10th ANNUAL
GENERAL MEETING & PD Workshop

June 7, 2017

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

WELCOME TO OUR NEW MEMBERS!

- Travis Deeter, P.Ag., EP
- Paul Embregts, P.Eng.
- Yu-Min (Ben) Lin, P.Eng.
- Bonnie Marks, M.A.Sc., P.Eng., PMP
- Michael Muttersbach, P.Geo.
- Lora Paul, P.Eng., PGY
- Mandeep Purewal, P.Ag., R.P.Bio.

Welcome to the 10th Annual General Meeting

Review of the AGM AGENDA ~ Robin Jones, President

- Housekeeping activities
- Reports from the Directors
- Approval of the Financial Statements
- Appointment of the Auditor
- Election of Directors
- New Business
- Introduction of the 5 Directors at large
- Our annual "Thank you's"
- AGM closing

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CSAP 10th Annual General Meeting

~ Robin Jones, President

- ✓ 1.1 Appointment of the Meeting Secretary
- ✓ 1.2 AGM Notice (Attachment I)
- ✓ 1.3 Declaration that a meeting quorum is present

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2. Reports from the Directors

2.1 Committee Reports

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MEMBERSHIP

Chair: Scott Steer, MET., R.P.Bio., Director

Members: Brant Dorman, P.Eng.
Vijay Kallur, M.Sc., P.Eng., FEC
Simone Mol, Ph.D., P.Chem.
Sam Reimer, P.Ag., Vice Chair
Paul Webb, P.Geo.

Responsibilities:

- Administer the membership application and examination process
- Verify that existing members maintain their qualifications

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YEAR IN REVIEW

- REVIEW/REVISION OF MEMBERSHIP GUIDELINES
- REVIEW/REVISION OF EXPERIENCE FORMS AND EXPERIENCE REVIEW GUIDELINES
- REVIEW OF CURRENT SUBMISSION REQUIREMENTS
- DEVELOPMENT OF A DISCUSSION FORUM
- DEVELOPMENT OF EXCLUSIVE EXAM SOFTWARE

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EXAMINATION SCHEDULE

- 2017 EXAMS MOVED TO FEBRUARY 2018
  - Numeric Standards Technical – February 6, 2018
  - Regulatory – February 7, 2018
  - Risk-based Standards Technical – February 8, 2018
- DEADLINE TO APPLY (CANDIDATES) – SEPTEMBER 1, 2017
- DEADLINE TO APPLY (MEMBERS) – DECEMBER 3, 2017
- EXAM BANKS CURRENTLY UNDER REVIEW
  - Thanks to exam development leads: Sam Reimer (Risk); Paul Webb (Regulatory); Patty Carmichael (Numeric)
- EXAM DEVELOPMENT WORKSHOPS – DECEMBER 2017

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MEMBERSHIP STATISTICS

- 110 APs
  - 90 NUMERICAL STANDARDS
  - 16 RISK-BASED STANDARDS
  - 4 NUMERICAL + RISK
- 28 SUCCESSFUL RENEWALS
- 3 MEMBERS BECAME ASSOCIATE MEMBERS
- 1 MEMBER RESIGNED – KEN EVANS
- 7 NEW MEMBERS

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PERFORMANCE ASSESSMENT

Chair: Colin Dunwoody, P.Eng., Director

Members:
Eva Gerencher, M.Sc., P.Ag.
Ingo Lambrecht, P.Geo.
Duncan Macdonald, B.Sc., P.Eng.
Trish Miller, R.P. Bio.
Dave Mitchell, P.Eng.
Tara Siemens-Kennedy, P.Chem.

Responsibilities:

We Manage:
Quality of submissions forwarded to MoE for instruments under the CSR through:

- Continuous review and improvement of the PA process based on feedback with a particular focus on advancing the use of professional judgment
- Improving the completeness of submissions with improvements to the Annotated SoSC
- Providing training webinars for members

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THANK YOU

Thank you to the Committee members

I would like to thank the **committee members**. We have an excellent committee and have very good discussions regarding PAs past and present. Every member of the committee has a very good perspective in focusing on the "big picture" of potential impact to human health and the environment. We make every effort to work through administrative and minor technical issues to bring each submission to a successful conclusion where possible.

I would like to thank **Bob Symington** for managing the Detailed Screening process.

I would also like to thank **all the Detailed Screeners** and the **PA panel members** who have participated this year.

I would also like to thank **Anna** for her diligent Administrative Screening.

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STATS

This year the committee has completed:

- 123 Submissions / Detailed screenings, up 19 from last year
- 20 Performance Assessments
    - Of these 15 were found sufficient (and 3 are still pending)

- 14 of the 20 PAs were as a result of random selection
- 3 were selected for PA as a result of detailed screening
- 1 was requested by MoE

The issues identified include:

- insufficient hydrogeological data to exclude DW pathway or show protection of deeper aquifers
- AG11 (communication) issues
- lack of explanation of professional judgment exercised

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RESULTS OF QUESTIONNAIRE

After each PA the submitting AP is asked to evaluate the PA

-62% feel the PAs are not overly detailed

-97% feel the PAs are informative

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SUMMARY OF SITE CONDITION

Annotated Summary of Site Condition has been augmented with an expanded Hydrogeology section

While this enhancement covers more aspects of the hydrogeology of a site it is still incumbent on the submitting AP to provide additional text if there site conditions that warrant explanation.

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ADMINISTRATIVE GUIDANCE 11

With the upcoming Omnibus effective date of November 1, 2017 it will be very important for submitting APs to ensure they allow sufficient time to complete AG11 communication with affected parties.

Incomplete AG11 communication records will constitute an incomplete submission and would require resubmission (after Omnibus is in effect?)

This doesn't mean you need to have agreement/acceptance of affected parties but you do need to have completed the requirements of AG 11 or provided rationale as to how you have met the intent of AG 11.

CSAP has an AG11 template that is helpful.

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DETAILED SCREENING FLOWCHART ADDITION

When detailed screening results in a submission being referred to PAC for additional review by a DM the submitting AP will be advised.

http://csapsociety.bc.ca/members/guidelines/submission-screening/

PRELIMINARY & DETAILED ADMINISTRATIVE SCREENING

CSAP would like to thank those who have completed the survey following the screening of their submissions and of the 37 recently returned responses the following were noted.

Preliminary Administrative Screening

- 100% of respondents found the questions raised to be clear, that the screener was available for questions and the issues were adjudicated in a fair and timely manner.

Detailed Administrative Screening

- 94% or respondents found the questions raised to be clear, that the screener was available for questions and the issues were adjudicated in a fair and timely manner.
- 31% indicated the screening to have improved since their last submission, 69% indicated it was about the same and 0% thought the process was worse this time.

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TECHNICAL REVIEW COMMITEE

Chair: **Beth Power**, M.Sc., R.P.Bio., Director

Members: Guy Patrick, M.Sc., P.Eng. Ajay Tumber, P.Eng.
Michael Sloan, P.Eng. David Williams, P.Eng.

Responsibilities: Supports CSAP on technical issues.

We Manage:

Technical Review Process

CSAP Special Projects

CSAP Scholarship Program

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2016/17 SPECIAL PROJECTS

- Vapour Guidance (inputs to Technical Guidance 4 and new Protocol 22)
- Summary of Performance Verification Plans (PVPs) Issued to Date, and Preliminary Recommendations for Future Requirements
- Review of Peat Analytical Methodologies and Interpretation of Analytical Results
- Mapping Drinking Water Using Geographic Information System
- Toolkit #3 (Methods for Evaluation of Monitored Natural Attenuation) & Toolkit #4 (Enhanced Attenuation of Hydrocarbons (partially funded outside of CSAP)
- Professional Judgement Paper for APs (presented at Spring Professional Development meeting)
- Review of the Omnibus numbers (phase 1)
- Potential Contaminants of Concern (PCOC) list

2016/17 TECHNICAL REVIEWS

- Revisions to Protocol 2 (site-specific numerical soil standards)
- Development of leachate methods
- Review of Technical Guidance 3 (Environmental Quality Standards)

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CSAP SCHOLARSHIP AWARDS

The TRC manages the scholarship process.

Scholarship awards will be announced today.

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2017/18 SPECIAL PROJECTS

- Layman's guide to AP practice
- Further revisions to Protocol 2 (site-specific numerical soil standards) – develop "look-up" tables
- Review CSR risk assessment guidance to identify areas of overlap/conflicting guidance & recommend solutions
- Further assessment (beyond the FY 2016/17 CSAP project) of the implications of the revised CSR standards using data compiled by five companies
- Review of the omnibus numbers (phase 2)

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2017/18 TECHNICAL REVIEWS

- Review of various documents to reflect Omnibus

  Phase 1: March 2017

  Phase 2: July 2017

  TRC is looking for volunteers for Phase 2 reviews (sign up on the Members Survey, appendix A).

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PROFESSIONAL DEVELOPMENT

Chair: Andrew Sorensen, P. Eng., Director

Members: Mark Adamson, P. Geo.
Mike Rankin, M.Sc., R.P. Bio, (Past Chair)
James Smith, R.P. Bio
Bob Symington, P. Geo
Paul Webb, P. Geo
Jason Wilkins, P.Ag.

Responsibilities:

- **Develop** content and themes for annual Fall PD Workshop
- **Assist** with the development of Webinars and POD posts
- **Manage** Updates to CSAP Submission Manager
- **Developed** Agenda for Technical Stream at Ministry's 2016 Land Remediation Conference

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FALL CSAP PD WORKSHOPS

- 2016 Fall Workshop held last November. Topics included:
  - California Low-Threat Closure Policy
  - Regional Background Selenium in Groundwater in Kamloops
  - Investigations in Bedrock Settings
  - Professional Judgement
  - False Positives
  - Ministry updates regarding the Hazardous Waste Regulation Amendments, Pre-Approvals and Revisions to Soil Vapour Technical Guidance

- 2017 Fall Workshop scheduled for November 16
  - Will be held again at Vancouver Convention Centre
  - First Call for Abstracts sent out in Spring Members Update
  - Please also submit ideas for topics in the AGM Members Survey

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MOE LAND REMEDIATION CONFERENCE

- Developed the agenda for the technical stream at the Ministry's Land Remediation Conference held in September 2016.
- Presentations focused on four themes:
    1. Sustainable Remediation
    2. Emerging Toxicants
    3. Remedial Technologies
    4. Risk Assessment

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CSAP PD WEBINARS

- Three PD Webinars held this past year:
  1. **Preparing** a CSAP Submission – October 2016 (68)
     - Duncan Macdonald, Paul Webb, Tara Siemens-Kennedy, Amy Sloma and Annette Mortensen
  2. **SLRA** and Groundwater Models – November 2016 (67)
     - Mark Adamson, Christine Thomas, Stephen Munzar, George Szefer and Remi Odense
  3. **Omnibus** Standards Review – March 2017 (76)
     - Michael Sloan, Colin Dunwoody, Peter Reid, Chuck Jochems, Dan Walker and Glyn Fox
- Potential Upcoming Webinar Topics:
  - Lessons Learned (Ongoing Topic)
  - Risk Conditions and PVPs, Risk Based COCs and AG11 Communications
  - Vapour Assessments
- Always looking for Webinar ideas – Contact Bob Symington

SUBMISSION MANAGER UPDATES

- Updates to Submission Manager on hold
- Need to coordinate changes with Stage 10 Amendments and expected new Instrument templates
- Speed of Submission Manager previously improved
- Upgrades to Section 4.5 (APECs and PCOCs) coming

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LAST REQUEST

- Committee Volunteers – currently one to two openings
- Presentation ideas/topics for Workshops, Webinars and AGM
  - AGM Members Survey
  - Contact me or Catherine directly

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DISCIPLINE

Chair: Eva Gerencher, M.Sc., P.Ag., Director

Members: Dave Newton, P.Geo.
Reg North, P.Geo., P.Eng.

Responsibilities:

The Discipline Committee acts on behalf of the Board in dealing with complaints and determining appropriate measures for submissions found deficient through the Performance Assessment process.

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DUTIES AND RESPONSIBILITIES

Address written complaints about a member regarding:

- CSAP work conducted in an incompetent manner
- Professional misconduct or conduct contrary to CSAP Rules
- Breach of the CSAP code of ethics

CSAP has not received any written complaints requiring disciplinary action of a member.

 |

DUTIES AND RESPONSIBILITIES

Review and assess measures for deficient submissions

- PAC informs the Discipline Committee when a submission under PA has been found deficient
- Committee reviews the following as applicable:
  - DM letter outlining reason for deficient finding
  - PA Stage 1 and Final Findings reports
  - Addendum prepared by submitting AP(s)
  - Approved Professional's PA history
- Measures considered appropriate are listed in the Discipline Committee Guidelines

 |

2016 - 2017

- Remedial measures were assessed for three submissions found deficient by the Performance Assessment Committee.
- Committee revised the remedial measures to include an option to determine that remedial measures are not warranted.
- The Discipline Committee Guidelines are available at

  http://csapsociety.bc.ca/members/discipline/

 |

GOVERNANCE

Chair: Tony Gillett, P. Eng. (Director)

Members: Andrea Akelaitis, LLB (Director)
Jim Malick, Ph.D., P.Ag., R.P.Bio (Past President, Past Chair)
Cindy Ott, P.Ag., Geo.L , P.Chem., (Past President)
Greg Sutherland, Ph.D., R.P. Bio., (Past President)

Responsibilities:

Effective functioning of the Board and the committees, task forces, and any other work undertaken by the Board

Assessment, development and recommendation to the Board including, governance principles and policies approved by the Board.

Address governance issues referred to the Committee by the Board

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2016/17 GOVERNANCE COMMITTEE ACTIVITIES

- Develop/screen conflict of interest disclosure form for Directors;
- Conflict of Interest statement added to Committee ToRs;
- Updated CSAP privacy policy;
- Evaluation forms for Board and Committees;
- Policy statement regarding Parent Organizations.
- Thank you to Jim, Cindy, Greg, and Andrea who were instrumental in the success of the committee

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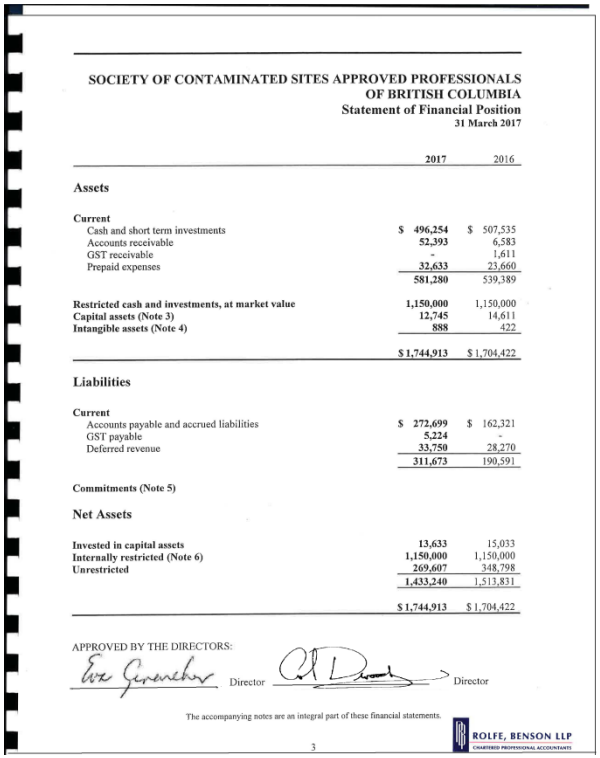
3. FINANCIAL STATEMENTS: 2016-2017

~ Colin Dunwoody, Secretary / Treasurer

Approval of the Financial Statements (Attachment 2):



SOCIETY OF CONTAMINATED SITES APPROVED PROFESSIONALS OF BRITISH COLUMBIA
Statement of Financial Position
31 March 2017

	2017	2016
Assets		
Current		
Cash and short term investments	$ 496,254	$ 507,535
Accounts receivable	52,393	6,583
GST receivable	-	1,611
Prepaid expenses	32,633	23,660
	581,280	539,389
Restricted cash and investments, at market value	1,150,000	1,150,000
Capital assets (Note 3)	12,745	14,611
Intangible assets (Note 4)	888	422
	$ 1,744,913	$ 1,704,422
Liabilities		
Current		
Accounts payable and accrued liabilities	$ 272,699	$ 162,321
GST payable	5,224	-
Deferred revenue	33,750	28,270
	311,673	190,591
Commitments (Note 5)		
Net Assets		
Invested in capital assets	13,633	15,033
Internally restricted (Note 6)	1,150,000	1,150,000
Unrestricted	269,607	348,798
	1,433,240	1,513,831
	$ 1,744,913	$ 1,704,422

APPROVED BY THE DIRECTORS:

Director Director

The accompanying notes are an integral part of these financial statements.

