

**2013 AMENDMENT CYCLE 1**  
**DENVER SOUTHERN SUBAREA 8-HOUR OZONE**  
**CONFORMITY DETERMINATION**

for the  
DRCOG Amended Fiscally Constrained 2035 Regional Transportation Plan and the  
Amended 2012-2017 Transportation Improvement Program

and the  
Southern Subarea Portion of the Upper Front Range 2035 Regional Transportation Plan  
and the 2012-2017 State Transportation Improvement Program for the  
Upper Front Range Transportation Planning Region

Public Hearing Draft  
July 17, 2013

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Preparation of this report has been financed in part through grants from the  
U.S. Department of Transportation, Federal Transit Administration,  
and Federal Highway Administration



## **ABSTRACT**

**TITLE:** 2013 Amendment Cycle 1 Denver Southern Subarea 8-Hour Ozone Conformity Determination for the DRCOG Amended Fiscally Constrained 2035 Regional Transportation Plan and the Amended 2012-2017 Transportation Improvement Program and the Southern Subarea Portion of the Upper Front Range 2035 Regional Transportation Plan and the 2012-2017 State Transportation Improvement Program for the Upper Front Range Transportation Planning Region

**AUTHORS:** Denver Regional Council of Governments

**SUBJECT:** Air quality conformity of the Denver region's and the Southern Subarea Portion of the Upper Front Range region's respective long-range transportation plans and short-range improvement programs

**DATE:** Public Hearing Draft July 17, 2013

**SOURCE OF COPIES:** Public Information and Communications Office  
DRCOG  
1290 Broadway, Suite 700  
Denver, CO 80203  
(303) 455-1000

**NUMBER OF PAGES:**

**ABSTRACT:** Demonstration of the Southern Subarea of 8-hour ozone nonattainment area's meeting of federally prescribed air pollution emissions tests for the 8-hour ozone standard.



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# Chapter 1. Introduction

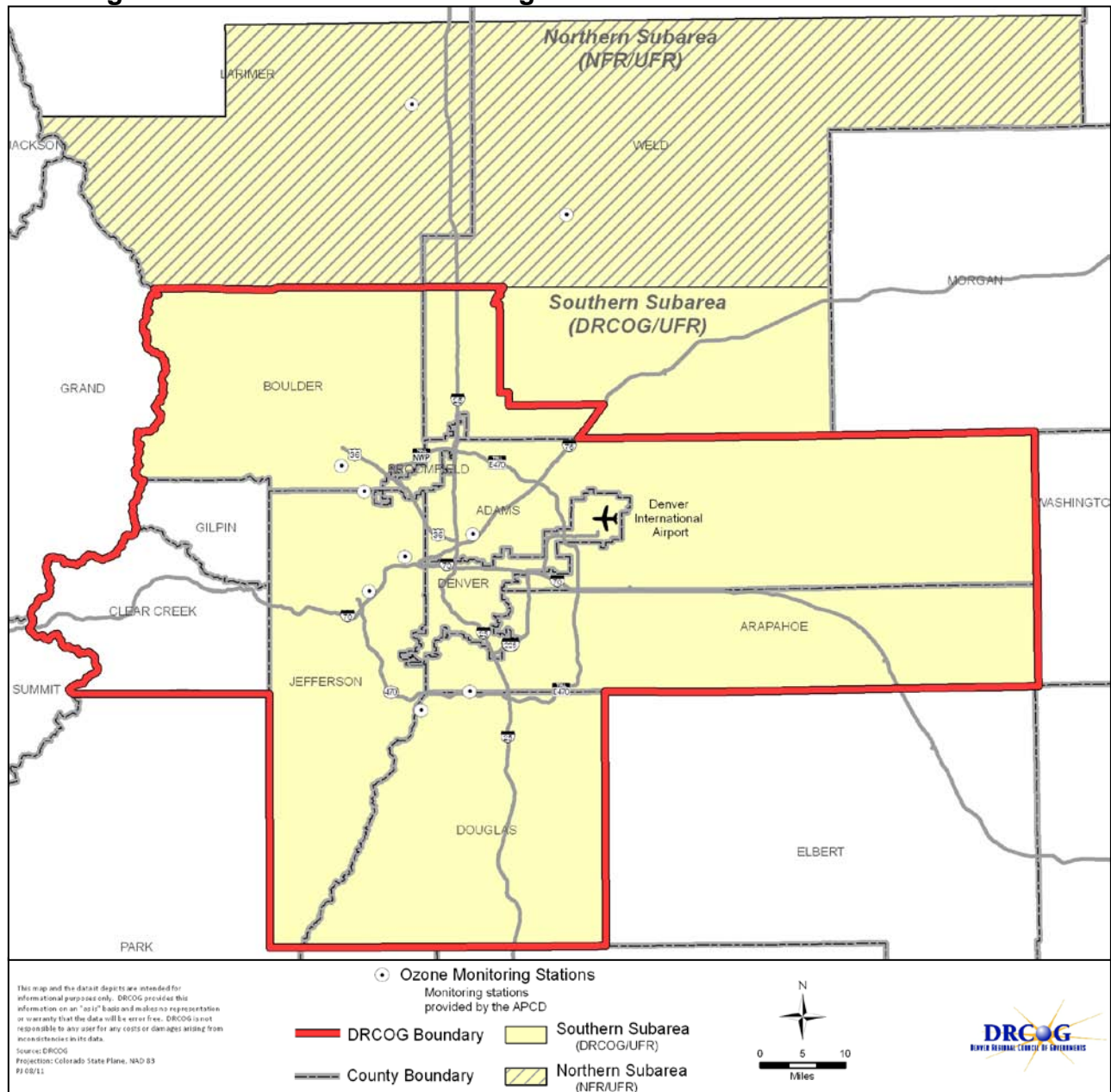
## Background—8-Hour Ozone Nonattainment Area

In 2008, the U.S. Environmental Protection Agency (EPA) lowered the National Ambient Air Quality Standards (NAAQS) for ground-level ozone to 0.075 parts per million (ppm) from the 1997 standard of 0.085 ppm. On April 30, 2012, the EPA designated Denver-North Front Range Area as marginal nonattainment under the 2008 ozone standard (0.075 ppm). The marginal nonattainment designation does not impose any new planning requirements on the State of Colorado at this time; however, the Denver-North Front Range Area must meet the standard before 2015 or new requirements may be imposed.

EPA's final rule designating areas for the 2008 ozone NAAQS became effective July 20, 2012. According to the EPA's *Transportation Conformity Guidance for 2008 Ozone Nonattainment Areas*, a conformity determination must be made with regard to the 2008 ozone NAAQS for metropolitan transportation plans and transportation improvement programs (TIP) within one year after the effective date of the nonattainment designation. The initial conformity determination of the fiscally constrained regional transportation plans (RTP) and TIPs with regard to the 2008 ozone NAAQS has been demonstrated by the two Metropolitan Planning Organizations (MPOs), the Denver Regional Council of Governments (DRCOG) and the North Front Range Metropolitan Planning Organization (NFRMPO), and one Transportation Planning Region (TPR), the Upper Front Range (UFR) TPR, that comprise the 8-hour nonattainment area, by March 2013.

The Denver-North Front Range 8-hour Ozone Nonattainment Area for the 2008 ozone NAAQS keeps the same boundary as the nonattainment area under the 1997 ozone NAAQS, which covers the counties of: Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson, and parts of Larimer and Weld Counties that have the highest concentration of emissions. Figure 1 shows the entire 8-hour ozone nonattainment area, which is comprised of two subareas (Northern and Southern). The boundary between the two subareas is the Boulder/Larimer County line extended through southern Weld County to the Morgan County line.

**Figure 1 Denver-North Front Range Nonattainment Area and Subareas**



EPA found that the motor vehicle emissions budgets (MVEB) for nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC) contained in the Denver-North Front Range 8-Hour Ozone Attainment Plan under the 1997 ozone NAAQS are adequate for transportation conformity purposes, effective on March 19, 2010. As a result of this finding, DRCOG and NFRMPO used these budgets for subsequent transportation conformity determinations.

According to the EPA's *Transportation Conformity Guidance for 2008 Ozone Nonattainment Areas*, if 1997 ozone budgets are available for each analysis year in a conformity determination



for the 2008 ozone NAAQS, an area would use 1997 ozone budgets that are established for that year.

## **Federal Requirements**

An MPO is required to show conformity of its fiscally constrained RTP and TIP with the State Implementation Plan (SIP) for air quality before transportation plans and programs are adopted. This action is required under Section 176(c) of the Clean Air Act, as amended in 1990. Conformity to an air quality implementation plan is defined in the Clean Air Act as conformity to the implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQSs and achieving expeditious attainment of such standards. In addition, activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with the timely attainment of required emissions reductions towards attainment. For pollutants for which a region currently meets standards but was formerly in nonattainment, the applicable SIP may also be referred to as a maintenance plan, which demonstrates continued attainment of the standards.

The EPA final transportation conformity rule is located at 40 CFR Part 93. To address revised standards and changes in conformity requirements, EPA has promulgated several amendments to the final rule in recent years.

### **Conformity Regulations for the 8-Hour Ozone**

On January 9, 2008, the EPA administrator signed an amendment to the conformity rule, (the "Final Rule"), to implement the provisions of SAFETEA-LU. The Final Rule was promulgated February 25, 2008.

According to 40 CFR §93.109 of the Transportation Conformity Rule, criteria and procedures for determining conformity of transportation plans, programs, and projects, transportation plans and programs must satisfy different criteria depending on whether the state has submitted a SIP revision, and whether the EPA has approved such submittal. In this case, EPA found the submitted NO<sub>x</sub> and VOC motor vehicle emissions budgets (MVEB) adequate (ref. 75 FR 9893, March 4, 2010) and conformity must be demonstrated for those MVEBs as per 40 CFR §93.118 as described below:

2. §93.109(e) (1) In such 8-hour ozone nonattainment and maintenance areas the budget test must be satisfied as required by §93.118 for conformity determinations made on or after:

(i) the effective date of EPA's finding that a motor vehicle emissions budget in a submitted control strategy implementation plan revision or maintenance plan for the 8-hour ozone NAAQS is adequate for transportation conformity purposes.

EPA found the 8-hour ozone NO<sub>x</sub> and VOC MVEBs adequate on March 4, 2010 and these MVEBs became effective on March 19, 2010 (ref. 75 FR 9893, March 4, 2010). Therefore these MVEBs are used for the 8-hour ozone conformity determination.

### **Planning Organizations and the Memorandum of Agreement (MOA)**

DRCOG is the MPO for the Denver Transportation Management Area (TMA). The DRCOG TMA includes four urbanized areas and consists of the portions of Adams and Arapahoe counties west of Kiowa Creek; all of Boulder County except Rocky Mountain National Park; all of Broomfield, Denver, Douglas, and Jefferson counties; and parts of southwestern Weld County. The TMA boundary expansion into southwestern Weld County was approved by the Governor on February 21, 2008. DRCOG is also the Transportation Planning Region (TPR) for the TMA, portions of Adams and Arapahoe counties east of Kiowa Creek, and the Rocky Mountain National Park area of Boulder County. DRCOG's 2035 RTP includes the entire DRCOG TPR region. The DRCOG TIP covers the TMA, while CDOT and the State Transportation Improvement Program (STIP) covers the remaining portions of the region.

The NFRMPO is the MPO for the North Front Range TMA. The NFRMPO includes 15 local governments in the urbanized area of Larimer and Weld counties.

The UFR TPR is the transportation planning region covering the remainder of the 8-hour ozone nonattainment area. Located in north-central Colorado, it is comprised of Larimer, Morgan, and Weld Counties, and excludes the urbanized areas in Larimer and Weld Counties (which comprise the NFRMPO region and the portion of Southwest Weld County included in the DRCOG TMA). Figure 2 depicts the boundary of all three MPOs/TPRs involved in this 8-hour ozone conformity determination.

Federal Transportation Regulations at 23 CFR 450.314(b) states "*where a metropolitan planning area (MPA) does not include an entire nonattainment area, there shall be written agreement among the State Department of Transportation, state air quality agency, affected local agencies, and the MPO describing the process for cooperative planning and analysis of all projects outside the MPA within the nonattainment area.*" An MOA was signed in March 2008

by the Colorado Department of Public Health and Environment (CDPHE), Colorado Department of Transportation (CDOT), Regional Air Quality Council (RAQC), UFR TPR, NFRMPO, and DRCOG. A copy of the MOA is in Appendix D.

The MOA calls for the establishment of an overall area motor vehicle emissions budget based on the entire 8-hour ozone nonattainment area, and allows for the option for establishing subarea emissions budgets based on subareas, which are delineated in Figure 1.

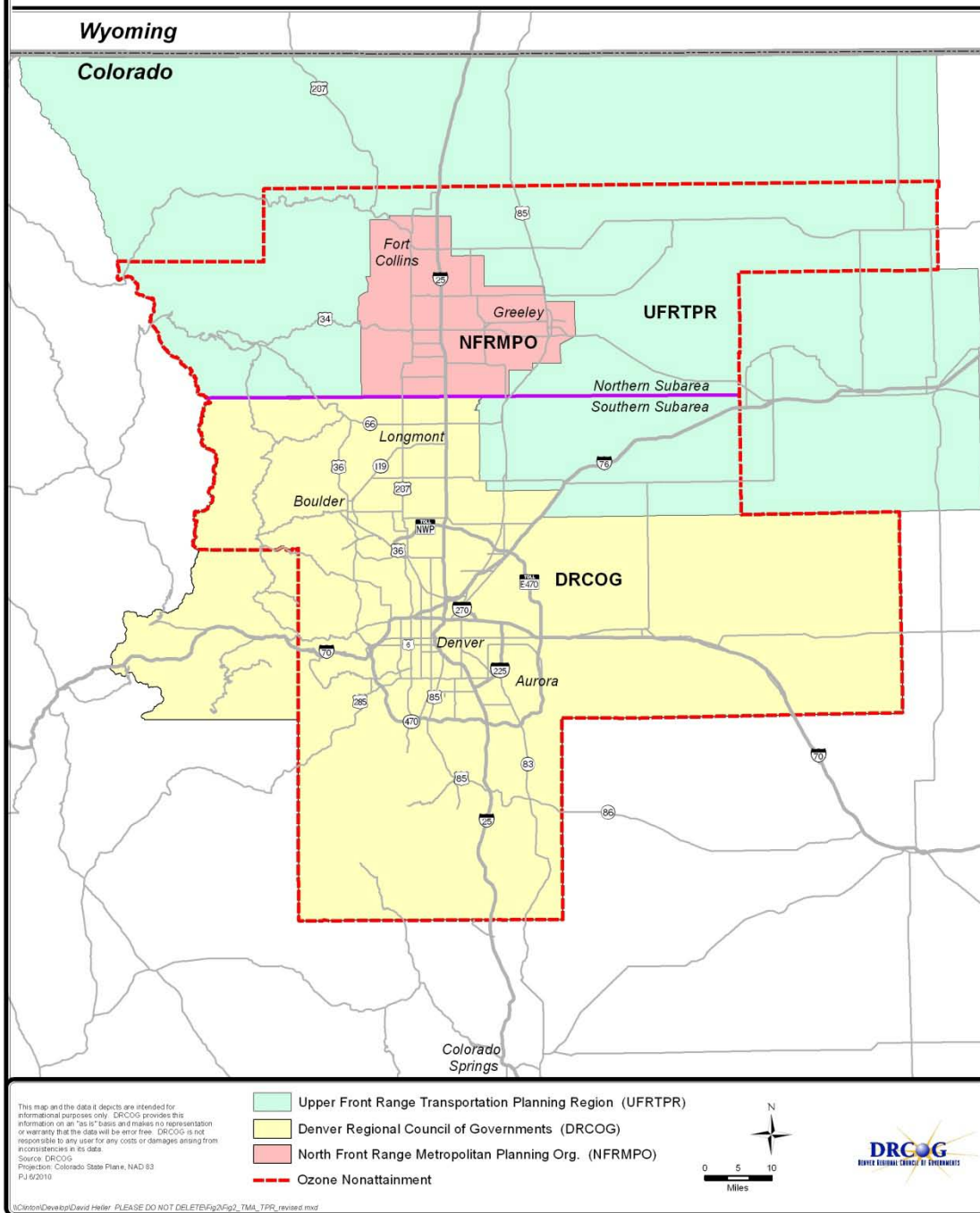
The MOA stipulates that DRCOG will make conformity determinations for the Southern Subarea of the 8-hour ozone nonattainment area, while the NFRMPO will make the conformity determination for the Northern Subarea of the 8-hour ozone nonattainment area. The travel demand model outputs from each of the MPOs are sent to the Air Pollution Control Division (APCD) of CDPHE for generation of emissions estimates. In the Northern Subarea, the 8-hour ozone nonattainment area outside of the NFRMPO model area, also known as the northern “donut” area, will have the transportation forecasting performed by the APCD.

