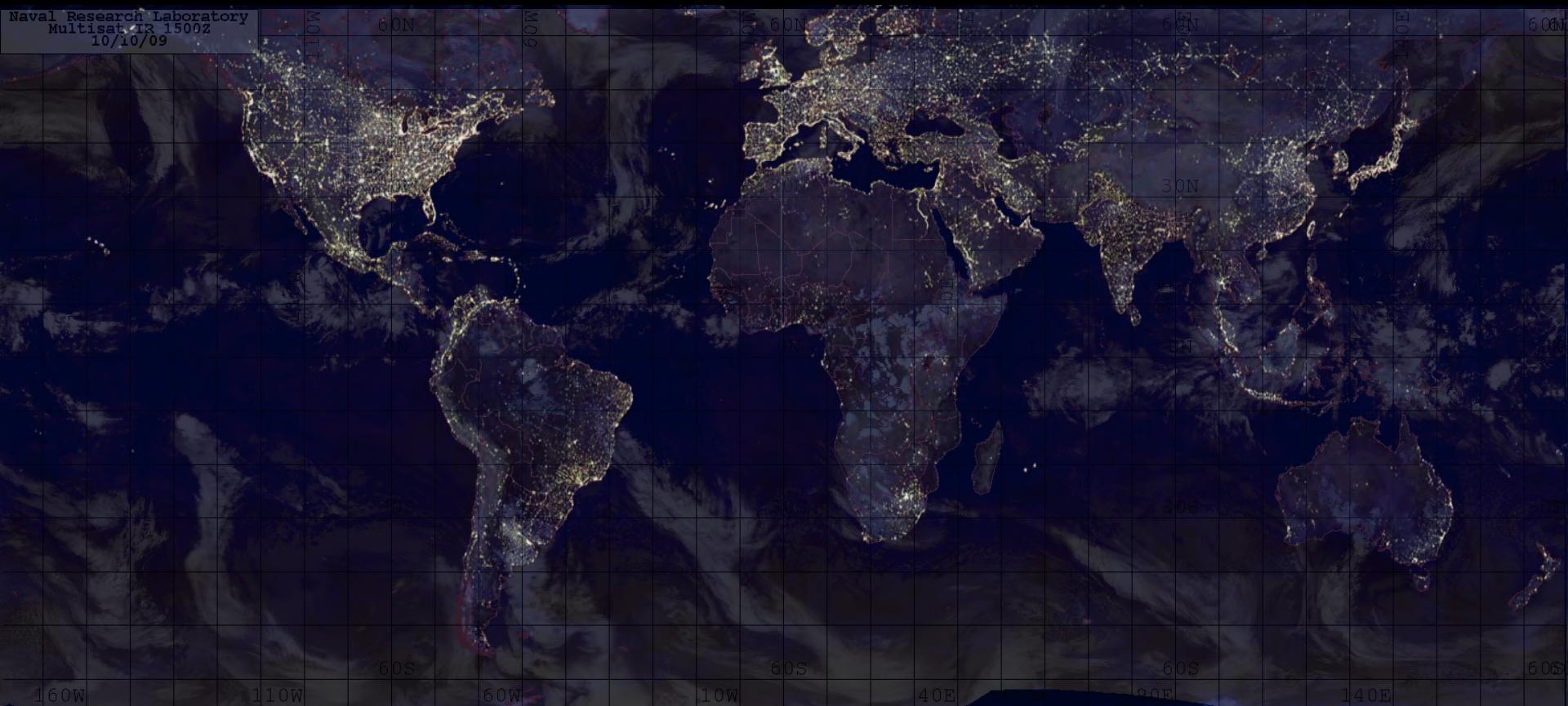


Gammel kunnskap i
nye sammenhenger

Nye teknologier,
materialer og funksjoner

En nyskapende og
bærekraftig arkitektur



Mange byområder ligger i kystnære elvedeltaer og andre soner som er sårbarer for endringer i vindforhold, havnivå og tilgang på drikkevann.

EXPLORE

Video



Deciduous Forest Central Park, New York



Coral Reef Moorea, French Polynesia



Tropical Cloud Forest
Monteverde, Costa Rica



Mountain Fynbos

Table Mountain, South Africa

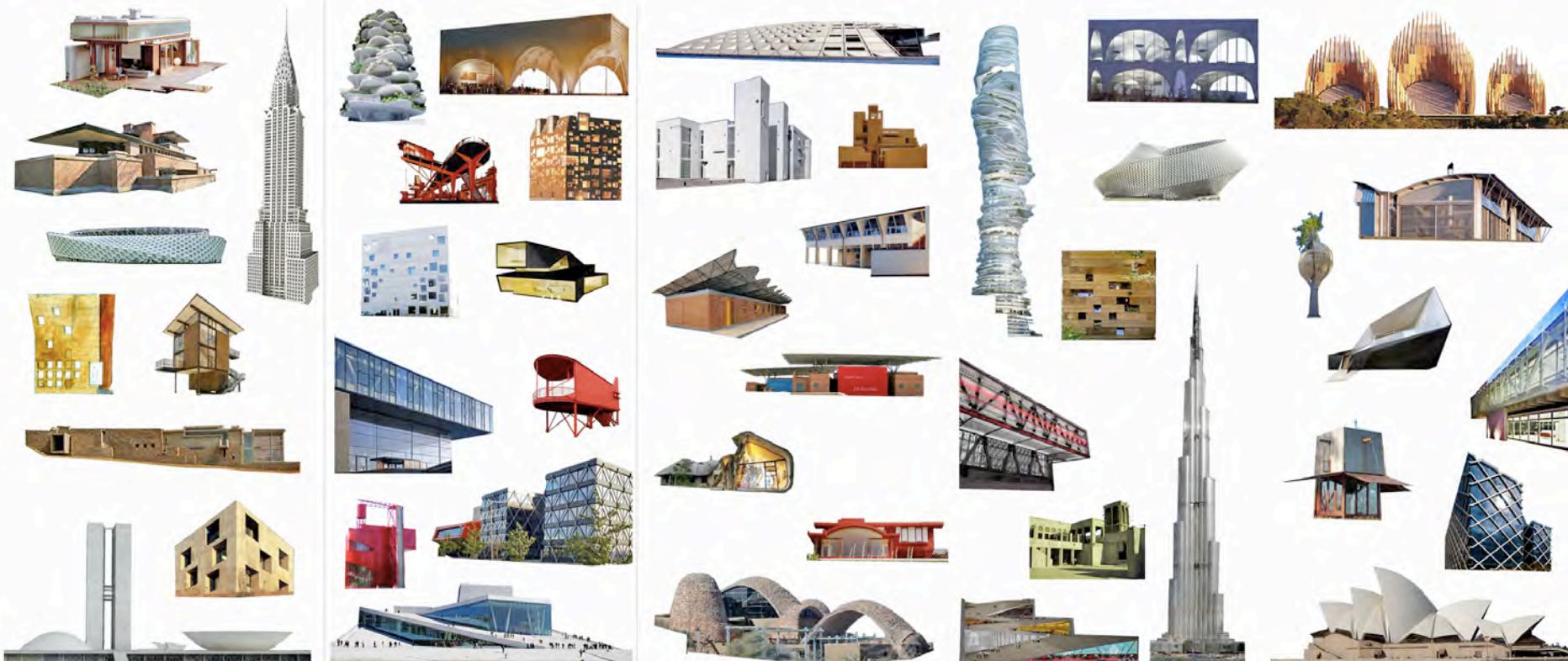


Fresh Water

One cubic foot of life:

Biodiversity project for National Geographic by Edward O. Wilson, photos by David Littschwager

EXPLORE



Americas
Several climate zones

Europe
Several climate zones

Africa
Several climate zones

Asia
Several climate zones

Australia and Oceania

Several climate zones

Arkitektur og klima forelesninger 1-6 høst 2011



Tiltak 1: Klima og bærekraft. Forelesninger av flerfaglig lærerteam i 2. år på AHO
III: Nils Forsén

Arkitektur og klima: Forelesningstema

1. Introduksjon – bærekraft – perspektiver (mn) 29.8
2. Arkitektur og klima – været og huset – grunnleggende begrep (nef) 5.9
3. Grunnleggende bygningsfysikk: Varme og fukt (nef)
26.9
4. Brannsikkerhet (nef) 3.10
5. Lyd (nef+gjest) 24.10
6. Grunnleggende bygningsfysikk i arkitektens praksis –
hvordan bygge (nef,bk.mn) 14.11

Tiltak 1: Arkitektur og klima. Forelesninger av flerfaglig lærerteam i 2. år på AHO
III: Nils Forsén



Fjellgård i høyliggende innlandsklima nær det boreale skogbeltet:
Budsjord på Dovre.

Laftet konstruksjon hevet fra grunnen. Klimakontroll ved gruppering av
bygninger og kompakte bygningsvolumer med små åpninger.

Foto: Jiri Havran



Treby i vindutsatt og fuktig kystområde:
Sogndalstrand.
Bygningenes orientering varierer med funksjon
og vindeksponering.
Kompakte volumer, moderate takutspring.

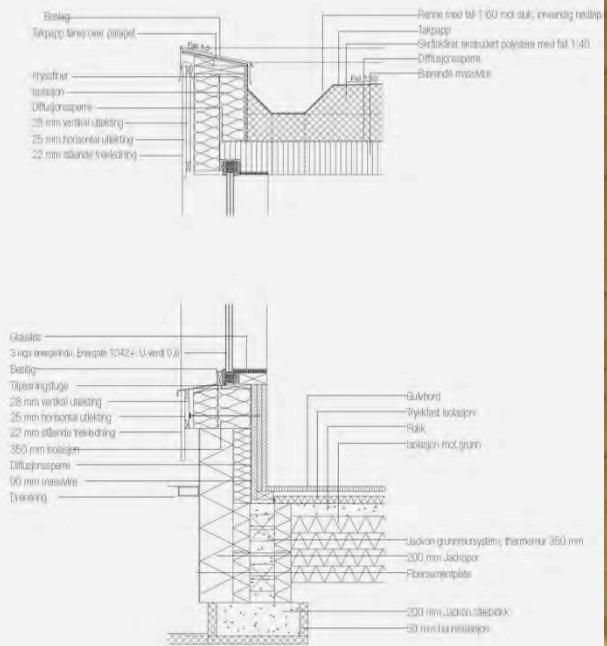


*Wooden town in windy and humid coastal area:
Sogndalstrand, Norway.
House orientation varies with function and wind exposure.
Compact volumes, modest roof overhangs.*



