

CORRESPONDENCE

Jomsky, Mark

From: Judy Cammer <kivarumi-vcp@yahoo.com>
Sent: Saturday, November 23, 2013 1:01 PM
To: Jomsky, Mark
Subject: 710 Freeway Extension

Dear Mr. Jomsky:

As a resident and property owner in Pasadena, I urge you to stop the proposed 710 freeway extension tunnel. This project will be a disaster for this city in many ways, including property damage due to soil settlement, increased congestion, noise, air pollution / negative health impacts, and major expenses borne by taxpayers for years to come.

Please support increasing the efficiency of the Alameda Corridor and other port and rail projects for moving cargo, and the improvement of light rail and bus transportation for moving people.

Thank you.

Sincerely,
Judy Cammer

From: Wesley Reutimann <wesley@godayone.org>

Date: April 9, 2015 at 12:11:46 PM PDT

To: <Smadison@cityofpasadena.net>, <gmasuda@cityofpasadena.net>, <ttornek@cityofpasadena.net>, <JohnJKennedy@cityofpasadena.net>, <mmcaustin@cityofpasadena.net>, <jacquerobinson@cityofpasadena.net>, <bbogaard@cityofpasadena.net>, <vgordo@cityofpasadena.net>

Cc: <nsullivan@cityofpasadena.net>, <jmcintyre@cityofpasadena.net>, <Mfuller@cityofpasadena.net>, <vdelacuba@cityofpasadena.net>, <tsuzuki@cityofpasadena.net>, <tinawilliams@cityofpasadena.net>, <pthyret@cityofpasadena.net>, <ChristianCruz@cityofpasadena.net>, <rstone@cityofpasadena.net>, <lnagahiro@cityofpasadena.net>, <jwest@cityofpasadena.net>, "Jomsky, Mark" <mjomsky@cityofpasadena.net>, <mbeck@cityofpasadena.net>, <fdock@cityofpasadena.net>, <christy@godayone.org>

Subject: 4/13 Public Comment - Support for "Transportation Alternatives", Pasadena 710 Working Group Recommendations

Good afternoon City leaders and staff,

On behalf of Day One, I am sending the attached comment letter for Monday's special city council meeting.

As an organization we hope the City will take a leadership role in advancing public transit, freight rail, bicycle and pedestrian "alternatives" in the City and LA County.

Thank you for your time and consideration,

-wmr

Wesley Reutimann
Environmental Prevention Director, Day One
175 N. Euclid Avenue
Pasadena, CA 91101
626-229-9750
www.goDayOne.org

Follow Us

facebook - [Day1DO](#)

twitter - [Day1DO](#)

instagram - [Day1DO](#)

Day One builds vibrant, healthy cities by advancing public health, empowering youth, and igniting change.



175 n. euclid ave.
pasadena, ca 91101
626.229.9750 626.765.6239
www.goDayOne.org

Board of Directors

alfred clark III
attorney
lord bissell & brook, llp

tom coston
president
light bringer project

karen evans
director program development
5 acres

binti harvey
director of communications
pasadena unified school district

darryl qualls
deputy chief
pasadena police department

natalie salazar
director of community relations
la county sheriff department

denise sparks
partner
amadeus salon and spa

delano yarbough
community activist
retired PUSD principal

April 9, 2015

Pasadena City Council
100 Garfield Ave.
Pasadena 91101

RE: Support for Healthy, Sustainable Transportation Investments

Dear Mayor and City Council,

On behalf of Day One, I am submitting this public comment with regard to the Council's consideration of supporting public transit, bicycle and pedestrian "alternatives."

Day One is a Pasadena-based community-based organization with a 25-year history of providing effective, culturally sensitive public health education, policy development and environmental prevention strategies. As an agency committed to improving the health and well-being of residents of the communities we serve, Day One is deeply concerned by the detrimental health implications of freeway expansions in LA County.

The LA Basin has yet to meet federal air quality standards set over three decades ago, and continues to suffer from some of the worst air quality in the nation. Automobile and freight truck centric transportation and land-use planning remain a primary driver of our poor air, which adversely impacts the health and well-being of all LA County residents, especially more susceptible children and lower-income communities that typically are subjected to more severe localized pollution near freeways.

Recommendations

As elected leaders for one of the largest Cities in LA County, the Pasadena City Council has the power to take a leadership role in ongoing efforts to realize a healthier, multi-modal transportation network in LA County. Our limited resources can and should be invested in a manner that will improve public health and safety, reduce greenhouse gas emissions, and foster the development of more sustainable communities.

Day One hopes you will acknowledge the many pressing community health and safety concerns with a potential freeway expansion, and formally support the development of a more transit, bike and pedestrian-friendly region. Specific types of projects that the billions of dollars on the table would be more effectively invested in include:

- Expansion of our existing public transit network:
 - Bus Rapid Transit (BRT) lines to/from Metro rail stations
 - Light Rail Transit (LRT) to Glendale-Burbank-Orange Line
 - Metro Gold Line Extension to Ontario
- Electrification of the freight and commuter rail system in LA County
- Investment in ship-to-rail technologies at the ports (e.g., [GRID Project](#))

Thank you for your time and consideration,

Christy Zamani, Executive Director
www.goDayOne.org

David and Eleanor Edwards
313 Arlington Drive
Pasadena, CA 91105
(626)441-7842
edgewood7@sbcglobal.net
November 15, 2013

Dr. Eric G. Walsh, MD MPH
Public Health Director and Officer
1845 N. Fair Oaks Ave.
Pasadena, CA 91103

95370 4170
412938 11 006 01

Dear Dr. Walsh,

We have been to several **Metro** public meetings regarding the completion of SR710. We are particularly concerned about the possibility of a large dual-bore tunnel going from Valley Drive to Del Mar Blvd. According to the information presented at these meetings the tunnel option will require large exhaust stacks at either end of the tunnel. This will mean an exhaust stack in the region where Del Mar Blvd. now crosses the 210 stub releasing a presumably concentrated stream of waste into our local atmosphere. This tunnel would also increase traffic through Pasadena. According to the information presented this increase would be on the order of 125,000 more vehicles through Pasadena each day.

