Pat Allen | Rachel Barrow | Alex Byard | Melanie Fonner | Brad Frederick | Brian LaChance | Mike Palmer

BIM Thesis | AEI Team 5 | Presentation #1 | 14 September 2012

Mission Statement

The mission for this project is to engineer an Elementary School that meets the needs of both the school district and community. The building design will address safety, functionality, and sustainability. These criteria will be met while providing the most cost-efficient building over its lifecycle. To achieve these goals, all building systems will be seamlessly integrated.

Project Information

Client: Reading School District

Name: Elementary School

Location: 13th and Park Streets

Description: Three-story elementary school with state-of-the-art classrooms; special education classrooms; library, gymnasium, swimming pool, and additional recreational facilities

Focus Points: High performance and energy efficient; security; safety; durability; functionality; adaptability; community connections

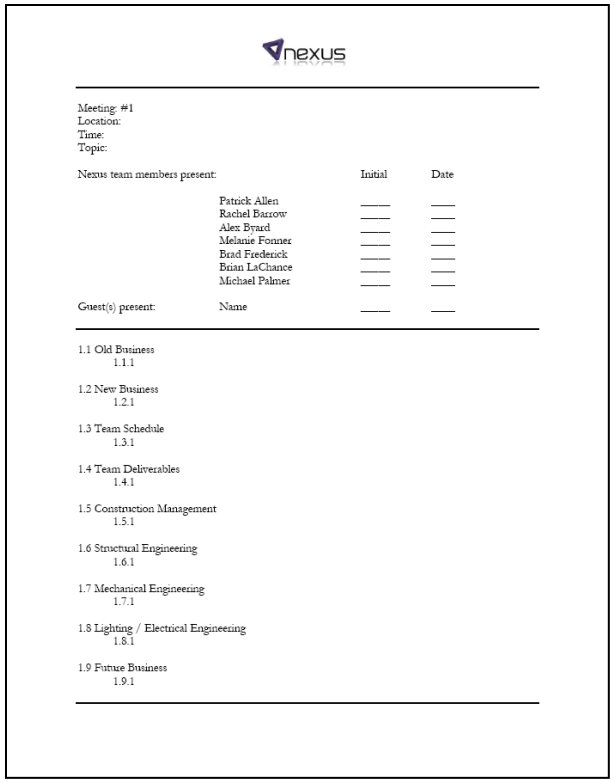
Project Milestones

Project Phase	Start Date	Completion Date
Presentation #1	29 August 2012	14 September 2012
Presentation #2	15 September 2012	3 October 2012
Presentation #3	4 October 2012	24 October 2012
Proposal Presentation	25 October 2012	12 November 2012
Written Submission	13 November 2012	22 February 2013
Final Presentation	25 February 2013	3-5 April 2013

Team Meeting Procedures

COLLABORATION STRATEGY:

- Weekly meeting schedule
- Team communication – group text messaging, Google Docs, common file storage
- Continual interdisciplinary interaction for building systems' integration
- Team leaders selected based on project phase



nexus

Meeting: #1
Location:
Time:
Topic:

Nexus team members present:		Initial	Date
	Patrick Allen	____	____
	Rachel Barrow	____	____
	Alex Byard	____	____
	Melanie Fonner	____	____
	Brad Frederick	____	____
	Brian LaChance	____	____
	Michael Palmer	____	____
Guest(s) present:	Name	____	____

