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SR 99 Bored Tunnel Alternative Design-Build Project

QUALITATIVE EVALUATION FORM

To be filled out by Advisors/Evaluators

Advisor/Evaluator: EVALUATORS

Proposer: STP

TECHNICAL SUBJECT: Section 2 - Proposer's Approach to Management of the Project (10,000,000 Max. Technical Credits)

Evaluated Element	Proposal Reference of Risks/Benefits And Commitment	Calculated Technical Credit	Narrative Explanation of Score
Project Management Approach	Section 2.1, pg. 11	0	The Constructability, Maintainability, and Durability discussion was thorough.
	Environmental Field Database Sect. 2.1, p 27 Sect. 2.5, p 21 - 29	0	Active monitoring / recording / evaluating noise, dust, traffic and other "nuisance" factors for continued improvement. Should increase public satisfaction and demonstrate accountability.
	Added Design Director position Sect. 2.1, p 9	460,000	Responsible for management of design-build integration process including environmental and 3rd party commitments. Final Design is complete April 20, 2012 (8 months after NTP 2 begins), ($125,000 at 250% mark up for 18 design months)
Organizational Structure and Key Personnel	Section 2.2	3,000,000	Strong experienced team with individuals with 30+ years in most key positions coming off large highway, large diameter and double deck tunnels in urban environments utilizing similar technology as they are proposing for this project. Strong local subconsultant with in depth understanding and tunnel experience in Seattle geology. The STP team has exceptional experience and is well qualified to design and build a tunnel of the size and type expected for the AWV Project. This is appreciably the same team that delivered one or more comparable tunnels while bettering both cost and schedule goals for those projects. Six of the ten principal design and construction leaders are coming off of the M30 and/or Barcelona Projects. Both projects came in below budget and ahead of schedule. An integrated management team that has delivered the largest soft soil tunnel boring projects to date is likely to effectively manage risks to WSDOT's benefit and avoid delays. Mitigation for 30 days delay at $100,000/day = $3,000,000 benefit to WSDOT
Subcontractor and Labor Management Approach	PLA signed Sect. 2.3, p 3 – 5	500,000	PLA signed with 25 trades. Avoids work stoppages with no-strike policy. Quantify with reduced risk of delay potential. (Total of five days over the next five years, 100,000 per day = 500,000 for labor harmony.)
Quality Management Approach	Section 2.4.1	0	STP has a demonstrated Quality Management process that has been used successfully on other projects. The STP proposal states that a higher level of staffing is proposed. However, could not document how quality would exceed expectations.
	Section 2.4, pg. 6 & 7	112,000	The Quality Process for Design was well thought out. The Design Definition Submittal exceeds the requirements and is added value to WSDOT. (WSDOT, City of Seattle, and Port of Seattle review effort will be reduced with better plans and an accepted scope of work for each plan submittal, assume 1 FTE for 7.5 months 112,000)
	Expert Review Board Sect. 2.4, p 8 – 9	250,000	This high level board of independent experts will check and proof technical and constructability concepts prior to final design. Should result in design/construction efficiencies and reduced construction risk, quantify by reduced reviewer FTEs and reduced risk potential. Addition of Expert Review Board (5 members meet quarterly during design presume Final Design or 3 meetings), Estimate $ 250,000 (5 members at ($5555/day)(3 day meetings)(3 meetings final design))
	Use of 3D Models for space requirements and building risk.	150,000	Sec 2.4 page 12 & 13. Will prevent system conflicts and potential design delays if used for services and space requirements. The use of 3-D modeling program FLAC3D provides qualitative risk evaluations for buildings (Sec. 5.4 page 3) Estimate one WSDOT FTE, or equivalent.
	Design element shelving process prior to NTP2 Sect. 2.4, p 8	0	This defined process will ensure consistent shelving practices of preliminary design items, resulting in increased efficiency and reduced WSDOT FTE efforts upon pulling these packages off the shelf for final design. Good business practice, good recognition of the possible conflicts with the environmental processes.
Risk Management Approach	Section 2.5, pg. 22, col. 1	100,000	Have already developed a 3D noise model. Daytime mock-up for nighttime work. Noise very often a major source of community disturbance. Savings of 1/2 FTE for 12 months.
	Stakeholder / Traffic Risk Management Sect. 2.5, p 29 – 35	0	Excellent presentation and awareness of traffic issues relating to multiple stakeholders. Should improve community relations at start-up of project.
TOTAL SCORE		4,572,000	

