

PROJECT: 357

ENPRO 357

Green Building Design Concept
&
Integration

Team Alpha

- **Faculty Advisors:**

- Steve Beck, Jeffery Budiman, Mark Snyder

- **Team Leaders:**

- Andrew Bossemeyer (Arch), Aneta Ustupka (ArchE)

- **Student Members:**

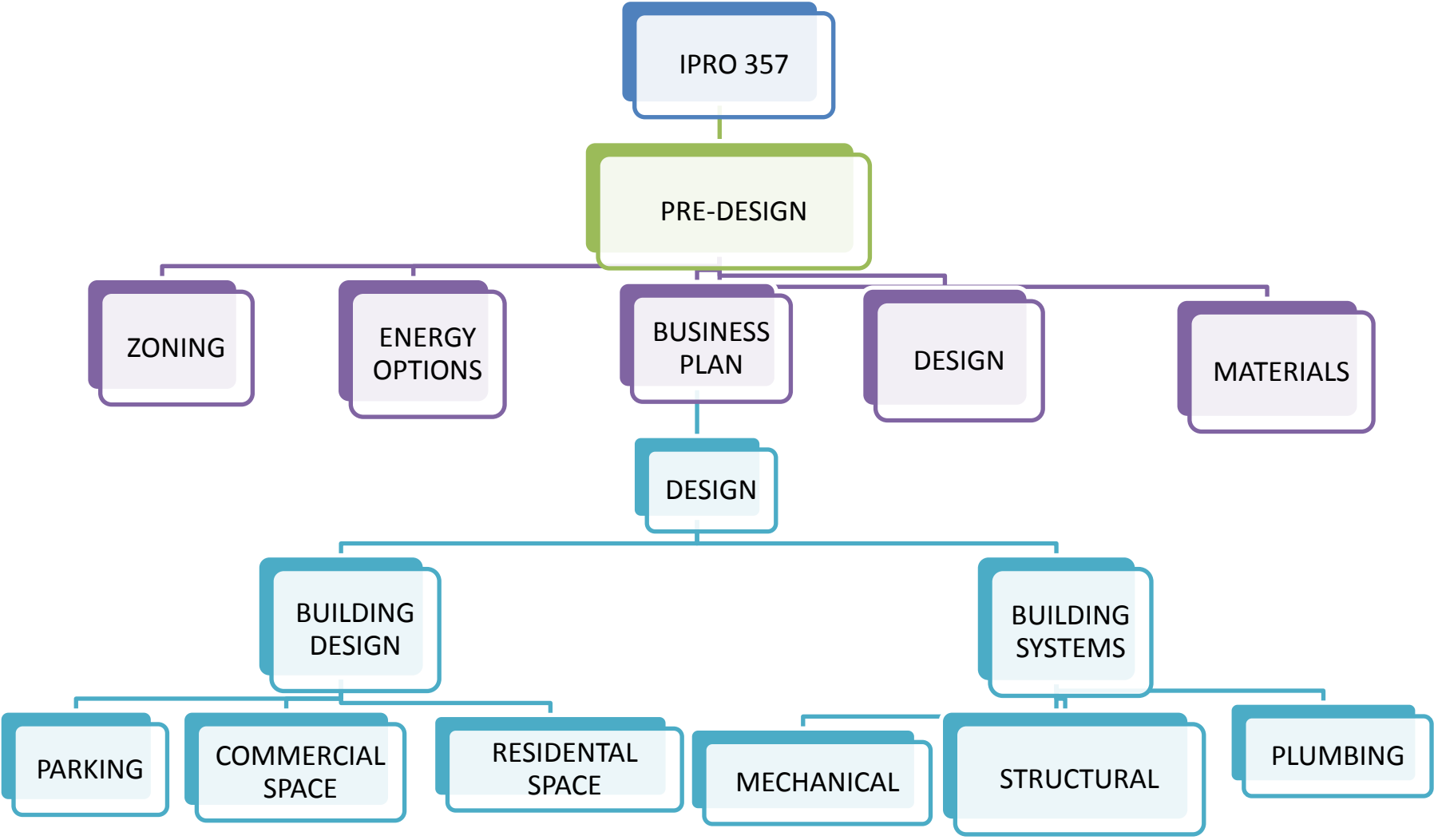
- Ryan Bouck(Arch), Jorge Chavez (Arch), Guadalupe Cortes (ArchE), Brett McQuillan(ArchE), Robert McLuckie (Arch), Beth Nielsen (ArchE), Alex Ong (CE), Issac Plumb (Arch), Timothy Ranttila(EE/CPE), Michael Warnes (Arch)

Introduction

- **OPPORTUNITY:** To design a mixed use development for the Oak Park area
- **CLIENT:** Owns nearby house and leases commercial space for his business
- **OBJECTIVE:** To develop a mixed economically feasible & sustainable prototype for the development
- **PROBLEM:** To meet the needs of the client while keeping in mind a larger client base of the community

