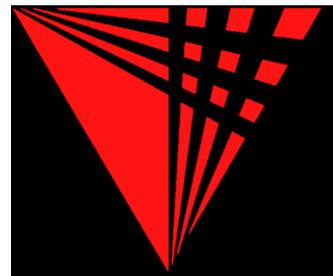


I PRO 339- Providing Affordable Housing through Shipping Containers



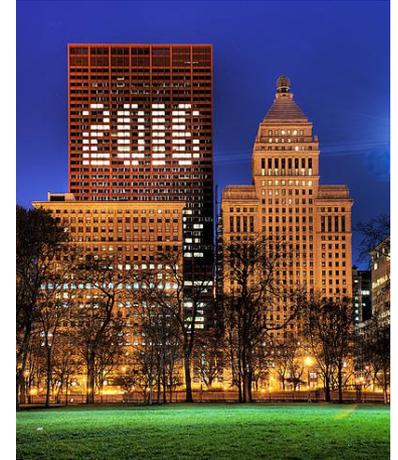
Statement of the Problem

- Temporary Olympic Housing
 - Approximately 17,000 people
- Permanent Affordable Housing for the City of Chicago
 - Affordable housing solutions for low income residents
- Showcase sustainability



Semester Goals

- Designed viable housing units for the Olympics
- Ensured easy convertibility to permanent housing structures
- Identified sustainable solutions and alternatives
- Produced a scaled Olympic Village Site Model
- Procured sponsorships to support the long term project



Values & Mission

- Common Values
 - Contribute our individual skills and diverse knowledge base
 - Respect the professional opinion of others
 - Work hard and value the experience
- Mission
 - Develop on previous semester's work and produce viable designs that will move this IPRO to the next phase of marketability to the Olympic Committee

Organization of the Team

Design	Engineering	Presentation	Quality Control
Specht, Cassandra	Roseen, Michael	Silvestre, Ivan	Pyciak, Mark
Ribot, Anna	Kucher, Rostislav	Rahman, Raihan	Dunn, Michael
Pedersen, Erin	Gregory, Nicole	Park, Lucas	Ahsan, Saad
Park, Ji Ae	Gibbons, Jennifer	Lima, Nancy	
LaBuda, Timothy	Anderson, Aaron	Bais, Rajiv	
Jacobson, Joel			
Chan, Ronald			

Current Semester

- Focus on allocating and optimizing land use
 - Olympic Housing relatively new goal
- Recommendations have been incorporated
 - Chicago Lot
 - Building Heights
 - Sustainability
- Some past research and work has been shelved due to shift in focus

Added Value

- Affordable Housing
 - social fabric
- Monetary Consideration
 - save taxpayers' money
- Environment
 - Creative solutions
- Prominent Advertising



Ethical Considerations

- Understanding needs of low-income residents.
- Distinguishing between cheap and affordable to ensure the conditions are livable.
- Using local materials and labor from USA.
- Is this housing solution going to effectively increase the standard of living?
- Honesty in assessing fundraising needs.