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TECHNICAL SUBJECT: Section 3 - Preliminary Baseline Contract Schedule (20,000,000 Max. Technical Credits)			
Evaluated Element	**Proposal Reference of Risks/Benefits And Commitment**	**Calculated Technical Credit**	**Narrative Explanation of Score**
A. Evaluation Criteria for Time of Substantial Completion	[1905 Calendar Days - Contract Time Bid] * 50,000 Technical Credits	15,800,000	(1905-1589)*50,000=15,800,000 Substantial Completion is December 21, 2015. Opening To Traffic is December 21, 2015.
B. Evaluation of Schedule Narrative	2,000,000 Technical Credits		
• Other Milestone Commitments (Form D)		0	Identified in Form D Additional milestone added for MN05 M-N5 Access to Tunnel through NA Contractor = 19AUG14 No LDs are applicable.
• Schedule anticipates and makes reasonable allowance for potential delays.	General	0	Relocation of North and South Operations Buildings away from the Tunnel Bore. (Provides concurrent construction of tunnel and operations building which is a benefit to Project schedule)
		0	TBM advance rates divided into 4 sections by station, primarily selected due to proximity of adjacent features near start up and machine learning curve. Sect. 3, p 7, 11 Average production not provided, but calculated at approximately 19.7 LF/day average including interventions from break-in to break-out. Tunnel boring is 24/7 operation. All other activities 8/5. Sect. 3, p 12
		0	Critical path generally described as TBM & segment procurement, TBM drive, tunnel interior structures and systems, portal tie-ins and commissioning, with a statement that many other near-critical paths exist that could easily become critical. Sect. 3, p 8 - 10
• Schedule is illustrative of Proposer's plan to mitigate risk.		0	Meets RFP requirements.
OTHER		1,000,000	SCD is stated as 21 Dec 2015. This is also the date that traffic is running in the tunnel. First traffic in tunnel is 21 Dec 2015. Schedule Pg 46 of 46 Dec 21st to Dec 31st (10 days * 100,000 LD = 1,000,000)
TOTAL SCORE		16,800,000	

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TECHNICAL SUBJECT: Section 4 - Tunnel Roadway Clearance Envelope (20,000,000 Max. Technical Credits)

Evaluated Element	Proposal Reference of Risks/Benefits And Commitment	Calculated Technical Credit	Narrative Explanation of Score
Minimum horizontal roadway clearance of 32 feet in width or larger	15,000,000 Technical Credits	15,000,000	Horizontal roadway envelope is 32' throughout the limits of the tunnel with a continuous 8' west shoulder, 2-11' travel lanes and a 2' east shoulder. Reference: Section 4.1
Vertical Clearance greater than 15 feet but less than 15 feet 3 inches.	0 Technical Credits	0	
Vertical Clearance greater than or equal to 15 feet 3 inches but less than 15 feet 6 inches.	1,000,000 Technical Credits	0	
Vertical Clearance greater than or equal to 15 feet 6 inches but less than 15 feet 9 inches.	2,000,000 Technical Credits	2,000,000	Vertical clearance from the roadway surface to the signing is 15'6" continuous for both north and southbound roadways. Reference: Section 4.1
Vertical Clearance greater than or equal to 15 feet 9 inches but less than 16 feet.	4,000,000 Technical Credits	0	
Vertical Clearance greater than or equal to 16 feet.	5,000,000 Technical Credits	0	
TOTAL SCORE		17,000,000	