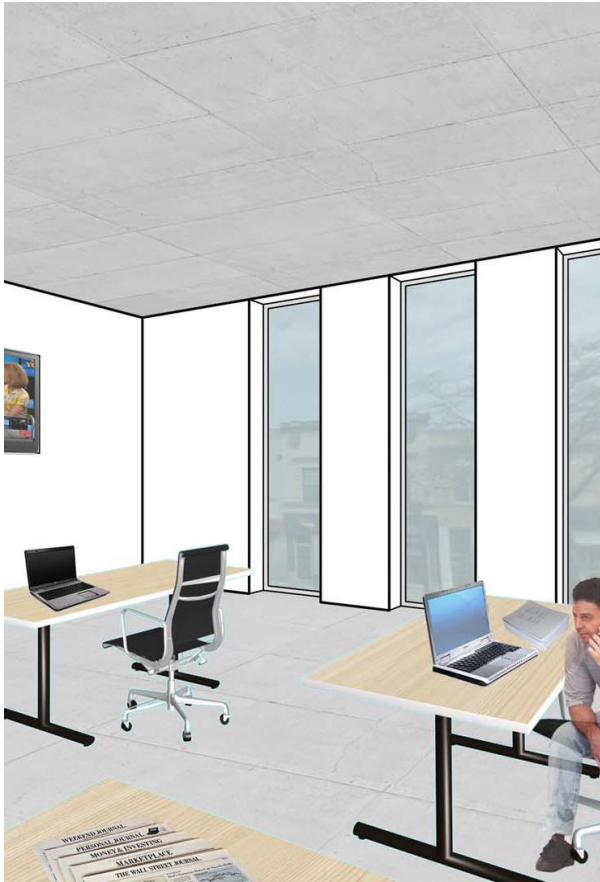


Team Performance



PROJECT: 357





Work



Live

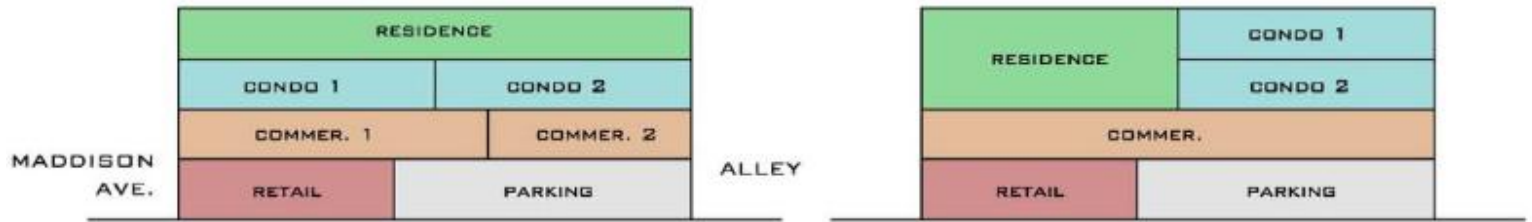


Play

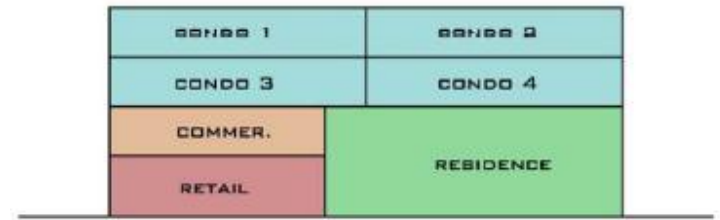
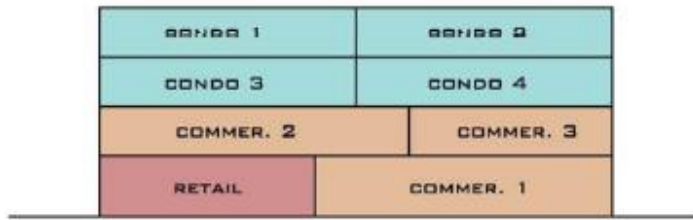
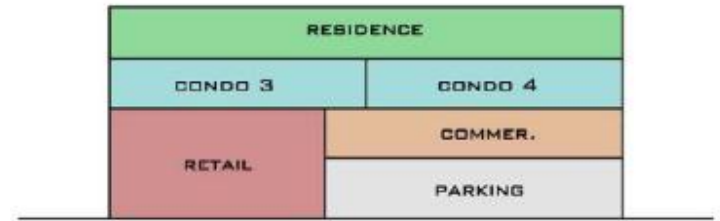
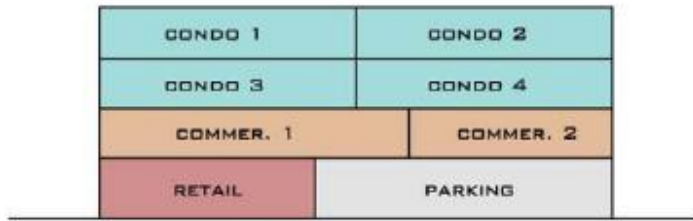
BUSINESS PLAN



LAYOUT OPTIONS



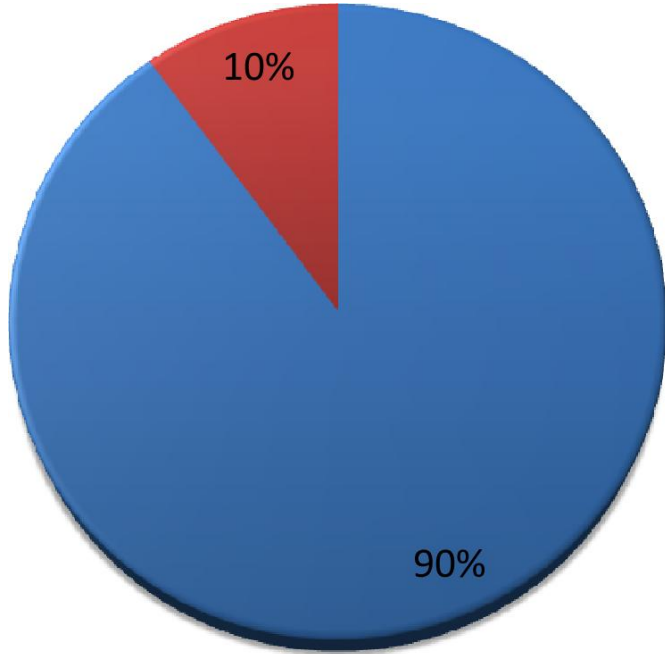
- RESIDENCE
- CONDOS
- COMMERCIAL
- RETAIL
- PARKING



BUSINESS PLAN



MARKET RESEARCH



Oak Park Businesses

- Less than 20 employees
- Greater than 20 employees



Commute To Work In Oak Park

BUSINESS PLAN



MIXED USE LIVE WORK BENEFITS

- Convenience
- Efficient use of time and money due to overlap of operations
- Smart financial investment
- Community and cultural sensitivity
- Activates urban areas during more hours of the day
- Reduces auto dependence
- Minimizes carbon footprint

BUSINESS PLAN



GREEN BUILDING BENEFITS

Economic benefits:

Life-Cycle savings from:

- Energy & lighting efficiency
- Water efficiency
- Materials efficiency
- Employee productivity
- Employee health

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

BUSINESS PLAN



838 Madison St, Oak Park



Client Needs

Commercial space of 2,000 sf

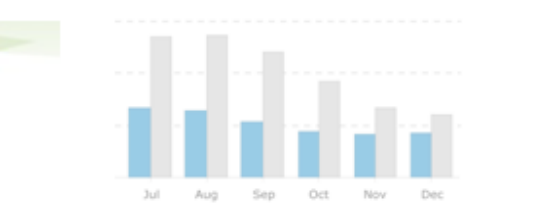
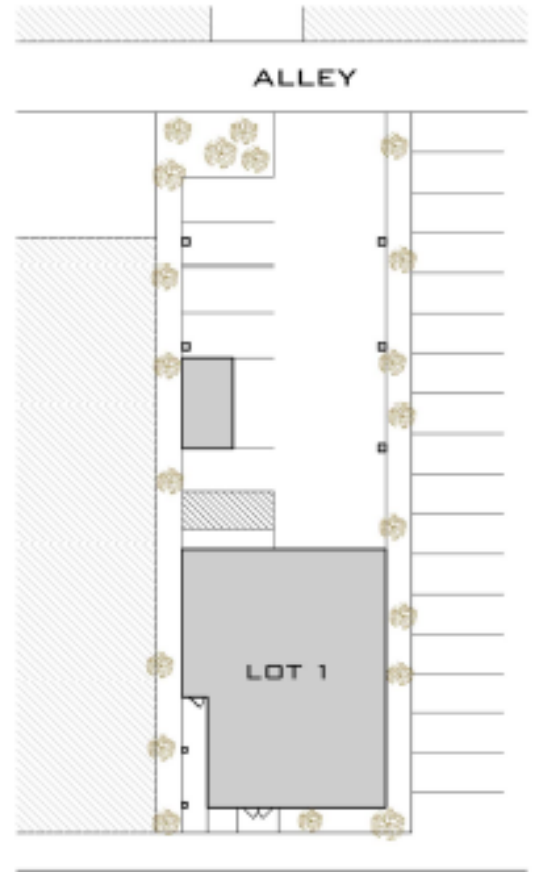
Single family residence for 7 with large outdoor space

