Use of GIS for Discovering and Investigating Contamination from Dry Cleaners in Visalia California

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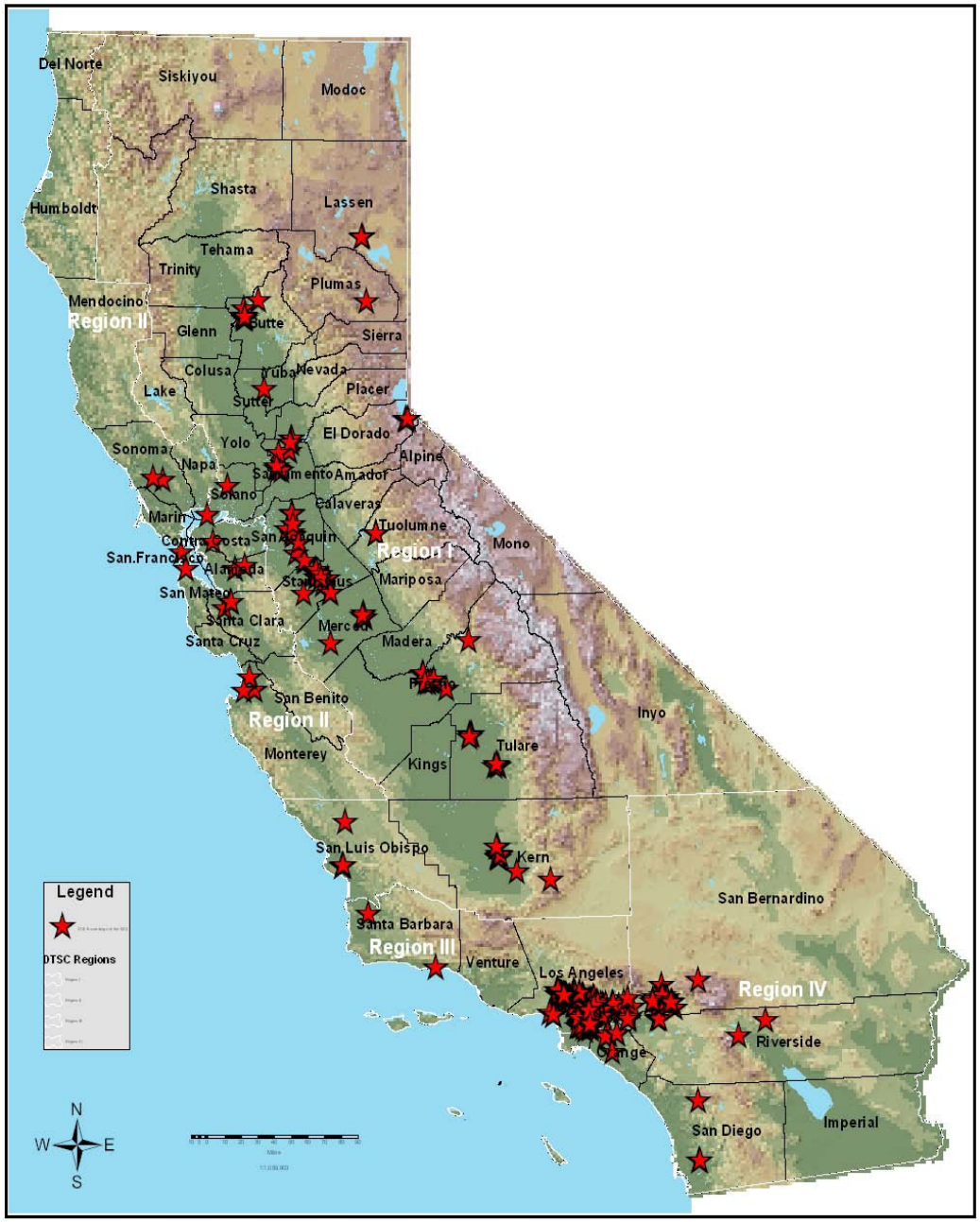
General Discovery Approach

- **Through a Cooperative Agreement Obtain DHS California Water Quality Monitoring Database (Approximately 38,000 Source Locations)**
- **Work With DTSC's OEIM to Develop Intranet Based Sequel Server Query Application For DHS Water Quality Database**
- **Identify Locations of Public Drinking Water Wells Impacted by PCE Statewide**
- **Select Visalia Study Area**

