
RAINWATER

Using "Sky Water" For Gardening… and

- A rapidly growing interest in rainwater for urban gardens
- How much can I collect and use?
- What's involved? What does it look like?
- How can I build one?
- Using rainwater indoors – more need for clean water & disinfection

RDN Green Building Workshop
Qualicum Beach. June 18 ,2011

Prepared by Bob Burgess
The Rainwater Connection

THE RAINWATER CONNECTION

- 10 Years of designing, building and servicing rainwater systems.
- R&D time averaging 350 hrs/year
- Testing, development and manufacturing of components
- Engineer approved Rainwater Permits for Potable Systems
- Actively promoting rainwater use thru' presentations, workshops, demonstration projects

Connected Barrels and Small Pump

Link together with garden hose.

Pump if you need over 1 psi of pressure

Who is catching the rain

Urban and Rural Residences

Long payback periods, but reducing our water footprint

Who is catching the rain

Large Scale Irrigation Systems

Who is catching the rain

The Rainwater Connection has recently installed 5 Garden Systems with 16,000 – 40,000 imp. gallon cisterns (73 – 182 m^3)

Rainwater Harvesting For City Gardens One Way to Conserve Water

- Demand for increasingly expensive, treated water doubles (or triples) during the summer
- Reducing total outdoor water use (Conservation) is THE first step
- Backyard collection and storage of rainwater is the next step

(alternative supply & reduced Peak Hour Demand)

Parksville Outdoor 1,000 SF July 1 09.xls
Monthly Water Balance Table

Location	Little Qualicum hatchery 17 year data 1990-2006
Property	Typical Parksville Location

Collection Area #1 (sqft)	1,000
Collection Area #2 (sqft)	0
Collection Area #3 (sqft)	0
TOTAL Collection Area	1000

Scenario Outdoor water from 1,000 sq. ft (93m2) roof catchment area, and stored in 1,000 Imp Gal (4,550 L) tank

Volume Units: gal (Choose one of gal or litre)

Max Storage Cap (gal) 1,000

Assumed Rainfall Level Avg (Enter 10% : 20% : 30% : 50% : Max : Avg : Min)

Month	Indoor Useage gal/mon	Outdoor Useage gal/mon	Assumed Rainfall inches	Assumed Collection Efficiency	Rainfall Collected gal/mon	Alternate Supply gal/mon	Storage Volume gal/mon
Start							64
October	0	1,800	4.6	75%	1793	0	57
November	0	0	7.0	85%	3113	0	1000
December	0	0	6.4	85%	2847	0	1000
January	0	0	7.0	85%	3074	0	1000
February	0	0	4.3	85%	1922	0	1000
March	0	0	4.0	85%	1754	0	1000
April	0	0	2.4	50%	631	0	1000
May	0	700	1.8	75%	698	0	998
June	0	700	1.7	75%	670	0	968
July	0	800	0.8	65%	284	0	452
August	0	800	1.4	65%	482	0	135
September	0	600	1.4	75%	529	0	64
TOTAL	**0**	**5,400**	**42.9**		**17,797**	**0**	**12,397**
Demand	**5,400**			**Supply**	**17,797**		Surplus Supply

From Roof Area 93m2 (1,000 SF) and Cistern 4.5m³ (1,000 gal)

Rain Supply May – Sept. 16.4m³(3,600 gal)

October 8.2m³ (1,800 gal)

