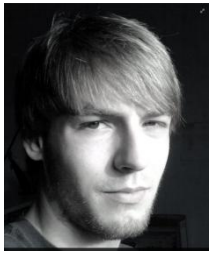
AEC PBL
GLOBAL TEAMWORK
PACIFIC TEAM 2013



Marian Lukesch
Matthias Schaefer
LCFM

Ethan Landy
MEP

Nolan Milord
CM

Enrique Hernandez
CM

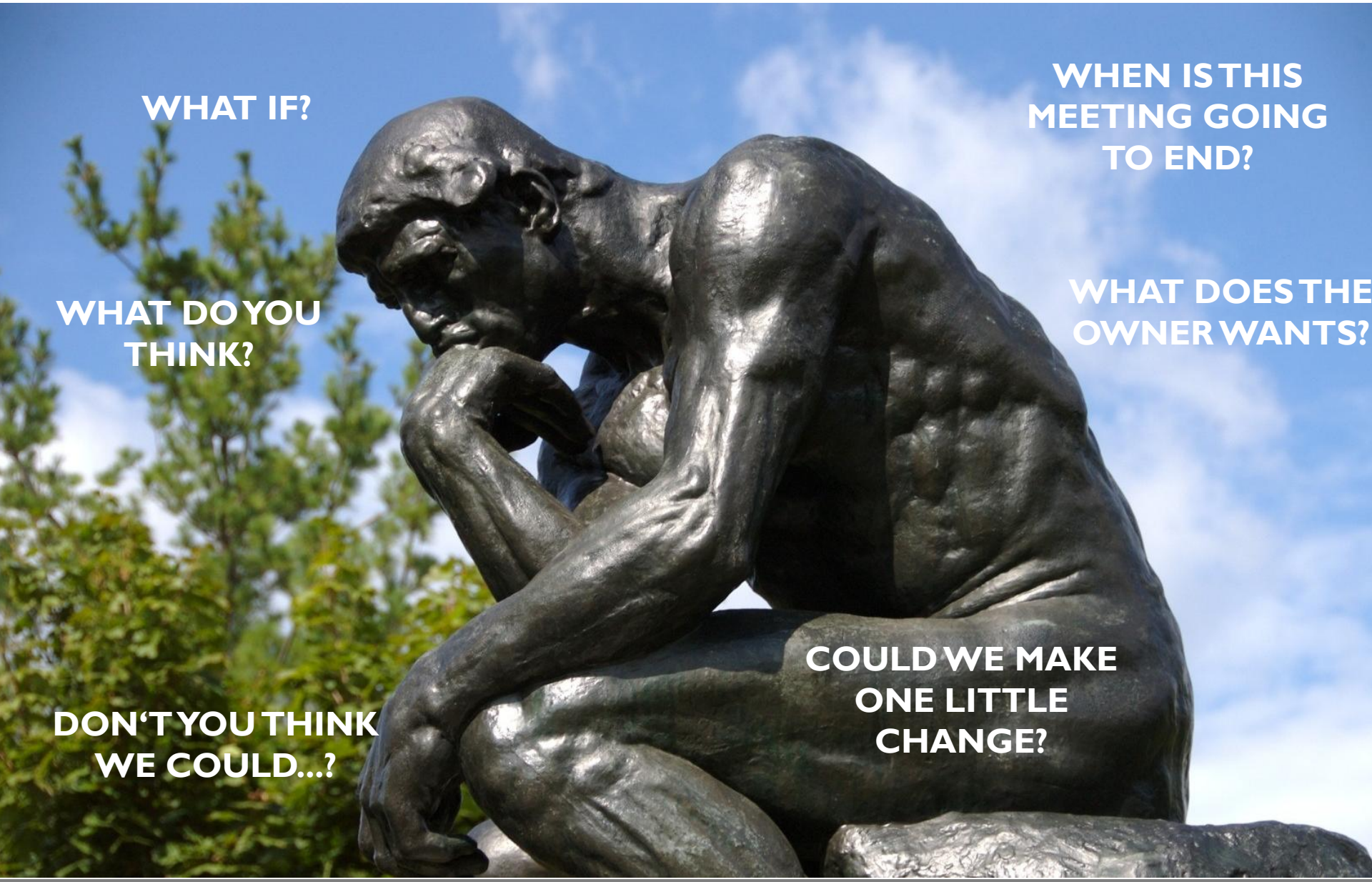
Mike Muller
SE

Bjarke Apollo-Andreasen
A

Donata Trost
SE

Sijia Tao
APP

TEAM PROCESS– THE THINKER TEAM



TEAM PROCESS– GOALS

INNOVATIVE MATERIALS

ENERGY EFFICIENCY

ICONIC BUILDING

TEAM PROCESS– THE THINKER TEAM

BEACON

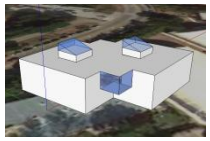
GATE

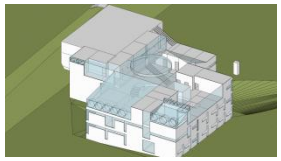
STEALTH BOMBER

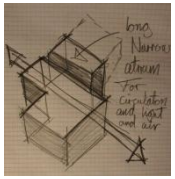
EMBRACE

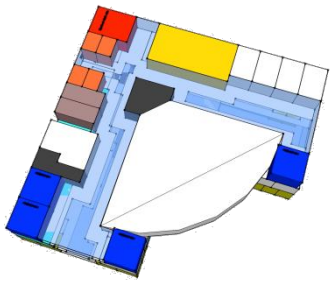
FLOW

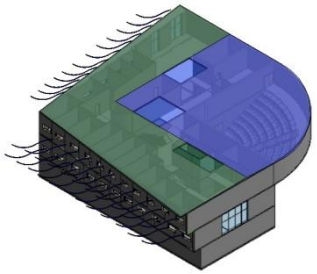
FINAL DESIGN



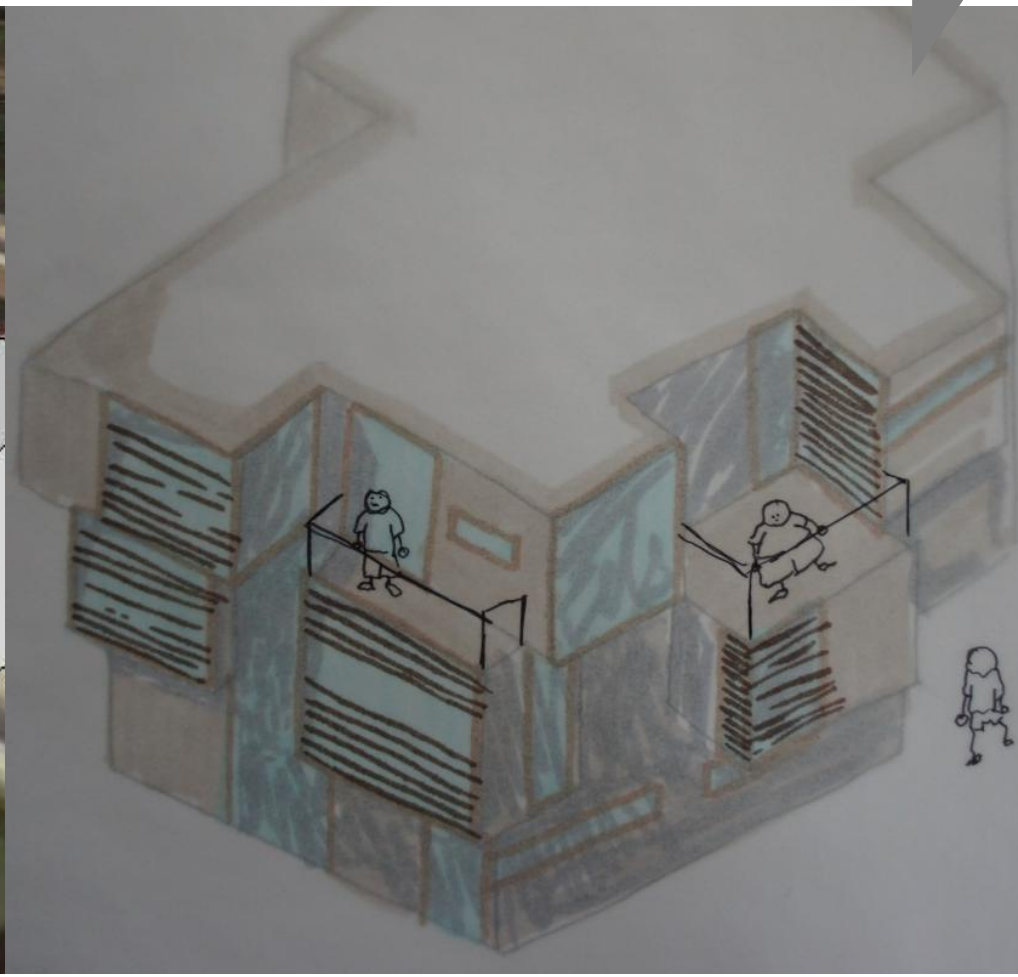




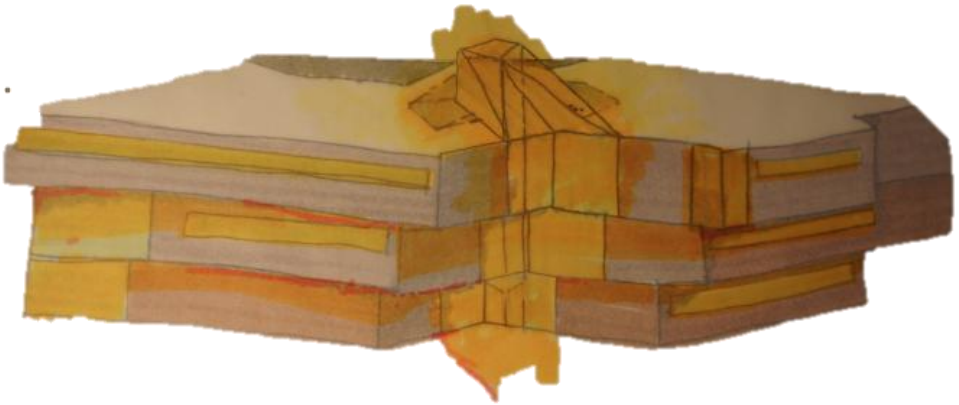


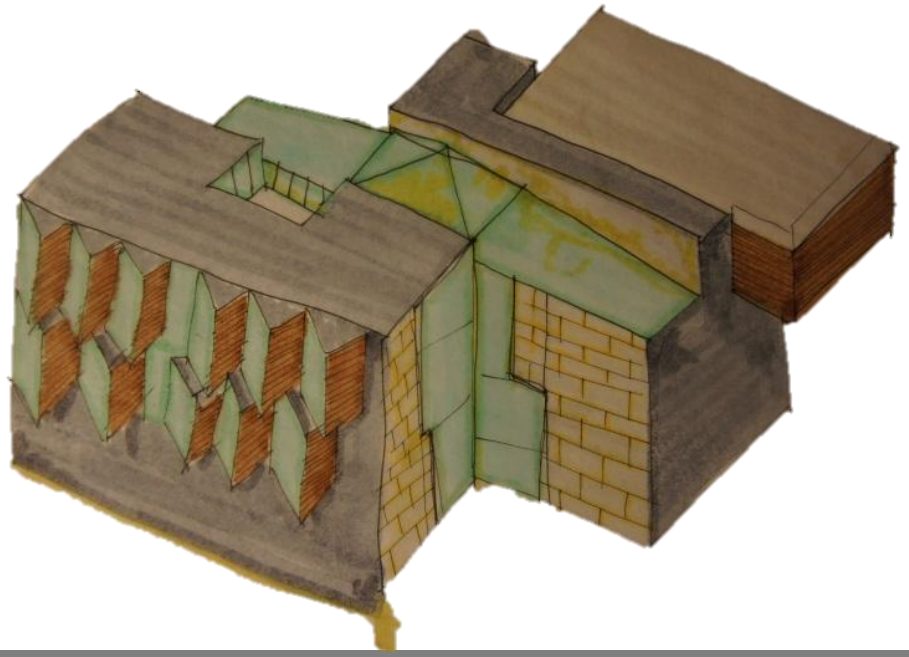


KICK OFF



PEER REVIEW





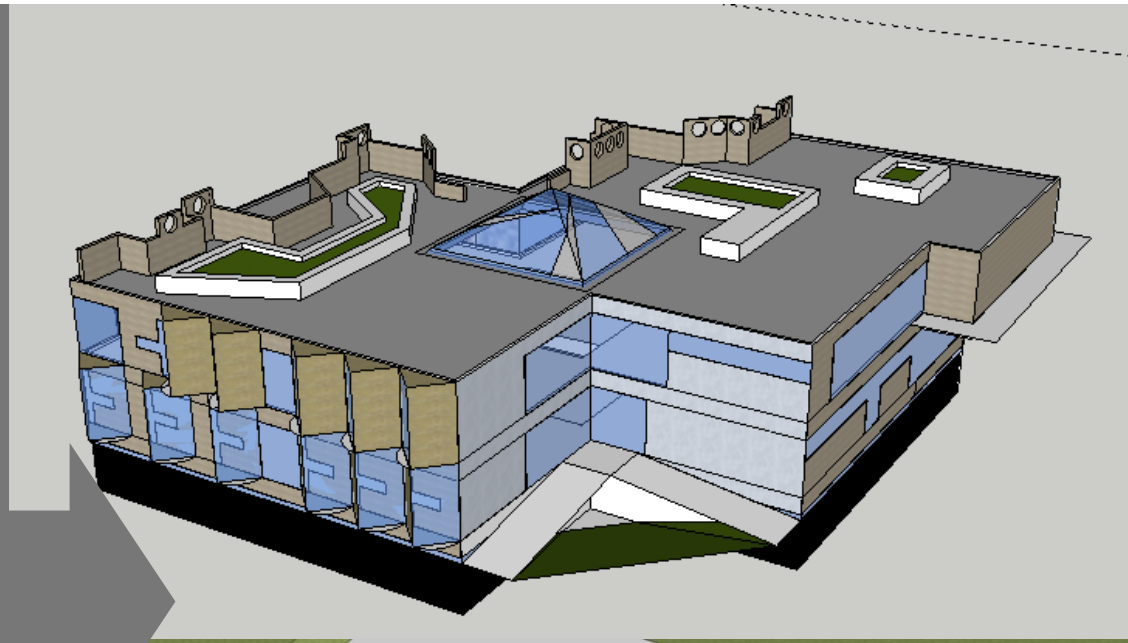
PEER REVIEW

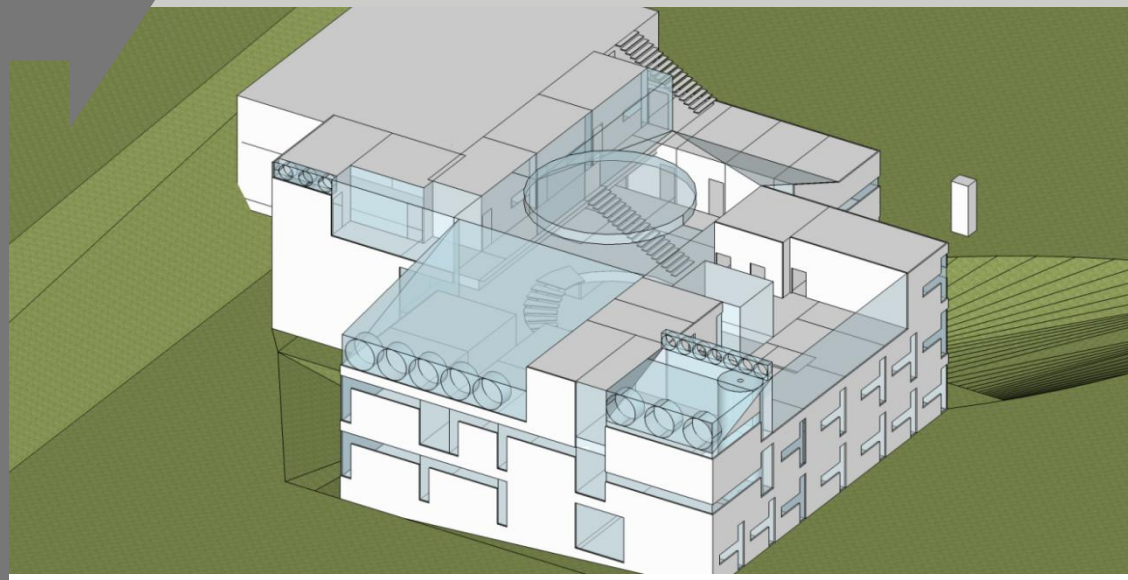
TEAM PROCESS – WIND TURBINES

WIND TURBINES +
TRANSPARENT
WALL+ ROOF
TERRACE + L SHAPE
WINDOWS + 20
CANTILEVERS +
ATRIUM + FAKE
BEACON

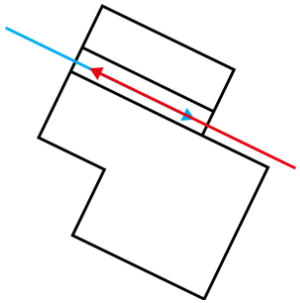
=

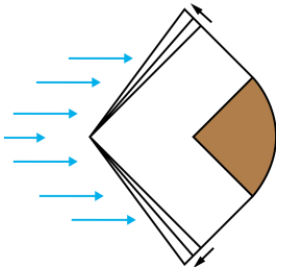
C
R
I
T





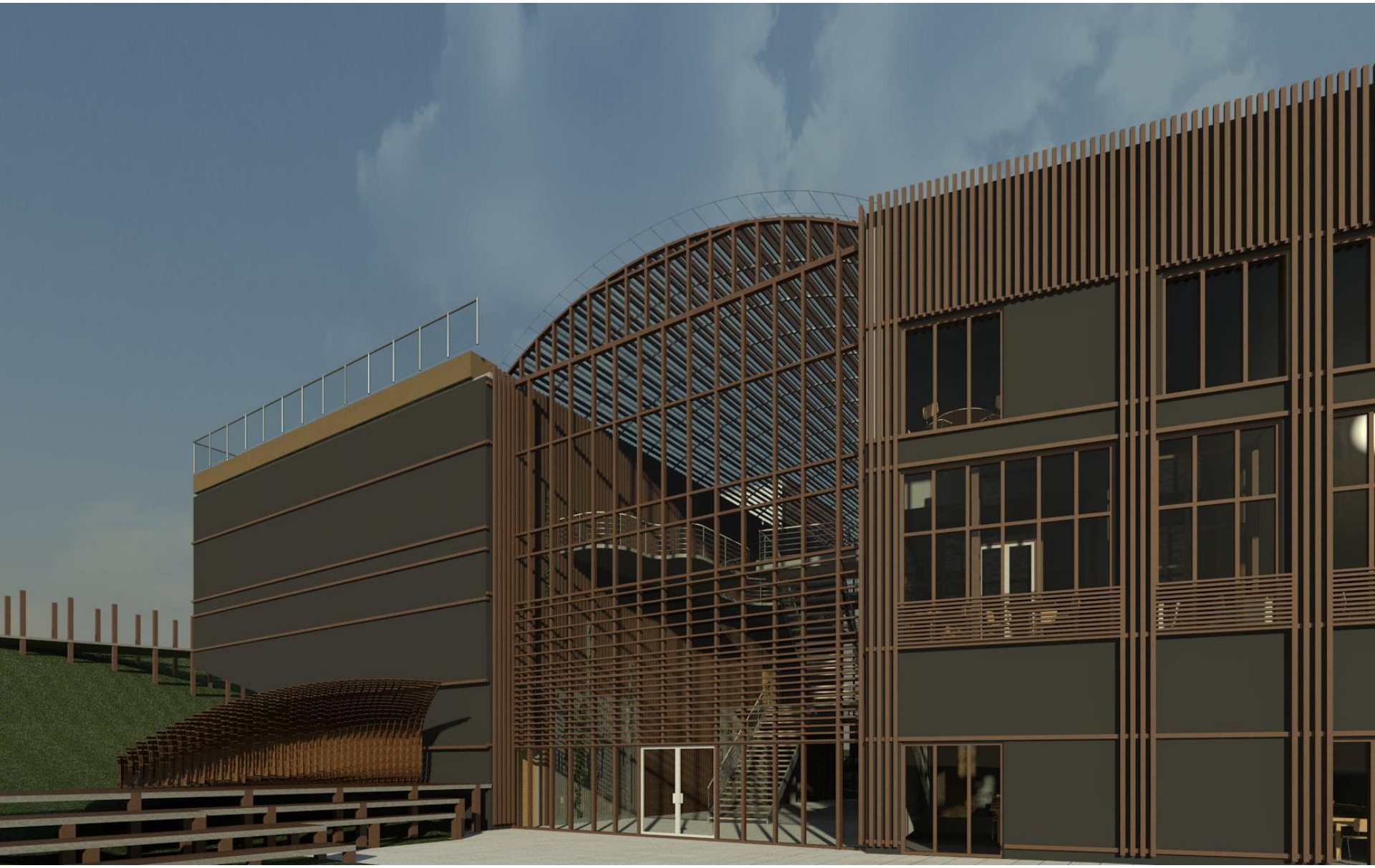
TEAM PROCESS– DECISION MATRIX





Foot Print	Flow - DD		Embrace-LS	
Structure Type	**Steel**	**CREE**	**Steel**	**Concrete**
Team Score	422	425	388	330
Owner's Score	412	415	390	330
Total Score	834	840	778	660

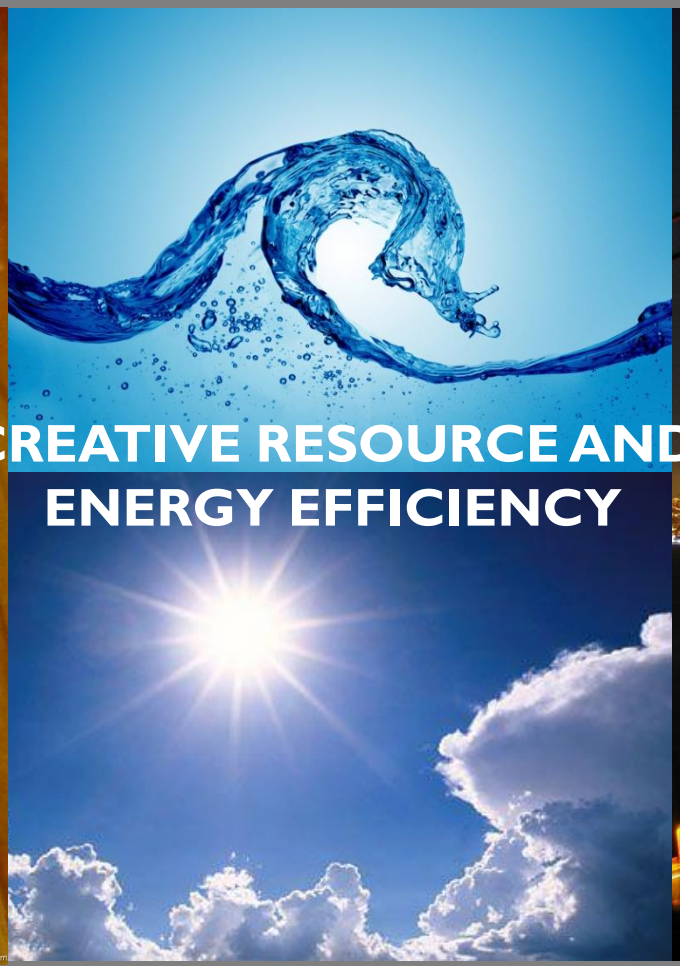
TEAM PROCESS – A JOURNEY TO OUR FINAL DESIGN



INNOVATIVE MATERIALS

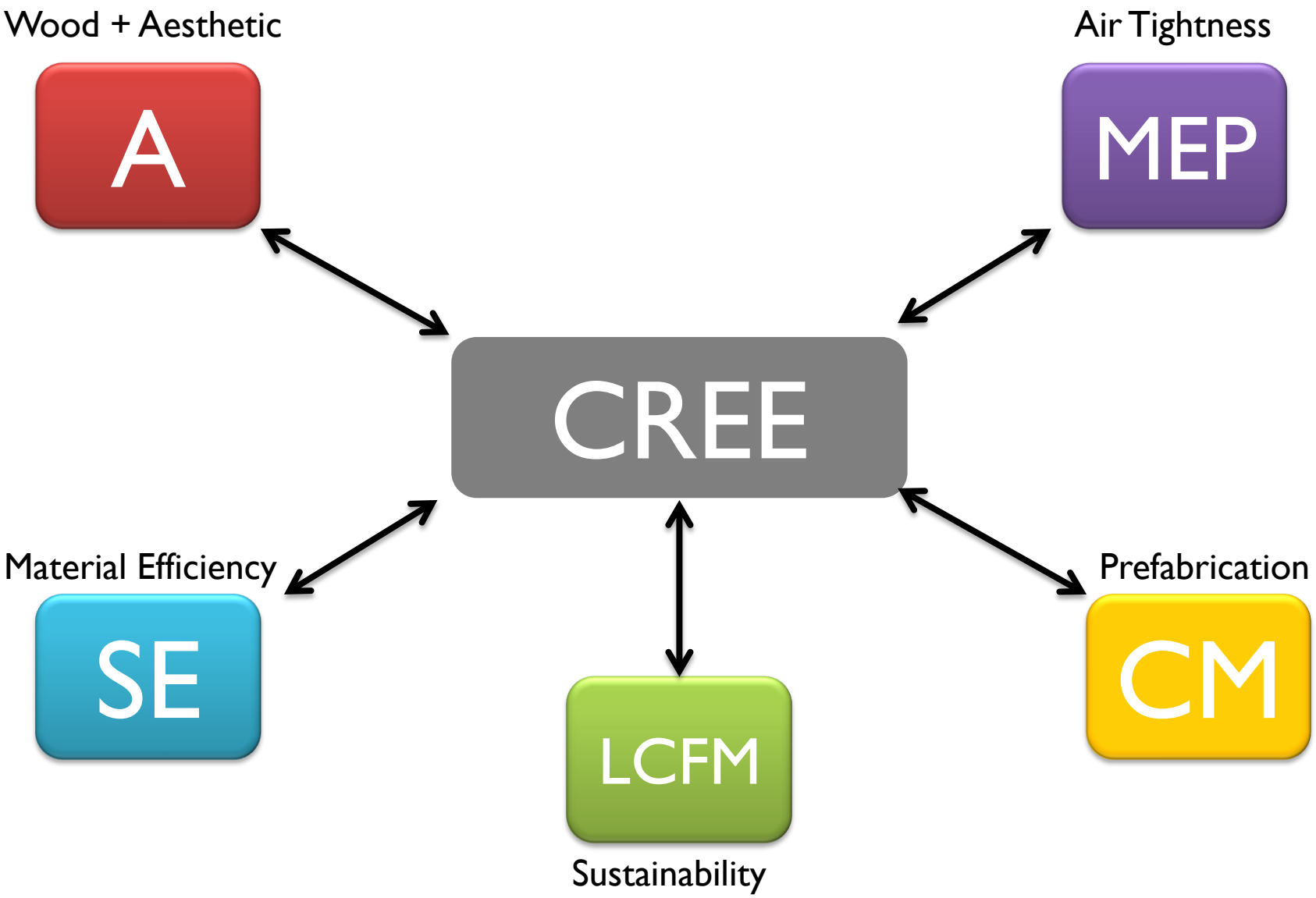
ENERGY EFFICIENCY

ICONIC BUILDING

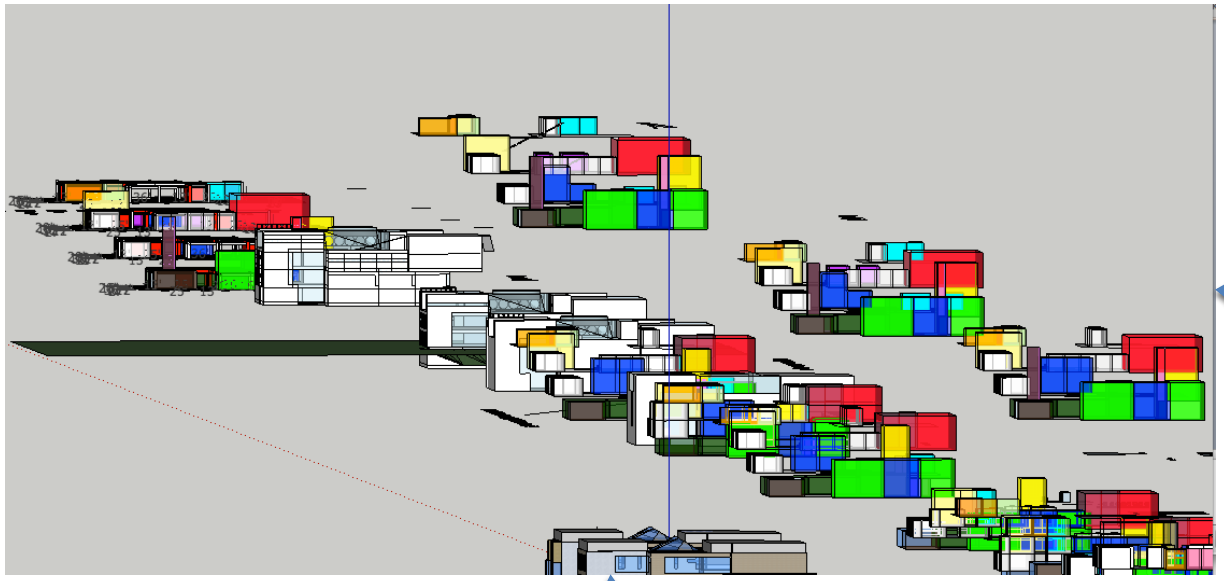


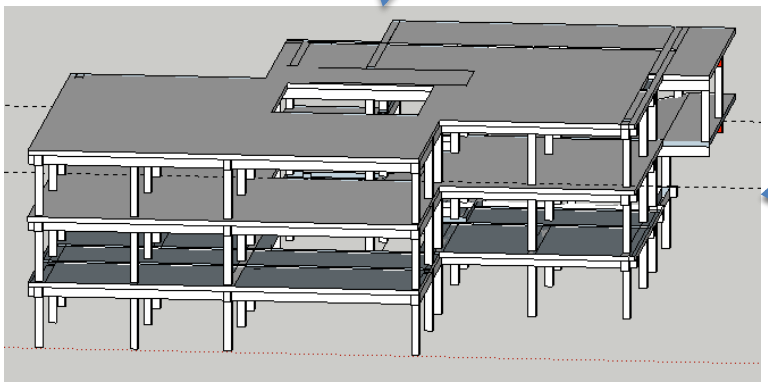
CREATIVE RESOURCE AND ENERGY EFFICIENCY

TEAM PROCESS– A SOLUTION THAT FITS EVERYONE

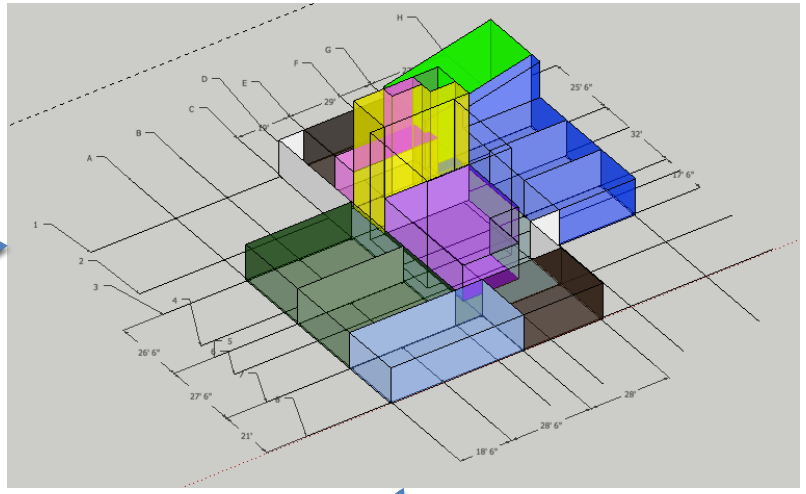


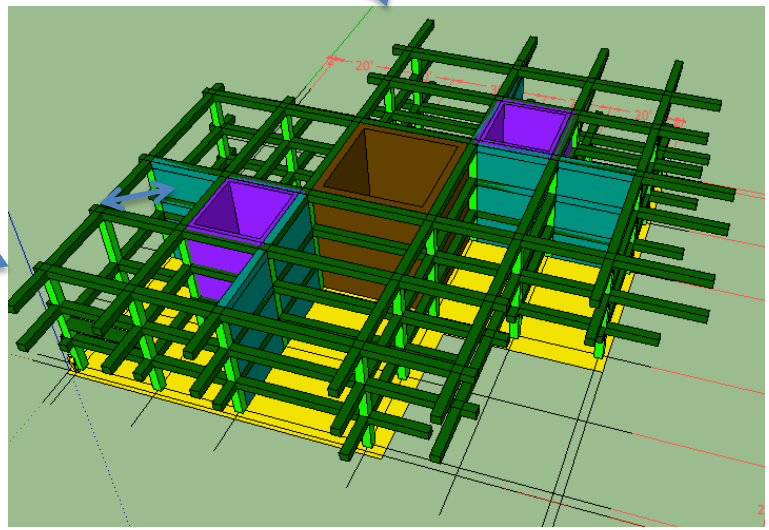
BIM COORDINATION – FROM THIS...



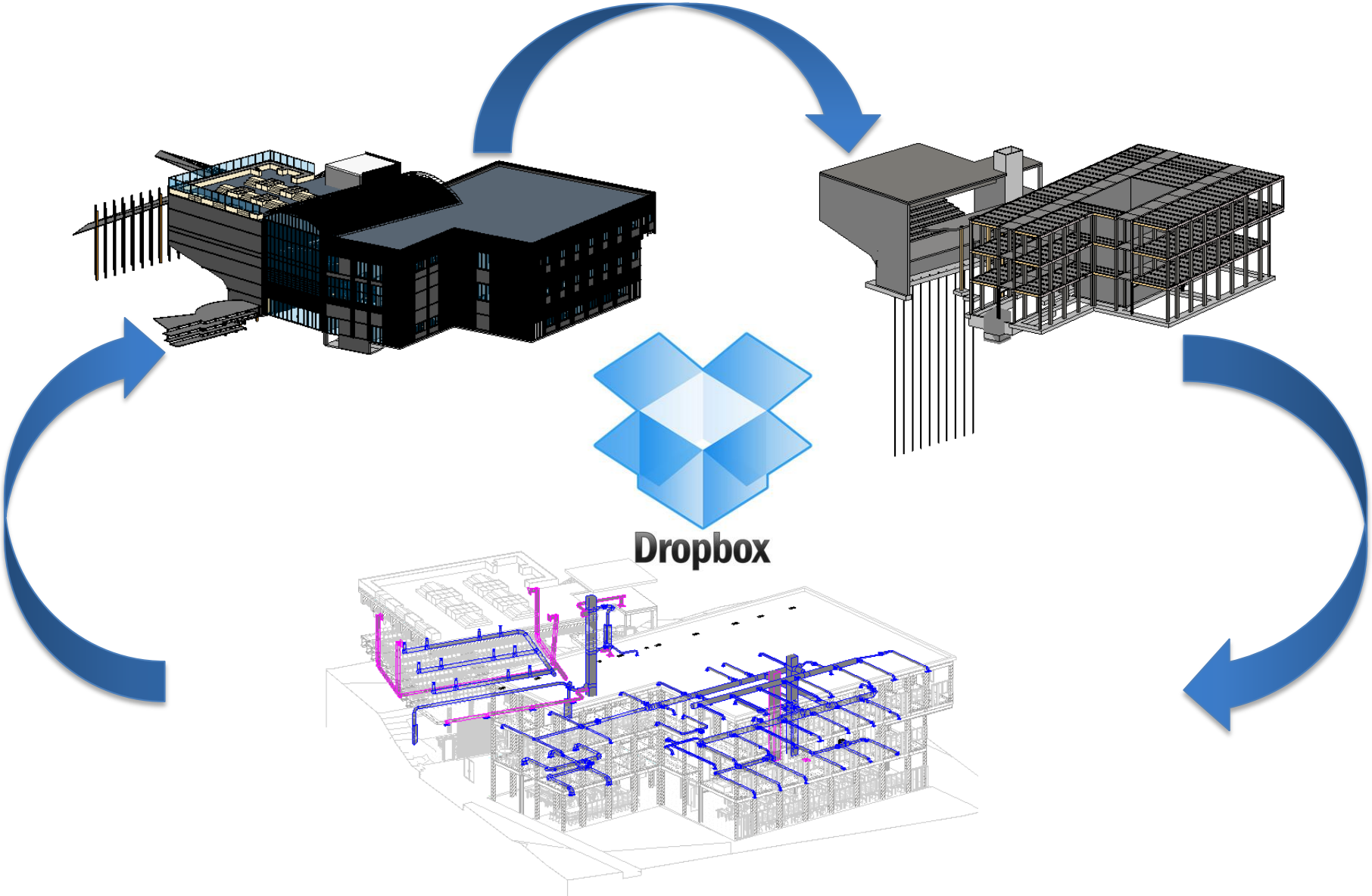


BIM COORDINATION – FROM THIS...

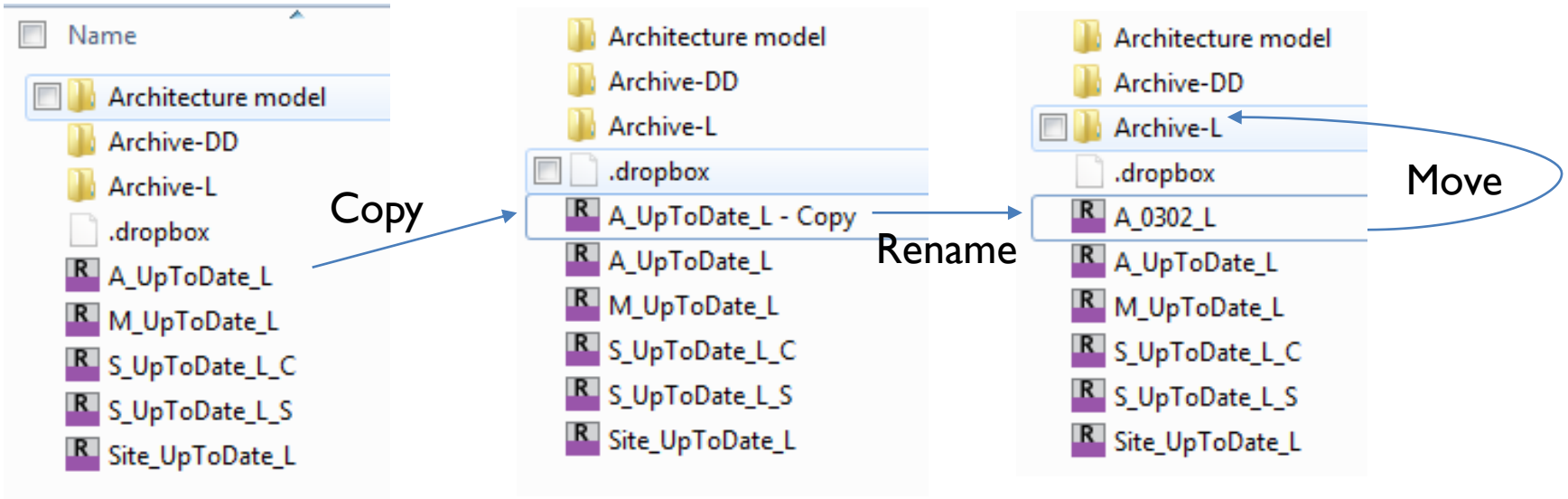




BIM COORDINATION – TO THIS...



