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Johnson Controls, Fullerton CA

Conceptual Site Model Presentation



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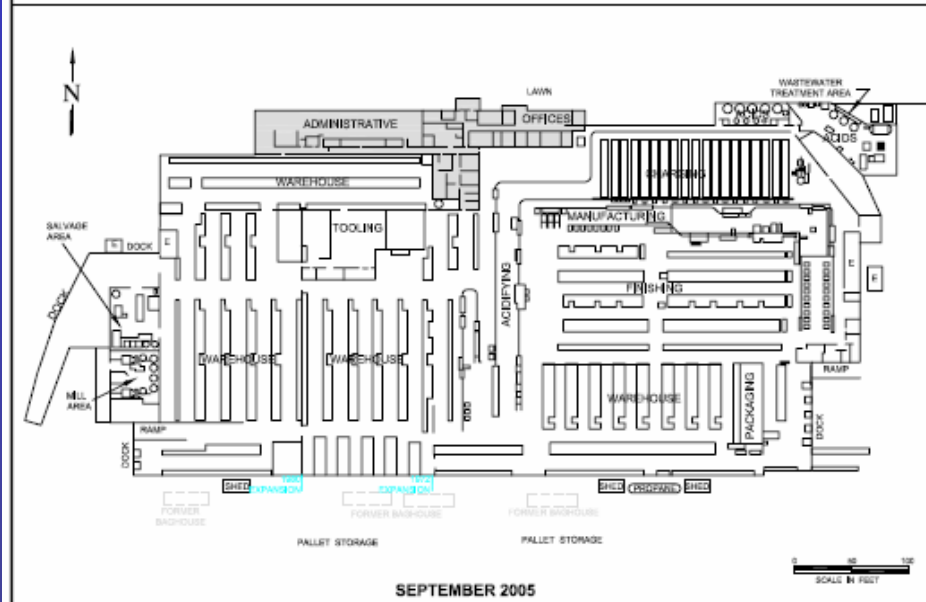
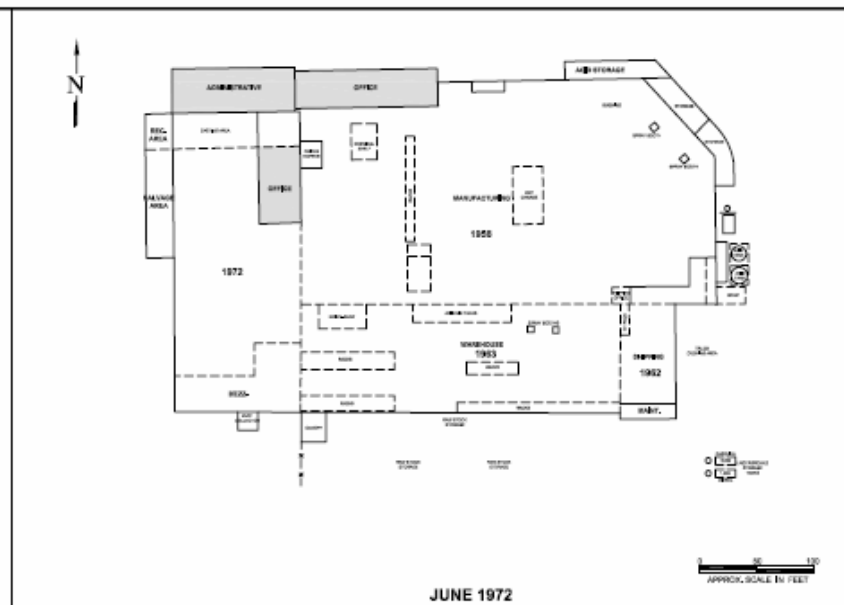
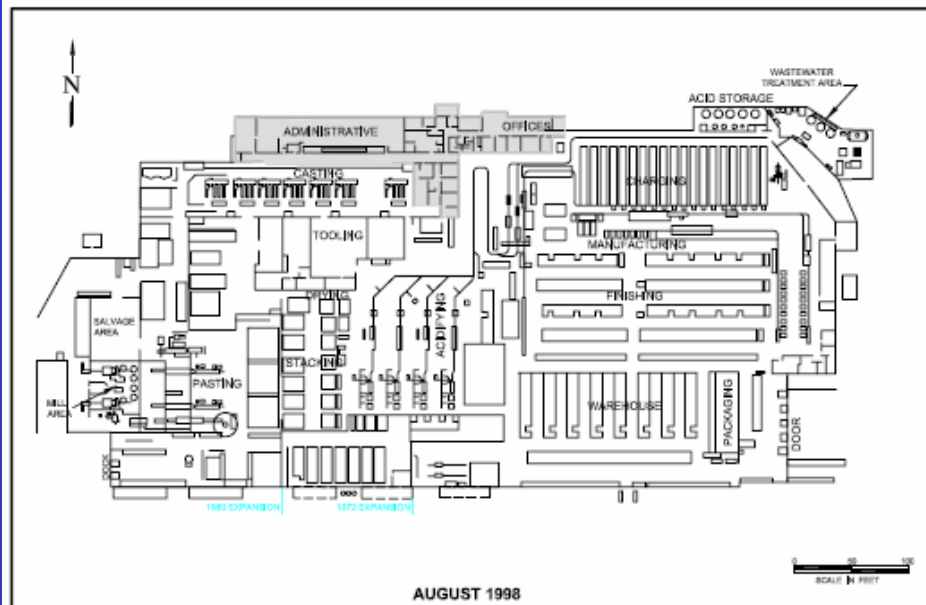
Facility History

- ❖ Standard Products owned during initial development in 1956.
- ❖ Globe Union purchased in mid-1960s and expanded facility. Glob Union merged with Johnson Controls in 1978.
- ❖ Second expansion of facility in 1980.
- ❖ Site purchased by Lowe Enterprises and scheduled for redevelopment after hand over of clean site (completely demolished and remediated) from Johnson Controls



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Site Development Over Time





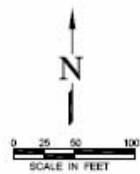
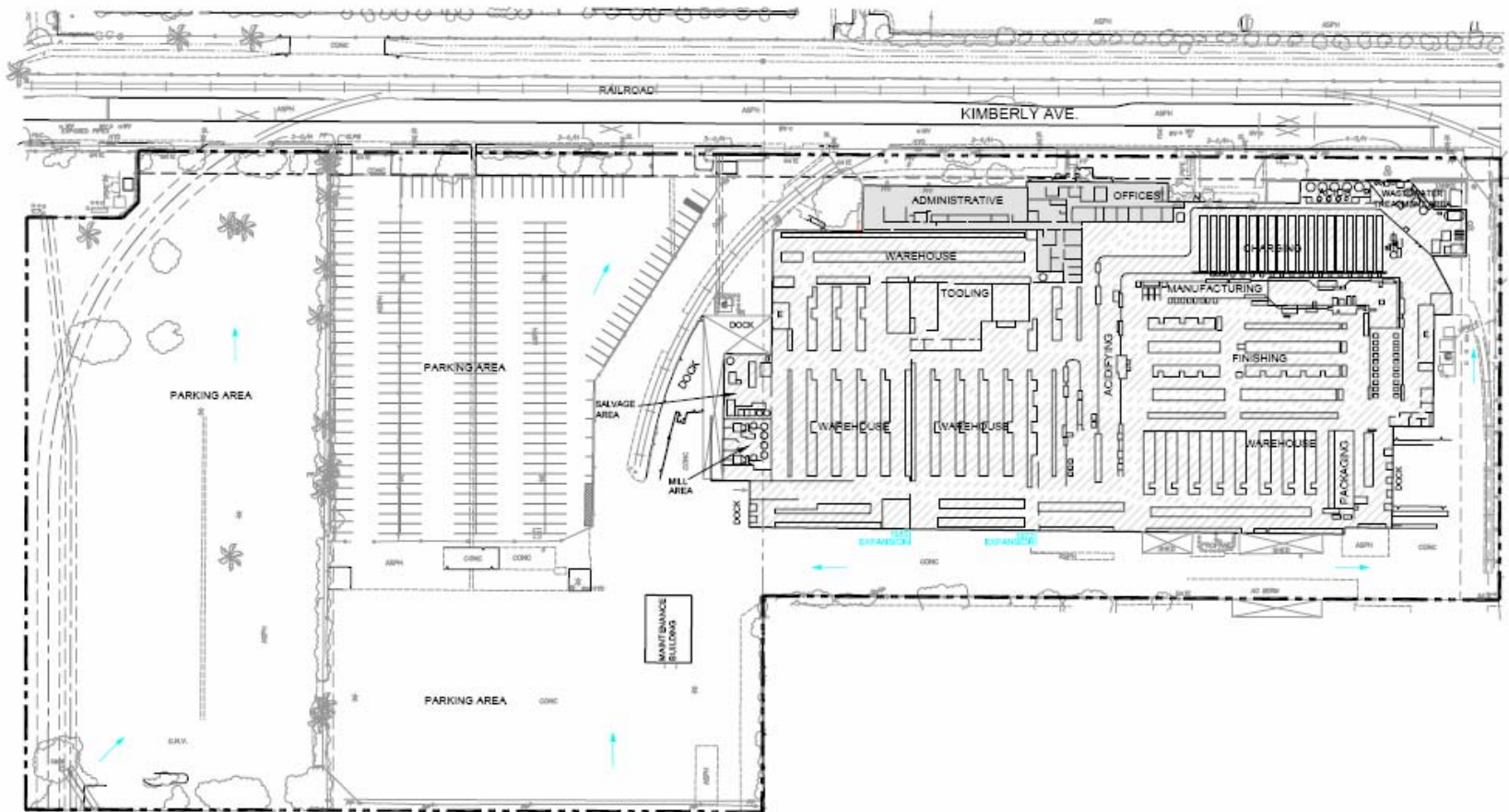
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Environmental Setting

