TEAM ATLANTIC
LIMNOLOGY LAB CANTILEVERS OVER THE LAKE
NARROW ACCESS ROAD TO THE PROJECT SITE
SITE PHOTOS - WINTER

PANORAMIC VIEW OF THE SITE
PIERS PRESENT AN IMPORTANT ELEMENT OF THE LOCAL CONTEXT
LAKE MENDOTA WITH ITS PIERS IS ONE OF THE MOST POPULAR SPACES ON CAMPUS
CLIMATE CONDITIONS

Wisconsin’s weather varies a lot
Need to Consider both Heating and Cooling Loads

Design Temperatures
• Summer Outside Air Temp. 90F
• Winter Outside Air Temp. -11F
• Space Temp.
  • 70F-Winter
  • 75F-Summer
# DECISION MATRIX  – BRAIN MERGE AND TEAM SURVEY

## Students + Coolness
- **40.00%**

## University/Owners + Sustainability
- **30.00%**
- **30.00%**

### Team Atlantic

#### Decision Matrix

<table>
<thead>
<tr>
<th>Category</th>
<th>Architecture 1: Landscape</th>
<th>Architecture 2: Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Students</strong></td>
<td><strong>Steel w/ TermoBuild</strong></td>
<td><strong>Concrete w/ normal HVAC</strong></td>
</tr>
<tr>
<td><strong>University/Owners</strong></td>
<td><strong>Steel w/ normal HVAC</strong></td>
<td><strong>Concrete w/ radiant heat</strong></td>
</tr>
</tbody>
</table>

**Students**
- "I wanna be here!" (lighted, comfortable, stress free, relaxing space)
- Functional - is the building easy to navigate? Do programs connect? Does the building promote learning?
- Is the building comfortable? - temperature, air quality, light

**University/Owners**
- Cost, structural frame should cost less than $850,000 (materials and...
- Easy to operate and maintain, safety
<table>
<thead>
<tr>
<th>Material Type</th>
<th>DECISION MATRIX - BIOSCAPE RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel w TermoBuild</td>
<td><strong>4.070401</strong></td>
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<tr>
<td>Concrete w normal HVAC</td>
<td><strong>4.011952</strong></td>
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</table>
## DECISION MATRIX – THE LEAF RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Steel w normal HVAC</th>
<th>Concrete w radiant heat</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>3.973648</td>
<td>3.954205</td>
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*Note: The values represent some form of performance metrics or scores for different construction materials.*
BIG IDEA SITE

- NARROW SITE
- STEEP TERRAIN CONFIGURATION
BIG IDEA BUILDING

- FUNCTIONAL LAYOUT
- TAKE ADVANTAGE OF SITE CONDITIONS TO OPTIMIZE ENERGY USE
BIG IDEA = BIOSCAPE

- BUILDING EMBEDDED IN THE TERRAIN – ENERGY EFFICIENT
- EXTEND LANDSCAPE ON THE ROOF AS A VIEWING POINT
BIOMIMICRY

Badger Burror “Sett”

Reach 30 ft deep

Ground Temperature is Constant

Large $\Delta T$

Small $\Delta T$
BIG IDEA  LEAN_3Rs CONSTRUCTION PRINCIPLES

- Reuse
  - Formwork
  - Machinery effective utilization
  - Materials from Demolished Building

- Recycle
  - Wood
  - Concrete
  - Façade
  - Construction Waste

- Reduce
  - Just in time delivery
  - Eliminating Salvage Material
  - Pre-Fabrication
    - Hollow-Core Slabs
    - Façade
    - Reinforcement
**FIX - FLEX**

- **2 SEMINAR ROOMS**
- **1 BIG SEMINAR ROOM**
FIX - FLEX

19' 19' 19'

SMALL LECTURES

19' 19' 19'

GALLERY WITH A VIEW
BUILDING GEOMETRY IS A RESPONSE TO THE EXISTING LIMNOLOGY LAB IN THE BACKGROUND
BUILDING EXTENDS TO THE LAKE WITH AN OUTSIDE AUDITORIUM AND RECEPTION AREA
AUDITORIUM

