

A photograph showing a group of hands of various skin tones reaching in from the edges of the frame to hold a small, realistic globe of the Earth in the center. The background is black. The text 'River Team 2009' is overlaid in white, bold font across the middle of the image.

River Team 2009

The Engineering School of
Riverbank University

A: JOSEFINE KOPPEN

– Bauhaus-Universität Weimar

E: XIAOYU LIU

– Stanford, CA

JEFF BRUNTON

– Wisconsin Madison

YURIY MIKHALEVSKIY

– Stanford, CA

C:JIANG BIAN

– Stanford, CA

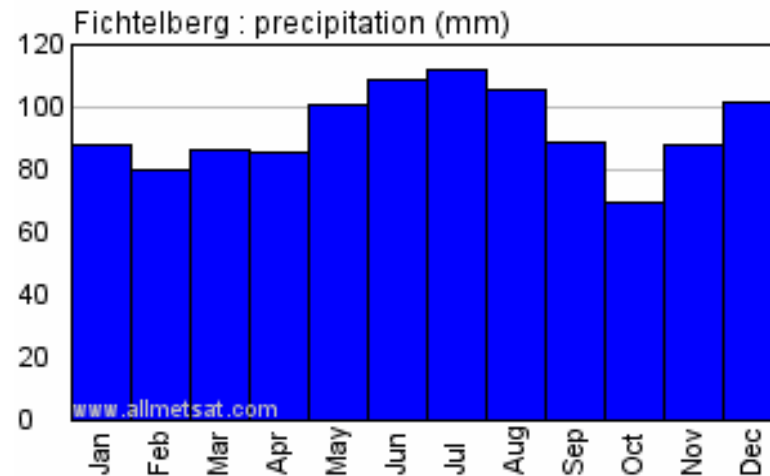
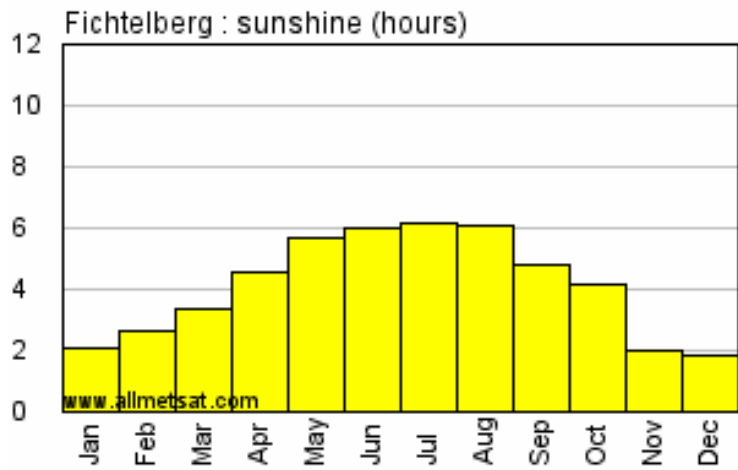
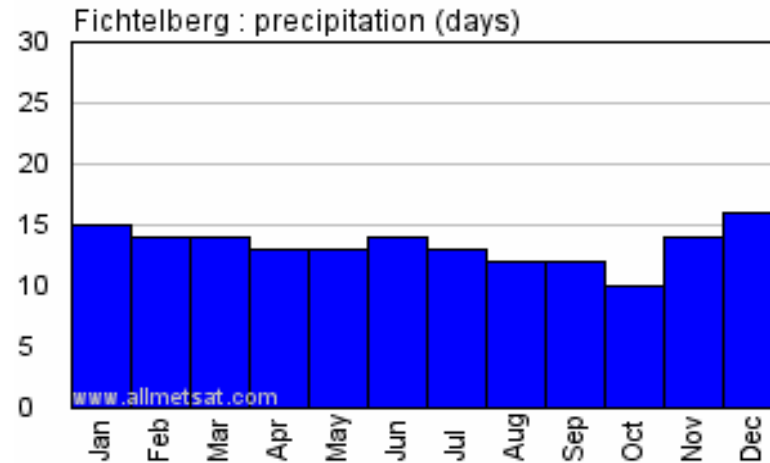
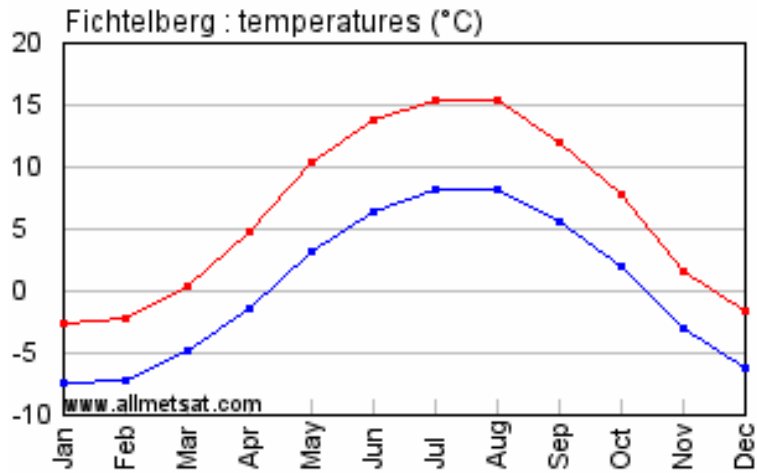
MATT WATLEY

– Chico State, CA

LCF: NADIN DITTMAN

-- Bauhaus-Universität Weimar

Site Conditions

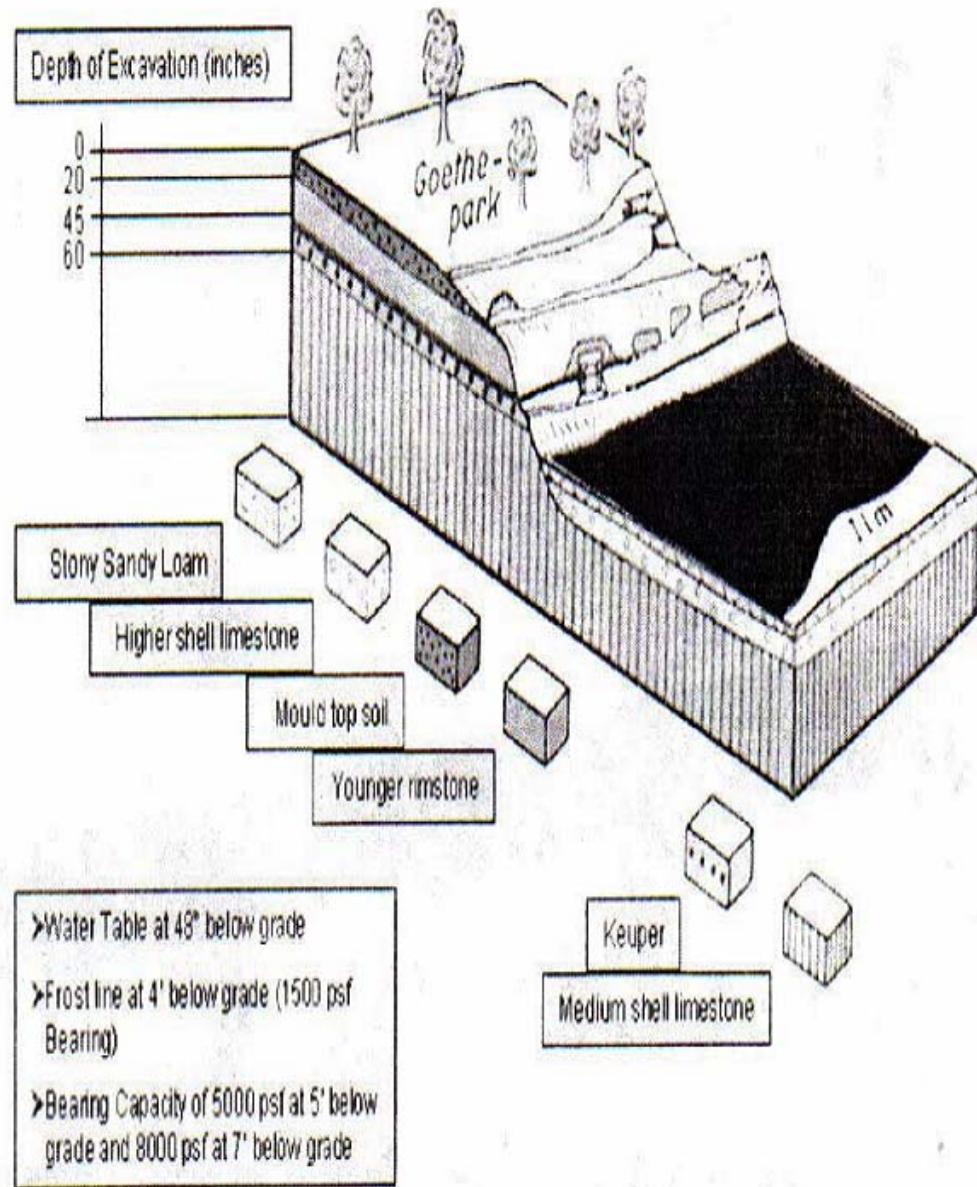


•Durable Material Preferred

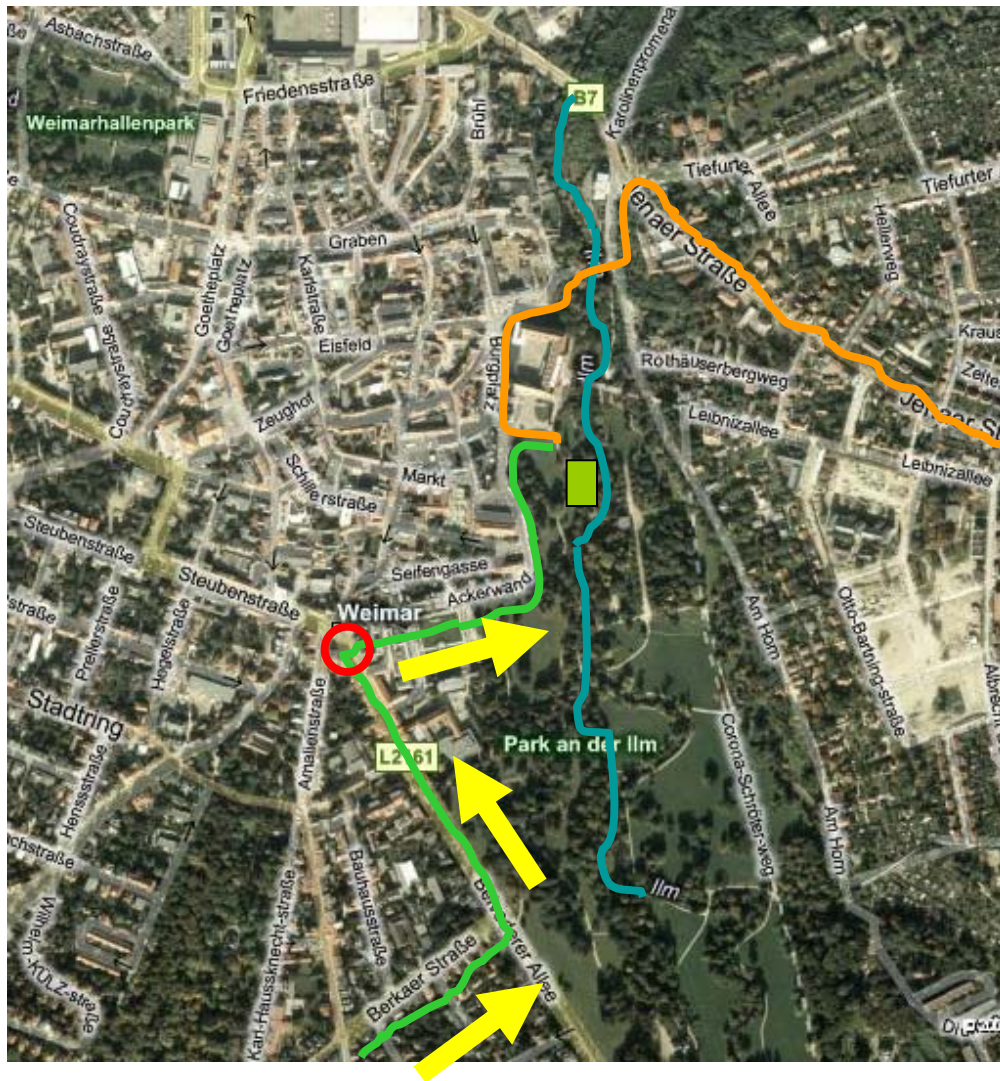
•Temperature Fluctuation
•Flooding potential





Site Conditions

- High Water Table
- High Frost Line
- Old Plants Adjacent
- Bearing Capacity:
385kPa



Small Site • Winding Access • Flood Hazard



-  School of Engineering
-  Ilm River
-  Access by bridge
-  Access through town (partly one way)

Expressway exit:
Mellingen -Apolda

- E: Ilm and Ilm Park
- SW: Anna-Amalia-Library
- N: Castle
- S: Ilm Park

Expressway exit:
Weimar - Gelmeroda

Natural Park • Historical City



CHALLENGES

River 2009



CASTLE

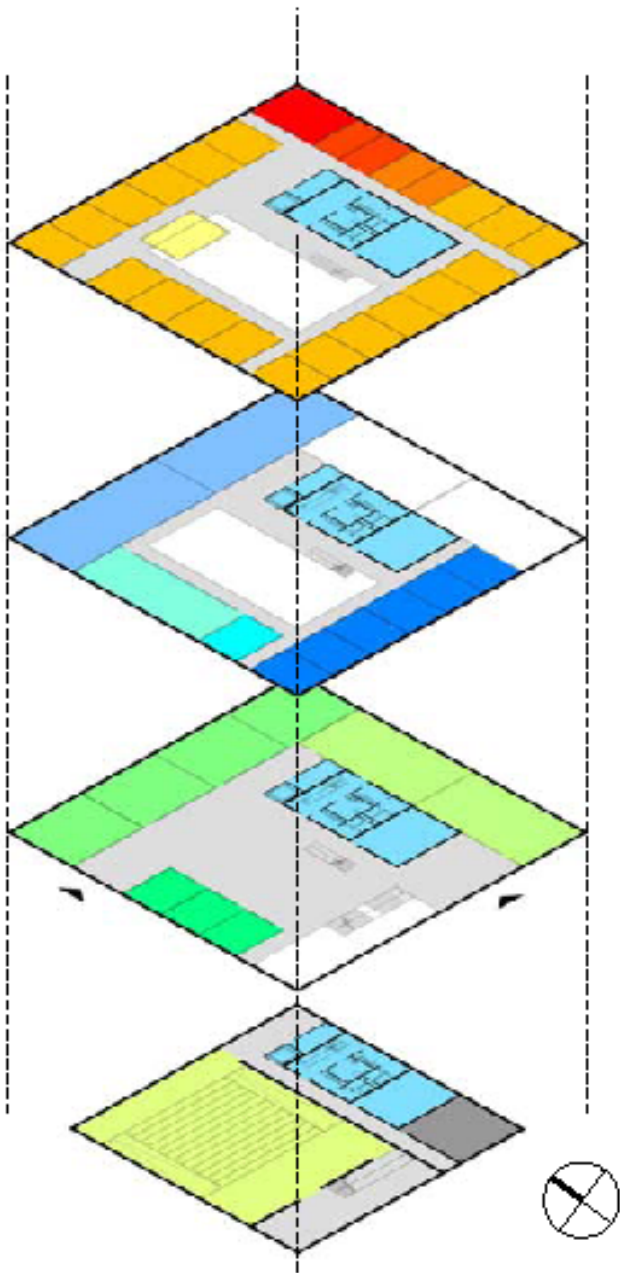
1
S
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River 2009

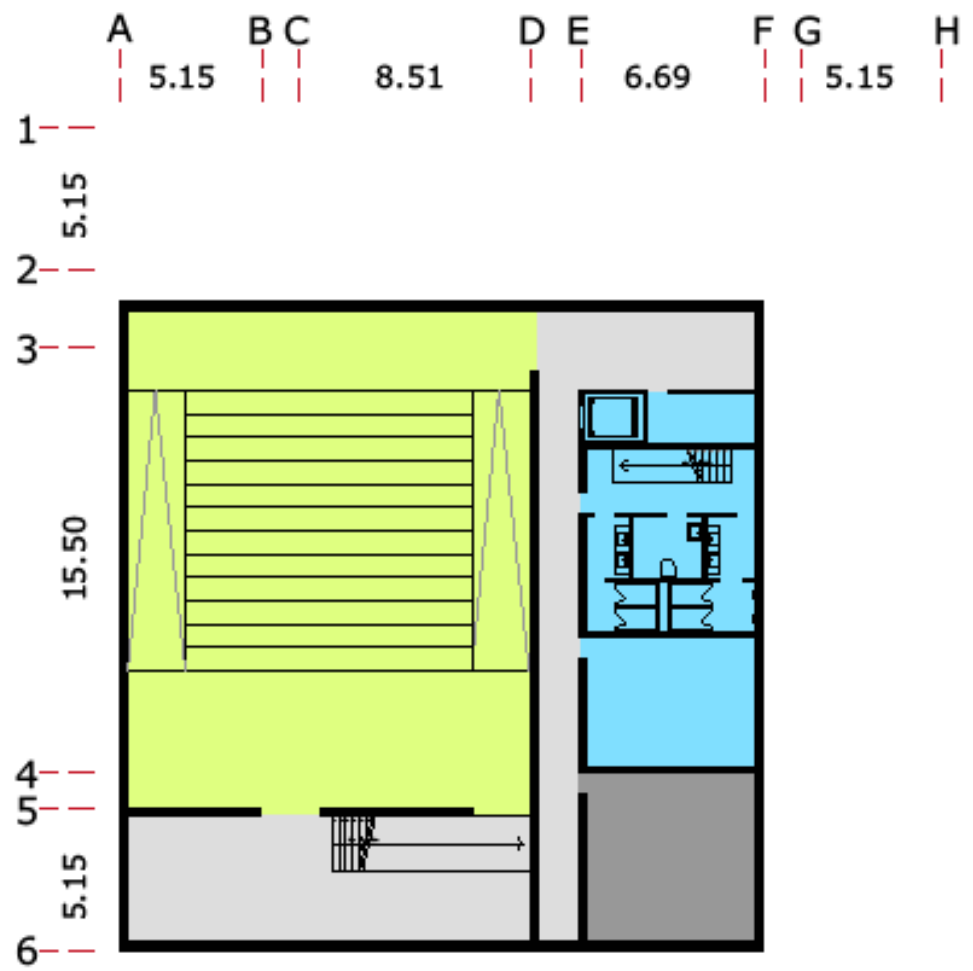


Siteplan with IIm in normality
scale 1/2500



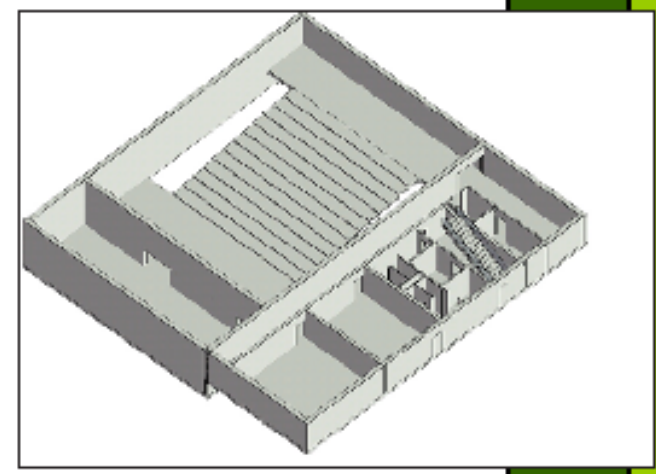


Space Type	Quantity	SqMeter each	Total SqMeter
Third Floor			
Faculty Offices	19	17, 17.8, 17x18	340.8
Dep. Chair's Off.	1	29	29
Senior Admin. Off	2	14	28
Admin. Assistants	2	14	28
Meeting Room	1	20	20
Second Floor			
Instructional Labs	2	90	180
Student Offices	6	17.8	106.8
Server Room	1	61	61
Technical Support	1	18	18
First Floor			
Seminar Rooms	3	2x17.8, 15.7	51.3
Small Classrooms	4	45	180
Large Classrooms	2	73	146
Basement			
Auditorium	1	266	266
Storage Room	1	32.3	96.9
On each Floor			
M/E Room	2	36.8	110.4
Total Building			2804

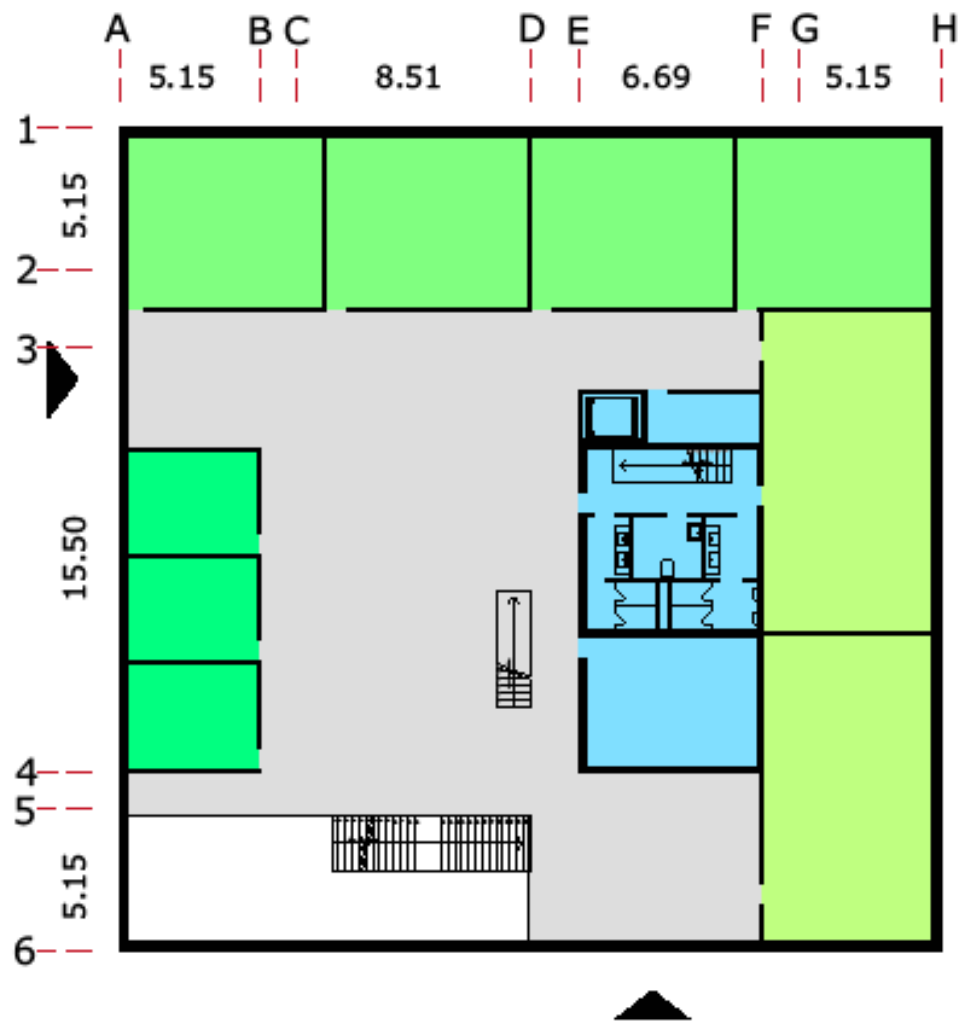


basement

- Storage
- Auditorium
- Core

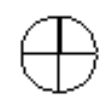
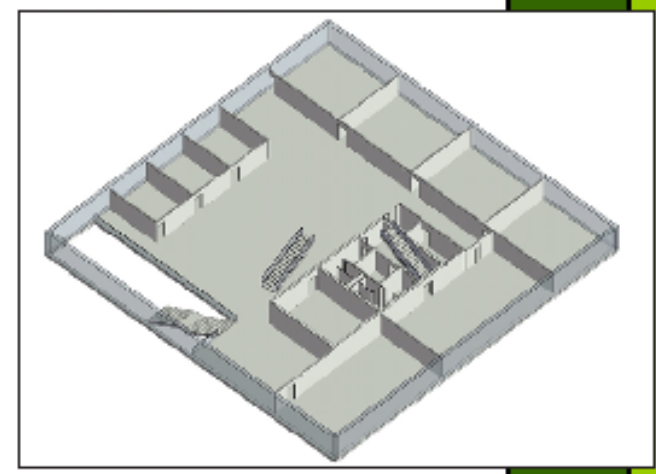



