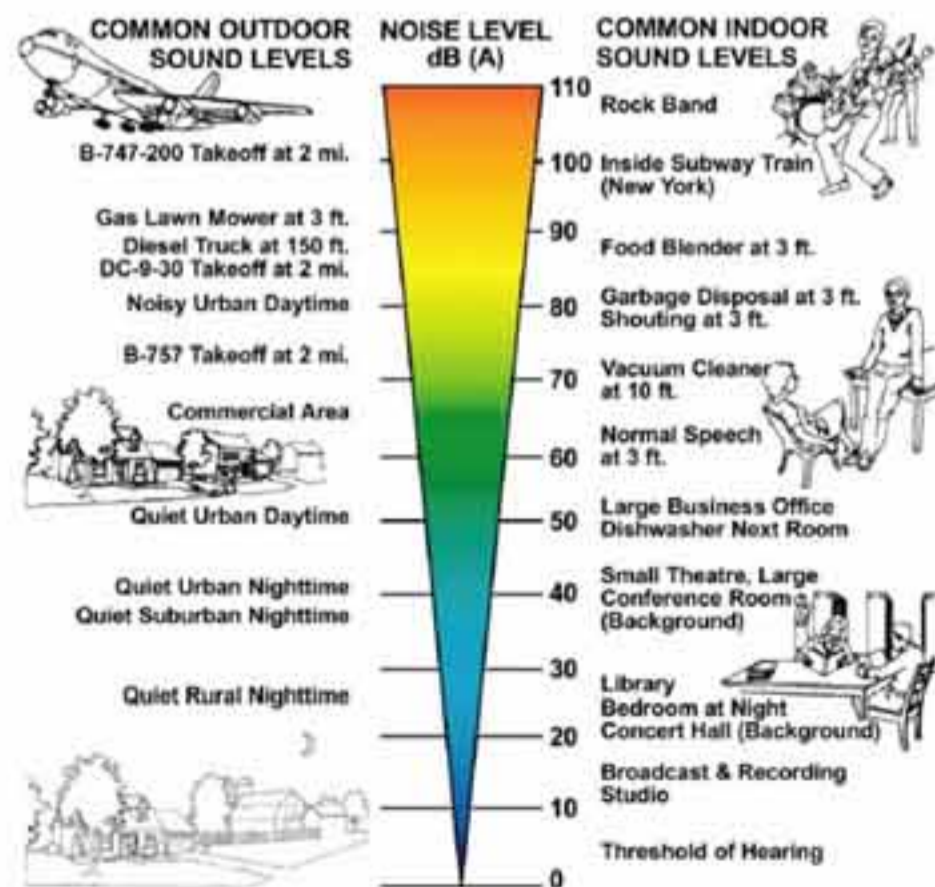
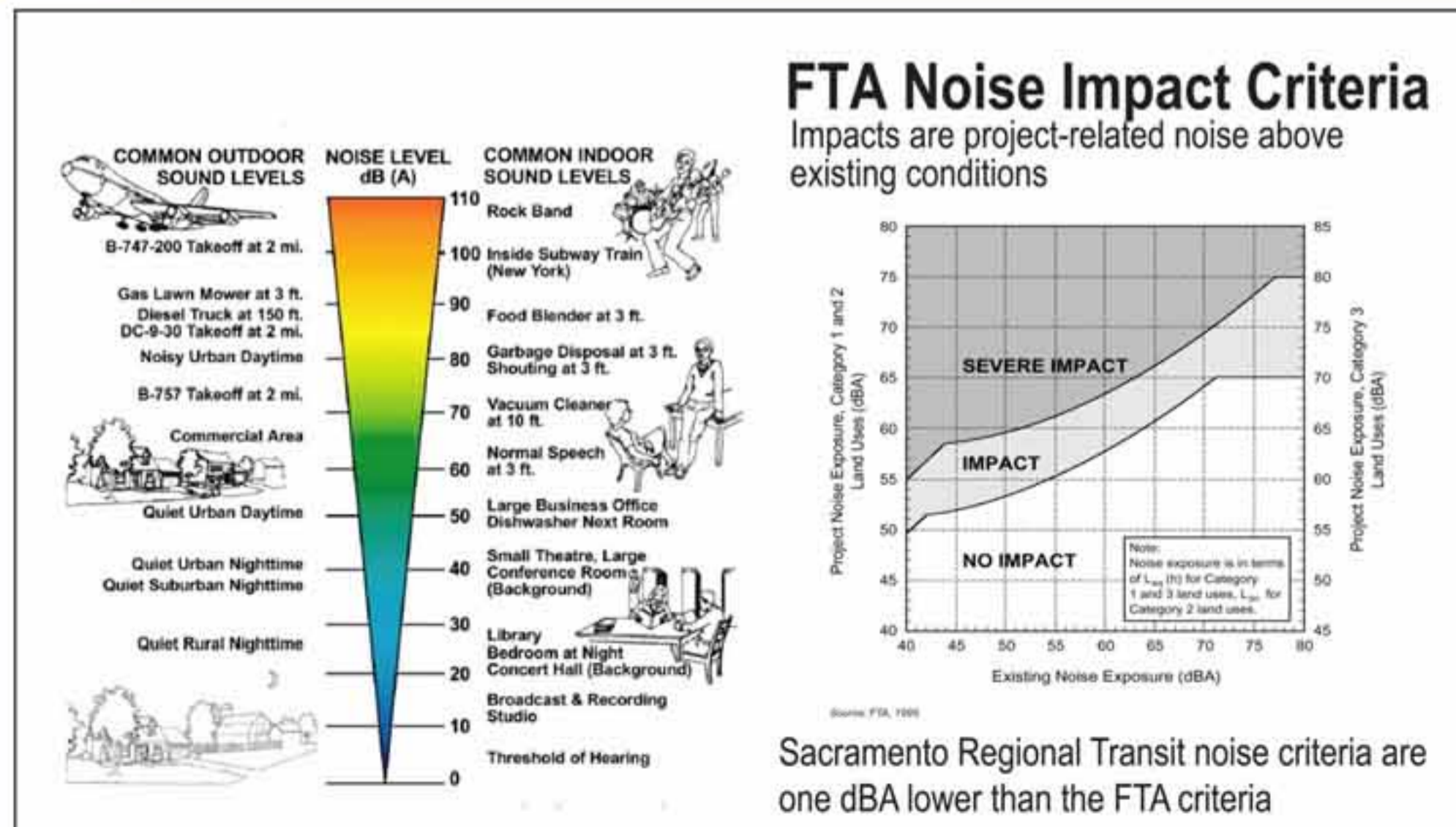


