

CEQA Challenges in Siting Infill Residential Development Projects

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**AWMA Golden West Section One-Day Specialty Conference
Current Developments in CEQA Guidance – The Road Ahead**

San Francisco, California

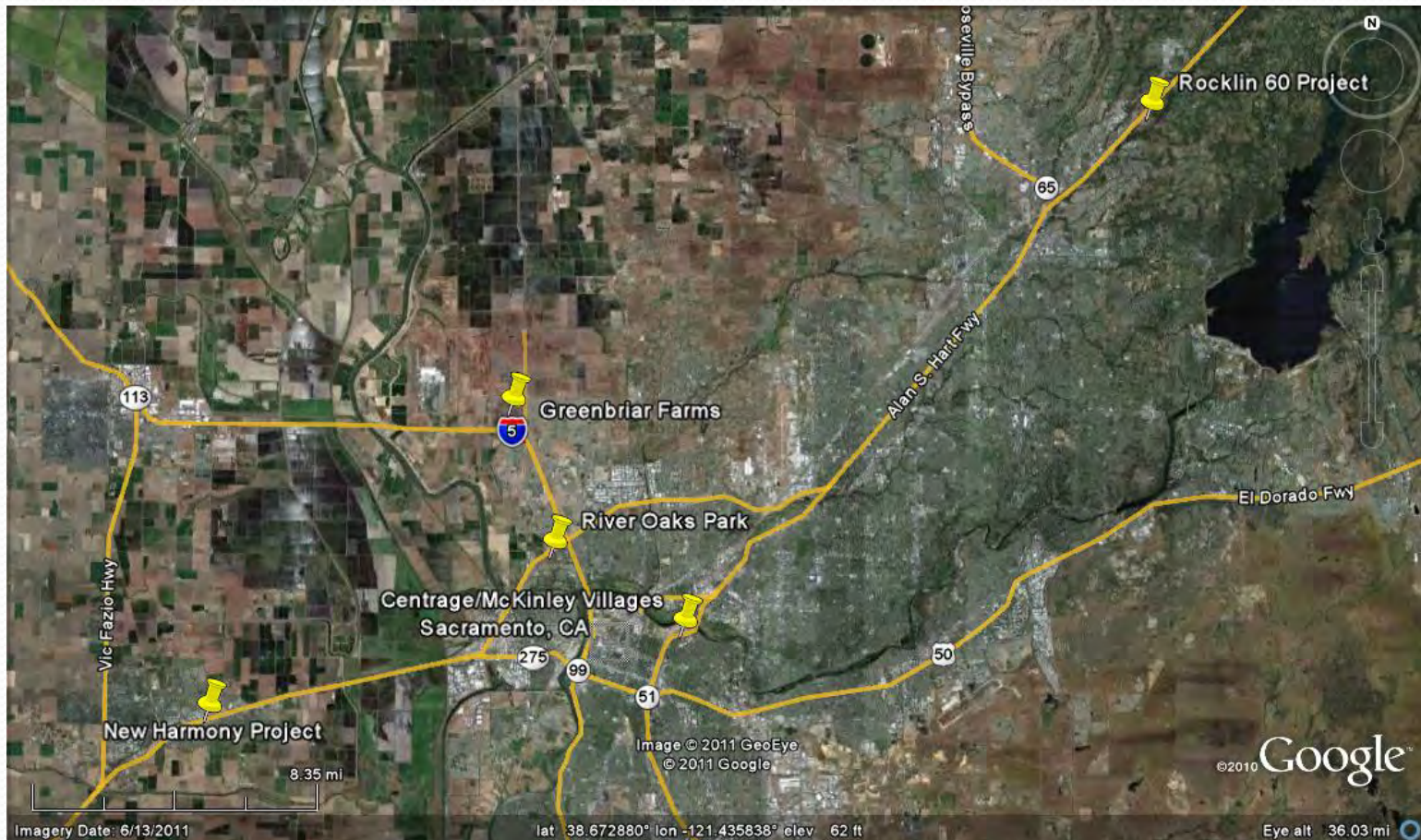
September 21, 2011

Overview

- Case Studies
- Relevant Guidance
- Health Effect Studies
- Effect of Recent National Ambient Air Quality Standards
- Conflicts between Guidances
- Approach to Achieve a Balance
- Potential Mitigations
- References



Sacramento Area In-fill Projects



Case Studies

- River Oaks Park Development (Sacramento, 2005)
 - ❖ Proposed residences within 135 feet of Interstate 80
 - ❖ Actual meteorology: most winds blow from proposed site towards I-80
 - ❖ Cancer risk ranged down from a maximum of $40E-06$ for residences closest (20 meters) to I-80 and constant 2007 mobile source emissions
 - ❖ Cancer risk maximum = $25E-06$ for 70-year average



