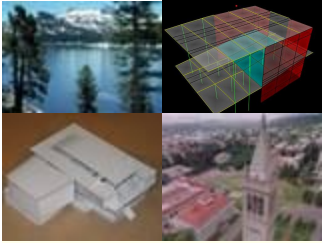




***Ridge Team 2003
Spring Quarter Presentation***



TEAM MEMBERS

TIPPING · MAR
+ associates



Joel Villamil
Owner



Jack Kim
Architect



Andy Essary



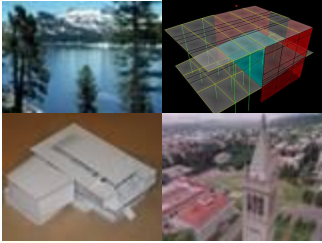
Ines Lam

Engineers



Oliver Hanke

Construction Manager



Revisit Global Context: Tahoe City

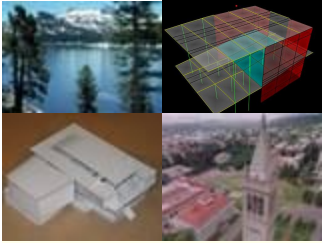


Climate:

- Average Temperature: 43 F
- Range: 30.5 F to 53 F
- Avg. Annual Precipitation: 32 in

Activities:

- Skiing/Snowboarding
- Hiking/Camping
- Water Activities

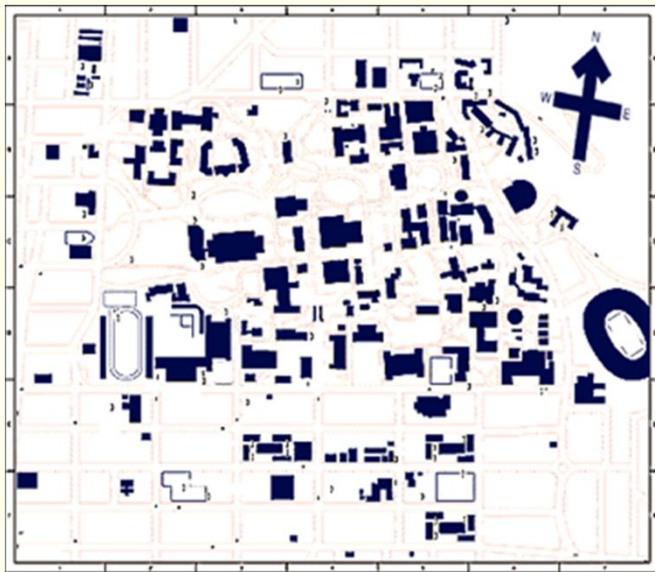


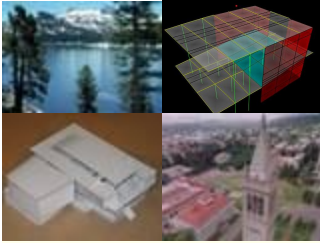
Revisit Local Context: UC Berkeley

ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT



An eclectic “mishmash” of architectural styles





Site Constraints and Project Considerations

LOADS

Dead Loads:

Steel Structure:

- Steel Deck: 55 psf
- Framing: 15 psf

Concrete Structure:

- Deck: 60 psf
- Framing: 45 psf

Superimposed:

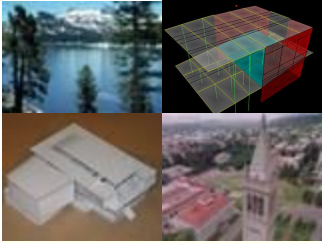
- MEP/Part. Etc: 35 psf
- Façade: 20 psf

Live Loads: (From ASCE-7)

- Office/Classroom: 50 psf
- Auditorium: 80 psf
- Computing/Labs: 100 psf
- Corridors: 100 psf
- MEP Rooms: 200 psf
- Roof Snow: 200 psf

Seismic Loads: (UBC 1997)

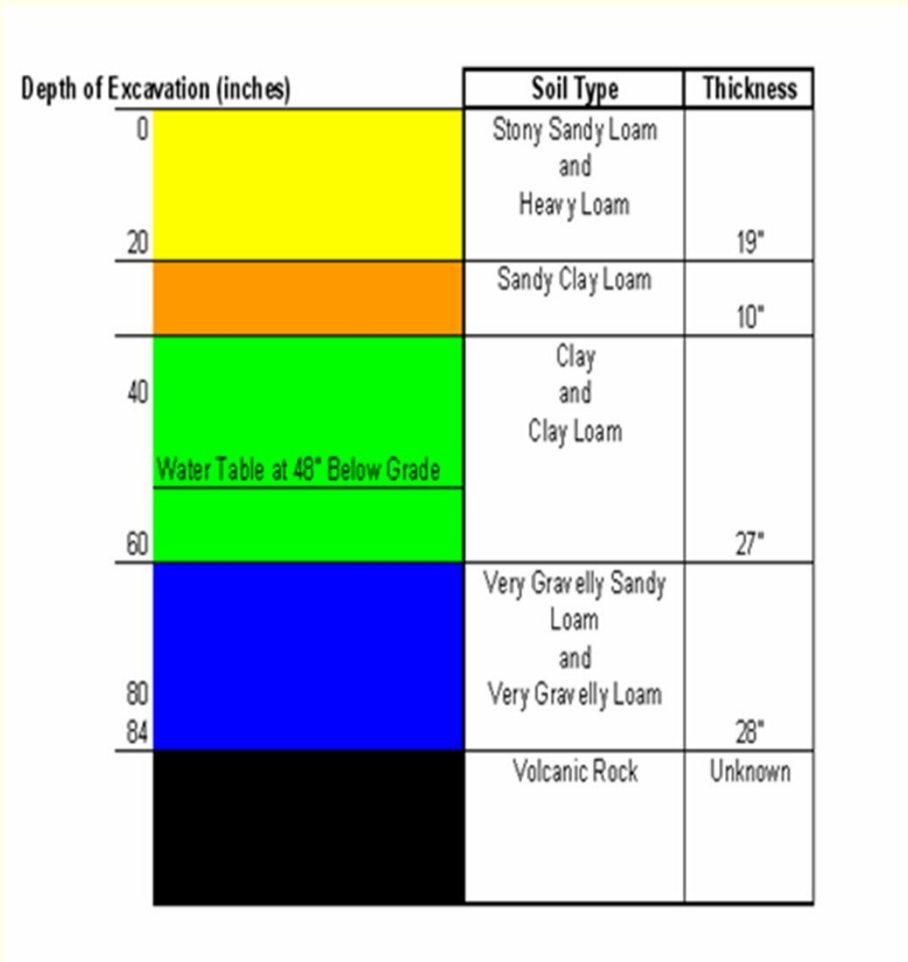
- Seismic Zone: 3

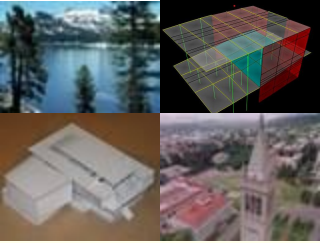


Site Constraints and Project Considerations

SOIL PROFILE

- Frost line at 4' below grade (1500 psf Bearing)
- Bearing Capacity of 5000 psf at 5' below grade and 8000 psf at 7' below grade





Site Constraints and Project Considerations

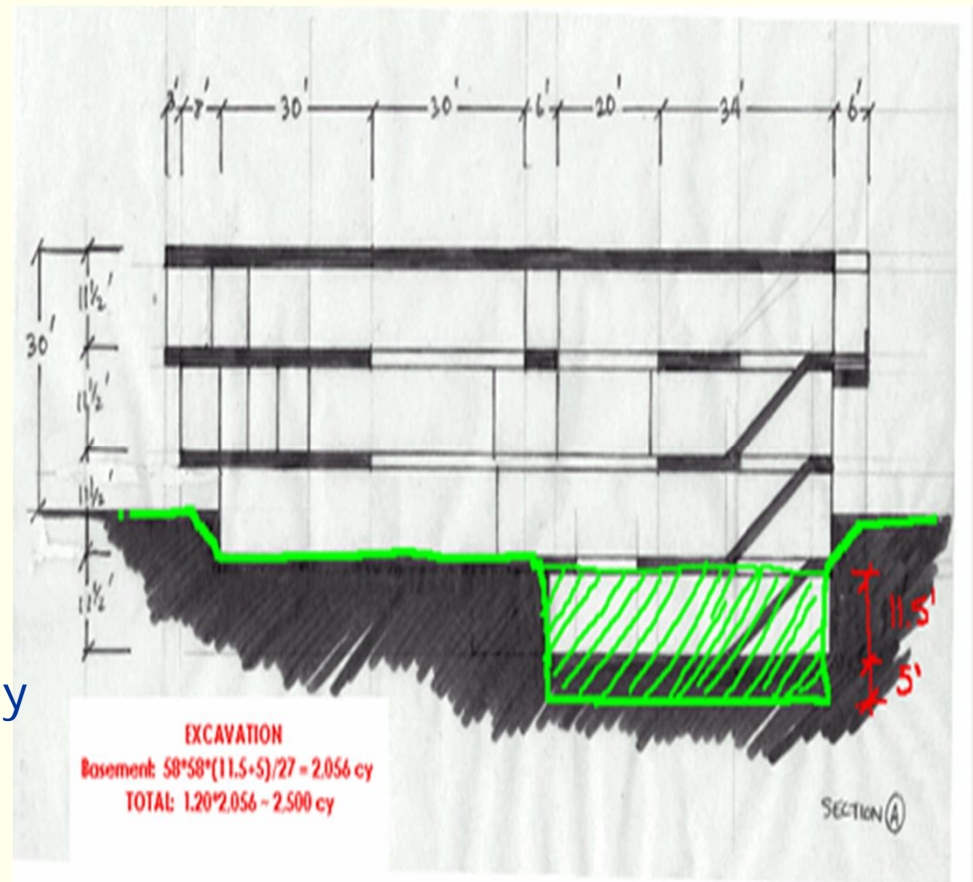
Mountain and Water Excavation

Account for Existing Basement

Reduced excavation: **2,800 cy**

The Challenge

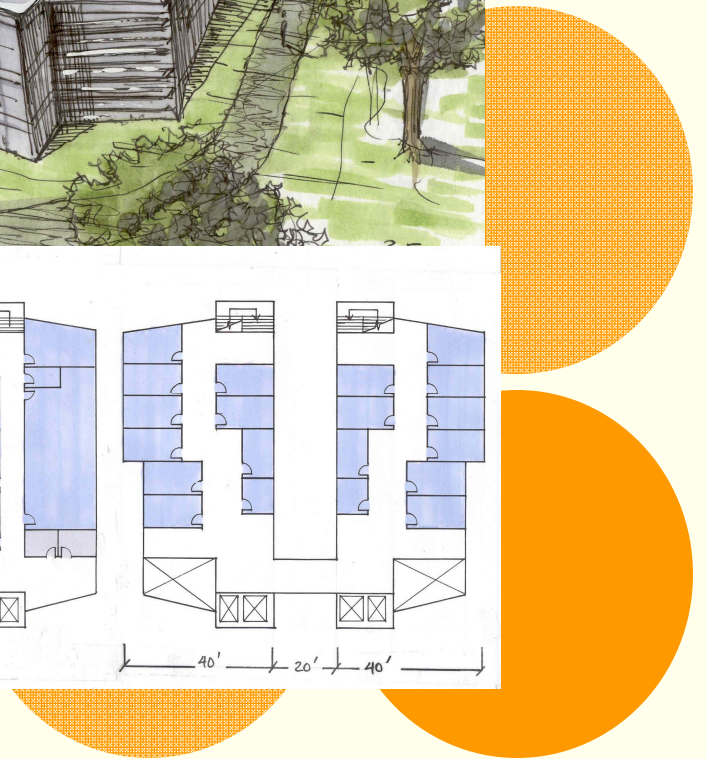
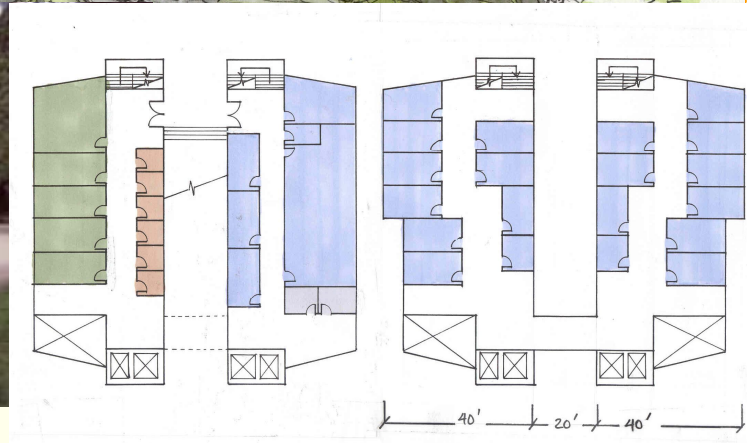
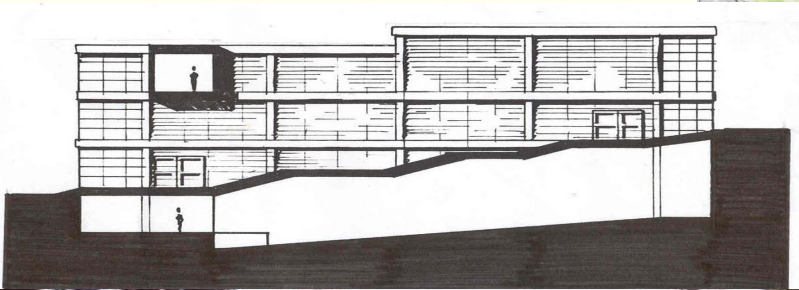
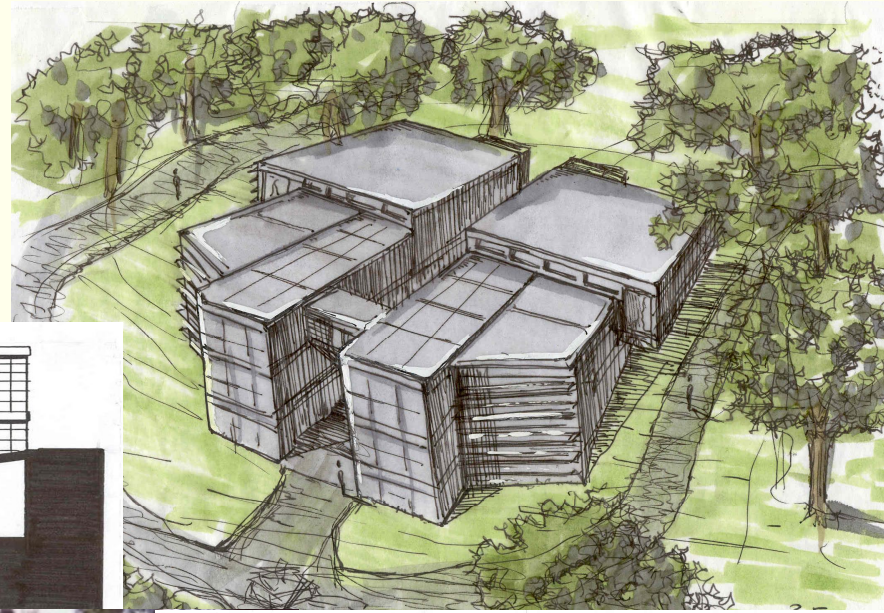
- Closed shell before Christmas
- Provide the computer lab in May 2016
- Fast delivery of the building



Winter Design Alternatives

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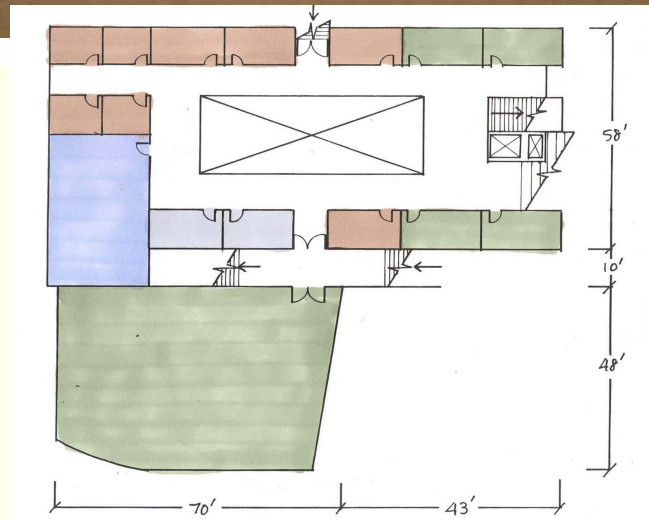
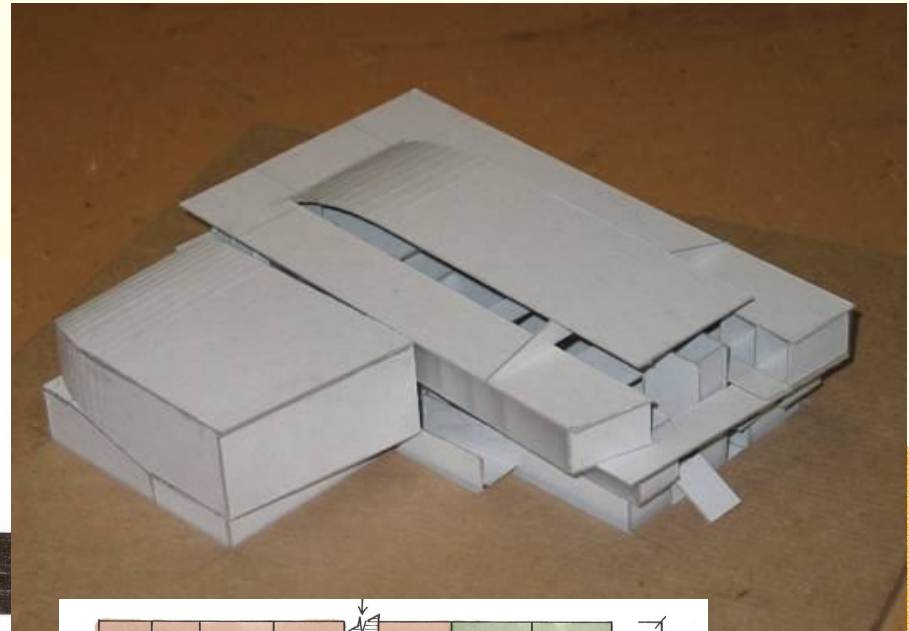
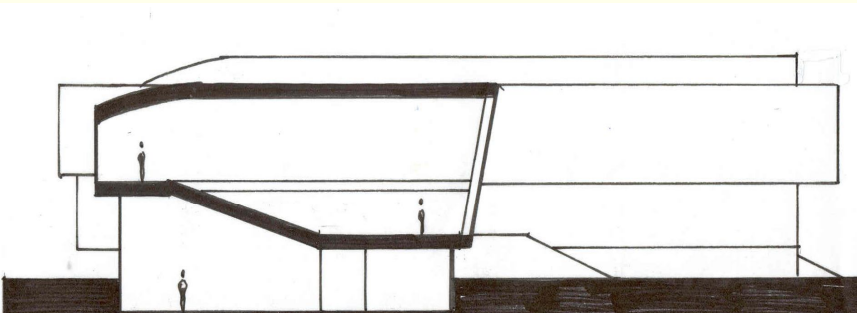
Mountain Path

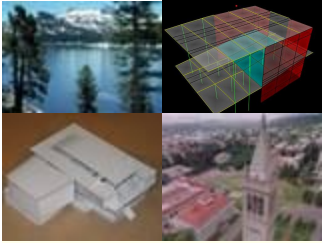


Winter Design Alternatives

ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

Mountain & Water





Winter Design Alternatives – Pro/Cons

PROs

CONs

Mountain Path

- Building as icon
- Ductile structure
- Cost efficient solution
- Interaction of Structure and Architecture

- Unremarkable interior spaces
- Large auditorium span
- Large transfer and walkway loads
- Large amount of excavation

Mountain & Water

- Spatially exciting
- Little structural interference
- Faster construction
- Owner's Preference

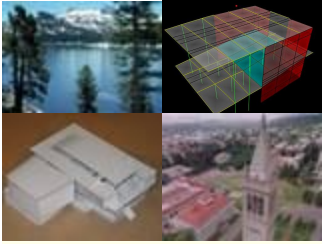
- Less than optimal zoning
- Intensive detailing
- MEP challenges
- Interrupted sightlines

Decision Matrix

Ridge 2003 Schematic Decision Matrix

	Mountain Path-- Steel	Mountain Path-- Concrete	Mountain & Water-- Steel	Mountain & Water-- Concrete
Cost	1	2	3	4
Delivery Time	1	3	2	4
Computer Lab Delivery Time	2	4	1	3
Building Enclosure	1	3	1	3
Architectural Statement	3	4	2	1
LEED Implementation	3	4	2	1

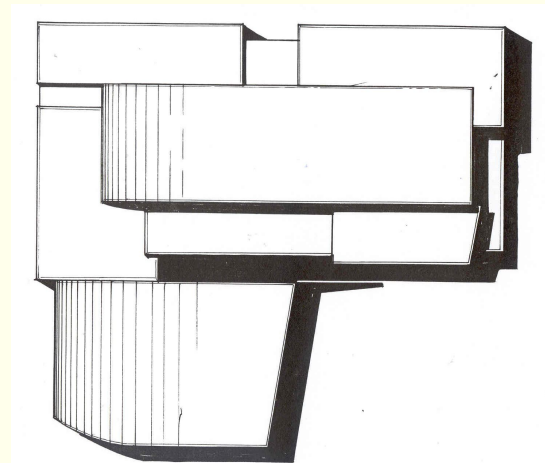
	Mountain Path-- Steel	Mountain Path-- Concrete	Mountain & Water-- Steel	Mountain & Water-- Concrete
Site Impact	4	2	2	1
Constructability During Winter	1	3	2	4
Owner's Preference	3	4	2	1
Team's Preference	2	4	3	1
Total	21	33	20	23

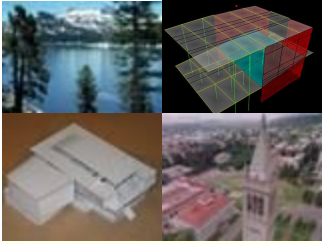


Considerations for Design Development

WINNER → MOUNTAIN AND WATER – STEEL DESIGN

- Provide bay spacing that works with architecture and structure
- Create balance between façade and exposed structure by using metallic panels
- Create greater balance of footprint within site context
- Use excavated soil as part of the site design
- Use trees to reduce the air condition requirements

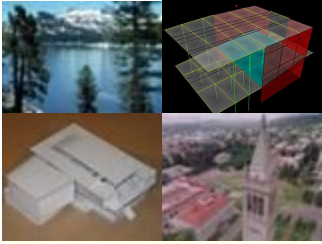




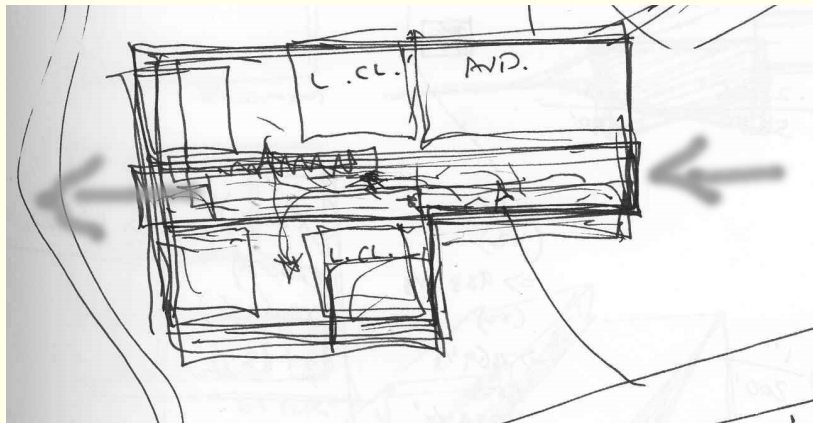
Mountain and Water: Site band Circulation



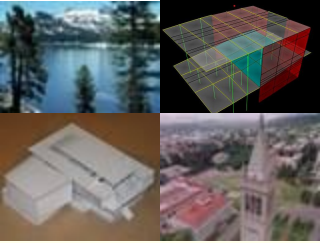
- Heavy vegetation;
limited sight lines
- 4-6 feet change in
elevation
- Stream to N



Mountain and Water: Concept

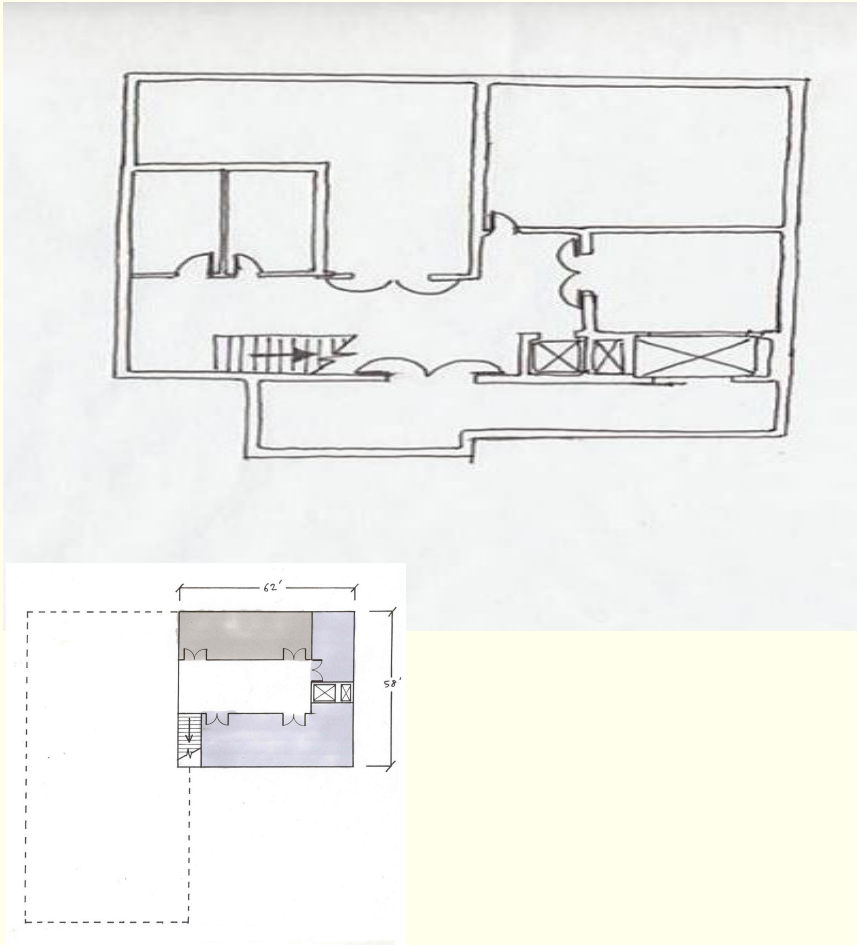


- The dual nature of mountain and water
- the solid and the void
- mass and air

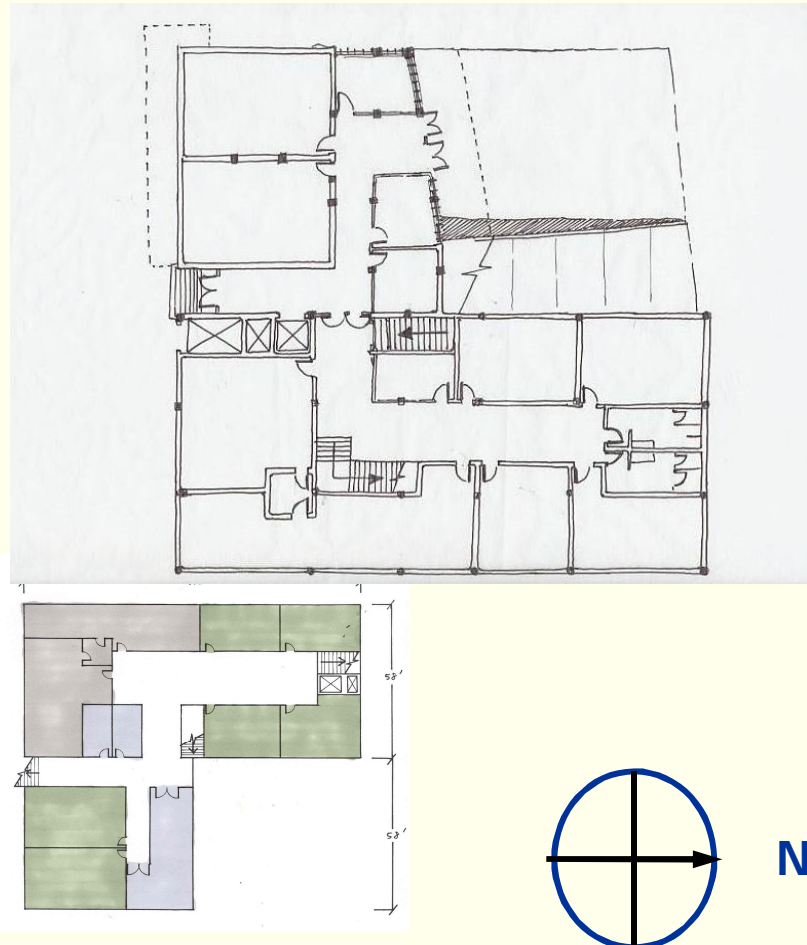


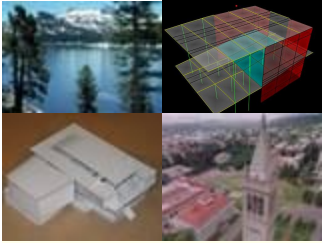
Mountain and Water: Plans

Basement



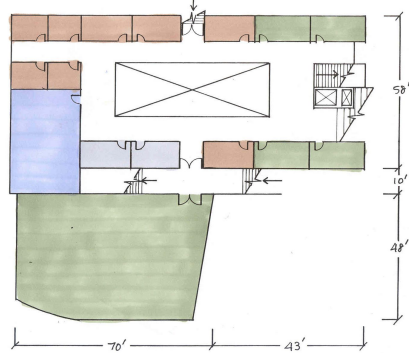
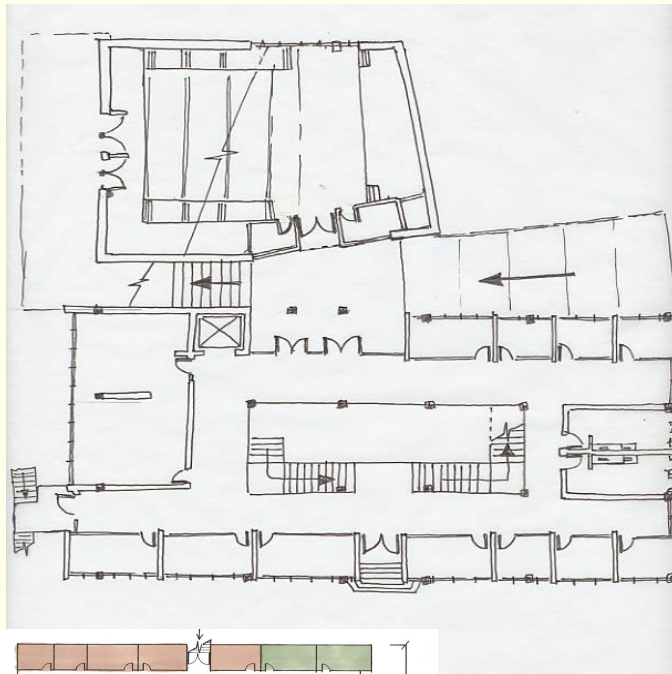
Ground Floor



