

**Project Selection for a  
Multimodal TIP:  
An Air Quality Focus**

**National Association of Regional Councils  
36<sup>th</sup> Annual Conference & Exhibition**

**June 25, 2002**

**2002-  
2004**

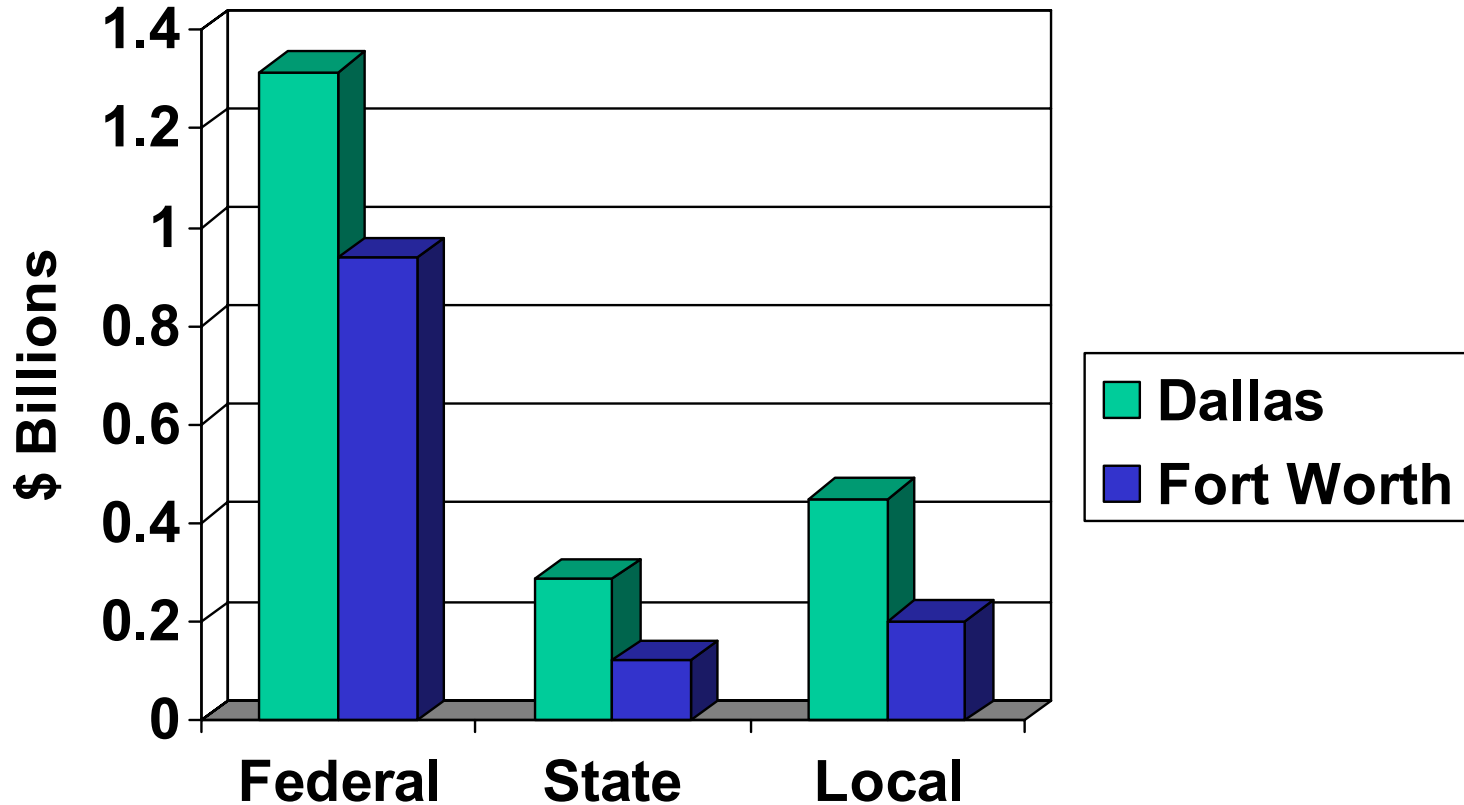
# **Transportation Improvement Program**