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TECHNICAL SUBJECT: Section 5 - Excavation and Support of Bored Tunnel and Management of Ground Deformation Impacts (40,000,000 Max. Technical Credits)			
Evaluated Element	**Proposal Reference of Risks/Benefits And Commitment**	**Calculated Technical Credit**	**Narrative Explanation of Score**
Geotech. Assumptions & Design Parameters	Sect. 5.1, p 1 – 3, 8 – 11, 14-18 -	0	STP thorough analysis of the soil properties and baseline values, as well as other experience and information from project nearby and of similar size. Team adjusted values in baseline such as conservative Ko values due to aquifer proximity, slickened and fractured clays, and general experience.
	Soil Pressures and Stability 5.1 page 27	0	Face pressure up to 7 bar included in design of EPB exceeds anticipated pressures by 25 % normal plus up to 10 bar mining on intermittent mode as contingency. Simulated operating scenario with 10 bar of pressure. Evidences experience of working at 7 bar with emergency capability of 10 bar.
	5.1 Page 26 - 30 Abrasive Soils Clogging Potential Cobbles and boulders	0	Recognizes potential of highly abrasive soil, clogging conditions and cobbles and boulders and provides details of where they have handled similar conditions before with an EPB machine. Will be able to handle boulders up to 3ft and break up bigger boulders.
TBM Design and Operation		20,000,000	- State of the art TBM designed to handle anticipated ground conditions and limit ground deformation. - Screw able to remove boulders up to 3.0 ft. Sec. 5.2 Page 22 - Belt measuring system, including radar, to provide accurate measure for spoils and volume loss Sec. 5.2 Page 36 - Thorough discussion on the use of polymers and other additives to minimize abrasive wear and face losses in granular conditions. Sec 5.2 Page 60/ 67 - Two augers with redundant close off gates, to allow positive control and emergency operation at 10 bar Sec. 5.2 page 69 - Integrated Monitoring Survey Control System to integrate the TBM monitoring system (for all TBM functions) and a Monitoring and Technical Control Unit (for the building monitoring). Integrated to provide real time data. Sec 5.2 Page 100/105. TBM Guidance System Sec 5.2 Page 112/114 - Automatic grouting through the tail seal Sec 5.2 Page, Secondary grouting if required. Sec 5.2 Page 140 - Emergency tail seal Sec 5.3 Page 142
	25%*20M = 5M for repairs 25%*40M = 10M 10M split into -> (Assume 7.5M for DSC & 2.5M for INT) but need to retain $3M for DSC at Portal(s) Excavation $7.5M Tunnel DSC - $3M Portal DSC = $4.5 M Even with a good TBM there is likely to be DSC associated with Tunnel. Assume 40% DSC occurs WSDOT Savings from $40 M Allowance = 2.5M Int. + 60%*4.5M DSC = say 5M WSDOT Savings from $20 M Repairs = $5 M, but deduct 2M for Launch Area Concept = $3 M Assume we have some minimal repairs (say $250,000). Total WSDOT Benefit = $5M + $3M - $0.25M = $6.75M	6,750,000	The following items provide benefit above that required in the Contract and will result in reduced repairs, ground deformation, and delays to the benefit to all parities and reduction in use of Contract allowance pools. DESIGN -72 drilling locations, shield & face (good coverage) better opportunity to deal with mixed ground, could reduce third party damage but would slow tunnel advancement when used. -redundant automatic face recovery system, integrated w/ shield and tail gap systems -multi level wear detection (3 levels) system, face, head, perimeter, tools, wear pipes -multi backfill grout mix system (2 component and mortar grout) and grout pressure sensor system placed in the segments) -hyperbaric habitat (exceeds safety goals) -3 man locks + 2 equipment locks -class one division one electrical above minimum requirements for potentially gassy tunnel, reduced maintenance (Benefit to WSDOT is reduced deformation and interventions with the TBM. WSDOT saves 25% of any unused amounts in $20M Repair & $40M Int/DSC)
TBM Maintenance Plan	Page 45-46 Section 5.2; page 123-128 Section 5.2	2,000,000	STP safe haven proposal for early inspection, inspections and "crew and machine testing and learning curve. Professional divers on site full time, hyperbaric room on the surface with a hyperbaric shuttle. Saving in potential schedule delay in the case of additional interventions saving to intervention pool. Reduces risk and WSDOT savings from $20 Repairs Allowance. (From calculations above = 25% WSDOT Repair Savings = $5M and reserved $2 M for Tunnel Launch Box/TBM Training Area at Southern end of the Project. $2 M was based upon 3 weeks or 20 days of intervention savings with the use of 3 safe havens resulting in controlled deformation and reduced damage from the Tunnel Launch Box or 20 days x $100,000/day).
	Page S.5.2 page 25	0	Interventions scheduled for every 450 feet to inspect cutterhead and clear plenum. Min. 19 interventions by visual inspection of trained operators and/or professional divers.
Structures & Utility Deformation Design Assumptions	5.1 page 21	0	STP have estimated a varying V_L from 1.5% in normally consolidated soils with low cover to 0.2% in over consolidated soils with high cover. WSDOT estimated V_L at 0.5%. WSDOT verified that difference between 0.2% and 0.5% resulted in no significant difference in the potential for building damage.
Pre-Proposal Deformation Mitigation Submittal(s)		0	Meets requirements of the RFP.
Measures to Manage Deformation.		0	Meets requirements of the RFP.
Excavation & Support of Tunnel & Management of Ground		0	Meets requirements of the RFP.
TOTAL SCORE		28,750,000	

