

Denver Southern Subarea 8-Hour Ozone 2050 Metro Vision Regional Transportation Plan Conformity Determination

for the Denver Regional Council of Governments Fiscally
Constrained Element of the 2050 Metro Vision Regional
Transportation Plan

and the DRCOG 2022-2025 Transportation Improvement
Program

and the Southern Subarea Portion of the Upper Front Range
2045 Regional Transportation Plan

and the 2022-2025 State Transportation Improvement Program
for the Upper Front Range Transportation Planning Region

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Executive Summary

The Denver Regional Council of Governments completed this transportation conformity determination as part of the transportation and air quality planning process. DRCOG's update to the long-range transportation plan triggered the need to perform the conformity analysis. The ozone nonattainment area continues to meet air quality conformity standards associated with the DRCOG and Upper Front Range Transportation Planning Region respective long-range transportation plans and short-range transportation improvement programs.

Emissions Test Results

Table 1 shows the budgets for volatile organic compounds (VOC) and nitrogen oxides (NOx), the pollutants that directly contribute to ozone. The modeled emissions must be below budget to pass conformity tests. All staging-year results for the Denver Southern Subarea are reported in Table 1. All tests are passed based on model results for emissions being below the budgets. This means the plans associated with this determination meet conformity requirements for the 2020 Ozone State Implementation Plan budgets (2008 and 2015 ozone standards). The emissions estimates were generated by Air Pollution Control Division using the transportation inputs from DRCOG's travel demand models and the Motor Vehicle Emission Simulator model (MOVES).

**Table 1. 8-Hour Ozone Conformity for Denver Southern Subarea Results
(Emission Tons per Day)**

| | 2017 SIP Budgets (2008 Ozone Standard) | Modeling Results | | | | |
|----------------------------------|---|---------------------------|--|---------------------------|---------------------------|------------------|
| | | 2023 Emissions | 2030 Emissions | 2040 Emissions | 2050 Emissions | Pass/Fail |
| Volatile Organic Compounds (VOC) | 47 | 35 | To be provided after model run completion (will be available at time of meeting) | | 30 | pass all tests* |
| Nitrogen Oxides (NOX) | 61 | 35 | | | 16 | pass all tests* |

*final conclusion of all tests passing is dependent on 2030 and 2040 emissions results

Other Pollutants

This document details ozone conformity. Currently, the DRCOG region is designated as a maintenance area for carbon monoxide (CO) and particulate matter equal to or less than 10 microns in aerodynamic diameter (PM10). The CO and PM10 conformity determination, last adopted in May 2019 by the DRCOG Board of Directors, is being updated concurrently with this document.

Chapter 1. What is Transportation Conformity?

Each metropolitan planning organization associated with an air quality nonattainment area is required to show conformity of its long-range fiscally constrained regional transportation plan and transportation improvement program with the state implementation plan for air quality before transportation plans and programs may be adopted. Section 176(c) of the Clean Air Act, as amended in 1990, requires that new conformity determinations must be made when there are additions or deletions of funded regionally significant projects not depicted as such in a current conformity determination or if a new TIP (with different programming years) is proposed for adoption. Project additions or deletions usually occur in relation to the RTP. Since TIP projects are contingent upon already being identified in the RTP, TIP changes alone rarely trigger the need for a new conformity determination. This new determination was triggered by DRCOG's update to the RTP consistent with a shift in Metro Vision Regional Transportation Plan horizon years from 2040 to 2050.

The Clean Air Act defines conformity as alignment with an air quality implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (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 toward 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. According to 40 CFR 93.109 of the Transportation Conformity Rule, criteria and procedures for determining conformity of transportation plans, programs, and projects must satisfy different criteria depending on whether the state has submitted a SIP revision, and whether the U.S. Environmental Protection Agency has approved the revision.¹

On Jan. 9, 2008, the EPA administrator signed an amendment to the conformity rule (the "Final Rule"), to implement the provisions of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. The EPA final transportation conformity rule is located at 40 CFR Part 93, Subpart A. The Final Rule was promulgated Feb. 25, 2008. The most recent EPA revision to the conformity rule occurred on March 14, 2012 (77 FR 14979, effective April 13, 2012). To address revised standards and changes in conformity requirements, the EPA has promulgated several amendments to the final rule in recent years. The Air Quality Control Commission Regulation No. 10 or "Criteria for Analysis of Transportation Conformity," was adopted by the commission in 1998. It formally defines the process for determining conformity. The EPA approved Regulation No. 10 on Sept. 21, 2001 (66 FR 48561), making it federally enforceable. Regulation No. 10 was updated and approved by the Air Quality Control Commission on Dec. 15, 2011.

¹ Transportation Conformity Guidance for 2015 Ozone NAAQS Nonattainment Areas (EPA-420-B-18-023) June 2018: §93.109(c) (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.

Chapter 2. Ozone Nonattainment Area

Area Boundaries and History

The EPA's process to determine the nonattainment area dates to 1997. Within the DRCOG region, there are several key planning organizations. Table 2 depicts the three organizations, their roles in the region and their geographic boundaries. Figure 1 depicts the boundary of all three metropolitan planning organizations/transportation planning regions involved in this report's 8-hour ozone conformity determination. For long-term and short-term planning, DRCOG's 2050 Metro Vision Regional Transportation Plan includes the entire DRCOG transportation planning region. The DRCOG Transportation Improvement Program covers the transportation management area, while the Colorado Department of Transportation and the State Transportation Improvement Program covers the remaining portions of the region.

Table 2. Area Planning Organizations

| Organization | Role | Boundaries |
|--|---|--|
| Denver Regional Council of Governments | Metropolitan planning organization and transportation planning region for the Denver Transportation Management Area | The transportation management area includes four urbanized areas and 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 transportation planning region area includes the transportation management area plus the portions of Adams and Arapahoe counties east of Kiowa Creek, Clear Creek and Gilpin counties, and the Rocky Mountain National Park area of Boulder County. |
| North Front Range MPO | Metropolitan planning organization for the North Front Range transportation management area | Includes 15 local governments in portions of Larimer and Weld counties. |
| Upper Front Range | Transportation planning region for north-central Colorado | Comprises Larimer, Morgan and Weld counties, and excludes the urbanized areas in Larimer and Weld counties. |

The DRCOG transportation management area boundary expansion into southwestern Weld County was approved by the governor on Feb. 21, 2008. The ozone non-attainment area includes a more expansive area of Weld County.

Figure 1. Planning Organizations Involved in Denver Metro/North Front Range 8-Hour Ozone Nonattainment Area

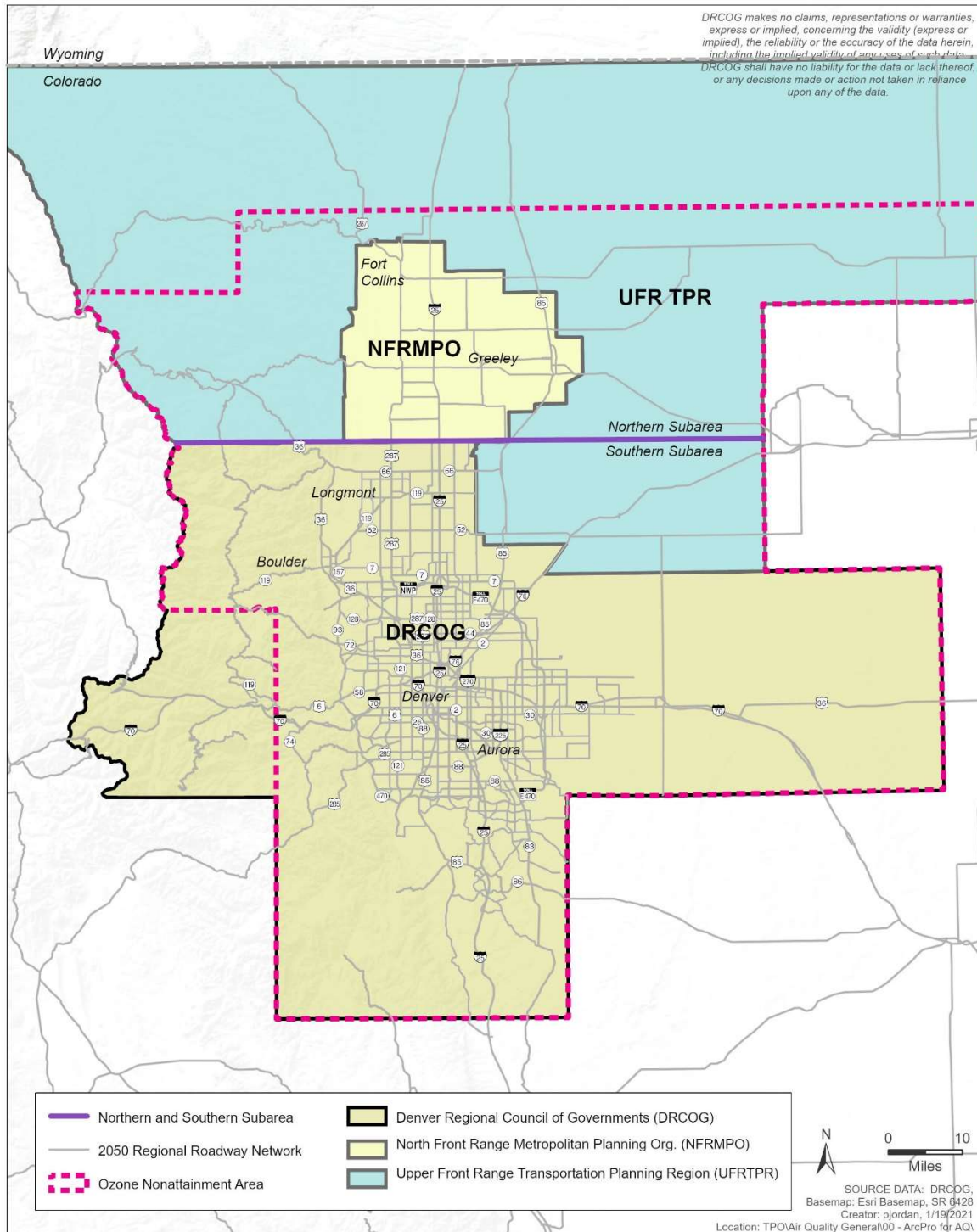


Table 3 is a historical summary of the 1997, 2008 and 2015 8-hour ozone NAAQS for the Denver Metro/North Front Range region. The 8-hour ozone nonattainment area is comprised of two subareas (Northern and Southern), shown in Figure 2. The boundary between the two subareas is the Boulder/Larimer county line extended through southern Weld County to the Morgan County line. Per 2004 designation, the area includes nine counties in the Denver Metro/North Front Range region (Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson and the southern portions of Larimer and Weld counties).

| Table 3. Historical Summary for the 8-Hour Ozone National Ambient Air Quality Standards in the Denver Metro/North Front Range Nonattainment Area | | |
|---|---|--|
| Date | Milestone | Comments |
| 1997 | U.S. Environmental Protection Agency established the 8-hour ozone National Ambient Air Quality Standard of 80 parts per billion (ppb). | Due to litigation at the federal level, it took the EPA until 2004 to designate nonattainment area. |
| April 30, 2004 | The EPA promulgated Phase I ozone implementation rule and designated nine Denver Metro/North Front Range counties as marginal nonattainment for the 1997 8-hour ozone NAAQS | nine counties in the Denver Metro/North Front Range region: Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson, and the southern portions of Larimer and Weld effective date: June 15, 2004 (69 FR 23951) |
| March 27, 2008 | The EPA lowered the NAAQS for ground-level ozone to 0.075 ppm; same nine counties marginal nonattainment | new 2008 standard is 75 ppb; secondary standards are identical to the revised primary standard effective date: May 27, 2008 (73 FR 16436) |
| May 21, 2012 | The EPA designated the Denver Metro/North Front Range region as marginal nonattainment under the new standard. | |
| conclusion of the 2014 ozone season | The Denver Metro/North Front Range region failed to attain air quality standards based on the three-year average of ozone data from 2012 to 2014. | |
| Oct. 26, 2015 | The EPA published the final rule revising 8-hour ozone NAAQS (2015 8-hour ozone National Ambient Air Quality Standards). | new 2015 standard is 0.070 ppm; secondary standards are identical to the revised primary standard effective date: Dec. 28, 2015 (80 FR 65291) |
| May 4, 2016 | The EPA reclassified the region from a marginal to a moderate nonattainment area for the 2008 ozone NAAQS, extending the attainment year to 2017. | A Moderate State Implementation Plan was developed to demonstrate how the Denver Metro/North Front Range region will comply with the federal Clean Air Act. |
| May 2017 | New motor vehicle emissions budgets were submitted to the EPA as part of | |

| | | |
|--------------|---|---|
| | the State Implementation Plan package for the 2008 ozone NAAQS | |
| June 4, 2018 | The EPA published a final rule designating the Denver Metro/North Front Range region as marginal for the 2015 ozone NAAQS | The same nine-county Denver Metro/North Front Range geography was used as with the 2008 ozone NAAQS. Until new motor vehicle emissions budgets are approved and become effective, the Denver Metro/North Front Range nonattainment area demonstrates conformity to the 2015 ozone NAAQS by meeting the approved moderate State Implementation Plan motor vehicle emissions budget tests for the 2008 NAAQS (40 CFR 93.109(c)(2)(i)) ² . effective date: Aug. 3, 2018. |

Memorandum of Agreement

Federal Transportation Regulations at 23 CFR 450.314(b) states:

“where a metropolitan planning area (MPA) does not include an entire nonattainment area, there shall be written agreement among the State Department of Transportation, state air quality agency, affected local agencies, and the MPO describing the process for cooperative planning and analysis of all projects outside the MPA within the nonattainment area.”

