August 29, 2007

Project No. OR07.031.T01
The Point At Wheeler Landing

CTS Engineers

Doug W. Hooper
City Manager
PO Box 177
Wheeler OR 97147

SUBJECT: ***Traffic Analysis for the proposed The Point At Wheeler Landing along Hemlock Street and west side of Hwy 101 in Wheeler, OR.***

Dear Mr. Hooper:

As requested, a traffic impact analysis has been prepared for the buildout of the proposed The Point at Wheeler Landing residential and retail development on the west side of Hwy 101 /Hemlock Street on a site of approximately 8.9 acres zoned water related commercial / general commercial. This development will consist of 44 two-story townhomes, 14 three-story live-work townhomes which will have approximately 570 GSF of retail space and a garage on the first floor and the upper two levels as a residence and 3 two-story buildings that will have a total of approximately 19,077 GSF retail space. ***Figure 1*** contains a vicinity map of the proposed site and surrounding roadway system. Access to the site will be provided via a proposed west leg to the existing intersection of Highway 101 /Hemlock Street (see attached Figures). ***Figure 1A*** presents a site plan of the proposed development.

This traffic analysis includes a detailed assessment of the traffic impacts of the proposed The Point at Wheeler Landing and the growth in background traffic due to other sources. Based on the results of this analysis, it is concluded that the proposed development can be constructed without adversely affecting the traffic operational or safety characteristics of the adjacent roadway system. Specific findings of this study are as follows:

- When the entire site is developed, it is estimated that The Point At Wheeler Landing will generate approximately 652 ***net new*** vehicle trips during a typical weekday, including 38 vehicle trips during the AM peak hour and 62 vehicle trips during the PM peak hour.
- Analysis of future 2010 background traffic volumes that will exist regardless of buildout for the proposed development found that the study area intersection will operate at acceptable Levels of Service (LOS) C or better during the peak hour /30th HV with V/C ratio of 0.01 or better.
- Analysis of future 2010 traffic conditions with the buildout of The Point at Wheeler Landing found that the traffic generated by this development will not adversely impact future Levels of Service. These results indicate that the study area intersection will continue to operate at LOS C or better during the peak hour /30th HV with V/C ratio of 0.01 or better.

The following sections document the study's methodology, results, and major findings.

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PROPOSED DEVELOPMENT
The proposed The Point at Wheeler Landing residential and retail development on the west side of Hwy 101 /Hemlock Street on a site of approximately 8.9 acres zoned water related commercial /general commercial. This development will consist of 44 two-story townhomes, 14 three-story live-work townhomes which will have approximately 570 GSF of retail space and a garage on the first floor and the upper two levels as a residence and 3 two-story buildings that will have a total of approximately 19,077 GSF retail space. ***Figure 1*** contains a vicinity map of the proposed site and surrounding roadway system. Access to the site will be provided via a proposed west leg to the existing intersection of Highway 101 /Hemlock Street (see attached Figures). ***Figure 1A*** presents a site plan of the proposed development.

STUDY AREA
Based on preliminary discussion with ODOT staff and previous traffic impact analyses conducted by CTS Engineers in the City, one intersection was selected for the analysis during AM Peak, PM peak hour and 30th DHV (design hour volume) conditions at the minor street stop-controlled intersection of Hwy 101 /Hemlock Street.

EXISTING CONDITIONS

Transportation Facilities
Figure 2 shows the approximate location of The Point at Wheeler Landing development and the surrounding roadway network including the lane configurations in the study area.

Area Roadway System
The main roadways in the study area include Hwy 101 and Hemlock Street. ***Table 1*** presents the characteristics of these roadways. Area roadway and sight distance photos are in the Appendix to the report. Both existing and future traffic analyses in this study were conducted assuming existing roadway conditions.

Table 1: Summary of Study Area Roadway Characteristics

Street Name	Road Class	Width (Feet)	Speed Limit	Sidewalks	Bike Lane	On-Street Parking
Hwy 101 (At Hemlock Street)	State Route	28	North-45 South-25	East-Yes West-No	No	No
Hemlock Street	Local	18	-	No	No	No

Land Uses
Land use in the immediate vicinity to the south along Hwy 101 is mostly retail and a public boat launch and dock along Marine Drive. Land to the east of the site across Hwy 101 consists of single family homes.

Pedestrian and Bicycling Considerations
Sidewalks currently exist along the east side of Hwy 101. To the north of the Hemlock Street, neither sidewalks nor bike lanes are present along Hwy 101. However, Hwy 101 has shoulder bikeways. The applicant will provide sidewalks/walking paths, curbs and gutters throughout the internal roadway system.

Transit Considerations
"The Wave" operates bus routes to/from Portland's Union Station. The Wave traverses Tillamook County, providing service to Manzanita, Nehalem, Wheeler, Rockaway Beach, Garibaldi, Bay City, Tillamook, Hebo and Cloverdale and from these locations to Portland. The nearest stop to the site is about a quarter mile from the site's southern edge.

Existing Traffic Volumes
A reconnaissance of the site and its vicinity was conducted. To assess the impact of buildout of the proposed The Point at Wheeler Landing, traffic operations were analyzed during both AM and PM weekday peak hours because these periods represent reasonable "worst case" for traffic scenarios in the study area. Furthermore, traffic operations were also analyzed during 30th DH.

Traffic Volumes
Figure 3 shows recent weekday AM and PM peak hour traffic volumes obtained at the key intersection in the vicinity of the site. Traffic volumes during PM peak hour within the study area were obtained from actual weekday peak hour manual traffic counts conducted during August of 2007 and the AM counts were obtained from tube counts conducted during the same time in August of 2007. These data revealed that the weekday PM peak hour occurs between 3:00 - 4:00 PM, and the typical AM peak hour between 7:00 – 9:00 AM is significantly lower. This inconsistency is typical of the nature of the proposed site location. Traffic volumes greater than 25 were rounded upward to the nearest five vehicles. For the purpose of this traffic study, only PM peak hour between 3:00 – 4:00 PM will be analyzed.

To evaluate intersections for existing and future operational deficiencies, ODOT requires analysis of 30th highest design hour volumes (30th DHV), which is the hourly volume of traffic that is exceeded only 29 hours over the entire year. To estimate 30th DHV, typical PM peak hour volumes are adjusted using a seasonal factor. The ODOT methodology contained in the TPAU Manual – *Developing Design Hour Volumes* calls for averaging the most recent five years of seasonal factors after first tossing out the highest and lowest factors for each month. The 30th DHV is determined by adjusting typical PM peak hour volumes with a seasonal factor determined using data from an appropriate Automatic Traffic Recorders (ATR) or, if there is no ATR nearby, from the most current seasonal trend table. Approximately 8 miles south of Hemlock Street along Hwy 101 /Washington Street intersection in Rockaway Beach, ODOT maintains an Automatic Traffic Recorder (ATR) (29-001). Based on the data from this ATR it is revealed that the seasonal adjustment for the month of July (ATR's peak month) and August (traffic count month) is approximately the same (i.e. July/August = 143% / 143% = ***1.00***) Therefore, the counts obtained in August ***will not require adjustment.*** Again, as mentioned earlier, for the purpose of this traffic study only PM peak hour will be analyzed.

***Table 3*: Seasonal Adjustment Factors For OR 18-B (Based on ATR #29-001 on OR 9)**

	2006	2005	2004	2003	2002	Average
July ***(Peak Month of the year)***	143%	128%	143%	148%	144%	**143%**
August ***(Traffic Count Month)***	142%	124%	141%	148%	146%	**143%**

Peak Hour Traffic Operations
Traffic conditions at the key intersection in the study area were analyzed only during PM peak hour because the 30th DH along Hwy 101 is approximately the same as PM peak hour. Intersection operational analyses were conducted using the procedures in the ***2000 Highway Capacity Manual (HCM)*** for evaluating signalized and unsignalized intersections, which describe the traffic operations of an intersection in terms of its Volume to Capacity Ratio (V/C), Delay, Queue Length, and Level of Service (LOS). For unsignalized intersections, the intersection's LOS is stated relative to the most critical intersection approach or maneuver, typically the left turns from the minor street approach. For signalized intersections, the LOS is a function of the average vehicle delays that drivers on all approaches experience. For the section of Highway 101 in the vicinity of the site, ODOT standards require that all intersections operate at a V/C ratio of 0.75 or better (Aug 2005 Amendment to Table 6 in Policy 1F – Mobility Standards, 1999 Oregon Highway Plan). The V/C ratio is the ratio of hourly traffic volume to the theoretical maximum hourly volume of vehicles that a roadway section or approach can accommodate. The LOS worksheets for the results presented in this study are attached in the appendix to this report.

Table 2 presents the calculated results (V/C ratios) for our existing conditions analyses at all study area intersections based on the peak hour traffic volumes shown in ***Figure 3***. These results indicate that the study area intersection will operate at LOS C or better during weekday peak hour /30th HV with V/C of 0.01 or better during. These findings were confirmed during our general observations of traffic operations. Furthermore, queuing along Hemlock Street is minimal (1 vehicle during the peak hour) which was confirmed during our intersection volume counts.

Table 2: Existing 2007 Weekday PM Peak Hour /30th DH Levels of Service

Intersection	AM Peak Hour			PM Peak Hour /30th HV		
	Minor Street Stop Control					
	Avg Vehicle Delay (Sec/Veh)	V/C Ratio	LOS	Avg Vehicle Delay (Sec/Veh)	V/C Ratio	LOS
Hwy 101 /Hemlock Street (Critical Approach: WB)	-	-	-	EB-16.0 WB-13.1	0.01 0.01	C B

Traffic Safety
Collision records requested. Data pending.