AUDITRIUM GETS NATURAL LIGHT FROM THE NORTH SIDE, OVERLOOKING THE LAKE
STAIRCASE IS THE MAIN ARCHITECTURAL ELEMENT OF THE LOUNGE, LINK BETWEEN FLOORS.
FLEXIBLE SEMINAR ROOMS SHOW AN EXAMPLE OF A COLLABORATIVE OPEN FLOOR USAGE
ROOF AREA

GREEN ROOF PRESENTS AN ADDED VALUE FOR THE ENTIRE CAMPUS AREA
MODEL OVERVIEW

• Steel beams and columns
  • 4 Beam sizes – WT beam
  • 2 Column sizes

• Precast floors simply supported
LOADPATH UNIFORMLY DISTRIBUTED LIVE LOAD
South/Hillside

66.50 ft

48.00 ft

57.00 ft

114.00 ft

24.00 ft

North/Lakeside

66.50 ft
WATER TABLE CONCERN

103 psf

143 psf

8’ to bottom

Static pore pressure 648 psf

uplift < gravity loads
FOUNDATIONS

Excavated terrain
220,000 cubic feet

12’ tall retaining wall

Basement below water table

48’ tall retaining wall
FOUNDATIONS – MAT FOUNDATION PRESSURES

REPRESENTATIVE AREA

CONSTANT WATER PRESSURE

ACTUAL SOIL PRESSURE

ASSUMED SOIL PRESSURE
3/4 LOAD AT COLUMN LINES
1/4 LOAD BETWEEN COLUMNS
• Spread footings below columns
• Need mat foundation everywhere due to water table
FOUNDATIONS – MAT FOUNDATION IN 3D

9"

24"
COLUMN LAYOUT

- 19’
- 28’-6”
- 28’-6”

- W14x90
- W14x53 (not on all floors)
- W14x53
FOUNDATIONS – 4 DIFFERENT PREFAB REBAR LOCATIONS
Excavated terrain 220,000 cubic feet

12’ tall retaining wall

48’ tall retaining wall

Basement below water table
RETAINING WALL SOLUTION: TOP DOWN CONSTRUCTION TIE BACK WALL

- Soldier pile ~50’ long
- Shotcrete lagging
- 10’
- Compacted backfill
- Over excavate
RETAINING WALL SOLUTION: SIMILAR TO WALL SEEN OUTSIDE Y2E2
RETAINING WALL SOLUTION: BUILDING WALL ATTACHED FORMING RETAINING/SHEAR WALL

- Tie back anchors through flange
- Tie backs ~25’ long
- Unstable soil
- Stable soil
- Shear wall
- Retaining wall
FOUNDATIONS - CONNECTION FROM RETAINING WALL TO BEAM

- Embed rebar hoop, typ.
- Embed width = "W"
- Embed plate thickness = "t"
- 10" typ.
- BTWN. rebars 4" - 4"
- #6 A706 embed rebar hoop, typ.
- 2 4½ x 3'-0" loose, install through hoops, typ.
- 10" for 14" wall
- 8" for 12" wall
- 1" return top & bott
- 3/4" erection bolt typ
- L5x3-1/2x3/8 see double angle conn. table on detail 4 for angle length
- L6x4x3/8 (LLH)x0'-9" erection angle w/slot. holes for erection centered under beam
- 22" x 18" embed plate
- 14" concrete wall

ELEVATION - BACK

ELEVATION SECTION - SIDE
FOUNDATIONS - CONNECTION FROM RETAINING WALL TO BEAM
LATERAL SYSTEM

Braced lateral system

Retaining wall/shear wall
LATERAL SYSTEM

FACULTY
3RD FLOOR

STUDENTS
2ND FLOOR

AUDITORIUM
1ST FLOOR
BASEMENT

Doors from auditorium

HSS 4X4X1/4
STRUCTURAL MODEL: WIND EAST WEST

West

East

48.00 ft

24.00 ft

57.00 ft
Nonlinear Analyses 10 Timesteps - Deformation Result

MAX Deformation 4 mm / 0.16 inch

Deformations [mm]
1ST EIGENFREQUENCY 4.54 Hz
- Prevent the building from vibrating
- Need to avoid frequencies in the range 1 to 4.5 Hz
- A lot of uncertainties (live load mass, damping)
1st Eigenfrequency 3.19 Hz

