University Endowment Lands

Integrated Stormwater Management Plan

Stage 3 & 4 Reports

May 15, 2017

BRITISH COLUMBIA

AECOM

Agenda

1. Work completed to date
2. Stage 3 Report Summary
3. Stage 4 Report Summary
4. Discussion

Work completed to date

UEL ISMP Approach

Stage	Question Answered	Description of tasks	Relevant ISMP Sections
1	What do we have?	Review background information and summarize existing conditions	- Study Area - Regulatory Context - Land Use - Hydrology - Stormwater System - Hydrogeology and Soils - Environment - Hydraulic Modelling and Assessment
2	What do we want?	Establish the vision for future development	- Vision and Goals
3	How do we put this into action?	Development of an implementation plan, funding and enforcement strategies	- Implementation Plan
4	How do we stay on target?	Development of a monitoring and assessment program	- Adaptive Management Plan

Stormwater Management Vision and Goals

“A stormwater management plan that protects the natural and built environment through enhancement of natural watercourses, and provides opportunities for collaboration and engagement with community and residents on stormwater issues”

Stormwater Management Vision and Goals

Goal 1: The UEL community is engaged in stormwater management

Goal 2: Healthy streams and a natural environment are a part of the UEL

Goal 3: Stormwater infrastructure provides an adequate level of service, while protecting life and property

Goal 4: The UEL provides guidelines and a regulatory framework for stormwater management

Goal 5: Stormwater management at UEL adapts to change

Comments from Stage 2 Report?

Stage 3

Development of an Implementation Plan

UEL ISMP Stage 3
Development of an Implementation Plan

10 Action Items were identified and are proposed for implementation to help the UEL meet the goals and the vision established in Stage 2

Action Item #1:

Promote stormwater management awareness and engagement opportunities

- Promote Spanish Bank Streamkeepers

- Retain all stormwater reports and study results on record

In this issue:

- Snow Removal Policy
- Area A & B Parking
- Recycling
- UEL Waste Collection
- Boulevard Maintenance
- Sewer Work in Area A

Sewer Work – Area A

The UEL will be completing sewer work in Area A this winter and spring. Residents directly affected by work will be notified in advance. Sewer work will be followed by repaving, weather permitting. Please be patient with work crews and anticipate some traffic delays.

Water Billing – Next Cycle Ends December 31, 2016

Water bills will be sent out to residents and businesses of the UEL. Payments can be mailed or dropped off at the UEL Administration Office. We accept cheques by mail, or cash or cheque in person. Water payments should be made out to "University Endowment Lands" and should reference your **Address** and **Water Account ID** (located on the top right corner of your invoice).

Garbage and Green Bin

The UEL is responsible for garbage and green bin pick-up in the UEL. Waste pickup varies by neighbourhood. Schedules can be picked up from the box outside of the UEL office or accessed on our website.

UEL University Endowment Lands

Winter Newsletter - 2016

Christmas Tree Disposal

Wondering how to dispose of your Christmas tree following the holiday season? UEL residents can participate in the UBC Botanical Garden Christmas Tree Recycling Fundraiser for John Norquay Elementary School. Trees can be dropped off:

- Between **December 26, 2016** and **January 8, 2017**
- **9:30am – 4:30pm daily** at the **UBC Botanical Gardens**
- http://botanicalgarden.ubc.ca/events/event/tree-recycling/

Please visit their website for more information or call 604-822-3928. The suggested donation is $5.

For those unable to safely dispose of their trees, UEL will provide a tree pick up service for Areas A, B and C on **Wednesday, January 11, 2017**. Please ensure that all tinsel, lights, decorations and tree stands are removed.

- Areas A & B place tree at curb side no later than 7:30 AM
- Area C place tree in lane no later than 7:30 AM

Any questions regarding tree removal can be directed to the UEL Administration Office at 604-660-1808.

Snow Removal Policy

The UEL would like to remind its residents of their responsibility to clear the sidewalk fronting their home and/or business.

Parking Permits – Area A & B – New Decals!

Are you a resident of Area A or B? Was your parking decal acquired before August 2015 (the older decals can be identified as the white decals)? Then please come to the UEL office with proof of residence and your vehicle's registration to obtain a new RED (Area A) or BLUE (Area B) Parking Decal!

