ATLANTIC13

SPRING PRESENTATION 5/10

Andrej
Architect

Anran
Apprentice

Minyan
Structural Engineer

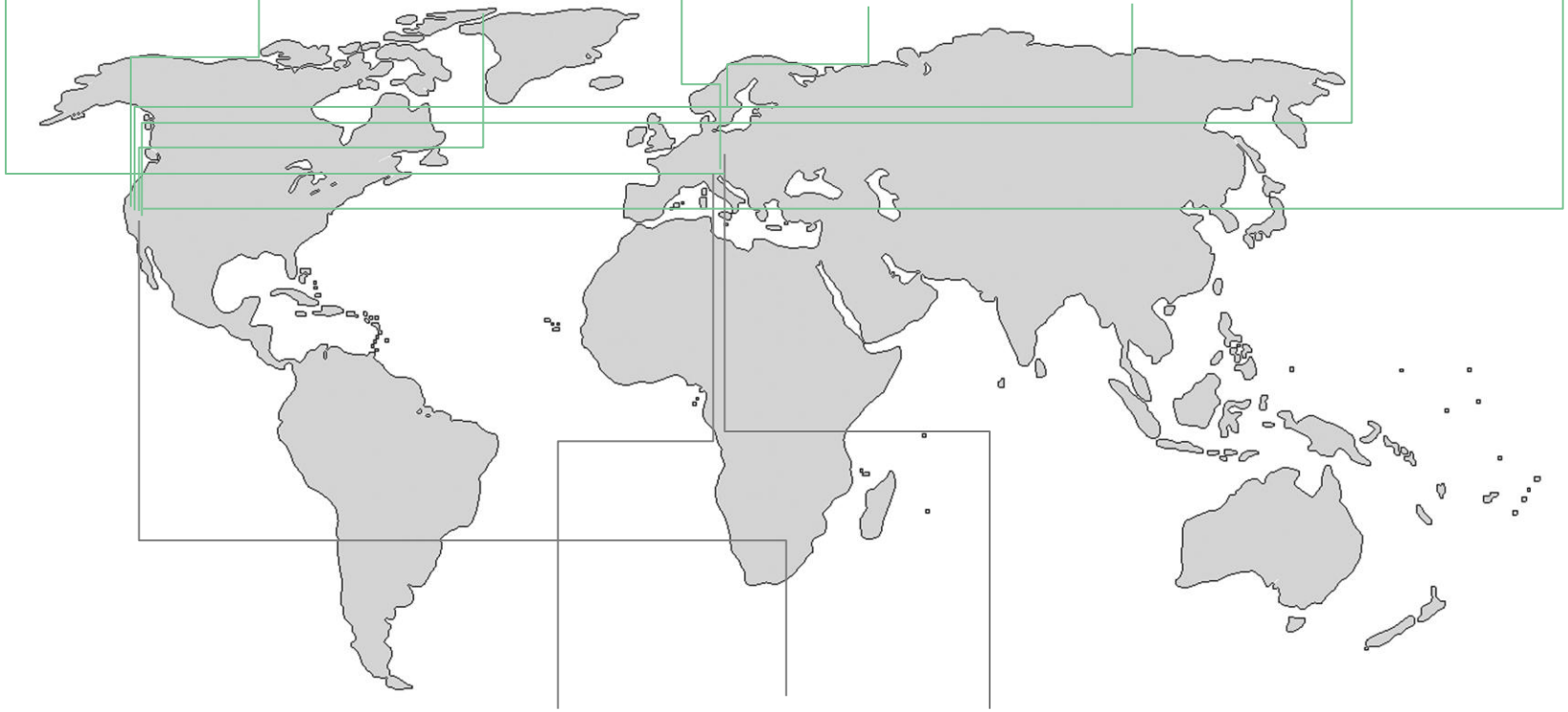
Jana
LCFM

Niklas
Construction Manager

Yang
Construction Manager

Graham
MEP

Elias
Structural Engineer



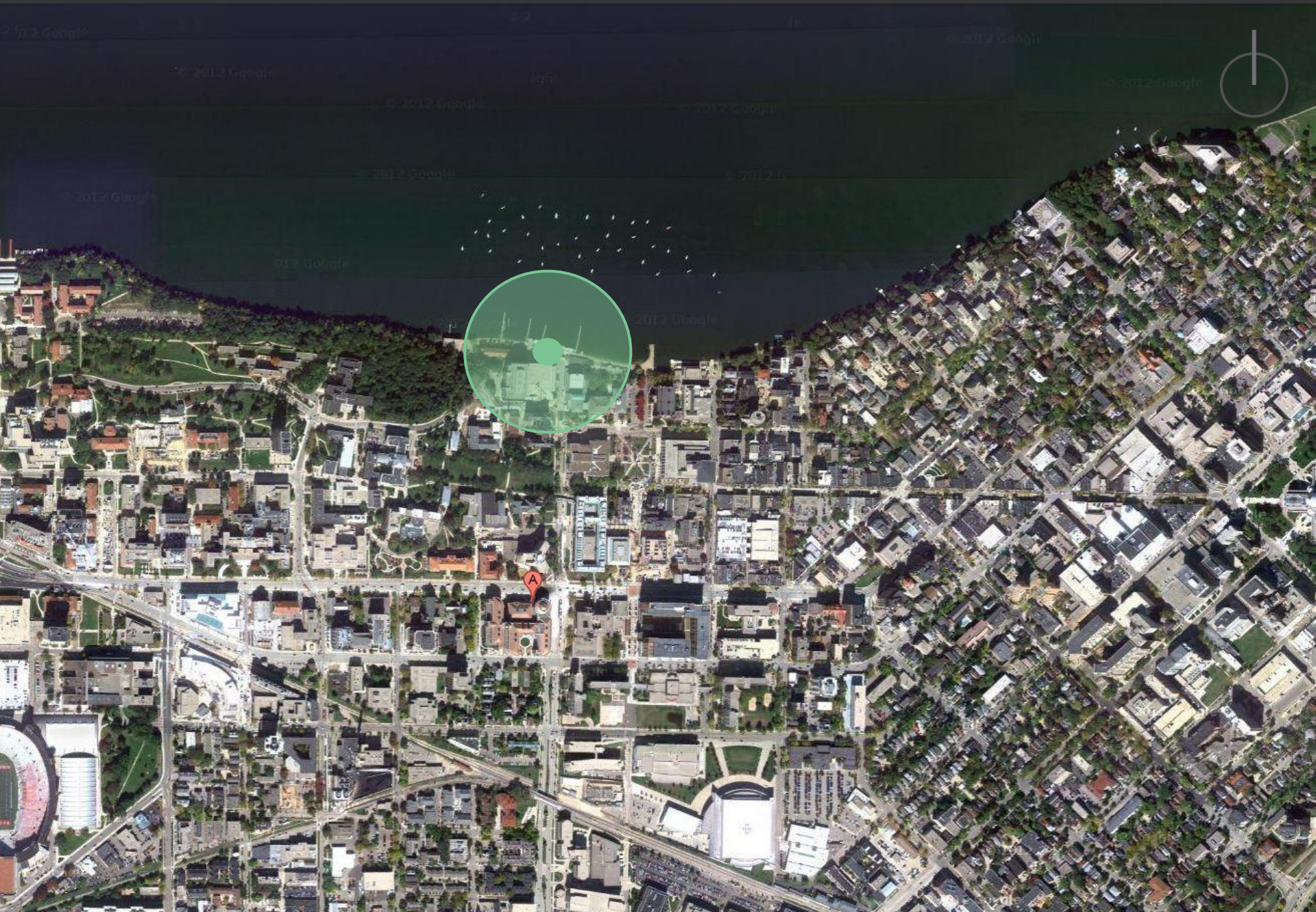
Anja
Owner

Mike
Owner

Maria
Owner

Madison city

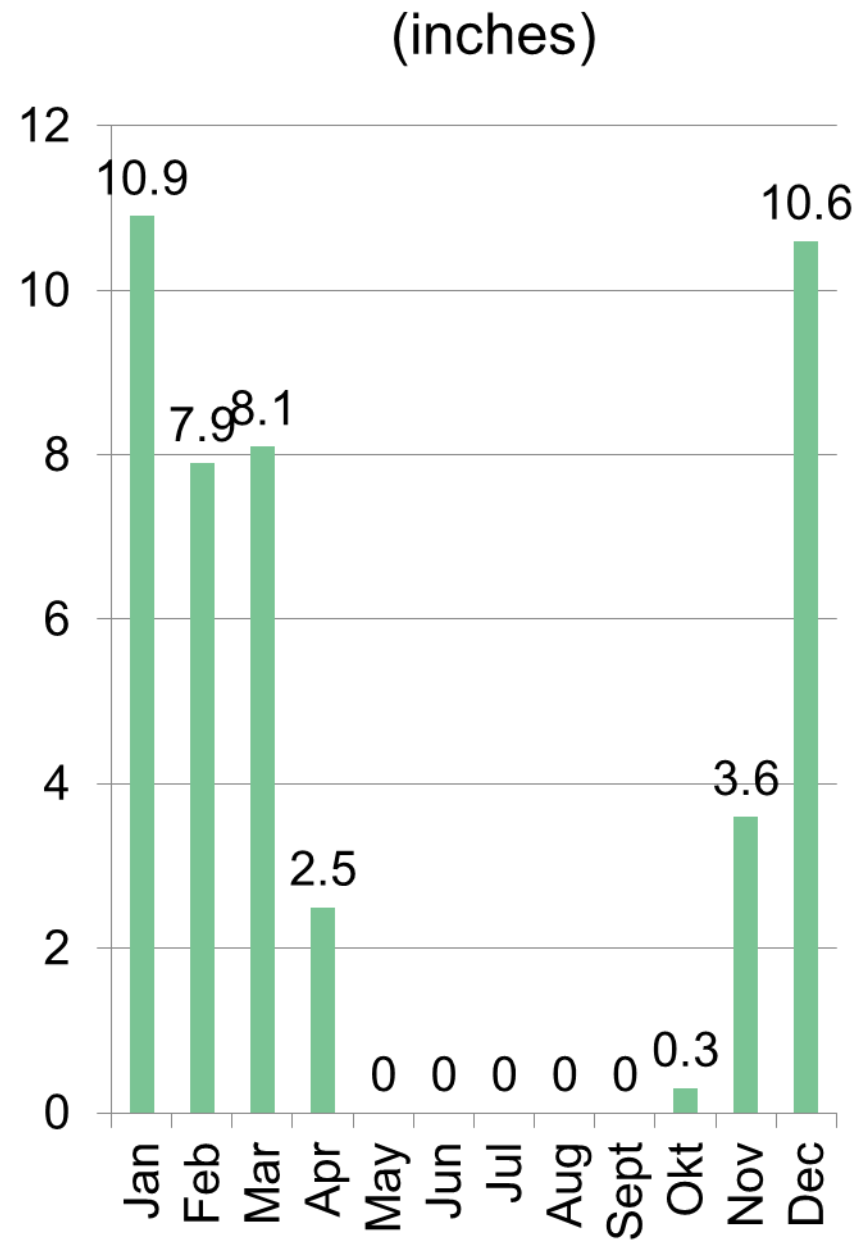
Atlantic

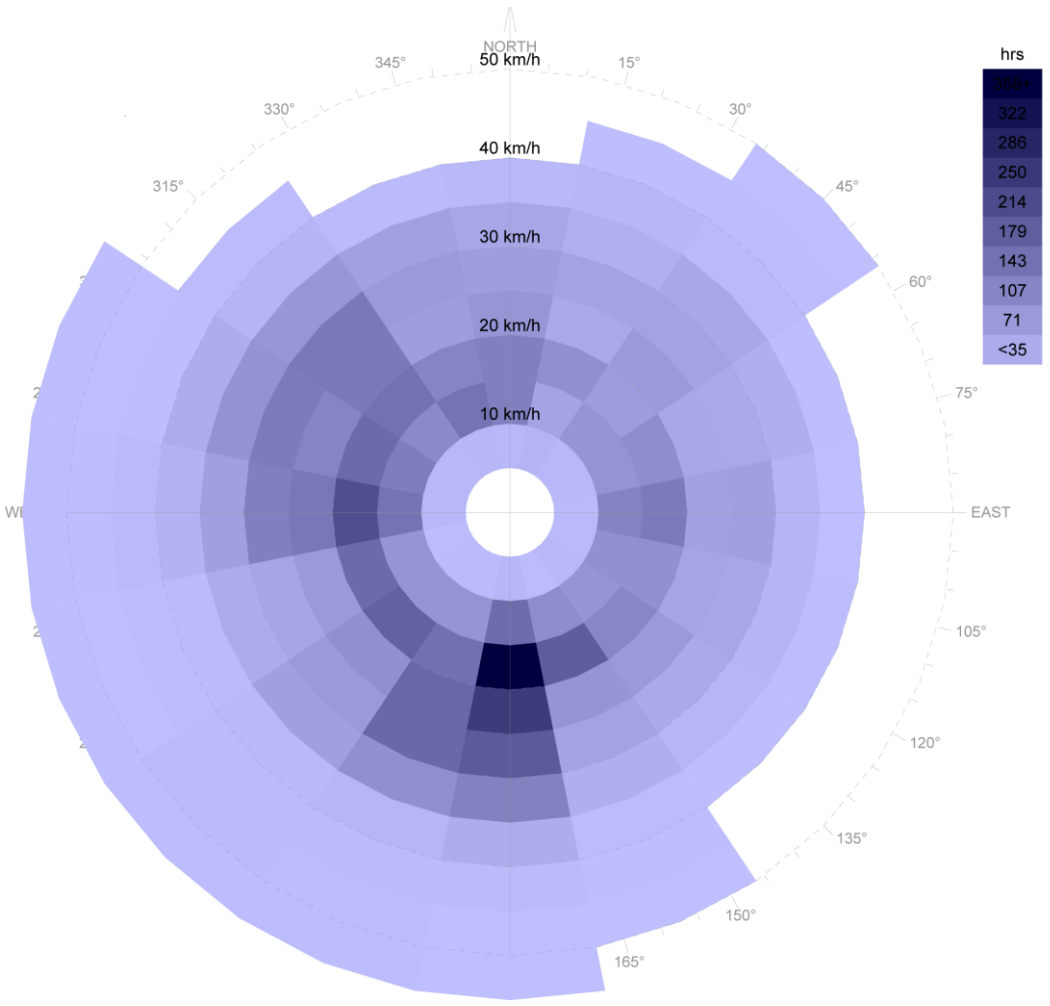


Climate conditions

Snow conditions

Atlantic

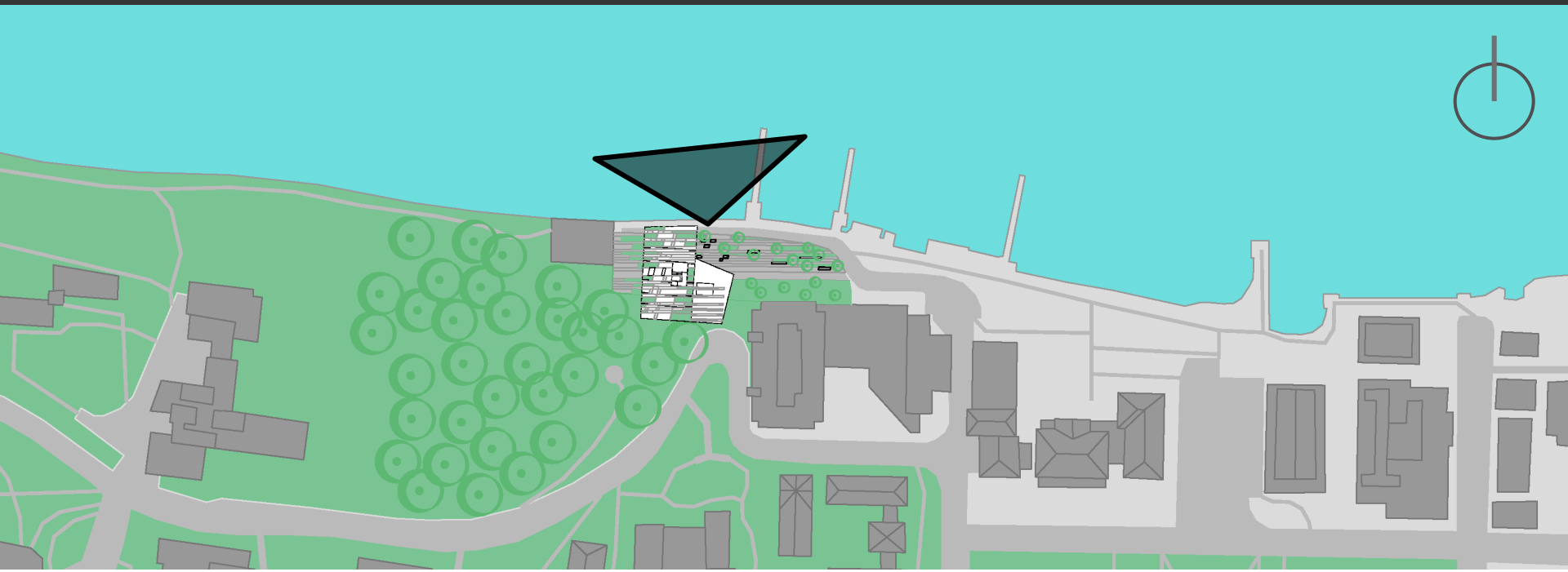


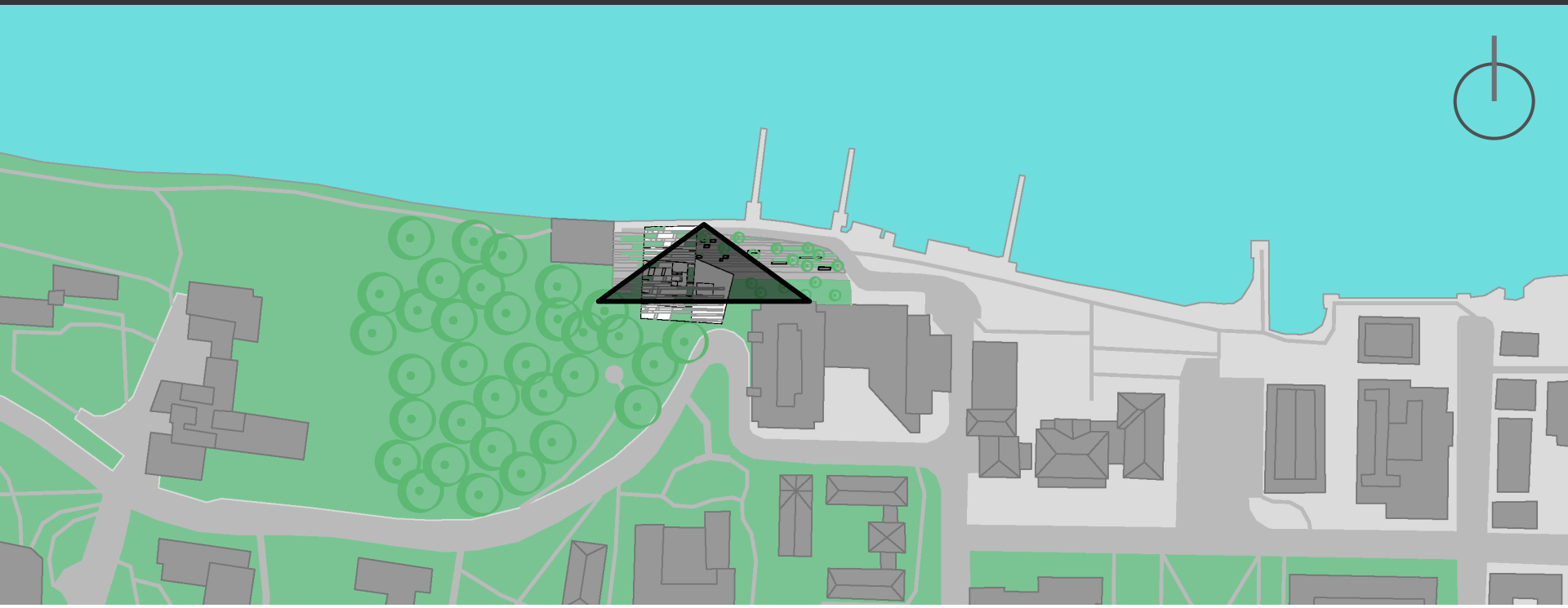


Decision Matrix

				boat		wave	
			Emphasis	wood	steel	wood	steel
Economic			33,30%	73,7026	73,1679	67,7346	65,6005
	Construction		43,00%	74,17	78,03	63,87	65,8
		building costs	10,00%	62	67	50	50
		prefabrication	18,00%	71	75	61	61
		short schedule	13,00%	74	74	65	62
		room program	15,00%	77	80	67	70
		flexibility	17,00%	81	83	71	75
		constructability	22,00%	75	85	61	68
		challenging structure	5,00%	75	68	78	71
	Operation					70,65	65,45
						75	67
						63	63
						70	62
						74	74
Ecologic						75,186	68,144
	nature impact					72,75	69,23
						75	70
						72	63
						72	77
	structure		30,00%	81,23	66,78	80,87	65,61
		Reliability on structure	27,00%	67	85	67	82
		environmental friendly structure	37,00%	86	63	86	63
		natural material	36,00%	87	57	86	56
Social			33,30%	82,465	80,985	78,015	76,815
	Building Quality		50,00%	83,25	81,76	80,01	78,38
		indoor quality	30,00%	85	77	82	80
		fresh air ventilation	25,00%	87	82	87	80
		Natural Lightning	27,00%	80	84	74	74
		natural views	18,00%	80	86	76	80
	Collaboration		50,00%	81,68	80,21	76,02	75,25
		collaboration space	15,00%	82	82	80	80
		atrium	18,00%	74	74	76	76
		connection between interior & exterior	25,00%	80	77	71	70
		connection to the hill	15,00%	78	75	73	70
		inside experience	20,00%	91	90	83	83
		representation of University	7,00%	88	87	72	71

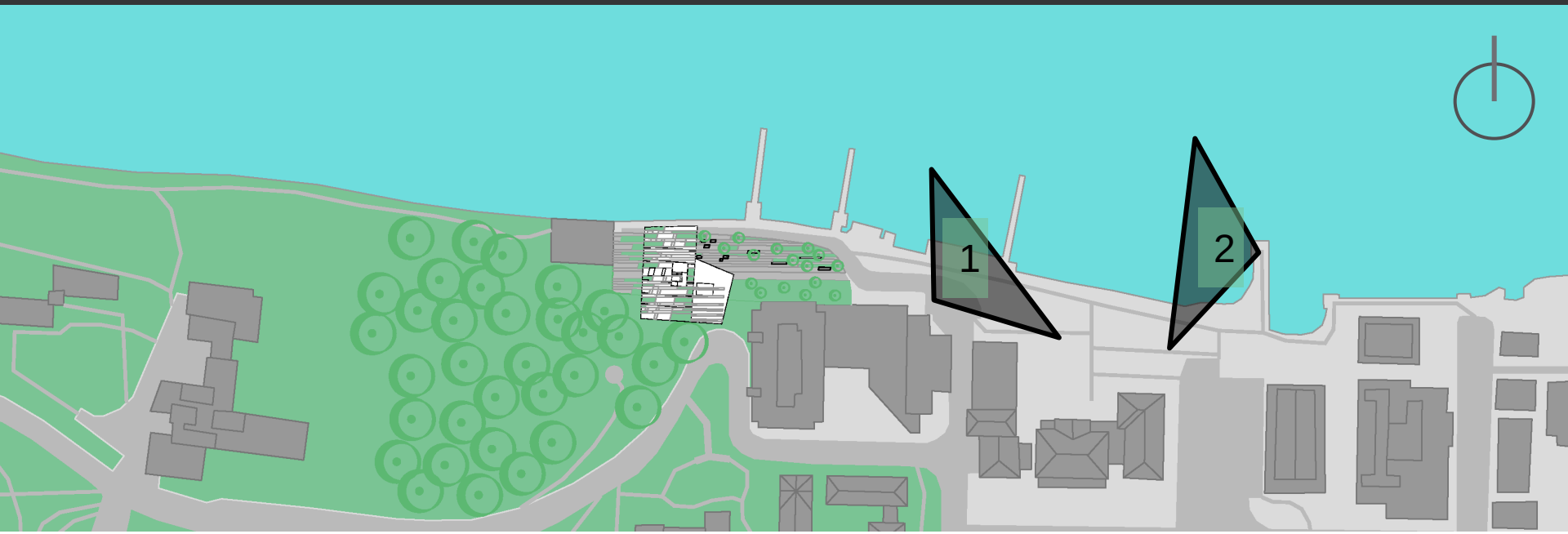
	boat		wave	
	wood	steel	wood	steel
Total Sum	78,35	75,54	73,57	70,12



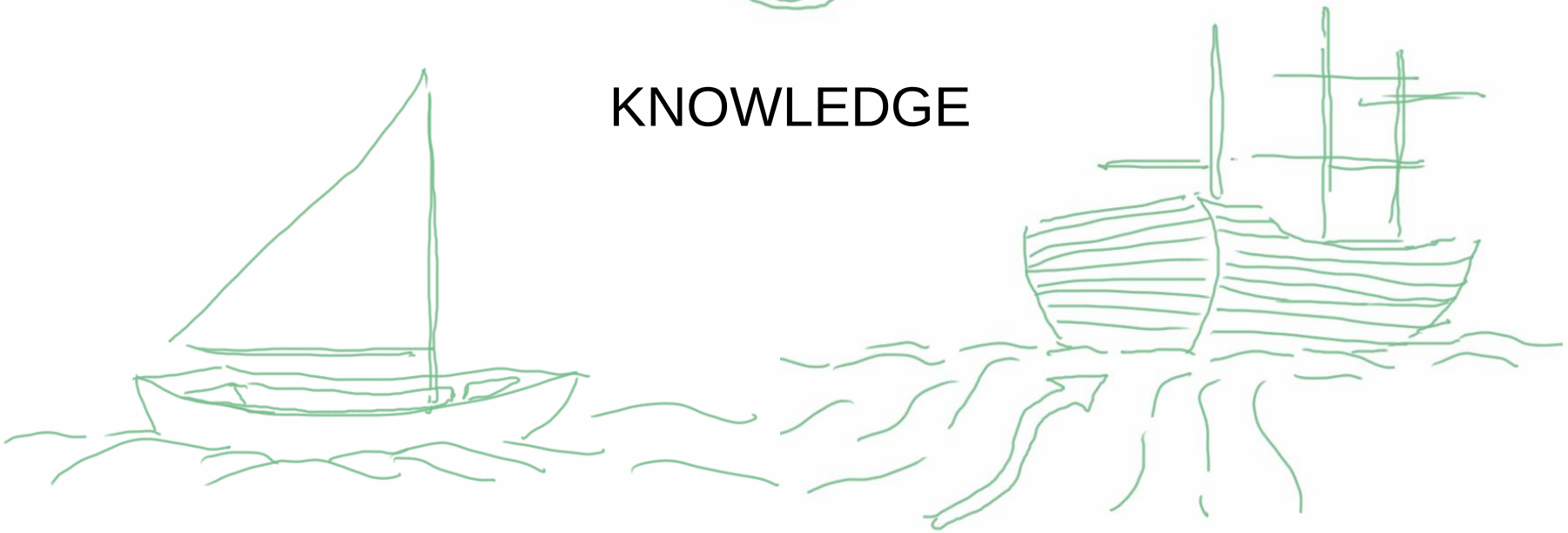


Views

Atlantic

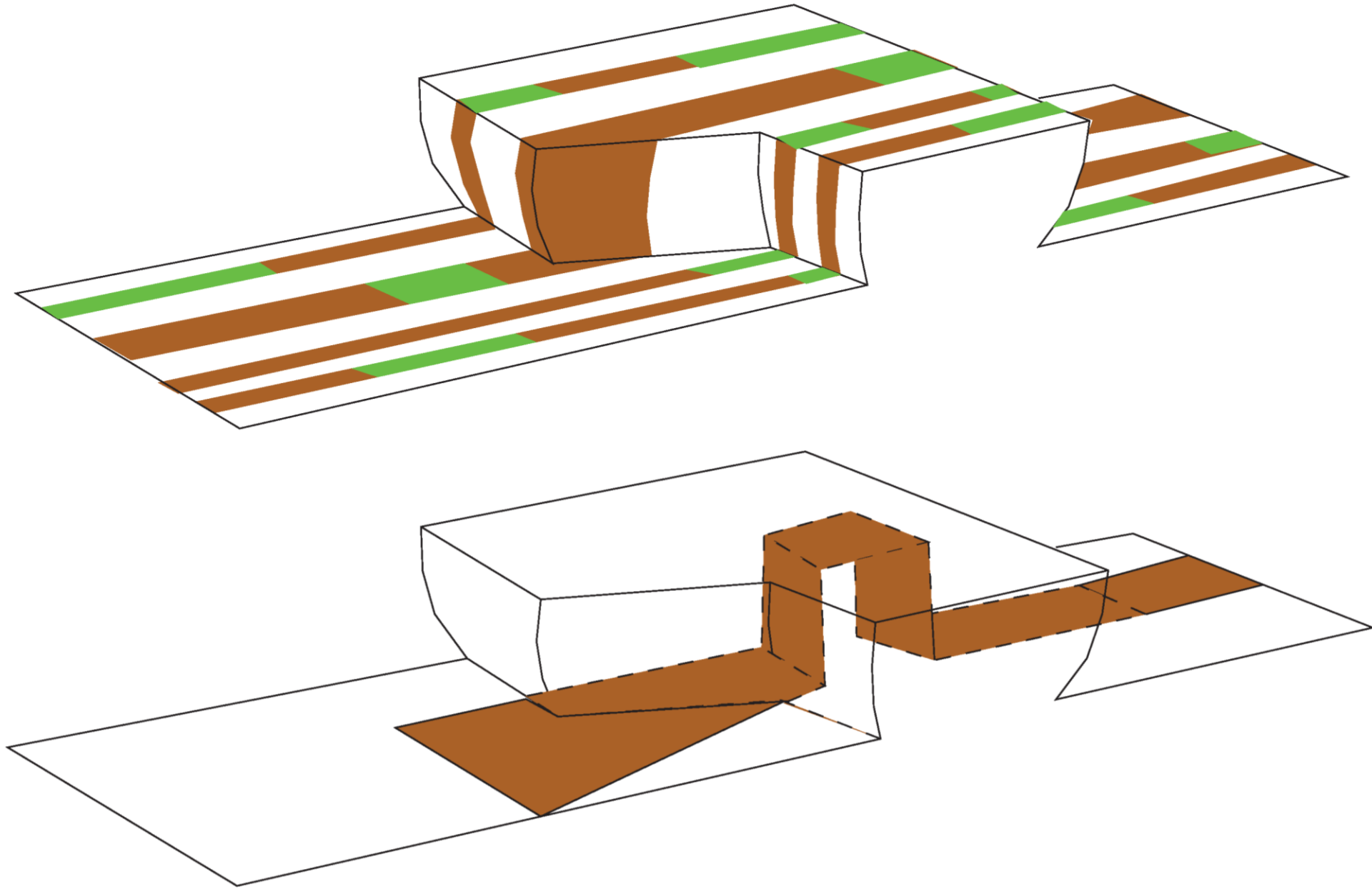


KNOWLEDGE



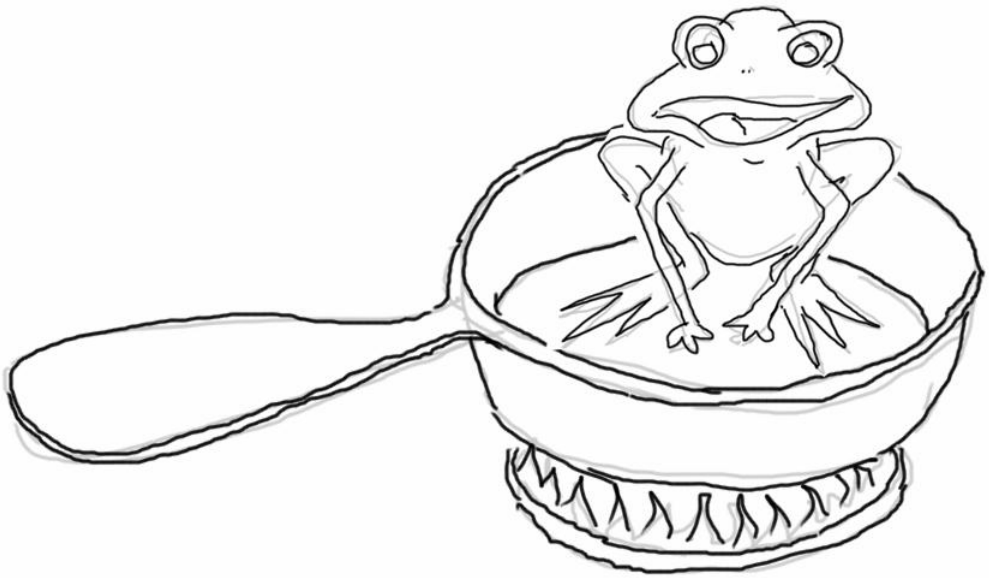
FREEDOM

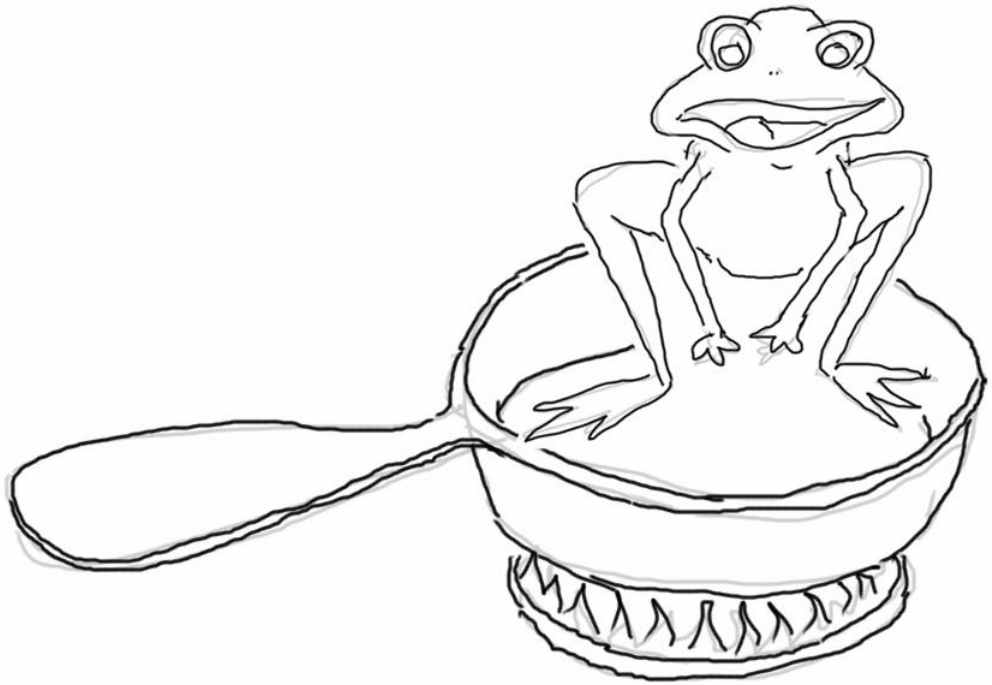
FLOW

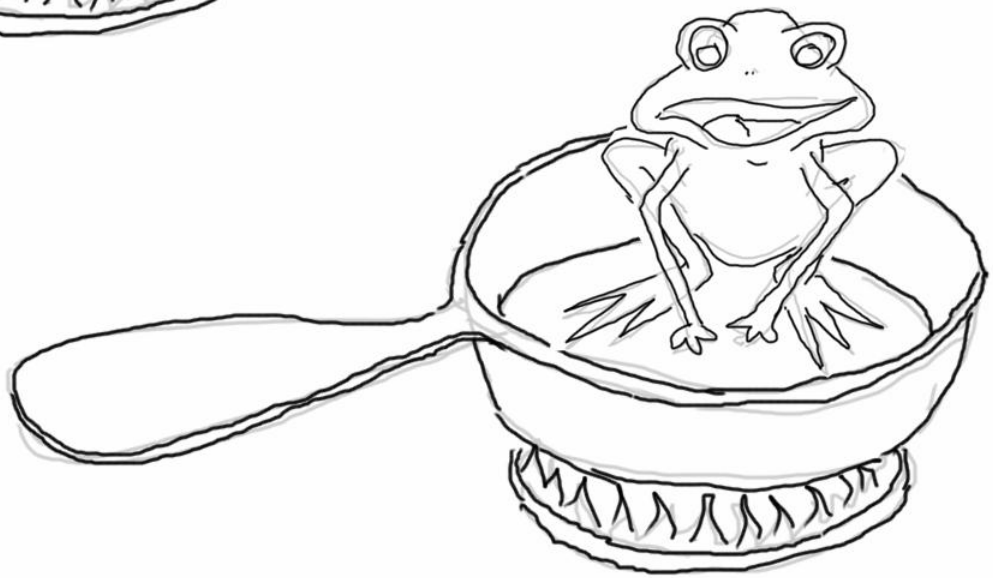


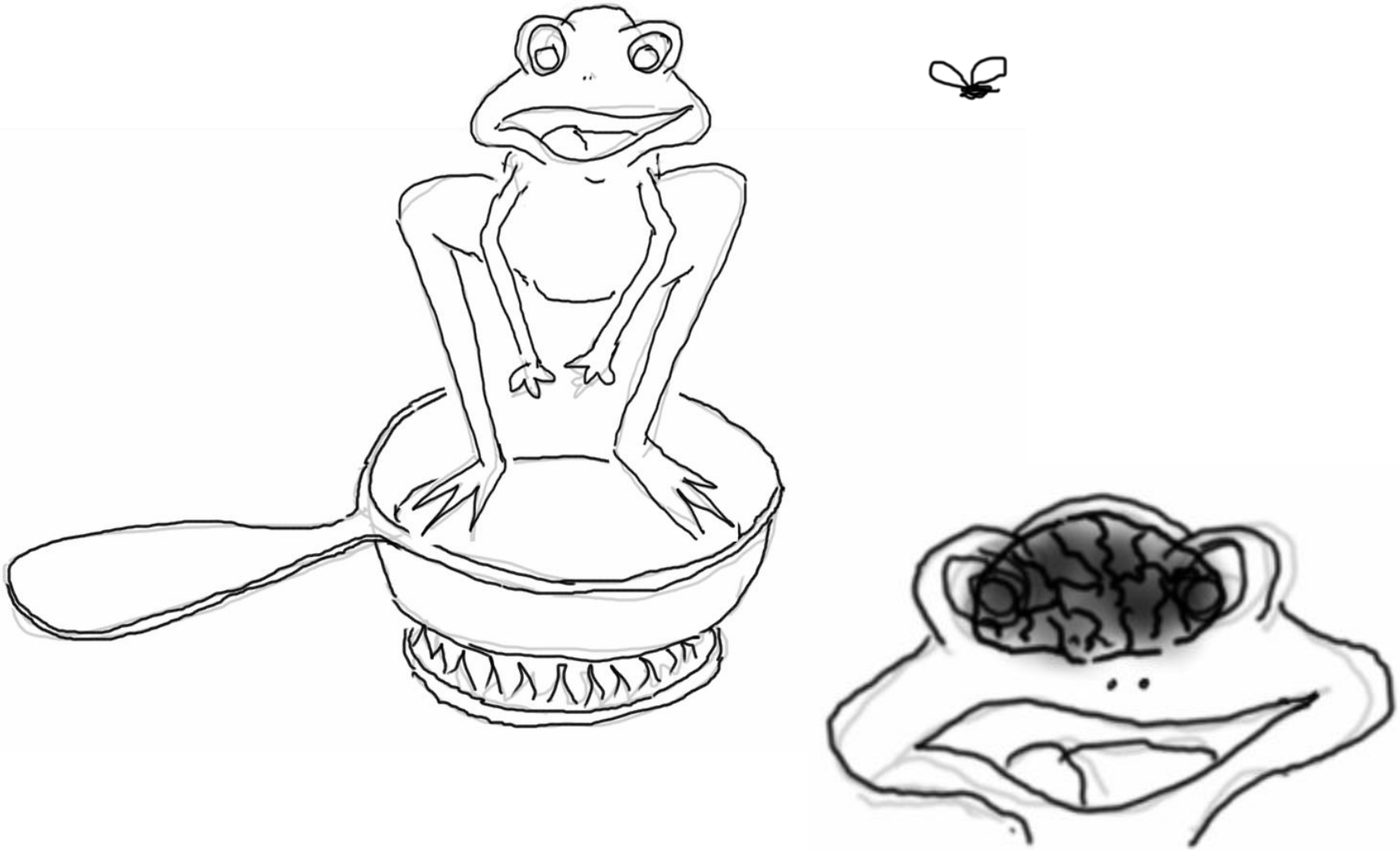
North view

Frog in a pan









Value for money

To WHOM are we bringing value?

- Chin, CEE Professor
  - Home office in this building
  - Researches fluid dynamics & lake ecosystems
- Carol, CEM Professor
  - Home office elsewhere, teaches classes here
  - Researches energy consumption and occupants' impacts
- Tyler, CEE Graduate Student
  - Holds office hours here
- Nolan, CEE Undergraduate Student
  - Has classes here
- Kyle & Melissa
  - Future Badgers

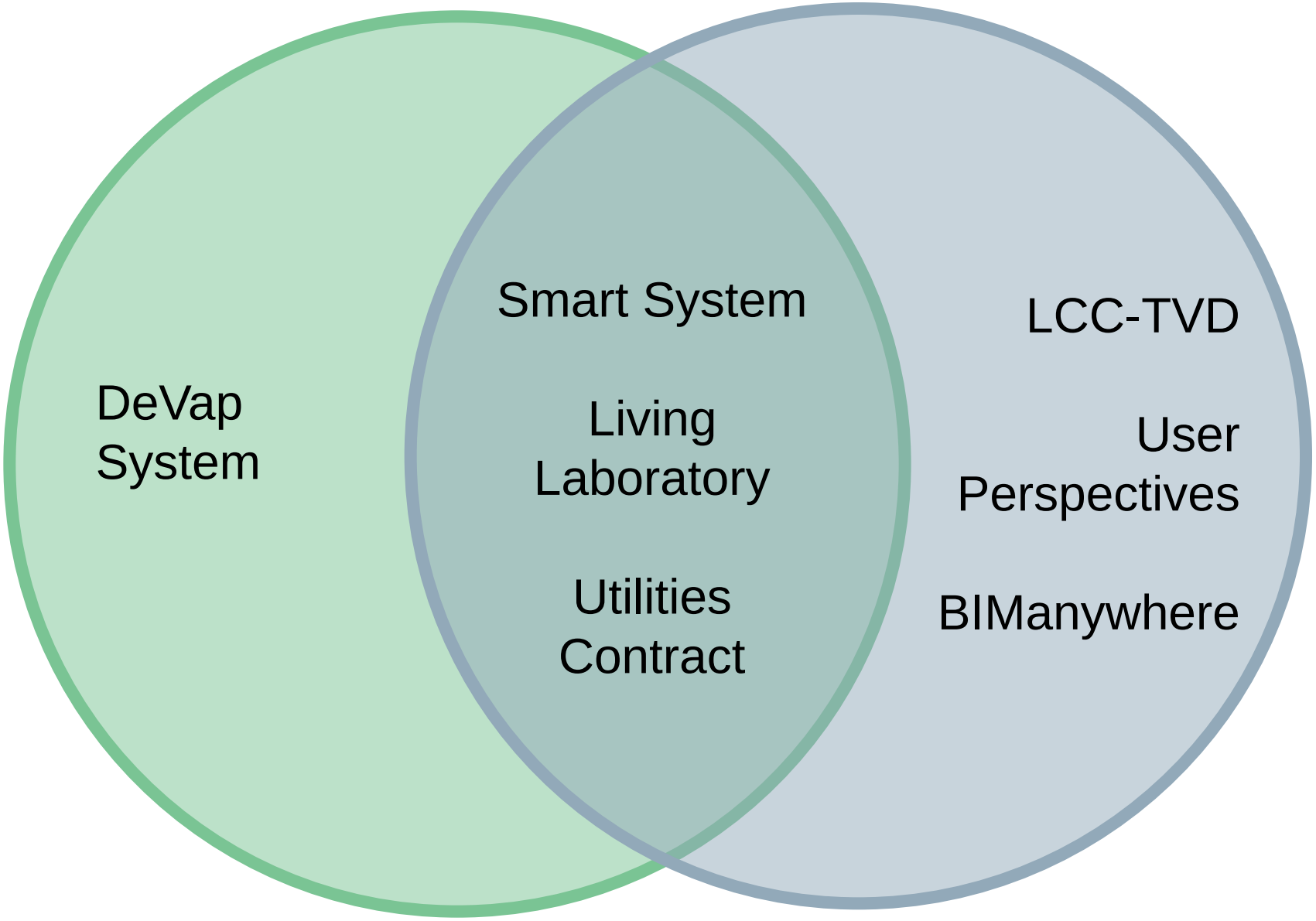
WHAT values are we bringing?

- User perspectives
- Low Life-cycle costs

HOW are we bringing them?

