

**SOUND TRANSIT
STAFF REPORT**

MOTION NOS. M2009-78 and 79

Ratifying and increasing the contingency for the Geotechnical and Civil Engineering Support Services Contracts for Beacon Hill Tunnels

Meeting:	Date:	Type of Action:	Staff Contact:	Phone:
Board	9/10/09	Possible Action/ Recommend Approval	Ahmad Fazel, Link Executive Director Joe Gildner, Link Deputy Executive Director Richard Sage, Construction Manager	(206) 398-5389 (206) 689-3350 (206) 398-5226

Contract/Agreement Type:	✓	Requested Action:	✓
Competitive Procurement		Execute New Contract/Agreement	
Sole Source	✓	Amend Existing Contract/Agreement	✓
Agreement with Other Jurisdiction(s)		Budget Amendment	
Real Estate		Property Acquisition	

PROJECT NAME

Central Link Initial Segment – Beacon Hill Station and Tunnels

PROPOSED ACTION

Ratify the chief executive officer's finding of the existence of an emergency in connection with the discovery of subsurface voids above the Beacon Hill tunnels. Additionally, ratify the actions taken by Sound Transit staff directing both Shannon and Wilson, Inc. and Hatch Mott MacDonald/Jacobs Engineering JV to perform specific tasks associated with the investigation into the existence and extent of subsurface voids, and the remedial work necessary to fill voids and compact loosened zones in specific areas above the Beacon Hill tunnels. Authorize the chief executive officer to: **a)** increase the contingency in the contract with Shannon & Wilson, Inc. to provide continuing geotechnical support services for the Beacon Hill Station and Tunnels Contract in the amount of \$1,700,000, for a new total authorized contract amount not to exceed \$16,268,581; and **b)** increase the contingency in the contract with Hatch Mott MacDonald/Jacobs to provide continuing civil engineering design support services for the Beacon Hill Station and Tunnels Contract in the amount of \$125,000, for a new total authorized contract amount not to exceed \$22,393,243

KEY FEATURES OF PROPOSED ACTION

- The proposed action will increase the contingency amounts in two existing professional services contracts supporting the construction of the Beacon Hill Station and Tunnels. The first proposed contingency increase is \$1,700,000 for the contract with Shannon and Wilson, Inc. (S&W) for geotechnical engineering services. The second proposed contingency increase is \$125,000 for the contract with Hatch Mott MacDonald/Jacobs Engineering JV (HMM/J), as the engineer-of-record, for civil engineering services. Both proposed actions are tied directly to the necessary remedial work following the discovery of subsurface voids above the Beacon Hill Tunnels.
- This proposed action is required because during the period of late-March through mid-July 2009, remedial work was immediately required to backfill specific subsurface voids and compact loosened zones in the vicinity of the voids in order to protect both the safety of the public and private property.

This work proceeded under the Chief Executive Officer's authority for handling emergencies or unusual or urgent matters and in compliance with ST procurement regulations (Resolution 78-1, Section 8) and under Federal Transit Authority provisions (Circular 4220.1F – Unusual and Compelling Urgency).

- Immediately after the discovery of a void above the Beacon Hill Tunnel, Sound Transit authorized S&W to provide additional geotechnical/geological services to conduct subsurface investigations including: a) drilling exploratory boreholes in target areas to probe for possible subsurface voids and loosened zones; and b) using non-destructive geotechnical geophysical investigative techniques conducted from the surface to check for subsurface voids and loosened zones. This investigation identified nine zones where voids and loose soils were encountered. Sound Transit and S&W identified, recommended, and implemented a remedial work program that was accomplished in two phases. First, the voids were backfilled with quick-setting cement-based fill material. Second, the loosened zones were compacted by carefully pumping cement grout into these zones under high pressure.
- Additionally, Sound Transit authorized HMM/J, engineer-of-record, to assist in the investigation and remedial work program. As the engineer-of-record, HMM/J reviewed the conditions of the tunnel liner in the target areas, back-checking tunnel stresses to confirm that the ground conditions (including areas where remedial work was performed) did not exceed design allowances for the liner. This work was accomplished before Sound Transit initiated passenger service on the Initial Segment.
- The requested ratification is necessary due to the unusual and compelling urgency to complete this work on an immediate basis in order to ensure the safety of the public and Sound Transit's infrastructure. This work is now substantially complete; however, additional contingency is required to cover the costs associated with the remedial work completed to date, and to cover additional engineering services to verify that all the required field work is complete and to document all work that was completed to backfill the voids and compact the loosened zones.
- The Board was notified in April 2009 and again in August, of these activities and was given an order of magnitude cost. Additionally, staff made a presentation to the members of the Central Link Oversight Committee in a regularly scheduled meeting on April 16, 2009, while this work was in progress.

