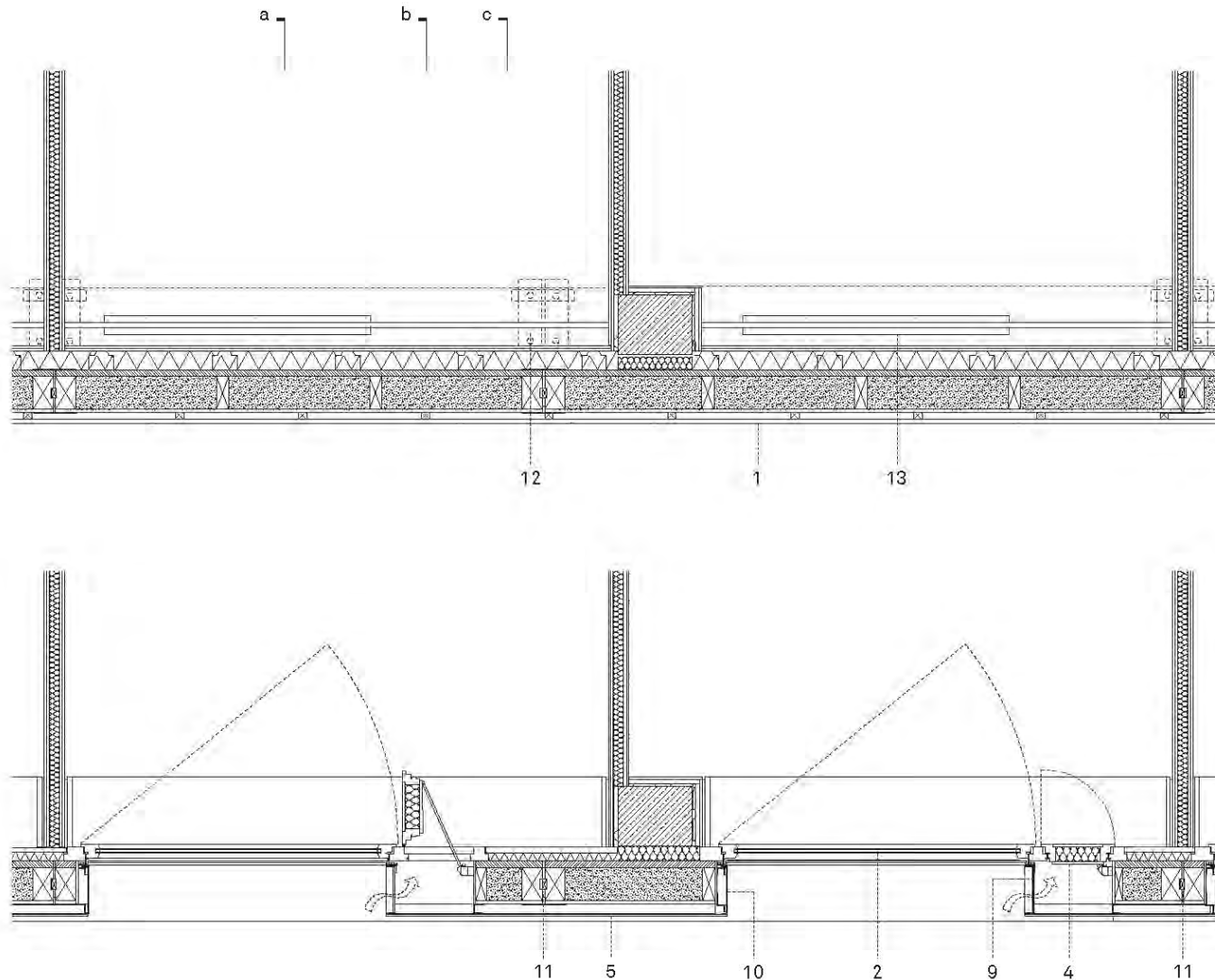


b



c

exterior facade: sections and plans



1 spandrel construction from the inside
 gypsum board 25 mm
 timber substructure 63 mm,
 metal fixing 27 mm,
 in between cellulose fibre insulation 90 mm
 fibre (wood / concrete) board 29 mm
 timber frame of laminated timber
 in between cellulose fibre insulation 160 mm
 gypsum fibre board 15 mm
 substructure and ventilation gap 40 mm
 larch cladding with fire-protection coating on inner side

2 timber-framed window
 larch veneered double window composed of a
 double glazed casement window (internal)
 and single leaf security glazing (external)

3 solar protection
 blinds 25 mm wide with light-refraction feature
 between casement window and security glazing
 manually operated

4 ventilation panel for night cooling
 timber framed panel 14 mm, larch veneered
 moisture protection
 with cellulose fibre insulation 70 mm
 automatic operation

5 coloured glass panel
 construction same as spandrel, but
 ventilation gap 52 mm
 single sheet safety glazing 10 mm,
 colour enamelled on reverse side
 held top and bottom by aluminium u-profiles

6 internal window sill and reveal
 timber board, larch veneered

7 external window sill
 tin-coated copper

8 external sill of sheet metal
 tin-coated copper

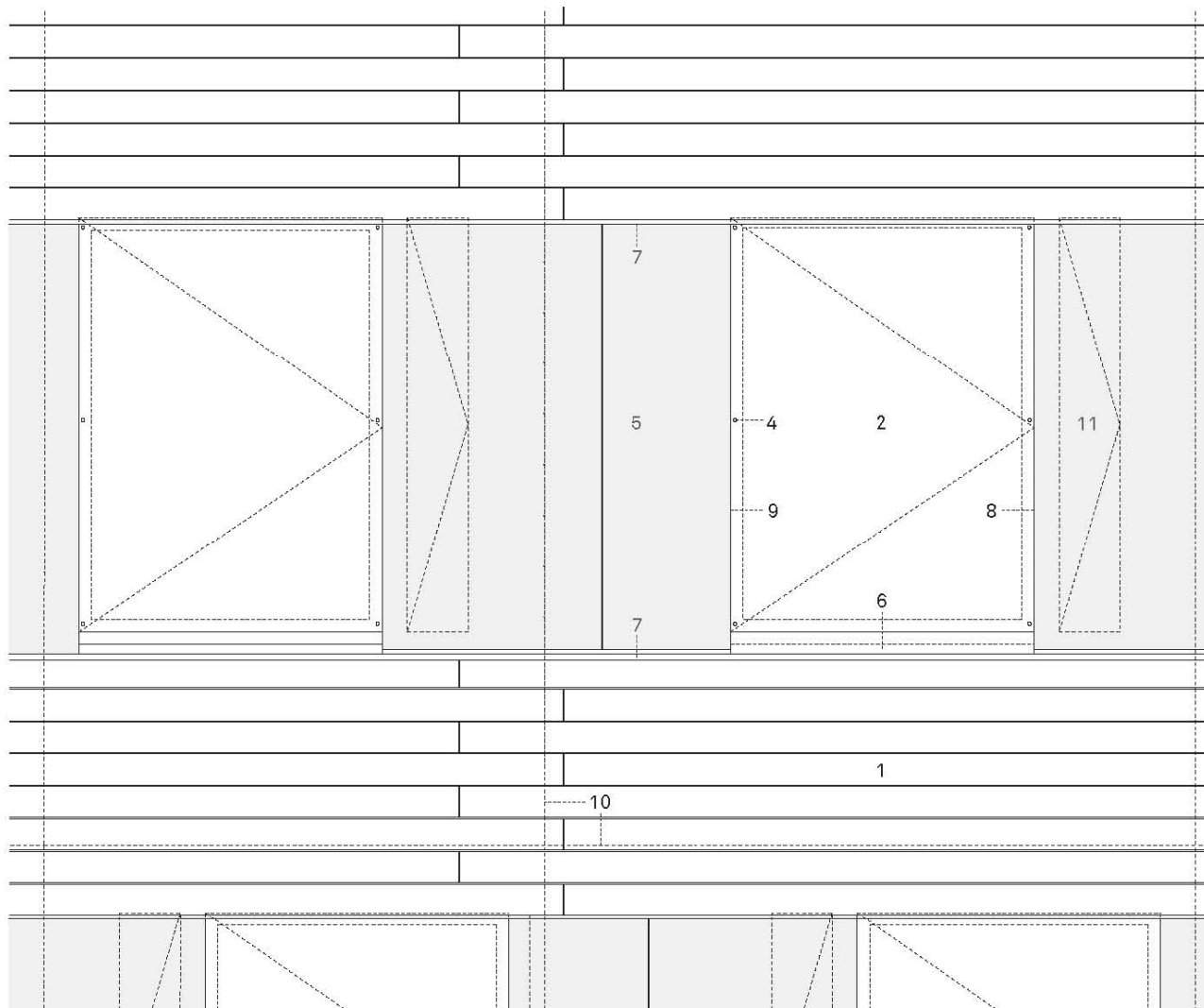
9 ventilation grille
 powder-coated aluminium
 free section allows 70% air transmission

10 window reveal
 powder-coated steel plate

11 separation joint between facade elements

12 fixing of facade elements
 bracket with 30 min. fire-rating on halfen channel

13 radiator



exterior facade: elevations

1 spandrel
larch cladding with fire-protection coating on inner side

2 timber-framed window
larch veneered double window composed of a
double glazed casement window (internal)
and single leaf security glazing (external)

3 solar protection
blinds 25 mm wide with light-refraction feature
between casement window and security glazing
manually operated

4 mounting element

5 coloured glass panel
single sheet safety glazing 10 mm,
colour enamelled on reverse side
held top and bottom by aluminium u-profiles

6 external window sill
tin-coated copper

7 external sill of sheet metal
tin-coated copper

8 ventilation grille
powder-coated aluminium
free section allows 70% air transmission

9 window reveal
powder-coated steel plate

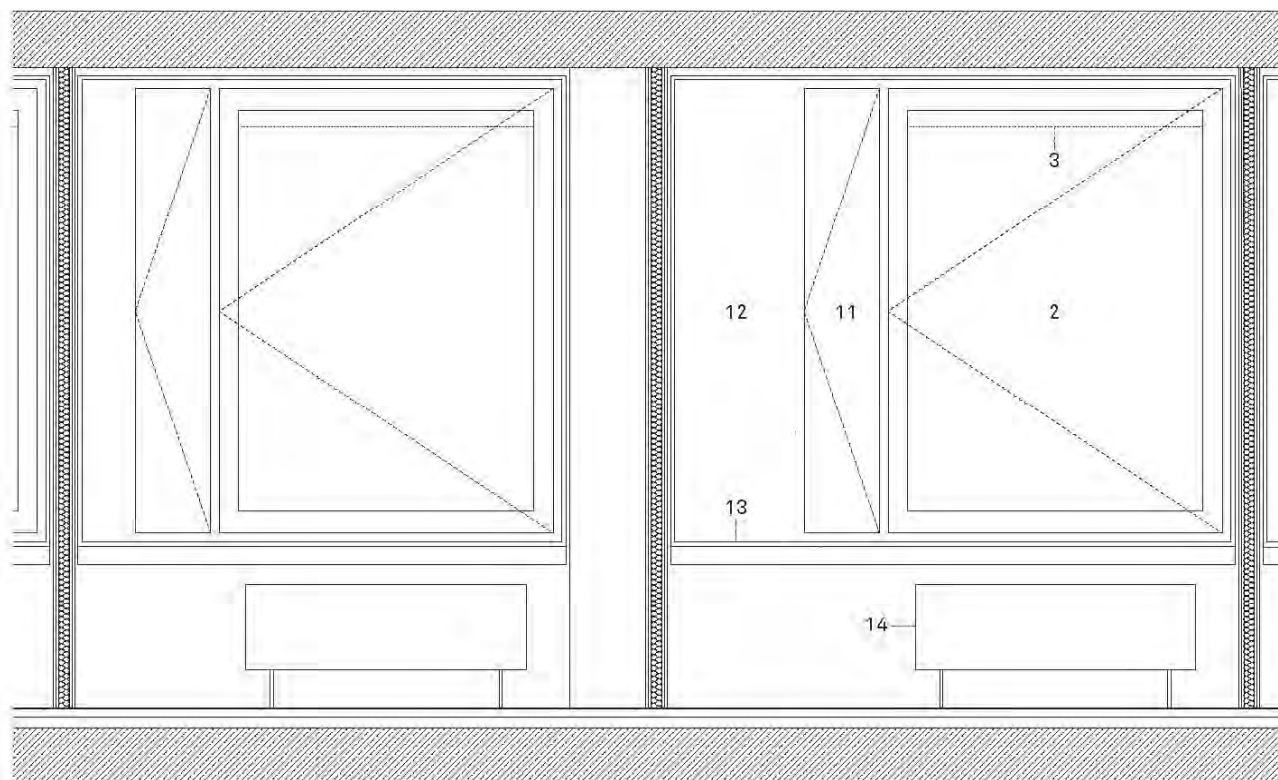
10 separation joint between facade elements

11 ventilation panel for night cooling
timber framed panel 14 mm, larch veneered
automatic operation

12 cladding
timber board, larch veneered

13 internal window sill and reveal
timber board, larch veneered

14 radiator



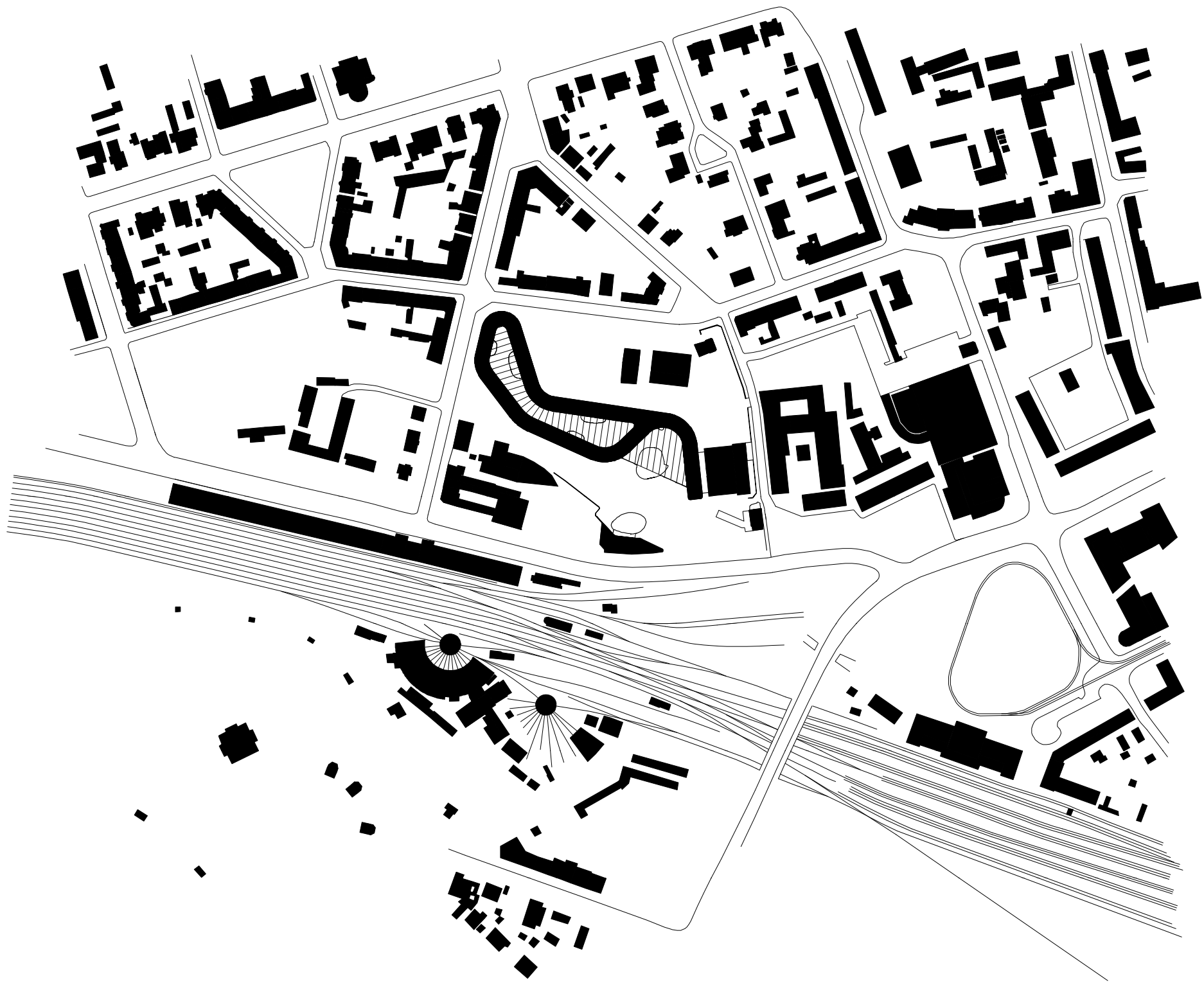








environmental agency dessau: diagram depicting the infiltration and intensity of noise sources near site (rail, street traffic, industry)

