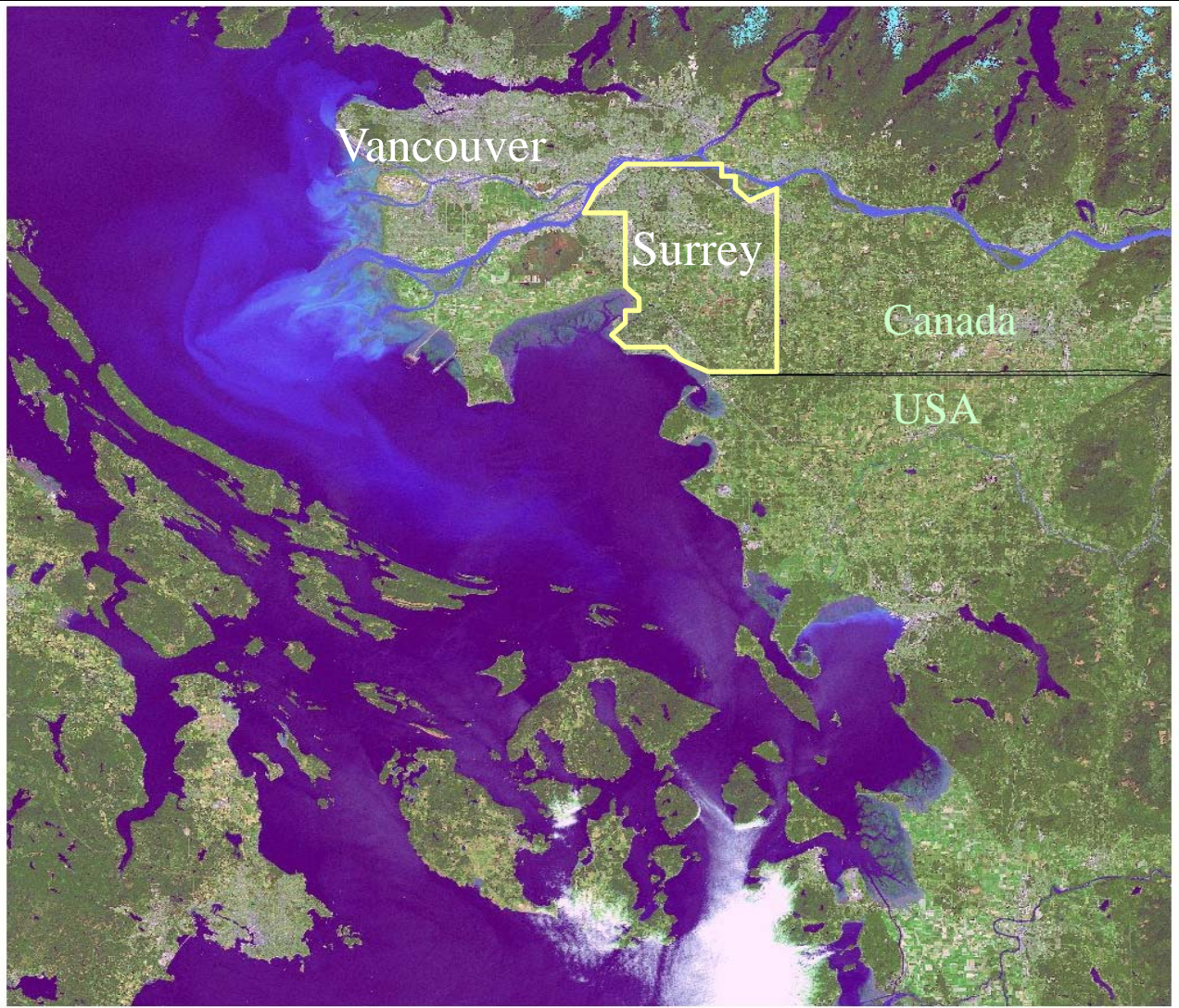


# Topsoil Technical Primer

**From Rain to Resource**  
**October 29, 2010**

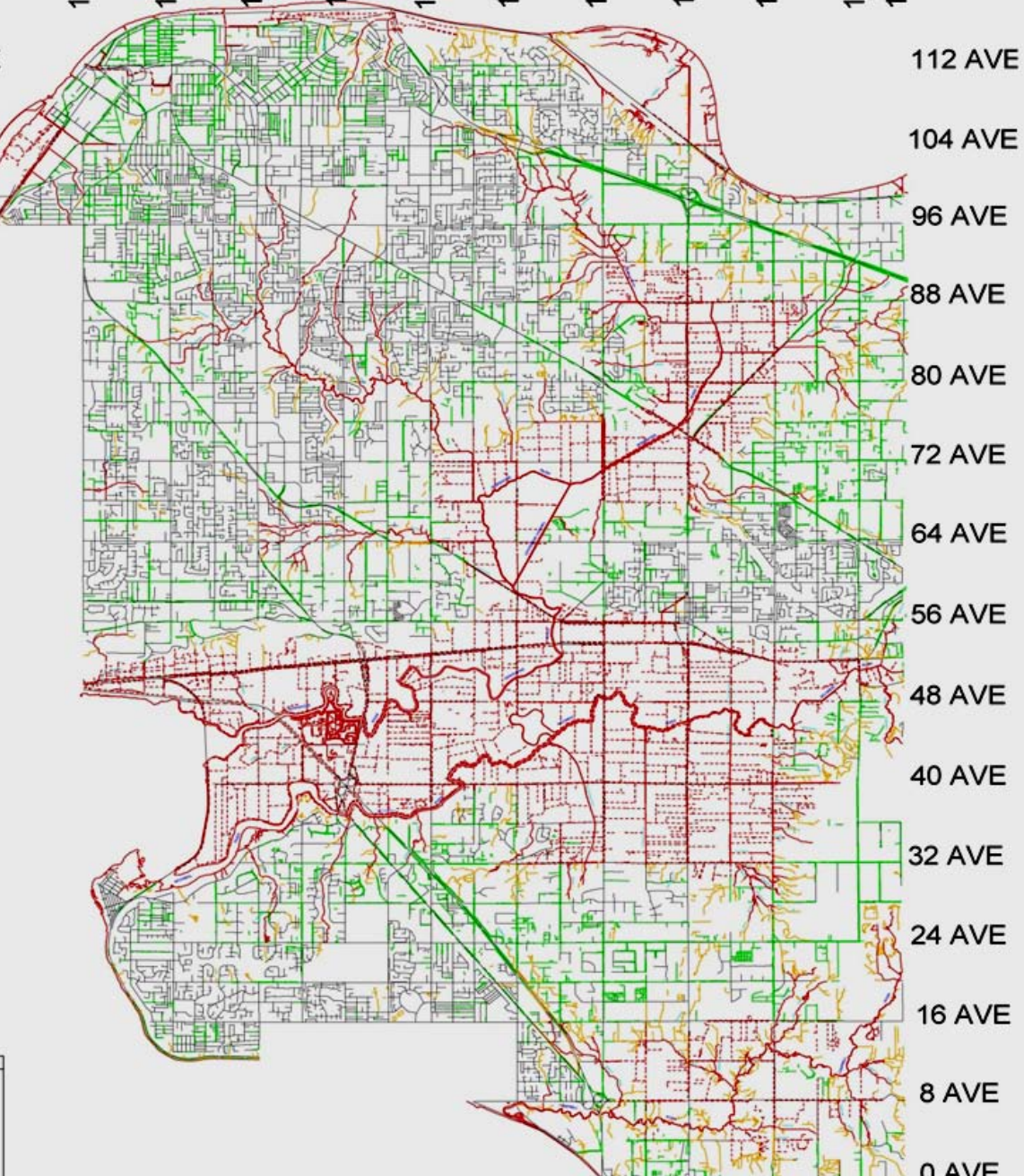
**Rémi Dubé, P.Eng.**  
**Development Services Manager**  
**City of Surrey**





## **Surrey Context**

120 ST  
128 ST  
136 ST  
144 ST  
152 ST  
160 ST  
168 ST  
176 ST  
184 ST  
192 ST  
196 ST



112 AVE  
104 AVE  
96 AVE  
88 AVE  
80 AVE  
72 AVE  
64 AVE  
56 AVE  
48 AVE  
40 AVE  
32 AVE  
24 AVE  
16 AVE  
8 AVE  
0 AVE