Precedents



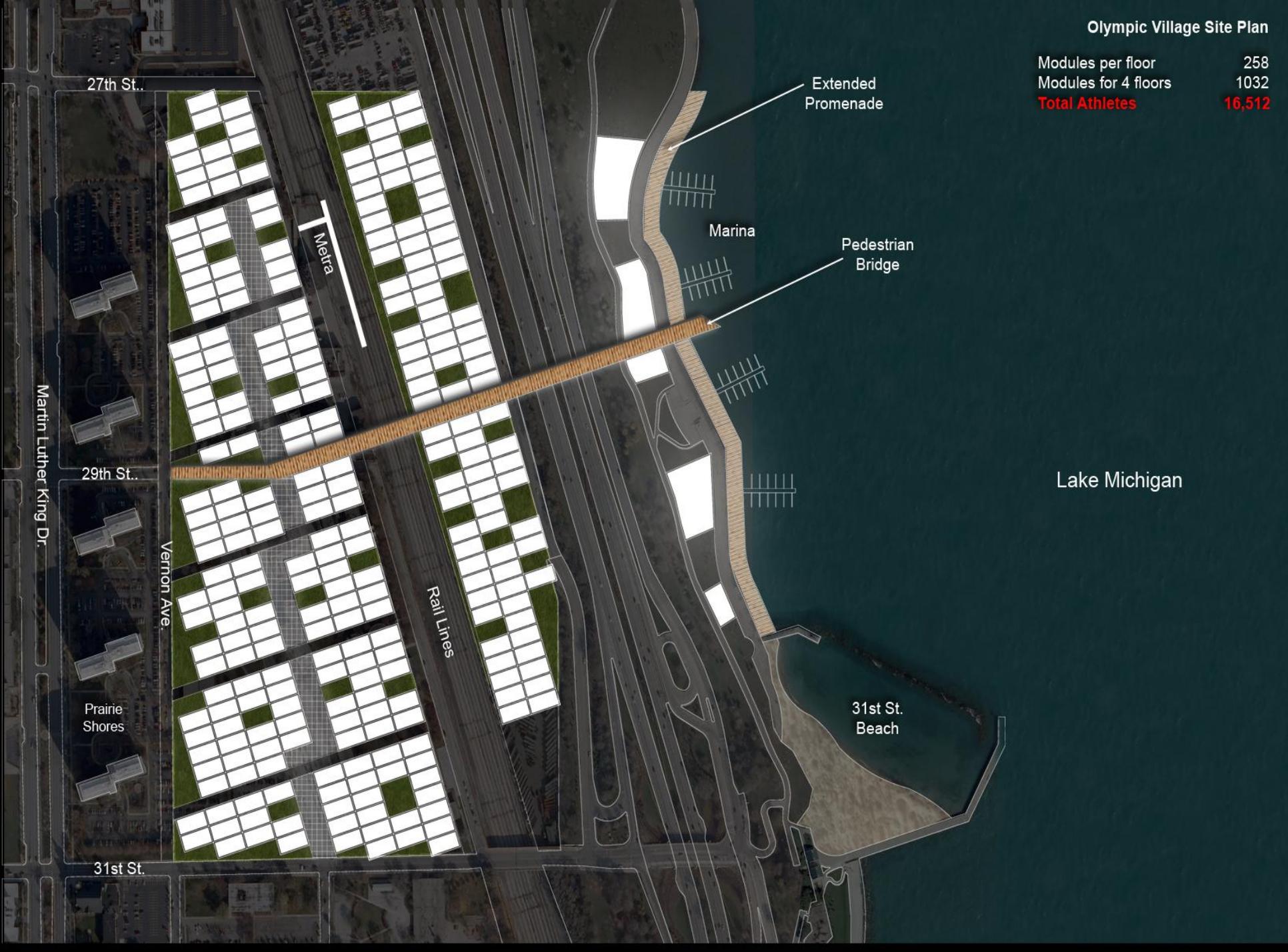
Barking Riverside
Marketing Suite



Container city in London

Olympic Village Site Plan

Modules per floor 258
Modules for 4 floors 1032
Total Athletes 16,512



27th St.

29th St.

31st St.

Martin Luther King Dr.

Vernon Ave.

