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TECHNICAL MEMORANDUM

Date:	January 30, 2009
To:	Susan Graham
From:	David Sherrard, Senior Environmental Planner
Subject:	Black Diamond EIS Lawson Hills and Villages MPD Technical Peer Review **EIS Element: Air Quality**
cc:	Project File
Project Number:	217-3043-003
Project Name:	Lawson Hills and The Villages MPD EIS

EIS ELEMENT: **Built Environment – Air Quality**

Original Documentation Prepared by: Environ. on: October 31, 2008

PMX Peer Review Author: David Sherrard

PEER REVIEW SUMMARY

The methodology used in the analysis is consistent with normal practices for operational level analysis of air quality impacts from transportation. Both the Washington State Intersection Screening Tool (WASIST) and the CAL3QHC dispersion model were used. The CAL3QHC dispersion model is the most robust methodology available.

There is no analysis of potential impacts of space heating and other stationary sources. In rural areas, space heating with wood and resulting wood smoke is a concern. A qualitative analysis could be easily provided.

The analysis of greenhouse gases (GHG) uses the standard King County spreadsheet methodology, with some revisions for elements such as LEED Silver building standards.

The analysis needs to be updated using current traffic and level of service projections. It is most effective to do so for the single cumulative impact case. The current transportation analysis covers a larger area and may warrant analysis of more than the three intersections currently performed.

Analysis by the consultant who prepared the original analysis would be the most straightforward method of updating the analysis. Given the analysis tools, the results are predicated by the inputs. Because of the background the current consultant has regarding local conditions and model setup, it would be more cost effective to have the existing consultant update the modeling analysis.

PEER REVIEW COMMENTS

Does documentation sufficiently address impacts such that mitigation can be identified?

Existing Conditions:

The document provides sufficient information to define existing conditions in both the region and the project vicinity

Impacts:

Methodology: Transportation Related Impacts:

Separate methodologies were used for the Lawson Hills and Villages Master Plan Development (MPD) analysis.

The Lawson Hills MPD analysis used the Washington State Intersection Screening Tool (WASIST) to estimate peakhour CO concentrations at a single intersection - the most project-affected intersection at the North Connector/SR-169. The purpose of WASIST is to quickly and conservatively estimate the highest CO concentrations that would occur at an intersection. WASIST estimates worst-case 1-hour and 8-hour CO concentrations at signalized intersections using "free-flow" and "queue" emissions. This provides a generally reliable assessment of planning level impacts and comparison of alternatives.

The Villages MPD analysis used CAL3QHC dispersion model used for operational analysis of three intersections. CAL3QHC is the standard methodology utilized to calculate air emissions from vehicles. It is an operational methodology and is generally used for transportation projects where the details of traffic volumes, turning movements and Levels of Service (LOS) can be precisely projected. For a planning level analysis, the precision of the methodology can be considered to be more reliable than the precision of estimates of traffic volumes and LOS.

In planning level studies, simpler models such as emission burden models are often used. These models are less accurate for hot-spot analysis than the dispersion model and largely provide a perspective of the difference between total volumes of emissions under various alternatives that vary substantially in total vehicle miles travelled (VMT).

In this case, the dispersion model used can be considered to provide the most reliable "worst case" analysis if the "worst case" intersection are selected for analysis.

Methodology Greenhouse Gasses (GHG): The King County spreadsheet analysis methodology was utilized and can be considered to be a reasonable methodology. Minor changes were made in the standard formulas used to calculate emissions to account for factors such as LEED certification. A more detailed description of revisions to the model should be provided for peer review.

Methodology Construction Impacts: The qualitative description of potential construction impacts is the standard approach and provides an appropriate level of detail for standard mitigation measures consisting of Best Management Practices (BMP).

Alternatives:

Three alternatives are proposed for both the Lawson Hills and the Villages MPD

- *No Action – future emissions without the proposal*
- *Proposed action – this is modeled separately for Lawson Hills and the Villages MPDs*
- *Cumulative – this includes both the Lawson Hills and the Villages MPDs*

This results in reporting a total of six cases. The intersections modeled, however differ between the two alternatives and therefore the results are not comparable.

For the purposes of estimating worst case impacts, only the cumulative impact case is relevant, unless one assumes there is a realistic potential for only one of the proposed MPDs being approved.

No alternative land use scenarios are analyzed. This is unnecessary if the "worst case" cumulative analysis indicates no impact.