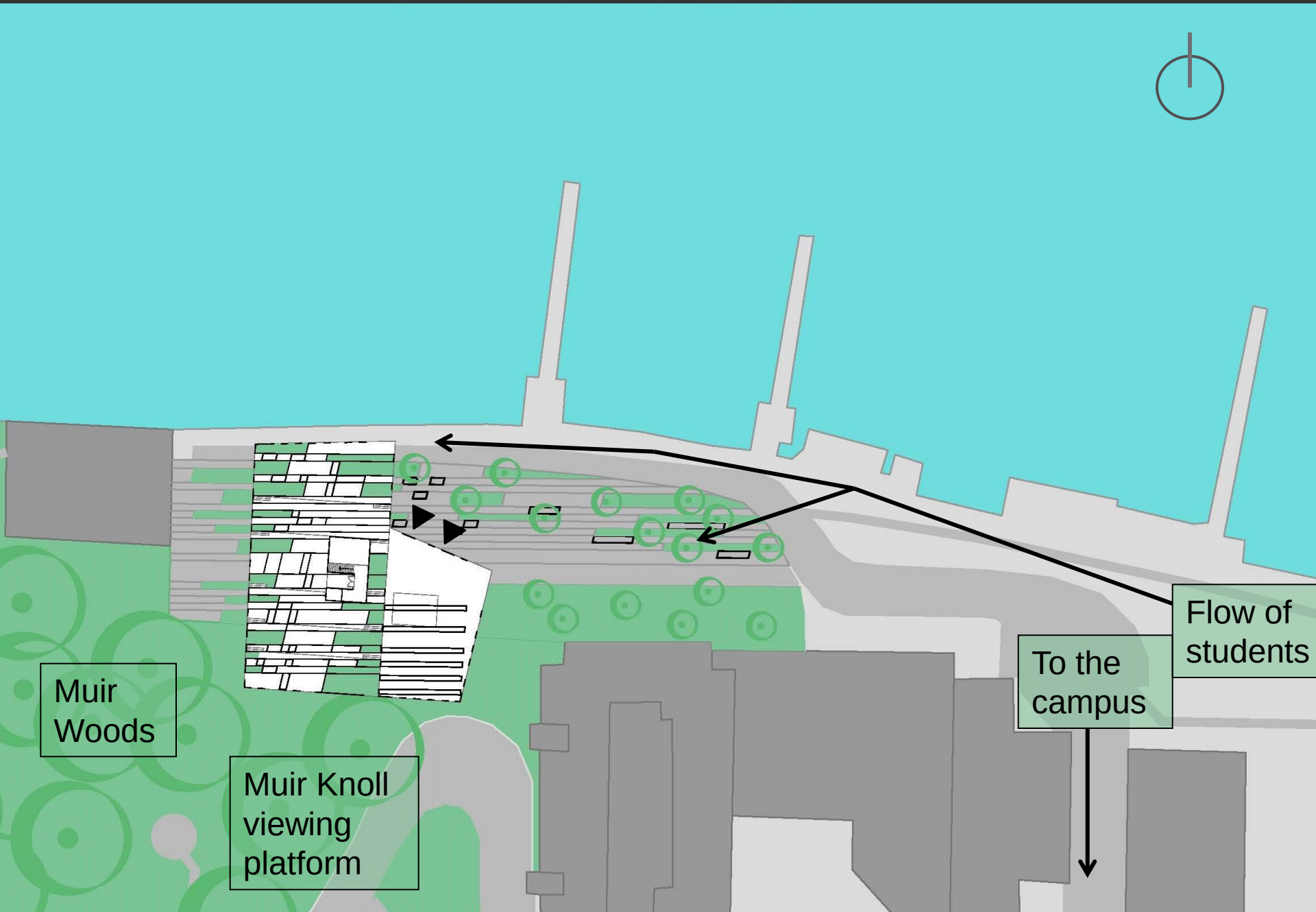
- Trade-offs and value engineering

Leapfrog & Value for money

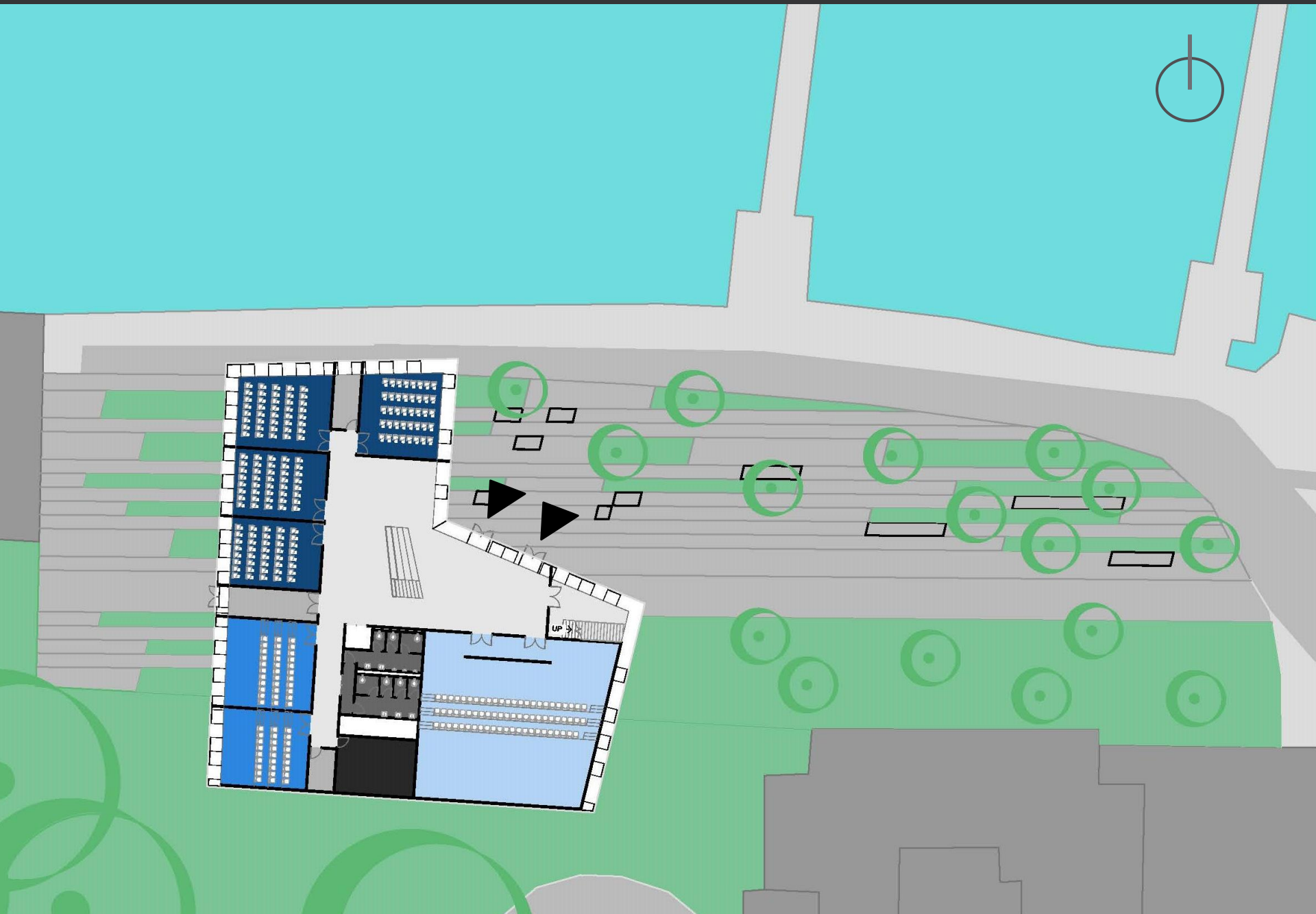


Agenda

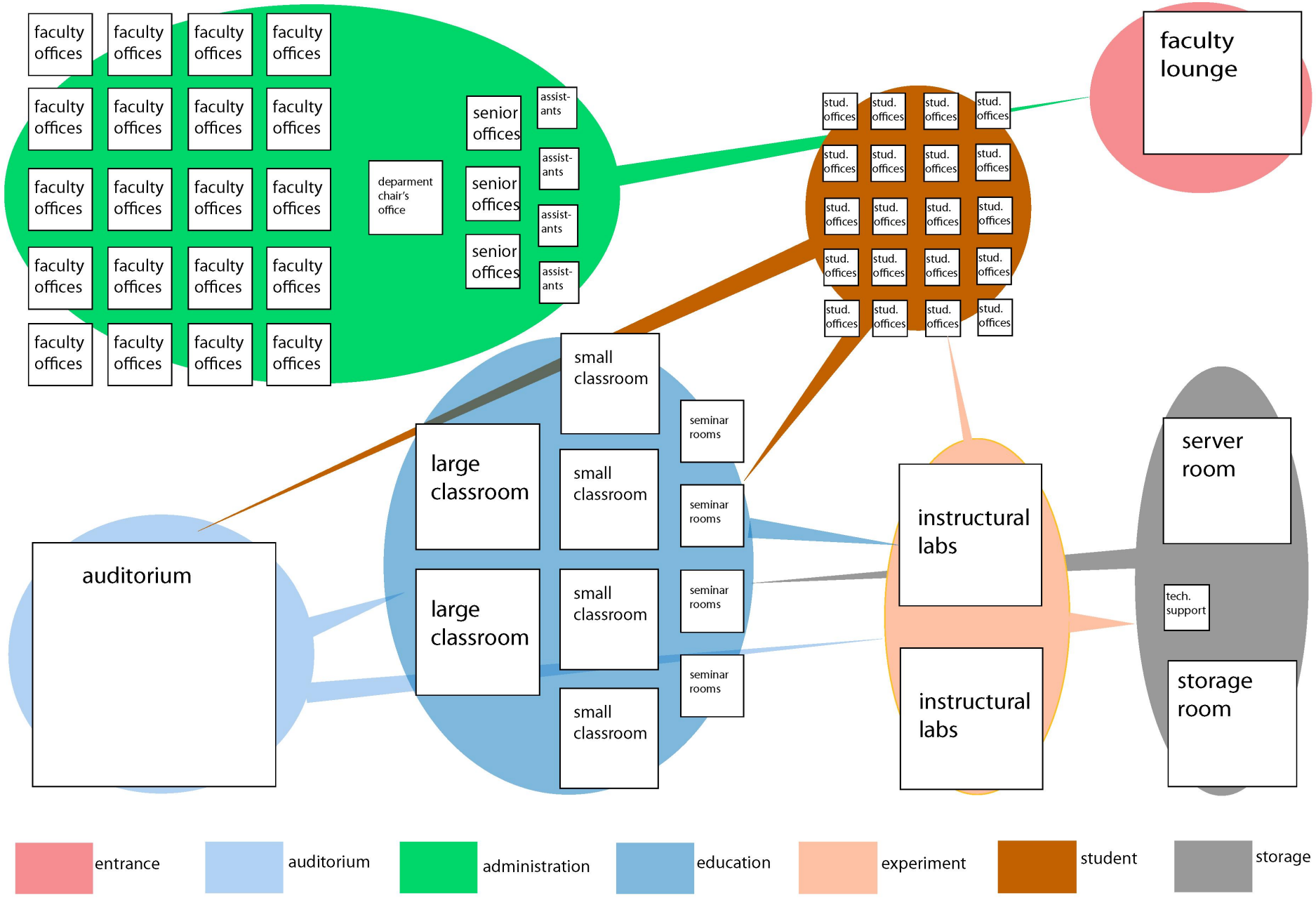
Architecture


Flow of students
To the campus
Muir Woods
Muir Knoll viewing platform

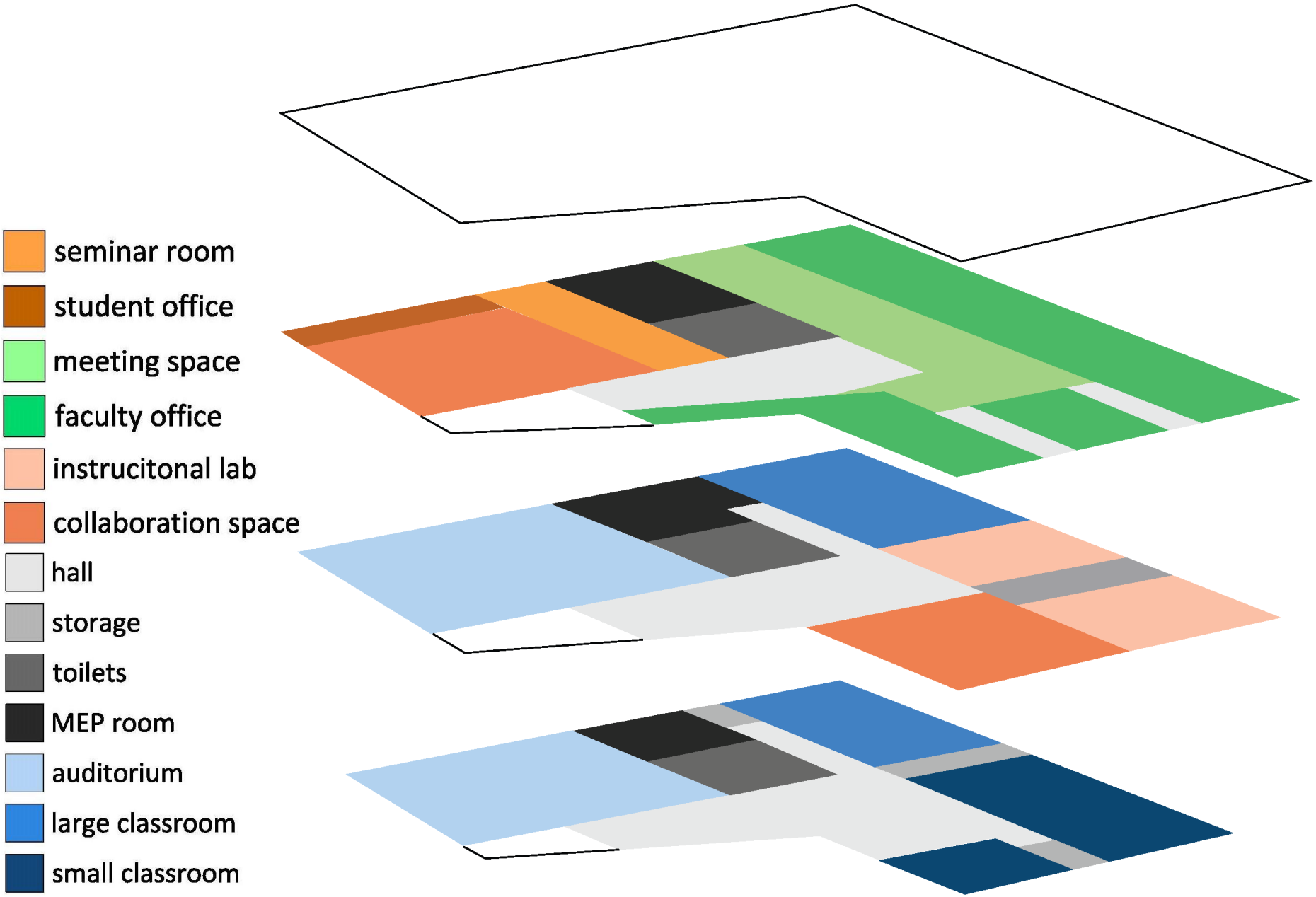
Location



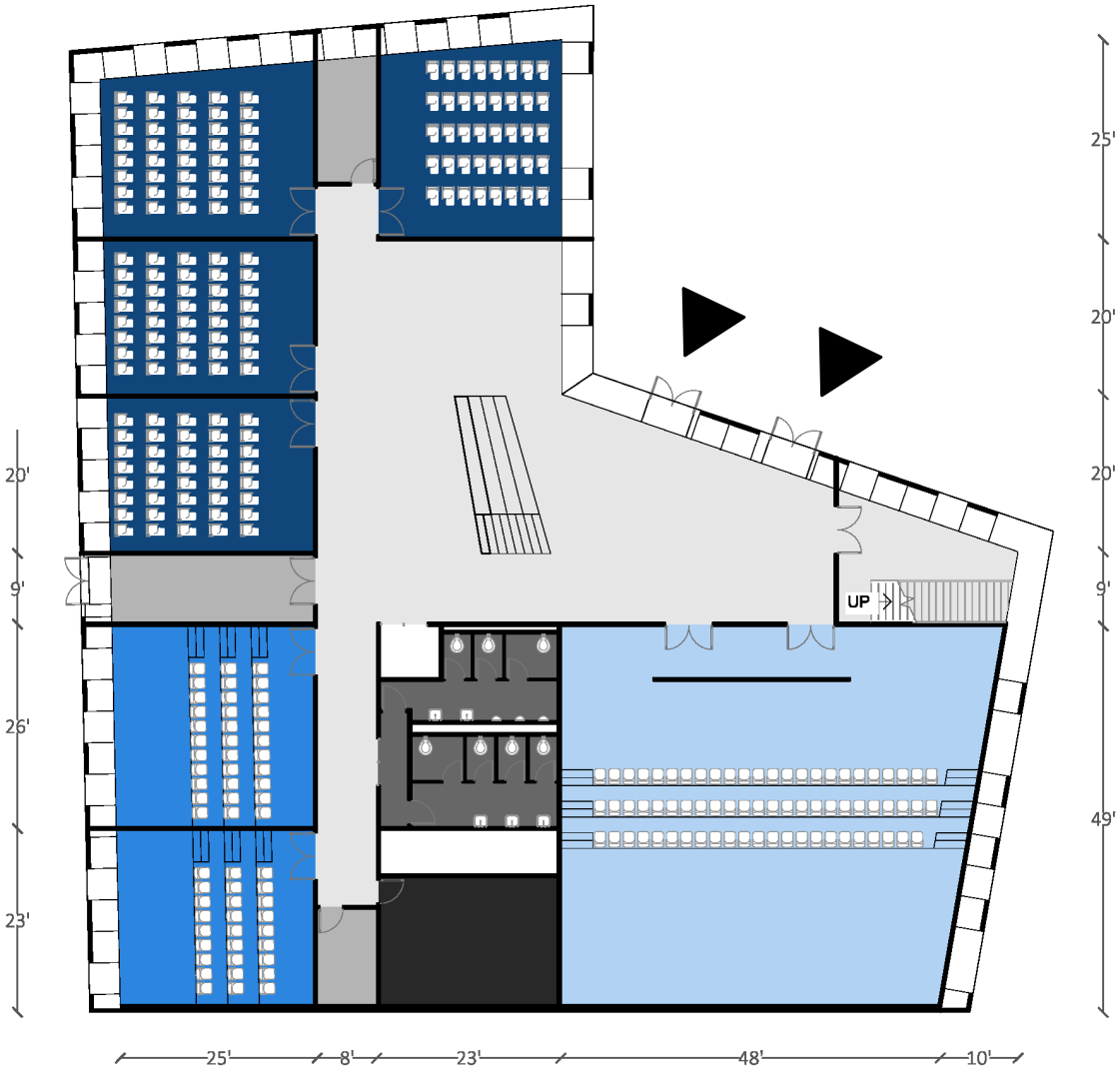
Program schematics



Floor distribution



- hall
- storage
- toilets
- MEP room
- auditorium
- large classroom
- small classroom

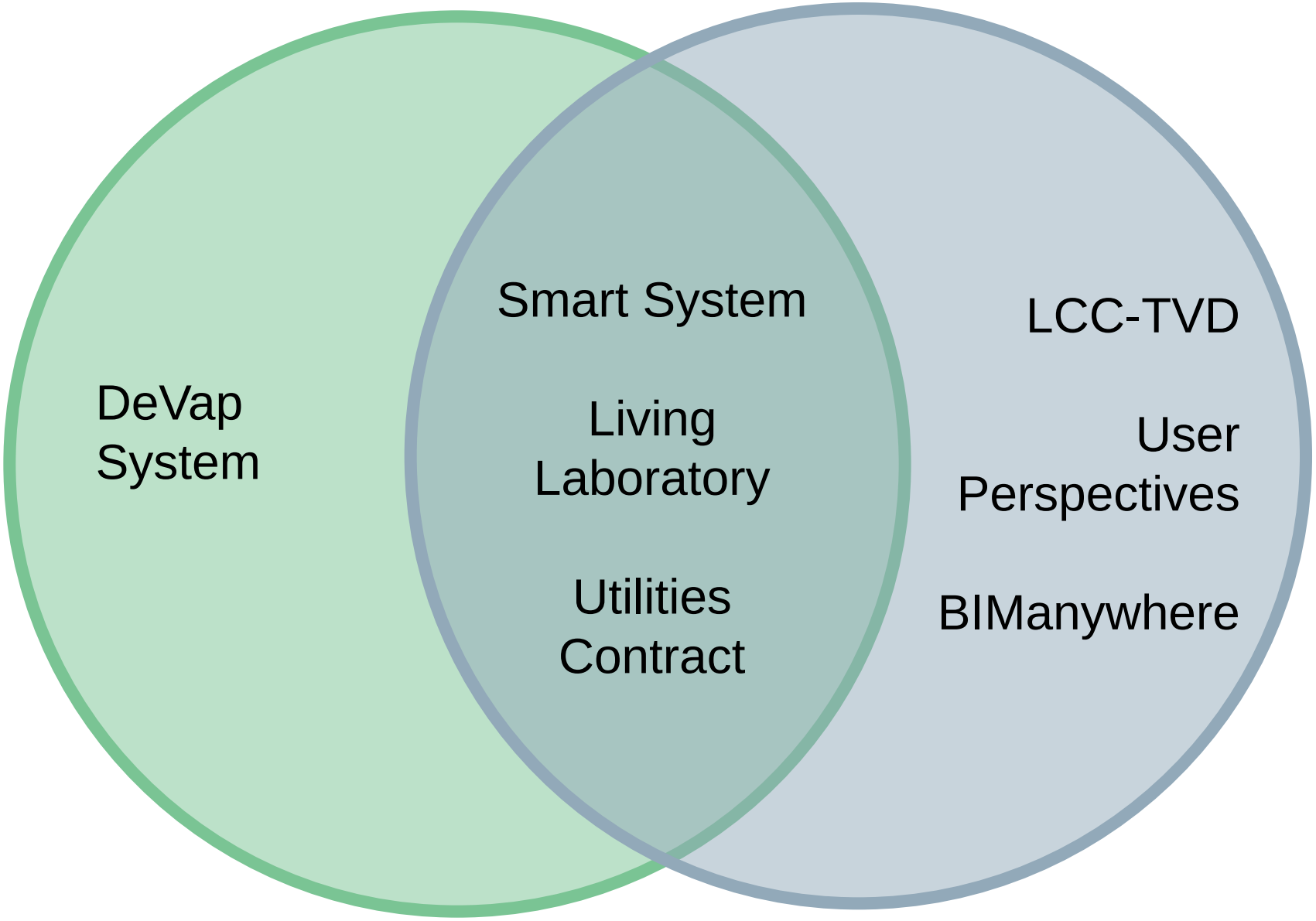


Multipurpose stairs

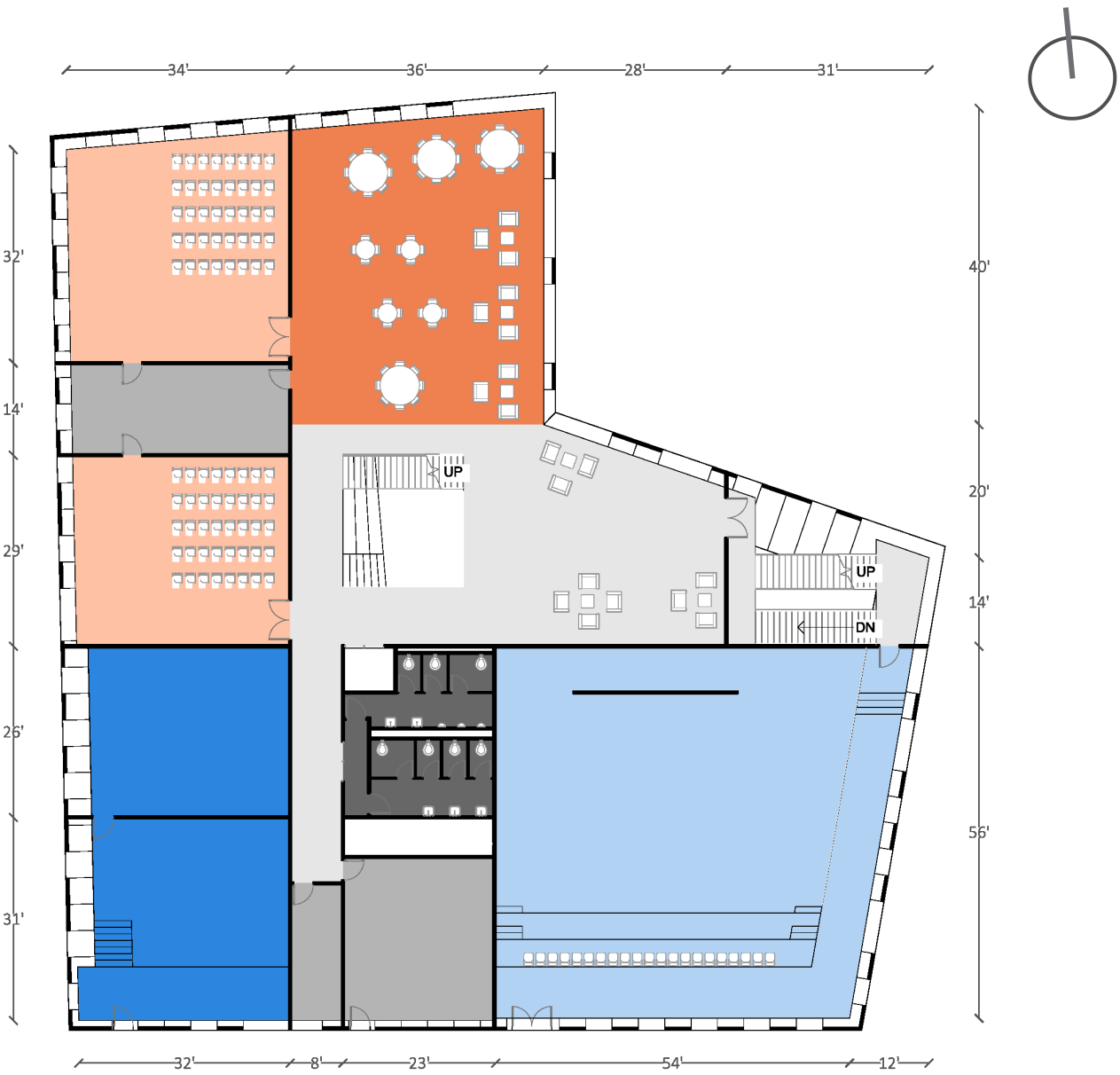
Auditorium

Plaza

Leapfrog & Value for money

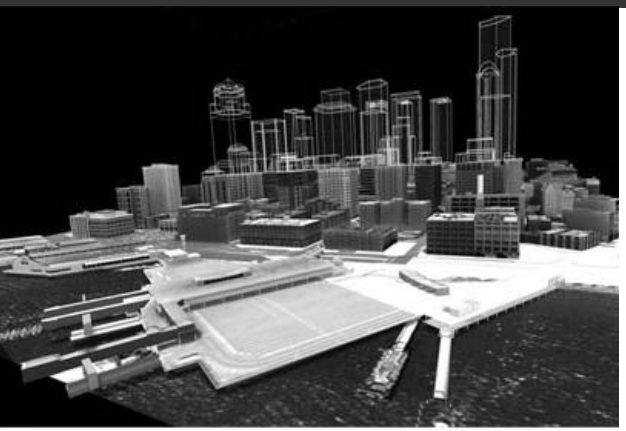


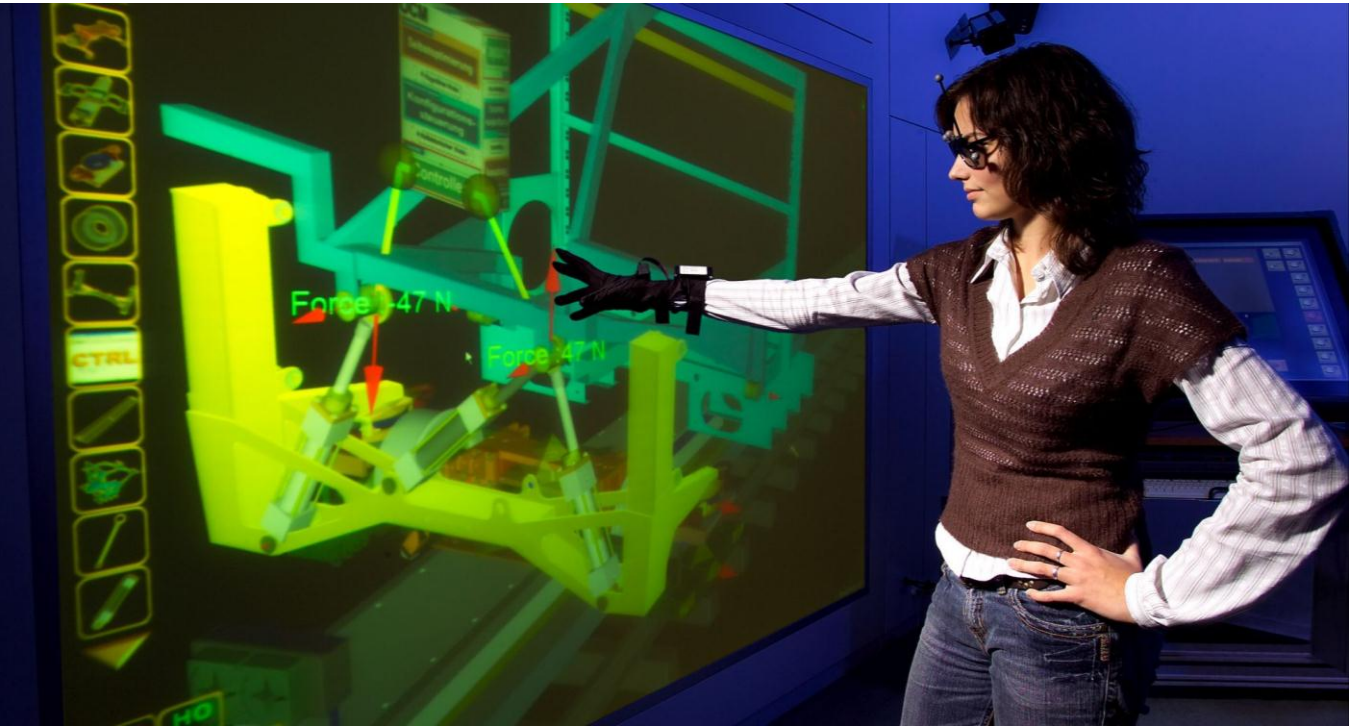
- hall
- storage
- toilets
- instrucitonal lab
- collaboration space
- auditorium
- large classroom



Open collaboration space

Virtual reality



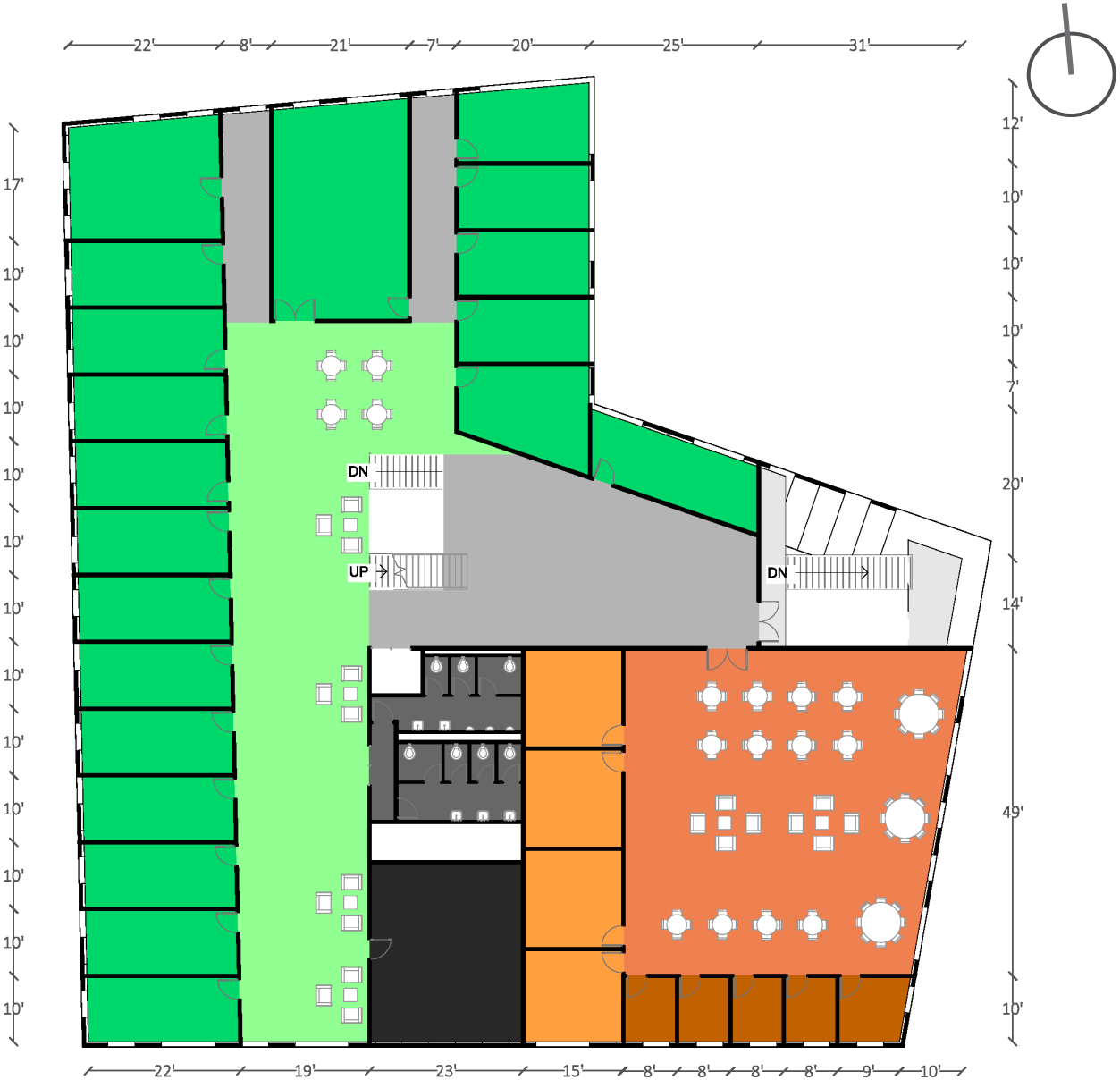


Touch transparent walls

West view

Third floor

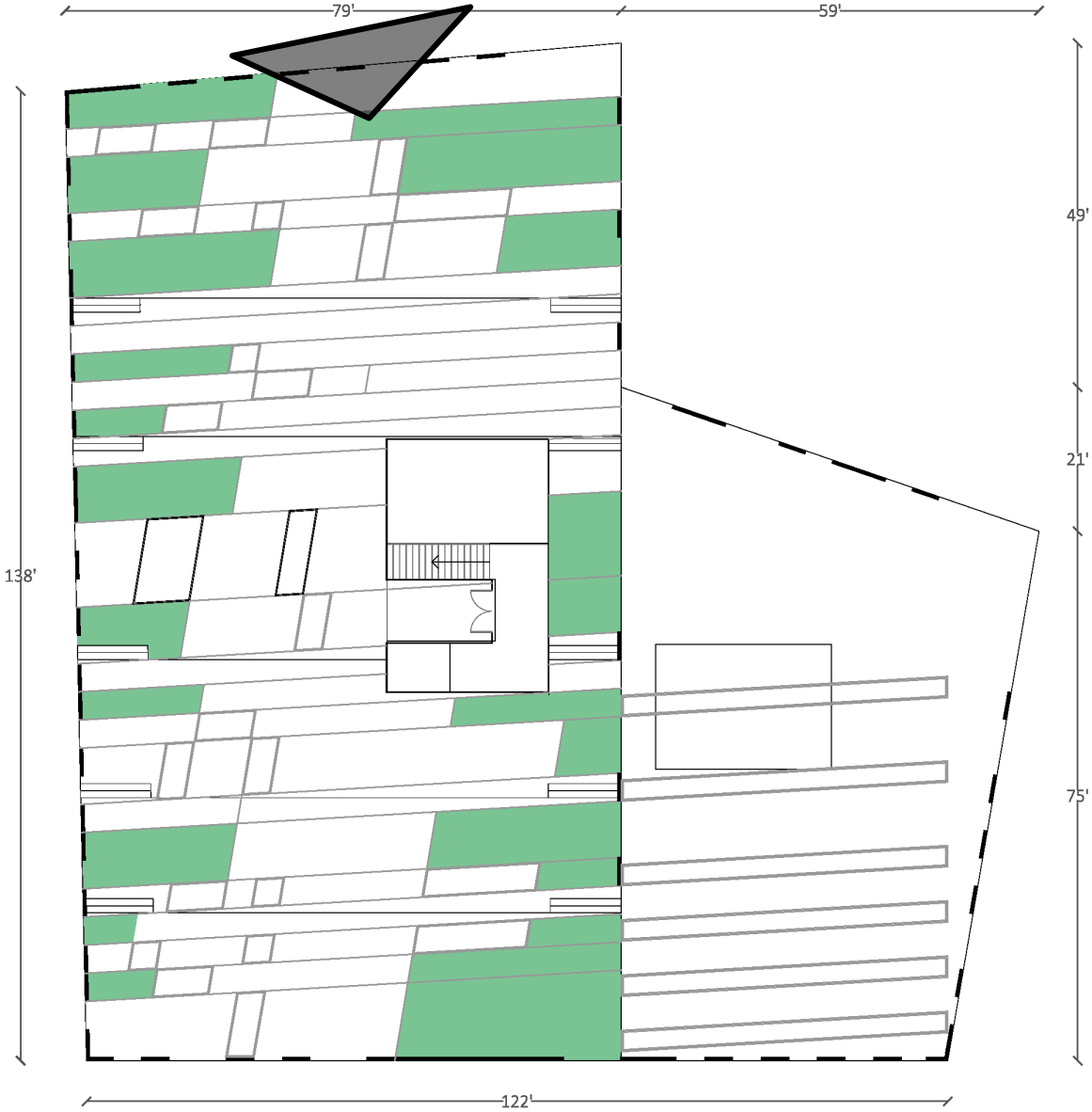
- hall
- toilets
- MEP room
- collaboration space
- seminar room
- student office
- meeting space
- faculty office



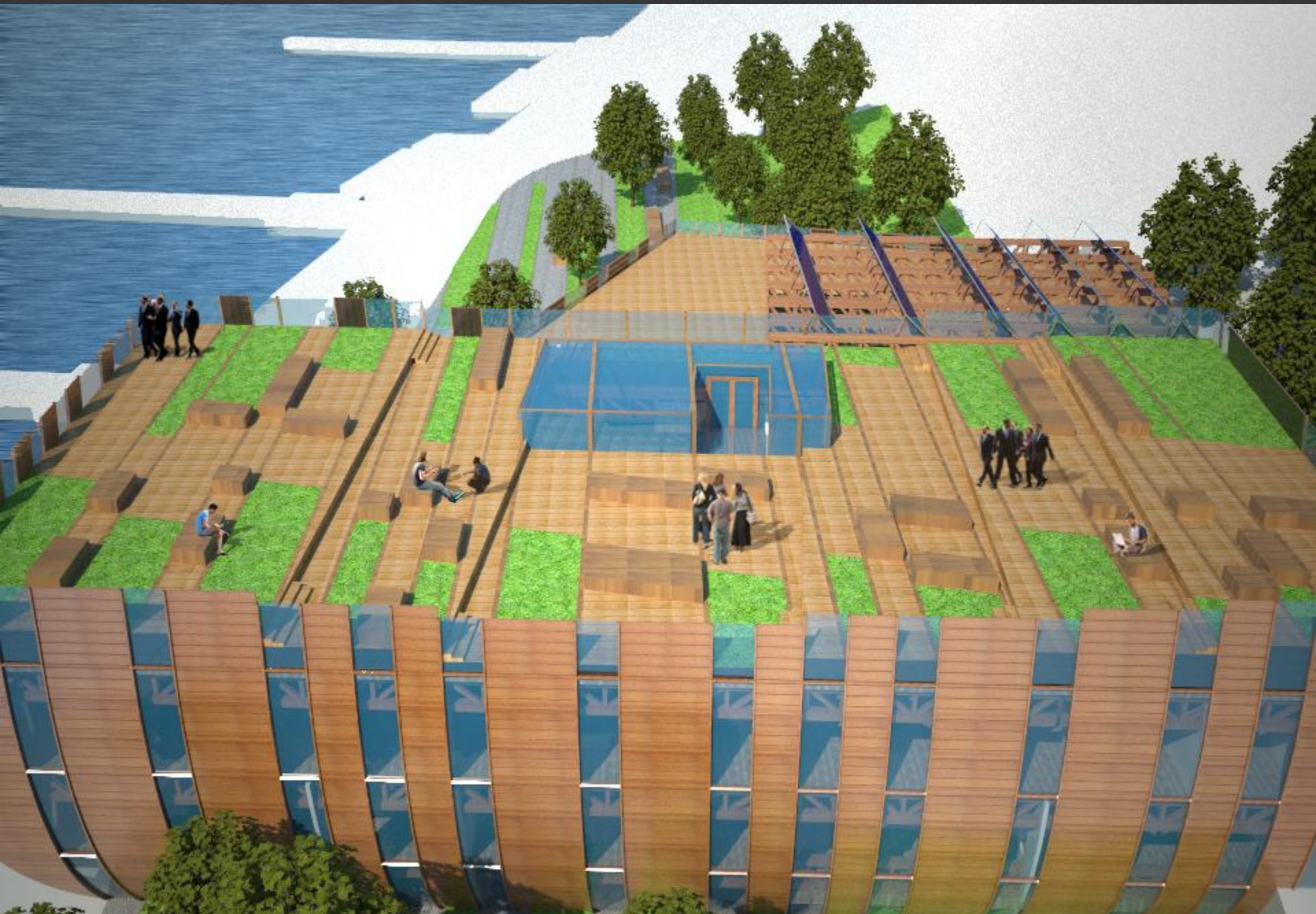
Meeting spot

Collaboration space

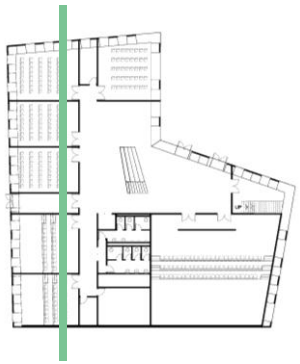
Roof terrace

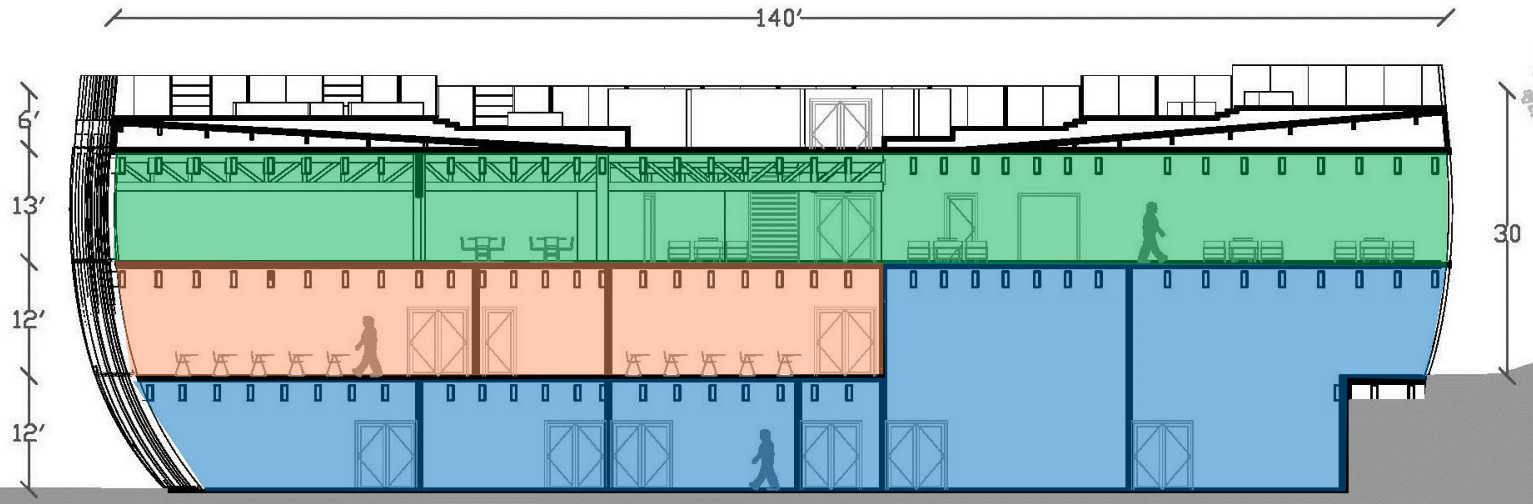


Roof garden

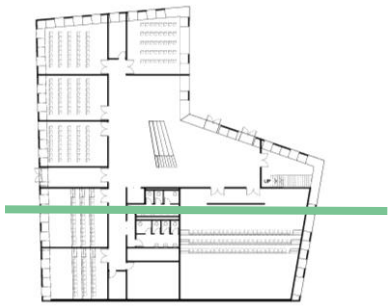


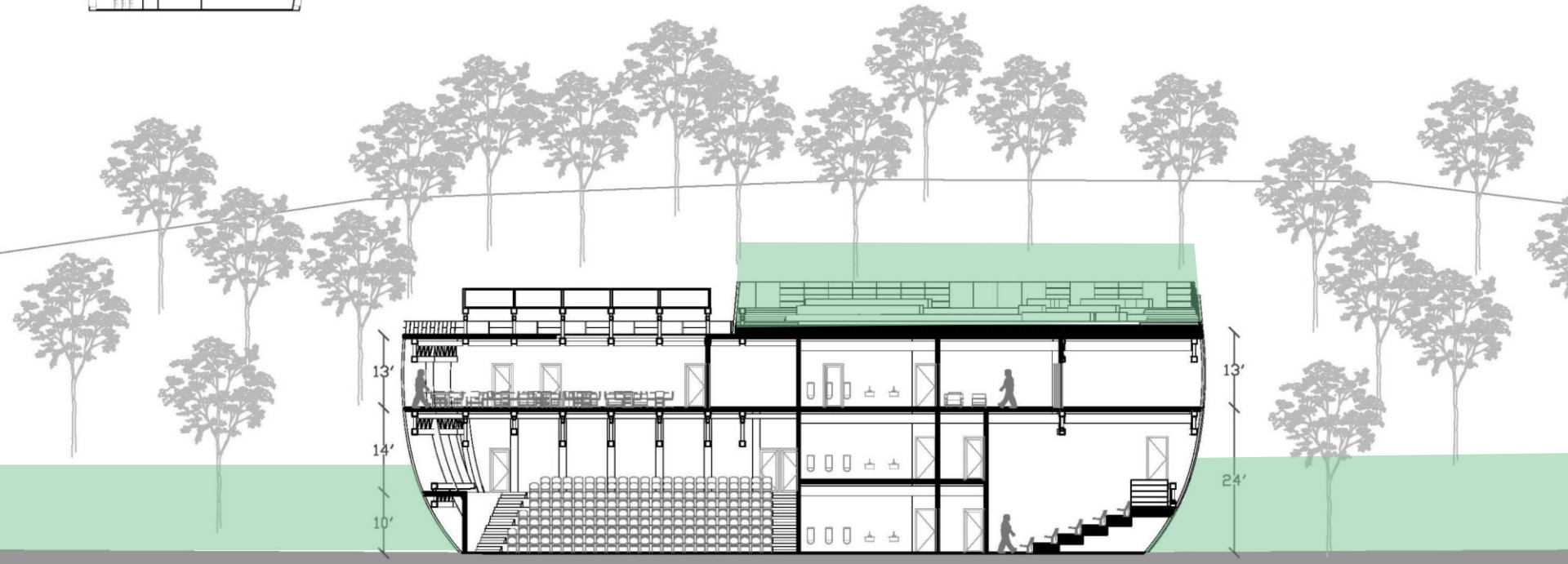
Section





Section



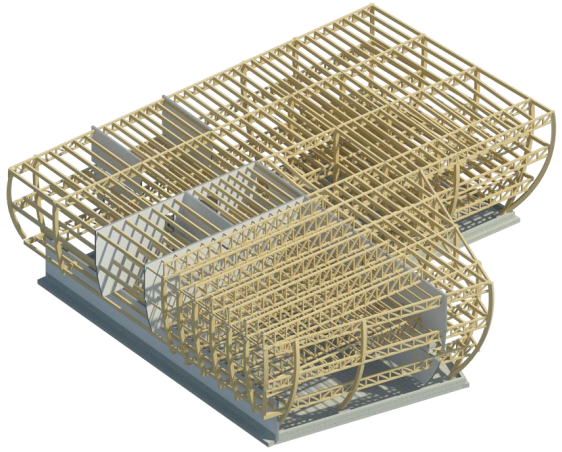


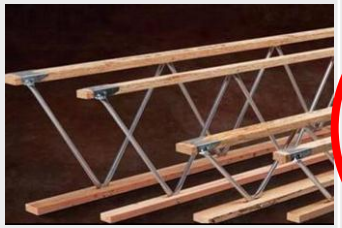
Agenda

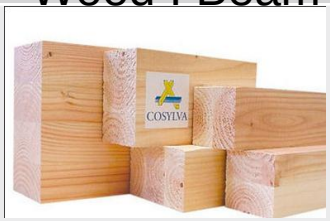
Structural engineering

	Live (psf)	Dead (psf)	Snow (psf)	Wind (kip)	E (kip)
Roof (Assembly)	100	45	23.1	24.45	21.97
Roof	20	45	23.1	24.45	21.97
3rd floor	57.82	45		46.96	19.34
2nd floor	68.27	45		45.48	9.67
1st floor	84.45	45		22.74	

