Alaskan Way Viaduct REPLACEMENT PROGRAM

NW Construction Consumer Council Seminar
Sept. 24, 2014
Today’s FOCUS

- The big picture
  - Why it matters
  - Continuing progress
  - Understanding Bertha
  - Tunnel contract
  - Managing risk
  - The path forward
The machine’s 2-mile journey

Southbound SR 99

Northbound SR 99
Building a new SR 99 Corridor
On Dec. 6, 2013, just hours after the machine passed the 1,000 foot mark ...

Crews stopped tunneling after measuring increased temperatures in the machine.
Seattle Tunnel Partners is building a circular pit to access and repair the machine and resume tunneling by the end of March 2015.
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This is a **SAFETY** project

The viaduct in 1953

The viaduct and neighboring seawall are vulnerable to earthquakes
Geography

vs. drivers
With no viaduct or SR 99 tunnel, where would SR 99 traffic go?
THE TUNNEL
will carry drivers through downtown

Drivers will enter and exit downtown at the TUNNEL PORTALS

South portal

North portal

SR 99 tunnel
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Building the SOUTH PORTAL

The south portal work zone in July 2014
Building the NORTH PORTAL

The north portal work zone in August 2014
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Vital stats:

- 57.5 feet in diameter
- 326 feet long
- Nearly 7,000 tons
Understanding BERTHA
At Bertha’s

CONTROL

S1
S2
S3
S4
Inside the TUNNEL
Access pit site today, above ground

Repairs BERTHA
Lower groundwater, tunnel into wall
Excavate, then tunnel into the access pit
Install a crane above the access pit
Repairing BERTHA

Remove pieces, make repairs
STP’s schedule

- **Late May:** Underground wall construction begins
- **June 16:** STP/Hitachi announce repair plan
- **Late July:** Access pit excavation begins
- **STP begins repairs to seal system and replacement of main bearing**
- **STP provides WSDOT with a full list of repairs**
- **Testing of machine begins**
- **Tunneling resumes**

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**Repairing BERTHA**
Today’s FOCUS

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• **Tunnel contract**
• Managing risk
• The path forward
**Design-Build** – a method of project delivery in which the owner executes a single contract with one entity (the Design-Builder) for design and construction services to provide a finished product.

**VS.**

**Design-Bid-Build** – traditional approach for delivery of transportation projects where the owner completes the design and accepts the lowest responsive bid for construction from qualified contractors.

**What Is** DESIGN-BUILD?
Why use DESIGN-BUILD?

Schedule: Faster project delivery

Completion cost: Better predictability of final cost at the onset

Risk management: Strategic risk distribution and control

Expertise: Optimize design for preferred means/methods

Why use
• 20 years using design-build contracting.
• Primarily used on large projects.
• Dozens of completed projects.
• Provide stipends to unsuccessful proposers.
• Most reports, plans and specifications prepared by Design-Builder. WSDOT reviews and provides comments.
• Provide a detailed Quality Management Plan outline for proposers use.
• Quality Management Plan is one of the few documents WSDOT approves.
• Geotechnical Baseline Reports are including in most design-build projects.
Comparison of contracting approaches:

**Typical design-bid-build process**
- Environmental analysis and preliminary design
- NEPA complete
- 100% design and permits
- Procurement
- Begin construction

**Typical design-build process**
- Environmental analysis and preliminary design
- NEPA complete
- Permits
- Procurement
- Final design
- Begin construction

**Accelerated design-build process**
- Environmental analysis and preliminary design
- NEPA complete
- Permits
- Procurement
- NTP 1
- NTP 2
- DB preliminary design
- DB final design
- Begin construction

**Approaches**
The SR 99 tunnel contract ensures that:

- Majority of work will be completed for a fixed cost.
- Better predictability of final cost at the onset.
- Limits WSDOT’s liability.
- Design or quantity changes are the contractor’s responsibility.

A tool that’s better than BERTHA
• Schedule incentives and disincentives for:
  • Final completion dates.
  • Milestone completion dates.
  • Open to traffic hours.
• Level playing field:
  • Upset price for design-build contract.
  • Contract terms – bonding, limits of liability, insurance.
• Shared risk funds:
  • Owner controlled.
  • Contractor incentives.

The design-build CONTRACT
Disputes Review Board

• Assist in the resolution of disputes between WSDOT and the design-builder.

• Three person board of independent experts.

• Utilize when standard dispute resolution is unsuccessful and prior to the filing of a claim.

• Provide nonbinding recommendations designed to expose the disputing parties to an independent view.
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• Manage project as a “strong” owner:
  • Experienced, well-trained core leadership and technical staff.
  • Augment with specific technical and management expertise.
  • Clear understanding and ownership of risk allocation.
• Identify project risks early and develop risk management strategy.
• Engage experts with national and international tunneling experience in urban environments.
• Develop contracting structure and risk allocation.
• Conduct extensive soil exploration program.
• Evaluate and identify potential construction impacts.
• Employ advances in tunneling machine and monitoring technology where appropriate.
• Used to baseline subsurface conditions along tunnel alignment.

• Factual field and laboratory data in Geotechnical Data Report (GDR) in contract documents.

• Requires clear, concise and measurable baselines for assessing differing site conditions (DSC) – NOT a geotechnical design report.

• Included along with Geotechnical Data Report as part of the contract documents.
**Baseline geologic PROFILE**

**RECENT GRANULAR DEPOSITS:**
Loose to dense SILT and SAND with gravel; includes normally consolidated alluvium, granular fill, beach deposits, reworked glacial deposits, and recessional ice-contact deposits.