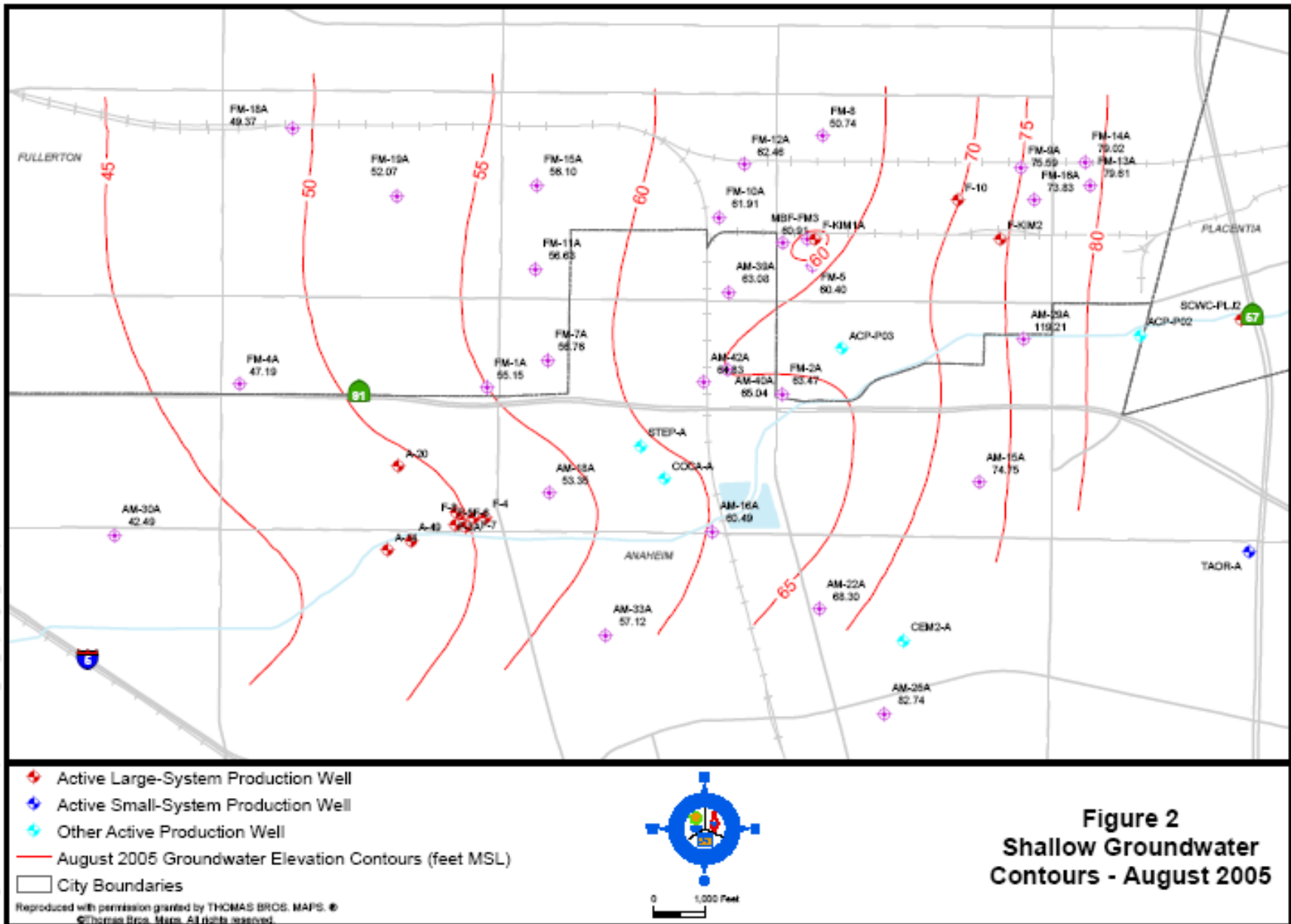
- **Topography** – flat, gentle regional slope to W and SW
- **Climate**
- **Geology**
 - Coastal Plain Basin filled with alluvium deposited by streams and sheet flow from erosion of surrounding hills/mountains.
 - Underlying soil in upper 20 feet is silt, clayey silt and sandy silt with layers of sand and clay
- **Hydrology**
 - Surface water drainage to north towards sewer line
 - Carbon creek nearest surface drainage (0.5 miles S of site)
- **Hydrogeology**
 - Principal aquifer 115- 125 feet bgs
 - GW flow is WNW
 - Orange County Water District observation well FM-5 – installed 1992 screened 121-141 feet bgs
 - Public Water Supply Well F-KIM1A – installed 2002 multiple screens from 500-1225 feet bgs
- **Land Use** –commercial light industrial



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- LEGEND**
- PROPERTY LINE
 - OVERHEAD ELECTRIC
 - X - X - FENCE
 - E ELECTRICAL TRANSFORMER, PAD MOUNTED
 - ← DRAINAGE





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Stakeholders

- ❖ DTSC – lead agency due to Tier 1 wastewater permit
- ❖ Johnson Controls (Entact)
- ❖ Lowe Enterprises
- ❖ Orange County Water District



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Environmental Issues

- Releases to surface soils from plant activities (mostly lead)
- Leaking fuels tanks releasing to soils and GW?
- Solvent releases from site activities and offsite activities



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Receptor Conceptual Site Model



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Site Investigations - Metals

- 2005
 - 64 borings sampled generally from 0.5 -1 and 2-2.5 feet bgs
 - submitted for Pb (6010)
 - samples collected deeper in production areas
- 2006
 - 31 additional borings sample from 2-2.5 feet bgs,
 - Submitted for Pb and pH (6010)
 - 8 locations submitted for CAM 17 metals based on the lead and pH results



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Lead Screening Criteria

Source	Concentration in mg/kg	Exposure Pathway
CAL EPA	150	Direct Contact residential
CAL EPA	800	Direct contact industrial
EPA Region 9 PRGs	750	Direct contact industrial



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Distribution of Metals

- Isolated Pb hot spots appear to be correlated to activities at former casting (B12), former pasting (B6), acidifying area (D17)
- No evidence of obvious metals impact observed in soils
- No samples taken from area under acid tanks, former wastewater treatment area, and charging area – areas will be sampled after demolition



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Exceedences of Industrial Standard

Location	Depth bgs in feet	Conc. in ppm
B6 (former pasting, mill area)	3.5-4	1400
D17 (former acidifying, outside pre 1972)	0.5-1	360*
	2-2.5	910
B12 (former casting, outside pre 1972)	2-2.5	8400

Exceedences all bound with depth

* Above residential criteria only



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Exceedences of Residential Standard

Location	Depth bgs in feet	Conc. in ppm
A3	0.5 – 1.0	170
	2-2.5	520
H39	2-2.5	210
G32	2-2.5	150
F29	0.5-1.0	150



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pH results

- pH collected from 20 samples in 2006
 - ranged from 2.4 -10.7
 - lowest pH at SB79 , lead concentration = 3.4 ppm
 - Aside from SB 79 pH ranged from 7.5 – 10.7
 - Does not appear to correlate with metal hot spots in soil



Other metals

- SB79, SB84, SB85, SB92, SB94, SB95, SB98, SB106, B12, D17, and B6 submitted for CAM17 metals
- Results compared to background and Region 9 PRG Direct Contact values
- As only metal above background of 3.5 mg/kg

Boring	Depth in feet	Conc in ppm
B6	3.5-4	5.9
SB85	2-2.5	10.1
	4.5-5	4.1
SB92	2-2.5	21.2
SB106	2-2.5	4.0



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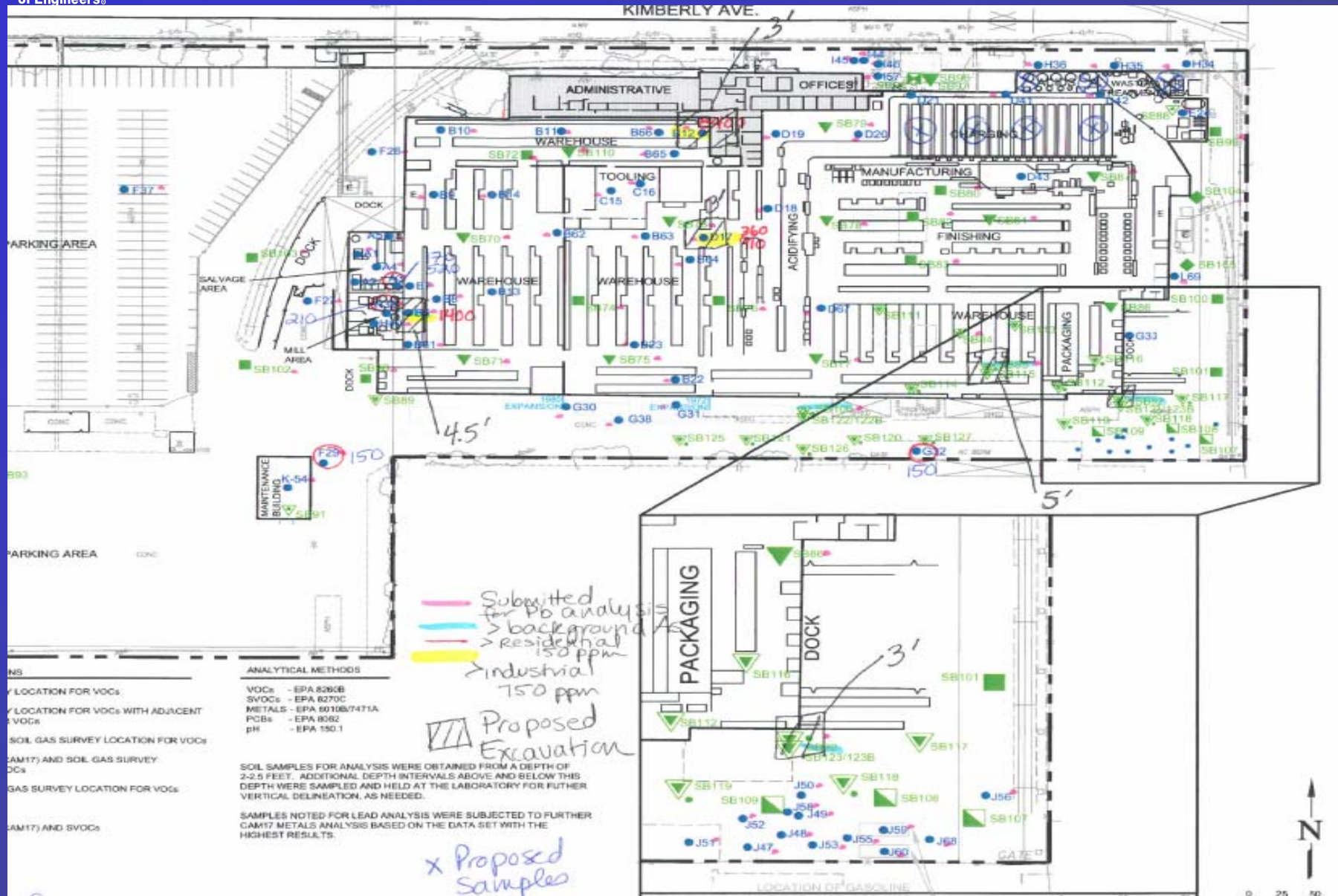
Proposed Interim Removals for Metals