We understand that an Environmental Impact Report has been commissioned to look into the environmental impacts of the various options under consideration. We would like to know how the Pasadena Public Health Department will be involved in this process.

- Will you and your department make any recommendations to the Pasadena City Council regarding the EIR?
- Will you be at any public meetings to address the questions and concerns of residents on the EIR?
- Will your department offer a view on the validity of the EIR?

We are most concerned about the adverse environmental affects the project poses to Pasadena and would welcome a chance to discuss this with you and understand better how your department plans to approach the above issues.

Sincerely,


David and Eleanor Edwards

cc: City Clerk of Pasadena

Avram Dean Gold

March 23, 2015

To: Pasadena Mayor Bogaard
Pasadena City Council Members
Pasadena Department of Transportation
Pasadena Planning Commission

3571
3571

Re: A Review of Excluded Facts in the SR-710 Tunnel Alternative DEIR

Dear Mayor, Council Members, Commissioners and Staff:

My name is Avram Gold and I have been a resident of Pasadena since 1986. In as much as my wife and I live close to the proposed SR-710 tunnel north portal, and I recently retired, I have great interest and the time to investigate the repercussions of such a massive undertaking, should it come to pass. Six months ago I began reading the SR-710 documentation released by CalTrans and Metro. Then I moved into researching global tunneling projects, including Seattle, Washington's SR-99 tunnel construction fiasco.

I was surprised to discover that more than half of the tunnel boring machines around the world, similar but smaller to the ones proposed for our own underground freeway, have had significant unexpected breakdowns. This means that Seattle's boring machine failure with its two-year stall is not an anomaly, nor is the method Seattle Tunnel Partners is using to rescue the huge 57 foot diameter excavating engine. If a similar breakdown and salvage were to happen in Pasadena, our city would suffer disastrous ramifications intentionally excluded from the SR-710 Draft Environmental Impact Report.

I have compiled my research and am submitting the analysis for your review. I ask the City Clerk to file my document as part of the public record so that it can be referenced in the April 13th City Council Meeting when the SR-710 Tunnel Alternative is discussed.

Yours sincerely,

Avram Gold

Avram D. Gold

Submitted with this letter, the report titled:

A GLOBAL REVIEW OF TUNNEL BORING MACHINE FAILURES
How a Mechanical Breakdown within the SR-710 Project
Would Impact
Pasadena, South Pasadena
And Los Angeles

687 Arbor Street
Pasadena, Ca. 91105
Hm (626) 796-2766 Cell (818) 383-8606

Avram Dean Gold

Distribution: Hard Copies & Email

Pasadena Mayor - Bill Bogaard: bbogaard@cityofpasadena.net
Pasadena Department of Transportation - Fred Dock: fdock@cityofpasadena.net
Pasadena Planning Department - Vincent Bertoni: vbertoni@cityofpasadena.net
Pasadena City Manager - Michael Beck: mbeck@cityofpasadena.net
Pasadena City Clerk - Mark Jomsky: mjomsky@cityofpasadena.net

Jacque Robinson: district1@cityofpasadena.net
Margaret McAustin: mlmorales@cityofpasadena.net
John Kennedy: ChristianCruz@cityofpasadena.net, jwest@cityofpasadena.net
Gene Matsuda: nsullivan@cityofpasadena.net
Victor Gordo: vdelacuba@cityofpasadena.net
Steve Madison: smadison@cityofpasadena.net - tsuzuki@cityofpasadena.net
Terry Tornek: tornek@cityofpasadena.net

Distribution: Email

Mark Yamarone: myamarone@cityofpasadena.net Transportation Administrator
Planning Commission via staff rep, Paulina Rivera: privera@cityofpasadena.net

THE SR-710 TUNNEL ALTERNATIVE



A Global Review of Tunnel Boring Machine Failures

How a Mechanical Breakdown within the SR-710 Project
would impact
Pasadena, South Pasadena
And Los Angeles

If the proposed SR-710 tunnel boring machines breakdown anywhere along their underground routes, the rescue and repairs, if possible, could devastate communities and obliterate city blocks.

Building and boring tunnels is risky. At least half the tunneling projects around the world confront unexpected machinery breakdowns, flooding and collapses. Consequently Tunnel Boring Machines, or *TBM's* as they called in the industry, fail and stall regularly. As TBMs increase in size, as the tunneling projects become more ambitious, as the technology stretches beyond its proven capabilities, the potential for breakdowns and failures increases.

The largest diameter TBM which finished its drive without a failure completed the Yangtze River Tunnel in 2009. It's cutting head was 50.6 feet in diameter. Seattle's tunnel boring machine, named *Bertha*, is the largest in the world with a cutting head diameter of 57.5 feet, equivalent to a five story building. In December of 2013 *Bertha* clogged and stalled with broken parts a thousand feet from it's starting point. It has yet to be fixed.

TBM breakdowns push schedules and budgets way past projections. Seattle's tunnel completion date has been extended two years. Yet, despite a world wide record of TBM calamities and huge cost overruns, Washington States' Environmental Impact Report for its Seattle tunnel project, as well as our own SR-710 Draft Environmental Impact Report, does not address probable mechanical and technical failures.

We believe CalTrans and Metro are fully aware of the tunneling risks but are withholding that information from the public and decision makers. On March 11th, Metro held an open Technical Advisory Committee (TAC) meeting. South Pasadena's TAC representative, Doctor Bill Sherman, asked Yoga Chandran (HC2M Hill project manager) if a possible TBM breakdown like Seattle's was addressed in the SR-710 Draft Environmental Report. Mr. Chandran reply was short and direct. "No, we have not."

