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Taking Green Infrastructure Mainstream in BC

Andrew Kolper, P.Eng.

British Columbia

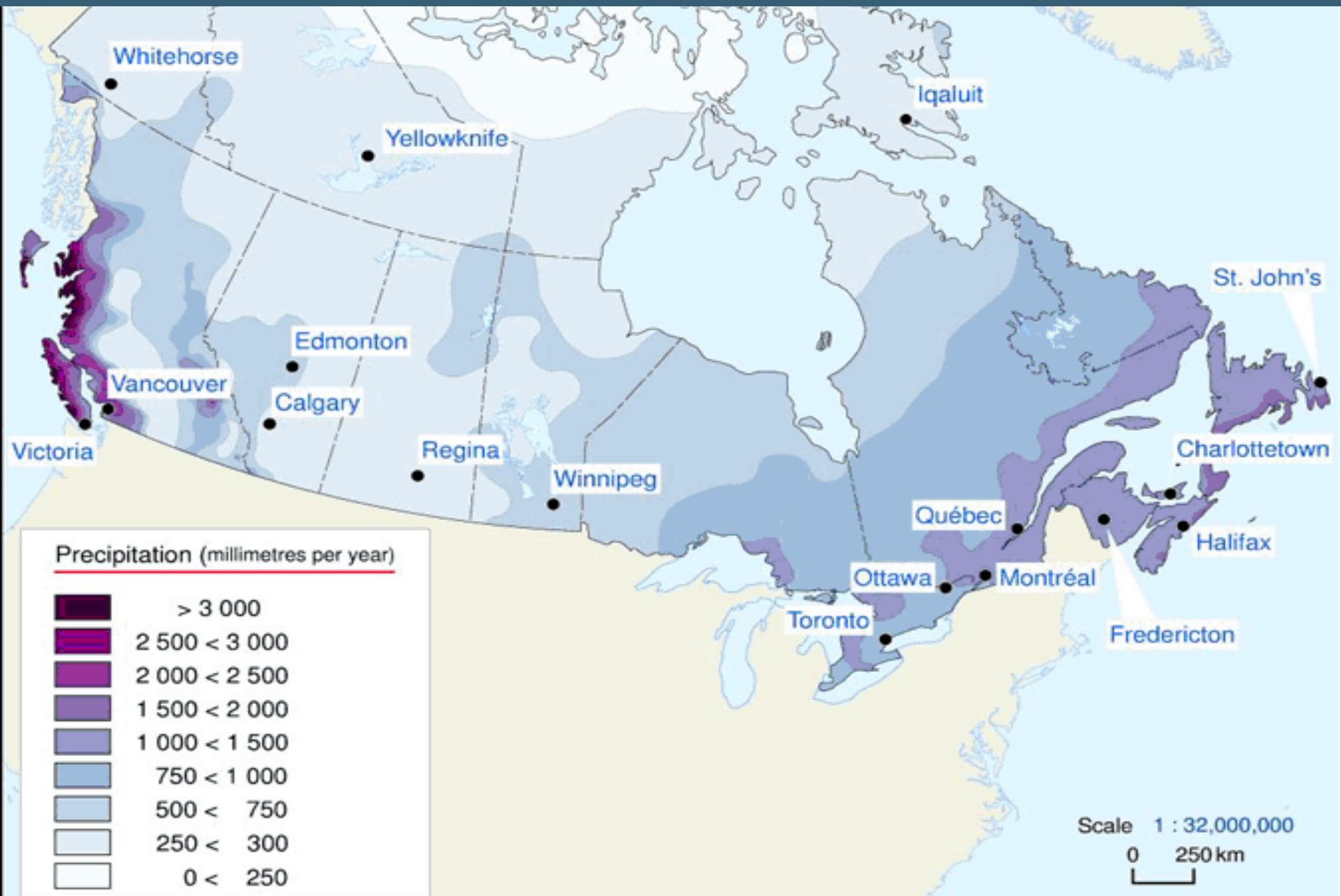
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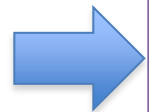
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Wet Coast vs Ontario Precipitation



