SOUND TRANSIT

MOTION NO. M99-17

Contract for professional geotechnical engineering services
BACKGROUND AND COMMENTS

Meeting:	Date:	Type of Action:	Staff Contact:	Phone:
Finance Committee	3/18/99	Recommend Board Approval	Paul Bay	689-4761
Board of Directors	3/25/99	Approval	Joe Gildner	689-3350

ACTION:

We are seeking Board approval to award a contract for professional geotechnical engineering services to the Shannon and Wilson team for design support on the Central Link Light Rail Project. The scope of work for this contract includes the comprehensive geotechnical engineering services for all underground workings for the locally preferred alternative associated with the Central Link Light Rail Project designated by the Board of Directors on February 25, 1999.
The negotiated amount of this contract is $7,036,407. An additional $700,000 (approximately 10%) is requested to be authorized as a contingency reserve (to cover changes in the scope of work). Therefore, the total amount for this contract is $7,736,407.

The award of this contract is critical for the completion of the preliminary engineering design program and for the design-build procurement documents for heavy civil underground work in the North Corridor. The geotechnical engineering in this scope of work will supplement the work completed to date and allow our design team to position the tunnels and stations, in the most favorable subsurface geologic conditions along the preferred alignment in the North Corridor. Likewise, this will provide our team with more factual information to better define the allocation of risk between Sound Transit and our design-build joint venture teams regarding anticipated geotechnical and geological conditions. Finally, this work will provide the necessary data and factual information to assist our staff in determining whether the overall budget is adequate and the overall schedule is achievable for all underground work on the Central Link Light Rail Project.

BACKGROUND:

In December 1998, Sound Transit staff advertised a Request for Qualifications and Proposals (RFQ/P) for geotechnical engineering services for the Central Link Light Rail Project (RFQ/P No. RTA/LR 106-98). The scope of work for this RFQ/P was divided into five packages along the entire alignment consistent with the staff recommended locally preferred alternative. The limits of each package are described as follows:

- *Package #1* Northgate to North Tunnel Portal (Segment A *as described in the Draft Environmental Impact Statement*);
- *Package #2* North Tunnel Portal to Downtown Seattle Transit Tunnel (Segments A and B) and Beacon Hill Tunnel (Segment C);
- *Package #3* International District Station to S. Norfolk Street, along Martin Luther King Jr. Boulevard (Segments C and D);
- *Package #4* Norfolk Street to just north of SR-518 in Tukwila (including the maintenance base and central yard) (Segment E); and
- *Package #5* North of SR-518 to South Terminus at S 200th Street in Sea-Tac (Segment F).

Qualifications and proposals on all five packages were received by Sound Transit on January 26, 1999. One of the packages (package #1) has been dropped from further consideration based on the designation of the locally preferred alternative designated by the Board on February 25, 1999.

For package #2, the Geotech Selection Committee interviewed three qualified teams in a very competitive field. Based on the written documentation and the presentation during interviews the Committee selected the Shannon & Wilson team as the "most" qualified. The Committee agreed their proposed technical approach combined with the qualifications of their key personnel and their applied local experience on similar work in the Central Puget Sound region makes their team the most qualified.

Presently, the Committee is interviewing teams for Packages #3, #4, and #5, and staff will solicit a request for award from the Board on each of these packages at a later date.

RELEVANT BOARD POLICIES AND PREVIOUS ACTIONS TAKEN:

- Adoption of *Sound Move,* the Ten-Year Regional Transit System Plan (May 31, 1996)
- Adoption of Implementation Guide (May 22, 1997)
- Adoption of First Moves (May 22, 1997)
- Resolution No. 78-1, establishing delegation of authority and procurement procedures (April 9, 1998)
- Resolution 98-49, adopting Fiscal Year 1999 Budget (November 12, 1998)

KEY FEATURES:

The immediate start of this work is very important to support of the Project's overall schedule and the critical issues that staff has identified for the heavy civil underground work in the North Corridor. On February 11, 1999, staff outlined the critical issues in our discussion for the use of design-build contract delivery for the underground work. This geotechnical work and the

documentation that our consultants will develop will be an integral part of the overall RFP that we are developing for the design-build procurement packages.

