Future Conditions
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This section describes the future transportation environment of the UW Tacoma campus and surrounding area. A description of the future conditions on campus in terms of the street system, traffic and intersection operation, parking, transit and non-motorized travel is the key focus.

Travel Forecast

The City of Tacoma will continue to rapidly change. Efforts to revitalize downtown will provide new opportunities for housing and jobs throughout the City. Understanding the future nature and volume of traffic in the study area makes it possible to identify transportation issues and to suggest appropriate facility improvements. Starting with the City of Tacoma/Pierce County traffic forecasting model, the analysis refined the model to the study area to forecast the future traffic volumes on area streets.

In the vicinity of the UW Tacoma Campus, the model assumes a high level of growth in households and employment. Table 1 shows the projected growth in employment and households within a one mile radius of campus.

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2030</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>8,881</td>
<td>17,975</td>
<td>9,094</td>
</tr>
<tr>
<td>Households</td>
<td>18,990</td>
<td>31,936</td>
<td>12,946</td>
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</table>

Source: City of Tacoma/Pierce County Traffic Forecasting Model

Table 1. Change in Employment and Households within 1 mile of UW Tacoma

Within one mile of campus, there will be double the number of jobs and an increase of nearly 13,000 new households by 2030. Appendix B describes the procedures used in the development of the forecast model for this analysis.

No Action Alternative

The 2030 No Action alternative provides a baseline for comparison – a look at the transportation system assuming that the UW Tacoma campus stays the same size, while allowing for growth in the population and employment in the City and region. Under the No Action alternative, the existing street network would remain the same.

Campus Alternatives

The Campus Master Plan Update plans for denser mixed-use development, attracting students and creating a hub of activity that would, in turn, support the development of housing, retail, and jobs in the surrounding neighborhoods. This would result in a shift from a solely commuter-oriented student body to a growing locally-based student body, where students would be able to live, work, and study near campus.

Student enrollment is anticipated to grow to 10,000 FTEs or more. Two alternatives were explored to study the future transportation environment as a result of the Campus Master Plan Update:
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- Alternative 1 includes 10,000 full time equivalent (FTE) students and on-campus housing accommodating 1,261 beds on-campus. This alternative will also include a sports field.
- Alternative 2 includes 12,000 FTE students and on-campus housing accommodating 1,513 beds.

Proposed Changes to the Transportation System

These two alternatives would change the street network to provide additional opportunities for transit users, pedestrians and bicyclists on campus. Figure 11 shows how the future development would affect the transportation system, including:

Market Street Transit Corridor
This street would become a transit-focused transportation corridor, emphasizing the movement of transit and pedestrian activity while allowing the continued movement of vehicles. The analysis anticipates that existing or expanded transit service would use Market Street, potentially relieving pressure on Pacific Avenue. Traffic calming features and a high level of pedestrian amenities would be included on Market Street to enhance pedestrian connections to transit along this corridor and access across Market Street.

S 19th Street Pedestrian Corridor
S 19th Street between Fawcett Avenue and Jefferson Avenue would become the backbone of an east/west pedestrian corridor that would connect the academic, student life and housing to the remainder of campus.

Trail Development
As part of the vision of the UW Tacoma and the City of Tacoma’s downtown plans, the existing Prairie Line rail alignment would be converted to a multi-purpose trail connecting the campus to downtown and the waterfront areas to the north with adjacent neighborhoods to the south.

Fawcett Avenue Bicycle Corridor
The City of Tacoma’s Downtown Plan has identified Fawcett Avenue as a potential bicycle corridor, which would connect the University to the St. Helen’s residential neighborhood, the downtown commercial core and the Brewery District. The plan envisions striped bicycle lanes, or a bicycle boulevard with shared bicycle lanes and traffic-calming measures.

