Exhibit No. ___ (KH-7)
Dockets TR-100127,
TR-100128, TR-100129, and
TR-100131 (*consolidated*)
Witness: Kathy Hunter

**BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

| | |
|---|---|
| **WASHINGTON STATE DEPARTMENT OF TRANSPORTATION,**<br><br>**Petitioner,**<br><br>**v.**<br><br>**CENTRAL PUGET SOUND REGIONAL TRANSPORTATION AUTHORITY AND THE CITIES OF LAKEWOOD AND DUPONT,**<br><br>**Respondents.** | **DOCKETS TR-100127, TR-100128, TR-100129, and TR-100131 (*consolidated*)** |

**EXHIBIT TO**

**TESTIMONY OF**

**KATHY HUNTER**

**STAFF OF**

**WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

***Point Defiance Bypass Project***
***Grade Crossing Diagnostic Meeting Notes***

**May 7, 2010**

**Point Defiance Bypass Project**
**Grade Crossing Diagnostic Meeting Notes**

On September 20, 2006, grade crossing diagnostic meetings were held for the Point Defiance Bypass Project.

Attendees:

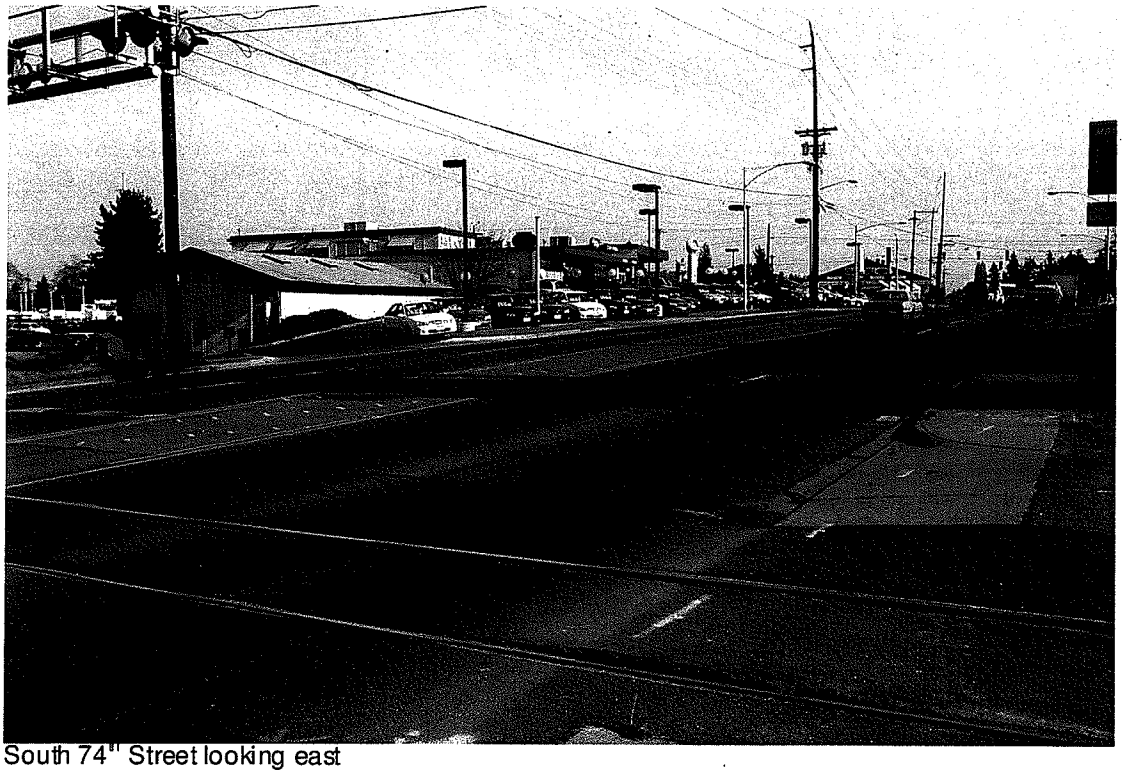
John Howe, City of Lakewood
Don Carney, City of Lakewood
Chris Larson, City of Tacoma
Carolyn Simmonds, WSDOT
Abe Sahari, WSDOT
Ahmer Nizam, WSDOT
Vern Page, Pierce County Traffic
Ken Burt, WSDOT Traffic
Buzz Berger, HDR
John Hammersmith, HDR
Fusan Lin, HDR
Andy Enloe, Twin City Signal
Mike Anderson, Twin City Signal

The diagnostic team met at each grade crossing affected by the Point Defiance Bypass Project in order to discuss the future configuration of the grade crossing and make recommendations. The crossings surveyed included South 74th Street, Steilacoom Blvd SW, 100th Street SW, 108th Street SW, Bridgeport Way SW, Chicago Ave SW, North Thorne Lane SW, Berkeley Street SW, 41st Division Drive, and Barksdale Ave (Dupont Road).

