



February 20, 2017

TARRAGON, LLC  
Attn: Dennis Rattie  
601 Union St #3500  
Seattle, WA 98101

Re: Chehalis I-5 Corporate Park – Lewis County  
Traffic Impact Analysis - Update

Dear Mr. Rattie,

I am pleased to submit this Traffic Impact Analysis – Update for the proposed 1,155,500 sq. ft. Chehalis I-5 Corporate Park project in Lewis County. This update is to **JTE, Inc.** Chehalis I-5 Corporate Park Traffic Impact Analysis dated March 29, 2007.

The project comprises of two buildings, Building A with 1,011,500 sq. ft. and Building B with 144,000 square feet. The project is generally located south of Bishop Road and west of Rush Road. Access to the site will be via one driveway on Bishop Road and two driveways on Rush Road.

The County trip impact threshold for analyzing an intersection or roadway is typically 50 PM peak hour trips. Coordination with the County identified the following intersections for study/review in this updated report, reference report Figures 3 to 7. They are:

1. Rush Rd./Jackson Highway
2. Rush Rd./Maurin Rd..
3. Bishop Road/Rush Road
4. Bishop Road/Jackson Highway
5. SR – 5 SB Ramp Junction/Rush Road
6. SR – 5 NB Ramp Junction/Rush Road
7. Kirkland Rd./Rush Rd.
- D. Labree Rd/SR – 5 SB ramp (traffic discussion)
- D. Labree Rd/SR – 5 NB ramp (traffic discussion)
- D. Labree Rd-Maurin Rd/Bishop Road (traffic discussion)
8. Site Access intersections

The general format of this report is to describe the proposed project, identify existing traffic conditions (baseline), project future traffic conditions and identify Agency street/road improvements (future baseline), calculate the traffic that would be generated by the project and then add it to the future baseline traffic volumes. Operational analyses are used to determine the specific project traffic impact and appropriate traffic mitigation measures to reduce the impact.

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The SUMMARY, CONCLUSIONS AND RECOMMENDATIONS begin on page 12 of this report.

## PROJECT INFORMATION

Figure 1 is a vicinity map showing the location of the proposed site and surrounding street network.

Figure 2 shows a preliminary site plan prepared by AHBL. The plan consists of the Chehalis I-5 Corporate Park layout comprised of two buildings as follows:

- Building A: 1,011,500 sq. ft.
- Building B: 144,000 sq. ft.

The site plan also shows the internal circulation and parking for 809 vehicles; 136 stalls for truck trailers and 673 for automobiles. Access to the site will be via one driveway on Bishop Road and two driveways on Rush Road.

Full development and occupancy of the proposed Chehalis I-5 Corporate Park project is anticipated to occur by 2018/2019. The horizon year for analysis is 2021 to ensure a conservative review.

## EXISTING ENVIRONMENT

### Project Site

The site is currently undeveloped. An aerial of the site obtained from Lewis County GIS is below:



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Road System

Figure 3 shows the existing traffic control, number of road lanes, number of approach lanes at the intersections and other pertinent information. The primary streets within the study area and their classifications per the County are as follows:

- SR - 5 State Route
- Jackson Hwy. Rural Major Collector
- Bishop Rd. Rural Major Collector
- Rush Rd. Rural Major Collector
- Hamilton Road Rural Major Collector
- Labree Road – Maurin Road Rural Major Collector
- Rose Marie Drive Local Access

Traffic Volumes

Figure 4 shows the existing PM peak hour traffic volumes for the analysis intersections. Traffic Count Consultants, a firm that specializes in the collection of traffic data, collected the existing PM peak hour turning movement counts at the analysis intersections on the date shown in Figure 4. The count data sheets are attached in the appendix.

Intersection Operations

Traffic engineers have developed criteria for intersection operations called level of service (LOS). The LOS's are A to F with A and B being very good and E and F being more congested. LOS C and D correlate to busy traffic conditions with some restrictions to the ability to choose travel speed, change lanes and the general convenience comfort and safety.

