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VI ASSESSMENT AND MITIGATION

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OVERVIEW

- Site Introduction
- Subslab Vapor Assessment
- Screening Experiments
- Mitigation Design Testing
- Mitigation Design
- Lessons Learned

SITE INTRODUCTION

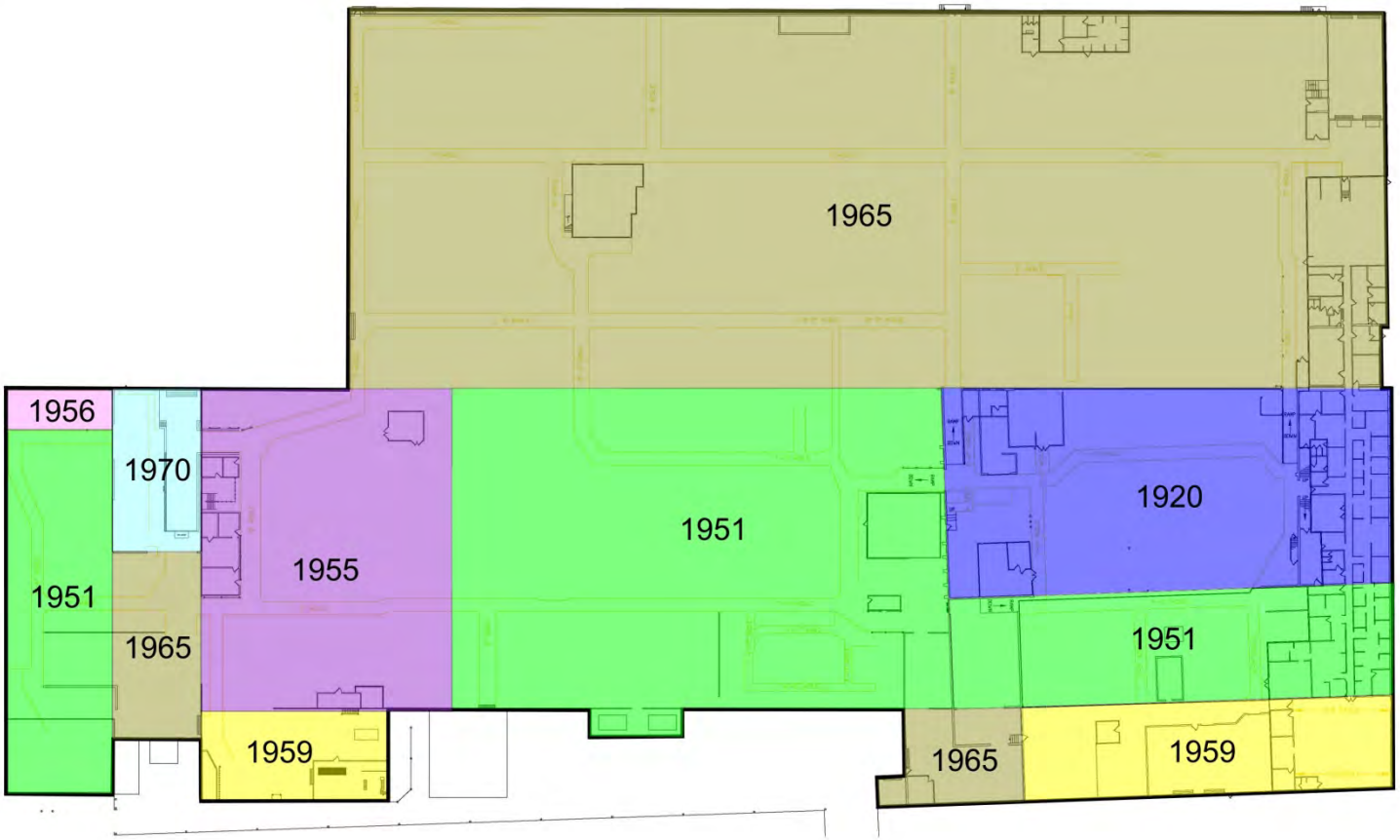
SITE

- 11 Acres
- 265,000 sq. ft. bldg.

SITE HISTORY

- <1884 – 1908: Lumber yard; manufacturing (furniture and springs)
- 1908 – 1929: Manufacturing (wagon and truck wheels, portable buildings); creamery
- 1929 – 1947: Manufacturing
- 1947 – 2008: Manufacturing (bearings and bushings)

