



# Memorandum

**Date:** August 23, 2018  
**To:** Citizens Advisory Committee  
**From:** Eric Cordoba – Deputy Director for Capital Projects  
**Subject:** 09/05/18 Citizens Advisory Committee Meeting: Adopt a Motion of Support for the Adoption of the Pennsylvania Alignment as the Preferred Alternative for Grade Separations at 16<sup>th</sup> Street and Mission Bay Drive on the Approach to the Caltrain Downtown Extension

<p><b>RECOMMENDATION</b>    <input type="checkbox"/> Information    <input checked="" type="checkbox"/> Action</p> <p>Adopt a motion of support for the adoption of the Pennsylvania Alignment as the preferred alternative for grade separations at 16<sup>th</sup> Street and Mission Bay Drive on the approach to the Caltrain Downtown Extension (DTX).</p> <p><b>SUMMARY</b></p> <p>At the June 27 CAC meeting, the Planning Department presented the staff recommendations stemming from the Rail Alignment and Benefits Study (RAB), previously known as the Railyard Alternatives and I-280 Boulevard Feasibility Study. The RAB included an evaluation of various rail alignment options for the DTX that would achieve grade separation with 16<sup>th</sup> Street. In a companion item, Transportation Authority staff sought adoption of the Pennsylvania Alignment as the preferred alternative. The CAC decided to continue the item due to concerns with not knowing the potential railyard relocation sites, lack of clarity regarding future use of the 4<sup>th</sup> and King Railyard, and the desire to better understand why a 7<sup>th</sup> Street alignment proposed by Mr. LeBrun during public comment was not studied by RAB. This memo and the attached response from the Planning Department are intended to address the concerns expressed by the CAC. It is anticipated that the Transportation Authority and other city agencies will be asked to adopt separate or a joint resolution of support for the Pennsylvania alignment as the preferred alternative, establishing it as city policy, in September 2018. This will provide clear guidance to the Transbay Joint Powers Authority (TJPA), city agencies, funders, and other stakeholders, and will enable the project to be more competitive for discretionary funding.</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Fund Allocation</li> <li><input type="checkbox"/> Fund Programming</li> <li><input checked="" type="checkbox"/> Policy/Legislation</li> <li><input type="checkbox"/> Plan/Study</li> <li><input checked="" type="checkbox"/> Capital Project Oversight/Delivery</li> <li><input type="checkbox"/> Budget/Finance</li> <li><input type="checkbox"/> Contract/Agreement</li> <li><input type="checkbox"/> Other: _____</li> </ul>
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**DISCUSSION**

One of the main reasons for delays in advancing the DTX has been the need to develop City consensus on the best below-grade rail alignment alternative to avoid two at-grade DTX intersections

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(7<sup>th</sup>/Mission Bay Drive and 7<sup>th</sup>/16<sup>th</sup> Street) that serve east/west traffic between Mission Bay and the rest of the City. One of the primary purposes of the RAB Study was to study alternative alignments and develop agreement on the City's preferred below-grade alignment for the DTX. As we indicated at the June CAC meeting, San Francisco agency staff, including the Transportation Authority, have identified the Pennsylvania alignment as the staff preferred DTX alignment.

It is anticipated that the Transportation Authority and other city agencies will be asked to adopt separate or a joint resolution of support for the Pennsylvania alignment as the preferred alternative, establishing it as city policy, in September 2018. This will provide clear guidance to the TJPA, city agencies, funders, and other stakeholders, and will enable the project to be more competitive for discretionary funding.

### **Caltrain Yard Studies**

It is important to note that it is still early in the planning/conceptual engineering process for the Pennsylvania alignment and much remains unknown. The CAC expressed concerns about one of these unknowns, namely the potential relocation of the Caltrain yard at 4th and King streets. At this time, no decision can be made about modifying or relocating (including undergrounding the yard at substantially the same location) the yard and/or its functions until a full analysis of the needs of Caltrain and California High Speed Rail are completed. This work is being done through the Caltrain Business Plan and the Blended Service Operations Plan. Both efforts are underway and anticipated to be completed in mid-2019. In the future, any proposed yard relocation would be required to have its own environmental process where all alternatives will be analyzed, and public input sought.

As a funding agency for Caltrain and TJPA, the Transportation Authority is committed to ensuring that the various studies and planning/conceptual engineering efforts related to the potential Caltrain yard relocation are conducted in a transparent and thorough manner. This will include inclusive stakeholder involvement and full disclosure of the benefits, impacts and mitigations of various options to the Board, CAC, and public. We will bring regular updates on these efforts to the CAC and Board.