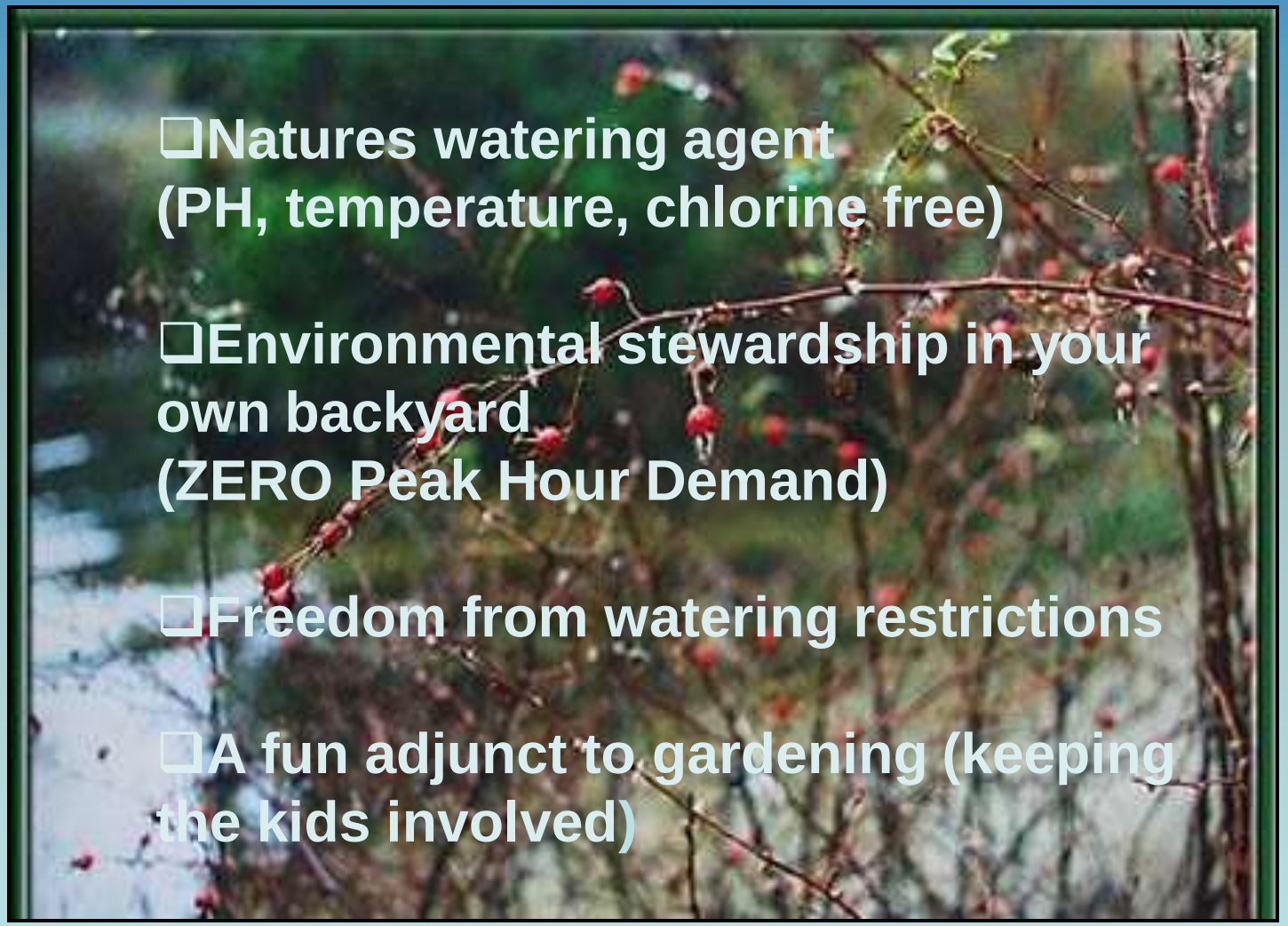
For Power Washing?

Adding Piped Water to Your Tank Without Adding to Peak Hour Demand

- Double or triple your outdoor water supply when the tank runs low
- Add 100-200 gallons during the night (timer or slow drip)
- Garden Water quality improves in the tank (vents chlorine & warms up)
- Delays need for upgrades to water pipe sizing, water treatment and pumping infrastructure

Rainwater Harvesting is a perfect companion to gardening

Why use rainwater?

