

Convening for Action: Rainwater Management & “Green” Subdivision Design

Presentation at EMCO Technical Session #3
Victoria, June 2006

Province of British Columbia
Ministry of Environment, Lands and Parks
**VANCOUVER ISLAND
SATELLITE IMAGE MAP**

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Water Sustainability Committee of the BC Water & Waste Association



**Drought, Forest Fires and Floods in 2003
Created a 'Teachable Moment' for Change
that resulted in the
Water Sustainability Action Plan for BC**

The Water Sustainability Action Plan for BC....

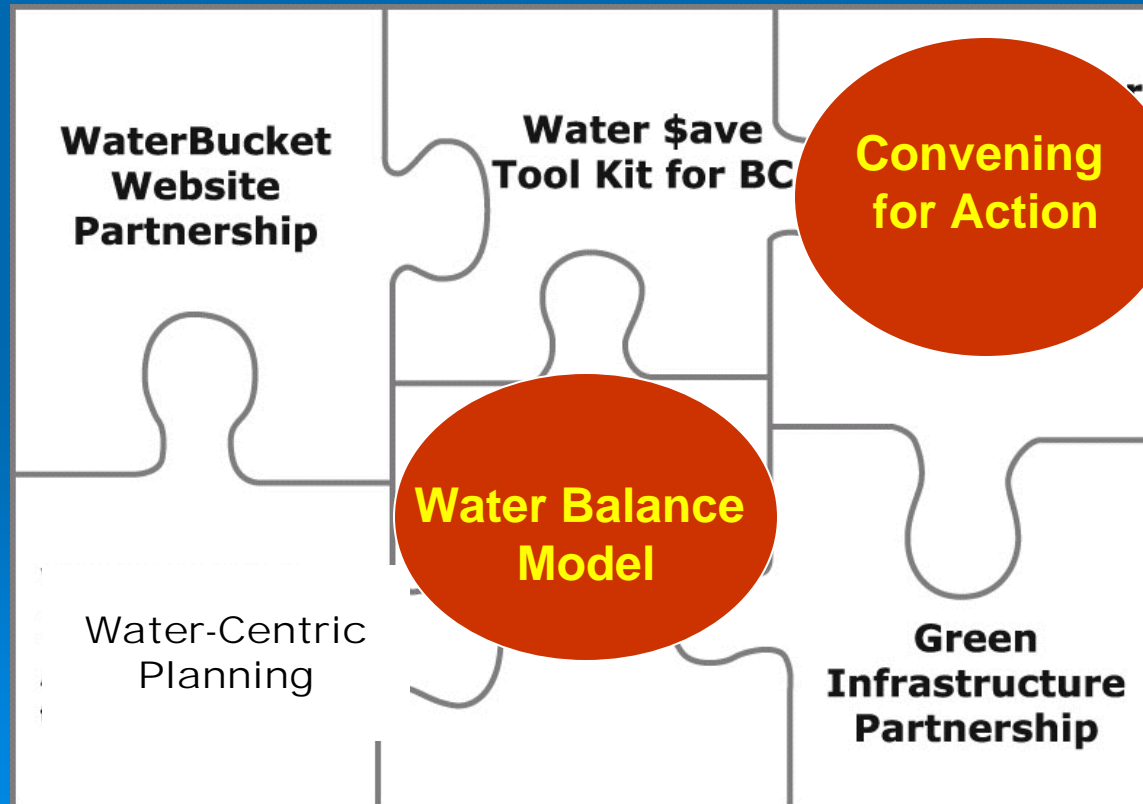


... provides a partnership umbrella for
an array of *on-the-ground* initiatives that promote
a 'water-centric' approach to community planning



BCWWA
British Columbia Water
& Waste Association

and the Province are partnering to deliver the Water Sustainability Action Plan



Presentation Mind Map



- Convening for Action**
 - Partnerships & Tools**
 - Rainwater Management**
- 

Convening for Action in British Columbia comprises regional initiatives:

- **Okanagan Basin**
 - **Greater Vancouver Region**
 - **Vancouver Island**
- 

Change is being advanced through these partnerships:



- **Convening for Action**
- **Water Bucket Website Partnership**
- **Water Balance Model Partnership**
- **Green Infrastructure Partnership**

When 'convening for action', we build capacity through a 3-step process:

1. **Challenge** practitioners and others to step back from existing paradigms
2. **Inform** them regarding alternatives
3. **Provide** the tools & experience to develop land and use water differently

Presentation Mind Map



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- 

waterbucket.ca is a resource-rich 'destination location' for timely and provocative information


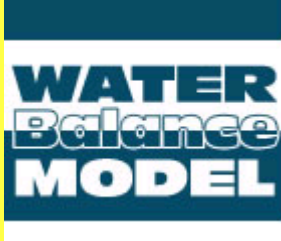
The image displays a collage of overlapping screenshots from the waterbucket.ca website. The screenshots show various sections of the site, including:

- AGRICULTURE & WATER**: Features a search bar and navigation links for Water Management, Drought, Water Use, Water Stewardship, and Resources.
- WATER SUSTAINABILITY COMMITTEE**: Includes a search bar and navigation links for Design With Nature, Outreach & Training, Construction Details, and Resources.
- WATER USE & CONSERVATION**: Includes a search bar and navigation links for Design With Nature, Outreach & Training, Construction Details, and Resources.
- GREEN INFRASTRUCTURE**: Includes a search bar and navigation links for Design With Nature, Outreach & Training, Construction Details, and Resources.
- CONVENING FOR ACTION**: Includes a search bar and navigation links for Understanding Water Supply, Limiting Water Demand, Watershed / Ecological, Upstream / Downstream, and Resources.
- RAINWATER MANAGEMENT**: Includes a search bar and navigation links for Turning Ideas into Action, On the Ground Changes, Resources, and Networking.
- WATER CENTRIC PLANNING**: Includes a search bar and navigation links for Understanding Water Supply, Limiting Water Demand, Watershed / Ecological, Upstream / Downstream, and Resources.