1. BC's Journey to Green Infrastructure



**Integrated Stormwater Management Plans
for Urbanizing Watersheds, 2002 - Present**



Guidance Documents



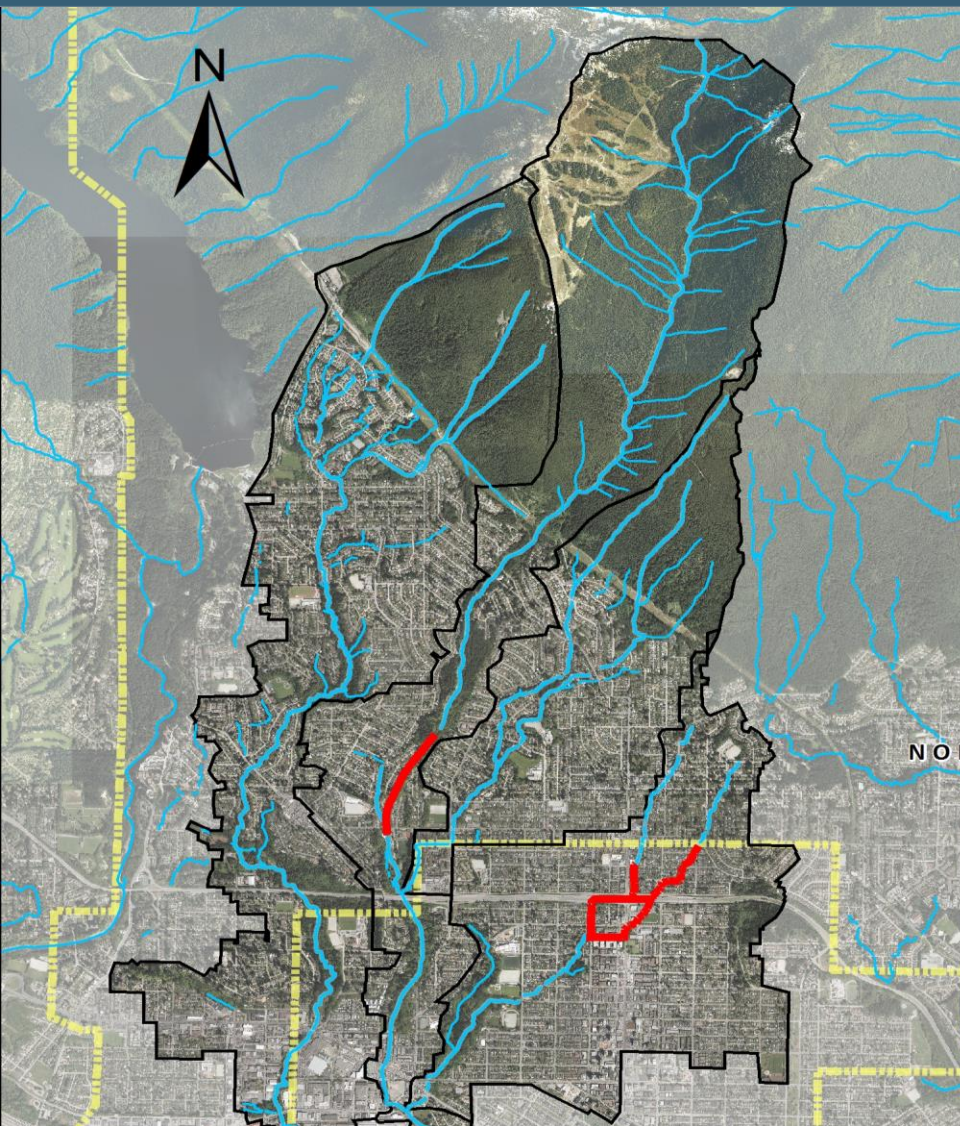
LID Projects

2. Current Initiatives

1. Updating Municipal Bylaws
2. Monitoring & Adaptive Management
3. Research & Development with UBC
4. Wide Implementation of LID

Integrated Stormwater Management Plans

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What are they?

- Watershed Based
- Holistic Approach
- Integrated – engineers, biologist, land use planners, hydrogeologists, stakeholders
- Allow Development / Redevelopment to proceed while Protecting the Environment