 scale 1/250



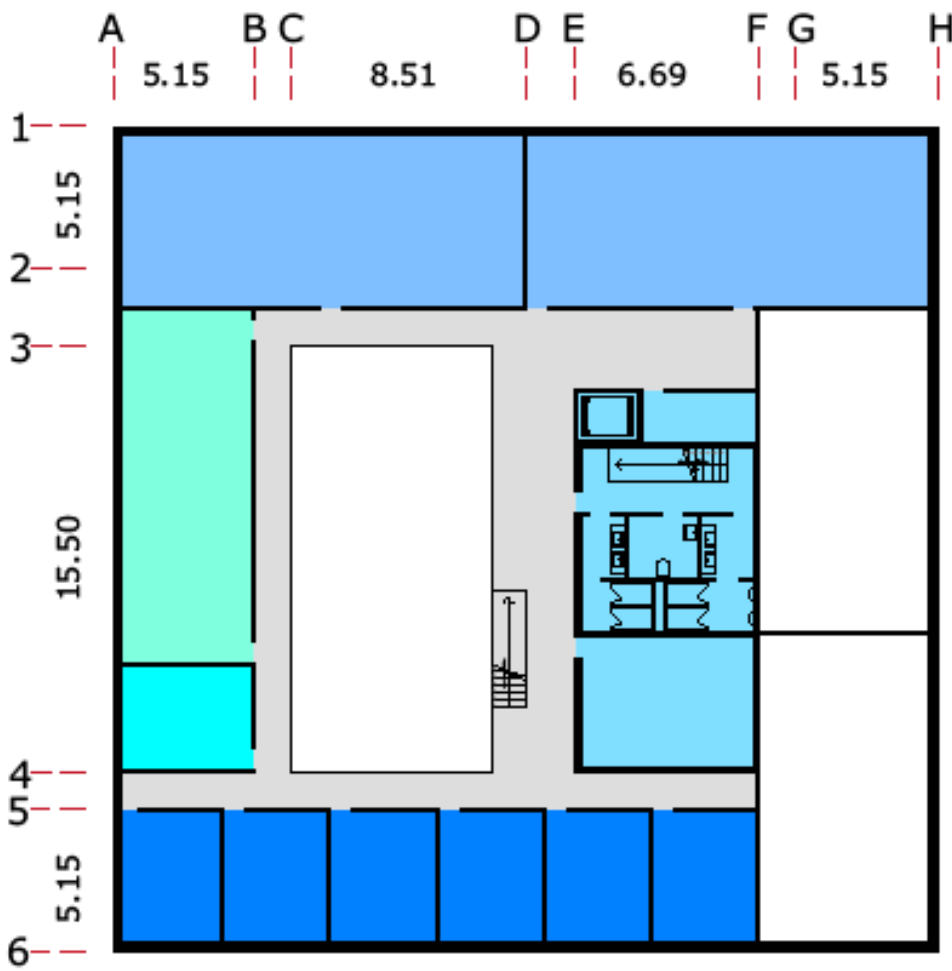
1st

- Core
- S-Classrooms
- L-Classrooms
- Seminar Rooms



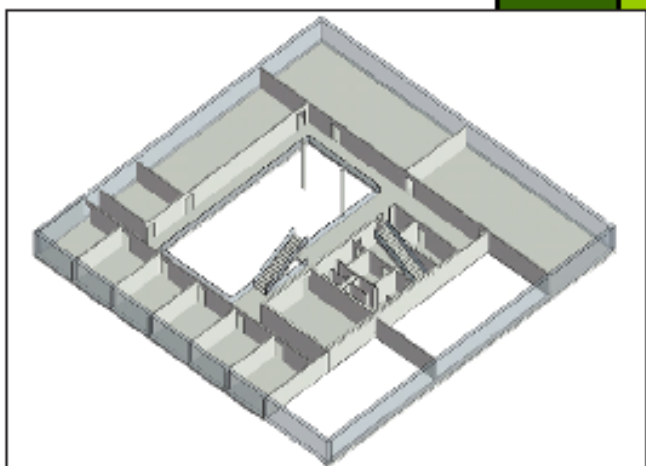
scale 1/250



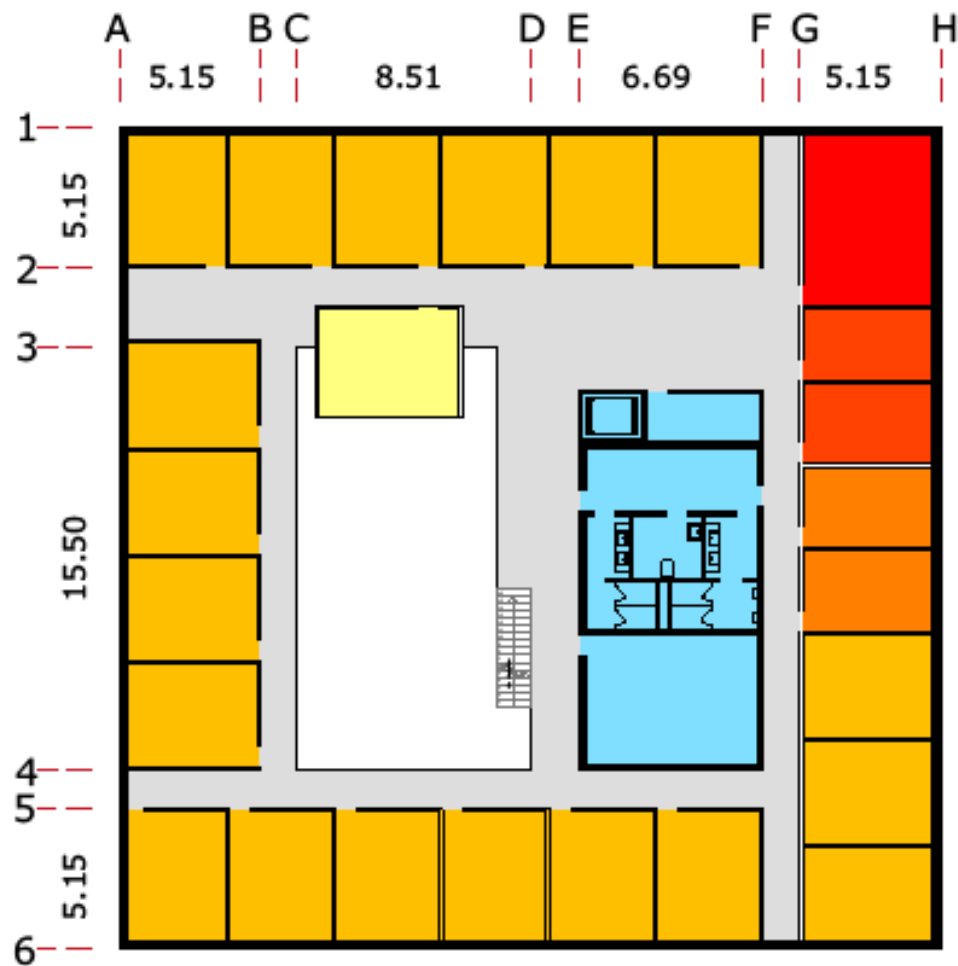


2nd

- Core
- Server
- Instructional Labs
- Student Offices
- Technical Support

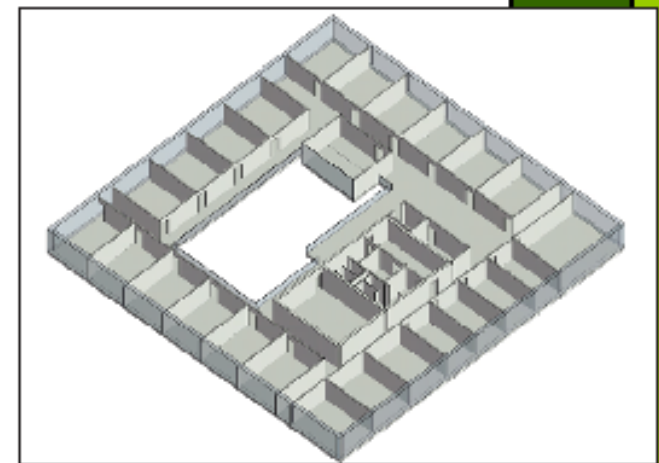


scale 1/250

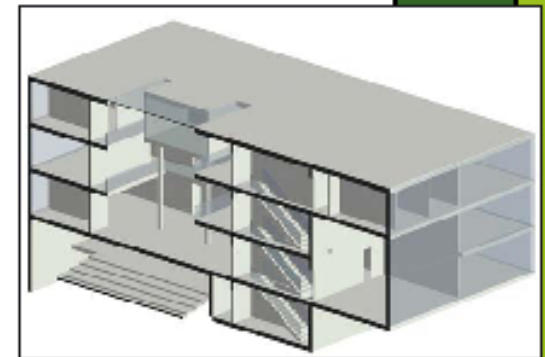
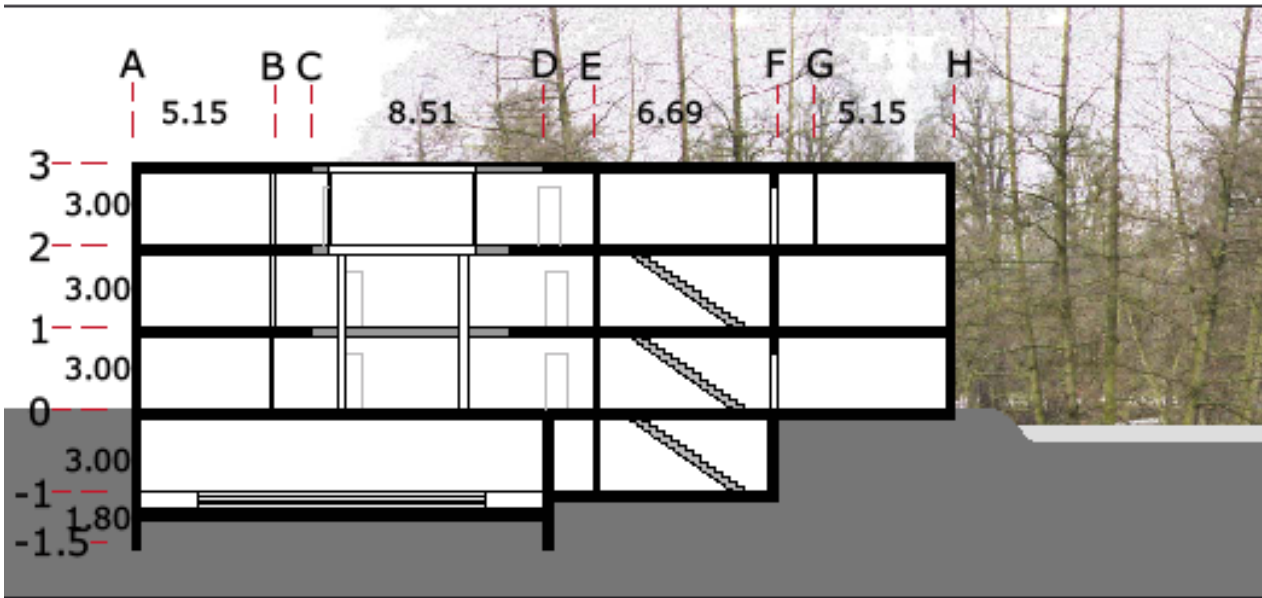


3rd

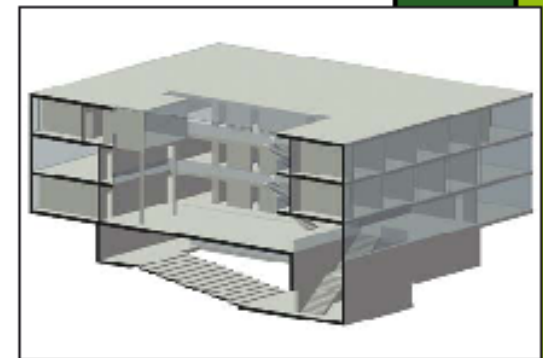
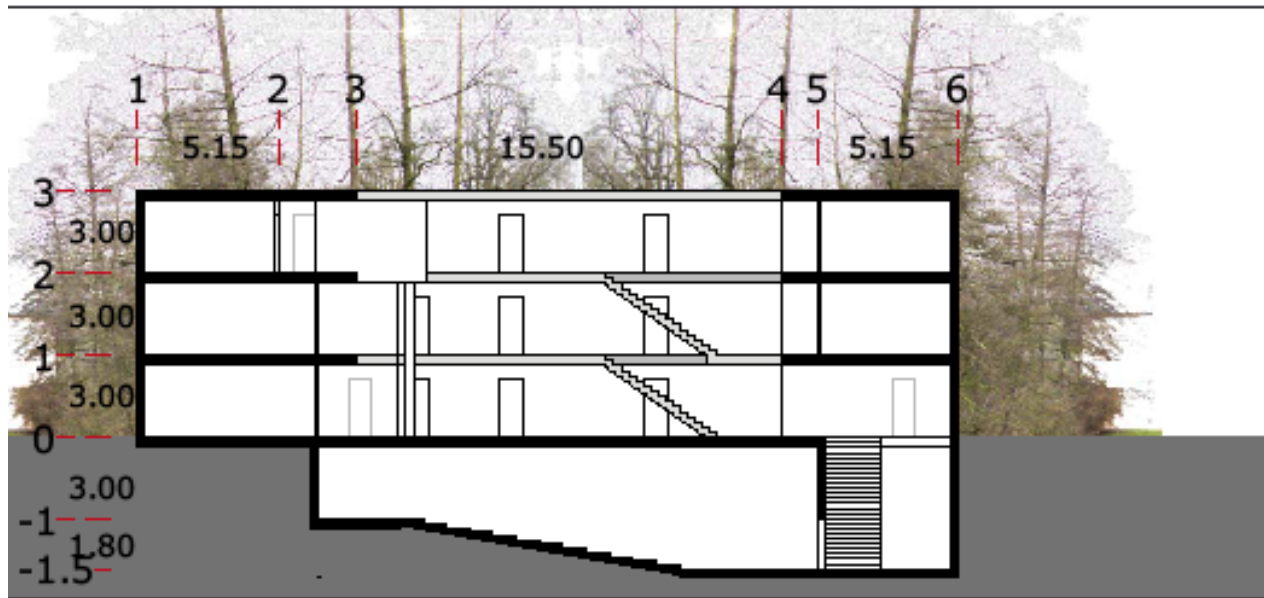
- Core
- Faculty Offices
- Conference Room
- Administrative Assistance
- Senior Administrative Assistance
- Department Chair's Office



scale 1/250



scale 1/250



scale 1/250



DEAD LOADS:

kPa

MEP	0.24
CLADDING	0.24
MISC	0.58
PARTITIONS	0.96
SYSTEM	2.88
SELF-WEIGHT	2.40

LIVE LOADS:

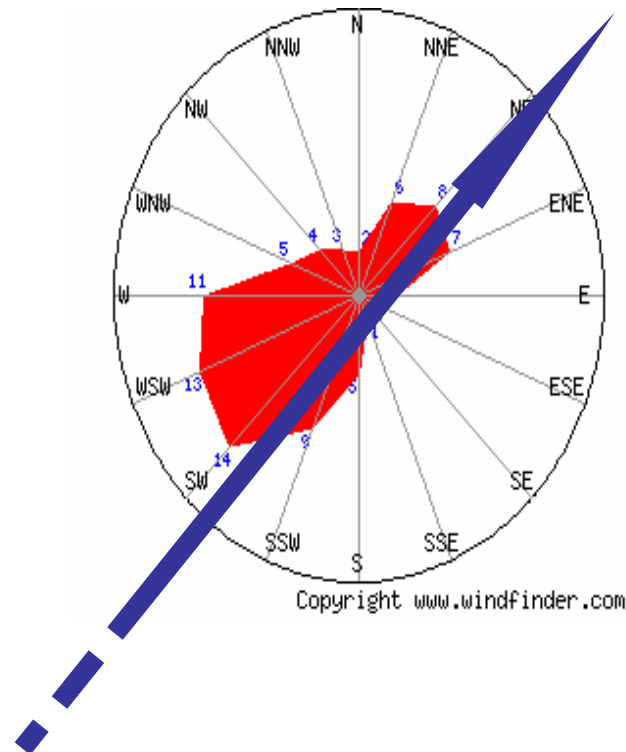
ROOF	0.96
CLASSROOM	1.92
OFFICE	2.40
AUDITORIUM	2.40
COMPUTER ROOM	4.80
CORRIDOR	4.80
STORAGE	6.00
SNOW	0.96

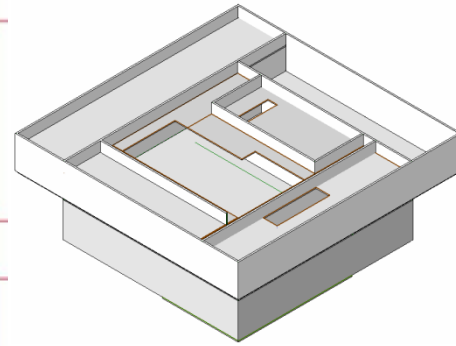
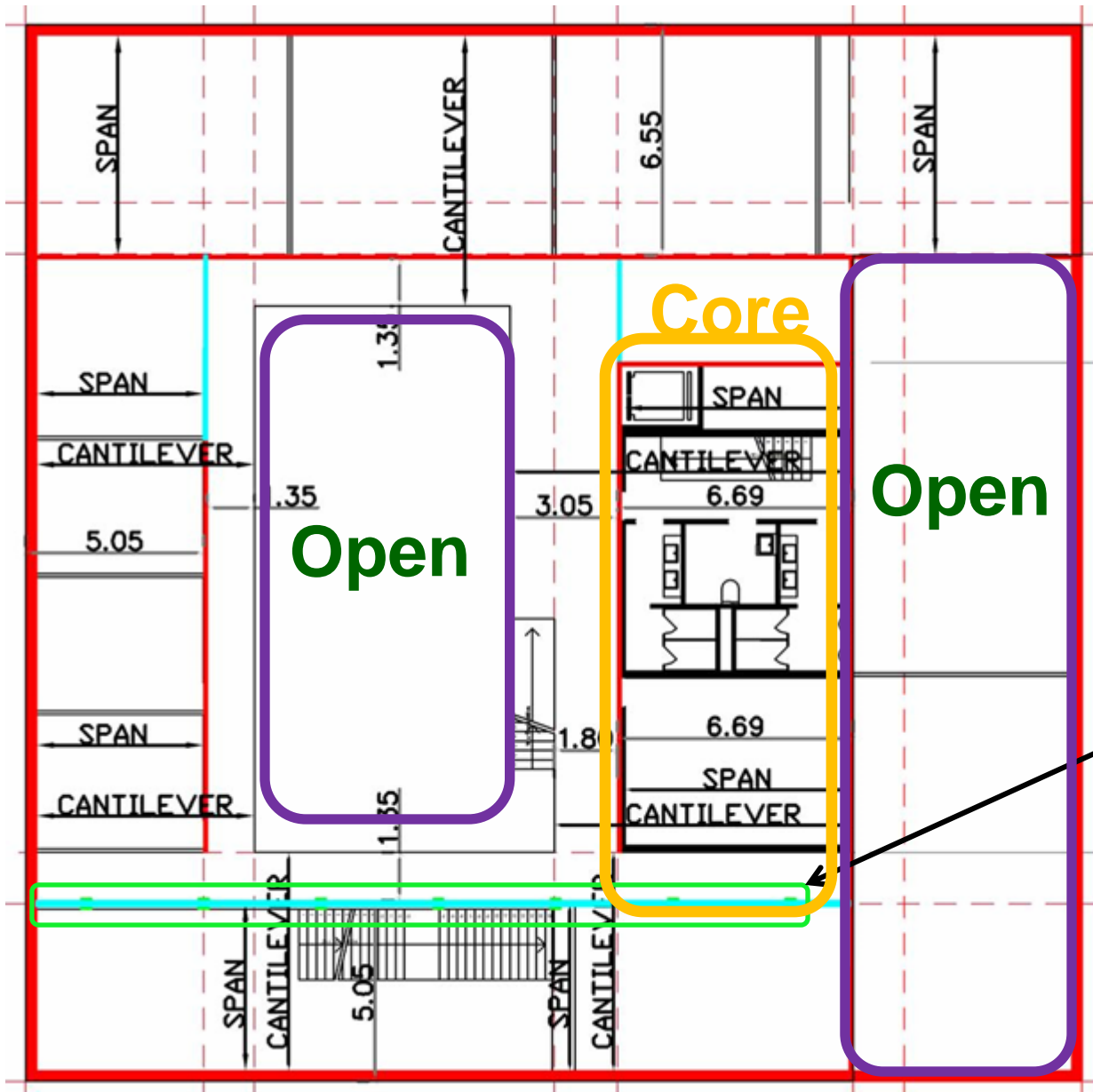
WIND LOADS:

Southwest Dominate Wind Direction

Annual Wind Speed:

- 9kts|18km/h
- Wind Zone 20



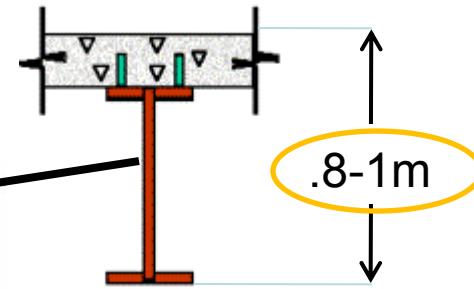
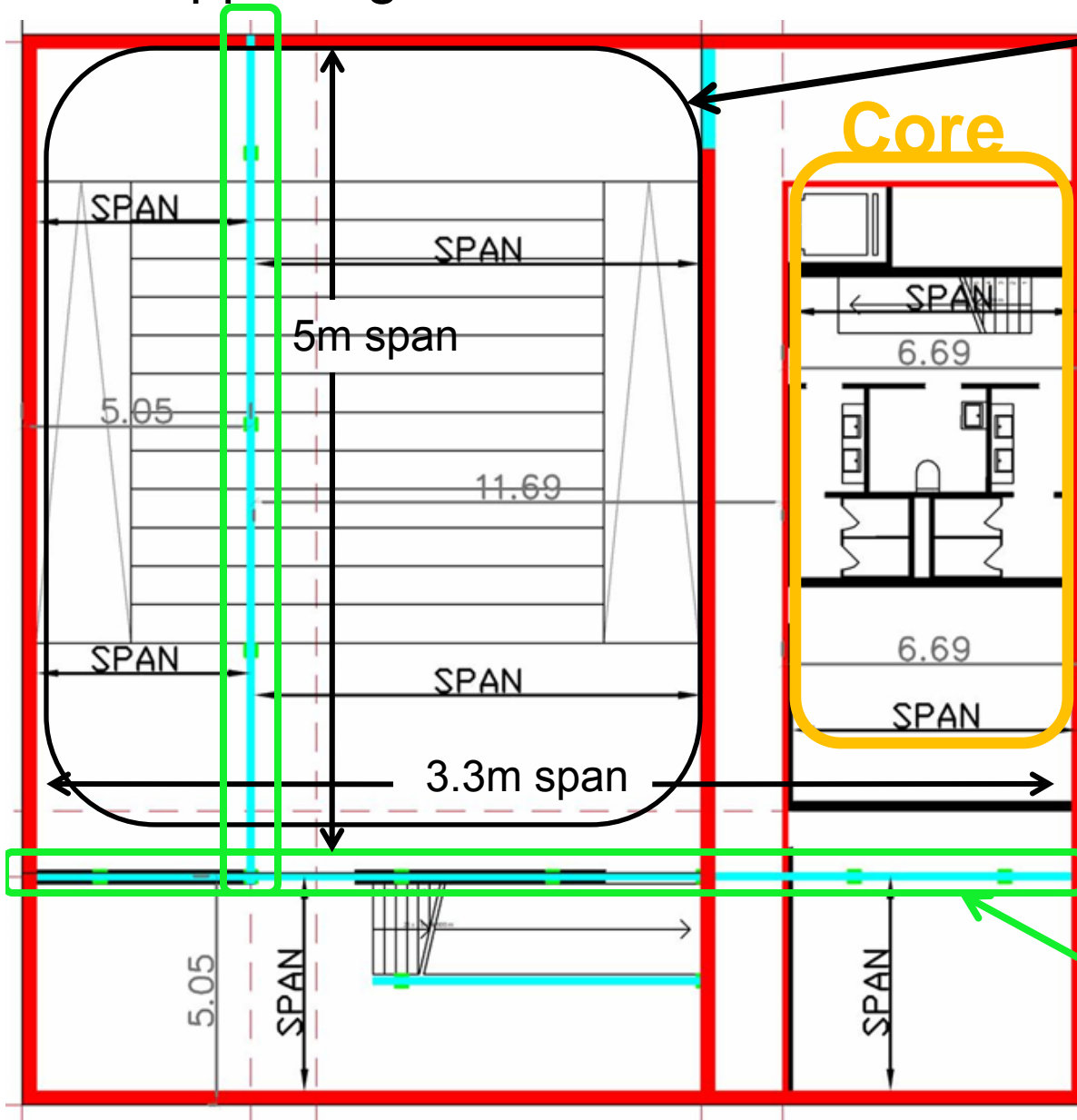


