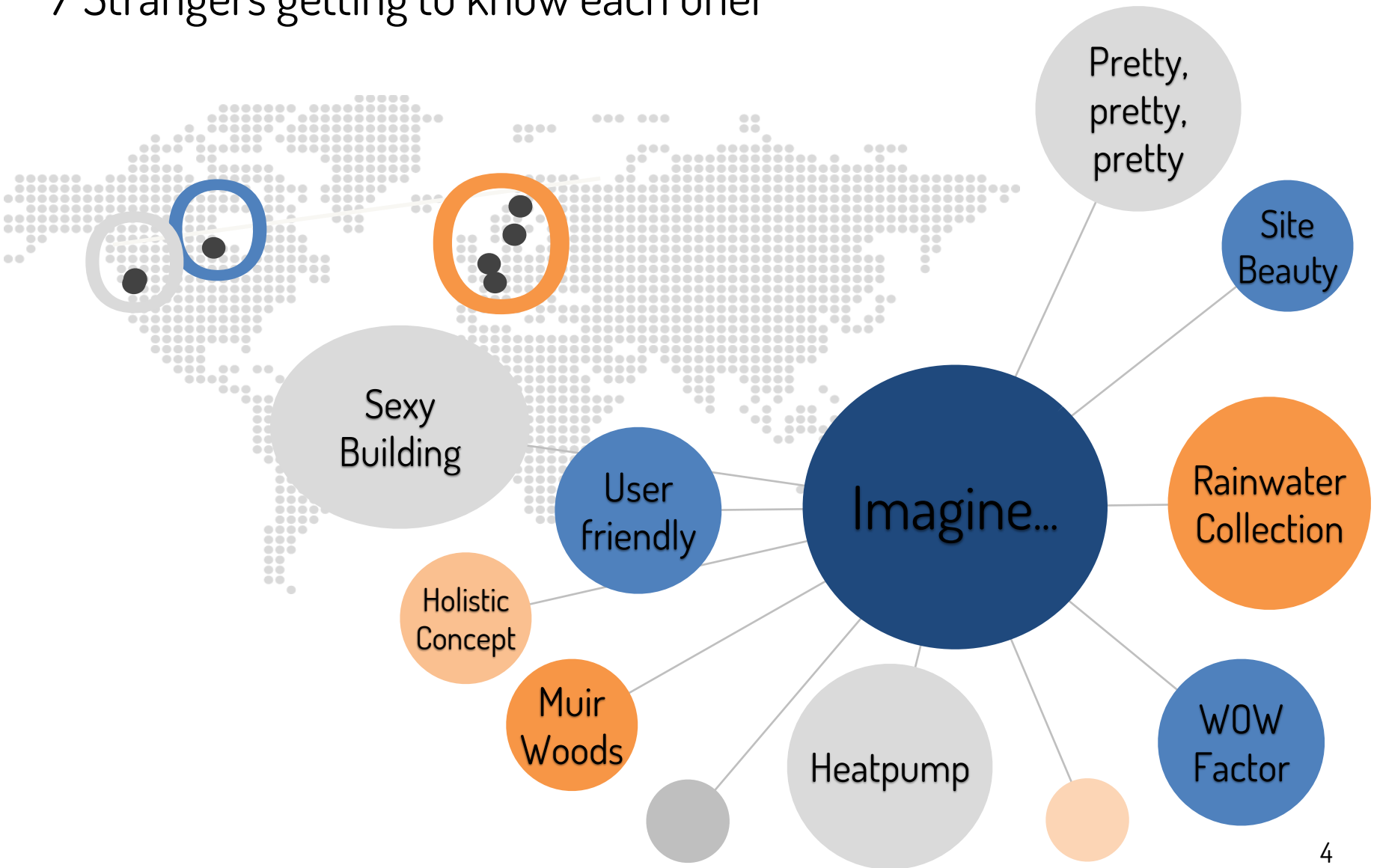
TEAM ATLANTIC 15

Winter Cyber Presentation


Nick, Construction Manager
Ali, Mechanical, Electrical and Plumbing
Lisa, Structural Engineer
Katja, Architect
Helsinki, Finland
Copenhagen, Denmark
Erfurt, Thunringia
Madison, Wisconsin,
Ljubljana
Slovenia
Stanford, California USA
Elisa, Life Cycle and Financial Manager
Nejc, Construction Manager
Cici, Structural Engineer
Andrej, Ljubljana
Dorian, Copenhagen
Jana, Frankfurt
Jackie, Stanford

Team Process

7 Strangers getting to know each oher



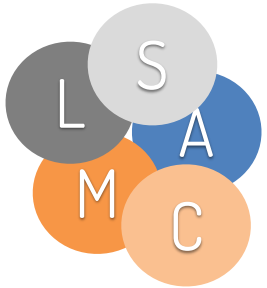
Spring Quarter
April/May
Week 12-17

Floating in Space-
Where are you??

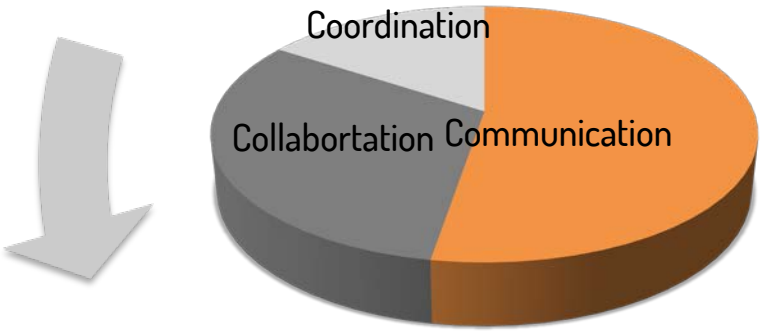
Meetings
once a week

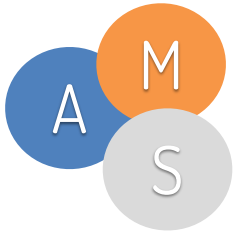
Kick Off
Januar
Week 1

Winter Cyber
Presentation
Week 9



Meetings
twice a week/
Subgroups/
Standups





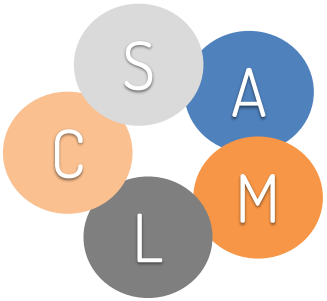
We are getting
better at this!?

Meetings
once a week/
Subgroups

Peer Crits
February
Week 5

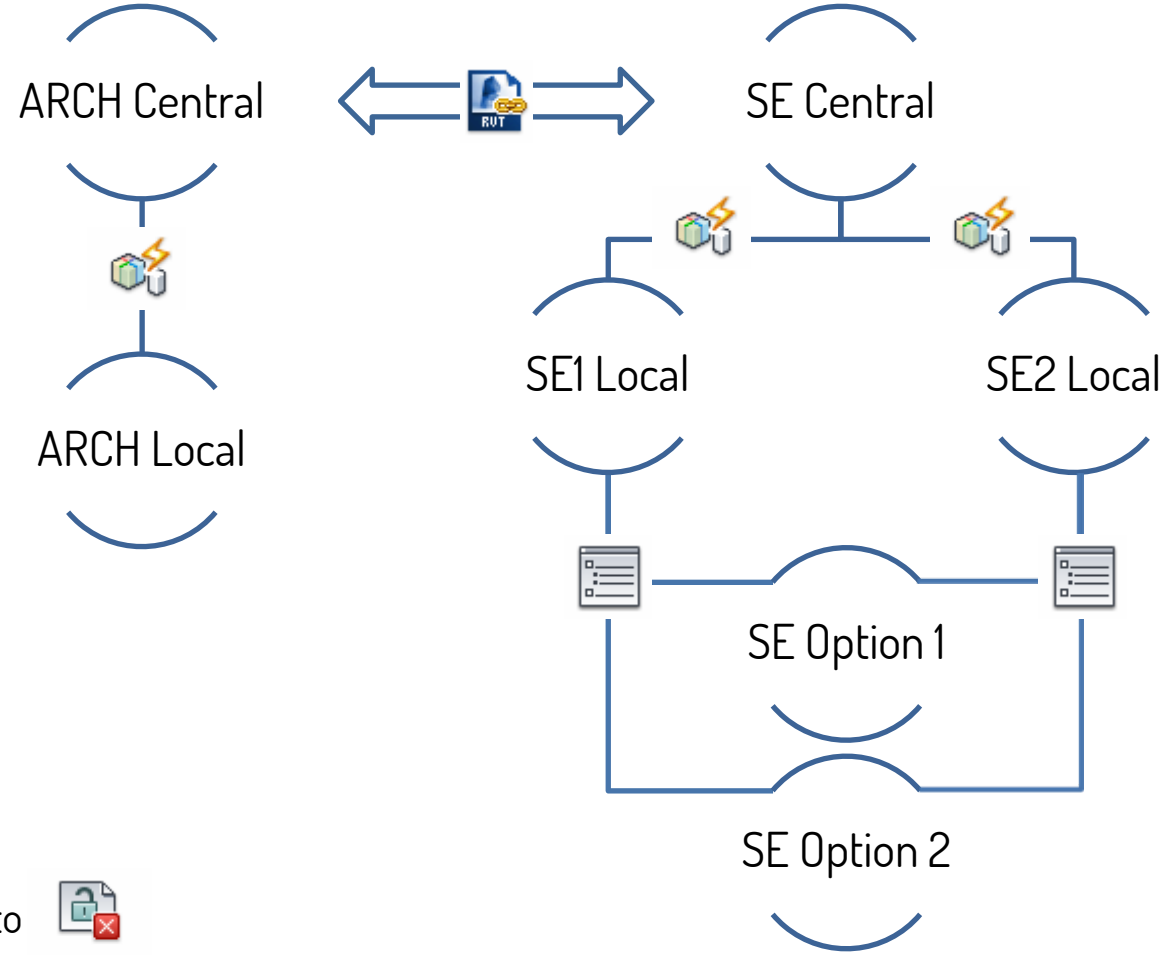
Mentor Crits
February
Week 6

Like/ Wish?!
Transparency?



Meetings
twice a week/
Subgroups

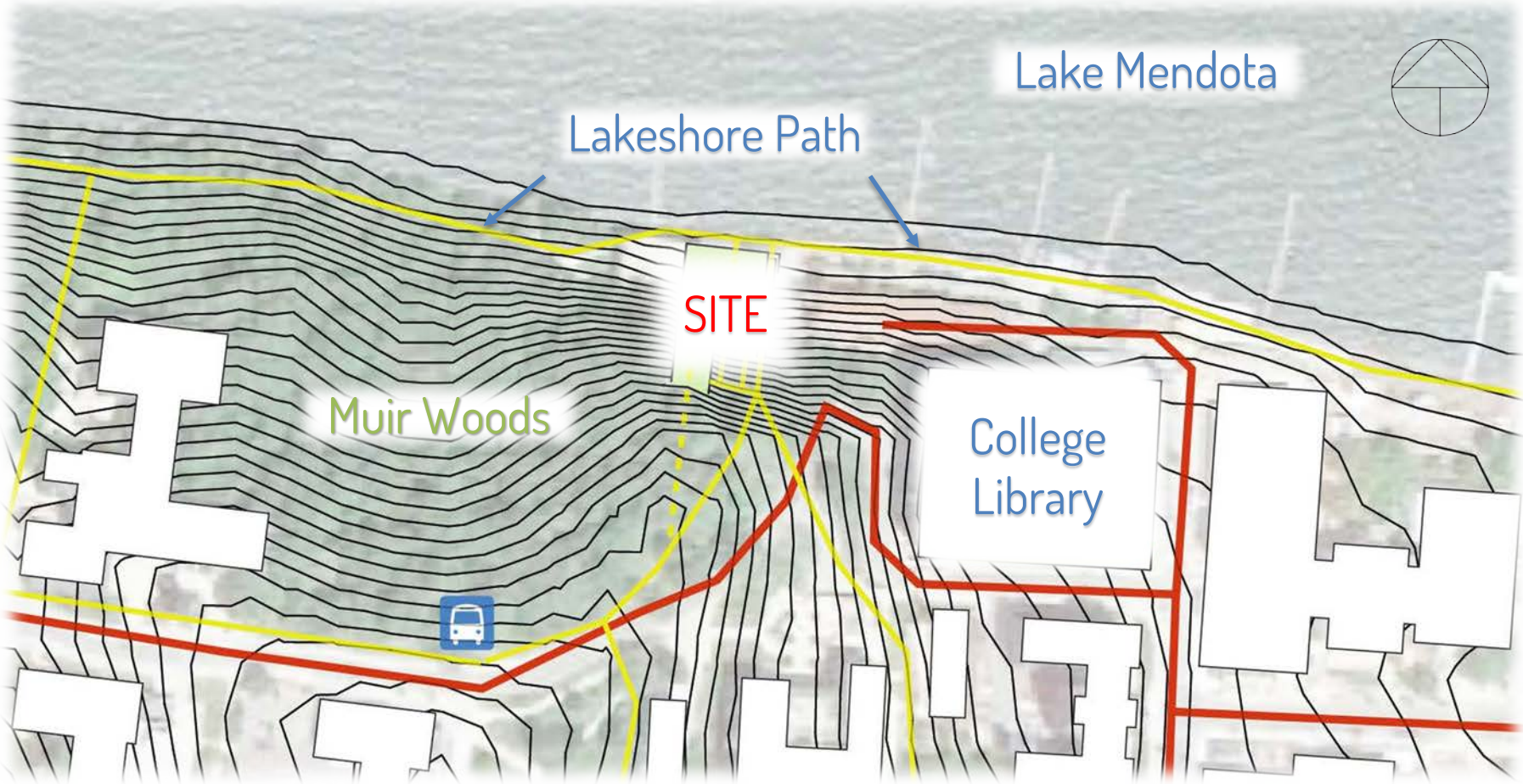
BIM Coordination



Never ever forget to
-reducing latency!


Madison, WI
Location

University of Wisconsin – Madison

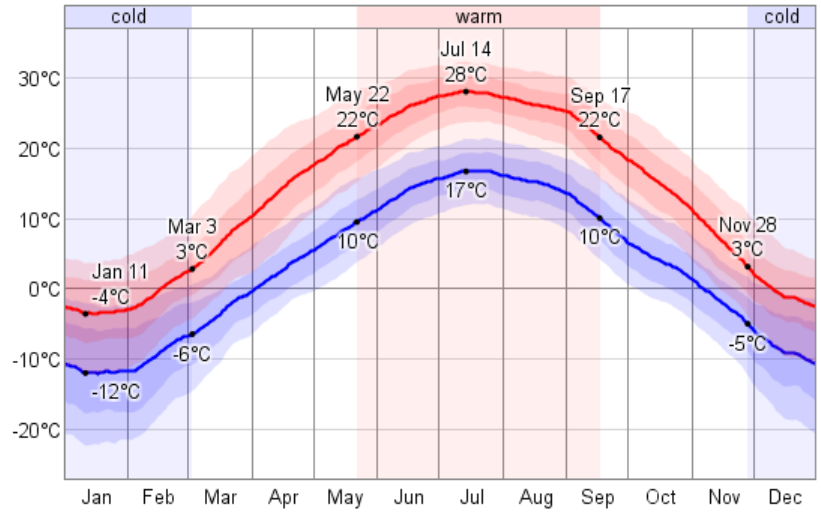


Local Hazards and Challenges

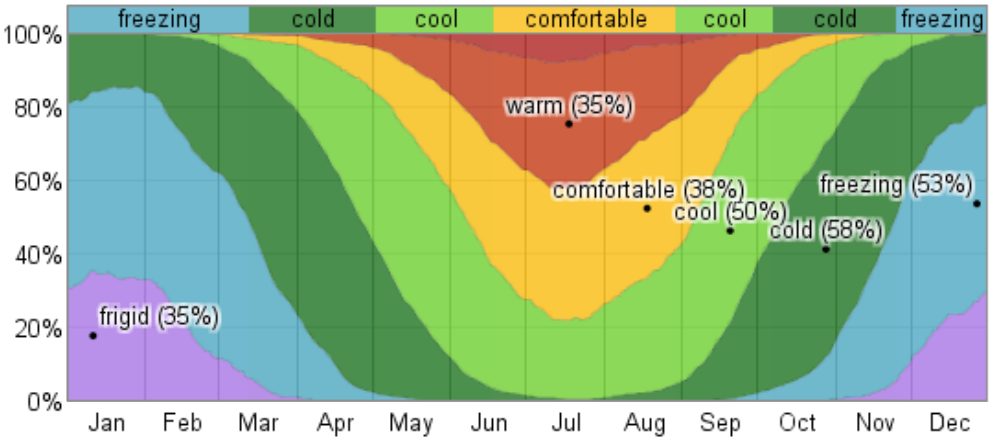
- Constrained by lake, hill and forest
- High water table
- Extreme climate
- Proximity of College Library
- Howard Temin Lakeshore path

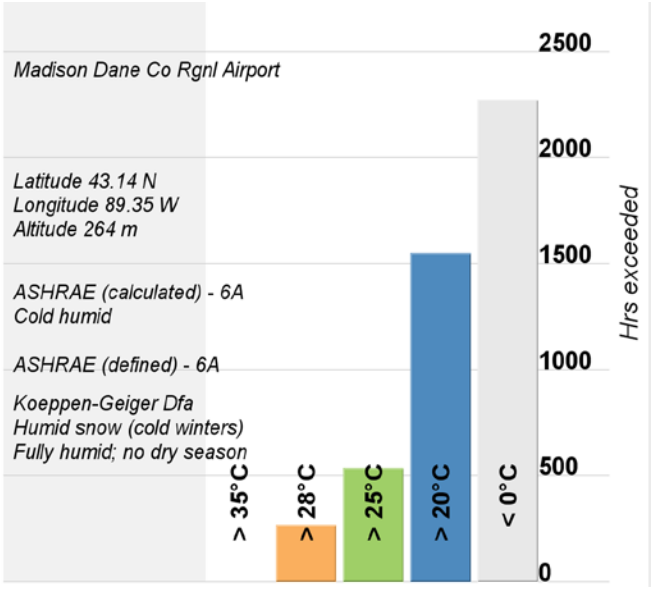
Site

Warm & Cold Weather

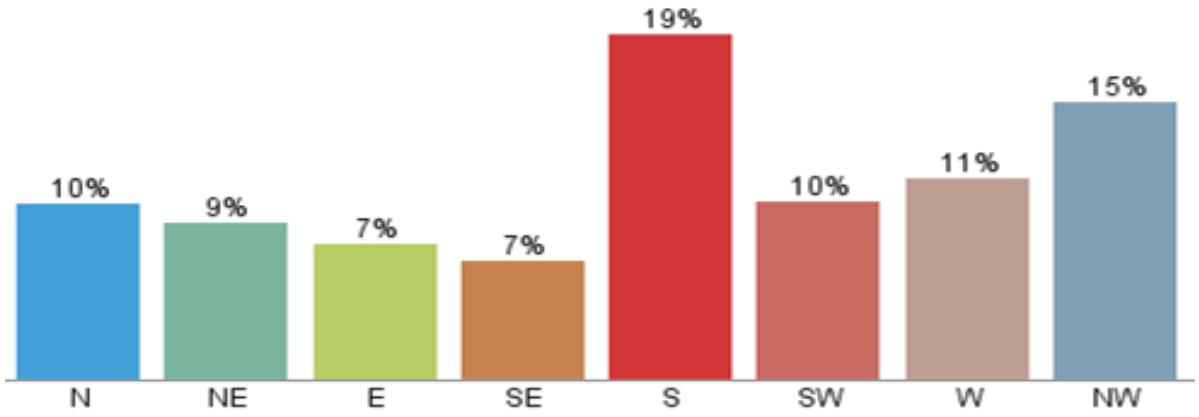


Average max. temperature: 28 °C
Average min. temperature: -12 °C



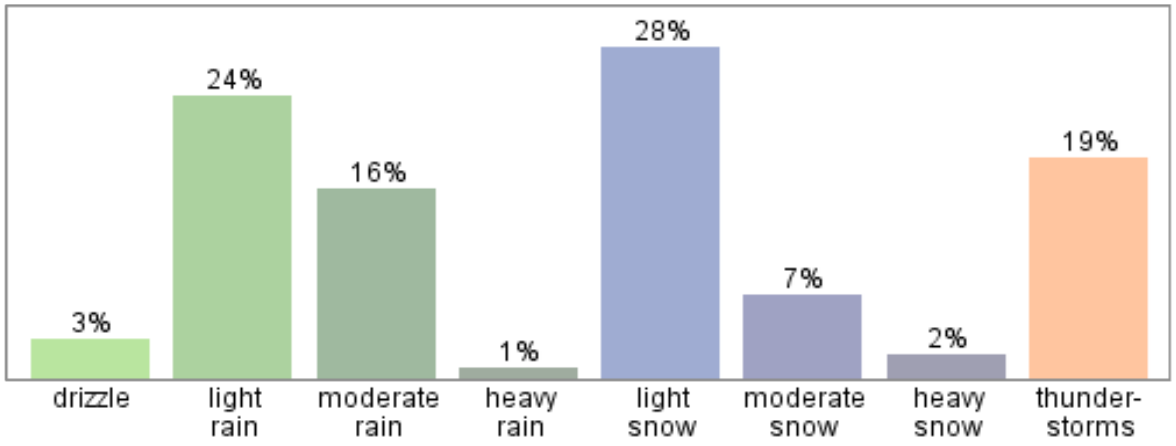


Rain & Wind

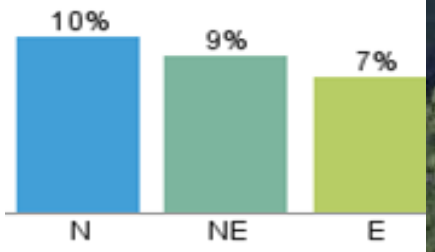


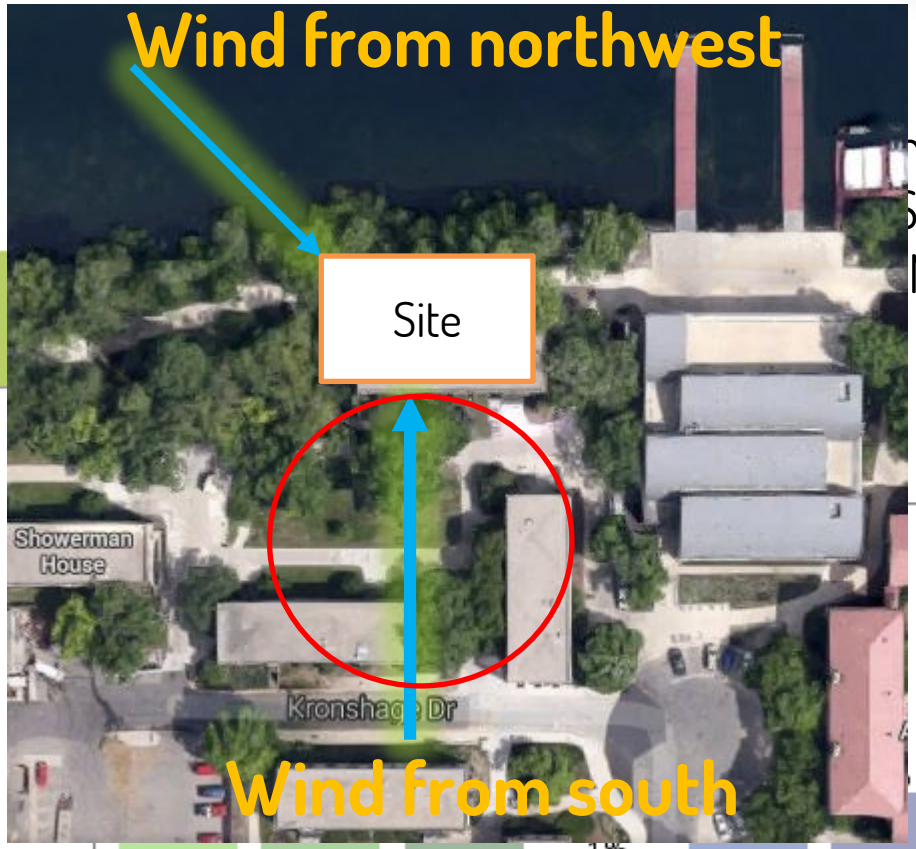
Wind mostly from
S-SW
W-NW

Average yearly rainfall: 34.5 in
Average yearly snowfall: 38.2 in



Rain & Wind

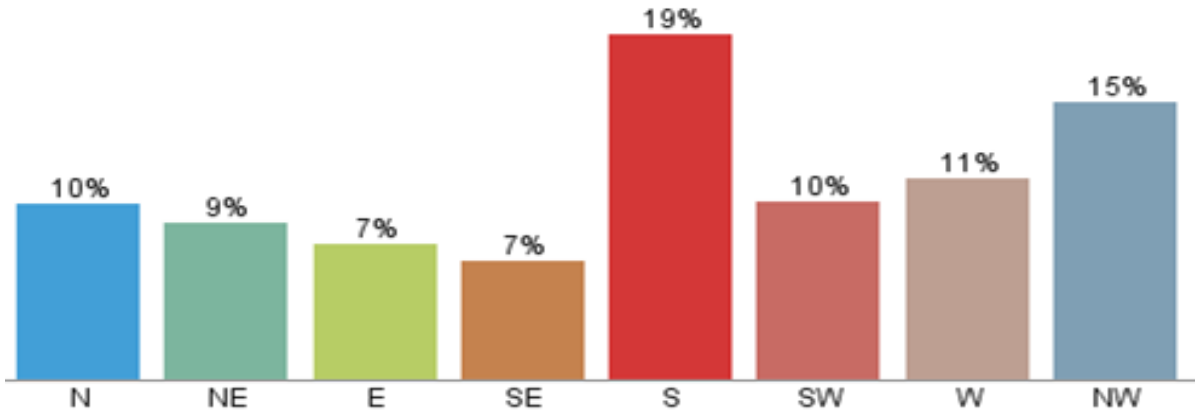




nd mostly from
SW
NW

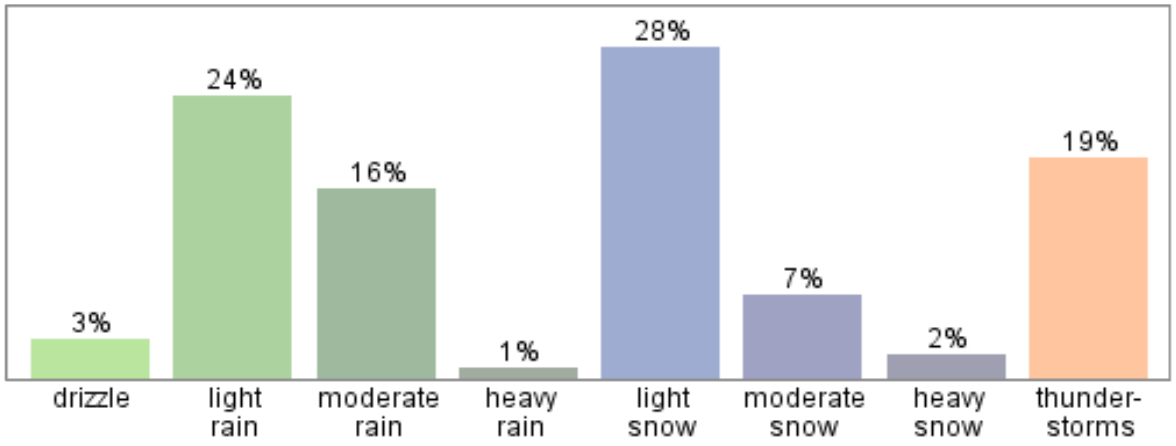
Average yearly rainfall: 34.5 in
Average yearly snowfall: 38.2 in

Rain & Wind

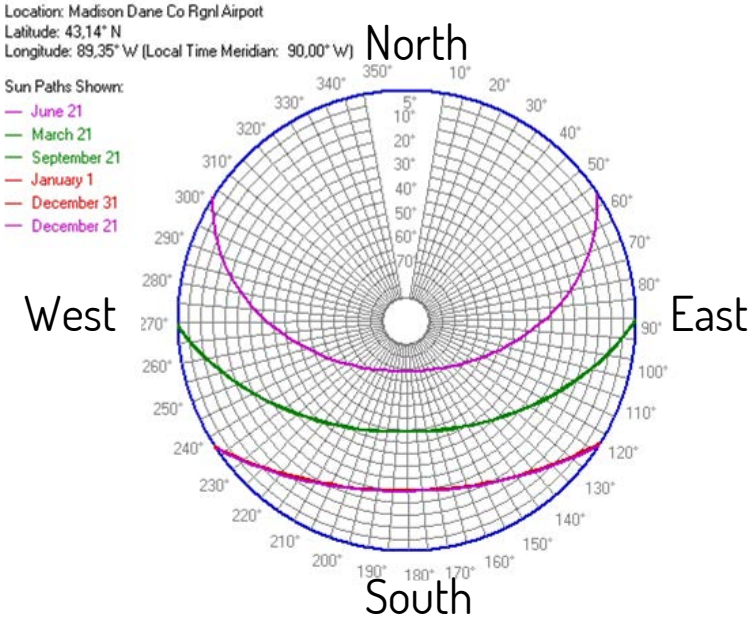


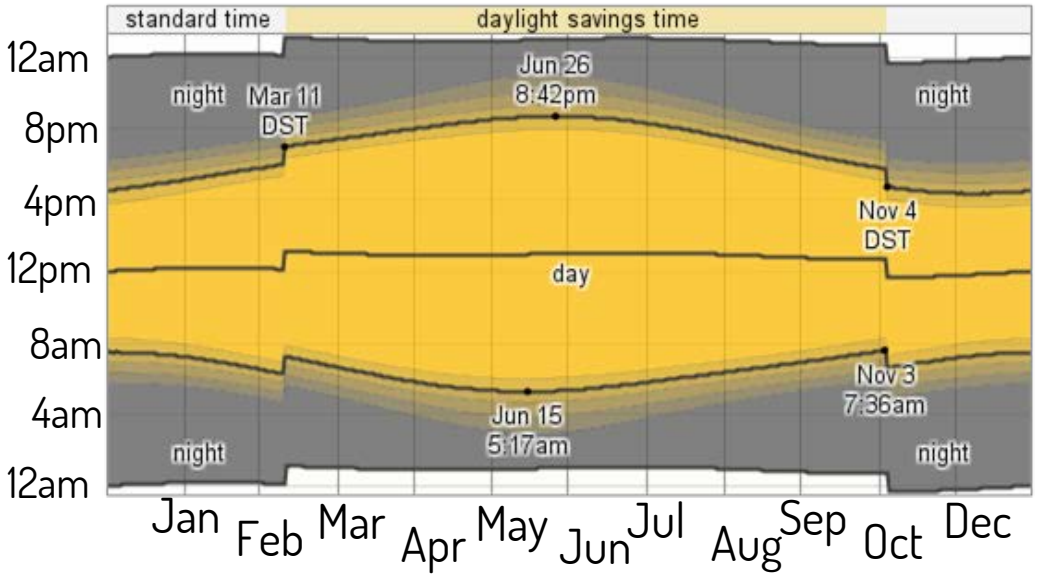
Wind mostly from
S-SW
W-NW

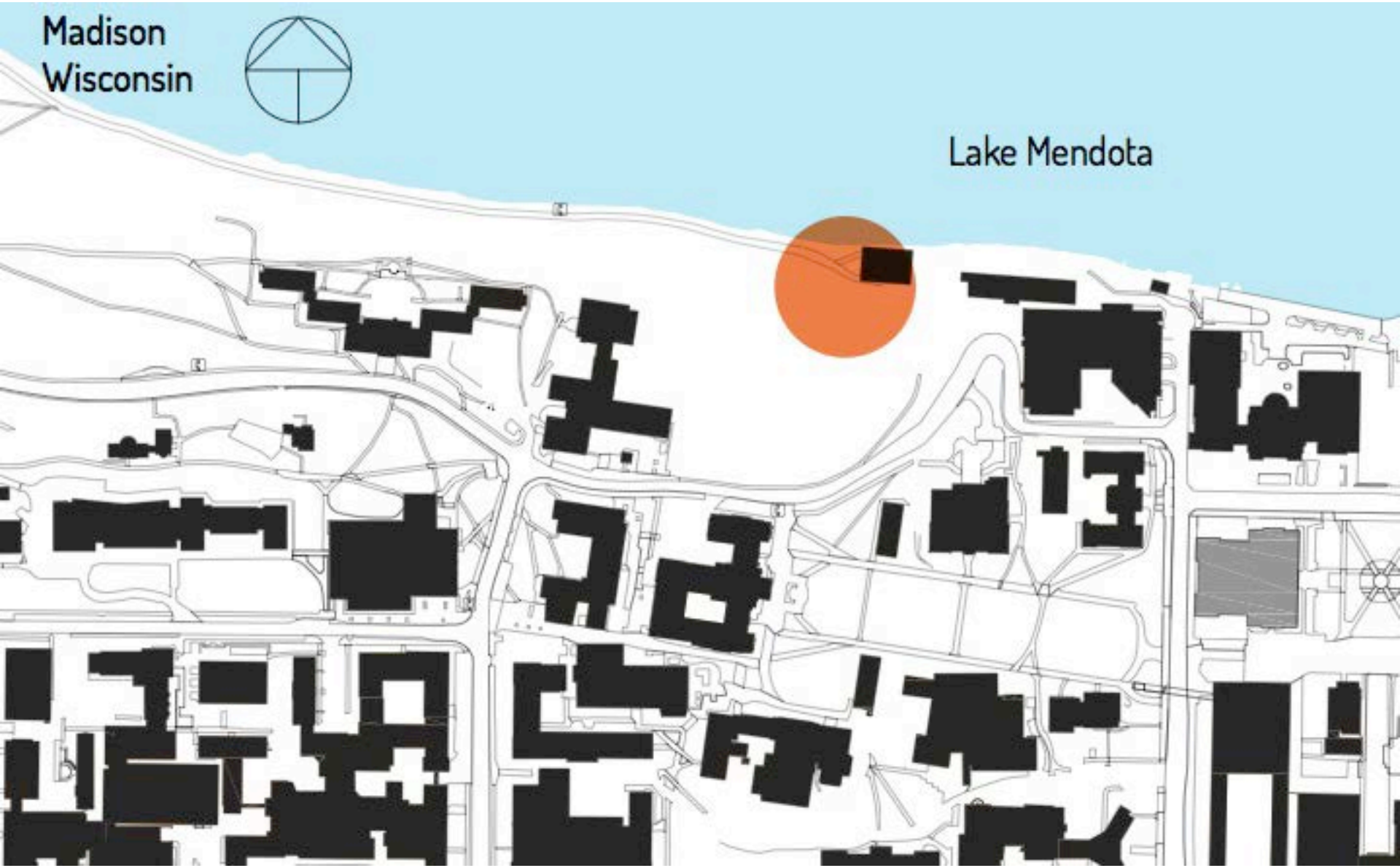
Average yearly rainfall: 34.5 in
Average yearly snowfall: 38.2 in