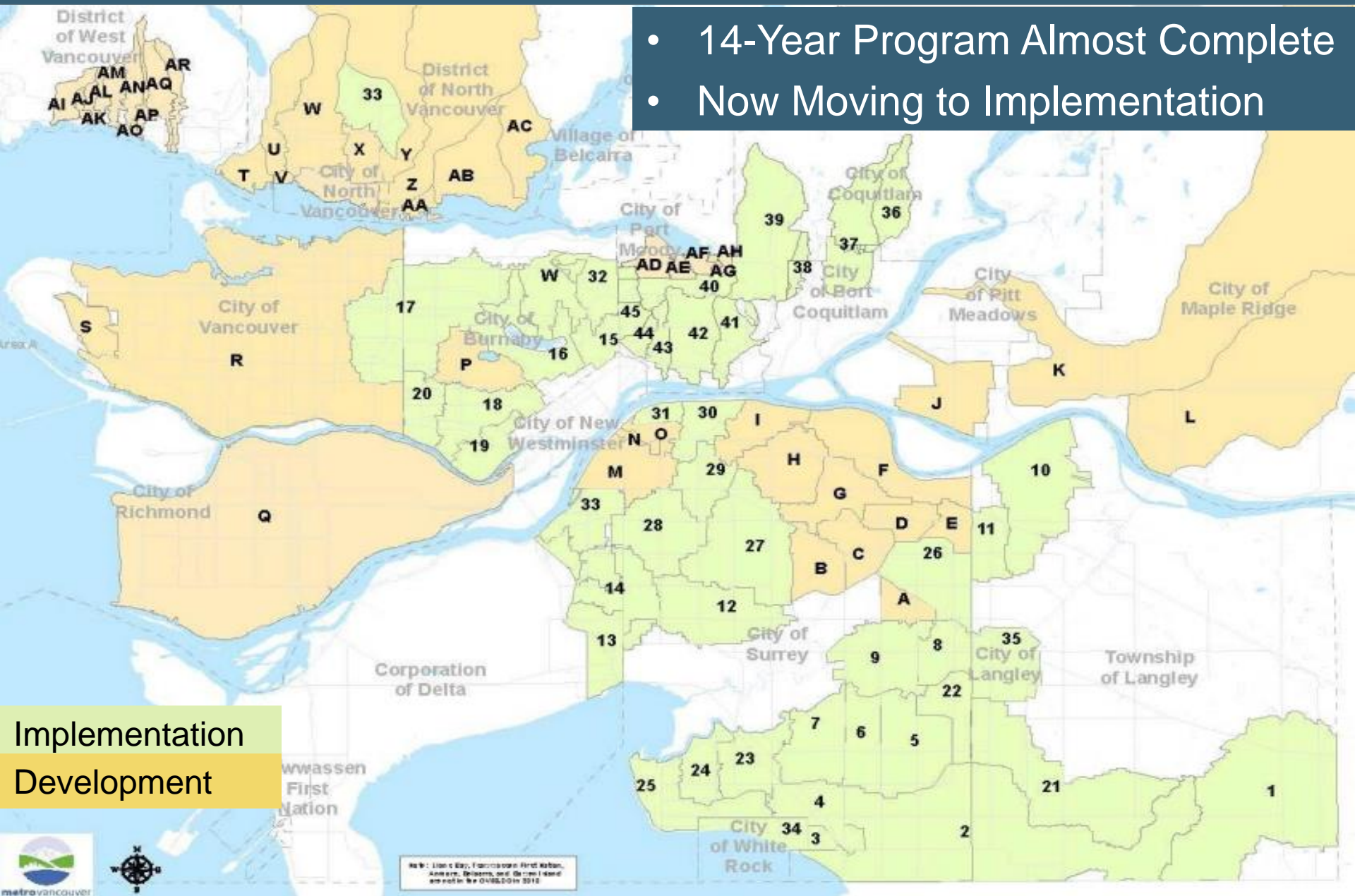
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ISMPs in Metro Vancouver

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- 14-Year Program Almost Complete
- Now Moving to Implementation