- BEARING WALL
- COLUMN
- BEAM

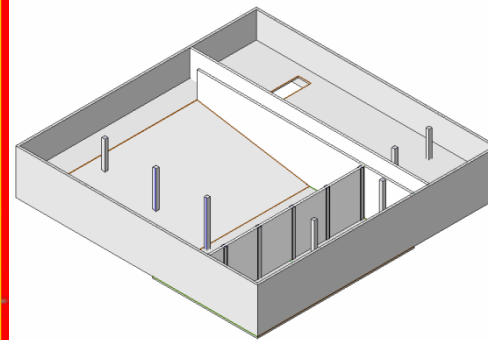
Floor Slab Span - 6.7m
0.2m Thick Hollow Core



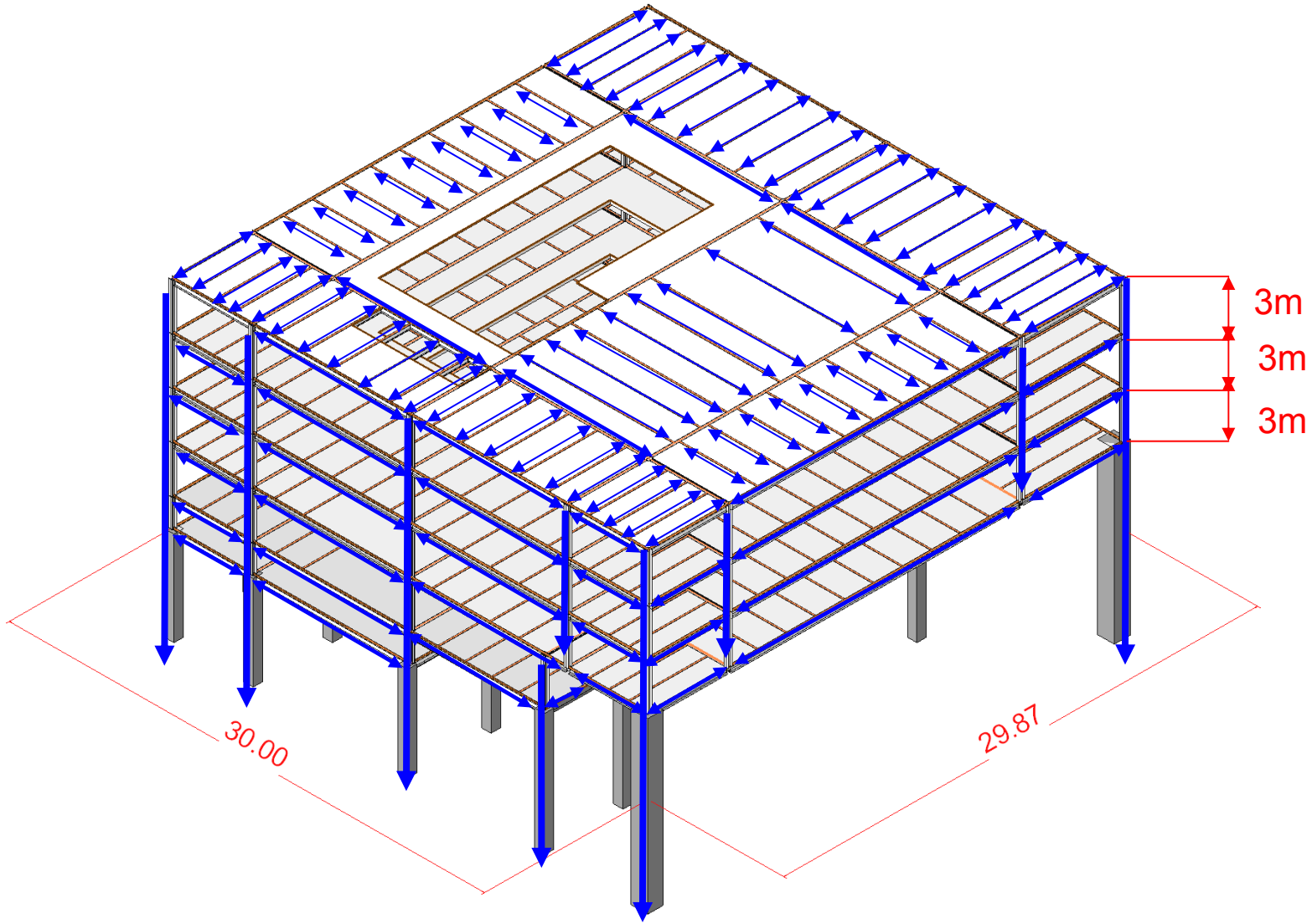
CIP Concrete Floor System Supporting the First Floor



Approx. 2.2m Clearance in Basement

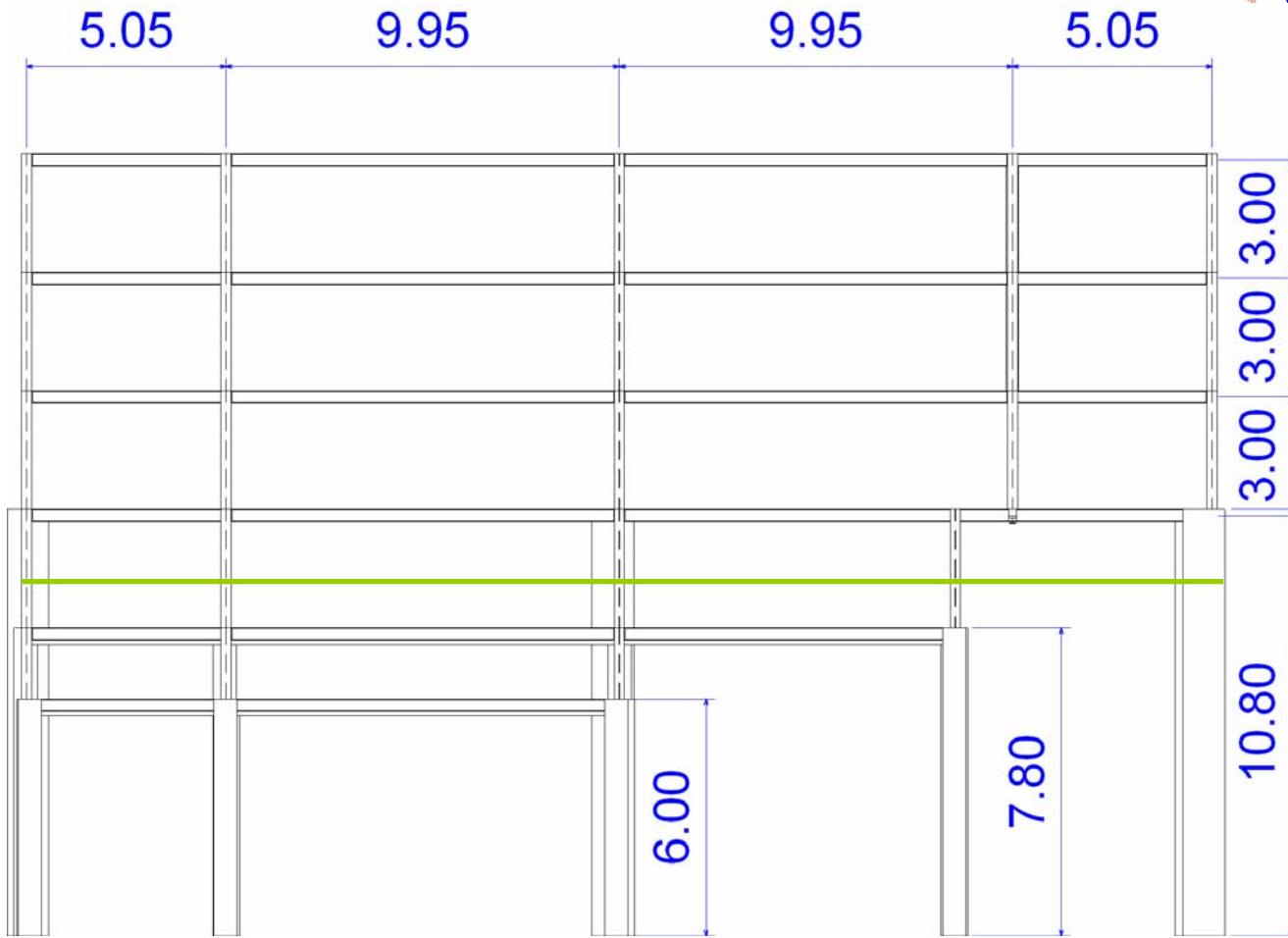
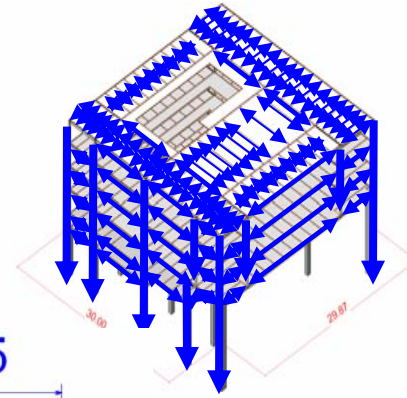


- BEARING WALL
- COLUMN
- BEAM

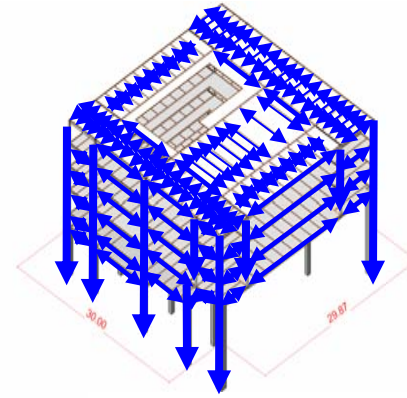
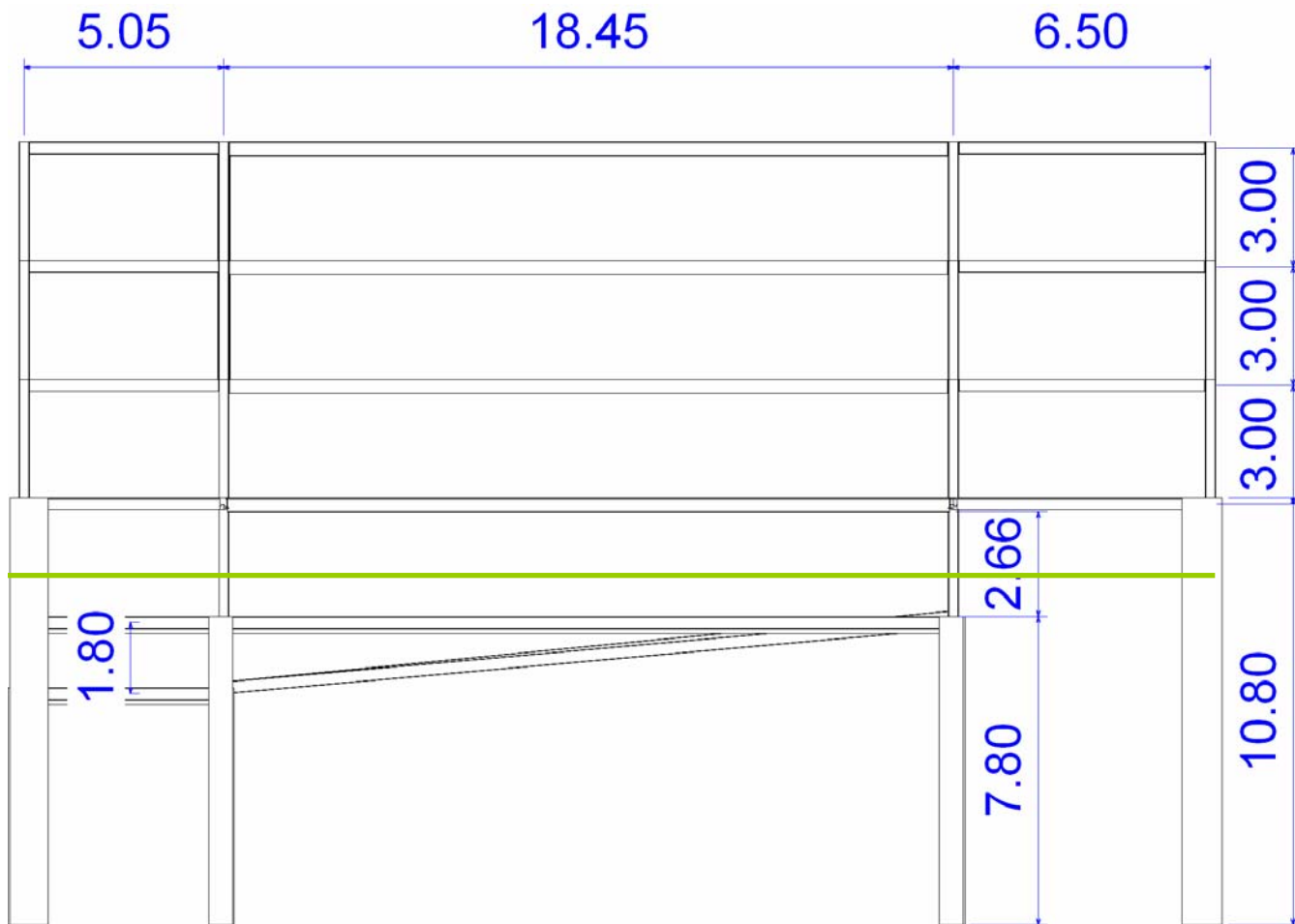


LOAD
PATH

SOUTH
FACE



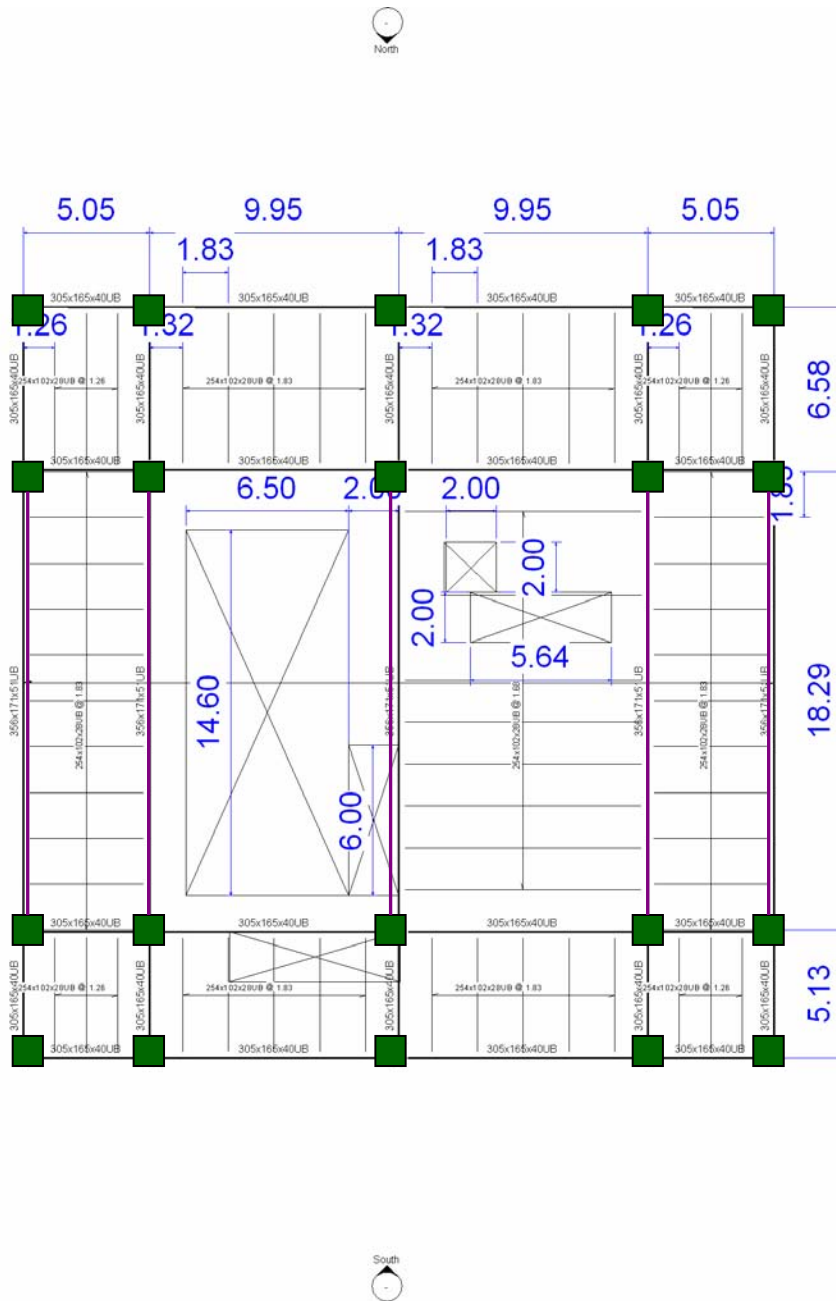
— Water Table



E
A
S
T

F
A
C
E

— Water Table



Girder: 305x165x40 UB
 406x178x60 UB

Beam: 254x102x28 UB

Column: 254x254x73 UC

Slab: 210mm
 -Concrete: 160mm
 -Deck: 50mm

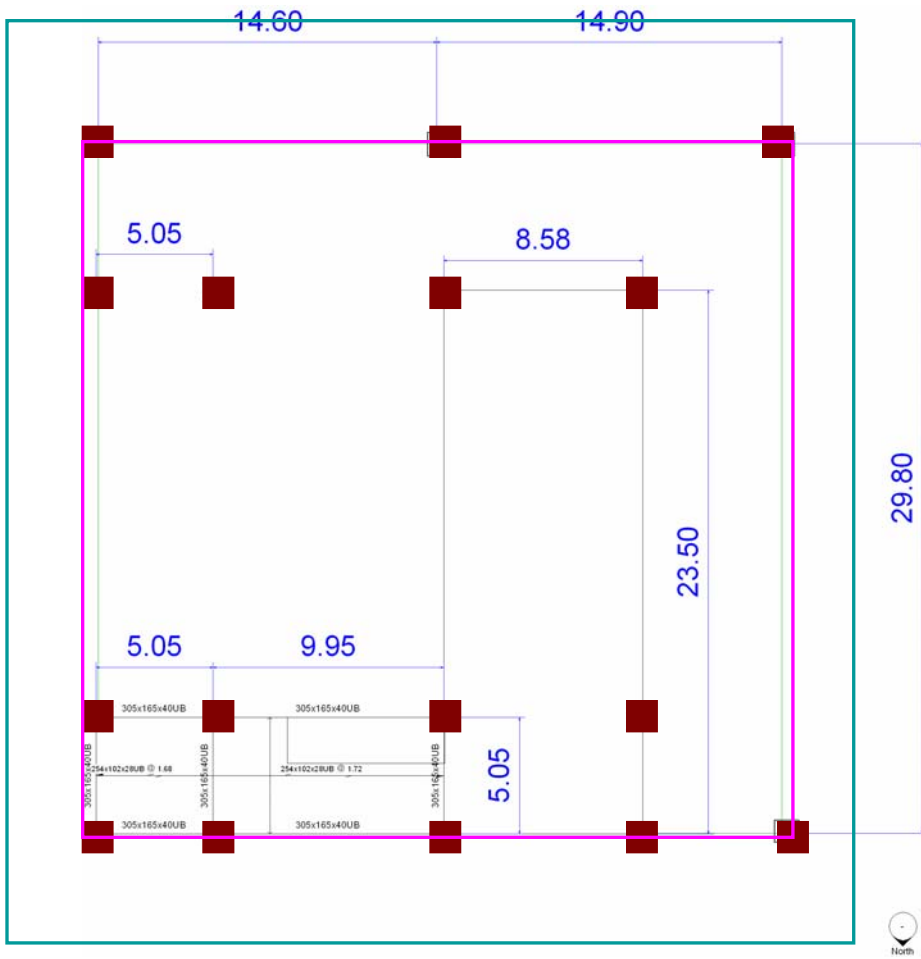
Floor Depth: 650mm

— Large Girder

■ Column

TYPICAL FLOOR PLAN

FOUNDATION PLAN

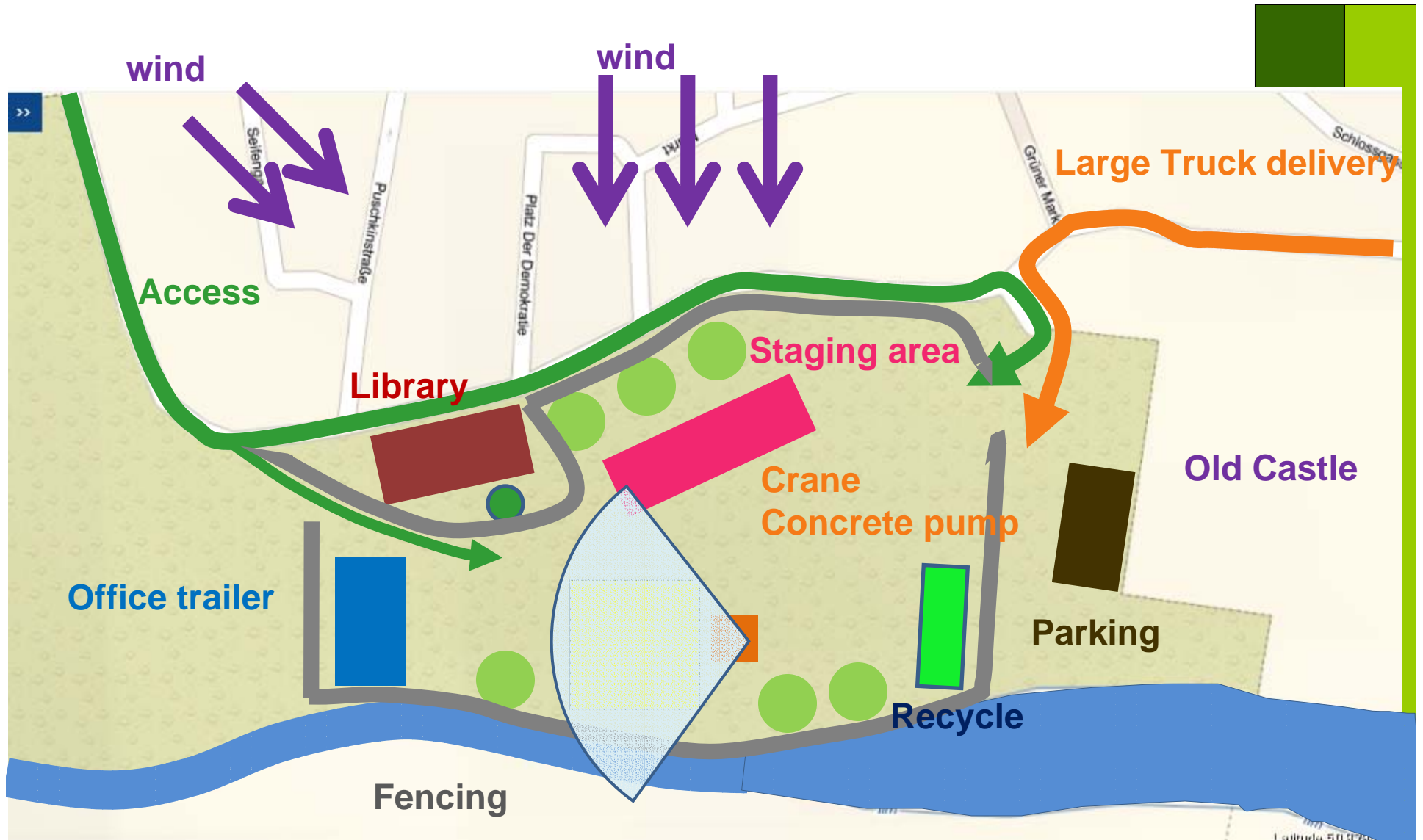


Pile: 600mmx600mm
Concrete

Pumping System:
Dewatering

Geosynthetic System:
Waterproof



- Geomembrane
- Pile Foundation
- Pumping system Installation lining



Symmetrical Design for Continuous Construction
 Formwork Reuse Plan • Recycled Materials • Local Suppliers

Concrete Delivery Route



-  School of Engineering
-  Ilm River
-  Access I for Concrete
-  Access II for Concrete (partly one way)

-  Concrete Plant



Hydraulic Excavator



Truck-mounted Crane



Concrete Pump Truck

- Our system will include four wells
 - The wells will connect to each other
 - From there they will go into the tank
 - The water will be transferred through our pump system
- Ground Source Heat Pump
 - Savings by energy conservation
 - Reduces visible equipment
 - Reduces environmental impact of the building