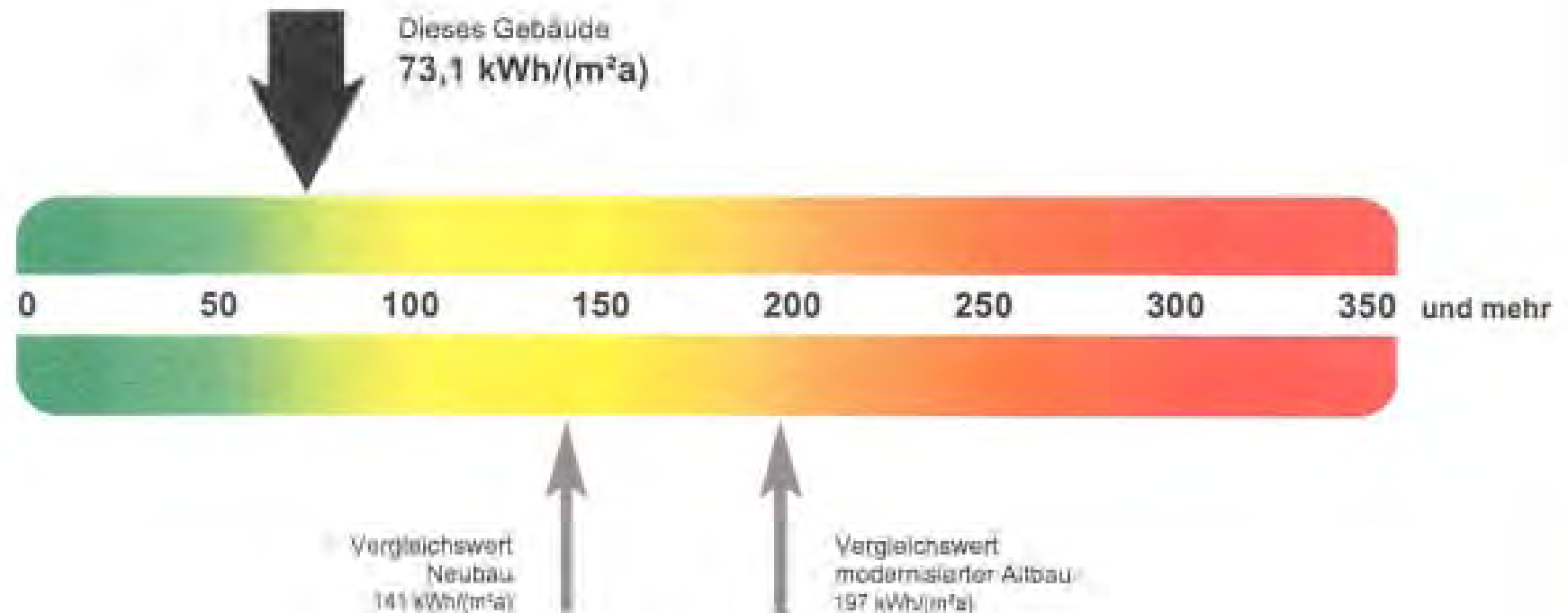




Energieausweis für das UBA Dessau

(Hauptgebäude einschließlich Hörsaal und Bibliothek)

Gesamtbewertung Primärenergiebedarf



Vergleichswert in Anlehnung an EnEV 2004

Zeit	Event	Status	P...	Wert
01.10. 07:55:40	Anl. 929 ANTRIEBE ISPI65/Storanzeige	QUIT	100	aktiv
29.09. 15:47:20	Zentralbatterieanlage_1	QUIT	10	gestört
29.09. 15:47:20	Anl. 932 SSM BEGLEITZG/gespeicherter Zust	QUIT	100	Störung

Liegenschaft: UBA
Gebäude: UBA
Geschoß: 01
Anlage: 006/009
AKS-Anlage: 01A/23_924
AKS-Schaltschrank: CPU010

Bediener: Name:
Zugangsebene: 0
Rechte: Supervisor
Datum: Donnerstag
02.10.2008
12:34:49

Bild 2 von 12

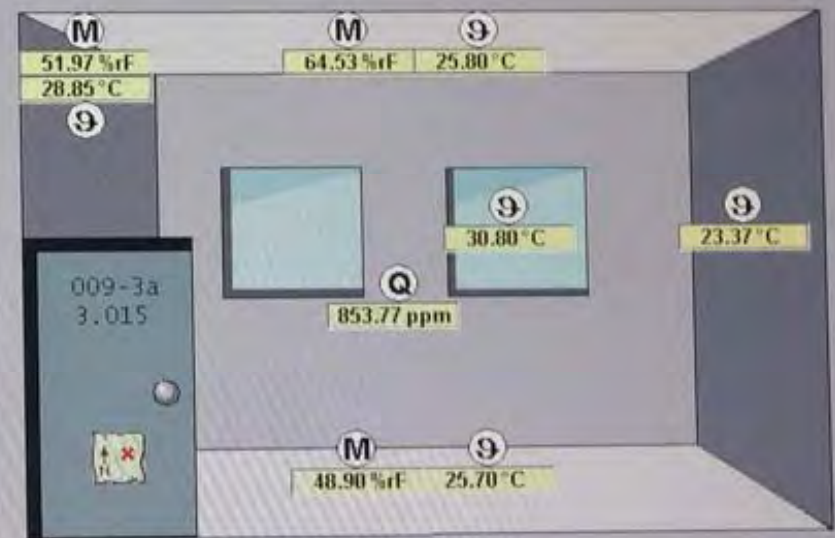
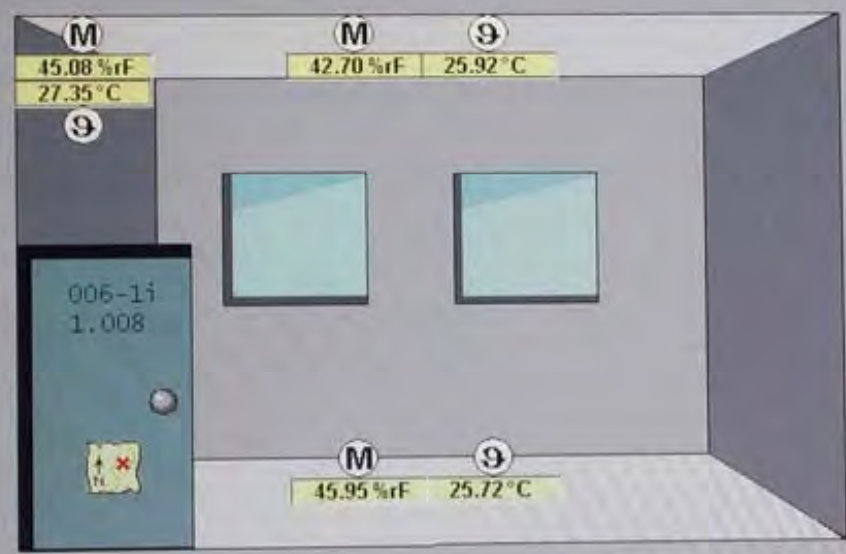
Außentemperatur: 14.85 °C
 Außenfeuchte: 60.91 %rF
 Windstärke: 4.85 m/s
 Globalstrahlung: 183.19 W/m²



Anlage
 Auto
 0h

Meßtechnik Raum 006-1i, 009-3i

- Einblendungen
- Betriebsstunden
- Sollwerte
- Informationen
 - Auswertung
 - Trend
- Kommunikation
- Alarmliste
- Navigation
 - Übersicht
 - letzte Auswahl
 - Vor Zurück
- Sicherheit
 - An/Abmelden



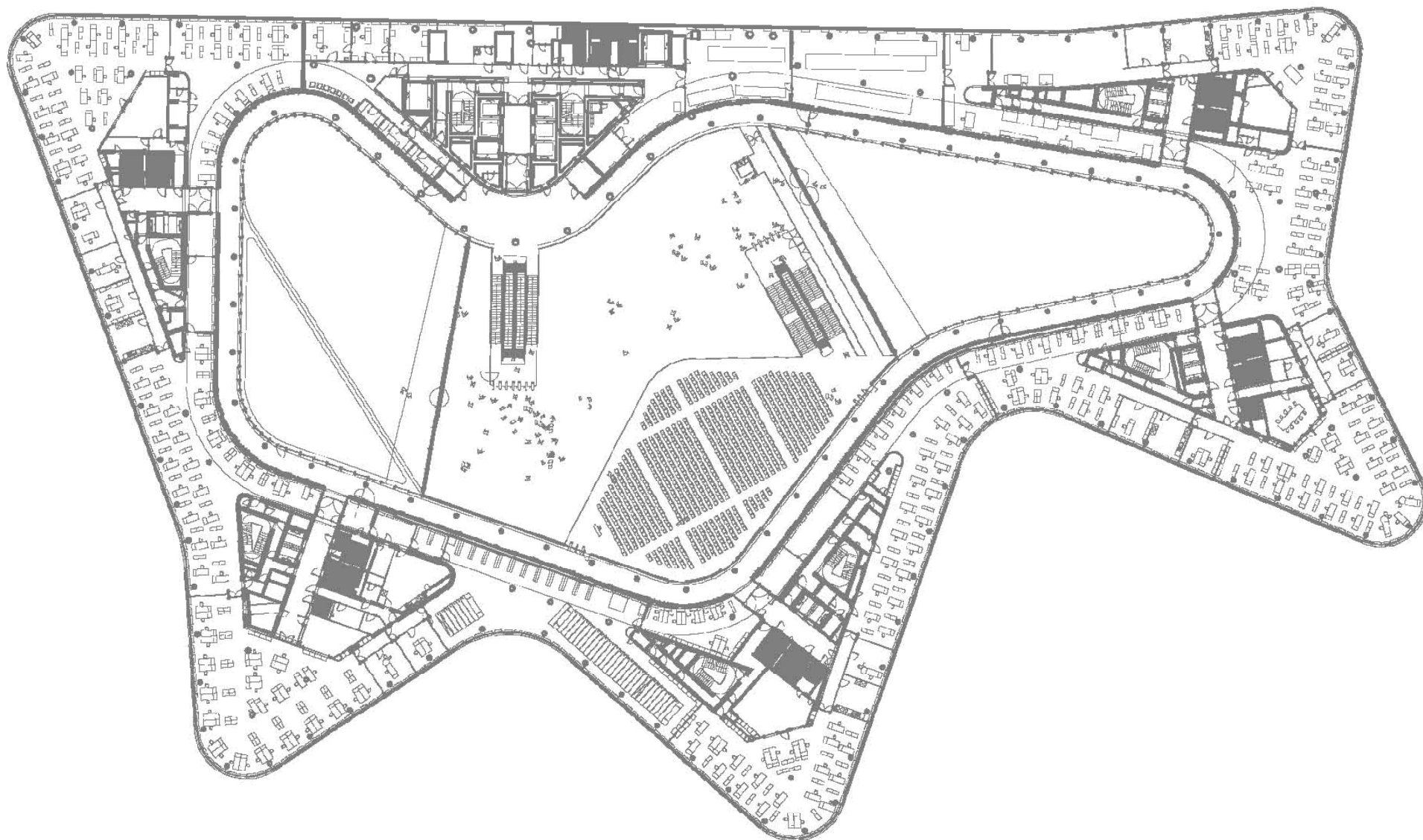


adac headquarters munich









adac headquarters munich: first floor plan





In den folgenden Grafiken ist das Klima- und Lüftungskonzept von Foyer und ADAC Welt dargestellt.