1.1 Old Business
1.1.1

1.2 New Business
1.2.1

1.3 Team Schedule
1.3.1

1.4 Team Deliverables
1.4.1

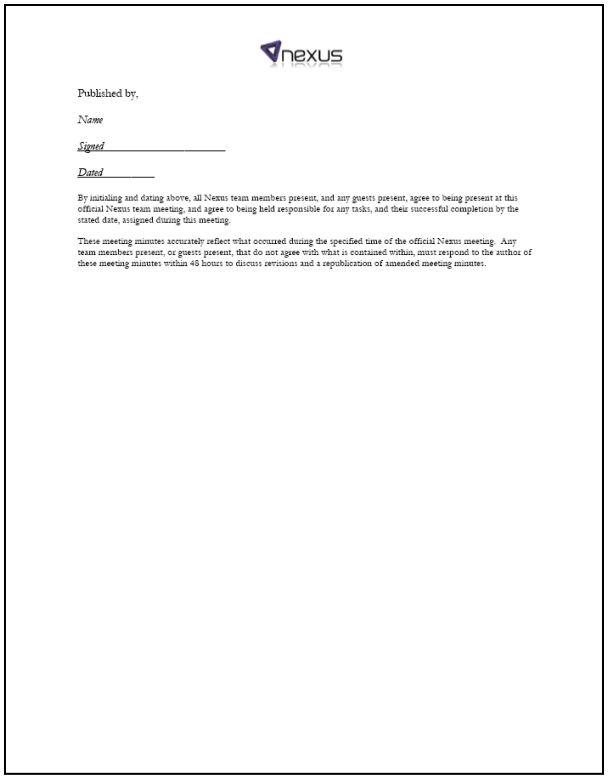
1.5 Construction Management
1.5.1

1.6 Structural Engineering
1.6.1

1.7 Mechanical Engineering
1.7.1

1.8 Lighting / Electrical Engineering
1.8.1

1.9 Future Business
1.9.1



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Published by,

Name

*Signed*_____

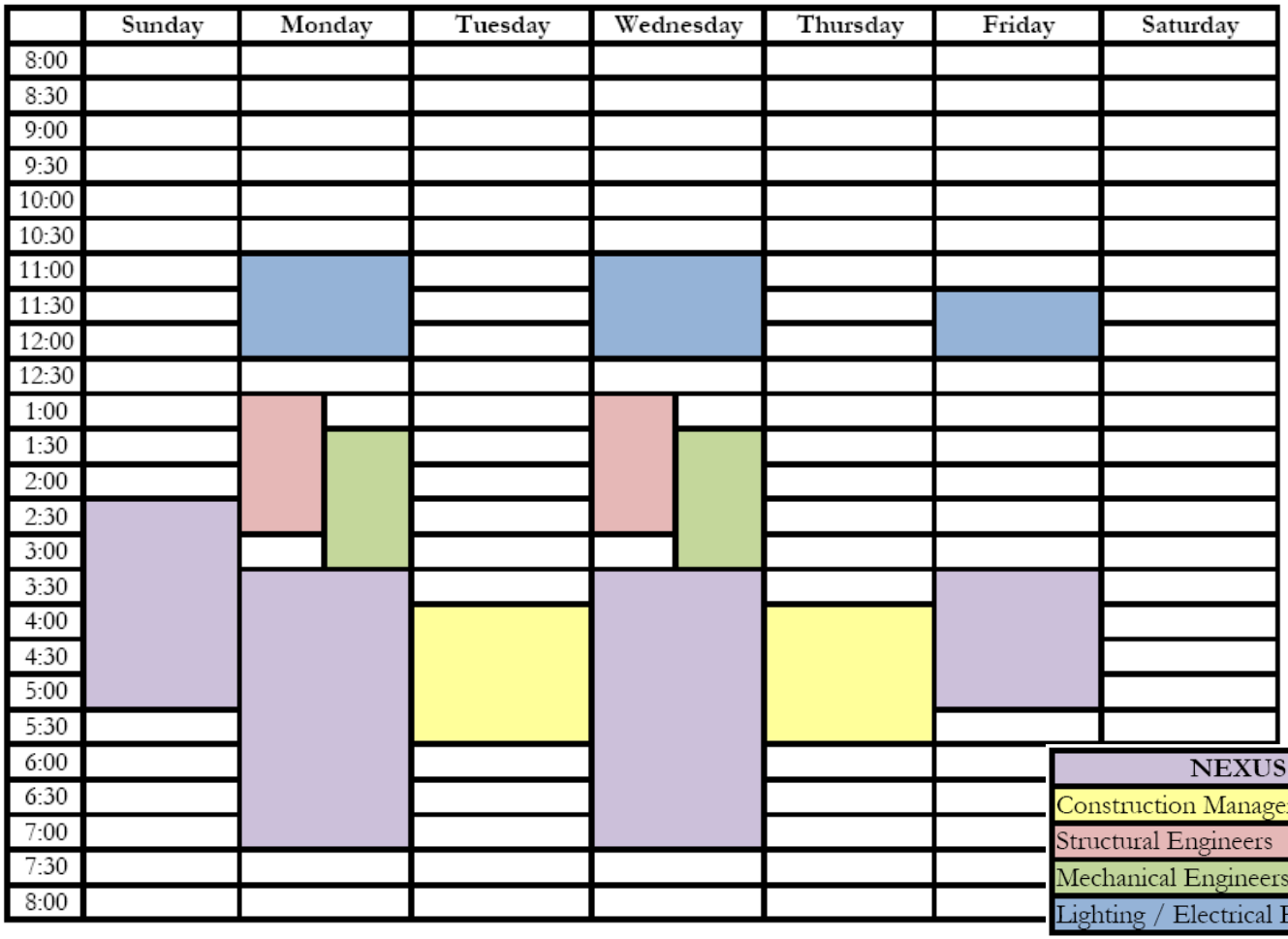
*Dated*_____

By initialing and dating above, all Nexus team members present, and any guests present, agree to being present at this official Nexus team meeting, and agree to being held responsible for any tasks, and their successful completion by the stated date, assigned during this meeting.

These meeting minutes accurately reflect what occurred during the specified time of the official Nexus meeting. Any team members present, or guests present, that do not agree with what is contained within, must respond to the author of these meeting minutes within 48 hours to discuss revisions and a republication of amended meeting minutes.

Team Meeting Schedule

- Mission
- **BIM Ex. Plan**
- Structural
- Mechanical
- Lighting
- Construction
- Precedents
- Modeling



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Meeting Types

Meeting Type	Project Stage	Frequency	Participants	Location
BIM Execution Plan	Presentation #1	5x / week	All	333 Sackett
3D Coordination	Presentation #3	3x / week	All	334 Sackett
Structural Analysis	Presentation #3	3x / week	All	335 Sackett
Lighting Analysis	Presentation #3	3x / week	All	336 Sackett
Mechanical Analysis	Presentation #3	3x / week	All	337 Sackett
Energy Analysis	Proposal Presentation	1x / week	All	338 Sackett
Sustainability (LEED) Evaluation	Presentation #3	2x / week	All	339 Sackett
Phase Planning (4D Modeling)	Proposal Presentation	3x / week	All	340 Sackett
S.F. / Detailed Cost Estimation	Presentation #2	3x / week	All	341 Sackett
Existing Conditions	Presentation #1	3x / week	All	342 Sackett
Record Modeling	Proposal Presentation	1x / week	All	343 Sackett
Site Utilization Planning	Presentation #1	2x / week	All	344 Sackett

BIM Goals

Priority	Goal Description	Potential BIM Uses
High	Engineering integration through multi-disciplinary collaboration	Design Reviews
High	Whole-building constructability and operation	3D Coordination
High	Fluid transfer and comprehension of information	Phase Planning
High	Short term and lifecycle cost benefits	Cost Estimation
Medium	LEED certification	Sustainability Evaluation

BIM Roles

- Mission
- **BIM Ex. Plan**
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BIM Uses

- Mission
- **BIM Ex. Plan**
- Structural
- Mechanical
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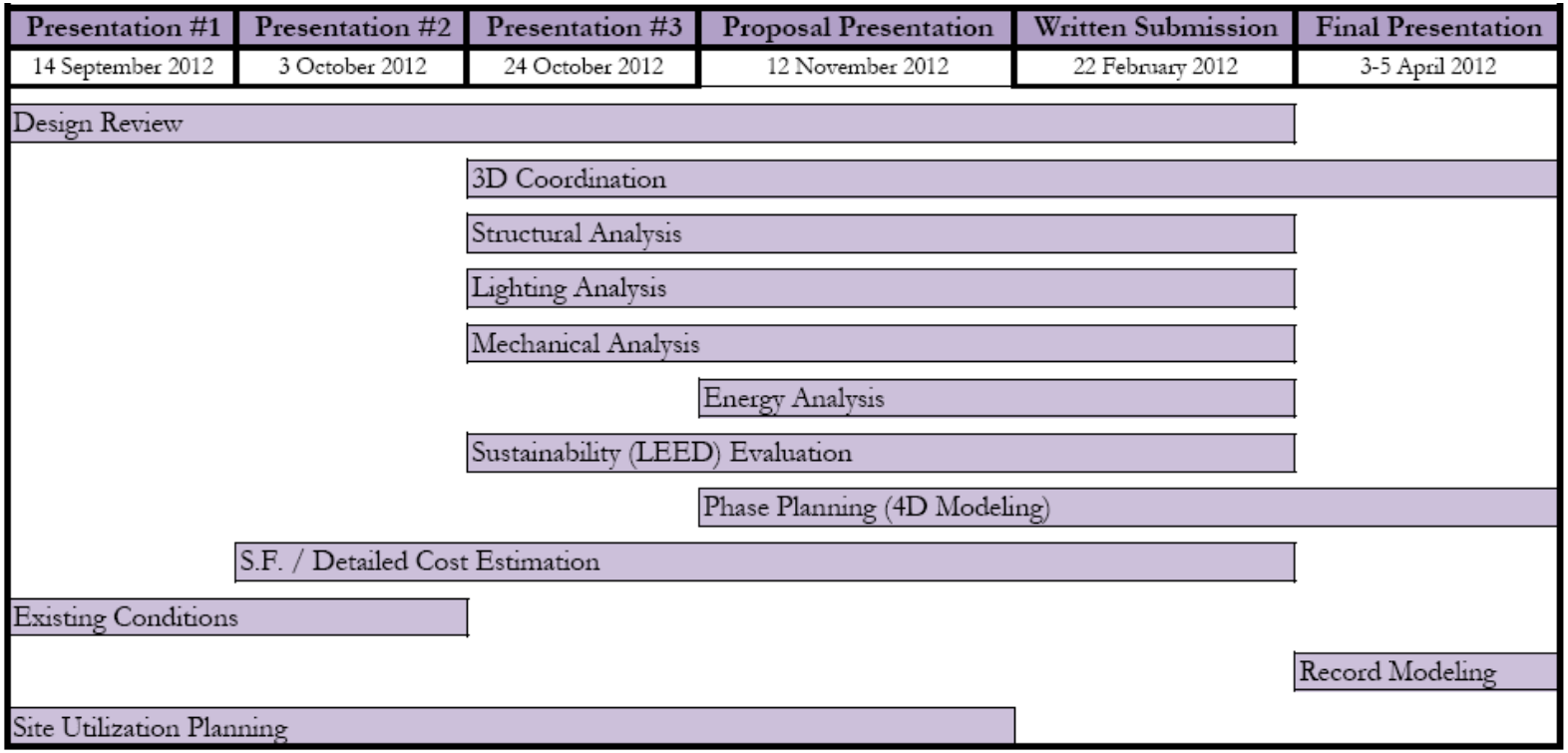

