BROADWAY ROAD STREETSCAPE & PEDESTRIAN IMPROVEMENTS PROJECT

March 18, 2009

Robert Yabes/Eric Iwersen/Sue Taaffe

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Ground Rules

- Respect
  - each other
  - process & parameters
- Assume the best
- Own your words
- Stick to agenda
- One speaker at a time
- Questions at the end

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Introduction/Purpose

- **Introduction of Project Team**
- **Project Description**
- **Community Process**
  - Broadway Road Action Team
  - Community Meetings
- **Today's Meeting**

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Project Description

- Project Area –
  - Broadway Road between Mill Avenue and Rural Road
- Design and Construction Budget $3.3 million
- Congestion Mitigation and Air Quality Improvement Program (CMAQ) - $2.5 million
  - Bicycle and Pedestrian Improvements
  - Streetscape

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Project Requirement

- **This project is being funded with federal CMAQ grant.**
  - http://www.fhwa.dot.gov/environment/cmaq/index.htm
  - http://www.fhwa.dot.gov/environment/cmaq06gd.pdf
- **The primary focus of these funds is to design and construct bicycle and pedestrian improvements. A protective wall may be built as part of this project provided the wall helps or complements the bicycle and pedestrian improvements.**
- **A wall by itself without bicycle and pedestrian improvements is not an eligible CMAQ expenditure.**

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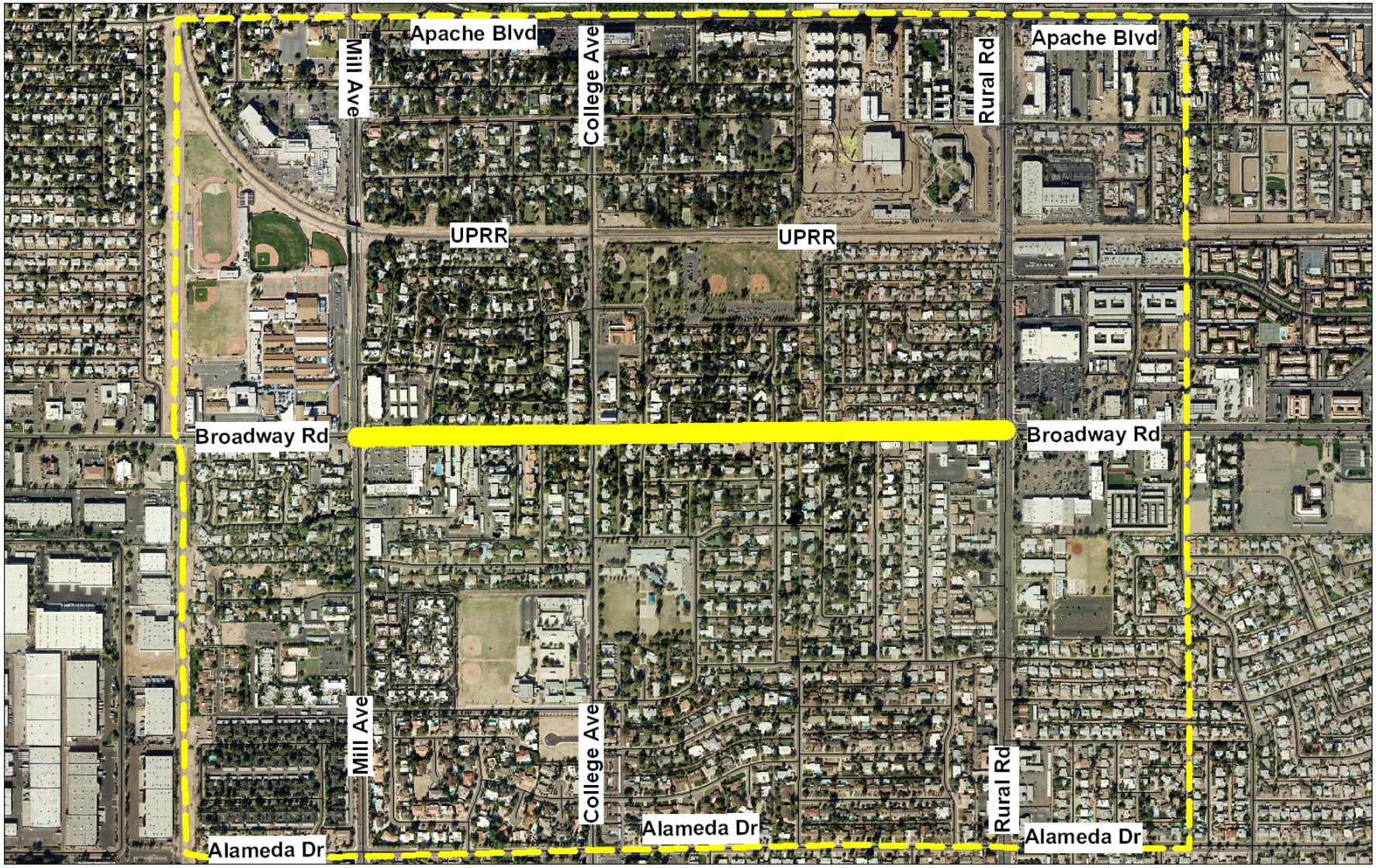
Broadway Road Project Area



Project History

- **Comprehensive Transportation Plan**
- **Community Design Dialogues**
  - Broadway Road between Mill Avenue and Rural Road
- **Identified Issues for Project Area**
  - Safety
  - Bike and ped Improvements
  - Noise
  - Cut-through traffic
  - Retain community character

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Project Goals –First Meeting

- Reduce traffic noise
- Protect community character and address community safety concerns
- Provide bicycle lanes
- Provide 8-foot sidewalks
- Retain Broadway Lane
- Improve streetscape
- Discourage cut-through traffic by maintaining traffic flow
- Transit stop improvements
- Coordinate with other related projects

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Other Major Projects

- Apache Blvd. Street Improvement Project
- College Avenue Streetscape and Bicycle and Pedestrian Improvement Project - US 60 to Apache Blvd. (Testing ongoing)
- Daley Park Traffic Management Project- Daley Park Action Team

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Community Process

- **Community Meeting 1**
  - Identify project goals and objectives
  - Solicit volunteers for Action Team
- **Community Meeting 2**
  - Existing conditions report
    - Noise analysis
    - Traffic study
  - Preliminary and general solution proposals

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Tentative Schedule

- **Community Meetings**
  - Community Meeting 1 – November 19, 2008
  - Community Meeting 2 – March 18, 2009
  - Community Meeting 3 – May - June 2009
  - Community Meeting 4 – July - August 2009

- **Broadway Road Action Team Meetings – Monthly**
  - April 7, 2009

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Tentative Schedule

- **February 2009 - August 2009**
  - **Public meetings / Public Input**
    - Prepare Design Alternatives
    - Select Preferred Alternative
    - Prepare Final Design Concept Report for Federal Approval
  - **Broadway Road Action Team**
    - Monthly Team Meetings
    - Additional Team Meetings may be required during preparation of construction drawings

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Tentative Schedule

- **August 2009 - January 2010**
  - Final Design
    - Construction Drawings
    - Permits
    - Bid Documents
  - Secure Federal Environmental Clearance
  - Complete Federal Obligation Process

- **February 2010-February 2011**
  - Construction

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Meetings

- **Broadway Road Action Team**
  - Initial Action Team Meeting - February 2009
  - Next Meeting – April 7, 2009

- **3rd Public Meeting – May - June, 2009**
  - Design alternatives
  - Selection of Preferred Alternative

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Project Contacts/Logistics

For questions - Please contact:

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Broadway Road Streetscape Plan

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Project Team

City Staff

- Robert Yabes
  Project Manager
- Eric Iwerson
  Senior Transportation Planner
- Shelly Seyler
  City Traffic Engineer
- Sue Taaffe
  Public Participation

Consultant Team

- Tom Hester
  Project Manager
- Tom Bennett
  Urban & Landscape Design
- Srinivas Goundla
  Traffic
- Kevin Keller
  Noise
- Jennifer Love
  Transportation
- Terry Gruver
  Public Participation

Where We Are in the Process

- Beginning phase
  - Gathering initial data
  - Understanding the range of issues

Agenda

- Discuss traffic model
- Discuss noise issues
- Discuss best practice examples
- Discuss community character
- Participate in small groups
- Use your ideas to develop alternatives

Traffic Study

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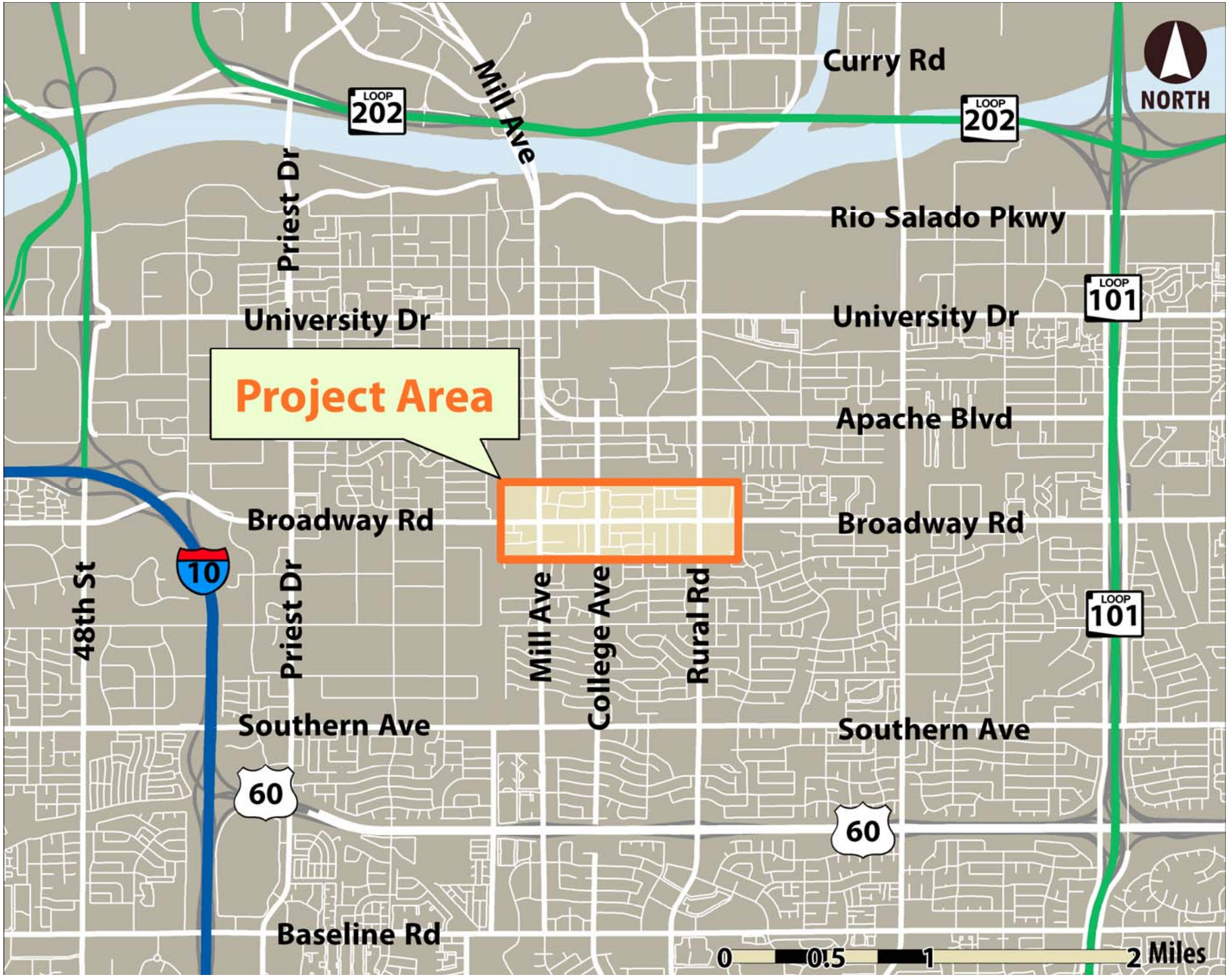
Traffic Analysis

- Evaluate existing pedestrian, bicycle and vehicle traffic
- Determine the future traffic growth
- Evaluate the signalized intersections with and without this project


Curry Rd
NORTH
LOOP 202
Mill Ave
Priest Dr
Rio Salado Pkwy
LOOP 101
University Dr
Project Area
Apache Blvd
Broadway Rd
10
48th St
College Ave
Rural Rd
Southern Ave
60
Baseline Rd
0
0.5
1
2 Miles