Finally, the MOA states the courses of action to be pursued if one (or both) of the subareas exceeds a conformity test or its (their) emissions budgets.

The NFRMPO and DRCOG worked cooperatively with an interagency consultation group (Federal Highway Administration (FHWA), EPA, CDOT and APCD) to review the conformity documentation and planning assumptions. Furthermore, the NFR Technical Advisory Committee (TAC), or their representative, served as the review team for the NFR socioeconomic data and transportation network as per Regulation No. 10 *Criteria for Analysis of Conformity*.

The MOA noted that after the initial MVEB-based conformity determination, DRCOG and the NFRMPO may switch from using the total nonattainment area MVEBs to using the subarea MVEBs for determining conformity. To switch to use of the subarea MVEBs (or to subsequently switch back to use of the total nonattainment area MVEBs), DRCOG and the NFRMPO must use the process as described in the Denver/NFR Ozone Attainment Plan on pages VI-4 through VI-6.

**Figure 2 TPRs Involved in Denver-North Front Range  
8-Hour Ozone Nonattainment**



## **Current Situation for the Denver Southern Subarea**

### Transportation Planning

#### *DRCOG Region*

The Metro Vision 2035 Plan is the long-range growth and development strategy for the Denver region. It integrates plans for growth and development, transportation, and environmental quality into a single comprehensive foundation for regional planning. Metro Vision calls for a balanced multimodal surface transportation system including rapid transit, a regional bus network, a regional beltway, bicycle and pedestrian facilities, and improvements to the existing roadway system.

The 2035 Metro Vision Regional Transportation Plan (MVRTP) is the transportation plan that implements the transportation element of Metro Vision. The 2035 MVRTP contains an unconstrained vision plan, outlining the region's transportation needs, as well as the Fiscally Constrained 2035 RTP, which includes those projects that can be implemented given the anticipated level of funding. The 2035 MVRTP and Fiscally Constrained 2035 RTP were first adopted on December 19, 2007 and last amended in February 2013.

The 2012-2017 Transportation Improvement Program (TIP) adopted in March 2011 identifies transit, multimodal, and roadway projects to be funded with FY 2012 through FY 2015 federal funds. The regionally significant projects are described in Chapter 3. The 2012-2017 TIP implements the Fiscally Constrained 2035 RTP.

#### *UFR TPR*

The Upper Front Range 2035 Regional Transportation Plan was approved by the Upper Front Range Regional Planning Commission on December 13, 2007. The UFR TPR 2035 RTP contains both a Vision Plan as well as a Fiscally Constrained Plan. Short-range transportation projects in the UFR TPR are contained in the STIP. There are no regionally significant amendments to either of these documents since the last determination in February 2013.

### Air Quality Planning

#### *Other Pollutants*

Currently, the DRCOG region is designated as a maintenance area for carbon monoxide (CO) and particulate matter equal to and less than 10 microns in aerodynamic diameter (PM10). The CO and PM10 conformity determination adopted on February 20, 2013 by the DRCOG Board is being updated concurrently with this document.

## *8-Hour Ozone*

The current State Implementation Plan (SIP) for the Denver-North Front Range 8-hour Ozone Nonattainment Area was approved by the Air Quality Control Commission (AQCC) in December 2008; and approved by the EPA on August 5, 2011. This SIP demonstrates how the region would attain the 1997 8-hour ozone standard (0.085 ppm) by 2010, and also establishes mobile source emissions budgets. Two air quality planning agencies were charged with preparing the SIP. The RAQC is the air quality planning agency for the Denver metropolitan area (Southern Subarea) and the North Front Range Transportation and Air Quality Planning Council (NFRTP & AQPC) is the air quality planning agency for the NFRMPO and the Northern Subarea.

The nine-county Denver Metro Area/Northern Front Range has been designated as marginal nonattainment for the 2008 8-hour ozone standard (0.075 ppm). A new SIP or modeled attainment demonstration is not required as long as the area attains the standard by 2015.

## **Process**

### Agency Roles

The Conformity SIP, also known as the AQCC Regulation Number 10 or conformity implementation plan, was developed by the AQCC and adopted in 1998. It formally defines the process for finding conformity. The EPA approved the Regulation Number 10 on September 21, 2001 (66FR48561), making it federally enforceable. The Regulation Number 10 was updated and approved by the AQCC on Dec 15, 2011. It has been submitted to the EPA for final approval.

In November 1998, a MOA was signed by the CDPHE and DRCOG for the purpose of defining the specific roles and responsibilities in conformity evaluations and findings. A similar MOA was also signed by the CDPHE and NFRMPO in November 1998. Following the EPA's approval of the updated Regulation Number 10, the 1998 MOA between CDPHE and DRCOG will be updated to reflect the changes made in the Regulation Number 10.

### Public Participation

Public participation was encouraged throughout the development of DRCOG's 2035 MVRTP and the 2012-2017 TIP. Public hearings (and associated 30-day comment periods) were held before the DRCOG Board for the:

- 2035 Metro Vision Regional Transportation Plan and its original conformity document on December 5, 2007.
- 2035 MVRTP 2008 Cycle 1 amendments and conformity document on July 16, 2008.
- 2035 MVRTP 2008 Cycle 2 amendments and conformity document on December 17, 2008.
- 2035 MVRTP 2009 Cycle 1 amendments and conformity document on July 15, 2009.
- 2035 MVRTP 2009 Cycle 2 amendments and conformity document on December 16, 2009.
- 2035 MVRTP Update and conformity documents on December 15, 2010.
- 2012-2017 TIP and its conformity document on February 16, 2011.
- 2035 MVRTP 2011 Cycle 1 amendments and conformity document on July 20, 2011.
- 2035 MVRTP 2012 Cycle 2 amendments and conformity document on January 16, 2013.
- 2035 MVRTP 2013 Cycle 1 amendments and conformity document on July 17, 2013.

Consistent with the MOA, no specific public hearing was held in the UFR TPR. However, public notice of the two MPOs' public hearings was circulated within the UFR TPR. Summaries of testimony received during the review periods and at the public hearings are available at the DRCOG office. The public was also encouraged to provide input to their local elected officials and government staff who work closely with DRCOG.

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## **Chapter 2. Implementation of Control Measures**

For this conformity determination, there are no new transportation control measures (TCMs) identified for timely completion or implementation as part of the applicable implementation plan. The 8-hour Ozone Attainment Plan (SIP) that was adopted by the AQCC in 2008 did not include any TCMs.

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## Chapter 3. Emissions Tests

### General Description

The transportation plan and program must pass a series of 8-hour ozone emissions tests to demonstrate conformity. These emissions tests relate to the two ozone precursors, Nitrogen oxides (NO<sub>x</sub>) and Volatile Organic Compounds (VOC). The plan and program must respect the motor vehicle emissions budget in the applicable SIP or SIP submittal. Satisfying these tests involves demonstrating that relevant emissions in future years are less than or equal to the emissions budget established in the SIP.

### Budgets Analysis Years

In accordance with EPA regulations 40 CFR 93.118, the interagency consultation group agreed upon the following staging years for this 8-hour ozone conformity determination.

- **2015**—an intermediate modeling year
- **2025**—an intermediate modeling year
- **2035**—the last year (horizon) of regional transportation plans

Under the terms of the MOA (as described above), DRCOG is responsible for the 8-hour ozone nonattainment area's Southern Subarea (everything within the 8-hour ozone nonattainment area south of the north line of Township 3), while the NFRMPO is responsible for the conformity determination for the 8-hour ozone nonattainment area's Northern Subarea (everything within the 8-hour ozone nonattainment area north of the north line of Township 3). The entire Denver-North Front Range nonattainment area, with both the Northern and Southern Subareas, is shown in Figure 1.

### Technical Process

The technical process used to estimate future pollutant emission levels is based on the latest planning assumptions in effect at the time of this conformity determination. Assumptions behind the analysis were derived from estimates of current and future population, employment, travel, and congestion most recently developed by DRCOG. The MOA stipulates that the emissions estimates are to be performed by the APCD. Information concerning vehicle miles traveled and operating speeds was updated as part of this conformity finding process. These planning assumptions were used with the EPA emission model (MOVES) to estimate emissions. The DRCOG travel demand model covers the whole Southern Subarea. Appendix B describes the

modeling structure and recent enhancements for the DRCOG travel demand model in more detail.

### DRCOG Demographic Assumptions

The population forecast for the Southern Subarea of the Denver-North Front Range 8-Hour Ozone Nonattainment Area in 2035 is 4,061,076. This is an increase of 41 percent over the year 2010 estimated population of 2,872,251. Employment is forecasted to be 2,329,691 in 2035, compared to the year 2010 estimate of 1,678,021, an increase of approximately 39 percent. Growth in population and employment will be the principal factors for the increased demand for travel on the region's transportation facilities and services. Table 1 shows the latest forecasts of population and employment for 2010, 2015, 2025, and 2035 for the Southern Subarea of the Denver-North Front Range Nonattainment Area, as depicted in Figure 1. Table 2 lists 2010 and 2035 population and employment estimates by each of the counties in the DRCOG ozone modeling Southern Subarea.

**Table 1**

**Population and Employment Forecasts –  
DRCOG Ozone Modeling Southern Subarea**

	<b>2010</b>	<b>2015</b>	<b>2025</b>	<b>2035</b>
Population	2,872,251	3,095,130	3,613,031	4,061,076
Employment	1,678,021	1,863,540	2,108,740	2,329,691

**Table 2**

**2010 and 2035 Population and Employment Estimates by County –  
DRCOG Ozone Modeling Southern Subarea**

<b>County</b>	<b>Population</b>		<b>Employment</b>	
	<b>2010</b>	<b>2035</b>	<b>2010</b>	<b>2035</b>
Adams County	455,155	728,028	204,531	331,702
Arapahoe County	563,874	787,406	336,956	442,279
Boulder County	302,198	373,301	188,833	198,895
Broomfield County	51,697	87,693	37,401	76,880
Denver County	596,720	760,726	512,252	689,934
Douglas County	283,811	482,295	111,259	205,705
Jefferson County	548,793	691,254	266,007	343,730
Weld County*	70,004	150,373	20,782	40,566
<b>Total DRCOG Ozone Modeling Southern Subarea</b>	2,872,251	4,061,076	1,678,021	2,329,691

\* Includes entire extent of Weld County that lies within the DRCOG 8-hour ozone modeling domain (i.e. Southern Subarea of 8-hour Ozone Nonattainment Area).

## Transportation Assumptions

In order to complete the emissions tests, the 2010, 2015, 2025, and 2035 transportation networks must first be defined. DRCOG's Fiscally Constrained 2035 RTP specifies financially constrained highway and transit system improvements and resulting networks to be completed by the year 2035. The detailed list of improvement projects by completion year staging for 2013 Cycle 1 is displayed in Appendix A. The 2012-2017 TIP identifies funding to complete a number of regionally significant projects on the designated regional roadway and rapid transit system that are also contained in the Fiscally Constrained 2035 RTP, listed below:

- US-85 from Cook Ranch Road to Meadows Parkway: widen roadway to four lanes.
- I-25 from US-36 to 120<sup>th</sup> Avenue: add two HOT lanes.
- I-25 from RidgeGate Pkwy to County Line South Ramps: widen roadway to 8 lanes.
- West Corridor, Denver Union Station to Jefferson County Government Center: new light rail, stations, park-n-Rides.
- Gold Line, Denver Union Station to Ward Road: new light rail, stations, park-n-Rides.
- I-225 Corridor, Parker Road to Smith Road: new light rail, stations, parking.
- Northwest Rail, Denver Union Station to Westminster (71<sup>st</sup> Ave Station): new rail, stations, parking.
- East Corridor, Denver Union Station to Denver International Airport: new rail, stations, and park-n-Rides.
- Denver Union Station: intermodal center.
- 120<sup>th</sup> Avenue Connection over US-36: build new six lane road.
- I-25 from Santa Fe to Alameda: interchange reconstruction.
- US-36 from the Table Mesa Park-n-Ride to the I-25 Express Lanes: add two HOT lanes, enhancements for bus rapid transit (BRT).
- I-225 from Parker Road to Mississippi Avenue: widen roadway to six lanes.

The 2012-2017 TIP also includes many other projects that will help to reduce emissions associated with ozone:

- Transit operating funds and bus purchases
- Bicycle and pedestrian facilities
- Travel Demand Management (TDM) programs
- Intelligent Transportation Systems (ITS) infrastructure

- Traffic signal systems and coordination
- Master plans for areas around transit stations and urban centers

Other representative regionally significant projects in the Fiscally Constrained 2035 RTP using federal and state resources, in addition to those listed above include:

- Wadsworth Boulevard (SH-121) from 36<sup>th</sup> Avenue to 46<sup>th</sup> Avenue: widen roadway to six lanes.
- Wadsworth Parkway (SH-121) from 92<sup>nd</sup> Avenue to SH-128/120<sup>th</sup> Avenue: widen roadway to six lanes.
- 104<sup>th</sup> Avenue from Grand View Ponds to US-85: widen roadway to four lanes.
- I-70 from Brighton Boulevard to York Street: roadway reconstruction and interchanges.
- I-70 from I-270 to Havana Street: widen roadway to ten lanes.
- Hampden Avenue (US-285) from Colorado to I-25: widen roadway to six lanes.
- Hampden Avenue (SH-30) from Dayton Street to Havana Street: widen roadway to six lanes.
- I-270 from Vasquez to Quebec Street: widen roadway to six lanes.
- US-36 at Wadsworth Boulevard: interchange reconstruction.
- I-25 from SH-66 to WCR 38: add two HOT lanes.
- US-85 from Louviers to MP191.75 and from Sedalia (SH-67) to Meadows Pkwy: widen to 4 lanes.
- North Metro Rail Line, Denver Union Station to 72nd Avenue Station: new rail, stations, parking.
- Southeast Rail Extension, Lincoln Avenue to RidgeGate Parkway: new rail, stations, parking.

Regional highway projects in the Fiscally Constrained RTP using locally-derived funds include:

- New interchanges at I-25/Douglas Lane and at US-85/North Meadows Drive in Castle Rock.
- E-470 from I-25/C-470 to I-25/Northwest Parkway: widen to eight/six lanes, build five new interchanges.
- New interchange at I-70/Harvest Mile Road.
- Peña Boulevard from I-70 to Jackson Gap Street: widen roadway to six lanes.

- Jefferson Parkway from SH-93 to SH-128: new four-lane tollroad, plus 3 partial interchanges.

