

Denver-North Front Range Northern Subarea 8-Hour Ozone Nonattainment Area Conformity Determination

for the
North Front Range Metropolitan Planning Area
2040 Regional Transportation Plan Amended June 1, 2017
and the
FY2020-2023 Transportation Improvement Program
and for the
Northern Subarea of the Upper Front Range Transportation Planning Region
2040 Regional Transportation Plan
and for the
Northern Subarea of the Upper Front Range Transportation Planning Region
portion of the
Colorado FY2019-2022 Statewide Transportation Improvement Program

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LIST OF ACRONYMS

APCD	Air Pollution Control Division
AQCC	Air Quality Control Commission
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulation
CMAQ	Congestion Mitigation Air Quality
CO	Carbon Monoxide
COLT	City of Loveland Transit
DRCOG	Denver Regional Council of Governments
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GET	Greeley Evans Transit
ICG	(Air Quality) Interagency Coordination Group
I/M	Inspection and Maintenance Program
MOA	Memorandum of Agreement
MOVES2014b	EPA's Motor Vehicle Emission Simulator model
MPO	Metropolitan Planning Organization
MVEB	Motor Vehicle Emissions Budget
NAAQS	National Ambient Air Quality Standards
NFRT&AQPC	North Front Range Transportation and Air Quality Planning Council
NFRMPO	North Front Range Metropolitan Planning Organization
NO _x	Nitrogen Oxides
PPM	Parts per Million
RAQC	Regional Air Quality Council
RTDM	Regional Travel Demand Model
RTP	Regional Transportation Plan
RVP	Reid Vapor Pressure
SIP	State Implementation Plan
STIP	State Transportation Improvement Program
TAC	Technical Advisory Committee
TAZ	Transportation Analysis Zone
TCM	Transportation Control Measures
TDM	Transportation Demand Management
TIP	Transportation Improvement Program
TMA	Transportation Management Area
TMO	Transportation Management Organization
TPR	Transportation Planning Region
TSSIP	Traffic Signal System Improvement Program
UFR	Upper Front Range Transportation Planning Region
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

CHAPTER 1: INTRODUCTION

Purpose

This report demonstrates the transportation programs and plans in the Northern Subarea of the Denver-North Front Range Nonattainment area meet the federally prescribed air quality conformity requirements for the 2008 8-Hour Ozone National Ambient Air Quality Standard (NAAQS) and 2015 8-Hour Ozone NAAQS. This demonstration is based on the regionally significant projects in the 2040 RTP amended June 1, 2017, with which the FY2020-2023 TIP projects are consistent, along with the regionally significant projects in the 2040 RTP for the Upper Front Range (UFR). Several travel modeling and emissions modeling assumptions have been updated since the previously approved conformity determination in 2018, including external station volumes, time of day factors, temperature profiles, and vehicle population estimates. The out year remains 2040.

A conformity determination report for the Fort Collins and Greeley Carbon Monoxide (CO) Maintenance Areas was prepared concurrently with this document to have the same effective date.

Background

The North Front Range Metropolitan Planning Organization (NFRMPO) conducts air quality conformity determinations for the Northern Subarea of the Denver-North Front Range 8-Hour Ozone Nonattainment Area. The NFRMPO has 15 local government members, including 13 municipalities and the portions of Larimer and Weld counties likely to become urbanized.

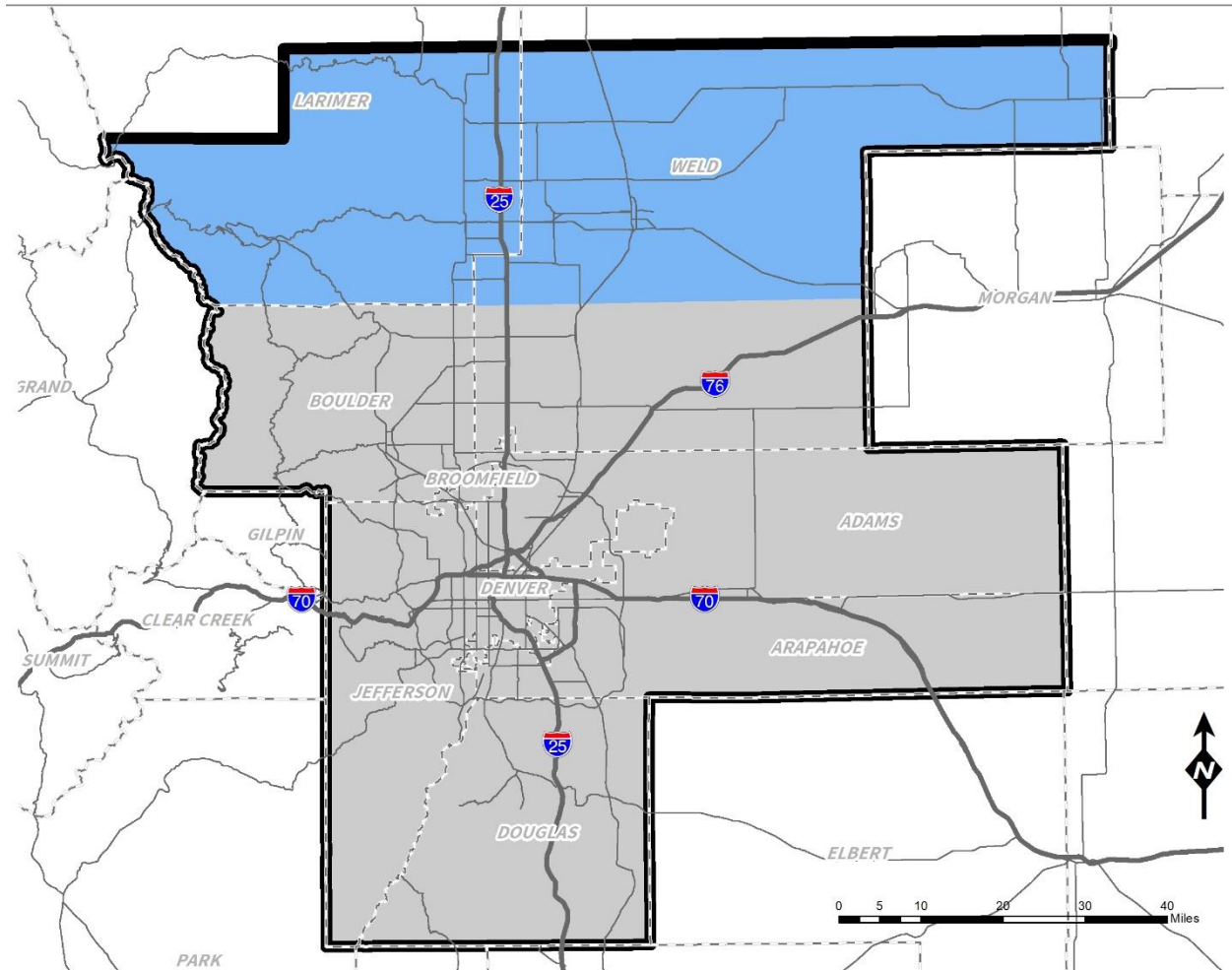
The Denver-North Front Range Nonattainment Area for the 2008 Ozone NAAQS covers the counties of Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson, and portions of Larimer and Weld with the highest concentration of emissions. **Figure 1** shows the entire 8-Hour Ozone Nonattainment Area and its two subareas, Northern and Southern. The boundary between the two subareas is the Boulder/Larimer County line, extended at the same latitude eastward through southern Weld County to the Morgan County line.