Streetscape Improvements
Streets, such as S 17th Street, Fawcett Avenue, Market Street and Jefferson Avenue, would be redesigned to include elements such as widened sidewalks, street trees, pedestrian crossings, curb bulb-outs, and improved lighting to improve pedestrian comfort and safety on campus. Streetscape improvements would also be designed with traffic-calming features to reduce the number and speed of vehicles traveling through campus.

Parking Access
S 17th Street, S 19th Street (west of Fawcett Avenue) and Fawcett Avenue would see an increase in traffic from the construction of on-campus parking garages for resident, faculty and commuter parking. Parking would be strongly discouraged and would be priced to make alternative commute modes attractive. The proposed master plan would access these structures using Court C, Court D and Court E as the primary access points for entering and exiting vehicles.
Figure 11. Master Plan Development Plan – Transportation Elements
Vehicle Trip Generation
Trip generation is defined as the number of vehicle trips generated by a particular use, during a specified time period, within the context of its surrounding environment. In suburban areas, a standard rate might be applied to estimate the number of vehicle trips such as those found in the Institute of Traffic Engineer’s (ITE) Trip Generation Manual. In diverse urban environments, where the land use and transportation systems are developed, the rate of trip generation is affected by factors such as the density of development, the diversity of the mix of land uses, streetscape design and connectivity, distance to transit, and the accessibility of destinations – the 5 Ds. These five factors have a strong influence on the number of users who walk or use transit that ultimately affects the number of students, staff and faculty that drive and park on campus. The trip generation for the 2030 forecast assumes that the future development of the campus and surrounding areas will strongly reflect the 5 Ds characteristics.

To estimate the future trip generation for the UW Tacoma, the analysis used travel data from the UW Seattle Campus, the University of California, and the Winter Quarter 2008 survey of students at UW Tacoma campus. The UW Seattle and the University of California datasets provided strong indicators of travel and housing patterns and their effects on the way students choose to commute to campus.

Distribution of Student Housing
Students who live closer to campus are more likely to walk and less likely to drive. Data from the UW Seattle campus was used to approximate the percentage of students who would live within a given distance from campus. On-campus residents were considered separately. Figure 12 shows the distribution of student residences by distance.

Auto Trips by Distance
Travel data from the University of California was used to estimate the likelihood of auto use related to the distance living from campus. This factor was used in conjunction with the distribution of student housing to estimate student trips by auto. Using the same data set, the percentage of students carpooling was subtracted from the total trip profile to arrive at the total number of daily vehicle trips. The line in Figure 13 shows the percentage of ridesharing by distance.

Figure 12. Assumed Student Residences by Distances
Future Conditions

Figure 13. Assumed Vehicle Use and Ridesharing by Distance

Source: University of California, UC Davis Campus Travel Assessment 2007

Table 2. Summary of Trip Generation

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1</th>
<th></th>
<th>Alternative 2</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Entering Trips</td>
<td>Exiting Trips</td>
<td>Total Trips</td>
<td>Entering Trips</td>
</tr>
<tr>
<td>AM Peak Hour</td>
<td>1,330</td>
<td>148</td>
<td>1,478</td>
<td>1,596</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>540</td>
<td>1,669</td>
<td>2,209</td>
<td>648</td>
</tr>
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</table>

Table 3. Comparison of Trip Generation Rates

<table>
<thead>
<tr>
<th></th>
<th>Assumed UW Tacoma Trip Generation Rate/ Student</th>
<th>UW Seattle Trip Generation Rate</th>
<th>ITE Trip Generation Rate (Average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Peak Hour</td>
<td>0.12</td>
<td>0.11</td>
<td>0.21</td>
</tr>
<tr>
<td>PM Peak Hour</td>
<td>0.18</td>
<td>0.11</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Sources: UW Seattle data calculated from University of Washington Annual Traffic Count: 2007 Data Collection Summary. ITE data from Institute of Transportation Engineers Trip Generation (7th Edition).
Trip Generation Calculation
For each alternative, the data above was used to estimate the number of daily trips for students. An estimate of faculty, staff and visitor trips were then added to arrive at the total daily trips. These trips were reduced by data on daily attendance (not all students are on campus everyday) and factored to arrive at AM and PM peak hour. Table 2 summarizes the trip generation estimate for Alternative 1 (10,000 FTE students) and Alternative 2 (12,000 FTE students). Table 3 shows a comparison of the trip generation rate used for the UW Tacoma analysis with the national averages found in the ITE Trip Generation Manual. The calculated UW Tacoma rate falls between the UW Seattle rate and the ITE rate, reflecting the strong transit orientation and urban character assumed in the analysis.