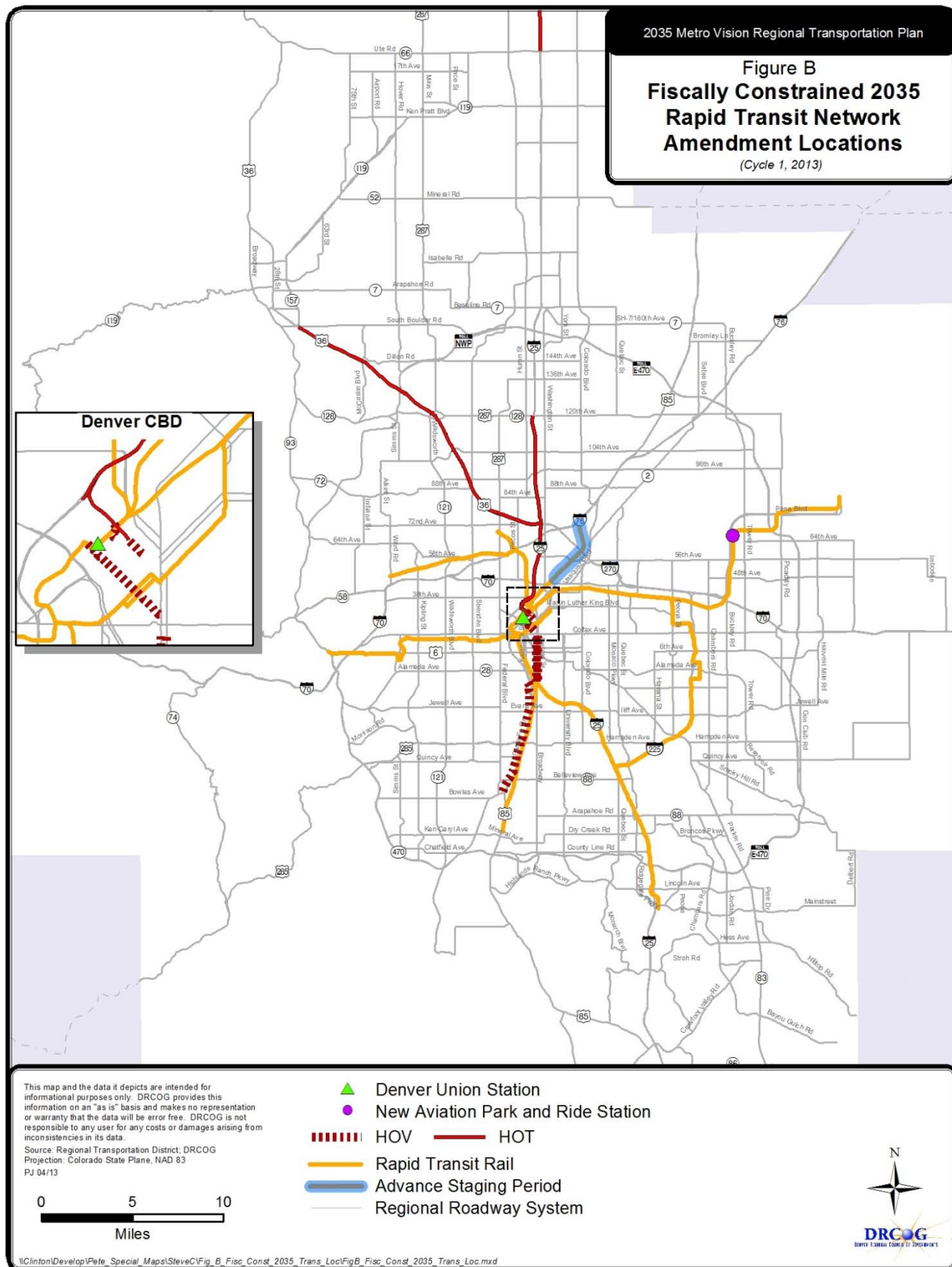
The major proposed 2013 Cycle 1 project amendments to the Fiscally Constrained 2035 RTP roadway network are described in Table 4. All changes (e.g. staging year updates) are depicted in Appendix A.

The base 2010 rapid transit network includes the existing Central, Southwest, Southeast, and Central Platte Valley rail lines. It also includes the I-25 HOV/Tolled Express Lanes; HOV lanes on Santa Fe Drive and US 36; and bus lanes on Broadway and Lincoln. The remaining rapid transit system to be completed by 2035 is shown in Figure 3. The 2013 Cycle 1 amendment for FasTracks will advance the National Western Stock Show to 72<sup>nd</sup> North Metro Rail segment from the 2035 stage to the 2025 stage. The amendment will also add a new Park-and-Ride station (Aviation Station) to the East Rail Line at approximately Pena Boulevard and 61<sup>st</sup> Avenue.

The proposed 2013 Cycle 1 project and operational amendments to the Fiscally Constrained 2035 RTP are described in Table 4.



**Figure 3 Fiscally Constrained 2035 Rapid Transit Rail Network Amendment Locations**



**Table 3**  
**Proposed 2013 Cycle 1 Amendments to the Fiscally Constrained 2035 RTP Rapid Transit System**

<b>FasTracks Components</b>	<b>Current RTP Project Description</b>	<b>Type of Change to the FC-2035-RTP</b>	<b>Proposed Model Network Staging</b>
North Metro Rail Line	Denver Union Station to 72nd Ave	Change network staging of segment from National Western Stock Show Station to 72nd Ave Station from 2025-2035 to 2015-2024	2015 - 2024
East Rail Line	Denver Union Station to Denver International Airport	Add new Park-and-Ride Station (Aviation Station) at Pena Boulevard/61 <sup>st</sup> Avenue	2015-2024

### *UFR TPR*

There were no regionally significant transportation improvement projects in the UFR TPR portion of the Southern Subarea, and no amendments are proposed for this cycle. The 2012-2017 STIP does include construction of a park-and-ride lot in Fort Lupton on US-85.

### Air Quality Modeling Assumptions

The APCD estimates air pollution emissions using MOVES. The conformity analysis for this 8-hour ozone conformity finding began in March 2013 after amendment proposals were submitted for inclusion.

### **Mobile Source Measures**

The regional emissions analysis does not reflect the air quality benefits of such travel demand management programs as DRCOG's Regional TDM Program, Teleworking, Eco Pass, and other transportation demand management actions. In addition, other programs whose benefits are more difficult to ascertain are not fully incorporated into the model. Examples of such programs include compressed workweeks and programs initiated after 1998.

The DRCOG model does reflect emissions reduction benefits created by DRCOG's Traffic Signal System Improvement Program (TSSIP), which is funded through the TIP. The goal of this program is to ensure that the region's traffic signals operate in a coordinated manner that makes the most efficient use of arterial street capacity. The efficiency objectives include:

- Minimizing vehicle stops.
- Minimizing travel delay.
- Minimizing disruption caused by malfunctioning equipment.

## Emission Test Results

According to the EPA's *Transportation Conformity Guidance for 2008 Ozone Nonattainment Areas*, if an area does not have budgets for the 2008 ozone NAAQS, but has budgets for a previous ozone NAAQS (i.e., the 1997 ozone NAAQS), these budgets must be used in the budget test. Since budgets for the 2008 ozone NAAQS are not available, the SIP budgets established for the 1997 ozone NAAQS are used in this conformity.

The results of the Denver Southern Subarea emissions tests by year are reported in Table 4. The emissions estimates were generated by APCD using the transportation inputs from DRCOG's travel demand models and the MOVES emissions model. The 8-hour ozone conformity analysis was performed for the years 2015, 2025, and 2035, which meet the requirements for the staging years specified in 40 CFR 93.118. The test results do not indicate any failures in the horizon years of the program or plan that would lead to a finding of non-conformity. Therefore, conformity is demonstrated for the Denver Southern Subarea.

**Table 4**  
**8-Hour Ozone Conformity for Denver Southern Subarea**  
**(Emission Tons per Day)**

<b>SIP budgets</b>	<b>2015 Emissions</b>	<b>2025 Emissions</b>	<b>2035 Emissions</b>	<b>Pass/Fail</b>
Volatile Organic Compounds (VOC)				
89.7	<b>79.7</b>	<b>56.1</b>	<b>49.1</b>	Pass all tests
Oxides of Nitrogen (NOx)				
102.4	<b>84.4</b>	<b>48.6</b>	<b>43.2</b>	Pass all tests

## Summary of 8-hour Ozone Conformity Findings for the Denver Southern Subarea

Based on the quantitative conformity analysis, the DRCOG staff have determined that the DRCOG Fiscally Constrained 2035 RTP and 2012-2017 TIP and the Southern Subarea portion of the UFR 2035 RTP and 2012-2017 STIP demonstrate conformity for the 2008 8-hour ozone standard for the Denver Southern Subarea. Appendix C of this conformity determination includes more information on the transportation and demographic assumptions used in this emissions analysis.

**APPENDIX A**

**DRCOG TRANSPORTATION NETWORK ASSUMPTIONS**

(intentionally blank)



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
<b>Adams County</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
	Washington Street	60th Avenue	68th Ave	Add through lane(s)	2	4	Principal
<i>Network Staging: 2025 (2015-2024)</i>							
	58th Avenue	Washington Street	York Street	Add through lane(s)	2	4	Principal
	Pecos Street	52nd Avenue	I-76	Add through lane(s)	2	4	Principal
	Washington Street	52nd Avenue	58th Avenue	Add through lane(s)	2	4	Principal
	York Street	160th Ave (SH-7)	168th Ave	Add through lane(s)	2	4	Principal
<b>Arapahoe County</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	Broncos Pkwy	Jordan Rd	Parker Rd	Add through lane(s)	4	6	Principal
	Easter Avenue	Havana St	Peoria St	Add through lane(s)	4	6	Principal
	Gun Club Road	Quincy Ave	1.5 Miles South	Add through lane(s)	2	6	Principal
	Hampden Avenue	Picadilly Rd	Gun Club Rd	Add through lane(s)	2	4	Principal
	Quincy Avenue	Plains Pkwy	Gun Club Rd	Add through lane(s)	2	6	Principal
	6th Avenue	Monaghan Rd	Watkins Rd	Add New Road		4	Collector
<i>Network Staging: 2035 (2025-2035)</i>							
	Monaghan Rd	Quincy Ave	Yale Ave	Add New Road		6	Principal
	Quincy Avenue	Hayesmount Rd	Watkins Rd	Add through lane(s)	2	6	Principal
	Quincy Avenue	Monaghan Rd	Hayesmount	Add through lane(s)	2	6	Principal
	Watkins Rd	Quincy Ave	I-70	Add through lane(s)	2	6	Principal
	Yale Avenue	Monaghan Rd	Hayesmount Rd	Add through lane(s)	2	6	Principal
	W. Coal Mine Road	S. Sheridan Blvd.	S. Platte Canyon Rd.	Add through lane(s)	2	4	Minor
	Watkins Rd	I-70	SH-36	Add through lane(s)	2	4	Minor
<b>Arvada</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	64th Avenue	Kendrick St	Terry St.	Add through lane(s)	2	4	Principal
<b>Aurora</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
2003-071	17th PL (phase 4)	I-225 NB	I-225 SB	Add New Road		4	Minor
2003-071	I-225	Colfax Ave		Interchange Reconstruction			Freeway



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	Gartell Road	County Line Rd	Inspiration Drive	Add through lane(s)	2	4	Minor
<i>Network Staging: 2025 (2015-2024)</i>							
	6th Avenue	E-470	Gun Club Rd	Add through lane(s)	2	6	Principal
	6th Avenue	6th Pkwy	Harvest Mile Rd	Add through lane(s)	3	6	Principal
	6th Avenue	Airport Blvd	Tower Rd	Add through lane(s)	2	6	Principal
	6th Avenue (S-30)	Tower Rd	6th Pkwy	Add through lane(s)	2	6	Principal
	6th Parkway	SH-30	E-470	Add New Road		2	Principal
	48th Avenue	Picadilly Rd	Powhaton Rd	Add New Road		6	Principal
	56th Avenue	E-470	Imboden Road	Add through lane(s)	2	6	Principal
	56th Avenue	Picadilly Rd	E-470	Add through lane(s)	2	6	Principal
	64th Avenue	Aurora City Limit	Himalaya St	Add through lane(s)	2	6	Principal
	64th Avenue	Harvest Road	Powhaton Road	New Road		2	Principal
	64th Avenue	Himalaya Rd	Harvest Mile Rd	Add through lane(s)	2	4	Principal
	64th Avenue	Powhaton Rd	Monaghan Rd	New Road		4	Principal
	Gun Club Rd	Yale Ave.	Mississippi Ave.	Add through lane(s)	2	4	Principal
	Harvest Mile Road	56th Avenue	DIA boundary line/64th Ave	Add New Road		3	Principal
	Harvest Mile Road	I-70	56th Ave	Add New Road		6	Principal
	Harvest Rd	Mississippi Ave	Alameda Ave	Add New Road		6	Principal
	Harvest Rd	6th Ave	I-70	Add New Road		6	Principal
	Harvest Rd	Alameda Ave	6th Ave	Add through lane(s)	3	6	Principal
	I-70	Harvest Miles Rd		New Interchange			Freeway
	I-70	Picadilly Rd		New Interchange			Freeway
	Jewell Avenue	E-470	Gun Club Rd	Add through lane(s)	2	6	Principal
	Jewell Avenue	Gun Club Rd	Harvest Rd.	Add through lane(s)	2	6	Principal
	Jewell Avenue	Himalaya Rd	E-470	Add through lane(s)	3	6	Principal
	Picadilly Rd	48th Ave	56th Avenue	Add New Road	2	6	Principal
	Picadilly Rd	56th Ave	70th Ave./Aurora City	Add New Road		6	Principal
	Picadilly Rd	6th Ave	Colfax Ave	Add through lane(s)	2	6	Principal
	Picadilly Rd	Colfax Ave	I-70	Add New Road		6	Principal
	Picadilly Rd	Smith Road	48th Ave	Add through lane(s)	2	6	Principal
	Picadilly Road	I-70	Smith Road	Add through lane(s)	2	6	Principal





## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	Picadilly Road	Jewell Ave	6th Ave Pkwy	Add New Road		4	Principal
	Tower Road	6th Avenue	Colfax Avenue	Add New Road		2	Principal
	Tower Road	Colfax Avenue	Smith Rd	Add through lane(s)	2	6	Principal
	38th Avenue	Himalaya	Picadilly	Add New Road		4	Minor
	38th Avenue	Imboden	Manila	Add New Road		4	Minor
	Aurora Parkway	Parker Rd	Picadilly	Add New Road		6	Minor
	Aurora Parkway	Picadilly	Gartrell	Add through lane(s)	4	6	Minor
	County Line Road	Monaghan Section line	Hayesmount Road	Add through lane(s)	2	4	Collector
	Dunkirk Street	Ceylon St	Louisiana Ave	Add through lane(s)	2	4	Minor
	Harvest Road	Quincy Ave	Alexander Dr	Add through lane(s)	2	4	Collector
	Manila Rd	I-70	38th Avenue	Add through lane(s)	2	4	Collector
	Manila Rd	38th Ave	48th Ave	Add through lane(s)	2	4	Collector
	Mississippi Avenue	Gun Club Road	Harvest Rd	Add through lane(s)	2	4	Collector
	Mississippi Avenue	Harvest Rd	Powhaton Rd	Add through lane(s)		4	Collector
	Mississippi Avenue	Tower Road	Ceylon St	Add through lane(s)	2	4	Minor
	Yale Avenue	Gun Club Rd	Harvest Mile Rd	Add New Road		4	Collector
	48th Avenue	Powhaton Rd	Monaghan Rd	Add New Road		6	Principal
	64th Avenue	Harvest Mile Road	Powhaton Rd	Add through lane(s)	2	4	Principal
	Gun Club Rd	Yale Ave	Mississippi Ave	Add through lane(s)	4	6	Principal
	Harvest Mile Road	56th Ave	64th Ave	Add through lane(s)	3	6	Principal
	Harvest Mile Road	Jewell Ave	Mississippi Ave	Add through lane(s)	2	6	Principal
	Imboden Rd	48th Ave	56th Ave	Add through lane(s)	2	6	Principal
	Powhaton Rd	Smoky Hill Rd	County Line Rd	Add through lane(s)	2	6	Principal
	Quail Run Rd	I-70	48th Ave	Add New Road		6	Principal
	Tower Road	6th Avenue	Colfax Avenue	Add through lane(s)	2	6	Principal
<b>Brighton</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
	Telluride Street	Bromley Lane	Prairie Center Pkwy	Add New Road		2	Collector
	Tower Road	Bridge Street	Bromley Lane	Add New Road		4	Minor
<i>Network Staging: 2025 (2015-2024)</i>							
	Bromley Lane	Hwy 85	Sable Blvd	Add through lane(s)	4	6	Principal



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	Bromley Lane	Tower Rd	I-76	Add through lane(s)	4	6	Principal
	Buckley Road	136th Avenue	Bromley Lane	Add through lane(s)	2	4	Principal
<b>Broomfield County</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
	120th Avenue	Allison St	Emerald St	Add New Road		6	Principal
	160th Avenue	Lowell Blvd	Sheridan Pkwy	Add New Road		2	Principal
	Wadsworth Blvd	120th Ave	US-287	Add through lane(s)	4	6	Major Regional
	Lowell Boulevard	128th Avenue	136th Avenue	Add through lane(s)	2	4	Minor
<i>Network Staging: 2025 (2015-2024)</i>							
	144th Avenue	Sheridan Blvd	Zuni Street	Add through lane(s)	2	4	Principal
	144th Avenue	US-287	Sheridan Blvd	Add through lane(s)	2	4	Principal
	160th Avenue	Boulder/Broomfield Co. line	Lowell Blvd	Add New Road		4	Principal
	Huron Street	160th Ave	SH-7	Add through lane(s)	2	4	Principal
	Huron Street	150th Ave	160th Ave	Add through lane(s)	2	4	Principal
	I-25	SH-7		Interchange Reconstruction			Freeway
	Interlocken Loop	96th St. w/Northwest Pkwy	SH-128	Add through lane(s)	4	6	Principal
	SH-7	Boulder County Line	Sheridan Parkway	Add through lane(s)	2	4	Principal
	SH-7	Sheridan Pkwy	I-25	Add through lane(s)	2	6	Principal
	Sheridan Pkwy	Lowell Boulevard	NW Parkway	Add through lane(s)	2	4	Principal
	Sheridan Pkwy	Northwest Pkwy	SH-7	Add through lane(s)	2	4	Principal
	Hoyt Street	Midway Boulevard	Industrial Lane	Add New Road		2	Collector
<i>Network Staging: 2035 (2025-2035)</i>							
	US-36	Wadsworth Blvd		Interchange Reconstruction			Freeway
<b>Castle Rock</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	Meadows Parkway	Coachline Road	Meadows Blvd	Add through lane(s)	2	4	Principal
	North Meadows Drive	Meadows Blvd	US-85	Add New Road		4	Minor
	Plum Creek Parkway	Gilbert Street	Ridge Road	Add through lane(s)	2	4	Principal
	Ridge Road	Plum Creek Parkway	SH-86	Add through lane(s)	2	4	Principal
	Southwest Ring Rd	Wolfensberger Rd	I-25	Add through lane(s)	2	4	Principal
	US-85	Castlegate Drive		New Interchange			Major Regional