Case Studies (included)

- Centrage/McKinley Villages (Sacramento, 2007)
 - ❖ Sandwiched tightly between a rail line and Business I-80
 - ❖ 370-foot setback would be needed to achieve ARB's 70% reduction from edge of major roadway
 - ❖ Analysis included a potential mitigation: assumed use of HEPA filter in HVAC system at overall DPM reduction effectiveness of 25%, 60% and 90%
 - ❖ Cancer risk ranged from Sacramento background (520E-06 in 2000) down to $< 10E-06$ depending on position/distance and mitigation level.



Case Studies (continued)

- Greenbriar Farms Development (Sacramento, 2005-2007)
 - I-5/SR-99 split near Sacramento Airport
 - Project is downwind from I-5 with southerly winds (e.g., summer Delta breeze) and upwind from I-5 with northerly winds (winter)
 - Cancer risks ranged down from a high of $138E-06$ at edge of mixing zone with most of the property $< 100E-06$
 - Risk = $14E-06$ at school proposed approximately 360 feet away



Case Studies (continued)

- Rocklin 60 (Rocklin, 2008, at I-80 and Sierra College Blvd)
 - ❖ Cancer Risk: $130E-06$ for nearest residence
 - ❖ Extended debate between Lead Agency (City) and Applicant over appropriate threshold of significance for cancer risk to new residents from existing mobile sources:
 - stationary source threshold of $10E-06$ vs.
 - ARB monitored background levels of $520E-06$ SVAB for 2000)
 - ❖ Lead Agency requested tiered trees replace 1 lot.

