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Cambridge Bay Airport Remediation Program

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Dillon's Project Manager

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Project Highlights

- **Semi-remote, northern location**
- **3 year Remediation Program**
  - construction of two LTUs
  - excavation of hydrocarbon-impacted soil from the apron and FTA
  - placement into the constructed LTUs
- **PFC Considerations**
- **Unexpected Challenges**
- **Sustainable Solutions**

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Apron Area Background

- Remediation of former tank farm near apron
- Three ASTs were decommissioned in 1992 and relocated 30 m east
- PHC, napthalene and metals were identified at the former tank farm area

FTA Background

- FTA was historically as a firefighting training facility
- Aqueous film forming foam (AFFF) was applied to lit aircraft crash mock-ups;
- Unburned fuel, water and AFFF were used in the unlined FTA facility within a 40 cm berm;
- Fuel was provided by an AST farm and pipe system formerly located west of the bermed FTA area;
- FTA used for a brief period in the early ‘90s; and decommissioned shortly thereafter (tanks and associated piping removed);
- AFFF contains fluoroalkyl surfactants (PFAS) and low levels of perfluoroalkyl sulfonate salts (e.g., PFOS)

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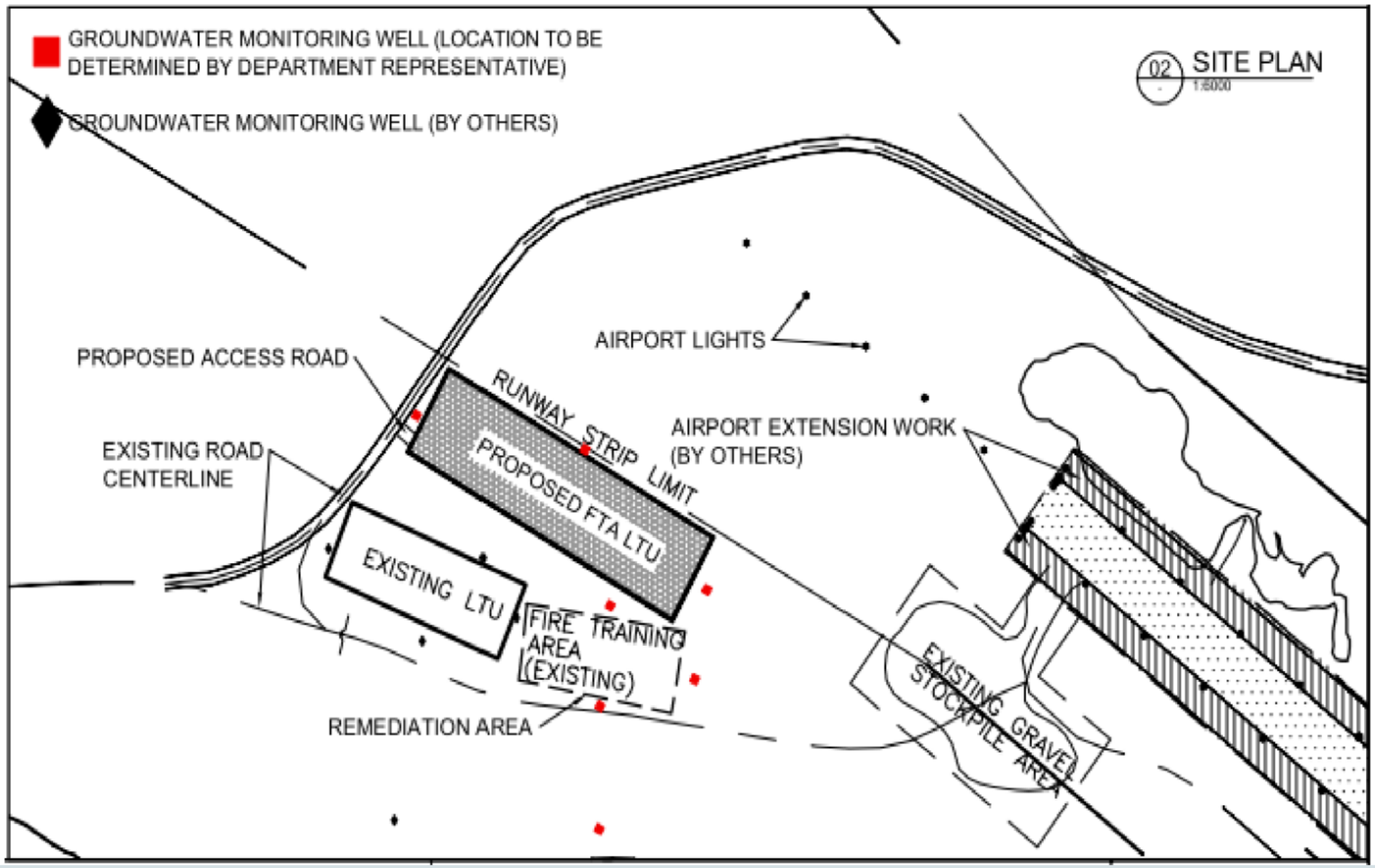
GROUNDWATER MONITORING WELL (LOCATION TO BE DETERMINED BY DEPARTMENT REPRESENTATIVE)
GROUNDWATER MONITORING WELL (BY OTHERS)
02 SITE PLAN
1:6000
PROPOSED ACCESS ROAD
EXISTING ROAD CENTERLINE
AIRPORT LIGHTS
RUNWAY STRIP LIMIT
PROPOSED FTA LTU
AIRPORT EXTENSION WORK (BY OTHERS)
EXISTING LTU
FIRE TRAINING AREA (EXISTING)
REMEDIATION AREA
EXISTING GRAVEL STOCKPILE AREA