SHS 7x3/8

3/8 inch

7 inch

24.00 ft

20.00 ft
INTEGRATION = OPTIMIZATION: TERMOBUILD SLABS

- Structural precast, prestressed slabs
- Voids used to transport air into room
- Can also implements concealed electrical wiring into voids
- Fire rating of up to 3 hours
WT SLAB CONSTRUCTION

W30x90

WT beam

15”
WT SLAB CONSTRUCTION

Prefabricated holes

12”

3”
Rebar for composite action
WT SLAB CONSTRUCTION

3”
WT DETAIL

- W14×56 COLUMN BEYOND
- 4 #4 @10" O.C. AT COLUMN
- #5 × 48" @24" O.C.
- 3" CONC. TOPPING
- 12" HOLLOW CORE SLAB
- WT15×45
- 3" BEARING
- HVAC DUCT
WT PLASTIC MOMENT DISTRIBUTION (EXTREME CASE)

INVERTED WT - 19' LONG

56 K-FT

277 K-FT

\((W \times L^2)/8\)
SANDWICH HEIGHT CONSIDERATIONS: SLABS BETWEEN THE FLANGES

Concrete topping

12 inch HC-slab

Half W 30 x 90

Total height: 23.266 in (590.95 mm)
Concrete topping if required

8 in HC-slab

W 10 x 100

Total height:
22.1 inch (561.3 mm)
SLAB ON BEAM DETAIL

Grout

Topping if req’d

Weld plate (weld at alternate ends of slabs)

Steel beam
Auditorium MEP ROOM

Largest Duct: 30x15in

Supply Air
Return Air
Exhaust Air
STRUCTURAL 1ST FLOOR/ MEP BASEMENT

Legend:
- MEP main ducts
- D-beams (W30x90)
- Retaining wall
- W14x90
- W10x22
- W36x256
Largest Duct: 30x15in

- Supply Air
- Return Air
- Exhaust Air
CEILING HEIGHTS 1ST FLOOR

Legend:
- MEP main ducts
- D-beams (W30x90)
- Retaining wall
- W14x90
- W10x22
- W36x256

1+ storeys (AUD)

9'

10'

8.5'

8.0'

11.0'

varies

28'-6"

8'-6"

19'

28'-6"
STRUCTURAL 3RD FLOOR

114.00 ft
57.00 ft
133.00 ft
57.00 ft

19.00 ft
Main Duct Height: 15in

Largest Duct: 30x20in

Supply Air

Return Air

Exhaust Air
STRUCTURAL 3RD FLOOR/ MEP 2ND FLOOR

Legend:
- MEP main ducts
- D-beams (W30x90)
- Retaining wall
- W14x90
- W10x22
- W36x256

-19'
-28' - 6"
-8' - 6"
CEILING HEIGHTS 2ND FLOOR

Legend:
- MEP main ducts
- D-beams (W30x90)
- Retaining wall
- W14x90
- W10x22
- W36x256

- 19’
- 8.5’
- 10’
- 28’-6”
- 8’-6”
- 19’, 19’, 19’, 8’, 8’, 8.5’, 8.0’
Main Duct Height: 15in

Largest Duct: 30x20in

Supply Air

Return Air

Exhaust Air
STRUCTURAL ROOF/ MEP 3RD FLOOR

Legend:
- MEP main ducts
- D-beams (W30x90)
- Retaining wall
- W14x90
- W10x22
- W36x256

Dimensions:
- 19'
- 28'-6"
- 8'-6"
CEILING HEIGHTS 3RD FLOOR

Legend:
- MEP main ducts
- D-beams (W30x90)
- Retaining wall
- W14x90
- W10x22
- W36x256