Stormwater Source Control Guidelines, 2005/2012

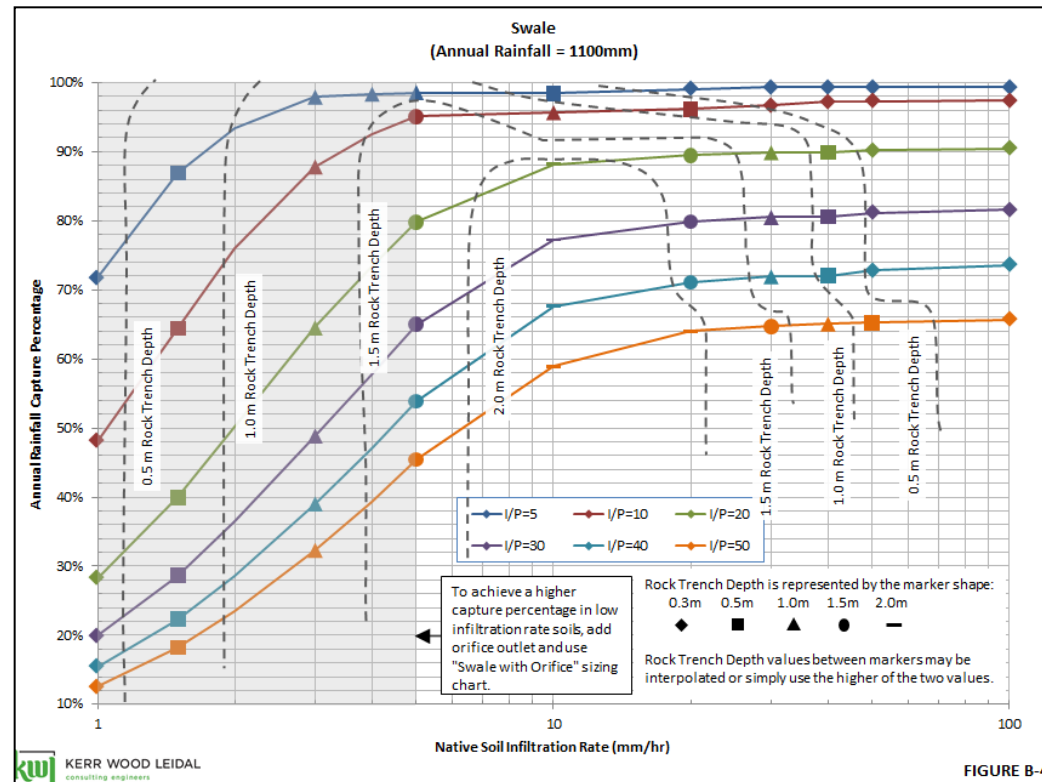
Stormwater Source Control Design Guidelines 2012



Lanarc Consultants Ltd.
Kerr Wood Leidal Associates Ltd.
Goya Ngan

DRAFT REPORT

Update
February 2012



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Region-wide Baseline for Rainwater Management, 2015

September 2015

Options for a Region Wide Baseline for On-Site Rainwater Management

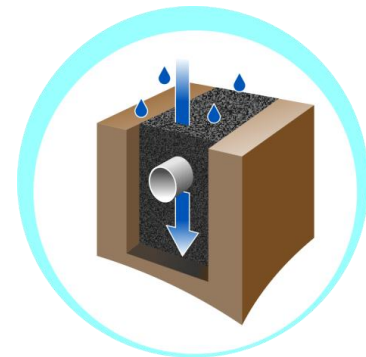
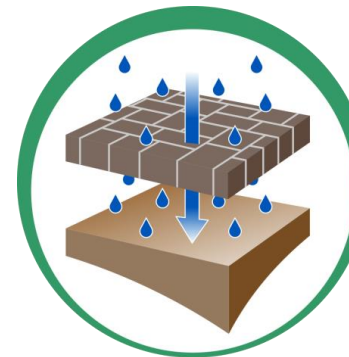
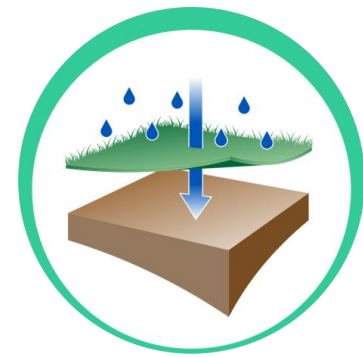
Final Report



Prepared by

Kerr Wood Leidal Associates Ltd.

