



Melody

GREETINGS FROM



Alwalid Dhaher
Energy

Erica Acton
MEP

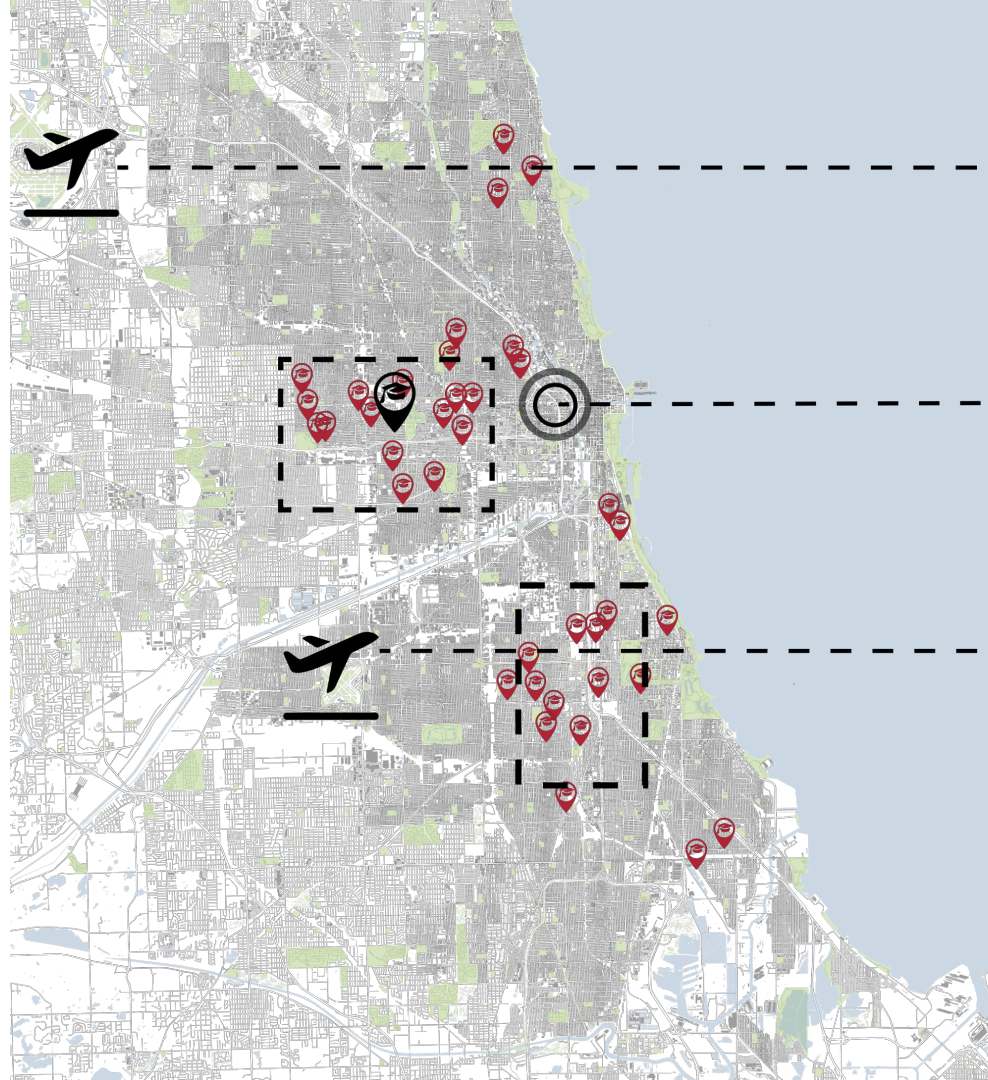
Brianna Galvan
Energy, Team Lead

Areej Siddiqui
Architecture

Gracelyn Attablayo
Enclosure

Enrique Orts
Architecture





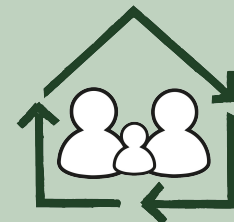
O'Hare International
Airport

Chicago Downtown
Loop

Midway Airport

Abandoned
CPS Building

Melody



MELODY



CONTEXT



CONCEPT



DESIGNING



ENERGY





Affordable
housing
development



Micro market
recovery
program



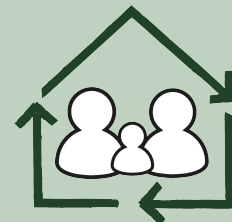
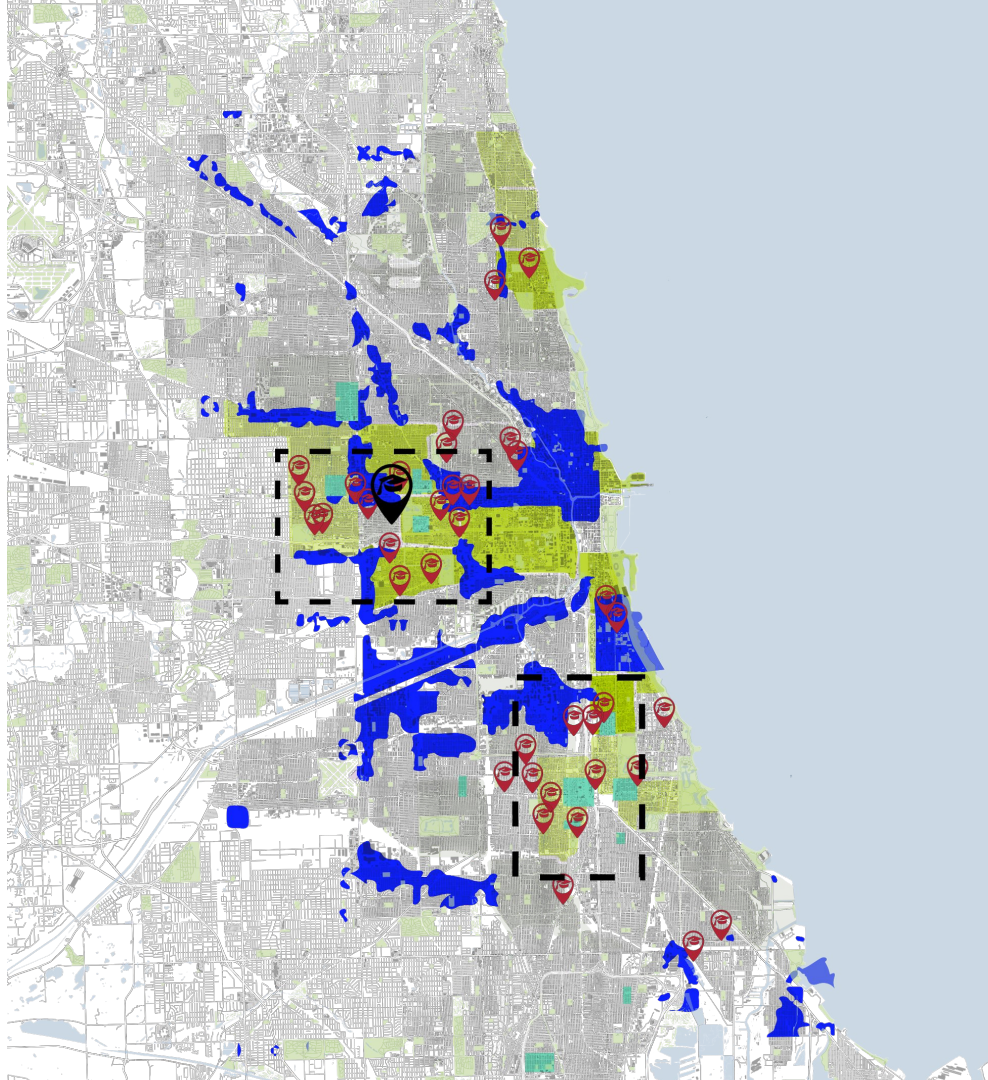
Industry and
innovation



Abandoned CPS
Building



Melody



MELODY



CONTEXT



CONCEPT



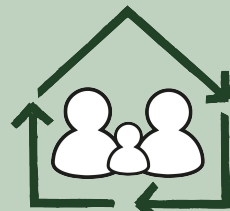
DESIGNING



ENERGY



Neighborhood Analysis



MELODY



CONTEXT



CONCEPT



DESIGNING

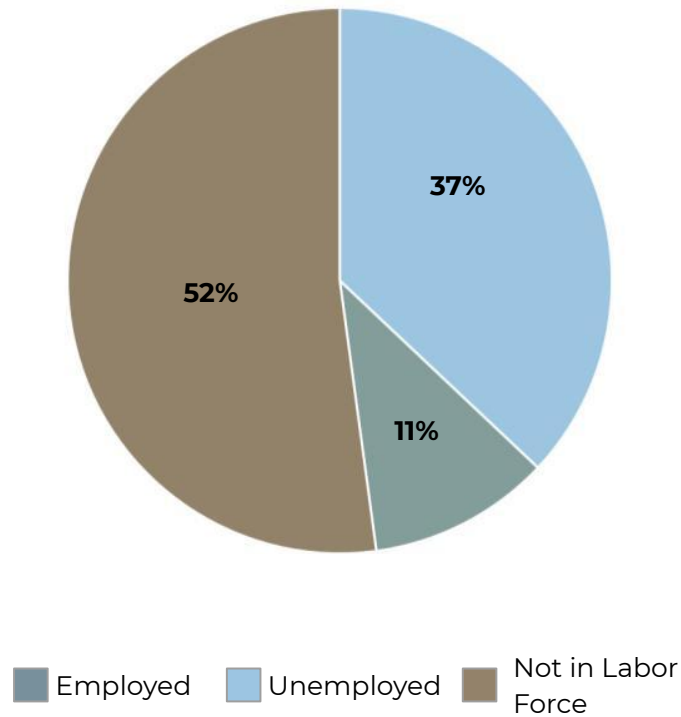


ENERGY

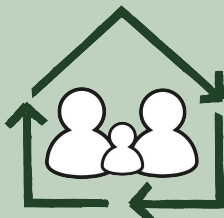
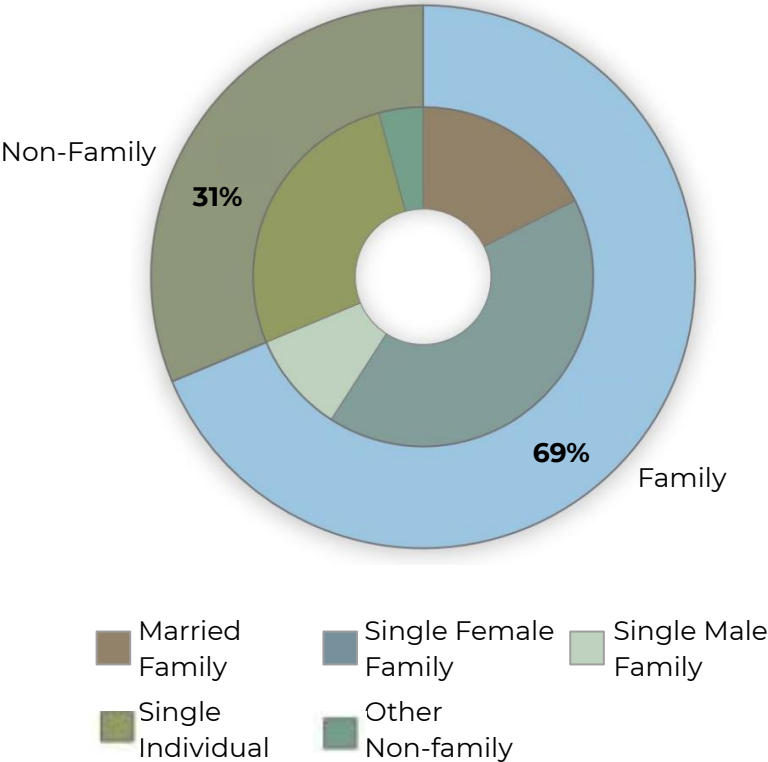


Community Statistics

Employment Statistics



Household Statistics



MELODY



CONTEXT



CONCEPT



DESIGNING



ENERGY

Existing Building

Location: 412 S Keeler
Ave, Chicago, IL

Year: 1965

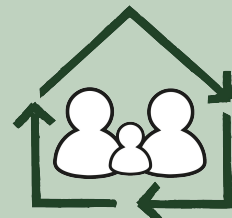
Climate Zone: 5A

Built Area: 66,450 sf

Plot Size: 79,500 sf

Stories: 3

EUI: 112.97 kBTU/sf /yr



MELODY



CONTEXT



CONCEPT



DESIGNING



ENERGY

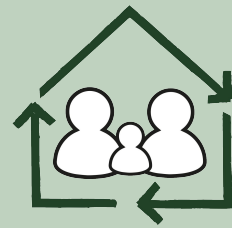


The “Loop”

People without shelter come into the **“Loop” system**, take up housing and help to maintain the center working on the facilities



As they acquire knowledge, the possibility of getting a **job increases**, allowing them freedom to move to the low-income housing system



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CONTEXT



CONCEPT

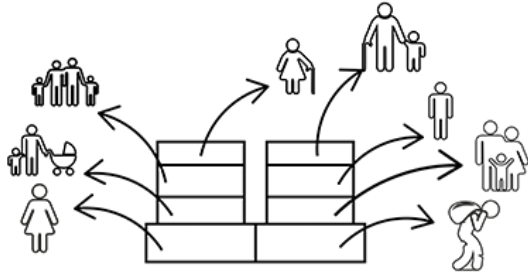


DESIGNING



ENERGY

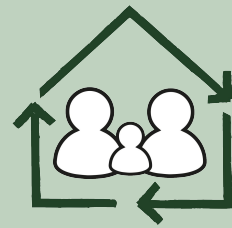
The “Loop”