BUILDING HISTORY

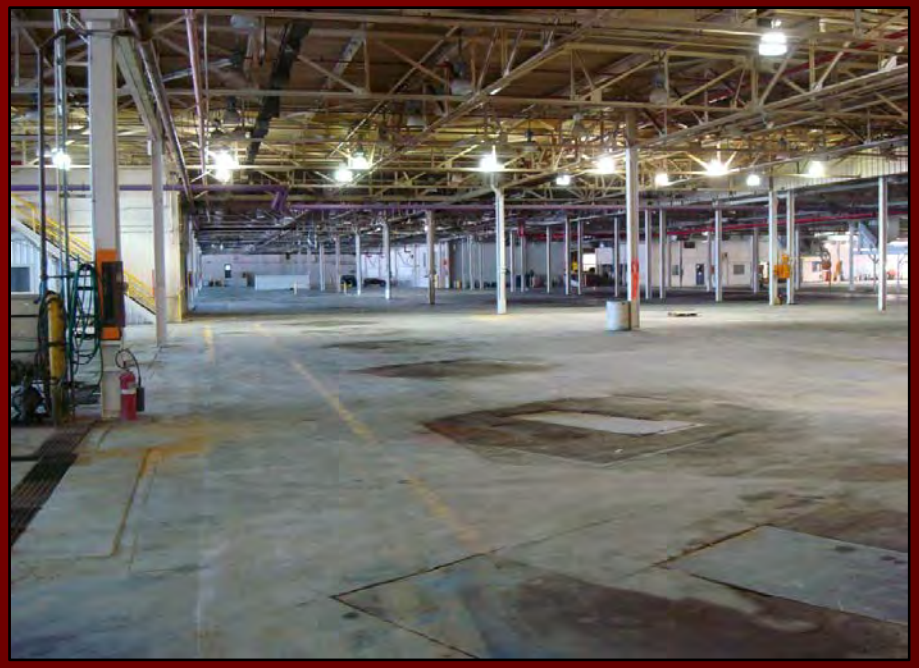


ENVIRONMENTAL CONDITIONS

- Soil
  - Trichloroethene (TCE) and daughters
  - Volatile aromatic hydrocarbons
  - Lead (surface)
  - Metals
  - PAHs
- Groundwater
  - TCE and daughters
  - Volatile aromatic hydrocarbons

ENVIRONMENTAL CONDITIONS

- Soil Gas
  - TCE and *cis*-1,2-dichloroethene
  - Volatile aromatic hydrocarbons



REDEVELOPMENT ISSUES

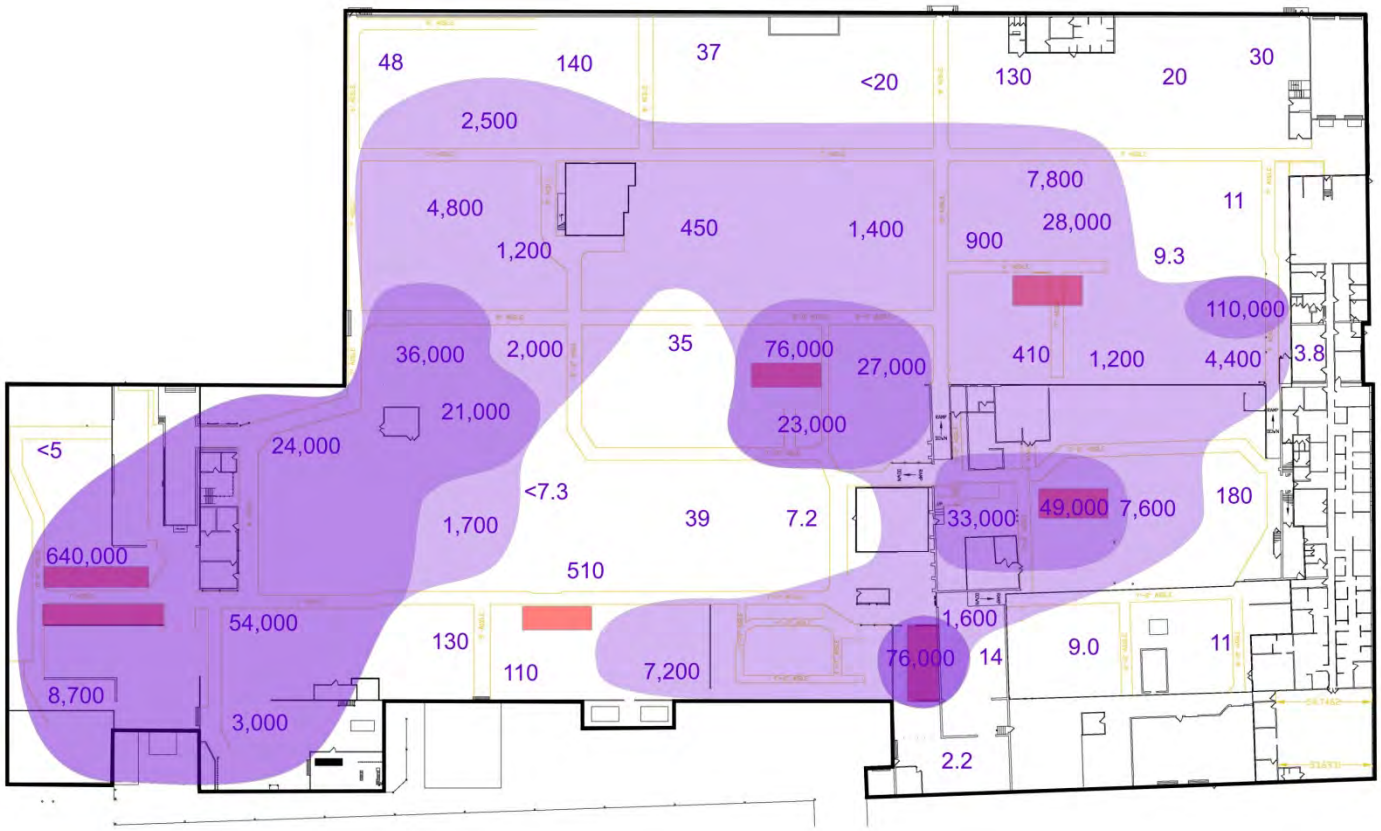
- Liable party cleanup
- Environmental liability management
- Vapor intrusion assessment and mitigation
- Assessment and mitigation funding