Specific Inputs and Results, Transportation Related Impacts:

Model results depend on inputs. For transportation related emission models, the inputs are traffic volumes and LOS calculations from the transportation analysis.

The results reported in the air quality analysis are considered valid for the inputs used.

However, the transportation analysis has been updated with

- *New assumptions for the No Action as well as different future analysis years*
- *New projections of traffic generation of the proposed actions*
- *A larger analysis area*

It is possible that the existing analysis still could be valid if the volumes used and the LOS is equal or greater than the current updated transportation analysis. In this case, however, both the projected future volumes and the LOS indicate that worse conditions would result than analyzed.

Tables 1 and 2 indicate the air quality results projected in the two studies.

Table 1 – Excerpt from Lawson Hills Air Quality Analysis

Table 2. WASIST CO Screening Model Results (ppm)

Intersection	Averaging Period	2015 Alternatives		
		No Action	Proposed Action	Cumulative Growth
North Connector and SR-169	1-hour	5.2	6.3	6.6
	8-hour	4.5	5.3	5.5

- The North Connector and SR-169 intersection does not currently exist. Thus, worst case CO concentrations under existing conditions were not evaluated.
- All CO concentrations include a background concentrations of 3.0 ppm
- 8-hour average CO concentrations are calculated by multiplying the 1-hour average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.
- 1-hr CO NAAQS standard is 35 ppm; 8-hr CO standard is 9 ppm

Table 2 – Excerpt from Villages Air Quality Analysis

Table 3. CAL3HC Modeling results (ppm)

Intersection	Averaging Period	2007 Existing [a]	2025 Alternatives		
			No Action	Proposed Action	Cumulative Condition
SE 288th St. & SR-169	1-hour	--	4.7	5.3	5.8
	8-hour	--	3.3	3.7	4.1
SE Auburn-Black Diamond Rd & SR-169	1-hour	--	6.1	6.2	7.7
	8-hour	--	4.3	4.3	5.4
North Connector & SR-169	1-hour	--	5.7	6.4	7.8
	8-hour	--	4.0	4.5	5.5

Notes:
[a] These intersections are not signalized or do not exist in 2007 so modeling was not performed.
All CO concentrations include a background concentration of 3.0 ppm
8-hr average CO concentrations are calculated by multiplying the 1-hr average concentrations by a persistence factor of 0.7
1-hr CO standard is 35 ppm; 8-hr CO standard is 9 ppm

Source: ENVIRON International Corporation 2008

Table 3 (attached at the end of this report) indicates that the preliminary results of revised transportation analysis results in:

- *Worse LOS conditions at the intersections analyzed in the Villages analysis.*
- *Other intersections have worse LOS than the three analyzed.*

Although not included in Table 3, traffic volumes are also higher, which accounts for the worse LOS.

The intersections analyzed may represent appropriate cases for analysis from the perspective of the worst case contribution of the projects in terms of the proportion of total volumes from the projects as compared to other sources of traffic. An evaluation of this parameter should be included in determining whether additional analysis is required. In addition, the applicant's has proposed alternative access to Green River Road, this should be analyzed to determine whether any intersections affected warrant analysis

There is no analysis of potential impacts of space heating and other stationary sources. In rural areas, space heating with wood and resulting wood smoke is a concern. A qualitative analysis could be easily provided.

Specific Inputs and Results, Greenhouse Gasses:

The results appear reasonable, however peer review of the specific adjustments made to the King County spreadsheet should be analyzed.

Specific Inputs and Results, Construction Impacts:

The qualitative analysis results are appropriate.

Mitigation:

Mitigation, Transportation Related Impacts:

No mitigation was identified based on the lack of impacts. This would need to be re-evaluated if changes in impacts resulted from updated impacts.

Mitigation, Greenhouse Gasses:

Qualitative mitigation is identified and is generally adequate. Additional coordination on transportation and design options is desirable for the EIS but aren't needed in the technical analysis

Mitigation, Construction :

Qualitative mitigation is identified and is generally adequate. Additional coordination on transportation and design options is desirable for the EIS but aren't needed in the technical analysis

Is additional work needed?

The analysis needs to be updated using current traffic and level of service projections.

Revisions should to include:

- *Review of the larger area analyzed in the current transportation analysis to determine whether additional intersections should be analyzed*
- *Review applicant's proposal for alternative access to Green River Road and determine whether any intersections affected warrant analysis*
- *Review of methodology to determine whether the WASIST or the CAL3QHC model is most appropriate, given the reliability of volume and LOS projections*
- *Recalculation of emissions based on the new volumes and LOS*
- *Qualitative discussion of potential emissions from space heating*
- *Review of assumptions in the Greenhouse Gas spreadsheet and potential revision to the analysis as well as potential analysis of land use alternatives.*

The results of reviews and decisions on locations to be analyzed should be reviewed and approved by Parametrix EIS technical staff prior to proceeding with analysis.