Remediation Activities

Activity	2013	2014	2015
Remove and Dispose Fuel Transfer Building	X		
Construct LTU for Petroleum Hydrocarbon Impacts Soils from Apron Area	X		
Excavate and Transport Petroleum Hydrocarbon Impacted Soils	X		
Excavate and Remove Concrete Debris from Excavation*	X		
Monitoring Well Installations (9) around Apron and LTU	X		
Construct LTU for Petroleum Hydrocarbon Impacts Soils from FTA		X	X
PFC Investigation		X	
Address Crushed Drums and Metal Cylinders*		X	
Dewater FTA LTU*			X
Excavate PHC Impacted Soils and Transport to FTA LTU			X
Monitoring Well Installations (11) around FTA and FTA LTU			X
Post-Excavation Confirmation Sampling	X	X	X
Quality Control (e.g., geomembrane testing)	X	X	

2013 Remediation Activities

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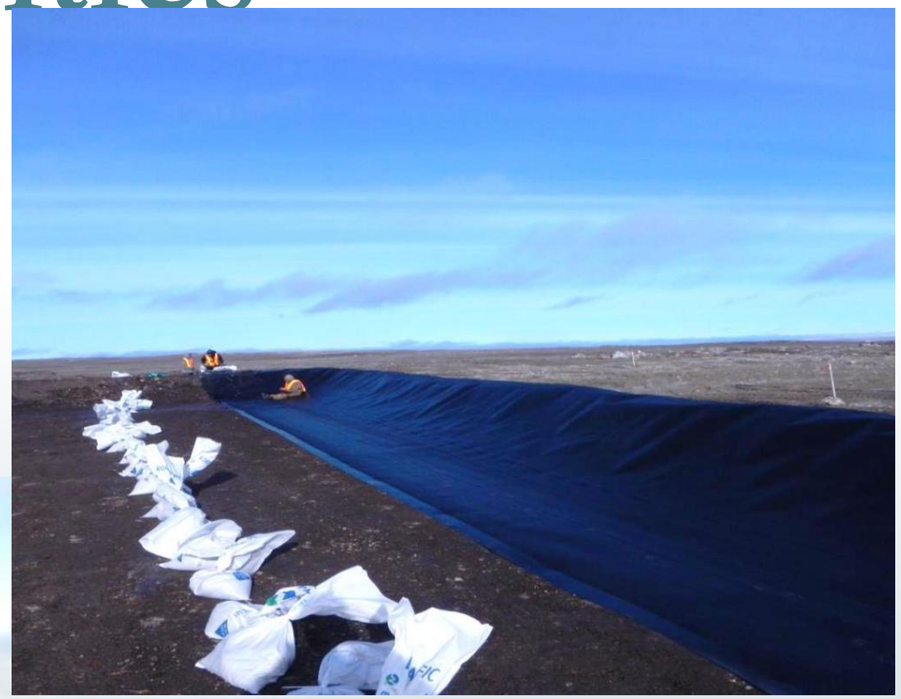
2013 Remediation Activities



