

# A closer look at the Alaskan Way Viaduct Replacement Program

David Sowers

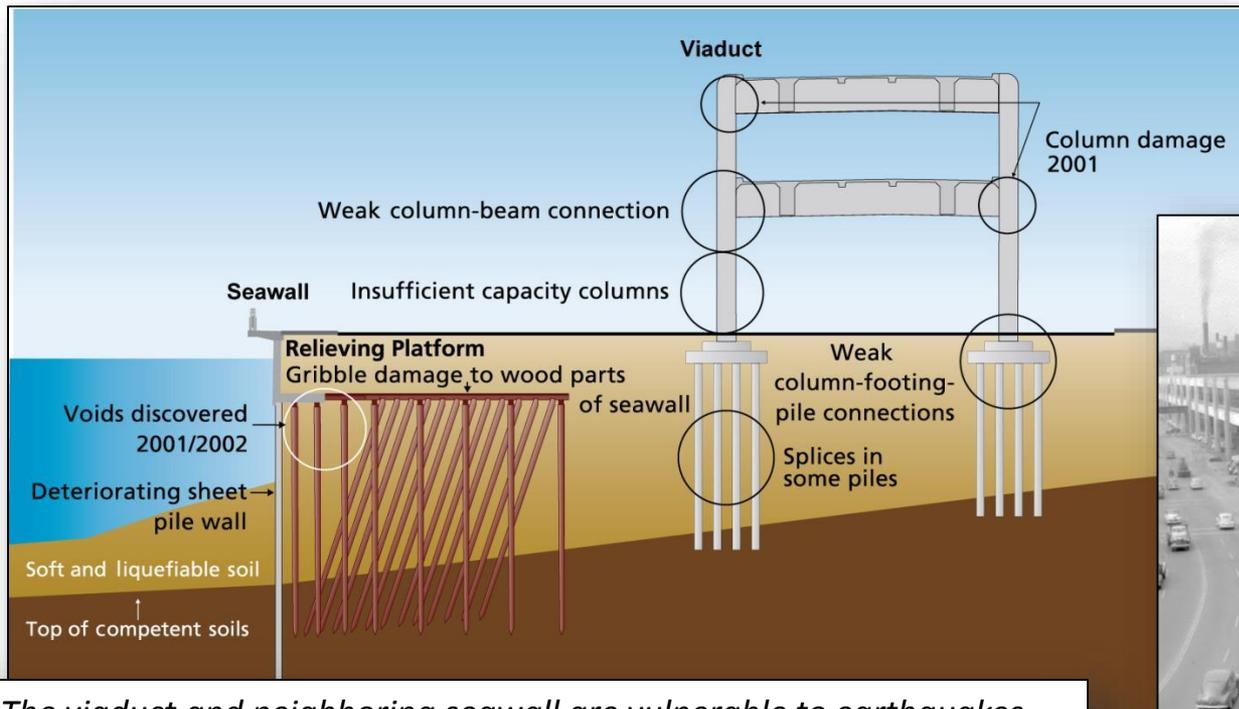
AWV Deputy Program Administrator  
Engineering and Program Management

# Today's **FOCUS**

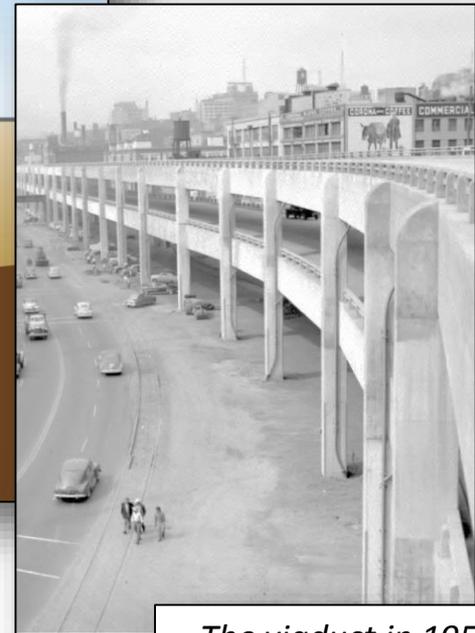


- **The big picture**
  - Continuing progress
  - Understanding Bertha
  - Risk management