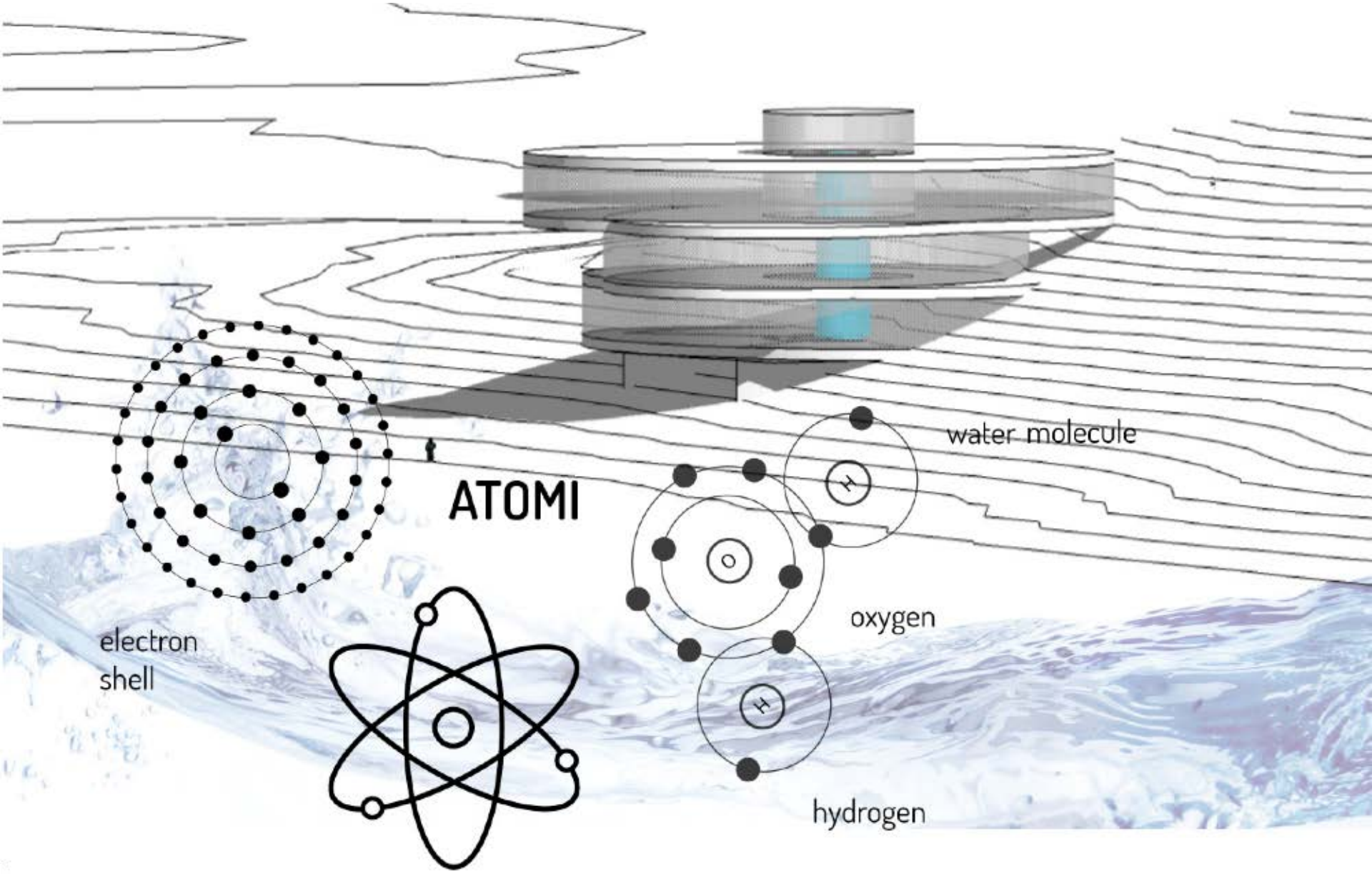
Sun & Daylight

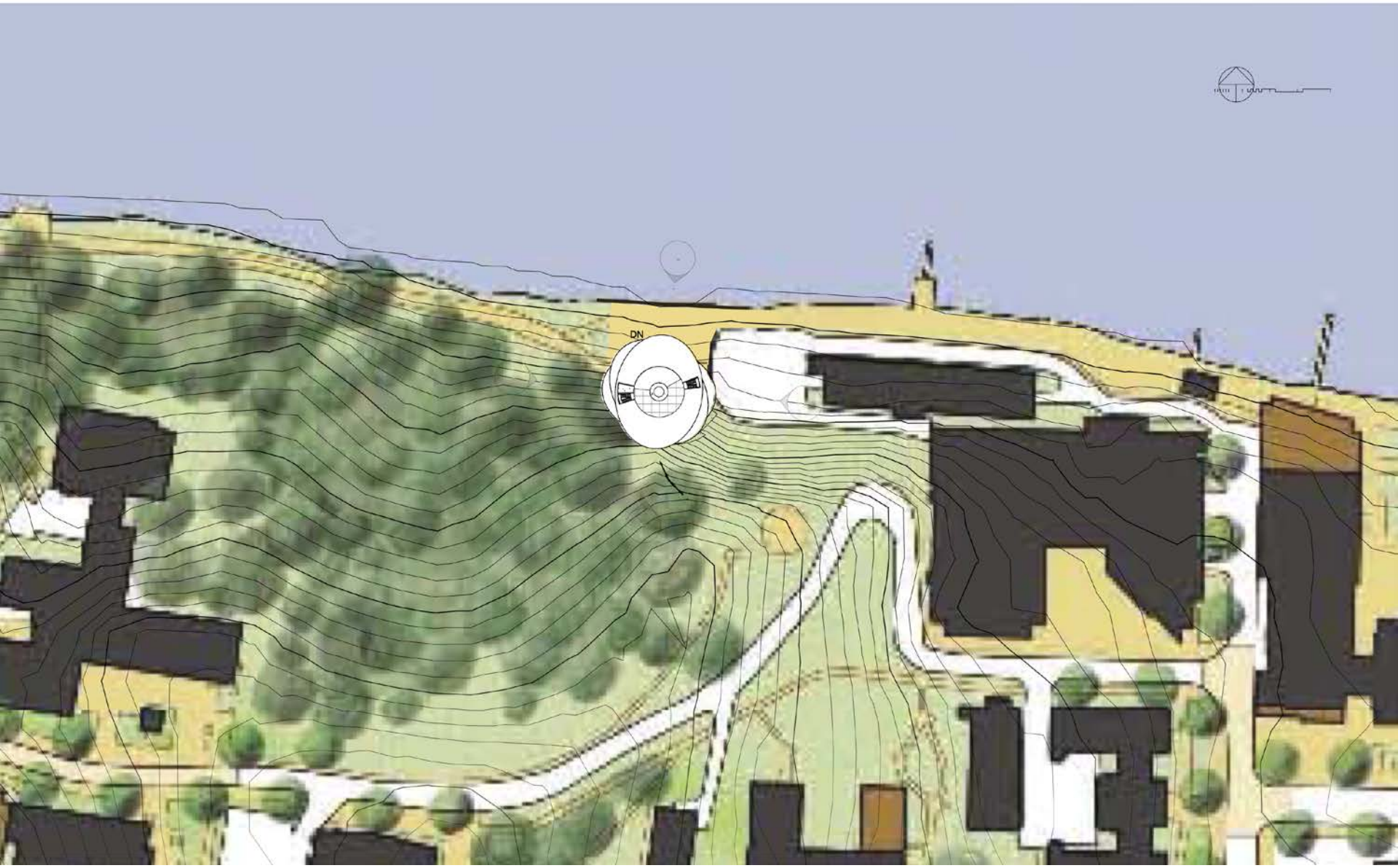


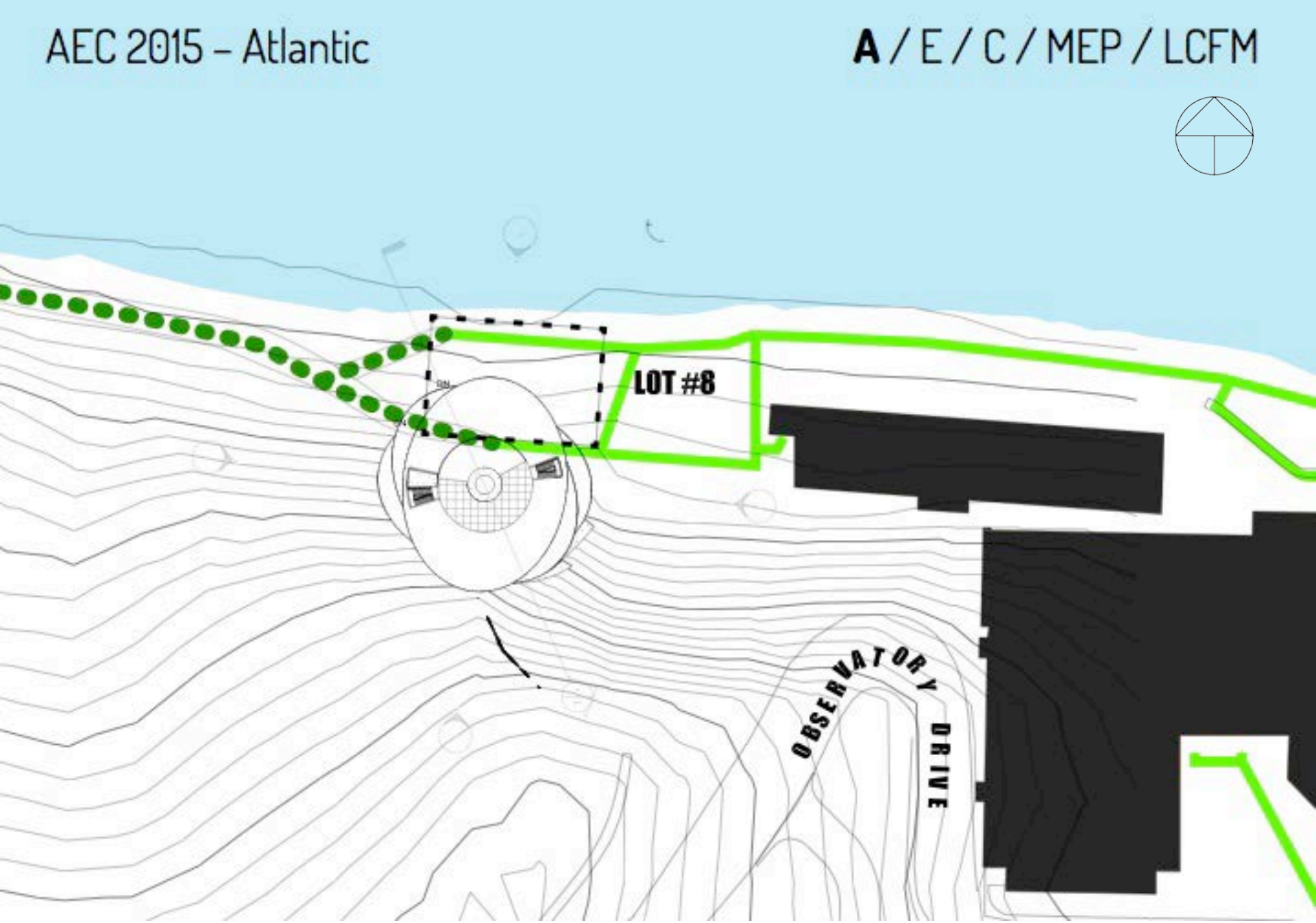


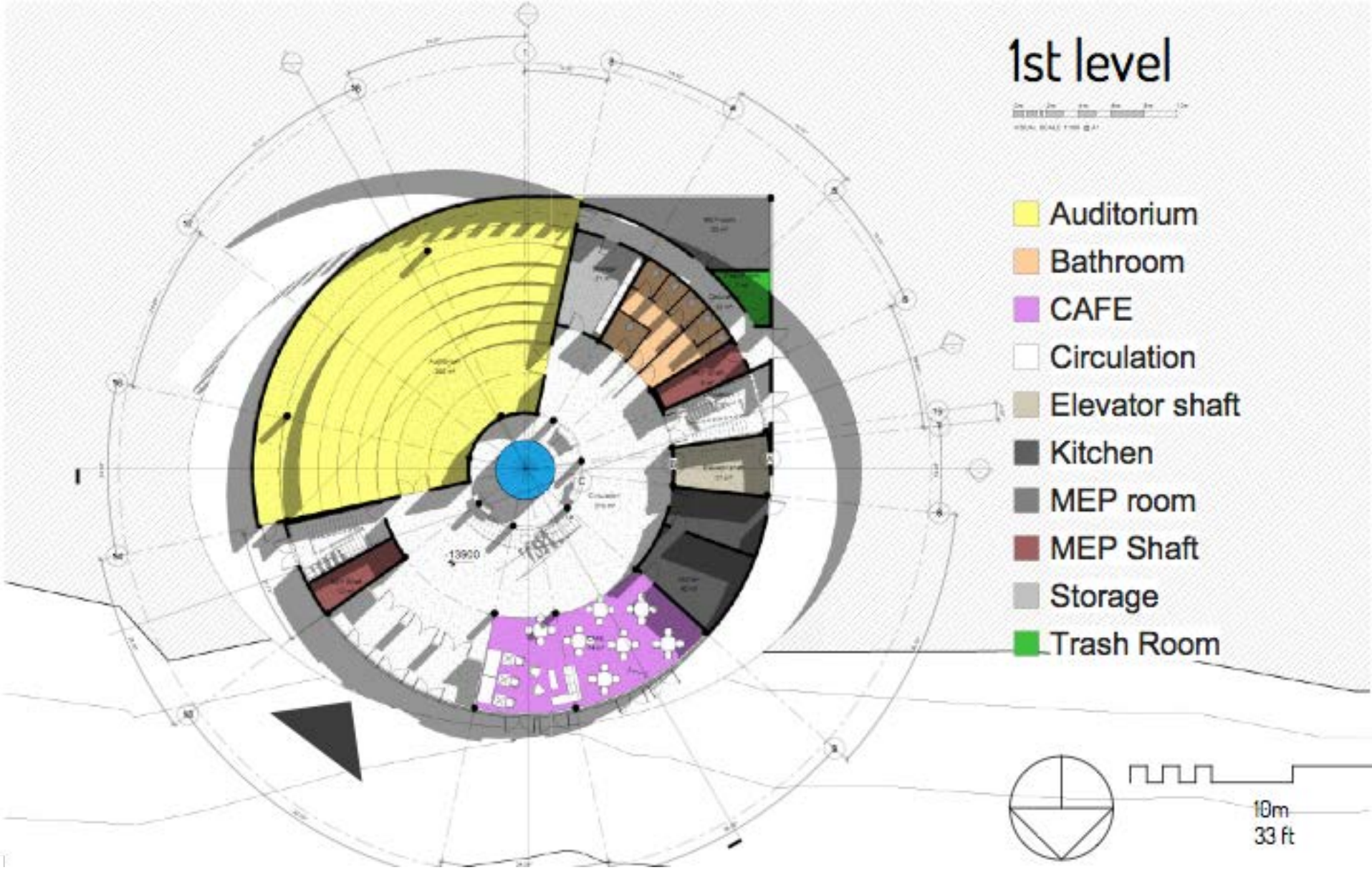

Madison
Wisconsin
Lake Mendota

ATOMI


ATOMI
electron
shell
water molecule
oxygen
hydrogen

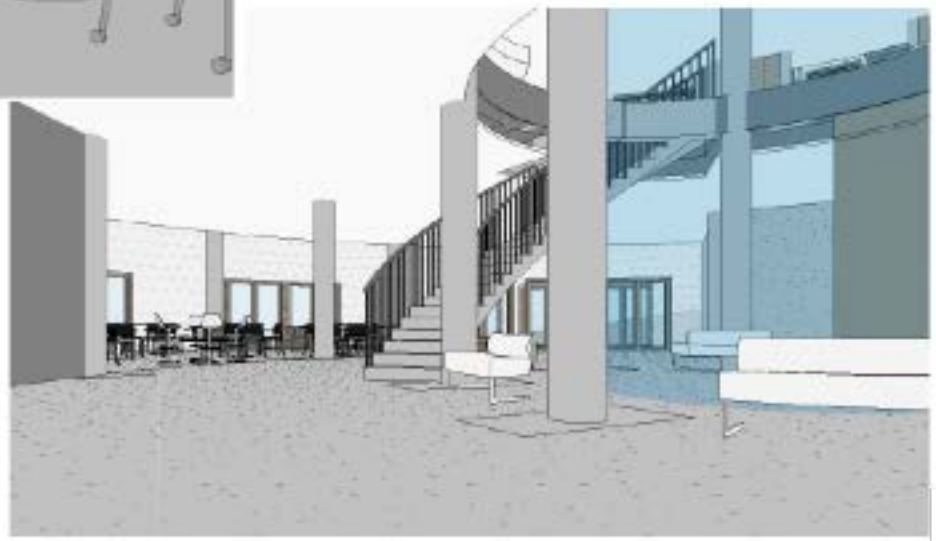

DN

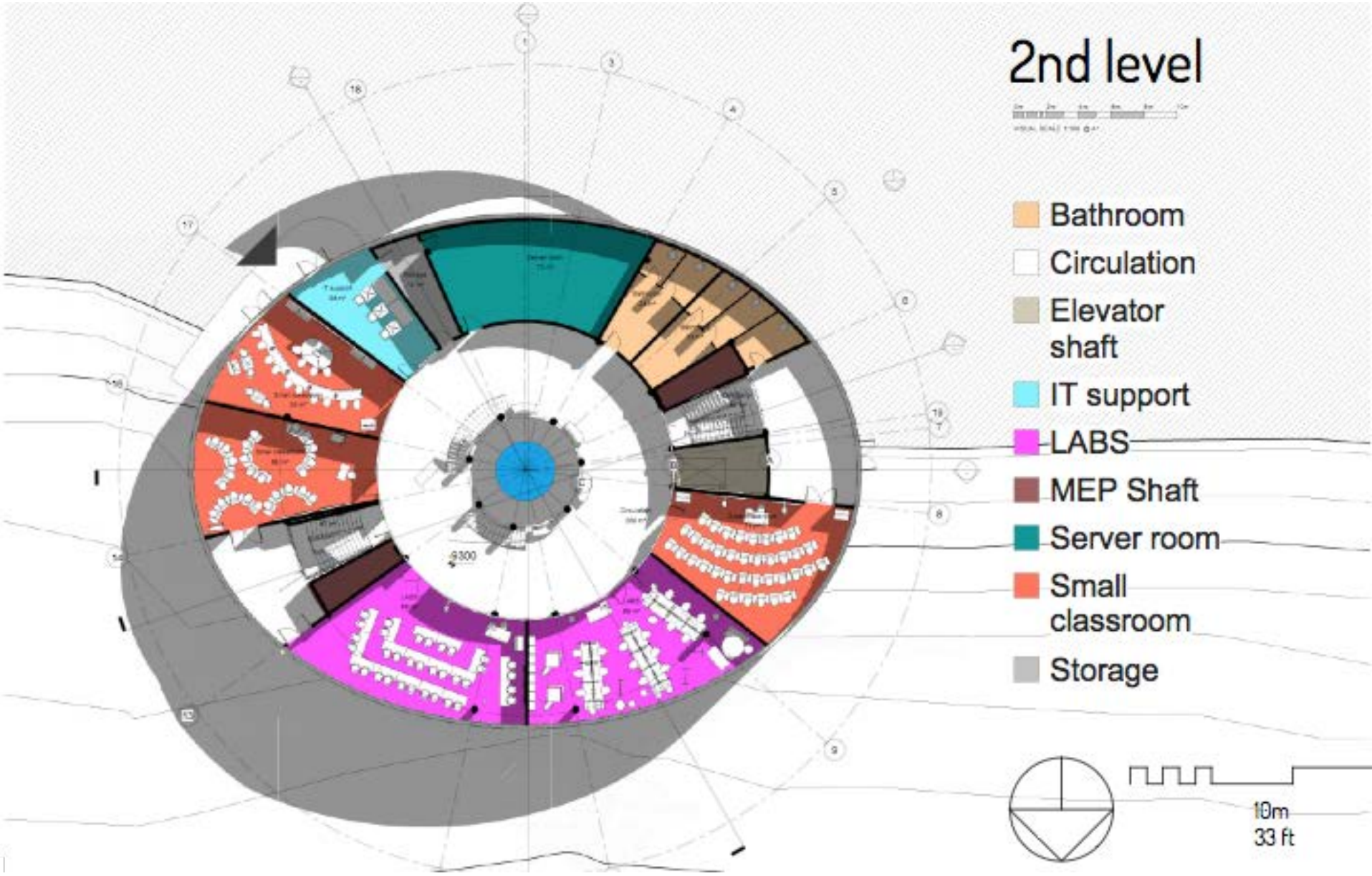

LOT #8
OBSERVATORY DRIVE

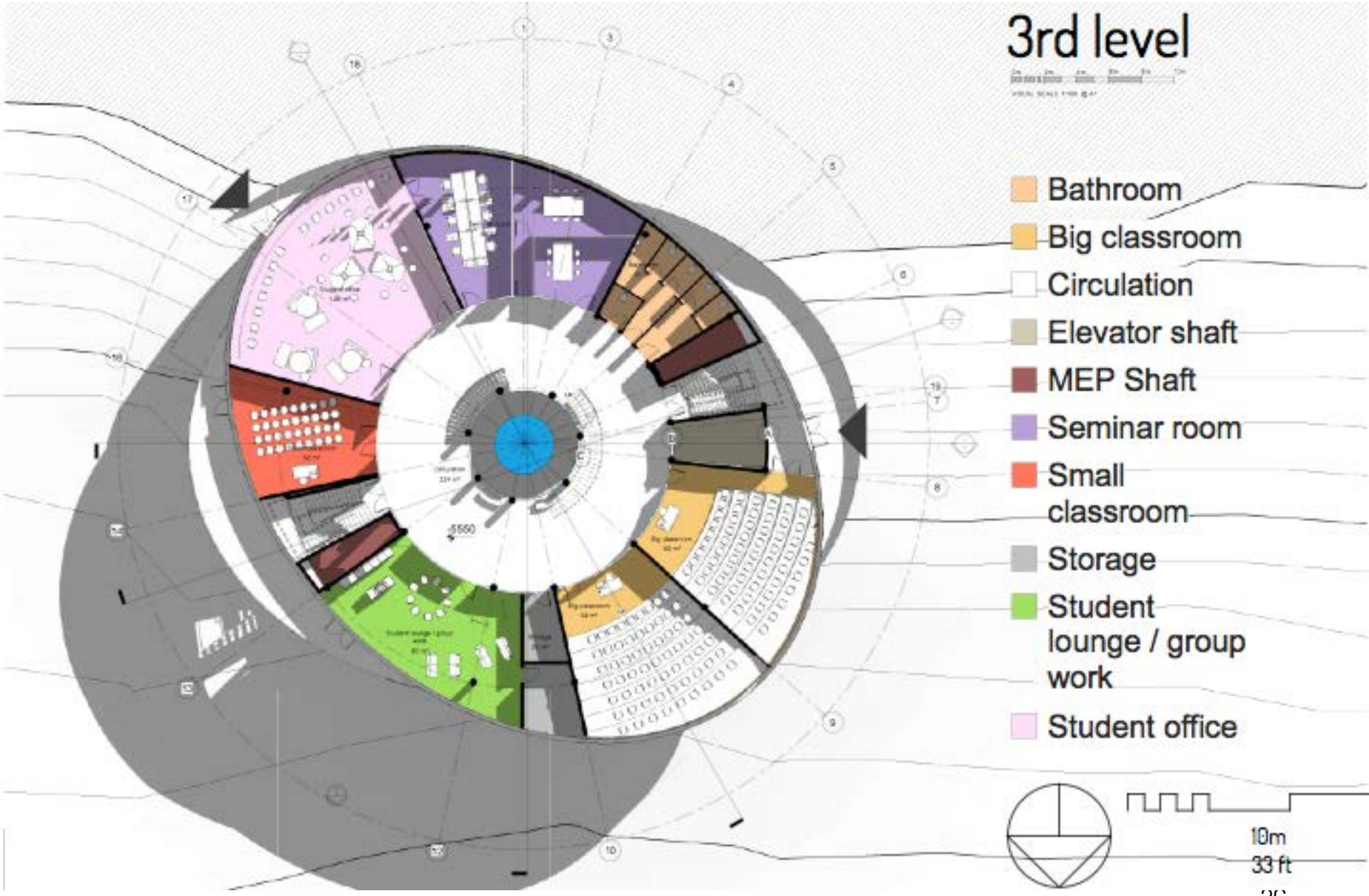

1st level
Auditorium
Bathroom
CAFE
Circulation
Elevator shaft
Kitchen
MEP room
MEP Shaft
Storage
Trash Room
13900
10m
33 ft

AUDITORIUM

CAFE & LOBBY



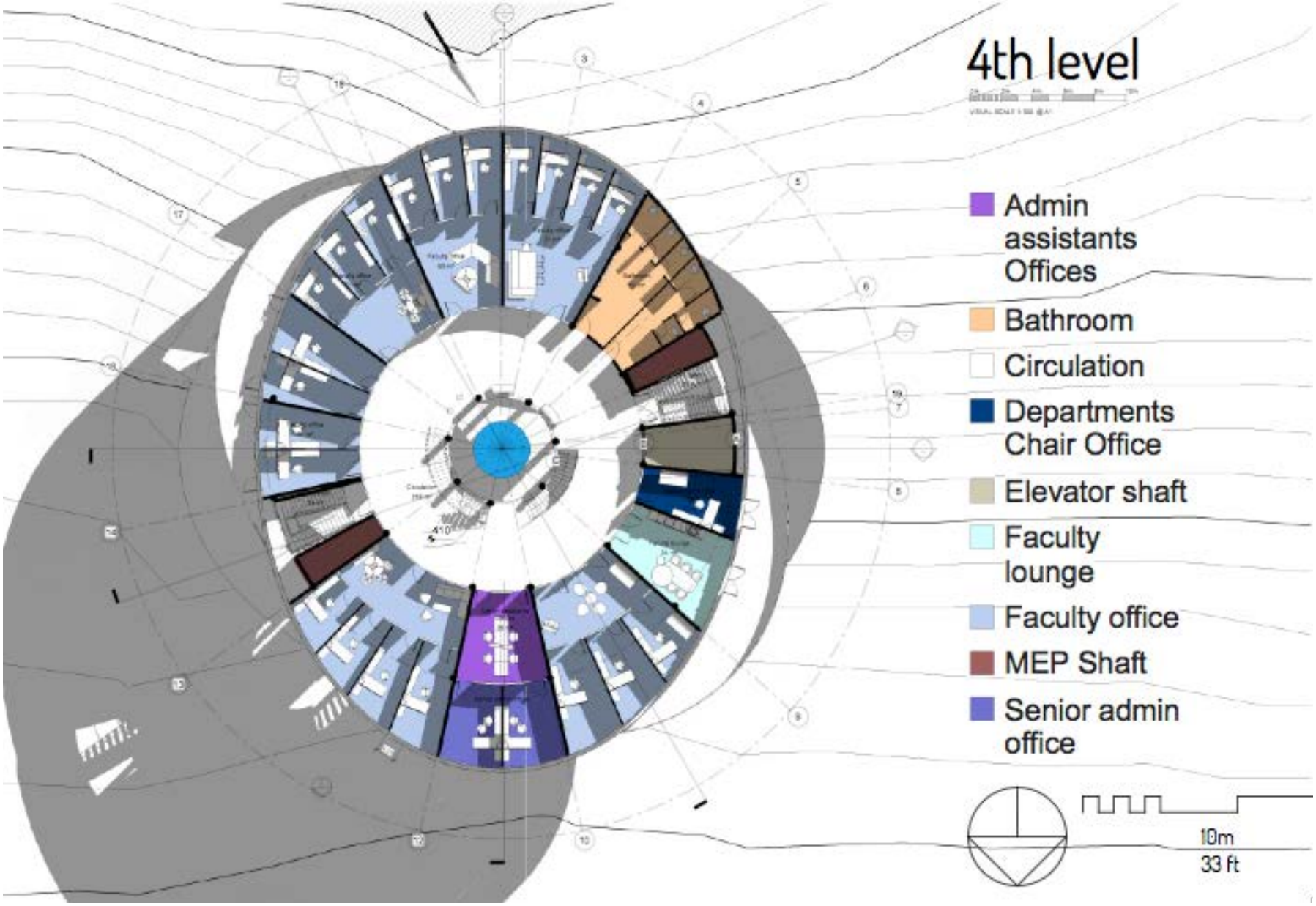

2nd level
Bathroom
Circulation
Elevator shaft
IT support
LABS
MEP Shaft
Server room
Small classroom
Storage
10m
33 ft

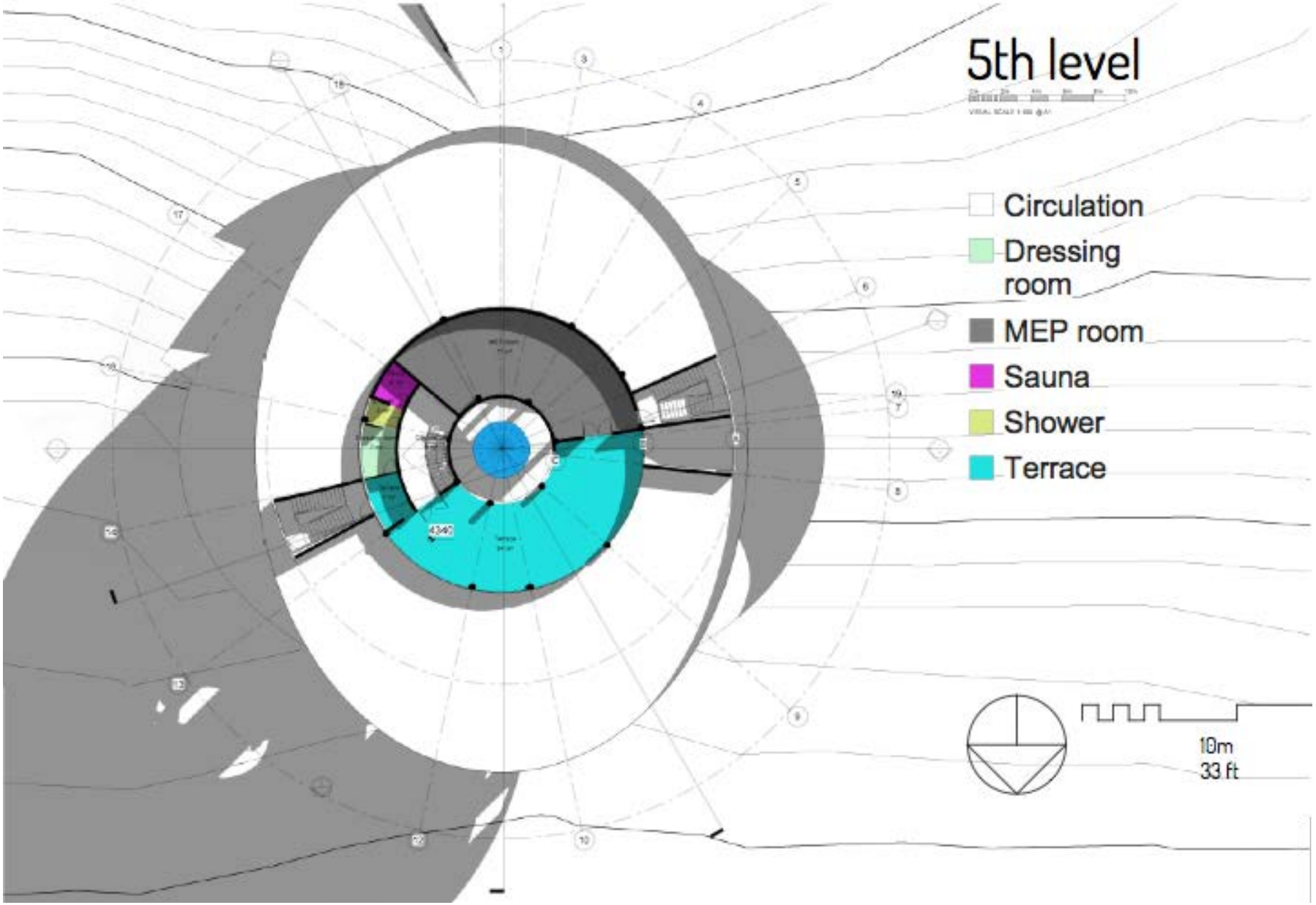

3rd level
Bathroom
Big classroom
Circulation
Elevator shaft
MEP Shaft
Seminar room
Small classroom
Storage
Student lounge / group work
Student office
10m
33 ft

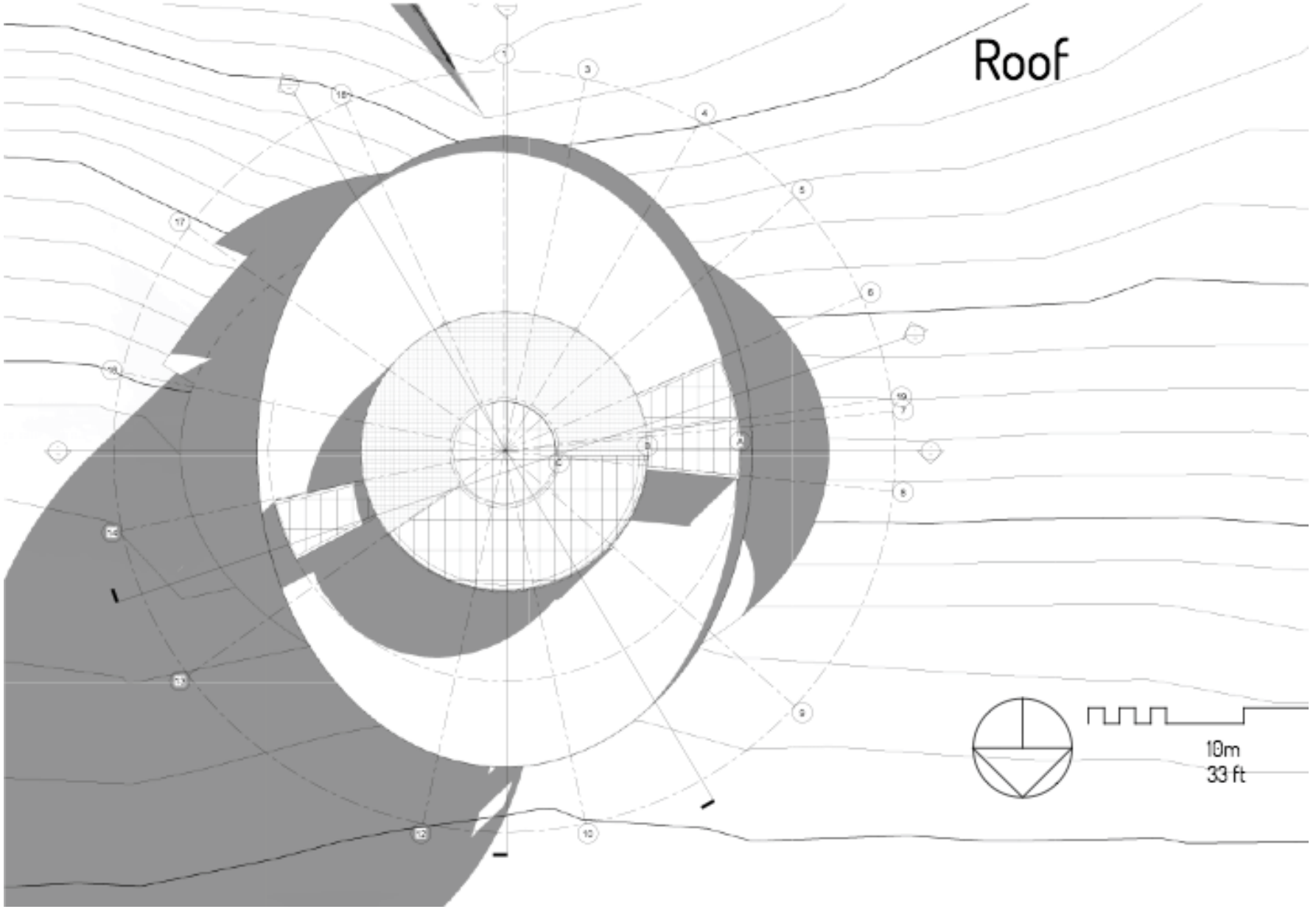
STUDENT'S OFFICE

STUDENT'S OFFICE

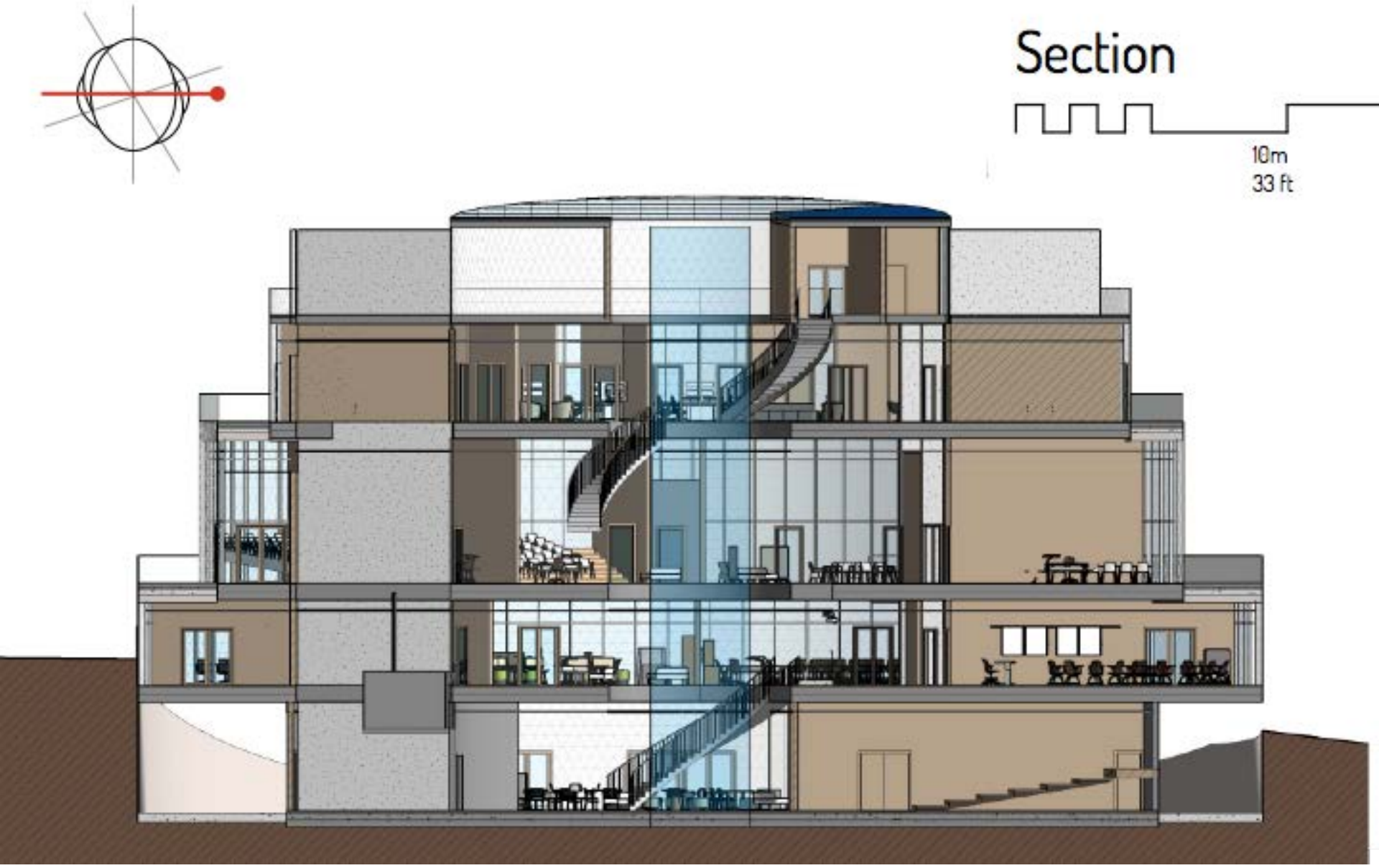
BIG CLASS ROOM


4th level
Admin assistants Offices
Bathroom
Circulation
Departments Chair Office
Elevator shaft
Faculty lounge
Faculty office
MEP Shaft
Senior admin office
10m
33 ft

