3.5 TRANSPORTATION

Transportation issues identified in scoping for the EIS included the existing and proposed street system, motorized traffic operations, non-motorized traffic and pedestrian movements, safe school walking routes and safety hazards. Existing conditions, impacts and potential mitigation measures related to these issues are addressed in Section 3.5. Supporting documentation is provided in Appendix O.

3.5.1 Existing Conditions

3.5.1.1 Study Area

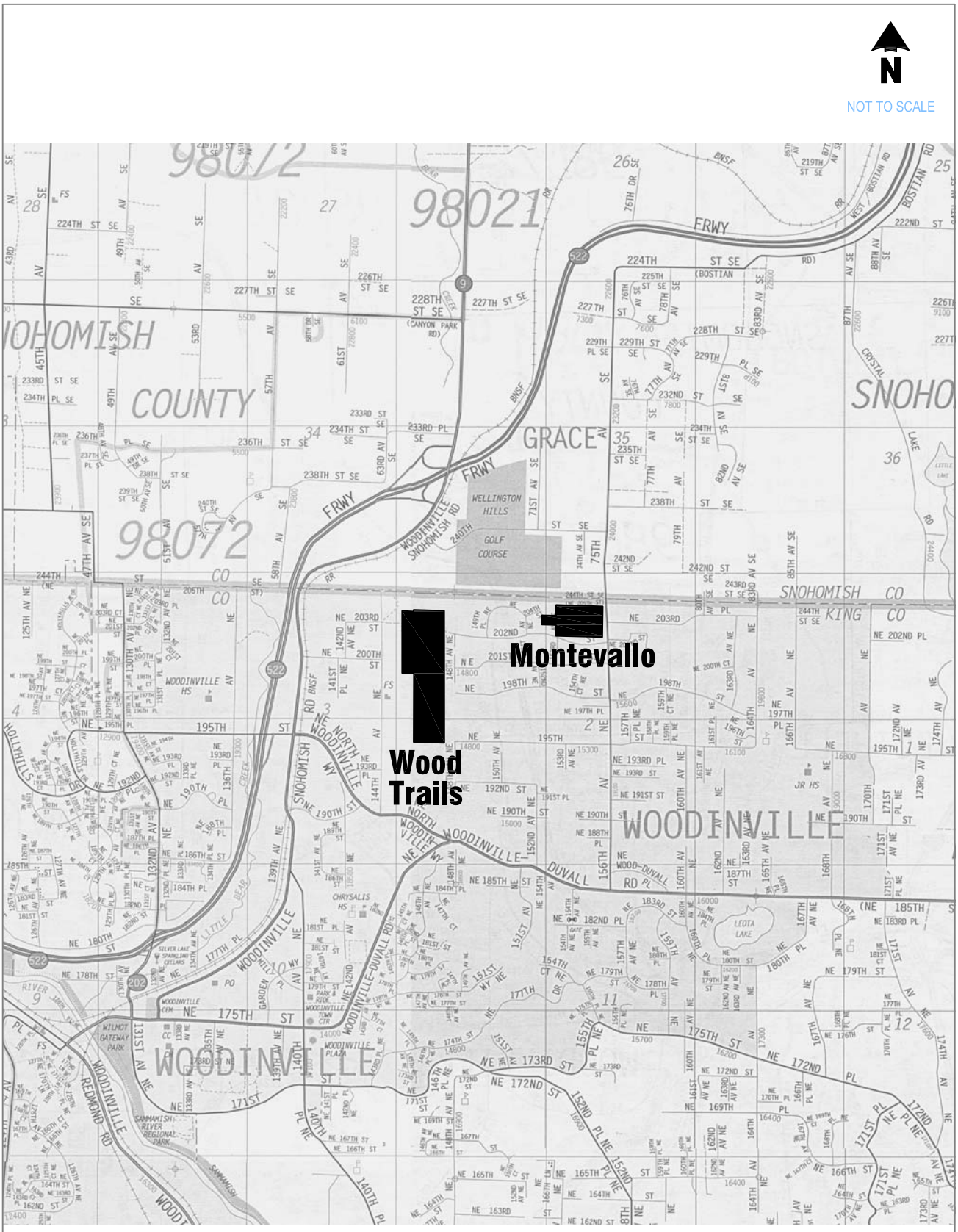
Based on the scoping process, City staff identified the study area intersections to be addressed in this analysis (see Figure 3.5-1). They include the signalized intersections located within the project limits for the City's Capital Improvement Plan (CIP). City staff also indicated that the study area should include the non-signalized intersections on 156th Avenue NE that are along the access routes to the two development sites (due to the directional and peaking nature of traffic in the area, both AM and PM peak-hour operations were evaluated at most study area intersections). Consequently, the following intersections are evaluated in this study:

- 156th Avenue NE/NE 203rd Place
- 156th Avenue NE/NE 202nd Street
- 156th Avenue NE/NE 201st Street
- 156th Avenue NE/NE 198th Street
- 156th Avenue NE/NE 195th Street
- 156th Avenue NE/NE Woodinville-Duvall Road
- NE Woodinville-Duvall Road/NE Woodinville Way
- NE Woodinville-Snohomish Road/NE 195th Street

For the Final EIS, the following intersections were added to the study for analysis of their PM peak-hour operations:

- 240th Street SE/Woodinville – Snohomish Road
- 240th Street SE/75th Avenue SE
- 156th Avenue NE/NE 204th Street (proposed new Montevallo access)
- 156th Avenue NE/NE 203rd Street (proposed new Montevallo access)

This page left intentionally blank.



Reproduced with permission granted by THOMAS BROS. MAPS. This map is copyrighted by THOMAS BROS. MAPS. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission. All rights reserved.

Figure 3.5-1
Site Vicinity
Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

3.5.1.2 Roadway System and General Terrain

The characteristics of the streets forming the roadway system within the study area are described below. The general descriptions given apply to the portion of the roadway within the study area defined for this analysis. Overall, the study area has a rolling terrain that creates many crest and sag vertical curves along the roadway alignments.

156th Avenue NE is a two-lane roadway in the vicinity of the project that is classified by the City as a minor arterial. 156th Avenue NE extends north from its intersection with NE Woodinville-Duvall Road, becoming 75th Avenue SE and eventually 224th Street SE in Snohomish County. Near the project site, the roadway has gravel and/or paved shoulders in places. The posted speed limit is 35 miles per hour (mph). Most intersections are stop-controlled on the minor street approaches along 156th Avenue NE. The exception is a traffic signal at its intersection with Woodinville-Duvall Road. 156th Avenue NE would eventually serve as a connection to the larger roadway network for the Wood Trails and Montevallo sites.

Photo 1: 156th Avenue NE in the Vicinity of NE 202nd Street

Photo 2: Stopping Site Distance Being Measured on 156th Avenue NE

There is a crest vertical curve on 156th Avenue NE that begins on the southern end at NE Woodinville – Duvall Place and extends north to approximately NE 190th Street. This curve is relevant to consideration of adequate stopping sight distances, and is discussed subsequently in Section 3.5.2.

This page left intentionally blank.

NE 203rd Place is a discontinuous, two-lane, east-west, local-access street. It serves residential areas located east of the Montevallo site, between 156th Avenue NE and 164th Avenue NE. A minimal paved or gravel shoulder is provided along NE 203rd Place and the posted speed limit is 25 mph.

NE 195th Street is a two-lane roadway that is classified as a collector roadway from its intersection with 156th Avenue NE east to 164th Avenue NE (where it ends), and a local-access roadway from 156th Avenue NE west to a dead-end west of 148th Avenue NE. Near the Wood Trails site, the posted speed limit is 25 mph and the roadway width is approximately 20 to 22 feet with minimal gravel shoulders. NE 195th Street, both east and west of 156th Avenue NE, has crest vertical hills with sight distances that are less than the required minimum stopping sight distance. NE 195th Street serves as a connection between the Wood Trails site and 156th Avenue NE for some development alternatives.

Photo 3: NE 195th Street Inadequate Stopping Sight Distance Location

Photo 4: NE 198th Street Looking West

NE 201st Street, NE 202nd Street, and NE 198th Street are east-west, local-access streets serving residential lots west of 156th Avenue NE near the Wood Trails site. All three, which are dead-end streets, currently terminate near the eastern edge of the Wood Trails site. Similar to NE 195th Street, these roadways include a 20- to 22-foot-wide paved section and gravel shoulders, where available. Intersections along these roadways are stop-controlled on the minor-street approaches. Segments of each of these streets do not meet the City of Woodinville's stopping sight distance standard. The location of the segments and their respective available sight distances are noted in a technical memorandum contained in Appendix O (Exhibit T-6). All streets have been identified to have sight distance conditions for posted speed limit. The posted speed limit on each roadway is 25 mph. These roadways serve as connection points between the Wood Trails site and 156th Avenue NE for some of the development alternatives.

This page left intentionally blank.

Photo 5: NE 201st St. Looking West

Photo 6: West End of NE 202nd St. Looking East

This page left intentionally blank.

Photo 7: Woodinville – Duvall Road Looking East at 156th Avenue NE Intersection

NE Woodinville-Duvall Road/NE Woodinville Way is classified as a principal arterial in the study area. This roadway is called NE 195th Street at the SR 522 interchange, before becoming NE Woodinville Way, and eventually Woodinville-Duvall Road near the project site. This roadway has three to five lanes in the study area, with traffic signals at major intersections. Sidewalks are located at various sections along the roadway. Wide paved shoulders are available where there are no sidewalks. This arterial serves as a connection between SR 522, Woodinville and Duvall. The posted speed limit near 156th Avenue NE is 35 mph.

3.5.1.3 Traffic Volumes

Existing traffic volumes for the roadways and intersections within the study area were estimated using data obtained from various sources. The sources include data from the King County Department of Transportation, traffic counts taken for traffic analyses for other developments in the area, and traffic counts taken by vendors under contract to The Transpo Group, the transportation consultant to the applicant. They were performed during the time period of 2003 to 2006. Summaries of these counts are provided in Appendix O (Exhibit T-1). All counts were increased by 2.5 percent per year to estimate 2006 and 2008 traffic volumes. This growth reflects the local traffic growth trend and is consistent with the rate of City growth. The weekday AM and PM peak-hour traffic volumes, shown in Figures 3.5-2(A & B), were rounded to the nearest 5 vehicles. This was done because weekday volumes typically fluctuate slightly from day to day. Note that Figure 3.5-2(B) shows traffic volumes from 2006 and includes traffic associated with the new Costco retail facility on the Woodinville-Snohomish Road.

This page left intentionally blank.

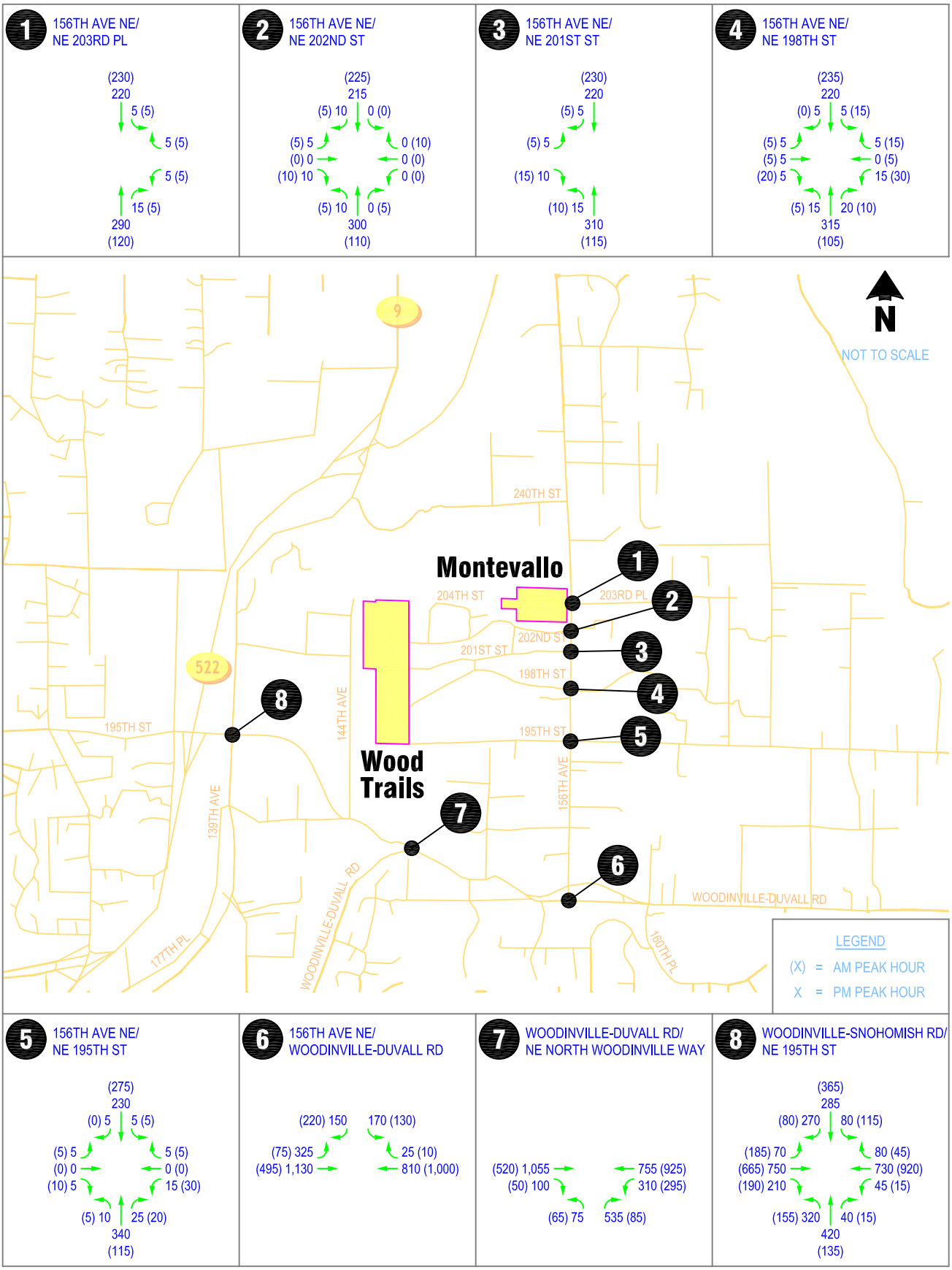


Figure 3.5-2(A)

Existing AM and PM Peak Hour Traffic Volumes

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

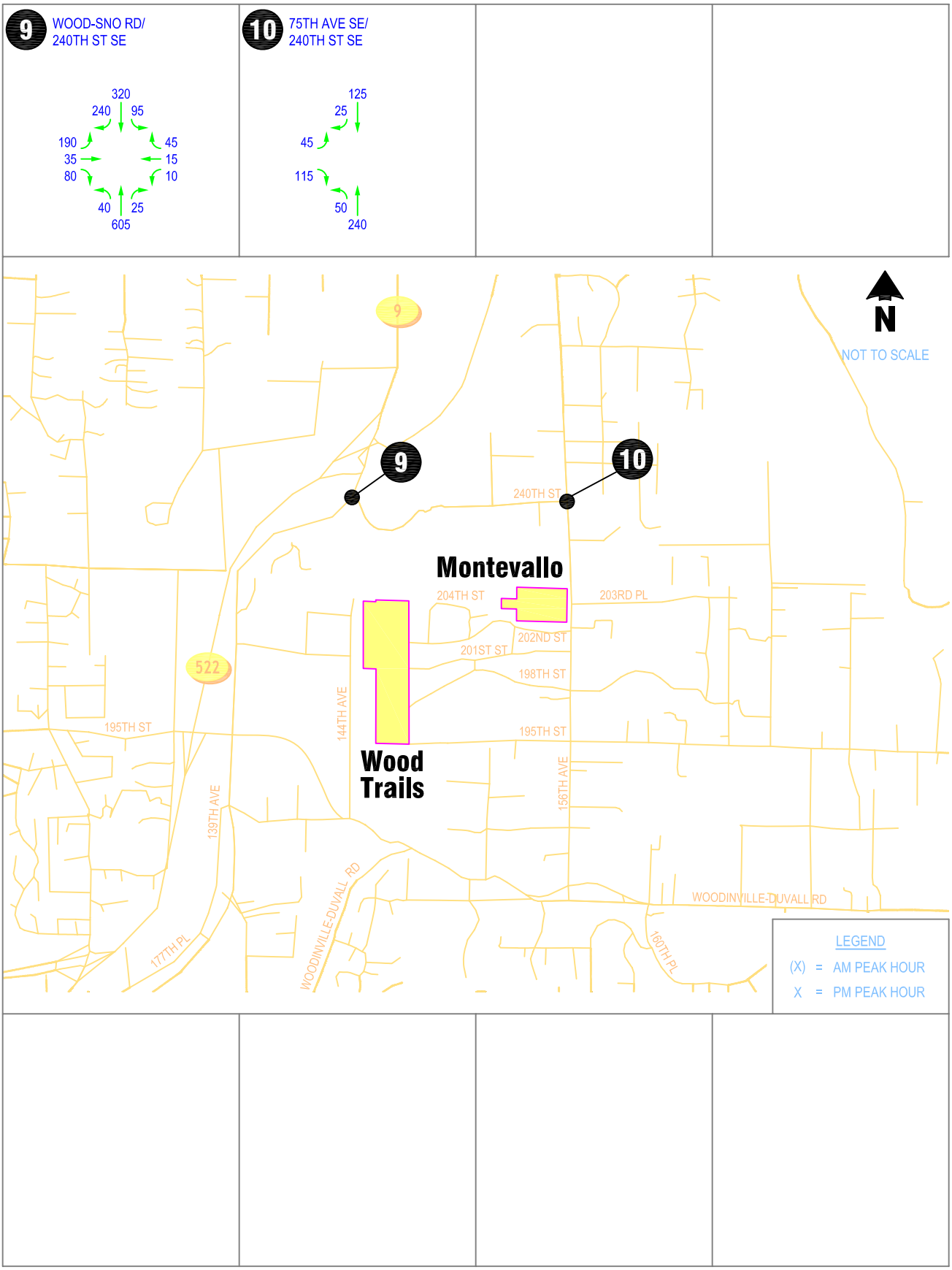


Figure 3.5-2(B)

Existing 2006 PM Peak Hour Traffic Volumes (with Costco)

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

3.5.1.4 Traffic Operations

An analysis was conducted to evaluate current traffic operations for the existing roadway system within the study area. Individual intersection levels of service (LOS) were calculated at the study intersections for the Draft EIS during both the weekday AM and PM peak hours. Intersection levels of service for the 240th Street SE intersections added for the FEIS are for PM peak hour volumes only. The LOS analyses were conducted using *Synchro* analysis software, which utilizes procedures identified in the *Highway Capacity Manual* (Transportation Research Board, 2000). In addition to the intersection LOS, vehicle queuing for southbound movement at the intersection of 156th Avenue NE/Woodinville-Duvall Road was evaluated for all development alternatives. Finally, using King County planning guidelines, overall roadway volume relative to capacity is considered.

Intersection Level of Service

Traffic operations for an intersection can be described alphabetically with a range of levels of service (LOS A through F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. A more detailed description of LOS definitions and criteria is provided in Appendix O (Exhibit T-2). The City of Woodinville has set an LOS standard of E for signalized and non-signalized intersections.

At signalized intersections, LOS is measured in stopped delay per vehicle and is typically reported using the intersection delay and volume-to-capacity (v/c) ratio. At stop-sign controlled intersections, LOS is measured in stopped delay per vehicle and is typically reported using the intersection turning movement or approach with the highest delay. Signal timing in the analysis was optimized for existing conditions at the signalized study intersections to reflect the actuated nature of the traffic signals, which vary depending on traffic flows.

Table 3.5-1 shows results of the PM peak-hour LOS calculations. All of the signalized study intersections currently operate at LOS C or better during both the weekday AM and PM peak hours. The stop-controlled movements at all non-signalized intersections currently operate at LOS B during both peak hours. All study area intersections currently meet the City of Woodinville's LOS E intersection standard.

Table 3.5-1
Existing Conditions LOS Summary

Weekday AM Peak Hour	LOS[1]	Delay[2]	WM or V/C[3]
156th Avenue NE/NE 203rd Place	A	9.9	WB App.
156th Avenue NE/NE 202nd Street	B	10.0	EB App.
156th Avenue NE/NE 201st Street	B	10.4	EB App.
156th Avenue NE/NE 198th Street	B	11.5	WB App.
156th Avenue NE/NE 195th Street	B	12.3	WB App.
156th Ave NE/ NE Woodinville-Duvall Rd	B	18.6	0.78
NE Woodinville-Duvall Rd/ NE Woodinville Way	A	6.8	0.43
NE Woodinville-Snohomish Rd/ NE 195th St	C	22.7	0.77
Weekday PM Peak Hour	**LOS[1]**	**Delay[2]**	**WM or V/C[3]**
156th Avenue NE/NE 203rd Place	B	11.3	WB App.
156th Avenue NE/NE 202nd Street	B	10.7	EB App.
156th Avenue NE/NE 201st Street	B	10.9	EB App.
156th Avenue NE/NE 198th Street	B	14.4	WB App.
156th Avenue NE/NE 195th Street	B	14.5	WB App.
240th Street SE/75th Avenue SE	B	11.5	EB App.
156th Ave NE/ NE Woodinville-Duvall Rd	C	20.3	0.87
NE Woodinville-Duvall Rd/ NE Woodinville Way	C	26.8	0.78
NE Woodinville-Snohomish Rd/NE 195th St	C	25.4	0.79
240th Street SE/Woodinville – Snohomish Road	B	11.0	0.45

1. Level of Service
2. Average vehicle delay (seconds)
3. Volume to Capacity Ratio at signalized intersections; worst movement at unsignalized intersections (EB=Eastbound, WB=Westbound, App.=Approach)

Vehicle Queuing

A queuing analysis was conducted for the intersection of 156th Avenue NE and Woodinville-Duvall Road. Based on public comments during the scoping process, the queuing analysis focused on the southbound approach at this intersection during the weekday AM peak hour. The queuing analysis was conducted using Synchro, which provides both the average queues and the 95th percentile queues. The Synchro model was calibrated based on field observations of on-site conditions. A detailed description of the calibration process, and information from the observations is included in Appendix O (Exhibit T-3). The calibrated queue lengths and existing storage capacities are summarized in Table 3.5-2.