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2013 Remediation Activities

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2014 Remediation Activities

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2015 Remediation Activities

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2015 Remediation Activities

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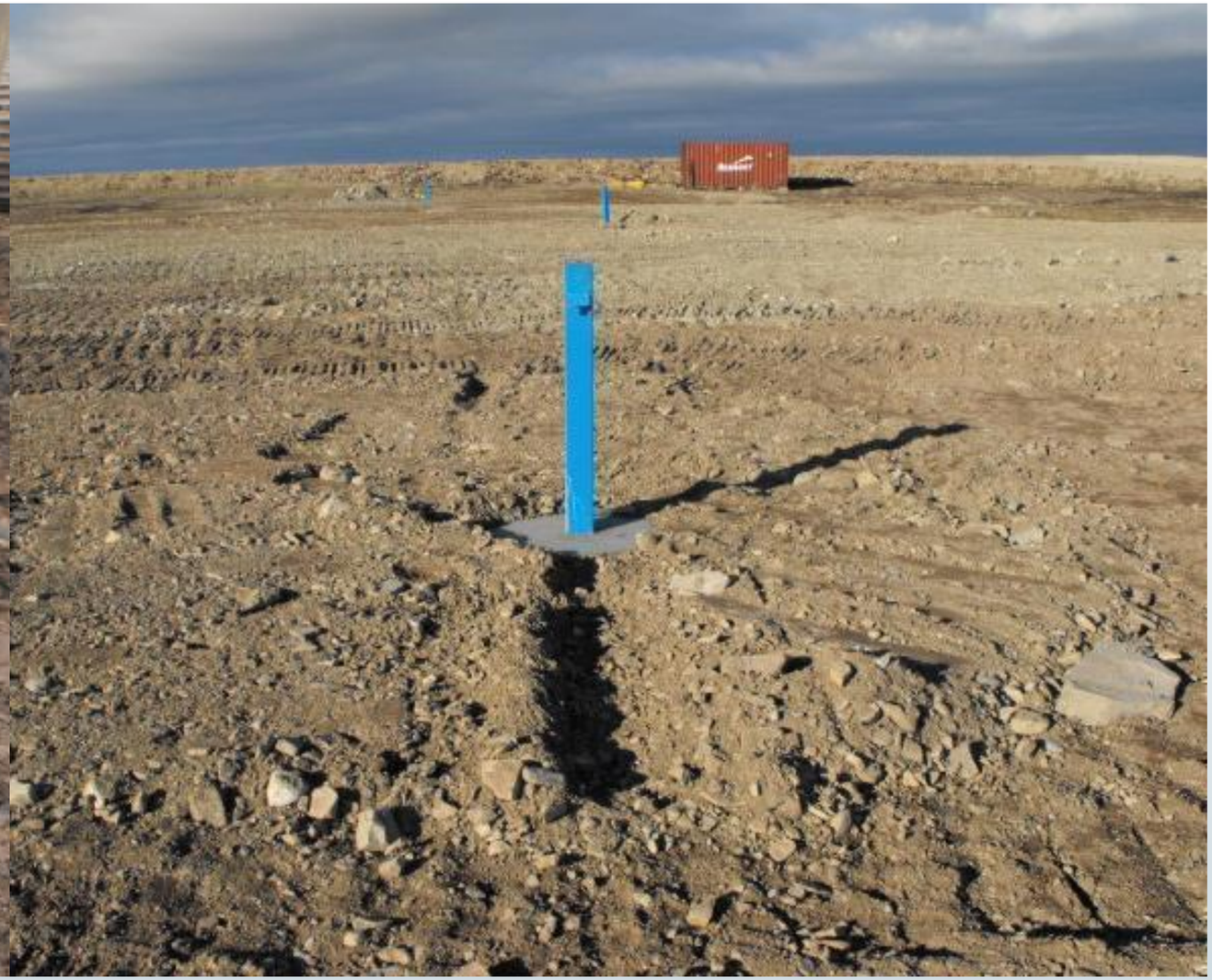

Remediation Metrics

Items	Numbers
LTUs Constructed	2
Volume of Petroleum Hydrocarbon Impacts Soils Excavated from Apron Area	3500 m^3
Volume of PHC Impacted Soils Excavated from FTA	4260 m^3
Volume of Concrete Debris Removed from Excavation	165 m^3
Volume of Unexpected Aggregate Placement for Base/Ballast Layer	9,350 m^3
Horizontal Delineation Achieved	Yes
Vertical Delineation Achieved	By permafrost
Tonnes of Crushed Drums and Metal Cylinders* Removed	20
Volume of Excavation Water requiring Off-site Treatment	400 liters
Number of Monitoring Wells Installed around FTA and FTA LTU	20
Number of Post-Excavation Confirmation Samples	117