A memorandum of agreement was signed in March 2008 by the Colorado Department of Public Health and Environment, Colorado Department of Transportation, Regional Air Quality Council, Upper Front Range Transportation Planning Region, North Front Range Metropolitan Planning Organization, and DRCOG. A new memorandum of agreement reflecting the updated Regulation No. 10 was signed by North Front Range Metropolitan Planning Organization, Colorado Department of Public Health and Environment, Regional Air Quality Council, and DRCOG in 2015. Both are still in effect. It updated the specific roles and responsibilities in conformity evaluations and findings for each agency. The memorandum of agreement also includes courses of action to be pursued if a subarea exceeds an emission budget. This superseded the November 1998 memorandums of agreement the Colorado Department of Public Health and Environment signed with DRCOG and the North Front Range Metropolitan Planning Organization. A copy of the 2015 memorandum of agreement is in Appendix D.

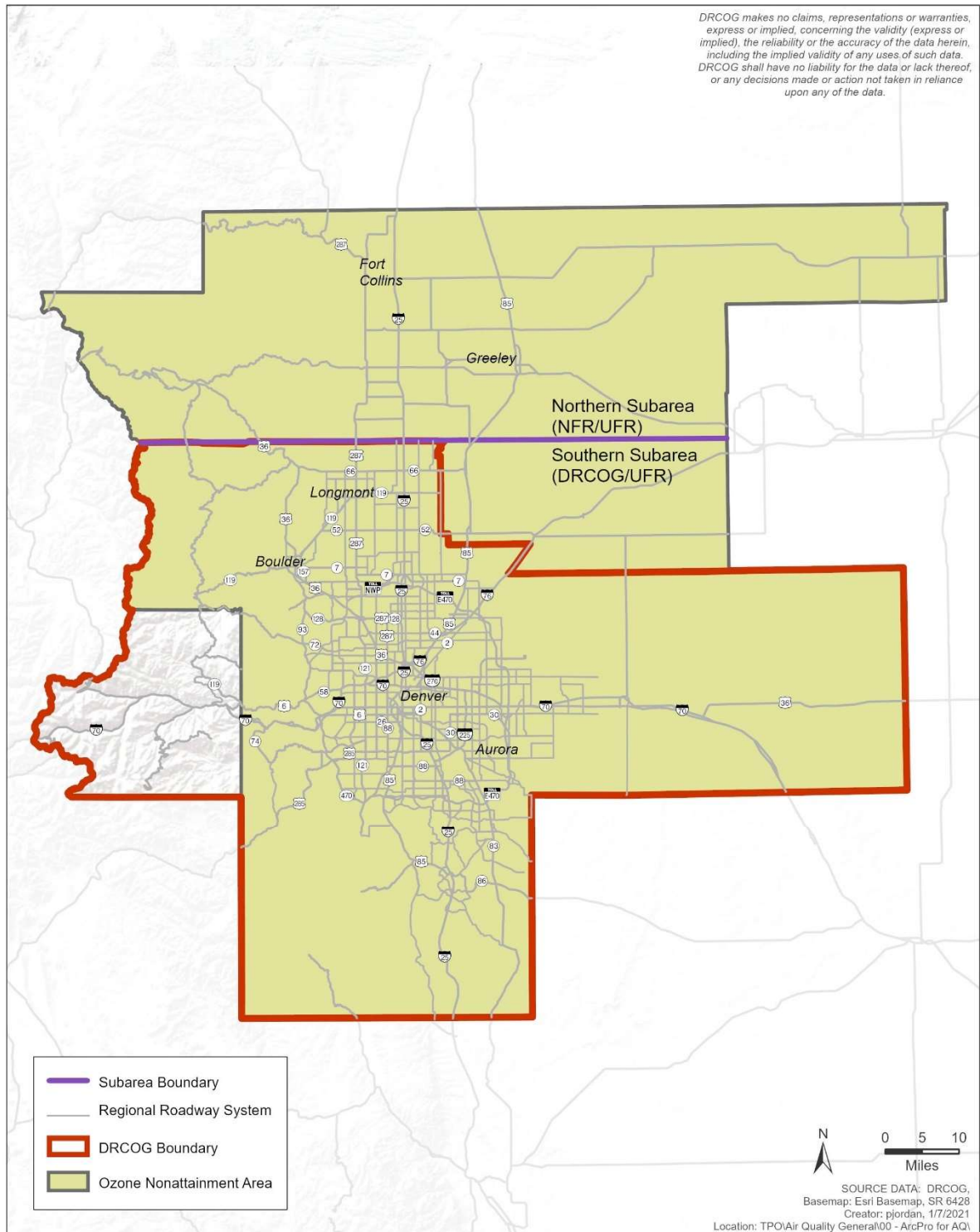
The memorandum of agreement stipulates that DRCOG will make conformity determinations for the Southern Subarea of the 8-hour ozone nonattainment area, while the North Front Range Metropolitan Planning Organization will make the conformity determination for the Northern Subarea of the 8-hour ozone nonattainment area, with boundaries as shown in Figure 2. Both the North Front Range Metropolitan Planning Organization and DRCOG worked cooperatively with an interagency consultation group (Federal Highway Administration, Federal Transit Administration, Regional Air Quality Council, North Front Range Metropolitan Planning Organization, Upper Front Range Transportation Planning Region, EPA, Colorado Department of Transportation and the Air Pollution Control Division) to review the conformity documentation and planning assumptions. Per the memorandum of agreement, the

² Transportation Conformity Guidance for 2015 Ozone NAAQS Nonattainment Areas (EPA-420-B-18-023), June 2018

travel demand model outputs from each metropolitan planning organization are sent to the Air Pollution Control Division of the Colorado Department of Public Health and Environment for generation of emissions estimates.

Figure 2 - Denver Metro/North Front Range Ozone Nonattainment Area and Subareas

DRCOG makes no claims, representations or warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the data herein, including the implied validity of any uses of such data. DRCOG shall have no liability for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.



Motor Vehicle Emission Budgets

Motor vehicle emission budgets are established as part of a State Implementation Plan. The Regional Air Quality Council is the air quality planning agency for the Denver metropolitan area (Southern Subarea) as well as the North Front Range metropolitan area and Upper Front Range transportation planning region (Northern Subarea) and is charged with preparing the State Implementation Plan.

The 2008 memorandum of agreement calls for the establishment of overall area motor vehicle emissions budgets based on the entire 8-hour ozone nonattainment area and allows for the option of establishing subarea emissions budgets based on subareas. The memorandum of agreement describes that after the initial motor vehicle emissions budget-based conformity determination, DRCOG and the North Front Range Metropolitan Planning Organization may switch from using the total nonattainment area motor vehicle emissions budgets for joint determinations to using the subarea budgets for individual conformity determinations. If using subarea budgets, as is the current practice, **both** subareas must demonstrate conformity for their plans. If one subarea fails, the other subarea cannot adopt a new conformity determination until the failure is resolved. To switch methods DRCOG and the North Front Range Metropolitan Planning Organization must use the process as described in the Denver Metro/North Front Range Ozone State Implementation Plan. The motor vehicle emissions budgets for NOX and VOC went through the process of:

- submittal to the EPA in 2009 as part of the SIP for the 1997 Ozone NAAQS
- EPA finding budgets adequate for transportation conformity purposes on March 4, 2010 (75 FR 9893), effective March 19, 2010
- EPA subsequently approving budgets in a final rule on Aug. 5, 2011 (76 FR 47443), effective Sept. 6, 2011

DRCOG and the North Front Range Metropolitan Planning Organization used these budgets for subsequent transportation conformity determinations until 2017. Due to the reclassification to a moderate nonattainment area in 2016, additional planning requirements were triggered including the requirement to submit updated motor vehicle emissions budgets for the 2017 attainment year. Following the same approach as under the 1997 ozone NAAQS, the Moderate Area Ozone State Implementation Plan set new motor vehicle emissions budgets for the northern and southern subareas found in Table 4. These lower budgets were submitted to the EPA in May 2017 as part of the State Implementation Plan package for the 2008 ozone NAAQS. The EPA found the budgets adequate on March 16, 2018 (83 FR 11751) with an effective date of April 2, 2018. The Regional Air Quality Council is undergoing the process of updating the State Implementation Plan, and reclassifying the nonattainment to serious, which will change the motor vehicle emissions budgets. Until new budgets are approved and become effective, the Denver Metro/North Front Range nonattainment area demonstrates conformity to the 2015 ozone NAAQS by meeting the approved Moderate State Implementation Plan motor vehicle emissions budget tests for the 2008 NAAQS (40 CFR 93.109(c)(2)(i))³.

³ Transportation Conformity Guidance for 2015 Ozone NAAQS Nonattainment Areas (EPA-420-B-18-023)- June 2018

**Table 4. 8-Hour Ozone Conformity by Subarea Budgets
(Emission Tons per Day)**

| Motor Vehicle Emissions Budgets | VOC (TPD) | NOX (TPD) |
|--|--------------|--------------|
| Northern Subarea Budget (North Front Range Metropolitan Planning Organization and Upper Front Range Transportation Planning Region Subarea) | 8 | 12 |
| Southern Subarea Budget (DRCOG and Upper Front Range Transportation Planning Region Subarea) | 47 | 61 |
| Total Nonattainment Area Budget (Entire Nonattainment Area) | 55 | 73 |

Relevant Planning Efforts

DRCOG Metro Vision Regional Transportation Plan

DRCOG’s Metro Vision 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, bicycle and pedestrian facilities, and improvements to the existing roadway system. Among Metro Vision’s regional objectives is to “Improve air quality and reduce greenhouse gas emissions,” which reflects the region’s commitment to improve air quality through local and regional initiatives that reduce ground-level ozone, greenhouse gas emissions and other air pollutants. Supporting objectives include:

- Increase collaboration with local and regional partners on air quality initiatives.
- Increase public awareness of air quality issues.
- Improve the fuel economy of the region's vehicle fleet.

The Metro Vision Regional Transportation Plan implements the transportation element of Metro Vision. The Metro Vision Regional Transportation Plan contains an unconstrained vision plan, outlining the region’s total transportation needs, as well as the Fiscally Constrained Regional Transportation Plan, which includes those projects that can be implemented given reasonably anticipated revenues through 2050. When the 2050 Metro Vision Regional Transportation Plan is referenced in this document it denotes the fiscally constrained element of the plan.

The 2022-2025 Transportation Improvement Program identifies transit, multimodal and roadway projects to be funded from fiscal year 2022 through fiscal year 2025. Regionally significant projects funded in the TIP must first be identified in the 2050 Metro Vision Regional Transportation Plan. Regionally significant projects are listed in Appendix A. The TIP will implement selected projects and strategies identified in the first staging periods of the 2050 Metro Vision Regional Transportation Plan.

DRCOG staff fostered public participation throughout development of the 2050 Metro Vision Regional Transportation plan and 2022-2025 Transportation Improvement Program, and continue to facilitate youth

and civic engagement on a regular basis. DRCOG has provided numerous public participation opportunities, including workshops, county forums, stakeholder meetings, surveys, interactive online forums, a Youth Advisory Panel and a Civic Advisory Group.

UFR RTP

The Upper Front Range Transportation Planning Region provided its 2045 Regional Transportation Plan for public comment in May of 2020 and was approved by the Upper Front Range Regional Planning Commission in September 2020. The Upper Front Range Transportation Planning Region 2045 Regional Transportation Plan contains both a vision plan as well as a fiscally constrained plan. Short-range transportation projects in the plan are contained in the Statewide Transportation Improvement Program. There have been no regionally significant amendments to either of these documents since the last determination.

Consistent with the process used for the memorandum of understanding, information about and summaries of DRCOG's public hearings were circulated within the Upper Front Range Transportation Planning Region, available through DRCOG's website and in the office. Additionally, the public was encouraged to provide input to their local elected officials and government staff who work closely with DRCOG.

Chapter 3. Transportation Control Measures

For this conformity determination, there are no transportation control measures identified for timely completion or implementation as part of the applicable implementation plan. The 8-hour ozone State Implementation Plan that was adopted by the Air Quality Control Commission in November 2016 did not include any transportation control measures.

Chapter 4. Emission Test Process and Assumptions

Background and Staging Years

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, NOX and VOC. The plan and program must meet the motor vehicle emissions budget in the applicable State Implementation Plan or plan submittal. Satisfying these tests involves demonstrating that relevant emissions in future years are less than or equal to the emissions budget established in the State Implementation Plan.

In accordance with EPA regulations 40 CFR 93.118, the Interagency Consultation Group agreed upon the following base and reporting years for this 8-hour ozone conformity determination.

- **2020** – regional transportation plan base year (no emissions analysis)
- **2023** – an intermediate modeling year
- **2030** – an intermediate modeling year
- **2040** – an intermediate modeling year
- **2050** – the last year (horizon) of regional transportation plan

Under the terms of the memorandum of agreement (as described above), DRCOG is responsible for the 8-hour ozone nonattainment area's Southern Subarea, while the North Front Range Metropolitan Planning Organization is responsible for the conformity determination for the 8-hour ozone nonattainment area's Northern Subarea, as shown in Figure 1.

Technical Models

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. Information concerning vehicle miles traveled and operating speeds was updated as part of this conformity finding process.