Table 3.5-2
Existing Conditions AM Peak-Hour Vehicle Queuing Summary

156th Avenue NE/ NE Woodinville-Duvall Rd	Current Storage Capacity[1]	Existing Calibrated Queue Length[2]
Southbound Left	170'	175'
Southbound Right	N/A	140'

1. Estimated storage capacity of current lane, including center turn lane (feet).
2. Existing 95th percentile queue length from Synchro after calibration based on existing observations of 95th percentile queues and average vehicle length-spacing (See Appendix O, Exhibit T-3).
3. Southbound travel lane of 156th Avenue NE becomes the southbound right turn lane; queue storage capacity extends thousands of feet to the north of the intersection.

As shown in Table 3.5-2, the calibrated 95th percentile queue length at 156th Avenue NE/NE Woodinville-Duvall Road for the southbound left turn is approximately 175 feet, while the southbound right-turn queue is approximately 140 feet. These queue lengths occur during the worst-case AM peak-hour. These figures suggest that the existing 95th percentile queue length for the southbound left-turn movement currently exceeds the available capacity during the AM peak hour conditions. The southbound right-turn lane does not have a specific storage capacity as it transitions from the southbound travel lane on 156th Avenue NE. The first public street on 156th Avenue NE that could become blocked by this queue is NE Woodinville-Duvall Place, which is approximately 250 feet from the intersection.

Synchro analysis of the intersection at the Woodinville–Duvall Road and 156th Avenue NE for current weekday PM peak-hour conditions shows that the left turn queue exceeds the available storage lane for the southbound left-turn movement only. The analysis also indicates the 95th percentile eastbound left-turn movement (required storage 250 feet) currently exceeds the available storage of 226 feet.

Roadway Volume/Capacity Conditions

In addition to intersection level of service and queuing considerations during the critical peak-hour period, the overall capacity of the local roadways to accommodate current daily traffic levels is considered. The existing average daily traffic (ADT), volumes along the potential access roadways for the proposed Wood Trails development, were estimated based on the PM peak-hour turning movement counts conducted at their respective intersections with 156th Avenue NE. In residential areas, PM peak-hour traffic represents about 10 percent of the daily traffic. Estimated link capacities developed by King County (provided in Appendix O, Exhibit T-4) indicate an ADT roadway capacity of 7,400 vehicles for two-lane roadways such as those in the project area. Although King County roadway standards suggest a capacity of 7,400 vehicles, the practical capacity (based on perceived livability) of roadways similar to the four subject roadways is often considered to be around 1,000 ADT (Appleyard 1981). The estimated existing ADT volumes for the four potential roadways that could be directly impacted from one of the proposed alternatives are summarized in Table 3.5-3.

The data in Table 3.5-3 suggest a substantial surplus of roadway capacity is available along all four roadways. Using the King County estimated link capacities, the existing ADT levels represent approximately 3 to 5 percent of the roadway capacity. Furthermore, even if the evaluation is based on a livability standard of 1,000 ADT, existing traffic volumes amount to 25 to 35 percent of the roadway capacity as measured by the livability criterion.

Table 3.5-3
Existing Roadway Volume/Capacity Summary

Roadway	Existing ADT[1]	Estimated Capacity[2]	Livability Criterion[3]	Adequate Capacity?
NE 202nd Street	350	7,400	1,000	Yes
NE 201st Street	350	7,400	1,000	Yes
NE 198th Street	350	7,400	1,000	Yes
NE 195th Street	250	7,400	1,000	Yes

1. Existing average daily traffic (ADT); estimated as being ten times the PM peak hour volume on the roadway.
2. Estimated ADT link capacity, as developed by King County.
3. Per Appleyard 1981.

3.5.1.5 Pedestrian Activity

Detailed observations and inventory of pedestrian facilities and their level of use were conducted. The following describes the facilities or accommodations for pedestrians on each of the identified study area roadways, together with notations on the observed level and nature of their use. A number of local residential streets connect the project site with 156th Avenue NE. Appendix O (Exhibit T-5) includes a more detailed assessment of the pedestrian accommodations and conditions of 202nd Street, 201st Street, 198th Street and 195th Street.

Pedestrian counts were conducted in December 2004 along 156th Avenue NE, and in June 2005 along the local residential roadways to the west of 156th Avenue NE, which would provide a link to the project site. The pedestrian counts were conducted during time periods that were inclusive of the starting and ending times of the neighborhood schools and pick-up/drop-off times of local school bus routes. Results for the AM and PM count periods are summarized in Figures 3.5-3 and 3.5-4, respectively. They show the number of pedestrians that utilized some portion of each roadway during each 2-hour time period. The June 2005 counts were performed during the Monday of the last week of the school year and may not be indicative of the level of activity on a typical school day. The actual number of students and pedestrians could be as high as 50 to 100 percent higher than the number observed.

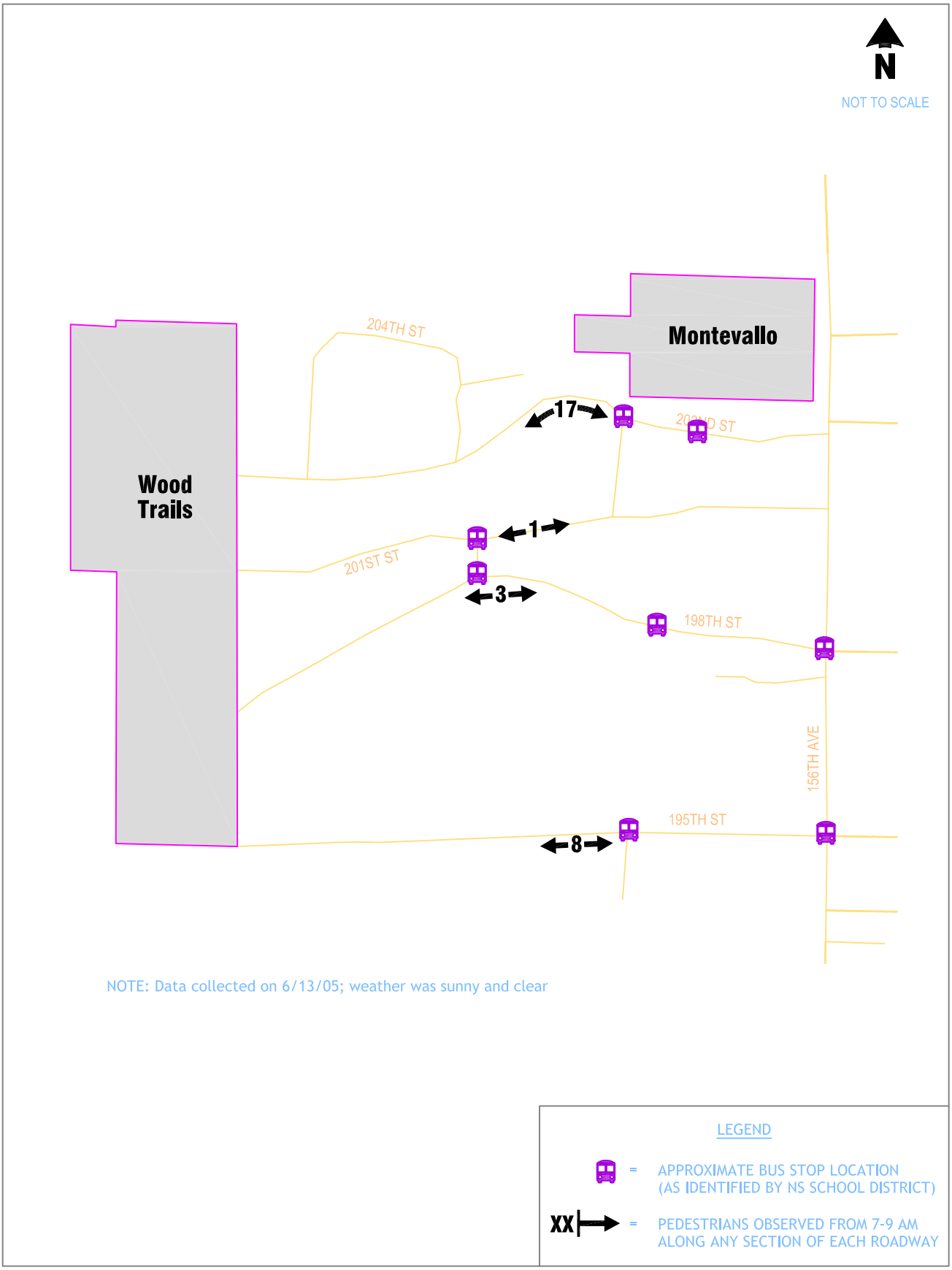


Figure 3.5-3

Pedestrian Activity Observations: 7:00 – 9:00 AM

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

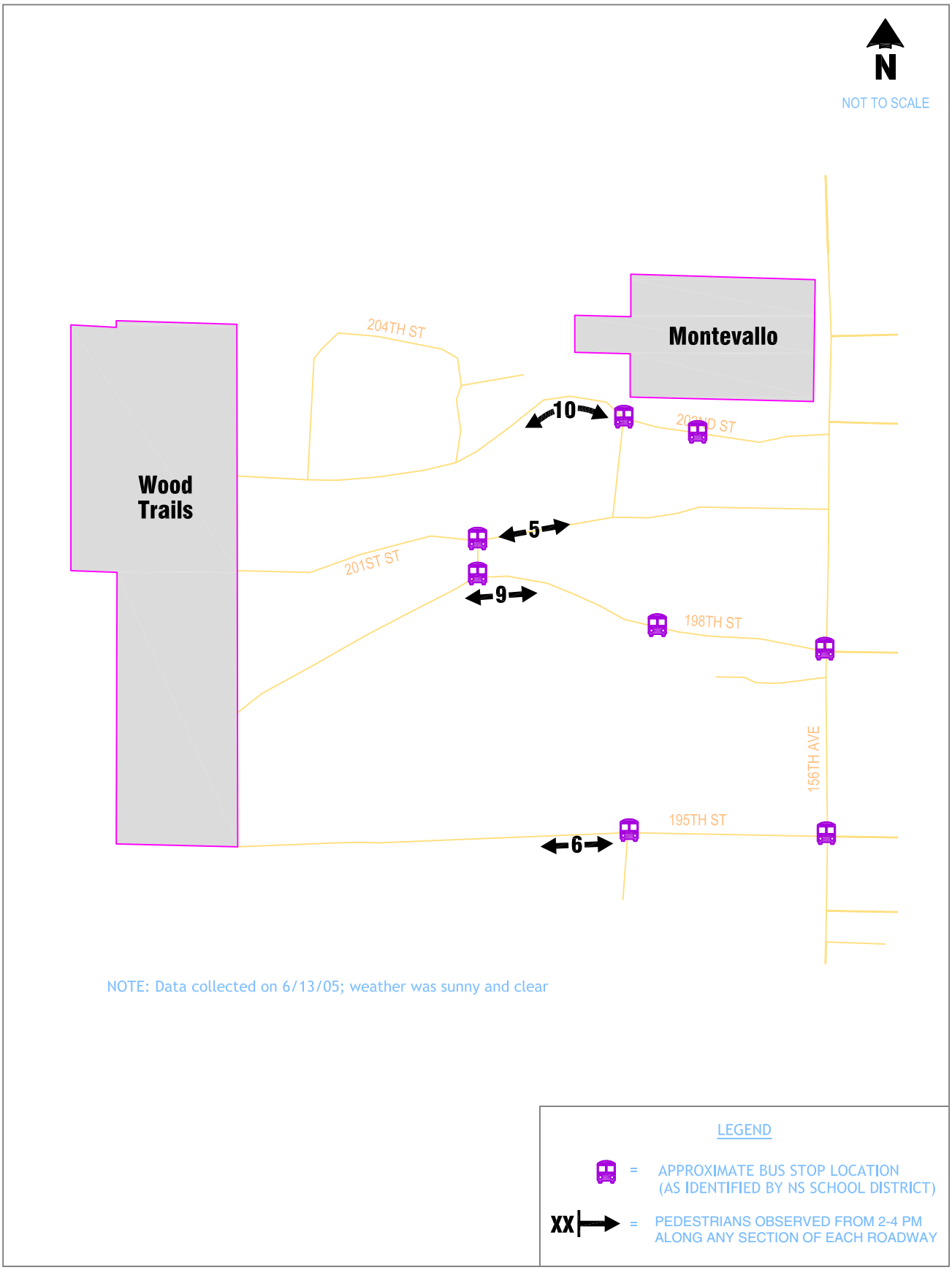


Figure 3.5-4

Pedestrian Activity Observations: 2:00 – 4:00 PM

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

Woodinville-Duvall Road

Formal pedestrian facilities on this street within the study area are limited. Sidewalks exist along short portions of the roadway, primarily connected to developed adjacent sites. In most areas the roadway accommodates pedestrians on paved or gravel shoulders. The level of pedestrian use of this roadway is limited, as local pedestrian attractions and facilities are also limited.

156th Avenue NE

Photo 8: 156th Avenue NE at NE 203rd Place Looking South

In 1998, the City constructed a paved shoulder along the west side of the road, which is used by children walking to and from school and for non-motorized travel. The east side of the road has a narrow shoulder, which makes walking on the east side difficult. Sidewalks exist on both sides of the road near the intersection of Woodinville-Duvall Road. Moderate use of these facilities occurs by residents in the area or school children who may need to walk to nearby bus stops or neighborhood schools. The level of usage depends on the location. During a 2-hour, weekday morning time period (7 AM - 9 AM), only two pedestrians were observed at the NE 202nd Street and NE 203rd Street intersections with 156th Avenue NE during the December 2004 count, while eight were observed during the June 2005 count. Observations along 156th Avenue NE near 195th Street, during the same AM peak period, showed no pedestrian activity during the December count and three pedestrians during the June 2005 count.

NE 195th Street

Minimal gravel shoulders ranging from 0 to 2 feet wide serve most of this roadway section. Some sections have shoulders as wide as 6 feet. Eight pedestrians used at least some portion of NE 195th Street during the 2-hour AM time period in the June 2005 pedestrian counts, while six used it during the PM 2-hour time period. As a residential street, varying levels of pedestrians and children use the street and/or shoulders, depending on the time of day. Because these counts were conducted during the period when the neighborhood schools begin and end, this is likely the highest level of use that occurs during the morning or afternoon periods, as school children are walking to or from school bus stops or schools at this time. West of 156th Avenue NE, one 468-foot long segment on NE 195th Street is deficient in providing adequate stopping sight distance.

Photo 9: NE 195th Street Approach Hill with Substandard Sight Distance

This page left intentionally blank.

NE 198th Street

Photo 10: NE 198th at 152nd Avenue NE Looking East

This roadway section is generally served by generous gravel shoulders of at least 6 feet in width, except for an approximately 100-foot section of roadway where shoulders range from 4 to 6 feet wide. The June 2005 pedestrian counts found a total of three pedestrians using at least some portion of NE 198th Street during the 2-hour AM time period, while nine used some portion during the PM 2-hour time period. Since there are designated school bus stops located on this roadway, pedestrian activity during school travel periods is anticipated to be the highest during the time periods that were counted. At other times, pedestrian levels are typical of a residential neighborhood. West of 156th Avenue NE, one 85-foot long segment on NE 198th Street is deficient in providing adequate stopping sight distance.

NE 201st Street

This roadway generally has 6-foot-wide shoulders. Three short sections have shoulder widths between 4 and 6 feet. Near 153rd Avenue NE, shoulders are somewhat narrower, between 2 and 4 feet. Pedestrian activity levels are similar to NE 198th Street and are typical of a residential neighborhood. The June 2005 pedestrian counts found only one pedestrian using at least some portion of NE 201st Street during the 2-hour AM time period, while five used it during the 2-hour PM time period. West of 156th Avenue NE, one 584-foot long segment at the west end of NE 201st Street is deficient in providing adequate stopping sight distance.

NE 202nd Street

This roadway is generally served by 2- to 4-–foot-wide shoulders, except for a short section of narrower, 0 to 2-foot shoulders. The June 2005 pedestrian counts found that a total of 17 pedestrians used at least some portion of NE 202nd Street during the 2-hour AM time period, while 10 used it during the 2-hour PM time period. Along NE 202nd Street, two segments are deficient in stopping sight distance, each extending 357 feet and 389 feet in length, respectively.

Photo 11: NE 202nd Street Looking East

Stopping sight distances along all four local residential roadways are summarized in Appendix O (Exhibit T-6).

This page left intentionally blank.

School Walking Routes/Bus Stops

Students in the immediate area of both sites attend Wellington Elementary, Leota Junior High and Woodinville High Schools. Both Wellington Elementary and Leota Junior High School are located on NE 195th Street within approximately 1 mile of the Wood Trails site, which may allow some students to walk to school. However, the Northshore School District provides bus service for neighborhood students attending all three schools.

The Washington State Department of Transportation (WSDOT) and the Washington Traffic Safety Commission (WTSC) in 2003 published a *School Administrator's Guide to School Walk Routes and Student Pedestrian Safety*. This document provides an overview of school walk routes and a general list and scale of factors in evaluating the adequacy of school walking routes. Some of these factors include:

- Age of pedestrians
- Number of students affected
- Posted speed limit
- Traffic volumes
- Length of problematic section
- Collision history in past three years
- Type of walkway
- Shoulder width

The *Guide to School Walk Routes* provides a general range from which to evaluate the walking routes, from a preferred walking environment to a riskier walking environment. Many of the factors provided by the *Guide* suggest that the walking areas along NE 198th Street and NE 201st Street, which lead to the Wood Trails development, meet acceptable standards. Both roadways have shoulder widths predominantly in excess of 6 feet; those sections of shoulder with less than a 6-foot width are relatively short. Both roadways have a 25-mph posted speed limit, relatively low projected future traffic volumes (<100 vehicles per peak hour), and no known safety (accident/collision) history involving pedestrians.

Younger students (those attending Wellington Elementary) are considered most at risk while walking. However, with the bus routes extending into the neighborhood, their walking distance and direct exposure is minimized. Junior-high age students (those attending Leota Junior High) would also have limited walking distance, as a school bus stop is designated at NE 198th Street/152nd Avenue NE. Older students (those attending Woodinville High) are considered less at risk when walking, and would need to continue to walk via NE 198th Street and NE 201st Street to 156th Avenue NE to the school bus stops located along that roadway, if coming from the Wood Trails site. As was noted earlier, the shoulder widths along these two roadways are considered adequate to accommodate such use, according to the guidelines listed in the *Guide to School Walk Routes*. Similar observations can be made for the facilities along 156th Avenue NE, particularly along the west side of the roadway.

Based on information from the Northshore School District, school bus stop locations were identified and mapped for all three schools; these are shown in Appendix O (Exhibit T-7). Leota Junior High and Woodinville High School bus service is provided along 156th Avenue NE, requiring those students living along NE 198th Street and NE 201st Street to walk to 156th Avenue NE to catch the bus. Wellington Elementary bus service is also provided along 156th Avenue NE, as well as along NE 202nd Street, NE 201st Street, and NE 198th Street. This allows elementary school students living along these roadways to walk a shorter distance to catch the bus without having to walk to 156th Avenue NE.

As described earlier, shoulder widths leading to these bus stops and schools vary by location. Refer to the previous section, as well as Appendix O (Exhibit T-5) for information regarding shoulder widths in the area.

3.5.1.6 Bicycle Facilities and Activities

No formal bicycle facilities exist in the study area. Review comments on the Draft EIS indicate that substantial bicycle activity occurs along 156th Avenue NE from the Woodinville–Duvall Road north into Snohomish County. This route is identified in the City's (2005) *Non-motorized Transportation Plan* and on the King County *Bicycling Guidemap*, which identifies the route as a "moderate traffic street without wide curb lane or shoulder" (King County Department of Transportation 2006a). This route has reportedly been used by hundreds of bicyclists at times on sunny summer weekends.

The east side of 156th Avenue NE currently has a minimal shoulder and bike riders must share the roadway with vehicles. Due to the bicycle and pedestrian activity along 156th Avenue NE, the City installed an asphalt path along the west side of the roadway in 1998. This path was intended to be a route that could be used by both pedestrians and bicyclists. The avid bicyclist however, may prefer to continue to share the southbound travel lane with vehicles.

Bicycle travel on the local residential streets described above is likely minimal. However, some children may play on bicycles on the street, typical of suburban residential neighborhoods.

3.5.1.7 Transit Service

King County Metro operates two transit routes in the vicinity of the project sites. Route 251 connects downtown Kirkland, the UW-Bothell Campus, Woodinville and Redmond. This route operates on NE Woodinville-Duvall Road with 60-minute headways on both weekdays and weekends during daytime and evening hours. The other area route, Route 311, connects downtown Seattle, Woodinville and Duvall. Route 311 operates on NE North Woodinville Way and Woodinville-Duvall Road only during weekday peak hours in the peak direction of traffic, with headways ranging between 20 and 30 minutes. These routes make stops near the NE Woodinville-Duvall Road/156th Avenue NE intersection. The distance between the project sites and the bus stops serving Routes 251 and 311 is beyond what transit planners typically consider to be acceptable walking distance to bus stops.

3.5.1.8 Traffic Safety

The purpose of this section is to identify any existing safety hazards in order to evaluate potential impacts at these locations. Historical accident records, the most reliable indicator of safety hazards, were obtained from the City of Woodinville for the most recent complete period available (2001 to 2005). In general, a signalized intersection is considered a high-accident location (HAL) if it experiences, on average, 10 or more accidents per year. Similarly, a non-signalized intersection is considered a high-accident location if, on average, five or more accidents are reported on an annual basis. In addition, an intersection is generally considered a high accident location if the accident rate per million entering vehicles (MEV) is greater than 1.0.

Table 3.5-4 summarizes the results of the safety analysis. No accidents were reported at any of the non-signalized study intersections along 156th Avenue NE during the 5-year time period. The only exception would be at the intersection of with NE 195th Street, where one accident was reported. Fifteen accidents were reported at NE Woodinville-Duvall Road/156th Avenue NE and 13 at NE Woodinville-Duvall Road/NE Woodinville Way. The NE Woodinville-Snohomish Road/NE 195th Street intersection had 46 accidents reported during the study time period, with an estimated accident per million entering vehicles (MEV) rate of 0.76. Most accidents reported at this intersection involved either rear-end collisions or left-

turn/angle collisions, which are not uncommon at such highly traveled intersections. Several improvement projects, both at the NE Woodinville-Snohomish Road/NE 195th Street intersection and in the immediate vicinity, are planned by the City and are summarized later. These improvements could assist in addressing the reported MEV rate and collision history at this location.