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TECHNICAL SUBJECT: Section 6 - Design and Construction, Except Tunneling (10,000,000 Max. Technical Credits)

Evaluated Element	Proposal Reference of Risks/Benefits And Commitment	Calculated Technical Credit	Narrative Explanation of Score
Proposed Design Plans and Details	STP Proposal 6.0, 6.3 (pg 2 & 23)	585,000	Construction of drilled shafts using fully-cased holes with oscillating excavation equipment has been successful for both Phases 1 & 2 of SR 519 Intermodal Projects and many other projects in Western Washington. The schedule savings associated with obstruction is real, however, schedule impact savings are the Contractor's unless there is a differing site condition. The proposal constructs approximately 6500' of secant, tangent or isolated drilled shafts. The use of this proven method will result in a reduction in the impacts associated with differing site conditions. Differing site condition cost savings is a percentage of shafts drilled. 6500'*(80'depth-35' embed)*$200/sf*1% = $585,000
	ATC #5	1,050,000	• Approx 600ft of additional mainline transferred to the tunnel contract from the south access contract. Narrower footprint allows roadway to be supported within an arrangement of two secant pile walls supporting the lower and upper roadway and top slab. The resulting structure is less massive, sustainable (less permanent material) and can be detailed to provide ductility to resist ground deformations for static and dynamic loading conditions. Also the narrower roadway width lessens the effects of shrinkage cracking of slab elements contributing to a more durable structure. • The seismic performance is predictable and redundant. The frame simplicity can tolerate lateral sway due to liquefied and non-liquefied ground motions. The loss of axial support due to liquefaction is mitigated by adequate embedment. • Reduction of soil excavation minimizes contaminated soil disposal requirements, reduces potential for unanticipated discovery and reduces dewatering effort (Reduction in excavation quantities approx. 50%. Associated reduction for differing site condition estimated at 10% of the balance). 750,000 • The secant pile containment structure protects surrounding ground and facilities from excessive settlement and reduces start-up risk. Isolation of the settlement trough at start-up when compared to allowing the structure to deform within acceptable limits constitutes a reduction in risk to WSDOT. Damage to one bent (bent 92 of 93) resulting in closure and work stoppage. Interruption to the traveling public is $100,000/day* 30 days of traffic disruption is $3M, there is a 10% chance of delay. 300,000
		0	Construction of the n/b on and s/b off ramps will impact upon both the 26kV (approx. 400ft) and the 115kV power lines that are currently being installed by H2K. The relocation of these utilities will incur additional cost (work is currently underway).
	Durable & Maintainable Design Sect. 2.1, p 13 – 14	0	Examples provided of elements that are incorporated, providing opportunities to reduce maintenance costs and improve durability. ATC#3 (PLC), camera relocation, building reconfigurations, conduit placement.
Construction Phasing and Staging	Sec. 5.2 Page. 17-19	2,400,000	Conveyor and Barge disposal clear advantages to community and reduces third party impacts. TBM conveyor belt system from TBM to Pier 46. Savings in WSDOT staff costs 1.5 FTE's for 18 months $400,000 and savings in Societal costs (traffic delays to the public) $2,000,000.
Geotechnical Design Assumptions and Design Parameters not related to Tunneling	Page 11 Section 6.3	0	STP, in general, affirms WSDOT assignment of geologic units and engineering soil units in GBR.
Cut-And-Cover Tunnel Design and Construction		0	Meets RFP requirements
	Dwg SD019	400,000	Braced excavation yields stiffer supports, reduces ground movement and eliminates the need for construction easements for tie-backs under port property. Estimated Reduction of 80,000 SF at $5 a SF = $400,000.
Bored Tunnel Interior Design and Construction		0	Meets RFP requirements
		0	Sustainability Action Plan using LEEDS Principles to be developed with WSDOT.
Tunnel Operations Buildings	Commitments & Page 4 of Section 6.6	20,000	Addition of landscaping at Operations Buildings.
TOTAL SCORE		4,455,000	

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