

2011 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

Adopted August 17, 2011

Denver Regional Council of Governments
1290 Broadway, Suite 700
Denver, CO 80203

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ABSTRACT

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CHAPTER 1. INTRODUCTION

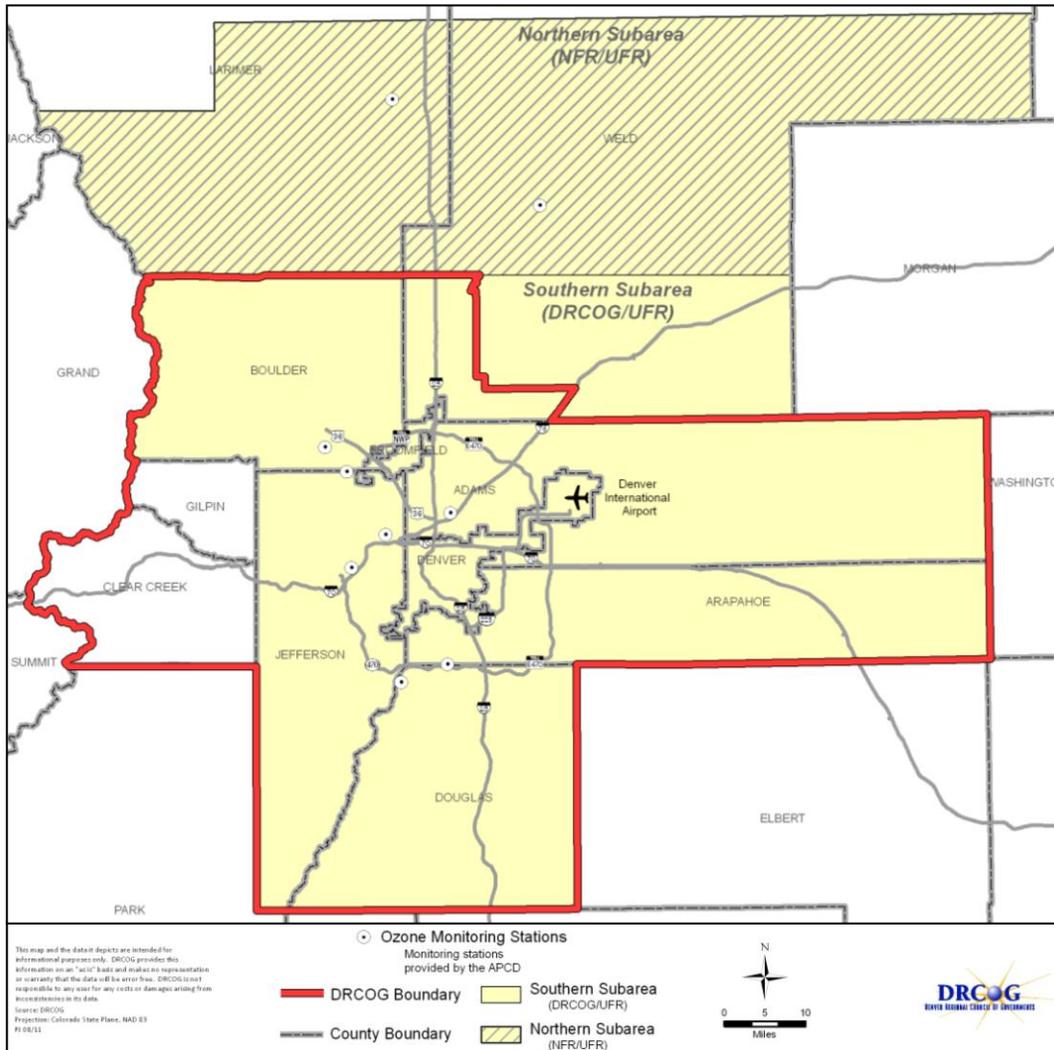
Background—8-Hour Ozone Nonattainment Area

The National Ambient Air Quality Standard (NAAQS) for ozone, promulgated in 1997, was set at a level of .085 parts per million (ppm) averaged over an 8-hour period. A violation of the 8-hour ozone standard occurs when the three-year average of the annual fourth-highest daily maximum 8-hour ozone concentration (i.e. design value) at one monitor is .085 ppm or greater. The Denver-North Front Range Area failed to achieve the standard due to high readings in July 2007, resulting in a three-year (2005-2007) design value of 0.085 ppm at one monitor (Rocky Flats North) which violated the 8-Hour Ozone NAAQS.

Based on this violation, on November 20, 2007, the Environmental Protection Agency (EPA) officially designated the Denver-North Front Range Area to be in nonattainment of the 8-hour ozone standard. The Federal conformity requirements stipulate that conformity to the 8-hour ozone standard take effect one year after the nonattainment designation. As such, conformity of fiscally constrained regional transportation plans (RTP) and transportation improvement programs (TIP) to the 8-hour ozone standard must be 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 and after November 20, 2008. The initial 8-hour ozone conformity determination was made in October 2008.

The Denver-North Front Range 8-hour Ozone Nonattainment Area 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 composes 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_x) and volatile organic compounds (VOC) contained in the Denver Metro Area and North Front Range 8-Hour Ozone Attainment Plan are adequate for transportation conformity purposes, effective on March 19th, 2010. As a result of this finding, DRCOG and NFRMPO used these budgets for the subsequent transportation conformity determination. The initial conformity determination under the new SIP MVEBs was a joint conformity which used the total nonattainment area MVEBs for NO_x and VOCs. With the completion of the initial joint conformity in January 2011, the two MPOs have decided to separate and conduct future conformities independently for their respective subareas. This conformity determination is for the Denver Southern Subarea.

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_x 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_x 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, plus 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), state that *“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 established the procedure for determining conformity prior to the establishment of mobile source emissions budgets (used prior to this conformity determination). It also 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.

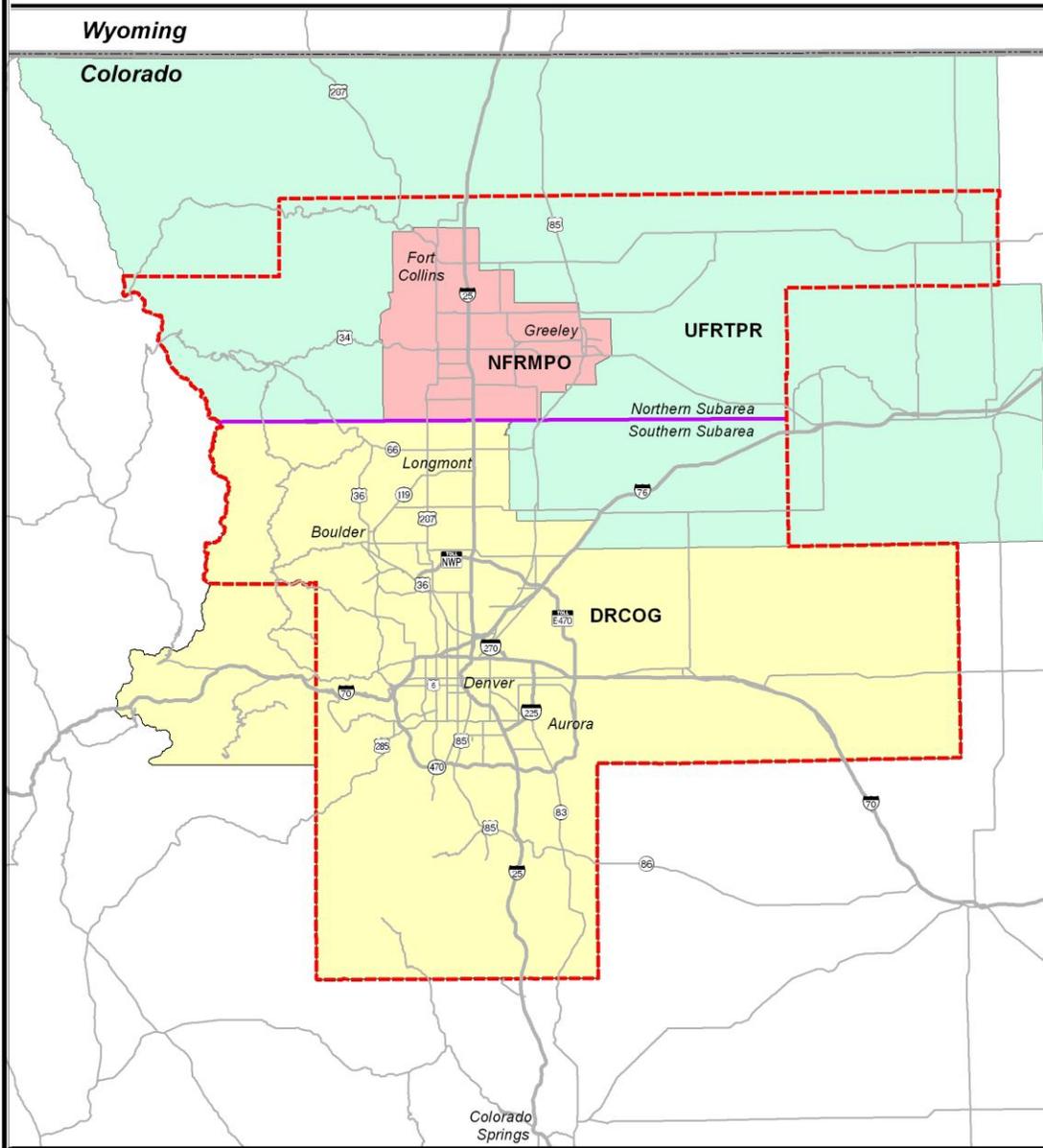
The MOA stipulates that DRCOG will make conformity determinations for the Southern Subarea of the 8-hour ozone nonattainment area, while the NFRMPO will make the conformity determination for the Northern Subarea of the 8-hour ozone nonattainment area. The travel demand model outputs from each of the MPOs are sent to the Air Pollution Control Division (APCD) of CDPHE for generation of emissions estimates in the Mobile 6.2 emissions model. 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



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 Source: DRCOG
 Projection: Colorado State Plane, NAD 83
 PJ 6/2010

- Upper Front Range Transportation Planning Region (UFRTPR)
- Denver Regional Council of Governments (DRCOG)
- North Front Range Metropolitan Planning Org. (NFRMPO)
- Ozone Nonattainment





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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 adopted on December 19, 2007 and last updated in February 2011.

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. These 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 amendments to either of these documents since the last determination in March 2011.

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 March 16, 2011 by the DRCOG Board is being updated concurrently with this document.

8-Hour Ozone

As a result of the 8-hour ozone nonattainment designation, a SIP covering the Denver-North Front Range Nonattainment Area was developed. The SIP demonstrates how the region will attain the 8-hour ozone standard by 2010. 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 of the 8-hour ozone nonattainment area. The SIP establishes mobile source emissions budgets that will govern future conformities. The proposed SIP was approved by the Air Quality Control Commission (AQCC) in December 2008. In June 2009, the SIP was approved by Gov. Ritter and sent to EPA for review and approval. EPA made an adequacy determination of the proposed motor vehicle emissions budgets for conformity and the new budgets became effective on March 19, 2010. The 1-hour ozone budgets are no longer used for transportation conformity purposes. Conformity must be demonstrated using the 8-hour ozone budgets.

Process

Agency Roles

The Conformity SIP, also known as the conformity implementation plan, was developed by the AQCC and adopted in 1998. It formally defines the process for finding conformity. 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, for the same purpose. The EPA approved the Conformity SIP on September 21, 2001 (66FR48561), making the Conformity SIP federally enforceable.

Public Participation

Public participation was encouraged throughout the development of DRCOG's 2035 MVRTP and the 2012-2017 TIP. Several public hearings were held before the DRCOG Board of Directors. A joint public hearing was held on 2035 MVRTP and its original conformity document on December 5, 2007. A public hearing was held on the 2035 MVRTP 2008 Cycle 2

amendments and its conformity document on December 17, 2008. A public hearing was held on the 2035 MVRTP 2009 Cycle 1 amendments and its conformity document on July 15, 2009. A public hearing was held on the 2035 MVRTP 2009 Cycle 2 amendments and its conformity document on December 16, 2009. A public hearing was held on the 2035 RTP Updates, the TIP amendments, and the associated conformity document on December 15, 2010. A public hearing was held on the new 2012-2017 TIP and conformity determination documents on February 16, 2011. A public hearing was held on the 2035 MVRTP 2011 Cycle 1 amendments and its conformity document on July 20, 2011.

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. Members of the public were 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_x) 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 (MOBILE 6.2) to estimate emissions. The DRCOG travel demand model covers the whole Southern Subarea. Appendix B describes

the modeling structure and recent enhancements for 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 4,368,600. This is an increase of 51 percent over the year 2010 estimated population of 2,889,700. Employment is forecast to be 2,577,200 in 2035 compared to the year 2010 estimate of 1,560,000, an increase of approximately 65 percent. Growth in population and employment will be the principal factor 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 that comprise the DRCOG ozone modeling Southern Subarea.