Under the Clean Air Act (CAA), Metropolitan Planning Organizations (MPOs) are required to demonstrate conformity of their fiscally constrained RTPs and TIPs with the applicable State Implementation Plan (SIP) before transportation plans and programs are adopted.¹ Conformity to a SIP is defined in the CAA as conformity to the SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving attainment quickly. Additionally, 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 reduction. The EPA transportation conformity rule is located in 40 CFR Part 93, Subpart A.²

¹ Clean Air Act Requirements and History, <http://www.epa.gov/air/caa/requirements.html>, 2015

² 77 FR 14979, <https://federalregister.gov/a/2012-6207>, 2012

Figure 1: Denver-North Front Range 8-hour Ozone Nonattainment Area and Subareas



Legend

-  Northern Subarea
-  Southern Subarea
-  Ozone Nonattainment Area
-  County Boundaries

April 2019
 Sources: CDOT, NFRMPO


Designations and Emissions Budgets

In 1997, the U.S. Environmental Protection Agency (EPA) established the 8-hour ozone NAAQS of 0.080 parts per million (ppm). Under the 1997 standard, the nine county Denver-North Front Range area was designated as a nonattainment area. A SIP was developed to demonstrate how the region would attain the 1997 8-hour ozone standard by 2010. For the purposes of Transportation Conformity, Motor Vehicle Emission Budgets (MVEBs) were established as part of the SIP. In 2010, EPA found the MVEBs for Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC) contained in the Denver Metro Area & North Front Range 8-Hour Ozone Attainment Plan as adequate for transportation conformity purposes.³ EPA approved these NOx and VOC MVEBs with the final rule to approve the Denver Metro Area & North Front Range Ozone

³ 75 FR 9893, <https://federalregister.gov/a/2010-4551>, 2010

Action Plan which included revisions to the SIP for the 1997 8-Hour Ozone NAAQS.⁴

On March 27, 2008,⁵ the EPA lowered the NAAQS for ground-level ozone to 0.075 ppm. The same nine county Denver-North Front Range Nonattainment area under the 1997 standard was designated as Marginal Nonattainment by the EPA under the 2008 standard on April 30, 2012.⁶ As a Marginal Nonattainment area, the deadline to attain the 2008 ozone NAAQS was by the end of the 2014 ozone season and a new SIP was not required. The Denver-North Front Range Nonattainment area failed to attain the NAAQS based on the three-year average of ozone data from 2012 to 2014. Because of this, on May 4, 2016, EPA reclassified the area from Marginal to Moderate, extending the attainment year to 2017.⁷ Per federal requirements, the State of Colorado developed a new SIP to demonstrate how the area will comply with the federal CAA for the 2008 ozone NAAQS. The *Moderate Area Ozone SIP*, submitted to the EPA on May 31, 2017, set MVEBs for each subarea of the Denver-North Front Range nonattainment area. On March 16, 2018, the EPA found the MVEBs in the Moderate Area Ozone SIP adequate for conformity determinations⁸ and on August 2, 2018, the EPA approved the majority of the SIP.⁹

Most recently, the EPA lowered the ozone NAAQS to 0.070 ppm on December 28, 2015.¹⁰ The nine county Denver-North Front Range area was designated as a Marginal Nonattainment area by the EPA on August 3, 2018.¹¹ A SIP has yet to be developed for the 2015 ozone NAAQS. Until new MVEBs are approved and become effective, the Denver-North Front Range Nonattainment area demonstrates conformity to the 2015 ozone NAAQS by meeting the approved Moderate SIP MVEB tests for the 2008 ozone NAAQS ([40 CFR 93.109\(c\)\(2\)\(i\)](#)). This conformity determination meets EPA's requirement to complete a new conformity determination within one year of the effective date of the Marginal Nonattainment designation for the 2015 Ozone NAAQS.¹²

Planning Organizations and Memorandum of Agreements (MOAs)

The NFRMPO is the MPO for the Fort Collins Transportation Management Area (TMA) which includes Berthoud, Fort Collins, Loveland, and portions of Johnstown, Timnath, and Windsor. The NFRMPO has 15 local government members, including 13 municipalities and portions of Larimer and Weld counties.

The UFR covers the remainder of the Northern Subarea of the 8-Hour Ozone Nonattainment Area. Located in north-central Colorado, the UFR is comprised of portions of Larimer and Weld counties and Morgan County, and excludes the portion of southwestern Weld County included in the DRCOG TMA. **Figure 2** illustrates the Northern Subarea boundaries for the NFRMPO and the UFR.

⁴ 76 FR 47443, <https://federalregister.gov/a/2011-19807>, 2011

⁵ 73 FR 16436, <https://federalregister.gov/a/E8-5645>, 2008

⁶ 77 FR 30098, <https://federalregister.gov/a/2012-11618>, 2012

⁷ 81 FR 26697, <https://federalregister.gov/a/2016-09729>, 2016

⁸ 83 FR 11751, <https://federalregister.gov/a/2018-05406>, 2018

⁹ 83 FR 31068, <https://federalregister.gov/a/2018-13599>, 2018

¹⁰ 80 FR 65291, <https://federalregister.gov/a/2015-26594>, 2015

¹¹ 83 FR 25776, <https://federalregister.gov/a/2018-11838>, 2018

¹² Transportation Conformity Guidance for 2015 Ozone NAAQS Nonattainment Areas. (EPA-420-B-18-023)- June 2018

The Regional Air Quality Council (RAQC) is the lead air quality planning agency for the entire Denver-North Front Range 8-Hour Ozone Nonattainment Area.¹³ The Denver Regional Council of Governments (DRCOG) is the MPO for the Denver TMA.

A Memorandum of Agreement (MOA) was signed in 2008 by the Air Pollution Control Division (APCD) of the Colorado Department of Public Health and Environment (CDPHE), CDOT, RAQC, UFR, NFRMPO, and DRCOG per federal transportation regulations,¹⁴ and is included in **Appendix A**. The MOA allows the option to establish subarea emissions budgets for VOC and NO_x based on subareas, defined in **Figure 1**. The MOA stipulates DRCOG will conduct conformity determinations for the Southern Subarea of the 8-Hour Ozone Nonattainment Area, while the NFRMPO will conduct conformity determinations for the Northern Subarea. It states the course of action to be pursued if one (or both) Subareas fail a conformity test or exceed emissions budgets.

In 2015, an MOA was signed by the NFRMPO, CDPHE, RAQC, and DRCOG, replacing an MOA signed in 1998 by the NFRMPO and CDPHE and a similar MOA between DRCOG and CDPHE. The MOA, included in **Appendix B**, identifies the specific roles and responsibilities in conformity evaluations and findings for each agency, including allowing for routine conformity determinations to be performed and approved through the APCD, rather than through a public hearing with the State of Colorado's Air Quality Control Commission (AQCC).

Conformity Determination Process

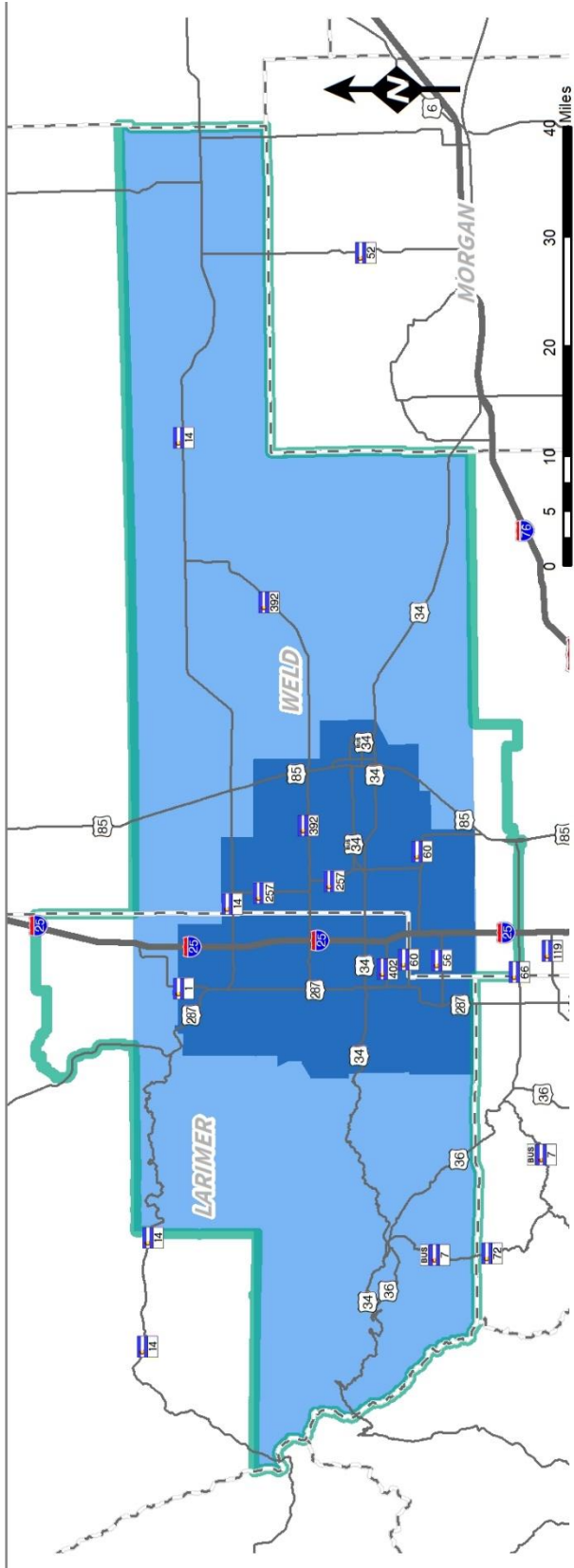
The NFRMPO and DRCOG worked cooperatively with the Air Quality Interagency Coordination Group (ICG) which includes membership from the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), EPA, Colorado Department of Transportation (CDOT), and APCD to review the conformity documentation and planning assumptions for this report. Furthermore, members of the NFRMPO's Technical Advisory Committee (TAC), or their representatives, served as the review team for the North Front Range Socio-economic Data and NFRMPO 2040 Regional Travel Demand Model (RTDM) assumptions, pursuant to the AQCC's Regulation Number 10.¹⁵

