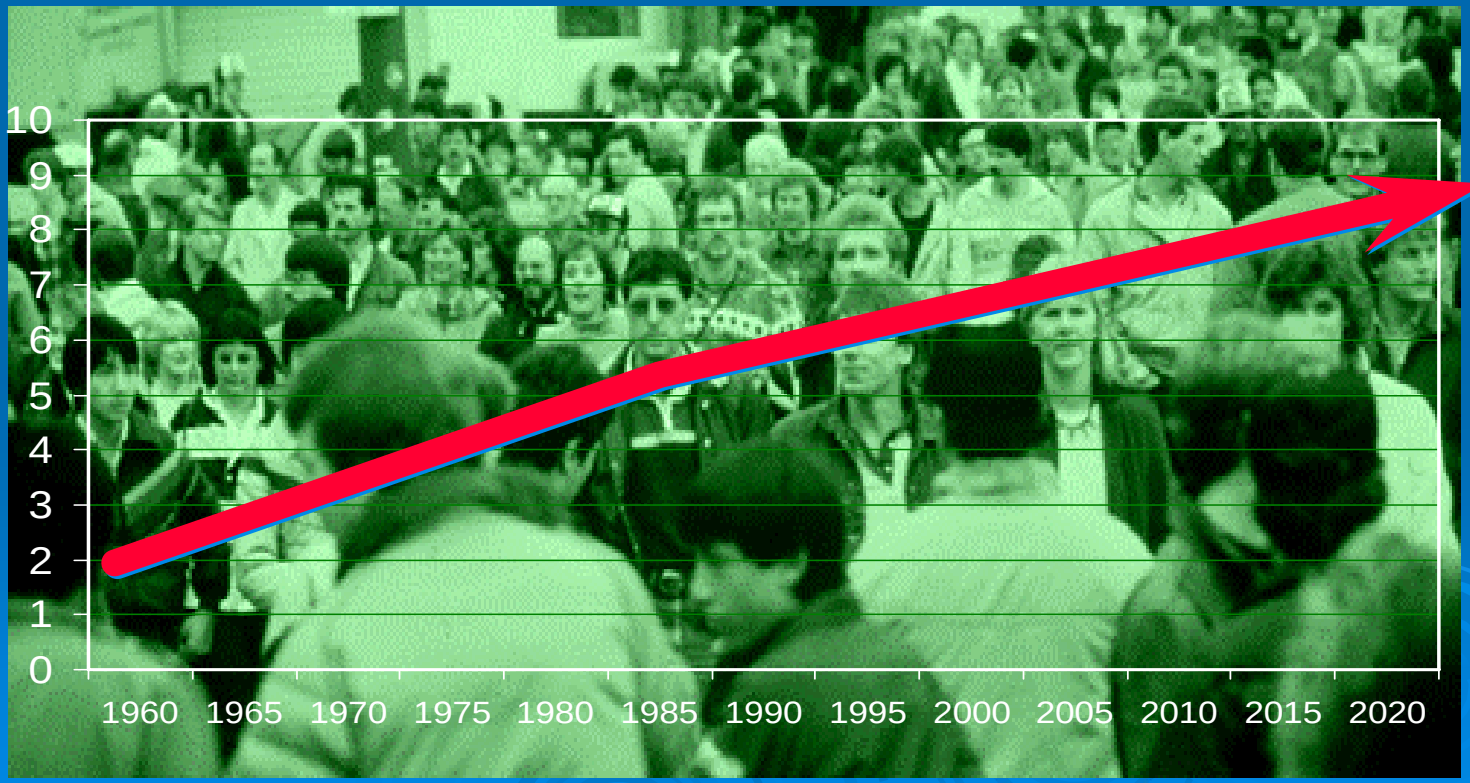
Greater Vancouver Regional District
The Sustainable Region Initiative
Sustainability Community Breakfast Series

Changing the Way We Develop Land: *Design with Nature*

Mayor Pam Goldsmith-Jones and the Green Infrastructure Partnership

December 13, 2006

The Core Issue:
How Will We Accommodate
A Doubling of the Population &
What Will British Columbia Look Like Then?



Presentation Road Map

- Create the Vision, Build the Legacy
- Convening for Action in British Columbia: Turning Ideas Into Action On-the-Ground
- Celebrating Green Infrastructure: Showcasing Innovation Series
- Green Infrastructure Performance: On-the-Ground Results for East Clayton Sustainable Community
- Implementing Green Infrastructure through Policies and Bylaws
- Design with Nature: Where We Go From Here

In a nutshell, we have three themes:

- Talk
- Action
- Law

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

Green Infrastructure Partnership

THE MISSION: Facilitate implementation of *design with nature* infrastructure practices and regulation province-wide

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BCWWA

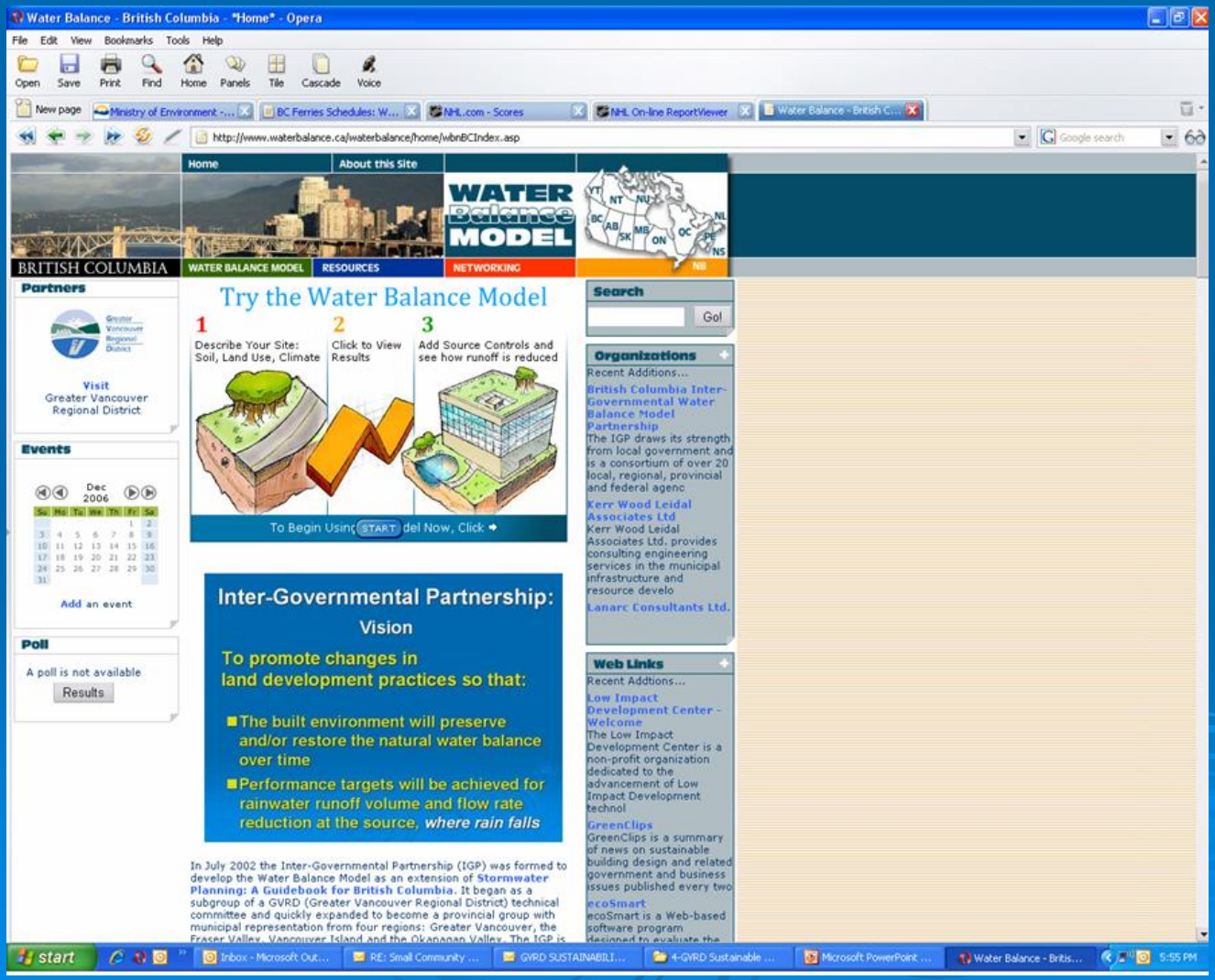
Who are we?

Our Mission

Safeguarding public health and the environment through sharing of skills, knowledge and experience in the water and wastewater industry