The memorandum of agreement stipulates that the emissions estimates are to be performed by the Air Pollution Control Division. The Air Pollution Control Division of the Colorado Department of Public Health and Environment estimates air pollution emissions using the EPA MOVES model. The conformity analysis for this 8-hour ozone conformity determination began in December 2020 when DRCOG transferred initial travel model output files to Air Pollution Control Division to be used with EPA's most current mobile source emission model (MOVES2014b) to estimate emissions. An update to the EPA model was underway during the analysis for this update and will be applied in the future.

The DRCOG travel demand model covers the whole Southern Subarea. Appendix B describes the modeling structure and recent enhancements for the DRCOG travel demand model in more detail. Appendix C of this conformity determination includes more information on the transportation and demographic assumptions used in this emissions analysis.

Demographic Assumptions

Growth in population and employment is the principal factor for the increased demand for travel on the region's transportation facilities and services. The population forecast for the Southern Subarea of the

Denver Metro/North Front Range 8-hour Ozone Nonattainment Area in 2050 is 4,404,997. This is an increase of 31 percent over the 2020 estimated population of 3,358,999. The employment forecast for 2050 is 2,970,635 compared to the 2020 estimate of 2,160,276, an increase of 38 percent. Table 5 shows the latest forecasts of population and employment for 2020, 2023, 2030, 2040 and 2050 for the Southern Subarea of the Denver Metro/North Front Range Nonattainment Area. Table 6 lists 2020 and 2050 population and employment estimates by each of the counties in the DRCOG ozone modeling Southern Subarea.

**Table 5.
Population and Employment Forecasts –
Southern Subarea**

| | 2020 | 2023 | 2030 | 2040 | 2050 |
|------------|-----------|-----------|-----------|-----------|-----------|
| Population | 3,358,999 | 3,520,911 | 3,806,424 | 4,180,711 | 4,404,997 |
| Employment | 2,160,276 | 2,241,691 | 2,443,012 | 2,706,188 | 2,970,635 |

Source: State Demography Office, Colorado Department of Local Affairs 2019 Data Pull. Weld County portioning applied by DRCOG staff.

Counties included in totals: Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson and southern Weld.

**Table 6. 2020 and 2050 Population and Employment Estimates by County –
Southern Subarea**

| County | Population | | Employment | |
|--|------------------|------------------|------------------|------------------|
| | 2020 | 2050 | 2020 | 2050 |
| Adams County | 523,778 | 842,689 | 267,686 | 365,949 |
| Arapahoe County | 659,564 | 837,991 | 426,173 | 584,069 |
| Boulder County | 331,025 | 420,105 | 248,111 | 339,920 |
| Broomfield County | 72,773 | 98,239 | 48,254 | 66,192 |
| Denver County | 736,531 | 883,165 | 646,251 | 885,225 |
| Douglas County | 354,508 | 464,189 | 174,176 | 238,725 |
| Jefferson County | 586,965 | 661,332 | 313,198 | 429,177 |
| Southern Weld County | 93,855 | 197,287 | 36,427 | 61,378 |
| Total DRCOG Ozone Modeling Southern Subarea | 3,358,999 | 4,404,997 | 2,160,276 | 2,970,635 |

Source: State Demography Office, Colorado Department of Local Affairs 2019 Data Pull. Weld County portioning applied by DRCOG staff.

Transportation Network Assumptions

DRCOG

Emission tests were based on the 2020, 2023, 2030, 2040 and 2050 transportation networks and associated planning assumptions as defined in DRCOG's 2050 Metro Vision Regional Transportation Plan. The networks included financially constrained roadway and transit system improvements and resulting networks to be completed by the year 2050. The networks include both federally and locally funded projects. The Metro Vision Regional Transportation Plan and Transportation Improvement Program also include many other projects that will help to reduce emissions associated with ozone such as:

- transit operating funds and bus purchases
- bicycle and pedestrian facilities
- transportation demand management programs
- intelligent transportation systems infrastructure
- traffic signal systems and coordination
- master plans for areas around transit stations and urban centers

All roadway and rapid transit projects and staging years through 2050 are shown in the figures found in Appendix A. The full project list is also detailed in Appendix A.

Upper Front Range Transportation Planning Region

There were no regionally significant transportation improvement projects in the Upper Front Range Transportation Planning Region portion of the Southern Subarea, and no amendments are proposed for this cycle.

Other Mobile Source Reduction Strategies

Two categories of strategies to reduce regional emissions are funded and assumed to continue through 2050, but are not specifically analyzed in the future year transportation and air quality modeling:

- transportation demand management programs such as DRCOG's regional Way to Go program, transit pass subsidies and other transportation demand management actions will help to reduce the amount of single-occupant-vehicle driving by the growing population of the region. Such efforts will also take advantage of the increased provision of pedestrian and bicycling facilities across the region.
- The DRCOG Regional Transportation Operations and Technology Program will implement projects that allow the transportation systems to operate much more efficiently. The projects cover four key areas:
 - traffic signal system equipment
 - traffic signal coordination and timing

- transportation incident management and communications
- intelligent transportation systems technological improvements covering a range of communications (vehicle and infrastructure), monitoring, public information and other projects

Chapter 5. Conclusion

Emission Test Results

The results of the Denver Southern Subarea emissions tests by year are reported in Table 1, included in the executive summary and repeated here. The emissions estimates were generated by Air Pollution Control Division using the transportation inputs from DRCOG's travel demand models and the MOVES model. The 8-hour ozone conformity analysis was performed and is reported for the years 2023, 2030, 2040 and 2050, which meet the requirements for the staging years specified in 40 CFR 93.118.

**Table 2. 8-Hour Ozone Conformity for Denver Southern Subarea Results
(Emission Tons per Day)**

| | 2017 SIP Budgets (2008 Ozone Standard) | Modeling Results | | | | Pass/Fail |
|---|---|---------------------------|--|---------------------------|---------------------------|--------------------|
| | | 2023 Emissions | 2030 Emissions | 2040 Emissions | 2050 Emissions | |
| Volatile Organic Compounds (VOC) | 47 | 35 | To be provided after model run completion (will be available at time of meeting) | | 30 | pass all tests* |
| Nitrogen Oxides (NOX) | 61 | 35 | | | 16 | pass all tests* |

*final conclusion of all tests passing is dependent on 2030 and 2040 emissions results

Summary Statement

DRCOG has assessed its compliance with the applicable ozone conformity criteria requirements and affirms conformity. The test results do not indicate any failures in the reporting years of the program or plan that would lead to a finding of nonconformity for the 2020 State Implementation Plan budgets (2008 Ozone Standard and 2015 Ozone Standard). Based on the quantitative conformity analysis, the DRCOG staff has determined conformity is demonstrated for the amended DRCOG 2050 Metro Vision Regional Transportation Plan, Upper Front Range 2045 Regional Transportation Plan, and the regionally significant projects funded in the DRCOG 2022-2025 Transportation Improvement Program and 2022-2025 Statewide Transportation Improvement Program within the Denver Southern Subarea associated with the 2008 and 2015 8-hour ozone standards.

Appendix A. DRCOG Transportation Network and Project Assumptions

APPENDIX A DRCOG Transportation Network and Project Assumptions

APPENDIX A DRCOG Transportation Network and Project Assumptions

| Project Name/Corridor | Location/Limits | Project Description | County | Project Cost (2020) | Staging Period | In 2022-2025 TIP | Funding Source |
|---|-------------------------|--|----------|---------------------|----------------|------------------|----------------|
| 2050 MVRTP: Regionally-Funded Projects and Programs | | | | | | | |
| Colorado Department of Transportation (CDOT) Administered Multimodal Capital Projects | | | | | | | |
| US-85 | 104th Ave. | New Interchange | Adams | \$100,000,000 | 2023-2029 | | CDOT |
| US-85 | 120th Ave. | New Interchange | Adams | \$100,000,000 | 2023-2029 | ✓ | CDOT |
| I-25 North | 84th Ave. to 104th Ave. | Operational Improvements, Center-Loading Transit Station at 88th Ave., and GP Lane | Adams | \$230,000,000 | 2045-2050 | | CDOT |
| Vasquez Boulevard | 60th Ave. | Intersection Improvements | Adams | \$80,000,000 | 2040-2044 | | CDOT |
| I-270 | I-25/US-36 to I-70 | New Managed Lanes | Adams | \$500,000,000 | 2030-2039 | ✓ | CDOT |
| I-270 | I-25/US-36 and I-70 | New Freeway "direct connects" at each end of I-270 | Adams | \$300,000,000 | 2030-2039 | | CDOT |
| I-25 | Bellevue | Interchange Reconstruction and Pedestrian Connections | Arapahoe | \$112,000,000 | 2030-2039 | | CDOT |

APPENDIX A DRCOG Transportation Network and Project Assumptions

| | | | | | | | |
|--|---|--|------------------|---------------|-----------|---|-------------|
| SH-83 (Parker Rd.) | SH-86 to East Mississippi Ave. | Corridor Planning/Investment for Multimodal Mobility, Operations, and Safety | Arapahoe/Douglas | \$150,000,000 | 2030-2039 | | CDOT /DRCOG |
| SH-66 | Lyons to Main St. (US-287) | Widen from 2 to 4 Lanes (Hover to St. Main St.) and Operational/Safety Improvements from Lyons to Longmont | Boulder | \$10,000,000 | 2030-2039 | ✓ | CDOT |
| I-25 North | E-470 to SH-7 | Managed Lanes, SH-7 interchange reconstruction, & SH-7 Mobility Hub | Broomfield | \$200,000,000 | 2030-2039 | ✓ | CDOT |
| I-25 North (Segment 4) | SH-7 to SH-66 | Managed Lanes, SH-119 Mobility Hub, ITS, Bicycle and Pedestrian Trail Connections | Broomfield/Weld | \$150,000,000 | 2030-2039 | | CDOT |
| I-70 | Twin Tunnels to Empire Junction (US-40) | Add 1 WB Peak Period Managed Lane | Clear Creek | \$0 | 2020-2022 | | CDOT |
| I-70 Floyd Hill Eastbound Improvements | Floyd Hill to Veterans Memorial Tunnel | TBD | Clear Creek | \$250,000,000 | 2030-2039 | | CDOT |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|---|--|---|--------------|---------------|-----------|---|--------------|
| I-70 Floyd Hill Westbound Improvements | Floyd Hill to Veterans Memorial Tunnel | TBD | Clear Creek | \$450,000,000 | 2030-2039 | | CDOT |
| Eisenhower Johnson Memorial Tunnels Maintenance | Eisenhower Johnson Memorial Tunnels | Major rehabilitation of the Eisenhower-Johnson Memorial Tunnels | Clear Creek | \$142,000,000 | 2020-2050 | | CDOT |
| I-25 | Santa Fe Dr. (US-85) to Alameda Ave. | Interchange Capacity | Denver | \$30,000,000 | 2023-2029 | | CDOT |
| Central I-25 Buildout | Colfax Ave. to 20th St. | Ultimate Buildout of Corridor Improvements | Denver | \$420,000,000 | 2040-2044 | ✓ | CDOT |
| I-25 Valley Highway/Burnham Yard | Santa Fe Blvd. to Colfax Ave. | Managed Lanes, Includes ROW, Burnham Yard, Central Main Line Relocation | Denver | \$900,000 | 2045-2050 | ✓ | CDOT |
| Federal Boulevard | 6th Ave. to Howard Pl. | Widen from 5 to 6 Lanes | Denver | \$0 | 2020-2022 | | CDOT |
| I-70 | I-25 to Chambers Rd. | Add 2 New Managed Lanes | Denver/Adams | \$0 | 2020-2022 | ✓ | CDOT / DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|--------|--|---|-----------|--------------|-----------|---|------|
| I-25 | El Paso County Line to North of Crystal Valley Parkway | Add 1 Toll/Managed Lane each Direction | Douglas | \$0 | 2020-2022 | ✓ | CDOT |
| US-85 | Louviers to MP 191.75 | Widen from 2 to 4 Lanes | Douglas | \$0 | 2020-2022 | ✓ | CDOT |
| US-85 | Sedalia to Daniels Park | Widen from 2 to 4 Lanes | Douglas | \$35,000,000 | 2023-2029 | ✓ | CDOT |
| US-85 | Daniels Park to Meadows | Widen from 2 to 4 Lanes | Douglas | \$32,000,000 | 2023-2029 | ✓ | CDOT |
| US-6 | Wadsworth Blvd. | Interchange Capacity | Jefferson | \$80,000,000 | 2023-2029 | ✓ | CDOT |
| US-285 | Pine Valley Rd. (CR 126)/Mt Evans Blvd. | New Interchange | Jefferson | \$40,000,000 | 2030-2039 | | CDOT |
| US-285 | Kings Valley Dr. | New Interchange | Jefferson | \$15,000,000 | 2023-2029 | | CDOT |
| US-285 | Kings Valley Dr. to | Widen from 3 to 4 Lanes (Add 1 SB Lane) | Jefferson | \$25,000,000 | 2023-2029 | | CDOT |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|---|---------------------------------------|---|---------------------|-----------------|-----------|---|-------|
| | Richmond Hill Rd. | | | | | | |
| US-285 | Shaffers Crossing to Kings Valley Dr. | Widen from 3 to 4 Lanes (Add 1 SB Lane) | Jefferson | \$60,000,000 | 2023-2029 | | CDOT |
| US-285 | Parker Ave. | New Interchange | Jefferson | \$25,000,000 | 2030-2039 | | CDOT |
| I-70 Kipling Interchange Reconstruction | Kipling | Interchange Reconstruction and Pedestrian Connections | Jefferson | \$80,000,000 | 2045-2050 | | CDOT |
| C-470 | US-285/Morrison/Quincy | Interchange Complex Reconstruction | Jefferson | \$150,000,000 | 2030-2039 | | CDOT |
| C-470 | Wadsworth to I-70 | New Managed Lanes | Jefferson | \$410,000,000 | 2030-2039 | | CDOT |
| I-25 North (Segment 5) | SH-66 to WCR 38 (DRCOG Boundary) | Add 1 Toll/Managed Lane each Direction | Weld | \$175,000,000 | 2023-2029 | | CDOT |
| | | | CDOT Projects Total | \$4,351,900,000 | | | |
| Denver Regional Council of Governments (DRCOG) Administered Multimodal Capital Projects | | | | | | | |
| TIP Set-Asides | Varies | Investment in Transportation Demand | DRCOG Region | \$372,862,551 | 2020-2050 | ✓ | DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

