Community
Planning
Association

Report No. 12-2005

Carbon Monoxide Air Quality Planning Analysis the FY2006-2010 Northern Ada County TIP

Community Planning Association of Southwest Idaho

Matthew J. Stoll
Executive Director

September 2005

CONTENTS

APPENDICES

SUMMARY

Northern Ada County is designated as a maintenance area in attainment of the health base carbon monoxide (CO) standard. The Idaho Department of Environmental Quality (IDEQ) submitted a *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area* in December 2001. The Environmental Protection Agency (EPA) approved that plan in December 2002. Maintenance areas under a "Limited Maintenance Plan" are not required to conduct regional emissions analyses to demonstrate conformity. However, COMPASS conducts a CO regional emissions analysis as requested by the Idaho Department of Environmental Quality in Northern Ada County's Limited Maintenance Plan to aid in the regional air quality planning.

Thus, an air quality planning analysis was conducted for the FY2006-2010 Northern Ada County Transportation Improvement Program (TIP). The analysis showed minor increases in forecasted "build" CO emissions when compared to the "no-build" scenarios. These increases are well below the CO emission forecasts in the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area* and the *Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request*. COMPASS is committed to working with IDEQ and the Northern Ada County Interagency Consultation Committee on Transportation Conformity (ICC) to identify and implement mitigation measures that will counteract the CO emissions increase should IDEQ require them.

I. INTRODUCTION

Community Planning Association

Community Planning Association of Southwest Idaho (COMPASS) is an association of governments in Ada and Canyon Counties, Idaho. It provides transportation planning and a host of other planning and community services to its member agencies as well as to the public. Since 1977, COMPASS, formerly known as Ada Planning Association, has been designated as the Metropolitan Planning Organization (MPO) for Northern Ada County. In addition, COMPASS was designated as the MPO for the Nampa Urbanized Area, located in neighboring Canyon County, in April 2003. The agency's service area covers the cities of Boise, Caldwell, Eagle, Garden City, Kuna, Meridian, Middleton, Nampa, and Star. Through an agreement with the IDEQ, the MPO is designated as the "lead agency" for development of the CO State Implementation Plan (SIP) for Northern Ada County.

Area's Designations

Northern Ada County is designated as a maintenance area in attainment of the National Ambient Air Quality Standards (NAAQS) for CO (see Appendix A). This area has not experienced a violation of the CO NAAQS since 1987. The Idaho Department of Environmental Quality (IDEQ) submitted the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area* to the EPA in December 2001. The EPA approved the plan and subsequently redesignated the area in December 2002. Maintenance areas under a limited maintenance plan are not required to demonstrate their transportation programs or long-range transportation plans conform through a regional emissions analysis. Therefore, there are no applicable CO motor vehicle emissions budgets established for Northern Ada County.

However, Northern Ada County is also designated as a maintenance area in attainment of the PM_{10} NAAQS. In September of 2003, the EPA approved the *Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request*. In this document are motor vehicle emissions budgets for PM_{10} and its precursor pollutants NO_X, and VOC. The FY2006-2010 Northern Ada County TIP PM_{10} conformity demonstration is titled: *Particulate Matter Air Quality Conformity Demonstration of the FY 2006-2010 Northern Ada County TIP*.

Means of Quantitative Analysis

Multiple computer models are used to estimate transportation related emissions. Typically, one model performs calculations based solely on the transportation system in order to develop estimates of the vehicle miles of travel (VMT) and average speeds of the area's transportation network. These data are then input into EPA's MOBILE6 emissions model to compute transportation related emissions factors. These emissions factors are then used with the modeled VMT of the area to estimate the amount of pollutant emissions.

This air quality planning analysis is based upon VMT estimated using COMPASS' travel demand model forecasts. Regional CO emissions factors were generated using the latest version of EPA's MOBILE6 emissions model (MOBILE 6.2).

COMPASS' Travel Demand Model:

COMPASS utilizes Citilab's Cube/Voyager software and TP+ scripting language to forecast travel demand for transportation planning and regional emissions analyses. The travel demand model provides a snapshot of Average Daily Traffic (ADT) for each link of the transportation network. The current boundaries of the transportation network are Ada and Canyon Counties. In addition to ADT, the travel demand model produces forecasted estimates of daily VMT; congested network speeds, and other data relevant to regional emissions analyses. COMPASS' travel demand model is regularly maintained and updated to include all completed roadway projects. Future roadway networks include the current network and those anticipated projects that can be input into the model and approved for inclusion by the Northern Ada County Interagency Consultation Committee on Transportation Conformity (ICC), regardless of significance or exemption status. Appendix C provides more information on COMPASS' travel demand model.

COMPASS' modeling activities are performed under the review of the Transportation Model Advisory Committee (TMAC), a technical committee formed by the COMPASS Board of Directors. The Committee is made up of local experts, technical staff from COMPASS' member agencies, and local traffic engineers from both the public and private sectors. TMAC, along with COMPASS staff, work to periodically calibrate and validate the travel demand model to reflect the actual travel patterns and behaviors in the Treasure Valley. COMPASS' current travel demand model is calibrated and validated to 2002 conditions.

Build and No Build Scenarios:

For the purposes of this planning analysis, "build" emissions were forecasted and compared to the emissions forecasted for the "no build" scenario. A "no build" scenario estimates emissions **before** the programmed (or planned) projects are built using demographic forecasts for a given year. The "build" scenario estimates emissions **after** the programmed/planned projects are built using the same demographic forecasts as the "no build" scenario. When the two scenarios are compared, it produces an estimated air quality impact to the region from the planned roadway network.

As a supplement to the build/no build analysis, COMPASS staff compared the "build" scenarios to the CO emissions forecasts published in both the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area* and the *Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request*. This information is intended to aid air quality planning efforts when determining the need for CO mitigation measures.

Emissions Modeling:

COMPASS uses EPA's MOBILE6 emissions model to estimate the air quality impacts. MOBILE (version 6.2) is the most current emissions model approved by the EPA. EPA's MOBILE6 model

uses data input about the area's climate, elevation and vehicle emissions testing program(s) along with information on roadway network speeds to develop emission factors for specified air pollutants. These emission factors are applied to VMT forecasts from the travel demand model to develop motor vehicle emission estimates. Appendix D lists the MOBILE6.2 modeling assumption approved by ICC for use in this analysis. They are consistent with the modeling assumptions and methodologies used for the PM_{10} conformity demonstration for the FY2006-2010 Northern Ada County TIP. Appendices F through J list the MOBILE6.2 model input and output files for both the "build" and "no build" senarios.

Demographic Data:
COMPASS' Demographic Advisory Committee (DAC) is composed of demographers, developers, and representatives from local industries and governments. DAC develops the population and employment projections used by the travel demand model to generate ADT and VMT forecasts. Demographic projections made by the DAC are also endorsed and adopted by the COMPASS Board as the official population and employment projections for the Treasure Valley.

In March of 2004, the COMPASS Board approved countywide forecasted demographic control totals for 2005, 2010, 2015, 2025, and 2030. These control totals were then distributed to the model's TAZs according to a "trend" growth scenario. The "trend" growth scenario is based on the amount of vacant land, community redevelopment assumptions, current comprehensive plans, and existing densities. Overall, the "trend" growth scenario represents a continuation of the current land use, employment, and population trends. With COMPASS' adoption of *Destination 2030Limited Plan Update: Long-Range Transportation Plan*, the "trend" growth scenario became the official demographic forecast for transportation planning purposes.

Rules

EPA guidance related to "Limited Maintenance Plans," as well as the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area*, eliminates almost all of the requirements for Northern Ada County's transportation programs and long-range plans to demonstrate conformity:

> *"…in areas with approved limited maintenance plans, Federal actions requiring conformity determinations under the transportation conformity rule could be considered to satisfy the budget test required in section 93.118, 93.119, and 93.120 of the rule."* [1]

Therefore motor vehicle emissions budget tests or build/no build tests for CO are not federally required for Northern Ada County. However, IDEQ requires COMPASS to conduct a build/no build analysis of its programs and long-range plans in order to facilitate good air quality planning in Northern Ada County. If the results of the build/no build analysis shows an increase in CO emissions, IDEQ may choose to require CO mitigation measures. COMPASS will work with IDEQ on the implement of CO mitigation measures should they be required.

[1] Page 42 of the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area*

Interagency Consultation:
Idaho Administrative Code (IDAPA 58.01.01.567) requires non-attainment and maintenance areas establish an interagency consultation committee on transportation conformity. The procedures and methodologies employed in the development of the regional emissions analysis in the *Particulate Matter Air Quality Conformity Demonstration of the FY2006-2010 Northern Ada County TIP* are listed in Appendices D and E. With few exceptions, these same procedures and methodologies were used for this CO planning analysis. The emissions estimation procedures and methodologies were reviewed and approved by the ICC on May 26, 2005. Final project lists were also approved by the ICC on May 25, 2005. ICC requirements are outlined in Idaho Administrative Code (IDAPA 58.01.01.563-574).