The procedures in the Transportation Research Board Highway Capacity Manual, 2010 were used to calculate the level of service at the study intersections. The following table depicts the LOS and corresponding average delay in seconds at signalized and stop control intersections:

Intersection Type	Level of Service					
	A	B	C	D	E	F
Signalized	<10	>10 and <20	>20 and <35	>35 and <55	>55 and <80	>80
Stop Control	<10	>10 and <15	>15 and <25	>25 and <35	>35 and <50	>50

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### LOS Criteria

Lewis County Code below identifies the County LOS standard

#### *12.60.540 Minimum levels of service.*

*The minimum level of service (LOS) for roads within Lewis County shall be as shown in the transportation element of the county's comprehensive plan. The level of service for state routes and major county roadways is calculated on a corridor basis. A corridor is defined as a transportation route, or portion of that route, that connects major land use designations. Logical termini, such as major intersection points, land use changes or land use barriers, define the corridor boundaries. An affected corridor is defined as a road link or intersection on which a project may generate 50 new peak hour trips or turning movements. [Ord. 1194 Exh. B, 2007]*

The County LOS standard per the Policy T13.6 in the Transportation Element June 1, 1999 Amended April 4, 2002 is LOS 'D' on a corridor basis, pertinent section attached. Further, County staff identified that the adopted level of service standard for County roadways and intersection is "D".

The Washington State Department of Transportation (WSDOT) "Level of Service Thresholds for State Highways Set by RTPO's" identifies a threshold of LOS 'D' for urban growth areas and LOS 'C' for the rural growth area in Lewis County. The Rush Road/SR - 5 interchange is in the City of Napavine, an urban area. Thus the LOS criterion is "D". A copy of the WSDOT criteria is attached.

### LOS Analysis Software/Other

The LOS of the study intersections were calculated using the Synchro Traffic Model.

At the SR - 5 Rush Road interchange I included the Hamilton Road/Rush Road intersection using traffic data collected on prior JTE, Inc. work in the area, reference Rush Road PUD Traffic Impact Analysis dated April 19, 2011 that used 2016 as a horizon year. Truck data percents per the collected field data is used in the operational analysis.

### Safety Review

WSDOT provided 3 years (January 1, 2013 to December 31, 2015) of accident data electronically for the streets and intersections in the site vicinity; see WSDOT cover letter dated November 01, 2016, in the appendix. The electronic data is available via request at [jaketraffic@comcast.net](mailto:jaketraffic@comcast.net) reference #2016.059

The following table identifies the calculated accident rates at the study intersections. The rates were determined per million entering vehicles using a "k" factor of 10 that is that about 10% of the daily traffic occurs during the PM peak hour.

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Intersection	Incidents (3- years)	Entering PMPHT	Accident Rate
1) Rush Road/Jackson Highway	1	580	0.16
2) Rush Road/Maurin Road	1	238	0.38
3) Bishop Road/Rush Road	10	315	2.90
4) Bishop Road/Jackson Highway	5	469	0.97
5) SR - 5 SB ramp jct/Rush Road	2	1,070	0.17
6) SR - 5 NB ramp jct/Rush Road	2	796	0.23
7) Kirkland Road/Rush Road	1	614	0.15

In addition to the above study intersections I reviewed incidents at the new Labree Road/SR - 5 interchange. Three incidents are noted at the southbound ramp junction, one at the northbound ramp junction and one at the Bishop Road/LaBree Rd. intersection. The new interchange is operating satisfactorily.

The WSDOT 2014 Washington State Collision Data Summary identifies a collision rate of 1.15 incidents per million vehicle miles in Lewis County. The WSDOT accident rate is per million vehicle miles. The rates I calculated at the intersections are per million entering vehicles. Accident rates of less than 1 per million entering vehicles at intersections typically indicate that the intersection is operating satisfactorily. One study intersections operate with a higher accident rate. This intersection is Bishop Road at Rush Road.

The Bishop Road/Rush Road intersection is currently stop controlled eastbound and westbound. Both roadways are classified Rural Major Collector. The intersection is illuminated and has good sight lines. Traffic volumes at the intersection are well balance. Revising the existing two way 'Stop' control to all-way 'Stop' control would improve safety of the this intersection and is recommended. Traffic operation with all-wall 'Stop' control would be LOS 'A' overall and have LOS 'A' operation for all approached.

The other study intersections and roadways operate satisfactorily.