The screenshots also show navigation menus, search bars, and sidebar content, including a 'Toolbox' with a 'WATER BALANCE MODEL' link, a 'Partners' section for the 'BRITISH COLUMBIA' Ministry of Environment, and a 'Success Stories' section. The sidebar content includes a question: 'Which of the following databases do you find most useful?' with radio buttons for 'Web Links', 'Success Stories', and 'Publications'. The 'Success Stories' section for 'WATER CENTRIC PLANNING' includes a photo of a workshop and text: 'Rainwater Harvesting Workshop Series resonates with British Columbians! Vancouver Event was a sellout and so was the Victoria Event'. The text continues: 'The Vancouver Workshop was filled to capacity. Attendance was capped at 90 when registrations surged in the days beforehand. Those who were turned away from the Vancouver event were urged to attend the Victoria event, where another 60 registered. See stories below for program details. The Vancouver and Victoria workshops were part of a series of cross-Canada events sponsored by Canada Mortgage & Housing Corporation (CMHC). Workshops were also held in Calgary (Alberta), Toronto (Ontario), Sherbrooke (Quebec) and Halifax (Nova Scotia).'

The Green Infrastructure Partnership is 'turning ideas into action' on-the-ground !

Outreach & Continuing Education Program (OCEP)

| | | | | |
|--|---|--|--|--|
|  | Celebrating Green Infrastructure: Showcasing Innovation Series | Communication Guide for Elected Officials | Guide to Green Infrastructure Standards |  |
| Speaker Series | | Communication Guide for Senior Managers | Green Infrastructure Standards | Streamlined Environmental Approvals Protocol |



A provincial pilot is currently being implemented in the GVRD

Showcasing Innovation in North Vancouver – the first in the series



A Porous Asphalt Lane



**An Arterial Highway
with Infiltration System**

An Eco-Industrial Community





WATER Balance MODEL FOR BRITISH COLUMBIA

The Partnership has broad provincial and national representation



Greater
Vancouver
Regional
District



WORKING TOGETHER
FOR THE
GEORGIA BASIN
AU TRAVAIL
POUR LE
BASSIN DE GEORGIA



SURREY
CITY OF PARKS

westvancouver
THE WATERFRONT COMMUNITY

CITY OF
COQUITLAM



BRITISH
COLUMBIA



BCWWA
British Columbia Water
& Waste Association



CMHC SCHL
HOME TO CANADIANS



Township of
Langley



the
city
of NORTH VANCOUVER

CITY OF
Abbotsford
Est. 1873



DISTRICT OF
HIGHLANDS

Environment
Canada
Environnement
Canada
Fisheries and Oceans
Canada
Pêches et Océans
Canada



THE REAL ESTATE
FOUNDATION
OF BRITISH COLUMBIA

MAPLE RIDGE
Incorporated 12 September, 1874



CITY OF VANCOUVER

UDI
URBAN DEVELOPMENT INSTITUTE
pacific region



KEY MESSAGE #1:
The Water Balance Model enables changes in land development practices...

**...by quantifying the benefits –
in terms of reducing **rainwater runoff volume**
- of installing source controls under different
land use, soil and climate conditions**

KEY MESSAGE #2:


Anybody with a computer and internet connection can access the model

Home About this Site

WATER Balance MODEL

BRITISH COLUMBIA WATER BALANCE MODEL RESOURCES NETWORKING

Partners


City of Chilliwack
Visit City of Chilliwack

Events

Jun 2005

| Su | Mo | Tu | We | Th | Fr | Sa |
|----|----|----|----|----|----|----|
| | | 1 | 2 | 3 | 4 | |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |

Add an event

Poll

A poll is not available

Organizations

Recent Additions...

[British Columbia Ground Water Association](#)

[Canadian Water Resources Association](#)
The Canadian Water Resources Association is a national organization of individuals and organizations interested in the management of Canada's water resources. The membership of the Association is composed of private and public sector water resource professionals including managers, administrators, scientists, academics, students and users. It has branch organizations in eight provinces and members throughout Canada and beyond.

[Watershed Report Card](#)





TRY THE MODEL

1. Enter the area of your site, add existing soil conditions, and land use information.
2. Create a graph of rainwater volume summaries and see how well your site performs.
3. Add a Green Roof or a Rain Garden or similar rainwater source control and compare before and after results.

Environmental Best Management Practices for Urban and Rural Land Development in British Columbia

The *Ministry of Water, Land and Air Protection* has prepared **Environmental Best Management Practices for Urban and Rural Land Development** to assist people who are involved in planning, implementing, reviewing and/or approving land developments in British Columbia's urban and rural areas. Its primary purpose is to provide province-wide guidelines for the maintenance of environmental values[More](#)

Water-sensitive Urban Design (WSUD) – Adapting the Australian Experience

BASIC PROCEDURES FOR 'SOURCE CONTROL' OF STORMWATER



KEY MESSAGE #3:

Water Balance Model promotes Integration of Perspectives

- **Planners:** Tool for Better Use of Space
- **Engineers:** Tool for Pre-Design
- **Landscape Architects:** Tool for Green Solutions
- **Ecologists:** Tool for Watershed Function
- **Educators:** Tool for Social Marketing



WATER
Balance
MODEL
FOR BRITISH COLUMBIA

Inter-Governmental Partnership: Outreach & Continuing Education Program

The program has comprised sessions for:

Elected Officials

Local Government Staff

Development Community

Municipal Advisory Committees

Community Stewardship Groups

Professional Associations

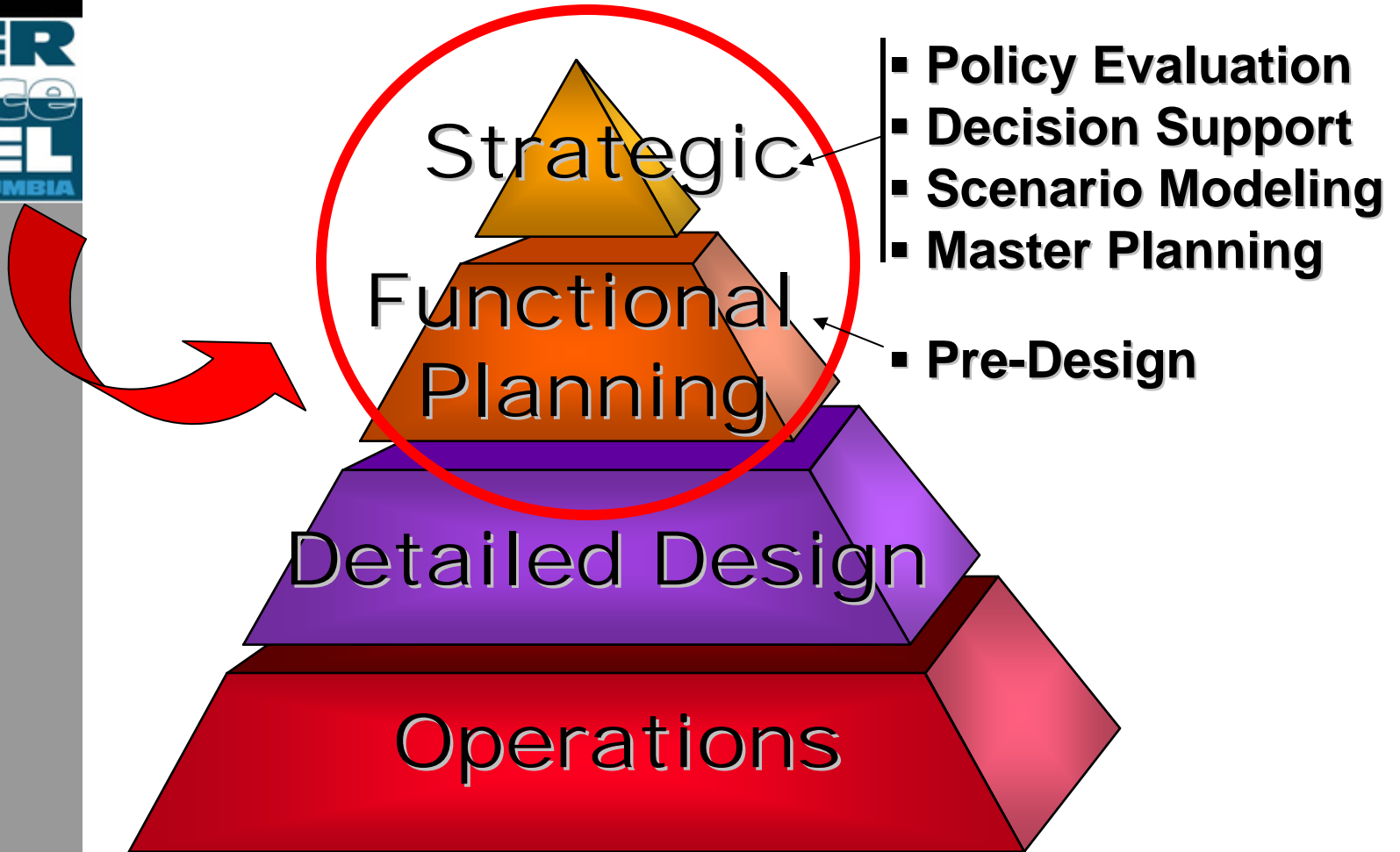
Industry – EMCO Technical Series

Including training workshops at UBC, UVIC, BCIT,
North Island College, and UBC-Okanagan



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Where the Water Balance Model fits on the 'Modeling Hierarchy'





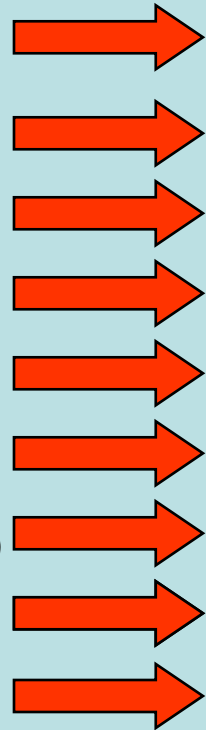
Presentation Mind Map

- Convening for Action
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from Stormwater Management to Rainwater Management

From TRADITIONAL to

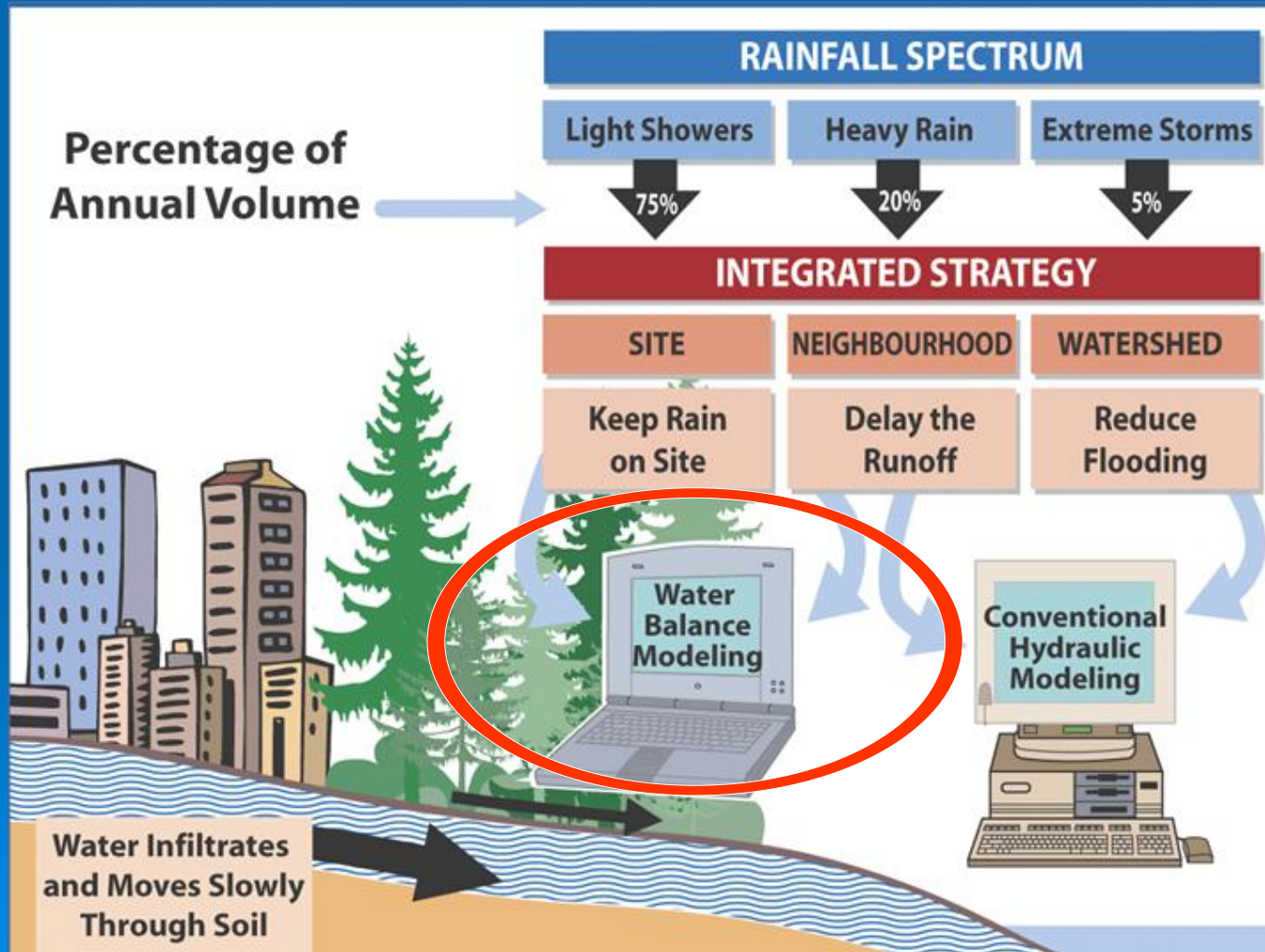
- Drainage Systems
- Reactive (Solve Problems)
- Engineer-Driven
- Protect Property
- Pipe and Convey
- Limited Consultation
- Local Government Ownership
- Extreme Storm Focus
- Peak Flow Thinking!