This is a **SAFETY** project



*The viaduct and neighboring seawall are vulnerable to earthquakes*



*The viaduct in 1953*

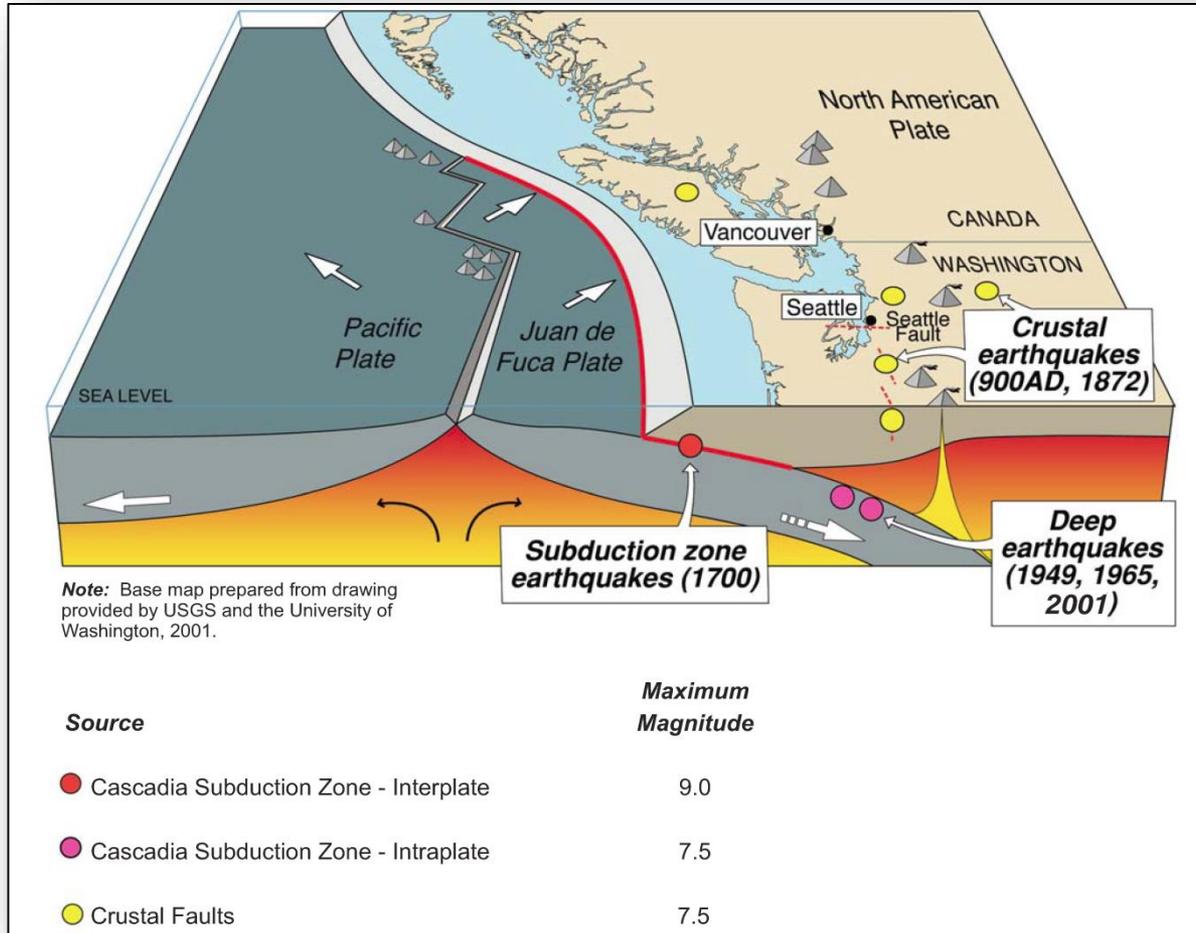
# Geography



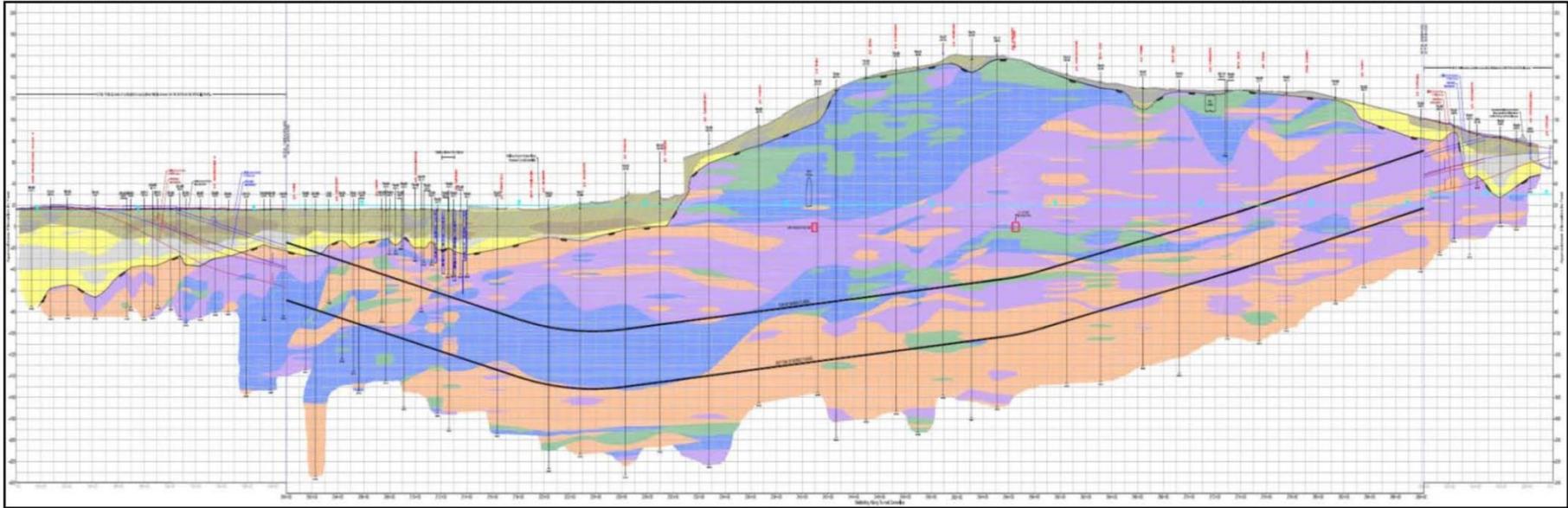
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vs. **drivers**





# REGIONAL SEISMICITY



- 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.

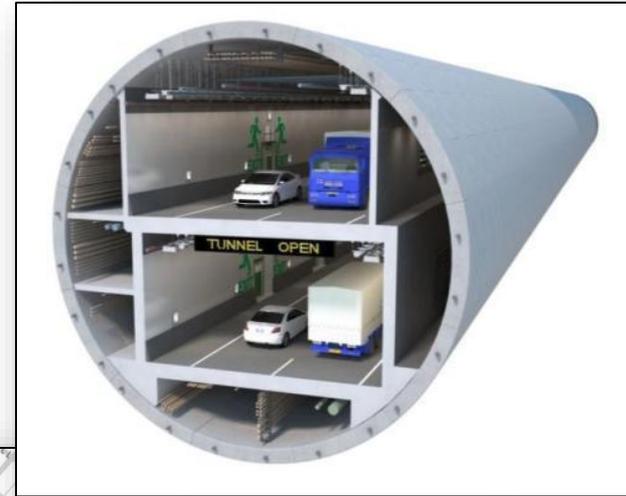
- TILL:**  
 Dense to very dense, silty SAND and GRAVEL, and hard, silty CLAY with sand and gravel; cobbles and boulders are common in these deposits; includes glacially overconsolidated till and glaciomarine drift.
- TILL-LIKE DEPOSITS:**  
 Dense to very dense, silty SAND and GRAVEL, and hard, silty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

*Baseline geologic*

# PROFILE

Building a new **SR 99**  
**Corridor**



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# Alaskan Way Viaduct REPLACEMENT PROGRAM



South-end replacement	Start	End
Electrical line relocation ✓	2008	2009
Holgate to King (stage 1) ✓	2009	2009
Holgate to King (stage 2) ✓	2010	2012
Holgate to King (Stage 3) ✓	2012	2014

\* Partially funded by the state

\*\* Per 2014 legislation, additional mitigation funding is being provided by WSDOT from funds outside the AWW Program

