BEARDEN TERRACE

A contemporary interpretation of the classic English terrace adapted to the Minneapolis context and climate. The English terraced home is a model of resource-efficient urban residential development that still retains the most desirable qualities of the traditional single-family house.

AFFORDABLE

• Compact massing and repetitive form for maximum economy.

• 4 foot modular dimensions for efficient use of standard building materials.

• Frost protected shallow foundations (FPSF) minimize excavation and foundation expense.

SUSTAINABLE

• Designed accordingly to sensible bioclimatic / passive solar design / natural ventilation principles.

• Highly insulated and airtight SIP (or OVE-framed) envelope.

• Maximizes south-facing glazing for solar heat gain and minimizes north-facing glazing.

• Exterior doors and windows: insulated fiberglass with high-performance glazing.

• Overhangs and adjustable awnings prevent overheating and protect entries from the elements.

• "Sun Porch" functions as winter warming sunspace and summer cooling veranda.

• "ZED" passive heat recovery ventilator for controlled ventilation.

• Low-maintenance, durable, 50-year fiber cement siding.

• 50-year "cool" Klip-Rib metal roof.

• Exposed low-maintenance polished "fly-ash" concrete and tile floors throughout for high thermal mass.

• Rainwater harvesting for irrigation purposes.

• "Edible Landscape" concept with individual vegetable gardens and shared fruit and nut trees.

ADAPTABLE

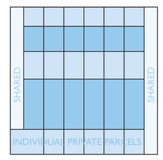
• "Flex Space" above Garage can function as Art/Music Studio, Home Office or Accessory Dwelling Unit (Granny, In-Law, Student, Returning Child, Rental, etc.) as needs change and circumstances require.

ACCESSIBLE

• Main House with ramped entries, interior path-of-travel and turning radii, bathrooms and kitchen per universal design principles.

• Configured to allow optional/future addition of inclined stair lift or compact elevator.

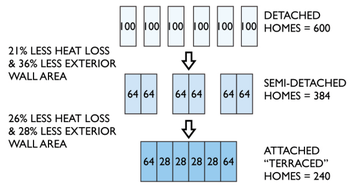
ECONOMICAL OWNERSHIP



- "FEE SIMPLE" PARCELS
- LIKE TRADITIONAL OWNERSHIP
- INDIVIDUAL CONTROL & RESPONSIBILITY
- MINIMIZED H.O.A. FEES
- LOWER LIABILITY & DEVELOPMENT COSTS

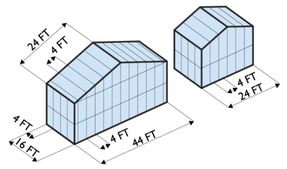
ECONOMICAL GROUPING

THE EFFECT OF GROUPING ON EXPOSED WALL AREA & HEATING LOAD

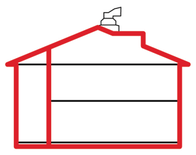


- TERRACED HOMES HAVE 60% LESS EXPOSED WALL AREA THAN DETACHED HOMES, RESULTING IN A 42% OVERALL HEAT LOSS REDUCTION
- TERRACED HOMES ARE MORE ECONOMICAL TO CONSTRUCT, OPERATE & MAINTAIN

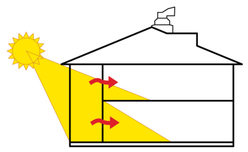
ECONOMICAL SHAPES & SIZES



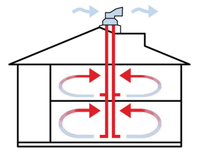
- 4 FT MODULE = EFFICIENT USE OF STANDARD BUILDING MATERIALS = 0% WASTE
- SIMPLE/ REPEAT FORM = ECONOMICAL CONSTRUCTION
- COMPATIBLE W/ A VARIETY OF CONSTRUCTION APPROACHES: S.I.P., S.C.I.P., O.V.E. FRAME, PANELIZATION & PRE-FAB/ MODULAR