Exempt Projects:
Pursuant to 40CFR93.126 (Exempt Projects), certain projects listed in a long-range transportation plan or TIP may proceed even in the absence of a conformity finding/demonstration. Exempt project include highway safety or mass transit projects, landscaping projects, roadway rehabilitation and repair, transportation enhancement projects, and transportation planning activities that do not lead directly to construction. However, the exempt projects listed in 40CFR93.126 are not considered exempt if the ICC concludes that they may have an adverse impact on air quality.

In addition, 40CFR93.127 (Projects Exempt from Regional Emissions Analyses) considers projects, such as intersection signalization, changes in alignment, bus terminals, and transit transfer points, exempt from regional emissions analyses. However, these projects must demonstrate project-level conformity. As with the types of exempt projects listed in 40CFR93.126, the projects listed in 40CFR93.127 may not be considered exempted if the ICC concludes them to have an adverse impact on air quality.

Regionally Significant:
Regional emissions analyses, for the purposes of demonstrating transportation conformity of a TIP or long-range plan, must include all regionally significant projects in the non-attainment or maintenance area. 40CFR93.101 defines a regionally significant project as:

> "… a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel."

The State of Idaho Administrative Code (IDAPA 58.01.01.566) further defines a regionally significant project as:

"A transportation project, other than an exempt project, that is on a facility which serves regional transportation needs… and would normally be included in the modeling of a metropolitan area's transportation network, including, at a minimum:

a. All principal arterial highways

b. All fixed guideway transit facilities that offer an alternative to regional highway travel; and

c. Any other facilities determined to be regionally significant through Section 570, interagency consultation."

On January 30, 2002, the ICC developed the following definition of a "Regionally Significant" project:

"A transportation project in Ada County, Idaho is designated 'Regionally Significant' if:

(a) the project is for the improvement of either:

(i) a principal arterial or higher functional classification; or

(ii) a minor arterial which will have a twenty (20) year projected traffic volume of at least 45,000 vehicles a day after completion of the project; and

(b) the project will add at least one new continuous vehicular lane which either:

(i) extends from one intersecting principal or minor arterial to another intersecting principal or minor arterial; or

(ii) in the case of an interstate, extends from the on ramp of one interstate interchange to a point beyond the off ramp of the next adjacent interstate interchange."

Despite these definitions, the ICC maintains discretionary authority in interpreting and applying them to the area's transportation programs, plans, and projects. For the purposes of this analysis, all applicable roadway projects, despite their significance, were included in the travel demand model networks.

Transportation Control Measures:

Despite the fact a maintenance area under a "Limited Maintenance Plan" does not have to conduct a regional emissions analysis to demonstrate conformity, a finding of conformity must still be made. As a part of this finding, as per 40CFR93.113(c), the area must still demonstrate its TIP or long-range plan will not interfere with the implementation of any transportation control measures (TCMs). Because there are no TCMs requiring implementation in the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area,* the FY2006-2010 Northern Ada County TIP meets this requirement.

II. EMISSIONS ESTIMATION

The projects used in the regional emissions analysis for the FY2006-2010 Northern Ada County TIP are derived from those listed in *Destination 2030Limited Plan Update: Long-Range Transportation Plan*, Ada County Highway District's Capital Improvement Program and Five Year Work Program, and the Idaho Transportation Department's FY2005-2009 State Transportation Improvement Program (STIP). To satisfy IDEQ requirements, a regional CO emissions analysis, including these project lists and the approved "trend" growth scenario, was developed. The list of modeled roadway projects used for this analysis can be found in *Particulate Matter Air Quality Conformity Demonstration of the FY2006-2010 Northern Ada County TIP* (COMPASS report no. 11-2005). CO emissions were estimated using the methodologies and assumptions given in Appendix D. Most of the methodologies and assumptions used in this analysis were taken from the PM_{10} Maintenance Plan Emissions Inventory. Thus, average daily VMT (i.e., average VMT of weekday and weekend traffic volumes) were used to estimate CO emissions. The Northern Ada County PM_{10} Maintenance Plan established motor vehicle emissions budgets for the years 1999, 2010, and 2015. Thus, build/no-build analyses were preformed for:

- 2006 - The base year of the FY2006-2010 Northern Ada County TIP
- 2010 - The last year of the TIP and budget year
- 2015 – PM_{10} budget year
- 2025 - An intermediate analysis year, as there can be no more than 10 year between analysis years
- 2030 - The horizon of the *Destination 2030 Limited Plan Update*

Specific emissions factors were developed to estimate the Canyon County vehicle contribution to Ada County's VMT. MOBILE6 emission factors for Canyon County vehicles are different than those for Ada County because of Ada's vehicle inspection and maintenance program. According to COMPASS' 2002 Household Travel Survey[2], 32.2% of Canyon County residents commute into Ada County for work. In order to accurately represent the CO emissions of the vehicle fleet that drives on Ada County roadways, Ada County emissions estimates were increased to account for the Canyon County vehicles. Appendix E demonstrates how this was accomplished.

2006Baseline Scenario

The baseline scenario uses 2006 demographics with the anticipated 2006 roadway network (the currently built roadway network and those applicable roadway projects expected to be open to the motoring public by December 31, 2006). 2006 demographics were interpolated using the growth anticipated between 2005 and 2010. The 2005 and 2010 population "control totals" for Ada County were adopted on March 15, 2004. Allocation of these demographic forecasts represents the "trend" growth scenario developed by COMPASS' Demographic Advisory Committee.

Table II-1 below shows estimated VMT and CO emissions from the 2006 baseline scenario. Emissions estimates were developed using emissions factors from MOBILE 6.2. Appendix F lists the

2 *2002 Treasure Valley Transportation Survey, Final Report*, February 2003. Compass Report #2003-2, Page 16, Figure 2.

MOBILE 6.2 input and output files for the 2006 scenario.

TABLE II-1: 2006 CO Emissions Estimation

Road Type	Average Daily VMT *[VMT/day]*	Ada County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	Canyon County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1] *[Ton/day]*
Interstate	1,796,361	17.59	20.85		35.28
Ramps	93,182	21.31	24.85		2.21
Principal Arterials	2,195,428	16.09	19.06		39.43
Minor Arterials	1,649,991	15.99	18.94	7.02	29.45
Collector	530,124	15.71	18.63		9.30
Local	12,584	13.60	16.36		0.19
Centroid Connectors	549,124	17.63	21.47		10.84
Totals:	6,826,795	NA	NA	7.02	126.71

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] CO emissions factors used are 2007-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, pg 4-5.
[3] Refer to Appendix E for specific estimation methodologies.

2010 Scenarios

Both 2010 scenarios use 2010 demographic forecasts with a "build" or a "no-build" roadway network. The 2010 forecasted population "control totals" for Ada County was adopted on March 15, 2004. The allocation of the forecast represents the "trend" growth scenario developed by the Demographic Advisory Committee. Appendix G lists the MOBILE 6.2 input and output files for the 2010 scenarios.

2010 "Build" Scenario:
The 2010 scenario uses 2010 demographics with the 2006 roadway network and the projects given in Table II-5 of the *Particulate Matter Air Quality Conformity Demonstration of the FY 2006-2010 Northern Ada County TIP*. Table II-4 below displays the 2010 "build" scenario CO emissions estimates.

TABLE II-4: 2010 Build CO Emissions Estimation					
Road Type	Average Daily VMT *[VMT/day]*	Ada County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	Canyon County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1] *[Ton/day]*
Interstate	1,914,455	13.24	16.35		28.39
Ramps	96,186	15.35	18.74		1.65
Principal Arterials	2,435,373	12.13	14.94		33.09
Minor Arterials	1,957,854	12.12	14.92	6.82	26.57
Collector	596,539	11.92	14.68		7.96
Local	15,050	10.61	13.18		0.18
Centroid Connectors	611,262	13.24	16.78		9.08
Totals:	7,626,718	NA	NA	6.82	106.93

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] CO emissions factors used are 2011-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, page 4-5.
[3] Refer to Appendix E for specific estimation methodologies.

2010 "No Build" Scenario:
This scenario consists of 2010 demographics forecasts modeled on the "no-build" (2006) roadway network. Table II-5 below displays the 2010 "no build" scenario CO emissions estimates.