- 19'
- 28'-6''
- 8'-6''
- 8.5'
- 10'
- 8.0'

Dimensions:
- 28'-6" to 6"
COMFORT  NEST

- Thermo Comfort
- Saves Energy
- Tenants Control Temperature
- Remembers Temperature Settings
TERMOBUILD ENERGY SAVINGS

- Jack Laken-TermoBuild contact
- Energy Savings 20% to 45%
- Lower supply Air Temp.
  - 57°F Summer
  - 64°F Winter

<table>
<thead>
<tr>
<th></th>
<th>On Peak:</th>
<th>Off Peak:</th>
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<tbody>
<tr>
<td>Summer</td>
<td>$0.12</td>
<td>$0.05</td>
</tr>
<tr>
<td>Winter</td>
<td>$0.11</td>
<td></td>
</tr>
</tbody>
</table>

Room temperature graph:
- Supply air at the diffuser
- Supply Temp. to hollow core 57°F
- Surface Temp. into the room 68°-73°F
- Air supply to the room 66°-68°F
ENERGY ANALYSIS – VASARI Fuel Savings

Annual Fuel (Therms)

- Basic Design: 51 kBtu/sf/yr, 21,716 therms
- High Insulation Double Pane Windows: 34 kBtu/sf/yr, 14,527 therms

Savings: 33%
ENERGY ANALYSIS – VASARI Life Cycle Energy Cost

- Basic Design: $684,411
- High Insulation Double Pane Windows: $625,065

Difference: $684,411 - $625,065 = $59,346

9% increase in energy cost
QBISS FACADE

- 96% RECYCLABLE
- LIGHTWEIGHT (49 kg/m2)
- MAXIMISED USABLE SPACE
- MINIMISED CONSTRUCTION TIME
QBISS FACADE – CONNECTION DETAIL
QBISS FACADE – CONSTRUCTION

3' 2"

12'
GLASS FACADE – CONSTRUCTION

Glass Facade

Dimensions:
- 12 ft
- 9.6 ft
- 12 ft
GLASS FACADE – STRUCTURAL MODEL

Dimensions [m]
- 3.658
- 1.900
- 3.860

Loads [kNm²]

Average Temperature Range
Madison, Wisconsin

- High
- Low

Fahrenheit

1971-2000

TEAM ATLANTIC
GLASS FACADE – STRUCTURAL MODEL

MAX Deformation
14.4 mm

Dimensions [m]
- 3.658
- 3.860

Deformations [mm]
GLASS FACADE – STRUCTURAL MODEL

summer calculation:
load situation: temperature difference 20 Kelvin
wind load (optional)
GLASS FACADE – STRUCTURAL MODEL

winter calculation:
load situation: temperature difference 25 Kelvin
wind load (optional)

12 mm Single-pane safety glass

14 mm Single-pane safety glass

12,7 mm Air

15.18 N/mm²

-3.24 N/mm²

27.30 N/mm²

-5.95 N/mm²

Stresses [Nmm⁻²]

windowpane
synthetic film
air-layer
synthetic film
windowpane

MEP-E interaction

GLASS FACADE – STRUCTURAL MODEL

winter calculation:
load situation: temperature difference 25 Kelvin
wind load (optional)

12 mm Single-pane safety glass

14 mm Single-pane safety glass

12,7 mm Air

15.18 N/mm²

-3.24 N/mm²

27.30 N/mm²

-5.95 N/mm²

Stresses [Nmm⁻²]

windowpane
synthetic film
air-layer
synthetic film
windowpane

MEP-E interaction
MAX deformation 0.54in
SITE ACCESS

NO PEDESTRIAN CONNECTION FROM THE SOUTH!

