

LANDFILL GAS MONITORING & CONTROL STRATEGIES at DEVELOPED SITES

Sponsored by the:
CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

Developed and Presented by:
SCS Engineers & GC Environmental, Inc.

COURSE OUTLINE FOR DAY TWO

- Case Studies
 - LEA Case Study
 - SCS Case Study
- CIWMB Tire Production Presentation
- CIWMB Roles & Responsibilities
- Group Exercises
- Course Assessment/Evaluation

CASE STUDIES

- LEA Case Study

Alameda County
Environmental Health Department

Solid Waste Local Enforcement Agency (LEA)

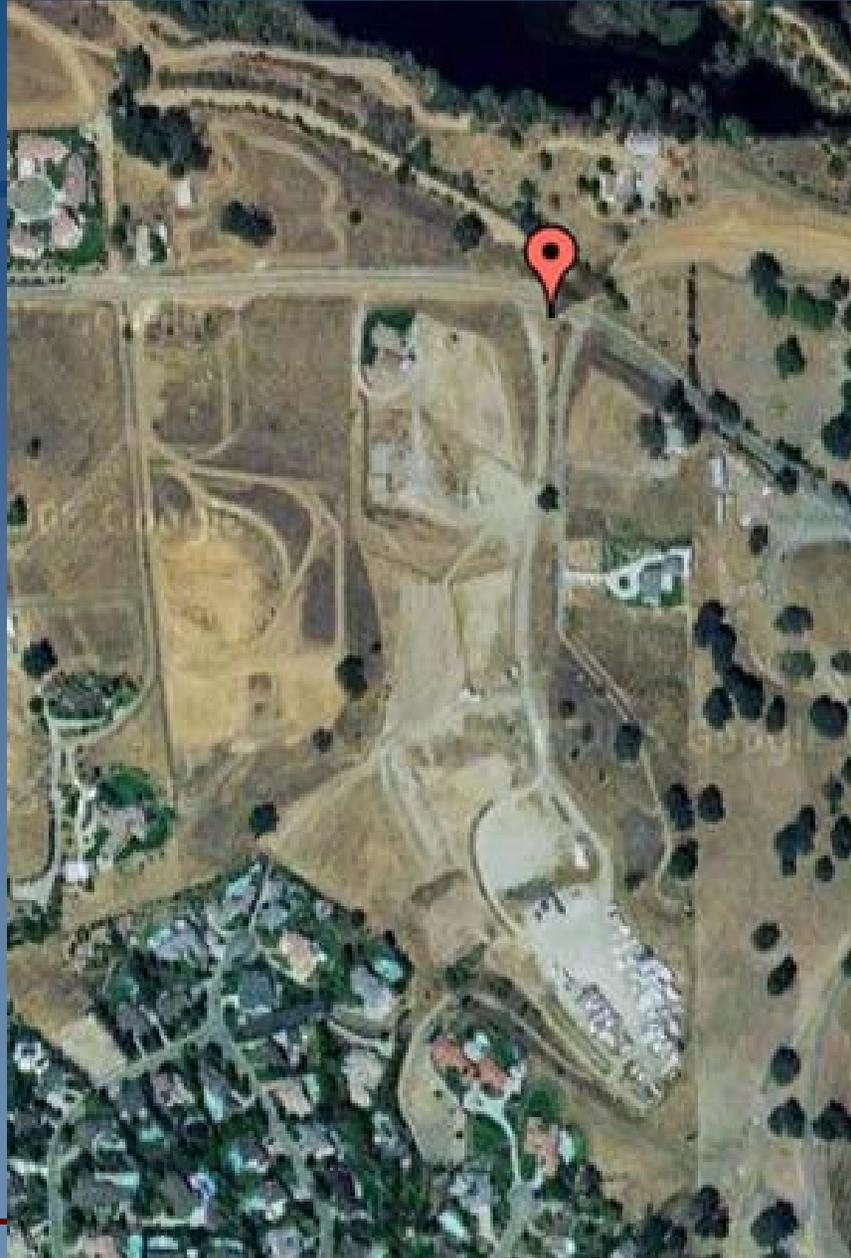
Pleasanton Landfill

Gas Control History

Presenter
Karen Moroz

Pleasanton Closed Landfill

- Operated from 1950 to 1976
 - Now closed 30 years
- 13 acre Canyon Fill.
- Received municipal, commercial, industrial, construction waste and large appliances.
- Privately owned.
- Operated in a rural county area, now area is being developed and incorporated into Pleasanton.