Table 1

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

| | 2010 | 2015 | 2025 | 2035 |
|------------|-------------|-------------|-------------|-------------|
| Population | 2,889,700 | 3,139,400 | 3,719,200 | 4,368,600 |
| Employment | 1,560,000 | 1,724,600 | 2,108,500 | 2,577,200 |

Table 2

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

| County | Population | | Employment | |
|--|-------------------|------------------|-------------------|------------------|
| | 2010 | 2035 | 2010 | 2035 |
| Adams County | 459,000 | 839,500 | 190,400 | 432,100 |
| Arapahoe County | 566,500 | 833,100 | 314,000 | 487,300 |
| Boulder County | 306,300 | 388,800 | 177,100 | 199,100 |
| Broomfield County | 51,800 | 100,900 | 33,200 | 95,500 |
| Denver County | 601,300 | 777,200 | 476,700 | 713,400 |
| Douglas County | 281,900 | 533,100 | 102,300 | 224,600 |
| Jefferson County | 555,300 | 720,100 | 247,900 | 375,400 |
| Weld County* | 67,700 | 175,900 | 18,400 | 49,800 |
| Total DRCOG Ozone Modeling Southern Subarea | 2,889,700 | 4,368,600 | 1,560,000 | 2,577,200 |

* 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

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 is displayed in Appendix A. The most significant highway projects on the designated regional roadway system are listed below.

The 2012-2017 TIP includes funding for a number of regionally significant projects that are also contained in the Fiscally Constrained 2035 RTP. They include:

- US-85 from Cook Ranch Road to Louviers: widen roadway to four 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.
- North Metro Corridor, Denver Union Station to 160th Avenue: new rail, stations, parking.
- Southeast Corridor, Lincoln Avenue to RidgeGate Parkway Extension: extend light rail with stations, park-n-Ride.
- Southwest Corridor, Mineral Station to C-470 Extension: extend light rail, new park-n-Ride.
- Northwest Rail, Denver Union Station to Longmont: new rail, stations, parking.
- Central Corridor, 30th and Downing to 38th and Blake: new light rail and stations.
- East Corridor, Denver Union Station to Denver International Airport: new rail, stations, and park-n-Rides.
- Denver Union Station: intermodal center.
- 120th Avenue Connection over US-36: build new six lane road.
- I-25 from Santa Fe to Alameda: interchange reconstruction.
- US-36 from Interlocken Loop to the I-25 Express Lanes: add two HOT 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 programs
- Intelligent Transportation System (ITS) infrastructure
- Traffic signal systems and coordination
- Master plans for areas around transit stations and urban centers

Regional highway projects in the Fiscally Constrained 2035 RTP using federal and state resources, in addition to those listed above include:

- SH-121/Wadsworth Boulevard from 36th Avenue to 46th Avenue: widen roadway to six lanes.
- SH-121/Wadsworth Parkway from 92nd Avenue to SH-128/120th Avenue: widen roadway to six lanes.
- 104th Avenue from Grand View Ponds to US-85: widen roadway to four lanes.
- I-25 from RidgeGate Pkwy to C-470 South Ramps: widen roadway to 10 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.
- SH-7 Arapahoe Road from Cherryvale Road to VoTech Drive: widen roadway to four lanes.
- US-285 Hampden Avenue from Colorado to I-25: widen roadway to six lanes.
- SH-30 Hampden Avenue from Dayton Street to Havana Street: widen roadway to six lanes.
- I-25 from US-36 to 120th Avenue: add two HOV/HOT lanes.
- I-270 from Vasquez to Quebec Street: widen roadway to six lanes.
- US-36 at Wadsworth Boulevard: interchange reconstruction.
- US-36 from SH-157 (Foothills Pkwy) to Interlocken Loop: add two HOV/HOT lanes.
- I-225 from Parker Road to Mississippi Avenue: widen roadway to six lanes.
- I-25 from SH-66 to WCR 38: add two HOV/HOT lanes.
- US-85 from Louviers to MP191.75 and from Sedalia (SH-67) to Meadows Pkwy: widen to 4 lanes.

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

- New interchange at I-25/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 DIA: widen roadway to six lanes.
- Jefferson Parkway from SH-93 to SH-128: new four-lane tollroad, plus 3 partial interchanges.

The major proposed 2011 Cycle 1 project amendments to the Fiscally Constrained 2035 RTP roadway network are described in Table 3. These amendments are on I-25 and I-76. All changes (e.g. staging year updates) are depicted in Appendix A.

The base 2010 rail rapid transit network includes the existing Central, Southwest, and Central Platte Valley rail lines, and the Southeast light rail line which opened in 2006. It also includes the I-25 HOV/Tolled Express Lanes, which also opened in 2006, as well as the existing Broadway/Lincoln bus lanes and the existing Santa Fe high occupancy vehicle lanes. The 2015 rapid transit network includes the West rapid transit corridor and the extension of US-36 HOT lanes to just east of East Flatiron Circle. All the remaining corridor lines that were approved by voters in RTD's FasTracks plan on November 2, 2004 are assumed to be completed by 2020 except for the US-36 HOT lanes from Interlocken Loop to Boulder. Other than the staging year adjustments there are no other changes to the rapid transit system.

The proposed 2011 Cycle 1 project amendment to the Fiscally Constrained 2035 RTP transit network is described in Table 3. The amendment is associated with the North Metro FasTracks station change.

DRCOG's regional travel model was used to perform the travel forecasting. A summary description of DRCOG's travel demand model is included in Appendix B. A more detailed description is documented in the DRCOG *Focus* Transportation Model Documentation and in a metadata report. Additional documentation is available on the assumptions and operation of the socio-economic model. These reports and papers are available for inspection at the DRCOG offices. This model includes a number of assumptions, which are supported by current regional experience.

One set of modeling assumptions concerns transit operating policies. The model assumes that RTD will keep transit fares constant in current dollars. This is a logical assumption as RTD has an adopted policy of increasing fares in line with increases in the Consumer Price Index.

Modeled fares for proposed new services are based on the most similar existing services. The model assumes that RTD would continue with its current approach in setting service levels for various areas of the region. RTD last increased its fares in January 2011.

The model assumes that the Northwest Parkway Authority and the E-470 Authority will continue to charge tolls on their facilities on a per-mile cost basis in constant dollars similar to current charges (16 cents per mile in 1996 dollars). The proposed Jefferson Parkway is assumed to have comparable tolls.

Parking costs in downtown Denver were varied using the Denver parking cost model, which uses employment density and estimates of parking supply as variables. Parking costs were established outside the Denver Central Business District by surveying current parking costs for work and non-work trips, and assuming that these would remain constant over time.

Appendix A contains the complete list of modeled transportation improvement projects within the DRCOG regional travel model.

Table 3
Proposed 2011 Cycle 1 Amendments to the 2035 RTP Roadway System and Transit System

| Sponsor | Project Location | Current RTP Project Description | Type of Change to the FC-2035-RTP | 2009 Existing Lanes | Proposed 2035 Lanes | Model Network Staging |
|---|--|--|--|----------------------------|----------------------------|------------------------------|
| Colorado High Performance Transportation Enterprise | I-25: US-36 to Thornton Parkway | Add two general purpose lanes | Change description: <i>Add two HOT lanes</i> <i>- Interim tolled express lanes (TELS)</i> <i>- Other general purpose, safety and operational improvements identified in the PEL study</i> <i>- Full EIS TEL buildout after 2025</i> | 6 | 8 | 2015 - 2024 |
| | I-25: Thornton Parkway to 120th Avenue | n/a | | | | |
| Colorado High Performance Transportation Enterprise | I-25: SH-66 to WCR 38 | Add two general purpose lanes | Change description: <i>Add two HOT lanes</i> <i>- Interchange reconstruction at WCR 34</i> | 4 | 6 | 2025 - 2035 |
| Brighton | I-76: Bridge Street Interchange | New Interchange | Delete project (1601 system study not complete) | n/a | n/a | n/a |

| Sponsor | Project Location | Current RTP Project Description | Type of Change to the FC-2035-RTP | Model Network Staging | Total 2035 Spaces |
|----------------|--|---|---|------------------------------|--------------------------|
| RTD | FasTracks North Metro Corridor: Station in Commerce City | Existing park-n-Ride located at US-85/72nd Avenue (83 parking spaces) | Change station location to 72nd Avenue at North Metro rail line; close existing park-n-Ride | 2015 - 2024 | 330 |

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 Mobile 6.2. The conformity analysis for this 8-hour ozone conformity finding began in April 2011 after identification by RTD, CDOT, and local governments of projects they would be submitting 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 RideArrangers 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

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 the DRCOG's travel demand models and the Mobile 6.2 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)

| SIP budgets | 2015 Emissions | 2025 Emissions | 2035 Emissions | Pass/Fail |
|----------------------------------|-----------------------|-----------------------|-----------------------|------------------|
| Volatile Organic Compounds (VOC) | | | | |
| 89.7 | 62.5 | 43.5 | 51.4 | Pass all tests |
| Oxides of Nitrogen (NOx) | | | | |
| 102.4 | 59.1 | 28.4 | 27.8 | 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 8-hour ozone standard using the 8-hour ozone emissions budgets 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.

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APPENDIX A
DRCOG TRANSPORTATION NETWORK ASSUMPTIONS

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Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|-------------------|-------------------|----------------------|---------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| Adams County | | | | | | | |
| <i>Network Staging 2015 (2012-2014)</i> | | | | | | | |
| | Washington Street | 60th Avenue | 68th Ave | Add through lane(s) | 2 | 4 | Principal |
| <i>Network Staging 2020 (2015 -2019)</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 |
| <i>Network Staging 2025 (2020-2024)</i> | | | | | | | |
| | York Street | 160th Ave (SH-7) | 168th Ave | Add through lane(s) | 2 | 4 | Principal |
| Arapahoe County | | | | | | | |
| <i>Network Staging 2020 (2015 -2019)</i> | | | | | | | |
| | Gun Club Road | Quincy Ave | 1.5 Miles South | Add through lane(s) | 2 | 6 | Principal |
| | Quincy Avenue | Plains Pkwy | Gun Club Rd | Add through lane(s) | 2 | 6 | Principal |
| <i>Network Staging 2025 (2020-2024)</i> | | | | | | | |
| | 6th Avenue | Monaghan Rd | Watkins Rd | New Road | 0 | 4 | Minor |
| | 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 |
| | Hampden Avenue | Picadilly Rd | Gun Club Rd | Add through lane(s) | 2 | 4 | Principal |
| <i>Network Staging 2035 (2025-2035)</i> | | | | | | | |
| | Hampden Ave | Watkins Rd | Monaghan Rd | New Road | 0 | 4 | Minor |
| | Hudson Mile Rd | Quincy Ave | Yale Ave | Add through lane(s) | 2 | 4 | Minor |
| | Monaghan Rd | Quincy Ave | Yale Ave | New Road | 0 | 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 |
| | W. Coal Mine Road | S. Sheridan Blvd. | S. Platte Canyon Rd. | Add through lane(s) | 2 | 4 | Minor |
| | 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 |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|----------------------------|-----------------------|-------------------------|----------------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| Arvada | | | | | | | |
| <i>Network Staging 2020 (2015 -2019)</i> | | | | | | | |
| | 64th Avenue | Kendrick St | Terry St. | Add through lane(s) | 2 | 4 | Principal |
| <i>Network Staging 2025 (2020-2024)</i> | | | | | | | |
| | 80th Avenue | Alkire Street | Kipling Street | Add through lane(s) | 2 | 4 | Minor |
| | 80th Avenue | UPRR | | Grade Separation | | | Minor |
| ===== | | | | | | | |
| Aurora | | | | | | | |
| <i>Network Staging 2015 (2012-2014)</i> | | | | | | | |
| 2003-071 | 17th PL (phase 4) | I-225 NB | I-225 SB | New Road | 0 | 4 | Minor |
| 2003-071 | 17th PI (WB only, phase 3) | I-225 SB | Fitzsimons Pkwy | Add through lane(s) | 0 | 2 | Ramp |
| | Gartell Road | County Line Rd | Inspiration Drive | Add through lane(s) | 2 | 4 | Minor |
| 2003-071 | I-225 | Colfax Ave | | Interchange Reconstruction | | | Freeway |
| 2003-071 | NB on-ramp from Colfax (ph | Colfax Ave | North of 17th PL | Relocate Existing Ramp | | | Ramp |
| 2003-071 | Slip Ramp (phase 4) | 17th PL | I-225 SB | Relocate Existing Ramp | 0 | 2 | Ramp |
| <i>Network Staging 2020 (2015 -2019)</i> | | | | | | | |
| | 6th Avenue | Powhatan Rd | Monaghan Rd | New Road | 0 | 4 | Minor |
| | 38th Avenue | Imboden | Manila | New Road | 0 | 4 | Collector |
| | 38th Avenue | Himalaya | Picadilly | New Road | 0 | 4 | Minor |
| | Aurora Parkway | Gartrell | Smoky Hill Rd | Add through lane(s) | 2 | 4 | Minor |
| | Aurora Parkway | Picadilly | Gartrell | Add through lane(s) | 4 | 6 | Minor |
| | Aurora Parkway | Parker Rd | Picadilly | New Road | 0 | 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 |
| | Glasgow Dr | Smoky Hill Rd | Monaghan Section Lin | New Road | 0 | 3 | Collector |
| | Harvest Road | Quincy Ave | 1/2 mile south of Belle | Add through lane(s) | 2 | 4 | Collector |
| | I-70 | Picadilly Rd | | New Interchange | | | Freeway |
| | I-70 | Harvest Miles Rd | | New Interchange | | | Freeway |
| | Imboden Rd | 56th Ave | 64th Ave | Add through lane(s) | 2 | 6 | Collector |

Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|---|--------------------|-------------------|------------------------|---------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | Jewell Avenue | E-470 | Gun Club Rd | Add through lane(s) | 2 | 6 | Principal |
| | Manila Rd | 38th Ave | 48th Ave | Add through lane(s) | 2 | 4 | Collector |
| | Manila Rd | I-70 | 38th Avenue | Add through lane(s) | 2 | 4 | Collector |
| | Mississippi Avenue | Tower Road | Ceylon St | Add through lane(s) | 2 | 4 | Minor |
| | Mississippi Avenue | Harvest Rd | Powhaton Rd | New Road | 0 | 4 | Collector |
| | Picadilly Rd | Colfax Ave | I-70 | New Road | 0 | 6 | Principal |
| | Picadilly Road | I-70 | Smith Road | Add through lane(s) | 2 | 6 | Principal |
| Network Staging 2025 (2020-2024) | | | | | | | |
| | 6th Avenue | E-470 | Gun Club Rd | Add through lane(s) | 2 | 6 | Principal |
| | 6th Avenue | Airport Blvd | Tower Rd | Add through lane(s) | 2 | 6 | Principal |
| | 6th Avenue | 6th Pkwy | Harvest Mile Rd | Add through lane(s) | 3 | 6 | Principal |
| | 6th Avenue (S-30) | Tower Rd | 6th Pkwy | Add through lane(s) | 2 | 6 | Principal |
| | 6th Parkway | SH-30 | E-470 | New Road | 0 | 2 | Principal |
| | 48th Avenue | Picadilly Rd | Powhaton Rd | New Road | 0 | 6 | Principal |
| | 56th Avenue | Picadilly Rd | E-470 | Add through lane(s) | 2 | 6 | Principal |
| | 56th Avenue | E-470 | Imboden Road | Add through lane(s) | 2 | 6 | Principal |
| | 64th Avenue | Aurora City Limit | Himalaya St | Add through lane(s) | 2 | 6 | Principal |
| | 64th Avenue | Himalaya Rd | Harvest Mile Rd | Add through lane(s) | 2 | 4 | Principal |
| | 64th Avenue | Harvest Road | Powhaton Road | New Road | 0 | 2 | Principal |
| | 64th Avenue | Powhaton Rd | Monaghan Rd | New Road | 0 | 4 | Principal |
| | Gun Club Rd | Yale Ave. | Mississippi Ave. | Add through lane(s) | 2 | 4 | Principal |
| | Harvest Mile Road | I-70 | 56th Ave | New Road | 0 | 6 | Principal |
| | Harvest Mile Road | 56th Avenue | DIA boundary line/64th | New Road | 0 | 3 | Principal |
| | Harvest Rd | Alameda Ave | 6th Ave | Add through lane(s) | 3 | 6 | Principal |
| | Harvest Rd | Mississippi Ave | Alameda Ave | New Road | 0 | 6 | Principal |
| | Harvest Rd | 6th Ave | I-70 | New Road | 0 | 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 | Smith Road | 48th Ave | Add through lane(s) | 2 | 6 | Principal |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|-------------------|-------------------|-----------------------|---------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | Picadilly Rd | 6th Ave | Colfax Ave | Add through lane(s) | 2 | 6 | Principal |
| | Picadilly Rd | 56th Ave | 70th Ave./Aurora City | New Road | 0 | 6 | Principal |
| | Picadilly Rd | 48th Ave | 56th Avenue | New Road | 2 | 6 | Principal |
| | Picadilly Road | Jewell Ave | 6th Ave Pkwy | New Road | 0 | 4 | Principal |
| | Tower Road | Colfax Avenue | Smith Rd | Add through lane(s) | 2 | 6 | Principal |
| | Tower Road | 6th Avenue | Colfax Avenue | New Road | 0 | 2 | Principal |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | 6th Pkwy | SH-30 | E-470 | Add through lane(s) | 2 | 6 | Principal |
| | 48th Avenue | Imboden Rd | Quail Run Rd | Add through lane(s) | 2 | 6 | Principal |
| | 48th Avenue | Powhatan Rd | Monaghan Rd | New Road | 0 | 6 | Principal |
| | 64th Avenue | Harvest Mile Road | Powhatan 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 |
| | Powhatan Rd | Smoky Hill Rd | County Line Rd | Add through lane(s) | 2 | 6 | Principal |
| | Quail Run Rd | I-70 | 48th Ave | New Road | 0 | 6 | Principal |
| | Tower Road | 6th Avenue | Colfax Avenue | Add through lane(s) | 2 | 6 | Principal |
| ===== | | | | | | | |
| Brighton | | | | | | | |
| Network Staging 2015 (2012-2014) | | | | | | | |
| | Bromley Lane | Chambers Road | 27th/Buckley | Add through lane(s) | 4 | 6 | Principal |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | Bromley Lane | Hwy 85 | Sable Blvd | Add through lane(s) | 4 | 6 | Principal |
| | 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 |
| ===== | | | | | | | |
| Broomfield County | | | | | | | |
| Network Staging 2015 (2012-2014) | | | | | | | |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|--------------------|------------------------|-------------------|----------------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | 120th Avenue | Allison St | Emerald St | New Road | 0 | 6 | Principal |
| | 160th Avenue | Sheridan Pkwy | Huron St | Add through lane(s) | 2 | 4 | Minor |
| | 160th Avenue | Sheridan Pkwy | Lowell Blvd | New Road | 0 | 2 | Principal |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | 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 |
| | Hoyt Street | Midway Boulevard | Industrial Lane | New Road | 0 | 2 | Collector |
| | Huron Street | 160th Ave | SH-7 | Add through lane(s) | 2 | 4 | Principal |
| | I-25 | SH-7 | | Interchange Reconstruction | | | Freeway |
| | I-25 NB Off-Ramp | I-25 NB | SH-7 | Existing Ramp | 1 | 1 | Ramp |
| | I-25 SB Off-Ramp | I-25 SB | SH-7 | Existing Ramp | 1 | 1 | Ramp |
| | SH-7 | Sheridan Pkwy | I-25 | Add through lane(s) | 2 | 6 | Principal |
| | SH-7 EB Loop Ramp | SH-7 | I-25 NB | Existing Ramp | 1 | 1 | Ramp |
| | SH-7 WB On-Ramp | SH-7 | I-25 NB | Existing Ramp | 1 | 1 | Ramp |
| | 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 |
| Network Staging 2025 (2020-2024) | | | | | | | |
| | 160th Avenue | Boulder/Broomfield Co | Lowell Blvd | New Road | 0 | 4 | Principal |
| | Huron Street | 150th Ave | 160th Ave | Add through lane(s) | 2 | 4 | Principal |
| | Interlocken Loop | 96th St. w/Northwest P | SH-128 | Add through lane(s) | 4 | 6 | Principal |
| | SH-7 | Boulder County Line | Sheridan Parkway | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | US-36 | Wadsworth Blvd | | Interchange Reconstruction | | | Freeway |
| ===== | | | | | | | |
| Castle Rock | | | | | | | |
| Network Staging 2015 (2012-2014) | | | | | | | |
| | Prairie Hawk Drive | Meadows Pkwy. | Wolfensberger Rd. | Add through lane(s) | 2 | 4 | Minor |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | Prairie Hawk Drive | Wolfensberger Road | Franktown Rd | Add through lane(s) | 2 | 4 | Minor |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|---------------------|------------------------|-----------------------|---------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | Prairie Hawk Drive | Franktown Rd | Plum Creek Pkwy | New Road | 0 | 4 | Minor |
| | Southwest Ring Rd | Wolfensberger Rd | I-25 | Add through lane(s) | 2 | 4 | Principal |
| | Valley Drive | South Street | Plum Creek Pkwy | New Road | 0 | 2 | Collector |
| Network Staging 2025 (2020-2024) | | | | | | | |
| | Meadows Parkway | Coachline Road | Meadows Blvd | Add through lane(s) | 2 | 4 | Principal |
| | North Meadows Drive | Meadows Blvd | US-85 | New Road | 0 | 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 |
| | US-85 | Castlegate Drive | | New Interchange | | | Major Regional |
| | Wolfensberger Road | Coachline Road | Prairie Hawk Dr. | Add through lane(s) | 2 | 4 | Principal |
| ===== | | | | | | | |
| CDOT Region 1 | | | | | | | |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| 1999-001 | I-25 | RidgeGate Parkway | Lincoln Avenue | Add through lane(s) | 6 | 8 | Freeway |
| 1999-001 | I-25 | Lincoln Avenue | County Line Road | Add through lane(s) | 8 | 10 | Freeway |
| 2001-154 | US-85 | Castlegate Drive | Meadows Pkwy | Add through lane(s) | 2 | 4 | Major Regional |
| 2001-154 | US-85 | Cook Ranch (MP 194. | Louviers | Add through lane(s) | 2 | 4 | Major Regional |
| Network Staging 2025 (2020-2024) | | | | | | | |
| | US-285 | Richmond Hill Road | Kings Valley Drive | Add through lane(s) | 2 | 4 | Major Regional |
| | US-285 | Pine Junction Intercha | | New Interchange | | | Major Regional |
| 2001-154 | US-85 | SH-67 (Sedalla) | Daniels Park Rd | Add through lane(s) | 2 | 4 | Major Regional |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | I-70 | US-40/Empire Junctio | | New Interchange | | | Freeway |
| | 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 | | 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 |
| ===== | | | | | | | |
| CDOT Region 4 | | | | | | | |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|-----------------|-----------------------|-----------------------|-----------------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| Network Staging 2015 (2012-2014) | | | | | | | |
| 1997-033 | Arapahoe Avenue | Cherryvale Rd | Vo Tech Entrance | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | I-25 | SH-66 | WCR 38 | Add HOT lane(s) | 4 | 6 | Freeway |
| | SH-119 | SH-52 | | New Interchange | | | Major Regional |
| ===== | | | | | | | |
| CDOT Region 6 | | | | | | | |
| Network Staging 2015 (2012-2014) | | | | | | | |
| 2007-051 | US-36 | Wadsworth Pkwy | I-25 Express lanes | Add HOT lanes | 0 | 2 | Rapid Transit |
| 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 |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| 1999-006 | I-225 | North Ramps of Parker | South Ramps of Missis | Add through lane(s) | 4 | 6 | Freeway |
| | I-25 | US-36 | 120th Ave. | Add HOT lane(s) | 6 | 8 | Freeway |
| 2007-051 | US-36 | Interlocken Loop | Wadsworth Pkwy | Add HOT lanes | 0 | 2 | Rapid Transit |
| | US-6 | Wadsworth Blvd | | Interchange Reconstruction | | | Freeway |
| | Wadsworth Blvd | 4th Ave | 10th Ave | Add through lane(s) | 4 | 6 | Principal |
| Network Staging 2025 (2020-2024) | | | | | | | |
| 2007-158 | Alameda Avenue | Lipan St | Santa Fe Dr | Add through lane(s) | 5 | 7 | Principal |
| | I-25 | Arapahoe Road | | Interchange Reconstruction | | | Freeway |
| 2007-158 | I-25 | Santa Fe Dr | | Interchange Reconstruction | | | Freeway |
| | I-70 | Kipling Street | | Interchange Reconstruction | | | Freeway |
| 2007-051 | US-36 | Table Mesa Dr. | Interlocken Loop | Add HOT lanes | 0 | 2 | Rapid Transit |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | Arapahoe Road | Revere Pkwy | | Grade Separation (Arterial) | | | Principal |
| | Arapahoe Road | Havana Street | | Grade Separation (Arterial) | | | Principal |
| | Hampden Avenue | Colorado Boulevard | I-25 | Add through lane(s) | 4 | 6 | Principal |
| | I-270 | Vasquez Blvd | Quebec St. | Add through lane(s) | 4 | 6 | Freeway |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|---|--------------------|-------------------|----------------|----------------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | I-70 | I-270 | Havana St | Add through lane(s) | 8 | 10 | Freeway |
| | I-70 | York St | | Interchange Reconstruction | | | Freeway |
| | I-70 | Brighton Blvd | York St | 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 | 164th Ave | Dahlia St | Add through lane(s) | 2 | 4 | Principal |
| | US-36 | Sheridan Blvd | | Interchange Reconstruction | | | Freeway |
| | US-6 | Simms Street | | Interchange Reconstruction | | | Freeway |
| | US-6 | Kipling Street | | Interchange Reconstruction | | | Freeway |
| <hr style="border-top: 1px dashed black;"/> | | | | | | | |
| Centennial | | | | | | | |
| <i>Network Staging 2035 (2025-2035)</i> | | | | | | | |
| | Arapahoe Road | Himalaya Way | Liverpool St | Add through lane(s) | 4 | 6 | Principal |
| | Colorado Blvd | County Line | Dry Creek | Add through lane(s) | 2 | 4 | Minor |
| | Smoky Hill Road | Pleasant Run Pkwy | Versailles | Add through lane(s) | 4 | 6 | Principal |
| <hr style="border-top: 1px dashed black;"/> | | | | | | | |
| Commerce City | | | | | | | |
| <i>Network Staging 2015 (2012-2014)</i> | | | | | | | |
| | 104th Avenue | US-85 | SH-2 | Add through lane(s) | 2 | 4 | Principal |
| <i>Network Staging 2020 (2015 -2019)</i> | | | | | | | |
| | 96th Avenue | Buckley Road | Tower Road | New Road | 0 | 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 |
| <i>Network Staging 2025 (2020-2024)</i> | | | | | | | |
| | Tower/Buckley Road | 105th Ave | 118th Ave | New Road | 0 | 4 | Principal |
| <i>Network Staging 2035 (2025-2035)</i> | | | | | | | |
| | 88th Avenue | Tower Rd | Picadilly Rd | New Road | 0 | 4 | Minor |
| | 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 |
| | 104th Avenue | E-470 | Picadilly Rd | New Road | 0 | 4 | Minor |

Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|---|-------------------------|-------------------------|---------------------|----------------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | 112th Avenue | SH-2 | Picadilly Rd | Add through lane(s) | 2 | 4 | Minor |
| | 120th Avenue | E-470 | Tower Rd | Add through lane(s) | 2 | 6 | Principal |
| | 120th Avenue | Sable Blvd | E-470 | Add through lane(s) | 2 | 6 | Principal |
| | 120th Avenue | Tower Rd | Picadilly Rd | Add through lane(s) | 2 | 6 | Principal |
| | Picadilly Rd | 80nd Ave | 96th Ave | New Road | 0 | 6 | Principal |
| | Picadilly Rd | 96th Ave | 120th Ave | New Road | 0 | 6 | Principal |
| <hr style="border-top: 1px dashed black;"/> | | | | | | | |
| Denver | | | | | | | |
| Network Staging 2015 (2012-2014) | | | | | | | |
| | 38th Avenue | Himalaya | Picadilly | New Road | 0 | 4 | Minor |
| | 45th Avenue | Tower Rd | Chambers Rd | New Road | 0 | 4 | Collector |
| | 56th Avenue | Havana Street | Pena Blvd | Add through lane(s) | 2 | 6 | Principal |
| | 60th Avenue | Tower Rd | Telluride St | New Road | 0 | 4 | Collector |
| | 67th Avenue | Tower Rd | Telluride St | New Road | 0 | 4 | Collector |
| | 71st Avenue | Telluride St | Tower Rd | New Road | 0 | 6 | Minor |
| | 71st Avenue | Tower Rd | Dunkirk St | New Road | 0 | 6 | Minor |
| | 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 Bl | 56th Ave | New Road | 0 | 4 | Principal |
| | Dunkirk Street | 56th Ave | 71st Ave | New Road | 0 | 4 | Minor |
| | I-25 | Broadway | | Add Ramp(s) | | | Ramp |
| 2007-083 | I-70 | Havana St | | Interchange Reconstruction | | | Freeway |
| 2007-083 | I-70 | Central Park Blvd | | New Interchange | | | Freeway |
| | Martin Luther King Blvd | Havana St/lola St | Peoria St | New Road | 0 | 4 | Principal |
| 2007-083 | North I-70 Frontage Rd | Havana St | Central Park Blvd | New Road | 0 | 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 | New Road | 0 | 4 | Minor |
| | Telluride Street | 40th Ave | 71st Ave | New Road | 0 | 4 | Collector |
| | Yampa Street | 40th Ave | 72nd Ave | New Road | 0 | 4 | Collector |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|-------------------------|----------------------|-----------------------|---------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | 56th Avenue | Himalaya St | Picadilly Rd | Add through lane(s) | 2 | 4 | Principal |
| | 64th Avenue | Tower Rd | Denver/Aurora City Li | Add through lane(s) | 2 | 4 | Principal |
| | 64th Avenue | Dunkirk Rd | Pena Blvd | Add through lane(s) | 2 | 4 | Minor |
| | 64th Avenue | Dunkirk Rd | Pena Blvd | New Road | 0 | 2 | Minor |
| | Alameda Avenue | Cherry Creek Dr N | Steele St | Add through lane(s) | 4 | 6 | Principal |
| | Alameda Avenue | Colorado Blvd | Cherry Creek Dr N | 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 | Pena Blvd | Add through lane(s) | 2 | 4 | Principal |
| | Pena Blvd | I-70 | Tower Rd | Add through lane(s) | 4 | 6 | Freeway |
| | Pena Boulevard | Tower Road | E-470 east ramps | Add through lane(s) | 4 | 6 | Freeway |
| | Pena Boulevard | Jackson Gap St. west | DIA Terminal | Add through lane(s) | 6 | 8 | Freeway |
| | 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 |
| Network Staging 2025 (2020-2024) | | | | | | | |
| | 56th Avenue | Pena Blvd | Tower Rd | Add through lane(s) | 4 | 6 | Principal |
| | 56th Avenue | Himalaya St | Picadilly Rd | Add through lane(s) | 4 | 6 | 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 |
| | Green Valley Ranch Blvd | Chambers Rd | Telluride St | Add through lane(s) | 4 | 6 | Principal |
| | Green Valley Ranch Blvd | Telluride St. | Tower Rd | Add through lane(s) | 4 | 6 | Principal |
| | Pena Blvd Corridor | I-70 | Tower | New Road | 0 | 4 | Freeway |
| | Picadilly Road | 70th Ave | 82nd Ave | New Road | 0 | 6 | Principal |
| | Tower Road | 43th Ave | Green Valley Ranch BI | Add through lane(s) | 4 | 6 | Principal |
| | Tower Road | 38th Ave. | 43th Ave | Add through lane(s) | 2 | 6 | Principal |
| | Tower Road | 56th Avenue | Pena Boulevard | Add through lane(s) | 4 | 6 | Principal |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | 38th Avenue | Brighton Blvd | Walnut St | Add through lane(s) | 2 | 4 | Principal |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|----------------------------|------------------------|-------------------------|----------------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | Hampden Avenue (SH-30) | Dayton Street | Havana Street | Add through lane(s) | 5 | 6 | Principal |
| Douglas County | | | | | | | |
| Network Staging 2015 (2012-2014) | | | | | | | |
| 2003-112 | C-470 | Santa Fe Dr. | | Interchange Reconstruction | | | Freeway |
| | Hess Rd | I-25 | Chambers Rd | New Road | 0 | 2 | Principal |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | Chambers Road | Mainstreet | Lincoln Avenue | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2025 (2020-2024) | | | | | | | |
| | Canyons Pkwy (Arterial A) | Crowfoot Valley Rd | Hess Rd | Add through lane(s) | 2 | 4 | Principal |
| | Canyons Pkwy (Arterial A) | Crowfoot Valley Rd | Hess Rd | New Road | 0 | 2 | 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 |
| | Monarch Blvd | Castle Pines Pkwy | Rocky Heights Middle | Add through lane(s) | 2 | 4 | Principal |
| | North Meadows Dr. extensio | Castle gate Drive West | I-25 | New Road | 0 | 4 | Minor |
| | Peoria Street | E-470 | .75 miles s/Lincoln Ave | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | Bayou Gulch/Chambers Rd | Parker Road | Vistancia Dr. | Add through lane(s) | 2 | 4 | Principal |
| | Bayou Gulch/Chambers Rd | Vistancia Dr. | Southern Boundary of | New Road | 0 | 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) | 0 | 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 |
| | Mainstreet | Peoria St | Chambers Rd | Add through lane(s) | 2 | 4 | Principal |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|------------------|-----------------------|--------------------|----------------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | Peoria Street | .75 mi S. Lincoln Ave | Mainstreet | Add through lane(s) | 2 | 4 | Principal |
| | Rampart Range Rd | Waterton Rd | Titan Rd | Add through lane(s) | 2 | 4 | Principal |
| | Singing Hills Rd | Hilltop Rd | Elbert County Line | Add through lane(s) | 2 | 4 | Collector |
| | 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 |
| ===== | | | | | | | |
| E-470 Authority | | | | | | | |
| <i>Network Staging 2020 (2015 -2019)</i> | | | | | | | |
| | E-470 | Quebec | | New Interchange | | | Freeway |
| | E-470 | Potomac | | New Interchange | | | Freeway |
| <i>Network Staging 2025 (2020-2024)</i> | | | | | | | |
| | E-470 | 48th Ave | | New Interchange | | | Freeway |
| <i>Network Staging 2035 (2025-2035)</i> | | | | | | | |
| | E-470 | Peoria St | Chambers Rd | Add through lane(s) | 8 | 10 | Freeway |
| | E-470 | I-25 | Peoria St | Add through lane(s) | 6 | 8 | Freeway |
| | E-470 | Chambers Rd | Jordan Rd | Add through lane(s) | 6 | 8 | Freeway |
| | E-470 | Jewell Avenue | I-70 | Add through lane(s) | 4 | 6 | Freeway |
| | E-470 | Parker Rd | Jewell Avenue | Add through lane(s) | 4 | 6 | Freeway |
| | E-470 | I-70 | Pena Blvd | Add through lane(s) | 4 | 6 | Freeway |
| | E-470 | Jordan Rd | Parker Rd | Add through lane(s) | 7 | 9 | Freeway |
| | E-470 | I-25 North | I-76 | Add through lane(s) | 4 | 6 | Freeway |
| | E-470 | I-76 | Pena Blvd | Add through lane(s) | 4 | 6 | Freeway |
| | E-470 | I-70 | | Interchange Reconstruction | | | Freeway |
| | E-470 | 112th Avenue | | New Interchange | | | Freeway |
| | E-470 | 88th Avenue | | New Interchange | | | Freeway |
| | East Frontage Rd | 88th Ave | 96th Ave | New Road | 0 | 1 | Frontage Road |
| | Gun Club Rd | 6th Pkwy | Smith Rd | New Road | 0 | 2 | Minor |
| | West Frontage Rd | 88th Ave | 96th Ave | New Road | 0 | 1 | Frontage Road |