Intersection Sight Distance
A general assessment of intersection sight distance was performed along the study area intersection. Photos in the Appendix illustrate sight distance at the study area intersections. Hwy 101 in the vicinity of Hemlock Street (site's proposed access) is relatively straight and flat. To the east, Hemlock Street terminates as a "dead end". ODOT standards require that intersection sight distances conform to **AASHTO – *A Policy on Geometric Design of Highways and Streets 2001,*** which requires that measurements be based on an eye height of three and one-half (3.5) feet above the controlled road at least fifteen (15) feet from the edge of the vehicle travel lane of the uncontrolled public road to an object height of three and one-half (3.5) feet on the uncontrolled public road. For Hwy 101, a state highway with a posted speed limit of 45 mph to the north of Hemlock Street and 25 mph to the south, AASHTO requires 500 feet of available clear sight distance for 45 mph and 280 feet for 25 mph. Our measurements from Hemlock Street found that sight distance exceeds 550 feet to the north, but is obstructed to the south due to vegetation. After the removal/trimming of vegetation, the sight distance to the south will be at least 400 feet, which exceeds the minimum criteria of 280 feet.

Based on the above and the field observations, it does not appear that the applicant needs to address any sight distance traffic safety problems in the immediate vicinity of the site.

TRAFFIC IMPACT ANALYSIS

The impact of traffic generated by the full buildout of The Point at Wheeler Landing on the surrounding street system during the critical weekday peak hours was analyzed as follows:

- A three-year buildout was assumed, to the year 2010. Therefore, the existing traffic volumes were adjusted to estimate future 2010 background traffic conditions including other nearby developments expected to be completed before 2010.
- Total AM and PM peak hour trips both into and out of The Point at Wheeler Landing site were estimated for complete buildout conditions.
- Existing traffic volumes on the roadways surrounding the site and the site's proximity to major roadways were evaluated to estimate the trip distribution patterns in the study area for vehicle trips generated by the site.
- Estimated site-generated traffic volumes for the AM and PM peak hours were assigned to the roadway network and added to the estimated 2010 background traffic volumes to represent future traffic conditions with full buildout of the site.
- Future LOS and volume-to-capacity ratios (v/c ratios) at key intersections in the study area were examined under both background and full buildout traffic conditions.

Future 2008 Background Traffic Volumes
The future year analysis, as required by ODOT (OAR 734-051-0180) for any single phase development with an anticipated ADT between 0 and 999, is the year of its opening. Full buildout of the proposed The Point at Wheeler Landing residential development is expected to occur by the end of 2010. To assess the likely future traffic conditions regardless of the proposed development, increases in traffic due to general growth as well as other proposed developments in the vicinity of the site were estimated. Discussion was held with City /ODOT staff to review the area. There are no other approved developments in the immediate area.

To assess the likely future traffic conditions regardless of the proposed development, increases in traffic due to general growth as well as other proposed developments in the vicinity of the site were estimated. Discussions/meetings were held with ODOT planning staff to review traffic growth trends along Hwy 101. This research found there were no other major developments in the near future that have been proposed or approved in the vicinity. To determine an appropriate background growth factor for developing design hour volumes (30^{th} DHV) for this project, ODOT's TPAU (Transportation Planning and Analysis Unit) Future Volume Tables (FVTs) were used. These tables are based on historical volume trends from past years to project future volumes. Notably, data from mileposts north (MP 47.08) and south (MP 47.38) of the site were used to interpolate a more accurate result. As shown in ***Table 3*** and from the FVT at MP 47.08 along Highway 9 (US 101), the 2003 volume is shown as 5,400, the 2025 traffic volume is 7,100, and the r-squared value is 0.765. At MP 47.38 the 2003 volume was found to be 5,400, the 2025 traffic volume ,6800, and the r-squared value 0.93. Both of these r-squared values are acceptable and indicate a strong relationship between historical data points. Using this data, we first computed the 22 year growth factor for each milepost. At milepost 47.08 the 22 year growth factor is 1.31 (7,100/5,400), and at milepost 47.38 the 22 year growth rate is 1.25. Next, assuming a linear relationship, the average of these two 22 year growth factors was used to compute the annual growth factor: (((1.31+1.25)/2)-1)/22 = 0.0127, or 1.3% straight-line growth per year. Thus, to calculate the 2010 future background PM or 30^{th} DHV's that correspond with this annual growth rate and full buildout year, existing peak hour volumes (30^{th} HV) in ***Figure 3*** were increased by 3.9 percent (3 years x 1.3% per year = 3.9%) to account for other increases in traffic due to sources outside the study area during the next three years to 2010. The resulting weekday future 2010 background PM peak hour /30^{th} DHVs are shown in ***Figure 5*** and the intersection capacity analysis results are shown in ***Table 4***.

Table 3: Development of Future Growth Factor

Location	From ODOT/TPAU Future Volume Tables			22 Year Growth Factor
	2003 Volume	2024 Volume	R^2 Value	
US 101, **Milepost 47.08**	5,400	7,100	0.765	1.31
US 101, **Milepost 47.38**	5,400	6,800	0.939	1.25

These results indicate that under future background 2010 traffic conditions, traffic operations at study area intersections are expected to degrade only slightly when compared to the existing conditions analysis results. Intersection Levels of Service are similar to existing conditions The critical mobility measure of V/C ratio is estimated to remain within acceptable criteria as results indicate in ***Table 4***.

Table 4: Future Background 2010 Weekday PM Peak Hour /30th DH Levels of Service

Intersection	AM Peak Hour			PM Peak Hour		
	Minor Street Stop Control					
	Avg Vehicle Delay (Sec/Veh)	V/C Ratio	LOS	Avg Vehicle Delay (Sec/Veh)	V/C Ratio	LOS
Hwy 101 /Hemlock Street (Critical Approach: WB)	-	-	-	EB-16.5 WB-13.4	0.01 0.01	C B

Site-Generated Traffic Volumes

Figure 1A shows the proposed site plan for The Point at Wheeler Landing. The applicant is proposing to construct about 44 two-story townhomes, 14 three-story live-work townhomes which will have approximately 570 GSF of retail space and a garage on the first floor and the upper two levels as a residence. This development also has three 2-story buildings that will have a total of approximately 19,077 GSF retail space. The site is located along the west side of Hwy 101 /Hemlock Street intersection on a site of approximately 8.9 acres zoned water related commercial /general commercial. Access to the site will be provided via a new public street connection along the west side of Hwy 101 and aligned with existing Hemlock Street. The number of vehicle trips into and out of The Point at Wheeler Landing were estimated using standard trip generation rates for Townhomes (Land Use Code 230) and Shopping Center (Land Use Code 820) as presented in the ITE Trip Generation Report (7th Edition). Also, for the work portions of the live/work units, the trip rates from ITE Land Use Code 710 General Office are applied to the work portion (GSF) of these dwellings. This is a very conservative approach because the trip generation for the residential use includes people leaving the home to go to work, and the office rates include people driving to work. The primary concept of these live/work dwellings is that people do not have to leave their home to travel to a traditional office/work place. ***Thus, to remove double counts, trips generated by live portion from live/work units will not be included.*** Trip rates in this ITE publication are based on empirical observations performed at many similar sized developments located throughout the United States.

Due to the nature of retail land uses in the proposed site, a full understanding of the trip types that will be traveling to/from the site is necessary. In evaluating the traffic impact of retail uses, it is important to realize that the majority of vehicle trips to/from a retail use, such as the proposed The Point at Wheeler Landing will result from vehicles already on the road making trips for other purposes, such as getting to/from work or shopping at adjacent uses. This is particularly true for retail uses along major commuter routes. The first trip type, *pass-by trips*, comes from drivers who are already traveling along an adjacent street. As they pass by the site as part of their regular travel route, they turn into the site to make a purchase and then continue on their original route. The second trip type is *diverted trips* from other drivers already on the road, but who divert their route a few streets to enter the site. After they make their purchase they then return to their original route. The third trip type is totally new trips on the roadway system. These include nearby residents who leave their home or office and drive to make a purchase and then return home without making any other stops. To be

conservative, we considered diverted as a new trip, so, for this study diverted trips are included in new trips.

Furthermore, it should also be noted that the proposed site includes both residential and retial. Based on ***ITE Trip Generation Report (7th Edition)***, a mixed-use development such as the proposed will likely have trips that remain internal to the site (for example, trips from an on-site residential to an on-site retail destination) Analysis of potential internal travel demand was performed by using the *Multi-Use Development Trip Generation and Internal Capture Worksheet* from the ***ITE Trip Generation Handbook.*** This worksheet is set up to estimate the amount of internal travel based on the size/type of land uses for a typical mixed-use development. For instance, a retail and residential use in the same mixed-use development would be expected to produce internal trips between the two. The generated trips from each of these land uses were put into the internal capture spreadsheet (shown in the *Appendix).* It was found that approximately 17 percent of the traffic was internal trips. These internal trips were removed from the total site generated trips before applying the pass-by reduction. Based on these trip rates, and as shown below in ***Table 5***, we estimate that The Point at Wheeler Landing will potentially generate approximately 652 new vehicle trips throughout a typical weekday, including 38 vehicle trips during the AM peak hour and 62 vehicle trips during the PM peak hour.