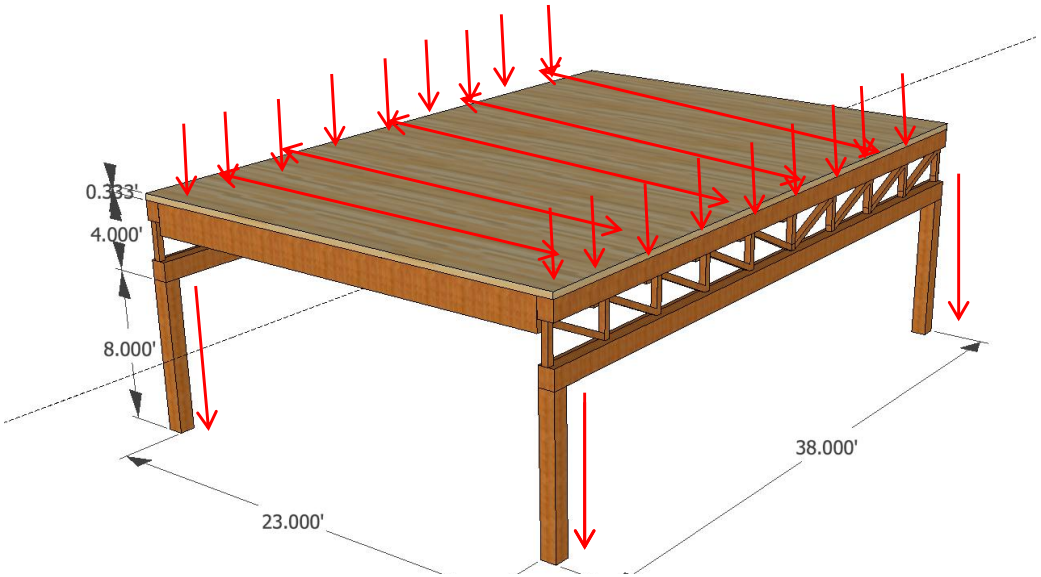
- Load cases
- 1.4D
- 1.2 D+ 1.6L
- 1.2 D+ 1.6L +0.8W

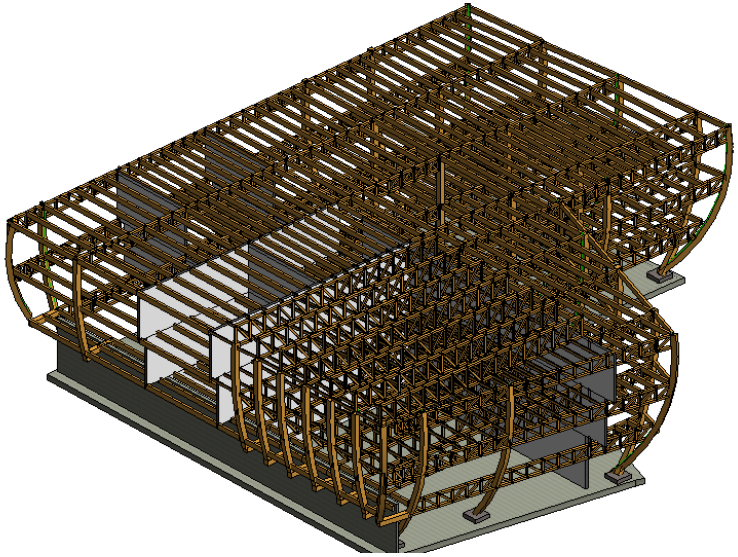


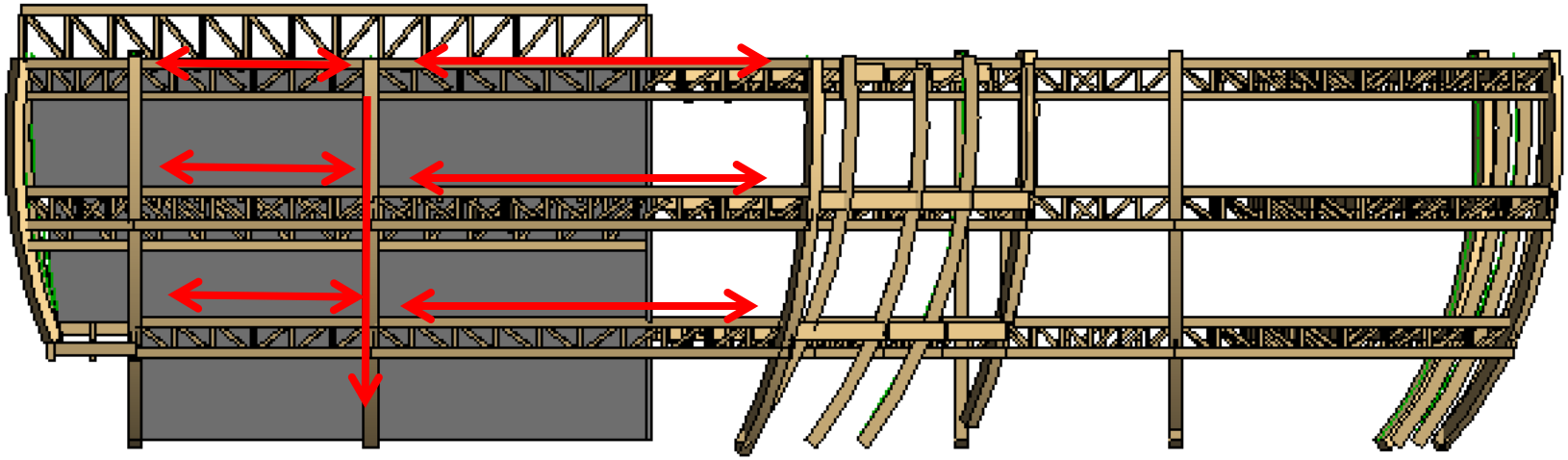
	Arch	MEP	CM	SE
 Truss	Aesthetics ✓	Duct Penetration ✓	Constructability ✓	Strength ✓ Stiffness ✓ Dimension ✓
 Open Web Joist	Aesthetics ✗ (compared to the truss)	Duct Penetration ✓	Constructability ✓	Strength ✓ Stiffness ✓ Dimension ✓
 Wood Beam	Aesthetics ✓	Duct Penetration ✗	Constructability ✓	Strength ✓ Stiffness ✗ Dimension ✓

	Arch	MEP	CM	SE
 Wood I Beam	Aesthetics ✗ (compared to wood joist)	Duct Penetration ●	Constructability ✓	Strength ✓ Stiffness ✓ Dimension ✓
 Wood Joist	Aesthetics ✓	Duct Penetration ✓	Constructability ✓	Strength ✓ Stiffness ✓ Dimension ✓
 Exposed Connection	Aesthetics ✓		Constructability ✓	Strength ✓ Stiffness ✓ Dimension ✓
 Hided Connection	Aesthetics ✓		Constructability ✗ (compared to the exposed connection)	Strength ✓ Stiffness ✓ Dimension ✓

Load path

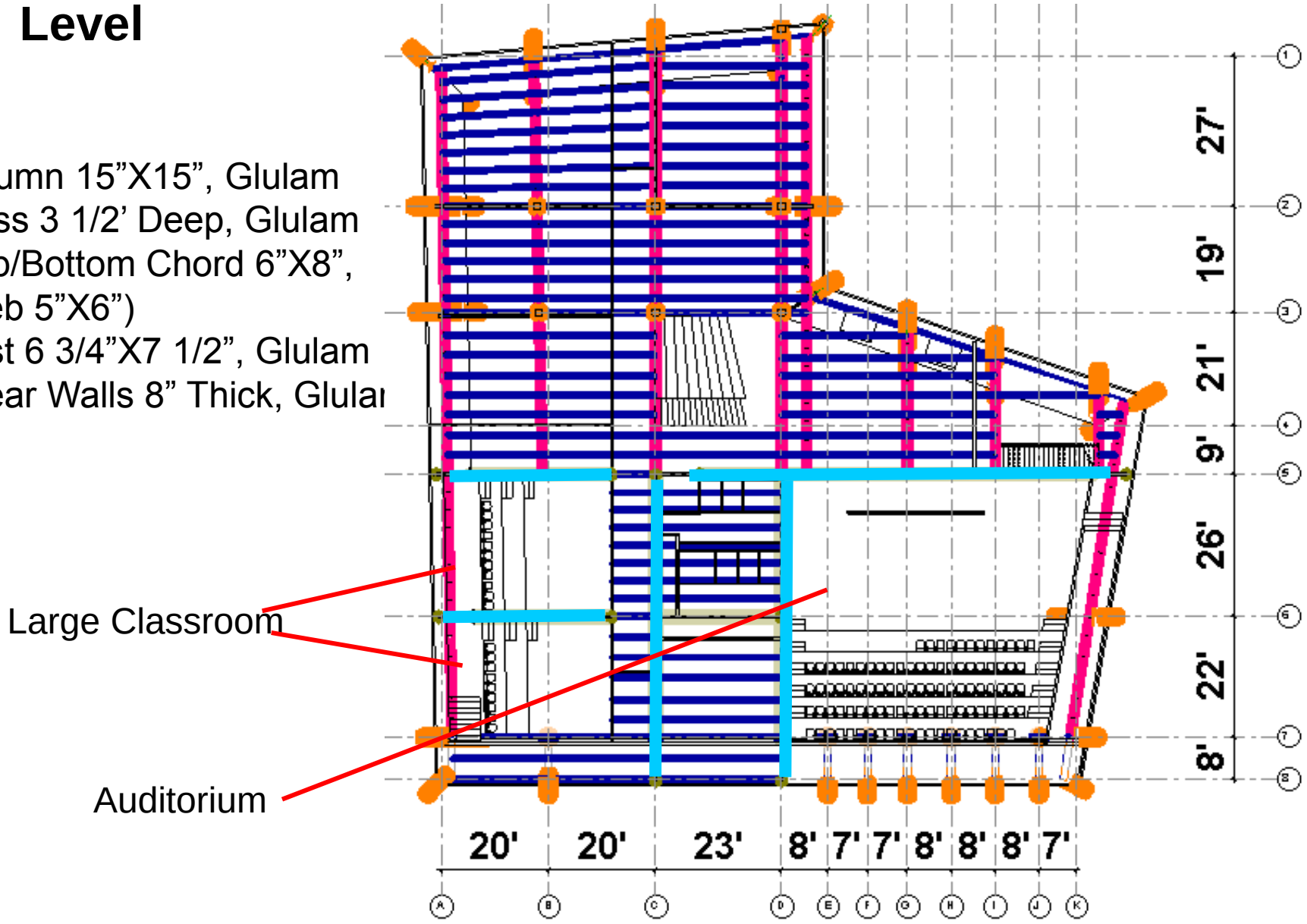






1st Level

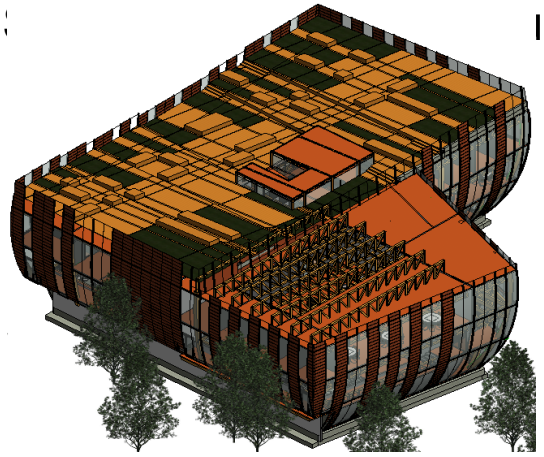
- Column 15”X15”, Glulam
- Truss 3 1/2’ Deep, Glulam (Top/Bottom Chord 6”X8”, Web 5”X6”)
- Joist 6 3/4”X7 1/2”, Glulam
- Shear Walls 8” Thick, Glulam

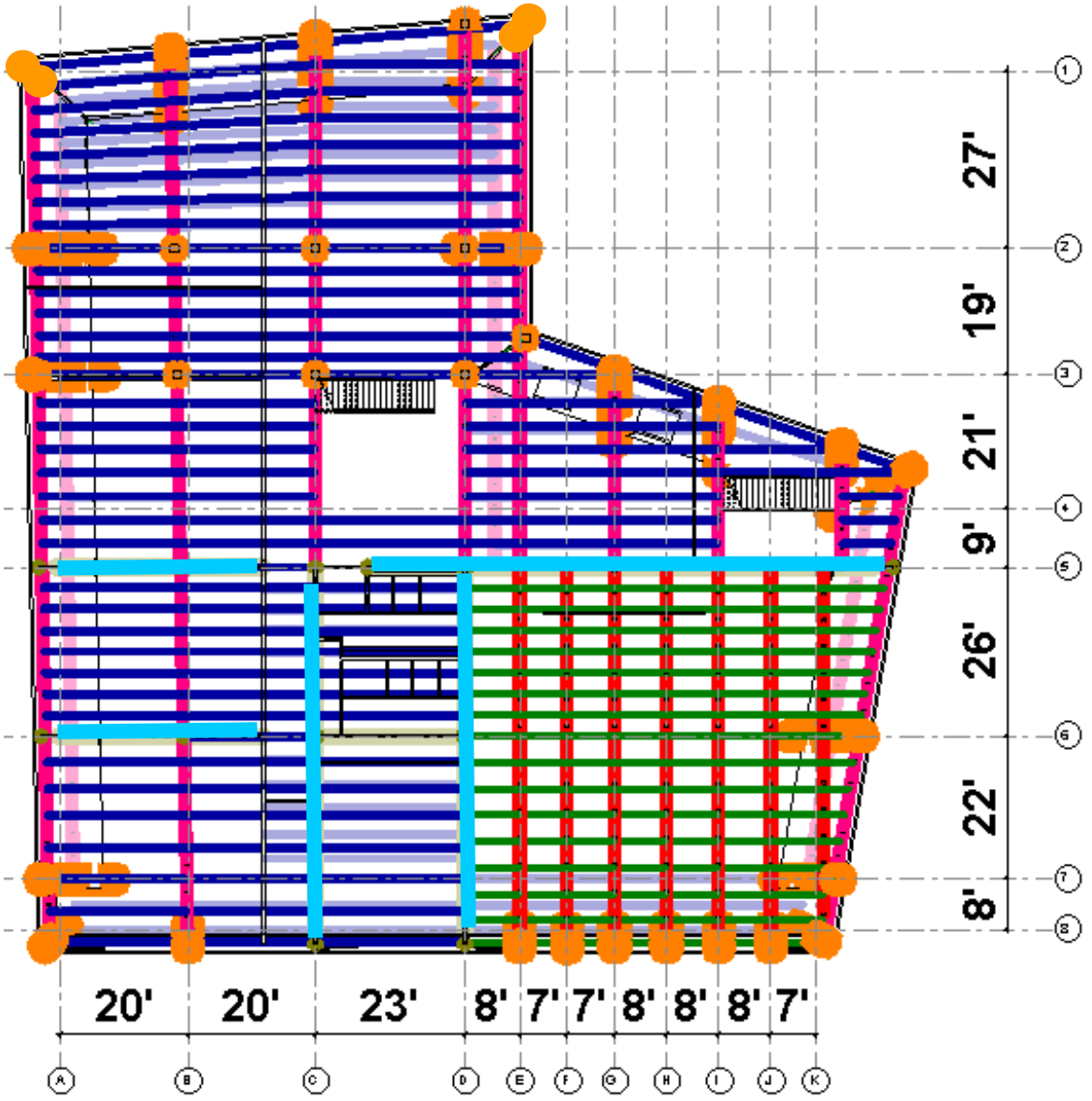


2nd Level

- Column 15”X15”, Glulam
- Truss 3 1/2’ Deep, Glulam (Top/Bottom Chord 6”X8”, Web 5”X6”)
- Auditorium Truss 6’ Deep, Glulam (Top/Bottom Chord 6”X8”, Web 5”X6”)
- Joist 6 3/4”X15”, Glulam Auditorium Joist
- 3 1/8”X7 1/2”, Glulam

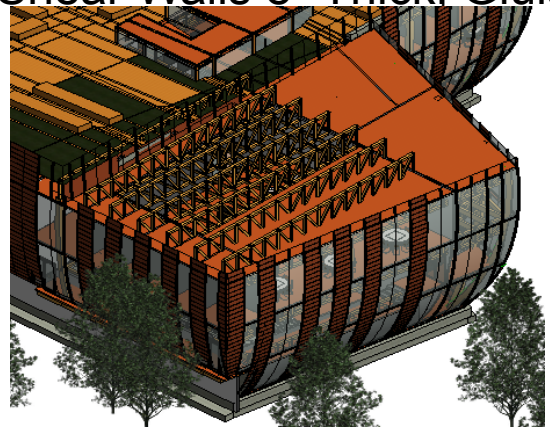
ılam

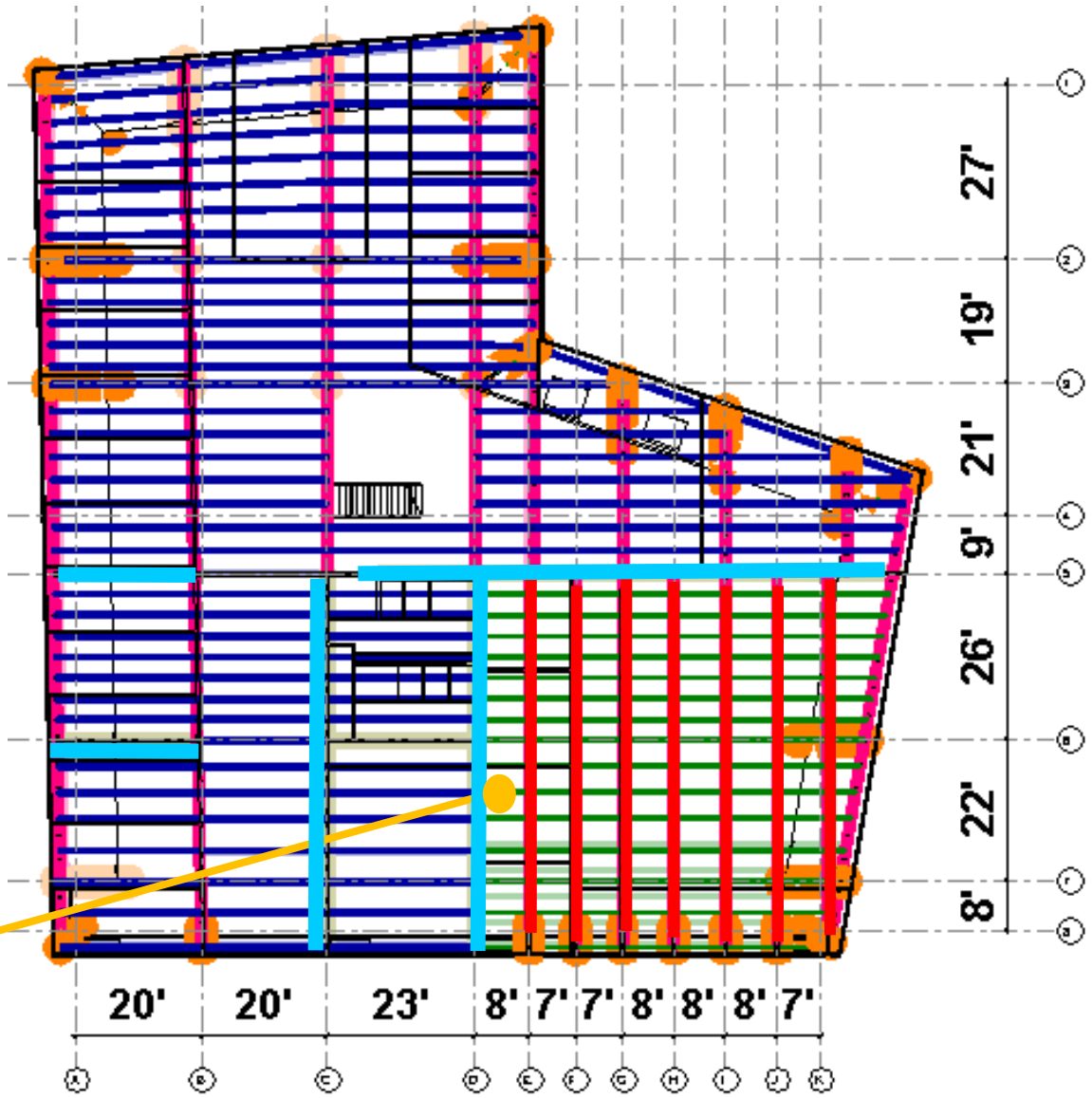




3rd Level

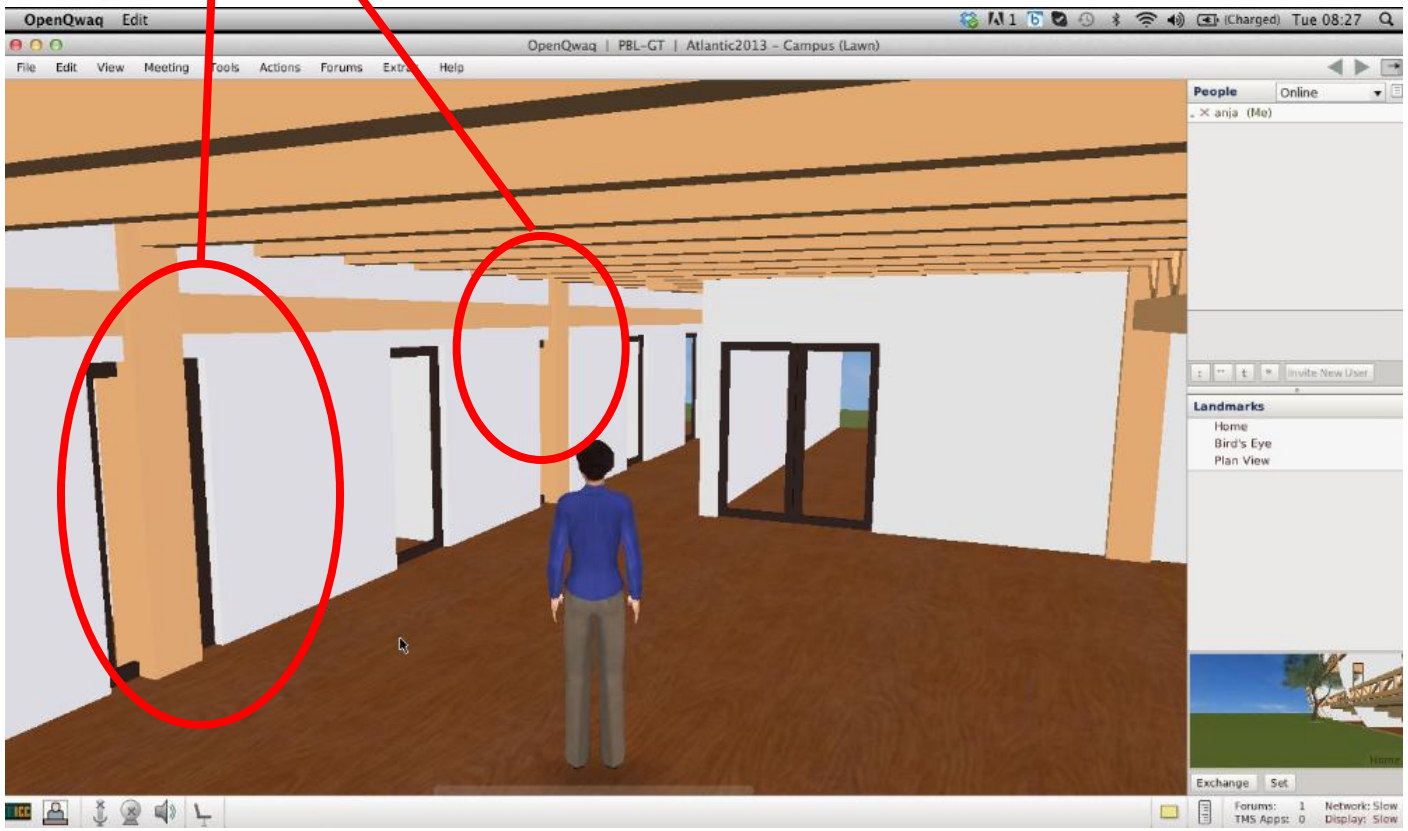
- Column 15”X15”, Glulam
- Truss 3 1/2’ Deep, Glulam (Top/Bottom Chord 6”X8”, Web 5”X6”)
- Auditorium Truss 6’ Deep, Glulam (Top/Bottom Chord 10”X12”, Web 5”X6”)
- Joist 6 3/4”X15”, Glulam Auditorium Joist
- 3 1/8”X7 1/2”, Glulam Shear Walls 8” Thick, Glulam





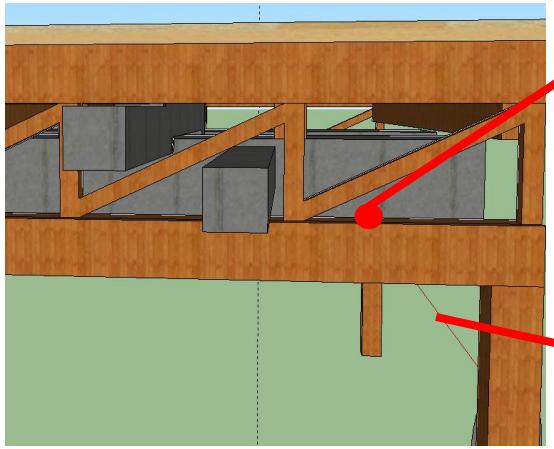
Coordination Between SE and Arch

- The structural column is in front of the door
- Realize the architectural design was not updated

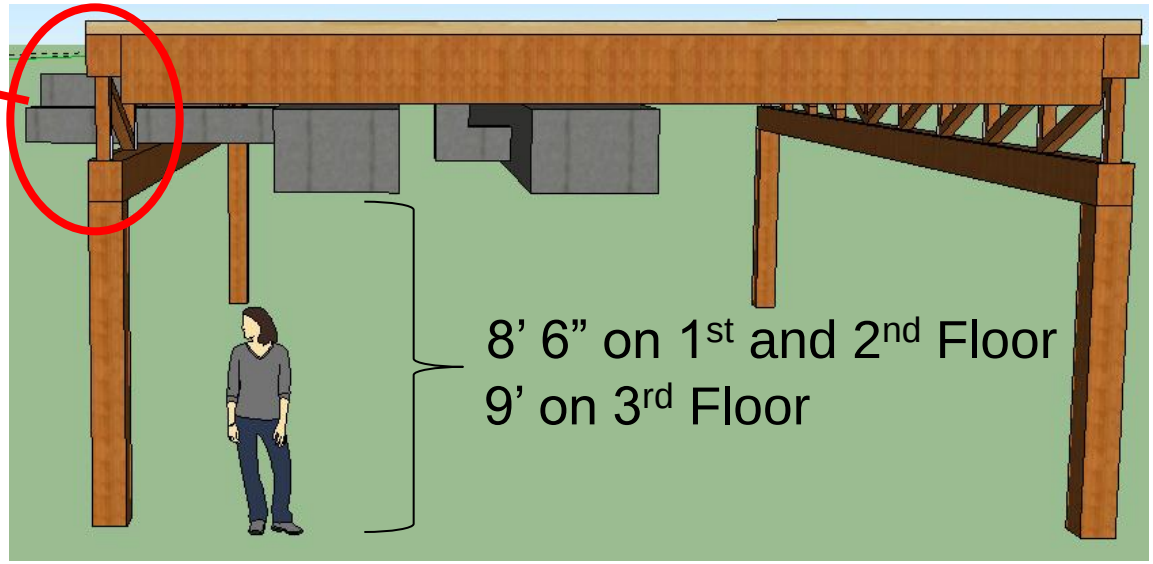


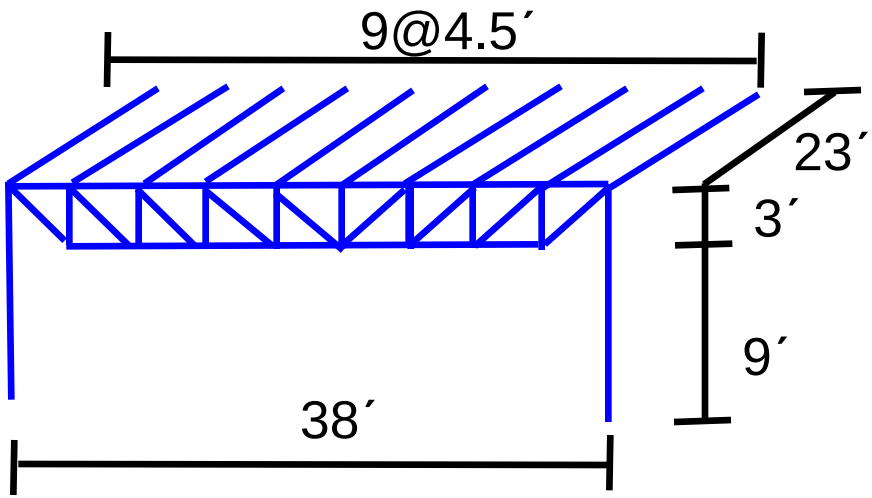
Coordination Between SE and MEP

- Select truss to enable MEP ducts can go through
- Negotiate the dimension of truss and allocation of ducts

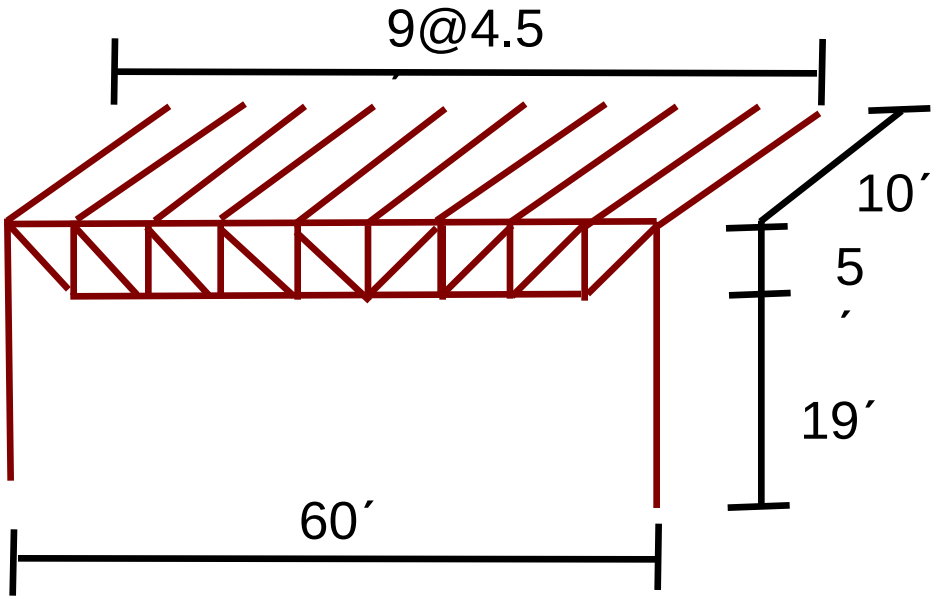


Typical Joist 6 3/4”X15”, Auditorium Joist 3 1/8”X7 1/2”
Top/Bottom Chord 6”X8” on 1st & 2nd Floor, 10”X12” on 3rd Fl
Diagonal Web 5”X6”
Duct 12”X12”

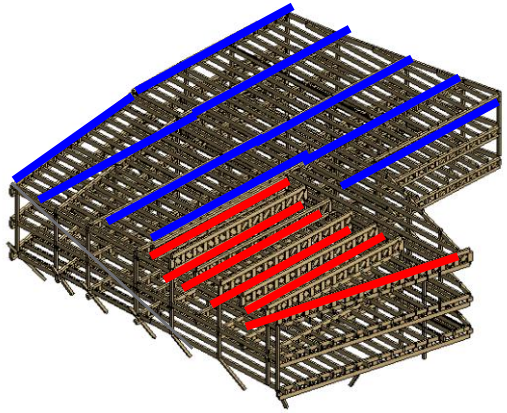




Typical

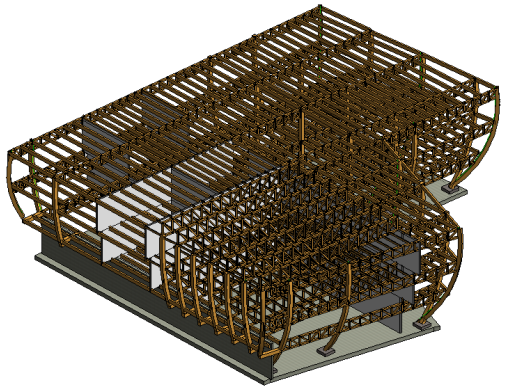


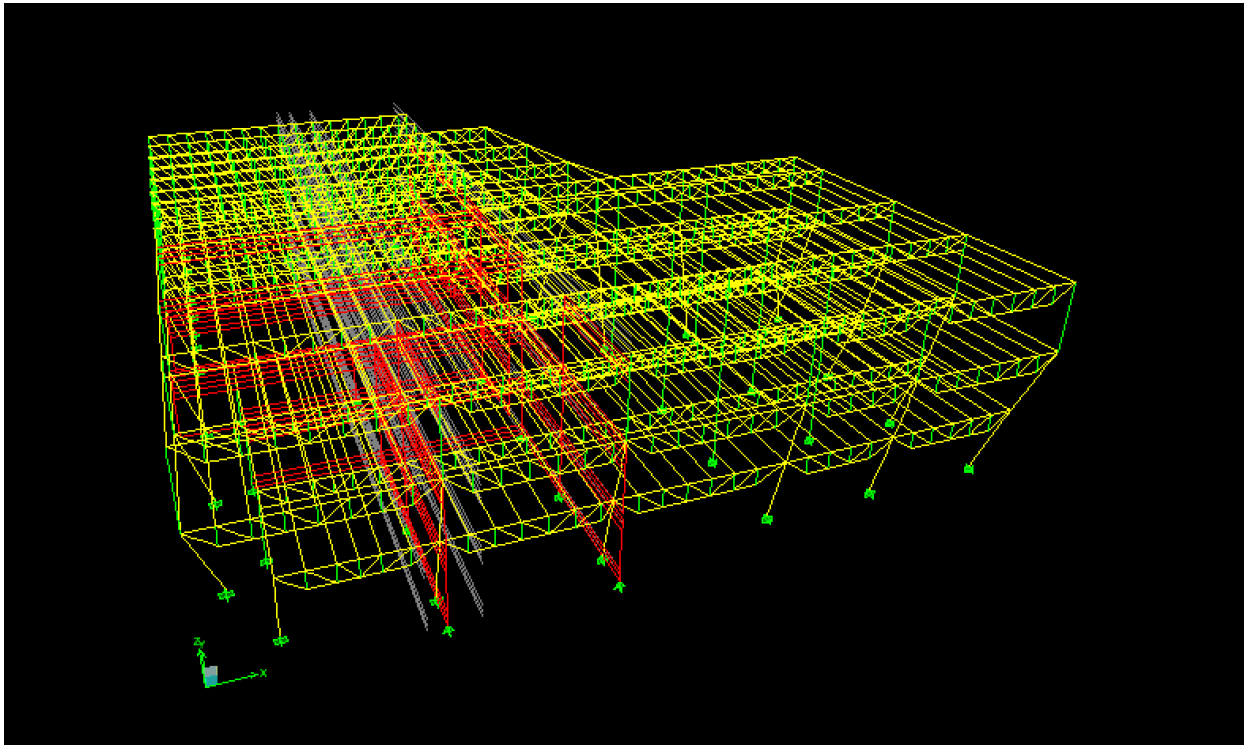
Framing Above Auditorium

	Joist	Truss Chord	Truss Diagonal	Column
 Auditorium	6 3/4”X15”	10”X11.5” 6”X8”	5”X6”	15”X15”
	3 1/8”X7	10”X11.5	5”X6”	15”X15”

Etabs Analysis

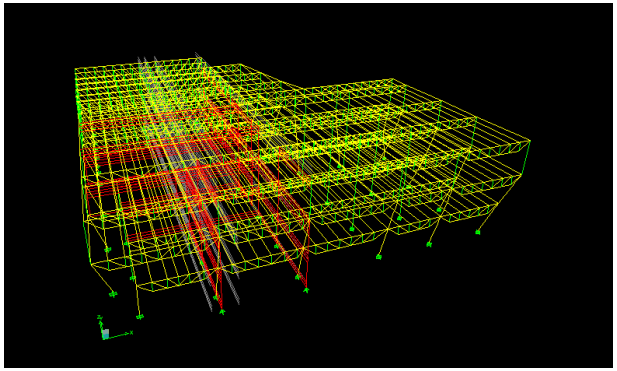
- 3D Structural Model
- Gravity system
- Lateral resistance system

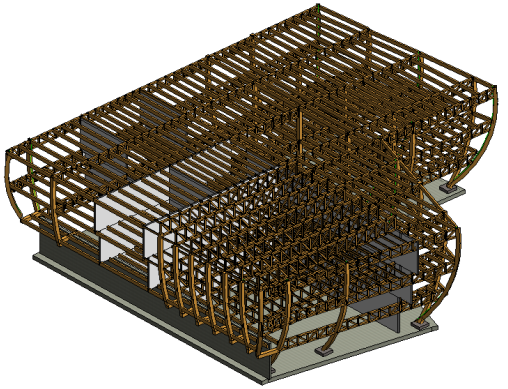


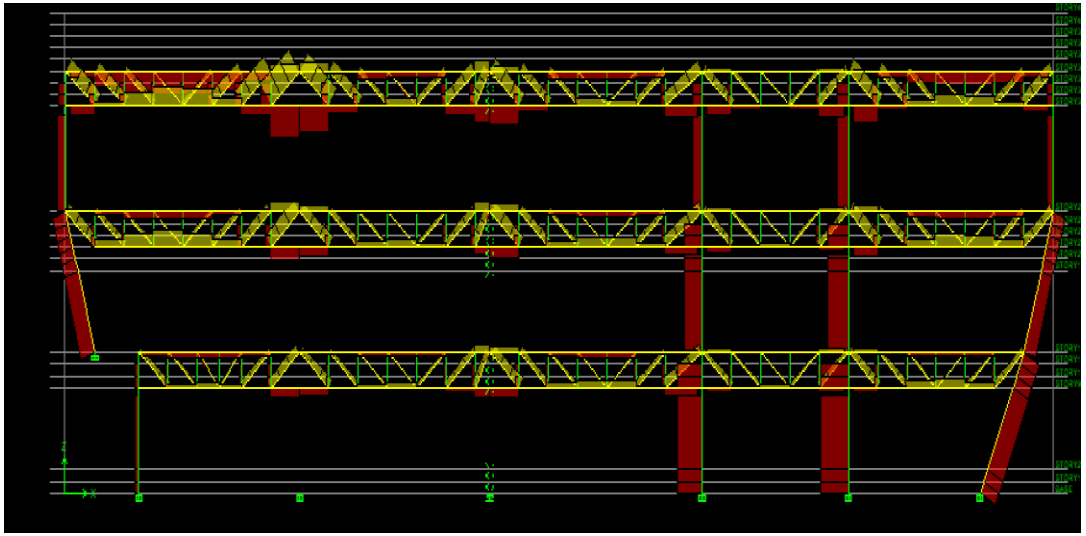


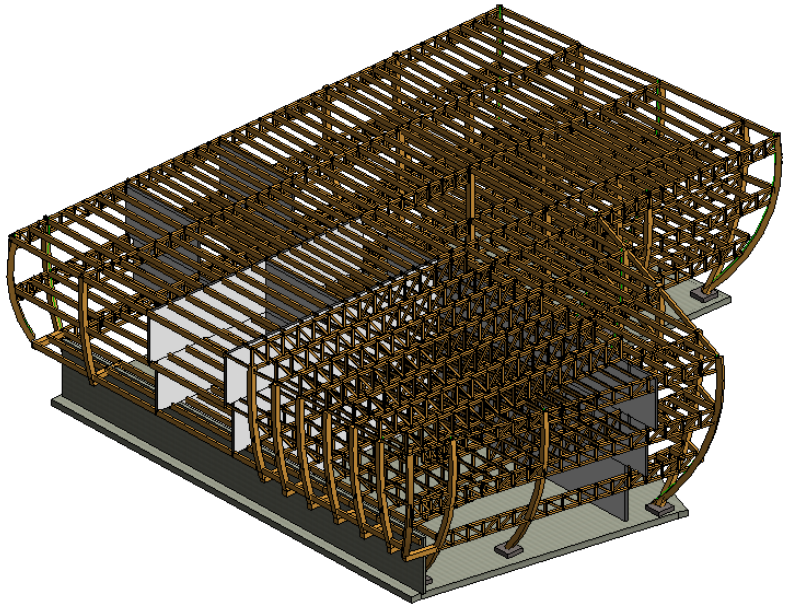
- ETABS Results

Element	Deflection(in)	Limit (in) D+L/240
Truss 32´	1.46	1.6
Truss 58´	1.91	2.9



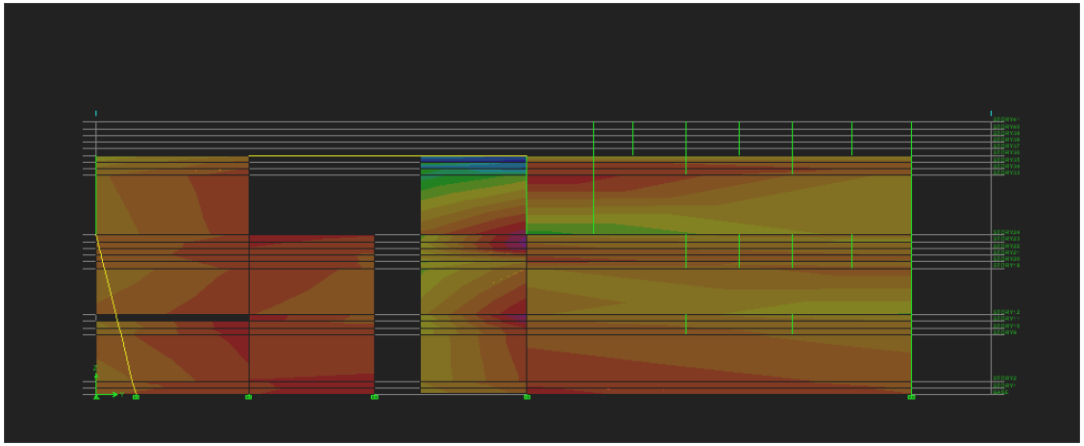


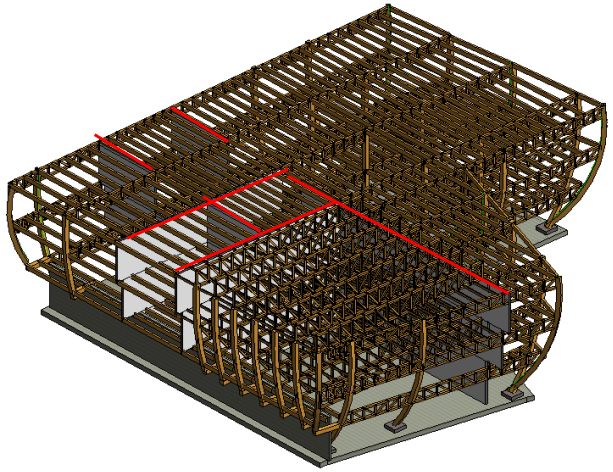




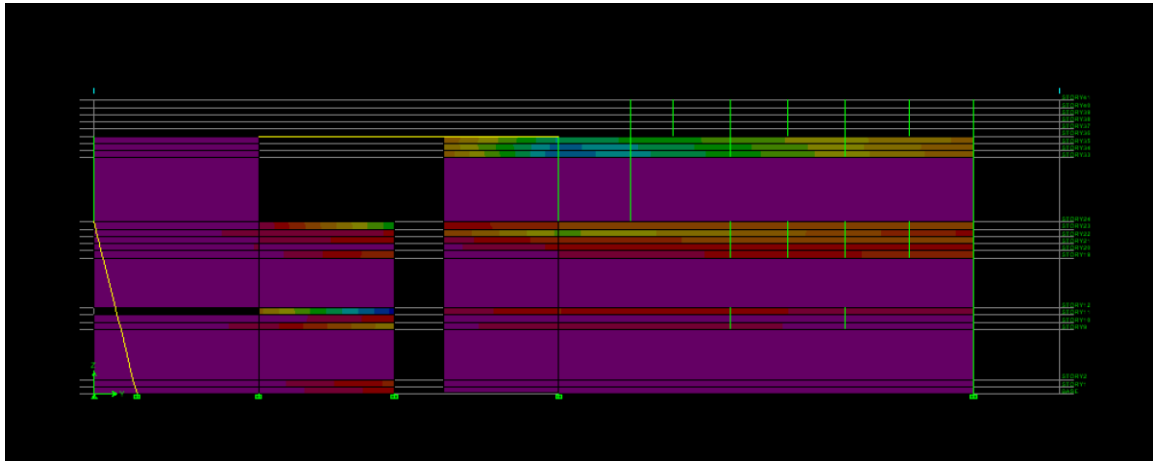
Element	Axial Load (kips)
Interior Column	271
Exterior Column	166
Brace (T)	67
Brace (C)	58
Top Chord (C)	155
Bottom Chord (T)	133