SUBSLAB VAPOR ASSESSMENT

METHODOLOGY

- Sampling episodes in December 2010 and August 2011
- EPA and Vapor Pin™ sampling ports
- Bottle-Vac and Summa canister sample containers
- TO-15 analyses
- Multiple screening techniques

SUBSLAB VAPOR CONCENTRATIONS



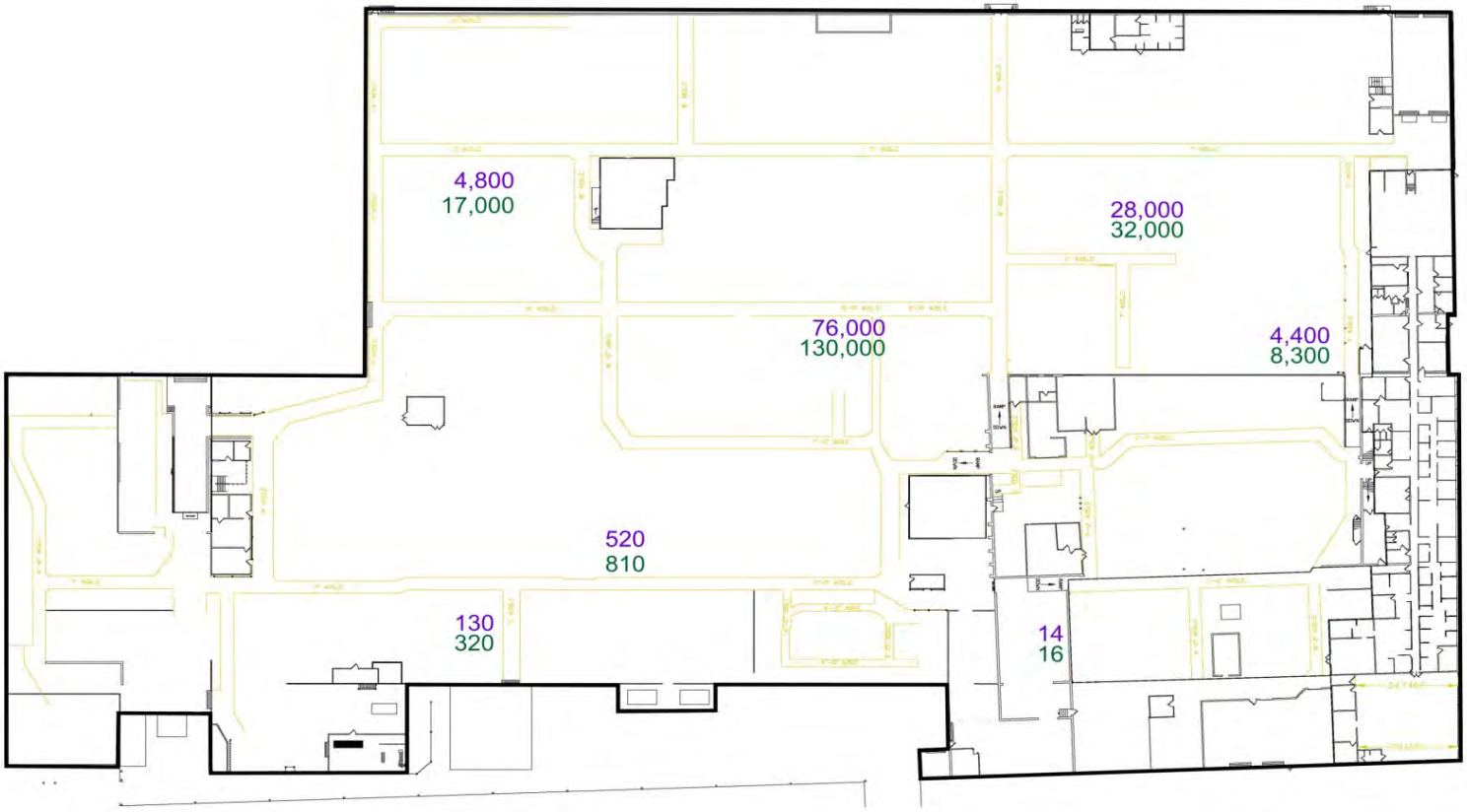
SUBSLAB VAPOR CONCENTRATIONS = ppb_v TCE

TCE RISK-BASED SUBSLAB CRITERION = 540 ppb_v

SUBSLAB DUPLICATES

SAMPLE 1 (ppb_v)	SAMPLE 2 (ppb_v)	RPD (%)
8	39	130
20	19	5
51	92	57
2,000	2,600	26
17,000	12,000	34
21,000	21,000	0