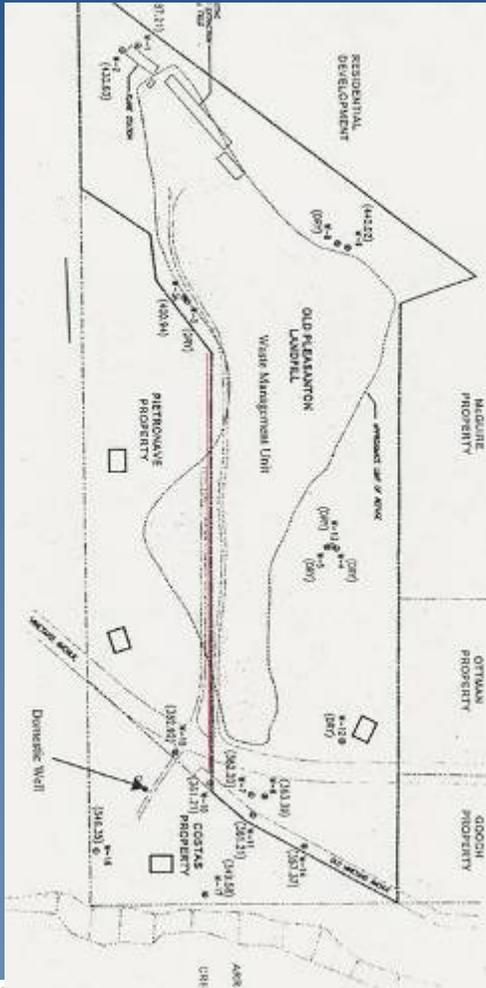
1974 Landfill Report

- RWQCB classification II-2..
- Average depth of fill is 40 feet.
- Fees - \$.50 load or \$1.00 cubic yard.
- No flooding or major fires recently. They were cited for 3 fires by the BAAPCD since 1967.
- Burn site until mid 50's.

Report cont.

- Water table is 90 feet below grade.
- Accepts 10,000 gallons/week of liquid waste from a cheese company, but no longer accepts water softener brine (class 1) or neutralized chemicals from Kaiser.
- There were sludge lagoons at the northern end of the site. Septic pumpings were also accepted.
- 75 tons/day.