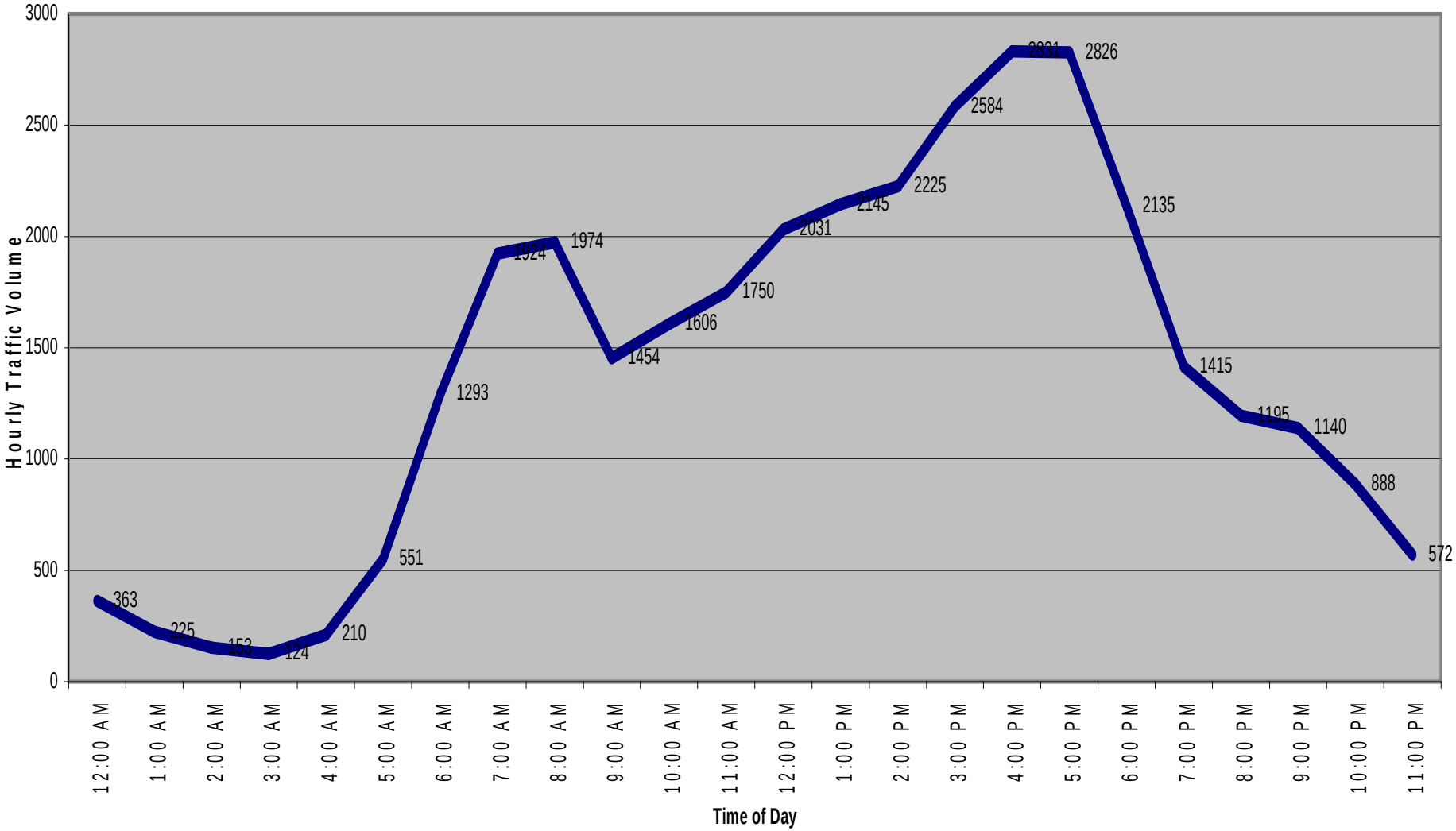
Characteristics of the Study Area

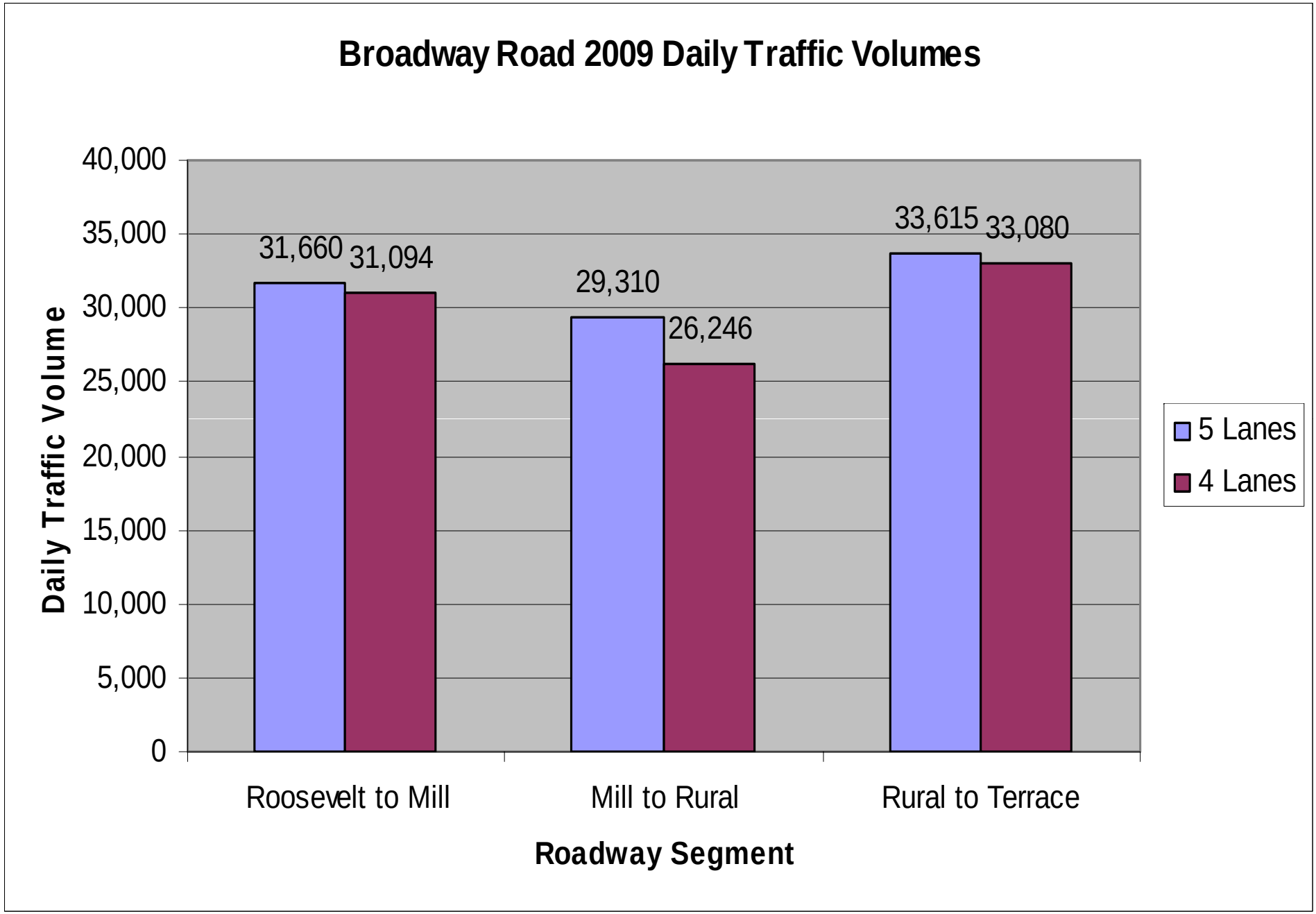
- Broadway Road
  - Primary arterial with access to I-10 and Loop 101
  - Existing speed limit: 40 mph
- Pedestrian Activity
  - Mill Avenue (Tempe High School)
  - College Avenue (Middle School, Elementary School, access to Arizona State University)
- Bicycle Traffic on College Avenue