TOTAL WELLS (480) EXCEEDING THE MCL (5.0 MICROGRAMS PER LITER) FOR PCE

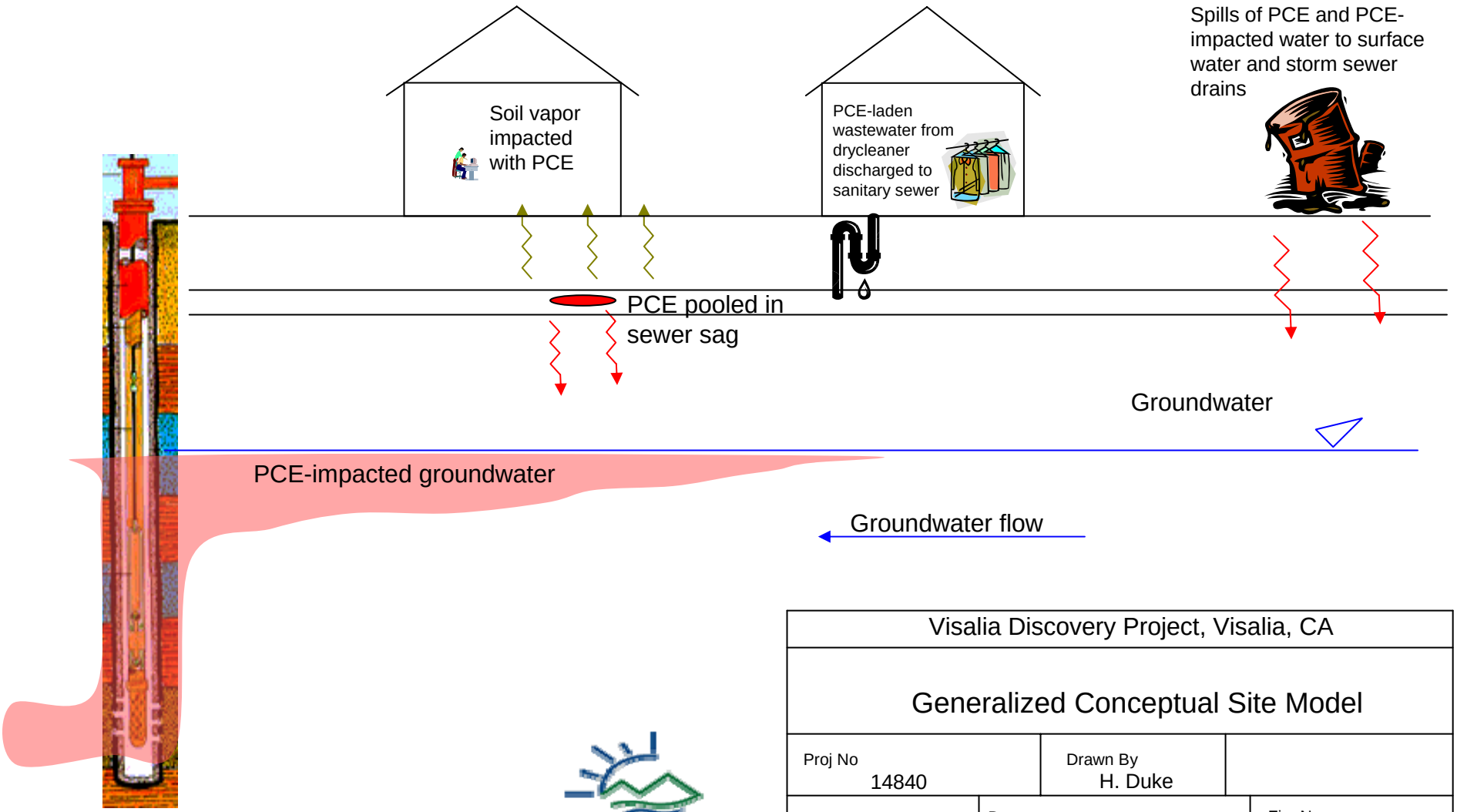
Department of Toxic Substances Control



Statewide Dry Cleaner Discovery Project Findings

- **1537 Wells in 41of 58 California Counties Have Been Impacted by PCE Above MDL of 0.5 ppb**
- **480 Wells in 29 of 58 California Counties Have Been Impacted by PCE Above MCL of 5.0 ppb**
- **311 PCE Impacted Wells are Currently Inactive and May Not Be Properly Abandoned**
- **7279 Dry Cleaning Operations (HWTS)**