Leasable commercial, retail, and residential spaces

CLIENT DESIGN



PROJECT: 357 BUILDING 1



4-Story mix used building

Retail: 824 sf

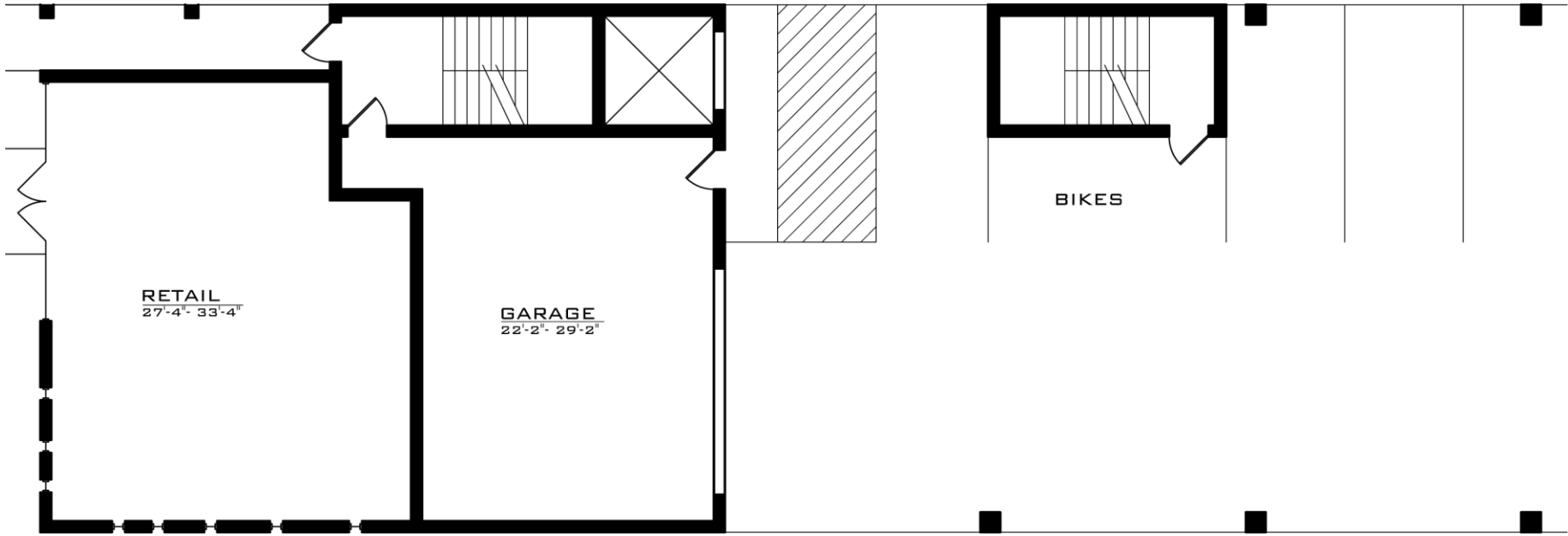
Condo: 4,300 sf

Commercial: 3,478 sf

Residence: 4,300 sf

CLIENT DESIGN

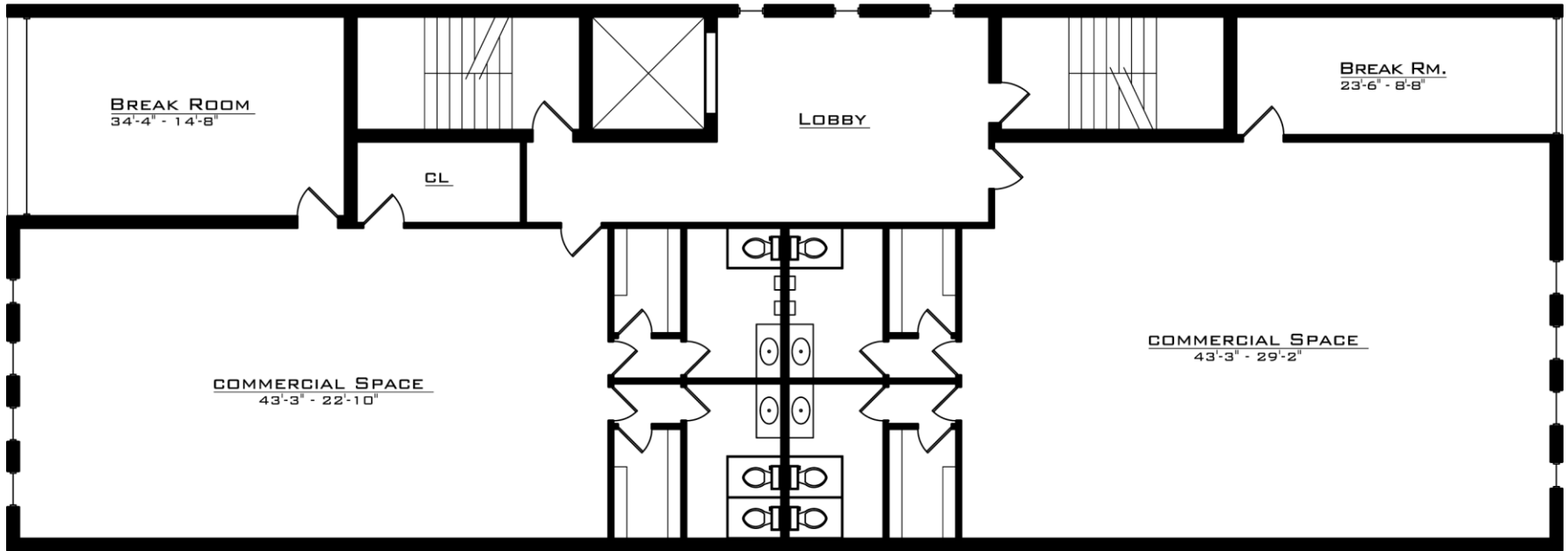




FIRST FLOOR

CLIENT DESIGN





SECOND FLOOR

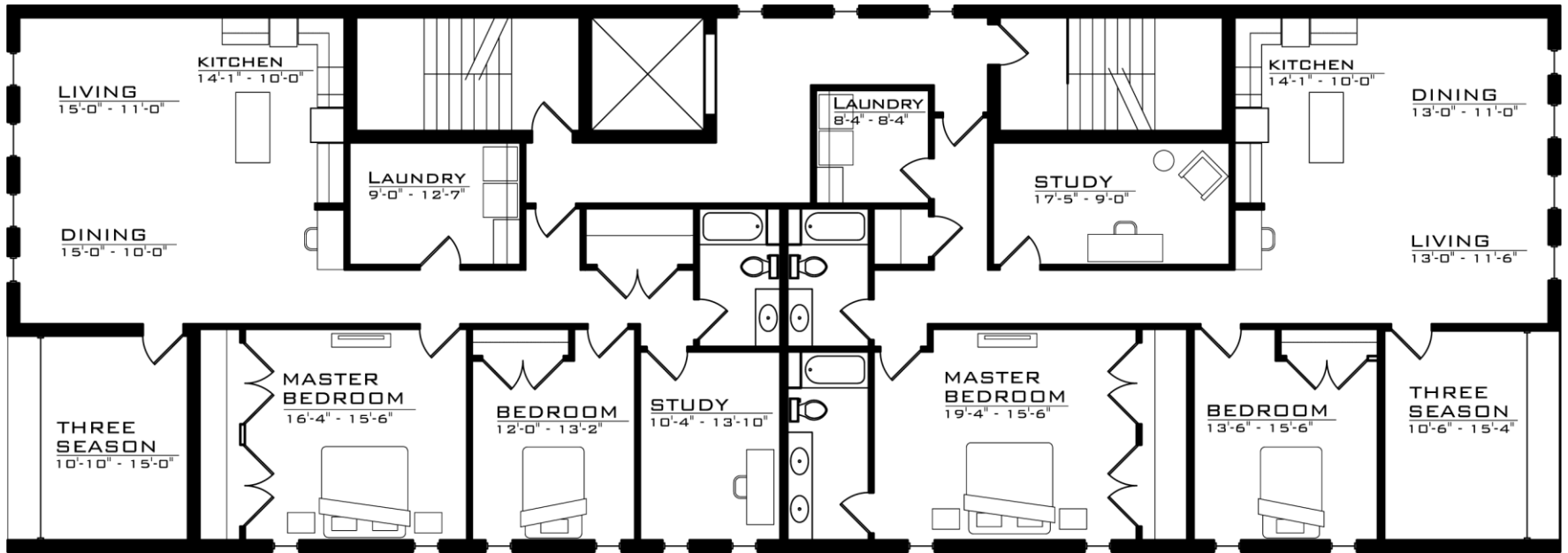
CLIENT DESIGN





CLIENT DESIGN

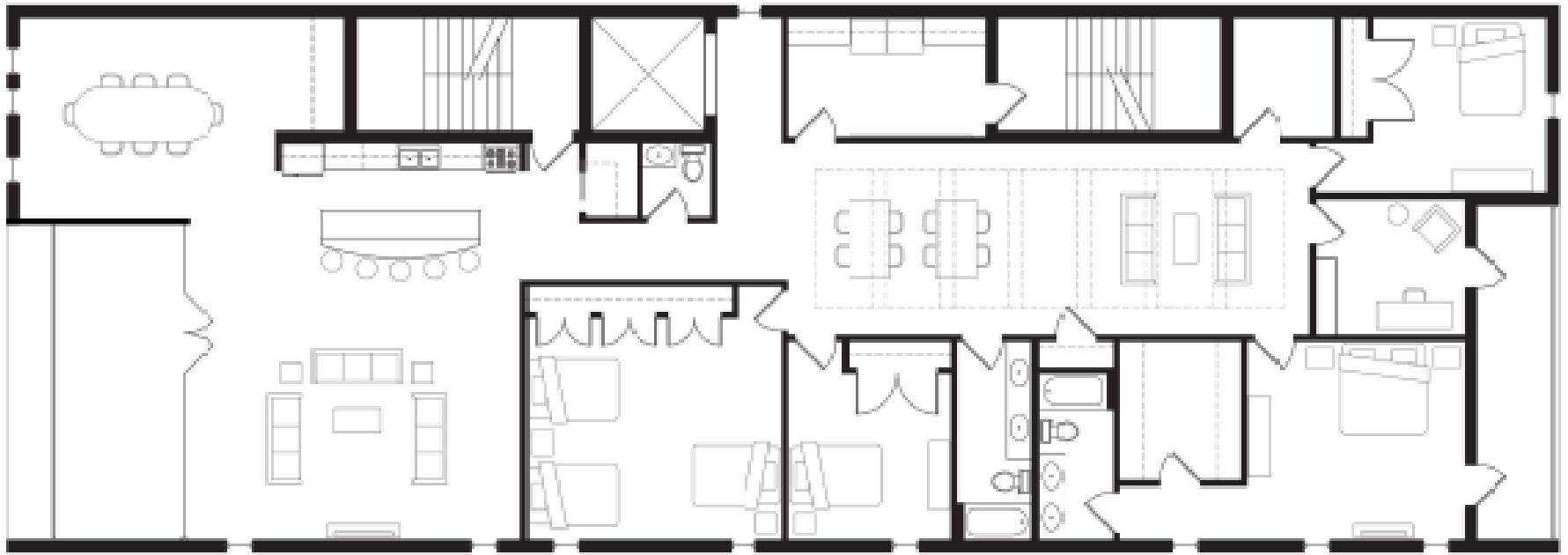