for the Dallas-Fort Worth

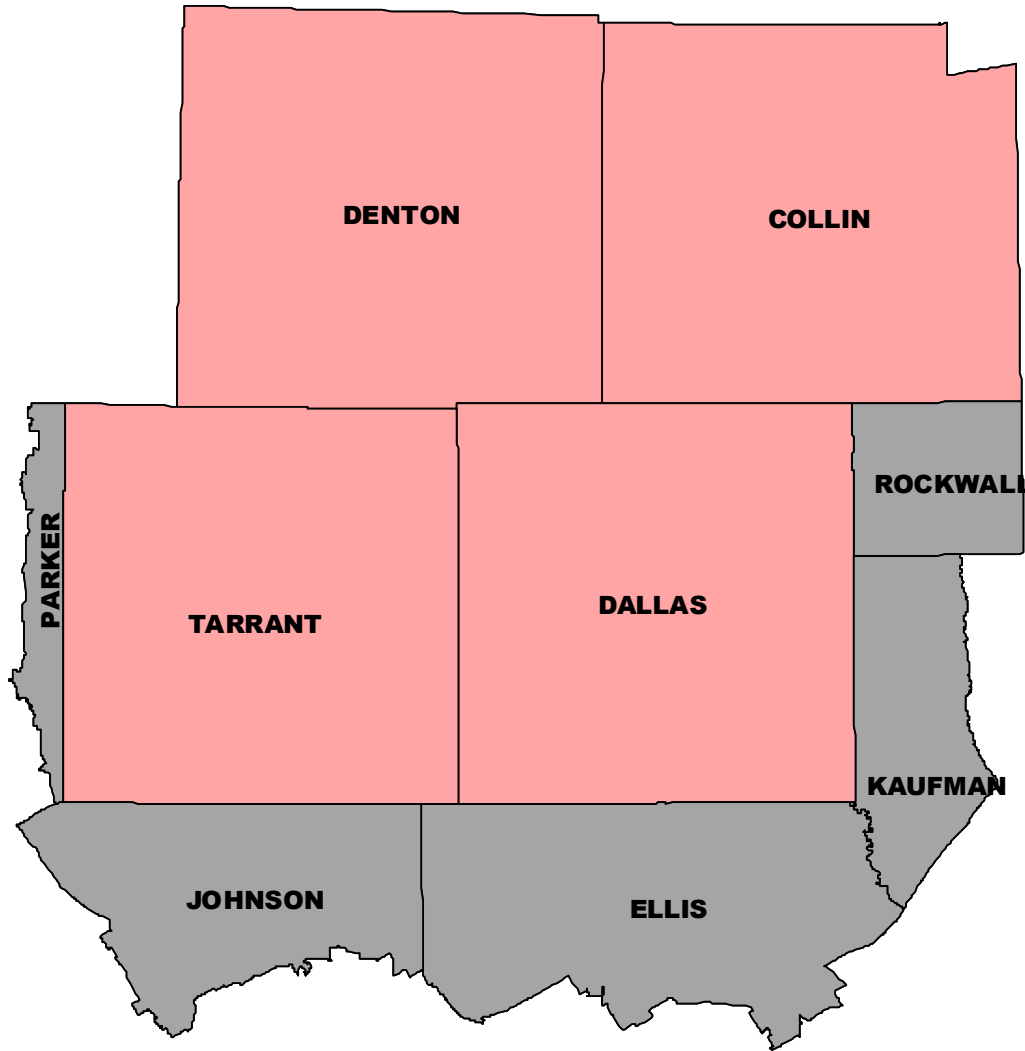
Metropolitan Area

North Central Texas  
Council of Governments

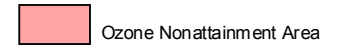
# 2002-2004 TIP Funding Programs



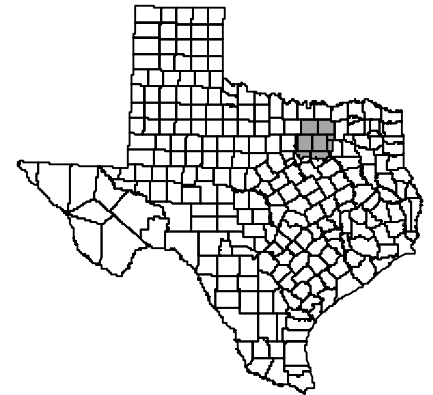
# CONGESTION MITIGATION AND AIR QUALITY IMPROVEMENT FUNDING PROGRAMS



## LEGEND



## LOCATION MAP

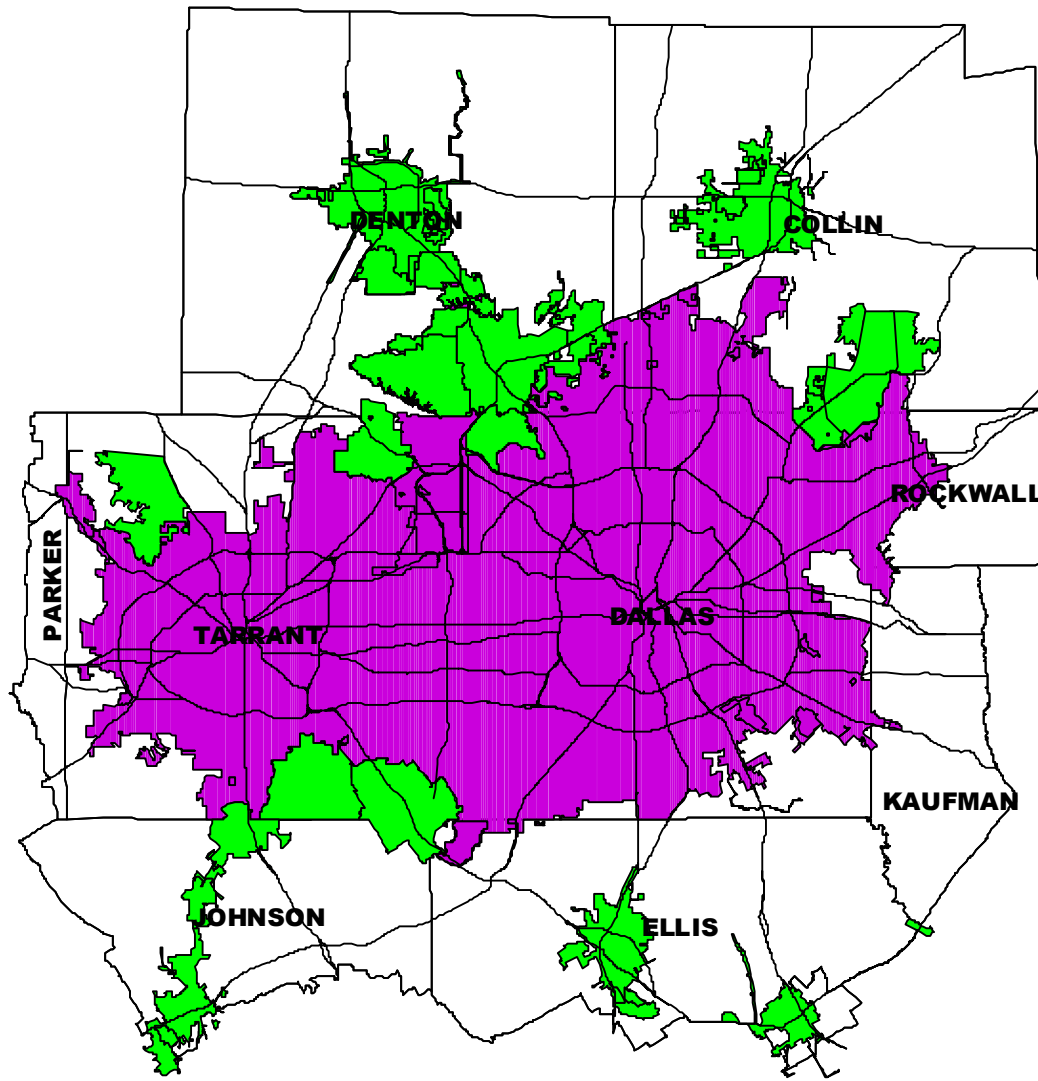


Scale in Miles






North Central Texas  
Council of Governments  
Transportation Department

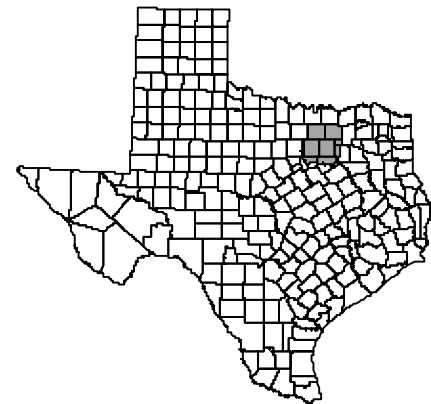
# SURFACE TRANSPORTATION FUNDING PROGRAMS