TABLE II-5: 2010 No Build CO Emissions Estimation					
Road Type	Average Daily VMT *[VMT/day]*	Ada County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	Canyon County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1] *[Ton/day]*
Interstate	1,919,059	13.23	16.34		28.44
Ramps	97,935	15.35	18.74		1.68
Principal Arterials	2,422,649	12.12	14.92		32.88
Minor Arterials	1,963,130	12.10	14.89	6.83	26.59
Collector	602,524	11.92	14.68		8.04
Local	14,802	10.58	13.14		0.18
Centroid Connectors	612,314	13.24	16.78		9.10
Totals:	7,632,413	NA	NA	6.83	106.91

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] CO emissions factors used are 2011-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, page 4-5.
[3] Refer to Appendix E for specific estimation methodologies.

2015 Scenarios

Both 2015 scenarios use 2015 demographic forecasts with a "build" (2015) or a "no-build" (2006) roadway network. The 2015 forecasted control totals for Ada County were adopted on March 15, 2004. The allocation of the forecast represents the "trend" growth scenario developed by the Demographic Advisory Committee. Appendix H lists the MOBILE 6.2 input and output files for the 2015 scenarios.

2015 "Build" Scenario:

The 2015 "build" scenario consists of 2015 demographics forecasts modeled on a "build" (2015) network. The 2015 "build" network consists of the 2010 roadway network and those projects listed in Table II-9 of the *Particulate Matter Air Quality Conformity Demonstration of Destination the FY2006-2010 Northern Ada County TIP*. Table II-6 below displays the 2015 "build" scenario CO emissions estimates.

TABLE II-6: 2015 Build CO Emissions Estimation					
Road Type	Average Daily VMT *[VMT/day]*	Ada County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	Canyon County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1] *[Ton/day]*
Interstate	2,067,591	10.74	13.56	6.60	24.90
Ramps	101,274	12.18	15.32		1.38
Principle Arterials	2,688,514	9.82	12.36		29.60
Minor Arterials	2,522,731	9.88	12.44		27.95
Collector	735,897	9.75	12.26		8.04
Local	23,656	8.83	11.09		0.23
Centroid Connectors	709,962	10.76	13.98		8.59
Totals:	8,849,624	NA	NA	6.60	100.69

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] CO emissions factors used are 2016-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, page 4-5.
[3] Refer to Appendix E for specific estimation methodologies.

2015 "No Build" Scenario:

This scenario consists of 2015 demographics forecasts modeled on the "no-build" (2006) roadway network. Table II-7 below displays the 2015 "no build" scenario CO emissions estimates.

TABLE II-7: No Build 2015 CO Emissions Estimation					
Road Type	Average Daily VMT *[VMT/day]*	Ada County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	Canyon County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1] *[Ton/day]*
Interstate	2,086,872	10.70	13.52		25.05
Ramps	102,344	12.18	15.32		1.40
Principal Arterials	2,708,758	9.79	12.31		29.72
Minor Arterials	2,447,514	9.85	12.40	6.61	27.04
Collector	780,497	9.75	12.26		8.53
Local	23,899	8.83	11.08		0.24
Centroid Connectors	712,703	10.76	13.98		8.62
Totals:	8,862,586	NA	NA	6.61	100.59

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] CO emissions factors used are 2016-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, page 4-5.
[3] Refer to Appendix E for specific estimation methodologies.

2025 Scenarios

Both 2025 scenarios use 2025 demographic forecasts with a "build" or a "no-build" roadway network. The 2025 forecasted control totals for Ada County were adopted on March 15, 2004. The allocation of the forecast represents the "trend" growth scenario developed by the Demographic Advisory Committee. Appendix I lists the MOBILE 6.2 input and output files for the 2025 scenarios.

2025 "Build" Scenario:
This scenario consists of 2025 demographics forecasts modeled on a 2025 "build" network. The 2025 "build" network consists of the 2015 roadway network and the projects listed in Table II-13 of the *Particulate Matter Air Quality Conformity Demonstration of the FY2006-2010 TIP*. Table II-8 below displays the 2025 "build" scenario CO emissions estimates.

TABLE II-8: 2025 Build CO Emissions Estimation					
Road Type	Average Daily VMT *[VMT/day]*	Ada County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	Canyon County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1] *[Ton/day]*
Interstate	2,765,631	8.93	11.59		27.74
Ramps	127,686	10.29	13.33		1.47
Principal Arterials	3,264,975	8.28	10.72		30.36
Minor Arterials	3,395,672	8.31	10.74	6.27	31.66
Collector	1,049,849	8.28	10.72		9.76
Local	40,006	7.61	9.78		0.34
Centroid Connectors	926,294	9.14	12.23		9.53
Totals:	11,570,112	NA	NA	6.27	110.87

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] CO emissions factors used are 2026-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, page 4-5.
[3] Refer to Appendix E for specific estimation methodologies.

2025 "No Build" Scenario:
This scenario consists of 2025 demographics forecasts modeled on a 2006 "no-build" roadway network. Table II-9 below displays the 2025 "no build" scenario CO emissions estimates.

TABLE II-9: 2025 No Build CO Emissions Estimation					
Road Type	Average Daily VMT *[VMT/day]*	Ada County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	Canyon County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1] *[Ton/day]*
Interstate	2,459,790	8.85	11.47		24.43
Ramps	114,355	10.29	13.33		1.32
Principle Arterials	3,277,820	8.28	10.72		30.46
Minor Arterials	3,522,705	8.28	10.72	6.29	32.76
Collector	1,191,374	8.28	10.72		11.08
Local	40,856	7.61	9.78		0.35
Centroid Connectors	940,365	9.14	12.22		9.67
Totals:	11,547,263	NA	NA	6.29	110.07

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] CO emissions factors used are 2026-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, page 4-5.
[3] Refer to Appendix E for specific estimation methodologies.

2030 Scenarios

Both 2030 scenarios use 2030 demographic forecasts with a "build" or a "no-build" roadway network. The 2030 forecasted control totals for Ada County were adopted on March 15, 2004. The allocation of the forecast represents the "trend" growth scenario developed by the Demographic Advisory Committee. Appendix J lists the MOBILE 6.2 input and output files for the 2030 scenarios.

2030 "Build" Scenario:
This scenario consists of 2030 demographics forecasts modeled on a 2030 "build" network. The 2030 "build" network consists of the 2025 roadway network and the projects listed in Table II-17 of the *Particulate Matter Air Quality Conformity Demonstration of the FY2006-2010 TIP*. Table II-10 below displays the 2030 "build" scenario CO emissions estimates.

TABLE II-10: 2030 Build CO Emissions Estimation					
Road Type	Average Daily VMT *[VMT/day]*	Ada County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	Canyon County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1] *[Ton/day]*
Interstate	2,986,632	8.67	11.26		29.08
Ramps	137,266	10.06	13.05		1.55
Principal Arterials	3,836,450	8.09	10.48		34.83
Minor Arterials	3,833,005	8.09	10.48	6.16	34.80
Collector	1,218,468	8.09	10.48		11.06
Local	41,448	7.44	9.56		0.35
Centroid Connectors	1,037,598	8.92	11.95		10.42
Totals:	13,090,867	NA	NA	6.16	122.09

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] CO emissions factors used are 2031-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, page 4-5.
[3] Refer to Appendix E for specific estimation methodologies.

2030 "No Build" Scenario:
This scenario consists of 2030 demographics forecasts modeled on a 2006 "no-build" roadway network. Table II-11 below displays the 2030 "no build" scenario CO emissions estimates.

TABLE II-11: 2030 No Build CO Emissions Estimation					
Road Type	Average Daily VMT *[VMT/day]*	Ada County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	Canyon County Composite Vehicle CO Emissions Factor[2] *[g/mile]*	% Of Canyon County Vehicles VMT in Ada[3]	Estimated CO Emitted[1] *[Ton/day]*
Interstate	2,661,414	8.48	11.00		25.32
Ramps	124,248	10.06	13.05		1.40
Principle Arterials	3,575,975	8.11	10.54		32.55
Minor Arterials	4,112,766	8.08	10.48	6.19	37.31
Collector	1,473,338	8.08	10.48		13.37
Local	52,875	7.44	9.56		0.44
Centroid Connectors	1,073,835	8.92	11.95		10.78
Totals:	13,074,452	NA	NA	6.19	121.19

[1] A conversion factor of 907,184.74 grams per ton was used.
[2] CO emissions factors used are 2031-winter. Refer to the PM_{10} Maintenance Plan, Appendix A, page 4-5.
[3] Refer to Appendix E for specific estimation methodologies.

III. CONCLUSIONS

"Build/No Build" Scenario Comparisons

Tables III -1 through III –5 compare the "build" and "no build" emissions scenarios for each forecasted analysis year. Again, the purpose of these comparisons is not to demonstrate conformity, but rather to facilitate good air quality planning in Northern Ada County.

