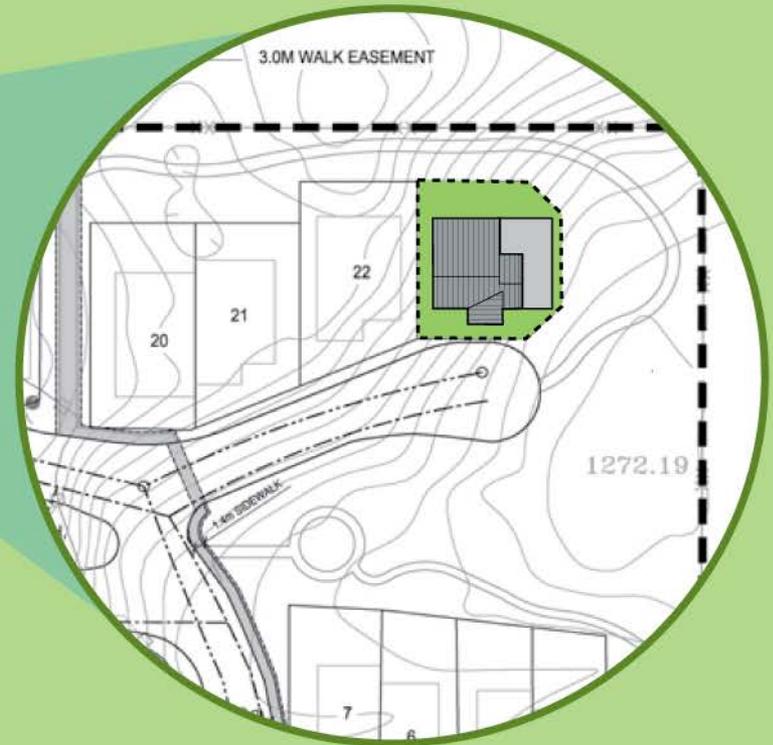




Living Lightly on the Land

EchoHaven and NetZero – for Professionals
Wildsight Kimberley February 19



The Site: Rocky Ridge Royal Oak NW Calgary Local Amenities



Wetland areas in the spring and autumn
Unique 'knob and kettle' geophysical area





Aspen stands and
pristine prairie





Development Patterns

Site Plan



- innovative green neighborhood for 25 homes and related amenities
- 6.4 acres knob and kettle terrain
- 60% of natural features to be preserved
- small lots RS-2
- maximum density for area structure plan



Environmental Site Initiatives

- 100% storm water retention on-site
 - grey water treatment and surface dispersion system
 - balanced water management strategy
 - common shared renewable energy generation on-site
 - greenhouse, permanent demonstration centre and guest suites in the community building
 - reduced utility and development costs for all homeowners
 - zero greenhouse gas emissions
 - construction management requirements
 - preservation of native plants
- 

Project Features - continued

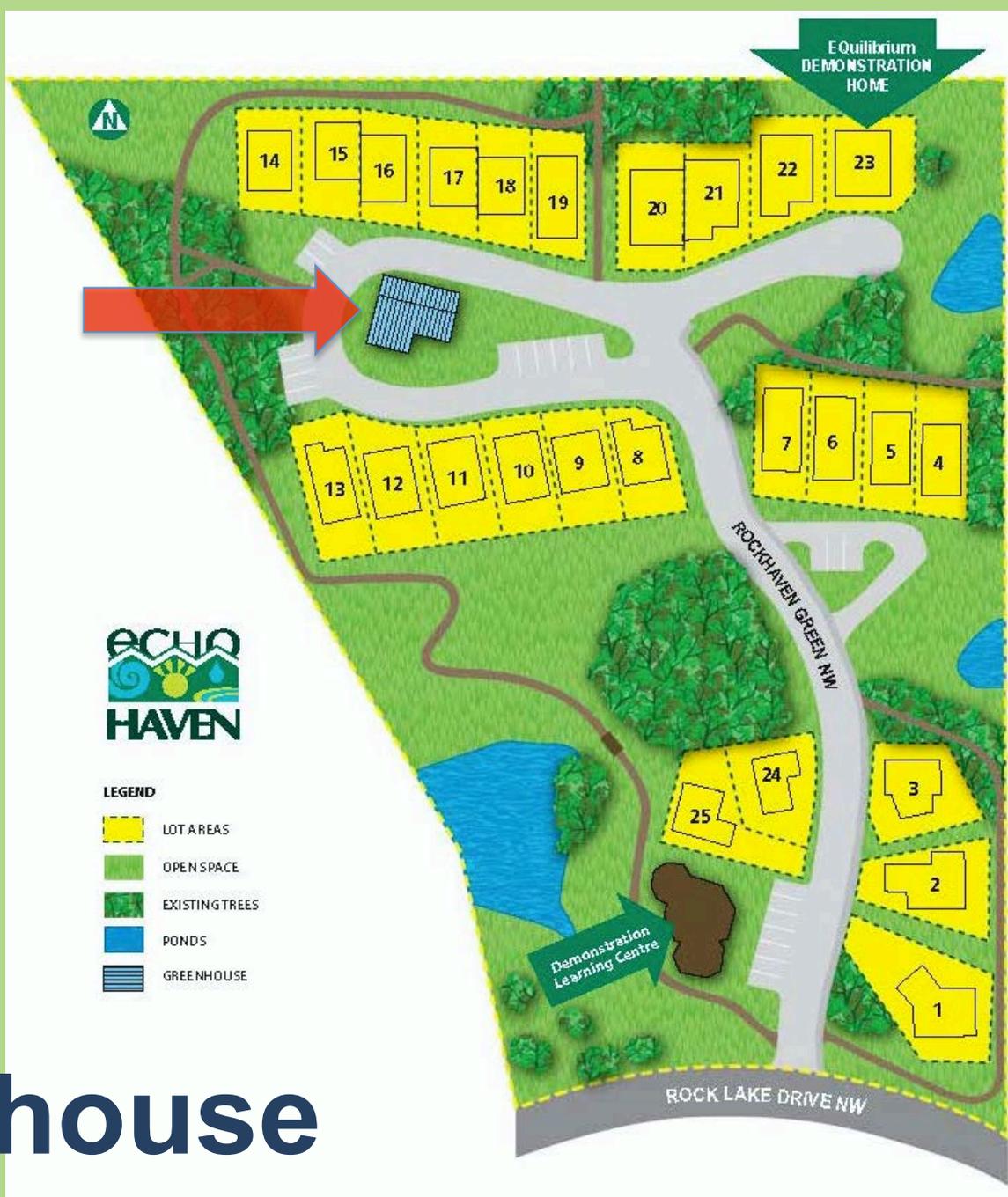
- solar access and site-friendly orientation for all home sites
- site close to LRT station
- shared transportation
- opportunities for community-based employment
- community composting and recycling
- variety of housing choices
- public access through site and transit shelter at the access road