Community program as a driving thread to bring cohesion to a wide range of people from diverse socioeconomic backgrounds



The center **acts as a catalyst**, encouraging activity and a sense of community in the neighborhood



MELODY



CONTEXT



CONCEPT

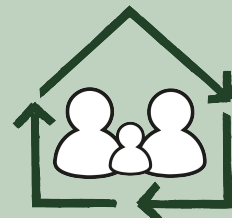
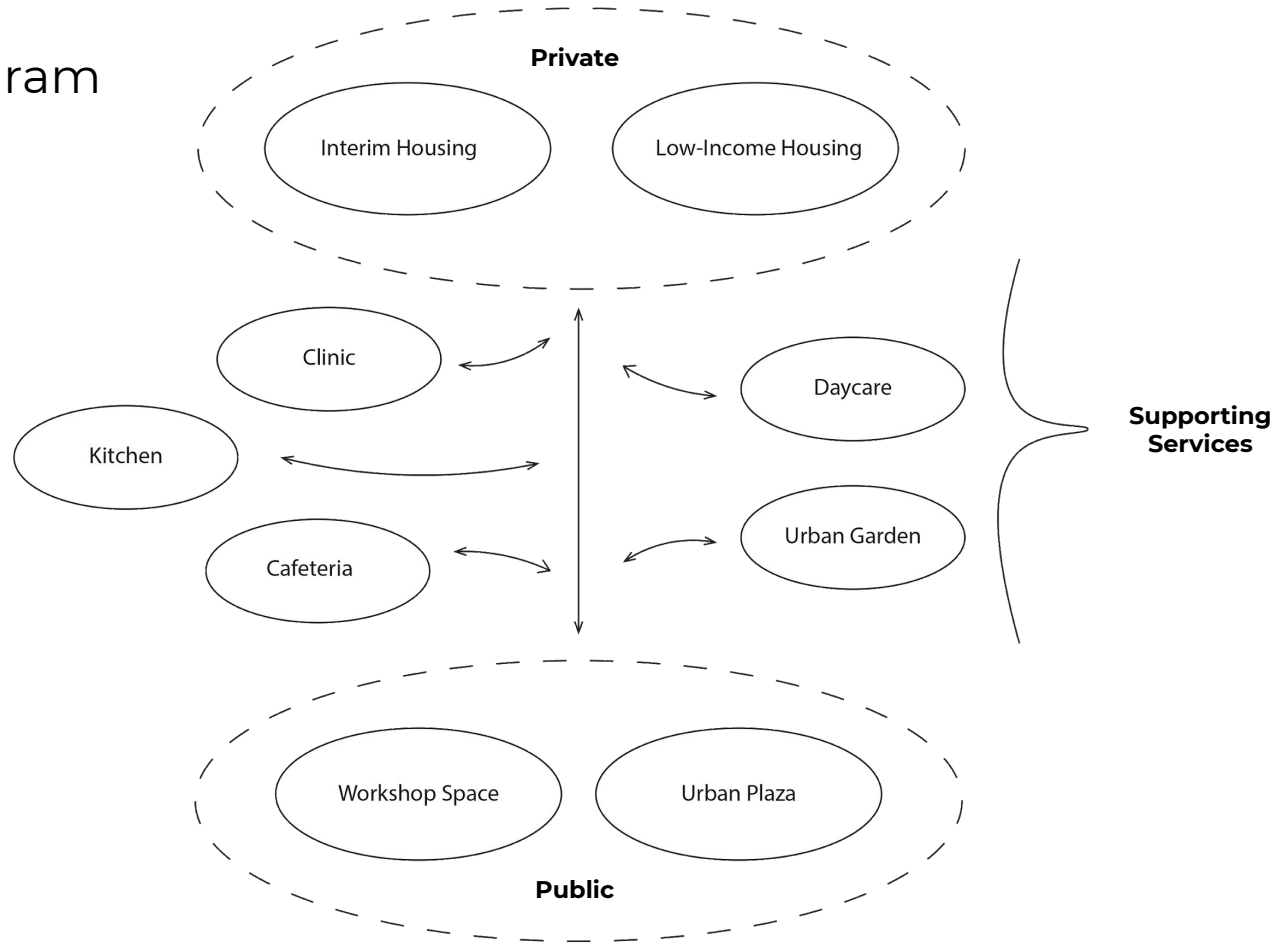


DESIGNING



ENERGY

Program



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CONTEXT



CONCEPT



DESIGNING



ENERGY

Proposed Building

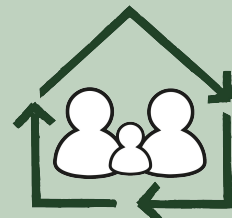
Covered Area: 75,890 sf

Plot Size: 79,500 sf

Stories: 3

Net EUI: -1.28 kBTU/sf/yr

Estimate: \$5,250,000



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CONTEXT



CONCEPT



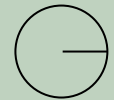
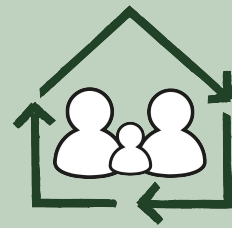
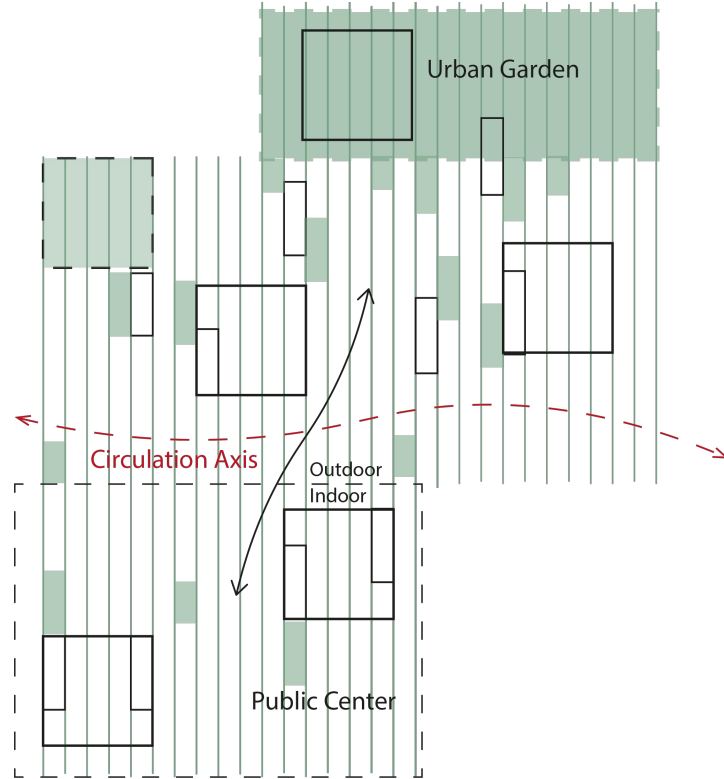
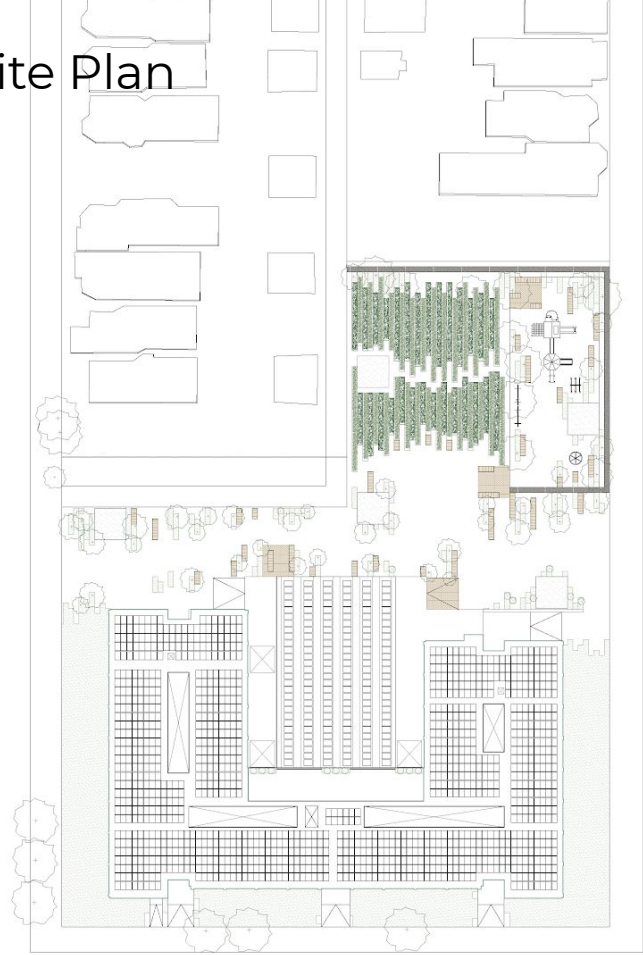
DESIGNING
THE SPACES



ENERGY



Site Plan



Existing vs Proposed

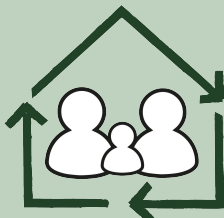
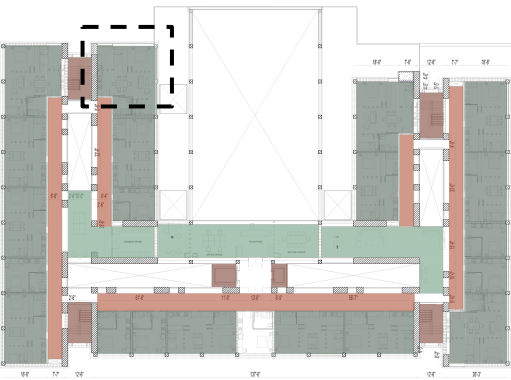
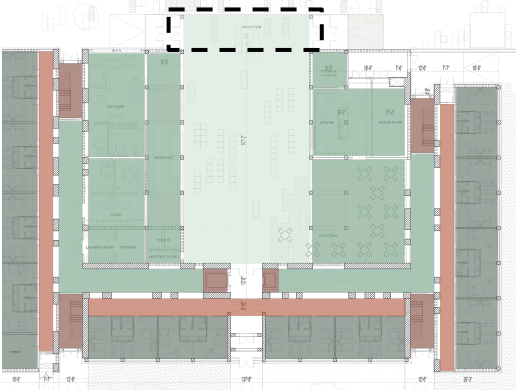
First Floor