- Shear Wall

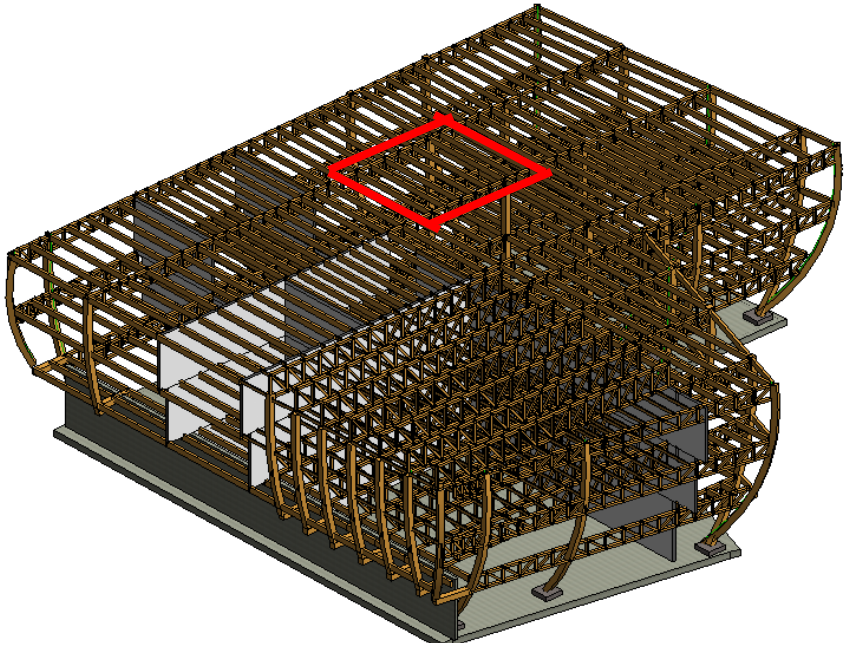


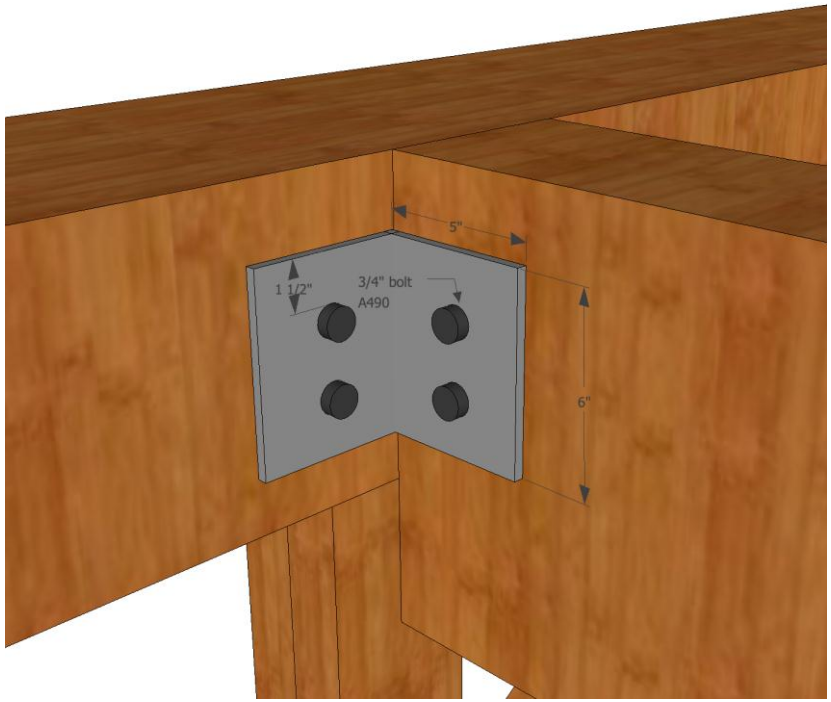


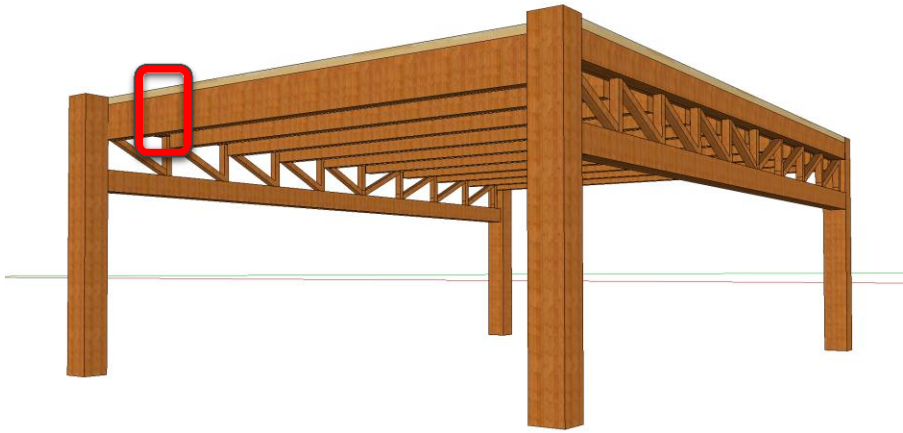
- Shear Wall
- Crosslam 8”
- Fmax = 270k
- Vmax =68.25k
- Fv= 0.175 ksi
- Fc= 2.75 ksi



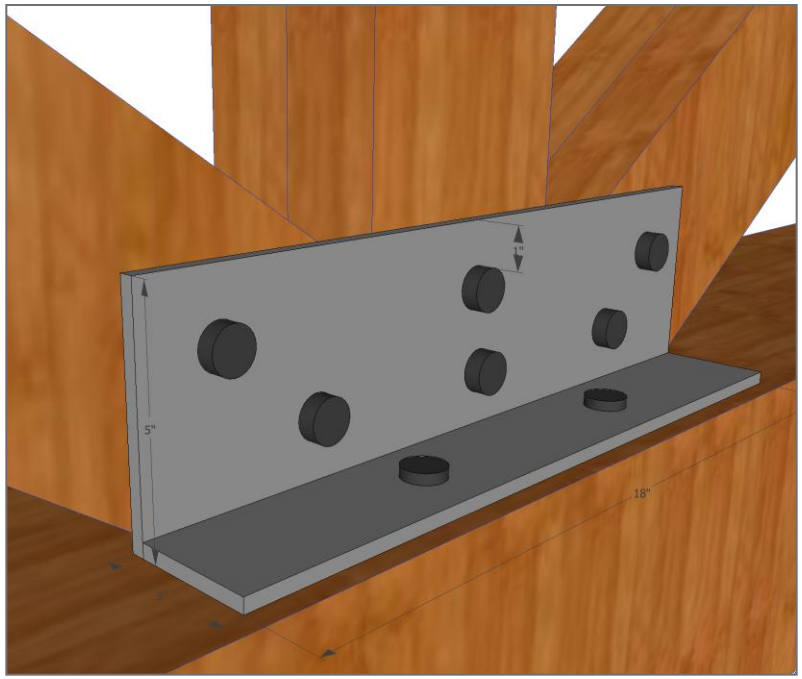
- Beam- truss connection
- A490 2 bolts d= 5/8”
- Angle L 5x5x 5/16 (Shear)
- Rn = 15 kips per bolts
- Bolts in shear

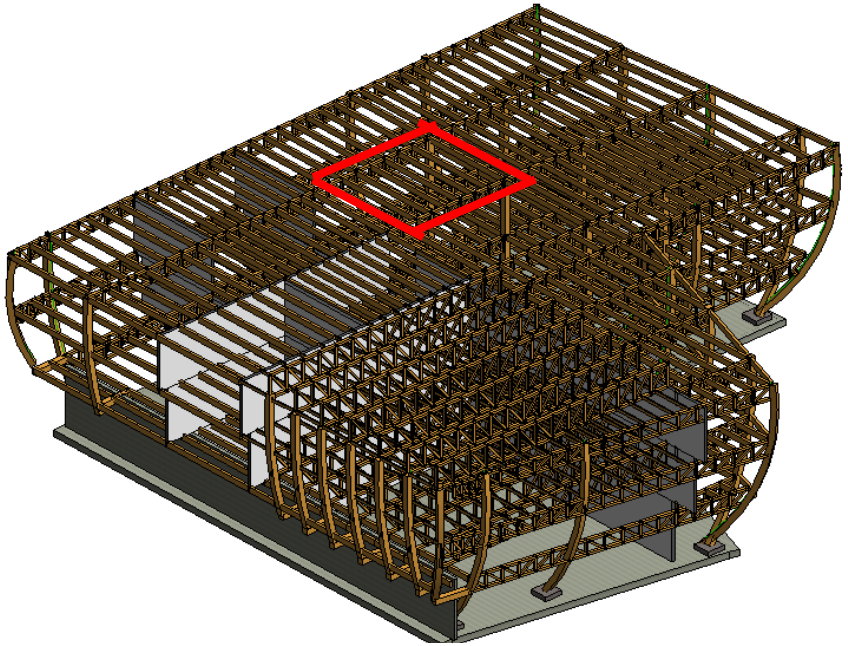


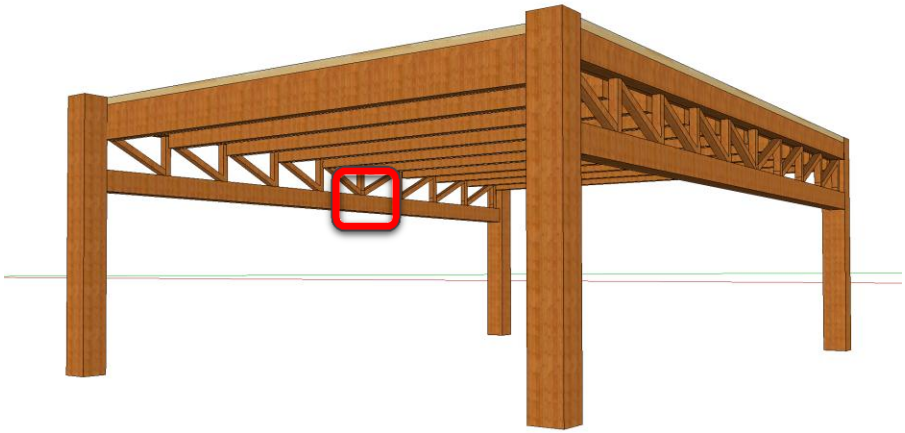




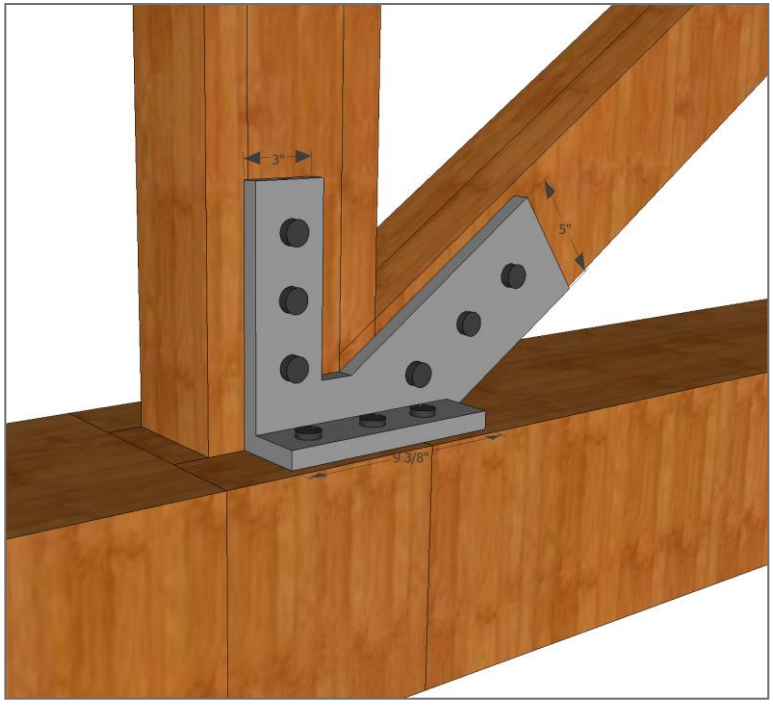
- Truss Connections
- 4 bolts A490 d= ¾”
- L 5x 3x 5/16
- Rn bolts = 27.8 kips
- Bolts in shear and tension

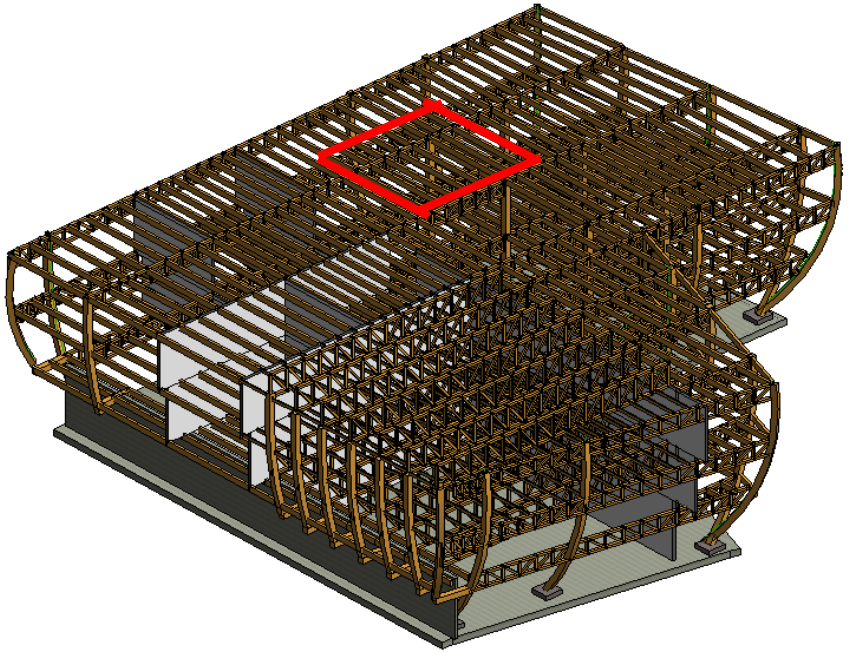


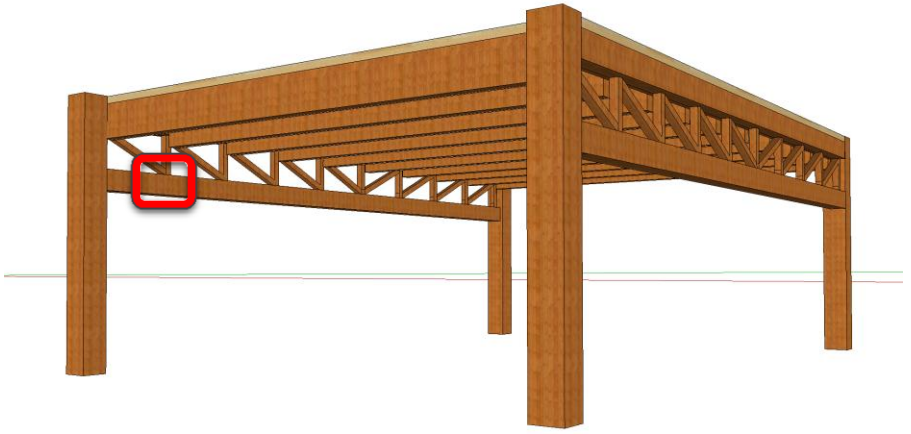




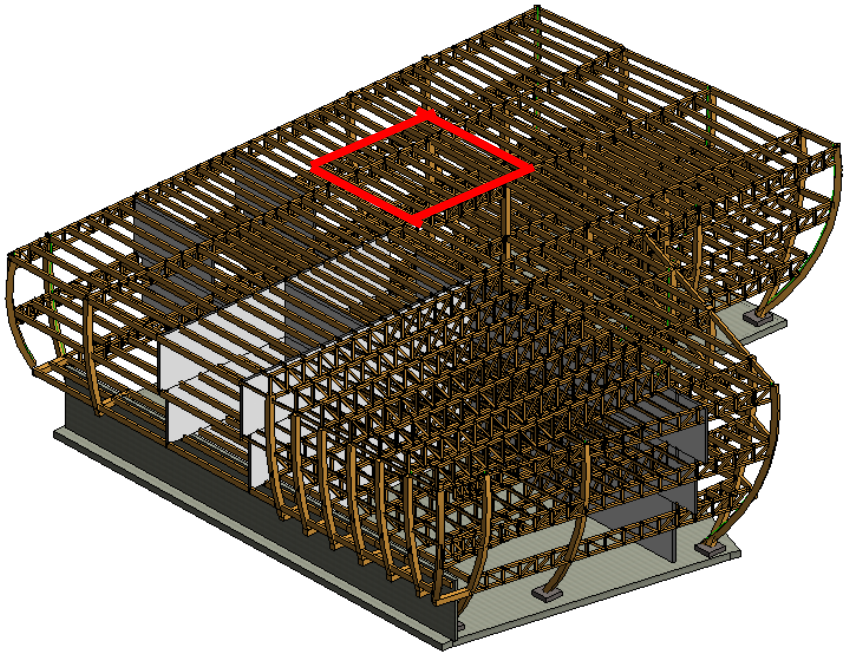
- Truss Connection
- 7 bolts A490 d= 3/4”
- 5/8” plate
- Rn= 27.8 kips
- Bolts in shear and tension

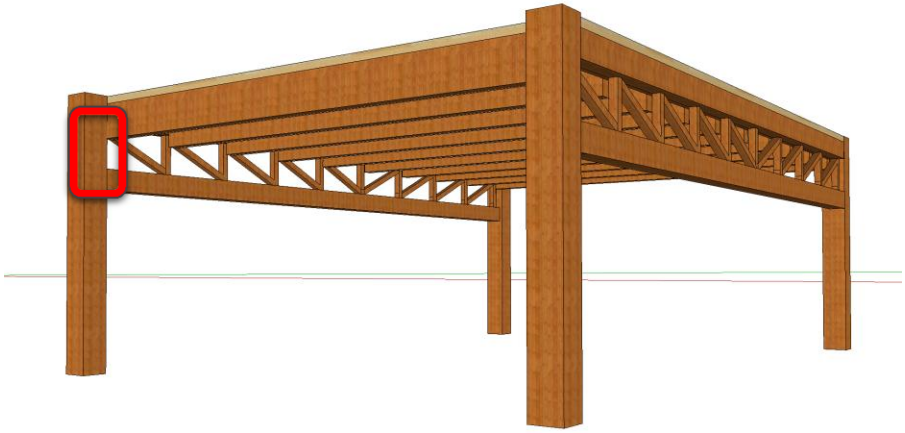






- Truss-Column
- 8 bolts A490 d= ¾”
- L 5x 3x 5/8
- Rn bolts = 27.8 kips
- Bolts in shear





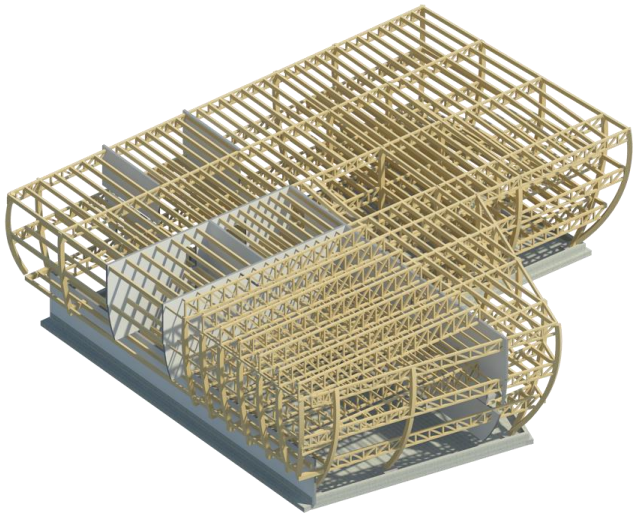
Cross Lam2 ½”-Structure

- Cross-layered construction
- Reduce carbon footprint
- Ready to assemble system

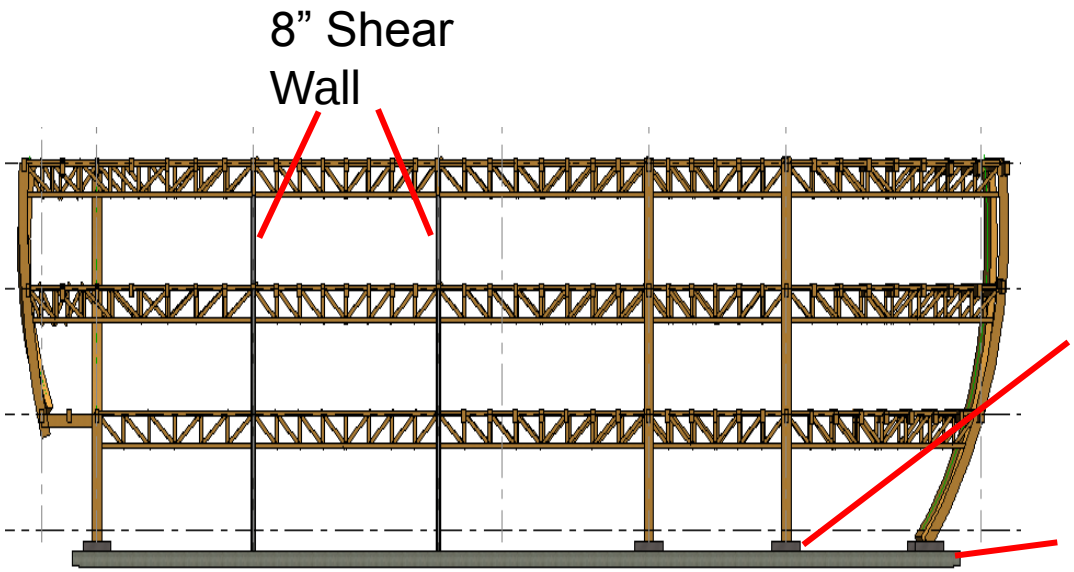
+

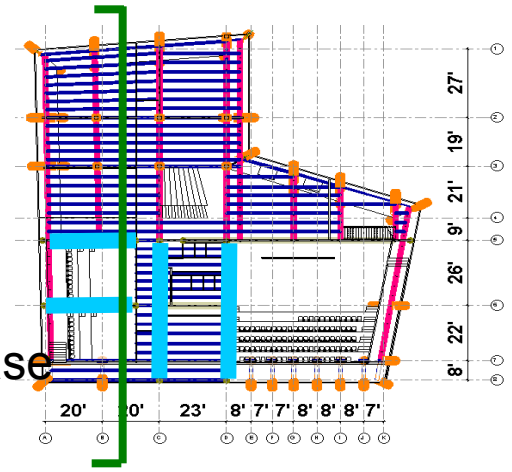
Finish 1 ½”

- Wear Layer
- Paper Layer
- Balance Layer

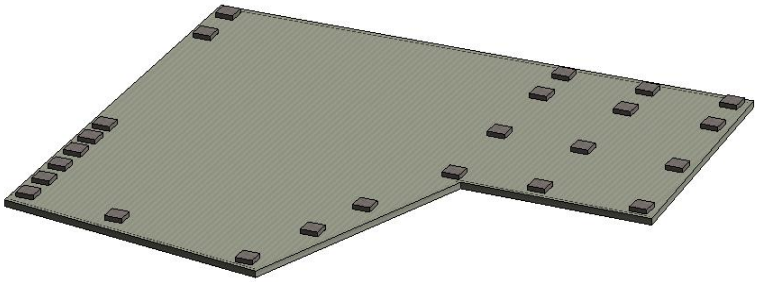


Mat Foundation

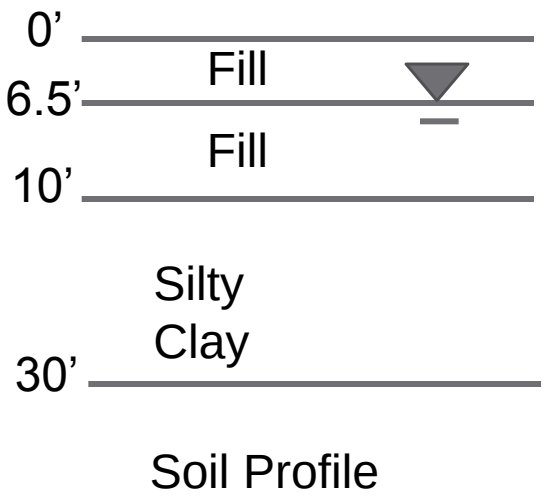




2´ Foundation Slab

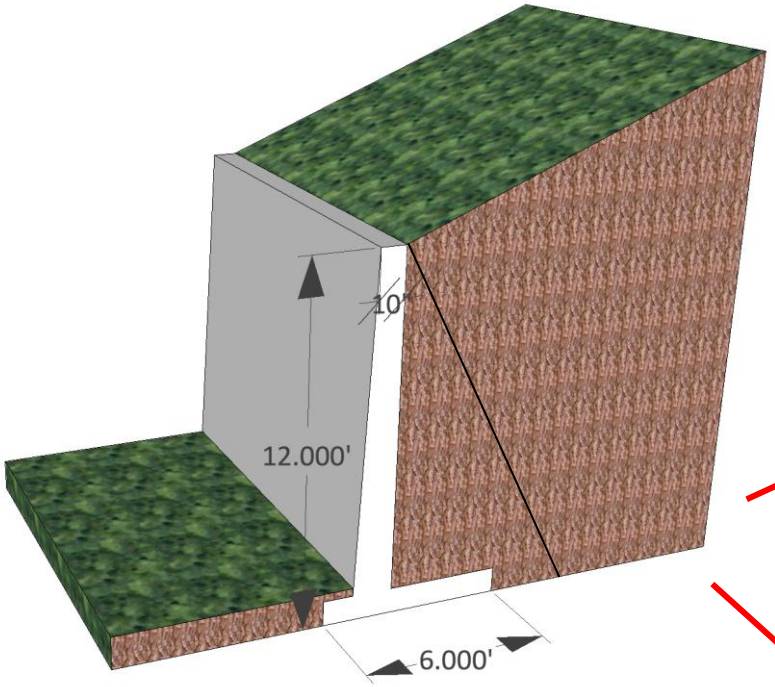


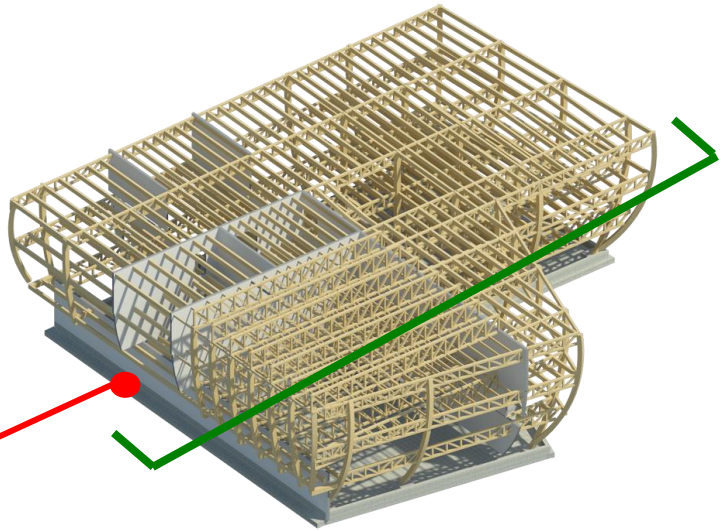
Mat Foundation

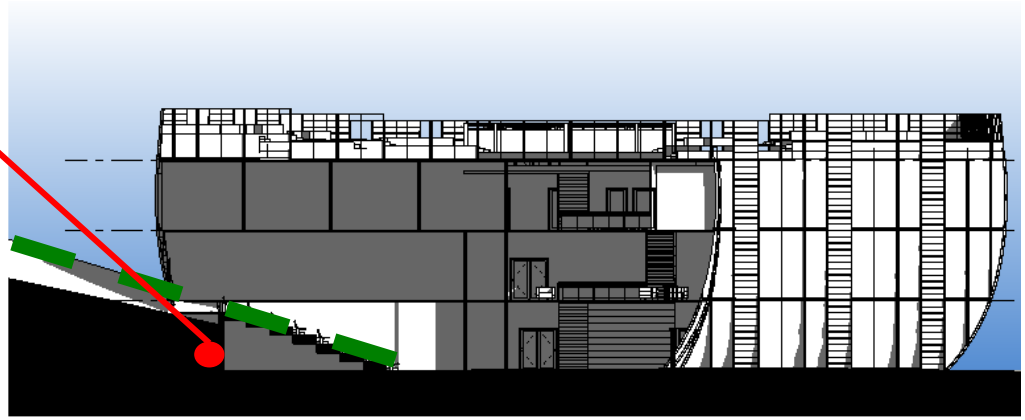


Soil Profile

Retaining Wall







Max Soil Load: 520 KSF

Max O. Moment: 12.5 k· ft/ft

Agenda

MEP engineering

Chilled Beams

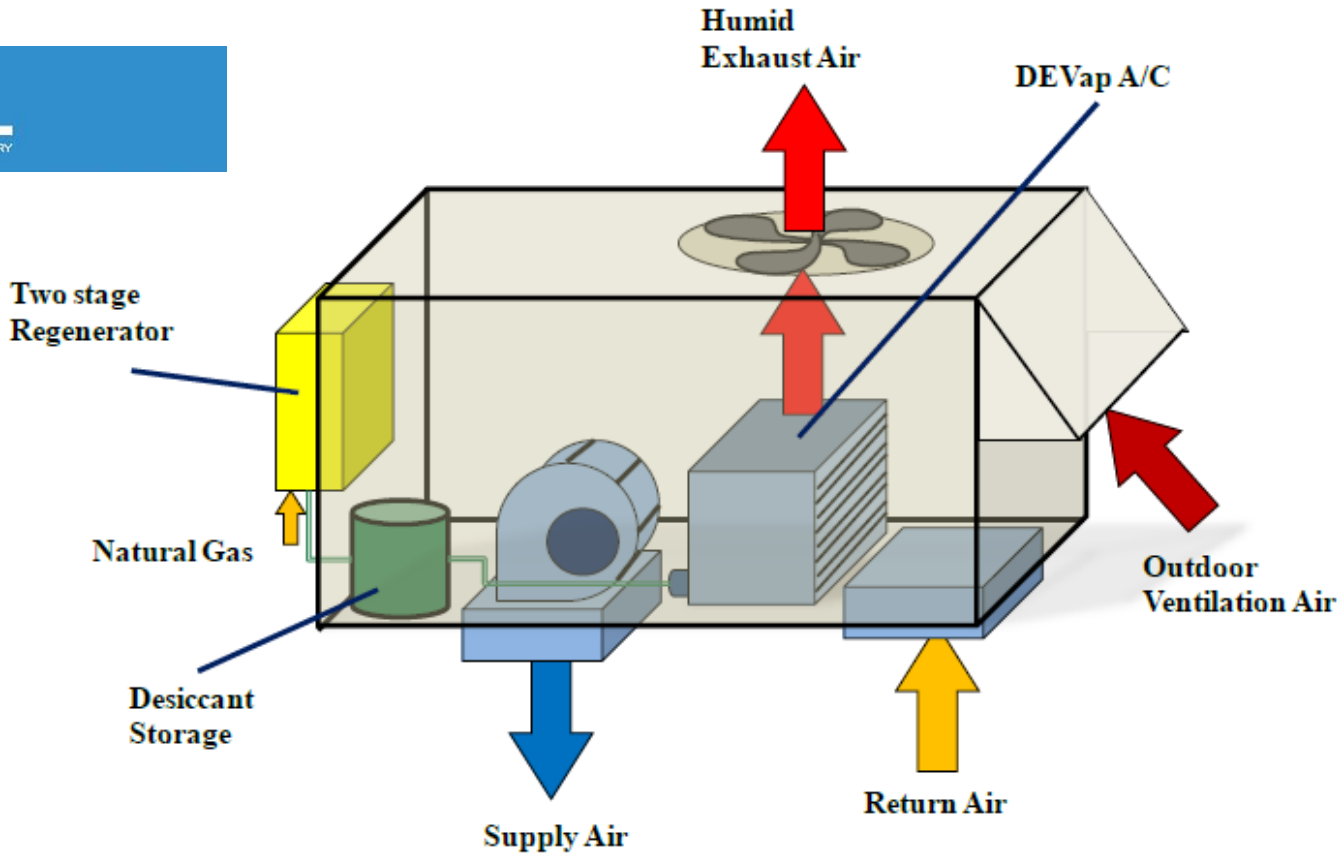
- Lower fan energy
- Wider comfortable temperature range

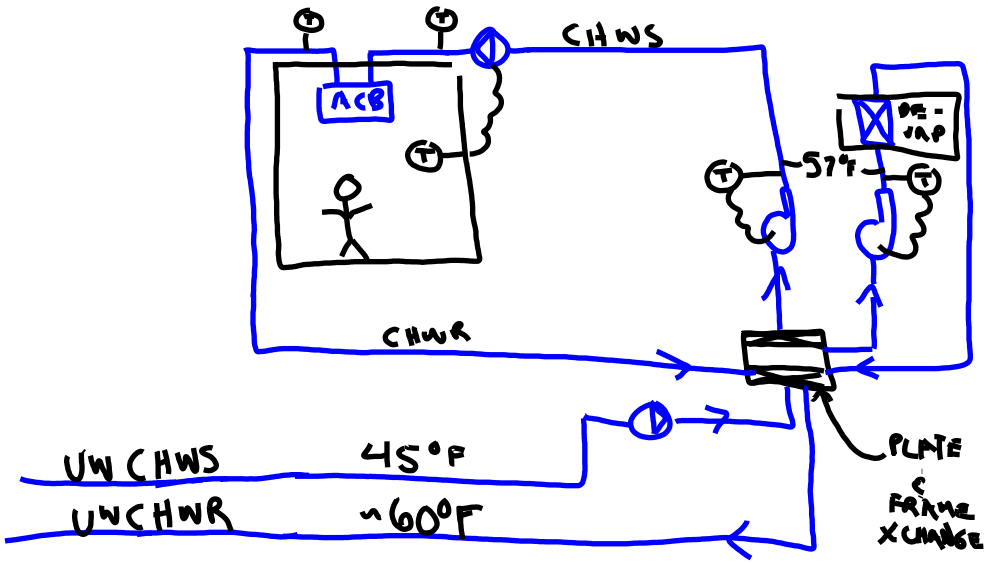
VAV in spaces with high flux

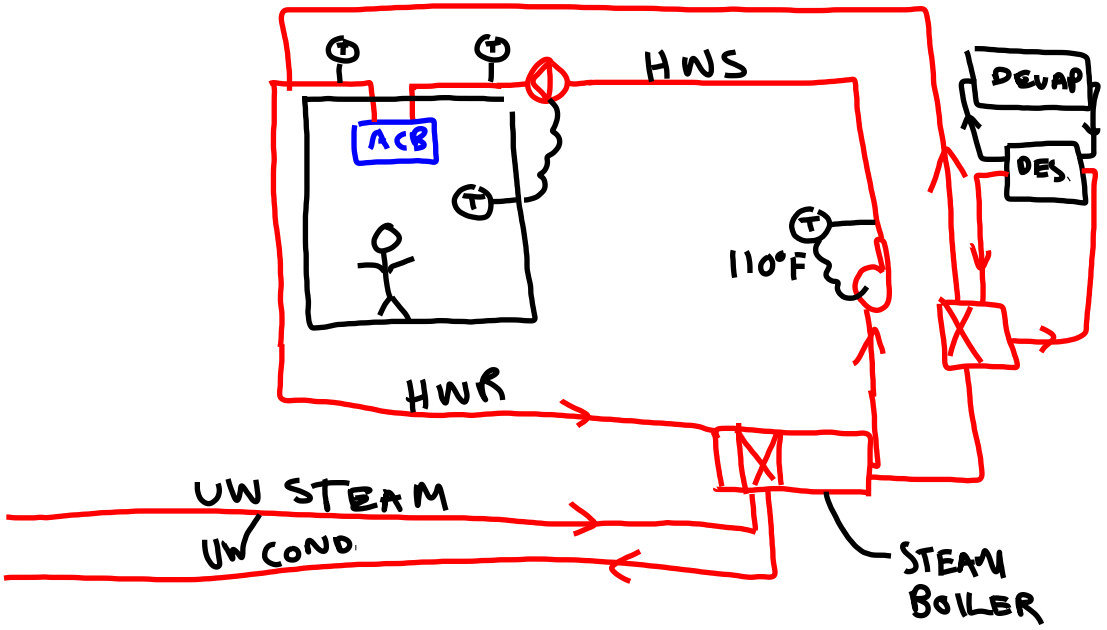
- Reacts to changes quicker than chilled beams
- Underfloor in auditorium

- DeVap system
  - Remove humidity with desiccant
  - Cool evaporatively
  - New technology studied by NREL
  - Possible link to solar thermal

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

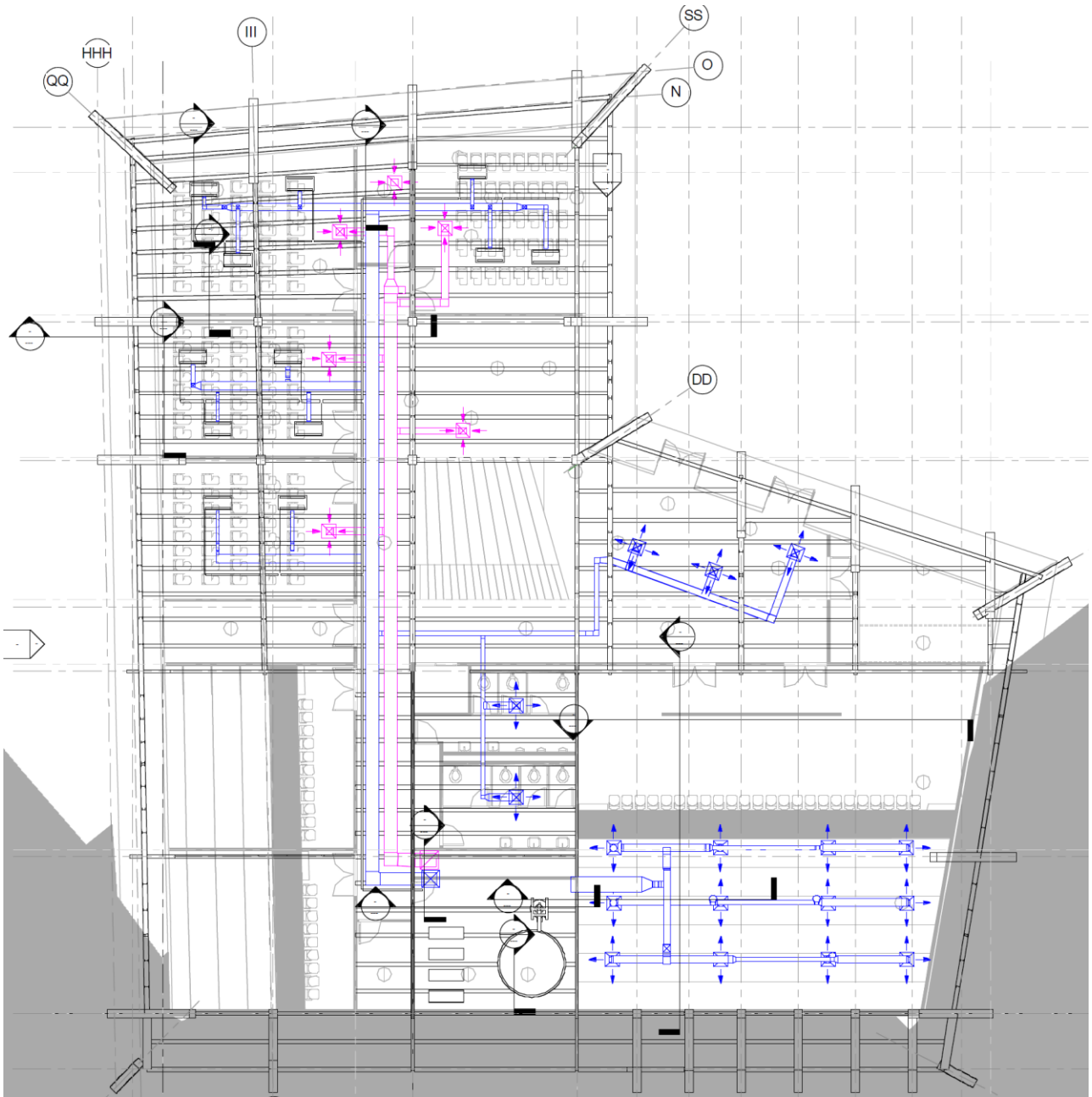



CHWS
ACB
DE-VAP
57°F
CHWR
UW CHWS
45°F
UW CHWR
~60°F
PLATE & FRAME XCHANGE


HWS
ACB
DEVAP
DES
110°F
HWR
UW STEAM
UW COND
STEAM BOILER

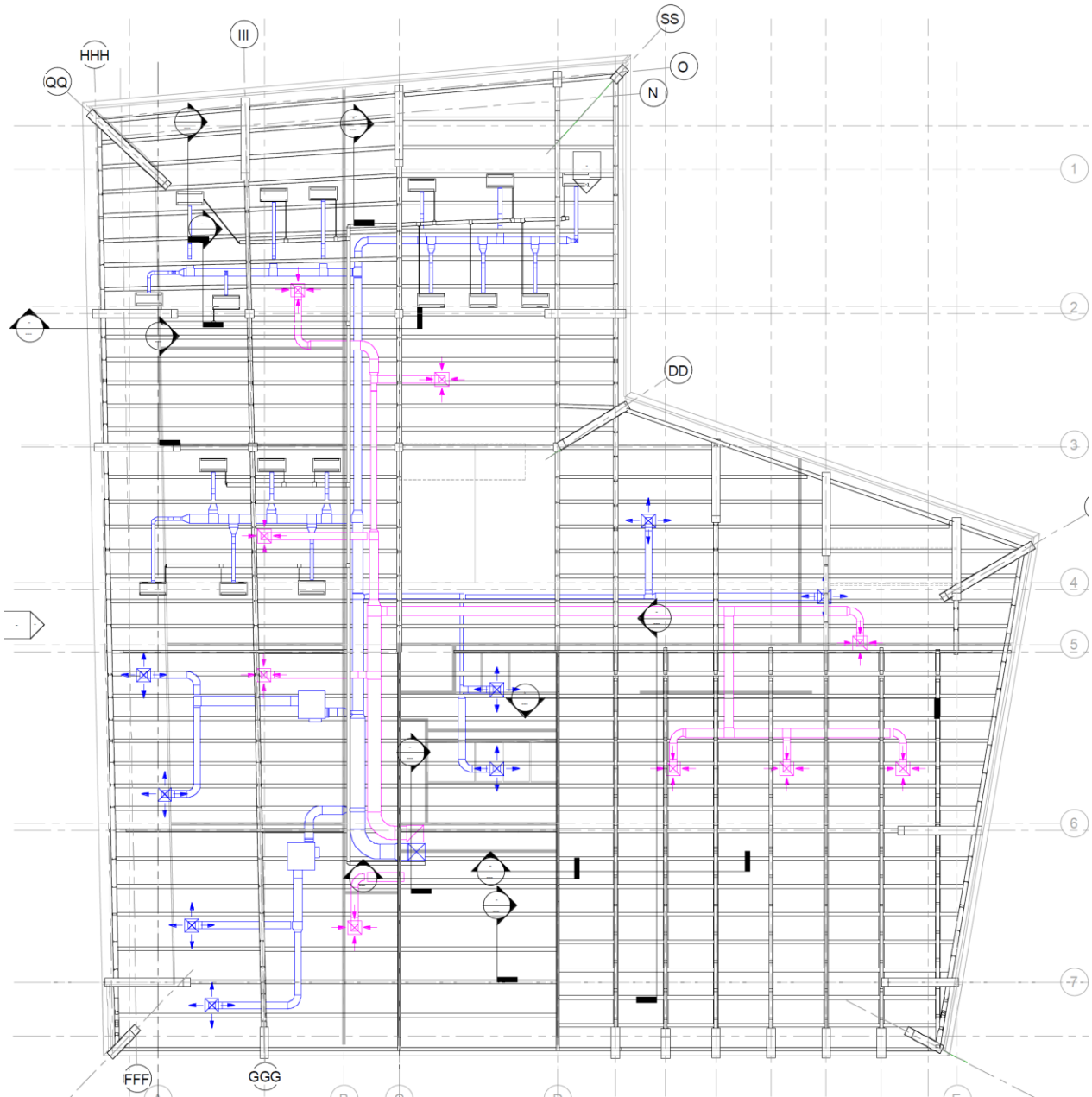
MEP/SE Floorplan 1

Atlantic MEP



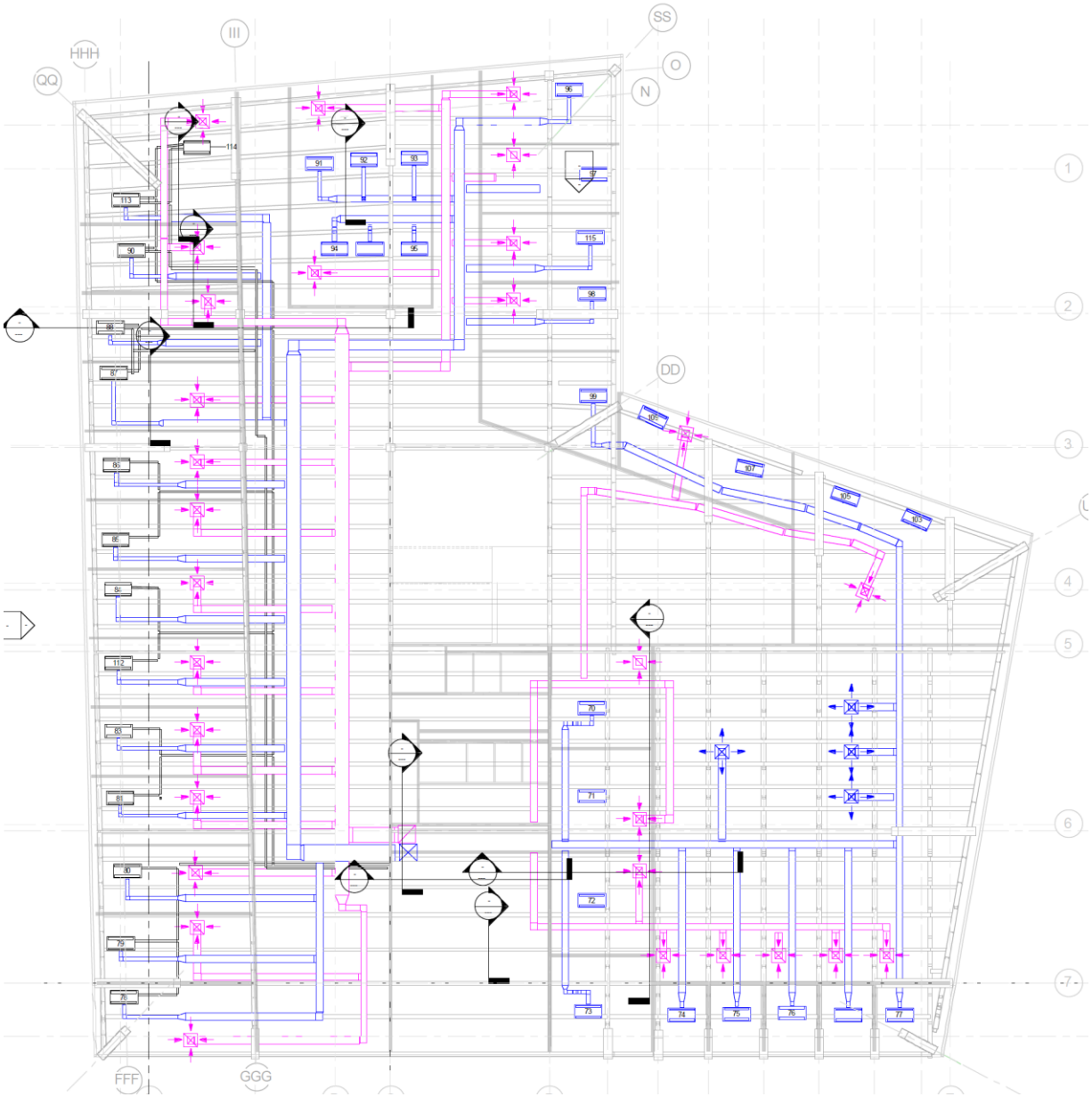
MEP/SE Floorplan 2

Atlantic MEP



MEP/SE Floorplan 3

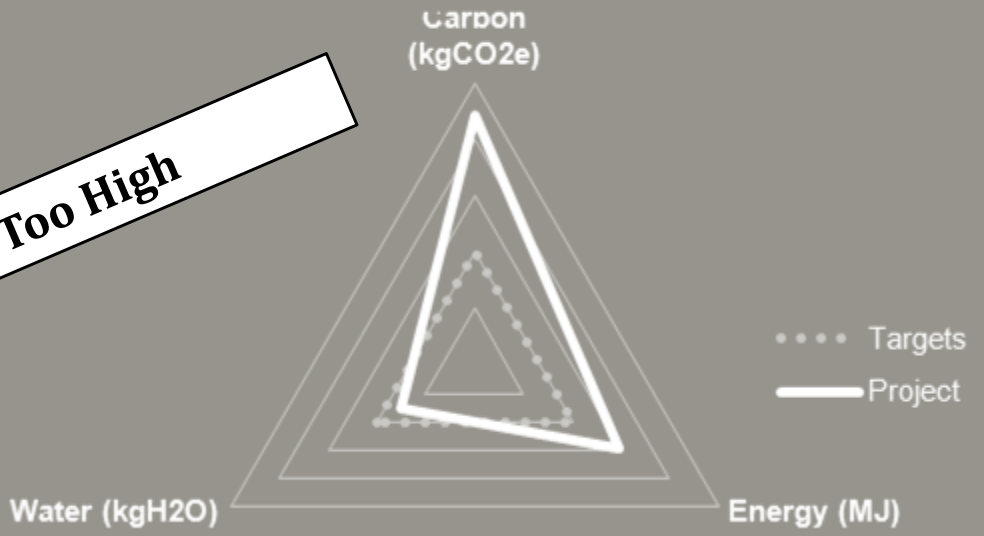
Atlantic MEP



Performance Relative to Life Cycle Impact Targets

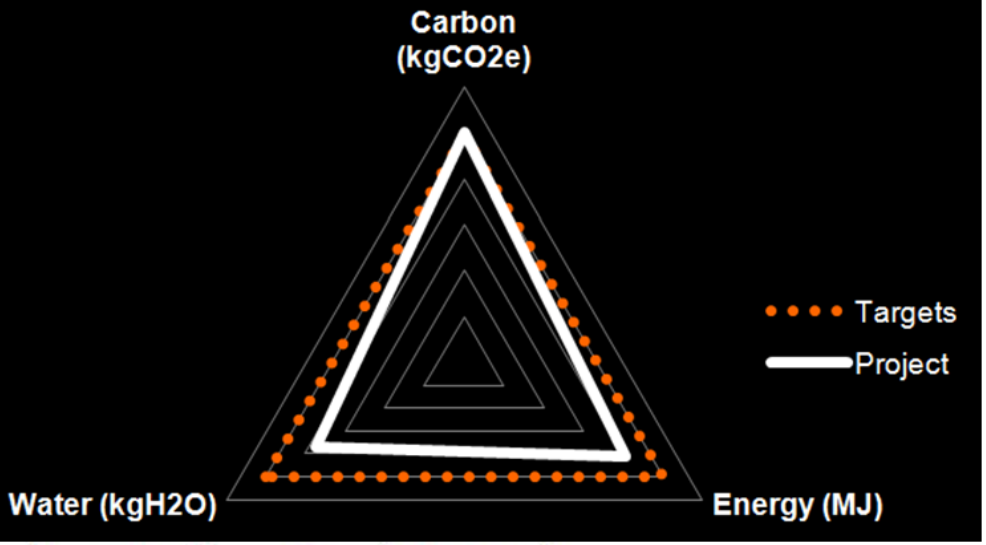
Impact	Target	Project	%
Carbon (kgCO2e)	6,737,582	14,960,913	222%
Energy (MJ)	158,937,616	235,431,004	148%
Water (kgH2O)	276,291,000	207,569,384	75%
Ozone (kgCFC11e	-	8.75E-01	-