8-MONTH COMPARISON



SUBSLAB VAPOR CONCENTRATIONS = ppb_v TCE

DECEMBER 2010

AUGUST 2011

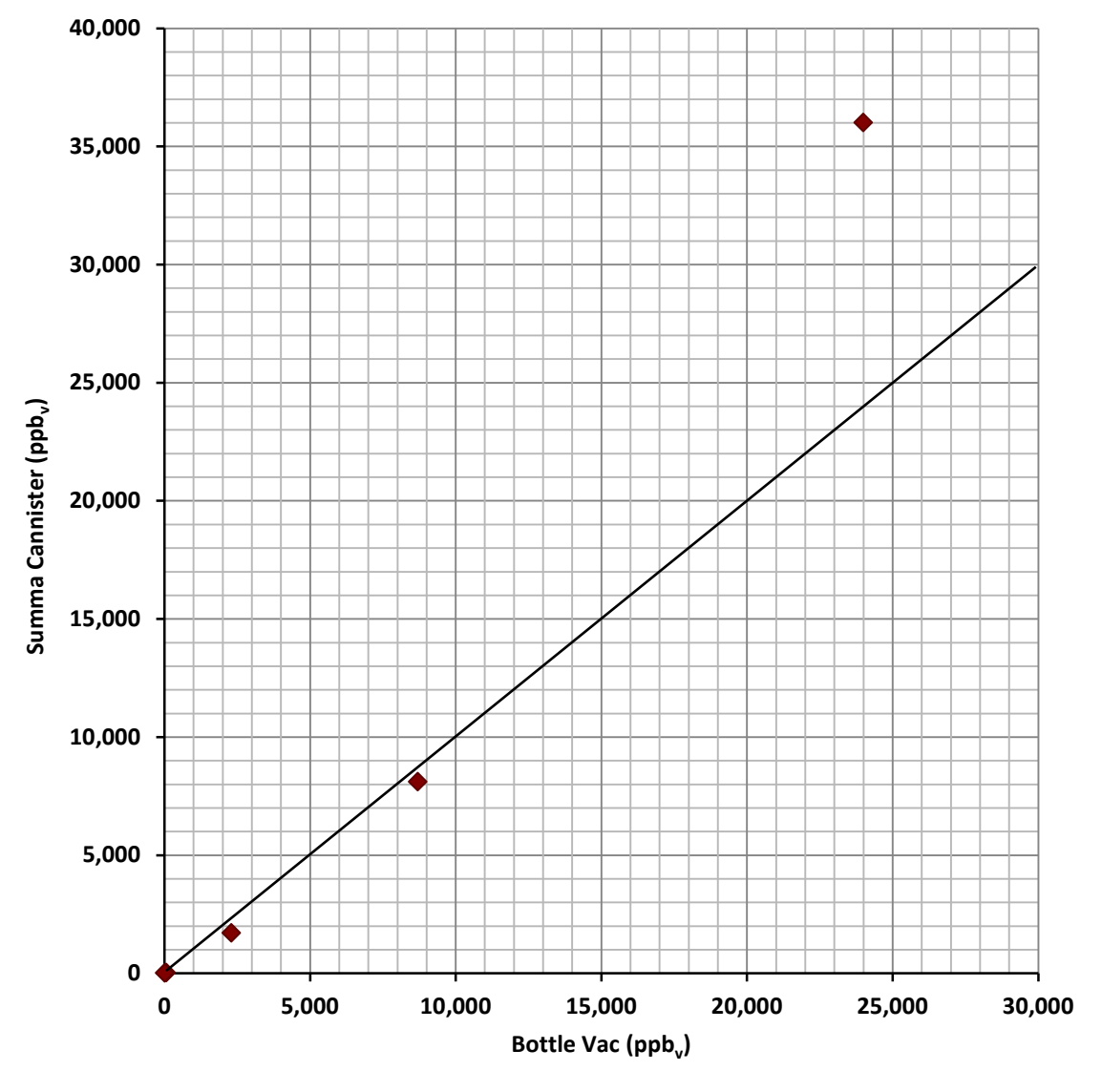
SAMPLING AND SCREENING EXPERIMENTS

SAMPLING TECHNIQUES

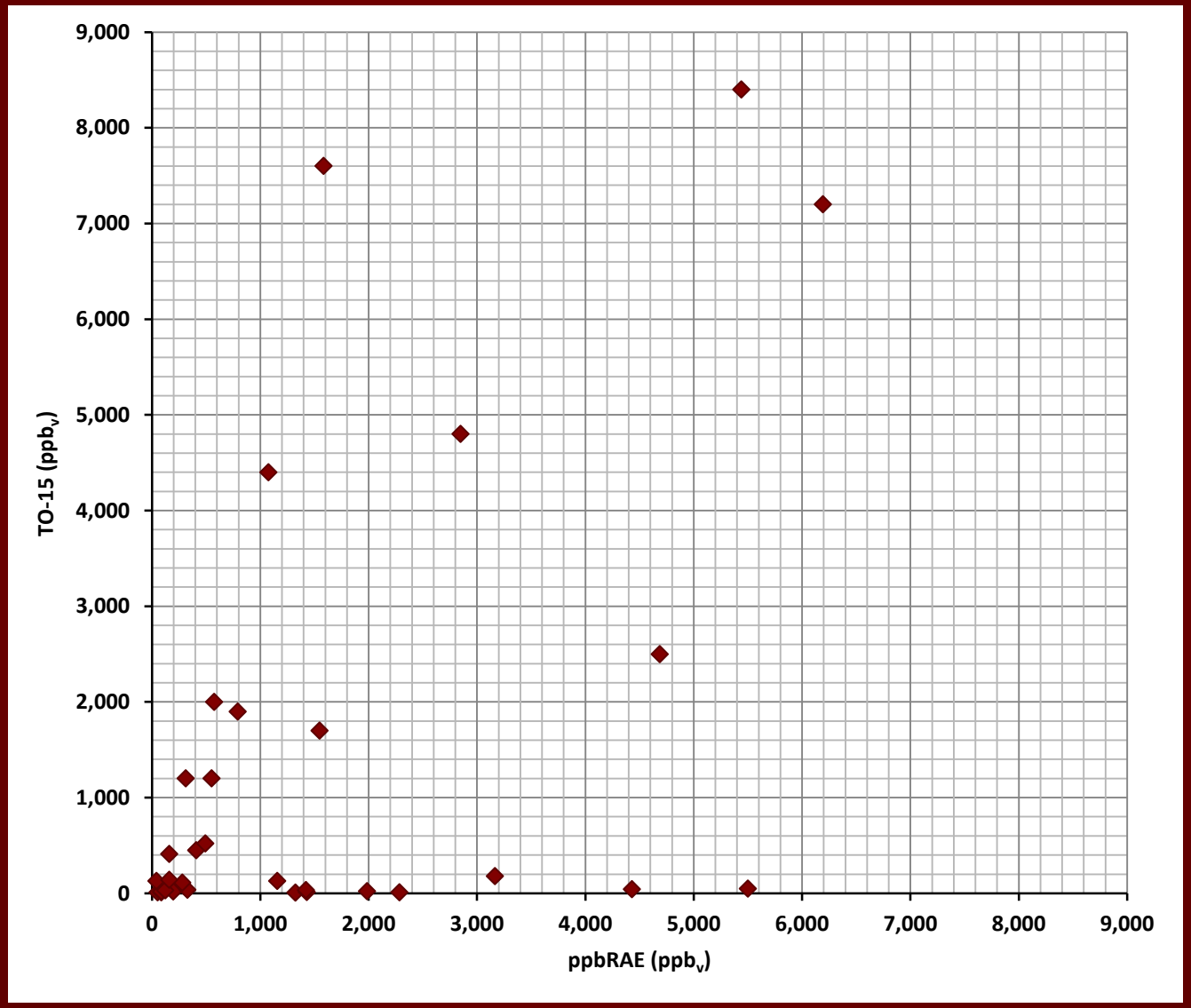
VI ASSESSMENT COMPARISONS

- EPA probe vs. Vapor Pin™
- Bottle-Vac vs. Summa canister
- ppbRAE vs. TO-15
- Gas tubes vs. TO-15