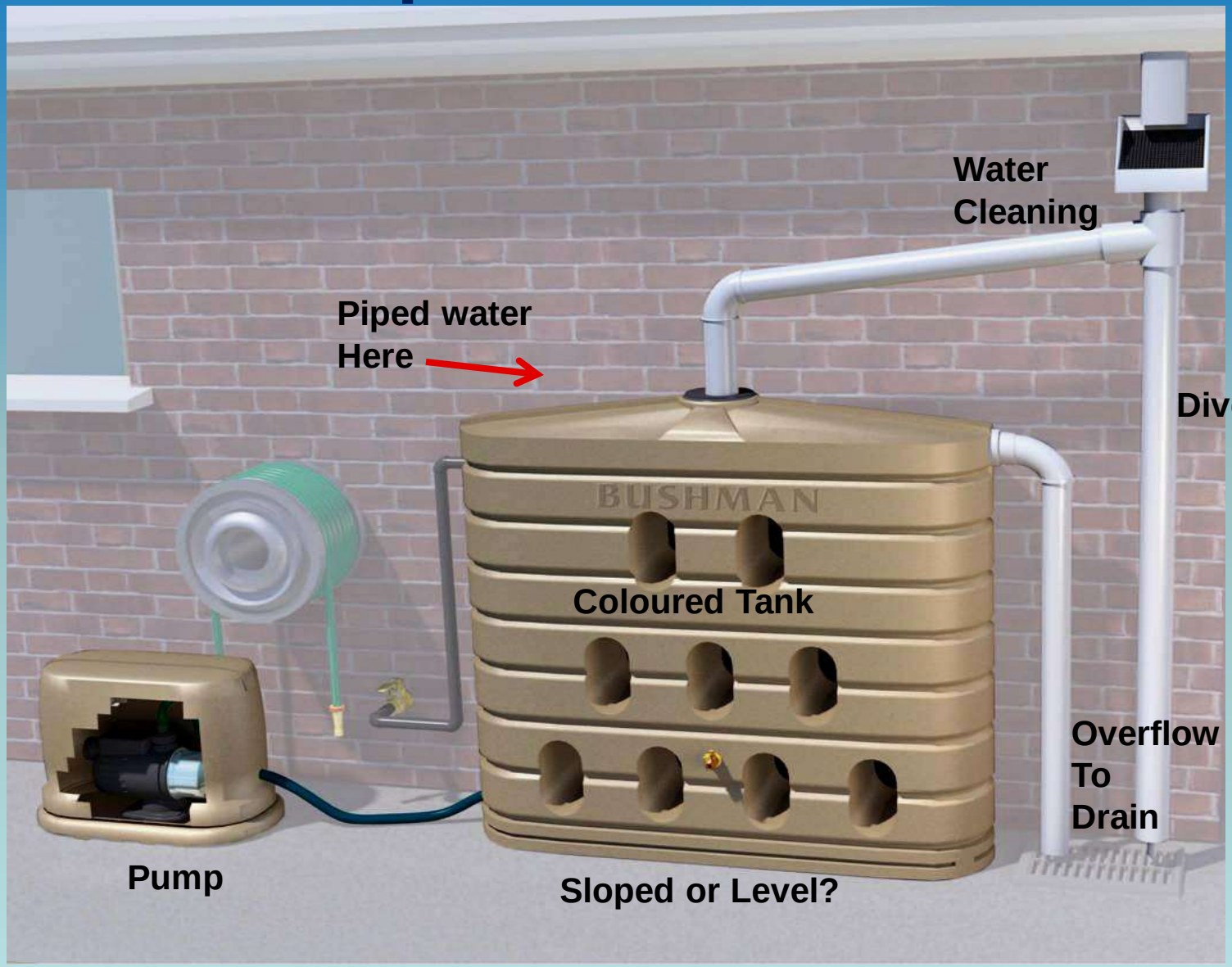


- Natures watering agent (PH, temperature, chlorine free)
- Environmental stewardship in your own backyard (ZERO Peak Hour Demand)
- Freedom from watering restrictions
- A fun adjunct to gardening (keeping the kids involved)

Important Features

- Debris removal on way to tank
- Diversion away from tank to drain
- Secondary water source
- Dark coloured tank
- Tank placement for easy cleaning
- Tank overflow to drain
- Gravity or pumped distribution

Important Features



CASE EXAMPLES

- System Features
- Installation Costs

GOOD DESIGN + MAINTENANCE = GOOD QUALITY WATER

RDN Church Road Transfer Station Administration Building

Who is catching the rain?