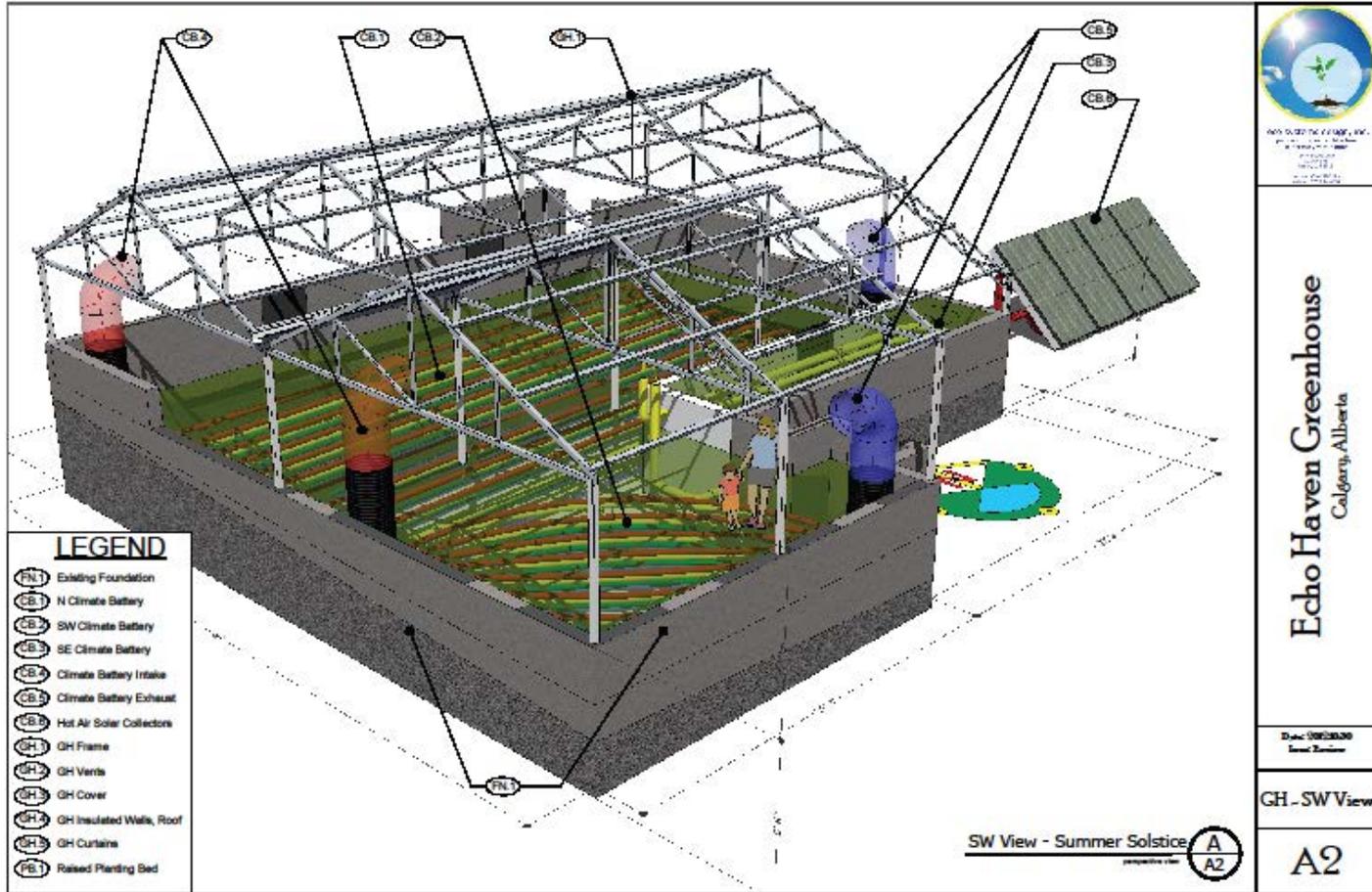




Community Building

Greenhouse





Greenhouse

Mandatory Home Requirements

- Energuide certified 84 minimum
- rainwater harvesting and re-use
- grade–adaptive site design
- no invasive landscape species, drought tolerant landscape
- architecturally integrated renewables
- solar passive/active heating (no gas to property)



**APPENDIX
ECHOHAVEN
CONSTRUCTION MANAGEMENT GUIDELINES**

Table of Contents

1.0	OBJECTIVES	1
2.0	CONSTRUCTION PRACTICES	2
	2.1 Borrow and Waste Sites	2
	2.2 Erosion and Sediment Control	2
	2.2.1 Roadways	2
	2.2.2 Dust	2
	2.2.3 Clearings	2
	2.2.4 Channeling Overland Flow	3
	2.2.5 Stockpiling	3
	2.2.6 Surface and Slope Protection	4
	2.2.7.1 Suggested Temporary Surface Protection	4
	2.2.7.2 Permanent Surface Protection	5
	2.3 Fuel	5
	2.3.1 Storage	5
	2.3.2 Spillage and Releases	5
	2.4 Construction Equipment	6
	2.5 Earthwork	6
	2.6 Waste Facilities	6
	2.7 Protective Fencing	7
3.0	ENVIRONMENTAL CONSTRUCTION MONITORING	9
4.0	BUILDING CONSTRUCTION PRACTICES	10
	4.1 Borrow and Waste Sites	10
	4.2 Erosion and Sediment Control	10
	4.3 Construction Equipment	11
	4.4 Waste Facilities	11
	4.5 Warnings and Barricades	11
	4.6 Damages Assessed to the Contractor	12
	4.7 Construction Guidelines	12
	4.7.1 Responsibility of Contractor	12
	4.7.2 Construction Signs	12
	4.7.3 Delivery and Parking	13
	4.7.4 Flushing and Cleaning of Equipment	13
	4.7.5 Debris and Trash Removal – Recycling	13
	4.7.6 Sanitary Facilities	14
	4.7.7 Firearms	14
	4.7.8 Pets	14

Waste Management

4.7.5 Debris and Trash Removal – Recycling

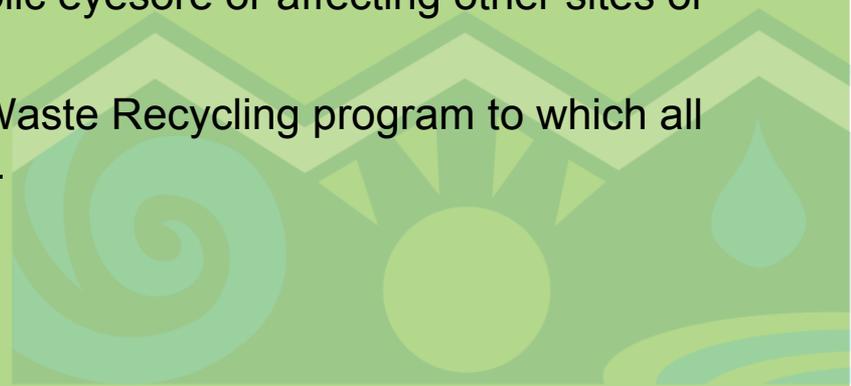
Debris and trash removal for a Project shall be undertaken by the Contractor, who shall clean up all trash and debris on the construction site at the end of each day. Trash and debris shall be removed from each site frequently and shall not be permitted to accumulate. The Contractor shall provide trash containers suitable for the quantity and type of refuse generated by the construction activities being undertaken on the Site at all stages of construction. Lightweight materials, packaging, and other items shall be covered or weighted down to prevent being blown off the construction site.

The Contractor is encouraged to recycle materials, such as wood, drywall, cardboard, glass, paper and tin.

Contractors are prohibited from dumping or burying any materials anywhere within Echo Haven.

During the construction period, each site shall be kept neat and clean, and shall be properly policed to prevent it from becoming a public eyesore or affecting other sites or any other area of Echo Haven.

Echo Haven will participate in a Construction Waste Recycling program to which all Builders and Associated Contractors must adhere.