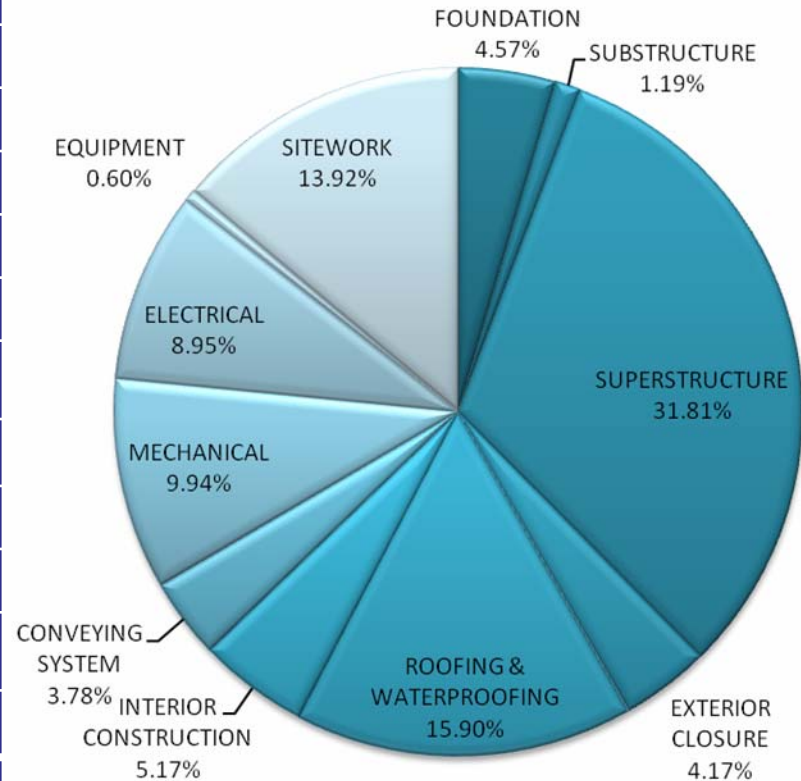
Building Gross Square Footage

Description	GSF	Cost	Cost/Sf	Percentage
	29,063			
FOUNDATION		230,000	\$7.91	4.57%
SUBSTRUCTURE		60,000	\$2.07	1.19%
SUPERSTRUCTURE		1,600,000	\$55.05	31.81%
EXTERIOR CLOSURE		210,000	\$7.23	4.17%
ROOFING & WATERPROOFING		800,000	\$27.53	15.90%
INTERIOR CONSTRUCTION		260,000	\$8.95	5.17%
CONVEYING SYSTEM		190,000	\$6.54	3.78%
MECHANICAL		500,000	\$17.20	9.94%
ELECTRICAL		450,000	\$15.48	8.95%
EQUIPMENT		30,000	\$1.03	0.60%
SITework		700,000	\$24.09	13.92%
SUB TOTAL		5,030,000	\$173.07	100.00%
General Conditions(10%)		503,000	\$17.31	
Fee(8%)		402,400	\$13.85	
Contingency(8%)		402,400	\$13.85	
TOTAL COST		6,337,800	\$218.07	
Inflation(3%)			\$0.00	
TOTAL COST IN 2015	7.6 million	\$260.39		

Prefabricated Concrete

1st Concept Concrete

COST

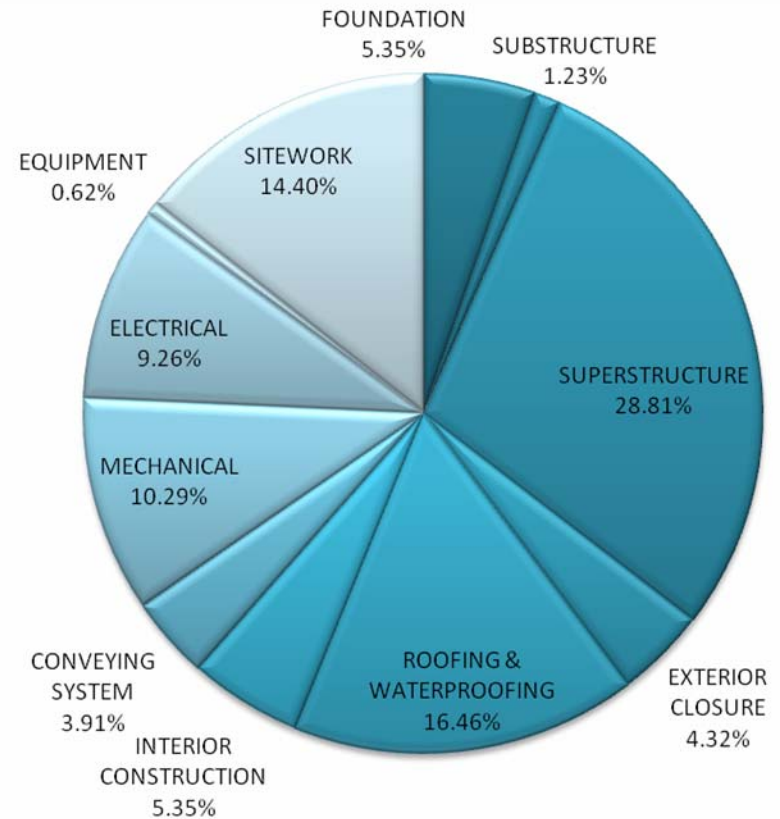


Building Gross Square Footage

	GSF	29,063	
Description	Cost	Cost/Sf	Percentage
FOUNDATION	260,000	\$8.95	5.35%
SUBSTRUCTURE	60,000	\$2.06	1.23%
SUPERSTRUCTURE	1,400,000	\$48.17	28.81%
EXTERIOR CLOSURE	210,000	\$7.23	4.32%
ROOFING & WATERPROOFING	800,000	\$27.53	16.46%
INTERIOR CONSTRUCTION	260,000	\$8.95	5.35%
CONVEYING SYSTEM	190,000	\$6.54	3.91%
MECHANICAL	500,000	\$17.20	10.29%
ELECTRICAL	450,000	\$15.48	9.26%
EQUIPMENT	30,000	\$1.03	0.62%
SITework	700,000	\$24.09	14.40%
SUB TOTAL	4,860,000	\$167.22	100.00%
General Conditions(10%)	486,000	\$16.72	
Fee(8%)	388,800	\$13.38	
Contingency(8%)	388,800	\$13.38	
TOTAL COST	6,123,600	\$210.70	
Inflation(3%)		\$0.00	
TOTAL COST IN 2015	7.3 million	\$251.59	

COST

1st Concept Steel



1st Concrete			
	GSF	29,063	
Description	Cost	Cost/Sf	Percentage
FOUNDATION	230,000	\$7.91	4.57%
SUBSTRUCTURE	60,000	\$2.06	1.19%
SUPERSTRUCTURE	1,600,000	\$55.05	31.81%
EXTERIOR CLOSURE	210,000	\$7.23	4.17%
ROOFING & WATERPROOFING	800,000	\$27.53	15.90%
INTERIOR CONSTRUCTION	260,000	\$8.95	5.17%
CONVEYING SYSTEM	190,000	\$6.54	3.78%
MECHANICAL	500,000	\$17.20	9.94%
ELECTRICAL	450,000	\$15.48	8.95%
EQUIPMENT	30,000	\$1.03	0.60%
SITWORK	700,000	\$24.09	13.92%
SUB TOTAL	5,030,000	\$173.07	100.00%
General Conditions(10%)	503,000	\$17.31	
Fee(8%)	402,400	\$13.85	
Contingency(8%)	402,400	\$13.85	
TOTAL COST	6,337,800	\$218.07	
Inflation(3%)		\$0.00	
TOTAL COST IN 2015	7.6 million	\$260.39	

1st Steel			
	GSF	29,063	
Description	Cost	Cost/Sf	Percentage
FOUNDATION	260,000	\$8.95	5.35%
SUBSTRUCTURE	60,000	\$2.06	1.23%
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INTERIOR CONSTRUCTION	260,000	\$8.95	5.35%
CONVEYING SYSTEM	190,000	\$6.54	3.91%
MECHANICAL	500,000	\$17.20	10.29%
ELECTRICAL	450,000	\$15.48	9.26%
EQUIPMENT	30,000	\$1.03	0.62%
SITWORK	700,000	\$24.09	14.40%
SUB TOTAL	4,860,000	\$167.22	100.00%
General Conditions(10%)	486,000	\$16.72	
Fee(8%)	388,800	\$13.38	
Contingency(8%)	388,800	\$13.38	
TOTAL COST	6,123,600	\$210.70	
Inflation(3%)		\$0.00	
TOTAL COST IN 2015	7.3 million	\$251.59	

Gantt view
version 3/12/2008 21:48

First Concept (Concrete)
Planner: Matt Wesley

Manager: Hierarchy	Code	Quantity Name	Predecessors	Duration	Start	End	Description	2015												2016					
								May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun				
+1	A1010.01	Sub Structure		39	5/28/2015	7/8/2015		[Gantt bars for Sub Structure]																	
-2	A1010.02	Footings and Slabs	17 FS 0	21.5	6/30/2015	7/23/2015		[Gantt bars for Footings and Slabs]																	
-2.1	A1010.02.01	*EXCAVATION	17 FS 0	(5.5)	6/30/2015	7/7/2015		[Gantt bars for *EXCAVATION]																	
-2.2	A1010.02.03	*FORMS AND STEEL	21 FS 0, 31 FS 0	(6)	7/8/2015	7/16/2015		[Gantt bars for *FORMS AND STEEL]																	
-2.3	A1010.02.04	*UNDERGROUND UTILITIES	23 SS 2	(6)	7/10/2015	7/20/2015		[Gantt bars for *UNDERGROUND UTILITIES]																	
-2.4	A1010.02.05	*INSPECTION	25 FS 0	(0)	7/20/2015	7/20/2015		[Gantt bars for *INSPECTION]																	
-2.5	A1010.02.05	*POUR CONCRETE	27 FS 0	(3)	7/20/2015	7/23/2015		[Gantt bars for *POUR CONCRETE]																	
-2.6	A1010.0202	*BATTER-BOARDS AND CLEAN	21 FS 0	(1)	7/23/2015	7/8/2015		[Gantt bars for *BATTER-BOARDS AND CLEAN]																	
-3	B1010.005	Basement Shell	29 FS 0	22	7/23/2015	8/25/2015		[Gantt bars for Basement Shell]																	
-3.1	B1010.015.01	Exterior Wall	29 FS 0	6	7/23/2015	8/3/2015		[Gantt bars for Exterior Wall]																	
-3.2	B1010.015.02	Interior Core Walls and Stairs	39 FS 0	16	8/4/2015	8/25/2015		[Gantt bars for Interior Core Walls and Stairs]																	
-4	B1010.01	First Floor Shell	46 FS 0	32	8/26/2015	9/29/2015		[Gantt bars for First Floor Shell]																	
-4.1	B1010.01.02	Exterior Wall	57 FS 0	17	9/7/2015	9/29/2015		[Gantt bars for Exterior Wall]																	
-4.2	B1010.01.03	Interior Core Walls and Stairs	46 FS 0	15	8/29/2015	9/18/2015		[Gantt bars for Interior Core Walls and Stairs]																	
-5	B1010.02	Second Floor Shell	61 FS 0, 39 FS 0	47	8/4/2015	10/14/2015		[Gantt bars for Second Floor Shell]																	
-5.1	B1010.02.01	Slab	39 FS 0	15	8/4/2015	8/25/2015		[Gantt bars for Slab]																	
-5.2	B1010.02.02	Exterior Walls	71 FS 0	14	8/29/2015	9/15/2015		[Gantt bars for Exterior Walls]																	
-5.3	B1010.02.03	Interior Core Walls and Stairs	61 FS 0	18	9/21/2015	10/14/2015		[Gantt bars for Interior Core Walls and Stairs]																	
-6	B1010.03	Third Floor Shell	85 FS 0, 78 FS 0	63.5	9/16/2015	11/16/2015		[Gantt bars for Third Floor Shell]																	
-6.1	B1010.03.01	Slab	78 FS 0	16	9/16/2015	10/7/2015		[Gantt bars for Slab]																	
-6.2	B1010.03.02	Exterior Walls	95 FS 0	17	10/8/2015	11/3/2015		[Gantt bars for Exterior Walls]																	
-6.3	B1010.03.03	Interior Core Walls and Stairs	85 FS 0	14.5	10/15/2015	11/4/2015		[Gantt bars for Interior Core Walls and Stairs]																	
-6.4	B1010.03.04	Roof	109 FS 0, 102 FS 0	16	11/4/2015	11/16/2015		[Gantt bars for Roof]																	
+7	B1010.04	Exterior Doors and Windows	102 FS 0	7	11/4/2015	11/12/2015		[Gantt bars for Exterior Doors and Windows]																	
+8	C1010.005	Basement Interior	121 FS 0, 227 FS 0	16	11/13/2015	12/8/2015		[Gantt bars for Basement Interior]																	
+9	C1010.01	First Floor Interior	153 FS 0, 232 FS 0	33	12/9/2015	1/28/2016		[Gantt bars for First Floor Interior]																	
+10	C1010.02	Second Floor Interior	176 FS 0, 237 FS 0	37	1/29/2016	3/17/2016		[Gantt bars for Second Floor Interior]																	
+11	C1010.03	Third Floor Interior	199 FS 0, 242 FS 0	37	3/18/2016	5/8/2016		[Gantt bars for Third Floor Interior]																	
+12	D1010.005	Basement Services	134 FS 0	14	11/17/2015	12/4/2015		[Gantt bars for Basement Services]																	
+13	D1010.01	First Floor Services	157 FS 0	28	12/15/2015	1/21/2016		[Gantt bars for First Floor Services]																	
+14	D1010.02	Second Floor Services	180 FS 0	24	2/5/2016	3/9/2016		[Gantt bars for Second Floor Services]																	
+15	D1010.03	Third Floor Services	203 FS 0	24	3/25/2016	4/27/2016		[Gantt bars for Third Floor Services]																	
+16	E1010.01	Equipment Furnishing	118 FS 0	9	11/16/2015	11/25/2015		[Gantt bars for Equipment Furnishing]																	
+17	G1010.01	Landscape	268 FS 0	13	5/24/2016	6/10/2016		[Gantt bars for Landscape]																	
+18	Z1010.01	Finish Site	222 FS 0	11	5/9/2016	5/23/2016		[Gantt bars for Finish Site]																	

S
C
H
E
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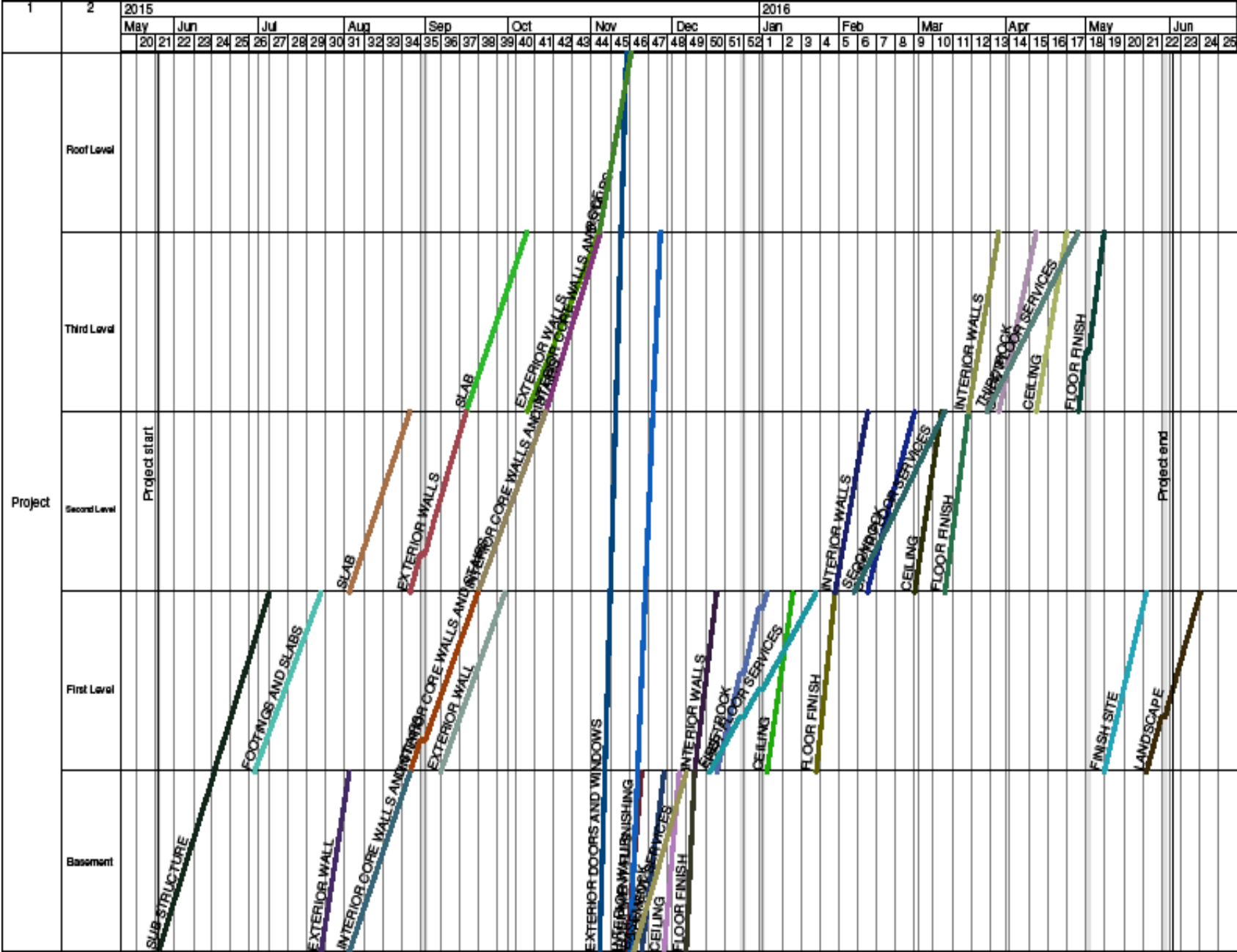
Flowline view

First Concept (Concrete)

version 8/18/2009 22:27

Planner: Matt Wasley

Manager:



Target Plan: _____ Actual: - - - - - Forecast: _____

Design mode

Control 2008 v3.0.00.40757

MFCDCS

River 2009



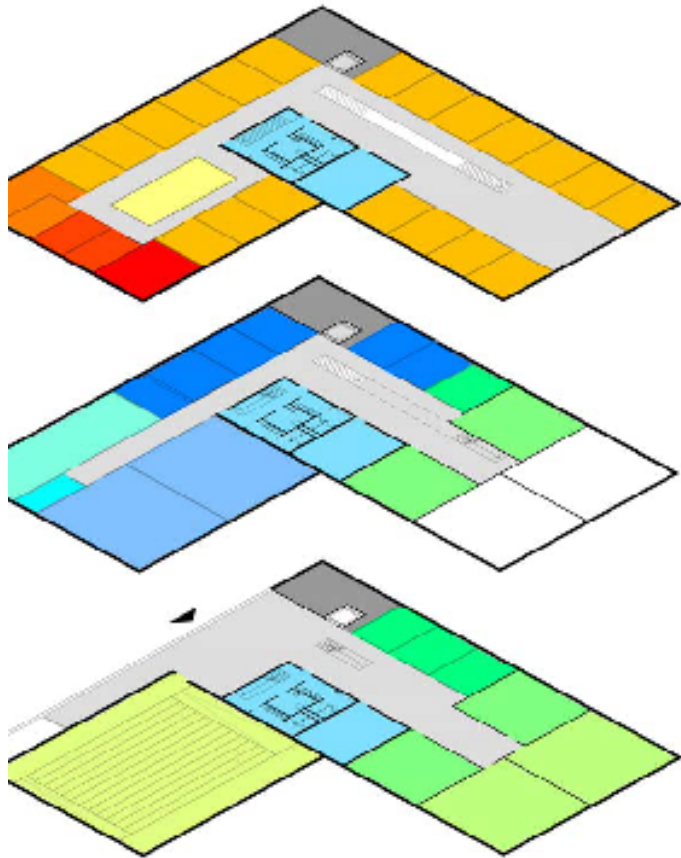
TREES NOMINAL

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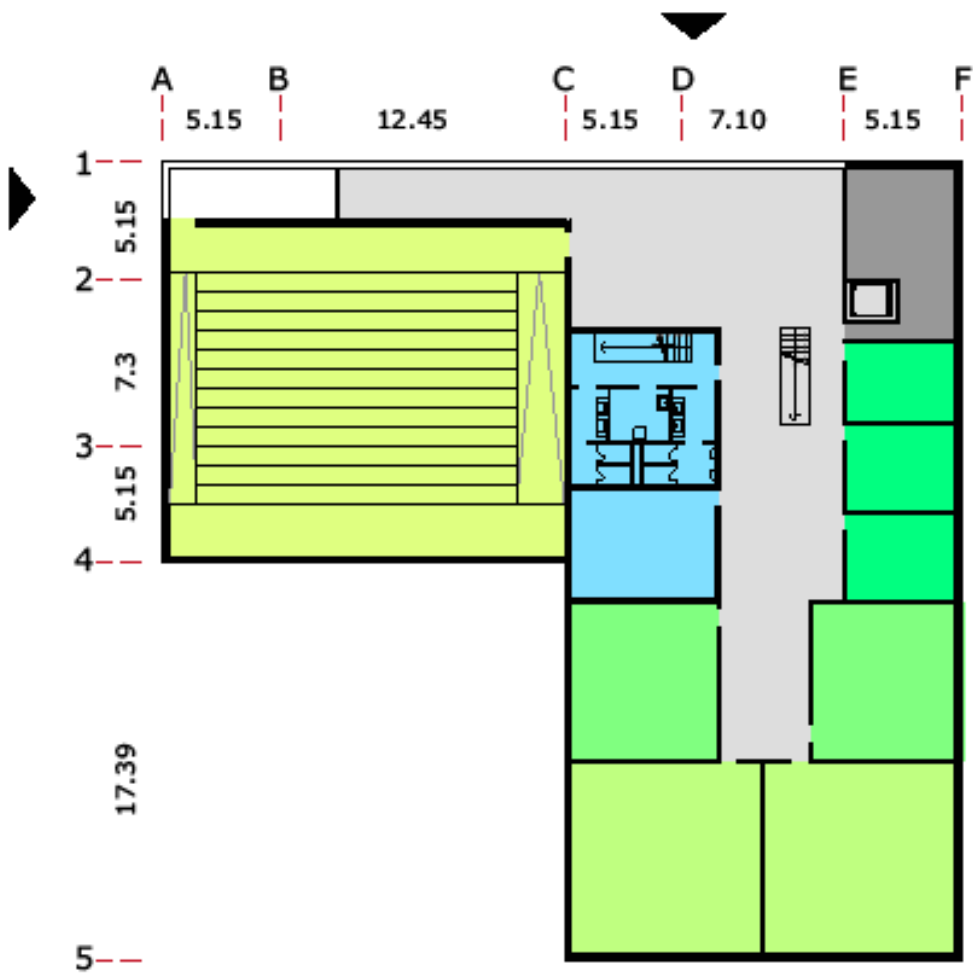


Siteplan with IIm in normality
scale 1/2500



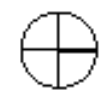
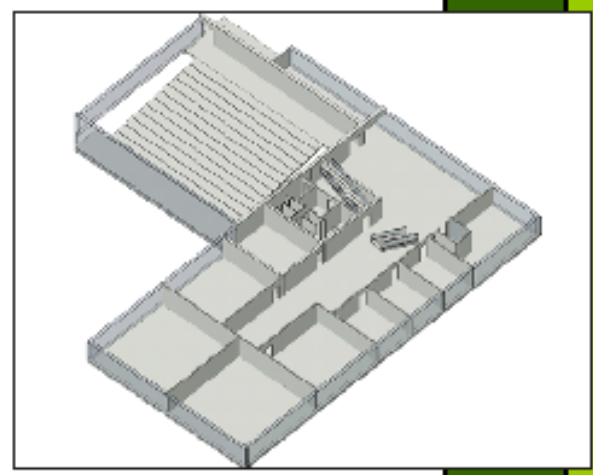


Space Type	Quantity	SqMeter each	Total SqMeter
Third Floor			
Faculty Offices	20	15.7, 17.8	352,7
Dep. Chair's Off.	1	28	28
Senior Admin. Off	2	14	28
Admin. Assistants	2	14.3 , 24.3	38.6
Meeting Room	1	30.76	30.76
Second Floor			
Instructional Labs	2	93.55, 96.69	190.24
Small Classrooms	2	44.4	88.8
Student Offices	6	13.4-20.7	103.7
Seminar Room	1	18.7	18.7
Server Room	1	71.3	71.3
Technical Support	1	9	9
First Floor			
Seminar Rooms	3	2x15.7, 18.7	50.1
Small Classrooms	2	44.4	88.8
Large Classrooms	2	69.7	139.4
Auditorium	1	250	250
On each Floor			
Storage Room	1	32.3	96.9
M/E Room	2	29.8	89.4
Total Building			2804

