



February 3, 2009

Alec Williamson
Design Engineering Manager
Washington State Department of Transportation
Northwest Washington Division
Alaskan Way Viaduct and Seawall Replacement Program
999 Third Avenue, Suite 2424
Seattle, WA 98104

Subject: SR 99 Alaskan Way Viaduct Phase 2 EIS
Preliminary Ballard Connection to 54' Diameter Single Bore Tunnel

Reference: AAA.02.RFS.01
LOT-0211

Dear Alec:

Parsons Brinckerhoff herewith submits the **draft** work product noted below from the Phase 2 EIS Continuation Scope of Work to your staff.

TASK	WORK PRODUCT	QUANTITY
AAA.02.RFS.01	Preliminary Ballard Connection to 54' Diameter Single Bore Tunnel	6 Hard Copies & 2 CDs

This **draft** work product was prepared to support the Central Waterfront Partnership process under the direction of the Independent Project Manager.

Please advise if further information is required. As always, you may reach me at (206) 382-6352. If you have any questions about this deliverable, please contact Gordon Clark at (206) 382-5246.

Very truly yours,
Parsons Brinckerhoff

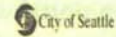
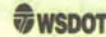
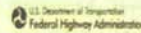

Mike Rigsby, P.E.
Project Manager

Enclosures

CC w/attachment: Rick Conte, PB
Gordon Clark, PB (2)
Norm Petersen, PB
Stephanie Kirby, PB
Kathleen Boyle, (letter only)
Ken Fiorentino, Jacobs
PB File 160073S. AAA.02.RFS.01



Alaskan Way Viaduct & Seawall Replacement Program



TO: Alec Williamson

FROM: Gordon Clark

SUBJECT: Preliminary Ballard Connection to 54' Diameter Single Bore Tunnel

DATE: January 12, 2009

Introduction

A request was made to prepare a conceptual design configuration and cost estimate for a SB/NB connection from Elliott & Western Avenues to the proposed 54' single bore tunnel.

Scope

The connection tunnel would have approximate outside dimensions of 42 feet wide by 48 feet tall and 2,700 feet long. The planning level cost estimate of \$770 million is a very preliminary number based on limited engineering and no geotechnical information. We believe a good range of cost would be \$650-\$850 million at this early stage. The planning level cost estimate includes risk, escalation and contingency see attached.