Table 5: Trip Generation Estimate for Buildout of The Point at Wheeler Landing

Land Use/ Site Location		Daily Trips	AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out
Attached Townhomes (44 Units) (ITE Code 230)		258	19	3	16	23	15	8
Live Work Townhomes (14 Units) (ITE Code 230)		*82*	*6*	*1*	*5*	*7*	*5*	*2*
Gen. Office in Live/Work Townhomes (14 @ 572 GSF ea. = 8,008) (ITE Code 710)		88	12	11	1	12	2	10
Shopping Center (19,077 GSF) - ITE Code 820A		819	20	12	8	72	35	37
Internal Trips	17%	139	3	2	1	12	6	6
Total External Trips		680	17	10	7	60	29	31
Pass-by Trips	55%	374	9	5	4	33	16	17
Total New /Diverted Trips	45%	306	7	4	3	27	13	14
Total Site Generated Trips		**1,165**	**51**	**26**	**25**	**107**	**52**	**55**
Total Internal Site Generated Trips		139	3	2	1	12	6	6
Total External Site Generated Trips		1,026	48	24	24	95	46	49
Total Pass-by Trips		374	9	5	4	33	16	17
Net New /Diverted Site Generated Trips		**652**	**38**	**18**	**20**	**62**	**30**	**32**

Distribution and Assignment of Site Generated Traffic

Traffic generated by the proposed The Point at Wheeler Landing residential and retail development was assigned to the roadway network by considering existing travel patterns obtained from AM and PM peak hour counts at the intersections of Hwy 101 /Hemlock Street. ***Figure 6*** displays the trip distribution that was assumed from these vehicle trips generated by this development. It was found that approximately 60 percent of the traffic travels south along Hwy 101 and 40 percent travels north. ***Figure 7*** shows these trip distributions and assignments of traffic associated with the proposed The Point at Wheeler Landing during the peak hours /30th HV.

Total Future 2008 Traffic Volumes and Levels of Service
Total future 2010 peak hour /30th HV traffic volumes at the study area intersections were estimated by adding the background future traffic volumes displayed in ***Figure 5***, to the volumes that would be generated by buildout of The Point at Wheeler Landing shown in ***Figure 6***. Total future 2010 peak hour /30th HV traffic volumes with buildout of The Point at Wheeler Landing are shown in ***Figure 7***. The results of the intersection LOS analyses for total future 2010 traffic volumes are shown in ***Table 6***. These results indicate that with The Point at Wheeler Landing fully built out, delays will degrade slightly from future background conditions. However, the study area intersections will continue to operate at LOS C with V/C ratio of 0.01 or better during weekday peak hour /30th HV peak hours, which meets ODOT standards for intersection performance.

Table 4: Future Background 2010 Weekday PM Peak Hour /30th DH Levels of Service

Intersection	AM Peak Hour			PM Peak Hour		
	Minor Street Stop Control					
	Avg Vehicle Delay (Sec/Veh)	V/C Ratio	LOS	Avg Vehicle Delay (Sec/Veh)	V/C Ratio	LOS
Hwy 101 /Hemlock Street (Critical Approach: WB)	-	-	-	EB-15.1 WB-14.5	0.01 0.01	C B

SITE ACCESS AND CIRCULATION PLAN
Figure 1 and ***Figure 1A*** show the vicinity and proposed site plan. The applicant is proposing to construct 44 two-story townhomes, 14 three-story live-work townhomes which will have approximately 570 GSF of retail space and a garage on the first floor and the upper two levels as a residence and 3 two-story buildings that will have a total of approximately 19,077 GSF retail space. Access to the site will be provided via a proposed west leg to the existing intersection of Highway 101 /Hemlock Street (see attached Figures).

CONCLUSIONS

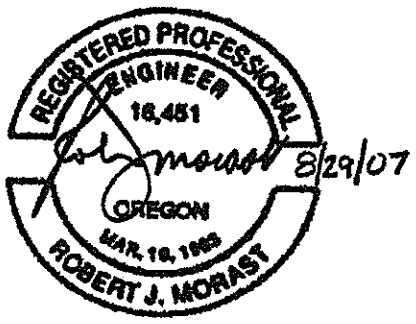
Based on the results of the analysis described in this report, it is concluded that the proposed The Point at Wheeler Landing development can be constructed without adversely affecting traffic operations or safety in the vicinity of the site. Furthermore, key intersection and roadways in the study area can operate at acceptable Levels of Service when this development is built out. No specific off-site roadway improvements are recommended to accommodate this development or mitigate its impact.

If you have any questions relating to the data or analyses discussed in this report, please contact me directly.

Sincerely,

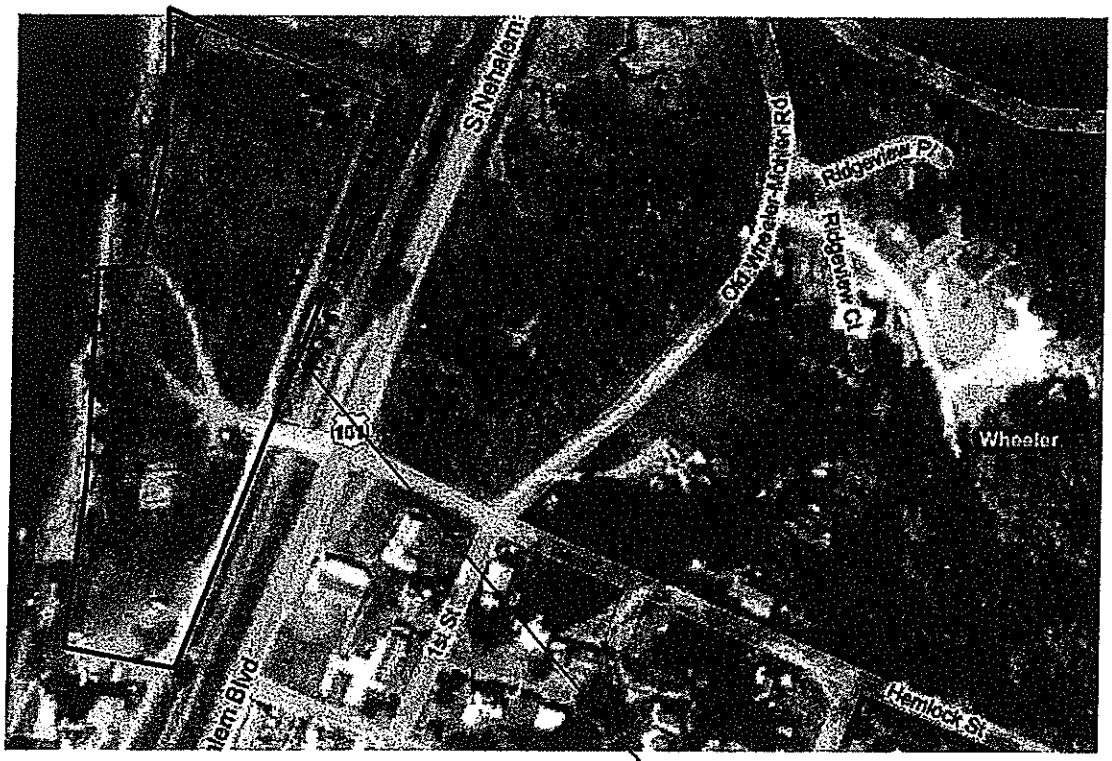
Robert Morast, P.E.
Transportation Engineer