BIM MANAGER → BIM IMPLEMENTATION PLAN

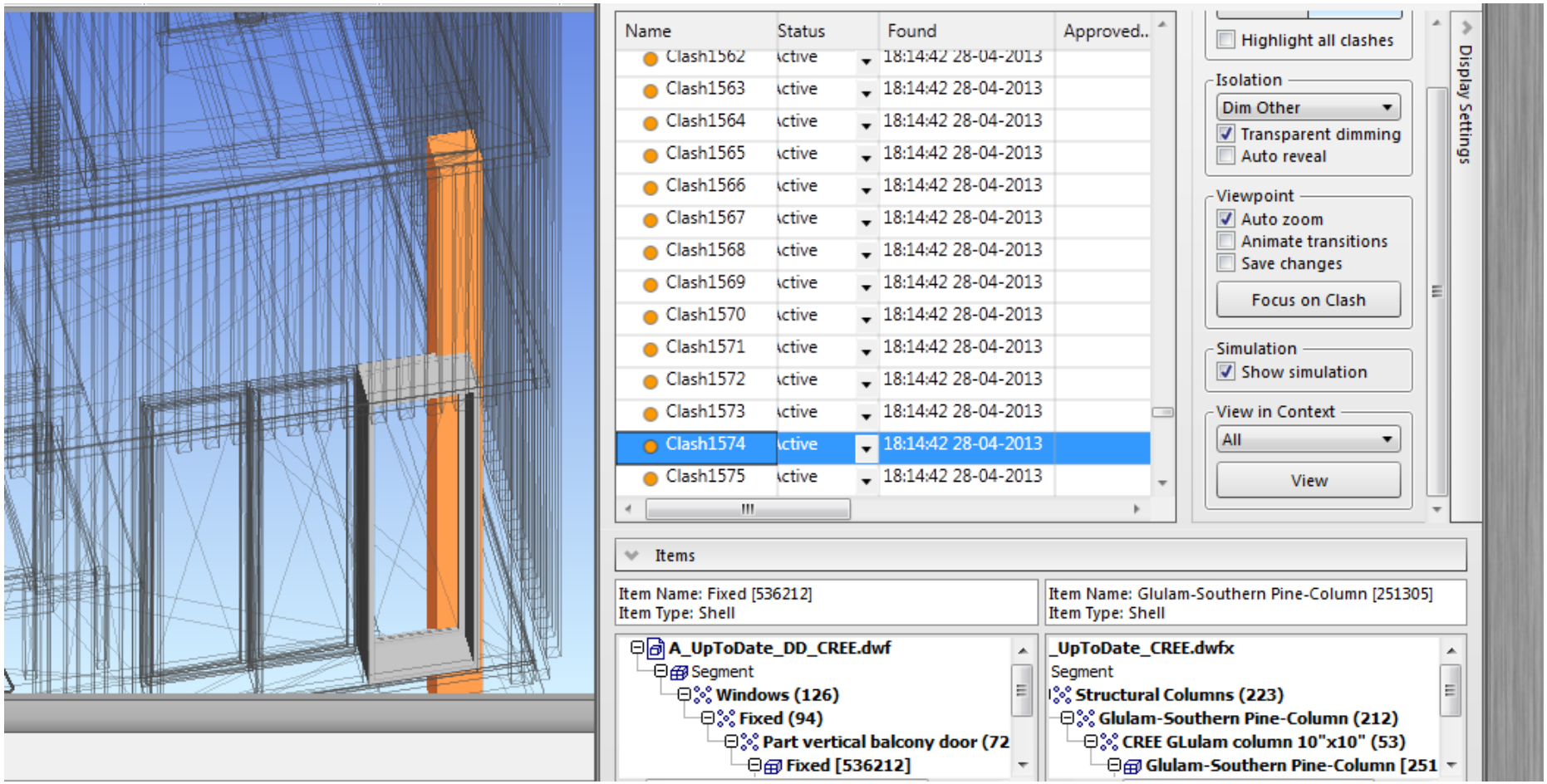


Before opening, copy file to be opened

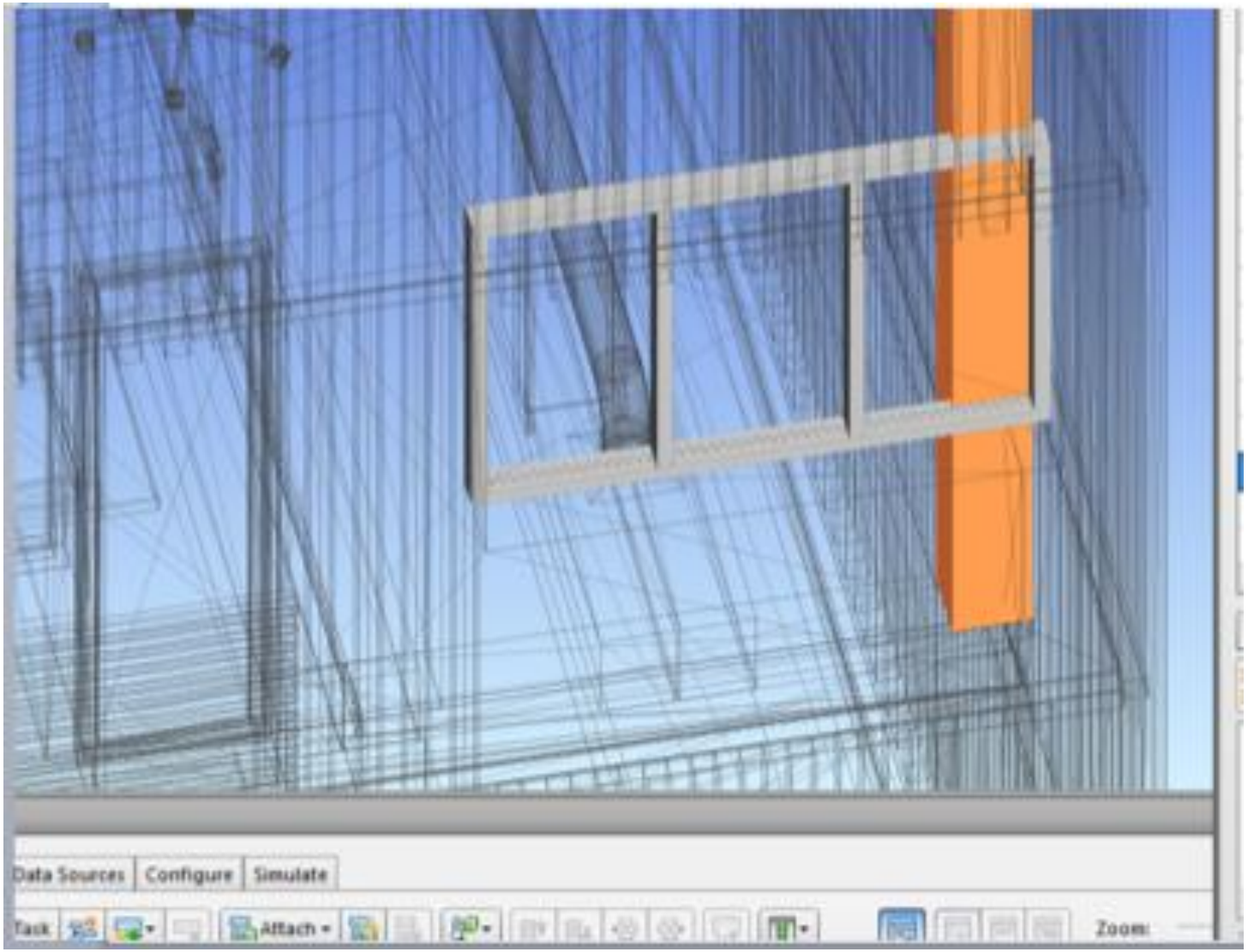
Rename copy using "Discipline_Month/Day_Shape_(C or S)"

Move file into appropriate archive folder and then open "UpToDate" file

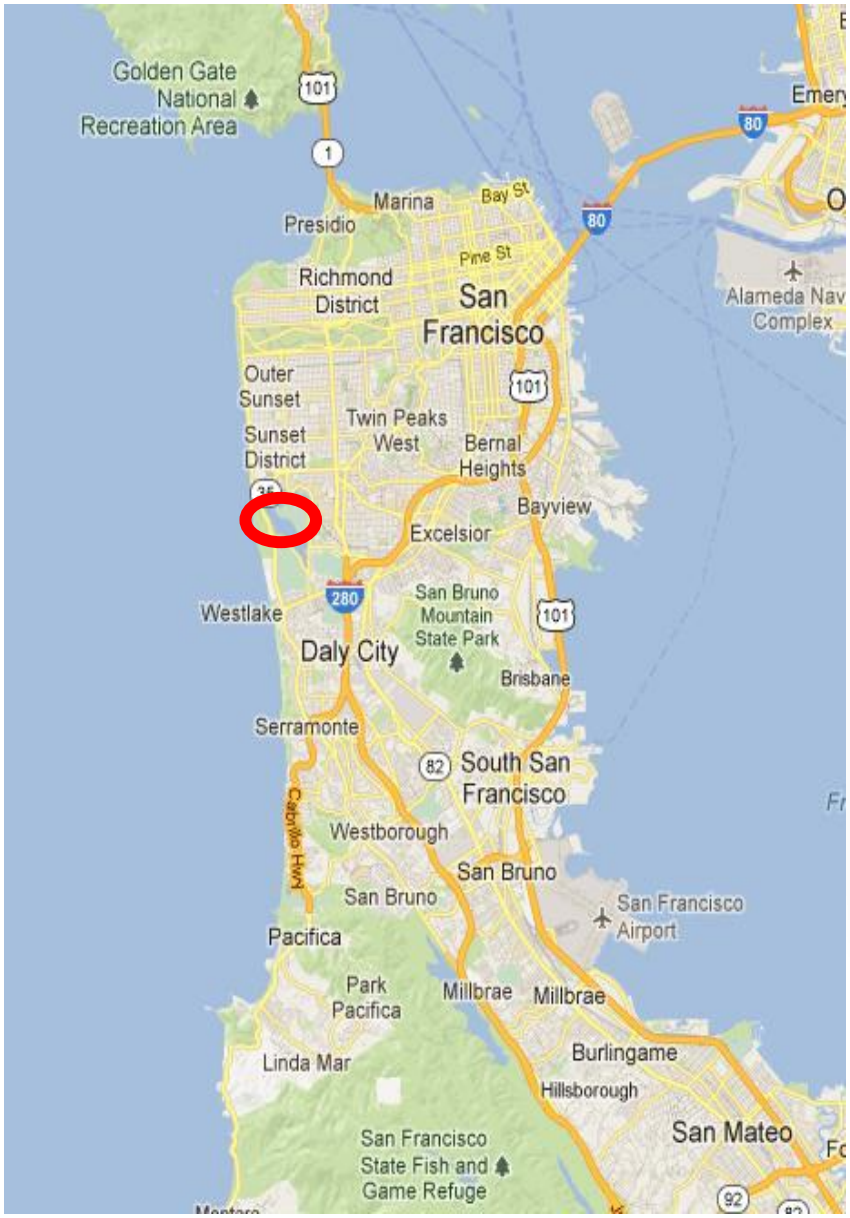
BIM COORDINATION – CLASH DETECTION

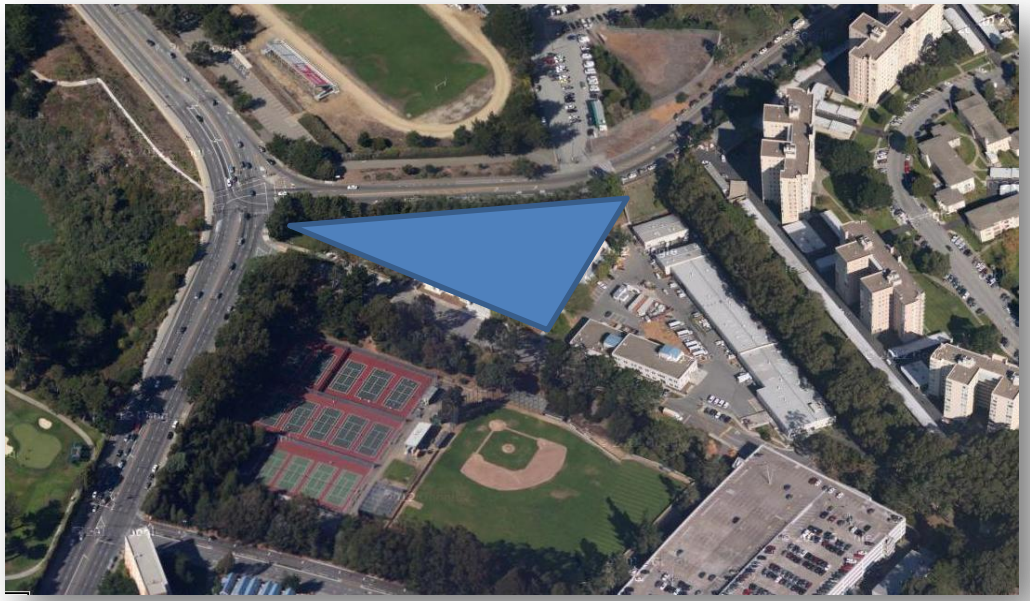


BIM COORDINATION – CLASH DETECTION

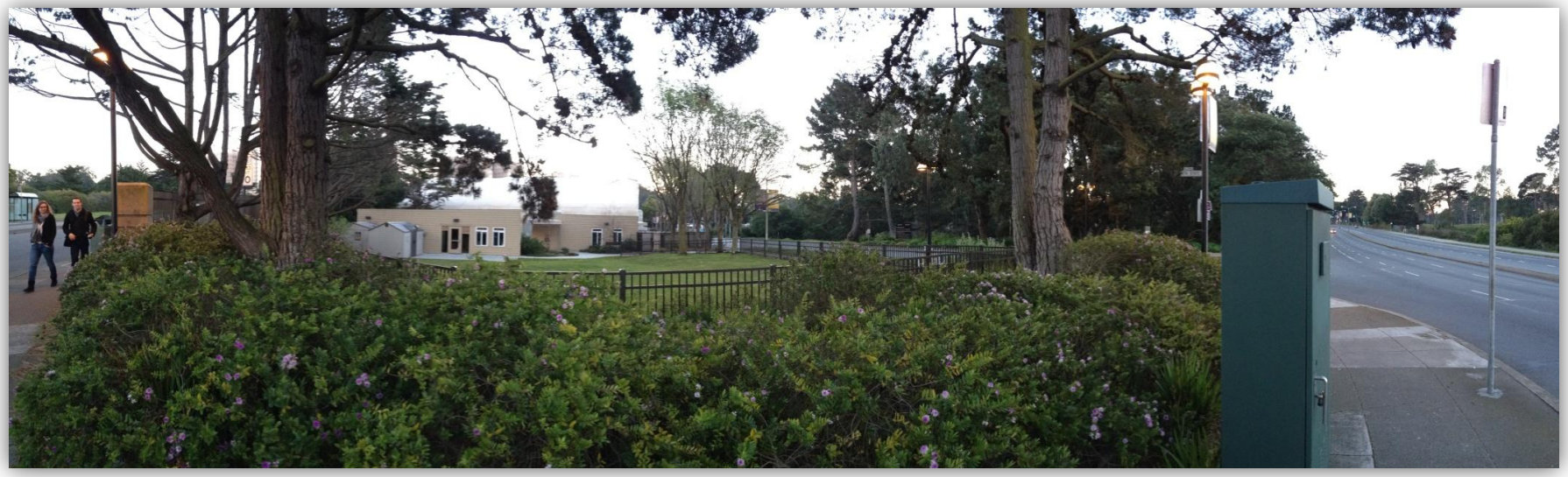


SITE – OVERVIEW

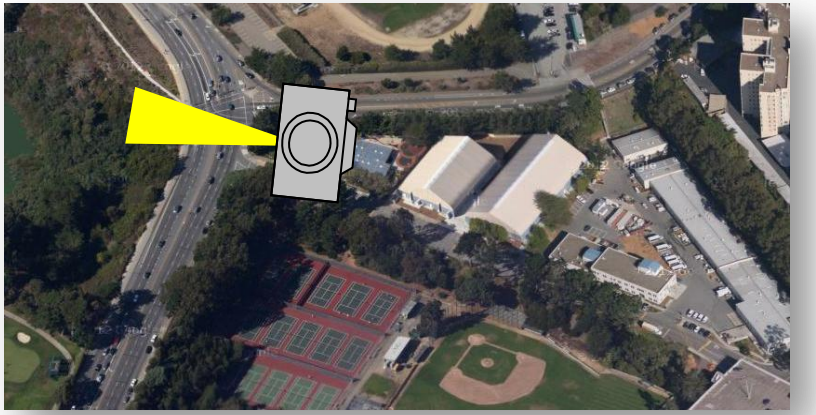




SITE – IMPRESSION



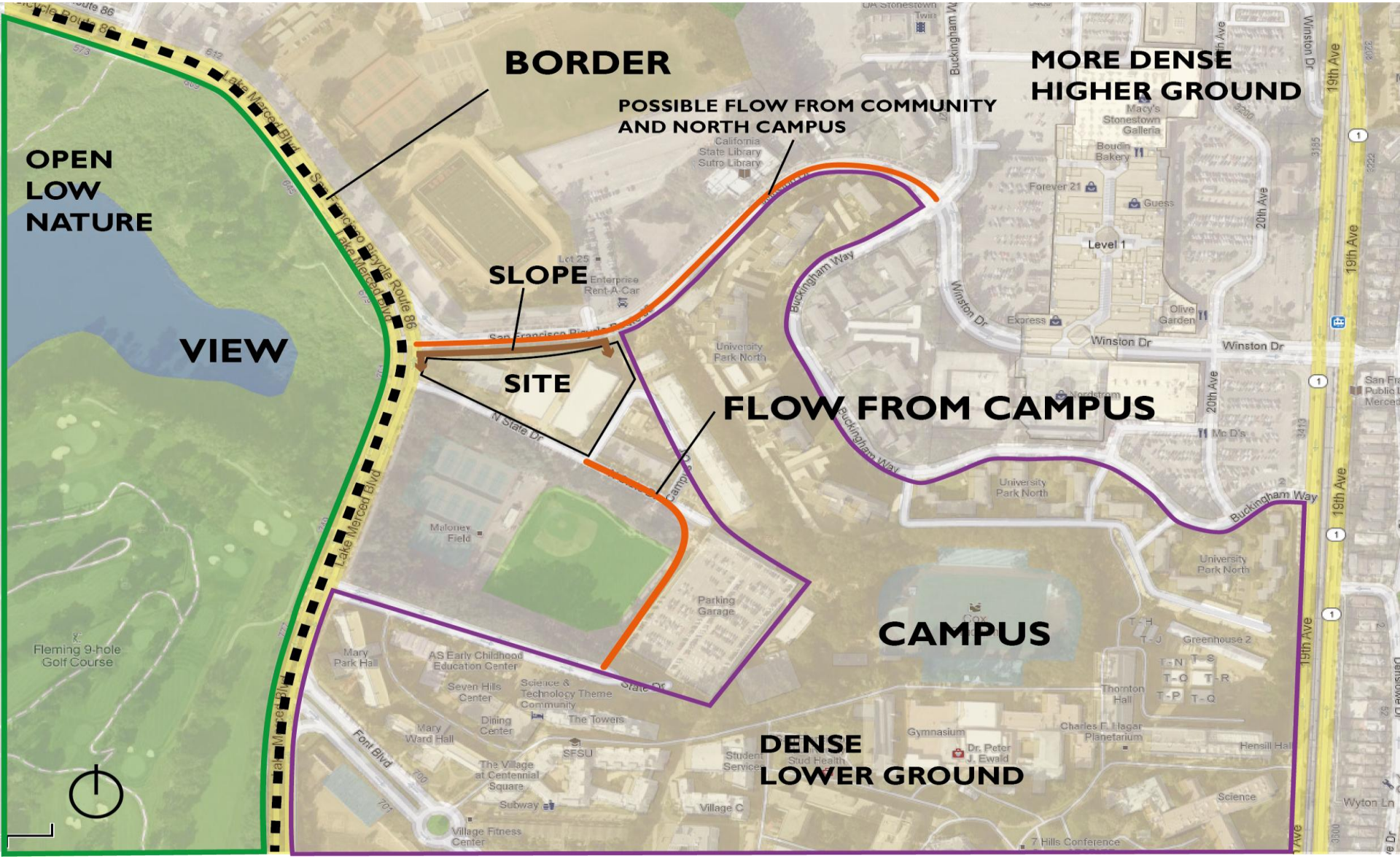
SITE – VIEW TOWARDS WEST & LAKE MERCED



SITE – VIEW TOWARDS NORTHEAST

SITE – VIEW TOWARDS SOUTH

SITE – ACCESS


BORDER
POSSIBLE FLOW FROM COMMUNITY AND NORTH CAMPUS
MORE DENSE HIGHER GROUND
OPEN LOW NATURE
SLOPE
VIEW
SITE
FLOW FROM CAMPUS
CAMPUS
DENSE LOWER GROUND
Lake Merced Blvd
Buckingham Way
Winston Dr
19th Ave
20th Ave
N State Dr
Parking Garage
Maloney Field
Fleming 9-hole Golf Course
University Park North
Mary Park Hall
AS Early Childhood Education Center
Seven Hills Center
Science & Technology Theme Community
Dining Center
The Towers
Mary Ward Hall
SFSU
The Village at Centennial Square
Subway
Village Fitness Center
Village C
Gymnasium
Thornton Hall
Charles F. Lagar Planetarium
Dr. Peter J. Ewald
Science
7 Hills Conference
Greenhouse 2
Macy's Stonestown Galleria
Forever 21
Guess
Express
Olive Garden
Mo D's
Level 1
Enterprise Rent-A Car
California State Library Sutro Library

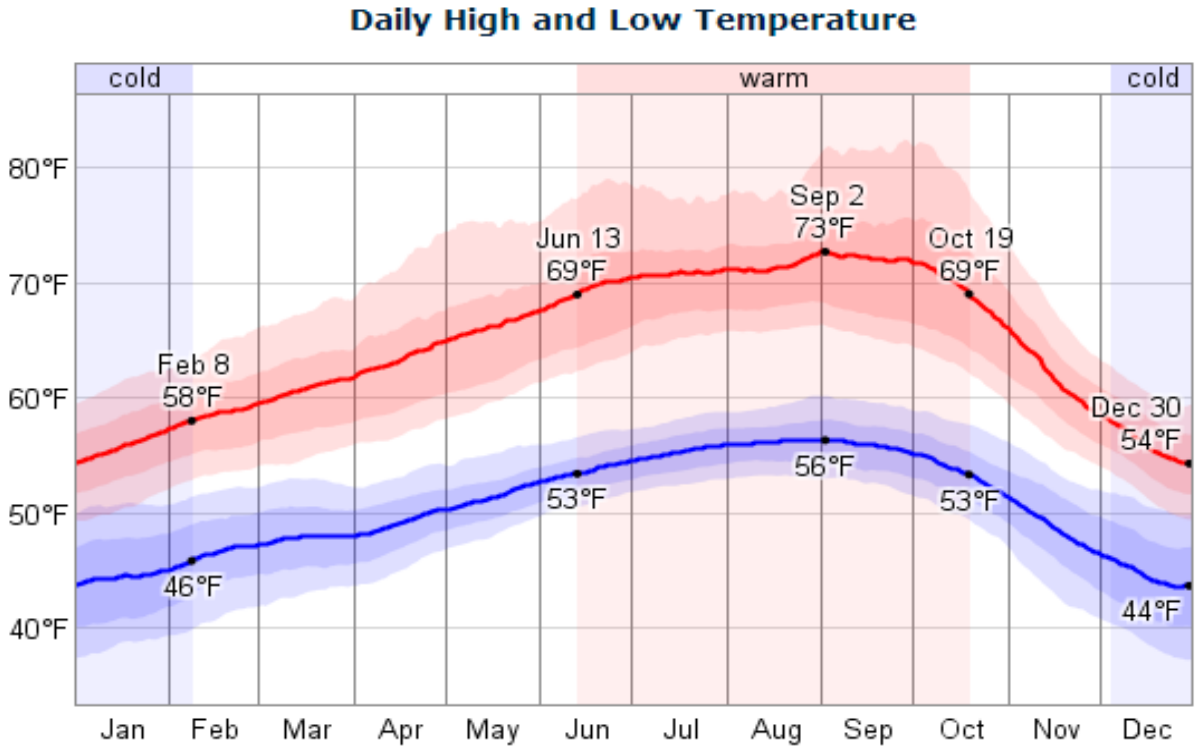
SITE CONDITIONS– SEISMIC

S_s= 2.190 g
S_1= 1.044 g

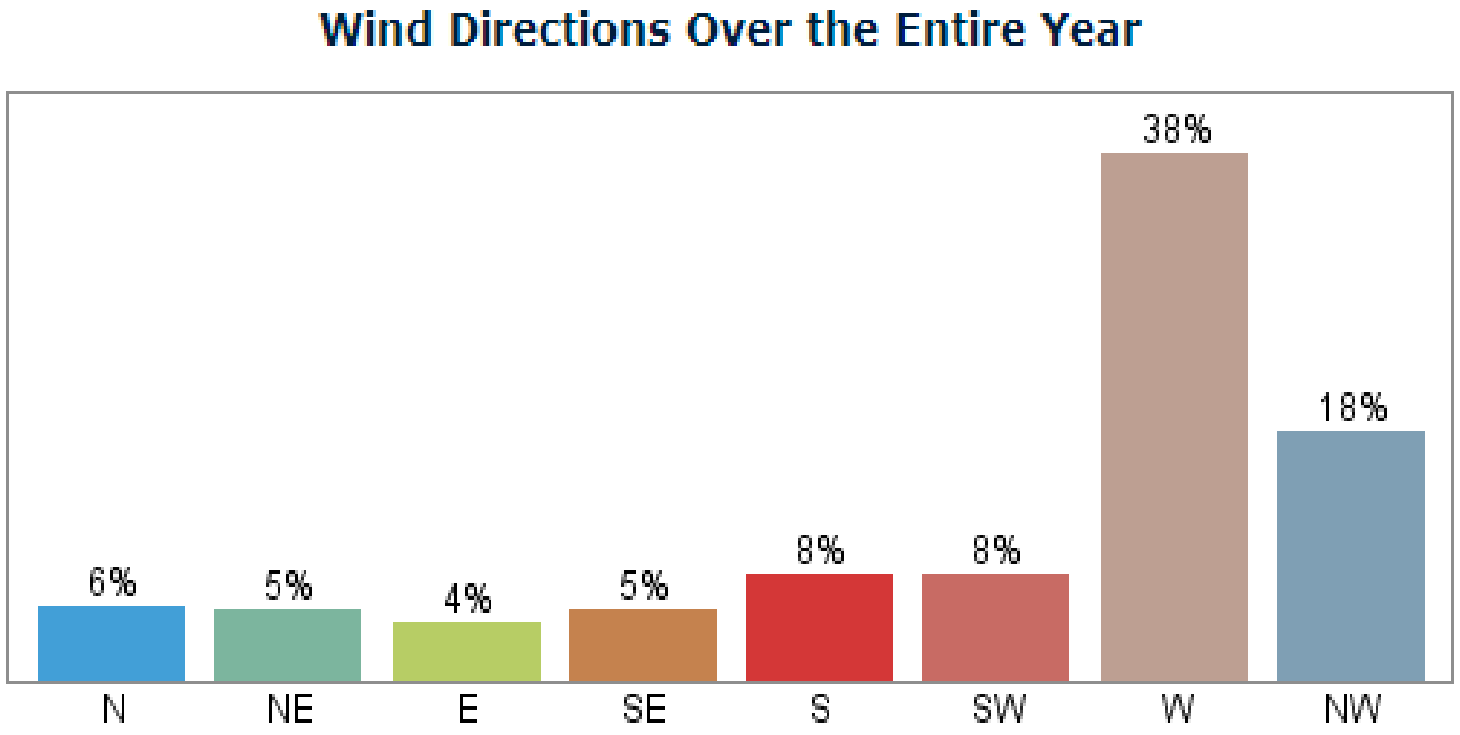
Summer Design Temperature:
79˚F Dry Bulb
63˚F WB

Winter Design Temperature:
41˚F Dry Bulb

Relative Humidity
74% (Average)



Average of 10-15 mph from the west



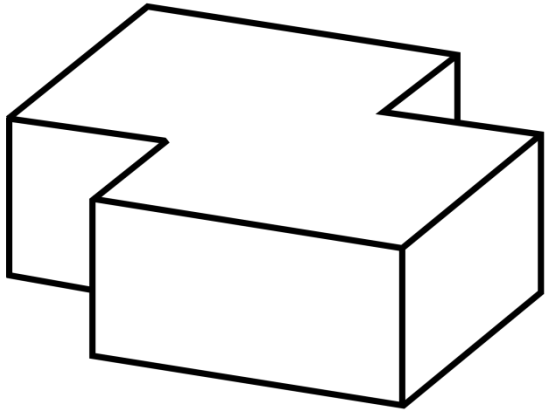
NEHRP Site
Class C

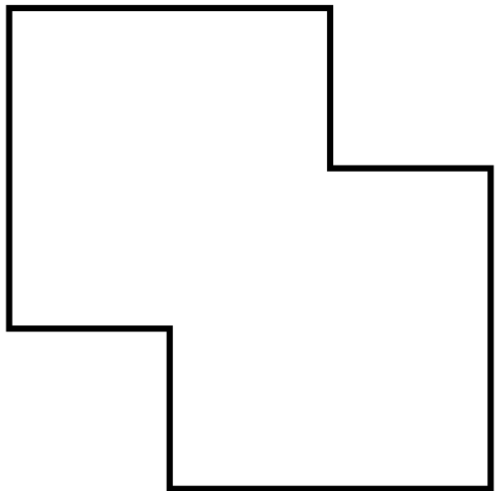
Lateral Soil Pressure
35 psf/ft

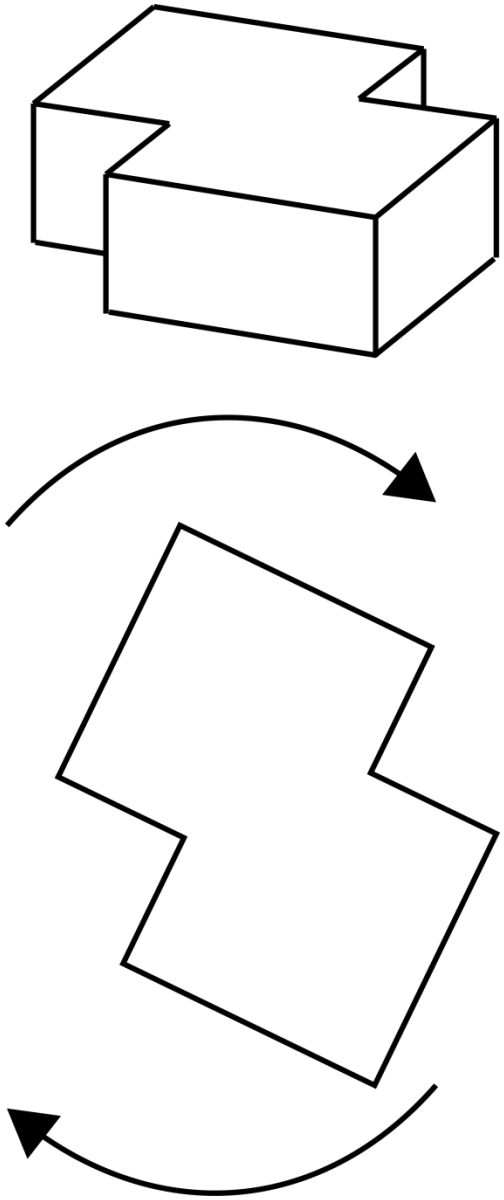
Bearing Capacity
3,500 psf

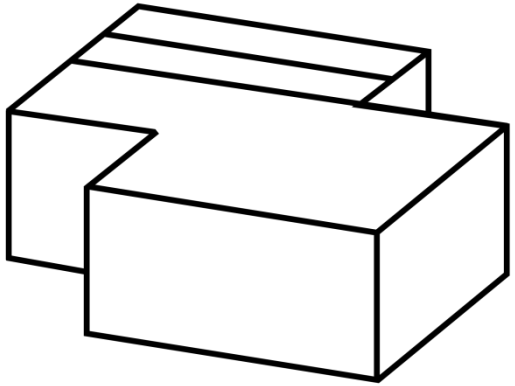
Water table
14’ below grade
Well-sorted fine-medium sand