The following day at the Stakeholders Outreach Advisory Committee meeting, Jan SooHoo from La Cañada Flintridge asked Mr. Chandan a variation of the same question – "Is there a tunnel boring machine breakdown contingency plan described in the Draft Environmental Report?" He gave her the same answer. "No."

Why is Caltrans and Metro deliberately omitting information about true tunneling risks, especially when they know we are concerned about them? The just-released **EXECUTIVE SUMMARY OF THE SR 710 NORTH STUDY** contains the category: **Areas of Controversy and Unresolved Issues**. Under that heading, we read the following line item --

"Constructability of tunnels of this size and potential for machinery malfunction"

Caltrans and Metro understand that tunnel “machine malfunction” is *controversial* and *unresolved*. With a proposed diameter of 60 feet, the SR-710 TBMs will be even larger than Bertha and could breakdown as well. If they do and excavation is needed for repairs within historic and business districts, or under schools, churches and houses; numerous buildings in Pasadena, South Pasadena and the Community of El Sereno would be demolished and those areas converted into four to six block construction zones.

What is the likelihood of this impact happening? The chances are greater than you think. The following table shows a record of worldwide tunneling projects within the last twenty years. The Comment column describes TBM failures and excessive cost overruns. *While we acknowledge that this survey may be incomplete, we believe that it includes the key historical tunnel excavations that are most relevant to the SR-710.*

List of Relevant Tunnel Projects and Important Technical Parameters
 Comments in **RED** denote TBM failure and/or excessive cost overruns

Ref #	Project Name	Tunnel Type	Tunnel Layout	Diameter	Tunnel Length	Method / TBM Type	TBM Design/ Manuf.	Comments
1	Brightwater-Washington State	Sewage	Single tube	17'	13 miles	4 TBMs / Slurry & EPB (both types)	Herrenknecht Germany Lovat TBM by Caterpillar USA	Two TBMs failed, the EPB was fixed, Slurry TBM had to be disassembled and its parts removed
2	Gilgel Gibe II Headrace Tunnel, Ethiopia	Hydro Electric	Single tube	22.9	16.1 miles	2 TBMs Double Shield Both Types	SELI Italy	TBM buried for 2 years under mud from a fault 2006-2008
3	OARS - Columbus, Ohio	Sewage	Single tube	23'	4.5 miles	1 TBM / Duel Mode Open & Closed Shield	Obayashi Japan	Clogged in slurry mode, needed an underground rebuild, 2 years behind schedule
4	Crossrail – London, UK	Subway Light Rail	Two parallel tubes	23.3'	13 miles	8 TBMs / 2 Slurry Mixshields & 6 EPBs	Herrenknecht Germany	To be finished in 2018
5	Beles II Headrace Tunnel, Ethiopia	Hydro Electric	Single tube	26.6'	7.45 miles	1 TBM Duel Mode Double Shield EPB	SELI Italy	Tunnel face collapsed with rocks blocking cutting head 2009
6	(English) Channel Tunnel - France & England	Rail	Three parallel tubes - 3 rd is a service tunnel	29'	31 miles	5 TBMs / 5 different EPB designs	The Robbins Company USA	Three tunnels – 2 rail & 1 service & emergency. Construction escalated to an 80% cost overrun.
7	Gotthard Base Tunnel - Switzerland	Rail	Two parallel tubes	3 sizes of TBM's 29', 31' & 31.5'	35.4 miles	4 TBMs & SEM / Hard rock Gripper	Herrenknecht Germany	5 month TBM break down stall, needed a 50m access tunnel for repairs
8	Tellier Tunnel Sarnia, Ontario, Canada	Rail	Single Tube	30.34'	1.16 miles	1 TBM EPB	Lovat Canada	7 month delay needing an access pit to repair broken seals & cutting head

Ref #	Project Name	Tunnel Type	Tunnel Layout	Diameter	Tunnel Length	Method / TBM Type	TBM Design/ Manuf.	Comments
9	A-86 East Duplex Tunnel – Paris	Only cars allowed	One tube Two - isolated decks	37.95'	6.2 miles	1 TBM / Mixshield multimode as a Slurry or EPB	Herrenknecht Germany	Extra lane each deck for break downs – completed 2003 & then 2008
10	Hsuehshan Snow Mountain Tunnels - Taiwan, China	Auto & truck	Three parallel tubes - 3 rd is a service tunnel	38.5' & 15.75'	8.1 miles	4 TBMs (2 small 2 large) / unknown types	The Robbins Company USA	Severe flooding destroyed one TBM. It was disassembled underground and removed from the tunnel. Project took 13 years & was delayed four times.
11	Dublin Port Tunnel - Ireland	Auto & truck	Two parallel tubes	38.6'	1.6 miles	SEM & 2 TBMs / One hard-rock shielded & one open-faced backhoe	Herrenknecht Germany	The boulder clay could not support the weight of the rock TBM cutter head. Twenty-four restraining cables were needed to regain steering.
12	Miami Port Link – Florida	Auto & truck	Two parallel tubes	42'	0.73 miles	1 TBM / Hybrid EPB Slurry	Herrenknecht Germany	Designed for varied hydrostatic conditions. No failures.
13	Waterview Tunnel – Auckland, New Zealand	Auto & truck	Two parallel tubes	47.25'	1.5 miles	1 TBM / EPB	Herrenknecht Nansha, China	Two stalls totaling 4 weeks to replace tail seals, 2014
14	M30 Calle - Madrid, Spain	Auto & truck	Two parallel tubes	49.21'	34.8 miles	7 TBMs / all EPB, SEM, Cut and Cover	Herrenknecht & Mitsubishi Heavy Industries & Duro Felguera SA	The largest TBMs as of 2005 that did not fail
15	Yangtze River Tunnel – Shanghai, China	Auto & truck above, rail below	Two parallel tubes	50.6'	5.5 miles	2 TBMs / both Slurry Mixshield	Herrenknecht Germany	The largest TBMs as of 2009 that did not fail
16	Sparvo Tunnel - Sparvo, Italy	Auto & truck / 2	Two parallel tubes	51'	1.6 miles	1 TBM & SEM / EPB	Herrenknecht Germany	TBM broke down for two months under ground 2011
17	Alaska Way Viaduct - Seattle, WA	Auto & truck	One tube - double deck	57.5'	1.7 miles	1 TBM / EPB	Hitachi Zosen Japan	TBM broke down Dec. 2013 & is still stalled in tunnel, a \$125M fix & rising
18	SR-710 - Los Angeles County, U.S.	Auto & truck	TBD	60'	4.9 miles	2 TBMs & Cut and Cover / Slurry and/or mixed mode	Yet to be contracted	Proposed TBM will be the largest ever made
19	Orlovski - St. Petersburg, Russia	Auto & truck		63.1'	3280'	TBM ordered but never built / Slurry Mixshield	Herrenknecht Germany	Project cancelled due to escalating budget