## LEGEND

-  Metropolitan Mobility
-  Urban Mobility
-  Rural Mobility

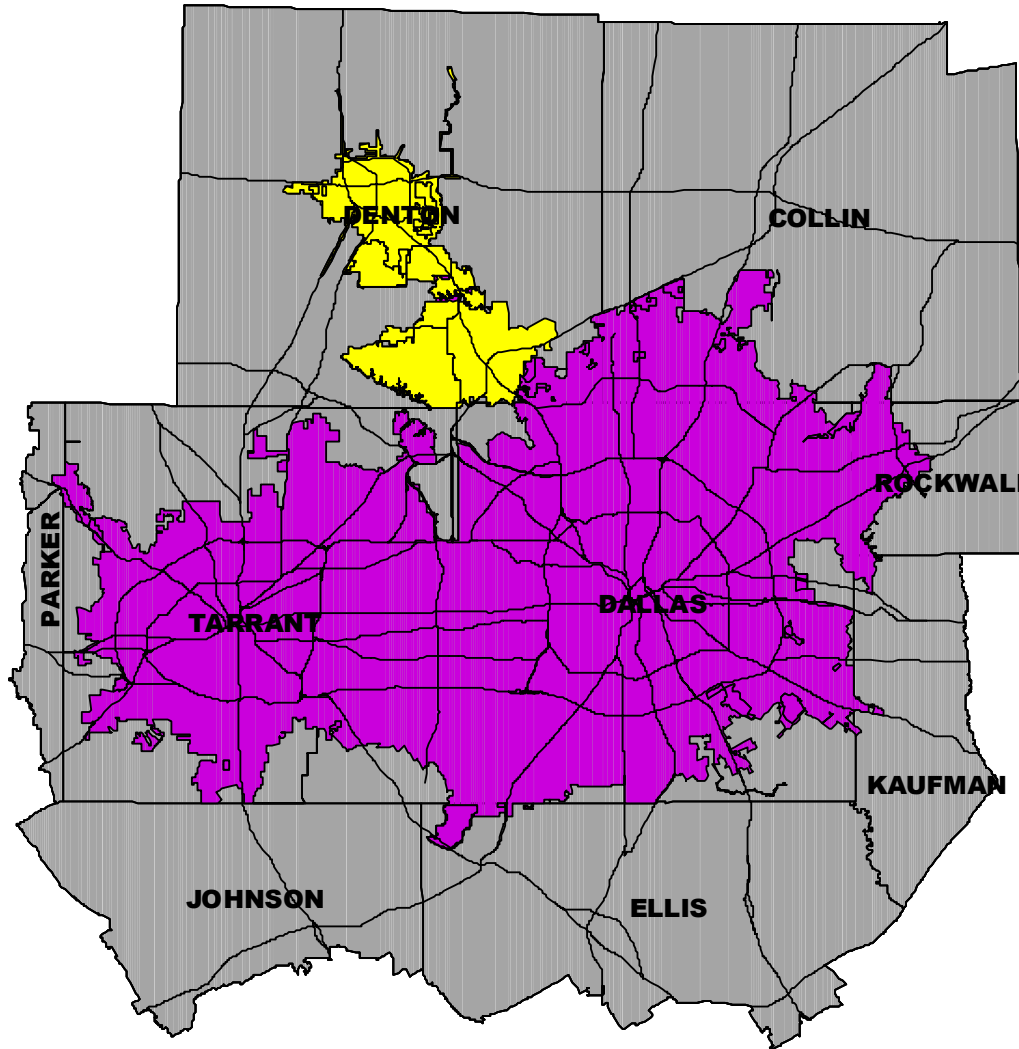
## LOCATION MAP






Scale in Miles



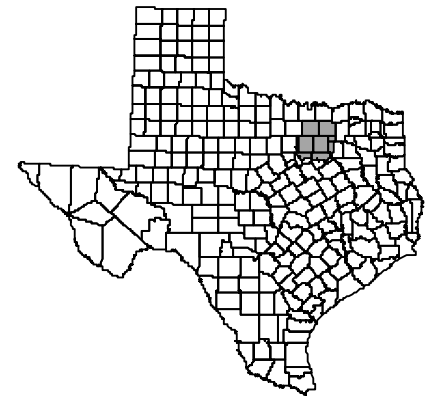
# TRANSIT FUNDING PROGRAMS



## LEGEND

-  DFW Urban Area
-  Denton/Lewisville Urban Area
-  Rural Area

## LOCATION MAP



Scale in Miles



North Central Texas  
Council of Governments  
Transportation Department

# **MPO Project Selection Through Calls for Projects**

## **Mobility and Air Quality (CMAQ and STP-MM)**

Calls for projects in 1992, 1994 and 1999

Next call anticipated in 2002 or 2003

Commitments = Current Transportation Bill + 3 Years

## **Urban Street Rehabilitation (TxDOT funds and STP-MM)**

Calls for projects in 1995 and 1998

## **TxDOT Calls for Projects (NCTCOG Participation)**

Surface Transportation Enhancement Program – 5 Calls

Elderly and Persons with Disabilities Program – 4 Calls

## **Other NCTCOG Calls for Projects**

Alternative Fuels/Clean Vehicle Program – 3 Calls

Land Use/Transportation Joint Venture – 1 Call

# **Surface Transportation Enhancement Program (STEP)**

- 1. Pedestrians and bicycles facilities**
- 2. Bike/ped safety and education activities**
- 3. Scenic easements, scenic and historic properties**
- 4. Scenic or historic highway programs (including tourist centers)**
- 5. Landscaping and scenic beautification**
- 6. Historic preservation**
- 7. Rehabilitation and operation of historic transportation structures**
- 8. Preservation (and conversion) of abandoned railway corridors**
- 9. Control and removal of outdoor advertising**
- 10. Archaeological planning and research**
- 11. Environmental mitigation to address water pollution due to highway runoff or reduce vehicle-caused wildlife mortality**
- 12. Establishment of transportation museums.**