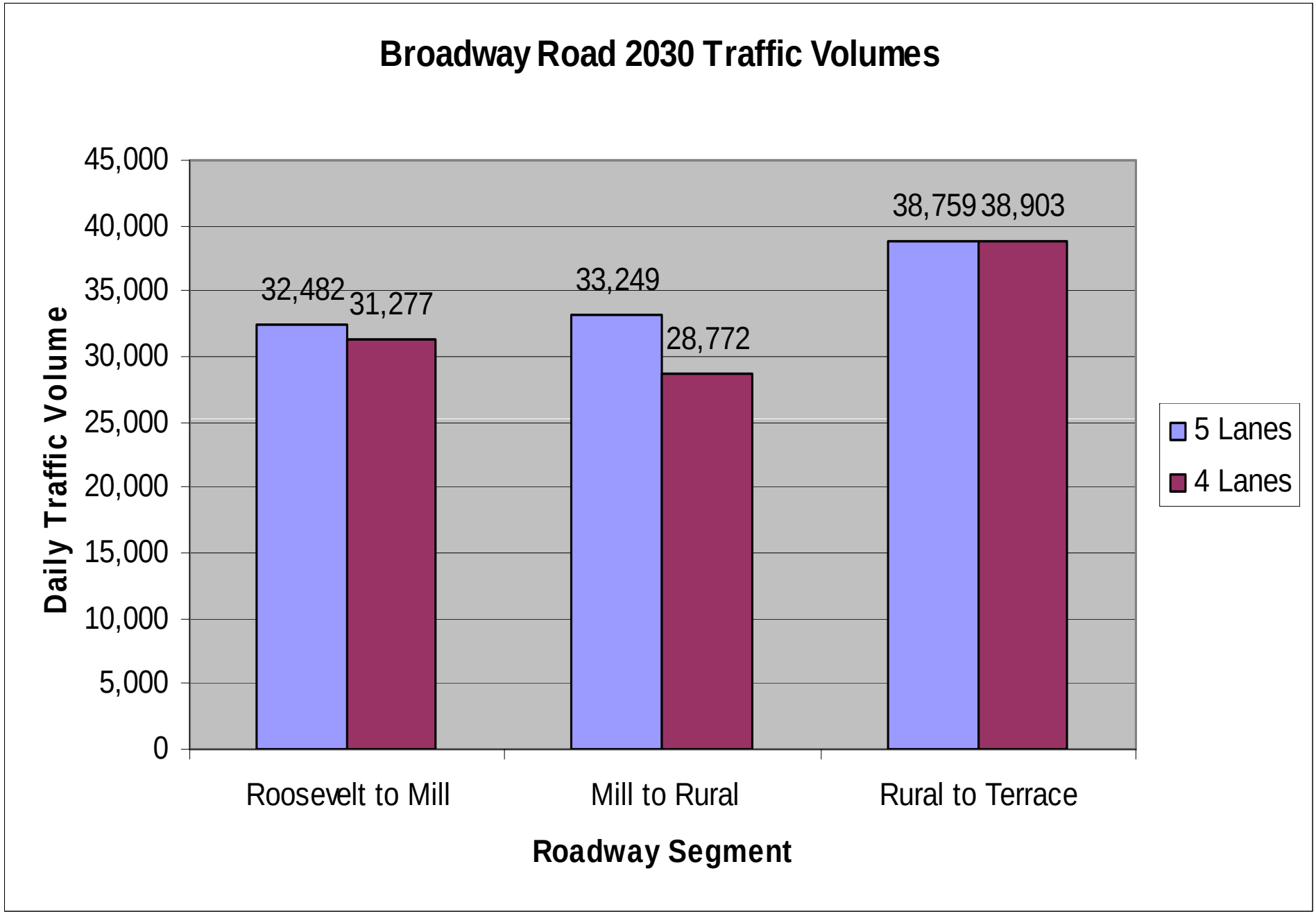
Broadway Looking East at Mill

College Looking South at Broadway

Broadway Road Hourly Traffic Variation (2009)




Broadway Road 2009 Daily Traffic Volumes
Daily Traffic Volume
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
31,660
31,094
29,310
26,246
33,615
33,080
Roosevelt to Mill
Mill to Rural
Rural to Terrace
Roadway Segment
5 Lanes
4 Lanes


Broadway Road 2030 Traffic Volumes
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Daily Traffic Volume
32,482
31,277
33,249
28,772
38,759
38,903
5 Lanes
4 Lanes
Roosevelt to Mill
Mill to Rural
Rural to Terrace
Roadway Segment

Travel Time* Comparison

2009 Existing Travel Time

Broadway Road (Roosevelt – Terrace)	AM Peak Travel Time	PM Peak Travel Time
Eastbound Broadway Rd	3 minutes	6 minutes
Westbound Broadway Rd	4 minutes	3 minutes

2030 4-LaneTravel Time

Broadway Road (Roosevelt – Terrace)	AM Peak Travel Time	PM Peak Travel Time
Eastbound Broadway Rd	5 minutes 30 seconds	6 minutes 30 seconds
Westbound Broadway Rd	4 minutes 10 seconds	4 minutes 30 seconds

2030 5-LaneTravel Time

Broadway Road (Roosevelt – Terrace)	AM Peak Travel Time	PM Peak Travel Time
Eastbound Broadway Rd	5 minutes 25 seconds	9 minutes 40 seconds
Westbound Broadway Rd	4 minutes 30 seconds	4 minutes 25 seconds

** Vehicular traffic only, not transit*

Summary of Findings

- 2030 (5 lanes):
  - Daily traffic volumes will increase by 13 percent by 2030 with existing lane configuration
  - Increased travel times and reduced intersection operations with increased delays by 2030
- 2030 (4 lanes):
  - Daily traffic volumes will reduce by 2 percent by 2030 compared to existing traffic volumes
  - Travel time increases by 1.5 times the existing travel time
  - Reduced intersection operations at Mill Ave and Rural Rd

Noise Analysis Consideration

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Noise Analysis Considerations

- Sound and Noise
  - Sound is created when objects vibrate, creating a localized change in pressure
  - Noise is unwanted sound

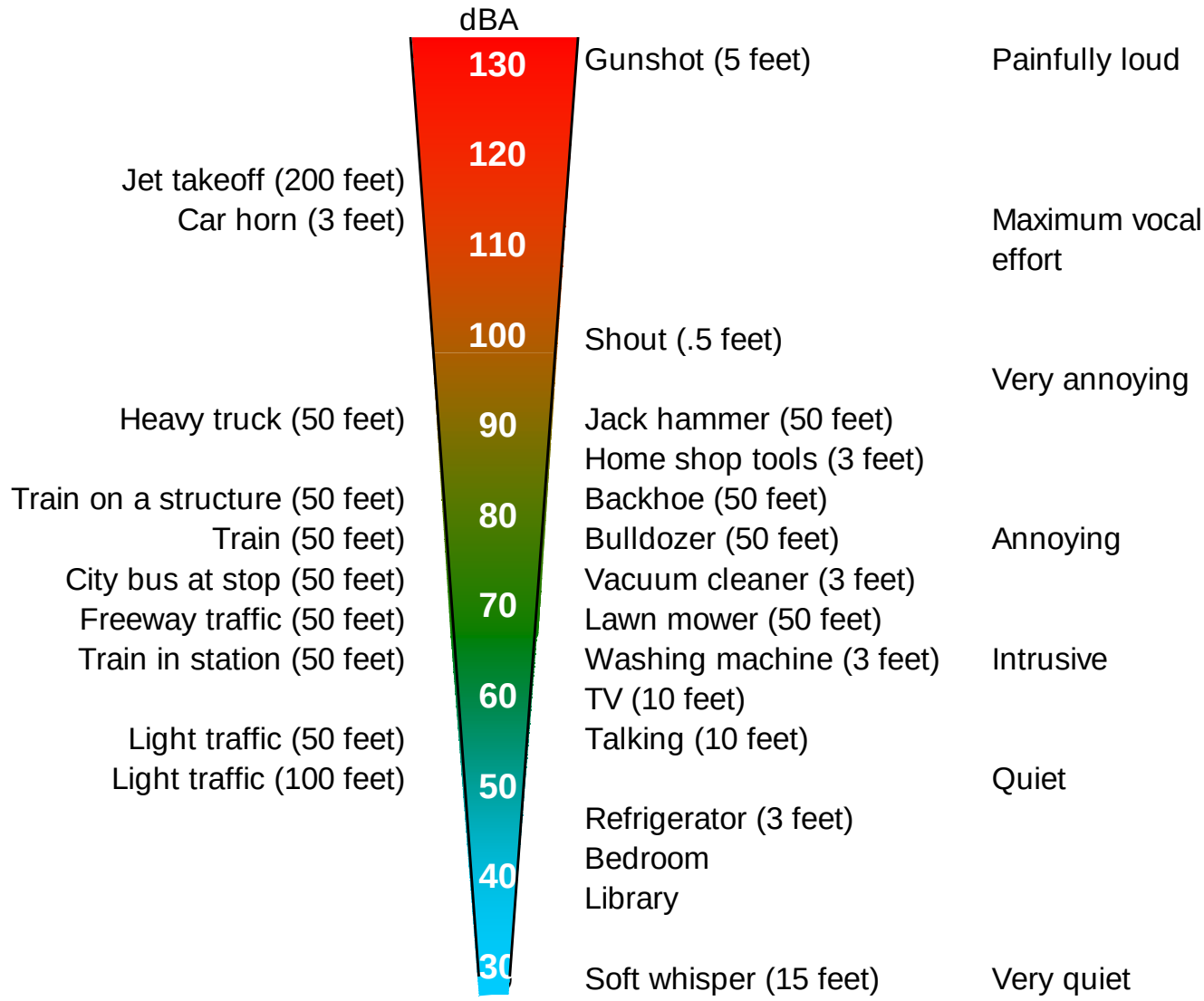
Age Old Question

- If a tree falls in the forest, it makes a sound
- It does not make noise

Description of Sound

- Sound is defined by magnitude and frequency
  - Magnitude is a measure of pressure in the units of bels or decibels
  - Frequency is measure of pitch in the units of Hertz
- The human ear can hear over a very broad range of magnitude and frequency

Typical Sound Pressure Levels



Existing Noise Measurements

Perception of Sound Level

- Humans perceive changes in sound level
- A 2 to 3 dB change is the smallest perceivable change
- A 5 dB change is readily perceived
- A 10 dB change appears to double or half the sound level

Addition of Sound Levels

- If two sources each produce a sound level of 70 dBA, what is their combined sound level?