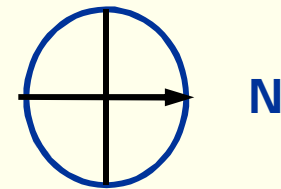
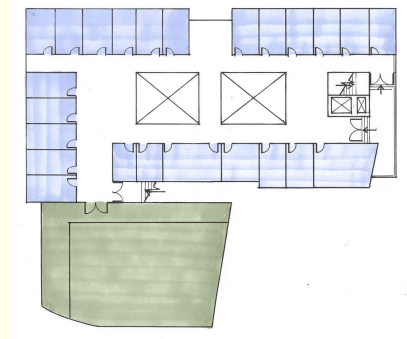
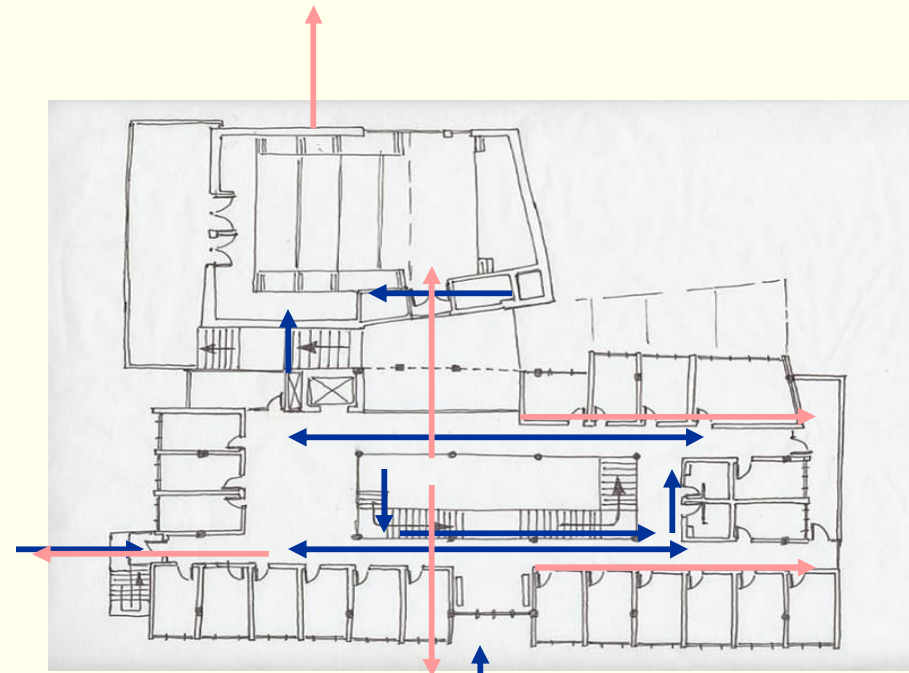


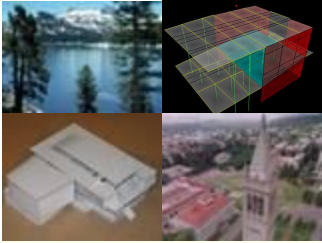
Mountain and Water: Plans

First Floor



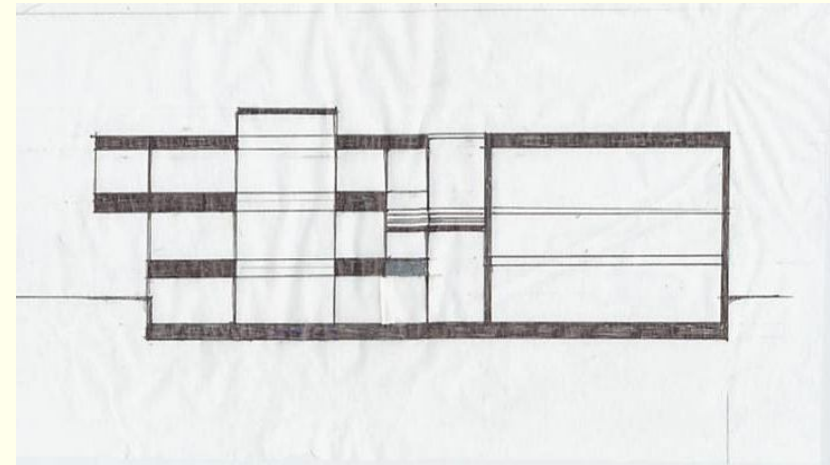
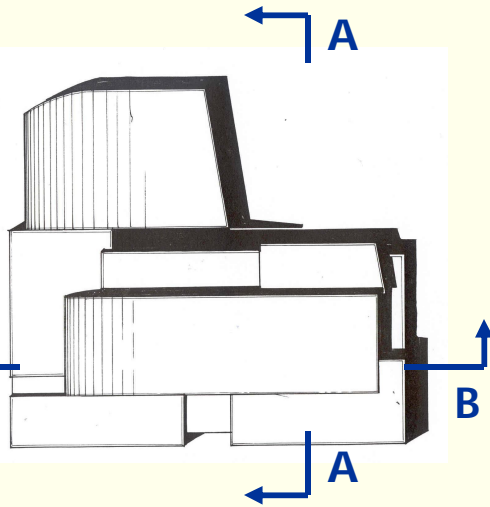
Second Floor



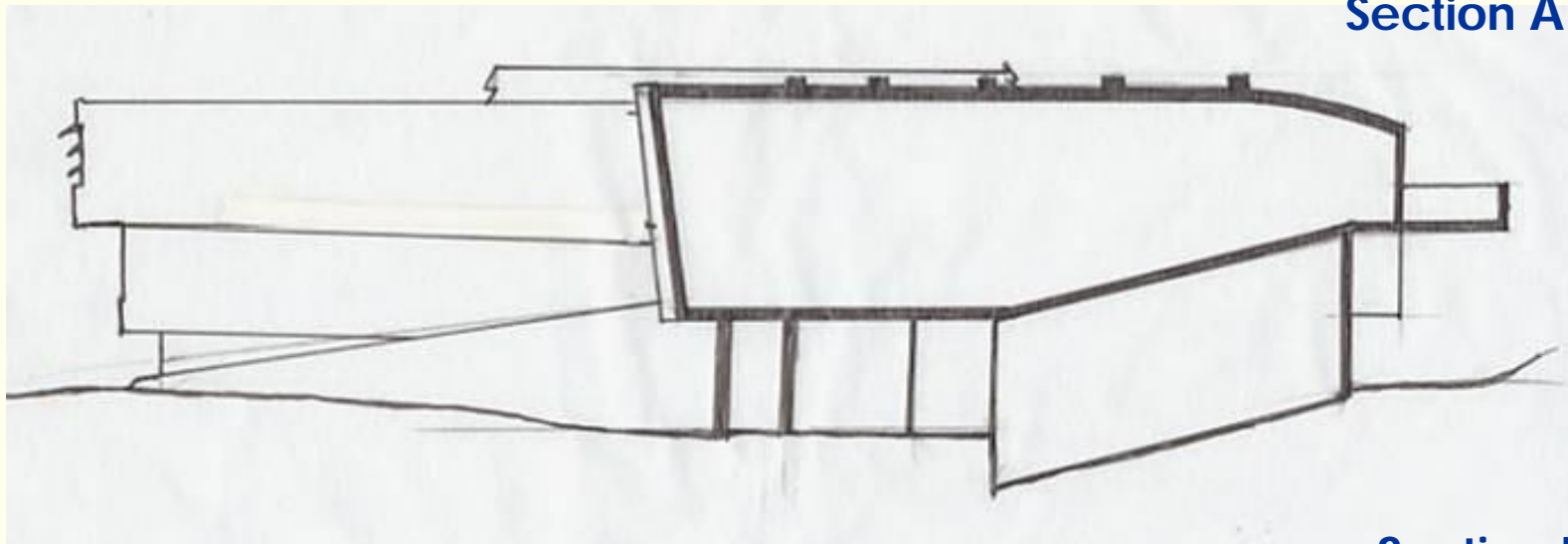


Mountain and Water: Sections

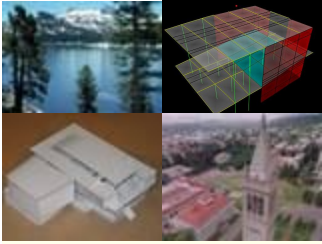
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Section A

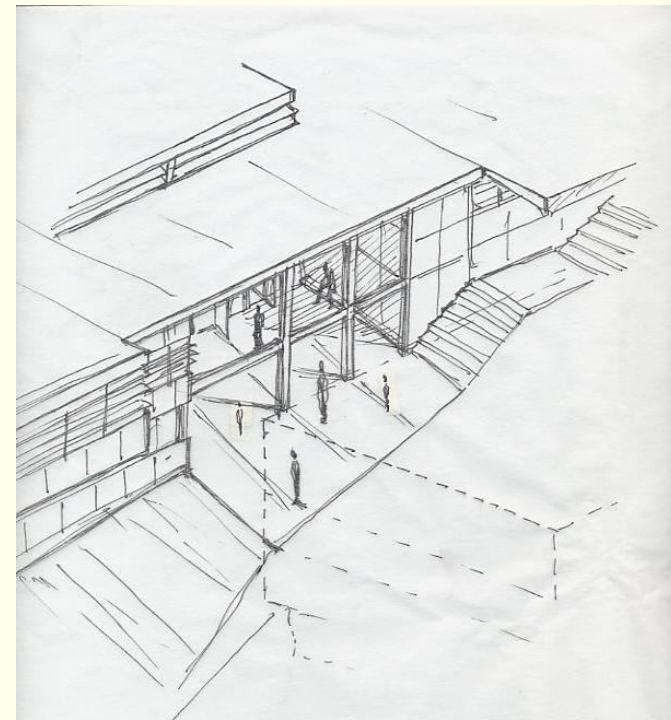
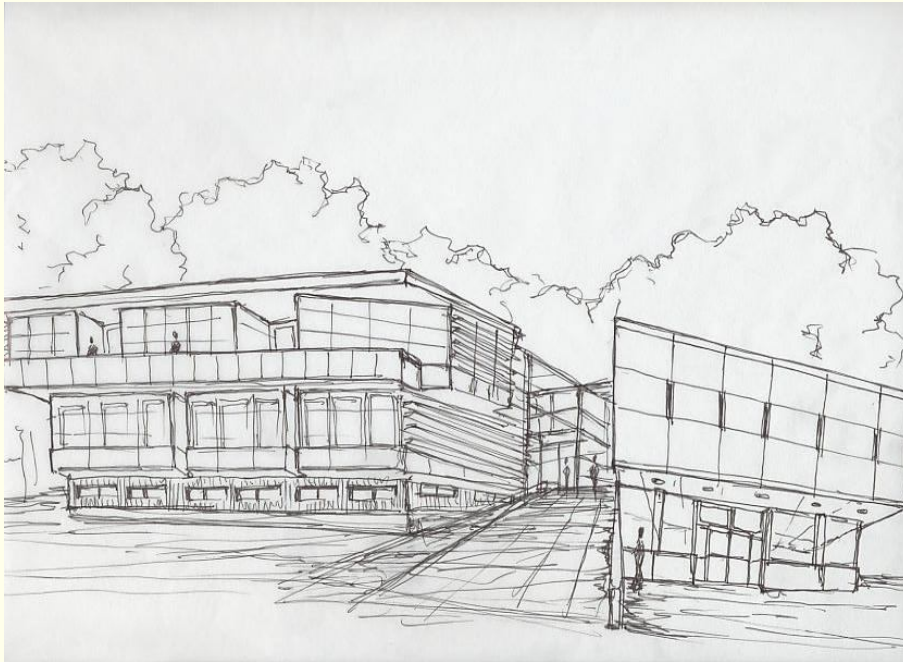


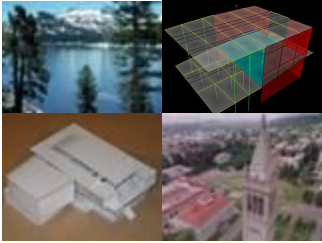
Section B



Mountain and Water: Exterior Views

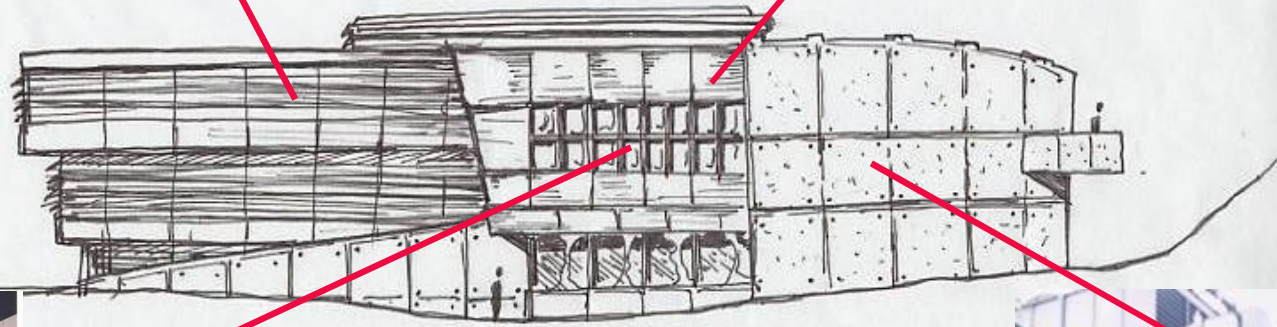
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

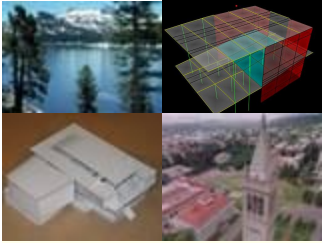




Mountain & Water Façade Materiality

ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

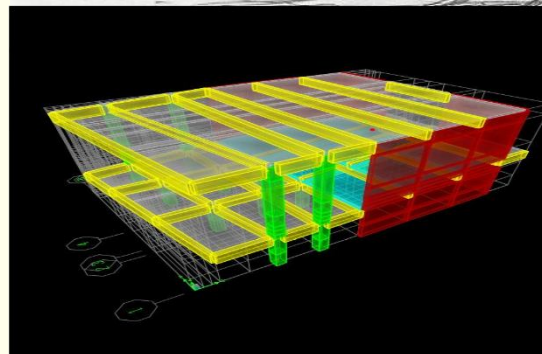
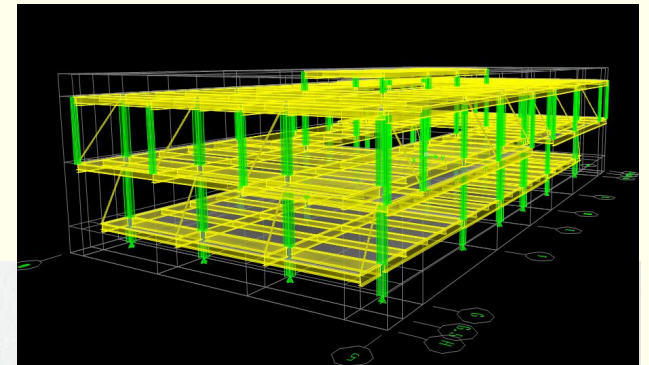
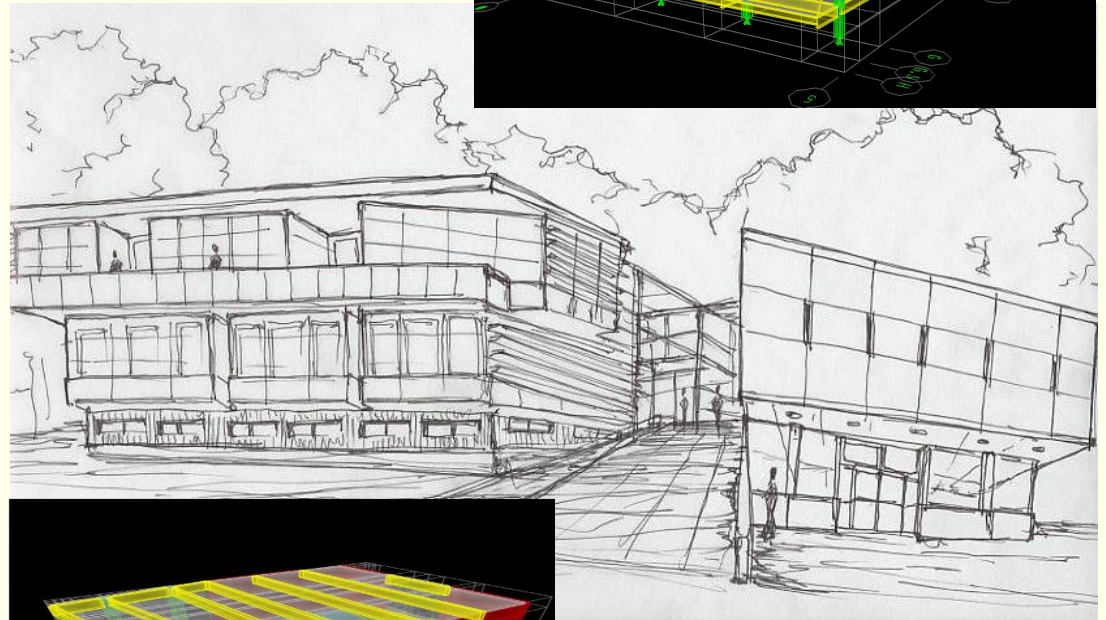


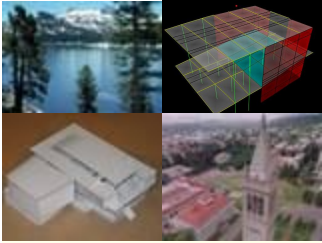


Mountain & Water Structural

Design Broken into Two Independent Structures

- Education Wing— Steel Structure
- Auditorium Wing— Concrete Structure
- Linked by Seismically Isolated Ramp
- Shared Foundation and Basement





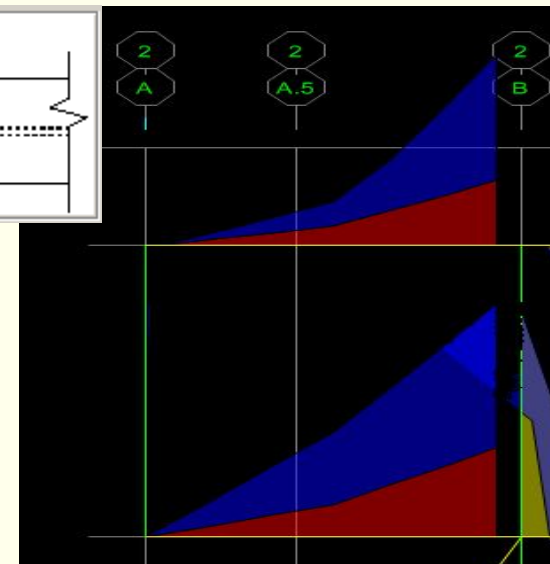
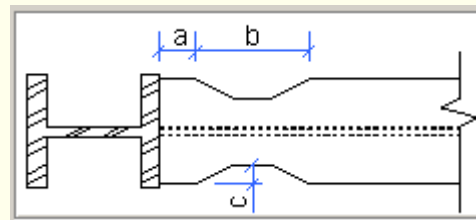
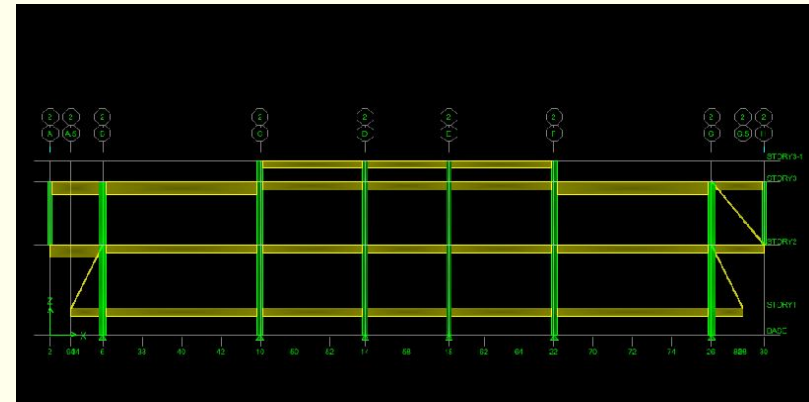
Mountain & Water Structural

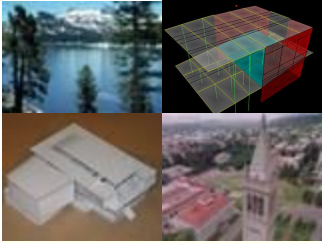
Education Wing

- Spread Footing with Bearing/Retaining Wall at perimeter
- Standard Beam/Girder Gravity System
- SMRF Lateral System with Reduced Beam Sections

Design Challenges

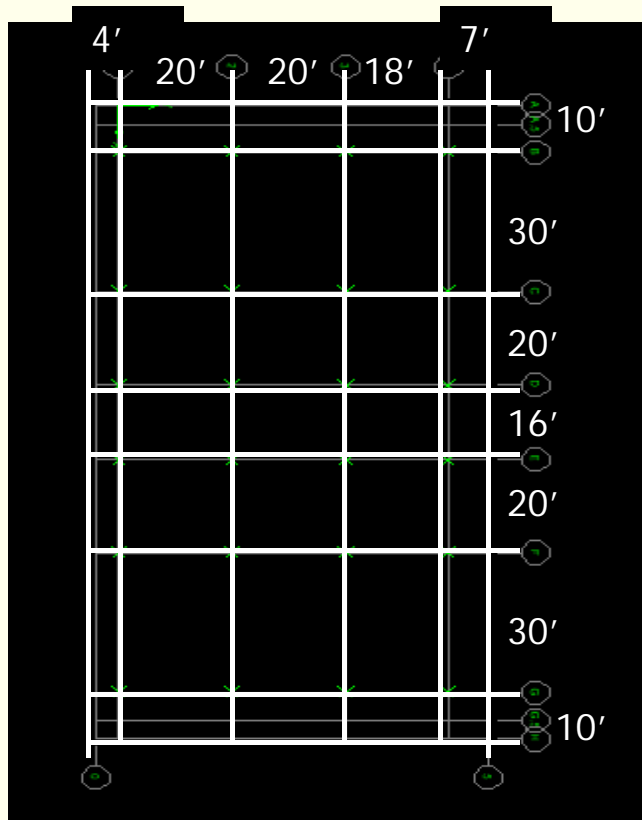
- Reduce Moment connections due to cantilevered areas per owners request



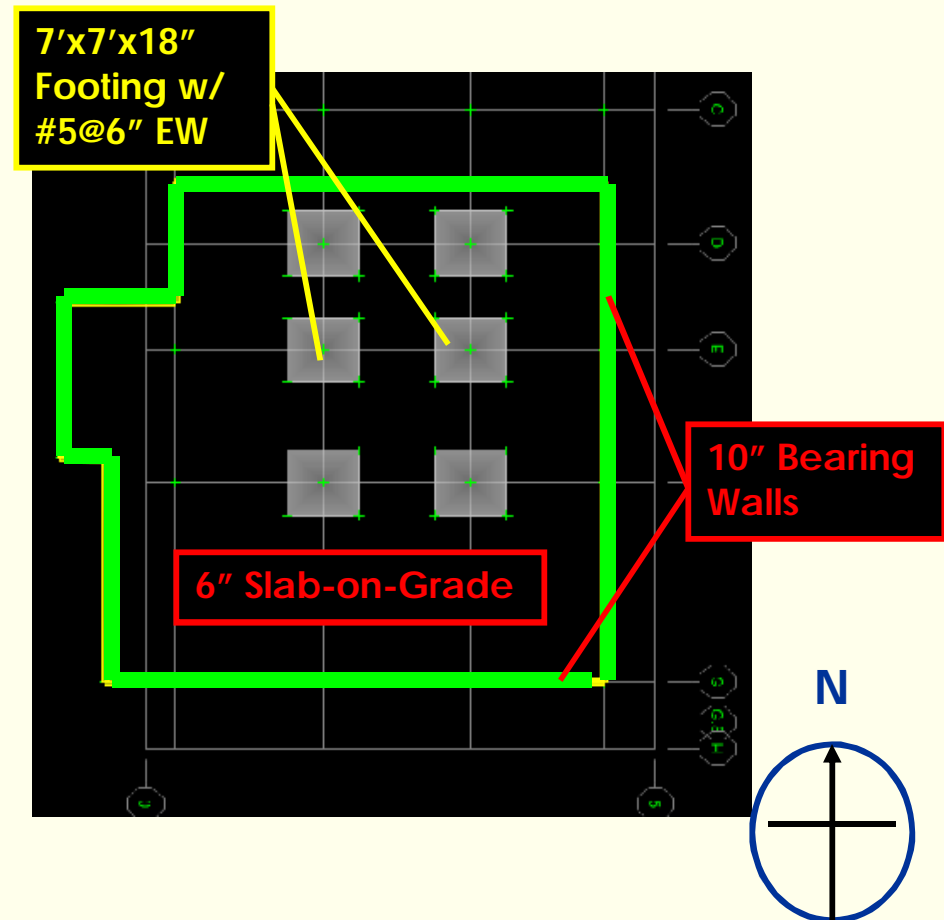


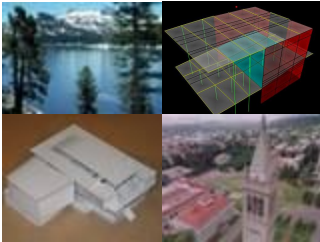
Mountain & Water Structural Education Wing

Structural Grid



Foundation Plan



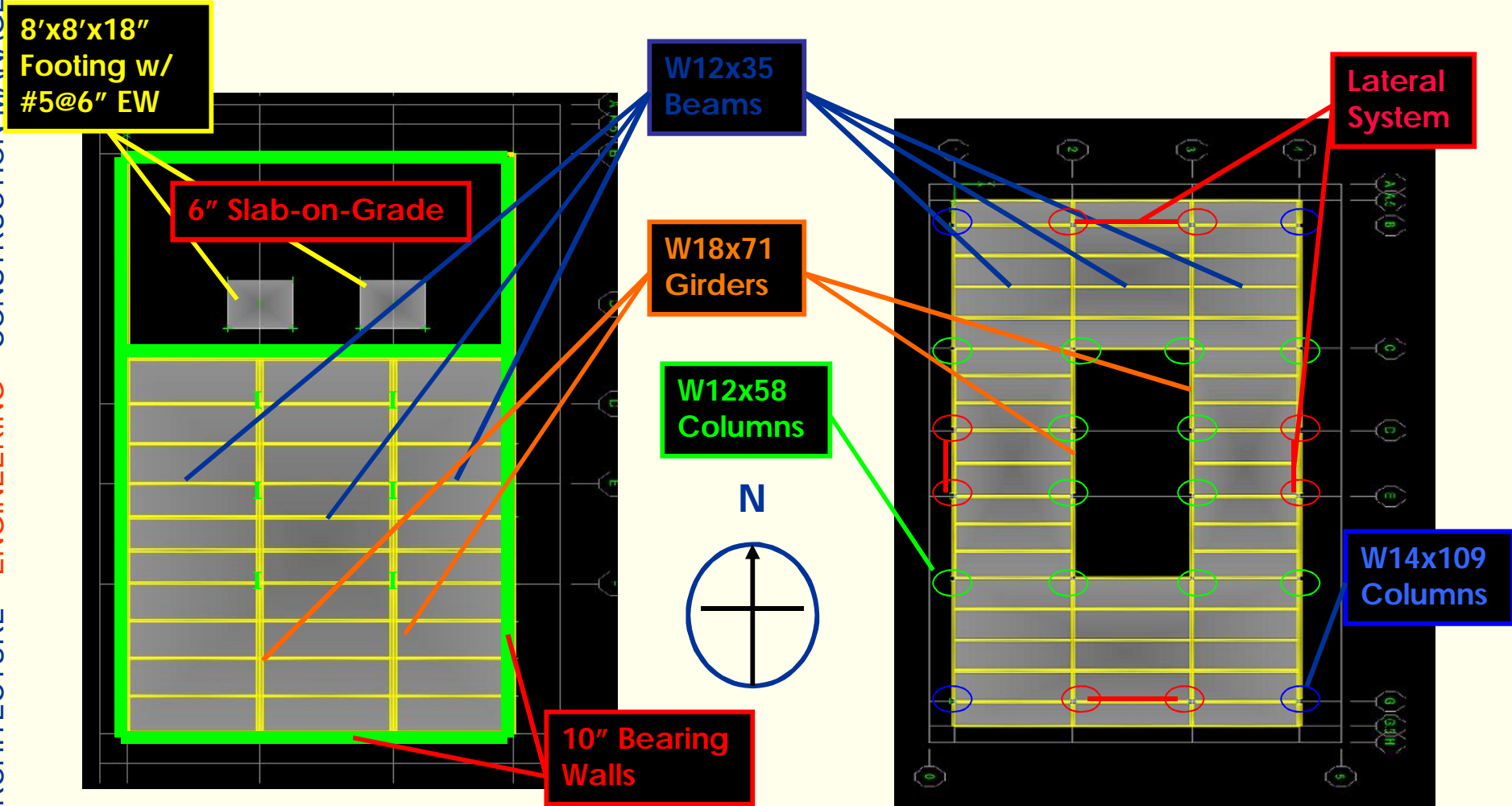


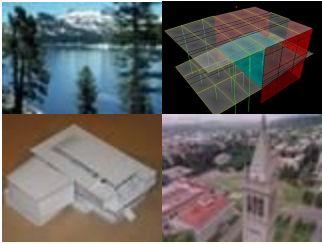
Mountain & Water Structural Education Wing