Location	Depth of Excavation in feet	Metal of concern
B6	4.5	Pb, As
B12	3	Pb
D17	3	Pb
SB85	5	As
SB92	3	As

- Proposal missing As exceedance at SB106, not addressing residential exceedences for Pb
- Approx 320 CY likely to be removed



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Organics analysis

Location	Rationale
SB93, 94	SVOCs - Waste Storage in parking lot
SB91	SVOCs - Maintenance building, former UST
SB88	SVOCs - Near air compressor
SB107, 108, 109	SVOCs - Near UST
SB104, 105	PCBs near transformers

- Results were below detection limits



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TPH related issues

- 10,000 gal diesel UST and spills at maintenance building
- 6,000 gal gasoline UST and 1,000 gal diesel UST in southeast corner of property
- Former Waste water treatment area in front of building



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Maintenance Building

- 10,000 diesel UST removed from maintenance building in 1993
 - 34 tons of PCS removed, site closed with concurrence of City of Fullerton Fire Department Fire Prevention Bureau
- ASTs and floor spills observed in building, but concrete pad in place



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Maintenance Building TPH 2005 sampling

- F29 placed in former UST area – only drilled to 5 feet, no TPH samples
- K54 placed between service bays in building – sample from 2' submitted for TPH. Results ND
- SB91 – submitted for SVOCs only – results ND



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Southeast UST area

- USTs reportedly removed in 1983, but no closure records available
- Soil borings J47-56, J58-60, and J68 drilled in UST area
 - J49 and 58 encountered obstruction and fill at 2 feet. Staining seen in J49
 - Diesel odor/staining in J47, 48, 53, and 60 from 10-15 feet bgs
 - Gasoline odor in J60 to 8 feet



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Sample Results near Southeast UST area

Location	Depth in feet	Conc in ppm
J47	14	DRO = 530
J49	2	DRO = 3500, GRO = 12
J53	12	DRO = 210
J60	2	DRO = 2000, GRO = 960, EX
	4	DRO = 2000, GRO = 470, EX

- Orange County Healthcare Agency screening criteria = 100 mg/kg for residential and 2,040 mg/kg for commercial/industrial



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Waste Water Treatment area

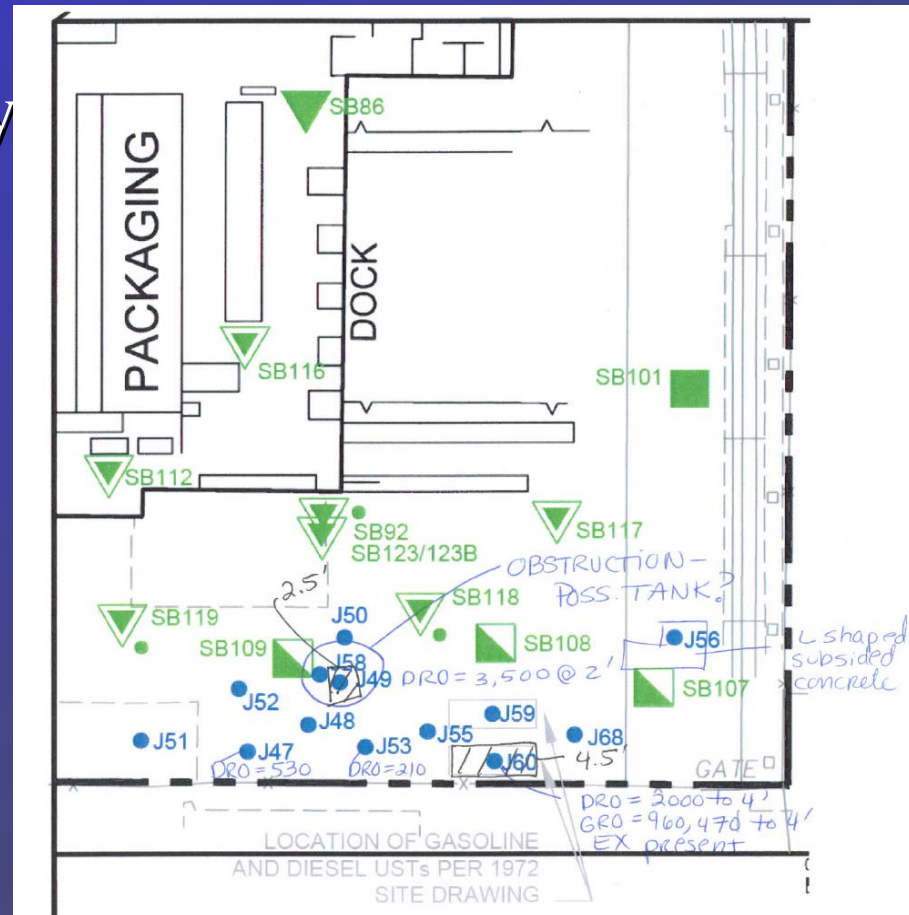
- In ground clarifier abandoned in place north of building in 1980s
- Upper portion of concrete reportedly removed and plumbing disconnected
- I46 and 57 located within former site (I44 and 45 mislocated)
- Obstruction encountered at 4.5 feet at I46
- TPH ND at maximum depth of 9 feet



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Proposed TPH removals

- Approx 25 CY likely to be removed
- What if tank is present?





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Volatile Organics Issue

- 2005 - 6 samples submitted for VOCs (8260)
- Results all ND

C15, 16	Tooling area
F29	Maintenance Area
I57	Former Waste water Treatment area
D67, L69	Storage areas



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2006 Volatile Organics Sampling

- Additional soil gas sampling requested by DTSC
- Semi permanent soil gas implants placed within soil borings to initial depths of 5' by either:
 - 10" section of permeable screen connected to 1/4"OD polyethylene tubing
 - 1/4"OD polyethylene tubing perforated in last 6"
 - Screen interval filled in with sand overlying bentonite
- Soil gas sample location step outs based on initial readings (lateral and with depth)
- Collocated soil samples collected from samples with detected soil gas readings
- Samples analyzed by on-site laboratory



Soil gas Screening criteria

- Screening criteria calculated using Office of Environmental Health Hazard Assessment values with attenuation factor, based on indoor air for commercial industrial use
- PCE and TCE soil gas < screening criteria

Compound	Value in ug/L
PCE	1.732
TCE	5.1
DCE	NA
Cis DCE	127.75
Toluene	1095
Xylenes	2550
TCF	NA



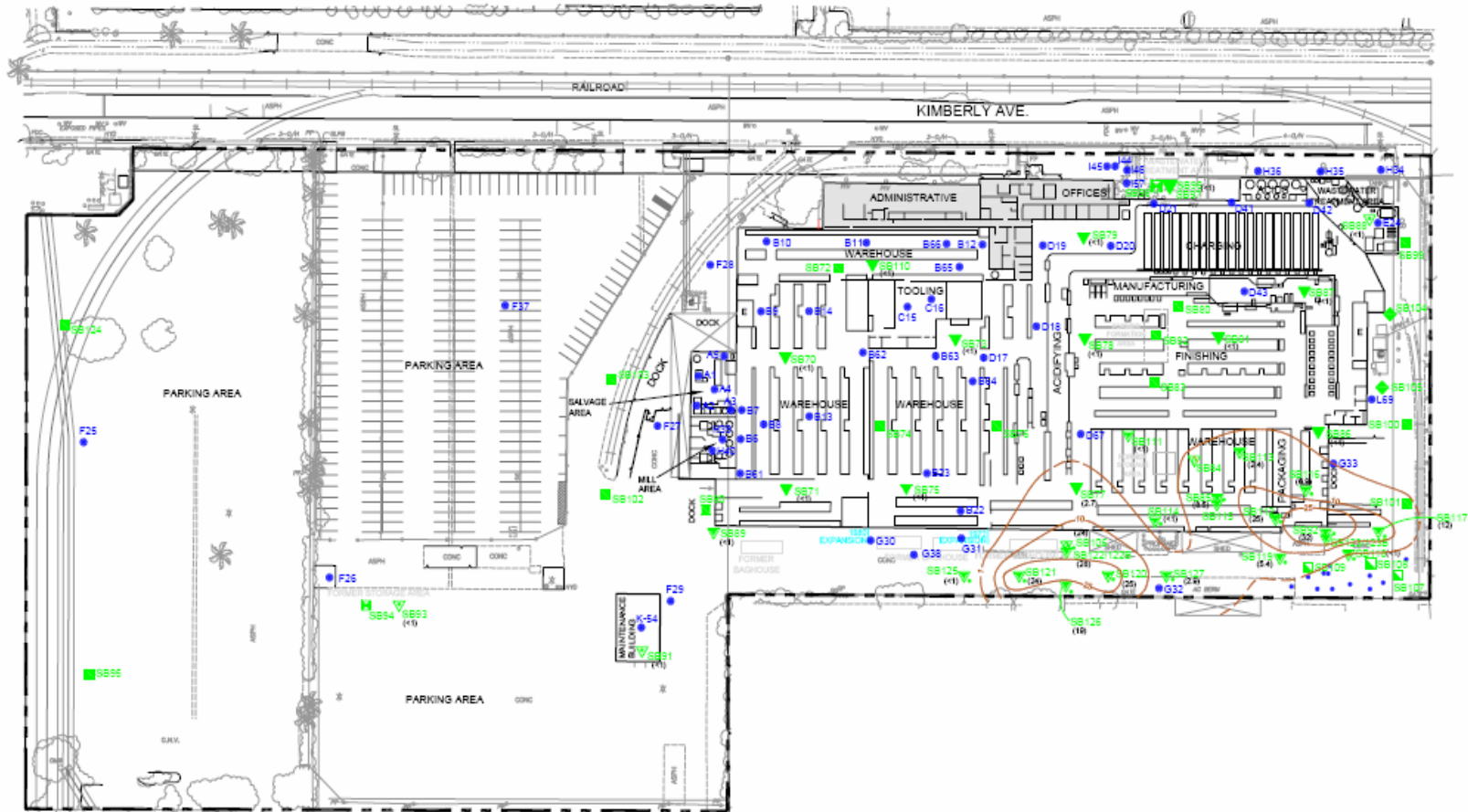
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Soil Gas results

- PCE: Detected in 20 samples (1.1 - 100 ug/L) in SE corner
- TCE: Detected in 14 samples (1.1 - 33 ug/L) in SE corner
- DCE: Detected in 15 samples (1.2 - 170 ug/L) in SE corner
- Cis DCE: Detected in 7 samples (1 - 53 ug/L) in SE corner
- Toluene: Detected in 2 samples (1.2 -1.6 ug/L) in SE corner
- Xylenes: Detected in 12 samples (1.1 - 1.3 ug/L) throughout site
- TCF: Detected in 3 samples (4 - 78 ug/L) in SE corner of site
- PCE, TCE, DCE, and TCF detected at depths up to 50 feet



10/1/2010



LEGEND

--- PROPERTY LINE
 --- OVERHEAD ELECTRIC
 --- X --- FENCE
 ● F25 PREVIOUS BORING LOCATIONS

SOIL SAMPLE LOCATIONS ADJACENT TO THE TRANSFORMERS AND FORMER WASTEWATER TREATMENT UNIT WERE LIMITED DUE TO UTILITIES.