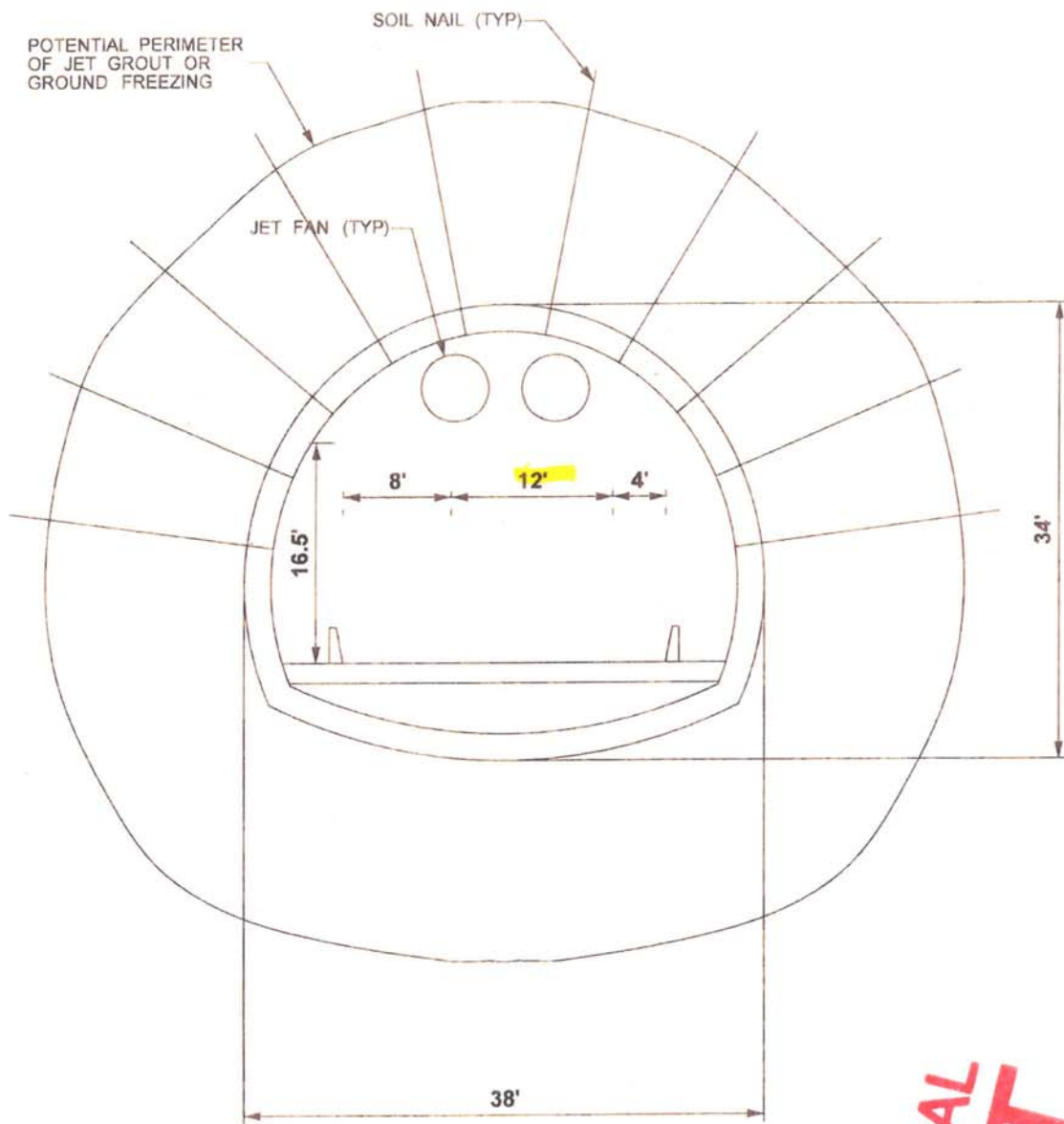
The intent of this concept was to provide direct access to the large bored tunnel, to and from Ballard via Elliott and Western Avenues. It is thought that one lane with full shoulders in each direction would have enough capacity for these movements. Further traffic analysis would be needed to confirm this assumption. A rough cross section was developed that assumed a Sequential Excavation Method (SEM) construction technique that involves extensive grouting to stabilize the ground, followed by sequential mining and the step-by-step excavation of ground and application of shotcrete and ribs to support the longitudinal cavern being created. This was thought to be the most economical approach given the short alignment and need to create an underground interchange with the SR 99 Tunnel. The cost was estimated based on an alignment that connects to the tunnel at approximately Union Street with a dual level roadway to match the SR 99 Tunnel. The SEM section would stack single lanes and shoulders and would unbraided at Virginia Street. The SEM tunnel would require a vent shaft to be located near Union Street and Post Alley that would be approximately 230 feet deep. The SEM tunnel would be ventilated using jet fans at 300 feet on center in conjunction with the vent shaft to supply fresh air or extract smoke depending on the need.

Item Description	Cost (Millions)
SB on-ramps and NB off-ramps Ballard Connection to 54' tunnel (Sequential Excavation Method Construction)	223
price include Vent shaft	
Dewatering Allowance	3
Utility Allowance	5
Tunnel Systems Allowance	40
Subtotal Direct Cost	271
Construction Allowance for Underdeveloped Design	339
Add 25.0%	
CONSTRUCTION ESTIMATE (SEM Tunnel Only) \$339	
Contract Mgmt, Admin, & Const Mgmt	53
15.50%	
Preliminary & Final Design	53
15.75%	
Tunnel Cost (without Escal & Cont / Risk)	445
Contingency	498
Add 12%	
Risk	647
Add 30%	
Escalation (per Global Insight)	748
Add 15.55%	
Right-of-Way Allowance	20
PROGRAM COSTS FOR TUNNEL ONLY \$768	
Rounded Total \$770	