# Surface Transportation Enhancement Program (STEP)

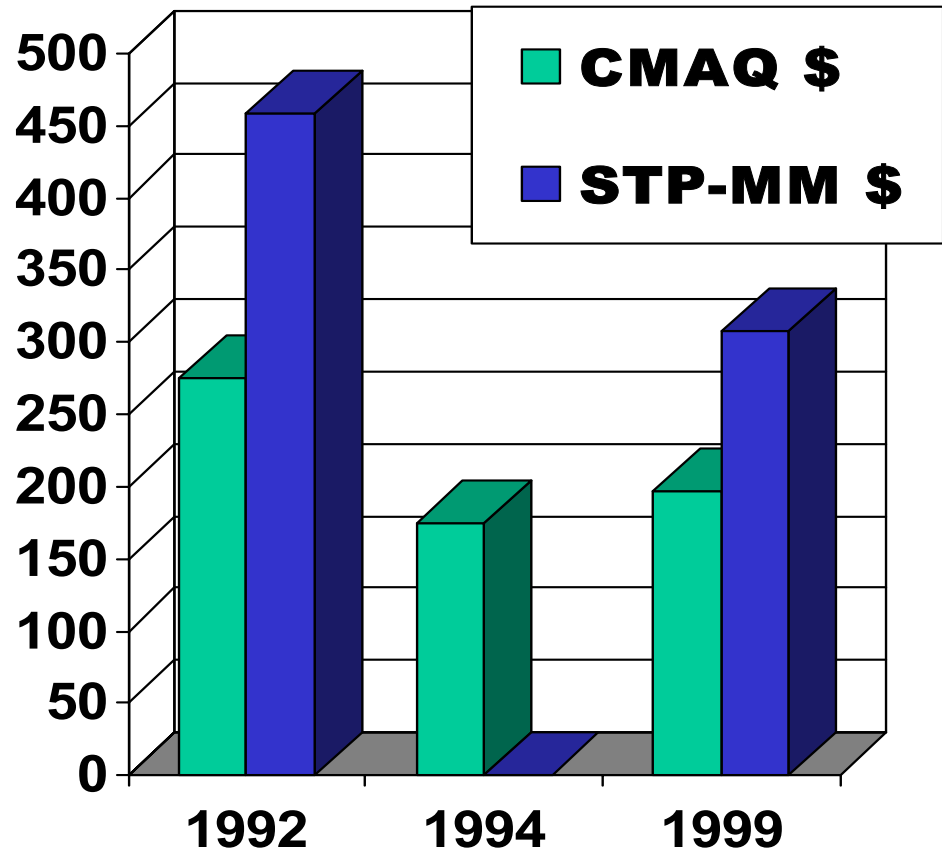
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# Previous CMAQ & STP-MM Calls for Projects

1992 CFP: 338 projects  
totaling \$757 million

1994 CFP: 207 projects  
totaling \$173 million

1999 CFP: 217 projects  
totaling \$515 million



# Distribution of Funding by Project Type (MPO-Selected)

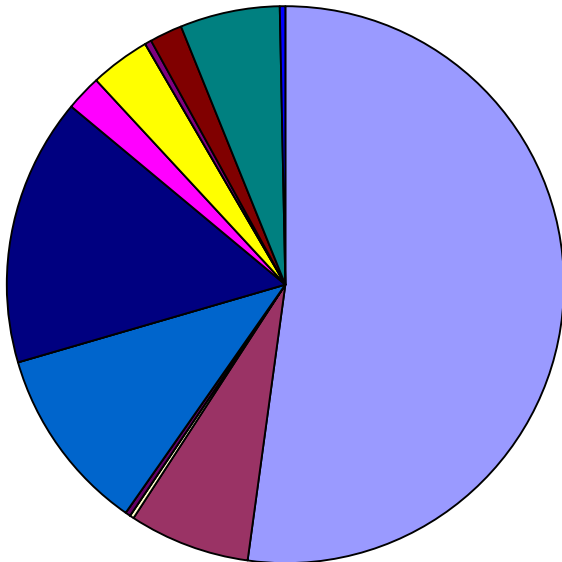
## 1992 Call For Projects

Addition of Lanes—52%

Int. Improvements—16%

HOV Facilities—11%

Alt. Fuel Conversion—7%



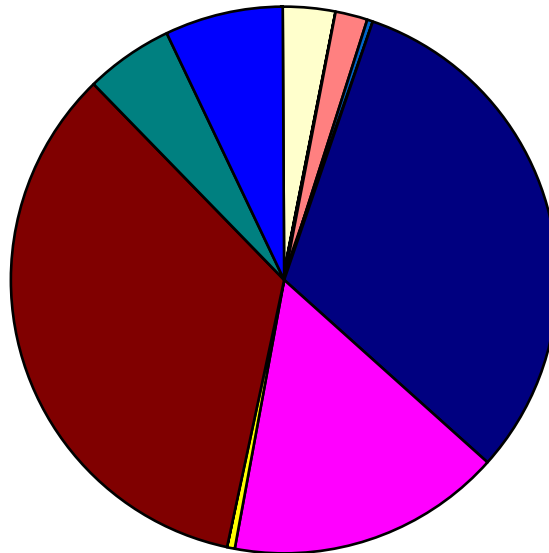
## 1994 Call For Projects

Rail Transit—35%

Int. Improvements—31%

ITS—16%

Travel Demand Mgmt—7%



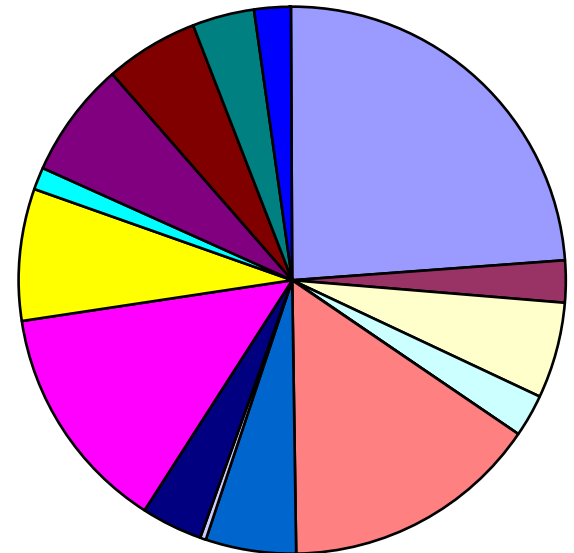
## 1999 Call For Projects

Addition of Lanes—24%

Grade Separations—15%

ITS—14%

New Roadways—8%



# MPO Project Selection Criteria

## Congestion Mitigation & Air Quality Improvement Program

|  |           |
|--|-----------|
| Current cost effectiveness (1995)      | 20 Points |
| Air quality/energy conservation (1995) | 20 points |
| Local cost participation               | 20 Points |
| Intermodal/multimodal/social mobility  | 20 Points |
| Congestion Mgmt System strategy/TCM    | 20 Points |

## Surface Transportation Program—Metropolitan Mobility

|  |           |
|--|-----------|
| Current cost effectiveness (1995)      | 24 Points |
| Future cost effectiveness (2020)       | 18 Points |
| Air quality/energy conservation (1995) | 18 Points |
| Local cost participation               | 24 Points |
| Intermodal/multimodal/social mobility  | 16 Points |

# Technical Evaluation Process: An Example

**Grade Separations (Criterion: Current Cost Effectiveness, or Benefits/Cost, Based on Travel time Savings)**

$$\text{Travel Time Savings} = TT_B - TT_A$$

Where:  $TT_B$  = Travel time before improvement (hours)

