

Performance Report on Surface Streets in the Seattle Central Business District Volume 2: First Update - Post Tunnel Closure January 31, 2006



As required by the Agreement between King County, City of Seattle and Sound Transit, as revised June 24, 2002, for the Downtown Seattle Transit Tunnel and Related Facilities.

Prepared by the Monitor and Maintain Committee, with representation from the following agencies:



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Report Purpose

This report, and subsequent updates satisfies the requirements of Section 10.3 of the “Agreement Regarding the Design, Construction and Operation of the Downtown Seattle Transit Tunnel and Related Facilities”, as executed by the City of Seattle, King County and Sound Transit.

Excerpts from Section 10.3 of this Agreement read as follows:

“It is the Parties’ intent that the Downtown Seattle Traffic and Street Improvements will be sufficient to maintain bus service performance on surface streets in downtown Seattle, during the closure period and after the tunnel is re-opened at performance levels similar to those existing prior to the Closure Period. The Parties hereby establish a Monitor and Maintain Committee (M&M Committee) to be comprised of the designated contacts set forth in Section 20.0. The M&M Committee may be expanded to include participation by other public agencies at the discretion of the Parties. The M&M Committee shall conduct baseline studies of bus travel time and passenger convenience, security, safety and comfort during a measurement period prior to the Closure Period (Baseline Measurement Period.)”

“During the Closure Period and for one year after the Tunnel is reopened, the M&M Committee shall continue to monitor downtown Seattle transportation system performance and make recommendations to the Parties to take actions to maintain said system performance. In performing its functions, the Committee shall be directed to (a) consult with and seek input from suburban stakeholders and (b) report quarterly to the City Council’s Transportation Committee regarding the performance of the downtown transportation system and regarding the Committee’s consultation with various stakeholders.”

The M&M Committee issued its first performance report in September, 2005 just prior to tunnel closure. Volume 1 of the report documented pre-tunnel closure conditions for six specific sets of performance measures. Data for this initial baseline report was collected during the spring and summer of 2005. The six sets of performance measures were as follows:

- Transit travel time
- General purpose traffic operations
- Transit ridership and bus volumes
- Pedestrian activity at bus zones
- Seattle Central Business District (CBD) customer surveys
- Transportation Demand Management (TDM) mitigation programs

This Volume 2 report includes three major elements. The first is an overall assessment of how the tunnel closure plan worked. The second is a detailed summary of the contingency planning effort that took place in the first 90 days following tunnel closure. Third, it compares the baseline data for the six sets of performance measures described above with data sets collected in the fall of 2005, following tunnel closure. Most of the post tunnel closure data included in this report was collected before the Thanksgiving holidays. This allowed for a better comparison before and after tunnel closure conditions in the Seattle central business district for non-holiday times.

The projected schedule for the release of the balance of the report updates is identified in Figure 1, as are the updated data sets that will be available with each of these reports. There will be eight reports issued in total over the next three and one half years. In March 2006 the M&M Committee will issue Volume 3, the third installment of this report.

Figure 1. Performance Report Release Dates

Performance Measure Updates	Performance Report Release Dates							
	Complete	Complete	March 06	July 06	Dec 06	June 07	Dec 07	Mar 08
	Sept 05	Jan 06						
Volume 1	Volume 2							
Transit Travel Time	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
General Purpose Traffic Operations	⊙	⊙		⊙		⊙		⊙
Transit Ridership and Bus Volumes	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
Pedestrian Activity at Bus Zones	⊙	⊙	⊙				⊙	
Surveys of CBD customers	⊙	⊙		⊙	⊙	⊙	⊙	
TDM mitigation programs	⊙	⊙		⊙	⊙	⊙	⊙	⊙

The M&M Committee will use these reports to communicate on a regular basis the actions taken by the M&M Committee to address any deficiencies in the performance of the CBD transportation system during tunnel closure.