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Ground Floor Plan

First Floor Plan



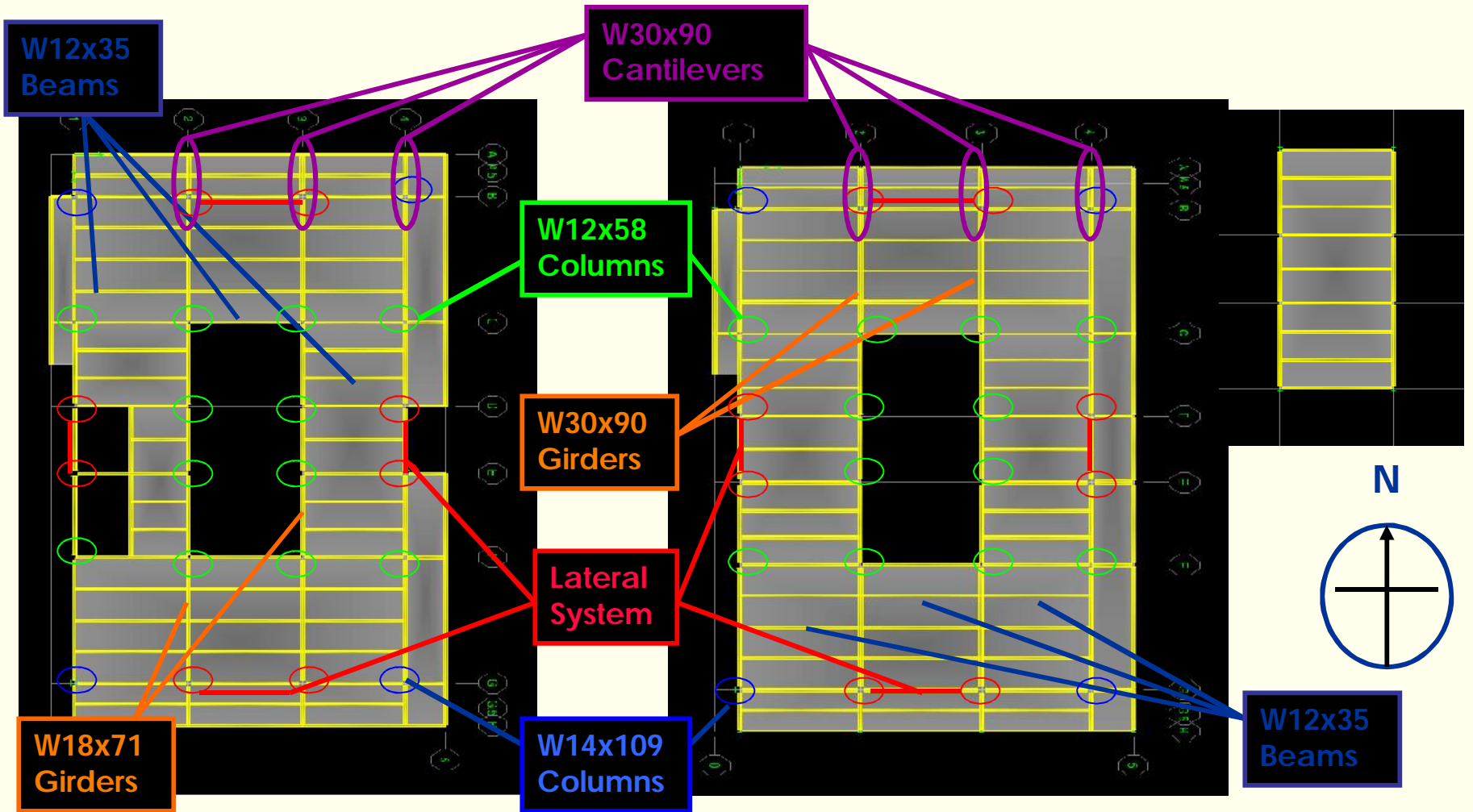


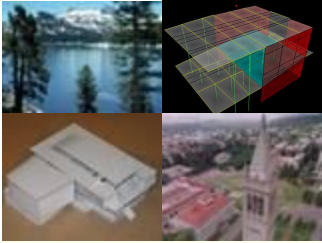
Mountain & Water Structural Education Wing

ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

Second Floor Plan

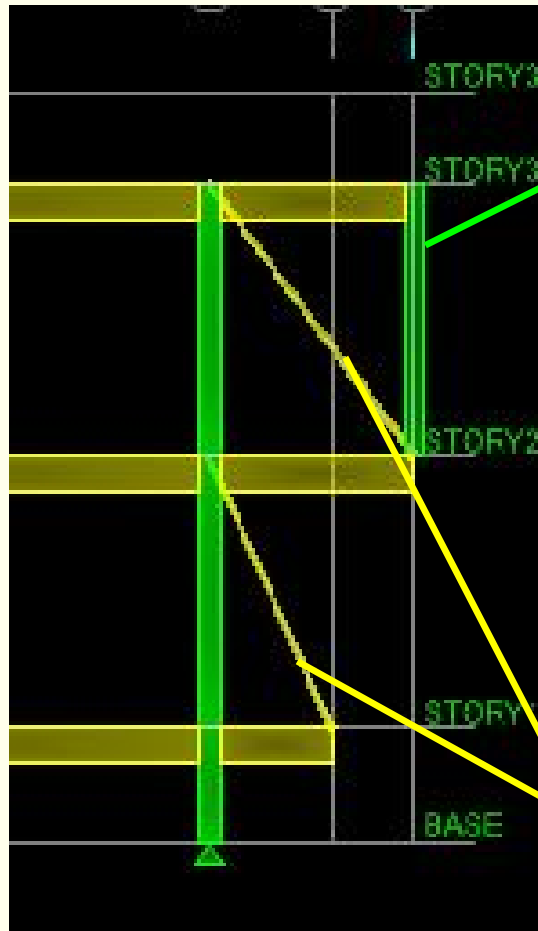
Roof Framing Plan





Mountain & Water Structural Education Wing

ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

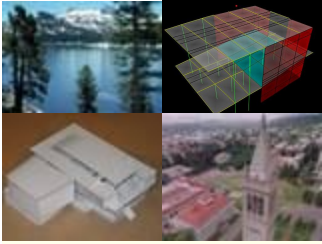


W10x33
Overhang
Column
Typ.

3" Φ XS
"Kicker"

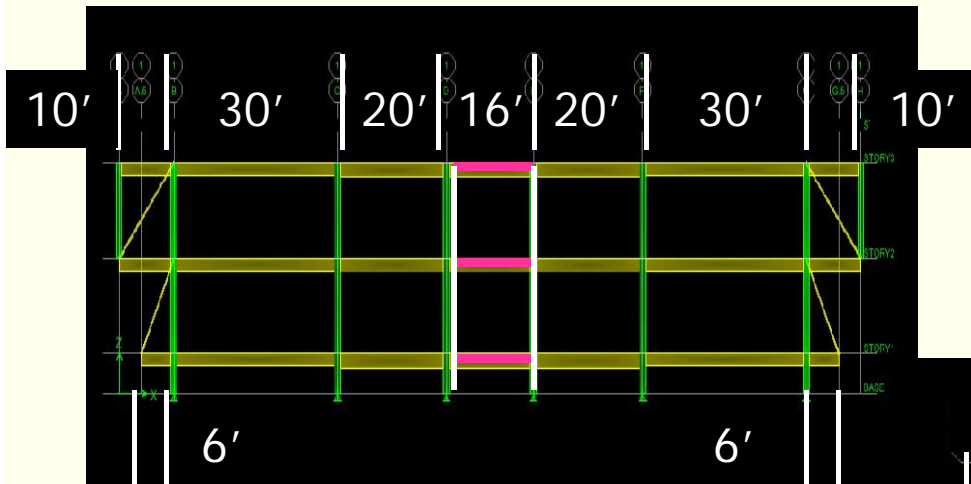
Cantilever Solution

- In Response to Architecture Layout and Owner Request
- Address Overhang Areas of 4'-10' throughout Building
- Use 3" Φ Extra Strong Pipe in Tension to Suspend Cantilever
- Able to hide "Kickers" within partition walls
- Able to reduce moment connections from 30 to 6



Mountain & Water Structural Lateral System

North-South Lateral System

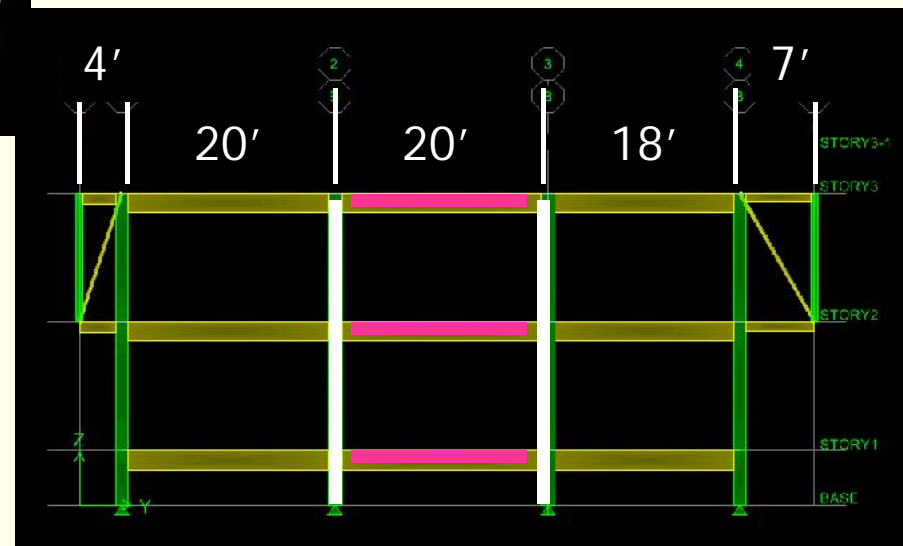


Special Moment Resisting Frame

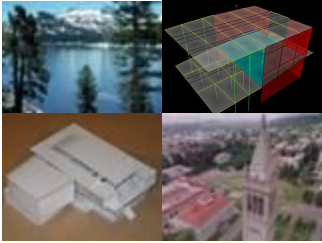
- Each Direction uses identical structural components
- Lateral Columns: W14x132
- Lateral Beams: W21x73

SMRF Characteristics

- Greater N-S System Stiffness
- Minimize Bays in Lateral System
- Design iterations led to no RBS members

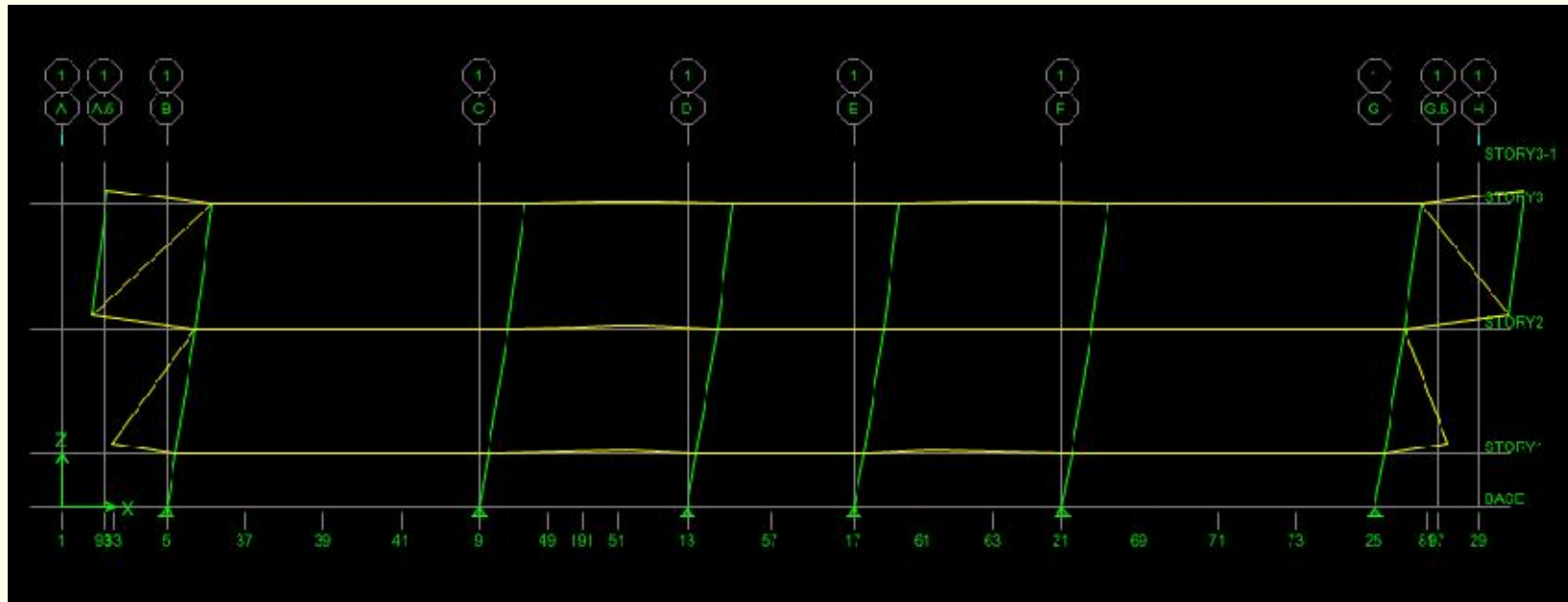


East-West Lateral System



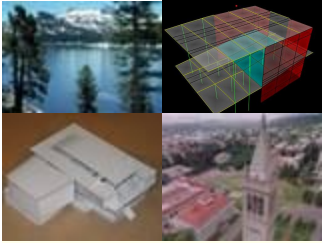
Mountain & Water Structural Education Wing

Lateral Deflections



Maximum Deflection $\Delta_{NS} = 0.52\text{in}$ $\Delta_{EW} = 1.52\text{in}$ **Period = 1.18s**

Maximum Drift $\delta_{NS} = 0.52\%$ $\delta_{EW} = 1.52\%$ **Base Shear = 146 kips**

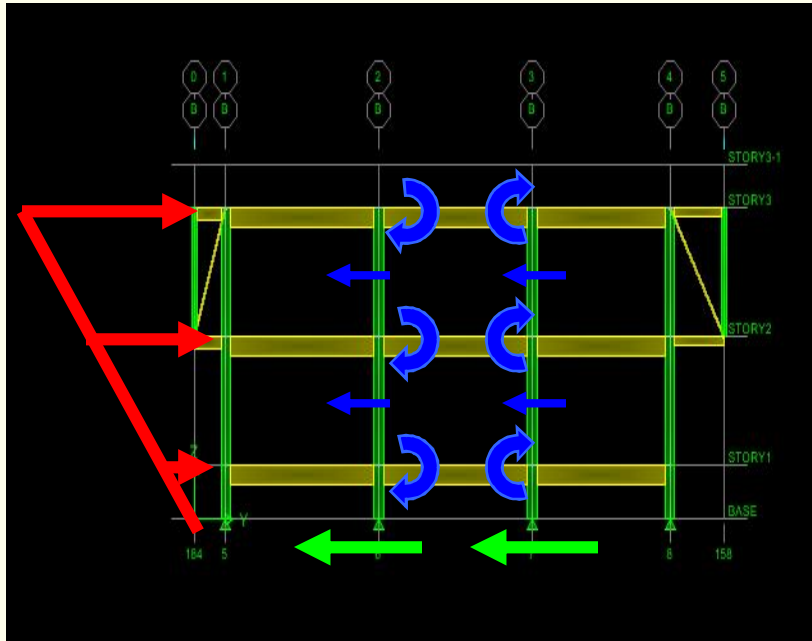


Mountain & Water Structural Education Wing

ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

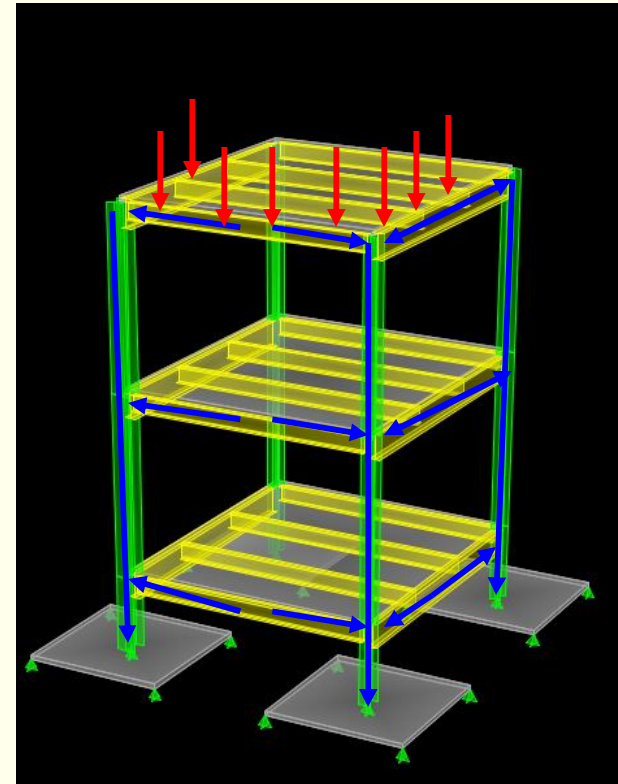
Load Paths

Lateral Loads



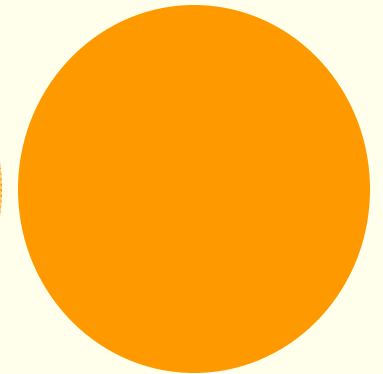
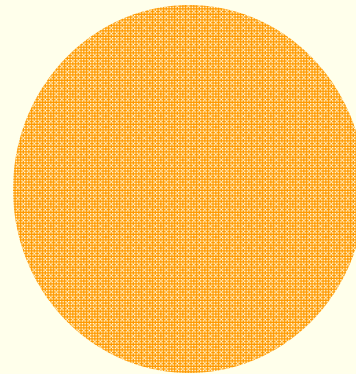
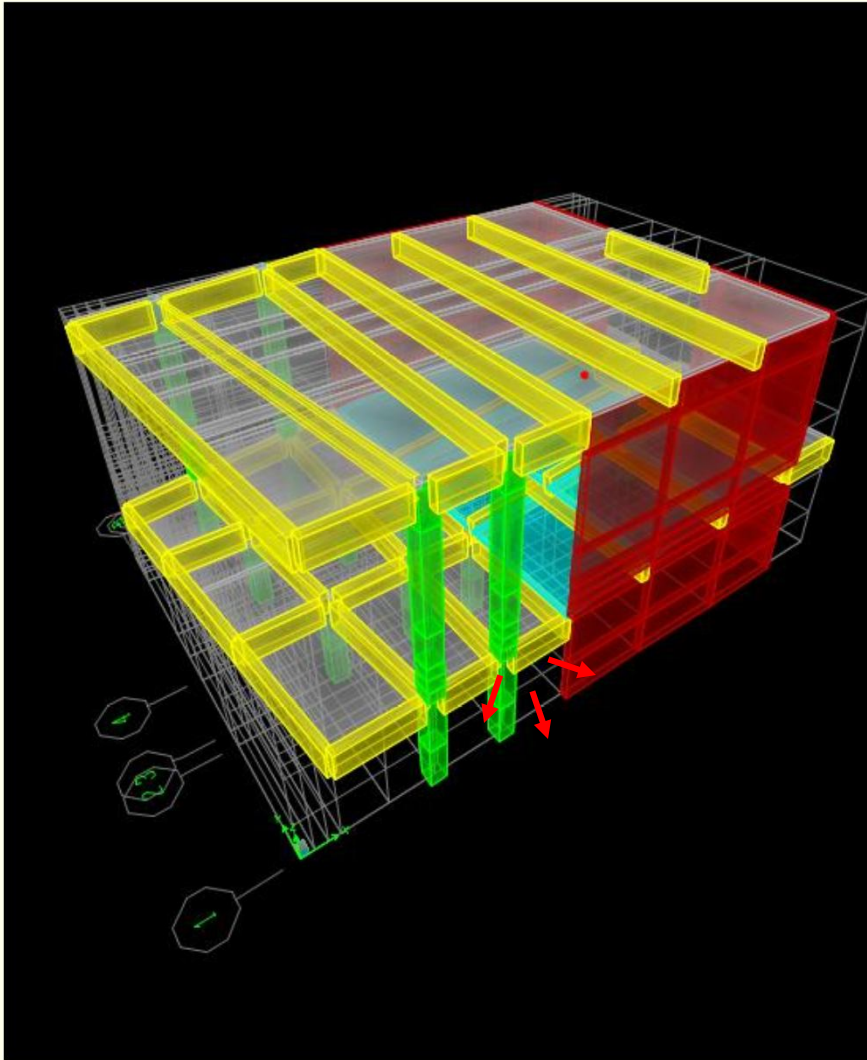
ETABS Response Spectra Applied with SRSS Modal Combination used for Analysis

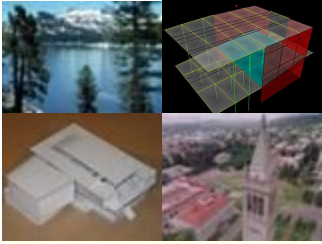
Gravity Loads



Mountain & Water Structural Auditorium Wing

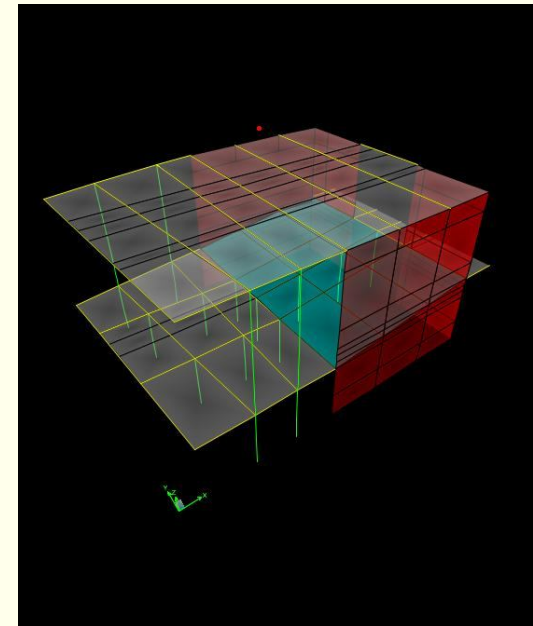
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

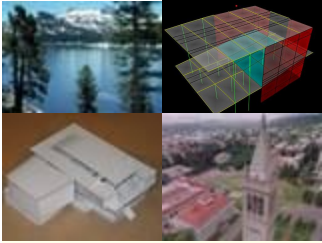




Mountain & Water Structural Auditorium System Overview

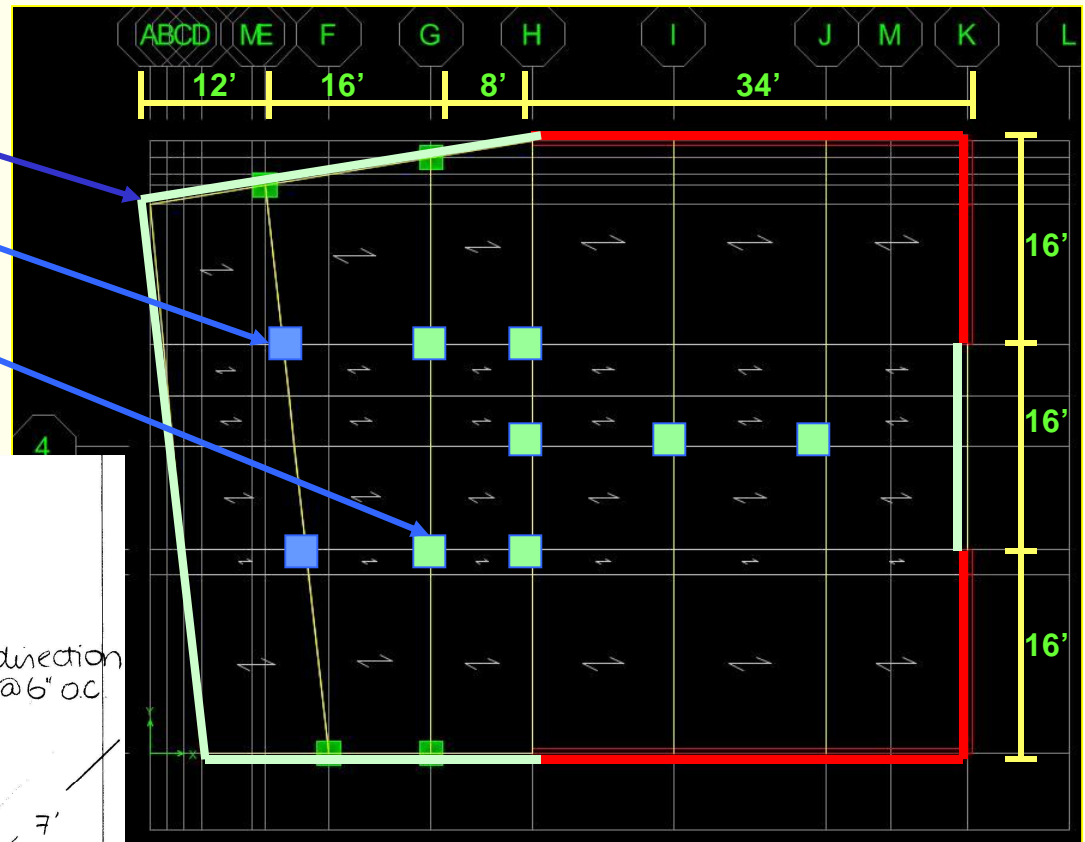
- Cast-in-place concrete building
 - $F'c = 4000$ psi
 - $Fy = 60$ ksi
- Gravity System
 - Slab, Beams and Columns
- Lateral Resisting System
 - Shear Wall



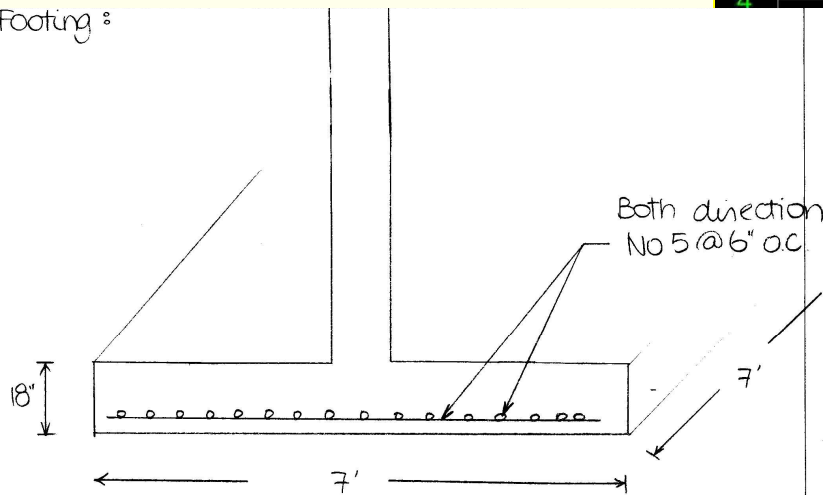


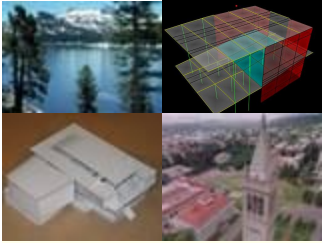
Mountain & Water Structural Auditorium Foundation

- 10" thick Bearing Wall
- 8' x 8' x 18" No. 5 @ 6" o.c.
- 7' x 7' x 18" No. 5 @ 6" o.c.

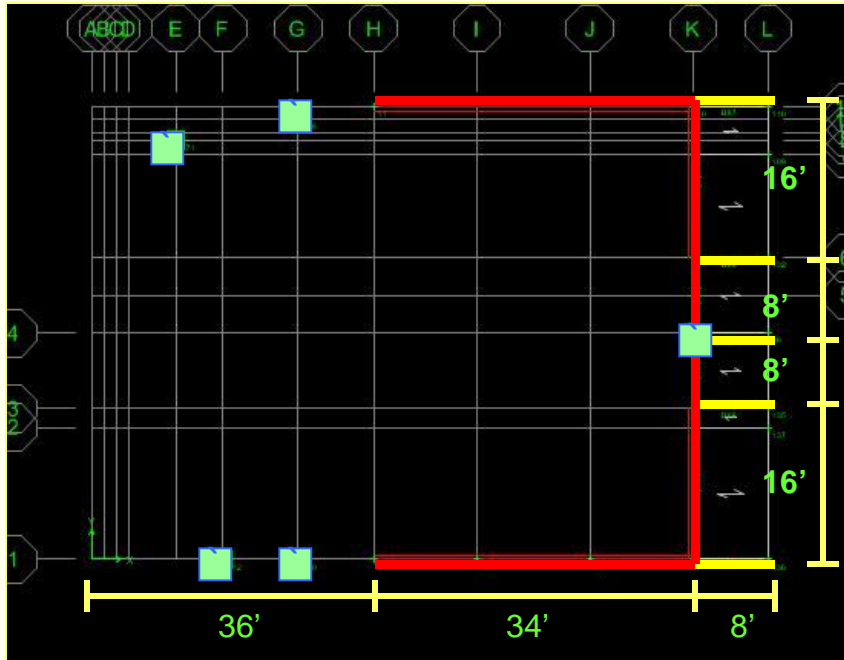


Footing :