# Stream Perspective

# Historical Perspective

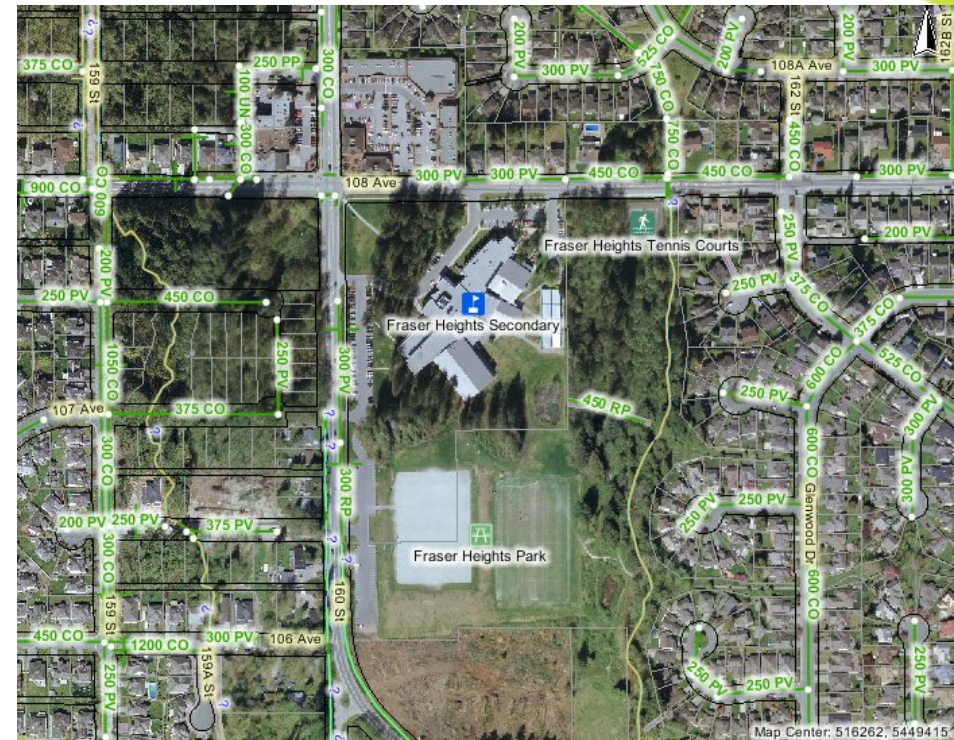
- Water courses as a resource
- First nations/colonization/logging/agriculture
- Urbanization
- Drainage servicing
- Surrey (1967) Waterways protection by-law/Natural Drainage Policy (natural water courses are integral to our system)
- Applied the science as it evolved: Pipes, Ponds, Integration
- Increased Stewardship, new guidelines/pilot projects, New By-law

# Drainage Servicing



# Drainage Servicing Response to land use

- Protect life and property
- Avoid nuisance flooding
- Design criteria
- Design storms (2y, 5y, 100y, 15 min, 1h, 2h, 24h)
- Statistically based level of service
- Peak flow conditions
- Pipes, ditches, ponds
- Historical storms for testing operational issues



# Drainage Servicing Framework

- City wide design criteria
- Master Drainage Plans
- Functional Plans
- Integrated into Neighbourhood Concept Plans
  
- We developed good long range servicing plans in the context of our natural drainage policy