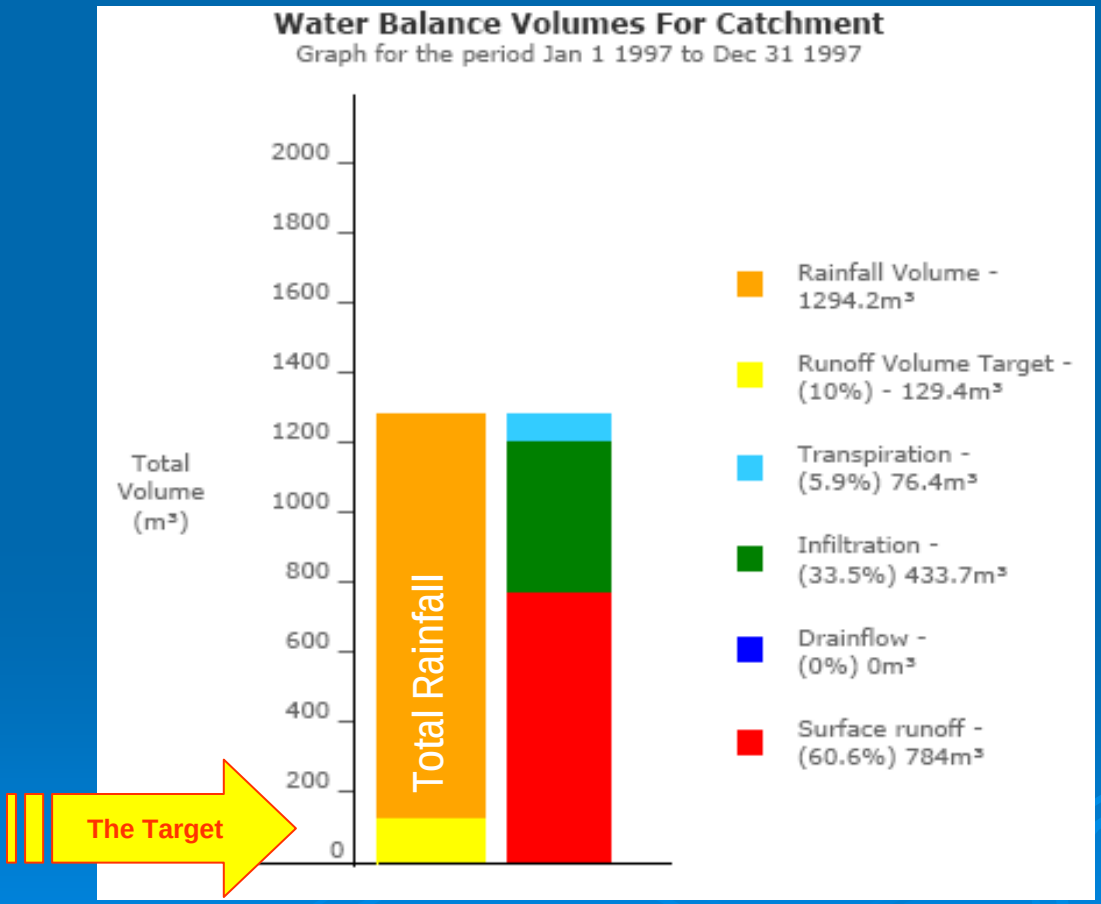
Water Sustainability Action Plan for BC

Water Balance Model



Water Balance Model

Single Family Residential Example



North Vancouver

WATER Balance MODEL FOR BRITISH COLUMBIA

www.waterbalance.c

WBM Partners

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

Greater Vancouver Regional District

SURREY CITY OF PARKS

BRITISH COLUMBIA

west vancouver
THE WATERFRONT COMMUNITY

CITY OF COQUITLAM

CITY OF COURTENAY

ALIDP
Alberta Low Impact Development Partnership

THE CITY OF CALGARY

BCWWA
British Columbia Water & Waste Association

CMHC SCHL
HOME TO CANADIANS

Township of Langley

City of Chilliwack

the city of NORTH VANCOUVER

CITY OF Abbotsford
Est. 1873

City of Kelowna

DISTRICT OF HIGHLANDS

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

DISTRICT OF METCHOSIN
INCORPORATED 1984

THE REAL ESTATE FOUNDATION OF BRITISH COLUMBIA

MAPLE RIDGE
Incorporated 12 September, 1874

CITY OF VANCOUVER

UDI
URBAN DEVELOPMENT INSTITUTE
pacific region

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

www.greeninfrastructure.ca

WaterBucket Website Partnership

Convening for Action:

Turning Ideas into Action

- **What** is the problem?
- **So What** can be done about it?
- **Now What** will be done?
- **Then What** – adaptive management

When ‘convening for action’, we build capacity by creating a picture of the future:

1. **Vision:** What do you want this place to look like in 20 years, 50 years?
2. **Starting Point:** What are you doing to achieve this?
3. **Strategy:** What are you going to do better or differently to get from here to there?

When ‘convening for action’, we also build capacity by showing how to create the future:

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

We are turning ideas into action through regional pilot programs:

- **South Okanagan** –
  Water for Life & Livelihoods
- **Vancouver Island** –
  Framework for Water-Centric Land Development Approvals
- **Greater Vancouver** –
  Celebrating Green Infrastructure & Showcasing Innovation

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A ‘Design with Nature’ approach to community design means…

- Develop compact, complete communities
- Increase transportation options
- Reduce the loads on water, waste and energy systems
- Protect and restore urban ‘green’ space
- Strive for a lighter ‘hydrologic footprint’
- Achieve higher levels of receiving water protection

In May 2005, we convened a Consultation Workshop that resulted in ‘Celebrating Green Infrastructure’

Because it is lonely being a champion, and everyone in local government is so busy, participants expressed a strong desire to pool resources and convene on-the-ground to share ‘how to do it’ experiences

The goal in Showcasing Innovation is to build regional capacity …

… by sharing green infrastructure approaches, experiences and lessons learned as an outcome of '*designing with nature*'.

2006 Showcasing Innovation Series

District of North Vancouver

North Vancouver used a lane, an arterial highway and the Maplewood community to illustrate the benefits of innovation.

Porous Pavement Lane in Lower Capilano

Dollarton Arterial Highway
pioneered use of infiltration

Richard Boase

2006 Showcasing Innovation Series
City of Surrey

The Surrey focus was on what can be accomplished on-the-ground, now and over the next 50 years, to restore watershed function.

East Clayton Sustainable Community

TransLink Hybrid Bus

Councilor Judy Higginbotham explains Council's vision for Campbell Heights Business Park

Jim Dumont presents vision for going "Beyond the Guidebook"

2006 Showcasing Innovation Series
UBC and City of Vancouver

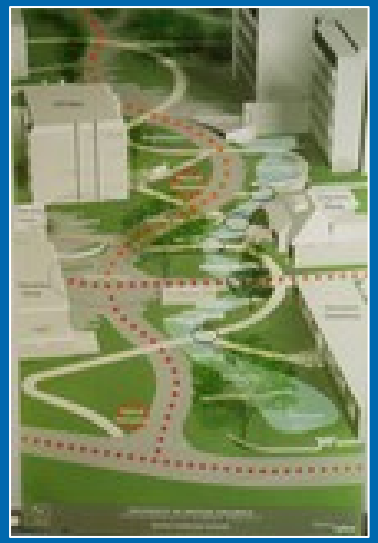
UBC and Vancouver have demonstrated how to build truly ‘green’ streets by integrating rainwater management and transportation design

David Desrochers: “Someone has to build the first one so that others will follow.”

Crown Street

Country Lane

David Grigg: “Beyond the Moment”



Sustainability Street

Connecting People – We Make It Easy!

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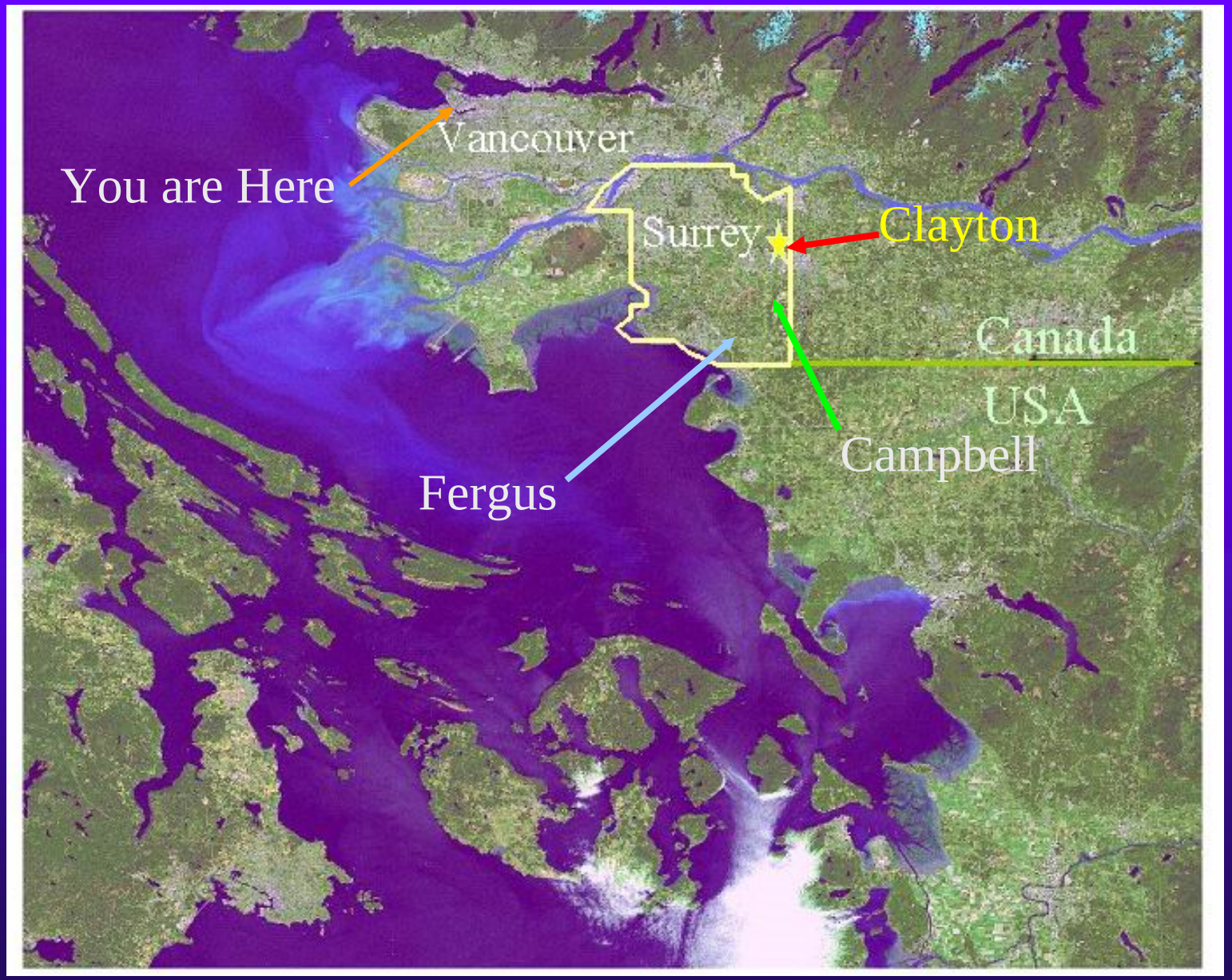
Practical Examples