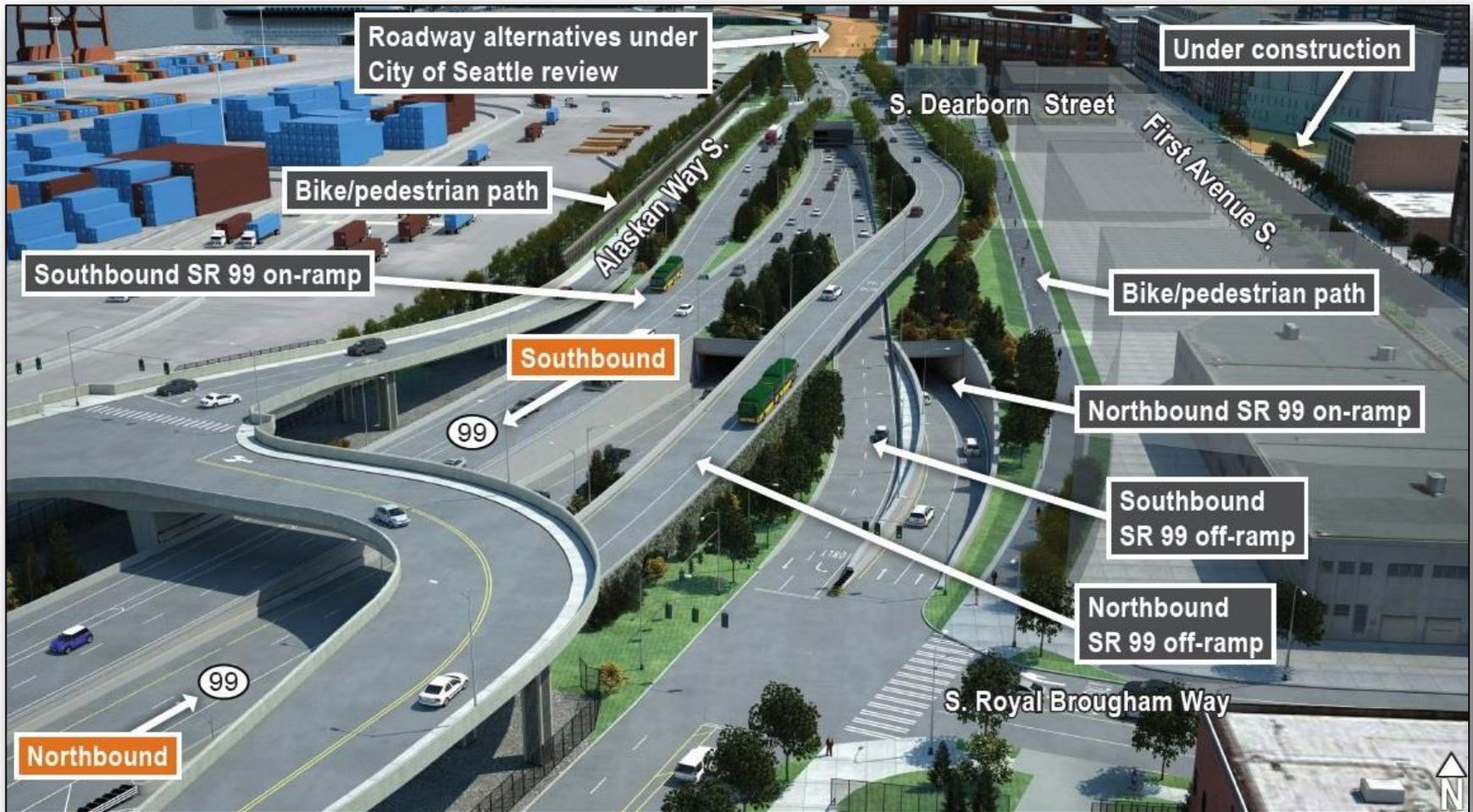
SR 99 tunnel	Start	End
SR 99 tunnel main contract	2011	TBD
North Access Project	2014	2017
North Surface Street Connections	TBD	TBD
South Access Project (main contract)	TBD	TBD
South Access (S. Dearborn Street off-ramp)	2016	2017
South Access (drilled shafts) ✓	2014	2014

✓ = completed project      □ = in progress

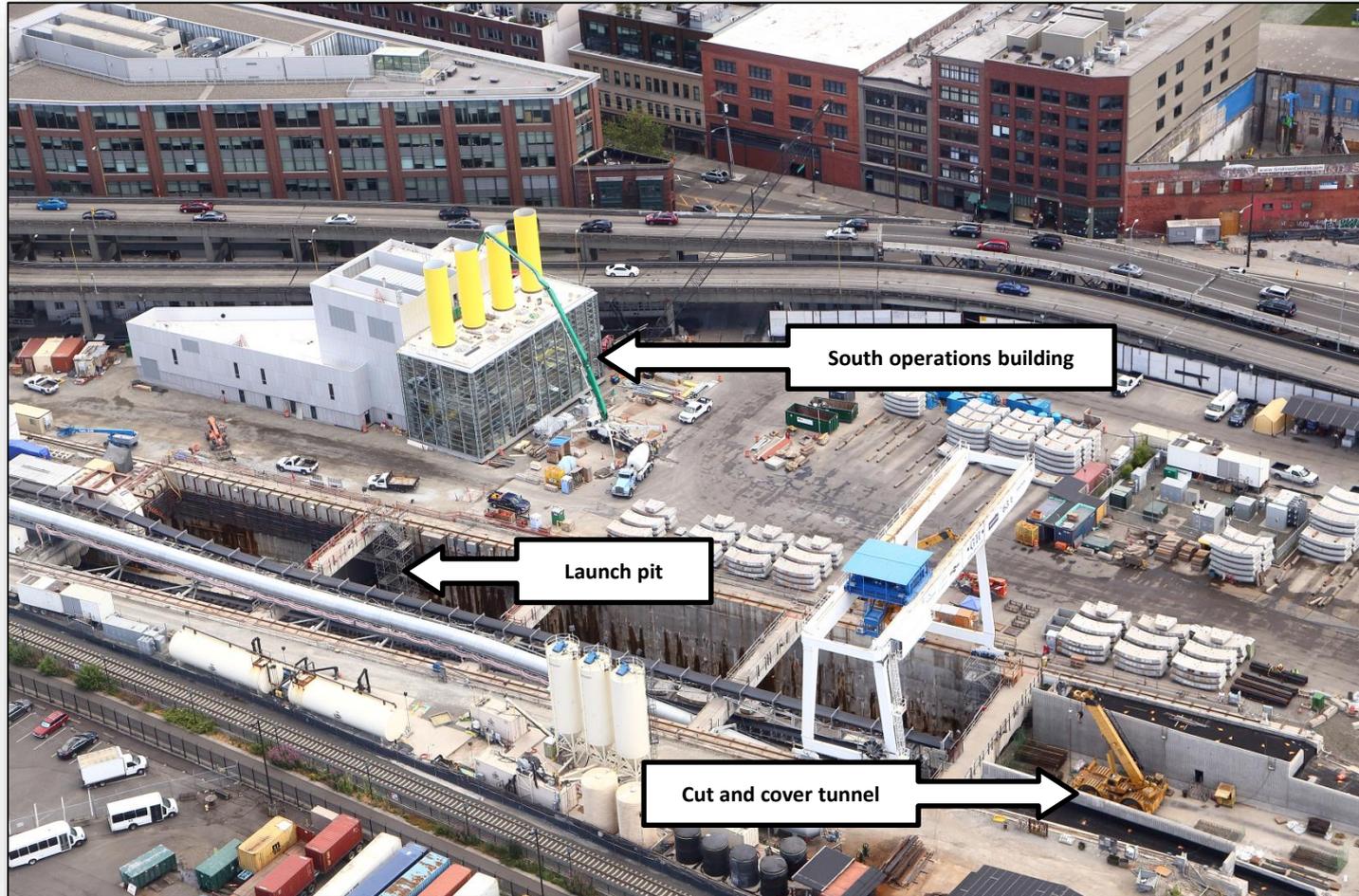
Miscellaneous projects	Start	End
Trager Building demolition ✓	2007	2007
Viaduct column stabilization near Yesler Way ✓	2007	2008
WOSCA Building demolition ✓	2009	2009
Pier 48 warehouse demolition ✓	2010	2010
Automated viaduct closure gates ✓	2010	2011
Western Building structural work ✓	2011	2016
SR 99 south-end fiber replacement ✓	2011	2011
Alaskan Way widening ✓	2012	2012
Cedarstrand Building demolition ✓	2012	2012
Waterfront viaduct removal	TBD	TBD
Battery Street Tunnel decommissioning	TBD	TBD
New Alaskan Way	TBD	TBD