Table 3.5-4
Accident Data Summary, 2001-2005

Study Intersections	Reported Accidents (2001-2003)[1]	Reported Accidents (2004-2005)[1]	Average Accidents/Year	Accidents per Million Entering Vehicles[2]
156th Avenue NE/NE 203rd Place	0	0	0.00	0.0
156th Avenue NE/NE 202nd Street	0	0	0.00	0.0
156th Avenue NE/NE 201st Street	0	0	0.00	0.0
156th Avenue NE/NE 198th Street	0	0	0.00	0.0
156th Avenue NE/NE 195th Street	0	1	0.20	0.08
156th Ave NE/NE Woodinville-Duvall Rd	10	5	3.00	0.31
NE Woodinville-Duvall Rd/NE Woodinville Way	10	3	2.60	0.25
NE Woodinville-Snohomish Rd/NE 195th St	37	9	9.20	0.76
Key Roadways	**Reported Accidents (2001-2003)**	**Reported Accidents (2004-2005)[1]**	**Average Accidents/Year**	**Accident Types**
156th Avenue NE: NE 195th Street to NE 203rd Place	2	0	0.40	Vehicle in ditch Vehicle struck pole
NE 202nd Street: 156th Avenue NE to Western Terminus	1	0	0.20	Vehicle struck pole
NE 201st Street: 156th Avenue NE to Western Terminus	1	0	0.20	Collision at private driveway
NE 198th Street: 156th Avenue NE to Western Terminus	0	0	0	None
NE 195th Street: 156th Avenue NE to Western Terminus	0	0	0	None

1. Data provided by City of Woodinville Staff
2. Accidents per million entering vehicles at the intersection (MEV); ADT estimated as being ten times PM peak TEV.
3. Intersections occurring either mid-block along these roadways, or at non-study intersections.

As noted in Table 3.5-4, three accidents were reported along 156th Avenue NE in the area of the project sites. Two of them involved single vehicles either colliding with a fixed object or driving into a ditch, and one involved a rear-end accident at NE 195th Street. The 5 years of accident data gathered for the EIS do not indicate an existing problem at this intersection. Along the local roadways that lead to the Wood Trails site, no accidents were reported during the 5-year period on NE 198th Street and NE 195th Street, while one collision each was reported on NE 202nd Street and NE 201st Street. One of these collisions involved a vehicle striking a fixed object, while the other was a collision between a vehicle exiting a private driveway and a vehicle traveling on the public street. None of the accidents anywhere in the study vicinity involved pedestrians, although a single vehicle/bicycle accident was reported in 2003 at the AM/PM convenience store driveway on NE 156th Street.

This page left intentionally blank.

Based on a detailed review of the 5-year accident history, the data do not suggest the existence of current traffic safety hazards within the study area. Furthermore, because no pedestrian-related accidents were noted, the current pedestrian facilities appear to be adequate for the existing level of pedestrians and vehicles.

3.5.1.9 NE 195th/NE 198th Street Student Drop-Off Activity

Photo 12: NE 195th Street Barricade West of 164th Avenue NE Looking West

Currently, an emergency gate is installed on NE 195th Street to the east of 156th Avenue NE, effectively making NE 195th Street a dead-end roadway. With both Wellington Elementary and Leota Junior High Schools located to the east of this gate, it is common for parents to drive to the gate and drop off their children, who then walk from the gate to their school. An alternative to using the NE 195th Street route is to use NE 198th Street east of 156th Avenue NE to 164th Avenue NE and then south to NE 195th Street. Through the scoping process, the City requested that the operations and impacts to this area be reviewed. A count of student drop-offs at this location was conducted from 7 AM - 9 AM in December 2004. The purpose of this count was to observe the current number of parents utilizing this access as a baseline to compare any future changes as a result of the proposed development. A total of 41 student drop-offs at the gate were observed during this 2- hour time period, with 23 occurring during the peak hour of the 156th Avenue NE/NE 195th Street intersection (7:30 AM -8:30 AM). A review of both King County and Snohomish County on-line parcel mapping systems showed that there are approximately 670 parcels in the area along 156th Avenue NE that could reasonably be expected to utilize NE 195th Street or the NE 198th Street routes to drop off a student. Based on these results, it is estimated that each residential parcel in the area currently generates an average of approximately 0.03 student drop-offs at the NE 195th Street gate.

Photo 13: NE 195th Street Barricade Looking North at 164th Avenue NE

This page left intentionally blank.

3.5.1.10 Parking

Parking in the immediate site vicinity is currently provided in the form of off-street parking in attached or detached garages and private driveways, and informal on-street parking in places where there is sufficient room on the roadway shoulder.. Most, if not all of the residential dwellings in the area have some form of off-street parking available for use. Any overflow parking from these homes (often from guests, deliveries, etc.) is typically accommodated by the on-street parking provided by roadway shoulders. This is typical of many established residential neighborhoods.

3.5.1.11 Planned Transportation Improvements

Planned improvements to transportation facilities in the immediate area are identified in the City of Woodinville's *2005–2010 Capital Improvement Program* (CIP), adopted June 2005, (Ordinance #393). No City of Woodinville or King County transportation improvements were identified that would directly impact the operations analysis conducted for this study, as none of them are expected to be constructed within the 2008 horizon year for the traffic analysis. The following projects are included in the current City CIP and are located in the vicinity of the proposed residential developments:

- **Woodinville-Snohomish Road Widening and Improvements (RM-3/5):** This project would widen Woodinville-Snohomish Road to the north and south of NE 195th Street to include a center turn lane, add curb, gutter, sidewalk, bike lanes, and various lighting and traffic signal improvements. Design and construction of portions of the project are projected to occur from 2007to 2010, with no specified completion date.

- **SR 522/NE 195th Street Interchange Improvements (RM-15A/15B)**: This project would improve the south on- and off-ramps to the half-diamond interchange at SR 522/NE 195th Street. Improvements to the existing ramp intersections would also occur, which would include the installation of traffic signals, transit improvements and street lighting, among other improvements. Design work for this project is designated for 2007 to 2010, with estimated completion dates between 2007 and 2010.

- **NE 195th Street: SR 522 to Woodinville-Snohomish Road (R0-28):** This project would provide additional capacity, pedestrian improvements, bike lanes, signal improvements and railroad crossing improvements. Design work for this project is designated for 2006, with additional design and construction slated for 2007 to 2010 with no specific completion date stated.

3.5.2 Impacts of the Proposed Action

The Proposed Action includes the construction of 66 single-family dwelling units on the Wood Trails site and 66 single-family dwelling units on the Montevallo site. Vehicular access to the Wood Trails site would be provided via NE 201st Street and NE 198th Street, while access to the Montevallo site would be provided via two new roadways connecting to 156th Avenue NE and located to the north and south of NE 203rd Place. The site plans for this alternative are provided in Section 2.1.

Construction activity for the Proposed Action would result in some short-term transportation impacts in the neighborhoods adjacent to the Wood Trails and Montevallo sites during the construction period. These impacts would likely include temporary traffic disruptions or detours on local streets caused by construction vehicle traffic and construction of roadways and utilities to serve the proposed subdivisions. Construction activity would also likely result in some level of damage to the surfaces of local streets. As discussed in Section 3.5.5, measures to limit construction-period impacts and requiring restoration of roadway damage are typically addressed during review of construction plans, and are incorporated into

the terms of the haul route agreement and/or heavy hauling permit for a development project. These impacts are typically highly localized and short-term in duration. Because of the nature of the impacts and common use of required mitigation measures, these impacts would be insignificant.

Based on the nature of the short-term transportation impacts and the mechanisms available to address those impacts, the transportation analysis for the EIS focused on the potential long-term impacts that could occur once the projects were developed. In order to identify the traffic impacts of the Proposed Action, a discussion of the baseline conditions has been presented in Section 3.5.1. The baseline conditions reflect the existing volumes plus a background growth rate, plus traffic from development projects that have been approved but not yet occupied for the horizon year of 2008, which was identified as the horizon year for which full buildout of the proposed projects is anticipated. The general methodology regarding the development of the baseline conditions is described in more detail in Section 3.5.2.1.

3.5.2.1 Project Trip Generation

Trip generation estimates for the Proposed Action were calculated using the *Trip Generation Manual* (Institute of Transportation Engineers [ITE] 2003). This manual is a national standard used by traffic analysts to determine the anticipated number of trips generated by specific land uses. This manual is also the standard that has been adopted by the City to establish the estimated trips generated by all new and existing land uses. The regression equations for Land Use Category 210 (Single-Family Detached Housing) were used to determine this alternative's anticipated trip generation during the weekday AM peak hour, PM peak hour, and on a daily basis. Five existing single-family dwelling units on the Montevallo site would be removed during construction of the project. Credit for these existing homes was applied toward the project trip generation. The trip rates per unit developed using the regression equations for Wood Trails and Montevallo sites are lower than the trip rates per unit developed using the regression equations for the existing five residents. This is because there will be more units within both the Wood Trails and Montevallo sites than the site of the existing homes. The estimated trip generation for the Proposed Action is summarized in Table 3.5-5. The Proposed Action is anticipated to generate 99 net new weekday AM peak hour trips (56 from Wood Trails, 43 from Montevallo) and 141 net new weekday PM peak hour trips (74 from Wood Trails, 67 from Montevallo).

Table 3.5-5
Project Trip Generation, Proposed Action

Time Period	Proposed Action[1]					
	Wood Trails[2]			Montevallo[2]		
	In	Out	Total	In	Out	Total
Daily	355	354	709	355	354	709
AM Peak Hour	14	42	56	14	42	56
PM Peak Hour	47	27	74	47	27	74
Less Existing Uses- (5 Single Family Units on Montevallo Site)[3]						
Daily				*(33)*	*(33)*	*(66)*
AM Peak Hour	-			*(3)*	*(10)*	*(13)*
PM Peak Hour				*(4)*	*(3)*	*(7)*
Net New Trips						
Daily	**355**	**354**	**709**	**322**	**321**	**643**
AM Peak Hour	**14**	**42**	**56**	**11**	**32**	**43**
PM Peak Hour	**47**	**27**	**74**	**43**	**24**	**67**

1. Proposed action consists of 66 single-family units at both Wood Trails and Montevallo.
2. Institute of Transportation Engineers (ITE) Trip Generation- 7th Edition: Land Use #210; Regression Equations.
3. Credit applied to Montevallo trip generation for removal of five existing single-family dwelling units on-site.

3.5.2.2 Proposed Action Traffic Volumes

The distribution of project trips was derived from the City's VISUM transportation model, which is based on a 2012 "High Existing Zoning" land use growth scenario. This scenario reflects the most likely trip distribution patterns, based on the current adopted comprehensive plan. The trip distribution patterns applied in the EIS analysis reflect future travel patterns determined by the City based on planned roadway improvements and development as projected in the City's land use model. Due to the nature of the travel patterns in the area and the existing configuration of the SR 522/SR 9 interchange, different inbound and outbound distribution patterns were identified. The City's travel demand model is based on weekday PM peak-hour conditions, so the in/out percentages for the PM peak hour were reversed to arrive at the weekday AM peak hour distribution. This method accounts for differences in travel patterns between the two peak hours. The VISUM outputs used to develop the trip distribution patterns are shown in Appendix O (Exhibit T-8).

The resulting distribution of project trips used for the EIS analysis is shown in Figure 3.5-5. The AM and PM numbers shown on the figure reflect the percentages of total project trips expected to use different roadways, while the arrows on the graphic indicate the direction of travel. For example, more than 70 percent of the outbound trips from the Wood Trails and Montevallo subdivisions would depart to the south on 156th Avenue NE, and would then head east or west on the Woodinville-Duvall Road. Approximately 20 percent of the total AM and PM peak-hour trips are assumed to initially head north on 156th Avenue NE and subsequently turn west on 240th Street SE (toward the SR 9/SR 522 interchange), while another 10 percent would continue north on 156th Avenue NE (75th Avenue SE in Snohomish County). The assignment of traffic to 240th Street SE was based on a review of previous traffic impact studies (for the Costco development) and local observations made by Transpo staff during the weekday PM peak hour. The weekday AM and PM peak-hour trip assignments at the study intersections resulting from this distribution pattern are illustrated in Figures 3.5-6(A & B).

This page left intentionally blank.

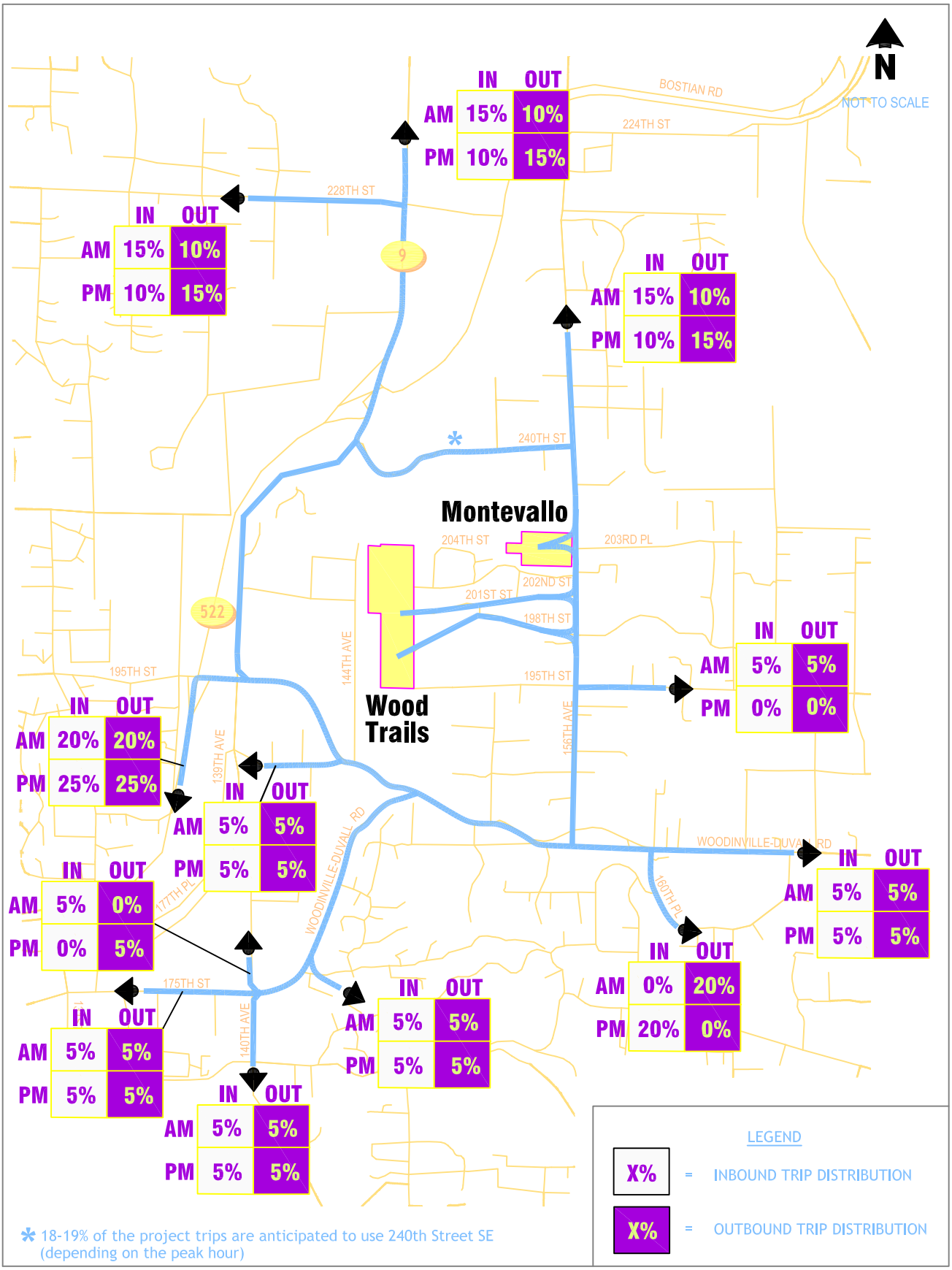


Figure 3.5-5

Project Trip Distribution

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

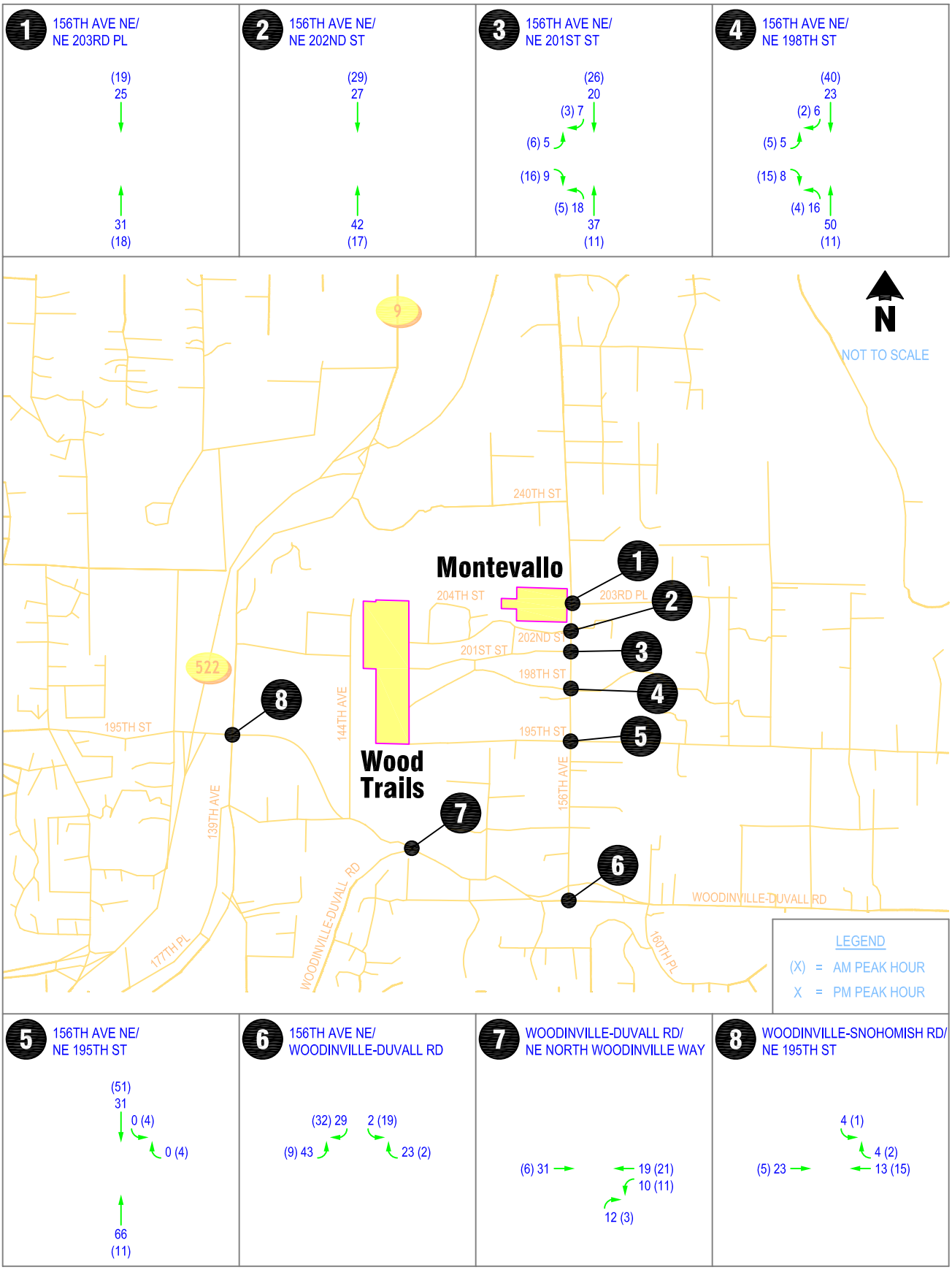


Figure 3.5-6(A)

Peak Hour Project Trip Assignment, Proposed Action

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

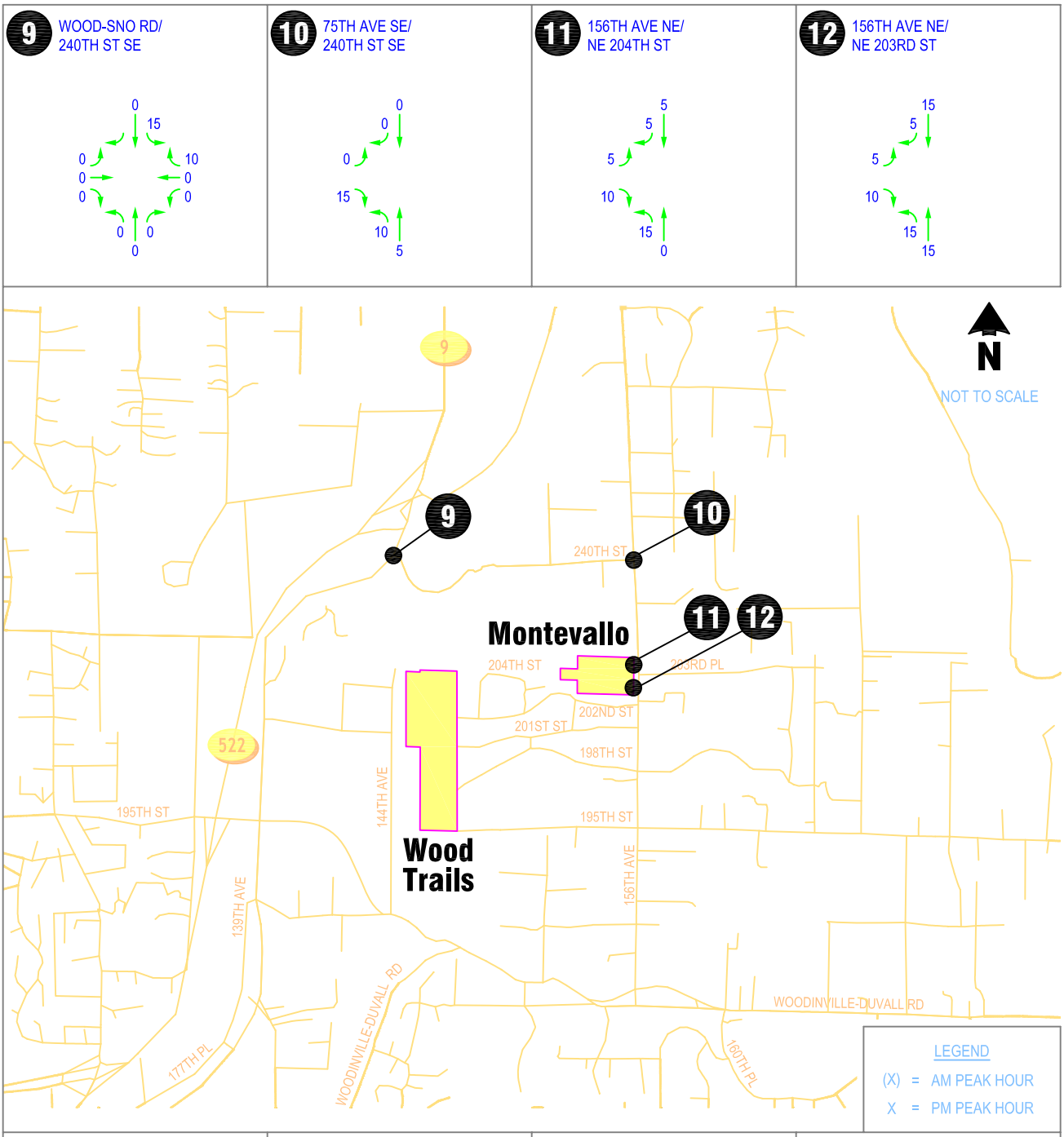


Figure 3.5-6(B)

PM Peak Hour Project Trip Assignment, Proposed Action

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

Forecast traffic volumes were developed for 2008 conditions to reflect the year of anticipated build-out and occupancy of the development. Forecasts were developed assuming a general traffic growth rate of 2.5 percent annually, plus the effect of approved but unoccupied development in the area, commonly referred to as "pipeline projects." Additional coordination occurred with Snohomish County regarding approved projects in that jurisdiction, for which Snohomish County maintains a database that assigns future project-generated traffic volumes to key intersections. The traffic data obtained from the Snohomish County database were added to future traffic volumes and extended to all study intersections, based on existing travel patterns.