First class rainwater catchment system, and 2,346L (516 gal) slimline tank to water green roof. Piped water fill option.

Garden Water Systems with Tanks

Optional Features

- Extra Water Cleaning Devices
- Water level indicator
- “Designer Tank” or Low Profile
- Winterized exit
- Tank Drain
- Coloured catchment piping

Salt Spring Island Garden System

Water for vegetable garden from new shed

- Gutterglove on gutters
- Diverter valve & overflow to rock pit under garden

1,500 L (335 imp gal) tank	$780
Gutterglove covers	$410
Pipe & fittings	$340
Pump and fittings	$750
TOTAL PARTS	$2,280
Design and owners manual	$530
Installation labour (21hrs.)	$1,260
TOTAL PROJECT COST	**$4,070**

Mayne Island Subdivision Home

Gutter Dam and "Gutter Glove" direct to flushing/Diverter valve, and across to the fence.

Mayne Island Subdivision Home - Continued

Along the Fence and into the 1,500 gal (6,800 litre) Can West semi burial tank and Grundfos MQ3 pump

Gutter Guard	**$650**
Catchment	**$1,250**
Cistern	**$1,850**
Tank Fittings	**$900**
Pump	**$900**
TOTAL	**$5,550**

Dual Pumping Garden Water System

Salt Spring Island

Rainwater pumped from big rain barrel to two 1,250 gallon poly tanks – with on-demand pressure pump to garden

Catchment:	**$1,600**
Tanks:	**$2,000**
Pump:	**$800**
	$4,400

Victoria West Project

80% of Irrigation Water and Storm Water Management

Catchment from 1/3 roof, First Flush Diverter & Overflow

Drainage to Rock Pit to control storm water
Pump to plants in summer & to 2nd rock pit in winter

Vic West Project (Continued)

