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Draft Technical Memorandum

TO: **Brad Bauer, Jefferson County** **DATE:** **July 19, 2010**

Jordan Rudel, CDOT

FROM: **Dana Ragusa**

SUBJECT: **South Wadsworth Boulevard/Waterton Road Intersection Project Air Quality Analysis**

Introduction

This memorandum was prepared in support of a categorical exclusion and summarizes the air quality analysis prepared for the South Wadsworth Boulevard/Waterton Road Intersection Project.

Project Location and Description

The proposed project is located in Jefferson County. Jefferson County, in coordination with the Colorado Department of Transportation (CDOT), is proposing to improve the South Wadsworth Boulevard/Waterton Intersection (see **Figure 1: Project Area Map**).

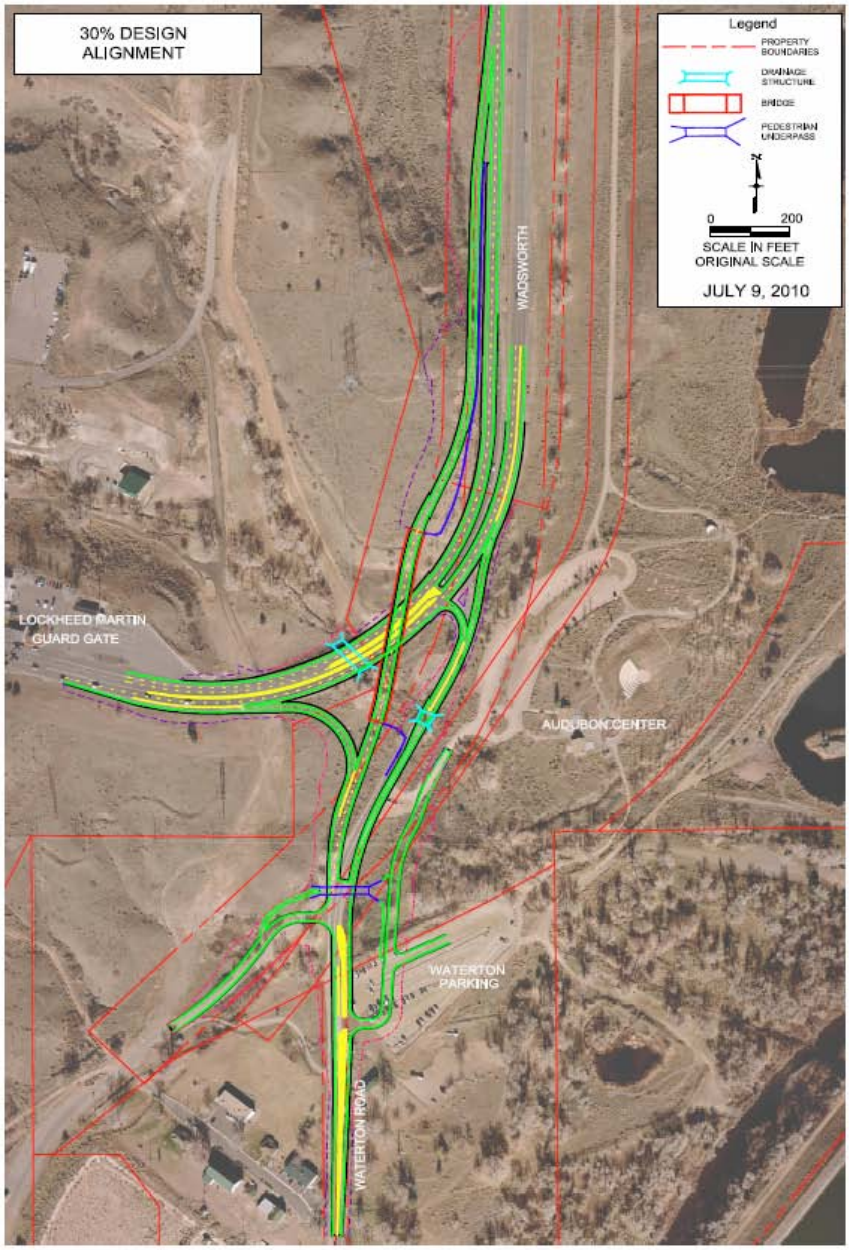
The existing typical section for South Wadsworth Boulevard consists of two travel lanes in each direction with narrow shoulders and turn lanes. The existing typical section for Waterton Road consists of one travel lane in each direction with narrow shoulders and turn lanes. Land uses adjacent to the project corridor include light industrial use, commercial development, and recreational areas. The purpose of this project is to improve the safety and operational deficiencies of the South Wadsworth Boulevard/Waterton Road Intersection.