$TT_A$  = Travel time after improvement (hours)

$$\text{Travel Time (hours)} = \frac{\text{VOL} * \text{VOL Factor} * \text{Approach Distance}}{\text{Speed}}$$

Where: VOL = Total 2-way approach volume

VOL Factor = Directional split \* Peak hr factor \* Peak period hours

Approach Distance = 0.25 miles for grade separations

Speed = Speed in miles per hour (before & after improvement)

# Technical Evaluation Process: An Example

Grade Separations (Criterion: Air Quality/Energy Conservation, or Dollars Per Pound Cost of NOx Emissions)

1. Calculate existing daily hydrocarbon (HC) emissions:

$$E_B = EF_B * VOL_{APP} * DIST_{APP}$$

Where:  $E_B$  = Emissions before improvement (grams)

$EF_B$  = Emission factor (grams per mile) based on assumed speed before improvement

$VOL_{APP}$  = Daily approach volume

$DIST_{APP}$  = Approach distance in miles (0.25 – grade separations)

# Technical Evaluation Process: An Example

Grade Separations (Criterion: Air Quality/Energy Conservation, or Dollars Per Pound Cost of NOx Emissions)

2. Calculate daily HC emissions after improvement:

$$E_A = EF_A * VOL_{APP} * DIST_{APP}$$

Where:  $E_A$  = Emissions after improvement (grams)

$EF_A$  = Emission factor (grams per mile) based on new average speed and improved level of service speed before improvement

# Technical Evaluation Process: An Example

Grade Separations (Criterion: Air Quality/Energy Conservation, or Dollars Per Pound Cost of NOx Emissions)

3. Calculate annual HC emissions reduction ( $E_R$ ):

$$E_R = (E_B - E_A) * 260 \text{ days per year}$$

4. Determine cost per pound of HC reductions:

$$\text{Cost per pound} = (\text{Annual Project Cost} * C_1) / E_R$$

Where:  $C_1 = 454$  grams per pound

# Transportation Funding Overview

## 1999 Call for Projects

### 1. Recurring Congestion Relief with Air Quality Improvement

|  |                     |
|--|---------------------|
| Traffic Signal/Intersection Improvements | \$17,600,000        |
| Intersection/Grade Separation            | \$81,400,000        |
| Freeway Bottleneck Removal               | <u>\$12,000,000</u> |
| Total                                    | \$110,000,000       |

### 2. Non-Recurring Congestion Relief with Air Quality Improvement

|  |              |
|--|--------------|
| Advanced Transportation Management Program (ITS) | \$73,400,000 |
|--|--------------|

# Transportation Funding Overview

## 1999 Call for Projects

### 3. Mode Selection Congestion Relief with Air Quality Improvement

|                             |                     |
|-----------------------------|---------------------|
| Ozone Season Fare Reduction | \$2,500,000         |
| Rail Transit                | \$49,000,000        |
| HOV                         | \$31,500,000        |
| Bicycle/Pedestrian          | \$25,900,000        |
| Vanpool                     | \$4,600,000         |
| Travel Demand Management    | \$4,100,000         |
| Park and Ride               | <u>\$12,500,000</u> |
| Total                       | \$130,100,000       |

# Transportation Funding Overview

## 1999 Call for Projects

### 4. No Congestion Relief with Air Quality Improvement

|   |                    |
|---|--------------------|
| High Emitting Vehicle Trade<br>Program/Transit Pass | \$3,000,000        |
| Inspection/Maintenance/Remote<br>Sensing            | \$600,000          |
| Transit Alternative Fuel                            | \$30,700,000       |
| Non-Transit Alternative Fuel                        | <u>\$8,800,000</u> |
| Total   | \$43,100,000       |

### 5. Congestion Relief Without Air Quality Credit

|                              |                     |
|------------------------------|---------------------|
| Arterial Street Improvements | \$134,436,000       |
| Freeway Improvements         | <u>\$14,300,000</u> |
| Total                        | \$148,736,000       |

# SUSTAINABLE DEVELOPMENT INITIATIVE

## Land Use/Transportation Joint Venture Projects

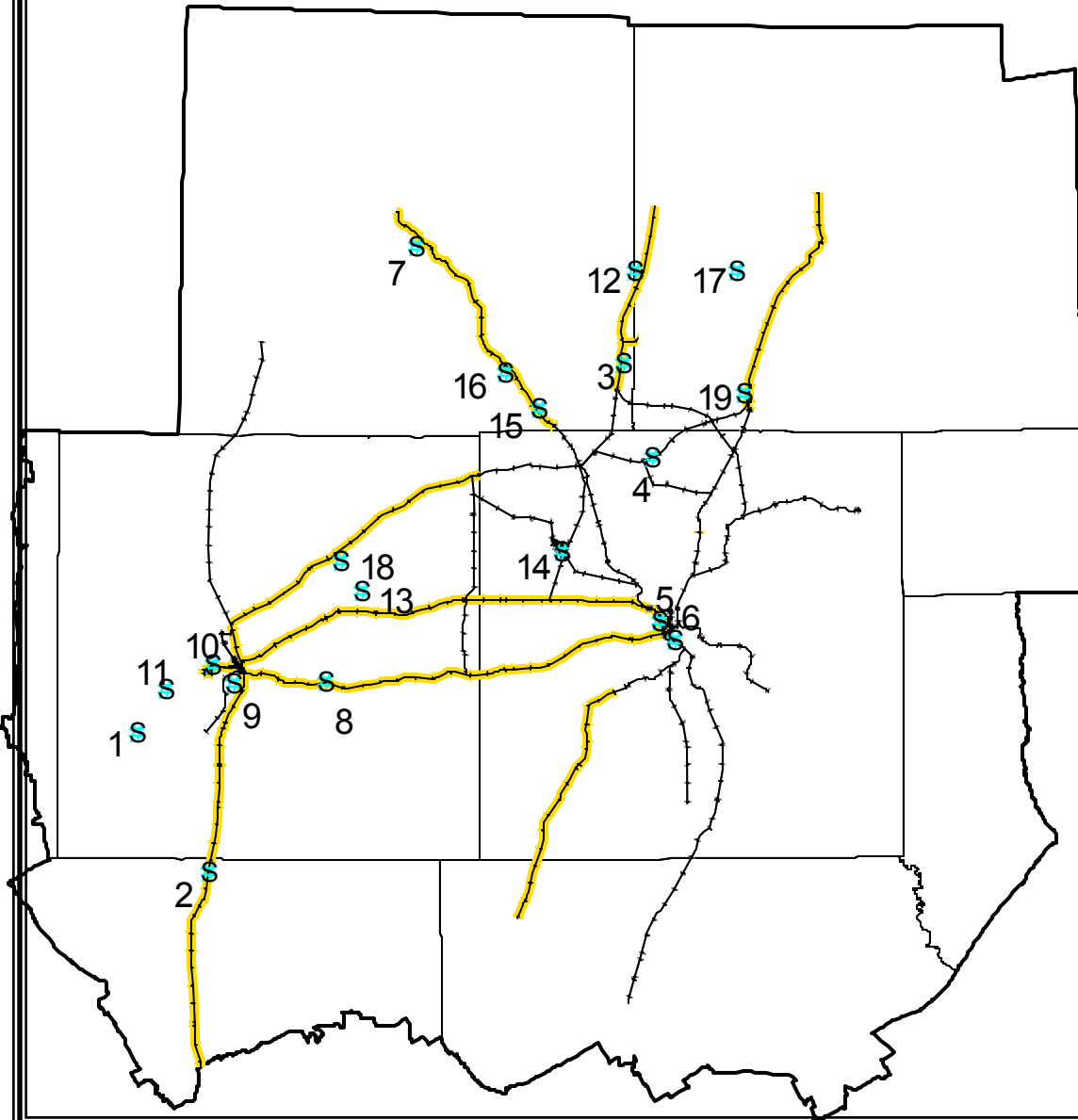
### 2001 Land-Use/Transportation Joint Venture Program