SOIL GAS SURVEY CONDUCTED IN ACCORDANCE WITH DTSC REQUIREMENTS WITH SAMPLES BEING COLLECTED FROM 5 FEET BGS FOR INITIAL SCREENING. FURTHER VERTICAL DELINEATION MAY HAVE BEEN PERFORMED IN SPECIFIC LOCATIONS AT A GREATER DEPTH INTERVALS.

SAMPLE LOCATIONS

▼ SOIL GAS SURVEY LOCATION FOR VOCs
 ▼ SOIL GAS SURVEY LOCATION FOR VOCs WITH ADJACENT SOIL BORING FOR VOCs
 ▼ TOTAL LEAD AND SOIL GAS SURVEY LOCATION FOR VOCs
 ▼ TOTAL METALS (CAMT) AND SOIL GAS SURVEY LOCATION FOR VOCs
 ▼ SVOCs AND SOIL GAS SURVEY LOCATION FOR VOCs
 ▼ SVOCs
 ▼ TOTAL METALS (CAMT) AND SVOCs
 ▼ TOTAL LEAD
 ▼ PCBs
 --- ISOCONCENTRATION CONTOUR LINE
 (+) SOIL GAS CONCENTRATION (ug/l)

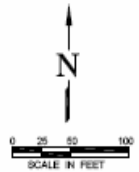
ANALYTICAL METHODS

VOCs - EPA 8260B
 SVOCs - EPA 8270C
 METALS - EPA 6010B/7471A
 PCBs - EPA 8082
 pH - EPA 150.1

SOIL SAMPLES FOR LEAD ANALYSIS WERE OBTAINED FROM A DEPTH OF 2-2.5 FEET. ADDITIONAL DEPTH INTERVALS ABOVE AND BELOW THIS DEPTH WERE SAMPLED AND HELD AT THE LABORATORY FOR FURTHER VERTICAL DELINEATION, AS NEEDED.

SAMPLES NOTED FOR LEAD ANALYSIS WERE SUBJECTED TO FURTHER CAMT METALS ANALYSIS BASED ON THE DATA SET WITH THE HIGHEST RESULTS.

SOIL GAS ANALYSIS PERFORMED BY EST MOBILE LABORATORY.



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 ENVIRONMENTAL SERVICES
 8150 Ross Ave. Ste. 200 - Charlotte, NC 28226
 (704) 585-4232 Fax (704) 585-7844

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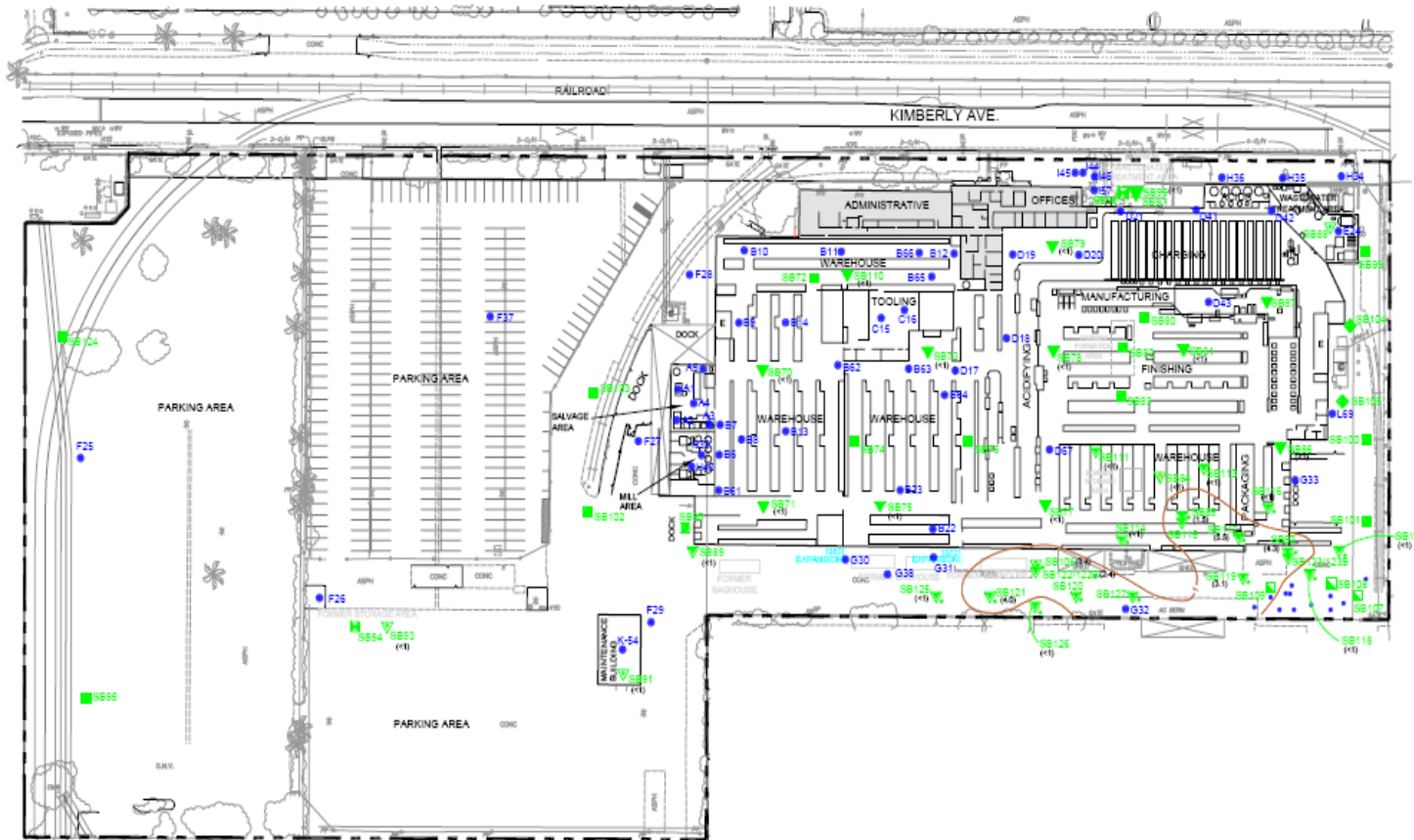
JOHNSON CONTROLS, INC.
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FIGURE 4-1

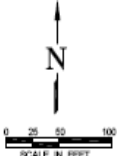
ISOCONCENTRATION MAP
 PCE IN SOIL GAS AT 5 FEET DEPTH (ug/l)



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LEGEND		ANALYTICAL METHODS	
PROPERTY LINE	SOIL GAS SURVEY LOCATION FOR VOCS	VOCS - EPA 8200	SOIL SAMPLES FOR LEAD ANALYSIS WERE OBTAINED FROM A DEPTH OF 3.3 FEET. ADDITIONAL DEPTH INTERVALS ABOVE AND BELOW THIS DEPTH WERE SAMPLED AND HELD AT THE LABORATORY FOR FURTHER VERTICAL DELINEATION, AS NEEDED.
OVERHEAD ELECTRIC	SOIL GAS SURVEY LOCATION FOR VOCS WITH ADJACENT SOIL BORING FOR VOCS	METALS - EPA 60105/741A	
FENCE	TOTAL LEAD AND SOIL GAS SURVEY LOCATION FOR VOCS	PCBs - EPA 8562	SAMPLES NOTED FOR LEAD ANALYSIS WERE SUBMITTED TO FURTHER CAN'T METALS ANALYSIS BASED ON THE DATA SET WITH THE HIGHEST RESULTS.
PREVIOUS BORING LOCATIONS	TOTAL METALS (CAN'T) AND SOIL GAS SURVEY LOCATION FOR VOCS	pH - EPA 150.1	
SOIL SAMPLE LOCATIONS ADJACENT TO THE TRANSFORMERS AND FORMER WASTEWATER TREATMENT UNIT WERE LIMITED DUE TO UTILITIES.	SVOCs AND SOIL GAS SURVEY LOCATION FOR VOCS		SOIL GAS ANALYSES PERFORMED BY EST MOBILE LABORATORY.
	SVOCs		
	TOTAL METALS (CAN'T) AND VOCS		
SOIL GAS SURVEY CONDUCTED IN ACCORDANCE WITH DTSC REQUIREMENTS WITH SAMPLES BEING COLLECTED FROM 4 FEET DEEP FOR INITIAL SCREENING. FURTHER VERTICAL DELINEATION MAY HAVE BEEN PERFORMED IN SPECIFIC LOCATIONS AT A GREATER DEPTH INTERVALS.	TOTAL LEAD		
	PCBs		
	ISOCONCENTRATION CONTOUR LINE		
	SOIL GAS CONCENTRATION (ug/l)		