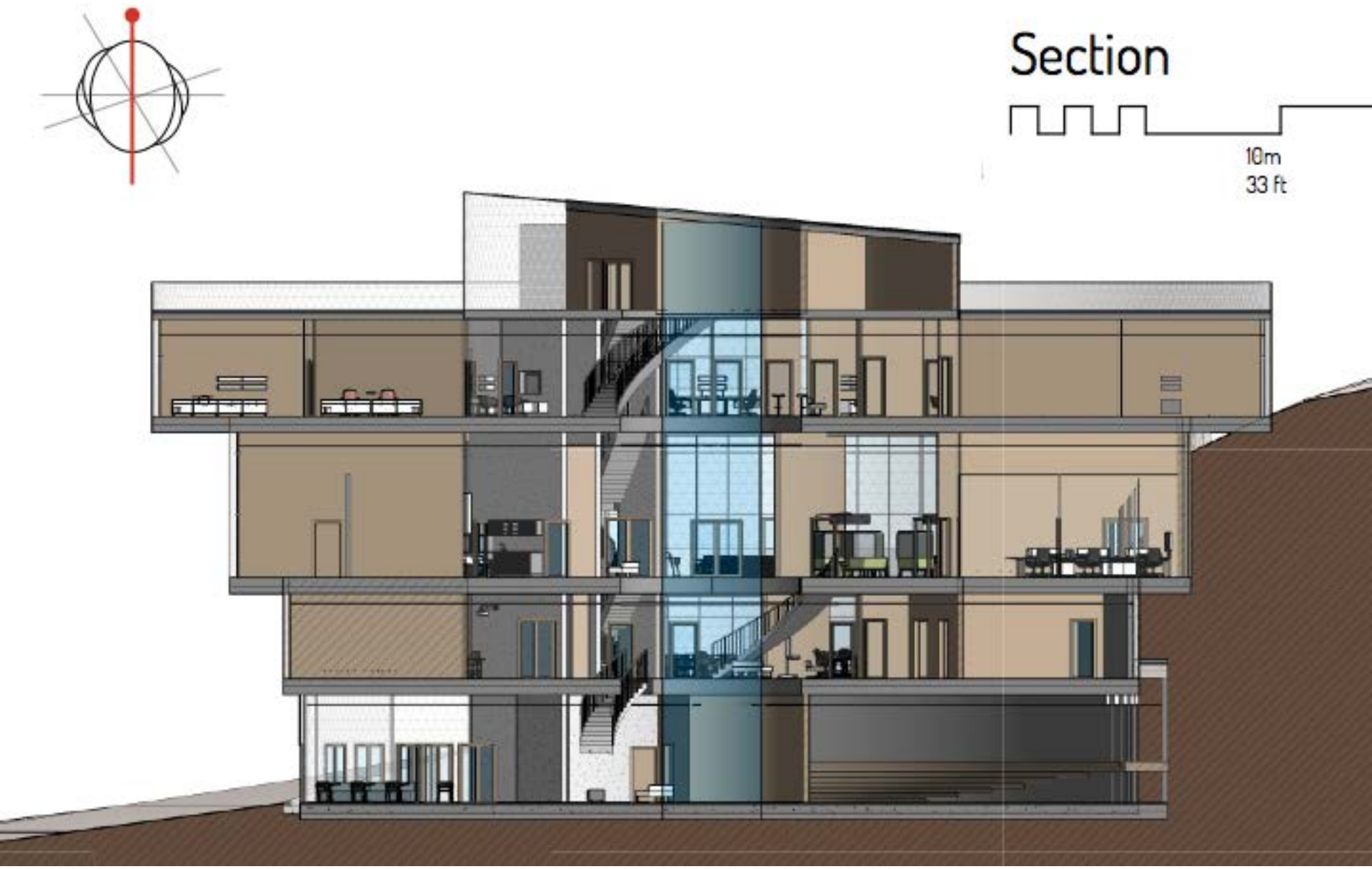

5th level
Circulation
Dressing room
MEP room
Sauna
Shower
Terrace
10m
33 ft

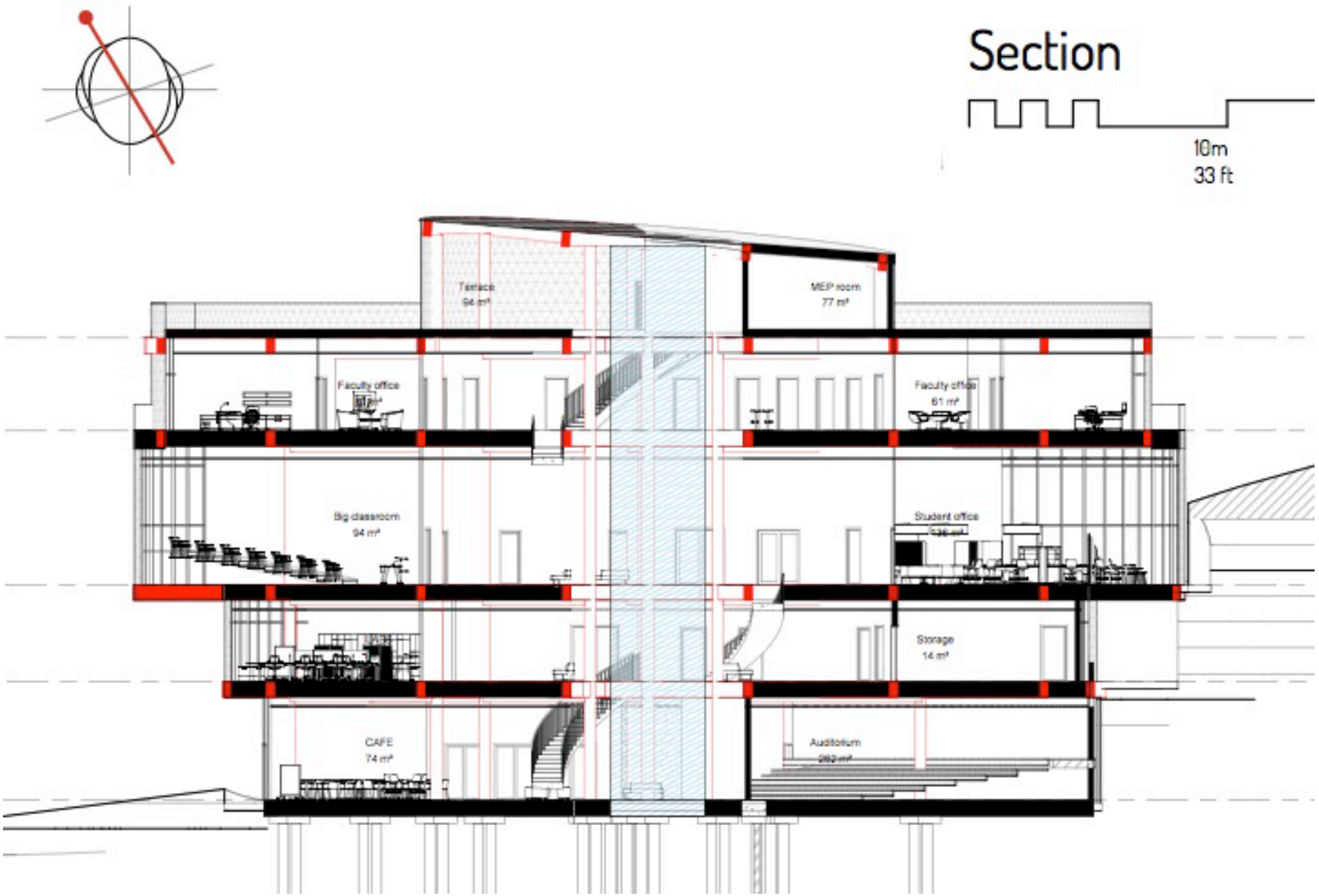

Roof
10m
33 ft


Section
10m
33 ft
B
1
B
Elevator shaft
17 m²
Small classroom
52 m²
Small classroom
Auditorium
282 m²
Elevator shaft
17 m²
Level 5
4000
Level 4
400
Level 3
-5550
Level 2
-9300
Level 1
-13900

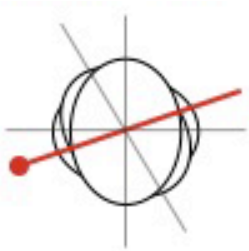

Section
10m
33 ft


Section
10m
33 ft
MEP room
77 m²
Admin assistants
Offices
Faculty office
77 m²
Storage
24 m²
Seminar room
99 m²
Server room
73 m²
CAFE
74 m²
Auditorium
262 m²
Level 5
4000
Level 4
400
Level 3
-5550
Level 2
-9300
Level 1
-13900


Section
10m
33 ft

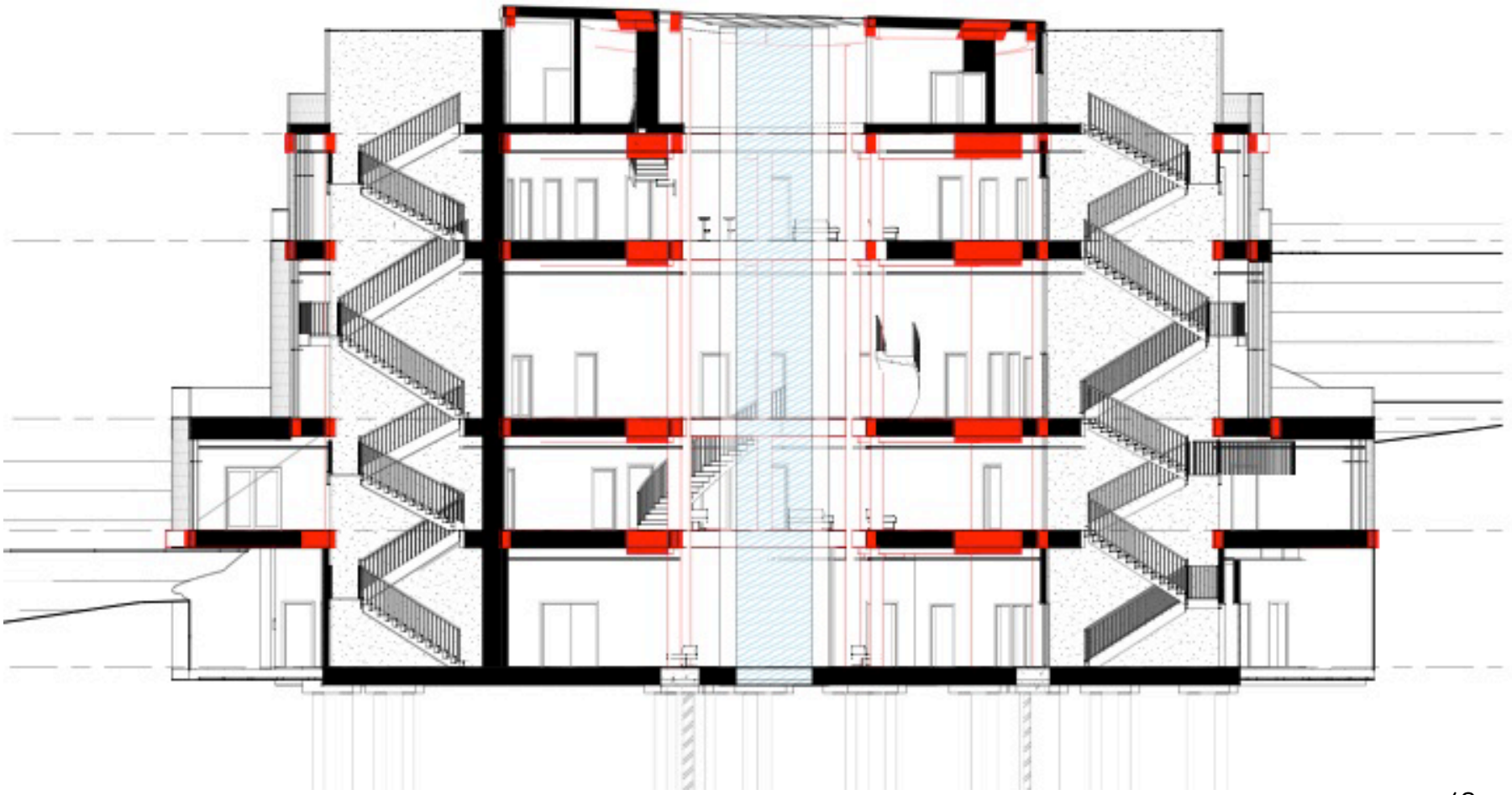

Section
10m
33 ft
Terrace
94 m²
MEP room
77 m²
Faculty office
Faculty office
61 m²
Big classroom
94 m²
Student office
Storage
14 m²
CAFE
74 m²
Auditorium


Section
10m
33 ft

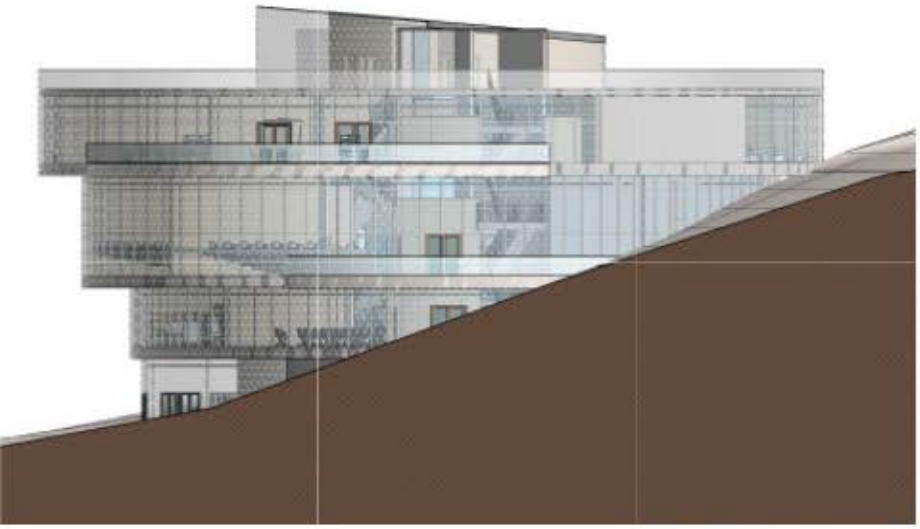


Section

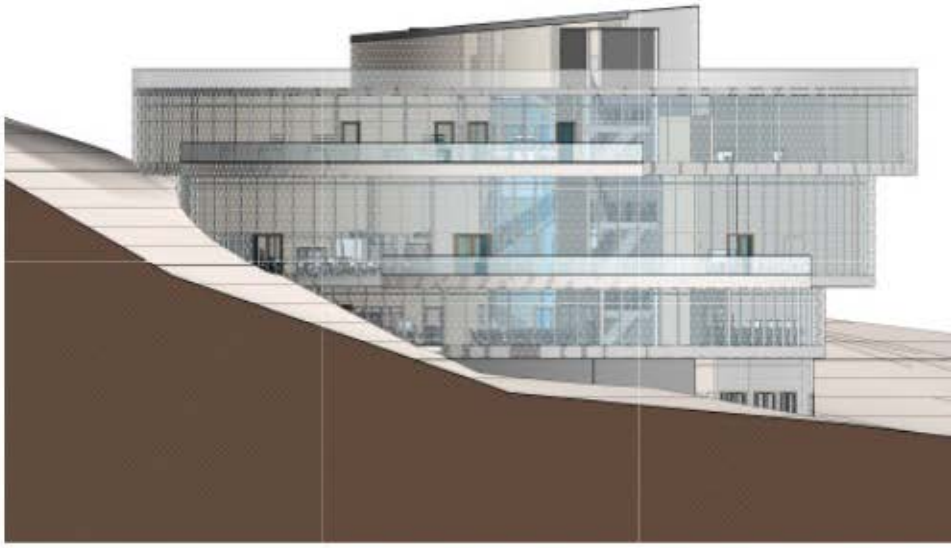
10m
33 ft



WEST

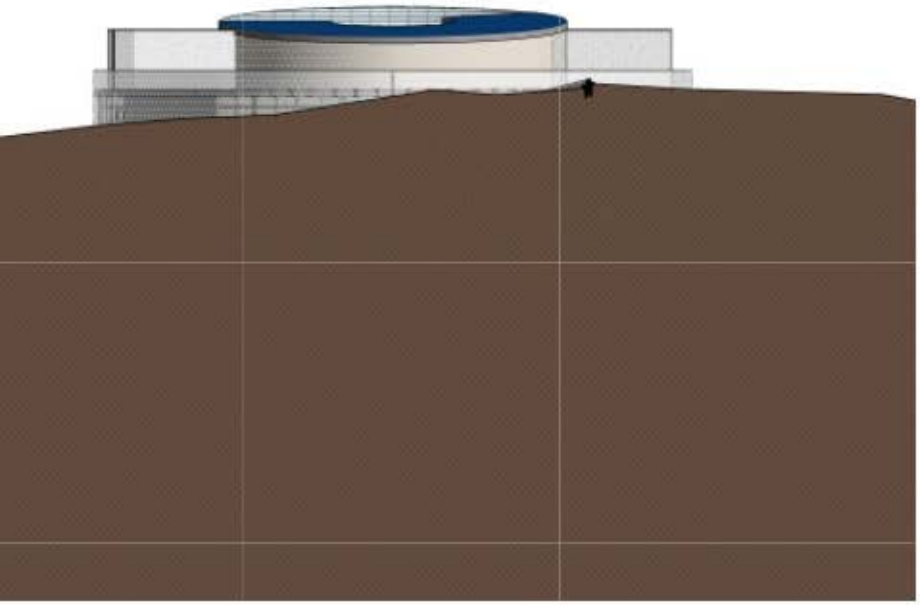


EAST



ELEVATIONS

SOUTH



NORTH

ELEVATIONS

Structural Options

Typical Loads

Room Type	Live Load (psf)
Office	50
Classroom	40
Auditorium	100
Corridor (first floor)	100
Corridor	80
Lab	60
Partition	15
Mechanical Room	100
Roof	20

Snow (psf)	30
Snow Drift (psf)	132
Wind (psf)	22.5

Typical Loads - Dead Load (Self-Weight)

Steel

2 in Metal Deck + 4.5 in LW Concrete Slab = 44 psf
OR Bubble Deck = 30 psf
Beam/Girder = 45 plf

Concrete

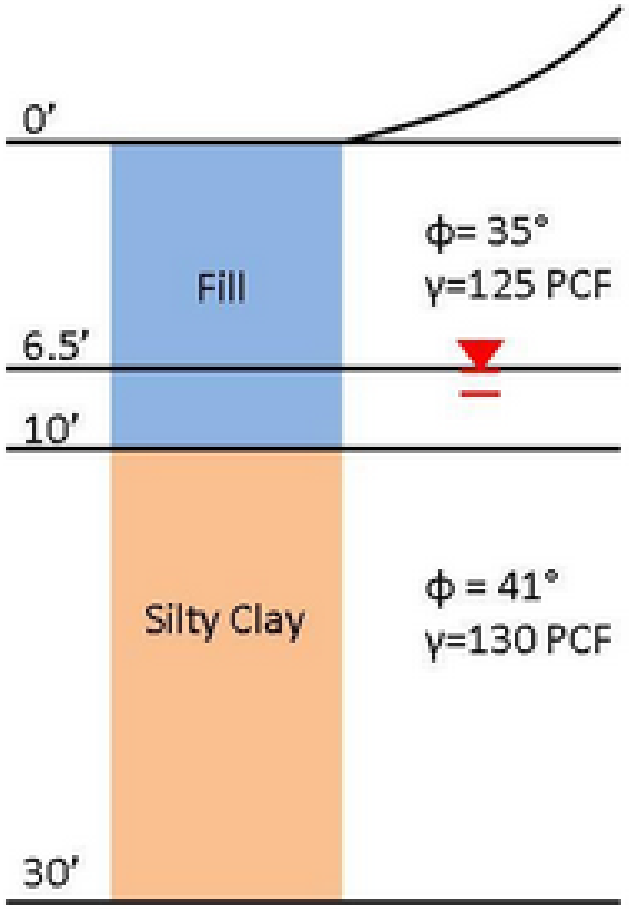
Bubble Deck = 30 psf
Beam/Girder = 35 plf

Timber (CLT)

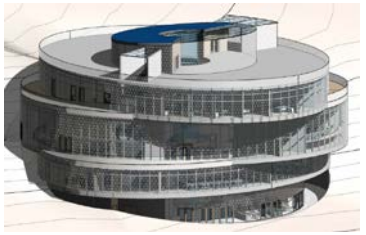
Floor = 3 psf
Beam/Girder = 26 plf

Soil Profile

- High Water Table (6.5 ft below ground)
- Bearing Capacity = 4ksf

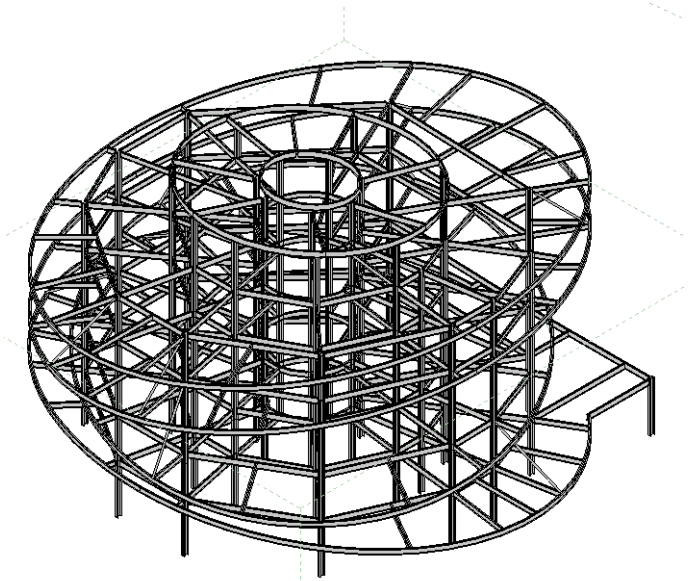


ATOMI



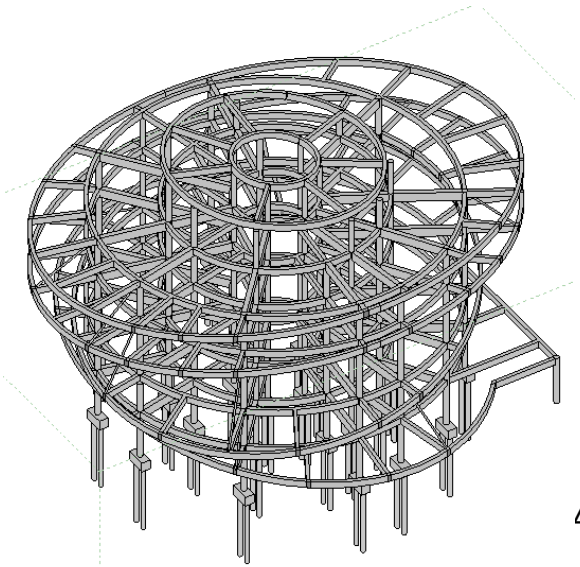
Steel Structure

- Gravity System
  Bubble deck,
  steel column and beam/girder
- Lateral System
  Bubble deck and beam system

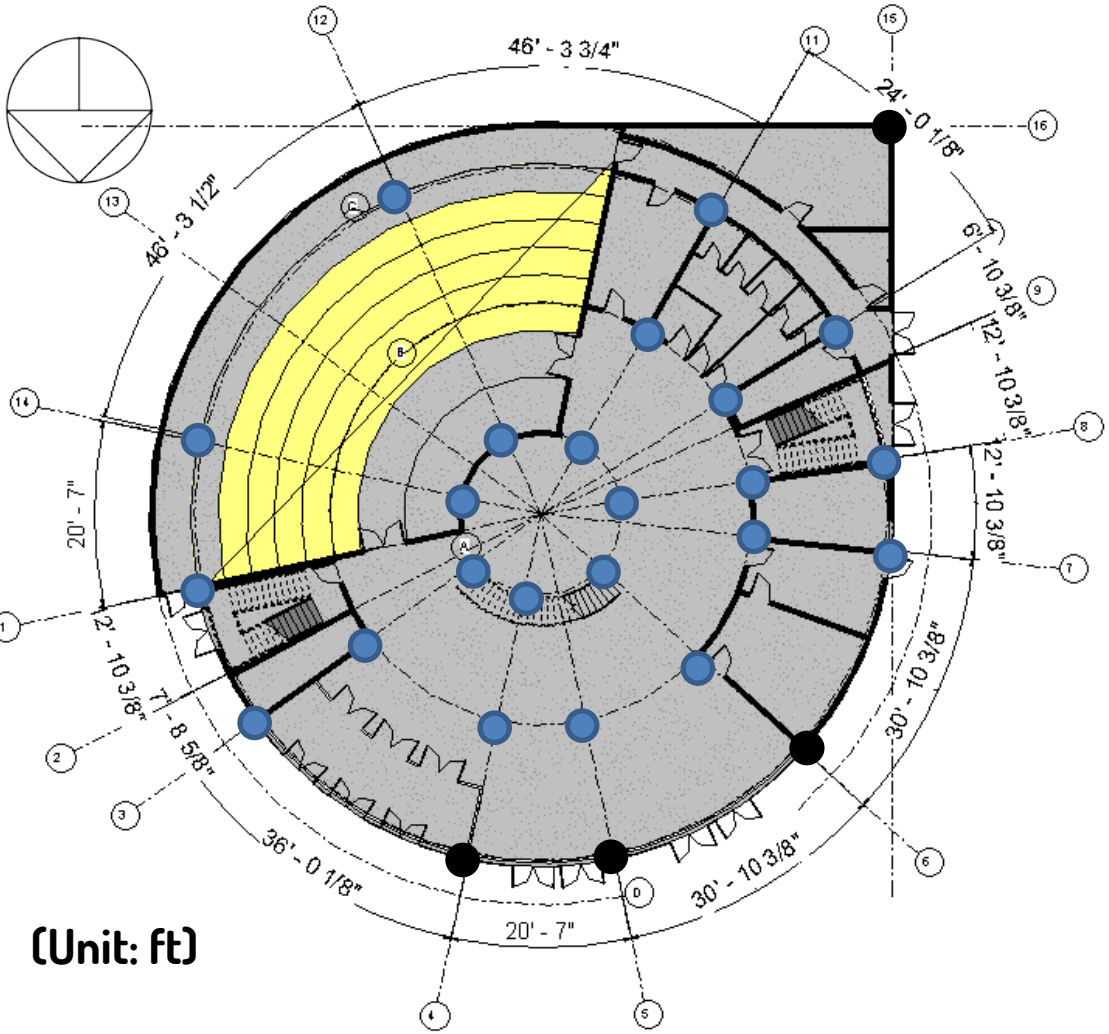


Concrete Structure

- Gravity System
  Bubble deck, reinforced concrete
  column and beam/girder
- Lateral System
  Bubble deck and beam system

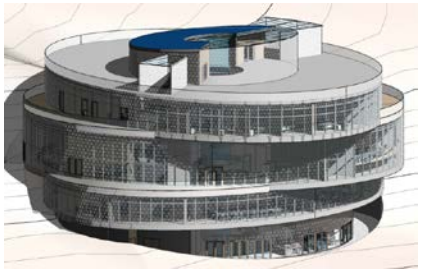


ATOMI – Structural Grid



(Unit: ft)

Ground Floor

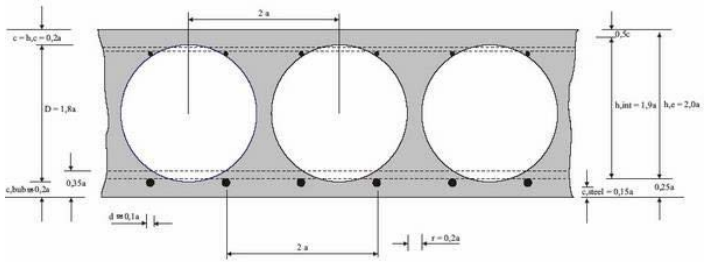


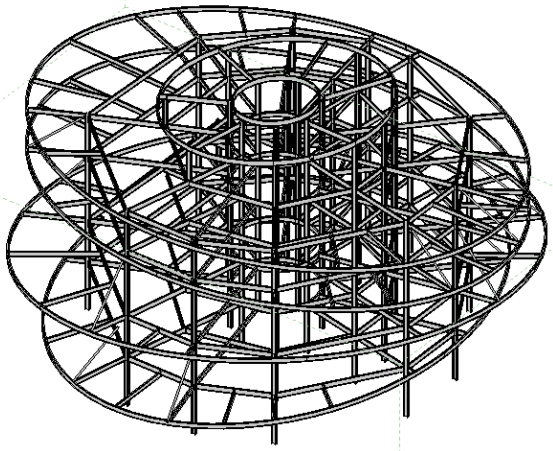
Small Circlar Grid Dia = 23 ft
Middle Circlar Grid Dia = 60 ft
Large Circlar Grid Dia = 98 ft

Largest Span = ~46 ft

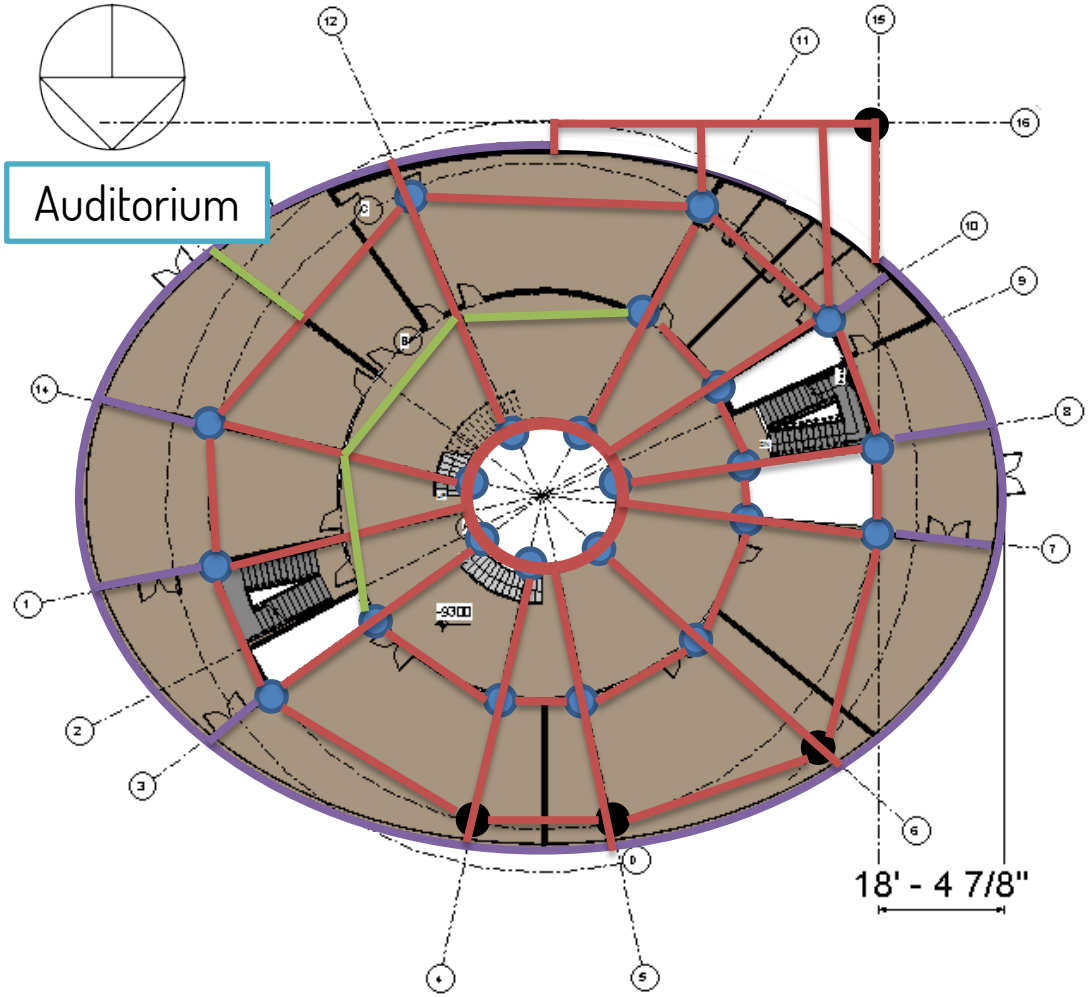
ATOMI - Steel Structure

- Bubble Deck BD450 (1.5 ft)
- Column W14X74
- Girder
  - W18X46
  - W27X84 (Auditorium and Cantilever)
- Beam
  - W21X50 (Cantilever)
- Steel Rod Dia. 6 in





ATOMI – Steel Structure



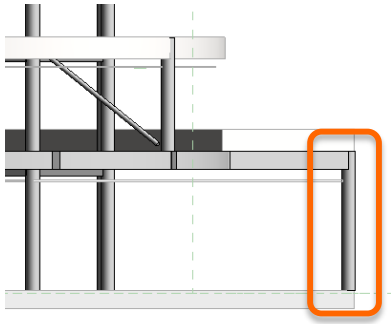
(Unit: ft)

First Floor

Max Cantilever = 18.5 ft

Column W14X74

- Continuous
- One-Story



Girder

W18X46

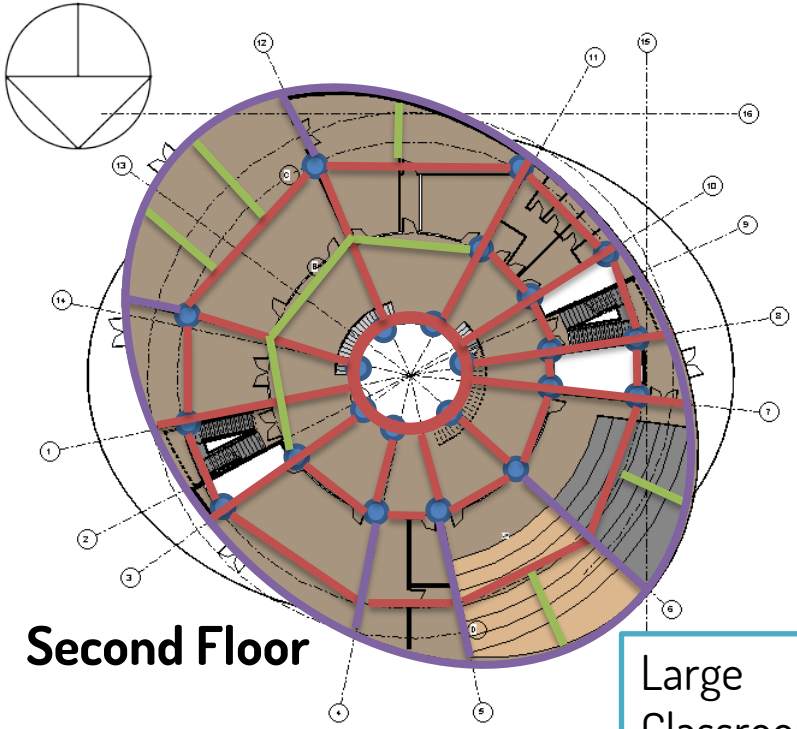
W27X84

(Auditorium+Cantilever)

Beam

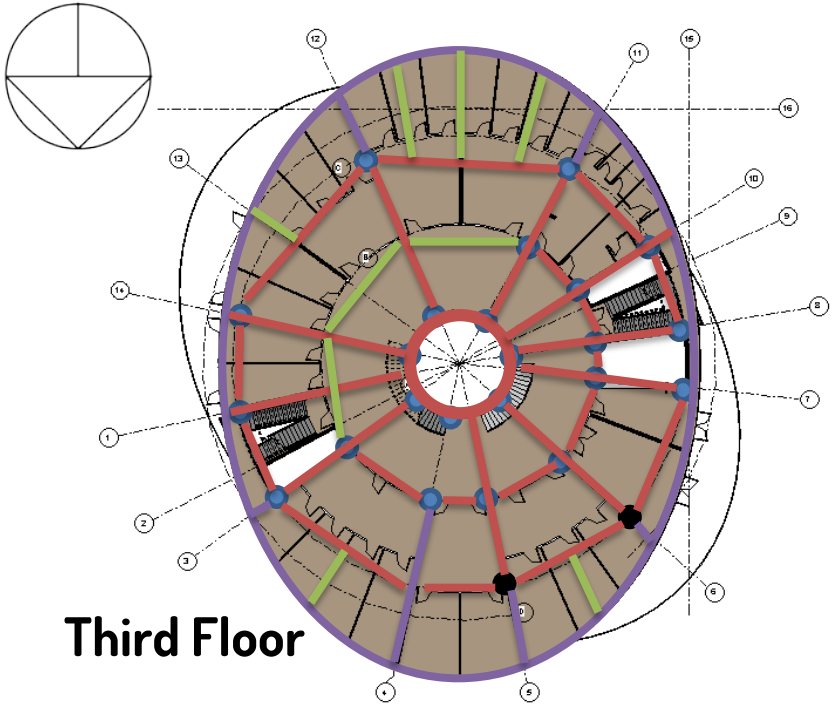
W21X50

ATOMI - Steel Structure



Second Floor

Large Classrooms



Third Floor

Column W14X74

- Continuous
- One-Story

Girder

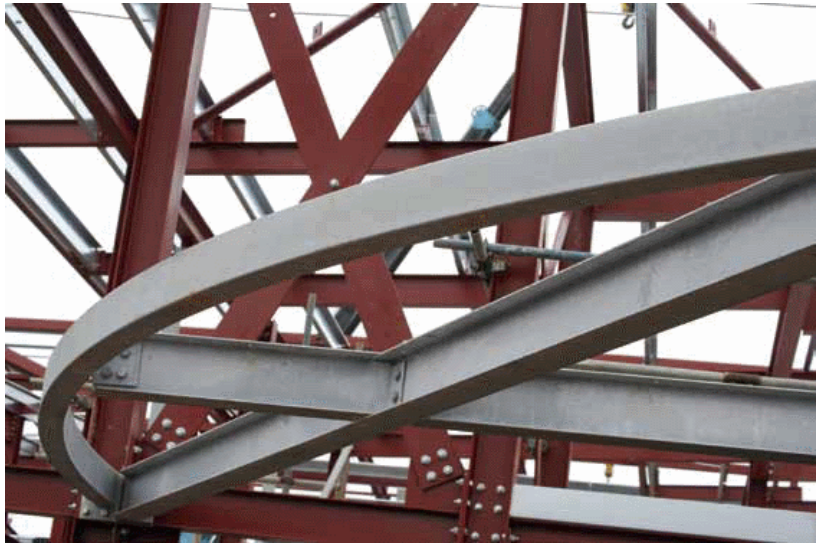
- W18X46
- W27X84

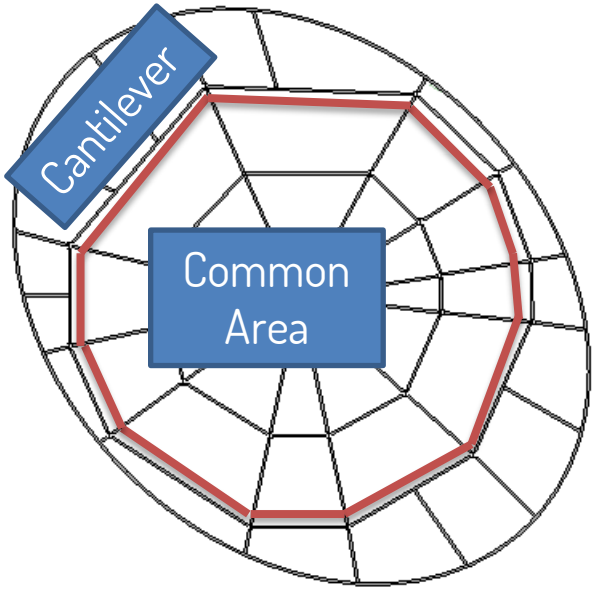
(Auditorium+Cantilever)