Second Floor



Third Floor



CONTEXT



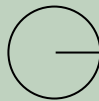
CONCEPT



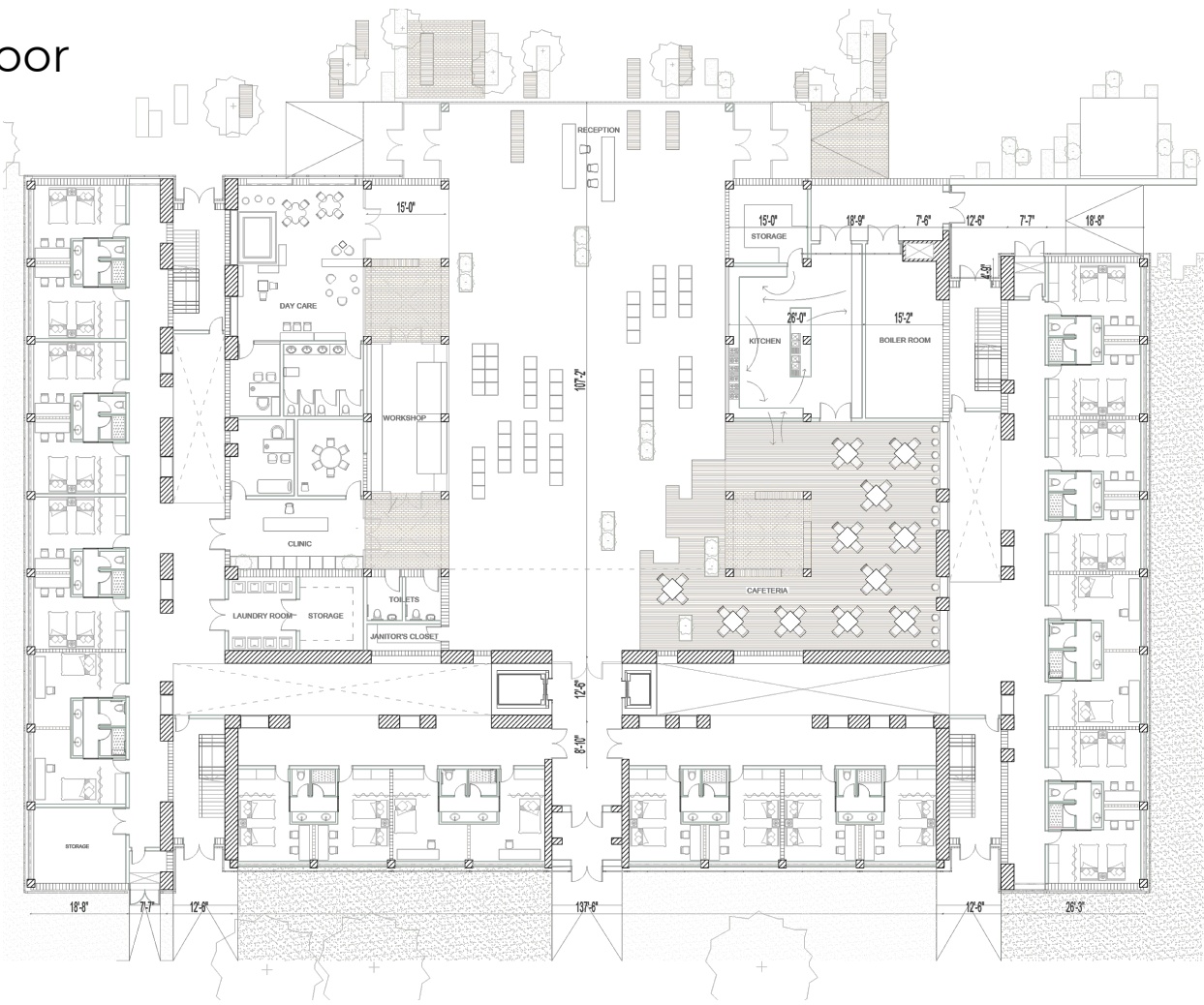
DESIGNING
THE SPACES



ENERGY



First Floor



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CONTEXT



CONCEPT



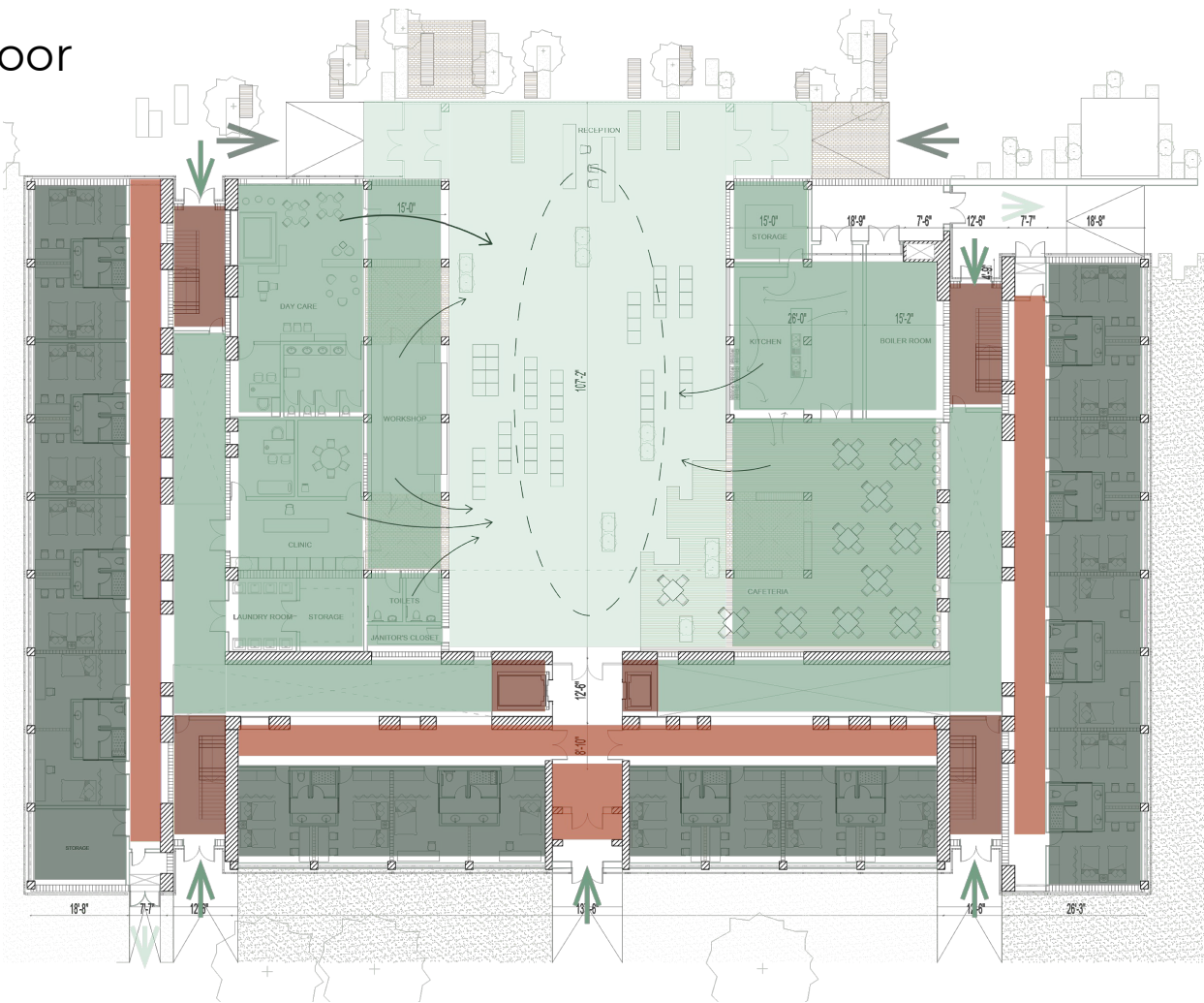
DESIGNING
THE SPACES



ENERGY



First Floor



MELODY



CONTEXT



CONCEPT

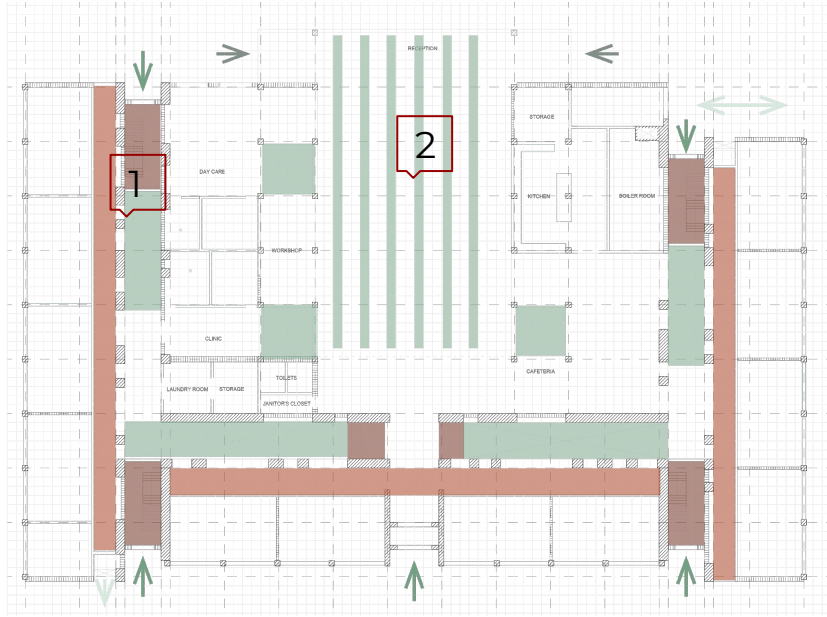


DESIGNING
THE SPACES



ENERGY





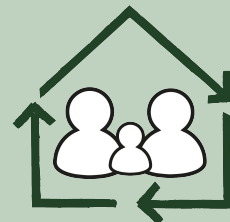
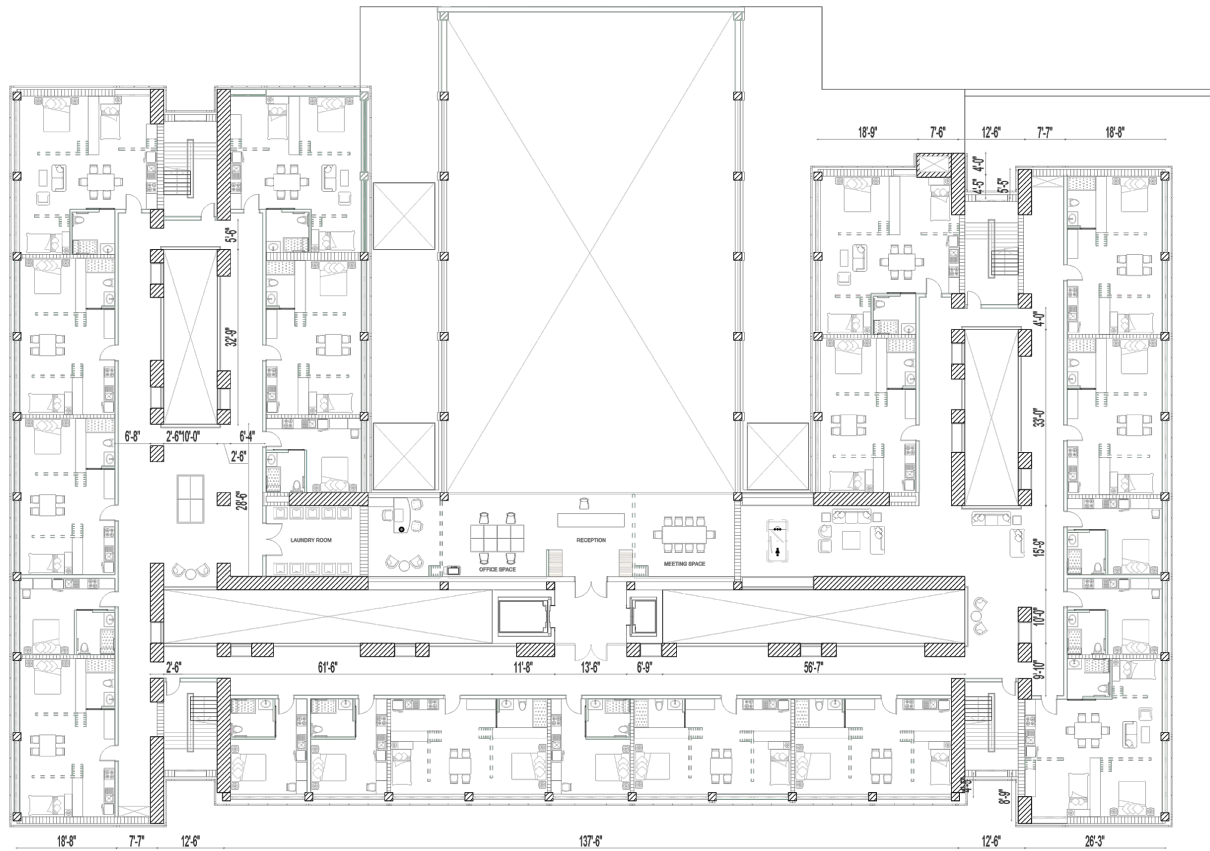
1





2

Second Floor



MELODY



CONTEXT



CONCEPT



DESIGNING THE SPACES



ENERGY



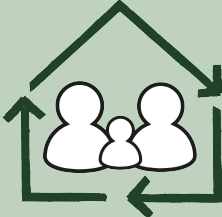
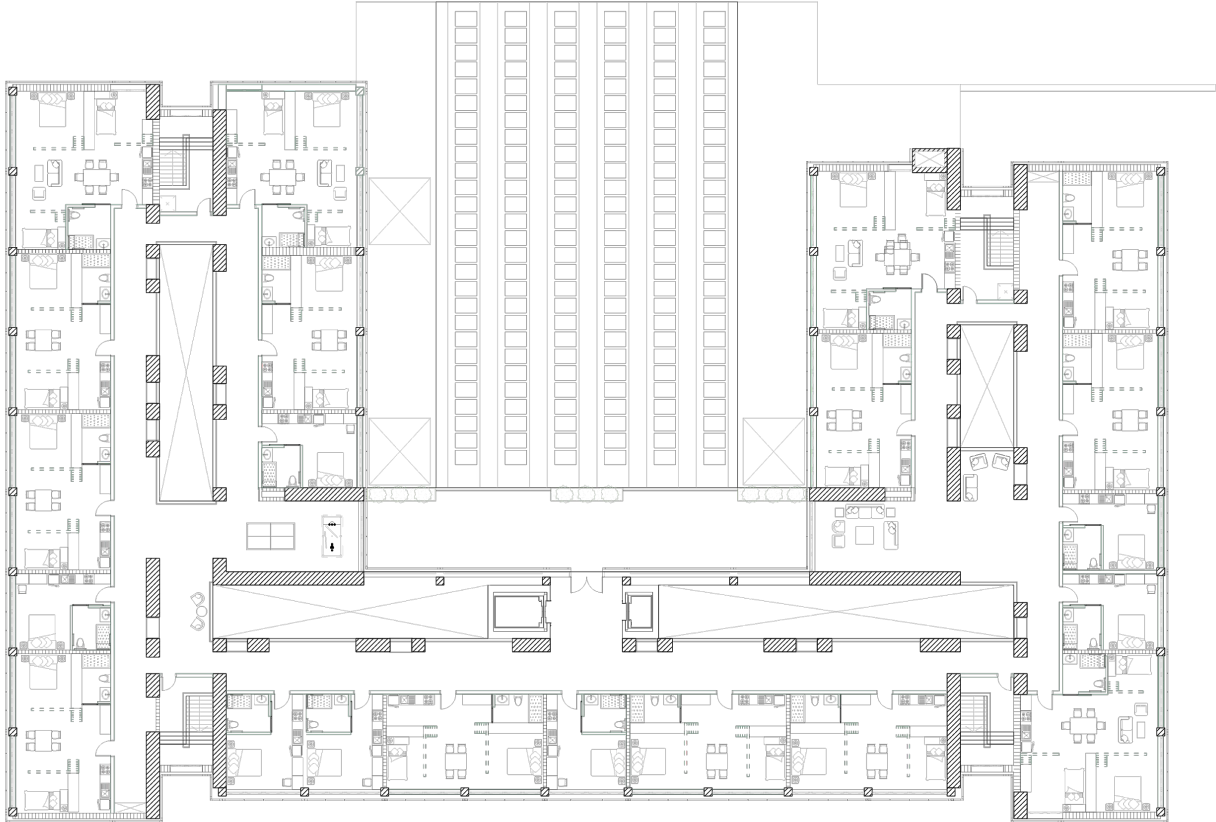
Architectural floor plan of the 1st floor. The plan shows a central corridor system with various rooms including offices, a reception area, a meeting space, a laundry room, and a storage area. Dimensions are provided for various sections and rooms. The plan is color-coded with green for office spaces, brown for corridors and stairs, and grey for other areas. A large 'X' is drawn across the central part of the plan, likely indicating a structural or design feature.