Those development projects included in the Snohomish County (2005) pipeline database as of January 2005, and addressed in the future traffic volumes, include:

- Bear Creek I
- Bear Creek II
- Bear Creek Motors
- Camden Meadows DUP
- Costco (Hwy 9/SR 522)
- Luschenshire Park
- Meadowbrooke
- Myers Assemblage
- Osborne L28-1 LLC
- Snohomish Cascade S8
- Snohomish Cascade Sector 7
- Sommerwood
- Sutherland L101-1
- Tambark Village Estates
- Village at Outcrop Creek
- Wellington Hills Bldg. A
- Woodinville II Opus
- Woodinville N. Business Park

All of the pipeline projects, except Costco, were assigned cumulatively to the study intersections based on the number of trips indicated by the Snohomish County volume database. A total of 17 AM and 14 PM peak hour pipeline trips were assigned to the intersection of Woodinville-Duvall Road and 156th Avenue NE.

The Costco trips were assigned separately, based on the *Transportation Impact Analysis Report* completed for Costco. Consequently, 6 AM and 92 PM peak-hour Costco trips were assigned to the intersection of the Woodinville-Duvall Road and 156th Avenue NE. In total, there were 23 AM and 106 PM peak-hour pipeline trips added to this intersection's baseline future traffic volumes due to anticipated pipeline projects.

The resulting baseline traffic volumes are shown in Figures 3.5-7(A & B). These also represent traffic volumes expected under the No Action Alternative. The assigned project trips were then added to the 2008 baseline traffic volumes to calculate the 2008 future with Proposed Action traffic volumes, which are shown in Figures 3.5-8 (A & B).

This page left intentionally blank.

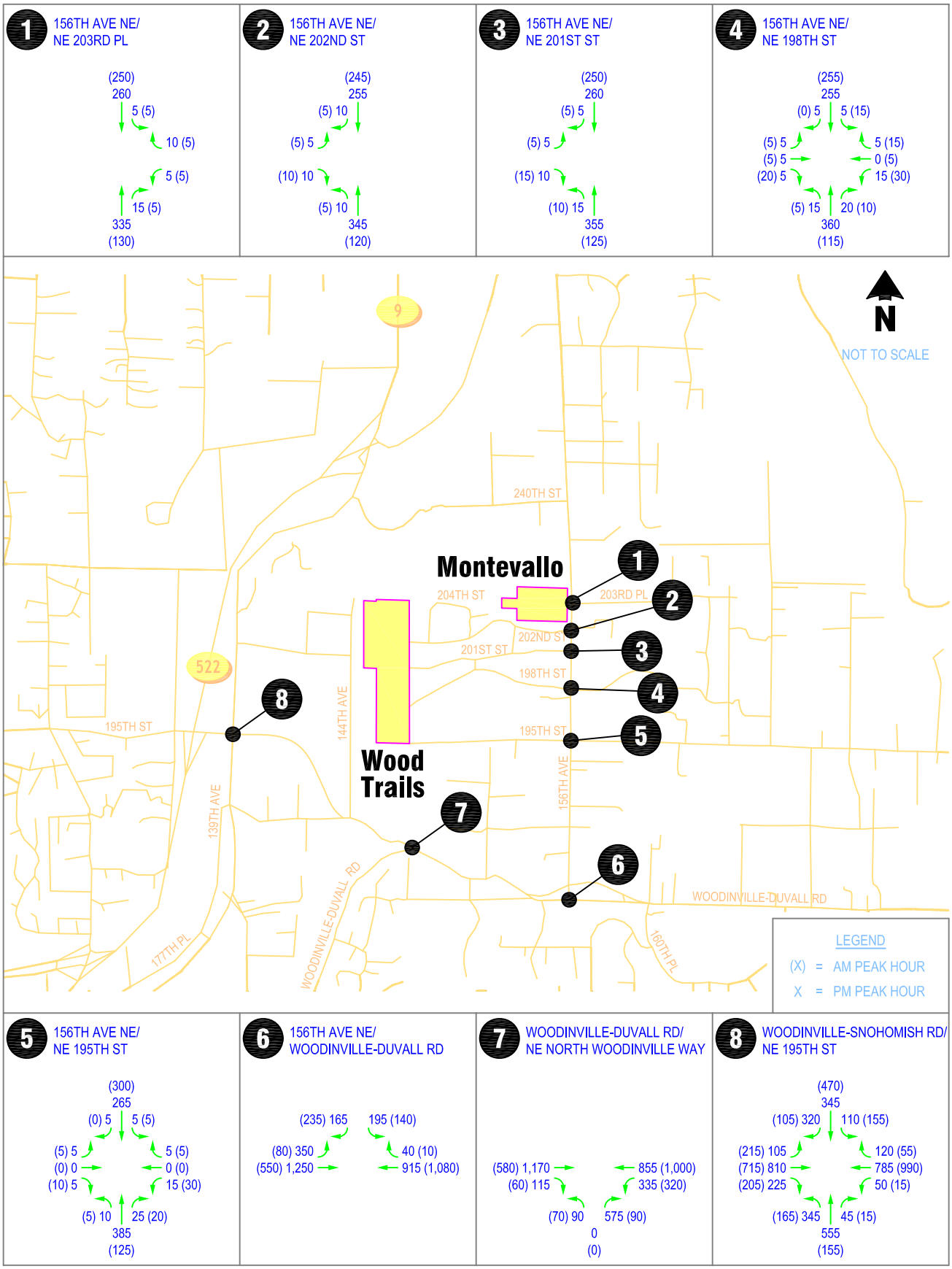


Figure 3.5-7(A)

Base Line Peak Hour Traffic Volumes

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

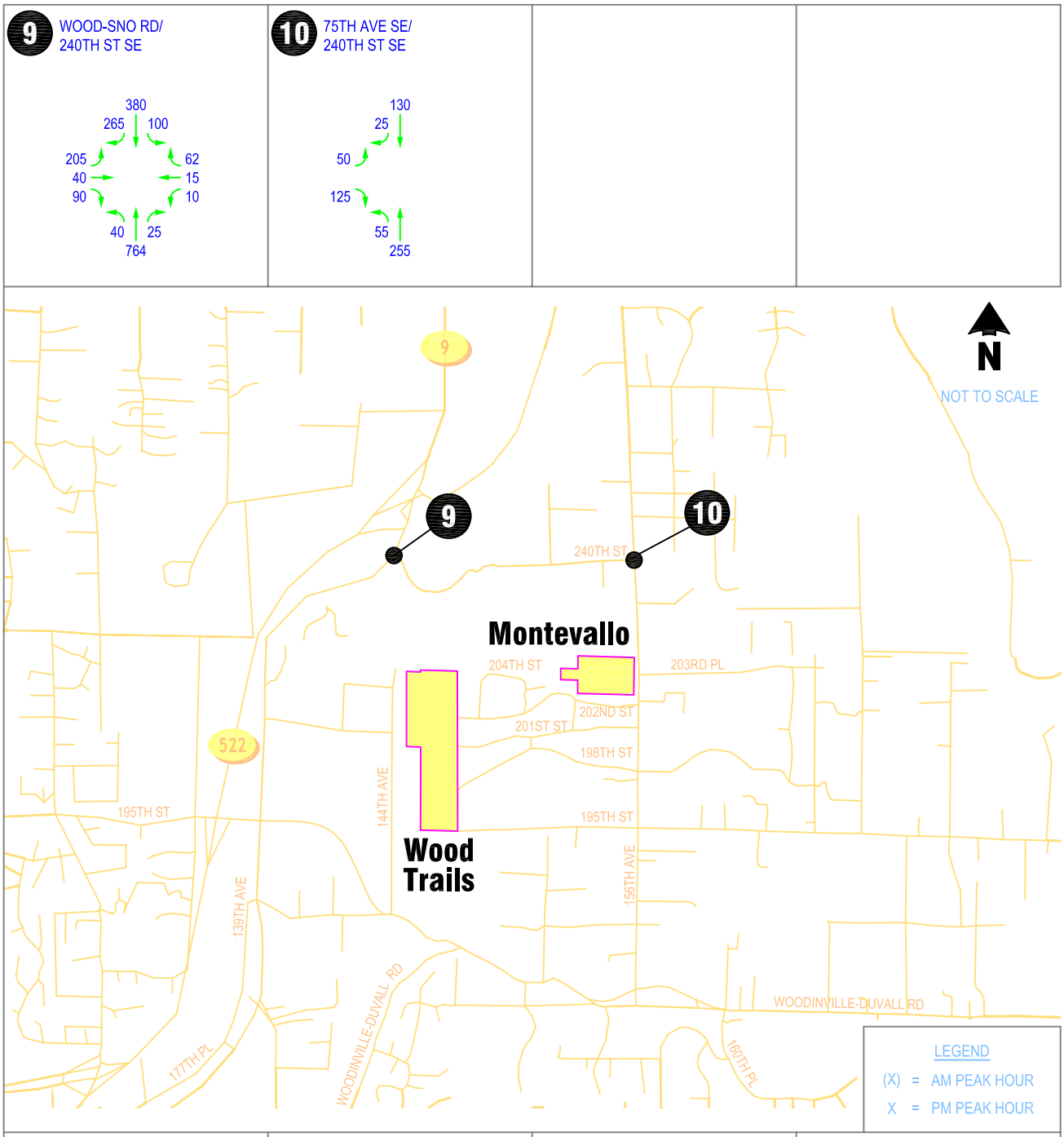


Figure 3.5-7(B)

Base Line PM Peak Hour Traffic Volumes

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

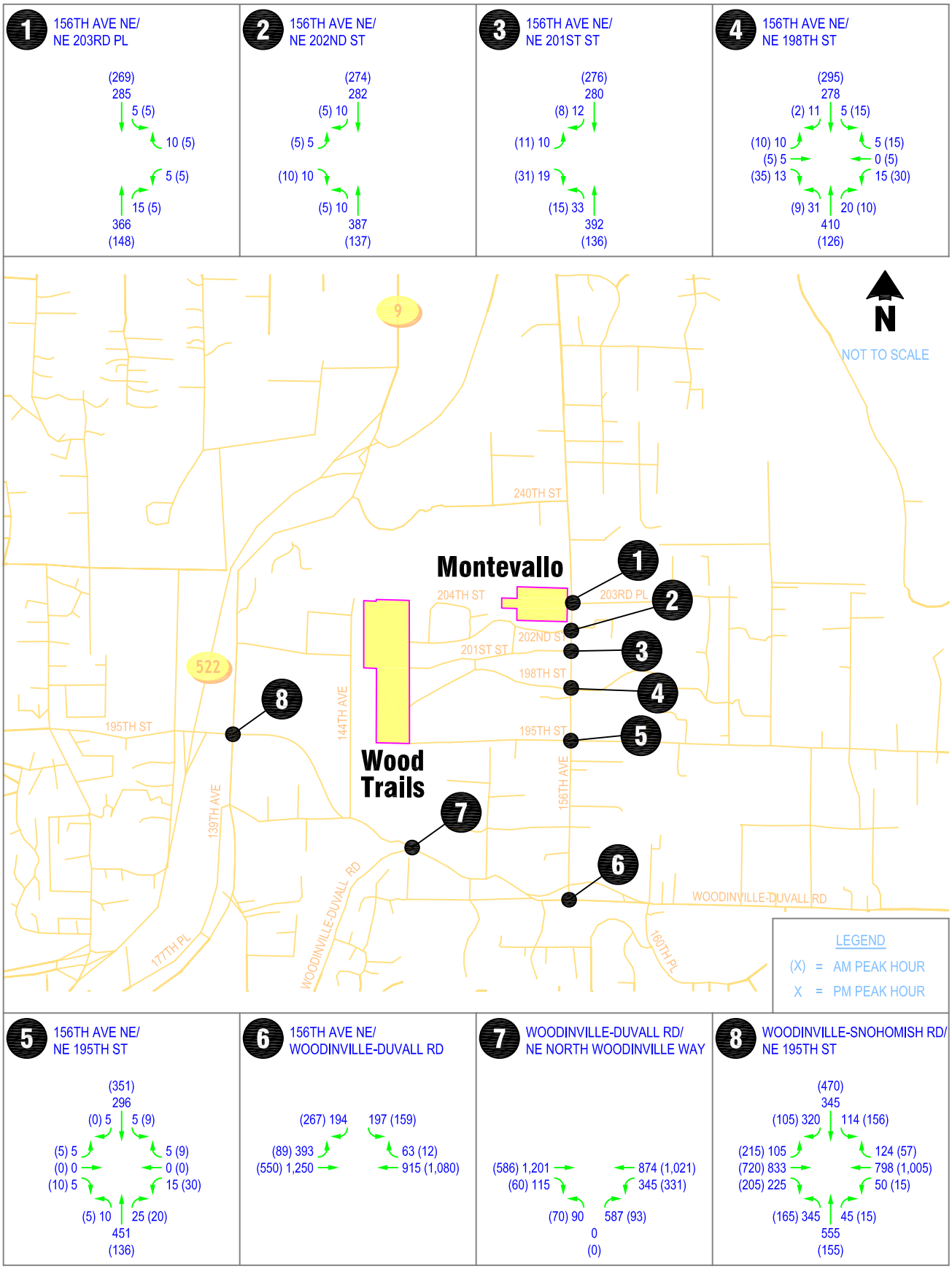


Figure 3.5-8(A)

2008 Future Peak Hour Traffic Volumes with Proposed Action

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

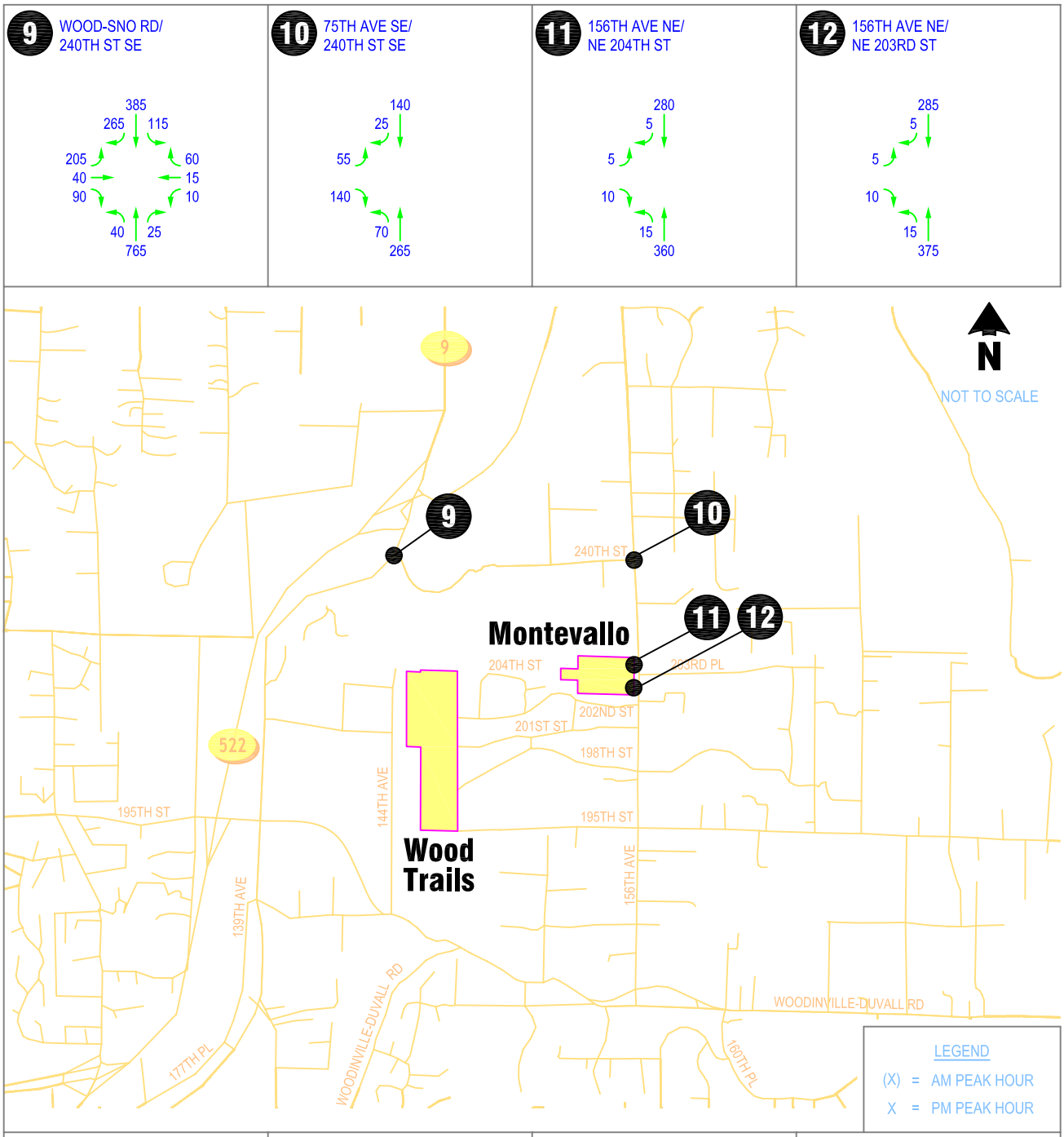


Figure 3.5-8(B)

2008 Future PM Peak Hour Volumes with Proposed Action

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

As a condition of a settlement agreement between Costco and the City of Woodinville, a *Costco Post-Occupancy Study* (June 16, 2006) was completed to determine the post development transportation impacts from the Costco retail facility on 156th Avenue NE. The settlement agreement stipulated than an additional payment from Costco to the City could be required if the actual number of cut-through trips on 156th Avenue NE was 16 trips or more per hour. This payment could fund traffic-calming measures on 156th Avenue NE in order to further mitigate the impacts on the City. The data collection for this study was delayed until the road construction in front of Costco on the Woodinville–Snohomish Road was completed in early February 2006. The data collection indicated that a maximum of 8 cut-through trips were observed during the 4 PM to 5 PM hour, and an average of approximately 6 cut-through trips per hour occurred over the 3-hour collection period. Therefore, it appears that the actual number of cut-through trips on 156th Avenue NE has been less than assumed or feared, and that Costco is not required to pay additional funds to the City in accordance with the settlement agreement.

3.5.2.3 Traffic Operations

Traffic operations under the Proposed Action, including intersection LOS, vehicle queuing, roadway volume-to-capacity ratios and turn lane warrants at key intersections, were analyzed using the same assumptions for baseline conditions, including signal timing splits, cycle lengths, channelization, and other factors. While signal timing was optimized to reflect the difference between the existing and No Action Alternative conditions, holding the timing constant in this comparison illustrates the maximum possible unadjusted project impact and is thus a representation of potential impacts. If timing patterns were actually optimized at the affected intersections, impacts would likely be less than is illustrated herein.

Intersection Level of Service

The 2008 LOS results with the Proposed Action are summarized in Table 3.5-6. LOS results from the baseline condition are included in the table for comparison purposes. A summary LOS results for all of the alternatives studied is presented in Appendix O (Exhibit T-9).

As shown in Table 3.5-6, almost all of the study-area intersections would remain at the same LOS with the Proposed Action as in baseline conditions during both the weekday AM and PM peak hours. The exceptions are the 156th Avenue NE/NE Woodinville-Duvall Road and Woodinville-Snohomish Road/NE 195th Street intersections, which would degrade from LOS C to LOS D. All of the study intersections operate at LOS D or better in Proposed Action conditions. Therefore, the Proposed Action would comply with the City's LOS E standard and would not create significant impacts to the level of service. Average vehicle delays during the AM peak hour would increase by less than 2 seconds at the study intersections with the addition of Proposed Action traffic. During the weekday PM peak hour, increases in average vehicle delays at the study intersections range from less than a second to 9 seconds of delay per vehicle.

