Appendix F: Twin Harbors State Park Traffic Impact Analysis
TWIN HARBORS STATE PARK
TRAFFIC IMPACT ANALYSIS

Grays Harbor County, WA

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TWIN HARBORS STATE PARK
TRAFFIC IMPACT ANALYSIS

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1. **INTRODUCTION**

The intent of this assessment is to provide, if any, related impacts to the proposed Twin Harbors State Park redesign. The first task includes the review of general roadway information on the adjacent street system and determining baseline vehicular volumes. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined if needed.

2. **PROJECT DESCRIPTION**

Twin Harbors State Park, located at 3120 Highway 105, Westport, is a 225-acre state park featuring year-round camping and outdoor activities. The park is proposing for the reconfiguration of the campsite layout via eliminating all sites presently situated on the east side of SR-105 and expanding the western portion. Currently, the campsites are distributed along either side of SR-105 with a total of approximately 160 functional sites. The proposal intends to vacate the east property for restoration and add new campsites to the western side totaling up to 150 sites. Overall, the park will contain less campsites than what currently exists. Figure 1 below illustrates the conceptual site plan and areas to be expanded. Figure 2 on the following page delineates state park limits and identifies the areas to be eliminated and relocated.
Illustrated above is the approximate state park limits. The hatched area on the east side of SR-105 is proposed to be vacated and no longer support functional campsites. New beachfront cabins, a trailhead, day use parking area, and a new camp loop with additional sites is proposed within the western property limits. Access to the park would continue via the existing Campground Loop driveway on SR-105 and access to Schafer Road W.
3. EXISTING CONDITIONS

3.1 Surrounding Roadway System

The surrounding roadways serving the project are described below.

*SR-105:* is a two-lane state route bordering the subject site to the east and serves approximately 3000-4000 vehicles per day. Adjacent the state park, the roadway is defined as SR-105 S. To the north, the roadway veers east perpendicular with Schafer Road W, becoming SR-105 E. Roadway lane widths are approximately 12 feet, with additional turn-lanes provided at major intersections. Shoulders are paved and/or grass/gravel. The roadway has a posted speed limit of 40-50 mph.

*Forrest Street S:* is a north-south, two-lane roadway located to the north of the subject site. Lane widths are approximately 12 feet, with additional turn-lanes provided at major intersections. Shoulders are composed of pavement varying in width and grass/gravel. The roadway has a posted speed limit of 35-40 mph.

*Schafer Road W:* is an east-west, two-lane roadway bordering the subject site to the north. Total roadway width is approximately 20 feet. Shoulders are composed of grass/gravel. The roadway has a posted speed limit of 25 mph.

*Campground Loop:* is a multi-directional roadway running within the subject site. The roadway provides access to the campsites and other amenities offered within the state park. Shoulders are composed of grass/gravel.

3.2 Roadway Improvements

A review on the proposed 2020-2025 Grays Harbor County Transportation Improvement Program shows the following improvement project planned for this area:

*Montesano Street Paving Project – 000.384 to 1.099 (WA-03973):*  
Pave the road and shoulder along Montesano Street between Westport and the Ocosta Schools. The estimated cost of this project totals $470,000.
3.3 Non-Motorist Traffic & Safety

Pedestrian and bicycle activity were observed during routine peak hour field counts. While no sidewalk corridor is offered within the subject site’s vicinity, a marked crosswalk exists at the intersection of SR-105 S & Campground Loop. This crosswalk is accompanied by signage alerting oncoming drivers of the crosswalk and provides pedestrian connection from the existing eastern campground to the western campground. During the peak travel hour, 3 group/pedestrian crossings were recorded on Friday at the SR-105 crosswalk and 12 group/pedestrian crossings were recorded on Saturday. However, the new park design would reduce the number of SR-105 crossing occurrences as all campsites are proposed to be contained on the west side.

3.4 Transit Service

A review of the Grays Harbor Transit bus schedule indicates that the Westport Transit Center/Westport-Grayland Park & Ride Lot to be within walking distance of the site (~ 0.50 miles east). Located southwest of the SR-105 E & Englewood Lane S intersection, the Transit Center services Routes 70 and 171 Dial-a-Ride. Route 70, Westport – Grayland, provides service from the Hoquiam Transit Center to the Grayland Water Department. Route 70 runs from 5:20 AM - 8:40 PM, with service approximately every 90 minutes. Saturday/Sunday service runs from 8:35 AM - 6:00 PM, with service every 120 minutes. Route 171, Westport Deviation & Dial-a-Ride, which provides additional service to and from fixed routes. Service is provided Monday through Friday from 7:45 AM – 4:45 PM.