Key dimensions and labels include:

- Overall width dimensions: 18'-8", 7'-7", 12'-6", 7'-7", 18'-8"
- Overall length dimensions: 137'-6", 26'-3"
- Room labels: OFFICE SERVICE, RECEPTION, MEETING SPACE, LAUNDRY ROOM, STORAGE
- Corridor and room dimensions: 6'-5", 2'-5" x 10'-4", 6'-4", 2'-6", 2'-8", 61'-6", 11'-8", 13'-6", 6'-9", 55'-7", 9'-10", 10'-0", 15'-9", 35'-0", 4'-0", 4'-5", 4'-0", 5'-5", 8'-8"



Third Floor



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CONTEXT



CONCEPT



DESIGNING
THE SPACES



ENERGY



Third Floor



MELODY



CONTEXT



CONCEPT



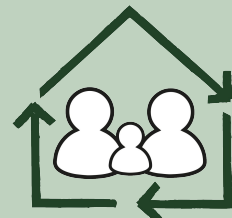
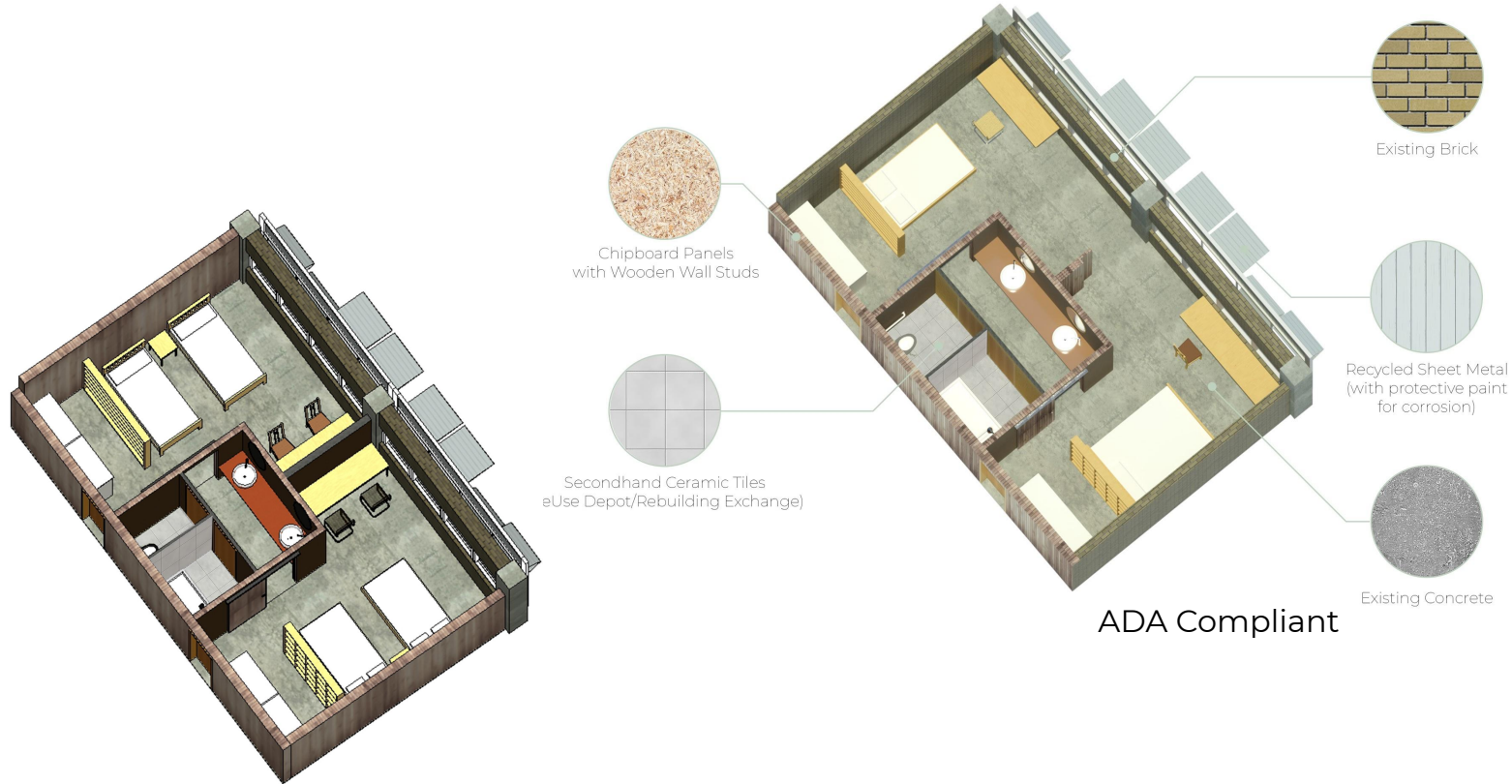
DESIGNING
THE SPACES



ENERGY



Interim Housing



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CONTEXT



CONCEPT



DESIGNING THE SPACES



ENERGY

Low-Income Housing



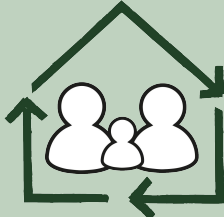
1-Bedroom



3-Bedroom



2-Bedroom



CONTEXT



CONCEPT

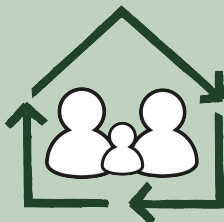
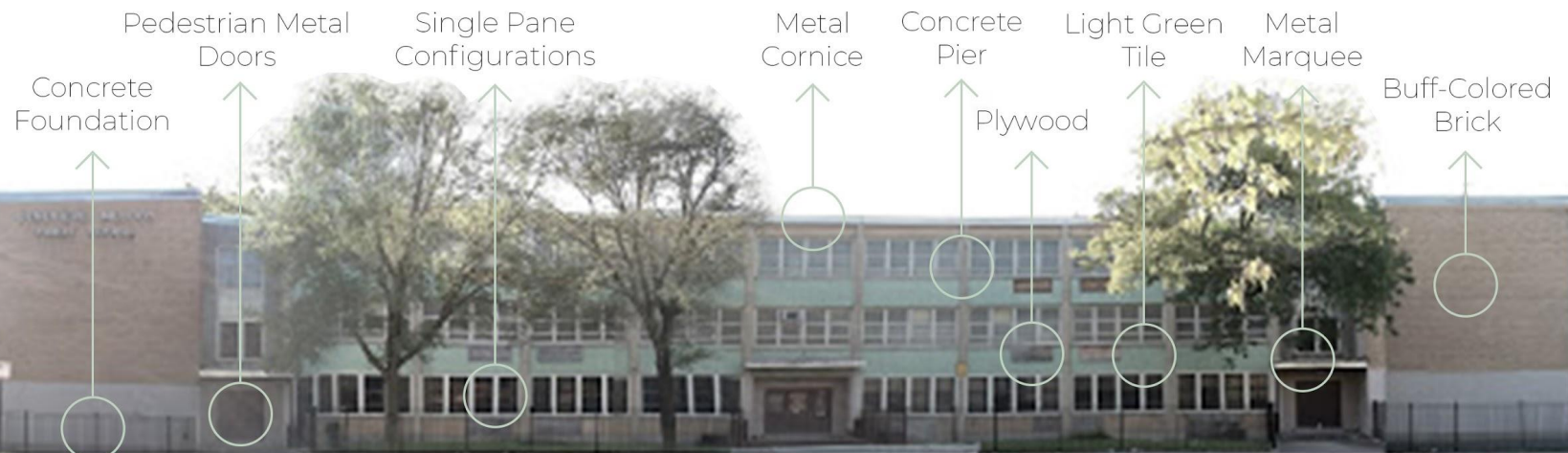


DESIGNING
THE SPACES



ENERGY

Existing Enclosure



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CONTEXT



CONCEPT



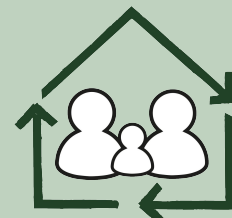
DESIGNING
THE ENCLOSURE



ENERGY

Thought Process

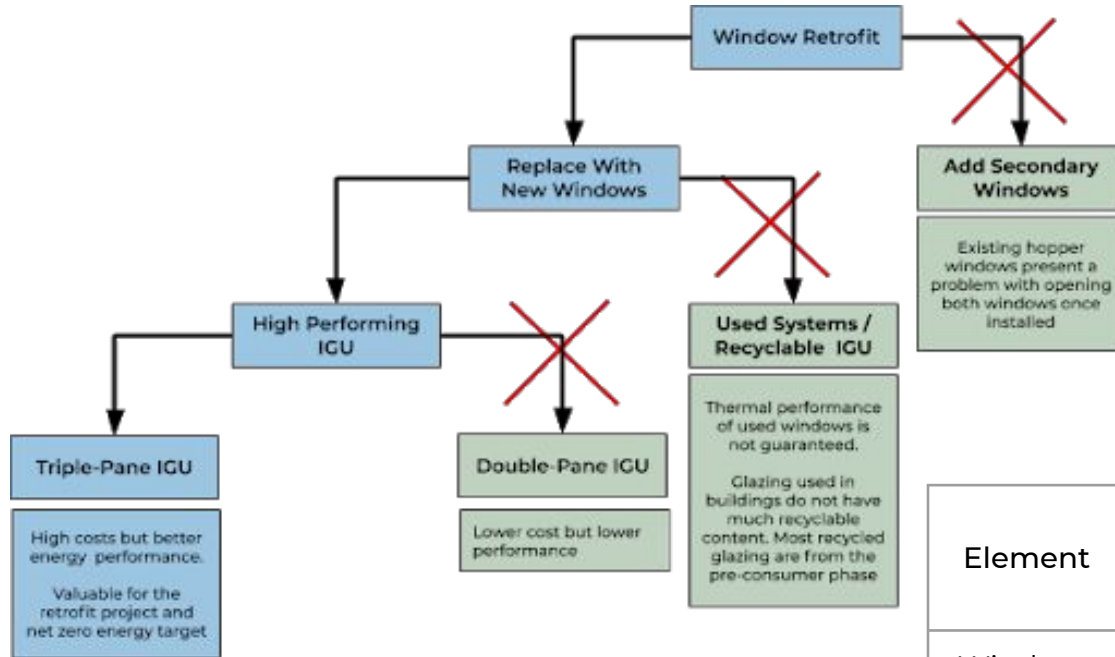
Retrofit Option	Thermal Performance	Moisture Management	Cost Benefit (Initial + Lifetime)	Constructability & Recyclability	Architectural Flexibility	Air Leakage Improvement and Sound Transmission	Indoor Air Quality	Fire Resistance	Rank
Retain Existing Wall	Low	Low	Moderate	High	None	Low	Low	Low	5th
Existing + Interior Insulation	Moderate	Moderate	Moderate	Low	Low	High	Moderate	Low	4th
Existing + Exterior Insulation Finish System	High	Low	High	Moderate	High	High	High	Low	2nd
Existing + Rainscreen System	High	High	High	High	Moderate	Moderate	High	Moderate	1st
Existing + Double Skin Facade	High	Moderate	Low	Low	High	High	Moderate	Not Clear	3rd



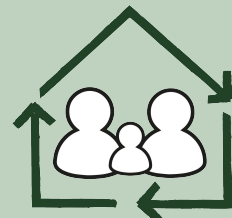
MELODY



Thought Process



Element	Proposed U-value (BTU/ft ² ·°F·h)	Proposed SHGC
Windows	0.18	0.17
Skylights	0.16-0.21	0.36



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1
CONTEXT

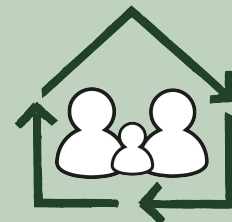
2
CONCEPT

3
DESIGNING
THE ENCLOSURE

4
ENERGY

Enclosure Performance Summary

Element	Original R-value (ft ² .°F·h/BTU)	Proposed R-value(ft ² .°F·h/BTU)
Above Grade Exterior Walls	2 (Brick Wall)	27 (6" Exterior Thermacork Insulation)
	New Construction (Wood Framed Wall)	33 (6" Cavity Insulation + 2"ci)
Roof	5 (Built-Up Roof)	50 (8" Exterior Polyiso Insulation)
Foundation Wall	3 (Concrete Wall)	17 (2.5" Exterior XPS Insulation)