# Stewardship





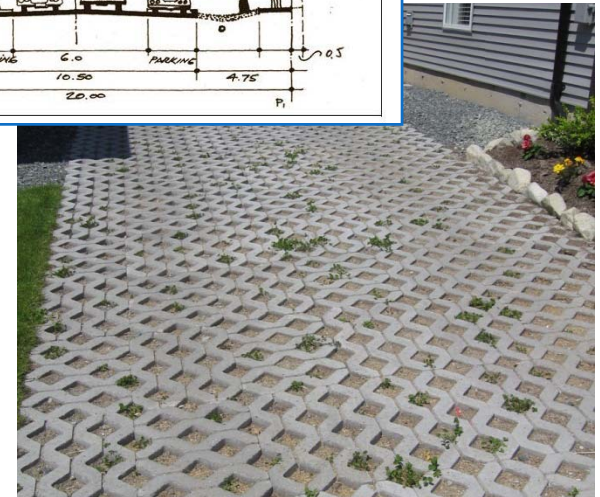
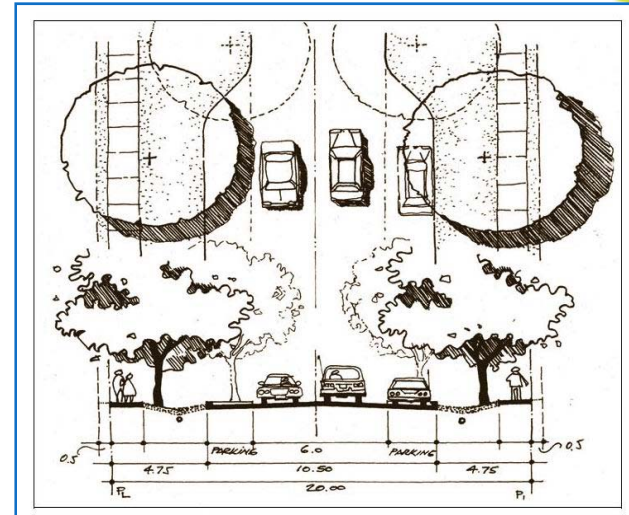
# Stewardship

- Protect our watercourses and their natural environment.
- Social benefits interweaved with environmental values.
- Could be conflicting with drainage servicing philosophy but consistent with natural drainage policy.
- Must understand natural processes.

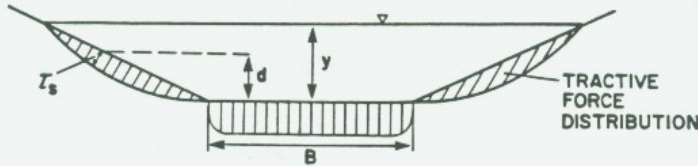


# Sustainability Smart Development

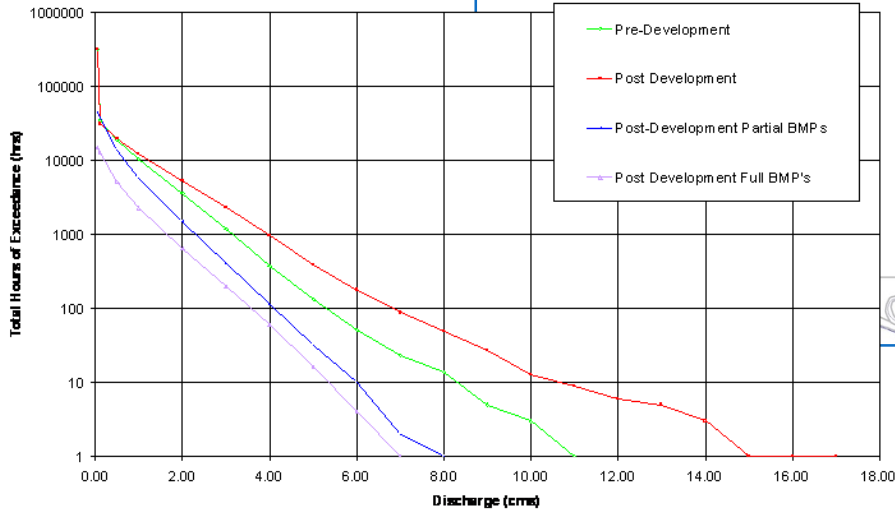
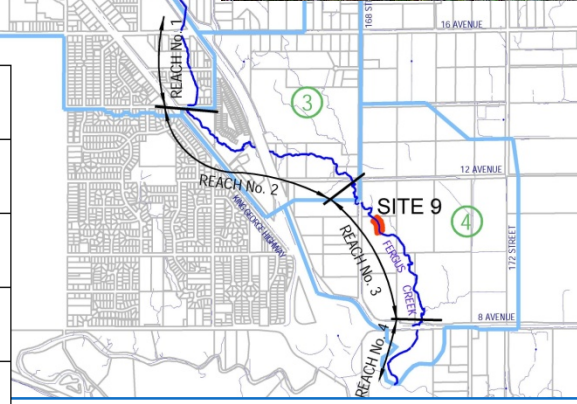
- Mid 1990's
- Multi-leveled sustainability objectives
- Natural drainage
- With respect to drainage hoped one size could fit all (capture 25 mm)
- Given Surrey's varied geology and streams a different approach was necessary