The Planning Department, with input from the Transportation Authority and the TJPA, prepared the attached response to the questions raised by the CAC at the June meeting.

The remainder of this memo provides background on the RAB Study and on the Pennsylvania Alignment. Staff from the Transportation Authority, the Planning Department, and the Office of Economic and Workforce Development will be present at the CAC meeting to answer any questions that the CAC may have.

### **RAB Study Background.**

The Planning Department initiated the RAB study in mid-2014 to gain better understanding of the transportation and land use changes at the state, regional, city, and neighborhood level impacting the southeast quadrant of the city. One of the main purposes of the study was to address the need for the future Caltrain/High Speed Rail alignment to be below grade at 16<sup>th</sup> Street, a critical link for Muni's electric trolley line and the only continuous east-west arterial in the Mission Bay area.

The rail alignment component of the study sought to answer the most time-sensitive question of the RAB: how to bring both Caltrain and High-Speed Rail from the county line into the Salesforce Transit Center. There are currently two at-grade intersections (7<sup>th</sup>/Mission Bay Drive and 7<sup>th</sup>/16<sup>th</sup> Street) that serve east/west traffic between Mission Bay and the rest of the City.

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As the impacts of the anticipated rail traffic were analyzed it became evident that in order to maintain east/west connections between Mission Bay and the rest of the city and avoid degradation of the intersections, a grade separation will be needed. While numerous possible alignments were reviewed and analyzed at some level, three alignments were finally selected for in-depth analysis:

- **Future with Surface Rail** - Composed of the DTX as currently cleared plus a grade separation at 16<sup>th</sup> Street that leaves the rail on the surface and depresses the streets
- **Pennsylvania Avenue Alignment** – Composed of the DTX as currently cleared plus a grade separation effected by a tunnel beneath Pennsylvania Avenue and 7<sup>th</sup> Street starting just north of the current 22<sup>nd</sup> Street Station
- **Mission Bay Alignment** – A brand new alignment starting in the neighborhood of the 22<sup>nd</sup> Street Station and veering east towards the Bay and proceeding northbound beneath 3<sup>rd</sup> Street until it meets up with the current DTX alignment on 2<sup>nd</sup> Street

After developing study-level designs and construction methodology, preliminary estimates of probable costs and estimated timing of the three rail alignment options were prepared as summarized in the table below.

	<b>Preliminary Net Cost</b>	<b>Expected Completion Date<sup>2</sup></b>
Future with Surface Rail (DTX + Trenched Streets)	\$ 5.1 Billion	2026
Pennsylvania Avenue (DTX + Extended Tunnel)	\$ 6.0 Billion <sup>1</sup>	2027
Mission Bay/3 <sup>rd</sup> Street (Modified DTX + 3rd St Tunnel)	\$ 9.3 Billion <sup>1</sup>	2031

<sup>1</sup>Includes costs of construction and moving railyard, as well as value capture and impact costs associated with each alignment. Note: relocation or resizing of the 4<sup>th</sup>/King Railyard are options that are subject to future policy decisions and will be informed by underway and anticipated follow up studies and efforts.

<sup>2</sup>Date for completion is based on the assumption that all money was available on January 1, 2017.

**Recommended Alignment: Pennsylvania Avenue.**

Based on a careful analysis of trade-offs (including, but not limited to cost, schedule, ridership, urban design and land use considerations), implementation considerations, and needs known in the study area, San Francisco agency staff, including Transportation Authority staff, recommends the Pennsylvania Avenue rail alignment. A summary of the primary benefits of the Pennsylvania Avenue alignment include the following:

- Solves the significant traffic operation conflicts that currently exist at the 16<sup>th</sup> Street at-grade intersection and the 7<sup>th</sup>/Mission Bay Drive at-grade intersection. This alignment unites Mission Bay with the City, removes the barrier of the Caltrain line as well as the anticipated 20+ minute closures of these two essential intersections during the peak hour, maintains access and mobility for critical life-saving services, and avoids a long, deep trenching of streets to maintain east/west connections.

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- Provides for opportunity to reknit over 1 mile of the city east/west. This creates at least six additional east/west street connections with the removal of surface rail north of 22<sup>nd</sup> Street.
- Provides for potential need for increased operational capacity via underground expansion of the 4<sup>th</sup>/Townsend station to allow for additional storage or staging opportunities for Caltrain.
- Maximizes options for phasing the project (DTX first, Pennsylvania Avenue extension opening quickly thereafter subject to funding availability)
- Pennsylvania alignment could be built an estimated 4 years sooner and at a significantly lower cost than the 3<sup>rd</sup> Street alignment, pending a full funding plan

### **FINANCIAL IMPACT**

There is no impact on the agency's adopted Fiscal Year 2018/19 budget associated with the recommended action.

