



Civil & Environmental Consultants, Inc.

Identifying and Managing Zombie Sites

2018 Pennsylvania Brownfields Conference

Presented By

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What is a Zombie Site?

- ▶ **A Property with regulatory closure that comes back to life resulting in unanticipated cost to the RP and/or property owner.**
- ▶ **Zombie sites most commonly occur through**
 - Change in regulations
 - Incomplete remediation
 - New (Emerging) contaminants
 - Change in property use

Due Diligence Requirements

- ▶ Contaminants evaluated for releases have changed
- ▶ Previous NFA/Liability Release only applies to contaminants assessed/remediated
- ▶ **ASTM 1527**
 - Database Report of NFA is a Historic REC
 - Historic RECs should be thoroughly reviewed
 - Understand extent of previous remediation
 - Give protection but significant cost can still occur
- ▶ **Phase II is could be worth the cost**



Change In Property Use

- ▶ **Regulatory Closure can be contingent upon site use**
 - Consider restricting site for non-residential use
- ▶ **Older contingent closures are not well tracked**
- ▶ **Transition from non-residential to residential can trigger additional remediation requirements**



Vapor Intrusion

▶ VOCs will drive this risk

- NJ reevaluated daycare centers
- OH required reevaluation of TCE sites

▶ Risk driven by completed exposure pathways

▶ PCE/TCE Remediation may have result in DCE or VC VI issues

▶ 2017 PA VI Guidance



New/Emerging Contaminants

▶ PFAS

- Common in the environment
- Very low screening levels (PPT)
- Immature regulations (PA = 70 ng/L, NJ = 14 ng/L [PFOA])
- Analytical challenges
 - No MCL (PA)

▶ 1,4-Dioxane

- Associated with TCE/TCA
- No MCL
- Immature regulations (PA = 10 ug/L, NJ = 0.4 ug/L)
 - No MCL

Potential Development Costs

► Soil Management

- Soil impacted above regulatory standards will need to be managed

► Vapor Barriers

► Sub-slab Venting

► Additional Permitting

- Stormwater permitting may be more complicated



Case Study

- ▶ **Unrestricted Closure 1994**
- ▶ **Property Use from Industrial to Commercial with a Daycare Center**
- ▶ **Property transfer to developer in 1997**
 - Preserved old buildings
- ▶ **Phase I completed prior to sale**
- ▶ **VI issue discovered at the daycare center**



Site History

- ▶ **Bronze Powder Manufacture 1873 - 1948**
- ▶ **Grinding Wheel Manufacture 1948 – 1972**
- ▶ **Various uses until closure in 1972 – 1983**
- ▶ **Redeveloped 1998**