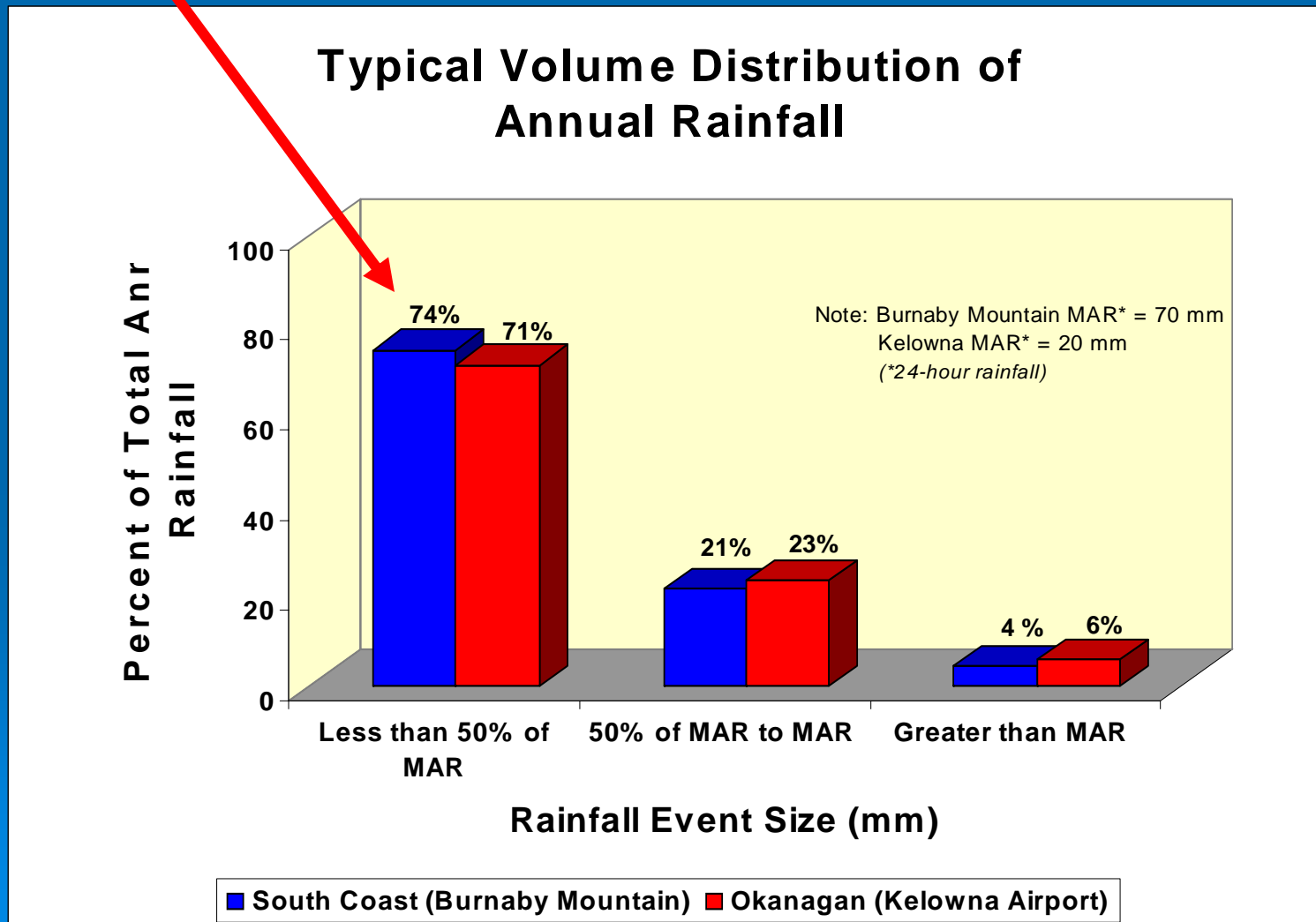
INTEGRATED:

- Ecosystems
- Proactive (Prevent Problems)
- Interdisciplinary Team-Driven
- Protect Property *and* Habitat
- Mimic Natural Processes
- Extensive Consultation
- Partnerships with Others
- Rainwater Integrated with Land Use
- Volume-Based Thinking!

The Water Balance Methodology at a Glance



Light Showers Account for Most of the Annual Rainfall Volume





**A Key Consideration is Understanding
How Water Moves Through Soil**

The City of Courtenay was the first BC municipality to adopt a Minimum Soil Depth Policy



New Year's Day evacuation in West Vancouver:



**‘Man versus nature’ development –
creates risks to life and property**

School

Application of Water Balance Model

Where I Live



Forested property prior to clear-cutting and stripping of soil down to bedrock



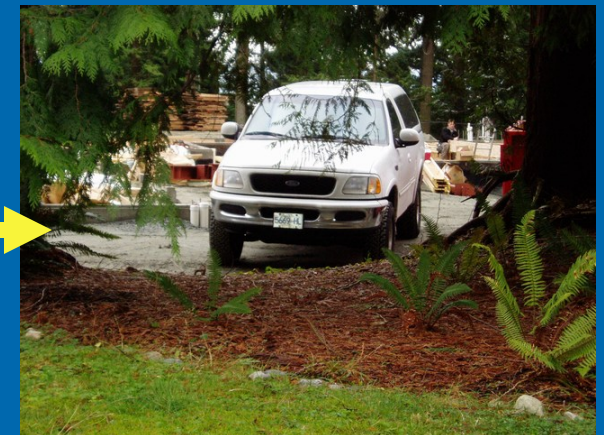
The View from My Back Yard



Man conquers nature



Nothing natural is left

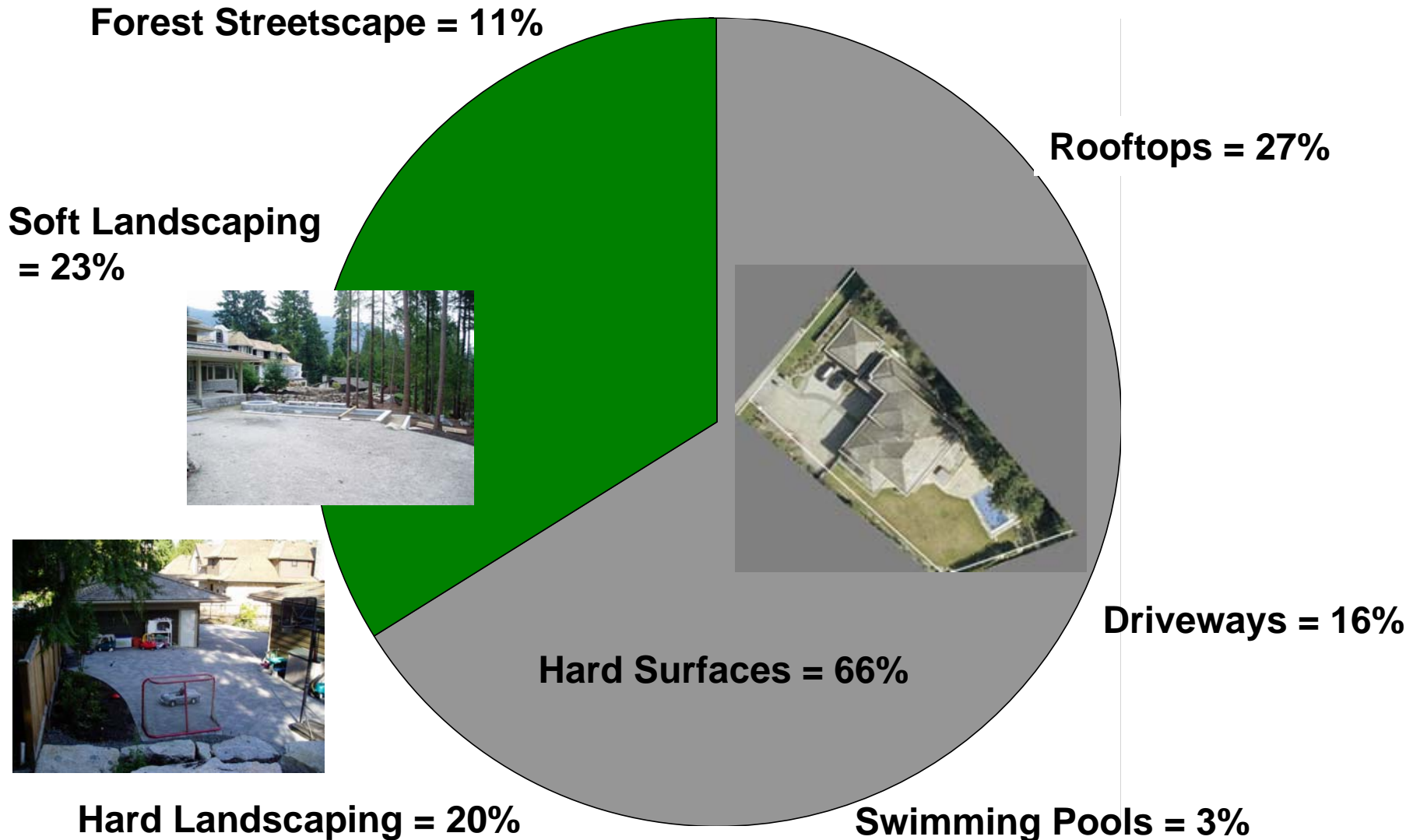


Working right to the line!



This is a 7600 sq ft house

For the three 20,000 sq ft properties, the average percentage for each category of ground surface coverage is shown below:



