

## **TECHNICAL MEMORANDUM**

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TO: Gretchen Bruner, Blumen Consulting Group

FROM: Shannon Khounnala

DATE: January 19, 2007

RE: **PROPOSED WAL-MART RETAIL FACILITY, TUMWATER, WASHINGTON**

This memorandum has been prepared to respond the development of additional and modified alternatives to the proposed Wal-Mart retail facility in Tumwater, Washington. The Draft Environmental Impact Statement (DEIS) discussed the existing and expected future (year of opening) air quality within the site vicinity under the Proposed Action and Alternative 1. The project site, located along the east side of Littlerock Road, remains the same as that described in the Draft EIS. However, the proposed size of the retail facility and layout of the existing Kingswood Drive have been modified in the various additional alternatives presented in the Final Environmental Impact Statement (Alternatives 2, 3, and 4). Because the land uses surrounding the proposed site include commercial/retail establishments and residences, additional evaluation of air quality effects associated with the new alternatives are included in this memorandum.

Although the City of Tumwater (City) will need to perform a full air quality analysis before altering any roadway intersections within the site vicinity, this air quality memorandum for the proposed Tumwater Retail Facility provides a preliminary evaluation of potential air quality effects associated with the proposed project.

### **DESCRIPTIONS OF ALTERNATIVES**

Two alternatives were originally evaluated for the project in the DEIS, the Proposed Site Plan and Alternative 1. Following the issuance of the DEIS, three additional alternatives (Alternatives 2, 3, and 4) were developed for consideration in the FEIS. Alternatives 2 and 4 propose to realign Kingswood Drive at the southern end of the site, where the roadway would not divide the parking lot into two areas. Several access points from the proposed retail store's parking lot would connect to Kingswood Drive to allow vehicles to enter and exit the lot under the new alternatives. This arrangement is similar to Alternative 1 discussed in the original Air Quality Memorandum (Landau Associates 2006). Under Alternative 3, Kingswood Drive would remain in its current location and would bisect the main parking area and a smaller southwest lot, similar to the proposed site plan. Although a lease lot is proposed for both the Proposed Site Plan and Alternative 1, a lease lot is not proposed for Alternatives 2 through 4.

Regardless of the selected alternative, a signalized intersection is planned to be installed to ease traffic congestion at the intersection of Costco/Albany Access and Littlerock Road. Additionally, a vehicle roundabout at the intersection of Kingswood Drive and Littlerock Road is included as part of the City's planned improvements to Littlerock Road, and is included in the design of all site plans. The purpose of this roundabout is to slow vehicle speeds in the project area and maintain a constant flow of traffic along Littlerock Road.

## **BACKGROUND**

Vehicular emissions contain a wide variety of pollutants, primarily carbon monoxide (CO), carbon dioxide (CO<sup>2</sup>), oxides of nitrogen (NO<sub>x</sub>), particulate matter (PM<sub>10</sub>) and hydrocarbons (HC), or Volatile Organic Compounds (VOC) which have a major long-term impact on air quality. These emissions vary with the engine design, the air-to-fuel ratio, and vehicle operating characteristics. With increasing vehicle speed, there is an increase in NO<sub>x</sub> emissions and a decrease in CO, PM<sub>10</sub> and HC or VOC emissions. The emissions of CO<sup>2</sup> and oxides of sulfur (SO<sub>x</sub>) vary directly with fuel consumption, and for any given vehicle and fuel combination, aggregate emission levels vary according to the distance traveled and the driving patterns (FHWA 2000).

Other effects of vehicular emissions include formation of ozone and acid rains, which have long-term detrimental effects. At ground level, ozone is a severe irritant and the primary component of "smog." In urban areas, at least one half of the ozone producing components comes from transportation sources such as automobiles. Ozone exposure is linked to respiratory illnesses, such as asthma and lung inflammation. The particulate matter from vehicular emissions consists of airborne solid particles and liquid droplets. Fine particles can easily reach remote lung areas, and their presence in the lungs is linked to serious respiratory ailments, such as asthma, chronic bronchitis and aggravated coughing. Exposure to these particles may aggravate these or other medical conditions, such as heart disease and emphysema. In the environment, particulate matter contributes to diminished visibility and particle deposition (FHWA 2000).

The addition of the roundabout at the intersection of Littlerock Road and Kingswood Drive could contribute to improving air quality within the site vicinity. Road and street intersections force vehicular traffic to slow down and stop and interrupt the traffic flow. The longer the stops, the more fuel is consumed and the greater the vehicular emissions. When vehicles idle in a queue they emit approximately seven times as much carbon monoxide as vehicles traveling at 10 mph. Emissions from a stopped vehicle are approximately 4.5 times greater than a vehicle moving at 5 mph (Crown 2001).