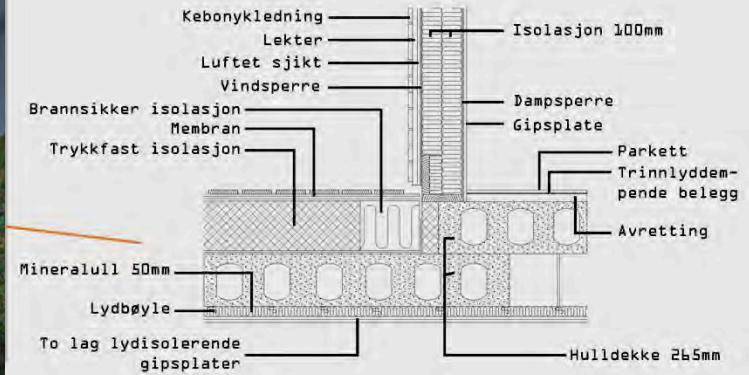


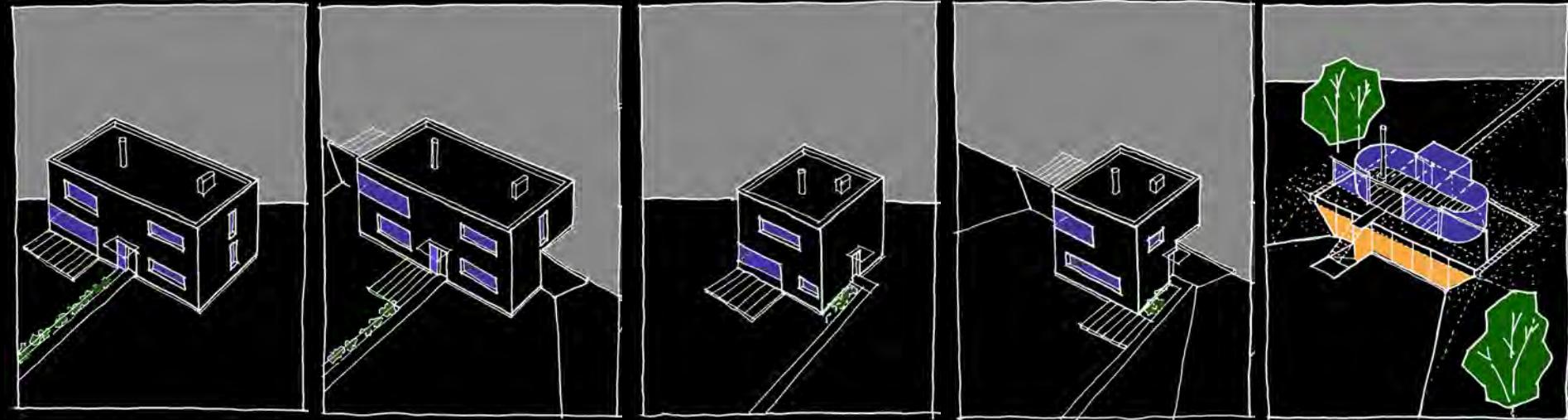
DETALJ VEGG, TAK OG VINDU





Trinnfri overgang mellom ute og inne





Energibehov	Spesifikt energibehov								
3065 kWh	12,0 kWh/m ²	2588 kWh	10,1 kWh/m ²	2185 kWh	17,1 kWh/m ²	1993 kWh	15,6 kWh/m ²	1543 kWh	12,1 kWh/m ²
1033 kWh	4,0 kWh/m ²	990 kWh	3,9 kWh/m ²	539 kWh	4,2 kWh/m ²	523 kWh	4,1 kWh/m ²	478 kWh	3,7 kWh/m ²
7622 kWh	29,8 kWh/m ²	7622 kWh	29,8 kWh/m ²	3811 kWh	29,8 kWh/m ²	3811 kWh	29,8 kWh/m ²	3811 kWh	29,8 kWh/m ²
1121 kWh	4,4 kWh/m ²	1121 kWh	4,4 kWh/m ²	561 kWh	4,4 kWh/m ²	561 kWh	4,4 kWh/m ²	561 kWh	4,4 kWh/m ²
41 kWh	0,2 kWh/m ²	41 kWh	0,2 kWh/m ²	25 kWh	0,2 kWh/m ²	20 kWh	0,2 kWh/m ²	20 kWh	0,2 kWh/m ²
2990 kWh	11,7 kWh/m ²	2990 kWh	11,7 kWh/m ²	1495 kWh	11,7 kWh/m ²	1495 kWh	11,7 kWh/m ²	1495 kWh	11,7 kWh/m ²
4485 kWh	17,5 kWh/m ²	4485 kWh	17,5 kWh/m ²	2243 kWh	17,5 kWh/m ²	2243 kWh	17,5 kWh/m ²	2243 kWh	17,5 kWh/m ²
0 kWh	0,0 kWh/m ²								
0 kWh	0,0 kWh/m ²								
20357 kWh	79,5 kWh/m ²	19837 kWh	77,5 kWh/m ²	10858 kWh	84,8 kWh/m ²	10646 kWh	83,2 kWh/m ²	10150 kWh	79,3 kWh/m ²



Energibehov	Spesifikt energibehov	Energibehov	Spesifikt energibehov	Energibehov	Spesifikt energibehov	Energibehov	Spesifikt energibehov	Energibehov	Spesifikt energibehov
2004 kWh	7,8 kWh/m ²	1891 kWh	6,6 kWh/m ²	1470 kWh	11,5 kWh/m ²	1299 kWh	10,1 kWh/m ²	673 kWh	5,3 kWh/m ²
825 kWh	3,2 kWh/m ²	770 kWh	3,0 kWh/m ²	431 kWh	3,4 kWh/m ²	412 kWh	3,2 kWh/m ²	292 kWh	2,3 kWh/m ²

Tiltak 2: EVU-kurs AHO vår 2010: Sammenstilling av resultater fra simulering med SIMIEN

BUILDING ENVELOPE 1 January 24. 09:00 Meeting room Architecture	Presentation of the course by Nils Forsén and Marius Nygaard. Lecture by Marius Nygaard: Overview of global and local climate systems, climate adaption of buildings. Examples of current envelope designs.
BUILDING ENVELOPE 2+3 January 31. 09:00 Small Auditorium	Lecture by Nils Forsén: The building envelope: Themes and terminology Lecture by Marius Nygaard: The building envelope: Design methodology.
BUILDING ENVELOPE 4 February 7. 09:00 Board Room	Lecture by Erik Algaard: The building envelope and building physics part 1
BUILDING ENVELOPE 5 February 14. 09:00 Small Auditorium	Lectures by Erik Algaard: The building envelope and building physics part 2 <i>Delivery of programme for course thesis</i>
BUILDING ENVELOPE 6 February 28. 9.00 Board Room	Lecture by Bjørn Thorud: Solar energy technology and the building envelope
BUILDING ENVELOPE 7 March 6. 09:00 Small Auditorium	Lecture by Arnkell Petersen (Erichsen & Horgen) The requirements of the climate inside the building envelope. Principles and examples.
BUILDING ENVELOPE 8 March 13. 0900 Big Auditorium	Lecture by Ivar Rognhaug Ørnnes (Erichsen & Horgen) The roles of the climate envelope in the control of indoor climate. How to use glazing. Principles and examples.
BUILDING ENVELOPE 9 March 20. 09:00 Small Auditorium	No lecture due to study trips at studio courses.
BUILDING ENVELOPE 10 March 27. 09.00 Small Auditorium	Case study: The Norwegian Maritime Museum at Bygdø: Brick facade in an architectural landmark.
BUILDING ENVELOPE 11 April 10. 9:00 Small Auditorium	Case study: Kleihues+Schuwerk (in collaboration with Dyrvik Architects: The Facades of the new National Museum for Art, Architecture and Design in Oslo
BUILDING ENVELOPE 12 April 17. 09:00 Board Room	Workshop / tutoring of work with course thesis <i>Delivery of course thesis: April 25th at 12.00</i>
BUILDING ENVELOPE REVIEW THESES April 27. 09:00 -16.00 Small Auditorium	<i>Review / Critique of course theses</i>

MN 08.04.2012

Tiltak 2: Fast fordypningskurs på
masternivå hvert 4. semester.

Klimaskallet - The Building Envelope

Dette er Forelesningsrekke våren 2012

year, though few are strong. The possibility of extreme increase of water level has to be taken into account, as the site is located in the direct vicinity of large watercourses.

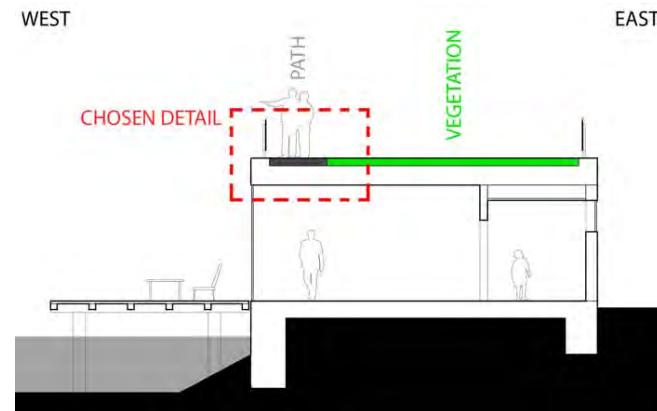
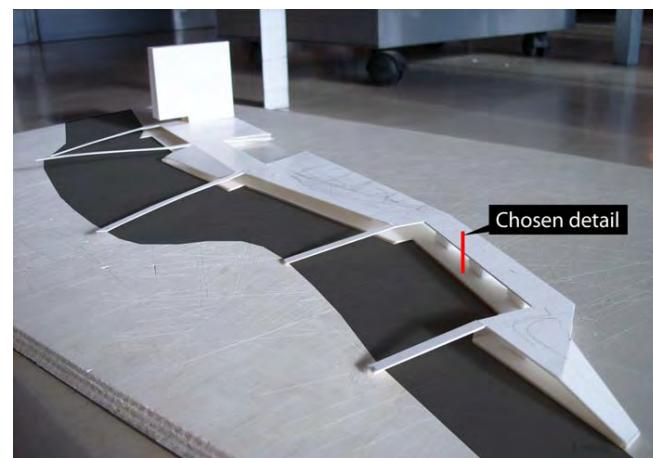
The dominating winds in the project site come from the south, and the overall wind speed is high due to the vast open areas located next to the site.

The basic climate parameters for the project site can be found in the following table:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °C	9.8	10.0	12.9	18.4	22.7	25.2	29.0	30.8	26.8	21.6	16.7	12.3	19.7
Daily mean °C	6.0	6.2	9.0	14.5	18.9	22.1	25.8	27.5	23.8	18.3	13.1	8.5	16.1
Average low °C	2.1	2.4	5.1	10.5	15.1	18.9	22.5	24.2	20.7	15.0	9.5	4.6	12.5
Precipitation mm	48.6	60.2	114.5	130.3	128	164.9	161.5	155.1	208.5	163.1	92.5	39.6	1466.7
Snowfall cm	6	6	1	0	0	0	0	0	0	0	0	0	13
Sunshine hours	180.5	161.1	159.2	164.9	180.9	120.1	147.5	177.5	112.9	129.9	141.4	171.1	1,847.2
% Humidity	50	51	57	62	66	73	75	72	72	66	60	53	63
Avg. rainy days	9	11	17	16	16	20	20	17	20	17	12	9	184
Avg. snowy days	2.7	3.5	2.2	0	0	0	0	0	0	0	0.7	9.1	
Avg. wind speed	10	12	12	13	12	11	12	11	11	10	10	10	11
Dominant wind direction	N/NW	N/NW	N/NE	S	S	S	S	E/NE	N/NE	N/NE	N/NW	S	