BUS STOP

OLD BUILDING

TRUCK ACCESS

BOAT ACCESS

CAR ACCESS
SITE ACCESS

- Site Trailers
- Portable Toilets
- Labor Rest Area
- Equipment Rest Area
- Construction Waste
- Recycle

IN
OUT

SITE ACCESS
County Materials Corporation
Material: Hollow Core Slabs, Masonry, Ready Mix

Zalk Josephs Fabricators LLC
Material: Structural Steel

Lycon Inc (Back-Up Concrete Supplier)
Material: Ready Mix
PEDSETRIAN TRAFFIC PLAN

Construction Zone

Fence

Pedestrian Path

SIDEWALK CLOSED
CROSS HERE
CONSTRUCTABILITY TWO CRANE LIFT

W36x256 – 66.5 ft
CONSTRUCTABILITY  TWO CRANE LIFT

Crane -1

Crane -2

W-36X256
CONSTRUCTABILITY TWO CRANE LIFT
CONSTRUCTABILITY MOBILE CRANE VS TOWER CRANE

- Mobile Crane
- Tower Crane
## Tower Crane vs Mobile Crane: Duration Required July - November

<table>
<thead>
<tr>
<th>Crane Type</th>
<th>Tower Crane</th>
<th>Mobile Crane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crane Model</td>
<td>Terex SK 575-32</td>
<td>Terex T-560</td>
</tr>
<tr>
<td>Rent Per Day</td>
<td>$2,068.80</td>
<td>$2,109.20</td>
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<tr>
<td>Mobilization</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Flexibility</td>
<td>Low</td>
<td>High</td>
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</table>
CONSTRUCTABILITY DEWATERING

Well Point System

Well Point Header Pipe
CONSTRUCTABILITY DEWATERING

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<thead>
<tr>
<th>Dewatering</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
</table>

Start: Excavation Commencement
Finish: Erection of Hollow Core Slabs on the 3rd Floor
Cost: $162500
Duration: 15 Weeks
BIM COORDINATION

The image shows the Revit Architecture interface with a focus on BIM coordination. The highlighted areas indicate the 'Worksets' tab and the 'Synchronize with Central' option, which are used for managing and synchronizing worksets in a project.

A dialog box titled 'Worksharing' is also visible, explaining that the user is about to enable Worksharing. It notes that sharing a project cannot be undone and requires careful planning and management. The dialog box allows the user to choose which levels and grids to move to a specific workset and whether to include remaining elements.

The project browser on the left side of the screen displays various categories such as Views, Ceiling Plans, Elevations, Legends, Schedules/Quantities, Sheets, Families, Groups, and Revit Links.
IDENTIFYING AND RESOLVING CLASHES

A, E, MEP
REVIT Models

NAVISWORKS Integration, Clash Detection

Clash Detection resolving Meeting

Approved

Resolved
<table>
<thead>
<tr>
<th>Image</th>
<th>Clash Group</th>
<th>Clash Name</th>
<th>Status</th>
<th>Description</th>
<th>Date Found</th>
<th>Assigned To</th>
<th>Comments</th>
</tr>
</thead>
</table>
| ![Image](image1) | MEP Shaft Clashes | Clash1 | New | Clearance | 2012/5/6 08:50.07 | Andrew | #1 - Administrator - 2012/5/6 08:54.19 Assigned to: Andrew
MEP Shaft clashes with the Duct |
| ![Image](image2) | MEP Shaft Clashes | Clash2 | New | Clearance | 2012/5/6 08:50.07 | Andrew | #2 - Administrator - 2012/5/6 08:54.19 Assigned to: Andrew
MEP Shaft clashes with the Duct |
| ![Image](image3) | MEP Shaft Clashes | Clash3 | New | Clearance | 2012/5/6 08:50.07 | Andrew | #3 - Administrator - 2012/5/6 08:54.19 Assigned to: Andrew
MEP Shaft clashes with the Duct |
| ![Image](image4) | MEP Shaft Clashes | Clash4 | New | Clearance | 2012/5/6 08:50.07 | Andrew | #4 - Administrator - 2012/5/6 08:54.19 Assigned to: Andrew
MEP Shaft clashes with the Duct |
| ![Image](image5) | MEP Shaft Clashes | Clash5 | New | Clearance | 2012/5/6 08:50.07 | Andrew | #5 - Administrator - 2012/5/6 08:54.19 Assigned to: Andrew
MEP Shaft clashes with the Duct |
HOW MUCH MONEY DO WE ACTUALLY HAVE?