PFC Investigation

- **14 TPs were completed**
- **Sampling Procedures were per Transport Canada Protocol, adopted from Dillon:**
  - cotton coveralls with no water resistant coatings,
  - no Gore-Tex™ gear,
  - no snacks or meals on-site,
  - no use of shampoo, conditioner, body gel, or cosmetics, and
  - no markers
- **Equipment was decontaminated after each TP**
- **Rinse water samples were collected and analysed for PFASs**
- **MWs sampled without the use of Teflon tubing or fittings**

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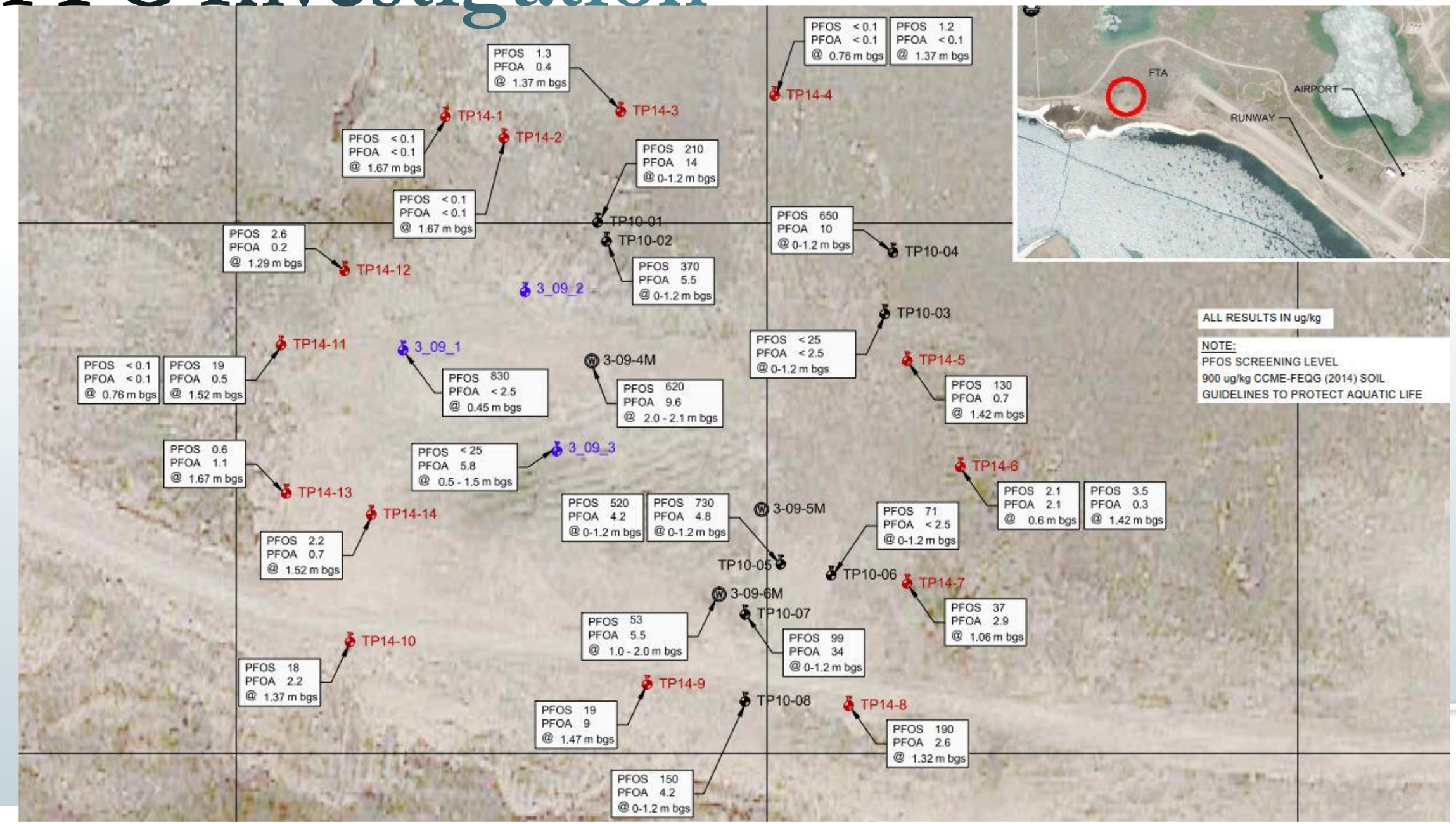
PFC Investigation