2030 Traffic Forecast
The City of Tacoma traffic forecasting model was used to estimate the future traffic levels without and with the Campus Master Plan Update alternatives. The No Action alternative assumed no campus growth, but assumed the 2030 employment and population growth from the City’s model. For Alternatives 1 and 2, the same overall model employment and population assumptions were used, with the addition of the proposed UW Tacoma growth to either 10,000 or 12,000 students. Using the model, the analysis applied the trip generation estimates for each alternative to develop future traffic forecasts for the AM and PM peak hour.

For Alternatives 1 and 2, the model analysis considered the proposed elements of the Campus Master Plan Update such as the location of proposed parking facilities, the Market Street transit corridor, and the S 19th Street pedestrian corridor to provide an understanding of the changes in travel patterns that might occur with each alternative.

Traffic Volumes and Intersection Operations
The increase of students and changes to land uses in the area would impact travel patterns and intersection operation near the UW Tacoma Campus. The 2030 analysis estimates the traffic conditions for the AM and PM peak commute hours for the baseline and the two alternatives.

AM Peak Hour Traffic (2030)
The future AM peak hour volumes reflect the re-development of downtown Tacoma and the changes expected for the UW Tacoma student population in 2030. To show the impact of the campus development on area roadways, the analysis compares the No Action with the two UW Tacoma Campus Master Plan Update land use alternatives. Figures 14, 15 and 16 show the peak hour operation of the area roadways and intersections during the morning commute. Appendix C summarizes the results of the analysis of the AM peak hour intersection operations.
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No Action
The No Action alternative represents the growth in area traffic assuming that the UW Campus remains largely unchanged, with the same student population as today. This analysis also assumes that the roadway network within and surrounding the UW campus would remain the same. Traffic patterns would remain similar to existing patterns, but volumes would increase on S 19th Street, S 21st Street, Market Street, Pacific Avenue and Tacoma Avenue, operating in excess of 750 vehicles per hour during the morning commute. Most area intersections would experience increased congestion, including Pacific Avenue/S 21st Street and Tacoma Avenue/S 21st Street.

The intersection of Fawcett Avenue/S 19th Street, Tacoma Avenue/S 21st Street, C Street/S 21st Street and Pacific Avenue/S 21 Street would all experience long to very long delays during the AM peak hour.

Alternative 1
Expanding the campus to 10,000 students would result in additional traffic during the AM peak hour. The Campus Master Plan Update would change S 19th Street between Market Street and Fawcett Avenue to a pedestrian corridor and would make Market Street primarily a transit corridor.

As compared to the No Action network, the analysis shows that under Alternative 1 traffic volumes would decrease on Market Street and S 19th Street and increase on external (outside of campus) corridors such as Pacific Avenue, Tacoma Avenue and S 21st Street.

During the morning commute peak hour, most intersections would be uncongested except for the Tacoma Avenue, Fawcett Avenue and Pacific Avenue intersections on S 21st Street and the Tacoma Avenue and Market Street intersections on S 17th Street.