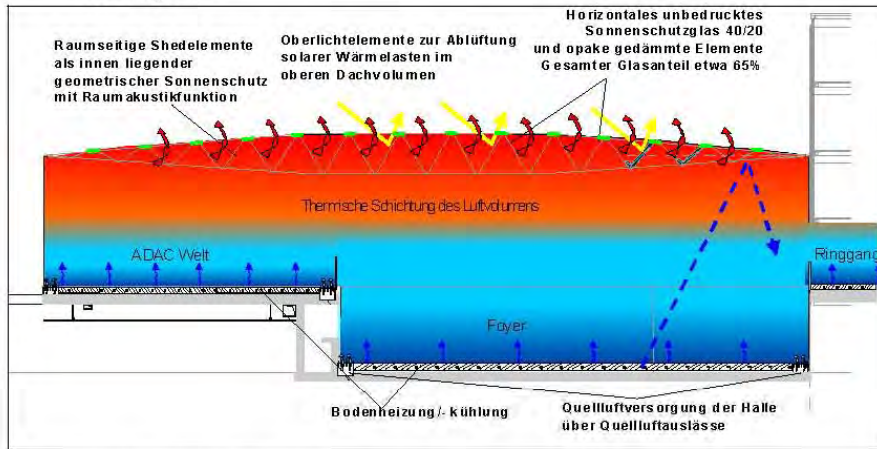


Abbildung 12: Klima- und Lüftungskonzept Foyer / ADAC Welt

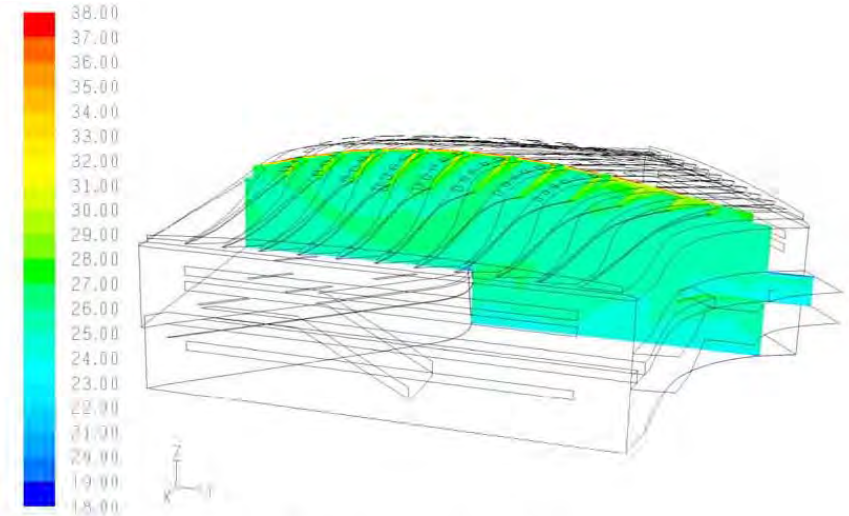


Abbildung 64: CFD Halle – Sommerfall 1: Lufttemperaturen

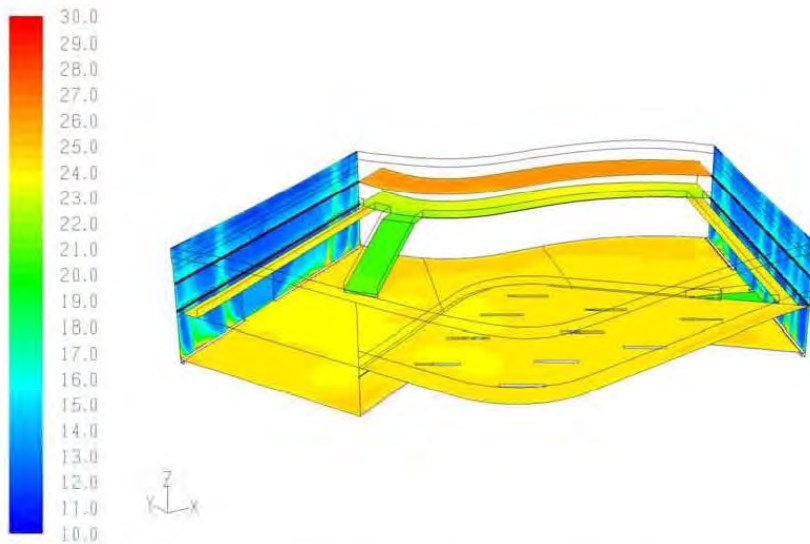


Abbildung 62: CFD Halle – Winterfall: Oberflächentemperaturen Boden und Fassaden

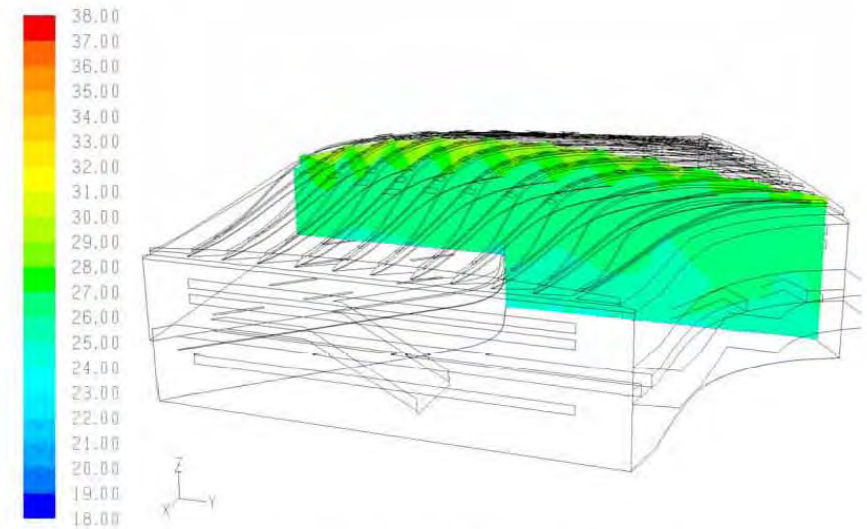
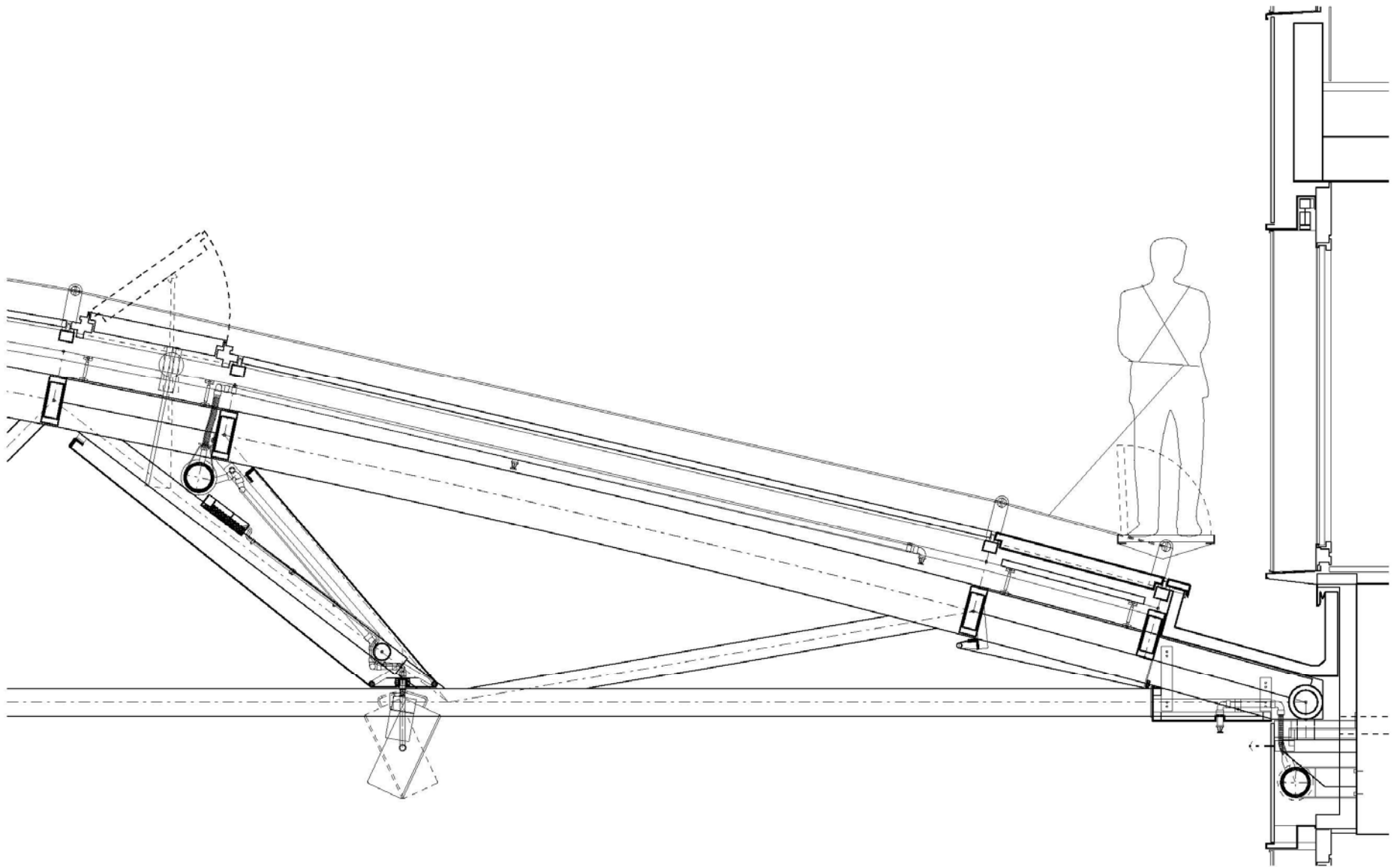
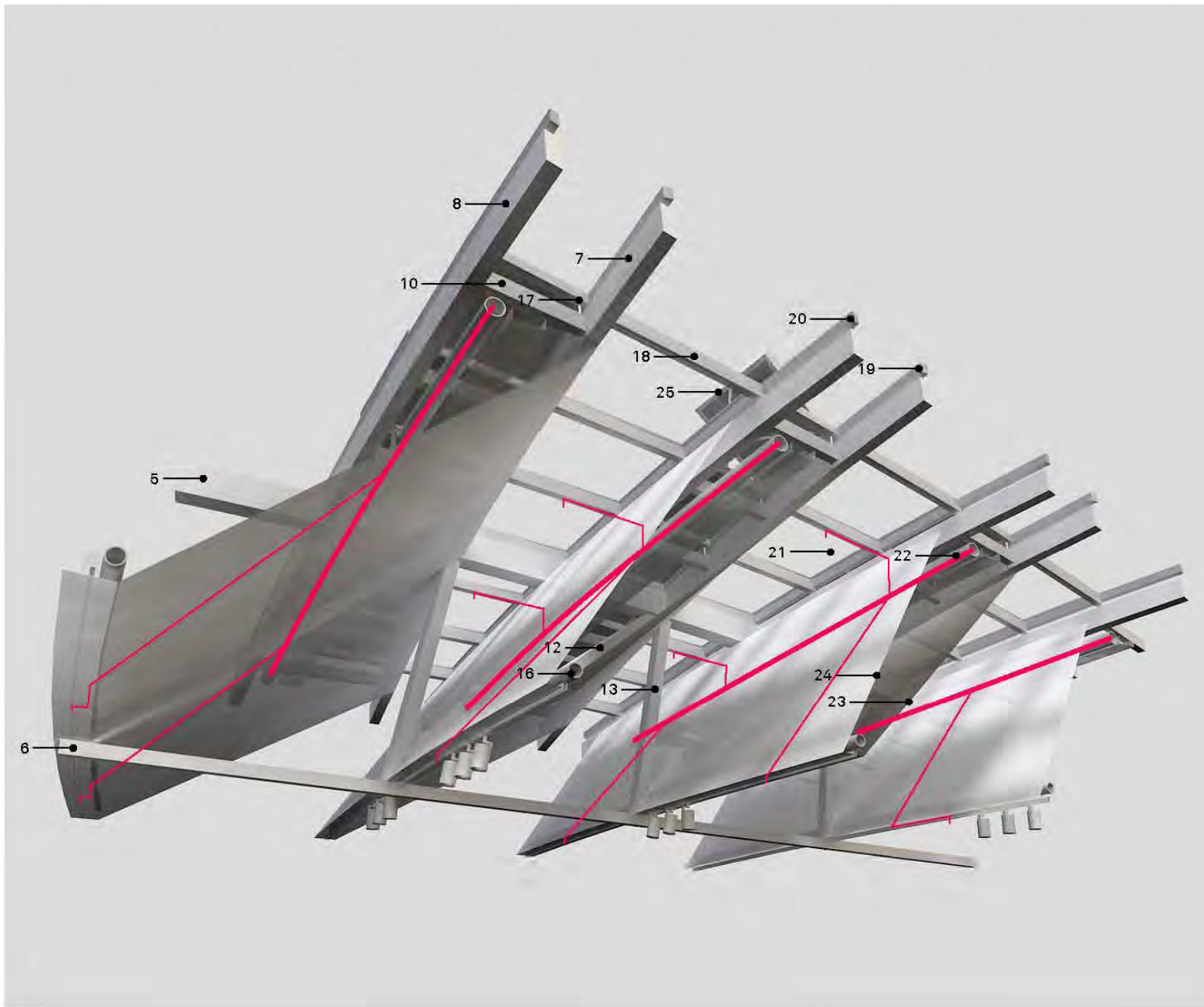


Abbildung 65: CFD Halle – Sommerfall 1: Empfundene Raumtemperaturen





adac headquarters munich: detail depicting glass roof, ventilation openings and shading elements, foyer



Primärstruktur

- 1 Ringträger 119,73 m
- 2 Fassadenträger 73,96 m
- 3 Foyerfassade Pfosten
- 4 Foyerfassade Riegel
- 5 Hauptträger Obergurt 299,77 m
- 6 Hauptträger Untergurt 294,40 m
- 7 Querträger A 659,17 m
- 8 Querträger B 626,55 m
- 9 Querträger Diagonale
- 10 Querträger Pfosten
- 11 Querträger Rinne 119,76 m
- 12 Hauptträger Diagonale A 279,07 m
- 13 Hauptträger Diagonale B 168,12 m
- 14 Hauptträger Diagonale C
- 15 Hauptträger Verlängerung 2,10 m
- 16 Installationskanal 643,52 m

Sekundärstruktur

- 17 Niveaueingleich
- 18 Pfette 1870,11 m
- 19 Pfette A quer 659,2 m
- 20 Pfette B quer 626,57 m

Systemflächen

- 21 Schale Glas 987,47 m²
- 22 Schale Opak 1272,94 m²
- 23 Segel A 2626,96 m²
- 24 Segel B 1415,52 m²
- 25 RWA 129,42 m²

Neubau ADAC Zentrale, München DIN A3

Vorabzug

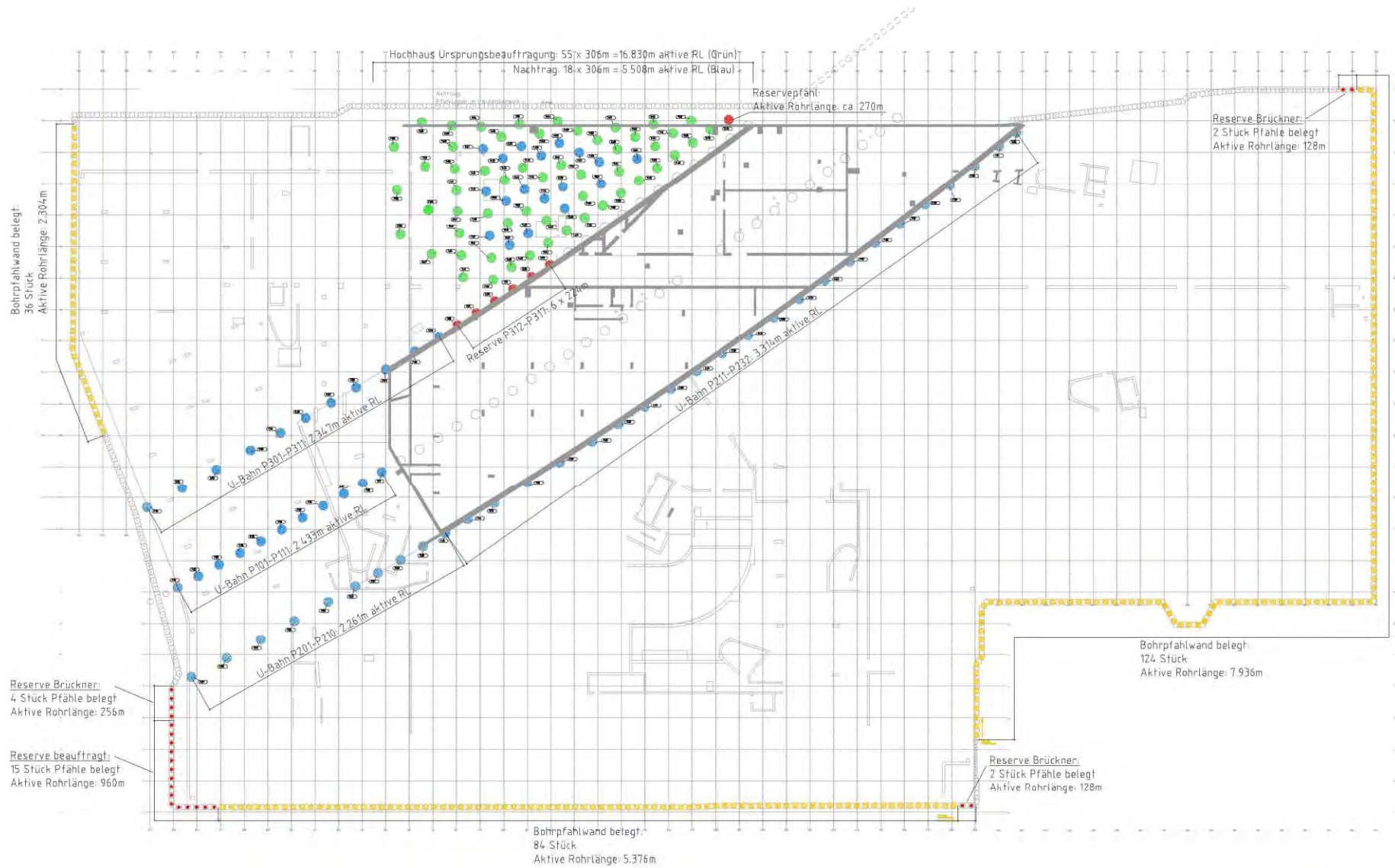
Fassade Typ 20, Foyer- shg 31.07.2008
dach Erläuterungsskizzen
Detailausschnitt

1000-FDP-DE-DB-FY-50-300-X
Seite 5 von 13

sauerbruch hutton generalplanungsgesellschaft mbH
Ludwigstr. 21 10557 Berlin Tel. +49 30 265 50 10 Fax. +49 30 265 50 121

[illegible]





- Gründungspfähle Baugrubenumschließung
- Gründungspfähle neu (Nachtrag)
- Gründungspfähle Ursprungsangebot
- Gründungspfähle Reserve
- Reservepfähle Bohrpfahlwand

Projekt-Nr. : 1000
 Projekt : ADAC München

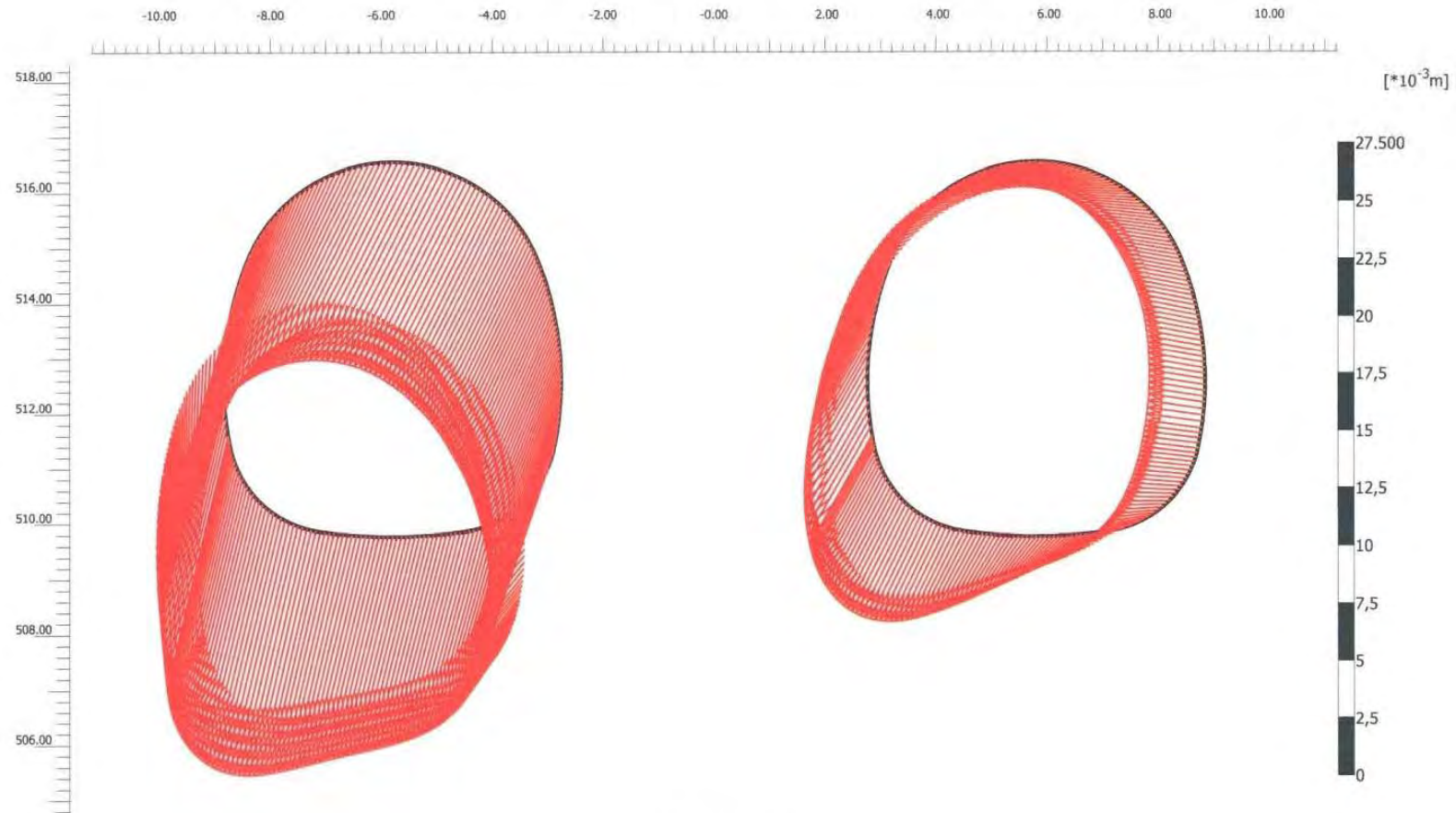
Plan-Nr. :
 CAD-Nr. : 1000-TSE-GR-xx-TG-53-G.dwg

Geothermie Übersicht aktive Pfähle

Maßstab :
 gez. von : eu
 gez. am : 18.04.2007



Plaxis 8.5



Al. 2.8

PLAXIS

Finite Element Code for Soil and Rock Analyses

Version 8.5.0.1133

Project description

ADAC Endzustand Verschiebungen Tunnelröhren

Project name

2D BK107 pfah...