The Preferred Alternative would improve existing South Wadsworth Boulevard from Lockheed Martin extending north approximately 700 feet north of Waterton Road. Minor widening would be required on South Wadsworth Boulevard west of the existing intersection for the acceleration lane and median accommodating the left turn from northbound Waterton Road to South Wadsworth Boulevard. Northbound Waterton Road would continue to use the existing roadway alignment. A protected (median separated) acceleration lane would be provided for traffic turning left from northbound Waterton Road onto southbound South Wadsworth Boulevard. Southbound traffic on South Wadsworth Boulevard to Waterton Road would exit South Wadsworth Boulevard one-third mile north of the current intersection, and continue on a flyover ramp over South Wadsworth Boulevard that would descend to Waterton Road near the existing Waterton parking lot (see **Figure 2: Preferred Alternative**).

The Preferred Alternative would combine the existing separate entrances for the Waterton parking lot, Audubon Nature Center, and Denver Water maintenance road into one intersection. Median deceleration lanes would be provided to separate left turns from through traffic.

Figure 1: Project Area

Figure 2: Preferred Alternative



National Ambient Air Quality Standards

The Clean Air Act (CAA) of 1970, which was last amended in 1990, requires the US Environmental Protection Agency (EPA) to set national ambient air quality standards (NAAQS) for the following criteria pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), and lead. The state of Colorado has adopted the NAAQS for the above criteria pollutants. **Table 1** summarizes the NAAQS.

Table 1: National Ambient Air Quality Standards

Pollutant	Averaging Time	National	
		Primary Standard	Secondary Standard
Ozone	1 hour (applies only in limited areas)	0.12 ppm*	0.12 ppm
Ozone	8 hour	0.075 ppm	0.075 ppm
Carbon Monoxide	1 hour	35 ppm	n/a
Carbon Monoxide	8 hour	9 ppm	n/a
Sulfur Dioxide	3 hour	n/a	0.5 ppm
Sulfur Dioxide	24 hour	0.14 ppm	n/a
Sulfur Dioxide	Annual	0.03 ppm	n/a
Nitrogen dioxide	Annual	0.053 ppm	0.053 ppm
Particulate Matter (PM_{10})	24 hour	150 µg/m³**	150 µg/m³
Particulate Matter (PM_{10})	Annual	revoked	revoked
Particulate Matter ($PM_{2.5}$)	24 hour	35 µg/m³	35 µg/m³
Particulate Matter ($PM_{2.5}$)	Annual	15 µg/m³	15 µg/m³
Lead	Rolling 3 month average	0.15 µg/m³	0.15 µg/m³
Lead	Calendar quarter	1.5 µg/m³	1.5 µg/m³

*ppm=parts per million by volume
**µg/m³=micrograms per cubic meter

Source: Environmental Protection Agency (EPA)

Air Quality Conformity

Under the conformity provisions of the CAA, projects located in designated non-attainment or maintenance areas must not cause or contribute any new violation of NAAQS. Ozone is a regional pollutant and therefore can not be assessed at the local project level. Non-exempt projects that are located within CO and PM_{10} non-attainment or maintenance areas are generally required to conduct a hot spot analysis.

Existing Air Quality Conditions

The project area is located within a portion of Jefferson County which is located in the Denver Metropolitan area. The Denver Metro area is classified as a non-attainment area for O_3, a maintenance area for CO and PM_{10}, and an attainment area for all other criteria pollutants.

Air Quality Monitoring

The Air Pollution Control Division (APCD) at the Colorado Department of Public Health and Environment (CDPHE) monitors criteria pollutant concentrations in Colorado. There are fourteen O_3 stations within the Denver metro area. **Table 2** summarizes ozone concentrations at each station.