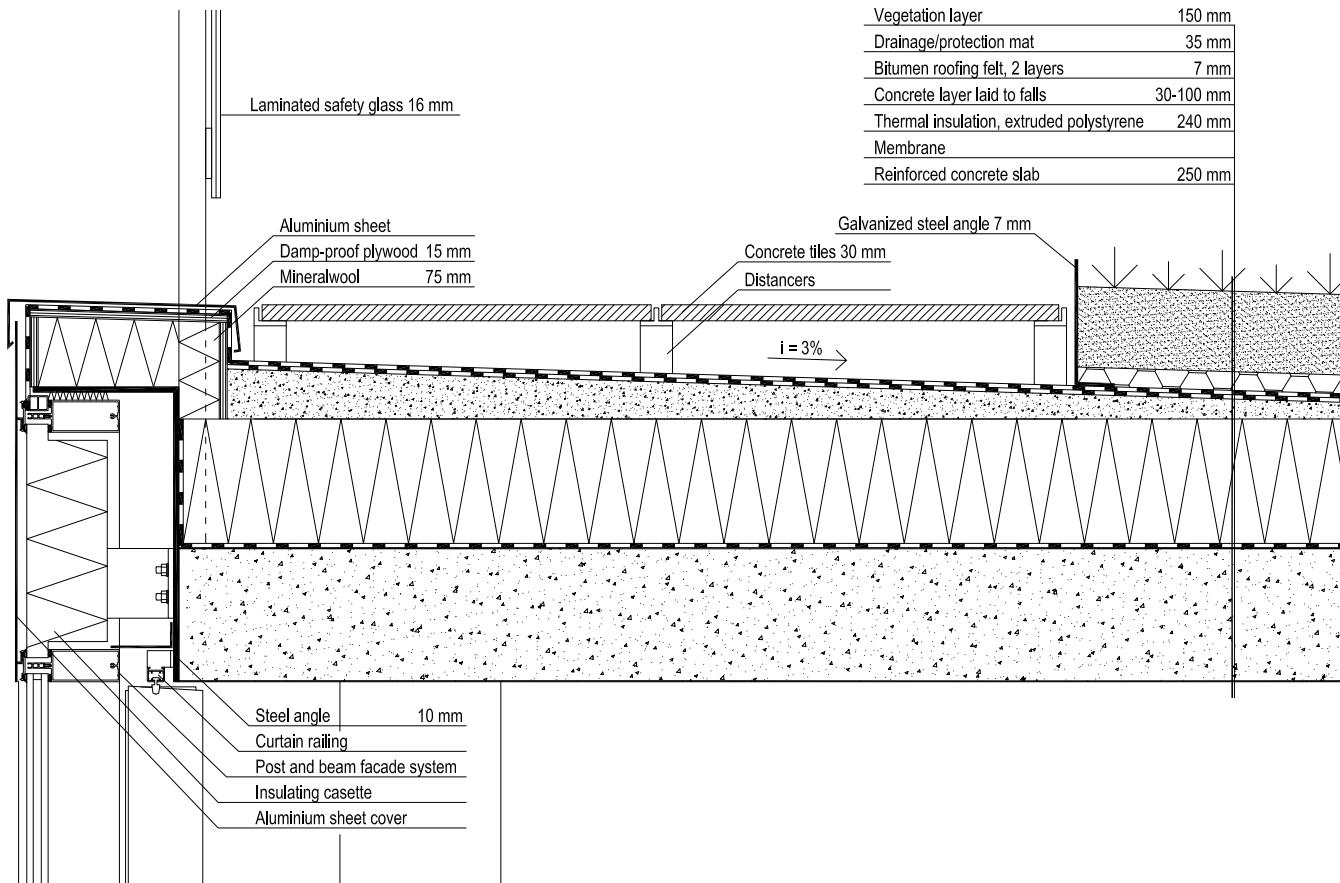
(Climate data for Tokyo (1971-2001), source: Japan Metereological Agency; wind data for Tokyo airport (2007-2010), source: windfinder.com)

The detail chosen for study



Stud. arch. Karlis Melzobs : Detalj i klimaskallet

Detail drawing 1:10



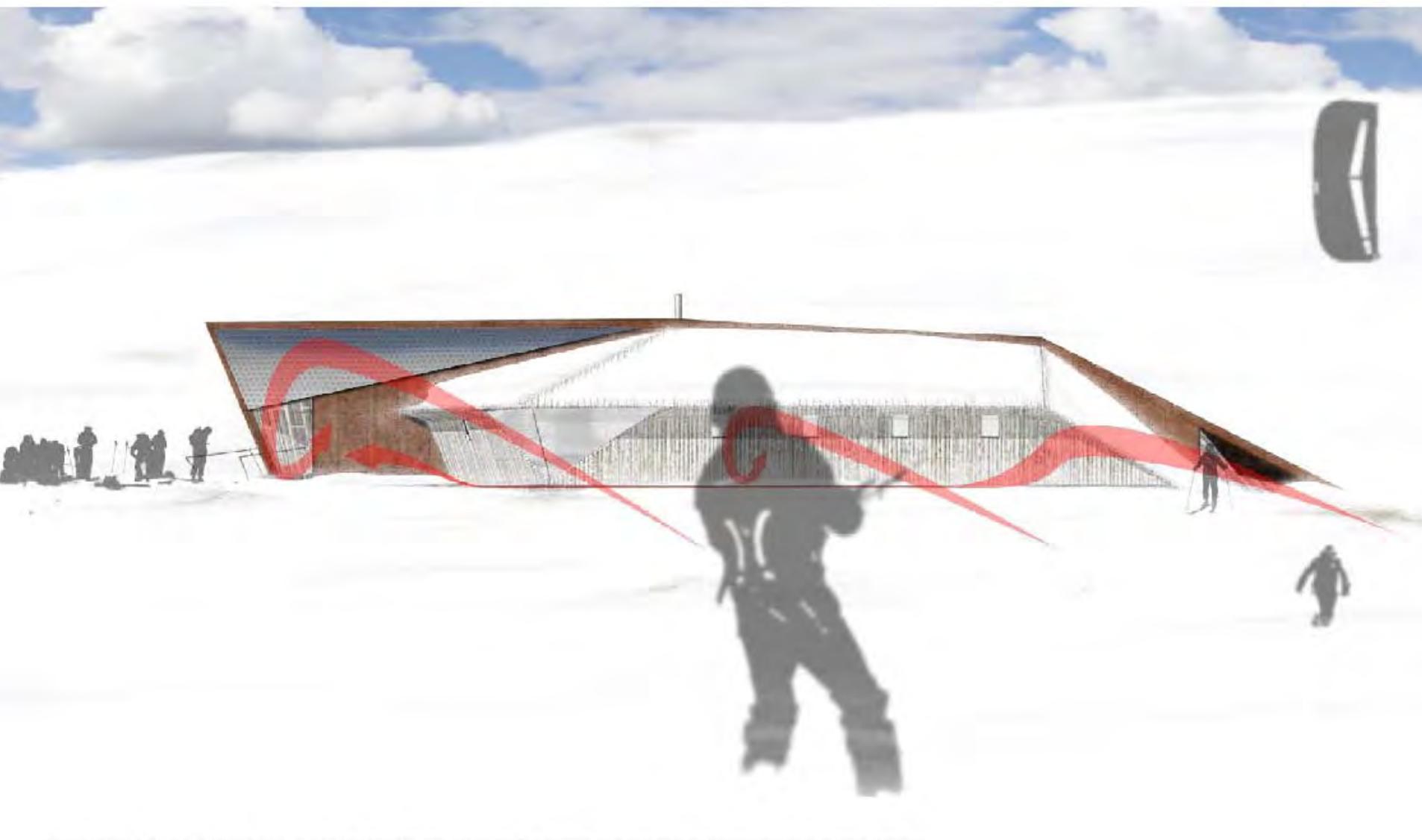
Stud. arch. Karlis Melzobs : Detalj i klimaskallet

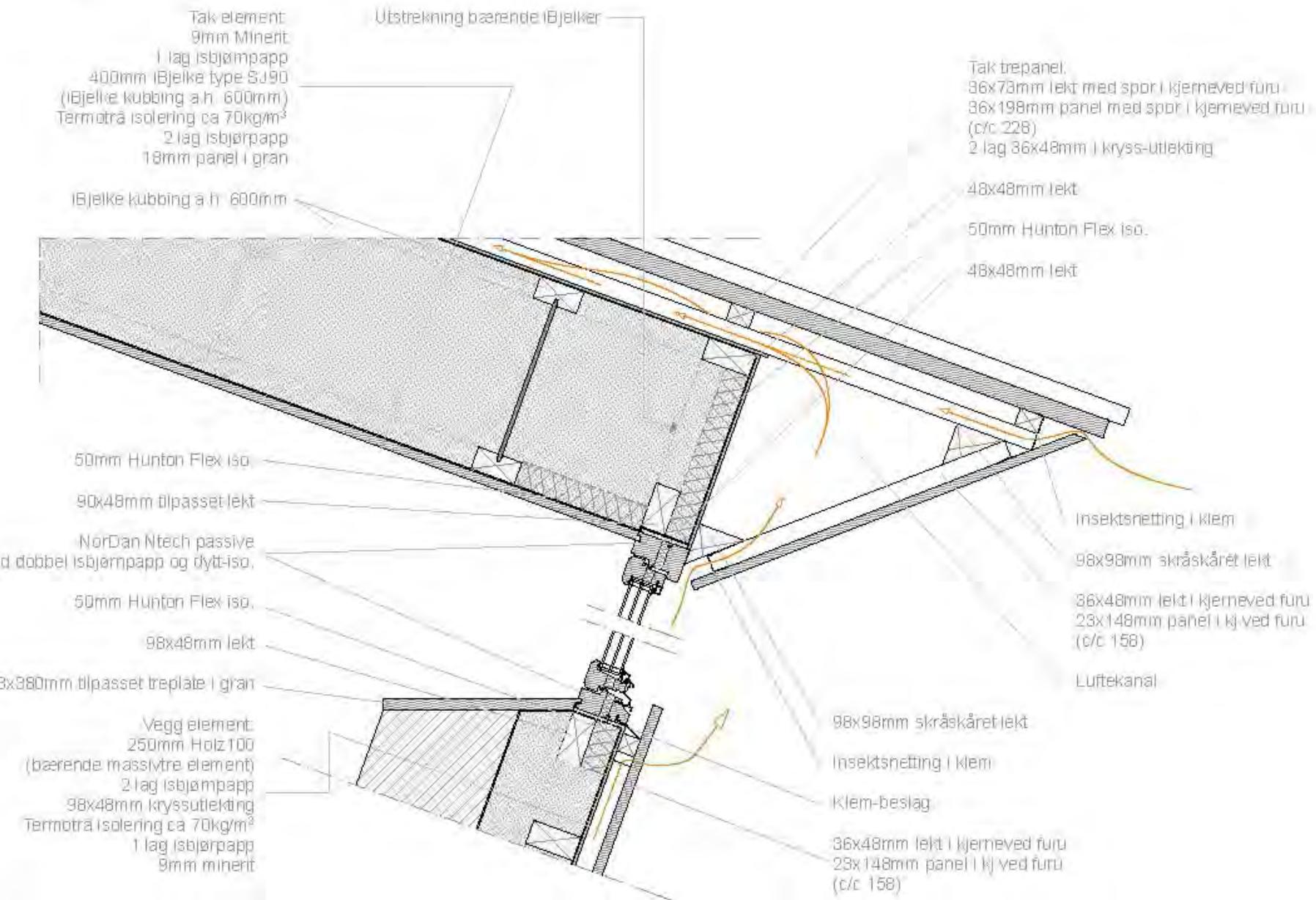


Marcus Runesson:
Vesletunga fjellstue
Master AHO V09

Bygging i sårbart og
klimaeksponert område

Tiltak 4: Master / diplomoppgaver







Nettverk for
flerfaglig utvikling og
utforskende bygging
med Norge som
klimalaboratorium