Mitigation projects	Start	End
SR 519 Phase 2 ✓	2008	2010
Spokane Street Viaduct Fourth Ave. off-ramp* ✓	2008	2010
I-5 active traffic management ✓	2009	2010
I-5 active traffic management sign bridges ✓	2009	2009
I-5 travel time signs ✓	2009	2009
City street intelligent transportation systems ✓	2009	2010
SR 99 intelligent transportation systems ✓	2010	2011
Enhanced transit/demand management** ✓	2010	2014
Parking mitigation for central waterfront ✓	2011	2019

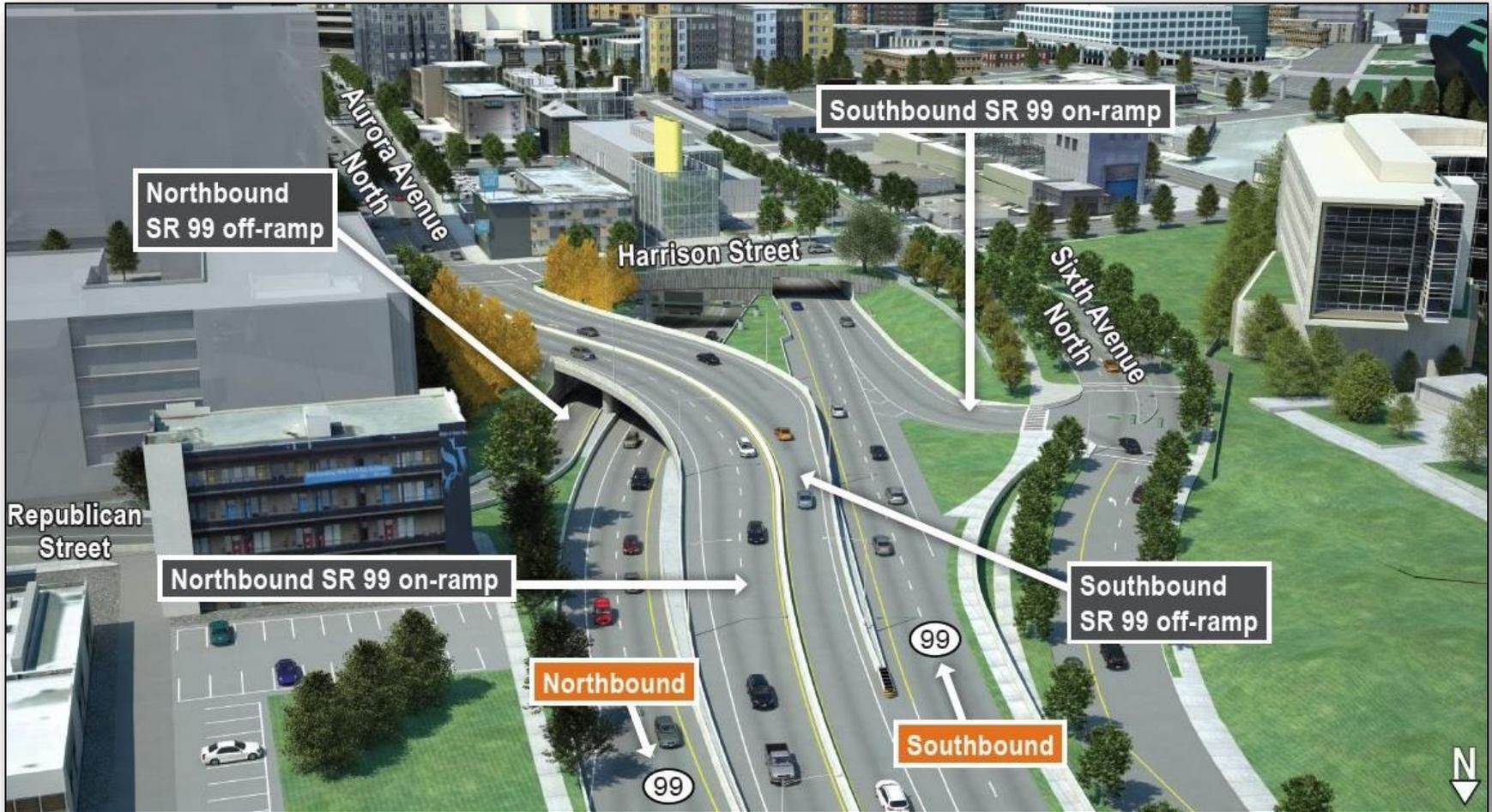
**Completed Work**



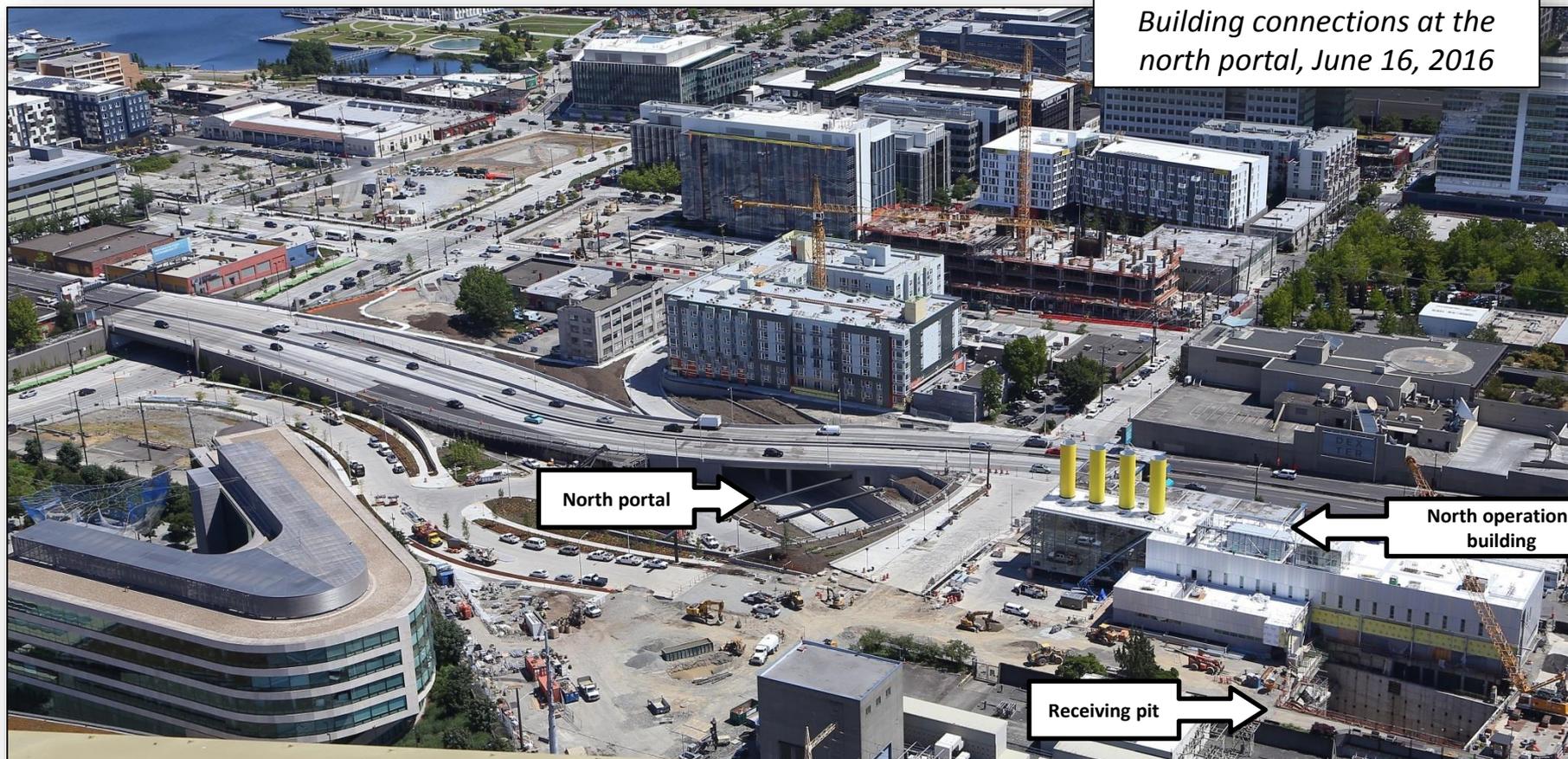