BIM Uses Analysis

BIM Goal Use Analysis Worksheet				
BIM Use	**Project Importance**	**Disciplines Involved**	**Discipline Importance**	**Necessary Data**
	High / Med / Low		High / Med / Low	
Design Phase				
Design Review	High	CM	High	Constructability input to design models
		SE	High	Structural design models
		ME	High	Mechanical design models
		LE	High	Lighting / Electrical design models
3D Coordination	High	CM	High	Design models
		SE	High	Design models, ETABS and SAP models
		ME	High	Design models
		LE	High	Design models, ceiling plans
Structural Analysis	High	SE	High	Local codes, ETABS and SAP models
Lighting Analysis	High	LE	High	AGI and Daysim models
Mechanical Analysis	High	ME	High	Energy model and equipment sizing and selection
Energy Analysis	High	ME	High	Preliminary Vasari model and later more accurate energy model
		LE	High	AGI - lighting power density information
Sustainability (LEED) Evaluation	High	CM	High	Materials and energy data
		SE	High	Material efficiency data
		ME	High	Energy model and IAQ information
		LE	High	AGI and Daysim analysis
Phase Planning (4D Modeling)	High	CM	High	Design models, project schedule
S.F. / Detailed Cost Estimation	High	CM	High	Materials, building statistics
Existing Conditions	Med	CM	Med	Site data
		SE	Med	Ggeotechnical report
Record Modeling	Med	CM	Med	4D coordinated model
		SE	Med	Structural and ETABS model
		ME	Med	Model and equipment selection
		LE	Med	Analyses and models
Site Utilization Planning	High	CM	High	Site layout, equipment, material laydown, project schedule

Information Exchanges

- Mission
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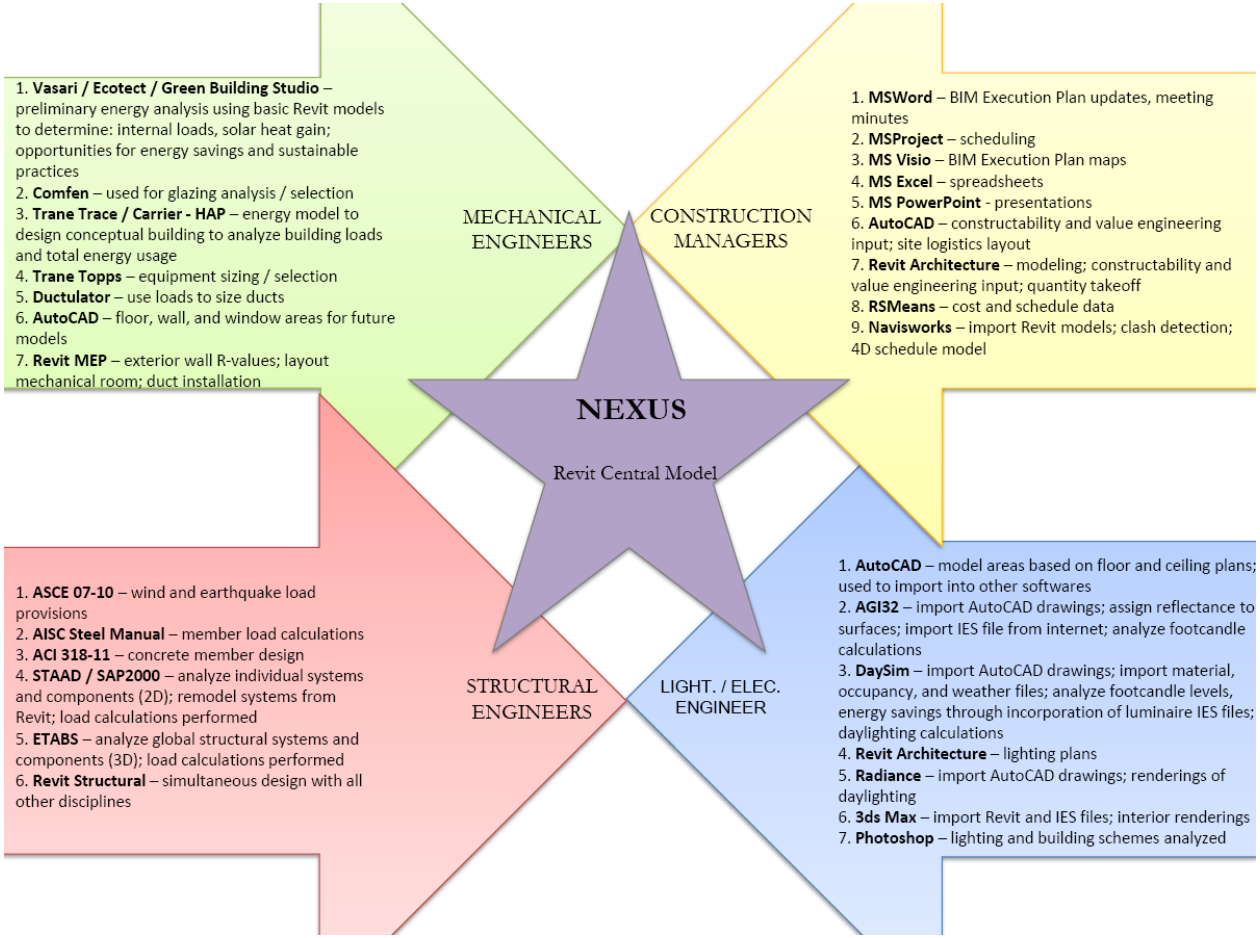

Team Overall Process Map

- Mission
- **BIM Ex. Plan**
- Structural
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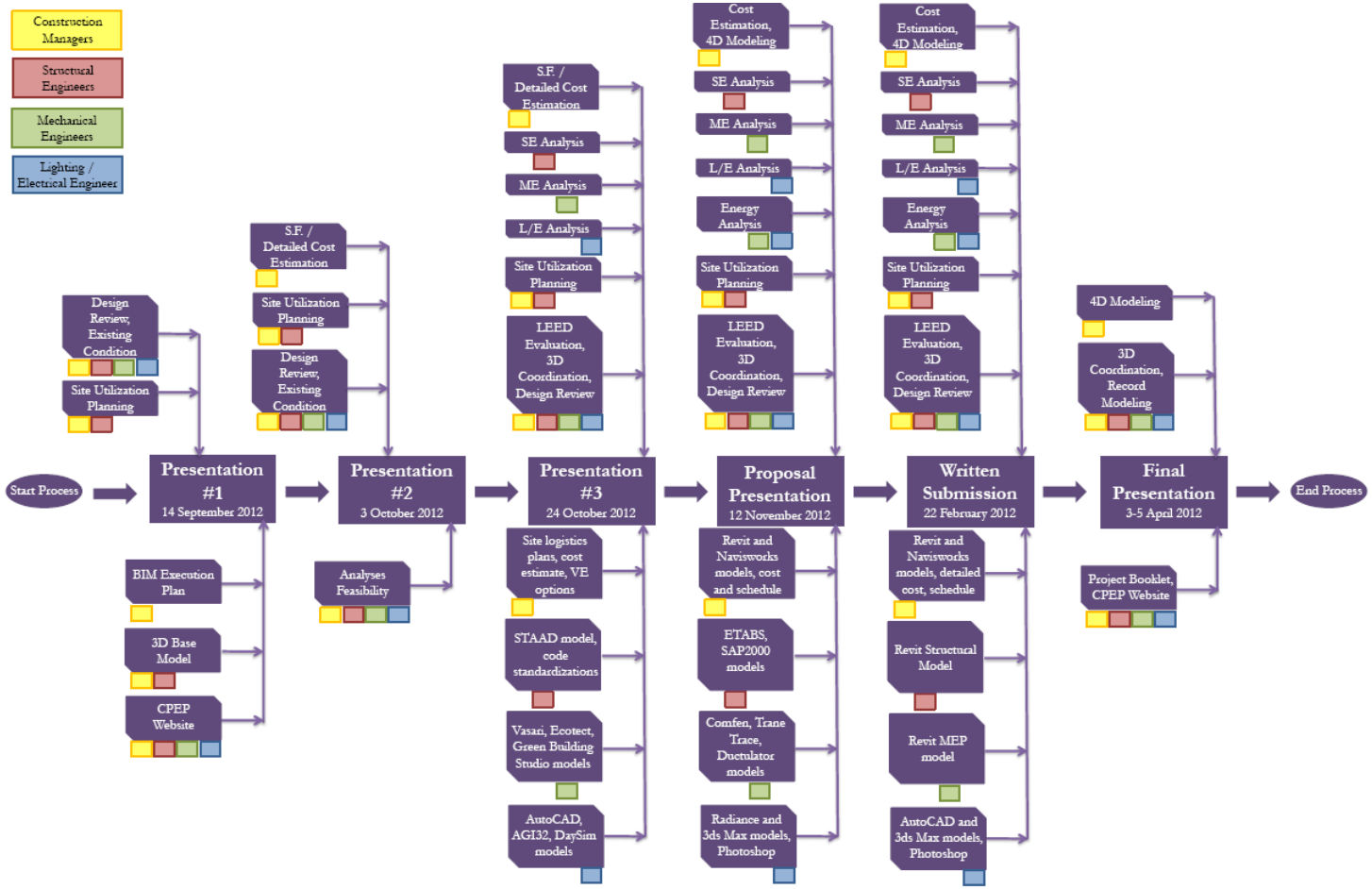