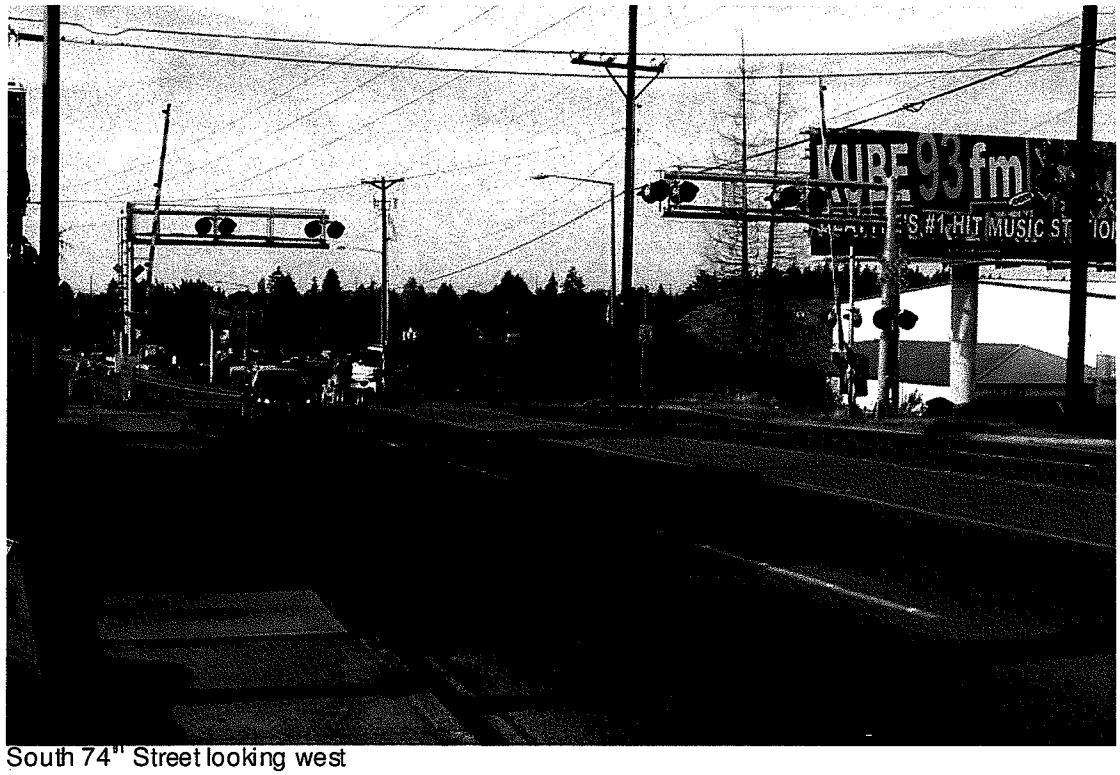
## SOUTH 74th STREET

**Current Conditions**

The single-track crossing at South 74th Street is currently equipped with gates and cantilevers, with two lanes of traffic in each direction, separated by a two-way left turn lane; there is no traffic signal interconnect. Traffic counts and a Synchro analysis performed in August/September 2006 indicate that queue lengths from the nearby signalized intersection with South Tacoma Way (approximately 350' east of the crossing) may extend almost to the crossing, given current traffic. Future traffic growth suggests that queue lengths may eventually extend across the grade crossing. This grade crossing is within the jurisdiction of the City of Tacoma.



South 74th Street looking east



South 74th Street looking west

**Proposed Conditions**
WSDOT proposes a second main track, constructed at 15' track centers, immediately east of the proposed Sound Transit alignment. Both tracks would be located in a curve, and the superelevation and plane of the rails would be developed to correspond to the roadway profile, which slopes upward from west to east.

The group agreed that an interconnection with the South Tacoma Way traffic signal would be required to accommodate the increased train traffic and speeds. The current configuration of warning devices – gate and cantilevers – would be maintained, and both tracks would be equipped with constant-warning time predictors. New channelization features, primarily medians on both sides of the crossing, would be constructed in the existing two-way left turn lanes to reduce the likelihood of motorists evading lowered gates.

Due to the heavy traffic on the roadway, which includes trucks traffic from nearby industries, and the relatively long distance to the traffic signal at South Tacoma Way, significant advance pre-emption time required for a traffic signal interconnection would be required in order to clear the queue length prior to the arrival of a train.

The pre-emption configuration currently proposed for the Sound Transit project is for 10 seconds of "traditional" advance pre-emption and 5 additional seconds of gate delay (during which time the flashing lights and bells would be activated, but which would precede the normal gate descent sequence), for a total of 15 seconds of additional warning time, when compared to a "simultaneous" pre-emption configuration.

In addition to the Sound Transit pre-emption configuration, the group discussed pre-signals as a means to prevent traffic from stopping on the tracks (in addition to signage indicating "Do not stop on tracks"). Two configurations were considered, one with traffic lights mounted on the grade crossing cantilevers themselves, and one with a pre-signal located further west on South 74th

Street, perhaps at the bottom of the hill (on which the crossing is located). The second configuration would be a mid-block light about 300' west of the grade crossing, and would need to be accompanied by some kind of traffic channelization to help direct motorists' attention to the presence of the traffic signal. In addition to timing the pre-signals in order to prevent queuing on the tracks, consideration was given to loop detection systems that would provide a feedback mechanism to help prevent queue lengths from extending across the tracks. The advantage of the pre-signals mounted directly on the cantilever is that it would likely afford better coordination between the pre-signal and the light at South Tacoma Way (there is an example of this configuration at the 5th Street crossing in Puyallup); locating the pre-signal 300' west of the crossing allows large trucks to stop and start on a level surface (the roadway near the crossing is approximately 3.5% uphill, against eastbound traffic.