### **SUPPLEMENTAL MATERIALS**

Attachment 1 – Letter from the Planning Department



# SAN FRANCISCO PLANNING DEPARTMENT

**MEMO**

**DATE:** August 14, 2018  
**TO:** SFCTA CAC members  
**FROM:** Susan Gygi, PE  
**RE:** Rail Alignment and Benefits (RAB) Study – responses to SFCTA CAC outstanding issues

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## Introduction

The RAB Study Project Management Team (Susan Gygi and Jeremy Shaw) provided an informational presentation related to the Rail Alignment and Benefits (RAB) Study at the June 27, 2018 meeting of the SFCTA CAC. In that meeting there was also an agenda item to adopt a motion of support for the Pennsylvania Avenue Alignment as the Preliminary Preferred Alternative for grade separations at 16<sup>th</sup> Street and Mission Bay Drive on the approach to the Downtown Rail Extension (DTX).

It was the desire of the CAC to continue the motion of support adoption for two reasons:

1. Two CAC members expressed concerns about not knowing the specific location of a potential southern railyard, and asked for clarification on the continued use of the 4<sup>th</sup>/King railyard.
2. During public comment, Mr. Roland LeBrun requested that a 7<sup>th</sup> Street alignment be fully reviewed prior to approval of any singular alignment moving forward

This memorandum responds to those two items.

## Response to Continued use of surface 4<sup>th</sup>/King Railyard

The continued use of the surface 4<sup>th</sup>/King railyard was not fully studied under the RAB. The RAB studied only scenarios which included full relocation of the 4<sup>th</sup>/King railyard to a southern location (biggest impact). The study also determined that it may be possible to distribute train storage among various locations (more on this below). At this time, no decision can be made about modifying or relocating the yard and/or its functions until a full analysis of the needs of Caltrain and CHSRA are completed. This work is being done through the Caltrain Business Plan and the Blended Service Operations Plan. Both efforts are underway and anticipated to be completed in mid-2019. In the future, any proposed yard relocation would be required to have its own environmental process where all alternatives will be analyzed, and public input sought.

As noted above, the RAB study found that it may be possible to distribute train storage among various locations. For example, expanding the 4<sup>th</sup>/Townsend underground station further south (under the 4<sup>th</sup>/King surface railyard), is one option that would allow for additional dead-end tracks for staging or storage, allowing for a transit-oriented development to be built above. In addition, there is the possibility to allow for overnight storage at the Salesforce Transit Center (SFTC) on all six tracks including double-berthing the trains on five of them. Some combination of the above could also be deployed with or without a southern railyard. Until the Caltrain Business Plan and the Blended Service Operations Plan efforts are completed, and we have a better understanding of the needs to operate future service, we must have potential alternative railyard sites. Of note, the Pennsylvania Avenue alignment and a potential yard relocation can be seen as independent projects. Even after the Pennsylvania Avenue alignment is built, Caltrain could continue using the current surface railyard (or a smaller footprint) for some to-be-determined amount of time. Since most trains would be going to the SFTC, train volumes on the surface would be significantly lower than present.

## Response to Request for Locations under Consideration for a Southern Railyard

The RAB study team identified two likely railyard locations (one inside the City limits, and one outside of the City limits) that could meet Caltrain's storage and operational needs in the near term.

Two CAC members requested the physical location of a potential southern railyard before they would consider supporting the preliminary preferred Pennsylvania Avenue alignment.

Based on the City Attorney's Office legal opinion and common practice, City agencies should not disclose potential locations for properties that may have to be acquired until sufficient work is completed to determine what parcels may be needed. Currently, both of the potential locations appear to work for operations. However, without further study, a determination cannot be made as to what, if anything, is necessary.

The RAB study was based on the most conservative planning assumptions for each of the three alignment alternatives. Specific to the Pennsylvania Avenue alignment, that included assuming a total replacement of the 4<sup>th</sup>/King railyard to a southern location. However, the ultimate solution may be much less (as stated above). Caltrain and California High Speed Rail Authority (CHSRA) do not currently know what their railyard needs are along the entire Caltrain alignment. Caltrain is currently undertaking the Caltrain Business Plan and CHSRA/Caltrain are undertaking a Blended Service Plan, aka the Peninsula Corridor Service Vision. These two documents, expected in 2019, will provide a better understanding of each agency's railyard needs along the Caltrain alignment.