DONATION IN 2015 = $8,500,000

PROJECT BUDGET = $7,974,506
PROJECT BUDGET = $7,974,506

TARGET VALUE = $7,535,000
HOW DID WE ARRIVE AT A TARGET VALUE?

Conceptualization
Estimate Type: SF
Estimates- RS Means

Program Development, Initial Design
Estimate Type: Similar Projects + RS Means

Schematic Design
Estimate Type: Level -3 Estimate from RS Means

Detailed Design
• Eliminate Contingency
• Design to Target
• Interdisciplinarity Negotiation
• Improve Reliability

Set Target Value through Discussion

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 General Condition</td>
<td>$ 605000.00</td>
<td>8.03%</td>
</tr>
<tr>
<td>1.2 Sub Structure</td>
<td>$ 605000.00</td>
<td>8.03%</td>
</tr>
<tr>
<td>1.3 Shell</td>
<td>$ 2300000.00</td>
<td>36.52%</td>
</tr>
<tr>
<td>1.4 Interiors</td>
<td>$ 1000000.00</td>
<td>15.27%</td>
</tr>
<tr>
<td>1.5 Services</td>
<td>$ 3640000.00</td>
<td>54.04%</td>
</tr>
<tr>
<td>1.6 Special Construction</td>
<td>$ 385000.00</td>
<td>5.11%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 7535000.00</strong></td>
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</table>
HOW DID WE ARRIVE AT A TARGET VALUE?
## RELIABILITY TRACKING

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>9956 - SF</td>
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</table>

### Low Reliability - 1

### Medium Reliability - 2

### High Reliability - 3
### ESTIMATE SUMMARY SHELL

<table>
<thead>
<tr>
<th>Line Number</th>
<th>Description</th>
<th>Estimate ($ in Thousands)</th>
<th>% Composition</th>
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<tbody>
<tr>
<td>1.3</td>
<td>Shell</td>
<td>$ 2404</td>
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<tr>
<td>1.3.1</td>
<td>Columns</td>
<td>$ 273</td>
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<tr>
<td>1.3.2</td>
<td>Basement</td>
<td>$ 190</td>
<td>8%</td>
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<tr>
<td>1.3.3</td>
<td>1st Floor</td>
<td>$ 474</td>
<td>20%</td>
</tr>
<tr>
<td>1.3.4</td>
<td>2nd Floor</td>
<td>$ 398</td>
<td>17%</td>
</tr>
<tr>
<td>1.3.5</td>
<td>3rd Floor</td>
<td>$ 402</td>
<td>17%</td>
</tr>
<tr>
<td>1.3.6</td>
<td>Façade</td>
<td>$ 666</td>
<td>28%</td>
</tr>
<tr>
<td>1.3.4.5</td>
<td>Topping Concrete</td>
<td>$ 36593.76</td>
<td>2%</td>
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<tr>
<td>1.3.5</td>
<td>3rd Floor</td>
<td>$ 401844.80</td>
<td>17%</td>
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<tr>
<td>1.3.5.1</td>
<td>Beams</td>
<td>$ 13376.00</td>
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<tr>
<td>1.3.5.2</td>
<td>Beams</td>
<td>$ 207540.00</td>
<td>9%</td>
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<td>1.3.5.3</td>
<td>Beams</td>
<td>$ 47880.00</td>
<td>2%</td>
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<tr>
<td>1.3.5.4</td>
<td>Hollowcore Slabs</td>
<td>$ 96525.60</td>
<td>4%</td>
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<tr>
<td>1.3.5.5</td>
<td>Topping Concrete</td>
<td>$ 36523.20</td>
<td>2%</td>
</tr>
<tr>
<td>1.3.6</td>
<td>Façade</td>
<td>$ 665120.00</td>
<td>28%</td>
</tr>
</tbody>
</table>