Table 2: Ozone Monitoring Stations within the Denver Metro Area

Station (Location – Name)	County	2005 8-hour	2006 8-hour	2007 8-hour	2008 8-hour
8100 S University Blvd. – Highland	Arapahoe	**0.080**	**0.081**	0.075	0.059
11500 N Roxborough Park Rd. – Chatfield Park	Denver	**0.084**	**0.086**	**0.082**	**0.080**
12400 Hwy 285 - Welch	Jefferson	0.064	**0.081**	**0.080**	0.073
2054 Quaker St. - NREL	Jefferson	0.079	**0.083**	**0.085**	**0.076**
9101 W 57th Ave. - Arvada	Jefferson	0.078	**0.082**	0.079	0.074
2325 Irving St. - Carriage	Denver	0.074	0.072	0.076	0.072
2105 Broadway - CAMP	Denver	0.051	0.062	0.057	n/a
3174 E 78th Ave. - Welby	Adams	0.073	0.069	0.070	**0.076**
16600 W CO 128 – Rocky Flats	Jefferson	0.077	**0.090**	**0.090**	**0.079**
1405 ½ S Foothills Pkwy - Boulder	Boulder	0.076	**0.082**	0.085	**0.076**
678 S Jason Street - Denver Animal	Denver	n/a	n/a	n/a	0.070
3416 La Porte Avenue - Fort Collins-West	Larimer	n/a	**0.087**	**0.085**	**0.076**
708 S Mason Street - Fort Collins-CSU	Larimer	0.076	0.078	0.069	0.066
3101 35th Avenue - Weld Co. Twr	Weld	0.078	**0.082**	0.074	0.073

*data not available

- exceedances are in bold

measured in ppm = parts per million

Carbon Monoxide (CO) Analysis

Currently, the South Wadsworth Boulevard/Waterton Road Intersection is a "T" configuration. The left turn from Waterton is stop sign-controlled. The proposed improvements include a flyover and grade separation. There is no signal proposed for this intersection. Therefore, a hot spot (modeling) analysis is not required and no further assessment is needed.

Particulate Matter (PM_{10}) Analysis

A qualitative PM_{10} hot spot analysis of this project was performed because EPA has not yet released guidance for doing quantitative analysis. Vehicle emissions and re-entrained road dust are the primary source of PM_{10} emissions. According to the APCD at the CDPHE, there are seven PM_{10} monitoring stations within the Denver metro Area. **Table 3** below summarizes the PM_{10} concentrations at each station.

Table 3: PM_{10} monitoring stations within the Denver Metro Area

Station	County	2005		2006	2007	2008
		24-hour	Annual	24-hour	24-hour	24-hour
678 S. Jason St.	Denver	42	29	63	48	54
225 W. Colfax Ave.	Denver	67	27	53	80	56
2105 Broadway	Denver	52	28	47	61	51
7101 Birch St.	Adams	94	39	78	103	86
3174 E. 78th Ave.	Adams	63	29	61	63	61
2440 Pearl St.	Boulder	33	20	29	36	35
350 Kimbark St.	Boulder	38	21	33	41	34

*measured in µg/m3 = micrograms per cubic meter

Annual PM_{10} revoked in 2006 by EPA

PM_{10} attainment/maintenance areas are required to attain and maintain the 24-hour standard of 150 µg/m³. As shown in the table above, the Denver metro area had no exceedances of the standard within the past four years. The No Build Alternative traffic volumes for the South Wadsworth Boulevard/Waterton Road intersection are assumed to be the same as the Preferred Alternative; however, the additional flyover lanes would provide for less traffic congestion which in turn would reduce emissions. Therefore, it is not anticipated that the project would violate the NAAQS for PM_{10}.

Fugitive Dust

The project will be subject to the fugitive dust permitting and control requirements of the CAQCC Regulation 1 (Emission Control Regulation for Particulate Matter, Smoke, Carbon Monoxide, and Sulfur Oxides for the state of Colorado, effective August 30, 2007) and Regulation 3 (Air Contaminant Emissions Notices, effective January 30, 2009). A Land Development Permit Application and Fugitive Dust Control Plan would need to be prepared and submitted to CDPHE–APCD.