Residents of Areas A & B are reminded to park in their driveway. If that's not possible, residents are permitted to park on the road in front of their home, so long as their vehicle is registered with the UEL and has the appropriate decal. These decals do not permit vehicles to park in other areas of the UEL.

Parking Permits – Multi-Family Area

All 2015-2016 multi-family parking permits expired at the end of September 30, 2016. Please come to the UEL office with photo ID, proof of residency (Tenancy Agreement or a letter from the Property Manager confirming residency) and vehicle registration with the appropriate address and resident's name listed as the principal operator. **Vehicles without valid permits will be towed at the owner's expense and without notice.**

BRITISH COLUMBIA Ministry of Community, Sport and Cultural Development

University Endowment Lands Administration Office
5495 Chancellor Boulevard
Vancouver BC V6T 1E2

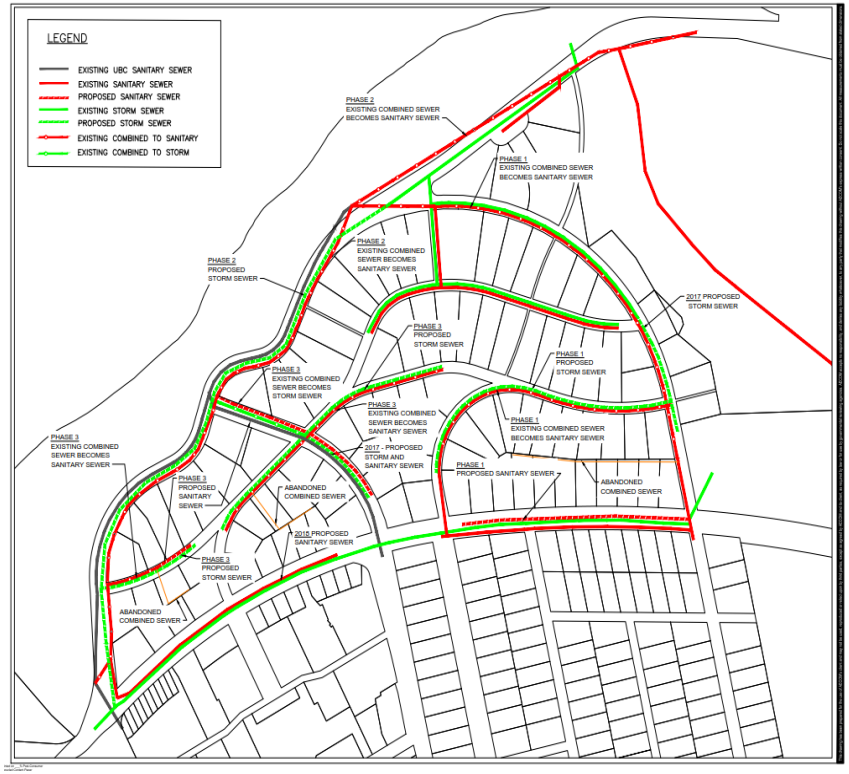
P: (604) 660-1808
F: (604) 660-1874
UEL@gov.bc.ca

www.universityendowmentlands.gov.bc.ca
The Office is open Monday – Friday
8:30 am – 4:30 pm

Action Item #2:

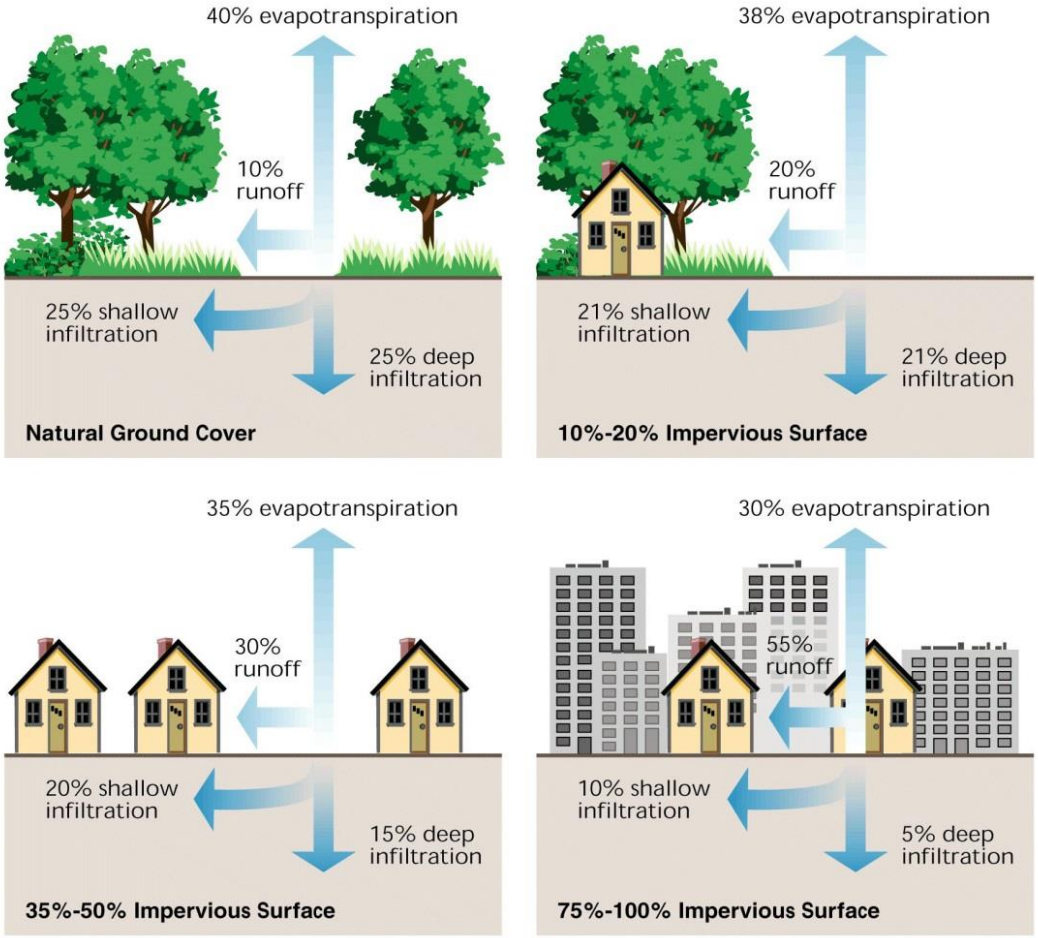
Continue to implement UEL's combined sewer separation strategy

- Currently in implementation phase of separating existing combined sewers in Area B
- Sewer separation helps reduce combined sewer overflows, sewage backups, and negative impact on baseflows in the Acadia Creek
- Opportunity to implement BMPs, such as rain gardens, to manage stormwater efficiently



Action Item #3:

Manage the quantity of road runoff



AECOM

Action Item #3:

Manage the quantity of road runoff

- Reduce impact of increased impervious areas
  - Decrease stream erosion
  - Groundwater recharge
  - Increased stream baseflows
- Rain gardens provide a plausible solution

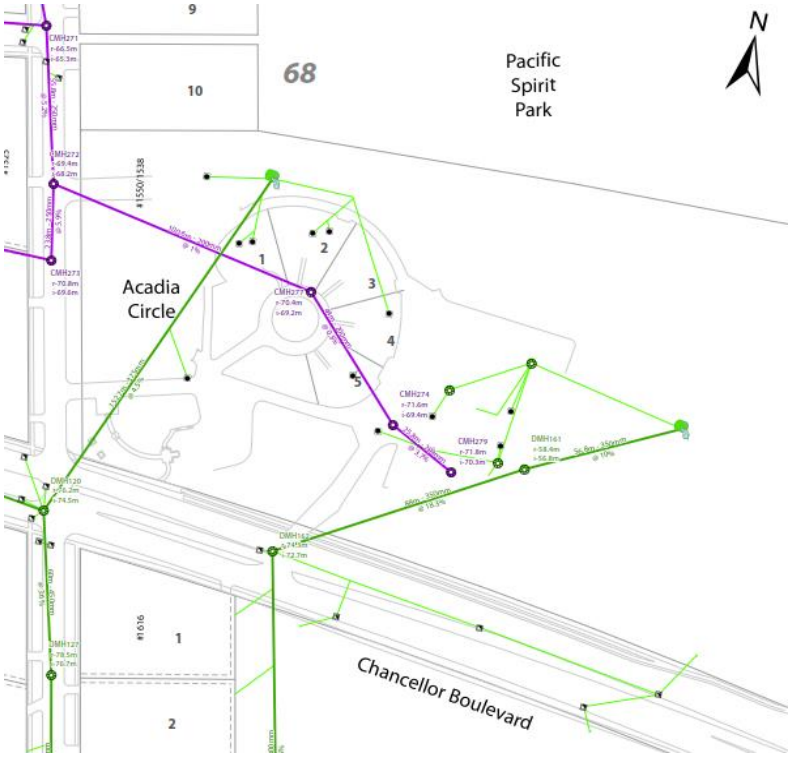
AECOM

Action Item #4:

Upgrade stormwater treatment at the UEL Works Yard

Action Item #4:

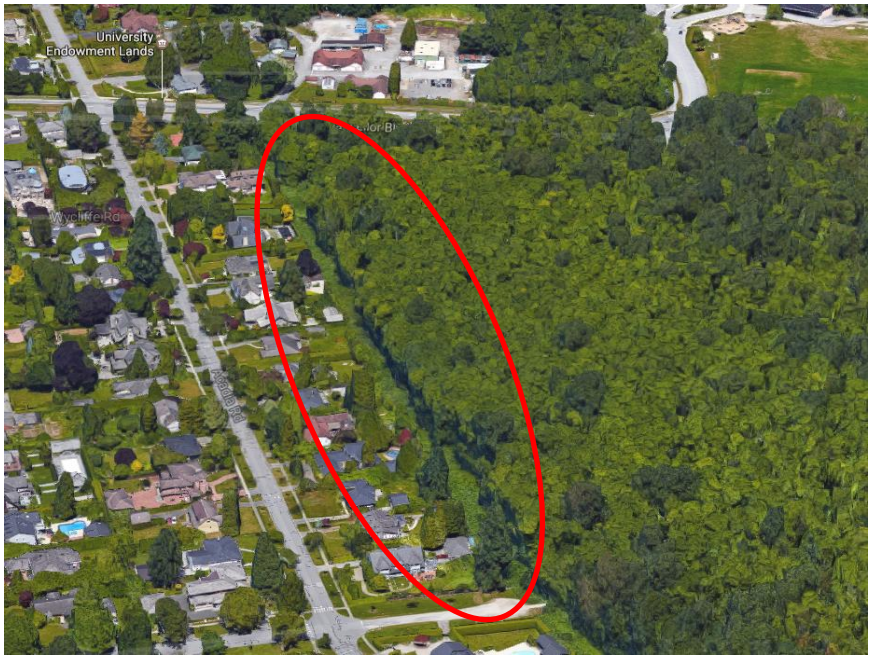
Upgrade stormwater treatment at the UEL Works Yard



AECOM

Action Item #5:

Identify stormwater infrastructure that are poorly located for maintenance. Develop plans for management or replacement.
(i.e. the 300mm diameter storm sewer in Pacific Spirit Park east of Acadia Road)



Action Item #6:

Continue to upgrade system capacity and renew aging infrastructure in a proactive manner through the capital planning process

Project Reference Number	Description
2015-02	Construction of stormwater/sanitary sewer separation on Wesbrook Cres, north of Chancellor Blvd.
2016-02	Construction of storm sewer replacement on Wesbrook Cres. South of Chancellor Blvd.
2016-01	Construction of new storm sewer on Alison Rd between Campus Rd. and College Highroad, and on Western Parkway between College Highroad and University Blvd.
2017-02	Design and construction of storm sewer replacements on lane north of College Highroad
2018-01	Construction of sanitary/stormwater separation on Acadia Rd. north of Chancellor Blvd.
2018-02	Design and construction (reline) of storm sewer on Drummond Dr. and College Highroad
2021-01	Construction of Water, Sewer and Road replacement on Newton Wynd between Acadia Rd. and Kingston Rd.
TBC-02	Construction of storm sewer replacement on lane north of Wycliffe Rd.