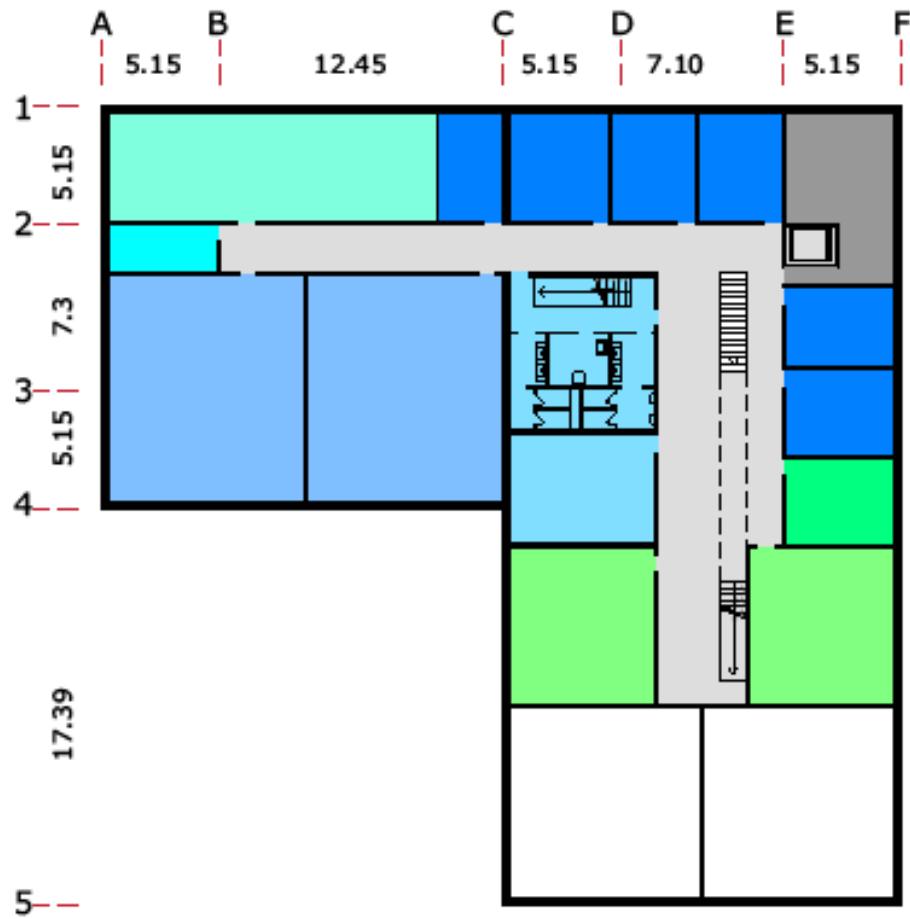


1st

- Storage
- Auditorium
- Core
- S-Classrooms
- L-Classrooms
- Seminar Rooms

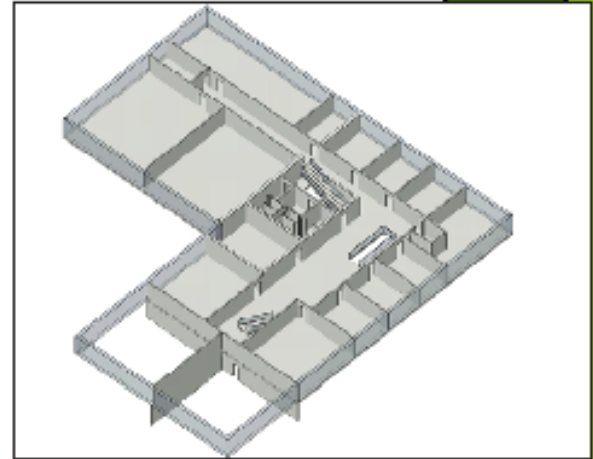


scale 1/300

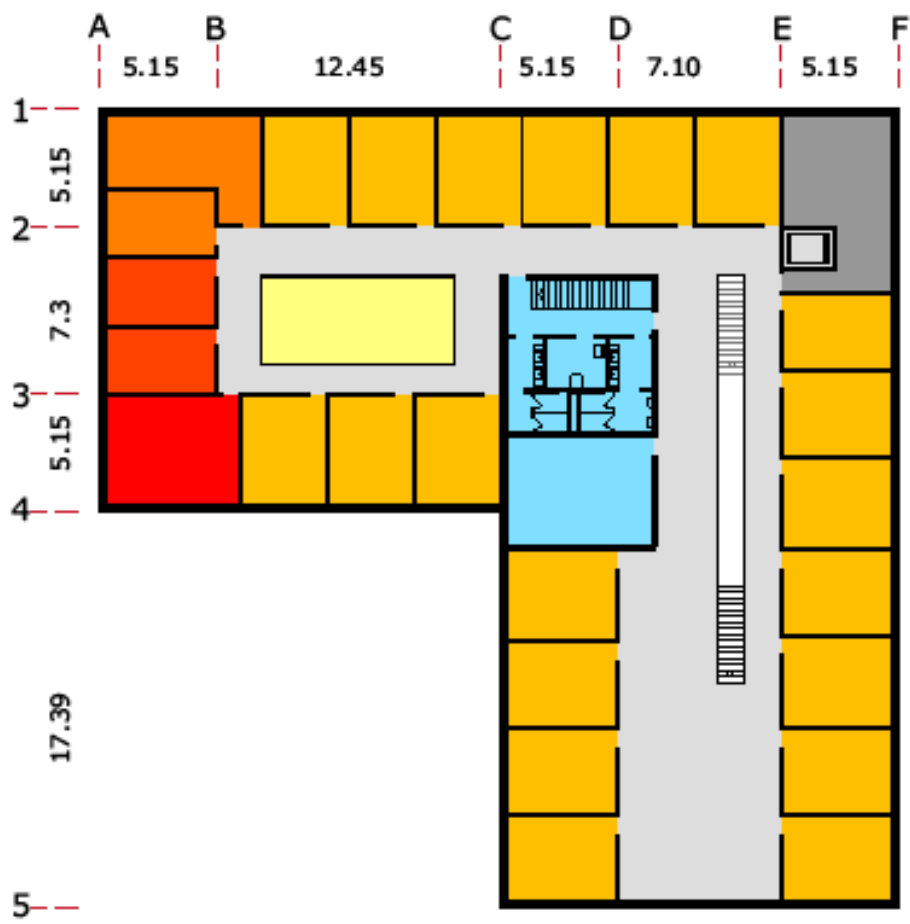


2nd

- Storage
- Core
- Server
- Instructional Labs
- S-Classrooms
- Seminar Rooms
- Student Offices
- Technical Support

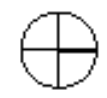
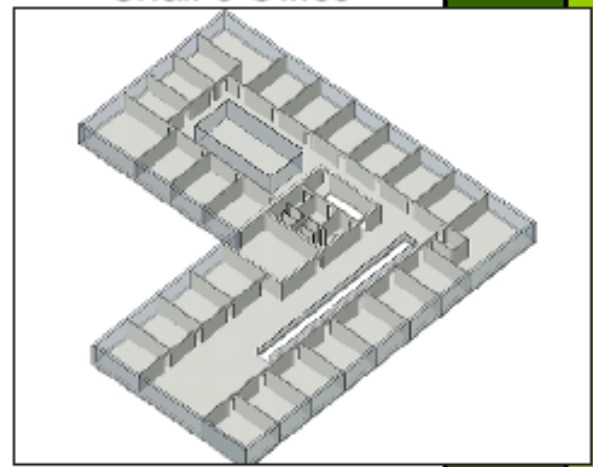


scale 1/300

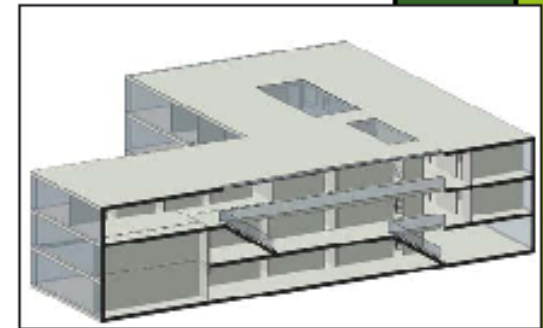
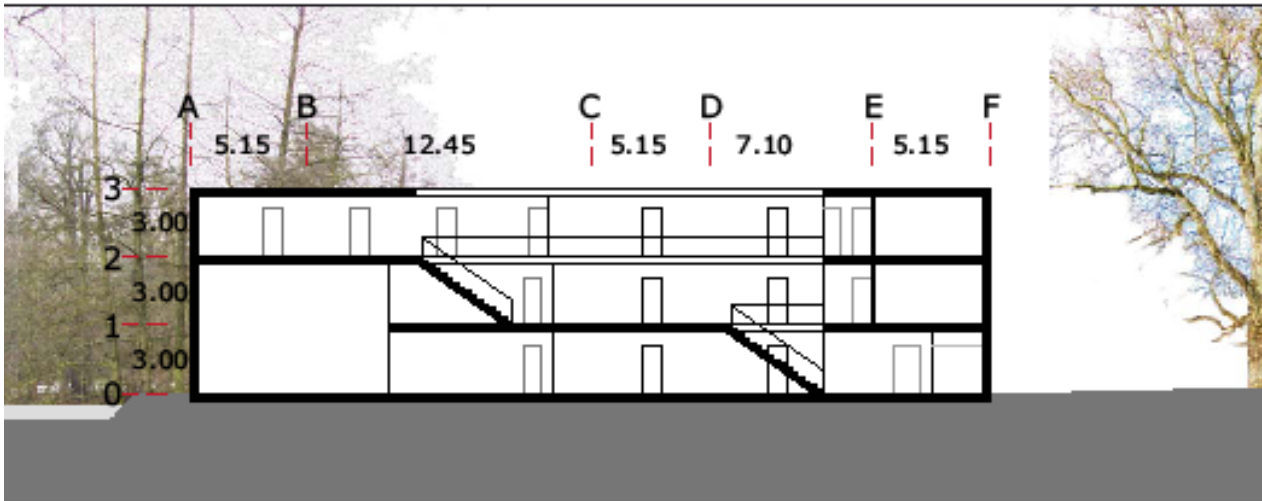


3rd

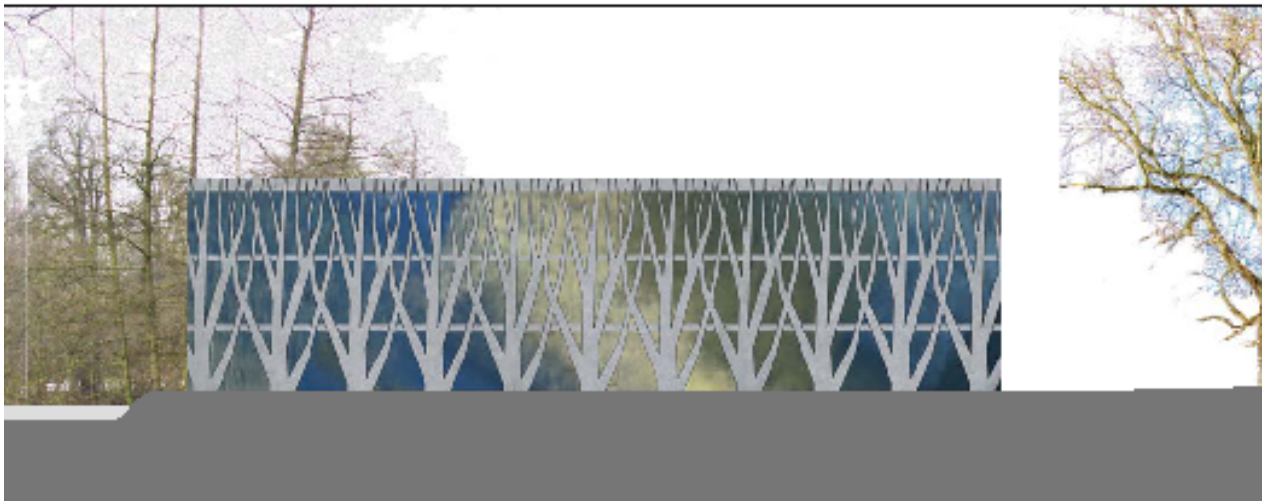
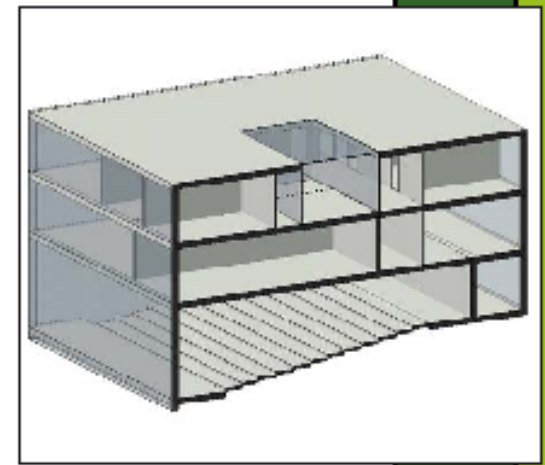
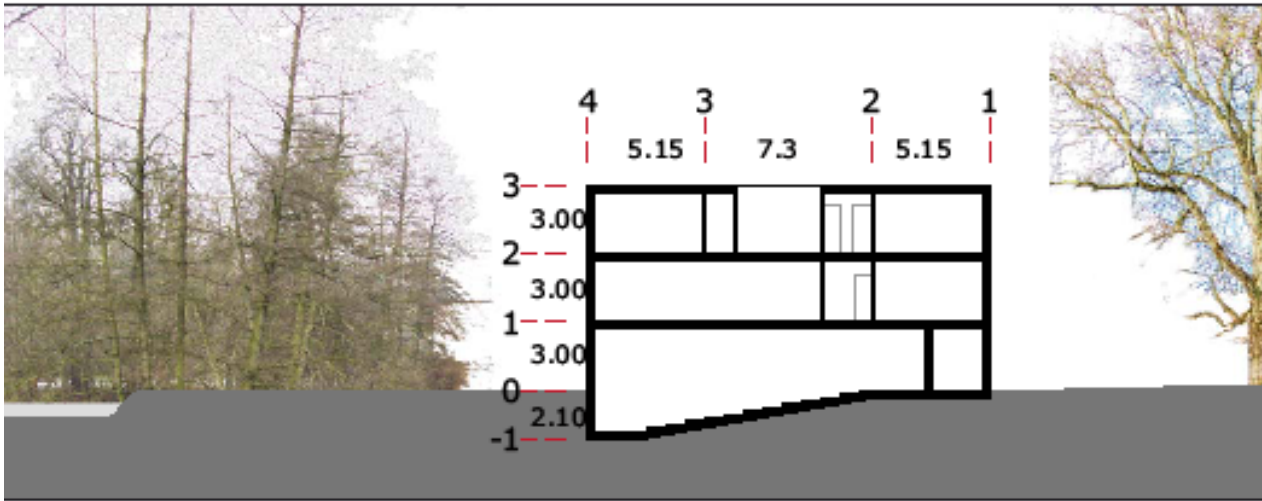
- Storage
- Core
- Faculty Offices
- Conference Room
- Administrative Assistance
- Senior Administrative Assistance
- Department Chair's Office



scale 1/300



scale 1/300



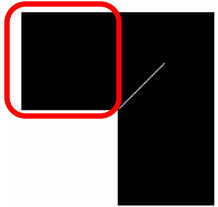
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




Auditorium Wing Framing

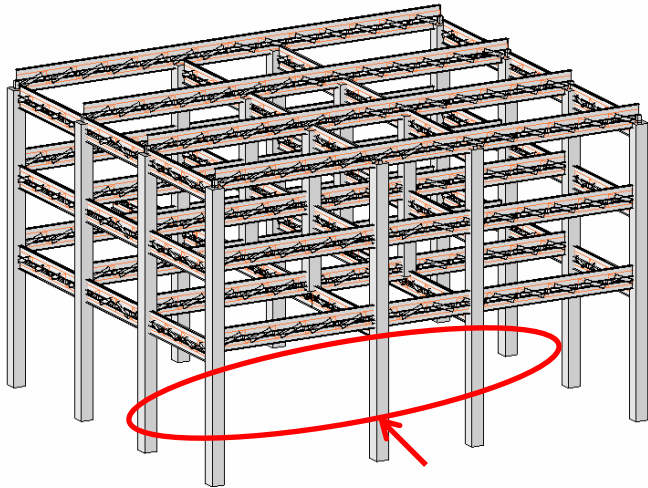
0.3m Thick – Two Way
CIP Concrete Floor

Section

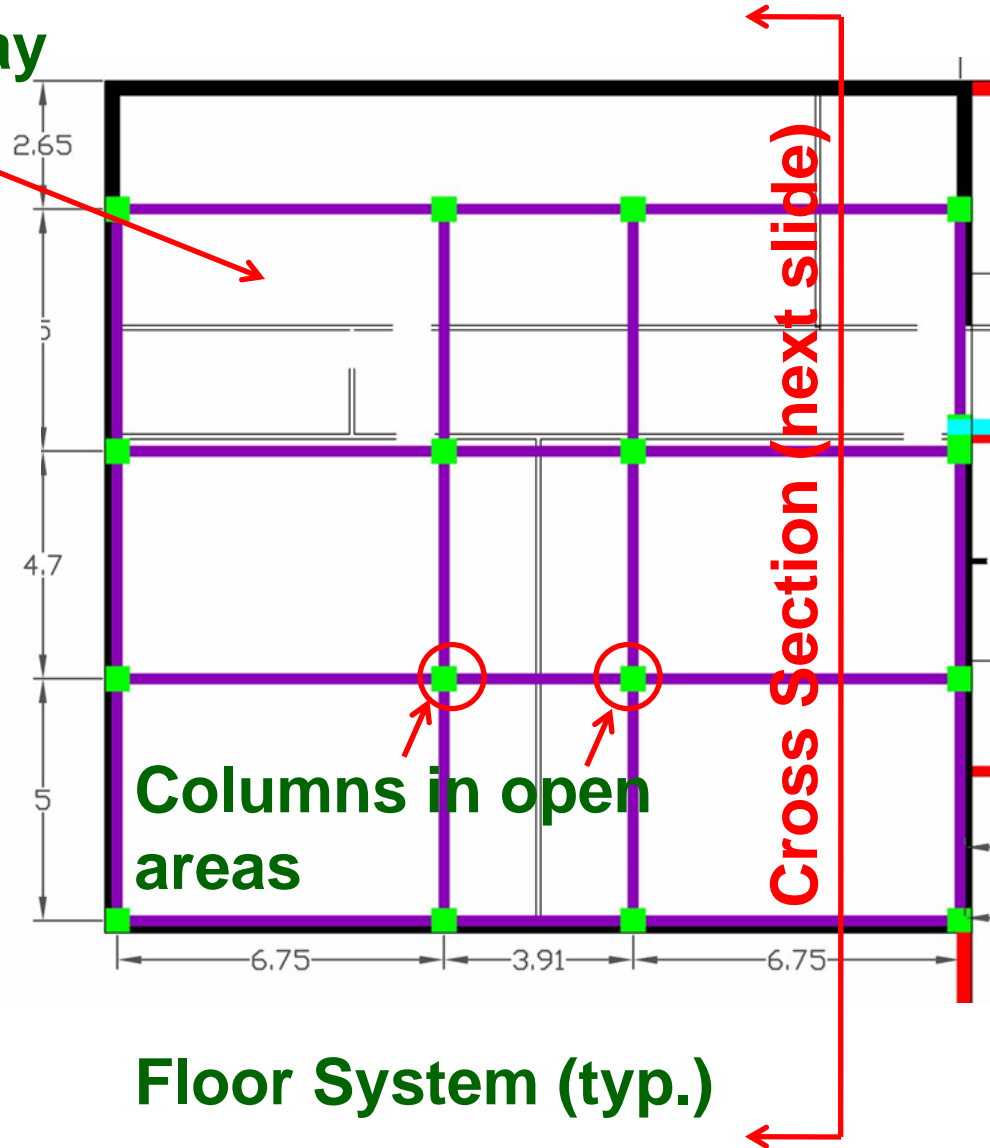


-  COLUMN
-  BEAM
-  TRUSS

2 Directional Truss



Open to Auditorium



Columns in open areas

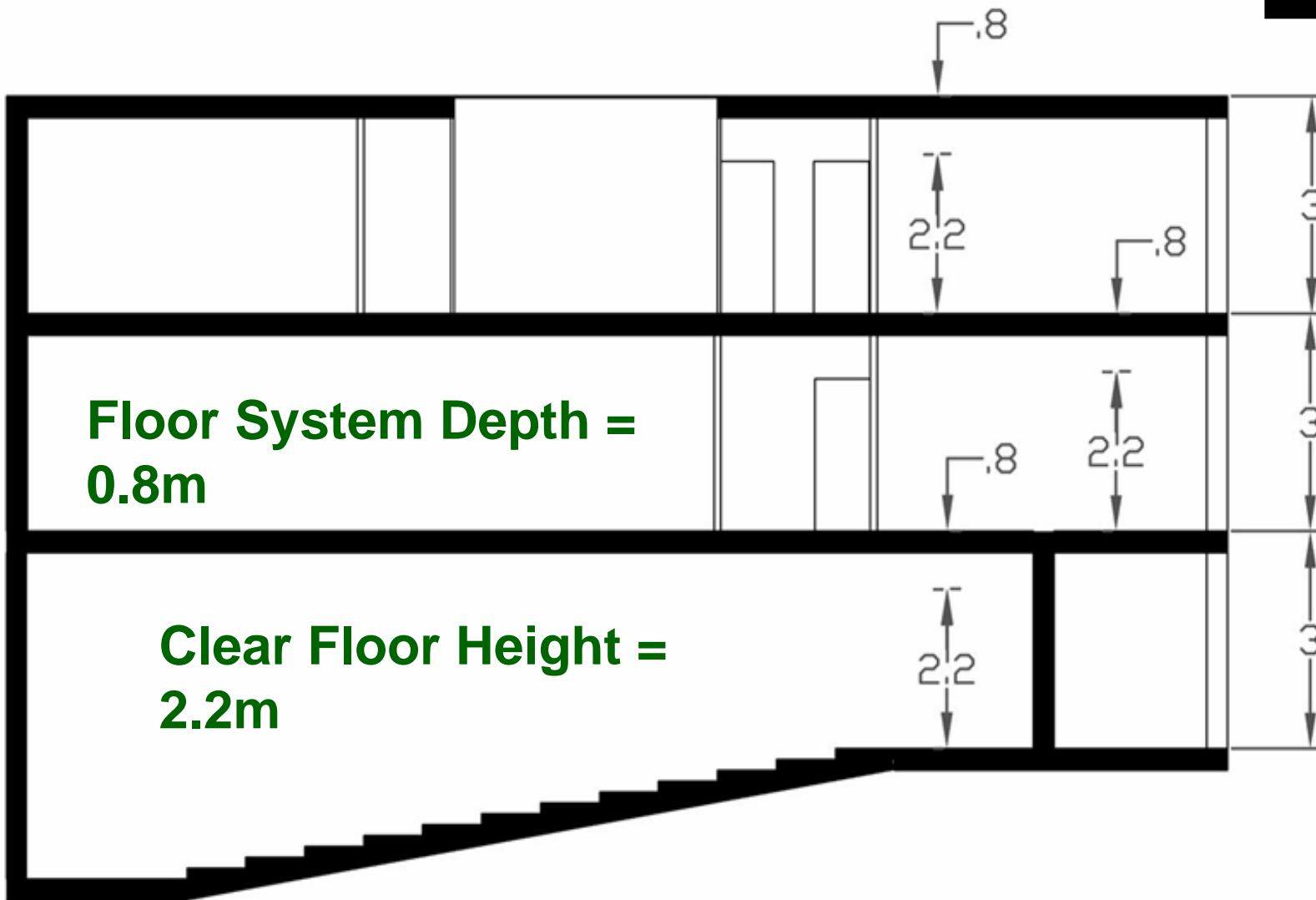
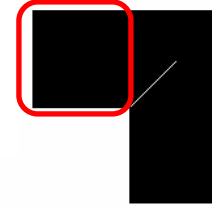
Floor System (typ.)

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River 2009

Auditorium Wing Framing

Section



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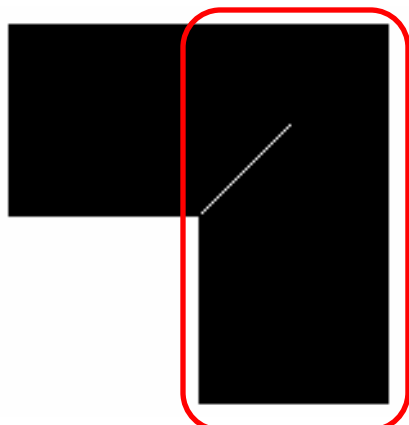
Office/Core Framing

Frame Spacing –
First Floor (typ.)