Table 3.5-6
Proposed Action LOS Summary

Weekday AM Peak Hour	2008 Baseline Conditions			2008 Proposed Action		
	LOS[1]	Delay[2]	WM or V/C[3]	LOS	Delay	WM OR V/C
156th Avenue NE/NE 203rd Place	B	10.1	WB App.	B	10.3	WB App.
156th Avenue NE/NE 202nd Street	B	10.2	EB App.	B	10.4	EB App.
156th Avenue NE/NE 201st Street	B	10.6	EB App.	B	11.2	EB App.
156th Avenue NE/NE 198th Street	B	11.8	WB App.	B	12.8	WB App.
156th Avenue NE/NE 195th Street	B	12.8	WB App.	B	13.3	WB App.
156th Ave NE/NE Woodinville-Duvall Rd	C	22.6	0.82	C	24.2	0.85
NE Woodinville-Duvall Rd/NE Woodinville Way	A	7.1	0.48	A	7.1	0.50
NE Woodinville-Snohomish Rd/NE 195th St	C	33.3	0.95	C	33.7	0.95
156th Avenue NE/NE 204th Street (Montevallo Access) [4]	-	-	-	B	10.3	EB App.
156th Avenue NE/NE 203rd Street (Montevallo Access) [4]	-	-	-	B	10.2	EB App.
Weekday PM Peak Hour	**2008 Baseline Conditions**			**2008 Proposed Action**		
	LOS[1]	Delay[2]	WM or V/C[3]	LOS	Delay	WM OR V/C
156th Avenue NE/NE 203rd Place	B	11.4	WB App.	B	11.9	WB App.
156th Avenue NE/NE 202nd Street	B	11.2	EB App.	B	11.7	EB App.
156th Avenue NE/NE 201st Street	B	11.5	EB App.	B	12.5	EB App.
156th Avenue NE/NE 198th Street	C	15.8	WB App.	C	18.6	WB App.
156th Avenue NE/NE 195th Street	C	15.9	WB App.	C	17.8	WB App.
240th Street SE/75th Avenue SE	B	12.2	EB App.	B	12.7	EB App.
156th Ave NE/NE Woodinville-Duvall Rd	C	31.3	0.95	D	40.3	1.05
NE Woodinville-Duvall Rd/NE Woodinville Way	C	32.8	0.92	C	35.0	0.95
NE Woodinville-Snohomish Rd/NE 195th St	C	34.6	0.86	D	35.5	0.86
240th Street SE/Woodinville – Snohomish Road	B	11.5	0.51	B	12.0	0.52
156th Avenue NE/NE 204th Street (Montevallo Access)[4]	-	-	-	B	11.9	EB App.
156th Avenue NE/NE 203rd Street (Montevallo Access)[4]	-	-	-	B	12.1	EB App.

1. Level of Service.
2. Average vehicle delay (seconds).
3. Worst movement reported at unsignalized intersections; volume to capacity ratio at signalized intersections.
4. New intersection serving as an access to the Montevallo site in this alternative.

Vehicle Queuing

A Proposed Action queuing analysis was conducted for the southbound approach at the intersection of 156th Avenue/Woodinville-Duvall Road. The factor determined through the calibration analysis of existing conditions was applied to the future conditions queuing analysis with the Proposed Action. The existing storage and calibrated queue length with the Proposed Action, as well as the calibrated queue length under the baseline condition, are summarized in Table 3.5-7.

Table 3.5-7
Vehicle Queuing Summary, Proposed Action

156th Avenue NE/ NE Woodinville-Duvall Rd	Current Storage Capacity[1]	Baseline Calibrated Queue Length[2]	Proposed Action Calibrated Queue Length[2]
Southbound Left	170'	190'	210'
Southbound Right	N/A[3]	150'	170'

1. Estimated storage capacity of current lane, including center turn lane (feet).
2. 95th percentile queue length from *Synchro* after calibration based on existing observations of 95th-percentile queues and average vehicle length/spacing (See Appendix L, Exhibit T-3).
3. Southbound travel lane of 156th Avenue NE becomes the southbound right turn lane; queue storage capacity extends thousands of feet to the north of the intersection.

The addition of traffic associated with the Proposed Action would increase the 95th- percentile queue length by the equivalent of approximately one vehicle. Average queue lengths are anticipated to increase by approximately the same amount. The 95th percentile queue reflects the queue length likely to be exceeded for about 5 percent of the peak hour, based on traffic volumes occurring during the highest 15 minutes within the hour. With a 90-second cycle length, it is estimated that this projected queue length would occur for approximately 2 out of 40 signal cycles during the peak hour. As shown in the table, the baseline queue length is anticipated to exceed the storage without the proposed project. Therefore, the following can be concluded:

- Queue lengths that exceed the formal left-turn storage capacity would continue to be rare, but might be extended by one vehicle due to the Proposed Action.
- Because the intersection would operate at LOS D, all queues would continue to clear with each signal cycle.

Synchro analysis of the weekday PM peak-hour conditions at the intersection of the Woodinville–Duvall Road and 156th Avenue NE shows that the left-turn queues with the Proposed Action exceed the available storage lanes for both southbound and eastbound movements. In the worst-case condition, the southbound left-turn queue would extend 210 feet north of the intersection within the two-way left-turn lane markings. As noted in Section 3.5.1.4, the 95th-percentile queue length of 175 feet also exceeds the available storage capacity under existing conditions. Consequently, the Proposed Action would extend the worst-case queue length by 35 feet, and would add incrementally to an existing storage capacity deficit.
Due to the hill on 156th Avenue NE just north of the intersection and north of the end of the queue, Draft EIS review comments questioned whether there was adequate sight distance on this stretch of the road. The City's traffic consultant performed field measurements and determined the stopping sight distance would be 377 feet from the end of the queue with the Proposed Action. This stopping sight distance exceeds the required sight distance of 360 feet for a roadway with a 45 mph design speed, indicating there would still be adequate stopping sight distance with the Proposed Action.

The southbound left-turn pocket for 156th Avenue NE at the Woodinville-Duvall road extends north using the channelization for the two-way left-turn lane. The combination of the left-turn pocket and the two-way left-turn lane provides enough storage space for turning vehicles, if properly used. There could be

occurrences of left-turning vehicles blocking the southbound right-turn lane. This could be attributed to drivers choosing to not use the two-way left-turn lane or some other unusual or rare circumstance. If the left-turn storage capacity was exceeded more than 5 percent of the time during the peak hours, consideration should be given to increasing the safe storage area at this location.

The baseline (2008 without-project) condition queue length for the eastbound left-turn movement at the 156th Avenue NE/Woodinville-Duval Road is estimated to exceed the available storage length by one vehicle. The incremental impact of the Proposed Action would be to increase this anticipated storage length deficiency by two additional vehicles.

Roadway Volume/Capacity Conditions

Future average daily traffic with the Proposed Action along the four local roadways near the Wood Trails development at their respective intersections with 156th Avenue NE was estimated based on the projected PM peak-hour traffic volumes. Estimated link capacities developed by King County (provided in Appendix O, Exhibit T-4) indicate an ADT roadway capacity of 7,400 vehicles. However, the capacity based on a potential livability criterion would be approximately 1,000 vehicles a day. The baseline ADT and estimated future ADT combined with the Proposed Action for NE 201st Street and NE 198th Street (which would be used for access to Wood Trails) and the adjacent roadways of NE 202nd Street and NE 195th Street are summarized in Table 3.5-8.

As in the baseline condition, comparing these volumes to the King County estimated link capacities suggests that a substantial surplus of roadway capacity would remain available along all four roadways with the Proposed Action. The total ADT with the Proposed Action would remain between 3 and 10 percent of actual roadway capacity. Future roadway volumes would use between 25 and 74 percent of capacity if the general livability criterion is applied.

Table 3.5-8
Roadway Volume/Capacity Summary, Proposed Action

Roadway	Baseline ADT[1]	Proposed Action ADT[2]	Estimated Capacity[3]	Livability Criterion[4]
NE 202nd Street	350	350	7,400	1,000
NE 201st Street	350	740	7,400	1,000
NE 198th Street	350	700	7,400	1,000
NE 195th Street	250	250	7,400	1,000

1. Estimated No Action alternative average daily traffic (ADT); estimated as being ten times the PM peak hour volume on the roadway.
2. Estimated Proposed Action ADT; estimated as being ten times the PM peak hour volume on the roadway.
3. Estimated ADT link capacity, as developed by King County.
4. Per Appleyard 1981.

Left-Turn Lane Warrants

Left-turn lane warrants were evaluated for the northbound left-turn movement at all of the study intersections along 156th Avenue NE. Forecast traffic volumes at these intersections were reviewed and compared to the WSDOT left-turn lane warrants. This analysis determined that none of the subject intersections warrant a left-turn lane with the Proposed Action. Appendix O (Exhibit T-10) shows the WSDOT left-turn lane storage guidelines and corresponding data points for this analysis.

Additionally, Appendix O, Exhibit T-11 contains the most recent (2000) Highway Capacity Manual (HCM) Exhibit 17-6, which also provides guidance on left-turn lane needs. HCM Exhibit 17-6 shows the

potential capacity for all movements on two-lane streets where the side street is stop-sign controlled (Transportation Research Board 2000). It shows that there would be excess capacity on 156th Avenue NE for left-turn movements at all of the intersections north of the Woodinville-Duvall Road to 240th St. SE in Snohomish County. The HCM includes standards for all classifications of roads, not just highways, and is also appropriate for use in this analysis.

3.5.2.4 Pedestrian/Non-Motorized Facilities

Vehicular access to Wood Trails with the Proposed Action would be via NE 201st Street and NE 198th Street. Scoping comments and Draft EIS review comments reflect residents' concerns over interaction between project-related traffic and pedestrian activity in the area. The Proposed Action would result in increased traffic volumes on these streets, as indicated in Table 3.5-8, and would also be expected to generate additional pedestrian activity from school children and other residents of the developments.

As noted in Section 3.5.1, of the four roadways adjacent to the site (NE 202nd Street, NE 201st Street, NE 198th Street, NE 195th Street), NE 201st Street and NE 198th Street have the most favorable pedestrian facilities. These include wider roadway shoulders and more contiguous portions of sizeable roadway shoulders. While NE 198th Street has one 85-foot section with inadequate stopping sight distance, this street also has adequate shoulder width to provide a safe location for pedestrians. Similarly, while there is inadequate sight distance at the west end of NE 201st Street, there is adequate shoulder room in this section of road. Site distance is an unavoidable significant adverse impact on NE 198th Street and NE 201st Street.

In addition, these two roadways were observed to have the least pedestrian activity during the AM hours observed (7 AM - 9 AM) and the 2nd and 4th least pedestrian activity during the PM hours observed (2 PM - 4 PM). Pedestrian use of NE 198th Street and NE 201st Street would increase with the Proposed Action, particularly with children from the Wood Trails subdivision walking to and from the existing bus stops on these streets (assuming the Northshore School District did not establish a new school bus stop within or closer to the development). Nevertheless, no accidents involving pedestrians were reported along either section of roadway. While pedestrians are present along with a minor amount of traffic, no physical conditions were observed that suggest these roadways have any unusual hazards to pedestrians. Based on current and future pedestrian activity and the anticipated increase in vehicle trips, the Proposed Action is not expected to have adverse impacts on pedestrian safety and no specific needs for pedestrian-related improvements are identified.

Because school buses in the area currently make several stops along 156th Avenue NE, the Northshore School District could decide that, if warranted, a bus stop could be added near the entrance of the Montevallo development. If not, frontage improvements completed in conjunction with the Montevallo development, as well as the existing paved roadway shoulder on 156th Avenue NE, would facilitate travel to and from other school bus stops along the route.

The Proposed Action would generate additional traffic on 156th Avenue NE, which receives substantial use by bicyclists. The accidents reported for 156th Avenue NE in a recent 5-year period involved no bicycles, indicating bike use on this roadway does not present an existing traffic safety problem. While the east side of this street has a minimal shoulder, a paved path on the west side of the street provides a safe location for bicycle travel. Considering these factors, the additional project-related traffic is not likely to result in significant impacts to bike use of this route.

3.5.2.5 Traffic Safety

Traffic associated with the proposed projects would have some level of involvement in traffic accidents. In the absence of any unusual feature of the road network or traffic flow associated with an action,

however, standard practice in traffic studies is to assume that a development project would increase the traffic volume in a given location but would not change the accident rate (the number of accidents for a given number of vehicles). Based on the accident history in the area, no existing safety deficiency has been identified that would be exacerbated in the Proposed Action condition. Residents of the new subdivisions can be assumed to have similar driving characteristics to current local residents. Therefore, increases in traffic volumes due to the addition of Proposed Action traffic could create a proportionate increase in traffic collisions (the absolute number of accidents would likely increase), but the accident rate would not be expected to change. This would not represent a significant change in traffic safety conditions in the local area.

3.5.2.6 NE 195th/NE 198th Street Student Drop-Off Activity

As noted in Section 3.5.1, it has been estimated that the area surrounding the proposed subdivisions generates 0.03 student drop-offs per residential lot during the AM peak hour at the NE 195th Street/156th Avenue NE intersection or the alternative NE 198th Street / 156th Avenue NE intersection. With the addition of 132 lots with the Proposed Action, approximately four new student drop-offs are anticipated to occur near the NE 195th Street gate in the AM peak hour. These trips were accounted for in the Proposed Action trip distribution and assignment that was used for the LOS analysis. With these additional student drop-off trips assumed, the 156th Avenue NE/NE 195th Street intersection would operate at LOS B, with approximately 14.4 seconds of average vehicle delay for the westbound approach. If these trips were all assigned to the 156th Avenue NE/NE198th Street intersection it would operate at LOS B with approximately 14.5 seconds of average vehicle delay for the westbound approach as well. Based on these results, it appears that the impacts of student drop-offs at the NE 195th Street gate would be minimal with the Proposed Action. Furthermore, the potential for the additional trips at the emergency gate are unlikely to create any operational impacts on queuing or general neighborhood accessibility.

3.5.2.7 Transit Service

Existing transit stops serving Routes 251 and 311 are located along the Woodinville-Duvall Road. As indicated in Section 3.5.1, the distance from the project sites to these bus stops is greater than what transit planners typically consider to be an acceptable walking distance. Consequently, the proposed subdivisions would be likely to generate relatively little immediate demand for transit service because few residents would be inclined to walk to bus stops on the Woodinville-Duvall Road. Based on the relatively low population density of the local area and the location near the outer part of the transit service area, routes serving the project area are likely to have available capacity to accommodate additional riders and the Proposed Action would not generate enough demand to require expanded transit service.

Commuters living in the proposed developments would also have the option of driving to a park-and-ride lot to access transit service. The facilities most likely to be used by project residents are the park-and-ride lots in Bothell and Woodinville. These two facilities have a combined capacity of 639 parking spaces, and neither facility is identified by Metro Transit (2006) as a lot that is typically filled to or above 90 percent of capacity on weekday mornings. Therefore, adequate local capacity for park-and-ride use appears to exist. Based on capacity considerations for bus routes and park-and-ride lots, no significant impacts to transit service in the area are anticipated with the Proposed Action.

3.5.2.8 Parking

With the Proposed Action, each single-family dwelling in both Wood Trails and Montevallo would contain its own dedicated driveway and garage. As with most single-family developments, residents and guests are expected to use these private parking areas rather than park along public streets. For land use #210 (Single-family detached housing), ITE *Parking Generation* 3rd *Edition* (2004) identifies an average peak parking demand per dwelling unit of 1.83 vehicles per unit. This suggests that the garage and private

driveway areas of each home should be able to accommodate parking demand for the Proposed Action. On-street public parking, would be available throughout most of either development, and should adequately serve any occasional overflow from these areas.

3.5.3 Impacts of the Alternatives

3.5.3.1 R-1 Zoning Alternative

The R-1 Zoning Alternative includes the construction of 23 single-family homes on the Wood Trails site and 14 single-family homes on the Montevallo site. Vehicular access to the Wood Trails site would be provided via NE 202nd Street, NE 201st Street, NE 198th Street, and NE 195th Street, while access to the Montevallo site would be provided via the addition of a west approach to the 156th Avenue NE / NE 203rd Place intersection. The site plans for this alternative are provided in Section 2.2.

Project Trip Generation

Trip generation estimates for the R-1 Zoning alternative were calculated using the methodology described previously for the Proposed Action. Five existing single-family dwelling units on the Montevallo site would be removed for construction of the project. Credit for these existing homes at the previously described higher per unit rate (see Section 3.5.2.1) was applied toward the project trip generation. The trip generation for Wood Trails and Montevallo with the R-1 Zoning Alternative is summarized in Table 3.5-9. For comparison purposes, trip generation estimates for the Proposed Action are also included.

The R-1 Zoning Alternative would generate approximately 373 daily trips (269 from Wood Trails, 104 from Montevallo), 32 AM peak hour trips (26 from Wood Trails, 6 from Montevallo), and 40 PM peak hour trips (29 from Wood Trails, 11 from Montevallo). The R-1 Zoning alternative would have substantially fewer dwelling units and less overall trip generation compared to the Proposed Action.

Table 3.5-9
Project Trip Generation, R-1 Zoning Alternative

Time Period	Proposed Action[1]						R-1 Zoning Alternative[2]					
	Wood Trails[3]			Montevallo[3]			Wood Trails[3]			Montevallo[3]		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Daily	355	354	709	355	354	709	135	134	269	85	85	170
AM Peak Hour	14	42	56	14	42	56	6	20	26	5	14	19
PM Peak Hour	47	27	74	47	27	74	18	11	29	11	7	18
Less Existing Uses- (5 Single Family Units on Montevallo Site)[4]												
Daily				*(33)*	*(33)*	*(66)*				*(33)*	*(33)*	*(66)*
AM Peak Hour		--		*(3)*	*(10)*	*(13)*		--		*(3)*	*(10)*	*(13)*
PM Peak Hour				*(4)*	*(3)*	*(7)*				*(4)*	*(3)*	*(7)*
Net New Trips												
Daily	**355**	**354**	**709**	**322**	**321**	**643**	135	134	269	52	52	104
AM Peak Hour	**14**	**42**	**56**	**11**	**32**	**43**	6	20	26	2	4	6
PM Peak Hour	**47**	**27**	**74**	**43**	**24**	**67**	18	11	29	7	4	11

1. Proposed action consists of 66 single-family dwelling units at both Wood Trails and Montevallo.
2. Alternative #1 (R-1 Zoning) consists of 23 single-family dwelling units at Wood Trails, and 14 single-family dwelling units at Montevallo.
3. Institute of Transportation Engineers (ITE) *Trip Generation*- 7th Edition: Land Use #210 (Single-Family Dwelling Unit): Regression Equations
4. Credit applied to Montevallo trip generation for removal of five existing single-family dwelling units located on- site.

Project Trip Distribution & Assignment

The distribution of project trips from the R-1 Zoning Alternative was determined using the same methodology described for the Proposed Action. Project trips were assigned to the roadway network based on this distribution, with the exception that in this alternative, all four roadways adjacent to the Wood Trails site (NE 202nd Street, NE 201st Street, NE 198th Street, and NE 195th Street) would be used to gain access to the site, and the Montevallo site is only accessed by a new western approach to the 156th Avenue NE / NE 203rd Place intersection. The resulting assignment of project trips at the study intersections is shown in Figures 3.5-9(A & B). The assigned project trips were then added to the 2008 baseline volumes shown previously in Figures 3.5-7(A & B) to calculate 2008 future traffic volumes with the R-1 Zoning Alternative, which are shown in Figures 3.5-10(A & B).