Table III-2: 2010 Build/No Build Comparison		
Scenario	**Average Daily VMT** *[VMT/day]*	**CO Emissions** *[Ton/day]*
2010 Build	7,626,718	106.93
2010 No Build	7,632,413	106.91
Result	***-5,695***	***0.02***

Table III-3: 2015 Build/No Build Comparison		
Scenario	**Average Daily VMT** *[VMT/day]*	**CO Emissions** *[Ton/day]*
2015 Build	8,849,624	100.69
2015 No Build	8,862,586	100.59
Result	***-12,962***	***0.10***

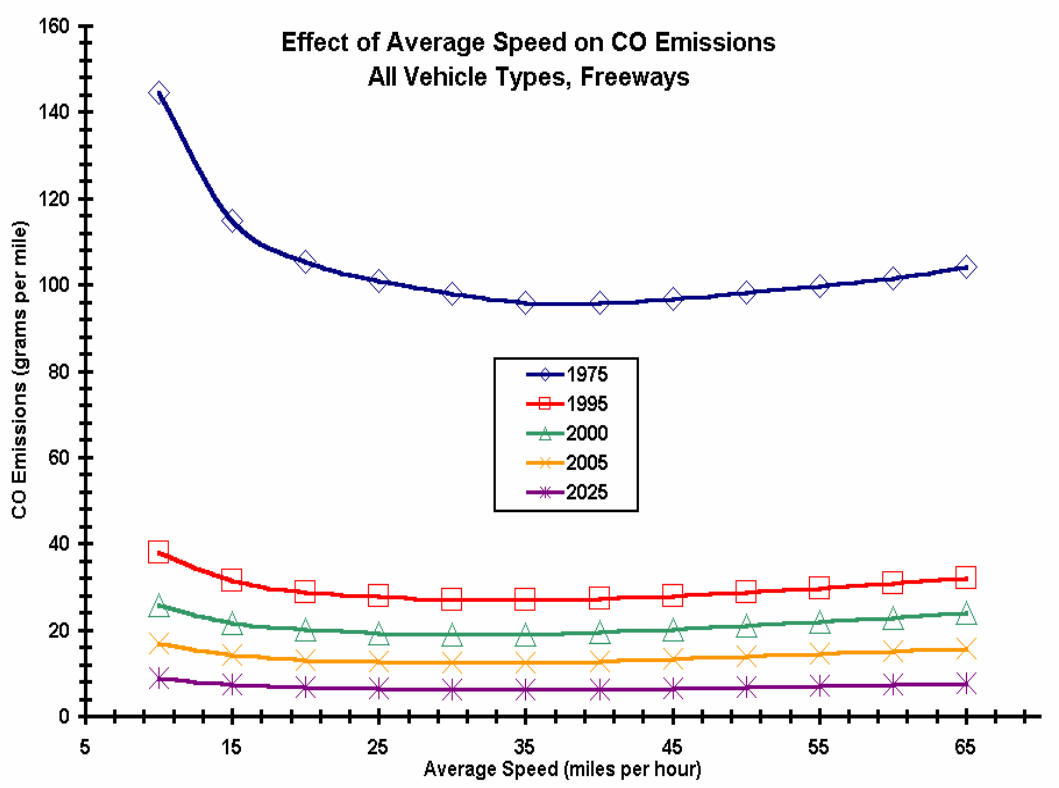
Table III-4: 2025 Build/No Build Comparison		
Scenario	**Average Daily VMT** *[VMT/day]*	**CO Emissions** *[Ton/day]*
2025 Build	11,570,112	110.87
2025 No Build	11,547,263	110.07
Result	***22,849***	***0.80***

Table III-5: 2030 Build/No Build Comparison		
Scenario	**Average Daily VMT** *[VMT/day]*	**CO Emissions** *[Ton/day]*
2030 Build	13,090,867	122.09
2030 No Build	13,074,452	121.19
Result	***16,415***	***0.90***

Each comparison shows an increase in CO emissions for the "build" scenarios, despite projected decreases in "build" network VMT in 2010 and 2015. These minor increases in CO emission

estimates are due, in part, to the use of posted speeds in the travel demand model. MOBILE6 CO emissions factors are very sensitive to speed. As Figure III-1 shows, MOBILE6 CO emissions factors decreases as speed increases until approximately 35 miles per hour. However, when speeds increase above 40 miles per hour, MOBILE6 CO emissions factors begin to increase. COMPASS' model uses posted speeds with little or no adjustments. This translates into significant differences in average vehicle speeds between the "build" and "no build" scenarios.

Figure III-1: Effect of Average Speed on CO Emissions for Freeway Facility types (adapted from Figure 28 of EPA's *Sensitivity Analysis of MOBILE6*, EPA420-R-02-035, December 2002)



As a result of this analysis, IDEQ may choose to require CO mitigation measures. However, COMPASS' past work with several local governments to mitigate open burning impacts may be considered more than adequate to offset the CO emissions increases forecasted in "build" scenarios.

Emissions Inventory Comparisons

To aid in the evaluation of the CO impacts related to the FY2006-2010 TIP, the "build" scenario CO emissions forecasts are compared to the on-road mobile portions of two relevant IDEQ emissions inventories. On-road mobile CO emissions forecasts were developed for both the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County*

Carbon Monoxide Not-Classified Nonattainment Area and the *Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request*. Tables III-6 and III-7 compare the on-road mobile CO emissions forecasts in IDEQ's air quality plans to those based on the FY2006-2010 TIP regional emissions analysis.

Table III-6: Comparison of the "Build" Scenarios to the CO Limited Maintenance Plan On-road Mobile Emissions Inventory

	Year				
	2006 *[Ton/day]*	2010 *[Ton/day]*	2015 *[Ton/day]*	2025 *[Ton/day]*	2030 *[Ton/day]*
"Build" Scenario	126.71	106.93	100.69	110.87	122.09
On-road Inventory*	154.16	162.46	162.46	162.46	162.46
Result	***-27.45***	***-55.53***	***-61.77***	***-51.59***	***-40.37***

*From Table VI.H-4 in Appendix A of the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area*. Inventory forecasts for 2000 are used to compare to 2006. Inventory forecasts for 2010 are used to compare to 2015, 2025, and 2030.

Table III-7: Comparison of the "Build" Scenarios to the CO On-road Mobile Emissions Inventory in the PM_{10} Maintenance Plan

	Year				
	2006 *[Ton/day]*	2010 *[Ton/day]*	2015 *[Ton/day]*	2025 *[Ton/day]*	2030 *[Ton/day]*
"Build" Scenario	126.71	106.93	100.69	110.87	122.09
On-road Inventory*	154.27	125.49	123.29	126.78	126.78
Result	***-27.56***	***-18.56***	***-22.60***	***-15.91***	***-4.69***

*Emissions estimates from Tables 4-3, 9-1, 9-2, and 9-3 in Appendix A of the *Northern Ada County PM_{10} SIP Maintenance Plan and Redesignation Request*. Inventory forecasts for 1999 are used to compare to 2006. Inventory forecasts for 2020 are used to compare to 2025 and 2030.