MELODY



CONTEXT



CONCEPT

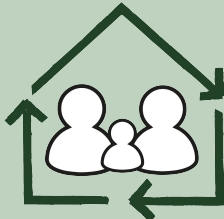
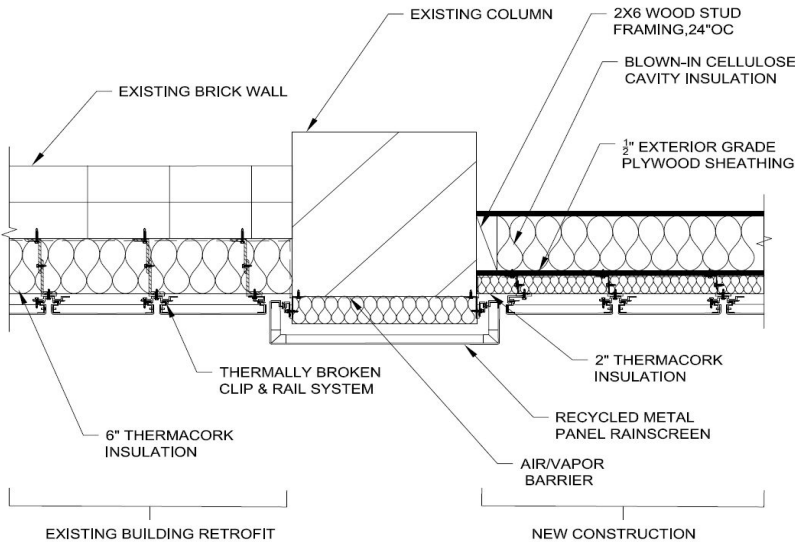
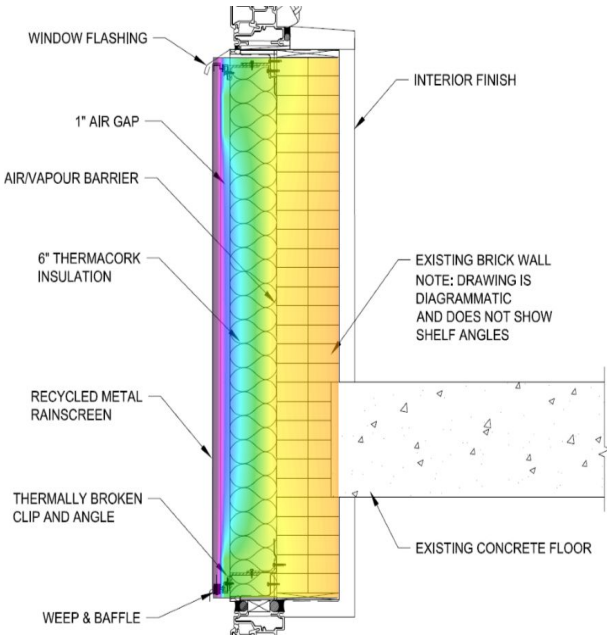


DESIGNING
THE ENCLOSURE



ENERGY

Enclosure Details



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CONTEXT



CONCEPT

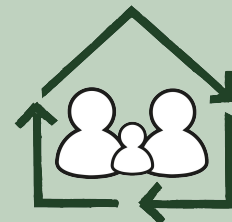
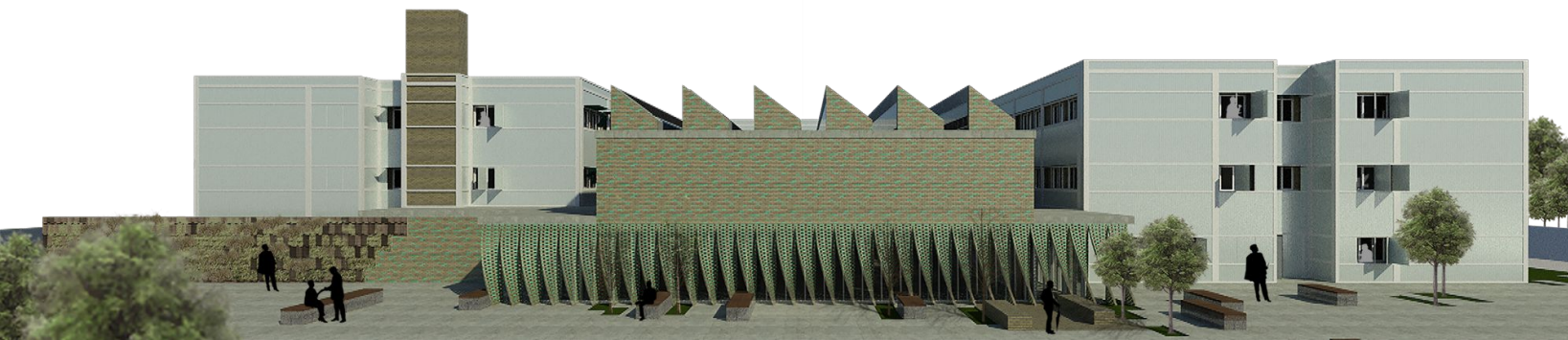


DESIGNING
THE ENCLOSURE



ENERGY

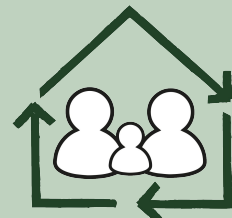
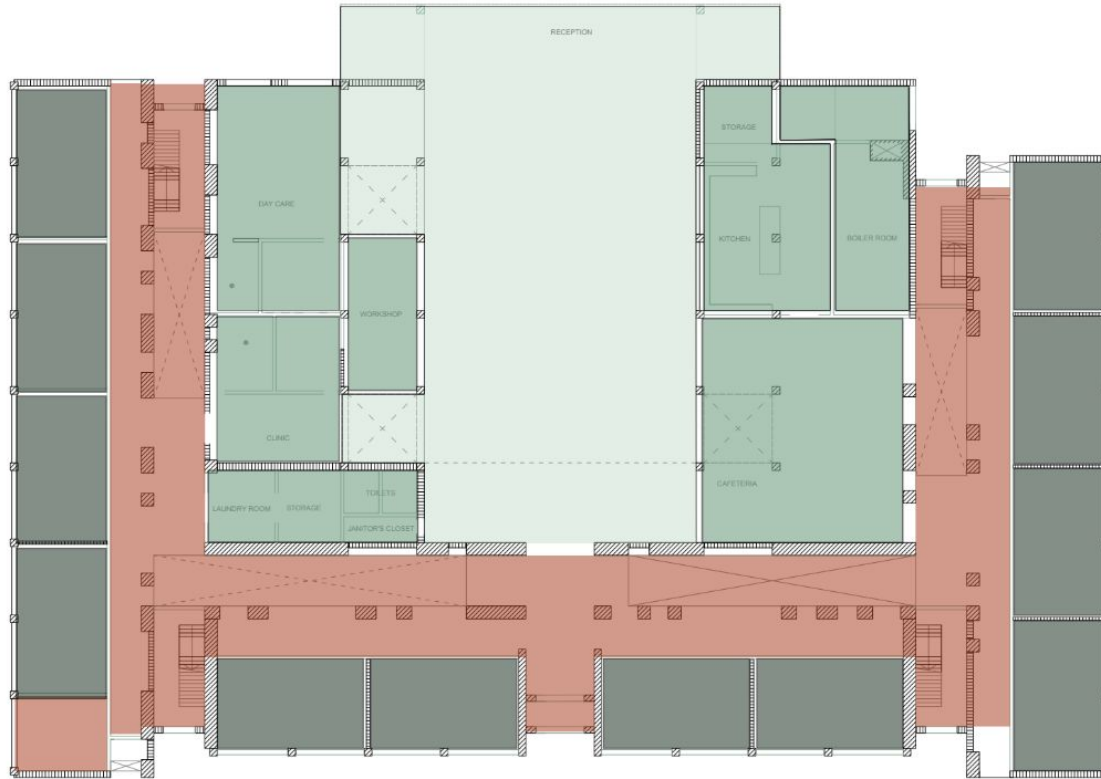
Proposed Enclosure



MELODY



Thermal Zones: First Floor



MELODY



CONTEXT



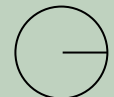
CONCEPT



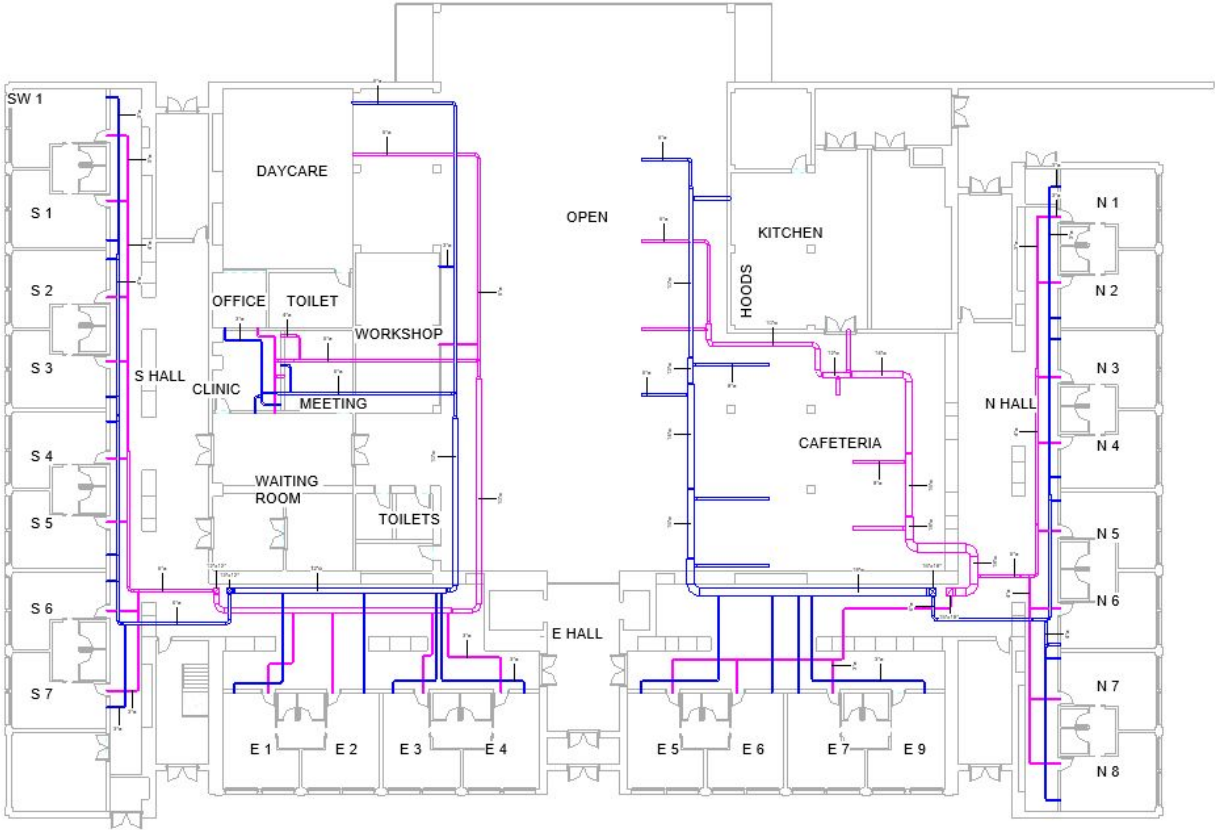
DESIGNING
MEP



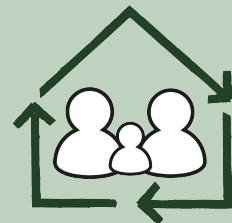
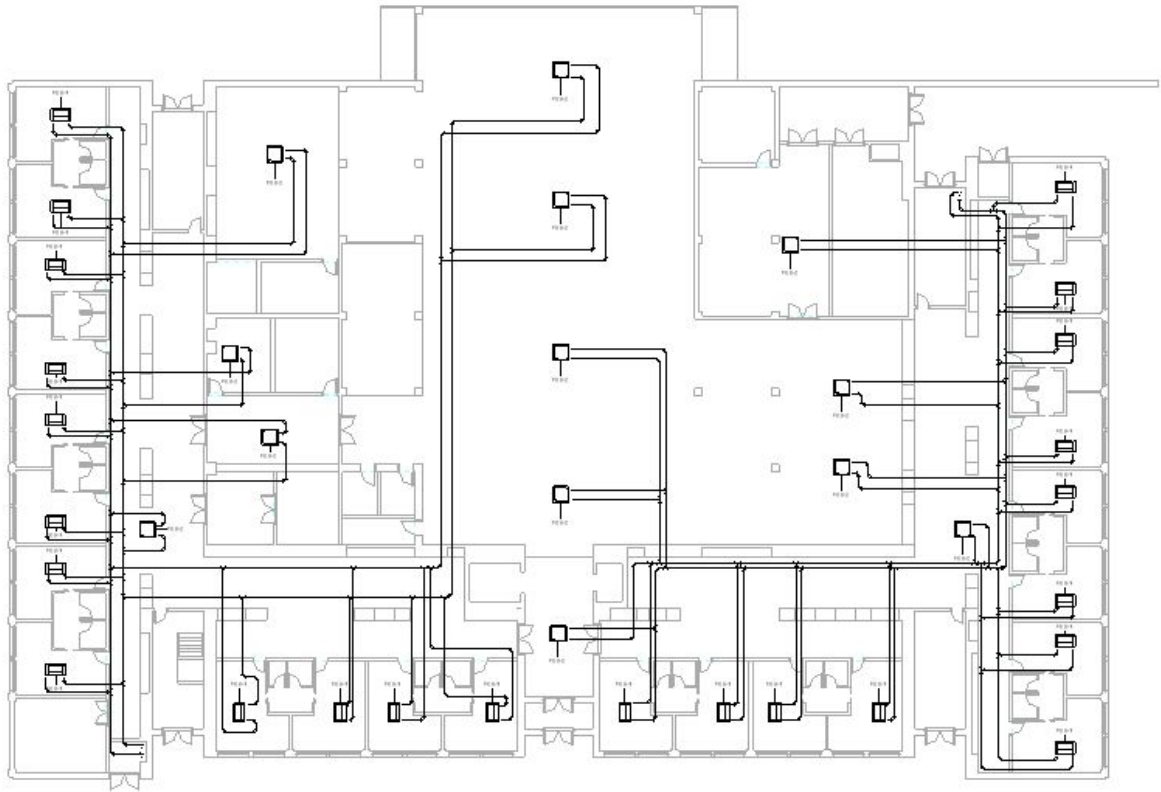
ENERGY