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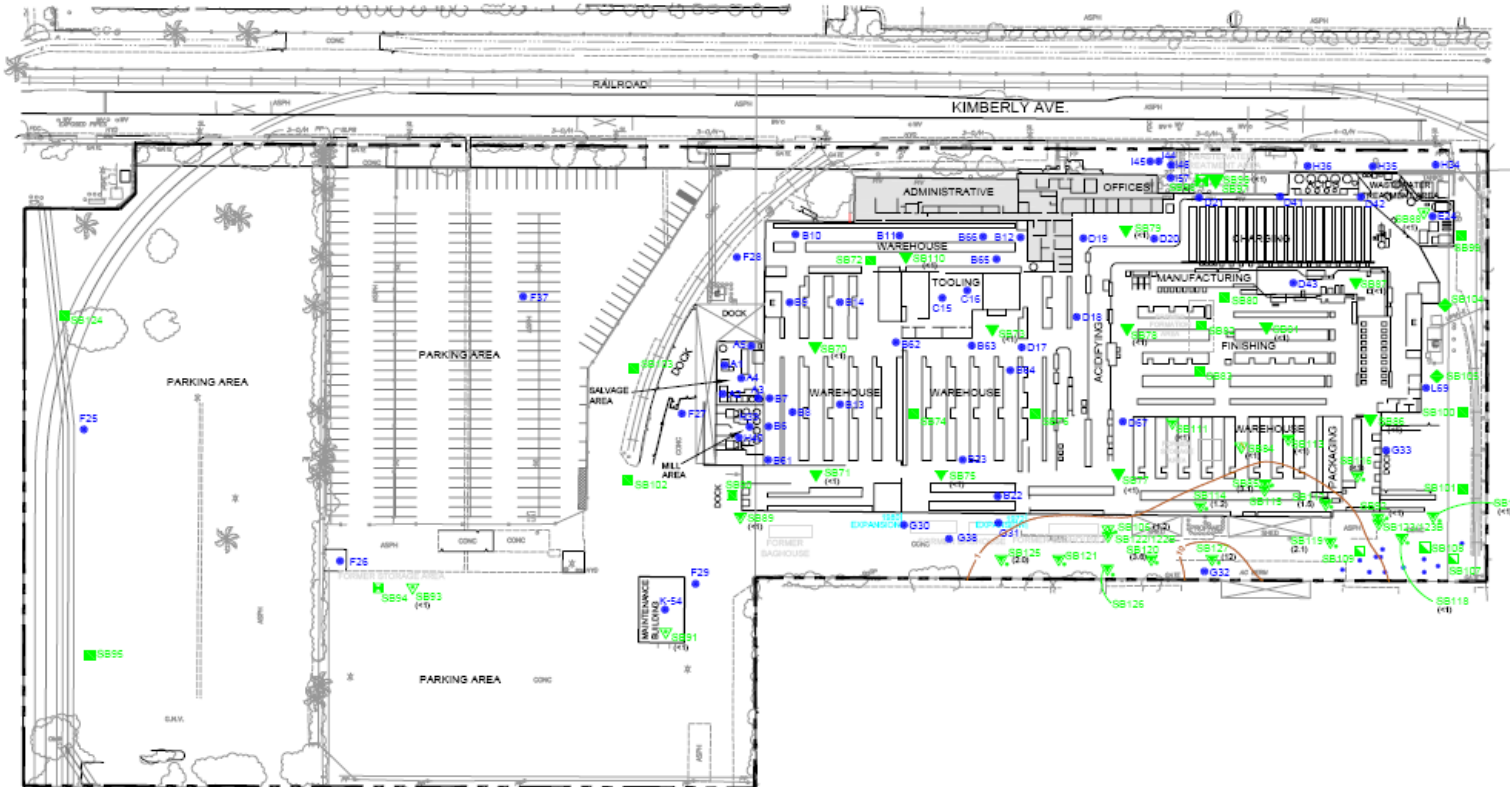
FIGURE 4-2

ISOCONCENTRATION MAP

TCE IN SOIL GAS AT 5 FOOT DEPTH (ug/l)



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LEGEND

- PROPERTY LINE
- O- OVERHEAD ELECTRIC
- X-X- FENCE
- x- PREVIOUS BORING LOCATIONS

SAMPLE LOCATIONS

- ▼ SOIL GAS SURVEY LOCATION FOR VOCs
- ▼ SOIL GAS SURVEY LOCATION FOR VOCs WITH ADJACENT SOIL BORING FOR VOCs
- ▼ TOTAL LEAD AND SOIL GAS SURVEY LOCATION FOR VOCs
- ▼ TOTAL METALS (CAM17) AND SOIL GAS SURVEY LOCATION FOR VOCs
- ▼ SVOCs AND SOIL GAS SURVEY LOCATION FOR VOCs
- ▼ SVOCs
- ▼ TOTAL METALS (CAM17) AND SVOCs
- ▼ TOTAL LEAD
- ▼ PCBs
- ◆ ISOCENTRATION CONTOUR LINE
- (K) SOIL GAS CONCENTRATION (ug/l)

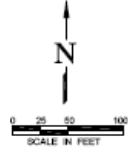
ANALYTICAL METHODS

- VOCs - EPA 8260B
- SVOCs - EPA 8270C
- Metals - EPA 8010B/741A
- PCBs - EPA 8282
- pH - EPA 150.1

SOIL SAMPLES FOR LEAD ANALYSIS WERE OBTAINED FROM A DEPTH OF 3-5 FEET. ADDITIONAL DEPTH INTERVALS ABOVE AND BELOW THIS DEPTH WERE SAMPLED AND HELD AT THE LABORATORY FOR FURTHER VERTICAL DELINEATION, AS NEEDED.

SAMPLES NOTED FOR LEAD ANALYSIS WERE SUBJECTED TO FURTHER CAM17 METALS ANALYSIS BASED ON THE DATA BETWEEN THE HIGHEST RESULTS.

SOIL GAS ANALYSIS PERFORMED BY EST MOBILE LABORATORY.



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FIGURE 4-3

ISOCENTRATION MAP
1,1-DCE IN SOIL GAS AT 5 FOOT DEPTH (ug/l)



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Johnson/Ettinger Modeling

- Conducted using site specific soil parameters, assumed exposure of 250 days/ year for 25 years
- Cumulative cancer risk 0.99×10^{-6}
- Hazard quotient below 1



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Soil samples for VOCs

- Associated soil results below direct contact screening criteria, except for:
- SB 119: PCE = 1,400 ug/kg at 9.5-10' (criteria = 1,300 ug/kg)
- No correlation between soil gas and soil concentrations, however if soil was above direct contact, soil gas was detected



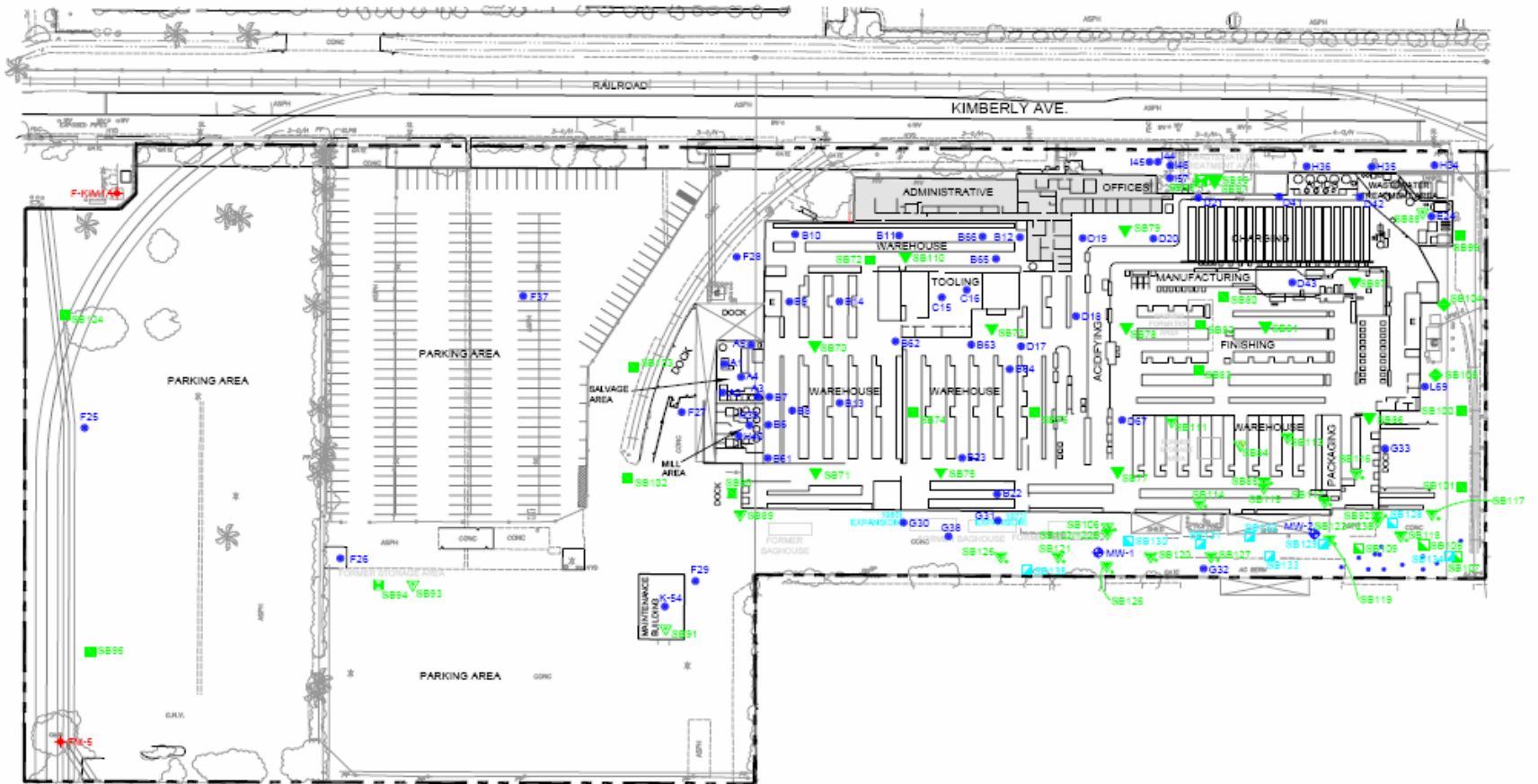
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Additional VOC sampling

- Additional soil and groundwater sampling conducted following initial soil gas investigation
 - 10 borings from 80-120'
 - 2 borings installed as wells in Southeast corner



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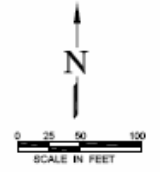


- LEGEND**
- PROPERTY LINE
 - OVERHEAD ELECTRIC
 - FENCE
 - ◆ OBSERVATION WELL MANAGED BY ORANGE COUNTY WATER DISTRICT

- PREVIOUS SAMPLE LOCATIONS**
- PREVIOUS SOIL BORING LOCATIONS CONDUCTED IN 2005
 - ▼ SOIL GAS SURVEY LOCATION FOR VOCs
 - ▼ SOIL GAS SURVEY LOCATION FOR VOCs WITH ADJACENT SOIL SAMPLING FOR VOCs
 - ▼ SOIL SAMPLING LOCATION FOR TOTAL LEAD AND SOIL GAS SURVEY LOCATION FOR VOCs
 - ▼ SOIL SAMPLING LOCATION FOR TOTAL METALS (CAM17) AND SOIL GAS SURVEY LOCATION FOR VOCs
 - ▼ SOIL SAMPLING LOCATION FOR SVOCs AND SOIL GAS SURVEY LOCATION FOR VOCs
 - ▼ SOIL SAMPLING LOCATION FOR SVOCs ONLY
 - ▼ SOIL SAMPLING LOCATION FOR TOTAL METALS (CAM17) AND SVOCs
 - ▼ SOIL SAMPLING LOCATION FOR TOTAL LEAD WITH HIGHEST DATA SET FURTHER ANALYZED FOR CAM17 METALS
 - ▼ SOIL SAMPLING LOCATION FOR SVOCs ONLY

- SAMPLE LOCATIONS**
- ▼ SOIL SAMPLING LOCATION FOR VOCs ONLY
 - MONITOR WELL LOCATION

REFER TO FACILITY INVESTIGATION REPORT DATED MARCH 2004 FOR FURTHER INFORMATION AND RESULTS OF PREVIOUS SOIL SAMPLE LOCATIONS.