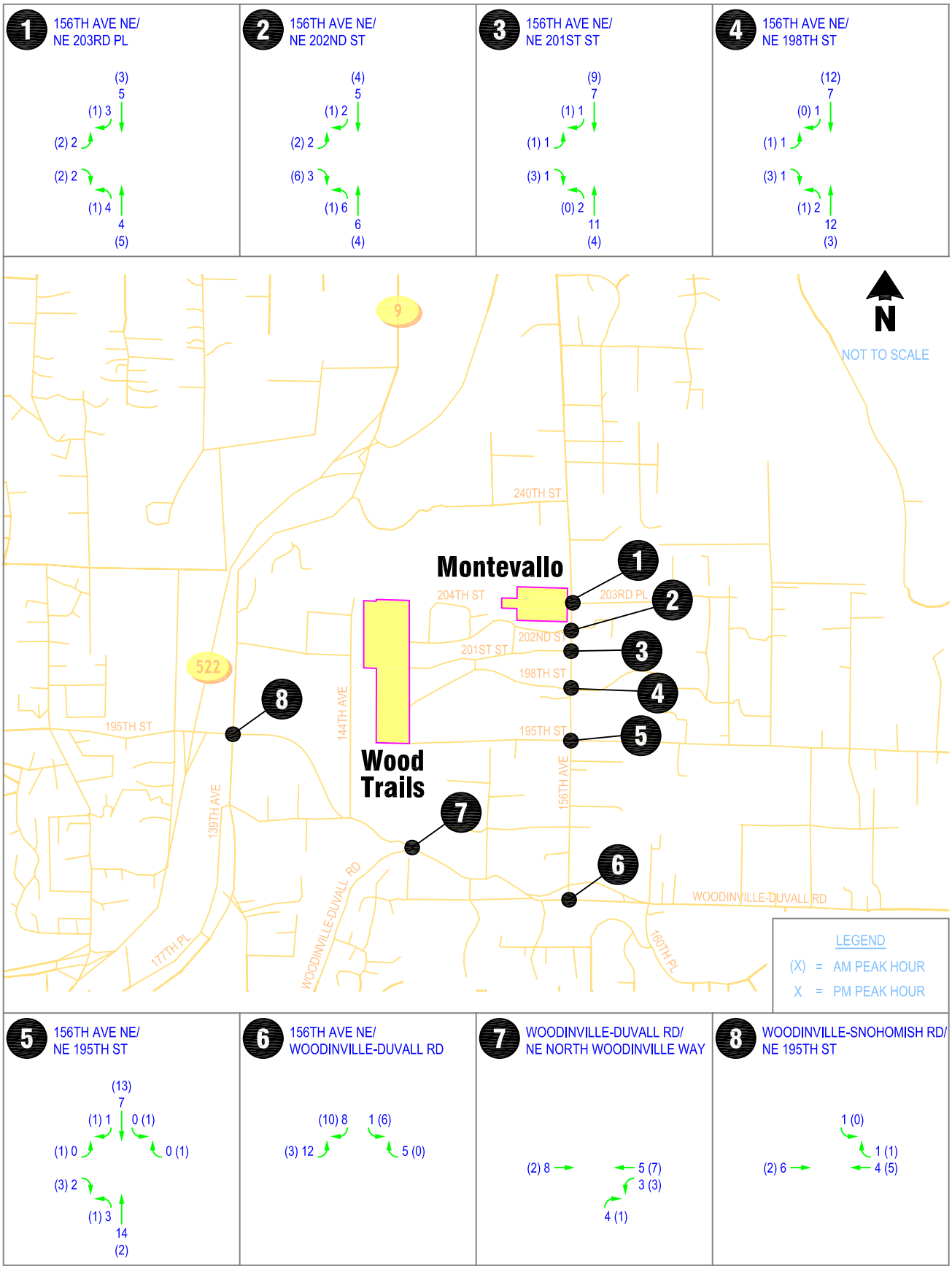


Figure 3.5-9(A)

Project Trip Assignment, R–1 Zoning Alternative

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

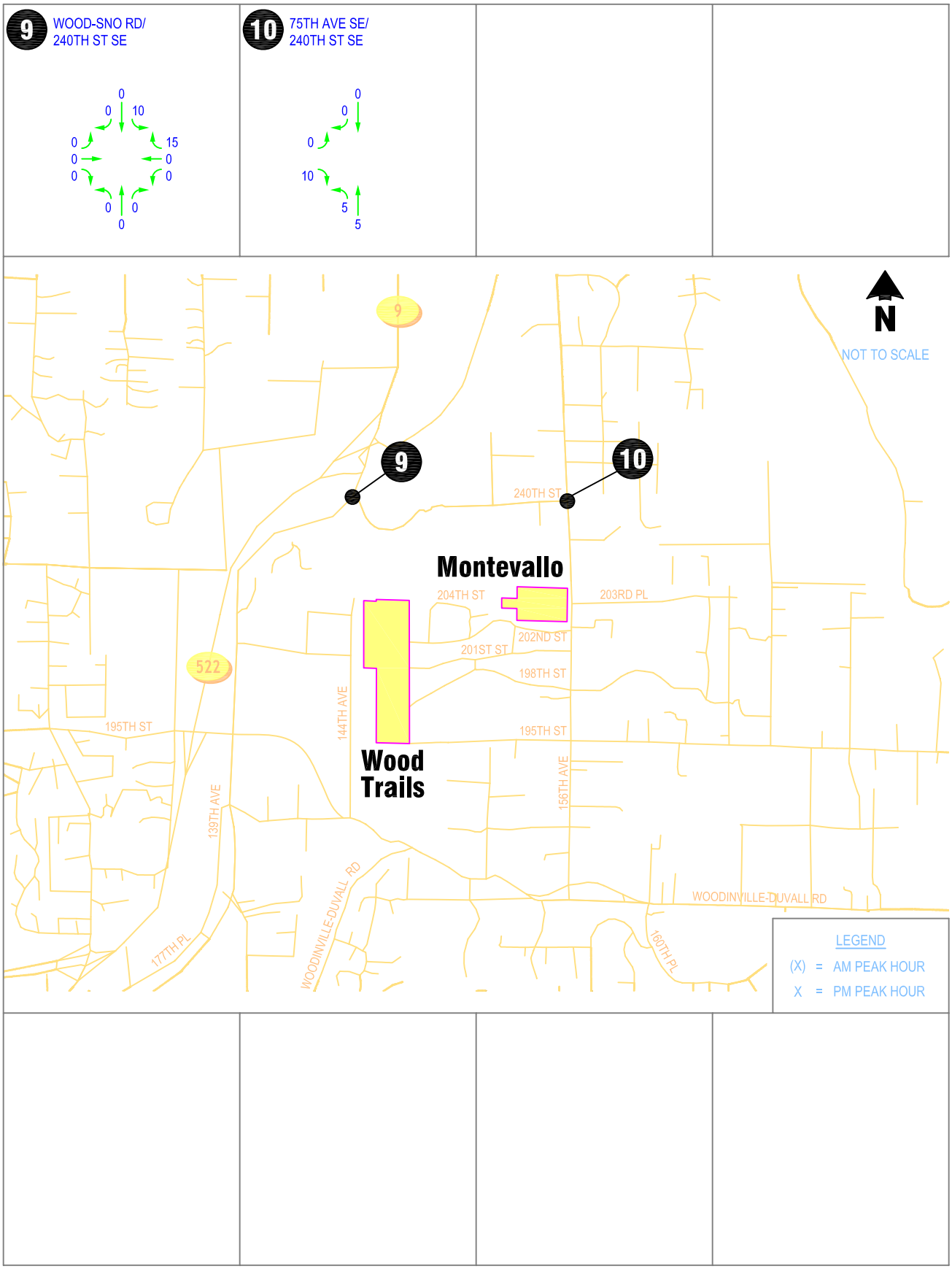


Figure 3.5-9(B)

PM Peak Hour Project Trip Assignment, R–1 Zoning Alternative

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

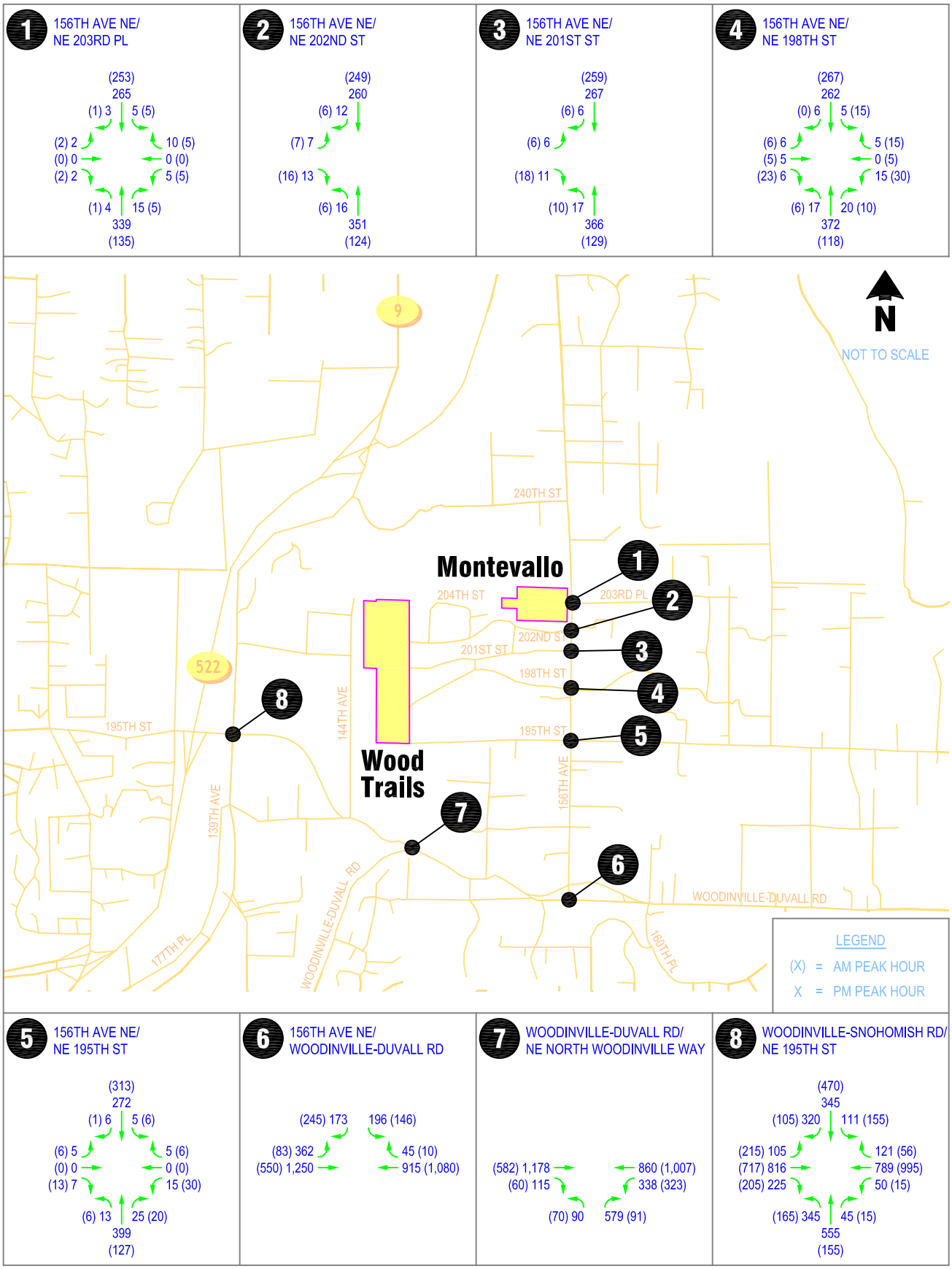


Figure 3.5-10(A)

2008 Future Peak Hour Traffic Volumes, R–1 Zoning Alternative

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

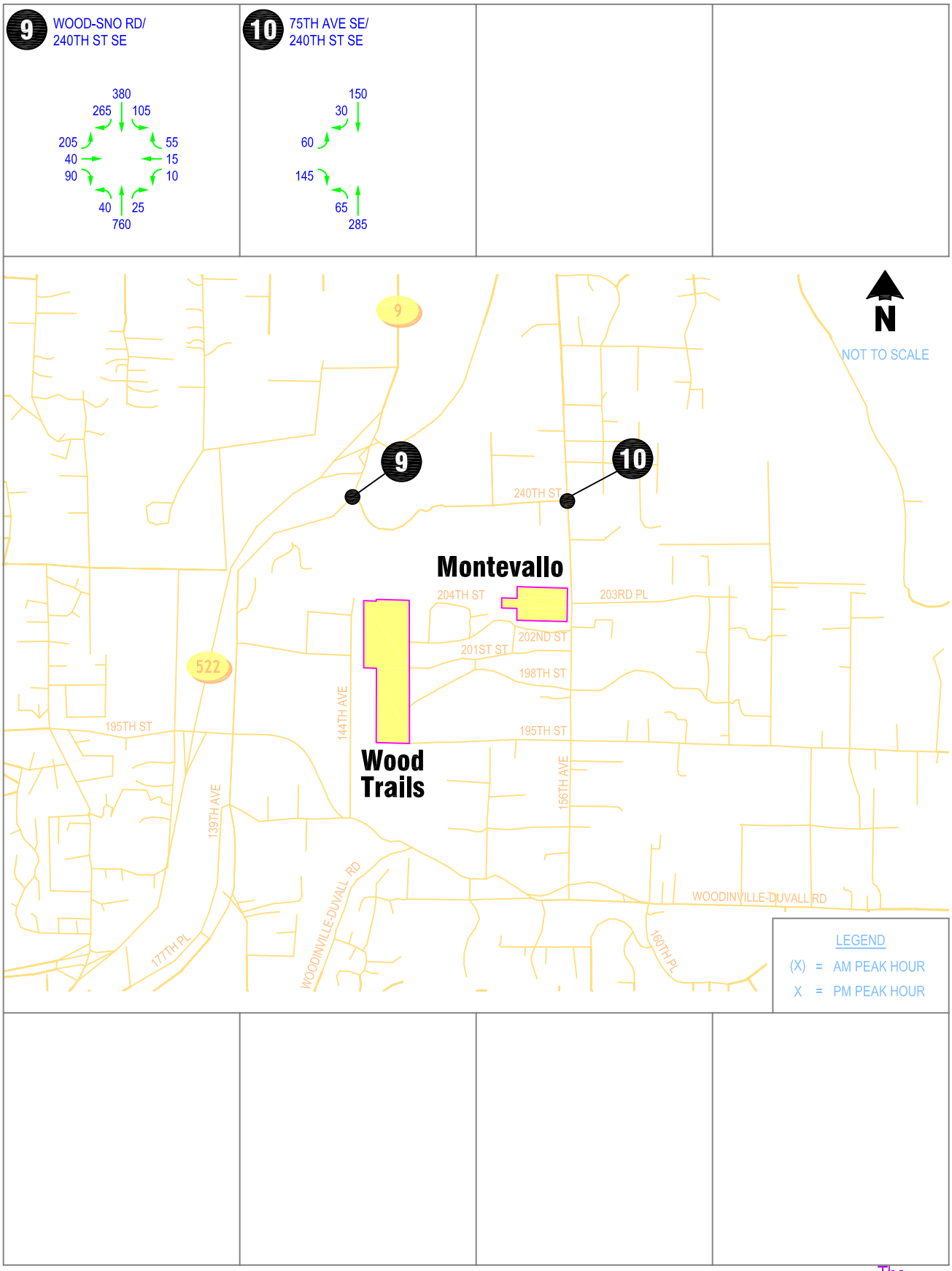


Figure 3.5-10(B)

2008 Future PM Peak–Hour Traffic Volumes, R–1 Zoning Alternative

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

Traffic Operations

Future traffic operations, including intersection LOS, vehicle queuing, roadway volume to capacity ratios and turn lane warrants at key intersections were analyzed for the R-1 Zoning Alternative using the same key assumptions as for No Action conditions (including signal timing splits, cycle lengths, roadway channelization, etc.). Results are summarized below.

Intersection Level of Service

The R-1 Zoning Alternative LOS results are summarized in Table 3.5-10. LOS results from the Proposed Action are included in the table for comparison purposes. Appendix O (Exhibit T-9).includes a summary of LOS results for all alternatives.

Table 3.5-10
LOS Summary, R-1 Zoning Alternative

Weekday AM Peak Hour	**2008 with Proposed Action**			**2008 with R-1 Zoning Alternative**		
	LOS[1]	**Delay[2]**	**WM or V/C[3]**	**LOS**	**Delay**	**WM OR V/C**
156th Avenue NE/NE 203rd Place	B	10.3	WB App.	B	10.8	EB App.
156th Avenue NE/NE 202nd Street	B	10.4	EB App.	B	10.2	EB App.
156th Avenue NE/NE 201st Street	B	11.2	EB App.	B	10.7	EB App.
156th Avenue NE/NE 198th Street	B	12.8	WB App.	B	12.1	WB App.
156th Avenue NE/NE 195th Street	B	13.3	WB App.	B	13.0	WB App.
156th Ave NE/NE Woodinville-Duvall Rd	C	24.2	0.85	C	23.0	0.83
NE Woodinville-Duvall Rd/NE Woodinville Way	A	7.1	0.50	A	7.1	0.49
NE Woodinville-Snohomish Rd/NE 195th St	C	33.7	0.95	C	33.4	0.95
Weekday PM Peak Hour	**2008 with Proposed Action**			**2008 with R-1 Zoning Alternative**		
	LOS[1]	**Delay[2]**	**WM or V/C[3]**	**LOS**	**Delay**	**WM OR V/C**
156th Avenue NE/NE 203rd Place	B	11.9	WB App.	B	12.5	EB App.
156th Avenue NE/NE 202nd Street	B	11.7	EB App.	B	11.5	EB App.
156th Avenue NE/NE 201st Street	B	12.5	EB App.	B	11.8	EB App.
156th Avenue NE/NE 198th Street	C	18.6	WB App.	C	16.3	WB App.
156th Avenue NE/NE 195th Street	C	17.8	WB App.	C	16.5	WB App.
240th Street SE/75th Avenue SE	B	12.7	EB App.	B	12.3	EB App.
156th Ave NE/NE Woodinville-Duvall Rd	D	40.3	1.05	C	33.2	0.98
NE Woodinville-Duvall Rd/NE Woodinville Way	C	35.0	0.95	C	33.4	0.93
NE Woodinville-Snohomish Rd/NE 195th St	D	35.5	0.86	C	34.8	0.86
240th Street SE/Woodinville – Snohomish Road	B	12.0	0.52	B	11.6	0.52

1. Level of Service.
2. Average vehicle delay (seconds).
3. Worst movement reported at unsignalized intersections; volume to capacity ratio at signalized intersections.

As shown in Table 3.5-10, all of the study intersections would operate at LOS C or better in both the AM and PM peak hours with the R-1 Zoning Alternative; therefore, these intersections would continue to meet the City's LOS E operating standard and there would not be significant traffic impacts as measured by LOS. In comparison to the Proposed Action, the R-1 Zoning Alternative results in a slightly lower amount of delays at most study intersections, ranging from 0.2 second of average delay to just over 7 seconds. The average vehicle delay at the 156th Avenue NE/NE 203rd Place intersection is higher with the R-1 Zoning Alternative than the Proposed Action, because this intersection is used as the only access point for Montevallo in the R-1 Zoning Alternative. Given the daily fluctuation in traffic volumes, the average motorist likely would not notice the variations in average delay between the Proposed Action and R-1 Zoning Alternative.

Vehicle Queuing

As for the Proposed Action, a queuing analysis was conducted for the southbound approach at the intersection of 156th Avenue/Woodinville-Duvall Road with the R-1 Zoning alternative. The factor determined through the calibration analysis of existing conditions was applied to the future conditions queuing analysis with the R-1 Zoning Alternative. The existing storage, calibrated queue length with the R-1 Zoning alternative and the calibrated queue length with the Proposed Action are all summarized in Table 3.5-11. The R-1 Zoning Alternative results in a 95th percentile queue that is approximately 15 feet less, for both the southbound right and left turns in the AM peak hour, than under Proposed Action conditions.

Table 3.5-11
Vehicle Queuing Summary, R-1 Zoning Alternative

156th Avenue NE/NE Woodinville-Duvall Rd	Current Storage Capacity[1]	Proposed Action Calibrated Queue Length[2]	R-1 Zoning Alt. Calibrated Queue Length[2]
Southbound Left	170'	210'	195'
Southbound Right	N/A[3]	170'	155'

1. Estimated storage capacity of current lane, including center turn lane (feet).
2. 95th percentile queue length from *Synchro* after calibration based on existing observations of 95th-percentile queues and average vehicle length-spacing (See Appendix T-3).
3. Southbound travel lane of 156th Avenue NE becomes the southbound right turn lane; queue storage capacity extends thousands of feet to the north of the intersection.

The baseline-condition 95th percentile queue length is estimated to be approximately 180 feet for the southbound left-turn movement. This baseline queue length would exceed the existing storage provided and extend back into the through lane. As discussed in Section 3.5.2, this condition is rare and, based on a 90-second cycle length, would occur only 5 percent of the time or for 2 out of 40 signal cycles during the peak hour. Thus, given that this queue spillback occurs in the baseline condition, the addition of 25 feet to the baseline queue length (15 feet less than for the Proposed Action) would not be a significant change.

As also noted for the Proposed Action, the baseline condition queue length for the eastbound left turn movement at 156th Avenue NE/Woodinville-Duval Road exceeds the available storage length by one vehicle. The incremental impact of the R-1 Zoning Alternative on this baseline deficiency would be one additional vehicle.

Roadway Volume/Capacity Conditions

The future ADT with the R-1 Zoning Alternative along the potential access roadways for the proposed Wood Trails development were estimated based on the PM peak-hour turning movement counts conducted at the respective intersections with 156th Avenue NE. The estimated ADT for the four

roadways that could access the Wood Trails site under this alternative are summarized in Table 3.5-12. ADT for the Proposed Action are included in the table for comparison purposes.

Table 3.5-12
Roadway Volume/Capacity Summary, R-1 Zoning Alternative

Roadway	Proposed Action ADT[1]	R-1 Zoning Alternative ADT[1]	Estimated Capacity[2]	Livability Criterion[3]
NE 202nd Street	350	480	7,400	1,000
NE 201st Street	740	400	7,400	1,000
NE 198th Street	700	400	7,400	1,000
NE 195th Street	250	310	7,400	1,000

1. Average daily traffic (ADT); estimated as being ten times the PM peak hour volume on the roadway.
2. Estimated ADT link capacity, as developed by King County.
3. Per Appleyard 1981.

These results suggest that the R-1 Zoning Alternative would generate more daily traffic on NE 202nd Street and NE 195th Street than the Proposed Action, and less daily traffic on NE 201st Street and NE 198th Street. This is due to the differences in access plans between the alternatives, as Wood Trails would utilize NE 201st Street and NE 198th Street under the Proposed Action, but would use all four roadways under the R-1 Zoning Alternative. As in the No Action condition, these volumes and the King County estimated link capacities suggest that a substantial surplus of roadway capacity would remain available along all four roadways despite construction of the R-1 Zoning Alternative. The total ADT with the R-1 Zoning Alternative would remain between 4 and 7 percent of the actual roadway capacity, and between 31 and 48 percent of capacity if the general livability criterion is applied.

Left-Turn Lane Warrants

Left-turn lane warrants were evaluated for the northbound left-turns at all of the study intersections along 156th Avenue NE. Forecast traffic volumes at these intersections were reviewed and compared to the WSDOT left-turn lane warrants. Based on this analysis, it was determined that none of the study intersections along 156th Avenue NE would warrant a left-turn lane with the R-1 Zoning Alternative. Appendix O (Exhibit T-10) shows the WSDOT left turn lane storage guidelines and corresponding data points for this analysis.

Pedestrian/Non-Motorized Facilities

Vehicular access to the Wood Trails site with the R-1 Zoning Alternative would be provided via NE 202nd Street, NE 201st Street, NE 198th Street and NE 195th Street. As was noted in Section 3.5.1, of the four roadways adjacent to the Wood Trails site, NE 201st Street and NE 198th Street have the most favorable pedestrian facilities, including wider roadway shoulders and more contiguous portions of sizable roadway shoulders. Under the R-1 Zoning Alternative, pedestrian traffic would be more likely to utilize the less desirable pedestrian roadways (NE 202nd Street and NE 195th Street) than in the Proposed Action case. Pedestrian activity was observed to be the highest along NE 202nd Street during both the AM and PM time periods observed; this roadway would experience a larger traffic increase under the R-1 Zoning Alternative.

Similar impacts to school walking routes and school bus stops noted for the Proposed Action could be anticipated with the R-1 Zoning Alternative, but to a lesser degree due to the smaller amount of traffic generated under this alternative. However, under the R-1 Zoning alternative, the Wood Trails development would also utilize NE 202nd Street and NE 195th Street, both of which have less desirable shoulder width conditions than NE 201st Street and NE 198th Street. Providing vehicular access to these

streets for Wood Trails may necessitate some degree of enhancement due to the roadway width deficiencies along NE 202nd Street and NE 195th Street. Site distance is an unavoidable significant adverse impact on NE 198th Street and NE 201st Street.

As discussed for the Proposed Action, the R-1 Zoning Alternative would not have significant impacts on bicycle use.