Conceptual Site Model



Visalia Discovery Project, Visalia, CA		
Generalized Conceptual Site Model		
Proj No 14840	Drawn By H. Duke	
Not to Scale	Date 06-21-05	Fig. No. 1

Visalia Discovery

Visalia Discovery Investigation Process

- **Locations-Current and Former Dry Cleaners**
- **Well Construction and Operations Info- PCE Impacted Wells**
- **Regional and Local Hydrogeologic Conditions**
- **Obtain Supporting GIS Shape Files**
  - **Roads**
  - **Streams**
  - **USGS Topographic Maps**
  - **Air Photos**
  - **City Boundaries**
  - **Local Sewer**
  - **Local Storm Water System Information**

Determine Locations of Current and Former Dry Cleaners

- **Query DTSC HWTS Database With Support From OEIM**
- **Research Polk City Directories at State Library For Names and Addresses of Dry Cleaners**
- **Web Based Search**
- **Obtain Geo-coded Latitudes and Longitudes Based on Street Addresses**

Processing Dry Cleaner Data

- **Verify Latitudes and Longitudes Via Hand Held GPS Unit in the Field (front door of address)**
- **Enter Latitudes and Longitudes on EXCEL Spread Sheets**
- **Use GIS to Create Point Shape Files for Dry Cleaners**
- **Map the Locations of Dry Cleaners in Study Area**

Gather Local Sewer and Storm Water System Information

- **The City of Visalia GIS Dept. provided shape files for the sewer and storm water systems**
- **DTSC mapped the sewer and storm water systems via GIS**
- **The City Public Works officials and staff from the RWQCB Fresno office provided some information on sewer system conditions in Visalia**

Gather Well Construction and Operational Information

- **DTSC contacted water purveyors for all known PCE impacted public wells in Visalia using information from the DHS Water Quality Database**

- **Purveyors provided well construction diagrams, well pump capacities driller logs, sample point histories, and sample results for impacted wells**