| | | | Management, Air Quality, Operations and Technology, and Human Services Transportation | | | | |
|-------------------------|------------------------------|---|---|--------------|-----------|---|--------|
| 88th Ave. | I-76 NB Ramps to SH-2 | Widen from 2 to 4 Lanes | Adams | \$21,500,000 | 2020-2022 | ✓ | DRCO G |
| 104th Ave. | Colorado Blvd. to McKay Rd. | Widen from 2 to 4 Lanes | Adams | \$8,100,000 | 2020-2022 | ✓ | DRCO G |
| SH-7 | 164th Ave. to Dahlia St. | Widen from 2 to 4 Lanes | Adams | \$24,000,000 | 2020-2022 | ✓ | DRCO G |
| 120th Avenue | US-85 to E-470 | Widen to 4 Lanes | Adams | \$24,000,000 | 2023-2029 | | DRCO G |
| I-25 North Improvements | 104th Ave. to 120th Avenue | Shoulders; General Purpose Lanes; Bridge | Adams | \$70,000,000 | 2045-2050 | | DRCO G |
| I-225/Yosemite | DTC Blvd. to I-25 on ramp | Interchange and Ramp Reconstruction | Arapahoe | \$60,000,000 | 2023-2029 | | DRCO G |
| Smoky Hill Road | Buckley Road to Picadilly St | Widen from 4 to 6 Lanes | Arapahoe | \$10,000,000 | 2040-2044 | | DRCO G |
| Gun Club Rd. | State Highway 30 to 6th Ave | Widen from 2 to 4/6 Lanes, Includes Stream Crossing Upgrade at Coal Creek | Arapahoe | \$32,000,000 | 2030-2039 | | DRCO G |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|--|---|---|------------|---------------|-----------|---|--------------------|
| Gun Club Rd. | Quincy to Aurora Pkwy. | Widen from 2 to 6 Lanes | Arapahoe | \$15,000,000 | 2023-2029 | | DRCOG |
| Broncos Parkway/Easter/Dry Creek Corridor Improvements | Parker Road to Havana | Widening to 6 Lanes, Bridge Widening, and Intersection Improvements | Arapahoe | \$35,000,000 | 2040-2044 | | DRCOG |
| SH-30 | Airport Blvd. to Quincy Ave. | Widen from 2 to 6 Lanes | Arapahoe | \$175,000,000 | 2030-2039 | | DRCOG, CDOT, Local |
| US-85 (Santa Fe) Improvements | C-470 to Bowles | Corridor Planning/Investment for Multimodal Mobility, Operations, and Safety | Arapahoe | \$150,000,000 | 2040-2044 | ✓ | DRCOG, CDOT |
| SH 66 | US-287/Main Street to East County Line Road | Capacity, Operations, and Bicycle/Pedestrian | Boulder | \$15,000,000 | 2030-2039 | | DRCOG |
| US 287/120th Ave. | Midway Blvd. to Lowell Blvd. | Improve circulation, safety, active transportation access, business access, congestion and transit operations | Broomfield | \$15,000,000 | 2023-2029 | ✓ | DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|------------------------------|--|--|---------|---------------|-----------|---|--------------|
| I-25 | Broadway | Interchange Capacity | Denver | \$50,000,000 | 2020-2022 | ✓ | DRCOG |
| Martin Luther King Jr. Blvd. | Havana St./Iola St. to Peoria St. | Widen 2 to 4 Lanes; New 4 Lane Road | Denver | \$0 | 2020-2022 | ✓ | DRCOG |
| Pena Boulevard | I-70 to 64th Avenue | Add one managed lane in each direction | Denver | \$139,000,000 | 2030-2039 | | DRCOG, Local |
| Pena Boulevard | 64th Avenue to E-470 | Add one managed lane in each direction | Denver | \$124,000,000 | 2030-2039 | | DRCOG, Local |
| County Line Rd. | Phillips St. to University Blvd. | Widen from 2 to 4 Lanes | Douglas | \$9,500,000 | 2020-2022 | ✓ | DRCOG |
| I-25 | Lincoln Ave. | Interchange Capacity | Douglas | \$49,400,000 | 2020-2022 | ✓ | DRCOG |
| Ridgegate Pkwy. | Havana St. to Lone Tree E. City Limit | Widen from 2 to 4 Lanes | Douglas | \$0 | 2020-2022 | ✓ | DRCOG |
| US-85 | Highlands Ranch Pkwy. to n/o County Line Rd. | Widen from 4 to 6 Lanes | Douglas | \$0 | 2020-2022 | ✓ | DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|-----------------|-------------------------------|--|-----------|---------------|-----------|---|--------------|
| I-25 | Crystal Valley Pkwy. | New Interchange & South Frontage Road | Douglas | \$80,000,000 | 2023-2029 | ✓ | DRCOG, Local |
| I-25 | Happy Canyon Rd. | Interchange Reconstruction | Douglas | \$30,000,000 | 2023-2029 | | DRCOG, Local |
| Lincoln Ave. | Oswego to Keystone | Widen 4 to 6 lanes | Douglas | \$24,000,000 | 2030-2039 | | DRCOG, Local |
| I-25 | Meadows/Founders | Interchange Reconstruction | Douglas | \$50,000,000 | 2045-2050 | | DRCOG, Local |
| Wadsworth Blvd. | 35th Ave. to 48th Ave. | Widen from 4 to 6 Lanes | Jefferson | \$31,000,000 | 2020-2022 | ✓ | DRCOG |
| SH-93 | SH-58 to SH-170 | Widen to 4 Lanes and Safety/Transit Improvements | Jefferson | \$200,000,000 | 2030-2039 | | DRCOG |
| US-6 | Heritage Rd. | New Interchange | Jefferson | \$30,000,000 | 2023-2029 | ✓ | DRCOG |
| Indiana (SH-72) | W. 80th Ave. to W. 86th Pkwy. | Widen to 4 Lanes | Jefferson | \$39,000,000 | 2030-2039 | | DRCOG |
| Kipling St. | Kentucky Ave. to I-70 | Multimodal Corridor Improvements | Jefferson | \$250,000,000 | 2040-2044 | | DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|---|--|---|------------------------------------|----------------------|-----------------|--------------------|
| Wadsworth Blvd. | 17th Ave. to 35th Ave. | Multimodal Corridor Improvements | Jefferson | \$60,000,000 | 2040-2044 | DRCOG |
| SH-66 | WCR 1 - WCR 19 | Widen 2 to 4 Lanes, Pedestrian Improvements | Weld | \$35,000,000 | 2045-2050 | DRCOG |
| SH-52 | WCR 1 - WCR 13 | PEL Outcomes - Safety, Operational, and Multimodal Improvements | Weld | \$20,000,000 | 2045-2050 | DRCOG |
| | | | | DRCOG Projects Total | \$2,248,362,551 | |
| Regional Transportation District (RTD) Administered Multimodal Capital Projects | | | | | | |
| Northwest Rail | Westminster Station to Downtown Longmont | Implement Peak Period Service Plan | Adams/Boulder/Broomfield/Jefferson | \$700,000,000 | 2045-2050 | RTD |
| | | | | RTD Projects Total | \$700,000,000 | |
| Regional Bus Rapid Transit (BRT) Projects | | | | | | |
| Colfax Ave. BRT | Lincoln St. to I-225 | BRT Service and Supporting Safety/Multimodal Improvements | Adams/Arapahoe/Denver | \$250,000,000 | 2023-2029 | CDOT, DRCOG, 53019 |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|---------------------------|--|---|---------------------------|---------------|-----------|---------------------------------------|
| | | | | | | -CIG, Local |
| Colfax Ave. Extension BRT | I-225 to E-470 | BRT Service and Supporting Safety/Multimodal Improvements | Adams/Arapahoe | \$100,000,000 | 2040-2044 | DRCOG, CDOT, Local |
| SH-119 BRT | Downtown Boulder to I-25/SH-119 Mobility Hub | BRT Service and Supporting Safety/Multimodal Improvements | Boulder/Weld | \$350,000,000 | 2030-2039 | CDOT, DRCOG, RTD, Local |
| Colorado Blvd. BRT | University of Colorado A Line to I-25 | BRT Service and Supporting Safety/Multimodal Improvements | Denver | \$35,000,000 | 2023-2029 | DRCOG, CDOT, 5309-CIG, Local |
| Alameda BRT | Wadsworth to R-Line | BRT Service and Supporting Safety/Multimodal Improvements | Arapahoe/Denver/Jefferson | \$61,000,000 | 2030-2039 | DRCOG, CDOT, 5309-CIG, Local |
| Broadway/Lincoln BRT | Colfax to Highlands Ranch Pkwy | BRT Service and Supporting Safety/Multimodal Improvements | Arapahoe/Denver/Douglas | \$61,000,000 | 2040-2044 | DRCOG, 5309-CIG, Local |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|------------------------------|-----------------------------------|---|-----------------------------|---------------------------|------------------------|------------------------------|
| 38th/Park BRT | Wadsworth to Colfax | BRT Service and Supporting Safety/Multimodal Improvements | Denver/Jefferson | \$40,000,000 | 2045-2050 | DRCOG |
| Speer/Leetsdale/Parker BRT | Colfax to I-225 | BRT Service and Supporting Safety/Multimodal Improvements | Arapahoe/Denver | \$95,000,000 | 2030-2039 | DRCOG, CDOT |
| Federal Blvd. BRT | 120th to Santa Fe/Dartmouth | BRT Service and Supporting Safety/Multimodal Improvements | Adams/Denver | \$94,000,000 | 2030-2039 | DRCOG, CDOT, 5309-CIG, Local |
| North I-25 BRT | Union Station to SH-119 | BRT Service and Supporting Safety/Multimodal Improvements | Adams/Bromfield/Denver/Weld | \$97,000,000 | 2045-2050 | DRCOG, CDOT, 5309-CIG, Local |
| New Bus Maintenance Facility | TBD-northern area of RTD District | Construction of a new bus maintenance facility in the RTD's northern area | TBD | \$50,000,000 | 2023-2029 | DRCOG |
| | | | | Regional BRT Total | \$1,233,000,000 | |