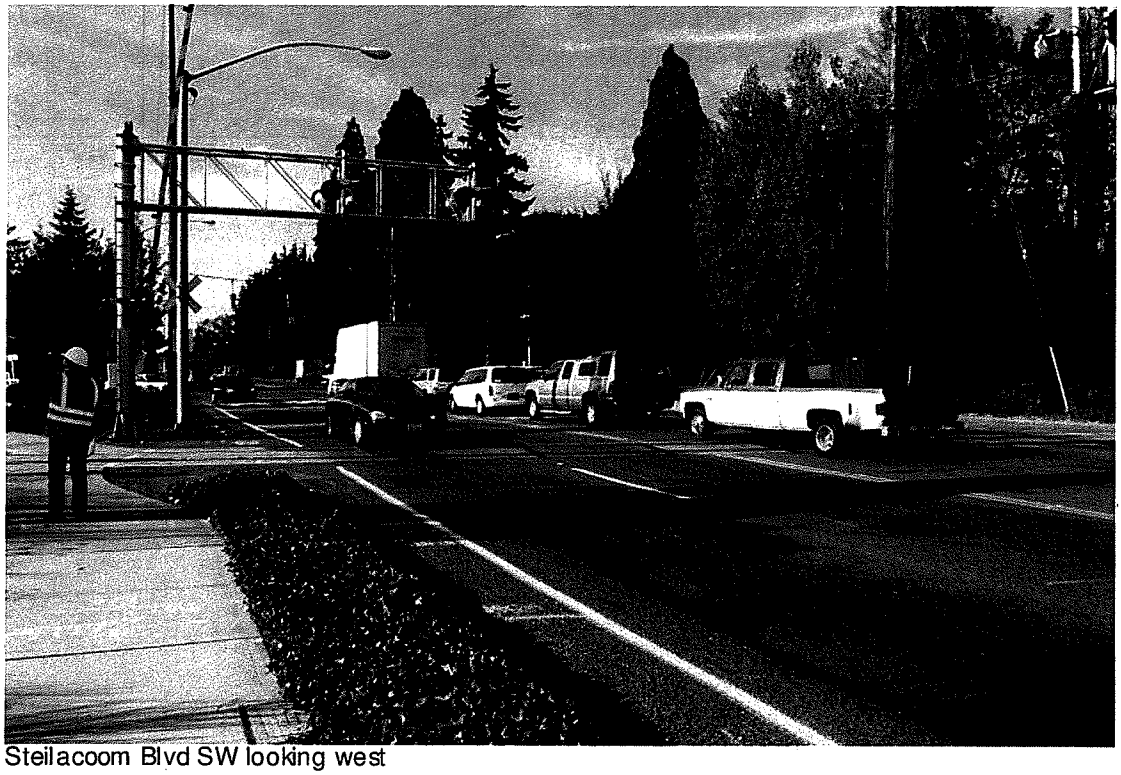
No decision was made regarding the final configuration of the crossing. Additional information about future traffic conditions will be developed, and Chris Larson of the City of Tacoma requested further study on the impact of a pre-signal on traffic operations.

## STEILACOOM BLVD SW

### Current Conditions

The single-track crossing at Steilacoom Blvd SW is currently equipped with gates and cantilevers, with two lanes of traffic in each direction, separated by a two-way left turn lane; there is an existing interconnection with the traffic signal at the intersection of Steilacoom Blvd SW and Lakeview Ave. Traffic counts and a Synchro analysis performed in August/September 2006 indicate that queue lengths from the nearby signalized intersection with Lakeview Ave (approximately 100' east of the crossing) may extend almost to the crossing, given current traffic. Future traffic growth suggests that queue lengths may eventually extend across the grade crossing. There is currently a bus stop for westbound buses, located immediately west of the grade crossing. This grade crossing is within the jurisdiction of the City of Lakewood, with traffic functions performed by Pierce County Traffic.

Steilacoom Blvd SW looking east



Steilacoom Blvd SW looking west

**Proposed Conditions**
WSDOT proposes a second main track, constructed at 15' track centers, immediately east of the proposed Sound Transit alignment.

Since there is relatively little distance between the crossing and Lakeview Ave., advance pre-emption should be effective at clearing the relatively short westbound queue length. A median is proposed to be located in the two-way left turn lane east of the grade crossing. Since there is a left turn pocket immediately west of the crossing, and the width of the roadway R/W is constrained, a c-curb barrier (between the westbound left turn pocket and the northernmost eastbound traffic lane) is proposed to extend from the west side of the crossing to the Lakeview Ave intersection. This c-curb will prevent eastbound traffic from evading lowered crossing gates. "Do not stop on tracks" signage would be provided.The group agreed that these measures should be adequate.

Pierce County Traffic noted that the bus stop just west of the crossing has the potential to create problems when a train arrives, since a stopped bus may not proceed, even though the bus has a green light. The bus driver may not be aware of the flashing lights and gates descending behind him. Thus, automobiles behind the bus may be trapped on the crossing. Effectively, a stopped bus negates the advantages of advance pre-emption. The group agreed that the solution is to relocate the bus stop to the east side of the crossing.

## 100th STREET SW

**Current Conditions**
The two-track crossing at 100th Street SW is currently equipped with cantilevers, with two lanes of traffic in each direction, separated by a two-way left turn lane; there is an existing interconnection

with the traffic signal at the intersection of 100th Street SW and Lakeview Ave. Traffic counts and a Synchro analysis performed in August/September 2006 indicate that queue lengths from the nearby signalized intersection with Lakeview Ave (approximately 100' east of the crossing) may extend almost to the crossing, given current traffic. Future traffic growth suggests that queue lengths may eventually extend across the grade crossing. This grade crossing is within the jurisdiction of the City of Lakewood, with traffic functions performed by Pierce County Traffic.

100th Street SW looking east

100th Street SW looking west

**Proposed Conditions**
The proposed WSDOT alignment will have two tracks, on 15' track centers, but both tracks will be located further east (approximately 20') than the existing tracks, and on a different bearing line. The new crossing will have cantilevers, gates, and an automated horn system, as well as an interconnection with the traffic signal at 100th St SW and Lakeview Ave.

Channelization features will include medians on both sides of the crossing, though the median on the west side of the crossing will be relatively short, tapering to a c-curb barrier to allow for the westbound left turn pocket on 100th Street. "Do not stop in tracks" signage would be provided. The roadway at the westbound right-turn lane is proposed to be widened to allow for improved drainage and WB 50 truck right-turn movements. Additional illumination was also suggested.