This report describes how a breakdown similar to Seattle's Bertha TBM could impact our communities. More specifically, it will illustrate with graphics and photos:

1. A significant and recent reference - Seattle's TBM rescue and the repair method
2. The route of the SR-710 Twin Tunnels from West Pasadena to El Sereno with selected examples of TBM breakdown areas along this route
3. Descriptions and illustrations of TBM rescue and repair operations in South Pasadena and El Sereno
 - a. **Scenario A** - a TBM failure under a business district with the Gold Line running through it
 - b. **Scenario B** - a failure under a high elevation and sloped neighborhood
 - c. **Scenario C** - a TBM failure under a city thoroughfare near a hilly Los Angeles residential area
4. The transport routes for crane and replacement parts to the SR-710 breakdown zones

1. SEATTLE'S TBM RESCUE AND REPAIR METHOD

There are two main reasons why TBM's breakdown beyond normal maintenance stops. The boring process encounters unexpected ground and water conditions, or the design of the TBM was not suited for the tunneling challenges before it started.

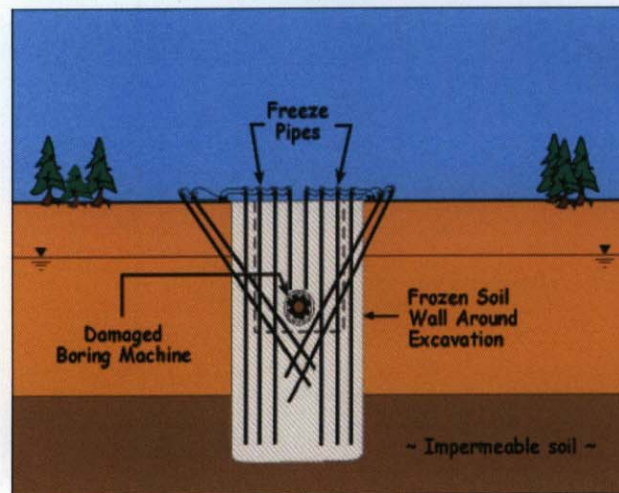
When a TBM fails underground, three procedures play out.

- The TBM must be fixed underground.
- The TBM must be accessed from above ground.
- The TBM cannot be fixed and consequently, is disassembled or abandoned.

When possible, accessing a stalled TBM from above ground is the preferred method as described in a paper (shown below) by Jerod Colman, Jesse Owens and Matt Maechler.

Breakdowns

Due to this method of tunneling, it's the nature of the beast for TBM's to breakdown while in the tunnel. Therefore the swift recovery of the machine is significantly important. The process most likely used in this situation is done by freezing the subsoil and extracting the machine with a crane. This method is effective in tight or low overhead areas, near existing structures, or at vibration-sensitive areas. Batter pipes are directionally bored and placed below the tunnel casing and freeze the groundwater to seal it off. Freezing of soil can be employed quickly to recover machines with little or no dewatering.



6. OUTLOOK

With the economic slowdown the world economy has faced over the last few years, tunneling work seems to have gone, to some degree, against that tide. While work has slowed a bit, projects scheduled for the next few years show activity increasing.

Seattle Tunnel Partners chose to repair Bertha above ground because it's primary drilling assemblies need to be replaced or reinforced. Judging from the total proposed rebuild, we can postulate that the TBM had design flaws from the get-go. The next set of photographs and illustrations will show the rebuild process.

Seattle's tunnel project ACCESS PIT and surrounding CONSTRUCTION AREA. The pit is 80' diameter and drops 120 feet down in order to reach Bertha, stalled underground.



Feb. 13, 2015 - Aerial photo of the 120-foot-deep pit crews will use to access and repair Bertha, the SR 99 tunneling machine.
Washington State Dept of Transportation