Winter Quarter STV: Too High



Performance Relative to Life Cycle Impact Targets

Impact	Target	Project	%
Carbon (kgCO2e)	6,737,582	6,783,486	101%
Energy (MJ)	158,937,616	129,970,930	82%
Water (kgH2O)	276,291,000	205,965,486	75%
Ozone (kgCFC11	-	4.13E-01	-

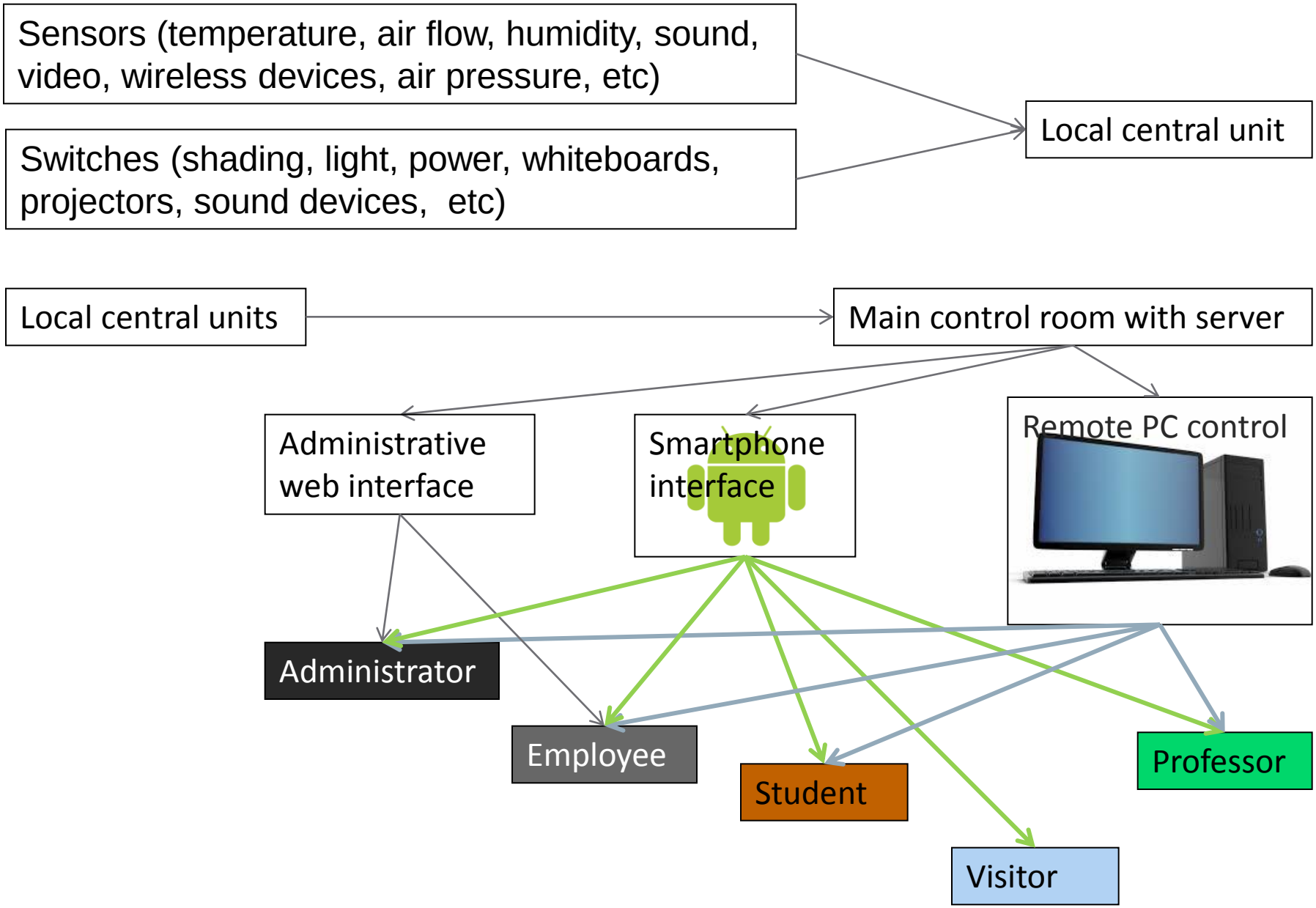


Existing technologies - Savant

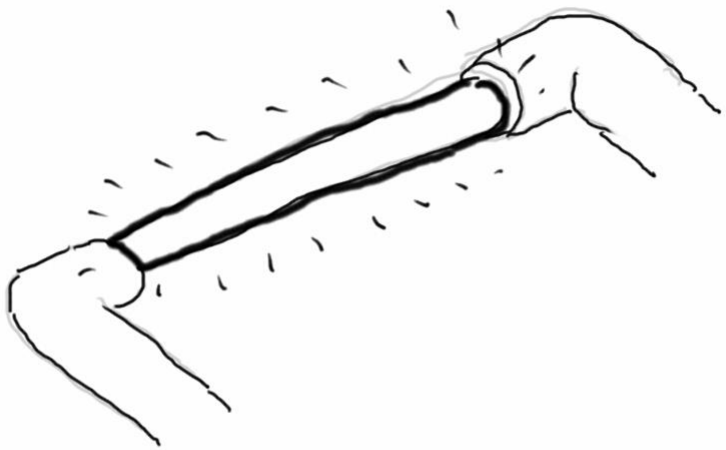
Existing technology - Nest

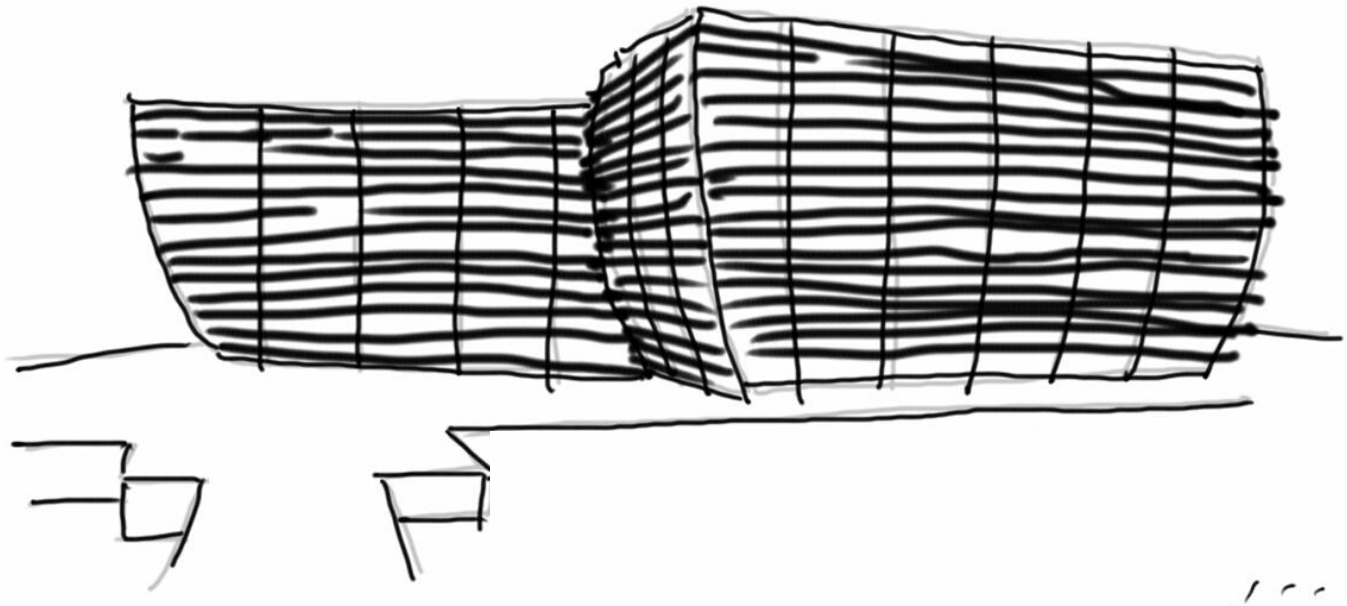
Existing technology – Gira

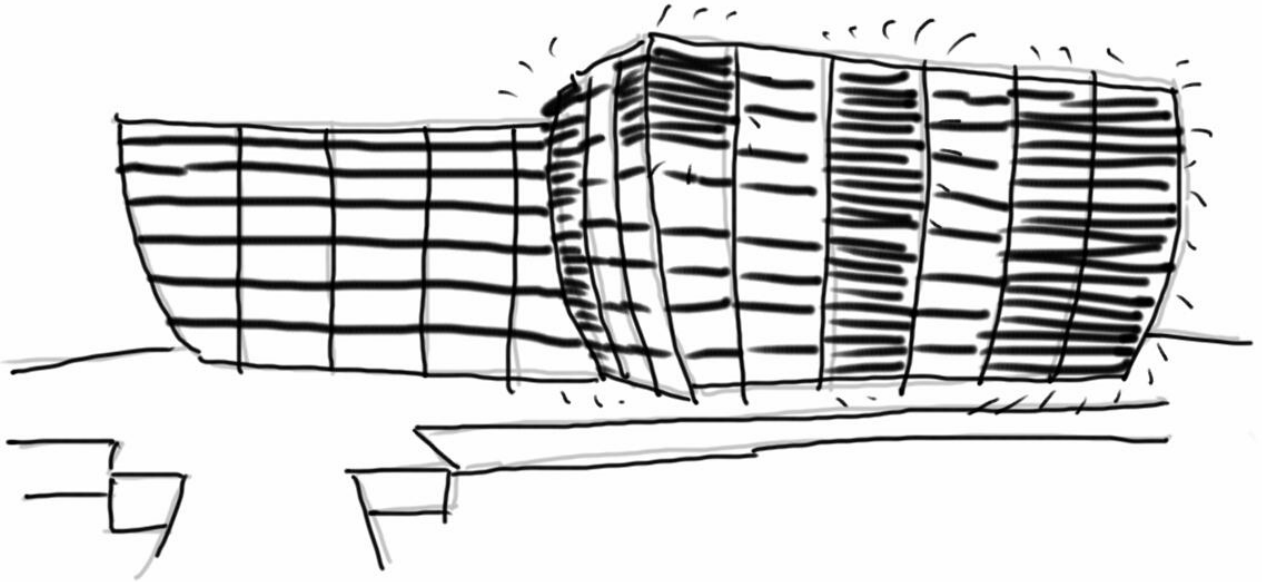
Smart system scheme



We save up to **17%** or $ 330,000 in 25 years in overall utility and maintenance with this system.



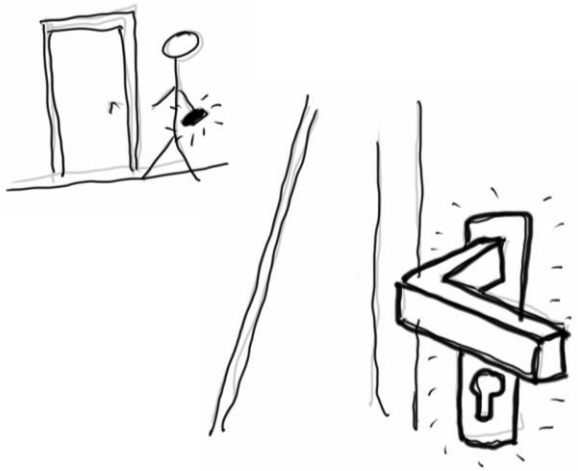


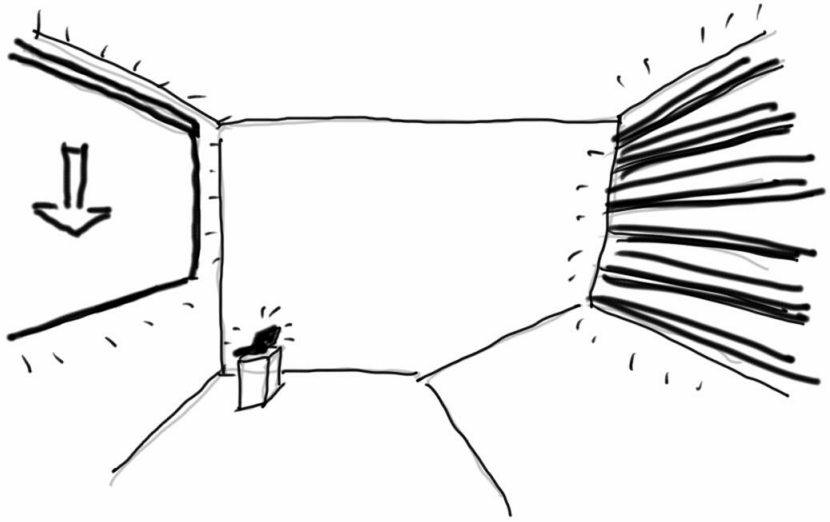


5 minutes per task = 87,5 hours per year

25 years and 200$ per hour = $ 437,500

VFM

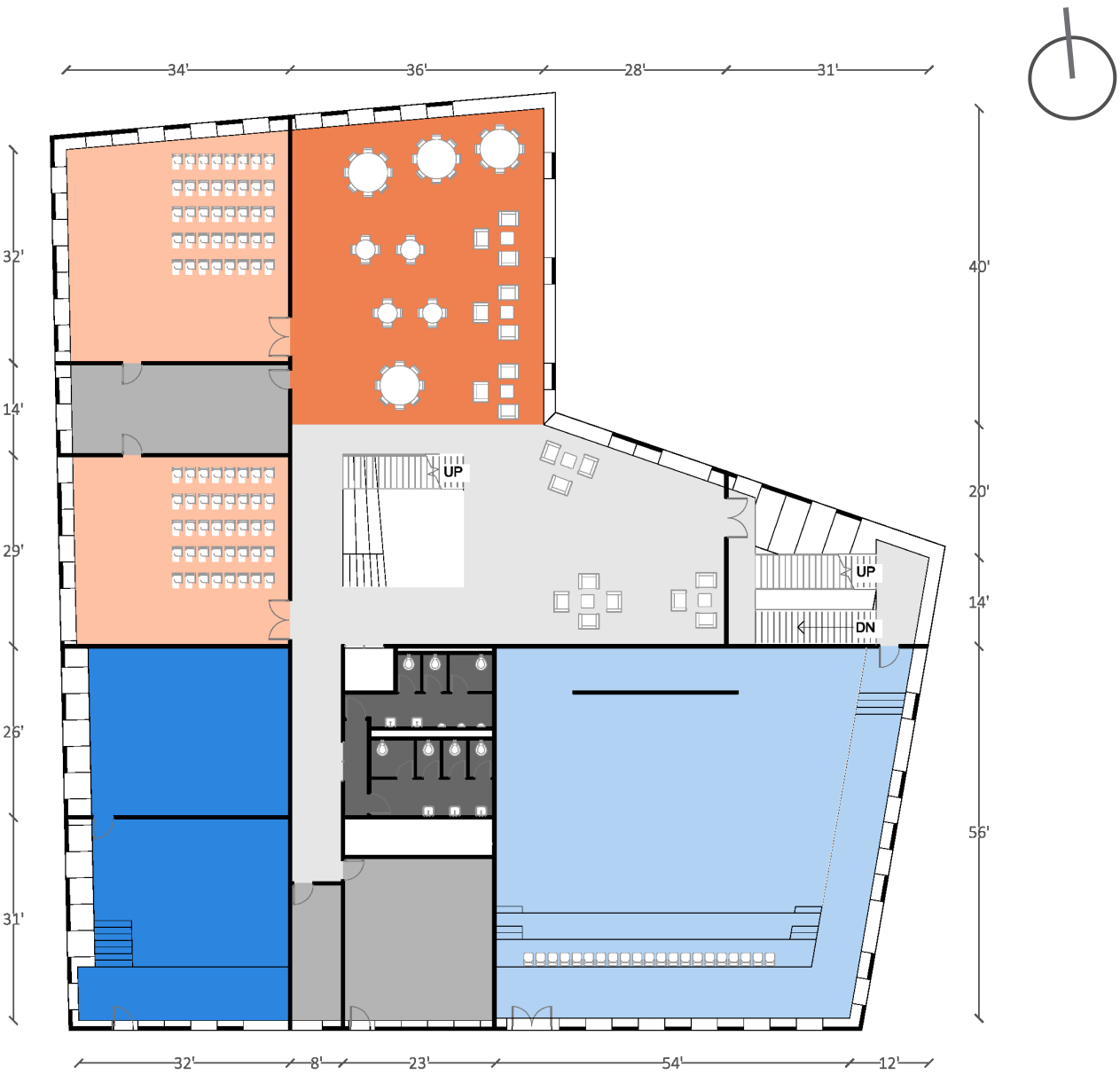




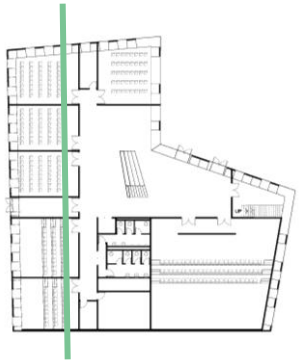
Agenda

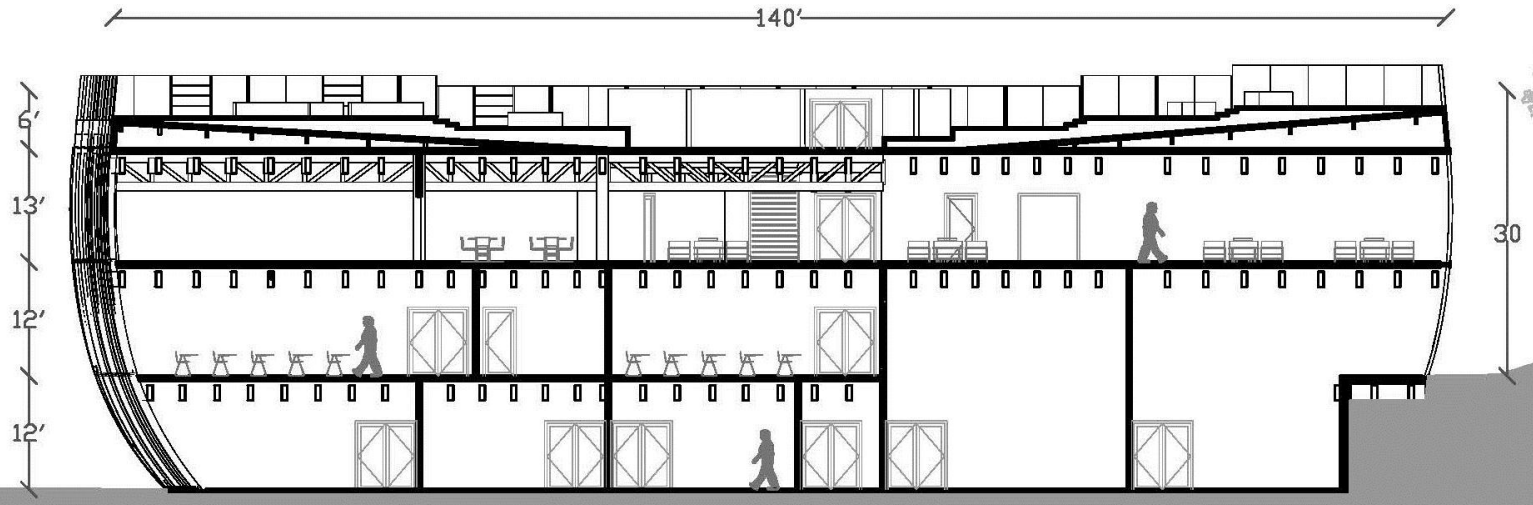
Floor Sandwich

- hall
- storage
- toilets
- instrucitonal lab
- collaboration space
- auditorium
- large classroom



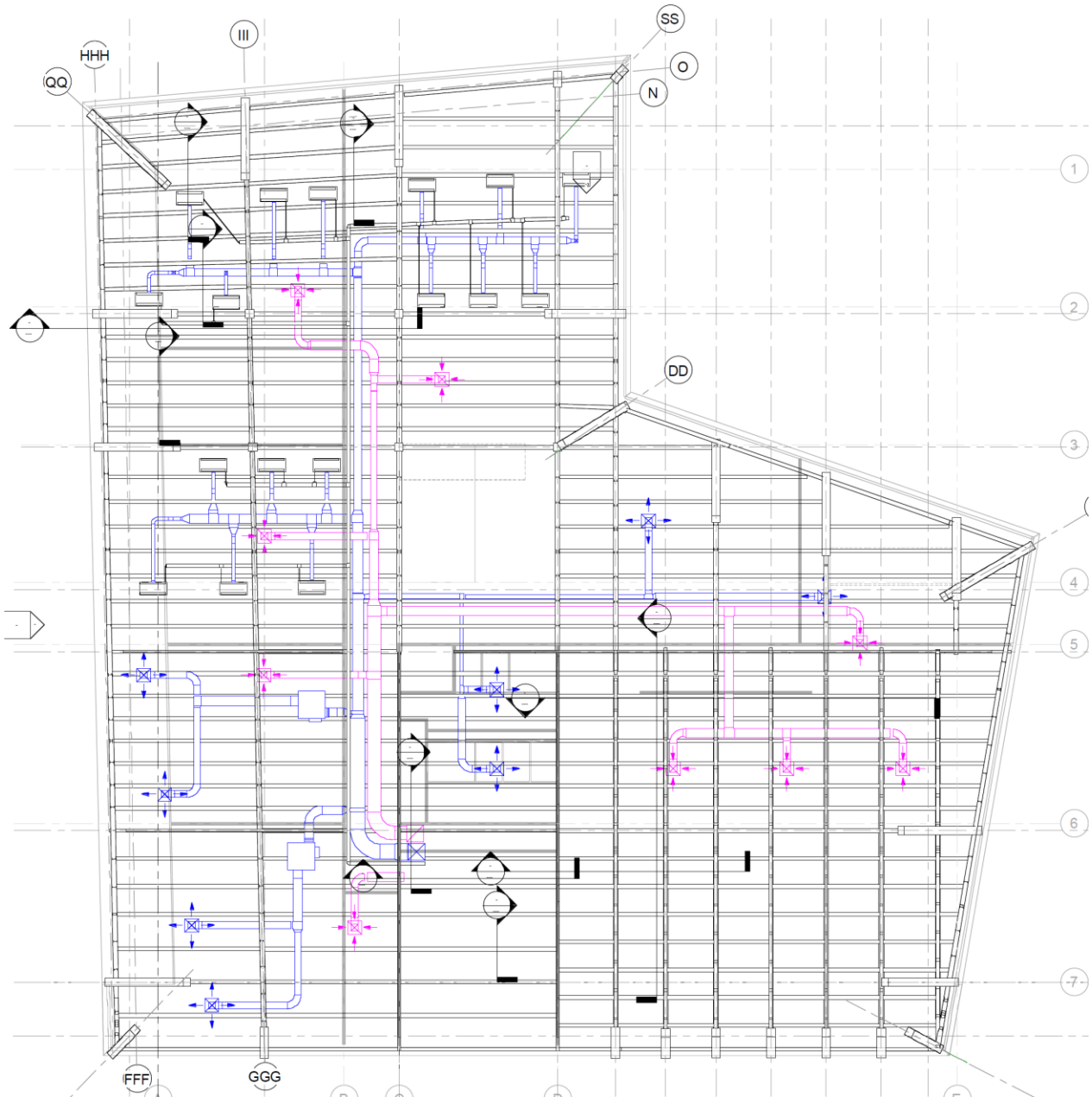
Section





MEP/SE Floorplan 2

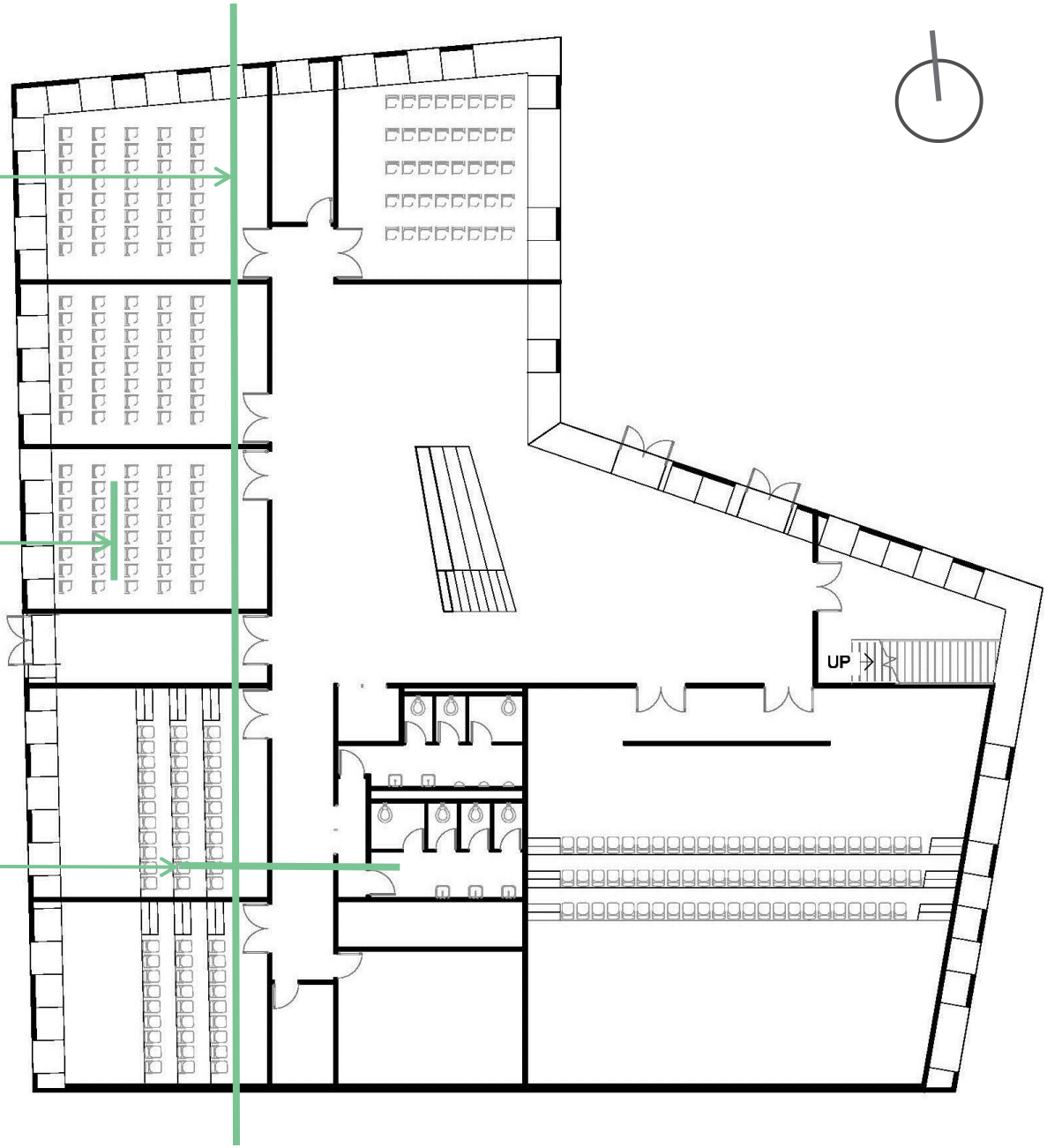
Atlantic MEP



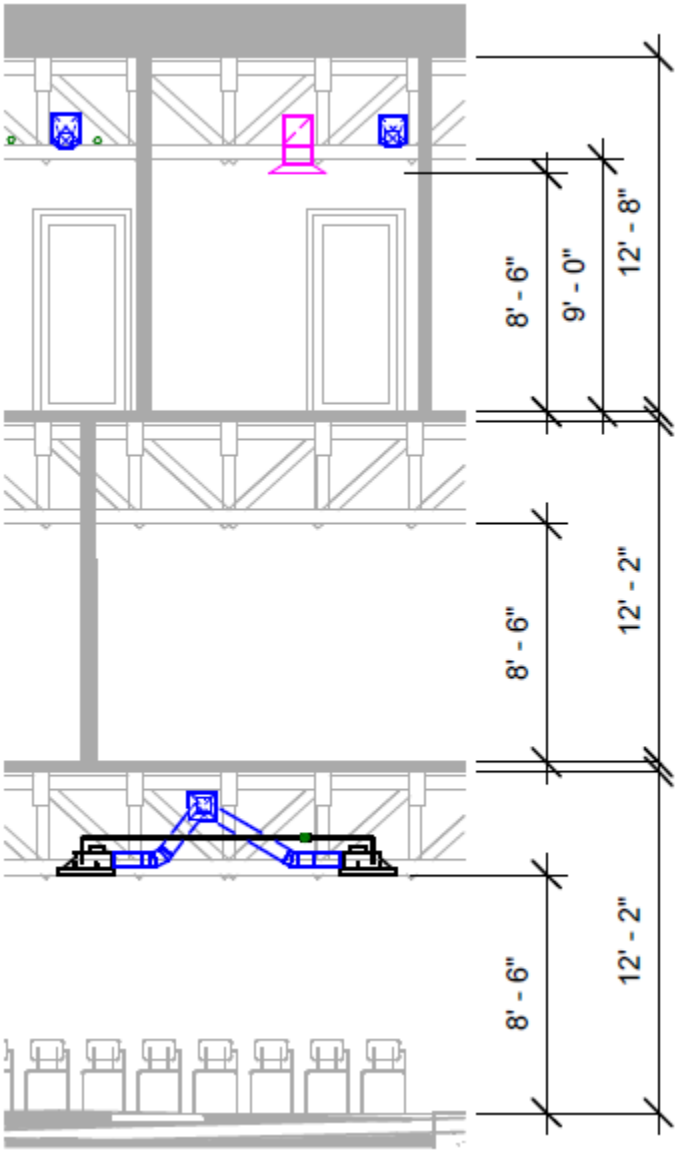
Overall section

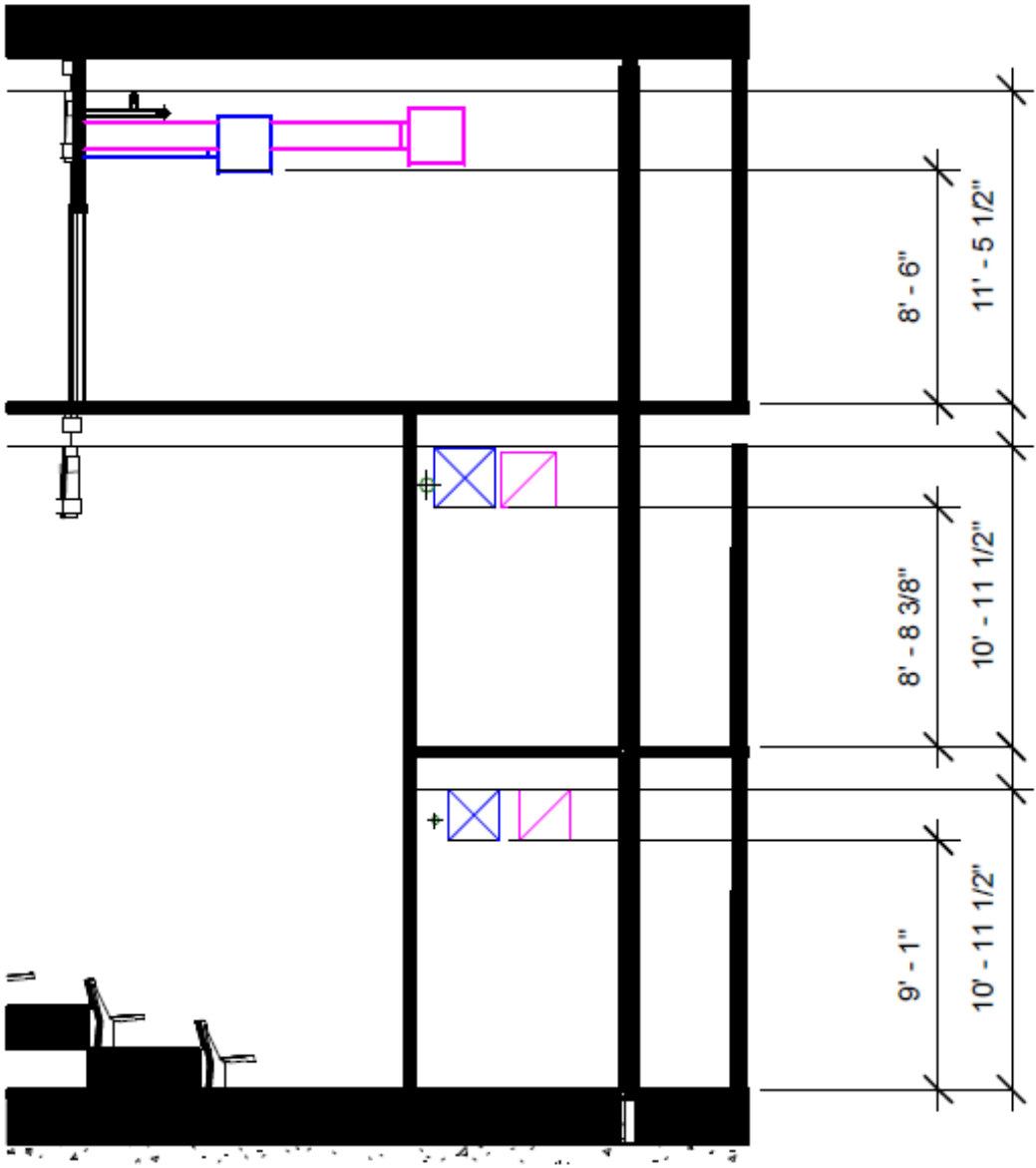
1st MEP section

2nd MEP section



Key Section: Office

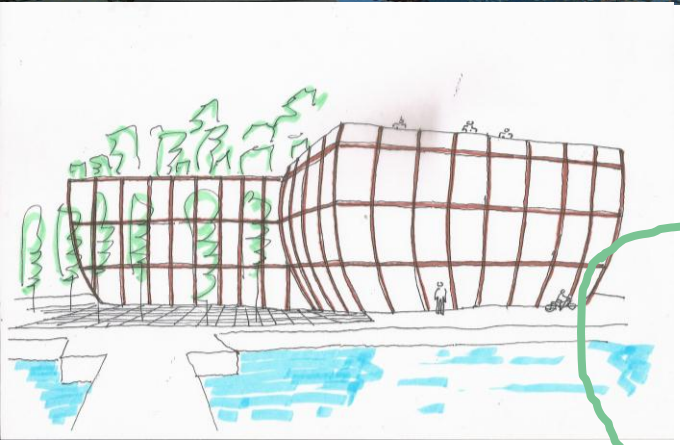


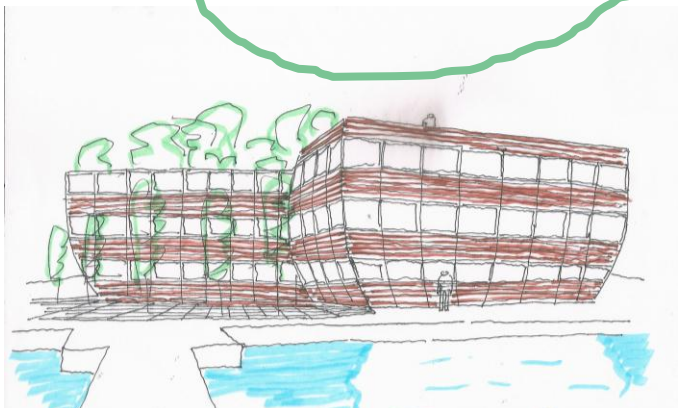


Agenda

Facade

Winter presentation facade





EcoClad

- Durable
- UV protection
- 15-year warranty
- Based in Madison
- FSC-Certified recycled fiber

Winter quarter
Curved in horizontal and vertical direction

Spring quarter
Curved only in vertical direction

Prefabrication
Limited to 6 different types – 3 ways of curving and 2 materials

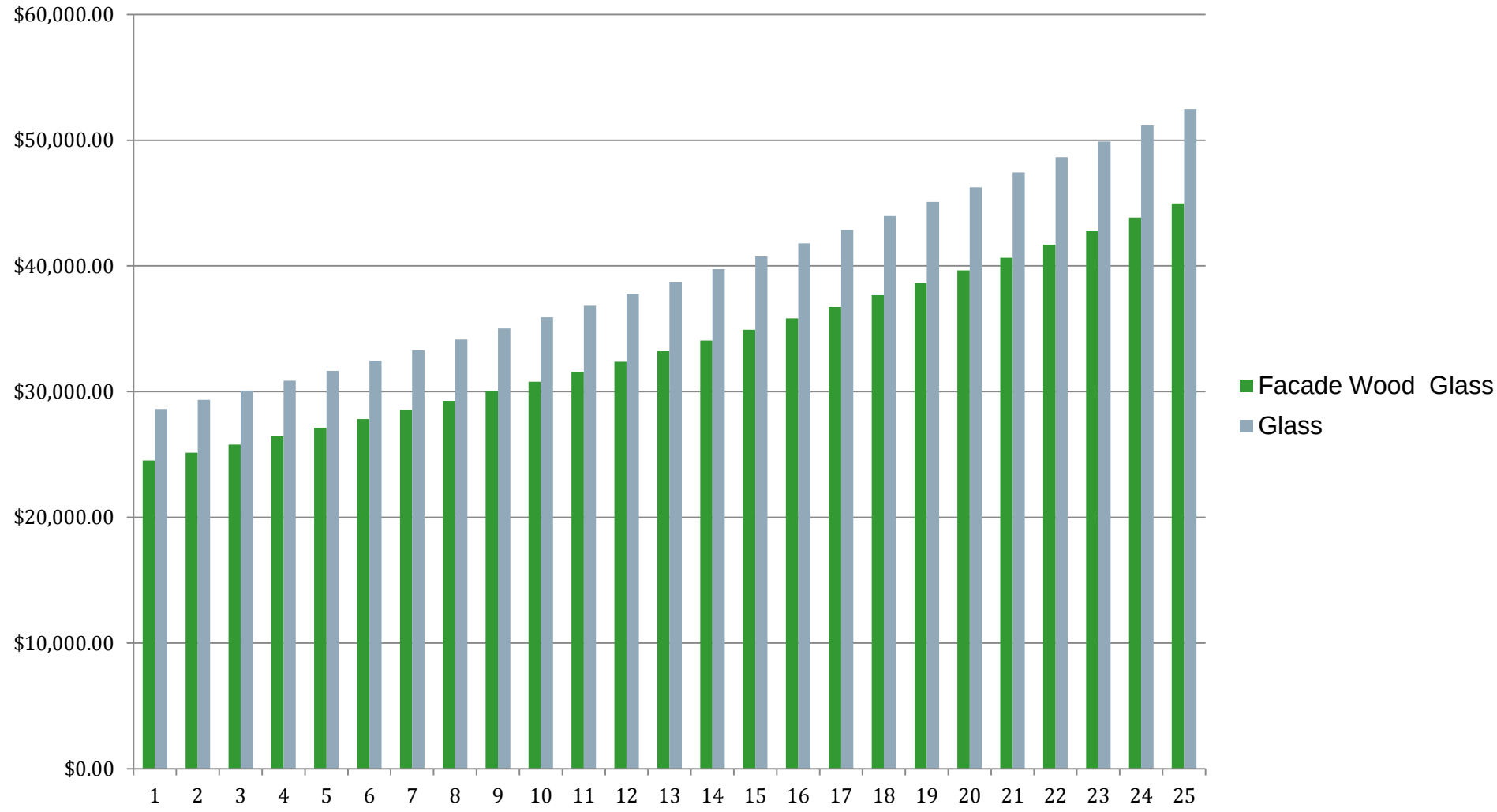
1st floor Elements 2 types

2nd floor Elements 2 types

3rd floor Elements 2 types

Comparison Facda Options

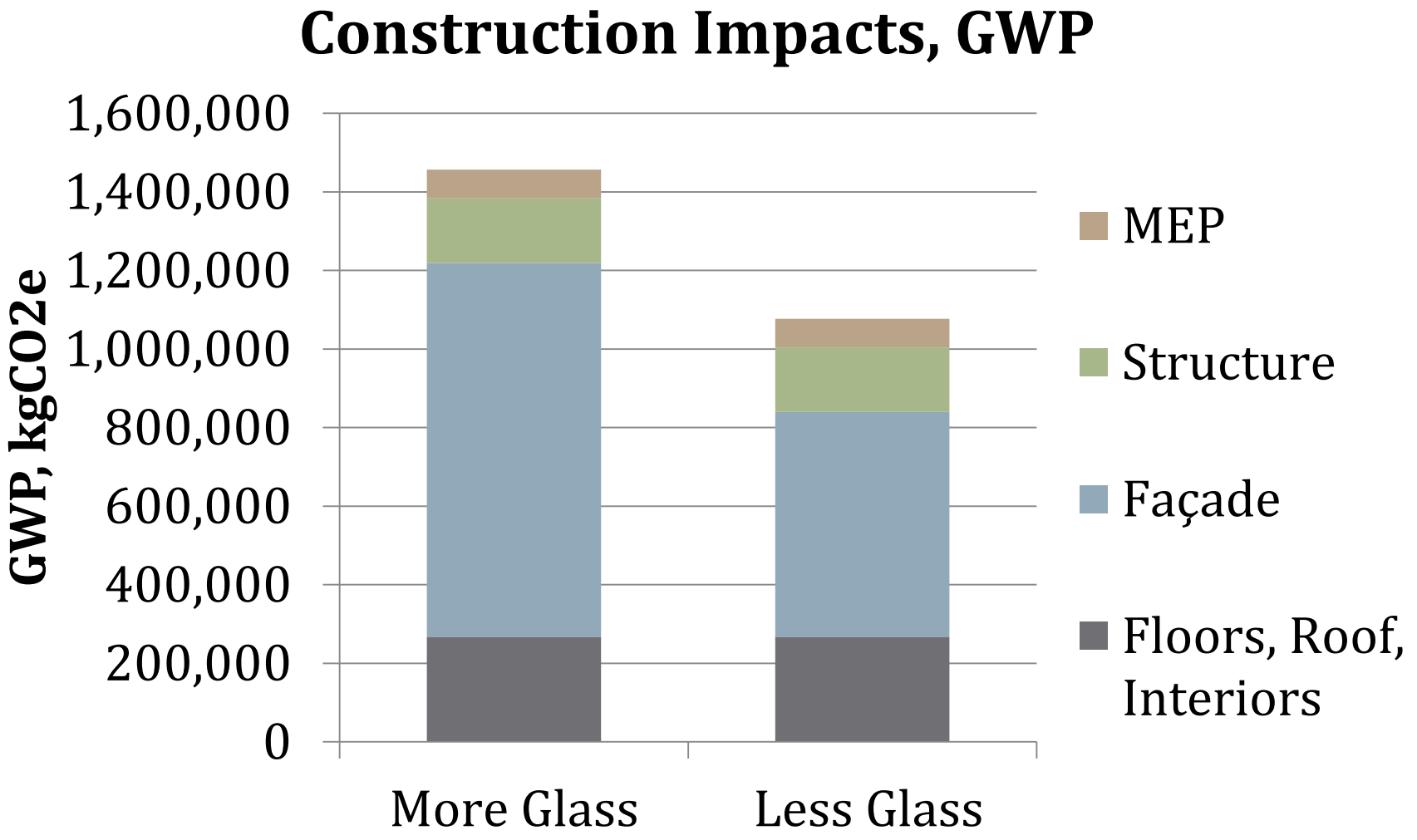
Atlantic

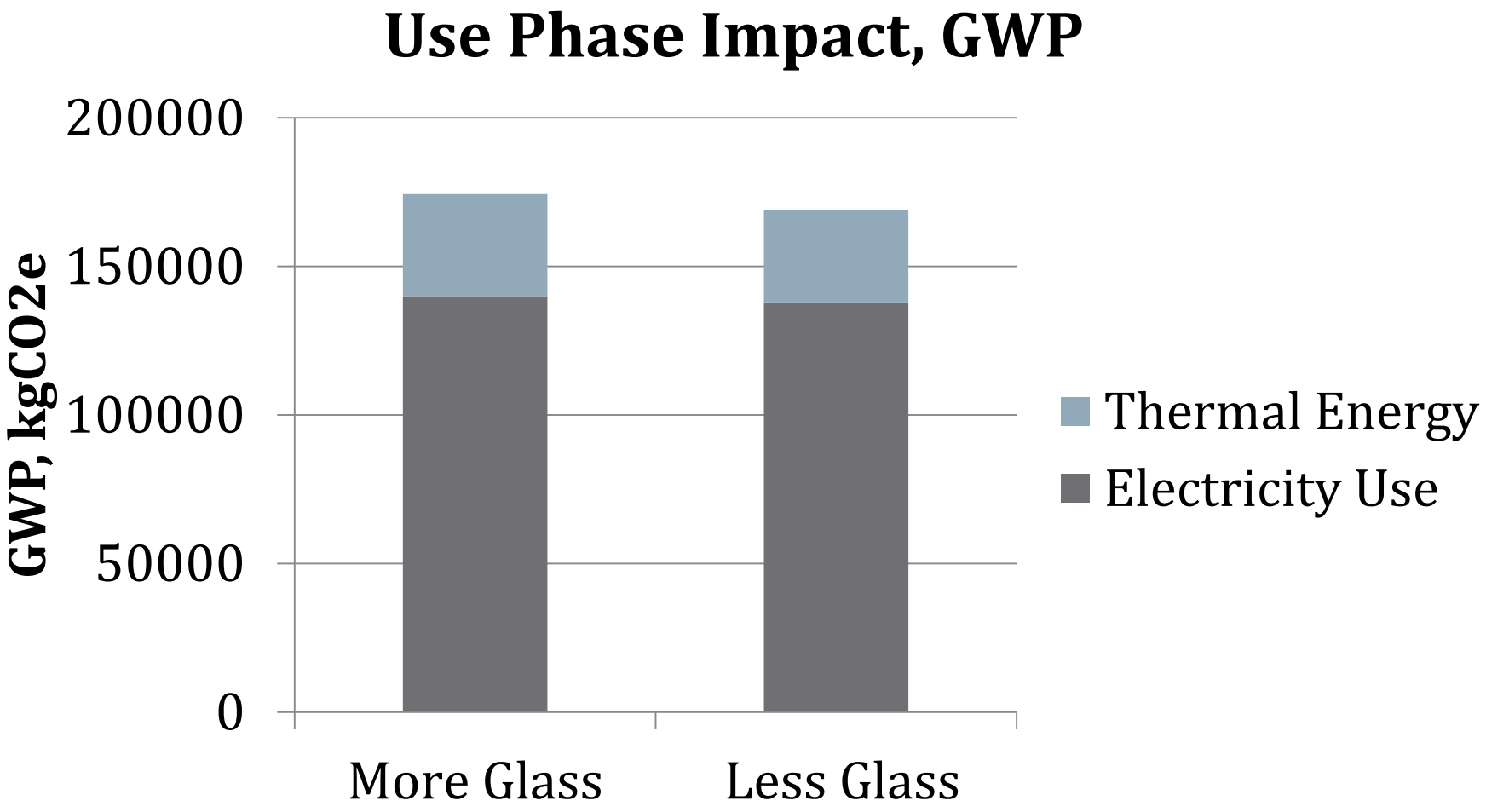


Over 17% Savings in O & M

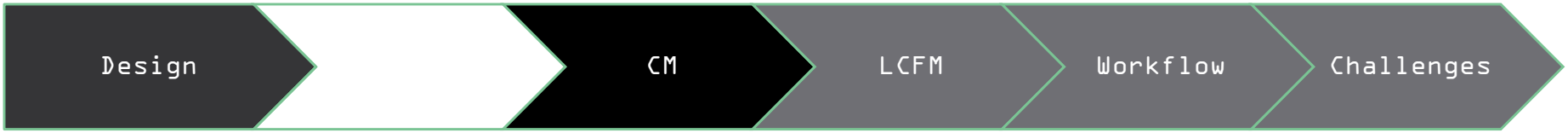
2% Savings in rental payments per year

(lowered by $5.400,00 per year)