Metra

Reitz Lines

Prairie Shores

Extended Promenade

Marina

Pedestrian Bridge

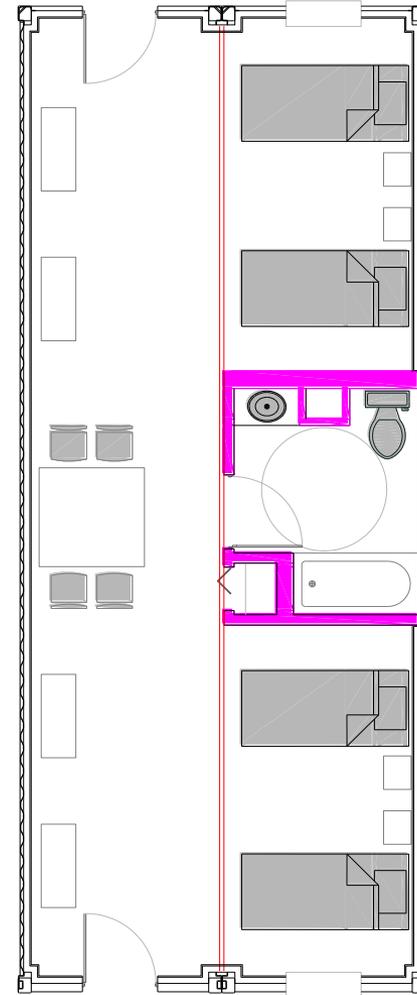
31st St. Beach

Lake Michigan

Olympic Housing Proposal

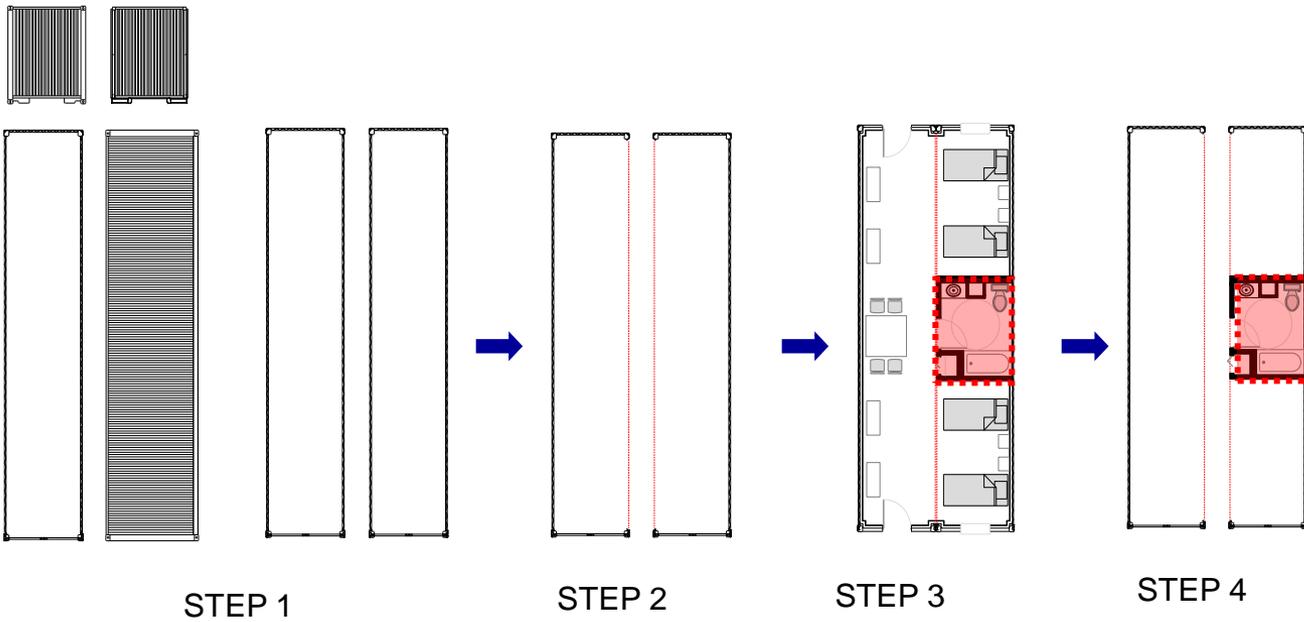


Olympic Housing Unit



1 Module = 4 units stacked 4 stories high

1 Unit = 2 Containers



Transition Strategy

Step 1: Shipping container

Step 2: Two containers, with one wall cut out

Step 3: Olympic Unit, houses four athletes

Step 4: Disassembled for transport; bathroom remains

Step 5a : 2-Story, Single family ; 3 bed, 2.5 bath

Step 5b : 3-story, Multi-family ; 2 bed, 1bath

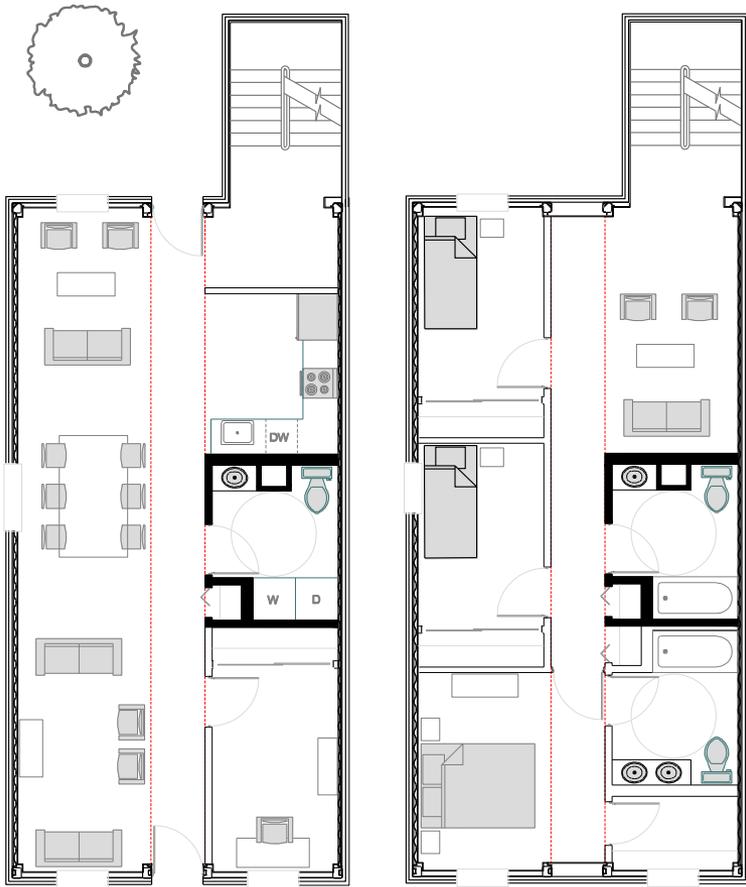


Affordable Housing



Fits a standard Chicago lot size (25' wide by 125' deep)