Recommendations for additional scope items (include field work if needed)

None

Estimated budget to complete additional scope

If completed by Environ, the applicant's consultant, considerable savings would be realized because of their familiarity with the area and the fact that they have already set the models up and done model runs. Because the results of the dispersion analysis are almost entirely driven by the transportation inputs, there is little risk of actual or perceived partiality on the part of the technical consultants.

The estimated cost if additional analysis were performed by Environ would range from $8,000 to $12,000, depending on whether additional intersections are analyzed. Analysis needs are limited to technical analysis and explanation of technical inputs. A revised report is not needed.

The estimated cost if the analysis were performed by a new subconsultant who would need to become familiar with the area and set up the models would be $15,000 to $25,000, depending on the number of intersections analyzed.

Table 3 LOS Summary – PRELIMINARY RESULTS – INITIAL MODEL RUNS – TRANSPORTATION ANALYSIS **These are preliminary results NOT FOR PUBLIC RELEASE**

		2007 Existing			Villages No Action			Villages Proposed			Cumulative 2025			Environ Air Quality		
		LOS	Delay (sec/veh)	v/c ratio	LOS	Delay (sec/veh)	v/c ratio	LOS	Delay (sec/veh)	v/c ratio	LOS	Delay (sec/veh)	v/c ratio	LOS	Delay	CO
Study Intersection	**Standard**										F	>200	>2			
SE 288th St/216th Ave SE	C	C	26.1	0.30	F	151.9	1.11	F	>200	>2	F	>200	1.62			
SE 288th St/232nd Ave SE	C	B	10.0	0.08	C	16.8	0.38	E	36.8	0.70	F	>200	>2			
SR 169/SE 288th St	D	C	20.9	0.37	B	10.6	0.78	D	47.3	1.54	F	138.0	1.38	D	29.4	5.8
SE Covington-Sawyer Rd/216th Ave SE	C	B	19.3	0.47	E	65.3	1.13	F	104.3	1.28	B	12.9	0.69			
SE 296th St/219th Ave SE	C	B	17.6	0.26	B	11.6	0.57	B	12.9	0.69	F	85.6	0.86			
SE Auburn-Black Diamond Rd/218th Ave SE	E	B	12.7	0.13	D	27.9	0.47	E	42.6	0.63	F	>200	>2			
SE Auburn-Black Diamond Rd/Lake Sawyer Rd SE	C	B	11.4	0.17	D	51.4	0.95	F	>200	1.66	F	>200	>2			
SE Auburn-Black Diamond Rd/Morgan St	C	B	10.9	0.14	F	60.7	0.83	F	144.3	1.13	NA	NA	NA			
SR 169/SE Black Diamond Ravensdale Rd[2]	C	D	26.9	0.40	C	31.8	0.89	D	49.2	0.96	NA	NA	NA	D	39.9	7.7
Baker St/Railroad Ave	C	F	94.5	0.99	A	9.9	0.22	B	10.1	0.25	F	143.0	1.37			
SR 169/Baker St	C	NA	NA	NA	C	18.9	0.16	D	29.1	0.36	B	10.1	0.25			
SR 169/Lawson Rd	C	A	9.2	0.11	E	43.2	0.67	F	118.4	1.02	E	39.2	0.56			
SR 169/Old Lawson Rd	C	C	17.7	0.26	B	11.6	0.00	B	12.2	0.00	F	>200	1.69			
SR 169/Jones Lake Rd	C	B	13.6	0.14	C	21.1	0.23	B	27.6	0.30	B	14.0	0.00			
Lawson Rd/Newcastle Dr	C	A	9.5	0.00	A	9.0	0.02	A	9.2	0.02	E	35.5	0.37			
SR 169/Maple Ridge Way SE	D	B	13.0	0.11	A	9.6	0.77	B	13.1	0.87	A	9.6	0.02			
SR 169/SR 516	D	A	8.5	0.02	*D*	52.8	0.86	*E*	67.7	0.96	C	25.3	0.98			
SR 516/Witte Rd SE	D	A	5.3	0.43	*C*	33.0	0.90	*C*	33.8	0.89	*F*	82.9	1.03			
SR 169/SE 240th St	D	*E*	*59.8*	*0.53*	D	51.0	0.97	E	70.0	1.11	*D*	35.3	0.84			
SR 169/Witte Rd	D	*C*	*31.2*	*0.62*	F	199.4	1.39	F	>200	1.44	F	100.1	1.23			
SR 169/SE Wax Rd	D	C	28.0	0.68	F	120.5	1.31	F	144.4	1.40	F	>200	1.61			
SR 169/SE 231st St	D	D	49.9	0.95	E	78.2	1.01	F	83.2	1.05	F	173.8	1.48			
SR 169/SR 18 EB Ramps	D	D	35.8	0.88	C	27.9	0.70	C	28.6	0.72	F	101.3	1.12			
SR 169/SR 18 WB Ramps	D	D	50.7	0.65							C	28.1	0.74			
SR 516/216th Ave SE	D	C	22.6	0.63	*D*	46.1	0.99	*D*	50.2	1.04						
SR 516/SE Wax Rd	E				*E*	73.1	0.99	*F*	82.7	1.08	*F*	86.7	1.15			
SR 516/172nd Ave SE	E	*C*	*25.6*	*0.60*	*C*	30.7	0.87	*D*	38.9	0.90	*F*	107.0	1.15			
SR 516/168th Pl SE	E	*D*	*52.0*	*0.75*	E	74.7	0.98	F	84.2	1.01	*D*	37.9	0.94			
SR 516/SR 18 EB Ramps	E	*D*	41.5	0.69	C	26.6	0.88	C	28.1	0.91	E	74.1	1.09			
SR 516/SR 18 WB Ramps	E	D	38.4	0.84	C	21.6	0.81	C	20.0	0.84	C	27.2	0.93			