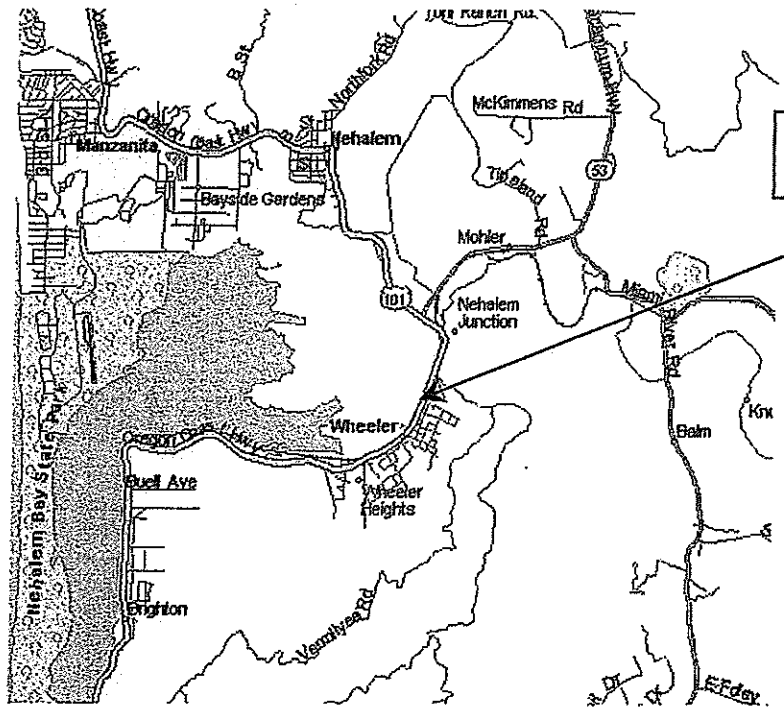
Attachments



EXPIRES 12-31-08

Figure 1: Site Area and Vicinity Map





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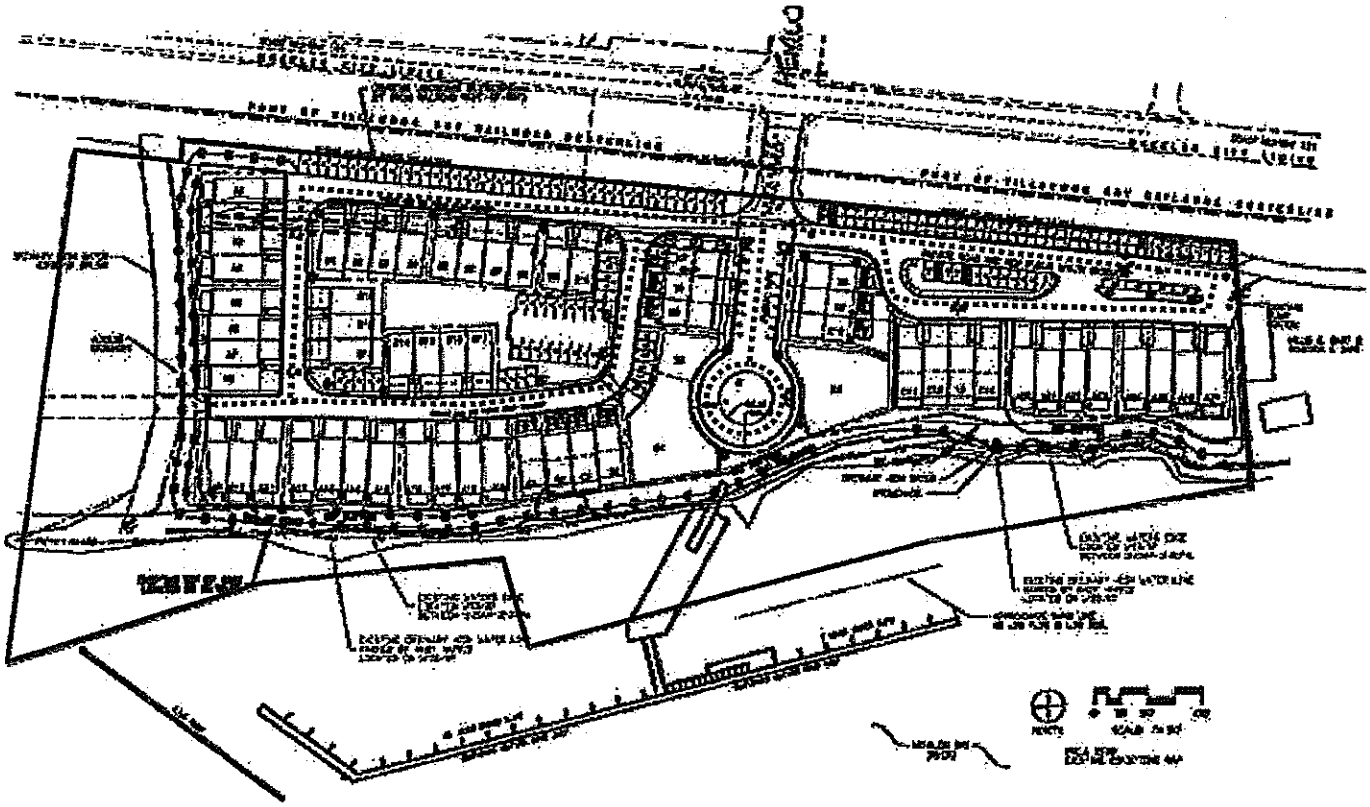
Proposed Site

Proposed Roadway

OR07.031.T01 The Point at Wheeler Landing

Figure 1A: Proposed Site Plan For The Point At Wheeler Landing



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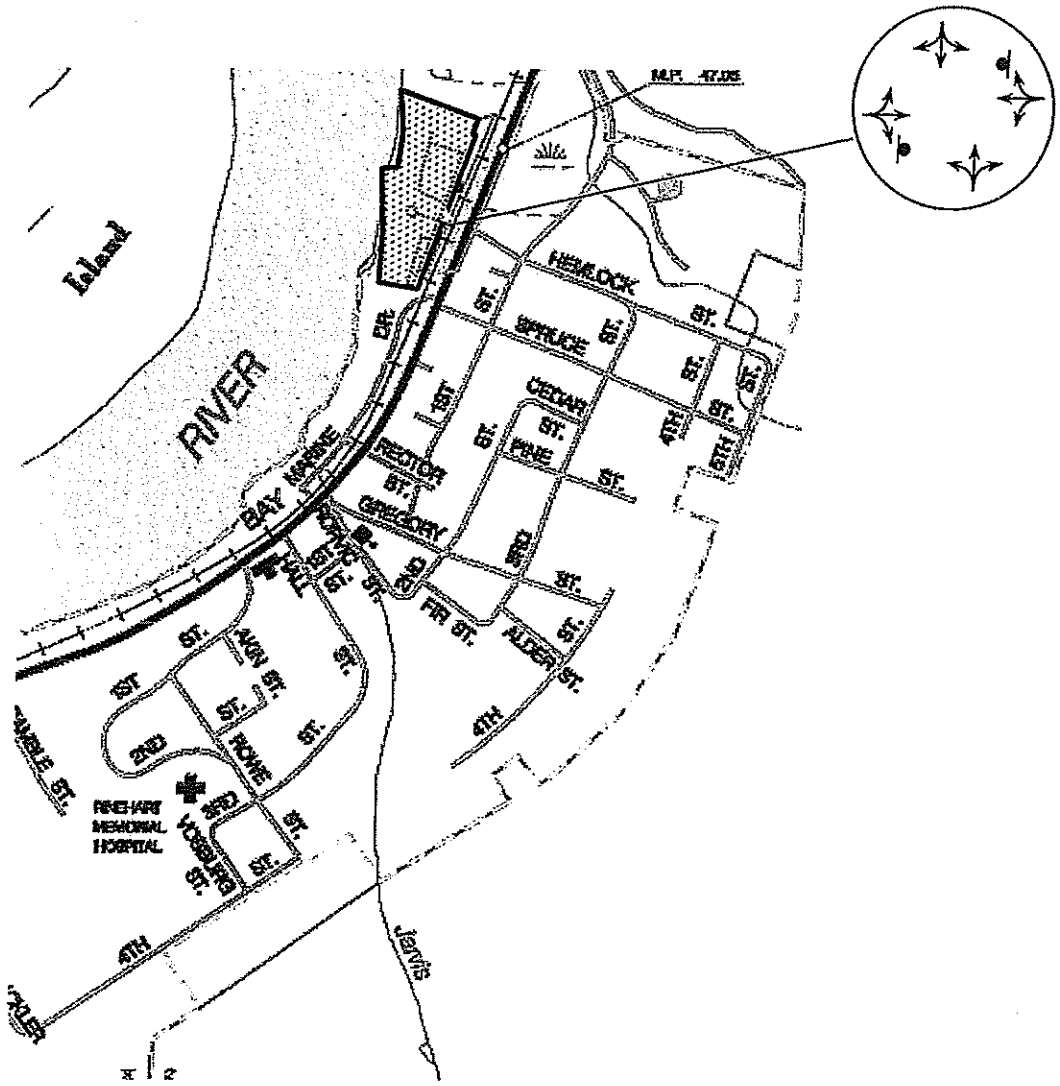
Proposed Site

Proposed Roadway

OR07 031.T01 The Point at Wheeler Landing

Figure 2: Study Area Intersections With Existing and TMP Proposed Lane Configurations



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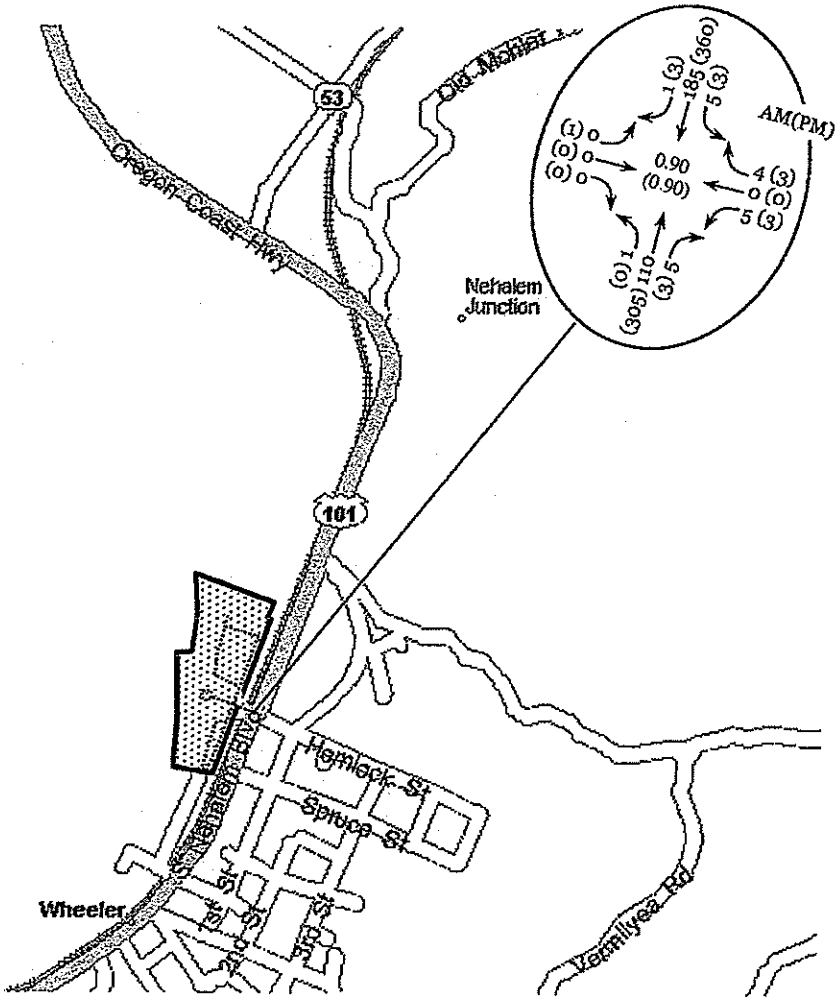
Proposed Site

