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Remediation of Private Properties in an Urban and Suburban Environment

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Execution Strategy

- Participation in the PHAI is voluntary and determined by each property owner
- Remediation includes removal of radioactively contaminated soil as well as structures, landscaping, hardscaping and vegetation in/on the contaminated soil
- Every site/property requires a contract (Remediation and Restoration Agreement) between the property owner and CNL to document the work to be done. A wide variety of challenges and scenarios exist for performing this work as each property has its own challenges



Small-Scale Sites Expansion Through the Years



Properties to be remediated was originally estimated at approx. 325

Current number of properties to be remediated - majority with depths of 0.3m to 2m



PROPERTIES
to be surveyed



PROPERTY
REMEDICATIONS
projected



ROAD REMEDIATIONS
projected



INTERIOR
REMEDICATIONS
projected



Small Scale Sites Challenges

Exterior Remediations



Remediation and Restoration Challenges - Contracting Strategy

Initially executed on a traditional lump-sum/fixed price model

- Very limiting in terms of contractor abilities, experience and scale of operation
- Made cost and schedule performance tracking challenging

Switched to cost-reimbursable/target price model (Characterization, Engineering, Design, Remediation and Restoration (CEDRR))

- Implemented key schedule and project milestones / Work Breakdown Structure
- Implemented deliberate ramp-up of field execution to allow for contractor personnel gaining knowledge and experience
- Much higher ability and consistency to meet budget expectations



Remediation and Restoration Challenges – Deferred Remediation

Not all waste is/can be removed

- Property owners can choose (direct) remediation activities to exclude removal of one or more structures, landscaping, hardscaping, trees, gardens or other items. The contaminated soil under that/those items is not removed.
- Structural integrity issues (e.g. aging, non-building code compliant) can prevent removal of contaminated soil in the vicinity of that structure (e.g. a basement or house foundation that will not withstand removal of soil).
- Physical limitations can prevent removal of contaminated soil and/or items (e.g. a very steep hillside that cannot be safely remediated or restored).

Solution: the above scenarios are examples of when a deferred remediation decision is applied and documented via a Special Circumstance to document the contaminated soil and/or items remaining on that property.

Remediation and Restoration Challenges – Volume Exceedances

Volume of contaminated soil exceeds the planned/Design volume. In-field sampling of excavation walls and bottom is time consuming and expensive. ***Solution – use of real time X-Ray Fluorescence and gamma radiation surveys to demonstrate compliance with clean-up criteria. Survey accuracy and reliability of 98.5% as based on comparison of results against 14,000+ data points***



Remediation and Restoration Challenges – Aging Structures

Aging/non-building code compliant structures (e.g. building foundations) will not allow removal of contaminated soil. ***Solution – deferred remediation/Special Circumstance***



Remediation and Restoration Challenges – Aging Structures

Aging municipal infrastructure limits/eliminates possibility for remediation without damage/failure to the utility. ***Solution – partnership with the Municipality for planned remediation approach that supports remediation of contaminated soil around/under the utility(ies) while also supporting replacement of the utility***