Evaluate Hydrogeologic Conditions

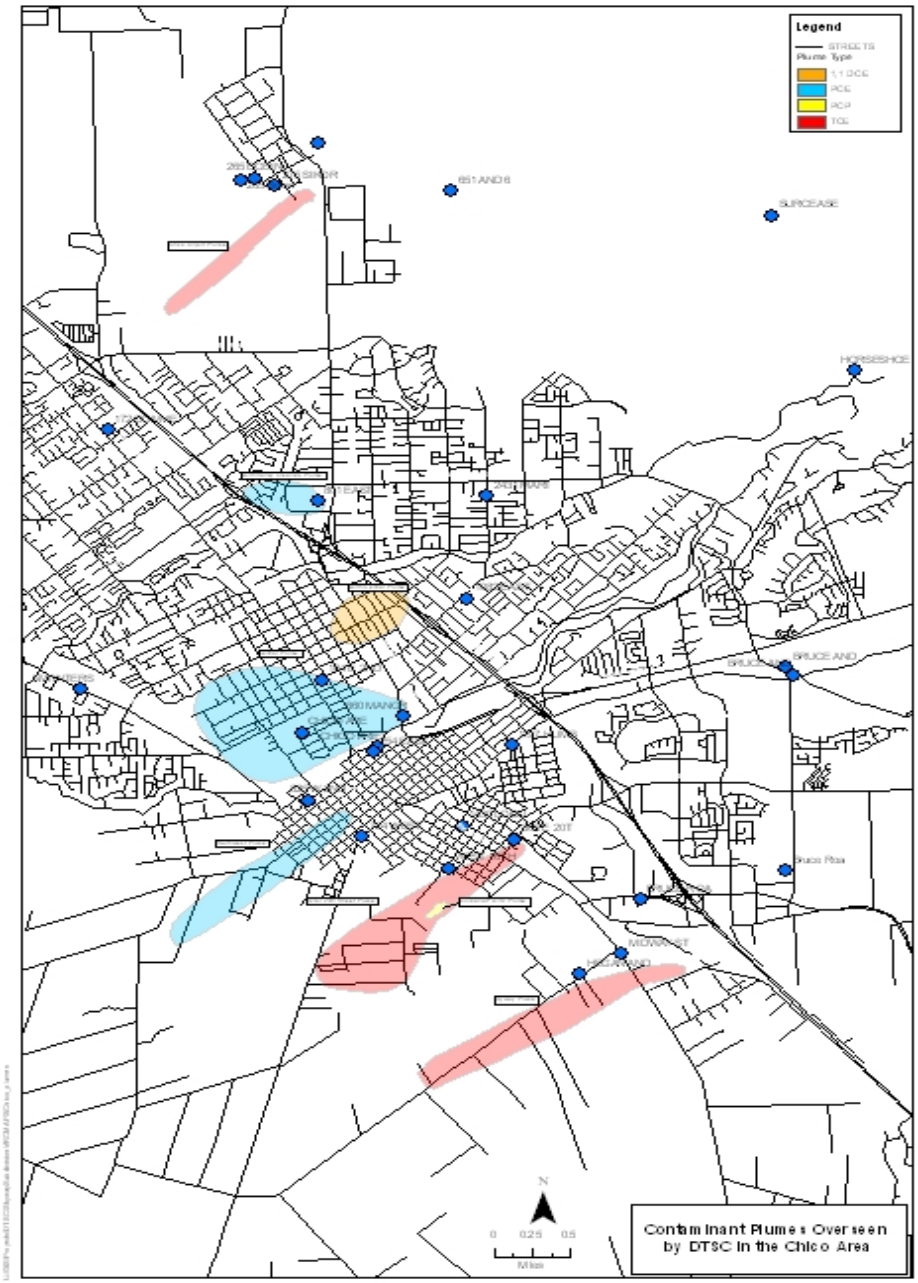
- **DTSC Reviewed Available Driller Logs From Purveyors**
- **Production zones are typically 10-15 ft units of coarse or medium sand and sandy gravels**
- **Well completion depths from 150 to 480 ft bgs With Variable Construction**
- **Regional Groundwater Flow is Generally South South-west at Approximately 0.002 ft/ft**