Affordable Housing



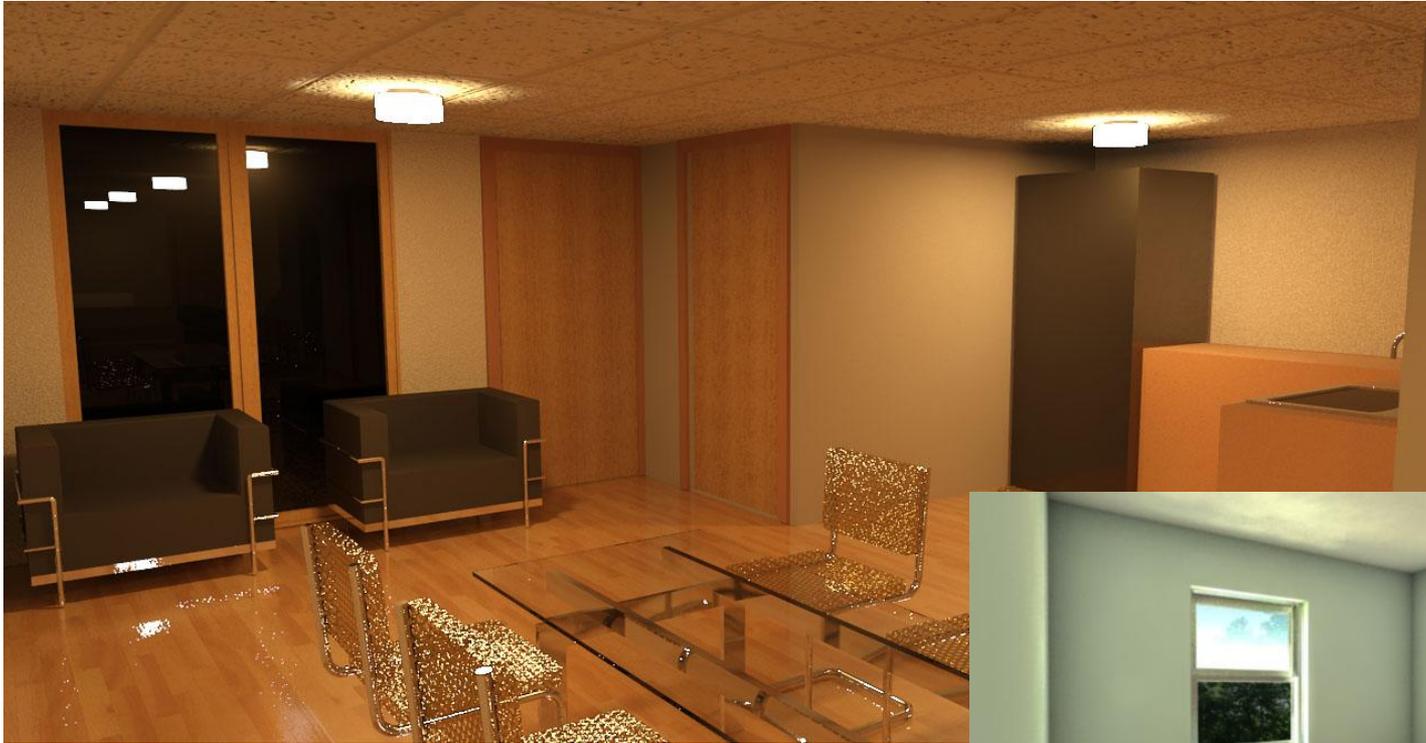
Front Elevation



Side Elevation

2 Story Single Family

Affordable Housing Interior



Dining Room and Kitchen



Master Bedroom

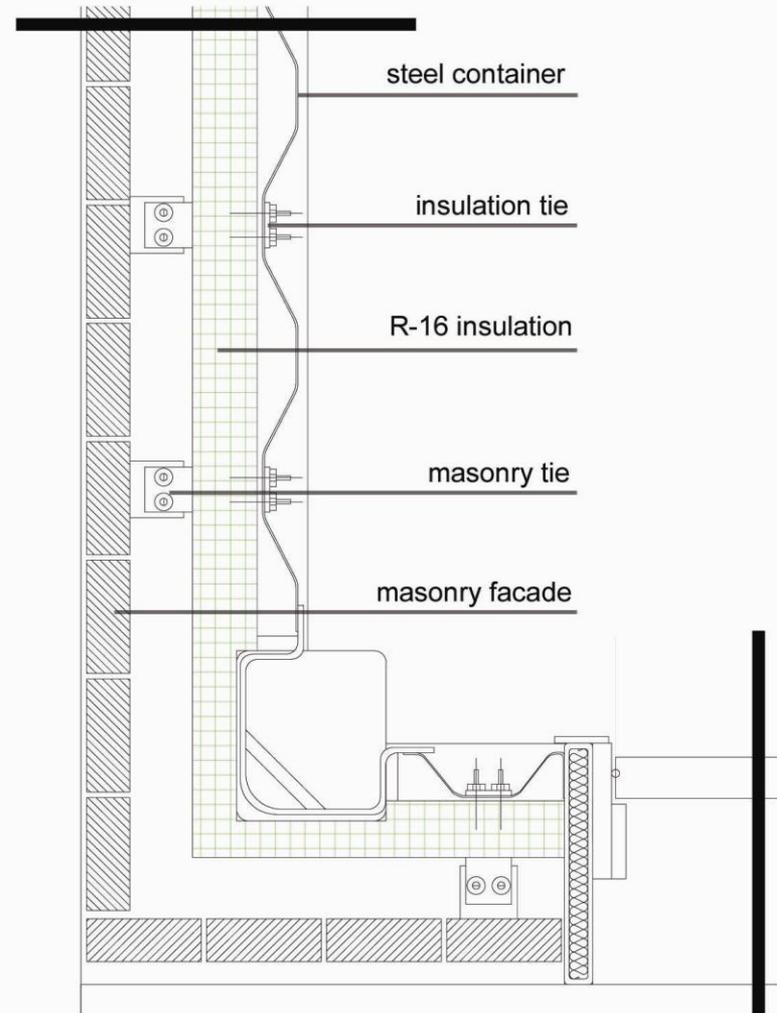
Affordable Housing



3 Story Multi-Family

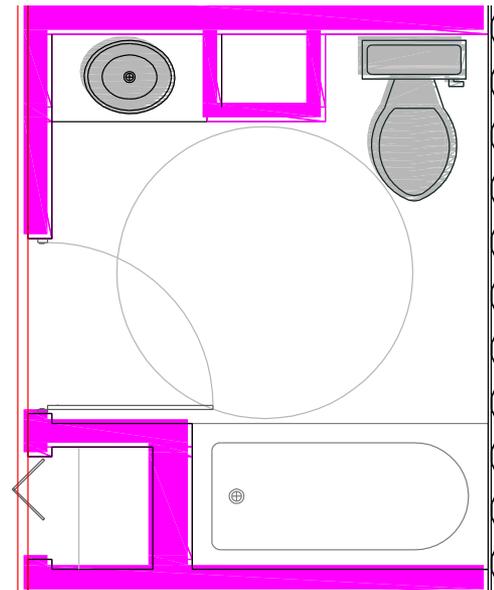
Engineering Sub-Group

- Focus: HVAC, structural, electrical, plumbing, and geotechnical systems
- Challenges: Integrating insulation and building systems within dimensional constraint



Goals & Accomplishments

- Goals:
 - Determining the best way to keep assemblies structurally sound
 - Cost-effective internal building systems
 - Heating, ventilation, and air conditioning
 - Foundation, Electrical and Plumbing
 - ADA accessible
 - Vertilift