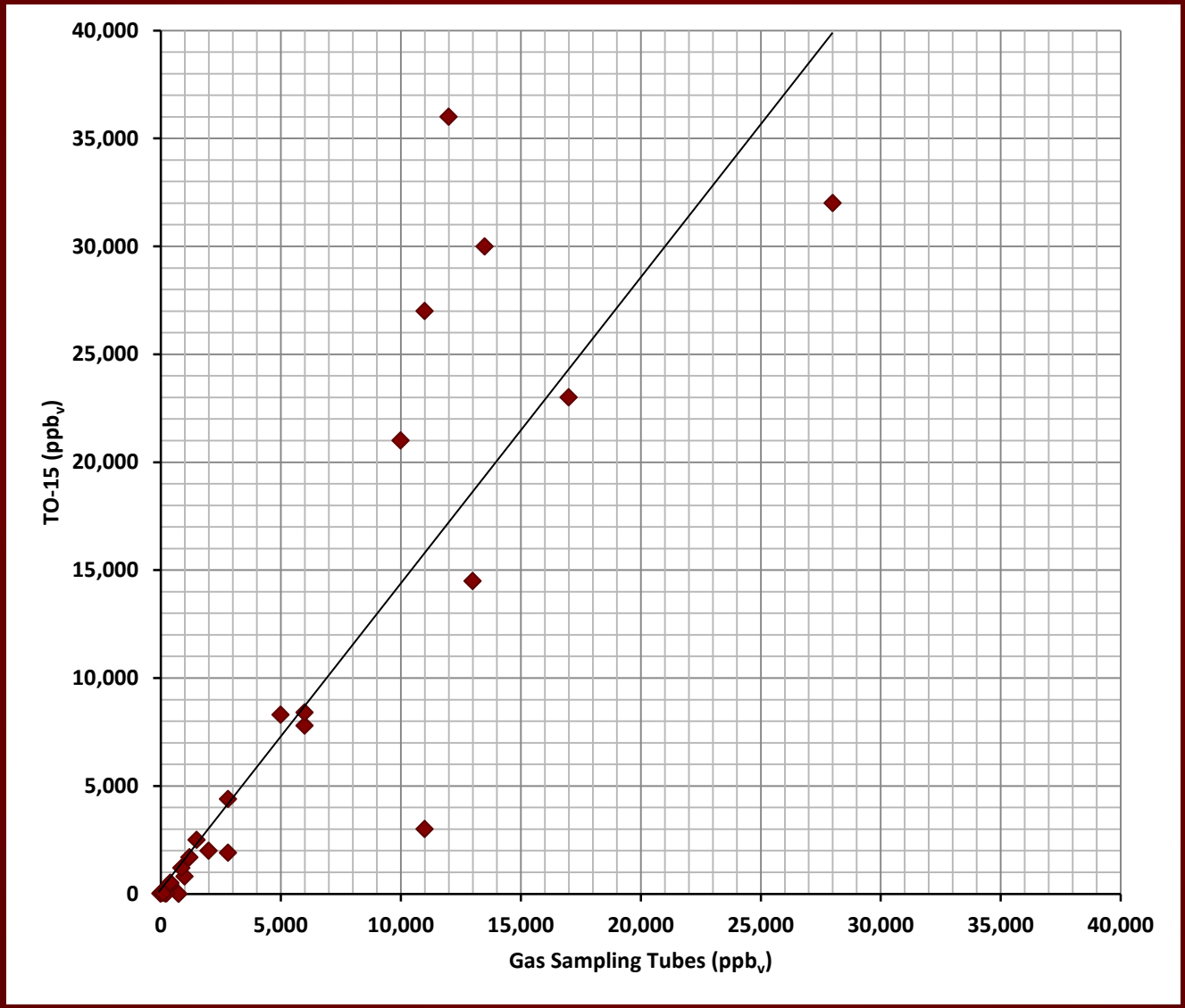
BOTTLE-VAC vs. SUMMA®



ppbRAE vs. TO-15



GAS TUBES vs. TO-15



MITIGATION DESIGN TESTING

MITIGATION DESIGN TESTS

Active Subslab Depressurization (ASSD)