What are the noise and vibration standards used to measure their effect on sensitive land uses?

Federal Transit Administration and Regional Transit Standards on Noise and Vibration

Land Use Categories:

- 1 Buildings or parks where quiet is an essential element of their purpose
- 2 Residences and buildings where people normally sleep (such as hospitals and hotels)
- 3 Institutional land uses with primarily daytime and evening use (such as schools, libraries and churches)



Vibration Criteria

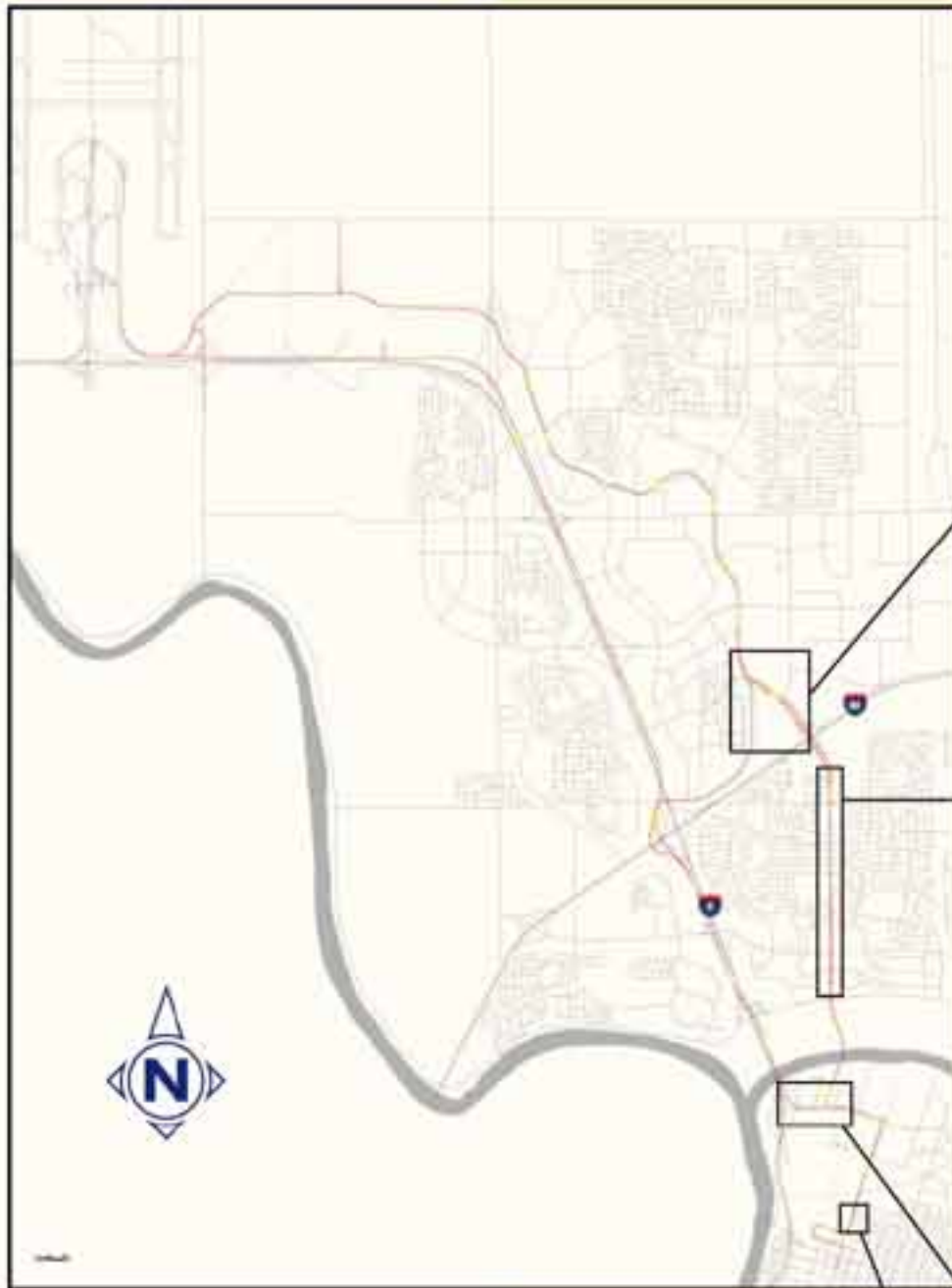
Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/sec)		Ground-Borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events ¹	Infrequent Events ²	Frequent Events	Infrequent Events
Category 1: Buildings where vibration would interfere with interior operations	65 VdB ³	65 VdB ³	N/A ⁴	N/A ⁴