AECOM

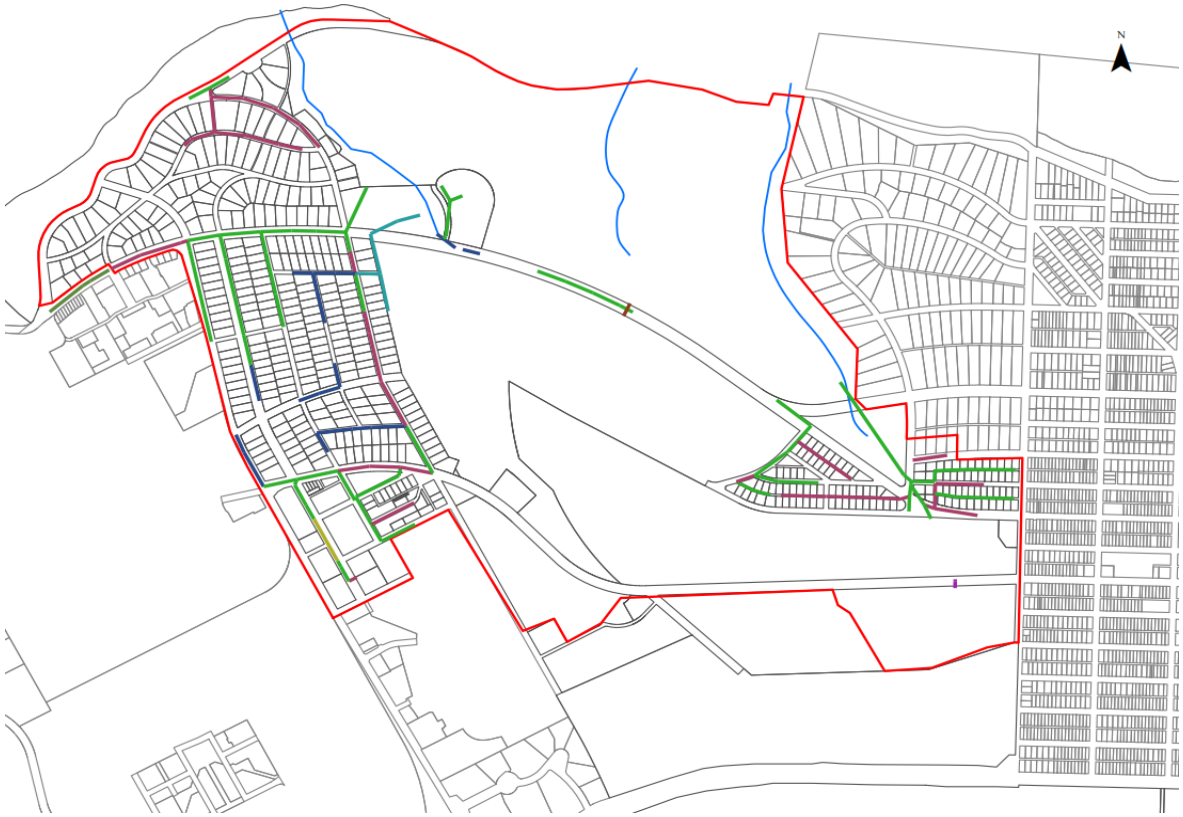
Action Item #7:

Develop mitigation measures to address slope stability in Area B

AECOM

Action Item #8:

Integrate stormwater asset maintenance with work order management using a GIS-centric system



Action Item #9:

Develop Erosion and Sediment Control requirements

BULLETIN 2002-003-EV — March 1, 2017
EROSION AND SEDIMENT CONTROL LARGE LOT DEVELOPMENTS (1,000M² OR MORE) — (Revised)