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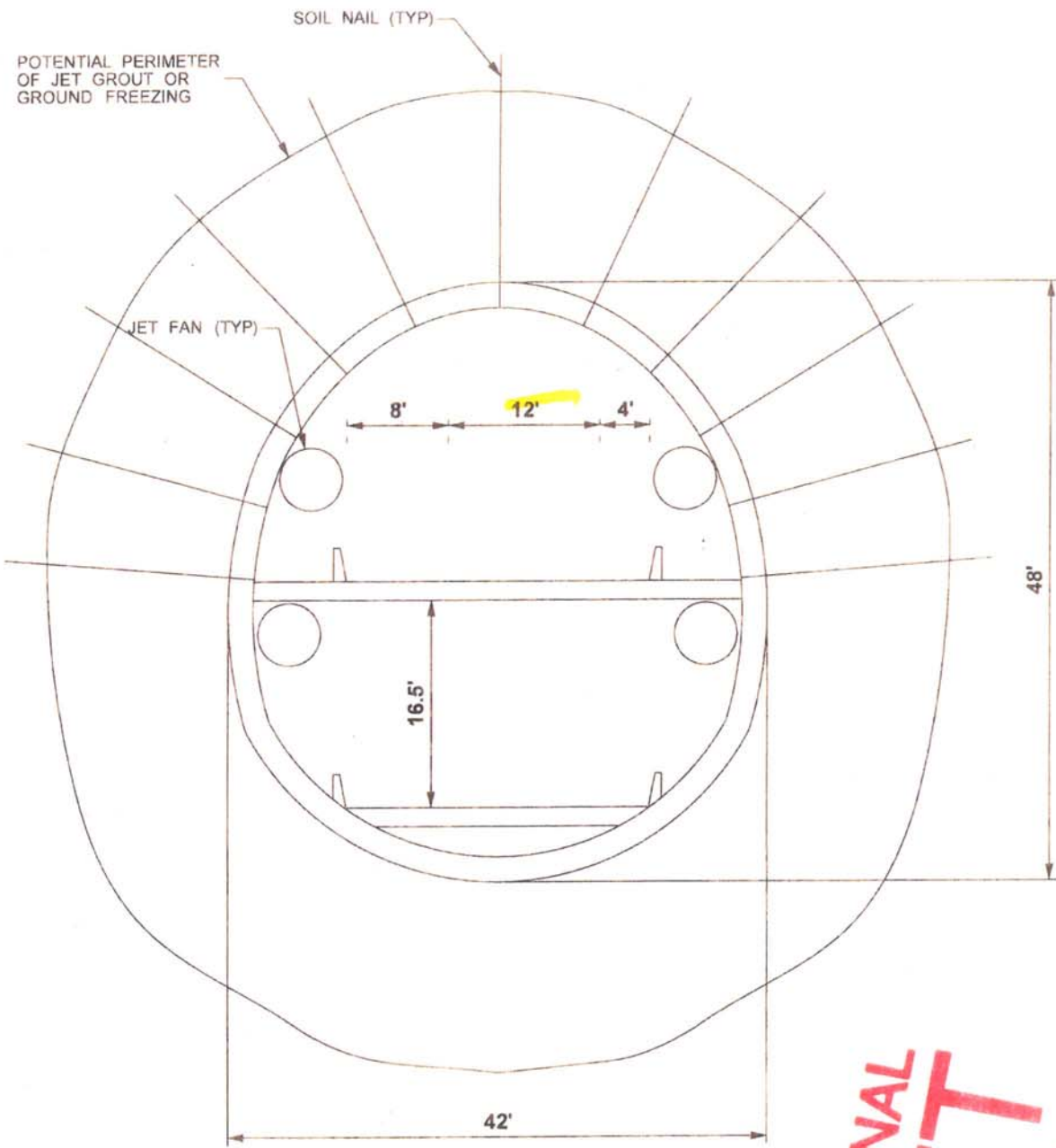
Elliott / WESTERN AVE RAMP TO S4 B01C



CONCEPTUAL SECTION
 ELLIOTT / WESTERN SEM TUNNEL
 (ONE LEVEL)

B - B

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CONCEPTUAL SECTION
 ELLIOTT / WESTERN SEM TUNNEL
 (TWO LEVELS)

A - A

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