Lowlands

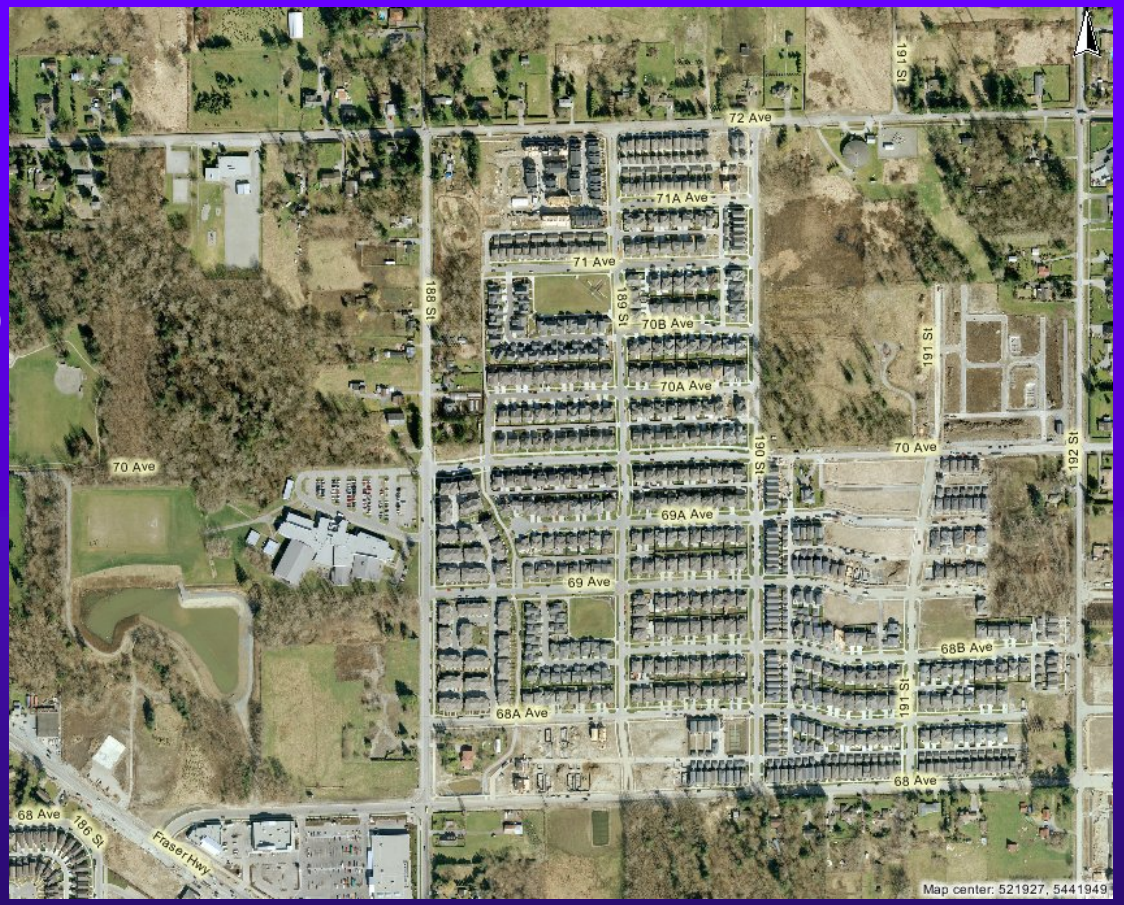
Volume & Flow Rate

The Problem of Development

- **Development is Change**
  - Housing is needed
- **Land Change = Environment Changes**
  - Potential Flooding
  - Potential Erosion

Objectives

- Control Runoff Volume to Pre-Development
- Control Runoff Rates to Pre-Development



Solutions

- **No development**
- **Develop with Best Management Practices**
  - Disconnect Roof Leaders
  - Provide more soil to absorb water
  - Soak water back into the ground

Disconnected Roof Leaders

- Disconnect roof water from the drain
- Requires more time to flow to the storm sewer
- Water faces many perils on its way to the storm sewer; Plants consume it, animals drink it, heat evaporates it, soil absorbs it.
- The journey improves it.

Disconnected Roof Leaders

Low Tech

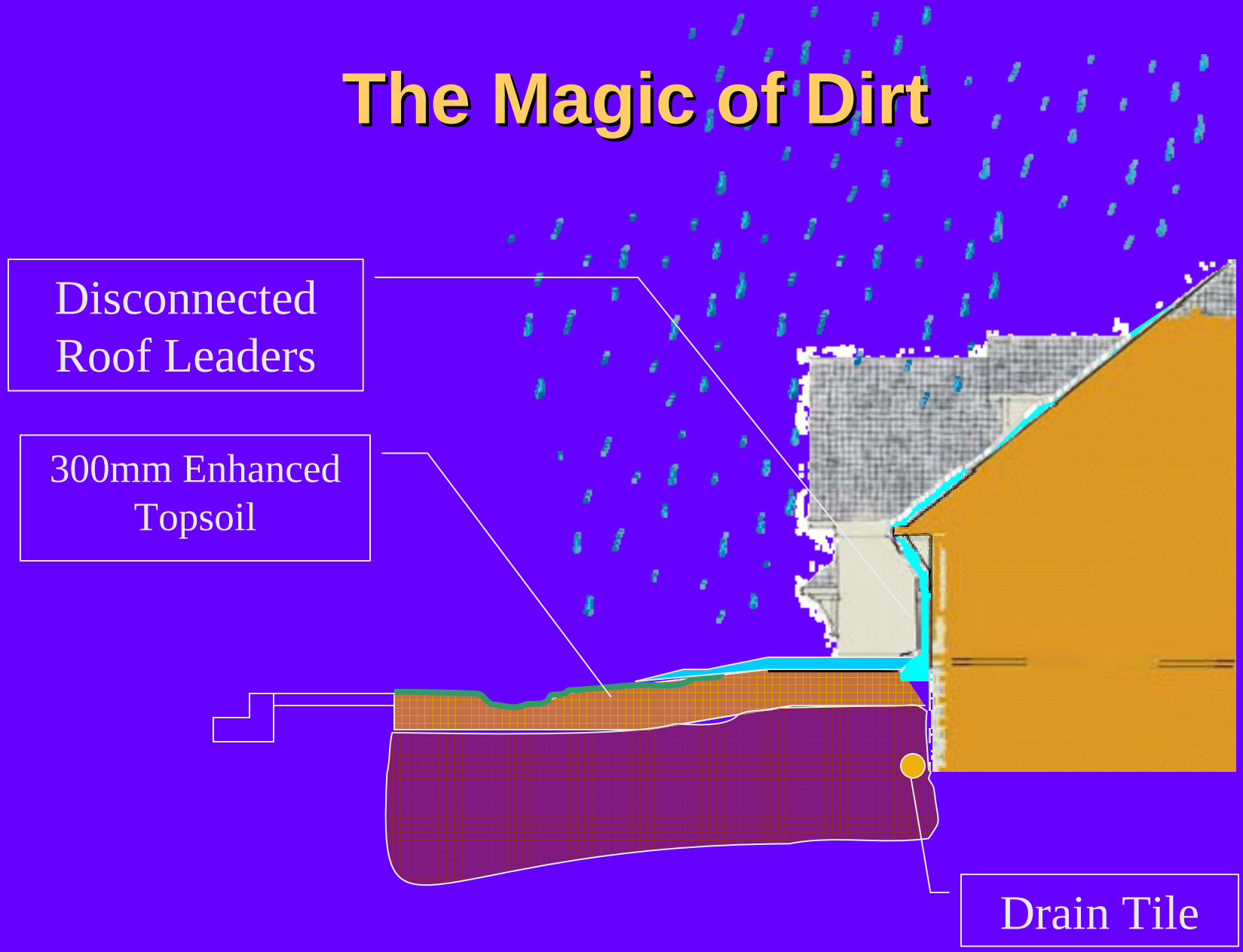
Easy to maintain

Absorbent Landscape

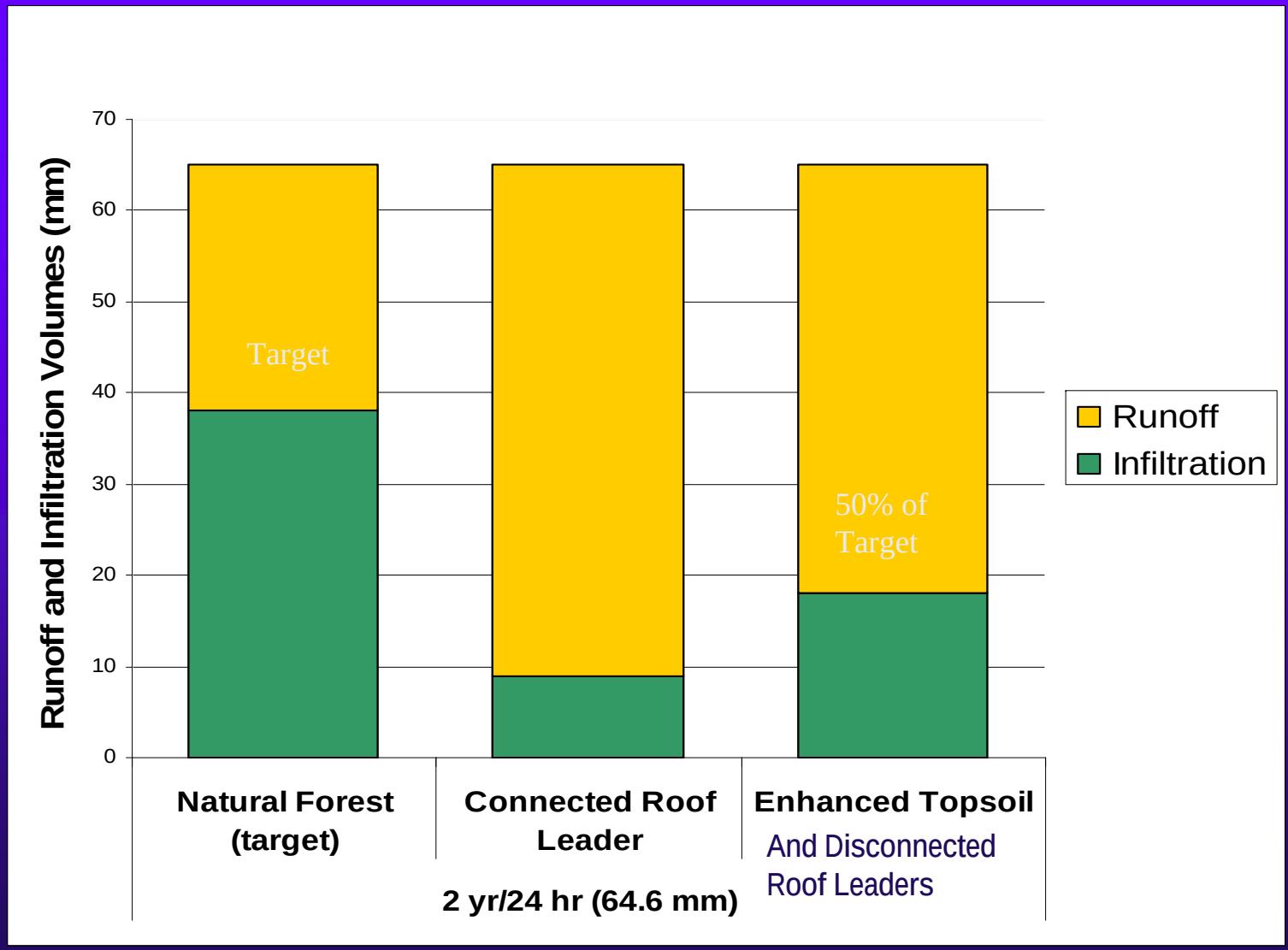
- **Landscaping absorbs water:**
  - Landscape soils
  - Plants
  - Depression Storage
- **Basic Absorbent Landscape = Dirt & Grass**