Step

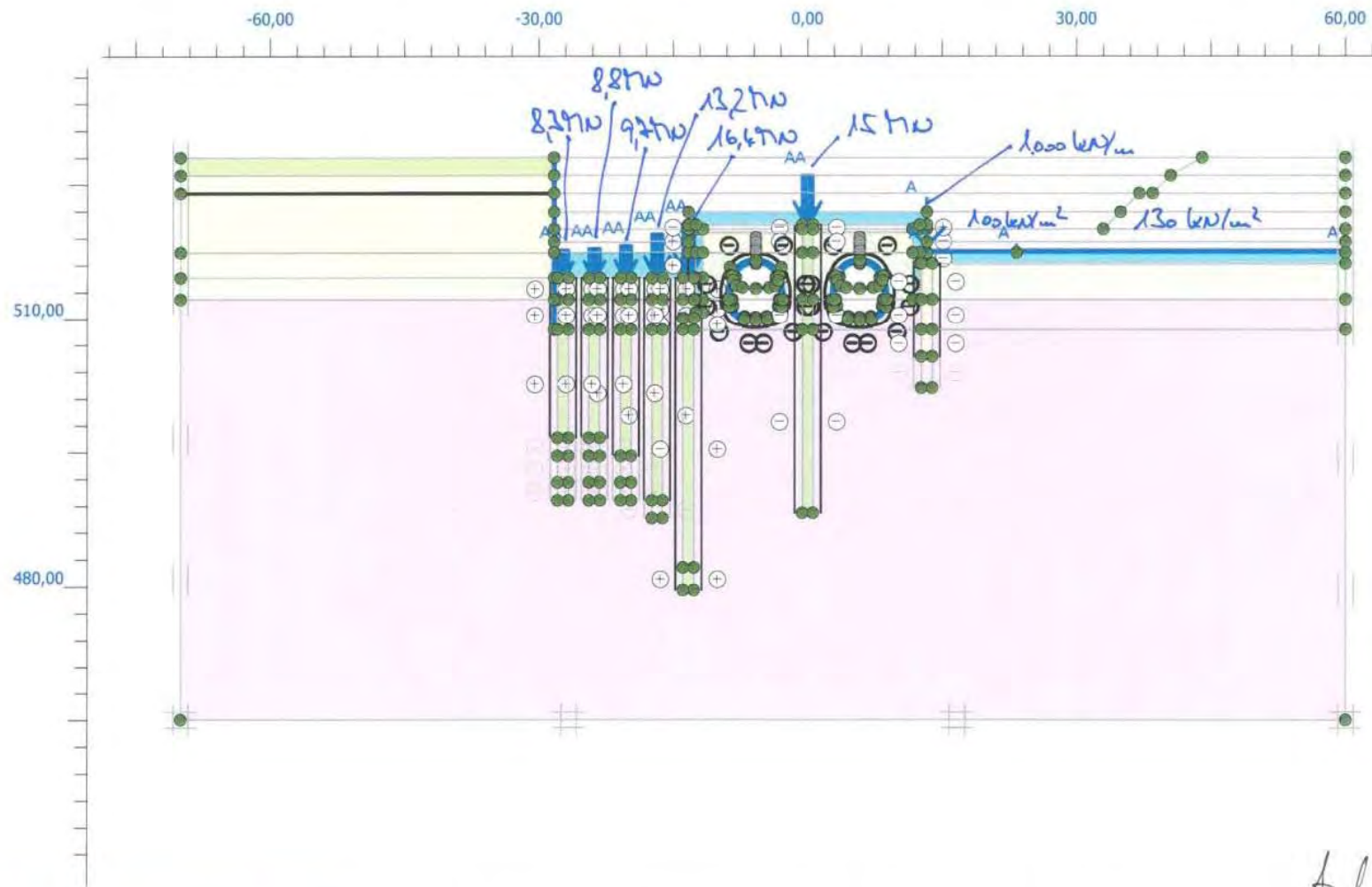
130

Date

22.05.07

User name

Dr. -Ing. Georg Ulrich



Aut. 2.1

PLAXIS
Finite Element Code for Soil and Rock Analyses

Version 8.5.0.1942

Project description

ADAC 2D FE Modell mit Lastverteilung

Project name

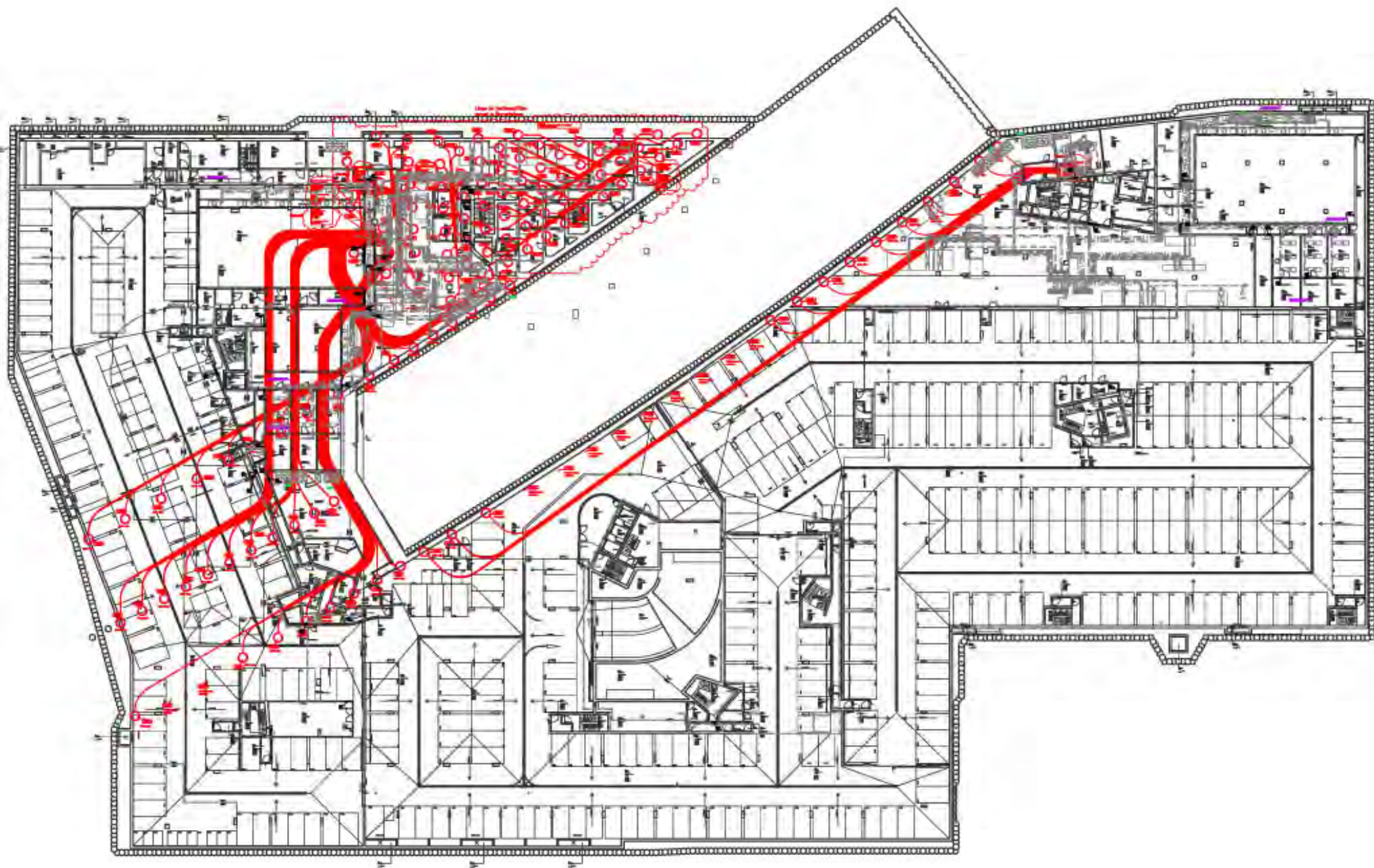
2D BK107 pfahlp...