10.7 Crack Longitudinal Hinge, 3



8.1 Crack Multiple



80.3 Joint Offset Large



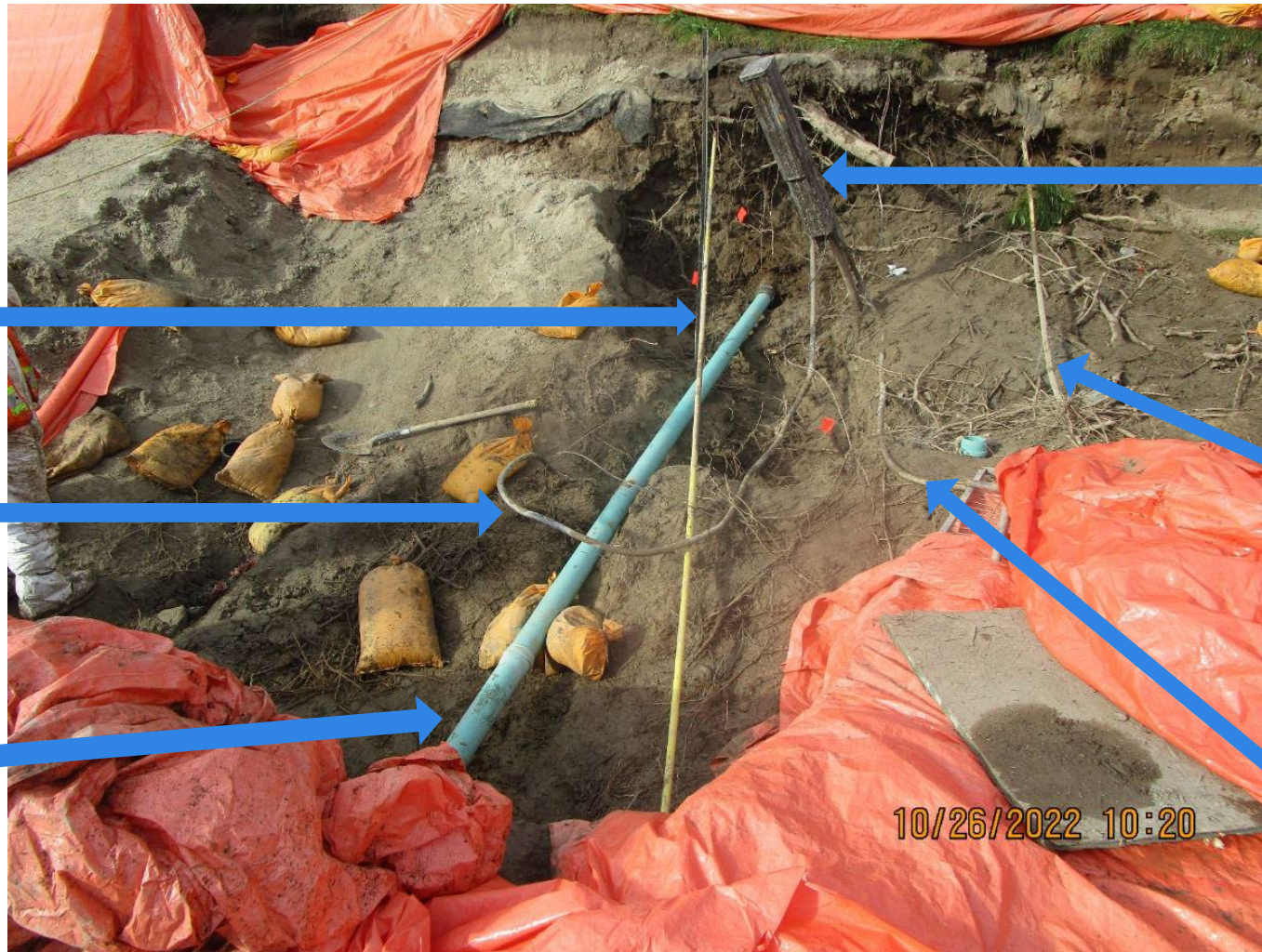
Remediation and Restoration Challenges – Aging Structures

Abandoned utilities/buried items that are not recorded on any property plans. ***Solution – use of ground penetrating radar to survey every property***

(1) Natural gas lateral to private property

Telecommunication main that runs parallel to the RA (south)

Sanitary sewer line replaced during remediation



Telecommunication box

(2) Natural gas lateral to private property

Telecommunication main that runs parallel to the RA



Remediation and Restoration Challenges, cont.

High/near surface water table adds complexity to remediation. ***Solution – use of de-watering systems and also minimizing the “open” area by backfilling to the extent possible while removing contaminated soil. Minimizes the open dig area where water can collect.***