300 mm Top Soil - Dirt Cheap

The Magic of Dirt



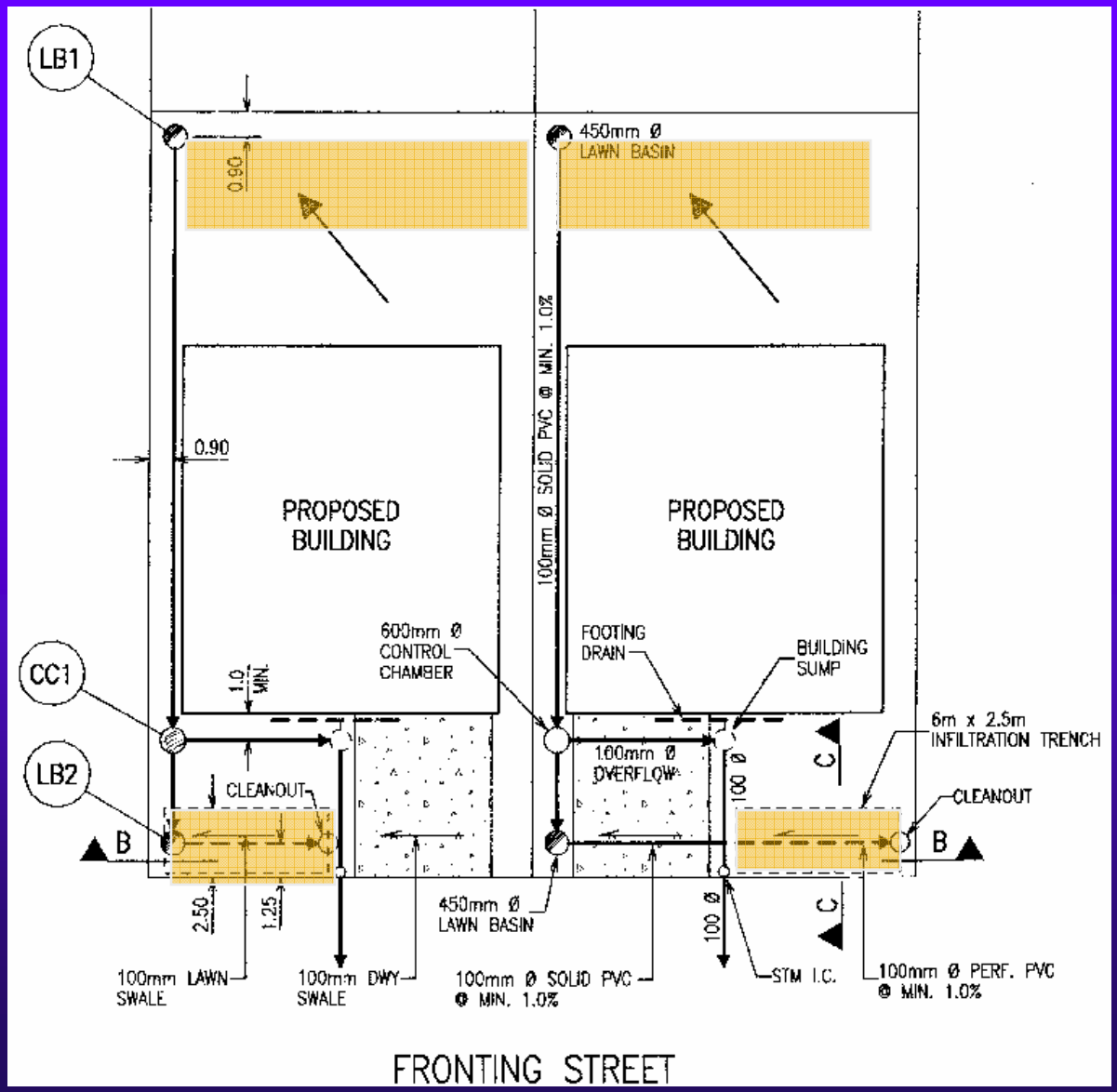
Effectiveness



Soaking it Away

- Replace the original exfiltration with a more compact version.
- Increased depth and longer contact time

In My Yard


LB1
450mm Ø
LAWN BASIN
0.90
0.90
PROPOSED
BUILDING
PROPOSED
BUILDING
100mm Ø SOLID PVC @ MIN. 1.0%
600mm Ø
CONTROL
CHAMBER
1.0
MIN.
FOOTING
DRAIN
BUILDING
SUMP
CC1
LB2
CLEANOUT
100mm Ø
OVERFLOW
100 Ø
6m x 2.5m
INFILTRATION TRENCH
CLEANOUT
B
B
C
C
2.50
1.25
450mm Ø
LAWN BASIN
100 Ø
100mm LAWN
SWALE
100mm DWY
SWALE
100mm Ø SOLID PVC
@ MIN. 1.0%
STM I.C.
100mm Ø PERF. PVC
@ MIN. 1.0%
FRONTING STREET