## 108th STREET SW

**Current Conditions**
The two-track crossing at 108th Street SW is currently equipped with gates and cantilevers, with a single lane of traffic in each direction, separated by medians; there is an existing interconnection with the traffic signal at the intersection of 108th Street SW and Lakeview Ave. Traffic counts and a Synchro analysis performed in August/September 2006 indicate that queue lengths from the nearby signalized intersection with Lakeview Ave (approximately 100' east of the crossing) are relatively short. Future traffic growth suggests that queue lengths may eventually extend across the grade crossing. This crossing is on the regular route of a truck driving school. The 108th St. SW grade crossing is within the jurisdiction of the City of Lakewood, with traffic functions performed by Pierce County Traffic.

108th Street SW looking east

108th Street SW looking west

**Proposed Conditions**
The proposed WSDOT alignment will have two tracks, on 15' track centers, but both tracks will be located further east (approximately 50') than the existing tracks, and on a different bearing line. The new crossing will have cantilevers, gates, and an automated horn system, as well as an interconnection with the traffic signal at 108th St SW and Lakeview Ave. A "third" exit gate on eastbound 108th was discussed to prevent traffic turning left at Halcyon from driving the wrong-way westbound along 108th, then changing lanes in the wide area (which lacks a median) where the three tracks cross 108th Street.

Channelization features will include medians on both sides of the crossing; at the request of the City of Lakewood, the new lanes, medians, and landscaping will match the widths and landscaping of the current lanes and medians (there is currently no shy distance provided at the curbs). The profile of the roadway will be altered slightly to allow for the two new tracks. The T-intersection with Halcyon Street will become a right-in/right-out only intersection, since the easternmost track is relatively close to the intersection. This arrangement will prevent northbound left-turn traffic off Halcyon from blocking eastbound traffic on 108th St SW from clearing the crossing during a crossing activation. "Do not stop on tracks" signage would be provided.

**BRIDGEPORT WAY SW**

**Current Conditions**
The single track crossing at Bridgeport Way SW is currently equipped with cantilevers, with two lanes of traffic in each direction, separated by a two-way left turn lane; there is an existing interconnection with the traffic signal at the intersection of Bridgeport Way SW and Pacific Highway. Traffic counts and a Synchro analysis performed in August/September 2006 indicate that queue lengths from the nearby signalized intersection with Pacific Highway (approximately 100' south of the crossing) extend across the tracks. Future traffic growth suggests that queue lengths will increase. The intersection of Bridgeport Way SW and Pacific Hwy is approximately 100' north of the signalized on/off ramps of southbound Interstate 5. The Bridgeport Way SW grade crossing is within the jurisdiction of the City of Lakewood, with traffic functions performed by Pierce County Traffic. The I-5 on/off ramp signals are within WSDOT traffic's jurisdiction.

Traffic counts were taken at the 7AM-9AM and 3PM-5PM peak hour. City of Lakewood reported that a second peak, which coincides with the military schedule also exists and may represent the same (or greater) volume traffic as the "traditional" peak. Additional traffic counts are recommended to determine the magnitude of the early peak.

Bridgeport Way SW looking south

Bridgeport Way SW looking north

**Proposed Conditions**
The proposed WSDOT alignment will have two tracks, on 15' to 18' track centers. The new crossing will have cantilevers, gates, as well as an interconnection with the traffic signal at Bridgeport Way and Pacific Highway.

The City of Lakewood is proposing a significant redesign of the Bridgeport Way/Pacific Highway intersection; this design is in-progress and expected to be completed in 2007. The new configuration will have a dedicated left turn pocket and new signalization at the intersection. The City of Lakewood has met separately with WSDOT and Sound Transit to discuss their plans for this intersection; the City has tentatively agreed to arrange medians on both sides of the tracks to prevent motorists from evading the crossing gates. The signalization at Pacific Highway SW and at the Interstate 5 on/off ramps will have to be reviewed in order to develop an interconnection and signal phasing plan. However, the relatively short distance between the crossing and Pacific Highway indicates that the queue lengths to be cleared will be relatively short.

## CLOVER CREEK DRIVE SW

**Current Conditions**
Clover Creek Drive SW extends approximately north-south and is two lanes; the existing lanes are relatively narrow. The existing single track crossing has only passive warning devices. This crossing provides access to a residential area and traffic counts are low. There is no traffic signal at the intersection with Pacific Highway (located approximately 150' south of the grade crossing). There is a business (Ponders Collision) located just south of the crossing which uses Clover Creek Drive as its primary access, which limits the length of medians.