Beam W21X50

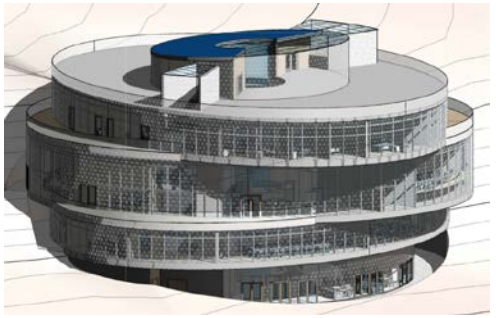
ATOMI - Steel Structure

Prefabrication

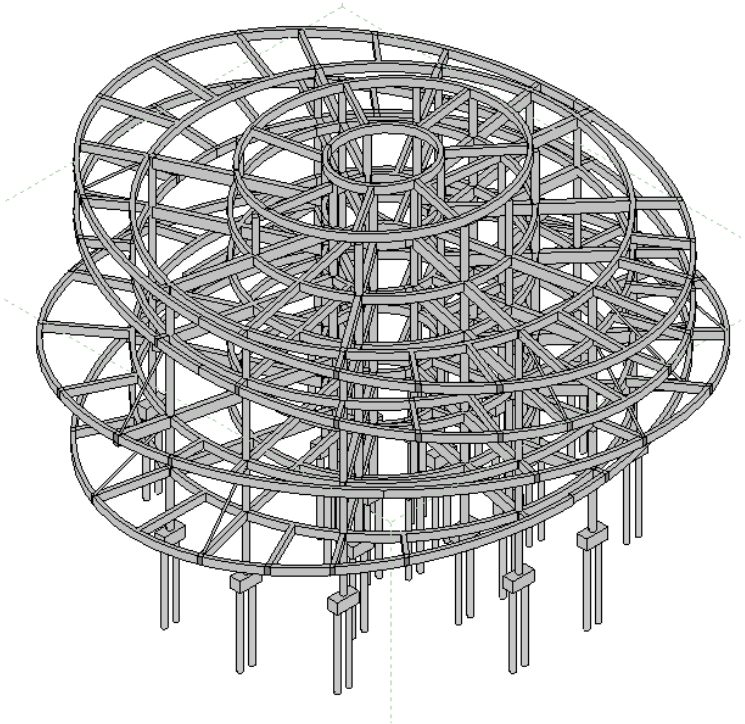




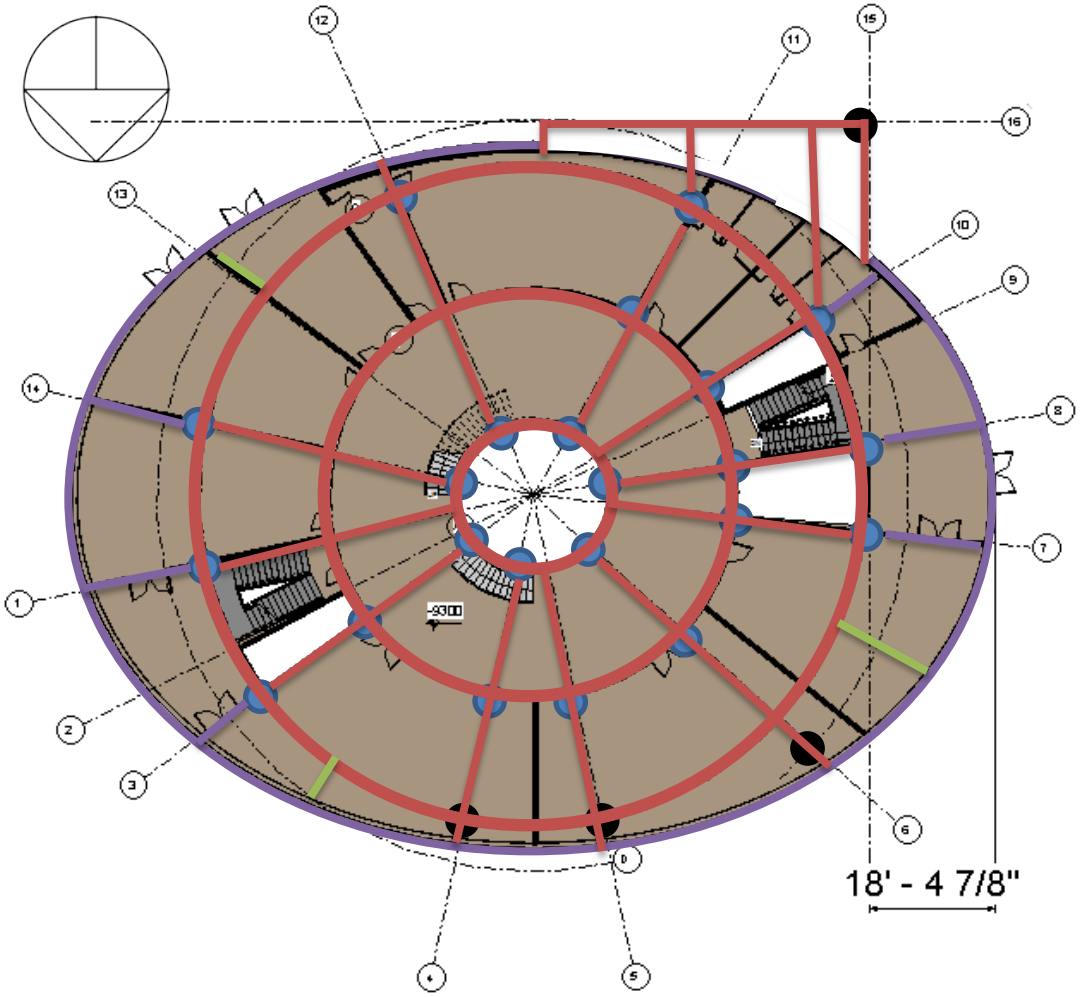
ATOMI - Concrete Structure



- Bubble Deck BD450 (1.5 ft)
- Column 18" Round
- Girder
  - 18" X 26"
  - 24" X 30" (Auditorium+ Cantilever)
- Beam
  - 18" X 30" (Cantilever)
- Steel Rod Dia. 6 in



ATOMI - Concrete Structure



Max Cantilever = 18.5 ft

Column 18" Round

- Continuous
- One-Story

Girder

18" X 26"

24" X 30"

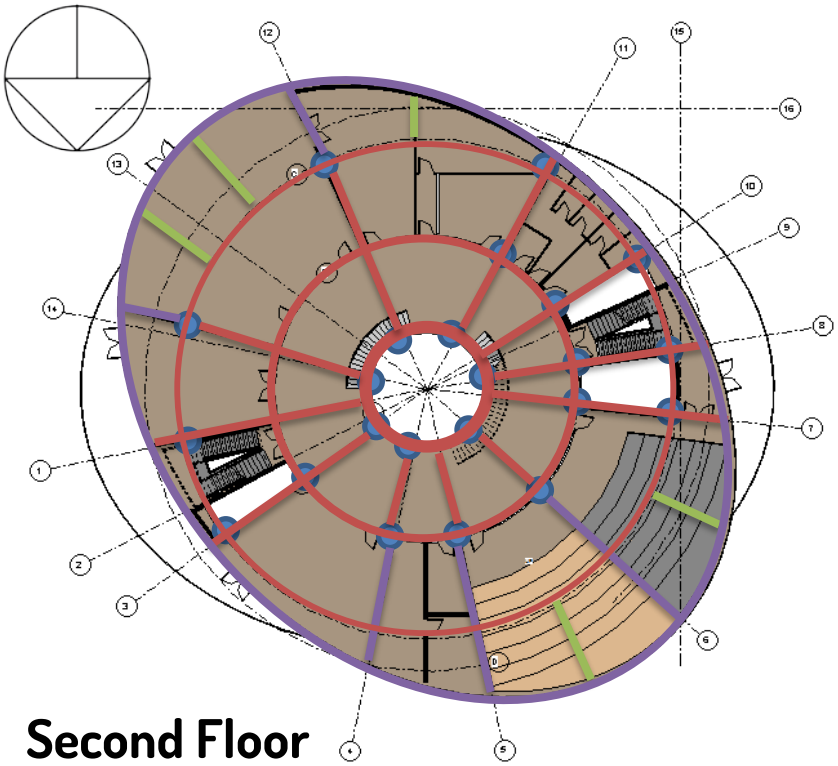
(Auditorium+Cantilever)

Beam 18" X 30"

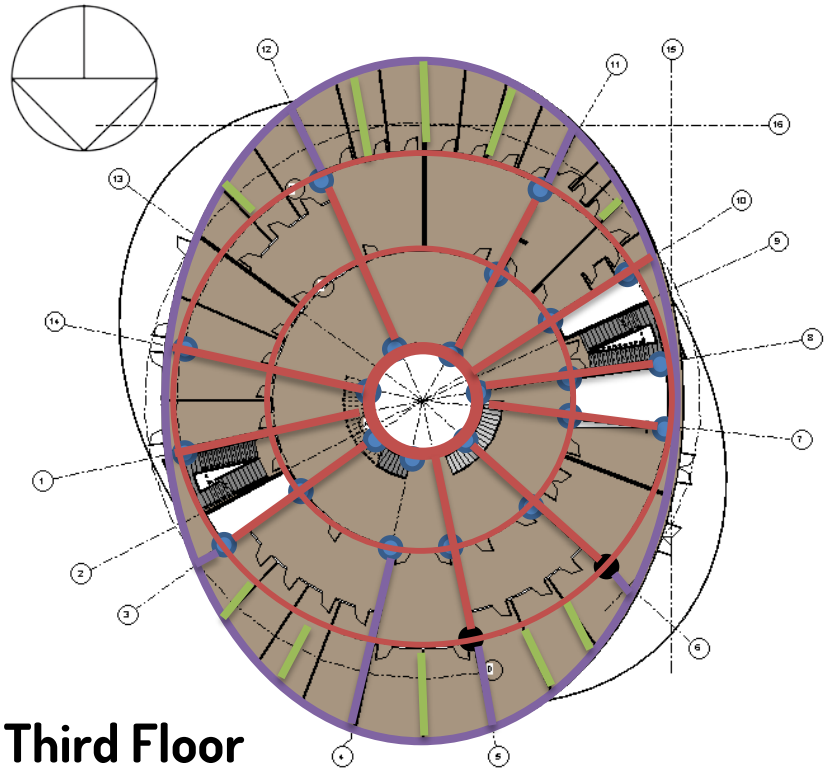
(Unit: ft)

First Floor

ATOMI - Concrete Structure



Second Floor



Third Floor

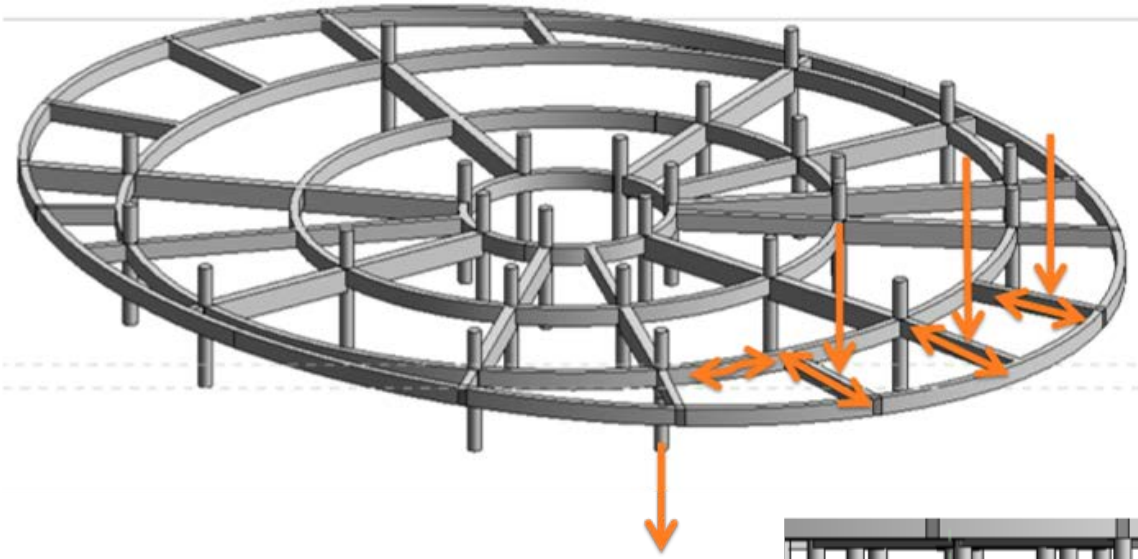
Column 18" Round
- Continuous
- One-Story

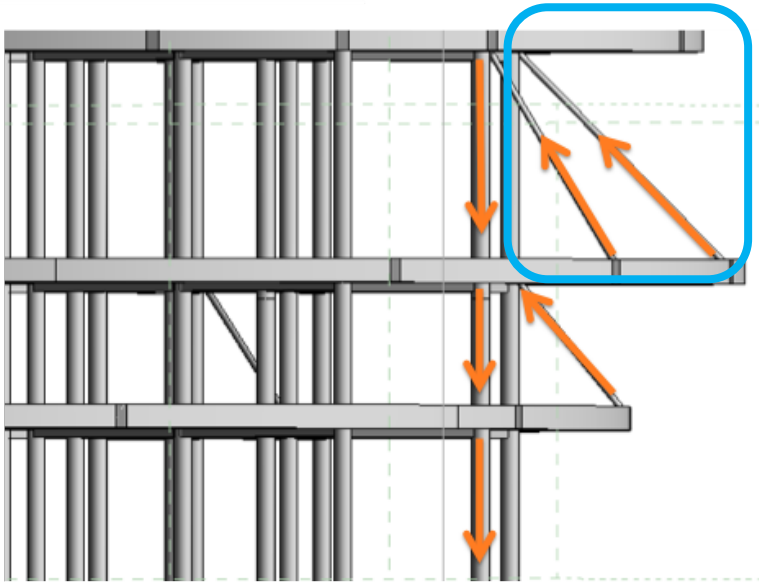
Girder
- 18" X 26"
- 24" X 30"

(Auditorium+Cantilever)

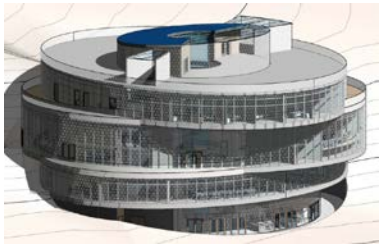
Beam 18" X 30"

ATOMI – Load Path

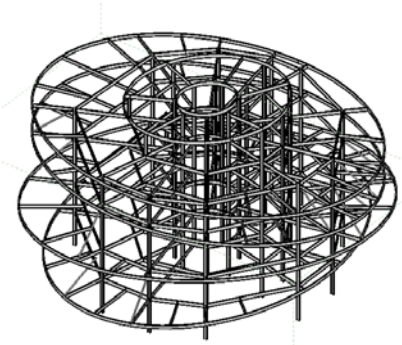


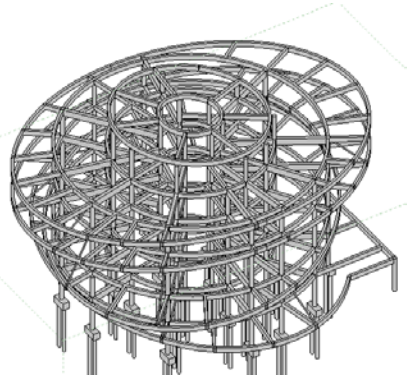


ATOMI – Comparison



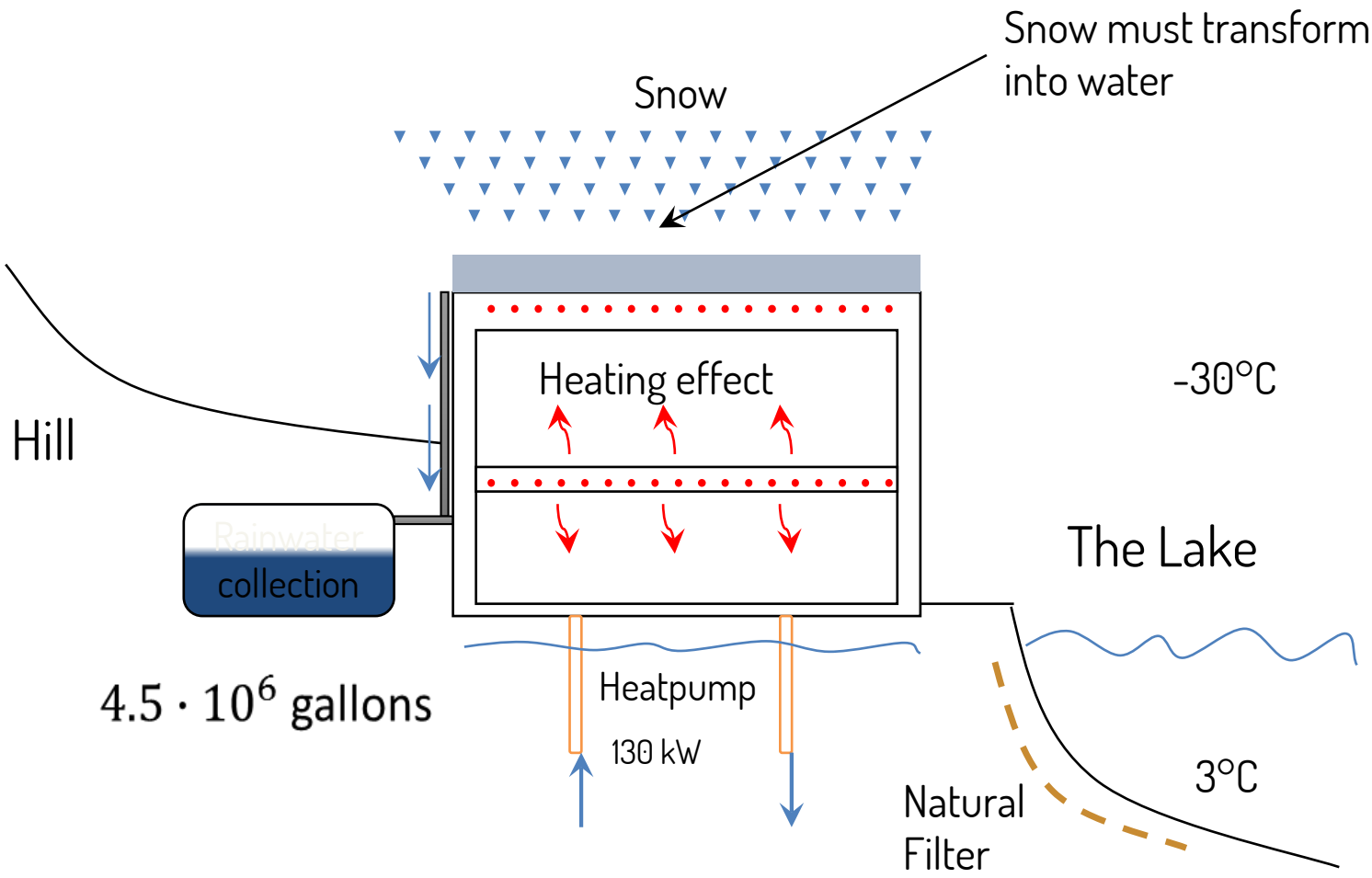
Criteria	**Steel**	**Concrete**
Constructability	Beam Size Variation	Ring Connection Curved Member
Latency	Possible Prefabrication	Cold Weather
Construction Challenge	Large Members Crane limits	Heavy Structure Large Foundation



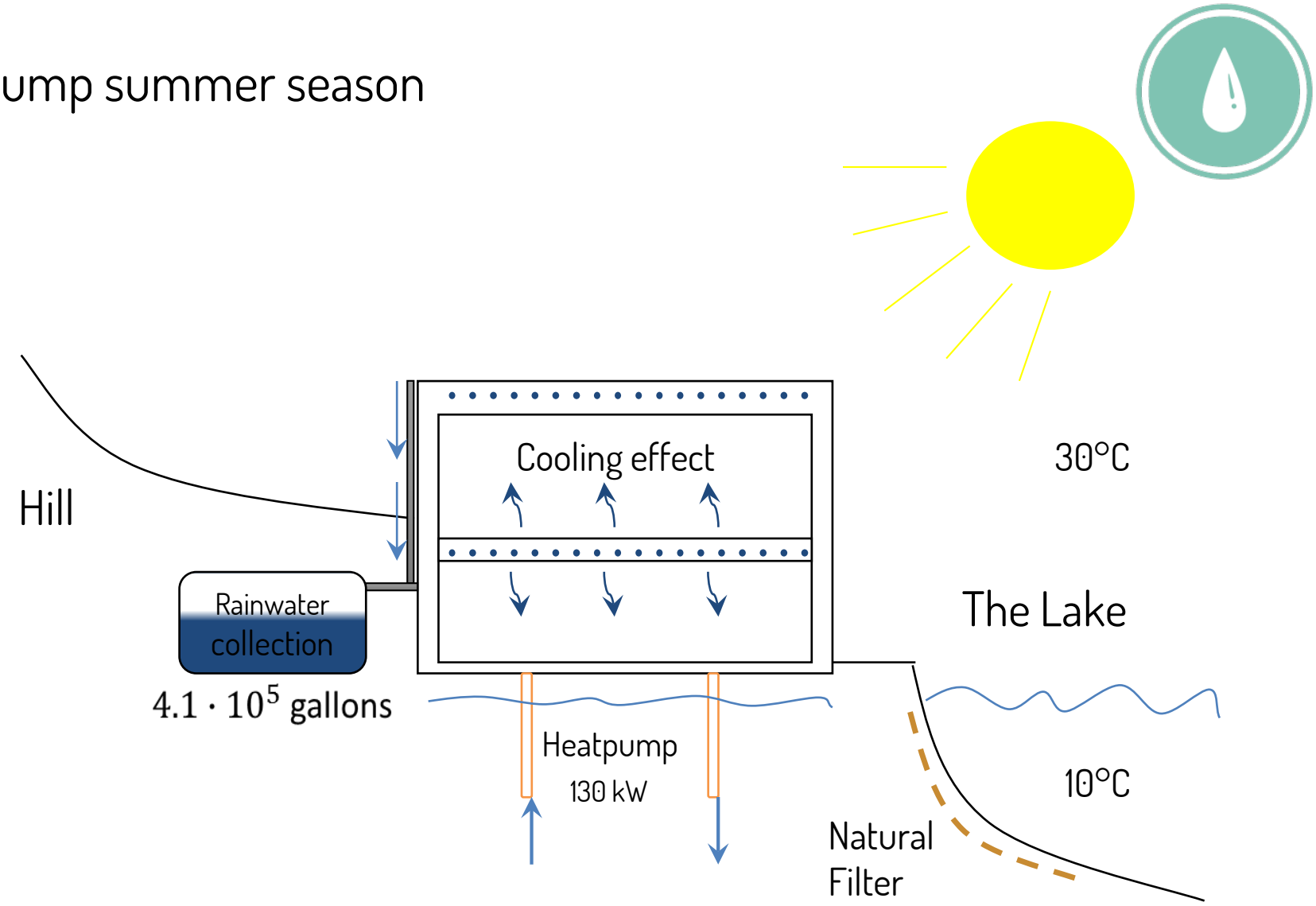


MEP Option

Heat pump winter season



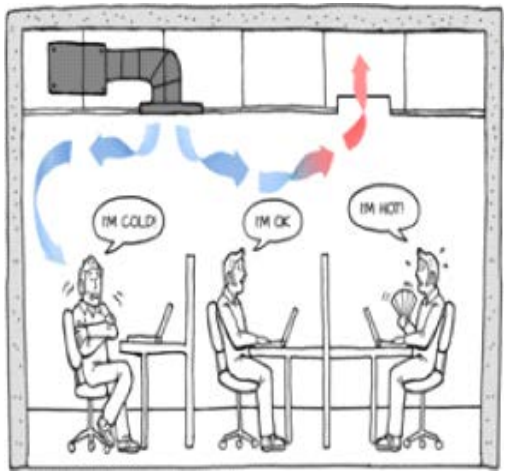
Heatpump summer season

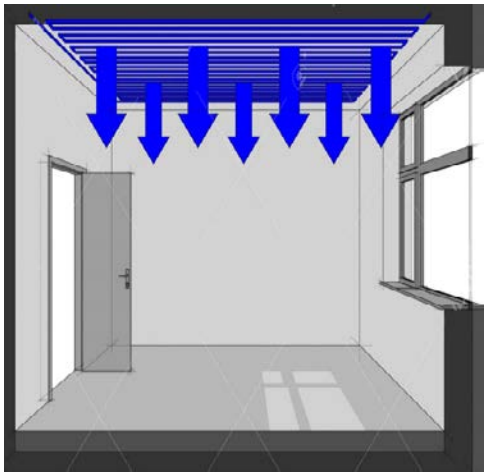


Using water for thermal comfort

Air as cooling	
Advantages	Disadvantages
Better acoustics compared with chilled ceiling	Low heat capacity
Better respons time	Less building height
	Draught
	Nonuniformaly distributed

Water as cooling	
Advantages	Disadvantages
High heat capacity	Low heat capacity
More building height	Less room height
Uniformaly distributed	Draught
Better comfort	Nonuniformaly distributed





Mixing ventilation

Advantages

- The entire room is supplied with clean air
- Uniform comfort in the room

Disadvantages

- High energy consumption compared with DV
- High operating costs compared with DV
- Poorer air in the breathing zone compared with DV

Displacement Ventilation

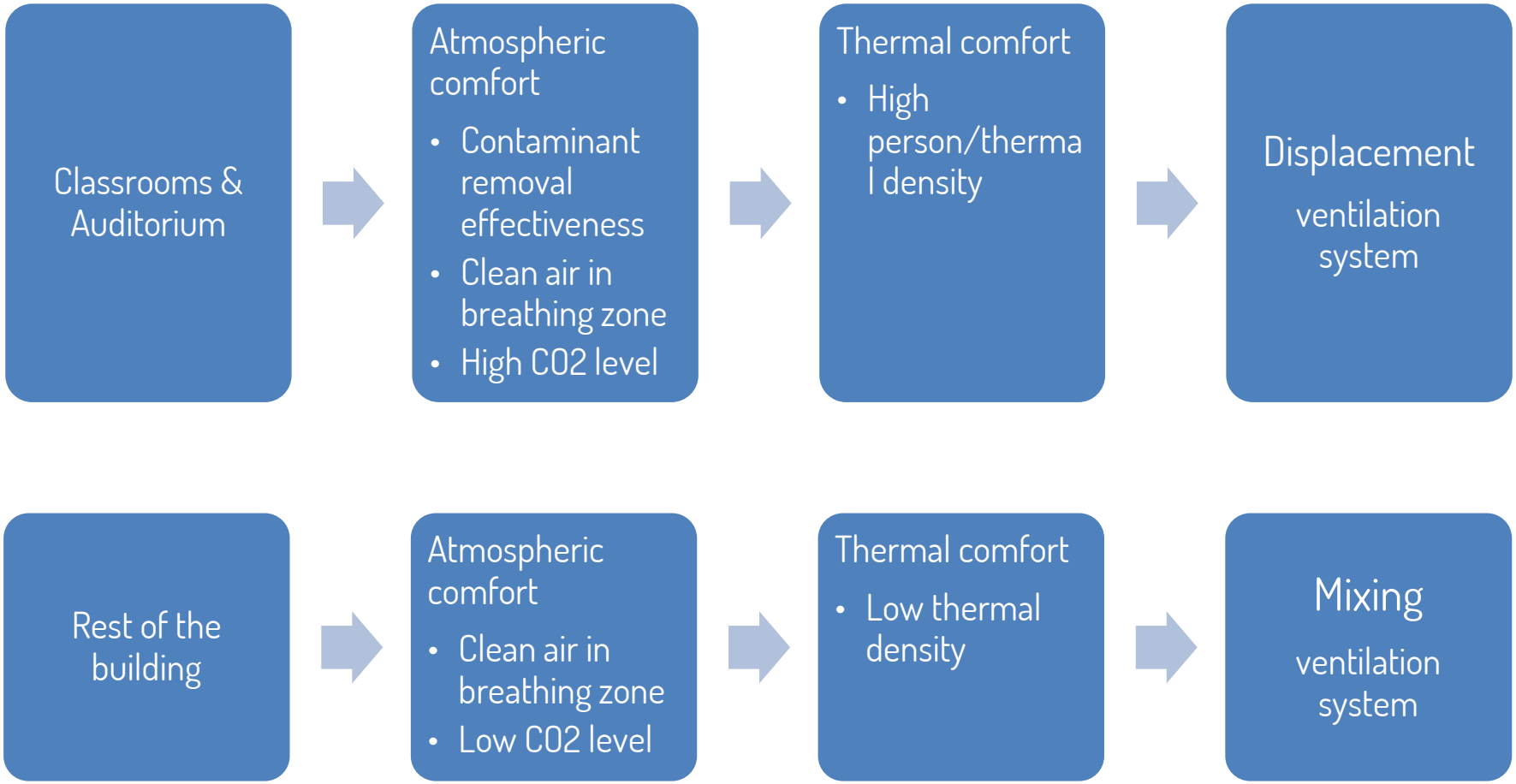
Advantages

- Cleaner air in breathing zone
- The entire room is supplied with air

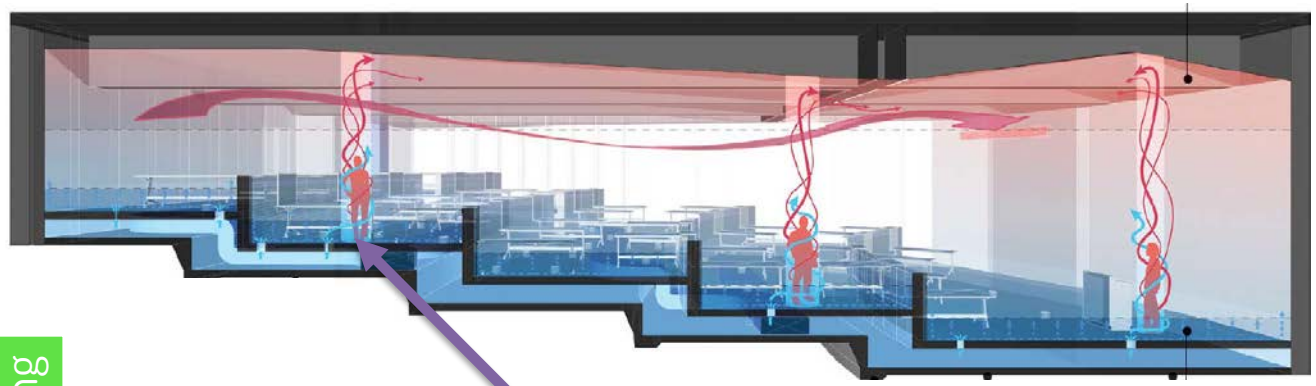
Disadvantages½

- High risk of draft
- Possibility of vertical temperature difference

Solutions for classrooms



Building systems



Auditorium

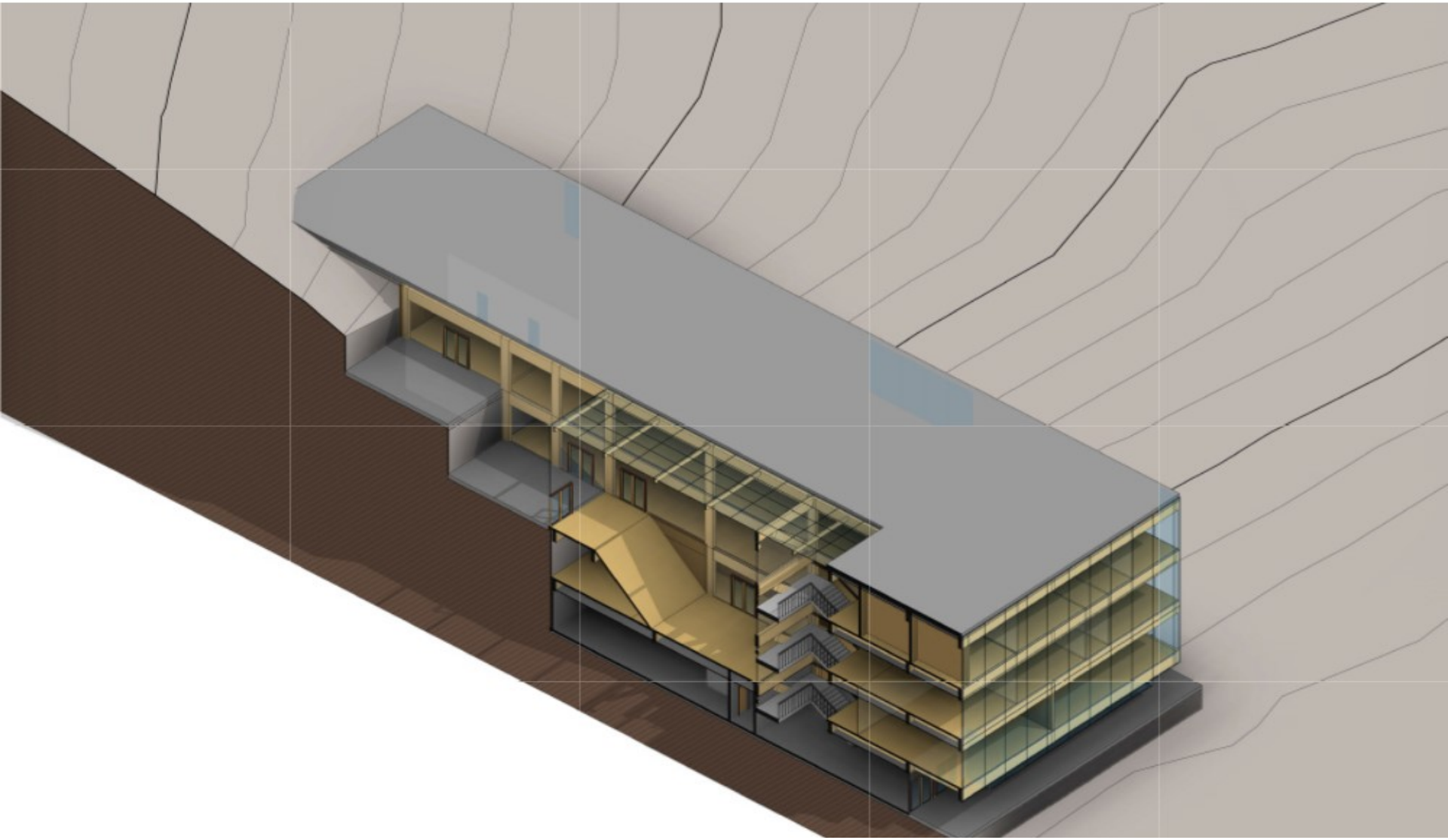
Classrooms

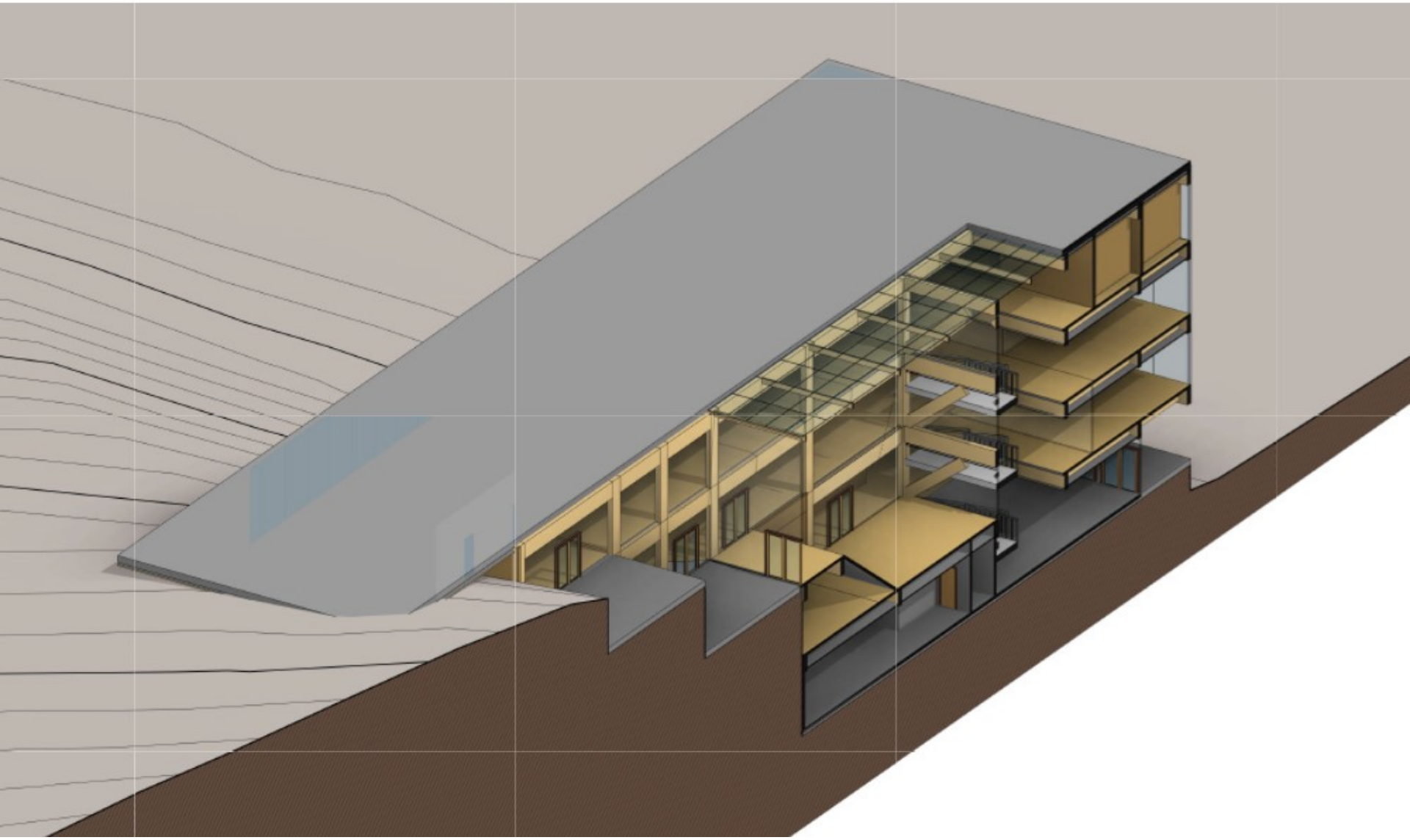
Underfloor displacement ventilation & chilled/heated ceiling

