

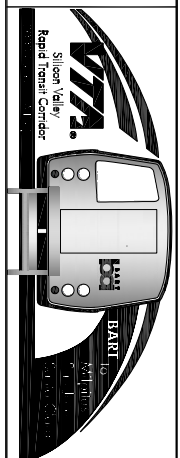
Appendix E

Coyote Creek Alignment Alternatives
Design Development Memorandum

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DESIGNED BY	A. MILLER
DRAWN BY	H. JOHNSON
CHECKED BY	
IN CHARGE	
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SILICON VALLEY RAPID TRANSIT PROJECT
 P0503 TUNNEL SEGMENT
 COYOTE CREEK ALIGNMENT OPTIONS

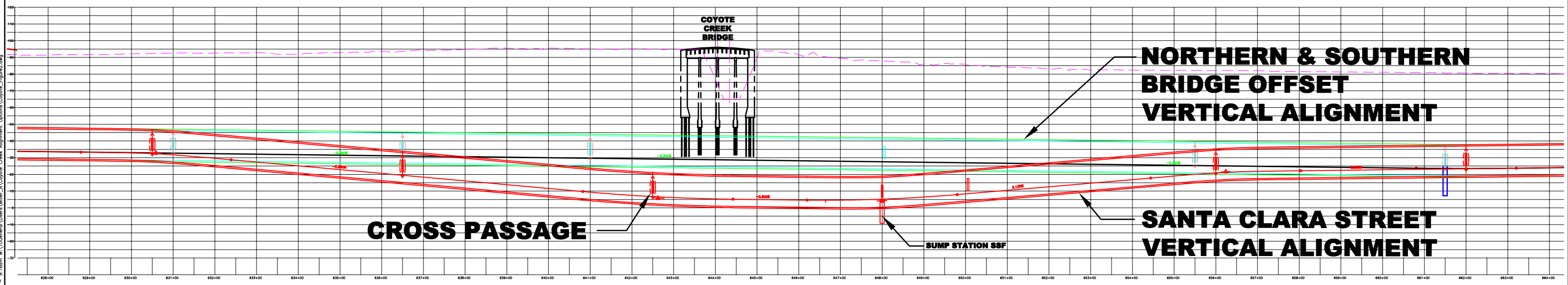
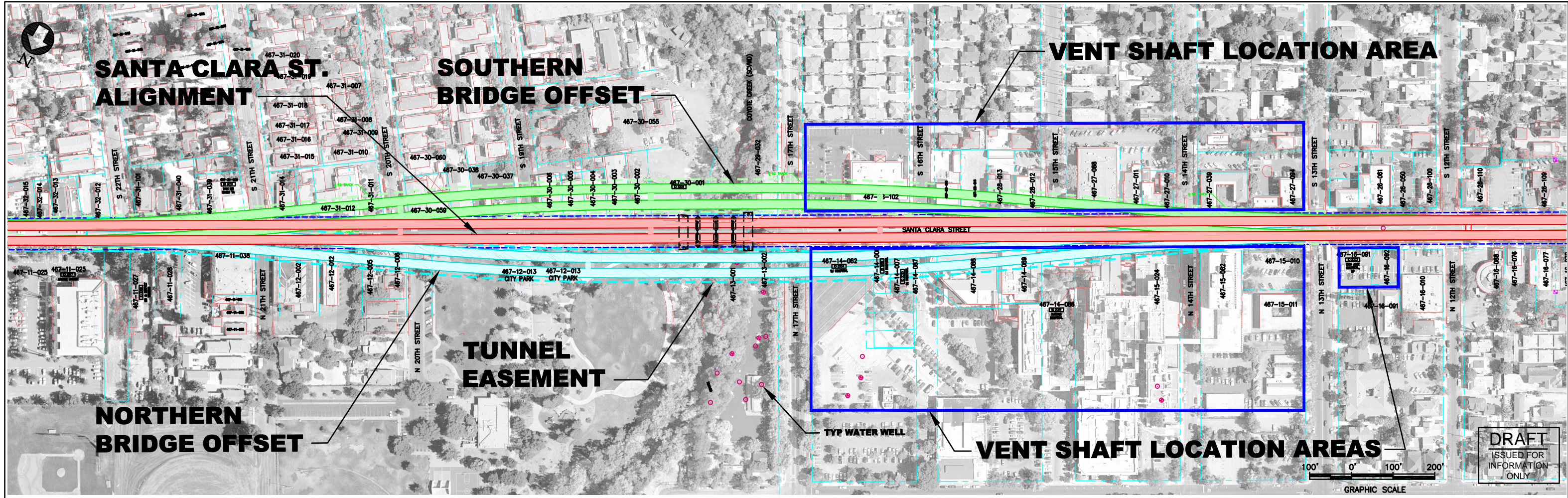
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PROFILE
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NOTE: Clearances shown from the existing bridge assume that the bridge will be reconstructed prior to bored tunnel construction. If the tunnels are constructed prior to the bridge reconstruction, there would be restrictions on the future bridge foundations in the form of larger protective clearance envelopes around the tunnels.