Construction Impacts, GWP
GWP, kgCO2e
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
More Glass
Less Glass
MEP
Structure
Façade
Floors, Roof, Interiors

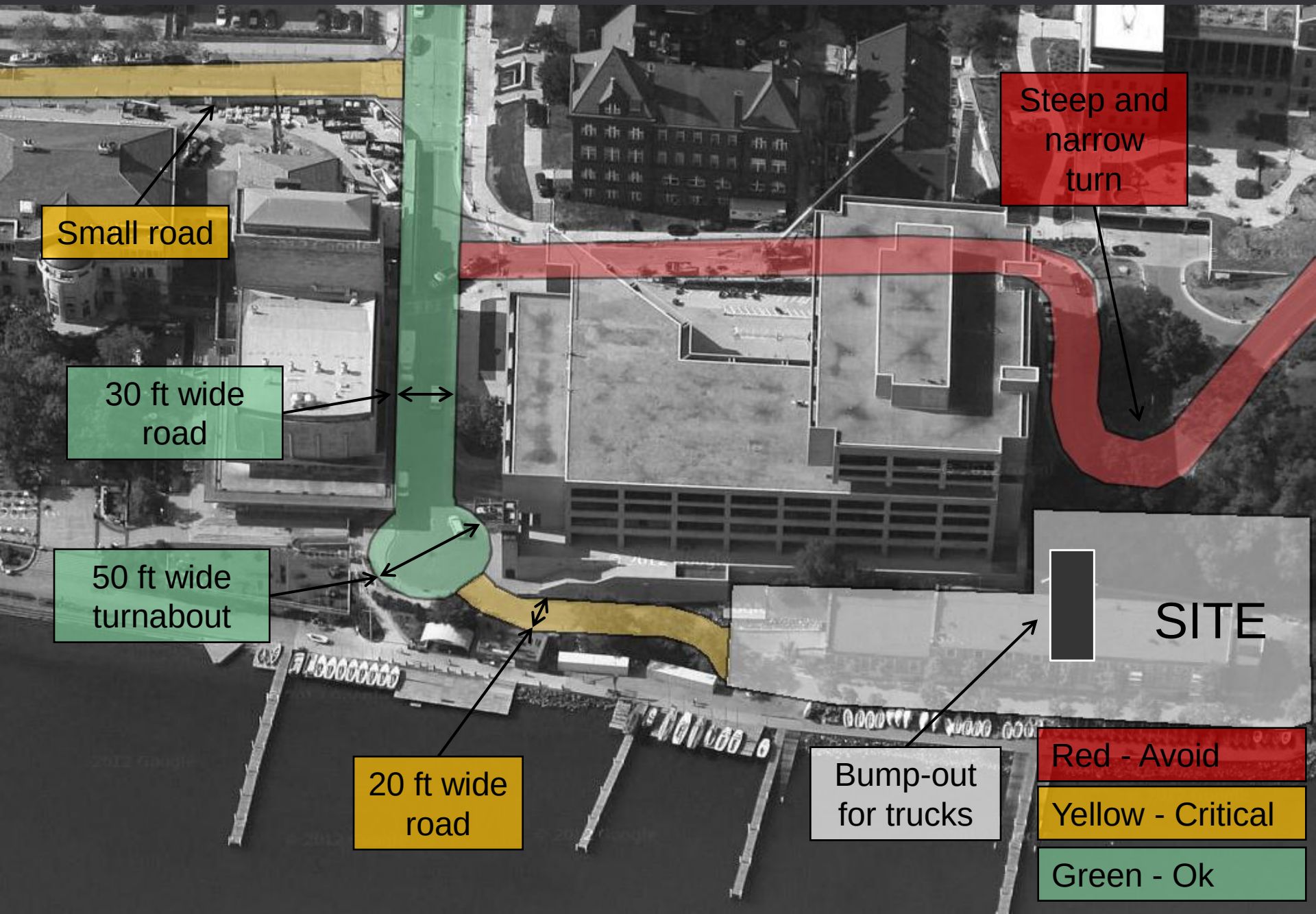

Use Phase Impact, GWP
GWP, kgCO2e
200000
150000
100000
50000
0
More Glass
Less Glass
Thermal Energy
Electricity Use

Agenda



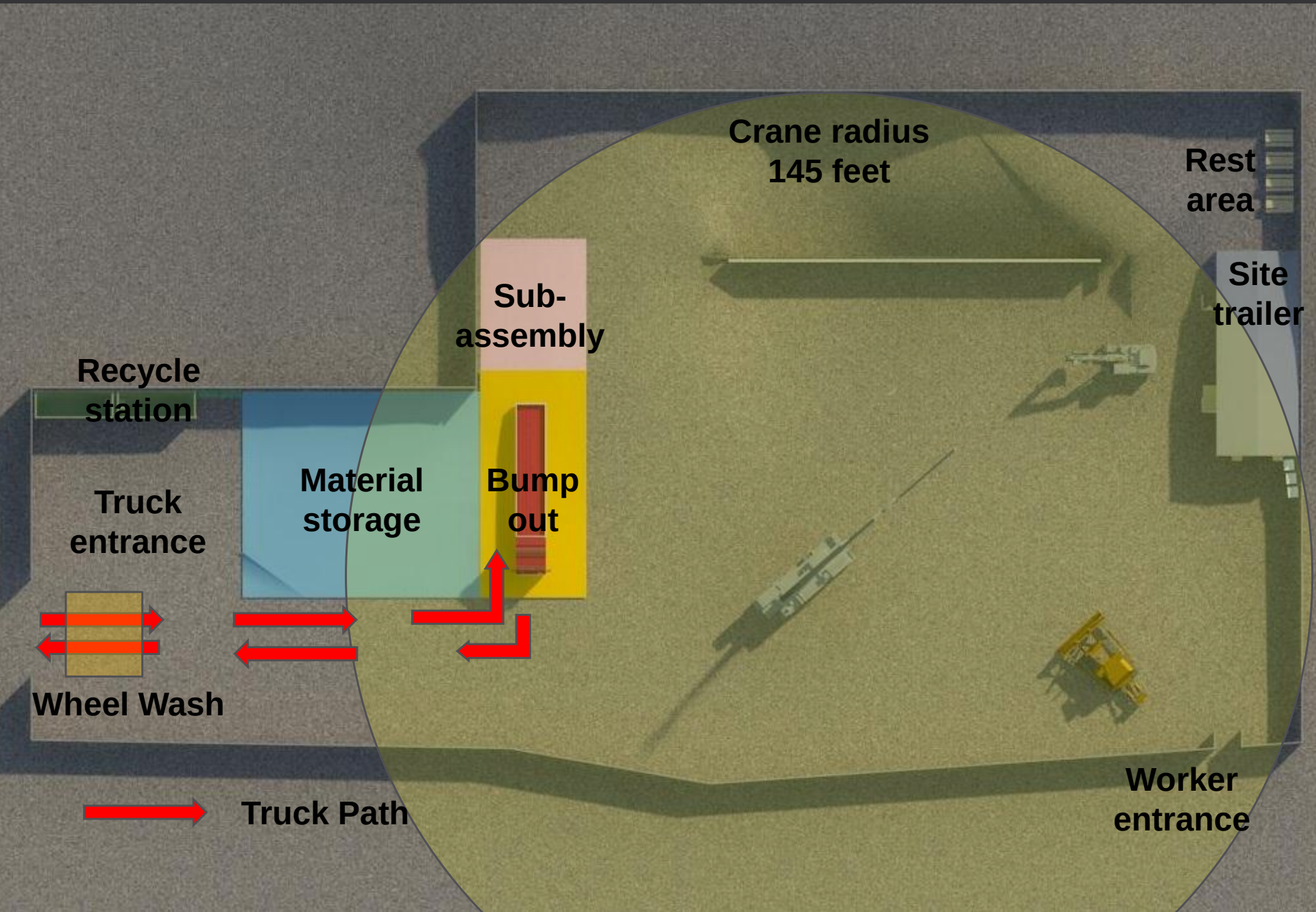
Road access

Atlantic CM



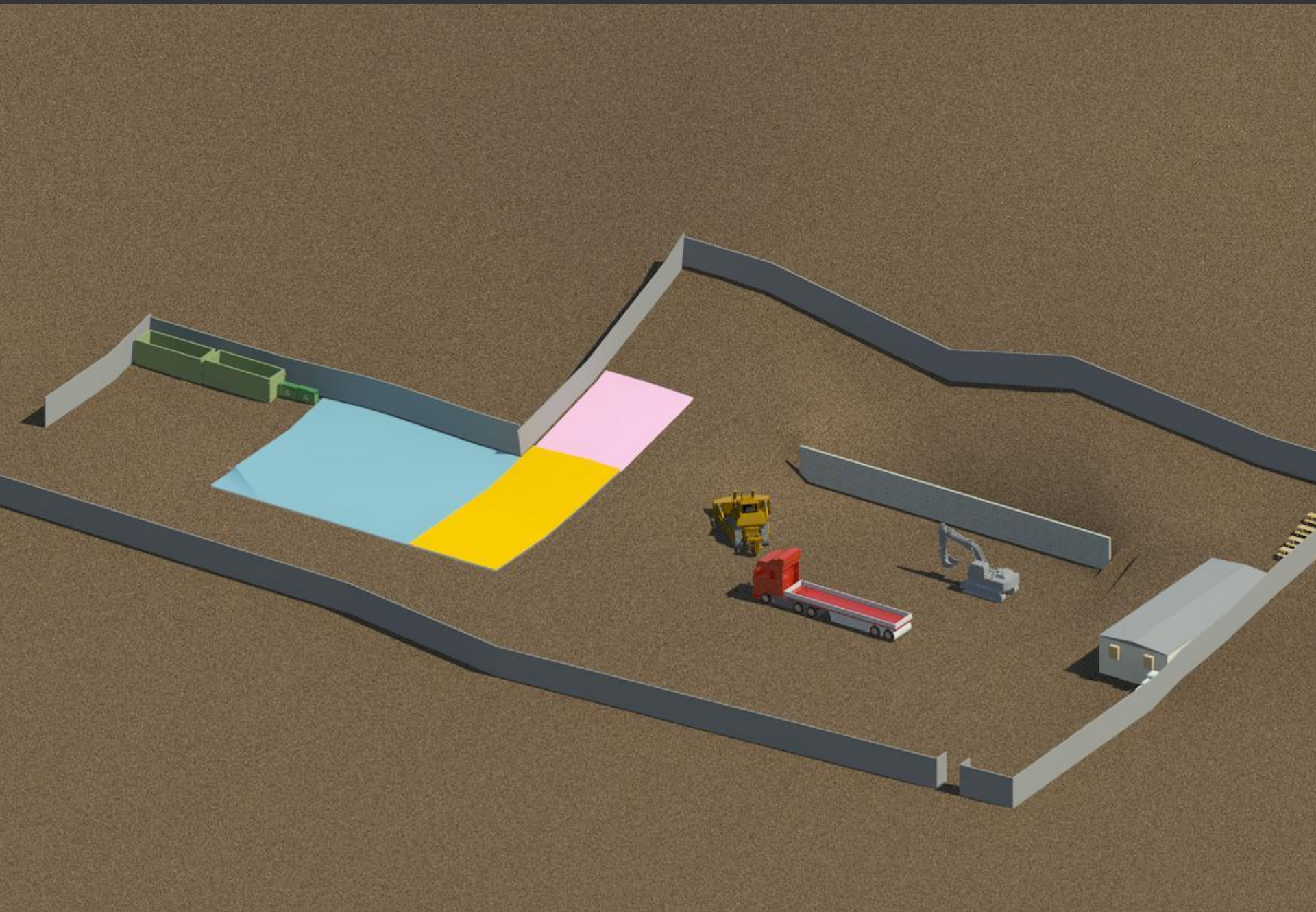
Site plan

Atlantic CM

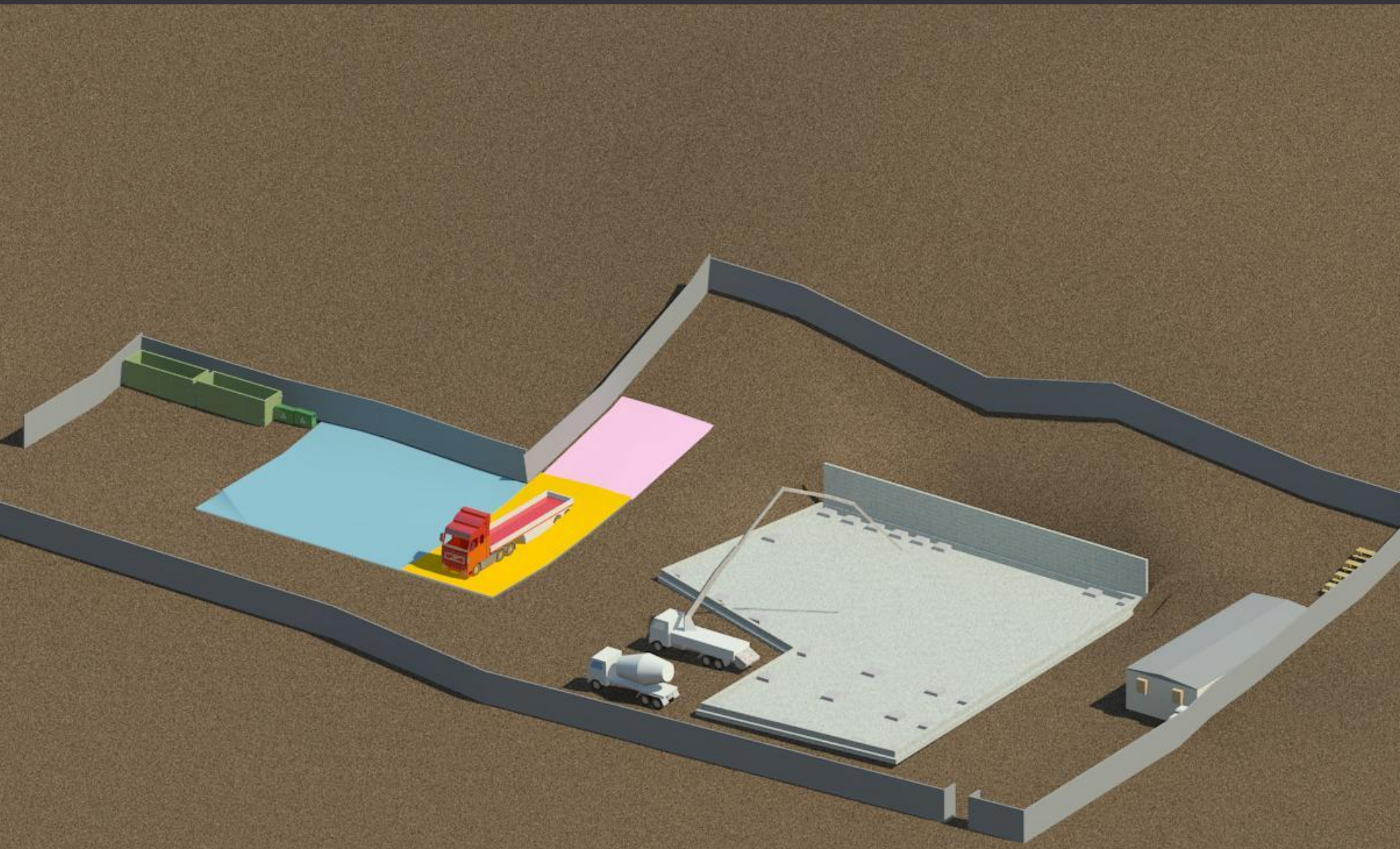


Site Plan

Atlantic CM

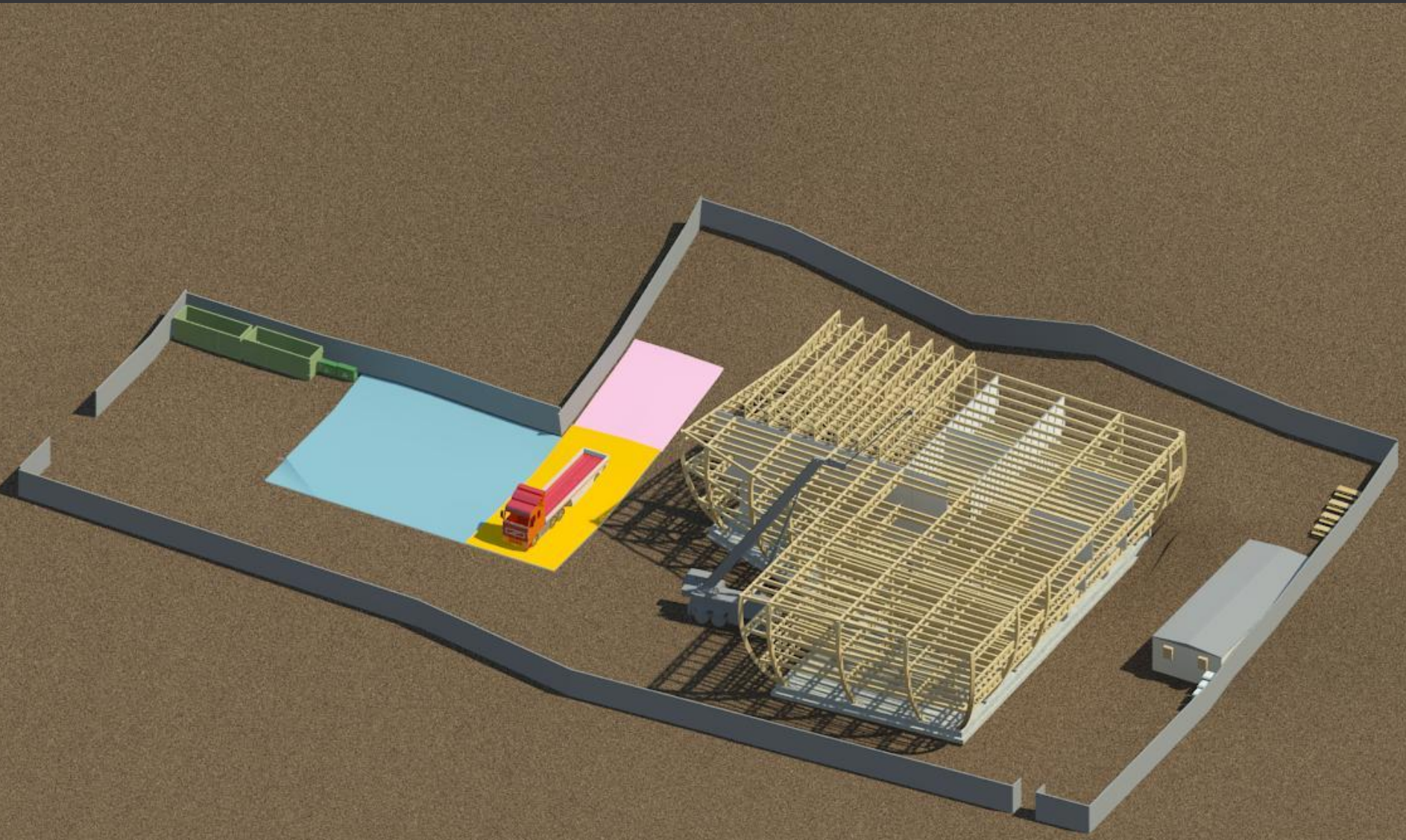


Site Plan



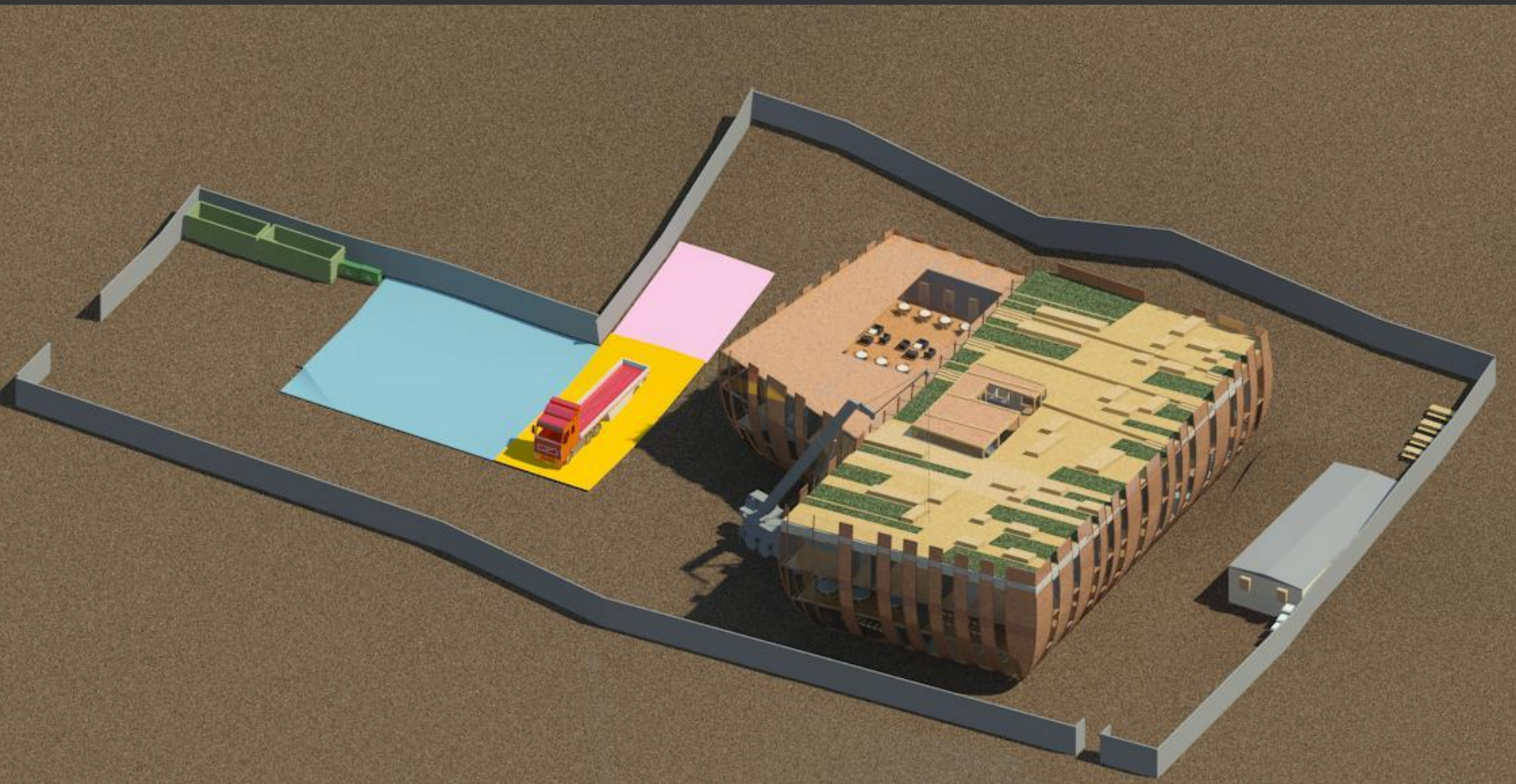
Site Plan

Atlantic CM



Site Plan

Atlantic CM



Cat 320D L Hydraulic Excavator

Net Flywheel Power 148.0 hp
Operating Weight 44820.0 lb

Price
850 USD/day
2300 USD/week

Cat 226B Series 3 Skid-Steer Loader

Net Flywheel Power 56.0 hp
Rated Operating Capacity 1500.0 lb

Price
200 USD/day
600 USD/week

Truck mounted concrete pump M 42-5

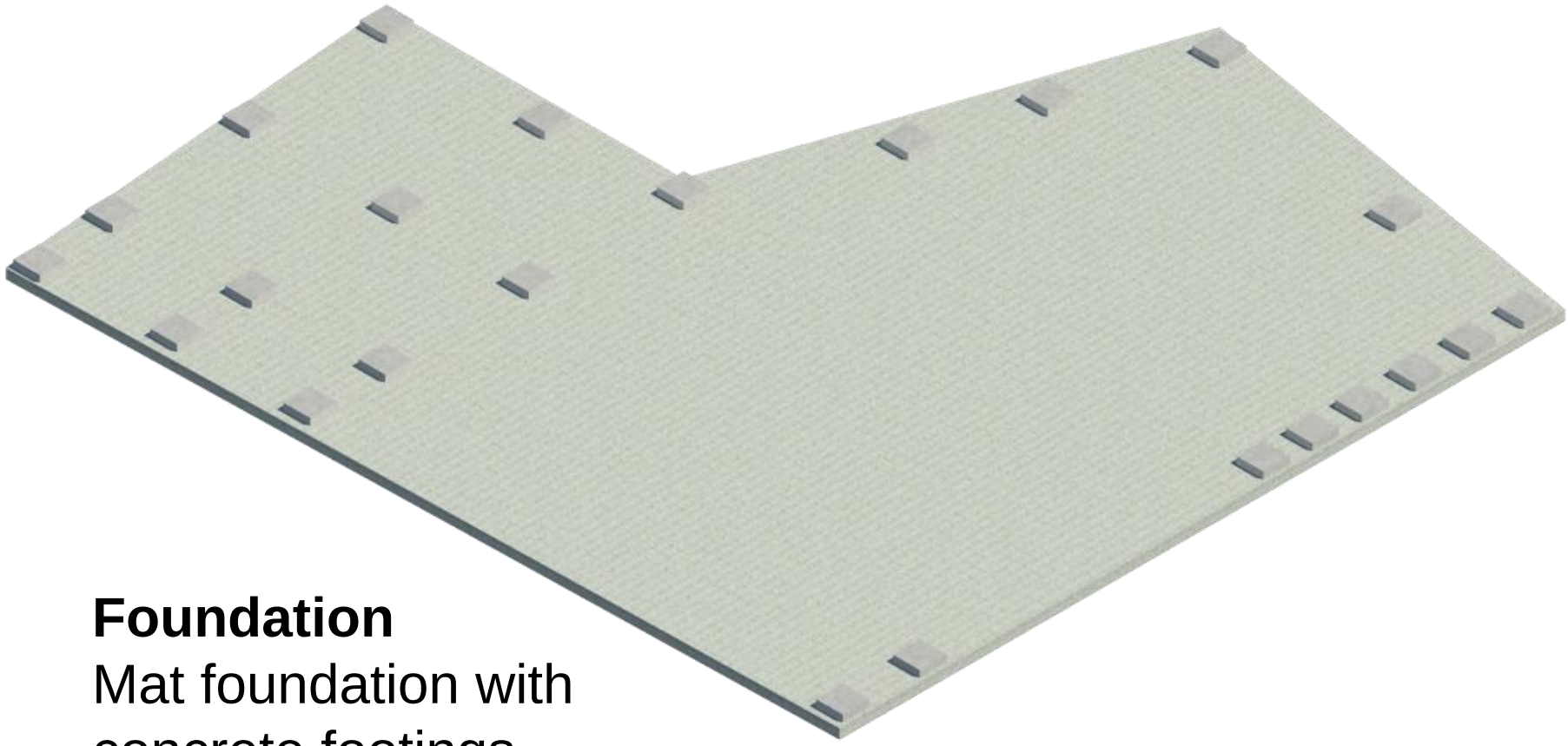
140m³/h

	Mobile	Tower
Price	Low	High
Flexibility	High	Low
Mobilization	Low	High
Operation speed	High	Low
Space needed	High	Low

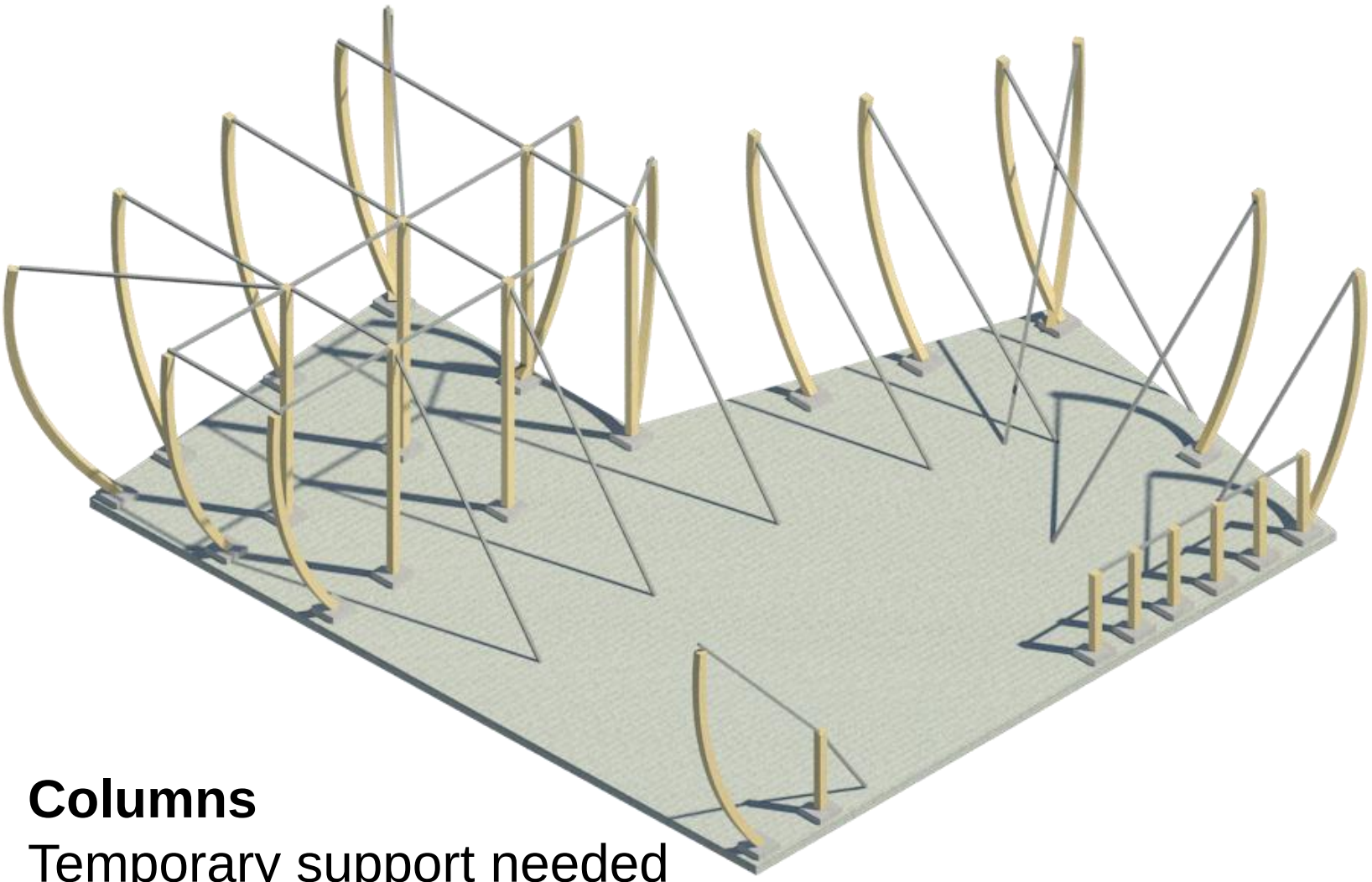
Conclusion: Mobile crane chosen

LTM 1090-4.1

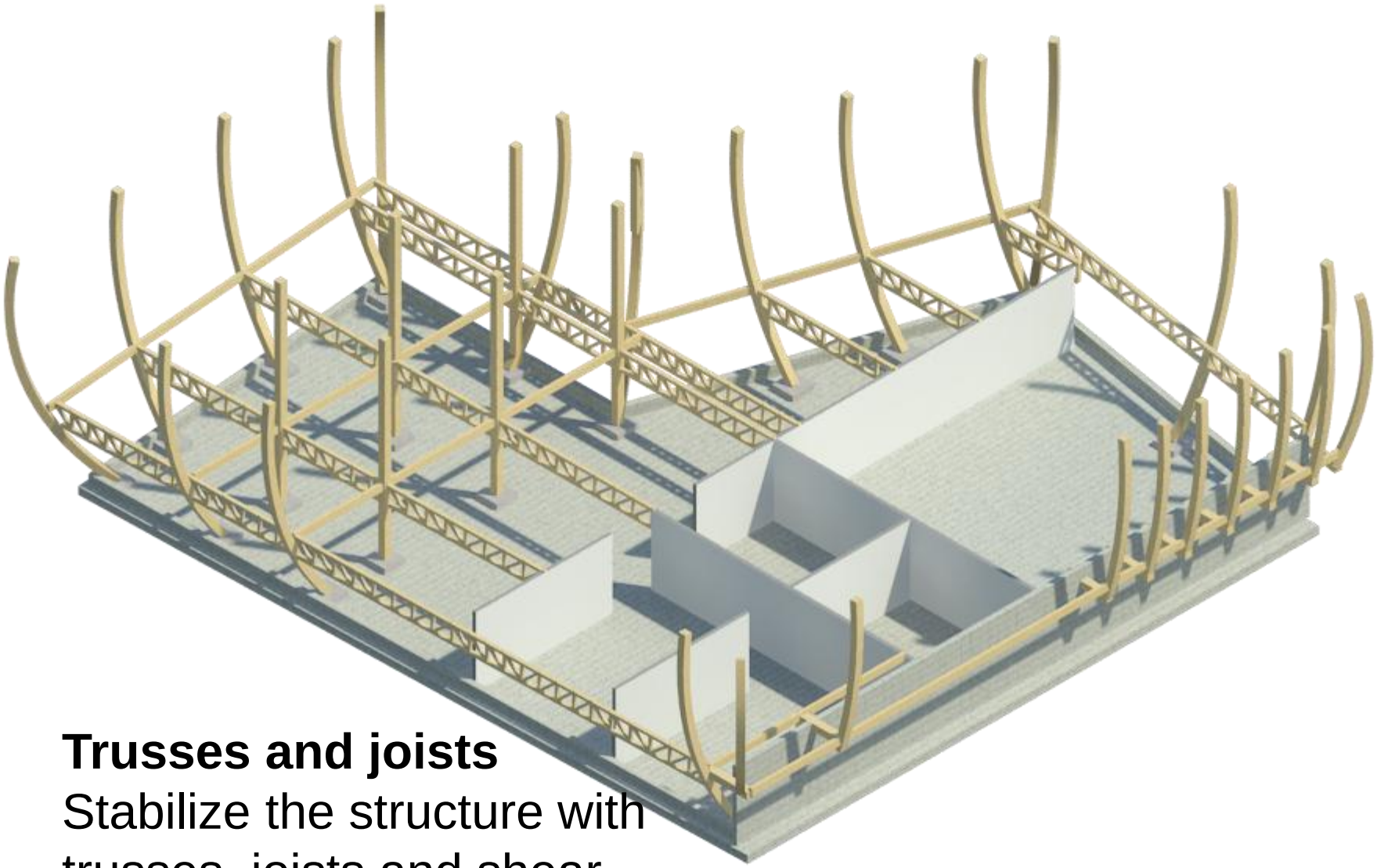
Max. lifting capacity	179’ lbs at 8 ft rad.
Telescopic boom	36 ft - 164 ft
Radius needed	145 ft



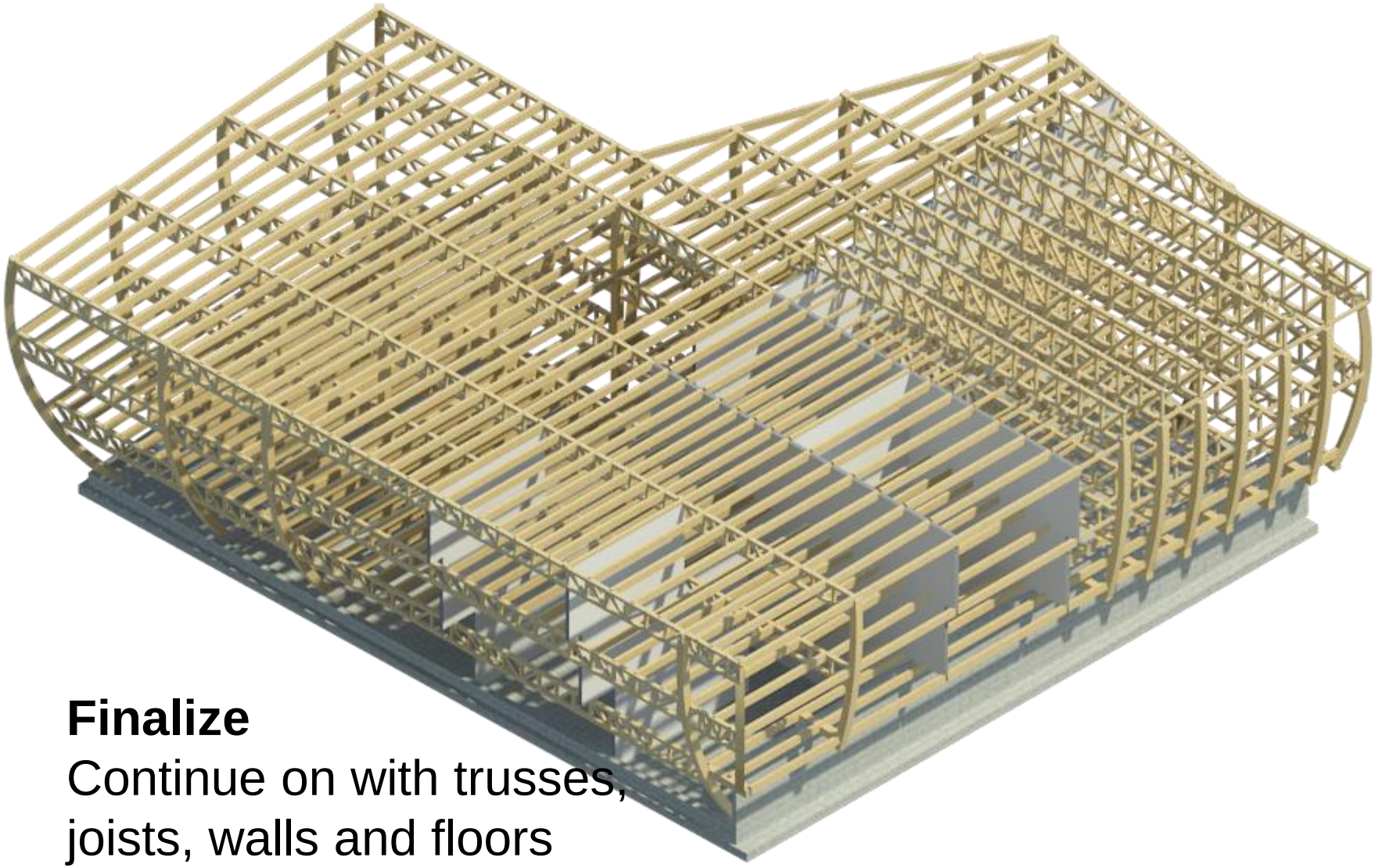
Foundation
Mat foundation with concrete footings



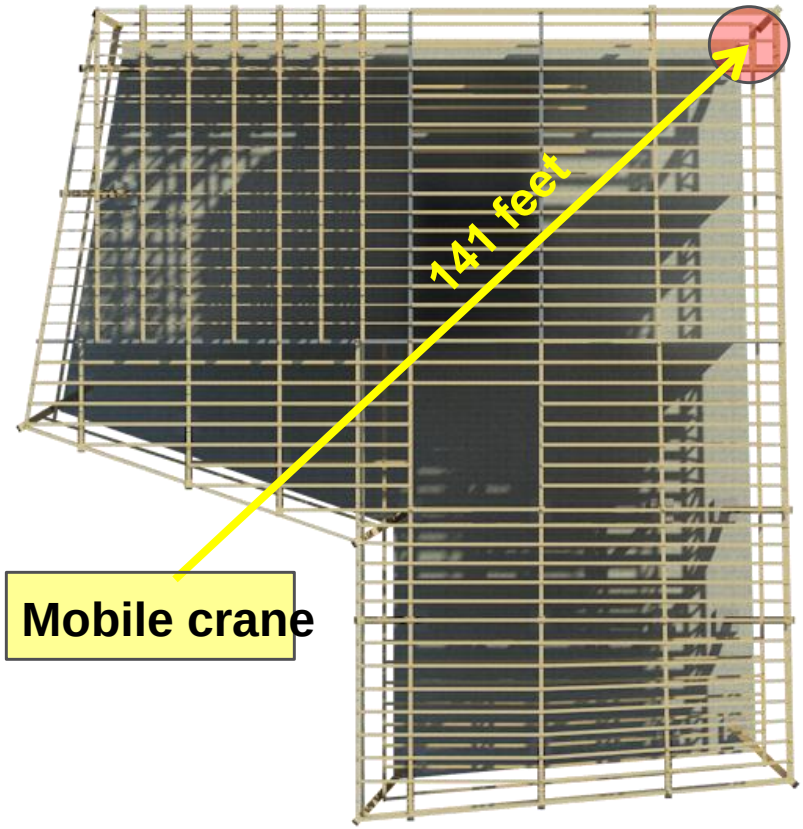
Columns
Temporary support needed
to hold columns in place