## **Response to Mr. LeBrun's proposed 7<sup>th</sup> Street alignment**

The RAB study preliminarily reviewed over 30 conceptual alignments for getting heavy rail (Caltrain and High Speed Rail) to the Salesforce Transit Center (SFTC). Four alignments were deemed to have merit and were studied further as part of the RAB Study. Mr. LeBrun's proposal is similar to the 7<sup>th</sup> St alignment that the RAB Study considered, deemed infeasible, and therefore, did not study further. This response to the request to look at Mr. LeBrun's alignment proposal was developed in cooperation by the RAB Study Team, the TJPA DTX Team, and SFCTA.

To reach the SFTC, Mr. LeBrun proposes two parallel one-track tunnels starting at the north west edge of the current railyard, traveling north under 7<sup>th</sup> Street, turning east under Minna/Natoma Streets, and ultimately entering the underground train box through the already-constructed western wall near Second Street. The Planning Department, TJPA, SFCTA, consultants, and other agencies evaluated a similar alignment as part of the 3-year RAB study, drawing upon original analysis from the TJPA DTX work. Agency staff and consultants determined that the 7<sup>th</sup> Street alignment did not warrant further study as it would: i) adversely impact other existing buildings, ii) constrain operations and create safety risks, iii) doesn't meet design requirements, iv) compromise the structural layout of the SFTC, and v) not conform to design requirements. Each finding is detailed out below.

### **Adverse Impacts to Other Existing Buildings**

The proposed alignment goes under multiple buildings, and will have greater ROW impacts than the current DTX alignment, located predominantly in the public ROW. The tracks and a mined crossover on the proposed alignment would be located under Moscone Center, which is in itself an underground facility with deep piles. Park Tower, currently under construction, sits on deep foundations and two levels of parking below grade, which would be in the path of the tunnel proposed by Mr. LeBrun. The tunnels for Mr. LeBrun's alignment would also pass under Moscone Center, Yerba Buena Gardens, and the SFMoMA. Since much of the Moscone facility as well as SFMoMA subsurface structures are located in the way of the proposed alignment its construction would be unacceptably disruptive and costly.

The two curves that would be necessary from 7<sup>th</sup> Street would not meet CHSRA standards. Mr. LeBrun's drawings do not seem to be to scale as preliminary layouts determined impacts to all three facilities. In addition, the curves impact many more buildings in the transition from 7<sup>th</sup> Street to Minna and Natoma, respectively. In addition, even by Mr. LeBrun's assumption, the grade coming up to the train box after passing under Moscone Center would be 3.5% or more. CHSRA has a maximum grade of 2.7% so this alignment would not meet CHSRA criteria for continued operation. Finally, the wider footprint of the throat structure in Mr. LeBrun's concept would affect two additional properties that are clear of the planned alignment. Impacting these two properties would require re-opening the environmental document again, delaying the project further with no possibility of improvement over the current proposed alignment.

## **Operational Constraints and Safety Risks**

The two single-track tunnels proposed by Mr. LeBrun would constrain operations, create severe safety risks, and pose maintenance challenges. The February 2018 SFCTA's peer review panel made up of five construction, operations, and maintenance experts, identified a need for three tracks into/out of the station to allow for anticipated operational inconsistencies without affecting train travel up and down the Peninsula main line. This determination of three tracks was not specific to the alignment itself but to address issues going in and out of the SFTC and the need to absolutely ensure that operations can be maintained even when there are incidents. This additional track allows for train service to continue if a train were disabled where the tracks enter the station. Mr. LeBrun's concept does not account for this. Twin-bore single-track tunnels, as recommended by Mr. LeBrun, fail to achieve the required operational flexibility provided by a third track, which is required by Caltrain and CHSRA. In addition, to meet safety standards for sufficient egress/access, Mr. LeBrun's option would require longer, numerous, and more expensive cross-passages between tunnels. Constructing the passages would disrupt businesses and circulation on Second Street and would be difficult to locate, given the large number of existing buildings with deep foundations and below-grade parking.

## **Design Requirements**

Relocating a planned 4<sup>th</sup>/Townsend station to 7<sup>th</sup> Street, as suggested by Mr. LeBrun, would undermine the planning and land use-transportation coordination at the core of the Central SoMa Plan and the Central Subway alignment. As currently, an escalator at Fourth Street will provide convenient access to the Central Subway from the underground 4<sup>th</sup>/Townsend Station currently planned for DTX. The proposed alignment would eliminate the connection with the Central Subway, which received \$65 million towards construction due to HSR connectivity funds.