#### HORIZON YEAR CONDITIONS "WITHOUT" THE PROJECT

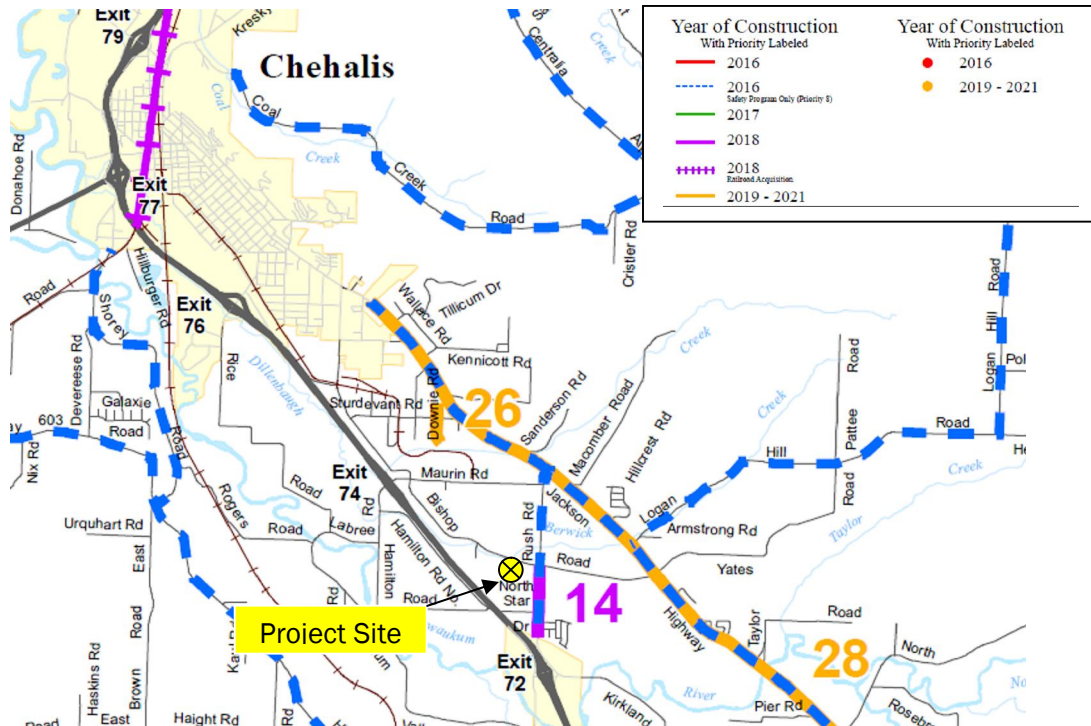
Figure 5 shows the projected 2021 PM peak hour traffic volumes "without" the project. These volumes include the existing traffic volume counts plus background growth. A growth factor of two percent per year was applied. The growth factor per the WSDOT Annual Traffic Report on SR - 5 after the Rush Rd. ramp between 2005 and 2015 indicates a growth rate of about 2% per year and is used for analysis in this report. This growth factor is consistent with other JTE, Inc. studies conducted in the site area and I believe is an appropriate representation of projected growth in the area.

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ROAD IMPROVEMENT PROJECTS

Lewis County

The Lewis County “Six Year Transportation Improvement Program, 2016 – 2021” (attached in the appendix) list was reviewed. Below is the County map of the planned improvements:



County project #14 is near the site and is described as:

Rush Road Widening from milepost 2.3 to milepost 3.164. Project is to provide base stabilization and road widening for industrial commercial traffic. Project cost estimate is \$2,300,000. Engineering is started and construction budget is noted in 2018.

A copy of the County project description is attached in the appendix.

In addition, the County has extended Rush Rd. to the north from Bishop Rd. to Jackson Highway since I conducted my initial site traffic study work on this project.

WSDOT

I have reviewed the WSDOT website ([www.wsdot.wa.gov](http://www.wsdot.wa.gov)) for improvement projects in the vicinity of the proposed project. No improvements are noted in the immediate site vicinity. However WSDOT completed a significant improvement project in 2009. This project was as follows:

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The improvement project occurred at the SR 5 – Rush Road interchange to 13<sup>th</sup> Street. The project widened SR - 5 to improve traffic flow through Lewis County. The finished project comprised of a concrete barrier-divided interstate with three general purpose lanes in each direction. The end result increased economic development opportunity and improved mobility and safety for all vehicles using this section of SR - 5. Additionally the project included a new interchange at Labree Road to improve truck access to the Port of Chehalis and was projected to reduce accidents by nine percent on area roadways and the SR – 5 ramps.

## TRIP GENERATION AND DISTRIBUTION

### Definitions

A vehicle trip is defined as a single or one direction vehicle movement with either the origin or destination (existing or entering) inside the proposed development.