Corridor Transit Planning Projects and Programs

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|---|---|--|--------------------------|---------------|-----------|---|------------------|
| Regional Mobility Hubs | Varies | Construction of Multimodal Mobility Hubs | DRCOG Region | \$200,137,636 | 2020-2050 | | CDOT, DRCOG, RTD |
| South Boulder Rd. | Lafayette to Boulder | Multimodal Corridor Improvements | Boulder | \$75,000,000 | 2040-2044 | | DRCOG |
| SH-7 | Boulder to Brighton | Multimodal Corridor Improvements | Adams/Boulder/Broomfield | \$100,000,000 | 2030-2039 | ✓ | CDOT |
| US-287 | US-36 to Larimer County Line | Safety, Operational, and Multimodal Improvements | Boulder/Broomfield | \$200,000,000 | 2030-2039 | | CDOT, DRCOG |
| West Colfax | Sheridan to Broadway /Lincoln | Transit Corridor and Supporting Safety/Multimodal Improvements | Denver | \$26,573,077 | 2045-2050 | | DRCOG |
| RidgeGate Parkway Transit Mobility Corridor | Mainstreet in Parker to Lone Tree City Center RTD station | Transit Corridor | Douglas | \$100,000,000 | 2045-2050 | | DRCOG |
| Castle Pines Transit Mobility Corridor | Castle Pines to RidgeGate RTD station | Transit Corridor | Douglas | \$20,000,000 | 2030-2039 | | DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|--|--|--|---------------------------------|---------------|-----------|---|-------|
| Golden/Mines Autonomous Circulator | Downtown Golden, School of Mines, RTD W Line | Autonomous Circulator | Jefferson | \$3,500,000 | 2023-2029 | | DRCOG |
| | | | Transit Corridor Planning Total | \$725,210,713 | | | |
| Arterial Safety/Regional Vision Zero Projects and Programs | | | | | | | |
| Arterial Safety/Regional Vision Zero Set-Aside | High Injury Network and Critical Corridors identified in the Taking Action on Regional Vision Zero | Vision Zero and Safety Improvements | DRCOG Region | \$151,672,902 | 2020-2050 | ✓ | DRCOG |
| Federal Boulevard Multimodal Improvements | 52nd Avenue to 120th Avenue | Bicycle/Pedestrian/Transit Improvements; Turn Lanes; Bus/Business Access Lanes | Adams | \$50,000,000 | 2023-2029 | | DRCOG |
| US-285 Congestion Mitigation Improvements | Knox Ctt/Lowell Blvd. | Speed and Reliability Corridor | Arapahoe/Denver | \$88,200,000 | 2023-2029 | ✓ | DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|---------------------------------|------------------------------------|---|------------------|--------------|-----------|---|-------------|
| | (west) to Havana (east) | & Vision Zero Improvements | | | | | |
| US-36 | Boulder to Lyons | Corridor Safety Improvements | Boulder | \$20,000,000 | 2020-2022 | | DRCOG |
| US-36/28th St. & SH-93/Broadway | US-36/28th St. & SH-93/Broadway | Corridor Safety Improvements | Boulder | \$15,200,000 | 2030-2039 | | CDOT |
| SH-42 | Louisville and Lafayette | Safety and Operational Improvements | Boulder | \$50,000,000 | 2030-2039 | ✓ | CDOT, DRCOG |
| West Mississippi Avenue | South Federal Blvd. to S. Broadway | Vision Zero and Pedestrian Improvements | Denver | \$18,600,000 | 2020-2022 | ✓ | DRCOG |
| Brighton Boulevard | Race to York | Reconstruction, Vision Zero, Safety, and Freight Improvements | Denver | \$19,762,500 | 2045-2050 | | DRCOG |
| Chambers Rd | E 56th Ave to E 40th Ave | Vision Zero Corridor Improvements | Denver | \$16,712,500 | 2023-2029 | | DRCOG |
| Sheridan Safety Improvements | 52nd to Hampden | Vision Zero Corridor Improvements | Denver/Jefferson | \$17,100,000 | 2023-2029 | | DRCOG |
| Colfax Safety Improvements | Wadsworth to Sheridan | Multimodal Arterial Safety | Jefferson | \$12,000,000 | 2020-2022 | ✓ | DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|---|---|-------------------------------------|--|---------------|-----------|---------|
| US-85 Operational & Safety Improvements | Weld CR 2 to Weld CR 10 | Safety and Operational Improvements | Weld | \$6,100,000 | 2023-2029 | CDOT |
| | | | Arterial Safety/Regional Vision Zero Total | \$465,347,902 | | |
| Active Transportation Projects and Programs | | | | | | |
| Active Transportation Set-Aside | Short-Trip Opportunity Zones identified in the Active Transportation Plan | Bicycle and Pedestrian Improvements | DRCOG Region | \$31,598,521 | 2020-2050 | DRCOG |
| Smith Road Bicycle/Pedestrian Facilities | Peoria Street to Powhaton Road | New Multi-Use Path | Adams | \$4,000,000 | 2020-2022 | DRCOG |
| RTD Rail Trail | Boulder to Erie | Regional Trail | Boulder | \$6,000,000 | 2020-2022 | DRCOG |
| St. Vrain Greenway | Longmont to Lyons | Regional Trail | Boulder | \$4,000,000 | 2020-2022 | ✓ DRCOG |
| McCaslin Regional Trail | Rock Creeky Pkwy. to SH-128 | Regional Trail | Boulder | \$3,000,000 | 2020-2022 | ✓ DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

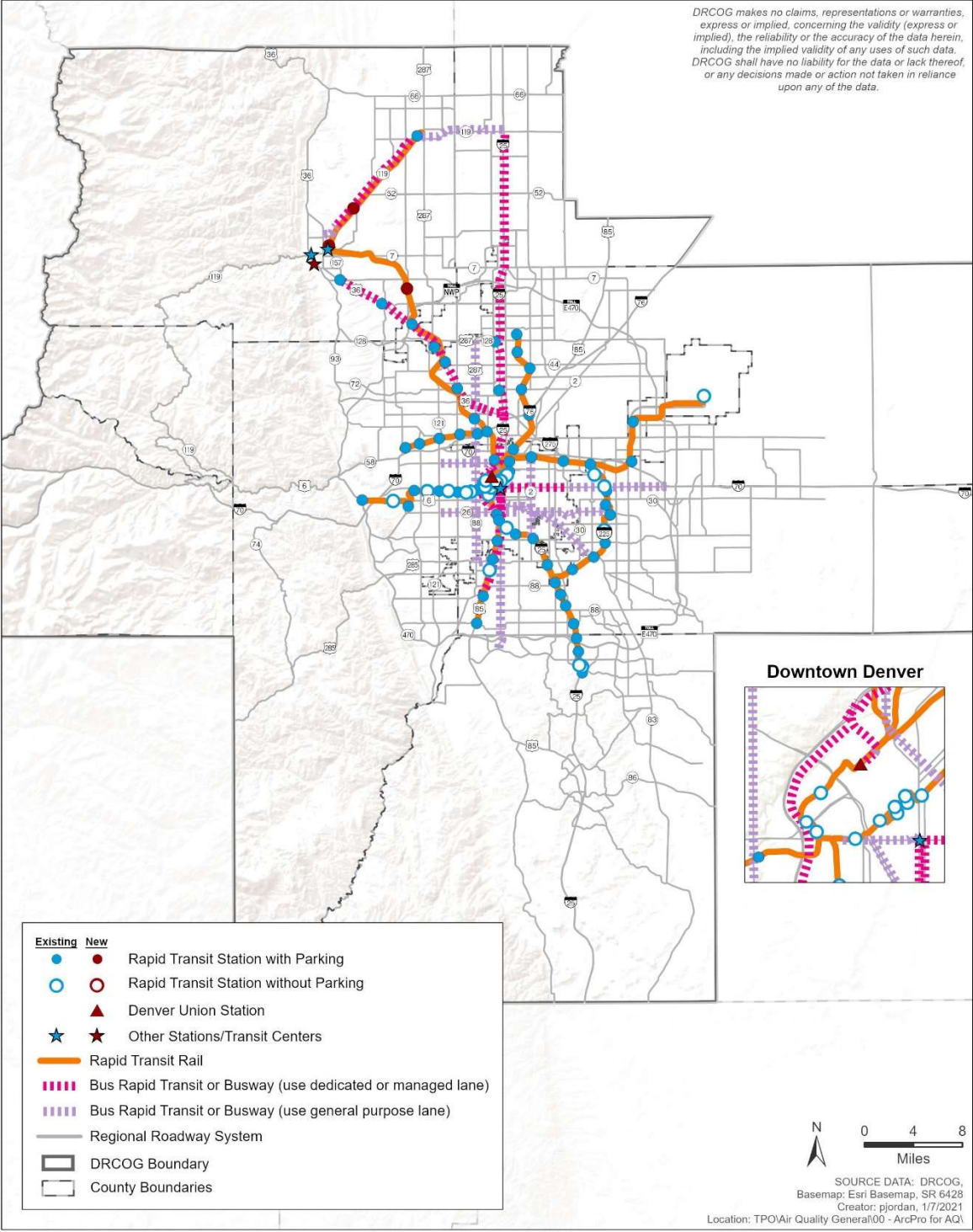
| | | | | | | |
|---------------------------------|--|---|--------------|-----------------------------|---------------|-------|
| Clear Creek Greenway | Jefferson County Line to Loveland Ski Area | Clear Creek Greenway portion of Peaks to Plains trail system | Clear Creek | \$50,000,000 | 2045-2050 | DRCOG |
| S. Platte River Trail | (not specified) | Complete Missing Links and Upgrade Trail Section | Denver | \$50,000,000 | 2030-2039 | DRCOG |
| Bear Creek Trail | (not specified) | Upgrade Trail for Safe Crossings and Consistent Cross Section. Integrate ITS/AI Equipment. | Denver | \$31,200,000 | 2045-2050 | DRCOG |
| | | | | Active Transportation Total | \$179,798,521 | |
| Freight Projects and Programs | | | | | | |
| Freight Set-Aside | Varies | Freight improvements including but not limited to bridge reconstructions, overpasses/underpasses, new bridges | DRCOG Region | \$75,836,451 | 2020-2050 | DRCOG |
| Peoria Street Bridge | Sand Creek | Bridge Reconstruction | Adams | \$19,000,000 | 2020-2022 | DRCOG |
| Alameda Pkwy. Bridge over I-225 | Between Potomac Street and | Bridge reconstruction | Arapahoe | \$20,000,000 | 2020-2022 | DRCOG |

APPENDIX A DRCOG Transportation Network and Project Assumptions

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|--|-----------------------------|---|---------------|------------------|-----------|---|-------|
| | Abilene Street | | | | | | |
| 47th Avenue/48th Avenue | I-25 to Pecos | Bridge Reconstruction, New Multimodal Underpass, and New Bicycle/Pedestrian Bridge. | Denver | \$45,225,000 | 2040-2044 | | DRCOG |
| Ward Rd./BNSF | I-70 FR North and Ridge Rd. | Multimodal Grade Separation | Jefferson | \$60,000,000 | 2023-2029 | ✓ | DRCOG |
| | | | Freight Total | \$220,061,451 | | | |
| Note: Projects with \$0 cost have funds fully obligated prior to fiscal year 2020. | | | Grand Total | \$10,123,681,138 | | | |

2050 Fiscally Constrained Rapid Transit System Guideway Facilities and Stations

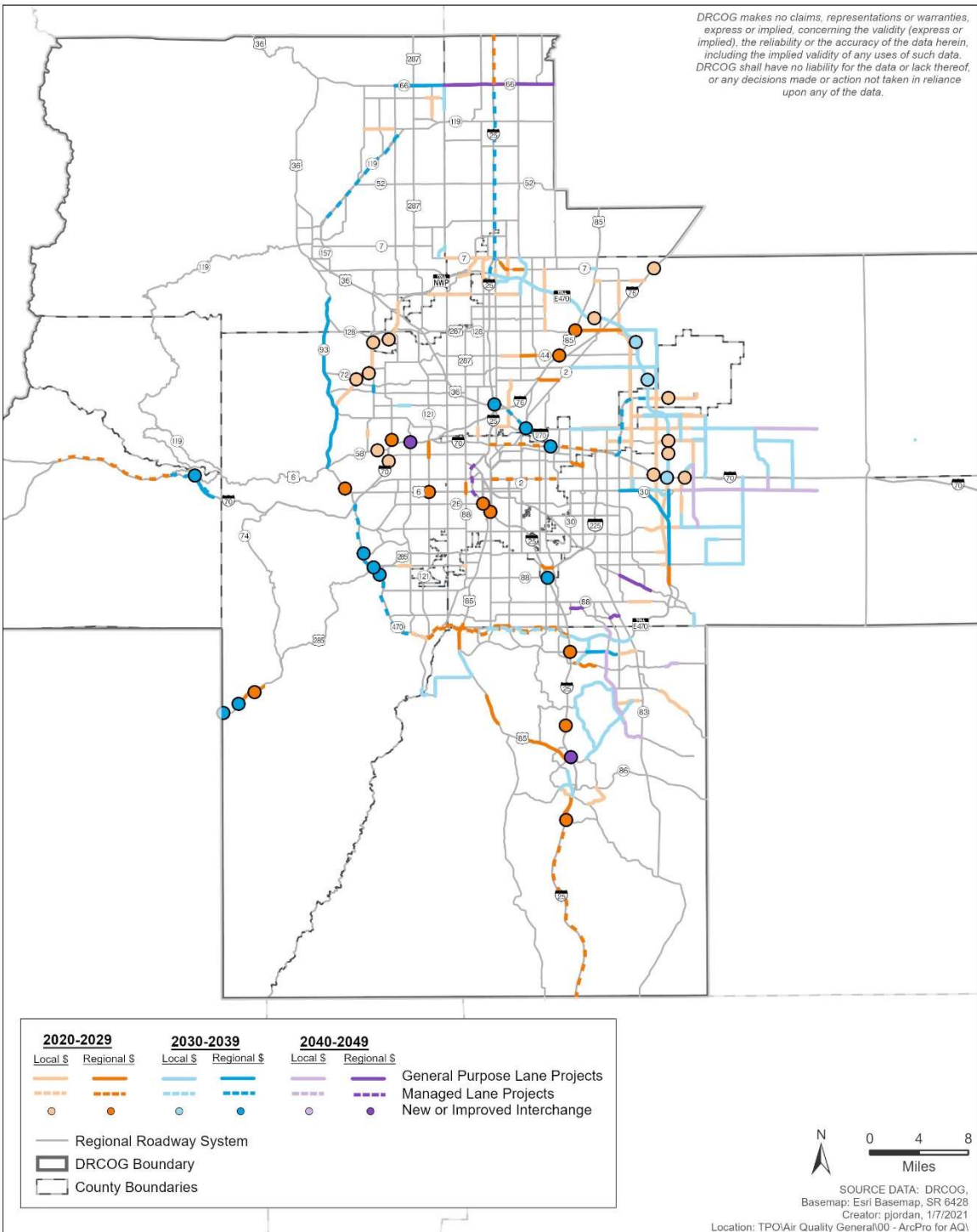
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2050 Staging of Fiscally Constrained Roadway Capacity Projects



DRCOG makes no claims, representations or warranties, express or implied, concerning the validity (express or implied), the reliability or the accuracy of the data herein, including the implied validity of any uses of such data. DRCOG shall have no liability for the data or lack thereof, or any decisions made or action not taken in reliance upon any of the data.



Appendix B. Summary of Transportation Model Calibration and Validation for the 2050 MVRTP, January 7, 2021

Introduction

In support of the conformity determination for the 2050 Metro Vision Regional Transportation Plan, the Denver Regional Council of Governments' maintains the Regional UrbanSim Socio-economic Model and the *Focus* regional travel modeling system.