BUDGET IMPACT SUMMARY

Current Project Phase: Construction
Projected Completion Date: 2009

Action Outside of Adopted Budget:	✓	Comments on Checked Items
This Project		
This Phase	✓	Proposed action a) requires funding from surplus budget within other phases of the Initial Segment project.
This Task	✓	Proposed action b) requires funding from unallocated contingency within the final design phase of the project.
Budget Amendment Required		

Key Financial Indicators:	✓	Comments on Checked Items
Contingency Funds Required		
Funding required from other parties (other than what is in financial plan)		

Not checked = action is assumed in current Board-adopted budget. No budget action or adjustment to financial plan required.

BUDGET DISCUSSION

The Adopted 2009 Lifetime Capital Budget for the Central Link Initial Segment is \$2.07 billion. Within that amount:

\$10,076,407 has been set aside for Design Services during Construction (DSDC) of the Beacon Hill Station and Tunnel contract (C710) in the final design phase.

- Motion No. M2009-79 would increase current commitments for this line item by \$125,000 for a revised total commitment of \$10,181,167, and result in a budget shortfall of \$104,760, which will be funded from final design unallocated contingency.
- Within the final design phase \$250,023 has been set aside for unallocated contingency. The proposed action would use \$125,000 of this amount, and leave a remaining balance of \$125,023 for unallocated contingency in this phase.

\$3,490,000 has been set aside for Geotechnical Services Package 2 Tunnels, which includes the Beacon Hill segment, in the construction services phase.

- The budget for this line item is fully committed. Motion No. M2009-78 would increase commitments to \$5,190,000, and result in a budget shortfall of \$1,700,000.
- A prior board motion (M2009-94, adopted 7/25/09) for PB Americas, Inc. to provide continuing construction management services for the Beacon Hill Station and Tunnel contract (C710) exhausted all funds remaining in the construction services phase, and left a budget shortfall of \$466,156. Approval of the proposed action would result in a combined budget shortfall of \$2,166,156 for the construction services phase that would require funding from surplus budget within other phases of the Initial Segment project.

The proposed action is within the Adopted 2009 Budget, and is affordable within the agency's long-term financial plan and subarea financial capacity. The action will have no new revenue impact on Sound Transit.

BUDGET TABLE

Ratify actions taken by Sound Transit staff directing performance of specific tasks associated with the remedial work to fill voids and compact loosened zones in specific areas above the Beacon Hill tunnels within the Central Link Initial Segment project:

Action Item a) Shannon & Wilson, Inc. (increase contingency to provide continuing geotechnical support services for the Beacon Hill Station and Tunnels (C710) contract.)

Action Item b) Hatch Mott MacDonald/Jacobs Joint Venture (increase contingency to provide continuing civil engineering design services during construction (DSDC) for the Beacon Hill Station and Tunnels (C710) contract.)

(Year of Expenditure \$000)

Initial Segment	Adopted 2009 Budget (A)	Committed To Date (B)	This Action (C)	Total Committed & Action (D)	Uncommitted (Shortfall) (E)
Agency Administration	189,213	173,267		173,267	15,946
Preliminary Engineering	33,289	33,310		33,310	(21)
Final Design	147,208	146,901	125	147,026	182
Right of Way	207,171	203,982		203,982	3,189
Construction	1,194,991	1,171,106		1,171,106	23,885
Construction Services	102,960	103,426	1,700	105,126	(2,166)
Third Party Agreements	62,861	63,076		63,076	(215)
Vehicles	132,307	131,799		131,799	508
Total Current Budget	2,070,000	2,026,867	1,825	2,028,692	41,308