Traffic Safety

Increases in traffic volumes due to the addition of project traffic could create a proportionate increase in traffic collisions relative to this increase in traffic volumes. However, based on accident history in the area, no specific existing safety deficiency has been identified that would be exacerbated with the R-1 Zoning Alternative.

NE 195th/NE 198th Street- Student Drop-Off Activity

As was noted in Section 3.5.1, it has been estimated that the area generates 0.03 student drop-offs per residential lot at the NE 195th Street/156th Avenue NE intersection during the AM peak hour. With the addition of 37 lots with the R-1 Zoning Alternative, approximately one new student drop-off is anticipated to occur at the NE 195th Street gate in the AM peak hour. Student drop-off trips were accounted for in the R-1 Zoning Alternative project trip distribution and assignment that was used for the LOS analysis. With these additional student drop-off trips assumed, the 156th Avenue NE/NE 195th Street (or 156th Avenue NE/NE 198th Street if the NE 198th Street route was used) intersection would operate at LOS B, with approximately 13 seconds of average vehicle delay for the westbound approach. Based on these results, it appears that the impacts of student drop-offs at the NE 195th Street gate would be minimal with the R-1 Zoning Alternative.

Transit Service

Potential impacts to transit service from the R-1 Zoning Alternative would be similar to those discussed previously for the Proposed Action, although the level of population increase associated with the new development would be substantially less. Consequently, no impacts to area transit service are anticipated from this alternative.

Parking

The parking analysis for the R-1 Zoning Alternative employed the same approach as described previously for the Proposed Action (see Section 3.5.2.8). As for the Proposed Action, garage and private driveway areas would be able to accommodate parking demand for each home with any occasional overflow adequately served by on-street public parking available throughout either development.

3.5.3.2 Attached Housing Alternative

The Attached Housing Alternative would consist of 85 townhouse units on the Wood Trails site and 47 single-family dwelling units on the Montevallo site. Vehicular access to the Wood Trails site would be provided via NE 202nd Street, NE 201st Street, NE 198th Street, and NE 195th Street, while access to the Montevallo site would be provided via two new roadways connecting to 156th Avenue NE, located to the north and south of NE 203rd Place. The site plans for this alternative are provided in Section 2.2.

Project Trip Generation

Trip generation estimates for the Attached Housing Alternative were calculated using the same methods described previously for other alternatives. These results are summarized in Table 3.5-13. For comparison purposes, trip generation estimates with the Proposed Action are included. As shown, the Attached Housing Alternative would generate approximately 1,012 daily trips (559 from Wood Trails, 453 from Montevallo), 74 AM peak-hour trips (45 from Wood Trails, 29 from Montevallo), and 100 PM peak-hour trips (53 from Wood Trails, 47 from Montevallo). These estimates suggest that the Proposed Action would generate approximately 34 percent more daily traffic than the Attached Housing Alternative.

Table 3.5-13
Project Trip Generation, Attached Housing Alternative

Time Period	Proposed Action[1]						Wood Trails Attached Housing Alternative[2]					
	Wood Trails[3]			Montevallo[3]			Wood Trails[4]			Montevallo[3]		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Daily	355	354	709	355	354	709	280	279	559	260	259	519
AM Peak Hour	14	42	56	14	42	56	8	37	45	10	32	42
PM Peak Hour	47	27	74	47	27	74	36	17	53	34	20	54
Less Existing Uses- (5 Single Family Units on Montevallo Site)[5]												
Daily				*(33)*	*(33)*	*(66)*				*(33)*	*(33)*	*(66)*
AM Peak Hour		--		*(3)*	*(10)*	*(13)*		--		*(3)*	*(10)*	*(13)*
PM Peak Hour				*(4)*	*(3)*	*(7)*				*(4)*	*(3)*	*(7)*
Net New Trips												
Daily	355	354	709	322	321	643	280	279	559	227	226	453
AM Peak Hour	14	42	56	11	32	43	8	37	45	7	22	29
PM Peak Hour	47	27	74	43	24	67	36	17	53	30	17	47

1. Proposed Action consists of 66 single-family dwelling units at both Wood Trails and Montevallo.
2. Wood Trails Attached Housing alternative consists of 85 townhome units at Wood Trails, and 47 single-family dwelling units at Montevallo.
3. Institute of Transportation Engineers (ITE) *Trip Generation*- 7th Edition: Land Use #210 (Single-Family Dwelling Unit): Regression Equations.
4. Institute of Transportation Engineers (ITE) *Trip Generation*- 7th Edition: Land Use #230 (Residential Condo/Townhouse): Regression Equations.
5. Credit applied to Montevallo trip generation for removal of five existing single-family dwelling units located on- site.

Project Trip Distribution & Assignment

The distribution of project trips from the Wood Trails Attached Housing alternative was determined by using the same methodology described for the Proposed Action, and is shown in Figure 3.5-5. Project trips were assigned to the roadway network based on this distribution, with the exception that in this alternative, Wood Trails would use all four adjacent roadways (NE 202nd Street, NE 201st Street, NE 198th Street, and NE 195th Street) to gain access to the site. As in the Proposed Action, two new roadways to the north and south of the 156th Avenue NE / NE 203rd Place intersection would be used for access to the Montevallo site. The assignment of project trips at the study intersections with the Attached Housing Alternative is shown in Figures 3.5-11 (A & B). The assigned project trips were then added to the 2008 No Action volumes shown in Table 3.5-17 to calculate the 2008 future volumes with the Attached Housing Alternative, which are shown in Figures 3.5-12 (A & B).

This page left intentionally blank.

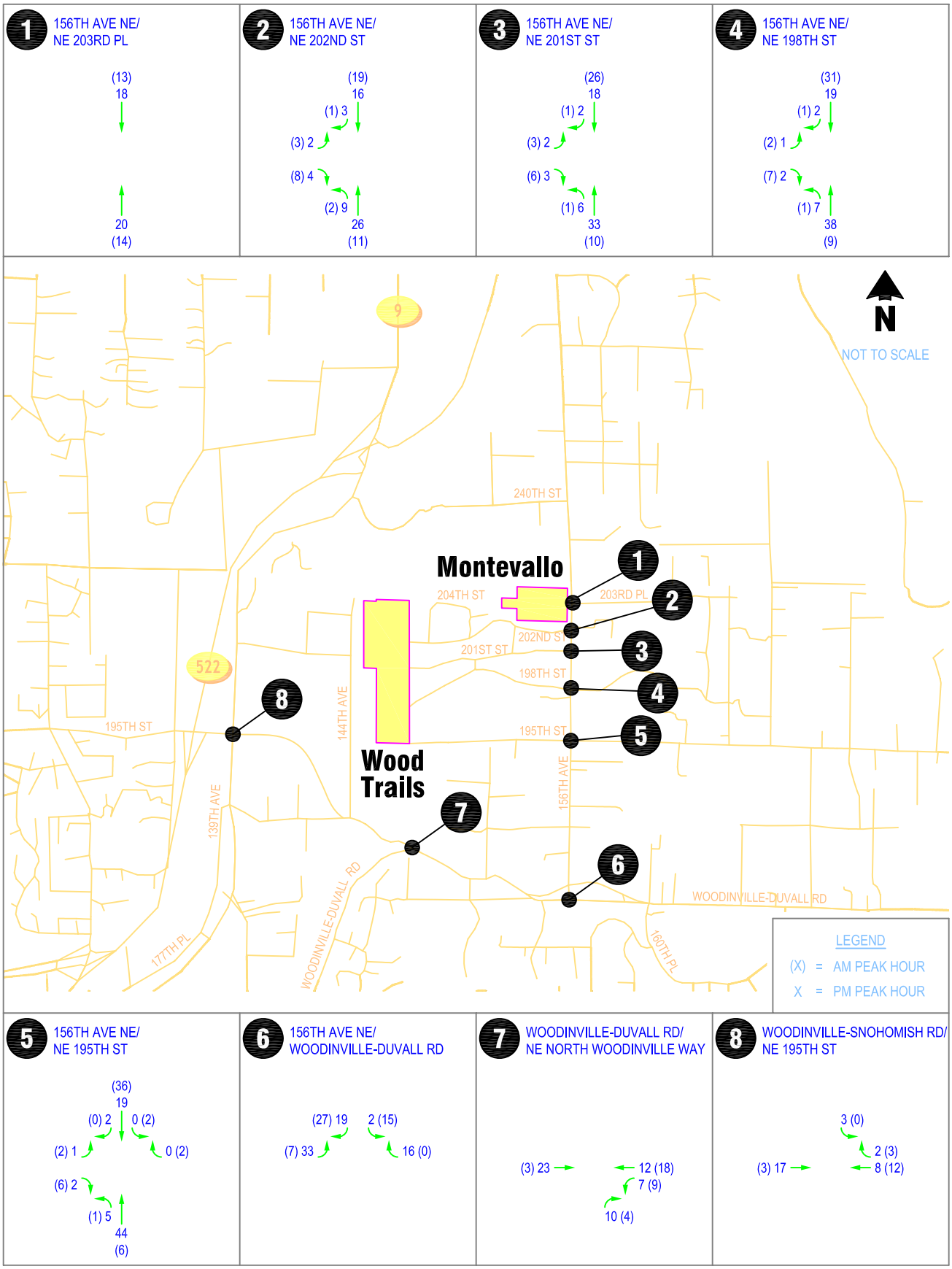


Figure 3.5-11(A)

Project Trip Assignment, Attached Housing Alternative

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

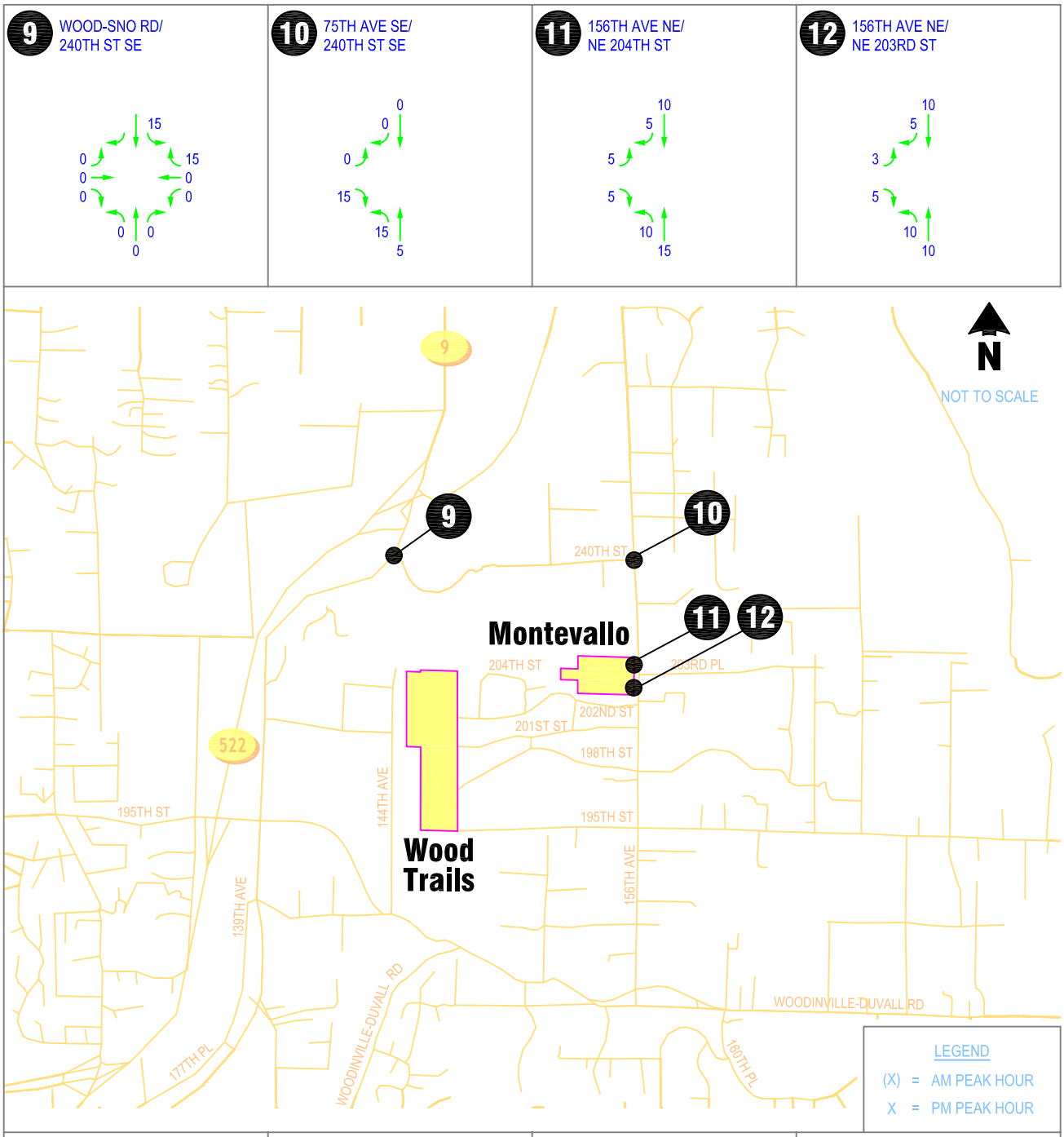


Figure 3.5-11(B)

PM Peak Hour Project Trip Assignment, Attached Housing Alternative

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

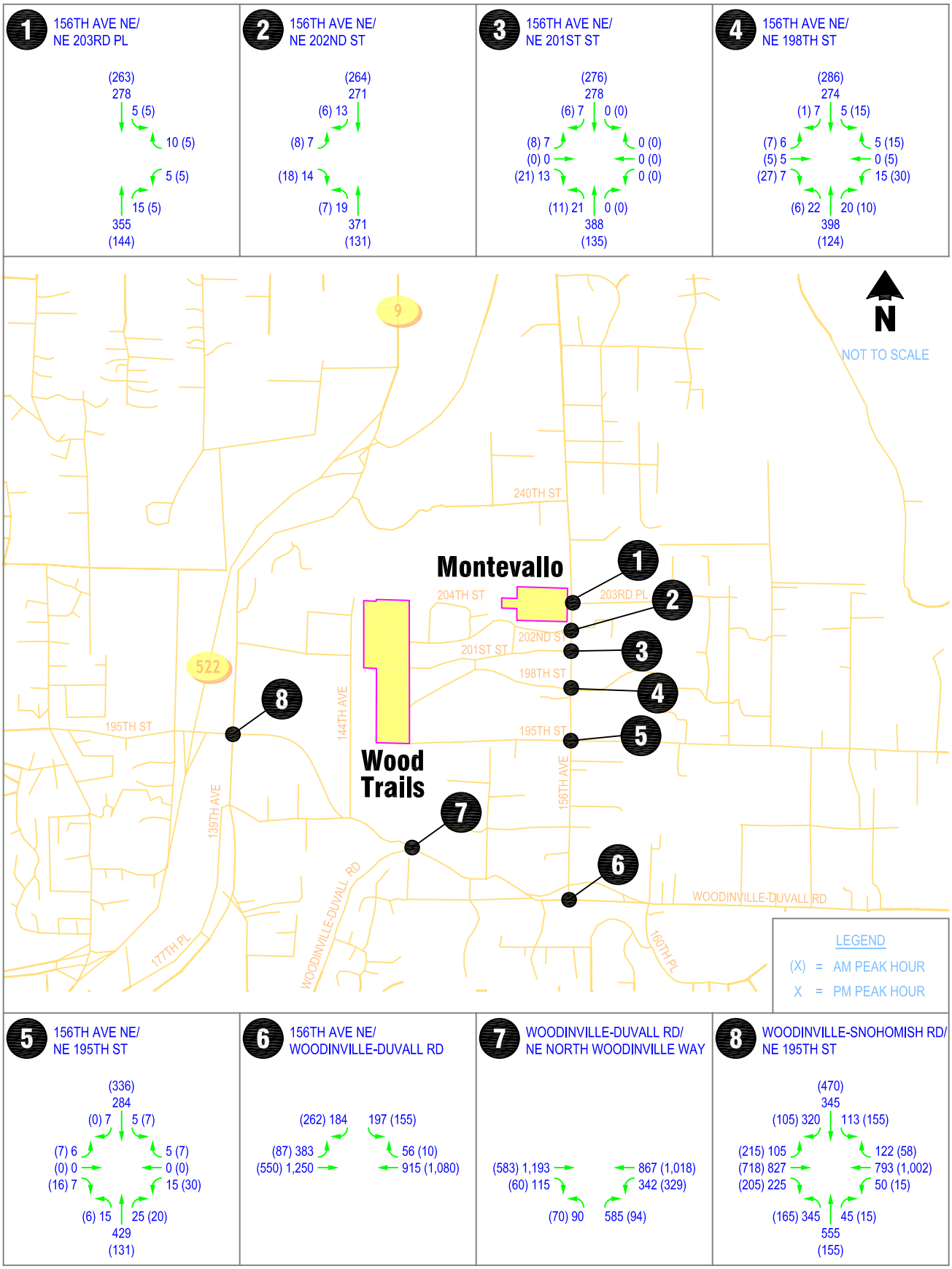


Figure 3.5-12(A)

2008 Future Peak Hour Traffic Volumes, Attached Housing Alternative

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

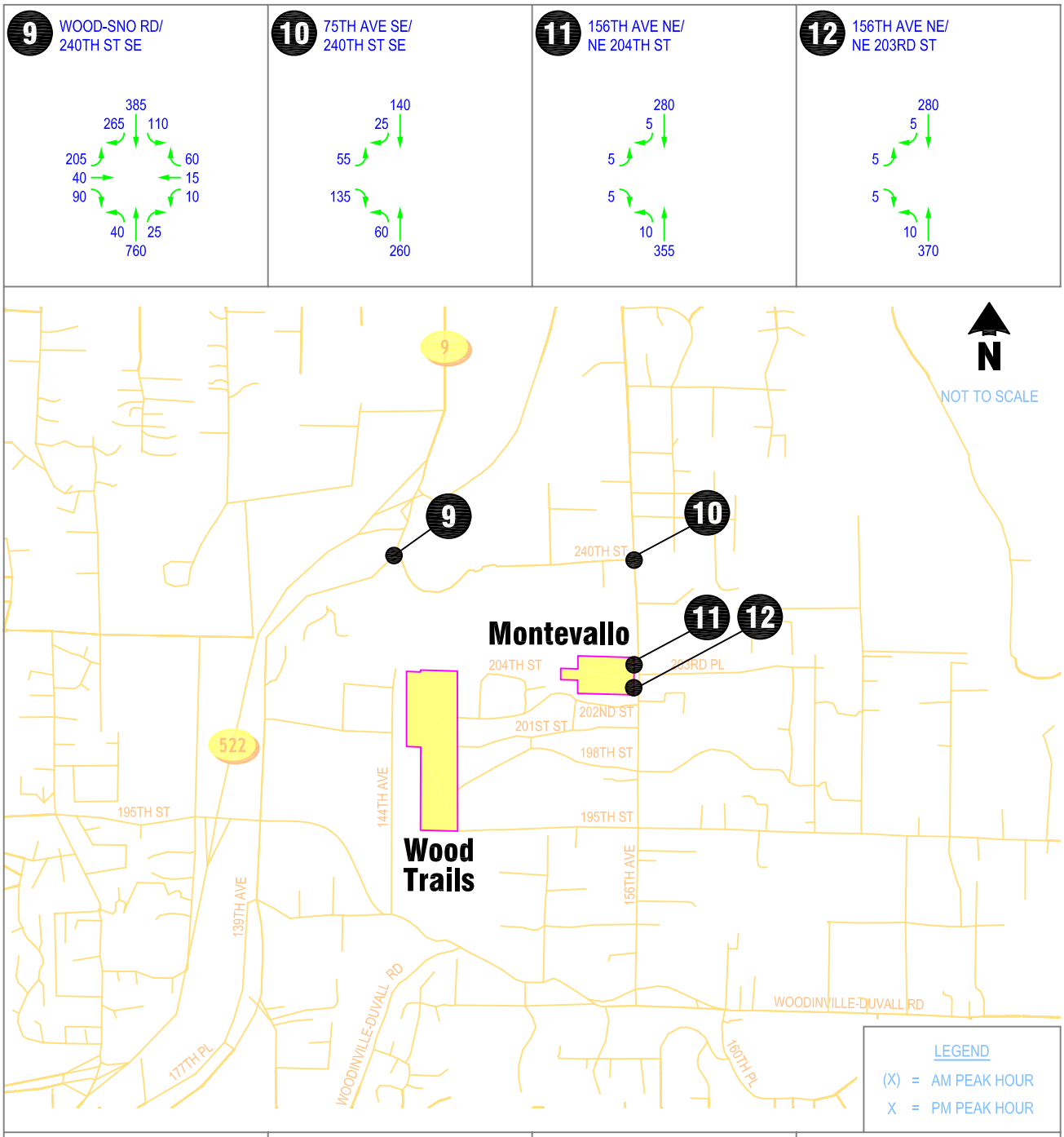


Figure 3.5-12(B)

2008 Future PM Peak Hour Traffic Volumes, Attached Housing Alternative

Wood Trails / Montevallo EIS Analysis

The Transpo Group

Perteet Inc.
425-252-7700 | 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

This page left intentionally blank.

Traffic Operations

Future traffic operations for the Attached Housing Alternative were analyzed using the same assumptions as described previously for other alternatives.

Intersection Level of Service (LOS)

The LOS results for the Attached Housing Alternative are summarized in Table 3.5-14. LOS results from the Proposed Action alternative are included for comparison purposes. Appendix O (Exhibit T-9) provides a summary of LOS results for all alternatives studied.

As shown in Table 3.5-14, all of the study intersections would operate at LOS D or better with the Attached Housing Alternative in both the weekday AM and PM peak hours. These results suggest that the intersections would continue to meet the City's LOS E intersection operating standard, and there would not be significant traffic impacts as measured by LOS. In comparison to the Proposed Action, the Attached Housing Alternative would result in slightly less of a delay at most study intersections, ranging from 0.1 second of average delay to less than 4 seconds per vehicle. In addition, the LOS classification for each intersection under the Attached Housing Alternative is the same as the existing LOS. Given the fluctuation in traffic volumes from day to day, variations in average vehicle delay at the study intersections between the Proposed Action and Attached Housing Alternative would likely go unnoticed by the average motorist.