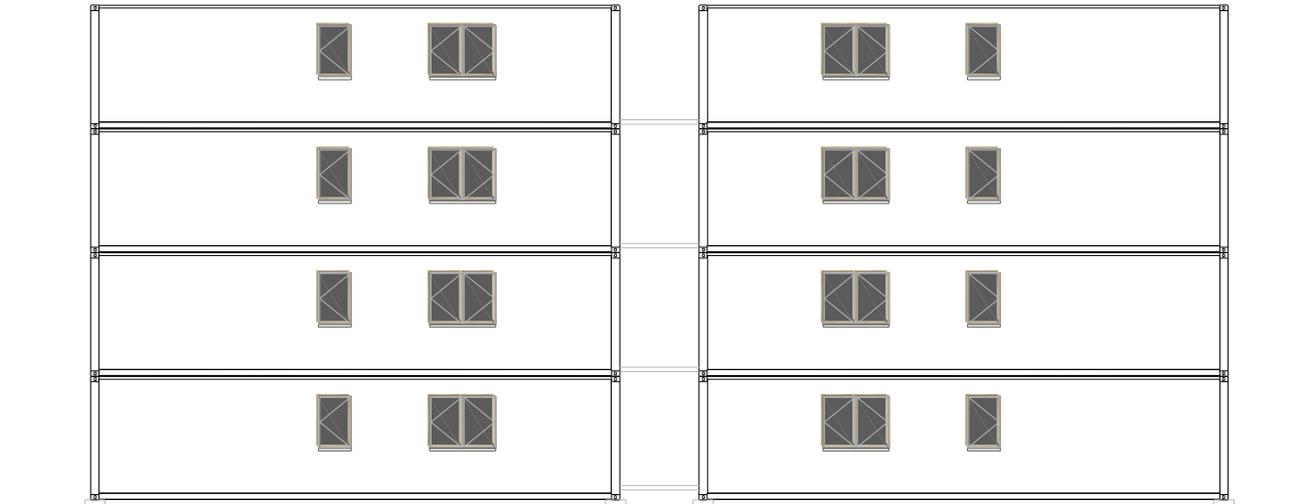
Accomplishments

- Confirmed structural integrity of design
- Chose efficient insulation/AC unit
- Developed foundation design
- Calculated Construction Budget



Structural

- Wind load calculations
- Seismic calculation check
- Structural integrity of walls
- Tensile strength of connections verified



Foundation

- Temporary Olympic Village foundation
-14"x14" square piers, 2' deep



- Permanent Affordable Housing Foundation



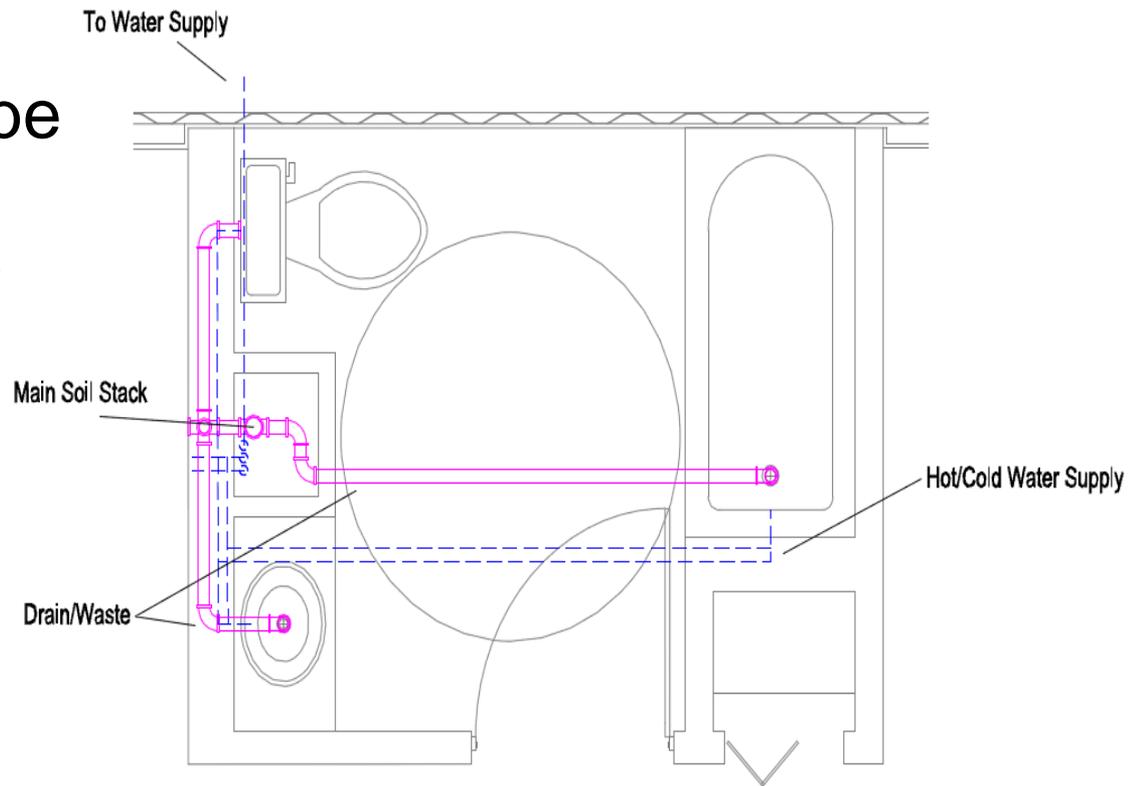
HVAC

- Typical Chicago summer day heat gain per unit is roughly 2,500 BTU with R-16 insulation
- A low-cost window unit will be installed in Olympic housing
- Small internal heating/cooling unit will be installed in permanent housing (magic-pak)