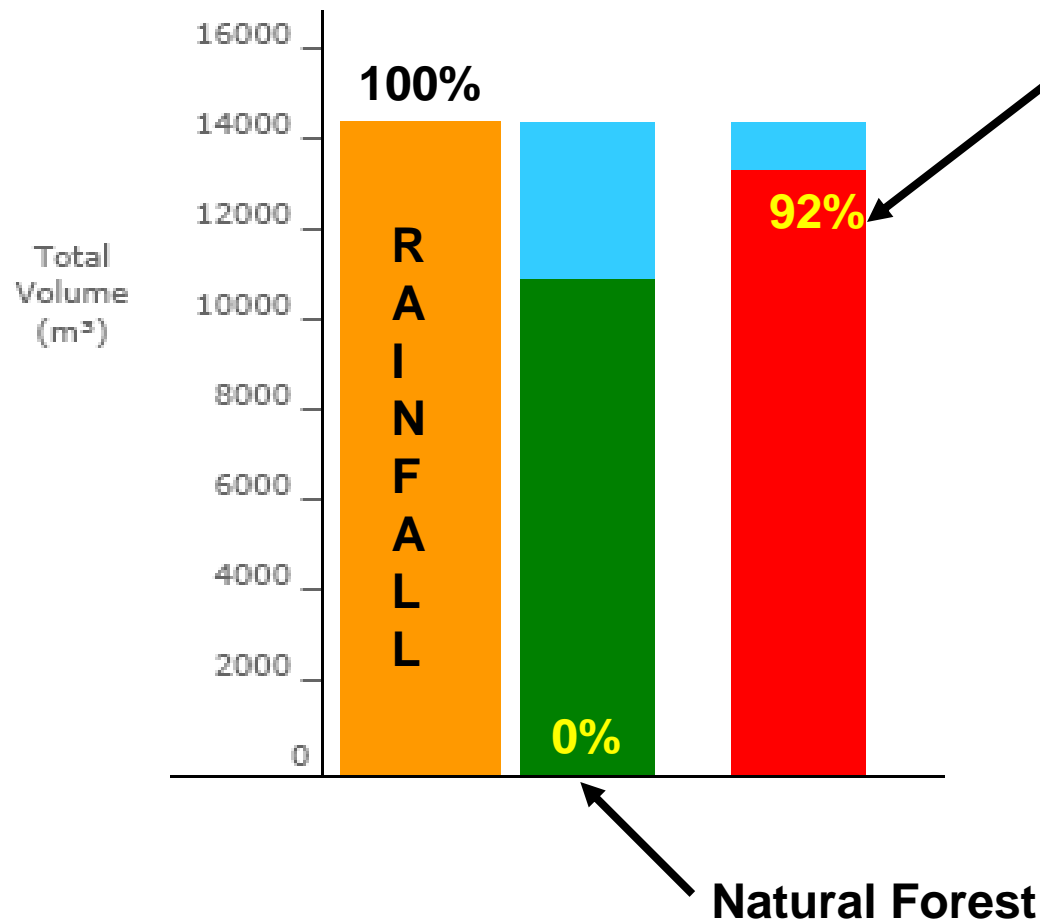


“Our rain gauge shows that almost 5 feet of rain has fallen on Clovelly-Caulfeild over the past *12 months”

*Rainfall during the period April 2005 through March 2006

When the Forest is Removed:

Runoff Goes from 0% to 92% of Annual Rainfall Volume



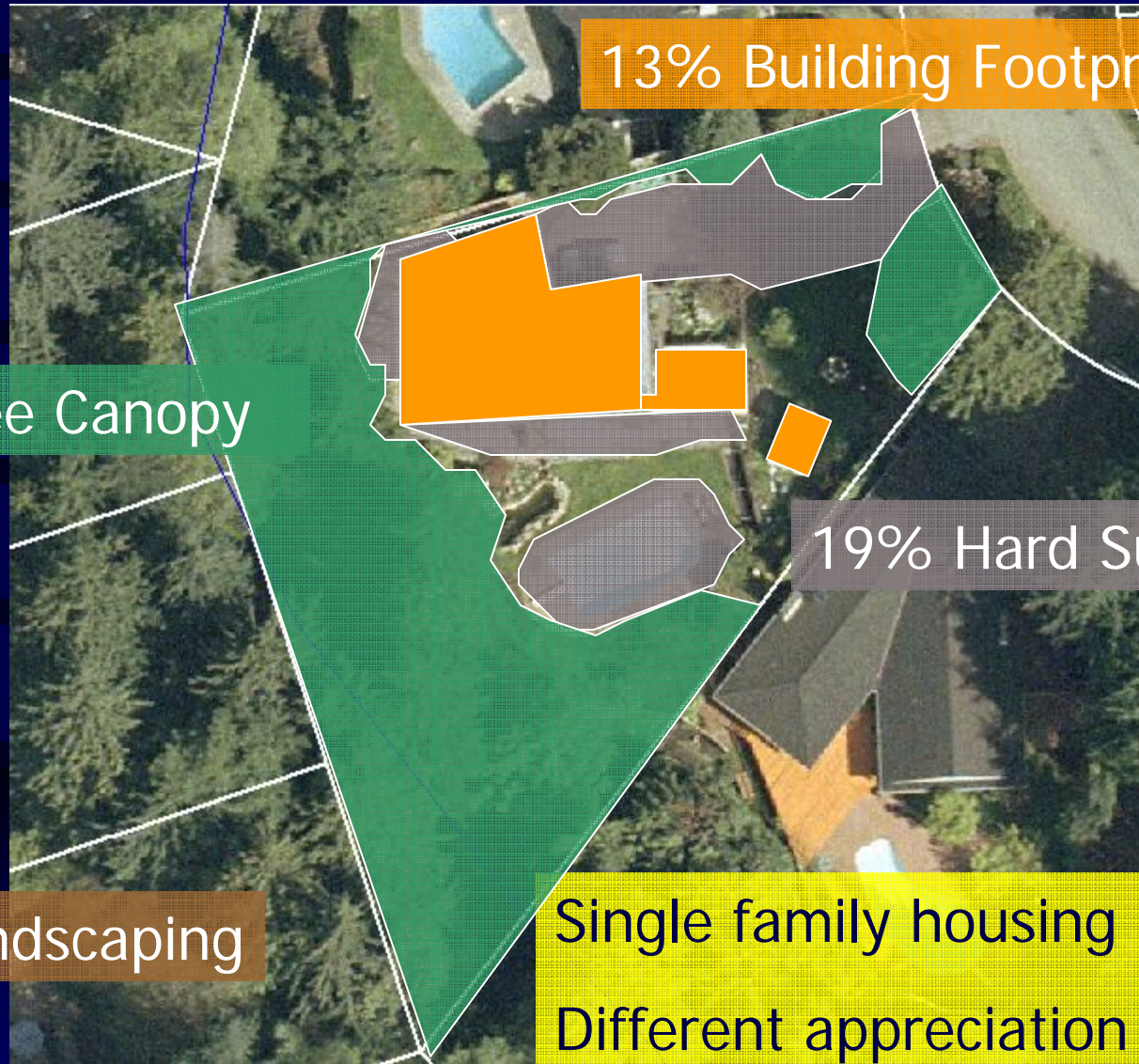
After Clear-Cutting,
Stripping the Ground
to Bedrock, and
Constructing Houses



What are the long-term implications of re-development for neighbourhoods?



Total lot area = 20,500 sq. ft.