Future **SOUTH**  
**PORTAL**



Building the **SOUTH**  
**PORTAL**



Future **NORTH**  
**PORTAL**



*Building connections at the north portal, June 16, 2016*

North portal

North operations building

Receiving pit

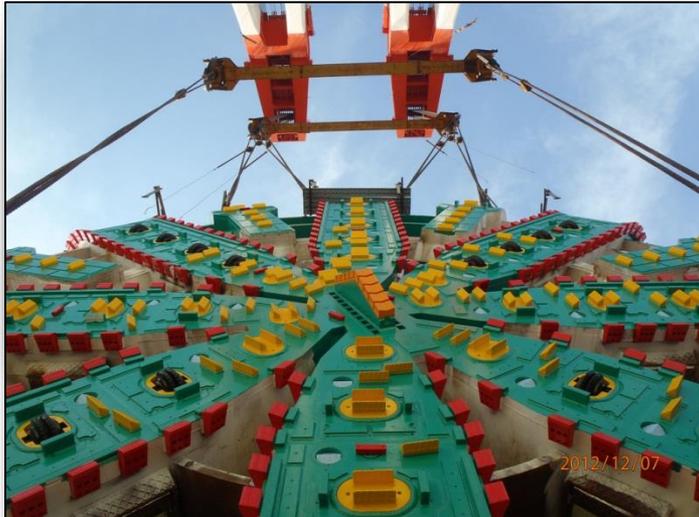
*Building the* **NORTH**  
**PORTAL**



*North portal receiving pit,  
August 31, 2016*

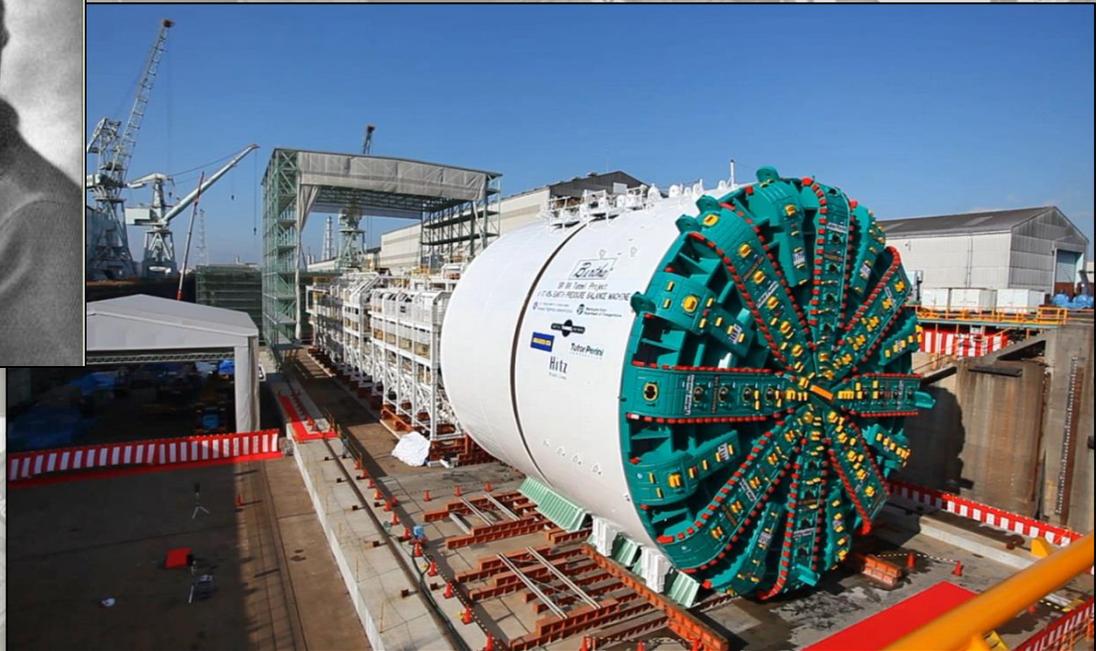
*Building the* **NORTH  
PORTAL**

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- The big picture
- Continuing progress
- **Understanding Bertha**
- Risk management