Site Division

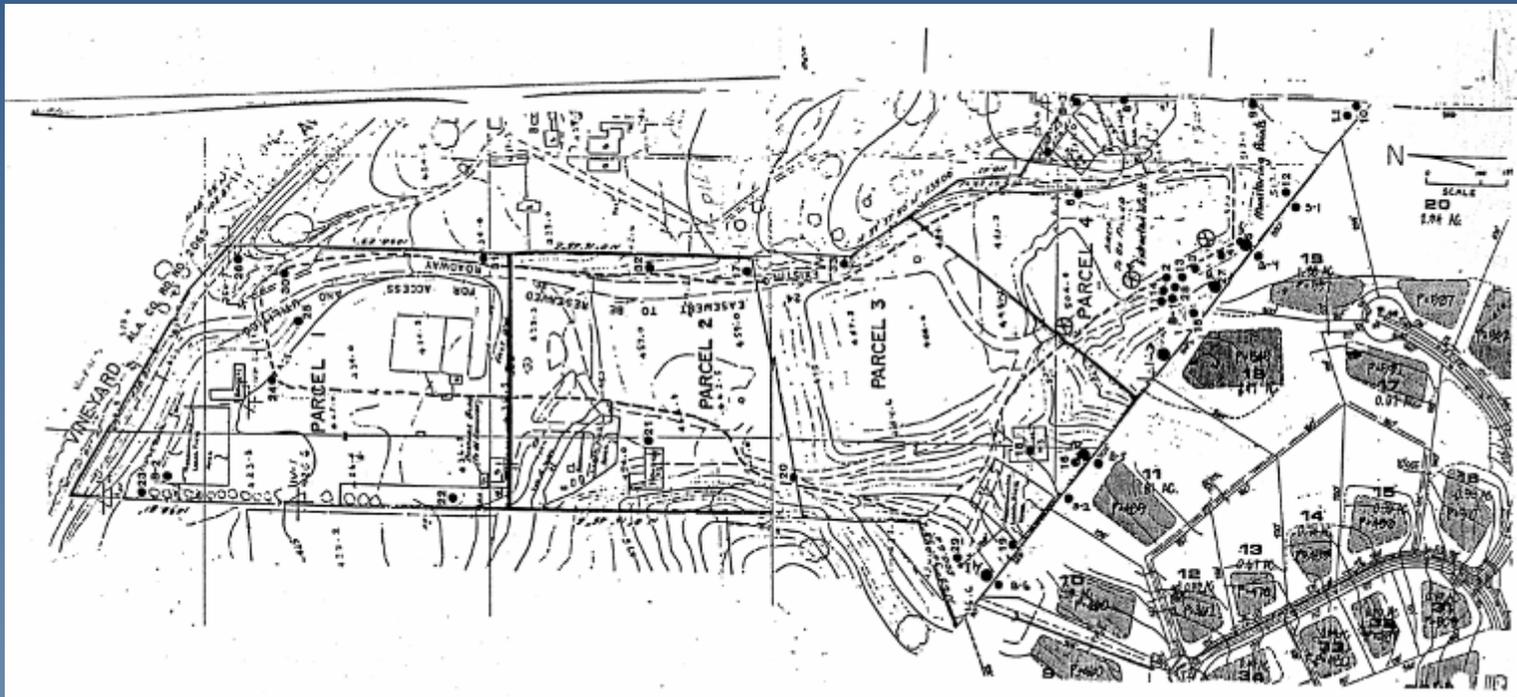


- In 1969 the eastern portion of the parcel was split off by the owner and 20 acres was conveyed to Pleasanton Garbage Service.
- A small area of fill was over the new property line.

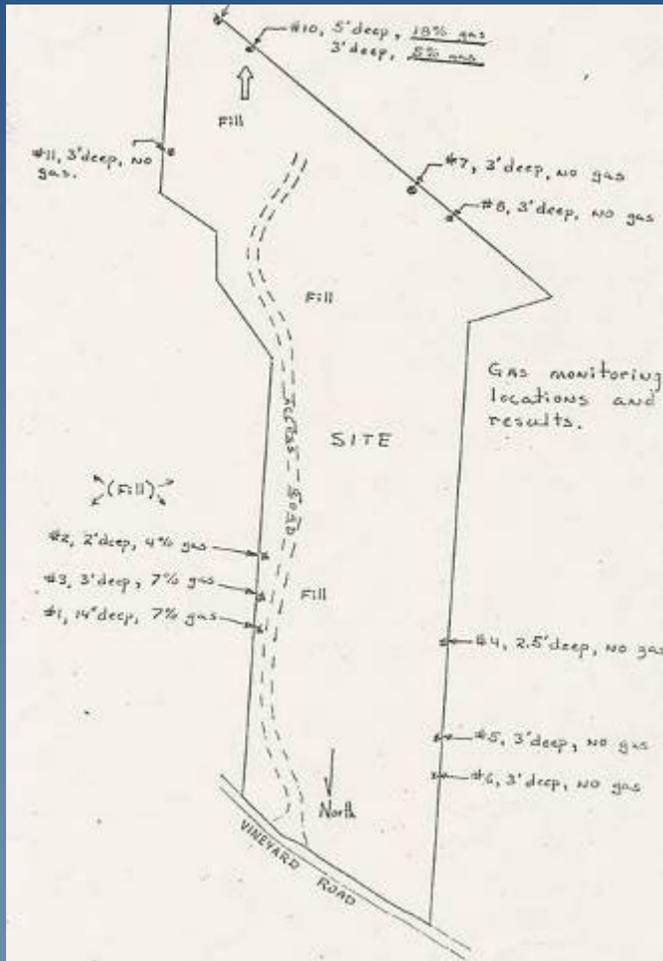
Post Closure Land Use

- In 1976 a tentative parcel map was submitted to planning to subdivide the site into four parcels.
- Sites would have a minimum of five acres with at least one acre of virgin soil that was suitable for building including a septic system.
- Engineered plans to deal with methane were submitted. Several options with active or passive systems were included.
- Parcel map was approved but not filed.

4 Parcel Proposal



Gas Migration



- In March 1980, gas at explosive levels were found at the property line during a Waste Board Inspection.
- On May 15, 1980, a letter to correct the migration was sent to the owner.
- In July, 1980, a letter was sent to the city of Pleasanton requesting the end use be changed.