13% Building Footprint

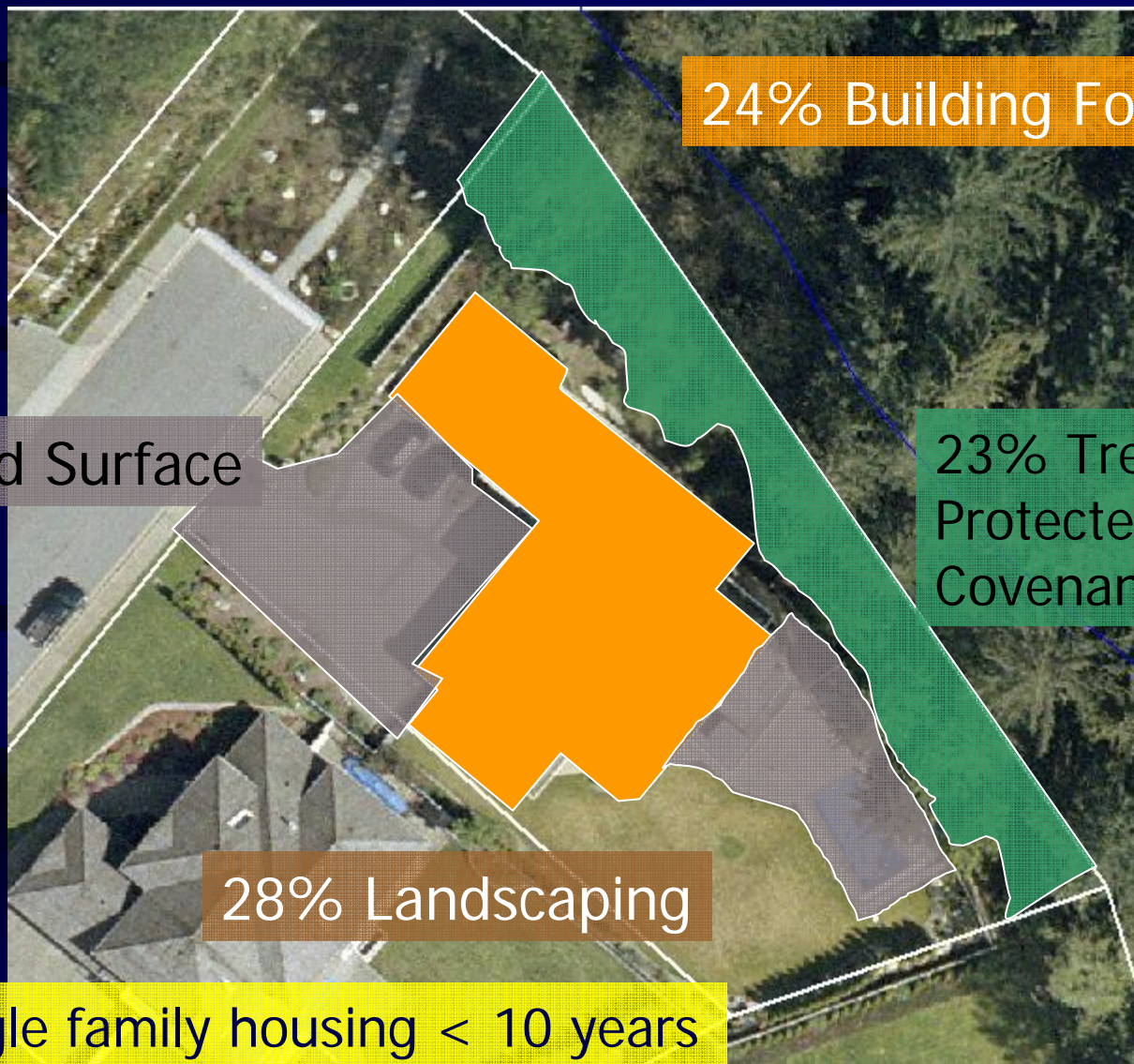
53% Tree Canopy

19% Hard Surface

15% Landscaping

Single family housing >50 years
Different appreciation for space

Total lot area = 21,300 sq. ft.



24% Building Footprint

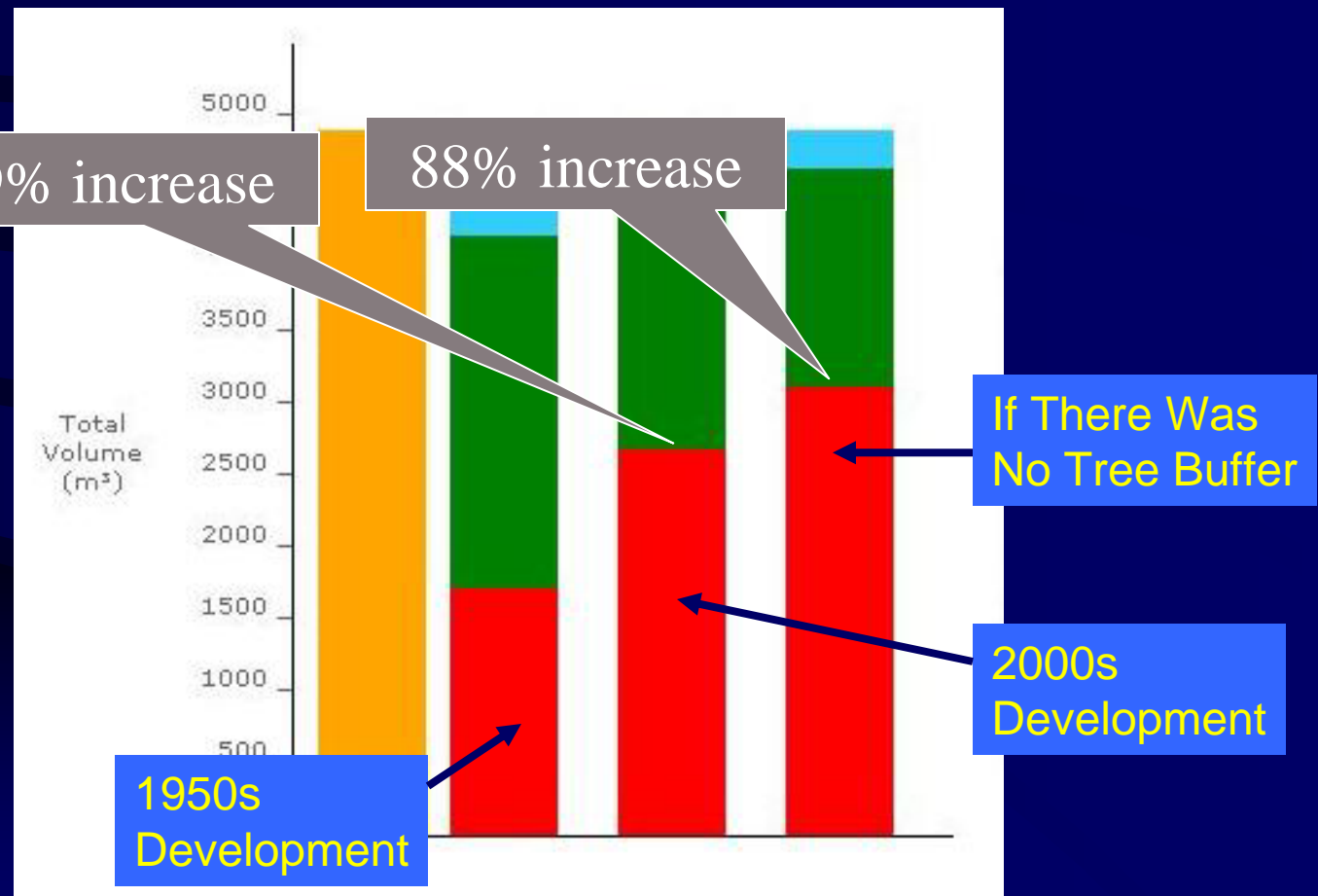
25% Hard Surface

23% Tree Canopy Protected By Creek Covenant

28% Landscaping

New single family housing < 10 years
Different appreciation for space

When Properties are Redeveloped: Annual Rainfall Runoff Volumes Can Easily Double