Final Design Phase Detail

DSDC C710 Beacon Hill	10,076	10,056	125	10,181	(105)
Other Final Design	136,881	136,844		136,844	37
FD Unallocated Contingency	250	-		-	250
Total Phase	147,208	146,901	125	147,026	182

Construction Services Phase Detail

Geotech Package 2	3,490	3,490	1,700	5,190	(1,700)
Other Construction Services	98,419	98,885		98,885	(466)
CS Unallocated Contingency	1,051	1,051		1,051	-
Total Phase	102,960	103,426	1,700	105,126	(2,166)

Contract Amount - Hatch Mott MacDonald/Jacobs JV

	Board Approvals to Date (F)	Current Approved Contract Value (G)	Proposed Action (H)	Proposed Total for Board Approval (I)	Proposed Contract Value (J)
Contract Amount	20,877	22,268	-	20,877	22,268
Contingency	1,392	-	125	1,517	125
Total Contract	22,268	22,268	125	22,393	22,393
Percent Contingency	7%	0%	100%	7%	1%

Contract Amount - Shannon & Wilson, Inc.

	Board Approvals to Date (F)	Current Approved Contract Value (G)	Proposed Action (H)	Proposed Total for Board Approval (I)	Proposed Contract Value (J)
Contract Amount	13,392	13,905	-	13,392	13,905
Contingency	1,176	664	1,700	2,876	2,364
Total Contract	14,569	14,569	1,700	16,269	16,269
Percent Contingency	9%	5%	100%	21%	17%
less North Link - Northgate to 45th St	736	736	-	736	736
less University Link	5,737	5,737	-	5,737	5,737
less North Link - UW Sta to Brooklyn Sta	1,837	1,837	-	1,837	1,837
Total Initial Segment	6,258	6,258	1,700	7,958	7,958

Budget Shortfall

Task Level	\$Shortfall (K)	Potential Resources (L)	Source (M)
DSDC C710 Beacon Hill	125	250	Unallocated contingency within the final design phase
Geotech Package 2	1,700	41,308	Surplus budget in other phases of the Initial Segment project

(A) ADOPTED 2009 BUDGET amounts as adopted by resolution of the Sound Transit Board (R2008-14, approved 12/11/08).

(B) COMMITTED TO DATE amounts are from Agency WBS Report as of July 2009 + approved and pending board actions not recorded as of 7/31/09, or submitted after that date, and include allocated contingencies.

(1) "SHORTFALL" to the Adopted 2009 Budgets for Preliminary Engineering and Third Party phases: "Committed to Date" amounts shown here include contingencies allocated for preliminary engineering contracts and third party agreements that will not be used. Adjustments are in process.

(2) "SHORTFALL" to the Adopted 2009 Budget for the Construction Services phase - in addition to This Action - reflects a board motion (M2009-94, adopted 7/25/09) for PB Americas, Inc. to provide continuing construction management services for Beacon Hill Station and Tunnel (C710) construction, which will also be funded from surplus budget within other phases of the Initial Segment project.

SMALL BUSINESS PARTICIPATION

Shannon & Wilson, Inc.

Shannon & Wilson, Inc., as the prime consultant for this contract was committed to a 25% Small Business goal. S&W met or exceeded this goal during the original contract and early amendments to the contract when they completed the geotechnical reports. This proposed amendment does not impact this goal.

Hatch Mott MacDonald/Jacobs

HMM/J is the prime civil facilities design consultant for the Beacon Hill Tunnel contract. During construction, the need to engage the designer of record is driven by the scope of a change or review, and the timeliness of the response required. The actual small business utilization will vary depending on these needs. The resulting small business participation for the overall contract is estimated to be 8.0% at completion. This proposed amendment does not impact this goal.

PROJECT DESCRIPTION AND BACKGROUND FOR PROPOSED ACTION

Shannon & Wilson, Inc.