Plumbing

- Plumbing utilities will be accessible via bathroom utility closet
- Plumbing fixtures chosen for efficiency and cost



Future Work

- What still needs to be done?
 - Finalization for permanent housing systems
 - Clarify and expedite transition phase
 - Budgeting for permanent housing



Potential Sponsors

- Mission
 - Fund and organize an Olympic Village built using Forty Foot Equivalent Units (FEU)
- Goals
 - Work with local Chicago-based companies to create a model of our Olympic Unit
- Obstacles
 - Economic
 - Legal
 - IPRO Funding
- Solutions
 - Marketing Plan
 - Increased Budget



Sponsor Interest

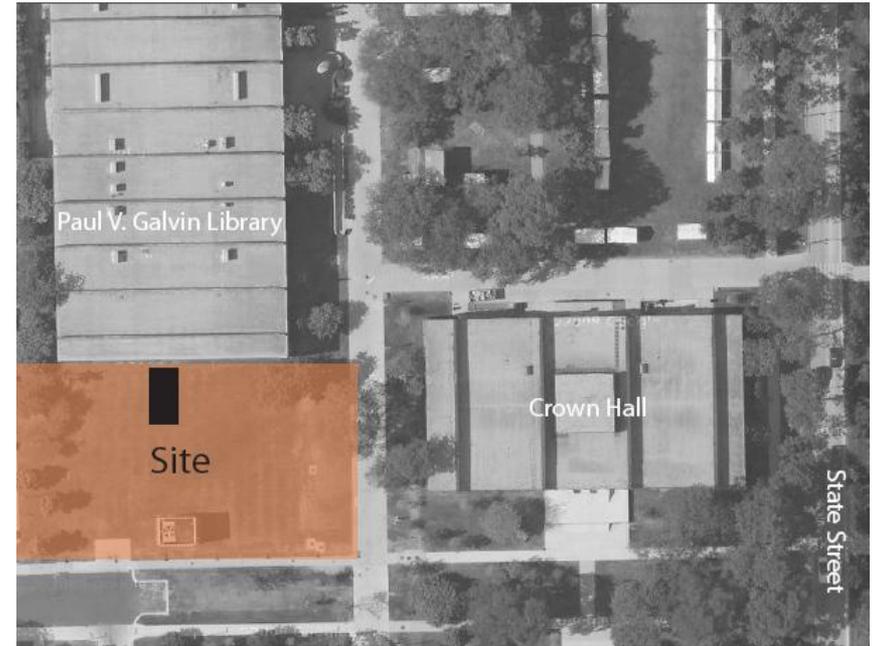
J.C. Restoration is interested in pledging funds



Complete Trucking is interested in supplying transportation



Proposed IIT Site



Cost Analysis

CSI NO.	ITEM DESCRIPTION	BASE BID	TOTAL	DIVISION PERCENT
1000	General Requirements	\$6.25	\$4,000.00	10.22%
2000	Sitework	\$2.34	\$3,000.00	4.05%
3000	Concrete	\$7.81	\$10,000.00	13.55%
4000	Masonry	\$6.56	\$7,104.00	9.62%
5000	Metals	\$0.79	\$1,000.00	1.35%
6000	Woods and Plastics	\$7.02	\$8,987.82	12.18%
7000	Weather Protection	\$1.76	\$2,258.00	3.02%
8000	Doors and Windows	\$0.78	\$1,000.00	1.35%
9000	Finishes	\$5.99	\$7,591.00	10.11%
10000	Specialties and Furniture	\$4.93	\$6,315.00	8.56%
13000	Special Construction	\$5.09	\$6,500.00	8.61%
14000	Conveying Systems			
15000	Mechanical	\$0.93	\$1,191.00	1.59%
16000	Electrical	\$4.62	\$5,916.70	8.02%
Subtotal			\$5,916.70	
Gross Square Foot (Per 2 Bedroom Unit)		1,280		
General Contractor OH&P			\$11,071.95	15%
Contingency			\$7,381.30	10%
Architect			\$7,381.30	10%
Conversion of Olympic Village to Athlete Housing			\$15,657,976.00	
Total Cost per Sq Ft (1,280 Avg SF)			\$77.85	