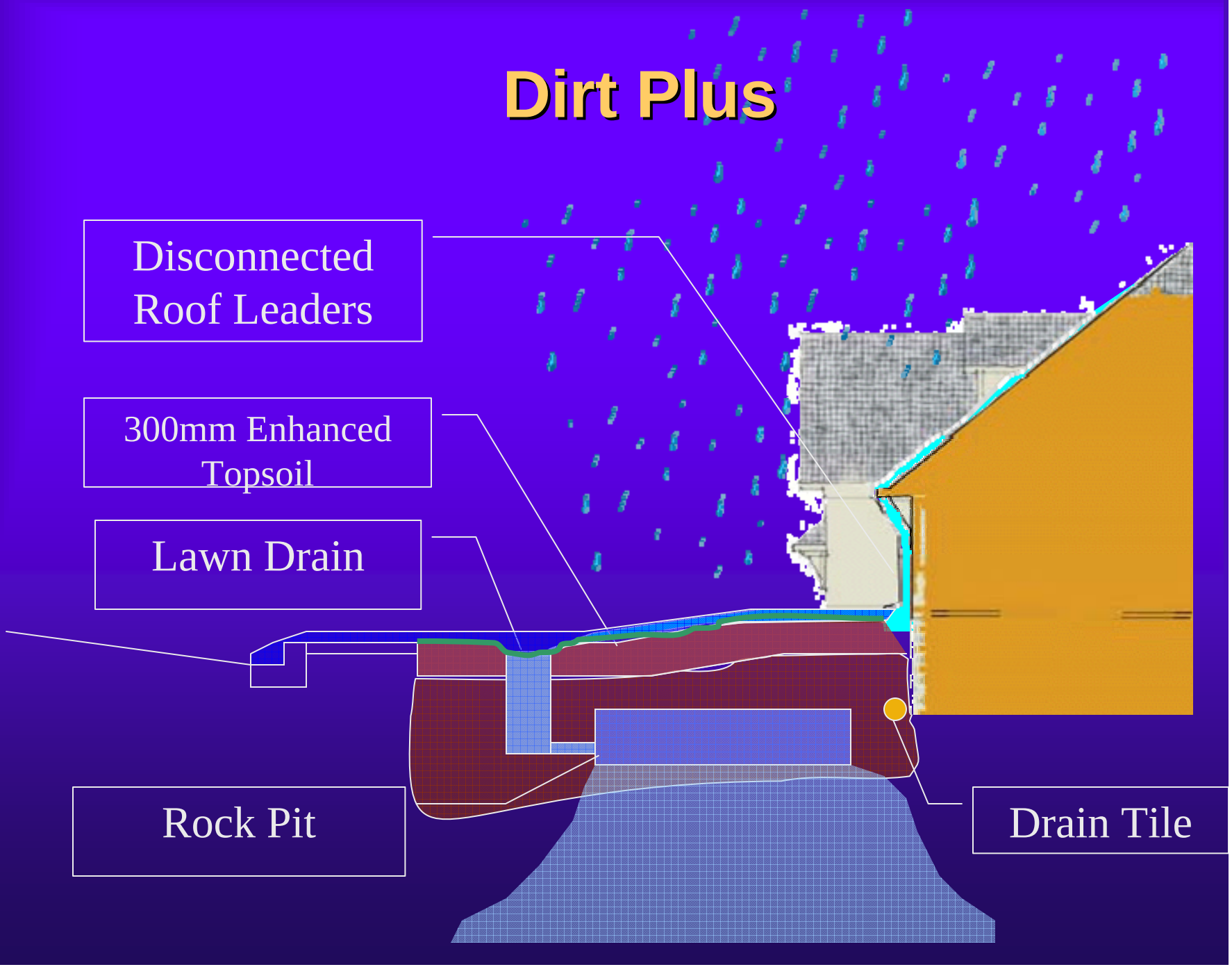
Exfiltration Device

Finished Inlet

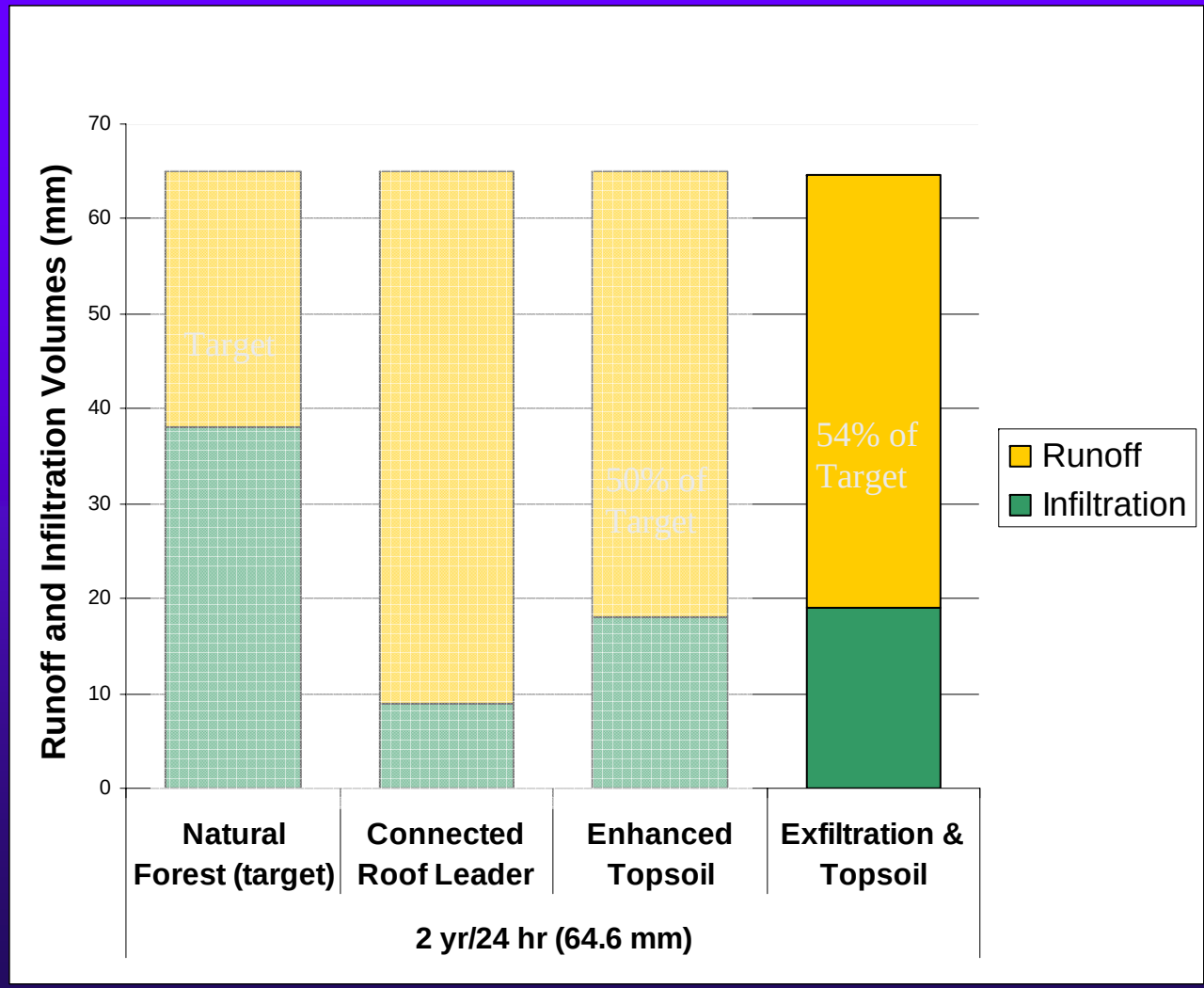
Rear yard lawn basin

Front Yard Inlet

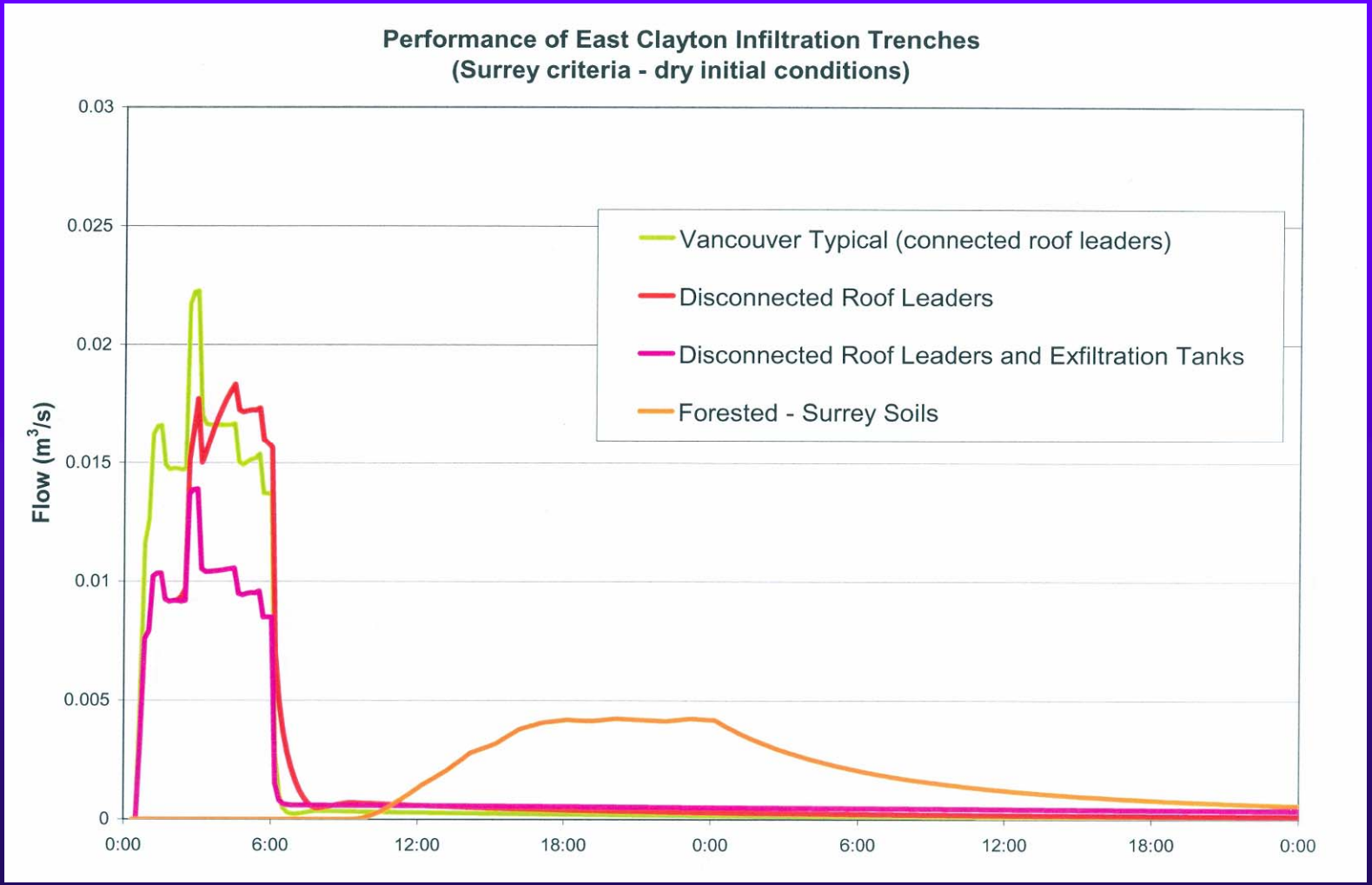
Dirt Plus


Disconnected Roof Leaders
300mm Enhanced Topsoil
Lawn Drain
Rock Pit
Drain Tile

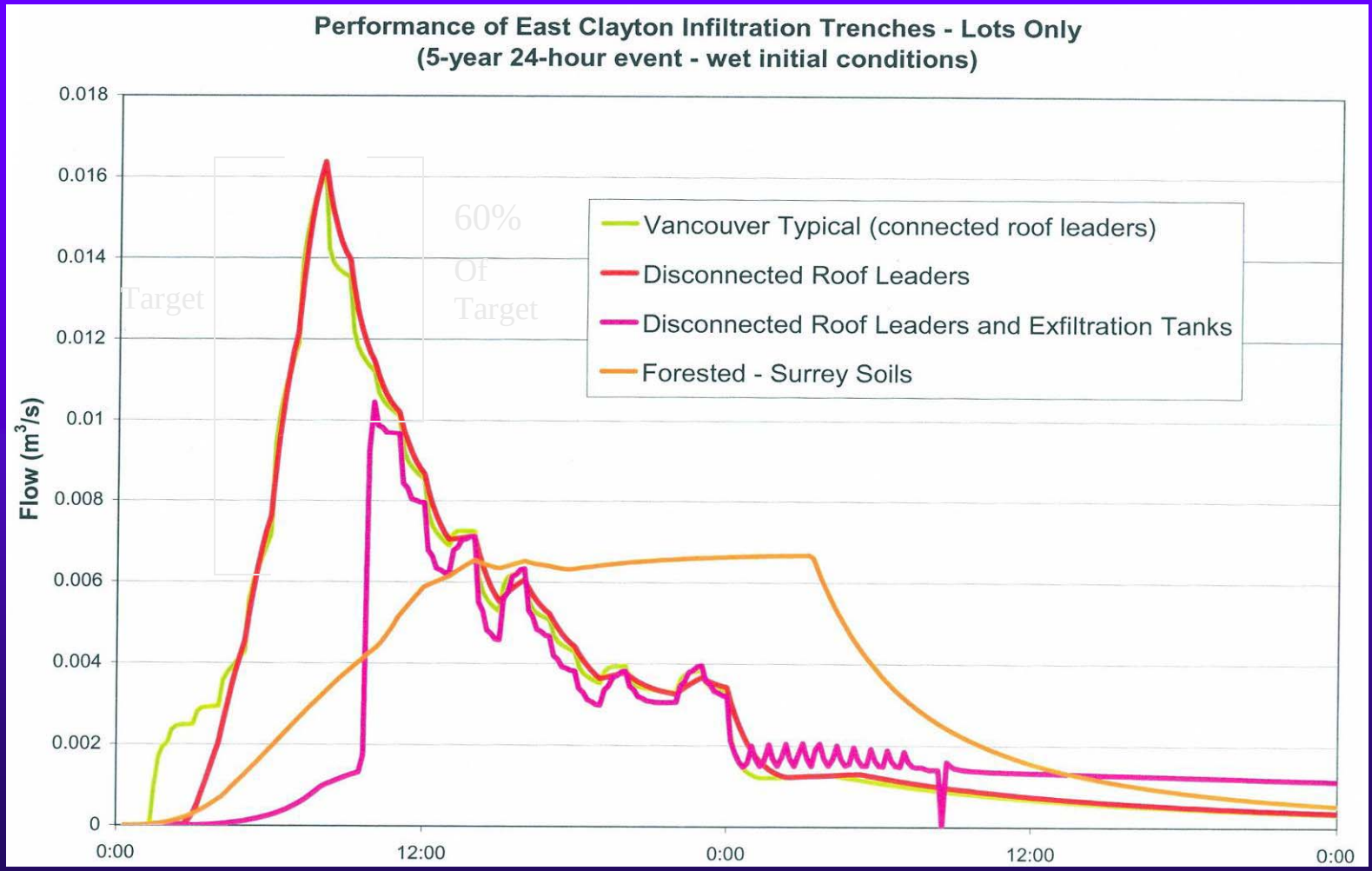