# Watershed Based Performance Targets (ISMPs under LWMP)



$y$  = MAX. DEPTH       $B$  = BED WIDTH  
 $d$  = DEPTH       $\tau_s$  = TRACTIVE FORCE



# Watershed Based Approach

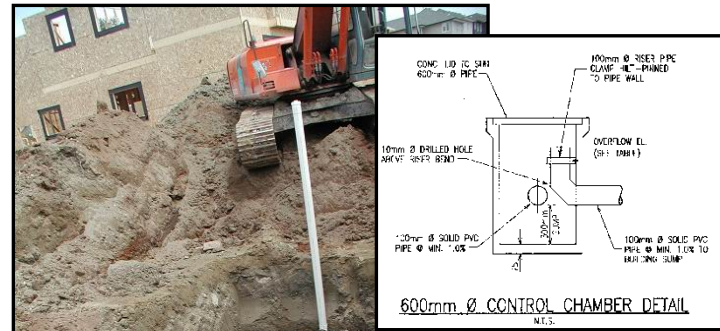
- Need to understand the watershed
    - streams
    - opportunities/constraints
    - vision
  - Need to go beyond peak flow conveyance and address full hydrologic regime.
  - Need to communicate vision (objectives/targets).
  - Must have a process to implement plan
- 
- Shift from arbitrary performance targets to watershed based performance targets (Fergus Creek and other ISMPs)



# Parallel Developments

## Examples and Tools

- Industry slowly moving to LIDs
- Understanding that old criteria were not enough
- As early as 2002 a partnership was struck to help develop an easy to use tool to evaluate on site strategies: WBM for BC
- Green Infrastructure Road Shows
- March 2009: Surrey WBM Forum lead to Green Infrastructure Partnership Primer Set (how can we meet the targets?)



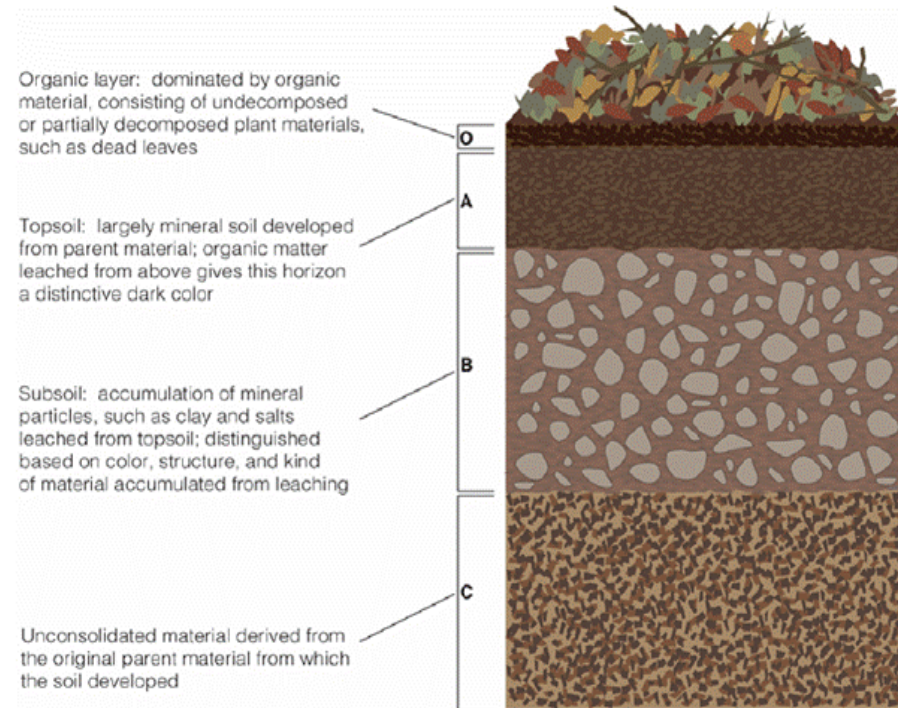
# Where does the primer fit in?