EROSION AND SEDIMENT CONTROL (ESC) MONITORING CRITERIA

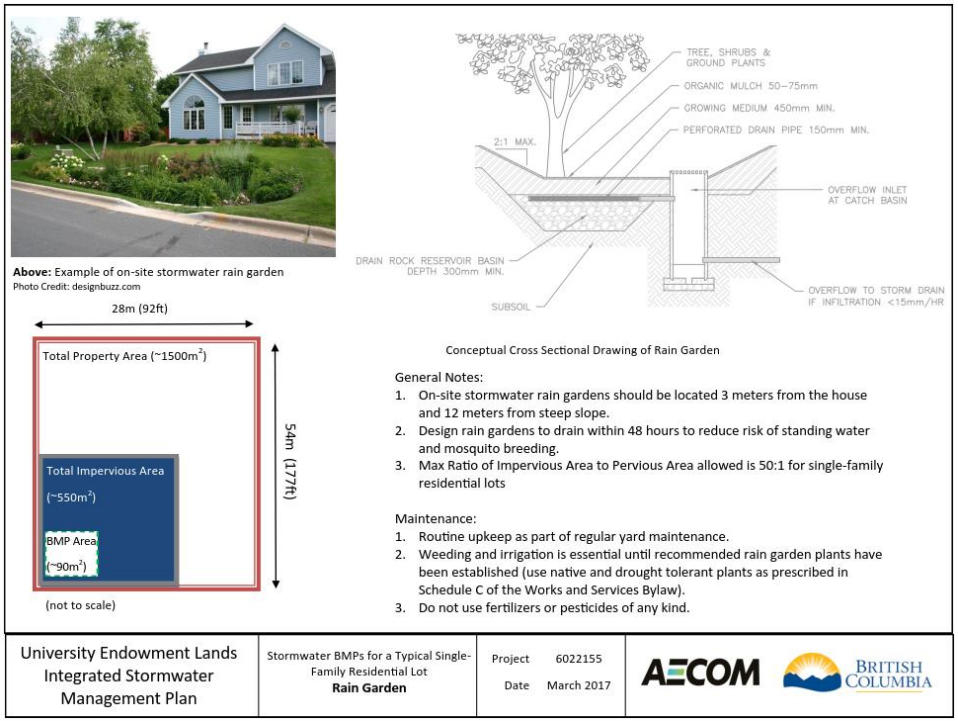
Applicable Bylaw	Sewer and Watercourse Bylaw No. 8093 (the Bylaw)
pH Requirements	Discharge water to have a pH of 6.0-9.0
Turbidity Requirements	Discharge water Total Suspended Solids (TSS) not to exceed 75mg/L.
Environmental Monitoring	Must be completed by a Qualified Person (QP). Acceptable designations include Applied Science Technologist (ASc.T), Environmental Professional in Training (EPt) or EP, BC Certified Erosion and Sediment Control Lead (CESCL) or equivalent, Engineer in Training (EIT), Professional Engineer (P. Eng), and Biologist in Training (BIT) or higher.
Monitoring Frequency	Dry Season (May-Sept): Bi-weekly Wet Season (Oct-Apr): Weekly Additional monitoring is required within 24 hours of a significant rainfall event (SRE) (>25 mm in 24 hrs). Additional monitoring is not required if the SREs are within 48 hours of each other. Discharge water sampling can cease once the Site is connected to the City sewer system or with written approval from Environmental Protection. Monitoring of best management practices should continue for the duration of the project. Monitoring frequency can be modified upon agreement in writing between the City Inspector and the Contractor or QP.
Sampling Parameters	Samples will be submitted for laboratory analysis of TSS if field testing results exceed the Trigger Value of 45 nephelometric turbidity units (NTU)** The Environmental Monitor may be permitted to submit a Site specific calibration curve to the City if analytical results are consistently below 75 mg/L. If the field measurements exceed 45 NTU or if the pH is less than 6.0 or greater than 9.0, the Contractor **must cease discharge** until appropriate remedial measures have been undertaken.
Report Submission	Templated report submitted within 48 hours of the monitoring event for Sites which are out of compliance. Templated report submitted within 7 days of the monitoring event for Sites which are in compliance. If laboratory analysis is required, the analytical results must be submitted within 7 calendar days. Reports are to be submitted to: environmentalprotection@vancouver.ca
Site Maintenance	No sediment-laden water from the work site shall be pumped out or otherwise discharged directly to a storm sewer system, water course, or other drainage system in such a manner as to bypass the sediment control system. Deficiencies identified by the Environmental Monitor are to be resolved as soon as practically possible.
Removal/Alterations of Treatment Works	No changes to the water treatment system are to be made without the City's Environmental Protection approval. A written request must be approved by Environmental Protection. A Site inspection may be required prior to approval.

DOC/2016/359505 — Page 2 of 3

Action Item #10:

Control runoff from private properties

- Review and formalize stormwater discharge limits for developments
- Provide options for developers for limiting stormwater runoff