Construct Composite GIS Map of Relevant Features

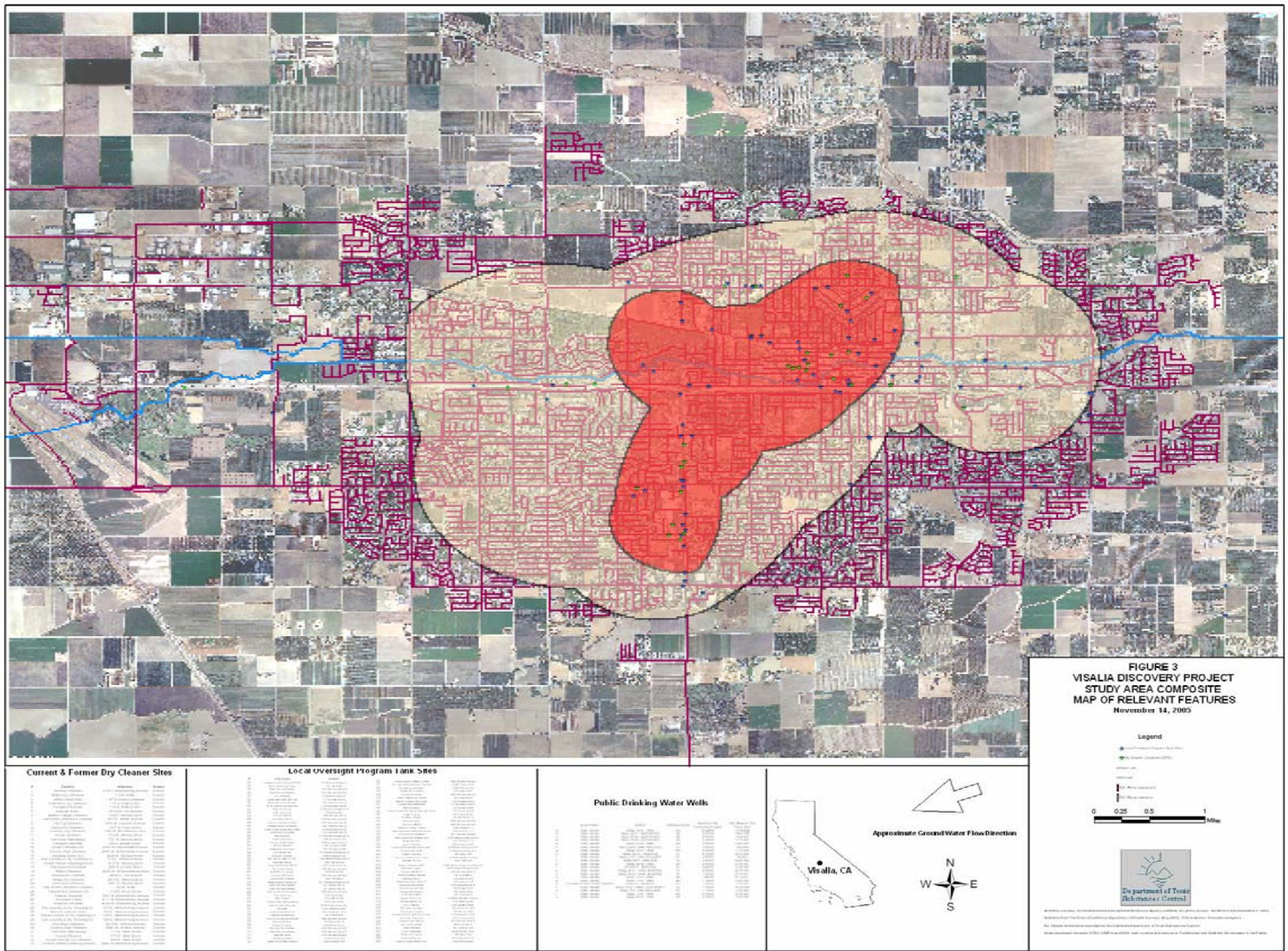
- **Impacted Wells and Their Operational Status**
- **Dry Cleaner Locations**
- **City Sewer and Storm Drain Systems**
- **Local Oversight Program Tank Sites**
- **Direction of Regional Groundwater Gradient**
- **Examine Spatial Relations Between Dry Cleaners and Impacted Drinking Water Wells**