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	Wolfensberger Road	Coachline Road	Prairie Hawk Dr.	Add through lane(s)	2	4	Principal
	Prairie Hawk Drive	Wolfensberger Road	Franktown Rd	Add through lane(s)	2	4	Minor
	Prairie Hawk Drive	Franktown Rd	Plum Creek Pkwy	Add New Road		4	Minor
	Valley Drive	South Street	Plum Creek Pkwy	Add New Road		2	Collector
	Woodlands Blvd.	Dales Pony Circle	Scott Blvd.	Add New Road		4	Collector
<i>Network Staging: 2035 (2025-2035)</i>							
	Crystal Valley Parkway	I-25 East Frontage Road	West Loop Road	Add New Road	2	4	Minor
<b>CDOT Region 1</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	US-285	Richmond Hill Road	Kings Valley Drive	Add through lane(s)	2	4	Major Regional
	US-285	Pine Junction		Add New Interchange			Major Regional
2001-154	US-85	SH-67 (Sedalia)	Daniels Park Rd	Add through lane(s)	2	4	Major Regional
1999-001	I-25	RidgeGate Parkway	Lincoln Avenue	Add through lane(s)	6	8	Freeway
1999-001	I-25	Lincoln Avenue	County Line Rd South	Add through lane(s)	6	8	Freeway
2001-154	US-85	Cook Ranch (MP 194.8)	Louviers	Add through lane(s)	2	4	Major Regional
2001-154	US-85	Castlegate Drive	Meadows Pkwy	Add through lane(s)	2	4	Major Regional
<i>Network Staging: 2035 (2025-2035)</i>							
	SH-119	US-6/SH-119	Main St. (Black Hawk)	Add through lane(s)	2	4	Principal
	US-285	Kings Valley Drive	Shaffers Crossing	Add through lane(s)	2	4	Major Regional
	US-285	Kings Valley Drive		Add New Interchange			Major Regional
2001-154	US-85	Louviers	MP 191.75	Add through lane(s)	2	4	Major Regional
2001-154	US-85	Daniels Park Rd	Castlegate Drive	Add through lane(s)	2	4	Major Regional
<b>CDOT Region 4</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
1997-033	Arapahoe Avenue	Cherryvale Rd	Vo Tech Entrance	Add through lane(s)	2	4	Principal
<i>Network Staging: 2035 (2025-2035)</i>							
2001-252	SH-119	SH-52		New Interchange			Major Regional
	I-25	SH-66	WCR 38	Add HOT lanes		2	Freeway
	I-25	WCR 34		Interchange Reconstruction			Freeway
<b>CDOT Region 6</b>							
<i>Network Staging: 2015 (2012-2014)</i>							



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
2007-051	US-36	I-25 Express lanes	Wadsworth Pkwy	Add HOT lanes		2	Freeway
2007-171	US-6	Federal Blvd		Interchange Reconstruction			Freeway
2007-171	US-6	Bryant St		Remove Component			Freeway
	Wadsworth Blvd	10th Ave	14th Ave	Add through lane(s)	4	6	Principal
<i>Network Staging: 2025 (2015-2024)</i>							
2007-158	Alameda Avenue	Lipan St	Santa Fe Dr	Add through lane(s)	6	8	Principal
1999-006	I-225	North Ramps of Parker Rd	South Ramps of Mississippi	Add through lane(s)	4	6	Freeway
2007-158	I-25	Santa Fe Dr		Interchange Reconstruction			Freeway
	I-25	Arapahoe Road		Interchange Reconstruction			Freeway
	I-70	Kipling Street		Interchange Reconstruction			Freeway
2007-051	US-36	Table Mesa Dr.	Wadsworth Pkwy	Add HOT lanes		2	Freeway
	I-25	US-36	120th Ave	Add HOT lanes		2	Freeway
	US-6	Wadsworth Blvd		Interchange Reconstruction			Freeway
	Wadsworth Blvd	4th Ave	10th Ave	Add through lane(s)	4	6	Principal
<i>Network Staging: 2035 (2025-2035)</i>							
	Arapahoe Road	Havana Street		Add New Interchange			Principal
	Arapahoe Road	Revere Pkwy		Add New Interchange			Principal
	Hampden Avenue	Colorado Boulevard	I-25	Add through lane(s)	4	6	Major Regional
	I-270	Vasquez Blvd	Quebec St.	Add through lane(s)	4	6	Freeway
	I-70	I-270	Havana St	Add through lane(s)	8	10	Freeway
	I-70	Brighton Blvd	York St	Reconstruction			Freeway
	I-70	York St		Interchange Reconstruction			Freeway
	Parker Road	Quincy Avenue	Hampden Avenue	Add through lane(s)	6	8	Major Regional
	SH-7	Riverdale Rd	US-85	Add through lane(s)	2	4	Principal
	SH-7	160th Ave	Dahlia St	Add through lane(s)	2	4	Principal
	SH-7	164th Ave	160th Ave	Add through lane(s)	2	4	Principal
	US-36	Sheridan Blvd		Interchange Reconstruction			Freeway
	US-6	Kipling Street		Interchange Reconstruction			Freeway
	US-6	Simms Street		Interchange Reconstruction			Freeway

### Centennial

*Network Staging: 2035 (2025-2035)*



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	Arapahoe Road	Himalaya Way	Liverpool St	Add through lane(s)	4	6	Principal
	Smoky Hill Road	Pleasant Run Pkwy	Versailles	Add through lane(s)	4	6	Principal
	Colorado Blvd	County Line	Dry Creek	Add through lane(s)	2	4	Minor
<b>Commerce City</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
	104th Avenue	US-85	SH-2	Add through lane(s)	2	4	Principal
<i>Network Staging: 2025 (2015-2024)</i>							
	96th Avenue	Buckley Road	Tower Road	Add New Road		4	Principal
	Buckley Road	118th Avenue	Cameron Dr	Add through lane(s)	2	6	Principal
	Tower Road	Pena Boulevard	105th Avenue	Add through lane(s)	2	6	Principal
	Tower/Buckley Road	105th Ave	118th Ave	Add New Road		4	Principal
<i>Network Staging: 2035 (2025-2035)</i>							
	96th Avenue	SH-2	Buckley Road	Add through lane(s)	2	4	Principal
	96th Avenue	Tower Rd	Picadilly Rd	Add through lane(s)	2	6	Principal
	120th Avenue	E-470	Tower Rd	Add through lane(s)	2	6	Principal
	120th Avenue	Tower Rd	Picadilly Rd	Add through lane(s)	2	6	Principal
	120th Avenue	Sable Blvd	E-470	Add through lane(s)	2	6	Principal
	Picadilly Rd	96th Ave	120th Ave	Add New Road		6	Principal
	Picadilly Rd	82nd Ave	96th Ave	Add New Road		6	Principal
	88th Avenue	Tower Rd	Picadilly Rd	Add New Road		4	Collector
	104th Avenue	E-470	Picadilly Rd	Add New Road		4	Principal
	112th Avenue	SH-2	Picadilly Rd	Add through lane(s)	2	4	Collector
<b>Denver</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
	71st Avenue	Tower Rd	Dunkirk St	Add New Road		6	Minor
	71st Avenue	Telluride St	Tower Rd	Add New Road		6	Minor
	Highpointe Blvd	Dunkirk St	Telluride St.	Add New Road		4	Minor
	56th Avenue	Havana Street	Pena Blvd	Add through lane(s)	2	6	Principal
	Broadway	Mississippi Ave	Kentucky Ave	Add through lane(s)	6	8	Principal
	Broadway	Kentucky Ave	Exposition	Add through lane(s)	4	6	Principal
	Central Park Blvd	47th Ave (Northfield Blvd)	56th Ave	Add New Road		4	Principal



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
2007-083	I-70	Central Park Blvd		New Interchange			Freeway
	Martin Luther King Blvd	Havana St/Iola St	Peoria St	Add New Road		4	Principal
2007-083	North I-70 Frontage Rd	Havana St	Central Park Blvd	Add New Road		4	Minor
	Pena Boulevard	E-470 east ramps	78th/75th Ave ramps	Add through lane(s)	6	8	Freeway
2007-083	South I-70 Frontage Rd	Central Park Blvd	Havana St	Add New Road		4	Minor
	60th Avenue	Tower Rd	Dunkirk St	Add New Road		4	Collector
	Argonne Street	56th Ave	67st Ave	Add New Road		2	Collector
	Dunkirk Street	56th	66th	Add through lane(s)	2	4	Minor
	Dunkirk Street	66	71st	Add New Road		4	Minor
	Havana Street/Iola Street	Florence Way	Smith Road			4	Minor
	Iola St	E. 25th Ave	E. 26th Ave	Add New Road		4	Minor
	Telluride Street	40th Ave	71st Ave	Add New Road		4	Minor
	Yampa Street	40th Ave	72nd Ave	Add New Road		4	Collector
<i>Network Staging: 2025 (2015-2024)</i>							
	56th Avenue	Himalaya St	Picadilly Rd	Add through lane(s)	2	4	Principal
	56th Avenue	Himalaya St	Picadilly Rd	Add through lane(s)	4	6	Principal
	56th Avenue	Pena Blvd	Tower Rd	Add through lane(s)	4	6	Principal
	64th Avenue	Tower Rd	Denver/Aurora City Limits	Add through lane(s)	2	4	Principal
	56th Avenue	Dunkirk St	Himalaya St	Add through lane(s)	4	6	Principal
	Broadway	Arizona Ave	Mississippi Ave	Add through lane(s)	4	6	Principal
	Evans Avenue	Colorado Blvd	I-25	Add through lane(s)	4	6	Principal
	Federal Boulevard	5th Ave	Holden Place	Add through lane(s)	5	6	Principal
	Green Valley Ranch Blvd	Chambers Rd	Telluride St	Add through lane(s)	4	6	Principal
	Green Valley Ranch Blvd	Chambers Rd	Pena Blvd	Add through lane(s)	2	4	Principal
	Green Valley Ranch Blvd	Telluride St.	Tower Rd	Add through lane(s)	4	6	Principal
	Pena Blvd	I-70	Tower Rd	Add through lane(s)	4	6	Freeway
	Pena Boulevard	Jackson Gap St. west	DIA Terminal	Add through lane(s)	6	8	Freeway
	Pena Boulevard	Tower Road	E-470 east ramps	Add through lane(s)	4	6	Freeway
	Picadilly Road	70th Ave	82nd Ave	Add New Road		6	Principal
	Tower Road	38th Ave.	43th Ave	Add through lane(s)	2	6	Principal
	Tower Road	43th Ave	Green Valley Ranch Blvd	Add through lane(s)	4	6	Principal



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	Tower Road	56th Avenue	Pena Boulevard	Add through lane(s)	4	6	Principal
	Tower Road	48th Ave	56th Ave	Add through lane(s)	4	6	Principal
	Washington Street	Elk Place	52nd Avenue	Add through lane(s)	2	4	Principal
	45th Avenue	Chambers Rd	Airport Blvd	Add New Road		2	Collector
	Airport Way	48th Ave	56th Ave	Add New Road		4	Collector
<i>Network Staging: 2035 (2025-2035)</i>							
	38th Avenue	Brighton Blvd	Walnut St	Add through lane(s)	2	4	Principal
	Hampden Avenue (SH-30)	Dayton Street	Havana Street	Add through lane(s)	5	6	Principal
<b>Douglas County</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
2003-112	C-470	Santa Fe Dr.		Interchange Reconstruction			Freeway
<i>Network Staging: 2025 (2015-2024)</i>							
	Canyons Pkwy (Arterial A)	Crowfoot Valley Rd	Hess Rd	Add New Road		4	Principal
	Chambers Road	Mainstreet	Lincoln Avenue	Add through lane(s)	2	4	Principal
	County Line Road	Phillips St	University Blvd	Add through lane(s)	2	4	Principal
	I-25	Castlegate Dr		New Interchange			Freeway
	Lincoln Avenue	Peoria St	1st Ave	Add through lane(s)	4	6	Principal
	North Meadows Dr. extension	Castle gate Drive West	I-25	Add New Road		4	Minor
	Peoria Street	E-470	.75 miles s/Lincoln Ave	Add through lane(s)	2	4	Principal
<i>Network Staging: 2035 (2025-2035)</i>							
	Bayou Gulch/Chambers Rd	Vistancia Dr.	Southern Boundary of	Add New Road		4	Principal
	Bayou Gulch/Chambers Rd	Parker Road	Vistancia Dr.	Add through lane(s)	2	4	Principal
	Crowfoot Valley Rd	Founders Pkwy	Macanta Rd	Add through lane(s)	2	4	Principal
	Crowfoot Valley Road	Macanta Rd	Chambers Rd	Add through lane(s)	2	4	Principal
	Douglas Lane	West I-25 Frontage Rd	East I-25 Frontage Rd	Add through lane(s)		2	Minor
	Hess Rd	I-25	Chambers Rd	Add through lane(s)	2	4	Principal
	Hilltop Rd	Canterberry Pkwy	Singing Hills Rd	Add through lane(s)	2	4	Principal
	I-25	Douglas Lane		New Interchange			Freeway
	Lincoln Avenue	1st Street	Keystone Blvd	Add through lane(s)	4	6	Principal
	Mainstreet	Canterberry Pkwy	Tomahawk Rd	Add through lane(s)	2	4	Principal
	Peoria Street	.75 mi S. Lincoln Ave	Mainstreet	Add through lane(s)	2	4	Principal



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	Rampart Range Rd	Waterton Rd	Titan Rd	Add through lane(s)	2	4	Principal
	Ridgegate Pkwy	Peoria St	Chambers Rd	Add through lane(s)	2	4	Principal
	Titan Rd	Rampart Range Rd	Santa Fe Dr.	Add through lane(s)	2	4	Principal
	Waterton Rd	Dante Drive	Campfire St	Add through lane(s)	2	4	Principal
	Singing Hills Rd	Hilltop Rd	Elbert County Line	Add through lane(s)	2	4	Collector

### E-470 Authority

*Network Staging: 2025 (2015-2024)*

E-470	Potomac		New Interchange			Freeway
E-470	Quebec		New Interchange			Freeway
E-470	48th Ave		Add New Interchange			Freeway

*Network Staging: 2035 (2025-2035)*

E-470	I-76	Pena Blvd	Add through lane(s)	4	6	Freeway
E-470	Parker Rd	Jewell Avenue	Add through lane(s)	4	6	Freeway
E-470	Jewell Avenue	I-70	Add through lane(s)	4	6	Freeway
E-470	112th Avenue		New Interchange			Freeway
E-470	I-25 North	I-76	Add through lane(s)	4	6	Freeway
E-470	I-25	Peoria St	Add through lane(s)	6	8	Freeway
E-470	Peoria St	Chambers Rd	Add through lane(s)	8	10	Freeway
E-470	Chambers Rd	Jordan Rd	Add through lane(s)	6	8	Freeway
E-470	Jordan Rd	Parker Rd	Add through lane(s)	7	9	Freeway
E-470	I-70	Pena Blvd	Add through lane(s)	4	6	Freeway
E-470	I-70		Interchange Reconstruction			Freeway
E-470	88th Avenue		Add New Interchange			Freeway
	East Frontage Rd	88th Ave	96th Ave	Add New Road		1 Frontage Road
	Gun Club Rd	6th Pkwy	Smith Rd	Add New Road		2 Minor
	West Frontage Rd	88th Ave	96th Ave	Add New Road		1 Frontage Road