Executive Summary on Post Tunnel Closure Conditions

Volume 2 of this report summarizes the first three months of the post tunnel closure experience in the Seattle Central Business District, from September through November. Leading up to tunnel closure there was an intensive multi-agency effort to complete all five of the primary mitigation projects required to support tunnel closure. All five primary projects were complete and operational prior to tunnel closure. The projects were:

- Olive Way Transit Priority Improvements
- Third Avenue Peak Period Traffic Restrictions and Alternating Transit Stop Operation
- Ninth Avenue Transit Contra Flow Lane
- Prefontaine Place South Reconfiguration
- Fifth Avenue South Transit Contra Flow Lane

Going into the September service change, it was known that tunnel closure would directly impact over 60 percent of all transit riders to the Seattle Central business district, including all riders who previously used the tunnel. It was also known that travel patterns for general purpose traffic would be significantly altered.

Given the magnitude of these changes, the City of Seattle, King County and Sound Transit collaborated on an intense public outreach effort to inform all downtown users – transit riders, transit operators, employees, employers, businesses and property owners and drivers – of the upcoming changes. Yet, despite all advance preparations, there was still a high level of anxiety among downtown stakeholders over how the downtown system would actually operate once the tunnel closed.

Now, from a post tunnel closure vantage point, it can be reported that tunnel closure largely went as planned, and that there were no major system failures. The problems and issues encountered in the first week following the September service change were fairly typical of any major transit service change. Downtown stakeholders, including the Downtown Seattle Association, have remarked that the closure went smoothly, largely due to the agency partnership and strong communications with stakeholders, property owners and the general public. Agency staff continue to work individually with stakeholders to address specific issues.

On Tuesday September 27, 2005, the second commute day after the service change, *The Seattle Post Intelligencer* reported: “On the first day that 140 buses per hour bypassed the now-closed downtown transit tunnel onto surface streets, traffic did not turn chaotic. In fact, for the most part Monday, traffic moved smoothly downtown, though there was more of it. Many bus passengers, however, were confused over where their stops were, and some buses ran late.” This was typical of the media coverage during the first few days.

The multi-agency rider outreach program that accompanied tunnel closure provided an unprecedented level of staffing for “street teams” both to give advance notice of the changes and to assist riders once the service change took effect. By Wednesday, September 28, most riders had acclimated to the changes.

Immediately following tunnel closure, an interagency Contingency Planning/Quick Response team, composed of representatives from Sound Transit, King County Metro, City of Seattle, Community Transit and Pierce Transit was activated as part of the tunnel closure plan. This group actively monitored downtown traffic, transit operations and pedestrians, including locations that had previously been identified as areas that might have problems. This team closely coordinated their work with the Seattle Police Department and the King County Sherriff, particularly with respect to the enforcement of the new Third Avenue traffic restrictions and the enhanced bus stop security measures made possible by a special Bicycle Emphasis and Enforcement Squad, known as the “BEES”, which is assigned to the downtown core during tunnel closure.

The Quick Response staff team was charged with monitoring potential “hot spots”, with resolving any unanticipated problems to tunnel closure and with being responsive to concerns and suggestions from

downtown stakeholders. One of the major adjustments the Quick Response team dealt with post tunnel closure was an adjustment in the peak hour restrictions on Third Avenue in the evening rush hour from 3 -7 p.m. to 3 -6:30 p.m. Based on field observations and data from the transit monitoring system, it was determined that this 30 minute adjustment would not have a significant impact on bus operations and would help improve access to Third Avenue for downtown businesses and residents.

The other area of focus for the Contingency Planning/Quick Response teams has been the Stewart Street corridor. This corridor has experienced a significant increase in congestion and delay since tunnel closure. A series of additional improvements has been made to respond to these problems, with the most recent changes being implemented in January 2006. The Stewart corridor will be closely monitored over the next few months to determine if its performance has improved. These results will be available with the next update of this report (Volume 3, March 2006).

In addition to the Quick Response effort, there are six ongoing monitoring programs for the Seattle Central Business District. The six program elements that are being monitored throughout tunnel closure are:

- Transit travel time and reliability along key corridors
- General purpose traffic operations
- Transit ridership and bus volumes
- Pedestrian activity at major downtown bus zones
- Customer surveys of downtown stakeholders
- Transportation demand management program designed as mitigation for tunnel closure

Individual sections provide more detail on each of the elements listed above in the first reporting period post tunnel closure. Key highlights from each monitoring program are as follows:

Transit Travel Time & Reliability

Transit travel times were analyzed at a corridor level for multiple corridors in downtown. Results were also aggregated to provide an overall measure for the average transit travel time through downtown