Enhanced Topsoil was a mitigation strategy common to each of our ISMPs.

Such a basic detail should be easily dealt with as the GIP's first attempt at a 'one page' primer.

Not intended to be a design guideline or expert system.

Intended to highlight opportunities, constraints and experience.



# Issues highlighted early

Definition of top soil  
(engineers, agrologists,  
landscape arch.)

MMCD is currently reviewing  
its definition, Surrey Parks  
and Rec. use an in-house  
specification

Difference in specifications  
not as important as having a  
specification that can be met  
and has well defined areas of  
application



## Details (don't assume)

Early site design/planning

Direct impervious areas

Max. slope, velocity, residency time

Safe conveyance

Sediment build up

Soil handling

Subsoil considerations

Implementation





## Areas of Responsibility

A clear understanding of who is responsible for what is important

In Surrey, City sets targets (based on ISMP) and mitigation options (NCPs)

Developer responsible to property line  
(Engineering dept)

Builder responsible on private property  
(Building dept)

Engineer of record for the developer must highlight issues if performance targets are at risk



# Range of developments is a challenge

Over 200 development applications per year, 2000 building permits.

Different delivery models  
developer is builder  
developer sells  
developer leaves  
builder

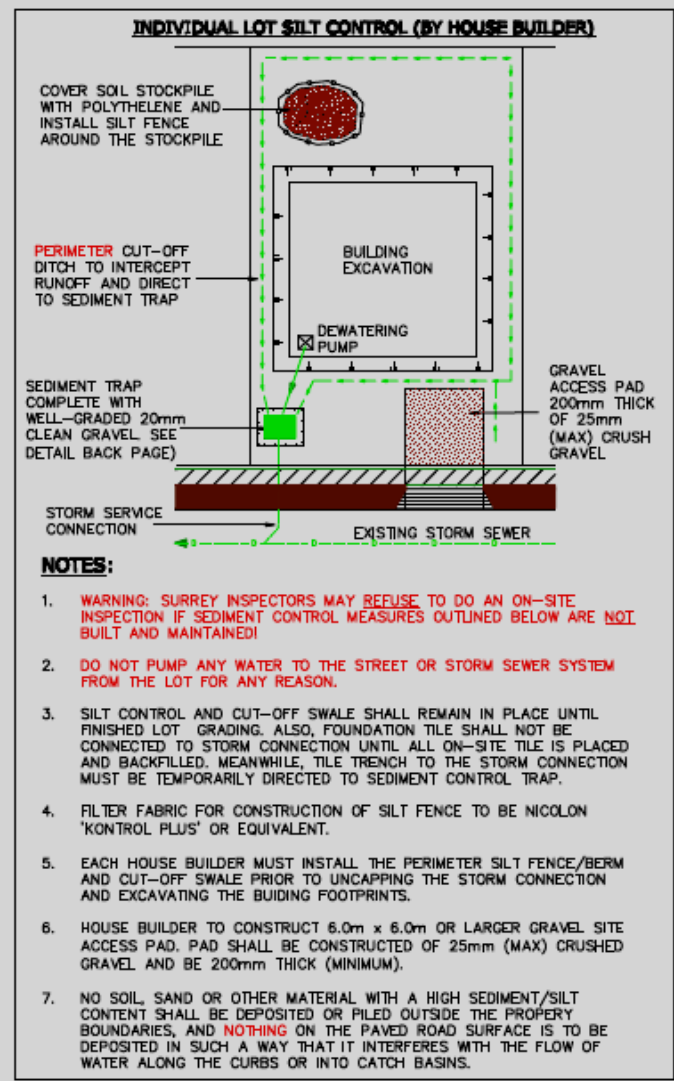
Depending on the project, sign-off is required at different points of the project. (through servicing agreement process, building permit process, development permit process). Every municipality will have its own process.