### Erie

*Network Staging: 2025 (2015-2024)*

	Leon A. Wurl Pkwy	US-287	119th St.	Add through lane(s)	2	4	Principal
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### Greenwood Village

*Network Staging: 2025 (2015-2024)*





## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	Peakview Ave/Dayton St	Boston Street	Dayton Street	Add through lane(s)	2	4	Collector
<b>Jefferson County</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	Quincy Avenue	Simms St	Kipling Pkwy	Add through lane(s)	2	4	Principal
	Chatfield Avenue	Pierce Street	Kendall Boulevard	Add through lane(s)	2	3	Principal
	Quincy Avenue	Kipling Street	Carr Street	Add through lane(s)	2	4	Principal
<i>Network Staging: 2035 (2025-2035)</i>							
	Quincy Avenue	C-470	Simms Street	Add through lane(s)	2	4	Principal
<b>Jefferson Pkwy/Highway</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	Jefferson Pkwy	SH-128/96th St	SH-93 n/o 64th Ave	Add New Road		4	Freeway
	Jefferson Pkwy	SH-72		Add New Interchange			Freeway
	Jefferson Pkwy	Candelas Parkway		Add New Interchange			Freeway
	Jefferson Pkwy	Indiana St		Add New Interchange			Freeway
	SH-93	64th Pkwy	.5 miles n/o Jefferson Pkwy	Add through lane(s)	2	4	Principal
<b>Lafayette</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	120th Street	Emma	Coal Creek	Add through lane(s)	2	4	Minor
	South Boulder Road	LaMont Does Park	120th St	Add through lane(s)	2	4	Minor
<i>Network Staging: 2035 (2025-2035)</i>							
	South Boulder Rd/160th Ave.	120th St	Boulder/Broomfield County	Add New Road		2	Principal
<b>Lakewood</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	Alameda Avenue	McIntyre St	Rooney Rd	Add through lane(s)	2	6	Principal
	Alameda Avenue	Bear Creek Boulevard	McIntyre St	Add through lane(s)	2	4	Principal
	McIntyre Street	Alameda Ave.	Yale	Add through lane(s)		4	Minor
	Yale Avenue	Indiana St	McIntyre St	Add New Road		4	Collector
<b>Littleton</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	Dry Creek Rd	Broadway	Mineral Ave	Add through lane(s)	3	4	Minor
<b>Lone Tree</b>							



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
<i>Network Staging: 2015 (2012-2014)</i>							
	Sky Ridge Ave	Ridgegate Parkway	Park Meadows Blvd.	Add New Road		2	Collector
<i>Network Staging: 2025 (2015-2024)</i>							
	Havana St	Lincoln Ave.	RidgeGate Parkway	Add New Road		2	Minor
	Sky Ridge Avenue	Park Meadows	Peoria St	Add New Road		4	Minor
<b>Longmont</b>							
<i>Network Staging: 2025 (2015-2024)</i>							
	17th Avenue	Alpine St.	East County Line Rd	Add through lane(s)	2	4	Principal
	Nelson Rd	75th St	Affolter Dr	Add through lane(s)	2	4	Principal
	Pace Street	5th Avenue	Ute Road	Add through lane(s)	2	4	Principal
1999-026	SH-66	Hover Road	US 287 (Longmont)	Add through lane(s)	2	4	Principal
<i>Network Staging: 2035 (2025-2035)</i>							
	East County Line Rd	9th Ave	SH-66	Add through lane(s)	2	4	Principal
<b>Parker</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
	Chambers Rd.	Stroh Rd.	Hess Road	Add New Road		2	Principal
	Stroh Rd	Chambers Rd	Crowfoot Valley Rd	Add New Road		4	Principal
<i>Network Staging: 2025 (2015-2024)</i>							
	Chambers Rd	Crowfoot Valley Road	Southern Boundary of	Add New Road		2	Principal
	Chambers Rd.	Stroh Rd.	Hess Road.	Add through lane(s)	2	4	Principal
	Chambers Road	Stroh Road	Crowfoot Valley Road	Add New Road		2	Principal
	Chambers Road	Stroh Road	Crowfoot Valley Road	Add through lane(s)	2	4	Principal
	Chambers Road	Hess Road	Mainstreet	Add through lane(s)	2	4	Principal
	Chambers Road	Newlin Gulch Blvd	Mainstreet	Add through lane(s)	2	4	Principal
	Crowfoot Valley Road	Chambers Rd	Stroh Rd	Add through lane(s)	2	4	Principal
	Hess Road	Chambers Rd	Parker Road	Add through lane(s)	2	4	Principal
	Jordan Road	Bradbury Pkwy	Hess Rd	Add through lane(s)	2	4	Principal
	Lincoln Avenue	Keystone Blvd	Parker Rd	Add through lane(s)	4	6	Principal
	Stroh Rd	Crowfoot Valley	J. Morgan Blvd	Add through lane(s)	2	4	Principal
	Cottonwood Drive	Parker Road	Jordan Road	Add through lane(s)	2	4	Minor
	Cottonwood Drive	Jordan Road	Chambers Road	Add New Road		4	Minor



## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	Motsenbocker Road	Hess Road	Mainstreet	Add through lane(s)	2	4	Collector
	Todd Drive	Jordan Road	Motsenbocker Road	Add New Road		2	Collector
<i>Network Staging: 2035 (2025-2035)</i>							
	Chamber Road	Crowfoot Valley Rd	South Boundary	Add through lane(s)	2	4	Principal
<b>R T D</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
2007-042	West Corridor LRT Line	South Golden	CPV LRT Spur	Rapid Transit			Rapid Transit
<i>Network Staging: 2025 (2015-2024)</i>							
	Denver Downtown Circulator	DUS	Civic Center	Bus Transit Shuttle			
	Commuter Rail Maintenance	Fox St		Rapid Transit- Other			Rapid Transit
2007-057	Denver Union Station Expansion	16th St/Wynkoop		Rapid Transit- Other			Rapid Transit
2007-052	East Corridor Commuter Rail	Denver Union Terminal	DIA	Rapid Transit			Rapid Transit
2007-054	Gold Line LRT	DUS	Ward Rd	Rapid Transit			Rapid Transit
2007-056	I-225 LRT Corridor	Parker Rd	East Corridor Commuter	Rapid Transit			Rapid Transit
2007-066	LRT	Eliati Street		Transit Maintenance			Rapid Transit
2007-050	Northwest Rail	DUS	Westminster	Rapid Transit			Rapid Transit
2007-055	North Metro	DUS	72nd Ave	Rapid Transit			Rapid Transit
<i>Network Staging: 2035 (2025-2035)</i>							
2007-059	Southeast Rail Extension	Lincoln Ave	Ridgegate Pkwy	Rapid Transit			Rapid Transit
<b>Sheridan</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
	Quincy Avenue	Irving St	Federal Blvd	Add New Road		2	Principal
<b>Thornton</b>							
<i>Network Staging: 2015 (2012-2014)</i>							
	Holly Street	136th Ave.	138th Ave.	Add through lane(s)	2	4	Minor
	Holly Street	123rd Ave.	128th Ave.	Add through lane(s)	2	4	Minor
	McKay Road	104th Ave.	103rd Ave.	Add through lane(s)	2	4	Collector
<i>Network Staging: 2025 (2015-2024)</i>							
	104th Avenue	Grandview Ponds	McKay Rd	Add through lane(s)	2	4	Principal
	144th Avenue	York St	Colorado Blvd	Add through lane(s)	2	4	Principal



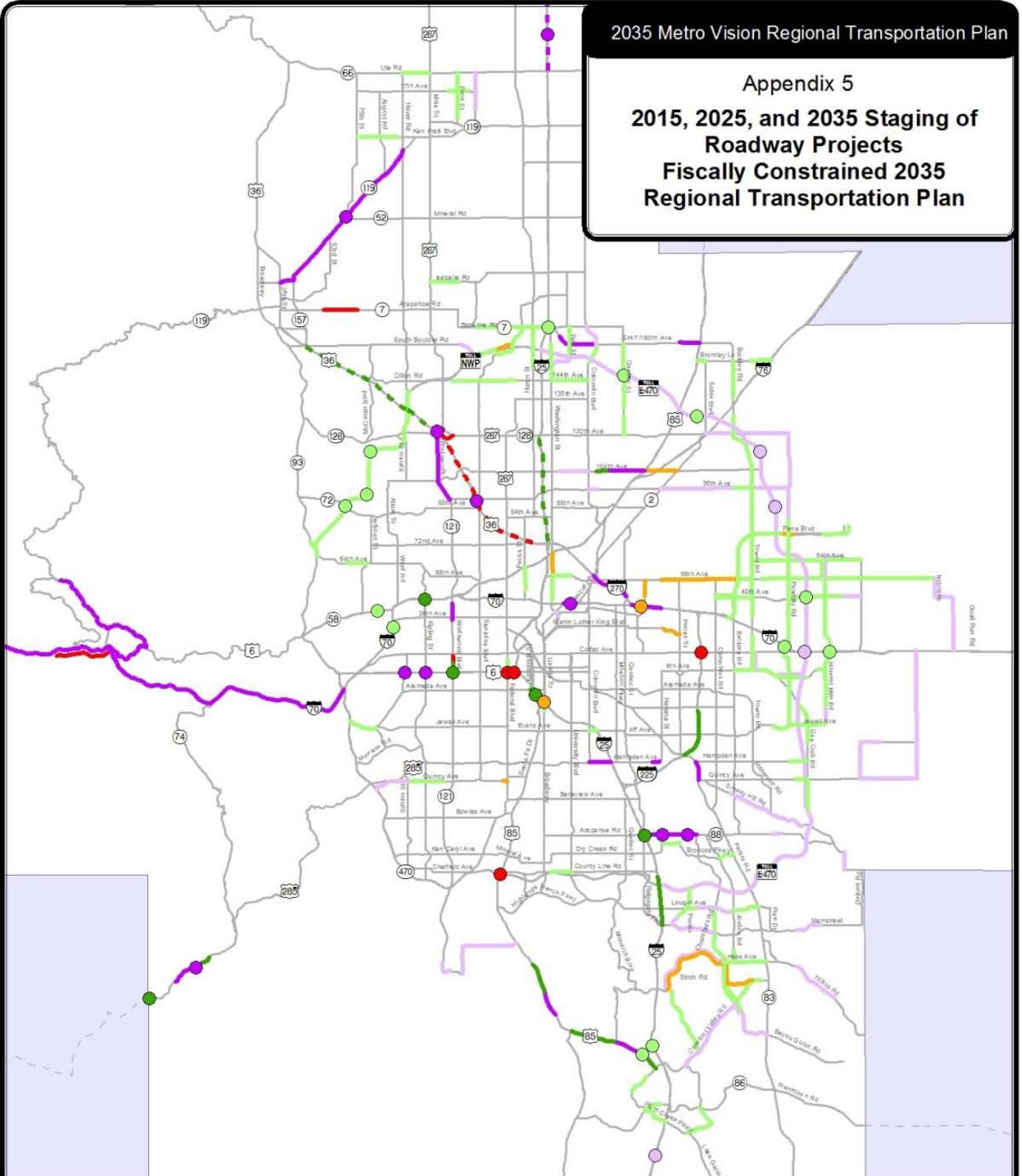
## Model Network Improvements Included in the 2013 Cycle 1 Air Quality Conformity Assesment for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Staging Periods

TIP-ID	Facility Name	Start At	End At	Improvement	Base Lanes	Future Lanes	Classification
	144th Avenue	Washington St.	York St.	Add through lane(s)	2	4	Principal
	Colorado Blvd	152nd Ave	156th Ave	Add through lane(s)	2	4	Principal
	Colorado Blvd	156th Ave	160th Ave (SH-7)	Add New Road		4	Principal
	Quebec Street	120th Ave	128th Ave	Add through lane(s)	2	4	Principal
	Quebec Street	132nd Ave	160th Ave	Add through lane(s)	2	4	Principal
	Washington Street	152nd Ave	160th Ave	Add through lane(s)	2	4	Principal
	Washington Street	144th Avenue	152nd Ave	Add through lane(s)	2	4	Principal
	York Street	E-470	SH-7	Add through lane(s)	2	4	Principal
	112th Avenue	Steele St.	Colorado Blvd.	Add through lane(s)	2	4	Collector
<i>Network Staging: 2035 (2025-2035)</i>							
	104th Avenue	McKay Road	US-85	Add through lane(s)	2	4	Principal
	104th Avenue	Marion St	Colorado Blvd	Add through lane(s)	4	6	Principal
	152nd Avenue	Washington St.	York St	Add through lane(s)	2	4	Principal
	Colorado Blvd	SH-7	168th Ave	Add New Road		4	Principal
	Thornton Pkwy	Colorado Blvd	Riverdale Road	Add through lane(s)	2	4	Principal
	York Street	150nd Ave	E-470	Add through lane(s)	2	4	Principal
	160th Avenue	I-25	Washington St.	Add through lane(s)	2	4	Minor
<b>Westminster</b>							
<i>Network Staging: 2035 (2025-2035)</i>							
	Wadsworth Parkway	92nd Avenue	SH-128/ new 120th Ave	Add through lane(s)	4	6	Major Regional
	128th Avenue	I-25	Zuni Street	Add through lane(s)	2	4	Minor
<b>Wheat Ridge</b>							
<i>Network Staging: 2015 (2015-2024)</i>							
	I-70	32nd Ave		Interchange Reconstruction			Freeway
	SH-58	Cabela Street		New Interchange			Freeway
<i>Network Staging: 2035 (2025-2035)</i>							
	Wadsworth Blvd	36th Ave	46th Ave	Add through lane(s)	4	6	Principal

# 2035 Metro Vision Regional Transportation Plan

## Appendix 5

### 2015, 2025, and 2035 Staging of Roadway Projects Fiscally Constrained 2035 Regional Transportation Plan



This map and the data it depicts are intended for informational purposes only. DRCOG provides this information on an "as is" basis and makes no representation or warranty that the data will be error free. DRCOG is not responsible to any user for any costs or damages arising from inconsistencies in its data.

Source: DRCOG  
Projection: Colorado State Plane, NAD 83  
RU 11/12

0 5 10  
Miles



Roadway Segment  
Managed Lanes (HOT)  
New or Improved Interchange



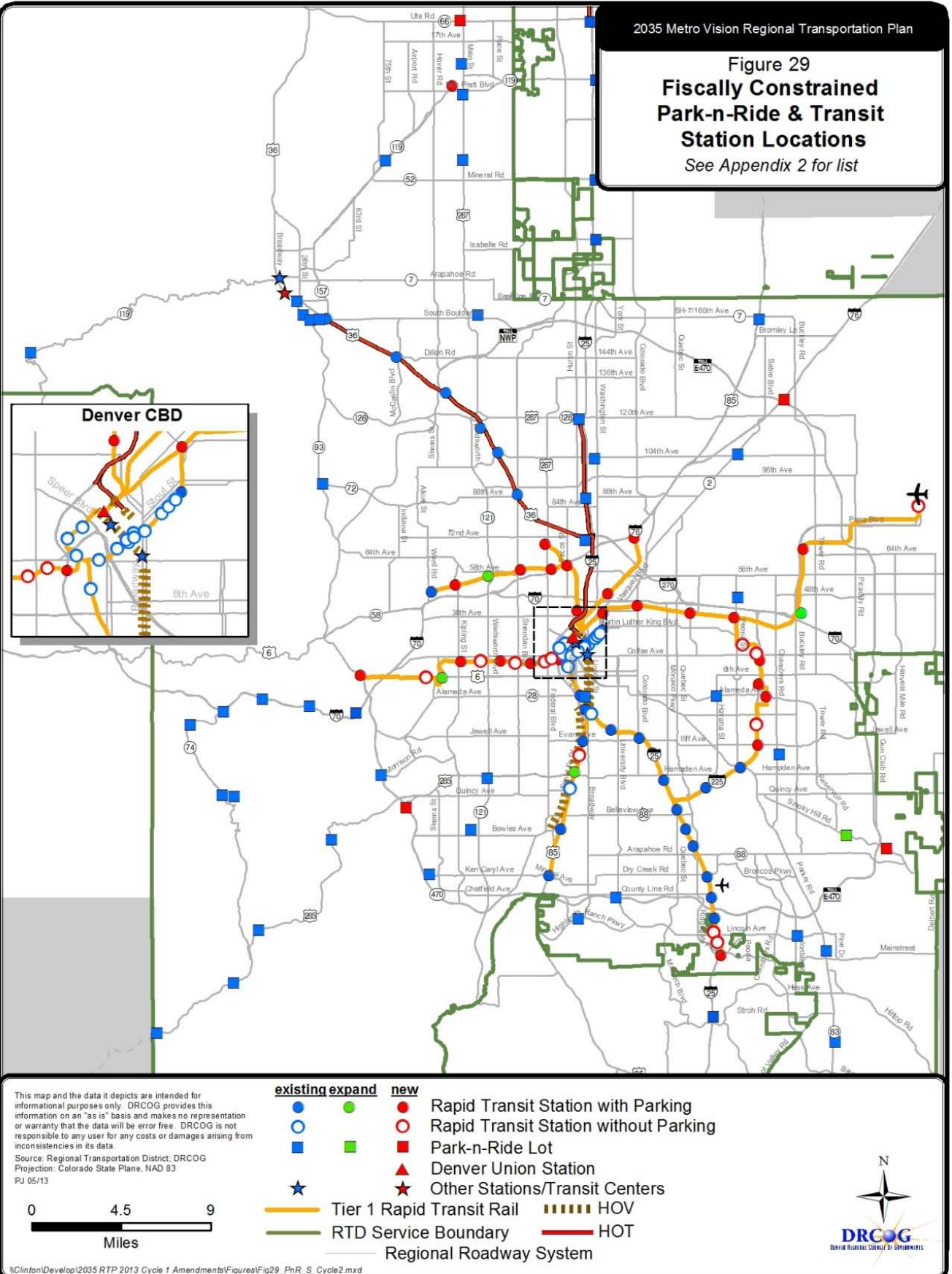
**DRCOG**  
DENVER REGIONAL COUNTY ORGANIZATION

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**Figure 29**  
**Fiscally Constrained**  
**Park-n-Ride & Transit**  
**Station Locations**

See Appendix 2 for list



## **APPENDIX B**

### **DRCOG Transportation model CALIBRATION description**

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## Introduction

In support of the conformity determination for the 2035 Regional Transportation Plan (RTP), the Denver Regional Council of Governments' (DRCOG) Metro Vision Resource Center employed the Regional Socio-economic Model together with *Focus*, the updated regional travel modeling system. Travel modeling uses mathematical formulations in computer software programs to show how regional development impacts road and transit usage.

