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July 5, 2005

Mr. John Ladenburg
Chairman, Sound Transit Board
Union Station
401 South Jackson Street
Seattle, WA 98104-2826

Re: Sound Transit North Link Project, First Hill Station

Dear Mr. Ladenburg:

By way of introduction, my name is Dennis McCarry. I am a member of Links Technical Oversight Panel, serving from its inception in 1999 to the present. My contribution has been mainly advisory on matters of constructability and feasibility. My service commenced on the original North Link Scheme from Convention Place to NE 45th St., and continued on the Beacon Hill Tunnels and Station segment.

I have had over forty (40) years experience in constructing underground projects, many of which were difficult and challenging. I was in charge of underground construction for Guy F. Atkinson Company which was recognized as a premier world class constructor in that era. I am particularly proud of managing construction on two Seattle high profile tunnels; Baker Ridge Tunnel on I-90 and the Seattle Bus Tunnel. Both of these tunnels had their unique soil condition surprises and construction challenges which were solved in co-operation with the owners. These tunnels were completed within budget and on time without disputes or claims. Since my retirement in 1993 I have been active as a consultant on many large projects both national and international. My consulting services have been equally divided between Technical Review Boards and Disputes Resolution Boards.

As a member of the Technical Oversight Panel for Sound Transit over the last five years, I have participated in a number of meetings regarding the constructability costs and risks of construction, including several meetings with the two short-listed contractors on the North Link. The original North Link had several very challenging elements; namely the Portage Bay underwater crossing, Broadway Station, requiring mining rather than cut & cover, the I-5 crossing, three deep mined stations constructed by the SEM method. The present plan, as reviewed on October 2004, has eliminated many of the very risky and expensive construction

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elements. The underwater crossing has been by-passed. The Capital Hill Station has been relocated allowing standard cut & cover construction. The two deep stations at Pacific and NE 45th Street have been replaced with shallow cut & cover type station construction. The revised plan retained two of the challenging elements; First Hill deep station and the I-5 crossing. The I-5 crossing is more a matter of expense rather than risk, as a very effective and positive plan has been adopted. There should not be a schedule risk as it can be a stand alone activity at one end of the project. This leaves First Hill Station as the one high risk element of construction remaining.

It is my understanding that the subsurface conditions predicted for First Hill are quite similar to the Beacon Hill station. SEM tunneling in these conditions require extensive ground improvement treatment. This treatment will reduce the risk but not eliminate it. The deep shafts will also require expensive slurry wall methods. This station is located approximately half way between Capital Hill and the southern portal. Any serious delays occurring in the station and shaft construction will impact the overall project. It is impossible to construct a project of this nature without serious inconvenience to the neighborhood.

SEM mining or tunneling is relatively new to the U.S., especially in soft ground applications. U.S. contractors have not had this experience and are therefore not comfortable in bidding it. Attempts to lure foreign contractors into our market have not been successful to date, with the exception of a few who have had a presence for several years. SEM mining is not without its risks, and a failure could be catastrophic. Beacon Hill is the first U.S. deep underground station to be constructed by SEM in soft ground conditions. This will set the precedent for many years to come. In my discussions with the two short listed bidders on the original scheme, they expressed serious concerns about the deep stations, especially First Hill Station.

In recent years there has been a shortage of bidders on high risk underground construction. Many projects are fortunate to draw three or less bidders. This is due to several factors such as; limited bonding capacity, attrition of several due to bankruptcy and combination of joint venture groups to share the risk.

In summary and for the reasons stated above, I would highly recommend eliminating the deep underground station of First Hill. The remaining contract would consist of reasonably low risk tunneling conditions with standard cut & cover type shallow stations. This would entice strong bidding competition and assure a timely completion of the project.



Dennis C. McCarry, Underground Consultant
July 5, 2005

Bc: Joseph P. Gildner, PE
Central Puget Sound Reg. Transit Authority
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