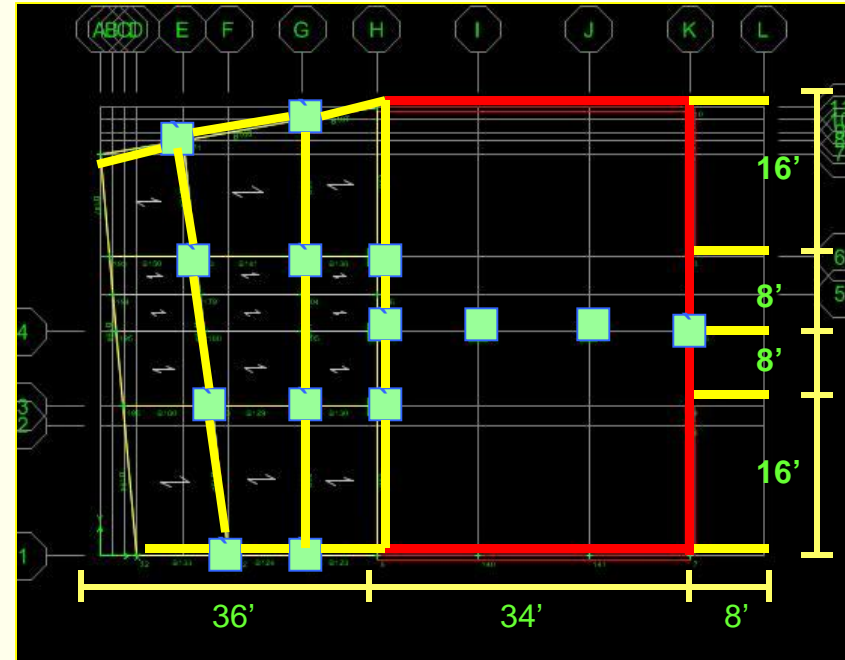




Mountain & Water Structural Auditorium Second Floor

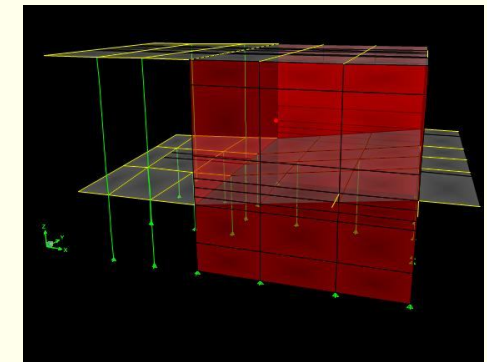


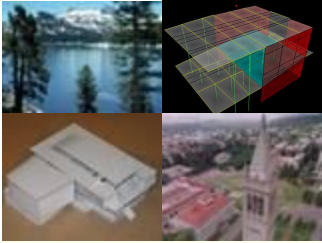
Balcony Level



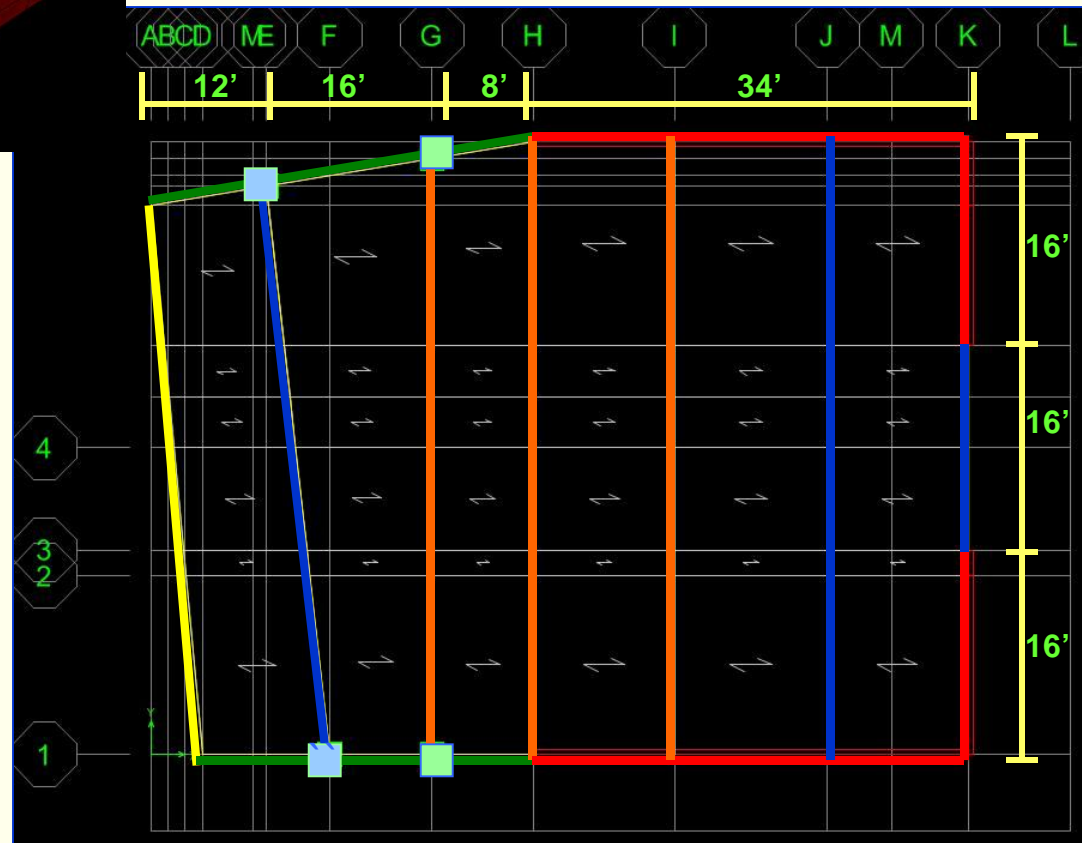
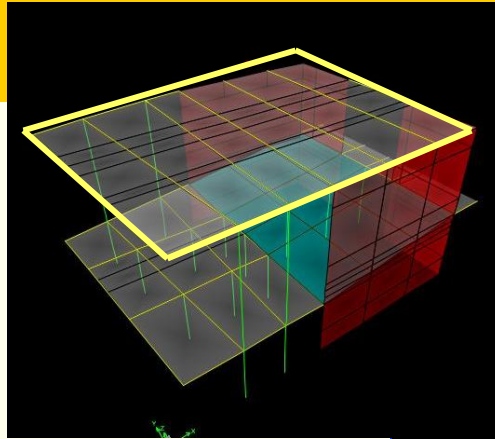
First Story

- 6" concrete slab
- BEAMS: 12" x 18" with 3 No. 10 and 2 No. 8 # 3 stirrups 8" o.c.
- COLUMNS: 12" x 12" with 8 No. 7



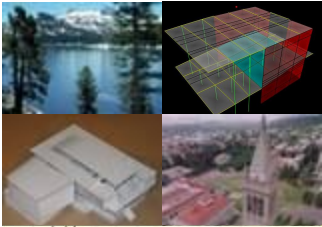


Mountain & Water Structural Auditorium Roof

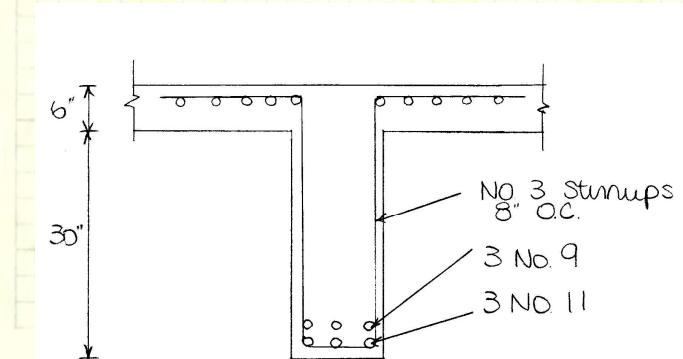
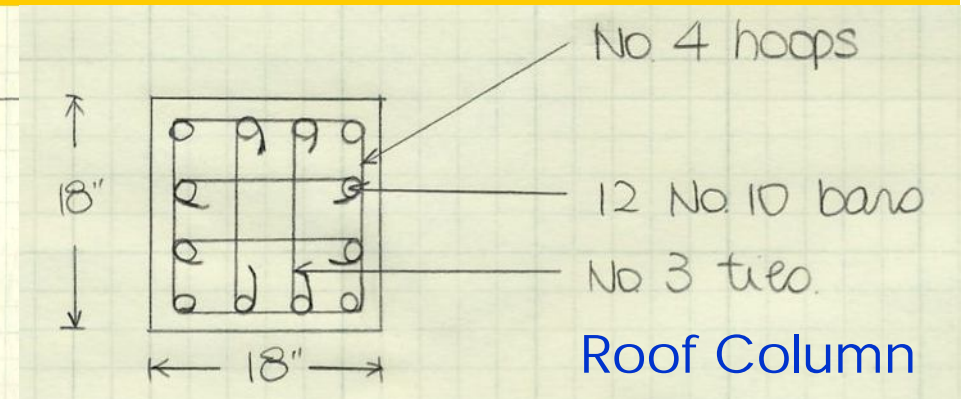
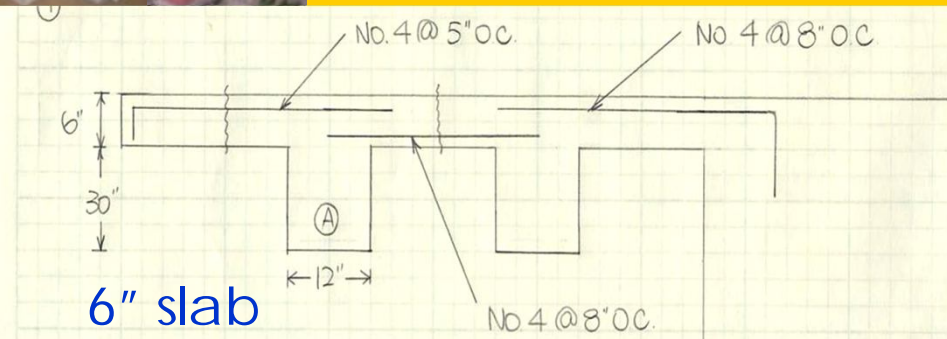


Roof Plan

- Cambered 6" thick concrete slab
- BEAM: 12" x 36" with
 - 3 #11 and 3 #9
 - 6 #9
 - 2#9 and 2#8
- #3 stirrups at 8" o.c.
- COLUMN: 18" x 18" with 12 #10
- #4 hoops confinement

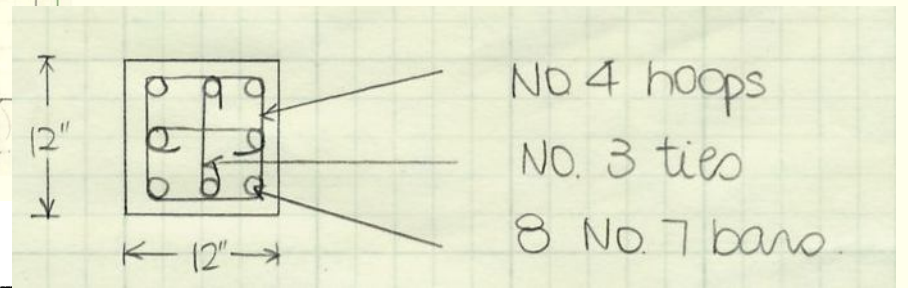
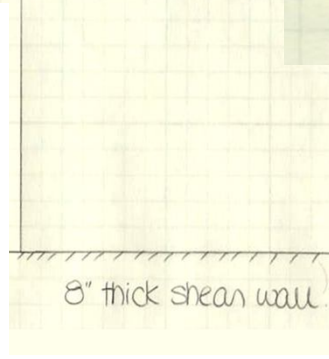


Mountain & Water Structural Typical Auditorium Sections



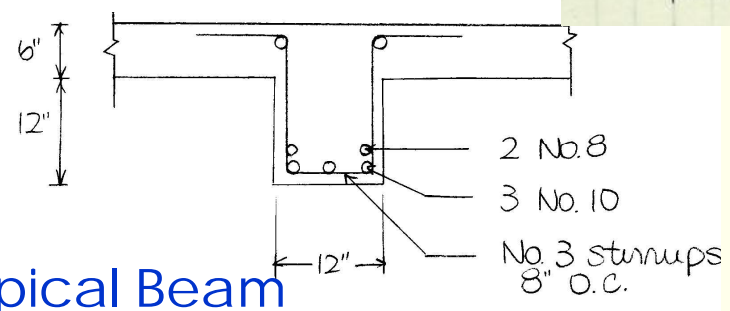
Roof Beam

12" x 36"



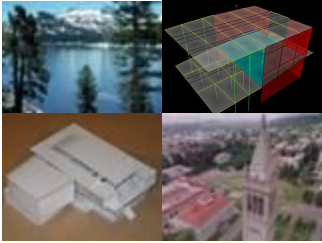
Typical Column

12" x 12"



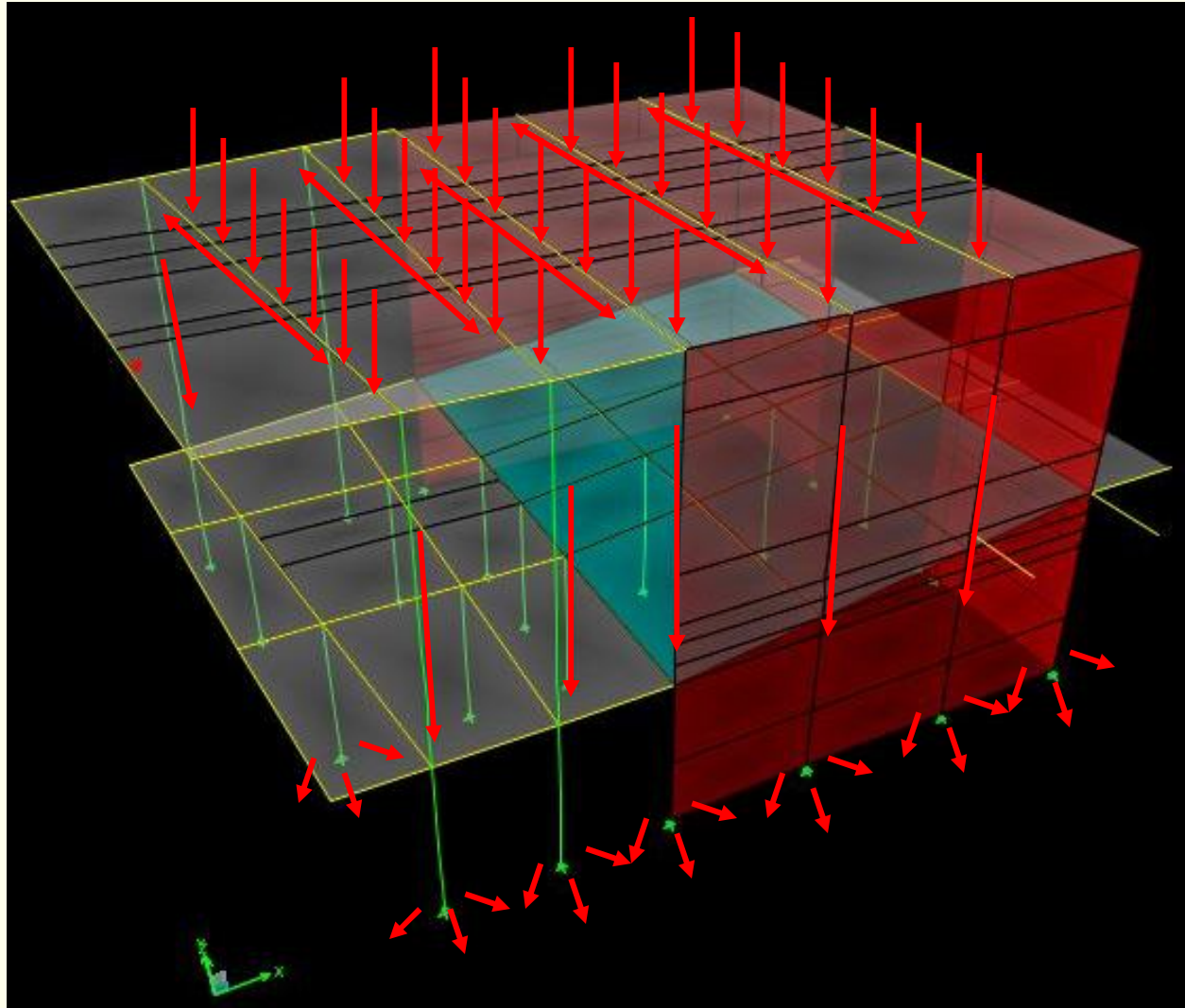
Typical Beam

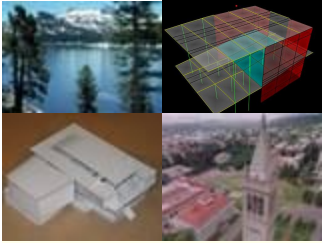
12" x 18"



Mountain & Water Structural Auditorium Load Path

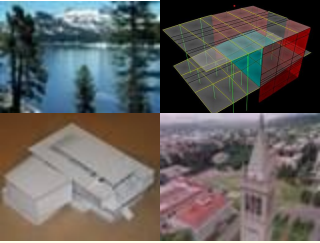
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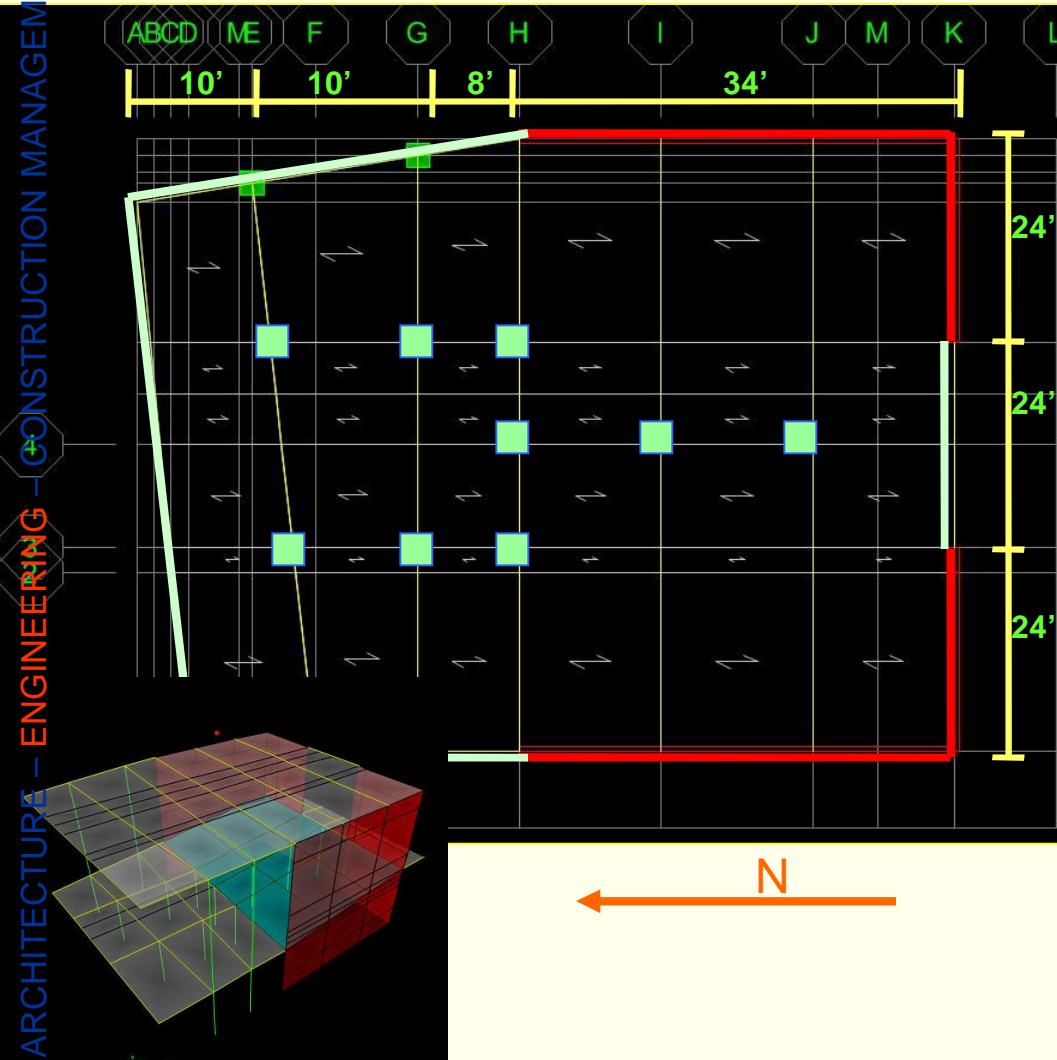
Mountain & Water Structural Auditorium Dynamic Analysis

- ETABS Modeling
- UBC 97 Response Spectrum
- SRSS method for combining modal responses
 - Fundamental Period = 0.176 sec
 - Story Base Shear = 500 kip
- Rigid Diaphragm

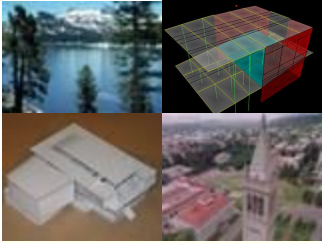


Mountain & Water Structural Lateral Resisting System

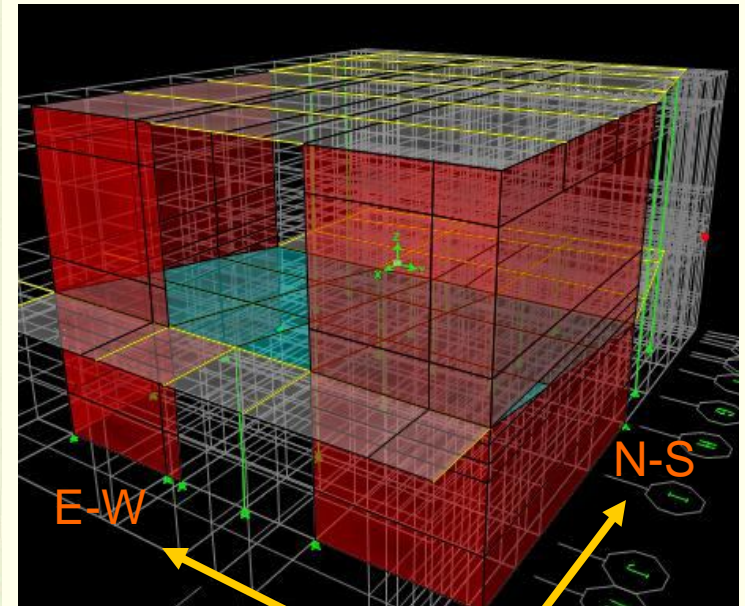
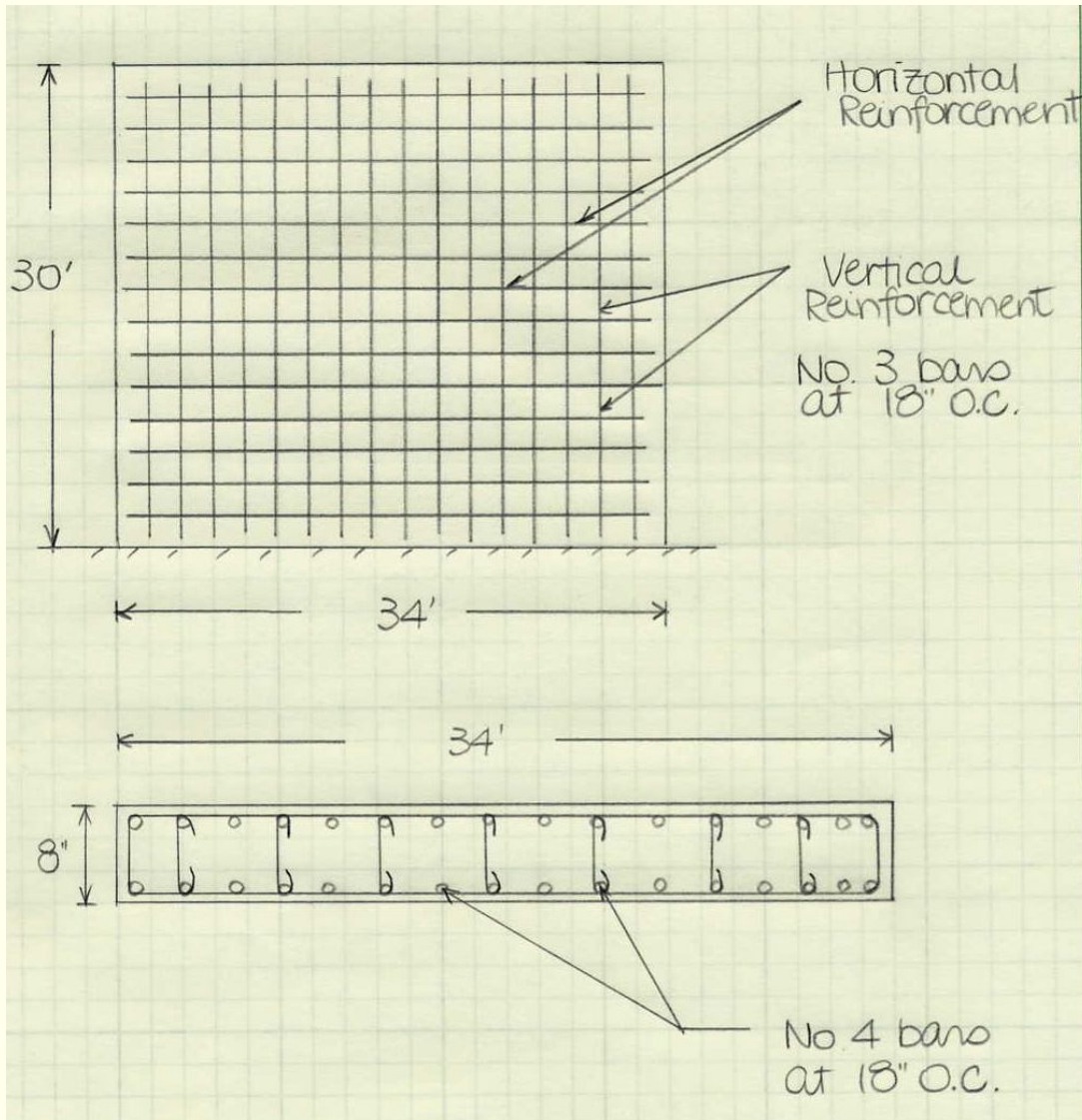
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- 8" thick shear wall in NS and EW
- Horizontal - No. 4 bars at 18" o.c.
- Vertical - No. 3 bars at 18" o.c.

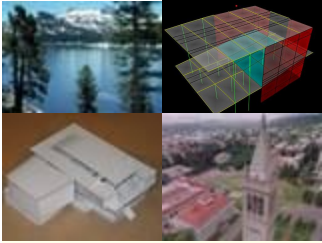


Mountain & Water Structural Auditorium Shear Wall Reinforcement



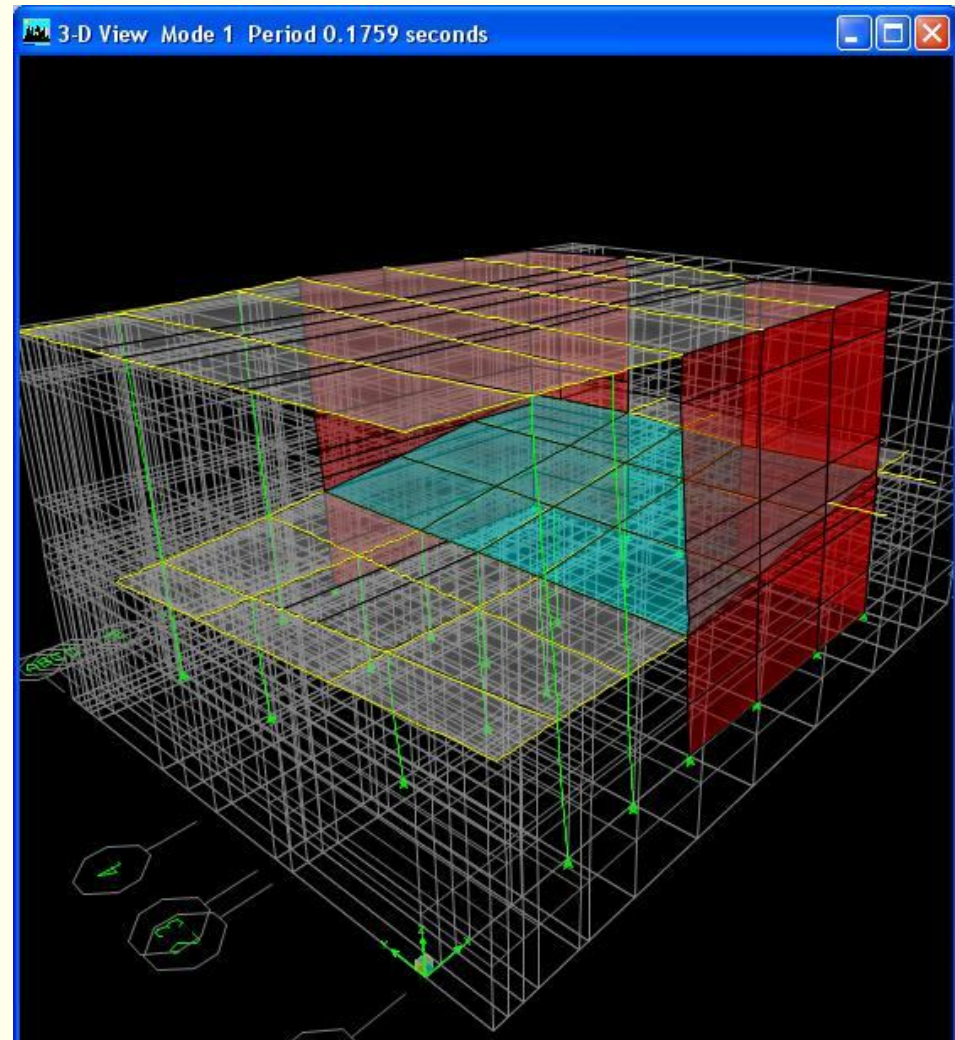
N-S direction: 2 - 8" x 34'

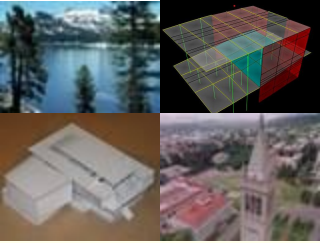
E-W direction: 2 - 8" x 16'



Mountain & Water Structural Auditorium Behavior

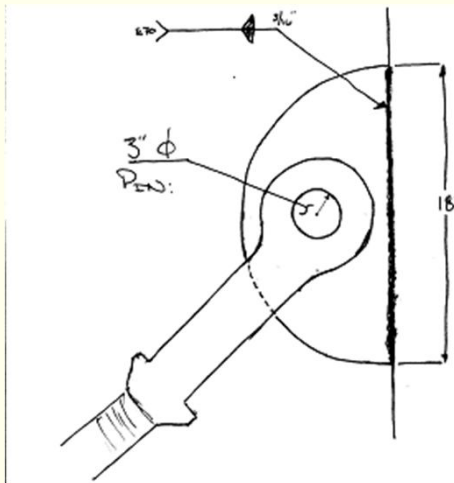
- Max. Story Drift:
 - N-S Direction = 0.35 %
 - E-W Direction = 0.82%
- Max. Displacement:
 - N-S Direction = 0.2 inch
 - E-W Direction = 0.65 inch





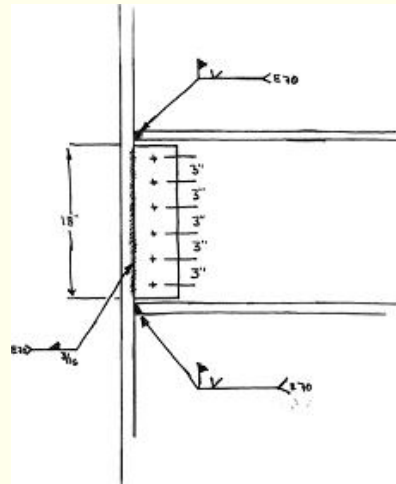
Mountain & Water Structural Connections

Steel Connections



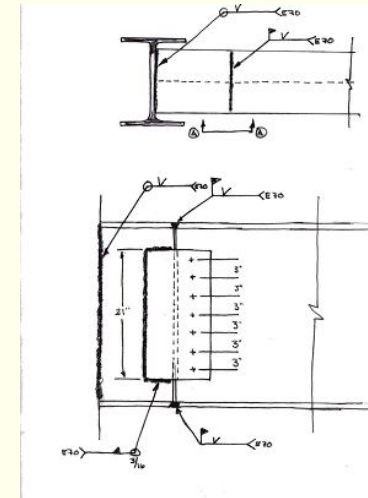
- 3" Φ A36 Pin
- 18" Φ $\frac{3}{4}$ " Thick Plate
- $\frac{3}{16}$ " E70 2-Sided Fillet Weld
- #7 Clevis

Pinned Kicker Connection



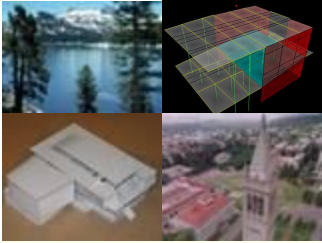
- $\frac{7}{8}$ " Φ A325 Bolts
- 18" x 6" x $\frac{1}{4}$ " Shear Plate w/ $\frac{3}{16}$ " E70 Fillet Weld
- Total Penetration Weld for Flanges

Typical Moment Connection



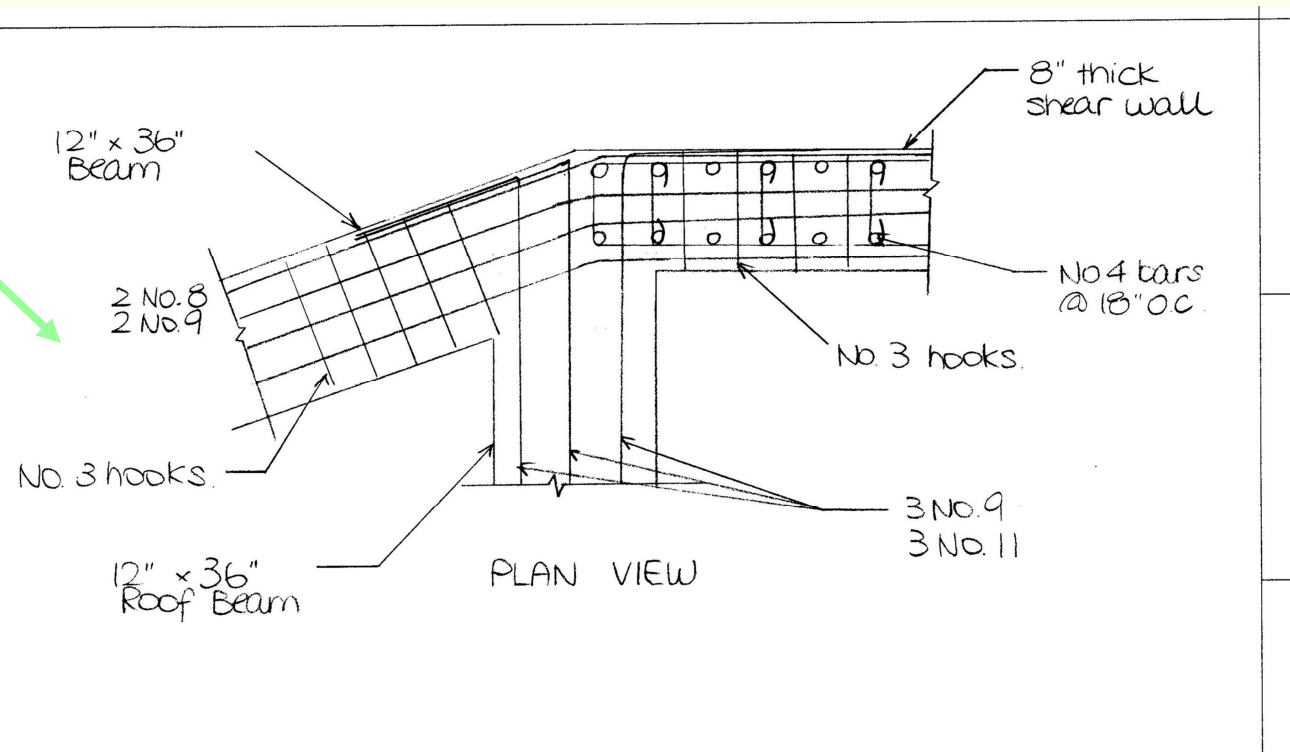
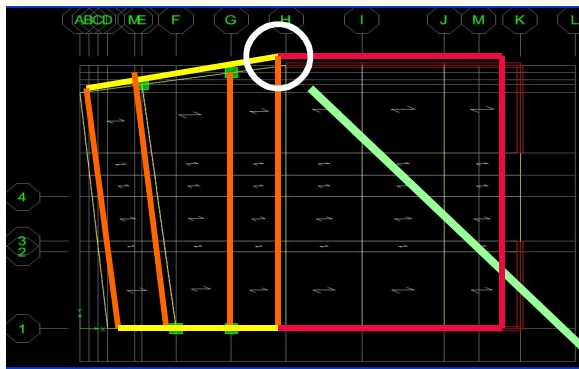
- $\frac{7}{8}$ " Φ A325 Bolts
- 21" x 9" x $\frac{1}{4}$ " Shear Plate w/ $\frac{3}{16}$ " E70 Fillet Weld
- Total Penetration Weld to Col.