**BEFORE LOT CLOSING:**

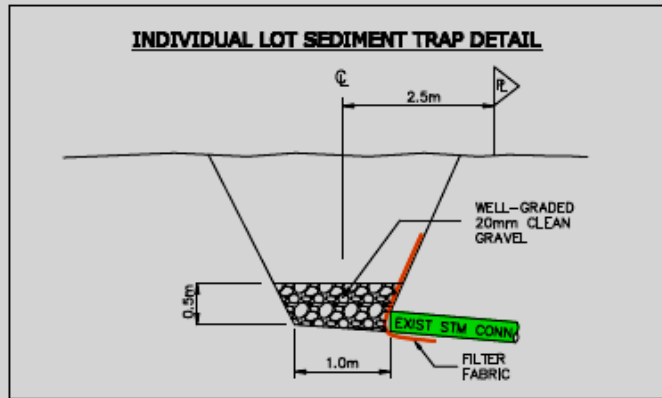
- READ ALL COVENANTS AND GUIDELINES AND INFORM YOURSELF BEFORE YOU START.
- CHECK CURBS, DRIVEWAYS LETDOWNS, SIDEWALKS, EXISTING TREE BARRIERS, PRE-INSTALLED FENCES, LOT GRADING AND GRASS SWALES, CATCH BASINS, ETC.
- AFTER LOT CLOSING, IT IS YOUR RESPONSIBILITY.

**BEFORE YOU START TO DIG: READ AND IMPLEMENT ....**



**Good example of  
commitment**

**Contributed by Aplin & Martin Consultants Ltd. and  
Morgan Heights Development**



**DURING HOUSE CONSTRUCTION AND LANDSCAPING :**

ALL "PARK" LOTS ON 26A AVENUE (151-157 AND 269-274) MUST HAVE SILT FENCING INSTALLED BETWEEN EXISTING GRASS SWALES AND THE HOUSE EXCAVATION AREA.

**NOTE THAT YOU SHOULD REMOVE AN EXTRA ONE (1) FOOT OF EXISTING SOIL FROM THE LOT DURING BASEMENT EXCAVATION WHICH MUST BE REPLACED TO FINAL LOT GRADE DURING YOUR LANDSCAPING WITH THE MANDATORY SPEC SOIL LISTED BELOW.\***

THE DEVELOPER WILL NOT PAY FOR 'DAMAGED' OR IMPROPERLY INSTALLED SERVICES UNLESS THE DEVELOPER IS IMMEDIATELY NOTIFIED. IF YOU FIX ANYTHING BEFORE YOU LET THE DEVELOPER FIRST VERIFY THE 'DAMAGE', IT IS AT YOUR COST.

THE DEVELOPER WILL ENFORCE A 'ZERO TOLERANCE' POLICY TOWARD ALL NECESSARY ROAD AND STORM SYSTEM MAINTENANCE DURING THE CONSTRUCTION PERIOD THROUGHOUT THE PROJECT.

YOU WILL BE NOTIFIED ONLY ONCE ABOUT PROPER ROAD CLEANING IN FRONT OF YOUR LOT; AFTER THAT, AT THE DEVELOPER'S DISCRETION, THE REQUIRED REMEDIAL WORK ON THE ROAD OR STORM SEWER SYSTEMS WILL BE DONE FOR YOU AND THE COST WILL BE DEDUCTED FROM YOUR COMPLIANCE DEPOSIT.

**APPROXIMATE COST FOR ROAD MAINTENANCE/REPAIRS:**

**CLEAN ROADS:**

- SCRAPE ROADS WITH BACKHOE AND SWEEPER: (4 HR MIN) \$525
- SWEEPER ONLY: (4 HR MIN) \$130/hr

**CLEAN CATCH BASINS:**

- VACTOR TRUCK: (4 HR MIN) \$220/hr

**CURB REPAIR:**

- SIDEWALK PANEL REPAIR: \$170/lm
- DRIVEWAY LETDOWN PER PANEL: \$225/ea
- \$1,000/PANEL

ALL BUILDING RELATED DEBRIS (SKIDS, PLASTIC, WOOD SCRAP ETC.) MUST BE REMOVED REGULARLY FROM THE BUILDING LOT.

