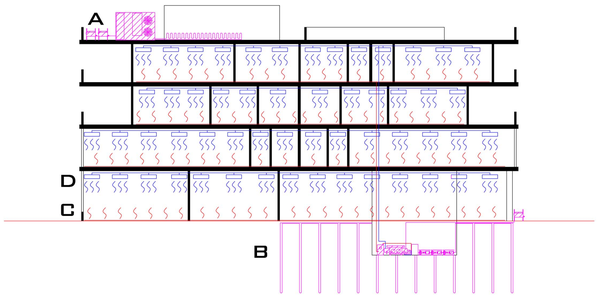
PROJECT: 357 GREEN BUILDING DESIGN: CONCEPT AND INTEGRATION

BUILDING SYSTEMS

Economic benefits:
- Reduce operating costs
- Enhance asset value and profits
- Improve employee productivity and satisfaction
- Optimize life-cycle economic performance

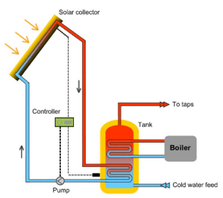
Health and community benefits:
- Improve air, thermal, and acoustic environments
- Enhance occupant comfort and health
- Minimize strain on local infrastructure
- Contribute to overall quality of life

SYSTEM INTEGRATION



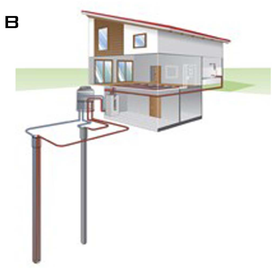
SYSTEM INFORMATION

A



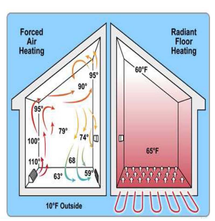
SOLAR WATER HEATING
- 7 yr. buy back without subsidies
- 30% federal tax credit & 30% state grant
- Gas prices are more likely to increase
- Cost: $7000 without subsidies

B



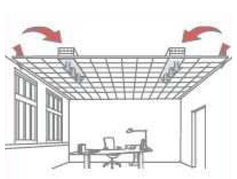
GEOTHERML HEAT PUMPS
- Quieter
- Need little maintenance
- 5-10 year buy back
- Minimal Indoor Equipment
- Use 25-50% less electricity than conventional heating & cooling systems.
- Reduces emissions by 44% (air-source pumps), 72% (electric resistance heating)
- Cost approximately $2,500 per ton of cooling ($7,500 typical residential)

C



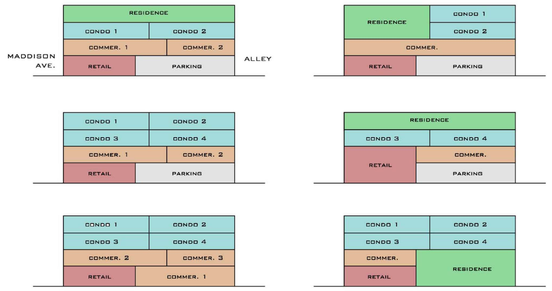
RADIANT FLOORING
- More efficient than force-air heating (no energy loss through ducts)
- 15% less energy than traditional systems
- Improves thermal comfort
- Large floor area=lower water temp needed=saving $$$
- Used with many floor coverings: wood, carpeting, tile, etc.

D



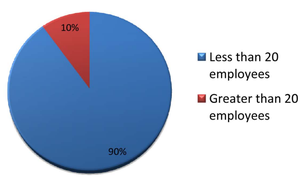
PASSIVE CHILLED BEAMS
- More efficient
  - Use of Space
  - Energy ($$$)
- Lower Maintenance
- Improved Occupant Comfort
- Short Buyback time (2-5 years)

LAYOUT OPTIONS

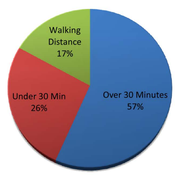


MARKET RESEARCH

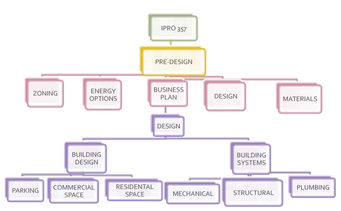
Oak Park Businesses



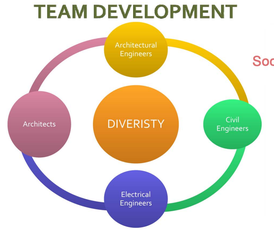
Commute to Work in Oak Park



TEAM PERFORMANCE



TEAM DEVELOPMENT



ETHICS

PROJECT DESCRIPTION

Mixed-use buildings have been proven to be a viable solution to meeting environmental, economical, and societal needs. Through extensive research, we have found this to be especially true for the Village of Oak Park and have developed a business plan for a replicable mixed-use building to be integrated into the neighborhood.