For the aggregate measure, average transit travel time through downtown increased by 11 percent. This aggregate measure is a composite measurement of average time spent in the study area. This value is obtained by identifying the first and last observation of a bus trip in the CBD, regardless of the corridor. Averaging this figure for all trips results in a single value of time spent in the CBD for all observed trips. This value is used as an index, not a measure. This figure includes all time expended in the central business district, including layover time as well as time spent in service. It will also reflect many different paths through the CBD with different lengths and travel conditions. The measure becomes meaningful when compared to the same measure for future conditions to compare the ease of travel for transit through the CBD.

The baseline Travel Time Index is **100**, representing the surface street value before tunnel closure. The average pre-tunnel closure travel time value was 21:59 minutes, based on bus trips between 4-6 p.m. on weekdays during the month of July. The comparable number for post tunnel closure conditions in this report was 24:30 minutes. Therefore, the Travel Time index after tunnel closure is **111**, based on trips between 4 -6 p.m. during October and November. This represents an **11 percent** increase in time spent in the CBD.

The increase of 11 percent in the travel time index is due to two major factors. The first is the increased travel time and congestion on the Stewart and Virginia corridors. The second is the increased travel time required to support operating the former tunnel routes on surface streets. A comparison of the schedule time allocated to the route segments through the central business district corroborates this 11 percent increase in transit travel time in the Seattle central business district since tunnel closure. Between the June 2005 and September 2005 service change, there was an 11.8 percent increase in schedule time for

downtown routes. This increase was a planned mitigation measure and required an investment of approximately 45,000 annual hours of service, at an estimated annual cost of \$4-5 million.

For the north-south transit corridors, transit travel time averages after tunnel closure were within one minute of the pre-closure baseline. On Third Avenue, conditions for transit improved noticeably. However, while the average travel time on these segments may not have changed substantially, variability in transit travel times has increased since tunnel closure on some street segments, making service less reliable on a day to day basis. The area that has been most problematic for transit post tunnel closure is the east-west conditions on Stewart and Virginia. These segments performed significantly worse when compared to the baseline, both in terms of average travel time and day to day variance in schedules.

It must also be noted that all the routes that previously operated in the tunnel now experience much longer running times when compared to the eight minutes it took to travel from the International District station to the Convention Place station. The tunnel also offered a highly reliable trip. Surface operation for these former tunnel routes is both longer and considerably less predictable.

General Purpose Traffic Operations

Overall, travel times for general purpose traffic did not change significantly for the morning rush hour or for the midday period. Most of the changes were +/- 1 minute of the pre-tunnel closure times. However, travel in the evening rush hour is slower on several key corridors. Stewart Street and Fifth Avenue have been impacted the most, where trip times have increased by 2:31 and 1:45 minutes, respectively.

As expected, traffic volumes declined on Third Avenue and increased on other streets in the central business district due to the traffic restrictions on Third Avenue. The greatest traffic increases occurred on southbound Second Avenue south of Pine Street and on northbound Sixth Avenue south of Olive Street.

Because the data collected on general purpose traffic operations reflects only a sample of the days and times of travel, these results may not fully reflect that the downtown transportation system is now more fragile and more subject to periodic disruption due to various types of incidents, such as accidents, inclement weather, on-street parking violations, vehicle breakdowns and special events. There is very little reserve capacity left to deal with these situations. As a result, it takes less to trigger a traffic problem and longer for the system to recover from it.

Finally, a new Emergency Vehicle Signal Priority system was installed at forty locations throughout the Seattle central business district to mitigate potential impacts to the Seattle Fire Department response time due to tunnel closure. A new "Opticom" system was installed to replace the older system of fire preemption in which all the programmed signals on a corridor would change to either an all way red or hold in green for the fire response route for 180 seconds. This 180 second period created congestion and frustrated motorists. The new Opticom system is dynamic, and only the intersections that are within a few hundred feet of the approaching emergency vehicle are impacted. This minimizes the number of streets and intersections that have to recover from the emergency. Once the emergency vehicle has passed out of the line of sight, the signal goes into its recovery phasing and resynchronizes. This restores the response corridor back into its normal pattern in a timely manner rather than a set interval of 180 seconds.