=====

Erie



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|---------------------------|----------------------|-----------------------|---------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | Leon A. Wurl Parkway | Coal Creek | Weld CR 5 | Add through lane(s) | 2 | 4 | Minor |
| | Leon A. Wurl Pkwy | US-287 | 119th St. | Add through lane(s) | 2 | 4 | Principal |
| Jefferson County | | | | | | | |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | Quincy Avenue | Kipling Street | Carr Street | Add through lane(s) | 2 | 4 | Principal |
| | Quincy Avenue | Simms St | Kipling Pkwy | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | Quincy Avenue | C-470 | Simms Street | Add through lane(s) | 2 | 4 | Principal |
| Jefferson Pkwy/Highway | | | | | | | |
| Network Staging 2020 (2015-2019) | | | | | | | |
| | Jefferson Pkwy | Candelas Parkway | | New Interchange | | | Freeway |
| | Jefferson Pkwy | Indiana St | | New Interchange | | | Freeway |
| | Jefferson Pkwy | SH-72 | | New Interchange | | | Freeway |
| | Jefferson Pkwy | SH-128/96th St | SH-93 n/o 64th Ave | New Road | 0 | 4 | Freeway |
| Lafayette | | | | | | | |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | South Boulder Rd/160th Av | 120th St | Boulder/Broomfield Co | New Road | 0 | 2 | Principal |
| Lakewood | | | | | | | |
| Network Staging 2015 (2012-2014) | | | | | | | |
| | McIntyre Street | Alameda Ave. | Morrison Rd | New Road | 0 | 4 | Minor |
| | Yale Avenue | Rooney Rd | Bear Creek Blvd | New Road | 0 | 4 | Minor |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | Alameda Avenue | Bear Creek Boulevard | McIntyre St | Add through lane(s) | 2 | 4 | Principal |
| | Alameda Avenue | McIntyre St | Rooney Rd | Add through lane(s) | 2 | 6 | Principal |
| Longmont | | | | | | | |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|----------------------|----------------------|----------------------|---------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | 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 | 3rd Avenue | Ute Road | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2025 (2020-2024) | | | | | | | |
| 1999-026 | SH-66 | Hover Road | US 287 (Longmont) | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | East County Line Rd | 9th Ave | SH-66 | Add through lane(s) | 2 | 4 | Principal |
| ===== | | | | | | | |
| Parker | | | | | | | |
| Network Staging 2015 (2012-2014) | | | | | | | |
| | Chambers Rd. | Stroh Rd. | Hess Road | New Road | 0 | 2 | Principal |
| | Cottonwood Drive | Parker Road | Jordan Road | Add through lane(s) | 2 | 4 | Minor |
| | Cottonwood Drive | Jordan Road | Chambers Road | New Road | 0 | 4 | Minor |
| | Stroh Rd | Chambers Rd | Crowfoot Valley Rd | New Road | 0 | 4 | Principal |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | Chambers Rd. | Stroh Rd. | Hess Road. | Add through lane(s) | 2 | 4 | Principal |
| | Chambers Road | Hess Road | Newlin Gulch Blvd | Add through lane(s) | 2 | 4 | Principal |
| | Chambers Road | Newlin Gulch Blvd | Mainstreet | 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 | J. Morgan Blvd | Crowfoot Valley | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2025 (2020-2024) | | | | | | | |
| | Chambers Rd | Crowfoot Valley Road | Southern Boundary of | New Road | 0 | 2 | Principal |
| | Chambers Road | Crowfoot Valley Road | Stroh Road | Add through lane(s) | 2 | 4 | Principal |
| | Chambers Road | Crowfoot Valley Road | Stroh Rd | New Road | 0 | 2 | Principal |
| | Crowfoot Valley Road | Chambers Rd | Stroh Rd | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2035 (2025-2035) | | | | | | | |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|-----------------------------|-----------------------|----------------------|---------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | Chamber Road | Crowfoot Valley Rd | South Boundary | Add through lane(s) | 2 | 4 | Principal |
| RTD | | | | | | | |
| <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 2020 (2015 -2019)</i> | | | | | | | |
| 2007-053 | Central Corridor Extension | 30th/Downing St | 38th & Blake St | Rapid Transit | | | Rapid Transit |
| 2007-052 | East Corridor Commuter Ra | 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 Commut | Rapid Transit | | | Rapid Transit |
| 2007-055 | North Metro Rail | DUS | SH-7 | Rapid Transit | | | Rapid Transit |
| 2007-050 | Northwest Rail | DUS | 1st /Terry St | Rapid Transit | | | Rapid Transit |
| 2007-059 | Southeast Corridor Extensio | Lincoln Ave | Ridgegate | Rapid Transit | | | Rapid Transit |
| 2007-058 | Southwest Corridor Extensi | Mineral Ave. | Lucent Blvd/C-470 | Rapid Transit | | | Rapid Transit |
| Sheridan | | | | | | | |
| <i>Network Staging 2015 (2012-2014)</i> | | | | | | | |
| | Quincy Avenue | Irving St | Federal Blvd | New Road | 0 | 2 | Principal |
| Thornton | | | | | | | |
| <i>Network Staging 2015 (2012-2014)</i> | | | | | | | |
| | Holly Street | 123rd Ave. | 128th Ave. | Add through lane(s) | 2 | 4 | Collector |
| | McKay Road | 104th Ave. | 103rd Ave. | Add through lane(s) | 2 | 4 | Collector |
| <i>Network Staging 2020 (2015 -2019)</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 |
| | Washington Street | 144th Avenue | 152nd Ave | Add through lane(s) | 2 | 4 | Principal |
| <i>Network Staging 2025 (2020-2024)</i> | | | | | | | |
| | 112th Avenue | Steele St. | Colorado Blvd. | Add through lane(s) | 2 | 4 | Minor |
| | 144th Avenue | Washington St. | York Sl. | Add through lane(s) | 2 | 4 | Principal |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

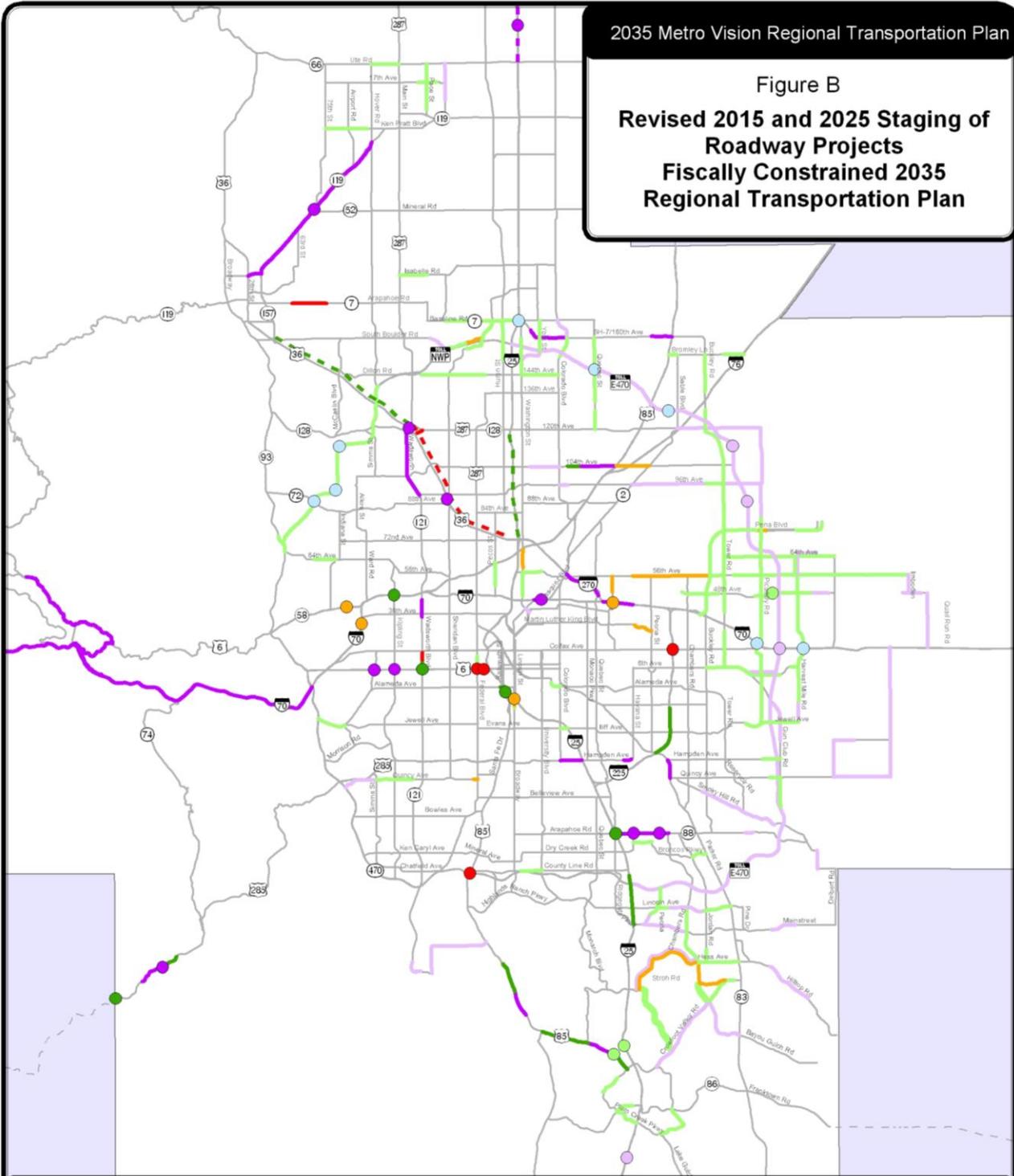
| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | Classification |
|--|---------------------|----------------|----------------------|----------------------------|---------------|-------|----------------|
| | | | | | Before | After | |
| | Colorado Blvd | 152nd Ave | 156th Ave | Add through lane(s) | 2 | 4 | Principal |
| | Colorado Blvd | 156th Ave | 160th Ave (SH-7) | New Road | 0 | 4 | Principal |
| | Holly Street | 136th Ave. | 138th Ave. | Add through lane(s) | 2 | 4 | Collector |
| | 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 |
| | York Street | E-470 | SH-7 | Add through lane(s) | 2 | 4 | Principal |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | 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 |
| | 160th Avenue | I-25 | Washington St. | Add through lane(s) | 2 | 4 | Collector |
| | Colorado Blvd | SH-7 | 168th Ave | New Road | 0 | 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 |
| ===== | | | | | | | |
| Westminster | | | | | | | |
| Network Staging 2020 (2015 -2019) | | | | | | | |
| | Westminster Blvd. | US-36 | 103rd Ave. | Add through lane(s) | 2 | 4 | Minor |
| Network Staging 2025 (2020-2024) | | | | | | | |
| | 112th Avenue | Pierce/Main St | Wadsworth Pkwy | New Road | 0 | 4 | Minor |
| Network Staging 2035 (2025-2035) | | | | | | | |
| | Old Wadsworth Blvd. | 92nd Ave. | Church Ranch Blvd | Add through lane(s) | 2 | 4 | Minor |
| | Wadsworth Parkway | 92nd Avenue | SH-128/ new 120th Av | Add through lane(s) | 4 | 6 | Major Regional |
| ===== | | | | | | | |
| Wheat Ridge | | | | | | | |
| Network Staging 2015 (2012-2014) | | | | | | | |
| | 41st Avenue | Cabela Dr | Youngfield St | New Road | 0 | 2 | Collector |
| | I-70 | 32nd Ave | | Interchange Reconstruction | | | Freeway |
| | SH-58 | Cabela Street | | New Interchange | | | Freeway |



Model Network Changes Included in the 2011 Cycle 1 Air Quality Conformity for the Fiscally Constrained 2035 RTP and the 2012-2017 TIP By Location

| TIP-ID | Facility Name | Start At | End At | Improvement | Through Lanes | | |
|---|----------------|----------|----------|---------------------|---------------|-------|----------------|
| | | | | | Before | After | Classification |
| <i>Network Staging 2035 (2025-2035)</i> | | | | | | | |
| | Wadsworth Blvd | 36th Ave | 46th Ave | Add through lane(s) | 4 | 6 | Principal |
| | | | | | | | |

Figure B
Revised 2015 and 2025 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
 PJ 6/11



| 2012-2014 | | 2015-2024 | | 2025-2035 | |
|-----------|-------------|-----------|-------------|-----------|-------------|
| Local \$ | Regional \$ | Local \$ | Regional \$ | Local \$ | Regional \$ |
| | | | | | |
| | | | | | |

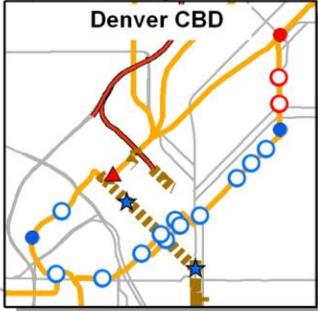
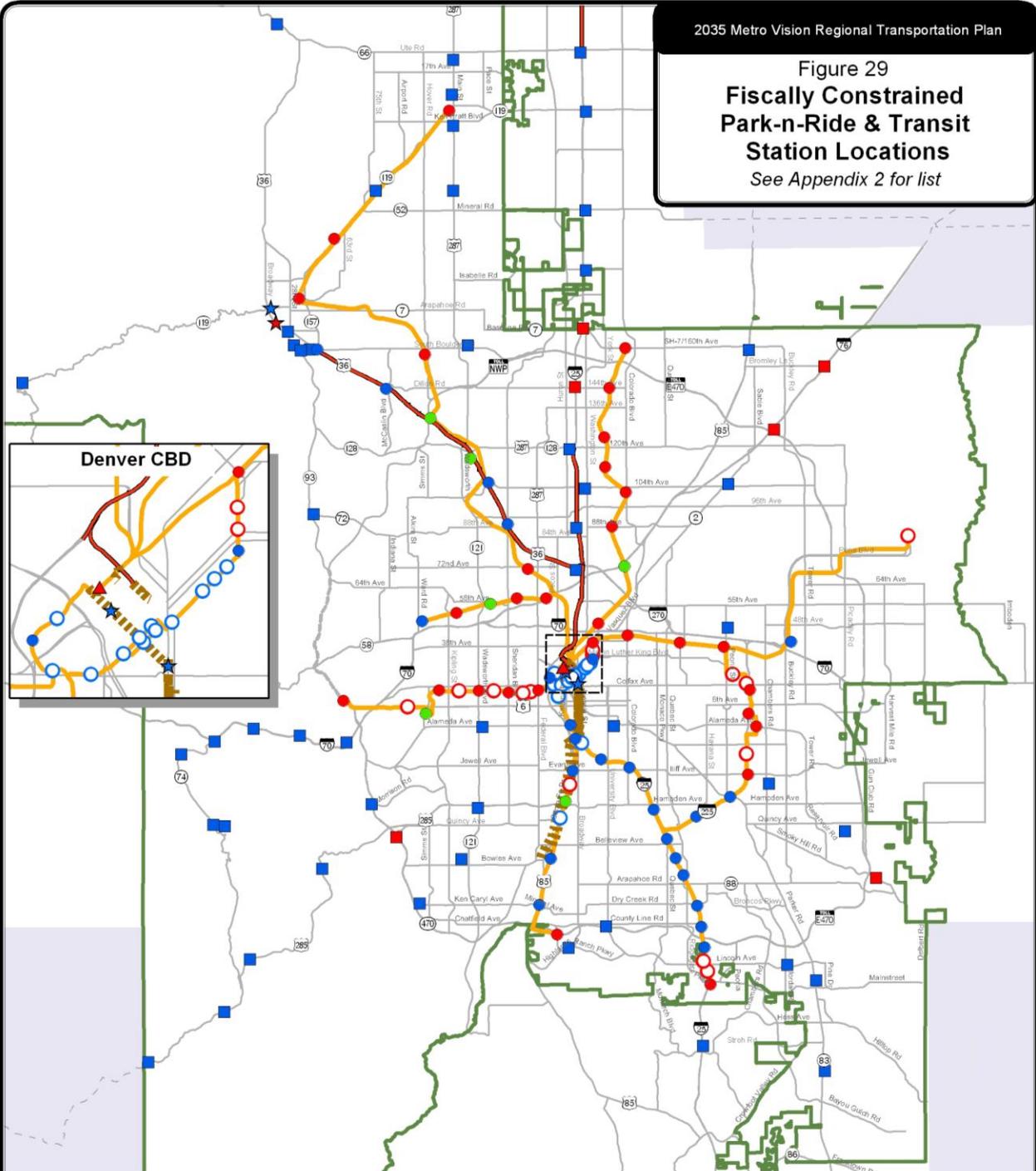
Regional Roadway System
 Roads Outside Region
 Area Outside Region