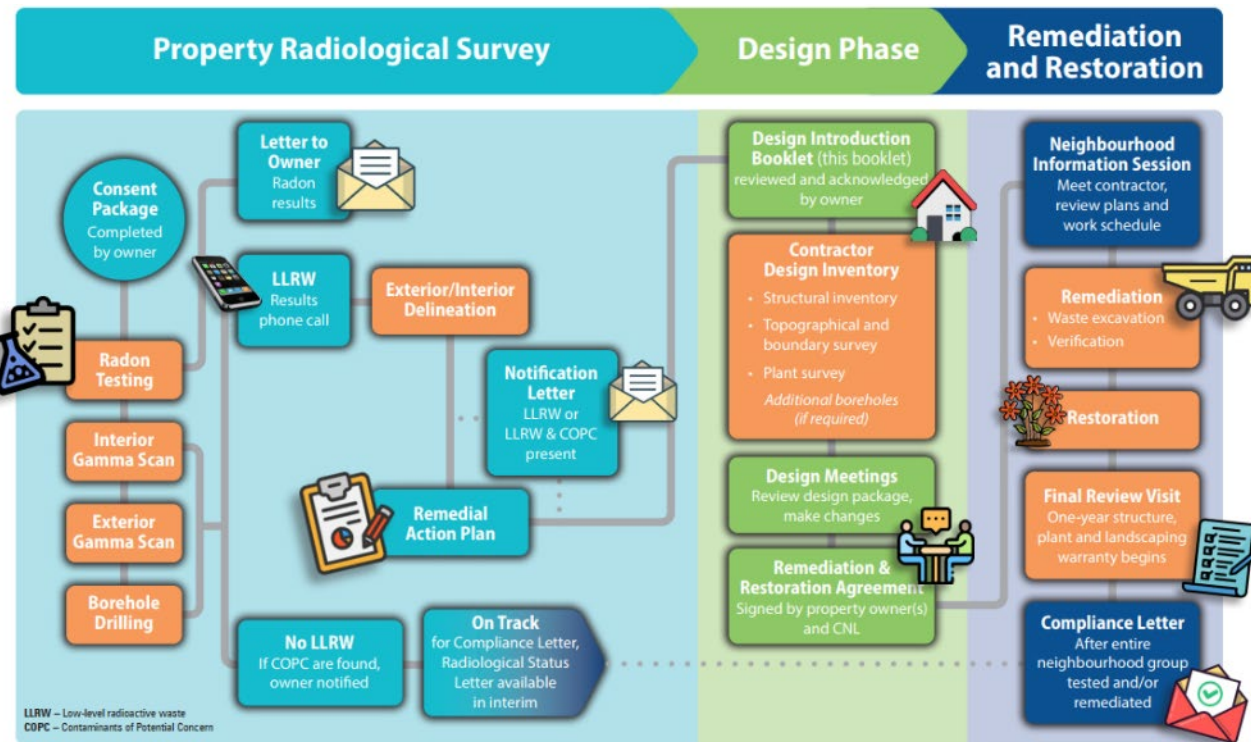
Restoration activities can have an impact on project cost and schedule. This can be seen in weather delays, homeowner delays, delays in material/landscaping supply availability. Structure restoration is performed based on type of original item(s) removed – to extent logistically and economically possible - using building code-compliant materials. ***Process improvement – homeowners can choose to have structures replaced or take a Payment in Lieu (PIL) for any item. Not all homeowners choose to have all landscaping, vegetation, structures, etc. replaced/restored that were removed as part of remediation. PILs are based on cost of materials and estimated labor to replace/restore the item. Very popular with homeowners.***



Remediation and Restoration Challenges – Communication / Stakeholders

Challenge

Minimize impact to property owners and neighborhood during sampling, design, remediation and restoration process



Solutions

Develop and maintain a Communication Strategy and implemented a comprehensive field communication program. This includes:

- Dedicated/documented agreements with each property owner for scope to be performed
- Extensive standard and routine Communications group engagement with the community
- Training on managing interactions with homeowners and de-escalation techniques
- Conducting “Town Hall” meetings with the public to provide project status and direction as well as gather feedback from the community

This effort aligns with the CNL commitment to fostering effective communication, enhancing stakeholder engagement, and maintaining project integrity.



Small Scale Sites Challenges

Interior Remediations



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Remediation and Restoration Challenges - Interior Remediation