140 dBA?

NO!

73 dBA!

WHY?

LOGARITHMS!

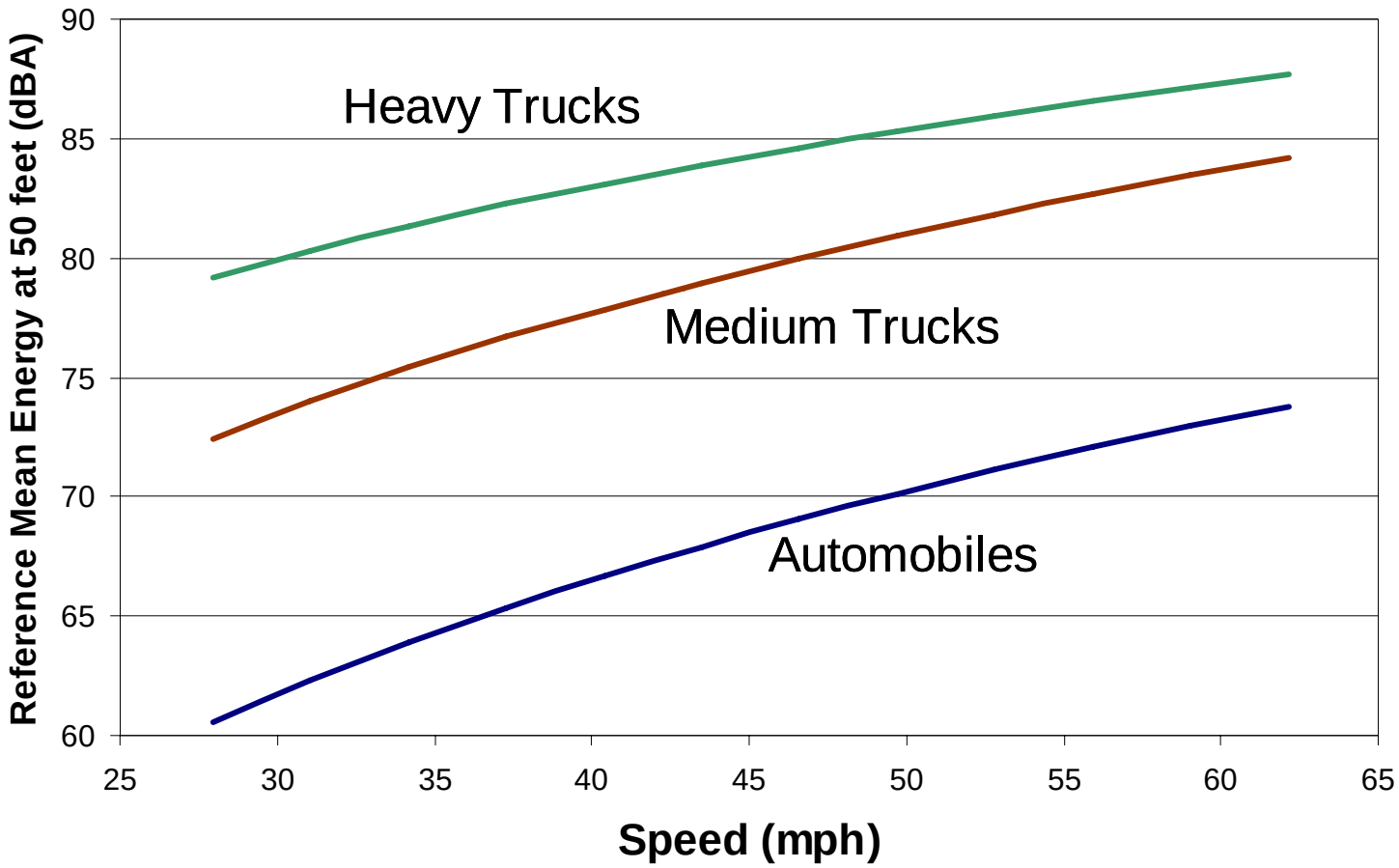
Basics of Traffic Noise

- Traffic noise depends on:
  - the volume of the traffic
  - the speed of the traffic
  - the number of trucks in the flow of traffic
- Vehicle noise is a combination of noises produced by engine, exhaust, and tires
- Traffic noise levels are reduced by distance, terrain, vegetation, and natural and manmade obstacle

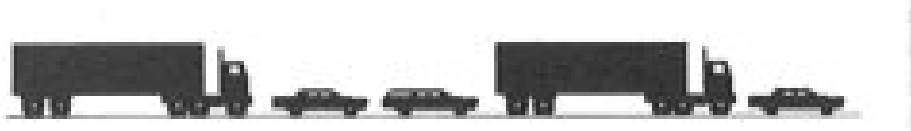
What Contributes

- Tire Noise
  - Dominant for automobiles
  - May be important for trucks
  - High frequency “whine”
- Engine Noise
  - Important for trucks
- Exhaust Noise
  - Important for trucks
  - Low frequency “rumble”