DRAFT
 ISSUED FOR INFORMATION ONLY



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SUBMITTED _____ APPROVED _____



SILICON VALLEY RAPID TRANSIT PROJECT
CENTRAL AREA GUIDEWAY
COYOTE CREEK ALIGNMENT STUDY
NORTHERN BRIDGE OFFSET,
SOUTHERN BRIDGE OFFSET
AND SANTA CLARA STREET ALIGNMENT

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November 29, 2007

Mr. Jim Helmer
Director of Transportation
City of San Jose
200 East Santa Clara Street
San Jose, CA 95113

Dear Mr. Helmer:

The purpose of this letter is to provide VTA's recommended approach for the BART alignment at the Coyote Creek crossing of Santa Clara Street. I appreciate the cooperation by the city of San Jose staff in helping us to address this important challenge. The presence of the existing bridge over Coyote Creek at this location presents us with an unacceptable level of risk in trying to tunnel under using the Tunnel Boring Machines. I understand that city staff supports our position that the risk of going under the bridge are substantial and, as such, further consideration of this option should be dropped.

The suggested alternatives, namely, tunneling slightly to the north or the south of Santa Clara Street at this location, will address the risk presented by the bridge and its foundation in the creek bed. From the perspective of tunnel construction, either a northerly or southerly alignment swing are acceptable to VTA and present no technical obstacles.

As a result of exhaustive public and internal review of both options, VTA's position is that the northern alignment is the preferred choice and is in the best interest of the project. Accordingly, I respectfully request that your staff revisit your previous recommendation and examine the northerly alignment in more detail. From VTA's perspective, it would appear to have advantages to the city over the southerly alignment. The biggest advantage is that the alignment travels under park land for the majority of the route and then minimally encroaches on approximately eight private properties on either side of the creek, including the one large property owner on the north west end of the alignment. This property is currently slated for development, and we believe that development could be designed to accommodate the length of tunnel underneath without impact to existing users or nearby residents. The southerly alignment would encroach onto approximately 29 different established properties, including residential properties.

While I recognize that a civil construction project of this magnitude is a challenge for any area in which it is located, I believe that in working together we can find ways to alleviate any disruption caused by this work. Based upon the large amount of park land, the encroachment onto eight properties, as opposed to 29, and the absence of proximate residences, it appears that the northerly alignment will have less potential project impact than the southerly alignment and encourage your staff to examine this option more closely.

Mr. Jim Helmer
November 29, 2007
Page 2 of 2


Thank you again for your cooperation and efforts on behalf of the BART Project. Please feel free to call on me if you have any questions or need further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael T. Burns". The signature is written in a cursive style with a prominent initial "M".

Michael T. Burns
General Manager

cc: VTA Board of Directors

	<p>Silicon Valley Rapid Transit DESIGN DEVELOPMENT MEMORANDUM</p>	<p>Document No. P0503-D300- DDM-DE- 022</p>
<p>Subject: VEM Alternative Tunnel Alignment at Coyote Creek</p>		<p>Revision No./ 1 Effective Date 2/20/08</p>

TO: Design Development Board
Silicon Valley Rapid Transit Project

FROM: James Chai
Central Area Tunnel Engineering Manager

SUBJECT: Alternative Tunnel Alignment at Coyote Creek

This revision is to formalize the recent VTA recommendation to adopt the ‘North Offset’ alignment at Coyote Creek (see Attachment – letter dated November 29, 2007 from Michael Burns (VTA) to Jim Helmer (City of San Jose)).