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

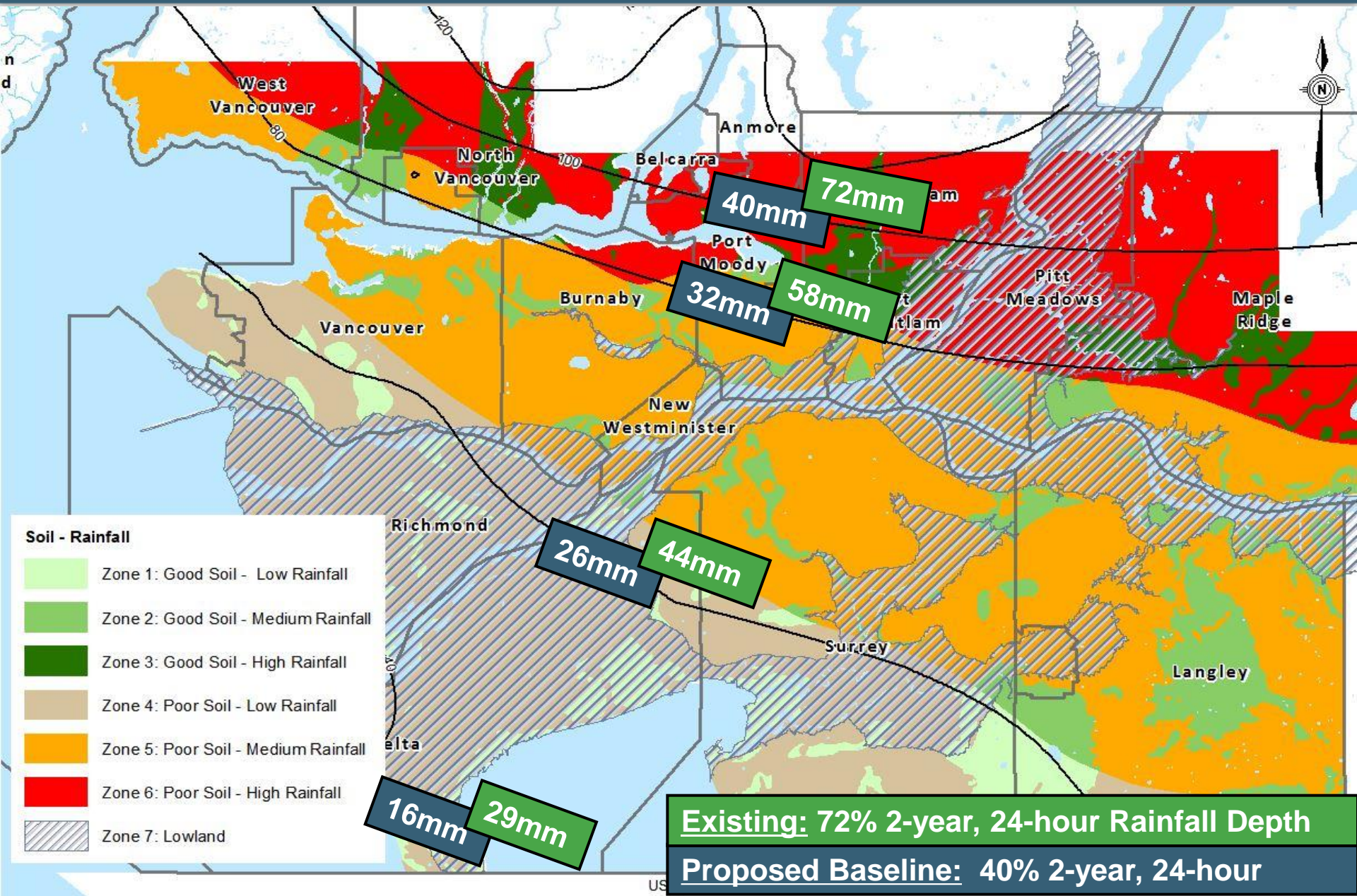


Full Criteria:

**Limit Runoff to 10% Annually
Capture 72% 2-Year 24-Hour Event**

Baseline Criteria

**Limit Runoff to 25% Annually
Capture 40% 2-Year 24-Hour Event**





Stormwater Utility Develop Case Studies Update Rainwater Management Standards

Rainwater Rewards Incentive Program

To encourage Rainwater Management
Sliding scale of incentives based on:

- Effectiveness of RWM
- Impervious area treated
- Property type
 - Low Density Residential
 - One-time rebates up to \$1500
 - On-going credits of 10%
 - All other Property Types
 - Up to 40% credit
 - Up to 10% additional for Education



LID Planning, Design, Construction, Monitoring

Silver Ridge Development, Maple Ridge

VOLUME CAPTURE **Flow Monitoring 2005-07**

- Confirmed infiltration rate (1 mm/hr). **2008-09**
- Captured 80-88% frequent events