¹³ *Executive Order B 2013 007*, https://www.colorado.gov/governor/sites/default/files/executive_orders/b_2013-007.pdf, 2013

¹⁴ *23 CFR 450.314(c)*, https://www.ecfr.gov/cgi-bin/text-idx?SID=cb8fc2bb654e58e1c70363164784595b&mc=true&node=se23.1.450_1314&rqn=div8, 2017

¹⁵ *5 CCR 1001-12*, <https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=4498&fileName=5%20CCR%201001-12>, 2012

Figure 2: Northern Subarea



April 2019
 Sources: CDOT, NFRMPO
 North Front Range
 Metropolitan
 Planning
 Organization

- Legend**
-  NFRMPO Modeling Area
 -  NFRMPO Planning Area
 -  Northern Subarea
 -  County Boundaries

Public Participation

The 2019 Public Involvement Plan (PIP) guides the NFRMPO's public participation activities for all plans and programs. The NFRMPO invited public participation throughout the development of the FY2020-2023 TIP and the associated conformity determinations.

A public hearing notice was published on April 27, 2019, with the documents made available to the public on April 26, 2019. The documents are available on the NFRMPO website at <http://nfrmpo.org/air-quality> and at the NFRMPO Office as a print copy. The public comment period ends at 5:00 p.m. on May 31, 2019.

The North Front Range Air Quality and Transportation Planning Council (NFRT&AQPC) will hold a public hearing regarding this conformity determination prior to their monthly meeting on June 6, 2019 at the Johnstown Community Center at 101 Charlotte St; Johnstown, Colorado 80550. Minutes of the NFRMPO Planning Council's public hearing will be available at the NFRMPO office and website: nfrmpo.org.

The FY2020-2023 TIP was made available for a 30-day public comment period from April 1, 2019 through April 30, 2019. Public comments will also be taken at the June 6, 2019 NFRT&AQPC meeting. It is anticipated the TIP will be adopted at this meeting.

CHAPTER 2: IMPLEMENTATION OF CONTROL MEASURES

For this conformity determination, no new transportation control measures (TCMs) are identified for timely completion or implementation as part of the applicable implementation plan. The Moderate Area Ozone SIP adopted by the AQCC in 2016 and approved by the EPA on August 2, 2018, did not include any TCMs.

CHAPTER 3: EMISSIONS TESTS

Background

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, NO_x and VOC. The plan and program must respect the MVEBs in the applicable SIP or SIP submittal. Satisfying these tests involves demonstrating relevant emissions in future years are less than or equal to the emissions budget established in the approved SIP.

8-Hour Ozone Emissions Tests

The EPA found the MVEBs for NO_x and VOCs contained in the *Moderate Area Ozone SIP* adequate for transportation conformity purposes on March 16, 2018 and approved these MVEBs on August 2, 2018. As a result of these actions, the NFRMPO is required to use these budgets for subsequent transportation conformity determinations.

Budgets Analysis Years

In accordance with EPA regulations,¹⁶ the ICG agreed on the following staging years for determining 8-hour ozone conformity:

- **2020** – the first horizon year (no more than 10 years from the 2012 base year of the travel demand model)
- **2030** – an intermediate modeling year
- **2040** – the last year (horizon) of the 2040 RTP

Technical Process

The technical process used to estimate future pollutant emission levels is based on the latest planning assumptions in effect at the time of this conformity determination. Assumptions behind the analysis were derived from estimates of current and future population, employment, travel, and congestion most recently approved and developed by the NFRMPO.¹⁷ The MOA stipulates the emissions estimates for the Northern Subarea portion of the 8-Hour Ozone Nonattainment Area are to be performed by the APCD.

The NFRMPO 2012 Base Year Regional Travel Demand Model (RTDM), developed for input to the emissions model, covers the Northern Subarea of the 8-Hour Ozone Nonattainment Area. **Appendix C** and **Appendix D** describe the modeling structure for the RTDM in more detail.

¹⁶ 40 CFR 93.118, <http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=4c2888da2e1fb443b24ff76fcd7cfc84&ty=HTML&h=L&mc=true&r=PART&n=pt40.20.93>,

¹⁷ 2040 Regional Socioeconomic Forecast, <http://www.nfrmpo.org/ResourcesDocuments.aspx>, 2013

Demographic Assumptions

Table 1 presents the demographic assumptions for the Northern Subarea used in the 2012 Base Year RTDM. The 2020 estimated population for the Northern Subarea is 578,594. The population forecast for the Northern Subarea in 2040 is 877,608, an increase of 52 percent. Employment is forecast to be approximately 422,706 in 2040 compared to the year 2020 estimate of 309,198, an increase of 37 percent. Growth in population and employment will be the principal factors for the increased demand on the region's transportation facilities and services.

Statistic	2020	2030	2040
Population	578,594	730,493	877,608
Employment	309,198	363,177	422,706

Transportation Assumptions

To complete the emissions tests, the applicable staging years (2020, 2030, and 2040) and transportation networks were defined for the NFRMPO boundary and the UFR area within the Northern Subarea. The RTDM includes all capacity improvements (widening) and regionally significant projects for the Northern Subarea for the respective staging years. **Appendix E** contains the list and map of regionally significant transportation improvement projects coded in the RTDM. Funding sources for these projects are identified in the project list. Projects that are not federally funded are either committed funds by the state, a local jurisdiction, or private developer within the Northern Subarea.

Air Quality Modeling Assumptions

APCD estimated air pollution emissions shown in this report using the most recent EPA Motor Vehicle Emissions Simulation (MOVES2014b) model.

The RTDM includes the effects of some Travel Demand Management (TDM) programs on a select regional corridors, such as signal coordination and the regional vanpool program; however, the impacts of the current programs in the emissions analysis are very small.

Emission Test Results – Northern Subarea

The results of the Northern Subarea emissions tests by year are reported in **Table 2**. APCD generated the emissions estimates using the transportation inputs from the RTDM and the MOVES2014b emissions model. APCD performed the 8-hour ozone conformity analysis for the years 2020, 2030, and 2040, which meet the EPA staging year requirements.¹⁸

¹⁸ 40 CFR 93.118, <http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=c9ad38a0577544cc1bd184aaa325cb6a&ty=HTML&h=L&mc=true&r=PART&n=pt40.20.93>, 2013

Table 2: 8-Hour Ozone Conformity for Denver-North Front Range Northern Subarea (Emission Tons per Day¹⁹)					
	2008 SIP Budgets	2020	2030	2040	Pass/Fail
Volatile Organic Compounds (VOC)	8	8	6	5	PASS
Oxides of Nitrogen (NOx)	12	11	6	5	PASS

Summary of 8-hour Ozone Conformity Findings

Based on the quantitative conformity analysis, NFRMPO staff has determined the NFRMPO FY2020-2023 TIP and the NFRMPO 2040 RTP amended June 1, 2017 demonstrate conformity for the 2008 and 2015 8-Hour Ozone NAAQS using the 8-hour ozone emissions budgets for the Northern Subarea. **Appendix C** includes more information on the transportation and demographic assumptions used in the 8-hour ozone emissions analysis.

¹⁹ The emissions of both VOC and NOx shown in the table are considered conservative because of two modeling assumptions: First, additional VOC emission reductions would have been calculated if a more stringent, lower gasoline Reid Vapor Pressure (RVP) specification had been modeled. The assumed RVP for the Northern Subarea was 8.5 pounds per square inch (psi) and 10 percent by volume ethanol in all gasoline. In contrast, EPA established an applicable standard for gasoline at 7.8 psi under the federal volatility control program in the Denver-Boulder-Greeley-Ft. Collins-Loveland, Colorado 1997 8hour ozone nonattainment area--as codified in 40 CFR Part 81--during the high ozone season, effective on March 31, 2010. Second, no emission reduction credit in the modeling had been calculated for the State-only inspection and maintenance (I/M) program that is currently active in Larimer and Weld Counties.