The original contract procurement with S&W was executed in 1999 to provide geotechnical services for the design of the Central Link Project, including the Beacon Hill Station and Tunnels. This professional services contract was subsequently modified to include geotechnical work for the Northgate segment, Beacon Hill exploratory test shaft, and the Pine Street Stub Tunnel. Subsequent to their work on final design, key staff from S&W were retained to provide geotechnical engineering support during construction for both the Beacon Hill Station and the tunnel bores.

Hatch Mott MacDonald/Jacobs Engineering JV

The original contract procurement with HMM/J was executed in August 2000, for final design of the civil facilities for the Beacon Hill Station and Tunnels. The final design for the Beacon Hill Tunnels and Station, including implementation of an exploratory test shaft program, was completed by the HMM/J team in December 2003. The final design was completed after a pause in the Project program from February to November 2001. Subsequent to their work on final design, key staff from HMM/J were retained to provide engineering design support during construction.

Voids Investigation / Remedial Work

In March 2009, Sound Transit was notified by a property owner about the discovery of a void on her property, near the corner of 18th Avenue South and South Lander Street. Sound Transit took immediate action to fill and stabilize this void, and set about investigating the underlying cause of the void and the possible existence of others. Under the chief executive officer's authority for handling emergencies and unusual or urgent matters, an integrated team of engineers and geologists from Sound Transit, S&W and HMM/J began subsurface explorations and probes, targeting the area and searching for other potential voids above both tunnel bores.

From April 2009 to approximately mid-August 2009, Sound Transit staff, with consultants, has worked with our contractor to fill the voids and stabilize the ground in the vicinity immediately east of the Beacon Hill Station extending approximately 250-350 feet along the length of the tunnel bores. This remedial work was accomplished in two phases. The first phase focused on probing target areas and filling voids with a quick-setting cement-based fill material (called "controlled density fill" or CDF). In April and May, the team conducted a thorough investigation and discovered subsurface voids in various shapes/sizes and at various depths below the ground surface at nine locations. Overall, the team drilled 38 probe holes and pumped in approximately 2550 cubic yards of CDF. Additionally, microgravity testing was conducted in order to provide Sound Transit staff and consultants the clearest possible picture of subsurface conditions in the affected area.

The second phase of this program was to stabilize any and all “loosened” zones or layers of soil that developed in proximity to the voids. These loosened zones or layers required stabilization to avoid any potential further ground displacements including during any future earthquakes. To address this concern, Sound Transit’s team recommended a program to “compact” these loose zones, by carefully pumping cement grout through a pattern of drill holes in the vicinity of the nine locations where the voids were discovered. This “compaction grouting” program required more engineering oversight and labor to ensure that these grout materials are properly placed in these zones because the grout is inserted at pressures ranging from 300 to 600 psi to effectively compact these loose zones. This phase of the work was undertaken in June and July and the team drilled 61 holes and pumped in approximately 293 cubic yards of grout.

Given the possible consequences that could have arisen as a result of the existence of the voids, all of the above-described work was undertaken on an immediate, emergency basis. The primary concern of Sound Transit staff and consultants was to ensure the safety of members of the public and to ensure the integrity of the infrastructure previously constructed. The circumstances presented were unusual and urgent, and the chief executive officer’s declaration of an emergency was appropriate and correct under both Resolution 78-1 and FTA guidelines.

Prior Board/Committee Actions on the Contract with Shannon & Wilson, Inc.