3

ROLFE, BENSON LLP
CHARTERED PROFESSIONAL ACCOUNTANTS

 |

4. APPOINTMENT OF THE AUDITOR

Rolfe, Benson LLP

 |

5. ELECTION OF THE 5 AT LARGE DIRECTORS

- CSAP Bylaws allow for a total of 12 Directors.

3 are representing our parent organizations:

Tony Gillett, representing APEG BC
Eva Gerencher, representing BCIA
Beth Power, representing CAB

3 are appointed by MoE:

Paul Gordon, representing industry
Patrick Johnstone, representing local government
Andrea Akelaitis, environmental representative

Representing MoE

Vince Hanemayer

 |

5. ELECTION OF THE 5 AT LARGE DIRECTORS

- Today we will be electing the 5 at–large Directors
- Please refer to your ballot, there should be a line to include nominations from the floor
- Call for nominations from the floor

 |

5. ELECTION OF THE 5 AT LARGE DIRECTORS

- Introduction of candidates:

- Vijay Kallur
- Trish Miller
- Guy Patrick
- Peter Reid
- Tara Siemens-Kennedy
- Andrew Sorensen
- Bob Symington

 |

5. ELECTION OF THE 5 AT LARGE DIRECTORS

- Please review the candidate statements and mark your ballots now.
- A basket will be circulated to collect the ballots

 |

6. NEW BUSINESS

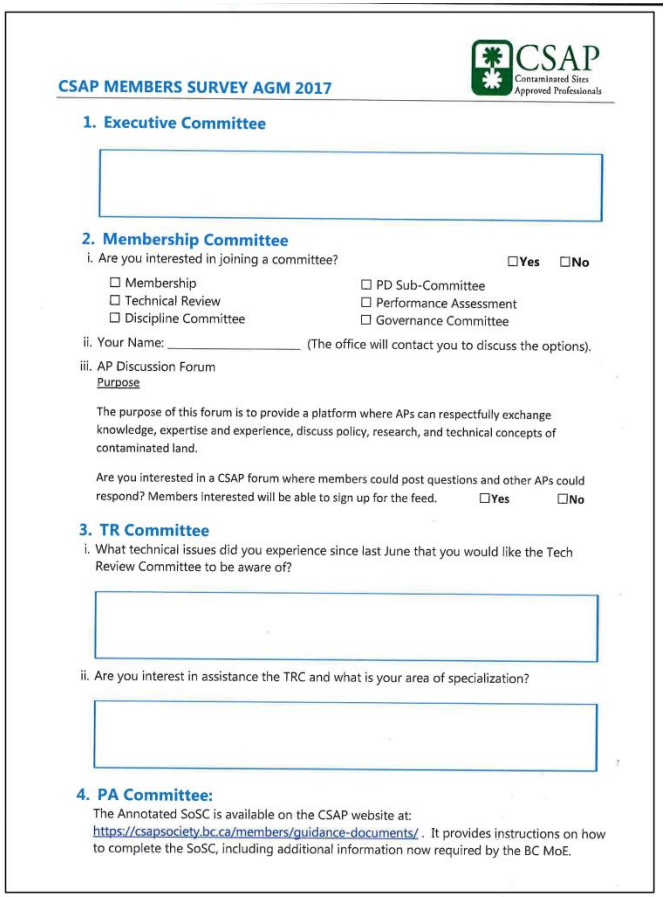
6.1 Estimating the # of submission you will be submitting prior to the implementation of the new standards Nov.1st (AGM Members Survey question #1)

 |

6. NEW BUSINESS

6.2 Members Survey (Attachment VI)

Please return your completed Survey to the registration area at the end of the meeting



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CSAP MEMBERS SURVEY AGM 2017

1. Executive Committee

2. Membership Committee

i. Are you interested in joining a committee? ☐Yes ☐No

- ☐ Membership
- ☐ Technical Review
- ☐ Discipline Committee
- ☐ PD Sub-Committee
- ☐ Performance Assessment
- ☐ Governance Committee

ii. Your Name: _____ (The office will contact you to discuss the options).

iii. AP Discussion Forum

Purpose

The purpose of this forum is to provide a platform where APs can respectfully exchange knowledge, expertise and experience, discuss policy, research, and technical concepts of contaminated land.

Are you interested in a CSAP forum where members could post questions and other APs could respond? Members interested will be able to sign up for the feed. ☐Yes ☐No

3. TR Committee

i. What technical issues did you experience since last June that you would like the Tech Review Committee to be aware of?

ii. Are you interest in assistance the TRC and what is your area of specialization?

4. PA Committee:

The Annotated SoSC is available on the CSAP website at: https://csapsociety.bc.ca/members/guidance-documents/ . It provides instructions on how to complete the SoSC, including additional information now required by the BC MoE.

 |

7. INTRODUCTION OF THE 5 DIRECTORS AT LARGE

Congratulations to our new at-large Directors

 |

8. THANK YOU TO CSAP PRESIDENT

 |

8. THANK YOU TO TREASURER & PA COMMITTEE CHAIR

 |

8. THANK YOU TO MEMBERSHIP COMMITTEE CHAIR

 |

9. OFFICIAL CLOSING OF THE 2016-2017 ANNUAL GENERAL MEETING

The AGM portion of the day is now concluded.
Thank you for attending.

 |

COFFEE BREAK

10:15 – 10:40

 |

PCOC LIST

Presenter: Duncan Macdonald

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Potential Contaminants of Concern

The Project

NEED

- APs have different opinions on what PCOC apply to industrial activities
- Fill, waste oil, gas stations, dry cleaners
- Variety of resources (EPA, Health Canada etc)

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The Project

SCOPE

To create a guidance document outlining the normal PCOC associated with the most common commercial industrial land use activities

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Topics and Challenges

- Professional judgement vs. checklist
- Crowd sourcing / Wiki format
- Differences between references
- Matrix vs. text
- APEC vs. Schedule 2 Uses
- Omnibus
- Emerging contaminants
- What is useful?

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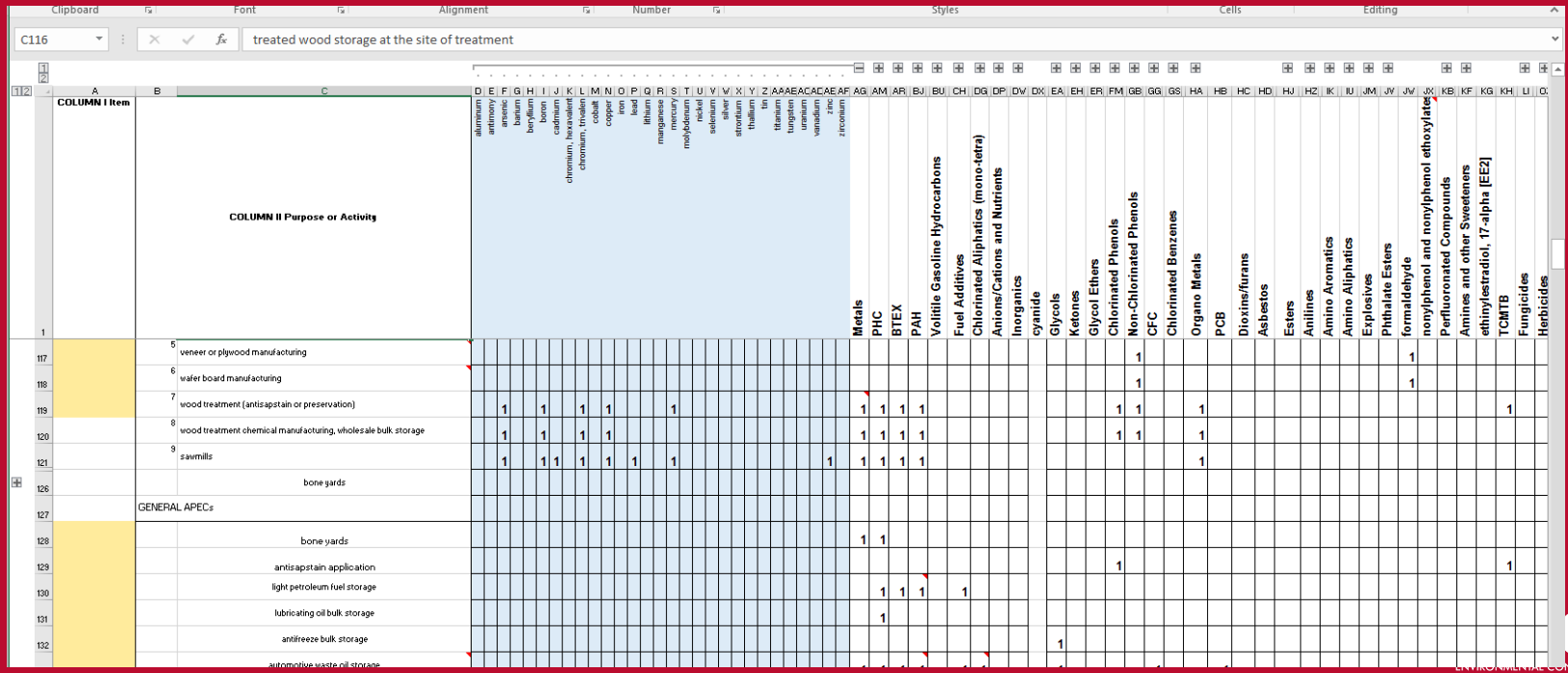
Matrix / Wiki



COLUMN I Item	COLUMN II Purpose or Activity	Metals	PHC	BTEX	PAH	Volitile Gasoline Hydrocarbons	Fuel Additives	Chlorinated Aliphatics (mono-tetra)	Anions/Cations and Nutrients	Inorganics	cyanide	Glycols	Ketones	Glycol Ethers	Chlorinated Phenols	Non-Chlorinated Phenols	CFC	Chlorinated Benzenes	Organo Metals	PCB	Dioxins/furans	Asbestos	Esters	Anilines	Amine Aromatics	Amino Aliphatics	Explosives	Phthalate Esters	formaldehyde	nonylphenol and nonylphenol ethoxylates	Perfluorinated Compounds	Amines and other Sweeteners	ethinylestradiol, 17-alpha [EE2]	TCMTB	Fungicides	Herbicides
	5 veneer or plywood manufacturing															1													1						
	6 wafer board manufacturing															1													1						
	7 wood treatment (antisapstain or preservation)	1		1	1		1			1					1	1			1														1		
	8 wood treatment chemical manufacturing, wholesale bulk storage	1		1	1		1								1	1			1																
	9 sawmills	1		1	1	1	1	1		1									1																
	bone yards																																		
	GENERAL APECs																																		
	bone yards	1	1																																
	antisapstain application														1																		1		
	light petroleum fuel storage		1	1	1		1																												
	lubricating oil bulk storage		1																																
	antifreeze bulk storage											1																							
	automotive waste oil storage																																		

Text Version

- Guidance document
- List of PCOC for 25 most common Schedule 2 Activities
- Not exhaustive
- Requires judgement
- Provides references
- Proposes “primary / secondary”

B4 – Electrical Transmission or Distribution Substations

Electrical substations contain transformers and other electrical equipment that may contain or have previously contained oils, PCBs, or tetrachloroethylene. Vegetation is a threat to equipment and underground grounding wires and is often aggressively controlled with herbicides.

PCOC Substance Class	Activity/Source	Comments
Petroleum hydrocarbons	Transformer oil	LEPH and HEPH
Herbicides	Vegetation control	e.g., atrazine, bromacil, 2,4-dichlorophenoxy acetic acid (2,4-D), diuron, glyphosate, linuron, simazine, tebuthiuron, among others
PCBs	Liquid dielectrics in transformers and capacitors	Most common pre-1980. PCB-containing equipment remains in use in some electrical transmission and distribution facilities until 2025.
Chlorinated aliphatics		Tetrachloroethylene and breakdown products - mostly used post-1980
1,2,4-trichlorobenzene		1,2,4-trichlorobenzene and breakdown products.
Metals	Handling and storage of cable and electrical components, herbicides.	Particularly arsenic (from herbicides), copper and lead

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Primary/Secondary

- Loosely used by most consultants
- “if you don’t find this, you won’t find that”
- Remediation/delineation drivers

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What's Missing

- Moves the ball, but far from perfect…or final
- Doesn't address "we never or seldom find this"
  - e.g. chlorinated solvents in soil/gw at service stations
  - Glycols in groundwater
  - No literature comes from experience, how to harness
  - Novel contaminants lack experience base
- Remediation/delineation drivers
- MOE "Complete" site characterization goal

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What's Next?

- Technical Review Committee
- Membership distribution
- Feedback on draft
- Revisions
- Use or contaminant Wikis?
- Repeat?

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Zayed Mohammed, P.Ag.