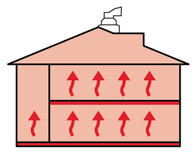
HIGHLY INSULATED & AIRTIGHT BUILDING ENVELOPE



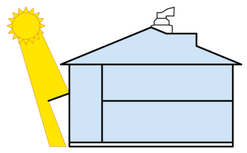
SUN PORCH ASSISTS WINTER PASSIVE SOLAR HEAT GAIN



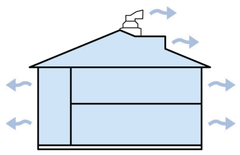
WINTER PASSIVE HEAT RECOVERY



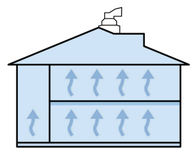
THERMAL FLOOR MASS FOR WINTER WARMTH



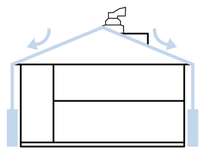
OVERHANGS & RETRACTABLE AWNINGS PREVENT SOLAR HEAT GAIN



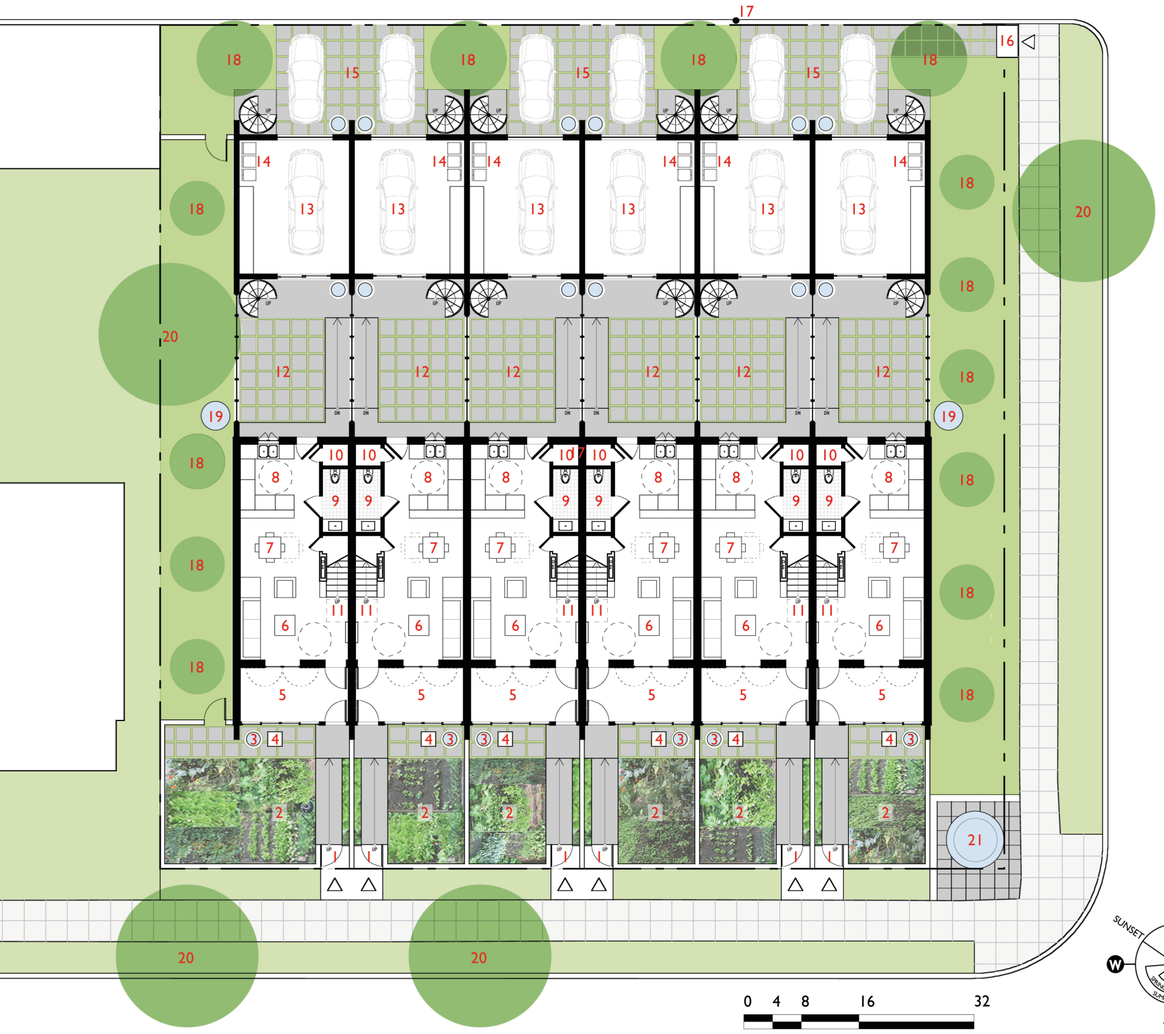
AIRTIGHT ENVELOPE W/ CONTROLLED NATURAL VENTILATION