Rest of the building

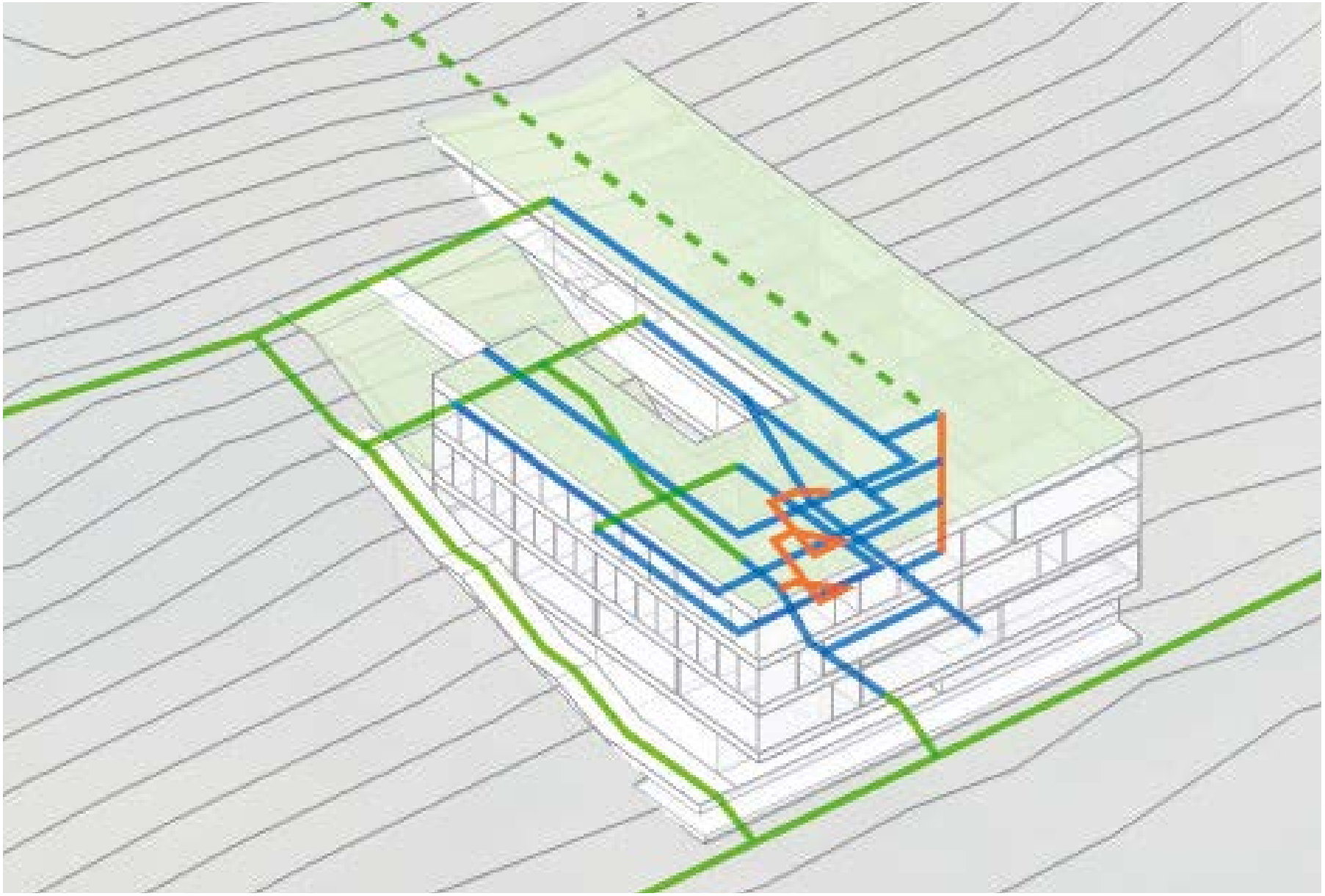
Mixing ventilation & chilled/heated ceiling

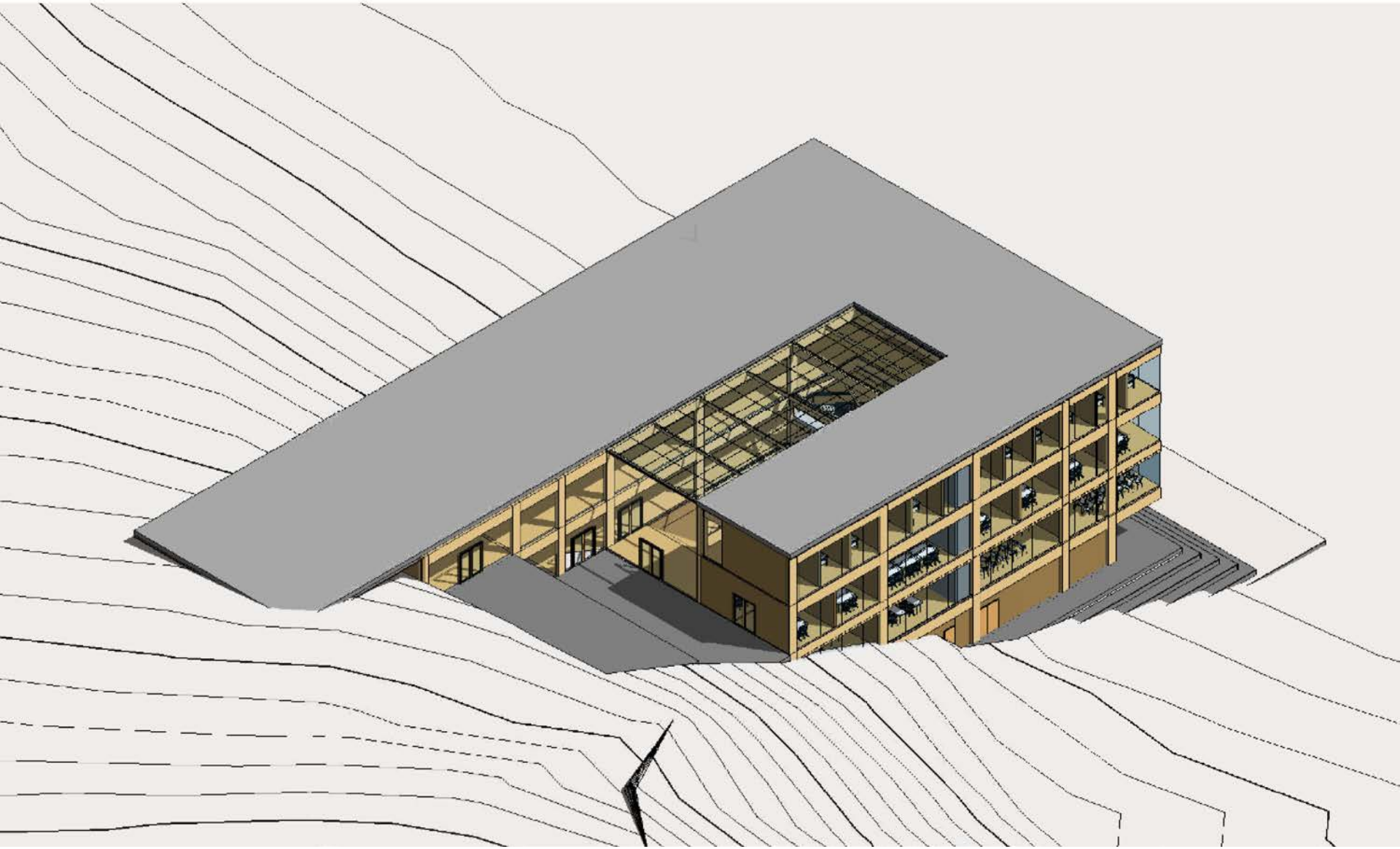
SHELL

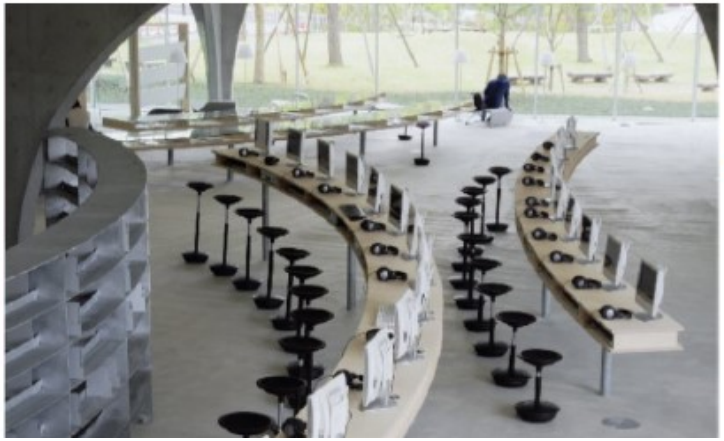


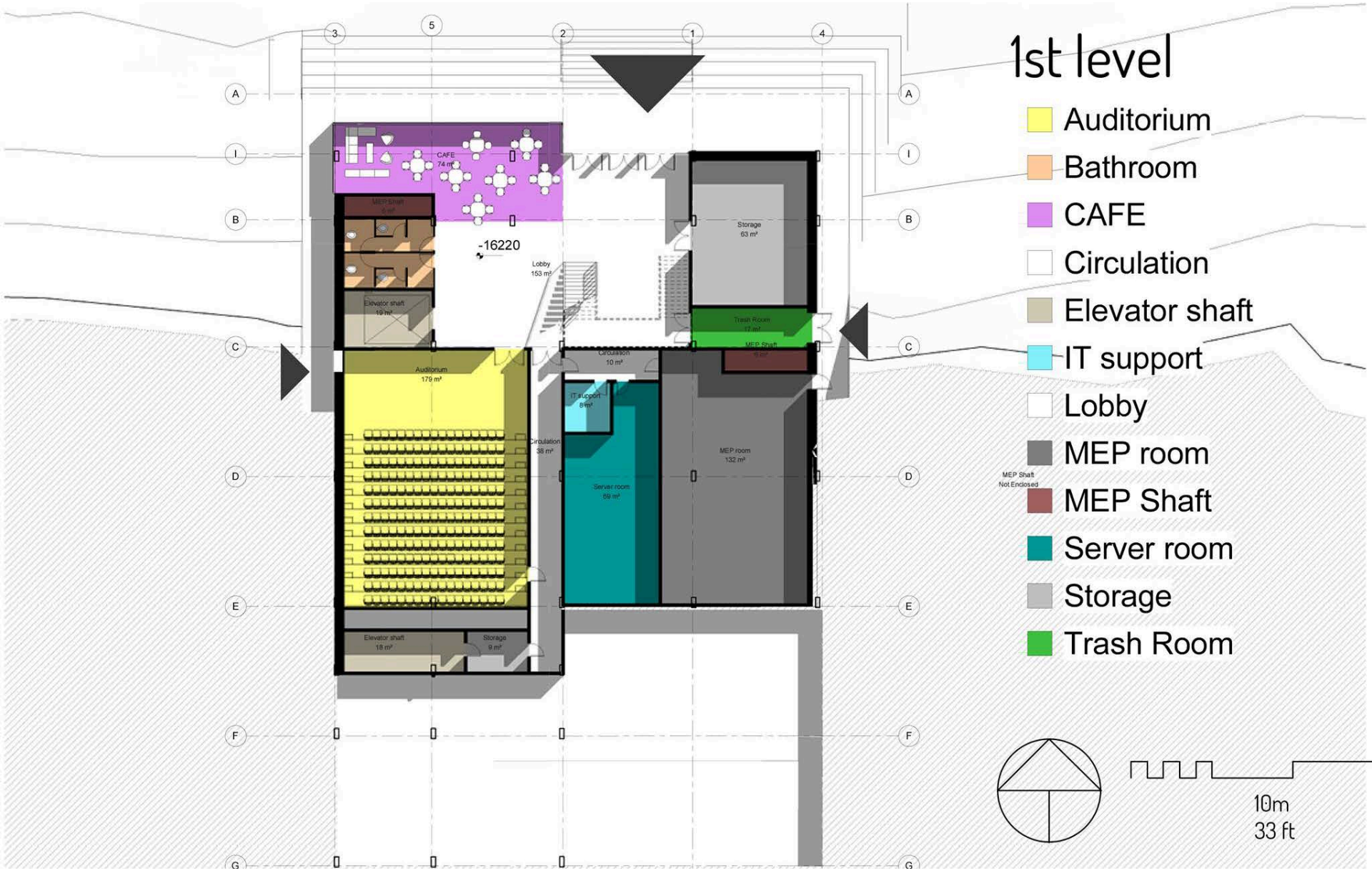


Atrium Courtyard








1st level
Auditorium
Bathroom
CAFE
Circulation
Elevator shaft
IT support
Lobby
MEP room
MEP Shaft
Not Enclosed
Server room
Storage
Trash Room
CAFE
74 m²
-16220
Lobby
153 m²
Storage
63 m²
Trash Room
17 m²
MEP Shaft
6 m²
Circulation
10 m²
Auditorium
179 m²
IT support
8 m²
Circulation
38 m²
Server room
69 m²
MEP room
132 m²
Elevator shaft
18 m²
Storage
9 m²
10m
33 ft

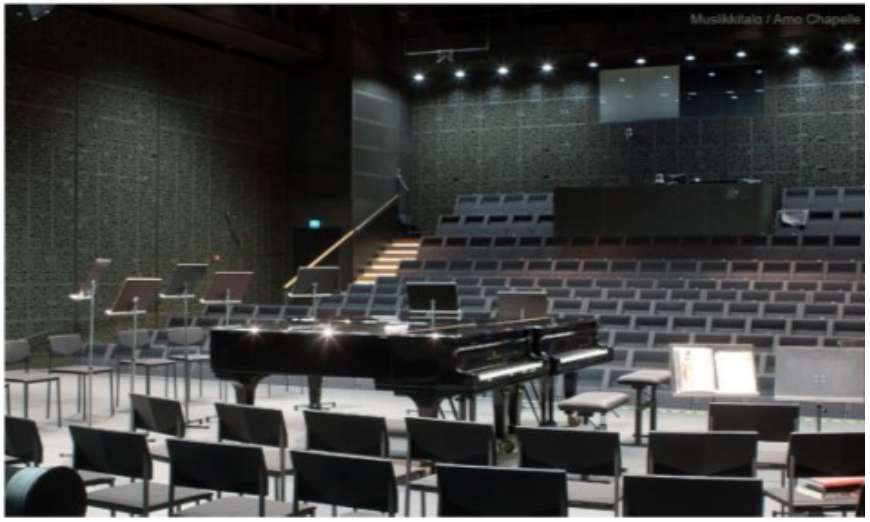
Auditorium

Telescopic seating

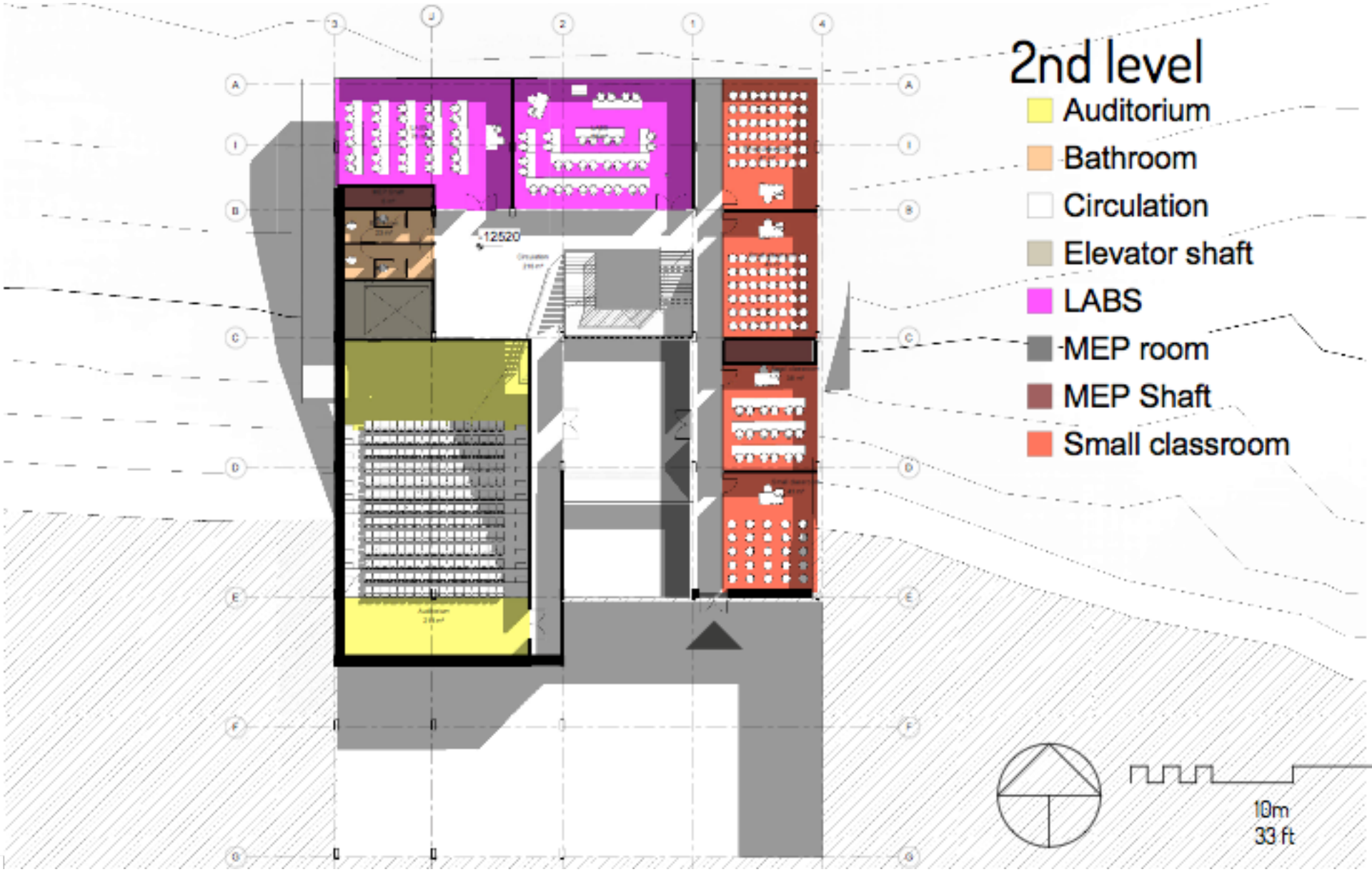
Wood Panels

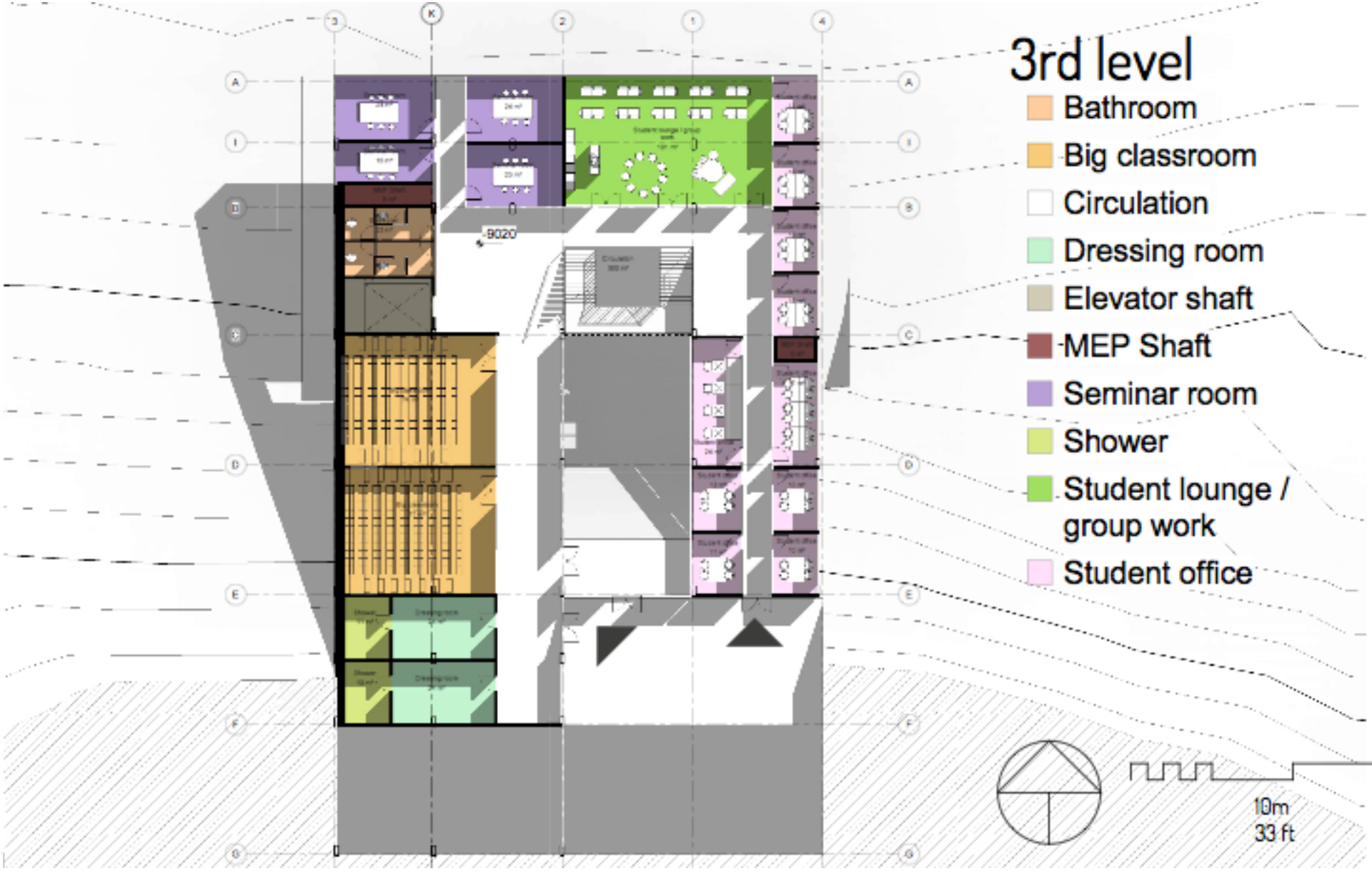
Lecture - Concert - Sponsor event

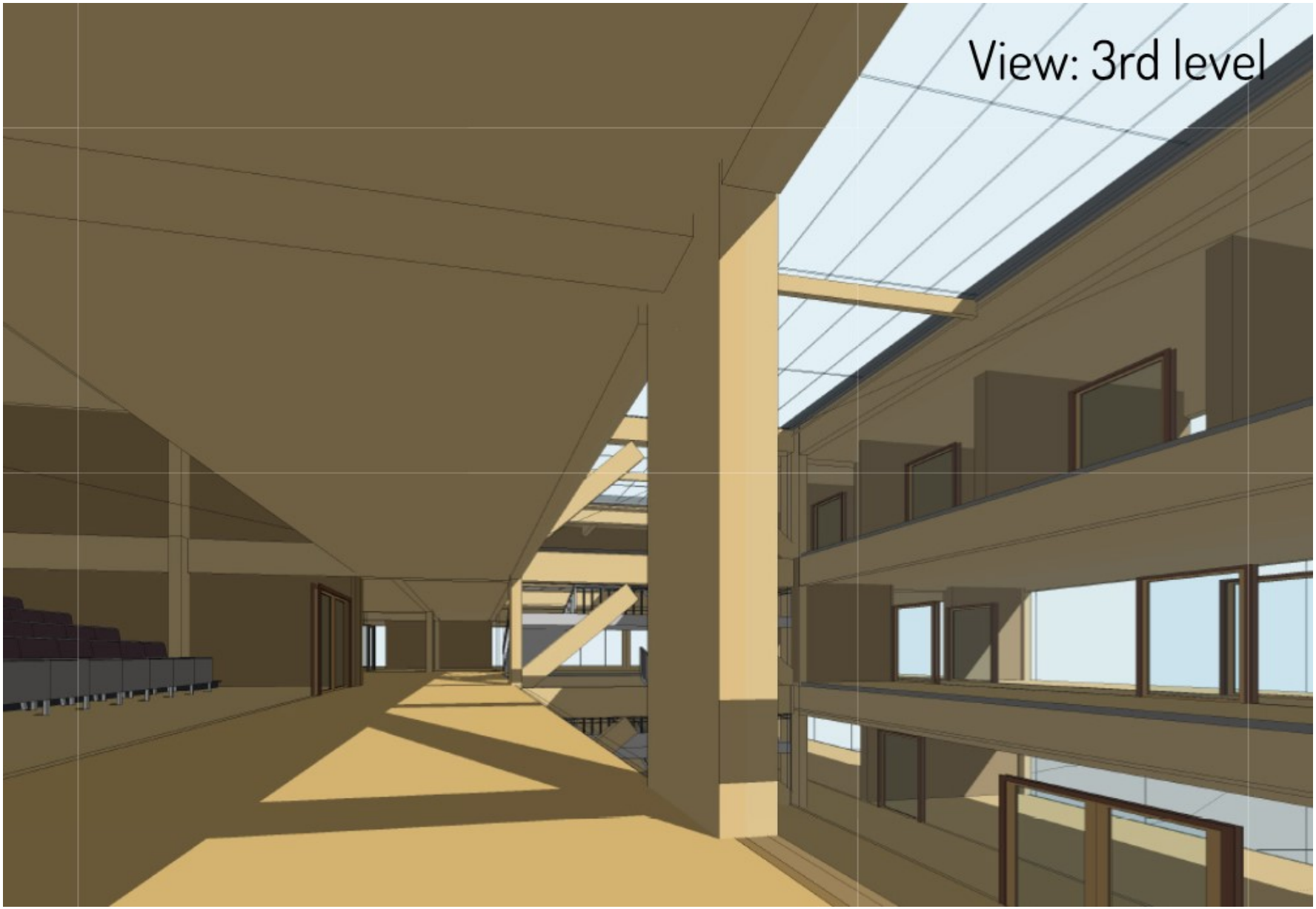
Auditorium



Section South - North

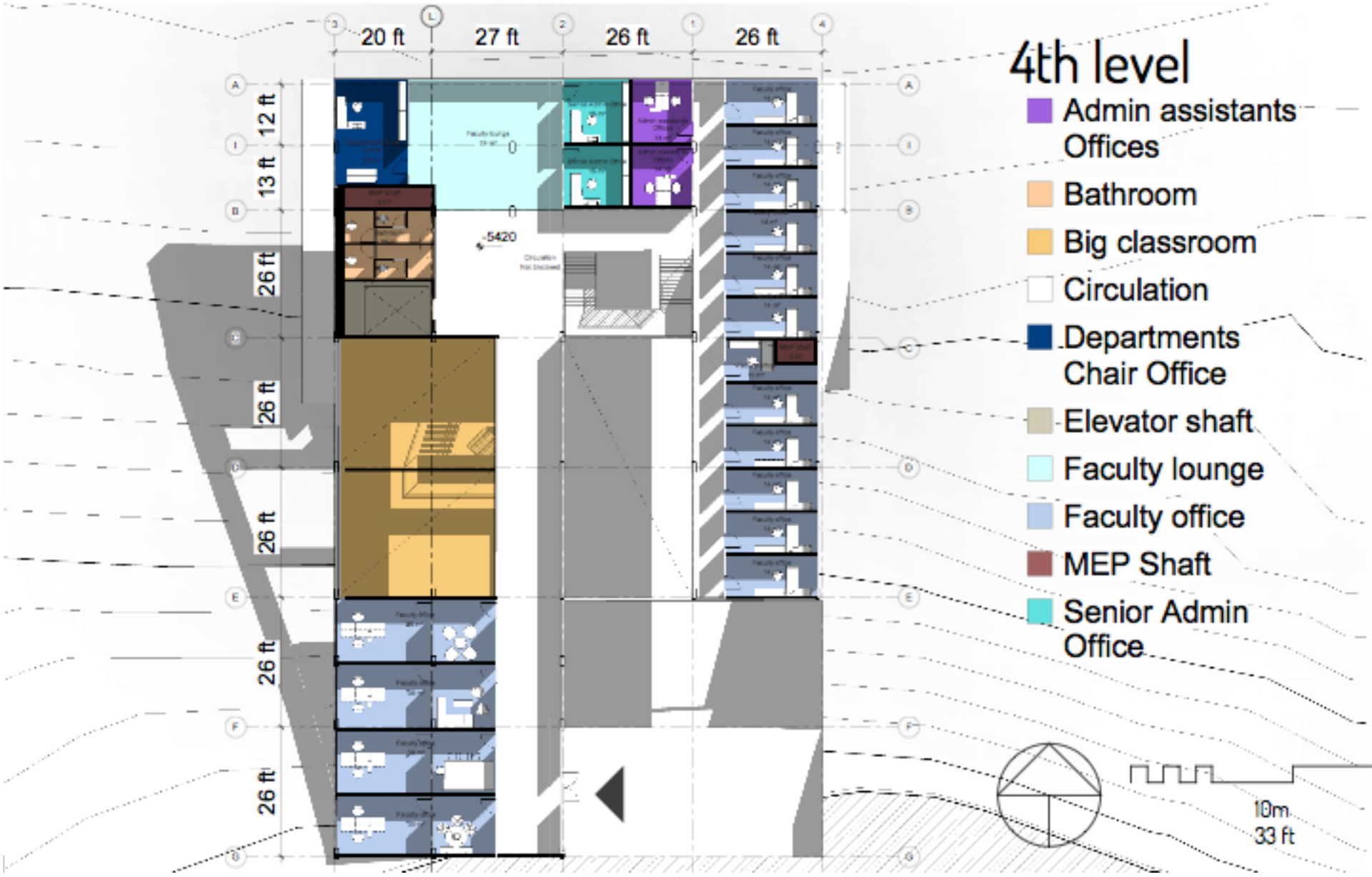

2nd level
Auditorium
Bathroom
Circulation
Elevator shaft
LABS
MEP room
MEP Shaft
Small classroom
12520
10m
33 ft


3rd level
Bathroom
Big classroom
Circulation
Dressing room
Elevator shaft
MEP Shaft
Seminar room
Shower
Student lounge / group work
Student office
B020
10m
33 ft


View: 3rd level

Section West - East

10m
33 ft


20 ft
27 ft
26 ft
26 ft
12 ft
13 ft
26 ft
26 ft
26 ft
26 ft
26 ft
5420
4th level
Admin assistants Offices
Bathroom
Big classroom
Circulation
Departments Chair Office
Elevator shaft
Faculty lounge
Faculty office
MEP Shaft
Senior Admin Office
10m
33 ft

Elevation East

10m
33 ft


Elevation North
10m
33 ft

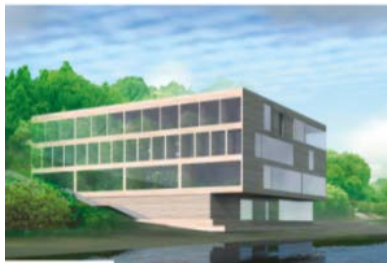

Elevation West
10m
33 ft

Elevation South

10m
33 ft

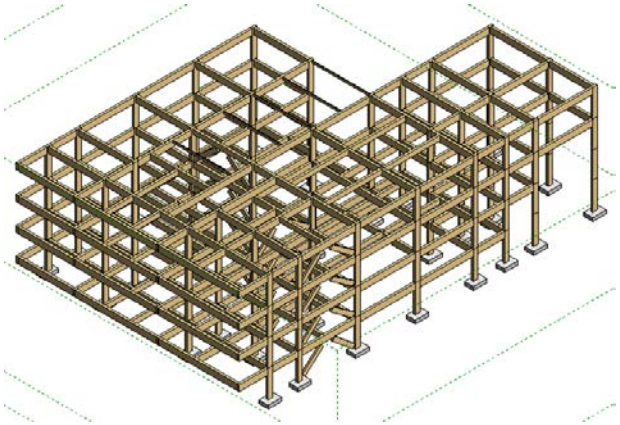
Structural Options

SHELL



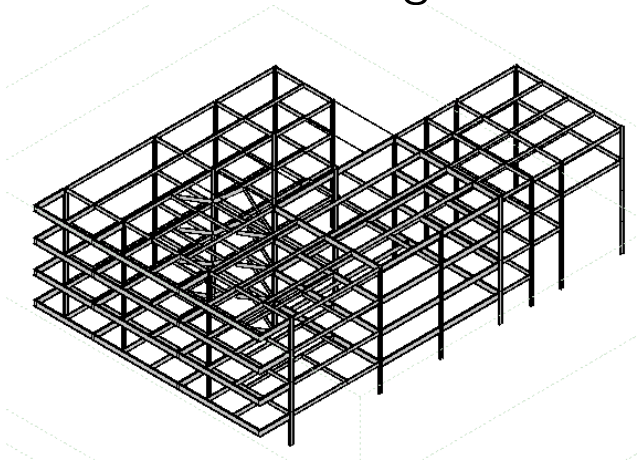
Timber (CLT) Structure

- Gravity System
  - CLT floor
  - CLT column and beams
- Lateral System
  - Chevron braces



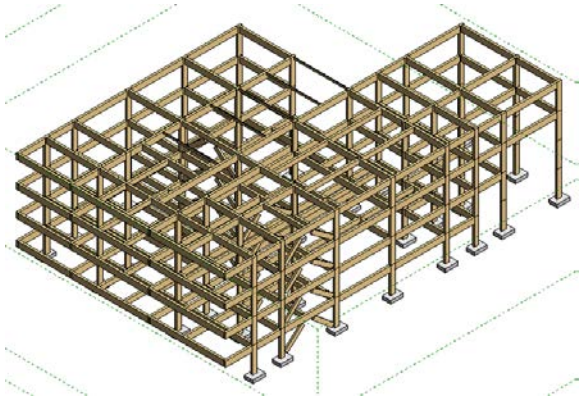
Steel Structure

- Gravity System
  - Composite slab
  - Steel column and beams
- Lateral System
  - Moment Resisting Frame



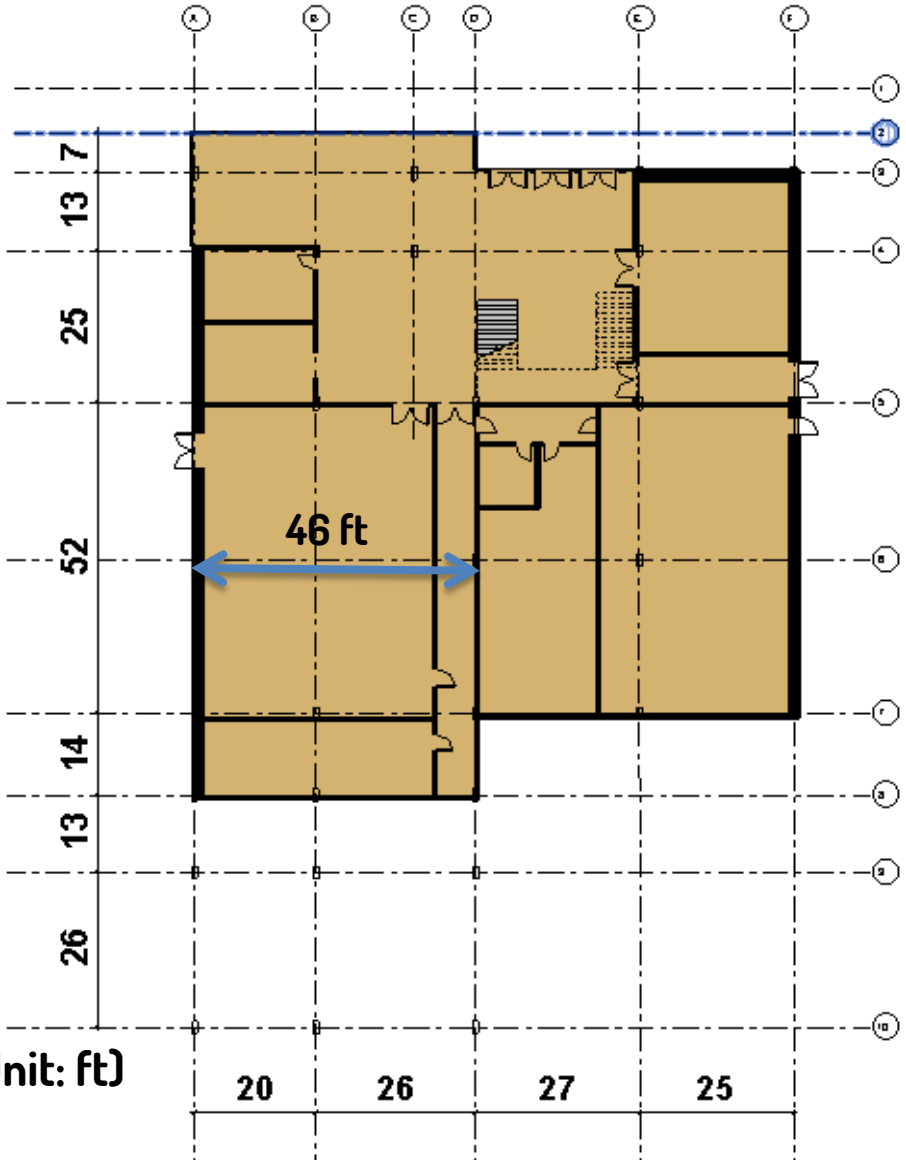
SHELL - Timber (CLT) Structure

- 6 in CLT Floor
- Column 10 X 24 ¾
- Girder
  - 10 ½ X 31 ⅝
  - 12 X 33 (Auditorium and Large Classrooms)
- Beam
  - 10 ½ X 24 ¾
  - 12 X 26 ⅛ (Auditorium and Large Classrooms)
- Chevron braces 3X11

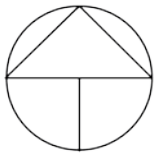


(Unit: in)