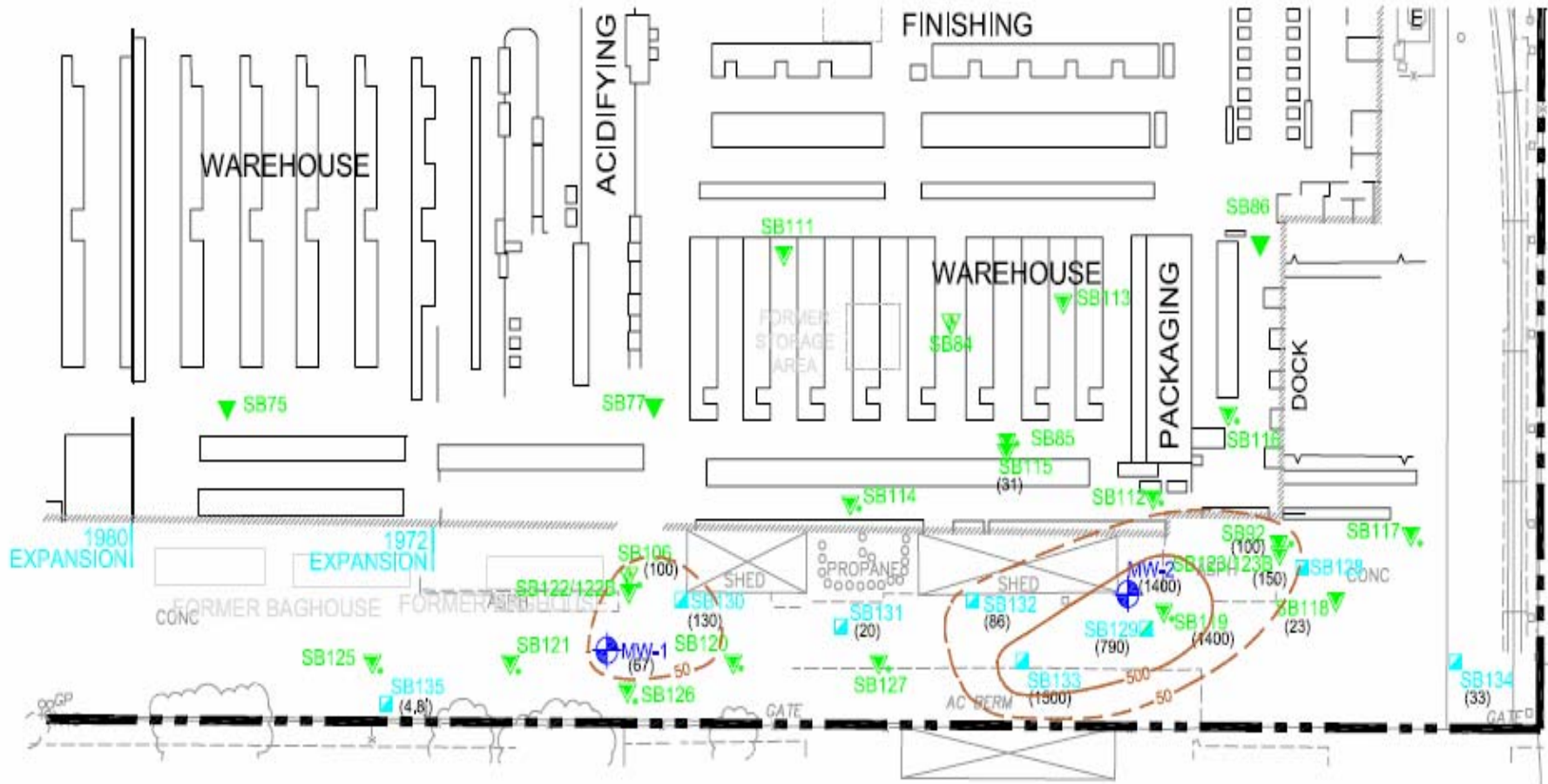




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Shallow (<10 ‘) soil sampling results

- Detected concentrations generally matched previous round, with hot spot around SB119 further delineated
- PCE: 4.8 -1500 ug/kg. Small area above direct contact screening level of 1,300 ug/kg (approx 3000 CY)
- All other VOCs below direct contact values
 - TCE: ND – 210 ug/kg
 - DCE: Only detected in SB 132, max 6.2 ug/kg
 - Cis-DCE: Detected in 3 borings, 6.1-28 ug/kg



SOIL ISOCONCENTRATION MAP

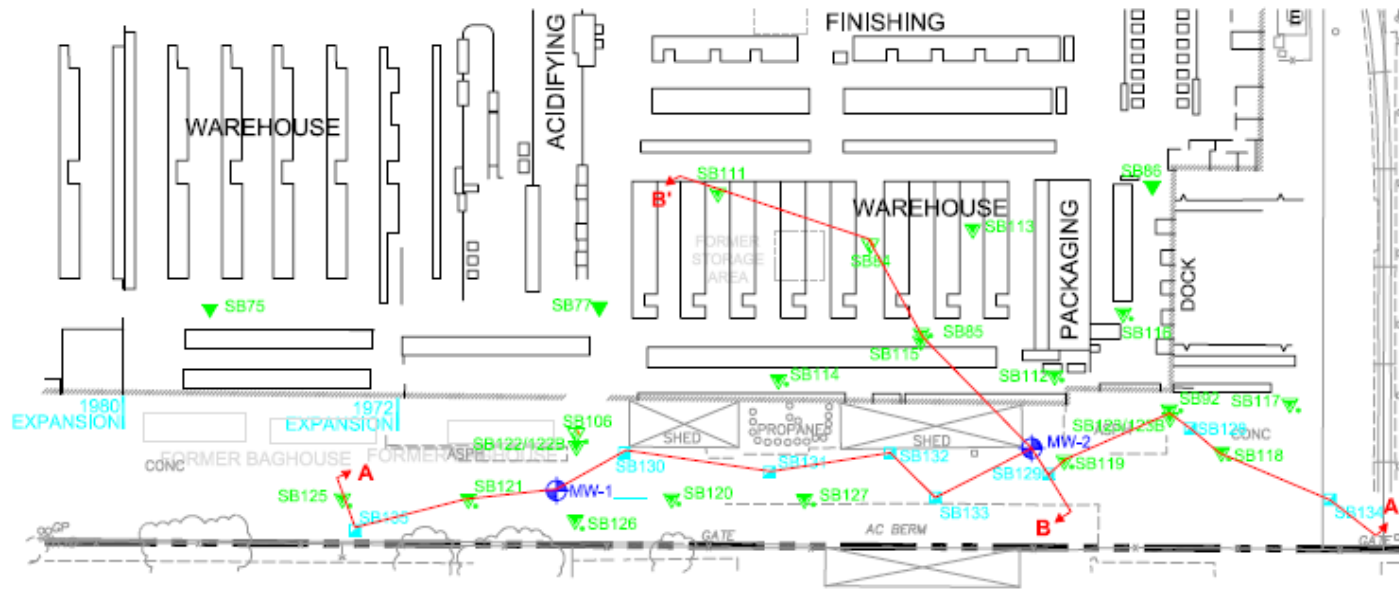
PCE IN SOIL AT 9.5 - 10 FEET DEPTH (ug/kg)



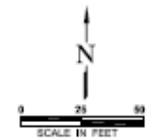
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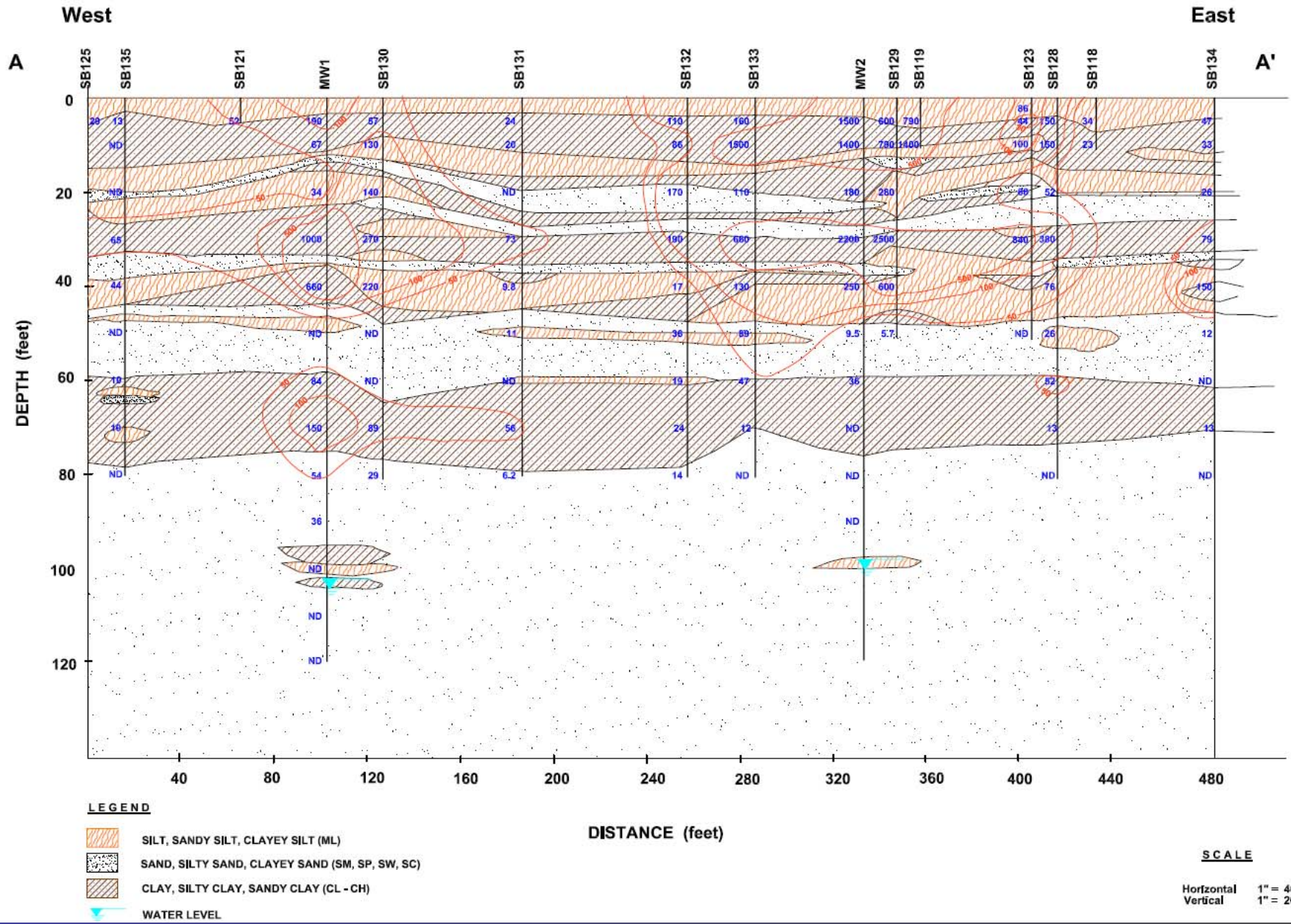
Deeper soil sampling results