604.682.3707

dmacdonald@pggroup.com

www.pggroup.com

VANCOUVER VICTORIA FRASER VALLEY TORONTO

CSAP's GIS MAP EXPLAINED

Presenter: Chuck Jochems

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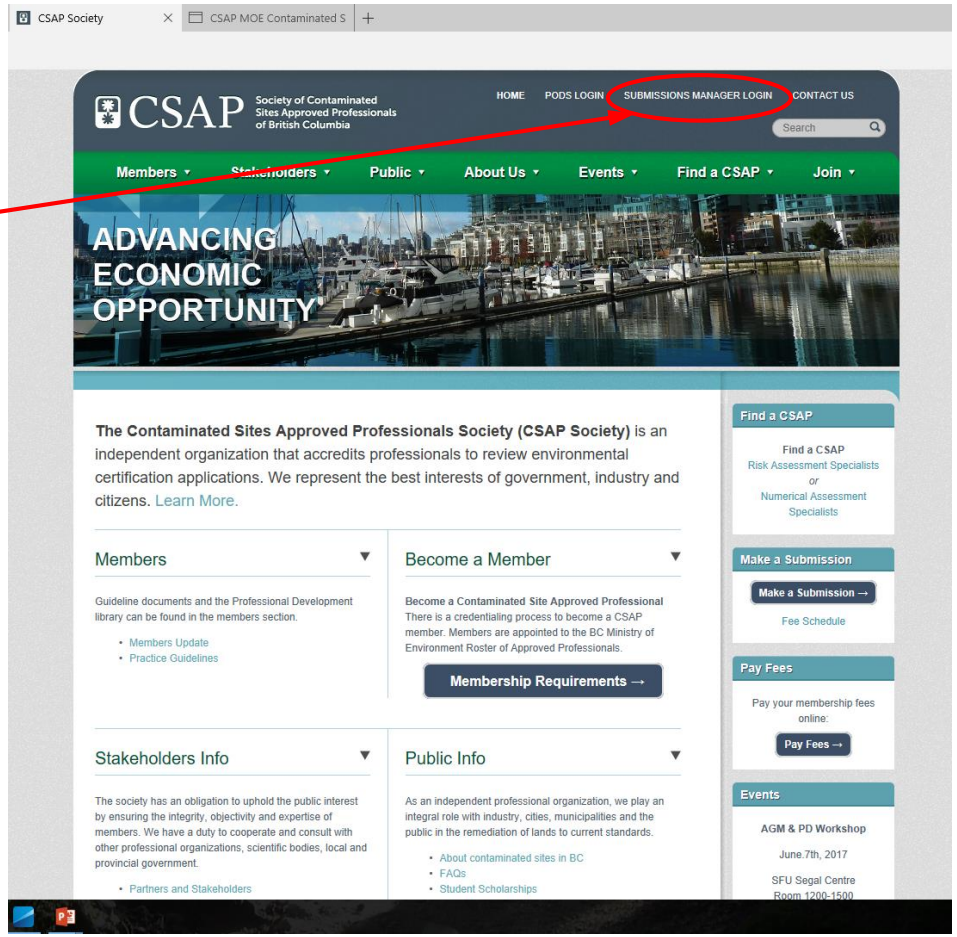
CSAP's GIS MAP

The CSAP and MoE Contaminated Site Legal Instrument Mapping tool has many uses in assessment of contaminated sits, including:

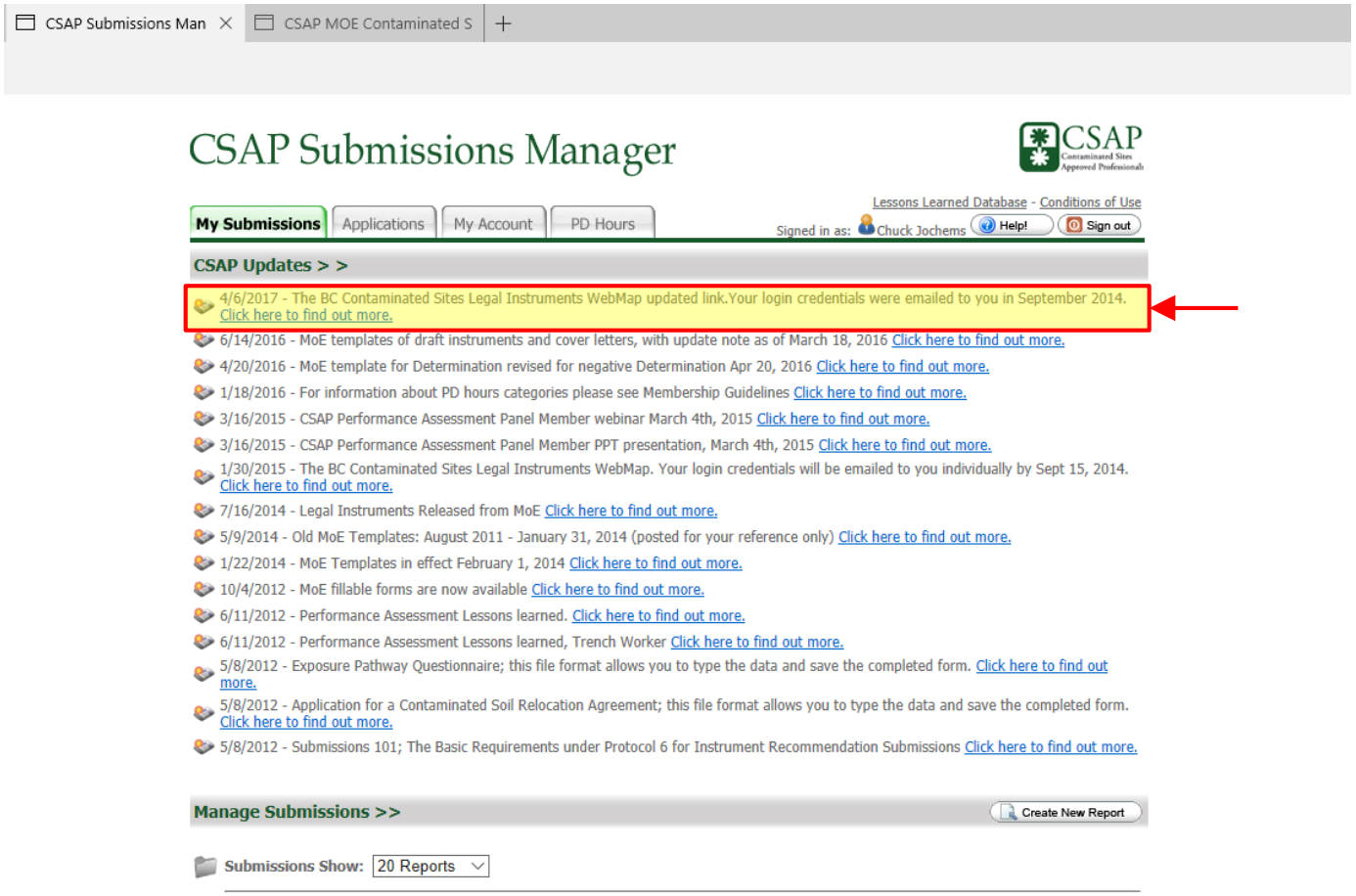
- Looking for a recent Determination, AiP or CoC anywhere in the Province?
- Need to know of any Water Use Determinations local to you site?
- Do you have background soil or groundwater issues?
- Want to be aware of any Protocol 6 pre-approvals local to your site?
- Does your site fall within the historic high water mark?

GETTING STARTED

- Go to the CSAP website
- "Click" on the Submission Manager Login in the top right
- Login with user email and password
- Access issues? Contact Nelly Pomareda



GETTING STARTED

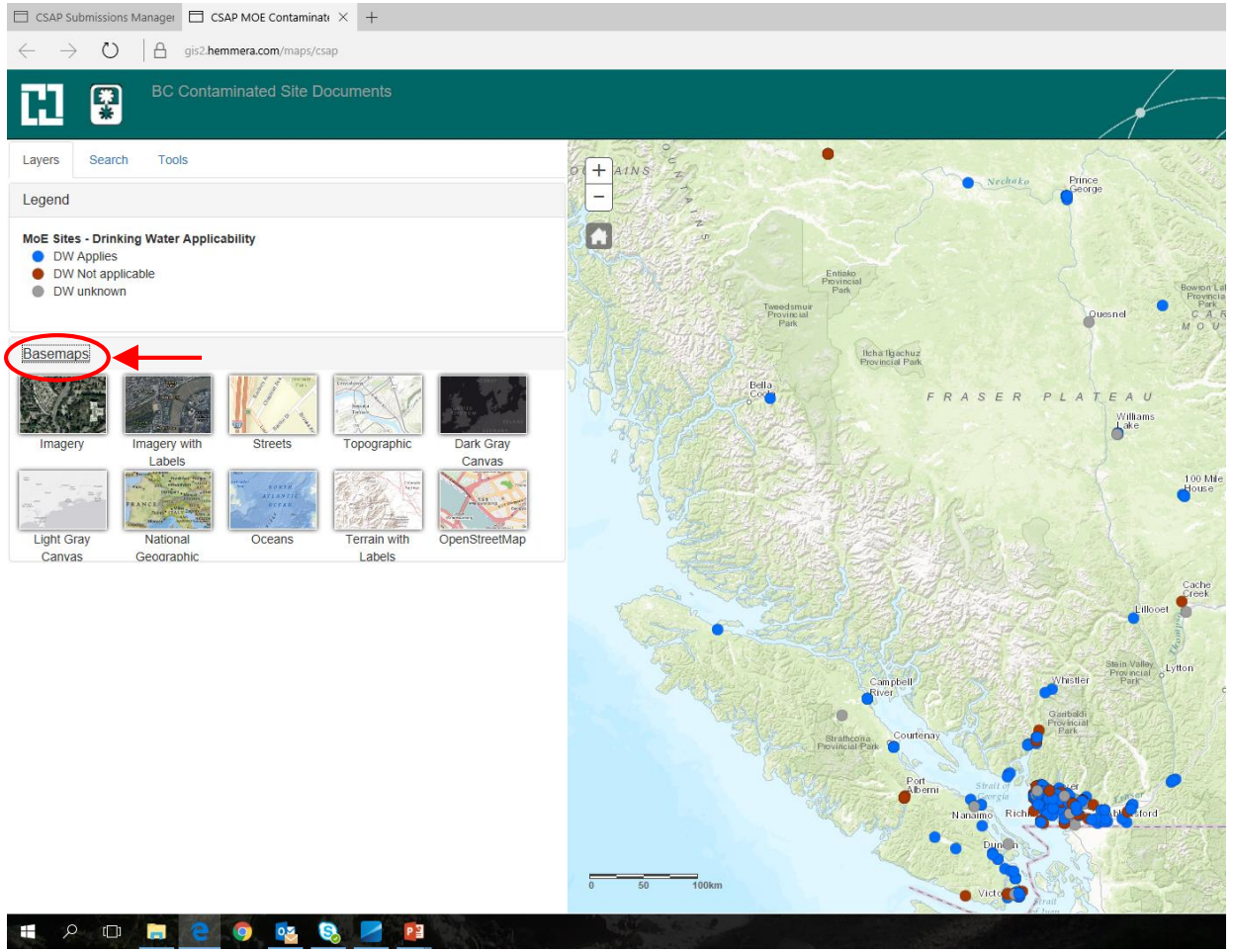


OPENING SCREEN

Master Legend

- DW Applies
- DW Not Applicable
- DW Unknown

Can change the basemap if you want - Just click!



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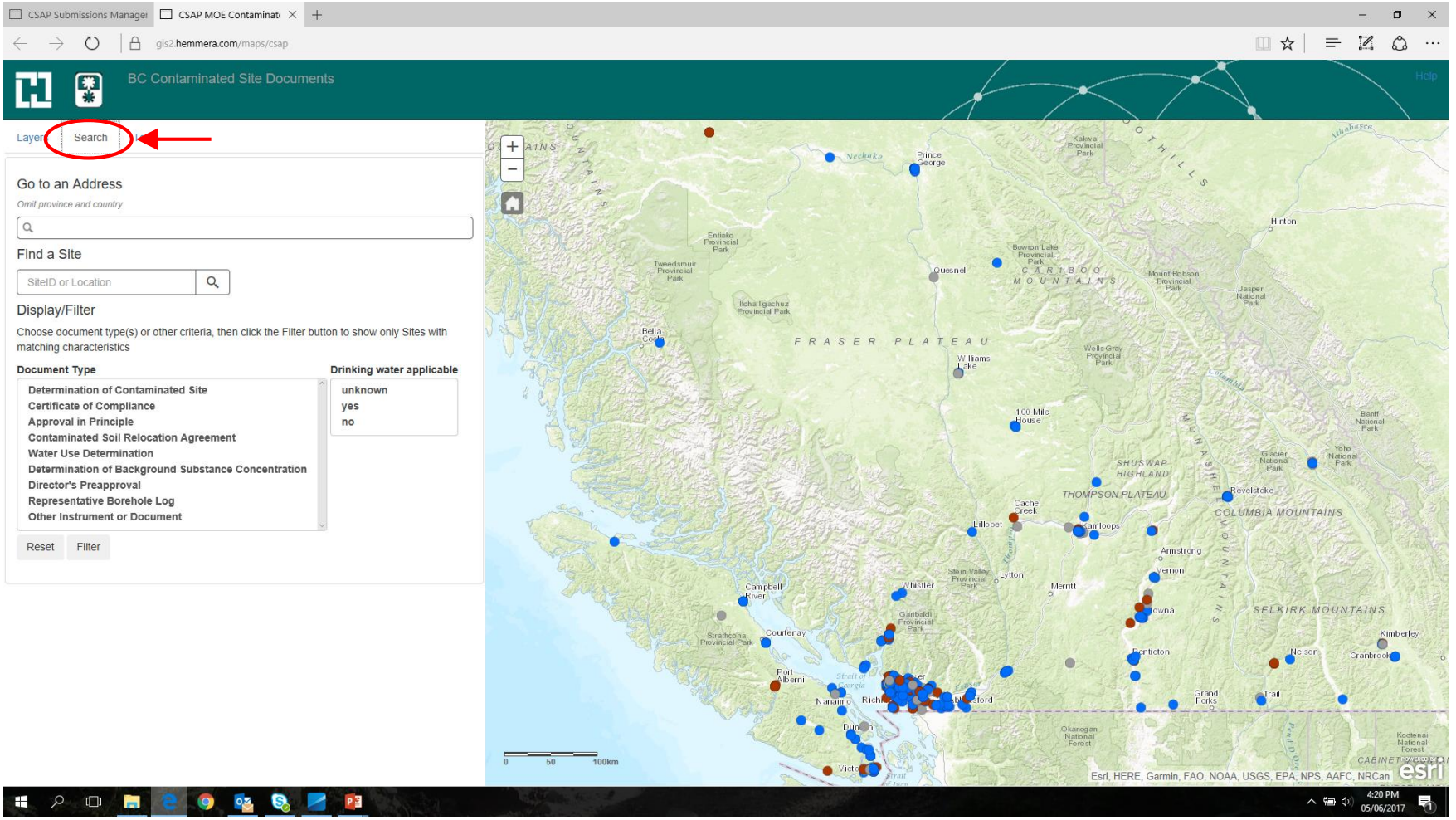
OPENING SCREEN