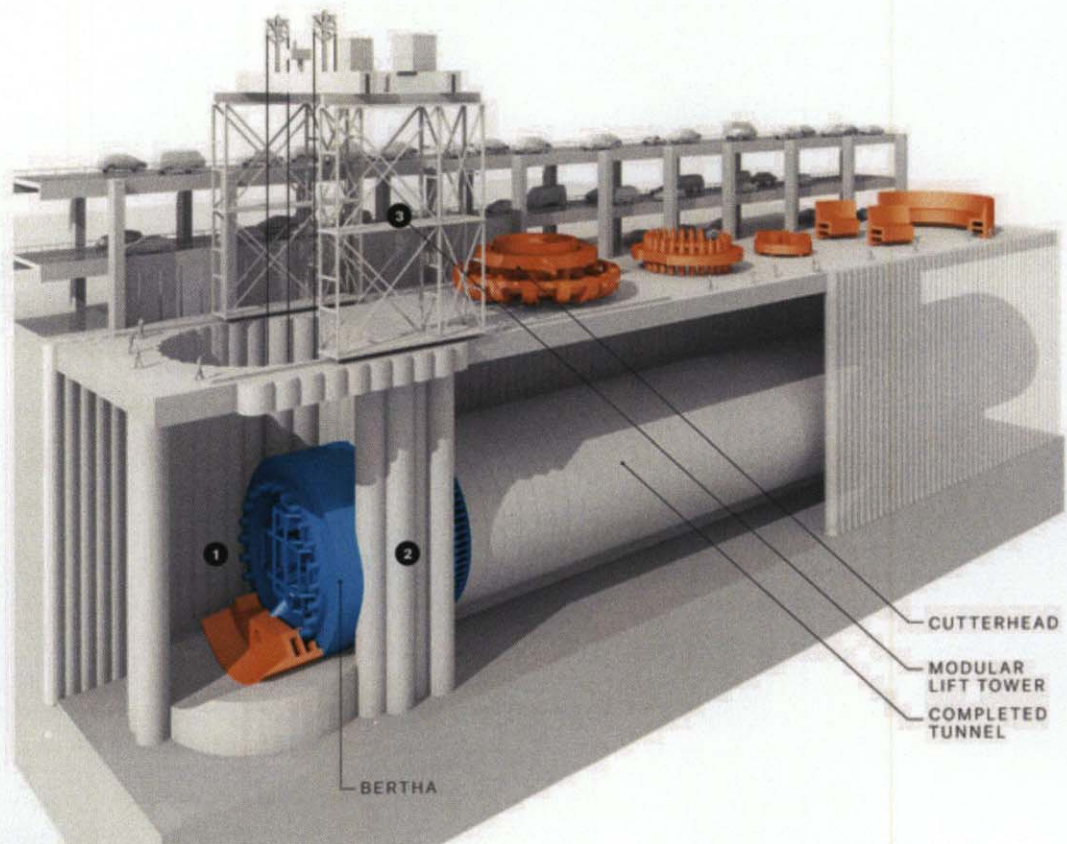
Now that Bertha has reached the access pit, the Mammoet crane, photographed above, will prepare to hoist the cutter head assembly, the motor assembly and shield sections to the surface. The parts will then be laid flat on the prepared surface, one behind the other.



Notice the scale of the lift crane compared to the automobiles and the double decked highway running parallel to the construction area.

Also note Seattle's Mammoet crane weighs 1,300 tons and will lift 2000 tons of TBM assemblies. This operation needs a level grade to move the parts and repair them.

The Rescue



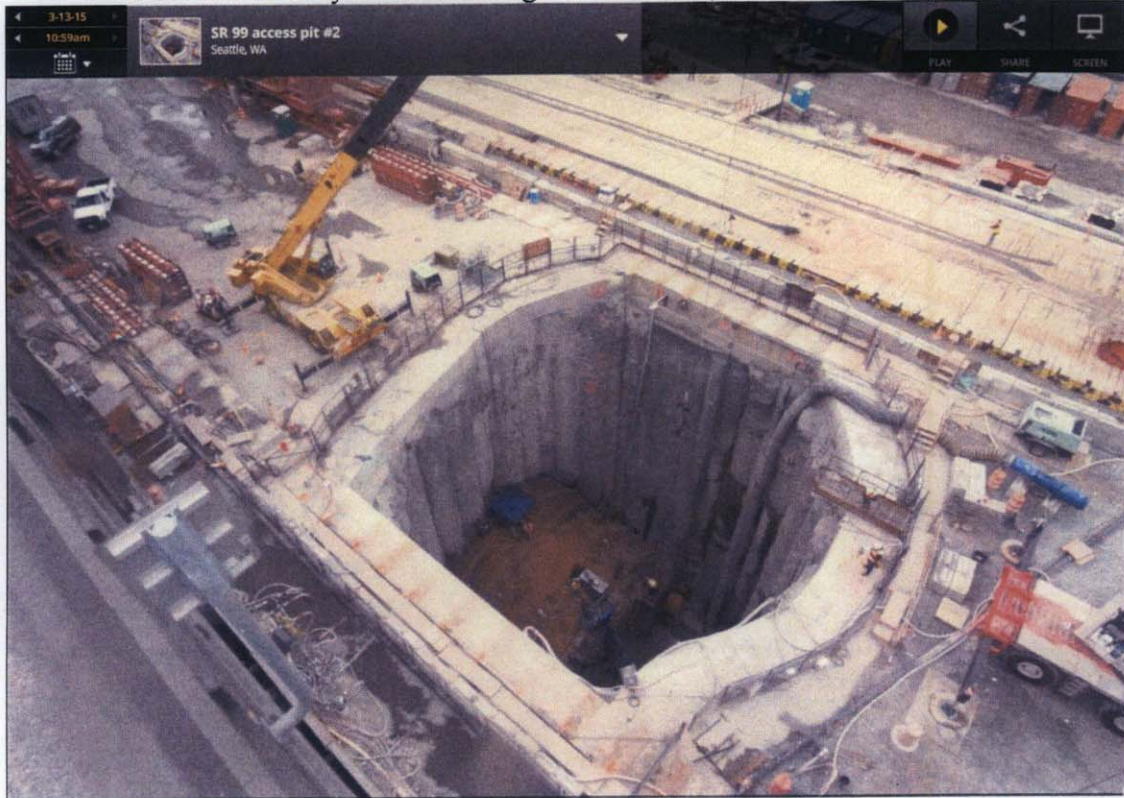
(Illustration by Bryan Christie Design)

A look at what it will take to snatch Bertha from the depths.

1. This summer Seattle Tunnel Partners sank 73 concrete pillars in a huge ring in front of Bertha's face. Workers then excavated the hole until it was deep enough to swallow an 11-story building.
2. Though she's running hot, Bertha can still move. Soon she will chew through the front of the protective wall until her head rests on a concrete cradle in the rescue pit.
3. Finally, a custom crane called a modular lift tower will raise Bertha's 2,000-ton face, tilt it, and set it down. Workers will replace Bertha's bearing assembly and add 86 more tons of steel ribs and plates.