SHELL - Timber (CLT) Structure

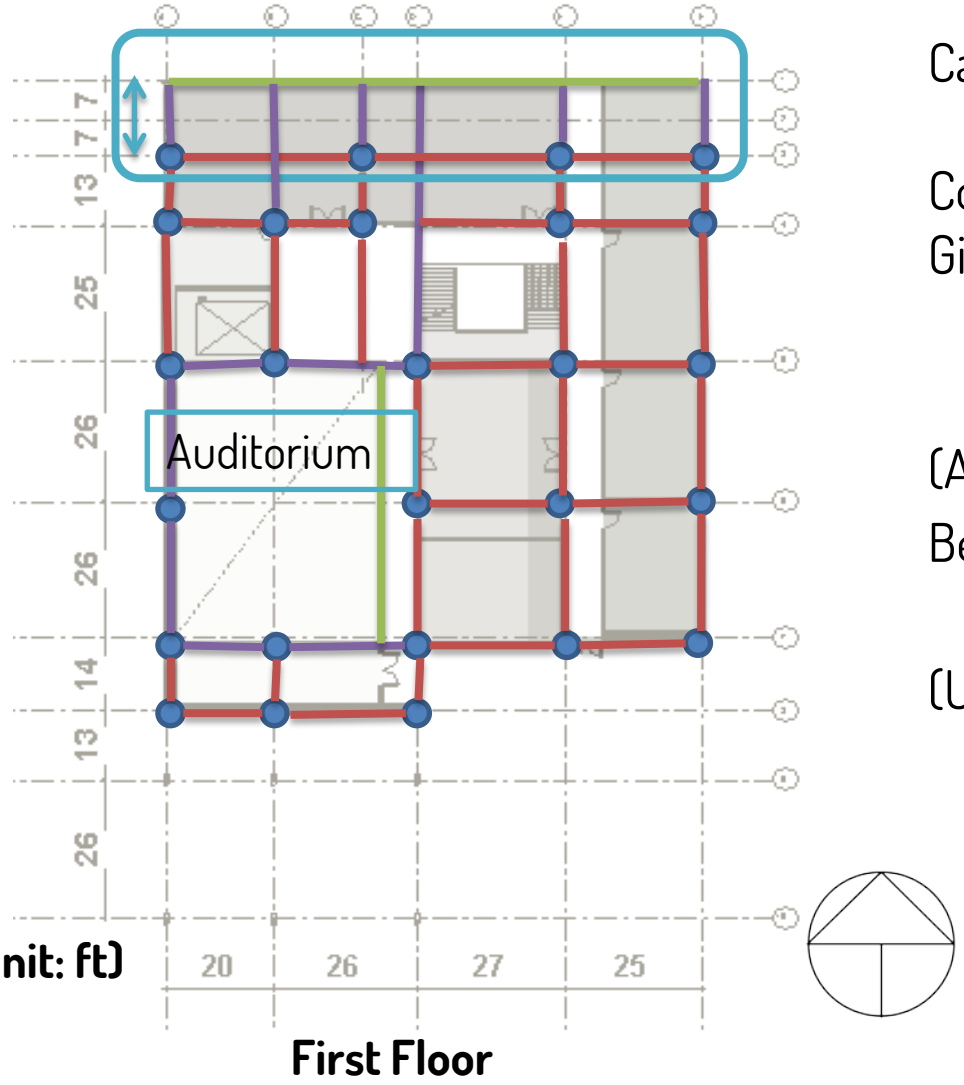


Max Beam Span = 46 ft



Ground Floor

SHELL - Timber (CLT) Structure



(Unit: ft)

First Floor

Cantilever Span = 14 ft

Column 10" X 24 ¾"

Girder

10 ½ X 31 ⅝

12 X 33

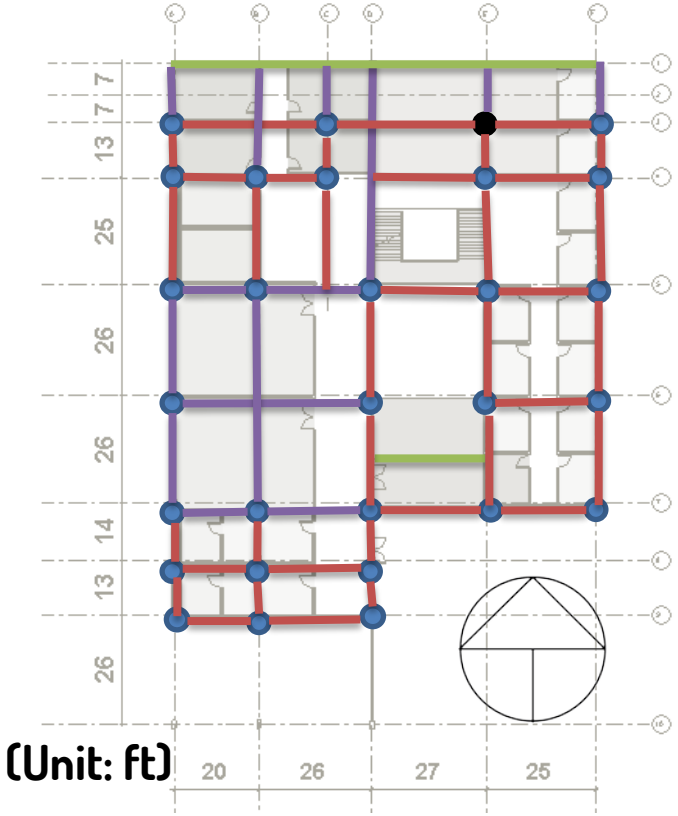
(Auditorium and Large Classrooms)

Beam

10 ½ X 24 ¾

(Unit: in)

SHELL - Timber (CLT) Structure



(Unit: ft)

Second Floor

Column 10" X 24 ¾"

- Continuous
- One story

Girder

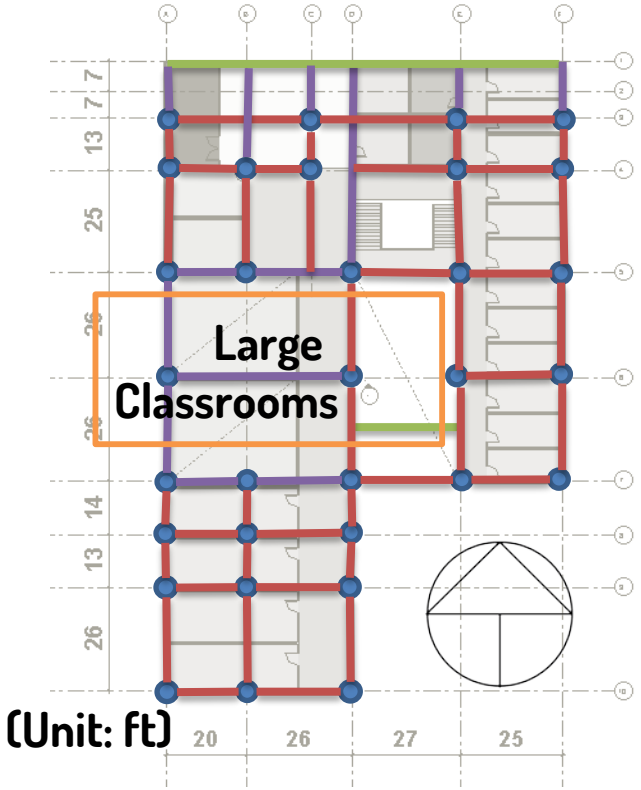
10 ½ X 31 ⅝

12 X 33

Beam

10 ½ X 24 ¾

(Unit: in)

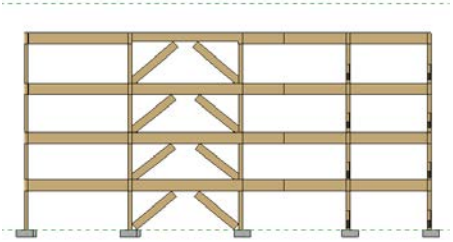


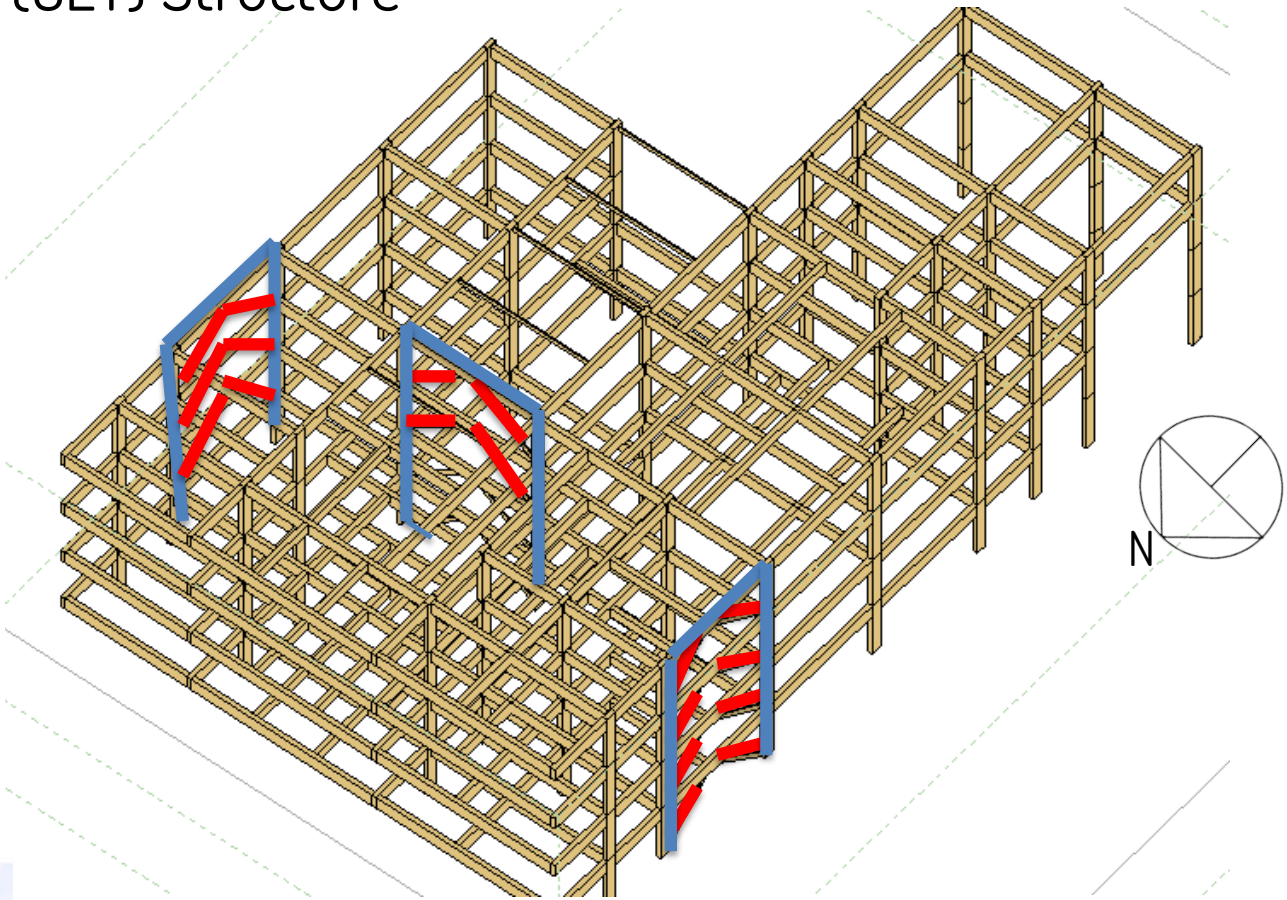
(Unit: ft)

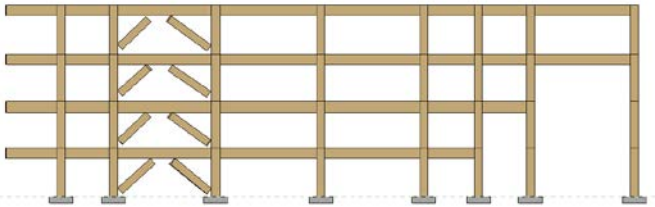
Third Floor

SHELL - Timber (CLT) Structure

Lateral System

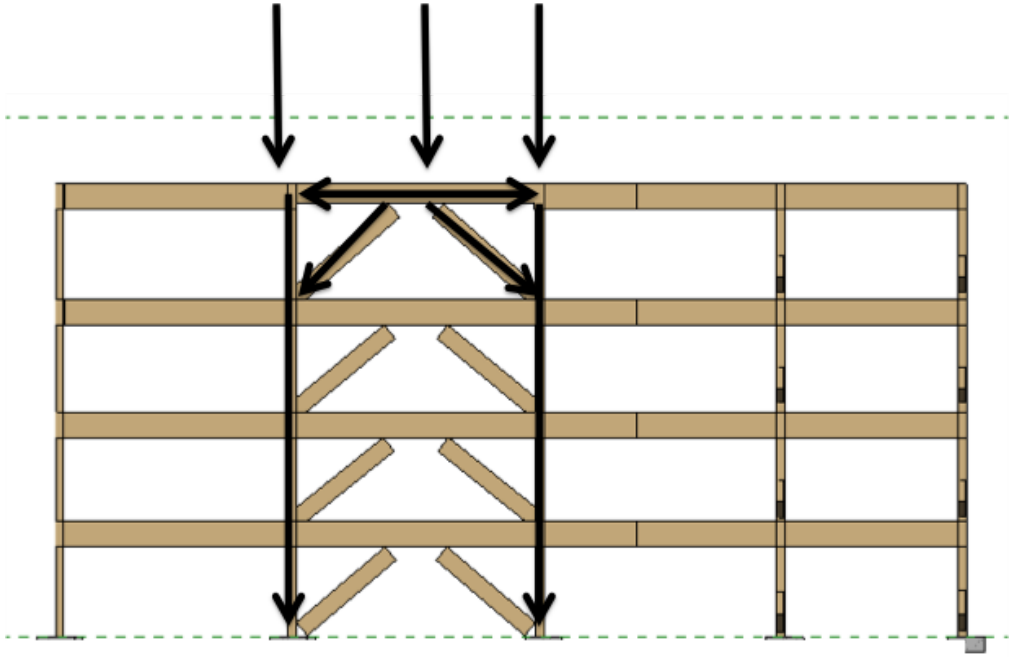


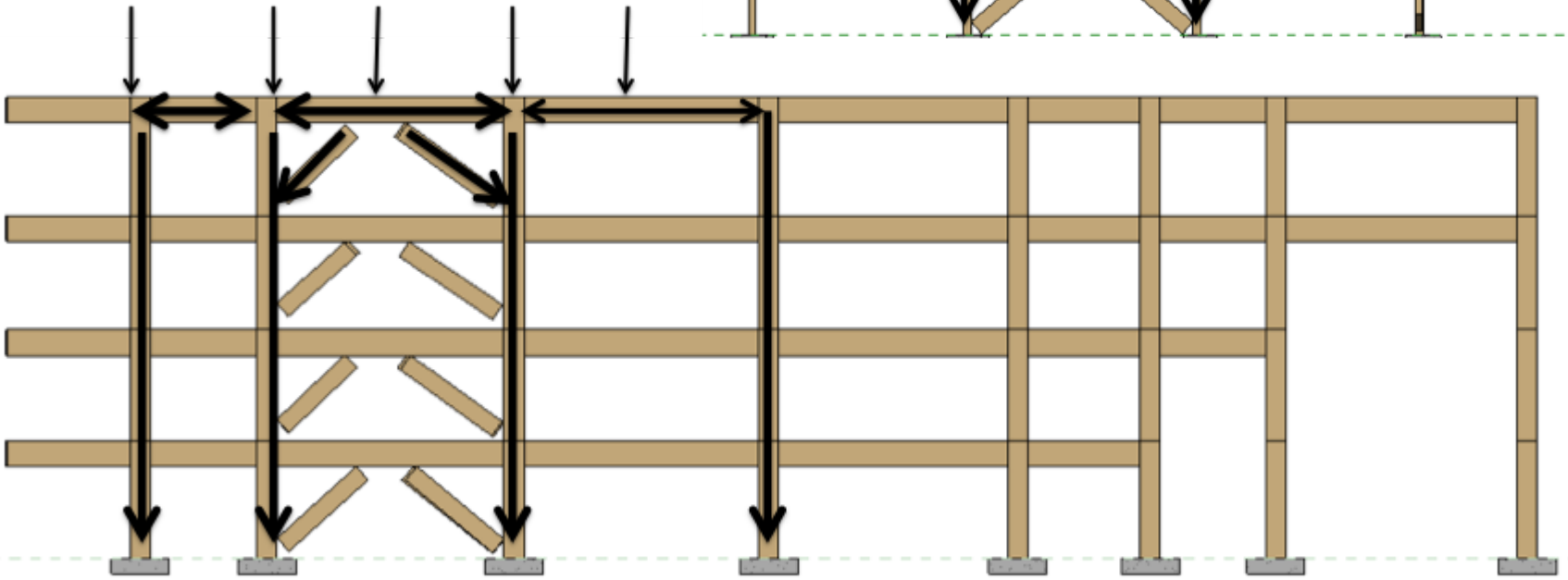




SHELL

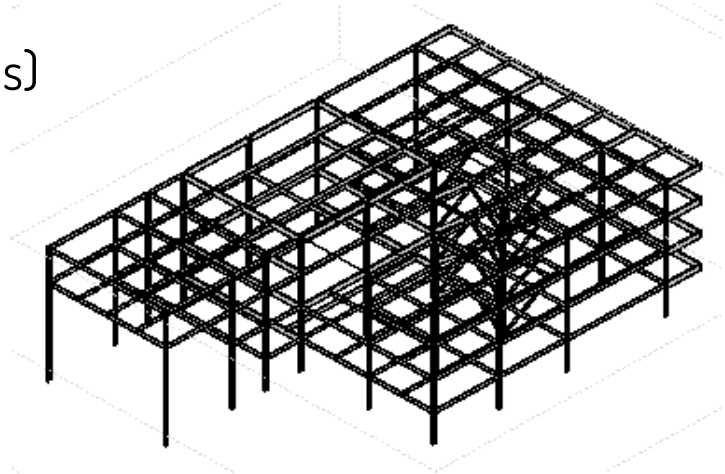
Load Path



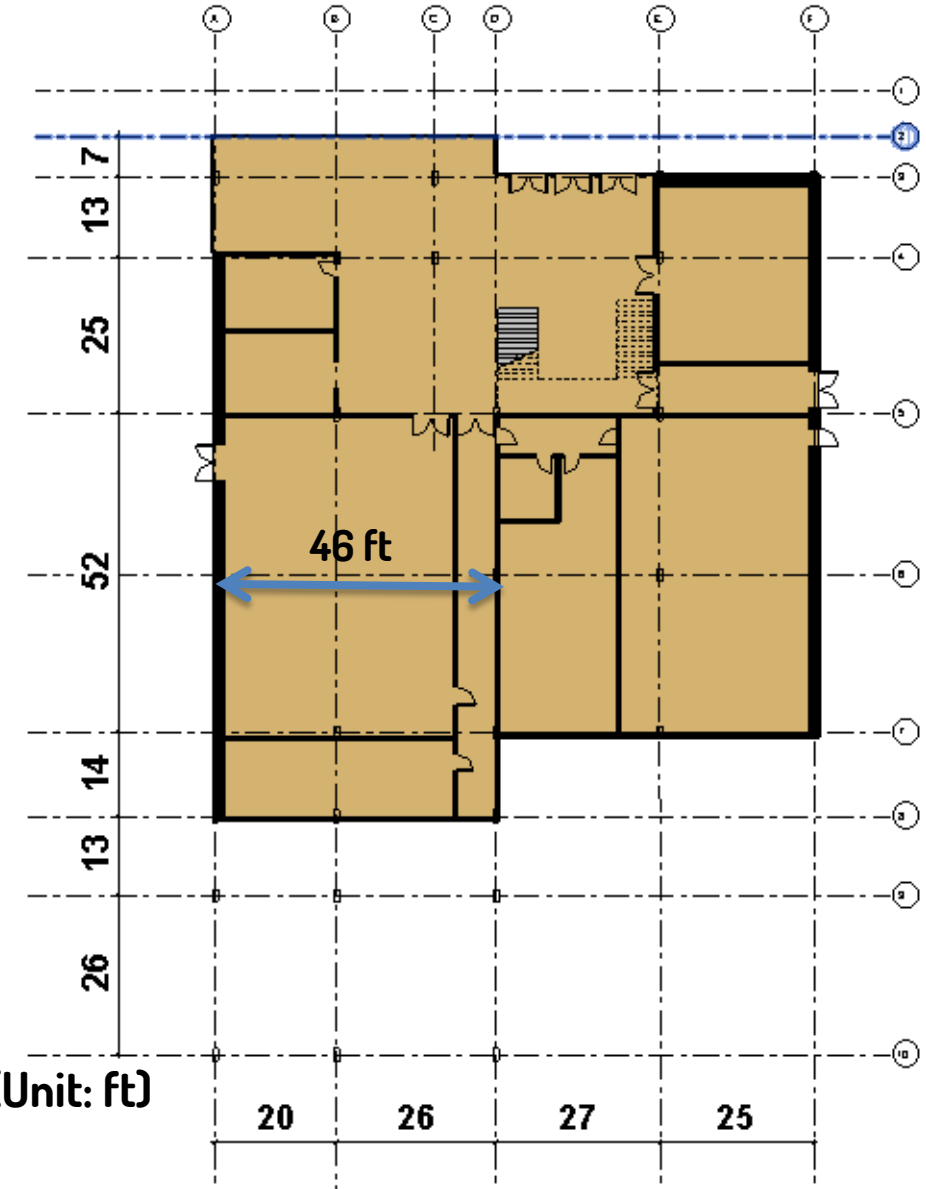


SHELL - Steel Structure

- 6.5 in Composite Slab
- Column W14X74
- Girder
  - W18X46
  - W24X55 (Auditorium and Large Classrooms)
- Beam
  - W16X36
  - W21X50 (Auditorium and Large Classrooms)
- Braces 2" X 2"



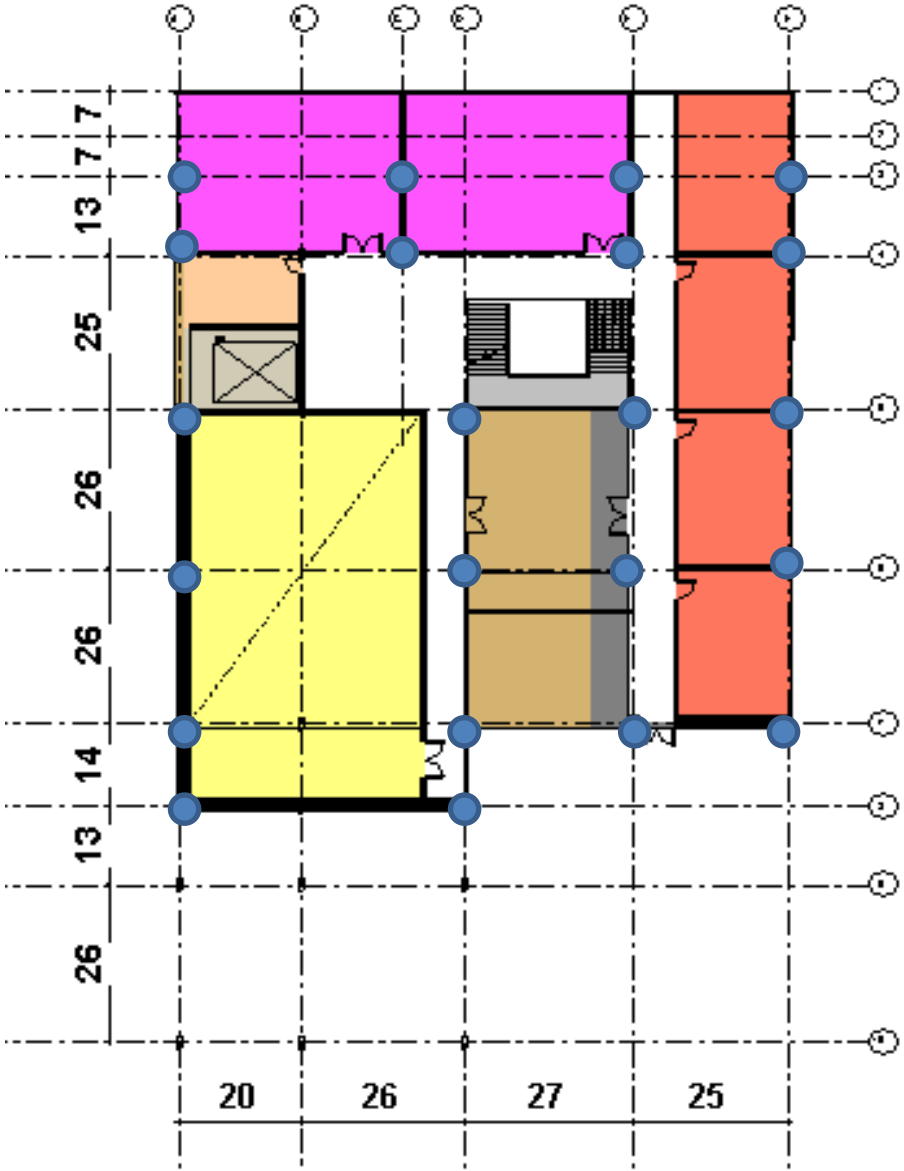
SHELL - Steel Structure

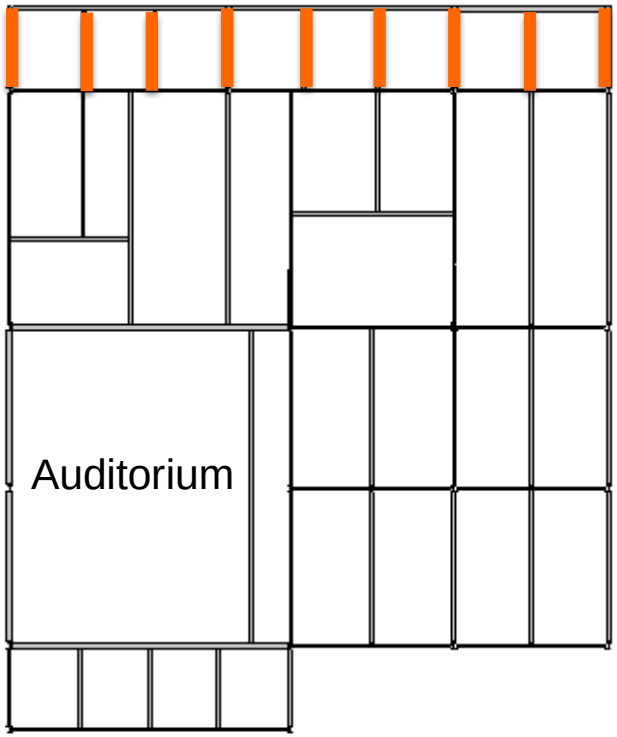


Max Beam Span = 46 ft

Ground Floor

Shell - Timber (CLT) Structure



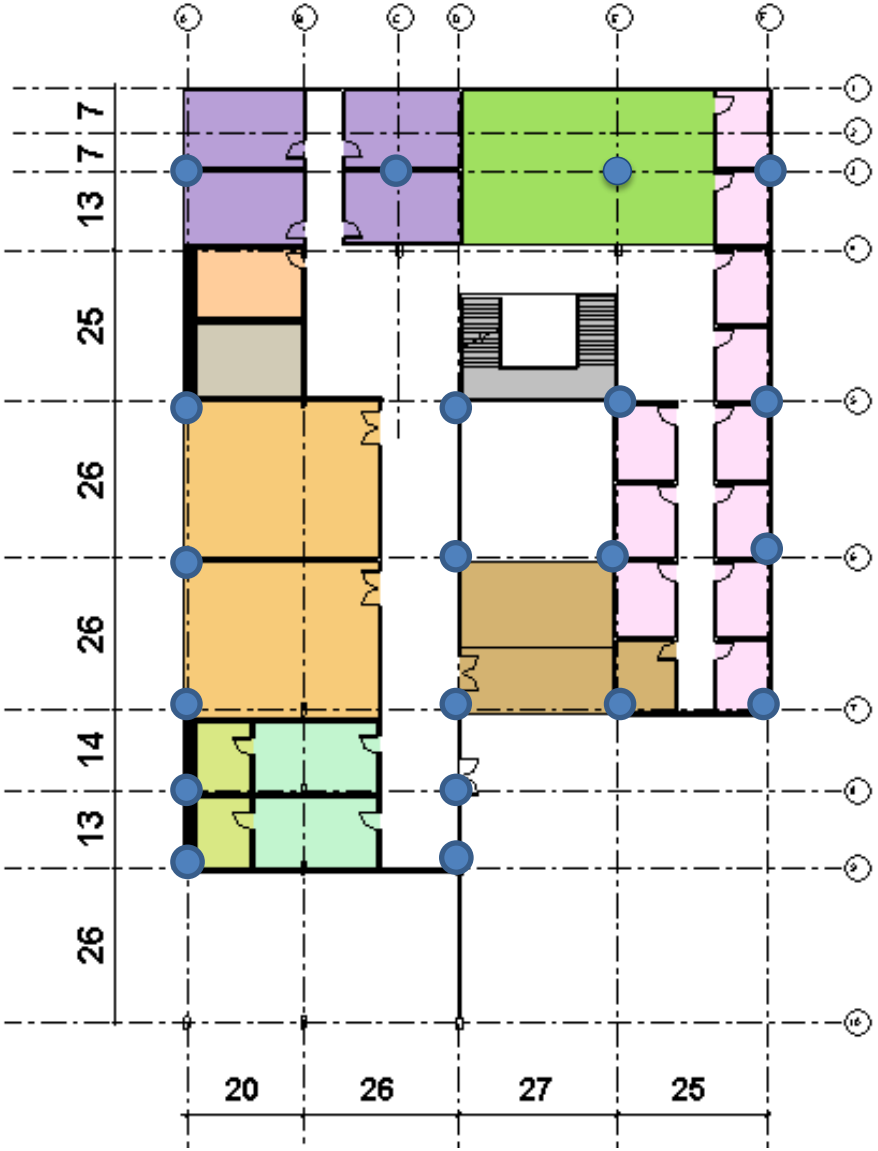


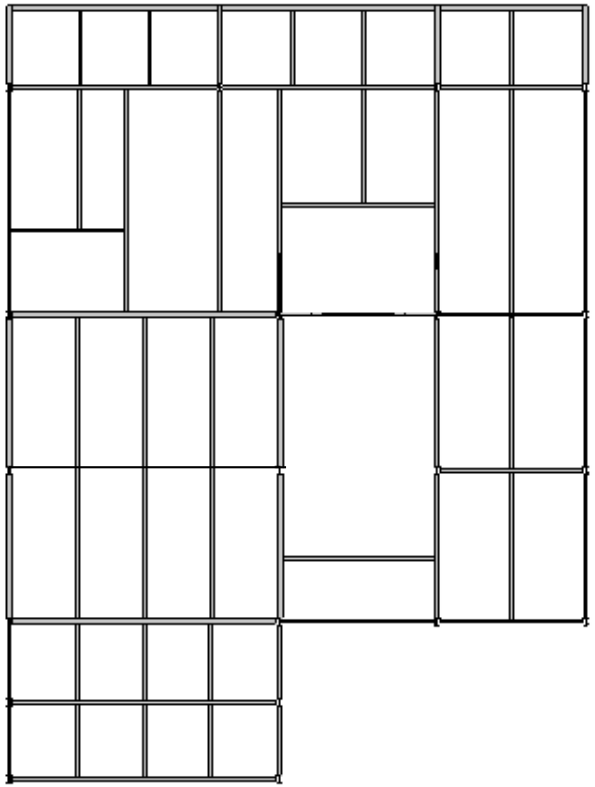
Cantilever=14 ft

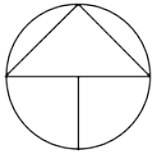
First Floor

Column W14X74

Shell - Steel Structure



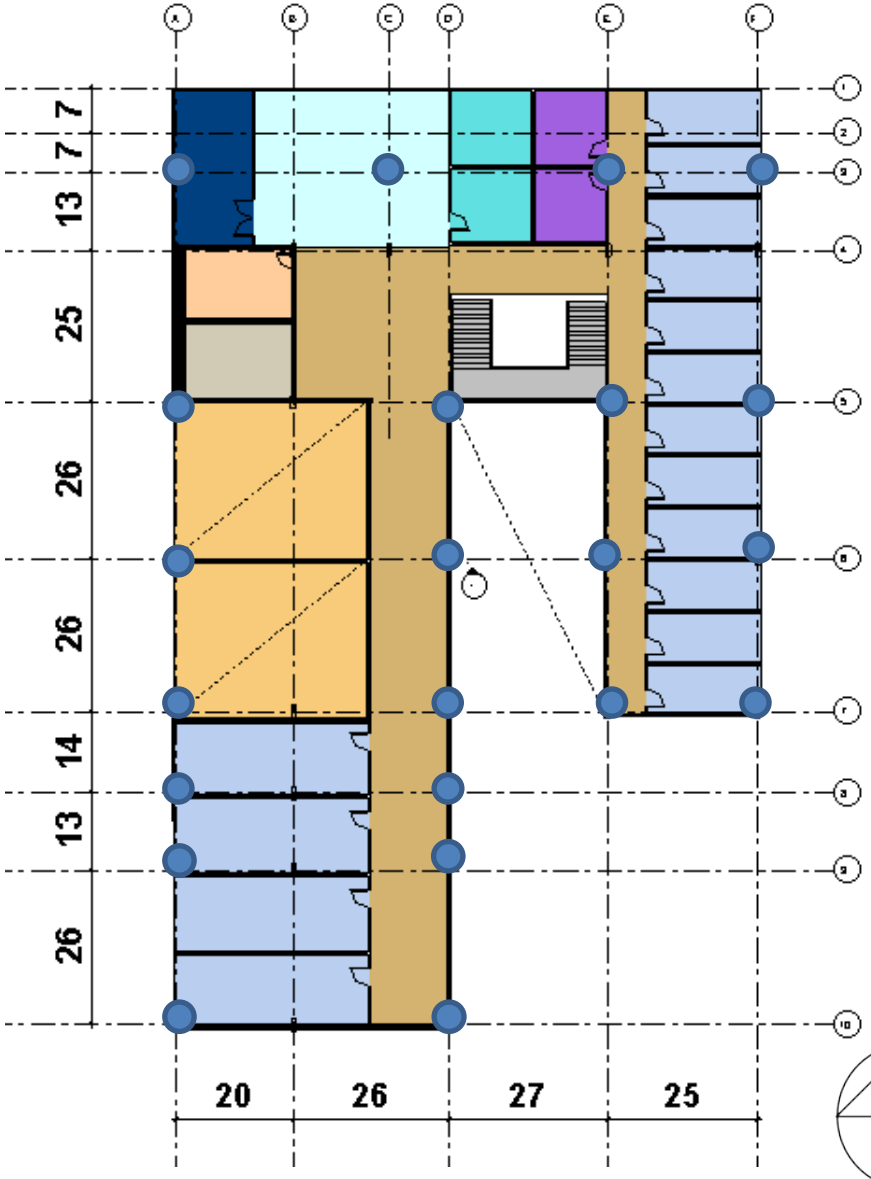


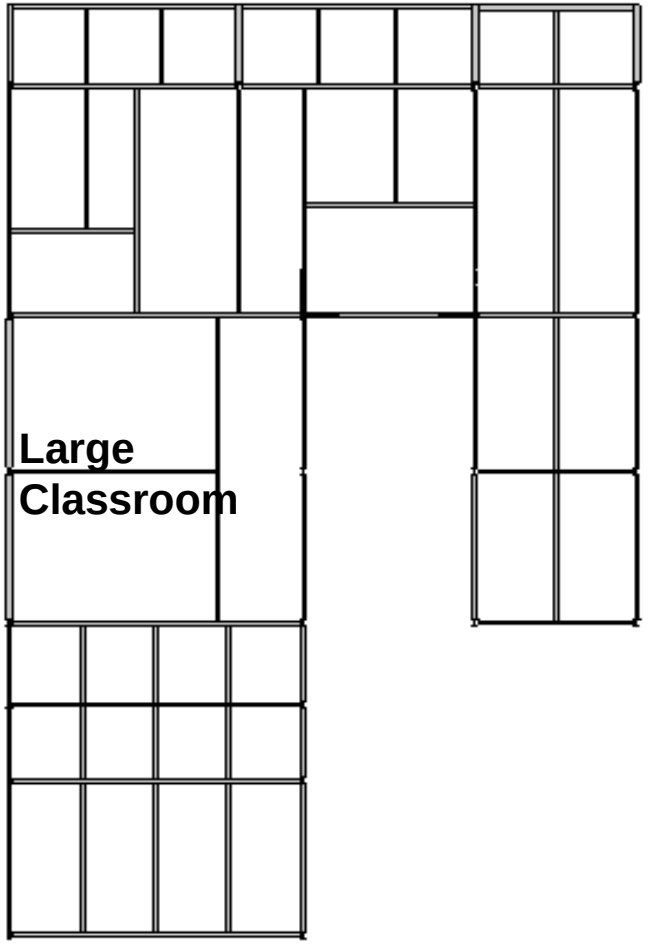


Second Floor

Column W14X74

Shell - Steel Structure





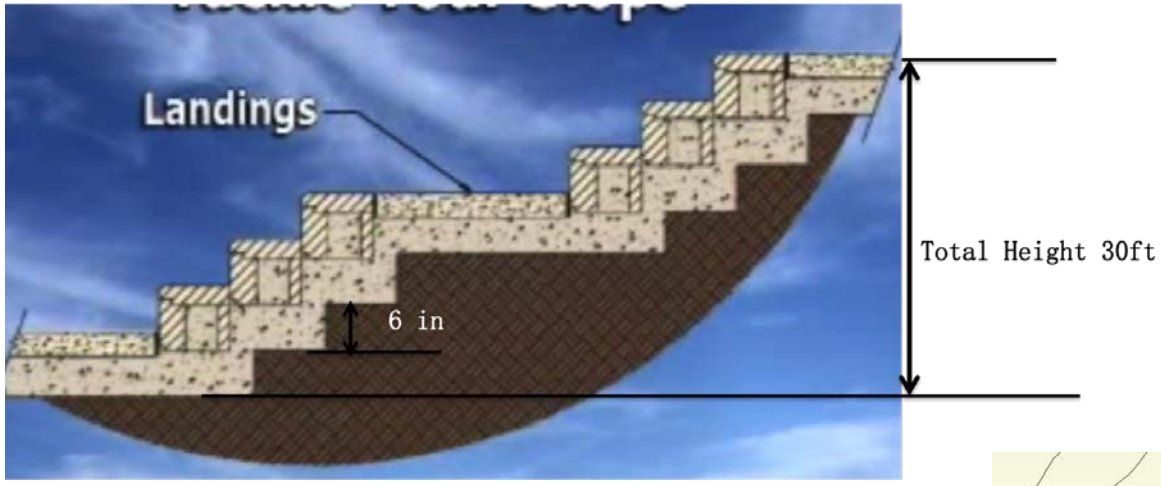
Third Floor

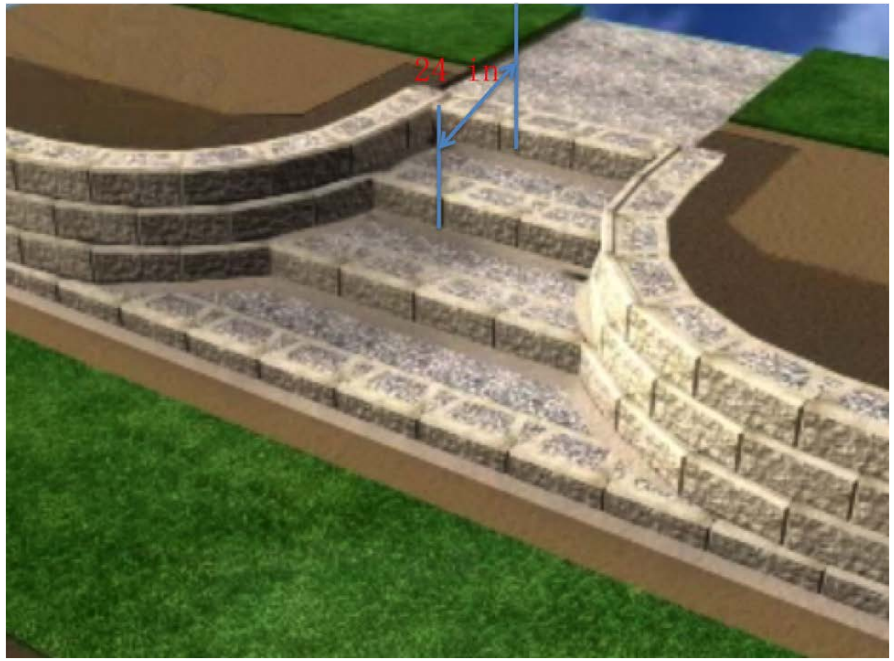
Column W14X74

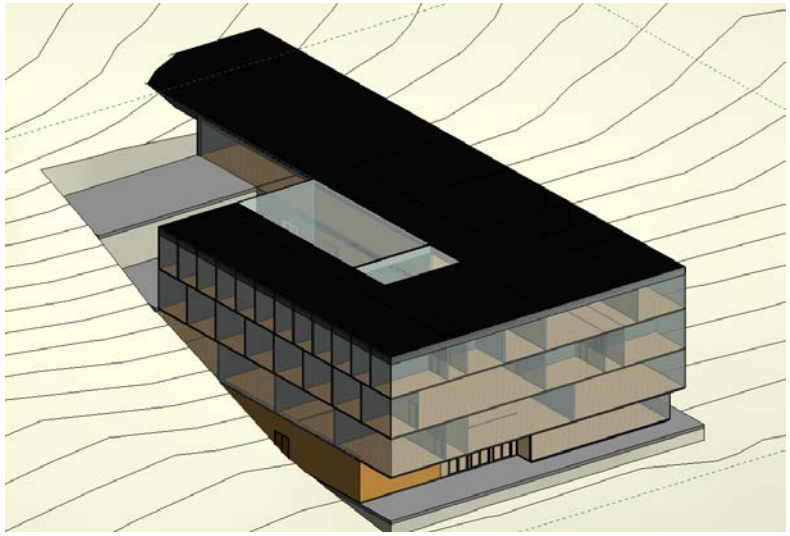
SHELL – Comparison

Criteria	**Steel**	**Timber (CLT)**
Sustainability	Regular	Green Material
Framing System	Larger Span	Beam System Replaced by Deck
Material Accessibility	Available	Manufacturer Nearby
Crane Capacity	Heavy Elements	Light and Small Elements