The U.S. Environmental Protection Agency compiled a summary of seven studies regarding the findings for air quality components and vehicle emissions. In the studies that reported quantitative results, in five of the studies, roundabouts reduced vehicle emissions for hydrocarbons by an average of thirty-three percent, in six studies, carbon monoxide was reduced by an average of thirty-six percent, and, in six studies, nitric oxides were reduced by an average of twenty-one percent. Modern roundabouts, which are functioning as one of the safest forms of intersection control and improving traffic flow at intersections, have the additional advantage of cutting down vehicular emissions and fuel consumption by reducing the vehicle idling time at intersections and thereby having a positive affect on the environment (Mandavilli, Russell, and Rys 2003).

## **POTENTIAL AIR QUALITY IMPACTS**

### **CONSTRUCTION IMPACTS**

Construction activities, as outlined in the original air quality memorandum, would remain the same. Depending on the alternative selected, the duration of construction activities could vary slightly due to the differences in building size and/or any additional time spent on the relocation of Kingswood Drive. Apart from the potential length of construction, the number of residences and businesses that may be affected by the construction activities are expected to remain the same.

### **OPERATIONAL IMPACTS**

As reported in the original air quality memorandum, existing air quality concentrations within Thurston County are lower than federal, state, and local air quality standards for all criteria pollutants.

Under Alternatives 2, 3 and 4, the Level of Service (LOS) at the six existing intersections within the immediate site vicinity would remain below the City's LOS D standard with one exception; the intersection of Littlerock Road and Costco/Albany Access will remain at LOS F under the Proposed Action and Alternative 1, as reported in the DEIS, as well as under Alternatives 1, 2, 3, and 4 (Transpo 2006).

<b>Location</b>	<b>2004 Existing</b>	<b>Proposed Action<sup>a</sup></b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
Littlerock Road/Trosper Road	D	D	D	D	D	D
Littlerock Road/Fred Meyer /Costco North	A	A	A	A	A	A
Littlerock Road/Israel Road SW	B	D	D	D	C	C
Littlerock Road/Costco/ Albany Access	F	F	F	F	F	F
Littlerock Road/Kingswood Drive	D	A	A	A	A	A
Littlerock Road/Tumwater Boulevard	E	A	A	A	A	A
Kingswood Drive/ Southwest Driveway	ND	A	A	A	A	A
Kingswood Drive/South Center Driveway	ND	B	B	B	B	B
Kingswood Drive/Southeast Driveway	ND	B	B	B	B	B
Littlerock Road/West Driveway	ND	C	C	C	C	C

*a. From the Landau Associates 2006 Air Quality Technical Memorandum and Transpo 2006*

There would be no additional traffic-related air quality impacts expected under Alternatives 2, 3, and 4, because the three new alternatives would generate lower volumes of traffic than was analyzed in the DEIS technical analysis for the Proposed Action and Alternative 1 (Transpo 2006).

## **MITIGATION MEASURES**

### **CONSTRUCTION MITIGATION**

Construction mitigation outlined in the Air Quality Technical Memorandum (Landau Associates 2006) and the DEIS included incorporating best management practices (BMPs) into the project's construction plans and specifications using both Ecology and ORCAA regulations. The same construction mitigation would be implemented under Alternatives 2, 3, and 4.

### **OPERATIONAL MITIGATION**

As described in the DEIS, the intersection of Kingswood Drive and Costco/Albany Access would operate at LOS F with or without the Proposed Action and Alternatives. The installation of a traffic signal has been proposed as mitigation for this intersection, as required by the TMC.

Although the proposed signal at this location is not expected to increase PM<sub>10</sub>, PM<sub>2.5</sub>, CO, and NO<sub>x</sub> emissions or any other criteria pollutant concentration above the NAAQS, the formal air quality analysis performed by the City of Tumwater, will verify these assumptions.

## CONFORMITY FINDINGS

Overall trip generation would decrease under Alternatives 2, 3, and 4, relative to the Proposed Action and Alternative 1 (The Transpo Group 2006), and the LOS values for the intersections within the site vicinity would remain the same. Therefore, the conformity findings of the original Air Quality Technical Memorandum would apply to Alternatives 2, 3, and 4. As described in the Draft EIS, air quality concentrations from the operation of the proposed retail store would be expected to remain below the federal, state, and local air quality standard and the proposed project would conform to all applicable regulations and to all requirements of the Clean Air Act Amendments of 1990 [42 United States Code of Federal Regulations, Section 7506(c)].

## REFERENCES

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- Elson, W. Modern Roundabouts: An Air Quality Measure? Environmental Protection Agency, Washington, D.C.
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