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**From:** White, John  
**Sent:** Friday, February 20, 2009 7:28 PM  
**To:** Reilly, John; 'harveyparker@compuserve.com'  
**Cc:** Paananen, Ron  
**Subject:** Re: Tunnel System

Thanks Harvey and John, we have more than enough to fill in the details needed for this response.

Have a great weekend,

John

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**From:** John Reilly  
**To:** Harvey W. Parker  
**Cc:** harveyparker@compuserve.com ; White, John; Paananen, Ron  
**Sent:** Fri Feb 20 18:07:11 2009  
**Subject:** Re: Tunnel System

Dear all:

Harvey's points are good but I think simple answers to the key points of the letter is best here. We can discuss Monday.

Regards, John Reilly  
Web: [www.JohnReilly.us](http://www.JohnReilly.us)  
Email: [JJReils@ATTGlobal.net](mailto:JJReils@ATTGlobal.net)  
Cell: +1-508-904-3434

----- Original Message -----

**From:** [Harvey W. Parker](#)  
**To:** [John Reilly](#)  
**Cc:** [harveyparker@compuserve.com](mailto:harveyparker@compuserve.com) ; [White, John](#) ; [Ron Paananen](#)  
**Sent:** Friday, February 20, 2009 8:51 PM  
**Subject:** Re: Tunnel System

I agree with both Ron and John. Here are some other words. Maybe John Reilly can check some of the facts for me and suggest whether I am on the right track or not. Surely this is too much but one can just cut it down to what makes sense for a response.

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"WSDOT took many precautions before deciding on the single large tunnel. Of course, WSDOT carefully evaluated the cost, schedule, and the risks associated with both smaller twin tunnels and the larger single tunnel. The overall cost and schedule of a single large tunnel were significantly less for the single large tunnel. The savings would be about \$1/2 Billion or more and the schedule is expected to be \_\_\_\_\_ years shorter. This is because of many reasons. The size of any tunnel bore must be large enough to accommodate the full width and height of the traffic lanes plus all ventilation, fire and life safety, and auxiliary equipment. Smaller tunnels have a sharp curvature which restricts available height for trucks and for ventilation ducts etc. The twin tunnel scheme could not work with 36-ft-diameter tunnels but rather would require at least 43-ft-diameter tunnels. Moreover, there would be more complex and more expensive right-of-way acquisition and there would have to be larger and

more complex and more expensive ventilation structures for the twin tunnel scheme. Usually tunnels are spaced about 1 diameter apart so the overall width of the construction zone would be about 150 ft or more if each tube went below a different street.

With respect to construction risk, both the small tunnel and the large tunnel would be excavated from the safety of a protective steel shield. However, unlike the single large tunnel, the twin tunnel scheme would require connections between the tunnels, called cross passages, for fire and life safety every 600 ft or so. These would be extremely difficult, expensive and risky to construct in the anticipated soils.

The scheduled opening on 2015 would be more difficult to meet with the twin tunnel scheme. It would require purchase of 2 TBM's and coordination of the construction would be extremely difficult. Moreover, it is anticipated that construction of the structure and roadway can begin earlier and be faster and more efficient in the single tunnel making the overall schedule shorter.

It has been demonstrated in many cases that tunnels behave well in earthquakes. Both tunnel schemes would be safe in an earthquake because the movements of the soil would be small in both cases. Moreover, this 54 ft diameter single tunnel will have an approximate inside diameter of \_\_\_ ft which is much smaller (\_\_\_%) than the existing Mt. Baker Ridge Tunnel which has an inside diameter of about 63 ft and which behaved extremely well during the Nisqually Earthquake.

In fact, the Mt Baker Ridge Tunnel is an excellent example of how WSDOT cares for most of the other issues you bring up in your letter. This design of this tunnel was way ahead of other tunnels and similar careful approach to the issues of drainage, fire safety, security, communications, traffic flow and control etc will be given to the new Alaskan Way tunnel. It is used every day by \_\_\_\_\_ vehicles and no concern is every voiced because it is inherently pleasant and safe. There are several double-deck tunnels around the world that have similar problems and lessons learned from these projects will be applied to the Alaskan Way tunnel project. Of course, no matter what, safety is our top priority.

Thank you for your concern. We trust that we answered your questions."

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Ron, John, and John. This is just a strawman to get someone started. Maybe we should say 43 to 45 ft. It is dangerous to get it exactly to one foot and a range may be better. I may be off on some of the issues and facts so they need to be checked. If you can use any of this, ok. If not, let me know what else I can do. If you want to, you could attach one of the leaflets that are given out to drivers in Europe.....or attach some information about just how good Mt Baker Ridge really is.