Category 2: Residences and buildings where people normally sleep	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use	75 VdB	83 VdB	40 dBA	48 dBA

Notes:
 1. Frequent Events is defined as more than 10 vibration events per day.
 2. Infrequent Events is defined as less than 10 vibration events per day.
 3. The criterion level is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes, vibration-sensitive manufacturing or research and require detailed evaluation to define the acceptable vibration levels. Showing lower vibration levels in a building often requires special design of the building systems and affected floors.
 4. Vibration-sensitive equipment is not sensitive to ground-borne noise.




Source: FTA 1995

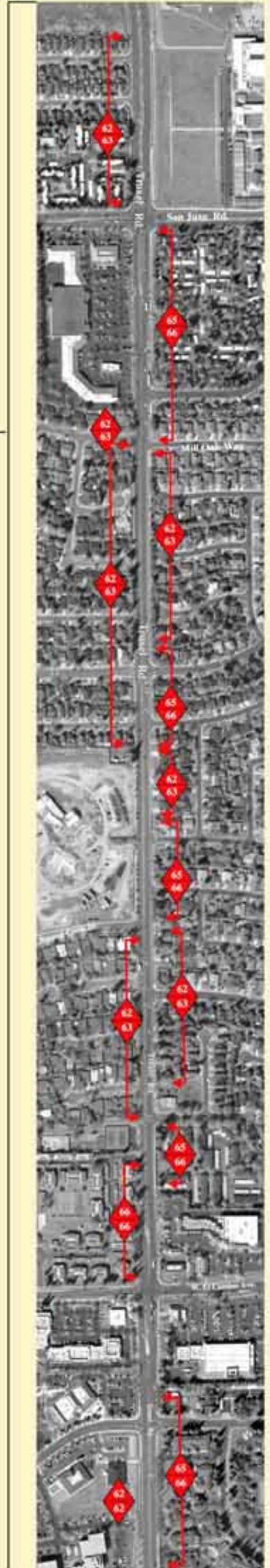
- Vibration does not pertain to BRT mode
- Only the Truxel LRT alternatives cause vibration effects to one property prior to mitigation