If one, two or all four of the SR-710 TBMs break down along their route and they need to be excavated for fixes, similar pits will need to be locally dug to repair and/or dismantle the cutting head and boring assemblies.

A brown and dirty Bertha waiting to be rescued, as of March 13th, 2014.



From WSDOT

Bertha rests in the access pit as hoisting handles are being welded onto its outer shield. Once the TBM is ready for disassembly, the Mammoet Company crane will track into position over the shaft and lift out each section one by one.

The Barnard Lift at Seattle's SR99 tunnel staging area.



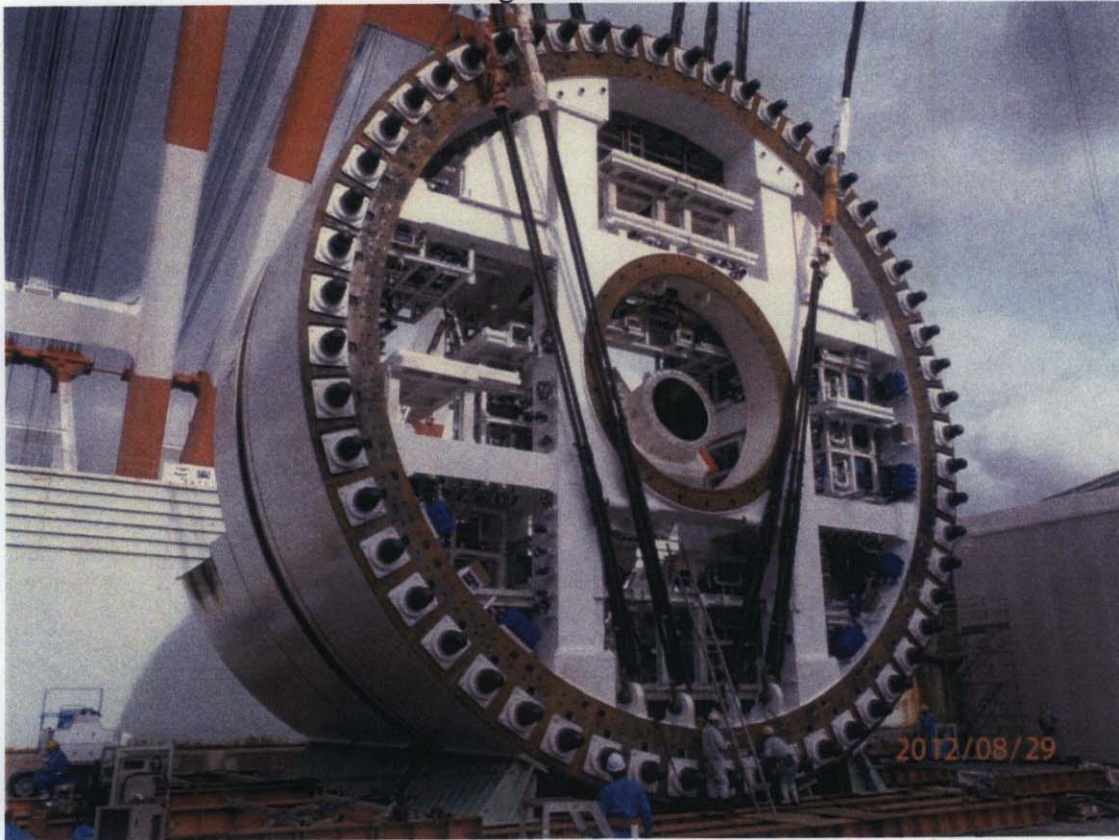
From WSDOT

The 57.5' cutter head being lowered into the portal assembly trench.



From WSDOT

A section of Bertha's cutting head motor assembly. The proposed SR-710 TBM will be larger than this.



Can you imagine a crane and TBM parts this size being laid out in Pasadena, downtown South Pasadena, one of our residential neighborhoods or Huntington Drive in El Sereno?

Homes, business and city buildings would need be purchased and demolished through Eminent Domain. Traffic would be rerouted. Hilly neighborhoods would be flattened to accommodate the crane movement. The tunnel machine "fix" could take more than a year, replicating Seattle's TBM excavation and rebuild.

To make matters worse, a loss caused as a result of "*an action by a civil authority*" is NOT covered by insurance. A home or business owner would have to sue Caltrans and/or Metro to recover the loss, if any funds could be recovered at all.

2. The route of the SR-710 Twin Tunnels from West Pasadena to El Sereno showing three examples of TBM breakdown areas along this route.