***Appendix A: Memorandum of Agreement – Transportation Conformity Evaluations
Conducted Under the 8-Hour Ozone Standard (2008)***

MEMORANDUM OF AGREEMENT

FOR

TRANSPORTATION CONFORMITY EVALUATIONS
CONDUCTED UNDER THE 8-HOUR OZONE STANDARD

BY AND BETWEEN

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

March 14, 2008

Abbreviations Guide

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

Terminology

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

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

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

A. Background and Purpose

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

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

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

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

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

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

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

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

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

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

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

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

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

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

D. Granting of Authority, Responsibilities

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

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

E. Compensation to MPOs for Additional Responsibilities

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

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

F. Conformity Review – Procedural

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

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

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

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

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

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

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

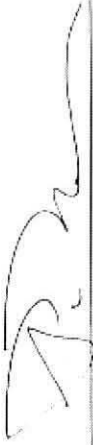
G. Dispute Resolution

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


H. Termination of Agreement

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


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



Paul Tourangeau, Director, Air Pollution Control Division, CDPHE Date 3/14/08



Jennifer Finch, Director, Transportation Development Division, CDOT Date 3/14/08



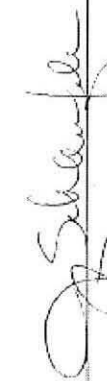
Kenneth H. Lloyd, Executive Director, Regional Air Quality Council Date 3/14/08



Robert D. Masden, Weld County Commissioner,
Chairman, Upper Front Range TPR Date 3/24/08

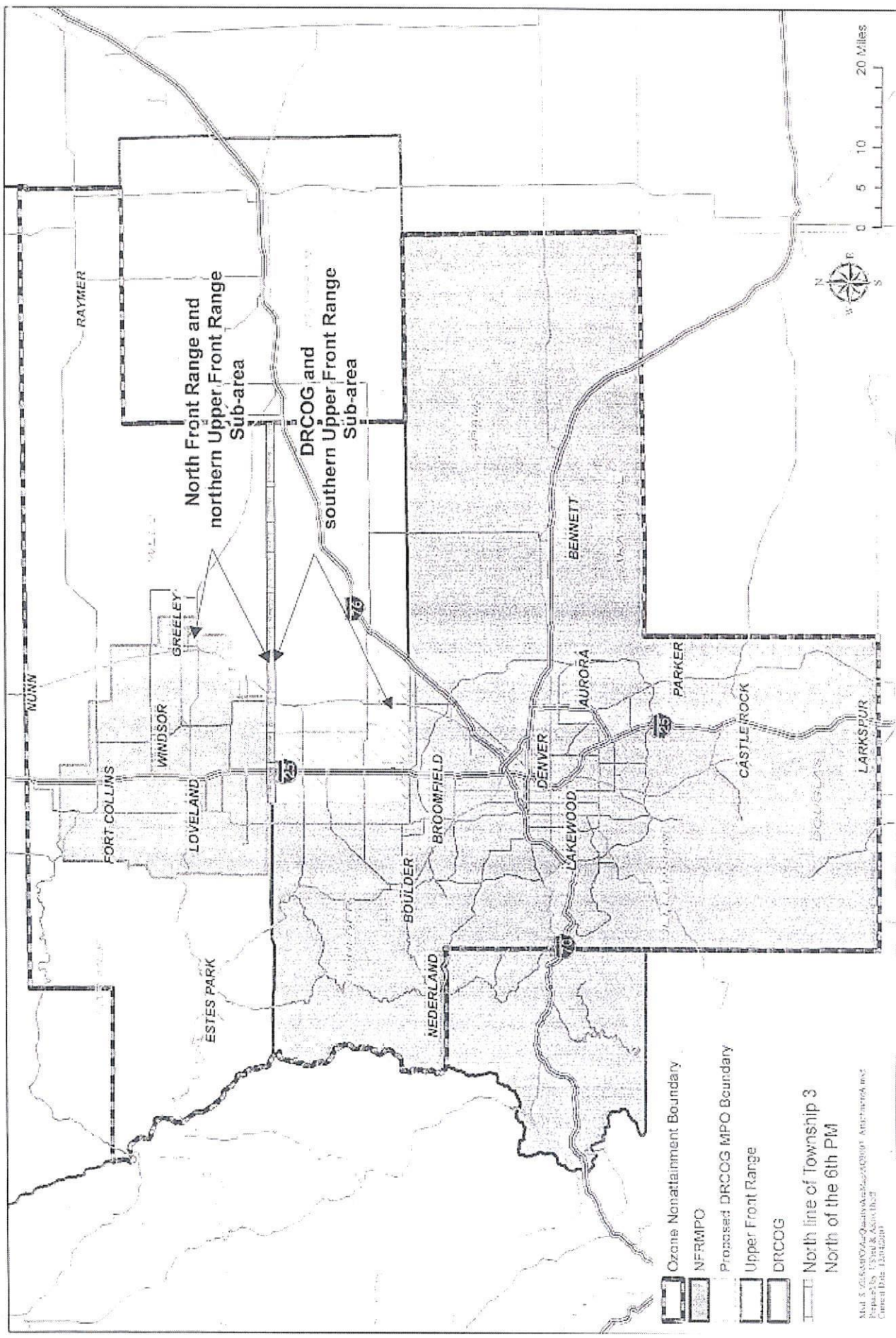


Cliff Davidson, Executive Director, North Front Range MPO Date 3/00/08



Jennifer Schaufele, Executive Director,
Denver Regional Council of Governments Date 3/14/08

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



Map 5: Ozone Nonattainment Area and Sub-areas
 Prepared by: URS | Jacobs | Parsons Brinckerhoff
 Council Date: 12/04/2004

***Appendix B: Memorandum of Agreement – Transportation Conformity Evaluations
(2015)***

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.

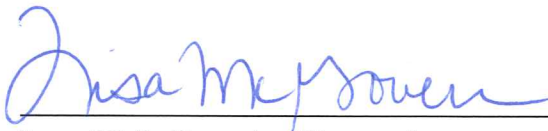
EXECUTION, MODIFICATION AND TERMINATION OF AGREEMENT

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.

for


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

5-28-15

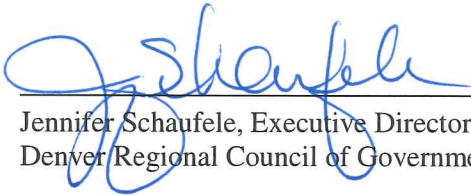
Date



Ken Lloyd, Executive Director
Regional Air Quality Council

March 31, 2015

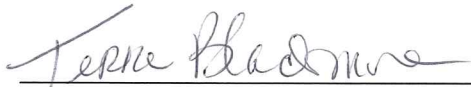
Date



Jennifer Schaufele, Executive Director
Denver Regional Council of Governments

March 25, 2015

Date



Terri Blackmore, Executive Director
North Front Range MPO

May 7, 2015

Date

Appendix C: NFRMPO 2012 Base Year Regional Travel Demand Model Description

The NFRMPO 2012 Base Year Regional Travel Demand Model (RTDM) is a traditional four-step travel model incorporating trip generation, trip distribution, mode choice, and trip assignment. The model was updated in 2014 to incorporate results from the North Front Range Metropolitan Planning Organization (NFRMPO) *Household Survey*, 2010 and the *NFRMPO On-Board Transit Survey*, 2009. The household survey was used to develop the trip generation rates, trip length frequency distributions, and auto occupancy rates. The on-board survey was used in combination with the household survey to produce updated mode share targets. Detailed information on the modeling process, inputs, and procedures can be found in the *North Front Range 2012 Base Year Regional Travel Model Documentation* available at <https://nfrmpo.org/wp-content/uploads/2040-nfrmpo-travel-model-documentation.pdf>. Since the completion of the 2012 Base Year RTDM in 2014, several minor updates have been implemented to improve the model. Memos detailing the updates are available at the NFRMPO office.

The model was calibrated using data from the household and on-board surveys. Roadway results were validated using traffic count data collected between 2008 and 2013. Transit results were calibrated to match boarding counts on the three transit systems in the region, at the system level.