#### Pie Chart Composition
- Columns: 11%
- Basement: 8%
- 1st Floor: 20%
- 2nd Floor: 16%
- 3rd Floor: 17%
- Façade: 28%
Shell Estimate = $ 2,953,405

Shell Estimate = $ 2,404,202

Target Value = $ 7,535,000
TARGET VALUE DESIGN AT IT’S BEST

Conventional Façade System
$34/SF

Qbiss Façade System
$60/SF

Metal Ceiling
$9.8/SF

Mineral Fiber Ceiling
$3.9/SF
**ESTIMATE SUMMARY**

- **General Condition**: 1%  
  - $0.097 Million
- **Sub Structure**: 17%  
  - $1.2 Million
- **Shell**: 32%  
  - $2.4 Million
- **Interiors**: 16%  
  - $1.16 Million
- **Services**: 31%  
  - $2.3 Million
- **Special Construction**: 3%  
  - $0.2 Million
FIXED TARGET VALUE

Estimate ($ in Thousands)

<table>
<thead>
<tr>
<th>Date</th>
<th>Estimate</th>
<th>Target Value</th>
</tr>
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Zone - 1

Zone - 2
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## SCHEDULE SUMMARY

Start Date: June 01, 2015  
Finish Date: May 11, 2016  
Total Duration: 50 Weeks

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PRODUCT
PRODUCT ORGANIZATION PROCESS (POP)
INTEGRATED PROJECT DELIVERY

- Owner
- Engineer
- Construction Manager
- Architect
Aaron, What is the Floor to Floor Height

Guys I’m changing the atrium again!

We need braces in the lounge!

Andrew, it’s 12ft

I’m hungry!
03:00pm Andrew: Hey found a solution for the Zoning our Owners Wanted in the meeting yesterday.

05:00pm Ram: What is Zoning?

06:00pm Leila: Andrew told us more than 5 times!! during the meeting.
**Why We Need It**

- Evaluation Tool
- Feedback tool
- Transparency

**Progress**

**Planned Time**
- 15 min (started ten minutes late) - Login 15 min
- 10 min (2 min) - Standup round
- Andrew started report
  - 30 min (20 min) - Basic ideas for each chapter of how each chapter will look like and it's code in the report

- Johannes-Renate said to focus on problems and possible solutions.

**Actual Time**

I just spent 5 hours designing our lateral system

Uhh... I did that last week
Scoring system
- lower if lots of uncertainty
- lower if dislike design
- 1 lower, 10 highest
• More specific rating categories

- How well do we meet the fire code?
- How familiar are we about our Façade Design?
- How developed is the landscape design surrounding the building?
• Anonymous feedback in survey form

<table>
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<th>Pop survey Week 3</th>
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<tr>
<td><strong>1. WHAT UP TEAM ATLANTIC?</strong> You know how a survey works. Do it! Here's how the numbers correspond: 1-not at all; 2-slightly; 3-moderately; 4-very; 5-extremely; 0-we super suck</td>
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<tr>
<td>1. How well do you work with our owners?</td>
</tr>
<tr>
<td>2. How well do you work with our mentors??</td>
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<td>3. How responsive are you to discussions in Box/Skype/Meeting/Email?</td>
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<td>4. How well do members of your team share responsibility for tasks?</td>
</tr>
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<td>5. How well do our meetings meet its objectives?</td>
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<tr>
<td>6. How often does our team meet its deadlines?</td>
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<td>7. How well do we make/act on decisions?</td>
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<td>8. This past week, how</td>
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POP SURVEY - BRAINSTORMING

Compliance with local building codes
Use of alternate sources of energy
The MEP/Structural clash detection
User comfort

Waterproofing of Roof
LEED compliance
The change in public spaces with the new stair positioning
Geothermal possibility
Compliance with local building codes
Use of alternate sources of energy
The MEP/Structural clash detection
Sequencing of construction
The use of just in time delivery?
Tower Crane vs Mobile Crane for construction
Retaining wall construction
Energy Savings
MEP and Structural communication
LEED
How developed and integrated is our BIM model?
How developed is our BIMmory idea?
How confident are we on sandwich heights throughout the building

Actually getting significant structural design work done!
Facade design - all disciplines
Go into detail with the fire code - see if we meet it

Ramprasad Palanisamy
Stanford, CA
Aaron McGavitt
Mountain View, CA
Janz Omerzu
Medvode
# Voting Room Title: Product Evaluation

The brighter (orange) the ideas are, the more popular they are!
6 people contributed their ideas.
5 people voted.