Motion/Resolution Number & Date	Summary of Action
M2007-50 5/10/07	Authorized the chief executive officer to execute a contract amendment with Shannon & Wilson, Inc. to provide continuing geotechnical support services during construction for the Beacon Hill Station and Tunnels project in the amount of \$900,000, with a 10% contingency of \$90,000 totaling \$990,000, for a new total authorized contract amount not to exceed \$14,568,581
M2004-72 7/22/04	Contract amendment with Shannon & Wilson, Inc., for scheduled and on-call geotechnical assistance during construction of the Beacon Hill Tunnel and Station and the Retrofit of the Downtown Seattle Transit Tunnel for the Central Link Light Rail Initial Segment, in the amount of \$2,400,000, with a 4% contingency of \$100,000, for a total of \$2,500,000 for a new total authorized contract amount not to exceed \$13,578,581.
M2003-101 10/9/03	Contract amendment with Shannon & Wilson, Inc., to provide additional geotechnical engineering services for the Beacon Hill Tunnel in the amount of \$251,800, with a 10% contingency of \$25,180, for a total of \$276,980, and for a new total authorized contract amount not to exceed \$11,078,581.
M2002-136 12/12/02	Amendment with Shannon & Wilson, Inc., to provide geotechnical services necessary for final design of the Link Pine Street Stub Tunnel in the amount of \$200,000, with a 10% contingency of \$20,000, for a total of \$220,000, and a new total authorized contract amount not to exceed \$10,801,601.
M2000-107 10/26/00	Amendment with contract RTA/LR 106-98F with Shannon & Wilson, Inc., for geotechnical engineering services of the Central Link light rail project. The action extends the contract period to June 30, 2001 and establishes a contract amendment amount of \$1,093,250 and a 10% contingency of \$109,325, for a total contract amendment amount not to exceed \$1,202,575, and a new total contract amount not to exceed \$10,581,601.
M2000-46 6/22/00	Amendment with Shannon & Wilson, Inc., to proceed with additional professional geotechnical engineering boring, lab work and reports for the north corridor in the amount of \$192,931, with a 10% contingency of \$19,293, for a total amendment not to exceed \$212,224, and a total contract amount not to exceed \$9,379,026.

M2000-40 5/18/00	Contract amendment with Shannon & Wilson, Inc., adding a 10% contingency of \$131,898 to a previously approved contract amendment of \$1,317,898 for a total authorized amount not to exceed \$1,449,688 for geotechnical engineering services on the Central Link Light Rail project
M2000-19 2/24/00	Contract amendment to Contract No. RTA/LR 106-98B for geotechnical engineering services with Shannon & Wilson, Inc., and to proceed with professional geotechnical engineering work on the Northgate segment in an amount of \$1,317,898, with a 20 percent contingency of \$260,000 for a total amount not to exceed \$1,577,898.
M99-17 3/25/99	Contract with Shannon & Wilson, Inc., for geotechnical engineering services for design support on the Central Link Light Rail Project in an amount not to exceed \$7,736,407, which includes a 10% contingency.

Prior Board/Committee Actions on the Contract with Hatch Mott MacDonald/Jacobs Engineering JV

Motion/Resolution Number & Date	Summary of Action
M2006-46 06/08/06	Authorized the chief executive officer to execute a contract amendment with Hatch Mott MacDonald/Jacobs Joint Venture to provide civil engineering design services during construction, including engineering oversight services for the sequential excavation work, for the Central Link Light Rail Initial Segment - Beacon Hill Tunnel, in the amount of \$3,120,000, for a new total authorized contract amount not to exceed \$21,788,763.
M2004-51 05/27/04	Authorized the chief executive officer to execute a contract amendment with Hatch Mott MacDonald/Jacobs Joint Venture to provide civil engineering design services during construction, including engineering oversight services for the sequential excavation work for the Beacon Hill Tunnel in the Central Link Light Rail Initial Segment Project in the amount of \$5,580,000 with no contingency for a new total authorized contract amount not to exceed \$18,668,763.
M2003-102 10/09/03	Authorized the chief executive officer to execute a contract amendment with the Hatch Mott MacDonald/Jacobs Joint Venture to provide additional civil engineering final design services for the Beacon Hill Tunnel in the amount of \$975,000, with a 10% contingency of \$97,500, for a total of \$1,072,500, and for a new total contract amount not to exceed \$13,088,763
M2002-98 09/12/02	Executed a contract amendment with the Hatch Mott MacDonald/Sverdrup Joint Venture to provide additional civil engineering final design services for the Beacon Hill Station in the amount of \$2,571,701 for a new total authorized contract amount not to exceed \$12,016,263.
M2002-09 02/14/02	Executed a contract amendment with Hatch Mott MacDonald/Sverdrup (HMM/S) Joint Venture to provide additional Civil Engineering Final Design Services in the amount of \$3,355,269 plus a contingency of \$287,293 for a total of \$3,642,562 and for a new total authorized contract amount not to exceed \$9,444,562
M2000-55 07/13/00	Executed a contract with Hatch Mott MacDonald/Sverdrup for civil engineering final design services associated with construction of the Beacon Hill tunnel segment for the Central Link Light Rail project for a contract amount of \$5,275,000 with a 10% contingency of \$527,000 for a total authorized amount not to exceed \$5,802,000.