Code Structure

- Mission
- BIM Ex. Plan
- **Structural**
- Mechanical
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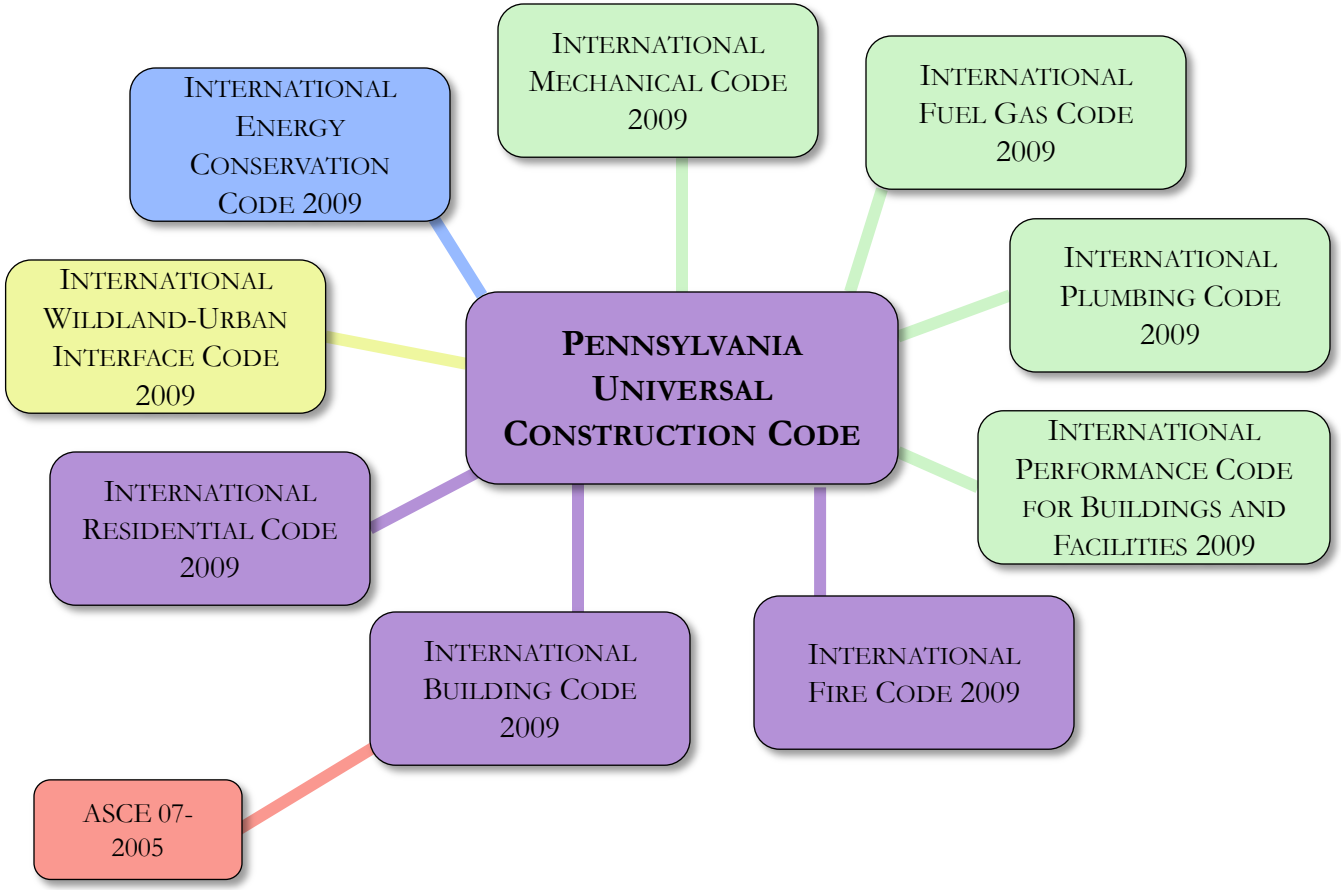
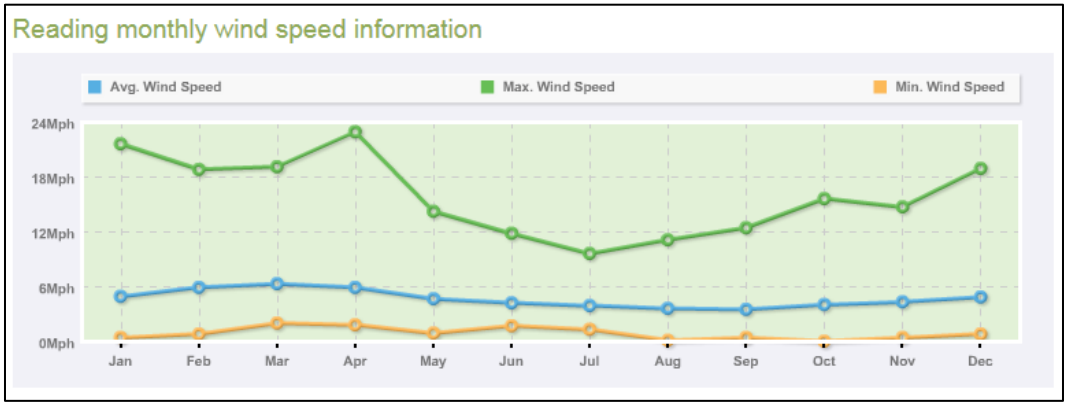
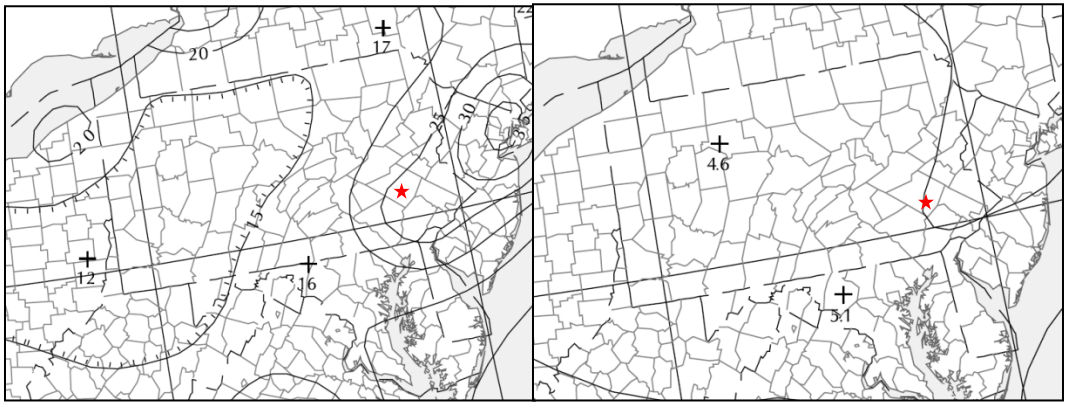