THERMAL FLOOR MASS FOR SUMMER COOLING



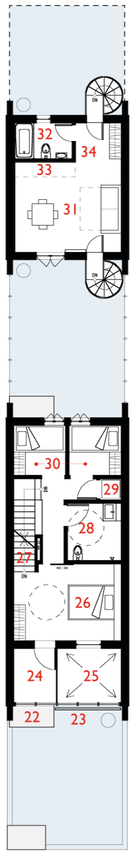
RAINWATER HARVESTING FOR STORMWATER MANAGEMENT & IRRIGATION PURPOSES



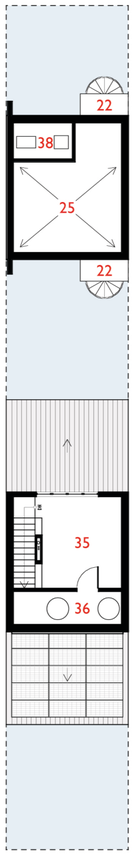
SITE / FIRST FLOOR PLAN

0 4 8 16 32

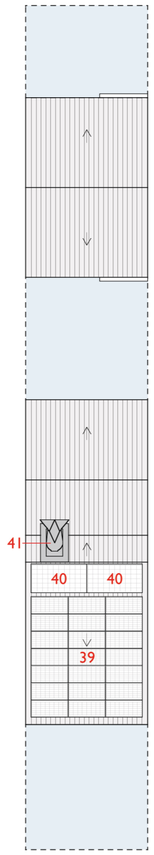
1 INCH IS EQUIVALENT TO 16 FEET



SECOND FLOOR



THIRD FLOOR



ROOF

LEGEND

1 **ENTRY PAVILION**
- w/ Mailbox

2 **VEGETABLE GARDEN**
- "Edible Landscape" Concept

3 **RAINWATER TANK**
- 130 Gallon for Individual Irrigation Purposes

4 **COMPOSTER**
- Composting Food Scraps to Enrich Garden Soil

5 **"SUN PORCH"**
- Entry & Mudroom
- Both Winter "Warming" Sunspace & Summer "Cooling" Veranda
- Clothes Drying Area

6 **LIVING**

7 **DINING**

8 **KITCHEN**
- Kraftmaid "Passport" Universal Design Cabinetry

9 **1/2 BATH**
- Accessible w/ Grab Bars

10 **CLOSET**
- Optional / Future Compact Elevator

11 **CLEAR AREA FOR OPTIONAL / FUTURE INCLINE STAIR LIFT**

12 **PRIVATE YARD**
- Permeable Pavers

13 **GARAGE / WORKSHOP**
- w/ Work Bench

14 **RECYCLING / COMPOST / TRASH BINS**
- w/ Bike Rack Above

15 **PERMEABLE PAVING**

16 **ALLEY ENTRY PAVILION**

17 **EXISTING UTILITY POLE**

18 **FRUIT & NUT TREE**
- "Edible Landscape" Concept

19 **RAINWATER TANK**
- 1150 Gallon for Shared Irrigation Purposes

20 **EXISTING TREE**

21 **COMMUNITY ART PROJECT**
- Possibly a Fountain, t.b.d.