3.5 Existing Peak Hour Volumes

Traffic counts were performed at the existing Twin Harbors State Park Campground Loop access on SR-105 S and the intersection of SR-105 & S Forrest Street to sample and identify baseline conditions. Traffic counts were administered on Friday, July 5th and Saturday, July 6th of 2019 between the hours of 12:00 PM to 6:00 PM. As custom of a typical campground, Twin Harbors State Park experiences a significant amount of traffic during summer holiday weekends; the counts would therefore present a worst-case approach. Existing Friday and Saturday peak hour volumes at the intersections of study are presented in Figures 3 and 4, respectively. Full-count sheets have been included in the appendix for reference. By examination, both days experienced relatively similar vehicular volumes to/from the park and on the adjacent roadways.
3.6 Existing Level of Service

Baseline peak hour delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the 2016 Highway Capacity Manual. Level of service calculations were made through the use of the *Synchro 10* analysis program. For side-street, stop-controlled intersections, LOS is determined by the approach with the highest delay.

**Table 1: Existing Level of Service**

*Delays given in seconds per vehicle*

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Friday Peak Hour</th>
<th>Saturday Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-105 S / Forrest St S &amp; SR-105 E / Schafer Rd W</td>
<td>Stop B 13.9</td>
<td>B 13.0</td>
</tr>
<tr>
<td>SR 105 S &amp; Campground Loop</td>
<td>Stop B 14.9</td>
<td>B 14.4</td>
</tr>
</tbody>
</table>

Existing Friday and Saturday peak hour delays are shown to operate with acceptable service levels at LOS B for either study intersection. SR 105 S offers an approximate 600-foot acceleration lane, allowing westbound (SR 105 E) left-turn motorists to perform a two-step maneuver and time to adjust travel speeds before entering the highway.

As illustrated in Table 1, Friday experiences a slight increase in intersection delays and will therefore be the focus of the remaining analysis to present worst-case conditions.

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1 Signalized Intersections - Level of Service

<table>
<thead>
<tr>
<th>Control Delay per Vehicle (sec)</th>
<th>Level of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤10</td>
</tr>
<tr>
<td>B</td>
<td>&gt; 10 and ≤20</td>
</tr>
<tr>
<td>C</td>
<td>&gt; 20 and ≤35</td>
</tr>
<tr>
<td>D</td>
<td>&gt; 35 and ≤55</td>
</tr>
<tr>
<td>E</td>
<td>&gt; 55 and ≤80</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 80</td>
</tr>
</tbody>
</table>

2 Stop Controlled Intersections – Level of Service

<table>
<thead>
<tr>
<th>Control Delay per Vehicle (sec)</th>
<th>Level of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤10</td>
</tr>
<tr>
<td>B</td>
<td>&gt; 10 and ≤15</td>
</tr>
<tr>
<td>C</td>
<td>&gt; 15 and ≤25</td>
</tr>
<tr>
<td>D</td>
<td>&gt; 25 and ≤35</td>
</tr>
<tr>
<td>E</td>
<td>&gt; 35 and ≤60</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 60</td>
</tr>
</tbody>
</table>

*Highway Capacity Manual, 6th Edition*
3.7 Accident History

A list of the recorded accident history from 2014 through September of 2019 for the study intersections was obtained from WSDOT. A summary of the reported accident totals per year is given below in Table 2.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Forrest St / Schafer Rd</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Campground Loop</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>&lt;1.0</td>
</tr>
</tbody>
</table>

Reviewing descriptions from the WSDOT report summaries indicates the most common types of crash occurrences at SR 105 & Forrest St/Schafer Rd were in the form of: entering at an angle (4/9) and left-turn maneuvers (2/9). Two of the nine accidents reported injuries while no accidents reported fatalities. Some contributing circumstances were listed as: improper turn, not granting right-of-way to vehicle, driver distraction and disregard stop sign as contributing factors. One accident was recorded at Campground Loop as a right-angle and involved a vehicle crossing from the east side of the park to the west.
4. FUTURE TRAFFIC DEMAND

4.1 Project Access

Currently, the east side of the Twin Harbors State Park can be accessed via an ingress only (Campground Loop) to the northeast by way of SR-105 E and an egress only, opposite the west side’s entrance by way of SR-105 S. The proposed development would eliminate all access to/from the east side of the park and continue accessing the west side via Campground Loop and Schafer Road W. Refer to the site plan in Figure 2 for site circulation and access plan.