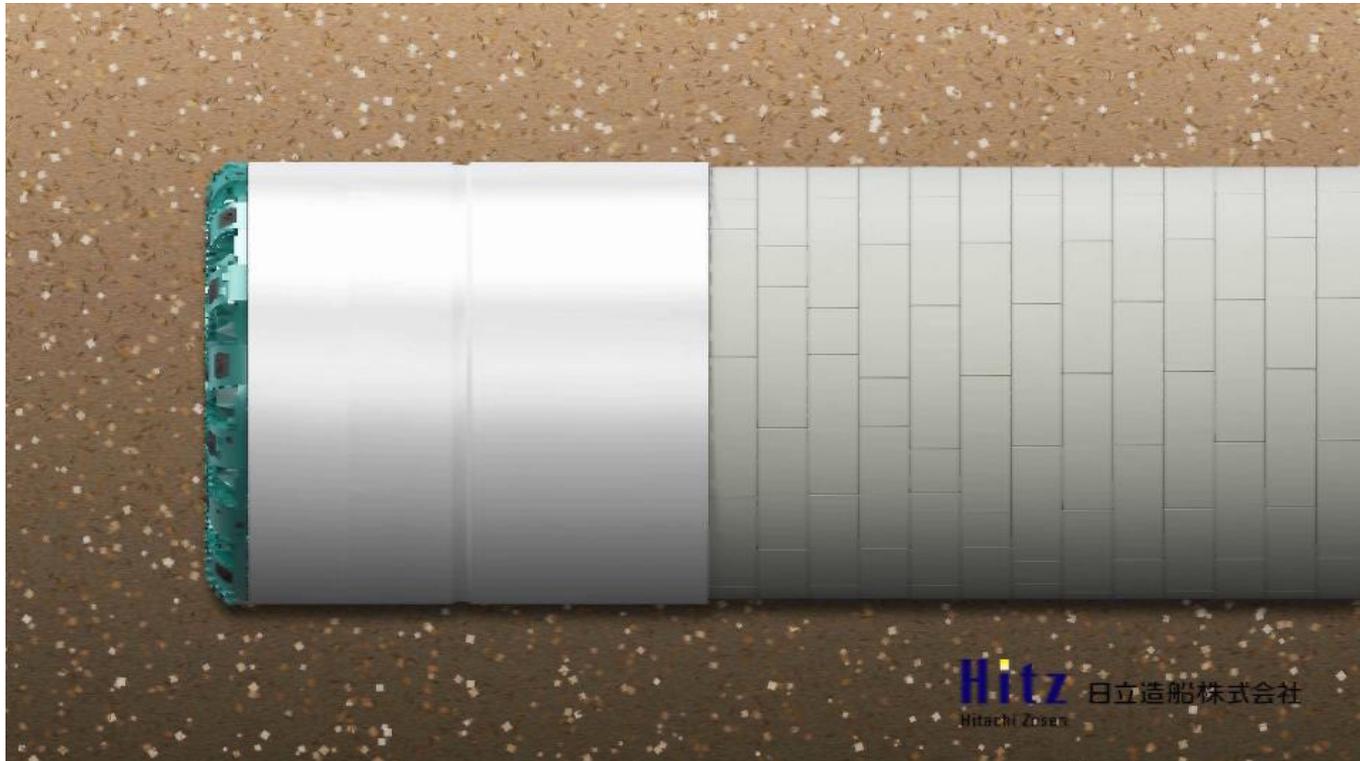
About **Bertha**



**Vital stats:**

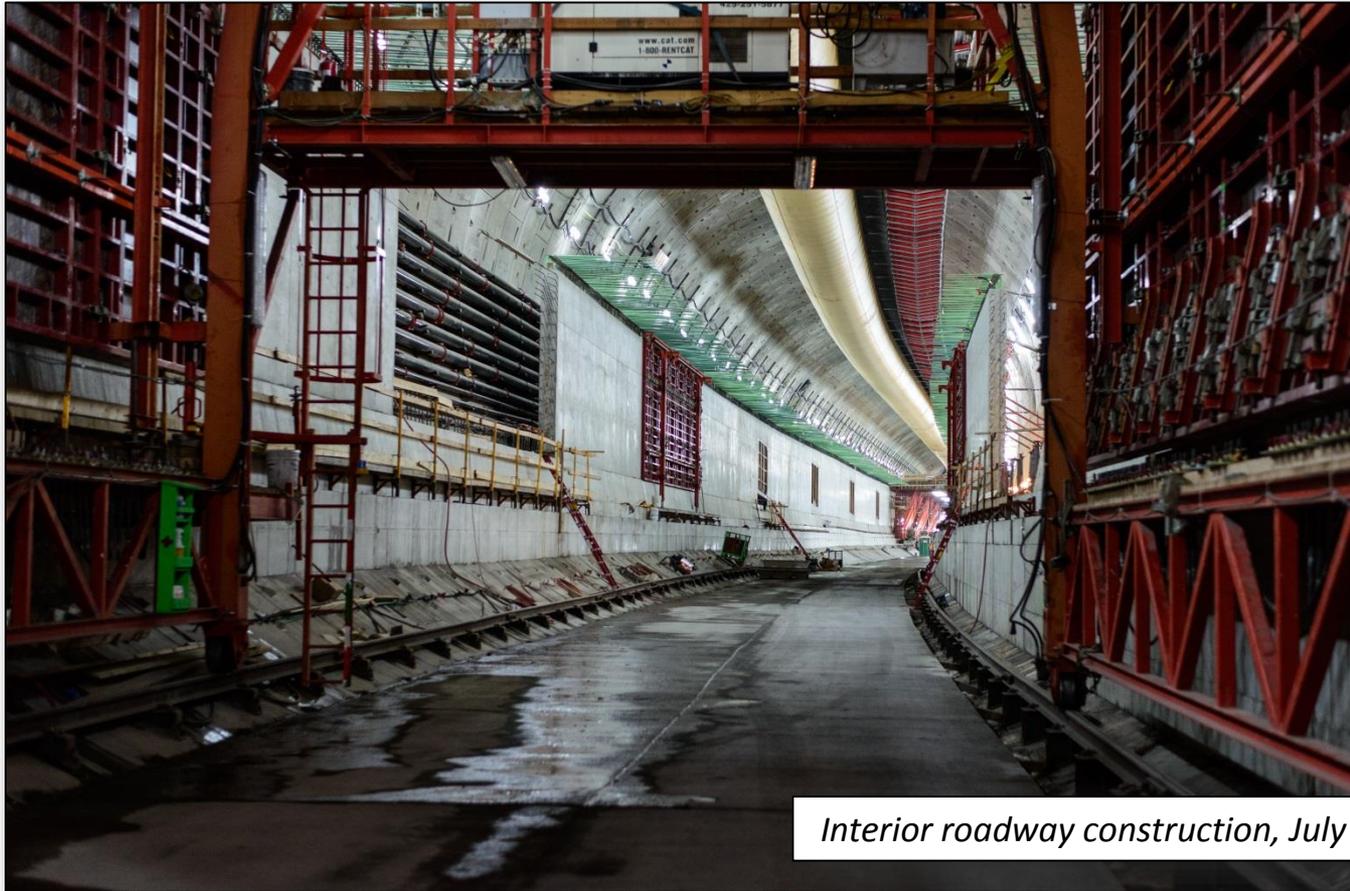
- 57.5 feet in diameter
- 326 feet long
- Nearly 7,000 tons