Date

22.05.2007

User name

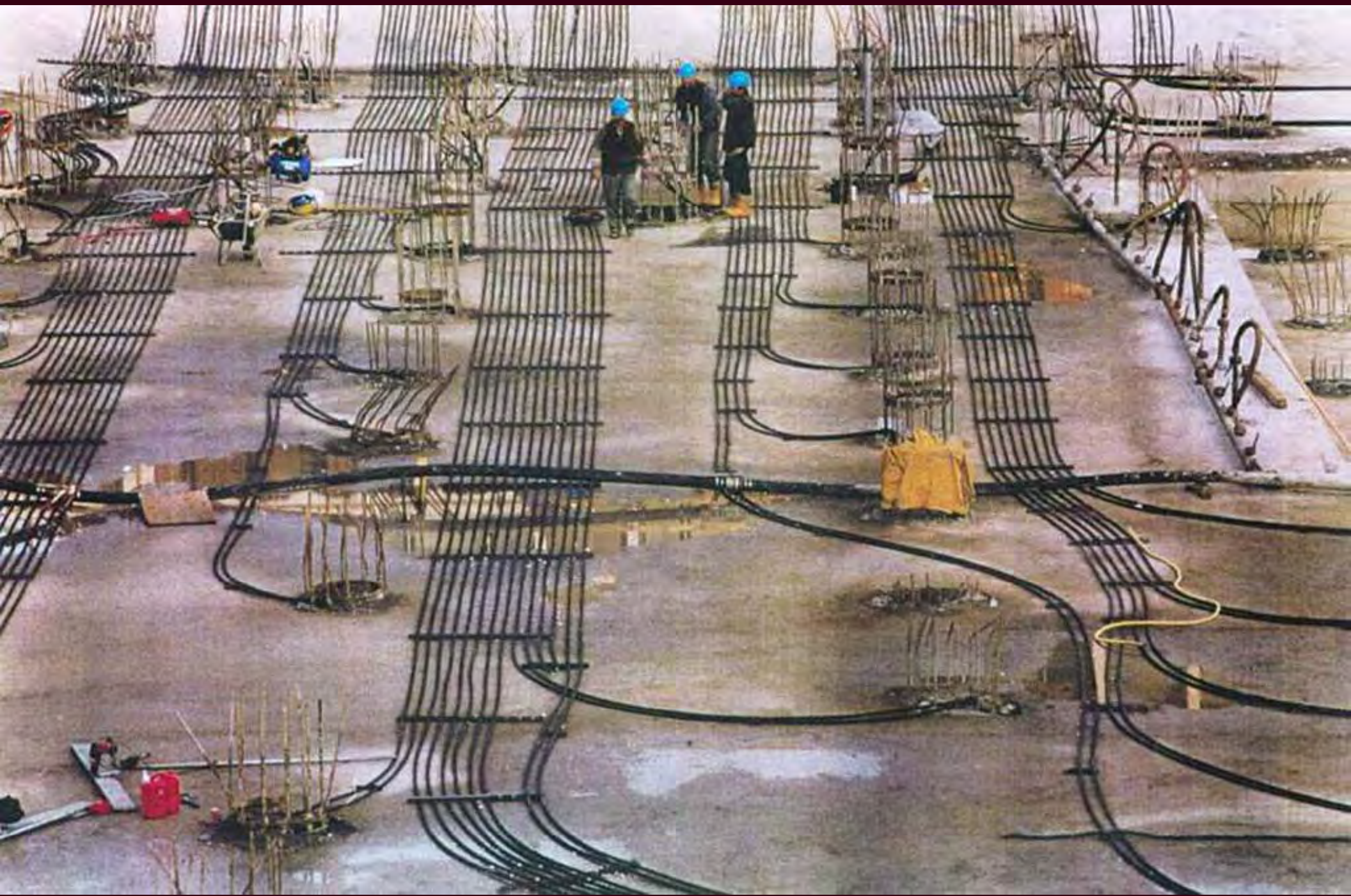
Dr. -Ing. Georg Ulrich

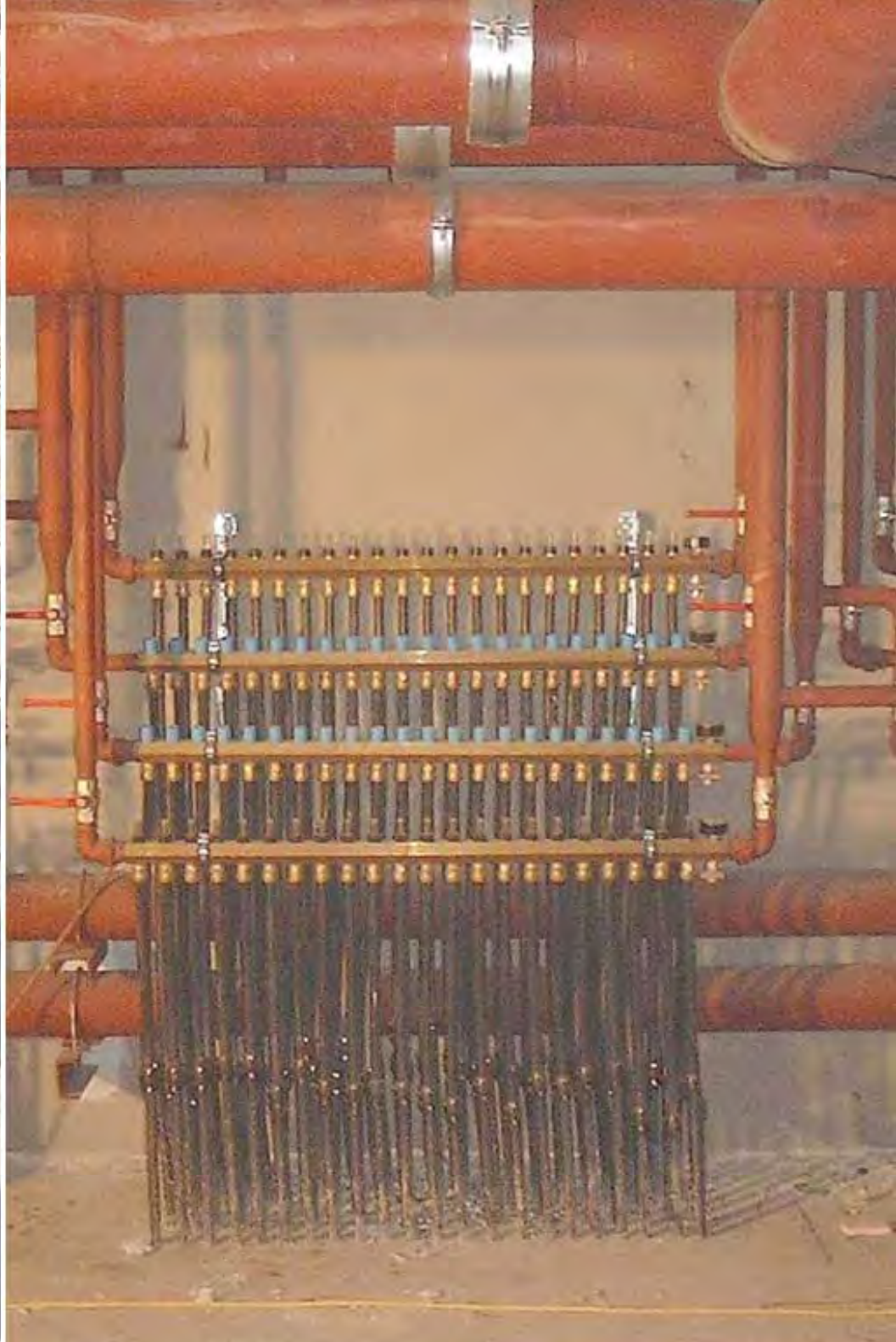


adac headquarters munich: diagram depicting the network of thermo-active piles











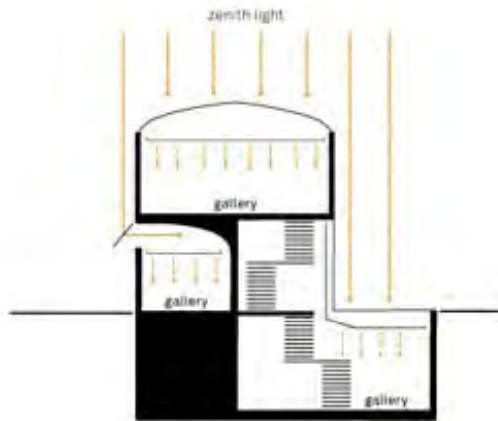
museum brandhorst münchen



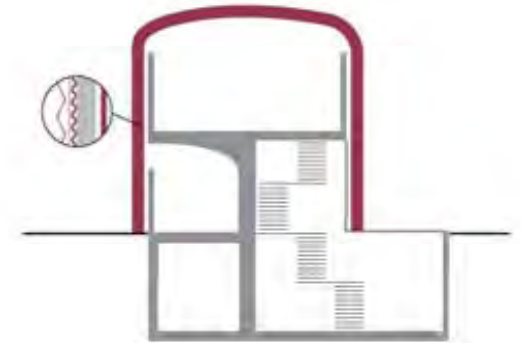




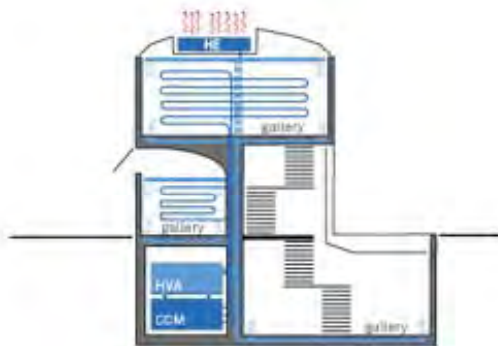
concept diagrams



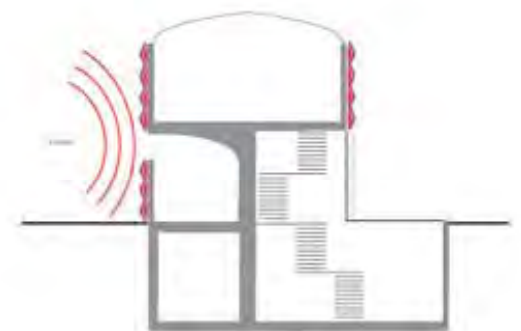
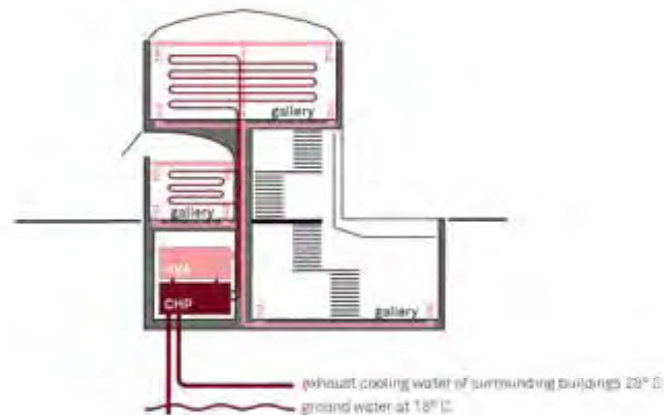
daylighting



thermal insulation



thermo-active construction



soundabsorption and reflection

thermo-active construction



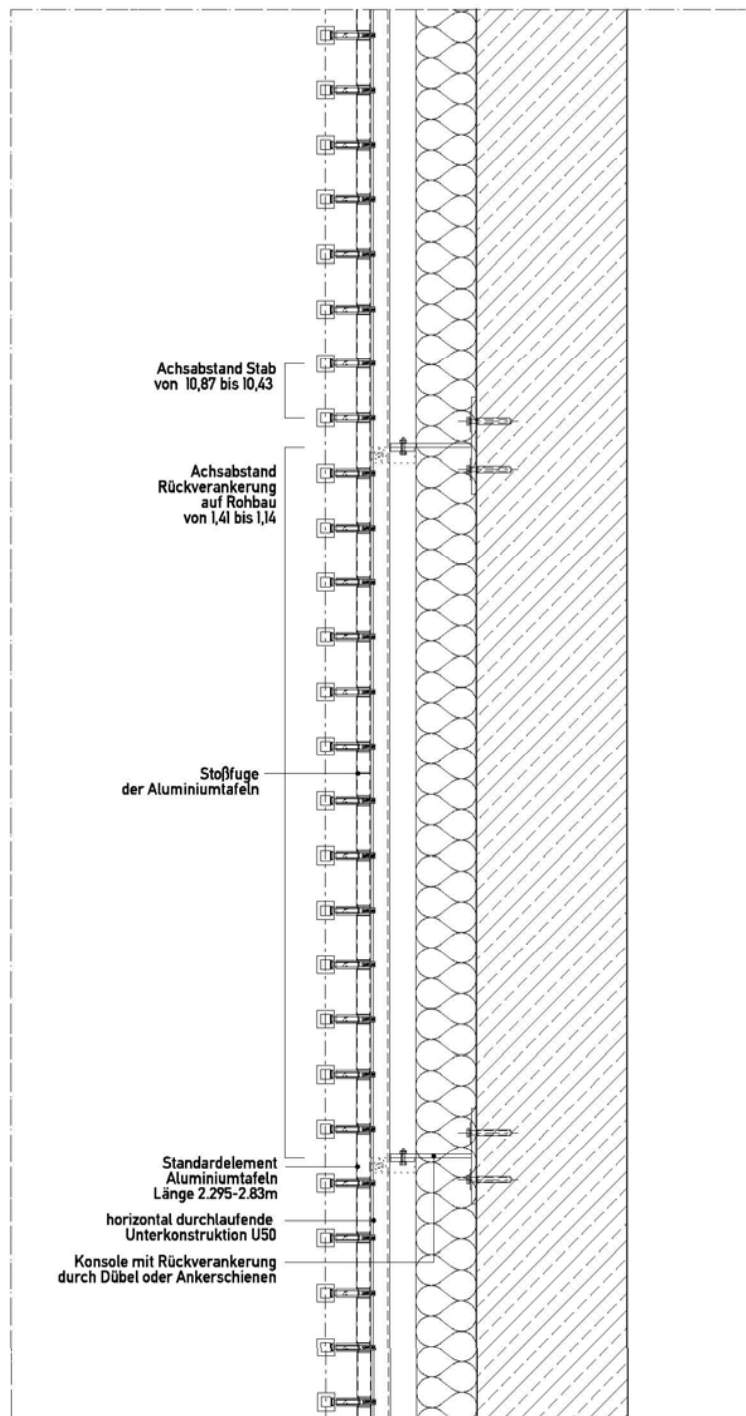
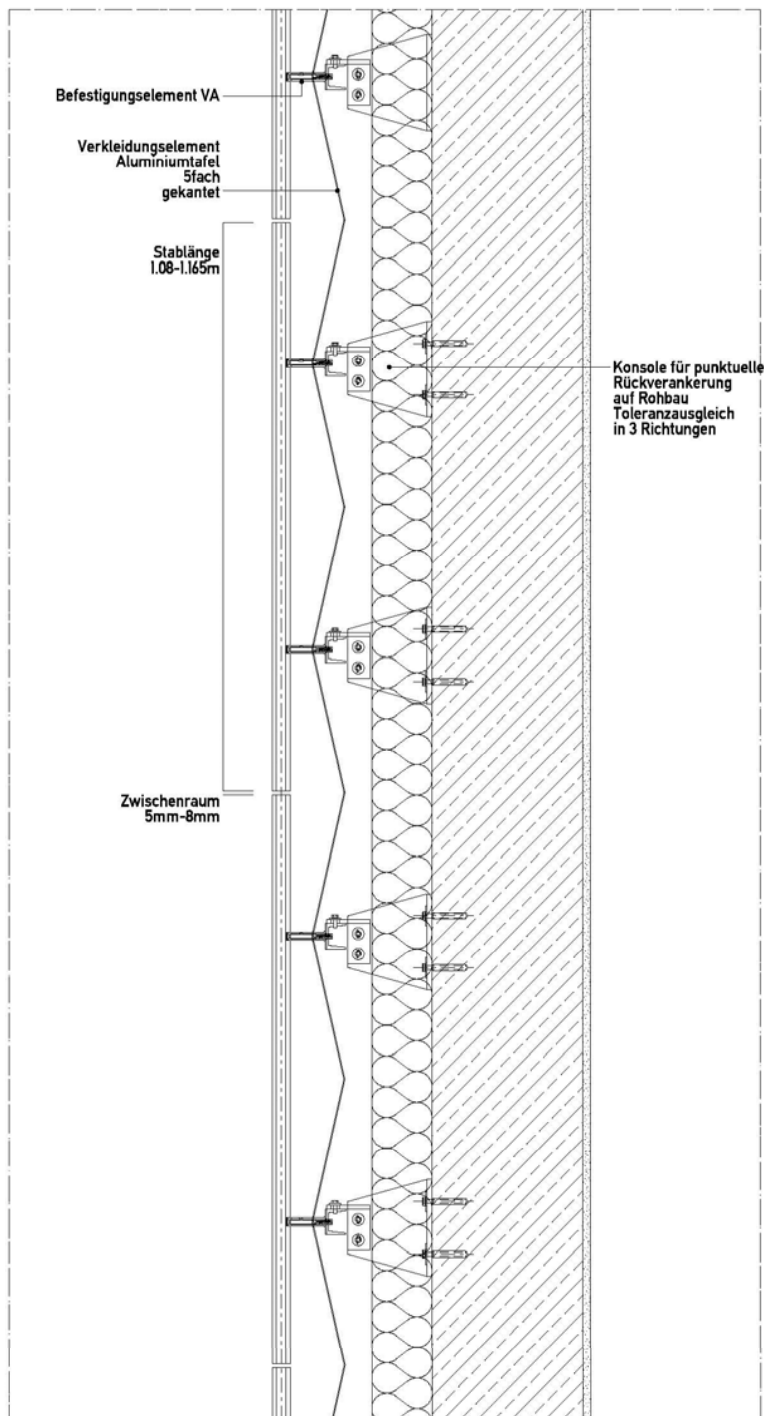












0	17.01.06	BAUFREI	com
Index	datum	Änderung	gezeichnet

alle Maße sind vor Ausführung vom An zu prüfen

AFU-Bau

Planungsstufe

Stabfassade Leitdetail

Horizontalschnitt

Vertikalschnitt

planinhalt	maßstab	format	plannummer	index
1:10	A3	06.320	0	

sab

museumsneubau sammlung brandhorst münchen
projekt

architekt

sauerbruch hutton generalplanungsgesellschaft mbh
lehrlersstraße 57 10957 berlin tel. +49 (0) 30 39 78 21-0 fax. +49 (0) 30 39 78 21 30

zur Ausführung freigegeben: datum unterschift

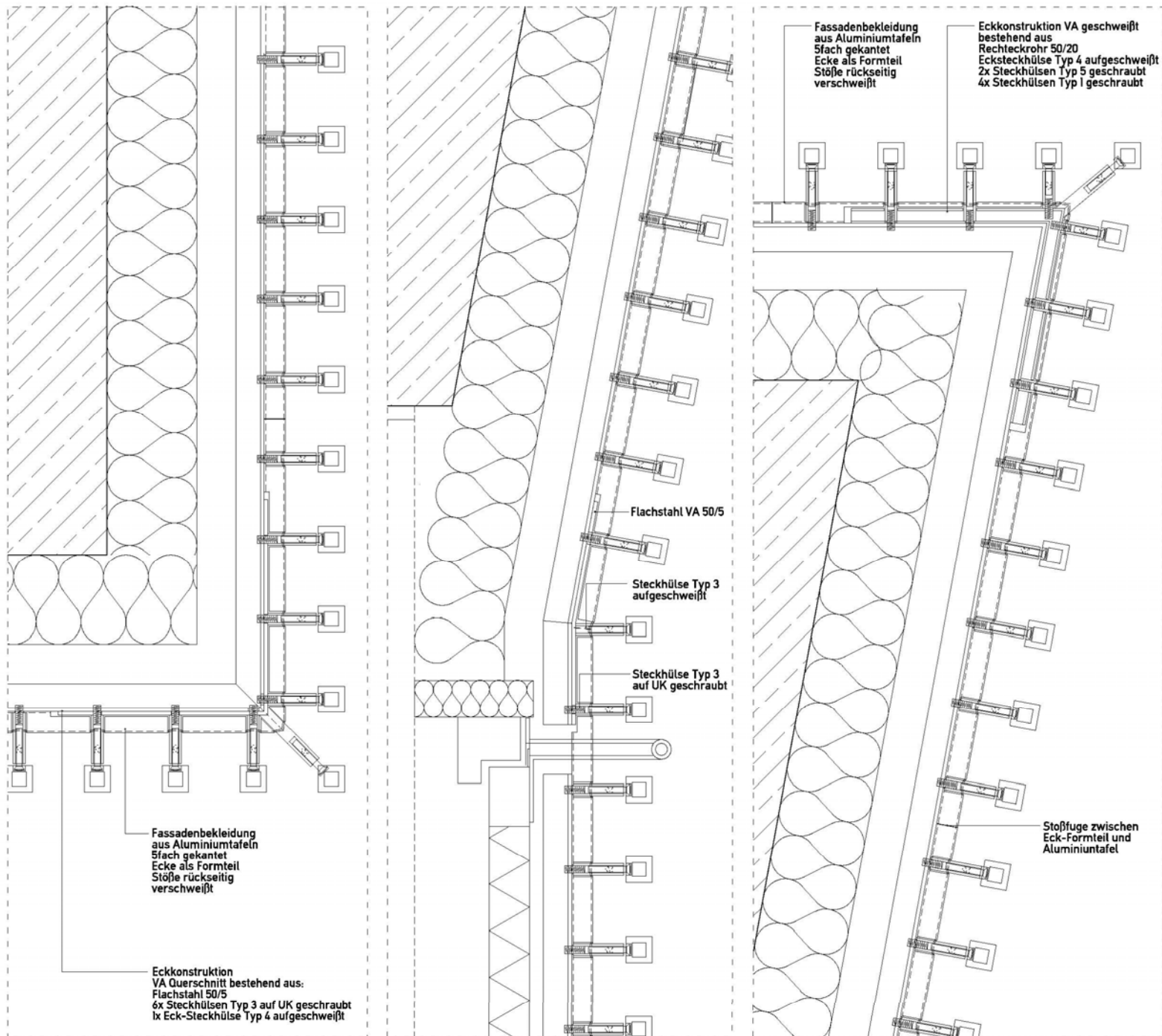
bauamt

staatliches hochbauamt münchen I
abt. VII seeaustraße 2 80538 münchen tel. +49 (0) 89 21232-0

stempel bauamt



staatliches bauamt münchen I
81547 münchen abt. L2.4 tel 089-21232-0



0 17.01.06 BAUFREI com
Index datum Änderung gezeichnet

alle Maße sind vor Ausführung vom An zu prüfen

AFU-Bau
Planungsstufe

Fassade
Eckdetails

planinhalt: 1:5 A3 06.323 0
maßstab format plannummer Index

sab
museumsneubau sammlung brandhorst münchen
projekt
architekt
sauerbruch hutton generalplanungsgesellschaft mbh
lehmerstraße 57 10557 berlin tel. +49 (0) 30 39 78 21-0 fax +49 (0) 30 39 78 21 50

zur Ausführung freigeben: datum: unterschrieben:

bauplan:
staatliches hochbauamt münchen I
abt. VIII seeaustraße 2 80338 münchen tel. +49 (0) 89 2322-0