Traffic generated by development projects consists of the following types:

Pass-By Trips:	Trips made as intermediate stops on the way from an origin to a primary trip destination.
Diverted Link Trips:	Trips attracted from the traffic volume on roadways within the vicinity of the generator but require a diversion from that roadway to another roadway to gain access to the site.
Captured Trips:	Site trips shared by more than one land use in a multi-use development.
Primary (New) Trips:	Trips made for the specific purpose of using the services of the project.

### Trip Generation

The location and design of the Chehalis I-5 Corporate Park project is consistent with that of a High Cube Warehouse. The proposed project is near major highways and has 30 foot clearances. The Institute of Transportation Engineers Trip Generation 9<sup>th</sup> Edition provides trip generation rates for various land use codes. The definition for ITE LUC “High Cube Warehouse” is as follows:

*“High-cube warehouses are used for the storage of manufactured goods prior to their distribution to retail outlets. These facilities consist of large shells of steel buildings and large halls, often subdivided for individual tenants, with a typical ceiling height of 24 to 26 feet; they are also characterized by a small employment count due to a high level of mechanization, truck activities frequently outside the peak hour of the adjacent street system and freeway access. Warehousing (Land Use 150) is a related use”*

The proposed Chehalis I-5 Corporate Park buildings have the following characteristics:

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- A building designed for bulk storage and distribution
- Has a large steel framed roof
- Subdividing the building into up to 12 tenants is a potential
- Provides 30 foot clearances that exceed the 24 to 26' ceiling height of High Cube facilities.
- Near a major freeway, SR – 5.

The above items are consistent with ITE definition for a High Cube Warehouse. The proposed Chehalis I-5 Corporate Park project is expected to generate the vehicular trips during the average weekday, street traffic AM and PM peak hours as shown in Table 2. The trip generation for the project is calculated using trip rates from the Institute of Transportation Engineers (ITE) Trip Generation, Seventh Edition, for High Cube Warehouse (ITE Land Use Code 152). All site trips made by all vehicles for all purposes, including commuter, visitor, and service and delivery vehicle trips are included in the trip generation values.

Based on our analysis, the trips generated by the Chehalis I-5 Corporate Park project are calculated to be 139 trips during the PM peak hour. During the PM peak hour 35% of the trips would be entering and 65% would be exiting the development.

#### Truck Trips

The Institute of Traffic Engineers (ITE) Trip Generation Handbook June 2004 provides information on truck traffic. Tables A.4, A.5 and A.6 contained in the ITE Trip Generation Handbook provide information pertaining to truck traffic generation. On an average day each 1,000 sq. ft. of Industrial (Heavy) Warehouse space is projected to generate 0.01 truck trips during the PM peak. This compares to the PM peak trip generation rate of 0.12 trips per 1,000 square feet. Thus trucks represent about 8.3% (0.01/0.12) of the PM peak hour trips. The ITE tables are attached in the appendix. Roughly half of the truck trips are UPS sized truck types; 2-3 axle.

The number of trucks generated by the project during the PM peak is projected at 12 truck trips (139 x 8.3%).

Note: The August 2014 Trip Generation Handbook was reviewed. This resource does not provide specific Truck Percent data, thus the truck information is projected using the available data in the June 2004 resource.

#### Trip Distribution

Figure 6 shows the site generated traffic assigned to the road system. Trips to and from the site were distributed to the surrounding road network based on the characteristics of the road network, existing traffic volume patterns, the location of likely trip origins and destinations (residential, business, shopping, social and recreational opportunities) and previous traffic studies.



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## PARKING

The site plan identifies parking for 673 parking stalls for passenger vehicles that is excessive. The Institute of Transportation Engineers Parking Generation, 4<sup>th</sup> Edition identifies the average peak parking demand by land use. A Warehouse is identified to have an average peak parking demand based on the following formula:

$$P = 0.41x - 1; P = \text{peak parking demand and } x = 1,000 \text{ sq. ft. of GFA}$$

The proposed Industrial Warehouse is 1,155,500 square feet; thus the peak parking demand is projected to be 472 parked passenger vehicles. I believe that the 472 value is also high based on JTE, Inc. Parking Study for Industrial Warehouse facility conducted for three sites in the Kent valley in 2013. The results of the study below:

The highest noted parking demand at each site was determined. Using the peak collected parking demand data and the total sf (adjusted for occupancy) I calculate that the average peak parking demand for the study warehouses to be 0.22 stalls/1,000 sf of building area. The peak site day parking for an individual site is 0.35 per 1,000 sf that occurred at Site #1.