- Pressure extension testing
- Pilot testing

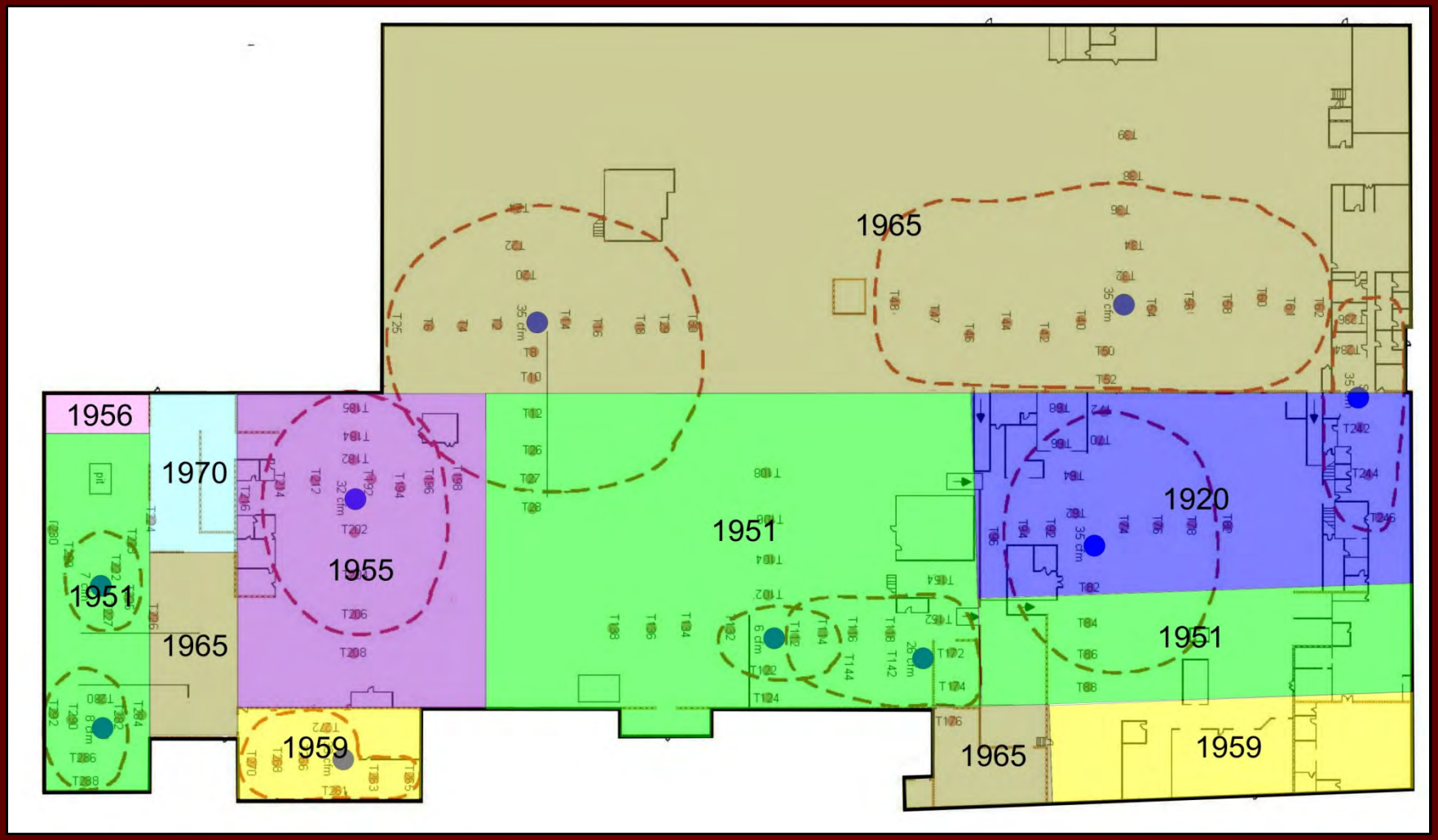
PRESSURE EXTENSION TESTS

- Determine subslab vapor capture radii

TEST FINDINGS

- Capture radius (- 0.02" H_2O) = 10' – 70'
- Capture radius affected by soil type