**RECENT CLAY AND SILT:**
Soft to very stiff CLAY and SILT with fine sand beds; includes normally consolidated cohesive fill, estuarine deposits, and recessional lacustrine deposits.

**PEAT AND WOOD:**
Very soft to hard PEAT, silty PEAT, organic SILT and WOOD; includes fill, normally consolidated peat and overconsolidated peat and buried soil deposits.

**TILL:**
Dense to very dense, silty SAND and GRAVEL, and hard, silty CLAY with sand and gravel; cobbles and boulders are common in these deposits; includes glacially overconsolidated till and glaciomarine drift.

**TILL-LIKE DEPOSITS:**
Dense to very dense, silty SAND and GRAVEL, and hard, silty CLAY with sand and gravel, interbedded and intermixed with cohesionless sand and gravel; cobbles and boulders are common in these deposits; includes lenses and layers of glacially overconsolidated till and glaciomarine drift.

**COHESIONLESS SAND AND GRAVEL:**
Very dense SAND and GRAVEL to SAND with variable silt; cobbles can be found in these deposits; includes glacially overconsolidated fluvial and glacial outwash deposits.

**COHESIONLESS SILT AND FINE SAND:**
Very dense SILT, silty fine SAND, and fine sandy SILT with trace of clay; predominantly cohesionless; includes glacially overconsolidated lacustrine deposits.

**COHESIVE CLAY AND SILT:**
Very stiff to hard, silty CLAY and clayey SILT with trace of sand and gravel; scattered cobbles and boulders can be found in these deposits; includes glacially overconsolidated lacustrine, peat, and paleosol deposits.
For tunneling/subsurface risk...

$40 Million Covers:
- Extraordinary interventions over 1,440 hours
- Differing site conditions

*Fund Exceeded:*
- WSDOT cost

*Funds Remaining:*
- Shared 75%/25%

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Shared contingency
**Settlement mitigation approach**

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<th>Category A – Mandatory mitigation</th>
<th>WSDOT defined building categories A &amp; B</th>
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<td>(1/2” settlement limits)</td>
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<th>Category B – All other buildings within zone of influence (1” settlement)</th>
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<th>DMS – Deformation Mitigation Submission</th>
<th>Modified by design-builder</th>
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| Deformation Mitigation and Repair Fund – $20M to be shared for Category B mitigation or repairs to property owners | Accepted in contract |

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<th>Fund exceeded – Split based on performance</th>
<th>Risk sharing</th>
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<th>Funds Remaining - Shared 75%/25%</th>
<th>Settlement mitigation</th>
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Construction monitoring AREA
WSDOT purchased subsurface parcels for the SR 99 tunnel.

**Purchase process:**

- Appraise change in property’s fair market value.
- Present offer to purchase with copy of appraisal report.
- Negotiate purchase agreements.
Alaskan Way Viaduct Replacement Program

Partner agencies:
• Federal Highway Administration
• Port of Seattle
• King County
• City of Seattle

WSDOT Consultants:
• Parsons Brinckerhoff
• Hatch Mott McDonald
• Shannon and Wilson
• Jacobs and Associates
• Strategic Technical Advisory Team

Seattle Tunnel Partners, D-B contractor:
• Dragados-USA and Tutor Perini
• HNTB
• Intecsa-Inarsa
• Hart Crowser
• Malcom Drilling
• Frank Coluccio Construction
• Hitachi Zosen (TBM manufacturing)
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- **The path forward**
|------|------|------|------|------|------|------|------|------|------|------|

*South Atlantic Street Overpass*

*Building on- and off-ramps near the north portal*

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**The path**

**FORWARD**
Building the new roadway inside the tunnel

Building on- and off-ramps near the south portal

The path FORWARD
The path FORWARD for tunnel. Tunnel scheduled to open to drivers.

Reconnecting surface streets near the north portal.
The path

FORWARD


Viaduct will be demolished and Battery Street Tunnel will be decommissioned and filled in

City of Seattle begins to rebuild Alaskan Way along the waterfront
A waterfront FOR ALL
How to REACH US

Website:
www.AlaskanWayViaduct.org

Twitter:
@BerthaDigsSR99

Email:
viaduct@wsdot.wa.gov

Hotline:
1-888-A WV-LINE

Our information center, Milepost 31, is located at 211 First Ave. S. in Seattle’s Pioneer Square neighborhood.
Features include:

- Improved access for all modes
- New on- and off-ramps in both directions
- New overpass reduces congestion near port terminal
Meet Bertha, the SR 99 Tunneling Machine

Photo from spring 2013.
Access pit site today, below ground
Inject grout between existing piles

Conceptual
Repairing

Relocate utilities (before)

BERTHA
Relocate utilities (after)
Inject grout behind the machine
Build the access pit’s walls
Build the access pit’s walls
Lower groundwater, tunnel into wall

Conceptual
Excavate, then tunnel into the access pit
Install a crane above the access pit
Remove pieces, make repairs
Building a better Bertha
SR 99 Tunnel Design Concept
Completed Projects in the AWV Program

- I-5 travel time signs (2009).
- SR 519 Phase 2 (2010).
- Spokane Street Viaduct Fourth Avenue off-ramp (2010).
- I-5 active traffic management (2010).
- City street intelligent transportation systems (2010).
- Automated viaduct closures gates system (2011).
- South Holgate to South King Street viaduct replacement – *Stages 1, 2 and viaduct demolition.*