The *Focus* model simulates the travel of millions of individual people in the region throughout a typical weekday. The previous model, Compass, was an aggregate model that did not include this level of detail.

The *Focus* model sums the individual travel to forecast how many vehicles will be driven on major roads, how much congestion there will be and how many people will walk, bike or use transit. To realistically simulate each person's daily travel, *Focus* models the many choices each person makes each day including:

- (1) where to work
- (2) where to go to school
- (3) how many automobiles are owned by the person's household
- (4) how many trips each person makes in a day
- (5) the address where each trip starts from and goes to
- (6) the mode for each trip, with choices including walk and biking
- (7) which major streets or bus routes were chosen to reach each destination

The model takes into account many characteristics of people, such as their age and income, and how the region will change demographically over time. It also takes into account characteristics of the built environment such as congestion, density, and walkability.

The *Focus* travel model was estimated based on detailed data from a survey called the Travel Behavior Inventory (TBI). The TBI project involved multiple surveys of travel in the Denver metropolitan area, including:

- The Household Survey – a travel diary survey that gathered complete travel information for an assigned day for approximately 5,000 households;
- The Front Range Travel Survey - a survey of vehicles entering and leaving the metropolitan area;

- The Commercial Vehicle Survey – a survey that gathered complete travel information from more than 800 commercial vehicles on an assigned day; and
- The Non-Respondent Populations Project - an effort to evaluate whether those who did not respond to the survey exhibited different travel behavior than people who did respond to the survey.

The bulk of this survey work was conducted in 1997-1998, with data “cleaning” and summary conducted through 2001.

*Focus* was calibrated using 2005 data sources including roadway counts, transit boardings, American Community Survey data, and Census data.

## **Demographic Development Estimation**

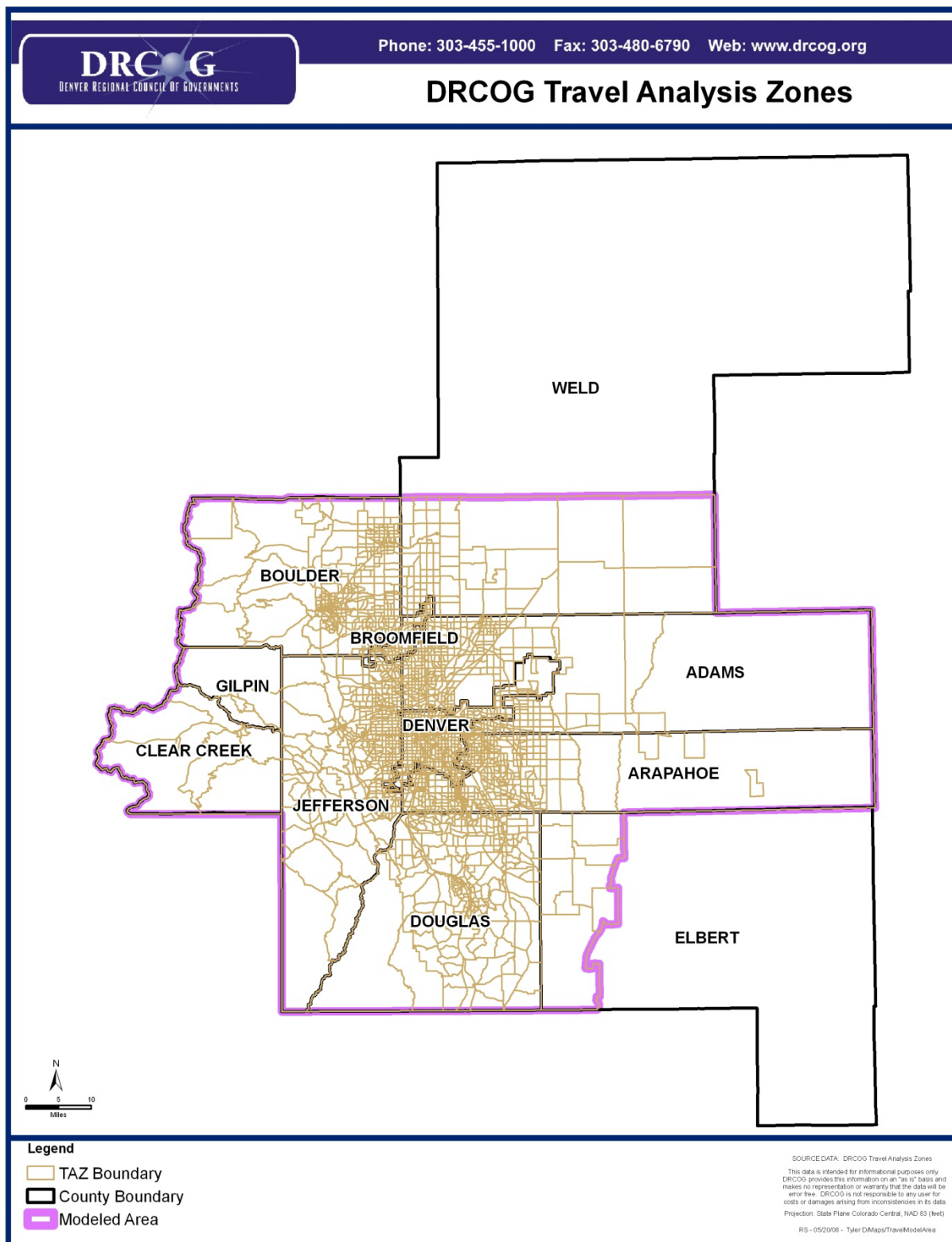
DRCOG works with a panel of economists and planners from both private and public sectors to review current growth trends and evaluate the output of a regional forecast model. This model relates the regional economy to national forecasts by industrial sector. Once employment levels are predicted, a demographic model is used to determine the migration levels needed to generate the labor force to fill the expected jobs. The forecasts are reviewed annually with major revisions expected every five years.

## **Small Area Development Estimates**

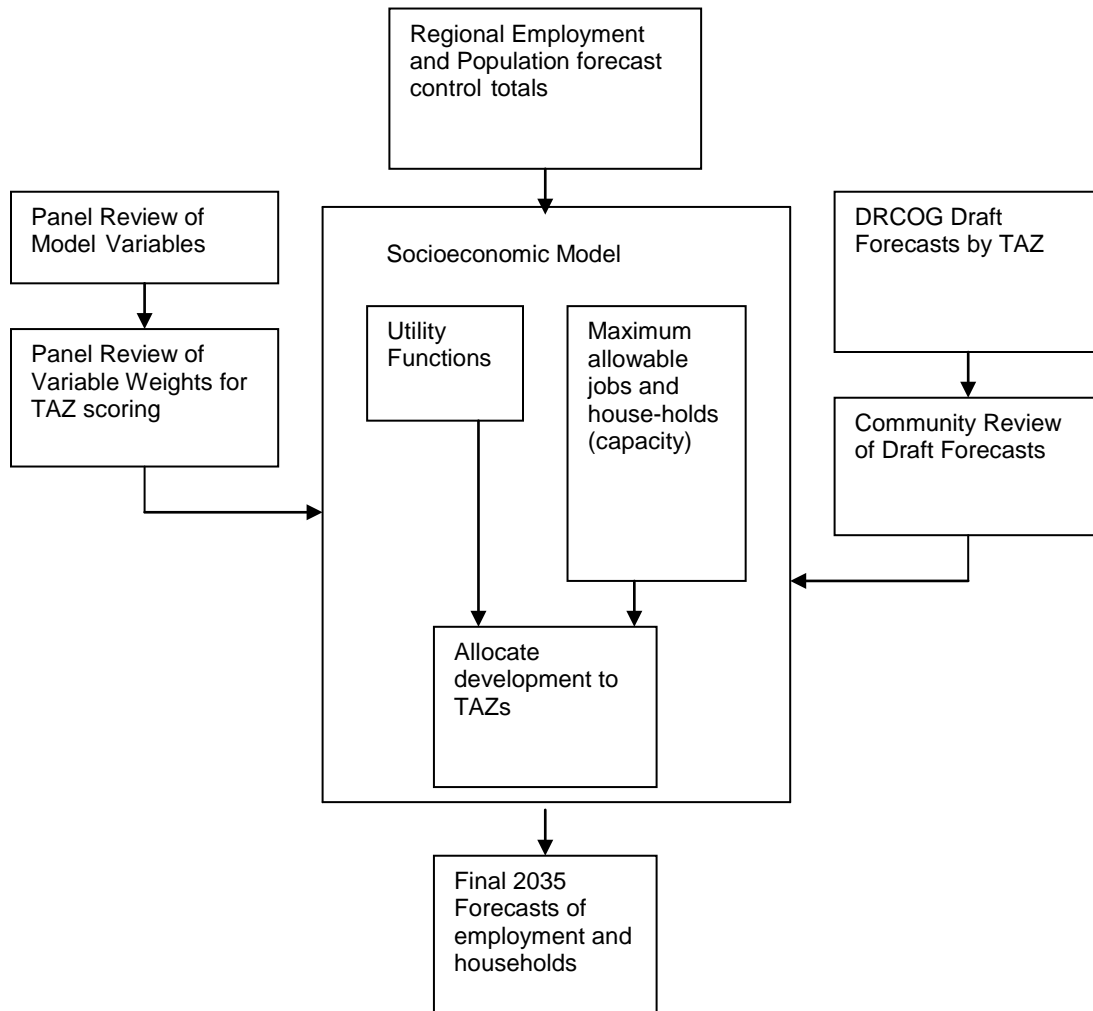
To provide development data at a level of detail necessary for the travel model, the regional urban activity forecasts are disaggregated into 2,800 transportation analysis zones (TAZs), as shown in Figure 1. The allocation to TAZs is carried out based on an attractiveness index for each TAZ, which in effect develops a desirability “score” for each TAZ. This score is based on roughly 20 variables such as miles of arterial roadway in the TAZ, rapid transit service, vacant land, local land use plans, growth over the last decade, environmental constraints, and income characteristics. Separate attractiveness indices and allocations are developed for commercial and retail employment, and for households. The zones are filled with new development in the given category starting with the TAZ with the highest attractiveness index. The amount of development allocated to a TAZ is controlled by the amount of vacant land in the zone available for residential or employment uses, the expected density in the zone, and other factors. The model works its way

through the list of zones until all of the growth is allocated. The effects of several regional planning policies also are taken into account in the model: open space plans affect the amount of developable land in the relevant TAZs; the regional urban growth boundary affects expected densities, and the development totals in TAZs outside that boundary; and planned urban centers affect the development capacity in the TAZs in which they are planned. Figure 2 shows a flowchart for the process of socioeconomic forecasting in the Denver region. The forecasting results were refreshed in 2009.

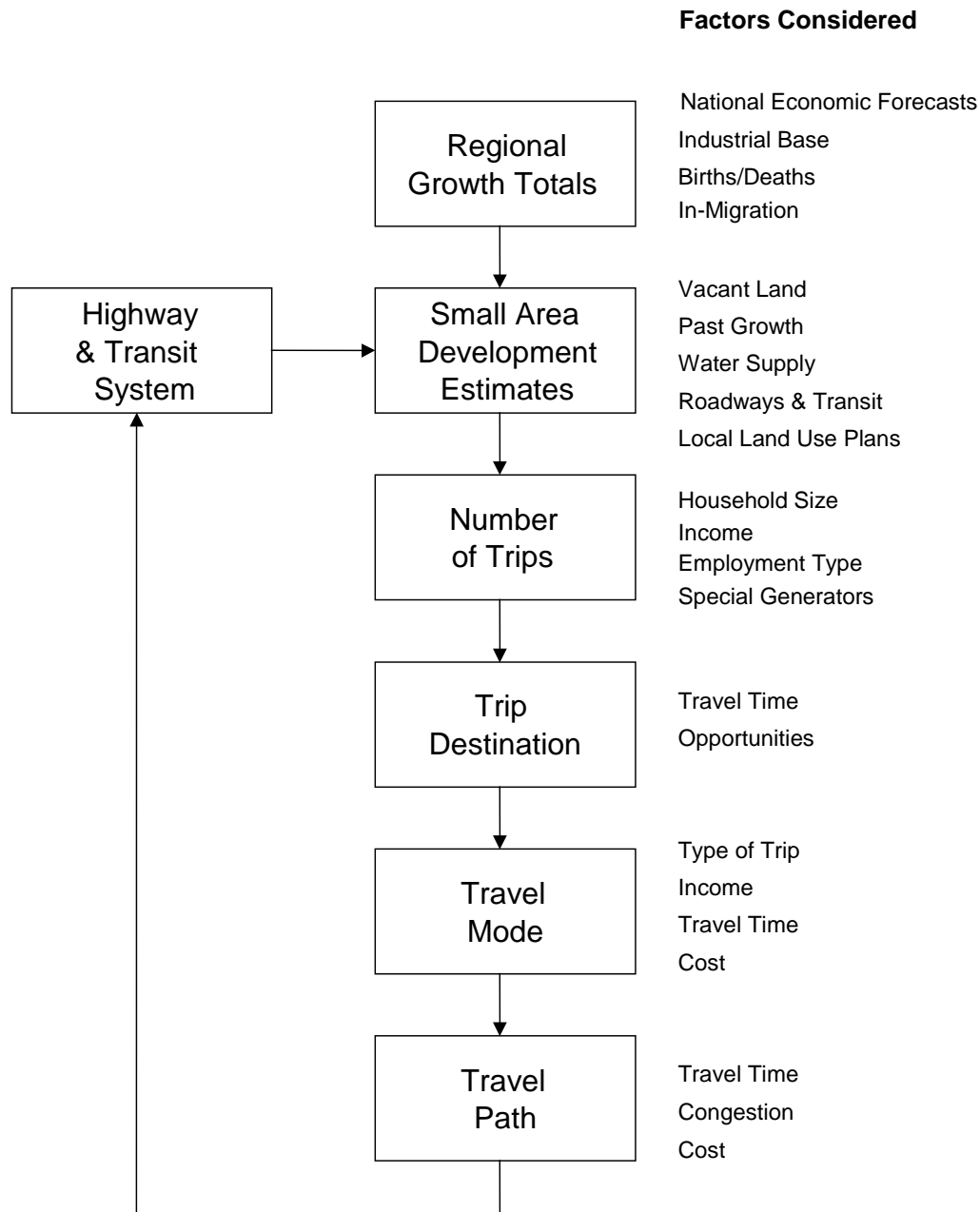
**Figure 1**  
**DRCOG Travel Analysis Zones**



**Figure 2**  
**Socioeconomic Model Elements and Flow**



**Figure 3**  
**Travel Model Elements and Flow**



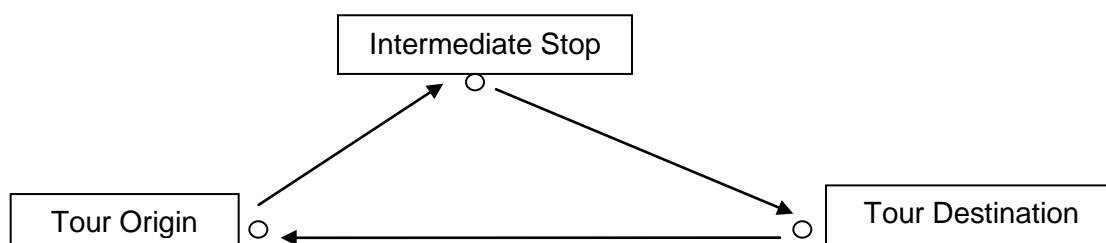
## Focus Model Process Overview

Figure 3 shows a simplified diagram of how the *Focus* model components flow after the socioeconomic forecast has been completed.