FUNDING:

Funding for this work is included as part of the *Sound Move* Plan. The proposed capital budget for 1999 preliminary engineering was $38 million, which did not include funding for these services. The approved 1999 budget included an additional $16 million for expanded geotechnical services to be performed in 1999. While this contract is for approximately $7.7 million, staff intends to procure additional geotechnical services after the publication of the final Environmental Impact Statement. The total cost of all additional geotechnical services to be performed this year will not exceed the approved amount of $16 million.

Scope of work

The "original" scope of work, as described in the RFQ/P for package #2, is consistent with the staff recommended locally preferred alternative that was published in early December 1998. (See Attachment #1). However, the scope of work has been revised and reformatted to be consistent with the designated locally preferred alternative chosen by the Board on February 25, 1999. In particular, staff has divided the scope and the contract amount into two phases as described below under the Cost section of this document.

Procurement and selection process

The Shannon and Wilson team has been selected through a very competitive qualification-based process established in our Request for Qualifications and Proposals (RFQ/P). Sound Transit staff fulfilled a good faith effort to fully disclose all available geotechnical data and reports developed by the Civil Facilities Design Consultant Team as part of the procurement process.

M/W/DBE participation

In their proposal, the Shannon and Wilson team has committed themselves to providing at least 25% M/W/DBE participation, regardless of the final contract amount. The estimated participation of DBE and SBA 8(a) firms is 21.2%. Another 4.7% is estimated for State of Washington certified M/WBE firms that are currently not DBE or SBA 8(a) certified. To date, Shannon & Wilson's participation on current contracts with Sound Transit is 36%.

Cost

The cost summary for Central Link Light Rail Project – Package 2 is attached (see Attachment #2). The cost proposal is separated into two phases of work based on the Board's designation of the locally preferred alternative on February 25. Phase I is the comprehensive geotechnical engineering services for the Beacon Hill Tunnel Alignment and the North Corridor Tunnel Alignment. In the latter case, the alignment extends between the existing Downtown Seattle Transit Tunnel and the designated terminus just north of the 45th Street Station. The negotiated cost for Phase I is $6,051,311.

Phase II is the geotechnical engineering services for the tunnel alignment between designated terminus adjacent to the 45th Street Station and Northgate. The engineering work described in this phase will not begin without approval from the Board. However, staff has negotiated a firm price for this phase if the Board decides to continue with preliminary engineering for an alignment to Northgate. The negotiated cost for Phase II is $985,097. This negotiated amount for Phase II would cover costs for geotechnical work for any alignment in Segment A designated by the Board.

The negotiated cost for geotechnical services for Phase I and II is $7,036,407 without contingency. Staff is recommending a contingency of approximately 10 percent, or $700,000, to cover the cost for changes to the scope of work. Therefore, the total amount of this contract is $7,736,407. Staff is recommending that the Board approve the entire budget with the understanding that our consultants will only proceed with Phase I. Phase II work will be deferred pending any further actions from the Board regarding the locally preferred alternative.

CONSEQUENCES OF DELAY:

If the award of this contract is delayed it will delay the completion of preliminary engineering for the underground workings on the Central Link Light Rail Project. Furthermore, it will delay the aggressive procurement schedule for the design-build contract as we discussed with the Board on February 11, 1999. In effect, this will impact the critical path of the entire schedule and jeopardize our chances of successfully completing our project and commencing with operations in November 2006.

LEGAL REVIEW:

The Legal Department has reviewed and approved the Background and Comments and Motion.

SOUND TRANSIT

MOTION NO. M99-17

A motion of the Board of the Central Puget Sound Regional Transit Authority authorizing the Executive Director to execute a contract with Shannon and 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.