Proposed Roadway

OR07.031.T01 The Point at Wheeler Landing

Figure 3: Existing 2007 Weekday Peak Hour Traffic Volumes In The Vicinity Of The Point At Wheeler Landing



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Proposed Site

Proposed Roadway

AM(PM) Peak Hour Volumes

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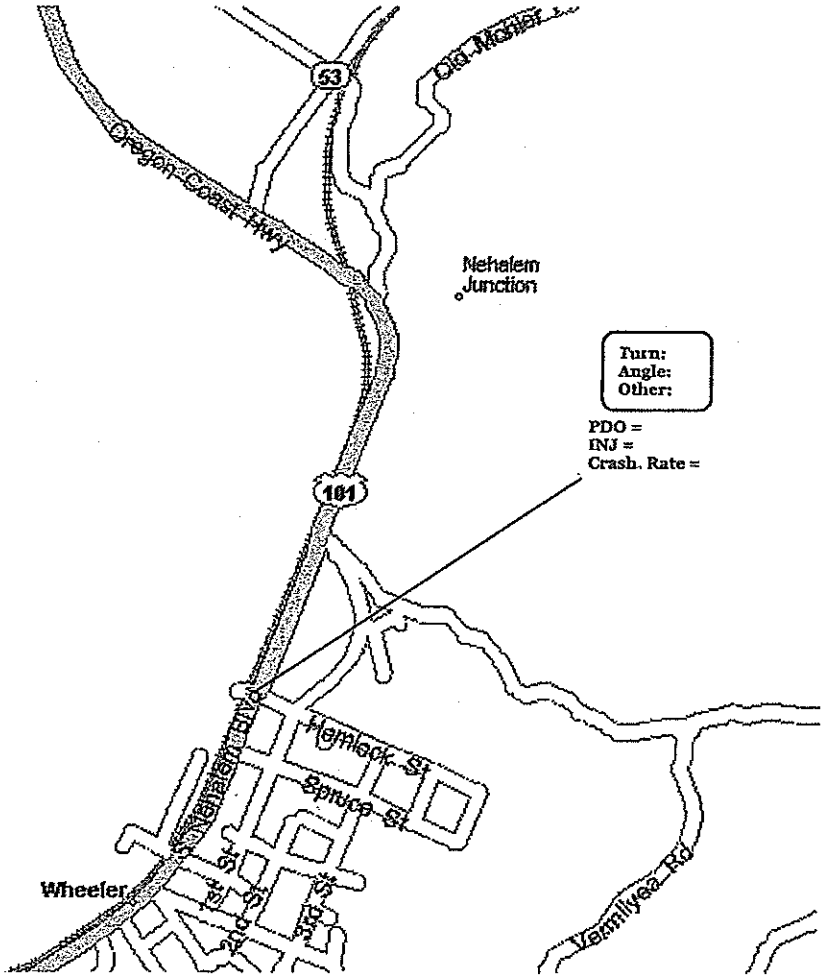
Figure 4: Traffic Accident Patterns Throughout The Study Area (Jan 2002 to Dec 2006) - Data Pending



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Proposed Site

Proposed Roadway

OR07.031.T01 The Point at Wheeler Landing

Figure 5: Future Background 2010 Weekday Peak Hour Traffic Volumes In The Vicinity Of The Point At Wheeler Landing

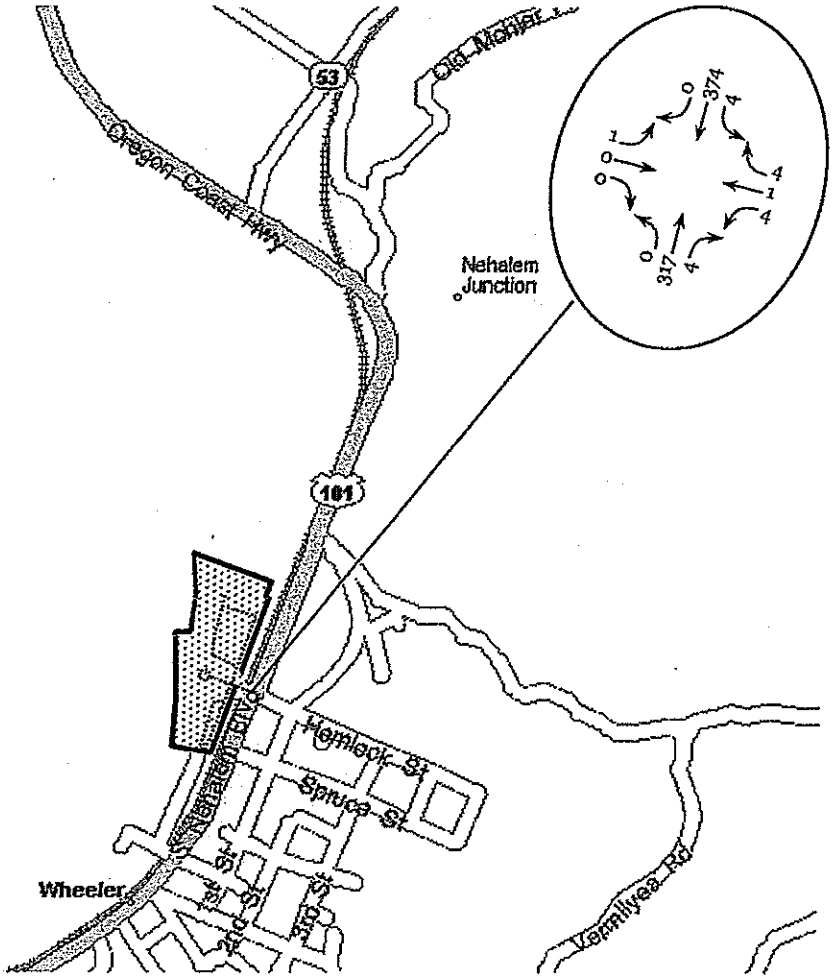
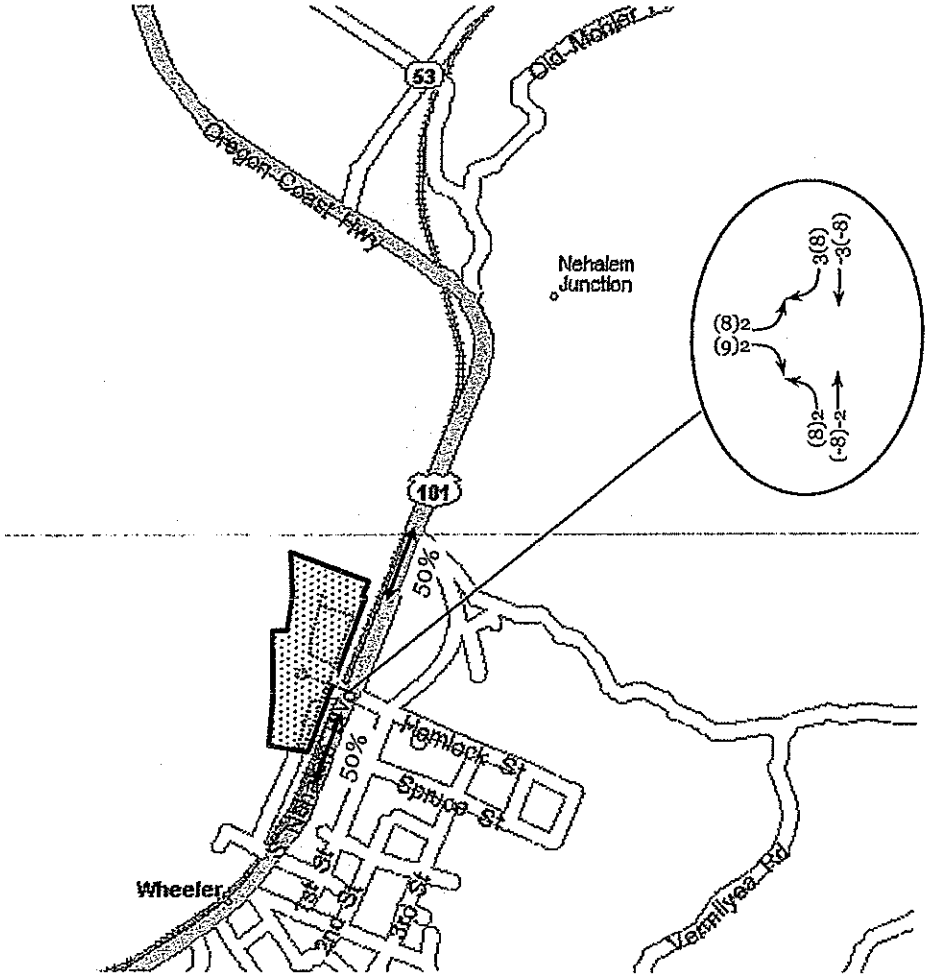


Figure 6a: Weekday Pass-By Peak Hour Traffic Volumes Generated By Full Buildout of The Point At Wheeler Landing