#### Legend

- S** Selected Joint Venture Projects
- 2025 Rail Lines<sup>1</sup>
- 2025 Rail Lines<sup>1</sup> Recommended for Transit / Land Use Study

Area Displayed Represents the Metropolitan Planning Area

<sup>1</sup> Rail as recommended in the Mobility 2025 Update



North Central Texas  
Council of Governments  
Transportation Department



# **MPO Project Selection Through Partnership**

## **Regional Transportation Council / Texas Transportation Commission**

Leveraging STP-MM funds to attract state funds

Annual proposals for Strategic Priority funds (since 1996)

Participation in NHS buy-down (since 1998)

Annual Partners In Mobility presentations to Commission

## **Urbanized Area Formula Program (3 Urbanized Areas)**

NCTCOG hosts annual meeting of transit providers

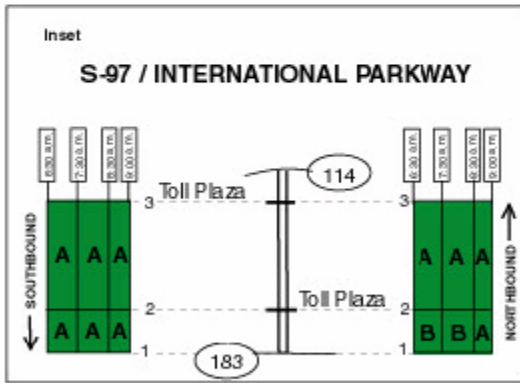
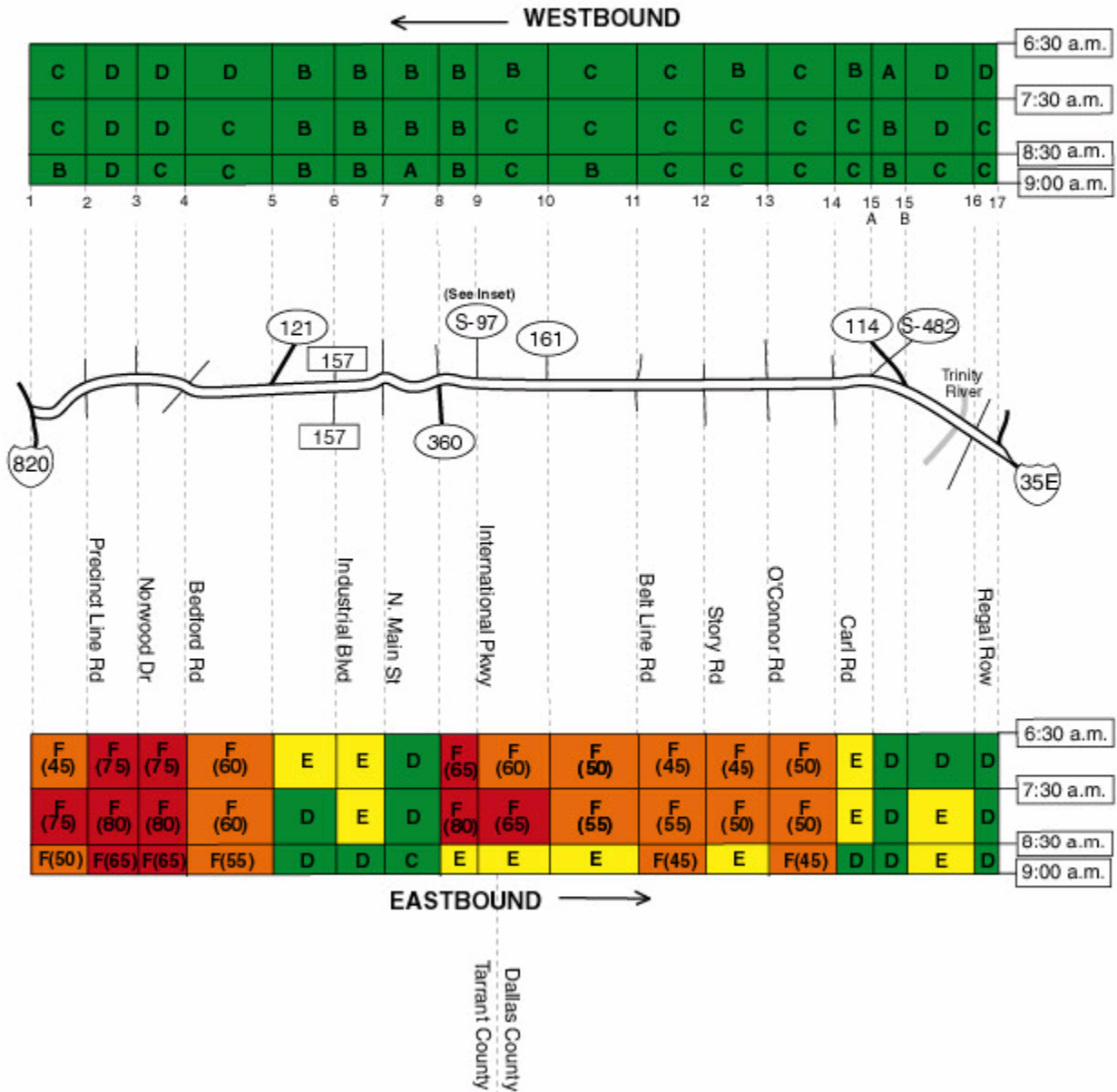
Project identification transit providers in consultation with NCTCOG