22 **OVERHANG OVER DOOR BELOW**
- For Weather Protection

23 **RETRACTABLE AWNING**
- For Solar Control & Weather Protection

24 **DECK**

25 **OPEN TO BELOW**

26 **MASTER BEDROOM**

27 **OPTIONAL / FUTURE STAIRS TO ATTIC**

28 **FULL BATH**
- w/ Accessible Tub and/or Shower

29 **WASHER / DRYER**

30 **"2-in-1" Bedroom**
- Sliding Panels Modulate Privacy

31 **"FLEX SPACE"**
- Studio Space, Home Office, etc.
- Accessory Dwelling Unit (Granny, In-Law, Student, Returning Child, Rental)

32 **STORAGE**
- Optional / Future Bathroom

33 **OPTIONAL / FUTURE KITCHENETTE**
- Provide Rough-in

34 **TANKLESS WATER HEATER**
- Recessed into Wall / Sealed Combustion / Concentric Venting

35 **ATTIC**
-Unfinished / Future Expansion Space

36 **MECHANICAL ROOM**
- 98% Efficient, Compact, Condensing Hybrid Water Heater
- Water Heater for both Domestic & Space Heating Use
- Optional / Future Solar Water Storage Tank

37 **STORAGE**

38 **MECHANICAL SOFFIT**
- Compact Hydronic Air Handler & HRV

39 **OPTIONAL / FUTURE PHOTOVOLTAIC ARRAY**
- Provide Rough-in

40 **OPTIONAL / FUTURE SOLAR WATER HEATING PANELS**
- Provide Rough-in

41 **"ZED" PASSIVE HEAT RECOVERY VENTILATOR**
- 70% Efficient, No Power Required

42 **PASSIVE VENTILATION DUCTWORK**

PROJECT DATA

(6) Terraced Units @ 1528 sf each	=	9168 sf
Main House (2+ Bed & 1-½ Bath)	=	1024 sf
Sun Porch & Deck	=	184 sf
Accessory Unit ("Flex Space")	=	320 sf
Total Unit Area	=	1528 sf

