Vapor Intrusion Assessment Techniques, Considerations, and Case Studies

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Presentation Topics

- Current Washington Regulatory Guidance
- Vapor Intrusion Assessment Approaches and Sampling Methods
- Vapor Intrusion Assessment and Mitigation Case Studies

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Current Ecology VI Guidance

- Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action (Finalized March 2022)
  - Ecology's 2009 Draft VI Guidance
  - Implementation Memos 14 and 18 (Petroleum Vapor Intrusion)
  - Implementation Memo 21 (FAQs)
  - Implementation Memo 22 (Short-Term TCE Toxicity)

- Vapor Intrusion Screening Levels for Workers (July 2022)

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Tiered Vapor Intrusion Assessment Approach

Preliminary Assessments

- Volatility and toxicity
- Immediate actions
- Distance from the source
- Conceptual site model

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Tier 1 Evaluations

- Preferential pathways
- Addressing petroleum and TCE
- Groundwater and soil sources
- Soil gas contamination

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Tier 2 Evaluations

- Assessing VI impacts on indoor air
- Soil gas, ambient air, and crawl space sampling
- Tier 2 decision making

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Soil Gas Sampling

- Sampling of soil gas from beyond the footprint of the building of concern or where there are no buildings
- Should be collected laterally close to the building of concern
- May be collected at different depths, ideally greater than 5 feet below ground surface
- Tracer should be used to verify that atmospheric air has not been drawn into the sample point

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Sub-Slab Soil Gas Sampling

- Sampling of soil gas immediately below a building's basement floor or floor slab
- Should not be collected in the immediate vicinity of sub-slab utilities, drains, or floor cracks
- Ideally collected while building is depressurized relative to the subsurface
- Tracer should be used to verify that ambient air within the building has not been drawn into the sample point

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Indoor Air Sampling

- Conducted when a Tier I screening fails to lead to a vapor intrusion assessment off-ramp for an existing building
- A pre-sampling site survey should be conducted to evaluate potential background sources of VOCs within the building, and any identified sources should be removed
- Outdoor ambient air samples collected simultaneously to account for ambient air conditions
- Analyte list should include those VOCs detected in the subsurface in the vicinity of the building
- Sampling may need to be conducted more than once to improve confidence that VOC levels are consistently acceptable

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Case Studies – Interference from Indoor Sources

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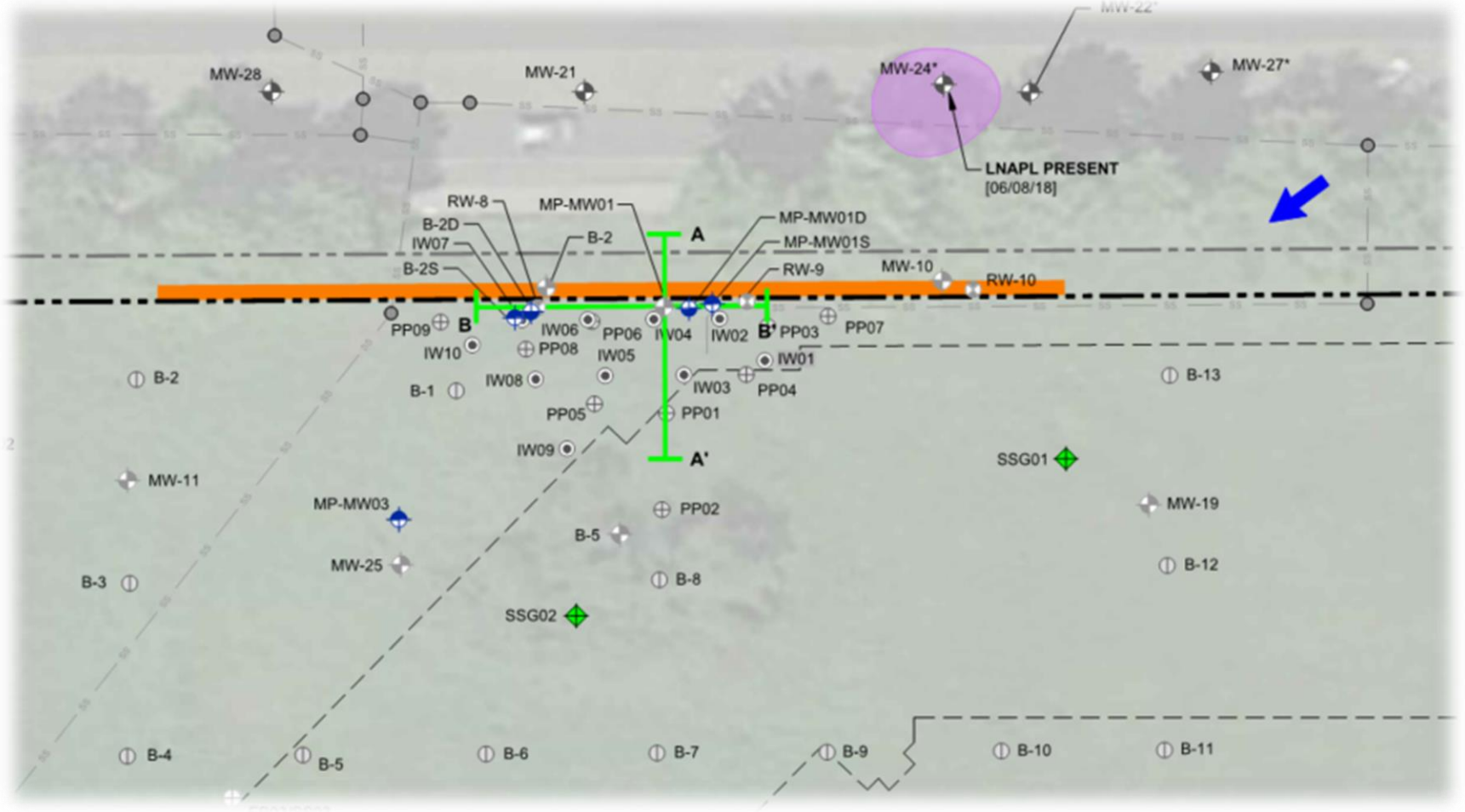
Case Studies – Off-Property Source