Cantilever Moment Connection

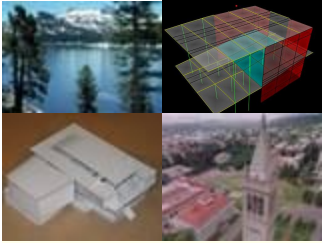


Mountain & Water Structural Connections

Concrete Connection



Beam-Shear Wall Connection



Mountain & Water Structural Building Interactions

Seismic Interaction

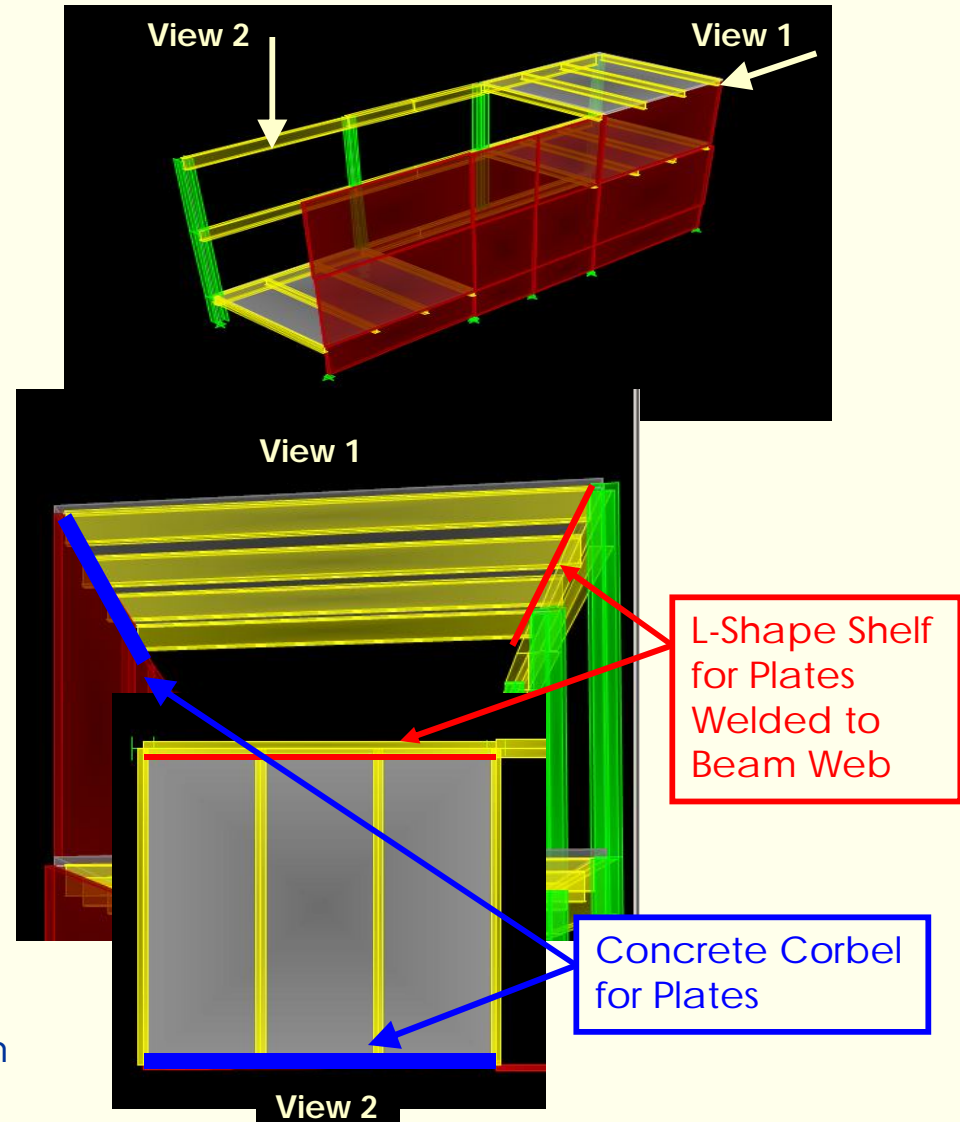
- Guard against Pounding
- Provide Bearing Support with Lateral Freedom

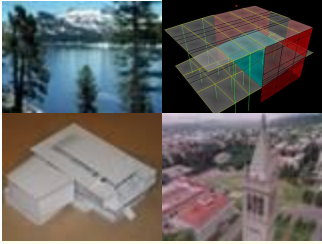
Sliding Bearing Plates



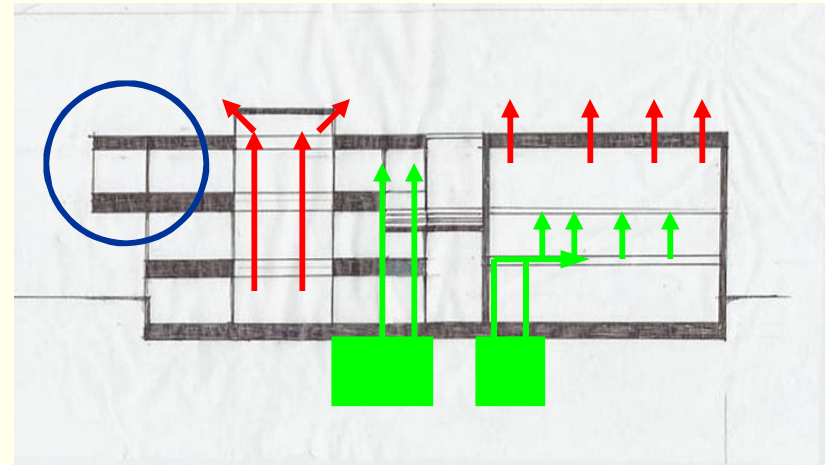
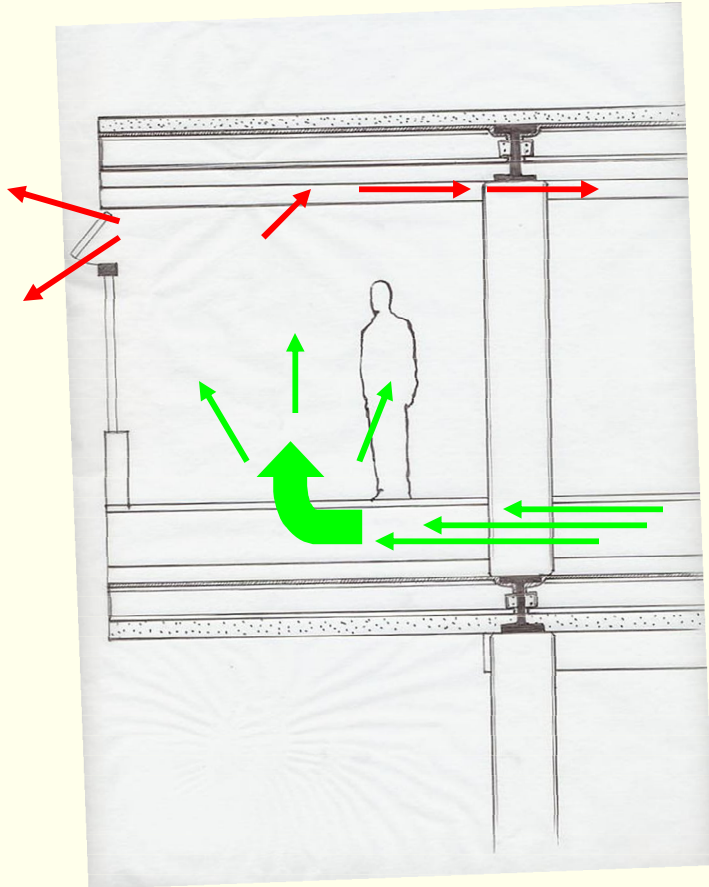
- Low Friction Coefficient (Teflon)
- Cost Effective

Reference: Piping Technology & Products
www.pipingtech.com/products/slideplates.htm



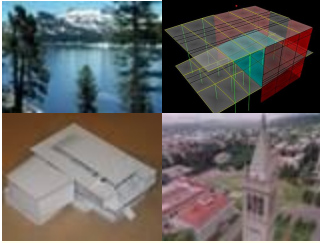


Mountain & Water HVAC Concept



Under Floor HVAC

- Create Pressurized Air Highway
- Exhaust through overhead ductwork
- No Additional to Inter-story height

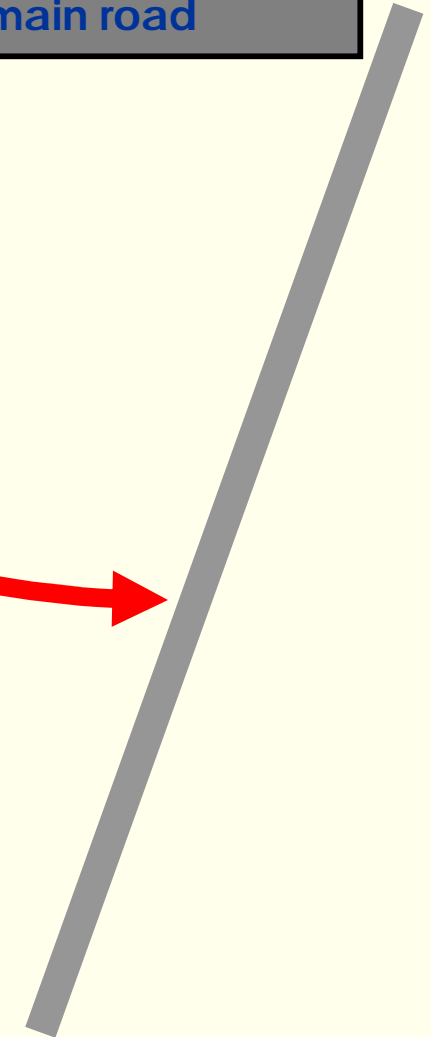
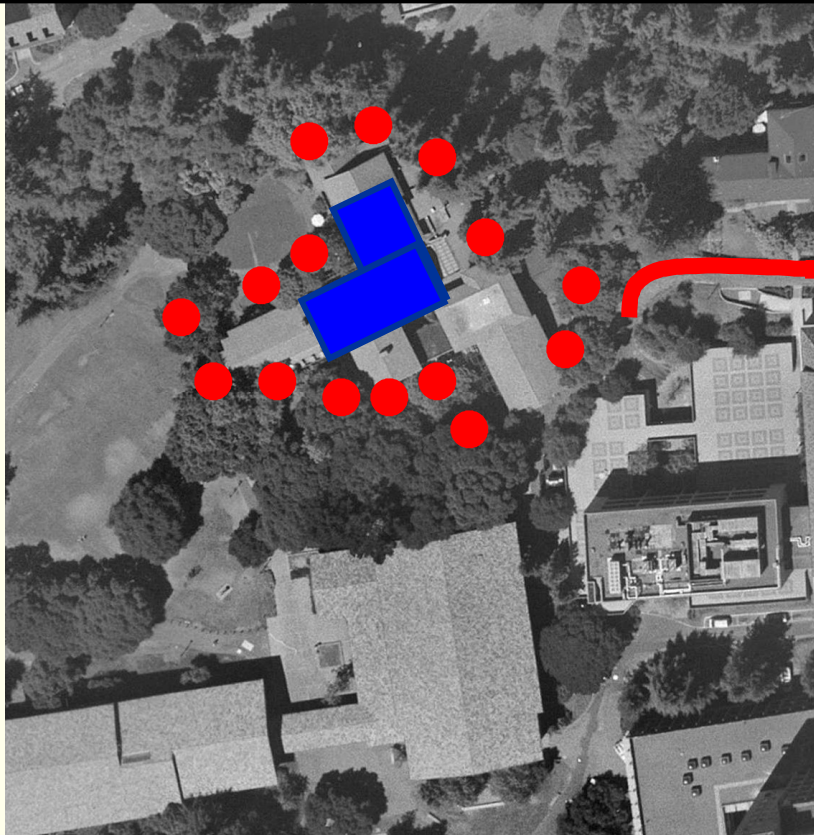


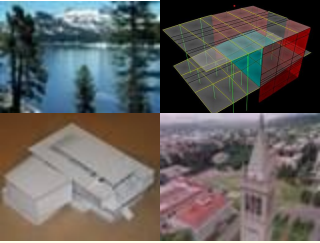
Site Layout and Access 2003

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Demolition of existing buildings is not part of in the project but tree removal and protection

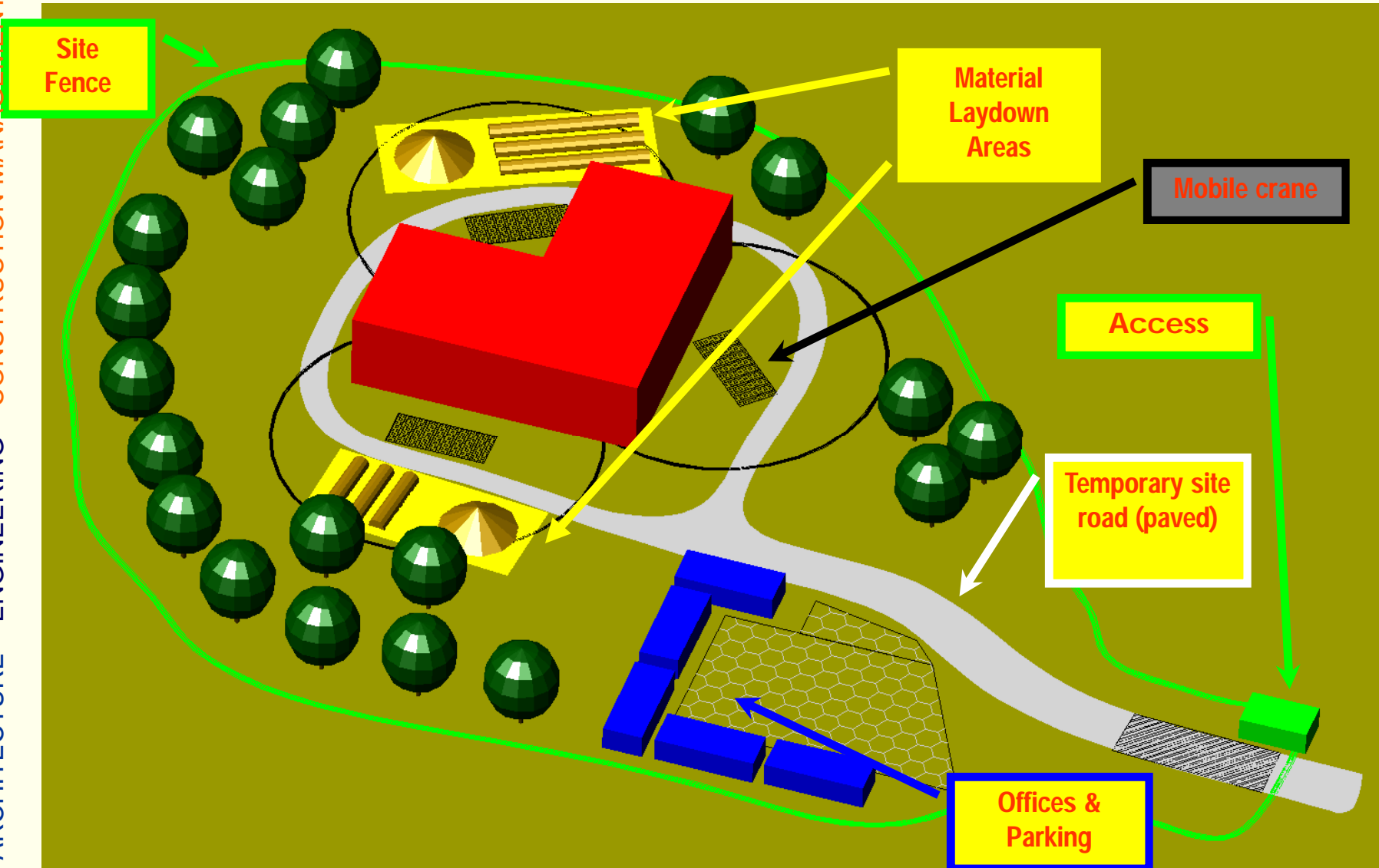
Access to the site over a paved 12 feet wide road linked to a main road

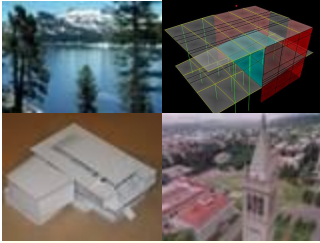




Site Layout 2015 – under Construction

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Heavy Construction Equipment

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STEEL

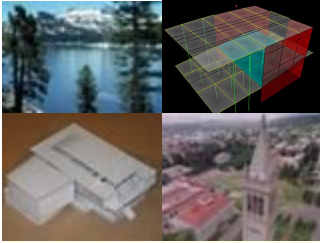


CONCRETE

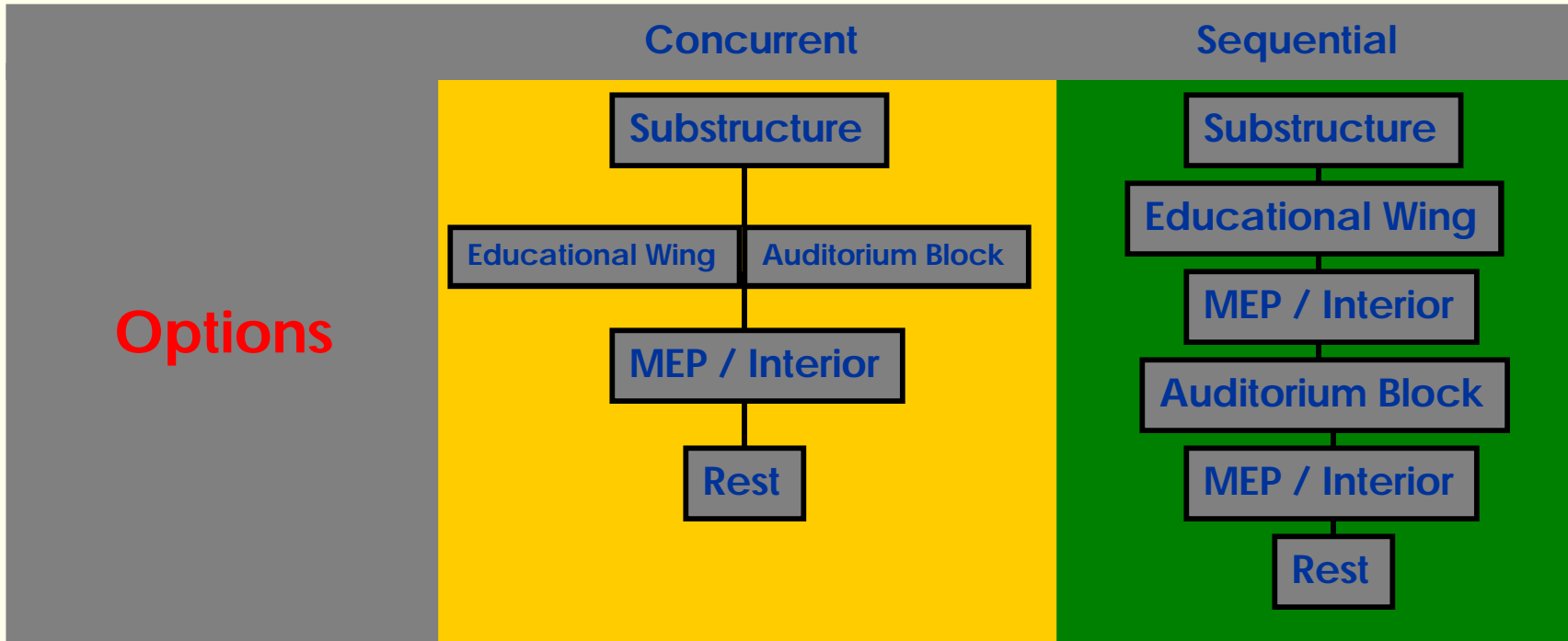


EARTH WORK



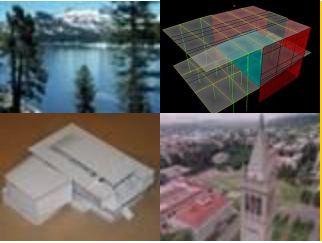


Choice of Construction Method



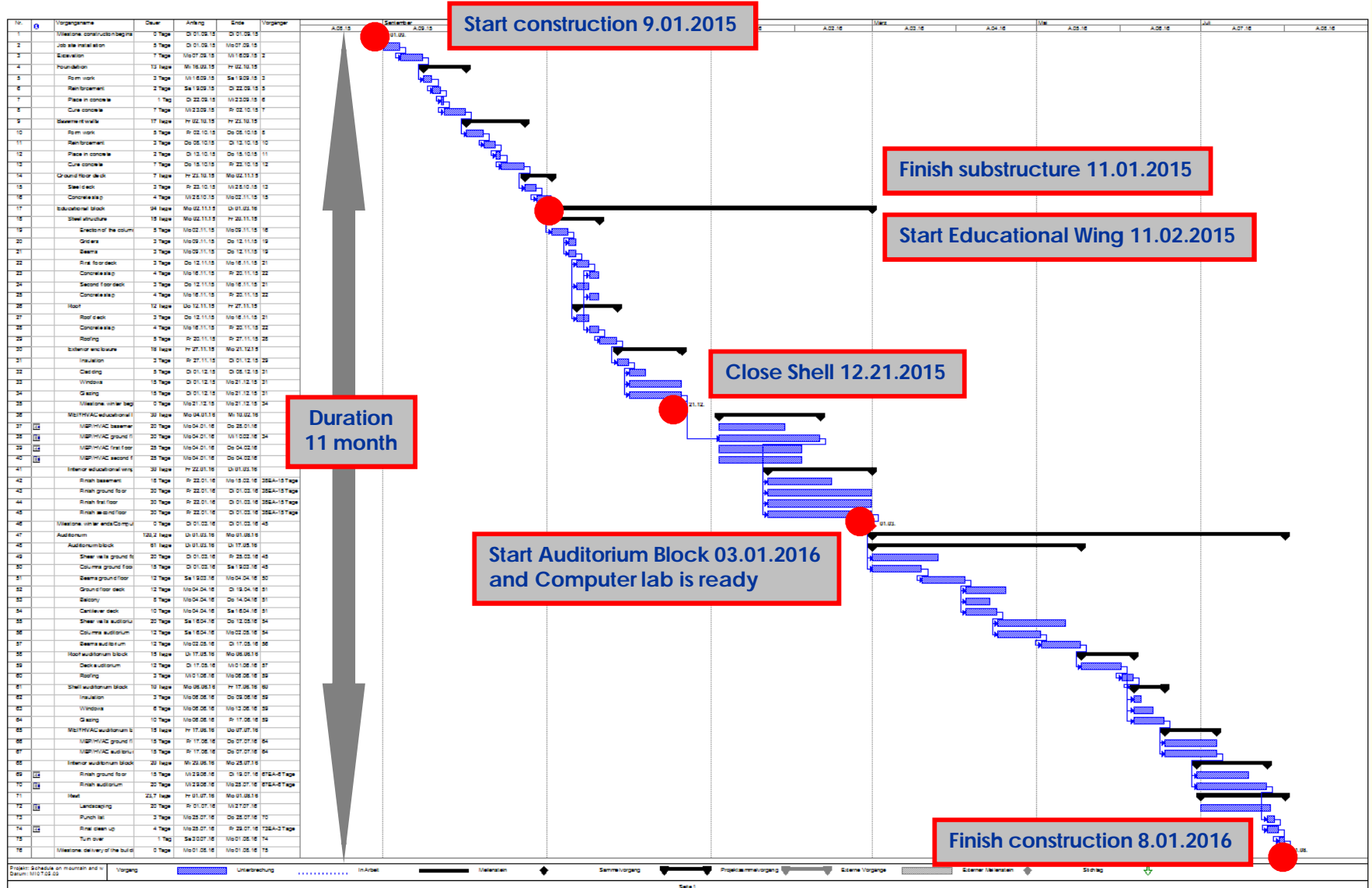
Time	+	+/-
Cost	+/-	+
Feasibility	--	++
Equipment	-	o
Interruption	None	Yes for concrete

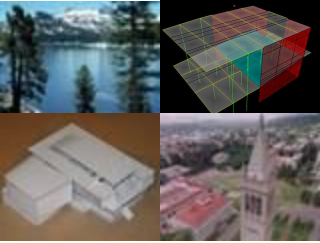




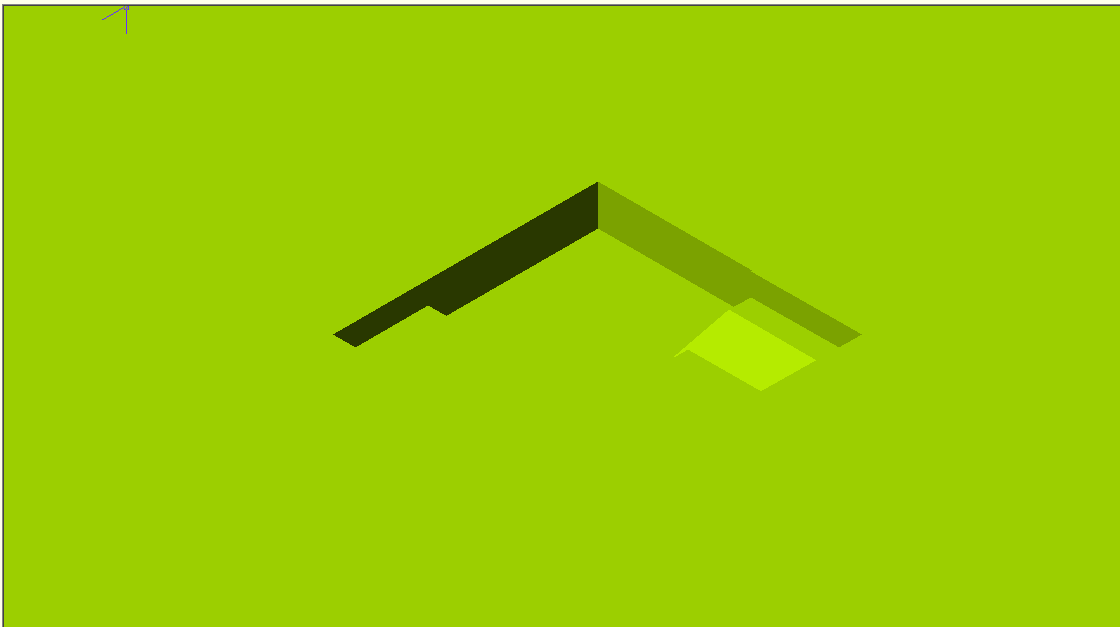
Schedule

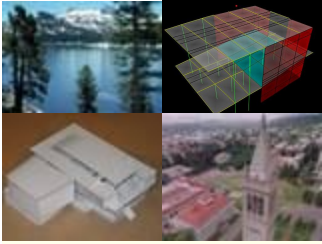
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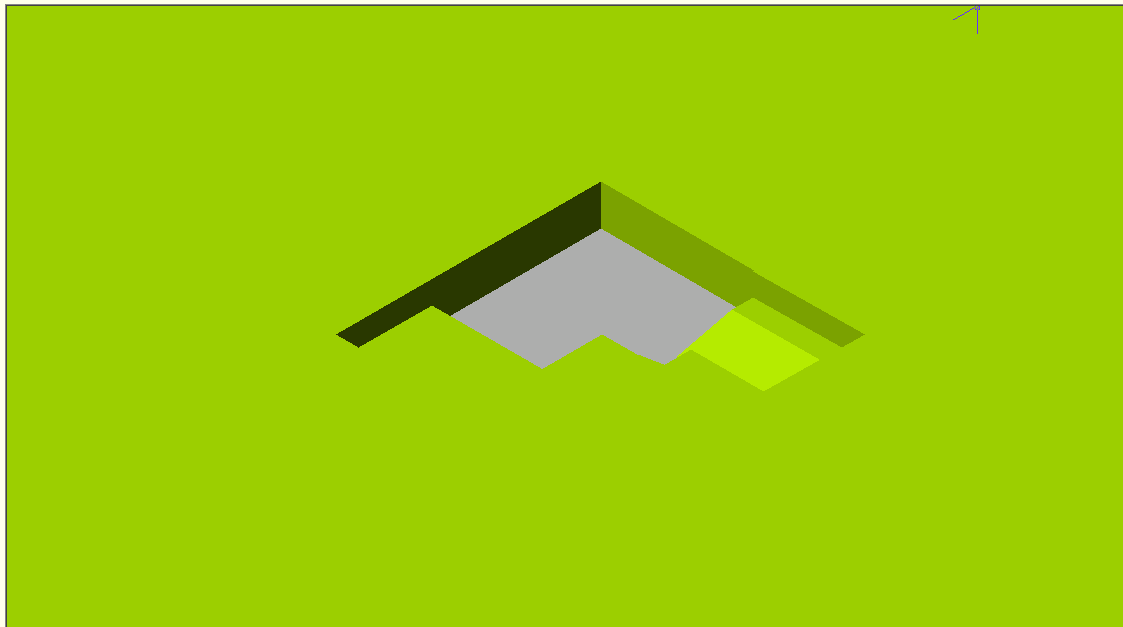
Excavation