Effectiveness – Volume Reduction



Effectiveness – Peak Rate Control
Dry



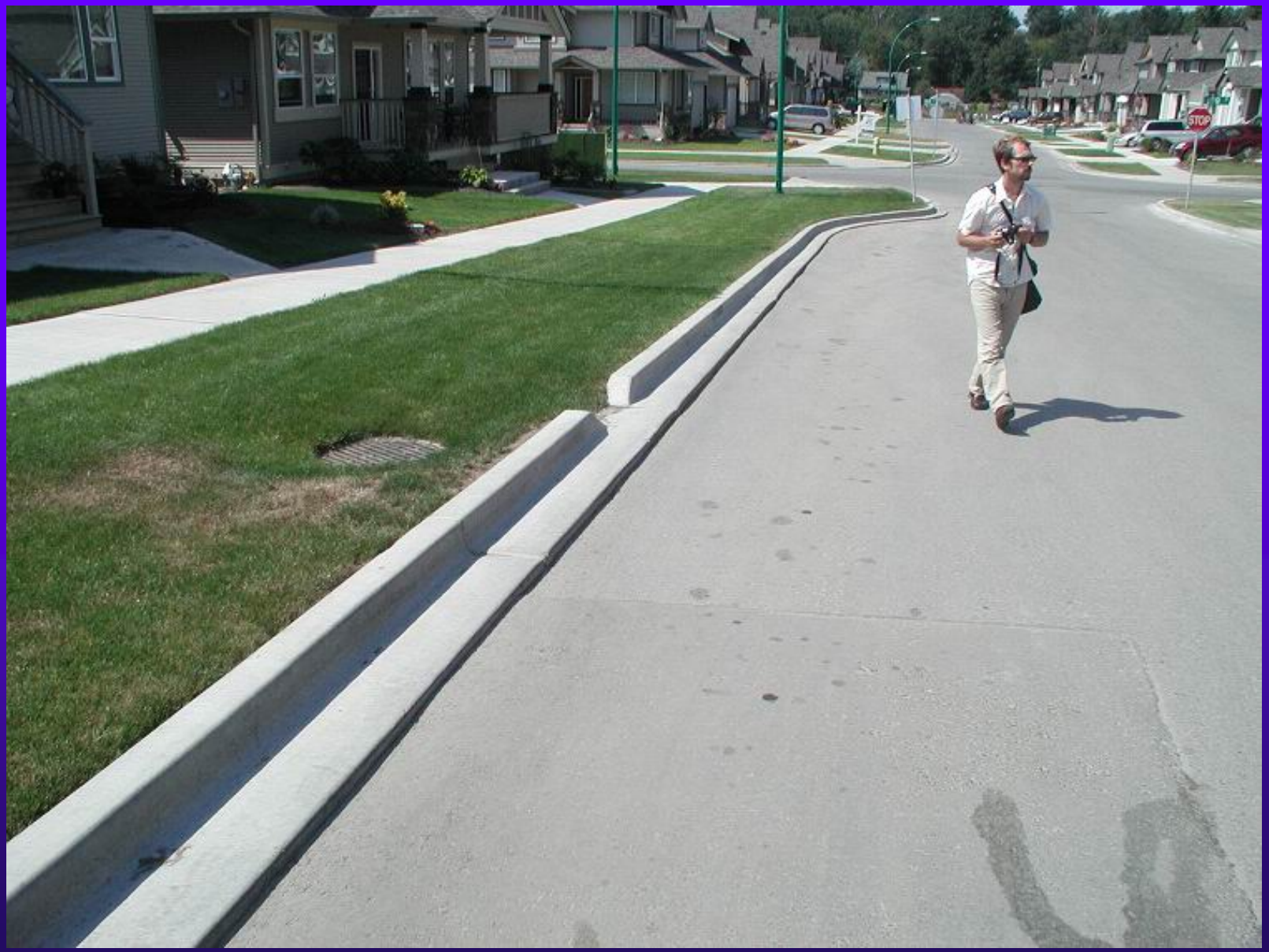
Effectiveness – Peak Rate Control
Wet



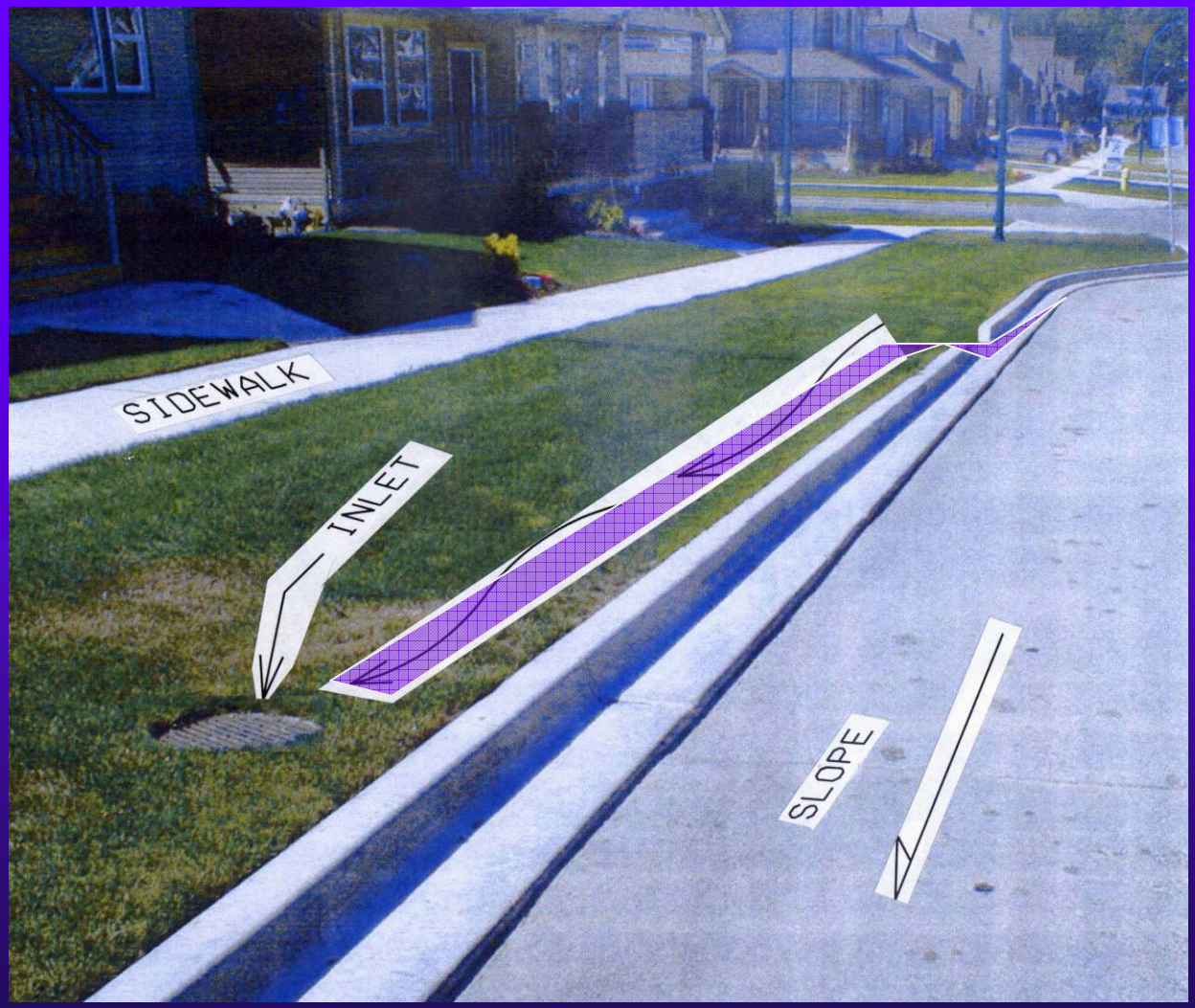
Roads

- Usually Impervious
- Approximately 10% of the area of development.
- Potential for significant reductions