Conceptual Plume Model

City of Chico



Conceptual Depiction of Extent GW Contamination



Visalia Wells and Dry Cleaners With 5-PPB PCE Contours

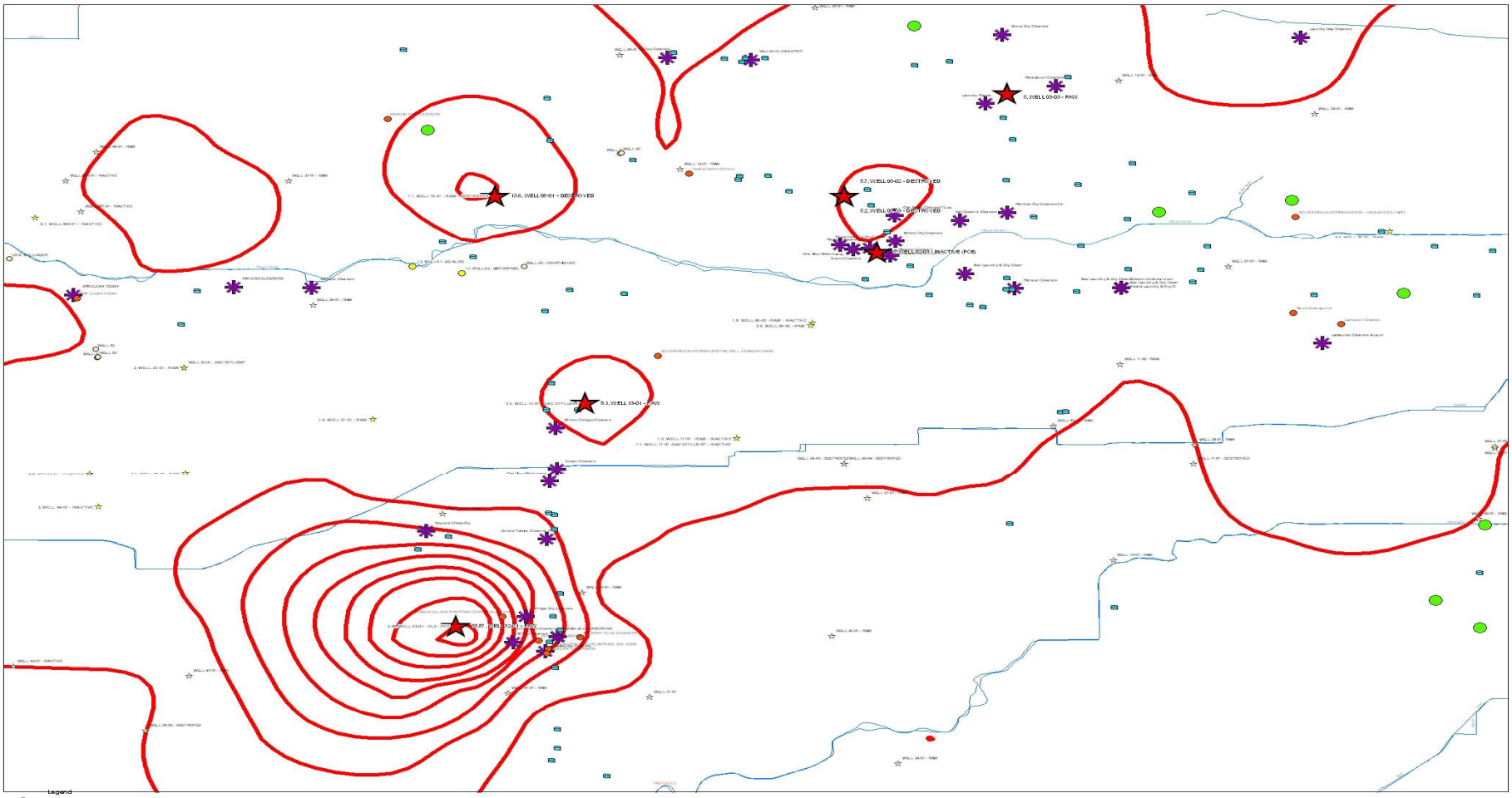
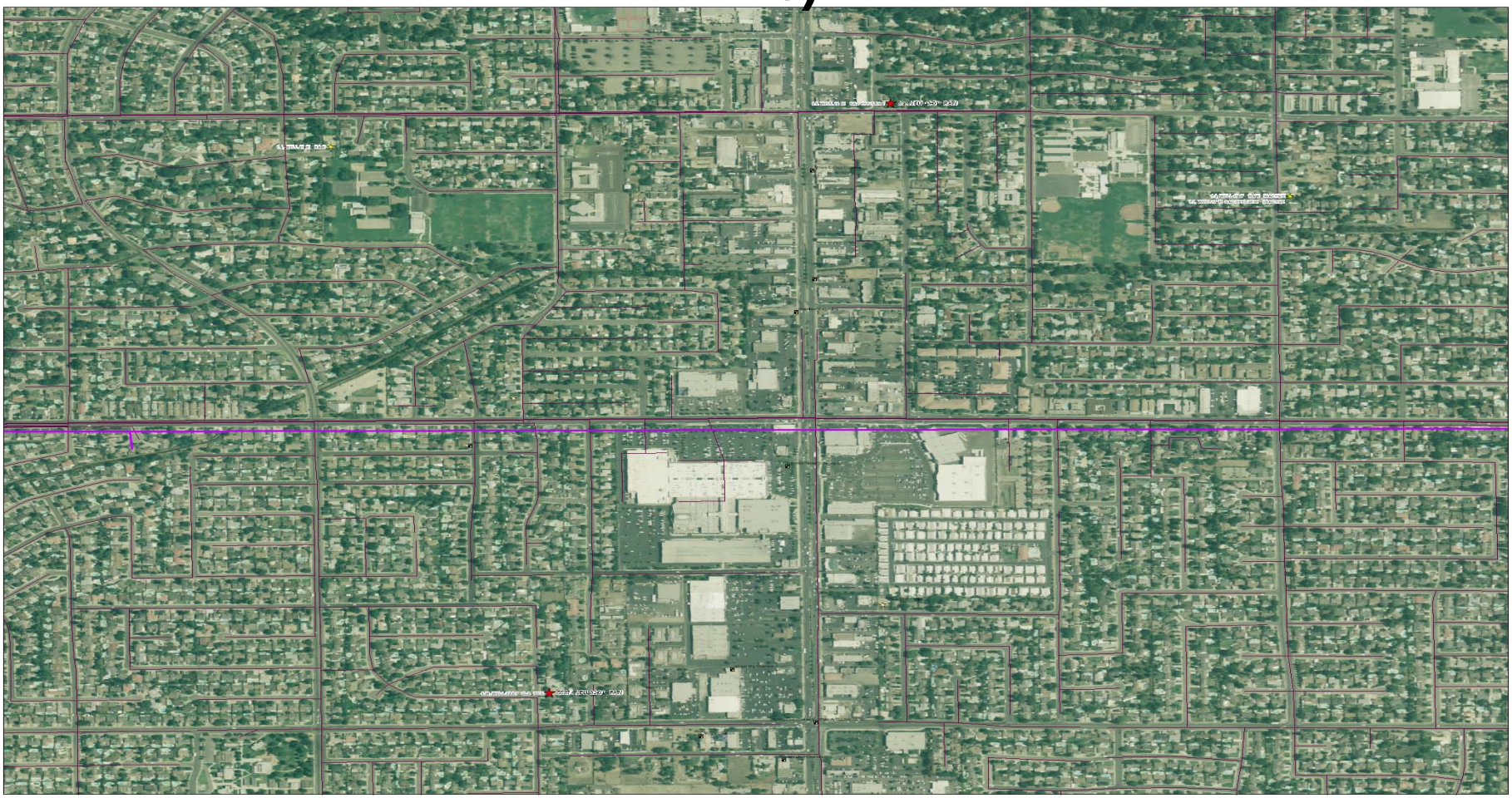
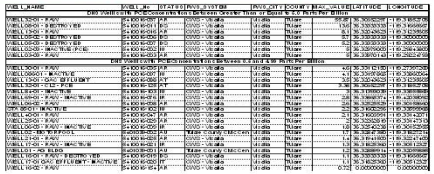