Table 3.5-14
LOS Summary, Attached Housing Alternative

Weekday AM Peak Hour	2008 with Proposed Action			2008 with Wood Trails Attached Housing Alternative		
	LOS[1]	Delay[2]	WM or V/C[3]	LOS	Delay	WM OR V/C
156th Avenue NE/NE 203rd Place	B	10.3	WB App.	B	10.3	WB App.
156th Avenue NE/NE 202nd Street	B	10.4	EB App.	B	10.4	EB App.
156th Avenue NE/NE 201st Street	B	11.2	EB App.	B	11.0	EB App.
156th Avenue NE/NE 198th Street	B	12.8	WB App.	B	12.4	WB App.
156th Avenue NE/NE 195th Street	B	13.3	WB App.	B	13.4	WB App.
156th Ave NE/NE Woodinville-Duvall Rd	C	24.2	0.85	C	23.9	0.84
NE Woodinville-Duvall Rd/NE Woodinville Way	A	7.1	0.50	A	7.1	0.50
NE Woodinville-Snohomish Rd/NE 195th St	C	33.7	0.95	C	33.6	0.95
156th Avenue NE/NE 204th Street (Montevallo Access)[4]	B	10.3	EB App.	B	10.2	EB App.
156th Avenue NE/NE 203rd Street (Montevallo Access)[4]	B	10.2	EB App.	B	10.2	EB App.
Weekday PM Peak Hour	**2008 with Proposed Action**			**2008 with Wood Trails Attached Housing Alternative**		
	LOS[1]	Delay[2]	WM or V/C[3]	LOS	Delay	WM OR V/C
156th Avenue NE/NE 203rd Place	B	11.9	WB App.	B	11.7	WB App.
156th Avenue NE/NE 202nd Street	B	11.7	EB App.	B	11.7	EB App.
156th Avenue NE/NE 201st Street	B	12.5	EB App.	B	12.1	EB App.
156th Avenue NE/NE 198th Street	C	18.6	WB App.	C	17.4	WB App.
156th Avenue NE/NE 195th Street	C	17.8	WB App.	C	17.4	WB App.
240th Street SE/75th Avenue SE	B	12.7	EB App.	B	12.5	EB App.
156th Ave NE/NE Woodinville-Duvall Rd	D	40.3	1.05	D	37.0	1.03
NE Woodinville-Duvall Rd/NE Woodinville Way	C	35.0	0.95	C	34.3	0.94
NE Woodinville-Snohomish Rd/NE 195th St	D	35.5	0.86	D	35.2	0.86
240th Street SE/Woodinville – Snohomish Road	B	12.0	0.52	B	11.8	0.52
156th Avenue NE/NE 204th Street (Montevallo Access)[4]	B	11.9	EB App.	B	11.9	EB App.
156th Avenue NE/NE 203rd Street (Montevallo Access)[4]	B	12.1	EB App.	B	11.6	EB App.

1. Level of Service.
2. Average vehicle delay (seconds).
3. Worst movement reported at unsignalized intersections; volume to capacity ratio at signalized intersections.
4. New intersection serving as an access to the Montevallo Site in this alternative.

Vehicle Queuing

As for the Proposed Action, a queuing analysis was conducted for the Attached Housing Alternative for the southbound approach at the intersection of 156th Avenue/Woodinville-Duvall Road. The factor determined through the calibration analysis of existing conditions was applied to the future conditions queuing analysis. The existing storage, calibrated queue length with the Attached Housing Alternative and the calibrated queue length with the Proposed Action are all summarized in Table 3.5-15. The AM peak-hour, 95th percentile queues with the Attached Housing Alternative are anticipated to be approximately 5 feet shorter than with the Proposed Action for the southbound left turn, and approximately the same for the southbound right-turn movement.

Table 3.5-15
Vehicle Queuing Summary, Attached Housing Alternative

156th Avenue NE / NE Woodinville-Duvall Rd	Current Storage Capacity[1]	Proposed Action Calibrated Queue Length[2]	Attached Housing Alt. Calibrated Queue Length[2]
Southbound Left	170'	210'	205'
Southbound Right	N/A[3]	170'	170'

1. Estimated storage capacity of current lane, including center turn lane. (feet)
2. 95th percentile queue length from *Synchro* after calibration based on existing observations of 95th-percentile queues. (See Appendix T-3)
3. Southbound travel lane of 156th Avenue NE becomes the southbound right turn lane; queue storage capacity extends thousands of feet to the north of the intersection.

As noted for the Proposed Action, the baseline-condition queue length is estimated to be approximately 180 feet for the southbound left-turn movement. This queue length would exceed the storage provided and extend back into the through lane. Also as discussed previously, this condition would be rare and would likely occur only 5 percent of the time, or for 2 out of 40 signal cycles.

As also noted for the Proposed Action, the baseline-condition queue length for the eastbound left-turn movement at 156th Avenue NE/Woodinville-Duval Road exceeds the available storage length by one vehicle. The incremental impact of the Attached Housing Alternative on this baseline deficiency would be two additional vehicles.

Roadway Volume/Capacity Conditions

The future ADT with the Attached Housing Alternative along the potential access roadways for the Wood Trails townhouse development were estimated based on the PM peak-hour turning movement counts conducted at the respective intersections with 156th Avenue NE. The estimated existing ADT for the four roadways that could access the Wood Trails site under this alternative are summarized in Table 3.5-16. ADT for the Proposed Action are included in the table for comparison purposes.

Table 3.5-16
Roadway Volume/Capacity Summary, Attached Housing Alternative

Roadway	Proposed Action ADT[1]	Wood Trails Attached Housing Alternative ADT[1]	Estimated Capacity[2]	Livability Criterion[3]
NE 202nd Street	350	530	7,400	1,000
NE 201st Street	740	480	7,400	1,000
NE 198th Street	700	470	7,400	1,000
NE 195th Street	250	350	7,400	1,000

1. Average daily traffic (ADT); estimated as being ten times the PM peak hour volume on the roadway.
2. Estimated ADT link capacity, as developed by King County.
3. Per Appleyard 1981.

These results suggest that the Attached Housing Alternative would result in more daily traffic on NE 202nd Street and NE 195th Street than with the Proposed Action, and less daily traffic on NE 201st Street and NE 198th Street, due to the differences in access plans. Regardless, adequate capacity would remain on all four roadways, based on the estimated King County link capacities. Furthermore, the proposal would result in traffic volumes ranging from 35 percent to 53 percent of the general "livability" criterion.

Left-Turn Lane Warrants

Left-turn lane warrants were evaluated at all of the study intersections along NE 156th Street, following the approach described previously. Based on this analysis, it was determined that none of the study intersections along 156th Avenue NE would warrant a left-turn lane with the 2008 Attached Housing Alternative conditions.

Pedestrian/Non-Motorized Facilities

Vehicular access to the Wood Trails site with the Attached Housing Alternative would be via NE 202nd Street, NE 201st Street, NE 198th Street and NE 195th Street. As noted previously, of the four roadways adjacent to the Wood Trails site, NE 201st Street and NE 198th Street have the most favorable pedestrian facilities, including wider roadway shoulders and more contiguous portions of sizeable roadway shoulders. Under the Attached Housing Alternative, pedestrian traffic would be more likely to utilize the less-desirable pedestrian roadways (NE 202nd Street and NE 195th Street). Pedestrian activity was observed to be the highest along NE 202nd Street during both the AM and PM time periods observed; this roadway would experience a greater traffic increase under the Attached Housing Alternative.

Similar impacts to school walking routes and school bus stops noted for the Proposed Action could be anticipated with the Attached Housing Alternative, but to a slightly lesser degree due to the smaller amount of traffic generated under this alternative. However, under this alternative the Wood Trails development would also utilize NE 202nd Street and NE 195th Street, both of which have less desirable shoulder width conditions than NE 201st Street and NE 198th Street. Providing vehicular access to these streets for Wood Trails may necessitate some degree of enhancement to the roadway along NE 202nd Street and NE 195th Street with the Attached Housing Alternative. Sight distance is an unavoidable significant adverse impact on NE 198th Street and NE 201st Street, though perhaps slightly less than the Proposed Action.

As discussed for the Proposed Action, the Attached Housing Alternative would not have significant impacts on bicycle use.

Traffic Safety

Increases in traffic volumes due to the addition of project traffic could create a proportionate increase in traffic collisions. However, no existing safety deficiency has been identified through accident records that would be exacerbated by the Attached Housing Alternative.

NE 195th/NE 198th Street- Student Drop-Off Activity

With the addition of 132 homes under the Attached Housing Alternative, approximately four new student drop-offs are anticipated to occur at the NE 195th Street gate in the AM peak hour. These trips were accounted for in the Attached Housing Alternative project trip distribution and assignment that was used for the LOS analysis. With these additional student drop-off trips assumed, the 156th Avenue NE/NE 195th Street intersection would operate at LOS B, with approximately 13 seconds of average vehicle delay for the westbound approach. If the NE 198th Street route was used to the 156th Avenue NE/NE 198th Street intersection, it would operate at LOS B, with approximately 13 seconds of average delay for the westbound approach. Based on these results, it appears that the impacts of student drop-offs at the NE 195th Street gate would be minimal with the Attached Housing Alternative.

Transit Service

Potential impacts to transit services from the Attached Housing Alternative would be essentially the same as those for the Proposed Action; no impacts to area transit services are anticipated from this alternative.

Parking

As discussed for the other alternatives, under the Attached Housing Alternative garage and private driveway areas would be able to accommodate parking demand for each home, with any occasional overflow adequately served by on-street public parking available throughout either development.

3.5.3.3 No Action Alternative

The No Action alternative represents a case of no new development on either site for the foreseeable future. Future traffic volumes would be as noted previously, as the baseline condition, which would reflect existing conditions and background growth in the local area.

Trip Generation

No increase in traffic volumes, beyond the background traffic growth and pipeline projects, would occur under this alternative. No Action (future baseline) traffic volumes for the AM and PM peak hour conditions were shown previously in Figures 3.5-7 (A & B).

Trip Distribution & Assignment

Because no development is assumed in the No Action Alternative, there are no project-related trips to distribute or assign to the roadway network.

Traffic Operations

Future, without-project traffic operations at the study intersections were analyzed using the same assumptions as in existing conditions. Traffic operations evaluated for the No Action Alternative include intersection LOS, vehicle queuing, roadway volume to capacity and turn-lane warrants.

Intersection Level of Service (LOS)

Intersection LOS results were calculated using the same methodology discussed for the existing conditions analysis (see Section 3.5.1). However, traffic signal timing splits were optimized at each of the signalized study intersections to account for changes in future signal operations that would occur as a result of normal operations and/or maintenance of the system. The resulting 2008 No Action LOS results are summarized in Table 3.5-17. LOS results from existing conditions are included for comparison purposes. Under the No Action Alternative all of the study intersections (overall or worst movement) are anticipated to continue to operate at LOS C or better in 2008, during both the weekday AM and PM peak hours. Based on these results, the City's intersection LOS E standard would continue to be met at all study intersections with the No Action Alternative.

Table 3.5-17
LOS Summary, 2008 No Action Alternative

	Existing Conditions			2008 No Action Conditions		
Weekday AM Peak Hour	**LOS[1]**	**Delay[2]**	**WM or V/C[3]**	**LOS**	**Delay**	**WM OR V/C**
156th Avenue NE/NE 203rd Place	A	9.9	WB App.	B	10.1	WB App.
156th Avenue NE/NE 202nd Street	B	10.0	EB App.	B	10.2	EB App.
156th Avenue NE/NE 201st Street	B	10.4	EB App.	B	10.6	EB App.
156th Avenue NE/NE 198th Street	B	11.5	WB App.	B	11.8	WB App.
156th Avenue NE/NE 195th Street	B	12.3	WB App.	B	12.8	WB App.
156th Ave NE/NE Woodinville-Duvall Rd	B	18.6	0.78	C	22.6	0.82
NE Woodinville-Duvall Rd/NE Woodinville Way	A	6.8	0.43	A	7.1	0.48
NE Woodinville-Snohomish Rd/NE 195th St	C	22.7	0.77	C	33.3	0.95
	Existing Conditions			**2008 No Action Conditions**		
Weekday PM Peak Hour	**LOS[1]**	**Delay[2]**	**WM or V/C[3]**	**LOS**	**Delay**	**WM OR V/C**
156th Avenue NE/NE 203rd Place	B	11.3	WB App.	B	11.4	WB App.
156th Avenue NE/NE 202nd Street	B	10.7	EB App.	B	11.2	EB App.
156th Avenue NE/NE 201st Street	B	10.9	EB App.	B	11.5	EB App.
156th Avenue NE/NE 198th Street	B	14.4	WB App.	C	15.8	WB App.
156th Avenue NE/NE 195th Street	B	14.5	WB App.	C	15.9	WB App.
240th Street SE/75th Avenue SE	B	11.5	EB App.	B	12.2	EB App.
156th Ave NE/NE Woodinville-Duvall Rd	C	20.3	0.87	C	31.3	0.95
NE Woodinville-Duvall Rd/NE Woodinville Way		26.8	0.78	C	32.8	0.92
NE Woodinville-Snohomish Rd/NE 195th St	C	25.4	0.79	C	34.6	0.86
240th Street SE/Woodinville – Snohomish Road	B	11.0	0.45	B	11.5	0.51

1. Level of Service.
2. Average vehicle delay (seconds).
3. Worst movement reported at unsignalized intersections; volume to capacity ratio at signalized intersections.

Vehicle Queuing

A queuing analysis was conducted for the southbound approach at the intersection of 156th Avenue/Woodinville-Duvall Road during the AM peak hour because this will continue to be the time where southbound queues are the longest. The factor determined through the calibration analysis of

existing conditions was applied to the future-conditions queuing analysis. The calibrated queue length and existing storage are summarized in Table 3.5-18. Under the 2008 No Action conditions, the calibrated 95th percentile queues for the southbound left- and right-turn movements are anticipated to increase by approximately 10 to 15 feet. These results suggest that the queue length for the southbound left turn will exceed the available storage by approximately one vehicle during the weekday AM peak hour traffic conditions.

Table 3.5-18
Vehicle Queuing Summary, No Action Alternative

156th Avenue NE / NE Woodinville-Duvall Rd	Current Storage Capacity[1]	Existing Calibrated Queue Length[2]	No Action Calibrated Queue Length[2]
Southbound Left	170'	175'	190'
Southbound Right	N/A	140'	150'

1. Estimated storage capacity of current lane, including center turn lane. (feet)
2. Existing 95th percentile queue length from *Synchro* after calibration based on existing observations of 95th percentile queues and average vehicle length/spacing. (See Appendix T-3)
3. Southbound travel lane of 156th Avenue NE becomes the southbound right turn lane; queue storage capacity extends thousands of feet to the north of the intersection.

As also noted for the Proposed Action, the baseline-condition queue length for the eastbound left turn movement at 156th Avenue NE/Woodinville-Duval Road exceeds the available storage length by one additional vehicle.

Roadway Volume/Capacity Conditions

Future average daily traffic with the No Action Alternative along the potential access roadways for the Wood Trails development were estimated based on the projected weekday PM peak hour traffic volumes at their respective intersections with 156th Avenue NE. Estimated link capacities developed by King County (provided in Appendix K) indicate an ADT roadway capacity of 7,400 vehicles and a potential livability criterion around 1,000 vehicles a day. Estimated ADT for existing and 2008 No Action conditions are provided in Table 3.5-19. The estimated future ADT in the No Action condition for NE 202nd Street, NE 201st Street, NE 198th Street, and NE 195th Street (to the west of 156th Avenue NE) remains at approximately the same ADT as in existing conditions. This is due to the minimal growth, if any, anticipated on these residential roadways in No Action conditions. This analysis shows that current and future No Action level of roadway use would remain well below roadway capacity, and also well below the guidelines for "livability" commonly used in transportation planning.

Table 3.5-19
Roadway Volume/Capacity Summary, No Action Alternative

Roadway	Existing ADT[1]	2008 No Action ADT	Estimated Capacity[2]	Livability Criterion[3]
NE 202nd Street	350	350	7,400	1,000
NE 201st Street	350	350	7,400	1,000
NE 198th Street	350	350	7,400	1,000
NE 195th Street	250	250	7,400	1,000

1. Average daily traffic (ADT); estimated as being ten times the PM peak hour volume on the roadway.
2. Estimated ADT link capacity, as developed by King County.
3. Per Appleyard 1981.

Left-Turn Lane Warrants

Left-turn lane warrants were evaluated for northbound traffic at all of the study intersections along NE 156th Street, using the methods described previously. Based on this analysis, it was determined that none of the study intersections warrant a left-turn lane under the 2008 No Action condition.

Pedestrian/Non-Motorized Facilities

Minimal impacts to the existing pedestrian and non-motorized facilities would be anticipated to occur with the No Action alternative, due to slight increases in traffic growth in the area. Furthermore, no changes to potential school walking routes or bus stop locations are anticipated to occur in the future in No Action conditions.

Transit Service

No impacts to area transit routes and services would be anticipated to occur with the No Action Alternative.

Traffic Safety

Future increases in baseline traffic volumes could create a proportionate increase in traffic collisions.

NE 195th/NE 198th Street- Student Drop-Off Activity

No changes to the pattern of student drop-offs at the NE 195th Street gate are anticipated to occur with the No Action Alternative.

Parking

No substantial change to the existing private or public parking supply is anticipated to occur in No Action conditions.

3.5.4 Secondary and Cumulative Impacts

The nature of the standard approach for analyzing the transportation impacts of development projects is such that direct, indirect/secondary and cumulative impacts are incorporated into the analysis and results. The results, documented previously in Section 3.5, identify potential impacts throughout the affected network of streets and other applicable transportation routes and thereby address indirect impacts (impacts that would occur off-site and/or later in time). Similarly, because the analysis is based upon a detailed forecast of future trip volumes, without-project traffic conditions, (that include the effects on baseline growth and traffic from other development projects already in the pipeline), cumulative impacts are accounted for in the analysis. Consequently, there are no secondary or cumulative transportation impacts that can be separately distinguished for the Proposed Action or the development alternatives.

3.5.5 Mitigation Measures

Any of the development alternatives would require mitigation for impacts to roadways and other facilities caused by construction activities. These measures typically include designation of construction traffic routes, traffic control plans and restoration of damaged roads to pre-project conditions. Mitigation measures for construction impacts are typically addressed during City review of construction plans, and are incorporated into the terms of the haul route agreement and/or heavy hauling permit for a development project.

3.5.5.1 Proposed Action

The traffic impact analysis for the Proposed Action identified sight distance as an unavoidable significant adverse impact and the following mitigation measures shall be applied:

1) Provide traffic calming devices in the impacted portions of NE 198th Street and NE 201st Street as per City of Woodinville requirements.
2) Install lane delineation features in the impacted portions of NE 198th Street and NE 201st Street as per City of Woodinville requirements.
3) For the streets of NE 195th and NE 202nd, if access is not restricted from the new development on to these two street (proposed to use bollards), then an acceptable mitigation measure to address the identified sight distance conditions shall be utilized as approved by the City of Woodinville Public Works Department.

The applicant is required to pay a transportation impact fee for each home constructed. These impact fees are collected to help pay for projects currently listed on the City's Capital Improvement Program. The total impact fee payment estimated for the Proposed Action, based on the City's current fee rate, is approximately $409,000. The actual fee payment would be different if the City revised the fee rate prior to the issuance of building permits.

3.5.5.2 R-1 Zoning Alternative

The traffic impact analysis for the Proposed Action identified sight distance as an unavoidable significant adverse impact on all four of the existing local residential road located between the site and 156th Avenue NE. To address the sight distance condition the following mitigation measures shall be applied:

1) Provide traffic calming devices in the impacted portions of NE 198th Street and NE 201st as per City of Woodinville requirements.
2) Install lane delineation features in the impacted portions of NE 198th Street and NE 201st Street as per City of Woodinville requirements.
3) For the streets of NE 195th and NE 202nd, if access is not restricted from the new development on to these two street (proposed to use bollards), then an acceptable mitigation measure to address the identified sight distance conditions shall be utilized as approved by the City of Woodinville Public Works Department.

There is inadequate sight distance at that location. Due to the increase in vehicles that would occur under this alternative, general improvements to this roadway are recommended. These improvements could include widening the roadway to a minimum width of 24 feet, along with the gravel or paved shoulders of 5 to 6 feet. The transportation impact fees associated with the R-1 Zoning Alternative, based on the City's current fee rate, would amount to approximately $115,000.

3.5.5.3 Attached Housing Alternative

The traffic impact analysis for the Proposed Action identified site distance as an unavoidable significant adverse impact and the following mitigation measures shall be applied:

1) Provide traffic calming devices in the impacted portions of NE 198th Street and NE 201st Street as per City of Woodinville requirements.
2) Install lane delineation features in the impacted portions of NE 198th Street and NE 201st Street as per City of Woodinville requirements.
3) For the streets of NE 195th and NE 202nd, if access is not restricted from the new development on to these two street (proposed to use bollards), then an acceptable mitigation measure to address

the identified sight distance conditions shall be utilized as approved by the City of Woodinville Public Works Department.

As noted above for the R-1 Zoning Alternative, general improvements to a small section of NE 195th Street approaching the Wood Trails site are recommended. These improvements could include widening the roadway to a minimum width of 24 feet, along with the gravel or paved shoulders of 5 to 6 feet. Per City of Woodinville guidelines, the applicant is required to pay an impact fee for each home constructed. The transportation impact fees associated with the Attached Housing Alternative, based on the City's current fee rate, would amount to approximately $281,000.

3.5.5.4 No Action Alternative

No significant traffic-related impacts would be likely to occur under the No Action Alternative, and no traffic mitigation measures are identified.

3.5.6 Significant Unavoidable Adverse Impacts

Any of the development alternatives would cause construction-related impacts to the local road system and traffic conditions. Because these impacts would be highly localized and temporary and road damages would be repaired, these short-term impacts would be insignificant. Any of the development alternatives would also generate an unavoidable increase in traffic on local streets near the sites of the proposed subdivisions. While the level of increased traffic would vary considerably among the alternatives, the analysis indicated that none of the alternatives would generate sufficient additional traffic or changes in traffic patterns to cause significant impacts to the existing level of service at study-area intersections, based on the City's LOS standard. Similarly, the incremental traffic increases generated by the alternatives would represent insignificant impacts to other aspects of traffic operations, traffic safety, pedestrian activity and other transportation facilities or uses.