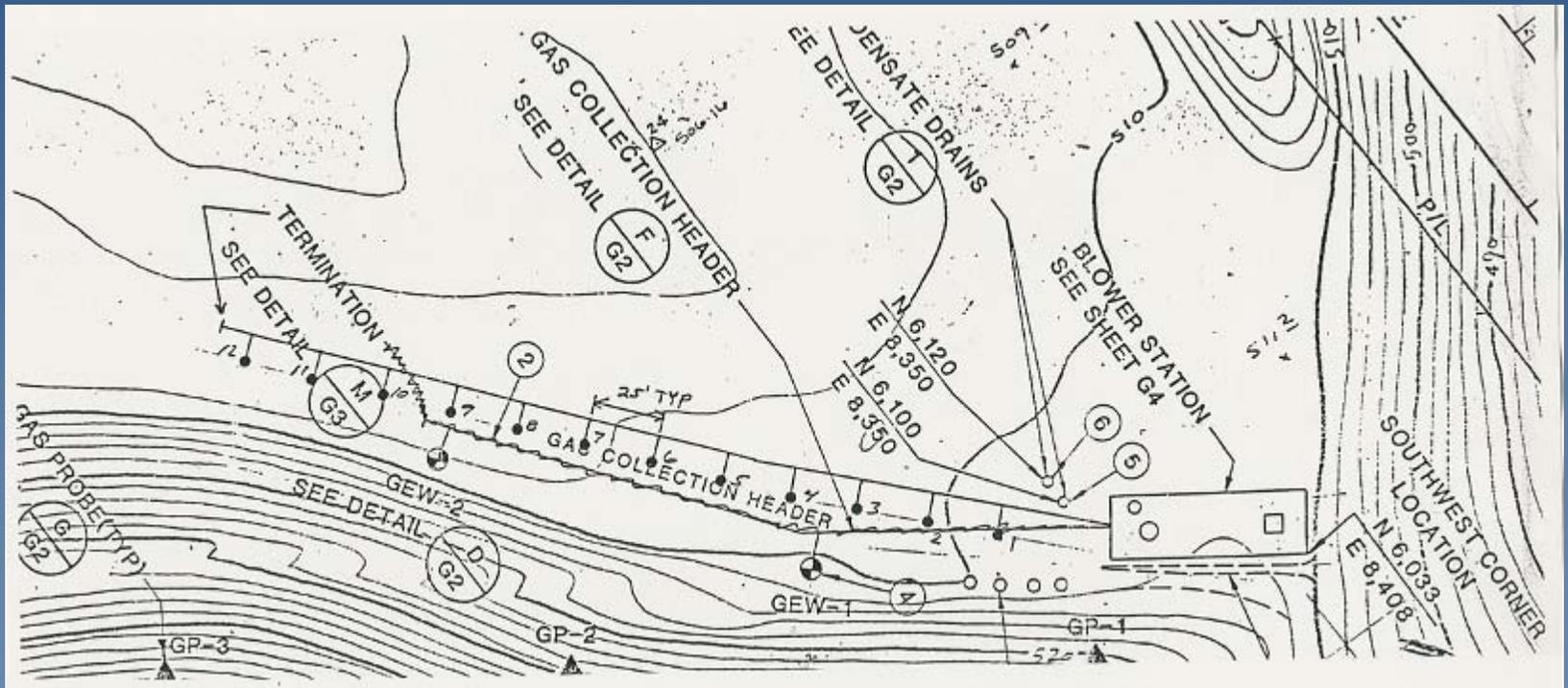
Gas Migration Control

- A passive pipe venting system was installed.
- 4 Monitoring wells were installed in 1982.
- By 1984, testing had ceased since test readings were at or near 0%.

Flare System

- November 1985: Attorney for adjacent property requested a boundary gas control system be installed
- December 1986: Plans for a gas control system were submitted (not approved)
- June 1987: No response
- Flare installed with 12 wells in August 1987