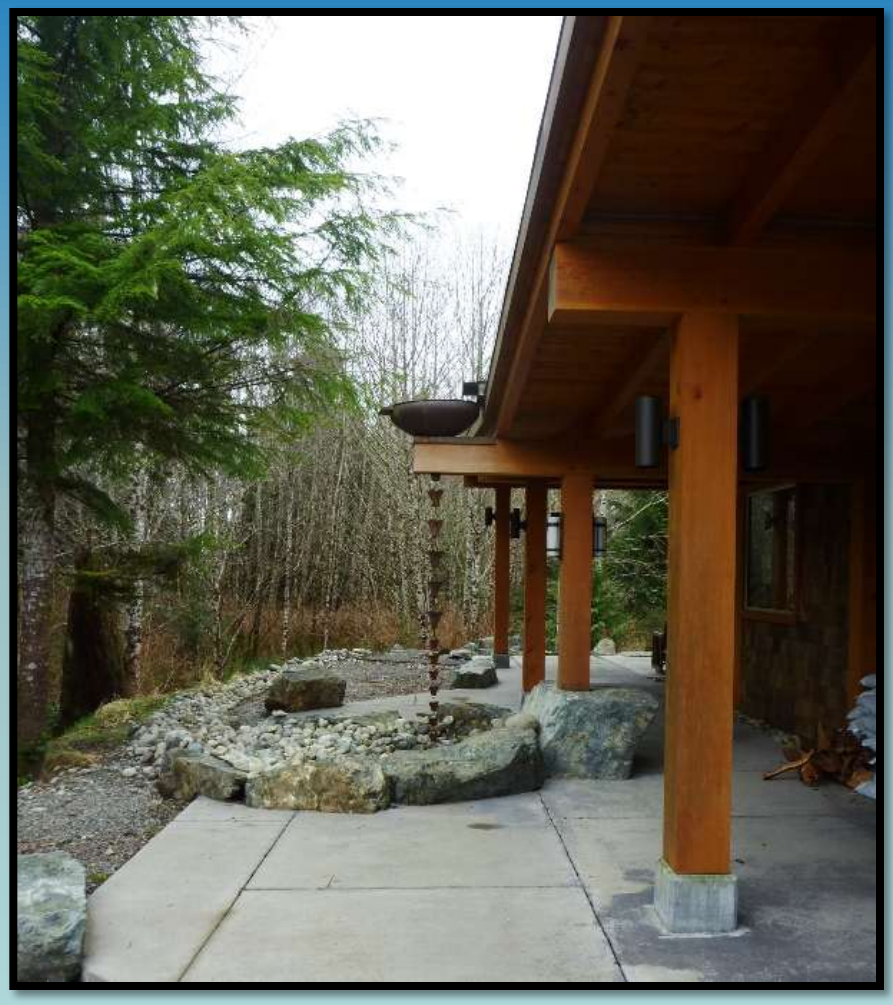
Cleanable, uphill pipe to tank

4.5m^3 (1,000 gallon) leg tank (55” tall by 9’6” long) $1,400

Total Project Cost $5,200

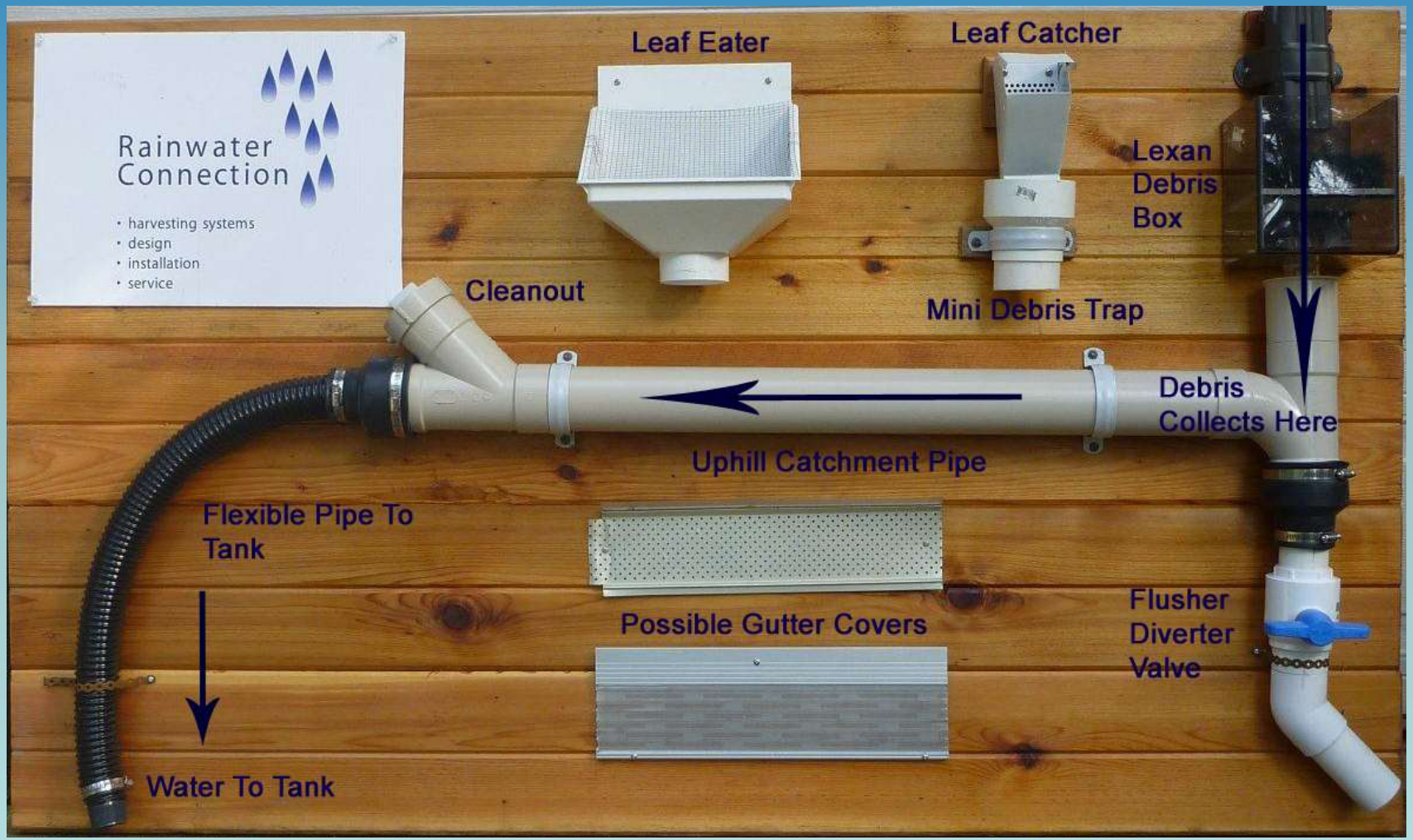
Rainwater as Part of the Landscaping

Tofino, BC



Rain chain to “streambed”. Hidden filter box & underground pipe to tank in crawl space.

Basic Rainwater Cleaning System with options



Simple Garden Water System

Thetis Island

2160 gallons (9,800 Litres) storage from Shed Roof of 145 SF or 13m²

Gravity flow to garden

Premier 1200 &

Premier 960 Tanks

$2,300

Thetis Garden System

Leaf trap, uphill sloped pipe & Diverter

Parts: $140 3 hrs Labour

Tank Fittings:

- Overflow
- Valved Connecting Manifold pipe
- Emerg Water Exit / Drain
- Sight Tube

$800 (parts & labour)

Galiano Island Garden Water

Gardening Water from ½ garage to two 7.5m^3 tanks

Tanks (1,660 gal) $2,300
Tank fittings: $470
Catchment Parts: $260
Pump: $680
TOTAL PARTS: $3,710

Simple diverter/flusher and uphill pipe to lined tank basket

Design $255
Install Labour (15 hours) $950
TOTAL PROJECT COST $4,915

The Galiano Island “Tuffy” Liner

Cleans to 200 microns
Lasts 3-4 months
$11.00 each

Pumps… Briefly