(Included below is the Rev. 0 wording of the DDM, with Rev. 1 updates noted in *bold italic.*)

PROBLEM STATEMENT:

The *baseline* tunnel alignment *developed during the 10% Conceptual Engineering (CE) phase* crosses Coyote Creek directly underneath the bridge along Santa Clara Street. The tunnel profile descends from a nominal cover of 40 feet adjacent to Alum Rock Station to approximately 70 feet at the bridge location and climbs back to the nominal cover prior to entering into San Jose Downtown Station, providing a vertical clearance of 10 feet to the bridge foundations. This deep profile beneath the bridge foundations imposes great risks to the project:

- The ground at this depth comprises low-fines sandy materials and is not optimal for the Earth Balance Machine (EPBM) tunneling technology. For these sandy materials, static water pressure approaching three bars at tunnel invert may slow tunneling and would increase difficulty of entering the face if maintenance is required at this location. Consequently, tunneling under such conditions will increase risks of developing larger than predicted settlements that could adversely impact adjacent structures and properties.
- The Coyote Creek Bridge is under jurisdiction of City of San Jose. The most recent bi-annual bridge inspection (*March 2007*) shows a *sufficiency rating of 61.2%* for the bridge. Per FHWA specifications, a *sufficiency rating* of 50% or below will require structure repair or replacement. At the present time, CSJ does not have any plan to repair or replace the bridge. However, future replacement of the bridge will likely require similar or deeper pile foundations. Recent experience on SR87 HOV Lane project demonstrated the potential difficulty in installing Cast –in-Place-Drilled-Hole (CIDH) piles in highly water pressured sandy layers. As such, the feasible options for bridge foundations would be driven piles or CIDH piles with permanent steel casing penetrating through the clean sandy layers. Either

option will be inevitably severely constrained by the presence of the tunnels and impose a risk to them.

To reduce these risks, the Tunnel Segment has evaluated two alignment options that avoid the bridge as follows:

North Offset Alignment Option locates both S1 and S2 tunnels to the north of Coyote Creek bridge, with the S2 tunnel closest to the bridge. The distance between S2 tunnel outline and bridge abutment is approximately 20 feet. This allows profiles of S1 and S2 tunnels to be raised about 20 feet higher than their profiles if the tunnels were located directly beneath the bridge. This option includes an allowance for future bridge widening to the north.

South Offset Alignment Option locates both S1 and S2 tunnels to the south of Coyote Creek bridge, with the S1 tunnel closest to the bridge. The distance between S1 tunnel outline and bridge abutment is approximately 20 feet. This allows profiles of S1 and S2 tunnels to be raised about 20 feet higher than their profiles if the tunnels were located directly beneath the bridge.

RECOMMENDATION:

The SVRT project should adopt the *North Offset* Alignment Option, which places the alignment to the *north* of the Coyote Creek Bridge.

ANALYSIS:

History – The current tunnel alignment travels through Coyote Creek right beneath the Coyote Creek Bridge along the Santa Clara Street. Subsurface soil conditions and the present and future bridge foundations impose great risks to tunneling and tunnels, which in turn would have adverse impacts to the bridge structure and adjacent properties. Two alternative alignment options have been investigated to reduce these risks as summarized in HMM/Bechtel, Tunnel Segment Coyote Creek Alternative Alignment Study Report (P0503-D300-STY-DE-015, Rev. A). The study recommends that South Alignment Option be adopted for the SVRT project considering cost, environmental, right of way, construction risks, and other factors.

Since issuance of this report, and in the current 65% Engineering phase of the project, many discussions between the VTA, the City of San Jose and the neighboring community have taken place to address the issue of where to align the tunnels in the vicinity of Coyote Creek. In summary, the community residents have concerns with construction and operation of BART trains under or closer to their properties (south of Santa Clara Street), and the developers interested in the former San Jose Medical Center property have concerns with limitations on future development with the tunnels located north of Santa Clara Street.

Cost – Based on a cost comparison between the baseline alignment and two options as shown in Table 1, South *Offset* Alignment Option is *the most cost effective solution*.

The costs in Table 1 have been updated to reflect the most current estimates. Note that these are direct costs only, and do not include items such as risk and loss of future development potential. An additional line item has been added for Rev. 1 to reflect the fact that the presence of the

tunnels under the existing Coyote Creek bridge would increase the cost of replacing the bridge, which the City plans to do in the near future.