## **Strategic Programming Initiative**



# TEXAS STATE HIGHWAY 183 MORNING (FALL 1999)

RETURN



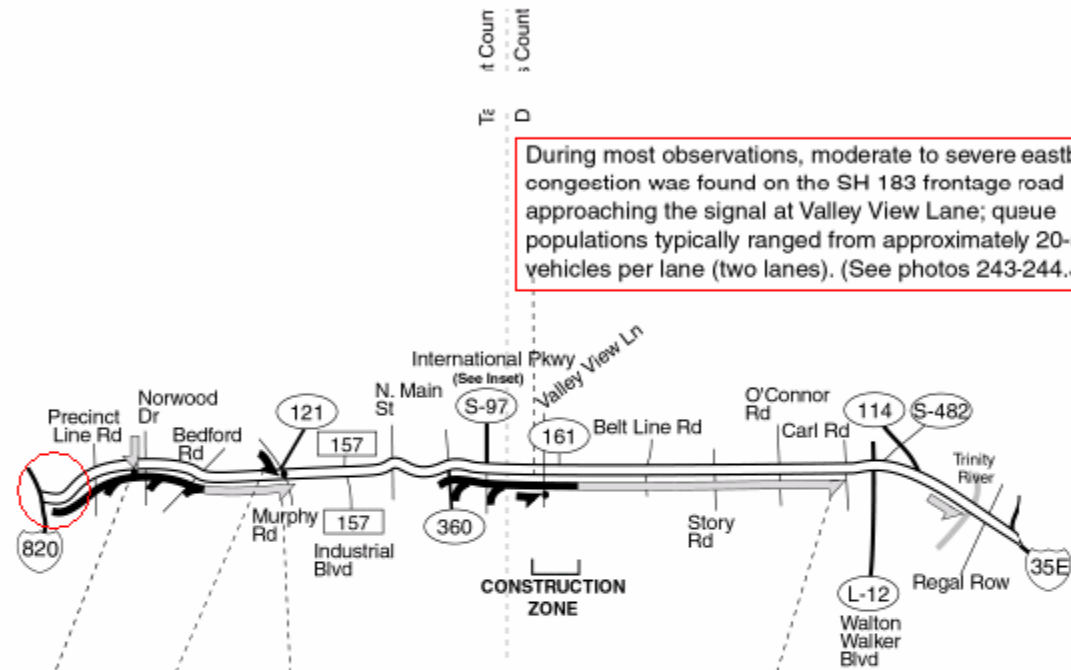


# SH 183 MORNING (FALL 1999)

LEVEL OF  
SERVICE

EVENING

RETURN



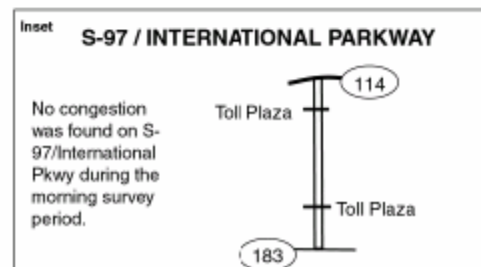
During most observations, moderate to severe eastbound congestion was found on the SH 183 frontage road approaching the signal at Valley View Lane; queue populations typically ranged from approximately 20-50 vehicles per lane (two lanes). (See photos 243-244.JPG)

During the peak period, southbound congestion was typically found on Norwood Dr approaching the signalized intersections at SH 183; queue populations typically ranged from approximately 20-30 vehicles (left lane).

During most observations, moderate to severe eastbound congestion was found on SH 183 between I-820 and SH 121; average estimated speeds ranged from approximately 20-40 mph. Traffic entering at Precinct Line Rd, Norwood Dr and Bedford Rd appeared to cause the congestion. (See photos 245-251.JPG)

During most observations, southbound congestion was found on Murphy Rd approaching the signalized intersections at the SH 183 interchange; queue populations typically ranged from approximately 20-40 vehicles (left lane). In some cases, congestion extended back through the upstream signal on the frontage road. (See photo 252.JPG)

During most observations, an extended zone of eastbound congestion was found on SH 183 between the vicinity of SH 360 and Loop 12; average speeds ranged widely, from approximately 20-45 mph. Congestion was particularly severe between SH 360 and SH 161; traffic entering at the freeway interchanges (SH 360 and International Pkwy) appeared to exacerbate this congestion (ongoing construction at the SH 161 interchange may also have contributed to the congestion). (See photos 234-242.JPG)



# Thoroughfare Assessment

**Detailed Traffic Delay and  
Air Quality  
Before/After Analysis**

**Thoroughfare Assessment**

**Survey of Detectors**



**Selection of  
Consultant(s)**



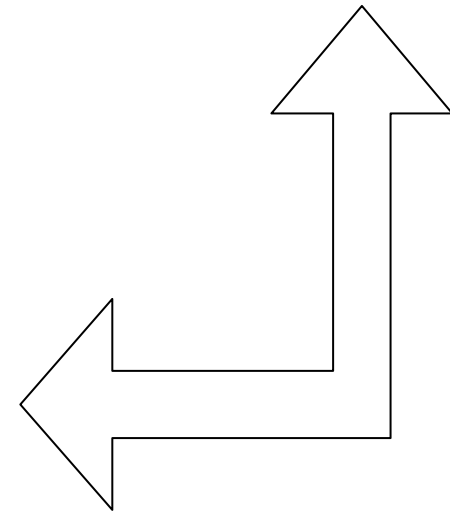
**Pilot Assessment  
(1 to 2 Corridors)**



**Regionwide Selection  
of Thoroughfares  
(30 + Corridors)**



**Regionwide  
Thoroughfare  
Assessment**



# **DFW AIR QUALITY IMPLEMENTATION PROGRAM**

## **Policies, Programs, and Projects**

| <b>Program Name</b>                             | <b>Cost<br/>(millions)</b> | <b>Funding<br/>Source</b> |
|---|----------------------------|---------------------------|
| <b>Traffic Signal Integration/Monitoring</b>    | <b>6.0</b>                 | <b>CMAQ</b>               |
| <b>Bicycle/Ped Public Education/Information</b> | <b>0.4</b>                 | <b>STP-MM</b>             |
| <b>Ozone Season Transit Incentives</b>          | <b>2.5</b>                 | <b>CMAQ</b>               |
| <b>Employee Trip Reduction</b>                  | <b>0.5</b>                 | <b>STP-MM</b>             |
| <b>Vanpools</b>                                 | <b>2.2</b>                 | <b>STP-MM</b>             |
| <b>Central Dallas Guaranteed Ride Home</b>      | <b>0.3</b>                 | <b>STP-MM</b>             |
| <b>DFW Airport Transportation Mgt. Assoc.</b>   | <b>0.25</b>                | <b>STP-MM</b>             |
| <b>Clean Vehicle Loaner-Alternative Fuels</b>   | <b>0.8</b>                 | <b>CMAQ</b>               |
| <b>Regional ITS Communication System</b>        | <b>1.48</b>                | <b>CMAQ</b>               |
| <b>AQ Public Education/Information</b>          | <b>0.9</b>                 | <b>STP-MM</b>             |
| <b>Digital Aerial Photography</b>               | <b>2.9</b>                 | <b>STP-MM</b>             |
| <b>DFW Rail Project</b>                         | <b>0.75</b>                | <b>CMAQ</b>               |
| <b>Service Program for Aging Needs Vanpools</b> | <b>0.3</b>                 | <b>STP-MM</b>             |
| <b>Heavy-Duty Delivery Truck Project</b>        | <b>4.4</b>                 | <b>CMAQ</b>               |