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Proposed Site

Proposed Roadway

AM(PM) Peak Hour Volumes

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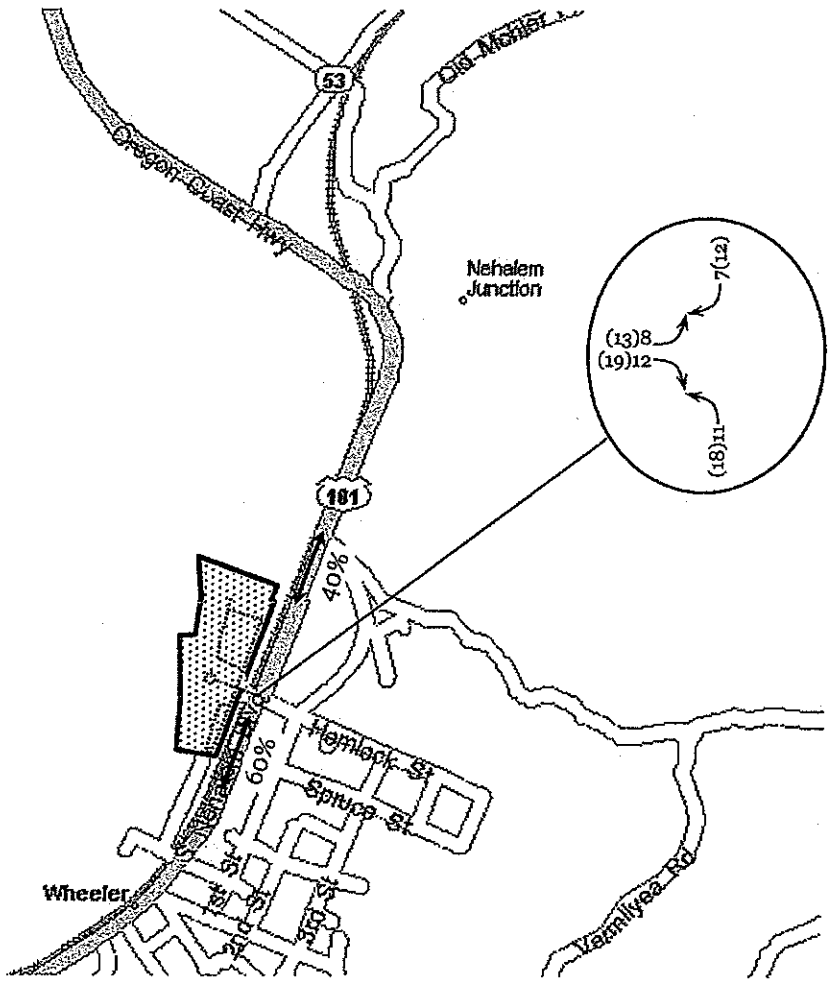
Figure 6b: Weekday New /Diverted Peak Hour Traffic Volumes Generated By Full Buildout of The Point At Wheeler Landing



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Drawing Not To Scale

Proposed Site

Proposed Roadway

AM(PM) Peak Hour Volumes

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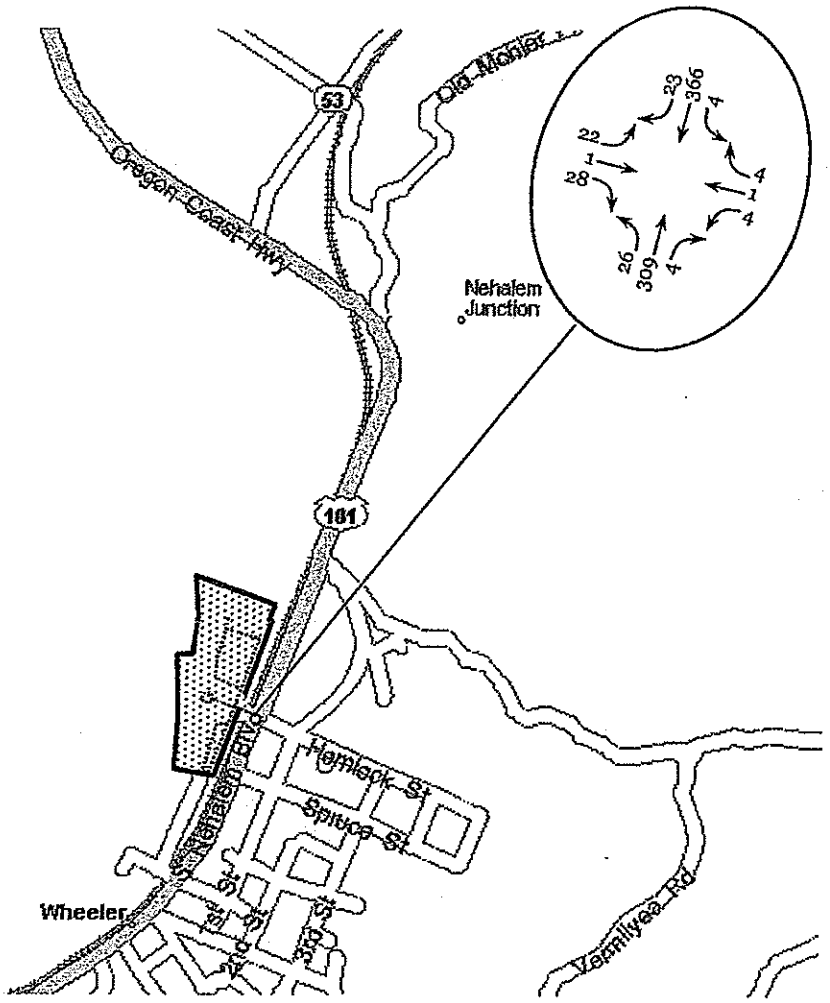
OR07.031.T01 The Point at Wheeler Landing

Figure 7: Total Future 2010 Weekday Peak Hour Traffic Volumes With Full Buildout Of The Point At Wheeler Landing



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Drawing Not To Scale

Proposed Site

Proposed Roadway

PM/30th Peak Hour Volumes

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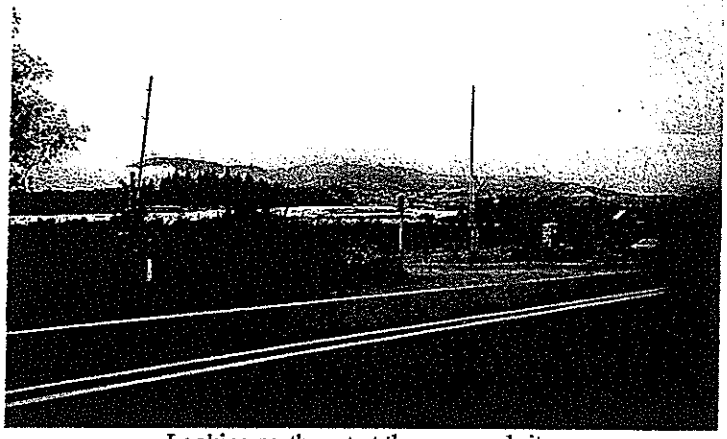
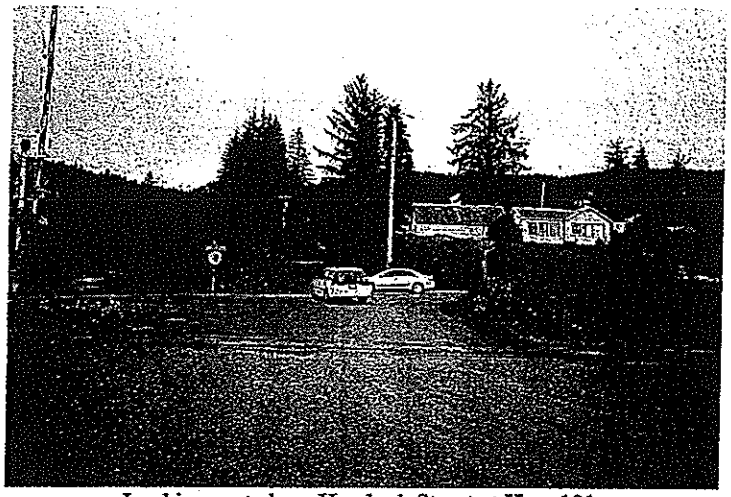
STUDY AREA TYPICAL VIEWS
The Point At Wheeler Landing
Wheeler, Oregon