Roadway Segment
 Managed Lanes (HOT)
 New or Improved Interchange



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Figure 29
**Fiscally Constrained
 Park-n-Ride & Transit
 Station Locations**
 See Appendix 2 for list



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: Regional Transportation District; DRCOG
 Projection: Colorado State Plane, NAD 83
 PJ 10/10

- | existing | | expand | | new | |
|----------|---|--------|---|-----|---|
| ● | ○ | ● | ○ | ● | ○ |
| ■ | ■ | ■ | ■ | ■ | ■ |
| ★ | | ★ | | ★ | |
| — | | — | | — | |
| — | | — | | — | |
| — | | — | | — | |
- Rapid Transit Station with Parking
 - Rapid Transit Station without Parking
 - Park-n-Ride Lot
 - ★ Denver Union Station
 - ★ Other Stations/Transit Centers
 - Tier 1 Rapid Transit Rail
 - RTD Service Boundary
 - Regional Roadway System
 - HOV
 - HOT



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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

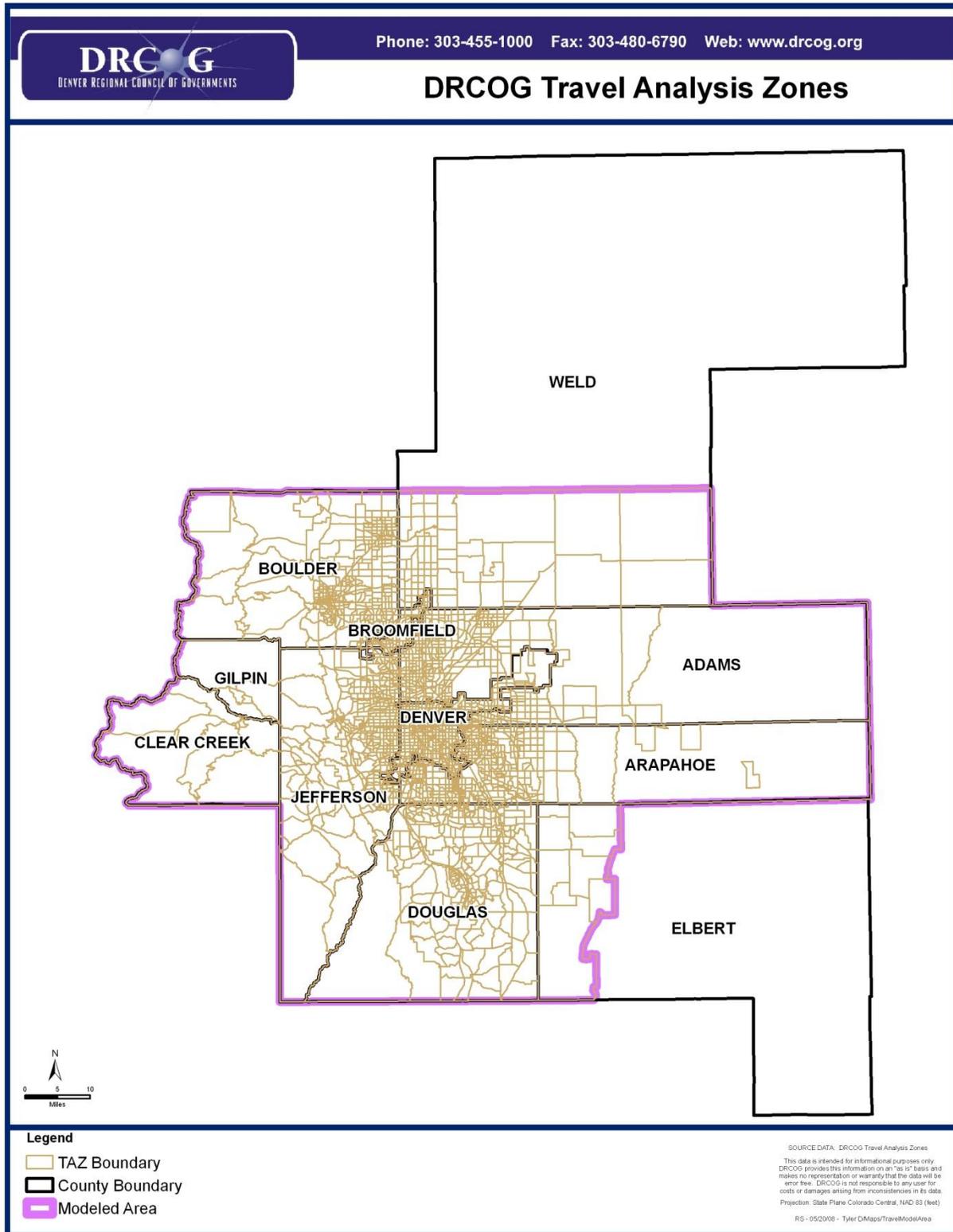


Figure 2
Socioeconomic Model Elements and Flow

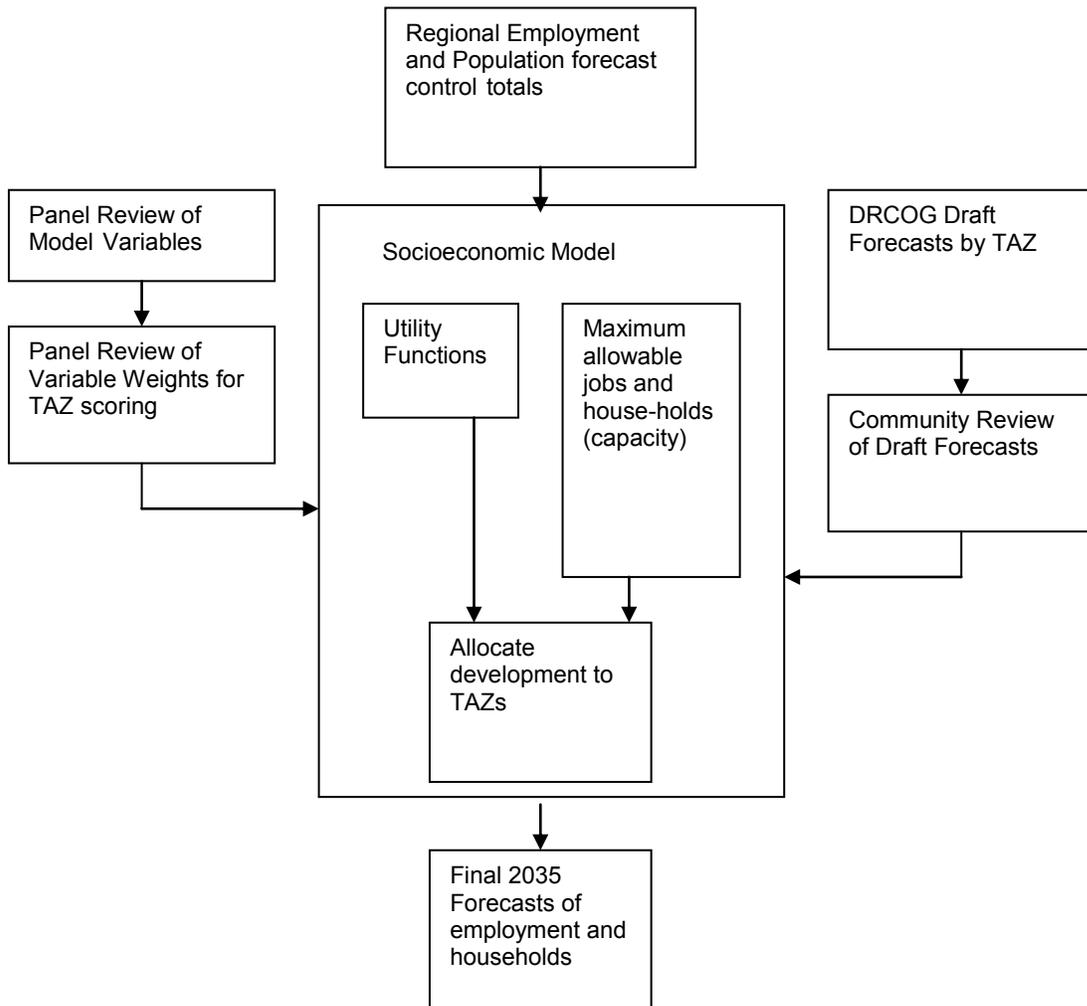
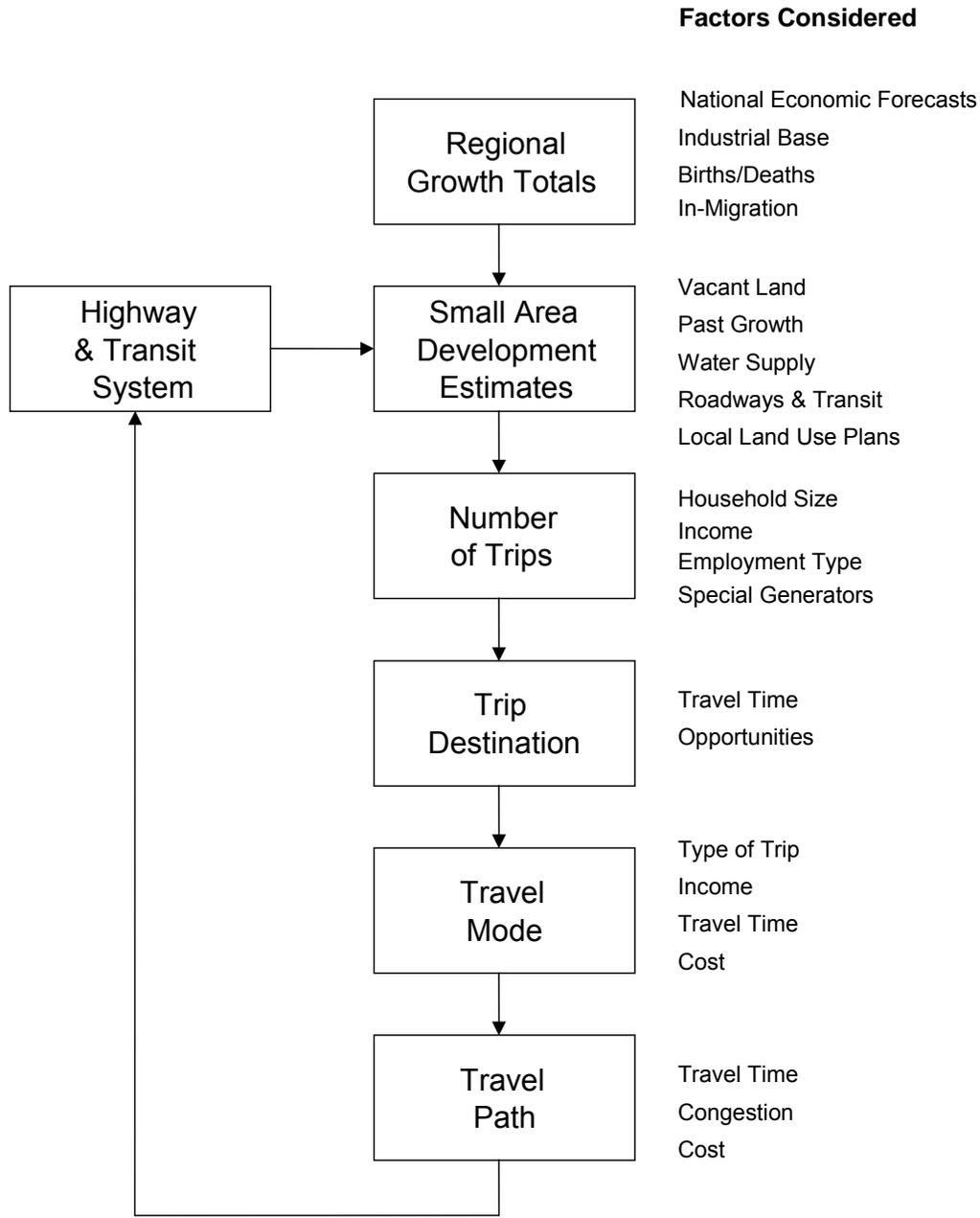


Figure 3
Travel Model Elements and Flow



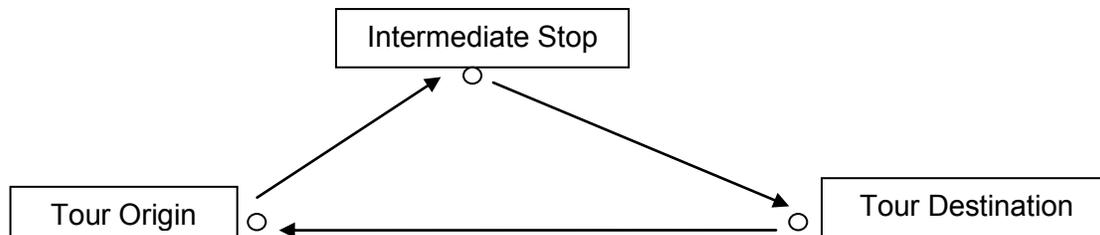
Focus Model Process Overview

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 millions of records for individual households and persons. Then the travel skims that give travel times from each origin zone to each destination zone are created. Tours are the first travel elements to be created. Figure 4 shows a diagram to explain how tours work. This diagram has one tour with three trips and one intermediate stop.