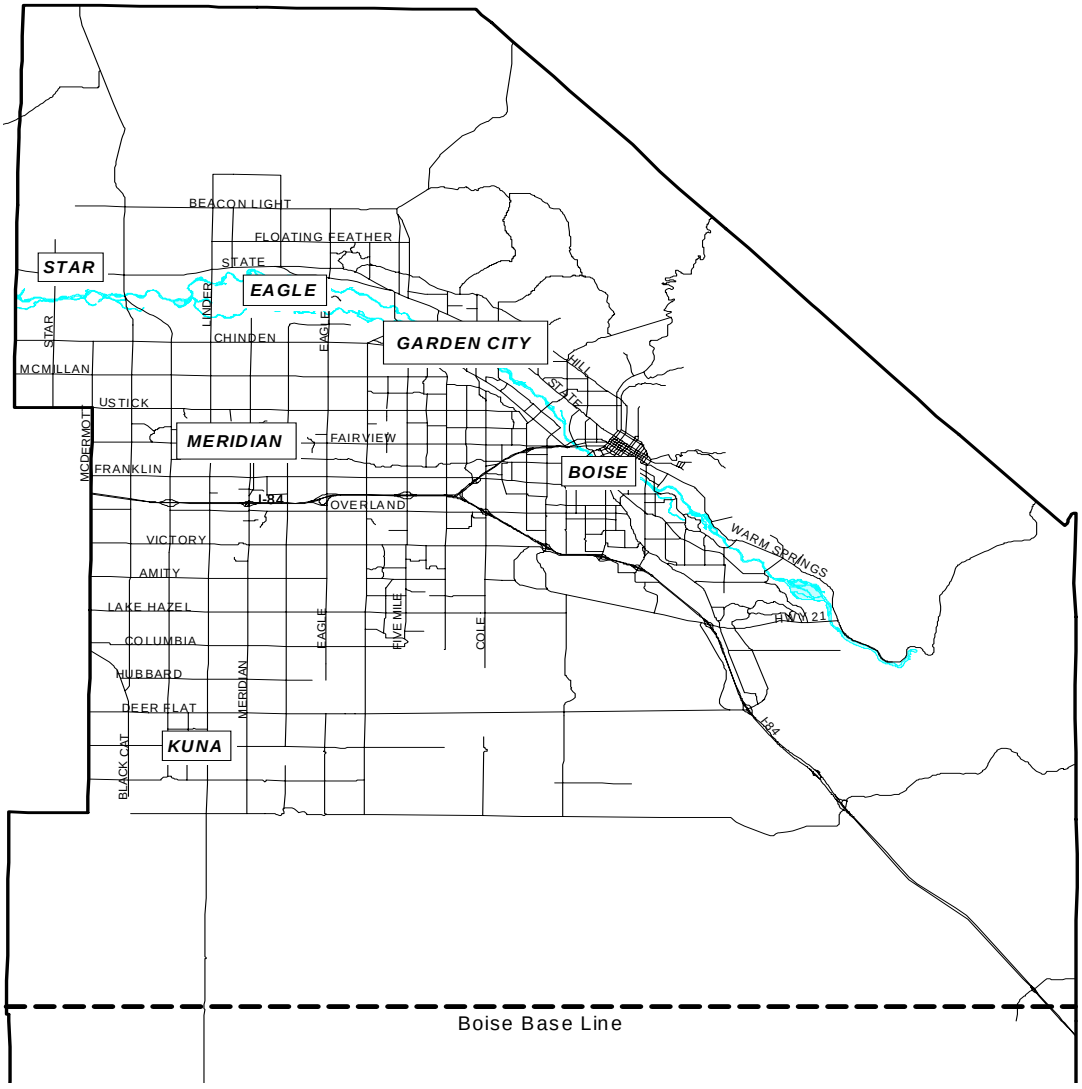
The comparisons above show that, despite the results of the build/no-build comparisons, the programmed/planned transportation projects will not increase the amount of CO emitted from on-road mobile sources into Northern Ada County's air above levels estimated by IDEQ.

T:\FY05\600Projects\685 TIP\FY062010 CO AQAnal\FY2006-2010 CO analdraft.doc

APPENDICES

APPENDIX A

Northern Ada County Carbon Monoxide Maintenance Area



APPENDIX B

GLOSSARY OF ACRONYMS

ACHD		Ada County Highway District
ADT		Average Daily Traffic
AQB		Air Quality Board
CAAA		Clean Air Act Amendment
CMAQ		Congestion Mitigation and Air Quality, a federal funding source for air quality
CO		Carbon Monoxide
COMPASS		Community Planning Association of Southwest Idaho
DAC		Demographic Advisory Committee
DOT		US. Department of Transportation
EPA		US. Environmental Protection Agency
FHWA		Federal Highway Administration
FTA		Federal Transit Administration
g		Grams
ICC		Northern Ada County Interagency Consultation Committee on Transportation Conformity
IDEQ		Idaho Department of Environmental Quality
I/M		Inspection and Maintenance Program
ITD		Idaho Transportation Department
kg		Kilograms
MPO		Metropolitan Planning Organization
NAAQS		National Ambient Air Quality Standards
NHS		National Highway System
NO_x		Oxides of Nitrogen
NRS		Not Regionally Significant
PM_{10}		Particulate Matter with a diameter less than 10 micrometers (i.e. $1x10^{-6}$)
SH		State Highway
SIP		State Implementation Plan
STIP		State Transportation Improvement Program
TCM		Transportation Control Measure
TDM		Travel Demand Model
TIP		Transportation Improvement Program
TMAC		Transportation Modeling Advisory Committee
TPD		Tons per day
VKT		Vehicle Kilometers of Travel
VMT		Vehicle Miles of Travel
VOC		Volatile Organic Compounds

APPENDIX C

INTRODUCTION TO TRAVEL FORECAST MODELING

Regional transportation planning is a complicated process that requires looking 20 years into the future. The Community Planning Association (COMPASS) uses a computer model to forecast traffic conditions and identify transportation system impacts for specific years in the future. The model is produced using demographic, land use, and roadway network data. Forecasted conditions include the planned improvements to the roadway network as well as land-use assumptions about where growth will occur.

COMPASS' Transportation Model Advisory Committee (TMAC) guides COMPASS staff in the research, development and review of the model as well as recommending improvements and/or enhancements to the model and its input data. TMAC is made up of representatives from COMPASS' many member agencies and appointed transportation/land use/air quality professionals who serve on a voluntary basis.

COMPASS' current travel demand forecast model was recently updated, calibrated and validated. It was calibrated with data from a household travel characteristics study performed and completed in 2002. This survey obtained information about the number of trips, travel time, and trip purpose by mode and time-of-day from more than 2,600 Treasure Valley households. It was validated with traffic count data for 2002. TMAC approved the use of the current travel demand model on June 29, 2004.

How the Model Works

COMPASS' travel demand model simulates traffic patters for the region based on where trips are likely to start and end. This is done using a four-step modeling process (see Figure C-1). The simulation is adjusted to account for roadway capacities, the availability of alternate routes, and changes in travel time due to congestion. When all routes have approximately the same travel time, and there are no longer advantages associated with alternative routes, equilibrium is reached and the model forecasts produced.

COMPASS' travel demand model is developed using:

- Past and Present Traffic Count Data -Traffic counts are collected from the Idaho Transportation Department, Ada County Highway District, and various Canyon County transportation agencies. Traffic count data are used to validate the model for a "base year".

- Demographic Data Forecasts - COMPASS' Demographic Advisory Committee develops area-wide demographic forecasts on population, households and employment. Forecasts are first developed for large demographic sub areas of the Treasure Valley. Then the forecasts are allocated to individual Traffic Analysis Zones (TAZ). TAZ boundaries are based on a combination of census boundaries and local geographic features such as roads and waterways and range in size from a few blocks to one or more square miles. COMPASS' TAZ boundaries are reviewed every 10 years, based on the results of the U.S. Census. This process maintains the integrity of the previous years of data while updating the boundaries of the zones based on major changes such as new roads or significant changes in development.

- Roadway Network – In order to forecast traffic, a digital network of the functionally classified roads and their current characteristics (number of lanes, traffic counts, etc.) are built for each analysis year. The functionally classified streets input into the model network are: interstates, principal arterials, minor arterials, and collectors. Some local roads are included in model roadway networks for the purposes of connectivity and model validation. However residential roadways are not specifically considered in the model. Instead they are abstractly represented as centroid connectors. Centroid connectors are connections in the model made between classified roadways and TAZs.

- Future year roadway networks are developed using existing facilities with roadway projects planned for completion by a certain date.

- Roadway Capacities - The capacity of a roadway is defined as the number of vehicles a particular road can manage before congestion occurs. Capacities are based on the functional classification of the facility and its location.

- Travel Speed – Posted speed limits are put into COMPASS' travel demand model as the maximum travel speed. Travel speeds may be adjusted during the model validation process to account for delay or route attractiveness not adequately considered by the other model inputs.

- Trip Types - The current travel demand forecast model uses six trip types. Five of these have one end of the round-trip at home. They are home –based work, home-based shopping, home-based social, home-based school, and home-based other. The sixth trip type does not involve travel either to or from home. Therefore, it is called a non-home-based trip. The characteristics for these trip types are developed from travel surveys completed by random households throughout the Treasure Valley as well as nationally developed data.

- Alternative Transportation Modes (Mode Split) - Based on census and household travel survey data, the fraction of single occupant vehicles, non-single occupant vehicles, and non-motorized travel modes can be determined. However, the model currently does not forecast changes in travel mode fraction. Therefore, forecasted traffic volumes assume a pro-rated reduction in single occupant travel over a given planning horizon to represent an increasing use of alternatives transportation modes. The current assumption is 25% of all travel by the year 2025 will involve non-single occupant vehicles.

Model Data Uses

COMPASS' travel demand model produces forecasts of average weekday traffic volumes (ADT), average traffic speeds, vehicle miles of travel (VMT), and the level of service for each roadway in the model network. These forecasts are used for a variety of purposes, including:

- Traffic Impact Studies – These studies determine traffic impacts of new developments such as a new retail mall.