Utilizing the results of my Parking Demand Study 255 parking stalls (0.22 stall per 1,000 sf) to 405 stalls (0.35 stall per 1,000 sf) would be needed.

## HORIZON YEAR CONDITIONS "WITH" THE PROJECT

### Traffic Volumes

Figure 7 shows the 2021 PM peak hour traffic volumes "with" the proposed project at the analysis and site access intersections, respectively. The site generated PM peak hour traffic volumes shown on Figure 6 were added to the projected background traffic volumes shown on Figure 5 to obtain the Figure 7 volumes.

### Level of Service

Table 1 shows the calculated LOS for the horizon year (2021) "with" and "without" project conditions at the pertinent intersection. Based on my analysis the analyzed SR - 5/Rush Road interchange intersections would operate at LOS "C" and better and the analyzed County road intersections would operate at B and better.

The new Labree Road/SR-5 signalized interchange is a fully developed and has ample capacity to serve the project site traffic and other future development in the area. This interchange and adjacent Maurin Road/Bishop Road signalized intersection work via Traffic Engineering Inspection. See County aerial of the new interchange below:

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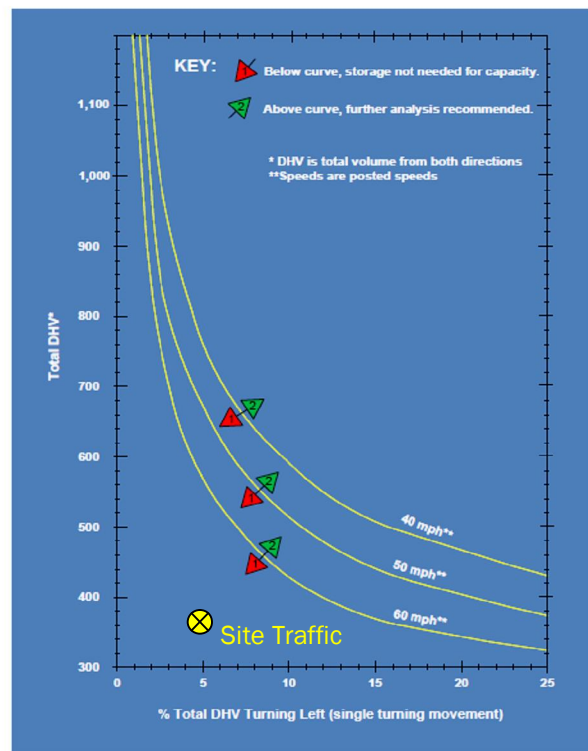
Site Access

Exhibit 1310-7a Left-Turn Storage Guidelines: Two-Lane, Unsignalized

Access to the site will be via one driveway on Bishop Road and two driveways on Rush Road. The site accesses are calculated to operate at LOS 'A' for all movements via Traffic Engineering Inspection.

I have reviewed the WSDOT Design Manual, November 2015, Exhibit 1310-7a "Left Turn Storage Guidelines: Two Lane, Unsignalized)" for the Site Access intersections (a copy of the WSDOT figure is to the right). The data indicates that left turn channelization is not needed for capacity.

However due to the site use, Industrial Warehouse, the installation of 100' Left Turn pockets at the site accesses is recommended to better facilitate truck turning into and out of the site, see Design Manual Exhibit 13-10a Median Channelization Widening, next page.

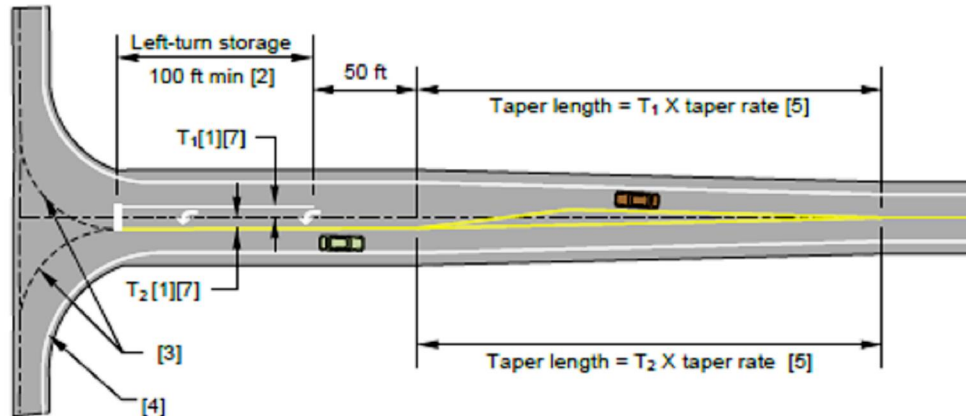


The centerline to centerline spacing of the Rush Road accesses is about 360' which, in my professional experience, is adequate spacing for this roadway. The site accesses will need to be constructed with appropriate tapers and radii to facilitate the anticipated site truck use.