Looking northwest at the proposed site

Looking northwest at the proposed site

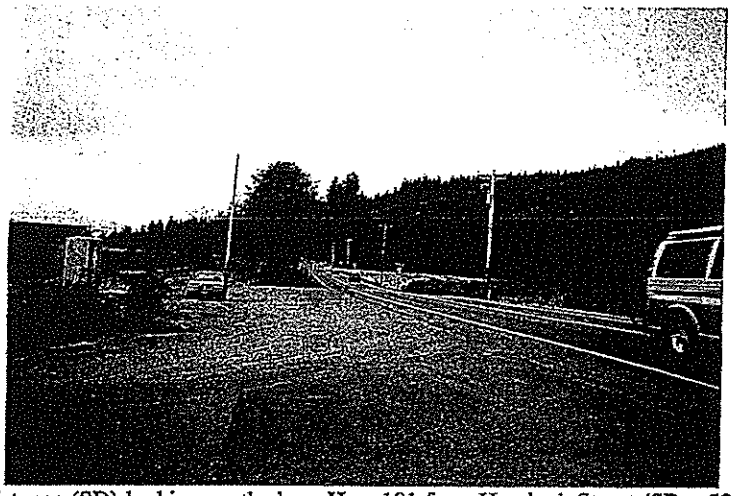


Looking east along Hemlock Street at Hwy 101

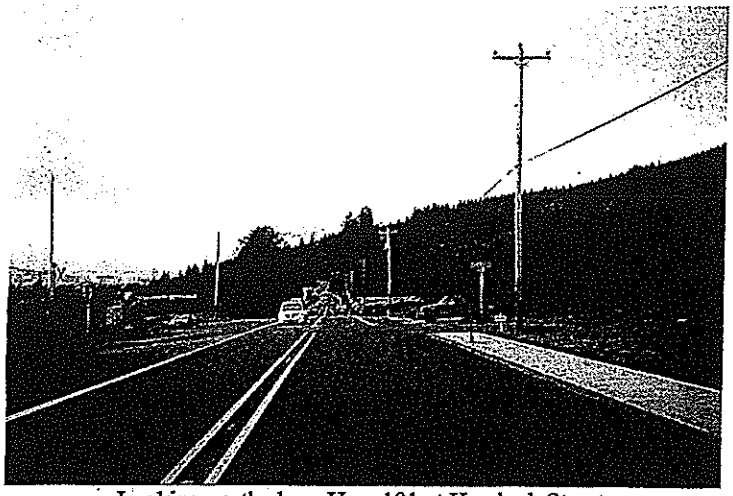
Photos Taken by CTS Engineers

STUDY AREA TYPICAL VIEWS
The Point At Wheeler Landing
Wheeler, Oregon

Sight distance (SD) looking south along Hwy 101 from Hemlock Street (SD blocked due to vegetation)



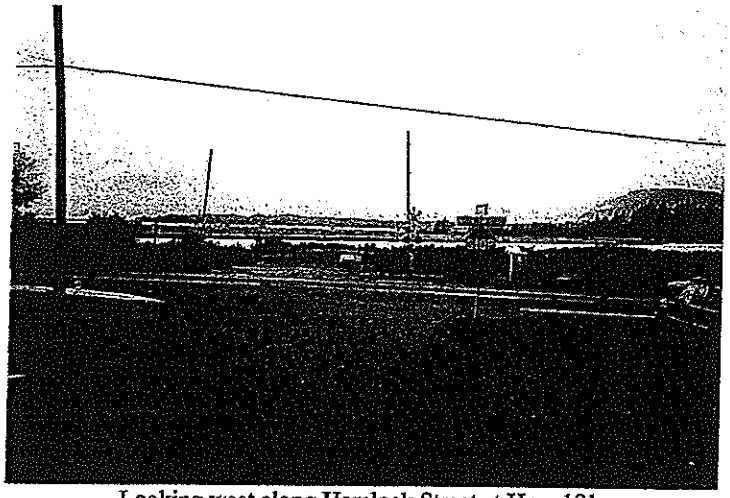
Sight distance (SD) looking north along Hwy 101 from Hemlock Street (SD > 500 feet)



Looking north along Hwy 101 at Hemlock Street

Photos Taken by CTS Engineers

STUDY AREA TYPICAL VIEWS
The Point At Wheeler Landing
Wheeler, Oregon



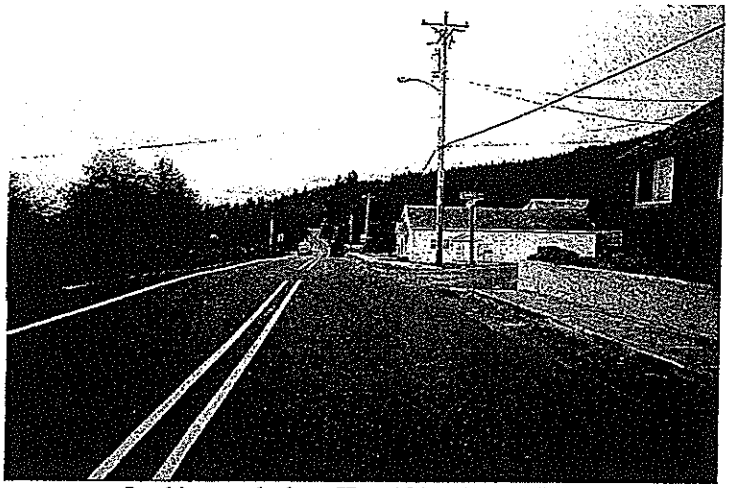
Looking west along Hemlock Street at Hwy 101

Looking south along Hwy 101 at Hemlock Street

Looking south along Hwy 101 at Spruce Street

Photos Taken by CTS Engineers

STUDY AREA TYPICAL VIEWS
The Point At Wheeler Landing
Wheeler, Oregon



Looking north along Hwy 101 at Spruce Street

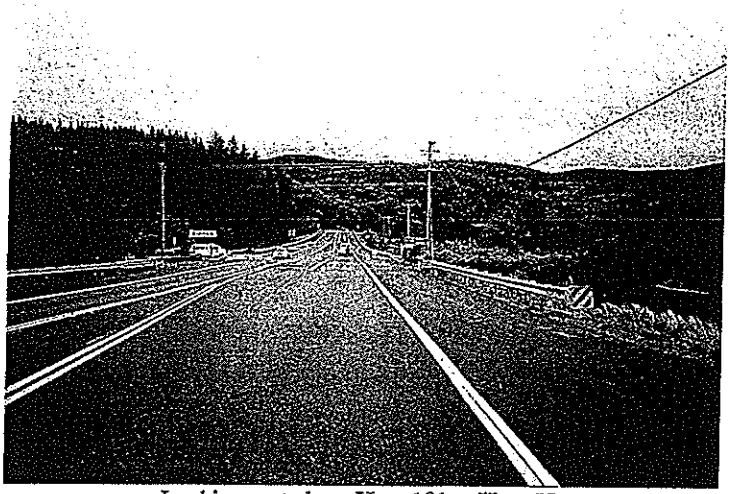
Looking west along Spruce Street at Hwy 101

Looking west along Hwy 101 at Hwy 53

Photos Taken by CTS Engineers

STUDY AREA TYPICAL VIEWS
The Point At Wheeler Landing
Wheeler, Oregon

Looking south along Hwy 53 at Hwy 101



Looking east along Hwy 101 at Hwy 53

Photos Taken by CTS Engineers

TRIP GENERATION WORKSHEET
RATES

Development:	**The Point at Wheeler Landing**
Size:	**44** A and B Units
ITE Land Use Code:	Condominiums/Townhouses, Code 230 (7th Edition)
Variable:	Number of Units (H)

Total Weekday Trips

T = 5.86 x (H)

	Enter	Exit	Total
Vehicle Trips	129	129	258
Site Distribution	50%	50%	100%

Weekday AM Peak Hour Trips

T = 0.44 x (H)

	Enter	Exit	Total
Vehicle Trips	3	16	19
Site Distribution	17%	83%	100%

Weekday PM Peak Hour Trips

T = 0.52 x (H)

	Enter	Exit	Total
Vehicle Trips	15	8	23
Site Distribution	67%	33%	100%

TRIP GENERATION WORKSHEET
RATES

Development: **The Point at Wheeler Landing**
Size: 14 C Units **(Live-Work Townhomes**

ITE Land Use Code: Condominiums/Townhouses,
Code 230 (7th Edition)

Variable: Number of Units (H)

Total Weekday Trips
T = 5.86 x (H)

	Enter	Exit	Total
Vehicle Trips	41	41	82
Site Distribution	50%	50%	100%

Weekday AM Peak Hour Trips
T = 0.44 x (H)

	Enter	Exit	Total
Vehicle Trips	1	5	6
Site Distribution	17%	83%	100%

Weekday PM Peak Hour Trips
T = 0.52 x (H)

	Enter	Exit	Total
Vehicle Trips	5	2	7
Site Distribution	67%	33%	100%

TRIP GENERATION WORKSHEET
RATES

Development: **The Point at Wheeler Landing**
Size: **8,008** GSF **(Live-Work Townhom**

ITE Land Use Code: General Office Building,
Code 710 (7th Edition)

Variable: Per 1,000 GSF (G)

Total Weekday Trips
T = 11.01 x (G)

	Enter	Exit	Total
Vehicle Trips	44	44	88
Site Distribution	50%	50%	100%

Weekday AM Peak Hour Trips
T = 1.55 x (G)

	Enter	Exit	Total
Vehicle Trips	11	1	12
Site Distribution	88%	12%	100%

Weekday PM Peak Hour Trips
T = 1.49 x (G)

	Enter	Exit	Total
Vehicle Trips	2	10	12
Site Distribution	17%	83%	100%

TRIP GENERATION WORKSHEET
RATES

Development: The Point at Wheeler Landing
Size: 19,077 GSF

ITE Land Use Code: Small Local-Serving Retail Centers (25,000 GSF or less), Code 820A

Variable: Per 1,000 GSF (G)

Total Weekday Trips

T= 42.94 x G

		Enter	Exit	Total
Vehicle Trips		409	410	819
Site Distribution		50%	50%	100%
55%	Pass-by Trips	225	226	451
17%	Diverted Trips	69	70	139
28%	New Trips	115	114	229
				819