# DFW AIR QUALITY CONFORMITY ANALYSIS

## Transportation Control Strategy Commitments

### Transportation Control Measures (TCM)

|                               |               |
|-------------------------------|---------------|
| Intersection Improvements     | 775 Locations |
| Bicycle/Pedestrian Facilities | 710 Miles     |
| HOV Lanes                     | 76 Miles      |
| Rail                          | 97 Miles      |
| Grade Separations             | 15 Locations  |
| Park-n-Ride                   | 8,236 Spaces  |
| Vanpools                      | 547 Vehicles  |

### Transportation Emission Reduction Measures (TERM)

|                                    |                   |
|------------------------------------|-------------------|
| Traffic Signal Improvements        | 3,565 Locations   |
| Intelligent Transportation Systems | 350 Miles Covered |

### Voluntary Mobile Emission Reduction Measures (VMEP)

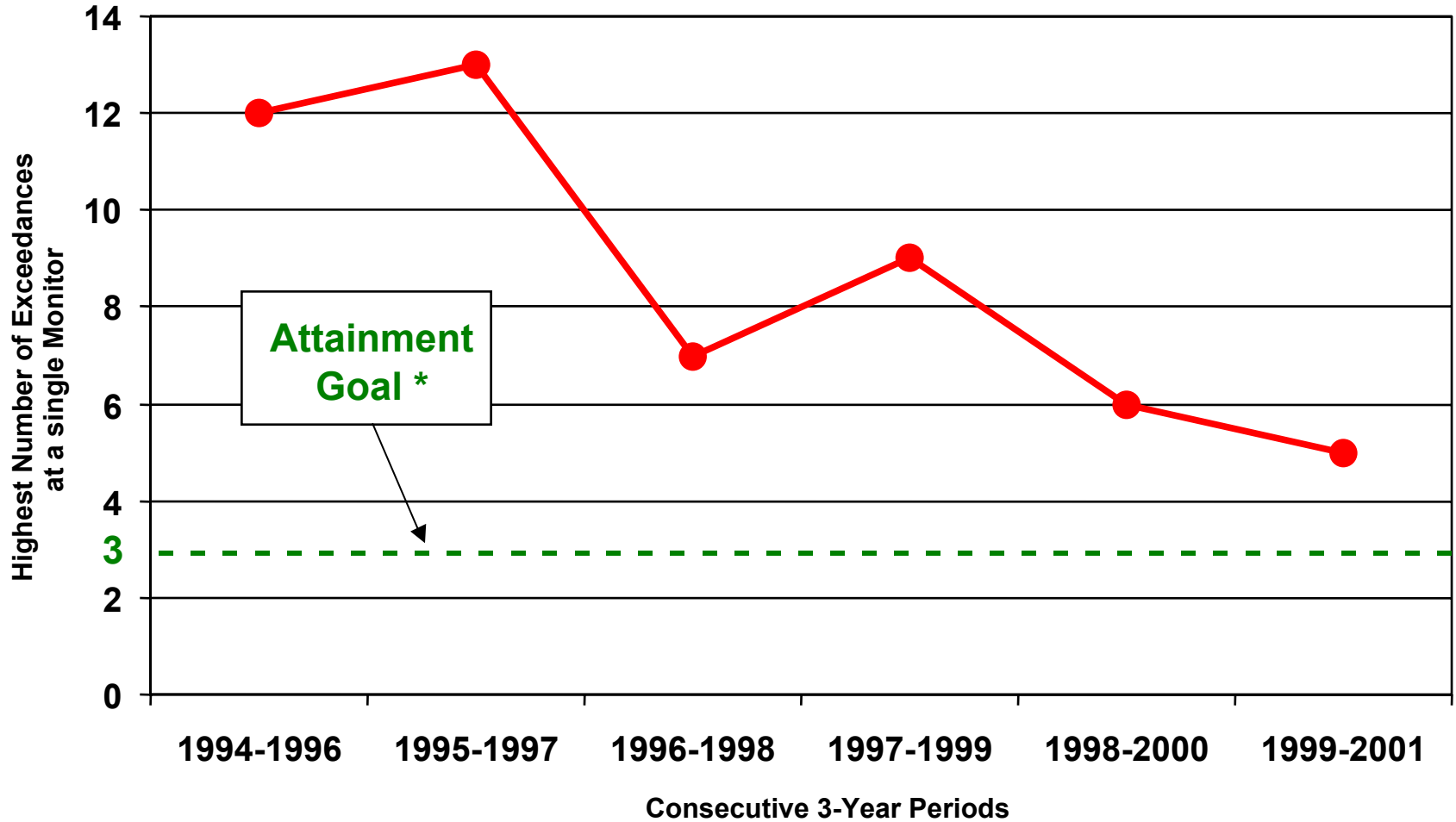
|  |                     |
|--|---------------------|
| Clean Vehicles                               | 3,700 Vehicles      |
| Sustainable Development                      | Regional            |
| Employer Trip Reduction Measures             | Regional            |
| Vehicle Retirement/Maintenance               | 2,500 Vehicles/Year |
| Public Education/Ozone Season Fare Reduction | Regional            |

### Alternate Measures

|                    |
|--------------------|
| Bottleneck Removal |
| CMAQ Projects      |
| Other              |

# DFW 1-HOUR OZONE EXCEEDANCE HISTORICAL TRENDS

## DFW Nonattainment Area



\* Attainment Goal – According to the US EPA National Ambient Air Quality Standards, attainment is reached when there are no more than 3 exceedances per monitor within a consecutive 3-year period.

# **Project Selection for a Multimodal TIP: An Air Quality Focus**

**For more information contact:**

**Dan Rocha 817-695-9265  
drocha@dfwinfo.com**