Curb Cuts to Boulevard



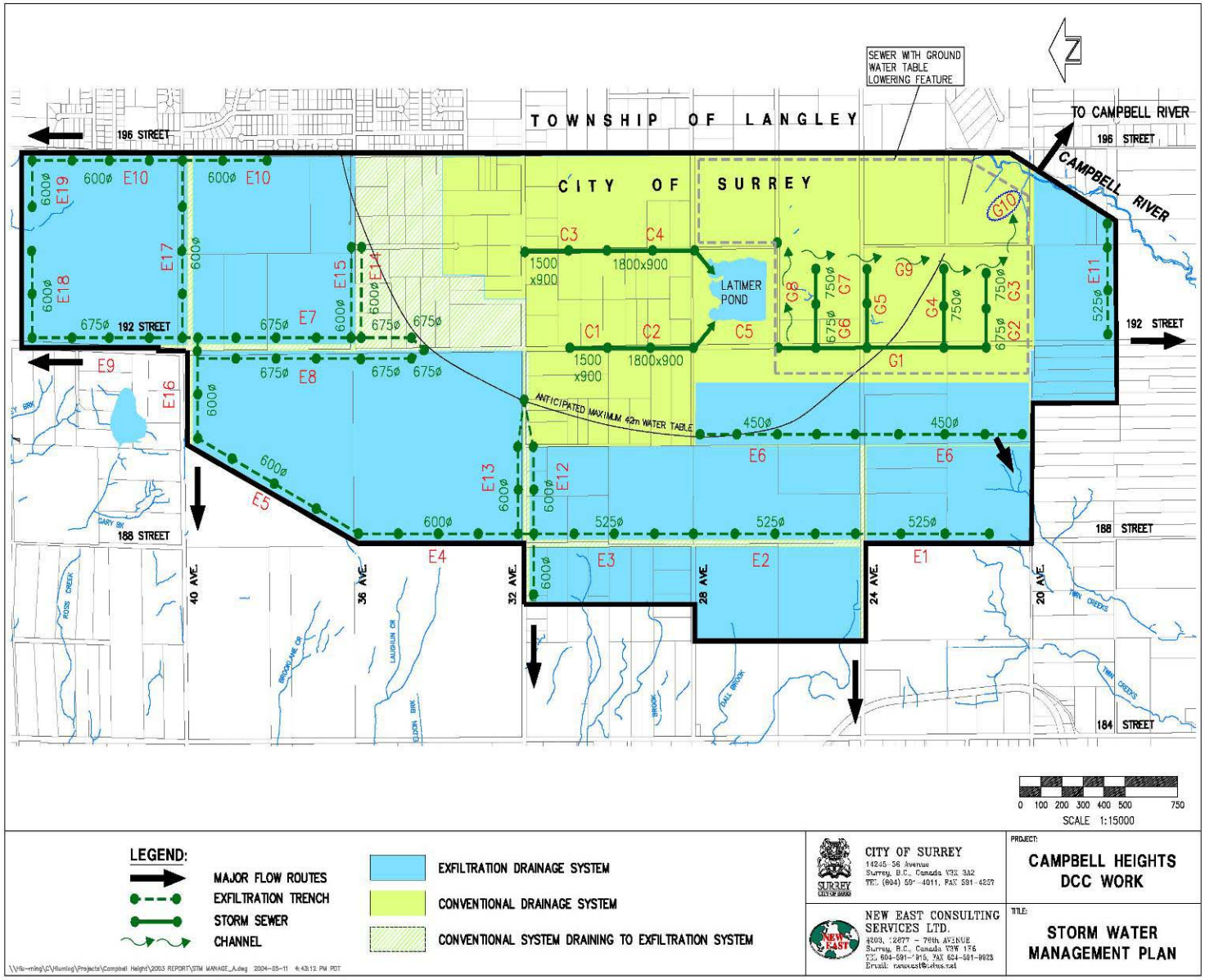
Road side swales



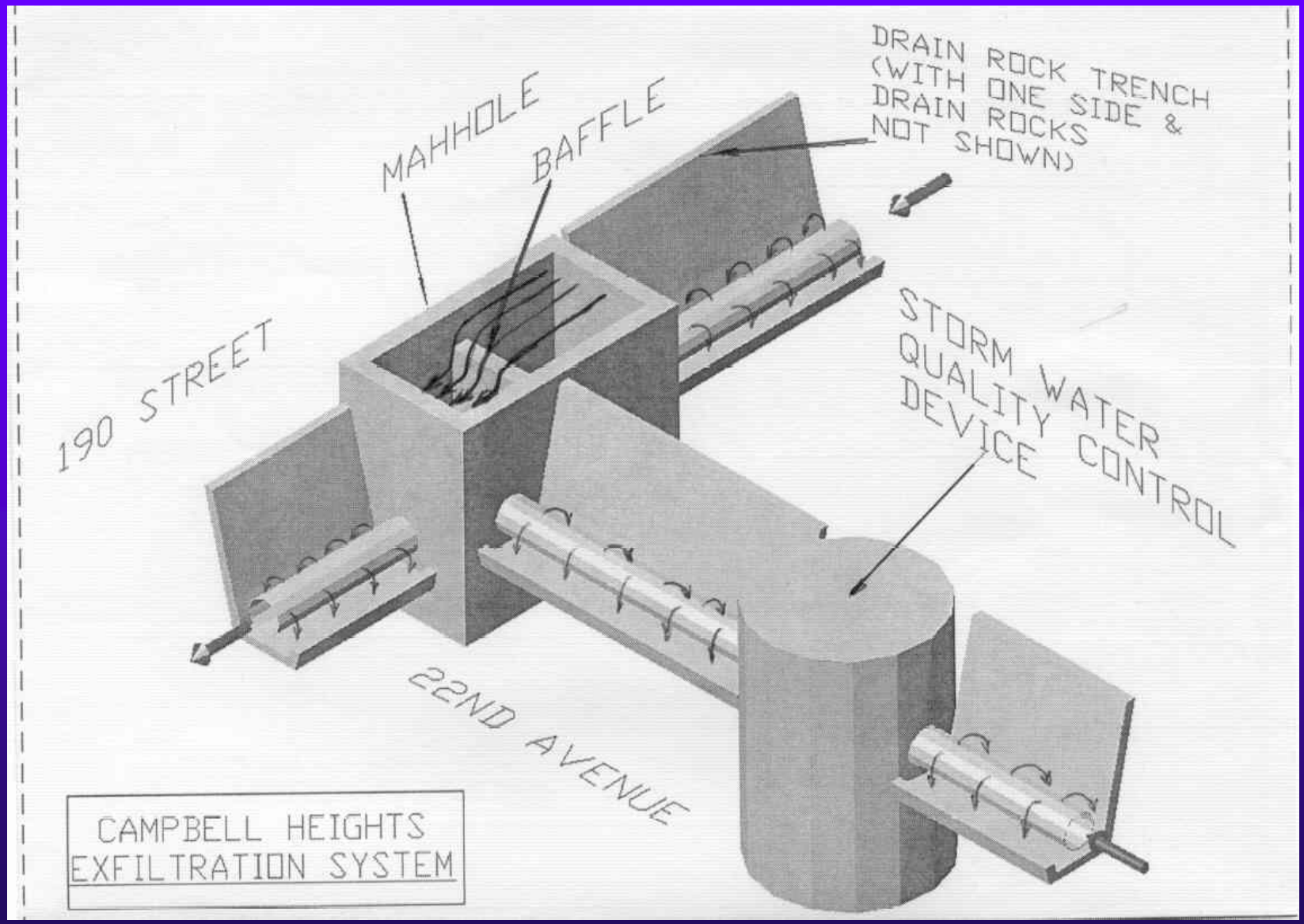
Landscaping and Swales

Commercial Applications OF BMP's

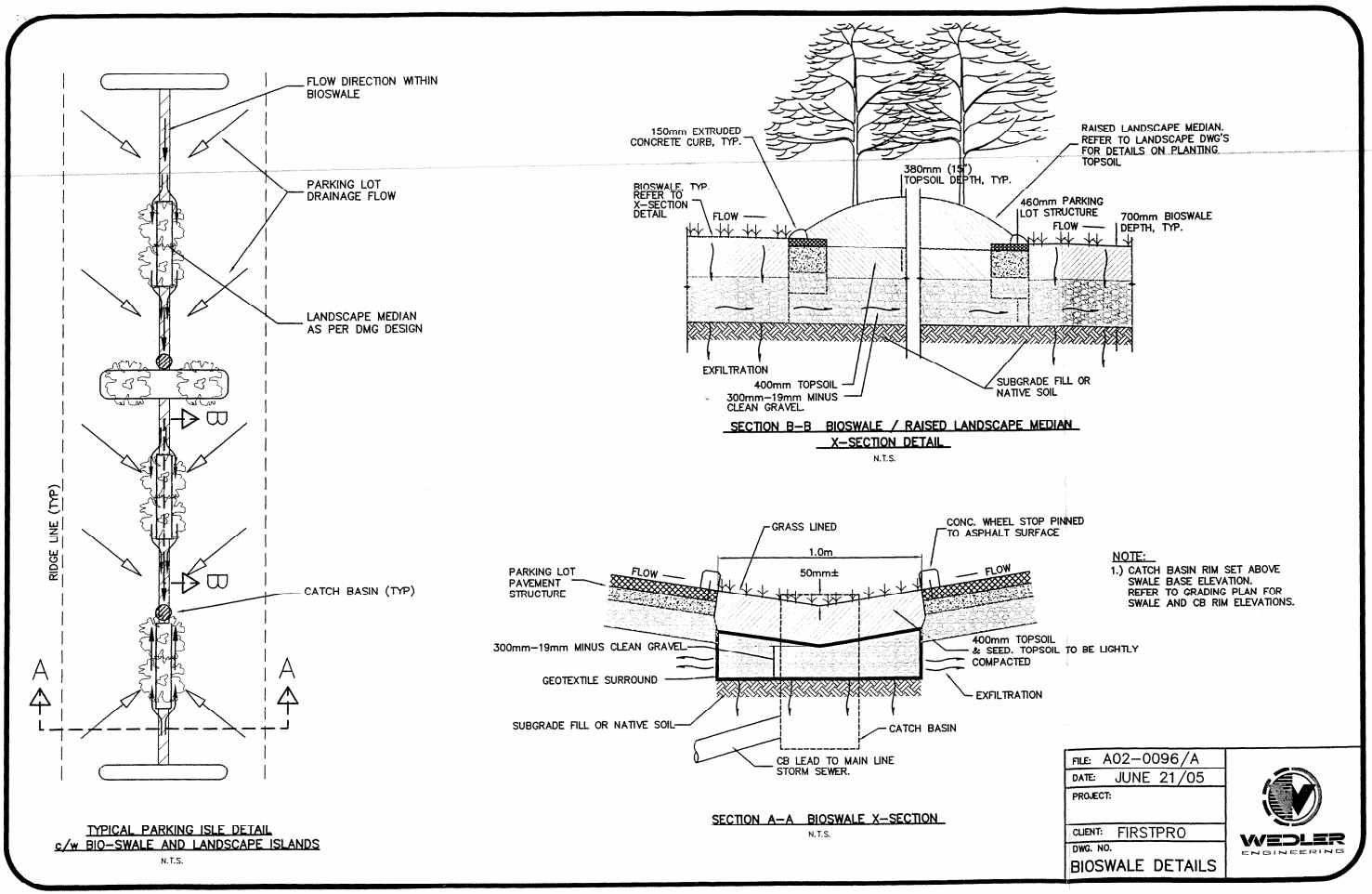
- Campbell Heights Industrial Park
- South Surrey Wal-Mart & Superstore