On-demand, RV style pump. Low volume, and no run dry protection

Grundfos MQ3 On-demand, High Volume Pump

Barrel or Tank with Automatic Pumping and Tank Refill

Conservepump Garden System

- **Pump to drip water system**
- **Soil moisture sensor control**
- **Automatic tank top up**

Strathcona Gardens Demo Project
Off the Grid Orchard Irrigation System

Garden Water Systems

Water from 470 SF (44m^2) roof delivered to orchard with no electronic pump.

< Gutter guard
Uphill catchment
Pipe with diverter
< “Day Barrel
On Left”

Banjo Filter to top of Premier 1950Gal > (8,900litre) tank.

Tofino Demo Project

Triple Cleaning Catchment and First Flush Diverter

Potable Water

Single Downspout; Debris Pail, Horizontal Catchment Pipe; FFD, and pair of Screen mesh filters

Design	**$600**
Parts & Tank	**$2,000**
Labour	**$700**
Total	**$3,300**

Cortes Island Cottage

Potable Water

- Recycled Milk Tank
- Debris Box
- First Flush Diverter
- Pair of Banjo Strainers
- Bilge pump to upper deck

THE RAINWATER CONNECTION
Super Cleaners

Cleans water from 5,000 sq. ft. of roof to 250 microns

RDN Church Road Transfer Station

Who is catching the rain?

6,500 SF roof area of two transfer buildings supplies 18,900L (4,165 gal) tank for outdoor washing.