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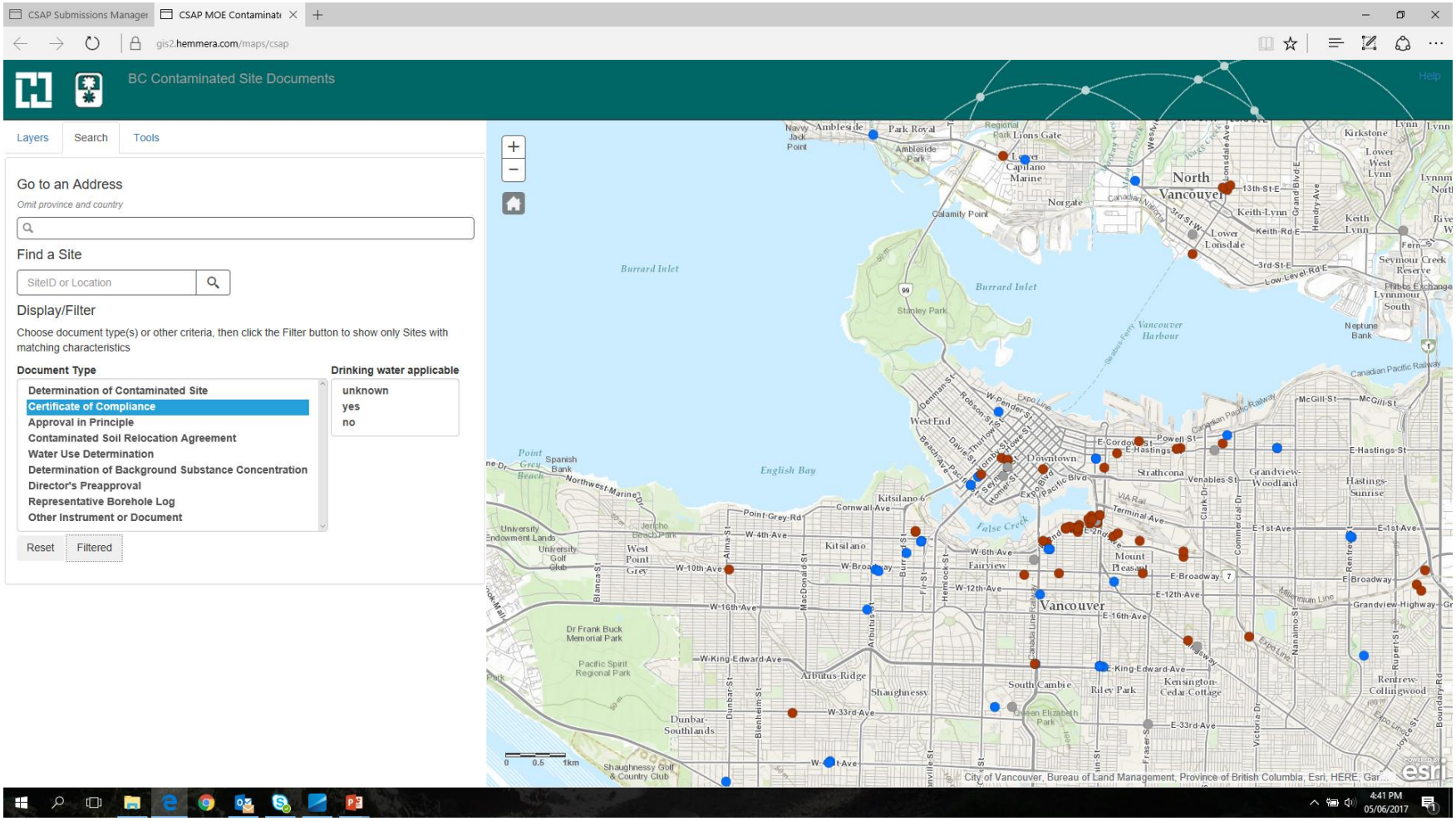
RECENT MoE INSTRUMENTS - COCs (348)



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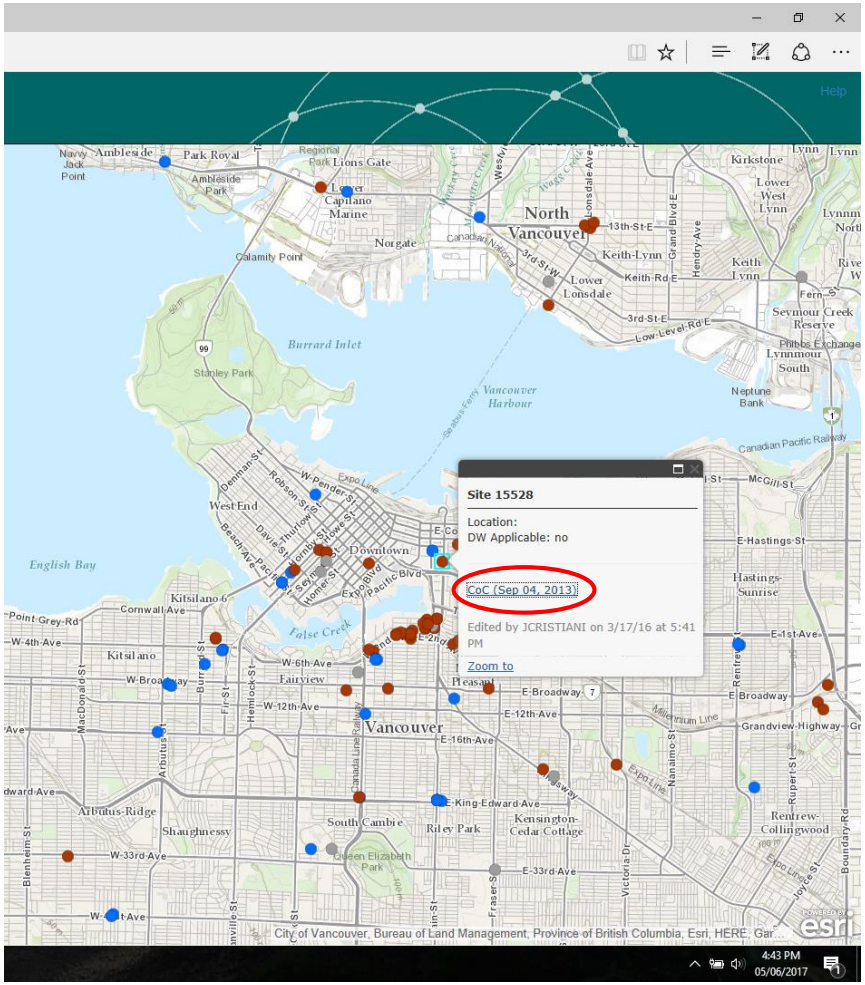
EXAMPLE - SITE 15528 COC, VANCOUVER



BRITISH COLUMBIA Ministry of Environment

CERTIFICATE OF COMPLIANCE
(Pursuant to Section 53 of the *Environmental Management Act*)

THIS IS TO CERTIFY that as of the date indicated below, the lands identified below have been satisfactorily remediated to meet Contaminated Sites Regulation standards and criteria for ***residential land*** **soil use** and ***aquatic life*** **water use**.

The portion of the site covered by this Certificate of Compliance is located at 721 Main Street, Vancouver, British Columbia which is more particularly known and described as:

Northern portion of Lot A, Block 19, District Lot 196, Group 1, New Westminster District, Plan BCP10656 - PID: 025-923-366, as described by metes and bounds:

COMMENCING from the northwesterly corner of the northern boundary of Lot A, Block 19, District Lot 196, Group 1, New Westminster District, Plan BCP10656;

THENCE at a bearing of 91 Degrees 42 Minutes 54 Seconds a distance of 36.565 metres to a point on the easterly boundary of Lot A, Block 19, District Lot 196, Group 1, New Westminster District, Plan BCP10656;

THENCE at a bearing of 181 Degrees 44 Minutes 14 Seconds a distance of 10.059 metres to a point on the easterly boundary of Lot A, Block 19, District Lot 196, Group 1, New Westminster District, Plan BCP10656;

THENCE at a bearing of 271 Degrees 42 Minutes 54 Seconds a distance of 36.565 metres to a point on the westerly boundary of Lot A, Block 19, District Lot 196, Group 1, New Westminster District, Plan BCP10656;

THENCE at a bearing of 1 Degrees 44 Minutes 14 Seconds a distance of 10.059 metres to the point of commencement.

The approximate centre of the lands using the NAD (North American Datum) 1983 convention is:

Latitude:	49°	16'	42.6"
Longitude:	123°	06'	0.9"

A site plan is attached as Schedule "A" to this Certificate of Compliance.

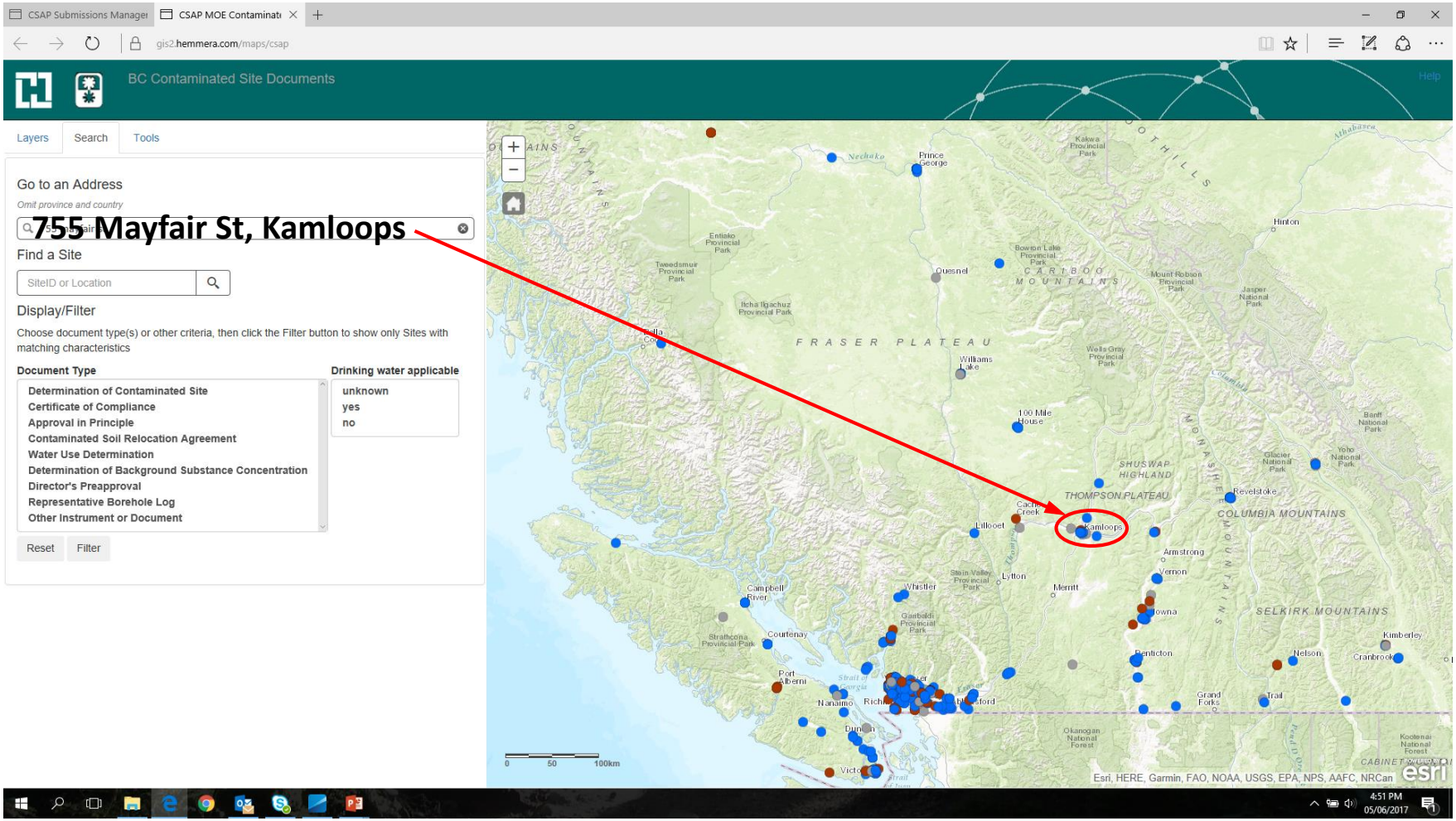
Sept 4/2013
Date Issued

John E. H. Ward
For Director, *Environmental Management Act*

Site Identification Number 15528
R

1 of 5

ADDRESS SEARCH OPTION



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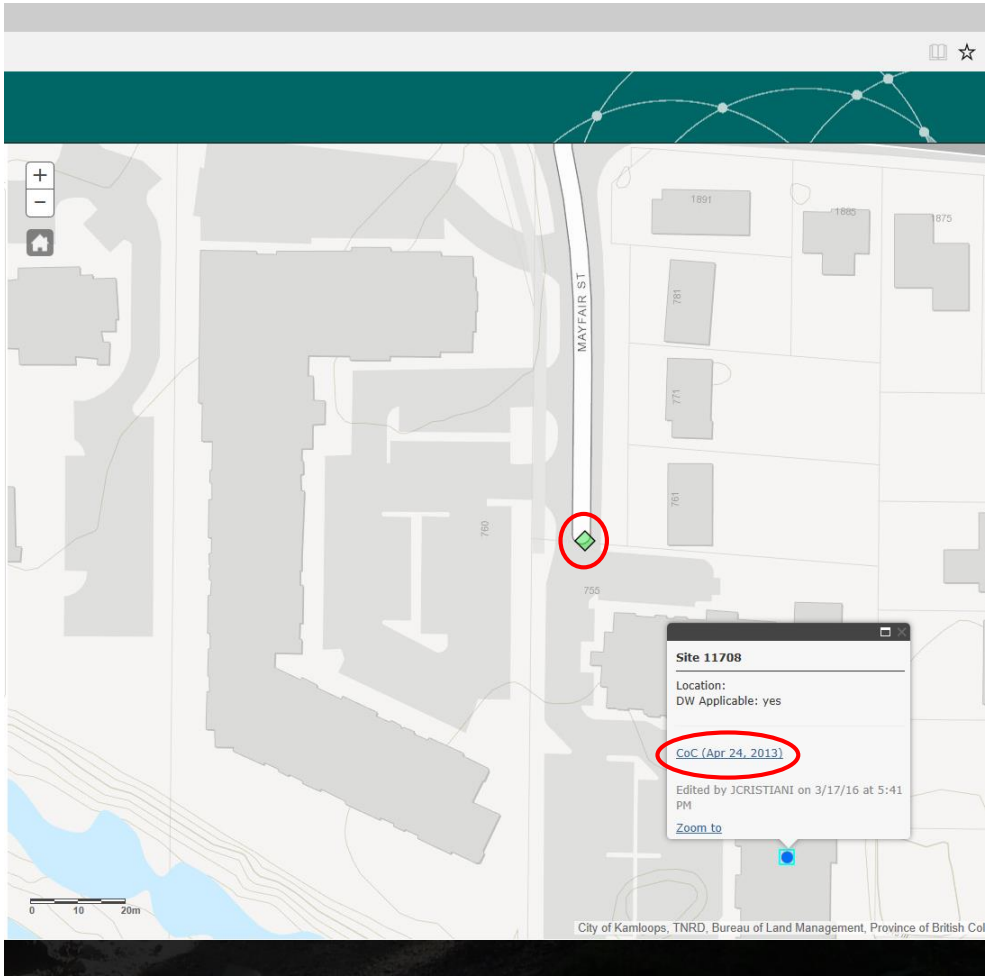
EXAMPLE - SITE 11708 COC, KAMLOOPS



BRITISH COLUMBIA | Ministry of Environment

CERTIFICATE OF COMPLIANCE
(Pursuant to Section 53 of the *Environmental Management Act*)

THIS IS TO CERTIFY that as of the date indicated below, the lands identified below have been satisfactorily remediated to meet Contaminated Sites Regulation standards for ***residential land* vapour use** and ***freshwater aquatic life*** and ***drinking water* uses**.

The site covered by this Certificate of Compliance is located at 755 Mayfair Street, Kamloops, British Columbia, which is more particularly known and described as:

Amended Lot A (DD260175F), District Lot 253 Kamloops Division Yale District Plan 11450

PID 009-508-210

And includes the area of foreshore immediately to the south legally described as:

All that unsurveyed Crown foreshore being part of the bed of Thompson River and fronting on Amended Lot A (DD260175F), District Lot 253.

As depicted in Kamloops Division Yale District Plan 11450, containing 0.170 hectares, more or less.

The approximate centre of the lands using the NAD (North American Datum) 1983 convention is:

Latitude: 50° 41' 54.00"
Longitude: 120° 23' 50.00"

A site plan is attached as Schedule "A" to this Certificate of Compliance.