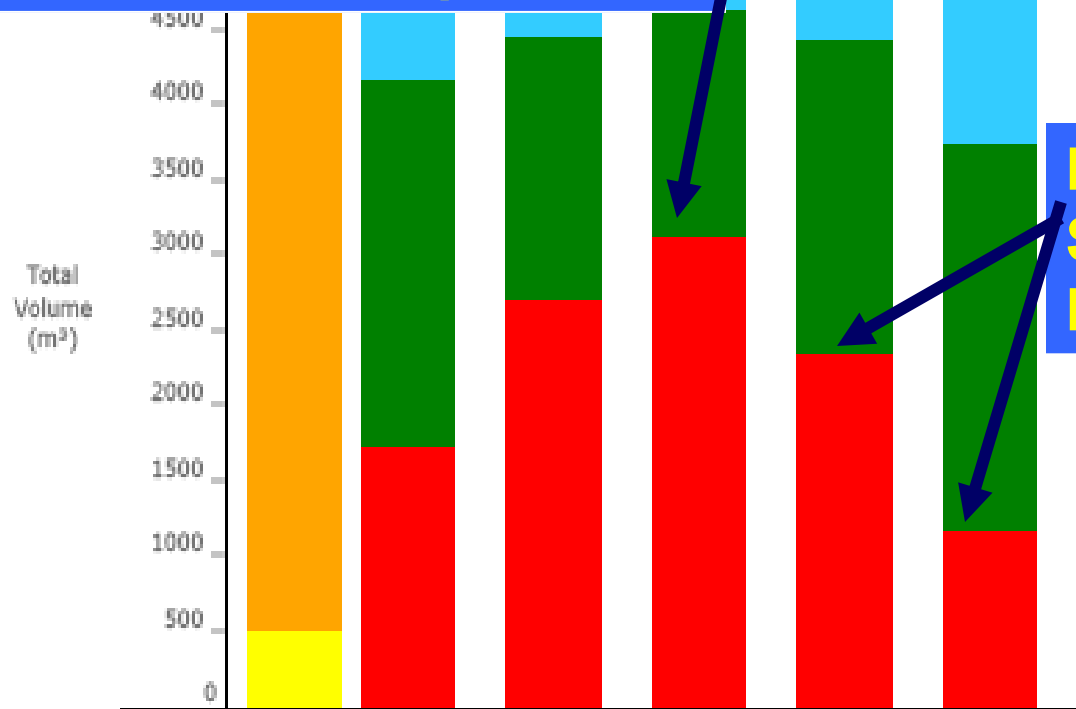


Greener, Smarter Development Could Look Like This:



KEY MESSAGE: Design with Nature to Reduce Rainwater Runoff Volume

Runoff Volume for 2000s
Form of Development

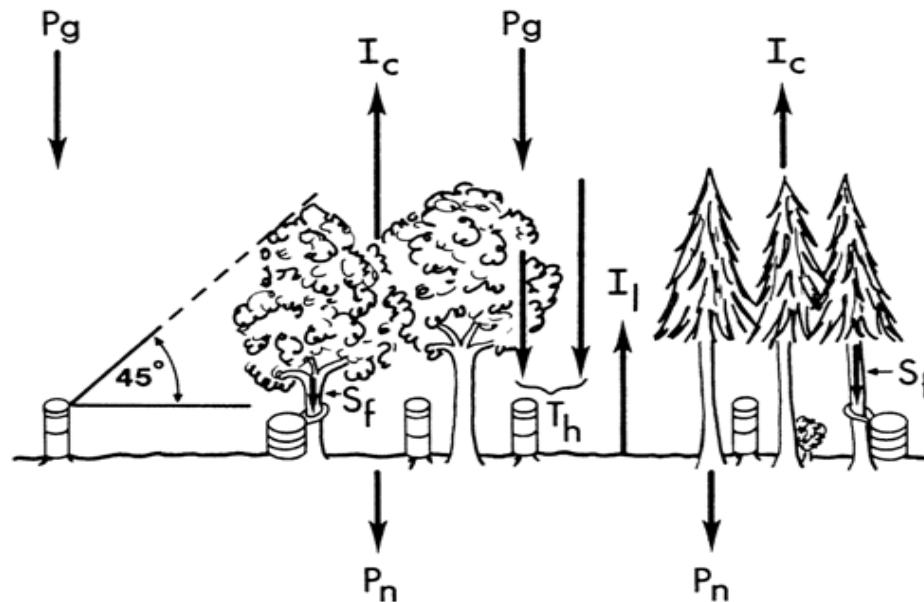


Effective Use of Trees,
Soil and Vegetation
Reduces Runoff Volume



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A **Tree Canopy Module** has been developed through a 3-way partnership with the **University of British Columbia** and the **Urban Forest Research Center** at the University of California (Davis)



$$\text{Interception total } I = I_c + I_l$$

$$\text{The amount reaching the forest floor} = T_h + S_f$$

$$\text{Interception by canopy (overstory + understory) } I_c = P_g - T_h - S_f$$

$$\text{Net precipitation } P_n = T_h + S_f - I_l$$



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NEXT:

Integration with QUALHYMO
will provide engineers with “one-stop shopping” for:

Rainwater Storage Routing

Water Quality

Stream Erosion

Drainage Area Flow Routing

Snowmelt Runoff

Build a Vision, Create a Legacy

- **Issue:** How Will We Accommodate Settlement Pressures?
- **Impact:** The Landscape is Being Transformed
- **Sustainability:** *Means Design with Nature*
- **Built Environment:** We Can Improve It
- **Natural Environment:** We Can Protect It
- **Cumulative Benefits:** Accrue Over Time
- **Desired Outcome:** Sustain Community Livability