Noise Emissions vs. Speed



Effect of Traffic Volume



2000 vehicles per hour sound twice as loud as

200 vehicles per hour

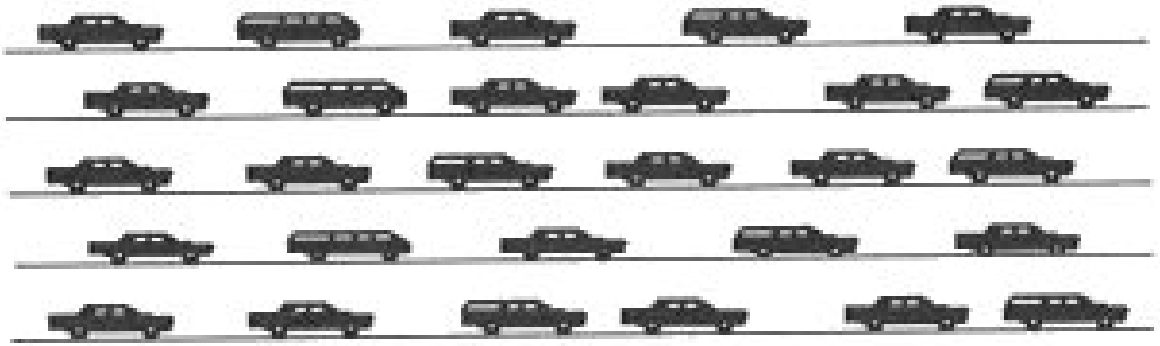
Effect of Speed

Traffic at 65 miles per hour sounds twice as loud as

traffic at 30 miles per hour

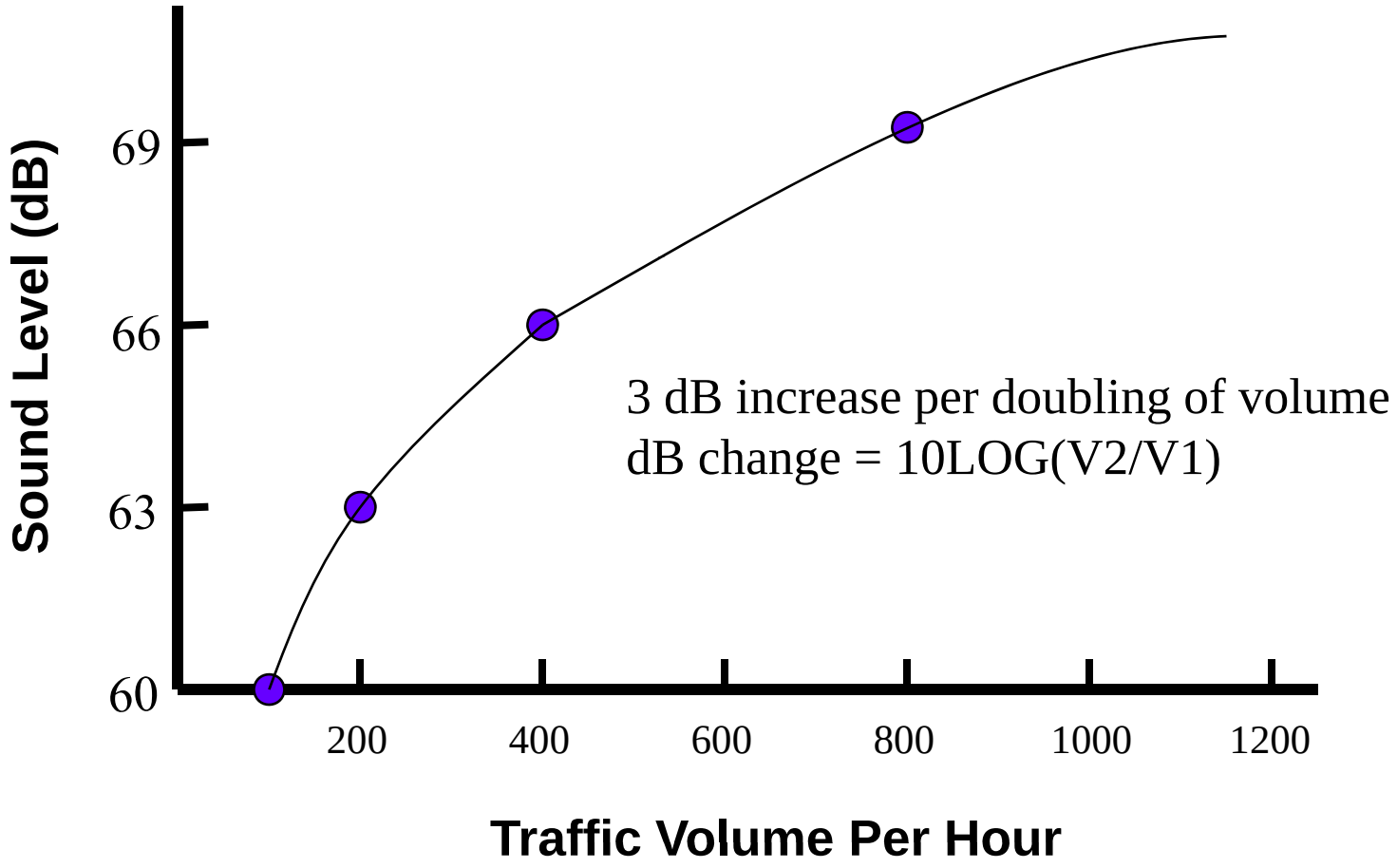
Effects of Trucks

One truck at 55 miles per hour sounds as loud as



28 cars at 55 miles per hour

Volume of Traffic



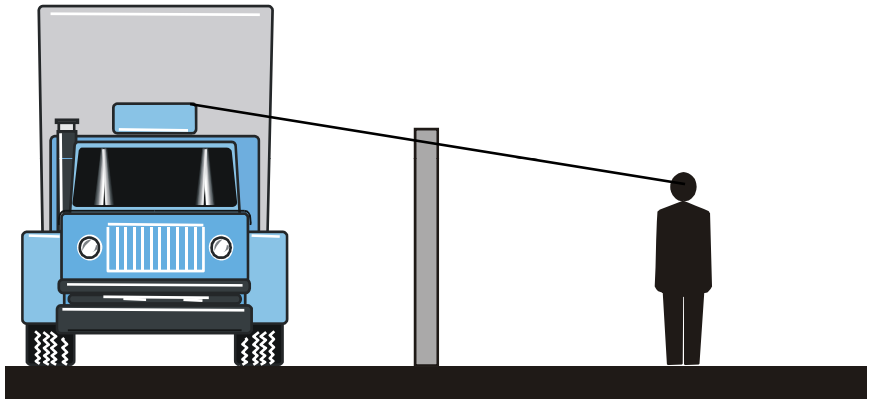
Factors That Affect Traffic Noise

- Source/path/receiver concept volume of traffic
- Vehicle type (trucks versus automobiles)
- Speed of traffic
- Geometric relationship between traffic and the receiver
- Grade of the roadway
- Barriers between traffic and the receiver
- Meteorology (temperature, humidity, wind)

Possible Mitigation Strategies

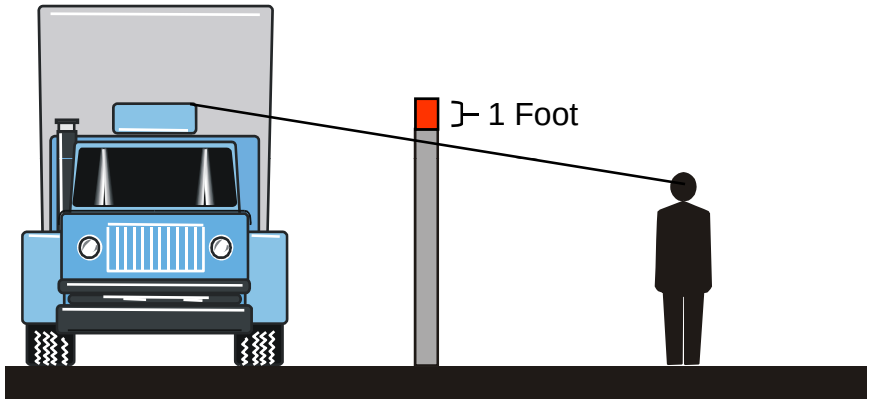
- Construction of noise barriers
- Traffic management measures
- Use different roadway surface (open-graded, rubberized)

Real World Effectiveness



Breaking Line of Sight Results in 5 dBA Insertion Loss

Real World Effectiveness



Each Additional Foot Provides 0.5 dBA Improvement

Feasibility of Wall

- Feasibility can be limited by:
  - Safety
  - Topography
  - Access requirements (i.e. driveways)
  - Local cross streets
  - Other noise sources (background)

Strategies to Reduce Noise

- Traffic Management Measures (reduces speed of traffic)
- Alternate Roadway Surface (open-graded, rubberized; 4 to 6 dBA noise reduction)

What Next?