RAINWATER, a clean, sustainable alternative

SUPPLEMENTARY SLIDES

Storage

The Heart of any West Coast Rainwater Harvesting System

Types of Storage

Above Ground Poly Tanks

Premier 1200 and

3,300 gal tanks

Premier 1660 set
14” into ground

Types of Storage

Above Ground Poly Tanks

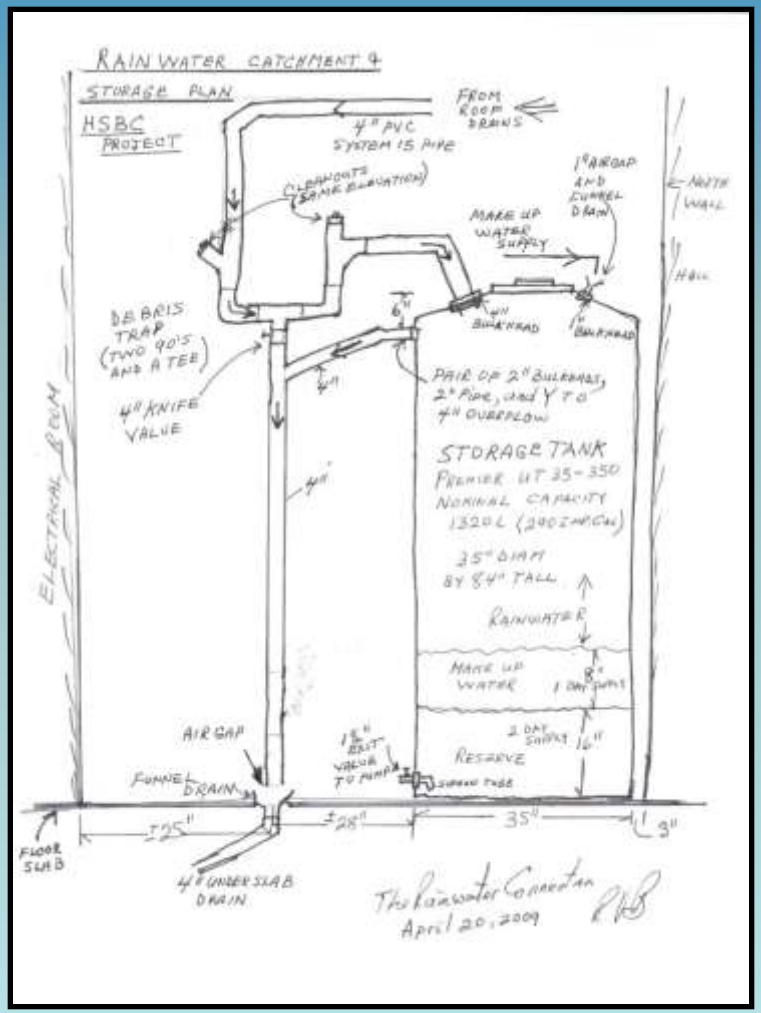
Water Storage

200; 125, and 500 gal Leg Tanks

Premier Box Tank 400 in foreground

HSBC Bank, North Vancouver

1,320L (290 gal) tank provides 80% of their toilet water demand



Who is catching the rain?

Types of Storage

Above Ground Poly Tanks

Water Storage

New Premier Slimline 340

“Tank Farm” of 4 tanks of 2,400 gal.

Polyethylene Semi Burial Tanks

Water Storage

Rectangular, Semi Burial Tanks work well in crawl spaces

Semi Burial - CONTINUED

Case Example

Or semi buried in 2 ft. deep hole with soil mounded up over

Tanks	**$7,000**
Installation	**$3,800**
Water Lines	**$700**

Concrete Cisterns

Water Storage

Concrete Cistern Under Garage

or under the house?