The model begins with a population synthesizer that creates a descriptive database record for each household in the region (about one million records in 2010) and each person (about 2.8 million records in 2010). Then the travel “skims” are created (travel times, costs, etc.). Tours are the first travel elements to be created. Figure 4 shows a diagram to explain how tours are related to trips. This example diagram has one tour composed of three trips and one intermediate stop.

The model then runs through a set of steps for each tour, including activity generation, location choice, mode choice, and time of day choice model components. Then the model runs through a parallel set of model components for each trip within a tour.

**Figure 4.  
Tour Diagram**



## Highway and Transit System

One of the most significant inputs to all travel model components is the transportation network representation. The highway network is represented by over 25,000 directional road segments, described by location, length, number of lanes, functional classification, and area type. High-occupancy vehicle (HOV) lanes also are represented as special links. Tollway links are assessed an additional impedance to reflect toll charges. The model also includes a fully detailed representation of transit facilities, including all bus and rapid transit lines, park-n-Ride lots, bus stops, and walk access/egress routes. Bus routes follow the same highway network as automobiles trips, and bus speeds are based on auto speeds. Rail speeds are developed based

on transit schedule information. Capture areas for park-n-Ride lots are quite broad, permitting trip-makers in the model to select the lot that produces the shortest overall transit path to their destination. As part of the process of estimating highway and transit use, minimum impedance paths are calculated using time, distance and toll cost over the highway and HOV system, and time and cost over the transit system.

## Model Components

The most important model components are briefly described in the sections below, and Table 1 lists all model components. Most model components are multinomial logit or nested logit models, which are statistical models that have two or more discrete choice outcomes.

**Table 1. *Focus* Model Components**

1. Population Synthesizer	14. Tour Time of Day Simulation
2. TransCAD Initialization	15. Tour Primary Destination Choice
3. TransCAD Trip Generation	16. Tour Priority Assignment
4. TransCAD Skimming	17. Tour Main Mode Choice
5. Size Sum Variable Calculator	18. Tour Time of Day Choice
6. Regular Workplace Location	19. Intermediate Stop Generation Choice
7. Regular School Location	20. Trip Time of Day Simulation
8. Auto Availability	21. Intermediate Stop Location Choice
9. Aggregate Destination Choice Logsum Generation	22. Trip Mode Choice
10. Daily Activity Pattern	23. Trip Time of Day
11. Exact Number of Tours	24. Write Trips To TransCAD
12. Work Tour Destination Type	25. TransCAD Highway and Transit Assignment
13. Work-Based Subtour Generation	

## Population Synthesizer

The model begins with a population synthesizer called PopSyn. PopSyn creates a forecast of individual households and persons with detailed demographic characteristics for chosen year. It operates by drawing household and person records from the US Census year 2000 Public Use Microsample (PUMS) with the goal of matching forecasted demographic controls, including land use model households by zone.



## **Highway and Transit Skims**

The highway and transit skims are made by finding shortest time paths for origin-destination zone pairs by time-of-day. The skims are used extensively in later model components location choice, mode choice, and time of day choice.

## **Denver International Airport/Internal-External/ External-External Trips**

After skimming is run, the Compass 4.0 model components must be run for airport trips, internal-external trips, commercial vehicle trips, and external-external trips. The entire Compass model must be run to generate and assign these trips.

## **Regular Workplace and School Location**

The work location choice model takes all regional workers and assigns them a regular work location zone and point. Characteristics of the worker and their home zone are used in combination with zonal characteristics to determine the desirability of any zone. The work location choice model is a nested logit model with the highest nest for a regular workplace at home or outside the home. At the second level in the next, if an “outside the home” workplace is selected, a particular workplace location zone is chosen.

Similarly to the regular work location choice model, the regular school location choice model assigns each student a regular school location zone and school. The model uses information about the student, such as income and age, and information on school enrollment and distance from home to school to determine which schools will be attractive for which students. There are four school location choice models by student grade level: pre-school, kindergarden-8<sup>th</sup> grade, 9<sup>th</sup>-12<sup>th</sup> grade, and university. Four separate models are used to reflect that the decision-making of school location for different grade ranges have significantly different characteristics. The models are all multinomial logit with the choice being the location of the school zone.

## **Auto Availability Choice**

The auto availability choice model is a multinomial logit model that selects number of automobiles available for each household in the region. The choices range from no cars to 4+ cars. The model uses information about households and their accessibility to work and school to determine how many autos are available to households.

## Tour Models

After *Focus* has projected the long-term decisions about work and school location and auto ownership, it forecasts daily activities on a tour-level.

The ***exact number of tours*** model determines exactly how many tours of each type each person will make in his or her day. The tour types predicted for each person include: work, school, escort, personal business, shop, meal, and social recreation. The model outputs this number of tours by purpose into the tours table in the database.

The ***tour primary destination choice*** model selects the destination of tour based the development (e.g. jobs and households) located within the zone. Then it assigns a point within each zone as the final destination.

After the tour destination is known, the ***tour main mode choice*** model predicts the main travel mode used on the tour. The mode chosen is based on the impedances associated with each mode from the tour origin to the tour destination, zonal characteristics, and demographic person characteristics.

Given the known tour origin, destination and mode from previous models, the ***tour arrival and departure time model*** predicts the time arriving at the primary destination of the tour and the time leaving the primary destination, both to within 1 hour periods.

## Trip Models

After the tour-level models are run, a series of trip-level models are run. The first trip level model is the ***intermediate stop generation*** model which generates intermediate stops on each tour.

The ***intermediate stop location choice*** model selects the zone for each intermediate stop. The locations of all intermediate stops on tours are modeled one at a time, first for stops from home to the primary activity and then for stops from the primary activity to home.

The ***trip mode choice*** model determines the trip mode on all trips. The tour mode has already been found by the tour mode choice model, and this knowledge is used in combination with skim data, zonal data, and person data to find the trip modes on these tours.

Given the origin, destination and mode of each trip, the ***trip time of day choice*** model predicts the time each intermediate stop will occur. The trip time of day choice model has 24 alternatives corresponding to each hour period.

After the trip models have been run, the following information is known for every trip internal to the region:

- Origin and Destination Zone and Point Location
- Trip Purpose (work, school, escort, personal business, shop, social recreation)
- Trip Mode ( drive alone, shared ride 2, shared ride 3+, walk to transit, drive to transit, walk, bike, school bus)
- Trip Time of Day ( one of 24 hours)
- Which tour the trip is part of
- What person made the trip
- What household the person who made the trip belongs to

### **Network Assignment**

Automobile trips are assigned to the highway network via a “user equilibrium” algorithm, after commercial trips have been loaded first using an “all-or-nothing process.” The all-or-nothing process simply assigns trips to the shortest path between origin and destination, ignoring possible congestion effects that might cause trips to take different paths. The user equilibrium process assigns the trips between each origin and each destination TAZ in such a way that, at the end of the process, no trip can reduce its travel time by changing its path. In other words, taking into account the congestion produced by all other trips in the region, each trip is following its minimum path. High-occupancy vehicles (HOV) are loaded simultaneously with single-occupant vehicles (SOV). Transit assignment is performed separately, using an all-or-nothing algorithm

that does not take into account the possibility that high demand on some transit routes may motivate some riders to shift routes. Finally, the model is run several times, feeding back the output speeds to the input stages that require them as input (among them, the trip distribution stage) until the output speeds and the input speeds match. The model also takes into account the effect of toll costs in roadway route choice by converting toll costs into equivalent time cost using an estimated value of time for automobile trip-makers.

## **Model Calibration**

Each *Focus* model component was calibrated using 2005 inputs to 2005 external data sources individually and then the entire model was calibrated aggregately against roadway counts and RTD transit boardings.

External data from 2005 was used wherever possible to ensure that the model was correctly capturing observed 2005 Denver travel behavior when 2005 inputs were used in the model. The following 2005 datasets were used to calibrate against:

- 2005 American Community Survey (ACS)
- 2005 Colorado state demographer data
- 2005 Colorado Department of Transportation (CDOT) highway counts
- 2005 HPMS estimated regional VMT
- 2005 Regional Transportation District (RTD) transit boardings and 2005 Compass trip-based model results.

In the spring of 2012, the model was again calibrated, this time using observations of highway volume and transit boardings from 2010.

Once comparisons were made of model results against the observed datasets, each model component was calibrated. The calibration involved changing utility function constants, coefficients, and adding variables. Then the model was re-run, results compared again, and modifications made again. This process was iterated as time allowed until satisfactory results were achieved.

The major regional level model results of the calibration are shown in Table 2 and Table 3. These tables demonstrate that the aggregate model results match the observed counts and transit boardings well.

**Table 2. Observed and Modeled Vehicle Miles Traveled on Links with Counts**

<b>Observed VMT</b>	<b>Modeled VMT</b>
29,061,936	28,285,657

**Table 3. Observed and Modeled Transit Boardings**

<b>Observed Transit Boardings</b>	<b>Modeled Transit Boardings</b>
317,645	320,584

## **Air Quality Modeling**

Formal air pollutant emissions modeling is conducted by the APCD. However, DRCOG, the APCD, and other agencies work closely together in this effort, both in developing the modeling techniques, assumptions, and parameters, and in executing the model runs. Travel model results are, of course, one of the principal inputs to the air pollutant emissions model. The model produces estimates of the amount of emissions of carbon monoxide (CO), volatile organic compounds (VOCs), oxides of nitrogen (NOx), and particulate matter (PM10) generated by motor vehicles. The results are then combined with numerous assumptions concerning meteorology and atmospheric chemical reactions to produce air pollutant concentration estimates.

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**APPENDIX C**  
**MODELING SUMMARY TABLES**

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**Table 1 – Denver Regional Council of Governments**

**Assumptions for the Entire Modeling Area and Data for Base and Future Years**

	<b>Base Year (2010)</b>	<b>Interim Year (2015)</b>	<b>Future Year (2035)</b>
<b>Total Population</b>	2,907,353	3,135,399	4,132,611
<b>Employment</b>	1,690,287	1,876,573	2,346,897
<b>Annual Growth Rate (Pop.)</b>	-	1.4%	1.6%
<b>Dwelling Units (Households)</b>	1,160,379	1,266,000	1,697,924
<b>Persons/Dwelling Unit (Household)</b>	2.47	2.42	2.40
<b>VMT by Roadway Type</b>			
-Freeway	26,416,797	28,427,764	36,334,245
-Expressway	4,340,918	6,124,852	7,981,432
-Principal	22,916,066	26,186,277	35,096,198
-Minor	8,065,783	7,450,020	10,254,925
-Other (Collectors, Centroid Connectors, Ramps)	11,836,132	12,637,883	17,592,755
<b>Total</b>	<b>73,575,695</b>	<b>80,826,796</b>	<b>107,259,554</b>
<b>Speed by Roadway Type (miles per hour)</b>			
-Freeway	61.9	60.9	56.2
-Expressway	49.0	47.9	43.8
-Principal	34.9	34.9	32.3
-Minor	32.0	31.7	29.0
-Other (Collectors, Centroid Connectors, Ramps)	23.2	22.9	21.7
<b>Total (Average Speed)</b>	<b>38.0</b>	<b>37.9</b>	<b>34.9</b>
<b>Lane Miles by Roadway Type</b>			
-Freeway	2,082	2,136	2,331
-Expressway	499	627	662
-Principal	3,465	4,045	4,787
-Minor	3,207	2,953	3,076
-Other (Collectors, Centroid Connectors, Ramps)	6,488	6,370	6,447
<b>Total</b>	<b>15,742</b>	<b>16,131</b>	<b>17,304</b>

# **2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments**

**Adams County**

## **PM10 Emission Reduction Conformity Commitments**

<b>Geographic Area of Commitment</b>	<b>For Staging Years</b>	<b>Emission Reduction Commitment</b>
General PM10 Modeling Domain	2015	61.89 %
	2020	61.89 %
	2030	61.89 %
	2035	61.89 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Alvin J. Nichols  
Name

6/28/2010  
Date

Chairman, Adams County Board of Commissioners  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

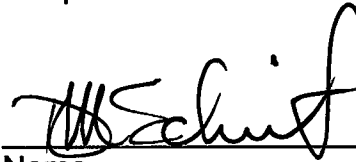
# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## Arapahoe County

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	55 %
	2020	55 %
	2030	55 %
	2035	55 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name

6/21/10  
Date

Public Works Director  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Arvada

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	71.5 %
	2020	71.5 %
	2030	71.5 %
	2035	71.5 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name

6-23-2010  
Date

Craig G. Kocian, City Manager  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

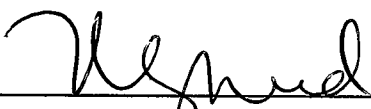
# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Aurora

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="45"/> %
	2020	<input type="text" value="45"/> %
	2030	<input type="text" value="45"/> %
	2035	<input type="text" value="45"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
\_\_\_\_\_  
Name      Nancy Freed

6/10/10  
\_\_\_\_\_  
Date

\_\_\_\_\_  
Interim City Manager  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

✓

## 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

Boulder County

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="31"/> %
	2020	<input type="text" value="31"/> %
	2030	<input type="text" value="31"/> %
	2035	<input type="text" value="31"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

**Ben Pearlman**

*Ben Pearlman*, vice chair  
Name

07/20/10  
Date

For Chair, Board of  
County Commissioners  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Boulder

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	70 %
	2020	70 %
	2030	70 %
	2035	70 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Jane S. Brautigam  
Name

06-10-2010  
Date

CITY MANAGER  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

**2035 Regional Transportation Plan Conformity  
PM10 Emission Reduction Commitments**

**City of Brighton**

**PM10 Emission Reduction Conformity Commitments**

<b>Geographic Area of Commitment</b>	<b>For Staging Years</b>	<b>Emission Reduction Commitment</b>
General PM10 Modeling Domain	2015	42.1 %
	2020	42.1 %
	2030	42.1 %
	2035	42.1 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
\_\_\_\_\_  
Name

6/29/10  
\_\_\_\_\_  
Date

City Manager  
\_\_\_\_\_  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.



City and County of Broomfield  
May 25, 2010

## 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City and County of Broomfield

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment	
General PM10 Modeling Domain	2015	68.2	%
	2020	68.2	%
	2030	68.2	%
	2035	68.2	%

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

George Di Lorio  
Name

6.24.10  
Date

CITY & COUNTY MANAGER  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## Castle Rock

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
PM10 Attainment/Maintenance Area	2015	65 %
	2020	65 %
	2030	65 %
	2035	65 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name Robert Goebel, P.E.