Tiltak 5



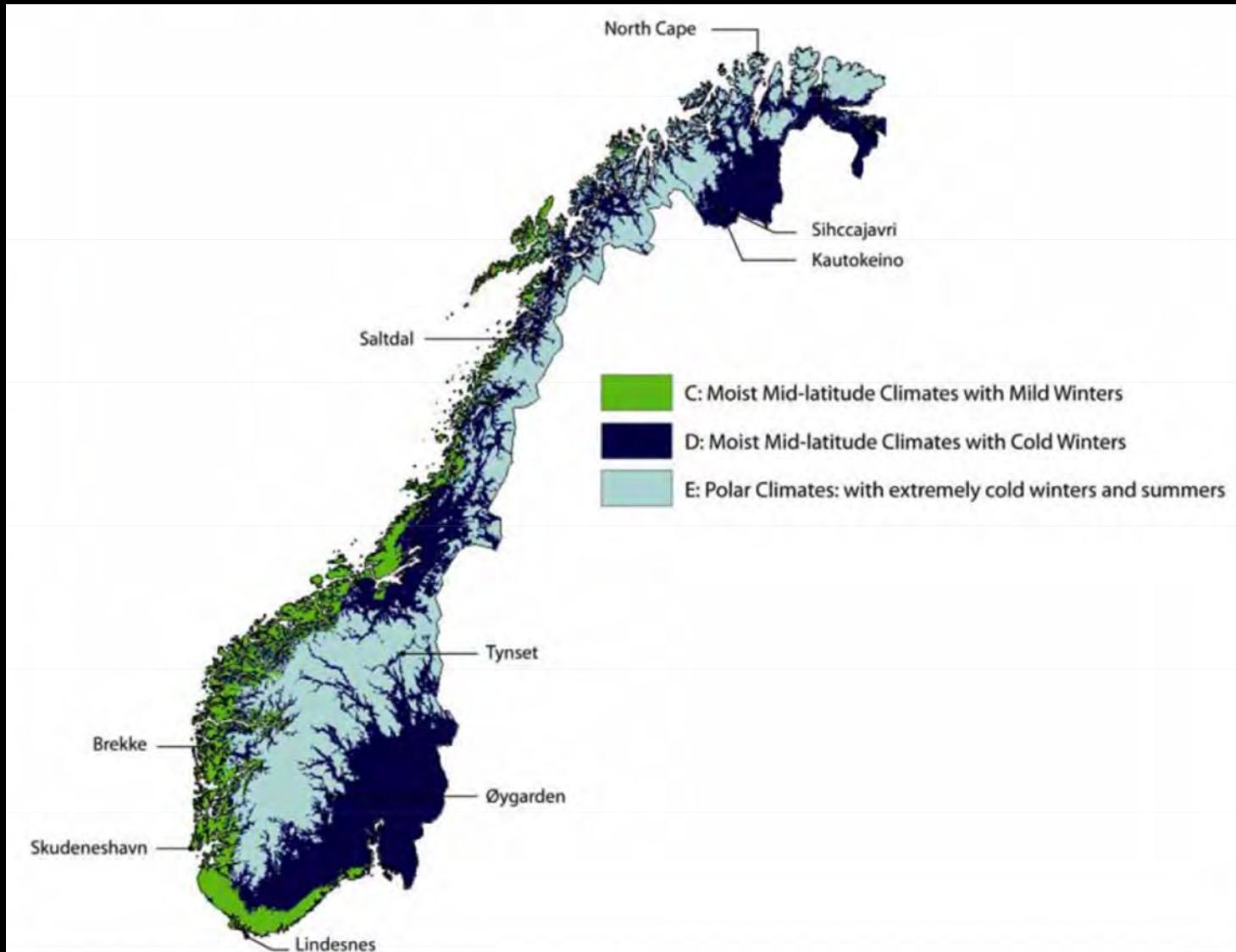
Sogn videregående skole



Skar leir i Maridalen



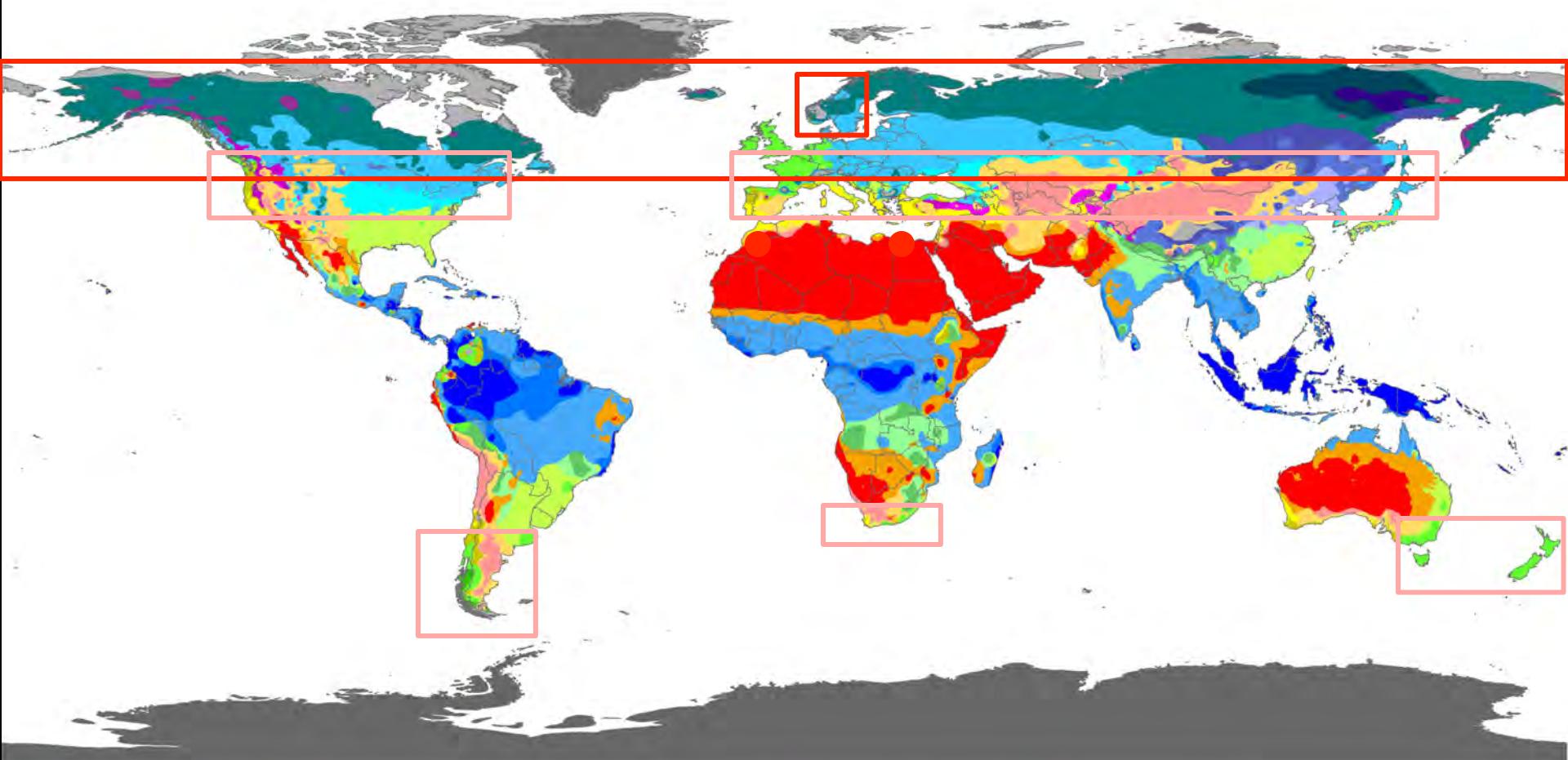
Byggforsk



Klimasoner i Norge ihht. Köppens klassifisering
Kilde: Thomas Thiis UMB

World map of Köppen-Geiger climate classification

(Source: University of Melbourne)

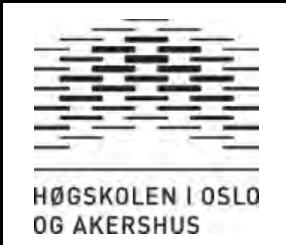


Af	BWh	Csa	Cwa	Cfa	Dsa	Dwa	Dfa	ET
Am	BWk	Csb	Cwb	Cfb	Dsb	Dwb	Dfb	EF
Aw	BSh	Cwc	Cfc	Dsc	Dwc	Dfc		
	BSK			Dsd	Dwd	Dfd		

Main.Climates:
A: equatorial
B: arid
C: warm temperature
D: snow
E: polar

Precipitation:
W: desert
S: steppe
f: fully humid
s: summer dry
w: winter dry
m: monsoonal

Temperature:
h: hot arid
k: cold arid
a: hot summer
b: warm summer
c: cool summer
d: extremely continental
F: polar frost
T: polar tundra



Sogn videregående skole



Skar leir i Maridalen



50.000 flyttbare enheter er i ferd med å bli utdatert.

Hvordan ser fremtidens flyttbare, fleksible og energieffektive byggmoduler ut?



Byggforsk



Bedriftsbesøk hos Moelven Byggmodul. Bjørn-Ottar Torp understreker et poeng



VERDENS STØRSTE CONTAINERBY: KEETWONEN - 1000 STUDENTBOLIGER I AMSTERDAM
(LEVERANDØR: TEMPOHOUSING.)



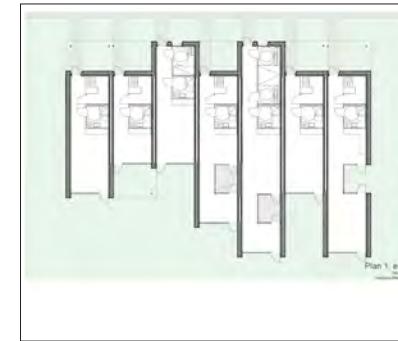
Flerfaglig workshop AHO / HiOA 21.9.2011



DANIEL PETER BARTH



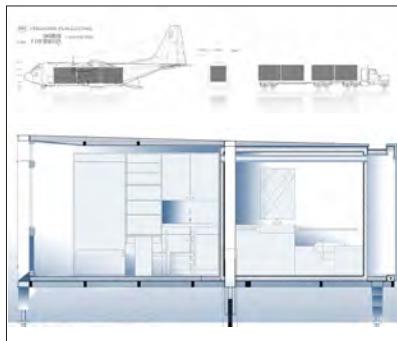
ANDERS SVENSEN ALMESVEEN



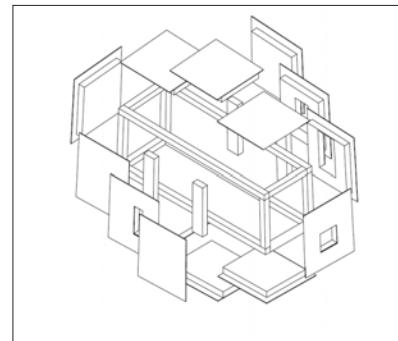
SARA MARIA HAGERUP BILLING



TERJE SANDBERG



TOR-MAGNUS HORTEN



SIMEN LENNERTZEN



EIVIND DANIELSEN



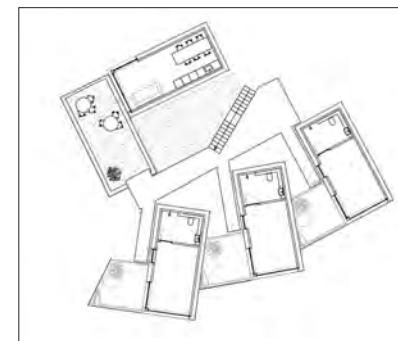
CHRISTIAN HALSE



JAN KRISTIAN ORVIK



BÅRD LINDQUIST

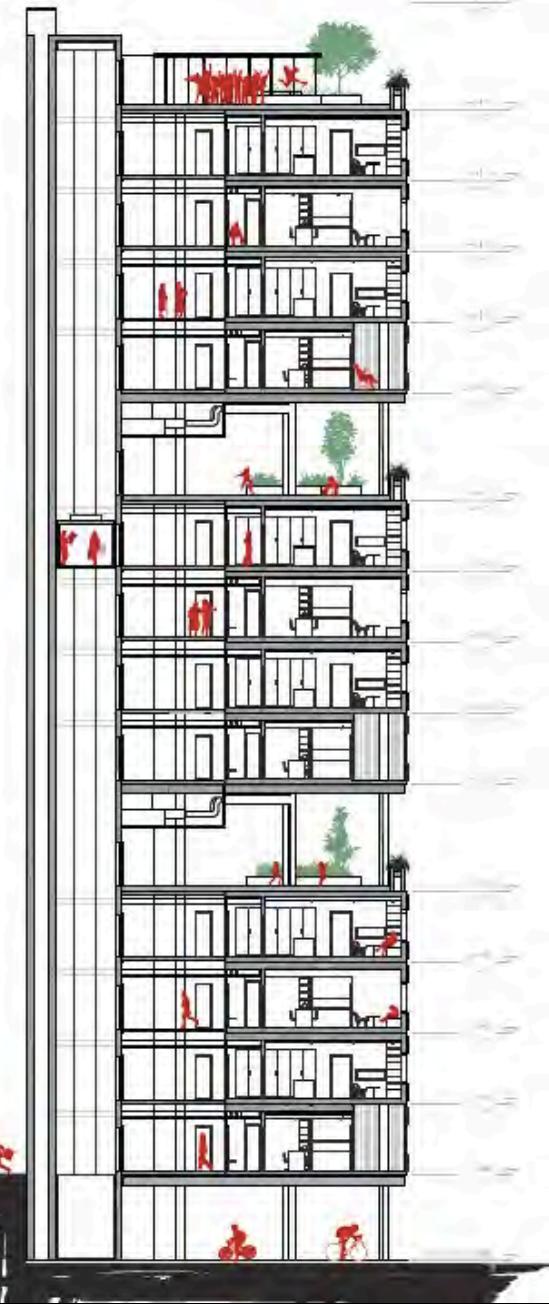
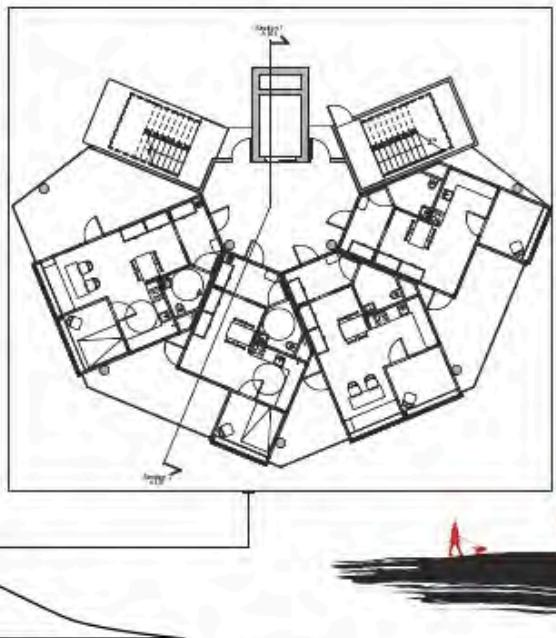
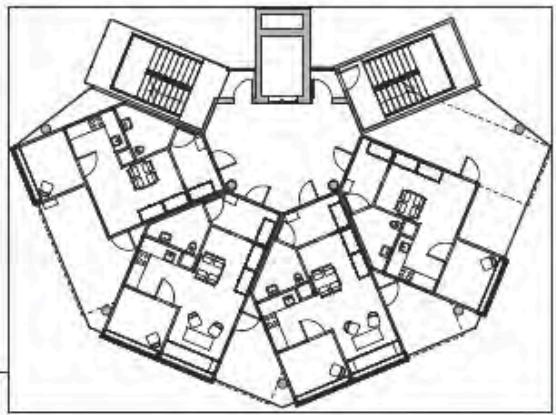