Borovec Road is not proposed to be used for site access; it would be emergency access only.

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**Exhibit 1310-10a Median Channelization: Widening**



**Notes:**

- [1] The minimum width of the left-turn storage lane ( $T_1+T_2$ ) is 11 ft.
- [2] For left-turn storage length, see Exhibits 1310-7b for 4-lane roadways or 1310-8a through 8c for 2-lane roadways.
- [3] Use turn simulation software (such as AutoTURN<sup>®</sup>) to verify the design vehicle can make the turn.
- [4] For right-turn corner design, see Exhibit 1310-6.
- [5] For desirable taper rates, see Table on this Exhibit. With justification, taper rates from the Table in Exhibit 1310-10c may be used.
- [6] For pavement marking details, see the *Standard Plans* and the MUTCD.
- [7] Where curb is provided, add the width of the curb and the shoulders to the left-turn lane width. For shoulder widths at curbs, see 1310.03(6) and Chapter 1230.

$T_1$  = Width of left-turn lane on approach side of centerline  
 $T_2$  = Width of left-turn lane on departure side of centerline

Posted Speed	Desirable Taper Rate [6]
55 mph	55:1
50 mph	50:1
45 mph	45:1
40 mph	40:1
35 mph	35:1
30 mph	30:1
25 mph	25:1

Truck Traffic Circulation

The proposed project would generate truck traffic and the County requested review of truck turning radii at intersections likely to be affected by site truck traffic. Intersections at the SR - 5/Rush Road interchange are used by trucks currently and so is the Rush Road/Kirkland Road intersection. These intersections based on field review are capable of accommodating trucks.

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Site trucks would use the Bishop Rd./Rush Rd. intersection, the County recently added the north leg that extends to Jackson Highway. The corridor is constructed in a manner to accommodate truck traffic and turning.

Trucks heading to and from the east on Bishop Road to Jackson Highway would be EB to SB right turns and NB to WB left turns that work for truck turning.

The freeway interchange with SR – 5 at Labree Rd. opened in 2009 was constructed to WSDOT standards. This new interchange and connecting roadways was installed to improve truck access to the Port of Chehalis and is designed to facilitate truck traffic.

#### AGENCY TRAFFIC IMPACT MITIGATION REQUIREMENTS

The proposed Chehalis I-5 Corporate Park project is to be constructed in conformance with Lewis County standards.

Additionally to facilitate truck ingress and egress at the site driveways I recommend the installation of left turn channelization per applicable standards. Further appropriate access tapers and radii to facilitate truck tuning into and out of the site is recommended.

The County Six Year Transportation Improvement program includes a project on Rush Road that encompasses the site access. Coordinating with the County on the Rush Road left turn channelization and site access improvements is recommended.

#### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The County and WSDOT have installed transportation system improvements since my initial site traffic report. The County extended Rush Road to Jackson Highway from Bishop Road. A new interchange with SR – 5 at LaBree Road has been installed that shifts a significant portion of site traffic, about 40%, away from Rush Rd corridor south of the site. The new LaBree Rd./SR-5 interchange is projected to provide the primary freeway access interchange for the project and is well designed and has ample capacity to accommodate the project. In addition the County has plans to improve Rush Rd. from Bishop Road to the south, Rush Rd./SR-5 interchange in 2018.

This report updated my prior traffic impact analysis of the proposed 1,155,500 sq. ft. Chehalis I-5 Corporate Park project in Lewis County. The project is generally located south of Bishop Road and west of Rush Road. Existing traffic data was collected at the pertinent road intersections identified for analysis. Future horizon year traffic volumes were derived using a growth factor of two percent per year. Level of service analyses were performed for existing and projected future horizon traffic volumes. The evaluation of the traffic impact of the proposed project included adding project generated traffic to the future traffic volume projections and calculating the level of service. The “with” project traffic operations were then compared to the “without” project operations. The comparison of traffic operations “with” and “without” the project identified that the project would not cause a significant adverse affect on the operation of the study intersections.