The model runs through a set of activity generation, location choice, mode choice, and time of day choice model components for tours. Then the model runs through a parallel set of model components for trips 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 representations. The highway network is represented by over 25,000 directional road segments, described according to 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 below. Table 1 enumerates all model components. Most model components are multinomial logit or nested logit models, which are regression models that have more than two 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 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 2.0 model components must be run for airport trips, internal-external 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. The second level nest is given the workplace is outside the home, in which zone it is located.

Similarly to the regular work location choice model, the regular school location choice model assigns each student a regular school location zone and school. It uses information about the student like 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-8th grade, 9th-12th 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 to which zone each tour is destined 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 for every person:

- 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)

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.

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

| Observed VMT | Modeled VMT |
|---------------------|--------------------|
| 20,506,768 | 20,906,583 |

Table 3. Observed and Modeled Transit Boardings

| Observed Transit Boardings | Modeled Transit Boardings |
|-----------------------------------|----------------------------------|
| 269,741 | 263,508 |

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

| | Base Year (2010) | Interim Year (2015) | Future Year (2035) |
|---|-------------------------|----------------------------|---------------------------|
| Total Population | 2,932,277 | 3,190,145 | 4,451,769 |
| Employment | 1,578,419 | 1,746,534 | 2,613,377 |
| Annual Growth Rate (Pop.) | - | 1.7% | 1.6% |
| Dwelling Units (Households) | 1,163,602 | 1,286,349 | 1,824,495 |
| Persons/Dwelling Unit (Household) | 2.52 | 2.48 | 2.42 |
| VMT by Roadway Type | | | |
| -Freeway | 27,371,113 | 29,096,513 | 39,690,337 |
| -Expressway | 4,143,948 | 6,070,873 | 8,348,377 |
| -Principal | 23,411,715 | 26,256,796 | 37,665,332 |
| -Minor | 8,125,521 | 7,450,889 | 10,619,409 |
| -Other (Collectors, Centroid Connectors, Ramps) | 10,827,536 | 11,339,541 | 17,064,104 |
| Total | 73,879,832 | 80,214,613 | 113,387,559 |
| Speed by Roadway Type (miles per hour) | | | |
| -Freeway | 60.5 | 59.7 | 52.0 |
| -Expressway | 48.7 | 46.1 | 39.2 |
| -Principal | 34.0 | 34.3 | 30.3 |
| -Minor | 31.6 | 31.2 | 25.6 |
| -Other (Collectors, Centroid Connectors, Ramps) | 21.8 | 21.5 | 18.7 |
| Total (Average Speed) | 37.4 | 37.3 | 32.0 |
| Lane Miles by Roadway Type | | | |
| -Freeway | 2,084 | 2,143 | 2,327 |
| -Expressway | 450 | 594 | 630 |
| -Principal | 3,403 | 4,052 | 4,864 |
| -Minor | 2,783 | 2,629 | 2,677 |
| -Other (Collectors, Centroid Connectors, Ramps) | 3,910 | 3,853 | 3,793 |
| Total | 12,631 | 13,271 | 14,292 |

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

| | Intermediate Year (2015) | Intermediate Year (2025) | Future Year (2035) |
|------------|-------------------------------------|-------------------------------------|-------------------------------|
| VOC | 0.73 | 0.42 | 0.42 |
| NOx | 0.69 | 0.28 | 0.23 |

APPENDIX D

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

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MEMORANDUM OF AGREEMENT

FOR

TRANSPORTATION CONFORMITY EVALUATIONS
CONDUCTED UNDER THE 8-HOUR OZONE STANDARD

BY AND BETWEEN

THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT,
THE DENVER REGIONAL AIR QUALITY COUNCIL,
THE COLORADO DEPARTMENT OF TRANSPORTATION,
THE UPPER FRONT RANGE TRANSPORTATION PLANNING REGION,
THE NORTH FRONT RANGE TRANSPORTATION AND AIR QUALITY
PLANNING COUNCIL (a.k.a. the North Front Range MPO),
AND THE DENVER REGIONAL COUNCIL OF GOVERNMENTS

March 14, 2008

Abbreviations Guide

APCD – Air Pollution Control Division
AQCC – Air Quality Control Commission, (“the Commission”)
CDPHE – Colorado Department of Public Health and Environment
CDOT - Colorado Department of Transportation
DRCOG – Denver Regional Council of Governments
MOA – Memorandum of Agreement
MPA – Metropolitan Planning Area
MPO – Metropolitan Planning Organization
NFR – North Front Range
NFRT& AQPC – North Front Range Transportation & Air Quality Planning Council (the NFR MPO)
NOx – Nitrogen Oxides
RAQC – (Denver) Regional Air Quality Council
SIP – State Implementation Plan
UFR – Upper Front Range
TIP – Transportation Improvement Program
TPR – Transportation Planning Region
USDOT – United States Department of Transportation
USEPA – United States Environmental Protection Agency
VOC – Volatile Organic Compounds

Terminology

Consulting parties – Those agency parties involved in data and document review for the purposes making or commenting on a Conformity Determination. Includes the Air Quality Control Commission, USDOT and USEPA, who are not signatory parties to this MOA.

Signatories/Signatory parties –The parties signatory to this document. This group of six agencies does not include USDOT or USEPA.

On-road motor vehicle – Refers to cars, trucks, buses, motorcycles, vans and other motorized vehicles that use public highways, streets and roadways; to be distinguished from motor vehicles that may be designed for off-road use, e.g., all-terrain vehicles, and from agricultural and construction equipment.

A. Background and Purpose

The U.S. Environmental Protection Agency (USEPA) has designated an area (See map, Attachment A) inclusive of the Denver Metro Area and portions of both the North Front Range Metropolitan Planning area and the Upper Front Range Transportation Planning Region as nonattainment under the 8-hour ozone standard. The nonattainment designation became effective November 20, 2007. The Upper Front Range TPR is not represented by a Metropolitan Planning Organization as it comprises a largely rural area. Furthermore, the TPR lacks the expertise and wherewithal to provide or purchase transportation and modeling forecasts as part of the Conformity Determination process for the 8-hour ozone area.

Federal Transportation Regulations at 23CFR 450.314 (b) state that where a metropolitan planning area does not include an entire nonattainment area or maintenance 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 or maintenance area. The agreement must also indicate how the total transportation-related emissions for the nonattainment or maintenance area, including areas outside the MPA, will be treated for the purposes of determining conformity in accordance with EPA’s transportation conformity rule (40 CFR Part 93). The agreement shall address policy mechanisms for resolving conflicts concerning transportation-related emissions...**(and)** (c): In nonattainment or maintenance areas, if the MPO is not the designated agency for air quality planning...there shall be a written agreement between the MPO and the designated air quality planning agency describing their respective roles and responsibilities for air quality related transportation planning. (d) If more than one MPO has been designated to serve an urbanized area, there shall be written agreement among the MPOs, the State(s), and the public transportation operator(s) describing how the metropolitan transportation planning processes will be coordinated to assure the development of consistent metropolitan transportation plans and TIPs across the MPA boundaries....”

Similarly, EPA regulations at 40 CFR 93.105(e) and 51.390 require states to create consultation procedures in the SIP whereby MPO representatives, state and local air quality planning agencies, state and local transportation agencies and other organizations must consult with each other and with U.S. Environmental Protection Agency (USEPA) and U.S. Department of Transportation (USDOT) regarding development of State Implementation Plans (SIPs), transportation plans, transportation improvement programs (TIPs), and Conformity Determinations.

This Memorandum of Agreement (MOA) is designed to allow for and to guide cooperative transportation planning in conformance with State air quality plans, and related review and analysis in the pursuit of transportation Conformity Determinations associated with the 8-hour ozone State Implementation Plan (SIP).

B. Conformity Determinations Prior to/In Lieu of the Establishment of On-Road Motor Vehicle Emission Budgets

The first Conformity Determination for the area of concern is due November 20, 2008, as required by the federal Conformity Rule at 40 CFR 93.102(d). Since adequate or

approved motor vehicle emission budgets will not be available until late 2009, one or more Conformity Determinations for the nonattainment or maintenance area of concern must follow the procedures at 40 CFR 93.109(e)(2)(iii).

The Denver Regional Council of Governments and the North Front Range MPO shall perform transportation emissions forecasting for the respective areas described in Section C.1 and C.2 for Conformity Determinations, regardless of whether emission budgets have been established, and regardless of whether overall nonattainment-or maintenance area emission budgets or sub-area emission budgets are used.

C. Motor Vehicle Emission Budgets for the 8-Hour Ozone Nonattainment (or Maintenance) Area and Sub-Areas

In the SIP development process, the Air Pollution Control Division (APCD), the North Front Range Metropolitan Planning Organization (NFRMPO), and the Regional Air Quality Council (RAQC) shall work together to propose overall area motor vehicle emission budgets for volatile organic compounds (VOC) and nitrogen oxides (NO_x) for the 8-hour ozone nonattainment or maintenance area. Said budgets must be adopted by the Commission and affirmed via USEPA adequacy determinations in order to become viable for use in Conformity Determinations.

Sub-area emission budgets for ozone precursors under the 8-hour ozone standard may also be proposed to the AQCC for the following two sub-areas:

1. The combined areas of the Denver Metro Region and the southern portion of the Upper Front Range Transportation Planning Region (TPR) as designated nonattainment by USEPA, i.e., the area south of the north line of Township 3 north of the 6th Principal Meridian; said line is the southern boundary of the North Front Range MPO extended to the east line of Weld County. For this sub-area, the budgets for NO_x and VOC shall be proposed during SIP development for the federal 8-hour ozone standard by the RAQC with input from the APCD, CDOT, DRCOG, and UFR to be considered for adoption by the Commission.
2. The combined areas of the North Front Range MPO area and the northern portion of the Upper Front Range TPR, as designated nonattainment by USEPA, i.e., the area north of the north line of Township 3 north of the 6th Principal Meridian; said line is the southern boundary of the North Front Range MPO extended to the east line of Weld County. For this sub-area, the budgets for NO_x and VOC shall be proposed determined during SIP development for under the federal 8-hour ozone standard by the NFR MPO in consultation with the APCD and the RAQC, with input from CDOT and UFR, to be considered for adoption by the Commission.

Sub-area budgets, agreed to by the signatories and approved by the Commission, may be used to measure the conformity of plans and programs for the respective areas, once determined adequate by the USEPA.

Sub-areas as described above and Conformity procedures described in this document shall remain the same when and if the 8-Hour Nonattainment Area is re-designated an “Attainment/Maintenance Area.

D. Granting of Authority, Responsibilities

The Upper Front Range TPR lacks the expertise and wherewithal to provide or purchase transportation and modeling forecasts as part of the Conformity Determination process for the 8-hour ozone area. By this agreement:

1. The DRCOG agrees to provide transportation forecasts and make Conformity Determinations for the area described in Section C.1 above. The area includes the DRCOG MPO area and other 8-hour ozone nonattainment areas within the DRCOG TPR, as well as a portion of the nonattainment area of the Upper Front Range TPR.
2. The North Front Range MPO agrees to provide transportation forecasts and make Conformity Determinations for an area described in Section C.2 above. The area includes North Front Range MPO 8-hour ozone nonattainment areas as well as portions of the Upper Front Range TPR nonattainment area.
3. The Upper Front Range TPR authorizes the DRCOG and the NFR MPO to prepare transportation forecasts and make Conformity Determinations for the relevant nonattainment areas of the Upper Front Range as described in Section C of this document.
4. The agreed-upon transportation forecasting authorities shall continue for the 8-Hour Ozone Area after it is re-designated “Attainment/Maintenance” status by USEPA.

E. Compensation to MPOs for Additional Responsibilities

It is anticipated that over the next one-to-four years, funding will be needed for enhanced transportation forecasting and to perform Conformity Determinations for the Upper Front Range areas of concern. The CDOT has the responsibility to fund required Conformity Determinations and associated transportation modeling efforts for areas outside of the MPOs.