Flare system





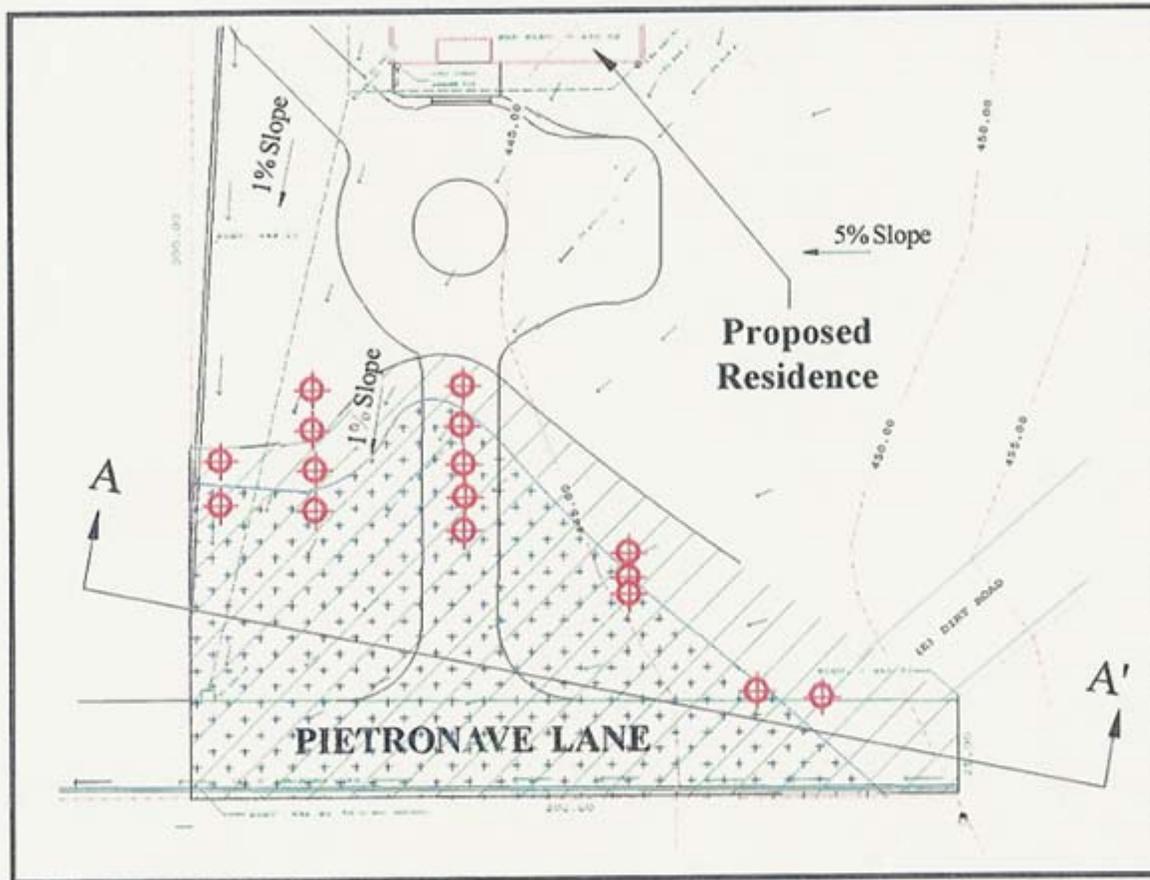


Pietronave Site

- March 1995: Inspections started as separate site. 100% LEL in surface cracks
- October 1996: LEA received a proposal to build on center lot.
- Gas probes installed between waste and house footprint. Up to 23% LEL
- Construction requirements set by CIWMB and LEA.

Conditions

- Methane sensors in subfloor, in house and in garage.
- Explosion proof fans under floor
- 20-mil PVC in underfloor subgrade
- CQA report
- No utility lines in waste prism



EXPLANATION



Area Designated to Receive Clay Cap



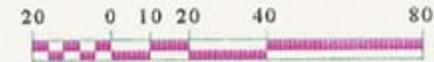
Area Underlain by Solid Waste



Exploratory Borehole Location



Finish Grade Slope Promoting Drainage



SCALE

**PORTION OF LANDS OF
DOMINISSE DESIGNATED TO
RECEIVE CLAY CAP**

Base Plan Source: David M. Fox

Project No. C-119-01	Date: 06-20-96	Scale: As Shown
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**Henry Justiniano
& Associates**
Soils and Foundation Engineering