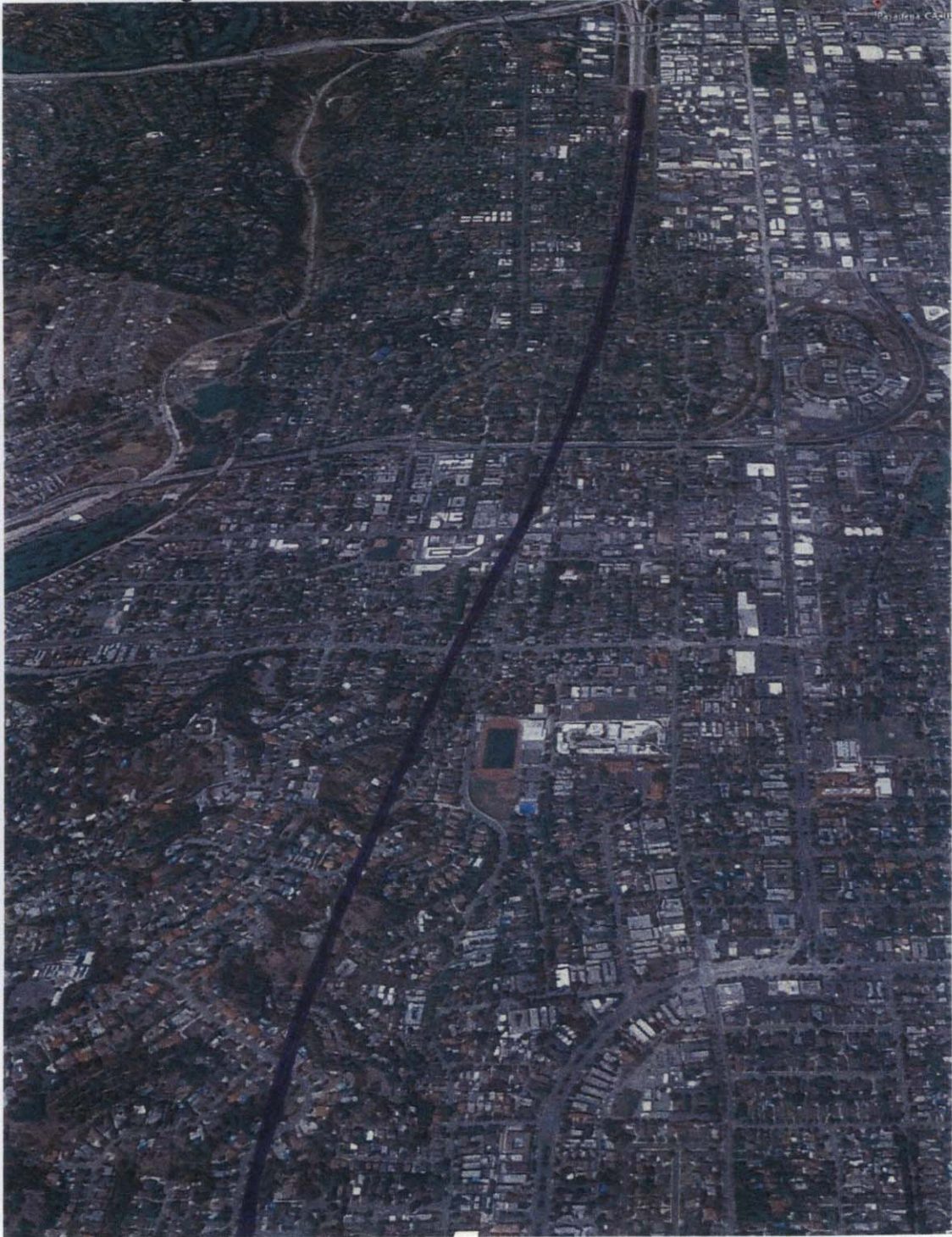
The proposed SR-710 tunnel route as shown by CalTrans.

Alternative F-7 Alignment



From Metro

View of the I-710 stub in West Pasadena with the purple outline of the SR-710 tunnel route running south into South Pasadena towards El Sereno at Huntington Drive.



Three Potential Tunnel Boring Machine Breakdown Areas

Scenario A – South Pasadena at Mission Street and Meridian Avenue

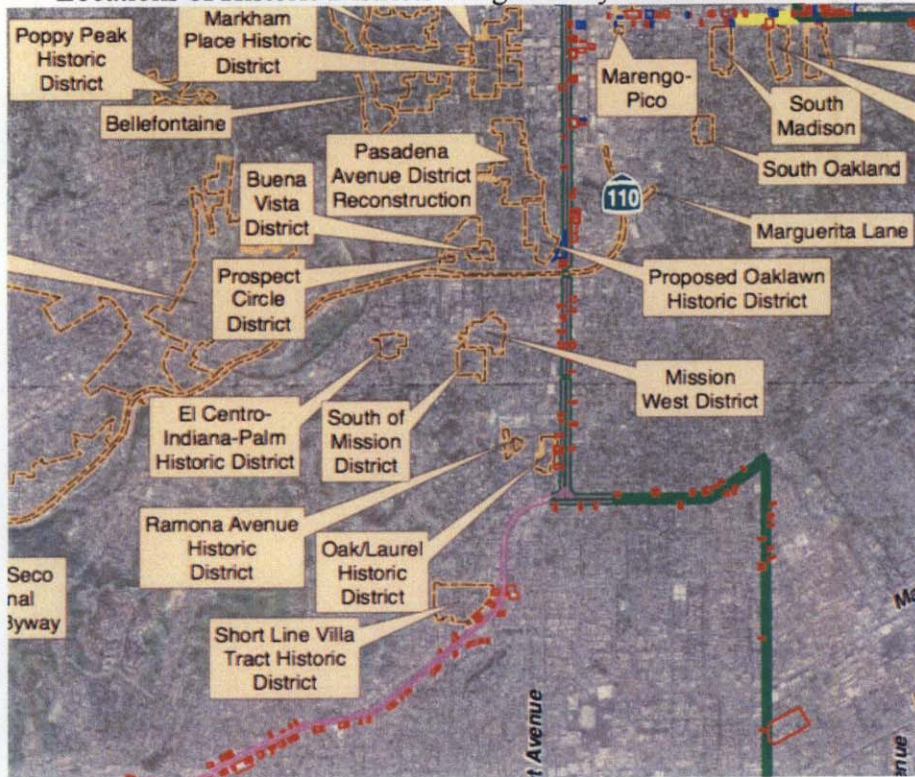
Scenario B – South Pasadena residential area at Alpha Avenue and Fremontia Street