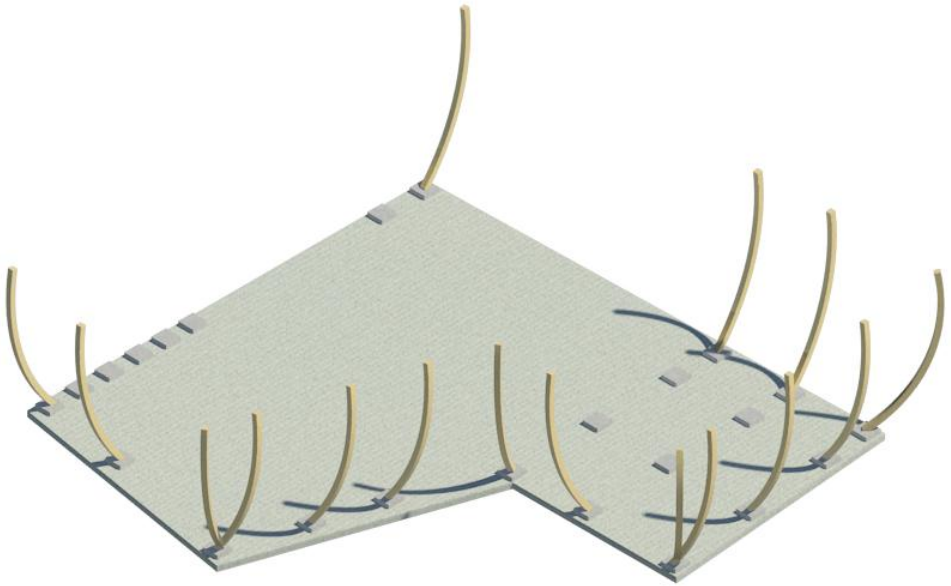


Trusses and joists
Stabilize the structure with trusses, joists and shear walls



Finalize
Continue on with trusses, joists, walls and floors





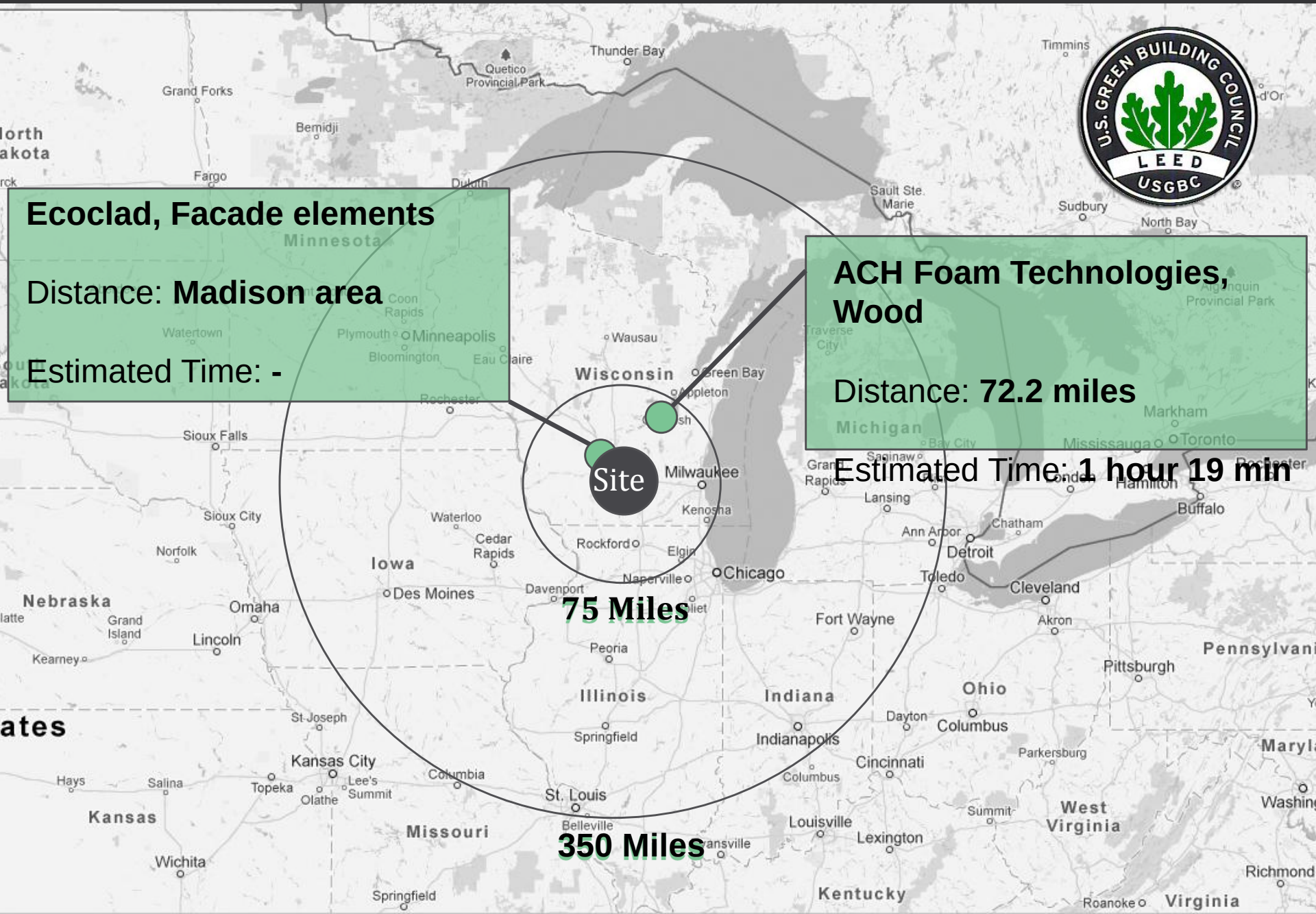
Furthest Pick
Curved column in top corner

Heaviest Picks
Curved columns - 2 kilopound

- (4d video)

Production Strategy - Material suppliers

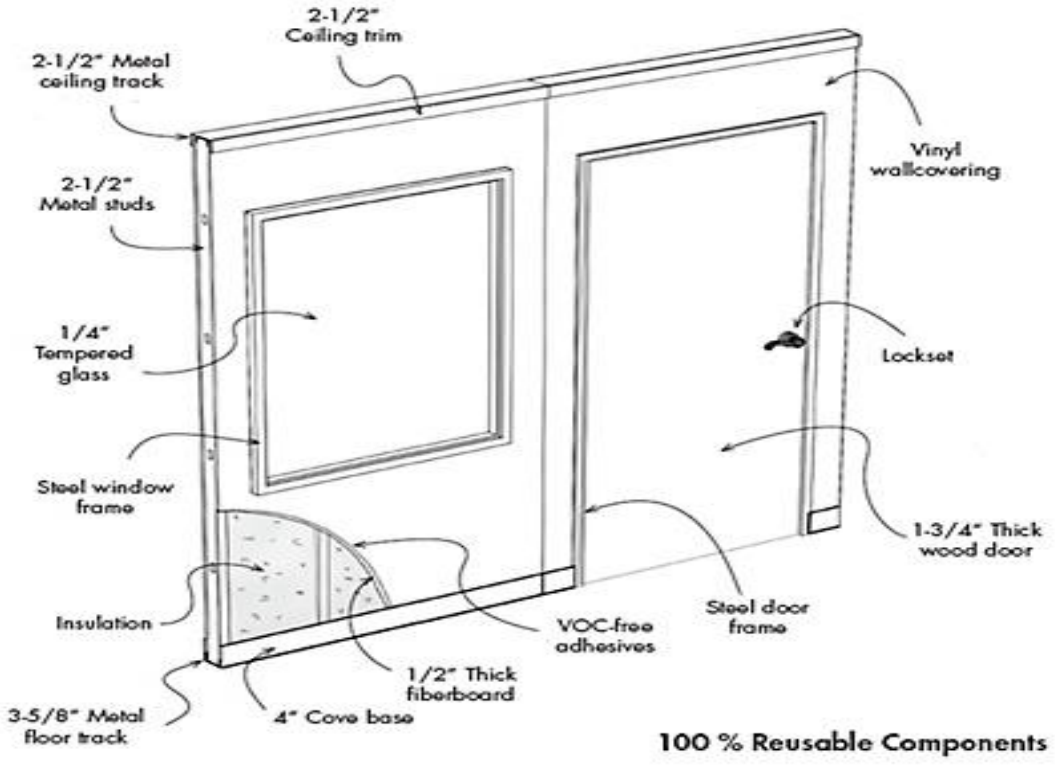
Atlantic CM

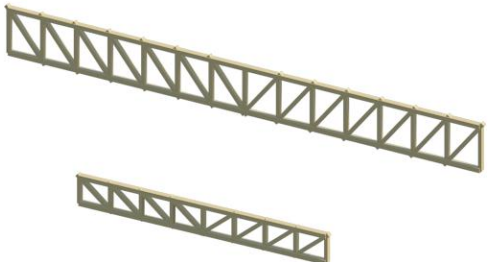


Interior Wall—N-Wall

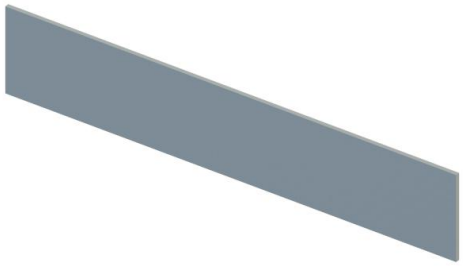
Alternatives to traditional drywall

- Reusable
- Lightweight
- Moveable
- Easy configuration
- Minimal workplace disruption
- Acoustically sound

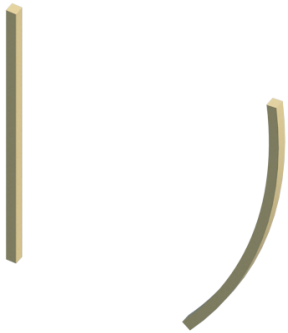




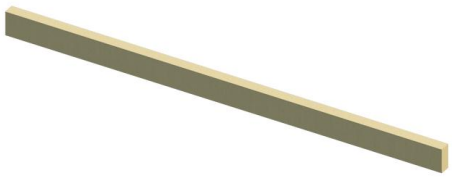
3’ and 5’ high trusses



CLT shear wall elements



36’ glulam columns



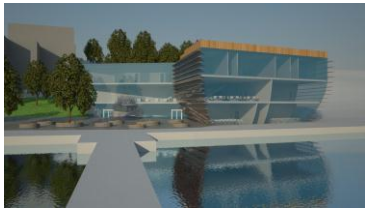
Glulam joists

Rhinoceros®
NURBS Modeling for Windows

Linked CAD

v-ray

AUTODESK® 360



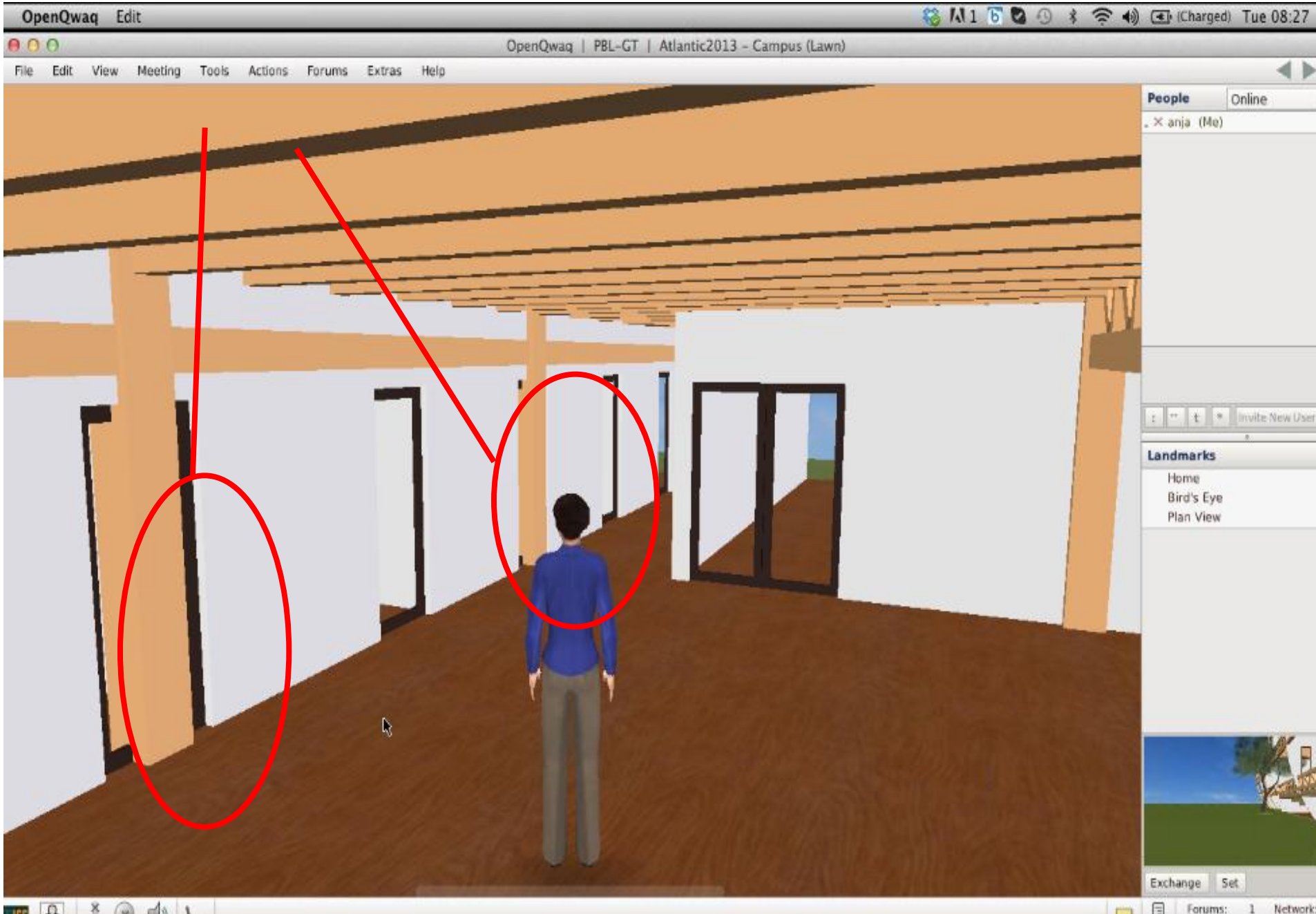
0. BIM
1. ARCH
2. SE
3. MEP
4. LCFM
5. CM

Archive
(etc.)

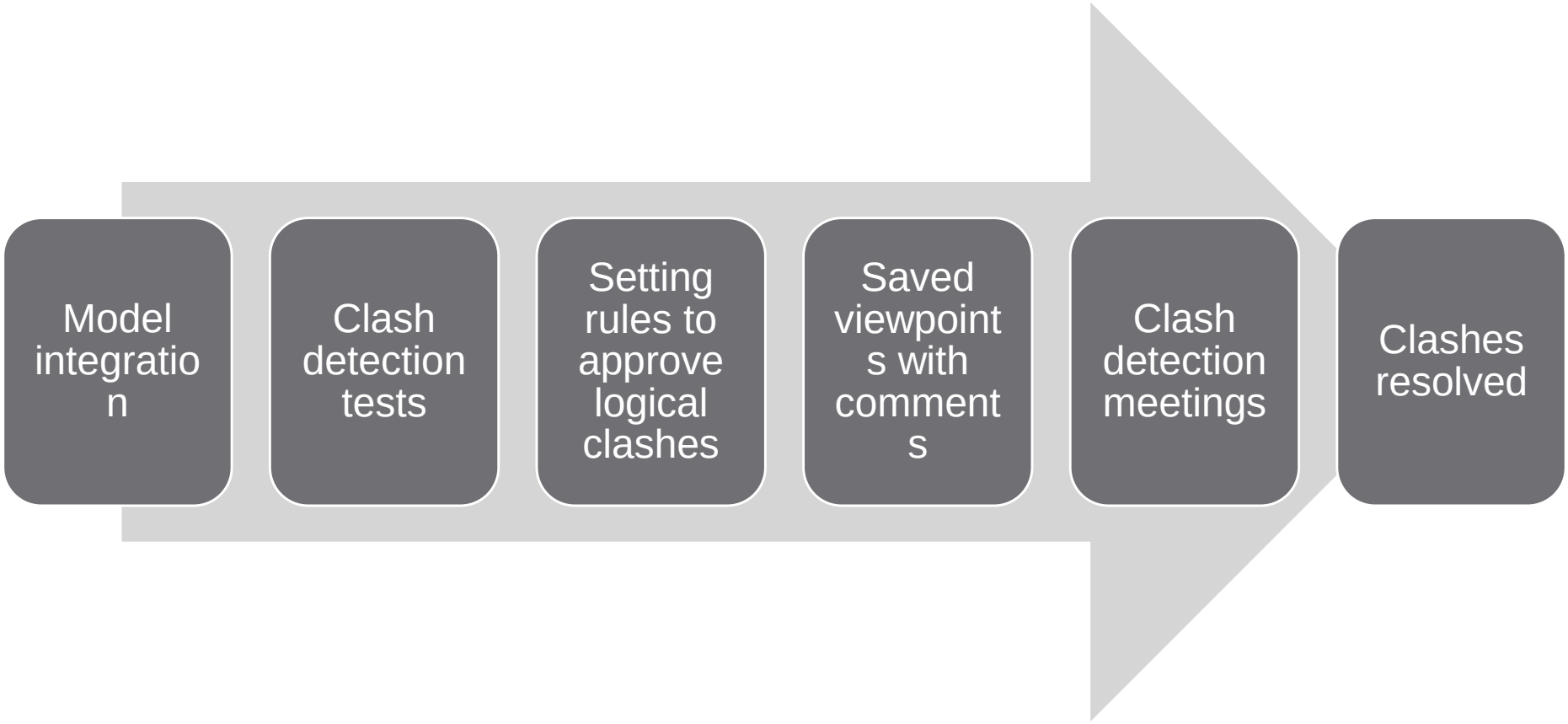
3dicc
Arch
CM
MEP
Navisworks
SE

Clash Detection – 3DICC

Atlantic CM

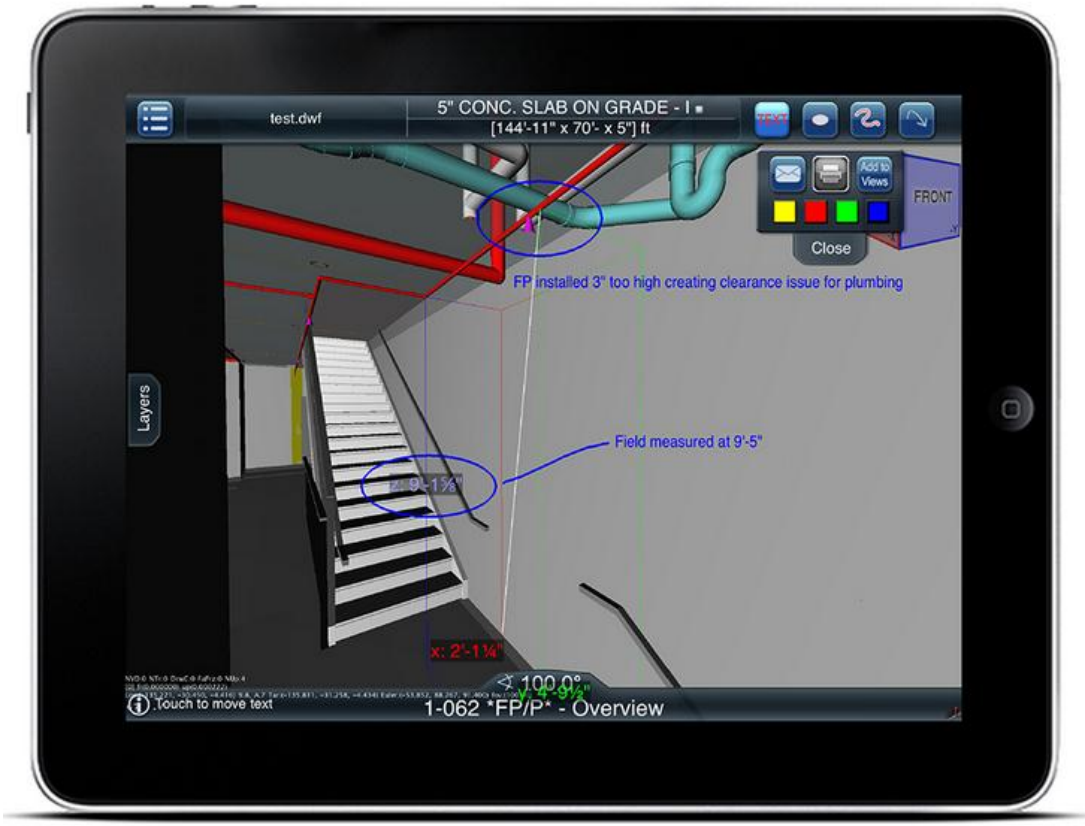


Clash Detection – Navisworks

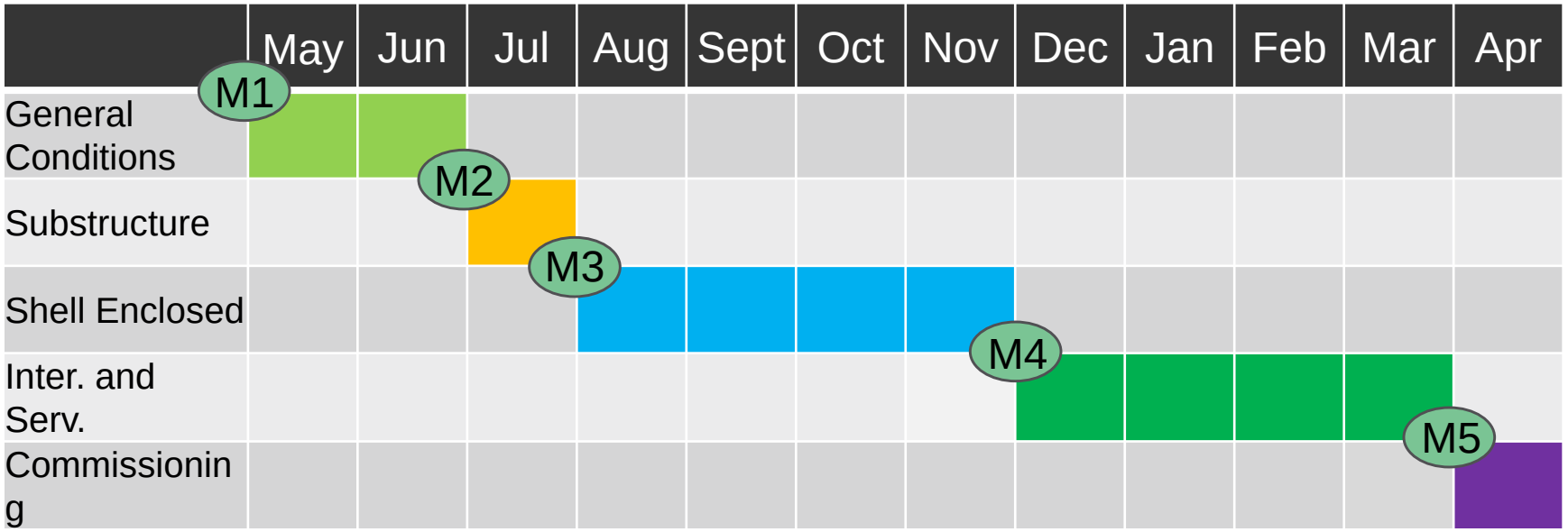


Clash Detection – Stru v. MEP

Atlantic CM


test.dwf
5" CONC. SLAB ON GRADE - I
[144'-11" x 70'- x 5"] ft
Add to Views
FRONT
Close
FP installed 3" too high creating clearance issue for plumbing
Layers
Field measured at 9'-5"
x: 2'-1¼"
100.0°
Touch to move text
1-062 *FP/P* - Overview

Schedule – Key milestones

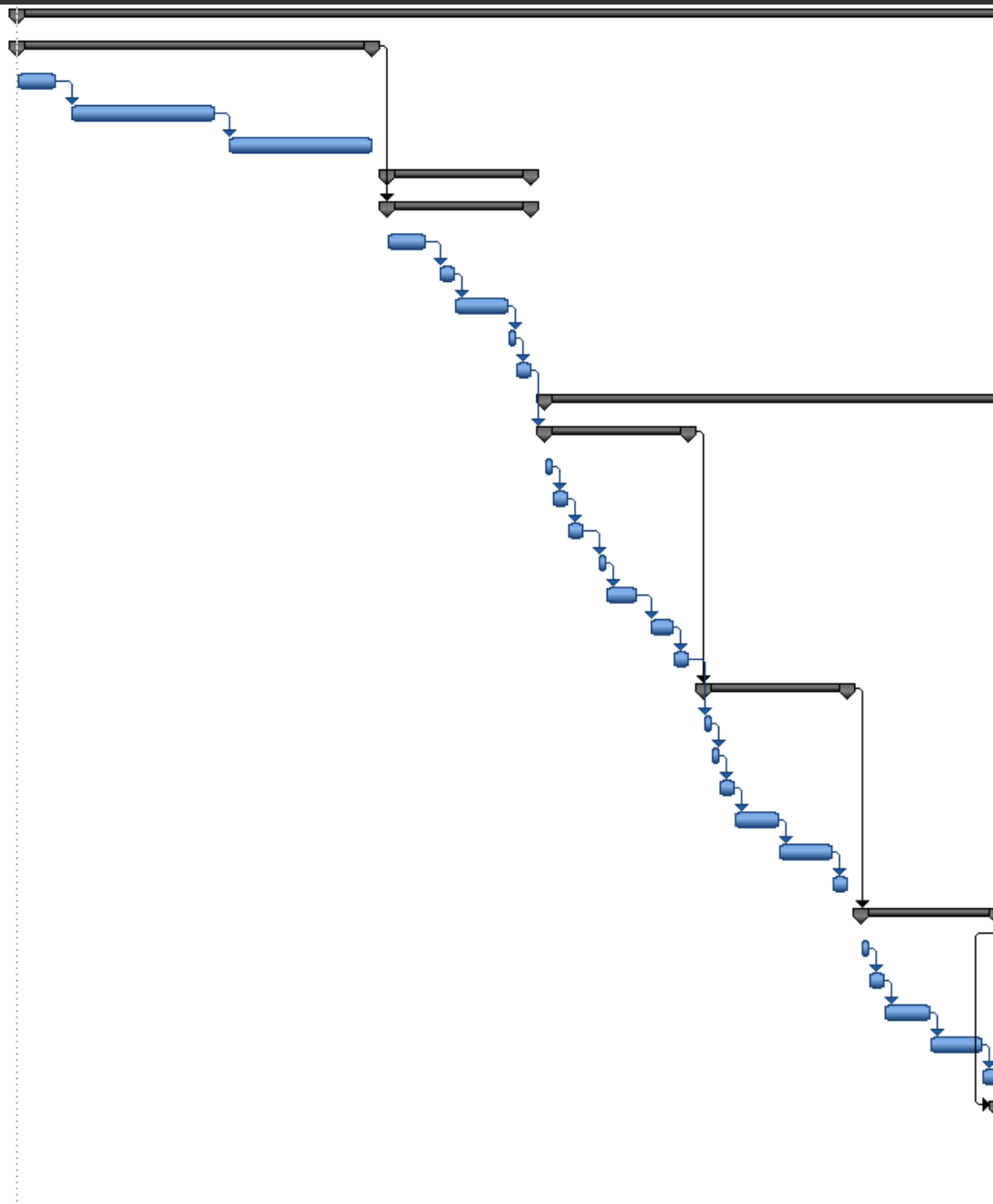


Money assigned to water resistant coating on all wood

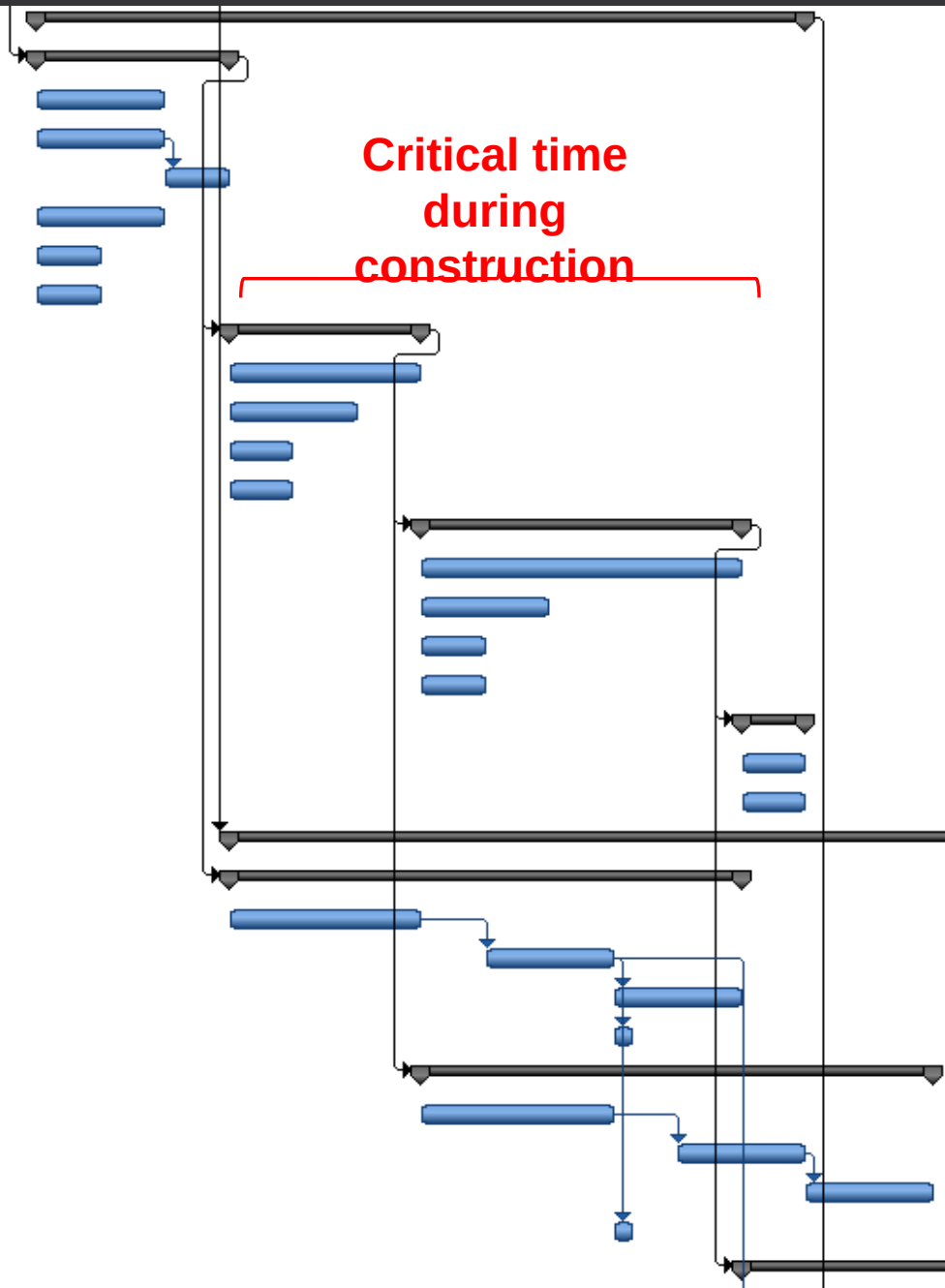
Total of 12.1” of rain during shell erection

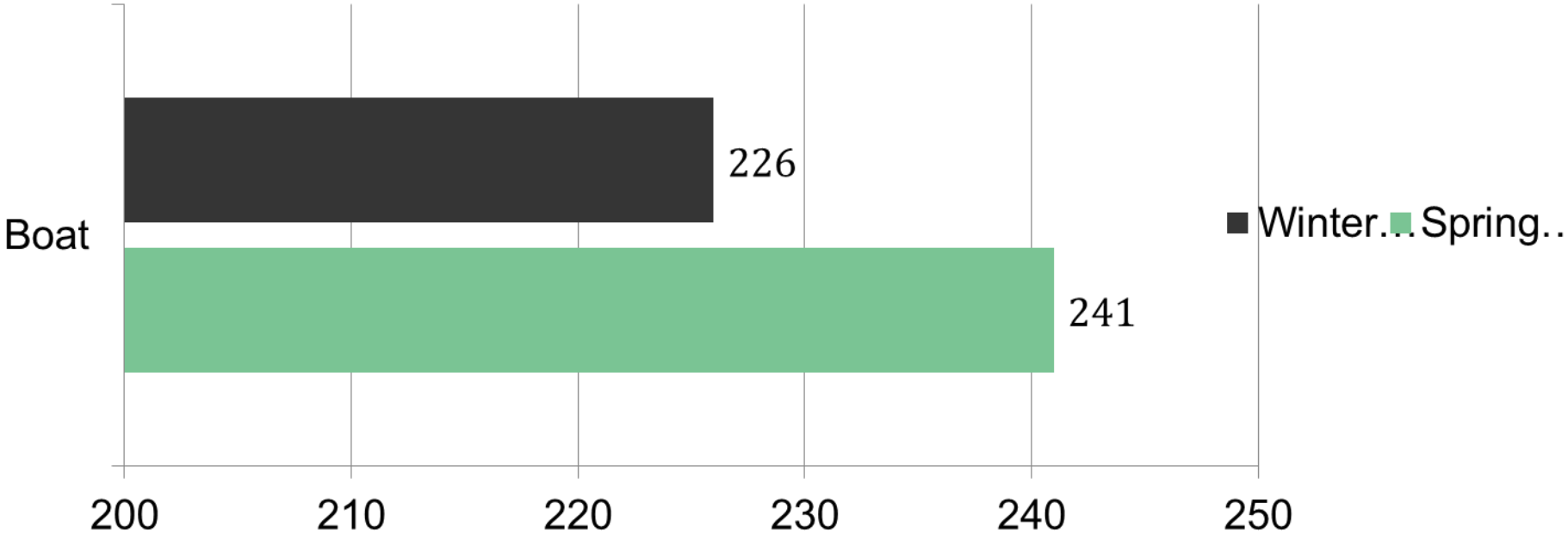
Schedule

1	**Project**	**241 days**
1.1	**Site Preparation**	**35 days**
1.1.1	Mobilization	5 days
1.1.2	Excavation	15 days
1.1.3	Retaining Wall	15 days
1.2	**Substructure**	**15 days**
1.2.1	**Mat foundation**	**15 days**
1.2.1.1	Rebar Installation	5 days
1.2.1.2	Elevator foundation	2 days
1.2.1.3	Concrete casting	5 days
1.2.1.4	Wall foundation	1 day
1.2.1.5	Column footings	2 days
1.3	**Shell**	**81 days**
1.3.1	**1st floor**	**15 days**
1.3.1.1	Center Columns	1 day
1.3.1.2	Inclined Columns	2 days
1.3.1.3	Shear walls	2 days
1.3.1.4	Staircase	1 day
1.3.1.5	Trusses	4 days
1.3.1.6	Joists	3 days
1.3.1.7	Floor	2 days
1.3.2	**2nd floor**	**15 days**
1.3.2.1	Inclined Columns	1 day
1.3.2.2	Staircase	1 day
1.3.2.3	Shear walls	2 days
1.3.2.4	Trusses	4 days
1.3.2.5	Joists	5 days
1.3.2.6	Floor	2 days
1.3.3	**3rd floor**	**14 days**
1.3.3.1	Staircase	1 day
1.3.3.2	Shear walls	2 days
1.3.3.3	Trusses	4 days
1.3.3.4	Joists	5 days
1.3.3.5	Floor	2 days
1.3.4	**Roof**	**30 days**
1.3.4.1	Glass roofs	2 days
1.3.4.2	Roof covering	5 days



1.4	**Services**	**60 days**
1.4.1	**1st floor services**	**15 days**
1.4.1.1	HVAC	10 days
1.4.1.2	Air handling unit	10 days
1.4.1.3	Pumps	5 days
1.4.1.4	Electricity	10 days
1.4.1.5	Pluming	5 days
1.4.1.6	Elevator	5 days
1.4.2	**2nd floor services**	**15 days**
1.4.2.1	HVAC	15 days
1.4.2.2	Electricity	10 days
1.4.2.3	Pluming	5 days
1.4.2.4	Elevator	5 days
1.4.3	**3rd floor services**	**25 days**
1.4.3.1	HVAC	25 days
1.4.3.2	Electricity	10 days
1.4.3.3	Pluming	5 days
1.4.3.4	Elevator	5 days
1.4.4	**Roof**	**5 days**
1.4.4.1	Elevator	5 days
1.4.4.2	Solar panels	5 days
1.5	**Interiors**	**95 days**
1.5.1	**1st floor interiors**	**40 days**
1.5.1.1	Internal walls	15 days
1.5.1.2	Wall painting	10 days
1.5.1.3	Flooring	10 days
1.5.1.4	Tiling	2 days
1.5.2	**2nd floor interiors**	**40 days**
1.5.2.1	Internal walls	15 days
1.5.2.2	Wall painting	10 days
1.5.2.3	Flooring	10 days
1.5.2.4	Tiling	2 days
1.5.3	**3rd floor interiors**	**55 days**





- Less prefabrication of shell
- Services and Interiors will take longer

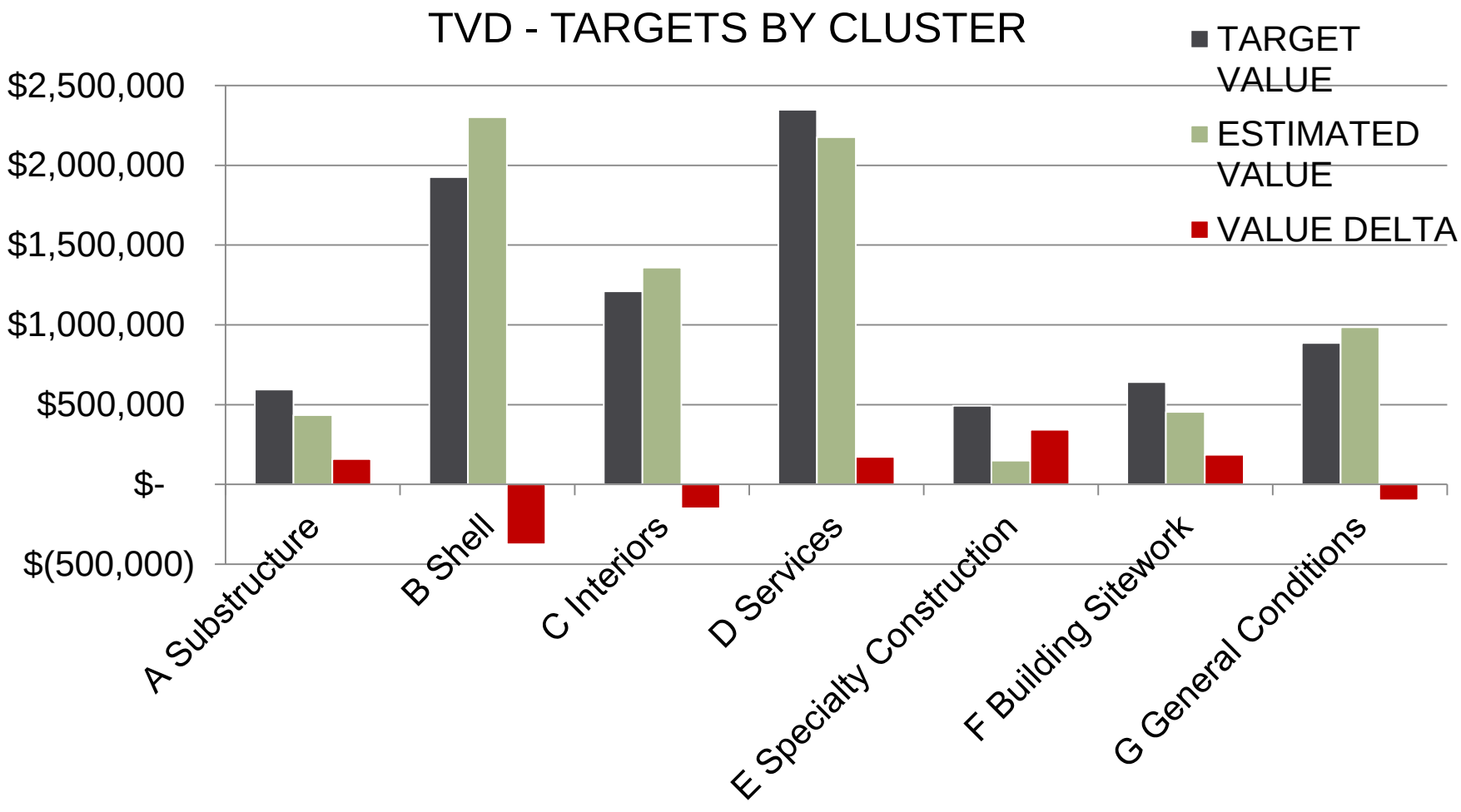
Still make it in time, **finished 25th of April 2016**

Wood with Active Chilled Beams			
	ESTIMATED VALUE	TARGET VALUE	VALUE DELTA
A Substructure	$ 433,980	$ 594,000	$ 160,020
B Shell	$ 2,301,423	$ 1,926,818	$ (374,605)
C Interiors	$ 1,359,123	$ 1,210,091	$ (149,032)
D Services	$ 2,175,970	$ 2,349,000	$ 173,030
E Specialty Construction	$ 150,000	$ 493,364	$ 343,364
F Building Sitework	$ 455,000	$ 640,636	$ 185,636
G General Conditions	$ 985,000	$ 886,091	$ (98,909)
TOTAL	$ 7,860,496	$ 8,100,000	$ 239,504

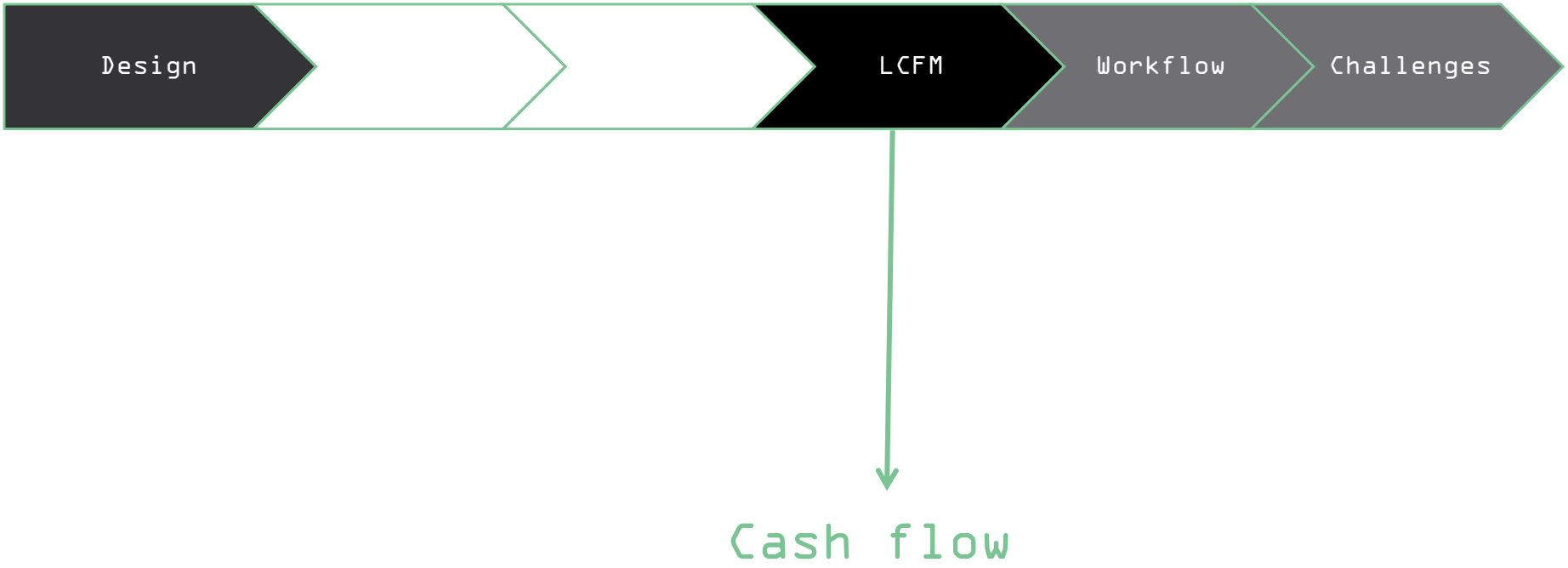
Spring estimate

Wood with Active Chilled Beams			
	ESTIMATED VALUE	TARGET VALUE	VALUE DELTA
A Substructure	$ 505,000	$ 594,000	$ 89,000
B Shell	$ 2,605,082	$ 1,926,818	$ (678,264)
C Interiors	$ 1,063,200	$ 1,210,091	$ 146,891
D Services	$ 2,521,211	$ 2,349,000	$ (172,211)
E Specialty Construction	$ 250,000	$ 493,364	$ 243,364
F Building Sitework	$ 365,000	$ 640,636	$ 275,636
G General Conditions	$ 1,060,000	$ 886,091	$ (173,909)
TOTAL	$ 8,369,493	$ 8,100,000	$ (269,493)

Winter estimate


TVD - TARGETS BY CLUSTER
TARGET VALUE
ESTIMATED VALUE
VALUE DELTA
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$-
$(500,000)
A Substructure
B Shell
C Interiors
D Services
E Specialty Construction
F Building Sitework
G General Conditions

Agenda



Combining TVD and LCC

Atlantic -Team

CATEGORY	LINE ITEM DESCRIPTION		COST DATA				QUANTITY		ESTIMATE RELIABILITY			ESTIMATE		TARGET VALUE		VALUE DELTA
	Identification Number	Description	Unit	Material O&P	Installation O&P	Total O&P	Quantity	Unit	Quantity Reliability	Cost Data	Overall Reliability	% of Total	ESTIMATED COST	% of Total	TARGET VALUE	VALUE DELTA
C. INTERIORS												15%	$1.242.865		$ 1.210.091	$ (32.774)
Interior walls												8%	$ 640.464		$ -	$ (640.464)
Rooms		N-wall	L.F			$ 130,00	3703	L.F	1	1	1		$ 481.367			
Offices		Modular walls				$ 160,00	994		1	2	2		$ 159.036			
Interior Doors												1%	$ 61.352		$ -	$ (61.352)
	C10201201000	Single-Glass 36" x 84" (+ 25% for glass)	Ea	239,43	364,7	755	39	Ea	1	2	1		$ 29.451			
	C10201201160	Double-Glass 72" x 84" (+ 25 % for glass)	Ea	364	574	1172,5	19	Ea	1	2	1		$ 22.278			
	C10201201000	Single-Flush 36" x 84"	Ea	239,43	364,7	604,13	5	Ea	1	2	1		$ 3.021			
	C10201145160	Sliding-2 panel 72" x 84"	Ea	2025	176	2201	3	Ea	1	2	2		$ 6.603			
Other												0%	$ 34.000		$ -	$ (34.000)
		Moldprotection of wood				$ 1,00	34000	-	3	3	3		$ 34.000			
Stair construction												0%	$ 33.876		$ -	$ (33.876)
	C20101100590	Stairs, CIP concrete, w/landing, 20 risers, w/o nosing	Ea	$ 1.874,00	$ 3.772,00	$ 5.646,00	6	Ea	1	2	2		$ 33.876			
Wall finishes												2%	$ 132.940		$ -	$ (132.940)
	SF p103	95% paint, 5% ceramic tile	S.F			$ 3,91	34000	S.F	2	3	3		$ 132.940			
Floor finishes												4%	$ 340.233		$ -	$ (340.233)
General spaces	p321	Hard wood	S.F			$ 10,00	33415	S.F	1	2	2		$ 334.150			
Toilets	p314 (3255)	Tiles	S.F	$ 4,43	1,94	$ 6,37	675		1	2	2		$ 4.300			
MEP rooms	p314 (3255)	Tiles	S.F	$ 4,43	1,94	$ 6,37	280		1	2	2		$ 1.784			
C3030 Ceiling Finishes												0%	$ -		$ -	$ -
									3	3	3		$ -			