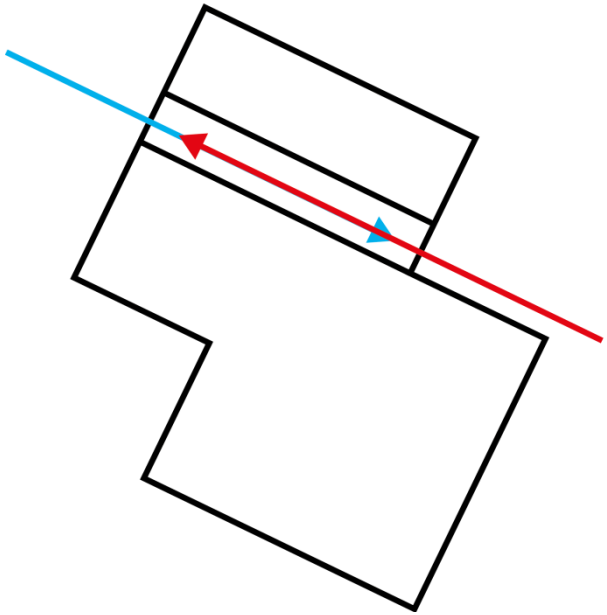
SITE – SITEPLAN

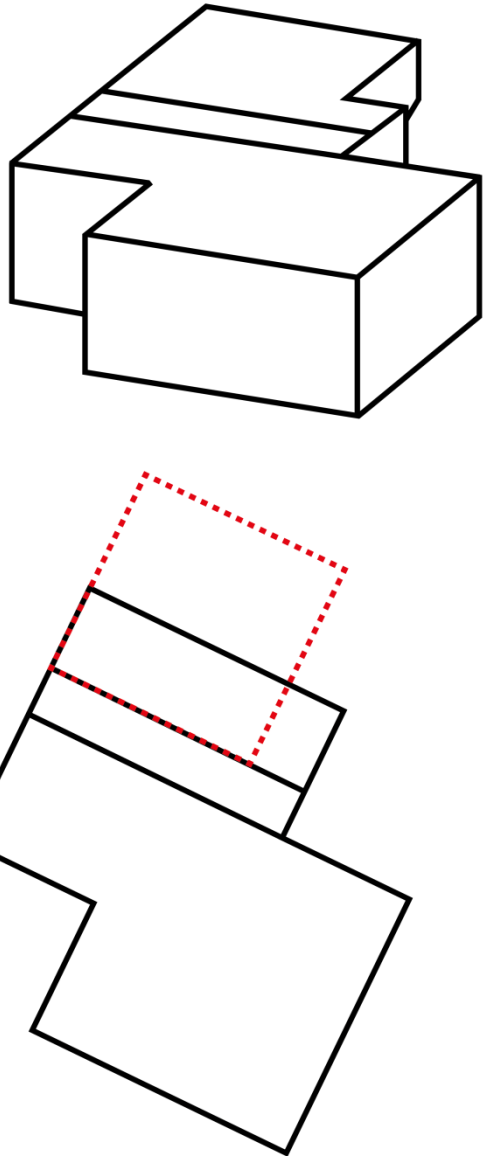


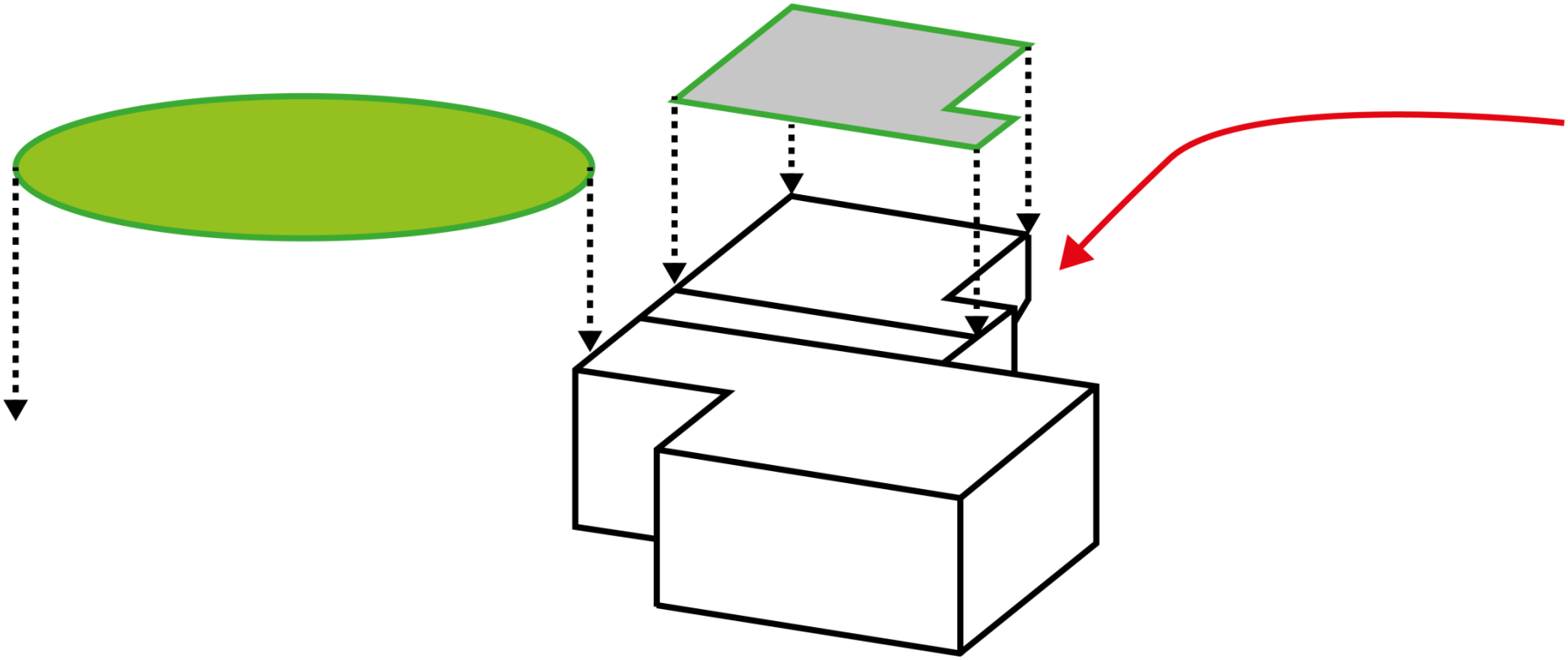


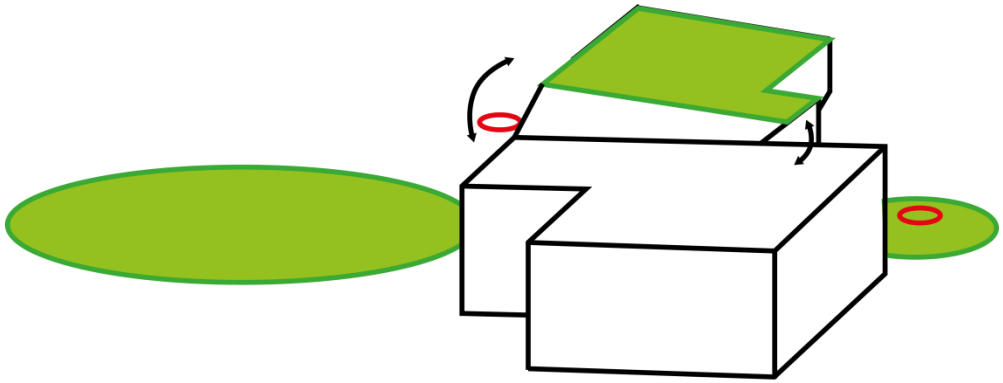


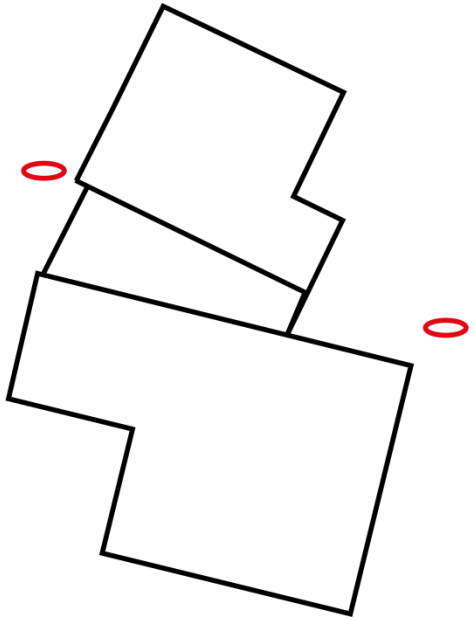




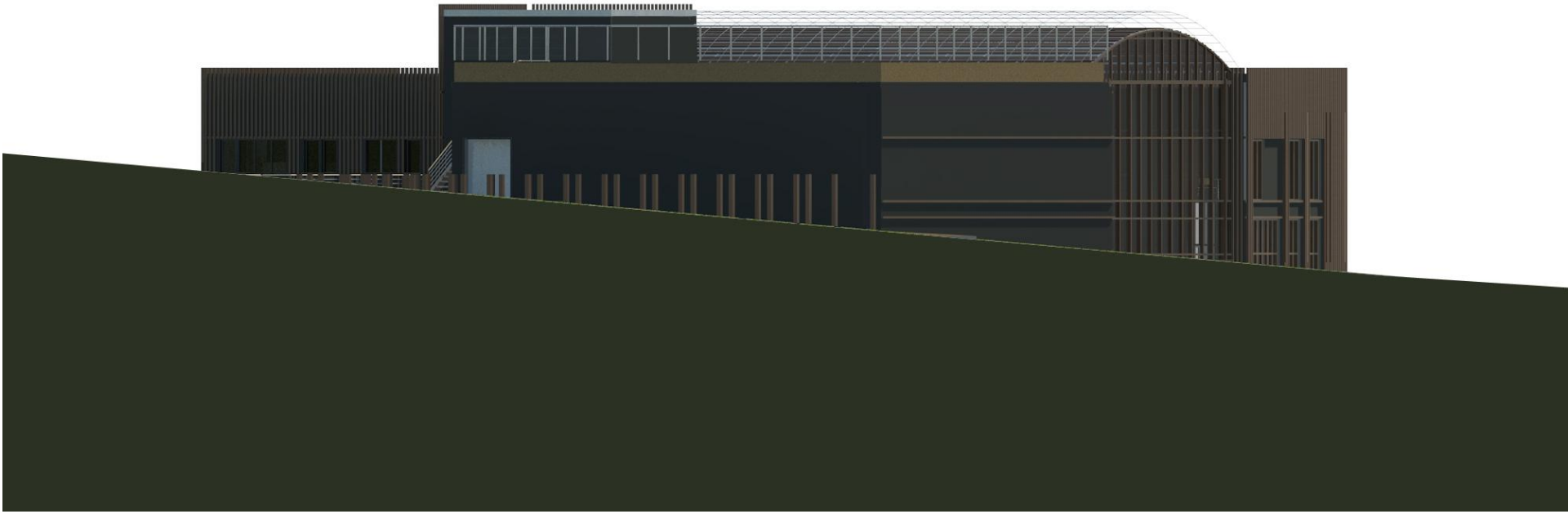






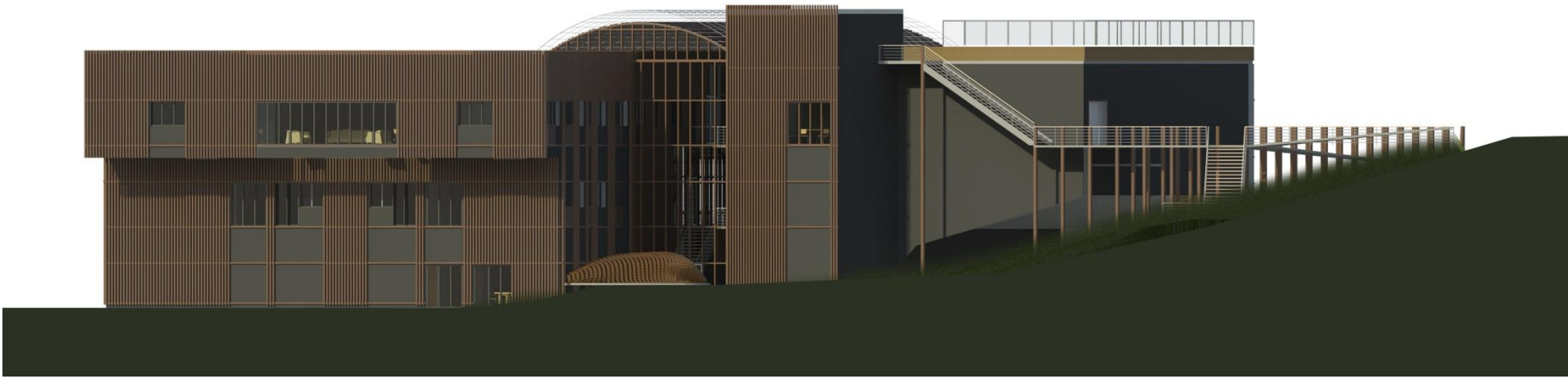


ELEVATIONS - NORTH



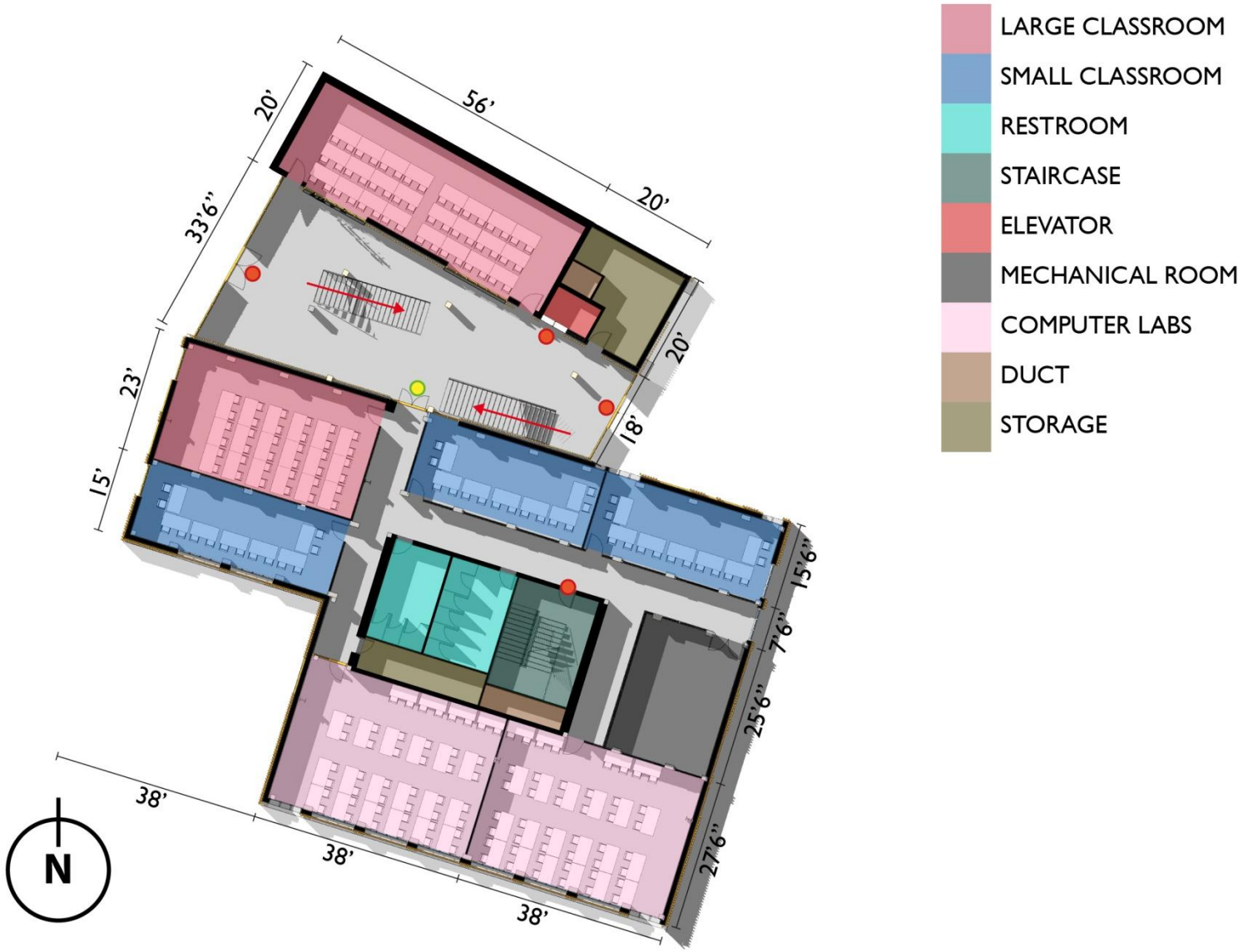
ELEVATIONS - SOUTH

ELEVATIONS - EAST

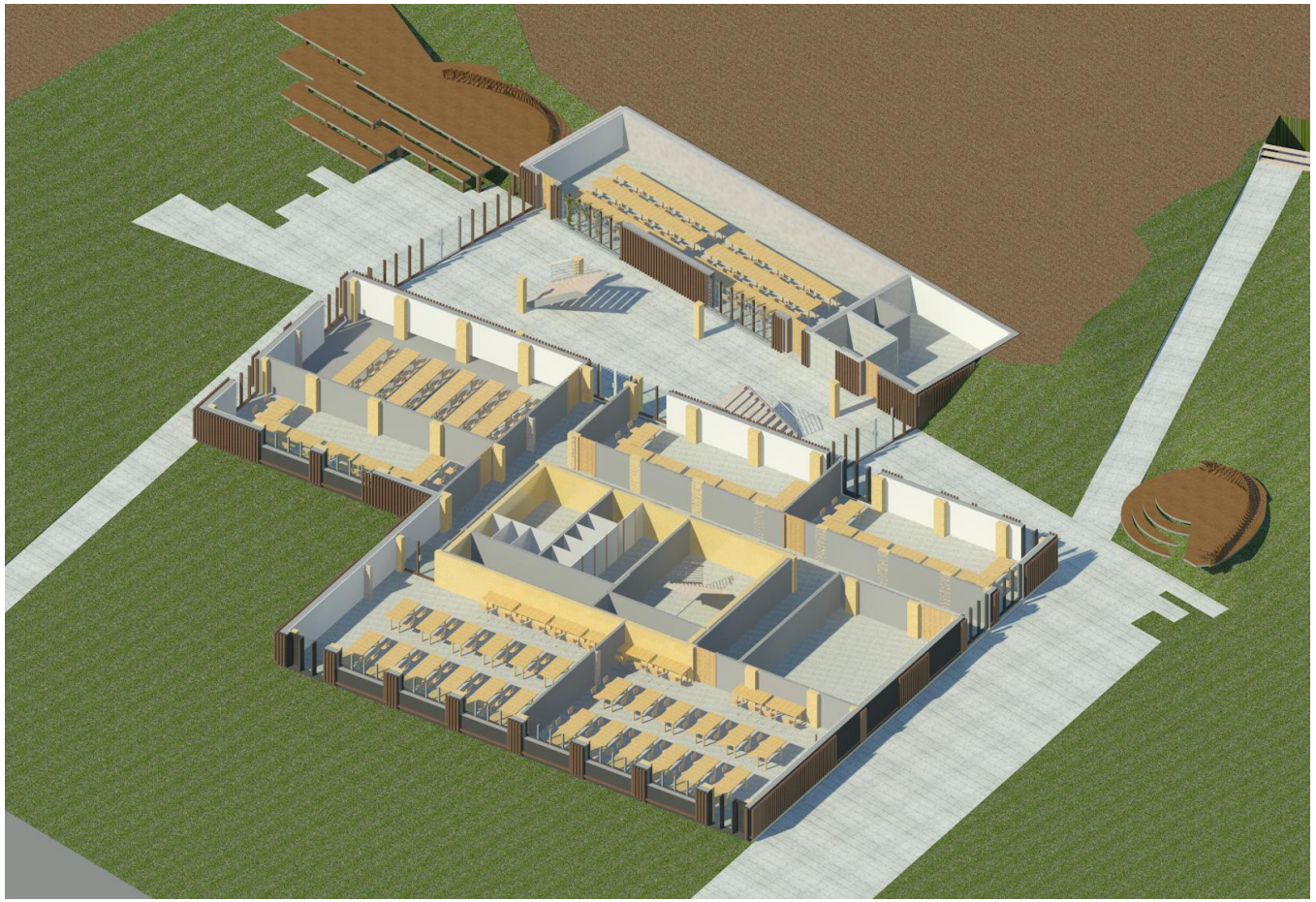


ELEVATIONS - WEST

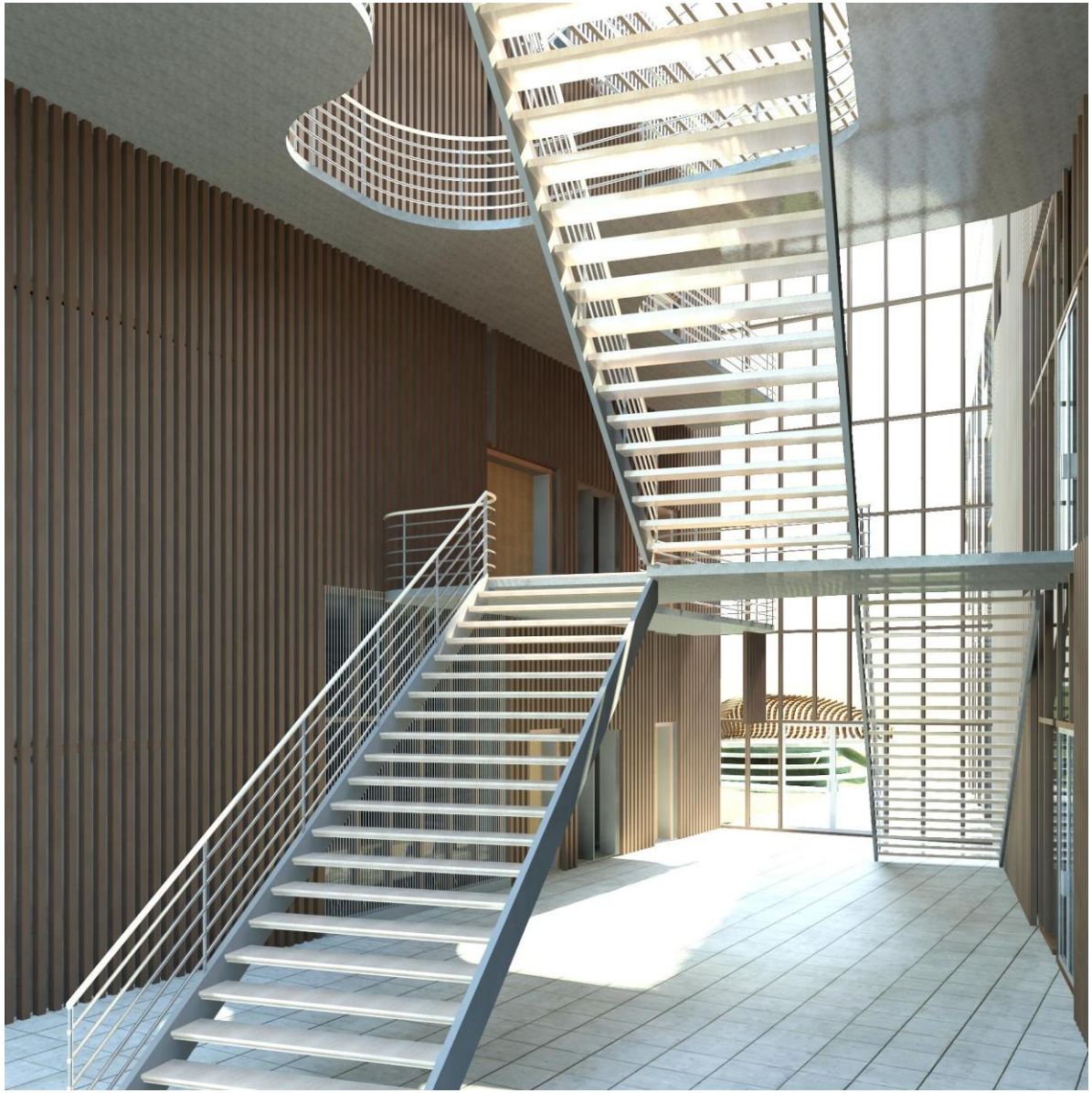
FLOOR PLANS - ENTRANCE



FLOOR PLANS - ENTRANCE

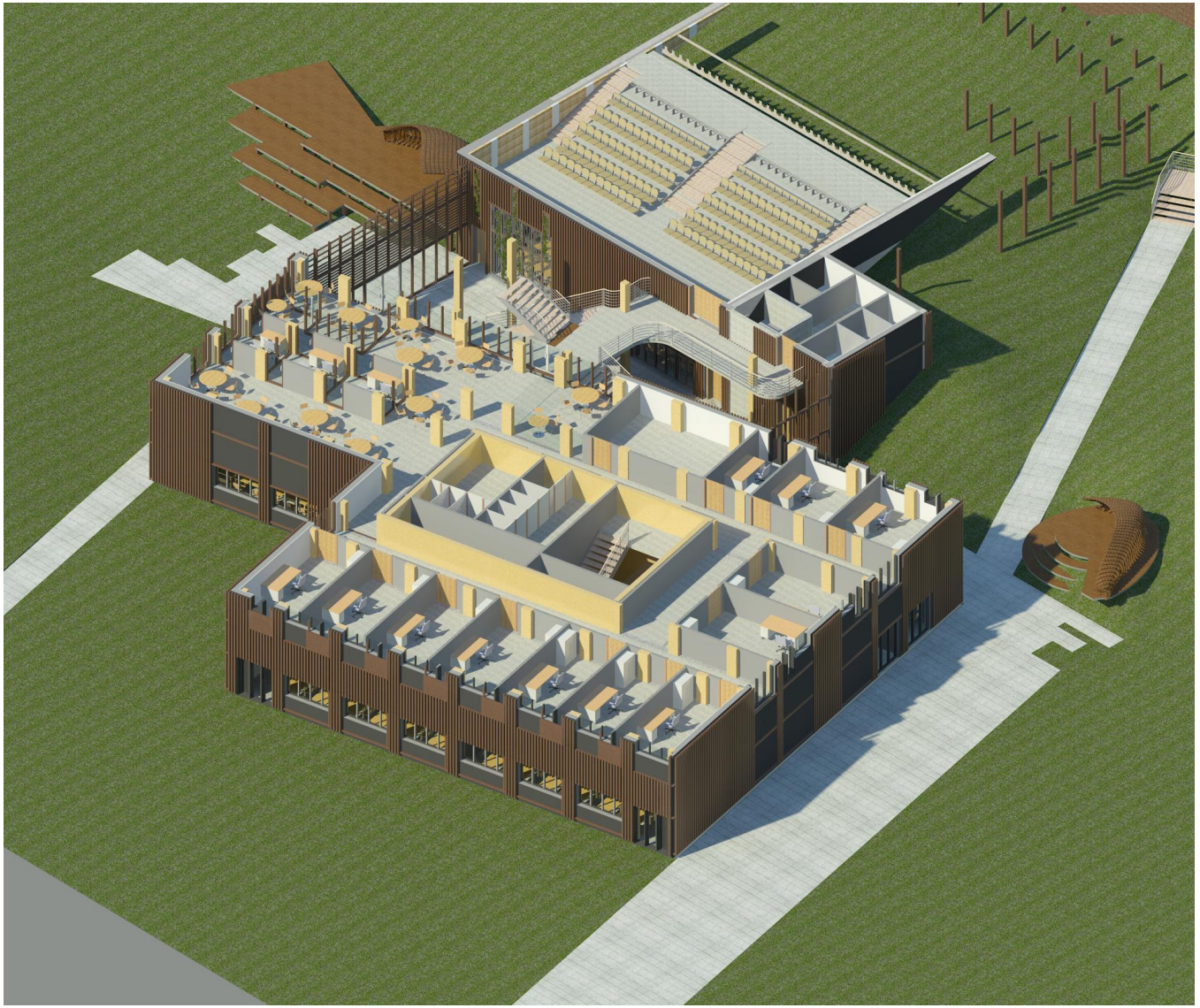


ENTRANCE LEVEL – ATRIUM



FLOOR PLANS – FIRST LEVEL

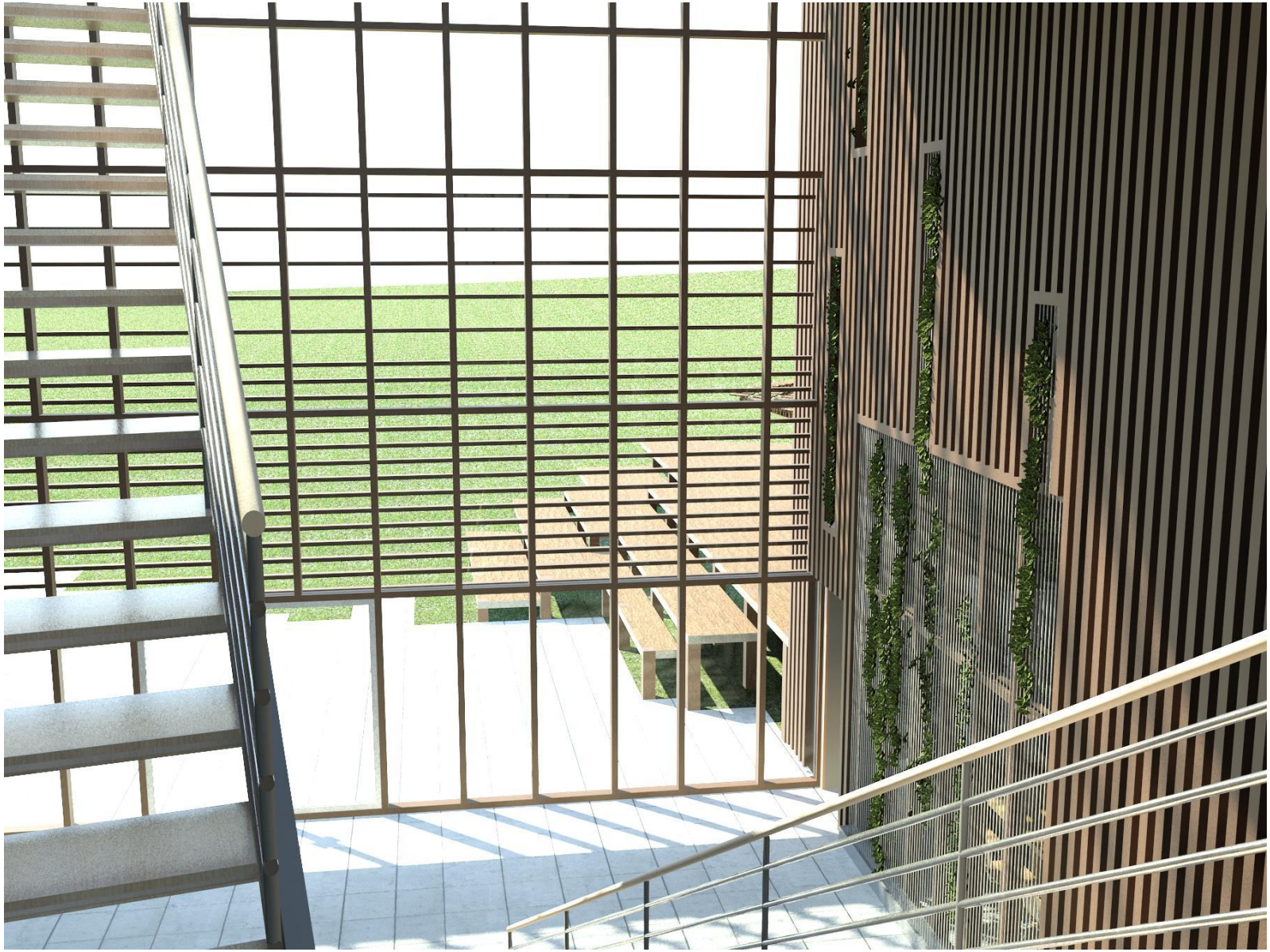
FLOOR PLANS – FIRST LEVEL



FIRST LEVEL - AUDITORIUM

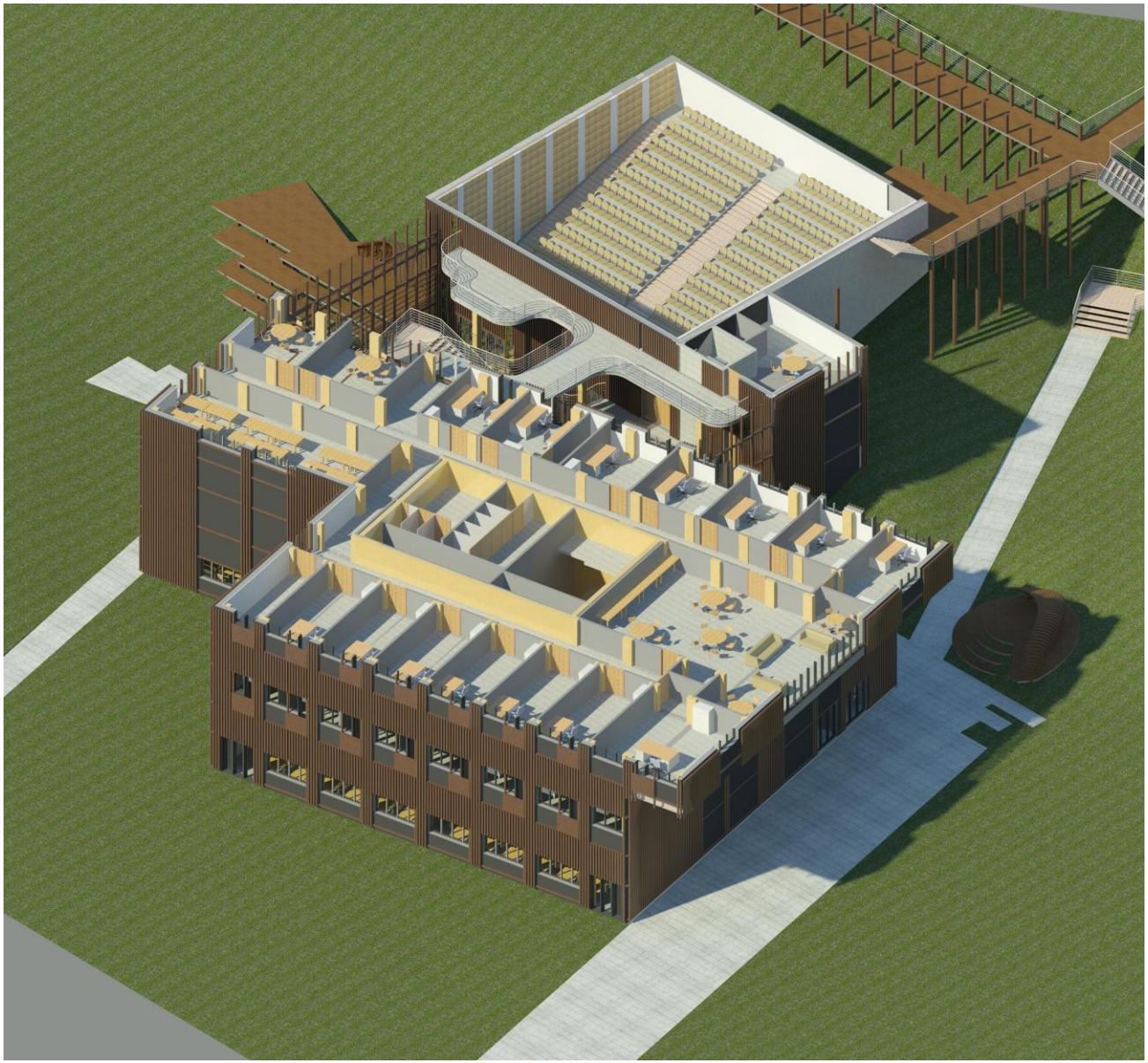
FIRST LEVEL – STUDENT LOUNGE

SECOND LEVEL – ATRIUM

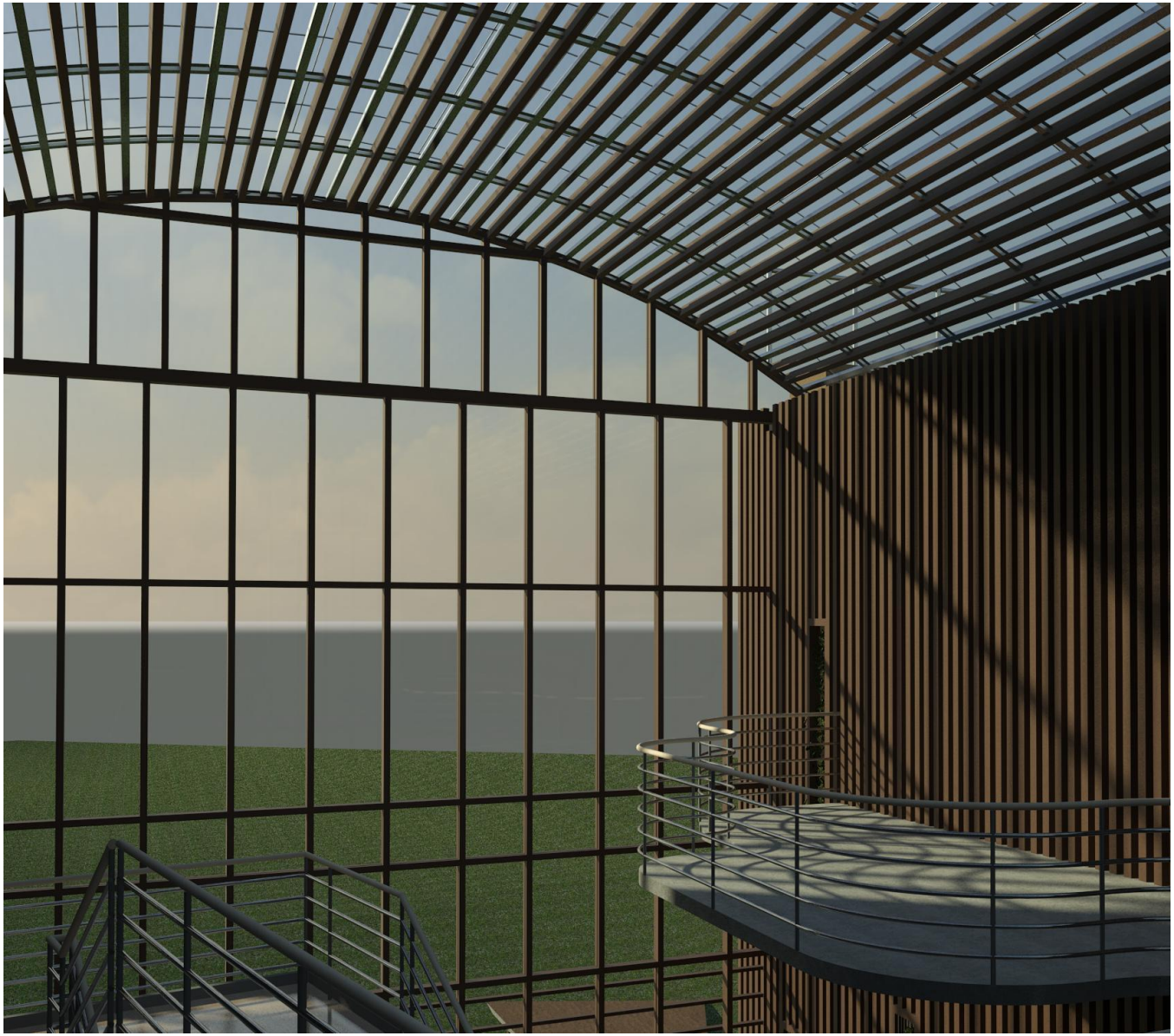


FLOOR PLANS – SECOND LEVEL

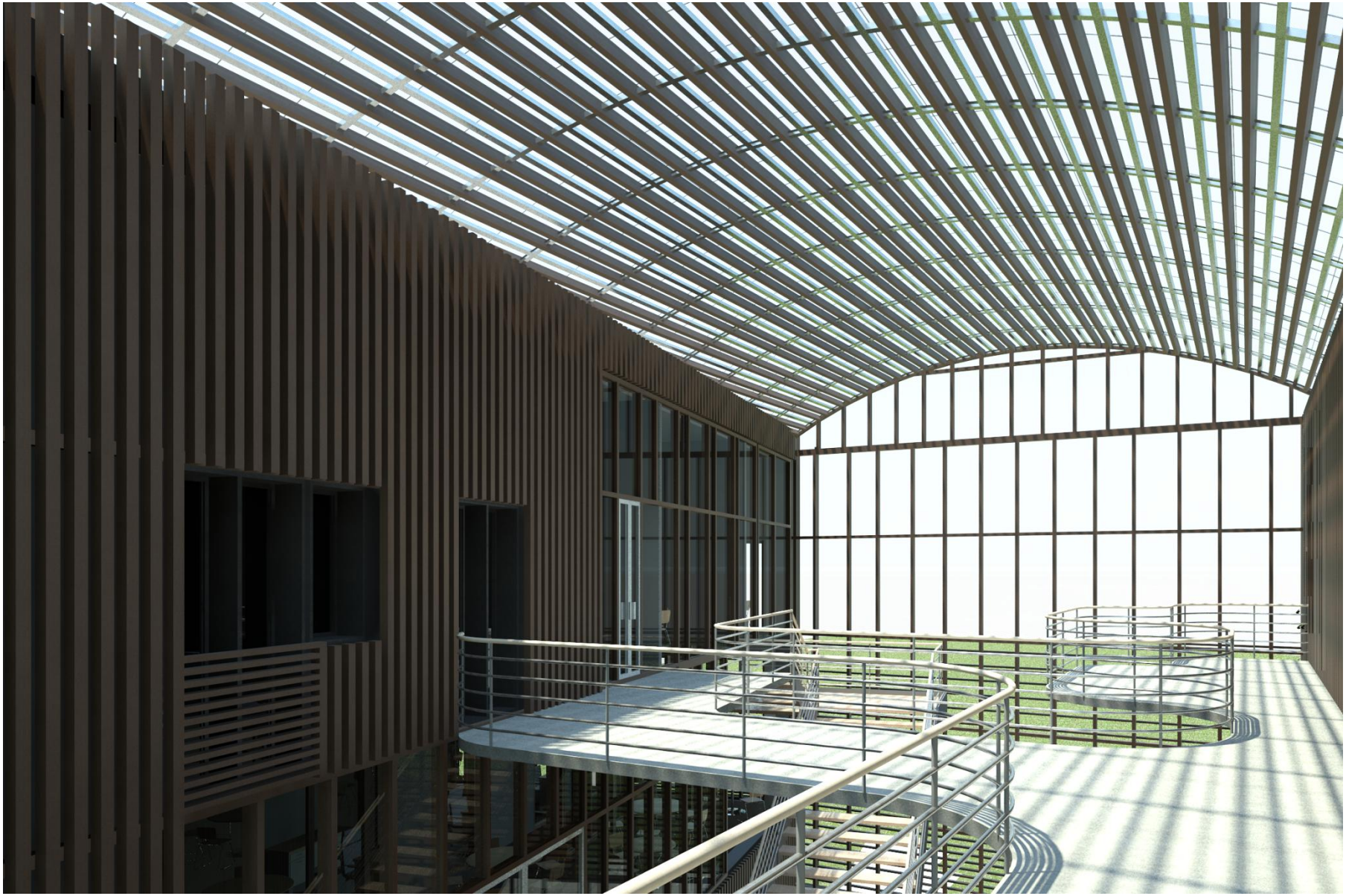
FLOOR PLANS – SECOND LEVEL



SECOND LEVEL – VIEW TOWARDS LAKE



SECOND LEVEL – ATRIUM

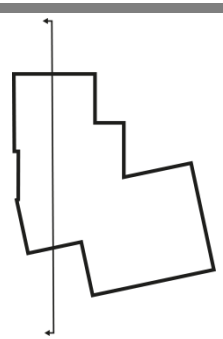


FLOOR PLANS – ROOF LEVEL

ROOF LEVEL – ROOF TOP TERRACE

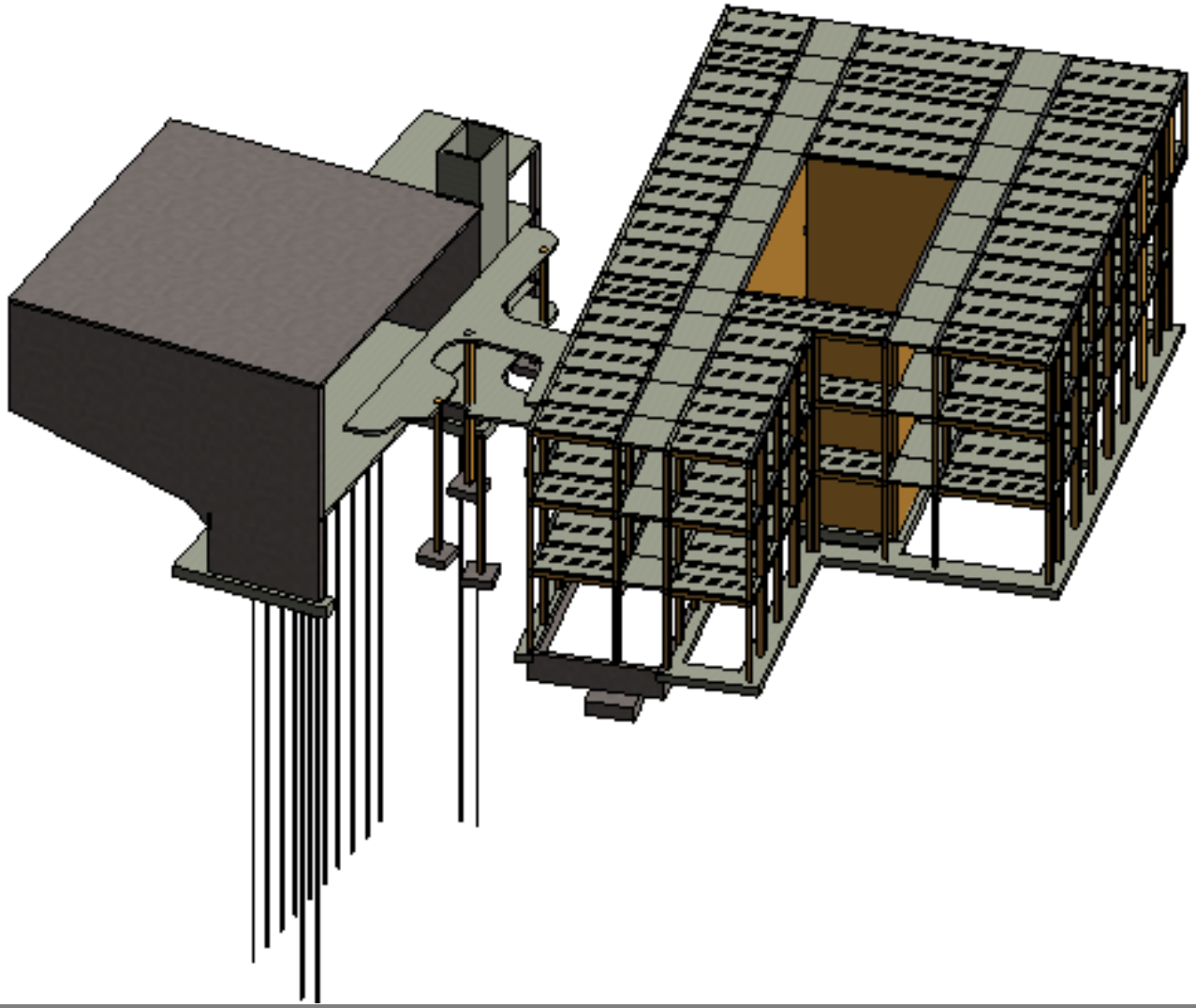
SECTIONS – CREE BUILDING TOWARDS AUDITORIUM