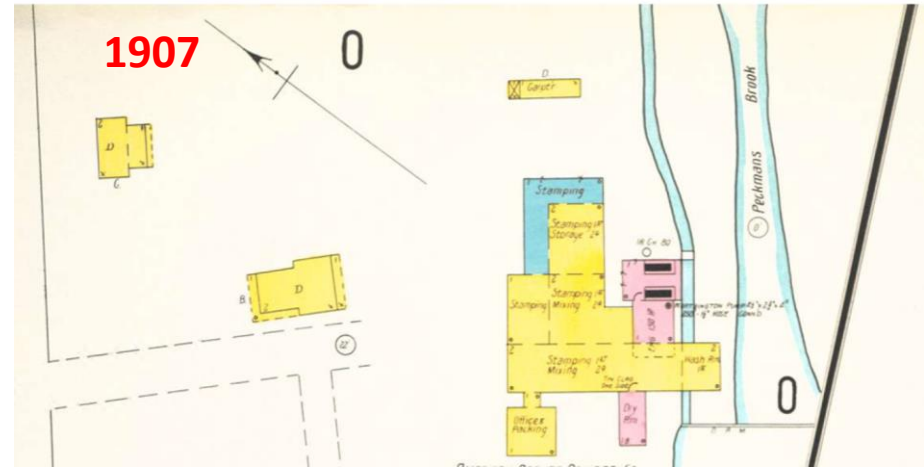


Photo From Williams, 1998

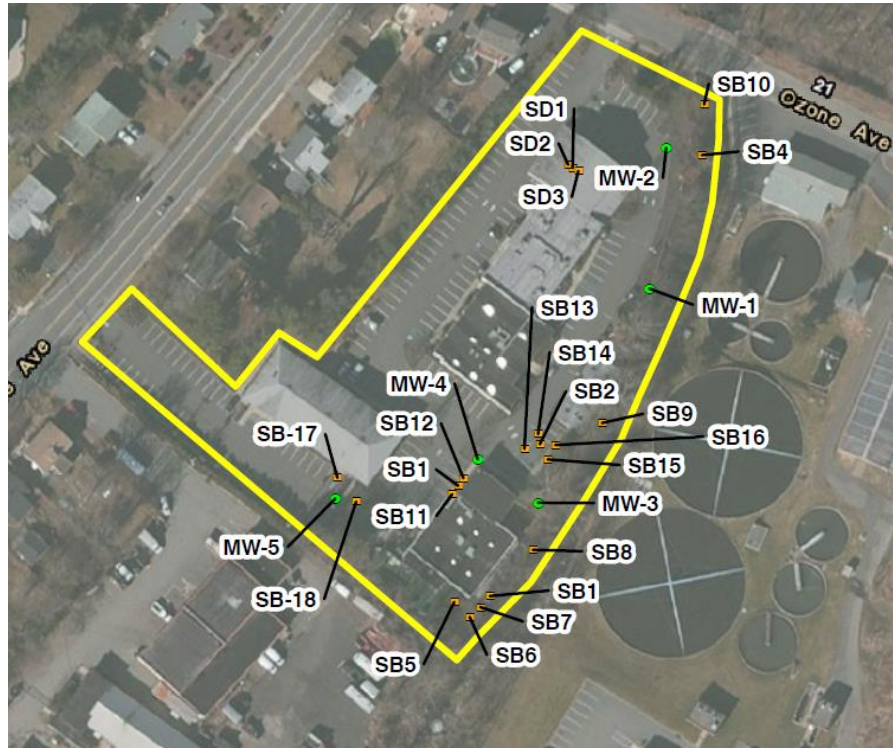


Current Uses

- ▶ Day Care 1998 – Present
- ▶ Office Park 1998 – Present

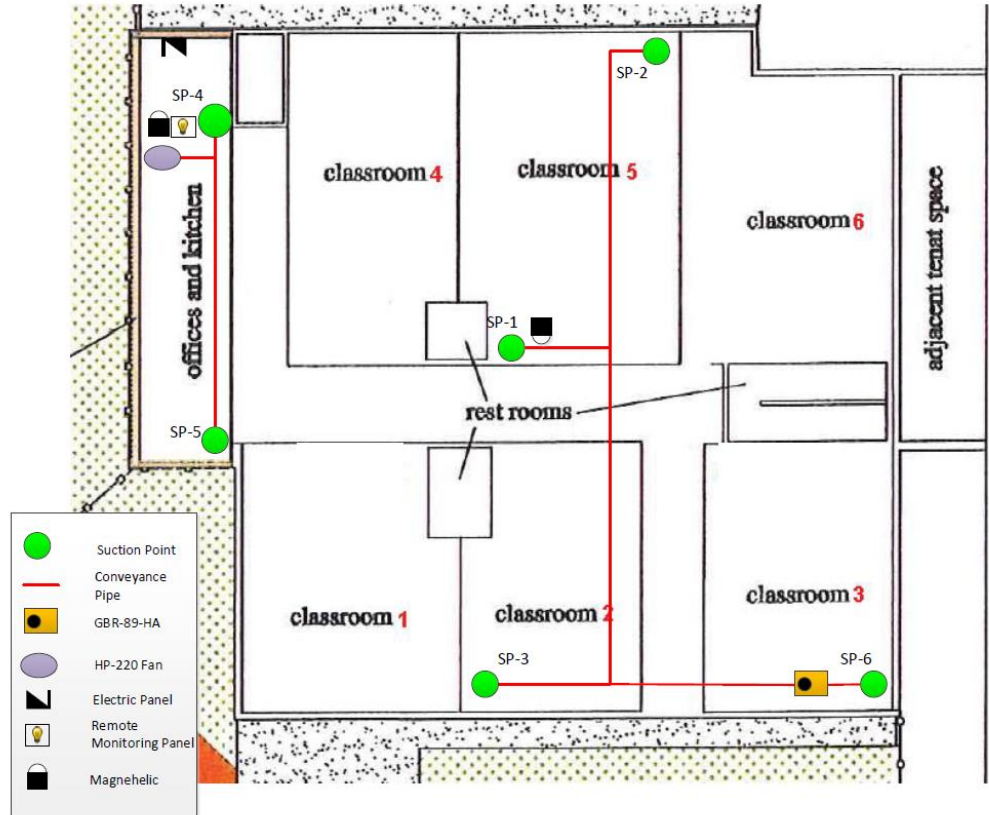


Previous Investigation/Remediation



2013 VI Investigation

- ▶ Sub-slab and indoor air sampling
- ▶ VI Investigation resulted in sub-slab mitigation system install



Current Assessment Remediation

- ▶ **Successor to the RP notified in 2014**
- ▶ **Cu & Pb in Surface Soil**
- ▶ **Chlorinated VOCs in groundwater under daycare center**
 - 60,000 ug/L total cVOCs
- ▶ **2 ft. hydraulic oil identified in area previously remediated**
- ▶ **Residual diesel fuel identified in area previously remediated**
- ▶ **Costs to Date:**
 - \$290,000 by RP
 - ~\$60,000 by Property Owner



Remediation Challenges

- ▶ cVOCs below a building and in Clay
- ▶ River ~ 25 ft down-gradient of source area
- ▶ RP does not own the property
- ▶ Busy commercial center
 - Difficult logistics for remediation



Conclusions

- ▶ **Take the time to review properties w/ regulatory closures**
- ▶ **When in doubt, complete a Phase II**
- ▶ **Prepare for additional development costs**
- ▶ **Consider restricting property use**
- ▶ **Complete thorough assessments and remediation**



Questions?
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