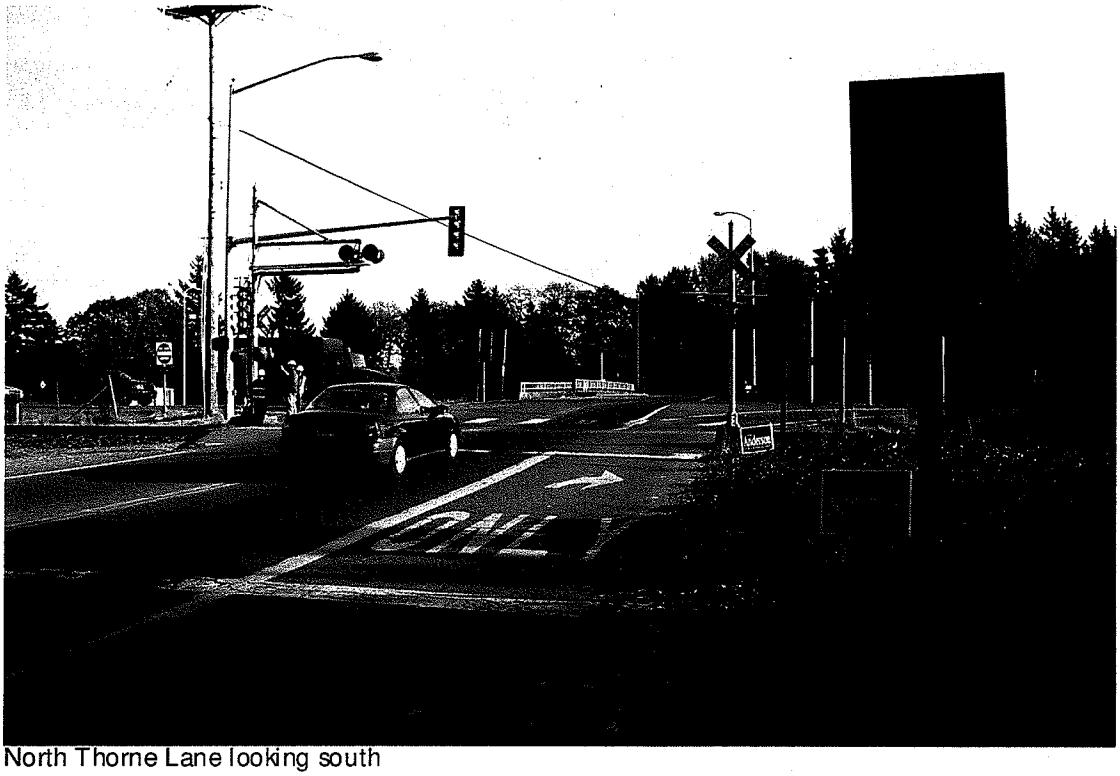

Clover Creek Drive SW looking south

**Proposed Conditions**
The roadway is proposed to be widened by approximately 2 feet to allow for a short median on the south (the median length is limited by the need to maintain access to the Ponders Collision) and a somewhat longer median on the north side of the crossing, extending along the curving route of Clover Creek Dr to the T-intersection. C-curb will extend northward beyond the end of the median. The crossing will be protected by gates and flashing lights. "Do not stop on tracks" signage would be provided.

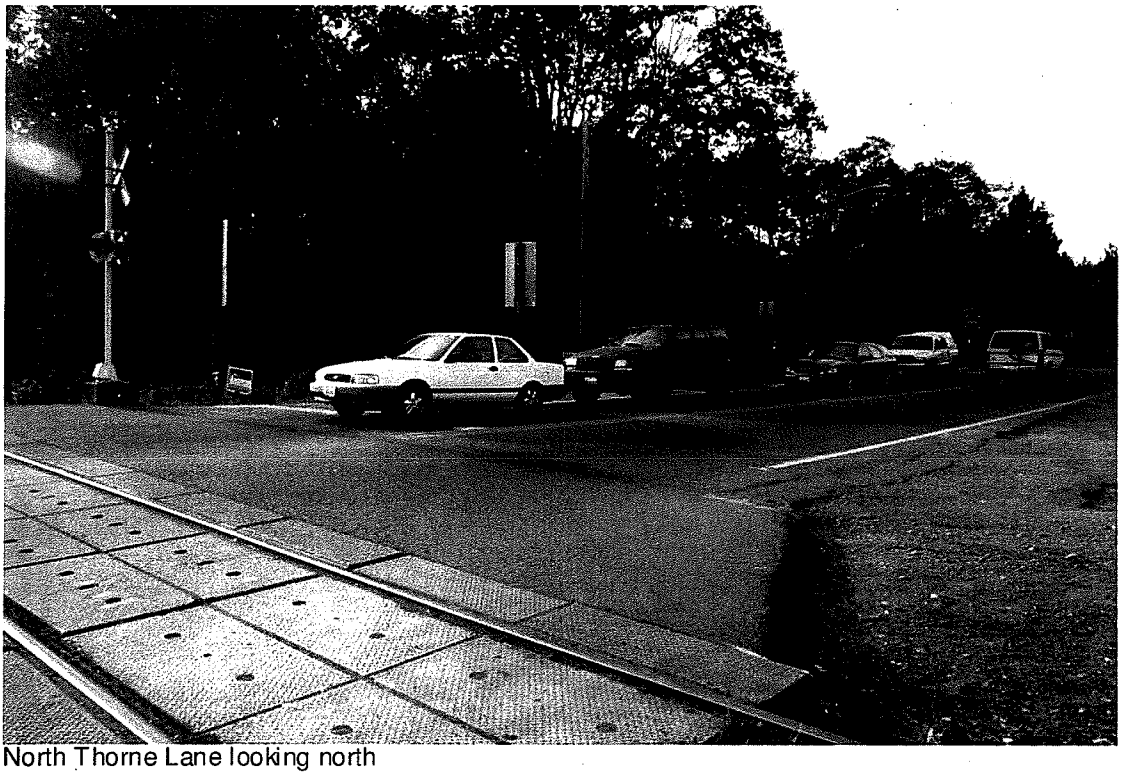
## NORTH THORNE LANE

**Current Conditions**
North Thorne Lane extends approximately east-west and is three lanes at the single track crossing; the existing lanes are relatively narrow. The southbound Interstate 5 Off/On Ramps intersect North Thorne Lane immediately south of the grade crossing. The traffic signal at the intersection is interconnected with the crossing equipment. Traffic analysis indicates that there is queuing across the crossing in both directions. Southbound traffic queues as it waits at the signalized intersection at the SB I-5 ramps. Northbound traffic queues as a result of left turn delays at the unsignalized intersection with Union Avenue, approximately 150' north of the crossing.