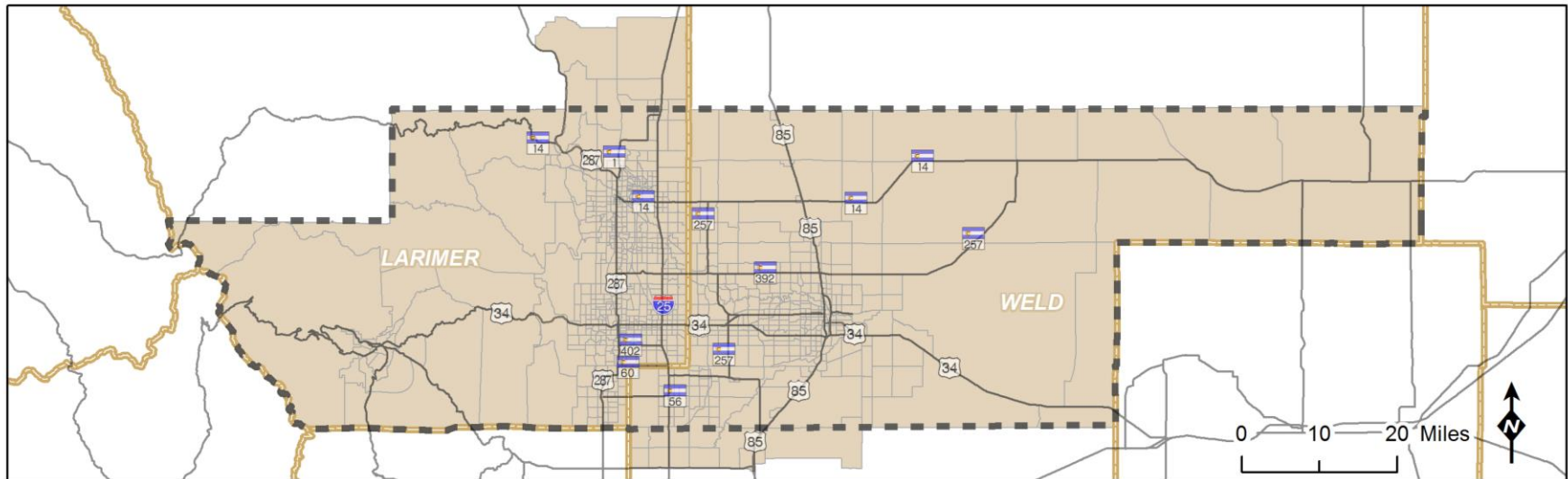
To facilitate modeling of the expanded ozone nonattainment area, the model was expanded to cover additional portions of Larimer and Weld counties not within the NFRMPO boundary. The majority of this additional area is very sparsely populated. The expanded area does include the Estes Park area, which is heavily influenced by seasonal tourist activity. To best reflect the unique nature of the Estes Park area, an additional lodging-based trip purpose was included. In addition, the Estes Park area was modeled to represent summer conditions rather than school-season conditions due to the heavily seasonal nature of the area. The remainder of the modeling area remains reflective of an average weekday when school is in session.

The model incorporates a transportation analysis zone (TAZ) structure developed based on existing land use and roadway conditions, future household and employment projections, and staff comments from member governments. The TAZ structure also includes additional details on the proximity of existing and proposed transit facilities to improve the accuracy of the mode choice component of the travel model. For the Northern Subarea, the TAZ structure includes 1,032 internal zones and 19 external stations. **Figure 3** depicts the complete TAZ structure, slightly larger than the 8-Hour Ozone Nonattainment Northern Subarea. The RTDM has a base year of 2012 and forecast years of 2015, 2018, 2020, 2025, 2030, 2035, and 2040. The conformity test is based on the MVEBs approved by the EPA and in the current Colorado Statewide Implementation Plan (SIP).

Demographic Development Estimation

Socio-economic data is the input activity-based information that provides the foundation for trip-making in the RTDM. Data is recorded for basic, retail, medical, and service employment types and for households by income groups and household sizes. Data for the Estes Park area also includes lodging information to better represent tourist/visitor trips. The socio-economic data is contained in the TAZ structure. Employment data is used in the RTDM primarily as generators of trip attractions. Household data is used in the RTDM primarily as a generator of trip productions. The NFRMPO develops and maintains a parcel-based land use allocation model (LUAM) which distributes total households and employment at the parcel level, which then aggregates to the TAZ level. The LUAM uses the household and

Figure 3: TAZ Structure



May 2015
Sources: CDOT, EPA, NFRMPO

- LEGEND**
-  TAZ
 -  Northern Subarea
 -  County Boundary
 -  Major Roadway

employment control totals for the region and sub-regions, as identified in the *North Front Range Land Use Allocation Model – Technical Documentation* available at <https://nfrmpo.org/wp-content/uploads/2040-nfrmpo-land-use-documentation.pdf>.

Highway and Transit System

Roadway and transit networks contain basic input information for use in the model and represents real-world conditions to the greatest extent possible. The highway system contains over 6,100 links described according to facility type, area type, speeds, capacities, etc. The roadway network is used to distribute trips and route transit and automobile trips. The roadway network was prepared based on data from the NFRMPO and from scheduling/phasing of projects in the RTP and TIP. The NFRMPO also collaborated with local jurisdictions as necessary to verify construction and opening dates. The model also contains base and forecast year transit route systems, based on information provided by Transfort, City of Loveland Transit (COLT), and Greeley Evans Transit (GET). Existing transit networks represent only walk access to local service. Forecast year transit networks also include Bus Rapid Transit and informal park-n-ride facilities.

Trip Generation

The trip generation module estimates trip productions and attractions based on zonal attributes (e.g. population, households, income, employment, etc.). Productions and attractions are generated for each TAZ and balanced by trip purpose at the regional level. Cross-classified trip rates are applied in the model to represent trip-making characteristics that vary by household size and income. Generally, trip rates increase as household size and income increase. The model includes the following trip purposes:

- **Home-Based Work (HBW):** Commute trips between home and work and vice versa.
- **Home-Based University (HBU):** Trips between home and university locations (i.e., CSU, UNC) and vice versa for school related purposes.
- **Home-Based Shop (HBS):** Trips between home and shopping locations (and vice versa).
- **Home-Based Other (HBO):** All other trips with one end at home.
- **Work-Based Other (WBO):** Work-related trips without an end at home.
- **Other-Based Other (OBO):** Trips with neither an end at home nor a work-related purpose.
- **Lodging-Based Other (LBO):** Trips with one end at a lodging facility and the other end at a non-home, non-work location (only applied to the Estes Park area).
- **Small Truck (STRK):** Small truck trips (FHWA Vehicle classes 5-7).
- **Large Truck:** Large truck trips (FHWA Vehicle classes 8-12).

Some TAZs have unique land uses and generate a significantly different number of trips in comparison to the model's estimation. It is assumed the trip rates at these locations are significantly higher or lower than the model generates using the standard trip equations. For these locations, special generator values are applied in the model to define the number of

trips produced and attracted to the locations.

The main Colorado State University (CSU) campus in Fort Collins and the University of Northern Colorado (UNC) campus in Greeley are the two University special generators used in the NFRMPO model area. Additionally, Rocky Mountain National Park is treated as a special generator in the expanded model area. The model represents two types of external travel. Through trips are represented by the EE trip purpose described previously and were estimated using traffic count data and information from an external station study previously conducted by the NFRMPO. Trips with one end inside the modeling area and another outside of the modeling area are referred to as Internal-External/External-Internal (IE/EI) trips. These trips are included in the primary model trip purposes described previously. At external stations, the number of IE/EI trips by purpose is based on traffic count data and analysis of the *NFRMPO Household Travel Survey* data.

Trip Distribution

Trip distribution is the process used to apportion person trip productions and attractions from the trip generation model among all zone pairs by trip purpose. The resulting trip table matrix contains both intrazonal trips (trips that do not leave the zone) on the diagonal and interzonal trips in all other zone interchange cells. The NFRMPO model uses a standard gravity model equation and applies friction factors to represent the effects of impedance between zones. The trip distribution model is calibrated to replicate trip length distributions observed in the *NFRMPO Household Travel Survey*. Because the Survey only includes records from within the NFRMPO boundary, calibration was performed using an unexpanded version of the model. The expanded model produced consistent trip length distributions for trips occurring within the original modeling area. Calibration required the use of gamma function based friction factors. K-factors are not included in the calibrated trip distribution model.

Mode Analysis

The RTDM uses a nested logit model to determine travel modes. The first step in the mode analysis process is the split among primary modes: auto, transit, and non-motorized. The second step provides a choice between drive alone and shared ride. The third step provides a choice between walk and drive access to transit. The fourth step provides a choice between walk access to local bus, walk access to express bus, or walk access to premium transit (BRT or rail). The fifth step provides a choice between drive access to express or premium transit. The sixth step provides a choice between walk and bike.

Traffic Assignment/Time-of-Day Analysis

The traffic assignment module loads vehicle trips onto the roadway network to estimate link-specific traffic volumes. This is done for eight time periods which cover the entire day. As part of the RTDM's 2012 base year development using the household survey and traffic count data, time-of-day parameters were developed to represent the variation of travel patterns throughout the day. The time-of-day assignment process uses the vehicle trip table in production/attraction format from the mode choice model and converts it into eight time periods: AM peak, AM shoulder, midday peak, PM peak, three PM shoulders, and an off-peak period representing the remainder of the day. Each of these trip tables is assigned to the roadway network using a capacity constrained equilibrium assignment procedure. The

resulting traffic volumes from the four assignments are summed to estimate a 24-hour volume for each link in the network.