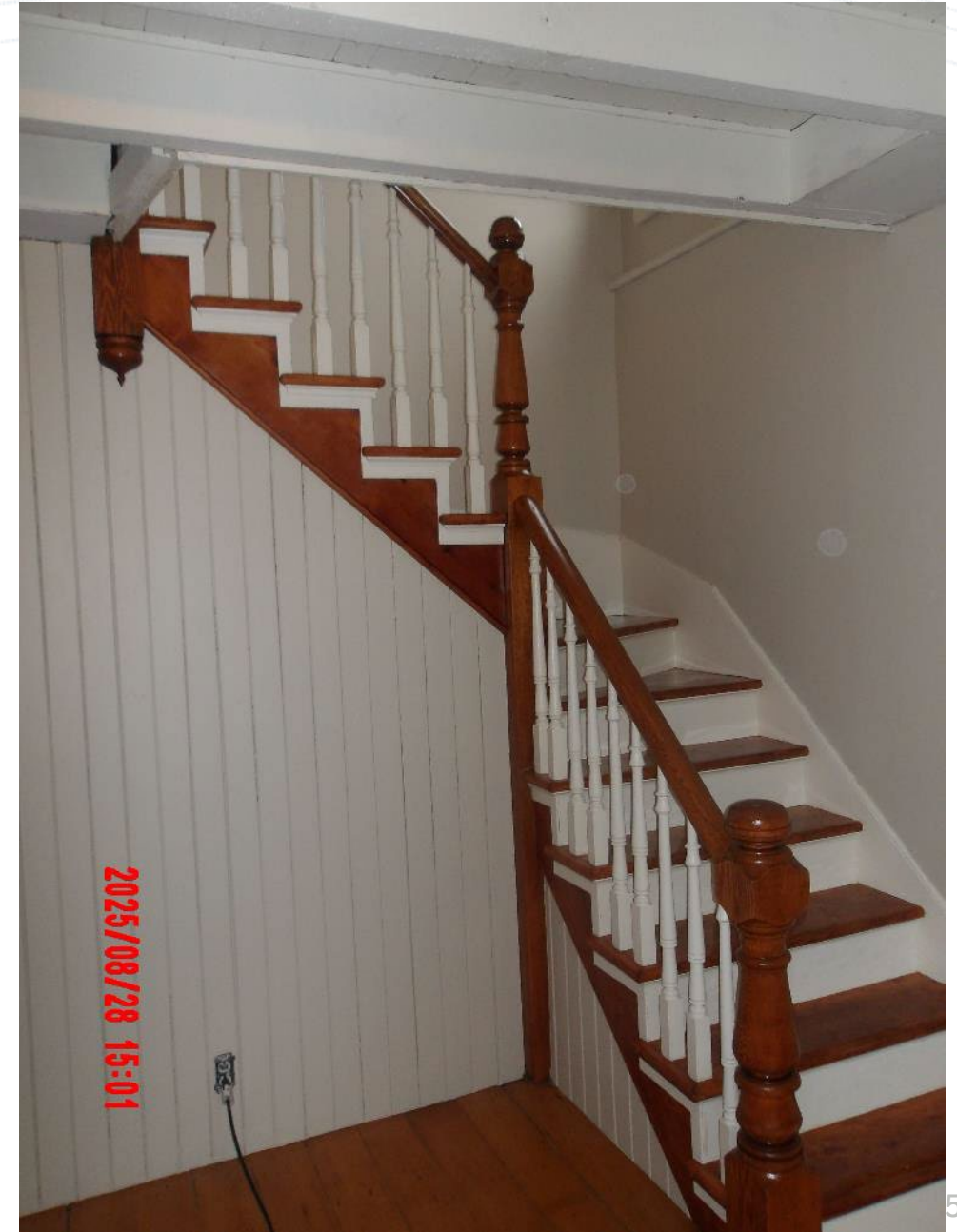
Interior property remediations are of a much different nature than exterior.

- Typically, small in scope – involves only a small section of the house
- Contamination found on building materials (e.g. studs and or insulation) largely from El dorado offering used items/materials to the public for free.
- The vast majority of contaminated items can be removed/replaced/cleaned; items that are of major structural support typically cannot be removed. Item will be cleaned/decontaminated to the extent possible. If contamination cannot be removed, a deferred remediation approach may be applied and documented via a Special Circumstance
- More intimately affects a homeowner. Remediation and restoration may in instances require the homeowner to be relocated while until the work is completed.

Given the smaller scope and nature of interaction with homeowners, Interior remediation and restoration has been generally very successful not only with respect to completion, but in homeowner satisfaction and perception of CNL.

Remediation and Restoration Challenges - Interior Conditions

Multiple layers of paint + contamination



Remediation and Restoration Challenges - Working Conditions

Filling 5 gallon buckets with contaminated soil



Tree stump used as part of main structural support



Project Status Summary

Of the approx. 1,700 properties to be remediated, 429 total have been completed (316 exteriors, 113 interiors) - 25% of the total. This has generated 202,900 metric tons of waste with a volume of 111,500 m³.

An estimated 700,000 m³ remains to be removed, or approx. 85% of the total SSS estimated waste volume remains to be removed.



Property Completion - Before



Property Completion - After





Miigwetch. Thank you. Merci



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PH.Area.Initiative



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PHAI.ca



Phai_porthope



CNL's Port Hope Area Initiative