THIRD FLOOR

CLIENT DESIGN





FOURTH FLOOR

CLIENT DESIGN





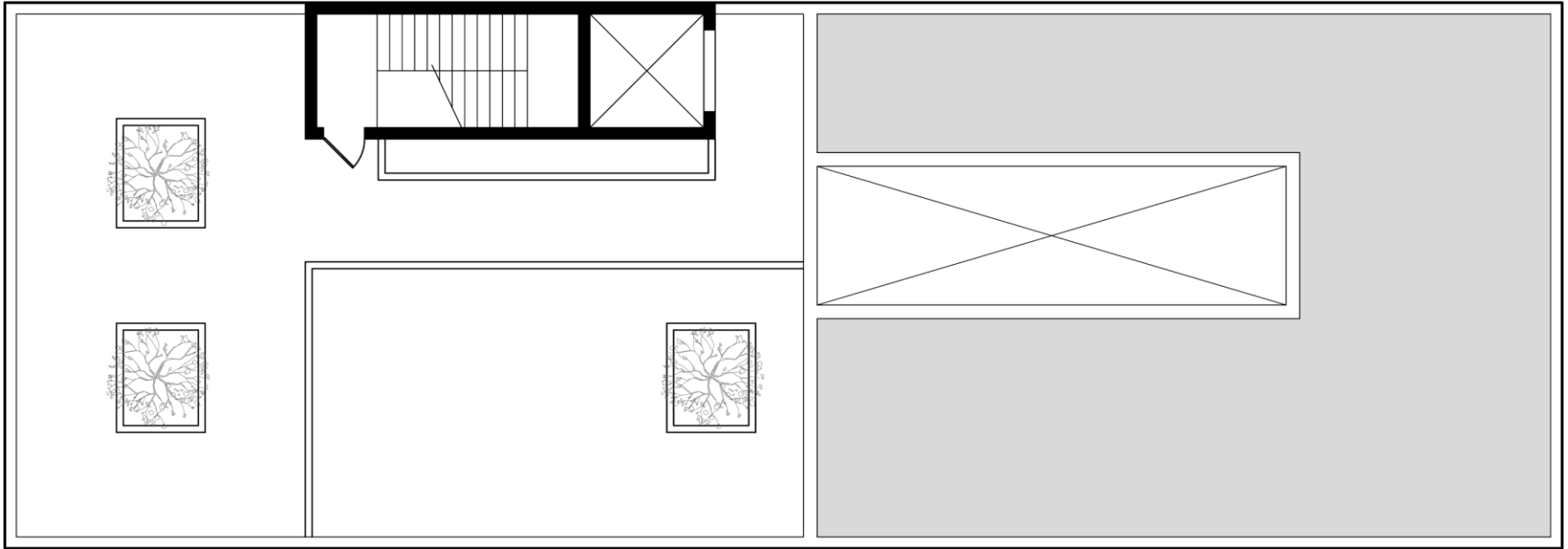
CLIENT DESIGN





CLIENT DESIGN





ROOF

CLIENT DESIGN

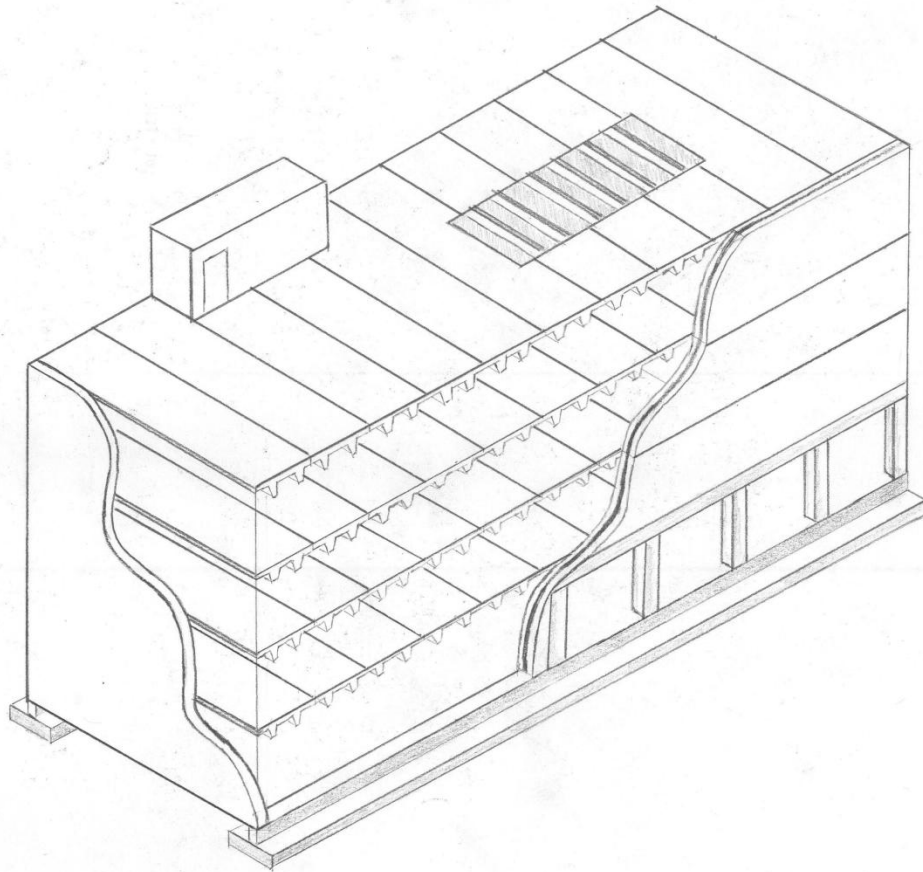




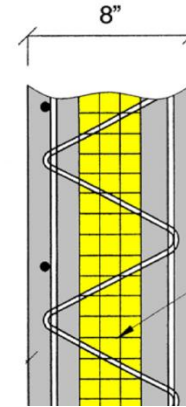
CLIENT DESIGN



DUKANE PRECAST CONSTRUCTION

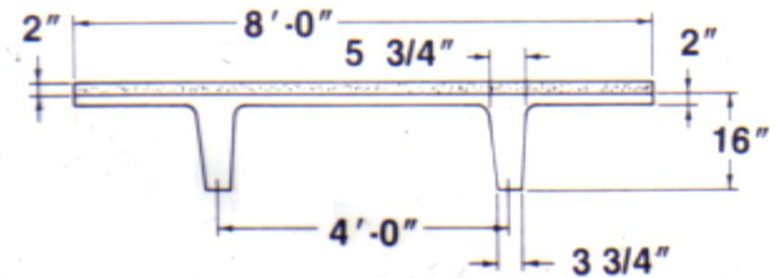


Double Wall Detail



Precast concrete wall panel
with R-21 insulation value
2 1/2" Concrete Wythes