SEWER WITH GROUND WATER TABLE LOWERING FEATURE
TOWNSHIP OF LANGLEY
CITY OF SURREY
TO CAMPBELL RIVER
CAMPBELL RIVER
196 STREET
192 STREET
188 STREET
184 STREET
LATIMER POND
ANTICIPATED MAXIMUM 42m WATER TABLE
40 AVE.
36 AVE.
32 AVE.
28 AVE.
24 AVE.
20 AVE.
E1
E2
E3
E4
E5
E6
E7
E8
E9
E10
E11
E12
E13
E14
E15
E16
E17
E18
E19
C1
C2
C3
C4
C5
G1
G2
G3
G4
G5
G6
G7
G8
G9
G10
0 100 200 300 400 500 750
SCALE 1:15000
LEGEND:
MAJOR FLOW ROUTES
EXFILTRATION TRENCH
STORM SEWER
CHANNEL
EXFILTRATION DRAINAGE SYSTEM
CONVENTIONAL DRAINAGE SYSTEM
CONVENTIONAL SYSTEM DRAINING TO EXFILTRATION SYSTEM
CITY OF SURREY
14245 - 56 Avenue
Surrey, B.C., Canada V3X 3A2
TEL (604) 591-4011, FAX 591-4257
NEW EAST CONSULTING SERVICES LTD.
#203, 12877 - 76th AVENUE
Surrey, B.C., Canada V3W 1Z6
TEL 604-591-9116, FAX 624-591-8923
Email: neweast@telus.net
PROJECT:
CAMPBELL HEIGHTS DCC WORK
TITLE:
STORM WATER MANAGEMENT PLAN

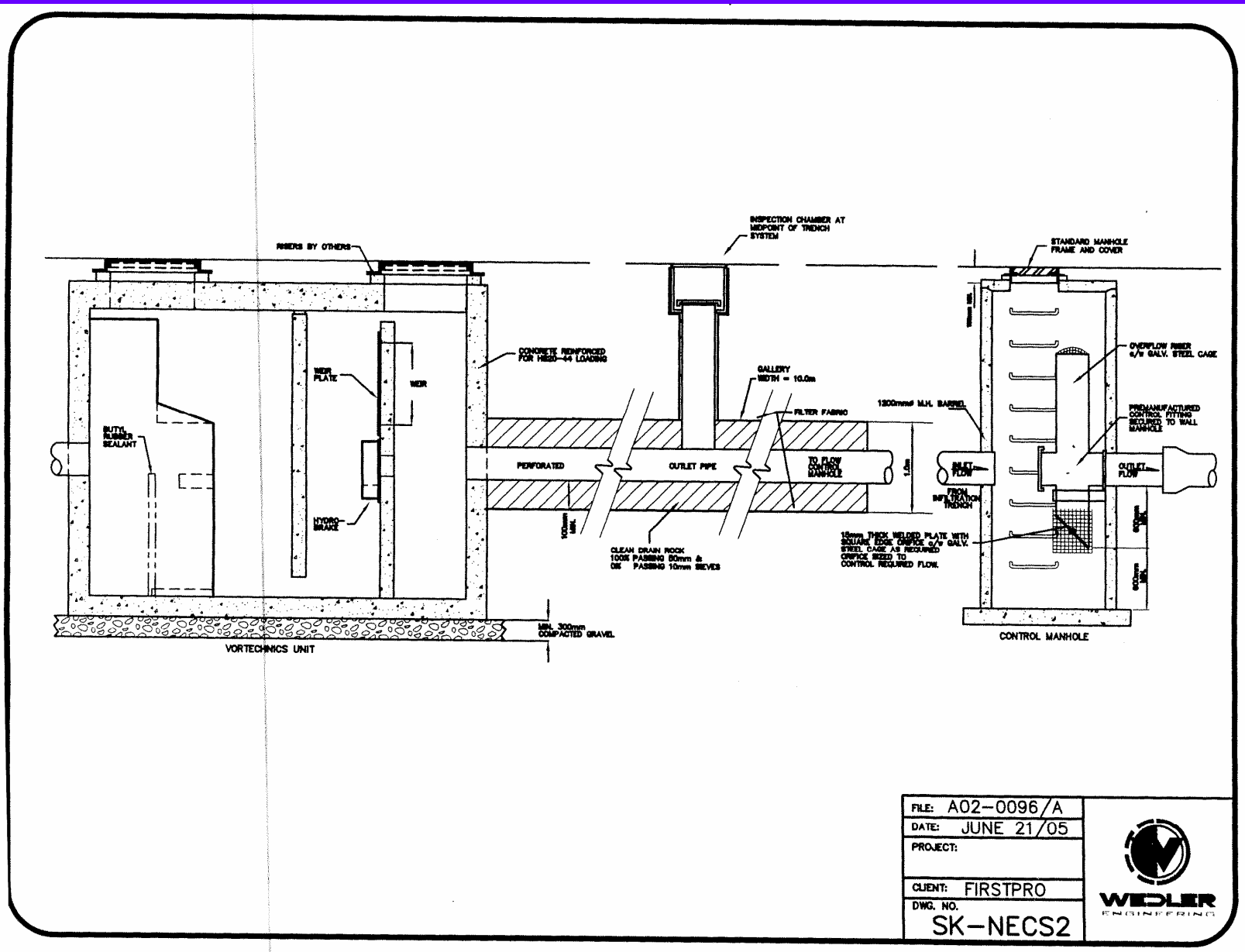
Drainage System



Commercial Site Bio-Filtration



Commercial Site Exfiltration Pit



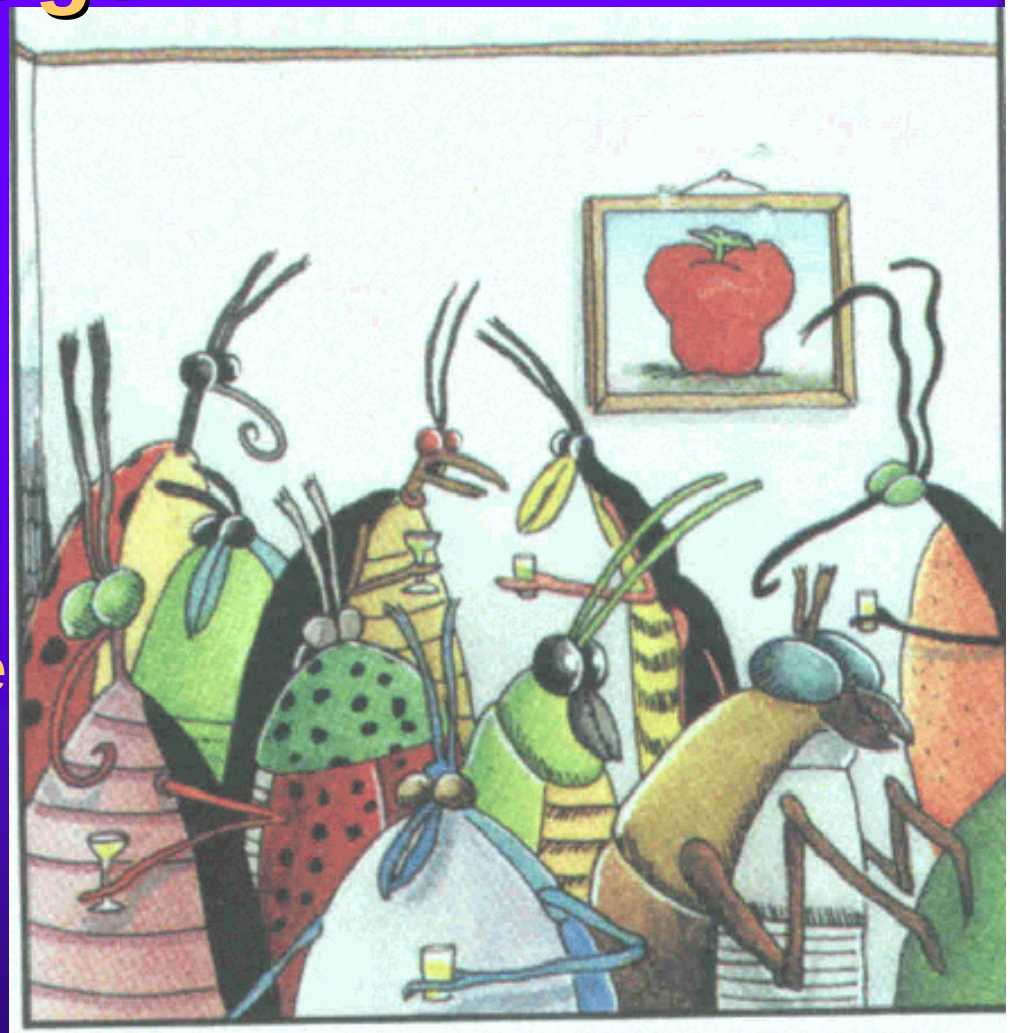
Does it Work?

- Benefit / Performance
- Costs
- Improvements

What are the Bugs

Is water flowing downhill ?

- Design details
- Construction
- Inspection
- Short term Performance
- Long term performance
- Maintenance
- Desirability
- The race is on



"Think about it, Ed. ... The class Insecta contains 26 orders, almost 1,000 families, and over 750,000 described species—but I can't shake the feeling we're all just a bunch of bugs."

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Policies and bylaws

- Start with regional context and planning. Set goals and priorities related to:
  - Environmentally sensitive areas - wetlands, streams, forests and other green spaces
  - Farmland or other working lands
  - Watershed context
  - Connecting transportation infrastructure
  - Establish an urban containment boundary and set policy to maintain it

Local community leadership

- Work towards a vision; your OCP should provide guidance and direction
- Plan for water and energy management.
  - What do you need to do now to get to where you want to be?
  - Are there alternatives? Conservation opportunities?
- Other leadership opportunities
  - Sustainability checklist
  - Civic green buildings policy
  - District heat
  - Retrofit program

Bylaws

- Integrated rain water management bylaw – e.g. Metchosin
  - Target: address 90% of rain water onsite
  - Address water quality (pollution controls) and quantity (runoff controls)
  - Effective impervious surface area limits
  - Standards for development, operation and maintenance
  - Rain water runoff calculations, rain water infiltration, treatment and detention methods/technologies
  - Rain water management plans
  - Monitoring and inspection

Other bylaws and tools…

- Impervious surface limits and run-off controls
- Parking – design standards - surface area, specifications, materials, bicycle
- Tree protection, landscaping and screening
- Soil removal/deposit, erosion and sediment control, especially during construction
- Subdivision development standards for low impact development
- Covenants for on-site rainwater management

Financial tools to support policy

- DCC adjustments to address on-site water treatment
- Tax breaks for ESAs protected with a conservation covenant
- Set policy to limit capital expenditures on infrastructure for edge areas that are likely to be unsustainable development
- Capital infrastructure planning and reporting – find the savings

Innovative leadership, process and follow-up

- Identify champions to lead and get everybody on the same page
- Integrate staff project decision-making to encourage innovation and efficiency
- Monitor and report on results
- Use adaptive management to ensure constant improvement

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