The *Focus* travel demand model simulates the millions of trips made throughout the region on a typical weekday. The *Focus* model sums all travel to forecast how many vehicles will be driven on major roads; travel speed and delay; and how many people will walk, ride a bicycle or use transit to get to where they want to go. To realistically simulate each person's daily household travel, *Focus* models the many choices each person makes, through the activity based model (ABM) components 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, and for what purposes
- (5) which trips are chained together into home-to-home tours
- (6) the location where each individual trip begins and ends
- (7) the travel mode used for each trip
- (8) which roadways or bus routes were chosen to reach each destination

In addition to the ABM components for household travel, *Focus* also incorporates three add-on gravity models for:

- Commercial Vehicle trips – by light, medium, and heavy duty vehicles
- External Station trips – starting or ending outside the DRCOG modeling area
- Denver International Airport (DIA) trips – for trips not captured by the ABM components

An UrbanSim model is used to forecast household and employment levels by small-area transportation analysis zones (TAZs) over time. The *Focus* model takes into account many characteristics of people, such as their age, gender, employment status, and income; and how the region will change

demographically over time. It also takes into account characteristics of the built environment such as transit stops and stations, household and employment density, bicycling facilities and walkability.

The *Focus* travel model creates an origin and destination for each trip. Specific groupings of “O&Ds” were initially estimated based on detailed data from a 1998 survey called the Travel Behavior Inventory.

In 2016, *Focus* was recalibrated using more recent data sources including roadway counts, transit boardings, American Community Survey Census data, and results from the following surveys:

- RTD's 2008 Regional On-Board Transit Survey – a questionnaire handed out to light rail and bus travelers to understand how transit travel patterns have changed since the opening of the Southeast Corridor Light Rail in November 2006. The survey contains information on almost 24,000 transit trips.
- The 2010 Front Range Travel Counts Household Survey – A survey of over 12,000 households along the Colorado Front Range, including 7,000 in the DRCOG region, using a format similar to the 1997 Travel Behavior Inventory described above.

In 2020, further refinements were made to the *Focus* model based on additional results of the 2010 Front Range Travel Counts Survey, the 2016 Commercial Vehicle Survey and RTD's updated 2018 Regional On-Board Survey.

The final trip assignment outputs of *Focus* were validated against traffic counts, operating travel speed observations, and RTD ridership data to make sure the overall regional travel patterns being forecasted were reasonable.

Regional Socioeconomic Forecasts

DRCOG uses county-level forecasts of population, households and employment produced by the Colorado State Demography Office as the basis for future growth in the *Focus* model.

Small Area Development Estimates

To provide household and employment 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 within the UrbanSim model based on the

dynamics of urban land markets and the simulated decisions of land developers, and residential and commercial land customers. The UrbanSim model considers questions such as:

- What parcels of land are profitable for development, and for what uses?
- Where should a firm locate to conduct its business in accordance with zoning regulations, and with suitable access to workers, supplies, and finished product markets?
- Does a family's current residence continue to meet its needs and be convenient to jobs, schools, and other activities, or should the family move to a “better” location?
- What size and types of residence does a family need based on the number and ages of its members and its household income?
- Where are designated open spaces, parks, and other undevelopable lands located?

The UrbanSim model outputs are used in a population synthesizer that creates a descriptive database record for each household in the region (about 1.3 million records for 2020) and each person (about 3.3 million records in 2020). Figure 2 shows a flowchart for the process of socioeconomic forecasting in the Denver region.

Figure 1. DRCOG Travel Analysis Zones

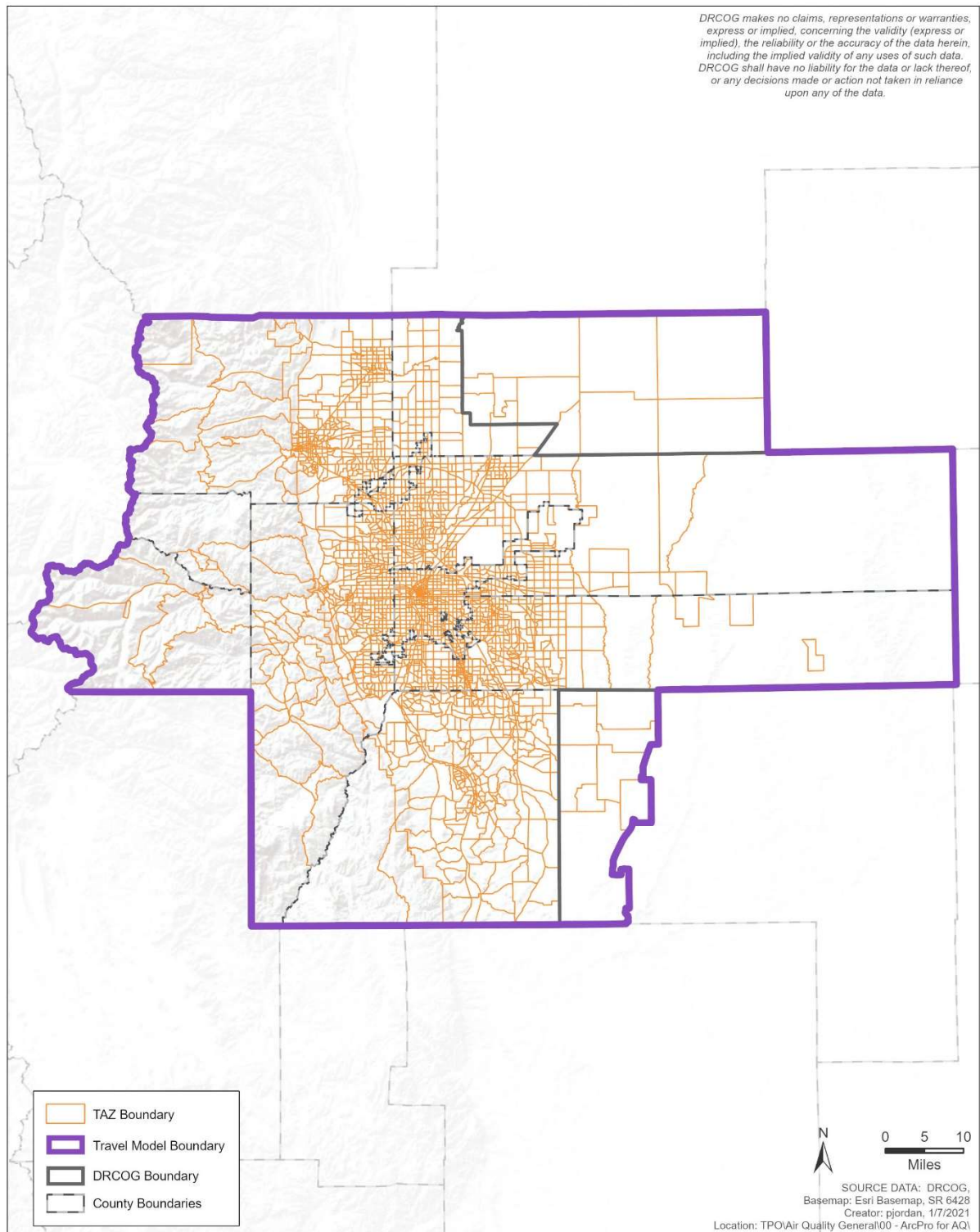
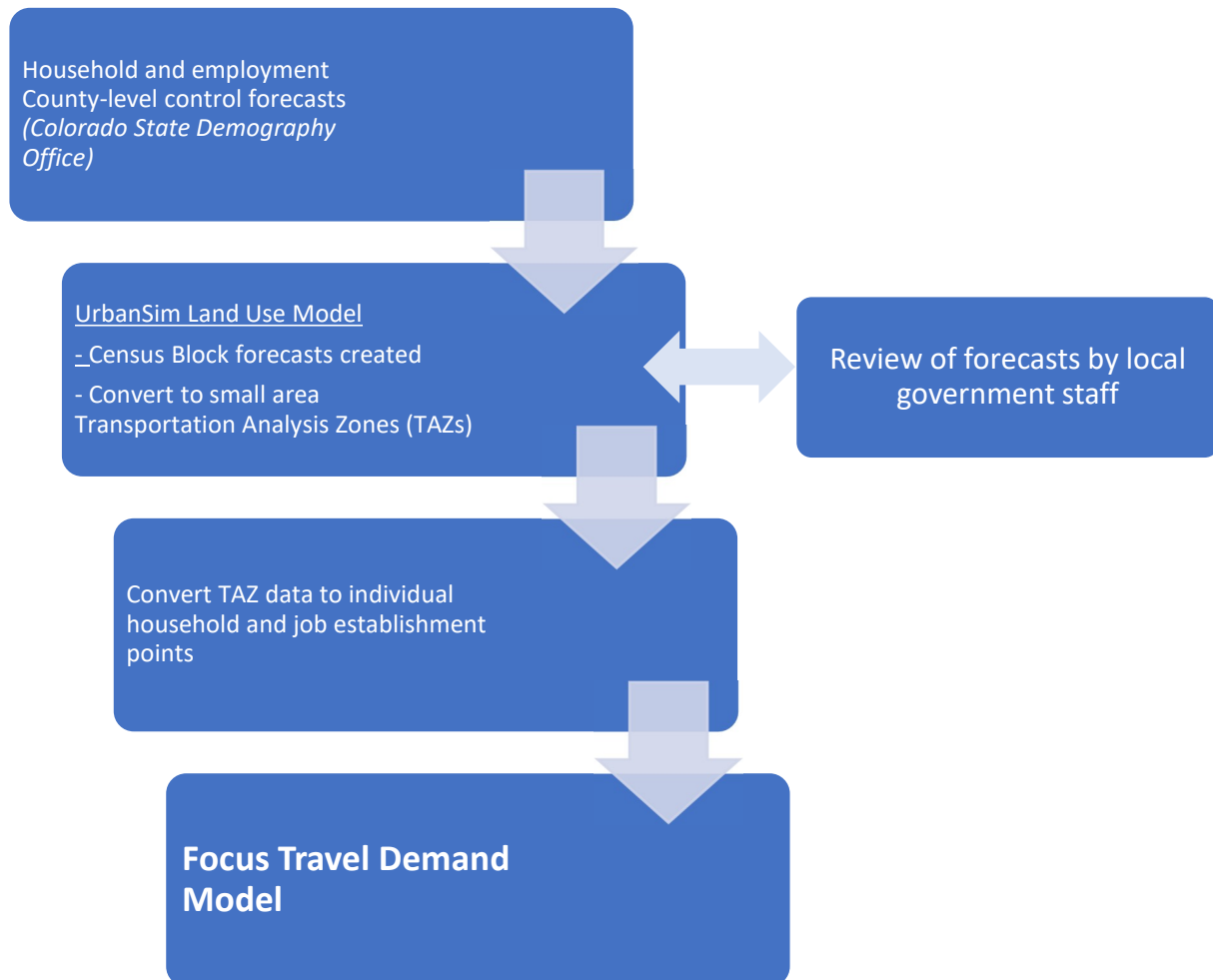


Figure 2
Socioeconomic Model Elements and Flow



Focus Model Process Overview

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

First, travel time and cost information between zones are calculated by travel mode and time of day. Tours are the first travel elements to be created. Figure 4 shows a diagram depicting an example set of tours for a person in one day, including intermediate stops.