Transit Ridership and Bus Volumes

Based on fall 2004 data, ridership at the downtown screen line at University Street was 95,000 riders on King County Metro-operated services. This number increased to 106,700 riders in the spring 2005 shakeup that immediately preceded tunnel closure. Based on partial data for the fall 2005 post tunnel closure (September through November), there has been a subsequent 1 percent growth in ridership at this screen line. Despite all of the changes in downtown transit services, King County Metro ridership at the screen line increased to 107,500. There are also ridership gains reported on the transit services from Pierce and Snohomish Counties to downtown Seattle.

Actual post tunnel closure bus volumes by street segment are generally consistent with the bus volumes that were projected in the baseline report. The changes that have occurred have been primarily associated with minor routing changes to reduce bus volumes on Stewart Street.

Pedestrian Activity at Bus Zones

The majority of bus stops functioned at an acceptable level of service both for waiting patrons and for those passing through the bus stop area.

Two zones, the northbound zone on Fourth Avenue at Union Street, and the eastbound zone on Olive at Sixth Avenue, experienced higher levels of congestion for patrons traversing the area. Fourth and Union problems were related to adjacent construction and should be resolved now that the construction is complete. The problems at Sixth and Olive are expected to continue, as there are few options for increasing the capacity of the sidewalk in this area.

For patrons waiting to catch the bus, the stop at Fifth Avenue and James Street experienced the most significant increase in pedestrian congestion. This may be related to schedule delays caused by Stewart Street. Further monitoring of this stop is planned.

Customer Surveys

A small intercept survey of approximately 200-300 downtown users was conducted in the fall of 2005 immediately following tunnel closure. The results of this survey can not be compared with the results of the much larger baseline survey conducted prior to tunnel closure. The type of inferences that can be drawn from the smaller intercept survey should be viewed as similar to the inferences that can be obtained from focus groups.

Based on the intercept survey, most respondents (62 percent) thought that getting downtown was about the same as it was before tunnel closure. But a sizable minority (31 percent) said getting downtown was more difficult.

The vast majority of respondents (93 percent) knew about tunnel closure before it happened and most of them (73 percent) recognized that there was a joint multi-agency effort to minimize the impacts of tunnel closure. People generally felt that the information supplied about tunnel closure was informative and most had heard about tunnel closure from more than one source.

There will be two additional small intercept surveys similar to the one described above, one in the spring of 2006 and the second in the spring of 2007. Additionally, there will be two more in depth customer survey conducted as part of this program, one in the summer of 2006 and the second in the summer of 2008 after the tunnel has reopened. These on depth surveys will have a much larger sample size and will be comparable to the baseline survey that was done prior to tunnel closure.

Transportation Demand Management Program

The Transportation Demand Management Program designed to support tunnel closure is a combination of new programs as well as enhancements to existing programs. Participation in all these alternative commute options has increased since tunnel closure.

Noteworthy statistics for this effort are: 30 new Flex Pass contracts accounting for 1,129 additional passes; 1,200 individuals served through the "Plan Your Commute" service; 500 additional registrations at Rideshare On Line; and the percentage of downtown employers offering telecommuting options increased from 10 percent to 22 percent.

Conclusions

In summary, the transit tunnel has been closed for more than three months. Even with the addition of 140 buses to surface streets during rush hour, downtown is still moving. This is due in large part to two years of careful planning, an investment of over \$16 million in traffic improvements and effective agency partnerships to manage these changes. A lot of this success is also due to the Seattle Police Department, which has had the tough job of enforcing the new traffic restriction on Third Avenue.

Due to added traffic on some streets, the downtown street system does become congested more easily, and takes longer to recover from incidents such as on-street parking violations, accidents, or vehicle breakdowns. As expected, travel times on former tunnel routes is longer on the surface streets.

Post tunnel closure, developing additional mitigation measures to deal with problems on Stewart has been an area of emphasis. Metro, Sound Transit, and the City of Seattle will continue to monitor the downtown transportation system and work closely with downtown stakeholders through the balance of the tunnel closure period. These monitoring reports are an important tool for communicating the results of these efforts to all downtown stakeholders.