Structural



Design Wind Speed: 90 mph



0.2 Sec Spectral Response
Acceleration: 25% g

1.0 Sec Spectral Response
Acceleration: 6% g

Local Considerations

- Seismic
- 65 psf roof live load

Geotechnical Data

- Sinkholes
- Subsurface improvement:
  - Compaction Grouting
  - Excavation and replacement
  - Driven piles and pile caps
- Bedrock 20’-30’ below grade
- Existing fill useable as backfill

Structural

Mount Nittany Elementary School
State College, PA

Millmont Elementary School
Reading, PA

Structural Framing

- Structural steel framing is the most common framing method for elementary schools in Pennsylvania
- A small number of schools are also constructed using reinforced concrete, wood, or masonry structural framing

Mechanical

- Mission
- BIM Ex. Plan
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- Lighting
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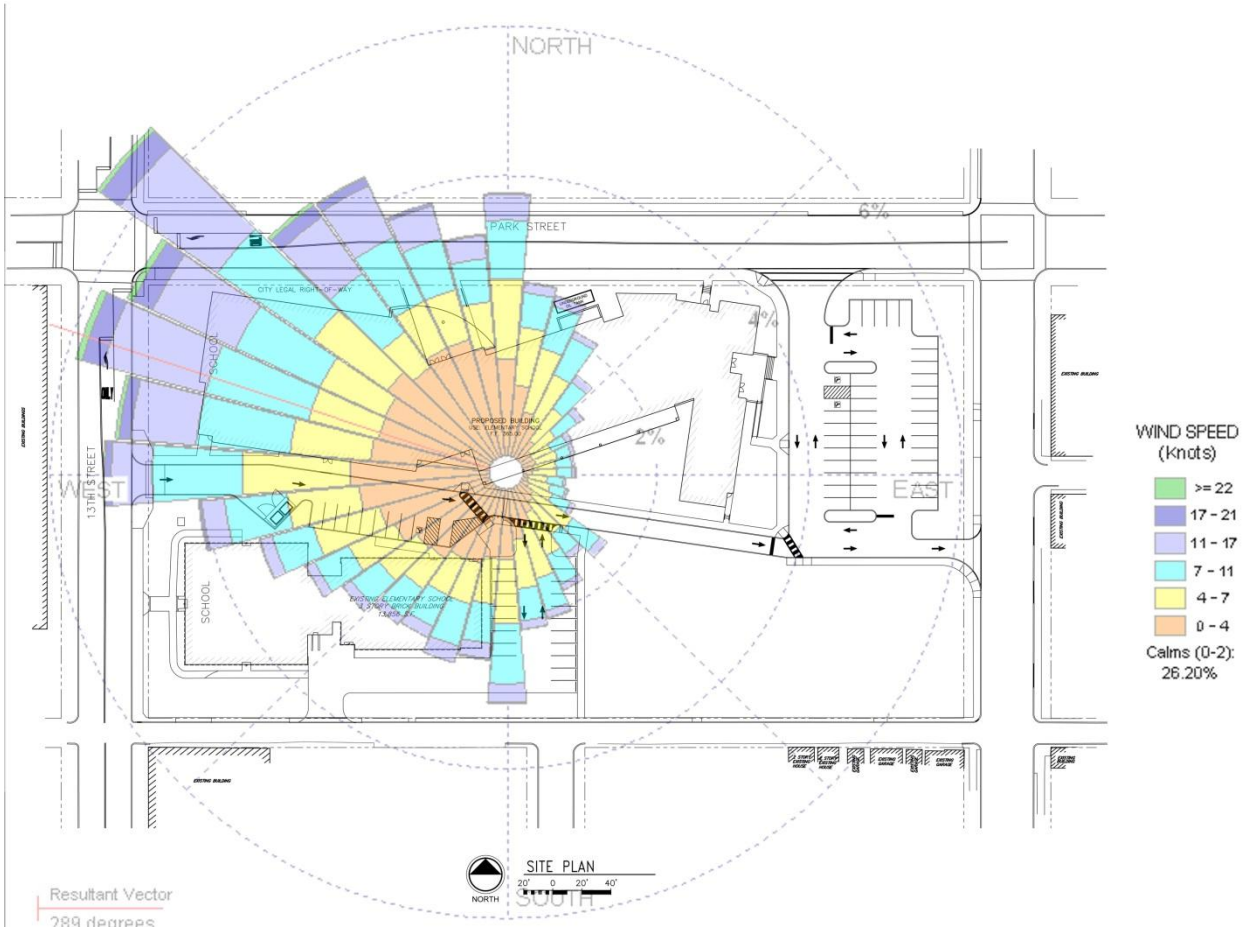

Penn State Department of Climatology

Mechanical

- Mission
- BIM Ex. Plan
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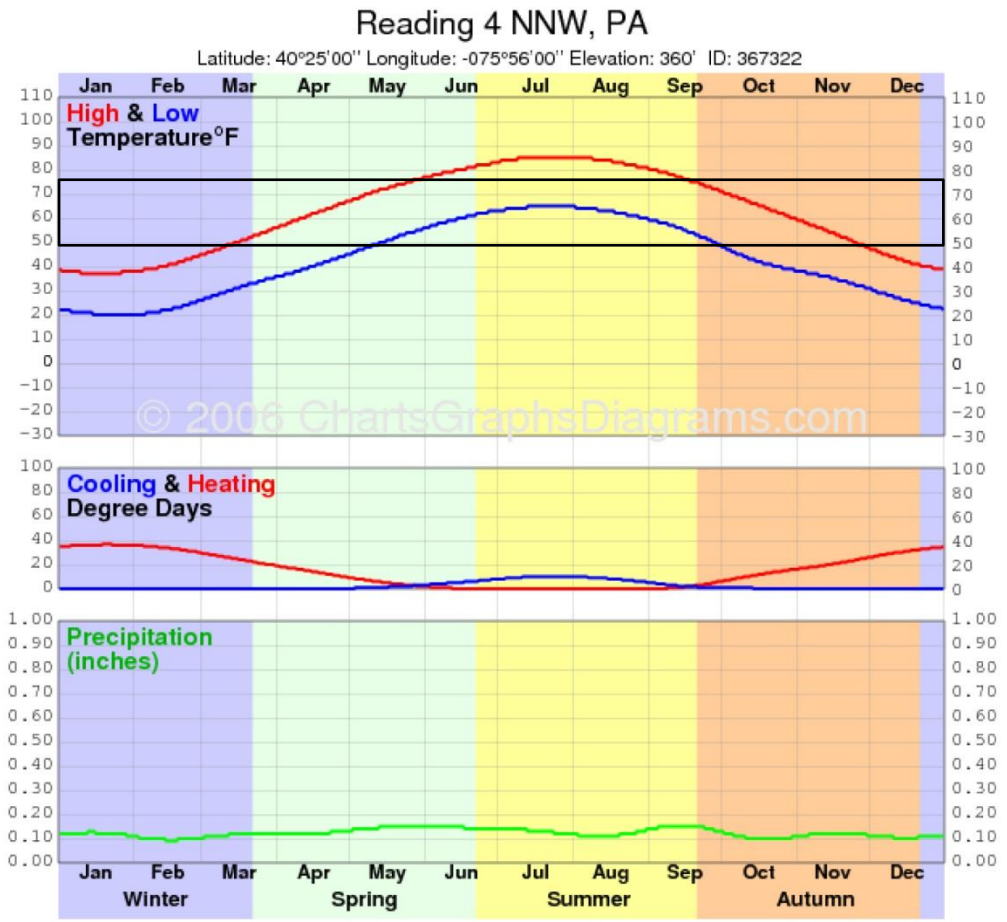
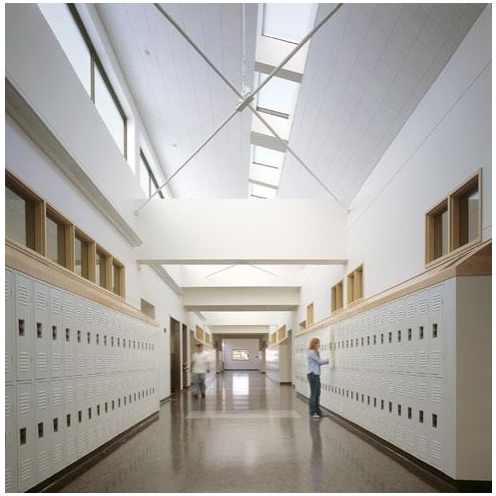