PROJECT COST

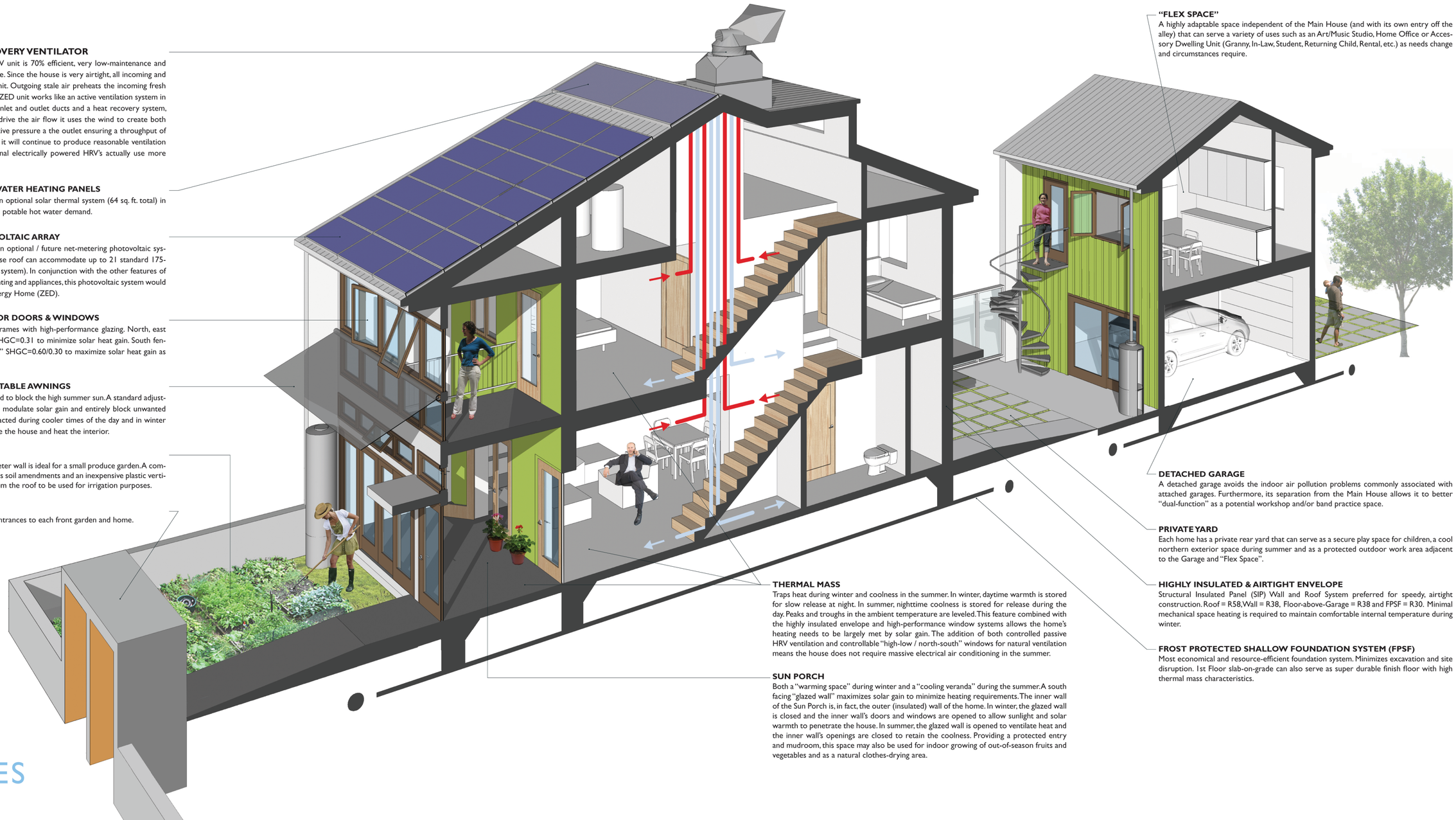
BUILDING	@	$ 100/sf	=	$ 916,800
LANDSCAPE & SITEWORK	@	$ 4/sf	=	$ 37,745
CONSTRUCTION COST	@	$ 104/sf	=	$ 954,545
ARCHITECTURAL	@	5.00%	=	$ 47,727
ENGINEERING (STRUCTURAL & MEP)	@	2.50%	=	$ 23,864
SALES & MARKETING	@	2.50%	=	$ 23,864
TOTAL FEES	@	10.00%	=	$ 95,455
TOTAL PROJECT COST			=	**$ 1,050,000**
SALES PRICE PER UNIT	@	$114/sf	=	**$ 175,000**

VIEW FROM NORTHEAST CORNER

VIEW OF PRIVATE YARDS

BEARDEN TERRACE

STREET VIEW



"ZED" PASSIVE HEAT RECOVERY VENTILATOR
Developed in the UK, this passive HRV unit is 70% efficient, very low-maintenance and requires no electrical power to operate. Since the house is very airtight, all incoming and outgoing air is directed through the unit. Outgoing stale air preheats the incoming fresh air in order to minimize heat loss. The ZED unit works like an active ventilation system in that it has dedicated (low-resistance) inlet and outlet ducts and a heat recovery system, but instead of using electrical fans to drive the air flow it uses the wind to create both positive pressure at the inlet and negative pressure a the outlet ensuring a throughput of air. Even in low or no wind conditions it will continue to produce reasonable ventilation levels through stack effect. Conventional electrically powered HRV's actually use more energy than they save.