Project	Cost/SF
IPRO 339 - Olympic Housing Proposal	\$65.36
Hotel, 4-7 stories in Chicago - (2009 RS Means)	\$180.89
Hotel, 8 - 24 stories in Chicago - (2009 RS Means)	\$194.54
Motel, 2-3 stories in Chicago - (2009 RS Means)	\$179.40
Apartment Bldgs., 4-7 Stories in Chicago - (2009 Rs Means)	\$183.21
IPRO 339 - Permanent Housing Proposal	\$77.85

New Residential, XXX Material in Chicago - (2009 RS Means)			
New Residential, XXX Material in Chicago - (2009 Rs Means)	xxxxx		
New Residential, XXX Material in Chicago - (2009 Rs Means)	xxxxx		

• Olympic Container Solution: **\$65.36** per sq. ft.

• Permanent Housing vs. Avg. Chicago Home - Adds **\$12.49** per sq. ft.

- Totaling **\$77.85** per sq. ft. vs. **\$200** per sq. ft.

• The current cost estimate for the residential Olympic Village is 1 billion dollars or approximately **\$60,000** per athlete

• Our Proposal is currently estimated at 250 million dollars or approximately **\$15,000** per athlete.

SI NO.	ITEM DESCRIPTION	BASE BID	DIVISION TOTAL	DIVISION PERCENT
1000	General Requirements	\$6.25	\$4,000.00	10.22%
2000	Sitework	\$4.69	\$3,000.00	7.66%
3000	Concrete	\$12.50	\$8,000.00	20.44%
4000	Masonry	\$0.00	\$0.00	0.00%
5000	Metals	\$1.56	\$1,000.00	2.55%
6000	Woods and Plastics	\$1.17	\$750.00	1.92%
7000	Weather Protection	\$1.34	\$859.00	2.19%
8000	Doors and Windows	\$1.14	\$728.00	1.86%
9000	Finishes	\$5.24	\$3,356.00	8.57%
0000	Specialties and Furniture	\$1.18	\$756.94	1.93%
0000	Special Construction	\$2.05	\$6,500.00	14.05%
5000	Mechanical	\$11.34	\$7,260.00	18.55%
6000	Electrical	\$6.15	\$3,935.00	10.05%
Subtotal			\$39,144.94	
Gross Square Foot (Per 2 Bedroom Unit)		640		
Total Cost of 2 Bdrm Units (400 Total Units)			\$15,657,976.00	

SI NO.	ITEM DESCRIPTION	BASE BID	DIVISION TOTAL	DIVISION PERCENT
1000	General Requirements	\$6.25	\$4,000.00	10.07%
2000	Sitework	\$4.69	\$3,000.00	7.56%
3000	Concrete	\$12.50	\$8,000.00	20.15%
4000	Masonry	\$0.00	\$0.00	0.00%
5000	Metals	\$1.56	\$1,000.00	2.52%
6000	Woods and Plastics	\$1.17	\$750.00	1.89%
7000	Weather Protection	\$1.34	\$858.50	2.16%
8000	Doors and Windows	\$1.14	\$728.00	1.83%
9000	Finishes	\$5.24	\$3,355.97	8.45%
0000	Specialties and Furniture	\$2.05	\$1,314.88	3.31%
0000	Special Construction	\$2.05	\$6,500.00	16.38%
5000	Mechanical	\$11.34	\$7,299.55	18.62%
6000	Electrical	\$6.15	\$3,934.70	9.91%
Subtotal			\$39,702.94	
Gross Square Foot (Per 4 Bedroom Unit)		640		
Total Cost of 4 Bedroom Units (4050 Total Units)			\$160,796,907.00	

Total Olympic Construction Cost			
Lifavators		\$9,702,000.00	
Total Cost of 2 Bedroom Units		\$15,657,976.00	
Total Cost of 4 Bedroom Units		\$160,796,907.00	
Total Project Cost		\$176,156,883.00	
General Contractor OH&P		\$27,923,532.45	15%
Contingency		\$18,615,688.30	10%
Architect		\$18,615,688.30	10%
Conventional Total Estimated Construction Cost		\$251,311,792.05	
Total Cost per Sq Ft		\$65.36	