		2007 Existing			Villages No Action			Villages Proposed			Cumulative 2025			Environ Air Quality		
		LOS	Delay (sec/veh)	v/c ratio	LOS	Delay (sec/veh)	v/c ratio	LOS	Delay (sec/veh)	v/c ratio	LOS	Delay (sec/veh)	v/c ratio	LOS	Delay	CO
SR 516/164th Ave SE	E	C	29.6	0.70	*C*	33.4	0.80	*D*	36.1	0.83	C	23.0	0.85			
SR 516/Covington Way SE	E	C	31.2	0.60	*D*	48.7	0.96	*D*	52.2	0.99	*D*	43.9	0.84			
SE 272nd St/160th Ave SE	E	*D*	*48.1*	*0.74*	**F**	54.2	0.71	**F**	59.1	0.74	*D*	53.9	0.99			
Covington Way SE/165th Pl	E	*D*	*44.2*	*0.81*	*B*	10.2	0.57	*B*	10.3	0.58	**F**	71.0	0.80			
Covington Way SE/SE Wax Rd	E	D	29.3	0.47	C	28.6	0.92	C	30.0	0.93	*B*	10.5	0.59			
SR 516/Landsburg Rd SE	E	*B*	*10.4*	*0.48*	**F**	>200	1.40	**F**	>200	1.64	C	32.4	0.95			
SR 169/SE Green Valley Rd	D	C	22.3	0.76	**F**	175.9	1.01	**F**	>200	1.99	**F**	>200	1.98			
SE Green Valley Rd/218th Ave SE	E	C	23.7	0.60	C	21.8	0.58	D	29.1	0.68	**F**	>200	>2			
SE Auburn-Black Diamond Rd/SE Green Valley Rd	E	C	17.2	0.09	**F**	116.1	0.97	**F**	50.9	0.66	E	44.0	0.80			
SR 169/North Connector	C	B	12.5	0.29	B	15.6	0.80	**E**	72.2	1.55	**F**	77.3	0.81	**E**	**55.5**	**7.8**
SR 169/Railroad-Lawson Connector	C	D	25.9	0.39	A	6.1	0.66	A	8.5	0.75	**F**	>200	>2			
Railroad-Lawson Connector/Lawson Rd	C				A	9.2	0.08	A	9.7	0.09	**F**	127.3	1.57			
SR 169/Villages South Access	C				**F**	>200	>2	**F**	>200	>2	C	21.6	0.45			
Lake Sawyer Rd/North Connector	C				B	15.2	0.73	**D**	53.0	1.06	**F**	>200	>2			
SE Auburn-Black Diamond Rd/North Connector	C				**F**	141.1	1.07	**F**	>200	>2	**D**	53.0	1.06			
											F	>200	>2			