6/16/10  
Date

Public Works Director  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

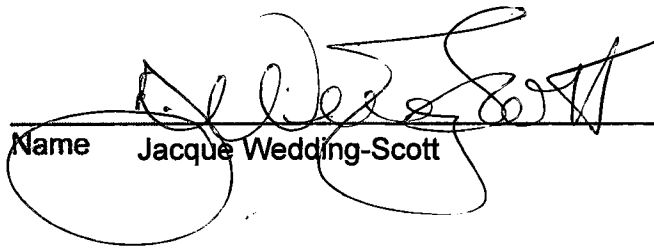
# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Centennial

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	45 %
	2020	45 %
	2030	45 %
	2035	45 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name Jacquie Wedding-Scott

6.18.10  
Date

Title City Manager

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

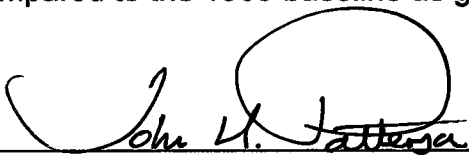
# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## City of Cherry Hills Village

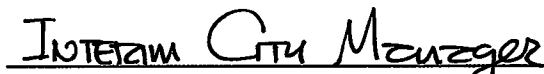
### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="55"/> %
	2020	<input type="text" value="55"/> %
	2030	<input type="text" value="55"/> %
	2035	<input type="text" value="55"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
\_\_\_\_\_  
Name

  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

Colorado Dept. of Transportation, Region 1

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	42 %
	2020	43 %
	2030	44 %
	2035	45 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Name

Date

Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

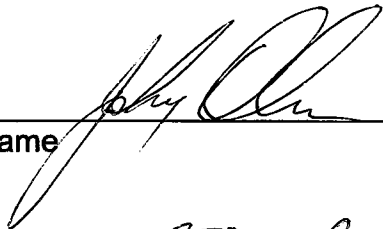
Colorado Dept. of Transportation, Region 4

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	55 %
	2020	55 %
	2030	55 %
	2035	55 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Name



Date

6-21-10

Title

RTD Region 4

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

Colorado Dept. of Transportation, Region 4

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="55"/> %
	2020	<input type="text" value="55"/> %
	2030	<input type="text" value="55"/> %
	2035	<input type="text" value="55"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

CHRISTIAN P. KELLY  
Name

6-29-10  
Date

LTC OPS I  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

Colorado Dept. of Transportation, Region 6

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment	
Sweep Box	2015	83	%
	2020	83	%
	2030	83	%
	2035	83	%
General PM10 Modeling Domain	2015	58	%
	2020	58	%
	2030	58	%
	2035	58	%

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name

6-8-10  
Date

REGION 6 TRANSPORTATION DIRECTOR  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.



# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

Colorado Dept. of Transportation, Region 6  
HOT lanes and future toll lanes with CDOT oversight

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment	
Sweep Box	2015	83	%
	2020	83	%
	2030	83	%
	2035	83	%
General PM10 Modeling Domain	2015	58	%
	2020	58	%
	2030	58	%
	2035	58	%

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name

6-8-10  
Date

REGION 6 TRANSPORTATION DIRECTOR  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

**Board Officers**

Rod Bockenfeld, Chair  
Jim Taylor, Vice Chair  
Dennis McCloskey, Secretary  
Sue Horn, Treasurer  
Ed Peterson, Immediate Past Chair  
Jennifer Schaufele, Executive Director

June 1<sup>st</sup>, 2010

Ms. Ann Jennings  
Town Administrator/Clerk  
Town of Columbine Valley  
2 Middlefield Road  
Columbine Valley, CO 80123

Dear Ms. Jennings:

The Denver Regional Council of Governments (DRCOG) is preparing to demonstrate that the updated *2035 Regional Transportation Plan (RTP)* and associated *2012-2017 Transportation Improvement Program (TIP)* are in conformity with the Colorado air quality program. A positive conformity finding permits road and transit capacity projects contained in the updated *2035 RTP* and *2012-2017 TIP* to be constructed. Critical to achieving a positive conformity finding is meeting the fine particulate matter (PM<sub>10</sub>) emissions budget of 55 tons per day for mobile sources for 2035.

In order to continue to meet the PM<sub>10</sub> budget, DRCOG is once again asking local governments and state agencies to commit to road sand reductions and street sweeping actions (compared to the 1989 baseline practices). It is through these commitments DRCOG has been able to demonstrate that the PM<sub>10</sub> air quality standard will not be violated in the future.

Please indicate below which agency conducts winter maintenance (street sanding & sweeping) for Town of Columbine Valley:

☐ Option I. Conducted by Town of Columbine Valley or contractor(s) hired by Town of Columbine Valley

☒ Option II. Conducted by another agency (e.g. the county or CDOT) or its contractor(s)

Please specify this agency CITY OF LITTLETON

If the answer is Option I, **DRCOG is asking you now to make PM<sub>10</sub> emission reduction commitment using the enclosed PM<sub>10</sub> Emission Reduction Commitment form.** This provides an opportunity for Town of Columbine Valley to demonstrate its willingness to assist the region in meeting air quality requirements.

The Air Quality Control Commission Regulation 16 requires PM<sub>10</sub> emission reduction of 30% for the area under your maintenance, which is considered the legal minimum. Just applying the legal minimum will be insufficient for the region to meet the budget. Therefore, to help

*Enhancing and protecting the quality of life in our region*

1290 BROADWAY • SUITE 700 • DENVER COLORADO 80203-5606 • TEL 303-455-1000 • FAX 303-480-6790  
E-MAIL: DRCOG@DRCOG.ORG • WEBSITE: WWW.DRCOG.ORG

meet the budget your commitment should exceed the minimum required by the regulation. The specific method used to achieve the emission reductions need not be specified at this time.

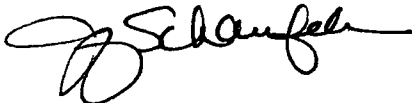
Please note that PM<sub>10</sub> commitments are part of the evaluation criteria to be used later in this year for projects submitted for funding in the 2012-2017 TIP. A commitment greater than a 30% reduction from the 1989 baseline practices is worth 1 point, a 45% reduction 2 points and a 55% reduction 3 points. However, until Town of Columbine Valley makes commitments, it cannot claim these points in the upcoming TIP solicitation process.

If the answer is Option II, you are not asked to make emission reduction commitment. The conducting agency's commitment, if any, is considered to apply to Town of Columbine Valley. Town of Columbine Valley will be granted the same credits as the conducting agency for your proposed TIP projects.

**Please complete and return this letter, and the enclosed *PM<sub>10</sub> Emission Reduction Commitment* form if applicable, to Wei Chen at DRCOG by June 30, 2010. A return envelope is enclosed for your use.**

If you have questions, please contact Wei Chen at (303) 480-6760 or Steve Cook at (303) 480-6749. If you would like to learn detailed information about the *PM<sub>10</sub> Maintenance Plan* or the methodology used to calculate the % agency PM<sub>10</sub> emissions reduction, please email to Wei Chen at [wchen@drcog.org](mailto:wchen@drcog.org) and electronic materials will be emailed to you.

Sincerely,



Jennifer Schaufele  
Executive Director

Enclosures

cc: Gale Christy, DRCOG Board Representative  
Wei Chen, Denver Regional Council of Governments


# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Commerce City

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	40 %
	2020	40 %
	2030	40 %
	2035	40 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name

  
Date

  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City and County of Denver

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
Sweep Box	2015	64 %
	2020	64 %
	2030	64 %
	2035	64 %
Denver CBD	2015	72 %
	2020	72 %
	2030	72 %
	2035	72 %
General PM10 Modeling Domain	2015	42 %
	2020	42 %
	2030	42 %
	2035	42 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Name

Date

Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

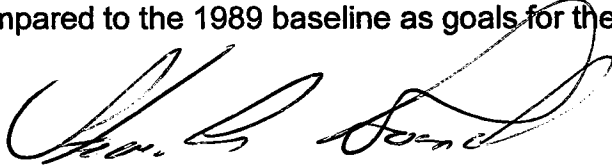
# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

Douglas County

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="30"/> %
	2020	<input type="text" value="30"/> %
	2030	<input type="text" value="30"/> %
	2035	<input type="text" value="30"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.



Name

6-1-2010

Date

CHAIR, DOUGLAS COUNTY BOARD OF COMMISSIONERS

Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Englewood

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment	
General PM10 Modeling Domain	2015	58	%
	2020	58	%
	2030	58	%
	2035	58	%

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Larry Davis  
Name

6/21/2010  
Date

City Manager  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

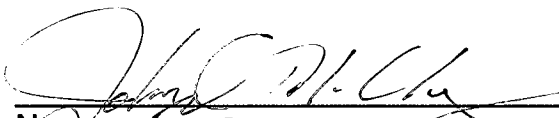
# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## E-470 Public Highway Authority

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	61.9 %
	2020	61.9 %
	2030	61.9 %
	2035	61.9 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name John D. McCuskey

6-8-2010  
Date

Acting Executive Director  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.



## 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

Town of Foxfield

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	64 %
	2020	64 %
	2030	64 %
	2035	64 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Doug Hedley  
Name Doug Hedley

Mayor  
Title

6/29/2010  
Date

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## City of Glendale

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	52.5 %
	2020	52.5 %
	2030	52.5 %
	2035	52.5 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Robert D. Taylor  
Name

June 9, 2010  
Date

Public Works Director  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

[Signature]  
City Manager

June 9, 2010

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Greenwood Village

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	58 %
	2020	58 %
	2030	58 %
	2035	58 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Name

*[Signature]* for Jim  
Sardone

Date

6/29/10

Title

Asst to CM for CM

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## Jefferson County

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
Foothills	2015	21 %
	2020	21 %
	2030	21 %
	2035	21 %
General PM10 Modeling Domain	2015	41 %
	2020	41 %
	2030	41 %
	2035	41 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Ralph Schell  
Name

6/17/10  
Date

COUNTY ADMINISTRATOR  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Lafayette

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	46.0 %
	2020	46.0 %
	2030	46.0 %
	2035	46.0 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Name

Carmy K. L. L.

Date

6/4/10

Title

City Manager

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Lakewood

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	45 %
	2020	45 %
	2030	45 %
	2035	45 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Kathleen E. Hodgeson  
Name

6/11/10  
Date

City Manager  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Littleton

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="60"/> %
	2020	<input type="text" value="60"/> %
	2030	<input type="text" value="60"/> %
	2035	<input type="text" value="60"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Jama C. Woods  
Name

6-4-2018  
Date

City Manager  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.


# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## Longmont

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
PM10 Attainment/Maintenance Area	2015	55 %
	2020	55 %
	2030	55 %
	2035	55 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name

  
Date

  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.



# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## City of Louisville

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	68.3 %
	2020	68.3 %
	2030	68.3 %
	2035	68.3 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

*Malcolm Fleming*  
Malcolm Fleming

Name

6/22/10  
Date

City Manager

Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## Town of Morrison

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="100"/> %
	2020	<input type="text" value="100"/> %
	2030	<input type="text" value="100"/> %
	2035	<input type="text" value="100"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Name

Earl Aukland

Date

Title

Mayor

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## Town of Mountain View

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="10"/> %
	2020	<input type="text" value="20"/> %
	2030	<input type="text" value="30"/> %
	2035	<input type="text" value="45"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Eugene Balva  
Name

06.04.2016  
Date

Juan Menager  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Northglenn

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="55"/> %
	2020	<input type="text" value="55"/> %
	2030	<input type="text" value="55"/> %
	2035	<input type="text" value="55"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

William A. Simmons  
Name

JUNE 30 2010  
Date

CITY MANAGER  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

## 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

Northwest Parkway Authority

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	45 %
	2020	45 %
	2030	45 %
	2035	45 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name

06/25/10  
Date

CEO  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

Town of Parker

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text"/> %
	2020	<input type="text"/> %
	2030	<input type="text"/> %
	2035	<input type="text"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

G. Yang  
Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

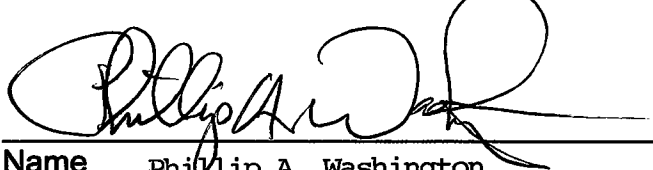
# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

## Regional Transportation District

### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
PM10 Attainment/Maintenance Area	2015	56 %
	2020	56 %
	2030	56 %
	2035	56 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name Phillip A. Washington

6/29/10  
Date

General Manager  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Sheridan

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	<input type="text" value="31"/> %
	2020	<input type="text" value="31"/> %
	2030	<input type="text" value="31"/> %
	2035	<input type="text" value="31"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Randy Mowbray  
Name

6/28/2017  
Date

SUPERINTENDENT / NEIGHBORHOOD SERVICE OFFICER.  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.



# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Thornton

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	60 %
	2020	60 %
	2030	60 %
	2035	60 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

Jaime Hunt  
Name

6-22-10  
Date

Acting City Manager  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

## 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

### Town of Ward

#### PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
Foothills	2015	<input type="text"/> %
	2020	<input type="text"/> %
	2030	<input type="text"/> %
	2035	<input type="text"/> %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

PETER J. GLEICHMAN  
Name PETER J. GLEICHMAN

6/9/10  
Date

MAYOR  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

**2035 Regional Transportation Plan Conformity  
PM10 Emission Reduction Commitments**

**City of Westminster**

**PM10 Emission Reduction Conformity Commitments**

<b>Geographic Area of Commitment</b>	<b>for Staging Years</b>	<b>Emission Reduction Commitment</b>	
General PM10 Modeling Doman	2015	55	%
	2020	55	%
	2030	55	%
	2035	55	%

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
\_\_\_\_\_  
Name

6/9/2010  
\_\_\_\_\_  
Date

City Manager  
\_\_\_\_\_  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director

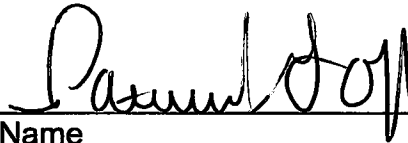
# 2035 Regional Transportation Plan Conformity PM10 Emission Reduction Commitments

City of Wheat Ridge

## PM10 Emission Reduction Conformity Commitments

Geographic Area of Commitment	For Staging Years	Emission Reduction Commitment
General PM10 Modeling Domain	2015	55 %
	2020	55 %
	2030	55 %
	2035	55 %

It is our intention to pursue the above percentages of PM10 emission reductions compared to the 1989 baseline as goals for the years noted.

  
Name

6-22-10  
Date

CITY MANAGER  
Title

Signature needed from Chairman, County Board of Commissioners,  
Mayor/City Manager of Municipality, or Agency Executive Director.

**Table 2 – 8-Hour Ozone Emission Rates (Gram/Mile)  
For the DRCOG Modeling Area**

	<b>Intermediate Year (2015)</b>	<b>Intermediate Year (2025)</b>	<b>Future Year (2035)</b>
<b>VOC</b>	<b>0.93</b>	<b>0.56</b>	<b>0.43</b>
<b>NOx</b>	<b>0.98</b>	<b>0.48</b>	<b>0.38</b>

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## **APPENDIX D**

### **MEMORANDUM OF AGREEMENT—TRANSPORTATION CONFORMITY EVALUATIONS CONDUCTED UNDER THE 8-HOUR OZONE STANDARD**

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**APPENDIX E**  
**U.S. DEPARTMENT OF TRANSPORTATION CONFORMITY FINDING**  
**(TO BE PROVIDED)**

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## APPENDIX F

### List of Acronyms

AADT	Average Annual Daily Traffic
ACT	Agency Coordination Team
APCD	Air Pollution Control Division
AQCC	Air Quality Control Commission
BNSFRR	Burlington Northern Santa Fe Railroad
CAMP	Continuous Air Monitoring Project
CDOT	Colorado Department Of Transportation
CDPHE	Colorado Department of Public Health and Environment
CMAQ	Congestion Mitigation Air Quality
CO	Carbon Monoxide
DRCOG	Denver Regional Council of Governments
DTD	CDOT Division of Transportation Development
EAC	Early Action Compact
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HOT	High-Occupancy Toll
HOV	High-Occupancy Vehicle
HPMS	Highway Performance Monitoring System
MOA	Memorandum of Agreement
MPO	Metropolitan Planning Organization
MVEB	Motor Vehicle Emissions Budget
MVRTP	Metro Vision Regional Transportation Plan
NAAQS	National Ambient Air Quality Standards
NFRT & AQPC	North Front Range Transportation and Air Quality Planning Council
NFRMPO	North Front Range Metropolitan Planning Organization
NFRRTM	North Front Range Regional Travel Model
NO	Nitrogen Oxide
PM	Particulate Matter
Ppm	Parts per Million
RAQC	Regional Air Quality Council
RTD	Regional Transportation District
RTP	Regional Transportation Plan
SIP	State Implementation Plan
STIP	State Transportation Improvement Program
TCM	Transportation Control Measures
TDM	Transportation Demand Management
TIP	Transportation Improvement Program
TMA	Transportation Management Area
TMO	Transportation Management Organization
TPR	Transportation Planning Region
TSSIP	Traffic Signal System Improvement Program
UFR	Upper Front Range Transportation Planning Region
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