CONSEQUENCES OF DELAY

The activities undertaken in connection with the investigation and remedial work relating to the voids have been performed under the chief executive officer's authority as a compelling urgency. This work is substantially complete, and any delay in approving this action would delay payment for these necessary services.

PUBLIC INVOLVEMENT

Throughout all phases of this work, Sound Transit staff has provided extensive outreach to the individual property owners and immediate neighbors in the target areas where voids were filled and compaction grouting was completed. The ST team (including executive management, construction management, engineering and community outreach) worked together to provide timely updates during each stage of the work program. Also, per RCW 39.04.020 and 39.04.280, Sound Transit posted notice in the local newspaper updating residents of the work performed.

ENVIRONMENTAL COMPLIANCE

JI, 09/04/09

LEGAL REVIEW

JN, 09/04/09

SOUND TRANSIT

MOTION NO. M2009-78

A motion of the Board of the Central Puget Sound Regional Transit Authority ratifying the chief executive officer's finding of the existence of an emergency in connection with the discovery of subsurface voids above the Beacon Hill tunnels. Additionally, ratifying the actions taken by Sound Transit staff directing both Shannon and Wilson, Inc. and Hatch Mott MacDonald/Jacobs Engineering JV to perform specific tasks associated with the investigation into the existence and extent of subsurface voids, and the remedial work necessary to fill voids and compact loosened zones in specific areas above the Beacon Hill tunnels. Authorizes the chief executive officer to increase the contingency in the contract with Shannon & Wilson, Inc. to provide continuing geotechnical support services for the Beacon Hill Station and Tunnels Contract in the amount of \$1,700,000, for a new total authorized contract amount not to exceed \$16,268,581.

Background:

Shannon & Wilson, Inc.

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undertaken in June and July and the team drilled 61 holes and pumped in approximately 293 cubic yards of grout.

Given the possible consequences that could have arisen as a result of the existence of the voids, all of the above-described work was undertaken on an immediate, emergency basis. The primary concern of Sound Transit staff and consultants was to ensure the safety of members of the public and to ensure the integrity of the infrastructure previously constructed. The circumstances presented were unusual and urgent, and the chief executive officer's declaration of an emergency was appropriate and correct under both Resolution 78-1 and FTA guidelines.

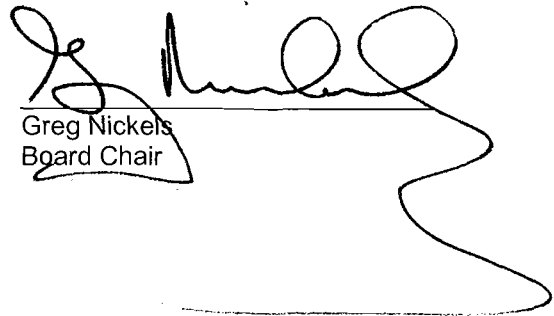
Motion:

It is hereby moved by the Board of the Central Puget Sound Regional Transit Authority that the chief executive officer's finding of the existence of an emergency in connection with the discovery of subsurface voids above the Beacon Hill tunnels is ratified. Additionally the actions taken by Sound Transit staff directing both Shannon and Wilson, Inc. and Hatch Mott MacDonald/Jacobs Engineering JV to perform specific tasks associated with the investigation into the existence and extent of subsurface voids, and the remedial work necessary to fill voids and compact loosened zones in specific areas above the Beacon Hill tunnels are ratified. The chief executive officer is authorized to increase the contingency in the contract with Shannon & Wilson, Inc. to provide continuing geotechnical support services for the Beacon Hill Station and Tunnels Contract in the amount of \$1,700,000, for a new total authorized contract amount not to exceed \$16,268,581.

APPROVED by the Board of the Central Puget Sound Regional Transit Authority at a regular meeting thereof held on September 10, 2009.

ATTEST:

Marcia Walker
Marcia Walker
Board Administrator


Greg Nickels
Board Chair