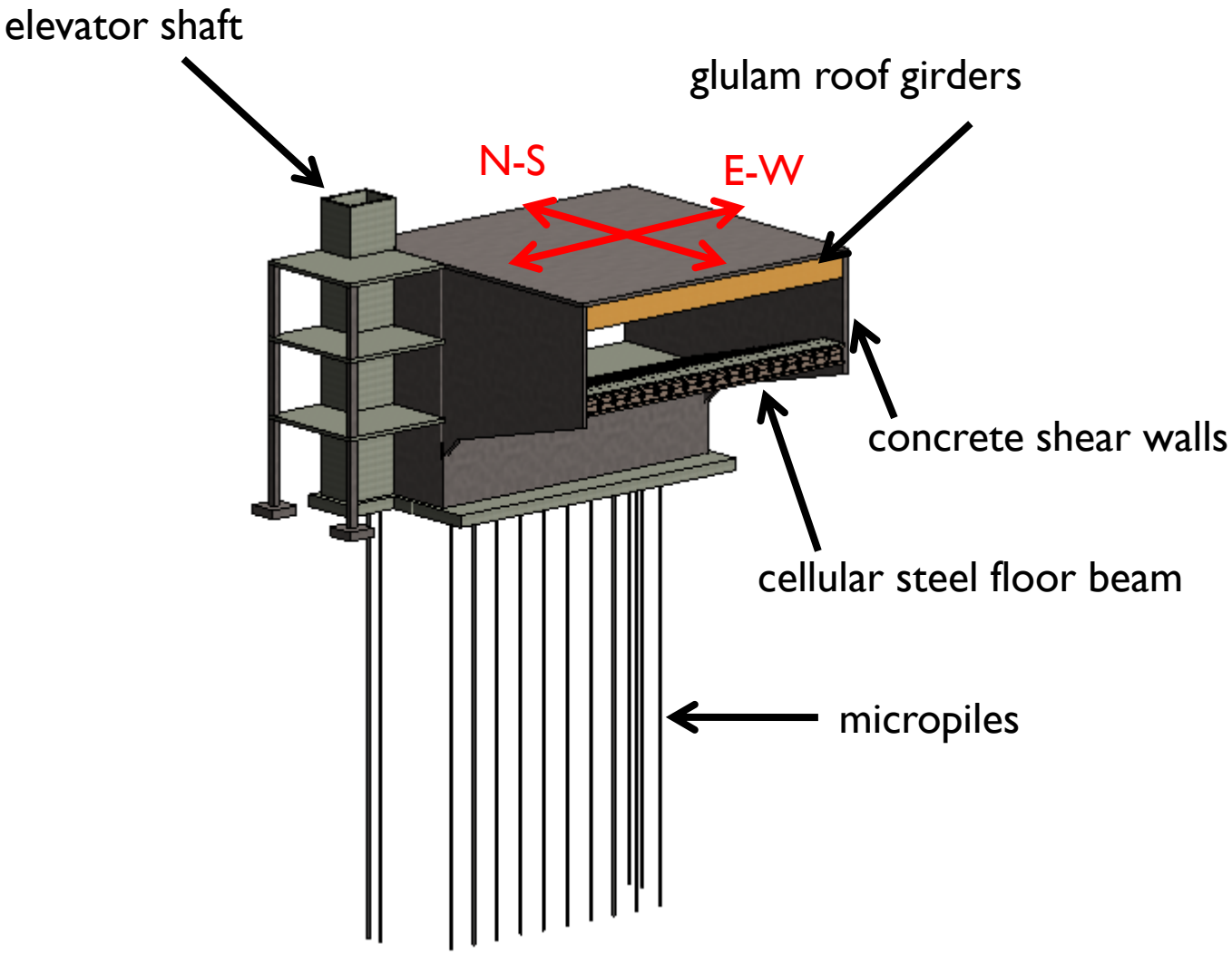
SECTIONS – CROSS AUDITORIUM



STRUCTURAL MODEL – TWO BUILDINGS

Auditorium + (atrium) + CREE Building




elevator shaft
glulam roof girders
N-S
E-W
concrete shear walls
cellular steel floor beam
micropiles

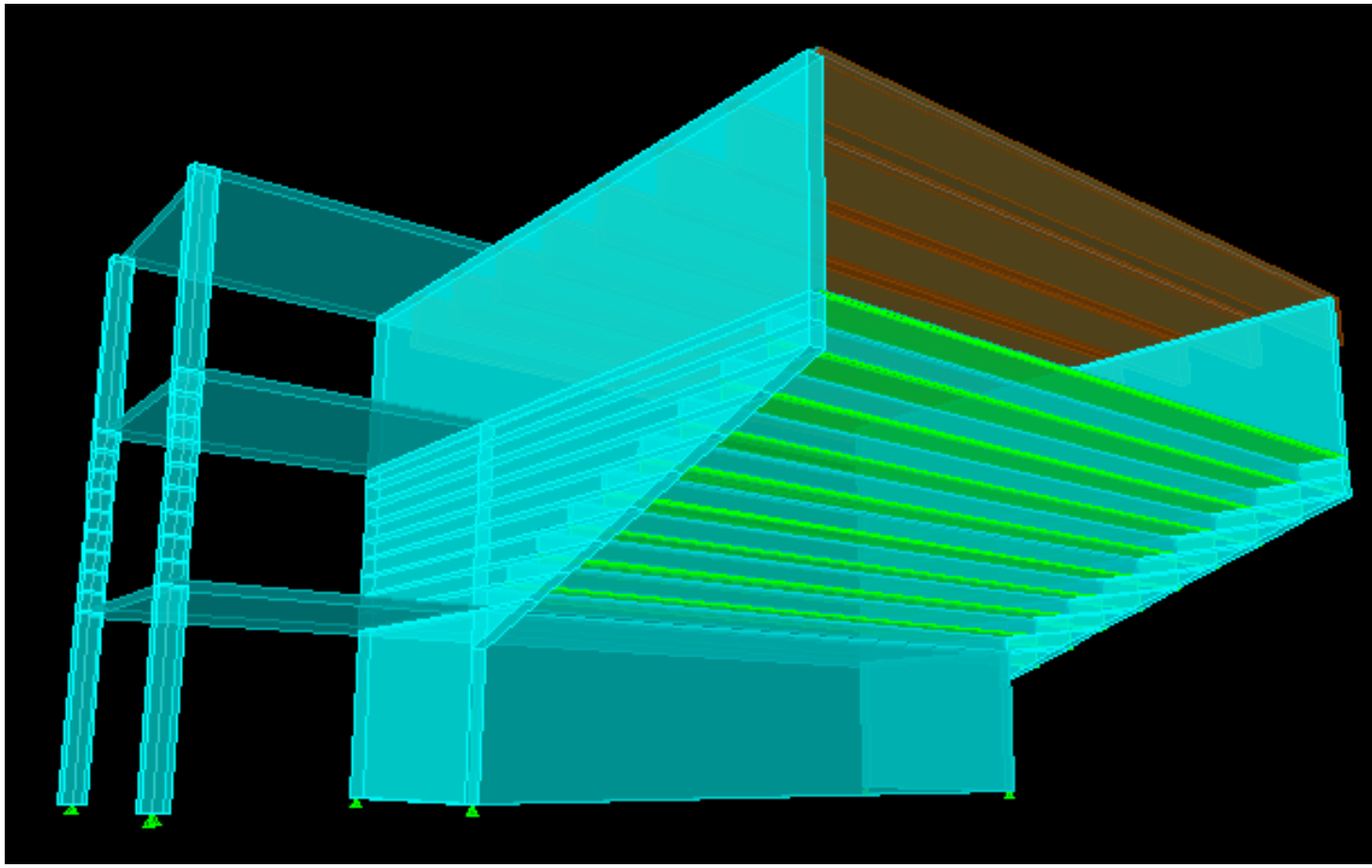
AUDITORIUM– ETABS MODEL & LOADS

Gravity:

Assembly Areas (auditorium)	60 psf
Rooftop terrace (garden)	100 psf
Everywhere else	50 psf

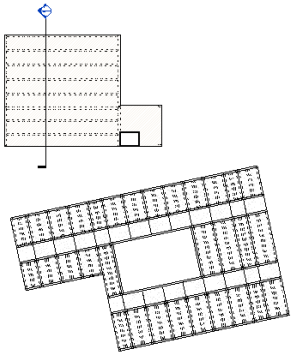
lateral:

F3= 276 k
F2= 150 k
F1= 55 k

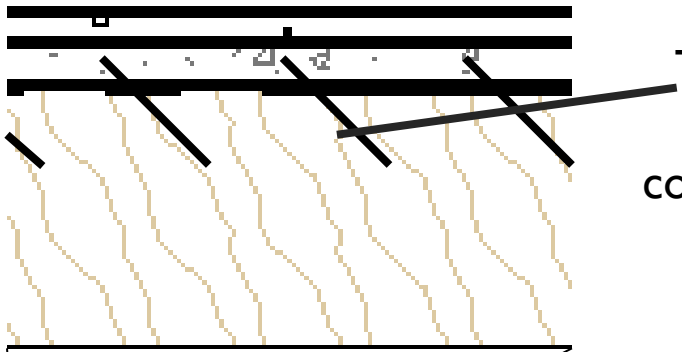


- Pinned at base
- Moment releases on all members
- 3 rigid diaphragms on the floors
- Intermediate reinforced concrete moment frames

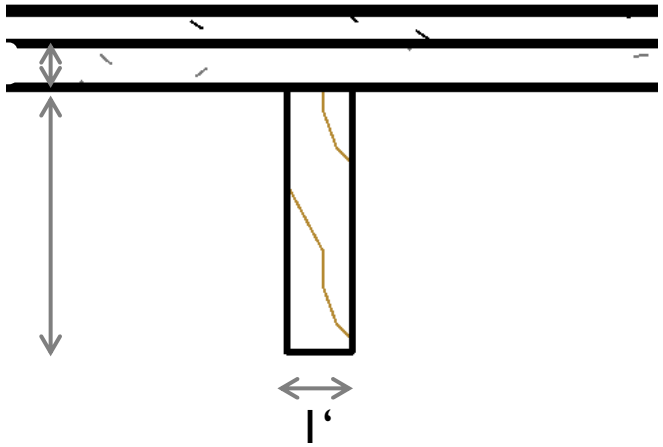
AUDITORIUM – SECTION

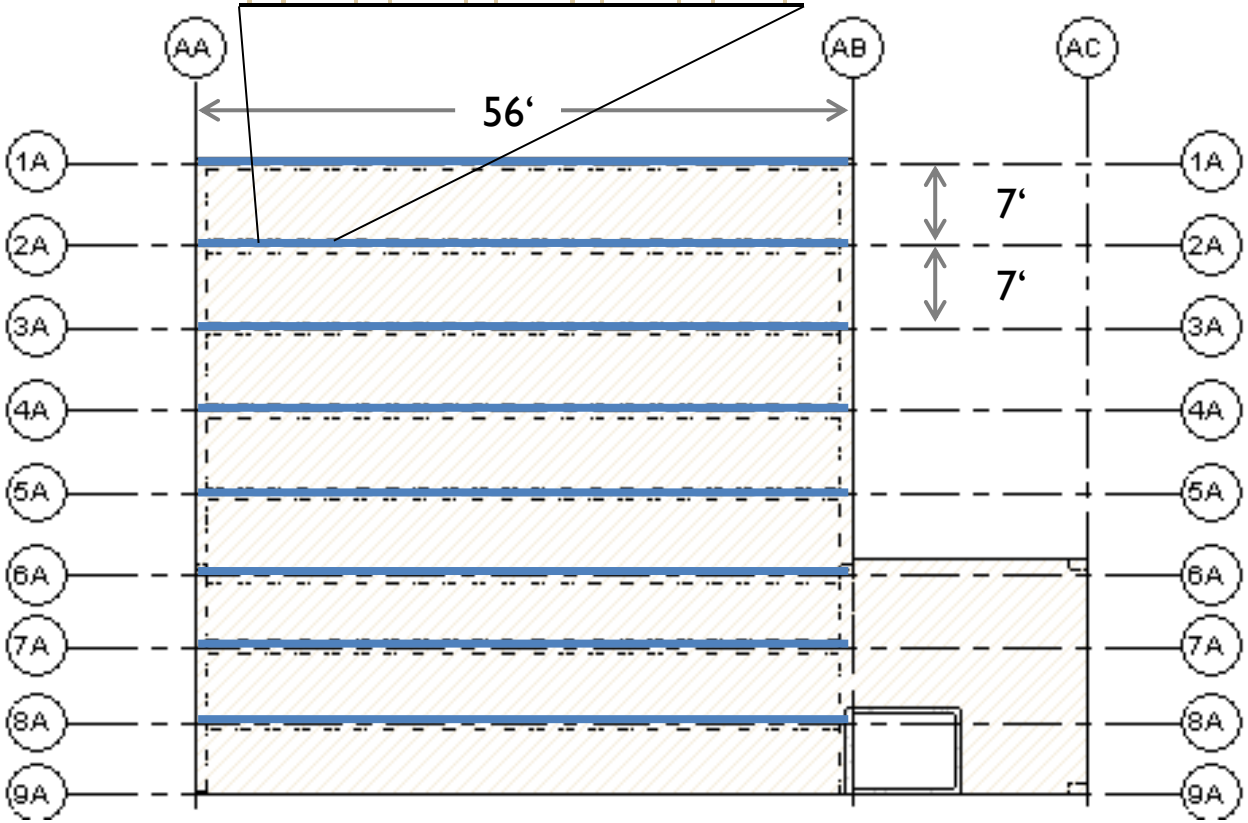


AUDITORIUM – GLULAM GIRDERS ROOF



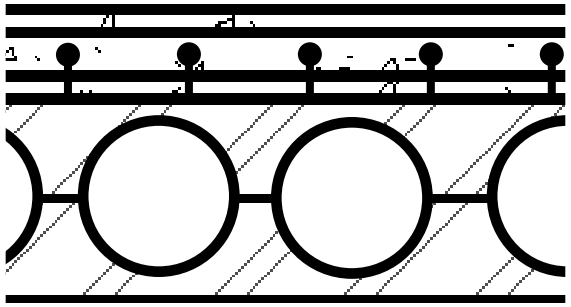
TIMCO hybrid connection screws

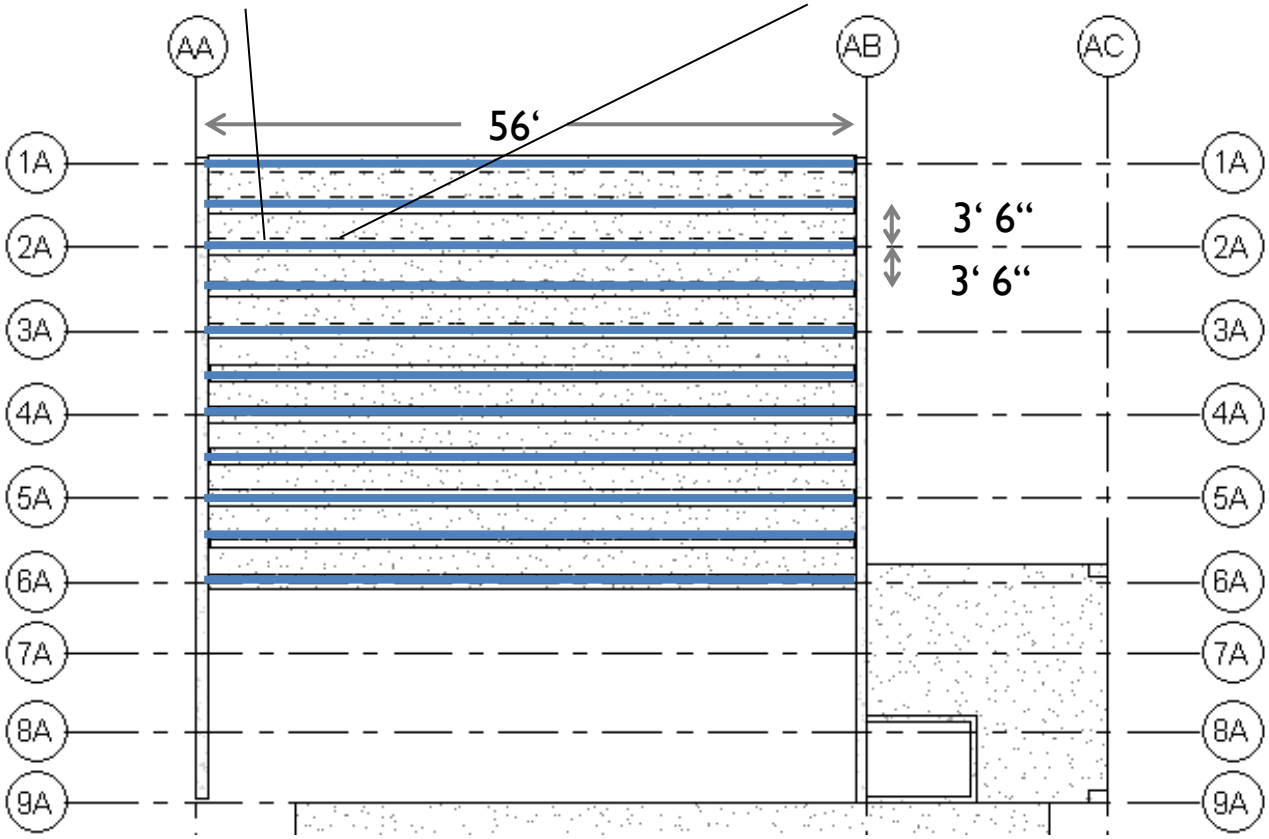


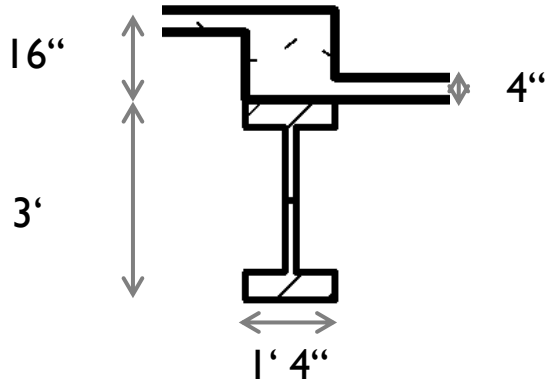


AUDITORIUM – INSIDE APPEARANCE

AUDITORIUM – STEEL GIRDERS FLOOR



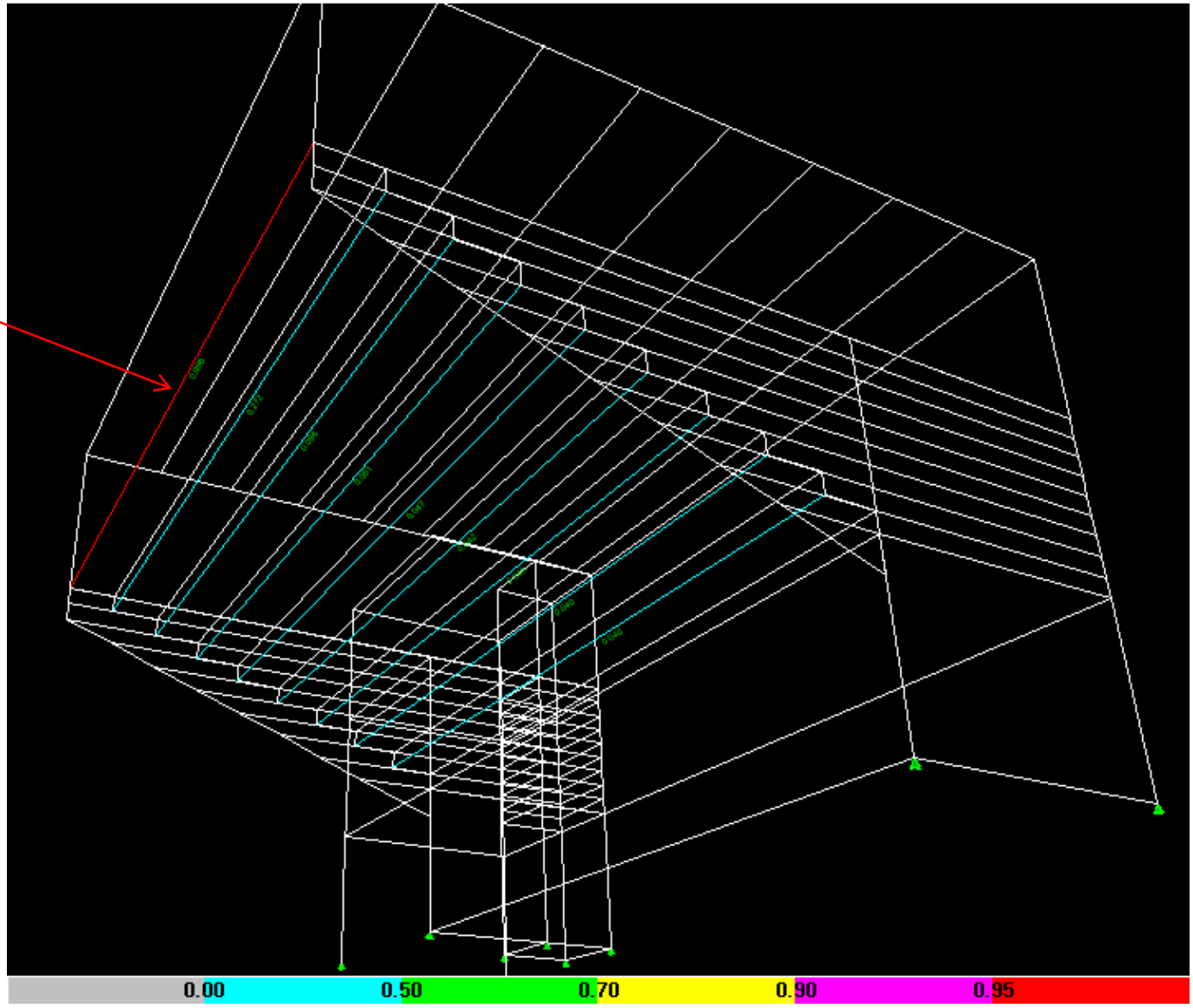




Cellular steel beam dimensions:

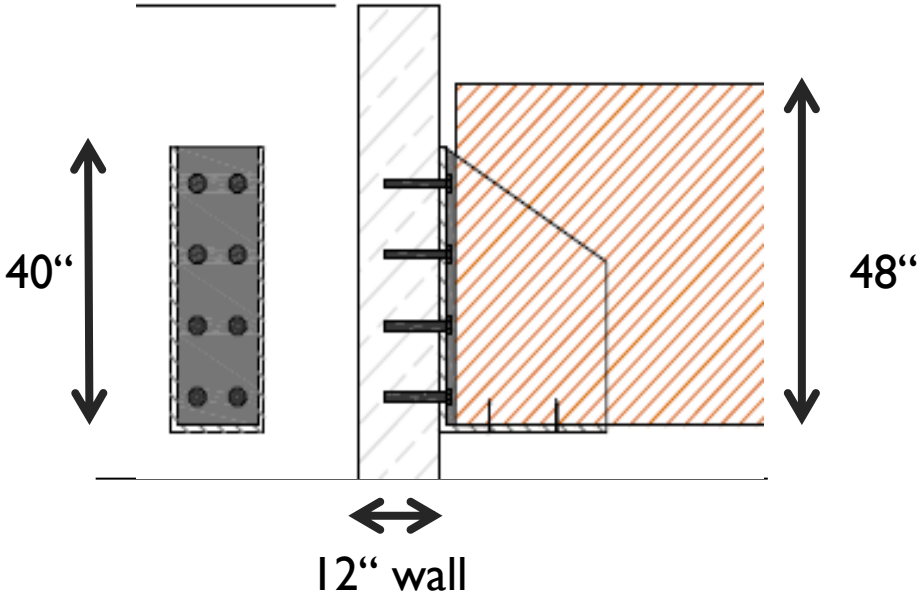
Total height	3‘
Flange width	1‘4“
Flange thickness	5“
Web thickness	2“

AUDITORIUM– STEEL MEMBER DESIGN



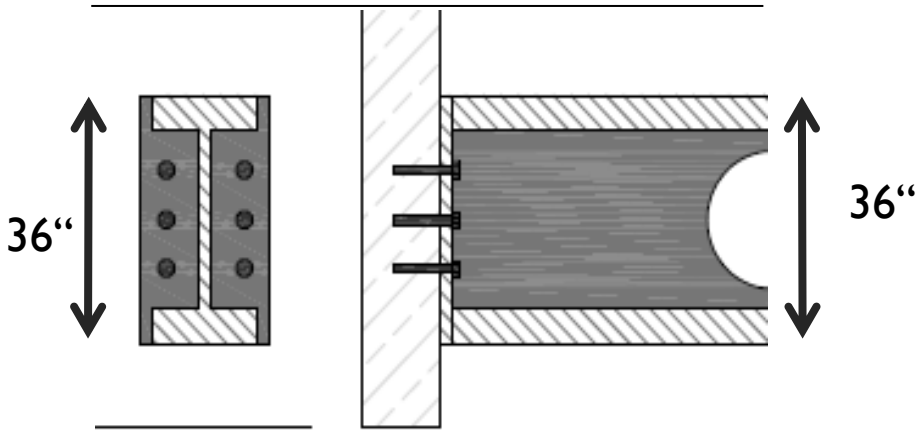
GLULAM GIRDER:

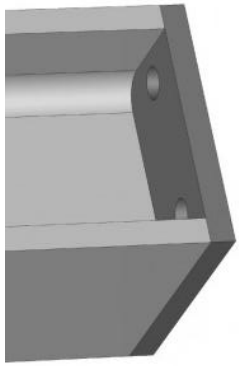
- Joist hanger
- 8 x 8“ screws
- threaded sleeves cast in wall



STEEL GIRDER:

- headplate
- 6 x 8“ screws
- threaded sleeves cast in wall

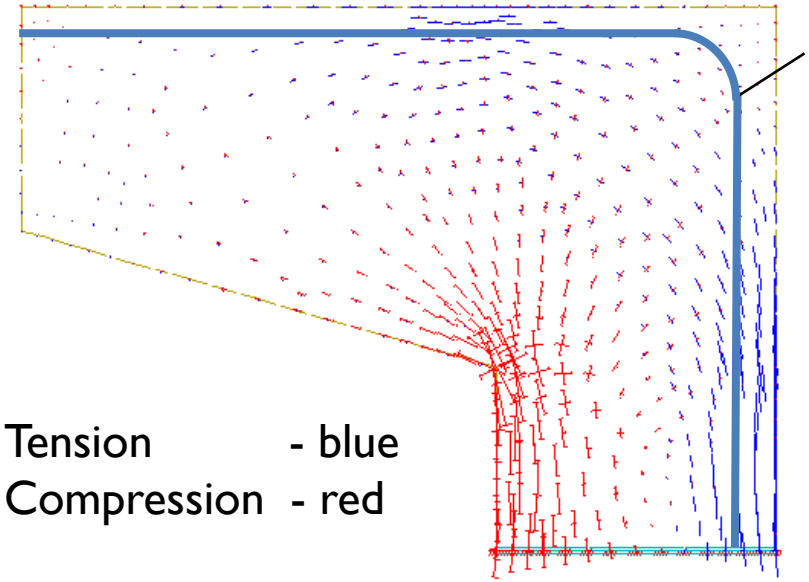


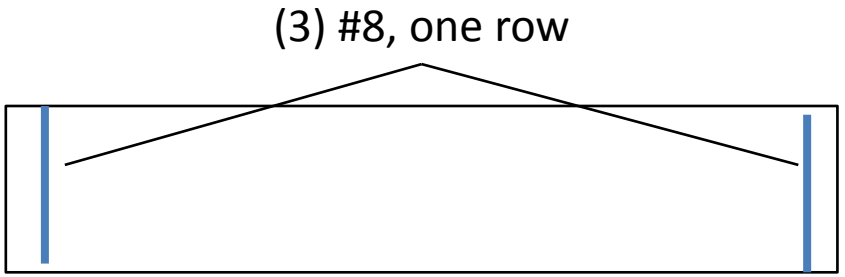


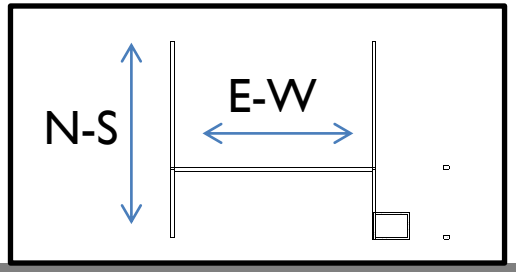
Responding to overturning moment (gravity + lateral):

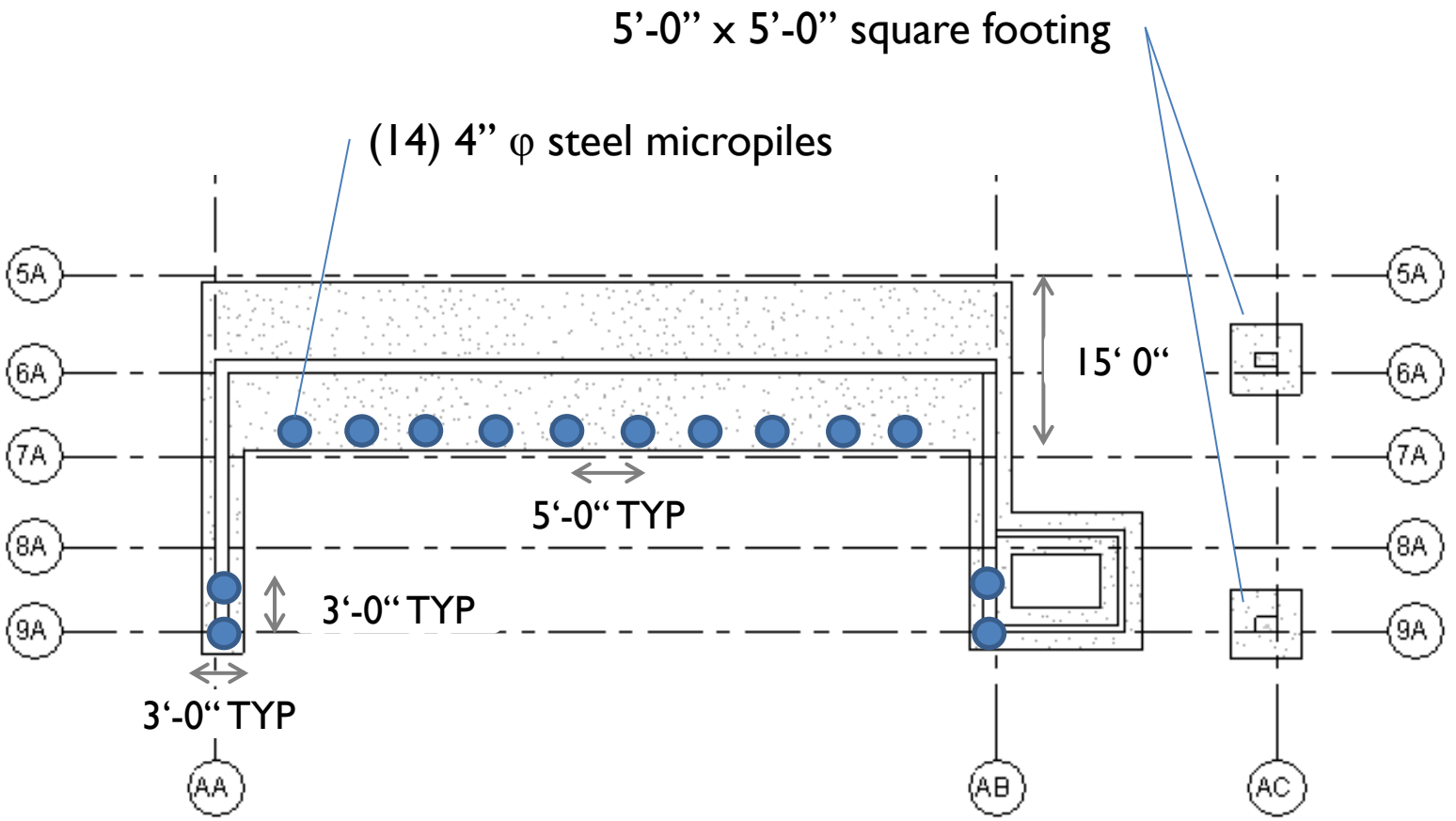
Shear walls in Project N-S direction

Shear walls in Project E-W direction





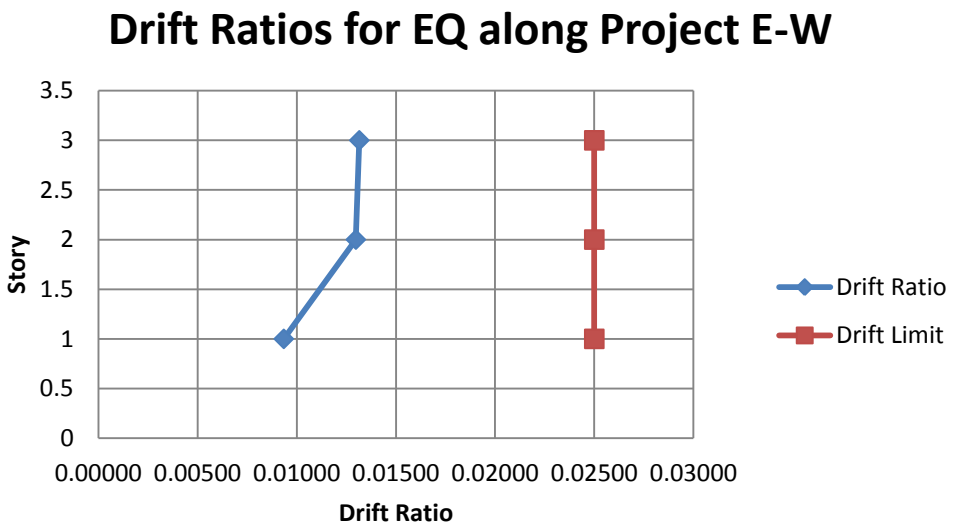




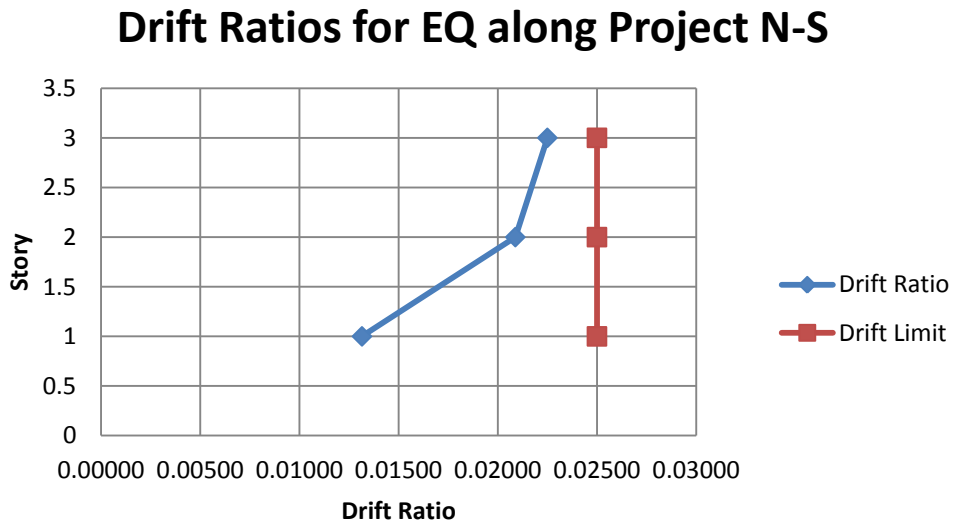
(All footings 2' thick)

AUDITORIUM– ETABS DRIFT ANALYSIS

		EQ Along Project E-W		
		Deflection δ (in)	$C_d*\delta/h_{sx}$	Allowable Drift Ratio
Story	3	1.23	0.01315	0.025
	2	0.774	0.01298	0.025
	1	0.324	0.00935	0.025