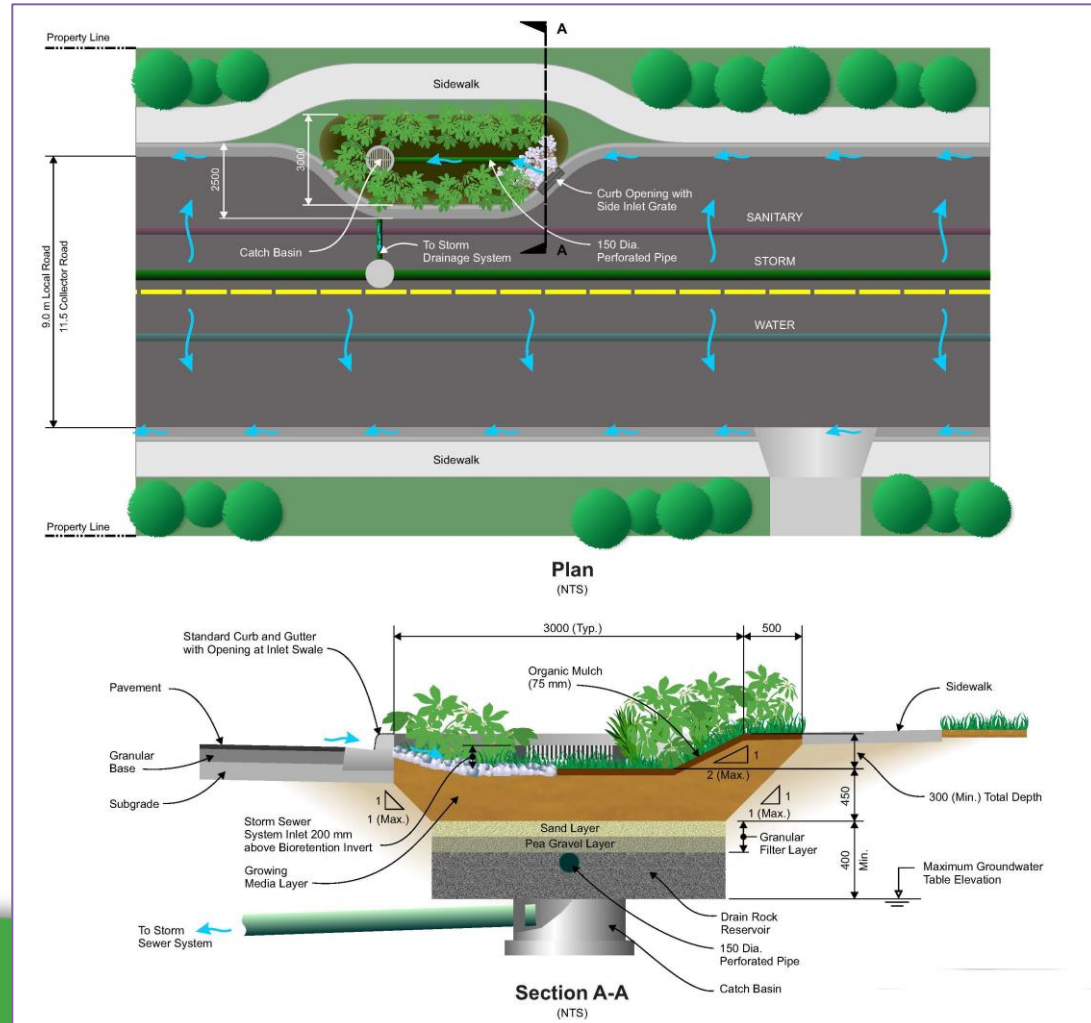
WQ TREATMENT **WQ Monitoring 2012-14**

- 92% Reduction in TSS (strong)
- Reduction in Metals (strong)
- Reduction in TKN, TP, TOC (weak)

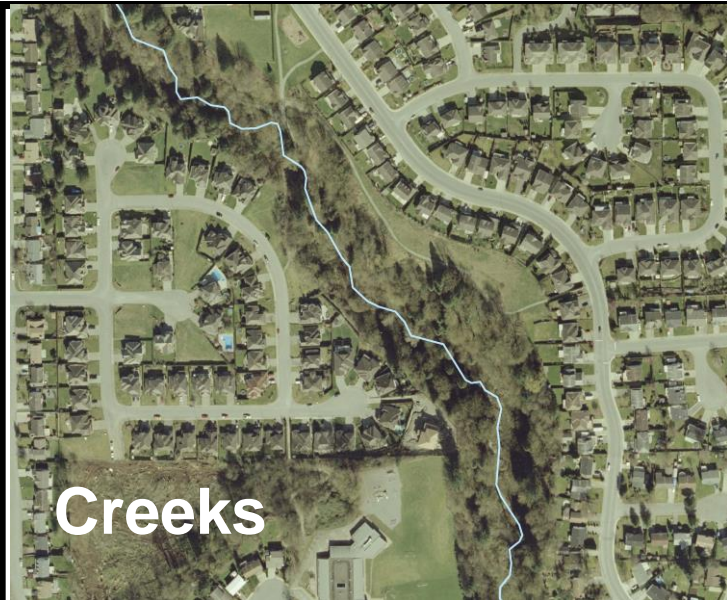


1. Updating Municipal Bylaws to Include LID Criteria & Standards

- Requirements of Development / Redevelopment
- Watershed Specific or City-wide Criteria & Targets
- Update Standards



Draining to Sensitive Creek or Directly to Ocean?