ARNA OSP GUDBRANDSDOTTIR



MARTIN KANDOLA

13 STUDENTPROSJEKTER SOM BELYSER ULIKE TEMAER KNYTTET TIL FREMTIDENS BYGGMODULER

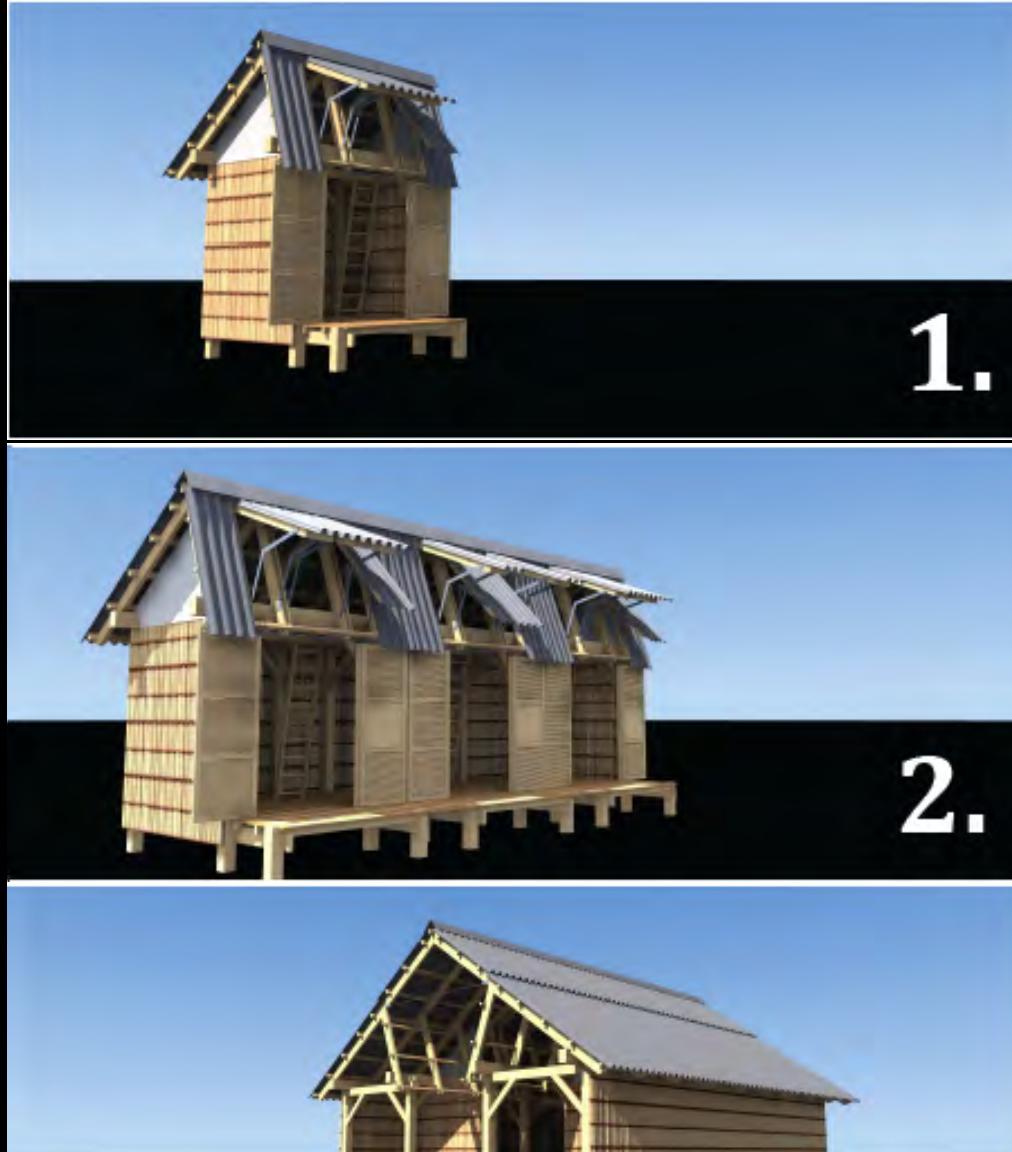


FASADE, SNITT OG PLANER 1:100



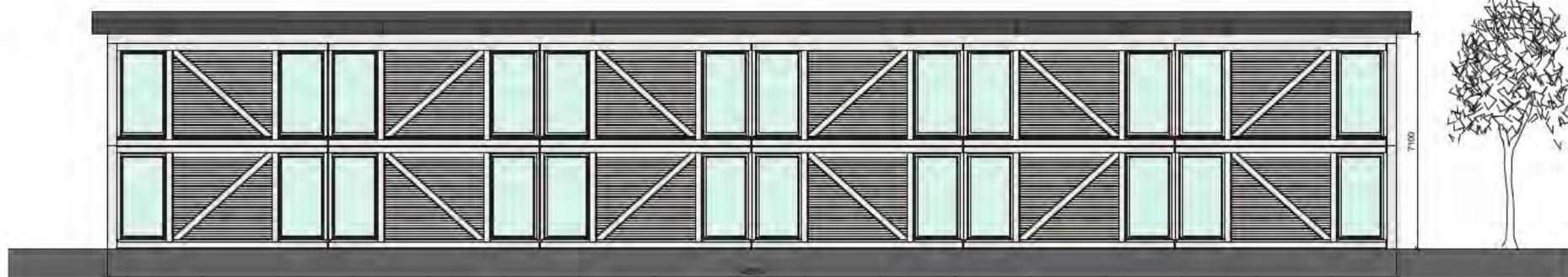
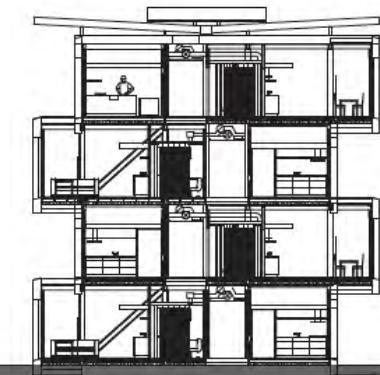
Hage i mellomplan