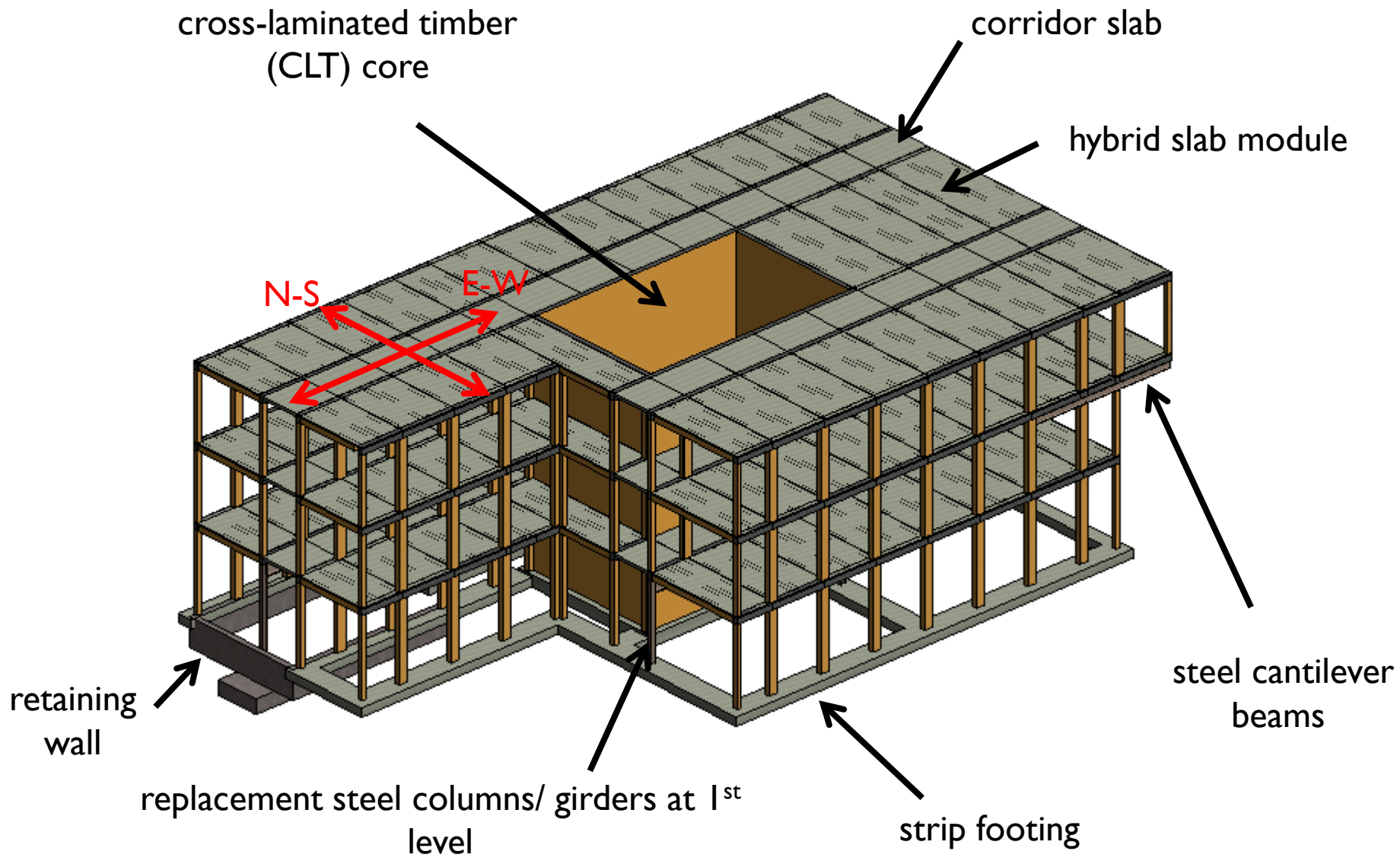


		EQ Along Project N-S		
		Deflection δ (in)	$C_d*\delta/h_{sx}$	Allowable Drift Ratio
Story	3	1.96	0.02250	0.025
	2	1.18	0.02088	0.025
	1	0.456	0.01315	0.025



(Note: C_d= 4.5, h_{sx}= 13')

CREE BUILDING– FEATURES



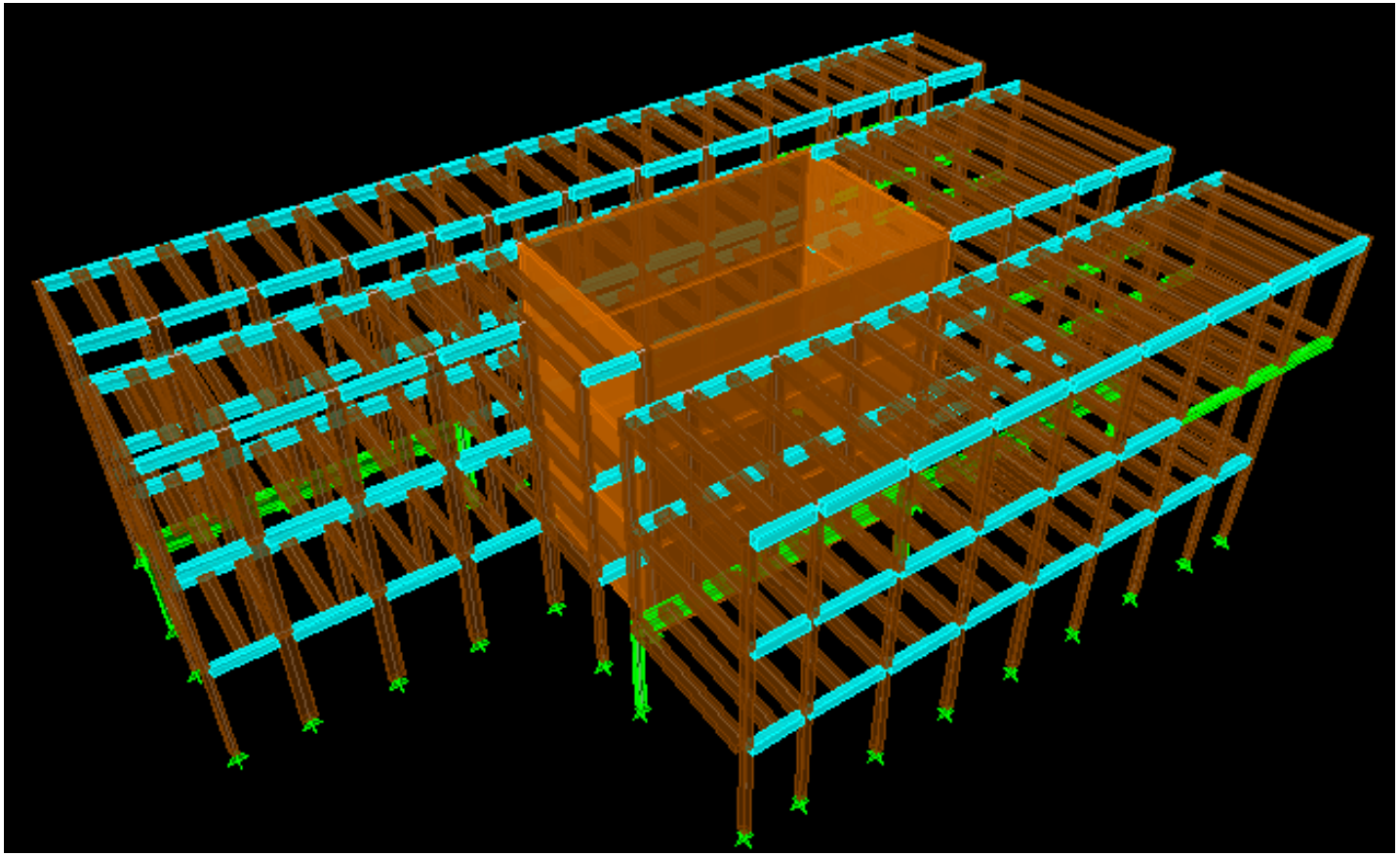
gravity:

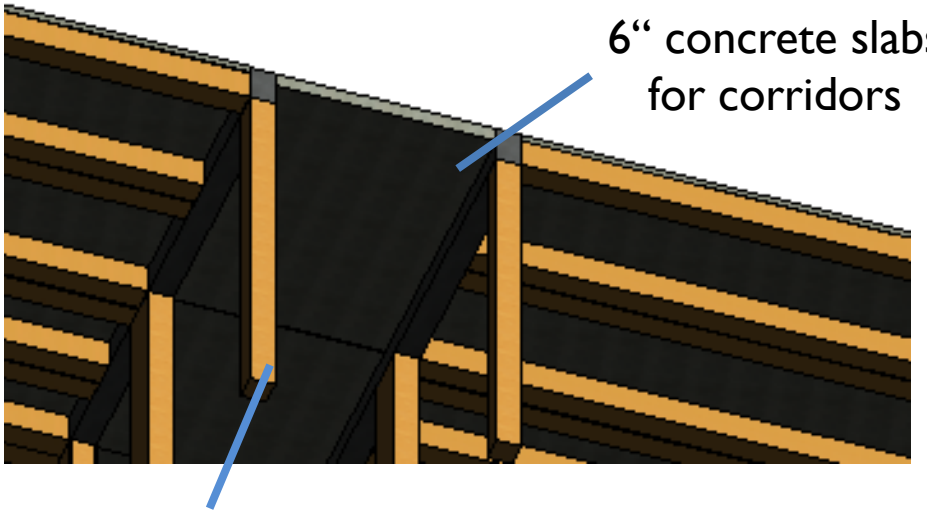
Corridors (above 1st floor)	80 psf
Roof live load (reduced)	13.4 psf
Elevator/ Stairwell	100 psf
Everywhere else	50 psf

lateral:

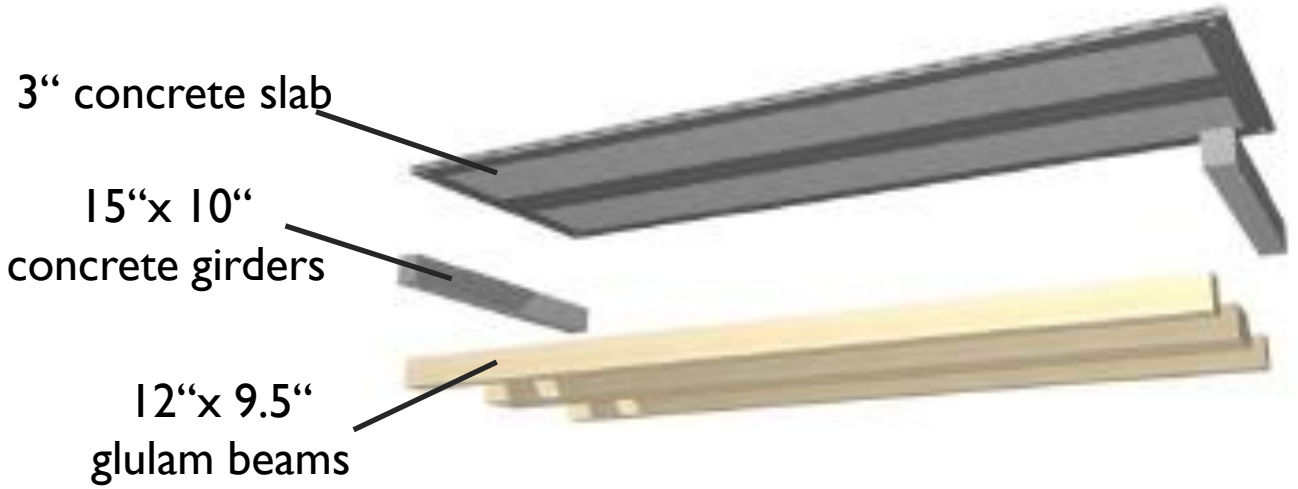
F3= 219 k
F2= 158 k
F1= 81 k

- Pinned at base
- Moment releases on all members
- 3 rigid diaphragms on the floors
- Light-frame wood wall lateral system

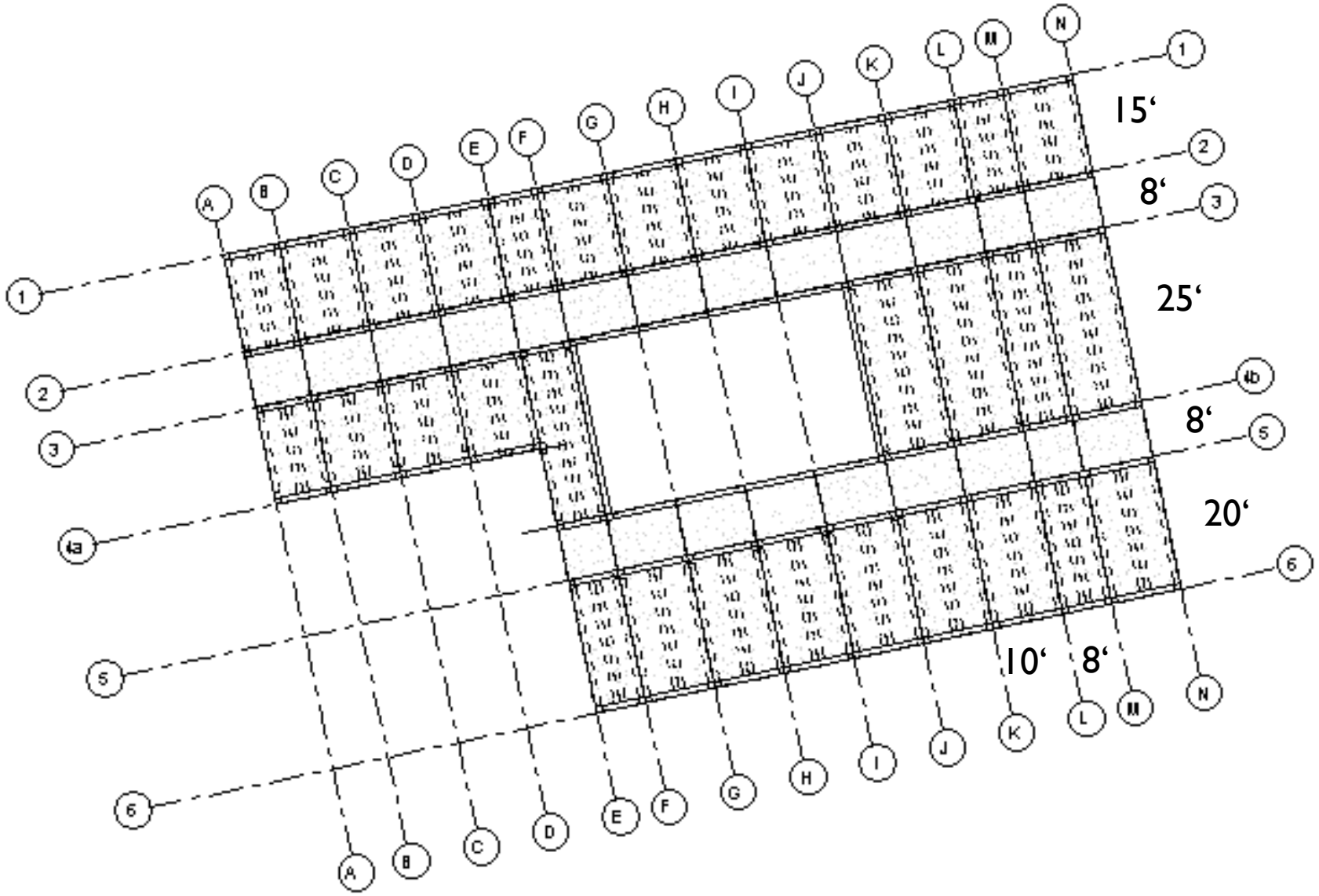




Modules in 3 different lengths :

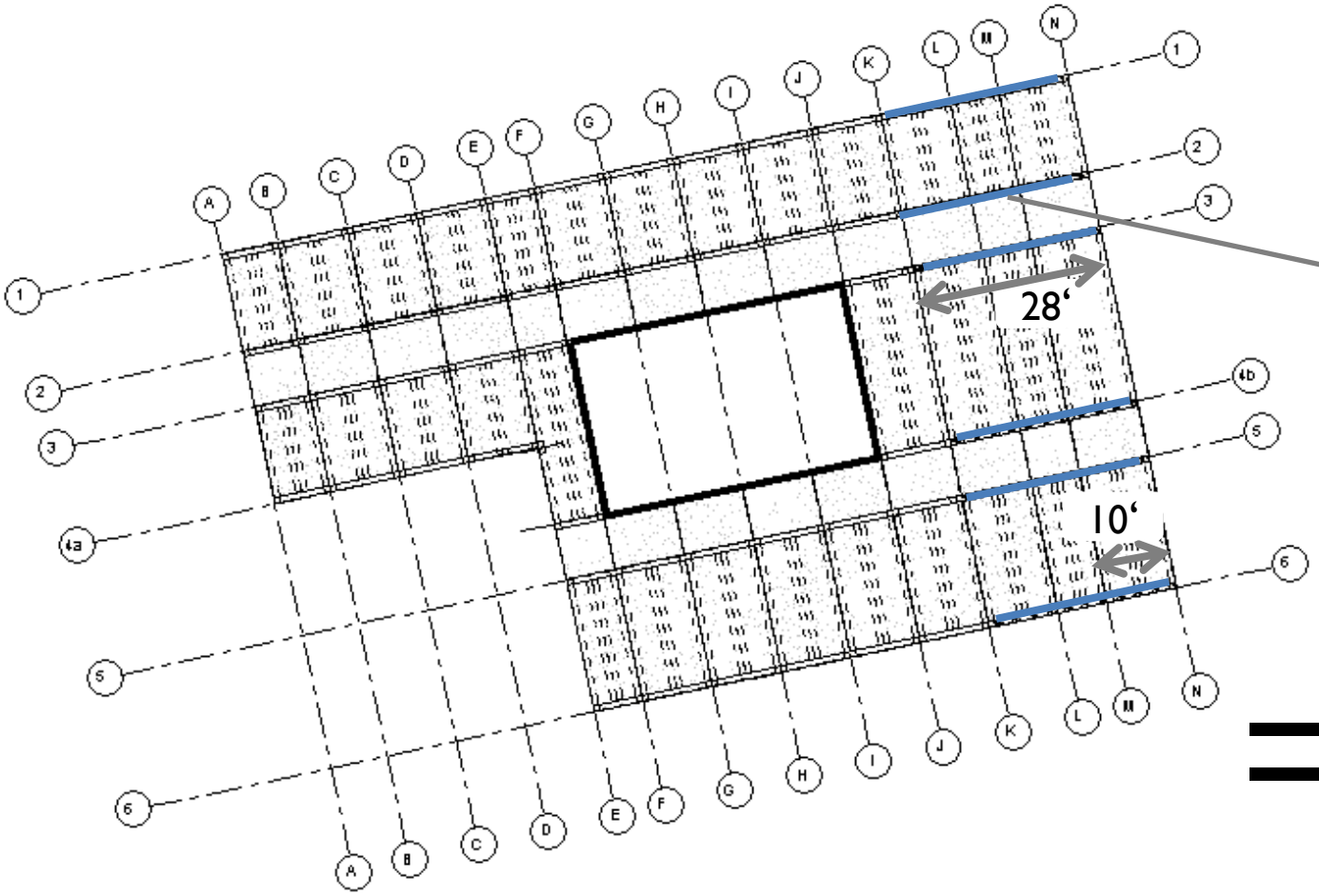


CREE BUILDING– ROOF

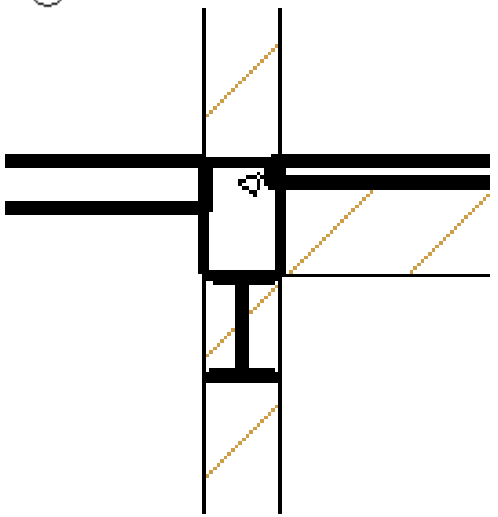


CREE BUILDING - CANTILEVER

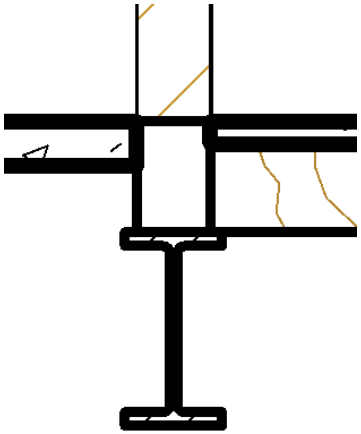
CREE BUILDING– 2nd LEVEL

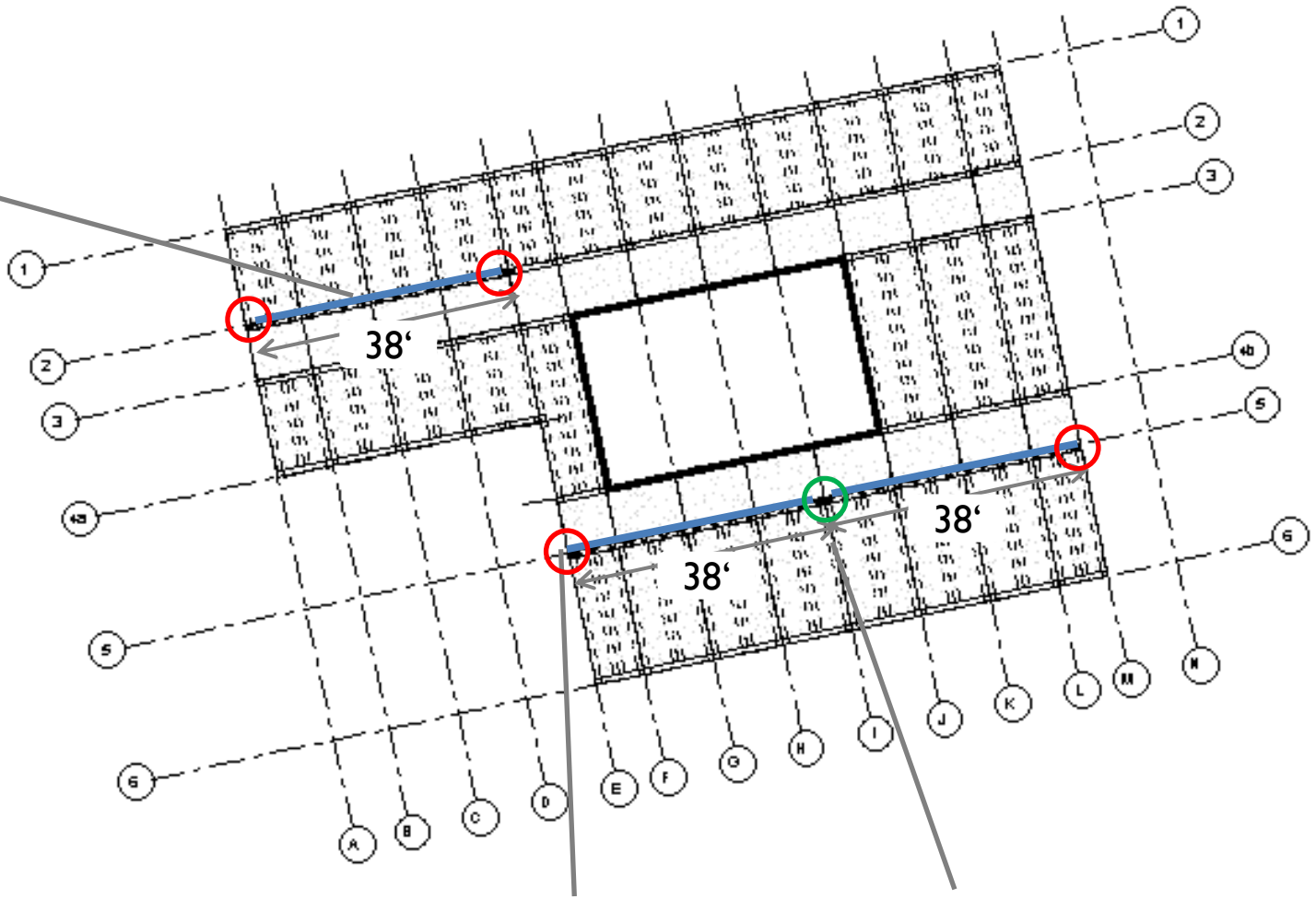


Steel beams holding up cantilever W 14x48



Steel beams replacing columns
W 24x250

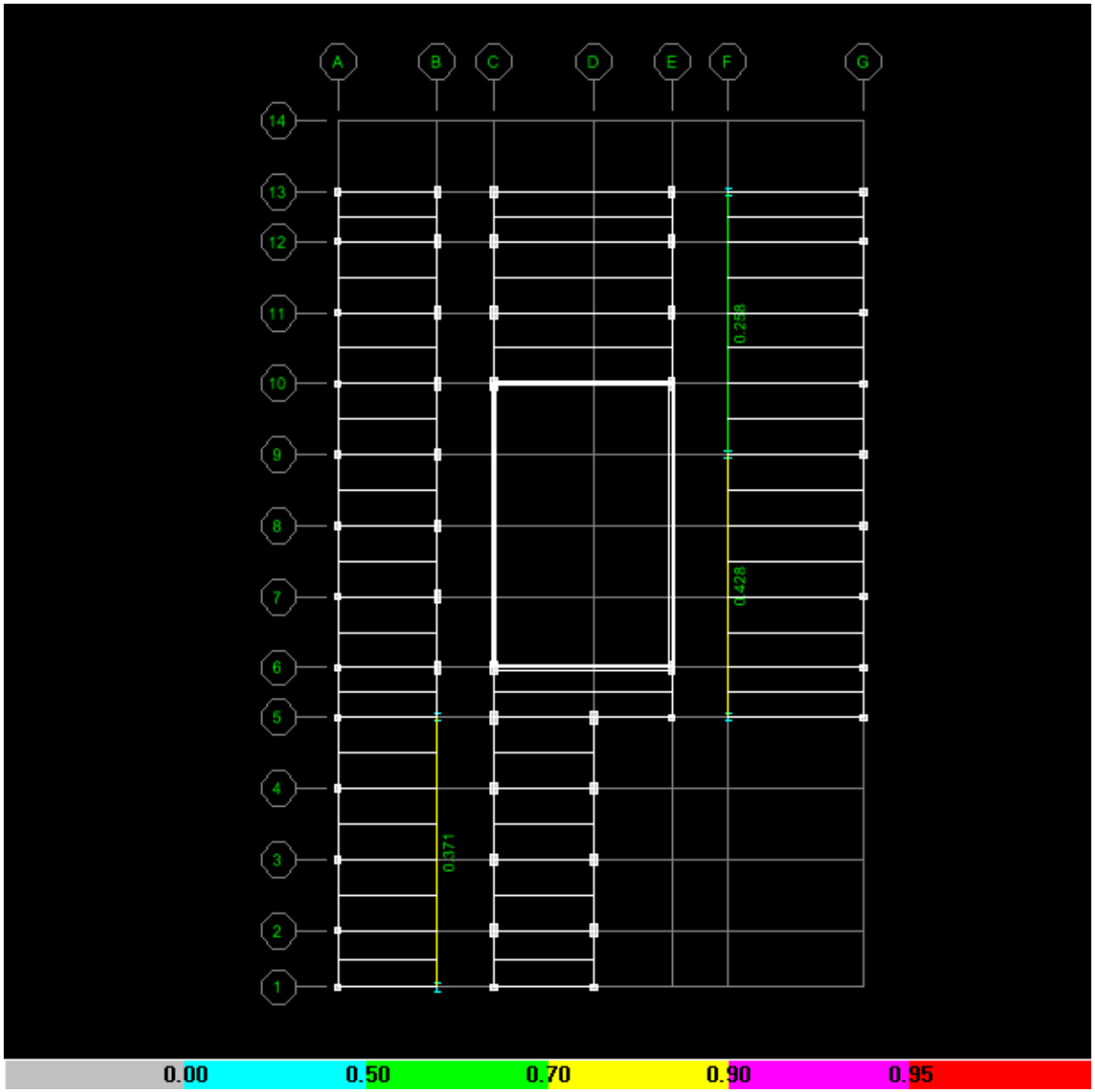




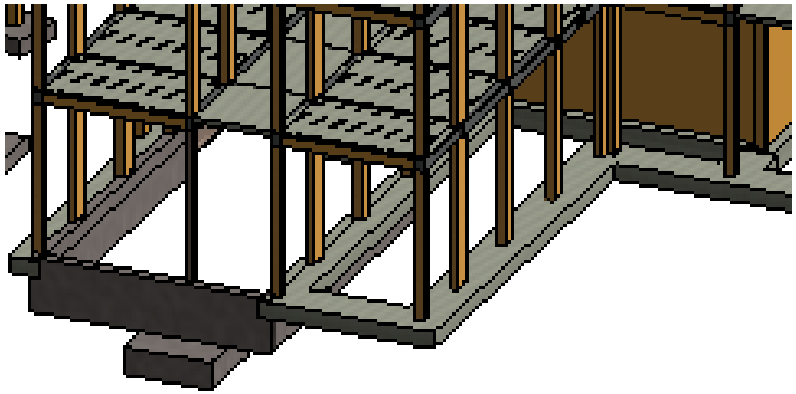
Steel columns supporting beams
W 12x50

Central steel column supporting beams
W 12x65

CREE BUILDING– STEEL MEMBER DESIGN



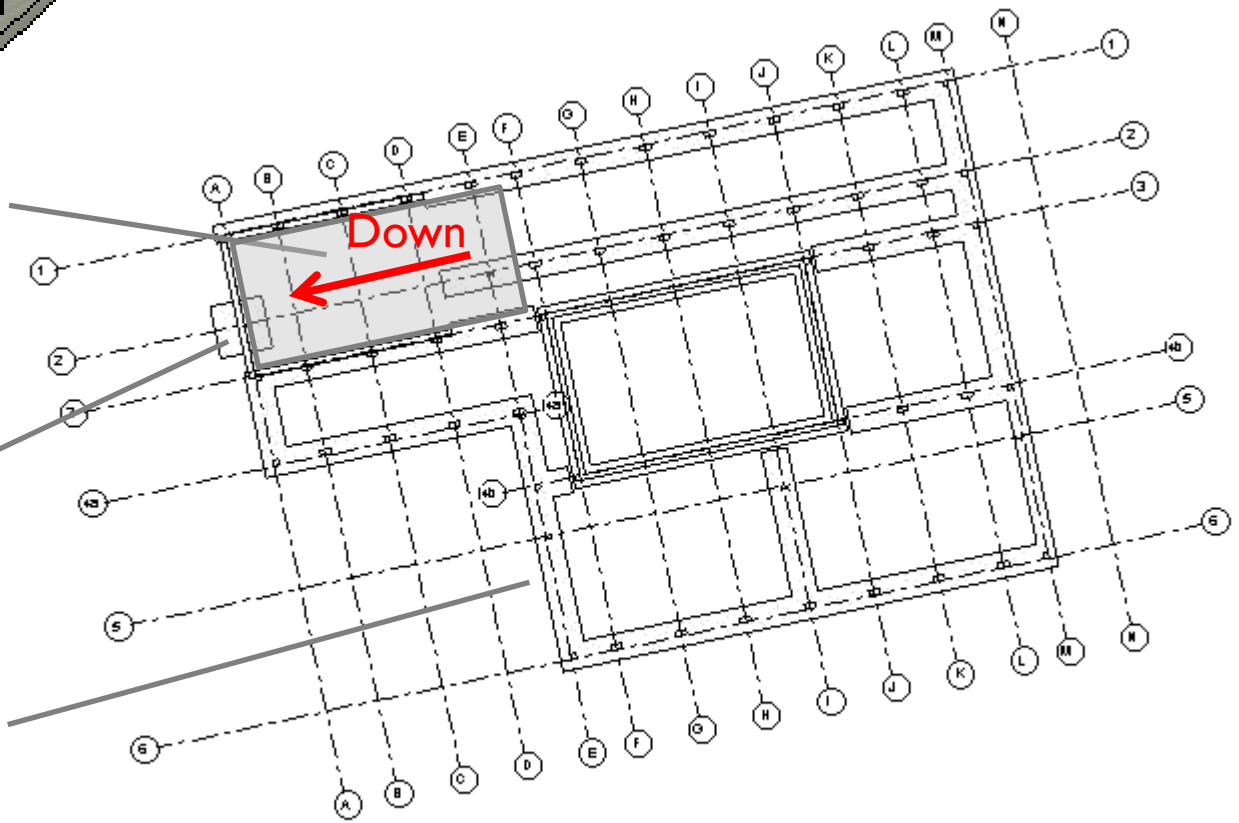
CREE BUILDING– INSIDE COMPUTER LABS



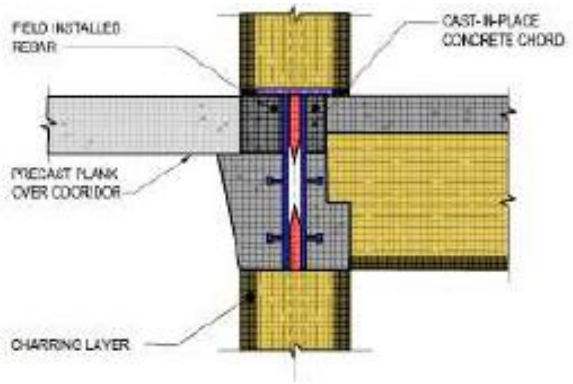
Sloped floor with retaining wall

Isolated footings for steel column: 8’ x 8’ x 30”

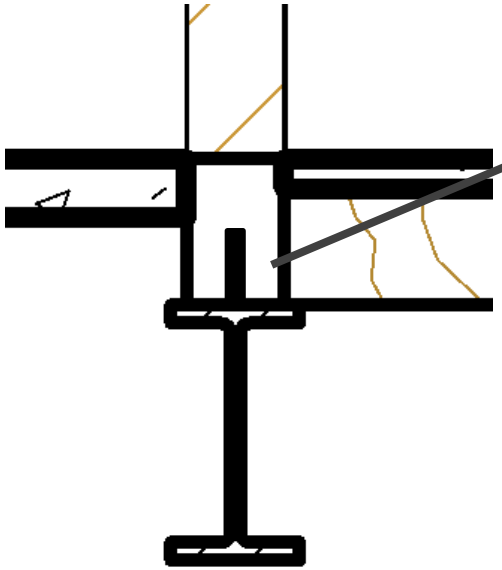
Strip footings for CREE columns: 4’ wide x 18” thick



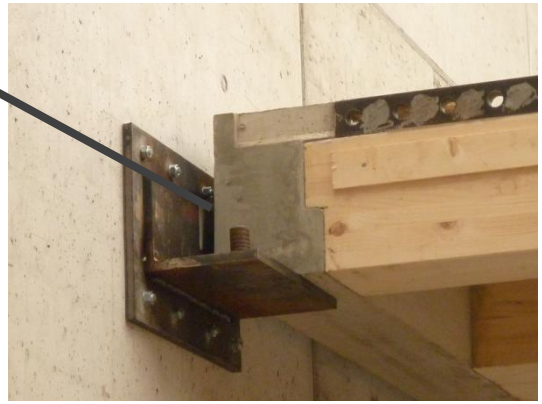
CREE BUILDING – VERTICAL CONNECTIONS

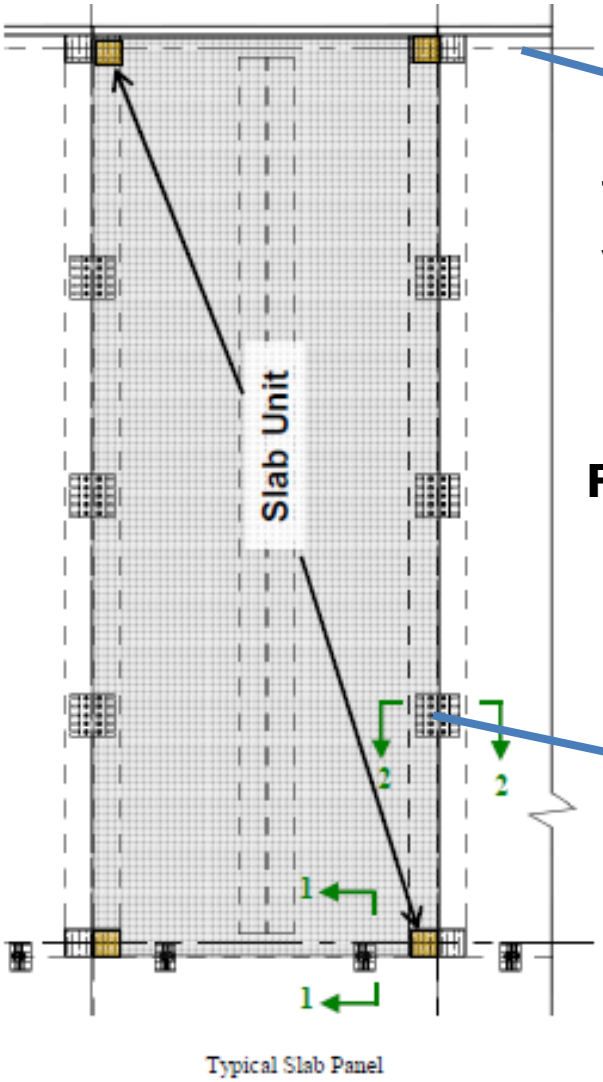


Assembled Components



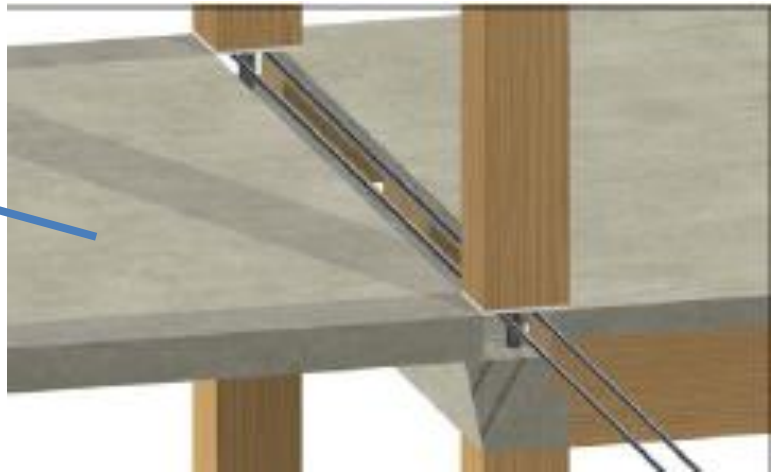
Pins on steel beams and core replacing columns