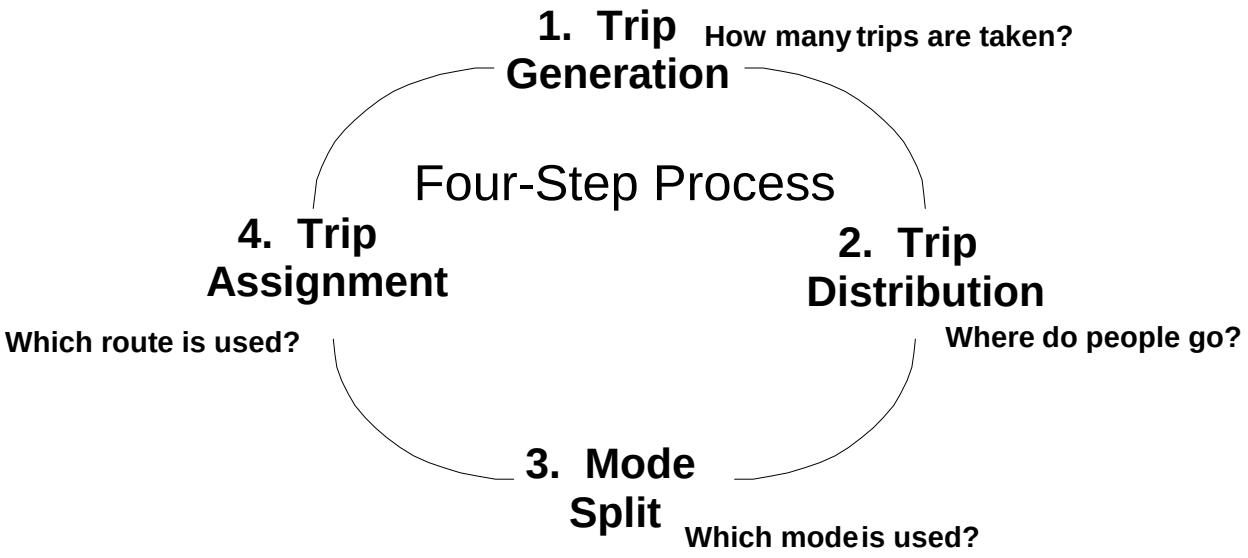
- Roadway Network Deficiency Analyses - These highlight potential future roadway inefficiencies and/or needs as a result of additional growth or other network modifications.

- Air Quality Conformity Analyses – Transportation conformity analyses are required to demonstrate planned transportation projects will conform to the state implementation plans in nonattainment and/or maintenance areas.

Peak-Hour Model

COMPASS' peak-hour model estimates travel demand during the afternoon rush hour (5 to 6 p.m.). It operates identical to and uses the same types of data inputs as COMPASS' 24-hour travel demand model. It was calibrated in September 2004. Forecasted traffic volumes from peak hour models are primarily used in traffic studies to aid in the design of intersections. The peak-hour model was not used in this regional emissions analysis.

Figure C-1:
The Four-Step Model



INPUTS:

Census and/or Home Interviews (Surveys)

Traffic Counts

Roadway Characteristics

Demographic/Land Use Data

MODEL USED TO FORECAST:

Travel Demand Estimation

How many vehicles may travel a particular route in the future?

Development Impacts

How will a proposed development impact the existing roads?

Roadway Deficiencies

Which roads may be overloaded and by how much?

Air Quality Conformity Determinations

Will air quality improve or worsen?

Decision Support

Where do we invest to best serve the future community needs?

Appendix D

Approved Modeling Assumptions and Emissions Estimation Methodologies

Table D-1: FY2006-2010 MOBILE Model Input Assumptions

Parameter:	FY2006-2010:	2030 Update/FY05-09 TIP Modeled at:	Note:
Fleet Mix	Local fleet mix data acquired as part of COMPASS' B20 Biodiesel (Remote Sensing) Study for LDV classes. MOBILE default for HDV classes.	EPA MOBILE 6.2 Default. Based on national fleet mix data	Local LDV data and default HDV data were combined and normalized for input into the MOBILE model.
I/M Program	Two distinct Annual programs: One is a test only 2500 RPM for pre 1996 vehicles, the other is a On board diagnostic test (OBD Test) for 1996 and newer vehicles. 2500 RPM: Waiver Rates = 1%, 1%; Stringency = 27%. OBD: Waiver Rates = 0.0% and 1%. Compliance Rate = 98% for both programs.	Same	Data acquired from/confirmed by Denis Turner, Air Quality Board, on 3-16-2005.
Anti-Tamper Program	Annual check for gasoline vehicles. Program started in 1984. Model years 1981 and newer are checked for tampering with: Air Pump, Catalyst, fuel inlet restrictor, EGR, and the gas cap. Compliance rate is 98%.	Same	
Min/Max Temp.	Winter = 31.25 / 48.20 F Summer = 46.77/ 73.22	Same	CO estimates use winter only. ITD's PLAQ uses different temps for project screening purposes.
Fuel RVP	Winter = 15; Summer = 8.6	Same	CO estimates use winter only.
Diesel Fuel Sulfur Content	500 ppm until 2010; 15 ppm after 2010	Same	Not used for CO emissions estimates
Facility Speeds	Based on the weighted average model speeds for Interstates, Interstate Ramps, Principle and Minor Arterials, Collectors, Local Roads, and Centroid Connectors.	Same	Per PM10 Maintenance Plan Methodology (see Attachment 2)
Fuel Program	3 = Conventional Gasoline West	Same	Applies one of two phase-in schedules for the Tier 2 sulfur fuel standards for years after 1999.
Absolute Humidity	Winter = 24.87grain/lb Summer = 43.05 grain/lb	Same	Per PM10 Maintenance Plan – Annual Values. CO estimates use winter only.
Seasonal Evaluation	Average of Winter and Summer emissions factors.	Same	CO estimates use winter only. Winter emissions will be for years 2007, 2011, 2016, 2026, 2031. This will allow us to take credit for some fleet turnover in November and December.

Summary of FY2006-2010 TIP Regional Emissions Analysis Methodologies

Budget Tests: A Budget Test will be used to demonstrate conformity of the FY2006-2010 TIP for NO_x, VOC, and PM_{10}. The test will use the PM_{10} Maintenance Plan's annual emissions estimation methodology. This method developed an annual average emissions factor by averaging summer and winter emissions factors for each pollutant. These annual average emissions factors will then be used with forecasted VMT from the travel demand model to calculate annual average emissions in tons per day (TPD).

VOC Emissions Adjustment: Refueling and evaporative VOC emissions will not be included in the regional emissions analysis, as per PM_{10} Maintenance Plan emissions inventory methodology.

PM Emissions: PM_{10} emissions will be calculated using average weekday VMT, not average daily VMT. This is due to how road dust emissions were calculated in the PM_{10} Maintenance Plan.

CO Planning Analysis: A Build/No Build Test will be conducted using winter emissions factors for CO instead of annual average. Average daily VMT will be used to calculate CO emissions. In addition, CO emissions estimates will be compared to those in the CO Limited Maintenance Plan emissions inventory and the PM_{10} Maintenance Plan. A CO regional emissions analysis is not required by FHWA, but is a requirement of the CO Limited Maintenance Plan.

Methodology for Determining MOBILE Model Facility Speeds: First, speeds for each link in the travel demand model are VMT weighted by multiplying the congested speed of the link by its corresponding distance and daily volume (Equation D-1):

$$SW_L = S_L * VMT_L \qquad \text{(Equation D-1)}$$

Where:
SW_L = VMT weights containing speed for each link (miles^2/ hour)
S_L = Congested speed of the link (in miles/hour)
VMT_L = Weekday VMT for the link (in miles)

Then, for each of the 7 modeled facility types, the daily VMT (Equation D-3) and the VMT weights containing speed (Equation D-2) are summed:

$$SW_T = \sum_{1}^{n} SW_L \qquad \text{(Equation D-2)}$$

$$VMT_T = \sum_{1}^{n} VMT_L \qquad \text{(Equation D-3)}$$

Where:
SW_T = Total VMT weights containing speed for a given facility type (miles^2/ hour)
VMT_T = Total weekday VMT of a given facility type (miles)

n = number of links for a given facility type

To arrive at a final speed for each travel demand model facility, the total VMT weight containing speed for each facility type is divided by the total VMT of a given facility type (Equation D-4):

$$S_M = \frac{SW_T}{VMT_T} \qquad \text{(Equation D-4)}$$

Where:
S_M = Speed used in MOBLIE 6.2 for a given facility type (miles/hour)

This was the methodology used to develop the on-road portion of the PM_{10} Maintenance Plan's emission inventory and motor vehicle emissions budgets.