OPTIONAL / FUTURE SOLAR WATER HEATING PANELS
At a minimum rough-in provided for an optional solar thermal system (64 sq. ft. total) in order to meet up to 60% of the annual potable hot water demand.

OPTIONAL / FUTURE PHOTOVOLTAIC ARRAY
At a minimum rough-in provided for an optional / future net-metering photovoltaic system. The south slope of the Main House roof can accommodate up to 21 standard 175-watt panels (an approx. 3kW de-rated system). In conjunction with the other features of the home, including energy-efficient lighting and appliances, this photovoltaic system would allow the house to become a Zero Energy Home (ZED).

HIGH-PERFORMANCE EXTERIOR DOORS & WINDOWS
Insulated low-maintenance fiberglass frames with high-performance glazing. North, east and west fenestration U=0.15 with SHGC=0.31 to minimize solar heat gain. South fenestration U=0.17 with "Nothern Glass" SHGC=0.60/0.30 to maximize solar heat gain as desired.

ROOF OVERHANGS & RETRACTABLE AWNINGS
Fixed roof eave overhangs are calibrated to block the high summer sun. A standard adjustable awning allows the homeowner to modulate solar gain and entirely block unwanted sun if need be. The awning can be retracted during cooler times of the day and in winter to allow the low angle sun to penetrate the house and heat the interior.

VEGETABLE GARDEN
South facing front yard with low perimeter wall is ideal for a small produce garden. A compost bin utilizing kitchen scraps provides soil amendments and an inexpensive plastic vertical tank stores harvested rainwater from the roof to be used for irrigation purposes.

ENTRY PAVILION
Defines individualized and protected entrances to each front garden and home.

"FLEX SPACE"
A highly adaptable space independent of the Main House (and with its own entry off the alley) that can serve a variety of uses such as an Art/Music Studio, Home Office or Accessory Dwelling Unit (Granny, In-Law, Student, Returning Child, Rental, etc.) as needs change and circumstances require.

DETACHED GARAGE
A detached garage avoids the indoor air pollution problems commonly associated with attached garages. Furthermore, its separation from the Main House allows it to better "dual-function" as a potential workshop and/or band practice space.

PRIVATE YARD
Each home has a private rear yard that can serve as a secure play space for children, a cool northern exterior space during summer and as a protected outdoor work area adjacent to the Garage and "Flex Space".

HIGHLY INSULATED & AIRTIGHT ENVELOPE
Structural Insulated Panel (SIP) Wall and Roof System preferred for speedy, airtight construction. Roof = R58, Wall = R38, Floor-above-Garage = R38 and FPSF = R30. Minimal mechanical space heating is required to maintain comfortable internal temperature during winter.

FROST PROTECTED SHALLOW FOUNDATION SYSTEM (FPSF)
Most economical and resource-efficient foundation system. Minimizes excavation and site disruption. 1st Floor slab-on-grade can also serve as super durable finish floor with high thermal mass characteristics.

THERMAL MASS
Traps heat during winter and coolness in the summer. In winter, daytime warmth is stored for slow release at night. In summer, nighttime coolness is stored for release during the day. Peaks and troughs in the ambient temperature are leveled. This feature combined with the highly insulated envelope and high-performance window systems allows the home's heating needs to be largely met by solar gain. The addition of both controlled passive HRV ventilation and controllable "high-low / north-south" windows for natural ventilation means the house does not require massive electrical air conditioning in the summer.

SUN PORCH
Both a "warming space" during winter and a "cooling veranda" during the summer. A south facing "glazed wall" maximizes solar gain to minimize heating requirements. The inner wall of the Sun Porch is, in fact, the outer (insulated) wall of the home. In winter, the glazed wall is closed and the inner wall's doors and windows are opened to allow sunlight and solar warmth to penetrate the house. In summer, the glazed wall is opened to ventilate heat and the inner wall's openings are closed to retain the coolness. Providing a protected entry and mudroom, this space may also be used for indoor growing of out-of-season fruits and vegetables and as a natural clothes-drying area.

FEATURES