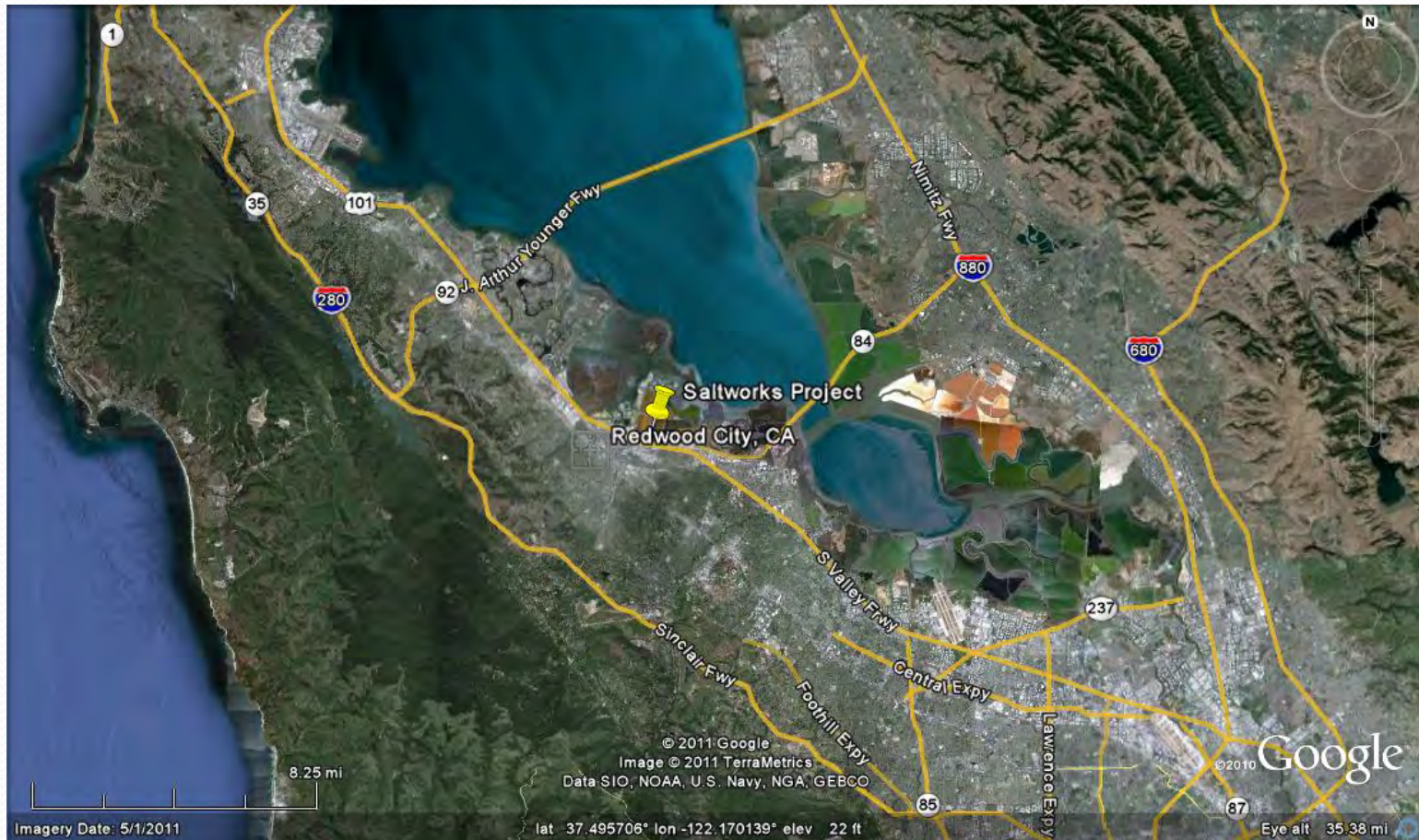


Case Studies (continued)

- New Harmony (I-80 in Davis, 2009-2010)
 - ❖ HRA calculated $7.6E-06$ at nearest residence.
 - ❖ Doctor member of Planning Commission objected to health impacts based on Lancet article.
 - ❖ CEQA review included an evaluation of the Lancet article (Gauderman et al, 2010). Discussed later.



Bay Area Project (Saltworks)



Case Studies (continued)

- Saltworks (Redwood City, 2011-2012)
 - ❖ Proposed for east side of US-101 and south side of Seaport Blvd with Port of Redwood City and industrial area on the north side.
 - ❖ Receptor (reverse) HRA needs to address both adjacent freeway and industrial facilities
 - ❖ Follow recent BAAQMD guidance (updated May/June 2011). Discussed later.
 - ❖ Project likely to include a substantial buffer zone to avoid significant health impacts.



Guidance

- SB375 (2008)
 - ❖ Seeks to reduce mobile source greenhouse gas (GHG) emissions towards state goals through coordinated urban and transportation planning.
 - ❖ Requires Metropolitan Planning Organizations (MPOs) like SACOG and ABAG to include in Regional Transportation Plans:
 - Sustainable Communities Strategy
 - Alternative Planning Strategy
 - ❖ Directly encourages mass Transit Priority Projects.
 - ❖ Indirectly encourages urban planning that puts residential areas close in to city centers and freeways



Guidance (continued)

- ARB's Air Quality and Land Use Handbook: A Community Health Perspective (2005)
 - ❖ Seeks to keep residential developments away from sources of toxic air contaminants (major roadways, ports, rail yards, distribution centers, chrome platers, etc.)
 - ❖ 500 ft setback reduces PM 70%
 - ❖ A 500-foot screening setback removes much close-in urban land from development.
 - ❖ Site specific HRAs can override 500 ft criterion.



Guidance (continued)

- Sacramento Metropolitan AQMD Protocol
 - ❖ Do not quantify non-cancer health impacts
 - ❖ Gives no significance threshold for DPM cancer risk (i.e., defers to Lead Agency)
 - ❖ Only for projects closer than 500 ft.
 - ❖ Use screening tables. If screening risk $> 276E-06$, then perform site-specific HRA.



Guidance (continued)

- BAAQMD CEQA Air Quality Guidelines (Updated May 2011)
 - ❖ New receptor-focused (vs. new source-focused) significance criteria and thresholds as of January 1, 2011
 - ❖ Guideline objectives: “encourage focused infill development” and “reduce vehicle emissions”
 - ❖ Construction and operation both given significance thresholds.



Guidance (continued)

- ❖ BAAQMD CEQA Air Quality Guidelines (cont.)
 - Comply with Qualified Community Risk Reduction Plan:
 - Planning area
 - TAC and PM_{2.5} base year and future emission inventories
 - Model health impacts and set goals
 - Identify reduction measures.
 - Adopt in public process and monitor.