Summary of Stage 3 Action Items

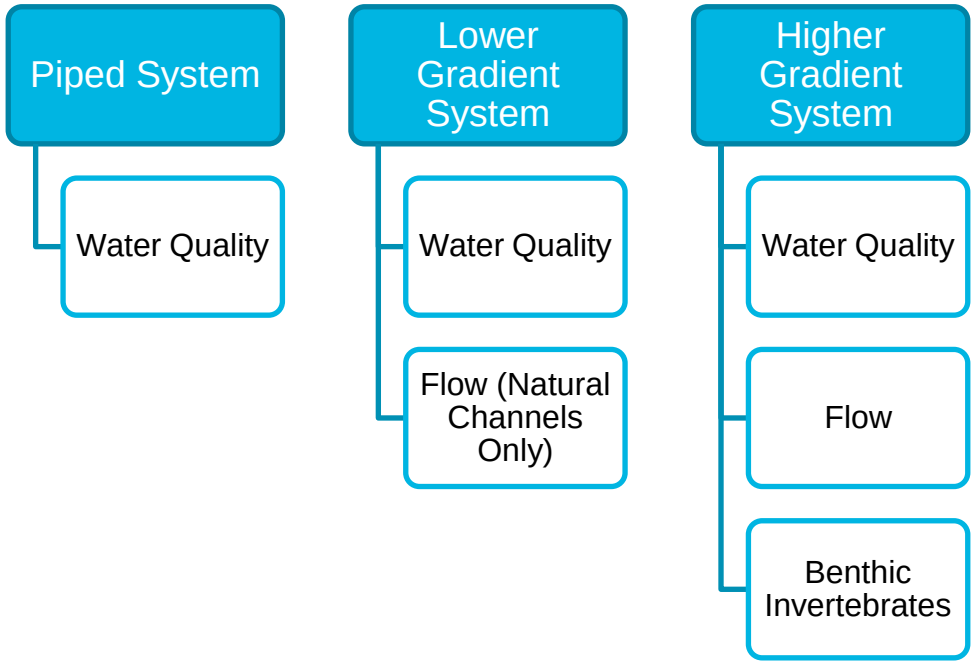
1. Promote stormwater management awareness and engagement opportunities
2. Continue to implement UEL's combined sewer separation strategy
3. Manage the quantity of road runoff
4. Treat stormwater runoff from the UEL Works Yard
5. Decommission, where possible, pipes that are poorly located for maintenance and replacement (i.e. the 300mm diameter storm sewer in Pacific Spirit Park east of Acadia Road)
6. Continue to upgrade system capacity and renew aging infrastructure in a proactive manner through the capital planning process
7. Establish areas of no infiltration at the UEL so as not to threaten slope stability
8. Integrate stormwater asset maintenance with work order management using a GIS-centric system
9. Develop Erosion and Sediment Control requirements
10. Control runoff from private properties