stempel bauamt

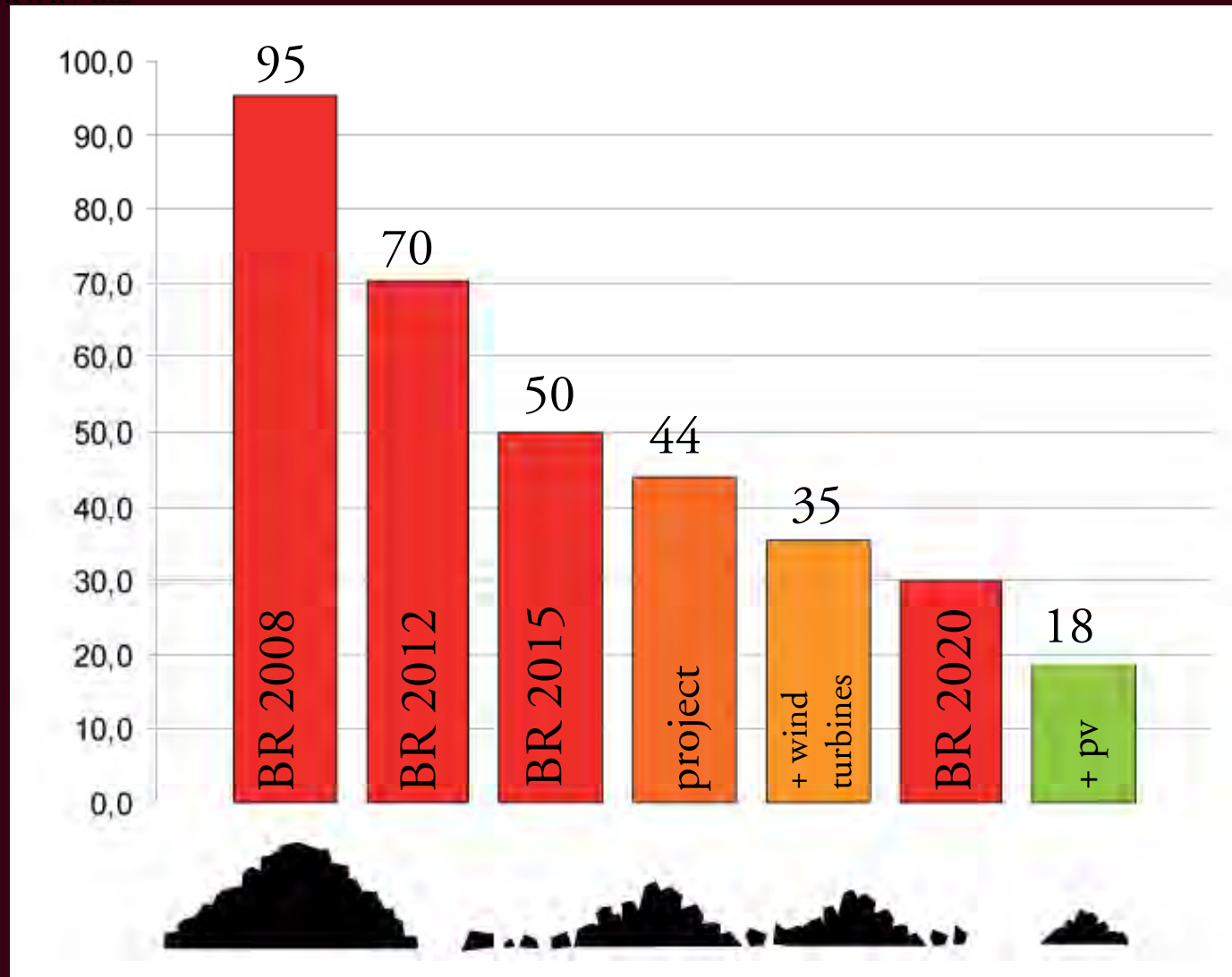


langelinie

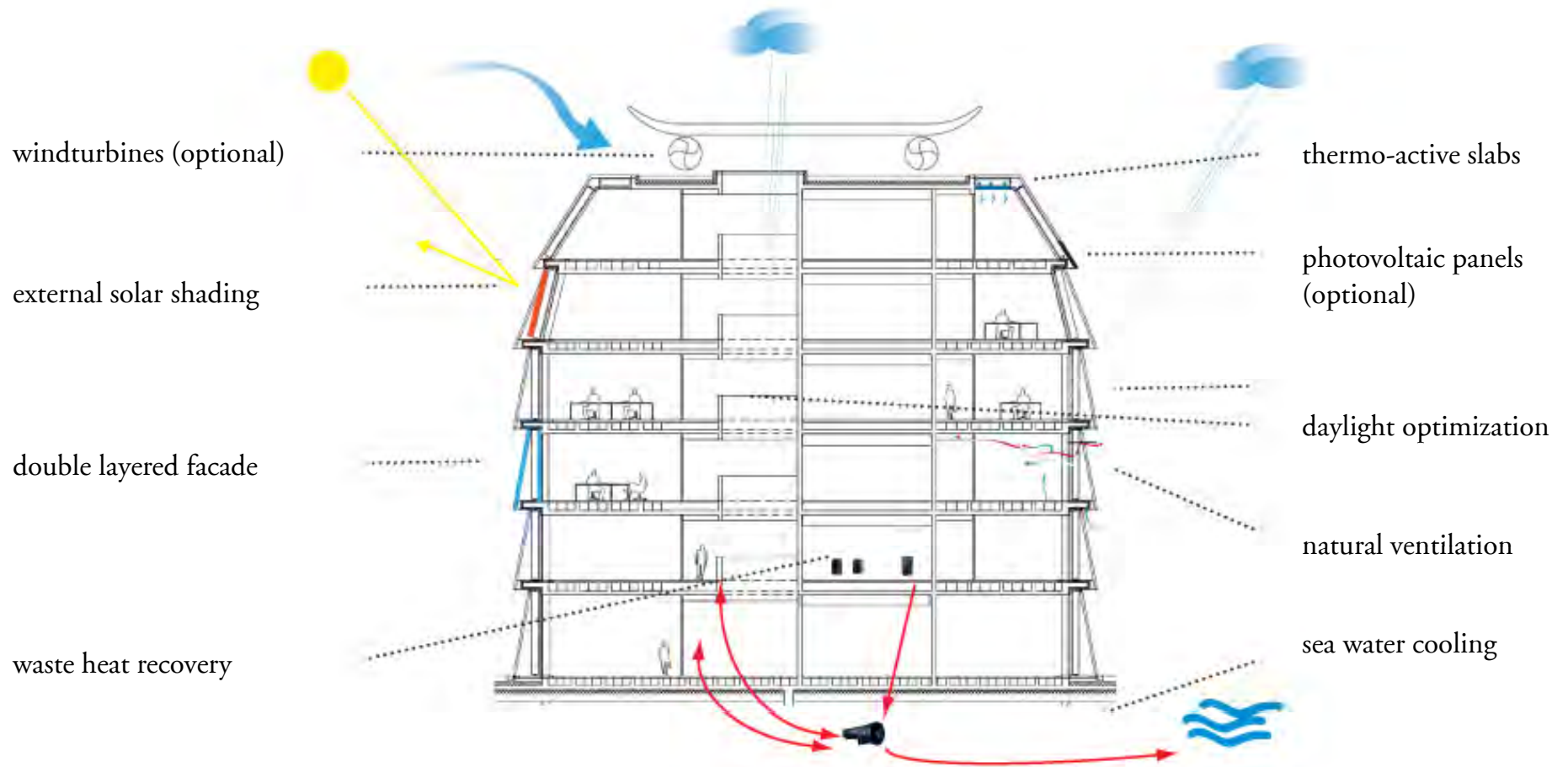


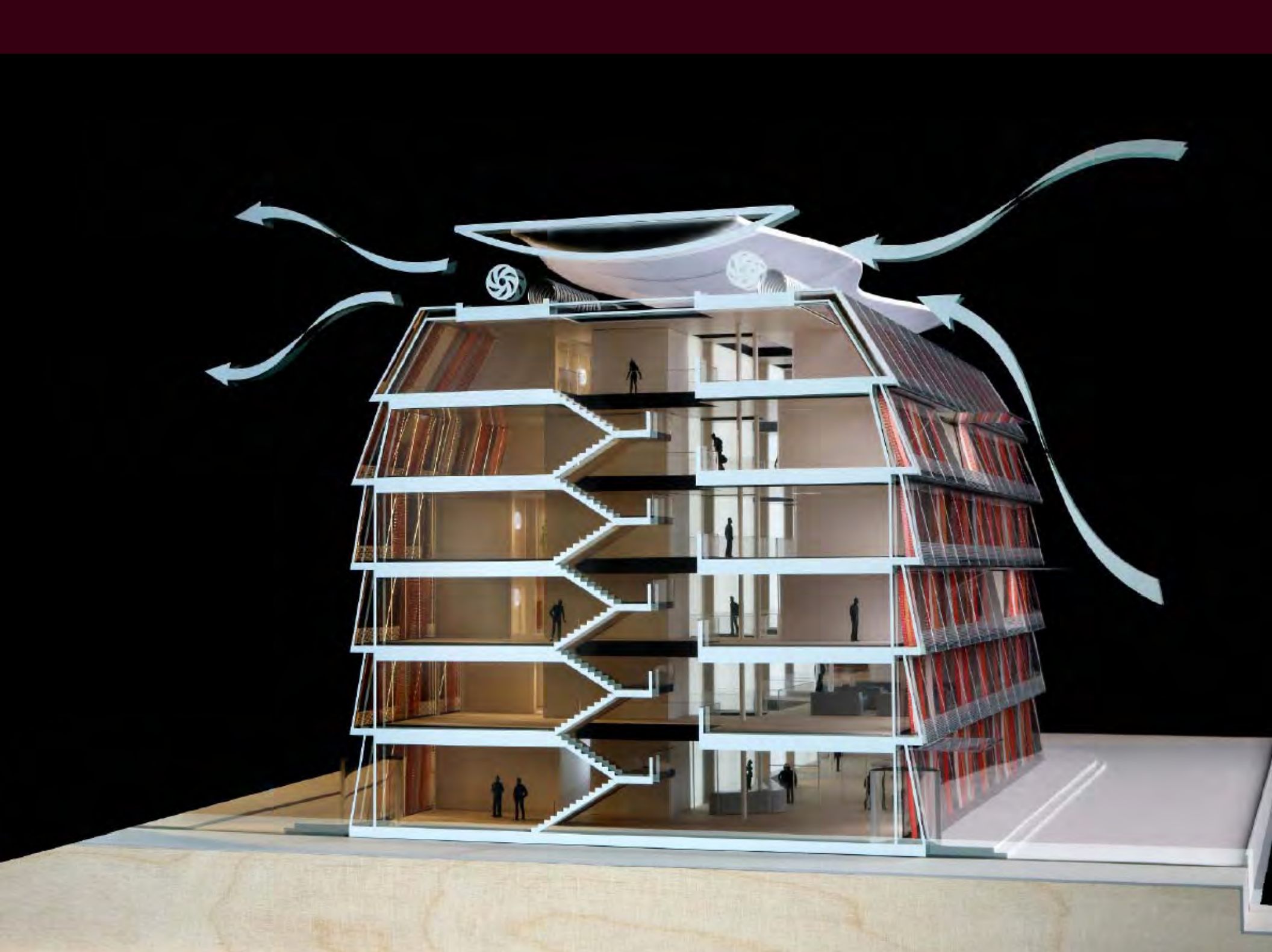
towards 0 carbon-emission

energy consumption
kWh / m²

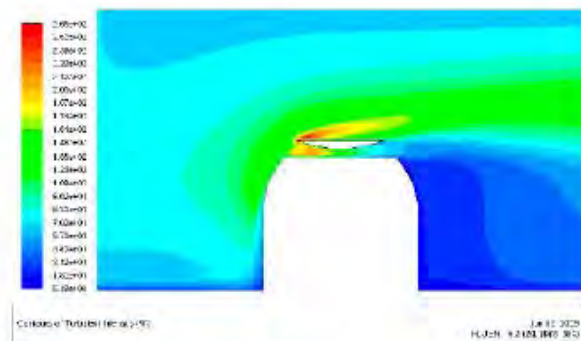
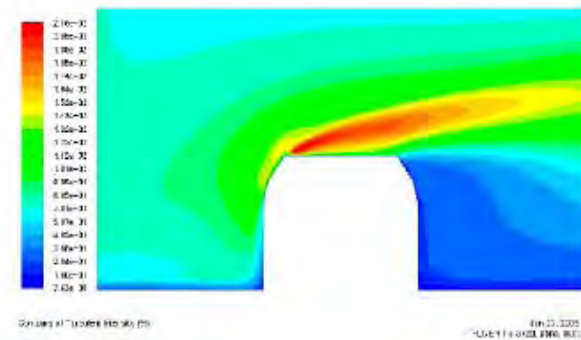
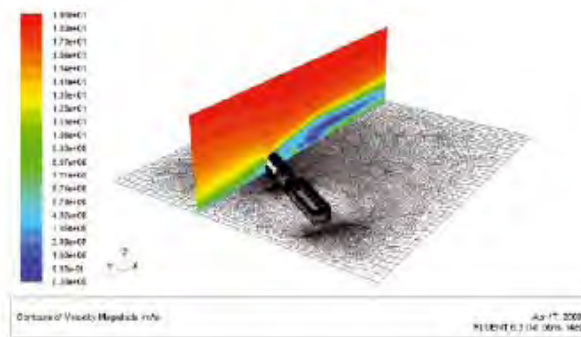


0-energy-concept

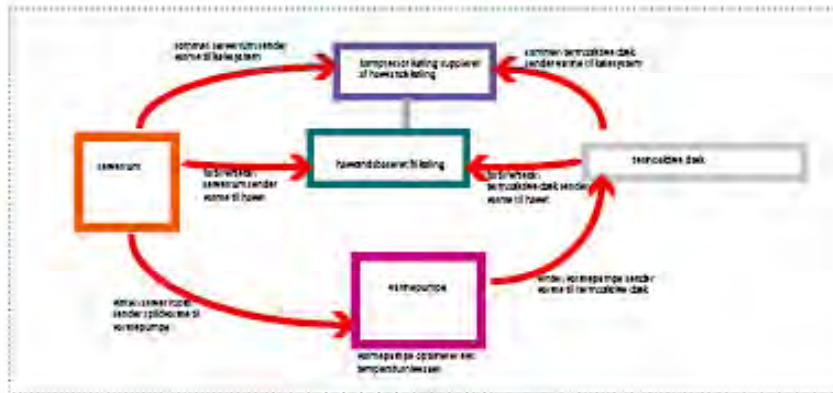




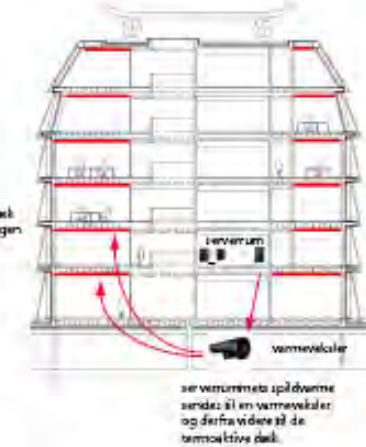
wind energy



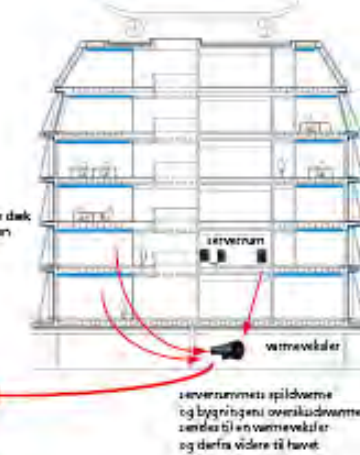
System for varme- og kølesystem med temoaktive dæk