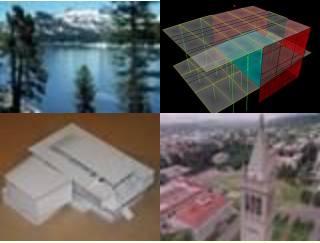




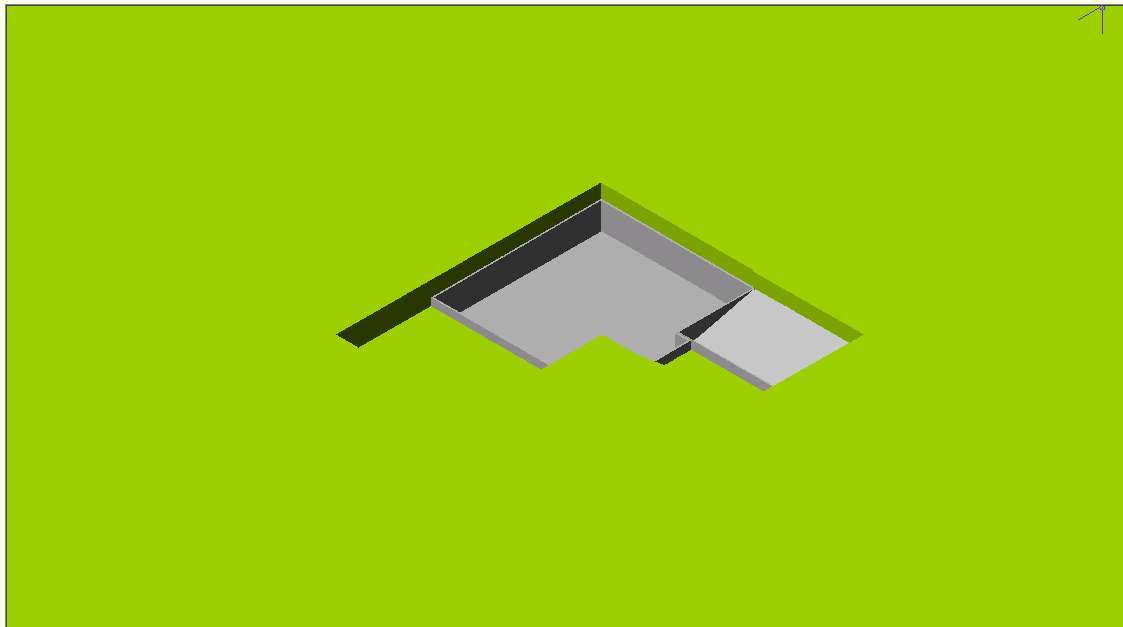
Foundation Basement

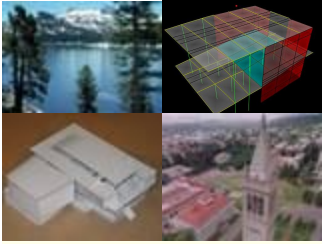
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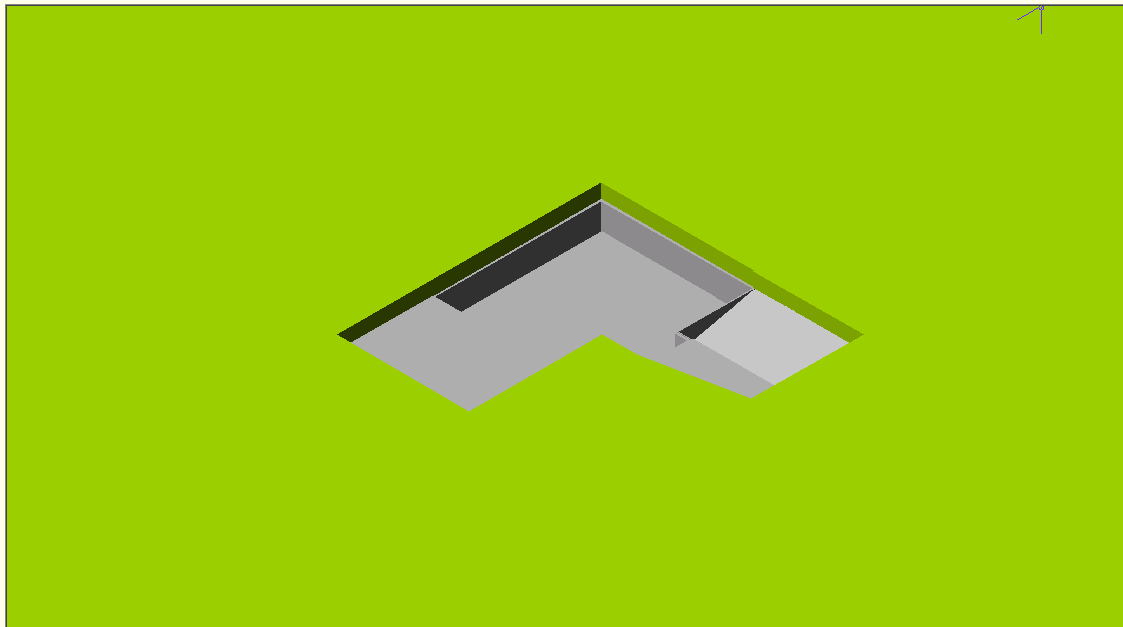
Bearing Walls Basement

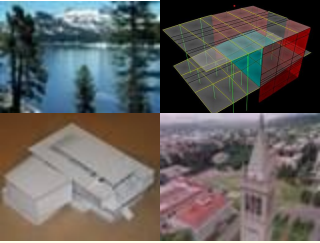




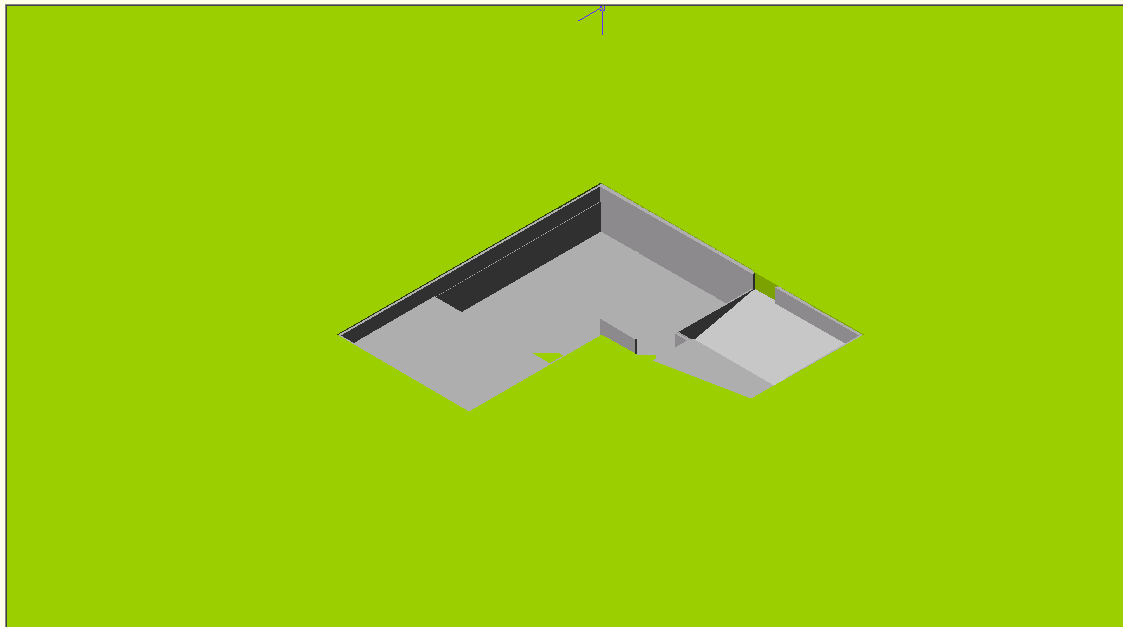
Foundation Educational Wing and Auditorium

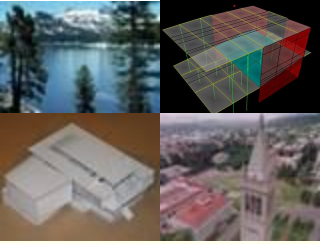
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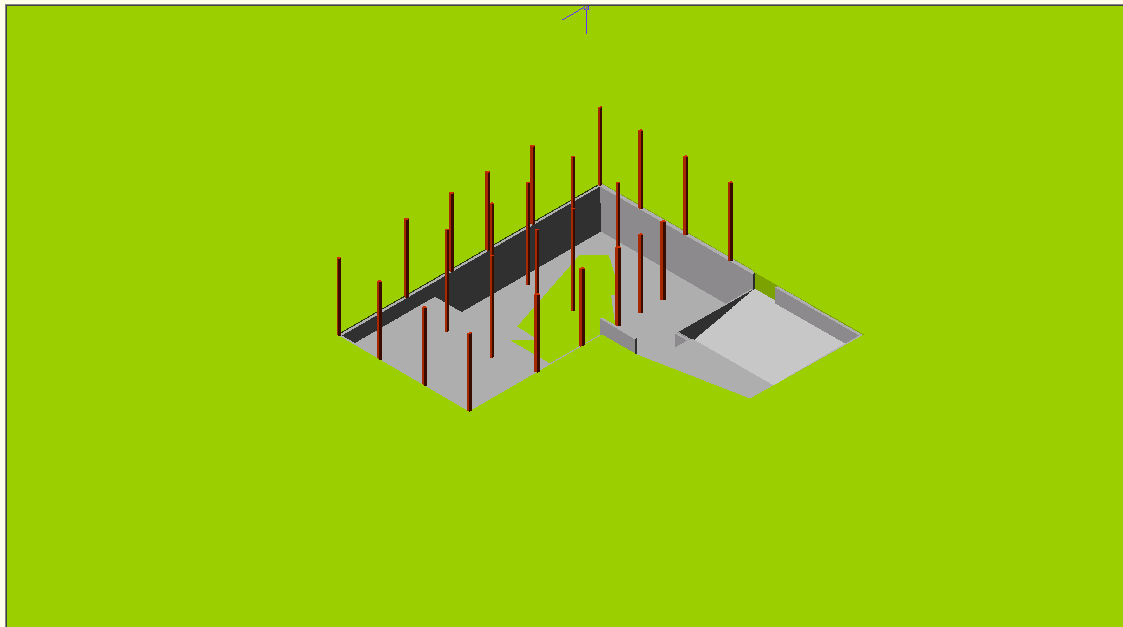
Retaining Walls

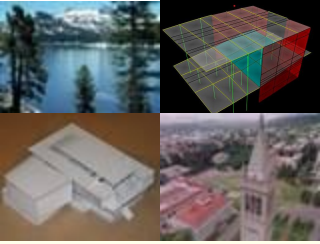




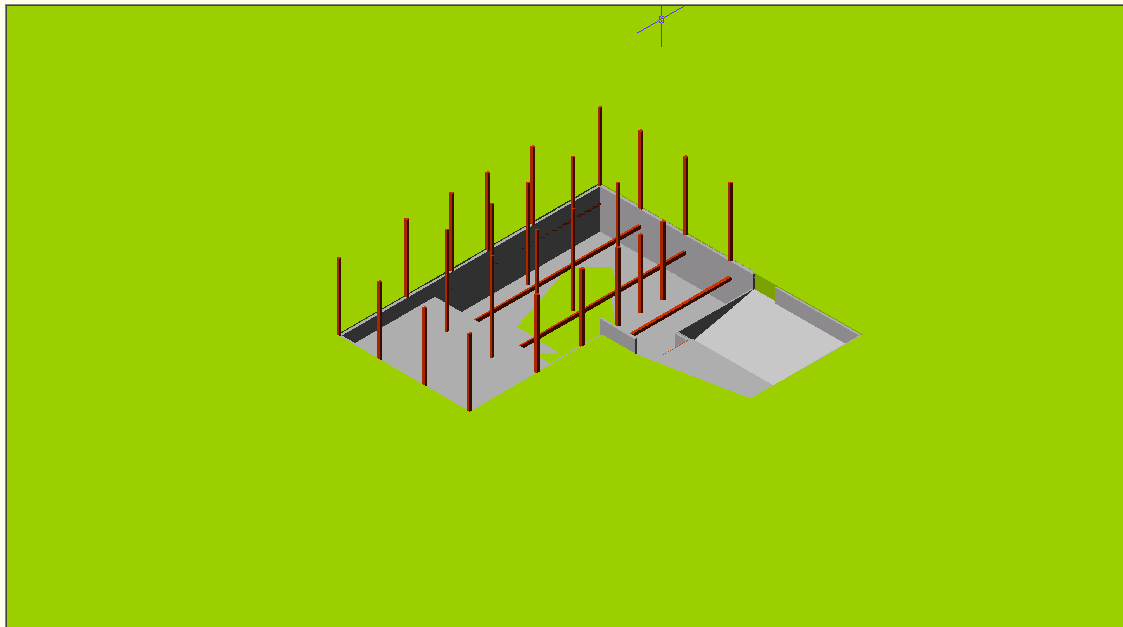
Erection Columns Educational Wings

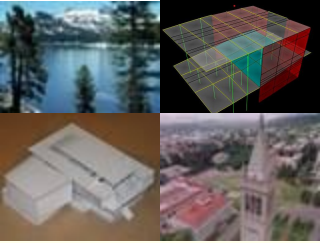
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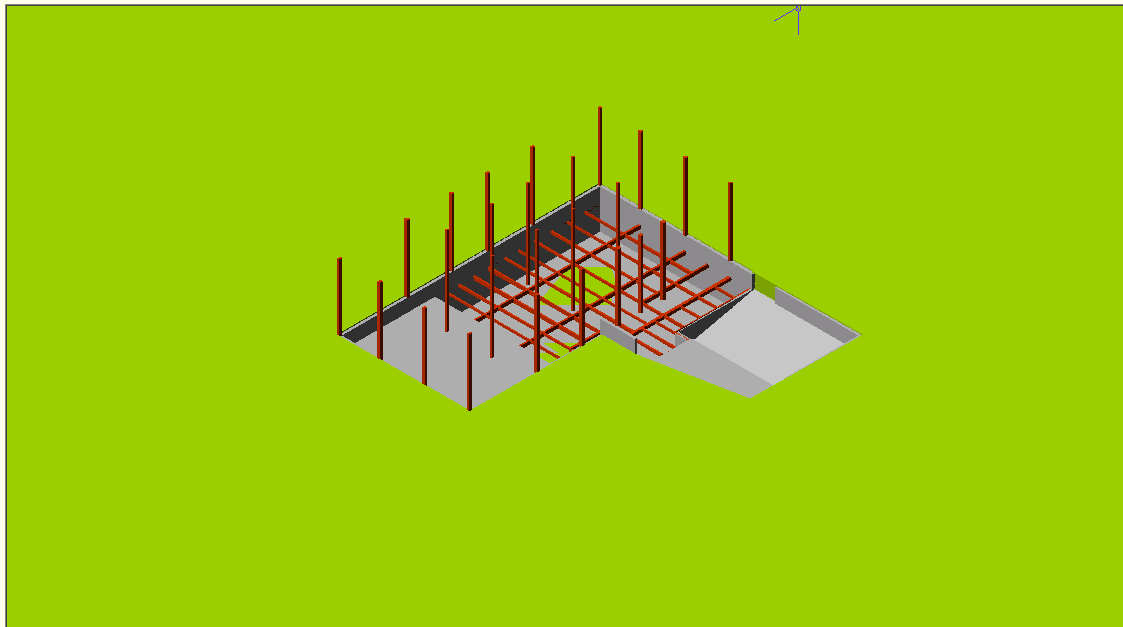