Retaining Wall



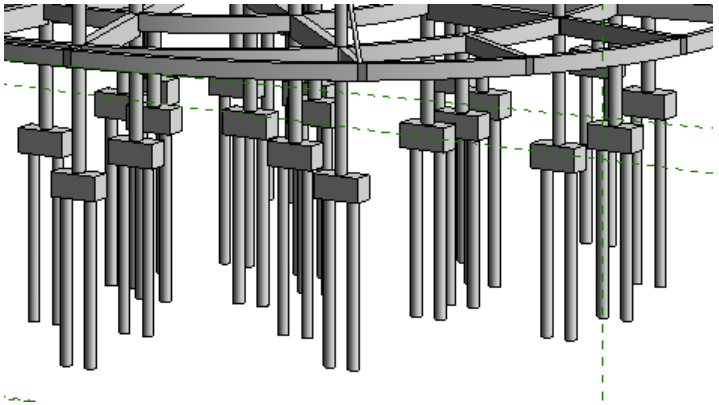




Foundations

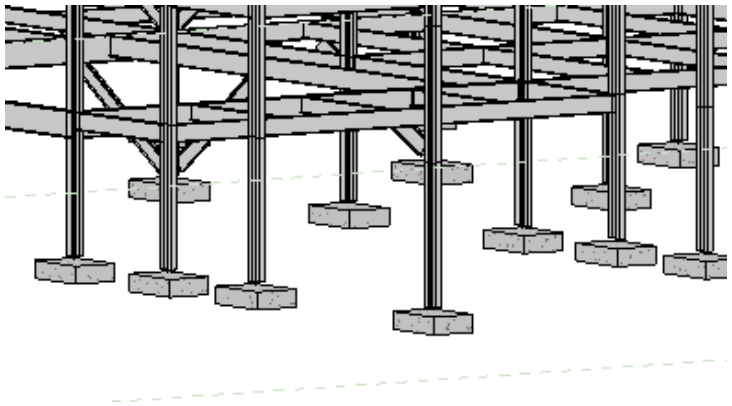
ATOMI - Pile Foundation, 8 ft

- Heavy structural system (Concrete or Steel)
- Under water table



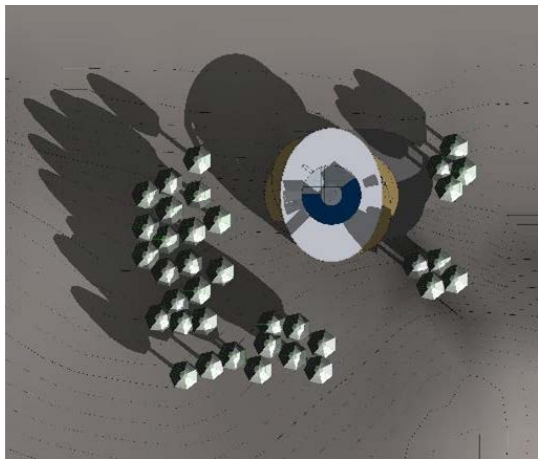
SHELL - Shallow Foundation, 6 ft

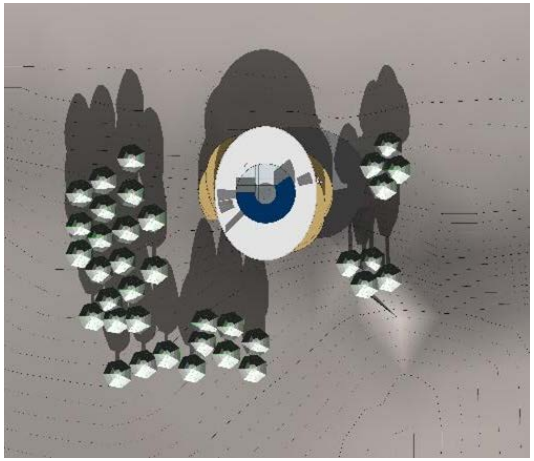
- More columns
- Lighter weight
- Without touching water table

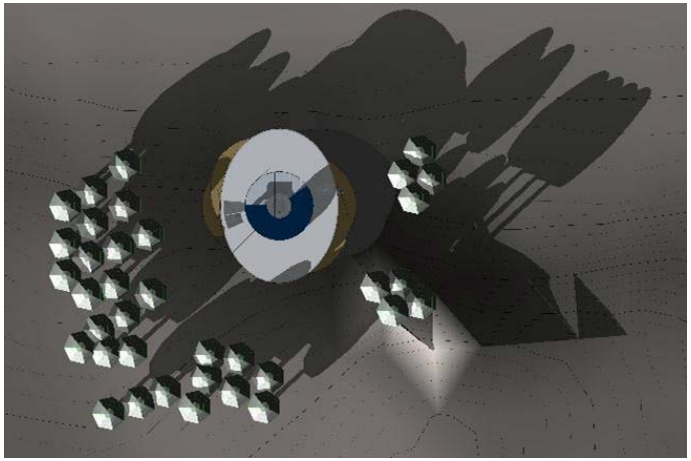


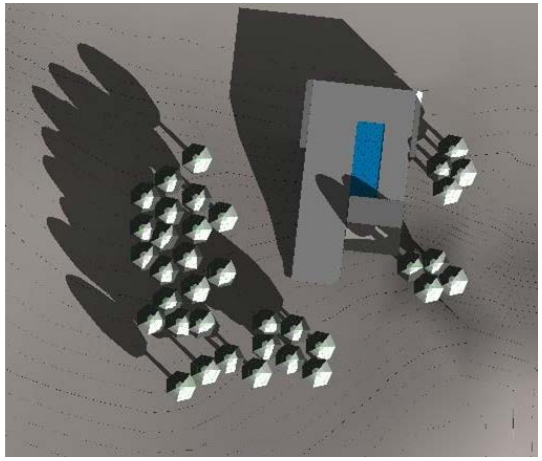
MEP Option

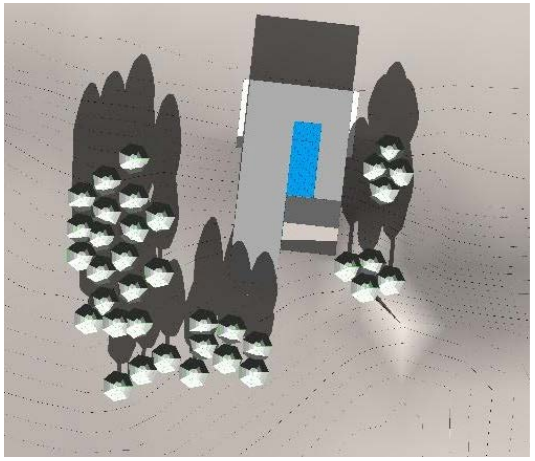
Shadows from Atomi/Shell and surroundings

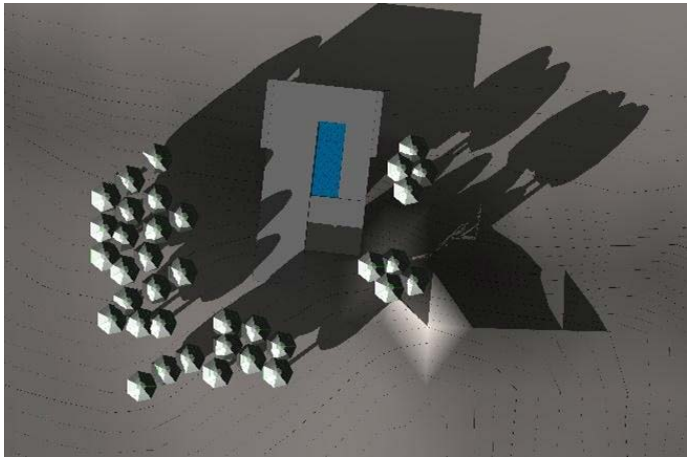










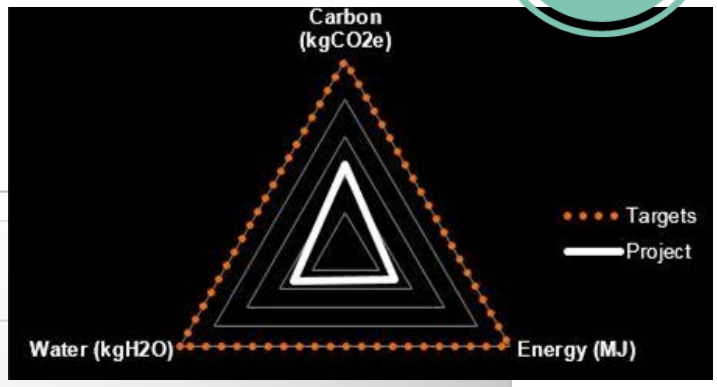


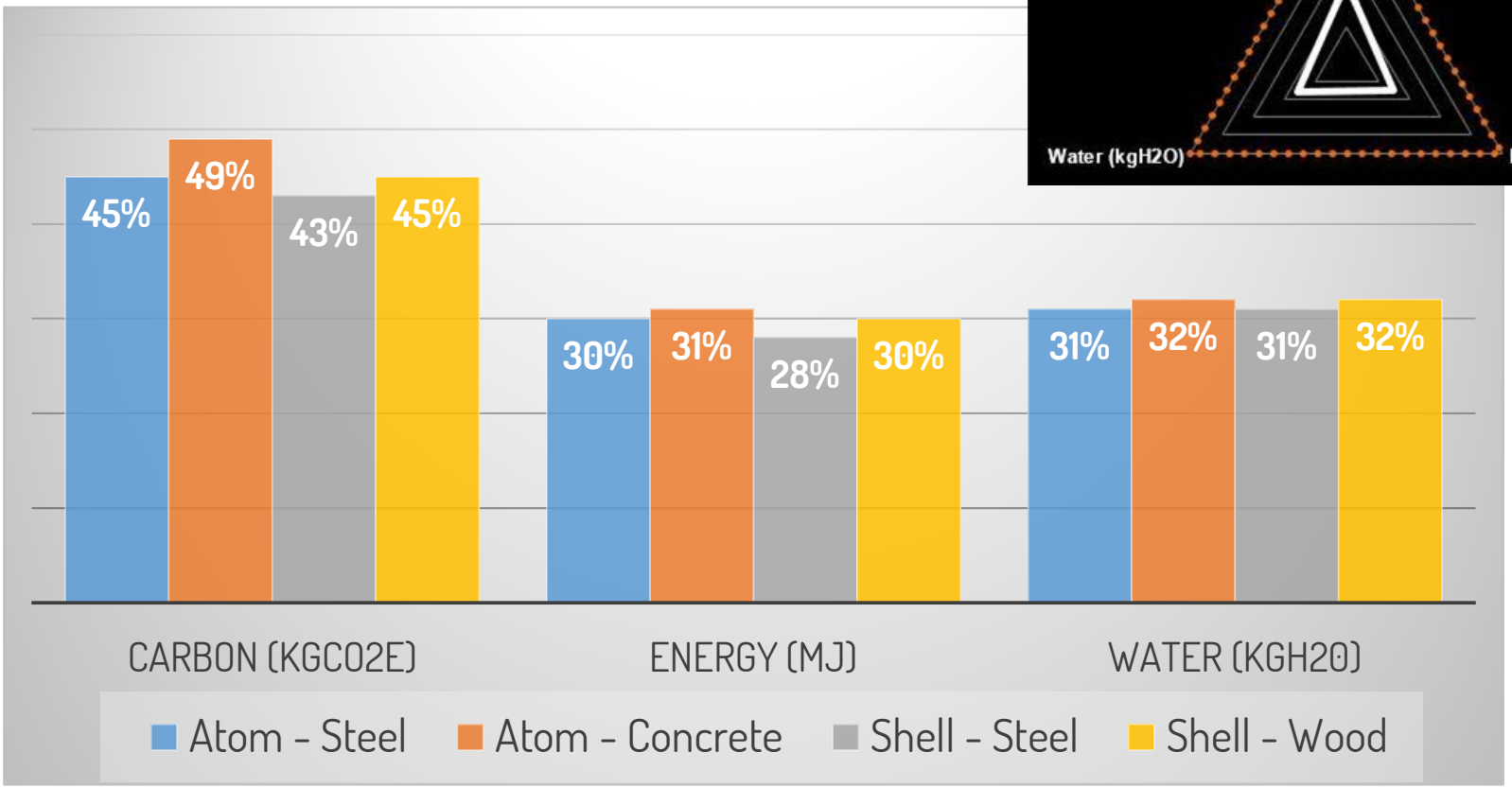
October 9 am

October 12 am

October 3 pm

Sustainable Target Value for Atomi/Shell





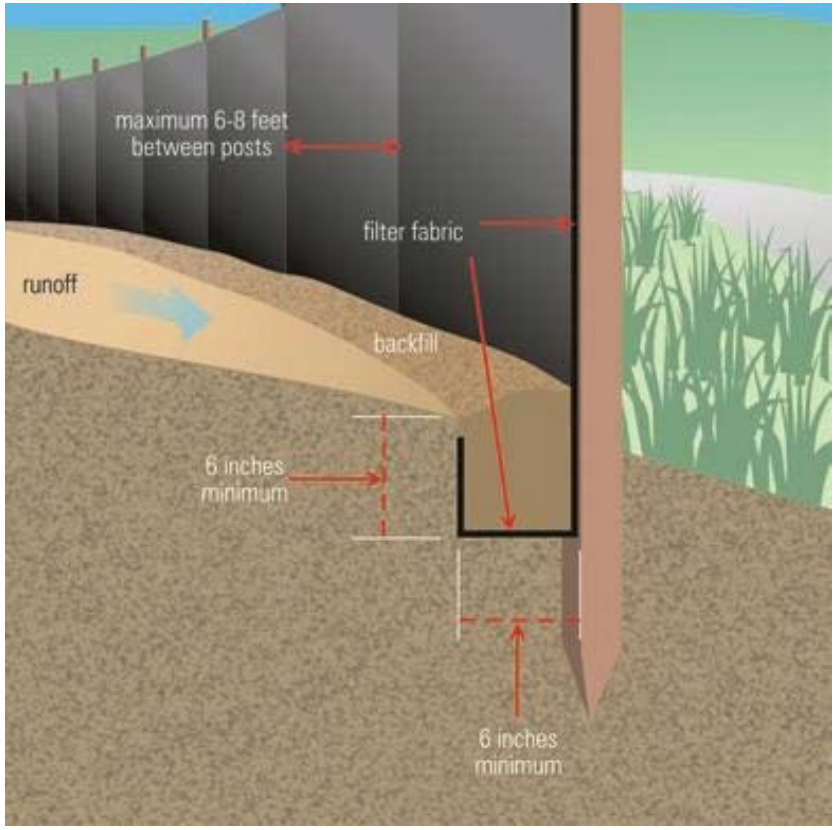
CM Items

Construction activity pollution prevention

Measures implemented	
Measure	*Cost*
„Super“ silt fence	$10/L.F.
Construction road stabilization	$5/S.Y.
Stablilized constr. entrance	$2.500
Storm drain inlet protection	$175/Ea.
Total Cost Estimate	$15.000

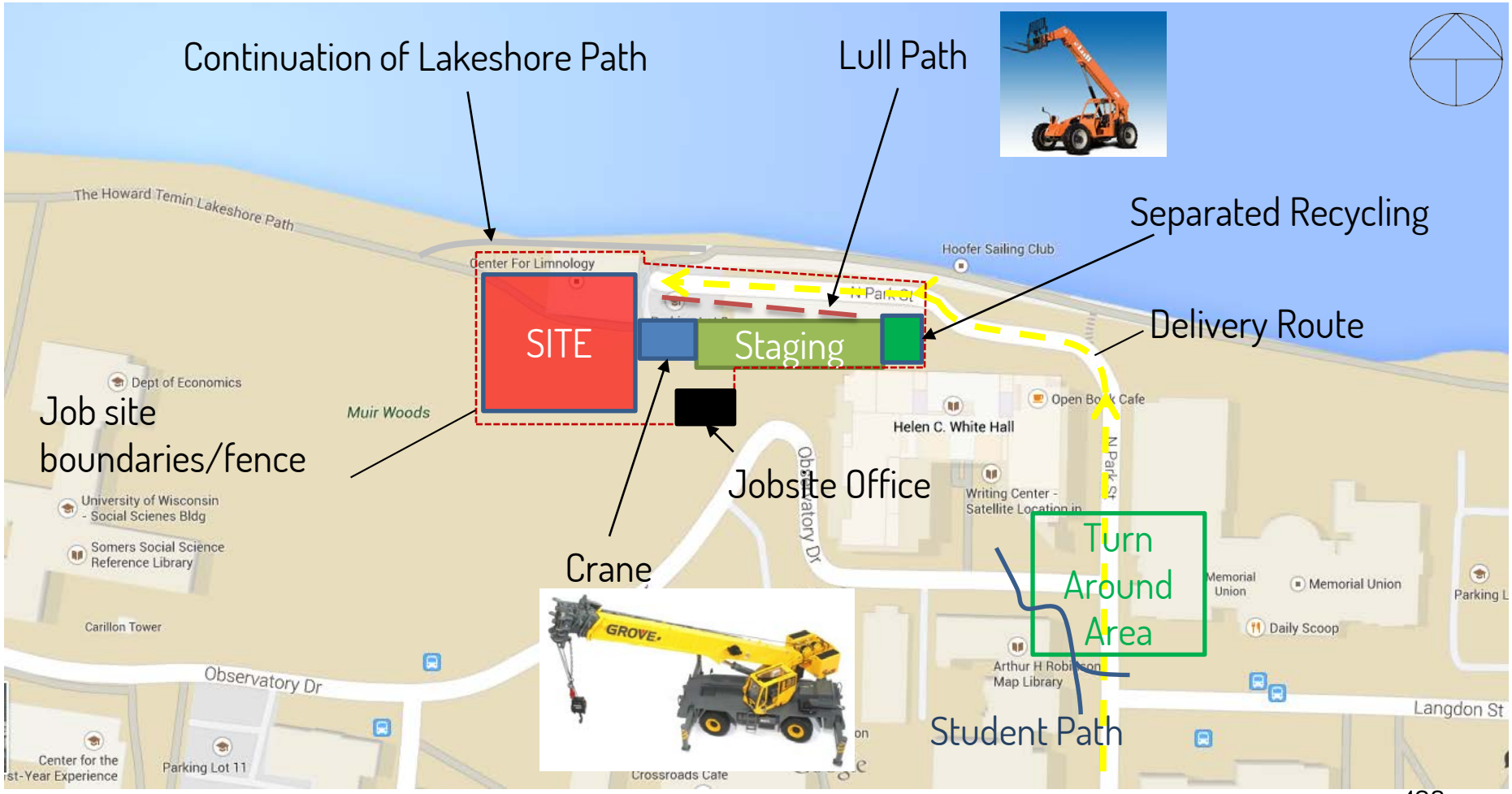
„Shaker Plates“

Lake Mendota

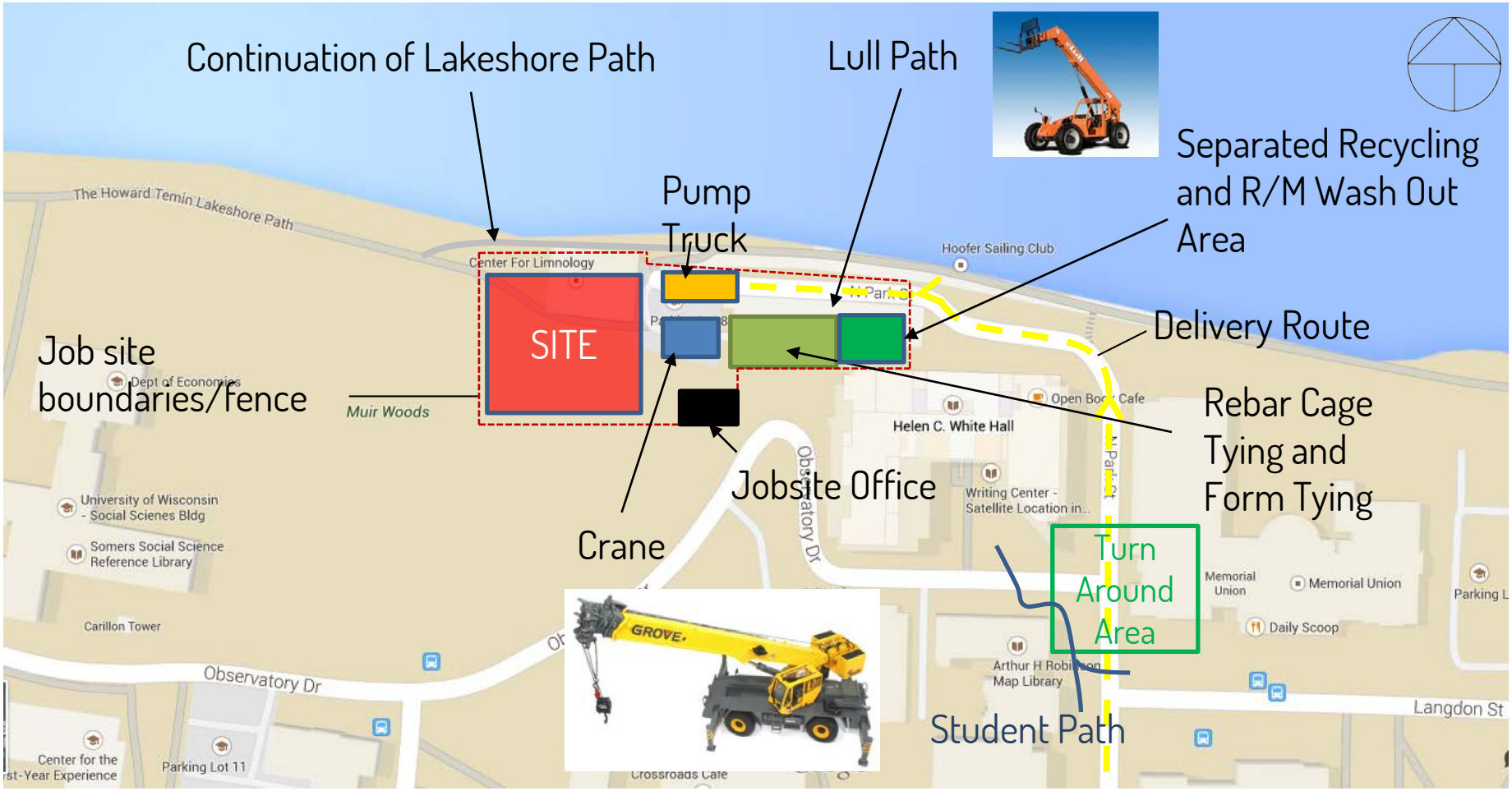


Silt fence system

Atomi – Steel Structure Site Logistics



Atomi - Concrete Structure Site Logistics



Shell Site Logistics - Both Structural Options

Schedules and Key Milestones

Preliminary Shell Construction Schedule - CLT Structure

Milestone	2019 1-Jan	Thru	30-Jun	1-Jul	15-Jan	1-Aug	15-Aug	1-Sep	15-Sep	1-Oct	15-Oct	1-Nov	15-Nov	1-Dec	15-Dec	2020 1-Jan	15-Jan	1-Feb	15-Feb	1-Mar	15-Mar	1-Apr	15-Apr	1-May	15-May
Dewatering	x	x	x																						
Install Piles for GSHP				x	x																				
Excavate For Footings					x	x																			
Pour Foundations						x																			
Steel Structure Begins - Columns Installed							x																		
Underfloor plumbing/Backfill							x																		
2nd floor beams installed/Ground floor poured								x																	
3rd floor beams installed/2nd floor poured								x																	
Enclosure - floor by floor								x	x	x	x														
4th floor beams installed/3rd floor poured																									

Preliminary Shell Construction Schedule - Steel Structure

Milestone	2019 1-Jan	Thru	30-Jun	1-Jul	15-Jul	1-Aug	#####	1-Sep	15-Sep	1-Oct	15-Oct	1-Nov	#####	1-Dec	15-Dec	2020 1-Jan	15-Jan	1-Feb	15-Feb	1-Mar	#####	1-Apr	15-Apr	1-May	#####
Dewatering	x	x	x																						
Install Piles for GSHP				x	x																				
Excavate For Footings					x	x																			
Pour Foundations						x																			
Steel Structure Begins - Columns Installed							x																		
Underfloor plumbing/Backfill							x																		
2nd floor beams installed/Ground floor poured								x																	
3rd floor beams installed/2nd floor poured									x	x															
Enclosure - floor by floor									x	x	x	x													
4th floor beams installed/3rd floor poured									x	x															

	2019							2020							
	Jan-Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept
Concrete Atomi	Dewater		Build Structure/Enclosure						Build Interior				Fin/Com			
Steel Atomi	Dewater		Build Structure/Encolsure						Build Interior				Finish/Commish			
CLT Shell	Dewater		Build Structure/Enclosure					Build Interior					Finish/Com			
Steel Shell	Dewater		Build Structure/Enclosure					Build Interior					Finish/Com			

= construction begins | = Enclosure Complete | = lab space open | =all space open

Milestone	1-Jan	Thru	30-Jun	1-Jul	15-Jul	1-Aug	#####	1-Sep	15-Sep	1-Oct	15-Oct	1-Nov	#####	1-Dec	15-Dec	1-Jan	15-Jan	1-Feb	15-Feb	1-Mar	#####	1-Apr	15-Apr	1-May	#####
Underfloor plumbing/Backfill				x																					
Pour Ground Floor + FRP 1st Floor Columns				x	x																				
FRP 2nd floor and 2nd floor columns					x	x																			
FRP 3rd Floor and 3rd Floor Columns							x	x																	
FRP 4th Floor and 4th Floor Columns								x	x																
Enclosure								x	x	x	x														
FRP Roof									x	x															
Roof structure complete									x	x															
Enclosure Complete -December 15											O														
Layout Walls												x	x												
MEP Rough Ins (in wall)												x	x	x	x										
MEP Room Install												x	x	x	x	x									
In Wall Inspections													x	x											
Hang Drywall/Finish													x	x											
MEP Rough Ins (above ceiling)														x	x	x									
Paint														x	x										
Install Flooring															x	x									
Install Ceiling Grid															x	x	x								
Electrical/Plumbing Fixtures															x	x	x								
Grills/Diffusers															x	x	x								
Install Casework															x	x									
Lab Spaces Complete - May 1													O												
Finishes													x	x											
Sitework													x	x	x	x									
Commissioning															x	x	x	x	x	x					

Milestone	1-Jan	Thru	30-Jun	1-Jul	15-Jul	1-Aug	#####	1-Sep	15-Sep	1-Oct	15-Oct	1-Nov	#####	1-Dec	15-Dec	1-Jan	15-Jan	1-Feb	15-Feb	1-Mar	#####	1-Apr	15-Apr	1-May	#####
Steel Structure Begins - Columns Installed								x																	
Underfloor plumbing/Backfill								x																	
2nd floor beams installed/Ground floor poured									x																
3rd floor beams installed/2nd floor poured										x															
Enclosure - floor by floor											x	x	x	x											
4th floor beams installed/3rd floor poured											x														
Roof beams installed/4th floor poured												x													
Roof Poured												x													
Enclosure Complete - November 15													O												
Layout Walls													x	x											
MEP Rough Ins (in wall)													x	x	x	x									
MEP Room Install													x	x	x	x	x	x							
In Wall Inspections															x	x									
Hang Drywall/Finish																x	x								
MEP Rough Ins (above ceiling)																	x	x	x						
Paint																		x	x						
Install Flooring																			x	x					
Install Ceiling Grid																				x	x				
Electrical/Plumbing Fixtures																					x	x			
Grills/Diffusers																					x	x			
Install Casework																						x			
Lab Spaces Complete - May 1																							O		
Finishes																							x	x	
Sitework																							x	x	x
Commissioning																								x	x

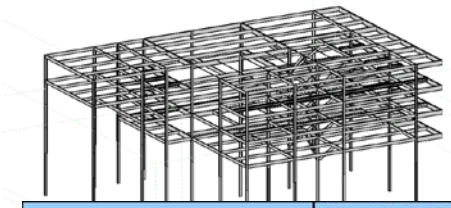
TVD - Setting the Target

- Public-Private Partnership (PPP)
  - Contract period: 25 years
  - Maximum annual budget to rent: $1.000.000
    - Maximum budget to rent in the contract period: $25.000.000
  - Construction costs: maximum 40% ($10.000.000)
- Target: $8.750.000 – SHELL
- Target: $9.500.000 - ATOM

Target Value Design – SHELL

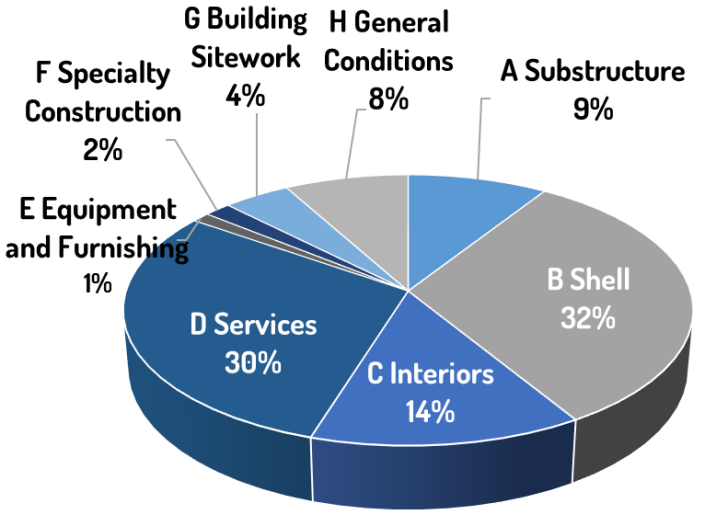
SHELL: Timber

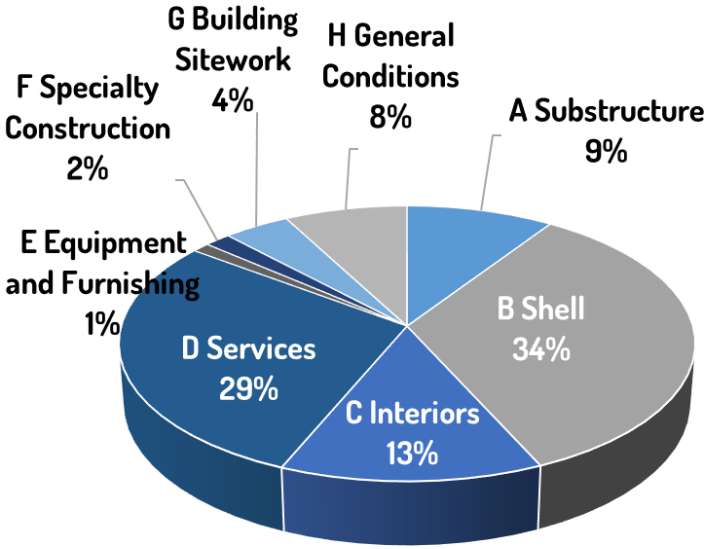
	ESTIMATED VALUE	TARGET VALUE	VALUE DELTA
TOTAL	$ 8.700.000	$ 8.750.000	$ 50.000
A Substructure	$ 790.000	$ 750.000	$ (40.000)
B Shell	$ 2.800.000	$ 2.700.000	$ (100.000)
C Interiors	$ 1.180.000	$ 1.300.000	$ 120.000
D Services	$ 2.600.000	$ 2.600.000	$ -
E Equipment and Furnishing	$ 100.000	$ 100.000	$ -
F Specialty Construction	$ 150.000	$ 200.000	$ 50.000
G Building Sitework	$ 380.000	$ 400.000	$ 20.000
H General Conditions	$ 700.000	$ 700.000	$ -



SHELL: Steel

	ESTIMATED VALUE	TARGET VALUE	VALUE DELTA
TOTAL	$ 9.000.000	$ 8.750.000	$ (250.000)
A Substructure	$ 840.000	$ 800.000	$ (40.000)
B Shell	$ 3.050.000	$ 2.850.000	$ (200.000)
C Interiors	$ 1.180.000	$ 1.200.000	$ 20.000
D Services	$ 2.600.000	$ 2.500.000	$ (100.000)
E Equipment and Furnishing	$ 100.000	$ 100.000	$ -
F Specialty Construction	$ 150.000	$ 200.000	$ 50.000
G Building Sitework	$ 380.000	$ 400.000	$ 20.000
H General Conditions	$ 700.000	$ 700.000	$ -





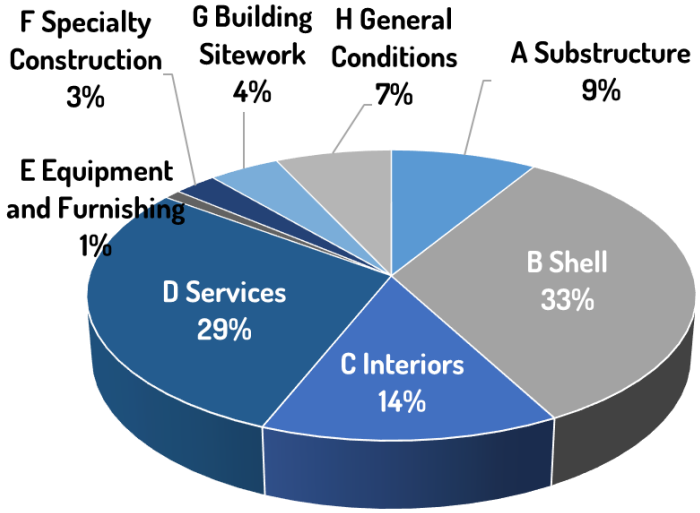
Target Value Design – ATOM

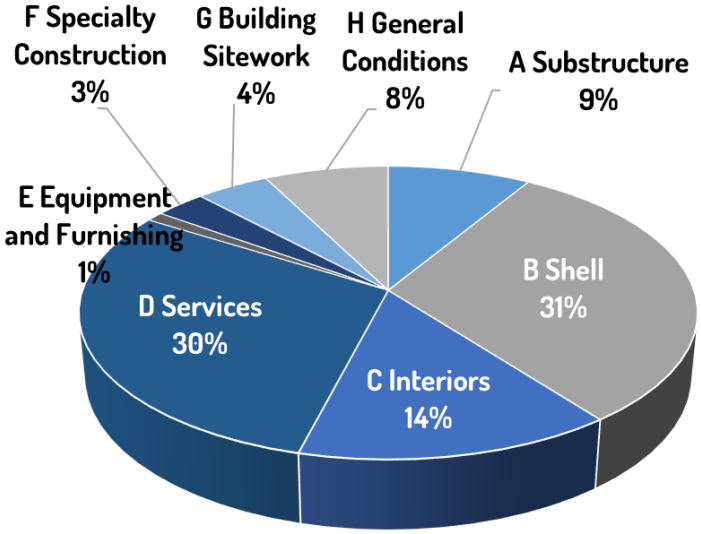
ATOMI: Steel

	ESTIMATED VALUE	TARGET VALUE	VALUE DELTA
TOTAL	$ 10.000.000	$ 9.500.000	$ (500.000)
A Substructure	$ 880.000	$ 800.000	$ (80.000)
B Shell	$ 3.330.000	$ 3.010.000	$ (320.000)
C Interiors	$ 1.400.000	$ 1.400.000	$ -
D Services	$ 2.900.000	$ 2.700.000	$ (200.000)
E Equipment and Furnishing	$ 100.000	$ 100.000	$ -
F Specialty Construction	$ 260.000	$ 300.000	$ 40.000
G Building Sitework	$ 430.000	$ 430.000	$ -
H General Conditions	$ 700.000	$ 760.000	$ 60.000