ChartsGraphsDiagrams.com

Lighting / Electrical

- Mission
- BIM Ex. Plan
- Structural
- Mechanical
- **Lighting**
- Construction
- Precedents
- Modeling



http://www.boora.com/files/64961232133930Clackamas-High-School--Daylighting-Skylights-Hallway.jpg

http://www.zigersnead.com/blog/wp-content/uploads/2010/02/ZigerSnead_Friends-School-of-Baltimore-Dining-Hall_Image-04.jpg

http://www.gauinc.com/wp-content/uploads/2012/06/LED-classroom.jpg

http://www.finelite.com/images/sustainable-hprled2x2.jpg

Construction Management

- Mission
- BIM Ex. Plan
- Structural
- Mechanical
- Lighting
- **Construction**
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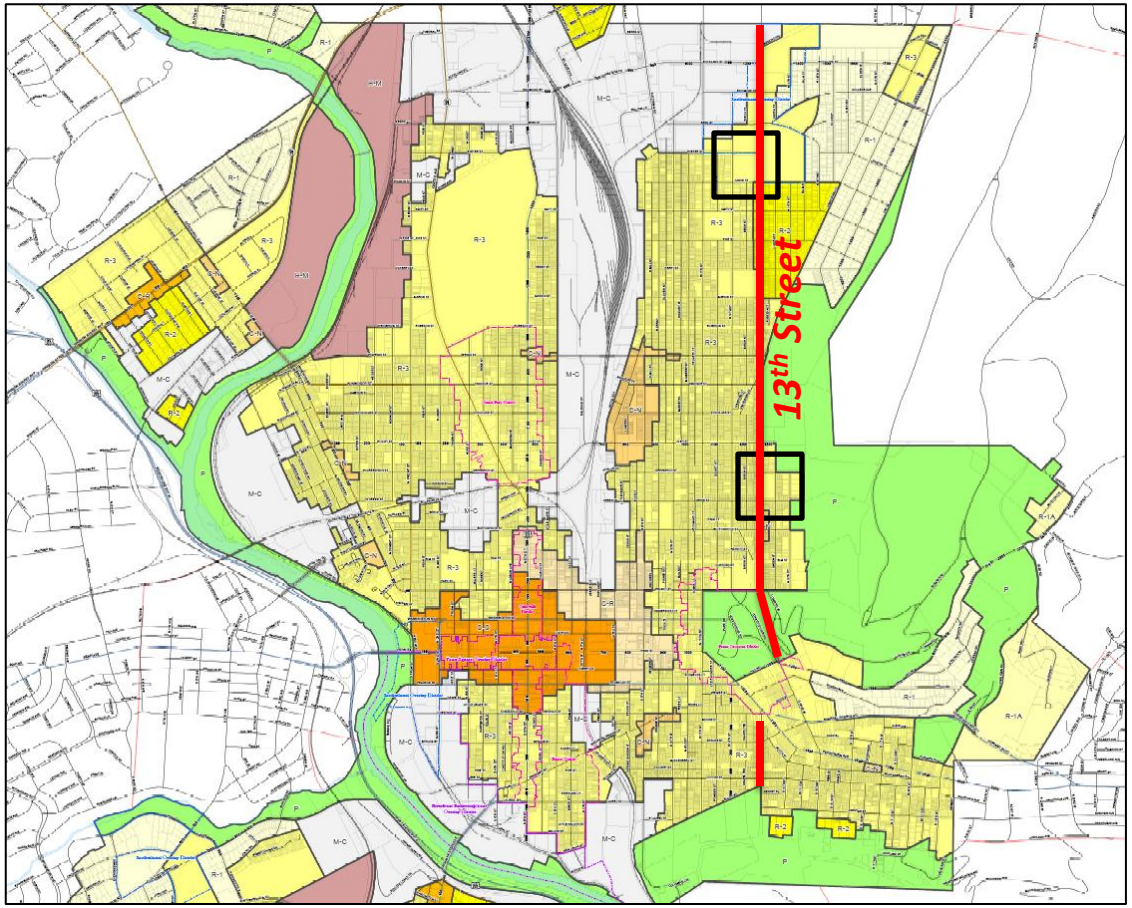
- Modeling



City of Reading Zoning Map

Construction Management

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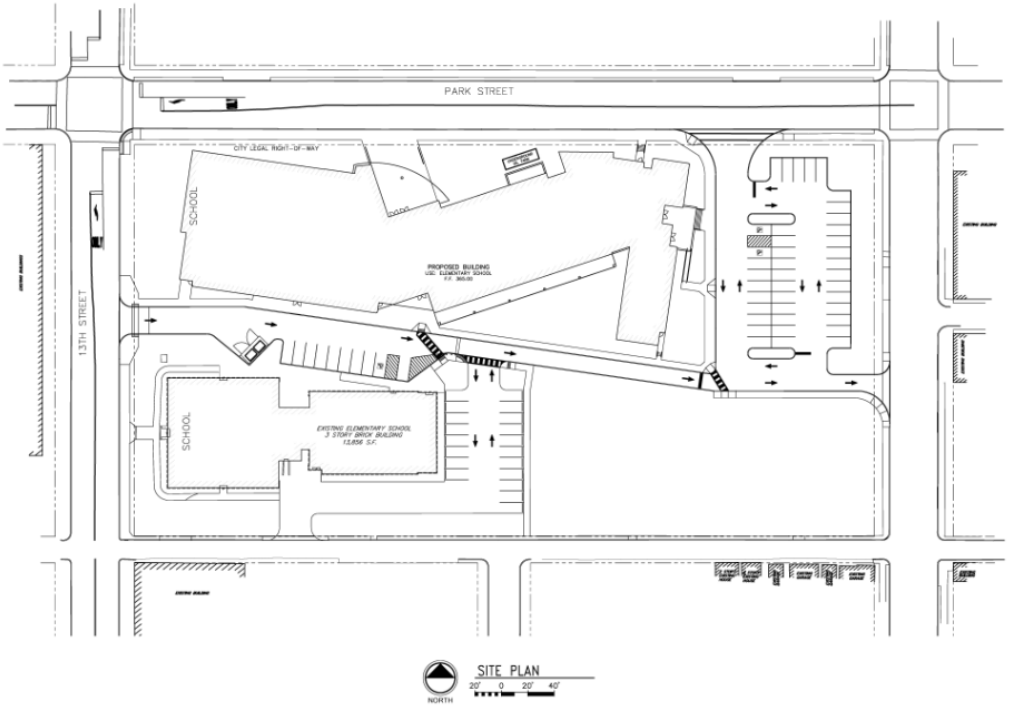

Building Gross SF: 90,521
Building Perimeter LF : 1,215
Site Perimeter LF: 3,110
Classrooms: 38

Construction Management

- Mission
- BIM Ex. Plan
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§27-804. R-3. Residential District

1. Dimensional Requirements.

Uses	Min. Lot Size Sq. Ft.	Max. Bldg. Cov.	Max. Imp. Cov.	Max. Height	Min. Lot Width	Min. Front Yard Setback ******	Min. Rear Yard Setback	Min. Side Yard Setback (each)
Place of Worship, Cemeteries and Private or Public Schools	20,000	50%	75%	60	125	5	30	10