Typical Slab Panel

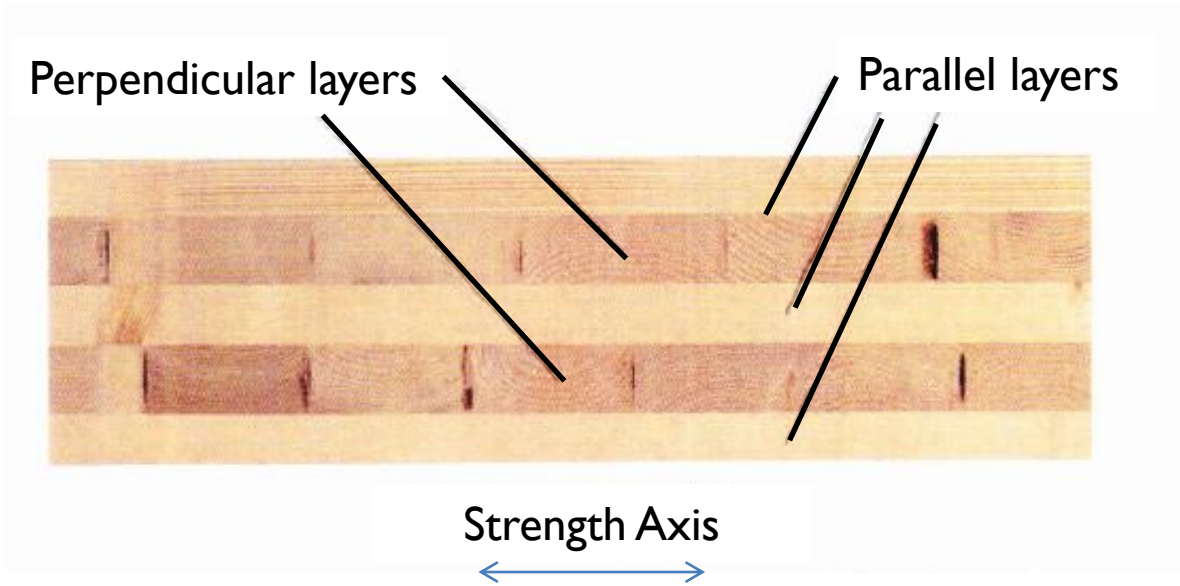
Tieing together slabs with rebars



FLOOR DIAPHRAGM

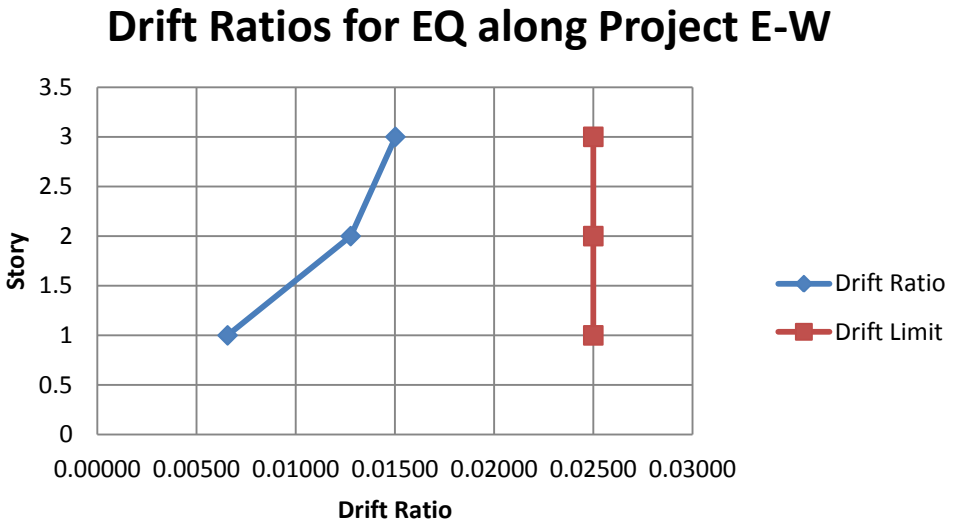
Connecting slabs with steel elements

CREE BUILDING– CROSS LAMINATED TIMBER CORE



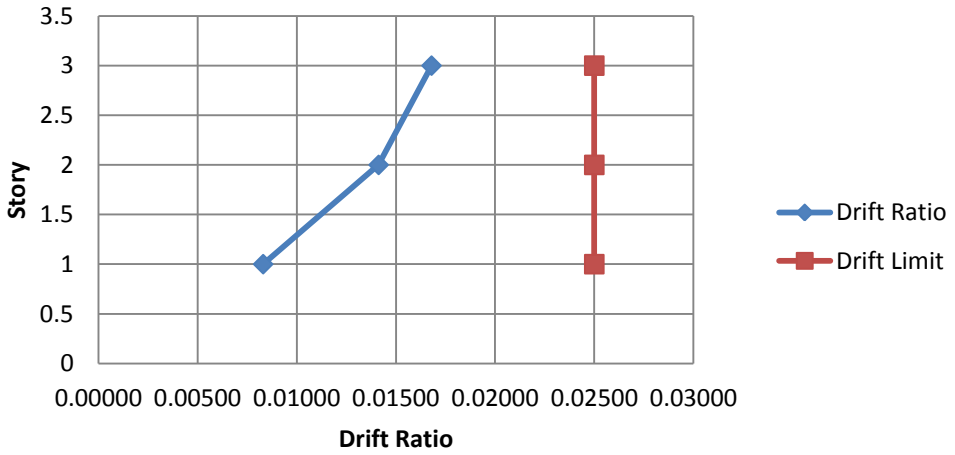
- V3 Grade
- No. 2 Southern Pine in parallel layers, No. 3 Southern Pine in perpendicular layers
- 5 layers (3 ═ layers, 2 ⊥ layers)
- Layers thickness 1 3/8" (6 7/8")

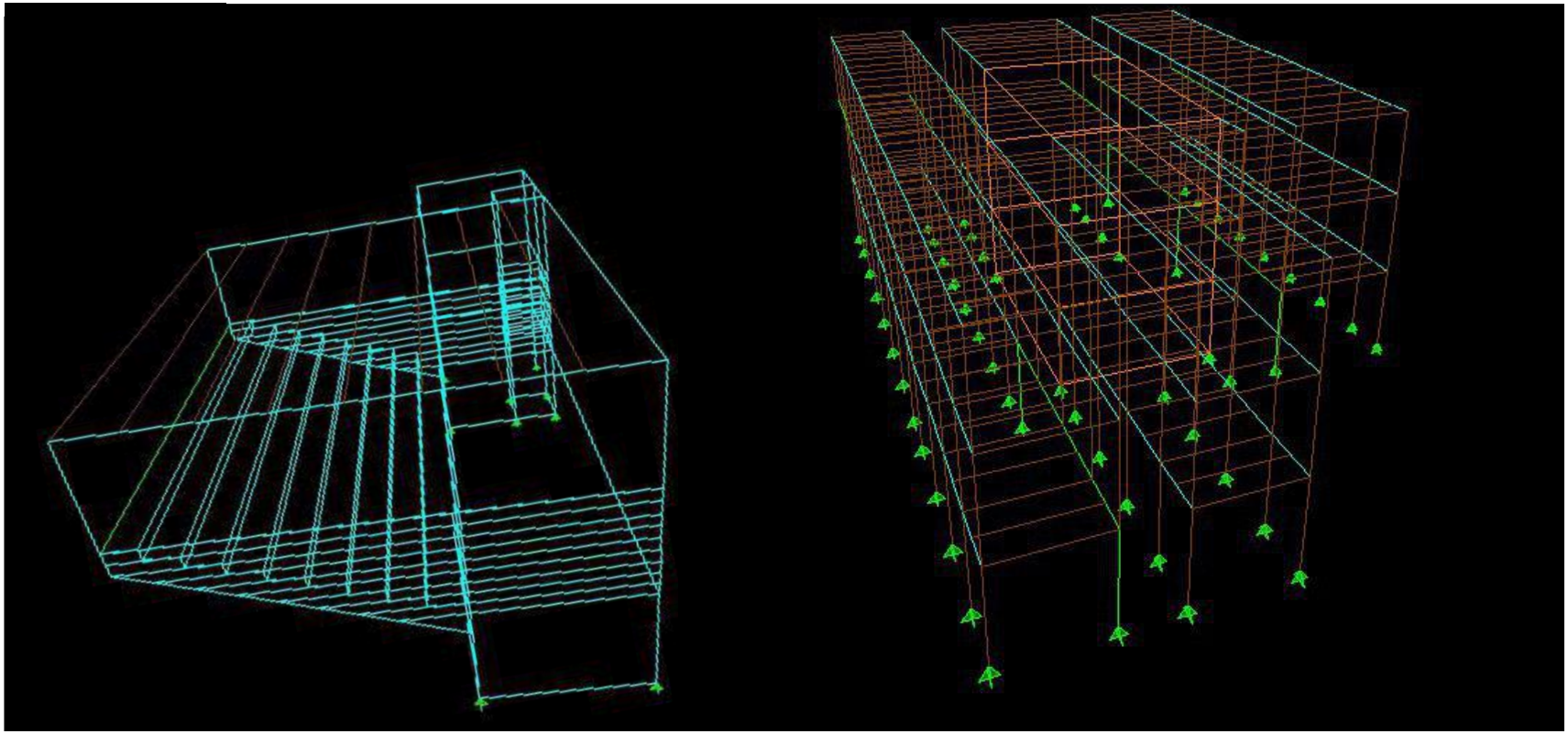
		EQ Along Project E-W		
		Deflection δ (in)	$C_d*\delta/h_{sx}$	Allowable Drift Ratio
Story	3	1.34	0.01503	0.025
	2	0.754	0.01277	0.025
	1	0.256	0.00656	0.025



		EQ Along Project N-S		
		Deflection δ (in)	$C_d*\delta/h_{sx}$	Allowable Drift Ratio
Story	3	1.53	0.01679	0.025
	2	0.875	0.01413	0.025
	1	0.324	0.00831	0.025

(Note: C_d= 4.0, h_{sx}= 13')

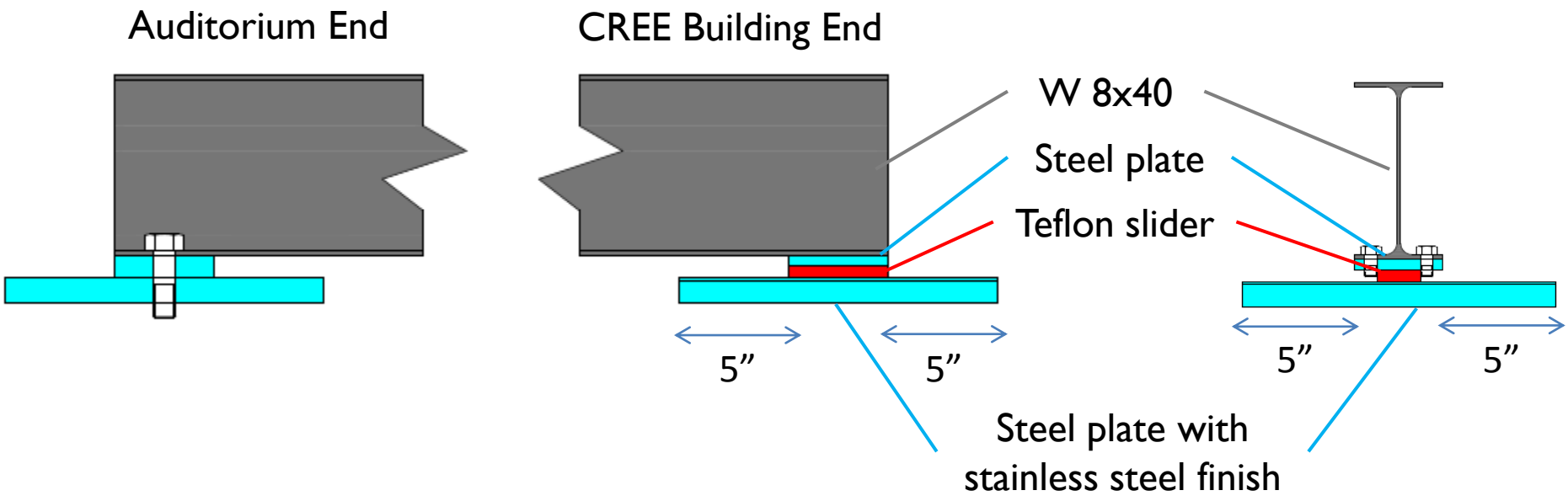




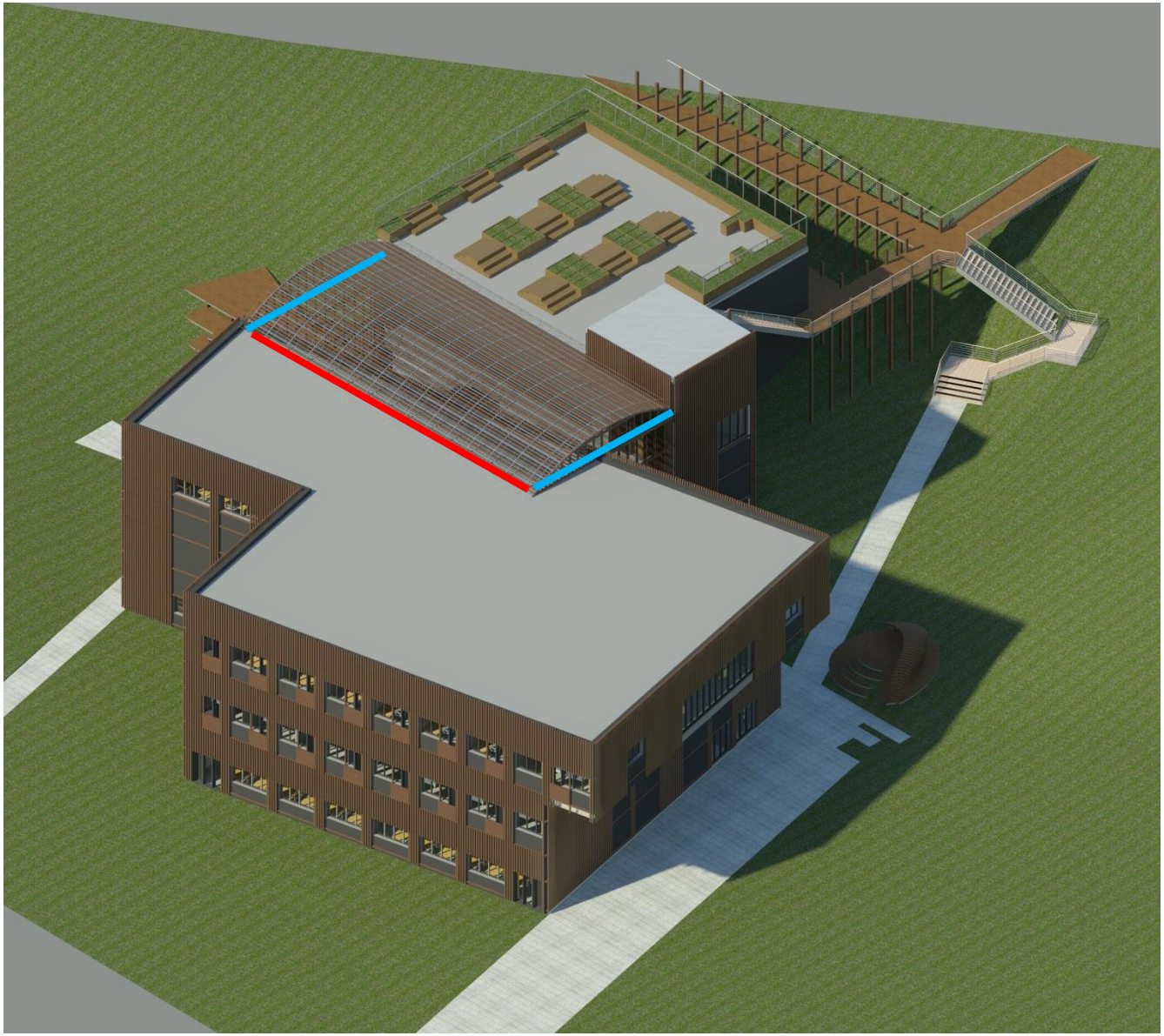
At maximum drift, ~4” relative displacement

Expansion joint needed to:
- Allow glazing to move freely across top of CREE Building
- Allow floors in atrium to move freely (atop corbels)

Expansion joint:
- Polytetrafluoroethylene (PTFE) "teflon" sliders
- Stainless steel plates to allow for 5" of movement in all directions



ATRIUM– ROOF SEISMIC JOINT

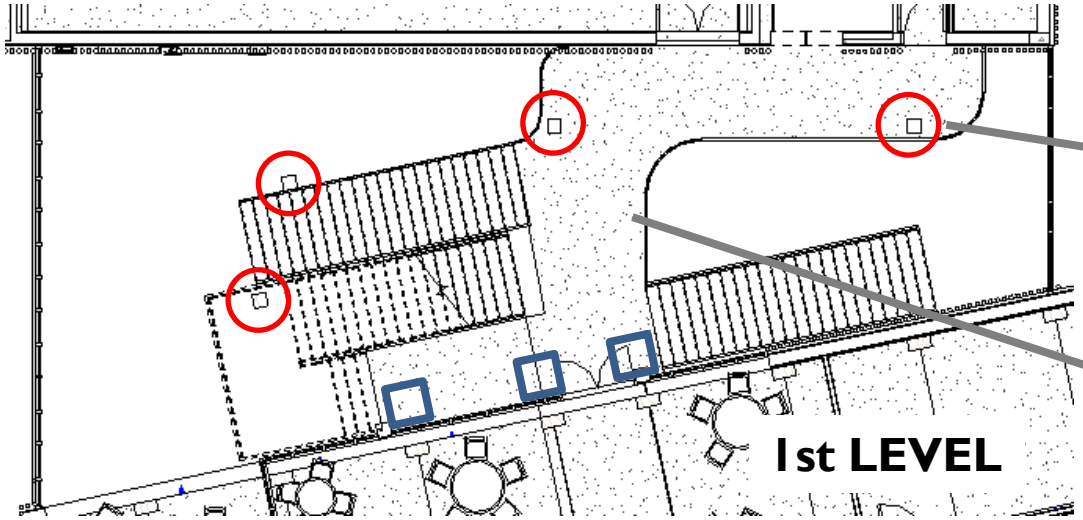


W 8x40

Teflon sliders

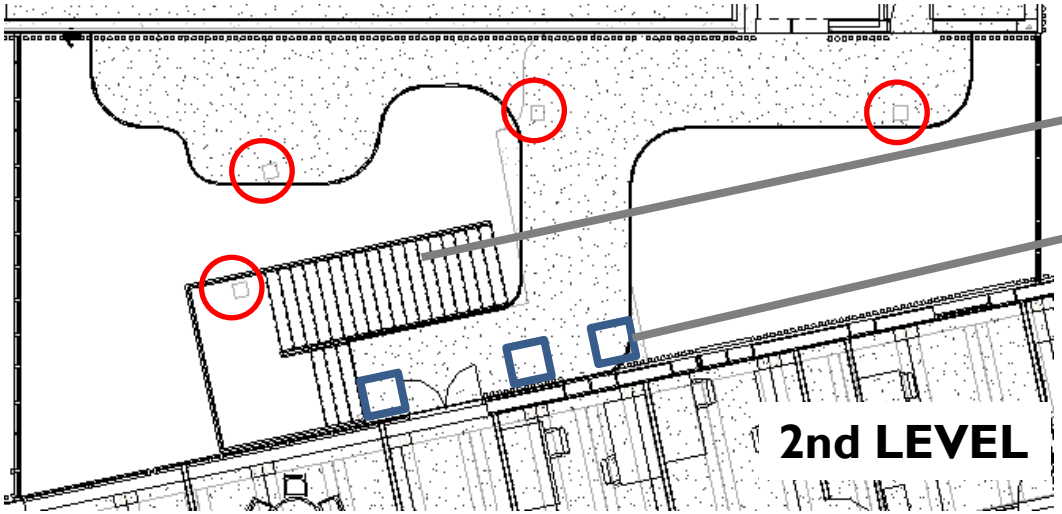
(Concrete atrium floors on teflon sliders on haunches)

ATRIUM – FLOORS



Glulam columns 12”x12”

Concrete floor 8”

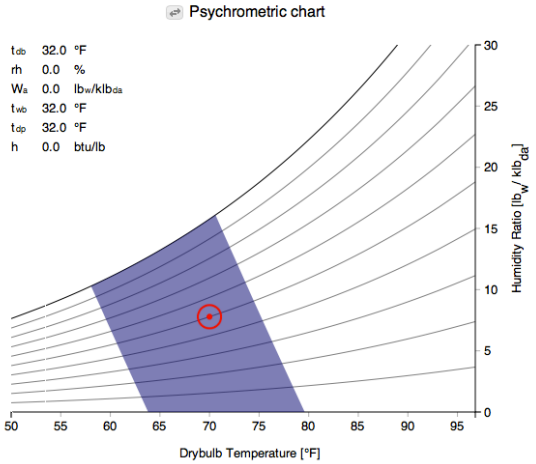


Steel and timber stairs

Concrete haunches
for expansion joint

MEP DESIGN DRIVERS

Occupant Comfort

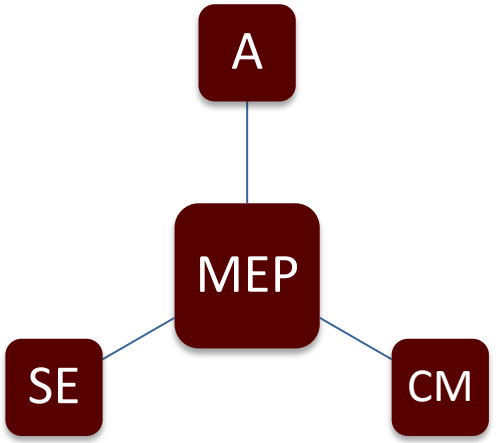


Design Set Point Temperatures

- 75˚F DB (Summer)
- 70˚F DB (Winter)
- 50% RH

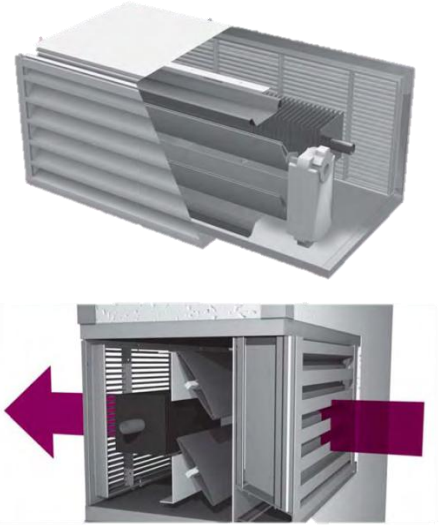
Energy Efficiency

Discipline Integration



HVAC SYSTEM SELECTION – SELECTION PROCESS

TRICKLE VENTILATION



"Provides natural ventilation, but not suitable for the majority of the building's high-load spaces"

ACTIVE CHILLED BEAMS

"Increases energy efficiency by decoupling ventilation from cooling, but does not integrate well with shallow CREE ceiling space"

UNDERFLOOR AIR DISTRIBUTION

"Offers a higher level of versatility and occupant comfort, but reduces constructibility while increasing first costs"

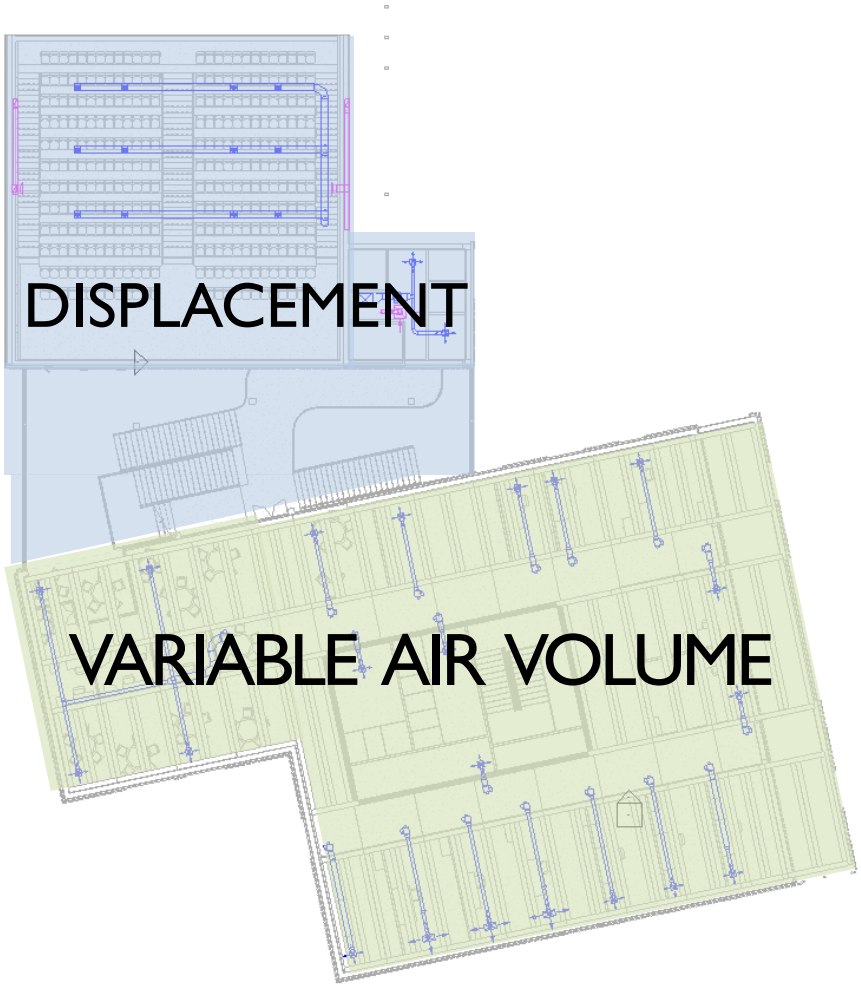
HVAC SYSTEM SELECTION – VAV & DISPLACEMENT

Displacement Distribution

- Capitalizes on occupant heat
- Lower supply air temperature
- Lower air velocity
- Responds quickly to high flux loads

Variable Air Volume Distribution

- Individual zone control
- Interlock with operable windows
- Common system - Reduced first costs
- Facilitates operations & maintenance



Interlock between zoned VAV System + Operable Windows

- Greater occupant control
- Greater tolerance of variations
- Greater comfort
- Greater energy conservation
- Greater **Value for Money**

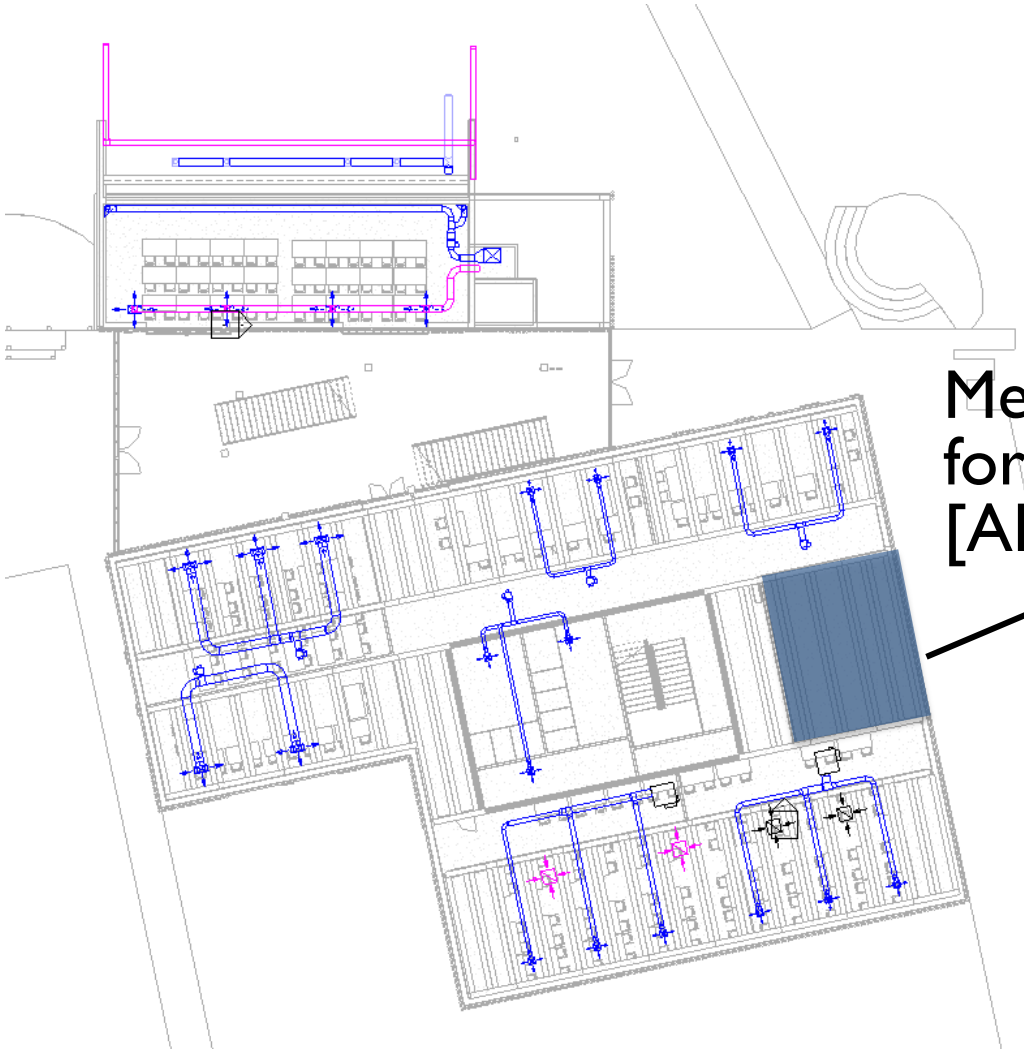
Tight construction to reduce infiltration

- CREE is designed to meet Passivhaus Standards
- Fewer drafts
- Greater occupant comfort
- Reduction in heating & cooling energy

System zoning & separation

- Reduces energy consumption
- Reduces distribution losses

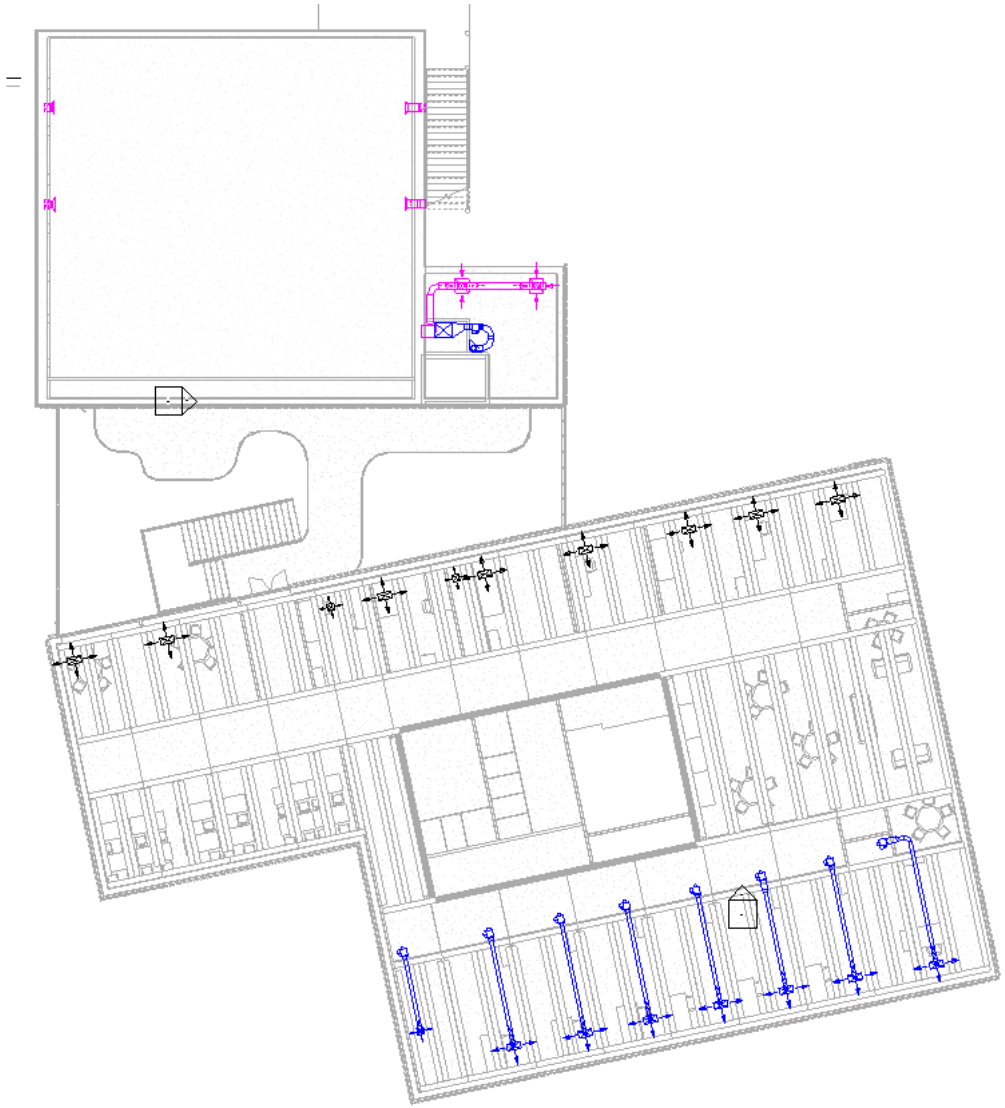
FLOOR PLAN – ENTRANCE LEVEL

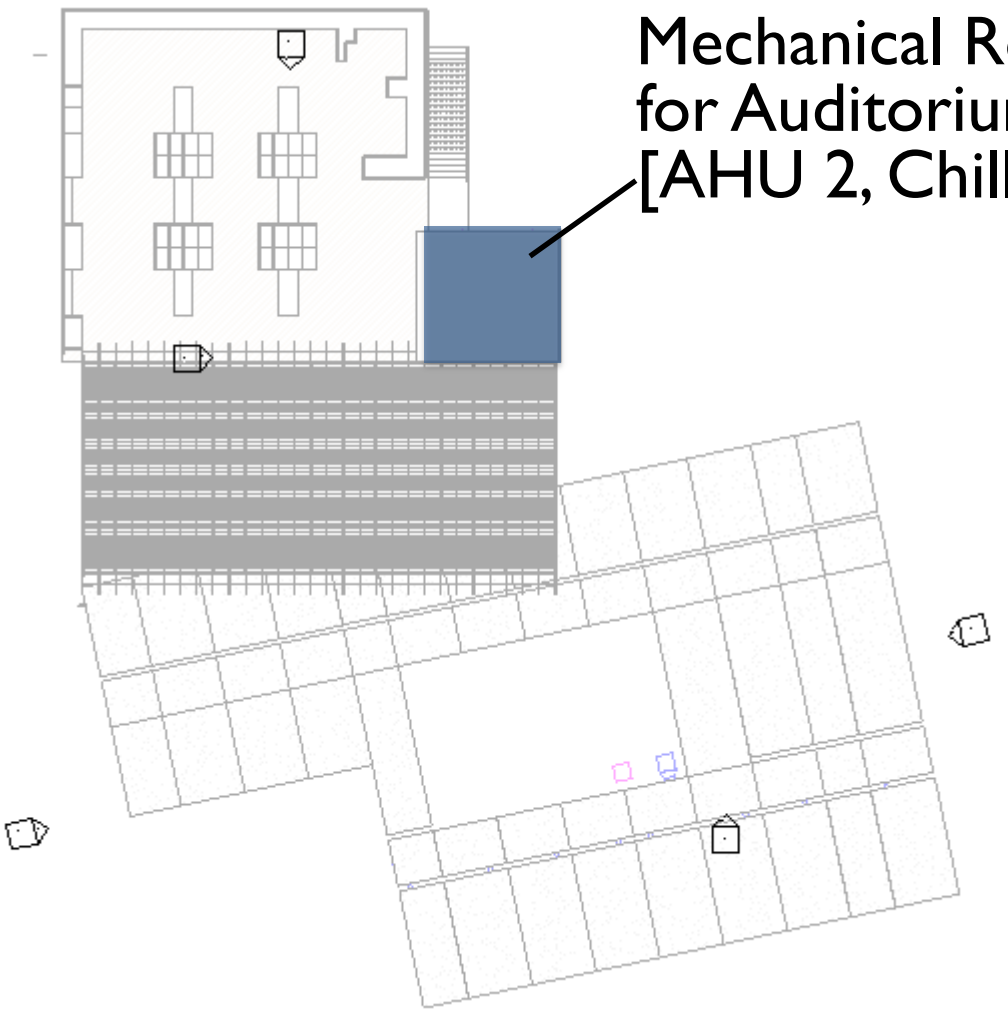


Mechanical Room
for CREE Block
[AHU 1, Chiller]