Creeks

- Water Quality
- Volume Reduction
- Rate Control



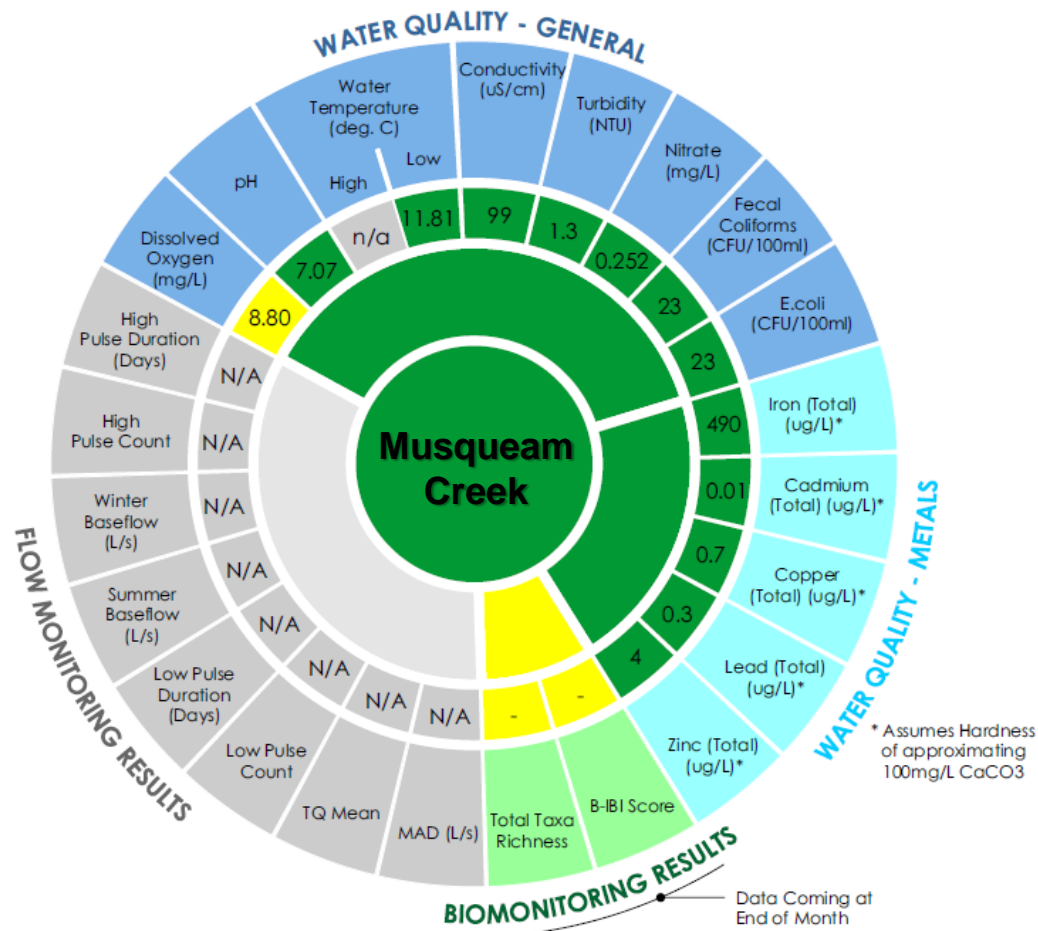
Sharing Our Watersheds

Ocean
Lake
Large River

Salmon, streams, stormwater, and you...