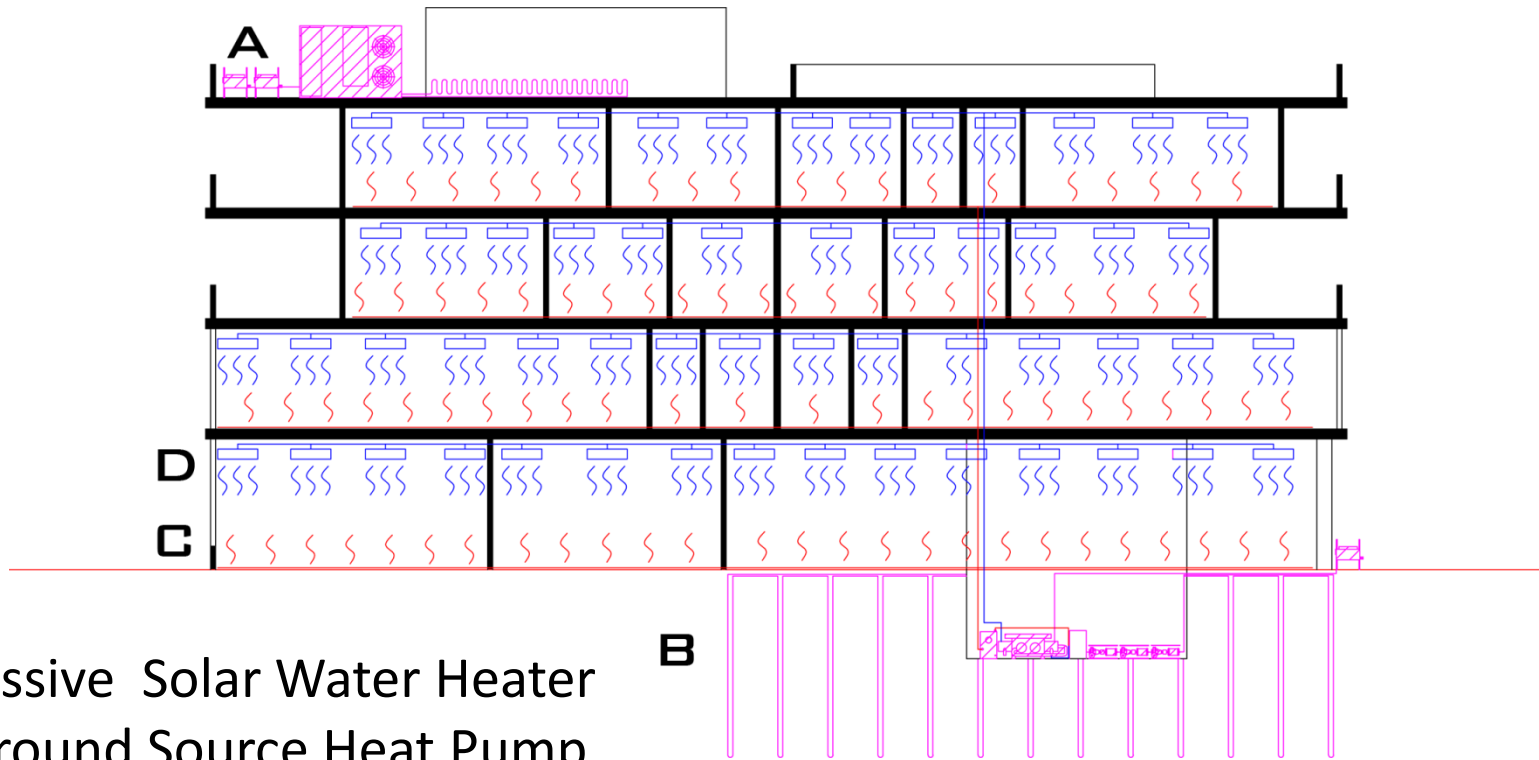
T-Slab Detail



BUILDING SYSTEMS



MECHANICAL SYSTEMS DIAGRAM



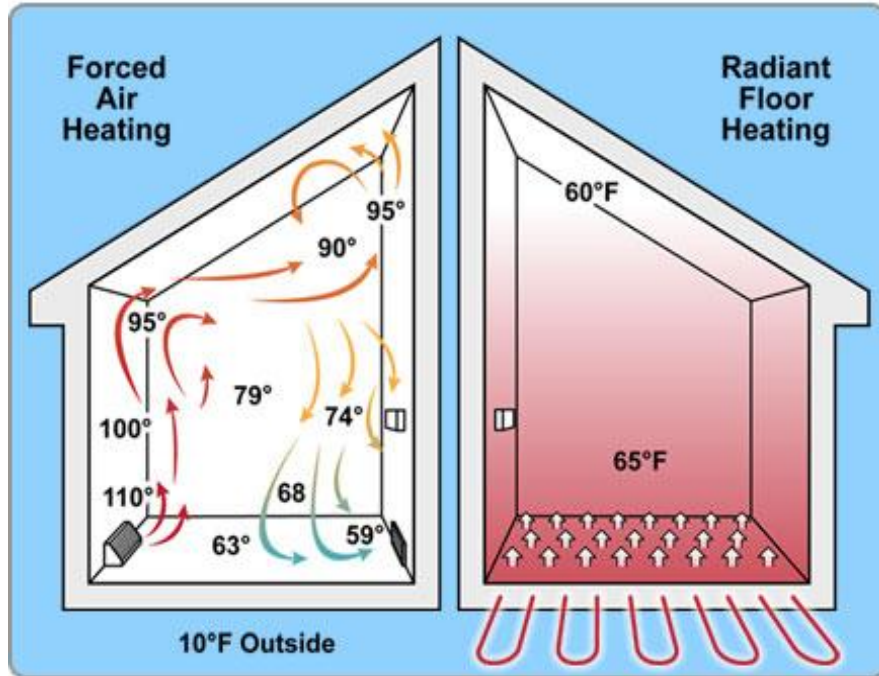
- A** Passive Solar Water Heater
- B** Ground Source Heat Pump
- C** Radiant Heated Floors
- D** Chilled Beam Ceilings

BUILDING SYSTEMS

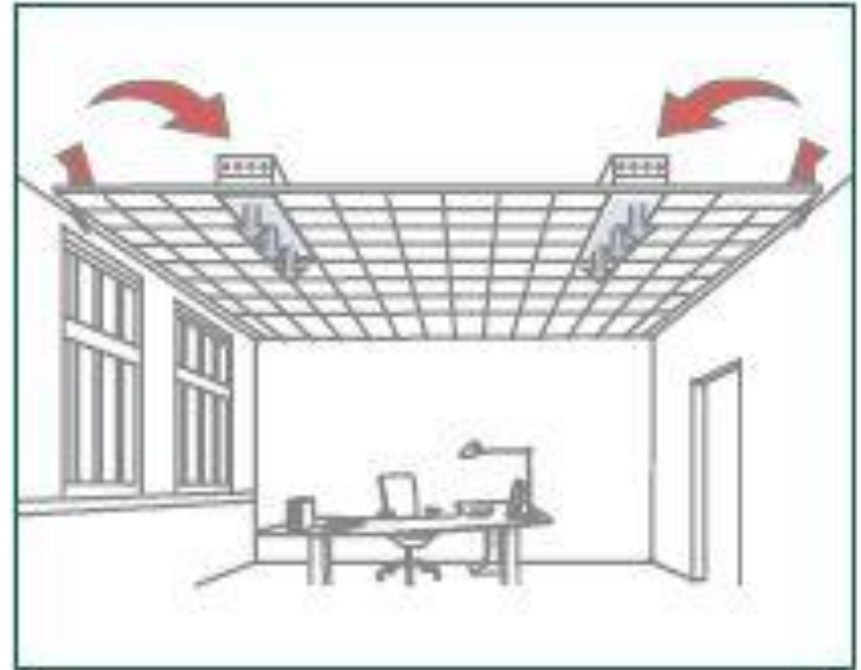


EFFICIENT HEATING AND COOLING

Radiant Heated Floors



Chilled Beam Ceilings

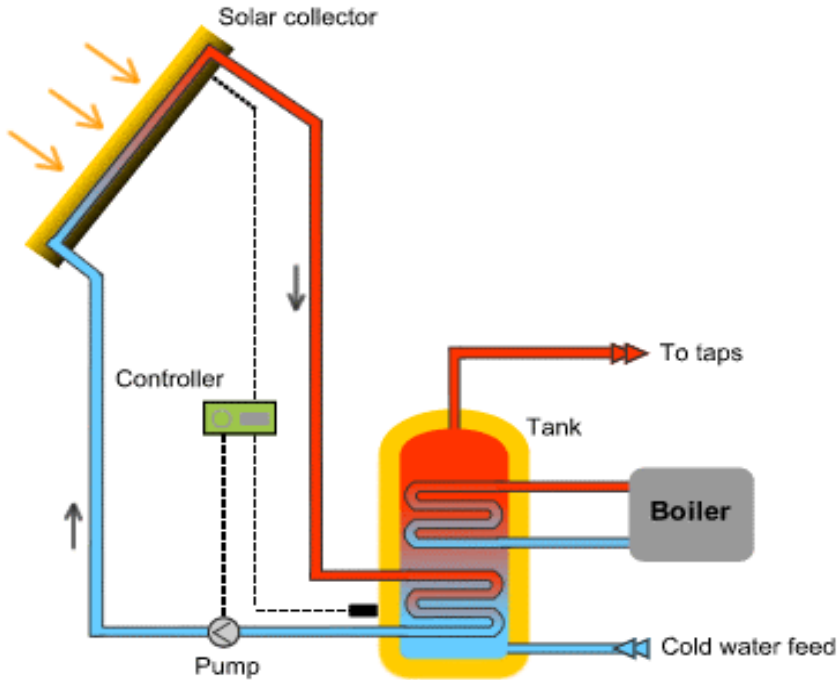


BUILDING SYSTEMS



ENERGY REDUCTION TECHNOLOGIES

Passive Solar Hot Water Heating



Ground Source Heat Pump



BUILDING SYSTEMS



SYSTEM BUYBACK TIMELINE

Radiant Heated Floors vs. VAV Central Forced Air

3-5 years

Chilled Beam Ceilings vs. VAV Central Forced Air

3-5 years

Passive Water Heating vs. Hot Water Boiler

5-7 years

Ground Source Heat Pump vs. Condensers

5-10 years

Solar Panels vs. Central Generation (not used)