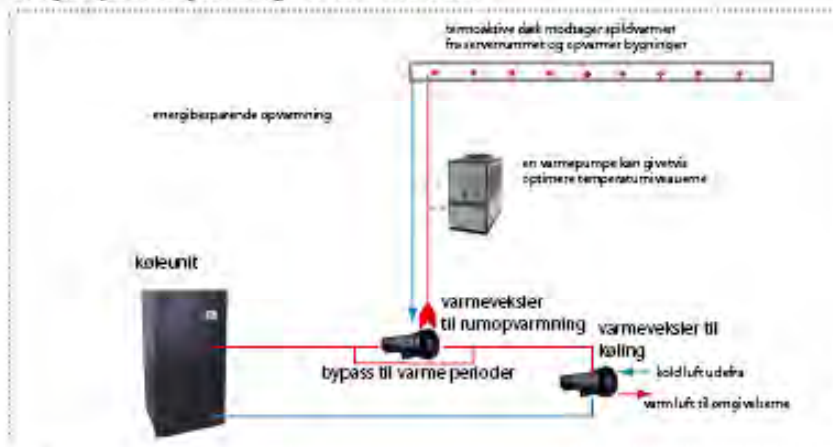
Varmesystemet



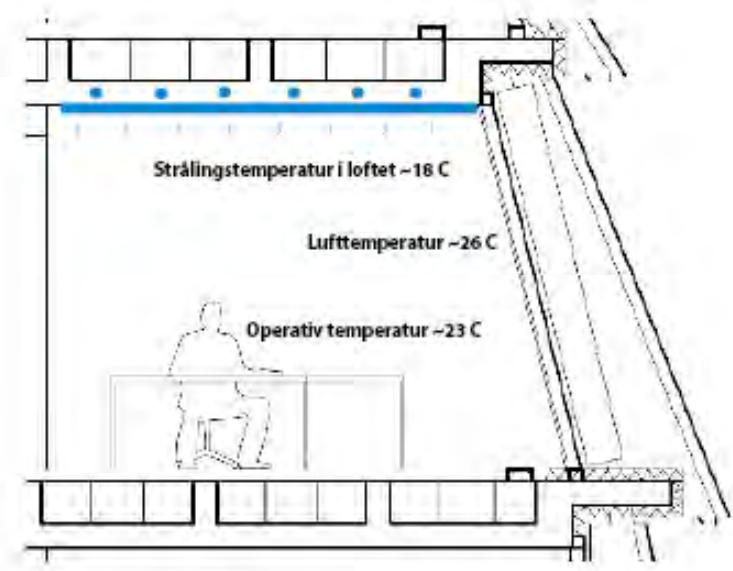
Kølesystemet



Energibesparende opvarmning med temoaktive dæk



thermo-active slab



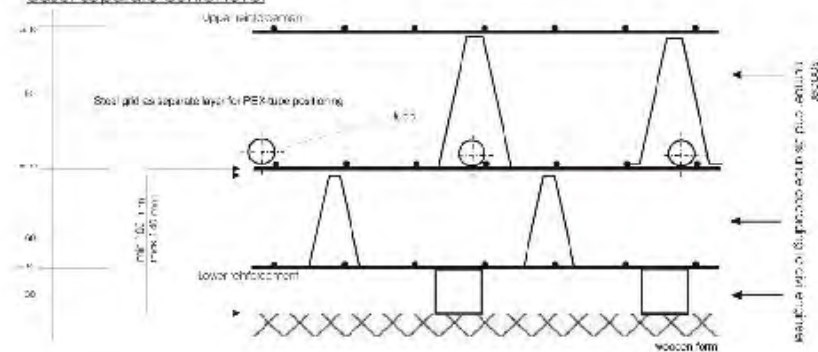
thermo-active slab



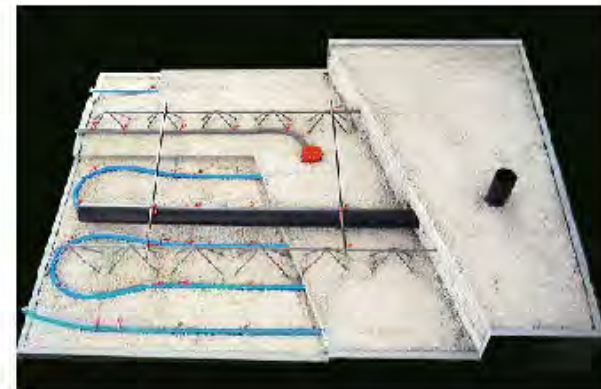
reinforced concrete slab with heating and cooling pipes - before pouring the concrete

With little advice from an experienced engineer, the tubes can be mounted on to the reinforcement by a local team.

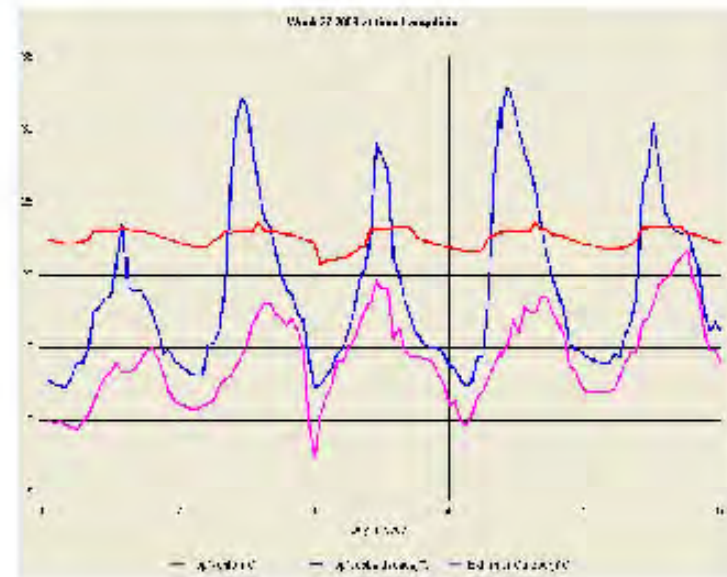
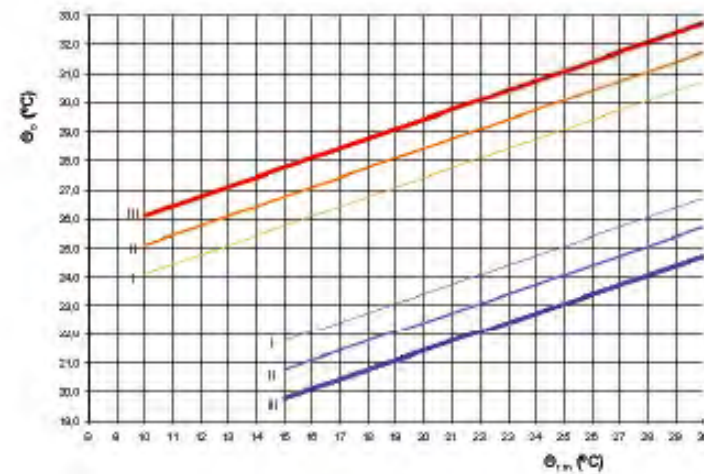
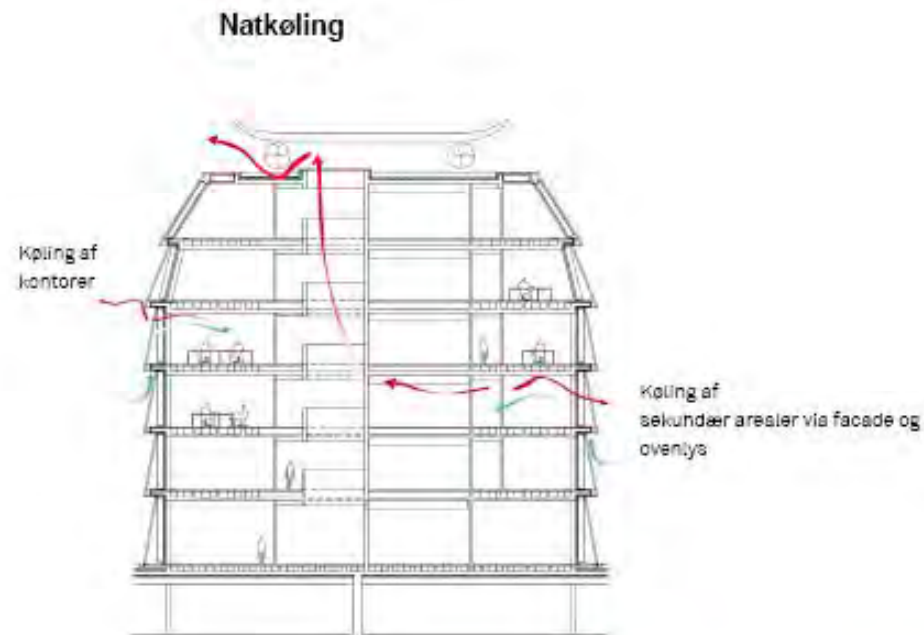
Cross Section of Reinforced Concrete Slab
with integrated cooling -
case: separate center level



Distance tube - tube: 150 mm.
Pattern: shall



hybrid-ventilation



daylighting

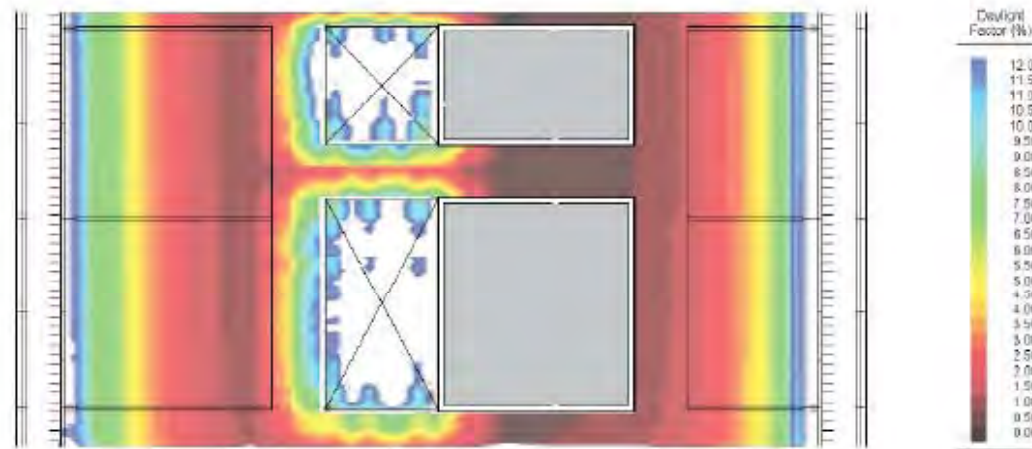


fig. 01. 3rd floor plan with daylight factors



fig. 02. 3rd floor section with daylight factors

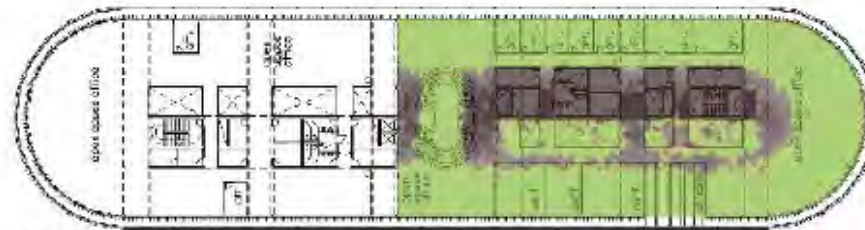


fig. 03. typical section; artificial lighting concept

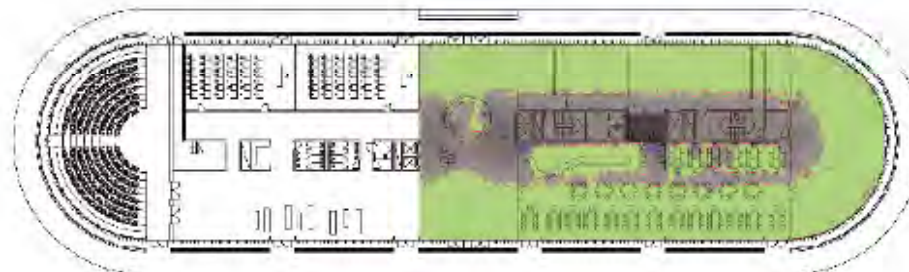
daylighting





















4th floor plan

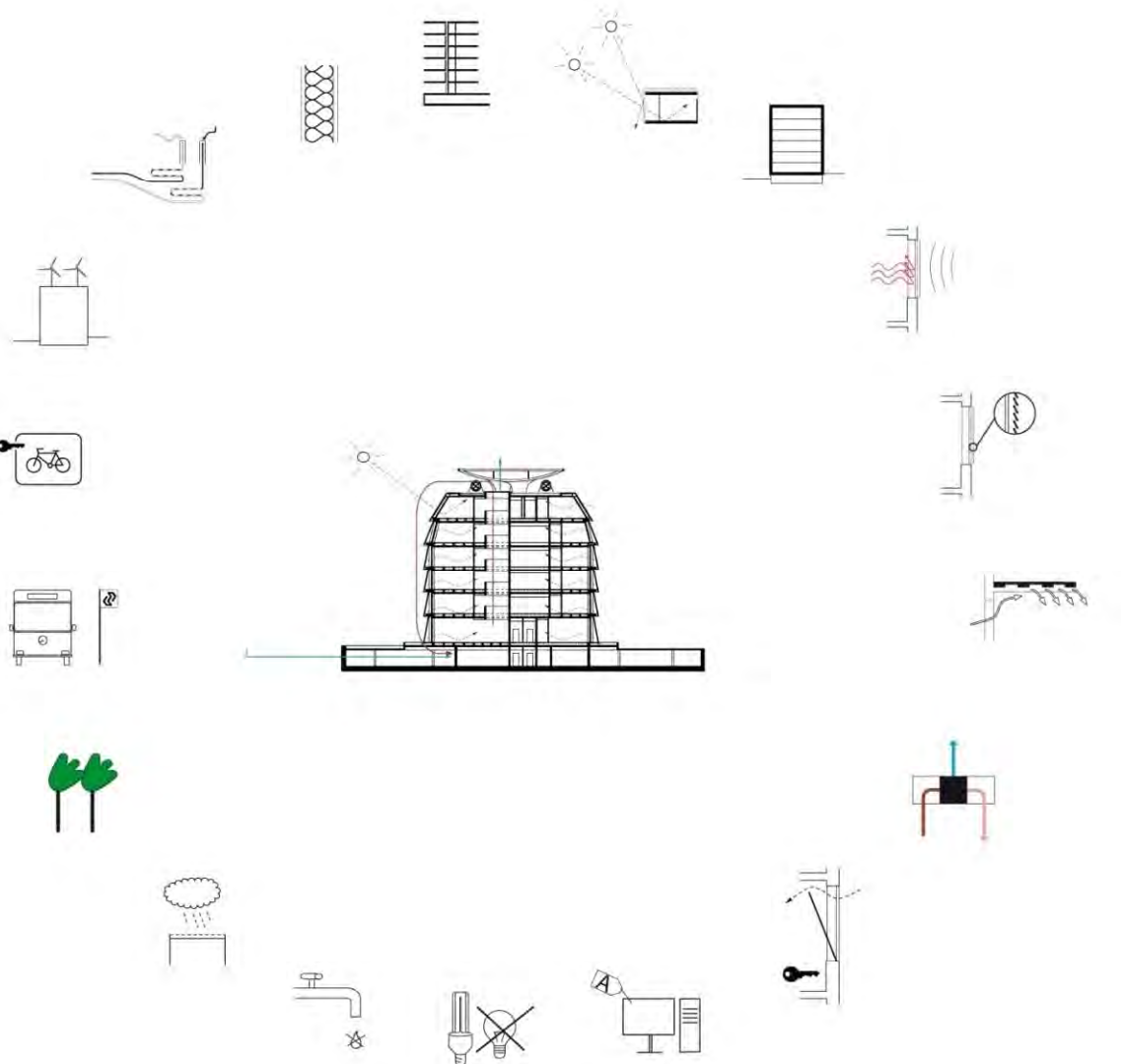


2nd floor plan



ground floor plan

-  low U-value
-  thermal active slabs
-  passive solar considerations
-  high building air-tightness
-  triple glazing for thermal and sound insulation
-  external shading
-  night cooling using the thermal storage of the primary construction
-  waste heat recovery
-  safe nighttime ventilation
-  A-rated equipment
-  low energy lighting
-  water reduction equipment
-  rain water collection
-  electricity production by wind turbines and photovoltaics
-  close access to public transport
-  bike storage facilities
-  materials according to EPD
-  pre-cooling of supply air by sea water