Summary of Contingency Planning Measures Post Tunnel Closure

Agencies prepared for the tunnel closure, developing a contingency plan. This included the identification of operational “hot spots” and potential actions to correct problems should they develop.

An interagency “Quick Response Team” was established with representatives from King County Transit, Sound Transit, City of Seattle, Community Transit, and Pierce Transit. This team of individuals had the responsibility and authority from each of the involved agencies to quickly respond and correct problems as they occurred.



Hot spots were identified as locations where there were existing operational or pedestrian constraints, or where enforcement might be needed due to projected increases in pedestrians, vehicles, or bus turning movements at certain intersections. Other areas in the downtown area were identified as “watch areas” and represented locations where there was the potential for minor operational issues to develop. The “Quick Response Team” designated key staff from Metro, City of Seattle Department of Transportation and Seattle Police as “agency implementers” to handle issues in real time as they arose.

Staff from the Quick Response Team were physically assigned to locations throughout the downtown core, during the morning and evening peak periods, to watch, evaluate, and determine if any corrective actions were needed. At the end of each AM and PM period, agency staffs met to debrief. The team evaluated the problems, identified and recommended solutions, and assigned staff to implement the desired changes. As these changes occurred, they were communicated by the partners to the downtown stakeholders and customers. The two weeks following tunnel closure was the most intense period of activity for these teams. Street level monitoring continues, but resources are now primarily focused on the areas that are known to need attention.

This section summarizes the key changes implemented by the Quick Response Team since tunnel closure. They fall into four general areas:

- Third Avenue, between Yesler and Virginia
- Stewart Street, between Second Avenue and Eighth Avenue
- Bus Stop/Security issues
- South Downtown

Third Avenue, between Yesler and Virginia

The implementation of Third Avenue general purpose traffic peak period restrictions and transit skip stop operations has been working quite well since its implementation. During the first three weeks of the new traffic restrictions, the Seattle Police Department provided a high level of enforcement for general purpose vehicles and pedestrians. After the initial three-week period, the level of enforcement was reduced to a sustainable level and has been working well. The violation rate at the reduced level of enforcement does not significantly impact transit operations.

On Third Avenue, staff evaluated the impact of reducing the evening restriction from 3-7 p.m. to 3-6:30 p.m. It was determined that this change could be made without seriously impacting bus travel times. This change went into effect on a trial basis beginning Monday, November 21, 2005. See the report section entitled “Measure 1: Transit Travel Time” for a summary of the analysis that was performed to support this decision.

Other adjustments to Third Avenue to ensure safe and efficient operations include:

- Additional training on skip stop operation was provided for transit operators.
- Signage changes were made to make peak hour traffic restrictions clearer.
- Adjustments to traffic signal timing were implemented.
- Additional communications with the public to troubleshoot problems educate the public about the service change and the new traffic restrictions.
- Lane widths were adjusted between Stewart and Pine to better accommodate buses.
- Bicycle “OK” stickers added to signs to allow bicycles in the curb lane.
- The commercial load zone on Third nearside Virginia was removed.



Stewart Street, between Second Avenue and Eighth Avenue

Transit and general traffic experienced increased congested and slow operating conditions on Stewart Street during the peak periods. Travel time through this corridor was also variable. The Quick Response team evaluated the problems along the Stewart corridor, and developed and implemented a multi-faceted solution to improve operations for both general purpose traffic and transit in this corridor. A chronology of the modifications are summarized below.



November 4, 2005:

- Three passenger load zones on Stewart between Seventh and Sixth restricted during peak periods (4-6 p.m. new restriction)
- Pedestrian signals installed at Stewart and Second in all directions

November 17, 2005:

- Parking restricted from 3-7 p.m. on north side of Stewart between Fifth and Fourth (7 stalls)
- Parking restricted during PM peak on south side of Stewart between Eighth and Seventh (2 stalls)

December 3, 2005

- Bus zone at Westlake and Fifth closed
- King County Metro routes 7E, 116, 118, 119, 196, and 202 relocated off of Stewart to reduce bus trips on Stewart (13 PM Peak Hour trips)
- A new skip stop pattern was implemented for certain routes on Stewart to reduce the number of buses making stops. In the PM peak hours, the number of buses stopping at Seventh Avenue was reduced by 21; the corresponding reductions on Fifth Avenue and Fourth Avenue were 17 buses and 9 buses, respectively.