- PCE: ND - 2,500 ppb
- TCE: ND - 220 ppb
- DCE: ND – 120 ppb
- Cis DCE: ND – 13
- Highest hits found in clayey materials
- Clayey materials does not appear to be an impermeable aquitard
- Low levels extend to 100' bgs



- SAMPLE LOCATIONS**
- MONITOR WELL LOCATION
 - SOIL GAS SURVEY LOCATION FOR VOCs
 - SOIL GAS SURVEY LOCATION FOR VOCs WITH ADJACENT SOIL BORING FOR VOCs
 - TOTAL LEAD AND SOIL GAS SURVEY LOCATION FOR VOCs
 - SOIL BORING LOCATION FOR VOCs
 - TOTAL METALS (CAM17) AND SOIL GAS SURVEY LOCATION FOR VOCs
 - CROSS SECTION CUT LINE







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Groundwater pathway

- Vadose zone leaching model (VLEACH) done to simulate vertical mobilization/migration to groundwater
 - 1-D finite difference
 - Allows for advection and diffusion
 - Degradation, production and dispersion neglected
 - PCE modeled using conditions at MW-1 and MW-2
 - Recharge rate varied from 0.025 - 0.5 ft/yr



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Cases modeled

- Case 1: Concentrations in 2 clay layers included using constant PCE values (59 and 69 feet bgs)
 - Max MW-1 Case 1A: 84 and 150 ppb
 - Max MW-2 Case 1A: 2200 and 36 ppb
- Case 2: Conc in clay and silty clay layers modeled at varying concentrations (4, 9, 19, 29, 59, and 69 feet bgs)
 - Max MW-1 Case 2A: 190, 67, 1000, 660, 84 and 150 ppb
 - Max MW-2 Case 2A: 1500, 1400, 180, 2200, 36 , and 3.8 ppb



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MW-1 modeling results

- Leachate concentrations below MCL
 - Case 1A: Max = 0.8 ppb at 100 year duration with recharge of 0.5 ft/yr
 - Case 2A: Max = 3.5 ppb at 100 year duration with recharge of 0.5 ft/yr



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MW-2 results

- Leachate above MCL in Case 1A and 2A
 - Case 1A: Max = 5.3 ppb at 100 year duration with recharge of 0.5 ft/yr
 - Case 2A: Max = 8.8 ppb at 100 year duration with recharge of 0.5 ft/yr



On site GW sampling

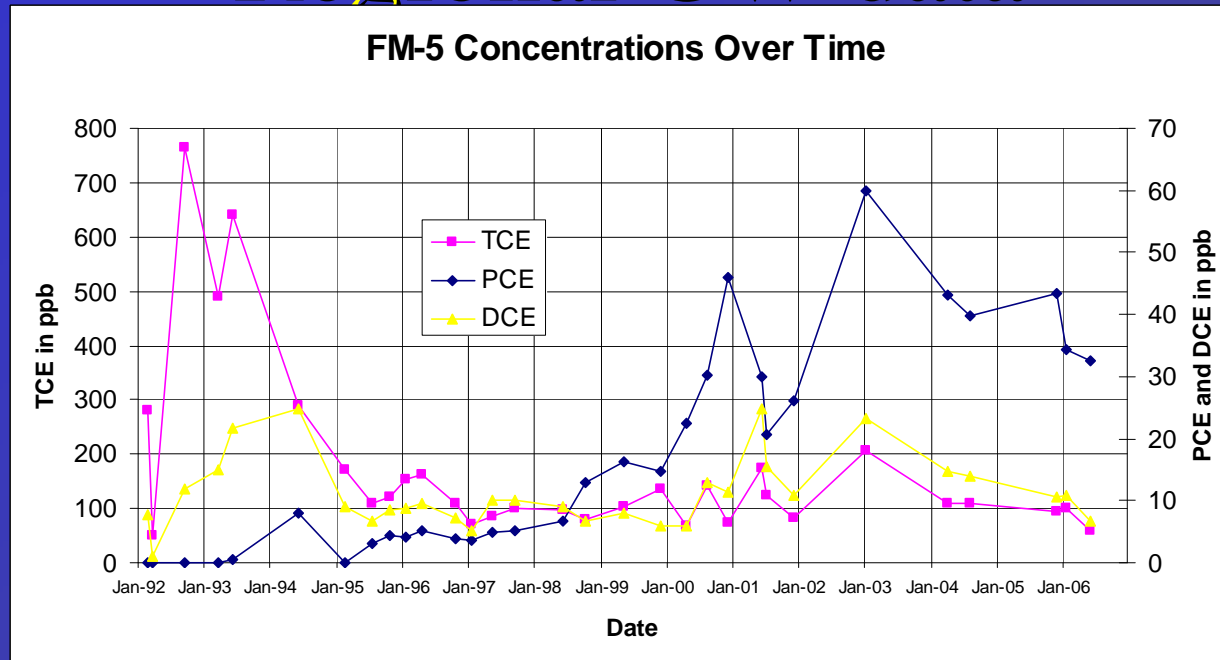
- MW -1 and MW-2 installed underlying areas with higher soil contamination
 - MW-1 screened 99-119' bgs
 - MW-2 screened 100-120' bgs
- Groundwater flow generally W to NW on site
- Concentrations lower than detected in regional well FM-5

	PCE	TCE	DCE
MCL	5	5	7
MW-1	10	33	5.5
MW-2	3.7	23	7.4



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Regional GW data



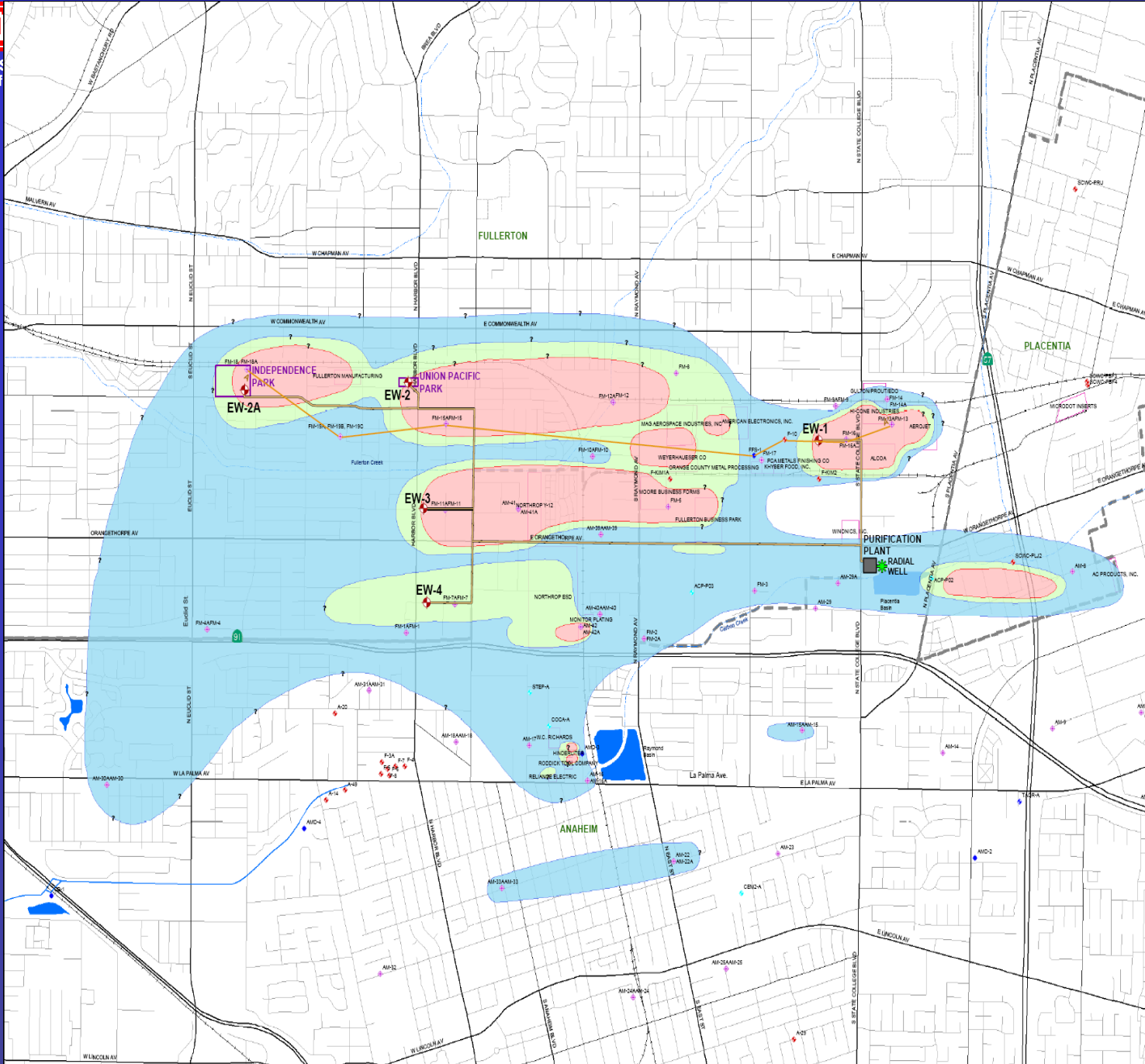
- FM-5 (SW corner of site) sampled since installed in 1992
- Well screened at 121-141 feet bgs
- TCE, PCE, and DCE all above MCL (except DCE in latest sample)
- General increasing trend over time
- No data from F-KIM1A