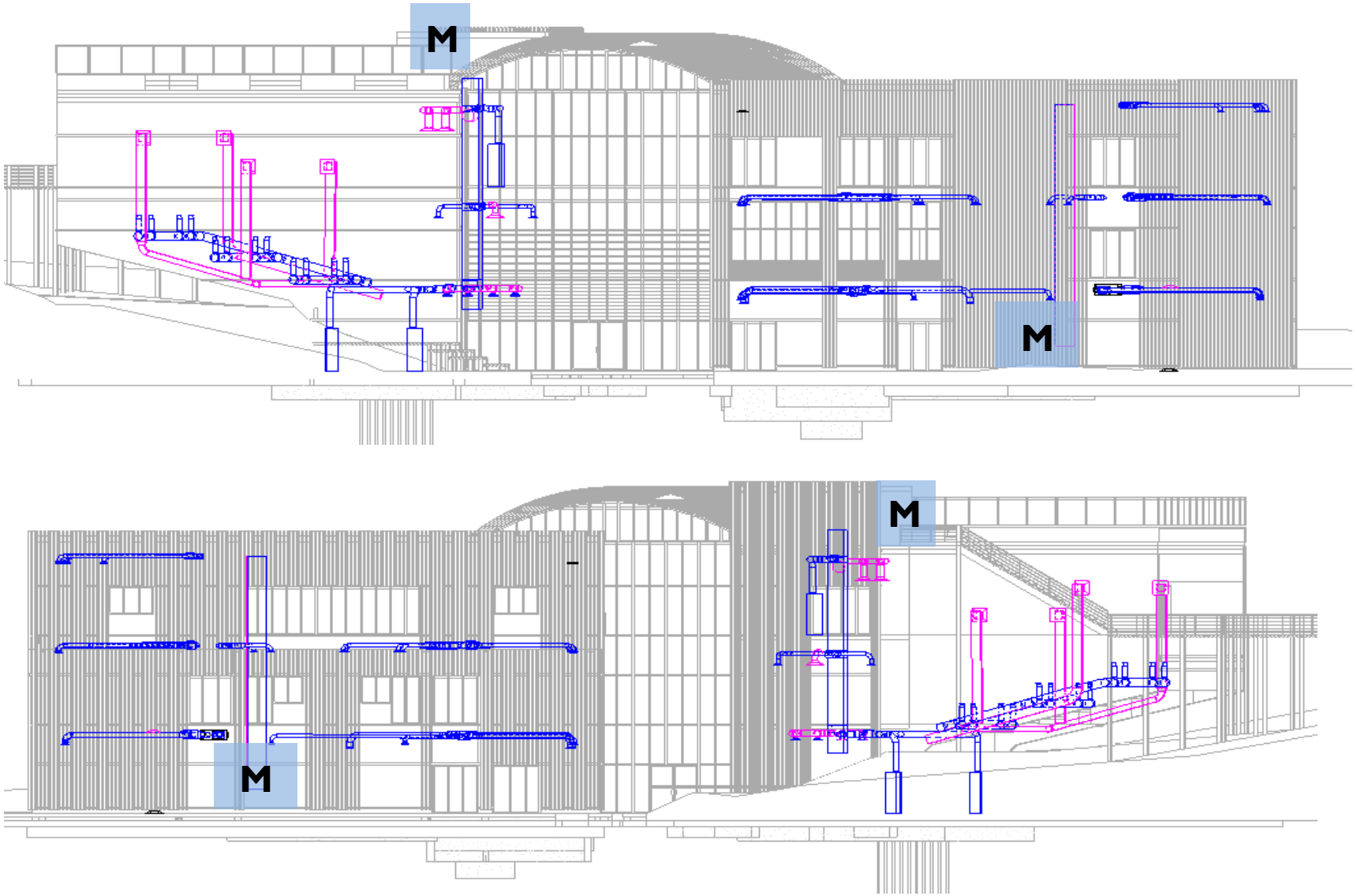
FLOOR PLAN – LEVEL 1

FLOOR PLAN – LEVEL 2

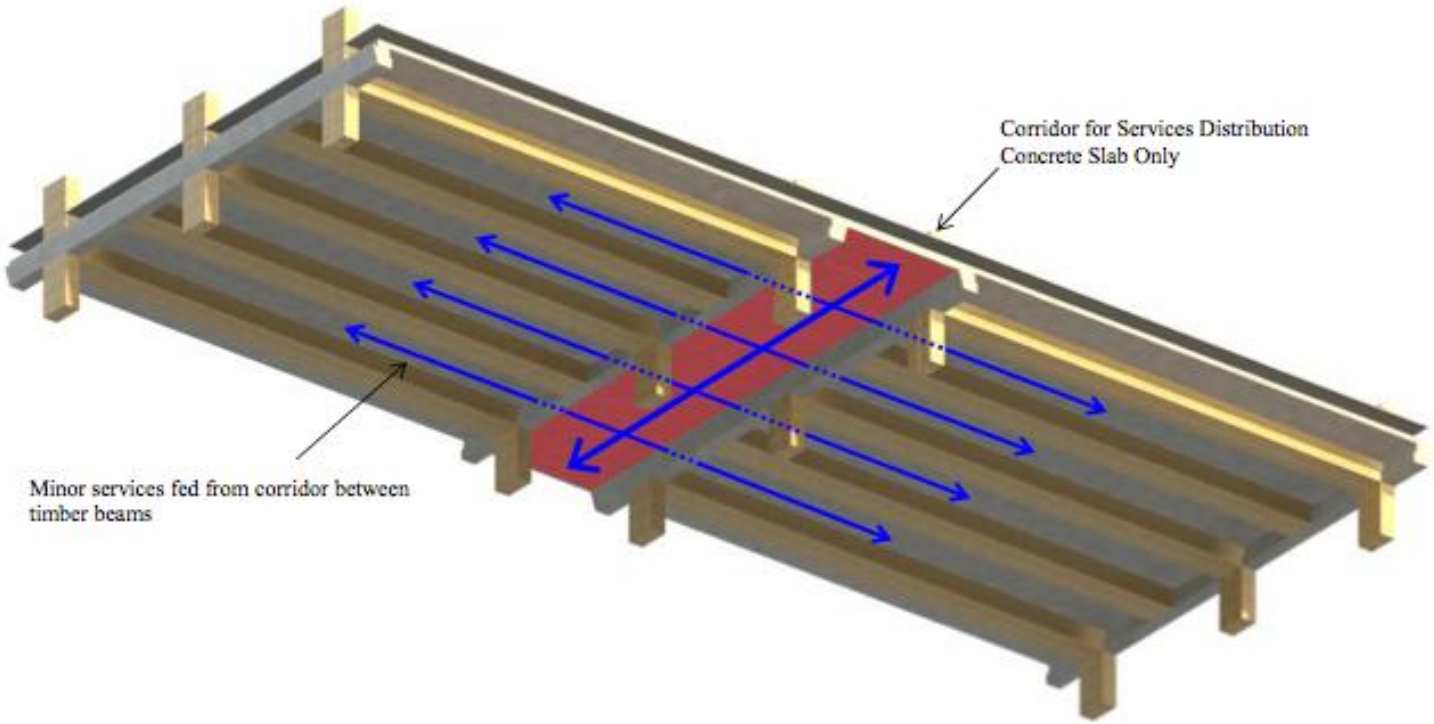



Mechanical Room
for Auditorium Block
[AHU 2, Chiller]

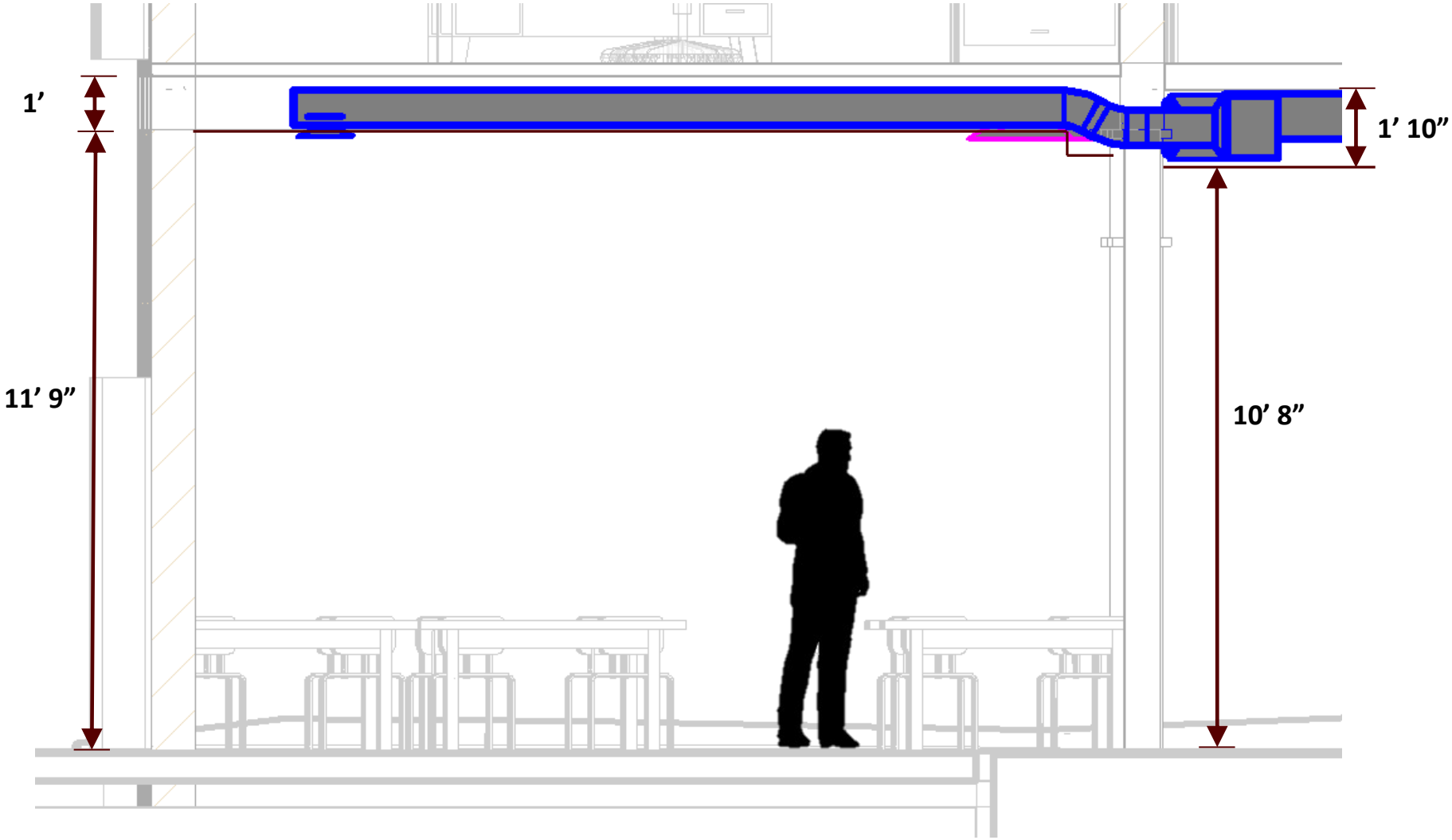
FLOOR SECTION



"How to integrate ductwork with the CREE system?"

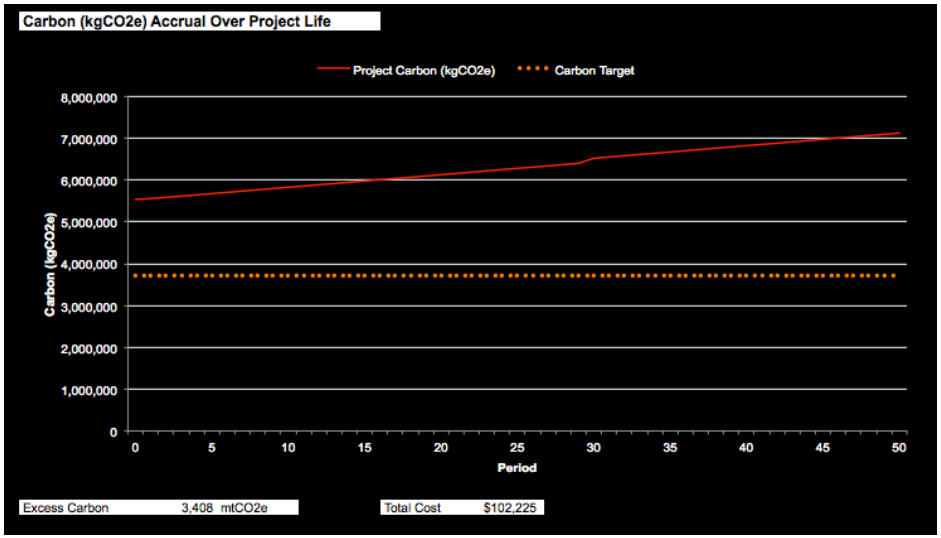


FLOOR SECTION – FLOOR –TO – FLOOR DIMENSIONS



ENVIRONMENTAL IMPACT - SUSTAINABILITY TARGET VALUE

From this (March):

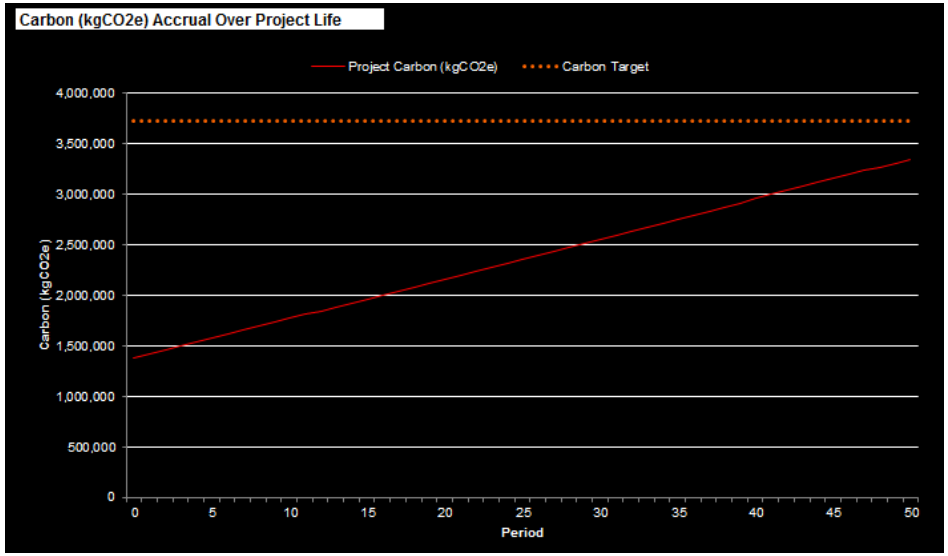


Key Lessons:

- Little changes = big difference
  - eg. Concrete vs. Glulam
- STV & Carbon drive design reflection and awareness
- Garbage in, garbage out – though still a design tool

To this (May):

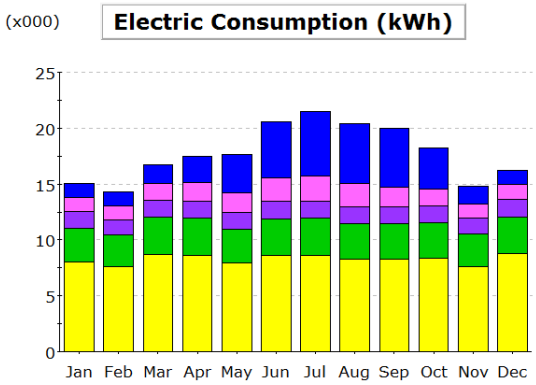
vs.

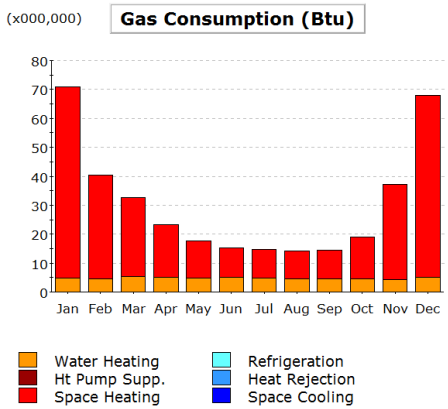


Category	Possible Points	Points Awarded
Sustainable Sites	26	20
Water Efficiency	10	7
Energy & Atmosphere	35	17
Materials & Resources	14	7
Indoor Environmental Quality	15	11
Innovation in Design/Regional Priority	10	0
Total Points		62

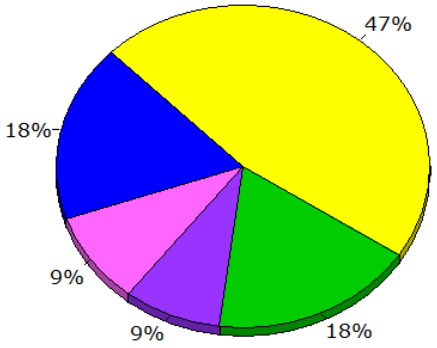
ENVIRONMENTAL IMPACT - ENERGY MODEL

	Electricity kWh (x000)	Natural Gas MBtu
Space Cool	37.85	-
Heat Reject.	-	-
Refrigeration	-	-
Space Heat	-	309.78
HP Supp.	-	-
Hot Water	-	57.64
Vent. Fans	19.70	-
Pumps & Aux.	18.11	-
Ext. Usage	-	-
Misc. Equip.	37.63	-
Task Lights	-	-
Area Lights	99.49	-
Total	212.77	367.43

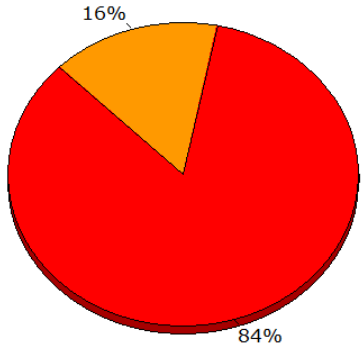




Area Lighting
Task Lighting
Misc. Equipment
Exterior Usage
Pumps & Aux.
Ventilation Fans
Water Heating
Ht Pump Supp.
Space Heating
Refrigeration
Heat Rejection
Space Cooling



Electricity



Natural Gas

Major Areas of Energy Consumption

- Space Heat
- Lighting
- Plug Loads
- Hot Water

1-. Identify Hazards

- Electrical
- Excavation and Trenching
- Falls
- Stairway Ladder
- Scaffolding
- Heavy Construction Equipment

Stanford Accident Cost Accounting System

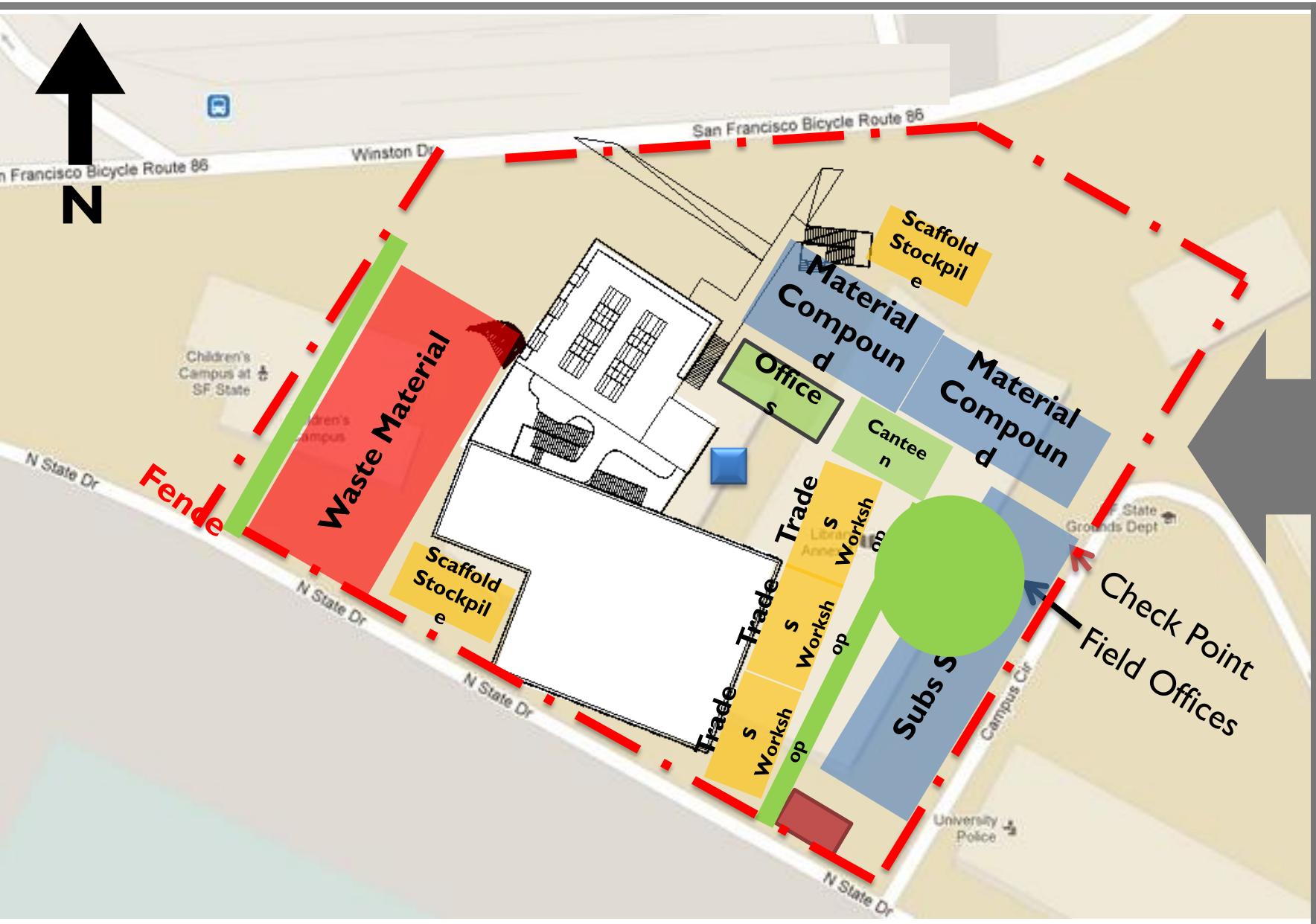
2-. Risk Matrix

Risk Identity & Cause					
Risk ID	Category	Location	Risk Description	Cause	Effect
Current Assesment					
Probability of Occurrence (P)		Impact (Cost & Time)		Risk Score	
Mitigation					
Strategy		Risk Plan		Action Owner	

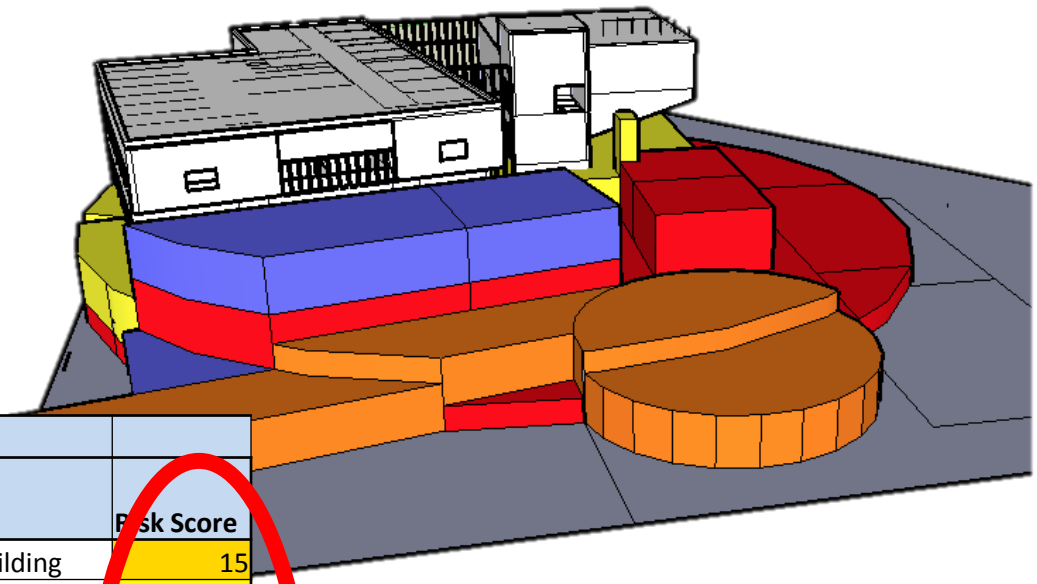
			Hazard Severity				
			Negligible 1	Slight 2	Moderate 3	High 4	Very High 5
Likelihood of Occurance	Very Unlikely	1	1	2	3	4	5
	Unlikely	2	2	4	6	8	10
	Possible	3	3	6	9	12	15
	Likely	4	4	8	12	16	20
	Very Likely	5	5	10	15	20	25

3-. Risk Map

SITE LAYOUT– OUR FIRST ITERATION



RISK MAPPING – 3D RISK MAPPING CONCEPT



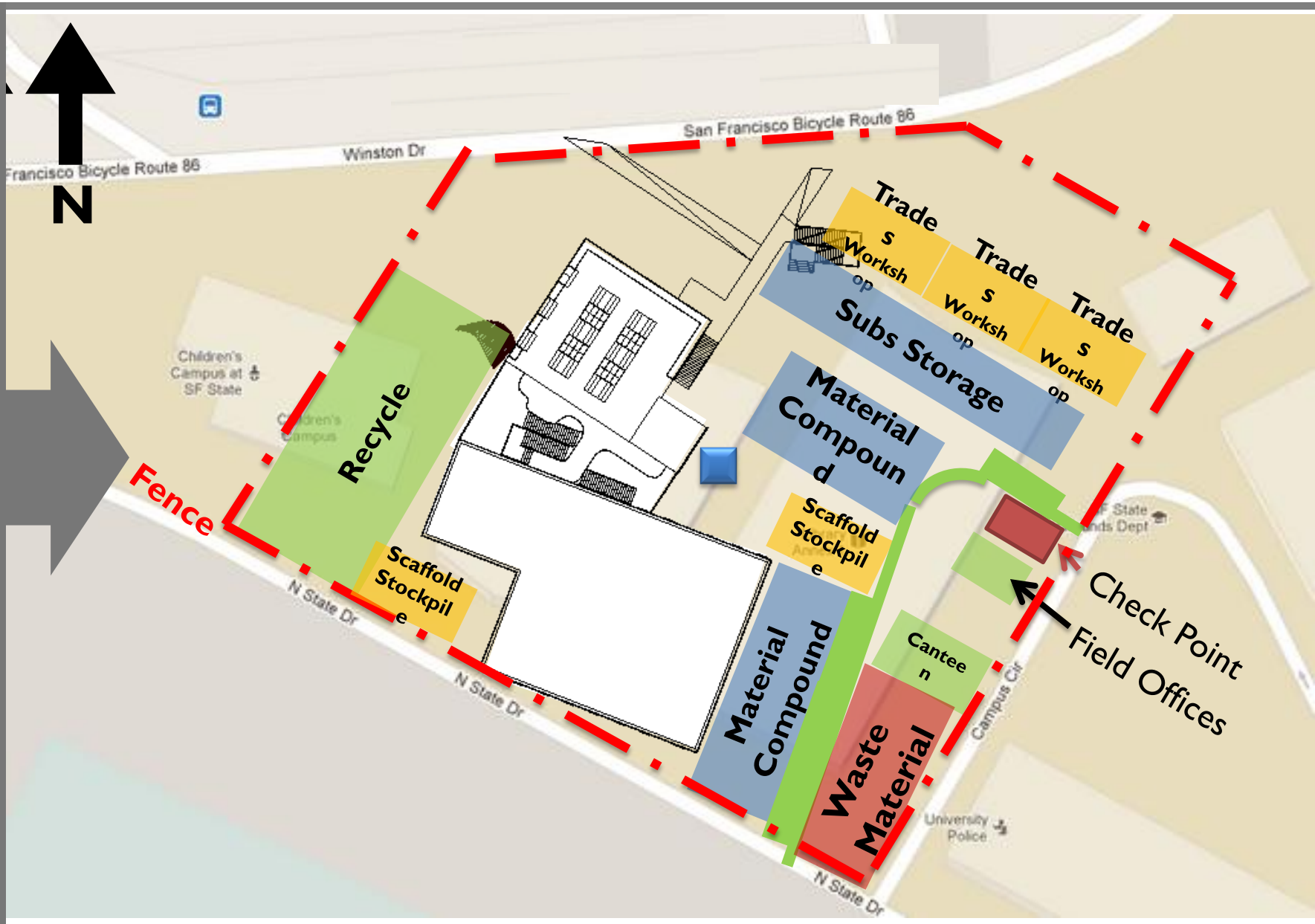
Risk Identity & Cause			
Risk ID	Category	Risk Description	Risk Score
11	Heavy Construction Equipment	Crane Dropping on Building	15
1	Electrical	Arcing	10
8	Stairway Ladder	Second Floor Drop	10
10	Scaffolding	Second Floor Drop	10
13	Heavy Construction Equipment	Getting hit by a Truck	9
14	Heavy Construction Equipment	Getting hit by a truck	9
2	Electrical	Overheating	8
3	Electrical	Electrical Leakage	8
5	Excavation and Trenching	Collapsing Trench	8
4	Excavation and Trenching	Falling	6
6	Excavation and Trenching	Falling Objects	6
12	Heavy Construction Equipment	Crane Dropping on Person	5
7	Stairway Ladder	First Floor Drop	4
9	Scaffolding	First Floor Drop	4

Risk Before Mitigation

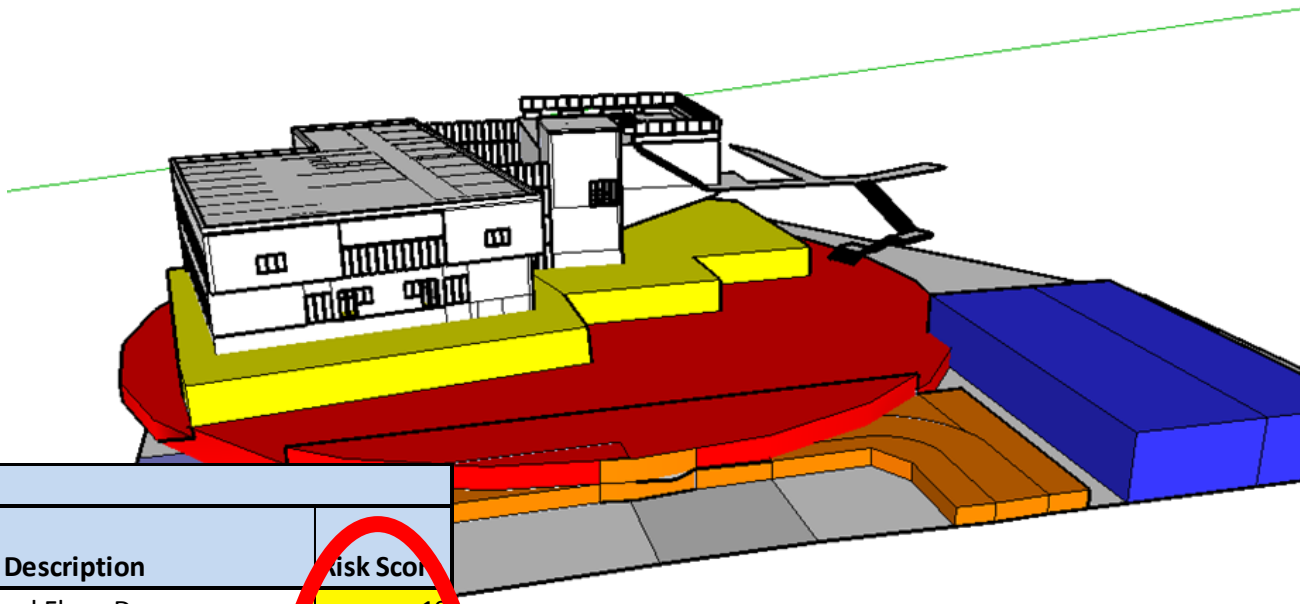
- Average risk score 8.5

SITE LAYOUT– OPTIMIZED TO INCREASE PRODUCTIVITY AND REDUCE RISK

AFTER



RISK MAPPING – 3D RISK MAPPING CONCEPT

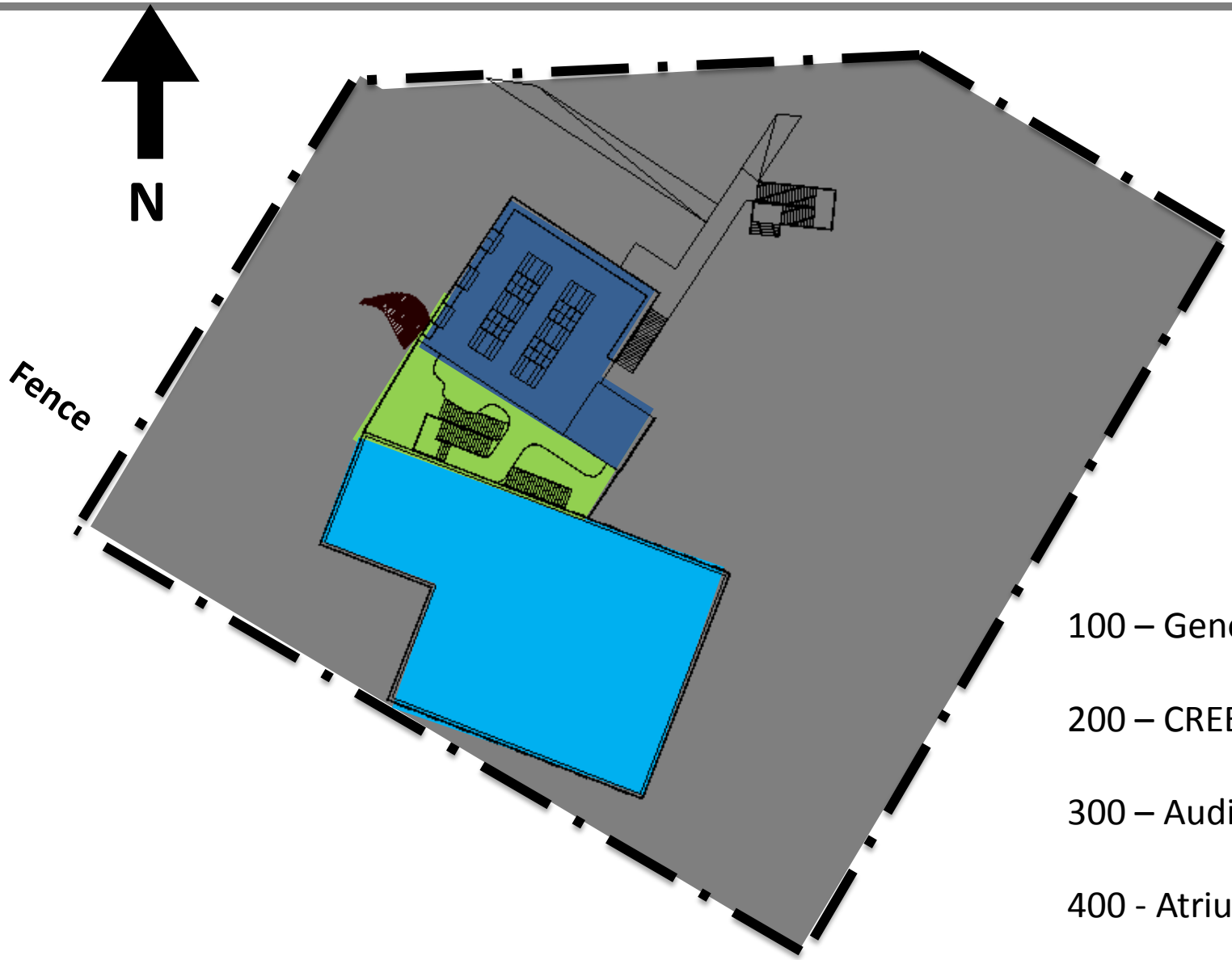


Risk Identity & Cause			
Risk ID	Category	Risk Description	Risk Score
8	Stairway Ladder	Second Floor Drop	10
10	Scaffolding	Second Floor Drop	10
5	Excavation and Trenching	Collapsing Trench	8
2	Electrical	Overheating	6
4	Excavation and Trenching	Falling	6
6	Excavation and Trenching	Falling Objects	6
1	Electrical	Arcing	5
12	Heavy Construction Equipment	Crane Dropping on Person	5
3	Electrical	Electrical Leakage	4
7	Stairway Ladder	First Floor Drop	4
9	Scaffolding	First Floor Drop	4
14	Heavy Construction Equipment	Getting hit by a truck	4
13	Heavy Construction Equipment	Getting hit by a Truck	4
11	Heavy Construction Equipment	Crane Dropping on Building	

Risk After Mitigation

- Average risk score 5.4

SCHEDULE – BUILDING PHASING



100 – General Area

200 – CREE Building

300 – Auditorium

400 - Atrium

SCHEDULE – LOCATION BASED SCHEDULE

Construction Starts

Start

Computer Labs

Contractual Finish

ctober | November | December | January | February | March | April | May | June | July | August | September