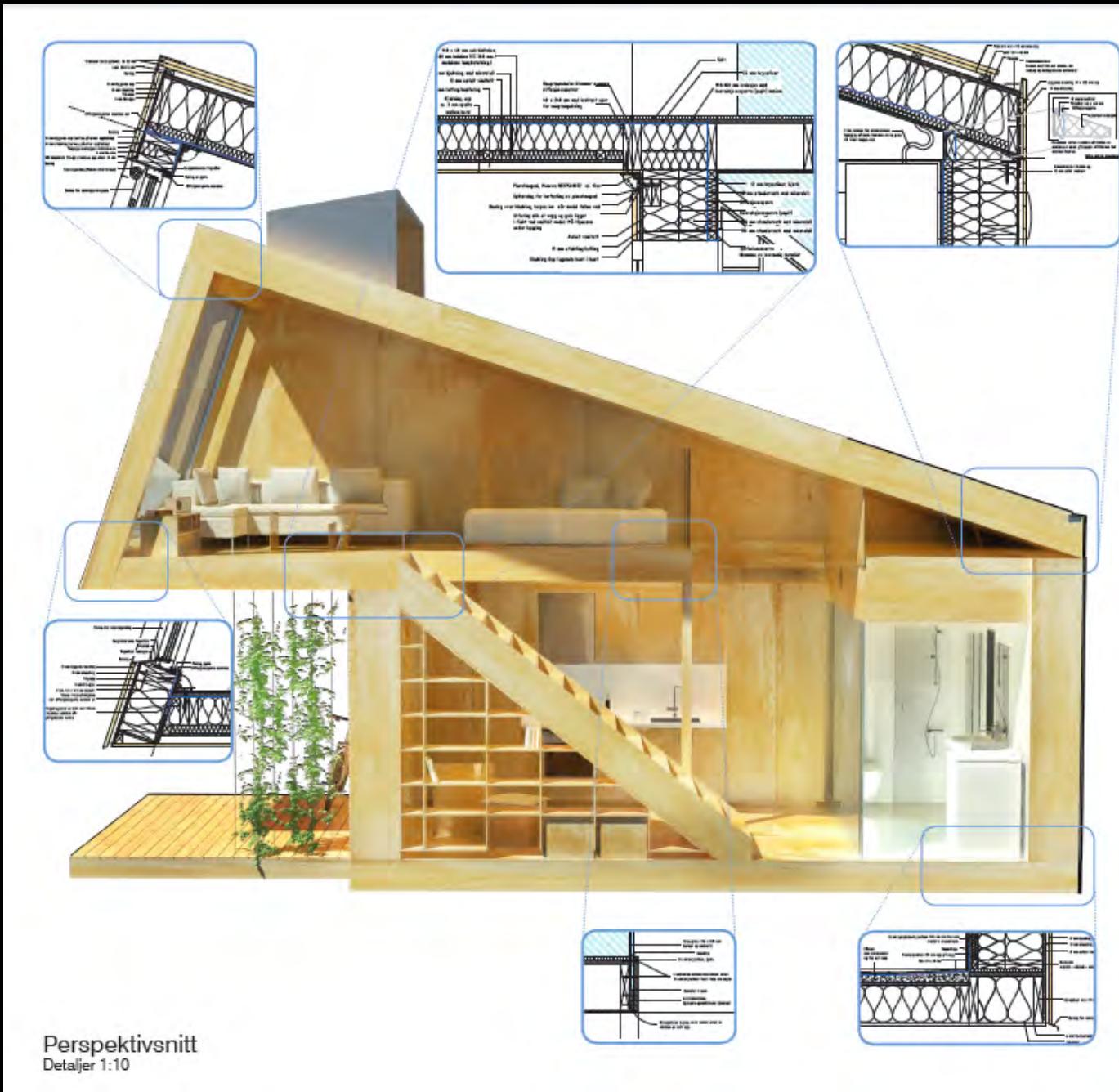






MODUL
MÅlestokk 1:20







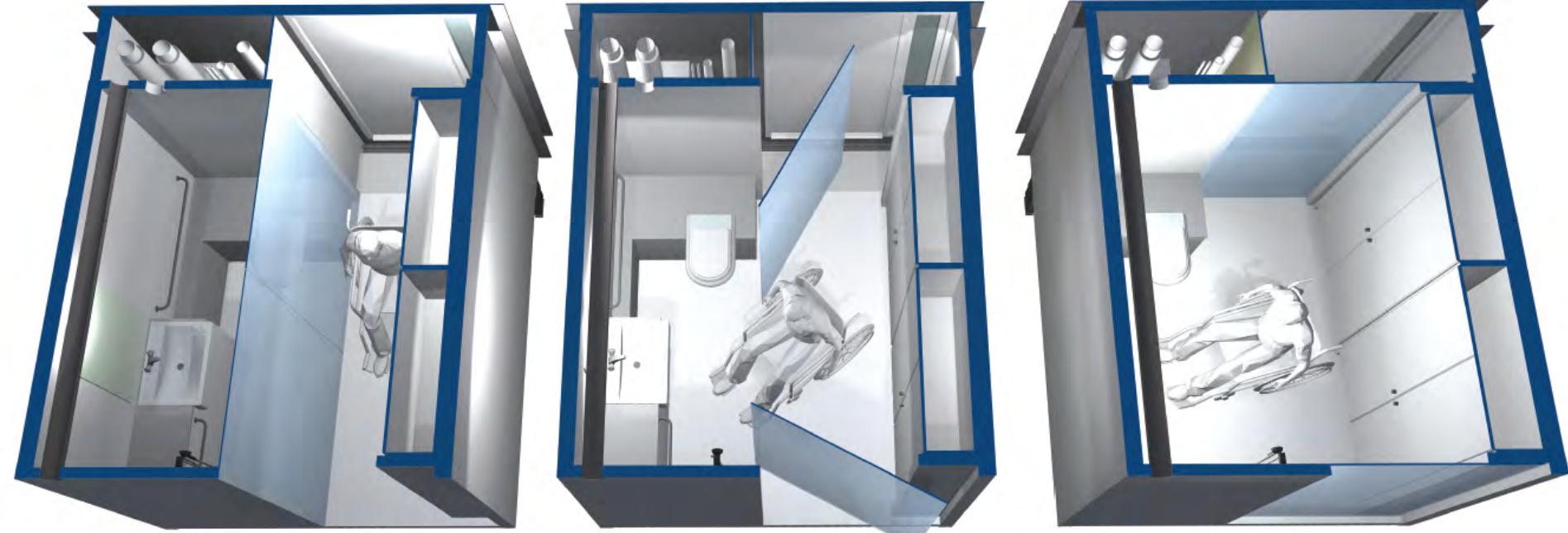
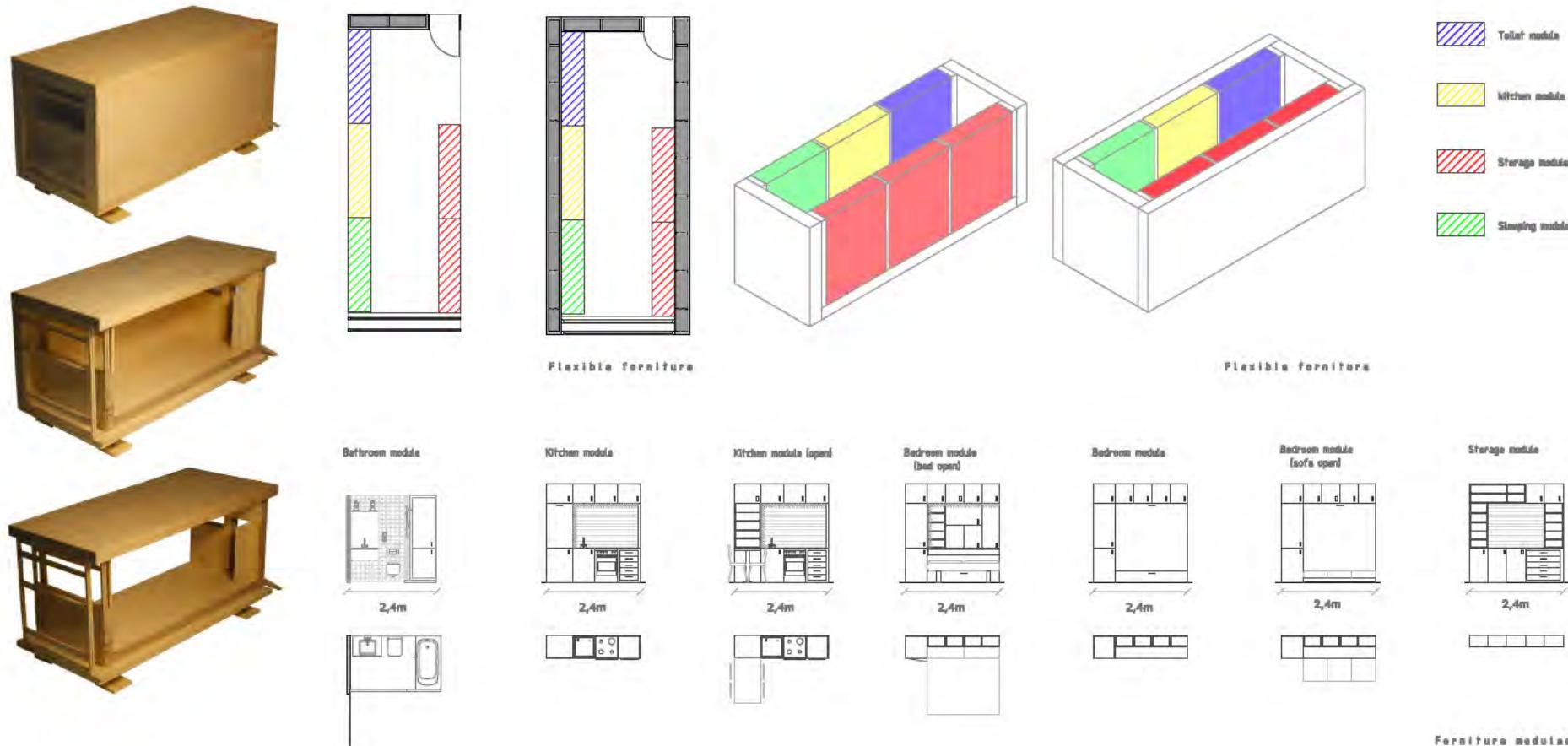


fig.1: Entresituasjon.
Baderommet ligger skjult bak glassdørene

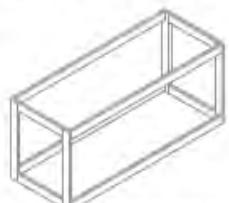
fig.2: Rommet endrer funksjon,
badet åpner seg og gangen forsvinner.

fig.3: Et romslig universelt utformet bad.



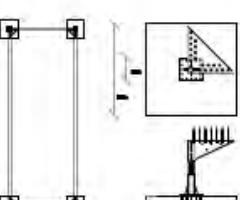
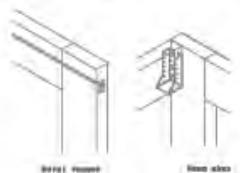
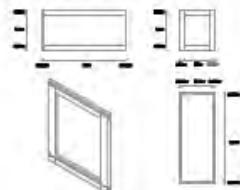
Universality

Structure

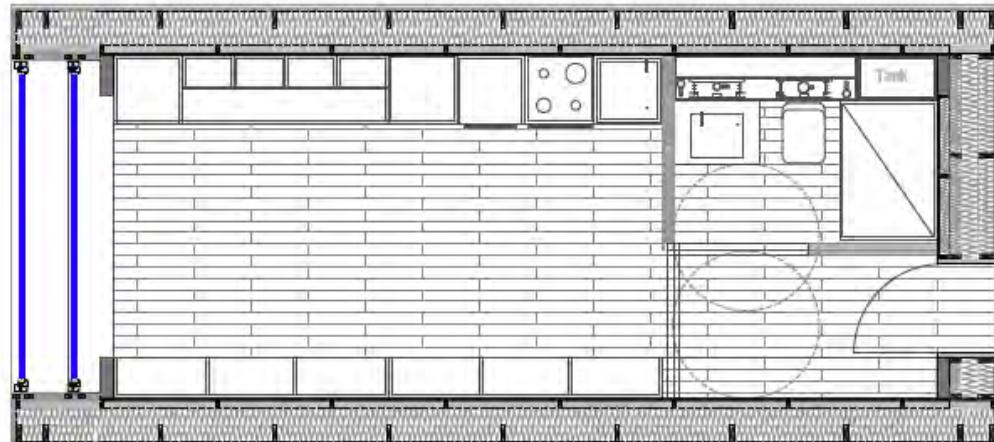


The structure is the main frame that gives the module its universality. It is made of a grid system that allows for the walls to be built around it. The roof is a simple truss system that supports the weight of the roof load.

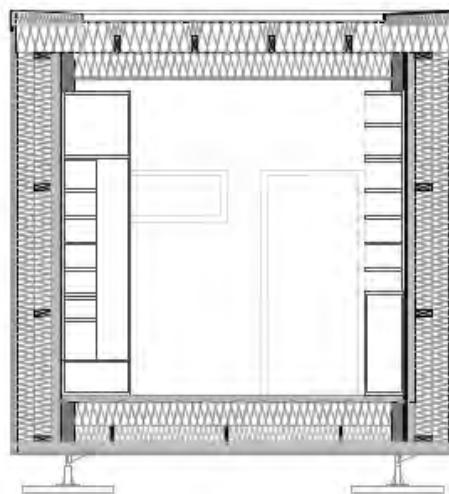
Structure dimensions



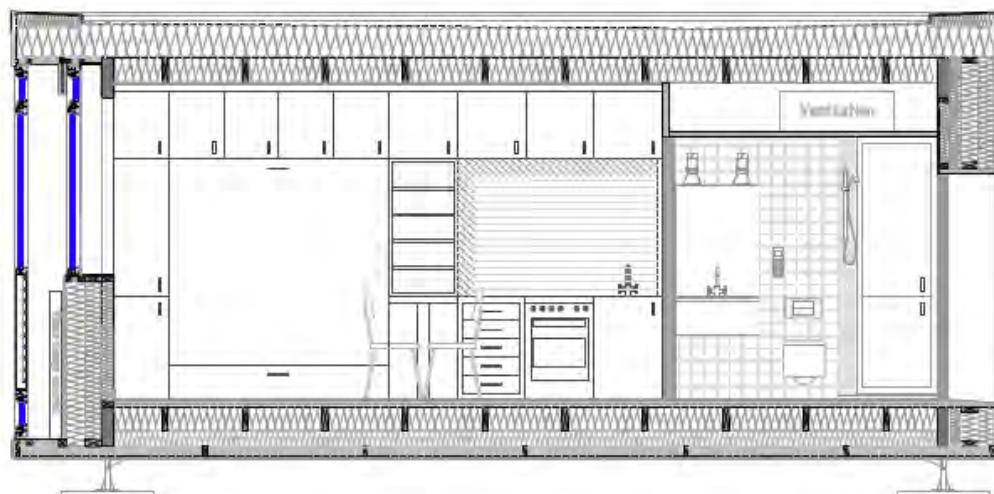
Foundation
The foundations are
made from the module
and consist of
different situations.
The base can be
concrete and there
are options for
surface work to the
walls.