Alternative 2
Alternative 2 would expand the campus to 12,000 students, and would have similar traffic results as Alternative 1 for the AM peak hour, except for the two intersections on S 17th Street, which would experience extreme delays.
Figure 14. Future (2030) AM Peak Hour Traffic – No Action
Figure 15. Future (2030) AM Peak Hour Traffic – Alternative 1
Figure 16. Future (2030) AM Peak Hour Traffic – Alternative 2
Future Conditions

**PM Peak Hour Traffic**

Like the AM analysis, the future PM peak hour volumes reflect the re-development of downtown Tacoma and the expected changes in the student population in 2030. The analysis compares the No Action conditions, with the two UW Tacoma Campus Master Plan Update land use alternatives to show the impact of the campus development on area roadways during the peak hour of the evening commute. **Figures 17, 18 and 19** show the PM peak hour operations on the area roadways and intersections during the evening commute. **Appendix D** summarizes the results of the analysis of the PM peak hour intersection operations.

**No Action**

The No Action alternative shows the growth in area traffic assuming that the UW Campus remains largely unchanged with the same student population as today. The analysis assumes that the roadway network within and surrounding the UW campus would also remain unchanged. Traffic patterns would remain similar to existing patterns, but volumes would increase on S 19th Street, S 21st Street, Market Street, Pacific Avenue and Tacoma Avenue, operating in excess of 1,000 vehicles per hour during the PM Peak Hour.

Congestion would substantially increase at the following intersections: S 19th Street, S 21st Street, Market Street, Pacific Avenue and Tacoma Avenue, S 21st Street/Fawcett Avenue, S 21st Street/C Street, S 21st Street/Commerce Street and S 25th Street/C Street.

**Alternative 1**

Expanding the campus to 10,000 students in 2030 would result in additional traffic during the PM peak hour. Compared to the No Action network, the analysis showed that Alternative 1 would decrease traffic on the Market Street transit corridor and increase traffic volumes on parallel corridors such as Pacific Avenue and Tacoma Avenue. Ten intersections would experience high levels of congestion. Those experiencing extreme delays include: 17th Street/Fawcett Avenue, S 21st Street/Tacoma Avenue, S 21st Street/Fawcett Avenue, S 21st Street/Court D, S 25th Street/C Street and S 21st Street/Pacific Avenue.

**Alternative 2**

The traffic results of Alternative 2, that expands the campus to 12,000 students, would be similar to Alternative 1 during the PM peak hour. Ten intersections would have higher levels of congestion during the peak hour of the evening commute. The signalized intersection at S 21st Street/Pacific Avenue would have extreme delays, with average delays of more than 176 seconds per vehicle.
Figure 17. Future (2030) PM Peak Hour Traffic – No Action
Figure 18. Future (2030) PM Peak Hour Traffic – Alternative 1
Figure 19. Future (2030) PM Peak Hour Traffic – Alternative 2
Future Conditions

Parking

The UW Tacoma Campus Master Plan Update provides a flexible approach to address parking needs. While the plan requires aggressive parking management and strong encouragement of use of alternative transportation, the plan would allow the campus to assess and incrementally add parking in response to parking needs and demand. Figure 20 shows the proposed parking for the Campus Master Plan Update.

The parking plan proposed in the Campus Master Plan Update assumes below-grade parking for 3-4 levels, which accommodates up to 4,150 structured spaces along with an additional 200-300 on-street parking spaces depending upon final street designs/upgrades. Parking would be located as follows:

- 17th Street/Court E – 800 spaces
- 17th Street/Court D – 300 spaces
- 17th Street/Court C – 180 spaces
- 17th Street/Court C (Academic Bldg) – 110 spaces
- 19th Street/Court E – 830 spaces
- Fawcett Avenue (Playfield) – 950 spaces
- 19th Street/Market Street – 200 spaces
- Fawcett Avenue (Student Life) – 110 spaces
- 21st Street/Court D – 330 spaces
- 21st Street/Court C – 240 spaces

An analysis of the parking demand indicates that the demand for parking would range between 3,100 to 3,700 spaces for Alternative 1 and 3,700 to 4,400 spaces for Alternative 2. The lower range reflects the availability of off-campus parking alternatives. Overall, the proposed campus plan should provide adequate parking to meet demand. In the future, additional parking may be available at the Tacoma Dome or elsewhere off-site with shuttle or transit access to campus.
Figure 20. UW Tacoma Campus Master Plan Update – Parking Plan
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Transit Service
Transit service will play a major role in expansion of the UW Tacoma campus. The ability to minimize traffic and parking impacts of the future campus depend on frequent and reliable transit service. Envisioned changes in the Campus Master Plan Update include the development of a transit corridor on Market Street and potential increases in transit services on Tacoma Avenue and Pacific Avenue. Figure 21 shows the proposed transit corridors proposed by the Campus Master Plan Update.