Best regards,  
Harvey

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At 07:28 PM 2/20/2009 -0500, John Reilly wrote:

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John - agree with Ron's key points, adding that the cost and risks associated with the cross passages is very significant. Additionally, to meet schedule in 2015 the twin tunnels require purchasing 2-43' dia. TBMs. A 43' TBM is maybe 75% of the cost of a 54' machine.

Harvey - your comments?

Regards, John Reilly  
Web: [www.JohnReilly.us](http://www.JohnReilly.us)  
Email: [JJReils@ATTGlobal.net](mailto:JJReils@ATTGlobal.net)

Cell: +1-508-904-3434

----- Original Message -----

From: [White, John](#)

To: [Reilly, John](#) ; [harveyparker@compuserve.com](mailto:harveyparker@compuserve.com)

Sent: Friday, February 20, 2009 7:11 PM

Subject: Fw: Tunnel System

[Do either of you wish to contribute any basic thoughts to this?](#)

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From: Paananen, Ron

To: White, John; Grotefendt, Amy (Consultant); Van Ness, Kristy (Consultant)

Sent: Fri Feb 20 15:10:05 2009

Subject: FW: Tunnel System

I'll let you guys expand on my two sentence answer.

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From: Paananen, Ron

Sent: Fri 2/20/2009 3:06 PM

To: Hammond, Paula; Dye, Dave

Subject: RE: Tunnel System

I will work with the team on a response. Our previous work on a twin bore showed that the bores would have to be 43 feet in diameter, not 36 as Mr. Still suggests. Twin bore requires cross passages every 600 feet or so between the tunnels for emergency egress. From our analysis, going from twin 43 foot tunnels to one 54 foot saved about \$600 million. This was confirmed by several tunnel experts.

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From: Hammond, Paula

Sent: Thu 2/19/2009 7:21 PM

To: Dye, Dave; Paananen, Ron

Subject: Fw: Tunnel System

[Would one of you care to respond? Thanks](#)

Paula

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From: Nelson Still

To: Hammond, Paula

Sent: Thu Feb 19 19:14:04 2009

Subject: Fw: Tunnel System

Dear Madam,

I am forwarding this correspondence in case you did not receive the previous email.

Kind regards

Nelson R Still

--- On Mon, 2/9/09, Nelson Still <[stillknotty@yahoo.com](mailto:stillknotty@yahoo.com)> wrote:

From: Nelson Still <[stillknotty@yahoo.com](mailto:stillknotty@yahoo.com)>

Subject: Tunnel System

To: "Paula Hammon (DOT)" <[hammonp@wsdot.wa.gov](mailto:hammonp@wsdot.wa.gov)>

Date: Monday, February 9, 2009, 1:22 AM

February 8, 2009

Paula Hammond

Dear Madam:

Further to my previous letter dated 16 January 2009 regarding the building of a tunnel system to replace the Alaskan Way viaduct I wish to make some further points as follows:

- 1) A tunnel boring machine of 36' diameter would be + - 40% cheaper than the 54' machine. The smaller machine is probably available second hand and also has a better re-sale value.
- 2) Even if one tunnel was closed for some reason the other tunnel could still service traffic flow north and south.
- 3) The smaller bore tunnel would be structurally stronger and could withstand seismic disturbance better than the larger tunnel.. Whichever design is used a gel should be pumped into the surrounding strata for added protection from water penetration or seismic disturbance.
- 4) The tunnels would have an incline that would allow any water (example flooding) to flow in the desired direction and then pumped out. The highest elevation would face the prevailing winds and this would allow exhaust gases in the tunnel dissipate quicker.
- 5) In the twin tunnel system, only the road deck would require concrete and this would be a substantial saving. The sidewalls and the headwall would only require fireproofing.
- 6) A good audio system and video system would be required so that drivers and passengers could be advised on any problem and what to do.
- 7) Drivers would have to know in the event of an evacuation that they must switch off, leave the keys in the ignition, doors unlocked and move quickly to the safety area (probably the adjacent tunnel).
- 8) Fire protection of the actual tunnel lining (concrete segments) must be very carefully considered. Damage control from terrorist action must also be considered.
- 9) Traffic flow would be both lanes going south in tunnel #1 and both lanes going north in tunnel #2. Alternatively traffic in both tunnels could have one lane going north and one lane going south which means that in the event of an emergency (example fire) the tunnel could be cleared very quickly,
- 10) The alternative method as described in 9) would allow traffic in one lane to do a u-turn and exit the tunnel quickly.

11) Fire hoses and phones every 200 yards which could be used by drivers in an emergency.

12) The twin tunnel system would allow drivers and passengers to exit from one tunnel to the other for safety reasons. The safety of persons using the tunnels is of the utmost importance. It has to be top priority.

Sincerely,

Nelson R Still

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Issaquah

WA 98027

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