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Based on my analysis I recommend that the Chehalis I-5 Corporate Park project be allowed with the following traffic impact mitigation measure:

- Construct site in accordance with applicable County requirements.
- Make the existing two way 'Stop' control Bishop Rd at Rush Rd. intersection into all-way 'Stop' control per applicable requirements. This would include adding 'Stop' signs on the south and north legs of the intersection and all-way stop signs on all four 'Stop' signs.
- Install left turn pockets at all the site access driveways and design the driveways with appropriate tapering and radii to accommodate the projected site truck traffic..

No other traffic mitigation should be necessary. Please contact me at (206) 762-1978 or email me at [jaketraffic@comcast.net](mailto:jaketraffic@comcast.net) if you have any questions.

Sincerely,

Mark J. Jacobs, PE, PTOE, President  
**JAKE TRAFFIC ENGINEERING, INC**

MJJ: mjj

TABLE 2 - VEHICULAR TRIP GENERATION  
 CHEHALIS I-5 CORPORATE PARK - LEWIS COUNTY  
 TRAFFIC IMPACT ANALYSIS - UPDATE

TIME PERIOD	TRIP RATE	TRIPS ENTERING	TRIPS EXITING	TOTAL
High Cube Warehouse (ITE Land Use Code 152; 1,155,500 sq. ft)				
Average Weekday	T = 1.68X	971 (50%)	971 (50%)	1,942
AM Peak Hour	T = 0.11X <sup>1</sup>	88 (69%)	39 (31%)	127
PM peak Hour	T = 0.12X	43 (31%)	96 (69%)	139

T = trips

X = per 1,000 sq. ft.

A vehicle trip is defined as a single or one direction vehicle movement with either the origin or destination (existing or entering) inside the study site.

The above trip generation values account for all the site trips made by all vehicles for all purposes, including commuter, visitor, recreation, and service and delivery vehicle trips

TABLE 1 - PM PEAK HOUR LEVEL OF SERVICE  
CHEHALIS I-5 CORPORATE PARK – LEWIS COUNTY  
TRAFFIC IMPACT ANALYSIS - UPDATE

INTERSECTION	APPROACH	EXISTING	2021 W/O PROJECT	2021 W/ PROJECT	
1. Rush Road at Jackson Highway	Overall NB	A (2.6) B (11.5)	A (2.8) B (12.0)	A (3.0) B (11.5)	
2. Rush Road at Maurin Road	Overall EB	A (3.3) B (10.1)	A (3.6) B (10.3)	A (3.6) B (10.5)	
3. Rush Road at Bishop Road	Overall	A (5.7)	A (5.9)	A (6.4)	A (8.3)*
	EB	B (10.4)	B (10.7)	B (11.3)	A (8.2)
	WB	B (11.3)	B (11.6)	B (12.2)	A (8.2)
	NB	A (1.6), due to LT's	A (1.6)	A (2.0)	A (8.3)
	SB	A (0.7), due to LT's	A (0.8)	A (0.8)	A (8.3)
4. Bishop Road at Jackson Highway	Overall	A (2.4)	A (2.6)	A (2.8)	
	EB	B (11.1)	B (11.5)	B (11.7)	
	WB	B (11.7)	B (12.8)	B (13.0)	
5. Rush Road at SR - 5 SB ramps	Overall SB	A (6.5) C (15.1)	A (6.5) C (15.1)	A (7.5) C (17.6)	
6. Rush Road at SR - 5 SB ramps	Overall NB	A (5.5) C (17.2)	A (6.3) C (20.8)	A (6.4) C (21.6)	
7. Rush Road at Kirkland Road	Overall EB	A (6.5) B (11.8)	A (6.8) B (12.4)	A (6.8) B (12.7)	
A. Site Access/ Bishop Road	Overall NB	--	--	A (2.8)	
		--	--	A (9.7)	
B. Site Access/ Rush Road **	Overall NB	--	--	A (1.0)	
		--	--	A (9.7)	

\* - Traffic operation with all-way 'Stop' control to improve safety.

\*\* - All site traffic using the two Rush Road, accesses were assigned to one to ensure a conservative analysis.

Number shown in parenthesis is the average control delay in seconds per vehicle for the intersection as a whole or approach movement, which determines the LOS per the Highway Capacity Manual.

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