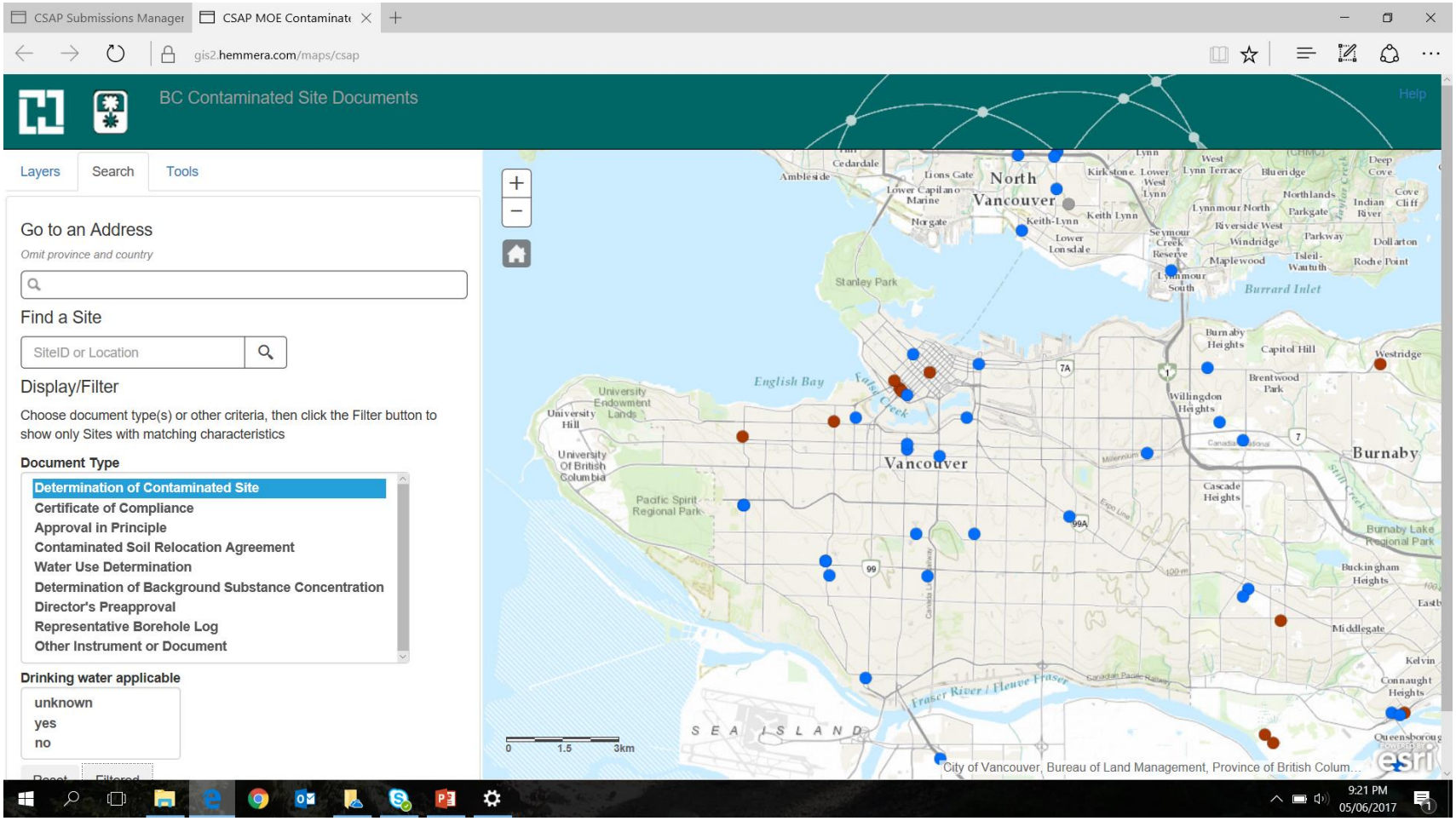
April 24/13
Date Issued

John E. H. Ward
For Director, *Environmental Management Act*

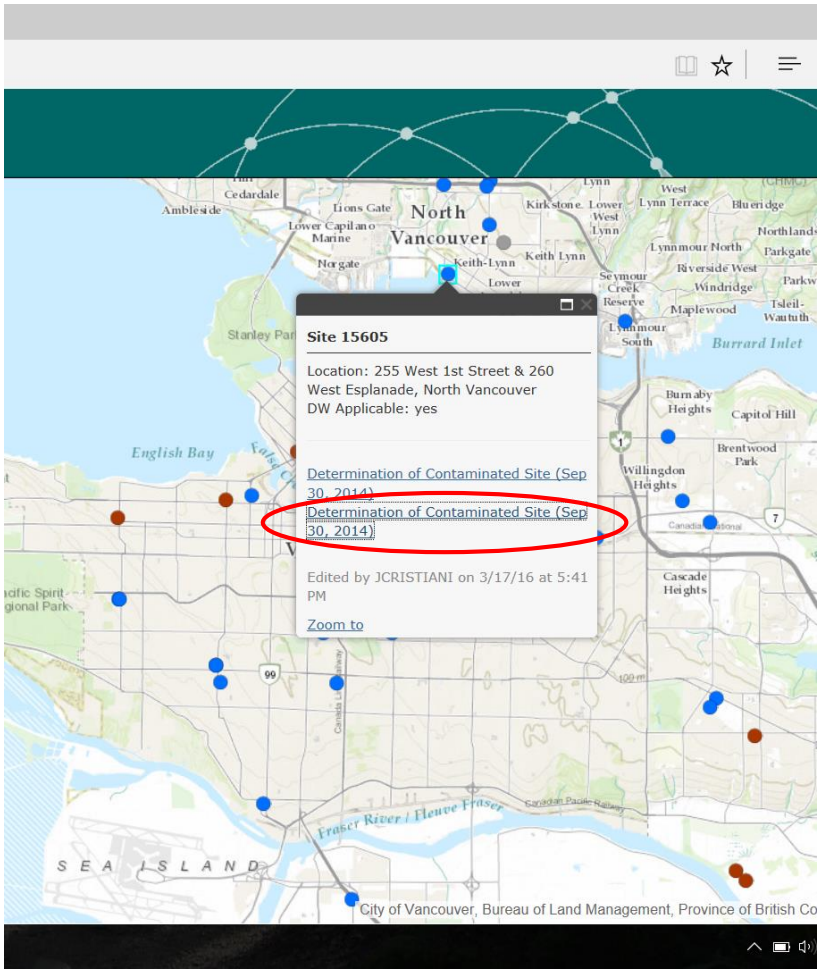
Site Identification Number 11708
R

1 of 5

RECENT MoE INSTRUMENTS - DETERMINATIONs (136)



EXAMPLE - SITE 15605 DETERMINATION, NORTH VAN



BRITISH COLUMBIA Ministry of Environment

FINAL DETERMINATION
(Pursuant to Section 44 of the *Environmental Management Act*)

I have made a Final Determination that the site identified in Schedule A of this document **is not** a contaminated site.

This Final Determination is qualified by the requirements and conditions specified in Schedule B.

The site **does not have** concentrations of the substances specified in Schedule C that exceed the applicable standards and criteria prescribed in the Contaminated Sites Regulation for determining whether a site is a contaminated site.

I have issued this Final Determination based on a review of relevant information including the documents listed in Schedule D. I, however, make no representation or warranty as to the accuracy or completeness of that information.

This Final Determination should not be construed as an assurance that there are no hazards present at the site.

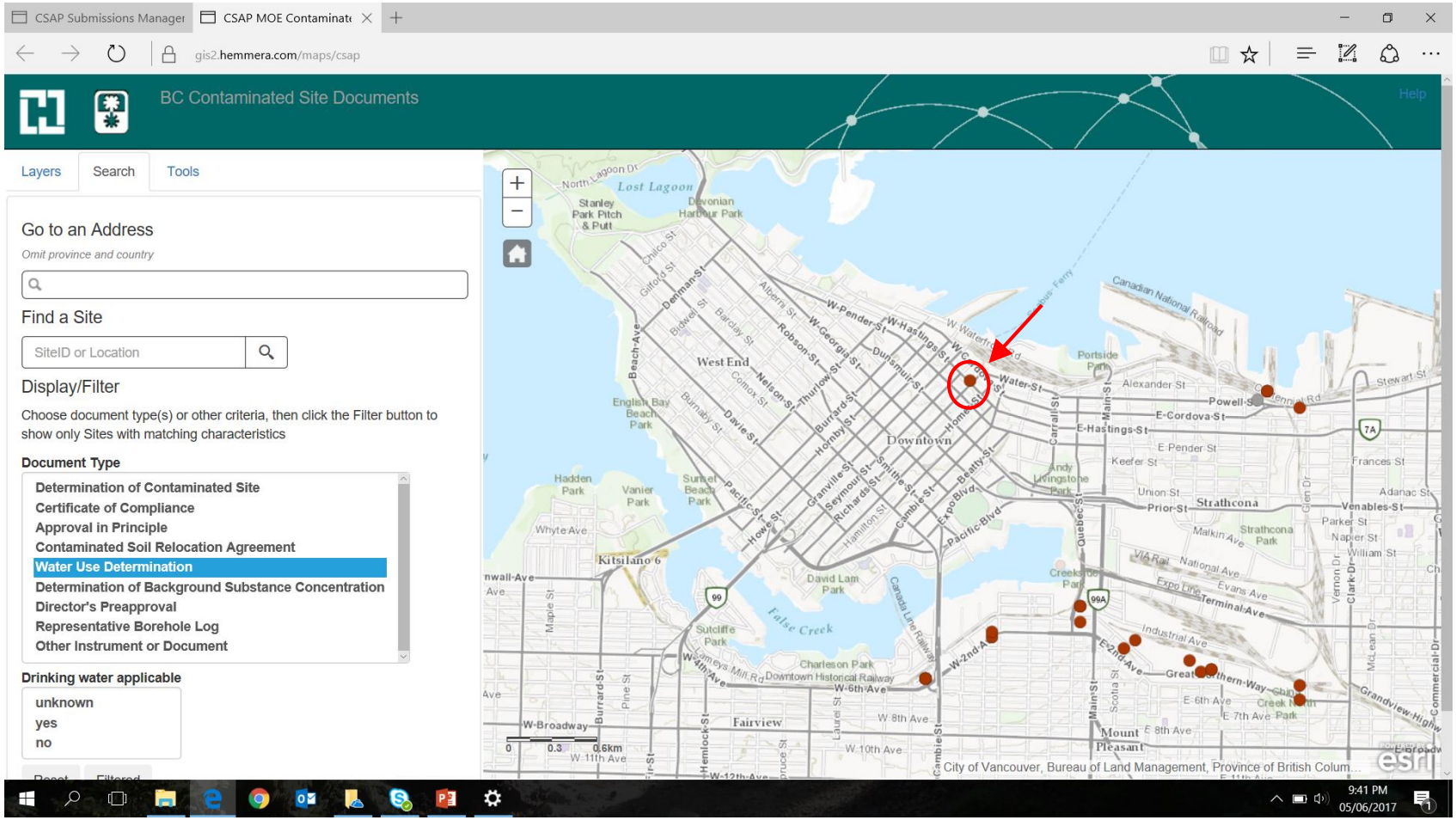
NOV 13/14
Date Issued

John E. H. Ward
For Director, *Environmental Management Act*

SITE Identification Number 15605
Version 8.0 R

1 of 7

WATER USE DETERMINATIONS (54)



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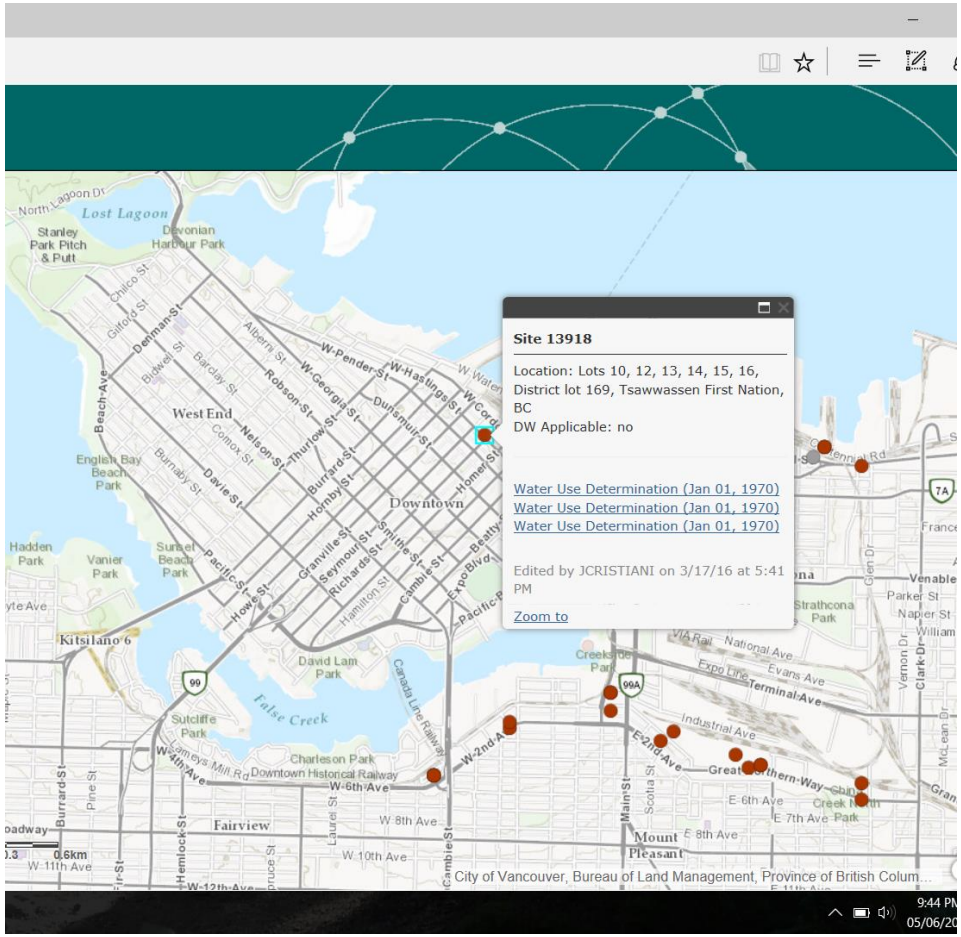
EXAMPLE - SITE 13918, DOWNTOWN VANCOUVER



BRITISH COLUMBIA

File: 26250-20/13918
Site: 13918

March 25, 2013

Mr. Chris Gillham
Aquilini/TFSI Development LP
510 West Hastings Street
Vancouver, BC V6B 1L8

Dear Mr. Gillham:

Re: Site 13918 – Water Use Determination Request for Lots 10, 12, 13, 14, 15, 16, District Lot 169, Tsawwassen First Nation, British Columbia

The ministry has reviewed the application *Water Use Determination at Lots 10, 12, 13, 14, 15, 16, District Lot 169, Tsawwassen First Nation, British Columbia , B.C.* dated January 30, 2013, prepared by Thurber Engineering Ltd (TEL) on behalf of the Aquilini/Tsawwssen Fee Simple Interest Development LP (Aquilini). The document referenced above describes investigations and supporting rationale for a determination of no drinking water use at the aforementioned legal addresses, also identified by the following PIDs 027-864-626, 027-864-642, 027-864-651, 027-864-669, 027-864-677 and 027-864-685 (the Site). The site location is depicted in the figure below:

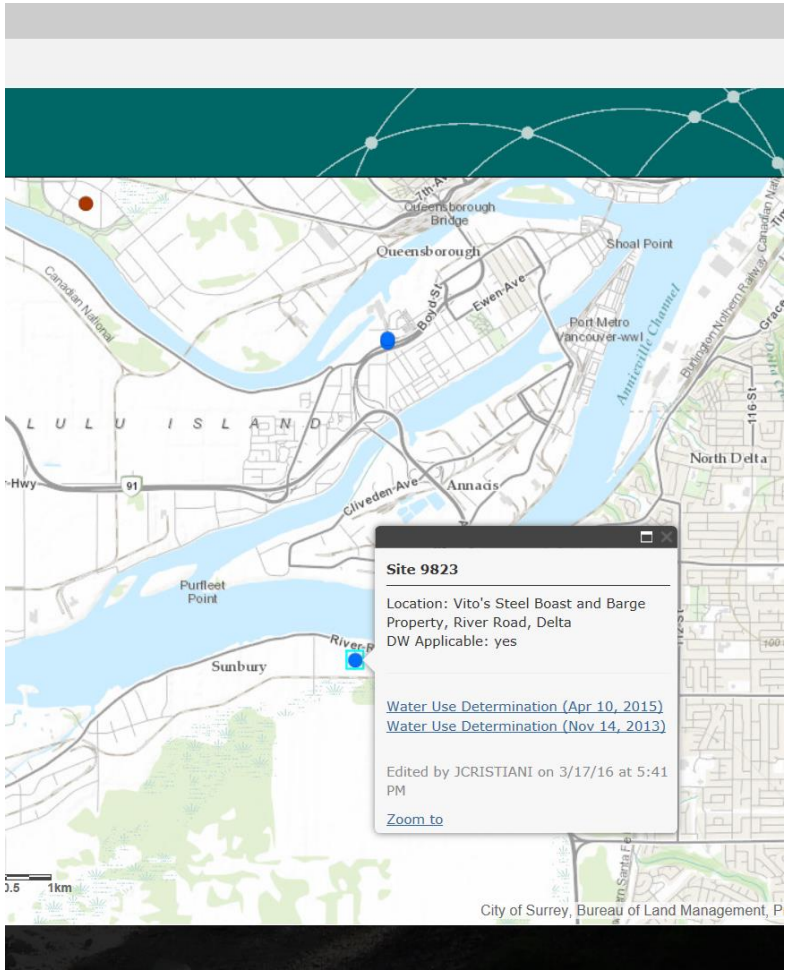
RATIONALE FOR DIRECTOR'S DECISION

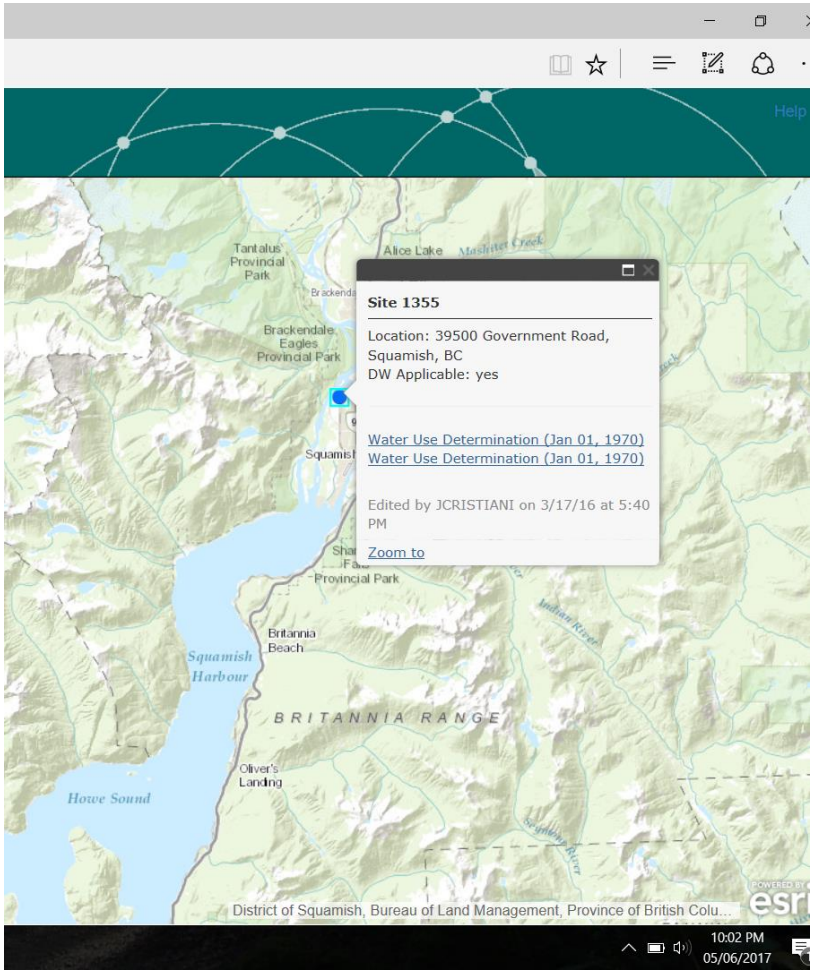
The January 30, 2013 application for a water use determination at the subject Site seeks a request for a Director's determination of water use and provides the following rationale as to why drinking water use according to the ministry Technical Guidance 6 does not apply:

- No wells are located within a 500 m radius of the site.
- Drinking water for the area is supplied by Metro Vancouver which sources water from reservoirs distant from the site.
- The shallow unconfined aquifer is located within fill of suspect quality and is of limited and inadequate extent to provide a sustainable drinking water supply for a single family dwelling. In addition, the hydraulic conductivity measured from wells partially screened in the fill is less than $1x10^{-6}$ m/s.
- The site is adjacent to marine surface waters. Groundwater is tidally influenced and discharges to the marine aquatic environment.
- The confined aquifer below the site has unsuitable water quality for drinking water purposes. For example, the 95^{th} percentile calculation for TDS concentrations within this aquifer is greater than 4,000 mg/L.
- A previous 1995 drilling investigation determined that a potable water supply in the area was not available unless the saline water encountered was treated by reverse osmosis.

 |

APPLICATIONS WHERE DW STILL APPLIES





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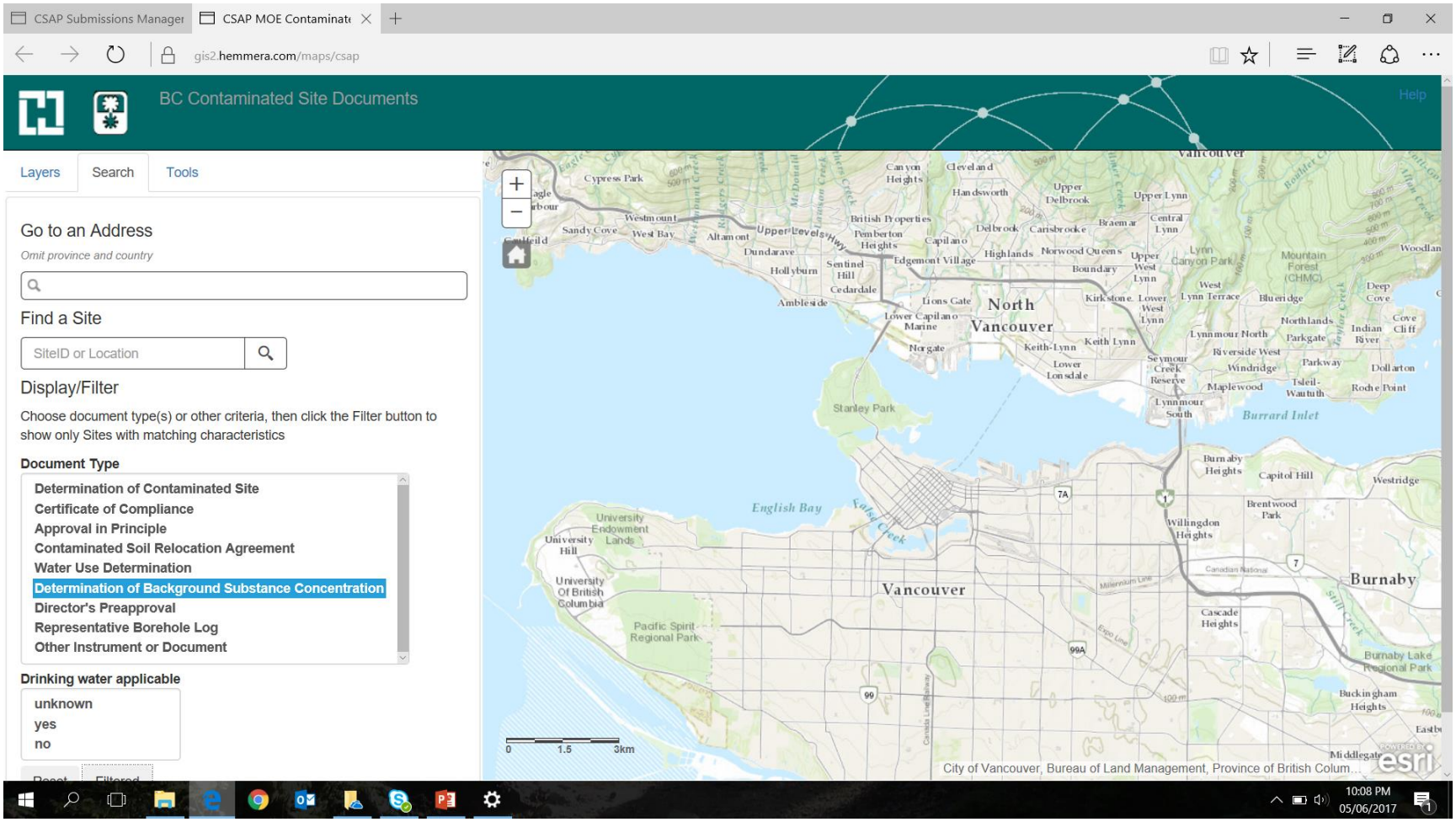
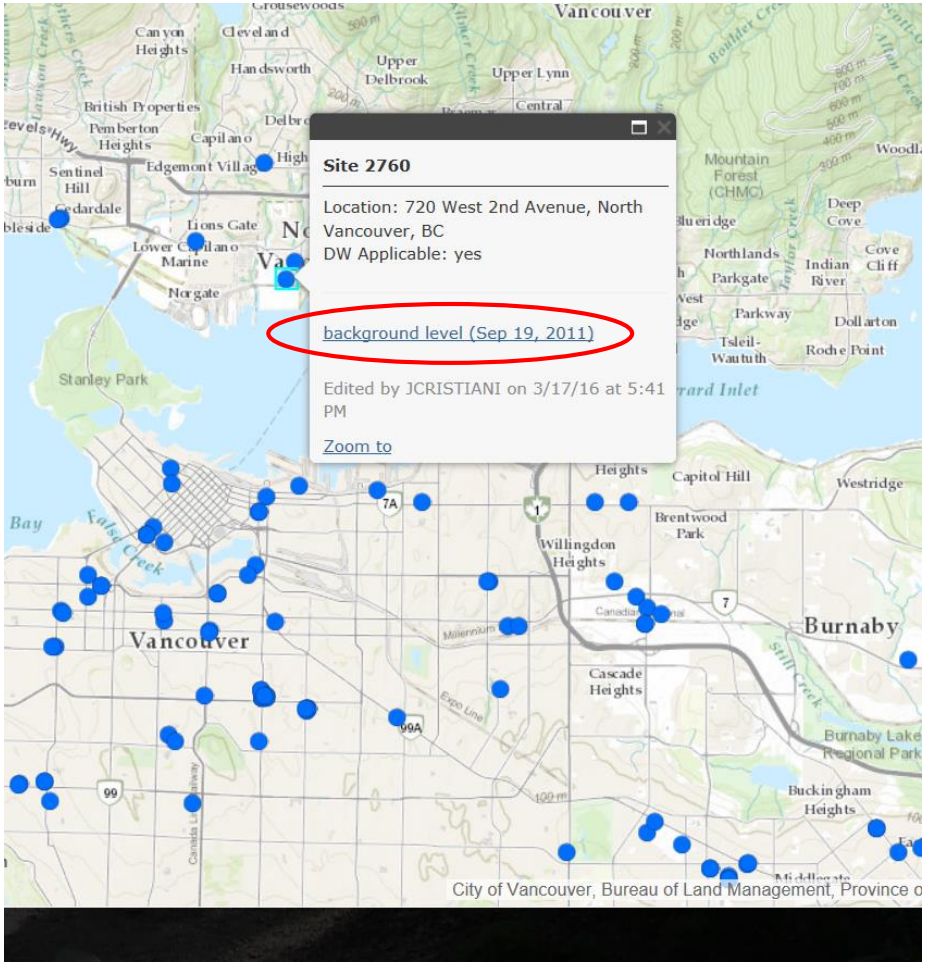
BACKGROUND SUBSTANCES (0 matches)



BACKGROUND SUBSTANCE CONCENTRATIONS

- Suggested work around
- Filter “DW applies”
- “Click” on sites close to the your site
- Look for ‘Background Level’ documents