Mid-January 2006

- Parking restricted during PM peak (3-7 p.m.) on south side of Stewart between Fifth and Fourth (10 stalls)
- Parking restricted during PM peak (3-7 p.m.) on south side of Stewart between Eighth and Seventh (5 additional stalls); 2 previous stall restrictions changed from 4-6 p.m. to 3-7 p.m.
- Parking restriction on Stewart between Seventh and Sixth changed from 4-6 p.m. to 3-7 p.m. (7 stalls); however, passenger load zone peak period restriction may be lifted to accommodate Max Hotel valet parking
- Extended bus zone on Virginia far side of Fifth Ave to the entire block and relocated Westin Hotel charter bus parking in consultation with the Westin.

February 11, 2006

- With its next service change, King County Metro will implement a set of schedule adjustment to improve on time performance on downtown service and to address overloads that have developed on selected trips. This will require an investment of approximately 4,000 annual hours.

Metro and SDOT will continue to monitor traffic operations on the Stewart Street corridor. Once all of the changes are in place and a concerted program of parking enforcement has been provided, it will be possible to measure the effectiveness of the entire package of modifications. The results of this analysis will be included in Volume 3, the next monitoring report.

Bus Stop Issues

Siting bus stops in the downtown core is always challenging given the types of issues that come with high use bus zones in an urban area. Maintaining good relations with businesses and property owners adjacent to existing bus stops is an ongoing effort. There were two new bus stops that required a significant amount of attention to deal with property owner concerns. These were the stops at Third Avenue and Pike Street, adjacent to the Melbourne Tower, and at Ninth Avenue and Howell Street, adjacent to the Regence Blue Shield building. A summary of the actions that have been taken at these two zones is provided below.

Bus Stop at Third and Pike, adjacent to Melbourne Tower

- City Light has agreed to install two flood lights for improved visibility
- Seattle Police Department and Transit Security have made this zone a high priority for random patrols to address security issues.
- There are ongoing discussions with property manager about awning/leaning rail options to help draw people away from their entry.



Bus Stop at Ninth and Howell, adjacent to Regence Blue Shield

- Removed middle back panels from shelters for easier access to/from coaches
- Installed diagonal paint markings on pavement to help prevent blockage to/from the driveway.
- Metro Service Quality is performing several traffic checks to make sure operators do not block access to/from the driveway.
- The City of Seattle and Metro staff are evaluating the operation of the traffic signal at Ninth Avenue and Stewart Street to determine if queuing, which affect the driveway operation at the Regence building can be reduced.



South Downtown Area

- The primary observation areas in south downtown area were Fifth Avenue between the intersection of Dearborn/Airport/Fifth Avenue and Washington Street, Washington Street between Fourth and Fifth Avenues and the new island platform on Fourth Avenue between S Jackson and Main Streets new skip stop pattern was implemented for certain routes on Stewart to reduce the number of buses making stops. In the PM peak hours, the number of buses stopping at Seventh Avenue was reduced by 21, the corresponding reductions at Fifth Avenue, and at Fourth Avenue were 17 buses and 9 buses, respectively.



Several signage, striping and signal timing adjustments were made in this area immediately after tunnel closure to address issues observed in the field.

The adjustments made in this area include the following:

- Additional green time was added to the northbound movement at signal at the intersection of Fifth and Washington.
- A westbound right turn lane was striped and signed on Jackson Street between Fifth and Fourth.
- Green time for the northbound phase was adjusted at the Fifth/Airport/Dearborn intersection.
- Loop detectors were repaired at the intersection of Royal Brougham and E3 Busway.
- A Seattle City Light pole was marked as hazard for buses on Fifth Avenue nearside of Main at new bus zone.
- The zone on Fifth Avenue far side of Jackson was extended by relocating a crosswalk.
- At the Fifth/Airport/Dearborn intersection, roadway markings were added for the south to eastbound right turn.
- A “Wait for Signal to Cross” sign was installed for pedestrians at the new bus platform on Jackson.
- Peak hour traffic restrictions were lifted on Washington Street between Fourth and Fifth Avenues.

