Potential Conflicts Between Air Quality Mitigations and Smart Growth Location & Land Use Mix

Phil Erickson, AIA
President
Community Design + Architecture
Oakland, California
Presentation Outline

• Guidance on potential mitigation

• Site design
  – Use of trees as “filter”
  – Location of sensitive uses within a mixed use development

• Relationship to Smart Growth and TOD Projects
Proximity to Emitters

- Bay Area Air Quality Management District (BAAQMD)
- Screening for impacts
- Potential conflict with regional goals for Priority Development Areas in proximity to jobs and transit

Data from 1 km x 1 km grid
Cancer Risk from:
- Diesel PM
- 1,3 - butadiene
- Benzene
- Formaldehyde
- Acetaldehyde

Legend:
- Major Highways
- Plane_Least
- Cancer Risk
- Expected number per million
- <100
- 100 - 200
- 200 - 300
- 300 - 600
- 600 - 900
- 900 - 900
- 1000 - 1200
- >1200

New Partners – Charlotte
February 5, 2011
Design Responses to Particulate Air Quality
BAAQMD  Suggested Mitigations

– Increase distance from roadways

– Redesign to locate sensitive receptors away from roadways

– Phase to build commercial/retail first and residential later to allow time for new CARB diesel standards to take effect

– Install tiered planting buffer of evergreen landscaping

– Install and maintain air filtration system on buildings

– Locate air intakes and operable windows away from roadway
BAAQMD Guidelines & TOD Projects

- MacArthur BART Transit Village
BAAQMD Guidelines & TOD Projects

- MacArthur BART Transit Village
BAAQMD Guidelines & TOD Projects

- MacArthur BART Transit Village
BAAQMD Guidelines & TOD Projects

• MacArthur BART Transit Village

Does not satisfy tree buffer mitigation

Design Responses to Particulate Air Quality
BAAQMD Guidelines & TOD Projects

• MacArthur BART Transit Village

Residential use with operable windows fronting toward freeway
BAAQMD Guidelines & Large Projects

- Places29 in Albemarle County outside of Charlottesville, VA
- How would application of BAAQMD Guidelines affect this plan?

Primarily Infill

Primarily New Growth

Design Responses to Particulate Air Quality
BAAQMD Guidelines & Large Projects

Community Center

Neighborhood Center

Design Responses to Particulate Air Quality
Community Center

• Reuse of shopping center
Community Center

- Mix of residential, retail, & office
Neighborhood Center

- Reuse of strip retail
Neighborhood Center

- Convenience retail, professional office, and residential

Urban Advantage
BAAQMD Guidelines & Large Projects

Design Responses to Particulate Air Quality

New Partners – Charlotte
February 5, 2011
BAAQMD Guidelines & Large Projects

Design Responses to Particulate Air Quality

New Partners – Charlotte
February 5, 2011
BAAQMD Guidelines & Large Projects

Reconfigure Rural Highway

Neighborhood Center

Design Responses to Particulate Air Quality
Create a Multi-Modal Highway

- Existing Rural Highway through future development area
Create a Multi-Modal Highway

- Reconfigured highway with —
  - Mixed use neighborhoods beyond buffer
  - Multi-use path “too close” to roadway?
Create Neighborhood Centered Pattern

• Transform suburban and rural environment
Create Neighborhood Centered Pattern

- Transform suburban and rural environment
Buildings and Windflow

“Fine Particulate Concentrations Near Arterial Streets: The Influence of Building Placement and Wind Flow”

– Study by Boarnet, Ferguson, Edwards, Princevac, Bartolome, Pan through the University of California Transportation Center, UCTC-FR-2010-24
Buildings and Windflow

• Studied 5 roads with ADT > 40,000 (twice the BAAQMD screening level)

• More compact areas tended to have higher particulate levels
Buildings and Windflow

- Studied 5 roads with ADT > 40,000 (twice the BAAQMD screening level)

- Combination of building location & wind direction show evidence of concentrating particulates mainly on the lee side of buildings
Buildings and Windflow

- Authors believe more study is needed of
  - Building placement and windflow
  - Potential relationship to compact development
  - Impact studies should consider more comprehensive assessment of public health costs and benefits
- Reduction in VMT as well as exposure to particulates
Research to Look Forward To...

- Affordable Housing in Transportation Corridors—Built Environment, Accessibility, and Air Pollution Implications of Near-Roadway Residential Locations

  - Study will look at HOPE VI and Low Income Housing Tax Credit projects in Southern California
    - Relationship to freeways and major roadways
    - Tracking of travel behavior and air pollution exposure of residents
Policy Issue

- Need for comprehensive evaluation:
  - Measuring range of impacts and benefits
  - Weighing impacts and benefits
Design and Location Issues

• Current standards may favor development in green field areas rather than urban infill
  – Easier to provide buffers around roadways
Design and Location Issues

• For Transit Oriented Development —
  – Design systems to provide transit access away from major roadways
  – Locate employment and retail closest to major roadways with residential beyond (not feasible on many infill sites)
Caution! Big Job Ahead

Reduce Near-Road Health Hazards

- Reduce harmful emissions at tailpipe
- Lower roadway volumes
- Re-route trucks
- Choose transit alignments carefully
- Create high roadway connectivity for dispersed traffic