Model Validation

Validation involves testing the RTDM's predictive capabilities. Validation tests include quantifying the model's ability to replicate observed conditions and performing sensitivity tests. The base year validation effort was conducted by comparing model results to observed traffic count data. The overall sum of model volumes is within one percent of the traffic counts on the same links. Model volume totals by facility type are within five percent of the sum of traffic counts for arterials and freeways and within 10 percent for collectors. The overall percent root mean square error (percent RMSE) is within 35 percent.

Speed Feedback

A speed feedback loop is incorporated into the modeling process to ensure consistency of speeds. This corrects a fundamental problem with travel demand models when estimated speeds used in the trip distribution process are not the same as those which result from the traffic assignment/speed estimation process.

Air Quality Modeling

The Air Pollution Control Division (APCD) conducts the air pollutant emissions modeling using the Environmental Protection Agency (EPA) Motor Vehicle Emissions Simulator (MOVES) computer software, MOVES2014b. The NFRMPO, APCD, and other agencies work together in this effort, both to develop the modeling techniques, assumptions, and parameters, and reviewing the executed model runs. The RTDM outputs are one of the principal inputs to the air pollutant emissions model. The air pollutant emissions model estimates the amount of emissions of Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NO_x) generated by motor vehicles. The results are then combined with numerous assumptions concerning meteorology and atmospheric chemical reactions to produce air pollutant concentration estimates. No dispersion modeling was conducted for this analysis; only emission estimates were calculated.

Inputs included the link vehicle miles traveled (VMT) and speeds from the transportation networks, vehicle fleet mix estimates from the Colorado Department of Transportation (CDOT) automatic traffic counters, maximum and minimum temperature, the ethanol content, and Reid Vapor Pressure (RVP) of the gasoline. The emissions model did not include adjustments for emission reduction credits from the State-only I/M program.²⁰ For the Northern Subarea the RVP was 8.5 psi and 10 percent by volume ethanol in all gasoline. The results reflect recent vehicle age distribution and mileage accumulation rates from the Mobile Sources program.

²⁰40 CFR 93.122(a)(3)(i). <http://www.gpo.gov/fdsys/pkg/CFR-2012-title40-vol21/pdf/CFR-2012-title40-vol21-sec93-122.pdf>, 2012

Appendix D: 8-Hour Ozone Nonattainment Area Modeling Summary

Table 3: 8-Hour Ozone Nonattainment Area Modeling Summary

	2020 (1 st Horizon Year)	2040 (Last Horizon Year)
Socioeconomic Data		
Population	578,594	877,608
Employment	309,198	422,706
VMT Weighted Speed by Roadway Type		
Freeway	69.5	65.4
Expressway	49.4	44.7
Major Arterial	39.6	37.9
Minor Arterial	37.8	35.7
Frontage Road	49.3	41.5
Collector	34.9	33.6
Ramp	27.6	24.0
Centroid Connector	27.4	27.0
<i>Average</i>	<i>44.2</i>	<i>41.3</i>
Daily VMT		
Freeway	2,417,938	3,682,290
Expressway	2,579,191	3,564,308
Major Arterial	4,304,346	6,068,612
Minor Arterial	2,771,703	4,511,492
Frontage Road	96,078	159,057
Collector	1,266,316	2,421,584
Ramp	89,476	149,528
Centroid Connector	1,479,019	2,350,145
<i>Total</i>	<i>15,004,066</i>	<i>22,907,015</i>
Lane Miles by Roadway Type		
Freeway	168	182
Expressway	409	409
Major Arterial	793	845
Minor Arterial	1,104	1,175
Frontage Road	78	72
Collector	1,782	1,903
Ramp	17	18
Centroid Connector	1,609	1,609
<i>Total</i>	<i>6,035</i>	<i>6,283</i>
Source: NFRMPO 2040 Regional Travel Demand Model, 2040 Regional Socioeconomic Forecast		

Appendix E: NFRMPO Regional Travel Demand Model Projects

Figure 4: Map of NFRMPO Regional Travel Demand Model Projects

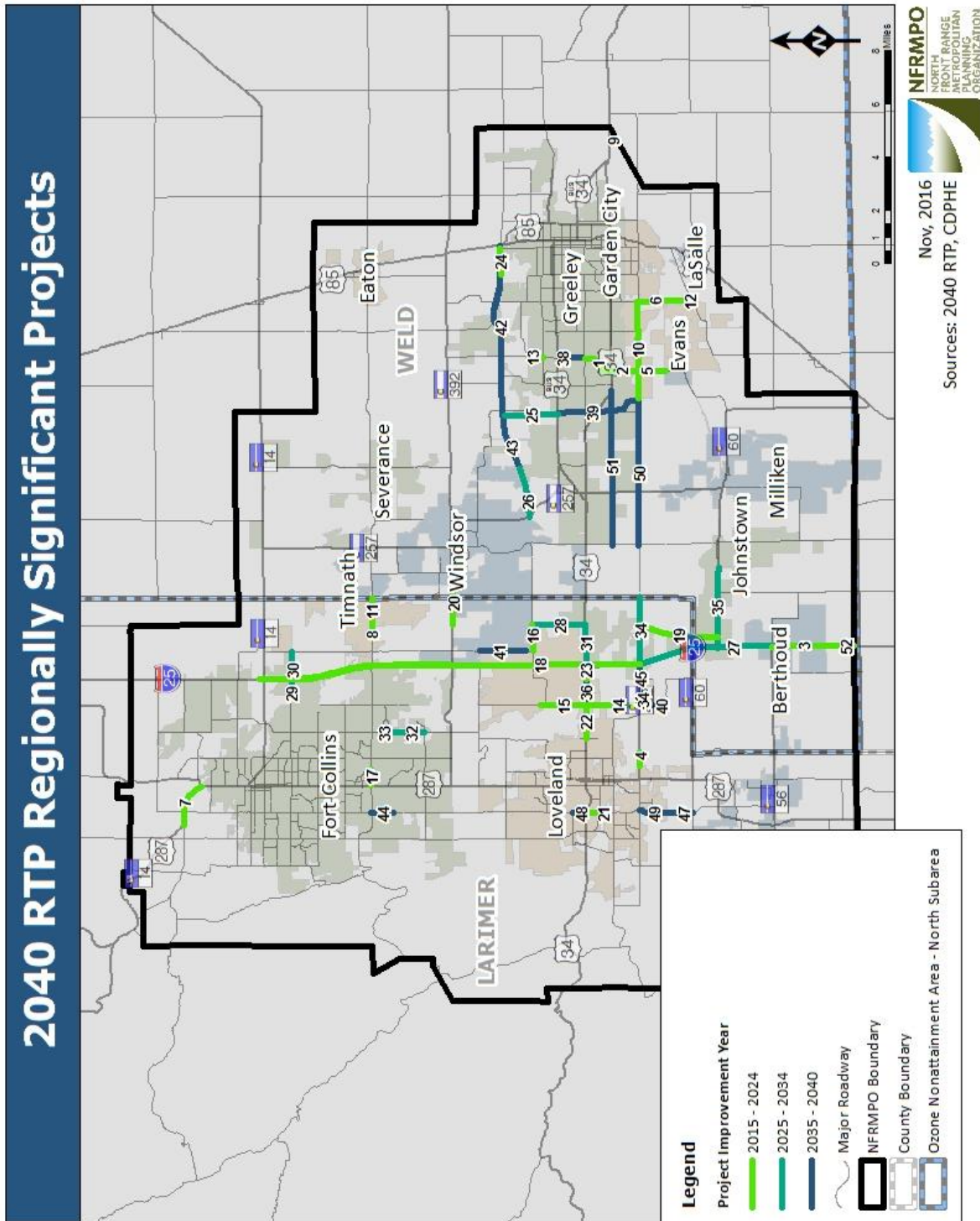


Table 4: List of NFRMPO Regional Travel Demand Model Projects

Map #	Street Name	From	To	Description of Improvement		Year of Improvement	Cost (thousands)	Funding Source
				Before	After			
2015-2024 Network								
1	59 th Avenue	20 th Street	US 34 Bypass	2	2 (Center turn lane)	2015	\$1,500	Greeley – Capital Improvement Program
2	65 th Avenue	US 34 Bypass	Weld CR 54	2	4	2015	\$3,000	Greeley – Road Development Funds
3	I-25 Southbound	Approximately Mile Marker 247	Approximately Mile Marker 249	2	3	2015	\$9,700	NFRMPO – STP-Metro Funds
4	SH 402	St. Louis Avenue	Boise Avenue	2	4	2015	\$6,000	Loveland – Transportation Capital Improvement Plan Funds; CDOT
5	65 th Avenue	37 th Street	49 th Street	2	4	2016	\$1,000	Evans – Capital Projects Street Fund Future Development
6	35 th Avenue	37 th Street	49 th Street	2	4	2016	\$1,000	Evans – Capital Projects Street Fund Future Development
7	US 287	Shields Street	LaPorte Bypass	2	4	2016	\$22,000	CDOT – FASTER Safety/RAMP
8	Harmony Road	RR tracks	Three Bell Parkway (Larimer CR 3)	2	4	2017	\$3,325	Timnath – General Fund/Adjacent Development
9	Weld County Parkway (Weld CR 49)	US 34	I-76	0-4	4 (Center turn lane)	2017	\$12,500	Weld County – General Fund
10	37 th Street	35 th Avenue	Two Rivers Parkway	2	4	2018	\$1,500	Evans – Capital Projects Street Fund Future Development