Storm Water



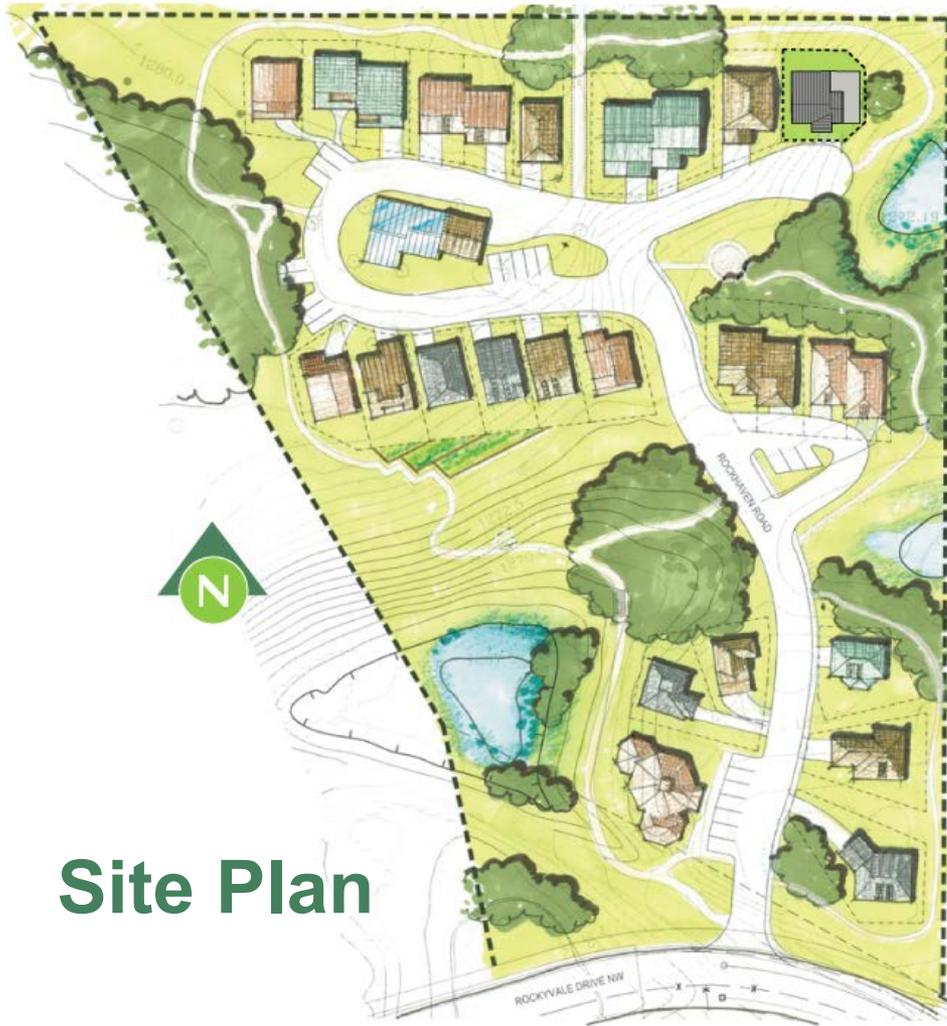
Stewardship

- Water Management Strategy requires Rainwater Harvesting to achieve zero discharge from site
- Infiltration and ground water recharge