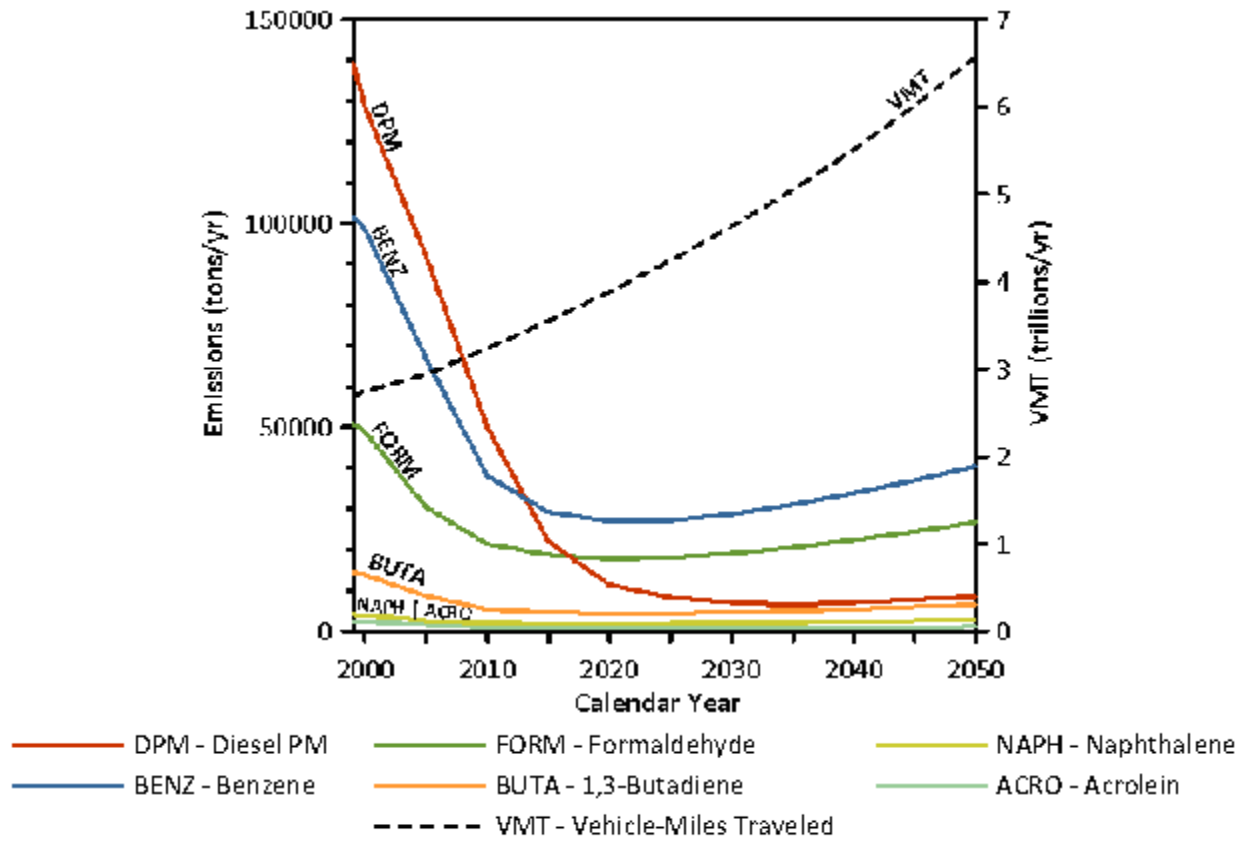
MOBILE SOURCE AIR TOXICS

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants form Mobile Sources (Federal Register, Vol. 72, No.37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/ncea/iris/index.html). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA

analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles traveled, VMT) increase by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in **Figure 3**.

Figure 3: NATIONAL MSAT EMISSION TRENDS 1999 - 2050 FOR VEHICLES OPERATING ON ROADWAYS USING EPA's MOBILE6.2 MODEL



Note:
(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

The EPA has not yet determined how best to evaluate the impact of future roads and intersections on the ambient concentrations of MSATs. There are no standards for MSATs and there are no tools to determine the significance of localized concentrations or of increases or decreases in emissions. Without the necessary standards and tools,

we cannot analyze the specific impacts of this project in any specific way. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions—if any—from the various alternatives.

For the South Wadsworth Boulevard/Waterton Road intersection project, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same. The total No Build 2030 and Preferred Alternative 2030 VMT for this project are estimated to be 3397 and 3381, respectively. The total No Build 2030 VMT is slightly higher than the Preferred Alternative 2030 VMT. Therefore, it is anticipated that MSAT emissions would be slightly lower as a result of the Preferred Alternative. Further, the proposed additional flyover lanes would result in less traffic congestion which in turn would reduce emissions. Emissions are also estimated to be lower for the Preferred Alternative than present levels as a result of EPA's national control programs that are projected to reduce MSAT emissions by 72 percent from 1999 to 2050.

Air Quality Impact Mitigation

No mitigation for air quality is necessary for direct impacts of this project because the project would not result in any exceedance of the NAAQS. Implementing techniques to control dust will minimize dust emissions during construction. Practical measures to control dust, such as watering of construction areas, should be incorporated into the plans and specifications for the construction phase of the project in accordance with CDOTs *Erosion Control and Stormwater Quality Guide*.