Table 1: Delta Cost Comparison Summary (in 2005 \$)*

	Baseline	North Offset Alignment Option	South Offset Alignment Option
TBM Mining	0	<i>-417,600</i>	<i>-417,600</i>
Additional Tunnel Length	0	<i>81,000</i>	<i>67,500</i>
ROW	0	<i>3,450,000*</i>	<i>3,865,000</i>
Cross Passage	0	<i>-1,738,913</i>	<i>-1,738,913</i>
Well Replacement	0	<i>1,500,000</i>	<i>0</i>
Property Protection	0	<i>0</i>	<i>0</i>
Noise and Vibration	0	<i>0</i>	<i>0</i>
Replacement Bridge	<i>0</i>	<i>-5,000,000</i>	<i>-5,000,000</i>
Delta Cost	0	- \$2,125,513	-\$3,224,013

**The North Offset Alignment Option Right-Of-Way cost is in 2008 dollars*

Community Impact – Though the South Offset Alignment Option is the more cost effective, the North Offset Alignment Option will have less potential project impact to the neighboring community due to the large amount of park land, the encroachment onto eight properties (as opposed to 29 for the South Offset) and the absence of proximate residences.

Schedule – Tunneling conditions under the baseline alignment may require use of a positive displacement pump in addition to screw conveyor if soil conditioners cannot provide an adequate plug. The positive displacement pump will act as the plug but typically operates at less capacity than just a screw conveyor, resulting in an increase in tunneling time and cost. Both Offset Options allow tunneling in cohesive soils and do not require the use of the pump and thus eliminate schedule and cost impact.

Constructability –As discussed previously, the constructability is the driver for this alternative alignment study. Either Offset Option reduces construction risks associated with the baseline alignment.

Right of Way – There is zero subsurface easement cost for the baseline alignment since the tunneling is along the Santa Clara Street. Both Offset Options would require additional subsurface easement ROW. Based on preliminary analysis, the additional ROW cost for the North Offset Alignment Option would be approximately \$415,000 less than that of South Alignment Option.

Safety/Security – Both Options reduce schedule and risk and, consequently, improve worker safety. There are no impacts on security.

Operations/Maintenance – Either Option would have minimal impacts. At 80 mph and increase in length of five feet, there will be less than 0.05 second increase in travel time between Alum Rock and Downtown Stations. BFS alignment criteria including rider comfort through curves and transitions are met.

EIR/EIS – There may be Section 4(f) issues regarding North *Offset* Alignment Option since the alignment will travel under the park northeast of the bridge. In particular, if a ventilation shaft is required in the Roosevelt Park. There is no environmental impact for South Alignment Option. Either Option requires supplemental EIR.

Note: The locations for the mid-tunnel ventilation shaft currently being studied do not include Roosevelt Park.

Segment Coordination – Coordination with Systems is required, specifically with regard to the mid-tunnel ventilation structure location. However, the location shown for the current alignment is also subject to change.

Third Party Coordination – CSJ has reviewed the study report and concurs with the recommendation. ***The San Jose City Council approved this alignment on December 11, 2007.***

Compliance with BFS – Either Option meets BFS requirements.

Consequences of Negative Action of DDM – A negative action for this DDM will revert the tunnel alignment to the baseline that would incur additional construction costs and risks.

CONCLUSIONS:

North Offset Alignment Option provides a cost effective and risk-reduced alignment and has no operational impact to BART. ***The VTA General Manager and the City of San Jose also support this alignment option.*** We recommend DDB adopt *the North Offset Alignment* option.

ATTACHMENTS:

- Figure 1 – Tunnel Segment Coyote Creek Alternative Alignment (Plan)
- Figure 2 - Tunnel Segment Coyote Creek Alternative Alignment (Profile)
- ***Letter dated November 29, 2007 from Michael Burns (VTA) to Jim Helmer (City of San Jose)***
- ***Email dated November 16, 2007 from Brandi Childress distributing “Response to Coyote Creek Community Concerns”***

REFERENCES:

HMM/Bechtel, Tunnel Segment Coyote Creek Alternative Alignment Study (P0503-D300-STY-DE-015, Rev. A)