Nutrients/contaminants

Streets contribute higher pollutant loads than any other source area

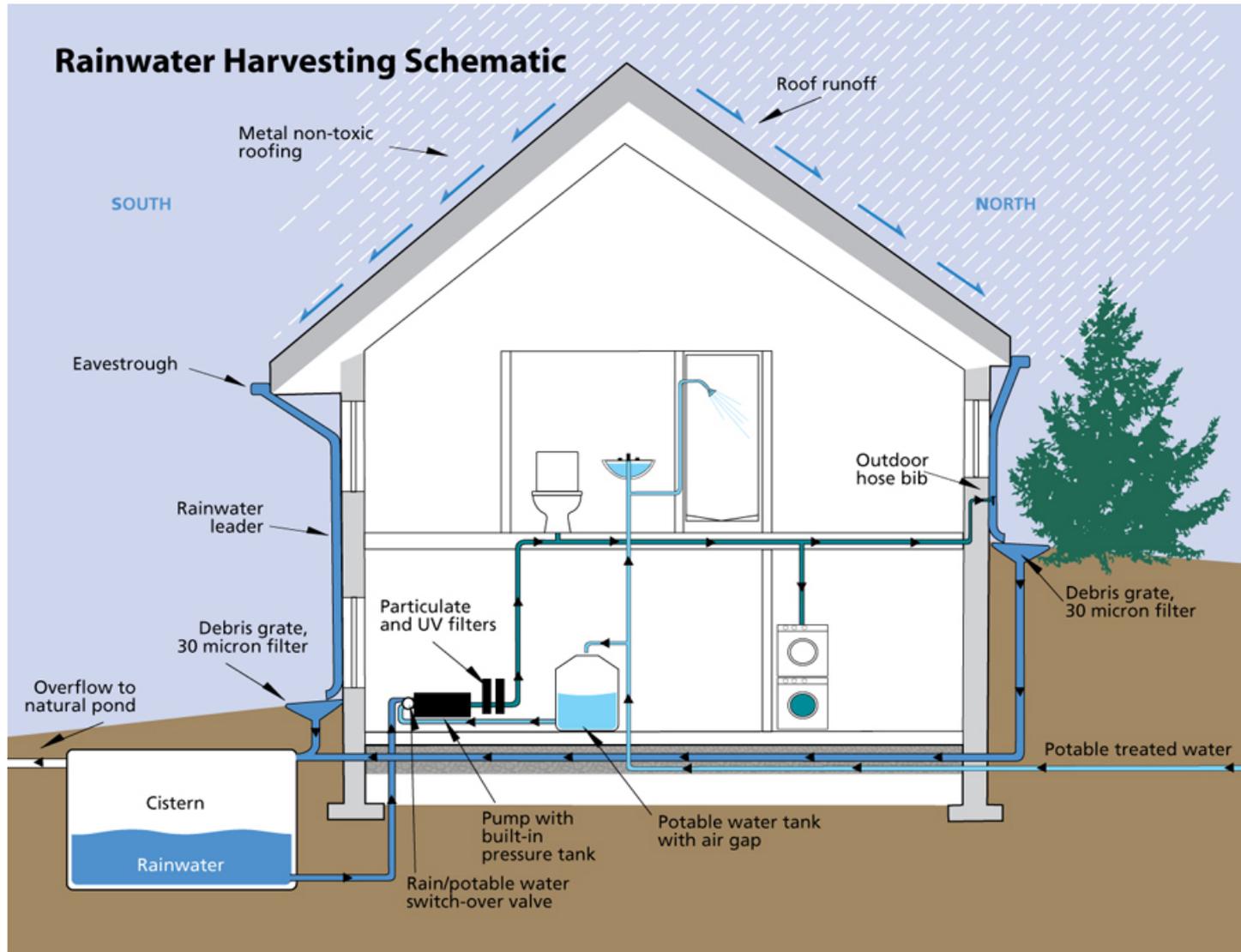
Site Plan



Rain Water Harvesting



Rainwater Schematic





Rain Water Harvesting



Filter basin



Cistern under driveway

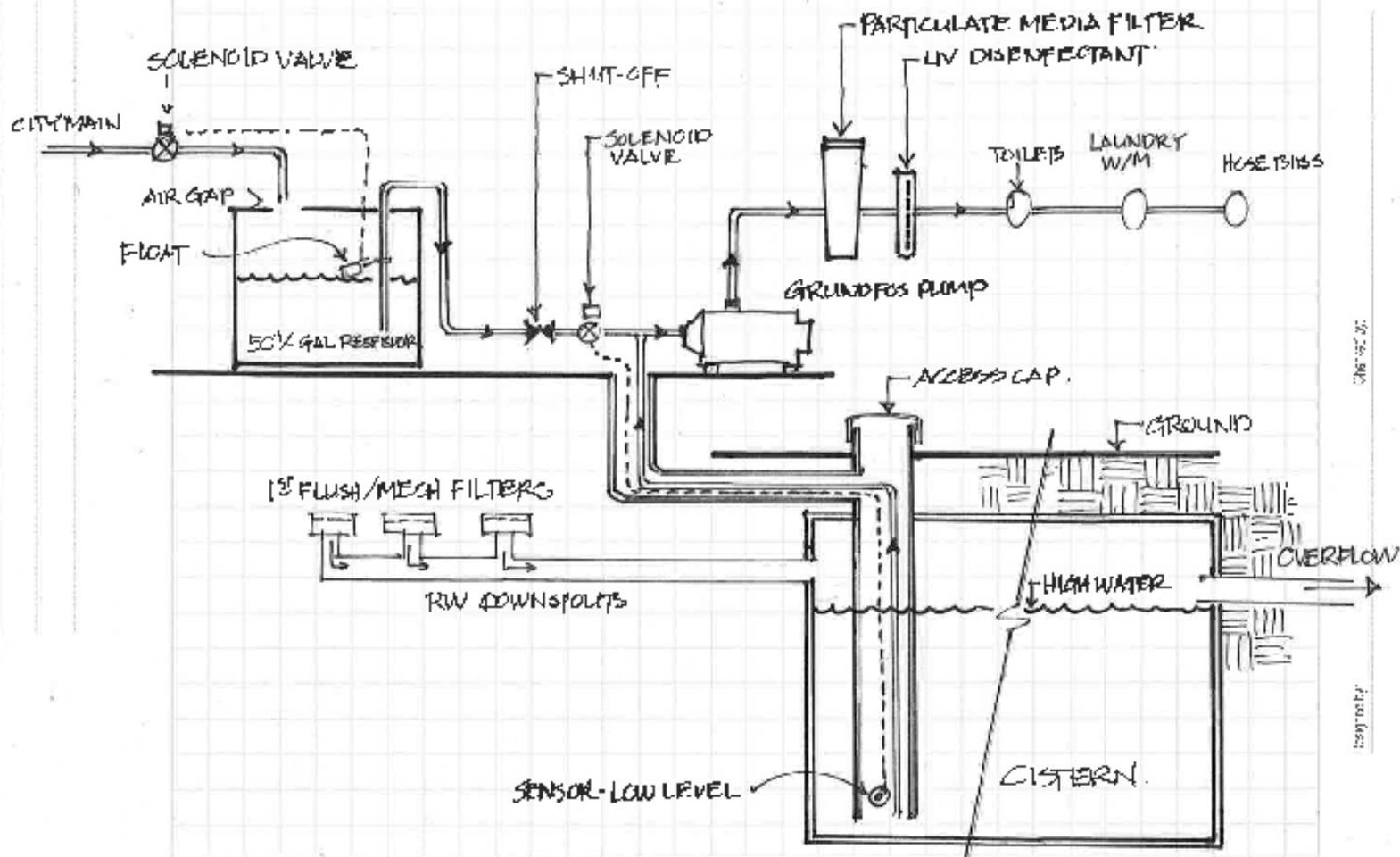


Rainwater Harvesting Mechanical



RAINWATER SYSTEM SCHEMATIC

DESIGN: DAVE SPENCER



DATE: 05/05/05

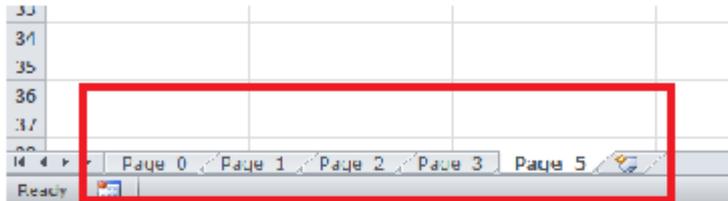
FOR THE RECORD: 1. THIS IS A PRELIMINARY DESIGN. 2. SEE PLAN FOR DETAILS.

ISSUED: 05/05/05

DAVE SPENCER
P.E.

How to View the Design & Costing Tool Report

This report consists of several pages or "tabs". To navigate the pages, click on the tabs located at the bottom of the Excel workbook. The report pages are marked "Page_1", "Page_2", etc., and the page tabs will appear as follows:



Printing the Report

To print the entire report:

For users of Microsoft Excel 2003 (or earlier versions) click on the 'File' drop-down menu item, and then click on Print. Under the "Print what" heading, change "Active sheet(s)" to "Entire workbook". Select the desired printer and click the OK button. For users of Microsoft Excel 2010 click 'File' (Microsoft Excel 2007 users click on the Office Button in the top-left corner of the screen) and then click on Print. Under the "Settings" heading change "Print Active Sheets" to "Print Entire Workbook". Select the desired printer and click the OK button.

To print just one page of the report:

Select the desired report page by clicking on the appropriate tab at the bottom of the screen. For users of Microsoft Excel 2003 (or earlier versions) click on the 'File' drop-down menu item, and then click on Print. Select the desired printer and click on the "OK" button. For users of Microsoft Excel 2010 click 'File' (Microsoft Excel 2007 users click on the Office Button in the top-left corner of the screen) and then click on Print. Select the desired printer and click the OK button.

Saving the Report

Rainwater Harvesting Design & Costing Tool Report

Once you have viewed the report, be sure to save the workbook if you wish to view the report in the future. To save the file in Microsoft Excel 2003 (or earlier versions), click on the 'File' drop-down menu item, and click on 'Save as' and specify the desired file name and location. In Microsoft Excel 2010 click on 'File' (or click on the Office Button in the top-left corner of the screen in Microsoft Excel 2007), and click on 'Save as' and specify the desired file name and location.

Rainwater Harvesting Connect-the-Drops

Practical Results?

Uncertain – Rules keep changing

Currently – No clothes washing both hot and cold
No hose bibbs as of 2015



WARNING! NON-POTABLE WATER
DO NOT DRINK

Rain Water Harvesting

Drought resistant landscape

30 Native Species



The EchoHaven House used less potable water than all the other 12 demonstration homes – 120 Liters per person per day

Average Calgary water consumption is 230 litres per person per day

Water Conservation















The Net Zero House

OVERVIEW





CMHC EQuilibrium Program

THEMES:

Energy
Health/Comfort
Resources
Environment
Affordability



Phase 1 - Charrette Process





The Net Zero House

ENERGY OVERVIEW



Energy Model

Calculated requirements

Space heating: 6,494 MJ / yr. (1803.7 kWh / yr)

Whole house energy: 27,627 MJ/ yr. (7674 kWh / yr)
Includes all energy requirements: hot water, lights, appliances,.....

Quick Facts



Energy Model

Energy requirements by floor area:

Space heating:

1804 kWh / 231 sq.m. = 7.8 kWh / square meter

Whole house:

7674 kWh / 231 sq.m. = 33.2 kWh / square meter

**Total Energy requirement: = 41 kWh / square meter
(Renewables not included)**

Quick Facts



Energy Model

Heat Load @ -30°C to maintain 21°C indoor temperature

3000 Watts

=



+



Quick Facts



Energy Model

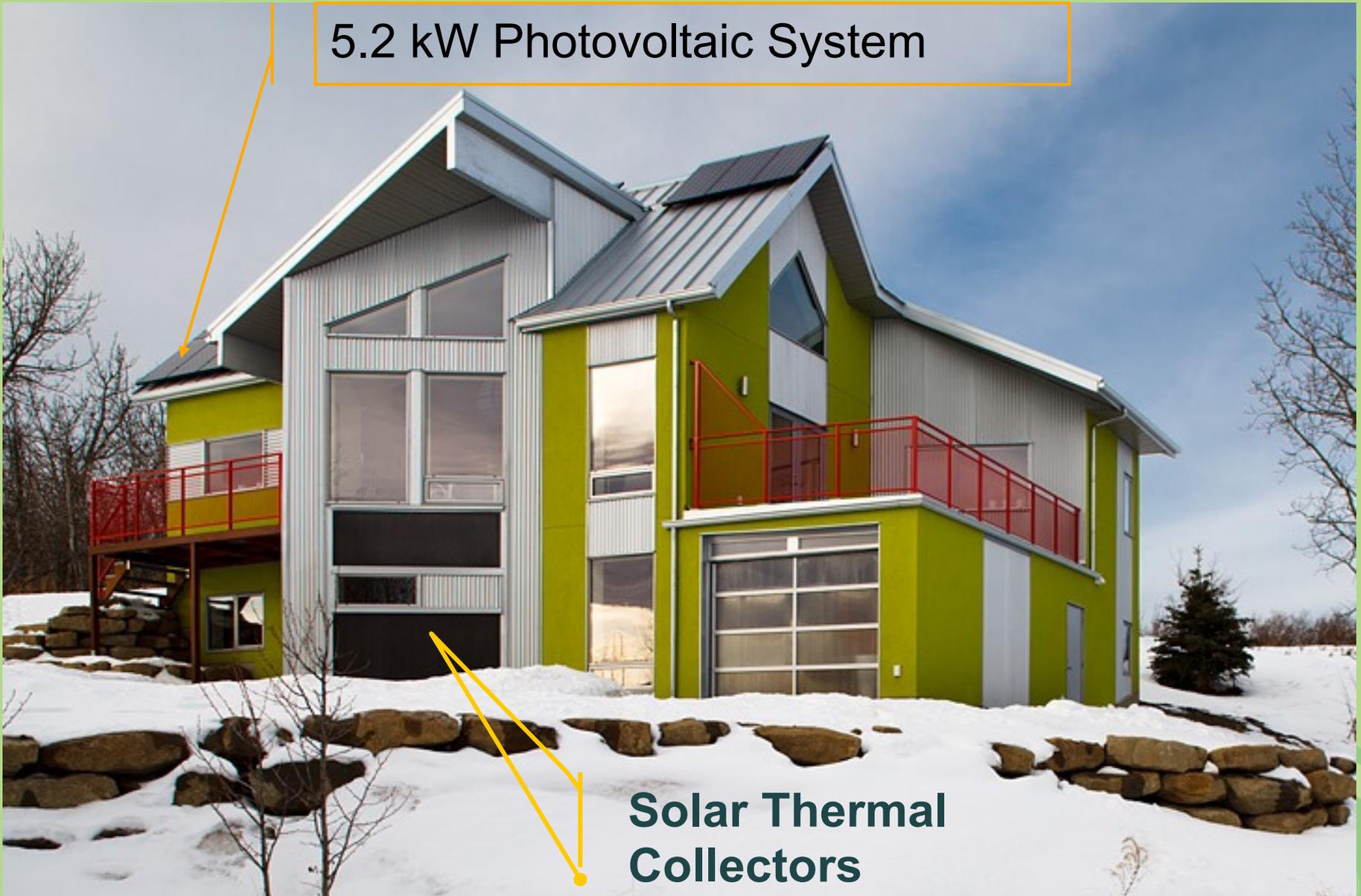
Passive Solar Gain

Provides 60% of heating requirements

Quick Facts



5.2 kW Photovoltaic System

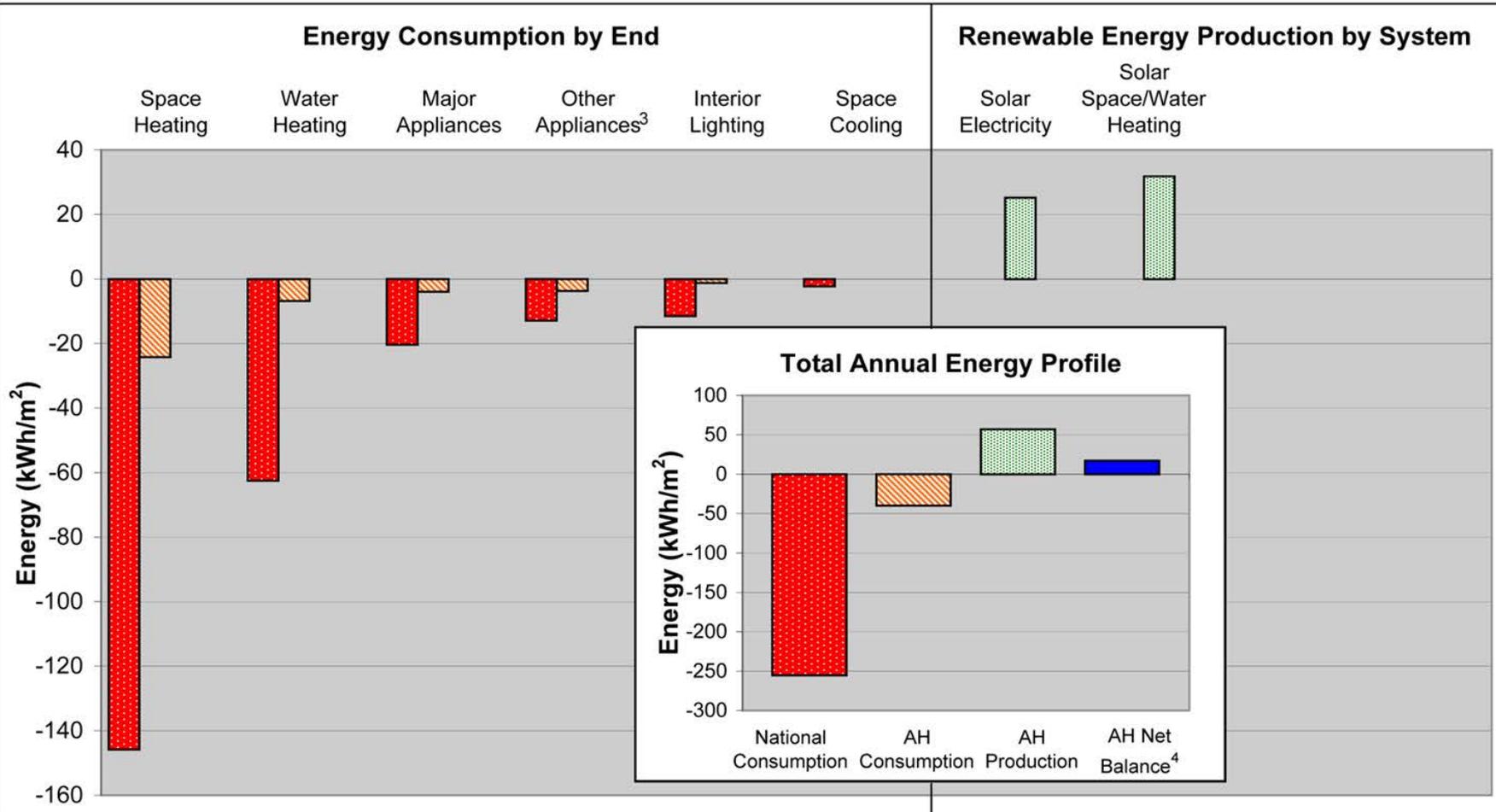


Solar Thermal
Collectors

Renewable Energy

CMHC Equilibrium Housing Initiative

Comparison of Canadian National Average¹ and Echo Haven² (EH) Annual Residential Energy Profile



- National Energy Consumption
- Echo Haven Energy Consumption
- Echo Haven Renewable Energy Production
- Echo Haven Net Balance