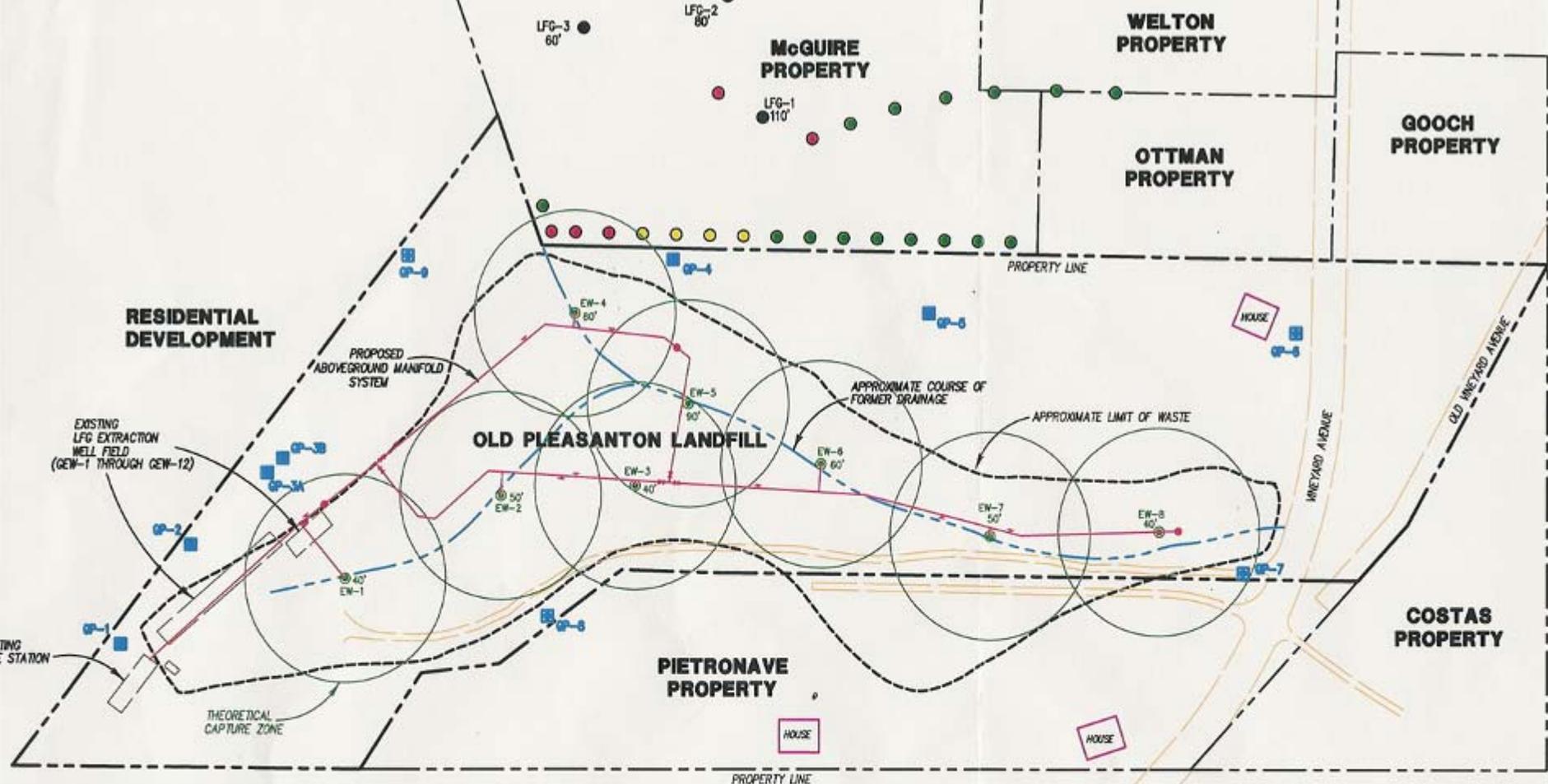
Figure No. 2

New Home



New Development

- Pre-development testing of the property to the west of the landfill showed gas up to 55.9% in October 2000.
- After some legal wrangling, Pleasanton Garbage agreed to expand their landfill gas system.
- In 2002, 15 gas wells were added and the flare repaired and upgraded.



LEGEND

- SOIL-VAPOR SAMPLE LOCATION (METHANE > 1% by Volume)
- SOIL-VAPOR SAMPLE LOCATION (METHANE < 1% by Volume)
- SOIL-VAPOR SAMPLE LOCATION (NOT SAMPLED)
- PROPOSED LFG MONITORING/EXTRACTION WELL AND DEPTH
- _{50'} PROPOSED LFG EXTRACTION WELL AND DEPTH (APPROXIMATE)
- EXISTING PERIMETER LFG MONITORING POINT
- PROPOSED PERIMETER LFG MONITORING POINT

NOTE: ON-SITE/OFF-SITE FEATURES AND PROPERTY LINES



Did it Work?

- The number of probes above 5% was reduced from 63% to 25%.
- 5 new wells were added and 2 reactivated from the original system in 2003.
- June 2004: 2 additional wells installed.
- December 2005: additional wells and lines being added. Still some pockets of methane.

Conclusion

- New homes are currently under construction.
- Probes on adjacent property have been destroyed. Probes adjacent to west property are now consistently close to zero.
- Pockets of gas still remain outside of waste.
- After 30 years, gas is still an issue.