Ductwork HVAC Plan: First Floor



Piping HVAC Plan: First Floor



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CONTEXT



CONCEPT



DESIGNING
MEP



ENERGY



Mechanical Equipment



Dedicated Outdoor Air Unit



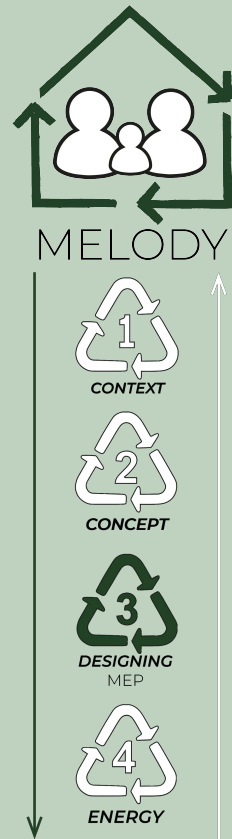
Outdoor Condensing Unit



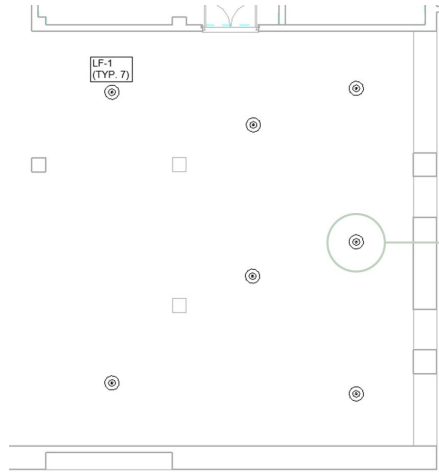
Cassette Type
Indoor Fan Coil Unit



Horizontal Type
Indoor Fan Coil Unit



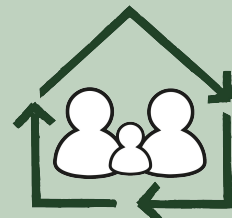
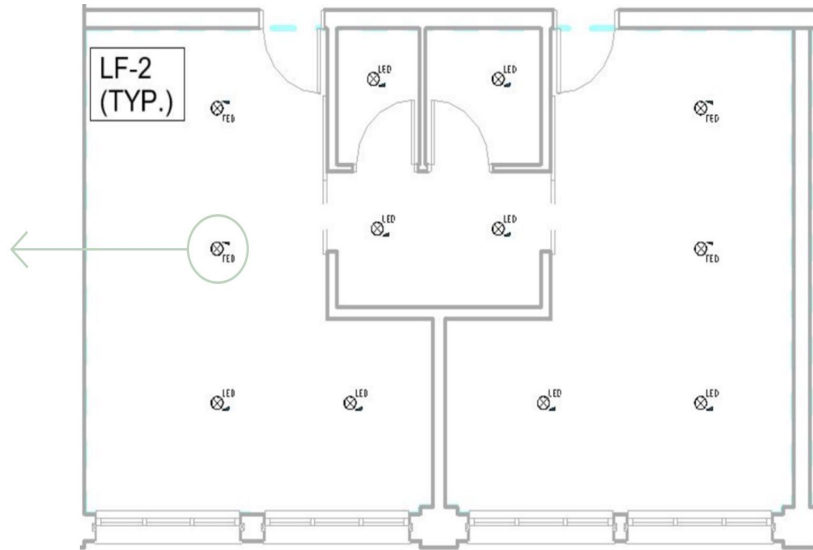
Lighting Fixtures



LF-1-Cafeteria



LF-2-Units



MELODY



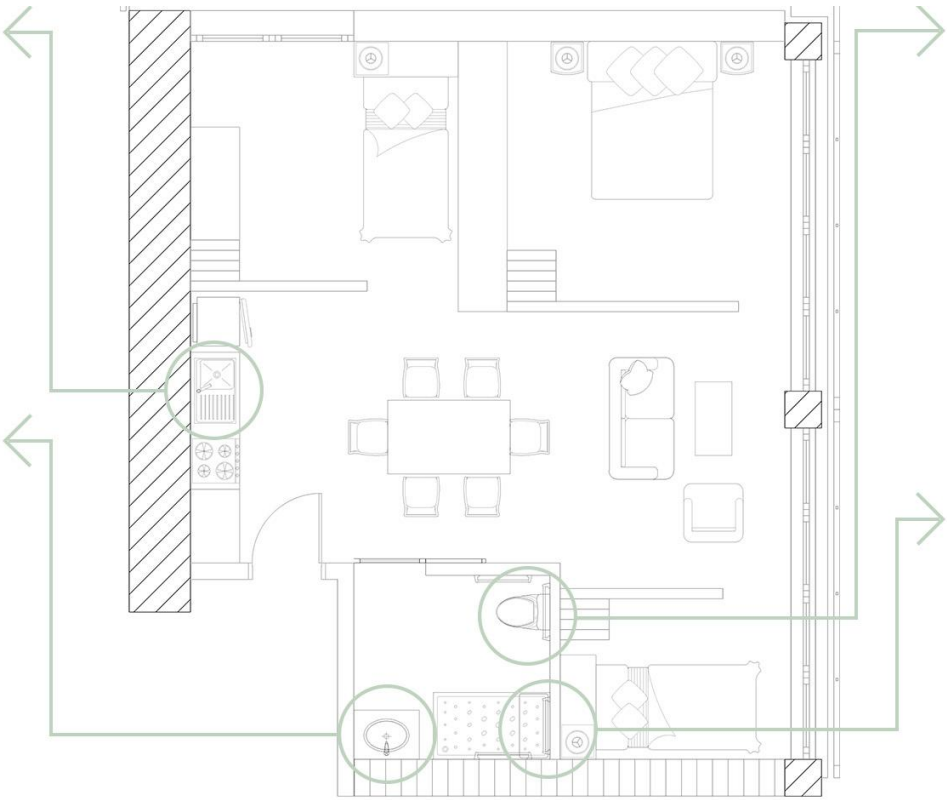
Plumbing Fixtures



SK-2



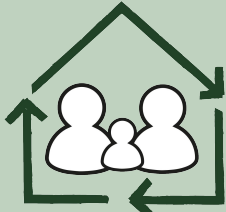
SK-1



SK-2



SK-1



MELODY



CONTEXT



CONCEPT



DESIGNING
MEP



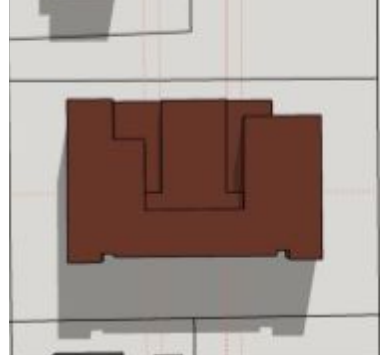
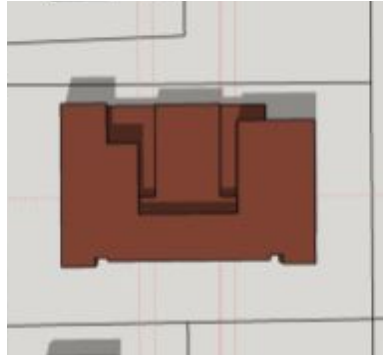
ENERGY

Solar Analysis

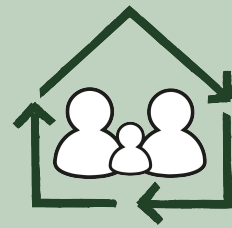
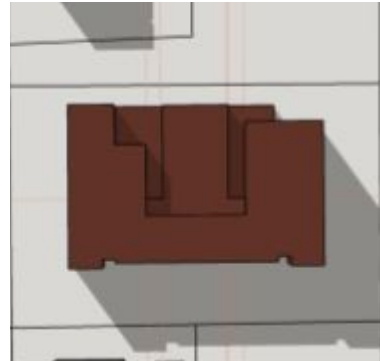
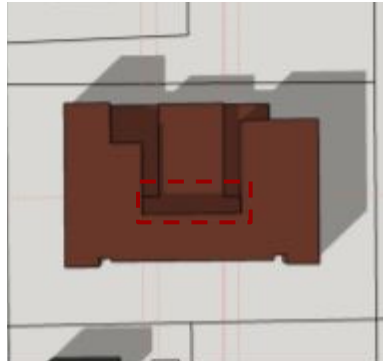
10 AM

6 PM

June 21



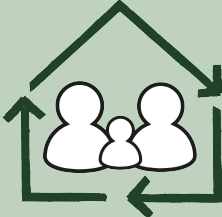
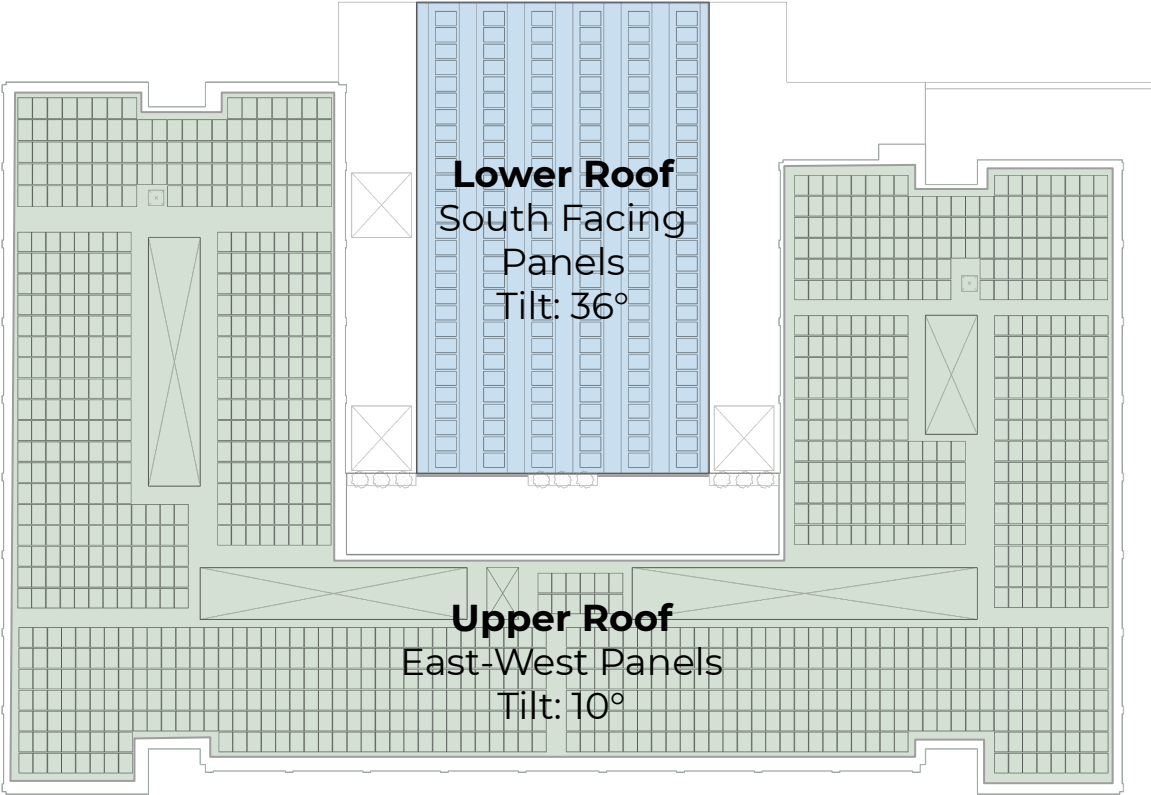
December 21