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

Figure 3
Focus Activity Based Model Elements

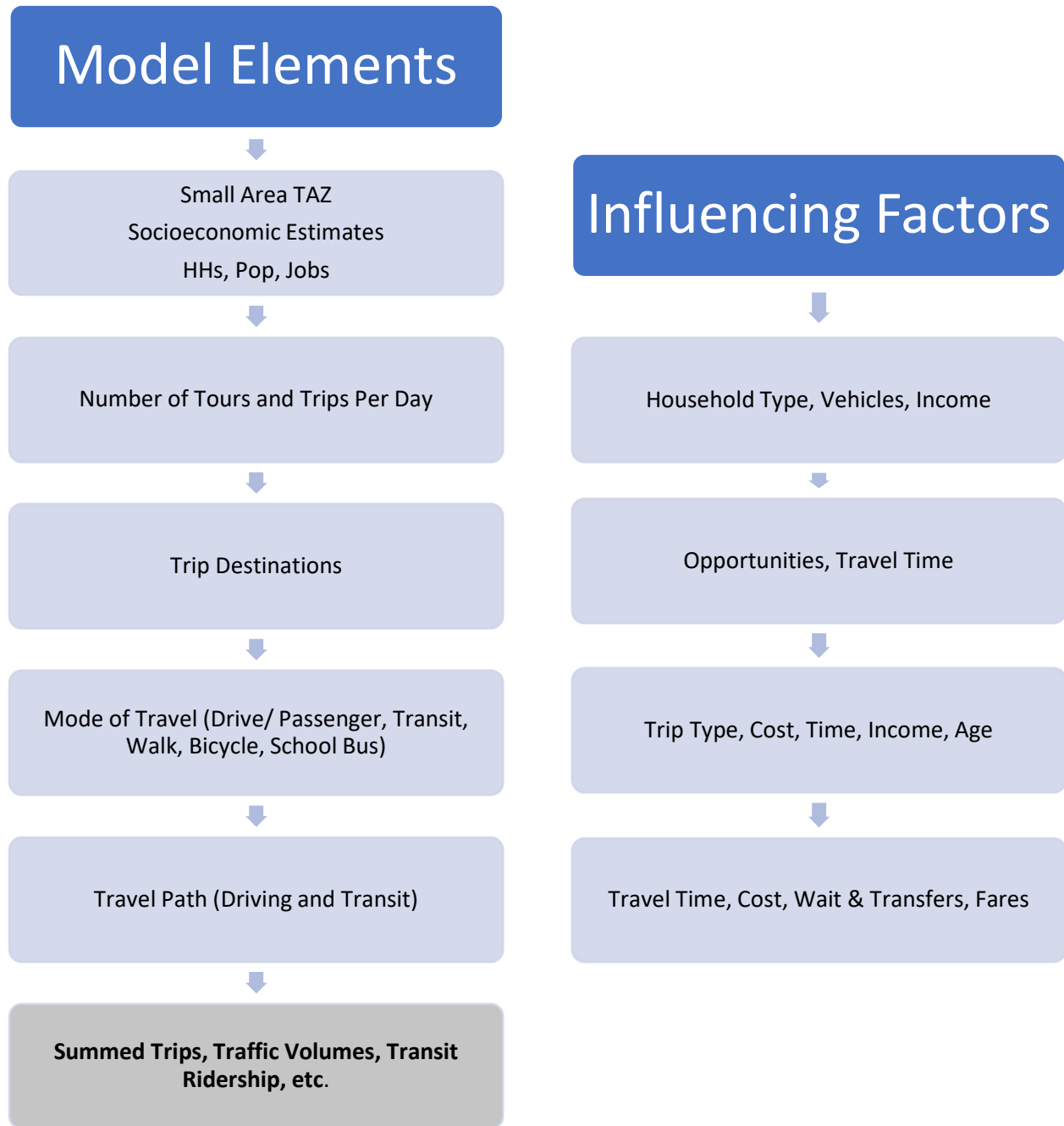
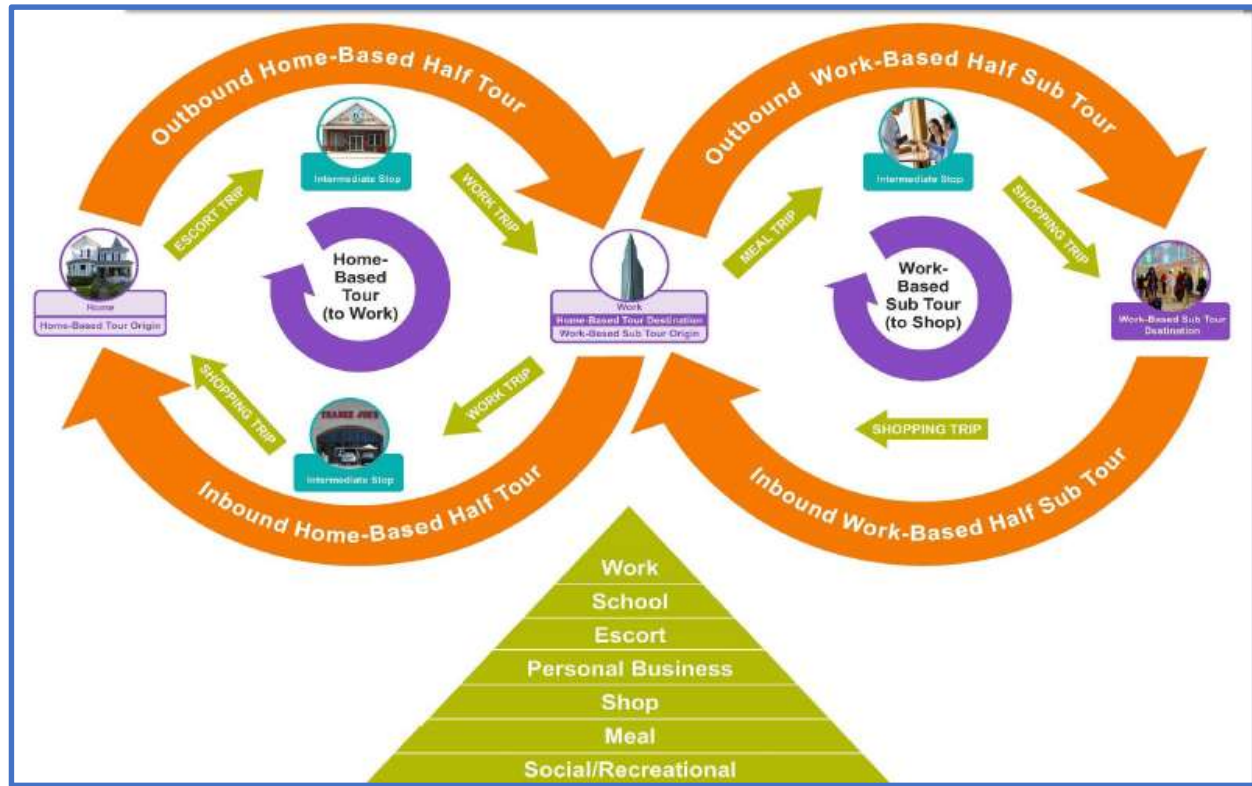


Figure 4
Sample Tour Diagram



Roadway and Transit System

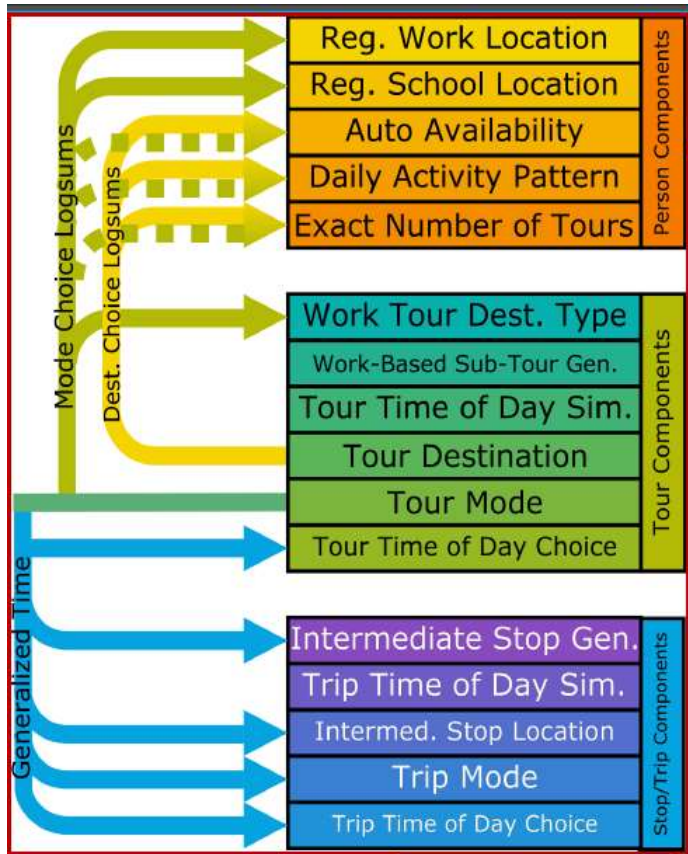
One of the most critical components is the transportation network representation. The roadway network is represented by over 25,000 directional road segments, described by location, length, number of lanes, functional classification, and area type. High-occupancy vehicle (HOV) and managed lanes also are represented as special links. Tollway links are assessed an additional cost 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, stations, and walk access/egress routes. Bus routes follow the same roadway network as auto trips, and bus travel speeds are based on auto speeds. Overall transit travel time also includes access, wait, and transfer time. 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 most convenient overall transit path to their destination. As part of the process of estimating roadway and transit use, minimum impedance paths are calculated using time, distance and toll cost over the roadway and HOV system, and time and cost over the transit system.

Model Components

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

Table 1. Key Focus Model Components
(Activity Based Model components in red)

| | |
|---|---|
| 1. TransCAD Initialization | 14. Tour Time of Day Simulation |
| 2. Size Sum Variable Calculator | 15. Tour Primary Destination Choice |
| 3. TransCAD Trip Generation | 16. Tour Priority Assignment |
| 4. TransCAD Skimming (Path Selection) | 17. Tour Main Mode Choice |
| 5. TransCAD Airport, Commercial Vehicle, and External Travel Distribution and Mode Choice | 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 | |



Roadway and Transit Skims (Path Selection)

Representative roadway and transit paths are initially used for all origin-destination zone pairs (2,800 x 2,800) and each of the ten time-of-day periods. The paths consider travel time, travel cost, and other factors. The time and cost TAZ-to-TAZ matrices are used extensively in later model components such as location choice, mode choice, and time of day choice.

Denver International Airport/Commercial Vehicle/Internal-External/ External-External Trips

After optimal paths are identified via the skims, all Compass model components must be run to generate and assign airport trips, internal-external trips, commercial vehicle trips, and external-external trips.

Regular Workplace and School Location

The work location choice model takes all regional workers and assigns them a regular work location TAZ and point. Characteristics of the worker and their home TAZ are used in combination with TAZ characteristics to determine the desirability of any TAZ.

The regular school location choice model assigns each student a regular school location TAZ and school. The model uses information about the student, such as income and age, and information on school enrollment and distance from home to determine which schools will be attractive for 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 has 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 such as income 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 availability, it forecasts daily activities on a tour-level.

The ***day activity pattern*** model determines which combinations of up to seven purposes (work, school, escort a family member, personal business, shopping, dining, and social or recreational) a person will make tours or stops along a tour.

The ***exact number of tours*** model determines 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 ***work tour destination type*** model determines whether a person making a work tour will travel to his or her usual work location, or somewhere else, perhaps to meet with clients or customers, or for off-site training. If the regular workplace is selected, this information is entered into the tours table in the database.

Work-based subtour generation determines whether someone will leave their regular workplace and return during the middle of the day. Such a person may be eating out, running errands, or attending

meetings, for example. After this point, the *Focus* model treats work-based subtrips similarly to home-based ones.

In reality, a person might consider the interactions of destination, mode, and departure time choices together in creating an itinerary for the day's travel and activities. Despite its complexity, the *Focus* model needs to have some simplifying assumptions to make its mathematical relationships and software workable. ***Tour time of day simulation*** is one such simplification, allowing destination and mode choices to be modeled as if the time of travel is known (so the right time and cost matrices can be used) as an initial guess. The simulated times of days are based on observed survey distributions. The later ***tour time of day choice*** confirms whether the initially simulated time of day was reasonable, or whether a shift earlier or later might be justified.

The ***tour primary destination choice*** model selects the destination of tour based the development (e.g., jobs and households) located within the zone. It then 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 such as density, travel mode facilities, and demographic person characteristics. The tour main mode is used for most of the distance of the tour, but not necessarily for all trips. For example, if a parent is driving a child to school, the return trip would necessarily be driving alone. In other cases, stops along a tour might be close enough that walking or bicycling would be more attractive than a motorized tour mode. The tour and trip modes are related by rules of precedence used to simplify the *Focus* model.

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 one 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 determines the number of intermediate stops on each tour (if any).

As with the tour models, there is a ***trip time of day simulation*** component to simplify the location and mode choices that are modeled next.

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 mode of travel for all trips. The tour mode is used in combination with skim data, zonal data, and person data to determine the modes for each trip on these tours.

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

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

- Origin and Destination Zone and Point Location
- Trip Purpose (work, school, escort, personal business, shop, social recreation)

- Trip Mode (drive alone, shared ride 2, shared ride 3+, walk to transit, drive to transit, walk, bicycle, school bus)
- Trip Time of Day (one of 24 hours)
- Which tour the trip is part of
- What person made the trip
- What household the person who made the trip belongs

The ***write trips to TransCAD*** component assembles the individual records for auto and transit trips into origin-destination trip tables (matrices) that TransCAD can use for assignment. These trip tables are then combined with those developed for DIA, commercial vehicle, internal-external, external-internal, and external-external trips developed earlier.

Network Assignment

Household vehicle, airport trips, internal-external trips, commercial vehicle trips, and external-external trips are assigned to the roadway network via a “user equilibrium” algorithm. The user equilibrium process assigns the trips between each origin and each destination TAZ in such a way that, by the end of the process, no trip can reduce its travel time by changing its path. The process takes 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). During this process, TransCAD keeps track of which vehicles are eligible to use HOV facilities, and which might need to pay a toll to use High-Occupancy/Toll (HOT) lanes, such as the reversible I-25 Express Lanes north of downtown Denver. 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.

Transit assignment is performed separately, using an all-or-nothing algorithm that does not take into account the possibility that high demand or crowding on some transit routes may motivate some riders to shift to other routes. RTD has special modeling tools that allow them to use *Focus* model forecasts for more detailed operational planning.

Finally, the model is run through several iterations, feeding back the output speeds from roadway assignment to the input stages that require them as input (among them, the trip distribution stage) until the output speeds and the input speeds match closely enough.

Model Calibration and Validation

Each *Focus* model component was originally calibrated to 2010 inputs, comparing the model "forecast" for 2010 to external data sources such as:

- 2010 American Community Survey (ACS) means of travel to work
- 2010 Front Range Travel Counts
- 2010 HPMS estimated regional VMT
- 2019 Regional Transportation District (RTD) transit boardings

Once comparisons were made of model results against the observed datasets, each model component was calibrated. The calibration involved changing the coefficients describing the mathematical models and travel and adding variables. Then the model was re-run, results compared again, and modifications made again. This process was repeated until satisfactory results were achieved.

The major regional level model results of the validation review for 2020 are shown in Table 2 and Table 3. Note the 2020 values actually represent the time and travel patterns prior to the COVID-19 pandemic. These tables demonstrate that the aggregate model results reflect the observed representative counts and transit boardings sufficiently well. When summed over the region, the links with observed traffic counts were observed to carry about 28.0 million vehicles per weekday. The sum of Focus Model estimates was within one percent difference.