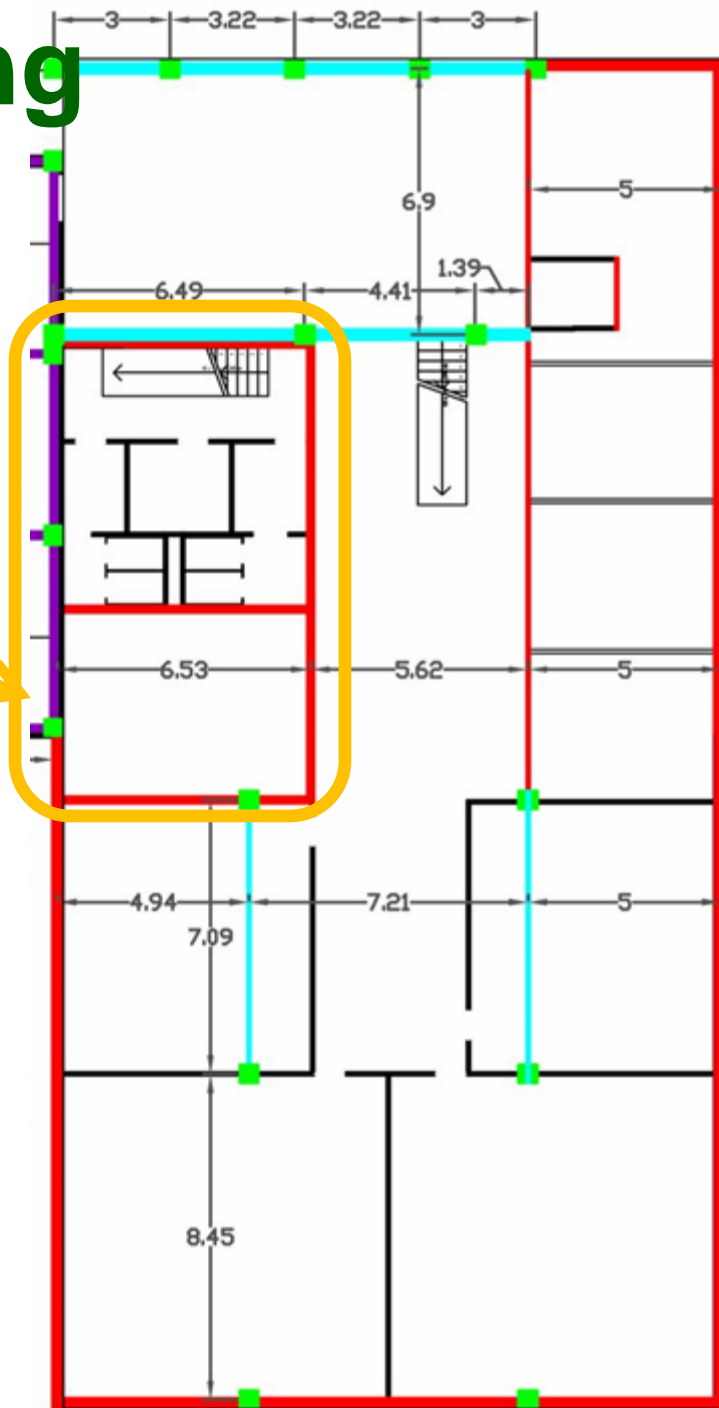
Core – Lateral
Resistance

0.3m CIP Concrete
Floor System

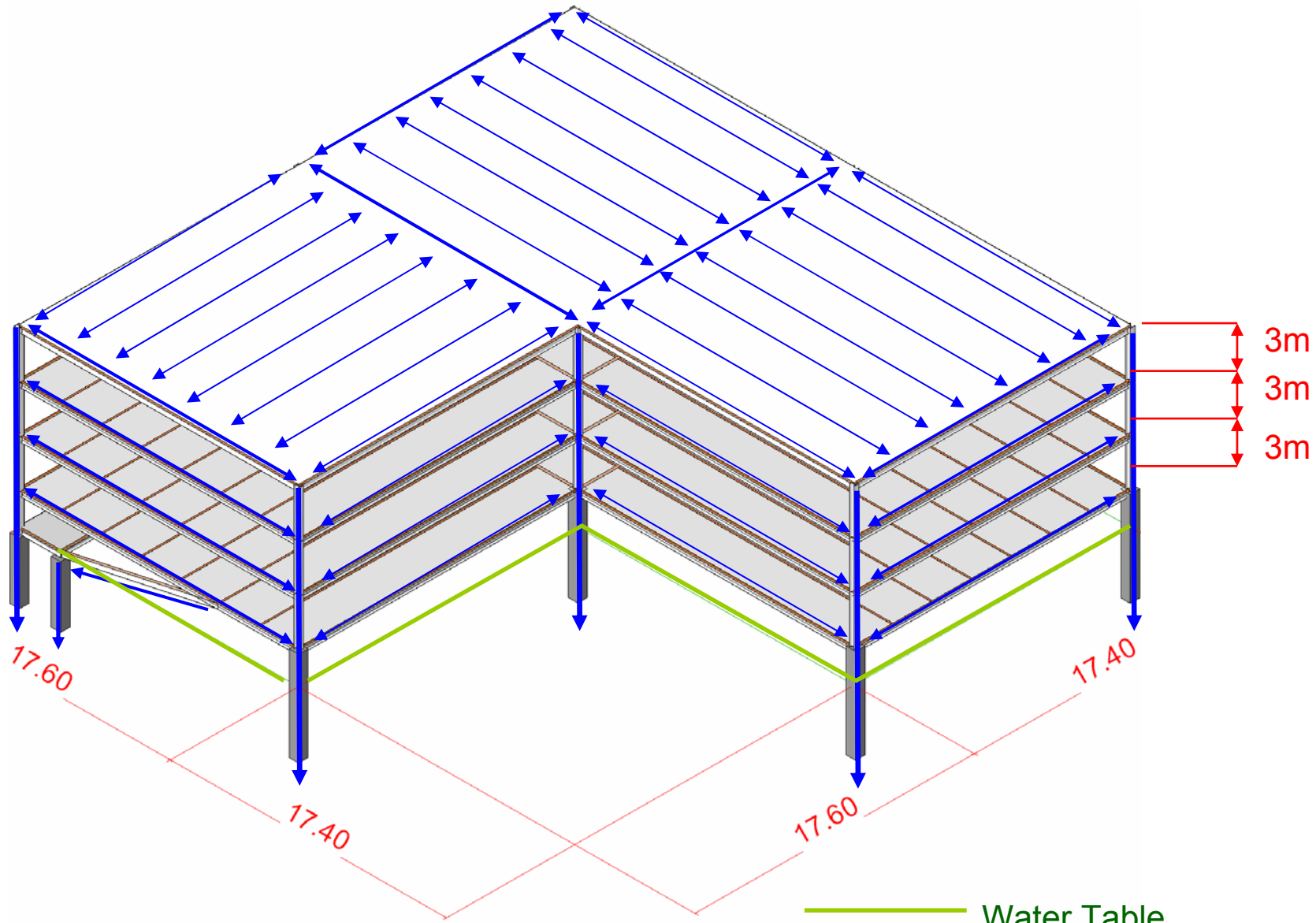
Section



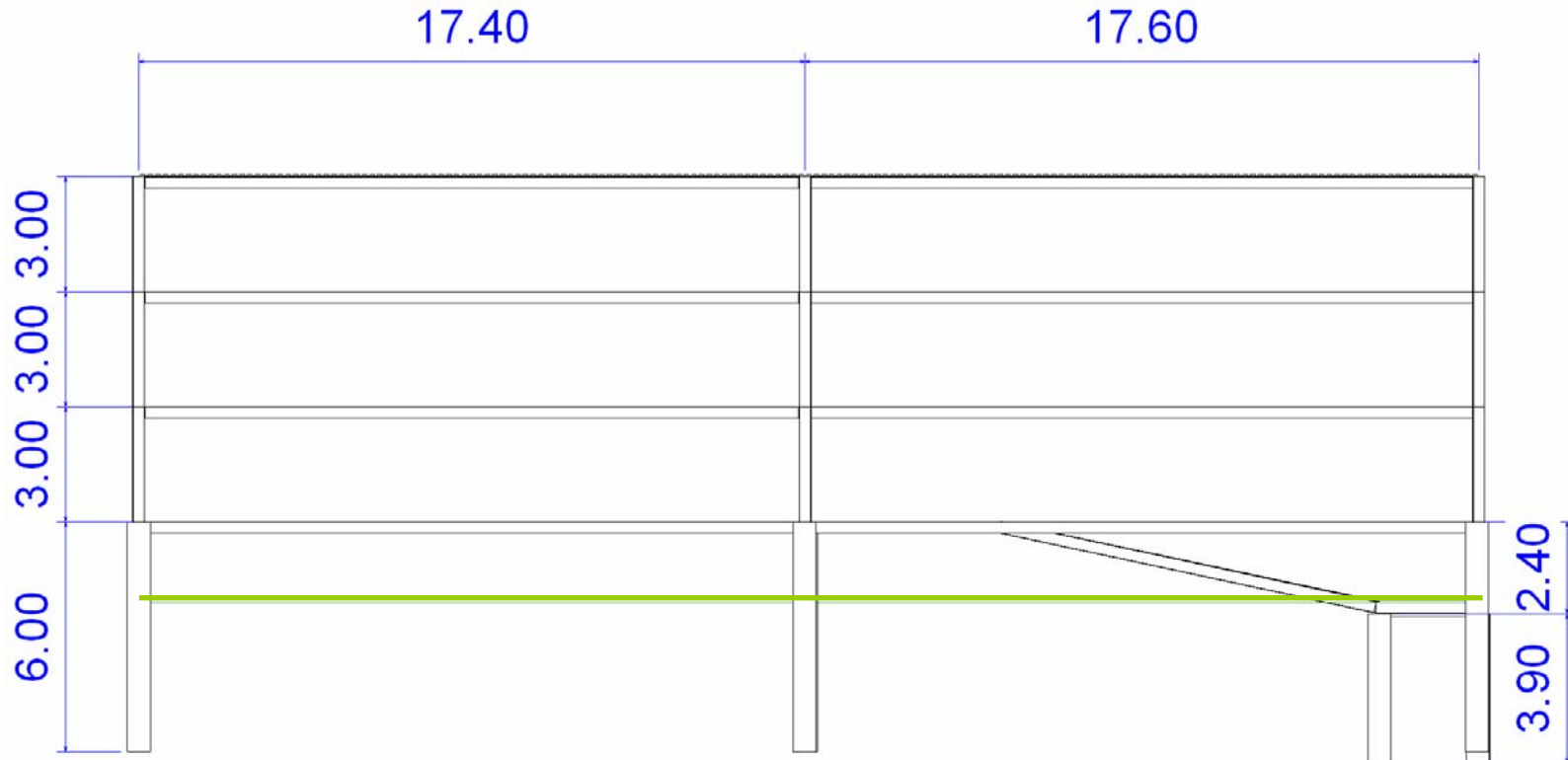
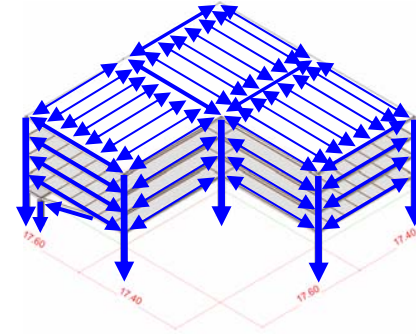
-  BEARING WALL
-  COLUMN
-  BEAM



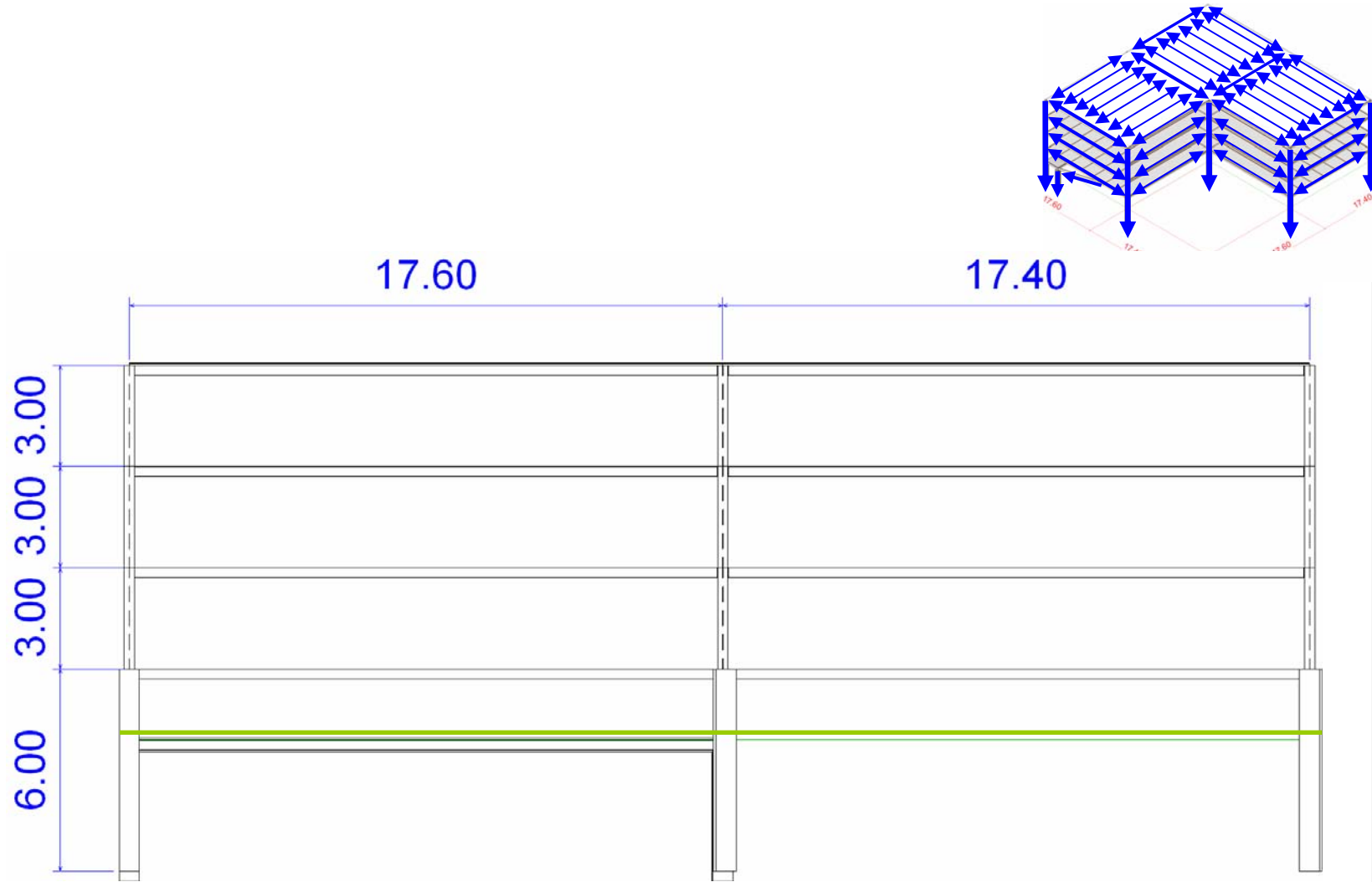
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LOAD PATH

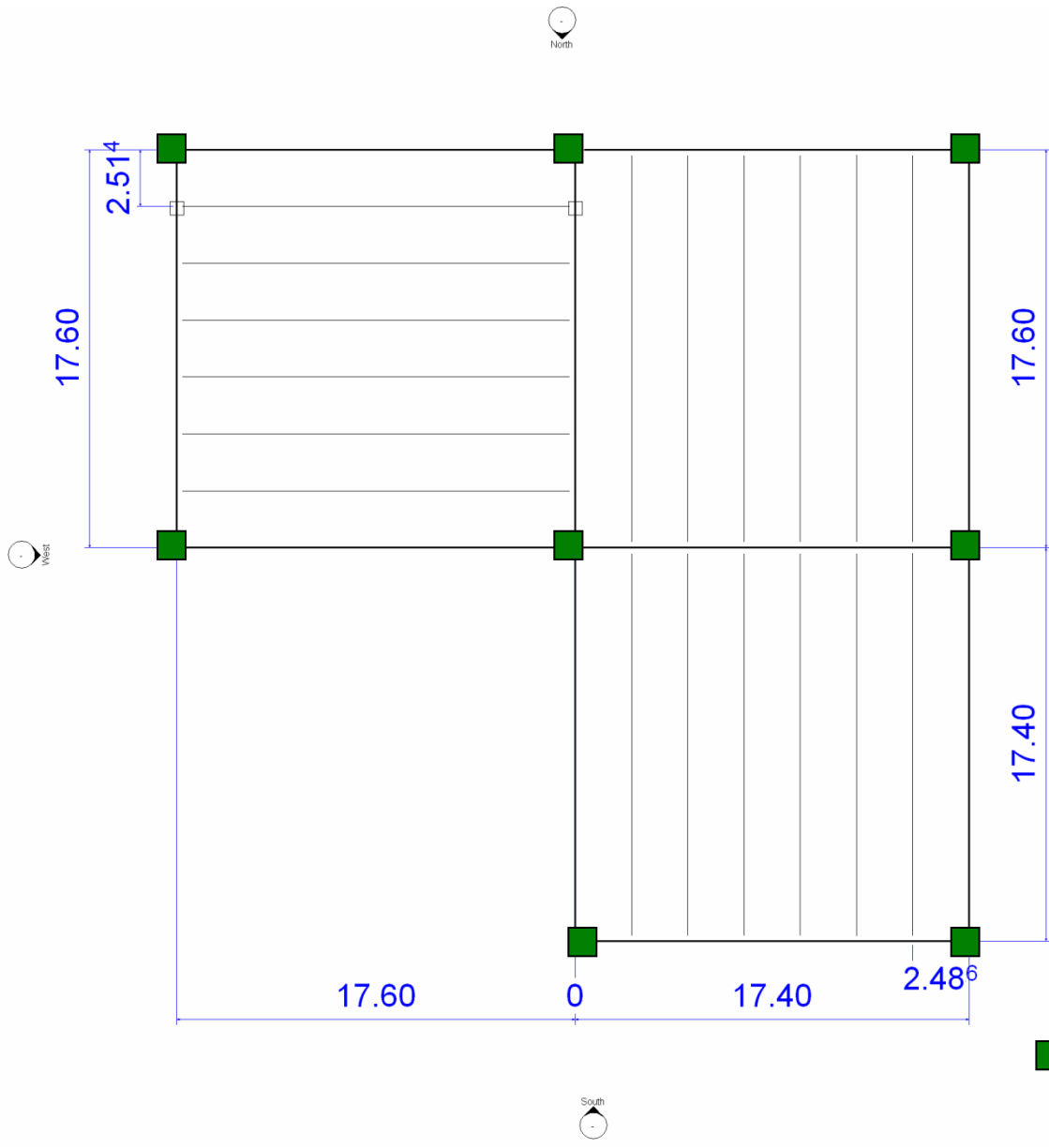


— Water Table



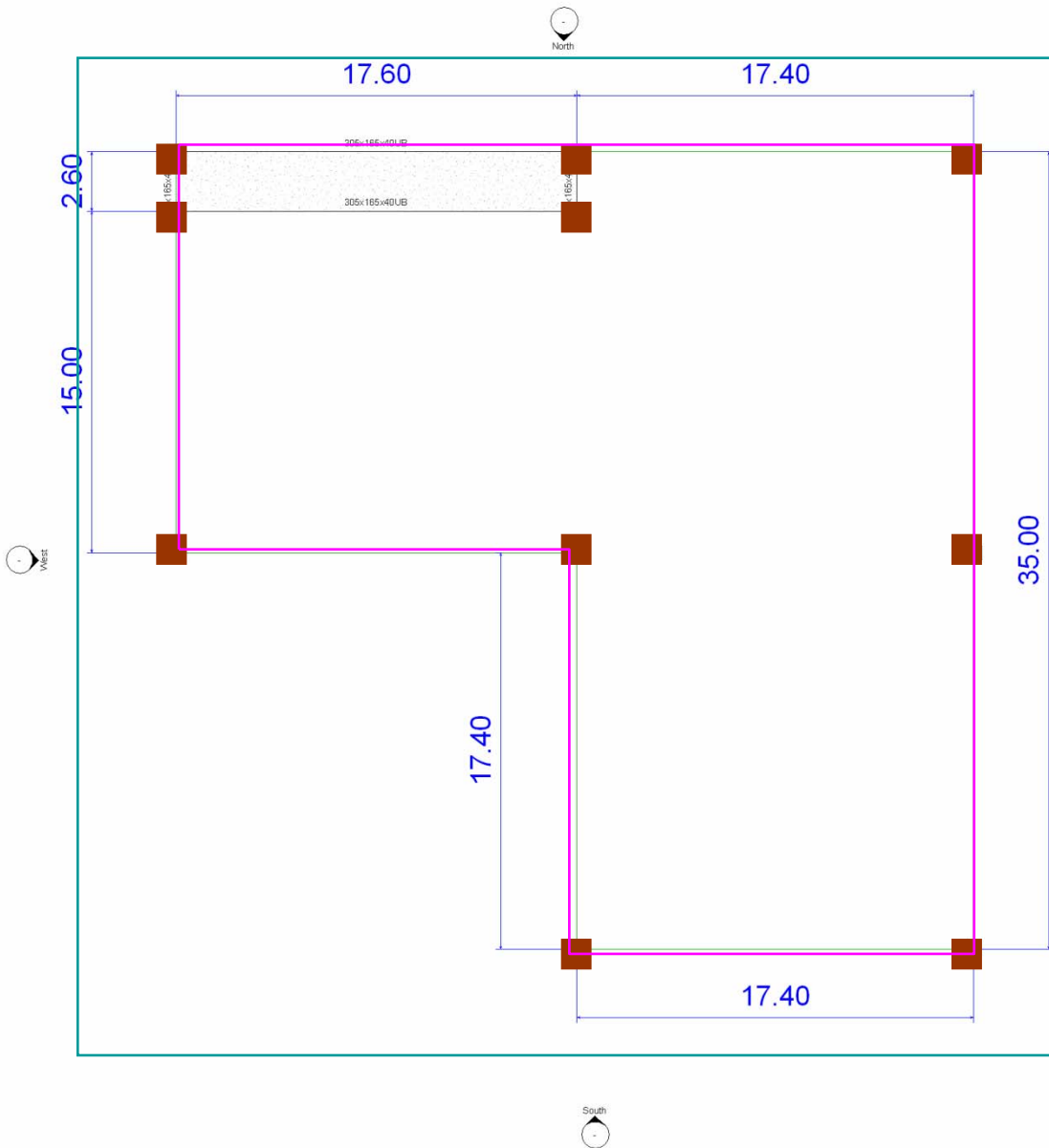
SOUTH
FACE

— Water Table



- Girder: 406x178x60 UB
- Beam: 254x102x28 UB
- Column: 305x305x97 UC
- Slab: 210mm
 - Concrete: 160mm
 - Deck: 50mm
- Floor Depth: 650mm