MELODY



Roof PV Plan



MELODY



CONTEXT



CONCEPT



DESIGNING

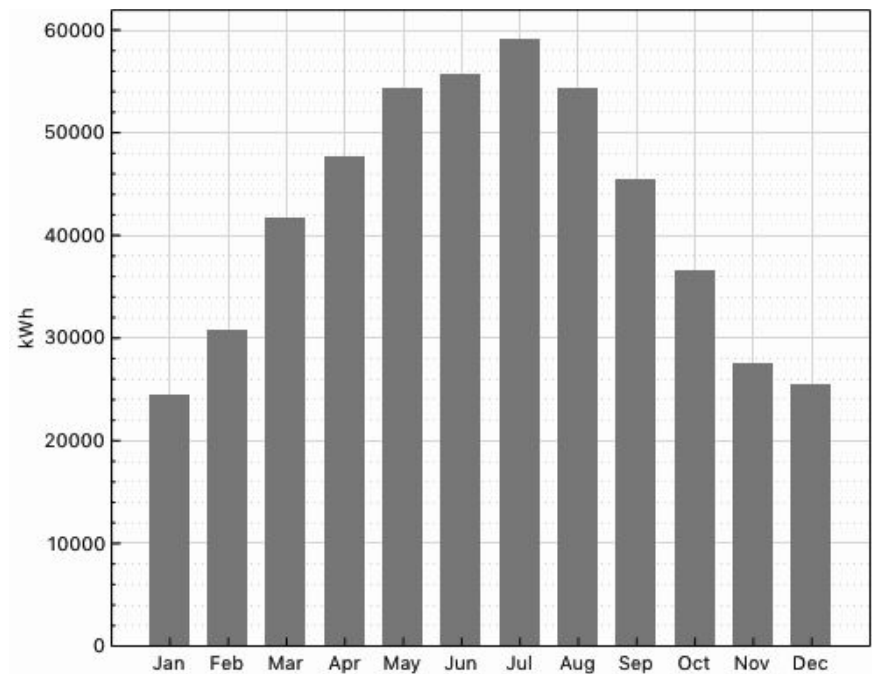


ENERGY PRODUCTION



Energy Production

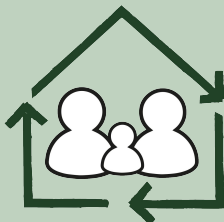
Monthly Energy Production



Annual Energy Production

Production: 491,630 kWh

EUI: 25.25 kBTU/sf/yr



MELODY



CONTEXT



CONCEPT



DESIGNING

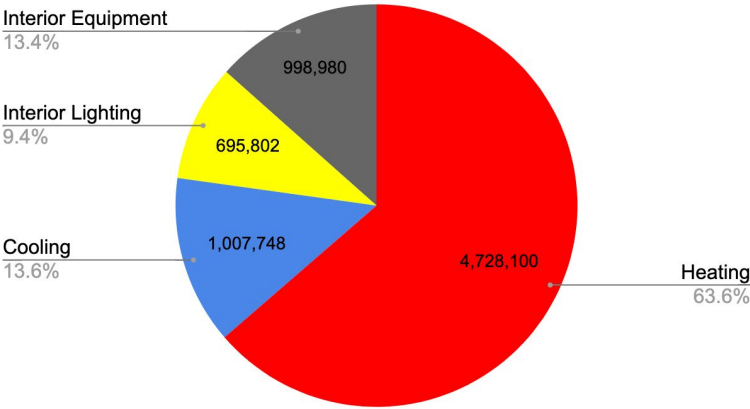


ENERGY

PRODUCTION

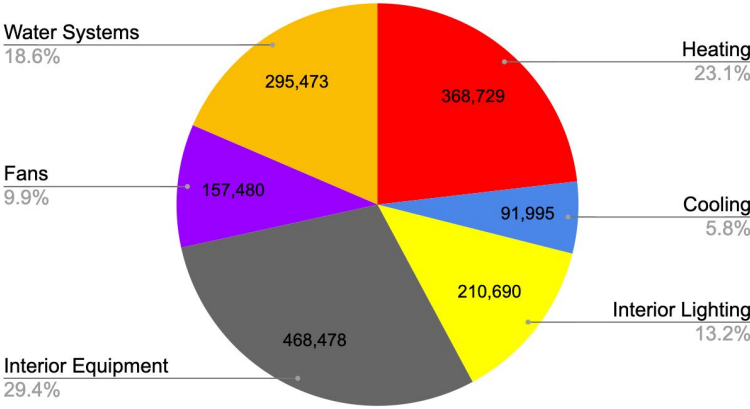
End Use Intensity Comparison

Existing Building General End Use

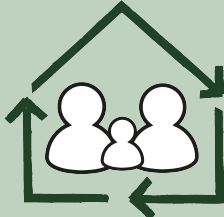


EUI: 112.97 kBTU/sf/yr

Design End Use



EUI Consumption: 23.97 kBTU/sf/yr



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CONTEXT



CONCEPT



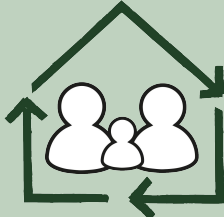
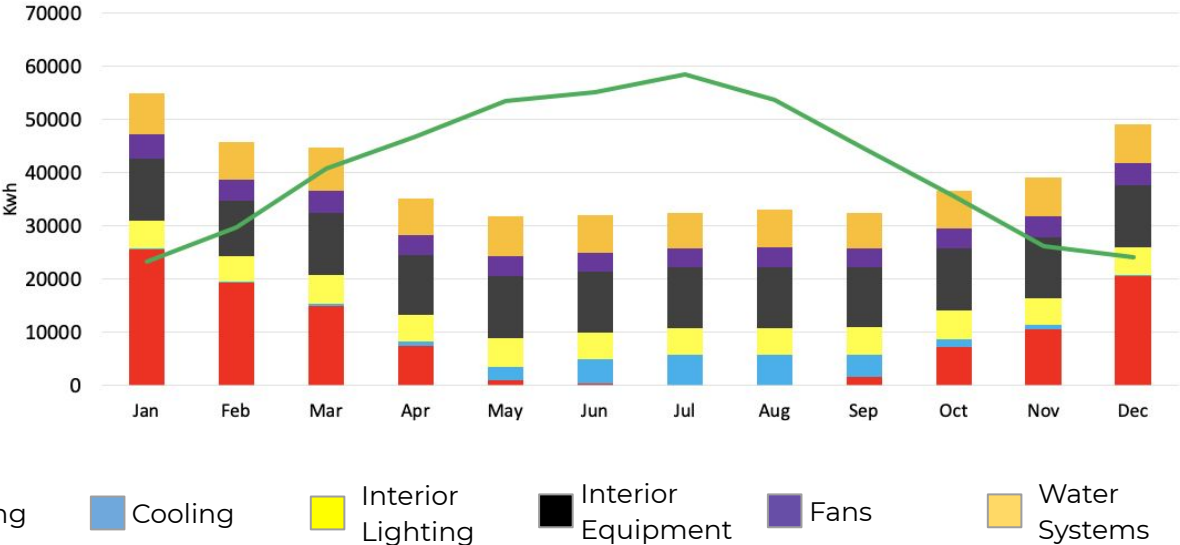
DESIGNING



ENERGY
CONSUMPTION

Production vs Consumption

EUI Consumption: 23.97 kBTU/sf/yr
EUI Production: -25.25 kBTU/sf/yr
EUI Net: -1.28 kBTU/sf/yr



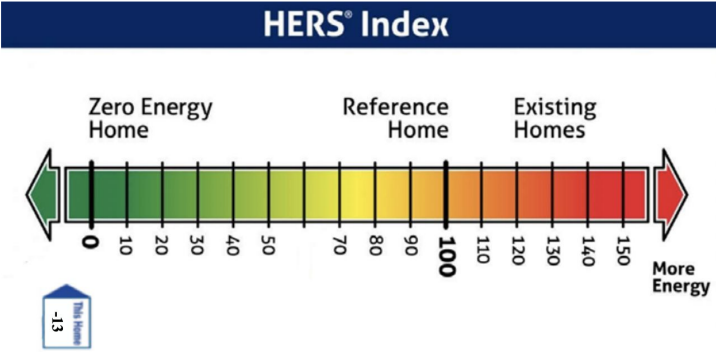
MELODY



ENERGY CONSUMPTION

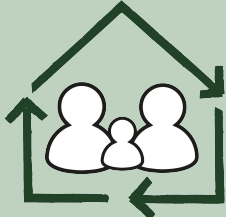
RESNET HERS Index

Annual Consumption	Melody (MBTU)	2018 IECC (MBTU)
Heating	625.3	430.9
Cooling	86.1	107.3
Water System	170.3	141.3
Lights & Appliances	649.8	400
PV	-1673.9	0



Calculated HERS Index: -13.19

REM/Rate validates the net zero objective



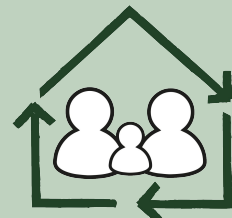
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Financial Analysis

Type	Tab #	Division #	Description	\$ / SF	Budget Amount
Direct Trade Costs	1	00	Procurement and Contracting Requirements	\$0.00	0
	2	01	General Requirements	\$3.93	261,286
	3	02	Site Construction	\$17.45	1,159,734
	4	03	Concrete	\$0.91	60,680
	5	04	Masonry	\$2.87	190,750
	6	05	Metals	\$0.00	0
	7	06	Wood, Plastics and Composites	\$0.85	56,250
	8	07	Thermal and Moisture Protection	\$7.99	531,000
	9	08	Doors and Windows	\$4.44	294,839
	10	09	Finishes	\$0.79	52,650
	11	10	Specialities	\$0.45	30,000
	12	11	Equipment	\$2.10	139,247
	13	12	Furnishings	\$2.51	166,930
	14	13	Special Construction	\$16.43	1,092,101
	15	14	Conveying Systems	\$0.42	28,000
	16	15	Mechanical/Plumbing	\$5.19	345,183
	17	16	Electrical	\$12.65	840,477
	18	17	OTHER	\$0.00	0
Cost Subtotal				\$78.99	5,249,126

Total estimate: \$5,250,000 (\$80/sf)



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CONTEXT



CONCEPT



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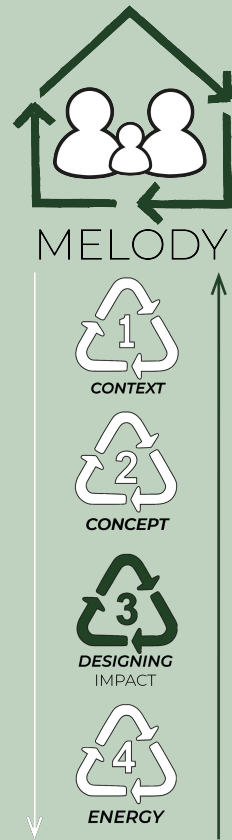
Points of Saving

Operations:

- Community education
- Resident incentives
- Low flow fixtures
- LED lighting
- Energy Star appliances

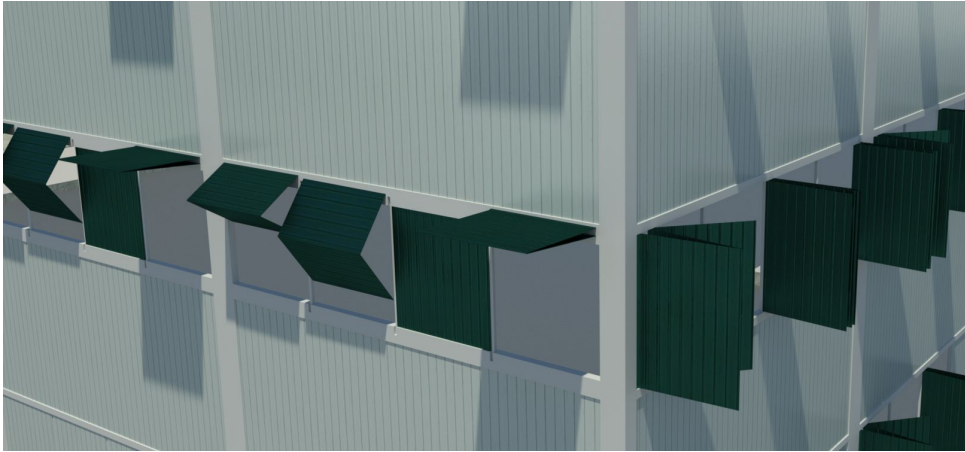
Second Hand Materials:

- 100% recycled metal cladding
- Reclaimed brick
- Reused furniture
- Reused cabinets



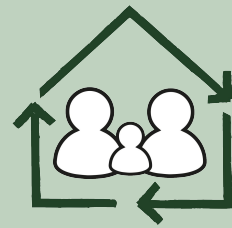
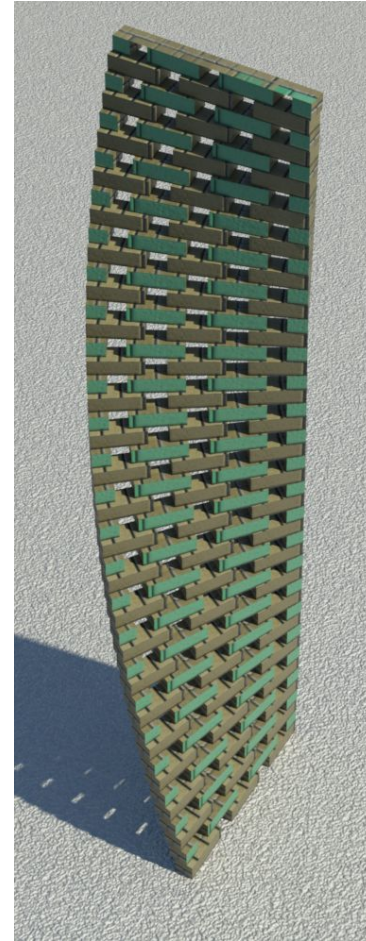
Points of Saving