Table 4: List of NFRMPO Regional Travel Demand Model Projects

Map #	Street Name	From	To	Description of Improvement		Year of Improvement	Cost (thousands)	Funding Source
				Before	After			
2015-2024 Network (Cont.)								
11	Harmony Road	Three Bell Parkway (Larimer CR 3)	Lathem Parkway (Larimer CR 1)	2	4	2019	\$3,500	Timnath – General Fund/Adjacent Development
12	35 th Avenue	49 th Street	Weld CR 35 & Weld CR 394	0	4	2020	\$1,500	Evans – Capital Projects Street Fund Future Development
13	59 th Avenue	4 th Street	C Street	2	4	2020	\$2,400	Greeley – Road Development Funds
14	Boyd Lake Avenue	Larimer CR 20C	US 34	2	4	2020	\$1,988	Loveland – Transportation Capital Improvement Plan Funds
15	Boyd Lake Avenue	US 34	Canal	2	4	2020	\$2,732	Loveland – Centerra Metro District
16	Crossroads Boulevard	Centerra Parkway	Larimer CR 3	2	4	2020	\$2,365	Loveland – Transportation Capital Improvement Plan Funds
17	Harmony Road	College Avenue	Boardwalk Drive	4	6	2020	\$9,349	Fort Collins – Street Oversizing Fund, Developer Contribution, Sales Tax
18	I-25	SH 402	SH 14	4	6	2020	\$250,000	CDOT – Regional Priority Program, FASTER, Surface Treatment, TC Contingency, HPTE, Strategic Transit, RoadX, Strategic Funds; Federal – FAST Freight State Allocation, TIGER; Local Funds; Private Funds; Flexible Funds – RTP, Other STBG, CMAQ; Tolling Revenue

Table 4: List of NFRMPO Regional Travel Demand Model Projects

Map #	Street Name	From	To	Description of Improvement		Year of Improvement	Cost (thousands)	Funding Source
				Before	After			
2015-2024 Network (Cont.)								
19	Larimer CR 3	Weld CR 50	Larimer CR 18	0	2	2020	\$7,605	Johnstown - Johnstown/Adjacent Developers
20	SH 392	17 th Street	Larimer CR 3	2	4	2020	\$1,500	Windsor - Road Impact Fee and Adjacent Development
21	Taft Avenue	Arkins Branch	US 34	4	4 (Center turn lane and bike lanes)	2020	\$10,509	Loveland – Transportation Capital Improvement Plan Funds
22	US 34	Denver Avenue	Boyd Lake Avenue	4	6	2020	\$6,506	Loveland – Transportation Capital Improvement Plan Funds; CDOT; STBG
23	US 34	Rocky Mountain Avenue	I-25	4	6	2020	\$2,066	Loveland - Centerra Metro District
24	O Street	11 th Avenue	Weld CR-37	2	4	2021	\$7,222	STBG; Greeley – Road Development Fund; Weld County – General Fund; Adjacent Developers
2025-2034 Network								
25	83 rd Avenue	US 34 Business (10 th Street)	US 34 Bypass	2	4	2025	\$5,900	Greeley – Road Development Funds
26	Crossroads Boulevard	Great Western Drive	SH 257	0	2 (Center turn lane)	2025	\$5,000	Windsor - Road Impact Fee and Adjacent Development

Table 4: List of NFRMPO Regional Travel Demand Model Projects

Map #	Street Name	From	To	Description of Improvement		Year of Improvement	Cost (thousands)	Funding Source
				Before	After			
2025-2034 Network (Cont.)								
27	I-25	SH 56	SH 402	4	6	2025	\$84,000	CDOT – Regional Priority Program, FASTER, Surface Treatment, TC Contingency, Strategic Transit, Strategic Funds; Federal – FAST Freight State Allocation; Local Funds; Flexible Funds – RTP, Other STBG, CMAQ; Tolling Revenue
28	Larimer CR 3	US 34	Crossroads Boulevard	0	2	2025	\$8,073	Loveland – Transportation Capital Improvement Plan Funds
29	Prospect Road	Summit View Drive	I-25	2	4	2025	\$7,500	Fort Collins - Street Oversizing Fund, Developer Contribution, Sales Tax
30	Prospect Road	I-25	Growth Management Area Boundary	2	4	2025	\$3,000	Fort Collins - Street Oversizing Fund, Developer Contribution, Sales Tax
31	US 34	Centerra Parkway	Kendall Parkway (Larimer CR 3E)	4	6	2025	\$5,568	Loveland – Centerra Metro District
32	Timberline Road	Trilby Road	Kechter Drive	2	4	2025	\$15,000	Fort Collins - Street Oversizing Fund
33	Timberline Road	Kechter Drive	Stetson Creek Drive	2	4	2025	\$7,755	Fort Collins – Street Oversizing Fund, NFRMPO – STBG

Table 4: List of NFRMPO Regional Travel Demand Model Projects

Map #	Street Name	From	To	Description of Improvement		Year of Improvement	Cost (thousands)	Funding Source
				Before	After			
2025-2034 Network (Cont.)								
34	Larimer CR 18	I-25 Frontage Road	Weld CR 13	2	4	2030	\$13,890	Johnstown; Adjacent Developers
35	SH 60	I-25	Weld CR 15	2	4	2030	\$17,363	Johnstown; CDOT
36	US 34	Boyd Lake Ave.	Rocky Mountain Ave.	2	2	2030	\$4,291	Loveland – General Fund - CDOT
37	US 34	I-25	Centerra Parkway	4	6	2030	\$2,543	Loveland – Transportation Capital Improvement Plan Funds; CDOT
2035-2040 Network								
38	59 th Avenue	US 34 Bypass	20 th Street	2	4	2035	\$3,500	Greeley – Road Development Funds
39	83 rd Avenue	Weld CR 54	Weld CR 64	2	2 (Center turn lane)	2035	\$7,000	Greeley - Road Development Funds
40	Boyd Lake Avenue	SH 402	Larimer CR 20E	2	4	2035	\$6,300	Loveland – Transportation Capital Improvement Plan Funds
41	N. Fairground Avenue (Larimer CR 5)	Rodeo Road	71 st Street (Larimer CR 30)	2	4	2035	\$3,000	Loveland – Transportation Capital Improvement Plan Funds
42	O Street	SH 85	83 rd Avenue	2	2 (Center turn lane)	2035	\$4,700	Greeley – Road Development Funds

Table 4: List of NFRMPO Regional Travel Demand Model Projects

Map #	Street Name	From	To	Description of Improvement		Year of Improvement	Cost (thousands)	Funding Source
				Before	After			
2035-2040 Network (Cont.)								
43	O Street	83rd Avenue	Weld CR 23	0	2 (Center turn lane)	2035	\$7,400	Greeley – Road Development Funds
44	Shields Street	Fossil Creek Drive	Harmony Road	2	4	2035	\$6,500	Fort Collins – Street Oversizing Fund
45	SH 402	Larimer CR 9	I-25	2	4	2035	\$33,378	Loveland – Transportation Capital Improvement Plan Funds; CDOT
46	SH 402	US 287	St. Louis Avenue	2	4	2035	\$3,000	Loveland – Transportation Capital Improvement Plan Funds; CDOT
47	Taft Avenue/ Larimer CR 17	SH 60/Larimer CR 14	28 th Street Southwest/ Larimer CR 16	2	4	2035	\$6,123	Loveland – Transportation Capital Improvement Plan Funds
48	Taft Avenue	US 34	22 nd Street	4	4 (Center turn lane and bike lanes)	2035	\$6,123	Loveland – Transportation Capital Improvement Plan Funds
49	Taft Avenue	28 th Street Southwest	14 th Street Southwest	4	4 (Center turn lane and bike lanes)	2035	\$3,920	Loveland – Transportation Capital Improvement Plan Funds
50	Weld CR 54	35 th Avenue	Weld CR 17	2	2 (Center turn lane)	2035	\$6,800	Greeley – Road Development Funds
51	Weld CR 56	US 34 Bypass	Weld CR 17	0	2	2035	\$21,000	Greeley – Road Development Funds
52	I-25	Weld CR 38	SH 56	4	6	2040	\$85,000	CDOT Strategic Projects, Strategic Transit, Local Funds, Flexible Funds – RTP, Other STP Metro, CMAQ, FASTER Safety