TYPICAL FLOOR PLAN



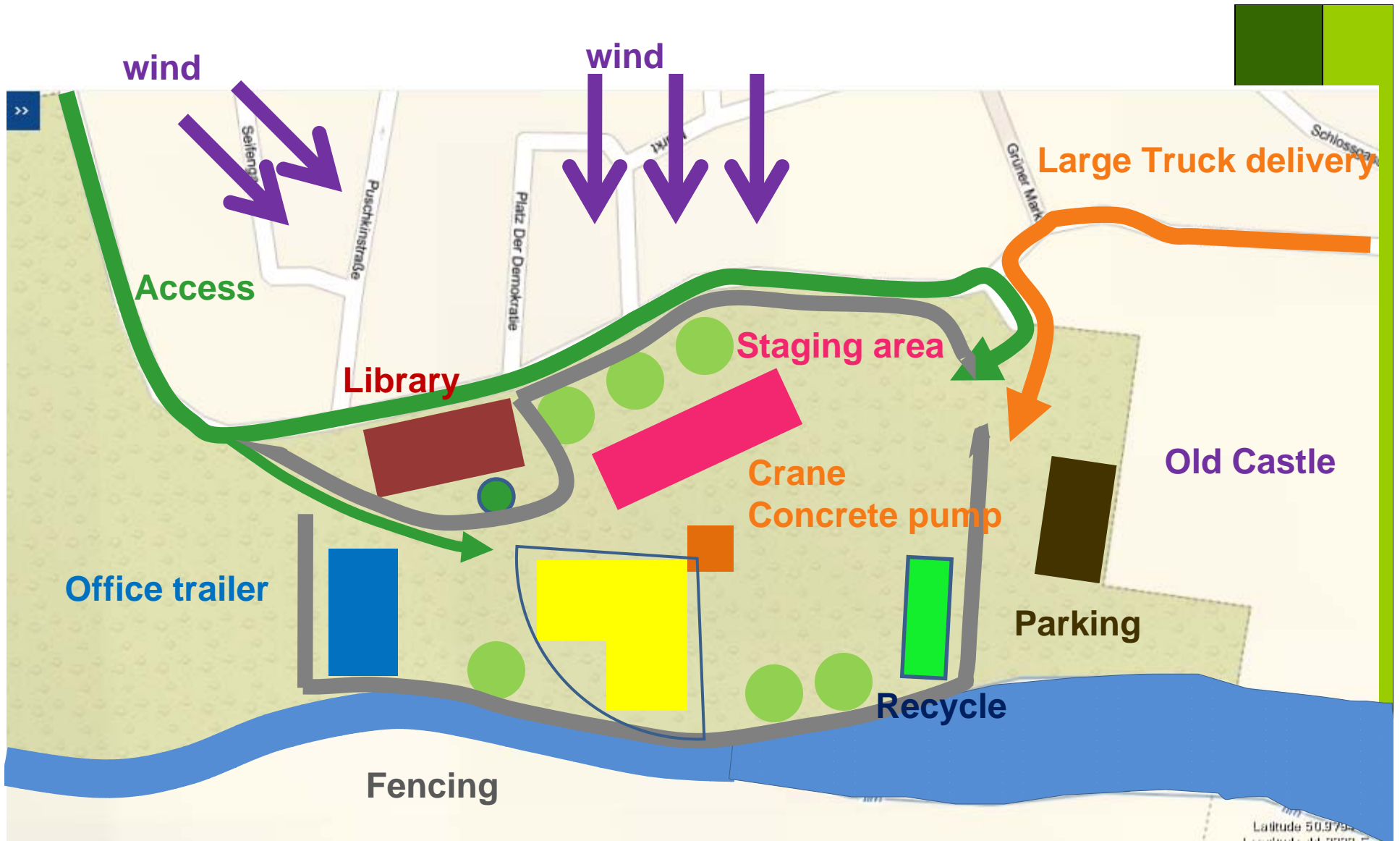
Pile: 600mmx600mm
Concrete

Pumping System:
Dewatering

Geosynthetic System:
Waterproof

- **Geomembrane**
- **Pile Foundation**
- **Pumping system Installation lining**

FOUNDATION PLAN



Proactive instead of Reactive

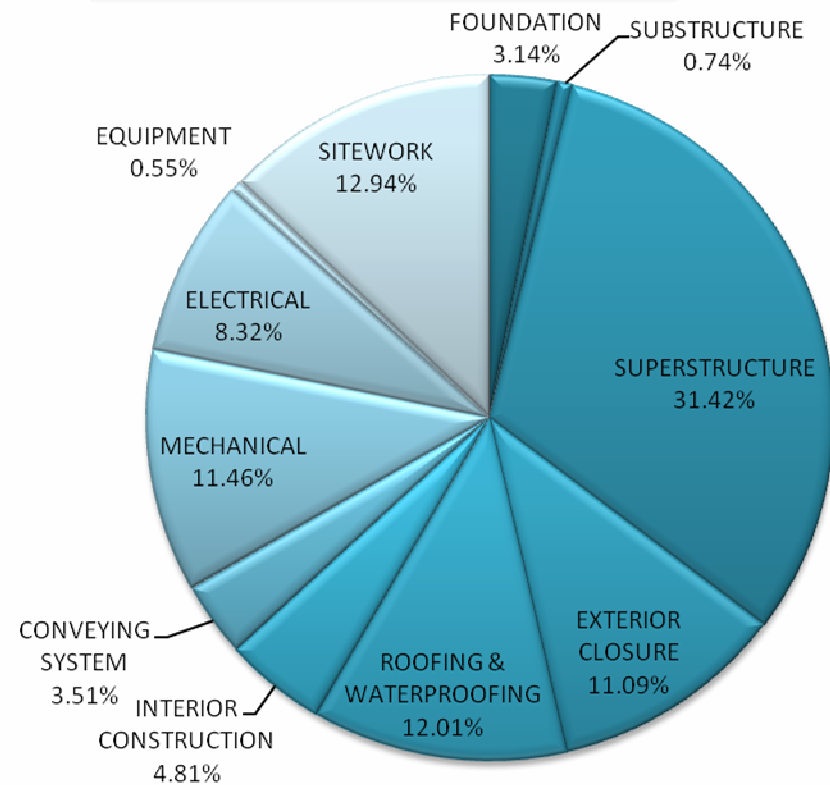
Building Gross Square Footage

	GSF	29,668	
Description	Cost	Cost/Sf	Percentage
FOUNDATION	170,000	\$5.73	3.14%
SUBSTRUCTURE	40,000	\$1.35	0.74%
SUPERSTRUCTURE	1,700,000	\$57.30	31.42%
EXTERIOR CLOSURE	600,000	\$20.22	11.09%
ROOFING & WATERPROOFING	650,000	\$21.91	12.01%
INTERIOR CONSTRUCTION	260,000	\$8.76	4.81%
CONVEYING SYSTEM	190,000	\$6.40	3.51%
MECHANICAL	620,000	\$20.90	11.46%
ELECTRICAL	450,000	\$15.17	8.32%
EQUIPMENT	30,000	\$1.01	0.55%
SITework	700,000	\$23.59	12.94%
SUB TOTAL	5,410,000	\$182.35	100.00%
General Conditions(10%)	541,000	\$18.24	
Fee(8%)	432,800	\$14.59	
Contingency(8%)	432,800	\$14.59	
TOTAL COST	6,816,600	\$229.76	
Inflation(3%)			
TOTAL COST IN 2015	8.1 million	\$274.35	

HIGHEST!

2nd Concept Concrete

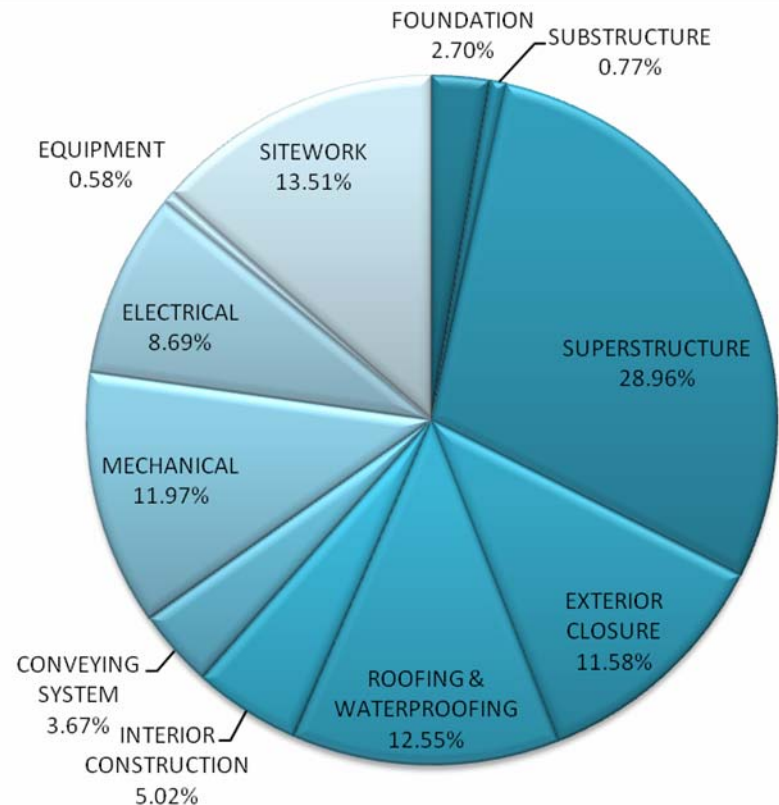
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Building Gross Square Footage

Description	GSF	Cost	Cost/Sf	Percentage
	29,668			
FOUNDATION	140,000	\$4.72	2.70%	
SUBSTRUCTURE	40,000	\$1.35	0.77%	
SUPERSTRUCTURE	1,500,000	\$50.56	28.96%	
EXTERIOR CLOSURE	600,000	\$20.22	11.58%	
ROOFING & WATERPROOFING	650,000	\$21.91	12.55%	
INTERIOR CONSTRUCTION	260,000	\$8.76	5.02%	
CONVEYING SYSTEM	190,000	\$6.40	3.67%	
MECHANICAL	620,000	\$20.90	11.97%	
ELECTRICAL	450,000	\$15.17	8.69%	
EQUIPMENT	30,000	\$1.01	0.58%	
SITework	700,000	\$23.59	13.51%	
SUB TOTAL	5,180,000	\$174.60	100.00%	
General Conditions(10%)	518,000	\$17.46		
Fee(8%)	414,400	\$13.97		
Contingency(8%)	414,400	\$13.97		
TOTAL COST	6,526,800	\$219.99		
Inflation(3%)				
TOTAL COST IN 2015	7.8 million	\$262.69		

2nd Concept Steel

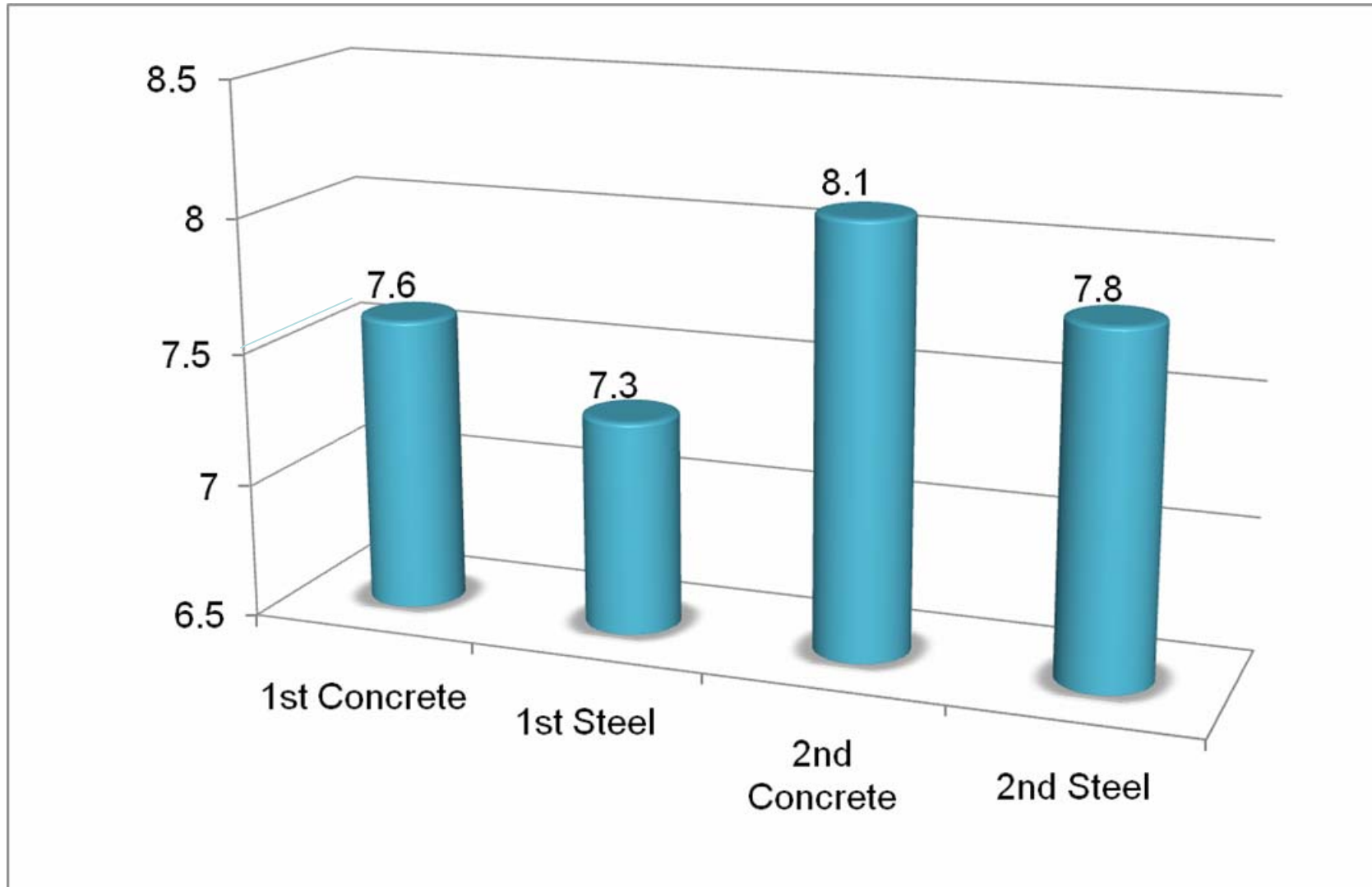


COST

2nd Concrete			
	GSF	29,668	
Description	Cost	Cost/Sf	Percentage
FOUNDATION	170,000	\$5.73	3.14%
SUBSTRUCTURE	40,000	\$1.35	0.74%
SUPERSTRUCTURE	1,700,000	\$57.30	31.42%
EXTERIOR CLOSURE	600,000	\$20.22	11.09%
ROOFING & WATERPROOFING	650,000	\$21.91	12.01%
INTERIOR CONSTRUCTION	260,000	\$8.76	4.81%
CONVEYING SYSTEM	190,000	\$6.40	3.51%
MECHANICAL	620,000	\$20.90	11.46%
ELECTRICAL	450,000	\$15.17	8.32%
EQUIPMENT	30,000	\$1.01	0.55%
SITWORK	700,000	\$23.59	12.94%
SUB TOTAL	5,410,000	\$182.35	100.00%
General Conditions(10%)	541,000	\$18.24	
Fee(8%)	432,800	\$14.59	
Contingency(8%)	432,800	\$14.59	
TOTAL COST	6,816,600	\$229.76	
Inflation(3%)			
TOTAL COST IN 2015	8.1 million	\$274.35	

2nd Steel			
	GSF	29,668	
Description	Cost	Cost/Sf	Percentage
FOUNDATION	140,000	\$4.72	2.70%
SUBSTRUCTURE	40,000	\$1.35	0.77%
SUPERSTRUCTURE	1,500,000	\$50.56	28.96%
EXTERIOR CLOSURE	600,000	\$20.22	11.58%
ROOFING & WATERPROOFING	650,000	\$21.91	12.55%
INTERIOR CONSTRUCTION	260,000	\$8.76	5.02%
CONVEYING SYSTEM	190,000	\$6.40	3.67%
MECHANICAL	620,000	\$20.90	11.97%
ELECTRICAL	450,000	\$15.17	8.69%
EQUIPMENT	30,000	\$1.01	0.58%
SITWORK	700,000	\$23.59	13.51%
SUB TOTAL	5,180,000	\$174.60	100.00%
General Conditions(10%)	518,000	\$17.46	
Fee(8%)	414,400	\$13.97	
Contingency(8%)	414,400	\$13.97	
TOTAL COST	6,526,800	\$219.99	
Inflation(3%)			
TOTAL COST IN 2015	7.8 million	\$262.69	

Cost Estimates Comparison in million dollars



Gantt view

Second Concept (Concrete)

Manager:		Gantt view					Second Concept (Concrete)											
Hierarchy		version 3/12/2009 22:01					Planner: Matt Wasey											
Code	Quantity Name	Predecessors	Duration	Start	End	2015						2016						
						May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
+1	A1010.01	Sub Structure	30	5/26/2015	8/26/2015	[Gantt bar]												
+2	A1010.02	Footings and Slabs	19.8	8/28/2015	7/21/2015	[Gantt bar]												
-3	B1010.01	First Floor Shell	31.5	7/21/2015	8/20/2015	[Gantt bar]												
-3.1	B1010.01.01	Exterior Wall	15	7/21/2015	8/10/2015	[Gantt bar]												
-3.2	B1010.01.02	Interior Core Walls and Stairs	16.5	7/30/2015	8/20/2015	[Gantt bar]												
-4	B1010.02	Second Floor Shell	45.5	8/24/2015	10/18/2015	[Gantt bar]												
-4.1	B1010.02.01	Slab	13.5	8/24/2015	9/15/2015	[Gantt bar]												
-4.2	B1010.02.02	Exterior Walls	18	9/15/2015	10/7/2015	[Gantt bar]												
-4.3	B1010.02.03	Interior Core Walls and Stairs	14	9/25/2015	10/10/2015	[Gantt bar]												
-5	B1010.03	Third Floor Shell	63.5	10/19/2015	12/28/2015	[Gantt bar]												
-5.1	B1010.03.01	Slab	16	10/19/2015	11/11/2015	[Gantt bar]												
-5.2	B1010.03.02	Exterior Walls	17	10/29/2015	11/16/2015	[Gantt bar]												
-5.3	B1010.03.03	Interior Core Walls and Stairs	14.5	11/17/2015	12/7/2015	[Gantt bar]												
-5.4	B1010.03.04	Roof	16	12/7/2015	12/28/2015	[Gantt bar]												
+6	B1010.04	Exterior Doors and Windows	8	12/21/2015	12/30/2015	[Gantt bar]												
+7	C1010.01	First Floor Interior	31.8	1/8/2016	2/24/2016	[Gantt bar]												
+8	C1010.02	Second Floor Interior	36	1/14/2016	3/18/2016	[Gantt bar]												
+9	C1010.03	Third Floor Interior	36	1/21/2016	4/11/2016	[Gantt bar]												
+10	D1010.01	First Floor Services	26	1/12/2016	2/17/2016	[Gantt bar]												
+11	D1010.02	Second Floor Services	24	2/5/2016	3/10/2016	[Gantt bar]												
+12	D1010.03	Third Floor Services	24	2/29/2016	4/1/2016	[Gantt bar]												
+13	E1010	Equipment Furnishing	5	1/4/2016	1/8/2016	[Gantt bar]												
+14	G1010	Landscape	13	3/31/2016	4/19/2016	[Gantt bar]												
+15	Z1010	Finish Site	13	3/18/2016	4/8/2016	[Gantt bar]												

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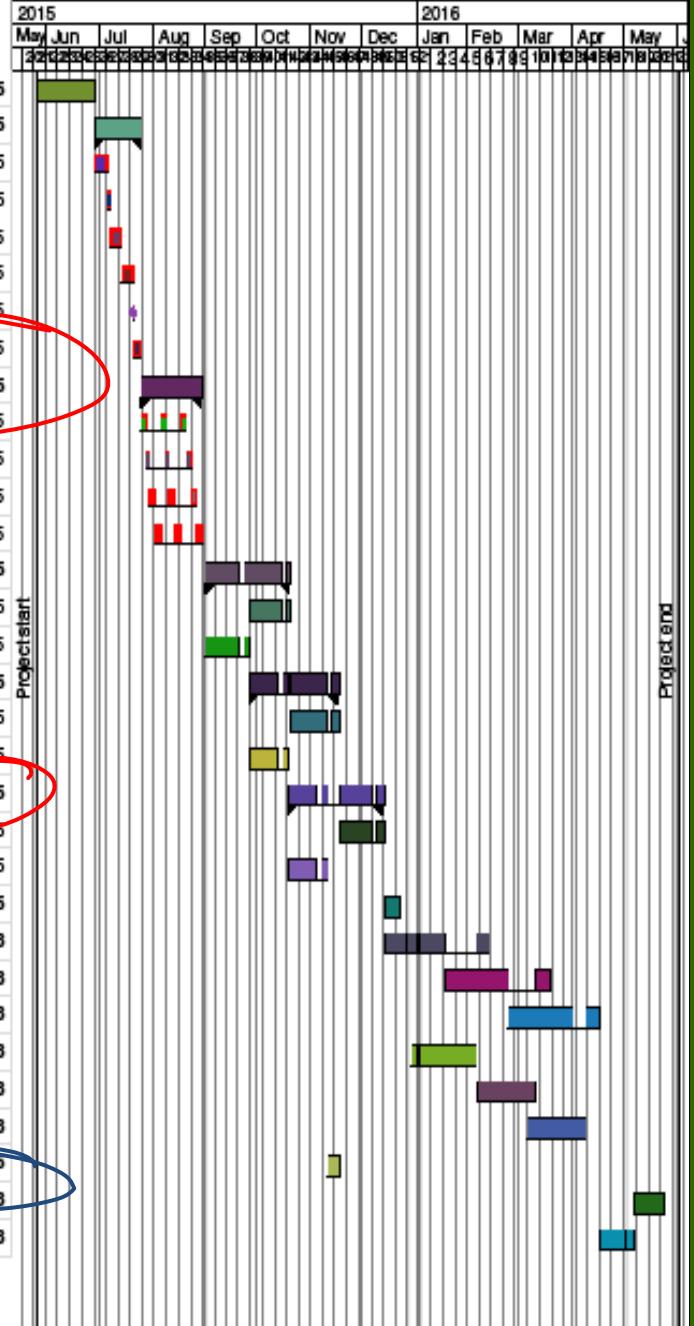
Gantt view

Second Concept (Steel)

version 3/12/2009 22:15

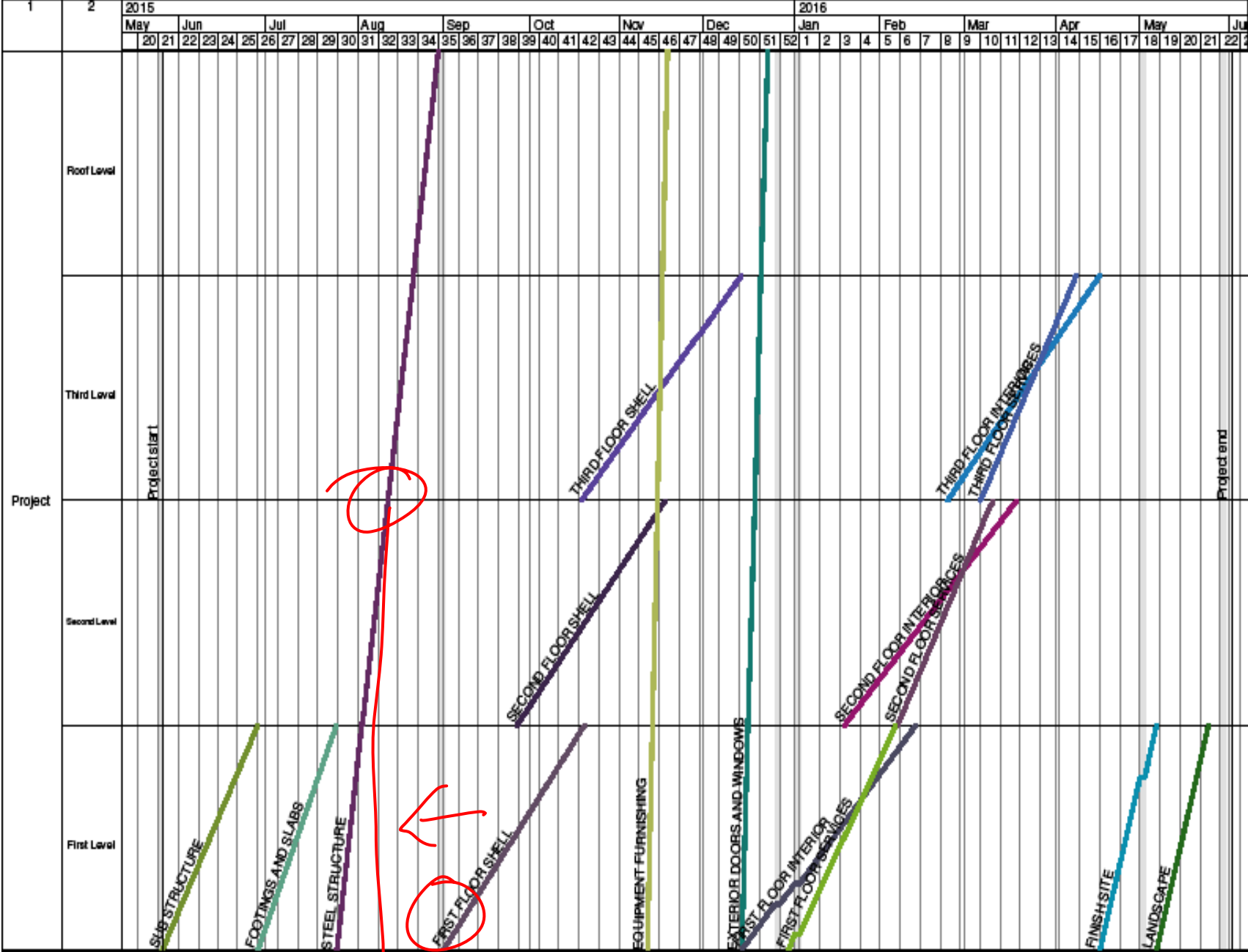
Planner: Matt Wesley

Manager:	Hierarchy	Code	Quantity Name	Predecessors	Duration	Start	End
	+1	A1010.01	Sub Structure		30	5/26/2015	8/26/2015
	-2	A1010.02	Footings and Slabs	16 FS 0	19.5	6/29/2015	7/24/2015
	-2.1	A1010.02.01	*EXCAVATION	16 FS 0	(5.5)	6/29/2015	7/6/2015
	-2.2	A1010.02.02	*BATTER-BOARDS AND CLEAN	19 FS 0	(1)	7/6/2015	7/7/2015
	-2.3	A1010.02.03	*FORMS AND STEEL	21 FS 0	(5)	7/7/2015	7/14/2015
	-2.4	A1010.02.04	*UNDERGROUND UTILITIES	23 FS 0	(5)	7/14/2015	7/21/2015
	-2.5	A1010.02.05	*INSPECTION	25 FS 0	(0)	7/21/2015	7/21/2015
	-2.6	A1010.02.05	*POUR CONCRETE	27 FS 0	(3)	7/21/2015	7/24/2015
	-3	B1010.01	Steel Structure	29 FS 0	25.5	7/24/2015	8/28/2015
	-3.1	B1010.01.01	*COLUMNS	29 FS 0, 53 FS 0	(5.5)	7/24/2015	8/18/2015
	-3.2	B1010.01.02	*BEAMS	32 FS 0	(5)	7/28/2015	8/21/2015
	-3.3	B1010.01.03	*UTILITIES	39 FS 0	(7.5)	7/30/2015	8/26/2015
	-3.4	B1010.01.04	*DECKS AND SLAB ON DECK	46 FS 0	(7.5)	8/3/2015	8/28/2015
	-4	B1010.02	First Floor Shell	53 FS 0	31.5	9/1/2015	10/20/2015
	-4.1	B1010.02.01	Exterior Wall	73 FS 0	15	9/25/2015	10/20/2015
	-4.2	B1010.02.02	Interior Core Walls and Stairs	53 FS 0	16.5	9/1/2015	9/25/2015
	-5	B1010.03	Second Floor Shell	73 FS 0, 66 FS 0	32	9/25/2015	11/7/2015
	-5.1	B1010.03.02	Exterior Walls	66 FS 0	18	10/20/2015	11/17/2015
	-5.2	B1010.03.03	Interior Core Walls and Stairs	73 FS 0	14	9/25/2015	10/19/2015
	-6	B1010.04	Third Floor Shell	88 FS 0, 81 FS 0	31.5	10/19/2015	12/14/2015
	-6.1	B1010.04.02	Exterior Walls	81 FS 0	17	11/17/2015	12/14/2015
	-6.2	B1010.04.03	Interior Core Walls and Stairs	88 FS 0	14.5	10/18/2015	11/10/2015
	+7	B1010.05	Exterior Doors and Windows	96 FS 0	6.5	12/14/2015	12/22/2015
	+8	C1010.01	First Floor Interior	96 FS 0, 187 FS 0	31.8	12/14/2015	2/11/2016
	+9	C1010.02	Second Floor Interior	133 FS 0, 192 FS 0	36	1/19/2016	3/18/2016
	+10	C1010.03	Third Floor Interior	158 FS 0, 197 FS 0	36	2/24/2016	4/15/2016
	+11	D1010.01	First Floor Services	124 FS 0	26	12/30/2015	2/4/2016
	+12	D1010.02	Second Floor Services	147 FS 0	24	2/5/2016	3/10/2016
	+13	D1010.03	Third Floor Services	165 FS 0, 177 FS 0	24	3/7/2016	4/7/2016
	+14	E1010.01	Equipment Furnishing	103 FS 0	5	11/11/2015	11/17/2015
	+15	G1010.01	Landscape	227 FS 0	13	5/6/2016	5/24/2016
	+16	Z1010.01	Finish Site	182 FS 0	13	4/18/2016	5/5/2016