Noise Levels Before and After LRT Project Implementation



Legend

-  Existing noise level (as recorded October, 2002)
-  Modeled noise level with project
-  Impacted Properties



Noise Modeling Results for LRT Alternatives

From the Airport to Highway 99
No noise effects exceed FTA/RT noise criteria

From Highway 99 to I-80 - North Natomas
Alternative 5 effects 26 homes behind Market Place Shopping Center

From I-80 to Garden Highway - South Natomas
Noise effects do not exceed impact criteria for any LRT alternatives

From Garden Highway to Sacramento Valley Station
No noise effects in the Richards Blvd Area
All American River bridge crossings will impact the park



Mitigation Measures Will Reduce Noise Effects Below FTA/RT Thresholds

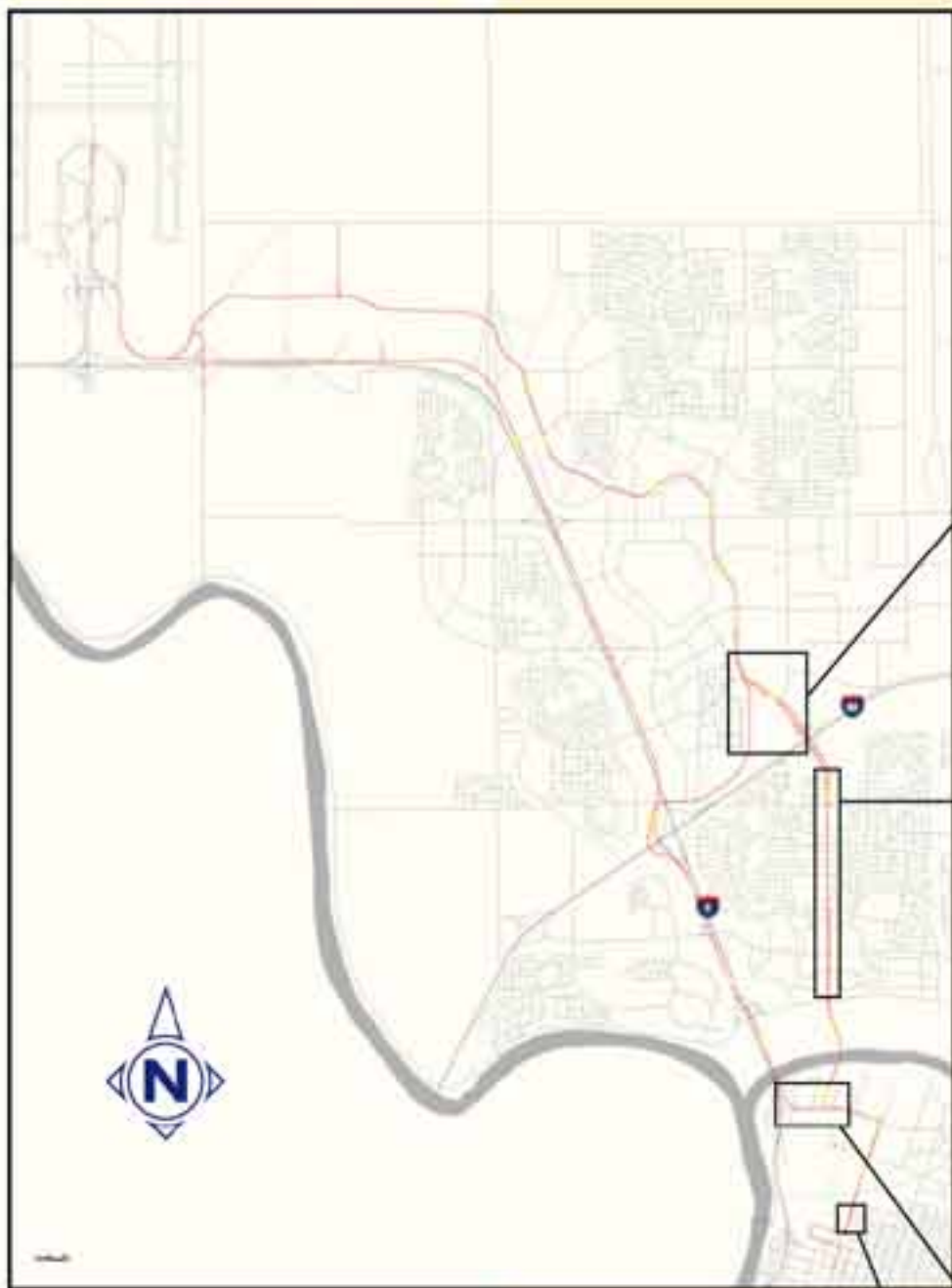
Operation Mitigation

- Construction of Noise Barriers, Where Feasible
- Building Soundproofing (i.e., replacing windows, weather stripping doors, and/or the installation of central air conditioning)
- Ballasted Track Construction on Aerial Guideways
- Use of Minimum Track Turn Radii to Avoid Wheel Squeals
- Rail Lubrication on Sharp Turns to Minimize Squeals
- Grind Down or Replace Worn Rail
- Wheel Truing and Overall Vehicle Maintenance
- Use of Natural Berms in Park Areas

Construction Mitigation

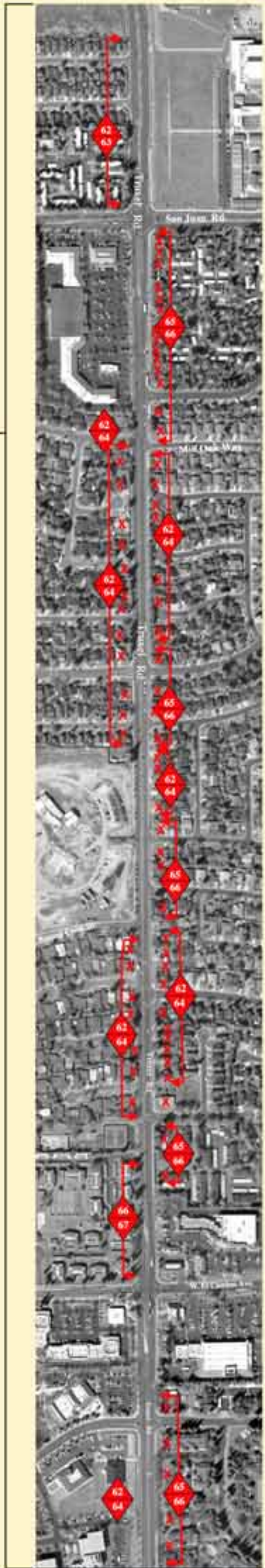
- Prepare a Noise Control Plan
- Replace noisy equipment with quieter equipment
- Noise control devices, such as equipment mufflers, enclosures and barriers
- Keep Staging areas as far from sensitive noise receptors as possible.
- Avoid residential areas when planning haul truck routes.
- Confine Noisy Activities to Daytime