Guidance (continued)

- ❖ BAAQMD CEQA Air Quality Guidelines (cont.)
 - Conduct a cumulative impact analysis and comply with significance thresholds:
 - Cancer risk = 100 in one million
 - Non-cancer chronic HI = 10.0
 - $PM_{2.5} = 0.8 \mu\text{g}/\text{m}^3$ annual average
 - Zone of Influence = 1,000- foot radius from fence line of receptor (e.g., subdivision boundary)



Guidance (continued)

- BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards (Version 2.0, May 2011)
 - ❖ Freeway Screening Analysis Tool
 - Highway links, PM_{2.5} concentrations and cancer risk
 - ❖ Surface Street Screening Tables
 - AADT, PM_{2.5} concentrations and cancer risk
 - ❖ Stationary Source Risk Screening Analysis Tool
 - ❖ Google Earth facilitation



Health Effect Studies

- Lancet Article (Gauderman et al, 2007)
 - ❖ Freeway emissions and child lung development
 - ❖ Classified children by distance from homes:
<500 m., 500 m. < d < 1,500 m. and >1,500 m.
 - ❖ Followed 3,677 10-year olds until 18 (1,445 left)
 - ❖ Annually measured lung function (forced vital capacity, forced expiratory volume in 1 second, and max. mid-expiratory flow rate), none of which are related to lung cancer or HRA cancer risk.



Health Effect Studies (continued)

- Lancet Article (continued)
 - Authors emphasized 2 of the 3 lung function parameters and 1 distance category that showed significant effects, but
 - They did not note that 34 of 36 statistical comparisons failed to be statistically different at the 95% level of confidence (i.e., 36 = 3 lung functions x 3 distances, x 3 freeway pollution levels, x 3 non-freeway distances, and x 3 non-freeway pollution levels)



Health Effect Studies (continued)

- Jacobson (2009)
 - ❖ Increase in CO₂, especially urban CO₂ domes, causing increased T, and hence O₃ and associated local health impacts (vs global impacts through indirect routes)
 - ❖ Does not note that level of increased O₃ is immeasurable.
 - ❖ Does not account for enhanced tree growth and pollution reduction.



Health Effect Studies (continued)

- PM_{2.5} Concentration and Premature Deaths
 - ❖ ARB Symposium Expert Panel Review February 26, 2010
 - ❖ Substantial epidemiological literature vs. industry counter arguments
 - ❖ Statistical (cohort) studies are losing participants
 - ❖ PM_{2.5} toxicity basis: mass vs. number



Health Effect Studies (continued)

- PM_{2.5} Concentration and Premature Deaths (integrated set of several studies)
 - ❖ All causes: 20 – 24% (LA) and 1% (NYC) per 10 µg/m³ PM_{2.5} increase
 - ❖ Lung cancer: 46 - 60% (LA) and 4% (NYC) per 10 µg/m³ PM_{2.5} increase
 - ❖ Couldn't separate different PM_{2.5} compositions
 - ❖ Couldn't account for different associated criteria pollutant compositions



Effect of Recent National Ambient Air Quality Standards (NAAQS)

- 1-Hour NO₂ NAAQS: Reduced from 180 ppbv to 100 ppbv (3-year average of 98th percentile of the daily maximum 1-hour concentration)
- 24-Hour PM_{2.5} NAAQS: Tightened from 65 to 35 µg/m³ (3-year average of 98th percentile of 24-hour averages)
- Both tougher to achieve, especially closer to inner urban core for infill developments, and tougher for cumulative analysis.
- Encourages people to live in cleaner areas.



Conflicts between Guidances

- SB375
 - ❖ Seeks to put residences closer to inner cities to reduce new mobile emissions
 - ❖ Puts people closer to major roadway mobile emissions.
- Health Effect literature, guidance documents and NAAQS
 - ❖ Encourages putting people further away from major roadways and urban cores.



Approach to Achieve a Balance

- Site-specific health risk assessment
 - ❖ Actual meteorology, especially wind direction, and highway alignment may be favorable.
 - ❖ Actual reduction of health impacts with distance from major roadway may be favorable.
 - ❖ Distance of each residence from roadway and potential impacts can affect project layout (buffer).
 - ❖ Forecast of actual emission reductions over time vs stagnant snapshot for 70 years



Potential Mitigation Measures

- Design features/mitigation measures to consider
 - ❖ Sound walls for enhanced dispersion and noise protection
 - ❖ Tiered tree planting to enhance dispersion and impaction, and noise reduction
- Enhanced heating, ventilation, and air conditioning (HVAC) systems in nearest homes
 - ❖ HEPA filter



References

- Gauderman, W. James, Hita Vora, Rob McConnell, Kiros Behane, Frank Gilliland, Duncan Thomas, Fred Lurmann, Edward Avol, Nino Kunzli, Michael Jerrett and John Peters. *Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study*, The Lancet, Volume 369, pages 571-577, February 17, 2007.
- Jacobson, Mark Z. *Enhancement of Local Air Pollution by Urban CO₂ Domes*, Environmental Science and Technology, Volume 44, Number 7, pages 2497-2502, 2010.