MOBILE 6.2 Modeling of Facility Types:
Travel Demand Model Interstate = MOBILE 6.2 Freeways
Travel Demand Model Principal Arterials = MOBILE 6.2 Arterial
Travel Demand Model Minor Arterials = MOBILE 6.2 Arterial
Travel Demand Model Collectors = MOBILE 6.2 Arterial

Travel Demand Model Local Roads: For local facility types MOBILE 6.2 assigns a speed of 12.9 mph. However travel demand model speeds of local roads are well above 12.9 mph. Therefore emissions factors for local roads are calculated using the ratios of three MOBILE 6.2 generated emissions factors (Equation D-5):

$$EF_{local} = EF_{AS} \times \frac{EF_L}{EF_{AL}} \qquad \text{(Equation D-5)}$$

Where:
EF_{Local} = Emissions factor for local roads (grams/mile)
EF_{AS} = The MOBILE 6.2 emissions factor for local roads modeled as an arterial (grams/mile)
EF_L = The MOBILE 6.2 emissions factor for local roads modeled as a local road (grams/mile)
EF_{AL} = The MOBILE 6.2 emissions factor for local roads modeled as an arterial at a speed of 12.9 mph (grams/mile)
Travel Demand Model Ramps: For freeway ramps, MOBILE 6.2 assigns a speed of 34.6 mph. This was accepted and used for the PM_{10} Maintenance Plan's emissions inventory.

Travel Demand Model Centroid Connectors = MOBILE 6.2 Arterial. Note: Centroid connectors are more representative of a MOBILE 6.2 local roadway than a MOBILE 6.2 arterial. The travel demand model speeds of most centroid connectors are 15 mph, while the speeds of local roadways are closer to those found on minor arterials and collectors. However, an analysis conducted as part of the FY2004-2008 Northern Ada County TIP regional emissions analysis showed changing the emissions estimation methodology to be insignificant.

Ada County On-Road Fleet Mix Estimation Method

On March 5, 2004 Desert Research Institute (DRI) used a digital camera to photograph vehicles on the Franklin Road and I-184 eastbound on-ramp as part of COMPASS' B20 Biodiesel Emissions Study. License plate images were then transcribed by staff and matched with registration records on file at the Idaho Transportation Department (ITD). Over 2,000 vehicle identification numbers (VINs), supplied by ITD and the Ada County Air Quality Board, were subsequently decoded and linked to their appropriate MOBILE6.2 vehicle classification (Table D-2).

Heavy-duty tractor-trailers have license plates that were often located outside the camera's field of view. However, DRI's license plate transcription software allowed staff the ability to flag vehicles that appeared to have gross vehicle weight ratios (GVWRs) greater than 12,000 lbs (i.e. heavy –duty trucks larger than dual wheeled pickups). The Northern Ada County Interagency Consultation Committee (ICC) assessed the limitations of this sampling technique and directed COMPASS to continue using MOBILE6.2 default fleet mix data for heavy-duty vehicles. However, the ICC approved the use of the observed light-duty vehicle fleet mix data from the B20 Biodiesel Emissions Study for the FY2006-2010 TIP regional emissions analysis.

The observed data from the 2004 B20 Biodiesel Emissions Study were forecasted to 2005 (FP_{2005} observed) using the second equation (FO_y). Equation D-6 was used to normalize the light-duty observed and heavy-duty default VMT fractions as required for input to MOBILE6.2:

$$FO_{2005} = FP_{2005} / FP_s \qquad \text{(Equation D-6)}$$

Where:

FO_{2005} = VMT fraction used for the base year regional emissions analysis
FP_{2005} = observed (LDV-LDT4, MC) or default (HDV2b-HDBT) VMT fraction for 2005
s = sum of the preliminary observed (LDV-LDT4, MC) and default (HDV2b-HDBT) VMT fractions for 2005

These VMT fractions were forecasted to coincide with the analysis years for the regional emissions analysis. MOBILE6.2 default future year distributions were used to forecast the VMT fractions according to Equation D-7:

$$FO_y = FO_{2005} \times (FD_y / FD_{2005}) \qquad \text{(Equation D-7)}$$

Where:

FO_y = VMT fraction for forecast year "y"
FO_{2005} = VMT fraction in 2005
FD_y = MOBILE6.2 default VMT fraction for year "y"
FD_{2005} = MOBILE6.2 default VMT fraction for 2005

Table D-3 shows the resultant VMT fractions used to estimate emissions for years 2006, 2010, 2015, 2025, and 2030.

Table D-2: MOBILE6 Vehicle Classifications for VMT Fractions (from EPA's *User's Guide to MOBILE6.1 and MOBILE 6.2*, 2003)

Abbreviation	Description
LDV	Light-Duty Vehicles (Passenger Cars)
LDT1	Light-Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3,750 lbs. LVW)
LDT2	Light-Duty Trucks 2 (0-6,000 lbs. GVWR, 3,751-5,750 lbs. LVW)
LDT3	Light-Duty Trucks 3 (6,001-8,500 lbs. GVWR, 0-5,750 lbs. ALVW*)
LDT4	Light-Duty Trucks 4 (6,001-8,500 lbs. GVWR, 5,751 lbs. and greater ALVW)
HDV2B	Class 2b Heavy-Duty Vehicles (8,501-10,000 lbs. GVWR)
HDV3	Class 3 Heavy-Duty Vehicles (10,001-14,000 lbs. GVWR)
HDV4	Class 4 Heavy-Duty Vehicles (14,001-16,000 lbs. GVWR)
HDV5	Class 5 Heavy-Duty Vehicles (16,001-19,500 lbs. GVWR)
HDV6	Class 6 Heavy-Duty Vehicles (19,501-26,000 lbs. GVWR)
HDV7	Class 7 Heavy-Duty Vehicles (26,001-33,000 lbs. GVWR)
HDV8A	Class 8a Heavy-Duty Vehicles (33,001-60,000 lbs. GVWR)
HDV8B	Class 8b Heavy-Duty Vehicles (>60,000 lbs. GVWR)
HDBS	School Buses
HDBT	Transit and Urban Buses
MC	Motorcycles (All)

* ALVW = Alternative Loaded Vehicle Weight: The adjusted loaded vehicle weight is the numerical average of the vehicle curb weight and the gross vehicle weight rating (GVWR)

Table D-3: VMT Factions (Projected using MOBILE6 defaults)

Vehicle Type	2005	2006	2010	2015	2025	2030
LDV	0.463	0.444	0.391	0.343	0.313	0.313
LDT1	0.029	0.030	0.034	0.037	0.039	0.039
LDT2	0.254	0.264	0.295	0.324	0.341	0.341
LDT3	0.104	0.108	0.121	0.132	0.139	0.139
LDT4	0.035	0.036	0.041	0.045	0.047	0.047
HDV2b	0.036	0.037	0.037	0.038	0.038	0.038
HDV3	0.004	0.004	0.004	0.004	0.004	0.004
HDV4	0.003	0.003	0.003	0.003	0.003	0.003
HDV5	0.002	0.002	0.002	0.002	0.002	0.002
HDV6	0.008	0.008	0.008	0.008	0.009	0.009
HDV7	0.010	0.010	0.010	0.010	0.010	0.010
HDV8a	0.010	0.011	0.011	0.011	0.011	0.011
HDV8b	0.037	0.038	0.038	0.038	0.039	0.039
HDBS	0.002	0.002	0.002	0.002	0.002	0.002
HDBT	0.001	0.001	0.001	0.001	0.001	0.001
MC	0.002	0.002	0.002	0.002	0.002	0.002
Sum	1.000	1.000	1.000	1.000	1.000	1.000

Appendix E

Emissions Adjustment Factors

Separate emissions factors were developed to account for the Canyon County resident portion of Ada County VMT. Estimates of the Canyon portion of Ada VMT were based on COMPASS' 2002 Household Travel Survey. The only difference between the Canyon County emissions factors and Ada County's will be the impacts associated with an I/M program. According to the *2002 Household Travel Survey*, 32.2% of Canyon County residents commute to work in Ada County during the week. Therefore, to more accurately represent the emissions of the Canyon County vehicles commuting on Ada County roadways:

2006 Percentage Ada VMT traveled by Canyon Vehicles:

% Canyon County Emissions in Ada:

32% Canyon Pop. That work in Ada from Table 28 of the *2002 Treasure Valley Transportation Survey*

33.70% Going Home trips from Table 35 of the *2002 Household Travel Survey*
8.30% Work Trips from Table 35 of the *2002 Household Travel Survey*
5.40% Work Related Trips from Table 35 of the *2002 Household Travel Survey*

47.40% Sum of all Canyon work related trips per *2002 Household Travel Survey*

Therefore:

32% Canyon Commuting Pop. x
47.40% of Canyon Trips related to work =
15.17% Canyon Trips that involve Ada travel, based on work trips.

2006	**Average Daily Canyon VMT (From COMPASS TDM)**
Interstate	847,197
P. Art	901,899
M. Art	693,205
Collector	422,354
Local	14,521
Ramp	33,277
Centroid Conn.	248,107
Total	3,160,559

15.17% x 3,160,559 VMT = 479,394 Estimated Canyon VMT that includes Ada travel, based on work trips.