City of Reading Zoning Ordinance

Precedent Buildings

- Mission
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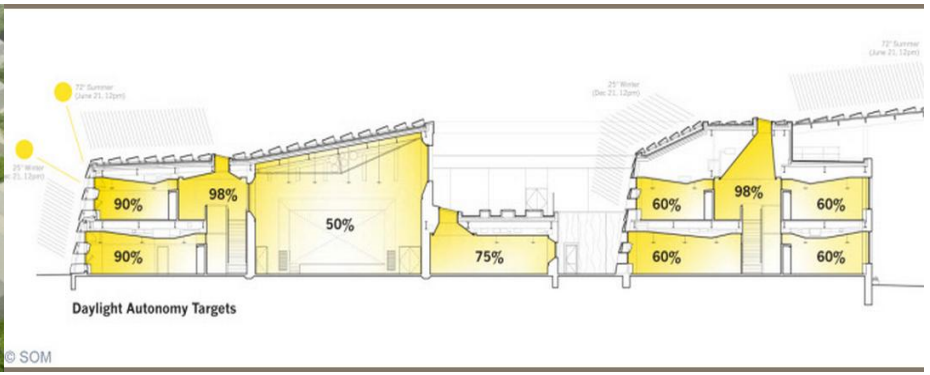

P.S. 62 Staten Island, NY – SOM

Richardsville Elementary School, KY – Sherman, Carter, Barnhart

Modeling

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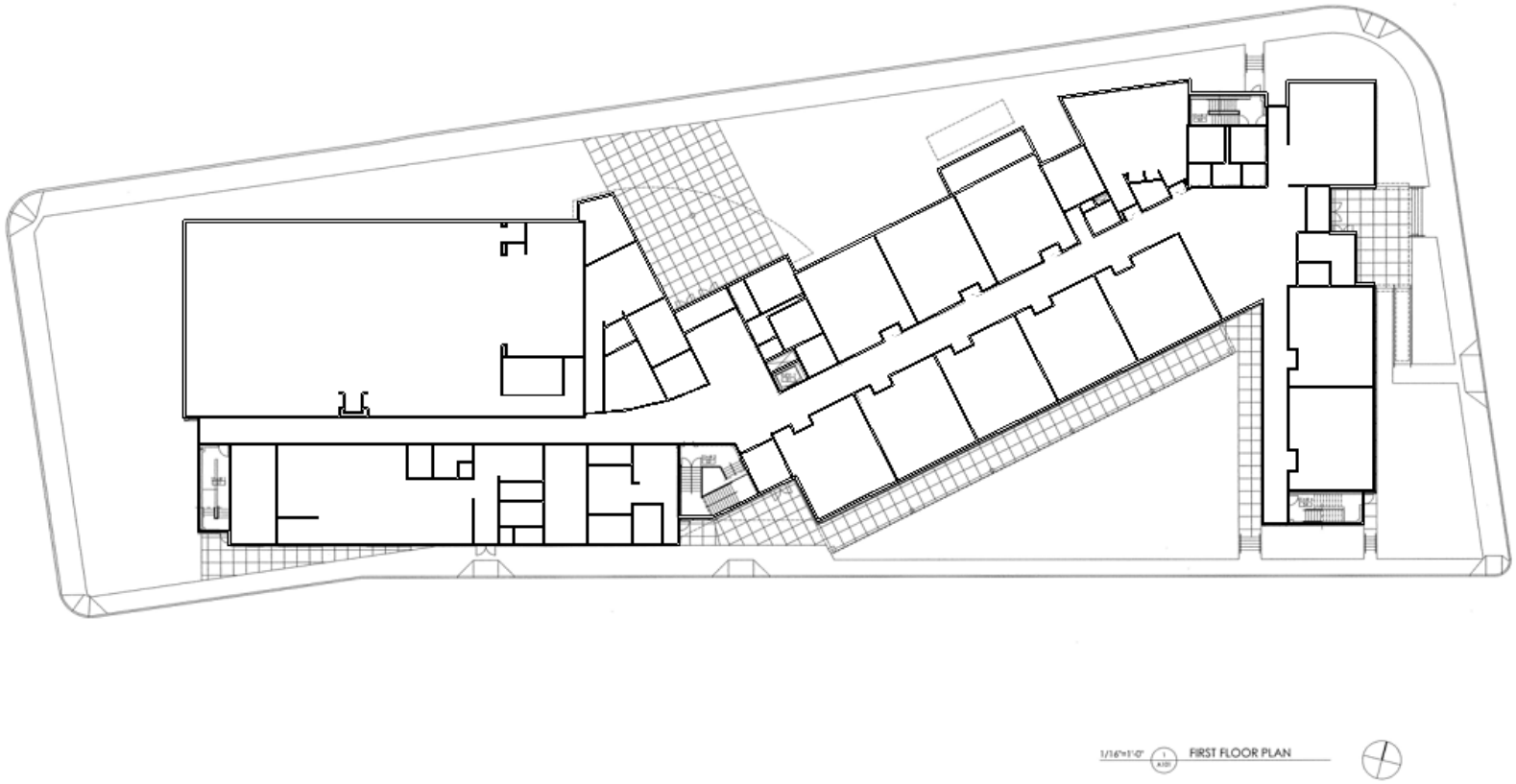
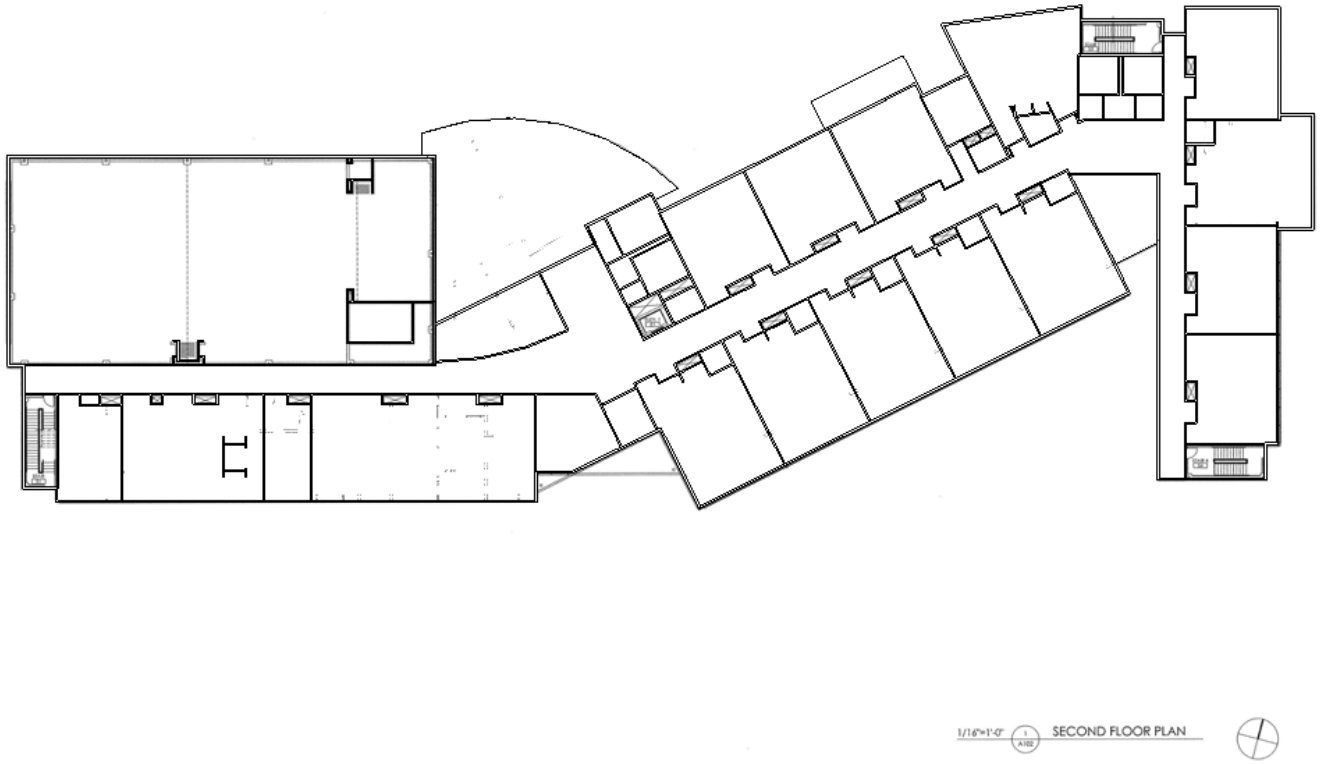
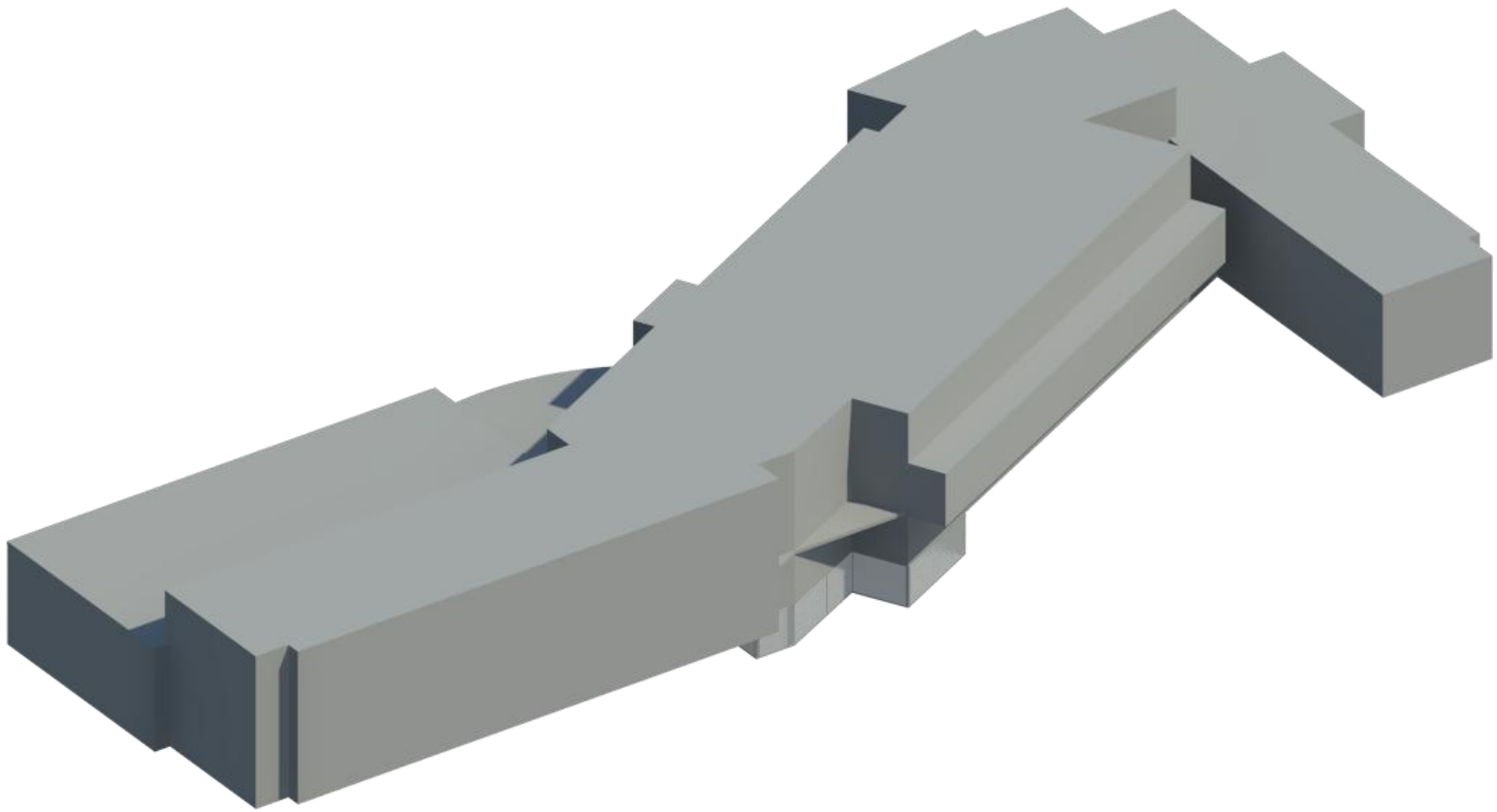