Stage 4

Adaptive Management Plan

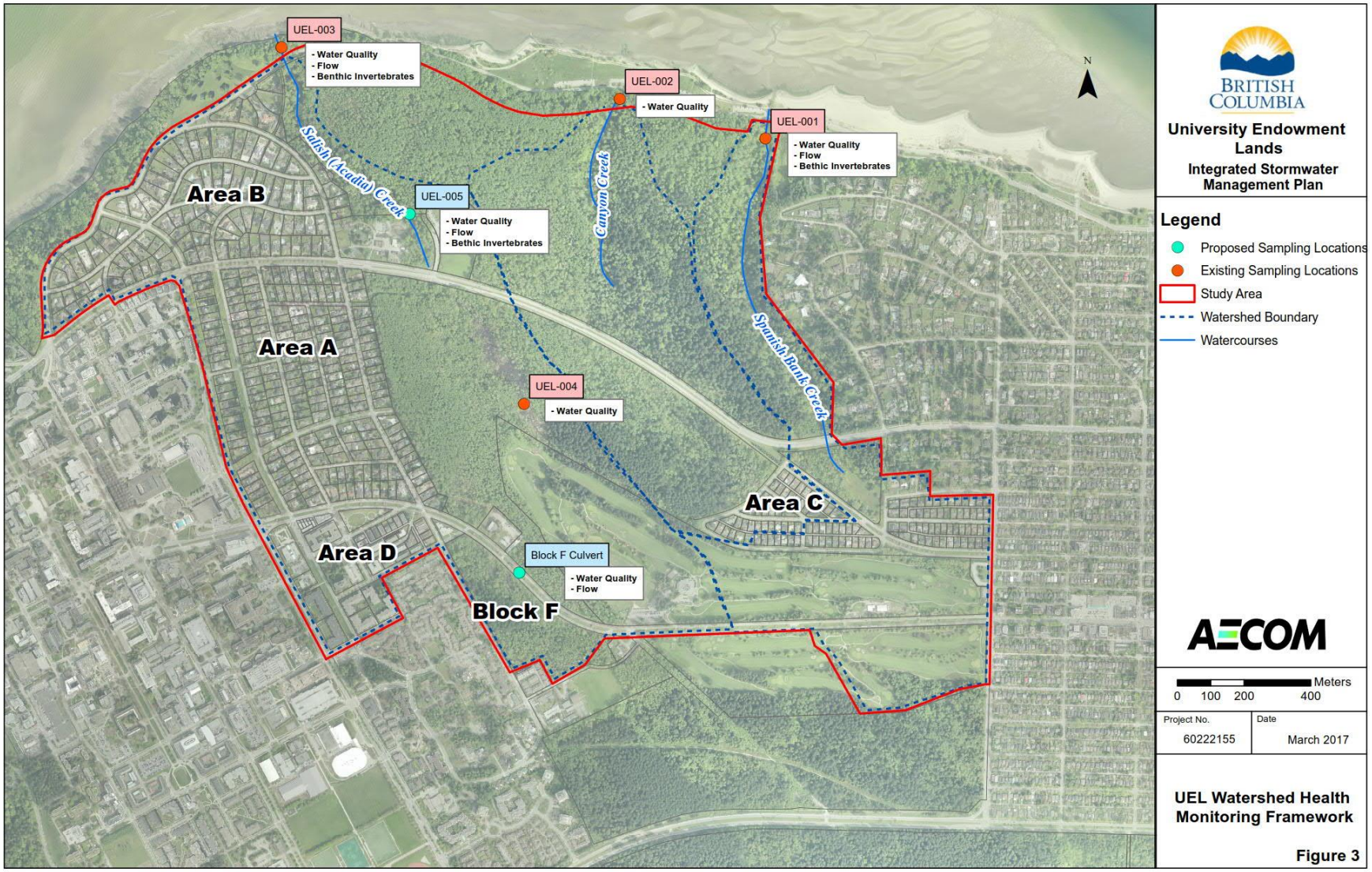
Metro Vancouver's Monitoring and Adaptive Management Framework

Recommended Monitoring Programs



AECOM

Monitoring Watershed Health



Adaptive Management

Assessment of Watershed Health Monitoring Results

- Water Quality Results
- Flow Monitoring Results
- Benthic Invertebrate Sampling Results

AECOM

Adaptive Management

Assessment of Watershed Health Monitoring Results

For Example,

Water Quality Assessment Criteria (MAMF, 2014)

	Good Level	Satisfactory Level	Need Attention Level
General Parameter			
Dissolved Oxygen (mg/L)	≥ 11	6.5 to < 11	< 6.5
pH	6.5 to 9.0	6.0 to < 6.5 or > 9.0 to 9.5	< 6 or > 9.5
Water Temperature (° C)			
Low flow summer	< 16	16 to 18	>18
Wet Weather	7 to 12	5 to <7 or >12 to 14	< 5 or > 14
Conductivity (µS/cm)	< 50	50 to 200	> 200
Turbidity (NTU)	≤ 5	> 5 to 25	> 25
Nutrients			
Nitrate as Nitrogen (mg/L)	≤ 2	2 to 5	> 5
Microbial Parameters			
E.coli (freshwater) (CFU/100ml)	Geomean ≤ 77	Geomean between 78 - 385	Geomean > 385
Fecal coliform (CFU/100ml)	Geomean ≤ 200	Geomean between 2201 - 1,000	Geomean > 1,000
Metals (Total Metals) (µg/L)			
Iron	< 800	800 to 5,000	> 5,000
Cadmium	< 0.06	0.06 to 0.34	> 0.34
Copper	< 3	3 to 11	> 11
Lead	< 5	5 to 30	> 30
Zinc	< 6	6 to 40	> 40

AECOM

Adaptive Management Practices

- Source Control Measures
  - Absorbent Landscaping
  - Rain Gardens
  - Pervious Pavement, and etc.
- Education and Public Outreach
- Cross Connection Control
- Runoff Detention, Retention, and Treatment Facilities
- Riparian Habitat Restoration
- Mitigation of Construction Impacts

Stage 4 Report In Summary

1. Monitor watershed health at strategic locations
2. Evaluate results of monitoring according to available criteria
3. Adapt to changes in watershed health through implementation of Adaptive Management Practices

Thank You!

Discussion and Questions

May 15, 2017