Original TVD

Combining TVD and LCC

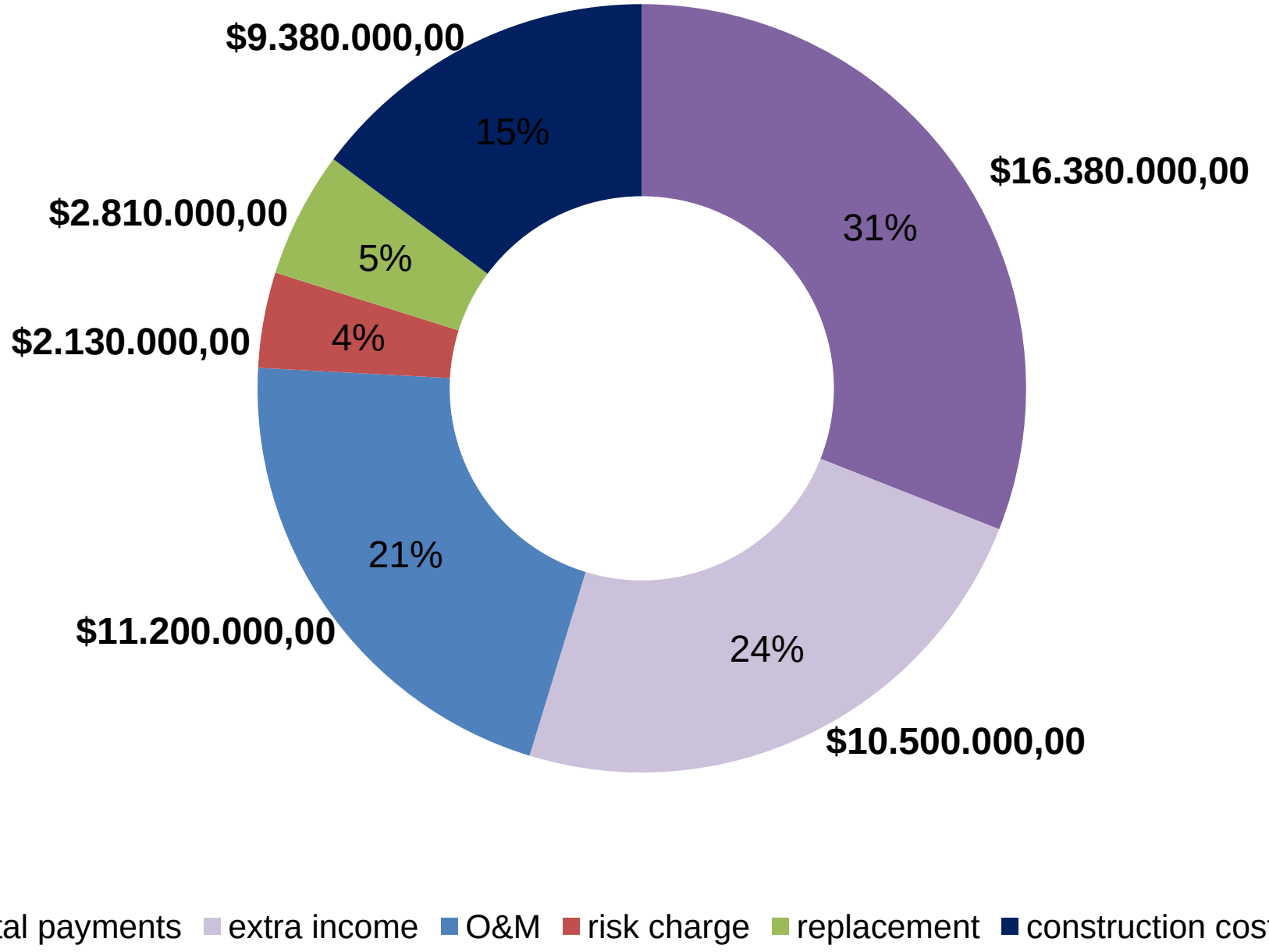
CATEGORY	LINE ITEM DESCRIPTION		COST DATA				LIFE EXPEC.	O & M	QUANTITY	
	Identification Number	Description	Unit	Material O&P	Installation O&P	Total O&P	Years	Total O & M	Quantity	Unit
C. INTERIORS										
Interior walls										
Rooms		N-wall	L.F			$ 130,00			3703	L.F
Offices		Modular walls				$ 160,00			394	
Interior Doors										
	C10201201000	Single-Glass 36" x 84" (+ 25% for glass)	Ea	239,43	364,7	755			39	Ea
	C10201201160	Double-Glass 72" x 84" (+ 25 % for glass)	Ea	364	574	1172,5			19	Ea
	C10201201000	Single-Flush 36" x 84"	Ea	239,43	364,7	604,13			5	Ea
	C10201145160	Sliding-2 panel 72" x 84"	Ea	2025	176	2201			3	Ea
Other										
		Moldprotection of wood				$ 1,00			34000	-
Stair construction										
	C20101100590	Stairs, CIP concrete, w/landing, 20 risers, w/o nosing	Ea	$ 1.874,00	$ 3.772,00	$ 5.646,00			6	Ea
Wall finishes										
	SF p103	95% paint, 5% ceramic tile	S.F			$ 3,31			34000	S.F
Floor finishes										
General spaces	p321	Hard wood	S.F			$ 10,00			33415	S.F
Toilets	p314 (3255)	Tiles	S.F	$ 4,43	1,94	$ 6,37			675	
MEP rooms	p314 (3255)	Tiles	S.F	$ 4,43	1,94	$ 6,37			280	
C3030 Ceiling Finishes										

Inserting new colums
(linked to facility management database)

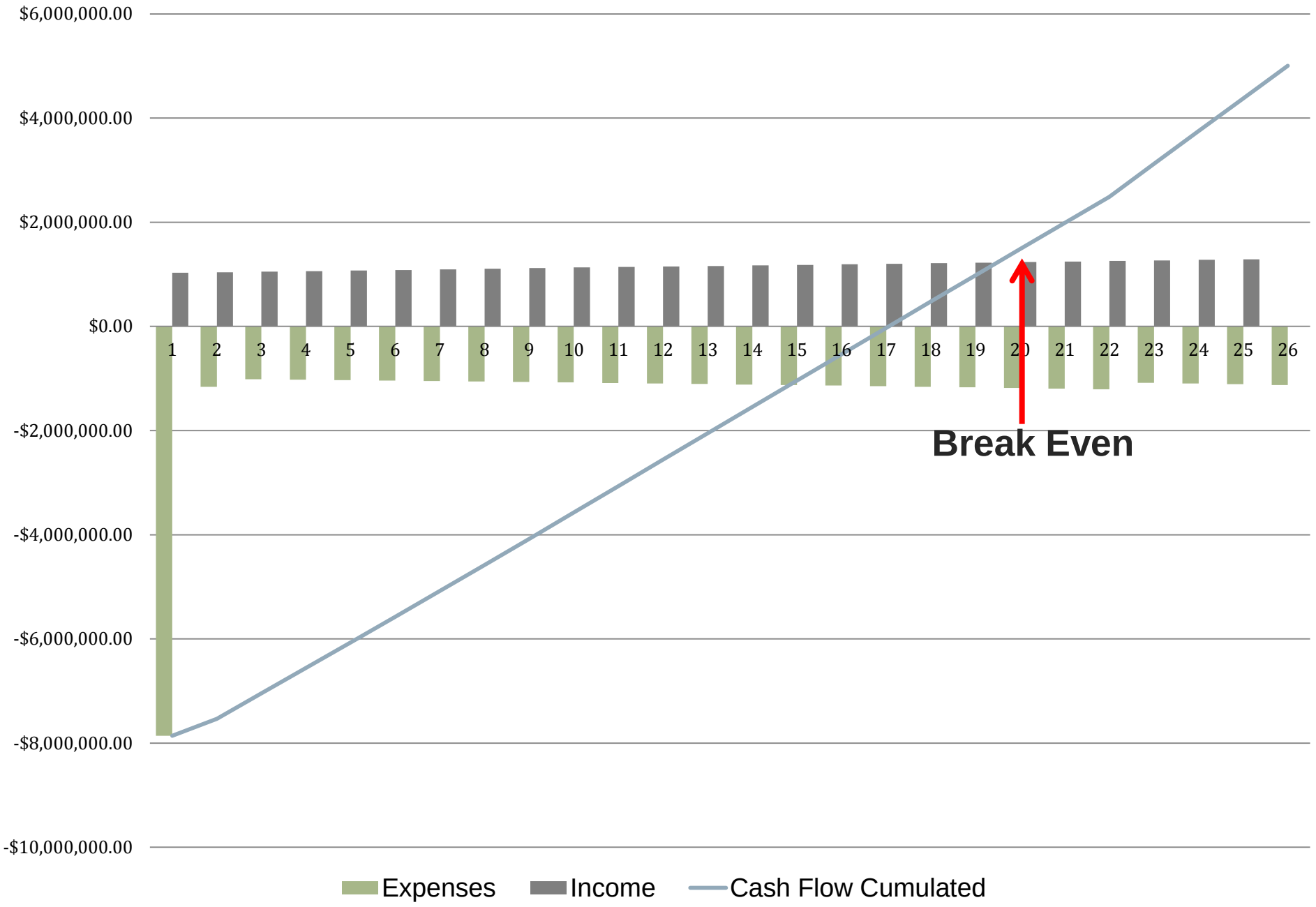
Combining TVD and LCC

CATEGORY	LINE ITEM DESCRIPTION		COST DATA				LIFE EXPEC.	O & M	QUANTITY	
	Identification Number	Description	Unit	Material O&P	Installation O&P	Total O&P	Years	Total O & M	Quantity	Unit
C. INTERIORS										
Interior walls										
Rooms		N-wall	L.F			$ 130,00	20	$ 24.562,50	3703	L.F
Offices		Modular walls				$ 160,00	15	$ 65.500,00	334	
Interior Doors										
	C10201201000	Single-Glass 36" x 84" (+ 25% for glass)	Ea	239,43	364,7	755	15	$ 2.500,00	39	Ea
	C10201201160	Double-Glass 72" x 84" (+ 25 % for glass)	Ea	364	574	1172,5	15	$ 2.500,00	19	Ea
	C10201201000	Single-Flush 36" x 84"	Ea	239,43	364,7	604,13	15	$ 2.500,00	5	Ea
	C10201145160	Sliding-2 panel 72" x 84"	Ea	2025	176	2201	15	$ 2.500,00	3	Ea
Other										
		Moldprotection of wood				$ 1,00			34000	-
Stair construction										
	C20101100590	Stairs, CIP concrete, w/landing, 20 risers, w/o nosing	Ea	$ 1.874,00	$ 3.772,00	$ 5.646,00	60	$ 20.000,00	6	Ea
Wall finishes										
	SF p103	95% paint, 5% ceramic tile	S.F			$ 3,91	20	$ 32.500,00	34000	S.F
Floor finishes										
General spaces	p321	Hard wood	S.F			$ 10,00	20	$ 30.000,00	33415	S.F
Toilets	p314 (3255)	Tiles	S.F	$ 4,43	1,94	$ 6,37	15	$ 20.000,00	675	
MEP rooms	p314 (3255)	Tiles	S.F	$ 4,43	1,94	$ 6,37	15	$ 8.000,00	280	
C3030 Ceiling Finishes										
						$ 500,00				

TVD is combined with LCC and gives first impression of future O & M Costs

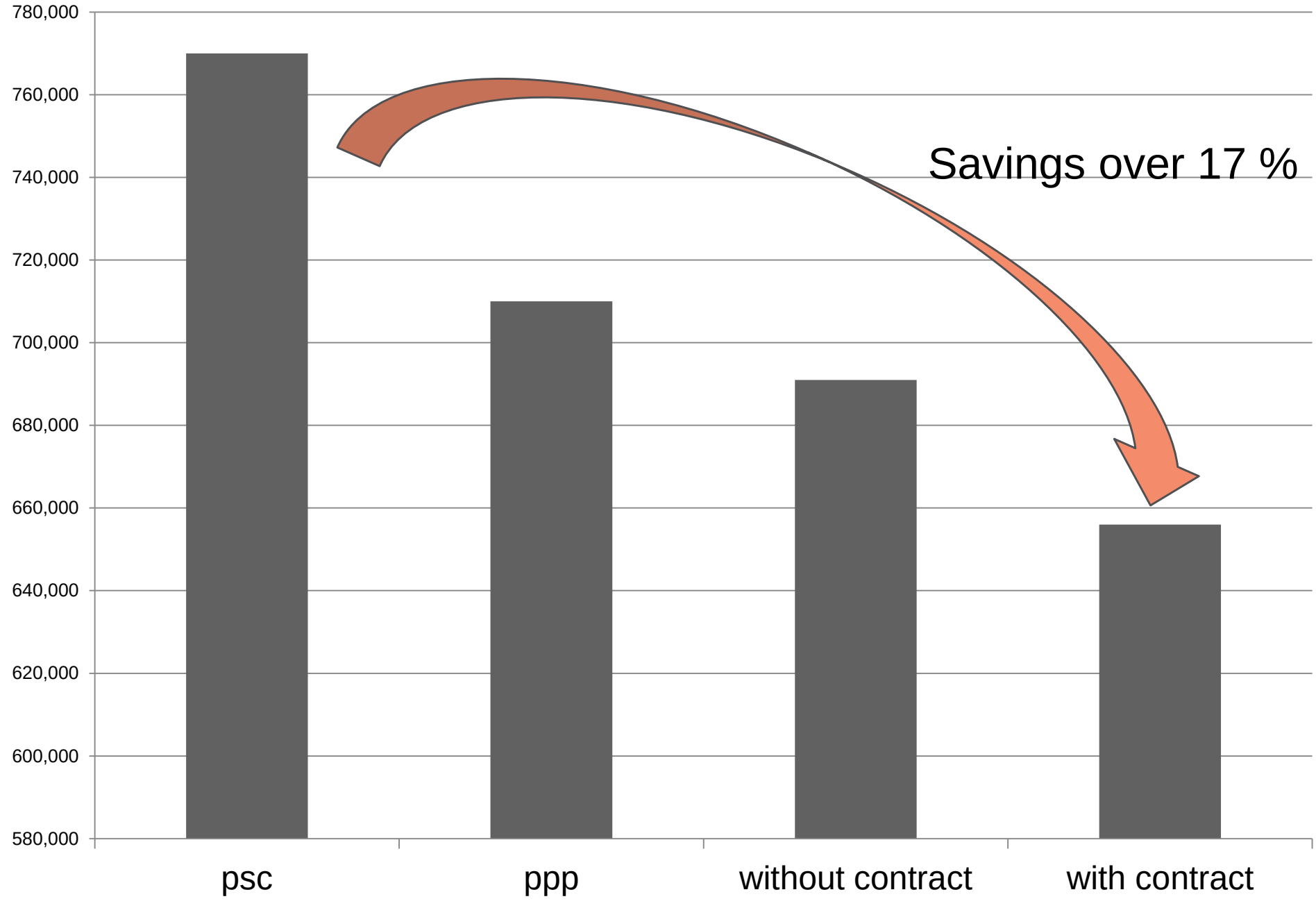

$9.380.000,00
15%
$16.380.000,00
31%
$2.810.000,00
5%
$2.130.000,00
4%
21%
$11.200.000,00
24%
$10.500.000,00
rental payments
extra income
O&M
risk charge
replacement
construction costs

Cash Flow

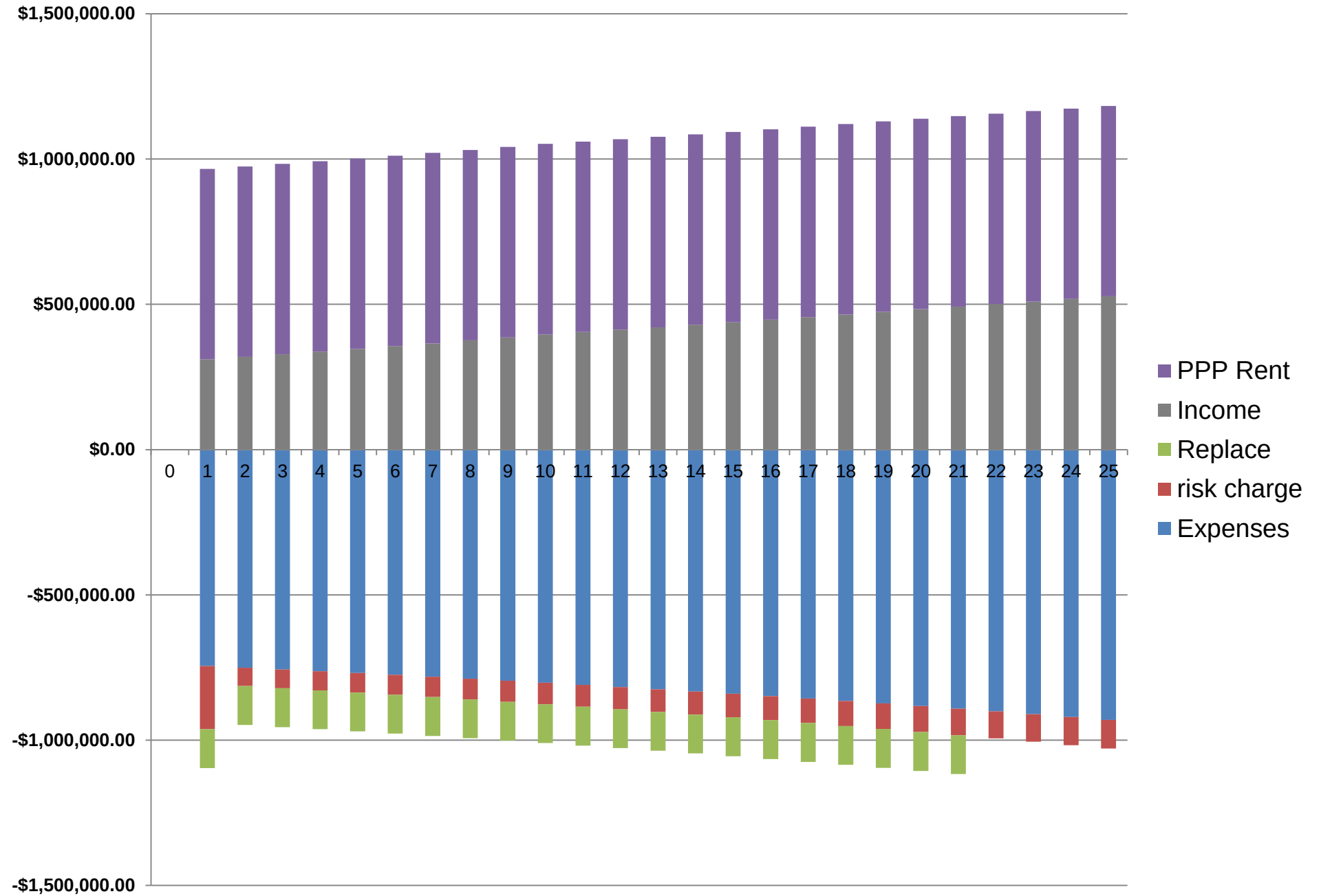

$6,000,000.00
$4,000,000.00
$2,000,000.00
$0.00
-$2,000,000.00
-$4,000,000.00
-$6,000,000.00
-$8,000,000.00
-$10,000,000.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Break Even
Expenses
Income
Cash Flow Cumulated

Rent

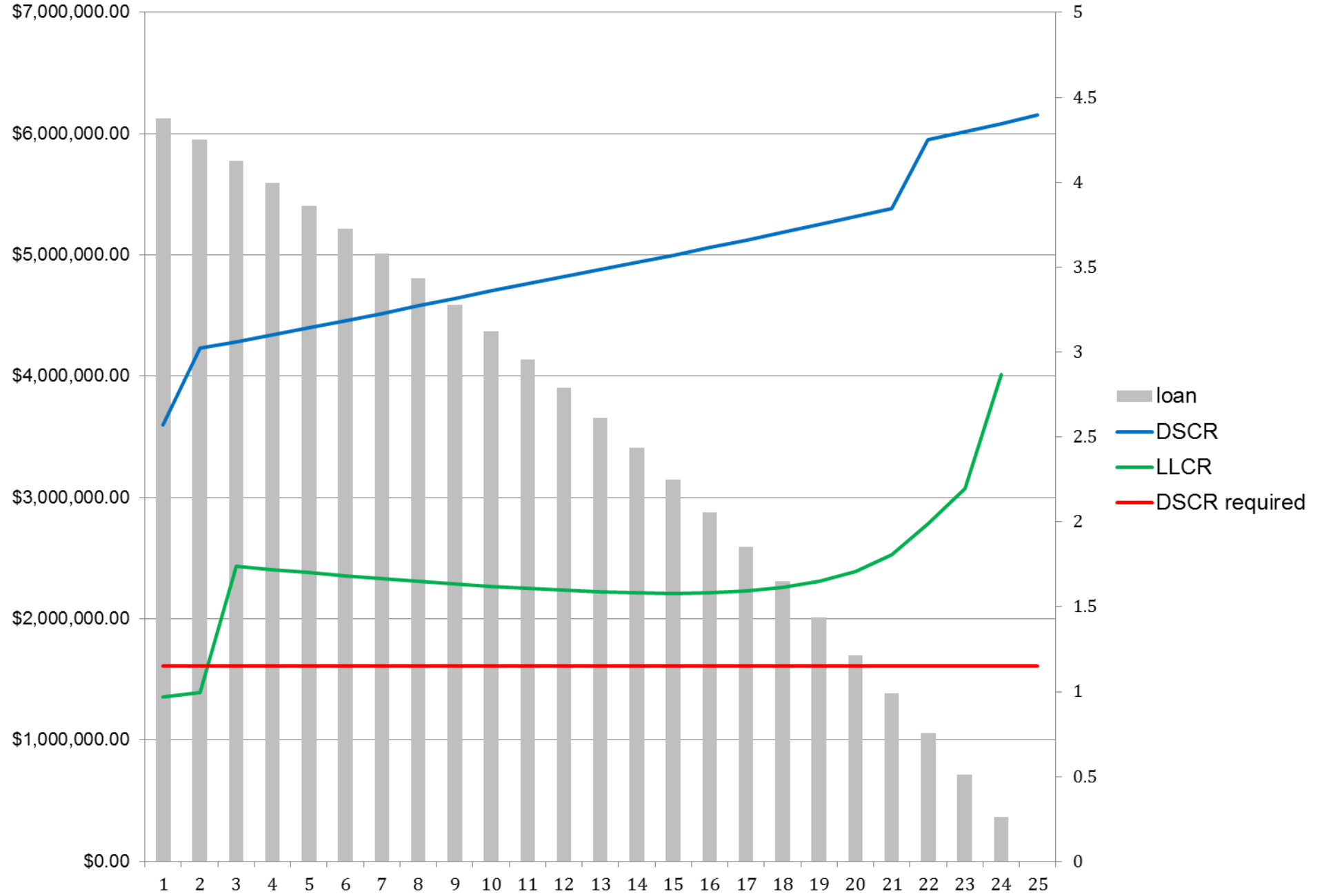
Atlantic



Cash Flow


$1,500,000.00
$1,000,000.00
$500,000.00
$0.00
-$500,000.00
-$1,000,000.00
-$1,500,000.00
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
PPP Rent
Income
Replace
risk charge
Expenses

Loan structure



Boat	LEED Criteria
40-49	50-59 60-79 80+
20	Sustainable Sites
7	Water Efficiency
16	Energy & Atmosphere
10	Material & Resources
14	Indoor environmental Quality
4	Innovation & Design Process
72	Sum

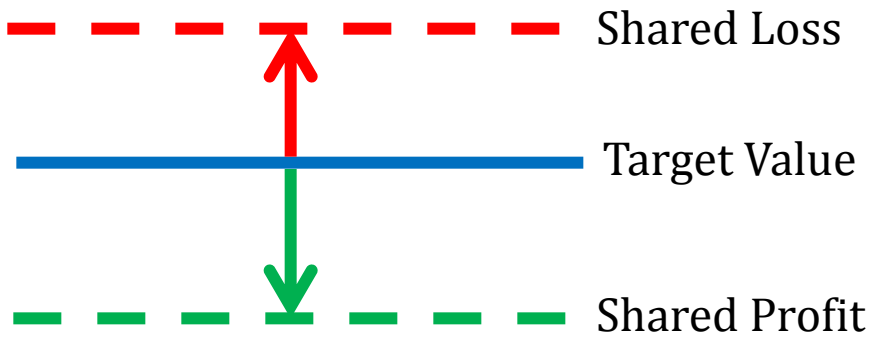
LEED Gold

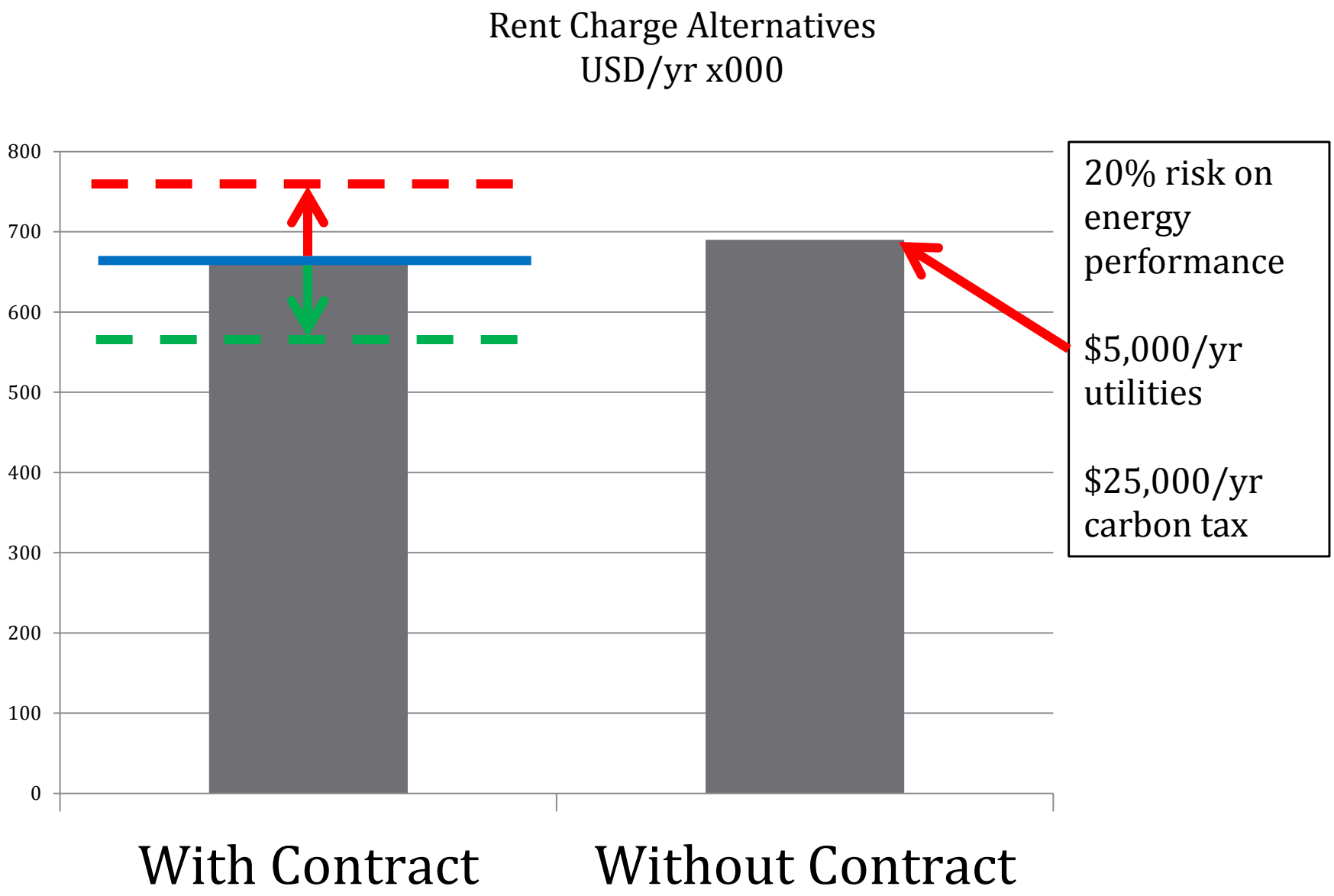
Typical Practice

- Predicted vs. actual energy not reliable
- Split incentives for utilities

Leapfrogging:

- Heavily monitor energy use
- Share profit/loss on utilities

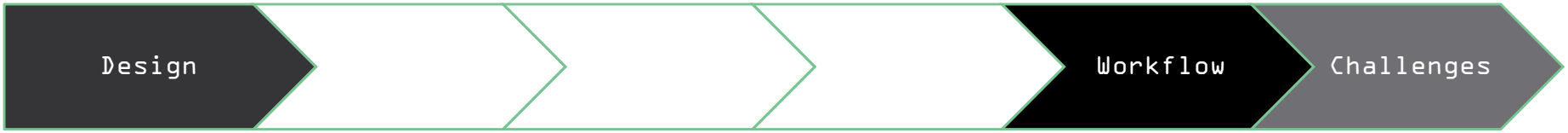


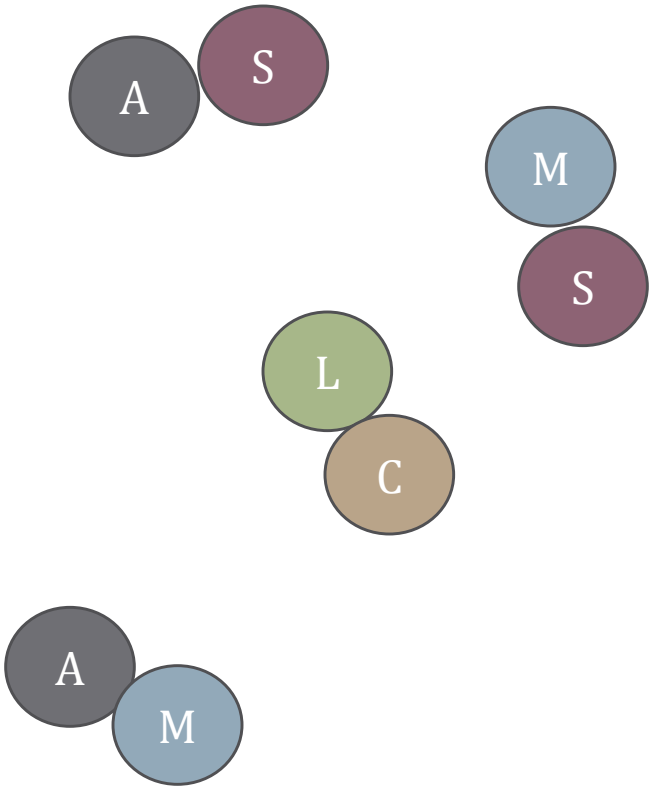

Rent Charge Alternatives
USD/yr x000
800
700
600
500
400
300
200
100
0
20% risk on energy performance
$5,000/yr utilities
$25,000/yr carbon tax
With Contract
Without Contract

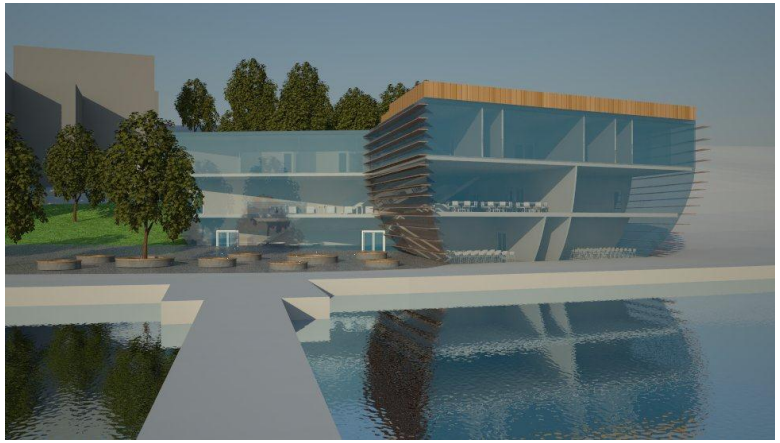
Stipulations

- Tenant only responsible for occupant & plug loads
  - Heavy commissioning of building envelope and equipment
- Ownership team will educated occupants
- 5-yr rampup period
  - “Target” starts high, decrease gradually to modeled value

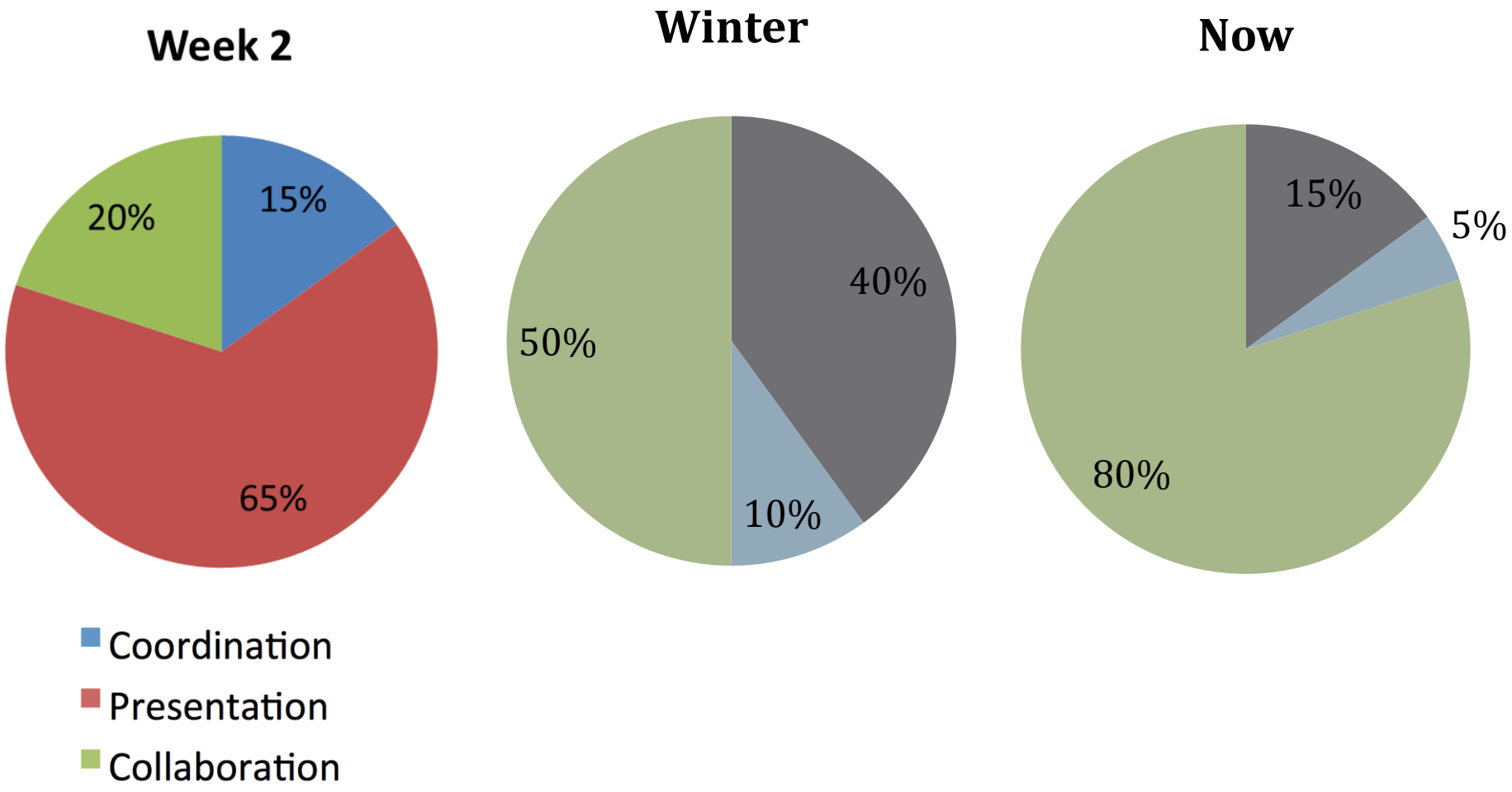
Agenda







A M S L C


Week 2
15%
20%
65%
Winter
40%
50%
10%
Now
15%
5%
80%
Coordination
Presentation
Collaboration

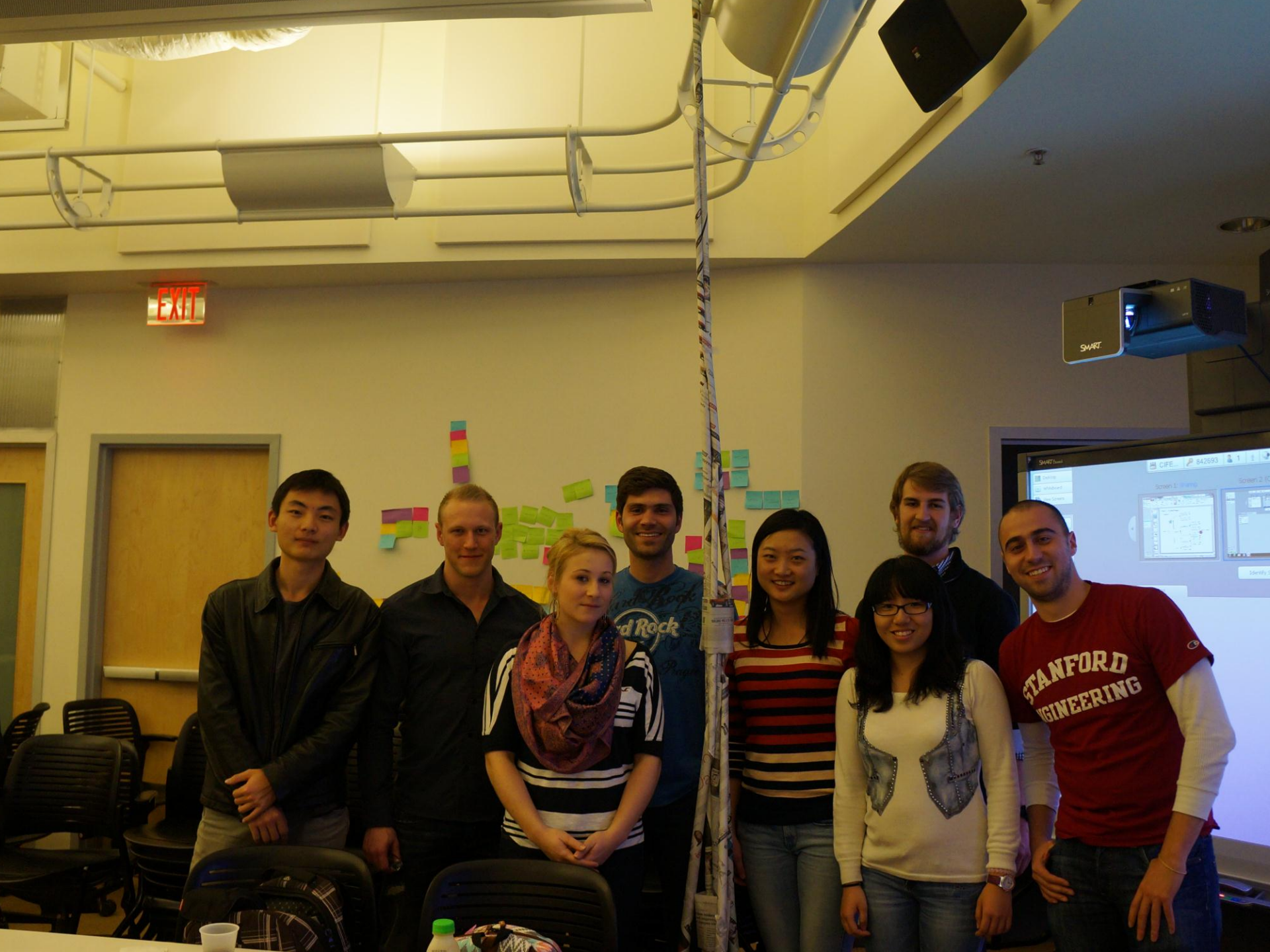
General Communication

Video Calls
Team Meetings
Screen sharing
Sketching

Task assignment

Organization
Note Taking
Brainstorming

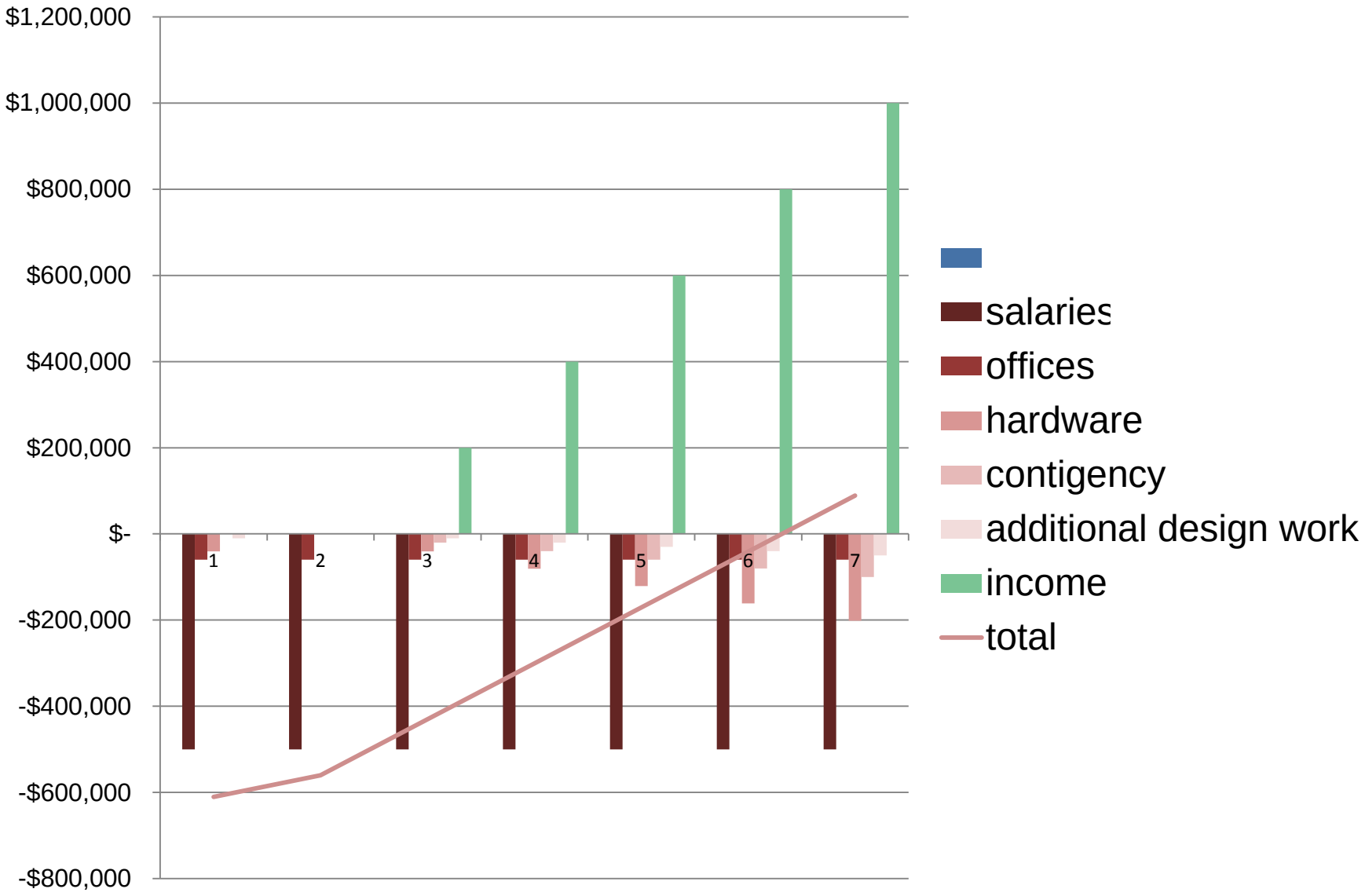
File Sync
Commenting


EXIT
SMART
Hard Rock
STANFORD
NGINEERING


Hard Rock


SMART
SUSTAINABLE
SYSTEMS

		amount	price ($)	total ($)
	switch/sensor	1500	19	28,500
	wifi router/access point	50	20.88	1,044
	terminal	50	35	1,750
	central computer	1	3,960	3,960
	additional hardware			5,000
	total			40,254


$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$-
-$200,000
-$400,000
-$600,000
-$800,000
1
2
3
4
5
6
7
salaries
offices
hardware
contigency
additional design work
income
total

Lessons Learned

Be clear with communication; meeting time is precious.

Compromises can sometimes result in better solutions.

It's important to know when to make concessions and when to be stubborn.

Always think from many perspectives when resolving conflicts.

Complex problems are easier to solve in a team.

Make sure everyone is aware of your perspective from your discipline.

Use pull planning and develop early metrics.

Communicating at the right moment is key to success.

Andrej
Architect

Anran
Apprentice

Minyan
Structural Engineer

Jana
LCFM

Niklas
Construction Manager

Yang
Construction Manager

Graham
MEP

Elias
Structural Engineer

Thank You!

Anja Jutraž
Clyde Tatum
Daniel Gonzales
David Bendet
Eduardo Miranda
Emile Hamon
Fernando Castillo
Fredrik Wincent
Glenn Katz
Greg Luth
Maria Frank
Mike Miller
Miloš Todorevič
Renate Fruchter
Sanja Štimac
Stefan Soderberg
Wendy Taniwangsa
Willem Kymmell
… and many more!

Thanks to all Mentors,
Faculty, and Participants!

It has been a great pleasure working with
and getting to know all participants.

Sincerely,
Team Atlantic 2013