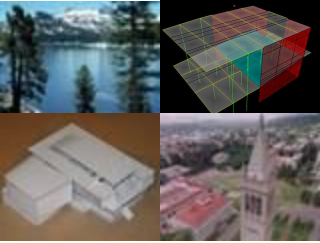
Griders for Ground Floor



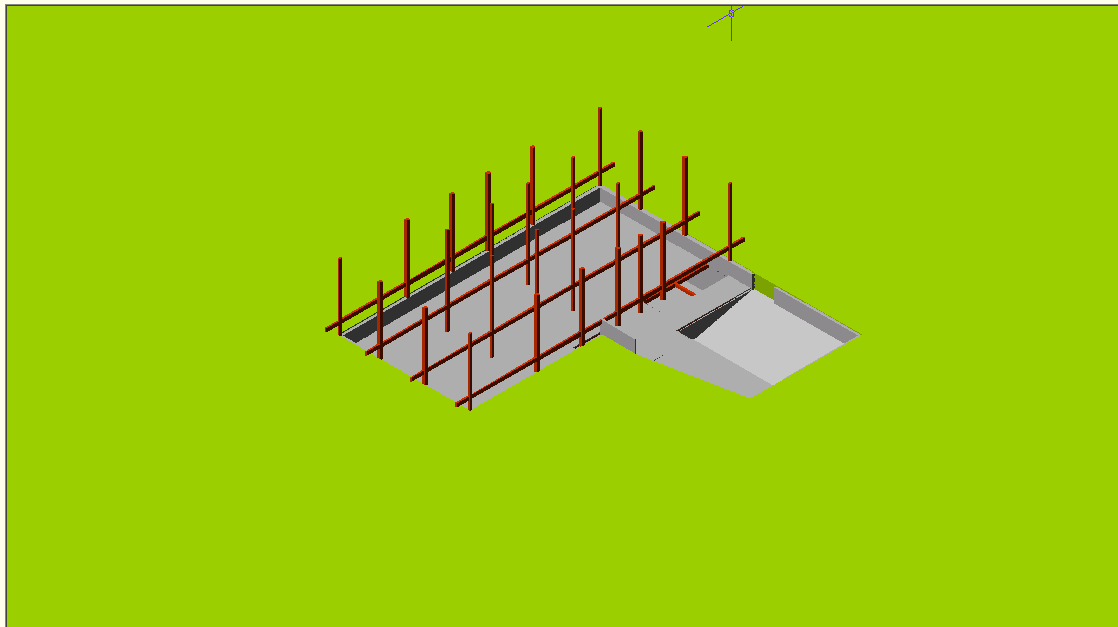


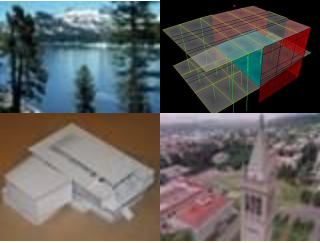
Beams for Groundfloor



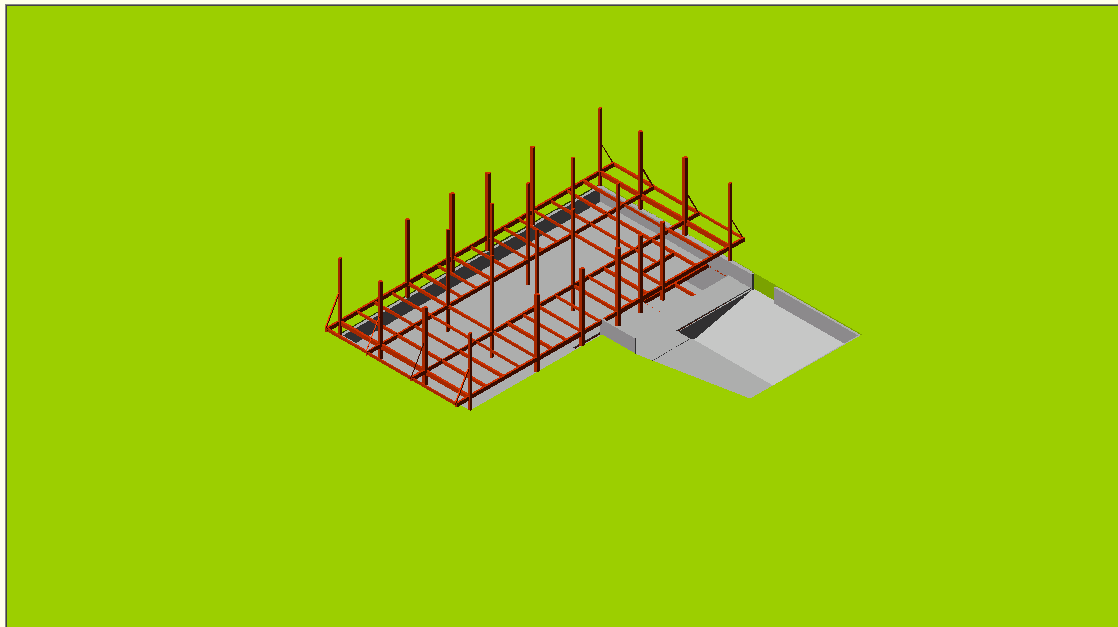


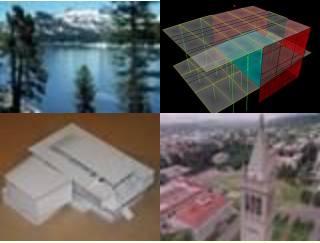
Concrete Slab Groundfloor and Griders



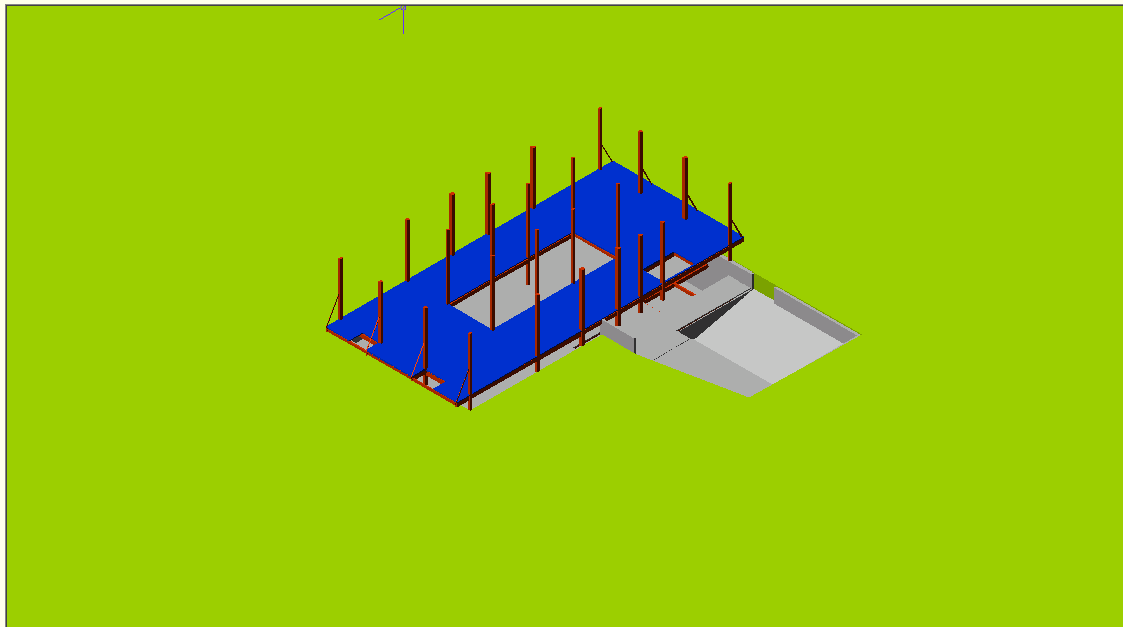


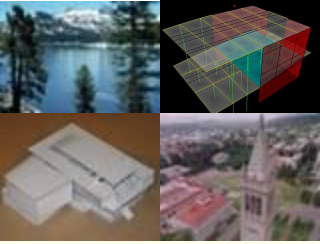
First Floor Beams and Steel Deck



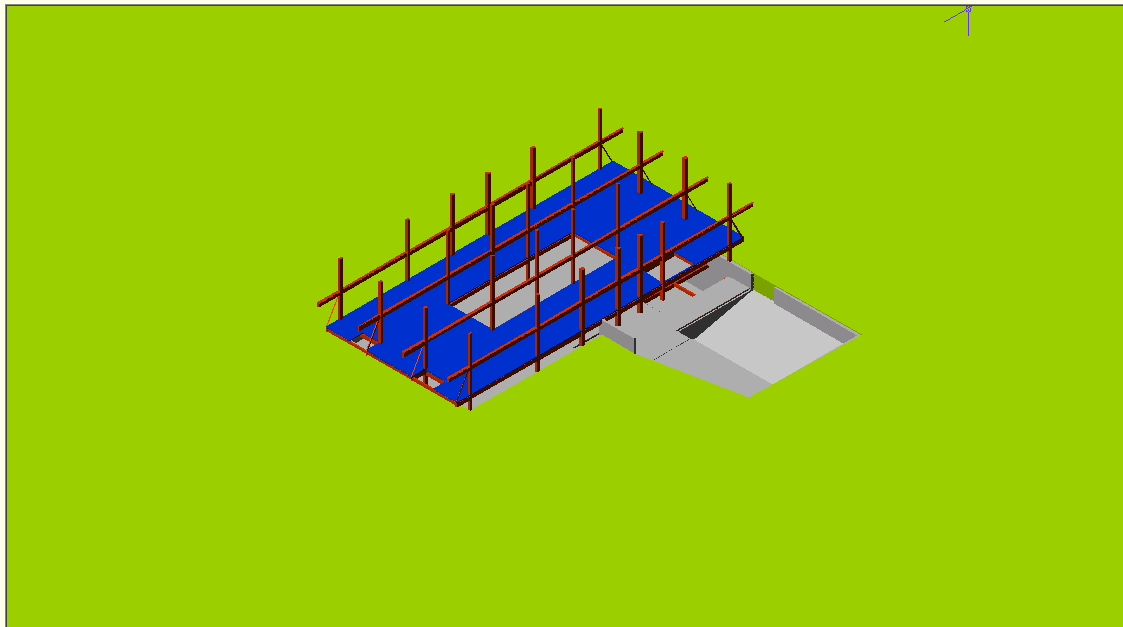


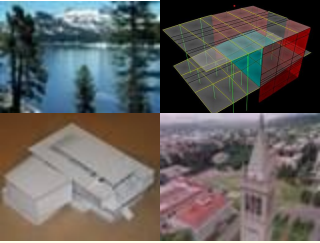
First Floor Concrete Slab



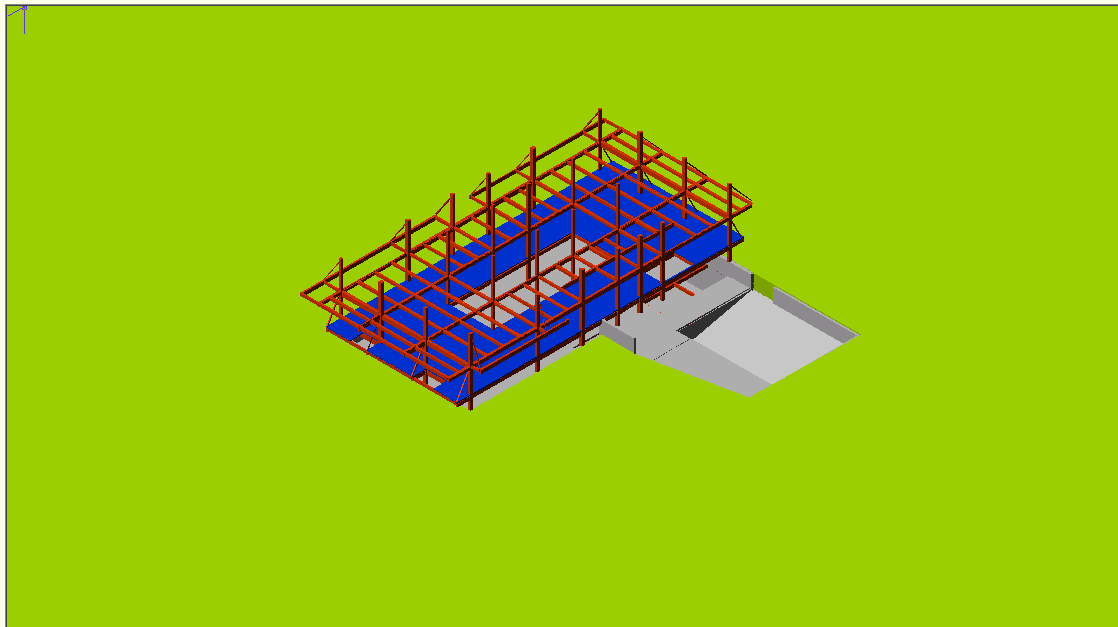


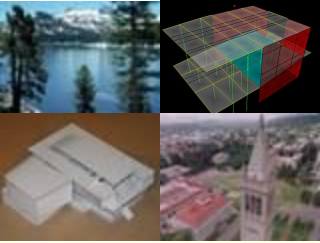
Girders



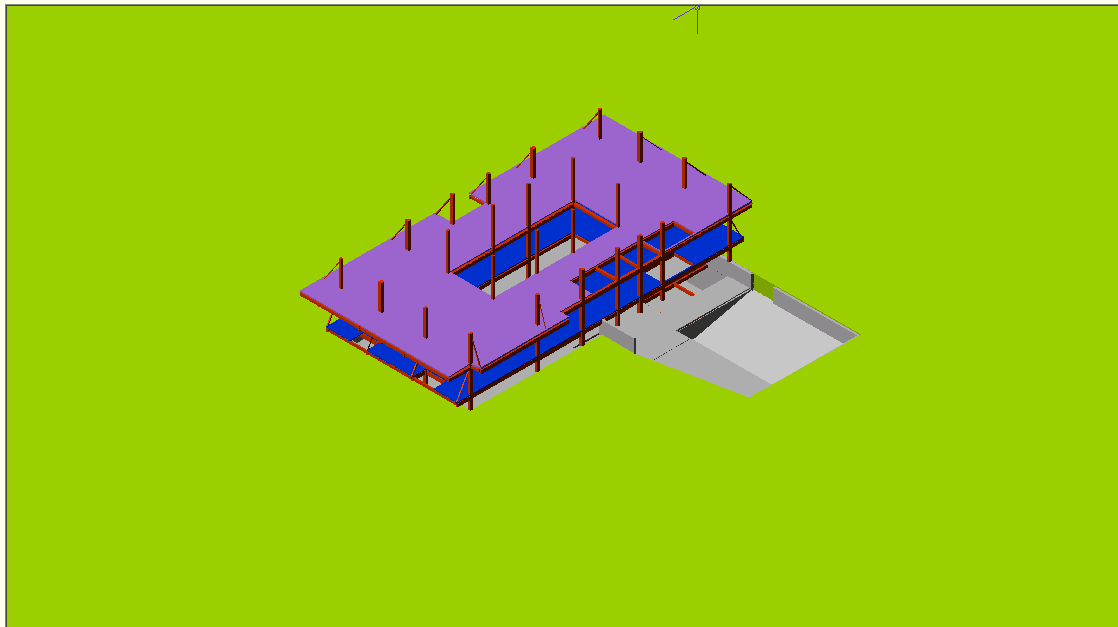


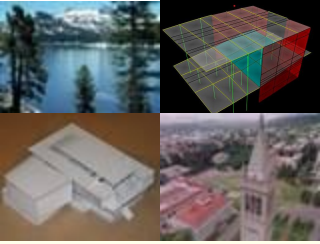
Second Floor Beams and Steel Deck



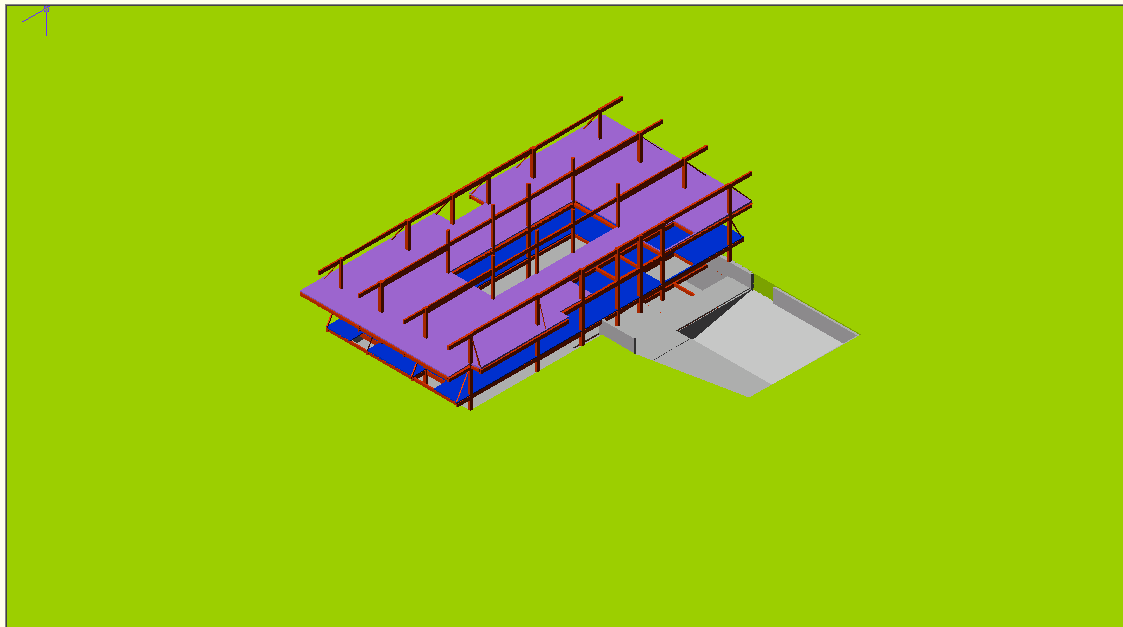


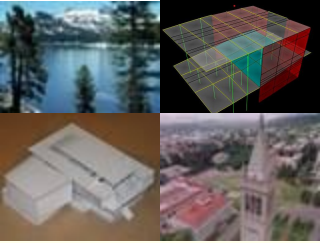
Second Floor Concrete Slab



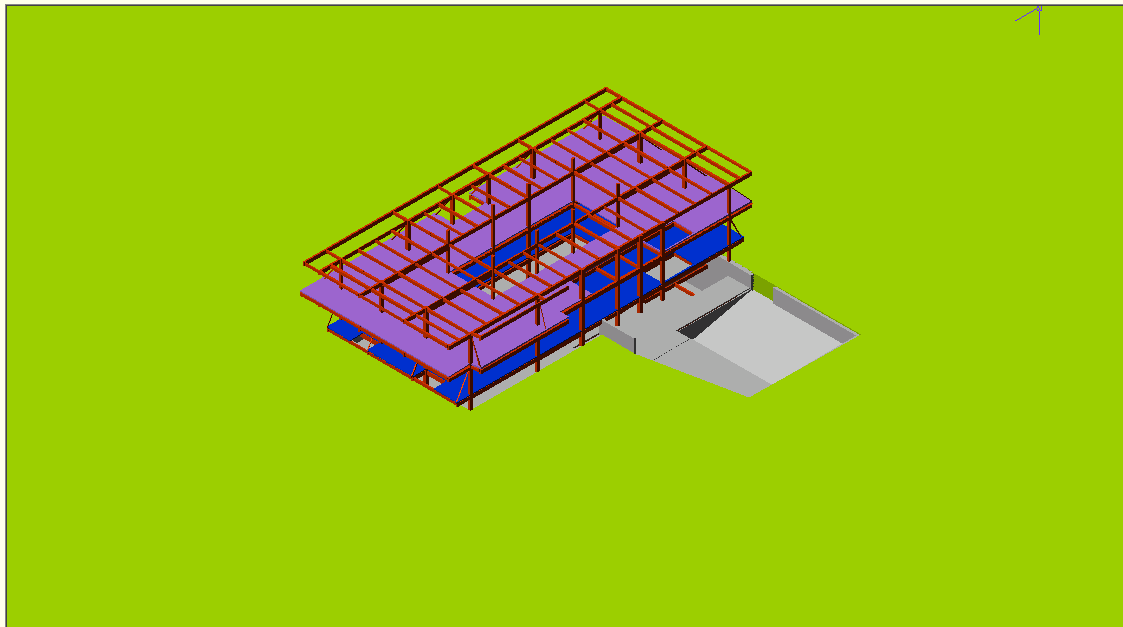


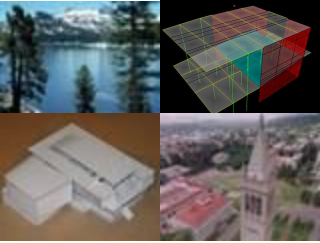
Griders





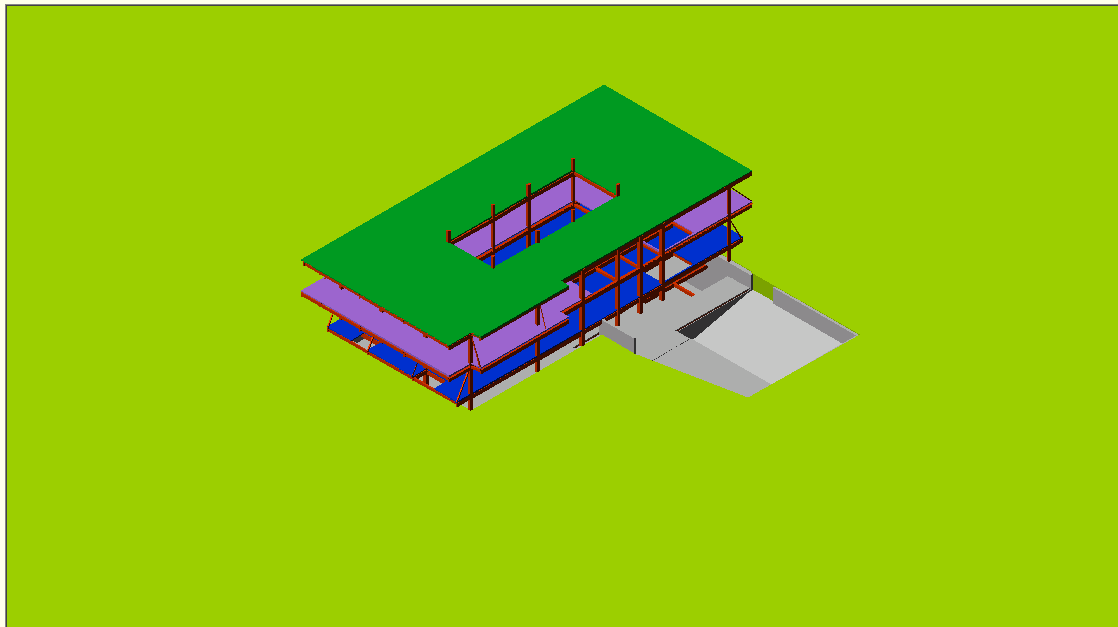
Roof Deck

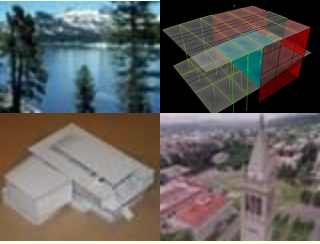




Roof Concrete Slab

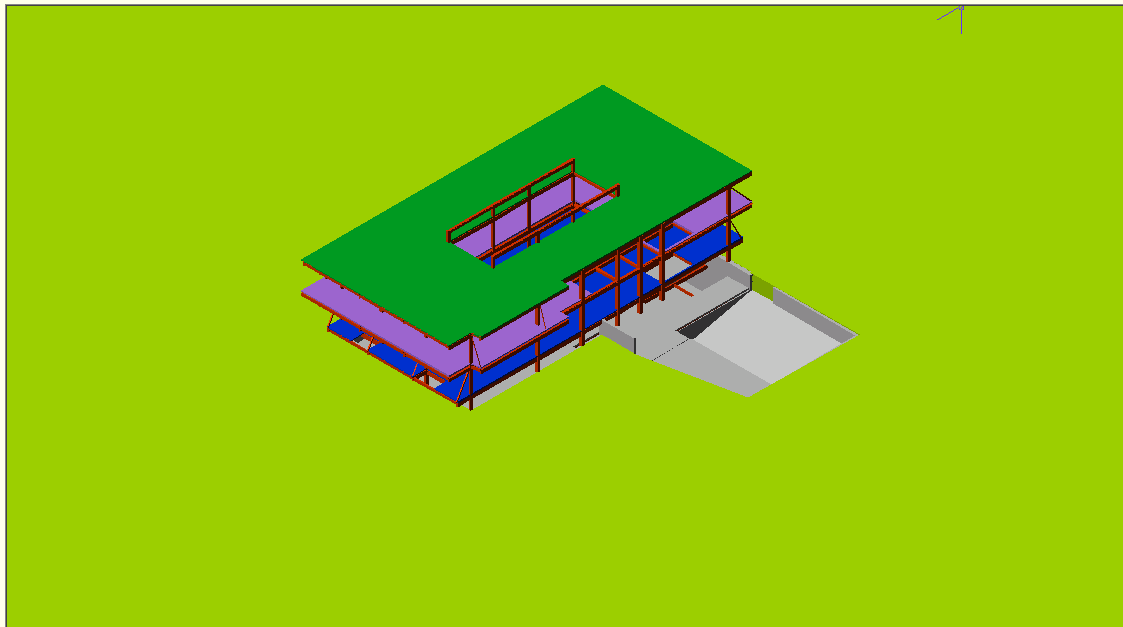
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

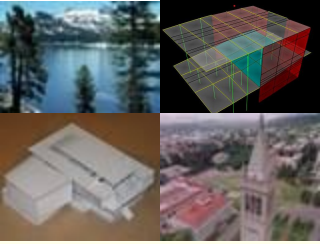




Griders Atrium

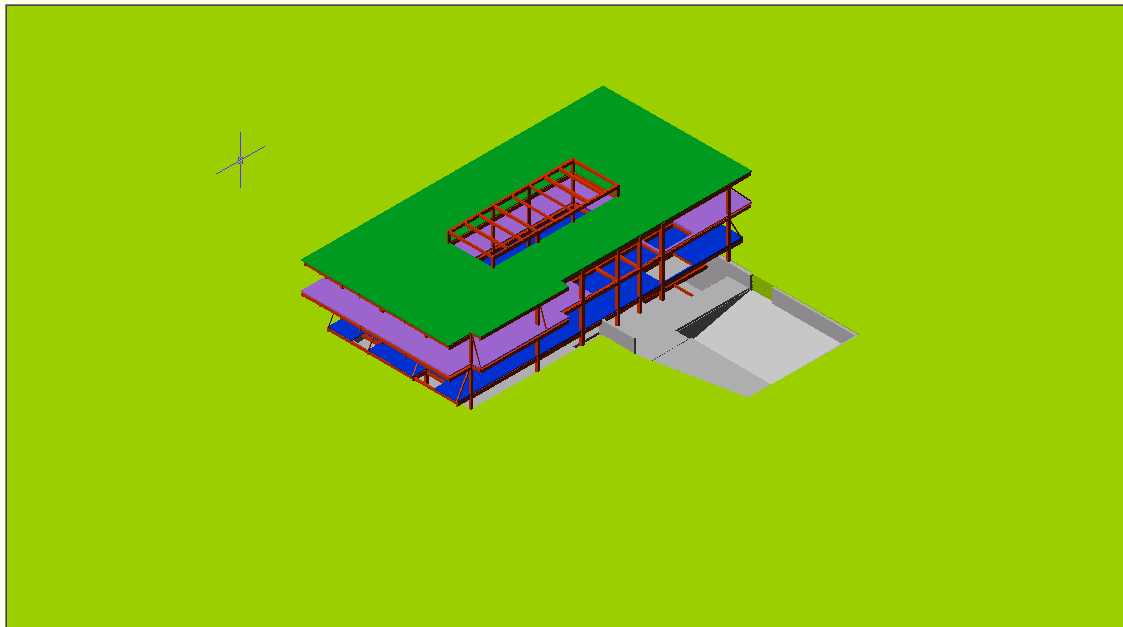
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

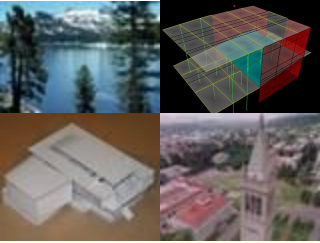




Beams Atrium

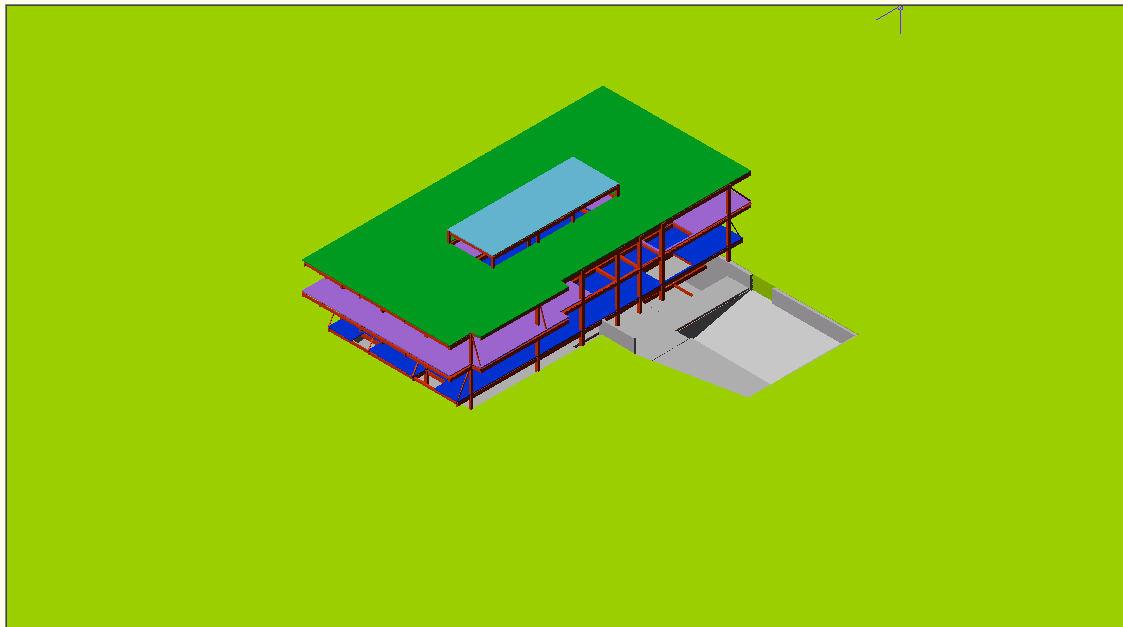
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT





Concrete Slab Atrium

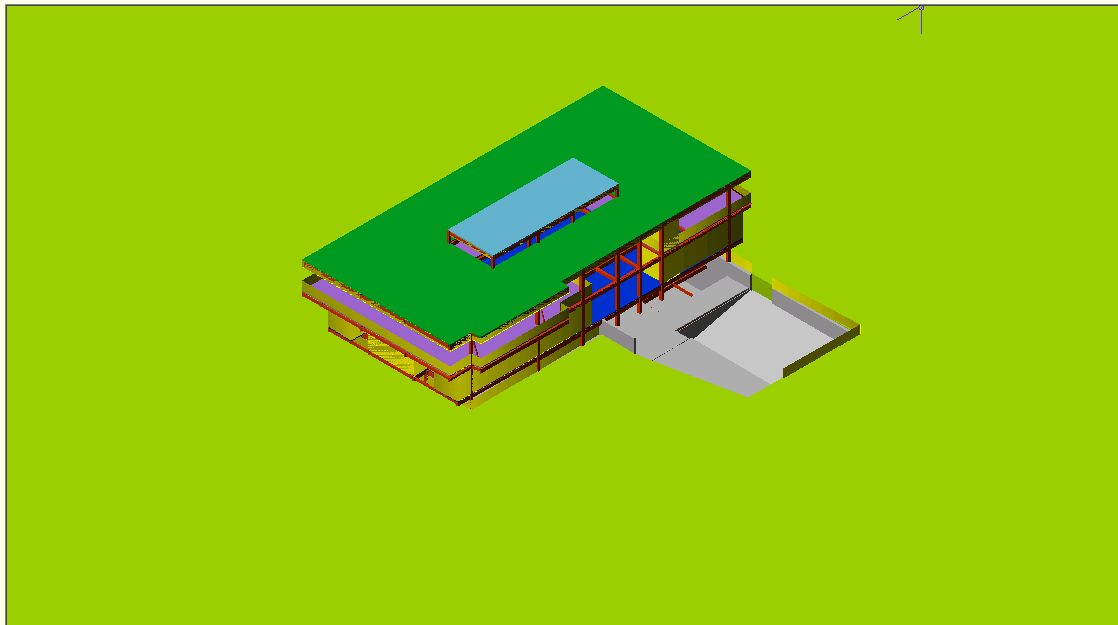
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

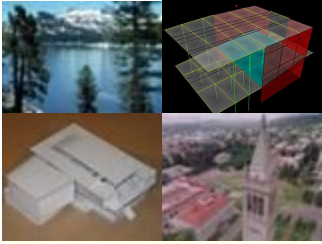




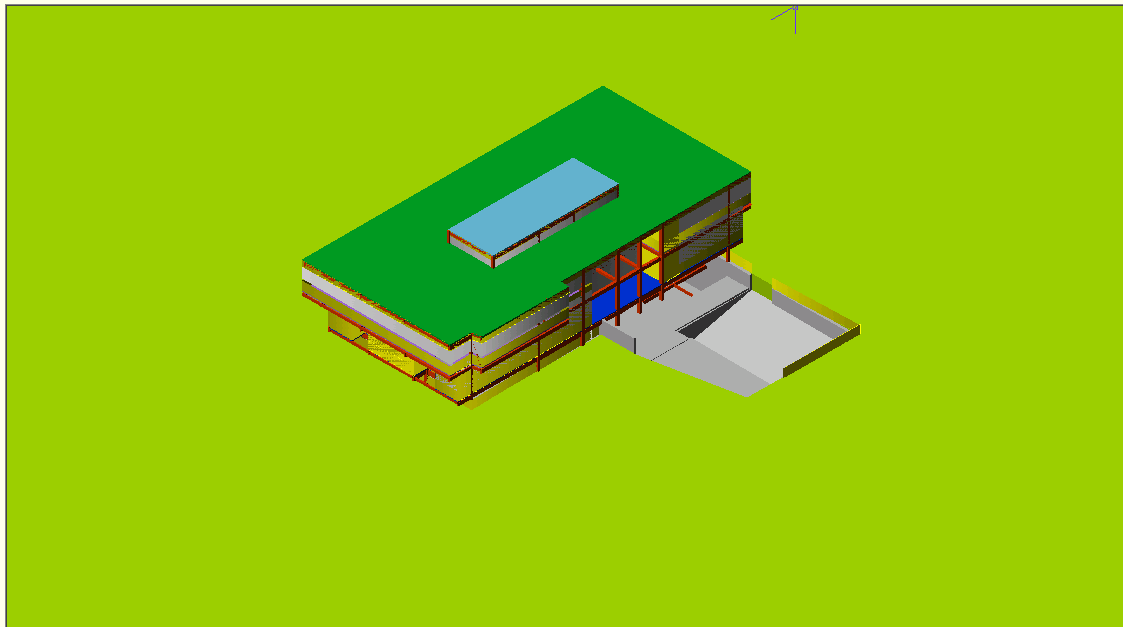
Enclosure Educational Wing

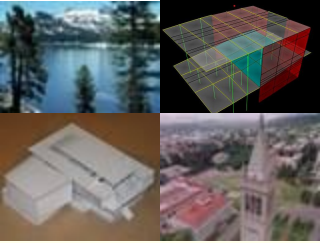
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT





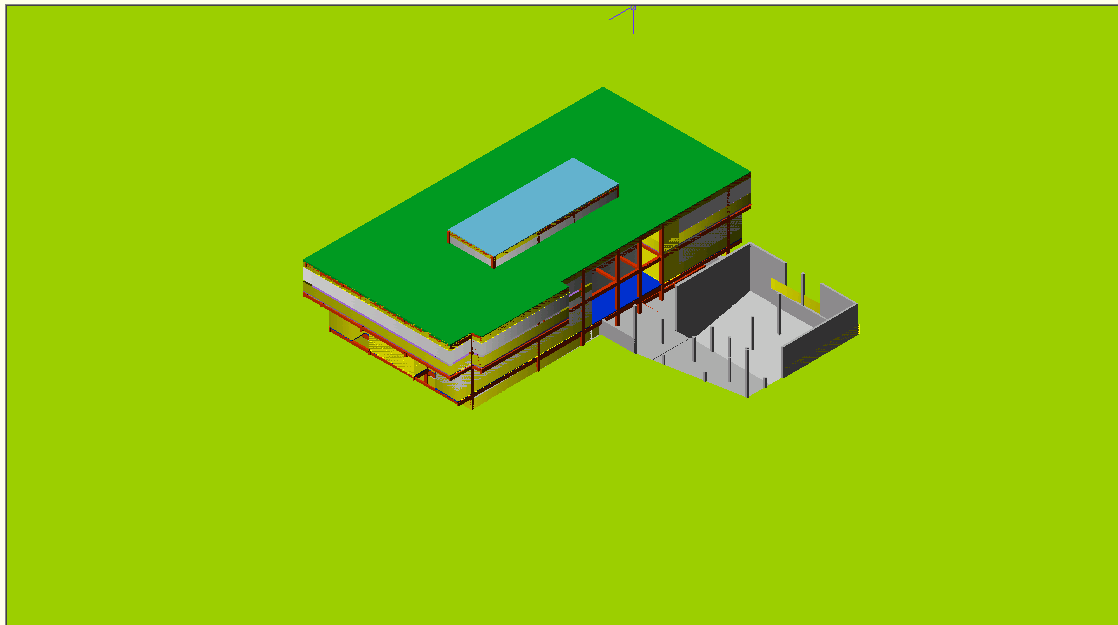
Windows and Glazing

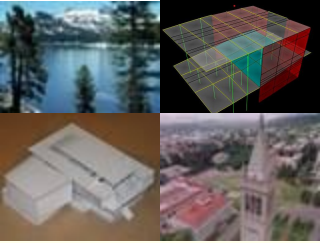




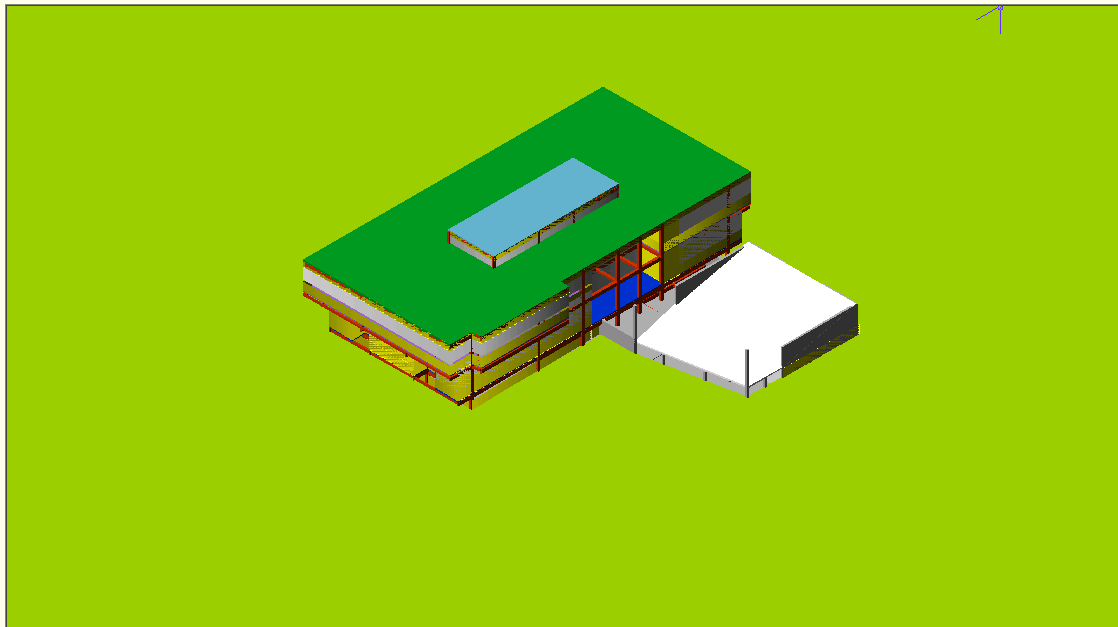
Shear Walls/Columns of Auditorium

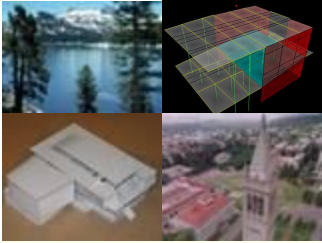
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT





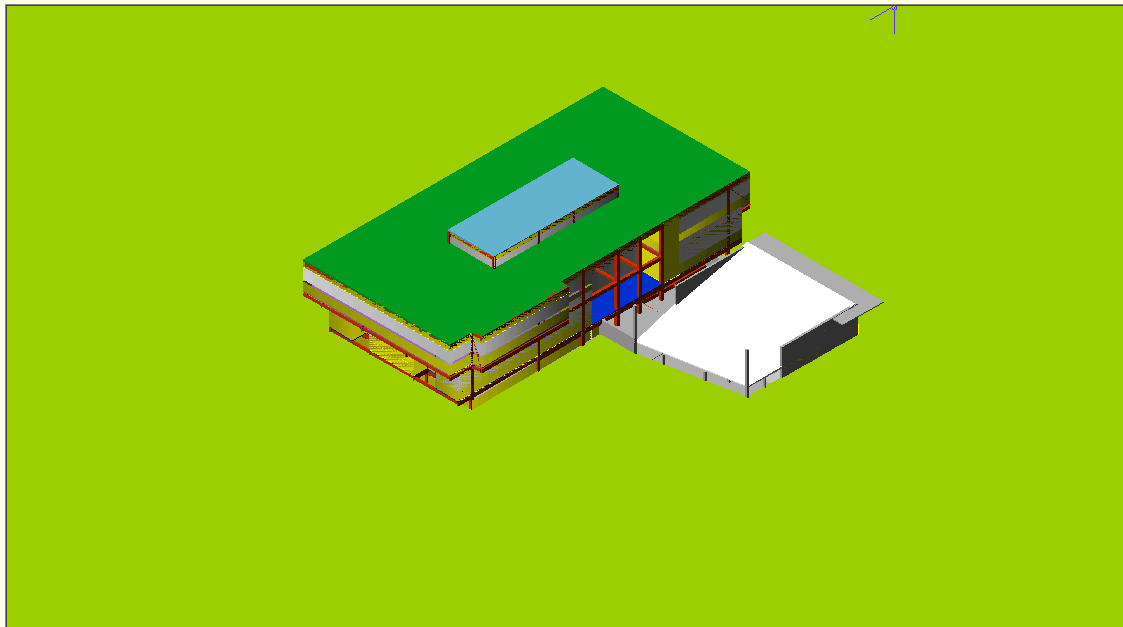
Auditorium Deck

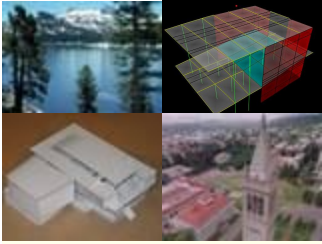




Auditorium Balcony

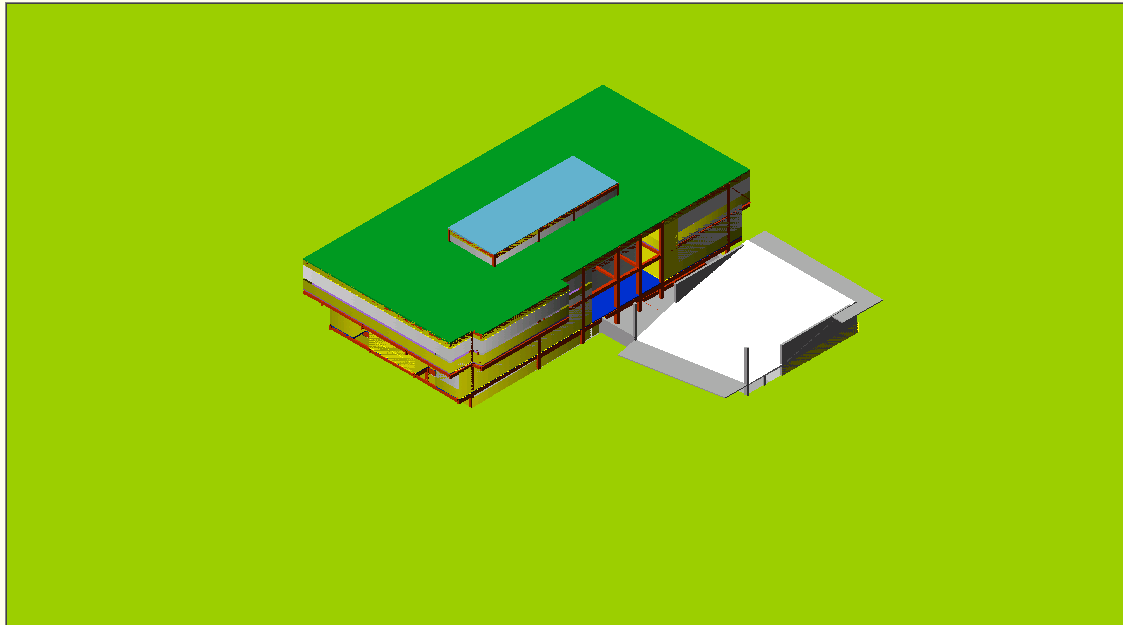
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