As forecasting and modeling work for the UFR will extend beyond the MPO boundaries, the CDOT will provide necessary funding to DRCOG and NFR based upon a mutually agreeable course of action delineating tasks, schedule, and costs among the signatory agencies. The signatory agencies will look to the USEPA and USDOT to assure consistency with federal requirements regarding tasks. The CDOT will execute separate intergovernmental agreements with the NFRMPO and DRCOG detailing the specific work that will be done for the agreed-to compensation.

F. Conformity Review – Procedural

The agencies shall follow the interagency consultation process and procedures identified in Colorado Air Quality Control Commission Regulation No. 10 for sharing information and conducting review of transportation data, projections, and determining Transportation Conformity to the State Implementation Plan under the 8-hour ozone standard, and generally the process outlined in memoranda of agreement for Transportation Conformity evaluations by and between the CDPHE and the Denver Regional Council of Governments (1998) and with the North Front Range Transportation and Air Quality Planning Council (2003).

The DRCOG and NFR MPO shall provide forecasts for their respective areas as described in Section C. 1 and C.2. In cases where one Conformity finding is to be made for the overall 8-Hour Ozone Nonattainment (or Attainment/Maintenance) Area, and no sub-area emission budgets are to be used, the MPOs, in consultation with the other signatory parties and with USEPA and USDOT, shall sum the ozone precursor emissions from their respective areas for overall-Area totals of VOC and NO_x, to determine whether forecasted emissions meet the appropriate Conformity test(s). In such cases, the MPOs jointly shall produce one Conformity Determination document for the overall 8-Hour Ozone Nonattainment (or Attainment/Maintenance) Area.

The APCD will perform independent emission budget tests and other applicable analyses for the overall Nonattainment (or Attainment/Maintenance) region and, as well as for the sub-areas described in C.1 and C.2 if sub-area budgets are to be used, within 30 days of receiving the final submittal of transportation data, although such data will be submitted to the APCD as early in the process as possible. The APCD may also assist with enhanced emissions forecasting for the Upper Front Range area, or provide other in-kind assistance to emissions forecasting efforts.

Assuming the APCD agrees with a Conformity Determination, it will recommend that the Air Commission comment formally via letter to the relevant MPO and to CDOT regarding its concurrence.

In the event that future sub-area emissions exceed a Conformity test or emission budget, the sub-area MPO shall immediately and diligently pursue actions, e.g., transportation plan and/or TIP amendment, that would bring projected emissions under budget (or in line with the Conformity test being used) and thus to conform to the SIP (and/or not threaten to increase the severity of the 8-Hour Area's nonattainment status). Such endeavor would be pursued as part of standard interagency process. If the sub-area were to fail to meet a Conformity test/make a positive Conformity Determination, all parties to this MOA shall confer on an emergency basis to review emission budgets and to consider the merits of the following actions, which may be needed to achieve or to re-establish Conformity:

- Potential revisions to transportation plans and/or transportation programs
- Potential modeling (by both MPO's) of the entire nonattainment (or Attainment/Maintenance) Area for a Conformity Determination, if allowed by the SIP
- Potential appeal (via the SIP process) for emission budget revisions
- Potential additional SIP revisions.

A course of action employing one or more of the above-listed actions shall be determined by the parties to this agreement. Parties may appeal to the USDOT and USEPA for guidance in establishing Conformity.

G. Dispute Resolution

Any protracted disagreements between consulting parties reviewing a Conformity Determination shall be elevated to the Commission, per the provisions in AQCC Regulation No. 10. Any continuing dispute that devolves or threatens to devolve into a situation of official non-conformance of transportation plans with the State Implementation Plan may be elevated to the Governor, just as a disputed Conformity Determination may be elevated to the Governor, as provided in AQCC Regulation No. 10 and at 40 CFR Section 93.105(d).

H. Termination of Agreement

This agreement shall be binding upon the signatory parties-until the 8-hour ozone area has achieved attainment status and maintains said status for a period of at least 20 years, unless the undersigned agencies revise or replace this MOA via unanimous, written agreement.

The undersigned hereby agree to the delegations, responsibilities and procedures described above.



3/14/08

Paul Tourangeau, Director, Air Pollution Control Division, CDPHE

Date



3/14/08

Jennifer Finch, Director, Transportation Development Division, CDOT

Date



3/14/08

Kenneth H. Lloyd, Executive Director, Regional Air Quality Council

Date



3/24/08

Robert D. Masden, Weld County Commissioner,
Chairman, Upper Front Range TPR

Date



3/20/08

Cliff Davidson, Executive Director, North Front Range MPO

Date

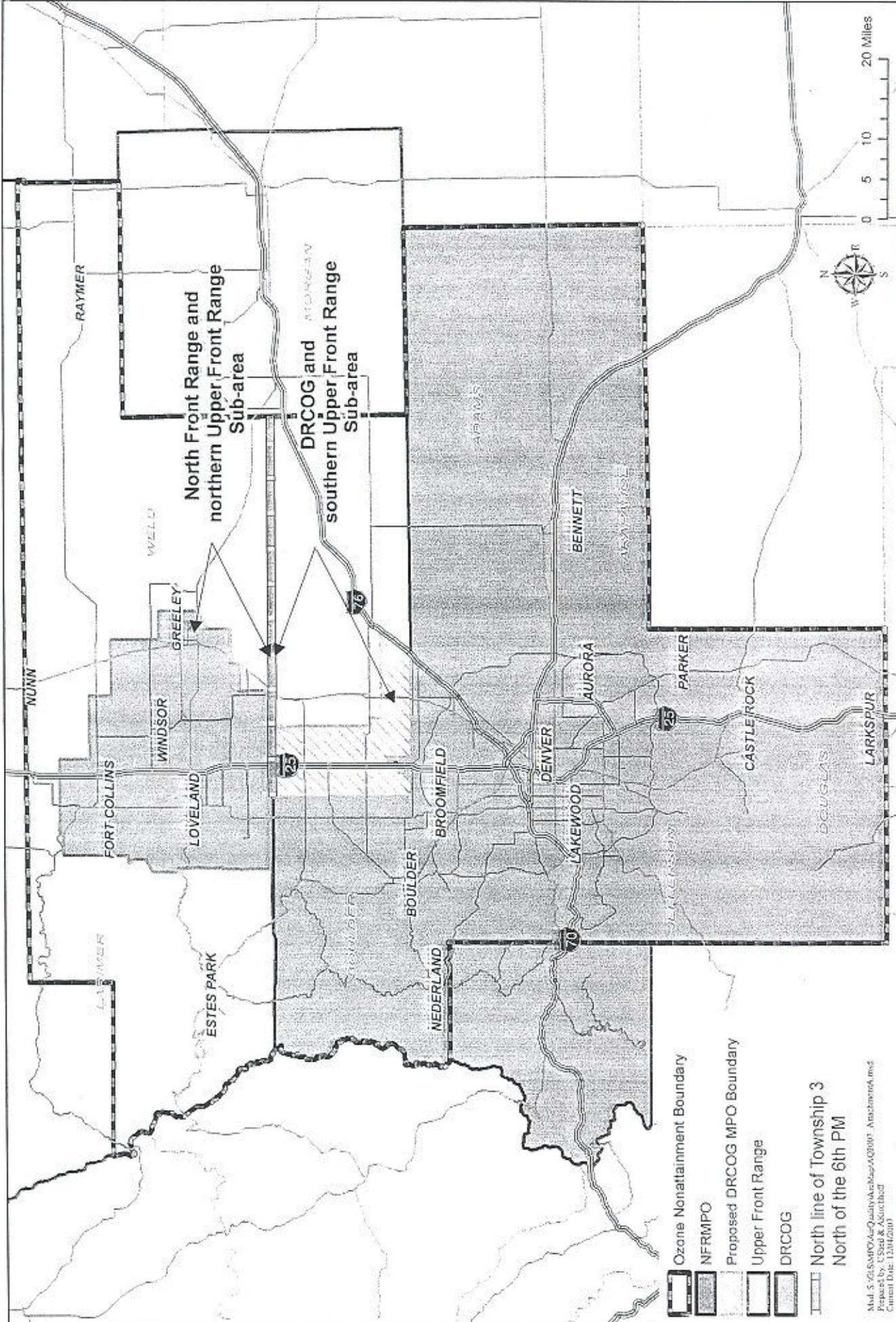


3/14/08

Jennifer Schaufele, Executive Director,
Denver Regional Council of Governments

Date

**Attachment A:
8-Hour Ozone Nonattainment Area
and Sub-areas**



- Ozone Nonattainment Boundary
- NFRMPO
- Proposed DRCOG MPO Boundary
- Upper Front Range
- DRCOG
- North line of Township 3
- North of the 6th PM

APPENDIX E

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

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U.S. Department
of Transportation
**Federal Highway
Administration**

Colorado Division

October 24, 2011

12300 W. Dakota Ave., Ste. 180
Lakewood, CO 80228
(720) 963-3014
Fax (720) 963-3001

Ms. Jennifer Shaufele
Executive Director
Denver Regional Council of Governments
1290 Broadway, Suite 700
Denver, CO 80202

Subject: DRCOG 2011 Cycle 1 2035 MVRTP Amendments and Amended 2012-2017 TIP
Conformity Redetermination

Dear Ms. Shaufele:

In accordance with the Clean Air Act of 1990, as amended, and 23 CFR 450, the U.S. Department of Transportation (U.S. DOT) is required to make air quality conformity determinations of Regional Transportation Plans (RTP) and Transportation Improvement Programs (TIP) in non-attainment and maintenance areas. The process to make a conformity determination in Colorado is the Federal Highway Administration (FHWA) Colorado Division office signs the letter on behalf of the Federal Transit Administration (FTA) Region VIII office per the current Memorandum of Agreement for Transportation Planning Oversight (MOA).

On November 20, 2007, the U.S. Environmental Protection Agency (EPA) designated the Denver, Boulder, Longmont, Fort Collins and Greeley urbanized areas non-attainment for 8-hour ozone. The non-attainment area includes the planning areas of the Denver Regional Council of Governments (DRCOG), North Front Range Transportation and Air Quality Planning Council, also known as the North Front Range Metropolitan Planning Organization (NFRMPO), and the upper Front Range Transportation Planning Region (Upper Front Range TPR). The transportation planning organizations have signed an MOA explaining how air quality conformity for 8-hour ozone is accomplished by the three parties within the non-attainment area. The 8-Hour Ozone MOA states that DRCOG will provide conformity determinations for the southern subarea on the Denver-North Front Range non-attainment area, as well as portions of the Upper Front Range TPR. Subarea budgets were used for the conformity determination of the 2011 Cycle 1 Amendments to the DRCOG 2035 RTP.

Currently, the DRCOG region is designated as a maintenance area for CO and particulate matter less than 10 microns in size (PM₁₀).

On August 17, 2011, DRCOG, in its capacity as the MPO, adopted an air quality conformity determination for the DRCOG 2011 Cycle 1 Amendments to the 2035 Metro Vision RTP and the Amended FY 2012-2017 TIP. The 2035 MVRTP is the fiscally constrained long-range transportation plan for the DRCOG region, while the FY 2012-2017 TIP is the fiscally constrained transportation improvement program for the DRCOG region. The 8-Hour ozone

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portion of the conformity determination covers the Denver Southern Subarea, and includes both the Upper Front Range 2035 RTP and the FY 2012-2017 State Transportation Improvement Program (STIP) for the Upper Front Range Transportation Planning Region.

We previously made conformity determinations for the DRCOG Updated 2035 MVRTP on May 13, 2011, and for the DRCOG FY 2012-2017 TIP on June 29, 2011. Furthermore, an initial conformity determination was made for the Upper Front Range TPR 2035 RTP on November 19, 2008. On June 29, 2011, the Upper Front Range TPR portion of the 2012-2017 STIP was included in the conformity determinations we made for the DRCOG and NFRMPO 2012-2017 TIPs.

Based on our evaluation of the DRCOG 2011 Cycle 1 Amendments to the 2035 MVRTP conformity determination and the FY 2012-2017 TIP in coordination with the EPA, the Colorado Air Quality Control Commission (AQCC), the Regional Air Quality Council (RAQC) and the Colorado Department of Transportation (CDOT), we have determined that the DRCOG area has met the requirements of 40 CFR 51 and 93, 23 CFR 450, 49 CFR 613 along with FHWA/FTA policies and guidance. Furthermore, the DRCOG 2011 Cycle 1 Amendments to the 2035 MVRTP and the Amended DRCOG FY 2012-2017 TIP conform to the State Implementation Plan (SIP).

A conformity redetermination for the DRCOG 2011 Cycle 1 Amendments to the 2035 MVRTP and the Amended DRCOG 2012-2017 TIP is hereby made. Our action is consistent with the FHWA/FTA Transportation Planning MOA.

Sincerely yours,



John M. Cater
Division Administrator

cc: Ms. Lisa Silva, APCD
Mr. Jeff Sudmeier, CDOT
Mr. David Beckhouse, FTA
Mr. Larry Squires, FTA
Mr. Tim Russ, EPA
Mr. Cliff Davidson, NFRMPO
Ms. Barbara Kirkmeyer, UPR

APPENDIX F

LIST OF ACRONYMS

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| 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 |