Background:

The scope of work for this contract includes the comprehensive geotechnical engineering services for all underground workings for the locally preferred alternative associated with the Central Link Light Rail Project designated by the Board of Directors on February 25, 1999. Specifically, this contract provides geotechnical services for the tunnels and deep subterranean stations in the North Corridor and the tunnels and deep station in Beacon Hill. The negotiated amount of this contract is $7,036,407. An additional $700,000 is requested to be authorized as a contingency reserve (to cover changes in the scope of work). Therefore, the total amount for this contract is $7,736,407. However, work will only be authorized for Phase I, in the amount of $6,051,311, plus a contingency of ten percent. Phase II activities will only be undertaken with specific additional Board authorization.

Motion:

It is hereby moved by the Board of the Central Puget Sound Regional Transit Authority that the Executor Director is authorized to execute a contract with Shannon and 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 including a 10% contingency. Of this amount, $6,651,311 will be authorized at this time.

Approved by the Board of the Central Puget Sound Regional Transit Authority at a regular meeting thereof on the 25th day of March, 1999.

Paul E. Miller
Board Chair

ATTEST:

Marcia Walker
Board Administrator

Attachment #1
Scope of Work

Package #2 ***North Tunnel Portal to Downtown Seattle Transit Tunnel (Segment A and B) Beacon Hill Tunnel (Segment C)***

This package includes all the geotechnical work for the twin tunnels and subterranean stations located north of downtown Seattle (segments A and B, figures 1 through 3) and the twin tunnel section south of downtown Seattle through Beacon Hill (segment C, figure 4). In the north corridor, Sound Transit has designated all the underground heavy civil work on the project's critical path. Therefore, Sound Transit is considering alternate contract delivery systems (i.e. design/build contracts) for the heavy civil construction of these underground workings. Underground work in Beacon Hill is not as critical, and, therefore, Sound Transit is considering a more traditional construction contract (i.e. design/bid/construct) for this work.

The locally preferred alternative (LPA) and thus, the tunnel alignment and extent in Segment A has not been determined by the Board at this time. If the Board were to choose to complete preliminary engineering for Segment A, then the Board will need to identify the LPA for that segment.

In segment B, the tunnel alignment will pass underneath the University District, Portage Bay, Capitol Hill and First Hill before connecting with the existing Downtown Seattle Transit Tunnel (DSTT) just past Westlake Station. On Figure 3, this alignment is identified as segment B1. In general, this segment of the alignment includes the following major underground facilities.

- Four deep stations identified as 45th Street Station, Pacific Street Station, Capitol Hill Station and First Hill Station from north to south. Currently, each of the stations are being designed as a center platform facility (380 feet long) with elevator service and the typical spacing between the centerline of the tracks is roughly 85 ft).
- The deep stations will include shafts for emergency ventilation and vertical circulation (via high speed elevators) and possibly a headhouse facility below the surface plaza for ancillary rooms to house mechanical and electrical equipment.
- Two dedicated ventilation structure (one near 50th Street, north of the 45th Street Station, and the other near SR-520 (along the south shoulder of the freeway)), that will house emergency fans and possibly other electrical/mechanical equipment. These structures will connect with the tunnel via a shaft.
- Two pairs of single crossover structures that connect both tunnel bores. The crossover structures allow operations in both directions via one tunnel when one bore is out of service for maintenance.

In the University District, the depth of the tunnel will range from 120 to 240 feet below the existing ground surface. The increased depth occurs between Pacific Street and NE 45th Street Stations because the grade of the topography is roughly 6%. At NE 45th Street, the subterranean station will be located below the existing parking lot between the Burke Museum and 15th Avenue NE and it will likely be the deepest station in the north corridor. The preliminary engineering design has positioned the station platform where the top of rail varies from 190 to

230 feet below the existing ground surface. At the plaza level, the station area development will interface with the paved areas around the Burke Museum along with 15th Avenue NE and NE 45th Street.

At the south end of the University District, the Pacific Street Station is located immediately south of NE Pacific Street and west of 15th Avenue NE. Currently, the depth of this station platform to top of rail is approximately 180 feet. The station area design and planning must consider the potential impacts of construction on surface facilities and utilities and the plaza connections with these same facilities and adjoining streets.