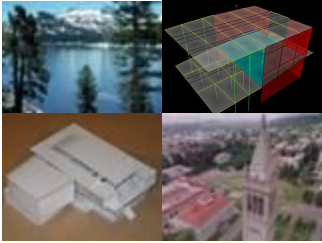




Auditorium Cantilever

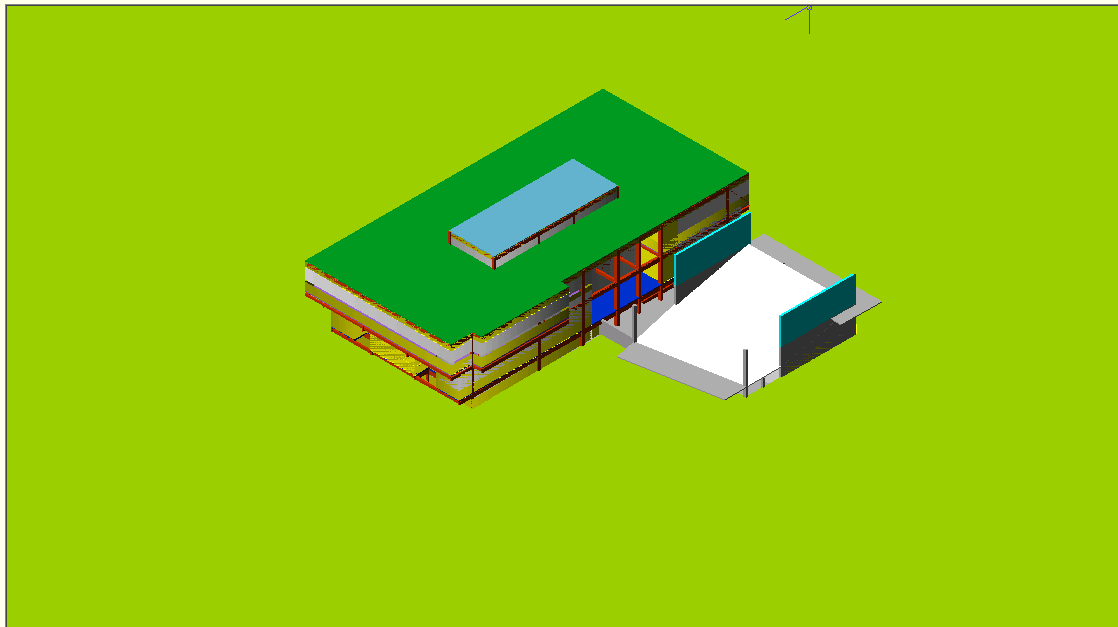
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

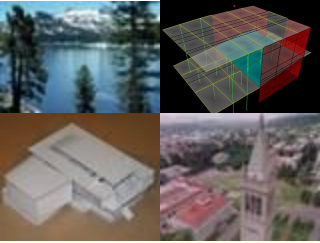




Shear Walls Auditorium Block

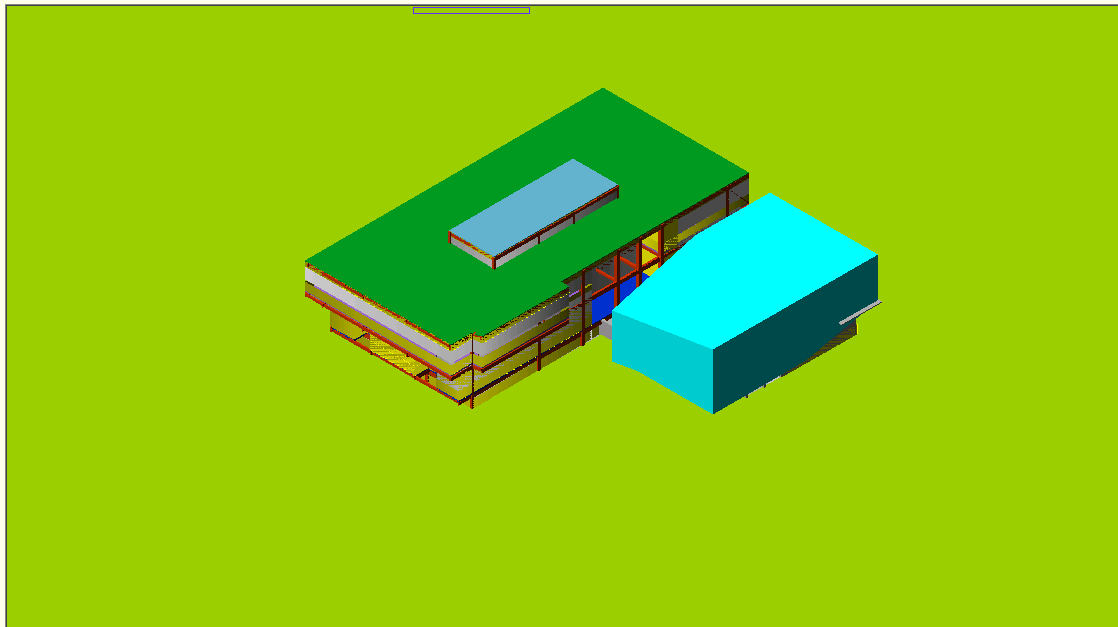
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT

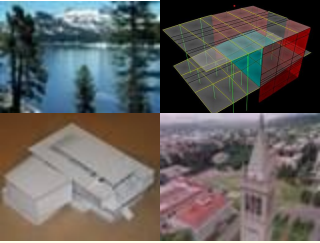




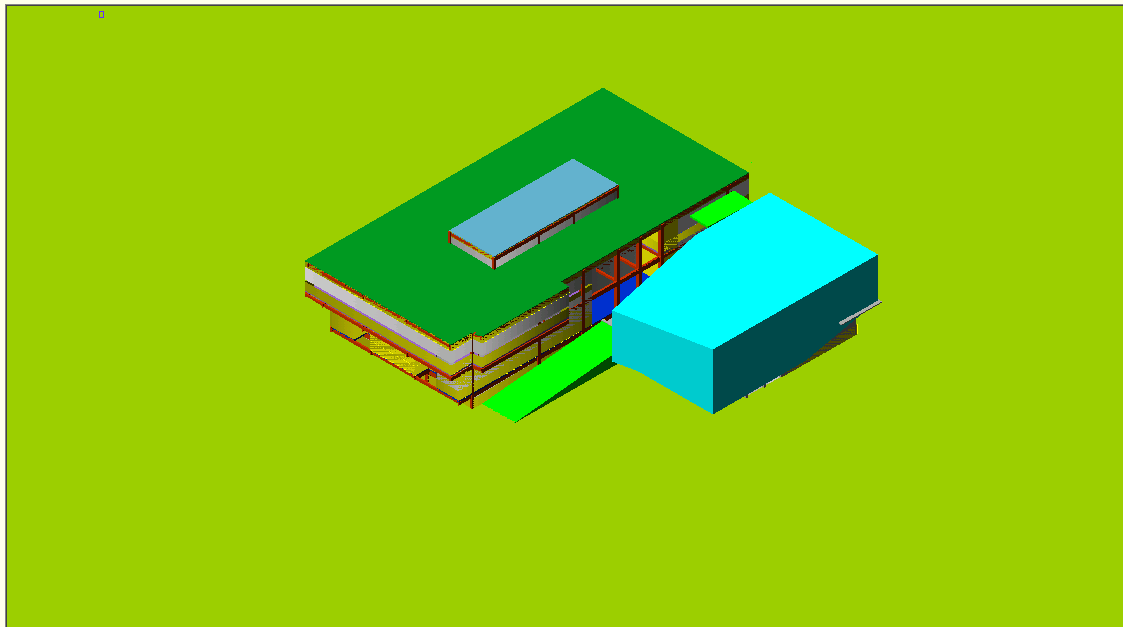
Enclosure Auditorium

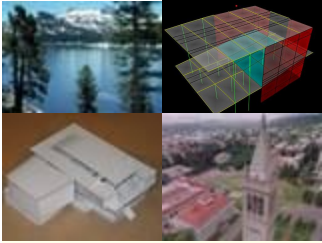
ARCHITECTURE – ENGINEERING – CONSTRUCTION MANAGEMENT





Ramp



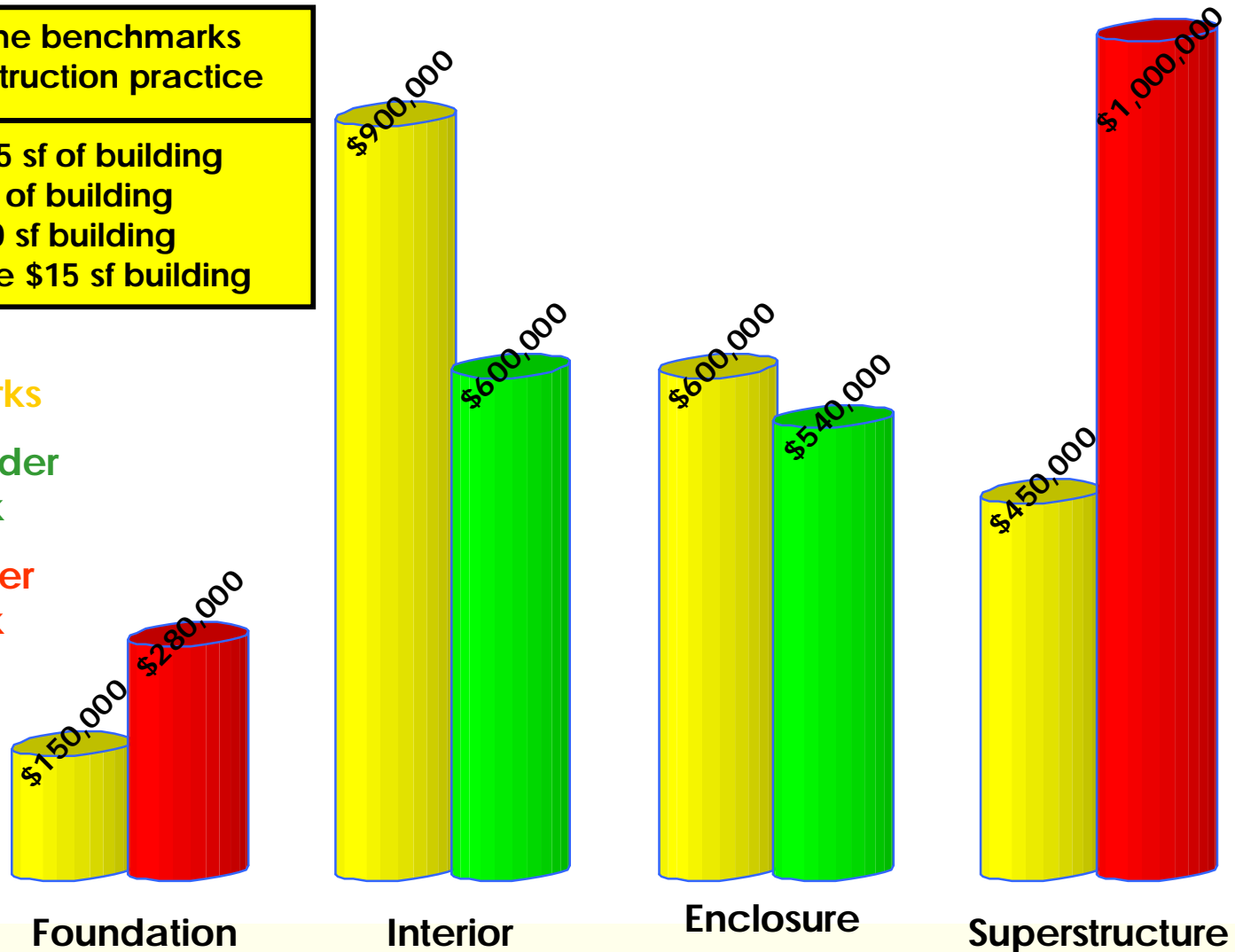


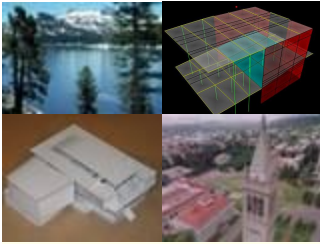
Benchmark Comparison

Analysing some benchmarks for good construction practice

- Foundation \$5 sf of building
- Interior \$30 sf of building
- Enclosure \$20 sf building
- Superstructure \$15 sf building

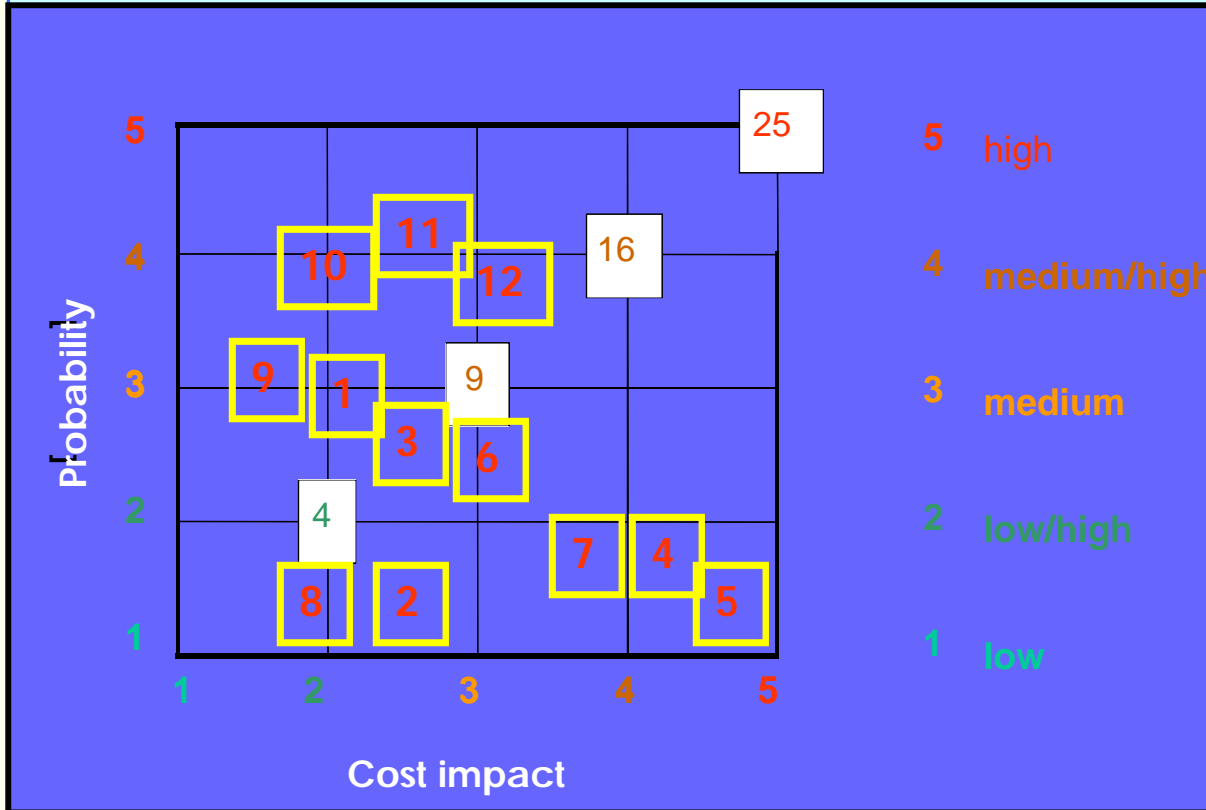
- Benchmarks
- Project under benchmark
- Project over benchmark



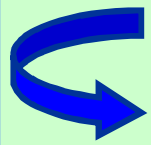


Risk Analysis and Management

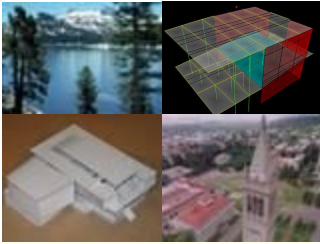
Evaluation by 5*5 matrix for risk assessment



1. Subcontractor Failure/Problems
2. Permit Problems
3. Site Contamination
4. Earthquake
5. Fire
6. Highly Unusual Weather
7. Loss of Funding
8. Land Reclaimed by Government
9. Theft / Vandalism
10. Material Delays
11. Cost / Labor Inflation
12. Scope / Design Changes



- Insurance
- Risk transfer to contractors (Design and build)
- Controlling



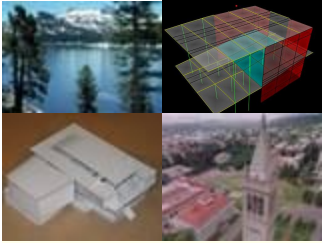
LEED Certification

Green Building Features of MW:

- Solar powered snow removal system
- Use of Trees to reduce energy requirements
- Use of window shades to reduce heat gain on building
- Under floor HVAC system for energy efficiency
- Low-emitting finishing materials

LEED™ Scorecard, Version 2.0

39		13		15		Total Project Score		Possible Points		69	
Certified		26 to 32 points		Silver		33 to 38 points		Gold		39 to 51 points	
Platinum		\$2 or more points									
8 1 5 Sustainable Sites						5 4 4 Materials & Resources					
Possible Points 14						Possible Points 13					
Y	?	N	Prereq 1	Erosion & Sedimentation Control		Y	?	N	Prereq 1	Storage & Collection of Recyclables	
			Credit 1	Site Selection					Credit 1.1	Building Reuse, Maintain 75% of Existing Shell	
1			Credit 2	Urban Redevelopment		1			Credit 1.2	Building Reuse, Maintain 100% of Existing Shell	
			Credit 3	Brownfield Redevelopment		1			Credit 1.3	Building Reuse, Maintain 100% Shell & 50% Non-Shell	
1			Credit 4.1	Alternative Transportation, Public Transportation Access		1			Credit 2.1	Construction Waste Management, Divert 50%	
1			Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms		1			Credit 2.2	Construction Waste Management, Divert 75%	
1			Credit 4.3	Alternative Transportation, Alternative Fuel Refueling Stations		1			Credit 3.1	Resource Reuse, Specify 5%	
1			Credit 4.4	Alternative Transportation, Parking Capacity		1			Credit 3.2	Resource Reuse, Specify 10%	
			Credit 5.1	Reduced Site Disturbance, Protect or Restore Open Space		1			Credit 4.1	Recycled Content, Specify 25%	
			Credit 5.2	Reduced Site Disturbance, Development Footprint		1			Credit 4.2	Recycled Content, Specify 50%	
			Credit 6.1	Stormwater Management, Rate and Quantity		1			Credit 5.1	Local/Regional Materials, 20% Manufactured Locally	
1			Credit 6.2	Stormwater Management, Treatment		1			Credit 5.2	Local/Regional Materials, of 20% Above, 50% Harvested Locally	
1			Credit 7.1	Landscape & Exterior Design to Reduce Heat Islands, Non-Roof		1			Credit 6	Rapidly Renewable Materials	
1			Credit 7.2	Landscape & Exterior Design to Reduce Heat Islands, Roof		1			Credit 7	Certified Wood	
1			Credit 8	Light Pollution Reduction		1					
3 2 Water Efficiency						13 2 Indoor Environmental Quality					
Possible Points 5						Possible Points 15					
Y	?	N	Credit 1.1	Water Efficient Landscaping, Reduce by 50%		Y	?	N	Prereq 1	Minimum IAQ Performance	
1			Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation		1			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 2	Innovative Wastewater Technologies		1			Credit 1	Carbon Dioxide (CO₂) Monitoring	
			Credit 3.1	Water Use Reduction, 20% Reduction		1			Credit 2	Increase Ventilation Effectiveness	
			Credit 3.2	Water Use Reduction, 30% Reduction		1			Credit 3.1	Construction IAQ Management Plan, During Construction	
8 5 4 Energy & Atmosphere						2 1 Innovation & Design Process					
Possible Points 17						Possible Points 5					
Y	?	N	Prereq 1	Fundamental Building Systems Commissioning		Y	?	N	Credit 1.1	Innovation in Design: Building to be Interactive Educational tool	
Y			Prereq 2	Minimum Energy Performance		1			Credit 1.2	Innovation in Design: Use possible rain and snow run off to create p...	
Y			Prereq 3	CFC Reduction in HVAC&R Equipment		1			Credit 1.3	Innovation in Design: Specific Title	
2			Credit 1.1	Optimize Energy Performance, 20% New / 10% Existing		2			Credit 1.4	Innovation in Design: Specific Title	
2			Credit 1.2	Optimize Energy Performance, 30% New / 20% Existing		2			Credit 2	LEED™ Accredited Professional	
			Credit 1.3	Optimize Energy Performance, 40% New / 30% Existing		2					
			Credit 1.4	Optimize Energy Performance, 50% New / 40% Existing		2					
			Credit 1.5	Optimize Energy Performance, 60% New / 50% Existing		2					
1			Credit 2.1	Renewable Energy, 5%		1					
			Credit 2.2	Renewable Energy, 10%		1					
			Credit 2.3	Renewable Energy, 20%		1					
1			Credit 3	Additional Commissioning		1					
1			Credit 4	Ozone Depletion		1					
1			Credit 5	Measurement & Verification		1					
1			Credit 6	Green Power		1					



LEED Certification

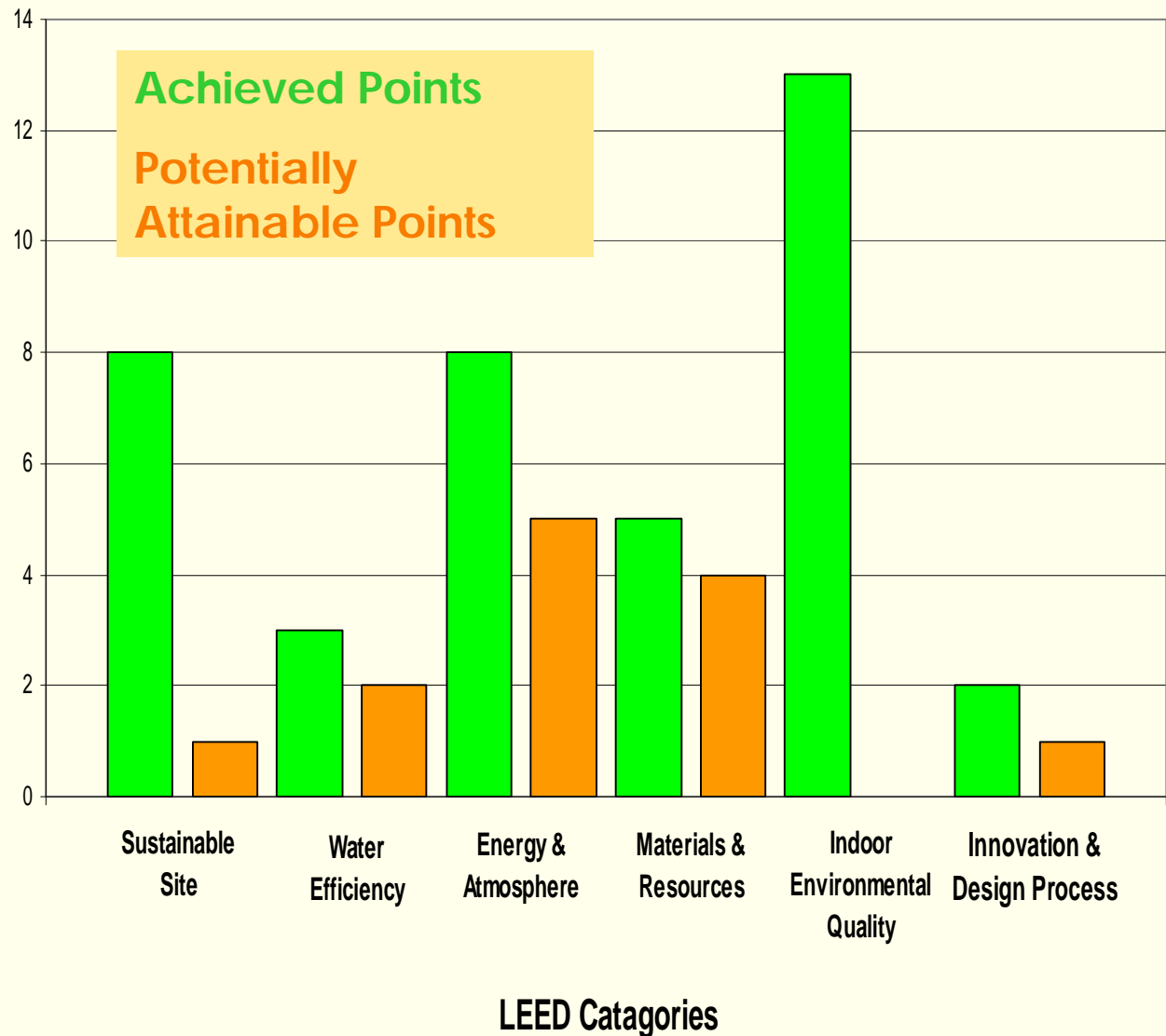
Owner Request:

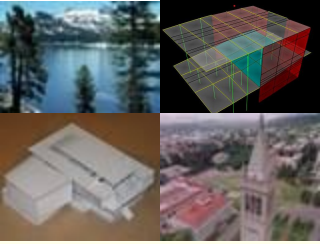
- Silver Rating
- Minimum of 33 points necessary

Focus on:

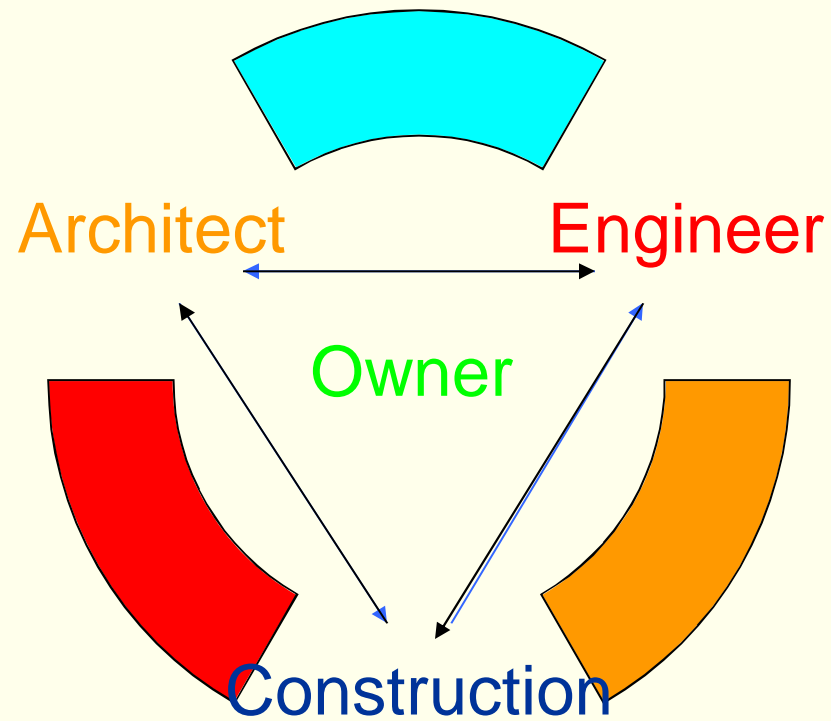
- Indoor Environmental Quality
- Energy and Atmosphere
- Sustainable Site

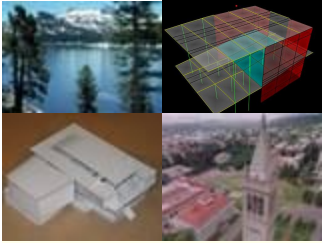
Total Points: 39
Gold Rating





Design Process & Iterations





Mountain & Water Iterations

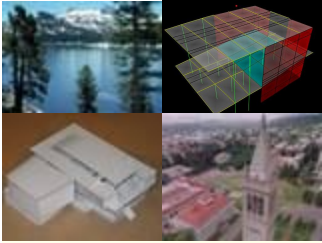
Choice to Blend Construction Materials.

- Initial all-steel construction
- Architect's desire for steel and concrete construction to articulate and "juxtapose" the tectonics of education block, auditorium block and the unifying ramp
- Integration of steel and concrete alternatives from winter quarter

Cantilever Solution

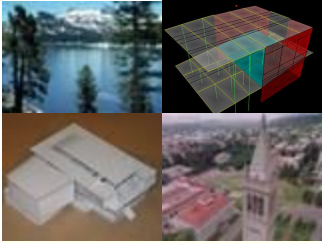
- In reaction to proposal made by Owner to reduce moment connections
- Original engineering solution to use exposed compression members
- A/E Interaction to develop "hidden" system within partitions





Discipline Roles as Defined by Ridge Team

	Architect	Engineer	Construction
Primary Roles:	<ul style="list-style-type: none"> • Formulation of Thesis • Spatial transition of Thesis • Arrangement of spaces to fulfill program 	<ul style="list-style-type: none"> • Design Structural and Lateral System to meet program and applicable codes 	<ul style="list-style-type: none"> • Budget design alternatives • Schedule design alternative
Secondary Roles:	<ul style="list-style-type: none"> • Create feasible space (structure and construction) 	<ul style="list-style-type: none"> • Structure to compliment architecture • Structure that is modular and constructible 	<ul style="list-style-type: none"> • Advise Architect and Engineer on constructability of design



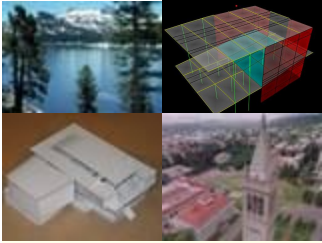
Communication and Coordination

Winter Areas of Improvement:

- More Real Time Communication (ICQ, NetMeeting)
- Involvement of All Disciplines in LEED Design

Achievement of Goals:

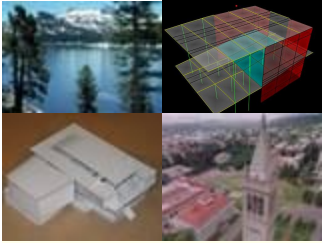
- Heavy use of ICQ in last weeks of design
- More efficient use of NetMeeting for file sharing
- All Disciplines offered ideas for ways to cut energy consumption and showed flexibility within discipline to attain LEED Credits



Ridge Team Interactions

Team Interactions:

- Disciplines began to *anticipate* the needs of other team members and *act* accordingly
- Team members began to act across disciplines in order to expedite the design process

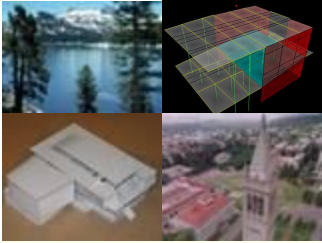


Interaction Experiences & Lessons Learned

Gained both knowledge and understanding of other disciplines

Learned the importance of collaboration and coordination between team members

Gained international and intercultural point of view towards the A/E/C industry



Thanks to All the Mentors

With Special Thanks to:

Dr. Renate Fruchter of Stanford

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Prof. Eduardo Miranda of Stanford

Humberto Cavallin of UCB

Susan Ubbelohde of UCB

Mike Martin of UCB

Daniel Gonzalez of Design Village

Robert Alvarado of Charles Salter & Associates

Greg Luth of KL&A, Inc.

Henry Tooryani of Swinerton

Adhamina Rodriguez of Swinerton