Finish
Fri 9/30/16

100

AREA 200 – CLASS BUILDING

GENE

AREA 300 – AUDITORIUM

RAL

COMISSIONING

AREA 400 – ATRIUM

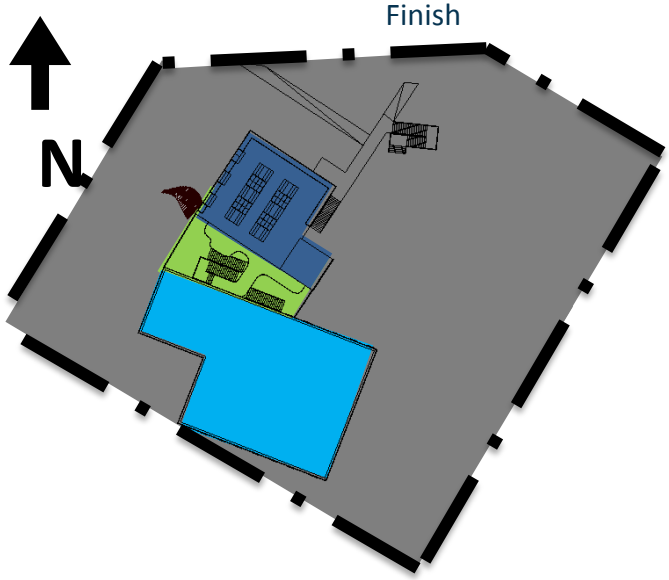
Earthwork Finished

Cree Bldg Dried In

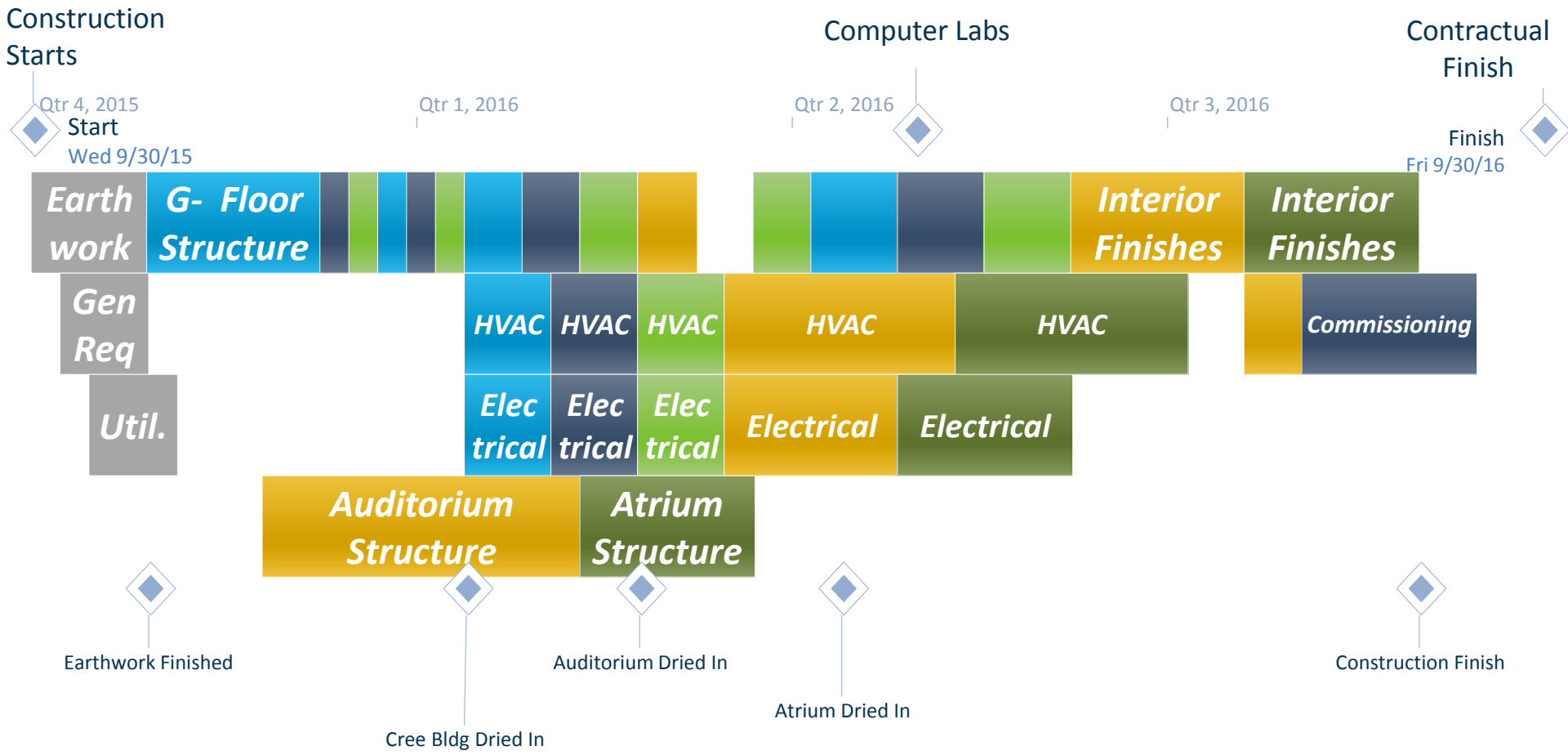
Auditorium Dried In

Atrium Dried In

Construction Finish



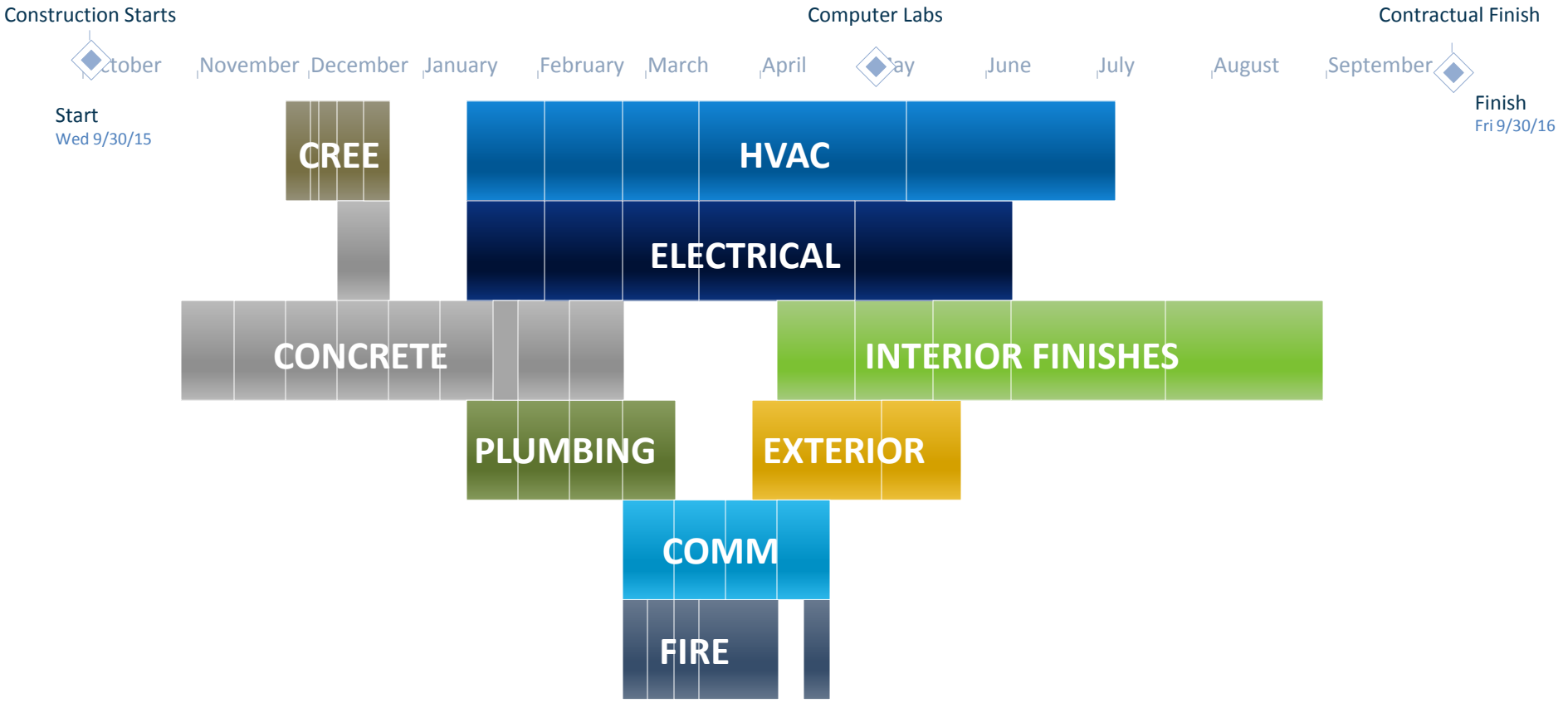
SCHEDULE – LOCATION BASED SCHEDULE (BY FLOOR)



271 Activities
6 Milestones

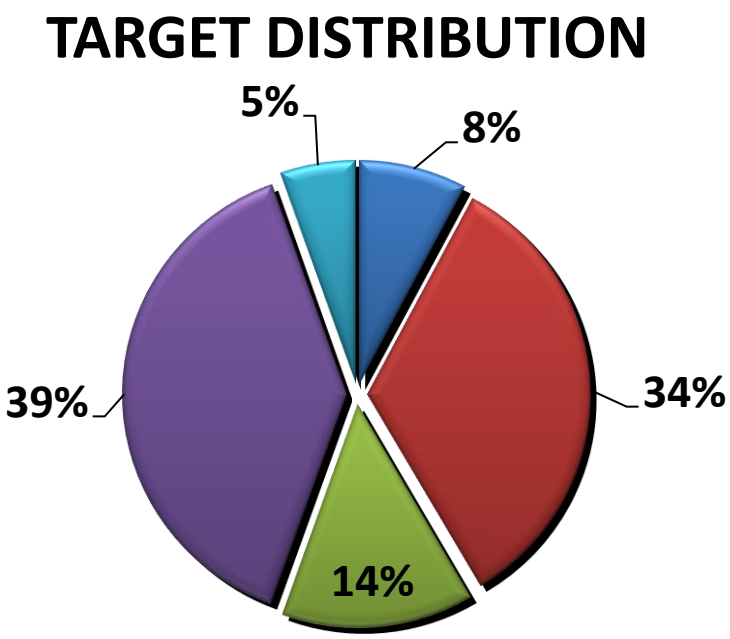
100 – GENERAL AREA
200 – ENTRANCE LEVEL
200 – 1ST FLOOR
200 – 2ND FLOOR
AUDITORIUM
ATRIUM

SCHEDULE – TRADES SCHEDULED WORK



Assuring contractors continuity in time

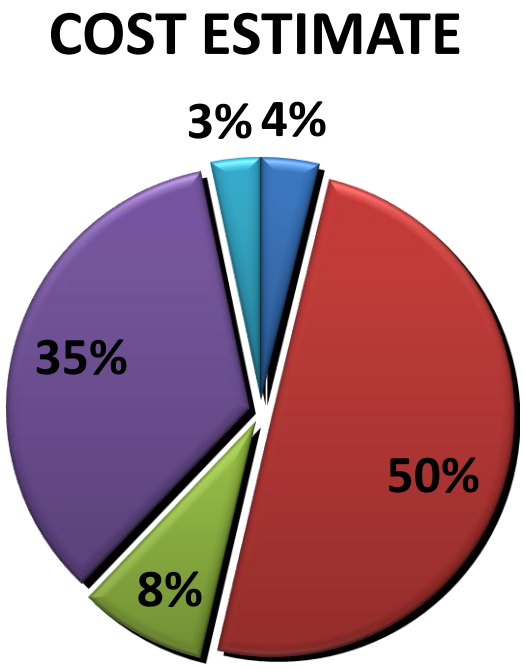
Overall Budget and Target	
Construction Grant	$8,500,000
Grant Year	2013
Construction Year	2015
Expected Inflation	2.00%
BUDGET	$8,200,000
TARGET	$7,250,000



Substructure | Shell | Interiors | Services | Sitework

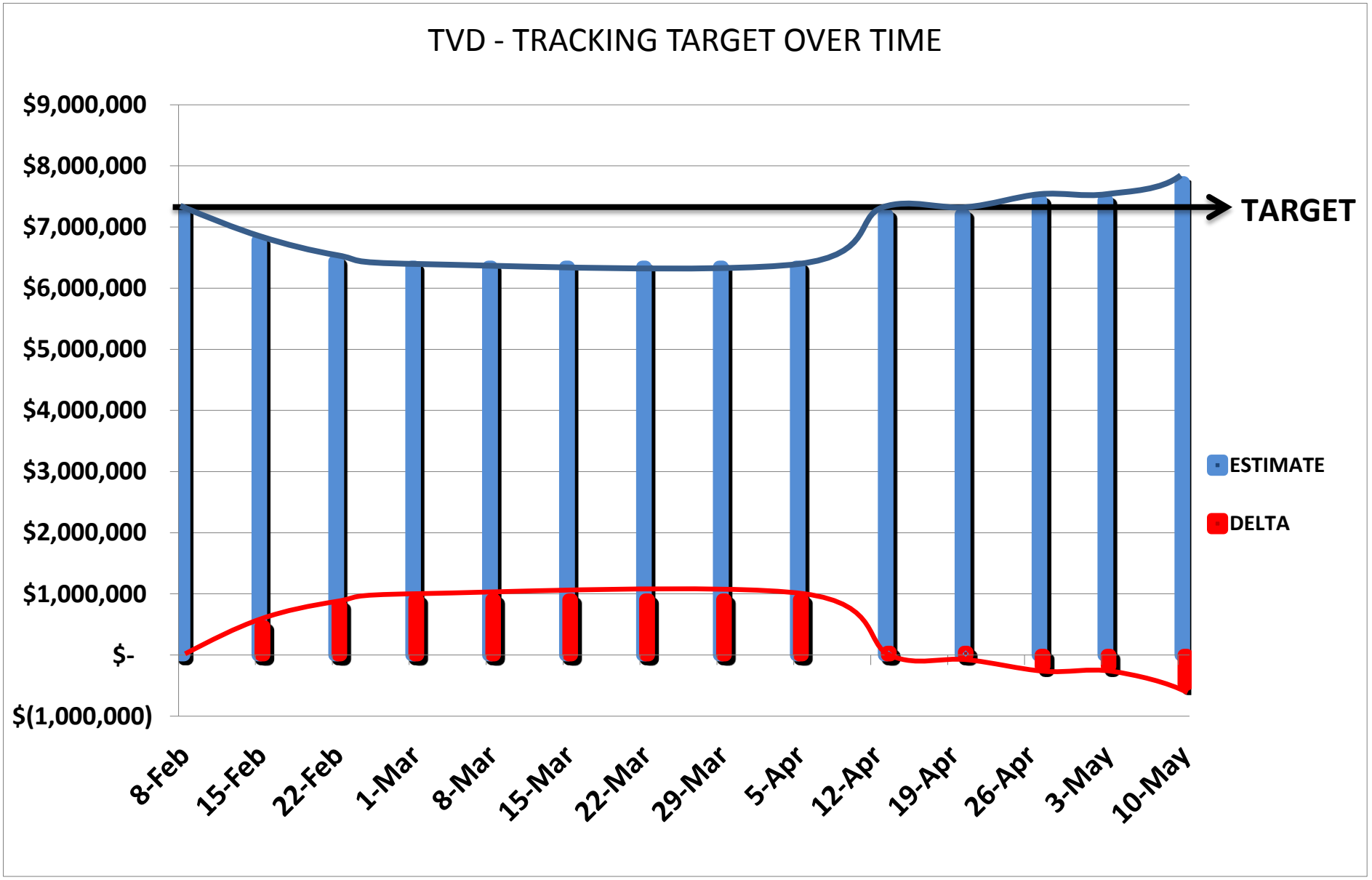
ESTIMATE VS. TARGET VALUES

ESTIMATE AND TARGET VALUE - SUMMARY			
	ESTIMATED VALUE	TARGET VALUE	VALUE DELTA
TOTAL	$7,730,000	$7,250,000	$(480,000)
Substructure	$292,000	$566,000	$274,000
Shell	$3,855,000	$2,445,000	$(1,410,000)
Interiors	$653,000	$1,012,000	$359,000
Services	$2,680,000	$2,834,000	$154,000
Sitework	$250,000	$392,000	$142,000



Substructure | Shell | Interiors | Services | Sitework

TARGET VALUE DESIGN – ESTIMATE PROGRESSION



TARGET VALUE DESIGN – ESTIMATE PROGRESSION

DATE	EVENT	ESTIMATE	DELTA
8-Feb	Target Value Set	$ 7,250,000	$ -
15-Feb		$ 6,780,000	$ 470,000
22-Feb	Crit	$ 6,439,000	$ 811,000
1-Mar		$ 6,347,000	$ 903,000
8-Mar	Winter Presentation	$ 6,347,000	$ 903,000
15-Mar		$ 6,347,000	$ 903,000
22-Mar		$ 6,347,000	$ 903,000
29-Mar		$ 6,347,000	$ 903,000
5-Apr	Fish Bowl	$ 6,347,000	$ 903,000
13-Apr	Auditorium Structural System Introduced	$ 7,200,000	$ 50,000
20-Apr	Meeting With Cree	$ 7,200,000	$ 50,000
27-Apr		$ 7,435,000	$ (185,000)
3-May		$ 7,435,000	$ (185,000)
10-May	Final Presentation	$ 7,730,000	$ (480,000)

WHY THE ESTIMATE EXCEEDS THE TARGET VALUE

CREE STRUCTURE

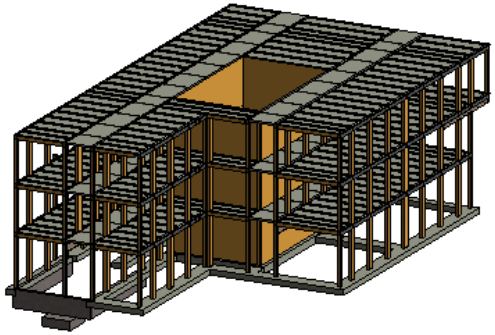
- First building of its kind
  - Inexperienced labor
  - Learning curve
- Unique cross-laminated timber core

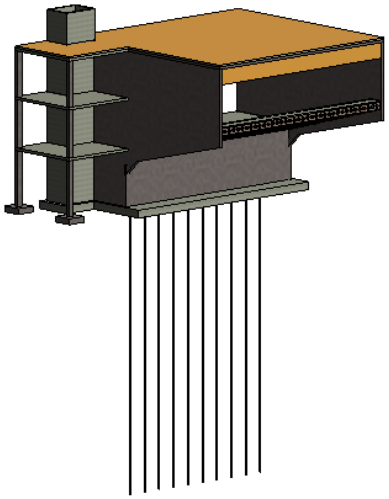
AUDITORIUM

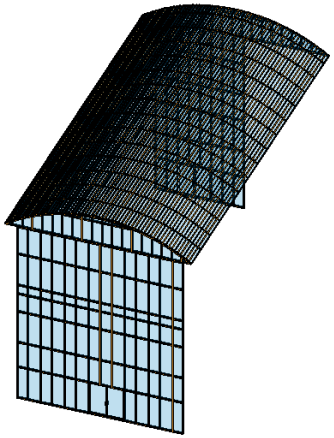
- Cantilevered auditorium
- Rooftop terrace
- Seismic challenges

ATRIUM

- Extensive use of curtain wall
- Large glazed skylight





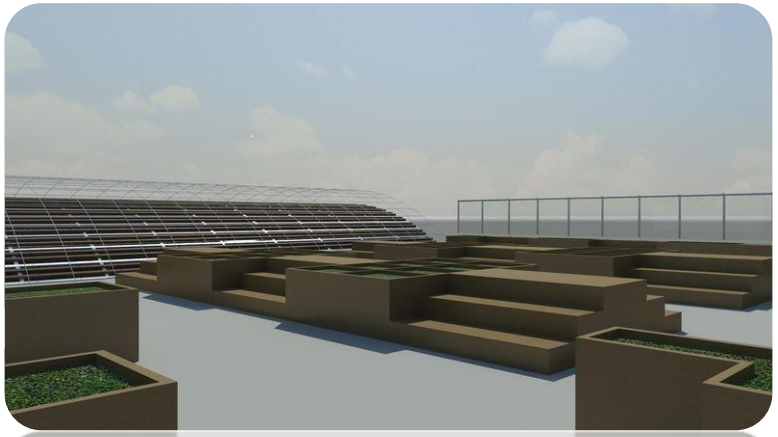


LIFE CYCLE COSTING – BIG IDEAS

BIG IDEAS TO OPTIMIZE LIFE CYCLE COSTING

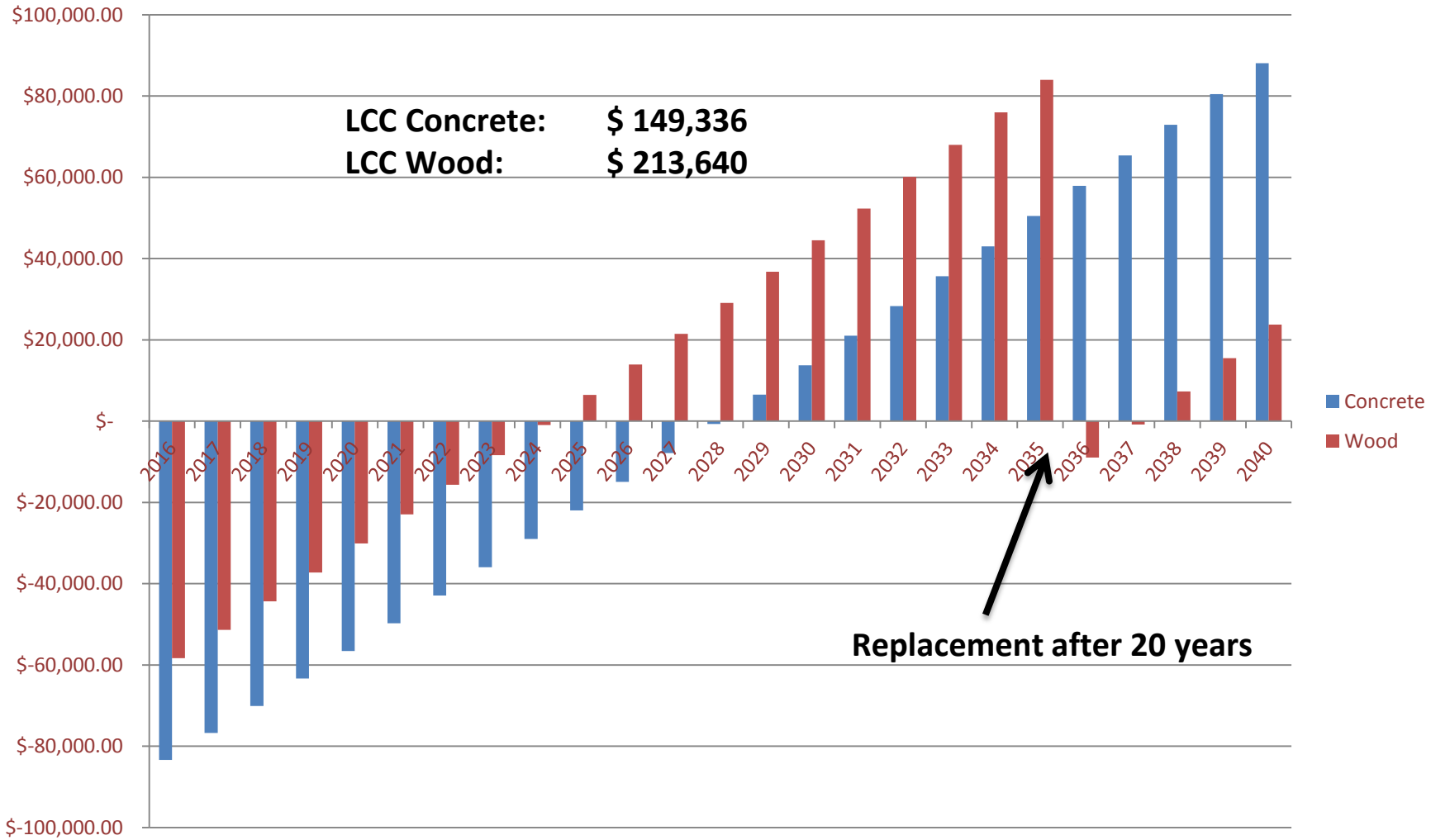
LIFE CYCLE COSTING – ROOFTOP TERRACE

LIFE CYCLE COSTING – ROOFTOP TERRACE



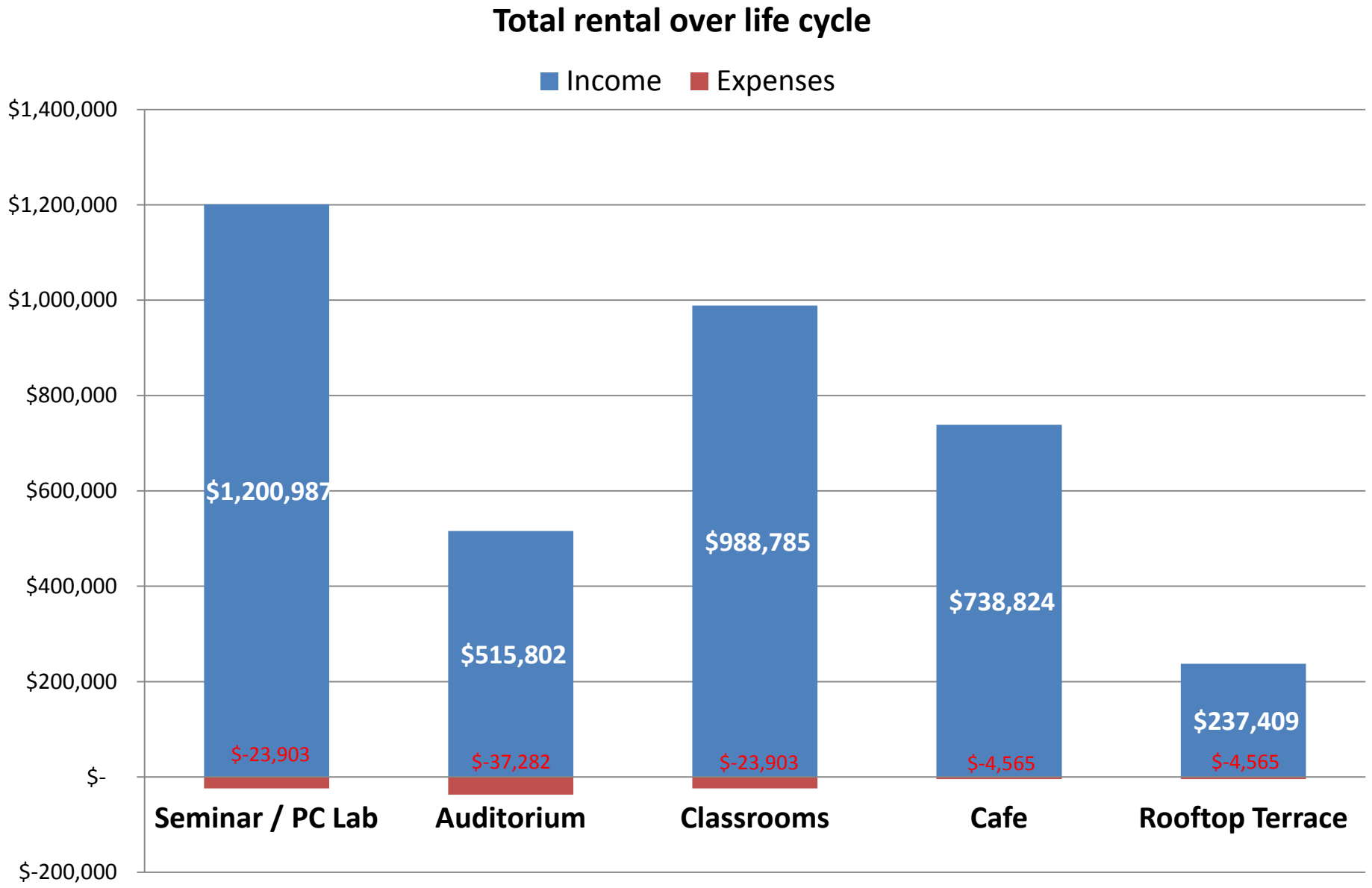
Space Efficiency	from 0.88		to 0.94 
$/Assignable SF	from $ 291		to $ 274 

LIFE CYCLE COSTING – ROOFTOP TERRACE CONCRETE VS. WOOD

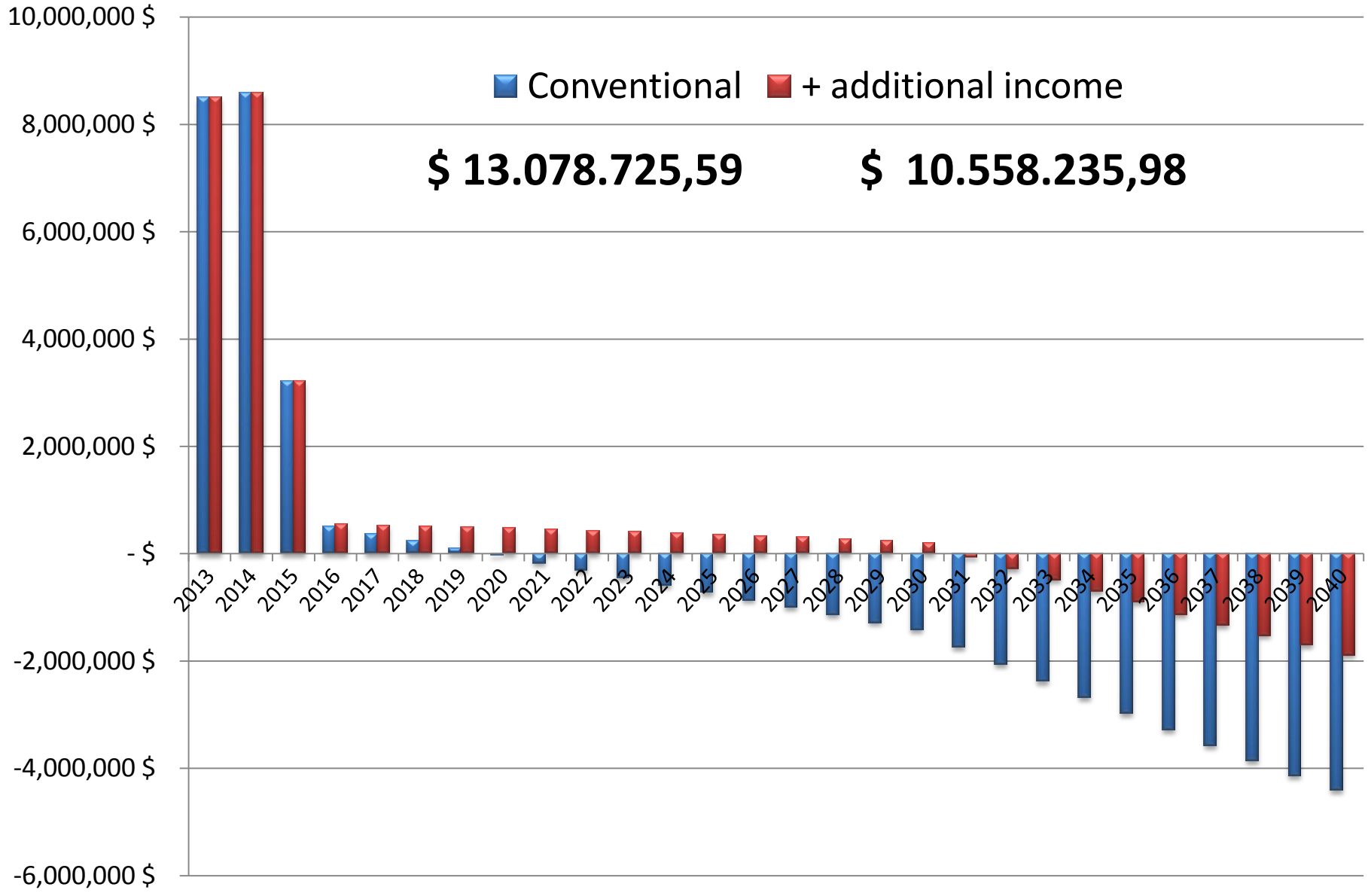


ADDITIONAL INCOME – AUDITORIUM

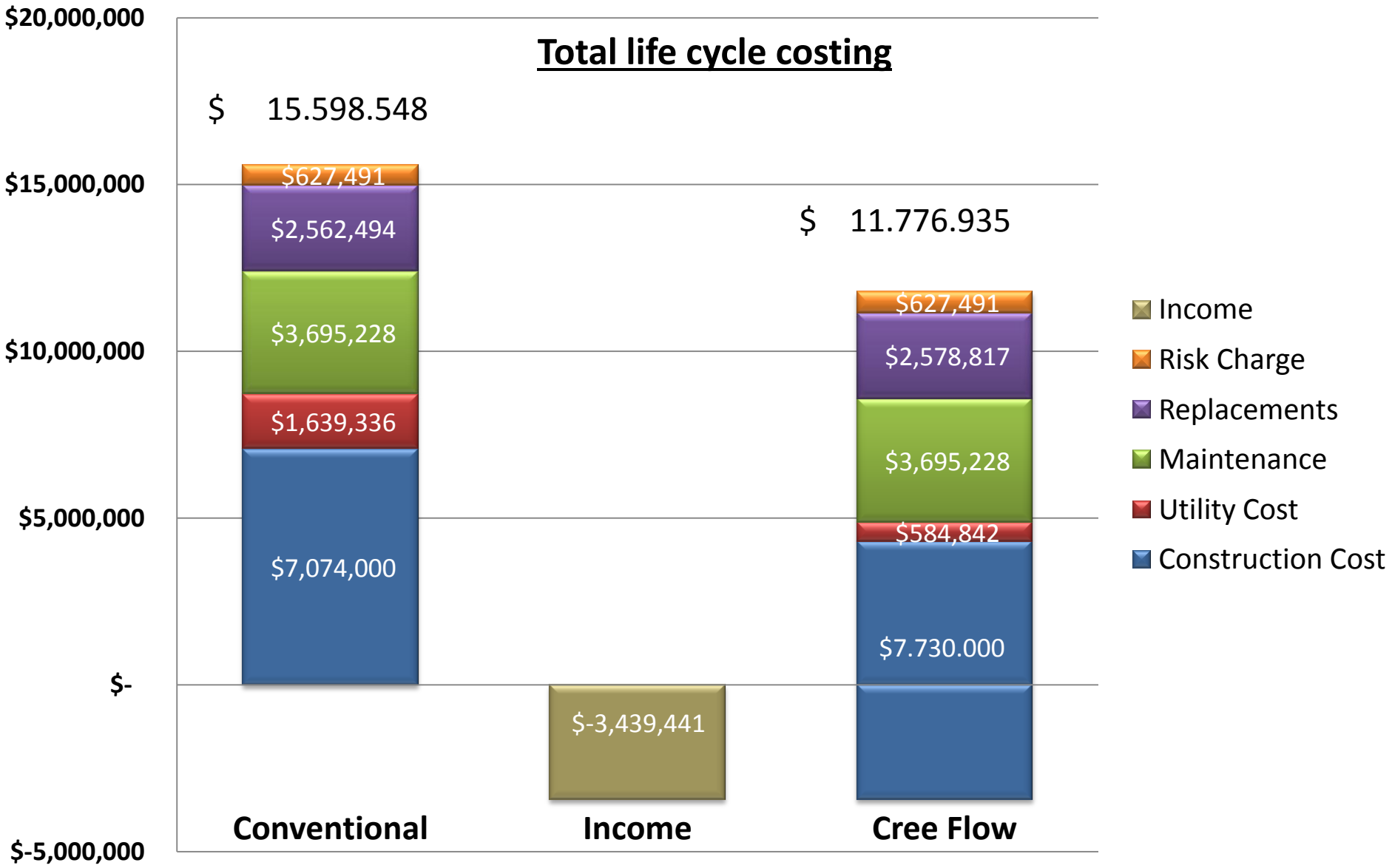
LIFE CYCLE COSTING – ADDITIONAL INCOME



ADDITIONAL INCOME – CASH FLOW (NET PRESENT VALUE)



TOTAL LIFE CYCLE COSTING



LIFE CYCLE COSTING – ROOFTOP TERRACE

ADDITIONAL INCOME – TEMPORARY CAFE

VALUE FOR MONEY

Winter Quarter

Best	★	3
Better	★	2
Good	★	1

Spring Quarter

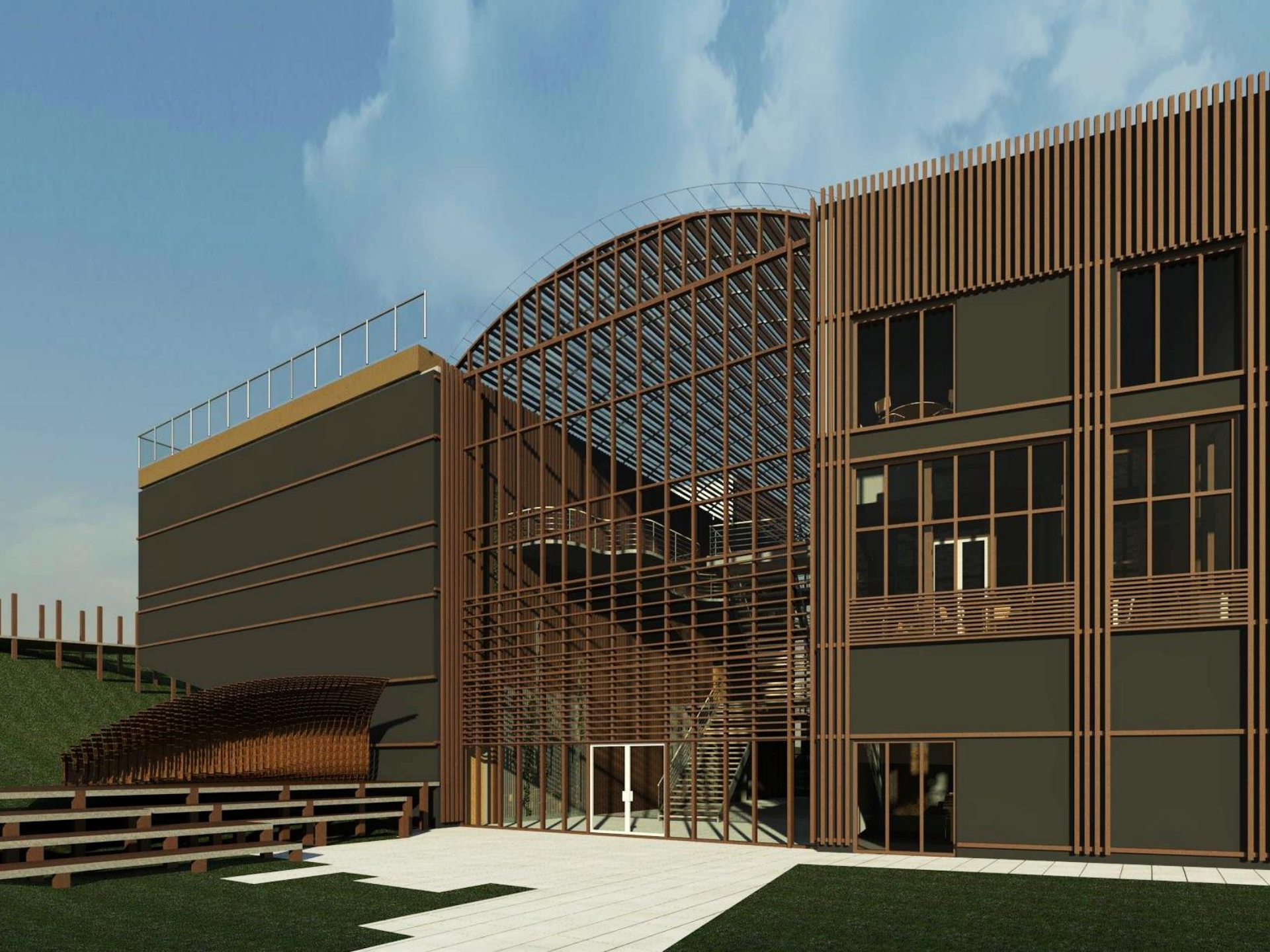
TOTAL POINTS= 13		Value for Cost	22	=TOTAL POINTS
Basic Steel Shape	★ 1	Iconic Status & Aesthetics	★ 3	CREE System, Natural Feel with Stucco and Wood, Monumental Cantilever
All program requirements met	★ 3	Meets Program Requirements	★ 3	All program requirements met
Recycled Steel	★ 1	Sustainability	★ 3	LEED Gold, CREE System, Reduced CO_2, Less Wasted Material
Daylighting and Trickle Ventilation	★ 2	Quality of Indoor Space & Comfort	★ 3	Large atrium, Rooftop Terrace, Daylighting, Warmth of Wood
Bike Path Skybridge	★ 1	Connection to Campus	★ 2	Bike Path Skybridge, Stucco/Wood façade, Temp. Café Competition
Stays within footprint and meets basic assignable SF	★ 1	Space Efficiency	★ 2	Rooftop terrace, cantilevered auditorium, widened atrium
Open collaboration space inside	★ 2	Promotes Colaboration & Innovation	★ 3	Large Atrium, Rooftop Terrace, Temporary Cafe
Modular Steel Erection and Early Computer Access	★ 2	Constructability	★ 3	CREE Modularization, Schedule Streamlined, Early Computer Lab Access

Little Effort…

- Known Materials and Tools
  - Wood
  - Concrete
  - Transportation
  - Connections
  - Local materials

…Big Impact

- Simplicity
- Rapidly erected and enclosed
- Completely renewable
- More efficient use of materials



TEAM REFLECTIONS

Bjarke

"The integration of all the professions early is extremely difficult, but well worth it in the end"

Donata

"Getting insight on other discipline's driving ideas for design furthers understanding of how to best integrate everything to achieve a balanced building design"

Mike

"It is important to embrace criticism and respond to it in our subsequent design iterations"

Ethan

"Change is part of design. Don't let it stop progress and trying new things"

Enrique

"Working with people is hard, working with incredibly talented people is even harder; ***but/and*** *in the end that is what makes the entire experience worth it and your final product better"*

Nolan

"Increased integration among all parties involved in the project's development not only results in a better design, but a shared sense of responsibility and pride as well"

Sijia

"Different cultural backgrounds benefited teamwork greatly by providing diverse and collaborative personalities, along with new ideas"

ACKNOWLEDGEMENTS

WE WANT TO THANK

OUR INDUSTRY MENTORS

Kyle Adams
David Bendet
Geoff Bomba
Eric Borchers
Fernando Castillo
Armin Dariz
Greg Luth
John Nelson
Nabih Tahan
Bryce Tanner
Brandon Sullivan

OUR OWNERS

Karolina Ostrowska
Michael Seaman
Lauren Scammell

OUR UNIVERSITY MENTORS

Renate Fruchter
Fernando Castillo
Norman Hallermann
Willem Kymmel
Andreas Leps
Eduardo Miranda


THANK YOU !