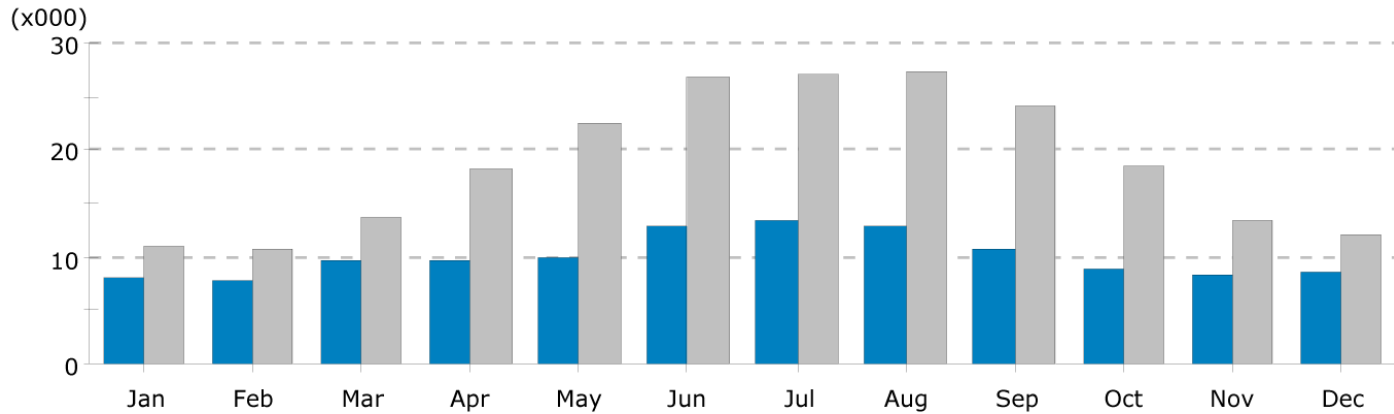
40+ years



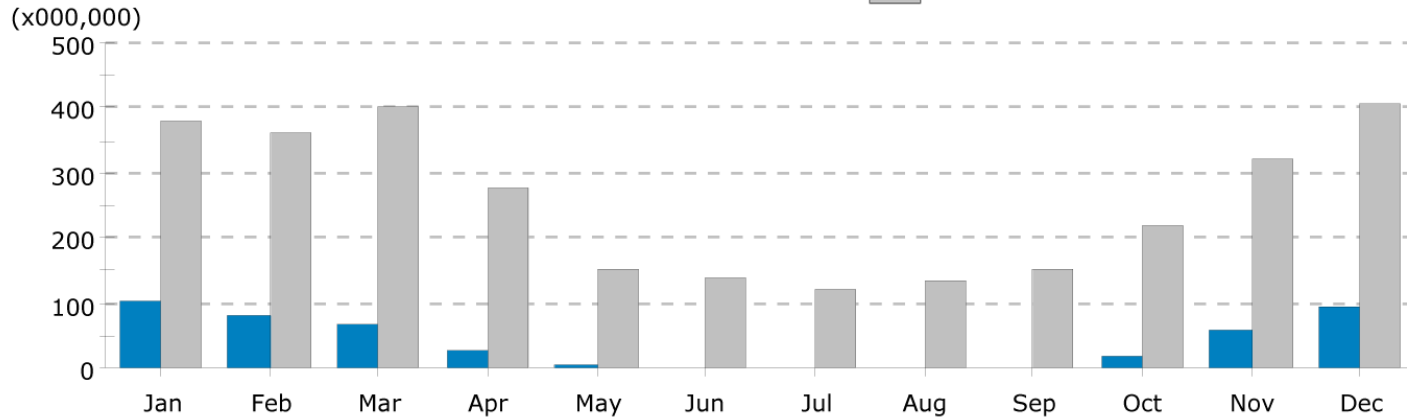
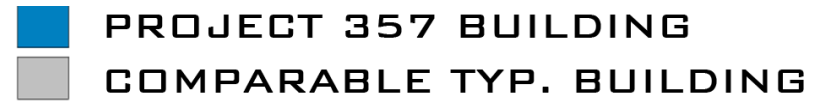
BUILDING SYSTEMS



ENERGY SAVINGS



Electric Consumption (kWh)

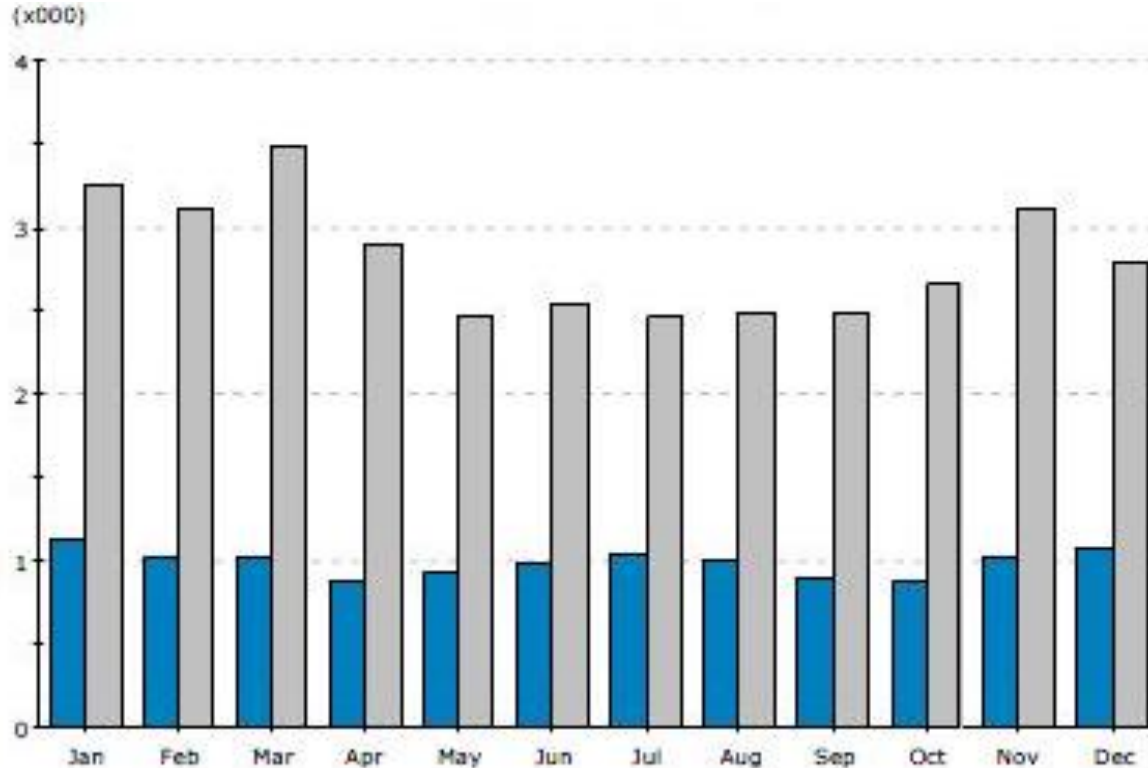


Gas Consumption (Btu)