The southbound dedicated right-turn lane is approximately 9' wide. Approximately 20' south of the tracks are the southbound on/off ramps for Interstate 5. North Thorne Lane continues across I-5 on an overpass, and eventually reaches an entrance gate and guard post to Fort Lewis. The crossing currently has a cantilever over the northbound lane, a curbside flasher for the two southbound lanes (no gates) and a traffic signal interconnection. The lights on the flasher unit intrude into the dedicated right turn lane (see photo).



North Thorne Lane looking south



North Thorne Lane looking north

**Proposed Conditions**
The roadway will remain the same width; however, C-curb barriers will be added to the centerline in both directions. To the north, the C-curb will extend nearly to the intersection with Union Avenue, stopping short of the intersection in order to facilitate turning movements. To the south, C-curb will extend as far as possible through the SB I-5 ramp intersection in order to prevent northbound traffic from evading the crossing gates. The length of C-curb is limited by the need to allow occasional traffic movements on the SB off-ramp to continue straight, onto the SB on-ramp and back onto the freeway. Since the SB off-ramp is two lanes (a left/through lane and a dedicated right lane), the C-curb will extend across the dedicated left, but end before it blocks the left/through lane.

An interconnection with the SB traffic signal, in conjunction with gates and flashers, should allow clearing of the queue lengths. Another possibility is to relocate the SB traffic signal on Thorne Lane to the north side of the crossing, potentially on the cantilever mast. In conjunction with the interconnection, this traffic signal position would prevent SB traffic from queuing on the tracks; though given the anticipated queue lengths from across the freeway, the signal at the top of the NB I-5 ramps may also need to be coordinated with the interconnection. Northbound traffic presents a more complex problem. The interconnection with the traffic signal at the SB I-5 ramps will help prevent queuing across the tracks, but queues form across the tracks starting at the intersection with Union Avenue (NB vehicles attempting to turn left onto WB Union Avenue are delayed by the SB queues on North Thorne Ln). A new signal at Union Avenue, also tied to the interconnection and coordinated with the signals at the SB I-5 ramps, may mitigate this situation. In addition, "Do not stop on tracks" signage would be provided.

In the future, the Gravelly Lake-Thorne Lane Connector of the Cross-Base Highway project will create an entirely grade separated crossing at this location. Although this project is in design, there are not yet adequate funds secured for construction.

## BERKELEY STREET SW

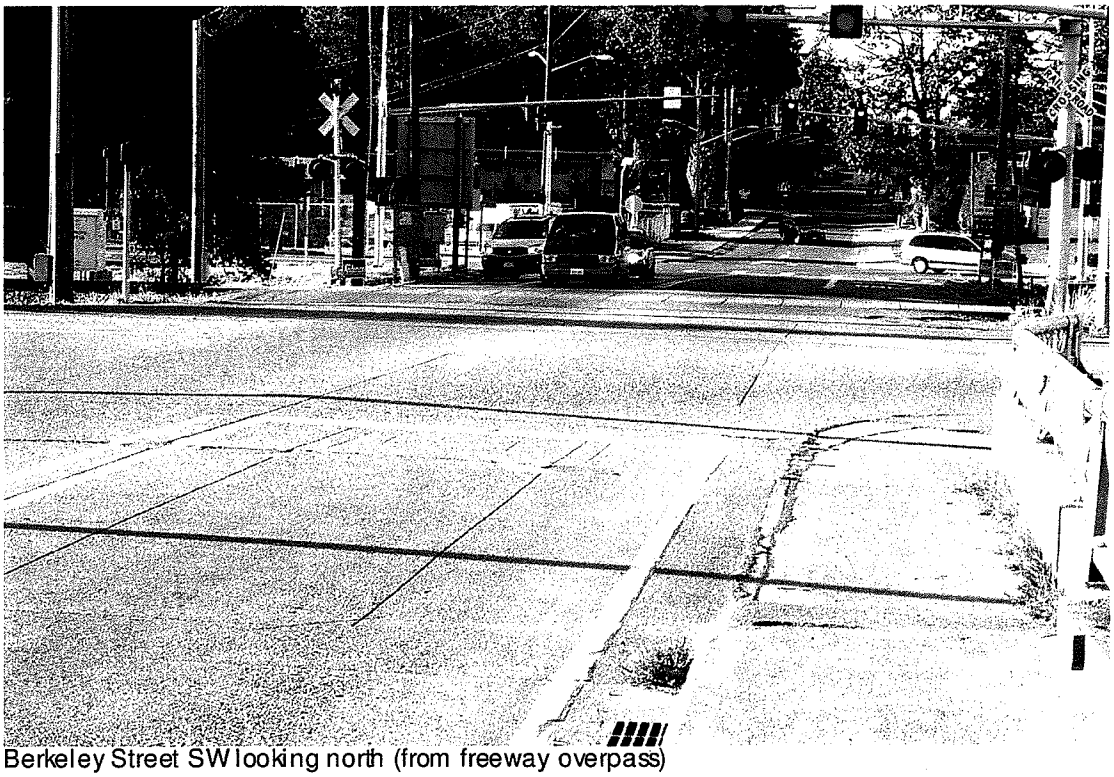
**Current Conditions**
Berkeley St extends north-south; if a motorist were to progress southward along Berkeley St towards the grade crossing, he would first encounter a four-way intersection (with a full traffic signal which currently operates as a four-way flashing red) with Union Avenue (to the east) and the entrance gate and guard shack to Camp Murray (to the west). Approximately 150' south of this intersection is the grade crossing. At the crossing, Berkeley St is one lane northbound and two lanes southbound - a through lane leading across the Interstate 5, and a dedicated right leading to the SB on-ramp to I-5. The dedicated right-turn lane is approximately 9' wide. Approximately 20' south of the tracks are the southbound on/off ramps for Interstate 5. Berkeley Street continues across I-5 on an overpass, and eventually reaches the entrance gate and guard post to Fort Lewis. The crossing currently has a cantilever over the northbound lane, a curbside flasher for the two southbound lanes (no gates) and a traffic signal interconnection.