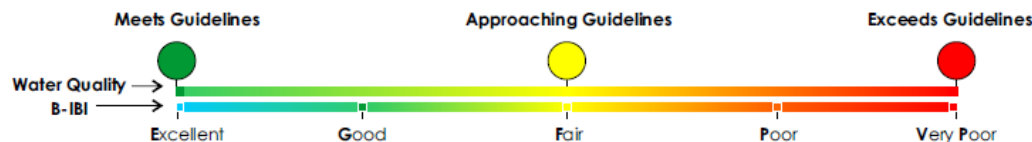
- Water Quality

2. Post-ISMP Monitoring & Adaptive Management

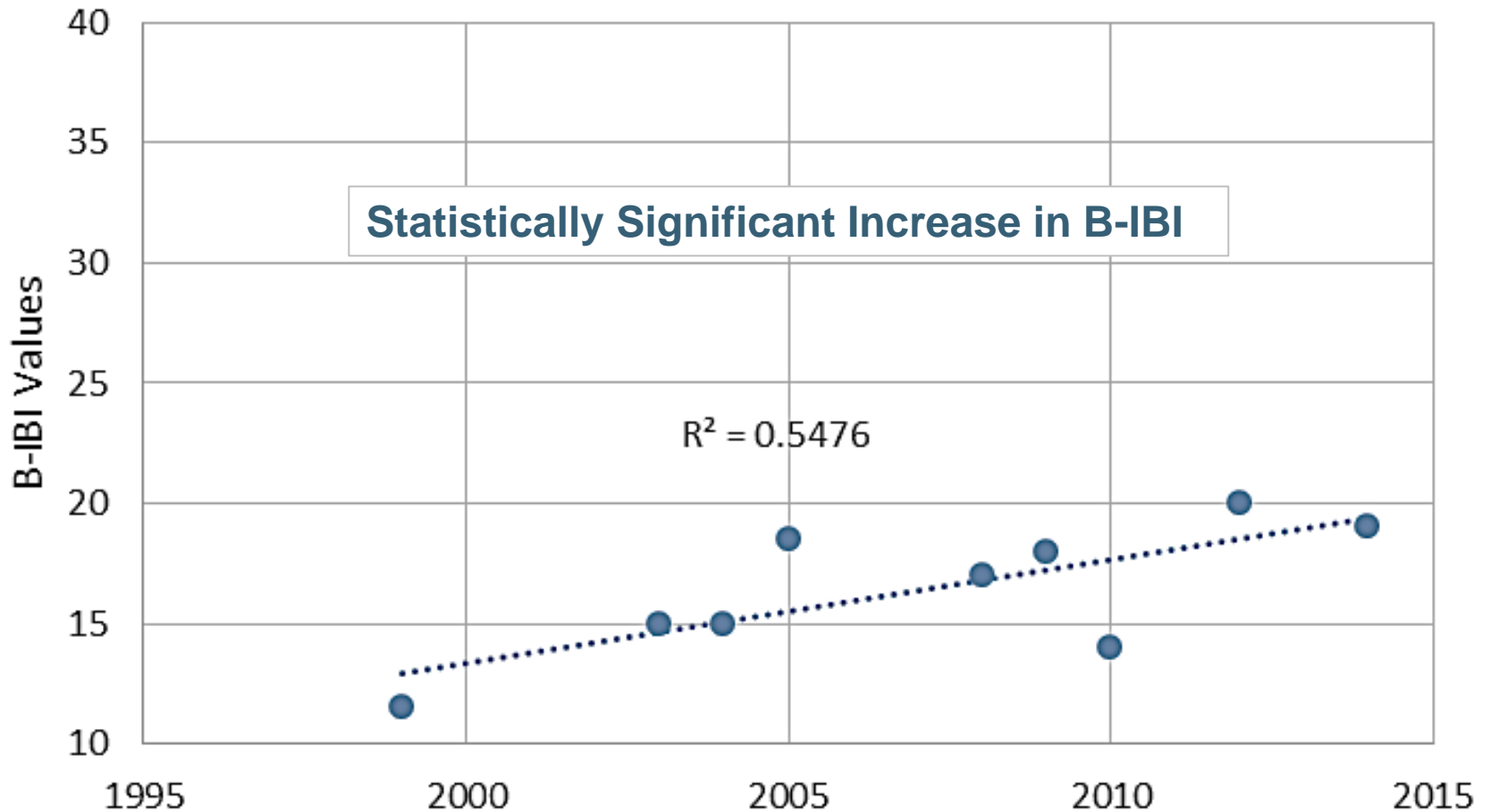


Monitoring Watershed Health Performance Indicators

- What is the data telling us?
- Are watershed goals being met?
- Are LIDs & BMPs working as envisioned & designed?



Wagg Creek Watershed



B-IBI & Flow Monitoring since 1999

3. KWL Research & Development with UBC

- Reduce nutrient loads from runoff & rain gardens
- Test effectiveness of wetland design to reduce contaminants, particularly metals using bacterial DNA
- Test different green roof configurations to increase attenuation of runoff



Current Initiatives



4. Wide Spread LID Implementation

City of Vancouver

Greenest City
Action Plan

Climate Change
Adaptation
Strategy

Integrated
Rainwater
Management
Plan

Green Infrastructure Program



Questions?



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- akolper@kwl.ca