The End



Questions

CASE STUDIES

- SCS Case Study

Landfill #1 - Setting



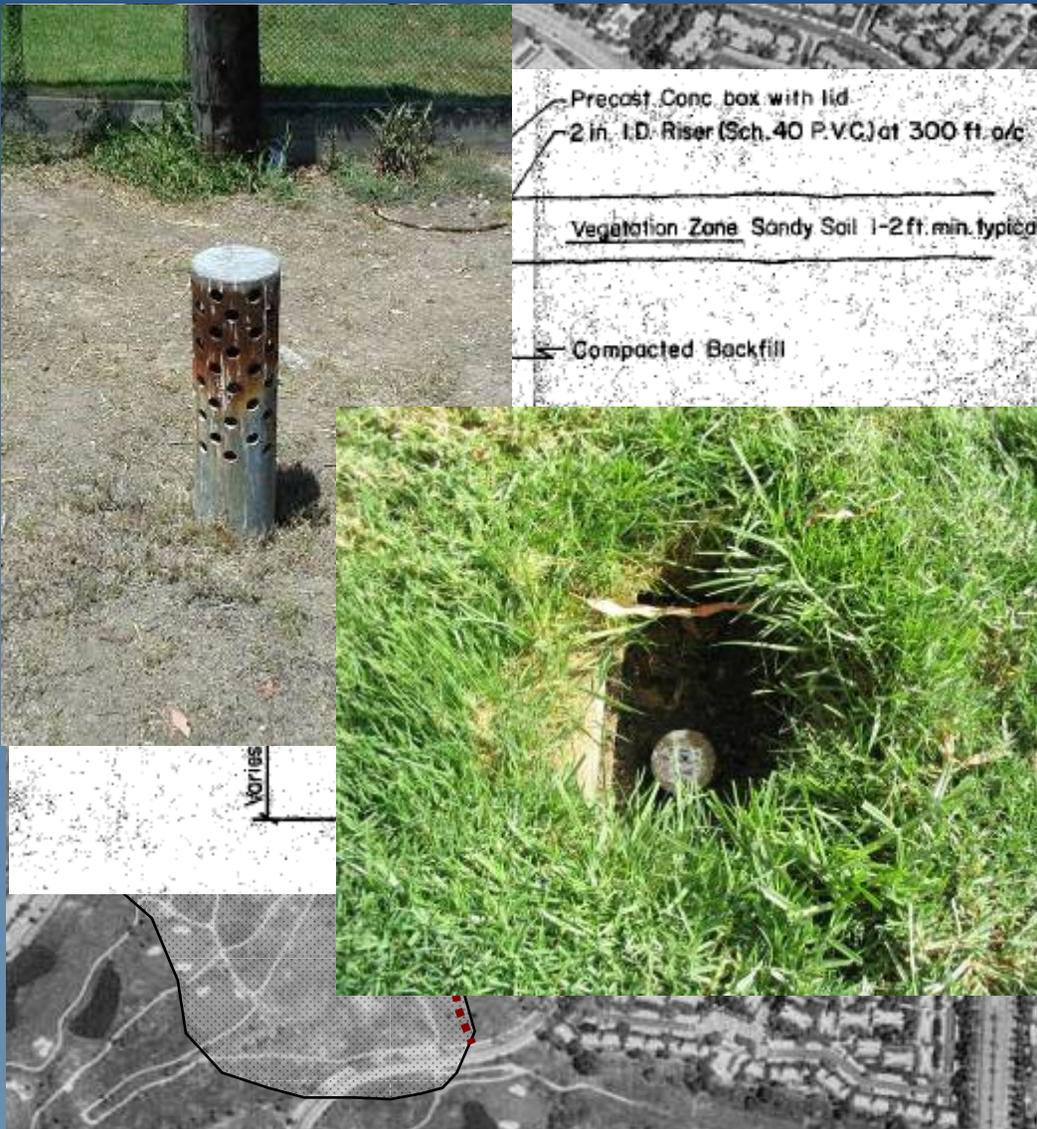
- 115-acre cut and cover operation
- Operated over 5 years (1960-1964)
- Property and surrounding area undeveloped at time of closure
- Golf course development on-site since 1965

Landfill #1 – Setting Refuse Extent



- Original landfill Extent (at time of closure)
 - A portion of refuse excavated for residential and commercial development
 - Current refuse Extent
-

Landfill #1 – Setting Historic Perimeter Gas Barrier



- Perimeter Gas Barrier/Passive Vent Trench installed prior to adjacent developments
- Perimeter Gas Barrier/Vent Trench Detail
- Limited, non-contiguous remnants of vent system identified on-site

Landfill #1 – Setting Perimeter Probe Installation



- Original network of 11 perimeter probes installed at site in 2002
- Based on exceedances, 24 additional probes installed
- 29 out of the 35 probes (eastern perimeter) have methane levels above 5%

Landfill #1 – Emergency LFG Monitoring

- In-house monitoring of residential structures performed over Thanksgiving Holiday due to elevated probe readings



Landfill #1 – Perimeter GCCS



- 28 perimeter extraction wells will be installed at the site
- Wells interspersed with probes at 100-foot spacing
- Wells to be located in refuse and/or soil, based on field conditions