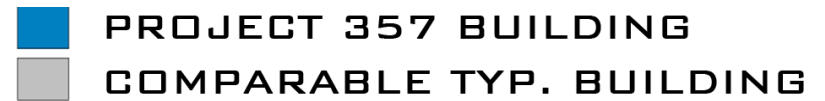
BUILDING SYSTEMS



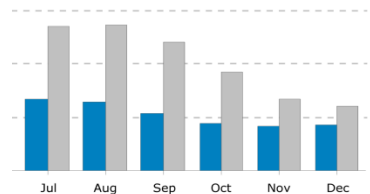
COST SAVINGS



Monthly Utility Bills (\$)



FINANCING



BUSINESS STRATEGY

\$ BONUS \$

HOME

\$

\$

WORK

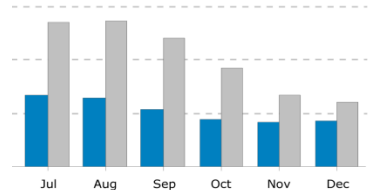
\$

\$

\$



FINANCING



BUDGET

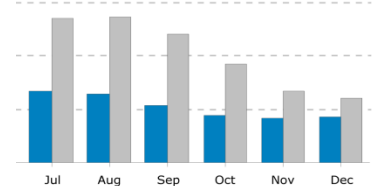
	Total:	Per sf	% of Costs
Project Costs	\$ 3,240,007	\$ 178	100%
Total Hard Costs	\$ 1,855,620	\$ 102	57%
Total Land Costs	\$ 500,000	\$ 27	15%
Total Soft Costs	\$ 884,387	\$ 48	27%

Div 3 - Concrete			
Structural Concrete Foundations	\$ 11,440	\$ 1.33	0.7%
Precast Concrete Panels	\$ -	\$ -	0.0%
Concrete Topping	\$ -	\$ -	0.0%
Div 4 - Masonry			
CMU Bearing Walls	\$ 154,440	\$ 18.00	9.0%
Masonry Veneer	\$ 154,440	\$ 18.00	9.0%
Div 5 - Steel			
Structural Steel	\$ 143,000	\$ 16.67	8.4%
Misc Ornamental Iron	\$ 35,000	\$ 4.08	2.0%
Light Gauge Metal Framing	\$ -	\$ -	0.0%
	\$ 498,320	\$ 58.08	29.1%

Div 3 - Concrete			
Structural Concrete Foundations	\$ 127,680	\$ 7.00	5.7%
Precast Concrete Panels	\$ 232,800	\$ 12.76	10.3%
Concrete Topping	\$ -	\$ -	0.0%
Div 4 - Masonry			
CMU Bearing Walls	\$ -	\$ -	0.0%
Masonry Veneer	\$ -	\$ -	0.0%
Div 5 - Steel			
Structural Steel	\$ -	\$ -	0.0%
Misc Ornamental Iron	\$ 35,000	\$ 1.92	1.6%
Light Gauge Metal Framing	\$ -	\$ -	0.0%
	\$ 395,480	\$ 21.68	17.6%



FINANCING



PROFORMA

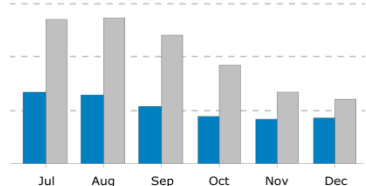
Effective Gross Income:

	Year 1	Year 2	Year 3	Year 4	Year 5
<i>Combined Rent Income:</i>	\$ 310,901	\$ 326,446	\$ 342,768	\$ 359,907	\$ 377,902
<i>Parking Income:</i>	\$ 10,800	\$ 11,340	\$ 11,907	\$ 12,502	\$ 13,127
<i>Other Income:</i>	\$ 600	\$ 630	\$ 662	\$ 695	\$ 729
<i>Concessions:</i>	\$ -	\$ -	\$ -	\$ -	\$ -
<i>Vacancy and Credit Loss:</i>	\$ (12,892)	\$ (13,537)	\$ (14,213)	\$ (14,924)	\$ (15,670)
<i>Effective Rental Income:</i>	\$ 309,409	\$ 324,879	\$ 341,123	\$ 358,179	\$ 376,088

Direct Capitalization Summary:

	Year 1	Year 2	Year 3	Year 4	Year 5
<i>Effective Rental Income:</i>	\$ 309,409	\$ 324,879	\$ 341,123	\$ 358,179	\$ 376,088
<i>Operating Expenses:</i>	\$ (111,387)	\$ (116,957)	\$ (122,804)	\$ (128,945)	\$ (135,392)
<i>Net Income (NOI):</i>	\$ 198,022	\$ 207,923	\$ 218,319	\$ 229,235	\$ 240,697
<i>Debt Service</i>	(126,360.26)	(126,360.26)	(126,360.26)	(126,360.26)	(126,360.26)
<i>Cashflow above Debt Service</i>	71,661.35	81,562.44	91,958.57	102,874.51	114,336.25
<i>Divided by cap rate:</i>	9.5%	9.0%	8.6%	8.1%	7.7%
<i>Indicated Value as stabilized:</i>	\$ 2,084,438	\$ 2,303,853	\$ 2,546,363	\$ 2,814,402	\$ 3,110,654

FINANCING



PROFORMA

Sources and Uses

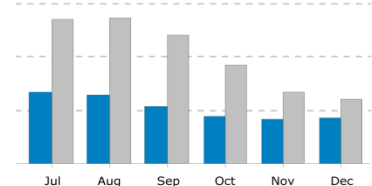
Sources		
Construction Loan (65% LTC)	\$	2,106,004
Equity (35% LTC)	\$	1,134,002
Projected Sales Revenue	\$	3,110,654
Cashflow above debt service	\$	462,393
Uses		
Project Costs		\$ (3,240,007)
Repayment of Construction Loan		\$ (2,106,004)
Repayment of Equity		\$ (1,134,002)
Developer Profit (Client Savings)		\$ (333,041)
	\$	6,813,054
	\$	(6,813,054)

Investment Analysis

Initial Investment Amount	\$	1,134,002
Total Return Amount	\$	3,110,654
Total Holding Period		6.0
Cash-on-Cash return		29%
IRR		18.3%



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