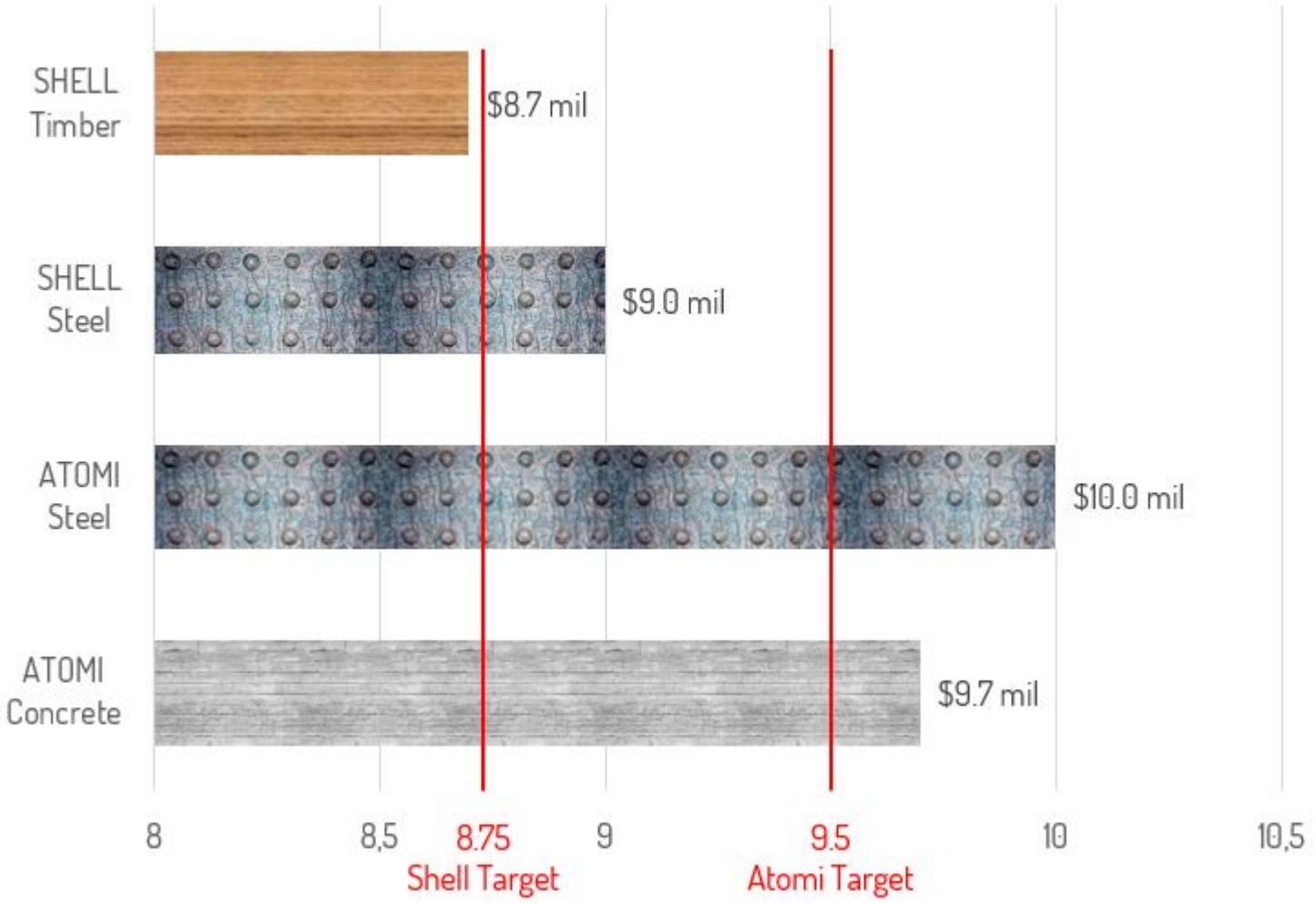
ATOMI: Concrete

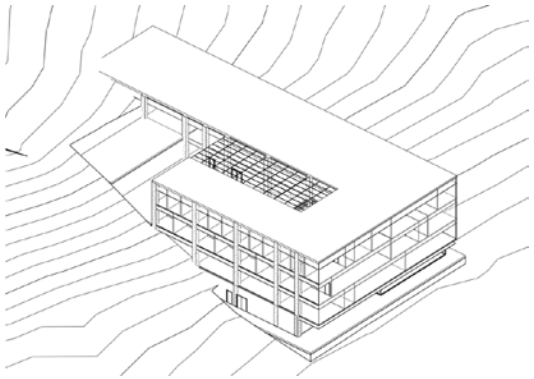
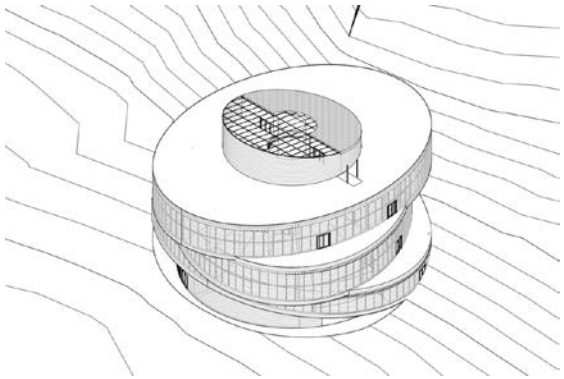
	ESTIMATED VALUE	TARGET VALUE	VALUE DELTA
TOTAL	$ 9.700.000	$ 9.500.000	$ (200.000)
A Substructure	$ 840.000	$ 790.000	$ (50.000)
B Shell	$ 3.000.000	$ 2.950.000	$ (50.000)
C Interiors	$ 1.400.000	$ 1.400.000	$ -
D Services	$ 2.900.000	$ 2.700.000	$ (200.000)
E Equipment and Furnishing	$ 100.000	$ 100.000	$ -
F Specialty Construction	$ 300.000	$ 370.000	$ 70.000
G Building Sitework	$ 430.000	$ 430.000	$ -
H General Conditions	$ 730.000	$ 760.000	$ 30.000





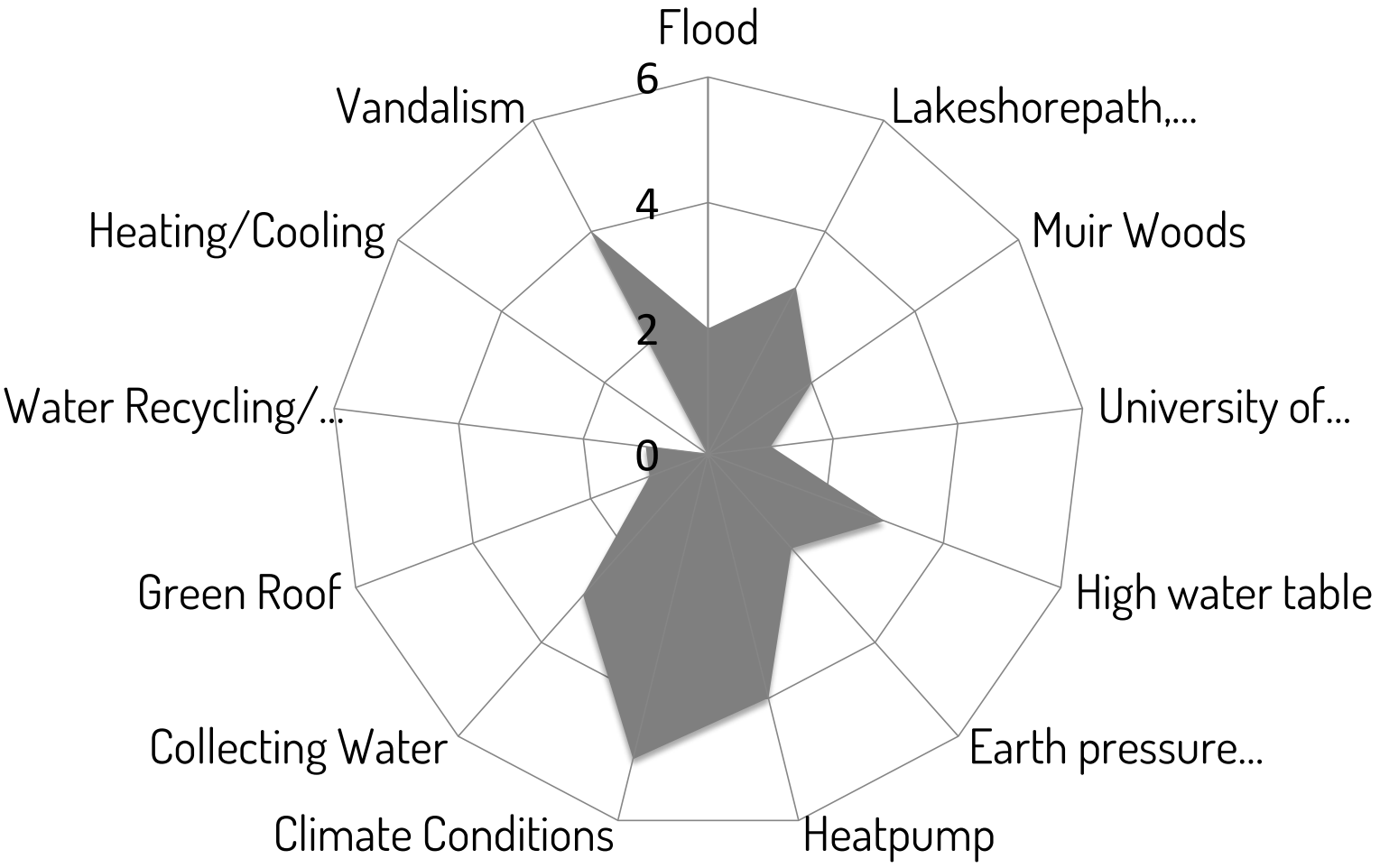
Cost Estimation Summary



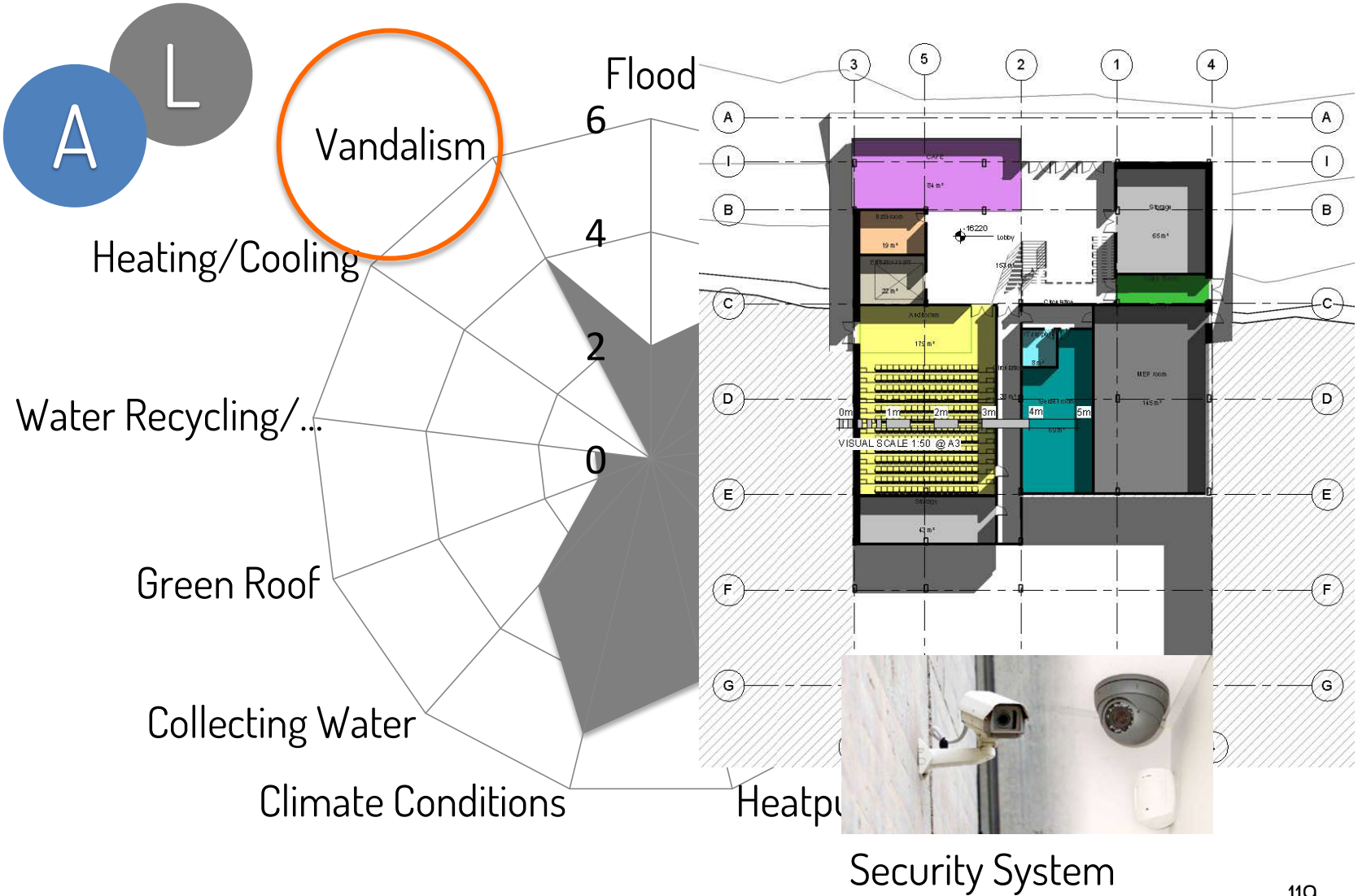
SHELL		**ATOMI**	
			
Timber	Steel	Steel	Concrete
			
Excavation: 7.500 C.Y.		Excavation: 10.500 C.Y.	
$8.700.000	$9.000.000	$10.000.000	$9.700.000
48 weeks	46 weeks	52 weeks	56 weeks

LCFM Risk/ LCC

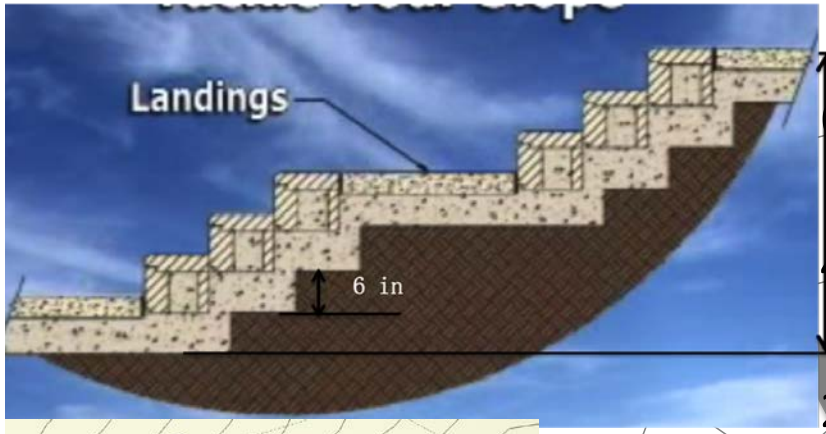
Risks with greater impact on project success



Risks with greater impact on project success



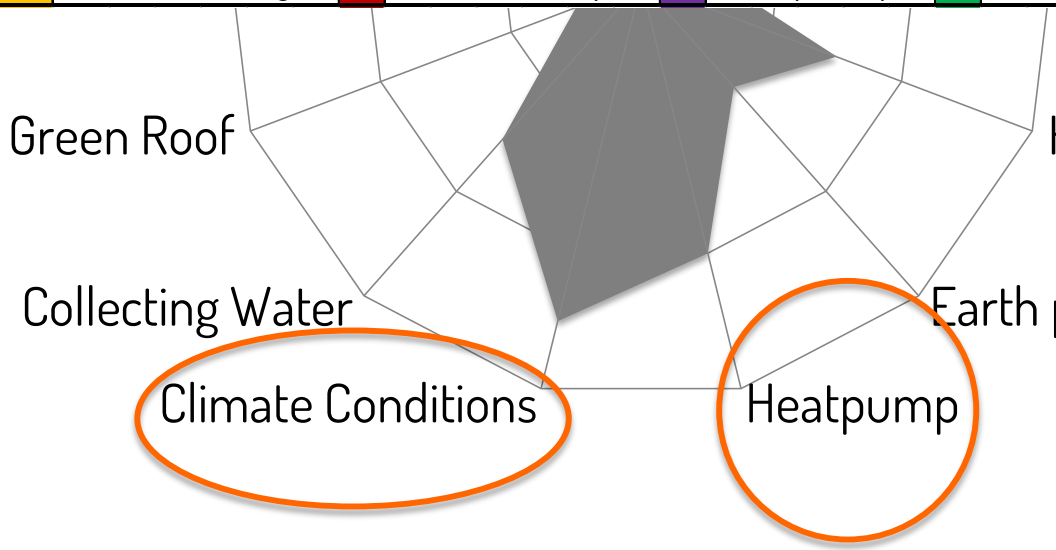
Risks with greater impact on project success

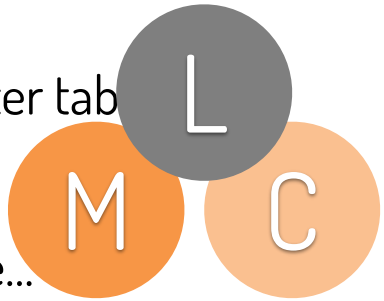


Risks with greater impact on project success

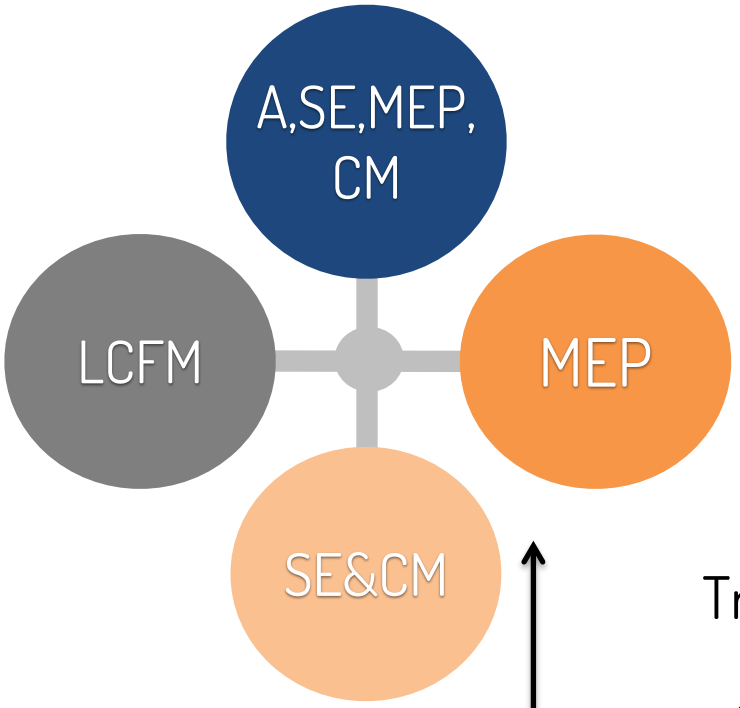
	2019							2020							
	Jan-Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept
Concrete Atom	Dewater		Build Structure/Enclosure						Build Interior					Fin/Com		
Steel Atom	Dewater		Build Structure/Encolsure						Build Interior					Finish/Commish		
CLT Shell	Dewater		Build Structure/Enclosure						Build Interior					Finish/Com		
Steel Shell	Dewater		Build Structure/Enclosure						Build Interior					Finish/Com		

= construction begins | = Enclosure Complete | = lab space open | =all space open





LCC Calculation

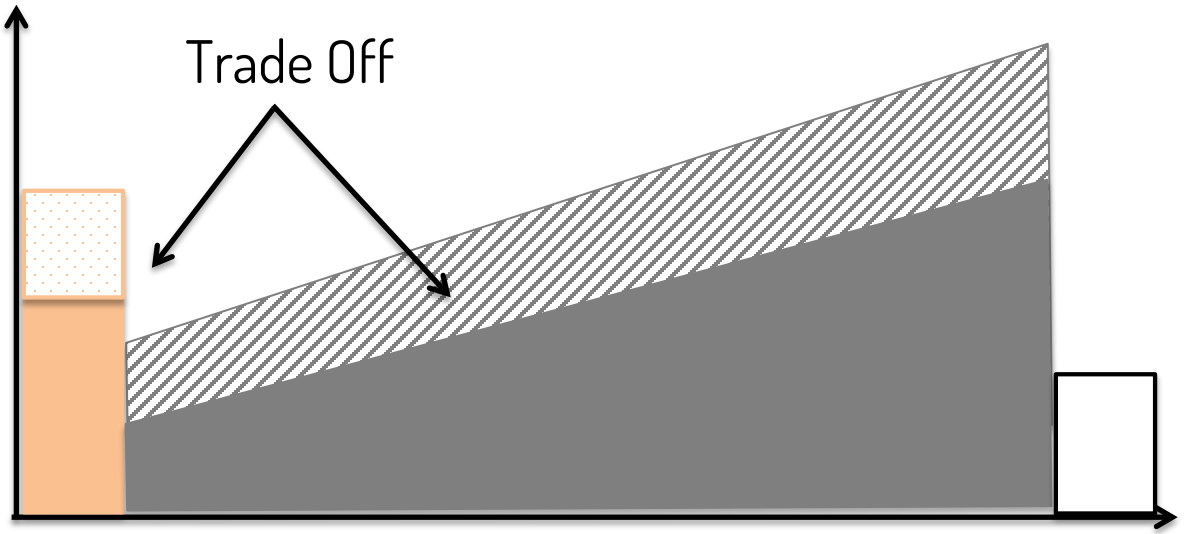


Maintenance Cost + Operation Cost

+ Water Costs + Energy Costs

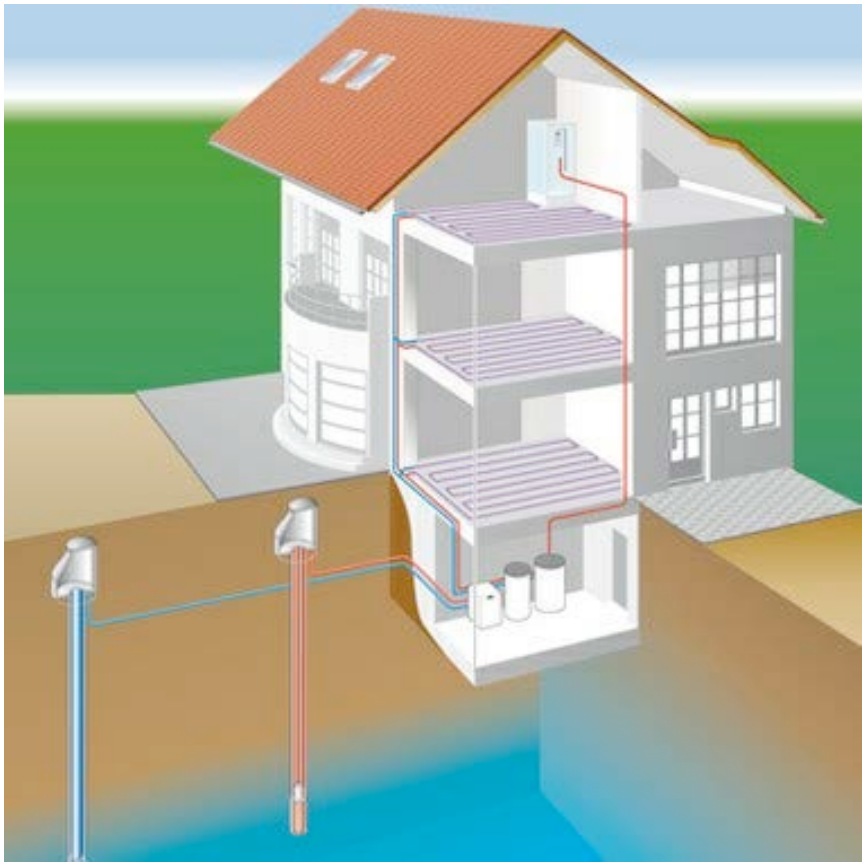
+ Construction Cost + Replacement

= Life Cycle Cost Guesstimate (LCC)



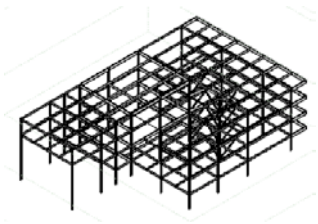
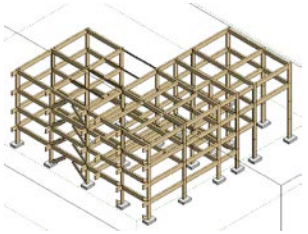
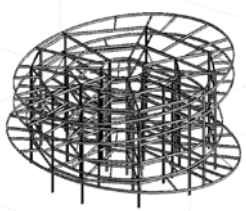
Heat pump

Heatpump	**Typ: WWP W 120 IDH**
	Cost in Dollars
Initial Cost	75.281
Approval	2.226
Comonents	1.113
Boring/ Finish	4.451
Pumping/ Try outs	1.335
Connection	8.902
Maintenance Cost	1.669/ per year
Lifetime	20-25 years



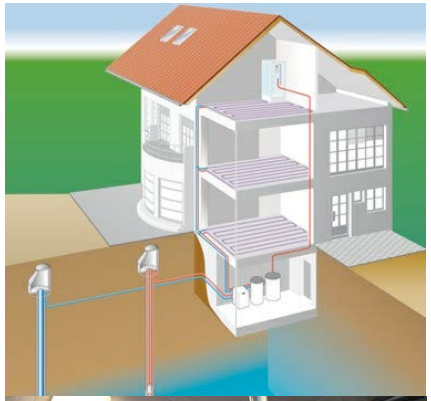
Weishaupt subsidiary
Weishaupt America Inc.
2587 Millennium Dr., Unit A
Elgin, IL 60124
Wisconsin/ United States

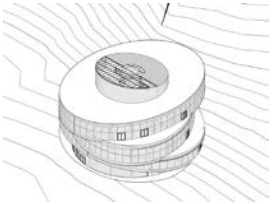
Guesstimates for Life Cycle Costs

	SHELL-Steel	**SHELL-Wood**	**ATOMI-Steel**	**ATOMI-Concrete**
				
Construction Cost	$ 8.900.000	$ 8.700.000	$ 10.100.000	$ 9.800.000
Operation Cost	$ 5.600.000	$ 5.600.000	$ 8.100.000	$ 8.100.000
Maintenance Cost	$ 2.600.000	$ 2.600.000	$ 2.800.000	$ 2.800.000
Replacement	$ 1.400.000	$ 1.400.000	$ 1.300.000	$ 1.300.000
LCC	$ 18.500.000	$ 18.300.000	$ 22.400.000	$ 22.100.000

LEED

LEED



SHELL 		**LEED CRITERIA**	**ATOMI** 		
Incor-porated	**Poten-tial**		**Incor-porated**	**Poten-tial**	**In charge**
1	1	Integrative Process	1	1	EB
7	10	Location and Transportation	7	10	NZ
7	11	Sustainable Sites	7	11	NF/EB/KV
6	9	Water Efficiency	4	7	AK/EB
10	30	Energy and Atmospere	10	30	EB/AK/NZ
3	9	Materials and Resources	3	9	NZ/NF/EB
8	15	Indoor Environmental Quality	8	15	AK/KV/EB
1	1	Innovation	1	1	All
4	4	Regional Priority	4	4	NZ
47	**90**	**TOTAL**	**45**	**88**	

LEED Dynamic Plaque

Decision Matrix

AEC

A / E / C / MEP / **LCFM**

Decison Matrix

Ecology

- Latency
- Water
- Material Reduction
- Innovative systems
- Green Materials
- Integration

Social

- Atmosphere
- Collaboration
- Coherent Concept
- Innovation
- Prestige

Economic

- Operation Cost
- Mainten-ance Cost
- Room Program
- Usability of the roof
- Rent

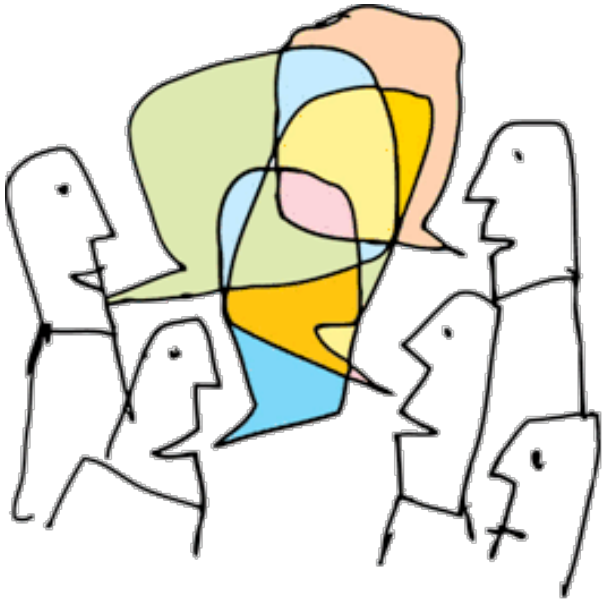
Const-ruction

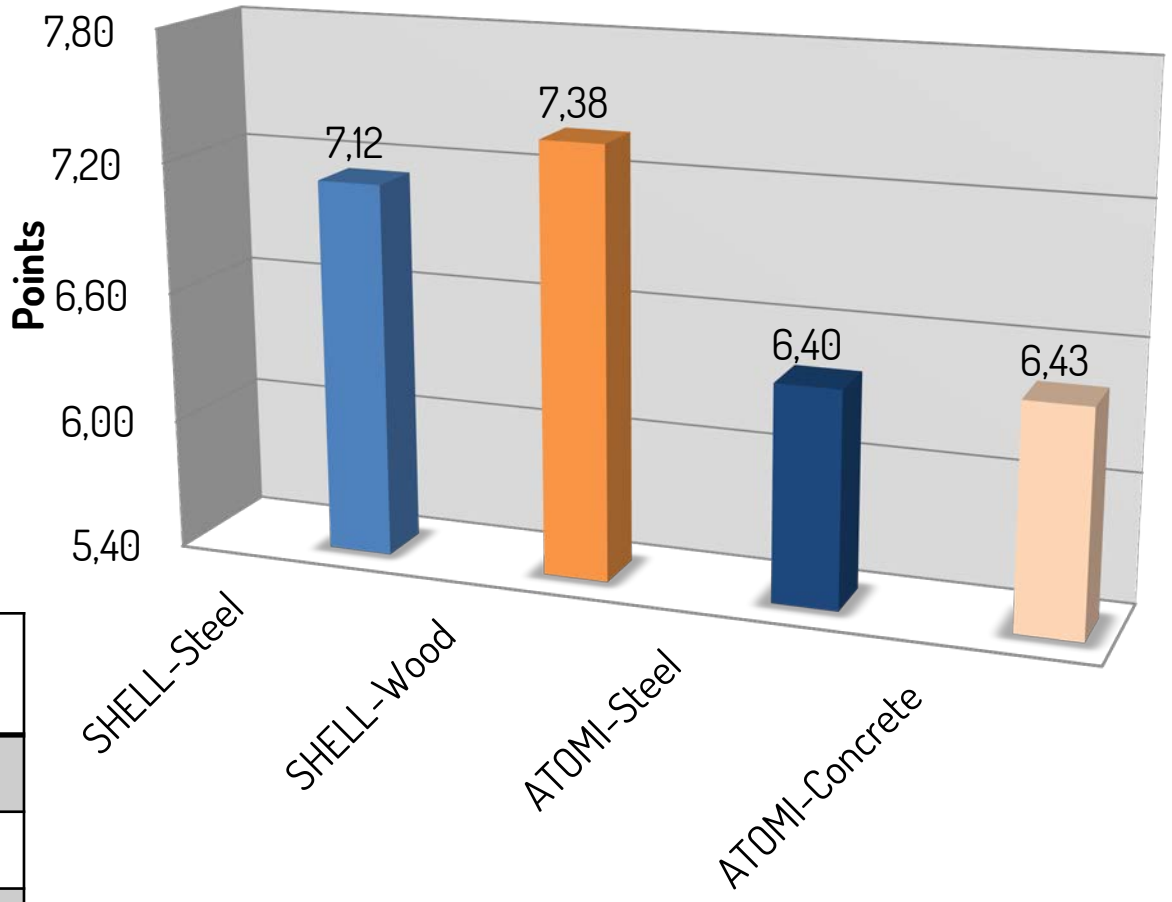
- Building Costs
- Prefab
- Schedule
- Reduction on emissions
- Construct-
- ability

Well-Being

- Indoor quality
- Air ventilation
- Acoustics
- Natural Light
- Materials
- Indoor design concept
- Lake views

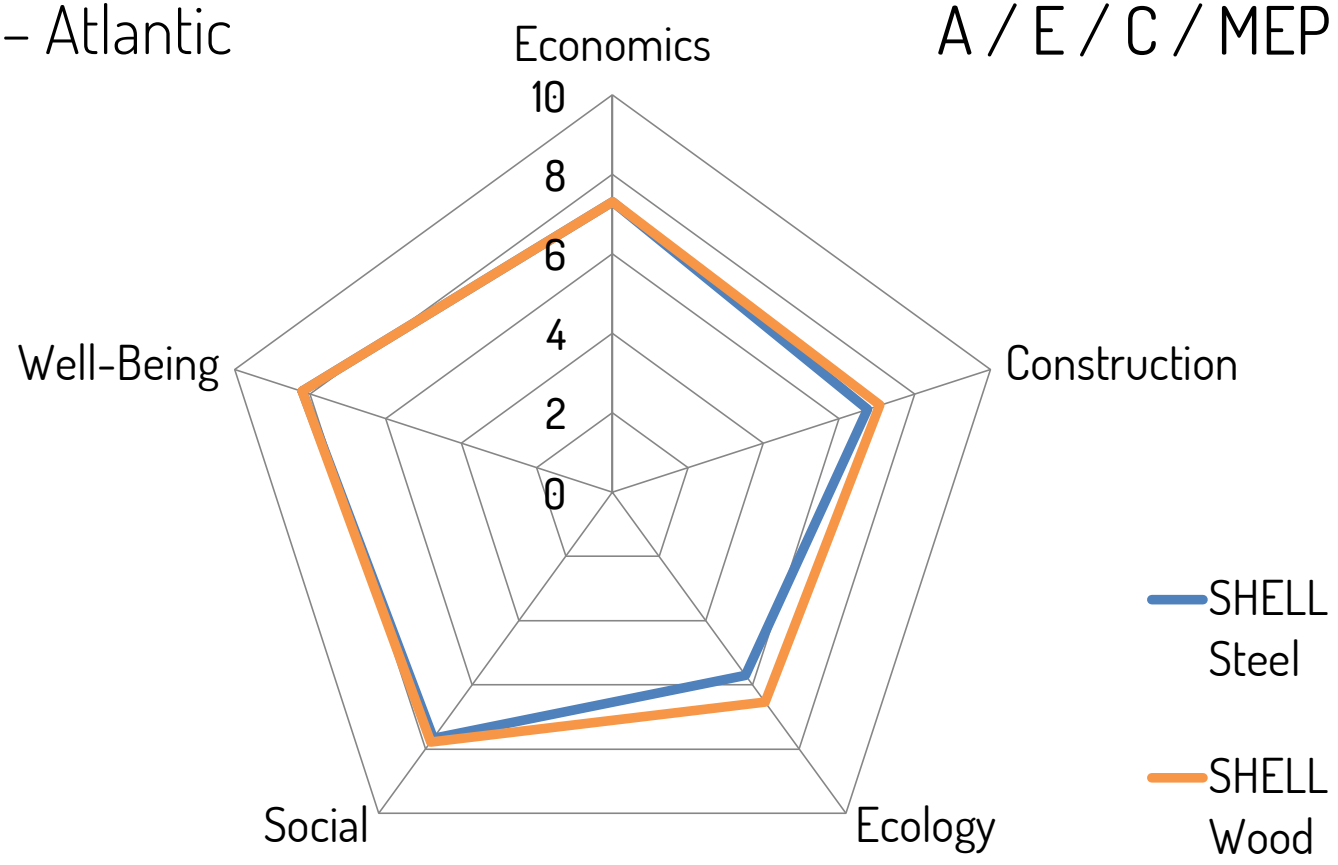
Result





Scale	**Model performes Criteria...**
0-2	poor
3-5	reasonable
6-8	good
9/10	excellent

Result



	SHELL Steel	SHELL Wood	ATOM Steel	ATOM Concret
Ecology	5.7	6.6	5.0	5.1
Social	7.6	7.8	7.7	7.7
Economics	7.3	7.3	6.4	6.4
Construction	6.8	7.0	4.6	4.6
Well-Being	8.2	8.2	8.2	8.2

Team Atlantic 2015 proudly presents: Shell in Timber

THANK YOU:

Course Director:

Renate Fruchter

Owners

Jana Unterschütz
Jackie Yiyang Jiao
Andrej Kurent
Dorian Curcanu

Mentors:

John Nelson
Greg Luth
Björn Wündsch
Tim Tarek Fergin
Sarah Russell-Smith
Glenn Katz
Maria Frank
Flavia Grey

And Everyone, who has helped us along the journey with great advice, opinions and feedback.
Get ready for a lot more questions!