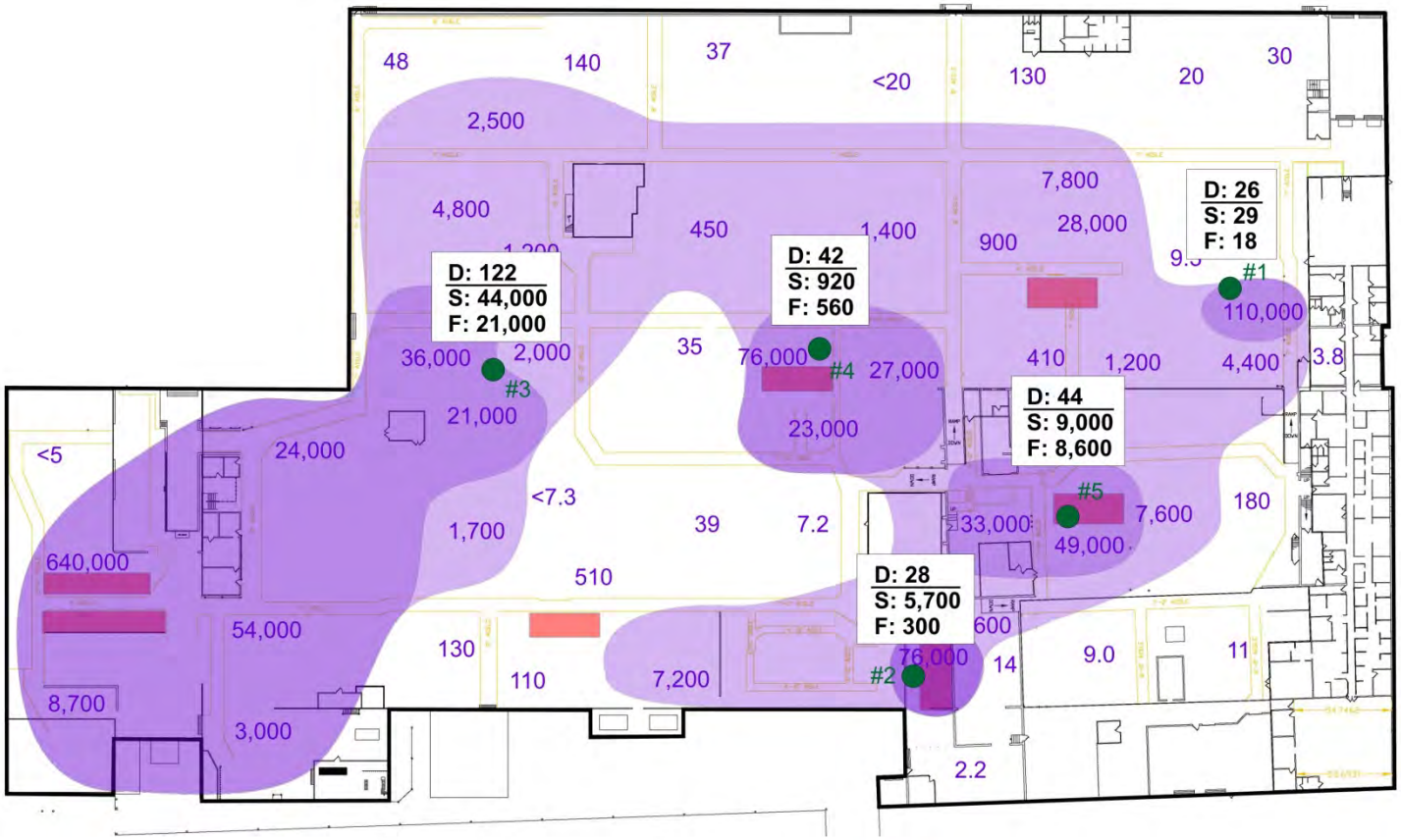
TEST LOCATIONS & RESULTS



PILOT TESTS

- Effluent vapor concentrations and changes over time
- Emissions estimates

PILOT TESTS



SUBSLAB VAPOR CONCENTRATIONS = ppb_v TCE

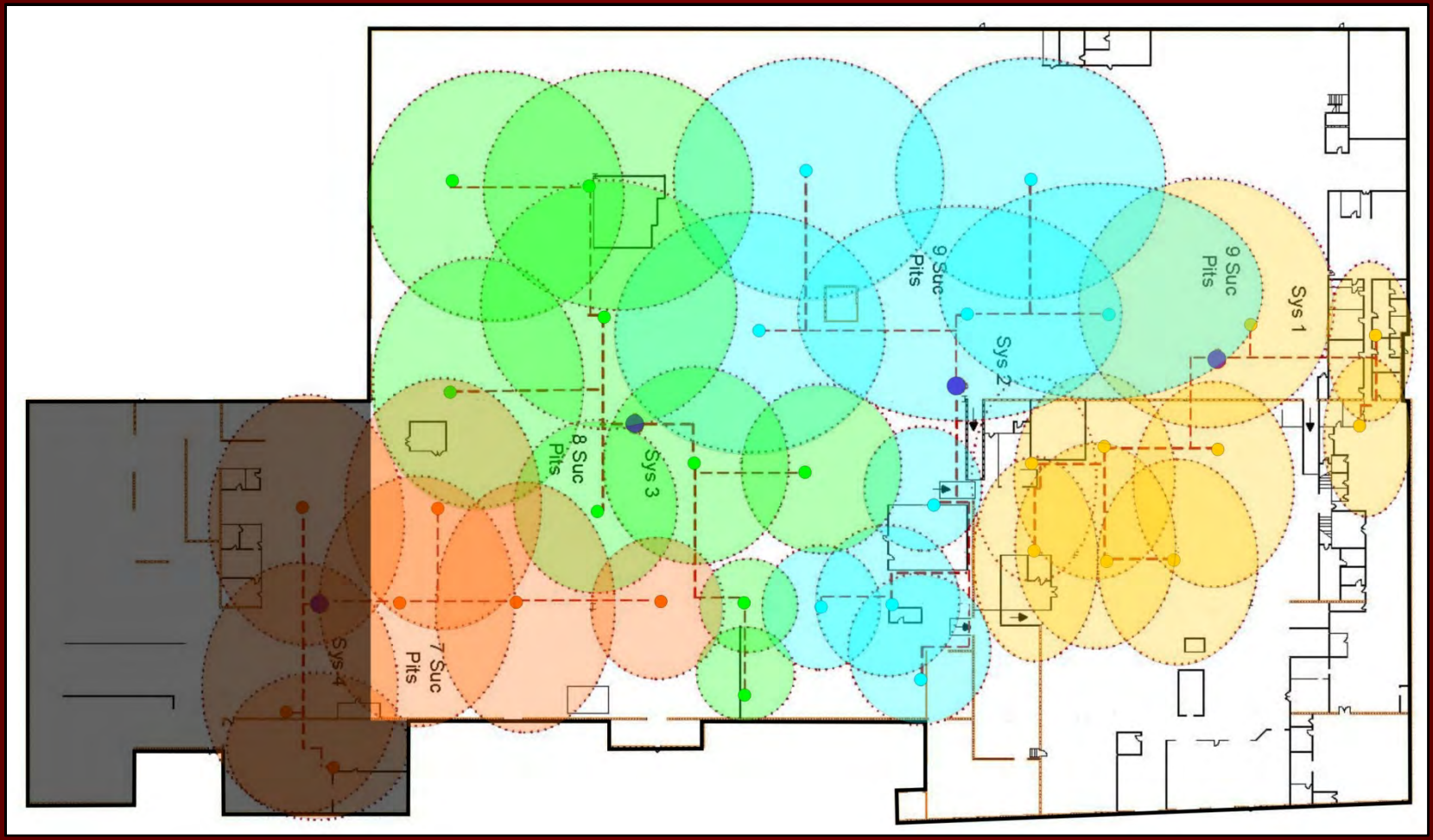
TCE RISK-BASED SUBSLAB CRITERION = 540 ppb_v

TEST RESULTS

LOCATION	FLOW (CFM)	CONCENTRATION (ppb_v)		DURATION (HRS)	Δ (%)
		START	FINISH		
1	14	29	18	26	-38
2	13	5,700	300	28	-95
3	18.5	44,000	21,000	122	-60
4	19	920	560	42	-39
5	13	9,000	8,600	44	-4

Total Emissions Estimate = 25 – 35 lbs/mo

ASSD DESIGN



DESIGN SPECIFICATIONS

- ASSD System
  - ≤ -0.02" H_2O
  - Variable speed fans
  - ~ 5-gallon suction pits
  - 4" suction piping
- Chlorinated solvent resistant coating
  - Retro-Coat™ Vapor Intrusion Sealant System (Land Science Technologies)
  - 20 mil – ¼" thickness

SOME LESSONS LEARNED

- Analysis results for subslab vapor samples are characterized by poor precision and reproducibility
- Subslab vapor screening techniques are generally unreliable
- Subslab vapor concentrations vary significantly over distance and time
- Subslab soil conditions can be highly variable, especially beneath buildings with multiple additions

SOME LESSONS LEARNED

- Effluent control and permitting is an issue
- Combined ASSD/coatings approach can be effective
  - Limited installation cost benefit
  - Potential operating cost benefit
  - Significant potential effluent control benefit

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