Table 2. Sum of 2020 Observed Estimates and Modeled Weekday Counts

| | 2019/20 Observed (Est.) Counts ADT Sum VMT | 2020 Model Results ADT Sum VMT | Model Variation |
|-------------------------------------|---|---|--------------------|
| CDOT Roadways w/Counts | 15,937,900 | 16,100,100 | 1.0% |
| HPMS Roadways w/Counts | 20,619,200 | 20,018,600 | -3.0% |
| HPMS Urbanized Area Network Est. | 67,381,400 | 73,270,000 | 8.0% |
| All Model Links w/Counts | 26,552,800 | 25,824,200 | -2.8% |

Table 3. Observed Estimates and Modeled 2020 Transit Weekday Boardings

| | 2019 Observed (Est.) | 2020 Modeled | Model Variation |
|---------------|-------------------------|-----------------|--------------------|
| RTD Boardings | 340,800 | 340,200 | -0.2% |
| RTD Trips | 237,900 | 222,900 | -6.8% |

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 link speed and VMT results are 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.

Appendix C. Modeling summary table

Table 1 – Denver Regional Council of Governments Assumptions for the Entire Modeling Area and Data for Base and Future Years

| | 2020 | 2050 |
|---|-------------------|--------------------|
| Total Population | 3,408,152 | 4,478,343 |
| Employment | 2,180,587 | 3,000,647 |
| Dwelling Units (Households) | 1,361,781 | 1,882,031 |
| Persons/Dwelling Unit (Household) | 2.50 | 2.38 |
| VMT by Roadway Type | | |
| -Freeway | 34,777,226 | 48,560,516 |
| -Expressway | 5,306,800 | 7,173,836 |
| -Principal | 25,367,941 | 36,412,893 |
| -Minor | 8,533,124 | 12,053,757 |
| -Other (Collectors, Centroid Connectors, Ramps) | 17,388,152 | 26,333,878 |
| Total | 91,373,242 | 130,534,879 |
| Speed by Roadway Type (miles per hour) | | |
| -Freeway | 58.3 | 53.2 |
| -Expressway | 42.7 | 39.1 |
| -Principal | 32.5 | 30.7 |
| -Minor | 29.2 | 27.7 |
| -Other (Collectors, Centroid Connectors, Ramps) | 27.3 | 27.1 |
| Total (Average Speed) | 37.6 | 35.4 |
| Lane Miles by Roadway Type | | |
| -Freeway | 2,190 | 2,478 |
| -Expressway | 542 | 561 |
| -Principal | 4,280 | 5,130 |
| -Minor | 2,895 | 3,126 |
| -Other (Collectors, Ramps) | 6,507 | 6,555 |
| Total | 16,414 | 17,851 |

Appendix D. Memorandum of Agreement – Transportation Conformity Evaluation Conducted Under the 8-Hour Ozone Standard

2015
MEMORANDUM OF AGREEMENT
FOR
TRANSPORTATION CONFORMITY EVALUATIONS

BY AND BETWEEN
THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
AND
THE REGIONAL AIR QUALITY COUNCIL
AND
THE DENVER REGIONAL COUNCIL OF GOVERNMENTS
AND
THE NORTH FRONT RANGE TRANSPORTATION AND
AIR QUALITY PLANNING COUNCIL

PURPOSE

This Memorandum of Agreement (MOA) is established for the purpose of defining the specific roles and responsibilities of the Air Pollution Control Division (APCD) of the Colorado Department of Health and Environment (CDPHE), the Regional Air Quality Council (RAQC), the Denver Regional Council of Governments (DRCOG), and the North Front Range Transportation and Air Quality Planning Council (NFRMPO) for transportation conformity evaluations and modeling for the Denver and North Front Range regions. Hereafter, the above are referenced as “parties,” and DRCOG and NFRMPO are referenced to as the “MPO(s)” (Metropolitan Planning Organization(s)).

Section 176(c) of the Clean Air Act Amendments of 1990 calls for conformity evaluations to be made for transportation plans, programs, and projects, and for these conformity determinations to be developed through an interagency consultation process. Title 23, Part 450 of the Code of Federal Regulations calls for a continuing, cooperative and comprehensive transportation planning process, including provision of complete information, opportunity for early and continuing public involvement, and access to technical and policy information used in developing transportation documents. These federal mandates are best carried out with the explicit understanding of how the state air quality agency and the MPOs will coordinate efforts, especially with regard to transmitting and analyzing data, and identifying key assumptions used in planning documents.

This MOA augments interagency consultation requirements set forth in federal law and Colorado Air Quality Control Commission (AQCC) Regulation Number 10, Section III. The MOA is to be used in conjunction with these federal and state requirements for transportation conformity determinations required under the Clean Air Act. Specifically, this MOA identifies the roles and responsibilities of RAQC, DRCOG, NFRMPO and APCD in conducting conformity evaluations and sets forth a procedural framework to ensure appropriate consultation and coordination between RAQC, DRCOG, NFRMPO and APCD in carrying out these responsibilities. It also clarifies what key assumptions and data are expected in draft documents and materials used in the interagency consultation process.

This MOA supersedes the prior agreements between the parties dated November 19, 1998 (DRCOG and APCD) and November 24, 1998 (NFRMPO and APCD).

CONFORMITY EVALUATIONS RESPONSIBILITIES

Conformity evaluations are conducted in association with new conformity determinations. The evaluations require the modeling and calculation of pollutant emissions.

MPO RESPONSIBILITIES

As defined in Regulation 10, Section III, MPOs are responsible for the development, maintenance, accuracy, and operation of the regional travel demand models which provide input data to the official emissions model. MPOs will notify APCD and RAQC staff once a need for a new conformity determination is identified and a schedule for conformity modeling has been established. The estimated time period over which APCD modeling work would be required will be defined. Any changes in the schedule will be discussed with APCD staff as soon as such changes are known by the MPO. When requesting APCD to model emissions, MPO staff will forward all necessary travel model data, for each staging year that will be modeled. The NFRMPO is responsible for travel modeling in the Ozone Northern Subarea and DRCOG is responsible in the Ozone Southern Subarea, as defined in the March 14, 2008 Memorandum of Agreement.

APCD RESPONSIBILITIES

The APCD is responsible for the development, maintenance, accuracy, and operation of the official emissions model. After receiving travel model inputs to the emissions model, the APCD will inform the parties regarding an estimated schedule for completion of the emissions results. After the APCD performs emissions modeling, it will provide the parties with the emission model output results as soon as possible.

RAQC RESPONSIBILITIES

The RAQC shall review travel and emissions modeling inputs and outputs and provide comments to the parties. The RAQC will provide technical support and advice regarding model modifications.

MODEL MODIFICATIONS AND CORRECTIONS

Once travel and emission models have been established, modifications and updates to those models by the APCD or MPO may occur for some of the following reasons: updated models, updated input information, such as fleet mix or travel demand model changes, or other issues that are discovered.

If a modification or correction is required in the travel or emissions model, the following steps should be led by the agency making the identification:

- Identify all affected parties and potential work items
- Notify the affected parties and provide an initial explanation
- If needed, call a meeting to review and explain the issue to all parties
- Establish timeline and assigned duties for implementing the modification or correction
- Obtain concurrence and approval for the process for implementation from all parties
- Ensure that the APCD or MPO updates the model with the new information for use with the next applicable conformity cycle
- Share and/or discuss model results with all parties

Changes to the models will be documented and provided to the affected parties and, if needed, may be incorporated into the applicable conformity determination report.

INTERAGENCY CONSULTATION PROCESS (OR GROUP)

An Interagency Consultation Group (ICG) has been established for consultation purposes as identified in Regulation 10. The APCD, DRCOG, and NFRMPO staff will submit technical data for review and recommendation by the ICG that is comprised of representatives from Federal Highway Administration (FHWA), Colorado Department of Transportation (CDOT), Environmental Protection Agency (EPA), Regional Air Quality Council (RAQC), Air Pollution Control Division (APCD), Upper Front Range Transportation Planning Region (UFR), Denver Regional Council of Governments (DRCOG), and North Front Range MPO (NFRMPO).

The ICG will meet as needed to review data pertaining to conformity determinations and advise in a timely fashion. In this way, the assumptions and procedures used in transportation and air quality modeling can be reviewed by staff before the final modeling is performed. Data to be submitted to the ICG for review as part of the regular transportation planning process should be sufficient for making decisions and may include transportation network and land use assumptions, descriptions of any calibrations or updates to the travel model, and updates or changes to the air quality model. If changes which could affect air emissions modeling or evaluations are made after the above data have been reviewed by the ICG, these differences will be disclosed to the ICG and to the other parties to this MOA prior to initiating the final air quality modeling.

Per Regulation 10 section III.H.2, the APCD, shall decide if the conformity determination needs to be reviewed by the AQCC (non-routine) or solely by APCD (routine).

AQCC CONFORMITY REVIEW

The MPO will follow the procedures identified in the AQCC Procedural Rules calling for a public meeting by the AQCC for purposes of commenting on the MPO's non-routine conformity determinations. The parties acknowledge the initial conformity determination document must be available to the Commission office at least 15 days prior to requesting that the AQCC schedule a public meeting, and the final conformity determination document must be available to the Commission office at least 30 days prior to the AQCC's public meeting at which the conformity determination is scheduled to be discussed. The initial document should contain all modeling results and the appropriate supporting materials, and the final documents should contain any updates, revisions or corrections. The Commission can entertain deviations from this schedule on a case-by-case basis.

The Division will provide the MPO with a copy of its written comments, if any, on the conformity determination at the same time it provides them to the AQCC. All AQCC comments on determinations of conformity shall be forwarded to the MPO by APCD. Any AQCC appeal of such conformity determination will follow the procedure outlined in Regulation 10. After review, the APCD will send the MPO a letter of concurrence of a positive conformity determination. If the AQCC does not concur on the conformity determination made by the MPO, this disagreement is forwarded to the Governor's Office unless the parties revise the conformity determination.

LIMITATIONS

1. Nothing in this MOA impairs or otherwise affects the authority of the heads of the signatory party over their organizations.
2. This MOA is intended to outline an agreement among the parties and does not create or confer any right or benefit on any person or party, private or public. Nothing in this MOA is intended to

restrict the authority of any signatory to act as provided by law or regulation, or to restrict any agency from enforcing any laws within its authority and jurisdiction.

3. This MOA in no way restricts signatory parties from participating in similar activities with other public or private agencies, organizations, and individuals.
4. Nothing in this MOA shall obligate any signatory party to obligate or transfer any funds, nor does it supplement existing statutory authorities of the signatory party agencies.
5. This MOA, consisting of five (5) pages, represents the entire and integrated agreement between the parties and supersedes all prior negotiations, representations, and agreements concerning this MOA, whether written or oral.

EXECUTION, MODIFICATION AND TERMINATION OF AGREEMENT

It is mutually agreed and understood by all signatory parties that:

1. Any party to this agreement may suspend it by a 60-day written notice to the other parties. If this occurs, the parties agree to consult further to determine whether the issues can be resolved and the agreement re-implemented in an amended form.
2. Changes to the scope of this MOA shall be made by the issuance of a multilaterally executed modification. These changes are to be mutually agreed upon between the parties to this MOA, shall be incorporated by written instrument, executed and signed by all parties to this MOA and are effective as of the date of the last signature obtained.
3. This MOA may be executed in counterparts. A copy with the original signature pages affixed will constitute the original MOA. The effective date shall be the date of the final signatory party agency's signature, and the MOA shall remain in effect until modified or dissolved.
4. This MOA may not serve as the basis for any challenges or appeals.
5. Colorado Open Records Act (CORA). Any information furnished by any parties under this Memorandum is subject to the Colorado Open Records Act (24-72-201 to 24-72-309, C.R.S.).
6. RESPONSIBILITIES OF PARTIES. The subject parties intend to handle their own activities and utilize their own resources, including the expenditure of their own funds, in pursuing these objectives. Each party intends to carry out its separate activities in a coordinated and mutually beneficial manner.
7. NON-FUND OBLIGATING DOCUMENT. Nothing in this MOA shall obligate the subject parties to obligate or transfer any funds. Specific work projects or activities that involve the transfer of funds, services, or property among the various agencies and offices of the parties will require execution of separate agreements and be contingent upon the availability of appropriated funds. This MOA does not provide such authority. Negotiation, execution, and administration of each such agreement must comply with all applicable statutes and regulations.
8. ESTABLISHMENT OF RESPONSIBILITY. This MOA is not intended to, and does not create, any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity, by a party against any of the signatory parties, including but not limited to, their agencies, their officers, or any other person.
9. AUTHORIZED REPRESENTATIVES. By signature below, the signatory party certifies that the individuals listed in this document as representatives of the signatory party are authorized to act in their respective areas for matters related to this agreement.
10. GOVERNMENTAL IMMUNITY: The parties do not waive their governmental immunity by entering into this MOA and retain all immunities and defenses provided by law with respect to any action based on or occurring as a result of this MOA.

11. The parties agree that exclusive venue for any action related to performance of this agreement shall be in the City and County of Denver, Colorado.

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

Lisa M. Wolk

for
Larry Wolk, Executive Director &
Chief Medical Officer
Colorado Department of Public Health and Environment

5.28.15

Date

Ken Lloyd

Ken Lloyd, Executive Director
Regional Air Quality Council

March 31, 2015

Date

Jennifer Schaufele

Jennifer Schaufele, Executive Director
Denver Regional Council of Governments

March 25, 2015

Date

Terri Blackmore

Terri Blackmore, Executive Director
North Front Range MPO

May 7, 2015

Date

Appendix E. U.S. Department of Transportation Conformity Finding