Continuing south of the University District, the alignment crosses underneath Portage Bay on roughly a tangent section where the subaqueous crossing is approximately 1300 feet long. Previous geotechnical field investigations in the bay have identified a variety of materials within the tunnel horizon ranging from soft "mud" deposits to dense sands and hard clayey material. In particular, on the south side of the main navigational channel, sampling revealed a trough of soft clay and silt and these soft deposits extend as deep as 60 feet below the dredge line.

South of Portage Bay, the bores continue underneath Capitol Hill as the alignment passes below SR-520 and 10th Avenue E. Near SR-520, the facilities design team is evaluating another potential site for a dedicated ventilation structure that is roughly 200 to 240 feet below the ground surface. As the alignment continues south underneath 10th Avenue E the bores pass near St Mark's Cathedral. In this vicinity, previous geotechnical explorations encountered thick deposits of sand and gravel below the upper groundwater table extending down to the tunnel horizon.

As the tunnel alignment crosses underneath E Howell Street the bores enter into the Capitol Hill Station where the top of rail is roughly 160 feet below the ground surface. Currently, Sound Transit is also considering another possible alternative whereby the station is constructed using cut-and cover techniques. In the latter case, the depth to top rail would decrease to approximately 80 feet. This station will service the Capitol Hill neighborhood and Central Seattle Community College. The station area design and planning must consider the potential construction impacts to existing structures and utilities and the interface connections with these same structures and adjoining streets.

As the alignment continues south it passes out of the Capitol Hill neighborhood and into the First Hill neighborhood. In First Hill, there will be a station adjacent to Swedish Hospital and Seattle University. This station will be located parallel to E Madison Street between Minor and Boylston Streets and the top of rail is roughly 170 feet below the ground surface. Again, the station area design and planning must consider the potential impacts to existing structures and utilities and the interface connection with the same structures and adjoining streets.

Between the First Hill Station and the Downtown Seattle Transit Tunnel (DSTT) the tunnel bores will pass underneath I-5. The undercrossing at I-5 includes an area where both bores must pass through the existing massive tangent pile wall that is supporting First Hill. Currently, Sound Transit and the Civil Facilities Design Consultant team are developing a scheme to accomplish this crossing. The conceptual design and the interface with the highway substructure have been

reviewed with officials from WSDOT and they have preliminarily approved the concept design. In document #5, section C, item C-7, Sound Transit has provided a summary of the design for this undercrossing.

In segment C, alternative C1 on Figure 4 includes a tunnel through Beacon Hill with a length of roughly 4500 route feet. As the tunnel bores continue through Beacon Hill the depth from the ground surface to the top of rail increase to roughly 210 feet. At each end of the proposed alignment the Civil Facilities Design Consultant team has identified some unstable slopes that will impact the design and construction of the portal headwalls. For this phase of the LRT project Sound Transit staff is recommending the construction of a Beacon Hill Station "shell" to provide for a future transit station.

Geotechnical Tasks

The overall length of these segments of the Central Link LRT is roughly 34,500 route feet. Considering the geotechnical guidelines mentioned previously, Sound Transit has estimated roughly 20,000 to 23,000 lineal feet of drilling to complete the field investigations.

The scope of the work includes the geotechnical site investigations, laboratory work and engineering studies for all the underground workings and the various connections and interfaces in and around each of the station plazas. For this contract, the Geotechnical Consultant team will provide a separate report for the GDR, GIR and GBR for all underground workings

In Segment A, the delivery dates for the various reports shall comply with the following schedule.

Document	Submittal Date
Draft GDR	July 30, 1999
Draft GIR	August 20, 1999
Final GDR	September 3, 1999
Final GIR	October 1, 1999
Draft GBR	November 19, 1999
Final GBR	December 23, 1999

For segment C, the scope of work includes all the geotechnical site investigations, laboratory work and engineering studies for the Beacon Hill tunnel and the station shell. The delivery dates for the various reports shall comply with the following schedule.

Document	Submittal Date
Draft GDR	May 28, 1999
Draft GIR	June 11, 1999
Final GDR	June 25, 1999
Final GIR	July 9, 1999
Draft GBR	August 6, 1999
Final GBR	August 27, 1999