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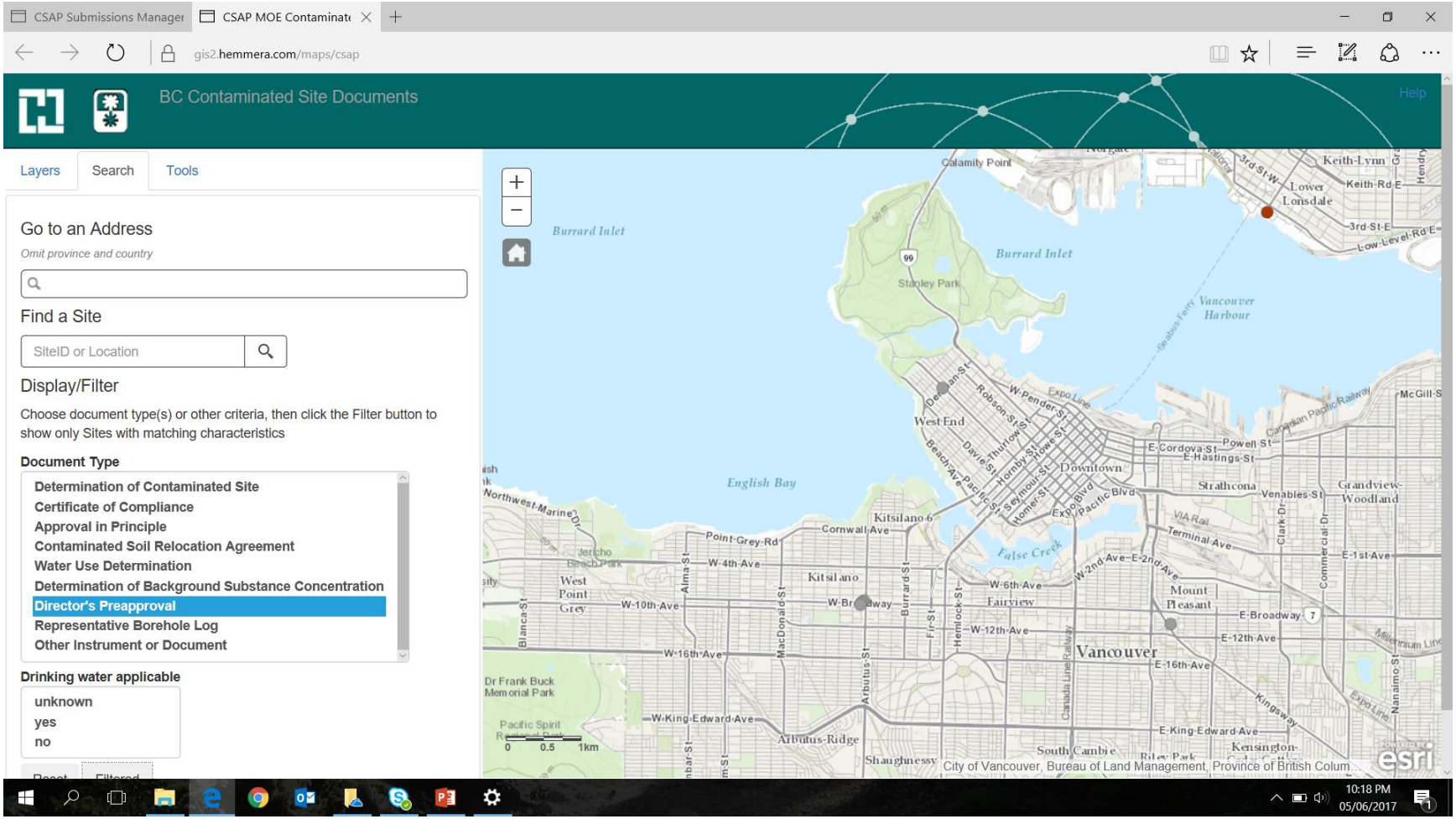
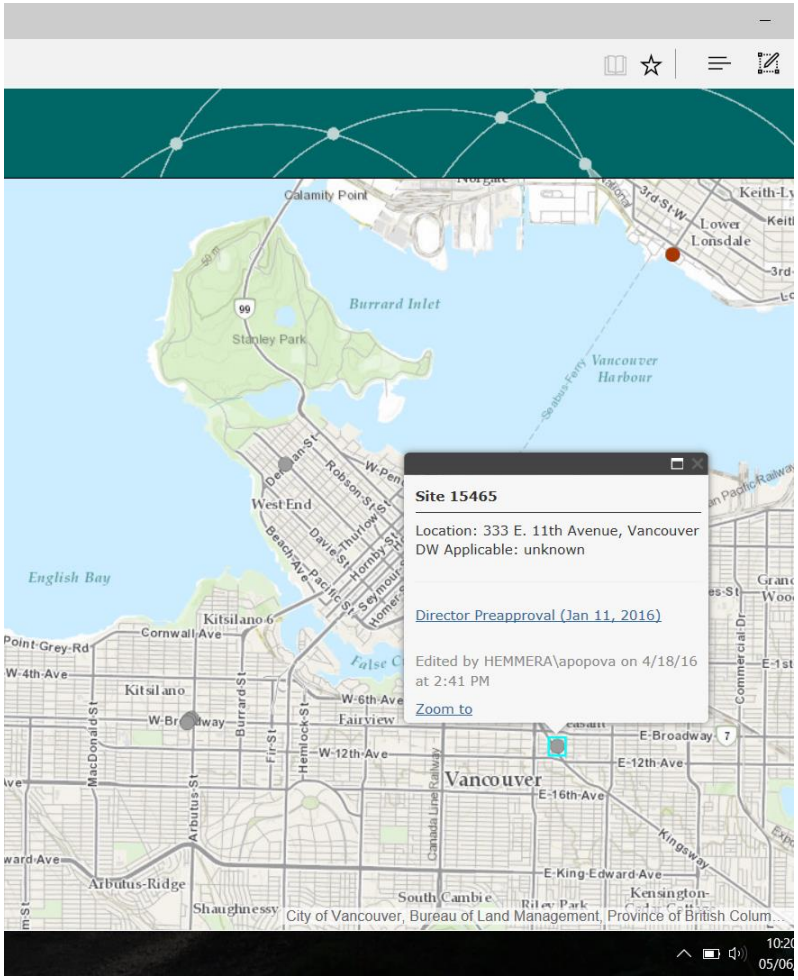
PROTOCOL 6 PRE-APPROVALS (17 matches)



EXAMPLE - SITE 15465 RELIEF FROM DELINEATION



BRITISH COLUMBIA

COPY

File: 26250-20/15465
SITE: 15465

January 11, 2016

RECEIVED
JAN 20 2016

Mr. Robert Horvath
Edgar Development Corp.
413-375 Water Street
Vancouver, BC V6B 5C6

Dear Mr. Horvath:

Re: Protocol 6 Preapproval Application for Relief from Delineation – Not Feasible or Safe, 333 E. 11th Avenue, Vancouver, BC

This letter provides my decision on your December 10, 2015 application for preapproval under Protocol 6 for relief from the requirement to delineate the vertical extent of petroleum hydrocarbon contamination in groundwater at 333 E. 11th Avenue, Vancouver, BC (the Site) because it is not technically feasible or safe and likely originates from sources on adjacent lands.

The property is owned by 333East 11th Holdings Ltd., Inc. and is further described as follows:

PID: 029-573-793

Legal Description:

Lot A, Block 117, District Lot 301, Group 1, New Westminster Land District

A Site plan and location plan are attached at Attachment A for reference.

In reaching my decision, I have relied on information provided in the following supporting documents:

- *Protocol 6 Preapproval Application for Relief from Further Delineation at a Flow-through Site – 333 East 11th Avenue, Vancouver, BC*, December 2, 2015, prepared by Hemmera Envirochem Inc.; and
- Supplemental information provided by email – Karey Dow, Hemmera Envirochem Inc to Amy Sloma, December 17, 2015

Ministry of Environment
Land Remediation Section
Environmental Emergencies and Land Remediation Branch
Environmental Protection Division
Mailing Address:
PO Box 9342 Stn Prov Govt
Victoria BC V8W 9M1
Telephone: 250 356-8386
Facsimile: 250 387-6897
Website: www.gov.bc.ca/env

RATIONALE FOR DIRECTOR'S DECISION

The primary rationale and supporting information presented by Hemmera Envirochem Inc in the above documents is summarized below:

- *Groundwater contamination is sourced from 205 Kingsway:*
  - *205 Kingsway historically operated as a gas station, and taxi company. Both operations used and stored large volumes of fuel in USTs from the early 1900s until the property was redeveloped.*
  - *Historical investigations completed at 205 Kingsway identified light non-aqueous phase liquid (LNAPL) at the property boundary with 225 Kingsway as well as dissolved groundwater concentrations migrating onto 225 Kingsway.* [adjacent property next to site]
- *Remediation at 205 Kingsway was completed in the early 1990s and included excavation, limited bioremediation, and groundwater pump and treat… Soil and groundwater contamination likely remains at depth at 205 Kingsway, but over time the residual concentrations will continue to decrease through processes of natural attenuation*
- *The groundwater data shows that groundwater hydrocarbon concentrations in the shallow wells are less than standards, but exceed standards in one deep well… observed pattern is consistent with migration;*
  - *All soil results were less than applicable standards;*
  - *Groundwater movement through Unit 3* [sandstone] *is highly influenced by stratigraphy, flowing primarily through cracks or layers of poor lithification…Contaminant distribution provides the best tracer for determining groundwater flow;*
  - *Groundwater contamination is continuous and follows a concentration gradient from 205 Kingsway, across 225 Kingsway, and onto 333 East 11th Avenue… highest concentration* [at 205 Kingsway] *then drops 2 order of magnitude at the midway point of 225 Kingsway to 643 ppb. At the Site, the highest benzene concentration drops another order of magnitude to 16 ppb.*
- *EDC could conceivably spend greater than $200,000 to complete a program to provide information on delineation of the groundwater contamination* [deeper than 34m] *with the assumption at the end of the day being groundwater contamination at depth extends underneath the entire extent of the 0.15 hectare site;*
- *There are risks associated with drilling in fractured bedrock formations. The primary concern is puncturing through a confining layer and allowing contamination to penetrate into a deeper more conductive layer causing mobilization of contamination that would have otherwise remained in place;*
- *The source of the groundwater contamination (leaking USTs) migrating from 205 Kingsway was removed in the 1980s and remediation was conducted in the late 1990's;*
- *Delineation is not necessary to manage on-site risk… for both these exposure pathways, further on-Site delineation of groundwater is not required to assess and manage the risk to human health and environment; and*
- *The plume is considered stable based on the fact that the source has been removed and at least partially remediated via historical efforts by the previous source site (205 Kingsway) owner and current efforts by the neighbouring site (225 Kingsway) that has excavated their property and removed existing contamination to approximately 8.5 m below grade.*

Based on the multiple lines of evidence presented in the preapproval documents referred to above, I concur that further expensive investigations to vertically delineate petroleum hydrocarbon contamination in groundwater at 333 E. 11th Avenue are unwarranted for purposes of seeking a Certificate of Compliance for the Site. I base this decision primarily on the following:

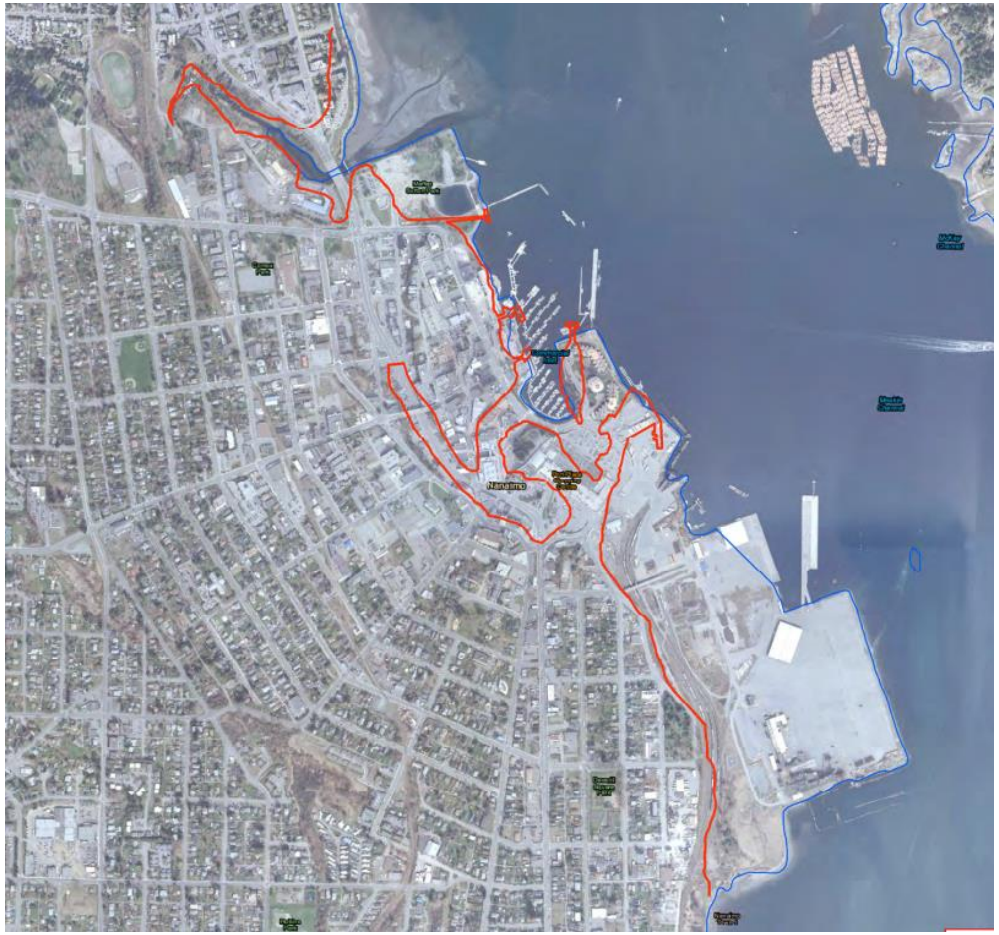
- petroleum hydrocarbon contamination is reported to originate from sources on neighbouring properties, and supporting information generally supports this assertion;
- concentration trends at locations investigated to 34 m depth in the bedrock show declining concentrations compared to higher concentrations at adjacent properties;
- drilling boreholes beyond 34 metres depth, and up to 20 metres in fractured sandstone bedrock poses the potential to disrupt and mobilize contamination introduced from sources dating back over 20 years;
- additional vertical delineation is reported to be unnecessary for completing a detailed human health and environmental risk assessment for the site;
- the cost of drilling through bedrock to depths greater than 34 metres at multiple locations are likely to be high and in the range of $200,000 reported by EDC; and
- no imminent risks are anticipated associated with the lack of vertical delineation of petroleum hydrocarbon contamination at the Site: groundwater contamination occurs at depths greater than 20 metres; the nearest aquatic resource (False Creek) is greater than 1 km away and no active drinking water wells are reported to exist within 500 m of the Site.

Therefore, I confirm my preapproval of your request under Item 1, Table 2 of Protocol 6 for relief from vertical delineation of petroleum hydrocarbon contamination in groundwater at the Site located at 333 E. 11th Avenue, in Vancouver, BC.

 |

WHAT'S NEW - HISTORIC HWM, NANAIMO

- Layer to be added to mapping tool
- Drafts have been created for:
  - Nanaimo
  - Victoria
  - Vancouver
  - False Creek



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WHAT'S NEW - HISTORIC HWM, VICTORIA

 |

WHAT'S NEW - HISTORIC HWM, FALSE CREEK

 |

WHY MEMBERS SHOULD USE IT?

- Helpful ideas on CoC vapour conditions for recent submissions
- Rationale for Water Use Determinations or if you would like to know of one close to your site
- Any background soil or groundwater determinations nearby
- Potential rationale for P6 pre-approvals
- You leave MoE staff to other matters!

 |

AREAS FOR IMPROVEMENT

- CSAP should be copied on Ministry correspondence for P4 and P9 Background Substance Concentrations and Water Use Determinations
- If users identify errors, please contact CSAP to make them aware of fixes
- Members should review the mapping and provide any updates from recent projects
- Have any ideas for improvements? Please let CSAP know.

 |

CSAP's GIS MAP EXPLAINED

Thanks

Questions?

PEAT PROJECT

Presenter: Michelle Uyeda

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

Review of Analytical Methodologies and Interpretation of Analytical Results in Peat

Prepared for

Society of Contaminated Sites Approved Professionals of BC

SLR ch2m SM

Agenda

Introduction
- Definition and Characteristics of Peat

Peat Analysis Issues and Biases
- Sampling, Analytical Methodology and Peat Characteristics

Regulatory Framework and Issues with Peat Assessment
- Numeric and Risk Standards

Review of Analytical Limitations and Research Completed
- Metals, Hydrocarbons, Salinity

Recommendations
- Interim Quick Fix for Practitioners
- Long-term for BC MoE

Definitions

BC MoE Procedure 8 (BC MoE 2015):

- **Organic soil** – any soil containing at least 30% by weight, commonly known as peat, muck, or bog soils.
- **Soil** – includes (a) unconsolidated mineral or organic material.