Future Transit Demand
With an increase in the campus population of 10,000 to 12,000 students there would be a need for additional transit capacity to serve the campus. Based on existing ridership activity reports and mode split by distance profiles, transit boardings on campus would increase to approximately 4,600 to 6,300 daily boardings -- nine times the existing ridership. To meet this demand, there will need to be an increase in transit service hours and frequency. Appendix E documents the estimate of future transit ridership used in this analysis.

Market Street Transit Corridor
The Market Street Transit Corridor would make transit a convenient and attractive option for UW Tacoma students. Transit stops would be located in the heart of campus, providing easy connections for local and regional connections. Market Street would also be an activity center for pedestrian activity and pedestrian pathways. Corridors and crossings would need to be carefully designed to minimize potential conflicts between pedestrians and transit vehicles.

Tacoma Avenue Transit Corridor
The Downtown Master Plan has also identified Tacoma Avenue as a potential transit corridor. While increased transit service on this street may be needed for the overall downtown area, the topography and the need for vehicle circulation around the campus makes this a less desirable transit corridor for serving the UW campus.
Figure 21. UW Tacoma Campus Master Plan Update – Transit Corridors
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Pedestrian and Bicycle Travel
Pedestrian and bicyclist travel are important to the success of any urban university. Pedestrian facilities move students and staff between buildings, and provide important connections between transit and vehicle parking as well as links to adjacent housing and neighboring business districts. Bicycle facilities allow travel from greater distances and provide attractive options for students and staff to cycle to the campus.

Pedestrian Corridors
Walking is the best choice for short trips to class, shopping, transit and other nearby activities. Sidewalks are the most basic pedestrian accommodation, and they play a key role in improving pedestrian safety. While the City has provided a nearly complete sidewalk network throughout the study area, many of the sidewalks should be improved to accommodate projected pedestrian activity and to provide safe corridors for walking commute trips and recreation. Improvements will also be needed to accommodate individuals with disabilities, including design of walkway facilities, pedestrian curb ramps and crosswalks. Because of the campus's topographic challenges, routes have been identified in the plan that connect pedestrian walkways with elevators and to other features that will give full access to buildings and destinations throughout campus. Figure 22 highlights the existing and new pedestrian corridors identified in the Campus Master Plan Update.
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Figure 22. UW Tacoma Campus Master Plan Update – Pedestrian Corridors
Bicycle Corridors
For university students, bicycle commutes are most often less than five miles, but may be as long as 10 to 15 miles. Commuting bicyclists require appropriately designed corridors where there are bicycle lanes or wide curb lanes, loop detectors at signalized intersections, signals where needed to cross busy arterials, periodic maintenance of the pavement, and adequate bicycle storage and lockers/showers at their destination points.

The proposed campus development will provide opportunities to create needed bicycle connections. The abandoned Prairie Line rail corridor, which runs through the UW Tacoma Campus between Jefferson Avenue and C Street, would provide for an urban trail for bicyclists and pedestrians. The City’s Downtown Plan also identified Fawcett Avenue as a potential bicycle corridor, which would eventually connect the University to the St. Helen’s residential neighborhood, the downtown commercial core and the Brewery District. Fawcett Avenue could be designed to include bicycle lanes or as a bicycle boulevard that would include features to discourage through traffic along the corridor.

Figure 23 highlights potential bicycle and multiuse trails through the campus area.
Figure 23. UW Tacoma Campus Master Plan Update – Bicycle and Trail Corridors
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