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Case Studies – Off-Property Source

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Case Studies – Building Construction

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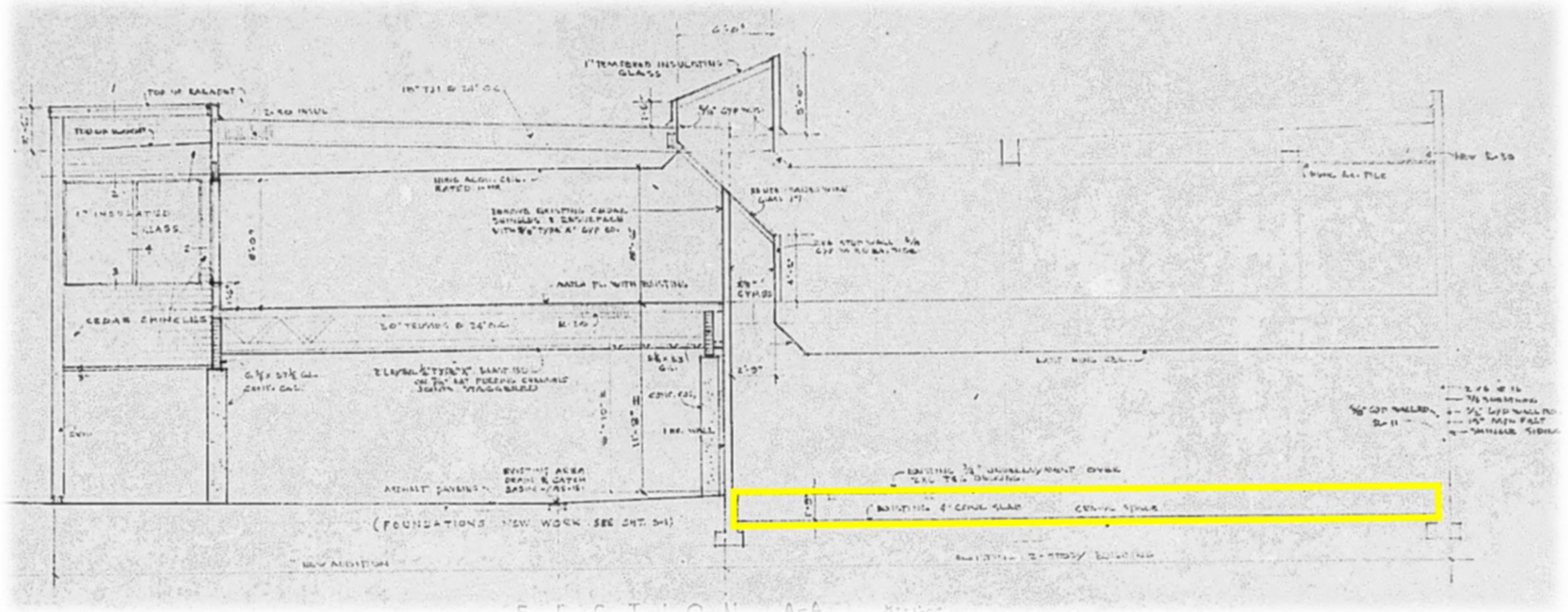
Case Studies – Attenuation Factor Considerations



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VI Assessment Case Studies – Attenuation Factor Considerations

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Takeaways

- Stay informed on updates to state and federal vapor intrusion guidance
- Evaluate potential interior and exterior sources of contaminants while conducting VI assessments to ensure that data is representative of conditions associated with VI
- Design and implement VI assessments and mitigative actions with site-specific conditions, current/future land use scenarios, and regulatory guidance in mind

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Thank You

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