Scenario C – The Community of El Sereno at Huntington Drive and Lowell Avenue

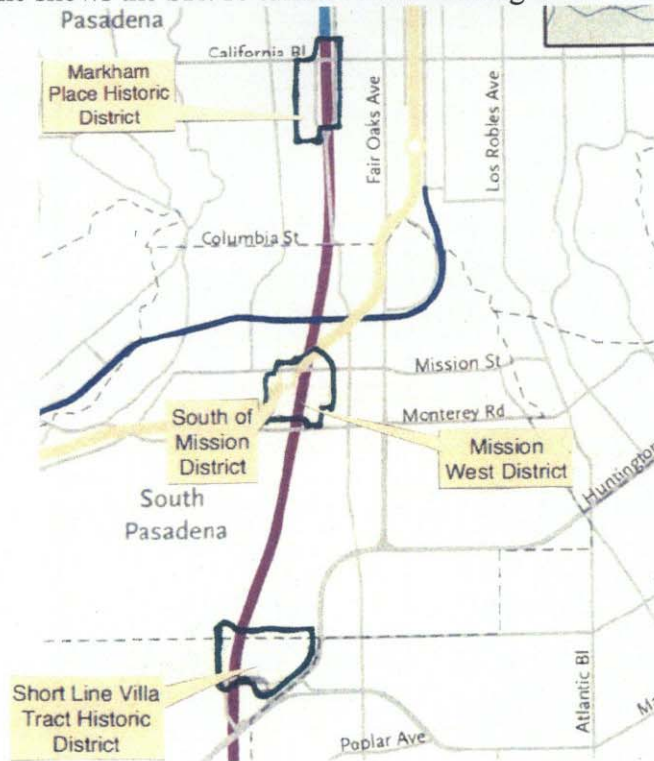
Alternative F-7 Alignment



Locations of Historic Districts designated by Metro and CalTrans



Purple outline shows the SR710 tunnel routes running under historic districts.

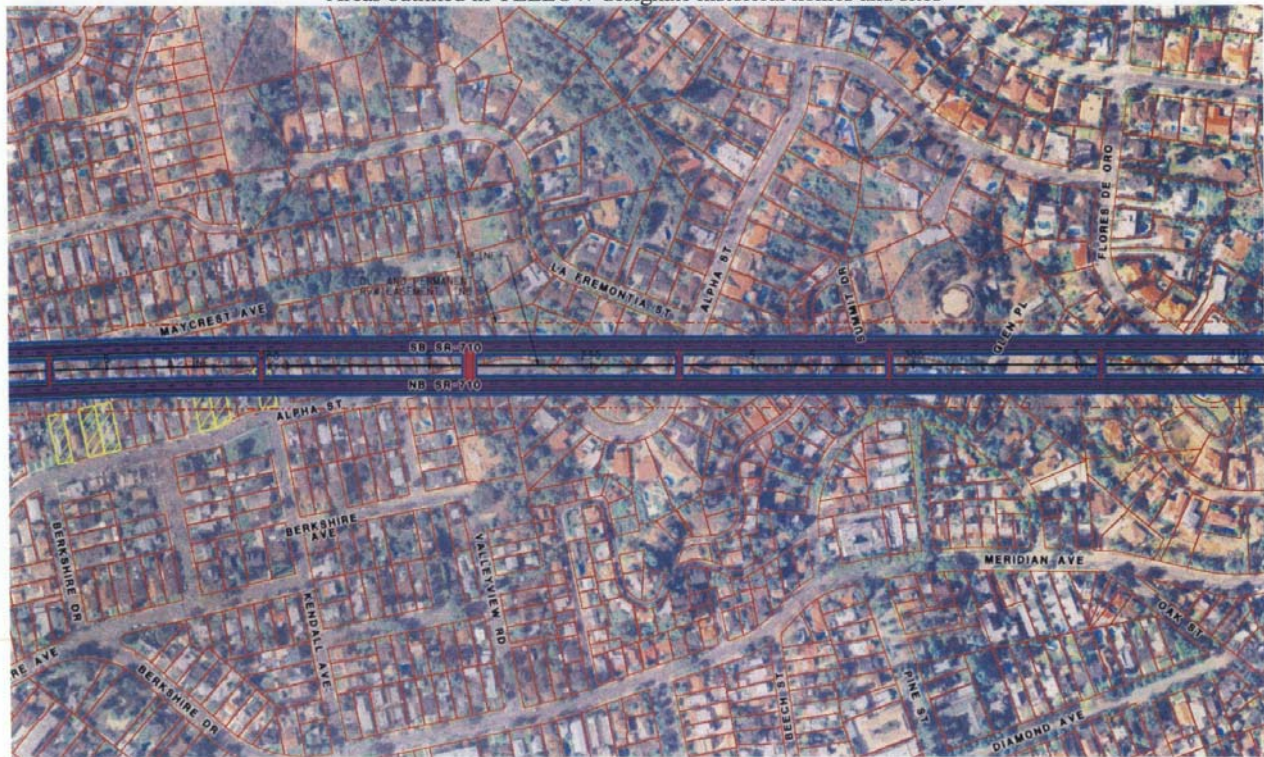


SCENARIO "A" LOCATION showing SR-710 TWIN TUNNELS
South Pasadena at Mission Street and Meridian Avenue
Areas outlined in YELLOW designate historical homes and sites



From CalTran/Metro's Freeway Alternative F-7 Conceptual Design

SCENARIO "B" LOCATION showing SR-710 TWIN TUNNELS
South Pasadena residential area at Alpha Avenue and Fremontia Street
Areas outlined in YELLOW designate historical homes and sites



From CalTran/Metro's Freeway Alternative F-7 Conceptual Design

SCENARIO "C" LOCATION showing SR-710 TWIN TUNNELS
Los Angeles, the Community of El Sereno at Huntington Drive and Lowell Avenue
Areas outlined in YELLOW designate historical homes and sites



From CalTran/Metro's Freeway Alternative F-7 Conceptual Design

3. Descriptions and illustrations of TBM rescue and repair operations in South Pasadena and El Sereno
SCENARIO "A" a TBM failure under a business district with the Gold Line running through it
South Pasadena at Mission Street and Meridian Avenue

Arial View of Downtown South Pasadena near the SR-710 tunnel route. Arrows show the Gold Line track route.
The Blue Overlay shows the Underground Twin Tunnel Route Crossing Mission St. and the Gold Line.



Based on Bertha's 80' wide access pit and its present construction area and the crane illustrations, we can approximate the area needed to accommodate a giant lift and space for a construction office, electrical power station, additional cranes, trucks, dewatering pumping stations and other heavy equipment. The construction zone would be 640' x 200' or larger.