# UNDERSTANDING BERTHA



*Understanding*

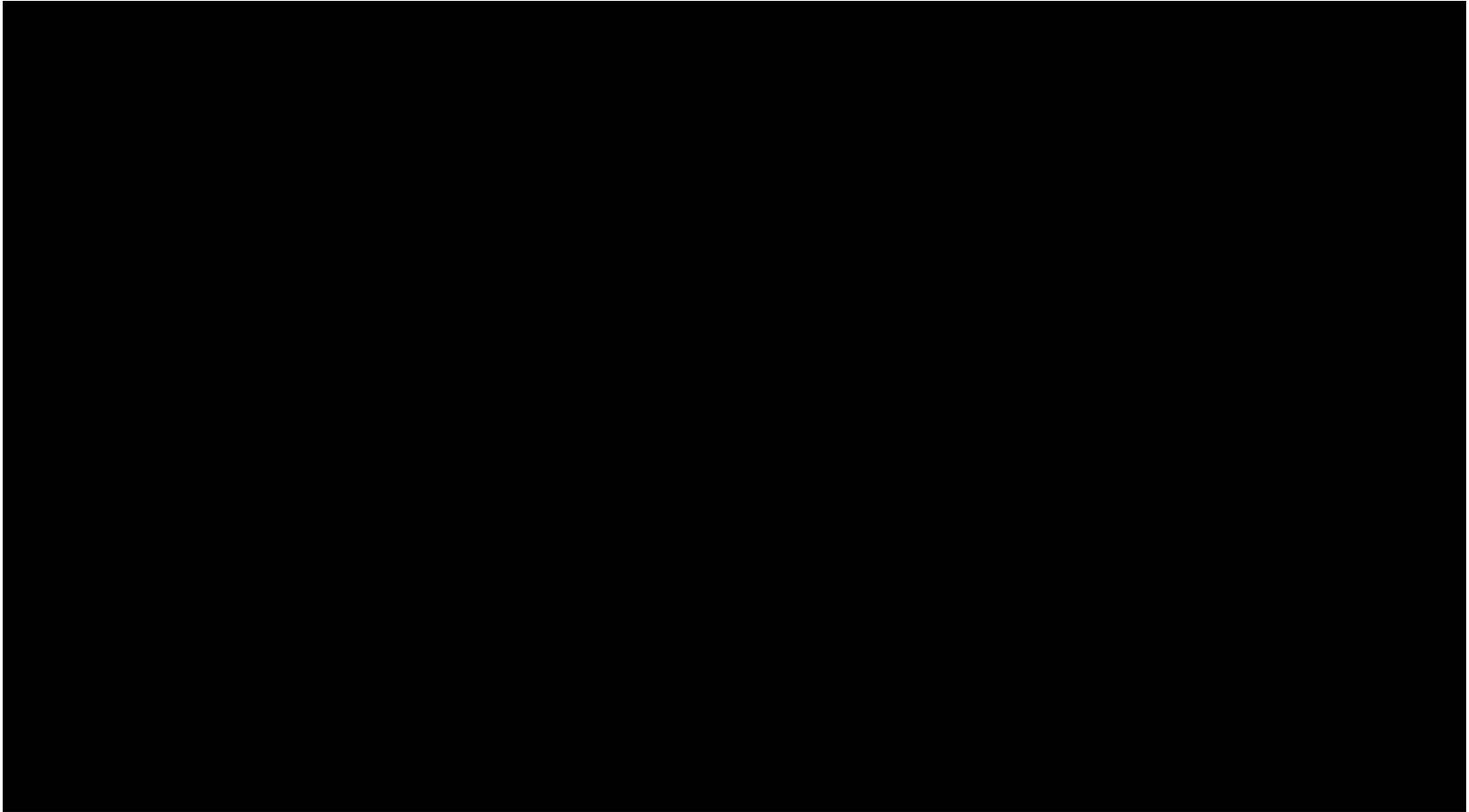
# **BERTHA**



*Interior roadway construction, July 13, 2016*

# **BUILDING THE HIGHWAY**

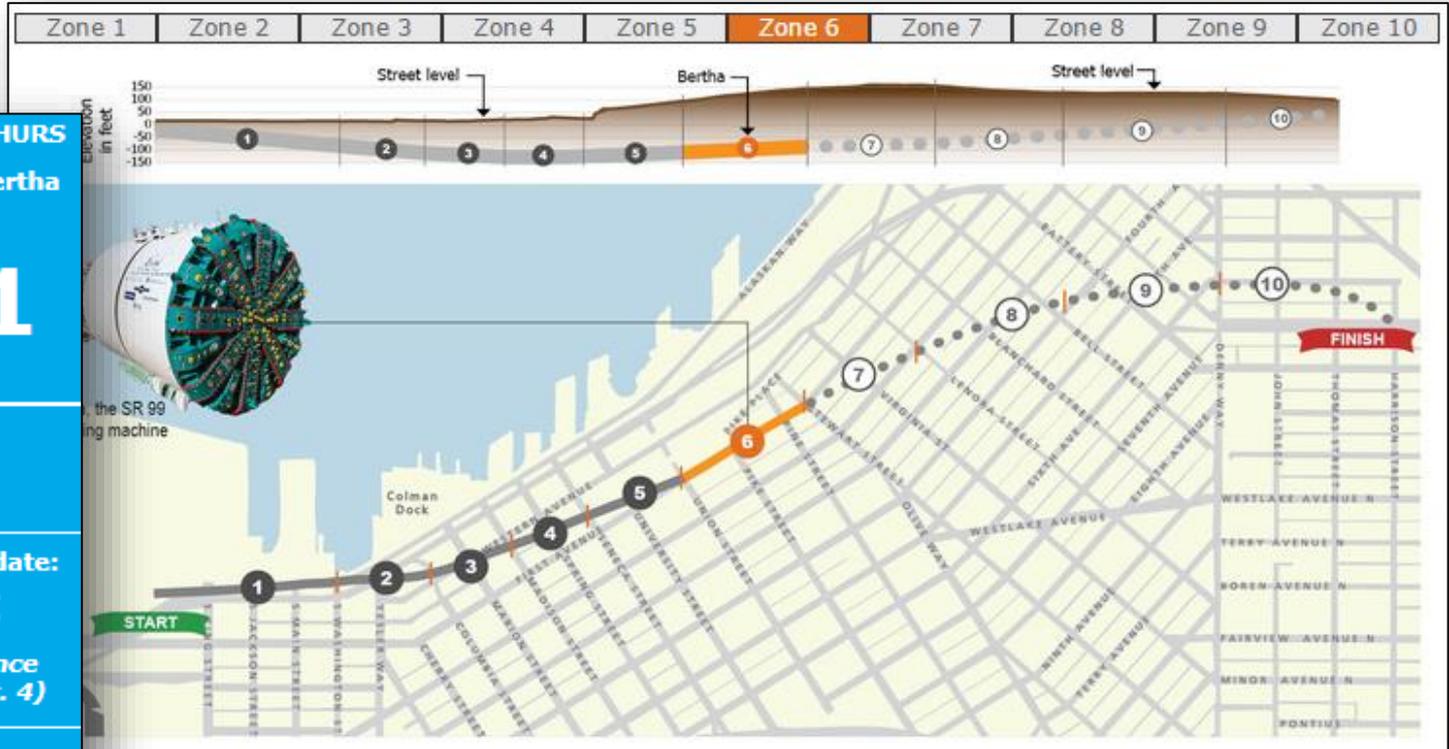
*inside the tunnel*



# **BUILDING THE HIGHWAY**

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*inside the tunnel*



**UPDATED MON AND THURS**

As of Oct. 6, 2016, Bertha has traveled

**4,721**  
 of 9,270 feet

Total rings built:  
**717**  
 of 1,426

October progress to date:  
**170 feet**  
*(planned maintenance period began on Oct. 4)*

September progress:  
**527 feet**

*Following*

**BERTHA**

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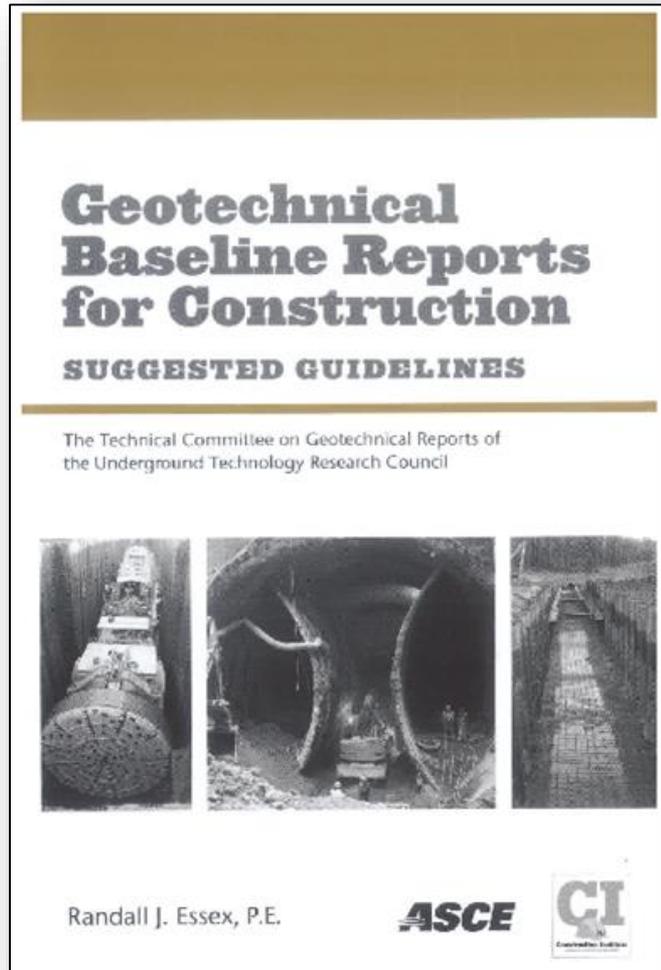


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- **Risk management**



**Outcome =**  
*Risk-based budget*

- Comprised of two components: base and risk/opportunities.
  - Base estimate and schedule if project goes as planned.
  - Risk register.
- Scalable.
- Use independent subject matter experts to minimize bias.



- 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.

***Geotechnical baseline***

**REPORT**





*Monitoring equipment installed on a rooftop. Photo by Soldata.*

- Install monitoring equipment on nearly 200 buildings.