MIXED USE BENIFITS

- Smart growth movement leads to more companies capable of construction
- Equalizes rising land prices (especially for commerical areas)
- Increases the sense of community
- Big growth office employment results in demand for office space which calls for surrounding amenities and uses.
- Economies of scale for hvac, maintenance, parking, infrastructure.
- Allows for special quality pricing and market synergy
- Faster absorption schedule
- Greater long-term appreciation in land and property values

The Problem:
To create an environmentally sustainable and economically sensible mixed use building that can be used as a typical plan and adopted to meet different client's needs.

Accomplishments:
Our team was able to design a building which addressed all of our clients needs while also working as a platform for other futures developments. Our design was within a reasonable budget and much more energy efficient than a conventional buildings as a result of using both active and passive green technologies. Our design also fits in well with the needs of the surrounding demographic, and will help with the Madison Street Corridor Revitalization projects goal of creating a more pedestrian friendly zone.

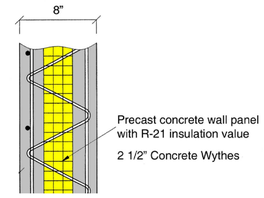
Student Members:
Andrew Bossemeyer (Arch), Ryan Bouck(Arch), Jorge Chavez (Arch), Guadalupe Cortes (ArchE), Brett McQuillan(ArchE), Robert McLuckie (Arch), Beth Nielsen (ArchE), Alex Ong (CE), Issac Plumb (Arch), Timothy Ranttila(EE/CPE), Aneta Ustupska (ArchE), Michael Warnes (Arch)

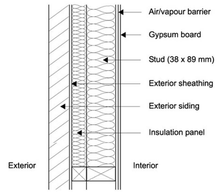
ENPRO 357

STRUCTURAL SYSTEM

SYSTEM COMPARISON

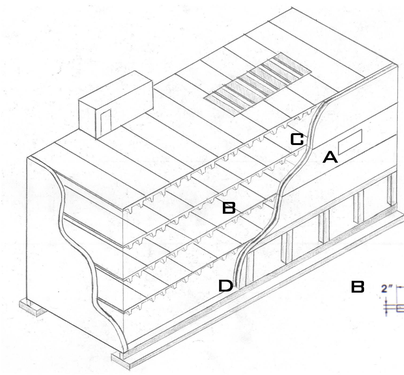
Double Wall System vs. Normal Wood Frame

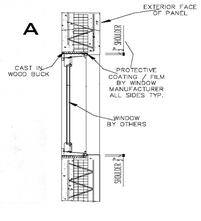


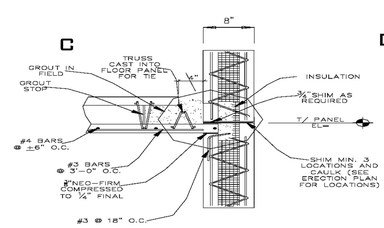


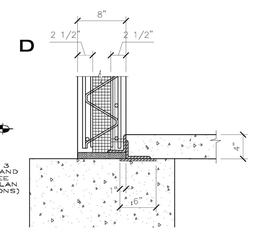
- Reduces energy usage
  - Heating by 44%
  - Cooling by 32%
- Reduces Insurance Premiums (15%-25%)
- 2/3 quieter
- Higher construction costs balance out after insurance costs and everay savings

SYSTEM DETAILS









CONSTRUCTION PROCESS

1

Prefabricated panels are brought to the site by trucks and put in place by cranes.

2

Floor panels are put in place after a wall level is in place.

3

Next, is on-site connections of electrical and telecommunication s conduit.

4

High strength grouting is applied to all perimeter wall/floor connections

5

Interior non-load bearing walls can now be built with wood or steel studs and drywall.