Plan



Cross section



Longitudinal section



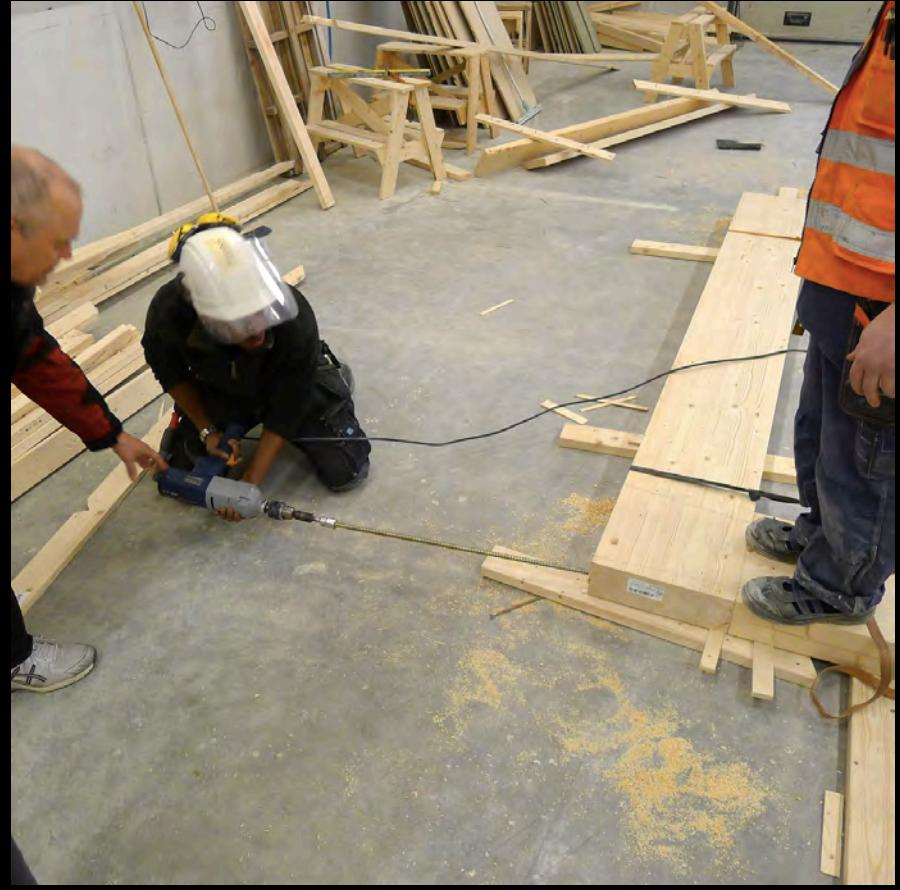
JOAN PASTOR PLANAS GJENNOMGÅR SITT PROSJEKT



KUNNSKAPSMINISTER
KRISTIN HALVORSEN
UTTRYKKER SIN STØTTE TIL
SAMARBEIDSOPPROSJETET



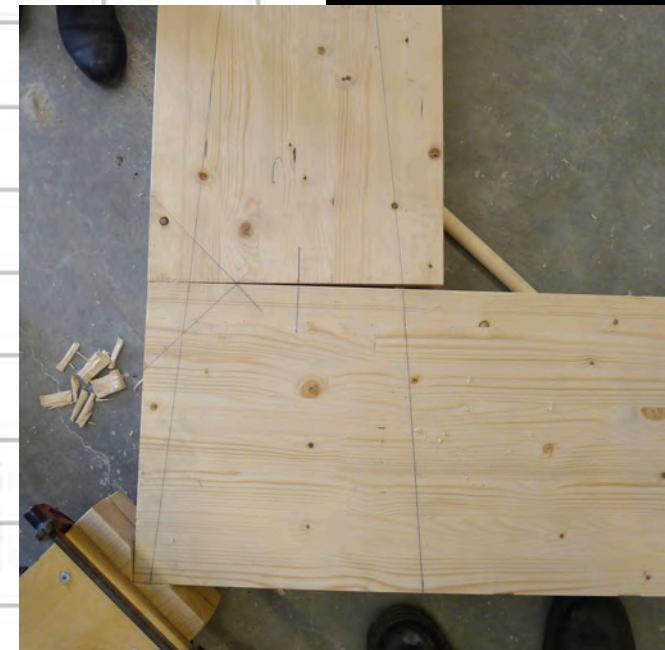
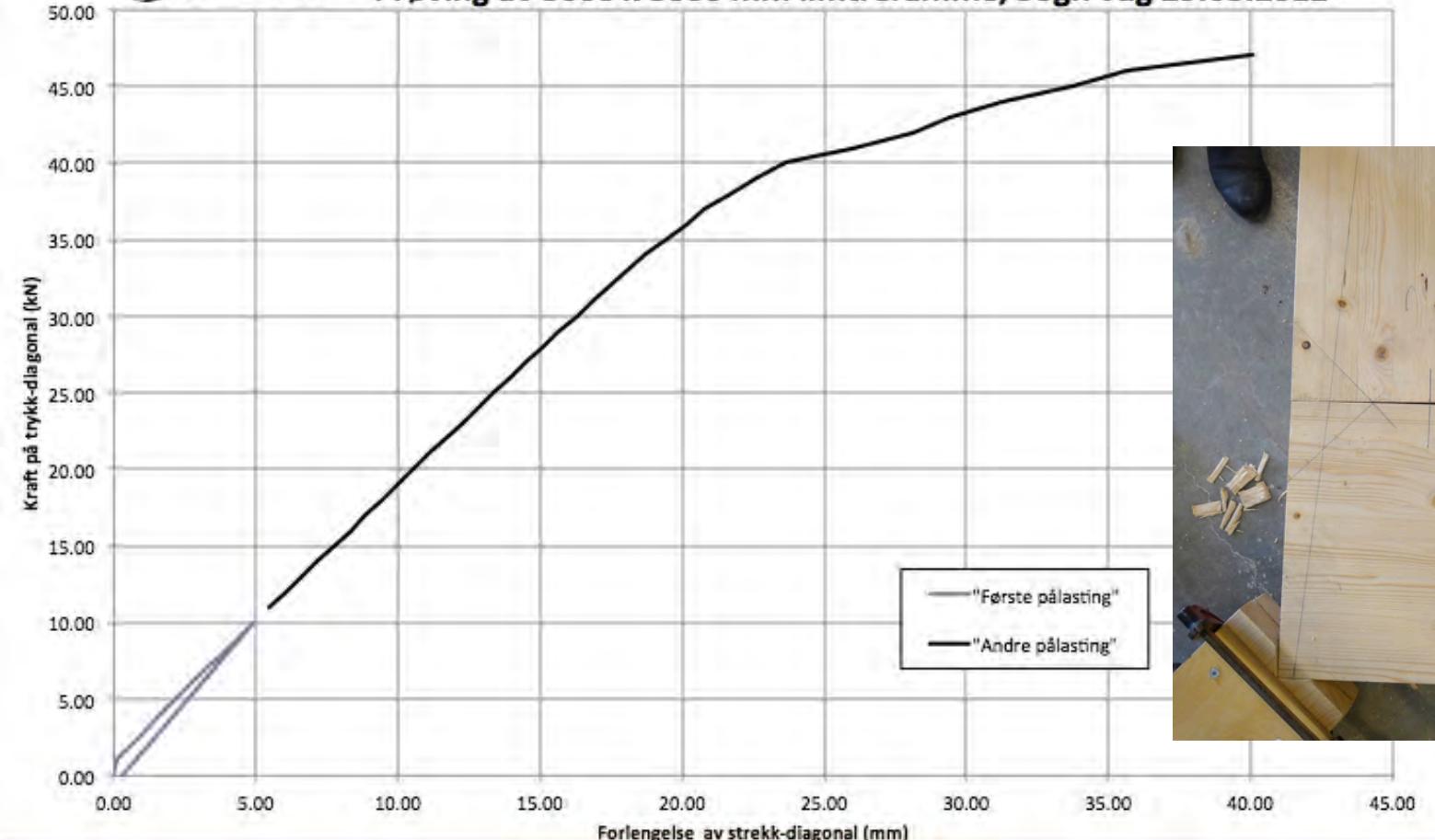
Nils Ivar Bovim med limtreramme