Material Reuse & Recycling



Recycled Metal Rainscreen

Brise Soleil



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CONTEXT



CONCEPT

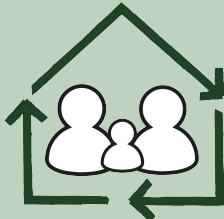
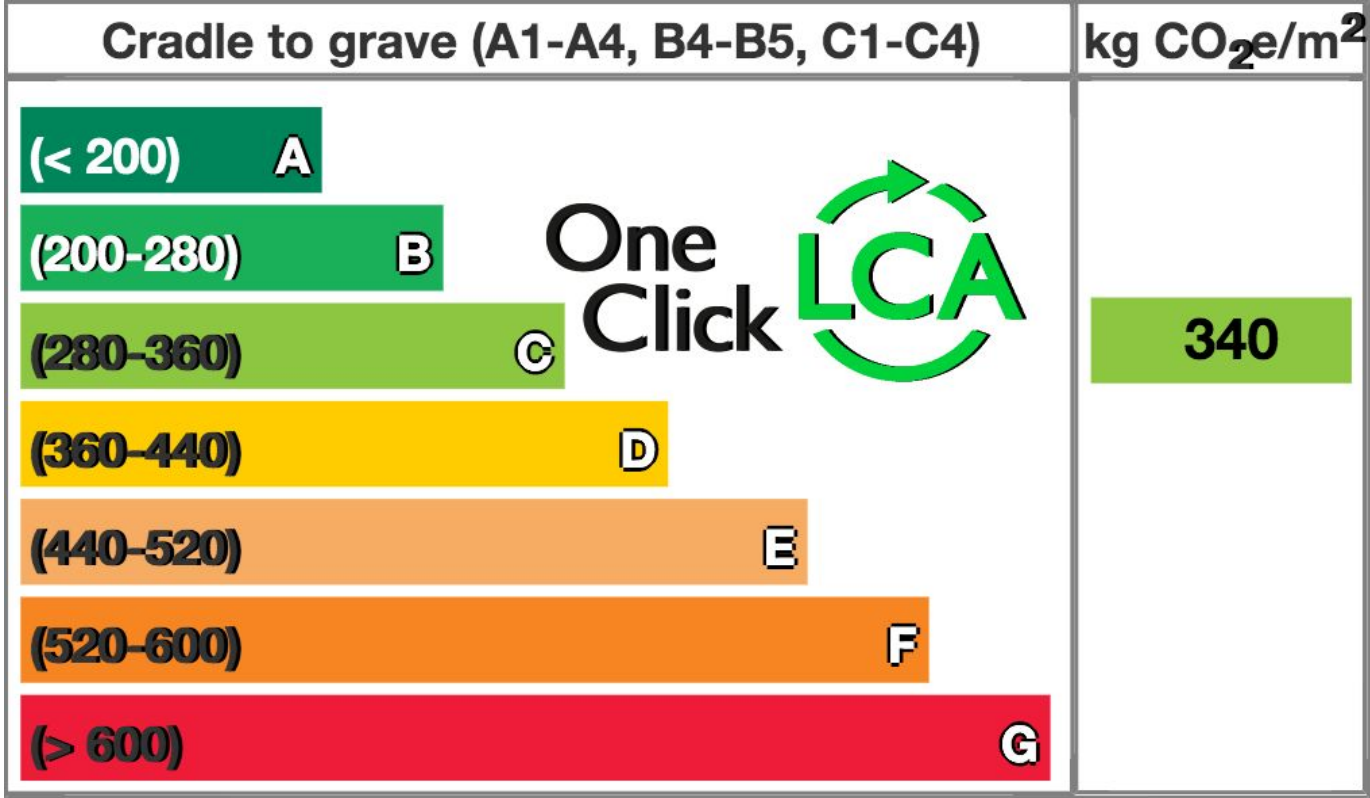


DESIGNING
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Life Cycle Analysis



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Long-Term Investments, Large Return

Openings
Skylights & Windows

- Improved indoor environmental quality

Envelope

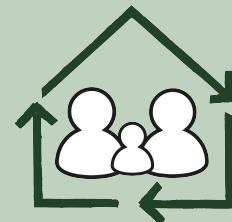
- Improved thermal comfort
- Aesthetics

Building Systems

- Targeted heat recovery
- High-efficiency lighting

Solar Panels

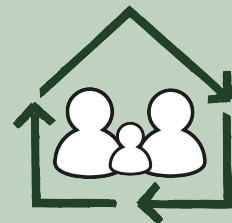
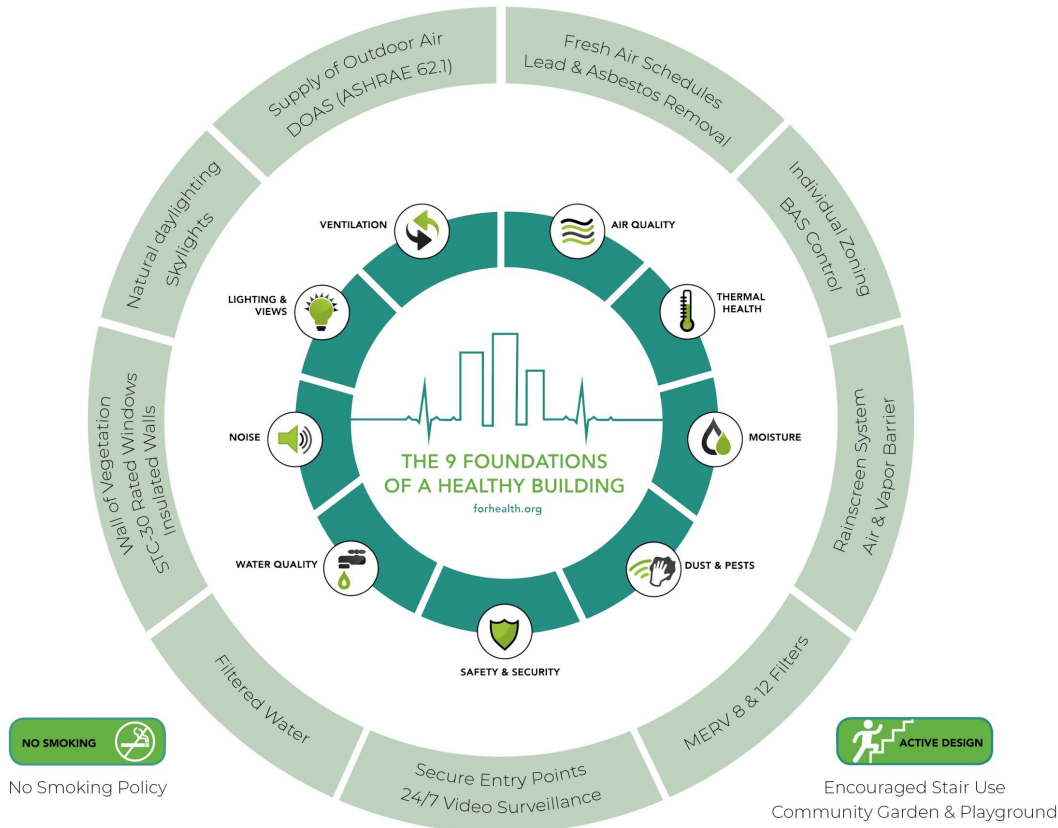
- Long term energy savings
- Reduced utilities



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Comfort & Environmental Quality

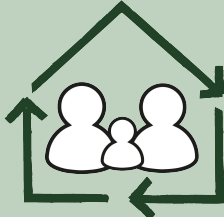


Beyond the Building

Community Revitalization



Chicago Housing Crisis



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CONTEXT



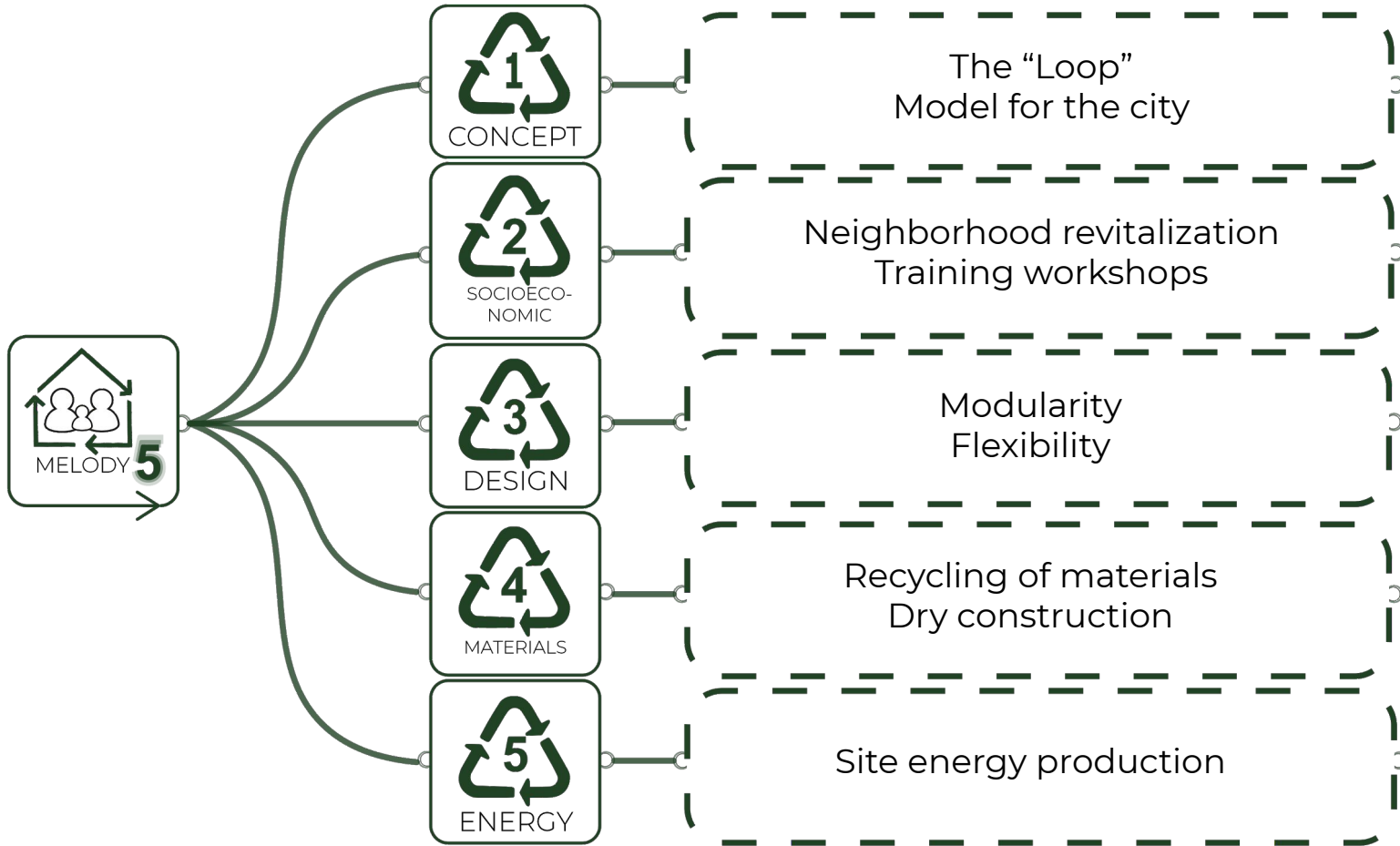
CONCEPT



DESIGNING

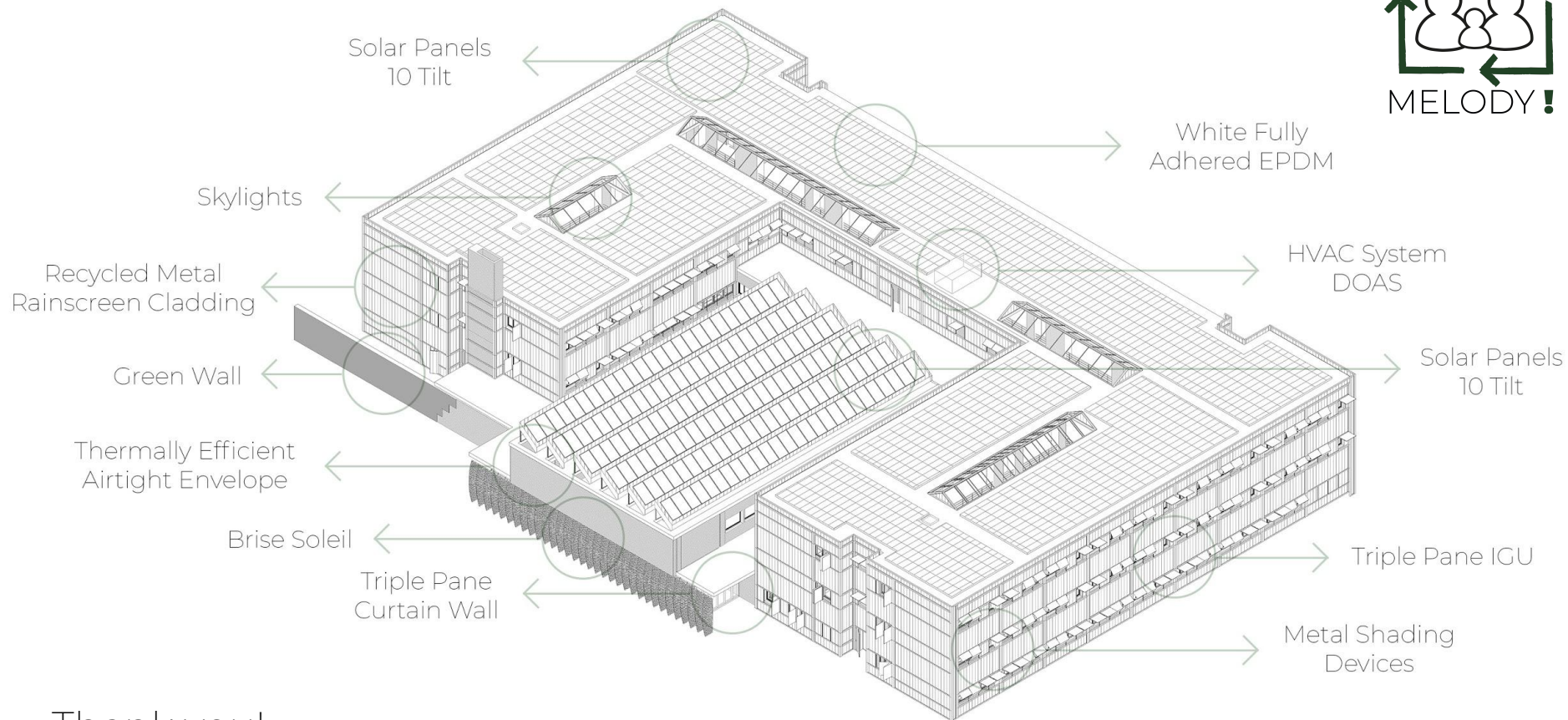


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A special thanks to our professors and industry partners





Thank you!