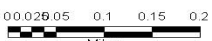
FIGURE 1
VISALIA DRY CLEANER INVESTIGATION
April 24, 2007

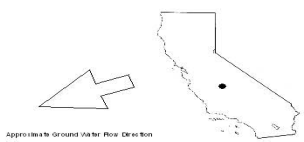
Typical Visalia Sewer Lines

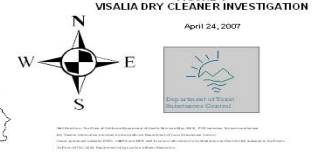
(Thicker Line Weight Indicates Larger Diameter Sewer Line)











Findings For Visalia Study Area

- **21 Public Drinking Water Wells Show PCE Detections Ranging From 1.0 – 23.3 ppb**
- **6 of These Wells Show PCE Detections Above MCL of 5.0 ppb**
- **6 of the PCE Impacted Wells are Inactive and May Not Be Properly Abandoned**
- **33 Locations of Current or Former Dry Cleaning Operations are Potential PCE Release Sources (40 Different Operations)**
- **4 Dry Cleaners, Located in the South City Area Are Being Investigated by the RWQCB**

Typical Abandoned Well

Example Dry Cleaner Locations

Former Cleaners
Currently a Bank

Former Cleaners
Currently Offices

Former Cleaners
Currently Offices

Currently Abandoned Utility Connections

Former Utility Connection (possibly gas)

Former Cleaners
Currently Parking Lot

Former Cleaners
Currently Offices

Former Cleaners
Currently Storage Building

Abandoned Utility Panel

DTSC Action

- **Completed Imminent and Substantial Endangerment Determination**

- **Orphan Site Status**

Orphan Site Investigation Scope of Work

- **DWR, RWQCB and Local Oversight Program LUST/SLIC File Search**
- **DTSC Envirostor Site Information Search**
- **Gore Sorber soil gas screening Survey Suma canister Soil Gas Sampling at key Locations**
- **Profiling Selected Existing Wells of Interest**
- **Focused Soil and Groundwater Investigation**
- **Preparing a Phase 1 Remedial Investigation Report**

Potential Future GIS Applications in Visalia

- Use of Electronically Reported Data
- Sewer Pathway Investigation
- Soil Gas Maps
- Conduct Hydrologic Modeling
- Indoor Air Evaluation