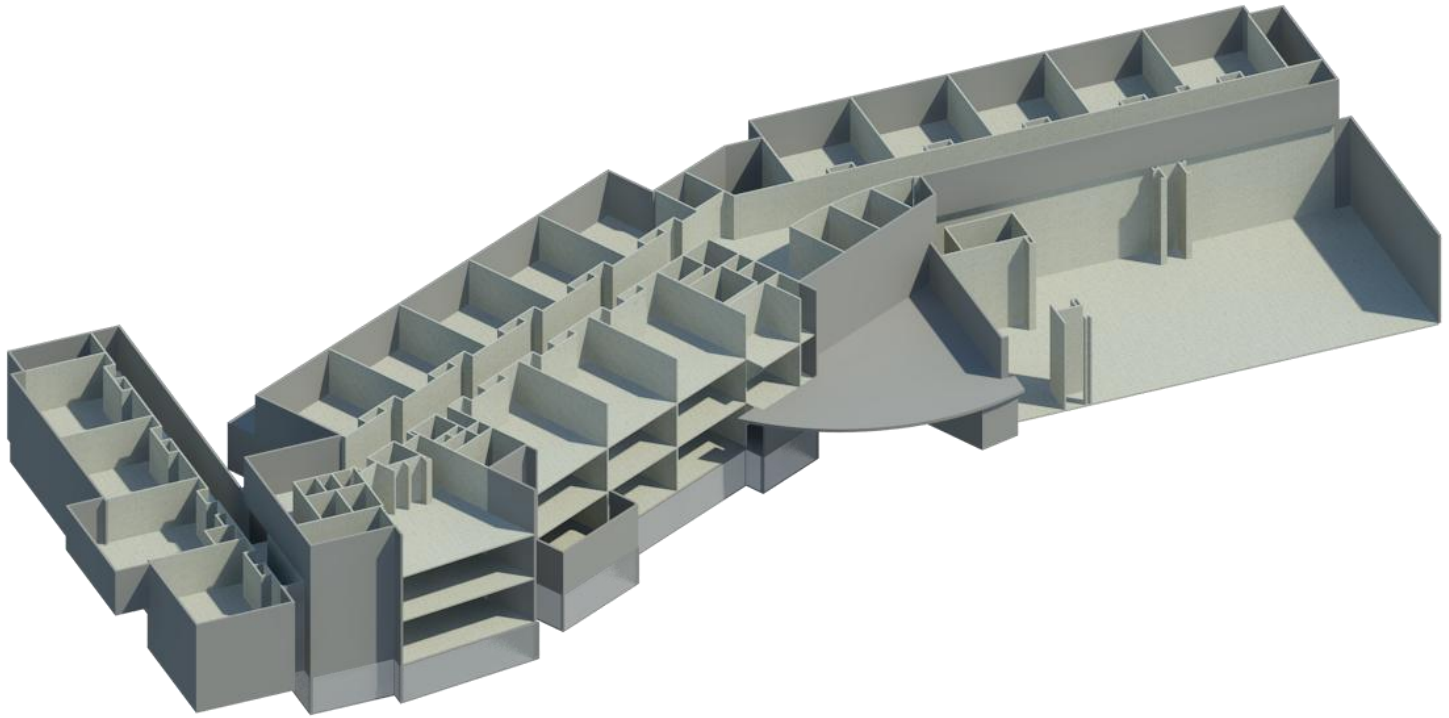
Modeling



Modeling



Modeling

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