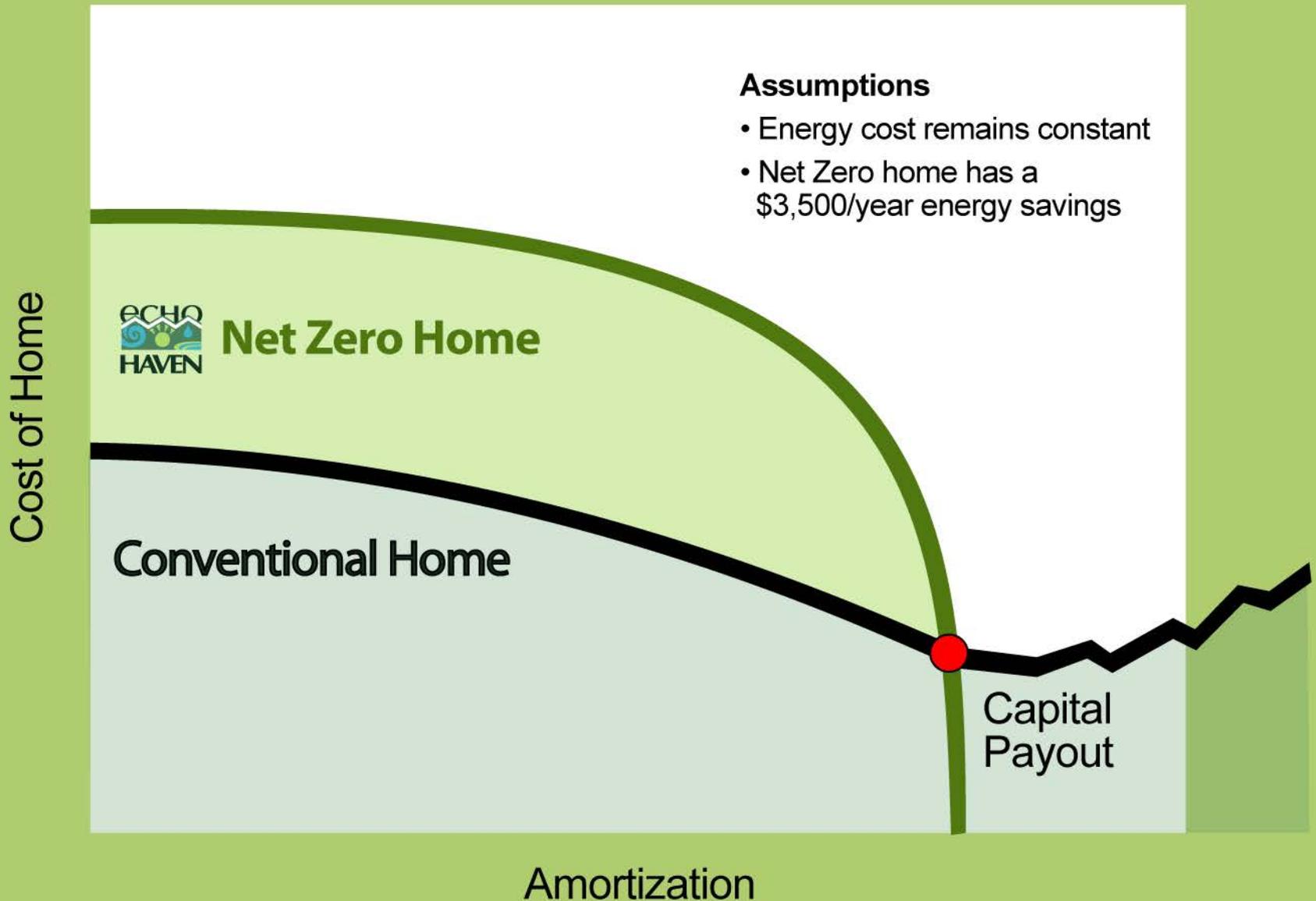
¹ Source for Canadian Residential Sector Energy Data: Residential Secondary Energy by End Use, 2004; *Energy Use Handbook Data: 1990 and 1998 to 2004*, Natural Resources Canada, 2006.

² Values are predicted based on Hot2000 modelling - TG

³ "Other Appliances" includes small appliances such as televisions, video cassette recorders, digital video disc players, radios, computers and toasters.

⁴ Net Balance = Energy Consumption + Renewable Energy Production

Home as an Investment



How do I sell a high performance home?

What motivates buyers?

Why are we here???



- Saving money
- Concerned about climate change
- Reducing my environmental footprint
- Healthier family
- Because I can

Why are we here???



AVERAGE SUNSHINE

Cranbrook: Latitude 49.530

	% Sun	Hours	Days
Jan	24	64	20
Feb	38	107	24
Mar	44	163	28
Apr	52	215	29
May	54	257	30
June	55	268	29
Jul	64	315	30
Aug	68	303	30
Sept	58	218	29
Oct	48	159	29
Nov	25	70	20
Dec	20	52	17
Annual	46	2191	315

Calgary: Latitude 51.039

	% Sun	Hours	Days
	46	120	27
	51	145	26
	48	177	27
	53	220	28
	52	249	29
	55	270	28
	63	314	31
	63	284	30
	54	207	27
	53	175	29
	45	121	25
	46	114	27
	52	2396	333

Good News: Cost of PV









Living naturally

EchoHaven presents a community in harmony with the environment ■ By Pepper Rodriguez



SUSTAINABILITY IN EVERY way, environmental thinking in every acre, EchoHaven puts the logic in ecologic when it comes to building a community that leaves the smallest environmental footprint in the province.

This picturesque parcel of land (just under three hectares) of 25 home lots set in the rolling hills of the northwest community of Rocky Ridge promises to be not only ecologically-sustainable, but as luxurious and comfortable as any modern community can be.



"By employing practical design ideas that maximize both the natural terrain and energy-saving technology, we can deliver a better performing home," says Dave Spencer, one of the partners of Echo-Logic Land Corp, the company developing the area.

"Large, north-facing windows are not practical with the kind of weather we have in Alberta," he says. "At EchoHaven, we 'echo' the proven successful designs from the past 20 years and update them using today's technologies."

One thing of note, EchoHaven sits on the highest natural elevation site in all of Calgary, and its ambitions are set just as high. "I've

owned several homes in Calgary, and nothing ever really suited me, I was looking for more functionality and sustainability," Spencer says.

He has built his own 2,700-square-foot home in EchoHaven — its first occupant — and it served for a time as the show home to give interested buyers a glimpse of what new earth-friendly technology and a little imagination can come up with. "It is a true Net Zero home where we produce as much energy as we use which is achieved using a combination of passive and active solar technologies and other strategies, including a ventilation design that maintains a comfortable temperature inside, no matter the weather outside," he says.

His vision for EchoHaven is a collection of homeowners who want the quality of life that a high-performance home in harmony with nature can provide. "These will all be custom-designed homes that have at minimum EnerGuide rating of 86," he says.

Unlike most move-up communities, garages won't be taking up most of the home's frontage, and there will be few north-facing windows, as each home will be designed to make the most of solar access. "I see homes as a big investment, and your home has to pay you back. Saving energy is one way to do it," he says.

Homes here will reduce reliance on grid power by 80 per cent compared to the average home, will have zero greenhouse gas emissions and employ rainwater harvesting to reduce treated water consumption by 72 per cent.

IT CONNECTS RESIDENTS TO NATURE IN MORE THAN ONE WAY.

Homes here will be energy producers by maximizing the use of solar energy. They will also have a balanced water management strategy — relying on rainfall and snowmelt to reduce consumption of city-supplied water. Each home will have cisterns to store and re-use collected rainwater.

Lots range from 31 to 37-foot frontages. Homes including the lot start at \$650,000. Jigsaw Homes and Janstar Homes are two of the homebuilders at EchoHaven. Spencer says "There are only 17 lots left and there is interest, mainly from young professionals who want a better quality of life and expect more from their homes."

EchoHaven has preserved over 60 per cent of the existing natural landscape, preserving the thick, natural stands of aspen trees throughout the community. It has natural ponds within the community to add to its idyllic nature and will have an amenities building that will feature two guest suites and a communal greenhouse where residents could grow their own produce.

It connects residents to nature in more than one way, as the natural vistas of the community attract an assortment of wildlife in the community, including deer, moose and a wide variety of birds. "You also get terrific mount air views from our vantage point," Spencer adds.

"EchoHaven is meant for people looking for a high quality of life that gives back to nature without giving up comfort or convenience," he says. NL



As Seen in New Home Living Magazine **newhome living**



ECHOHAVEN COMMUNITY

DEVELOPER: UnRed Communities

STYLE: Custom-built single-family or semi-detached homes stressing high performance features

SIZE: Lots range in size from 31- to 37-foot frontages

PRICE: Homes start at \$650,000

ADDRESS: 42 Rocky Ridge Crescent N.W.