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<th>Name</th>
<th>Idea</th>
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<td>Remprasath Palanisamy</td>
<td>Sequencing of construction</td>
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<tr>
<td>Remprasath Palanisamy</td>
<td>The MEP/Structural clash detection</td>
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<tr>
<td>Johannes solas</td>
<td>how is our design of the landscape surrounding the building?</td>
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<td>Andrew Eckhart</td>
<td>Energy Savings</td>
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<tr>
<td>Janz Omerzu</td>
<td>Facade design - all disciplines</td>
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<tr>
<td>Remprasath Palanisamy</td>
<td>LEED compliance</td>
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<td>Johannes solas</td>
<td>connection for the steel members? screws vs welded connections</td>
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<td>Leila Zheng</td>
<td>How integrated is the termobuild system in our product?</td>
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<td>How developed is our biomimicry idea?</td>
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<td>How confident are we on sandwich heights throughout the building</td>
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<tr>
<td>Leila Zheng</td>
<td>How sure are we on our MEP system? (geothermal, heat air exchanger, what?)</td>
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<tr>
<td>Janz Omerzu</td>
<td>Ceiling design/MEP system for the entire building</td>
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**Country**:
- **United States**
- **Germany**
- **Slovenia**
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<th>Week 3</th>
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<td>How well do members of your team share responsibility of tasks</td>
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<td>How well do our meetings meet its objectives?</td>
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<td>How often does our team meet its deadlines?</td>
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<td>How well do we make/act on decisions</td>
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**How well do members of your team share responsibility of tasks?**
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<td>How developed is our biomimicry idea?</td>
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<td>How developed and integrated is our BIM?</td>
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<td>How well do we meet the fire code?</td>
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<td>How knowledgeable are we on foundation design?</td>
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<td>How sure are we on MEP?</td>
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<td>How finalized is our Architectural Model?</td>
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<td>How well do you understand the sequencing of construction</td>
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<td>How confident are you about MEP/Structural Clashes?</td>
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<td>How confident are you about our building's Energy Savings Potential?</td>
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<td>How familiar are about our Façade Design</td>
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<td>How developed is the landscape design surrounding the building?</td>
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**How confident are we on sandwich Heights?**
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<tr>
<td>How well do you work with mentors</td>
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<td>3.67</td>
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<td>How responsive are you to discussions in Box/Skype/Email/Meeting?</td>
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<td>How well do members of our team share responsibility of tasks?</td>
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<tr>
<td>How well do our meetings meet its objectives?</td>
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<td>How often does our team meet its deadlines?</td>
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<td>How well do we make/act on decisions?</td>
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<td>This week how aware were about tasks performed by others?</td>
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<td>How confident are you about our buildings Energy Savings Potential?</td>
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How confident are you about our buildings Energy Savings Potential?

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<td>Site Constraints, Max Size for Pre-Fab Materials</td>
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PERSONALIZATION 3DICC

Constructability Review - Clash Detection - Twice Every Week
INTEGRATION OF PROCESS AND ORGANIZATION

Construction Manager

Architect

MEP Engineer

Structural Engineer
POP – LESSONS LEARNED

ABOUT OUR TEAM
• Very diverse - 4 countries represented

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<th>qh (psf)</th>
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</table>
- Coordination Tools involve the buy-in of all team members
ABOUT TEAMWORK
• Important to ask feedback from EVERYONE
• True IPD project — you spend more time coordinating than doing work.
  It’s best to have interactive work sessions
• Iteration
Transparancy applied to our building
Thank you