Skrueforbindelse i limtreramme

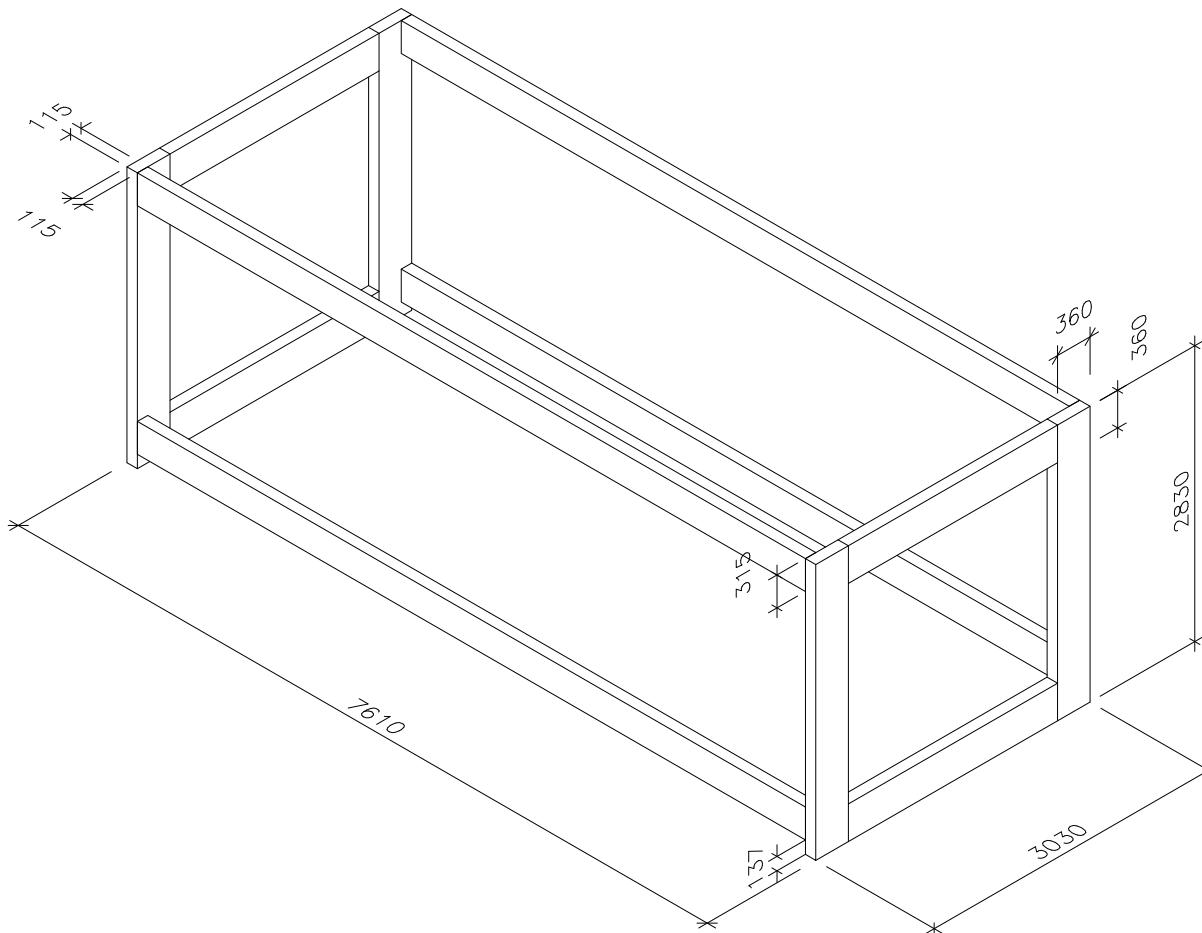


SINTEF Prøving av 3000 x 3000 mm limtreramme, Sogn vdg 29.03.2012

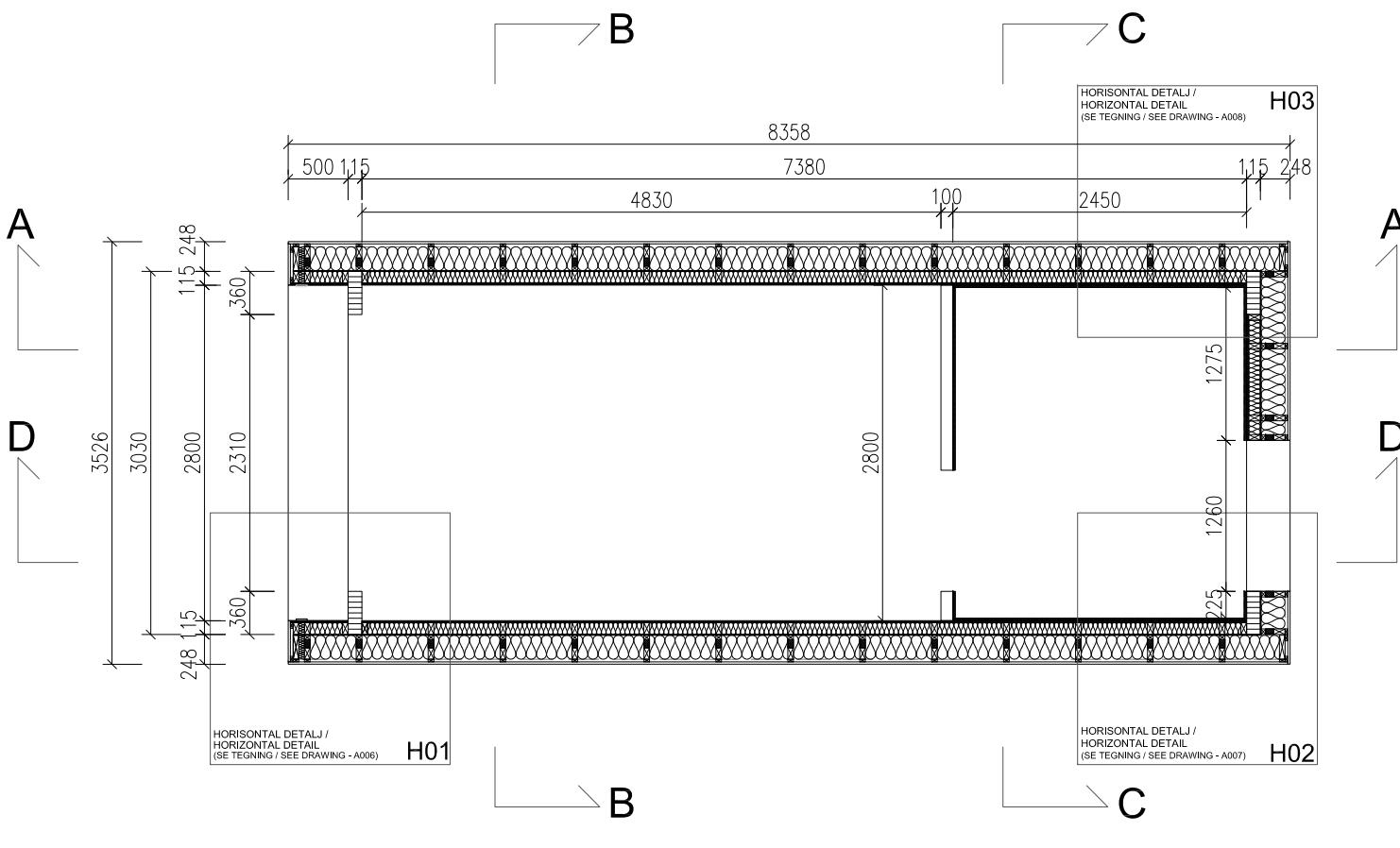


SINTEF Byggforsk v/ Dag Henning Sæther

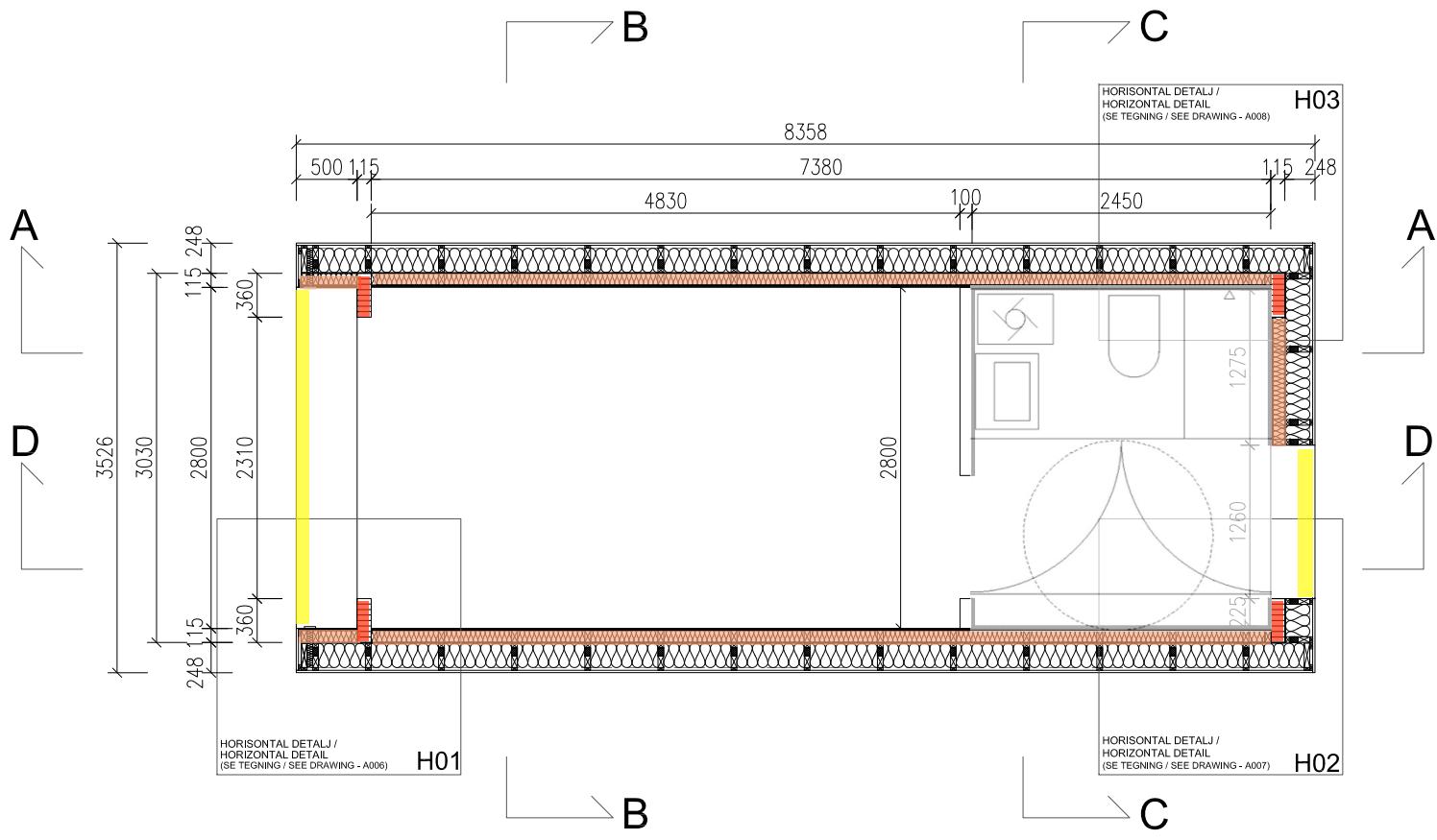
Limtreramme etter test



Joan Ramon Pastor Planas
Marina Toufexi
Martin Kandola

**PLAN**

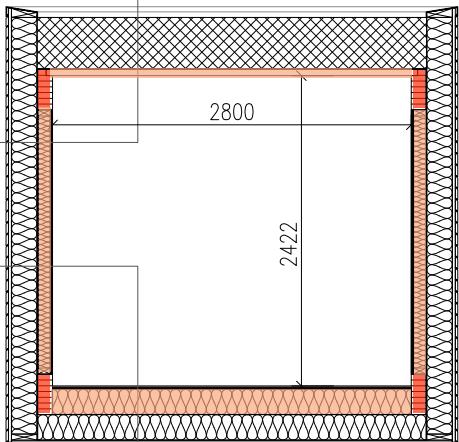
Joan Ramon Pastor Planas
Marina Toufexi
Martin Kandola



Joan Ramon Pastor Planas
Marina Toufexi
Martin Kandola

VERTIKAL DETALJ /
VERTICAL DETAIL
(SE TEGNING / SEE DRAWING - A010)

V02

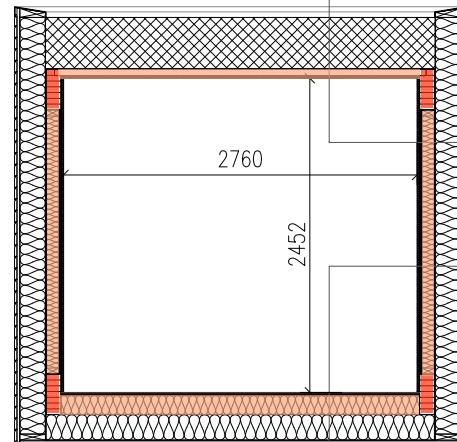


VERTIKAL DETALJ /
VERTICAL DETAIL
(SE TEGNING / SEE DRAWING - A009)

V01

VERTIKAL DETALJ /
VERTICAL DETAIL
(SE TEGNING / SEE DRAWING - A012)

V04



VERTIKAL DETALJ /
VERTICAL DETAIL
(SE TEGNING / SEE DRAWING - A011)

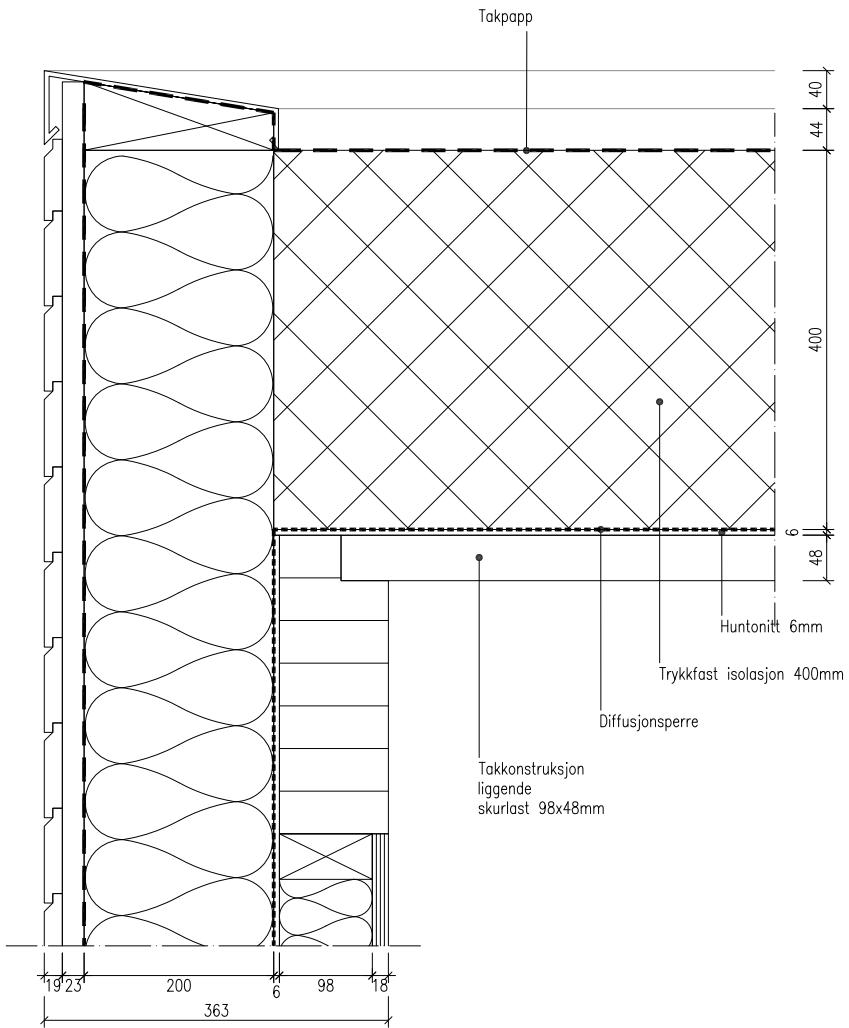
V03

SNITT B-B

SNITT C-C

Joan Ramon Pastor Planas
Marina Toufexi
Martin Kandola

VEGGOPPBYGGING: SE DETALJ V01



Joan Ramon Pastor Planas
Marina Toufexi
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Bygg skal utformes for langsiktig opprettholdelse av arkitektonisk, funksjonell og teknisk kvalitet

Da vil de opprettholde sin kulturelle og økonomiske verdi

De vil være bærekraftige