The four-way flashing red at the Union Ave intersection was, when originally installed, a standard traffic signal. However, reports from members of the Diagnostic Team indicate that it was not coordinated with the signal at the SB ramps to I-5, which bled to significant congestion problems. Changing the signal to a four way flashing red appeared to mitigate these problems.

At the intersection with the I-5 ramps, the northbound traffic signals on Berkeley Street are mounted just in front of the crossing cantilever and obscure the normal placement of the crossing flashers on the cantilever to such an extent that the flashers have been mounted on extensions to raise them above the traffic signal. At the same location, the southbound crossing flasher is mounted so close to the roadway that the lights extend into the narrow right turn lane.

Currently, northbound traffic headed into Camp Murray must wait at the intersection at Berkeley and Union Streets until the queue at the guard shack clears. The clearance time for this queue is entirely dependent upon the guards and the thoroughness of the vehicle inspections at Camp Murray. If an interconnection were established at the Berkeley/Union intersection, its effectiveness would be limited by the fact that the Camp Murray guards control traffic flow just downstream of the signal.

Berkeley Street SW looking south


Berkeley Street SW looking north (from freeway overpass)

**Proposed Conditions**
The situation at Berkeley Street is similar to that at North Thorne Lane, with the exception that the NB left turn traffic cannot, at this time, be effectively cleared from the crossing due to the guard post at Camp Murray.

Under any scenario, the existing interconnection would be maintained, and additional coordination made with adjacent traffic signals. The Diagnostic Team also suggested the possibility of reinstating the full traffic signal at the intersection of Berkeley Street and Union Ave, but with better coordination with the adjacent signal at the SB I-5 ramps.

Other suggestions involved reconfiguring the placement of the traffic signals at the SB I-5 ramps for better visibility and, perhaps, instituting a blocked right turn off the SB off ramp to help mitigate queue lengths. A no-right-on-red signal could be coordinated with loop detection at the crossing so that when queue lengths extended across the tracks, no additional right turns would be permitted. Also, the southbound signals at the freeway ramp intersection could be relocated in front of the cantilever in order to prevent queuing on the tracks. "Do not stop on tracks" signage would be provided.

C-curb would be located at the roadway centerlines in order to discourage motorists form evading the lowered crossing gates. The group also suggested that designers endeavor to make the crossing more pedestrian friendly.

## 41st DIVISION DRIVE

**Current Conditions**
41st Division Drive extends north-south and has 4 travel lanes across the tracks. The roadway is part of a cloverleaf interchange located below Interstate 5. The southbound lanes on 41st Division

Dr. both originate at the guard post at North Fort Lewis and extend across the tracks. A motorist can turn right from the curb lane and access southbound I-5, or continue straight and enter the South Ft Lewis at the guard post on the south side of the freeway.

The two northbound lanes of 41st Division Dr extend from the south gate toward the north gate, but narrow to a single lane immediately after crossing under the freeway overpass (and also immediately before the tracks). Thus, only one northbound lane extends from the South Fort guard post across the tracks to the North Fort guard post. The other lane across the tracks originates as a free-flow right from the southbound freeway off-ramp.

The crossing is equipped with cantilevers and flashers, but no gates. There are no traffic signals in the vicinity. Motorists driving off the southbound I-5 off ramp have their view of the tracks obscured by significant tree growth. No traffic queuing was observed during the field diagnostic meeting.