DIRECTIONS: From Country Hills Boulevard, turn left on Rocky Ridge Road, turn right on Rockyridge Crescent and follow the signs

WEBSITE: www.echohaven.ca













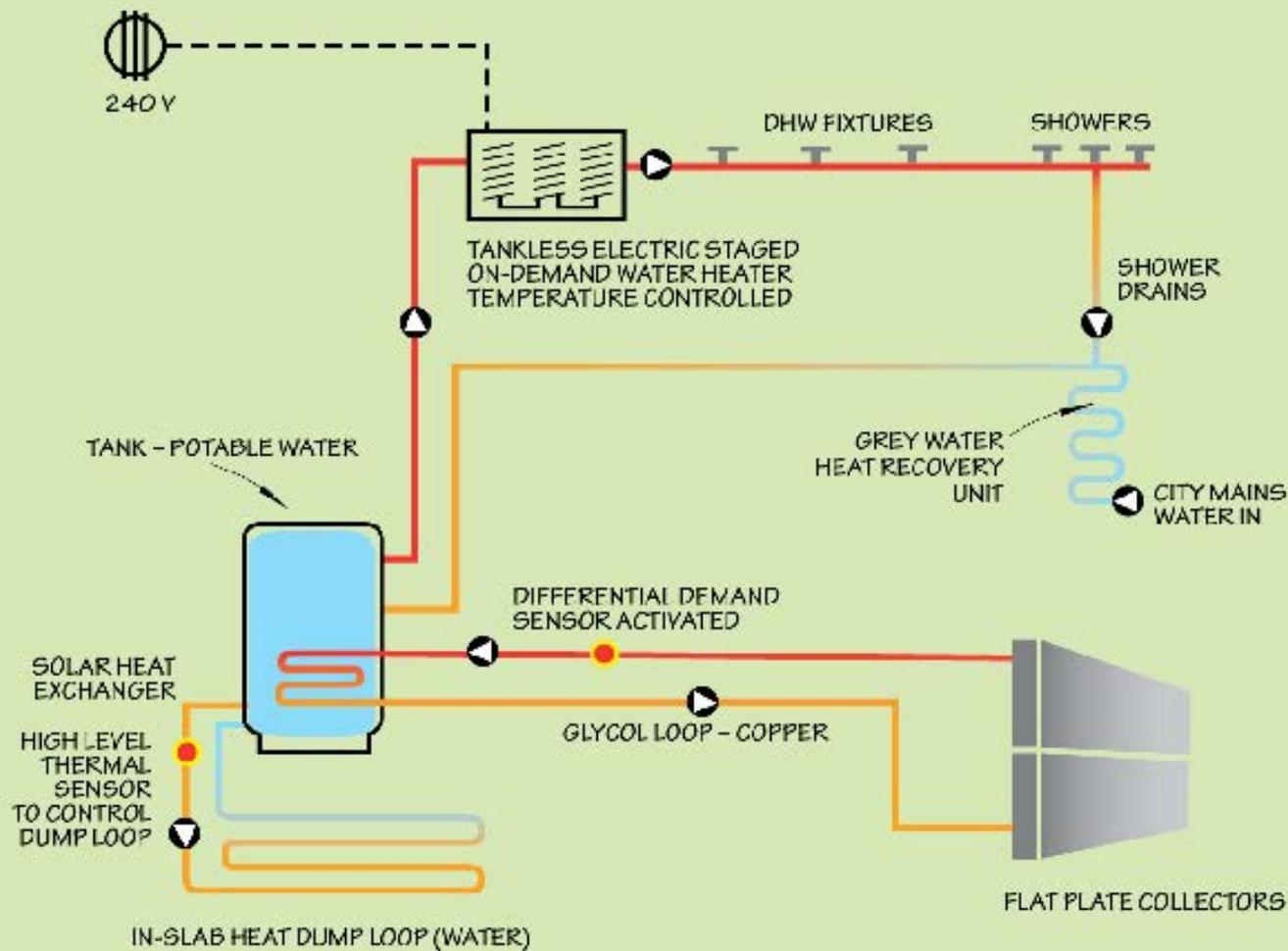






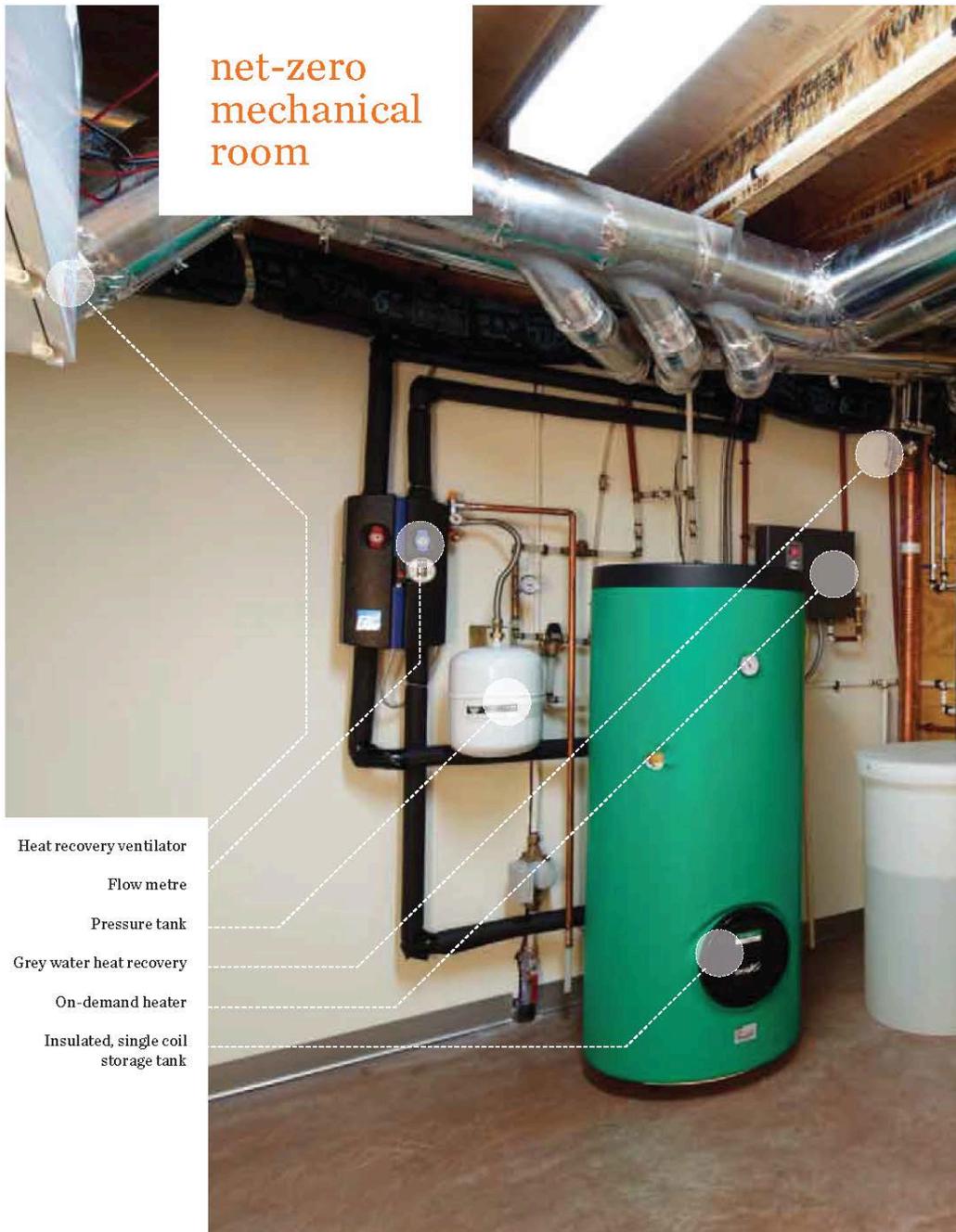






Mechanical Schematic

net-zero mechanical room



Heat recovery ventilator

Flow metre

Pressure tank

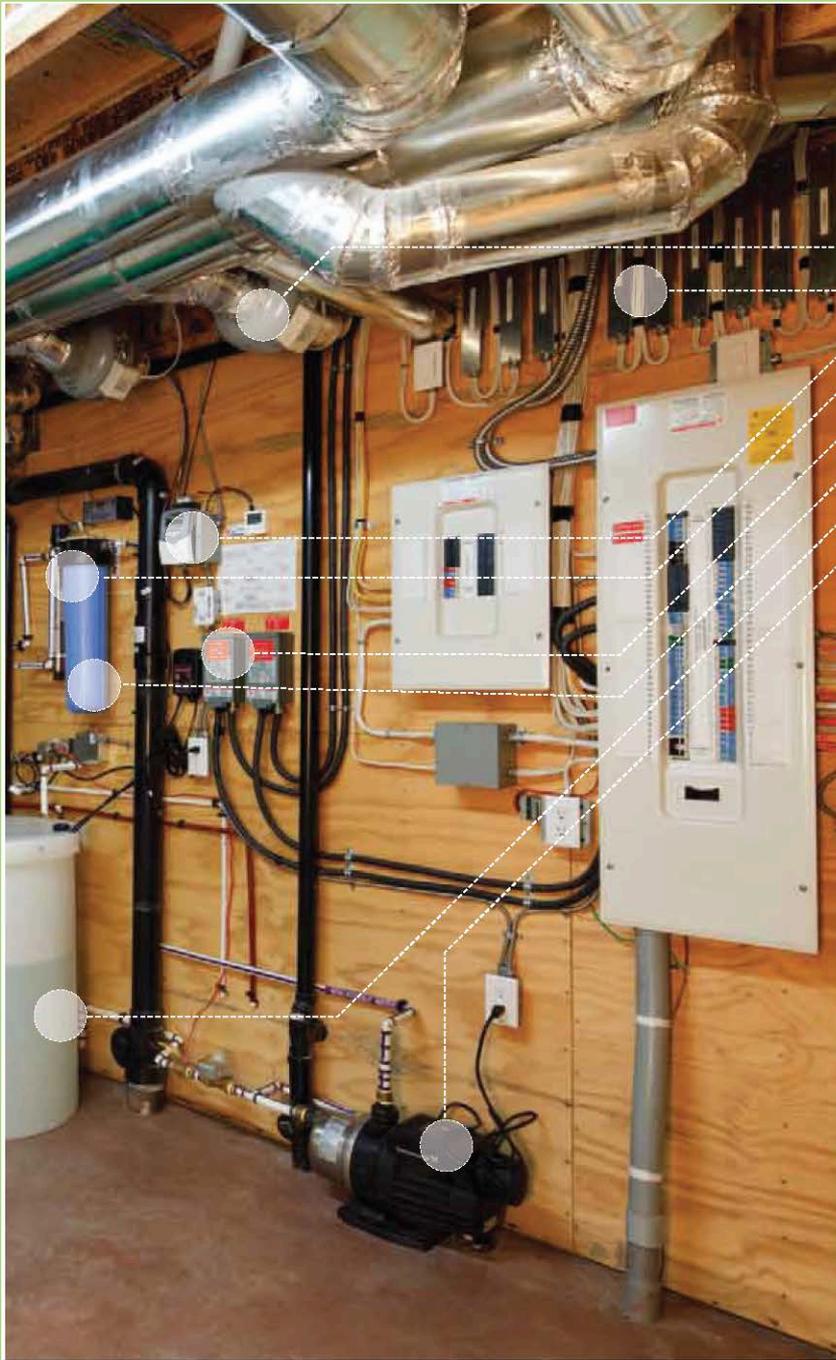
Grey water heat recovery

On-demand heater

Insulated, single coil
storage tank

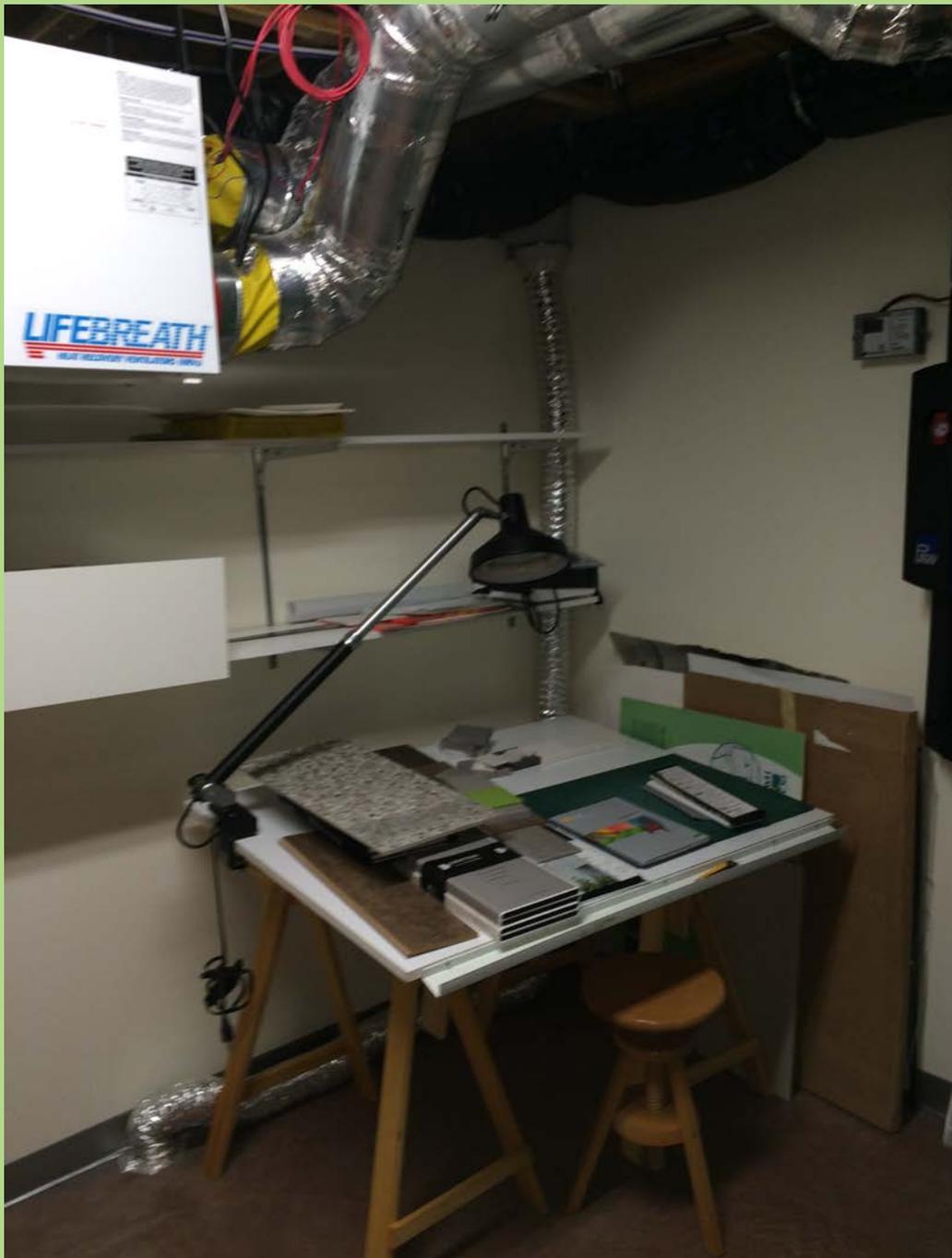


Natural Ventilation



- Booster fan
- Drivers for LED lighting
- Solar thermal controller
- UV filter
- PV junction boxes
- Particulate filter
- Rainwater holding tank
- Pump for rainwater

Keep it
simple



Radon





Excavation October 1, 2010



Point Load PT Pad Footings



Prefab walls on wood footing



PT Basement walls on wood footings



Detail of footings and foundation



Dec 2009 Winter Shutdown



March preparation for Frost
Removal



Frost Removal



Underslab 8" Insulation



Electric service over foam



Compacting 7" gravel over foam





Rebar placement



SDHW dump loop



Echo Have wedge anchors on sheer walls1



Installing basement walls

Geotextile over
footing gravel





Door Buck

Urethane in sheer wall





Joisting



Rigid Insulation Apron



Lower Slab Pour

Pre-fabricated Truss walls





Cold room insulation



Walltite







30" Ceiling and wall cellulose



Radiant heaters





Radiant heaters



Floor protection



Drawings and Details



www.echohaven.ca



Living Lightly on the Land

dave.spencer@stantec.com