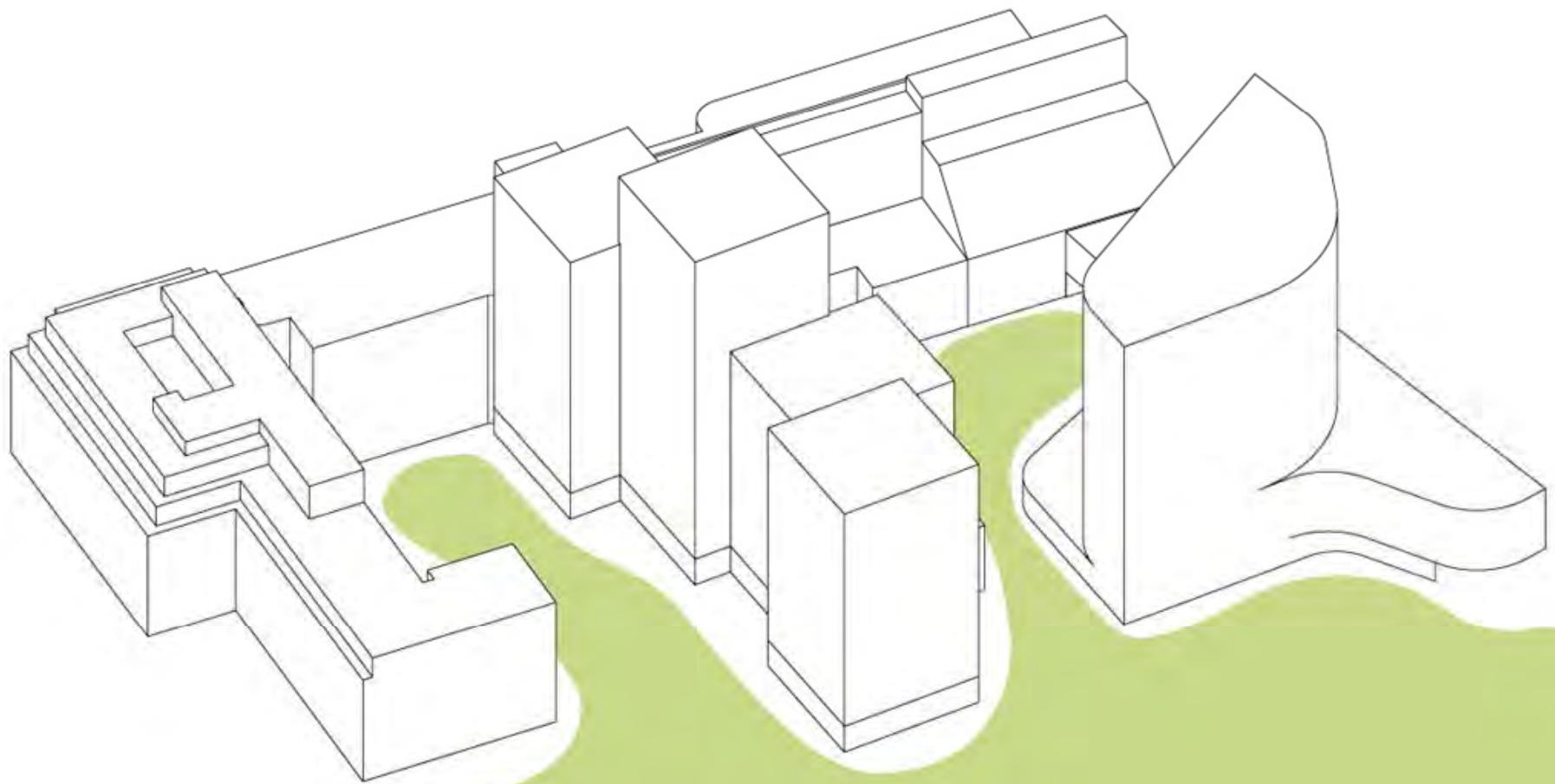
kfw bank frankfurt

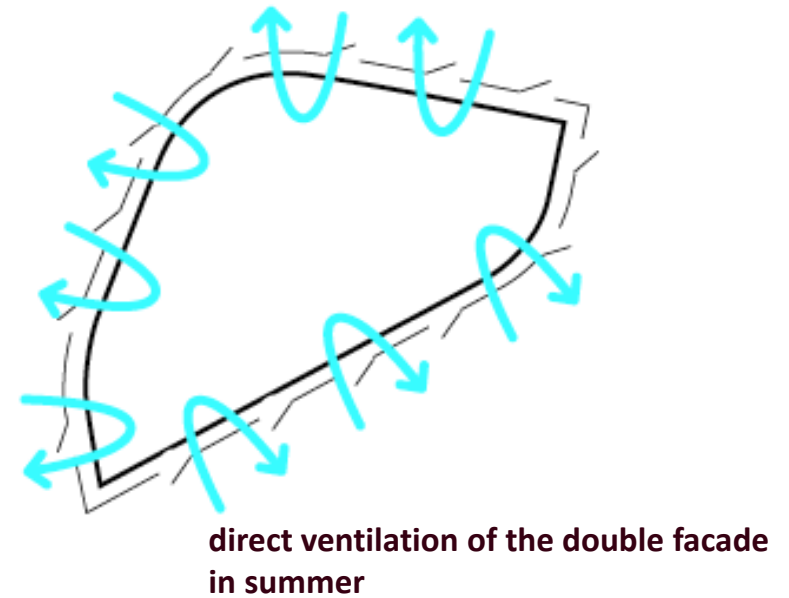
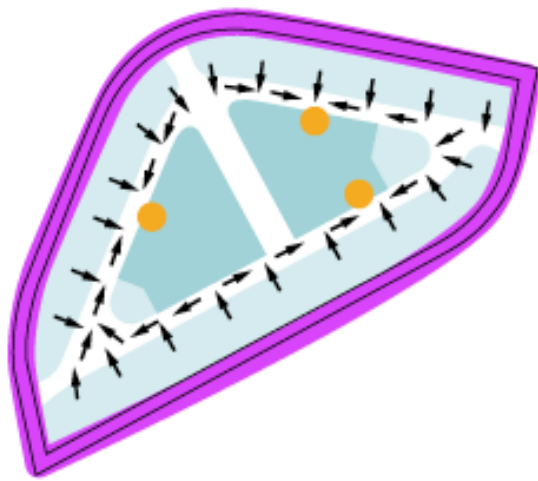
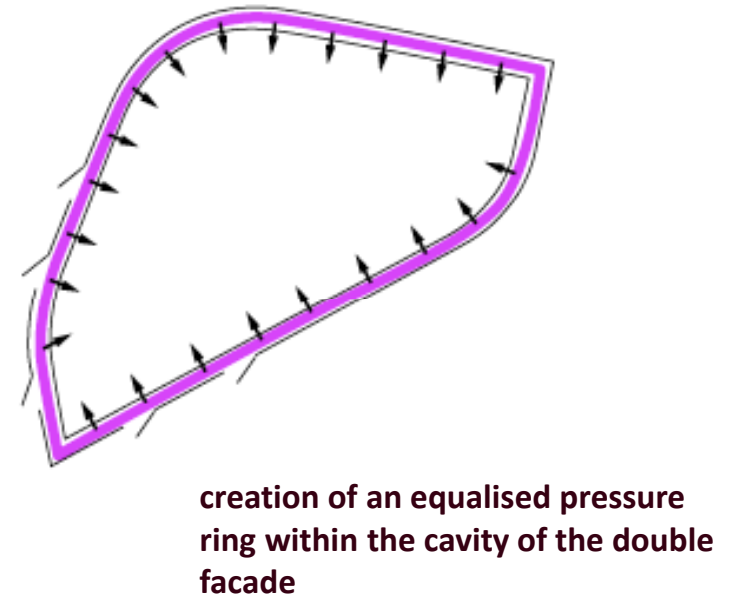
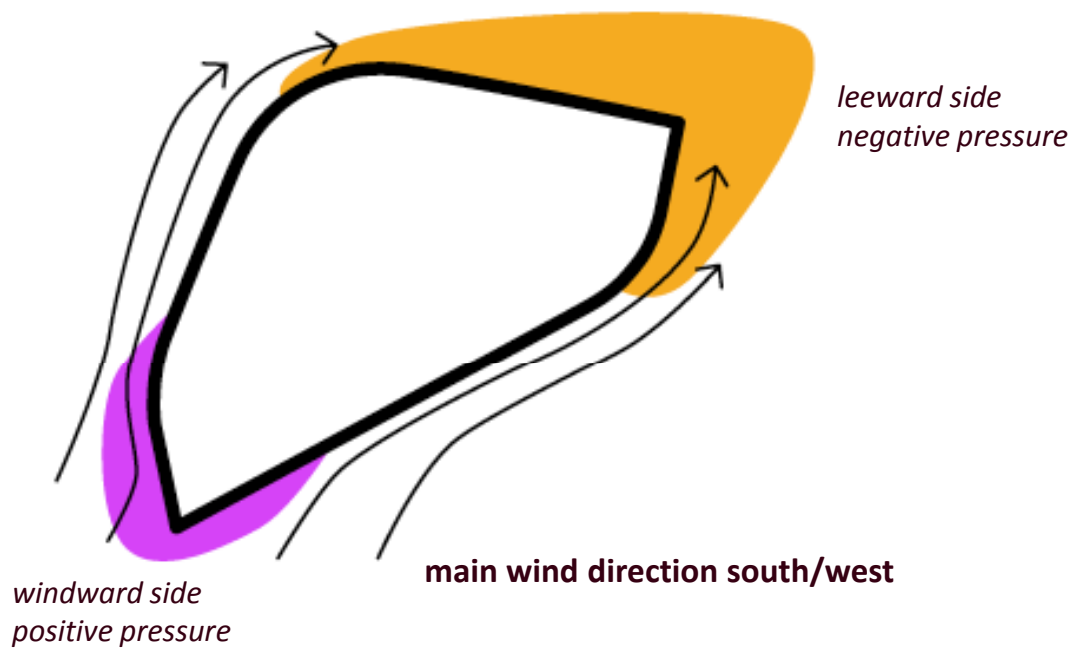




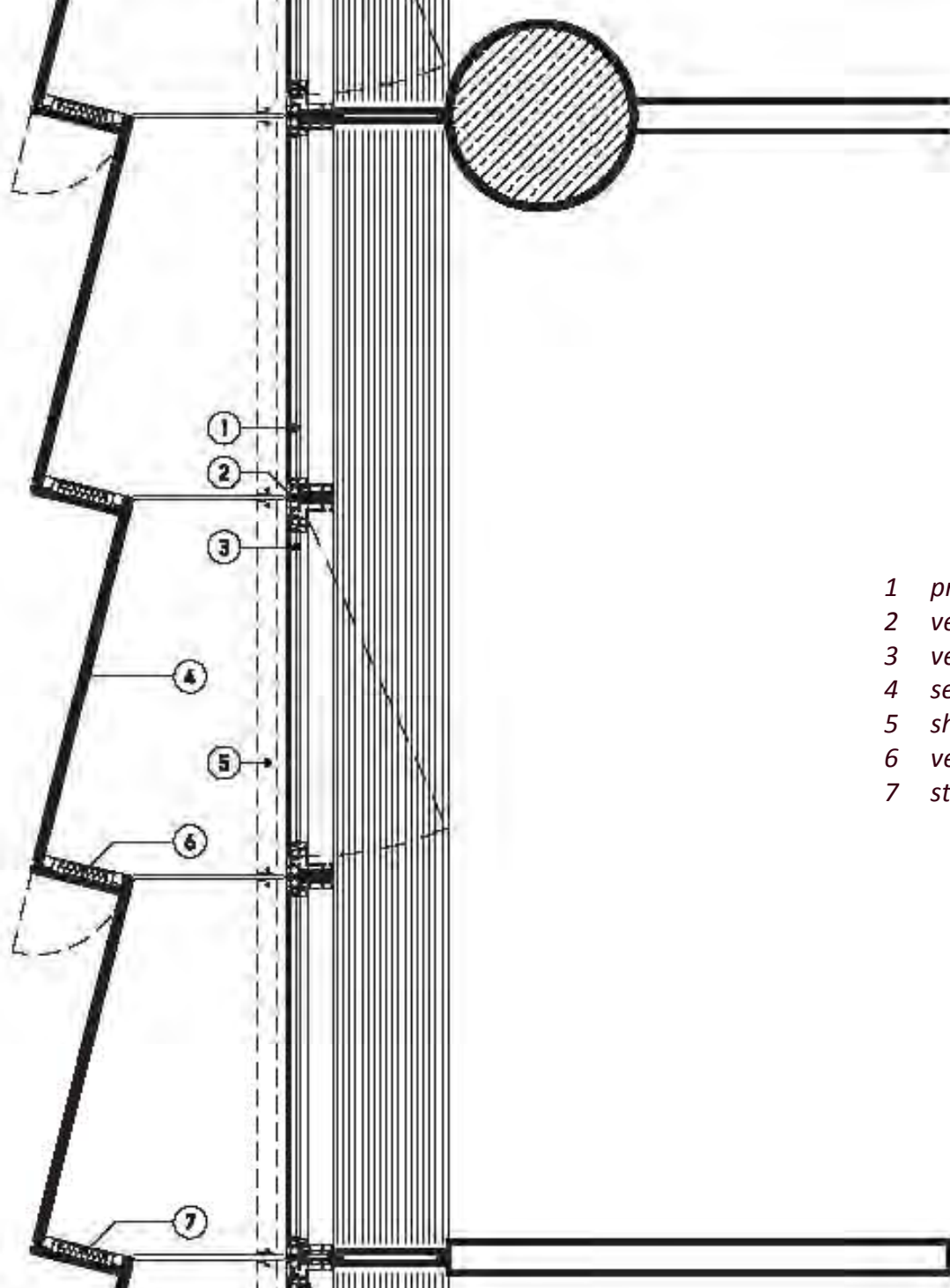






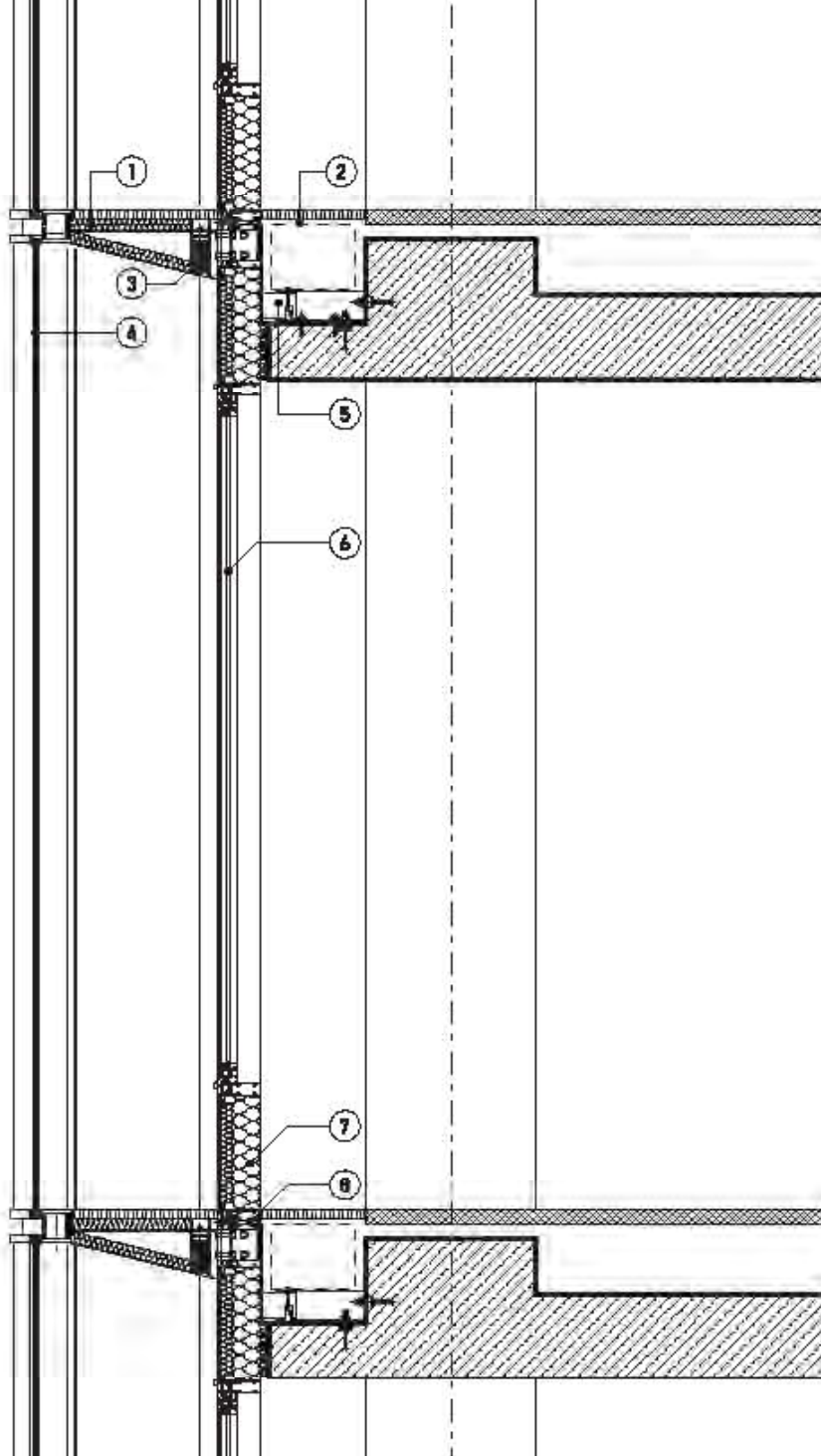






- 1 primary facade
- 2 vertical element joint
- 3 vertical sliding window
- 4 secondary facade
- 5 shading
- 6 ventilation opening
- 7 structural panel

kfw bank frankfurt: detail depicting the pressure ring facade (horizontal section)



- 1 structural bracket and metal flooring
- 2 heating unit with air vent
- 3 shading
- 4 secondary facade
- 5 attachment to concrete slab
- 6 vertical sliding window opening
- 7 spandrel with acoustic and thermal insulation
- 8 horizontal element joint

kfw bank frankfurt: detail depicting the pressure ring facade (horizontal section)









sauerbruch hutton