***Appendix F: Resolution 2019-10 North Front Range Transportation & Air Quality
Planning Council (NFRT&AQPC) Adoption***

RESOLUTION NO. 2019-10
OF THE NORTH FRONT RANGE TRANSPORTATION & AIR QUALITY PLANNING COUNCIL
ADOPTING CONFORMITY DETERMINATIONS FOR THE NORTH FRONT RANGE METROPOLITAN
PLANNING AREA FY2020-2023 TRANSPORTATION IMPROVEMENT PROGRAM (TIP) AND THE FISCALLY
CONSTRAINED 2040 REGIONAL TRANSPORTATION PLAN AMENDED JUNE 2017 AND FOR THE
NORTHERN SUBAREA OF THE UPPER FRONT RANGE TRANSPORTATION PLANNING REGION 2040
REGIONAL TRANSPORTATION PLAN AND THE FY2019-2022 STATEWIDE TRANSPORTATION
IMPROVEMENT PROGRAM

WHEREAS, 23 CFR §450.324 requires development through continuing, cooperative, and comprehensive (“3C”) multimodal transportation planning process of a fiscally constrained Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP) for Metropolitan Planning Organizations (MPOs); and

WHEREAS, the Planning Council as the MPO is the agency responsible for developing and amending the RTP and TIP; and

WHEREAS, portions of the cities of Fort Collins and Greeley are currently designated as maintenance areas for carbon monoxide (CO) for which the Planning Council performs conformity determinations; and

WHEREAS, the Planning Council through a Memorandum of Agreement (MOA) (2008) has agreed to perform ozone conformity determinations for the Northern Subarea of the Denver-North Front Range 8-hour ozone nonattainment area which includes portions of Larimer and Weld counties outside the MPO contained in the Upper Front Range Transportation Planning Region (UFRTPR); and

WHEREAS, Section 93.110(a) of the conformity rule requires conformity determinations based on the most recent planning assumptions in force at the time of conformity analysis; and

WHEREAS, the planning assumptions for the Northern Subarea were updated prior to conformity analysis; and

WHEREAS, the air quality conformity determinations conducted on the NFRMPO’s fiscally constrained 2040 RTP, Amended June 2017, the FY2020-2023 TIP, and the Colorado FY2019-2022 Statewide TIP (STIP) using the 2040 planning assumptions were within the federally approved emissions budgets; and

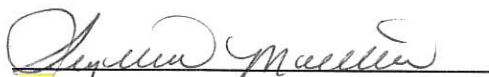
WHEREAS, the Planning Council received no public comment opposing the finding of conformity during the public comment period or during the public hearing;

NOW, THEREFORE, BE IT RESOLVED the North Front Range Transportation & Air Quality Planning Council determines the fiscally constrained 2040 RTP, the FY2020-2023 TIP, the 2040 Upper Front Range RTP, and the Colorado FY2019-2022 STIP conform to the State Implementation Plan (SIP) demonstrating positive air quality conformity redeterminations.

Passed and adopted at the regular meeting of the North Front Range Transportation & Air Quality Planning Council held this 6th day of June 2019.


Kristie Melendez, Chair

ATTEST:


Suzette Mallette, Executive Director

Appendix G: CDPHE Conformity Concurrence



COLORADO
Air Quality Control Commission
Department of Public Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

Ms. Suzette Mallette, Executive Director
North Front Range Metropolitan Planning Organization
419 Canyon Avenue, Suite 300
Fort Collins, CO 80521

May 28, 2019

The Colorado Air Pollution Control Division (APCD) has reviewed your agency's conformity determinations for its FY2018-2021 Transportation Improvement Program (TIP). The AQCC agrees that the North Front Range Metropolitan Planning Organization's (NFRMPO) FY 2020-2023 TIP, as of April 18, 2019, conforms to the State Implementation Plan (SIP) and emissions budgets for ozone precursors and carbon monoxide.

The North Front Range Metropolitan Planning Organization's and the Air Pollution Control Division's analyses indicate that emissions budgets for these pollutants will not be exceeded in any of the project or plan horizon years. Therefore, the APCD concurs with this conformity determination.

Should you have any questions, please contact Richard Coffin at the APCD, at 303-692-3127 or at richard.coffin@state.co.us.

Sincerely,

Rick Coffin, Air Quality Planner
Air Pollution Control Division

Cc: Tim Russ, U.S. EPA, Region 8
Bill Haas, FHWA
Doug Rex, DRCOG
Becky Karasko, NFRMPO
Rose Waldman, CDOT



Appendix H: U.S. Department of Transportation Conformity Finding



U.S. Department
of Transportation

July 31, 2019

Federal Highway Administration
Colorado Division
12300 West Dakota Ave., Ste 180
Lakewood, Colorado 80228

Ms. Suzette Mallette
Executive Director, NFRMPO
419 Canyon Avenue, Suite 300
Fort Collins, CO 80521

Subject: Conformity Redetermination for the NFRMPO 2040 RTP Amendment and Amended 2019-2022 TIP

Dear Ms. Mallette:

In accordance with the Clean Air Act of 1990, as amended, and 23 CFR 450, the U.S. Department of Transportation (USDOT) is required to make air quality conformity determinations of Regional Transportation Plans (RTP) and Transportation Improvement Programs (TIP) in non-attainment and maintenance areas. Consistent with the Federal Highway Administration (FHWA)/ Federal Transit Administration (FTA) Region 8 Memorandum of Agreement (MOA) for Transportation Planning Oversight, the FHWA Colorado Division office signs the letter on behalf of FTA Region 8.

On June 6, 2019, the North Front Range Metropolitan Planning Organization (NFRMPO) adopted an air quality conformity redetermination for the Fort Collins and Greeley urbanized areas for the 2040 RTP Amendment, as well as for the northern subarea of the Upper Front Range Transportation Planning Region (UFR TPR) 2040 RTP and the portion of the 2019-2022 State Transportation Improvement Program within the Upper Front Range region. On March 2, 2017, NFRMPO adopted a conformity determination for the Amended 2016-2019 TIP. The NFRMPO adopted both conformity determinations in its capacity as the Metropolitan Planning Organization.

Based on our evaluation of the NFRMPO 2040 RTP Amendment and Amended 2019-2022 TIP conformity determinations, in coordination with the Environmental Protection Agency (EPA), the Denver Regional Council of Governments (DRCOG), the NFRMPO, the Colorado Air Quality Control Commission, the Regional Air Quality Council and the Colorado Department of Transportation, we have re-determined that Fort Collins and Greeley urbanized areas have met the requirements of 40 CFR 51 and 93, 23 CFR 450, and 49 CFR 613 along with FHWA/FTA policies and guidance. Furthermore, the NFRMPO conformity redetermination is consistent with the 2008 DRCOG/NFRMPO 8-Hour Ozone MOA.

A conformity redetermination for the NFRMPO 2040 RTP Amendment and Amended 2019-2022 TIP is hereby made. We are also making a conformity redetermination for the northern subarea of the Upper Front Range TPR 2040 RTP and the Upper Front Range portion of the 2019-2022 State Transportation Improvement Program. This conformity redetermination does not restart the clock for

conformity for either the NFRMPO Amended 2040 RTP or the 2019-2022 TIP. Our action is consistent with the FHWA/FTA Transportation Planning MOA.

Sincerely,

John M. Cater, P.E.
Division Administrator

cc: Mr. Doug Rex, DRCOG
Ms. Barbara Kirkmeyer, Upper Front Range TPR
Mr. Rick Coffin, APCD
Ms. Marissa Gaughan, CDOT
Mr. Tim Kirby, CDOT
Ms. Ranae Tunison, FTA
Mr. Tim Russ, EPA