Landfill #1 – Perimeter GCCS

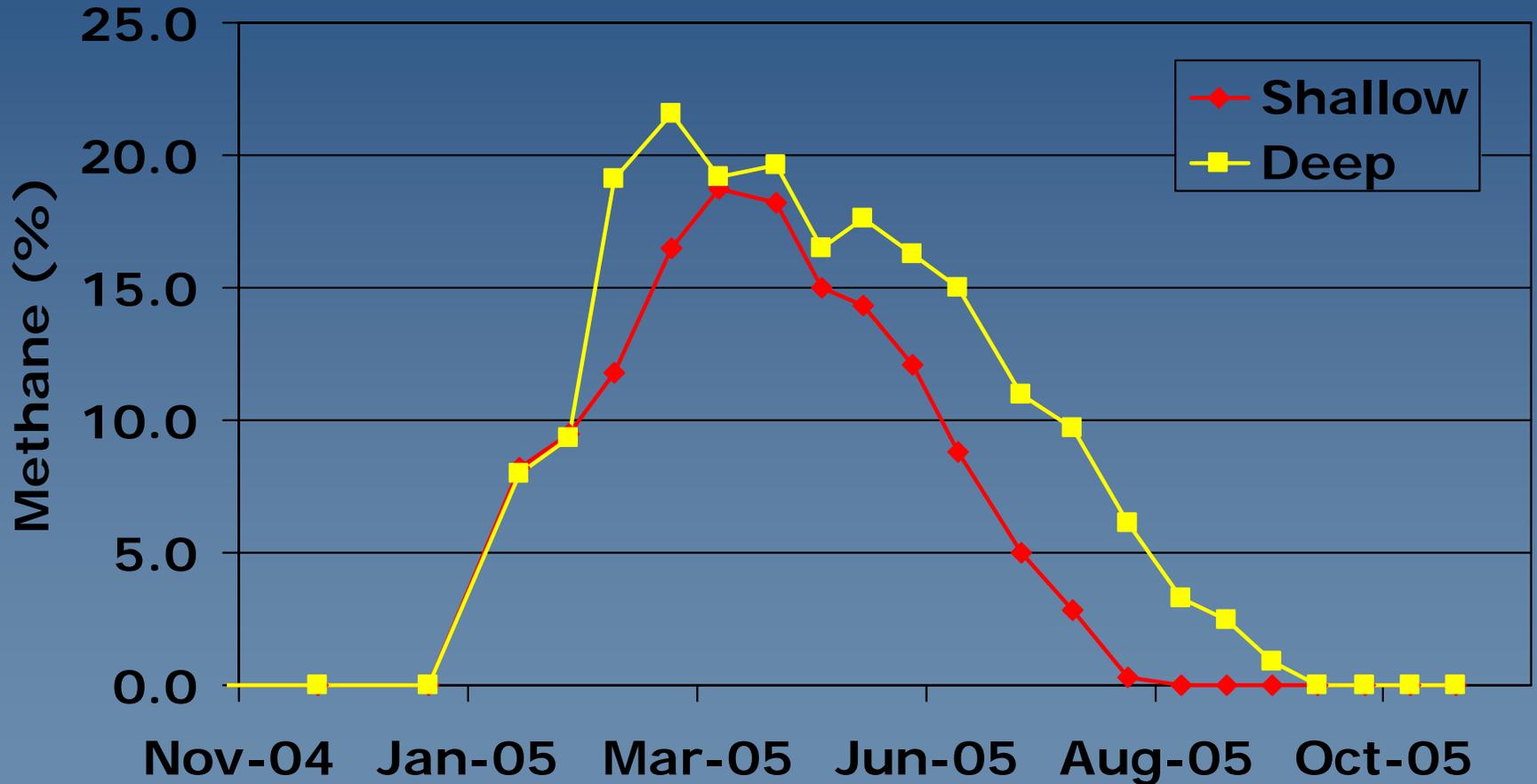
- Proposed perimeter GCCS must integrate with the existing golf course
 - Subgrade header installed adjacent to cart path
 - Installation of system split into separate sections to allow for installation during slow season
 - Former Gas Barrier/Vent Trench integrated with GCCS by running laterals to vent risers

Landfill #1 – Northern Perimeter Probe Issues



- Probe violation (>5%) in February 2005, after 3 years of non-detect
 - Exceedances continued through August '05
 - No exceedances since August '05
- Probe located in adjacent to unlined drainage alignment
- Significant rains during '04-'05 season

Landfill #1 – Northern Perimeter Time-Trend Analysis



Landfill #1 – Northern Perimeter Probe Issues

- Drainage area repaved to expand parking area
- Proposed parking area paving altered to allow for LFG migration through landfill cover



Questions

GROUP EXERCISES

- Two Scenarios will be Presented

ASSESSMENT & EVALUATION

- Conduct End-of-Course Assessment.
- Trainee Course Evaluation.