- Avoid impact pile driving where possible
- Select quieter demolition methods

Noise Levels Before and After BRT Project Implementation



Legend

- Existing noise level (as recorded October, 2002)
- Modeled noise level with project
- Impacted Properties



Noise Modeling Results for BRT Alternatives

From the Airport to Highway 99
No noise effects exceed FTA/RT noise criteria

From Highway 99 to I-80 - North Natomas
Alternative 6 effects 39 homes behind Market Place Shopping Center

From I-80 to Garden Highway - South Natomas
Alternatives 4/4A/4B will affect 54 single-family homes and 55 multi-family homes

From Garden Highway to Sacramento Valley Station
Effects in the Richards Blvd. area depend on future development plans
All American River bridge crossings will impact the park area
The Urrutia Bridge crossing could affect 16 single-family homes and 26 multi-family residences



Mitigation Measures Will Reduce Noise Effects Below FTA/RT Thresholds

- Operation Mitigation**
- Construction of Noise Barriers, Where Feasible
 - Building Soundproofing (i.e., replacing windows, weather stripping doors, and/or the installation of central air conditioning)
 - Use of Natural Berms in Park Areas

- Construction Mitigation**
- Prepare a Noise Control Plan
 - Replace noisy equipment with quieter equipment
 - Noise control devices, such as equipment mufflers, enclosures and barriers
 - Keep Staging areas as far from sensitive noise receptors as possible.
 - Avoid residential areas when planning haul truck routes.
 - Confine Noisy Activities to Daytime
 - Avoid impact pile driving where possible
 - Select quieter demolition methods