$1.80 -$2.30 per gallon

Steel Cisterns

Corrugated Steel Tank with Polypropylene Liner

Water Storage

16,000 gal.
behind trellis

$1.40 - $2.00 per gallon

12,000 gal.
in woods

Steel Cistern

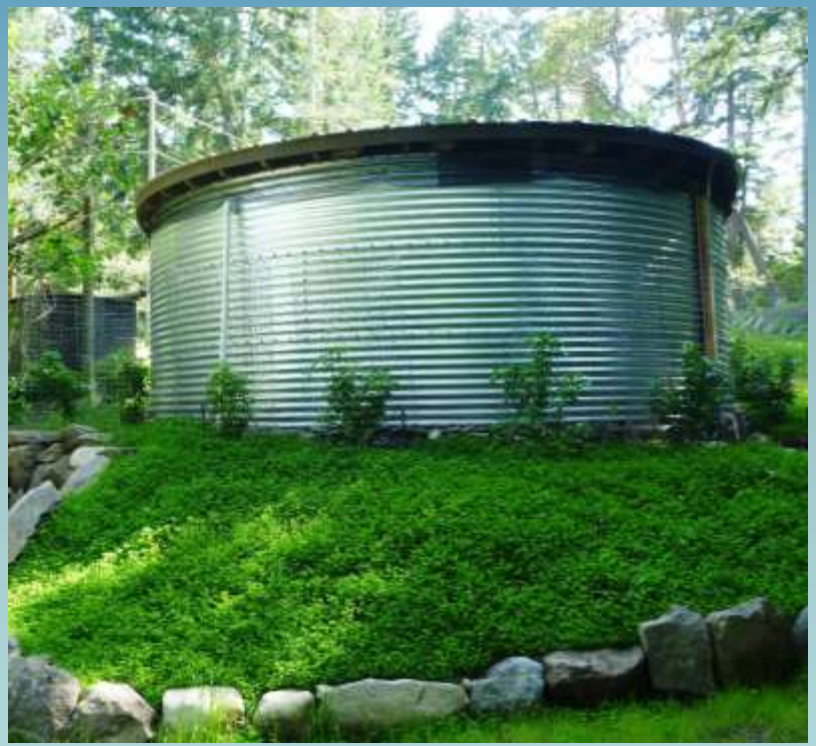
System Components

12,000 imp. gal (55m^3)

Steel Cistern

System Components

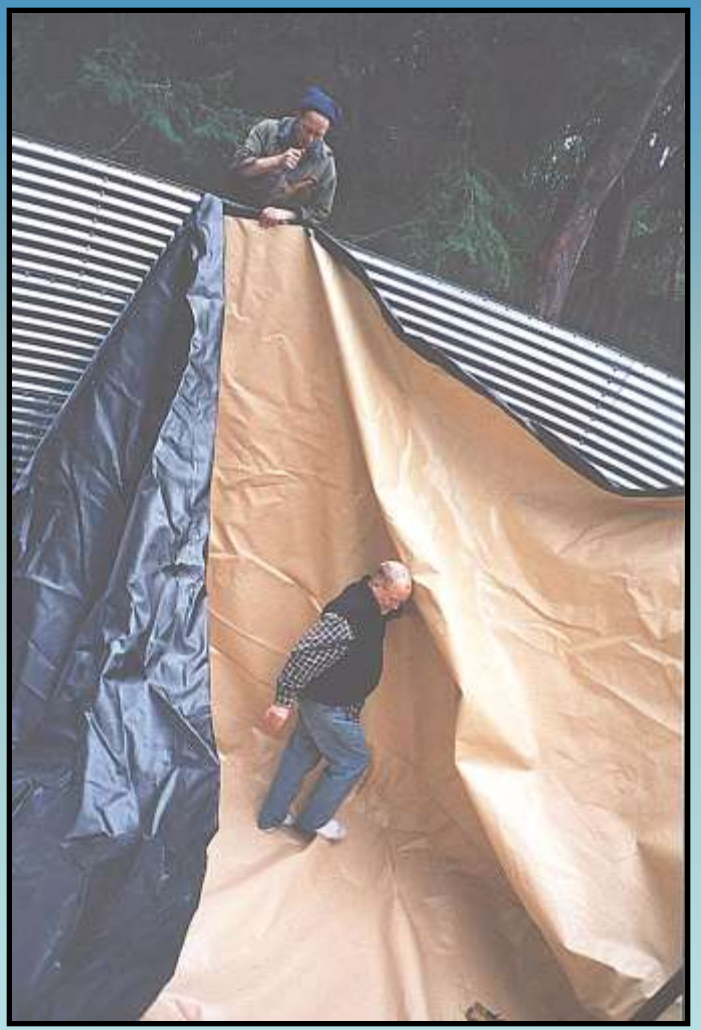
12,000 imp. gal (55m^3) Partly backfilled into hill



Bolt-in-place Construction with Liner

System Components

5,000 – 20,000 gallons



Steel Cistern
Polypropylene “Bag” Liner

System Components

36 mil Polypropylene
NSF 61 Rated

Steel Cistern Roofs

Fabric roof under shed

Wood-frame and steel roof with inspection hatch

Steel Cistern ~ Wood & Metal Roof

System Components

Rated for BC snow loads

Full Venting Around Perimeter