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Manager:

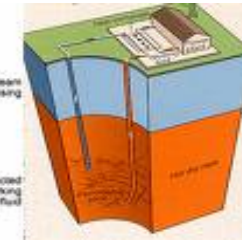
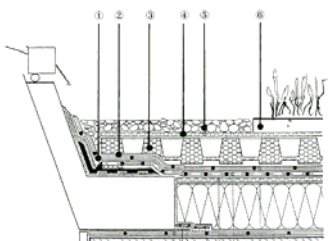


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Sustainability
NO WASTE

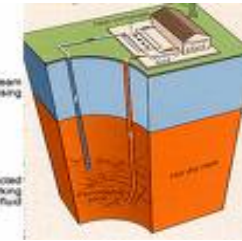
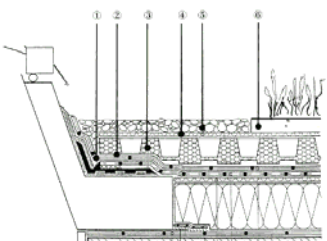
	green roof	solar panels	Radiant heating
details	<ul style="list-style-type: none"> -Intensive Green Roof -Increased Insulation -Stormwater Retention -"Bank" Heat Island 	<ul style="list-style-type: none"> -Single Crystalline Arrays -Lifespan of 25 years 	<ul style="list-style-type: none"> -Increased Comfort -Installed in Slab -Lifespan: 18 years
Numbers	Initial: ~\$10 per square foot	Initial: ~\$3000/sq.meter 4400 kWh/sq.meter over 25 years	Initial: ~\$100,000 23,000 annual therms saved
Chosen for the project	yes	yes	yes

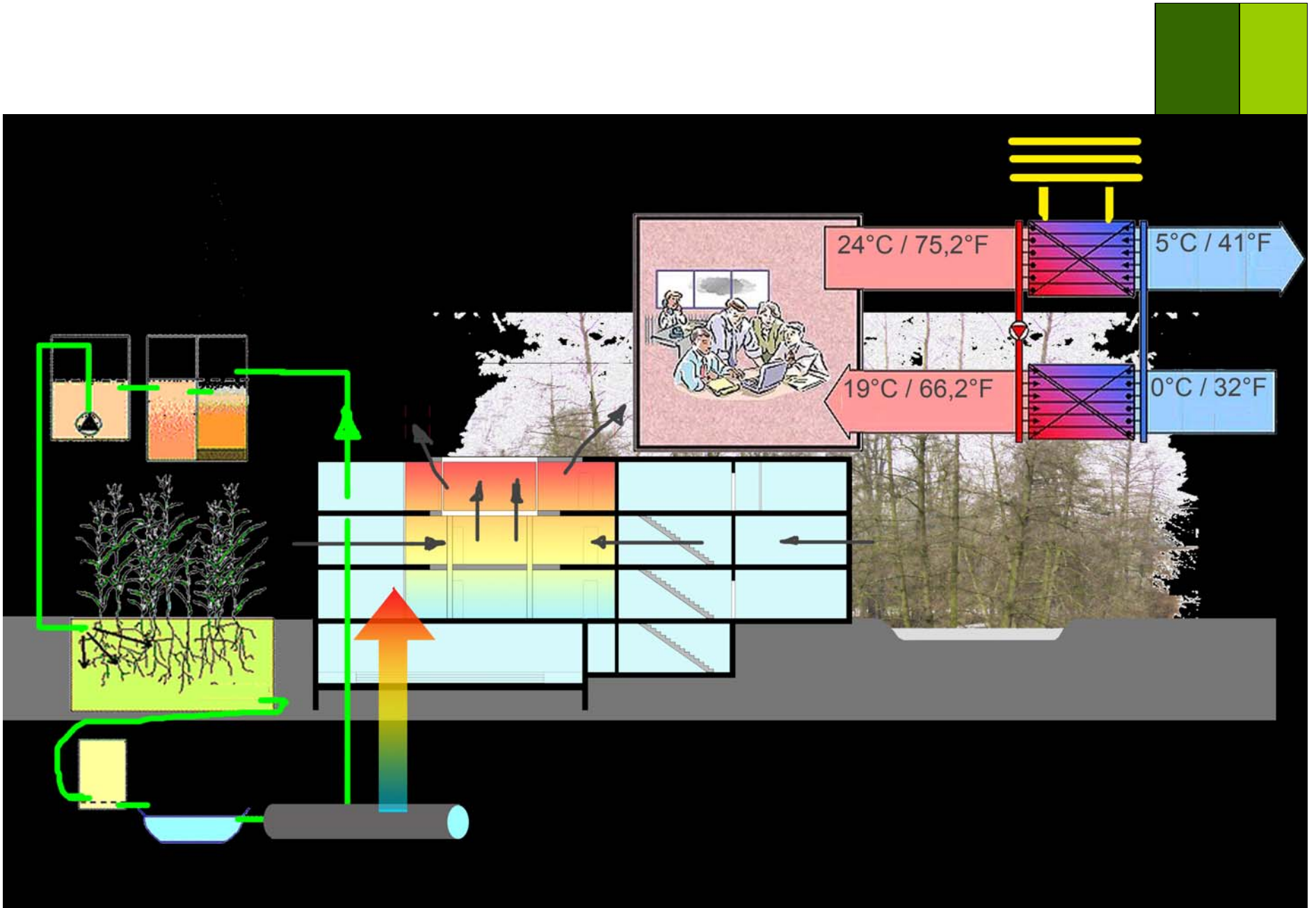


	Efficient glazing	Water Collection
details	<ul style="list-style-type: none"> -Triple-paned Windows -Combats conduction and convection 	<ul style="list-style-type: none"> -Greywater Collection -Blackwater Collection -Rainwater Harvest -Water independent for much of year
Numbers	Initial: ~\$22/sq.meter Cost Recovery over 10 years	Initial: ~\$350,000 Cost Recovery over 25 years
Chosen for the project	yes	yes

Green Dorm Feasibility Report

Green Dorm Feasibility Report







- „green“ materials
- Now:
24 points
- Optimize Energy Performance
 - Material Reuse

LEED Silver:
33-38 points

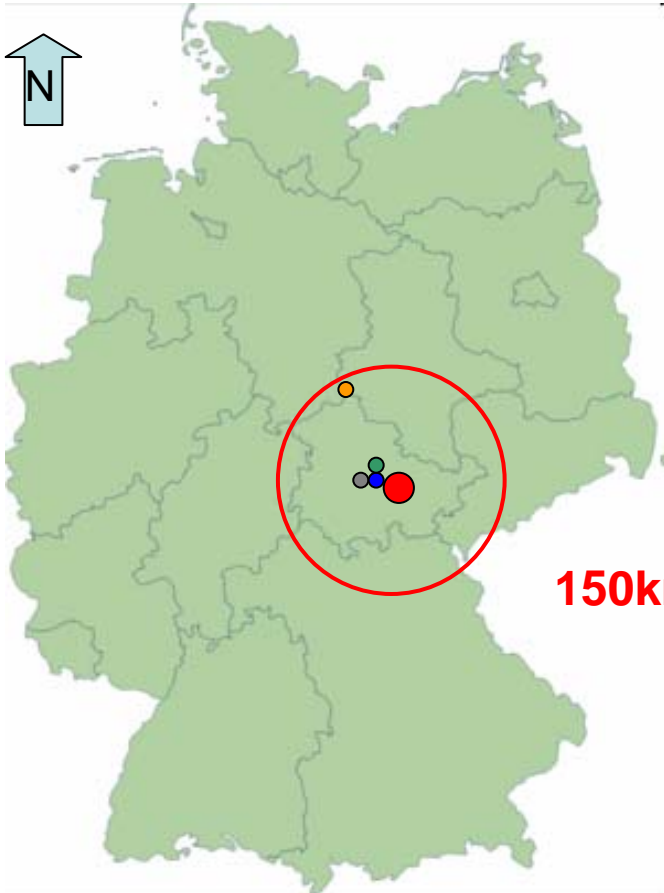
- LEED Innovation

We want:
LEED Gold
39-51 points

- Construction Waste Management
- IAQ Management Plan

Still possible:
LEED Platinum
max 53 points

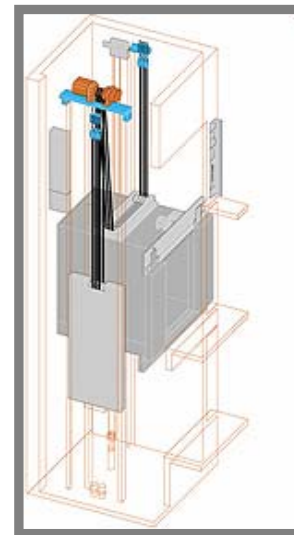
Local Material Suppliers



High Requirements:

- green company policy
- supply of using recycled material

150km/93 miles



- Project: April 2015 – March 2016
- PPP – Contract:
 - 25 years
 - design, plan, build, operate, maintain, finance

Riverbank-
University
Weimar

Consortium
River Team

Students/
Faculty

Public
Private

Operator
e.g. cafeteria

Contractor

Sub
Contractors

Bank

Investors

Insurance
Company

rental
fee

contracts

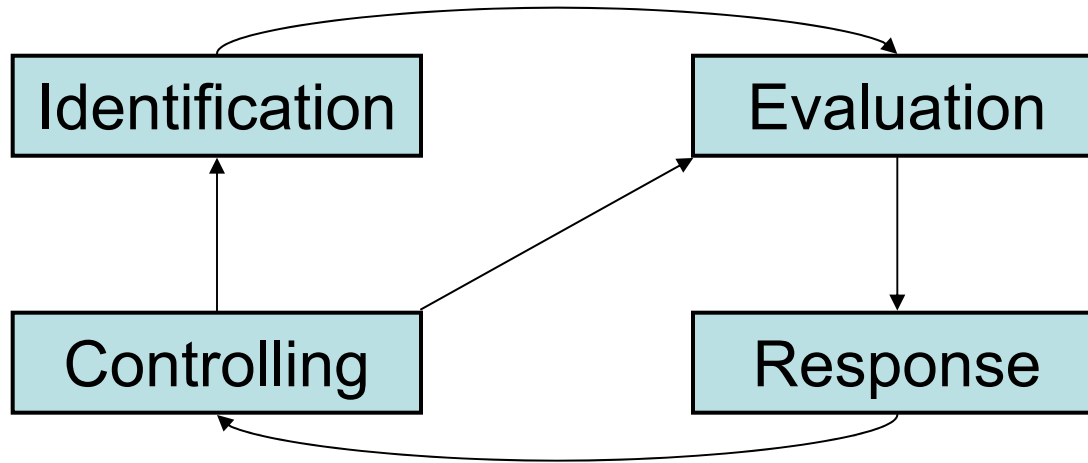


- costs for construction, operation, maintenance, service
- investment costs
- **risk costs**

	A	B	C
1	current year	2015	2016
2	year	0	1
3			
4	costs		
5	construction investment	6000000	
6	operation per year		
7	service per year		
8	maintenance per year		
9			
10	finances		
11	equity (10%)	600000	
12	debt (90%)	5400000	
13			
14	loan		
15	debt	5400000	4898880
16	interests		510300
17	loans pay back per year		204120
18	total payments		714420
19			
20	rental fee		
21	calculated risk		
22	profit		
23	total fee		
24			

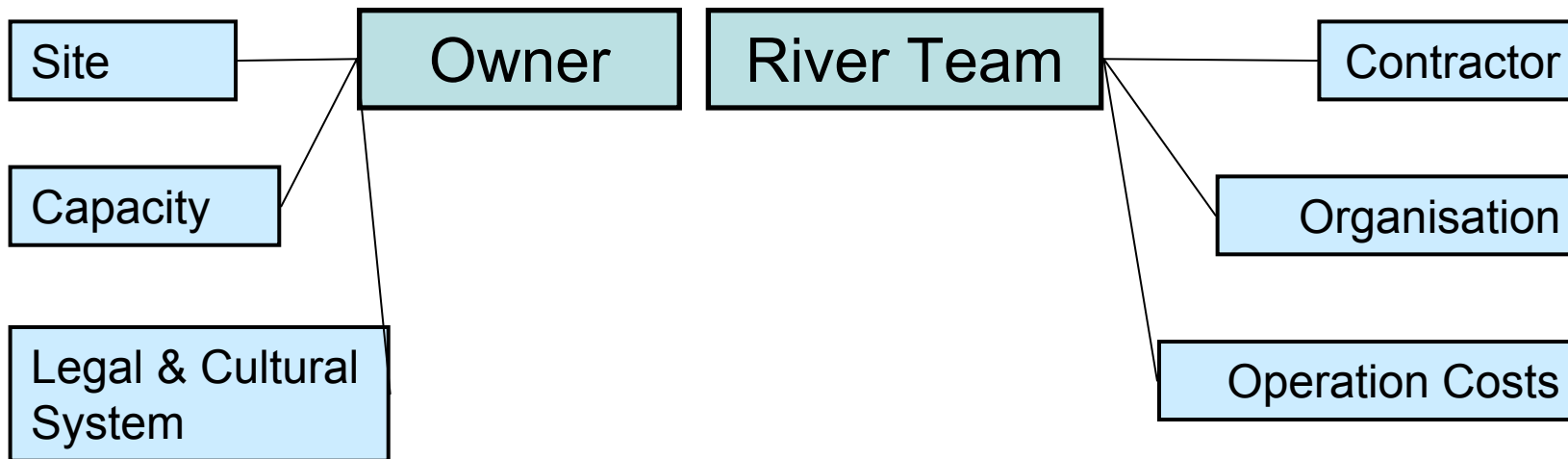


users fee on a monthly base
 break – even – point
 return – on – equity
 net present value



Risk allocation:

„Each risk is born by the partner who can control and bear it best.“



degree of
capacity
utilization

Riverbank-
University
Weimar

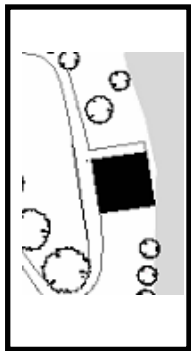


operation
costs

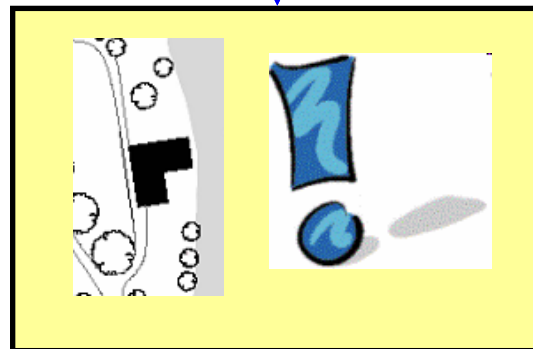
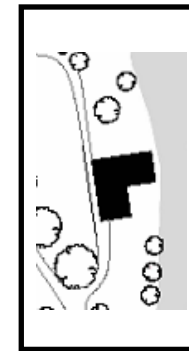
Consortium
River Team



optimal area size from economical point of view



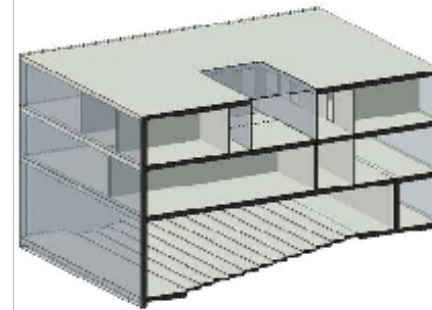
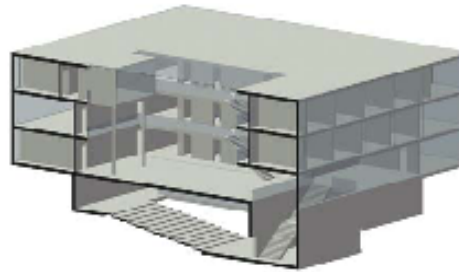
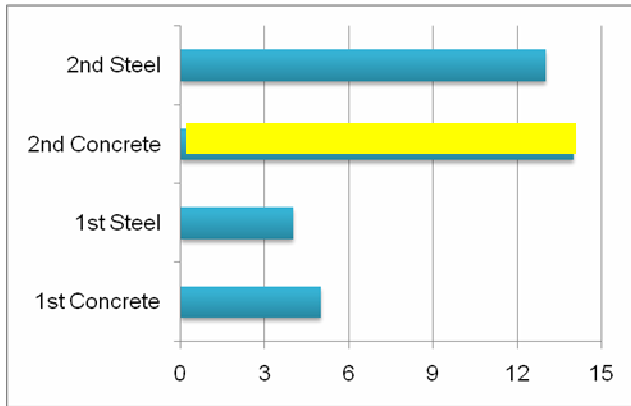
3120 m ²	① gross floor area	2757 m ²
2078 m ²	② usable floor space	1934 m ²
1662 m ²	③ effectiv floor space	1674 m ²
11 160 m ³	④ building volume	8901 m ³
0,62	② / ① > 0,6	0,70
0,8	③ / ② > 0,8	0,87
3,58	④ / ① ≈ 3,0	3,23





Decision Matrix





Criteria	1st Concrete	1st Steel	2nd Concrete	2nd Steel
Strength of Concept	1	1	3	2
Owner's Preferences	-2	-2	2	2
Constructability	2	1	2	1
Functionality	-1	-1	2	2
No waste of Materials	1	2	1	2
Sustainability	1	2	2	3
Least Cost	0	3	-3	1
Short Schedule	0	1	2	3
Local Building Method	3	-3	3	-3
Total	5	4	14	13

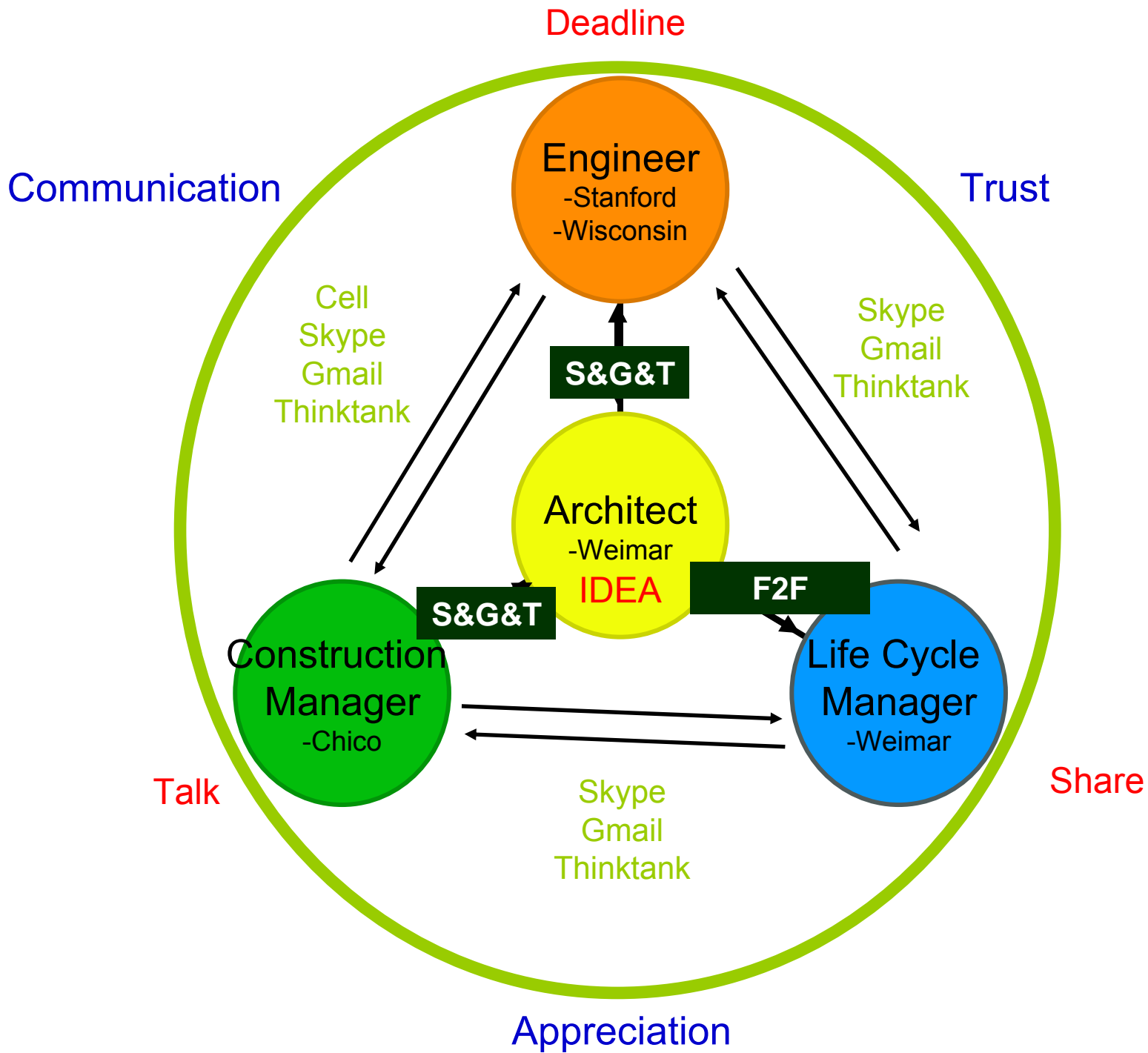
DECISION MATRIX





Team Process





T
E
A
M

P
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C
E
S
S

Q&A