41st Division Drive looking south

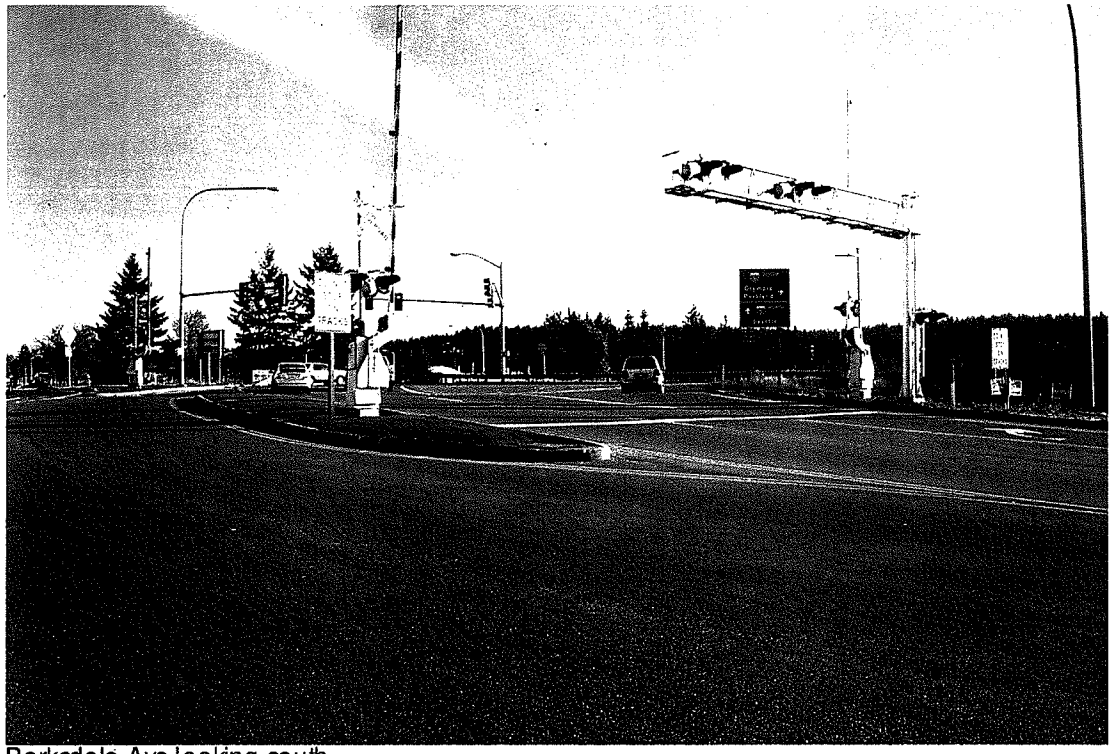
41st Division Drive looking north

**Proposed Conditions**
New cantilevers and gates are proposed for the two southbound lanes of this crossing. Where the two northbound lanes of 41st Division Drive narrow to a single lane, a new right-side curb median and taper is proposed to define the free-flow right off the freeway, since the current northbound merge is defined only by traffic cones permanently affixed to the pavement. A new crossing gate will be placed in the right-side median to protect the northbound traffic. Additional lights, pointing toward the freeway off ramp, will be provided on this gate to provide warning to motorists exiting the freeway. In addition, motorists exiting the freeway at the free-flow right will also have a gate and flashers. The SB I-5 off ramp could also be equipped with a warning sign (and flashing lights) that would indicate something to the effect of "Prepare to stop when flashing." This would provide motorists exiting I-5 advance warning if a train were approaching and the crossing gates were lowered. "Do not stop on tracks" signage would be provided.

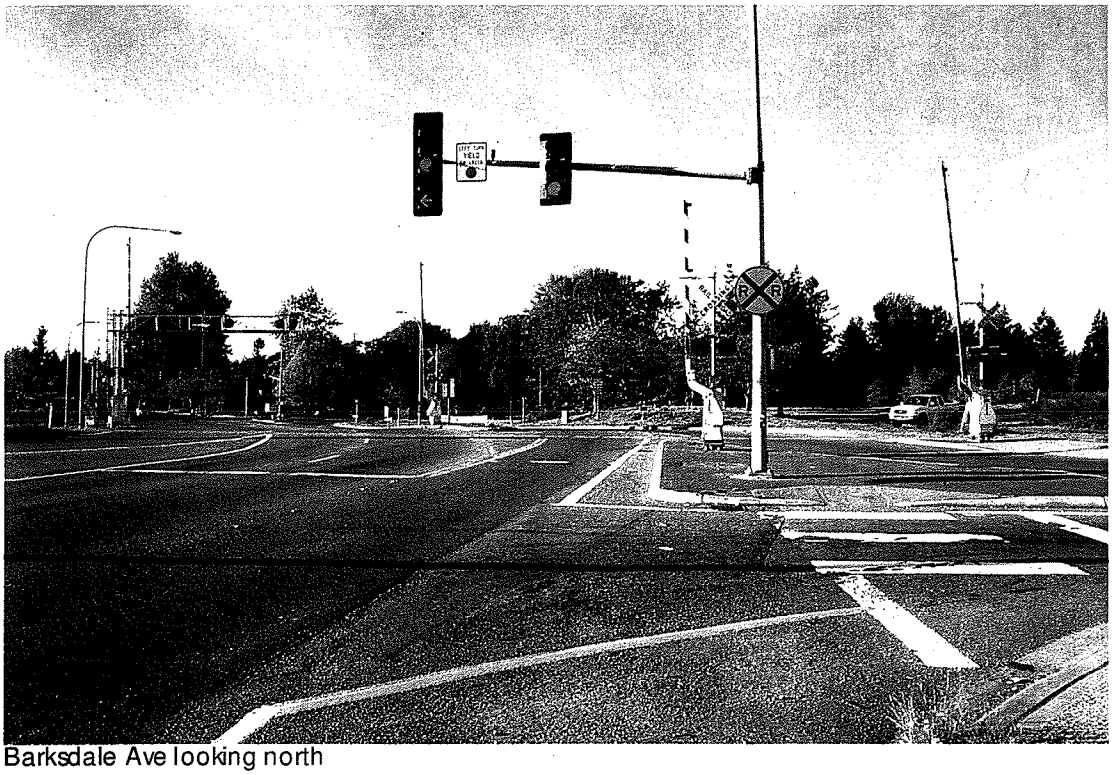
**BARKSDALE AVE (STEILACOOM – DUPONT RD)**

**Existing Conditions**
The crossing at Barksdale currently has 5 lanes across the tracks. To the south is the three lane overpass over Interstate 5. At the crossing itself, one of he northbound lanes is a free-flow right from the SB I-5 off ramp. The other NB lane is a through lane from the south side of the freeway. The three southbound lanes at the crossing include a free-flow right onto the SB I-5 on ramp, and two through lanes across the overpass.

The crossing is equipped with cantilevers and gates (dual gates on the southbound lanes). There is a median barrier between the NB and SB lanes on the north side of the crossing (that median has one set of gates for the SB lanes in the middle).



Barksdale Ave looking south



Barksdale Ave looking north

**Proposed Conditions**
The crossing has recently been reconstructed. Queue lengths are unknown at this time, but could be mitigated by pre-signals, which would need to be coordinated with the signals at the adjacent intersections. Sidewalks may be reconstructed in the vicinity of the tracks in order to provide adequate WUTC minimum clearances. An additional set of lights may be provided at the median flashers, aimed toward the SB I-5 exit ramp, in order to provide better visibility for motorists exiting the freeway.