Weekday AM Peak Hour Trips

T= 1.03 x G

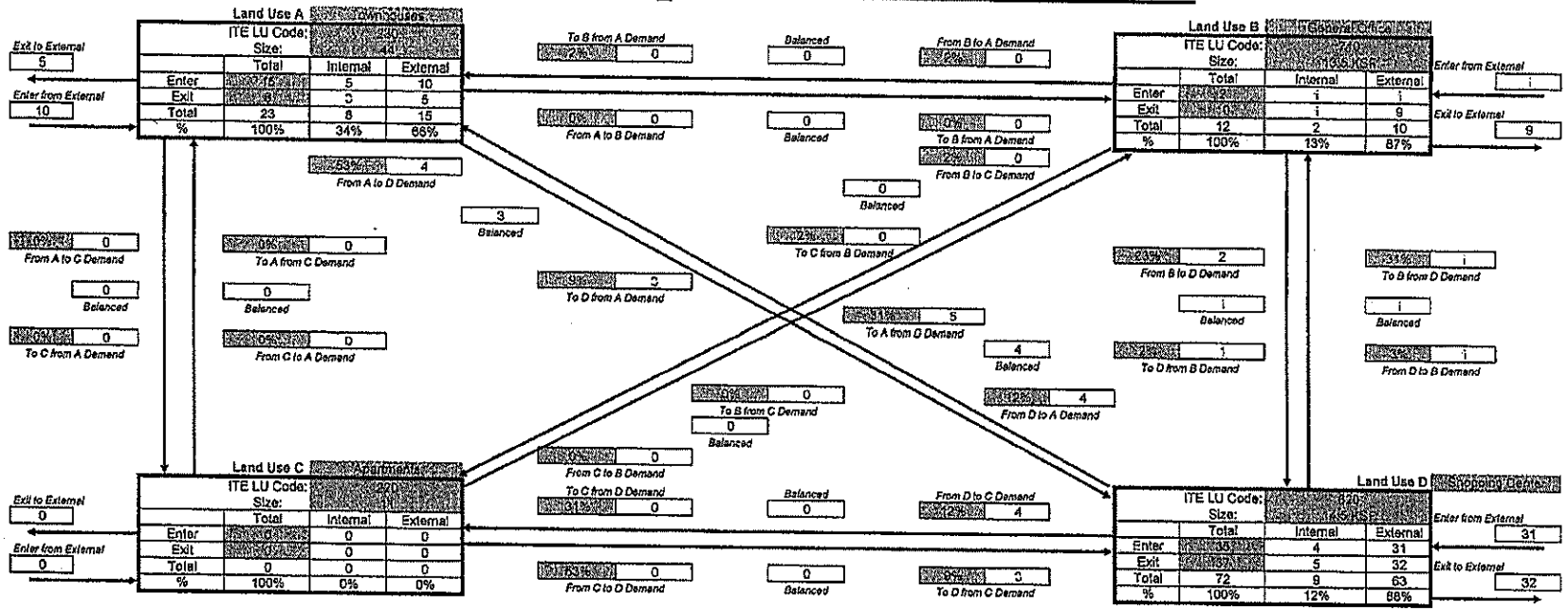
		Enter	Exit	Total
Vehicle Trips		12	8	20
Site Distribution		61%	39%	100%
55%	Pass-by Trips	5	6	11
17%	Diverted Trips	1	2	3
28%	New Trips	6	0	6
				20

Weekday PM Peak Hour Trips

R =3.75 x (G)

		Enter	Exit	Total
Vehicle Trips		35	37	72
Site Distribution		48%	52%	100%
55%	Pass-by Trips	20	20	40
17%	Diverted Trips	6	6	12
28%	New Trips	9	11	20
				72

Internal Capture Rate Worksheet



Net External Trips for Multi-Use Development					
	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	10	1	0	31	43
Exit	5	9	0	32	46
Total	15	10	0	63	89
Single-Use	23	12	0	72	107

INTERNAL CAPTURE 17%

Internal Capture Rates for Trip Origins				
		Mid-day Peak	PM Peak of Street	Daily
from OFFICE	to Office	2%	1%	2%
	to Retail	20%	23%	22%
	to Residential	0%	2%	2%
from RETAIL	to Office	3%	3%	3%
	to Retail	29%	20%	30%
	to Residential	7%	12%	11%
from RESIDENTIAL	to Office	N/A	N/A	N/A
	to Retail	34%	53%	38%
	to Residential	N/A	N/A	N/A

Internal Capture Rates for Trip Destinations				
		Mid-day Peak	PM Peak of Street	Daily
to OFFICE	from Office	6%	6%	2%
	from Retail	36%	31%	15%
	from Residential	0%	0%	N/A
to RETAIL	from Office	4%	2%	4%
	from Retail	31%	20%	28%
	from Residential	5%	9%	9%
to RESIDENTIAL	from Office	0%	2%	3%
	from Retail	37%	31%	33%
	from Residential	N/A	N/A	N/A

Performed per Trip Generation Handbook *Chapter 7*

8/29/2007

EXISTING 2007 WEEKDAY PEAK HOUR TRAFFIC VOLUMES (PM PEAK)
OR07.031 T01 - THE POINT AT WHEELER LANDING

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2 Hwy 101 /Hemlock Street

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: C[16.0]

Street Name:	Hwy 101						Hemlock Street					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 1 0			0 0 1! 0 0			1 0 0 0 0			0 0 1! 0 0		
Volume Module: >> Count Date: 2 Aug 2007 << PM Peak/30th HV												
Base Vol:	0	305	3	3	360	3	1	0	0	3	0	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	305	3	3	360	3	1	0	0	3	0	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	0	339	3	3	400	3	1	0	0	3	0	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	339	3	3	400	3	1	0	0	3	0	3
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	xxxx	xxxxx	7.1	6.5	6.2
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	xxxx	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	342	xxxx	xxxxx	751	xxxx	xxxxx	749	751	341
Potent Cap.:	xxxx	xxxx	xxxxx	1228	xxxx	xxxxx	330	xxxx	xxxxx	331	342	706
Move Cap.:	xxxx	xxxx	xxxxx	1228	xxxx	xxxxx	328	xxxx	xxxxx	330	341	706
Volume/Cap:	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	0.00	xxxx	xxxx	0.01	0.00	0.00
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	7.9	xxxx	xxxxx	16.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	A	*	*	C	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	450	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	13.1	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			16.0			13.1		
ApproachLOS:	*			*			C			B		

Note: Queue reported is the number of cars per lane.

FUTURE BACKGROUND 2010 WEEKDAY PEAK HOUR TRAFFIC VOLUMES (PM PEAK)
OR07.031 T01 - THE POINT AT WHEELER LANDING

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Hwy 101 /Hemlock Street

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: C[16.5]

Street Name:	Hwy 101						Hemlock Street					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0 1	0	0 0	1! 0	0	1 0	0 0	0	0 0	1! 0	0
Volume Module: >> Count Date: 2 Aug 2007 << PM Peak/30th HV												
Base Vol:	0	305	3	3	360	3	1	0	0	3	0	3
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	317	3	3	374	3	1	0	0	3	0	3
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Pass-By:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	317	3	3	374	3	1	0	0	3	0	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	0	352	3	3	416	3	1	0	0	3	0	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	352	3	3	416	3	1	0	0	3	0	3
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	xxxx	xxxxx	7.1	6.5	6.2
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	xxxx	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	356	xxxx	xxxxx	780	xxxx	xxxxx	778	780	354
Potent Cap.:	xxxx	xxxx	xxxxx	1214	xxxx	xxxxx	315	xxxx	xxxxx	316	329	694
Move Cap.:	xxxx	xxxx	xxxxx	1214	xxxx	xxxxx	313	xxxx	xxxxx	315	328	694
Volume/Cap:	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	0.00	xxxx	xxxx	0.01	0.00	0.00
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	8.0	xxxx	xxxxx	16.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	A	*	*	C	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	434	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	13.4	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			16.5			13.4		
ApproachLOS:	*			*			C			B		

Note: Queue reported is the number of cars per lane.

TOTAL FUTURE 2010 WEEKDAY PEAK HOUR TRAFFIC VOLUMES (PM PEAK)
WITH FULL BUILDOUT OF THE POINT AT WHEELER LANDING
OR07.031 T01 - THE POINT AT WHEELER LANDING

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Hwy 101 /Hemlock Street

Average Delay (sec/veh): 1.4 Worst Case Level Of Service: C[15.1]

Street Name:	Hwy 101						Hemlock Street					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module: >> Count Date: 2 Aug 2007 << PM Peak/30th HV												
Base Vol:	0	305	3	3	360	3	1	0	0	3	0	3
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	317	3	3	374	3	1	0	0	3	0	3
Added Vol:	18	0	0	0	0	12	13	0	19	0	0	0
Pass-By:	8	-8	0	0	-8	8	8	0	9	0	0	0
Initial Fut:	26	309	3	3	366	23	22	0	28	3	0	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	29	343	3	3	407	26	24	0	31	3	0	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	29	343	3	3	407	26	24	0	31	3	0	3
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	432	xxxx	xxxxx	347	xxxx	xxxxx	831	831	420	845	842	345
Potent Cap.:	1138	xxxx	xxxxx	1223	xxxx	xxxxx	291	307	638	285	303	702
Move Cap.:	1138	xxxx	xxxxx	1223	xxxx	xxxxx	283	299	638	265	294	702
Volume/Cap:	0.03	xxxx	xxxx	0.00	xxxx	xxxx	0.09	0.00	0.05	0.01	0.00	0.00
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.2	xxxx	xxxxx	8.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	411	xxxxx	xxxx	385	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.5	xxxxx	xxxxx	0.1	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	15.1	xxxxx	xxxxx	14.5	xxxxx
Shared LOS:	*	*	*	*	*	*	*	C	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			15.1			14.5		
ApproachLOS:	*			*			C			B		

Note: Queue reported is the number of cars per lane.