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Orange County Water District North Basin Groundwater Protection Project (NBGPP)

- Initiated in 2005 to contain movement of industrial contamination before it threatens additional parts of GW basin
- Installation of extraction and monitoring wells
- Purification plant and containment system recirculating in the shallow aquifer



North Basin Groundwater Protection Project

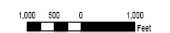
- ◆ Active Large-System Production Well
- ◆ Active Small-System Production Well
- ◆ Other Active Production Well
- ◆ OCWD Monitoring Well
- ◆ OCWD Multipoint Monitoring Well
- VOCs > 10X MCL
- VOCs > 5X MCL to 10X MCL
- VOCs > MCL to 5X MCL
- ?
- Questioned where queried
- PRP Sites
- City Boundaries
- ◆ Proposed extraction well
- Proposed pipeline
- Proposed purification plant
- ★ Proposed radial recharge well
- A—A' — Hydrogeologic cross-section location

Composite VOC map based on PCE, TCE, and 1,1-DCE concentrations in the shallow aquifer (generally < 250 ft bgs).

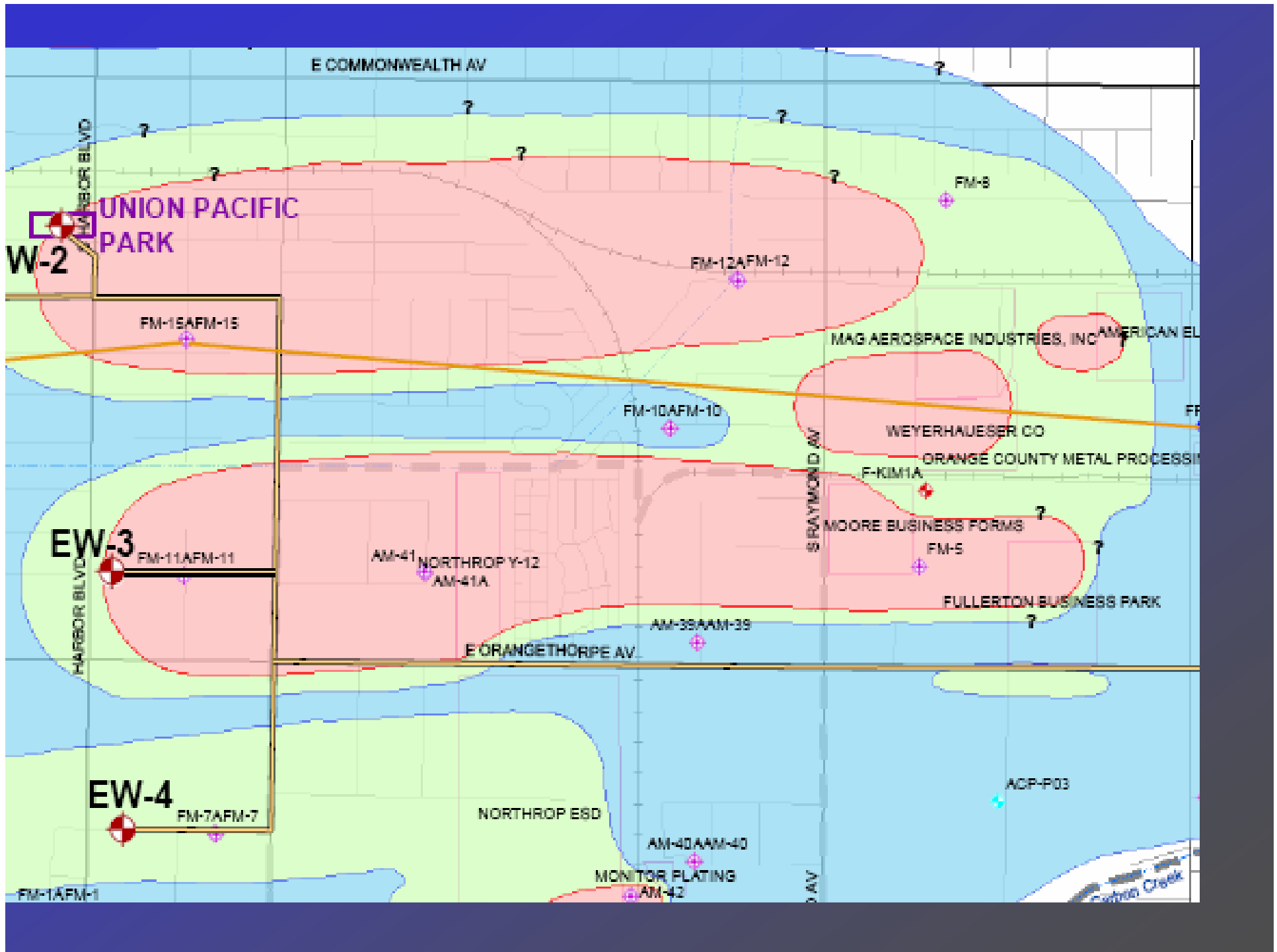
VOC concentrations based on average in OCWD monitoring wells, July 2003 - July 2005; and most recent data in OCWD files for facility monitoring wells.

PCE = Tetrachloroethene
 TCE = Trichloroethene
 1,1-DCE = 1,1-Dichloroethene
 MCL = Maximum Contaminant Level for Drinking Water

California MCLs:
 PCE = 5 ug/l
 TCE = 5 ug/l
 1,1-DCE = 6 ug/l



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Info on Fullerton Business Park



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OC WA plan for addressing regional plume



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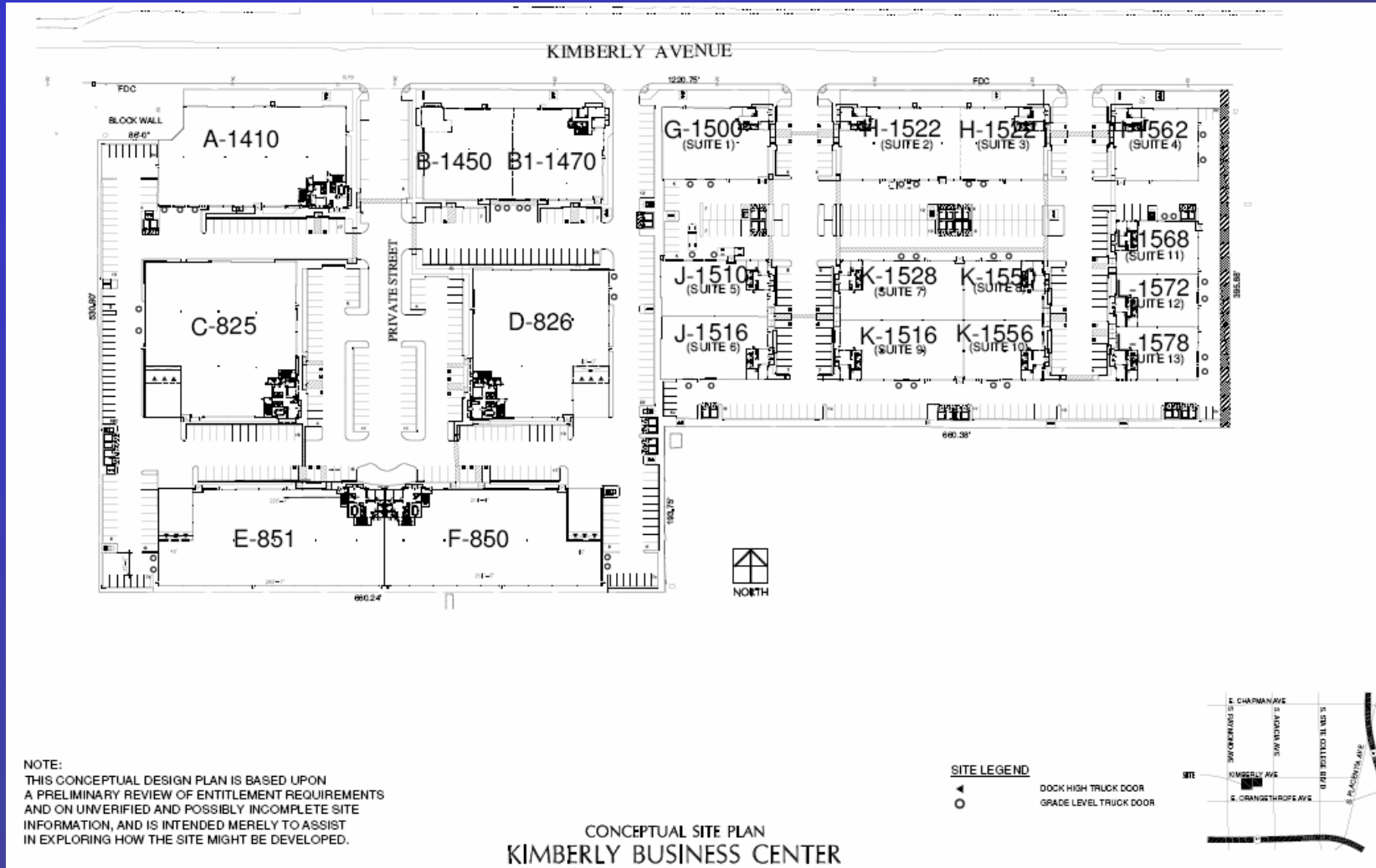
Property Transfer

- Johnson Controls Shut down operations and demolish site
- Sample following demo in waste treatment area
- Conduct remediation
- Turn over clean, dirt site to Lowe
- Lowe develops site in two phases



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Future Site Development



NOTE:
THIS CONCEPTUAL DESIGN PLAN IS BASED UPON
A PRELIMINARY REVIEW OF ENTITLEMENT REQUIREMENTS
AND ON UNVERIFIED AND POSSIBLY INCOMPLETE SITE
INFORMATION, AND IS INTENDED MERELY TO ASSIST
IN EXPLORING HOW THE SITE MIGHT BE DEVELOPED.

CONCEPTUAL SITE PLAN
KIMBERLY BUSINESS CENTER