Tarnocai, 1980:

- Peatland (such as, muskeg) is defined as containing more than 40 centimetres (cm) of peat accumulation on which organic soils develop

Table 2-1. Peat vs. Mineral Soil (Sand) Characteristics

Characteristic	Peat	Mineral Soil – Fraser River Sand
Moisture content	• Range: 50 to 95 %	• Average: 20 %
Organic matter content	• Average: 91.6 %	• Average: < 1 %
Total organic carbon	• Average 43 %	• < 1 %
Water retention	• 20 times its weight in water	• Porosity 30 %; only 10 % of pore volume filled with water
Bulk density	• 0.114 g/cm^3	• 1.75 g/cm^3
pH	• 4.5 to 7	• Neutral

Does peat in its natural definition constitute a soil?

It is a combined matrix of organics and water, more like *tissue*.

Consideration should be given to consider it as its own media or a subset media of soil.

Peat Analysis Issues and Biases

Field Sampling of Peat

- No current prescribed methodology for sampling
  - Issues with high water content

Naturally Occurring Background Concentrations

- Based on practitioner investigations in peat, natural background concentrations often exceed Protocol 4 or CSR standards for:
  - arsenic, cadmium, chromium, selenium and titanium
- Detectable biogenic toluene concentrations have also been observed in background areas in peat

Peat Analysis Issues and Biases (cont'd)

Laboratory Detection Limits, Blanks and Duplicates

- Elevated detection limits not uncommon in peat samples, but are an issue for low concentration standards such as BETX
- No standard reference material for peat – very heterogeneous material

Soil Standards vs. Bioavailability

- EPH soil standards assume that reported concentrations are fully bioavailable. However higher organic soils adsorb portions of EPH making it less bioavailable for uptake by living organisms.
  - ➢ EPH standard may overestimate its true risk in peat.

CSR Regulatory Framework – Numeric Standards

- Generally, human receptors are based on USEPA (IRIS) and Health Canada toxicological data
- Generally, ecological receptors are based on a calculation of Effects Concentration (ECx) depending on land use
  - Toxicological databases used are mainly based on mineral soil data NOT representative of a peat ecosystem
- Alternatively, a Site Specific Soil Standard can be derived using Protocol 2 and the CCST model
  - The fraction of organic content (foc) value can be changed from the default value of 0.06%, up to 2%. Much less than the peat foc of up to 30%.

CSR Regulatory Framework – Risk Standards

Technical Guidance 7 recommends that the preferential use USEPA Ecological Soil Screening Levels (Eco-SSL).

- does not sort the toxicological data based on percentage of organic content or type of soil – Can use word search “organic” to find matches
- includes few studies with organic content above 6%
- USEPA states:

  “The Eco-SSLs for plants and soil invertebrates were derived to apply to soils where the pH is greater than or equal to 4.0 and less than or equal to 8.5, and the organic matter content is less than or equal to 10%. Based on these stated parameters, it is expected that there are certain soils or situations to which Eco-SSLs do not apply.”

CSR Regulatory Framework – Risk Standards

- Some research studies on this issue:
  - U of Waterloo – bench scale ecotoxicity tests on crude oil spiked peat soils
    - Issues with standard ecological test receptors that do not thrive in peat ecosystem
  - Bright and Addison[1] studies with peat found an ecological protective threshold for chloride of 600 to 1,500 mg/L would be a target range for a soil standard for chloride in peat.

[1]- Bright and Addison, 2002

Analytical Limitations and Research

Metals

- Use of Inductively Coupled Plasma with Mass Spectrometer (ICPMS) rather than strong acid leach metals (SALM) Method.
- Use of Tissue and Vegetation method which uses hydrogen peroxide to dissolve the organic material and samples should not be sieved to 2 millimetre (mm) as some of the organic material would be removed by this process.

Hydrocarbons

- Silica gel methodology (SGM) cannot remove non-polar organic compounds, which would falsely elevate EPH concentrations.
- Organic samples can oversaturate the allowable amount of silica gel, with unretained organic compounds, falsely elevating EPH concentrations.
- SGM does not allow for running a sample twice through silica gel analysis.
- No spike test validation requirements - potentially creating a variability in results between samples and labs.

Salinity

- Alternate 'as received' saturated paste method for over-saturated soil not generally used for peat.
- % Saturation of peat material can be up to 300 to 700 %, which grossly overestimates the conversion of dry weight concentration by up to 20 X [1].
- Strong evidence[1,2,3] to support mg/L salt standard for sodium and chloride in peat samples.
- "Intentional over-saturation" alternate method and reporting it in mg/L would eliminate gross overestimation[2].

1- Hugdahl 2013; 2- SynergyAspen 2013; 3- Bright and Addison 2002

Biogenic Interference Calculation (BIC) Index[1]

- A mathematical approach to resolving false Petroleum Hydrocarbon Compounds (PHC) exceedances in organic materials, for the CCME Canadian Wide Standards soil standards F3 fraction.
- Currently adopted by Alberta Environment as a screening tool

$$\text{BIC Index} = [F2 / (F2 + F3_b)] \times 100$$ [1]

BIC Index < 10% - false PHC exceedances

BIC Index ≥ 10 percent - true F3 PHC exceedances

➢ Slight adjustments to the BIC Index calculation would allow it to be applied to the BC EPH method to identify false exceedances.

➢ Standard application of an adapted BIC Index could quantitatively identify samples that warrant a Silica gel cleanup.

[1]7-year PhD study – Dr. Francine Kelly-Hooper et al. 2014; Dr. Francine Kelly-Hooper et al. 2013

Interim Quick-Fix Practitioner Recommendations

- Request from laboratory to complete an extra concentration step to obtain a lower detection limits for peat samples for low standard parameters.
  - ➢ This is not a standard lab approach, but can be done for high moisture content soils.
- Peat sample collection – Not recommended practice to intentionally squeeze out water from a sample
  - ➢ Critical for salinity which is miscible in water.
- Use of a screening level risk assessment and multiple lines of evidence when presenting rationale for interpretation of anomalous concentrations in peat, including:
  - ➢ wet weight concentrations, background assessment, chromatogram review for biogenic peaks.

Interim Quick-Fix Practitioner Recommendations (cont'd)

- Obtain background release for detectable metals greater than Protocol 4 concentrations
  - ➢ particularly for arsenic in NE BC site.
- If working on a site where both provincial and federal regulatory regimes apply, consider applying the BIC Index calculation for hydrocarbon (F3) concentrations greater than applicable CCME guidelines to confirm true exceedances exist or not.
- Use a higher foc value for peat when using Protocol 2 CSST calculations.

Long-Term Recommendations for BC MoE

- **Field Methodology:**
  - Provide standardized peat sample collection methodology.
- **Standards:**
  - Identify peat either as own media or as sub-category of soil, allowing specific standards to be derived for peat media.
  - Re-evaluate soil standards for peat media based on toxicity data for specific peatland ecosystem receptors.
    - ➢ Use appropriate soil invertebrates specific to peat environment and not terrestrial environment. Would likely demonstrate higher standards warranted as more representative risks would be determined, in part due to lower bioavailability for uptake by living organisms.
  - Derive salt standards as mg/L – would eliminate variability across soil types due to water holding capacity differences.

Long-Term Recommendations for MoE

- **Analytical Methodologies:**
  - Review analytical laboratory methods for applicability and sensitivity to peat soils. Recommend alternate method including but not limited to:
    - peat samples to be digested using the Tissue and Vegetation method;
    - peat samples should not be sieved to 2 mm as some of the organic material would be removed by this process;
    - use of ICPMS for metals analyses.
  - Allow for “as-received” saturated paste methodology for all soils containing organics and avoid the dry/grind/analyze method for soils with peat, even if there is no “freeboard” as defined by “over-saturated” soil.
  - Review and update the silica-gel methodology and complete a multi-lab study for variability in silica-gel methodology and results. Coordinate use of Dr. Francine Kelly-Hooper’s PhD muskeg samples for use in a round-robin laboratory study.

Long-Term Recommendations

- **Regulatory Guidance:**
  - Allow for more than one site specific standard per site for both soil and peat media, if present, similar to varying standards for varying pH ranges.
  - Complete a study of peat materials to determine background concentrations for metals and biogenic hydrocarbons to include in Protocol 4 provincial background concentrations.
    - Peat soil survey samples used by Kelly-Hooper, et al. 2014 could be contributed to a BC background soil survey, or collate existing BC practitioner background peat data.
  - Provide further guidance as to when silica-gel clean-up is to be utilized.

Thank You

Questions?

Other issues or considerations for peat?

CSAP MEMBERS PRESENTATION

It's all about You

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

WHO ARE WE?

- Environmental Industry is a fairly young industry.
- Vast majority of us are late 30s to early 50s.
- Time for us to take a little bit of time to look after our selves.
- Unfortunately, more and more of our members are needing to take some time to deal with medical issues.
- We need to have a little conversation about those risks and what we can do.

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

WHAT WE DO

- Our job is to take land that currently has an unacceptable level of risk and remediate it so the level of risk is acceptable.

- Acceptable is defined as:
  - 1 in 100,000 over 70 years
  - HQ=1

- We are professionally dealing with relatively low risk situations with relatively high public perception of risk.

- Let's discuss the relatively high risk situations

 |

WHAT ARE THOSE RISKS?

- Cancer
  - Men 1 in 2 lifetime chance
  - Women 1 in 3 lifetime chance
- Hypertension
  - 1 in 5 lifetime chance
- High Cholesterol
  - 1 in 8 lifetime chance
- Much higher than what we are dealing with.

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STOP CANCER BEFORE IT STARTS

Did you know that about half of all cancers can be prevented?

Take a look at the It's my Life website

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WHAT AFFECTS YOUR CANCER RISK?

48% of Canadians (aged 12 and up) are inactive

Regular physical activity (30 minutes per day) helps protect you against cancer

68% of Canadian men get less than 7 servings of fruit and vegetables each day

Besides not smoking, having a healthy body weight is one of the best things you can do to prevent cancer

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PROSTATE CANCER

Some prostate cancer signs related to urination include:

- Burning or pain during urination.
- Difficulty urinating, or trouble starting and stopping while urinating.
- More frequent urges to urinate at night.
- Loss of bladder control.
- Decreased flow or velocity of urine stream.
- Blood in urine (hematuria)

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BREAST CANCER

Most women who develop breast cancer do not have any family history of the disease

- Be breast aware
- Understand the risk factors
- Keep informed about screening
- Reduce your risk
  - Healthy weight
  - Eat well
  - Be active
  - Quit smoking
  - Drink less alcohol

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ULTIMATE MESSAGE

- In the next six months, make an appointment to see your family doctor.
  - Talk about your risk factors.
  - Start to take some preventative measures and get the testing done.
    - Yes some are unpleasant, but necessary
  - Ideally want to prevent, but if not, let's catch it early so we can do something about it.
- Let's check back in November to see how we are doing.

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2017 CSAP SCHOLARSHIP AWARDS

Guy Patrick

CSAP
Society of Contaminated Sites Approved Professionals of British Columbia

MATTHEW BEVERIDGE

- Civil (Geo-environmental) engineering, MASc program at UBC
- Working on treatment options for precursor compounds of PFOS to further remediation technologies

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LAURA DESAUNOY

- Earth Science - Geochemistry, MSc program at SFU
- Characterization of the residuals/by-products from treatment of selenium-rich wastewater

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ROBYN PEARCE

- Environmental toxicology, Masters in Resource & Environmental Management, SFU
- Fate and effects of hydrophobic organic contaminants in aquatic environment, including development of Bayesian decision analysis tool

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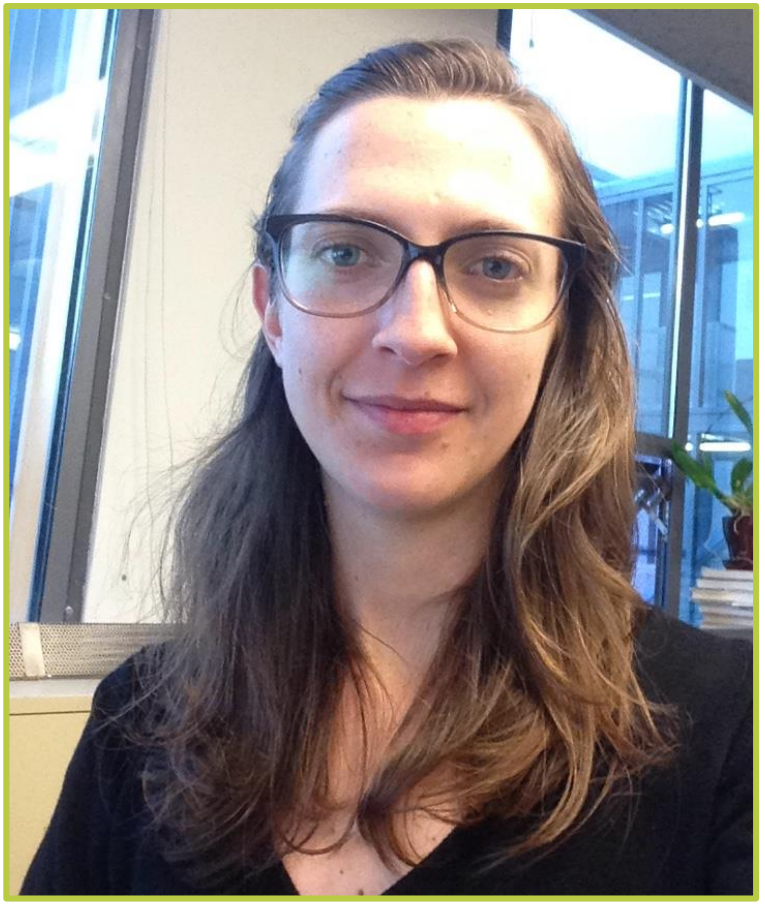
CONSTANZA NICOLAU

- Geological Sciences (Hydrogeology), PhD program at UBC
- Use of bio-electrical systems to remediate hydrocarbons in reducing environments (lab and numerical modeling)



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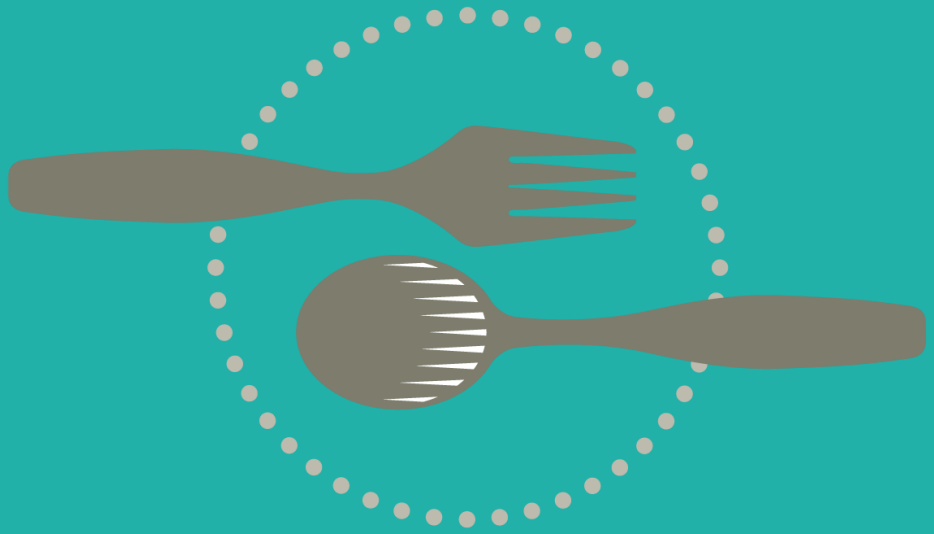

LUNCH BREAK

12:00 – 1:30