- Install 700 instruments under streets and sidewalks to measure any ground changes.
- Track measurements of excavated material as tunnel boring machine progresses.
- Use satellite images to assess any changes in ground condition.

*Protecting*

# STRUCTURES

- Construction monitoring task force meets daily to review data.
- From the tunneling machine
- From the surface



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*Collecting*

**DATA**



**PLANNED**



**EXISTING**

*Courtesy of Waterfront Seattle*

# How to **REACH US**



*Our information center,  
Milepost 31, is located  
at 211 First Ave. S. in  
Seattle's Pioneer Square  
neighborhood.*

**Website:**  
[www.AlaskanWayViaduct.org](http://www.AlaskanWayViaduct.org)

**Twitter:**  
[@BerthaDigsSR99](https://twitter.com/BerthaDigsSR99)

**Email:**  
[viaduct@wsdot.wa.gov](mailto:viaduct@wsdot.wa.gov)

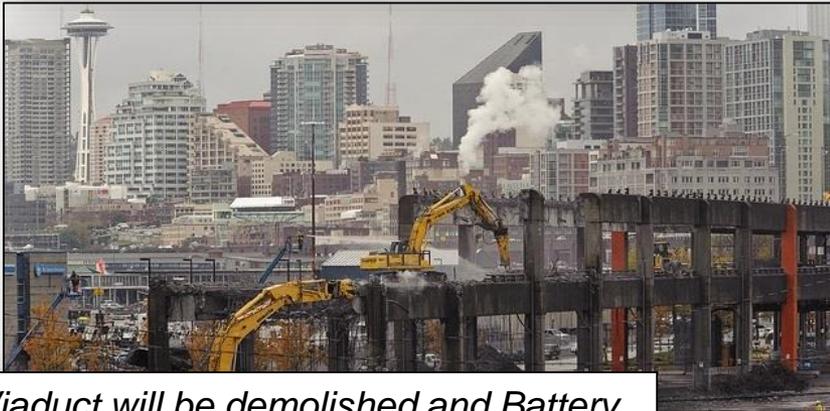
**Hotline:**  
1-888-AWV-LINE



*Tunnel connections and surface streets at the south tunnel portal*



*Reconnecting surface streets near the north tunnel portal*



*Viaduct will be demolished and Battery Street Tunnel will be decommissioned*



*City of Seattle rebuilds Alaskan Way along the waterfront*