479,394 VMT ÷ 6,826,795 Ada VMT = .0702

.0702 x 100 =

7.02% Of Ada's 2006 VMT from Canyon Commuters

2010 Percentage Ada VMT traveled by Canyon Vehicles, "Build" scenario:

2010	**Average Daily Canyon VMT (From COMPASS TDM)**
Interstate	921,980
P. Art	942,293
M. Art	737,487
Collector	504,439
Local	16,495
Ramp	40,956
Centroid Conn.	265,419
Total	3,429,070

15.17% x 3,429,070 VMT = 520,121 Estimated Canyon VMT that includes Ada travel, based on work trips.

520,121 VMT ÷ 7,626,718 Ada VMT = .0682

.0682 x 100 =

6.82% Of Ada's 2010 VMT from Canyon Commuters

2010 Percentage Ada VMT traveled by Canyon Vehicles, "No-Build" scenario:

2010	**Average Daily Canyon VMT (From COMPASS TDM)**
Interstate	907,134
P. Art	961,678
M. Art	768,111
Collector	484,272
Local	16,352
Ramp	34,567
Centroid Conn.	265,490
Total	3,437,604

15.17% x 3,437,604 VMT = 521,416 Estimated Canyon VMT that includes Ada travel, based on work trips.

521,416 VMT ÷ 7,632,413 Ada VMT = .0683

.0683 x 100 =

6.83% Of Ada's 2010 No-Build VMT from Canyon Commuters

2015 Percentage Ada VMT traveled by Canyon Vehicles, "Build" scenario:

2015	**Average Daily Canyon VMT (From COMPASS TDM)**
Interstate	999,934
P. Art	1,035,392
M. Art	851,268
Collector	608,052
Local	17,789
Ramp	42,390
Centroid Conn.	294,195
Total	3,849,019

15.17% x 3,849,019 VMT = 583,819 Estimated Canyon VMT that includes Ada travel, based on work trips.

583,819 VMT ÷ 8,849,624 Ada VMT = .0660

.0660 x 100 =

6.60% Of Ada's 2015 VMT from Canyon Commuters

2015 Percentage Ada VMT traveled by Canyon Vehicles, "No-Build" scenario:

2015	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	984,887
P. Art	1,055,489
M. Art	880,570
Collector	593,251
Local	17,945
Ramp	36,217
Centroid Conn.	294,290
Total	3,862,649

15.17% x 3,862,649 VMT = 585,887 Estimated Canyon VMT that includes Ada travel, based on work trips.

585,887 VMT ÷ 8,862,586 Ada VMT = .0661

.0661 x 100 =

6.61% Of Ada's 2015 No-Build VMT from Canyon Commuters

2025 Percentage Ada VMT traveled by Canyon Vehicles, "Build" scenario:

2025	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	1,271,141
P. Art	1,391,265
M. Art	974,347
Collector	714,516
Local	19,017
Ramp	56,059
Centroid Conn.	357,305
Total	4,783,650

15.17% x 4,783,650 VMT = 725,584 Estimated Canyon VMT that includes Ada travel, based on work trips.

725,584 VMT ÷ 11,570,112 Ada VMT = .0627

.0627 x 100 =

6.27% Of Ada's 2025 VMT from Canyon Commuters

2025 Percentage Ada VMT traveled by Canyon Vehicles, "No-Build" scenario:

2025	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	1,149,101
P. Art	1,247,485
M. Art	1,091,669
Collector	874,786
Local	23,796
Ramp	42,182
Centroid Conn.	357,442
Total	4,786,462

15.17% x 4,786,462 VMT = 726,011 Estimated Canyon VMT that includes Ada travel, based on work trips.

726,011 VMT ÷ 11,547,263 Ada VMT = .0629

.0629 x 100 =

6.29% Of Ada's 2025 No-Build VMT from Canyon Commuters

2030 Percentage Ada VMT traveled by Canyon Vehicles, "Build" scenario:

2030	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	1,355,113
P. Art	1,548,201
M. Art	1,105,418
Collector	835,940
Local	22,962
Ramp	61,213
Centroid Conn.	385,466
Total	5,314,314

15.17% x 5,314,314 VMT = 806,075 Estimated Canyon VMT that includes Ada travel, based on work trips.

806,075 VMT ÷ 13,090,867 Ada VMT = .0616

.0616 x 100 =

6.16% Of Ada's 2030 VMT from Canyon Commuters

2030 Percentage Ada VMT traveled by Canyon Vehicles, "No-Build" scenario:

2030	Average Daily Canyon VMT (From COMPASS TDM)
Interstate	1,249,290
P. Art	1,359,714
M. Art	1,227,147
Collector	1,037,936
Local	30,069
Ramp	45,170
Centroid Conn.	386,769
Total	5,336,095

15.17% x 5,336,095 VMT = 809,379 Estimated Canyon VMT that includes Ada travel, based on work trips.

809,379 VMT ÷ 13,074,452 Ada VMT = .0619

.0619 x 100 =

6.19% Of Ada's 2030 No-Build VMT from Canyon Commuters

Once the percentage of Canyon vehicle travel on the Ada County's roadway network was calculated for each analysis year, emissions were estimated using the Ada VMT and network speeds for a 100% Ada fleet and a 100% Canyon fleet. The total emissions for a given analysis were the sum of the portion of Canyon fleet emissions in Ada and the portion of Ada fleet emissions:

$$E_t = E_C(X) + (E_A(1-X)) \qquad \text{(Equation E-1)}$$

Where:

E_t = Total Ada County Emissions (in Tons/day)
E_C = Emissions resulting from a 100% Canyon County Fleet on Ada's Network (in Tons/day).
E_A = Emissions resulting from a 100% Ada County Fleet on Ada's Network (in Tons/day).
X = Fraction Ada VMT traveled by Canyon County vehicles (percentages derived above ÷ 100%).

Example E-1:

2006 Interstate CO Emission =

$$\left[\left(\frac{1{,}796{,}361\_VMT/day \times 20.85\_grams/mile}{907184.74\_grams/ton}\right)\times(0.0702)\right]+$$
$$\left[\left(\frac{1{,}796{,}361\_VMT/day \times 17.59\_grams/mile}{907184.74\_grams/ton}\right)\times(1-0.0702)\right]=35.28TPD$$

Appendix F

2006 Baseline Scenario

MOBILE 6.2 Model Files

Ada Vehicle Input File: A06Bas.IN

Canyon Vehicle Input File: C06Bas.IN

Ada Vehicle Output Files: A06Bas.OUT

Canyon Vehicle Output Files: C06Bas.OUT

Appendix G

2010 Build and No Build Scenarios

MOBILE 6.2 Model Files

Build Scenario

Ada Vehicle Input File: A10Act.IN

Canyon Vehicle Input File: C10Act.IN

Ada Vehicle Output Files: A10Act.OUT

Canyon Vehicle Output Files: C10Act.OUT

No Build Scenario

Ada Vehicle Input File: A10Bas.IN

Canyon Vehicle Input File: C10Bas.IN

Ada Vehicle Output Files: A10Bas.OUT

Canyon Vehicle Output Files: C10Bas.OUT

Appendix H

2015 Build and No Build Scenarios

MOBILE 6.2 Model Files

Build Scenario

Ada Vehicle Input File: A15Act.IN

Canyon Vehicle Input File: C15Act.IN

Ada Vehicle Output Files: A15Act.OUT

Canyon Vehicle Output Files: C15Act.OUT

No Build Scenario

Ada Vehicle Input File: A15Bas.IN

Canyon Vehicle Input File: C15Bas.IN

Ada Vehicle Output Files: A15Bas.OUT

Canyon Vehicle Output Files: C15Bas.OUT

Appendix I

2025 Build and No Build Scenarios

MOBILE 6.2 Model Files

Build Scenario

Ada Vehicle Input File: A25Act.IN

Canyon Vehicle Input File: C25Act.IN

Ada Vehicle Output Files: A25Act.OUT

Canyon Vehicle Output Files: C25Act.OUT

No Build Scenario

Ada Vehicle Input File: A25Bas.IN

Canyon Vehicle Input File: C25Bas.IN

Ada Vehicle Output Files: A25Bas.OUT

Canyon Vehicle Output Files: C25Bas.OUT

Appendix J

2030 Build and No Build Scenarios

MOBILE 6.2 Model Files

Build Scenario

Ada Vehicle Input File: A30Act.IN

Canyon Vehicle Input File: C30Act.IN

Ada Vehicle Output Files: A30Act.OUT

Canyon Vehicle Output Files: C30Act.OUT

No Build Scenario

Ada Vehicle Input File: A30Bas.IN

Canyon Vehicle Input File: C30Bas.IN

Ada Vehicle Output Files: A30Bas.OUT

Canyon Vehicle Output Files: C30Bas.OUT

Appendix K

Public Comment and Responses

The 30-day public comment period began July18, 2005 and ended August 16, 2005. No comments were received.