- Determine the Noise Levels Based on Future Alternatives
- Compare and Evaluate Noise Reduction Strategies

Best Practice Examples

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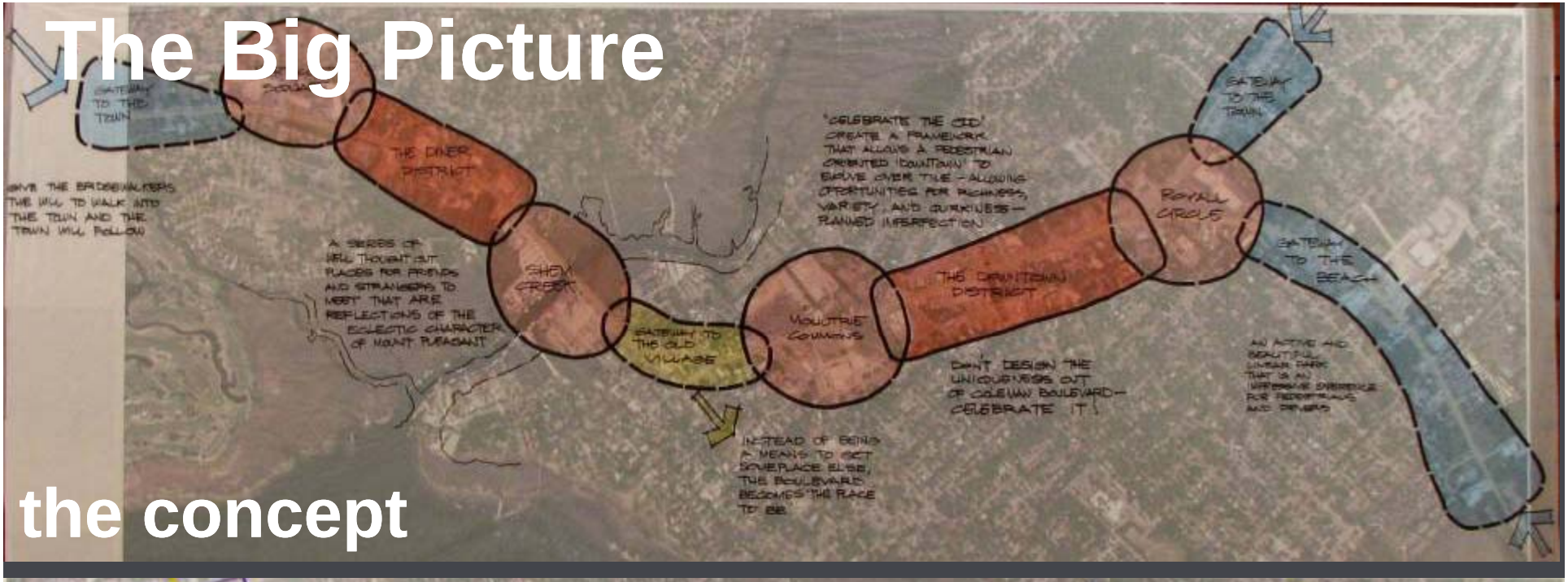
Qualities of Great Streets

- Unique Qualities
- People Places
- Peds, Bikes, & Cars
- Attractive Streetscape
- All Elements Work Together

Elements of Great Streets

- Access
- Lighting
- Walking
- Biking
- Traffic
- Transit
- Street Furniture
- Landscaping
- People Places