SOIL SUPPLIERS: ASK FOR "MORGAN HEIGHTS" SPEC. MIX.  
- ALNOR CONTRACTING (604) 813-5500\*

**PROJECT CONTACTS:**

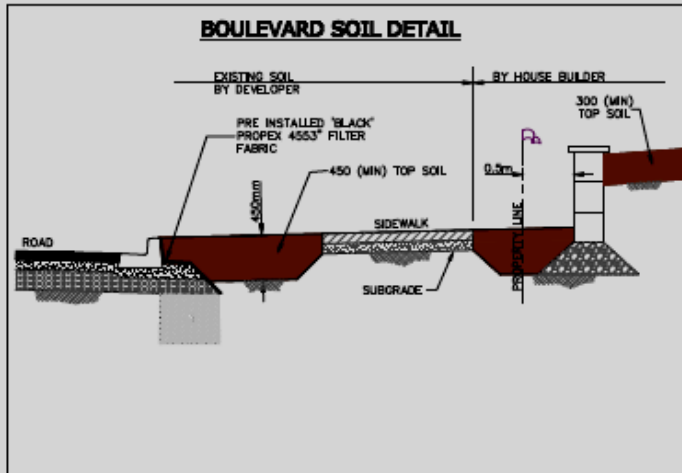
- SITE RELATED: KEN ANDERSON (604) 250-1636
- HOUSE RELATED: MIKE TYNAN (604) 921-6912

# Good example of commitment

Contributed by Aplin & Martin Consultants Ltd. and  
Morgan Heights Development

**LANDSCAPING**

- READ THE GUIDELINES AND ASK QUESTIONS BEFORE YOU PLAN.
- PLAN YOUR LANDSCAPING AS EARLY AS YOU CAN AND REMEMBER - YOU SHOULD PLAN TO REMOVE AN EXTRA ONE (1) FOOT OF EXISTING MATERIAL FROM THE LOT DURING BASEMENT EXCAVATION IN ORDER TO FINISH FINAL GRADE WITH THE MANDATORY SOIL SPEC\*. **NOTE** - THIS SPEC SOIL WILL BE RANDOMLY INSPECTED PRIOR TO FINAL RELEASE OF YOUR COMPLIANCE DEPOSIT. A COPY OF THE RECEIPT FOR THE DELIVERED SOIL MUST BE SUBMITTED BEFORE FINAL COMPLIANCE RELEASE. **ALL LANDSCAPING MUST CONFORM TO THE LOT'S APPROVED LOT GRADING & DRAINAGE PLAN.**
- ALL DEVELOPER PRE PLACED ("MORGAN HEIGHTS" SOIL) SPEC SOIL ON THE BOULEVARD MUST BE CLEAR OF WEEDS/DEBRIS, SCARIFIED OR REPLACED WITH THE SAME SPEC SOIL PRIOR TO SODDING. SODDING THE BOULEVARD IS AT THE LOT OWNER'S EXPENSE.
- MAINTAIN DEVELOPER INSTALLED TREE BARRIERS DURING CONSTRUCTION. DAMAGE TO EXISTING TREES AND/OR ANY RESULTING FINES WILL BE DEDUCTED FROM THE COMPLIANCE DEPOSIT IF NOT PAID PRIOR TO COMPLIANCE RELEASE.
- DEVELOPER INSTALLED TURF SWALES MUST BE MAINTAINED DURING CONSTRUCTION AND REPAIRED OR REPLACED IF NECESSARY, PRIOR TO COMPLIANCE RELEASE.
- MATERIALS FOR BOULEVARD FEATURE WALL IS AVAILABLE FROM HOME DEPOT (MORGAN HEIGHTS). CALL RAY FIELD FOR DETAILS, PHONE (604) 930-2482.



SOIL SUPPLIERS: ASK FOR "MORGAN HEIGHTS" SPEC. MIX  
 - ALNOR CONTRACTING (604) 813-5500

**Good example of commitment**

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# Summary

- Define the need – set targets
- Ensure soil mixes are clearly specified
- Clarify/define responsibilities (communication)
- Do not ignore good engineering practice (details)