4.2 Trip Assignment

To analyze operations with the proposal to relocate all campsite to the west side of SR-105, existing traffic entering and departing from the east side via Campground Loop were reallocated to the west accesses. As no increase in overall campsite is proposed (160 existing sites to up to 150 proposed), the existing trip counts captured during the holiday weekend are expected to accurately represent forecast buildout conditions.

During the Friday peak hour, volumes exiting the east leg of Campground Loop consisted of 25 trips turning onto SR-105 and 7 trips entering the west portion of the park. The 25 peak hour trips destined to SR-105 are the forecasted volumes to be reassigned to the new campsite area. Trips occurring between the east and west portions of the park would subsequently be captured internally as all sites would remain on the west side of SR-105 and would therefore not need to be modeled in the future analysis. To account for inbound movements at the northeast driveway on SR-105 E not captured in field data, the 25 outbound movements were considered to enter during the same hour, for a total trip reallocation of 50 peak hour trips (25 inbound/25 outbound). Figure 5 on the following page illustrates the trip assignments. Inbound and outbound volumes were split roughly by half and assigned to either Campground Loop or Schafer Road W.

4.3 Future Peak Hour Volumes

A 5-year horizon of 2024 was used to assess future conditions with the proposed Twin Harbor State Park redesign. Forecast 2024 background volumes were derived by applying a one percent compound annual growth rate the existing volumes. It should be noted that little to no growth has been experienced along SR-105 in the area. A comparison of WSDOT’s annual traffic reports from 2011 and 2018 indicate lower average daily traffic (ADT) for the SR-105 segments near the park. Forecast 2024 background peak hour volumes and peak hour volumes with the new state park are illustrated in Figure 6.

\(^2\) An exception for potential maintenance access to pump station with limited activity throughout the day.
REASSIGNED PEAK HOUR TRIPS
INBOUND: 25 TRIPS
OUTBOUND: 25 TRIPS

HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING
TWIN HARBORS STATE PARK
TRIP REASSIGNMENT
FIGURE 5
4.4 Level of Service

Forecast peak hour intersection delays were again determined through the use of the *Synchro 10* analysis program. The below analysis is reflective of the proposed Twin Harbors State Park design with all campsites accessing to/from west side of SR-105.

**Table 3: Forecast 2024 Peak Hour Level of Service with Project**

*Delays Given in Seconds per Vehicle*

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Control</th>
<th>LOS</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR 105 S / Forrest St S &amp; SR 105 E / Schafer Rd W</td>
<td>Stop</td>
<td>C</td>
<td>15.4</td>
</tr>
<tr>
<td>SR 105 S &amp; Campground Loop</td>
<td>Stop</td>
<td>C</td>
<td>15.8</td>
</tr>
</tbody>
</table>

As summarized in Table 3, forecast 2024 peak hour delays are shown to operate at LOS C indicating stable operations and sufficient intersection capacity. This analysis also reflects a summer holiday weekend when park and campsite demands would be in highest; non-peak seasons would likely yield lower delays. No operational deficiencies are identified with the proposal to relocate all campsites to access the west side of SR-105.
5. CONCLUSIONS AND MITIGATION

Twin Harbors State Park is proposing a new layout to their campsite configuration. The park, located at 3120 Highway 105, Westport, currently offers campsites on either side of SR-105. The proposal consists of adding new amenities and camping opportunities to the western property limits and eliminating all campsites presently occupying the eastern property. The proposed design would result in a traffic shift and increase vehicular volumes to one side of the highway. In total, the campsites will decrease from the existing 160 with up to 150 sites offered in the new design. Volumes to and from the park are therefore anticipated to remain relatively similar to existing utilization. A conceptual site plan illustration the overall park configuration is presented in Figure 1.

Traffic counts were administered on Friday, July 5th and Saturday July 6th, 2019 to capture and identify baseline peak conditions. Twin Harbors State Park generally experiences greater demands and higher campsite occupancy during summer weekend holidays. The volumes from the field counts therefore present conditions during a peak scenario. Existing study intersections of SR 105 & Forrest St S and SR 105 & Campground Loop operate with LOS B conditions. A five-year horizon with an applied background growth rate and the redistribution of park traffic all accessing to/from the west portion indicate conditions up to LOS C in the 2024 peak hour. No operational deficiencies are identified with the proposed Twin Harbor State Park configuration.

Based on the above, no mitigation is identified at this time.