Unexpected Challenges

- Meteorological Conditions
- Soil Conditions
- Drums and Canisters
- Concrete

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Unexpected Challenge #1
Rain, Snow, and Wind

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Climate Data

Cambridge Bay Airport, NU

mm	Rain	Snow	Total
Jul-13	48.6	0.0	48.6
Aug-13	10.6	3.4	14.0
Sep-13	27.0	2.8	29.8
Jul-14	85.6	0.0	85.6
Aug-14	15.8	0.0	15.8
Sep-14	15.2	11.0	26.2
Jul-15	59.4	0.0	59.4
Aug-15	11.8	0.0	11.8
NORMAL July	-	-	24.1
NORMAL August	-	-	25.7
NORMAL Sept.	-	-	19.1

Source: Environment Canada Weather Data

http://climate.weather.gc.ca/prods_servs/cdn_climate_summary_e.html

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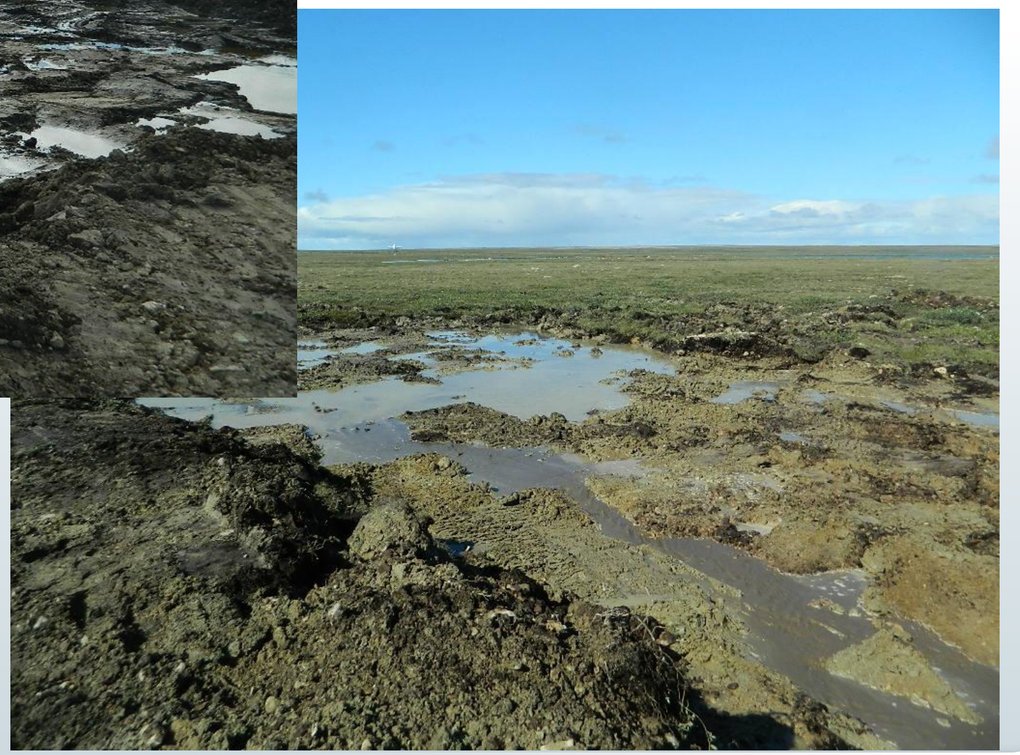
Unexpected Challenge #2
Soil: Saturated Silty Clays



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Challenge #3
Drums & Canisters

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Unexpected Challenge #4
Concrete

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Challenge Management: Snow Removal, Road Building

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Challenge Management: Drum & Canister Handling

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Challenge Management: Drum & Canister Handling

Getting Materials to and From the Site

Sustainable Solutions

- Local pitrun material (non-traditional) used as backfill material
- LTU base and berms used grubbed material from footprint (no hauling)
- Consolidated waste liquids recovered from drum disposal area excavation; pure product was separated and used in the Hamlet's pilot gasification plant
- Excavation surface water applied to apron LTU soils (in lieu of off-site removal)
- LTU accumulated water was analysed prior to discharge and discharged locally (no transport)

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Summary

- Delays associated with unexpected site conditions further resulted in weather related delays;
- Challenges associated with a short field season, soil conditions, barge delivery and unexpected subsurface discoveries;
- PHC impacted soils were successfully remediated at the 2 airport locations;
- Northern location fostered sustainable solutions: local borrow, water disposal.

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Questions?

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