The Big Picture

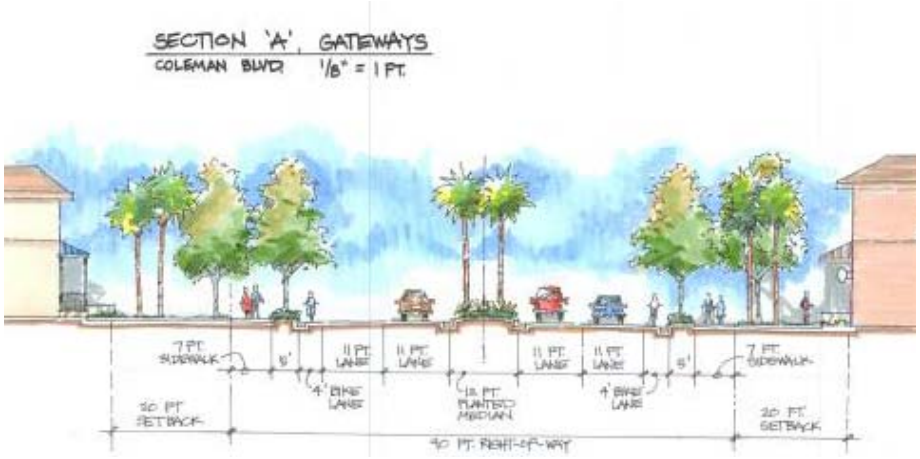


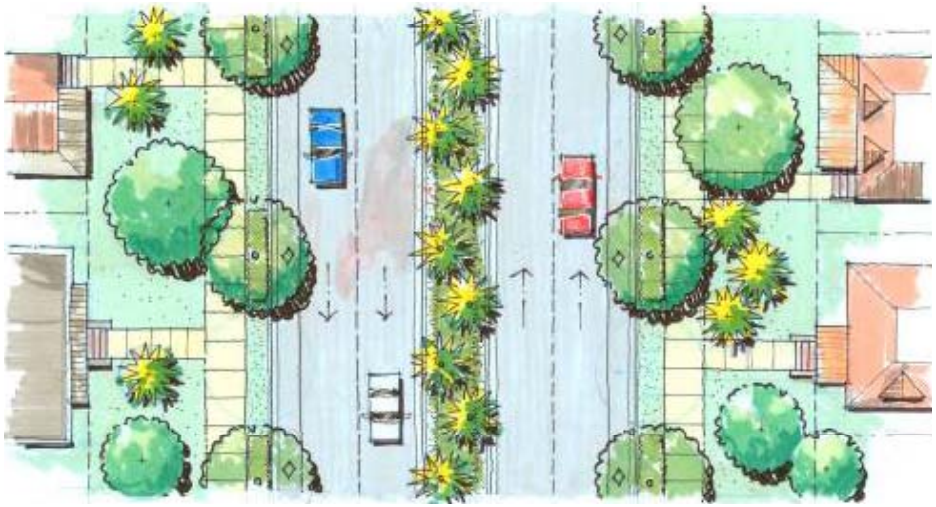
the concept

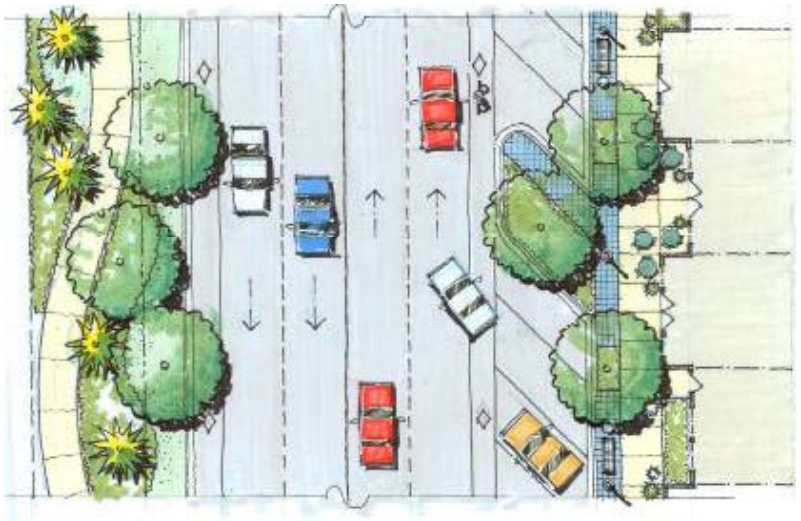
the necklace

Emphasizing the Unique Qualities

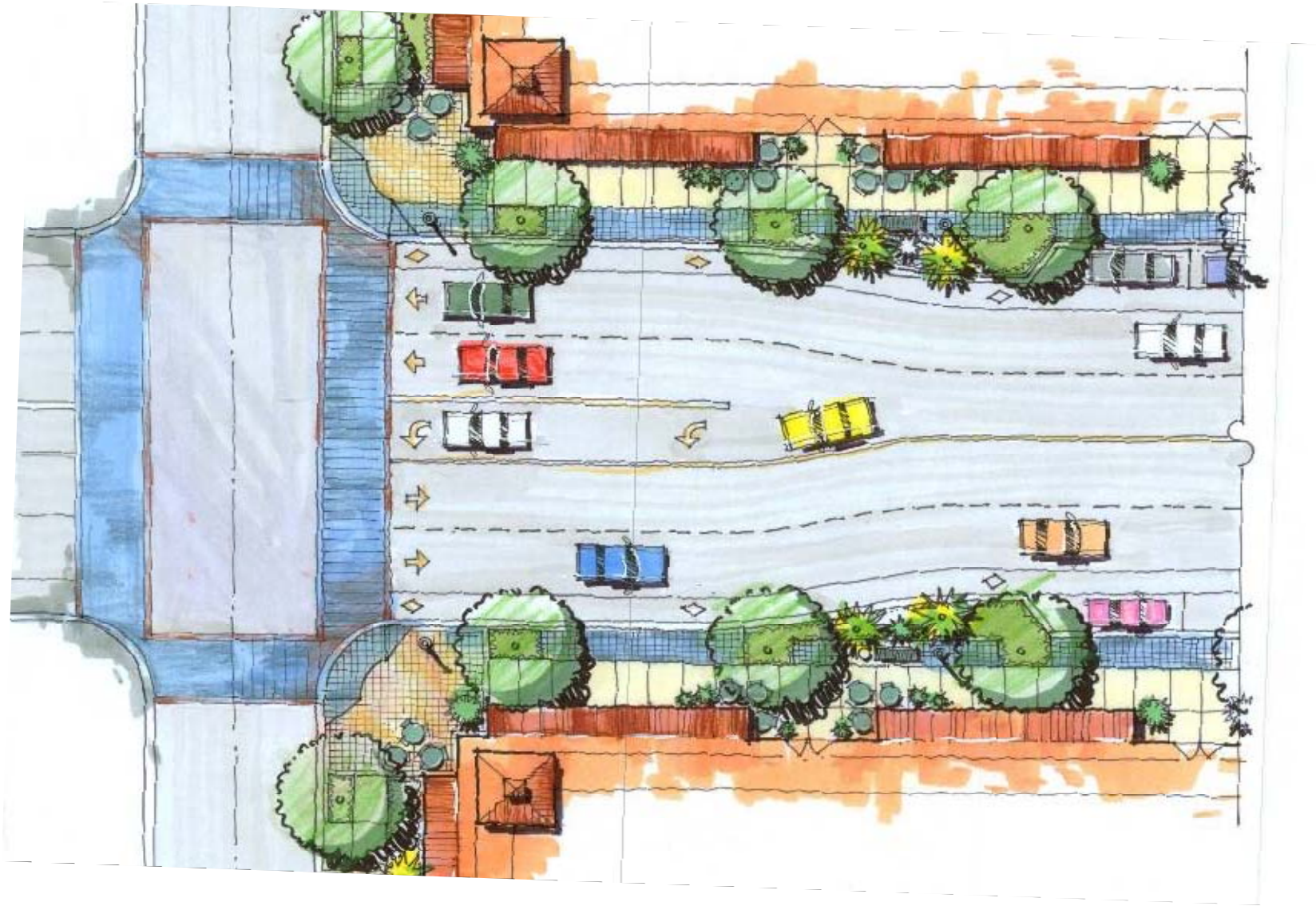
Emphasizing the Unique Qualities







Intersections for Pedestrians



Places for People

Medians & Pedestrian Crossings

Landscape Buffers

The Result: A Complete Street

“A Complete Street is safe, comfortable and convenient for travel via automobile, foot, bicycle, and transit.”

www.completestreets.org

Community Character

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Community Character

- What is a neighborhood?
  - Physical: houses and streets, parks and stores, churches and schools.
  - Real importance of a neighborhood: neighbors and neighborliness
- Who are neighbors?
  - Sense of connection
  - Sense of responsibility to the place
  - Not anonymous within the space

Broadway Walk Feedback

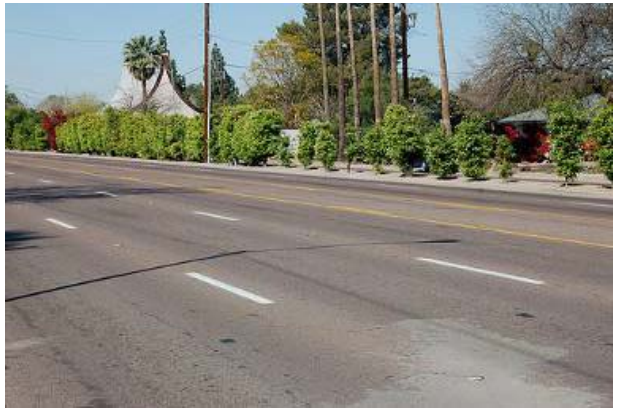
- Safety at transit stop – size of waiting areas, visibility
- Neighborhood safety
- Cut through traffic
- Noise
- Through-connectivity of bicycle facilities
- Litter
- Orange trees – landscape / maintenance issue
- Homes with direct access to Broadway Road
- Maintaining Broadway Lane

Flickr Feedback

- “No character here - it's flat, noisy, busy, hazardous and uninviting to pedestrians. No neighborhood feel...”
- “Confused, mish-mash entrance to: University Estates, bank, frontage road and right-hand turn lane...”
- “Why not another neighborhood-friendly business here? Coffee shop, restaurant, etc...”

Existing Conditions

- Safety
- Access
- Connectivity to citywide bicycle/ pedestrian network
- Pass-through vs. neighborhood users
- Inconsistent landscaping – inconsistent character
- Litter



Community Character

- Character-giving elements
  - Building form and style
  - Building street appearance and site layout
  - Public domain elements
    - Sidewalks
    - Lighting
    - Crosswalks
    - Transit stops

Existing Elements in Tempe

- Textured medians
- Visually interesting pedestrian facilities
- Noise walls with pedestrian access
- Distinct character areas

Potential Along Broadway

- Access control to neighborhoods
  - Limiting vehicle traffic creates more of a public/bicycle/pedestrian space
  - Use of alleys
  - Restricted vehicle movement

Potential Along Broadway

- Crossings
  - Signalized pedestrian crossings
- Median Treatments
  - Raised
  - Landscaped
  - Textured

Potential Along Broadway

- Pavement Treatments
  - Color and texture
  - Create a visual separation at crosswalks, bikeways and pedestrianways

Potential Along Broadway

- Planters
- Street Trees
- Light Poles with Identifying Banners
- Seating
- Public Art

Small Group Discussions

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Discussion Group Questions

1. What existing elements on Broadway Road help define your community - things that are unique or special?
2. What elements on Broadway Road would you like to see remain or enhanced?
3. What needs to change to make Broadway Road a better street?
4. What amenities would you like to see on Broadway Road and how would those amenities benefit: residents, businesses, pedestrians, cyclists, and drivers?
5. Do you know of examples of streets elsewhere that have amenities you would like to see on Broadway Road? Where and what are the amenities?

Next Steps

- Take Your Input and Develop Alternatives
- Discuss Alternatives at Next BRAT Meeting on April 7
- Refine Alternatives
- Present Alternatives with You in May or June