In addition, the Central SoMa plan upzoned the area based on a train station at 4<sup>th</sup>/Townsend. Moving the station would require longer walking distances for these higher density neighborhoods and for those making the connection between Muni Metro and Caltrain. Additionally, relocating the 4<sup>th</sup>/Townsend Station would not eliminate the cut-and-cover construction techniques and the resultant impacts, as Mr. LeBrun contends. 7<sup>th</sup>/Townsend ground conditions still require cut-and-cover construction. The relocation would also lose the advantage of the adjacent 4<sup>th</sup>/King railyard as a potential staging area for construction materials of the DTX.

## **Structural Compromise to the SFTC**

The SFTC construction is now complete. In order to accommodate Mr. LeBrun's proposal, the west end of the brand-new building would have to be demolished and rebuilt to accommodate the different approach of the proposed alignment and move the load bearing elements to another location. This would mean that the new bridge from the Bay Bridge, which connects to the terminal at the west end, would most likely have to be taken out of service (if not partly demolished), eliminating bus service on the bus deck for the duration of demolition and construction of the modifications. This very expensive proposition would require major structural changes to the SFTC. Having the tracks approach the train box from a different direction will require the relocation of the already-built columns at the west end of the station. Since the west end carries a significant portion of the structural load of the station, any change to the western wall would require modifying the rest of the SFTC. The SFTC opened for bus operations on August 12, 2018. Modifications to the structural elements within the building would impact bus operations on the bus level.

## **Travel Times**

Mr. LeBrun's claims the 7<sup>th</sup> St alignment will save three minutes travel time. Unfortunately, this claim is unrealistic, since the current travel time from 4<sup>th</sup>/Townsend into the SFTC is anticipated to be three minutes, so, under Mr. LeBrun's claim this time would shrink to zero. Mr. LeBrun states that the current DTX alignment has a longer travel time, due to three sharp curves with a maximum speed of 25 mph. This statement is incorrect. The curve speeds on the DTX alignment are 35 mph between 7<sup>th</sup>/Townsend and 2<sup>nd</sup>/Townsend. And while the final curve speed entering the SFTC is 22 mph, trains are required to slow down regardless of

curve radius because the SFTC is a terminal station. In 2007, TJPA engaged Deutsche Bahn International (DBI) GmbH, the engineering division of the German high-speed rail operator, to peer review the Transit Center and DTX alignment, configurations, and design criteria in relation to current practice in Europe and elsewhere. The peer review report prepared by DBI, and available for review online, concluded that “operating speeds on the DTX approach to the Transit Center are comparable to several major terminals in Europe and do not adversely affect the operation of the Transit Center.” Finally, for over two years during the RAB Study, the TJPA, Caltrain and CHSRA simulated rail operations between 4th/Townsend and the SFTC that met the needs of both train operators.

### **Peer Review**

Mr. LeBrun states that the 7<sup>th</sup> Street alignment was not reviewed by the SFCTA-convened DTX Peer Review. This is correct. The Peer review had a limited scope, which was to review three independent operational studies to determine whether two or three tracks are needed for the DTX as well as opining on other operational elements of the project. Therefore, alternative alignments were not part of the scope.

### **Cost and Schedule Impacts**

Mr. LeBrun’s assertions that the costs could be lowered to a total of \$1.3B with the extension through the west side of the SFTC are unsubstantiated, particularly since both alignments are practically the same length. Lacking backup information, we can only guess that he did not factor in the additional right-of-way costs, the need for a third track, crossover passages in the tunnel, ventilation structures, nor the demolition and reconstruction of the west end of the SFTC, not to mention the extension of the train box one block to the west. MTC, TJPA, and various City departments along with Caltrain and other agencies have reviewed the DTX cost as currently envisioned and estimated it at \$4 billion. There is no information to support the assertions Mr. LeBrun puts forth.

### **Conclusion**

The RAB Study, its peer review panels, and expert opinions all demonstrate the strengths of the Pennsylvania Avenue Alignment over other alignments to the Salesforce Transit Center (SFTC). However, at the current preliminary engineering stage (5-8% design completion) additional analysis and public outreach will be necessary to better understand needs, constraints and impacts. Agreeing on a preliminary preferred alignment is the best way to further the analysis and identify those impacts while also moving towards a common goal. We hope the above responses adequately address the concerns of CAC members as they have for the project team, consultants, peer reviewers, and the RAB Citizen’s Working Group. If so, we look forward to returning to the SFCTA CAC for their approval of the Motion of Support.

As always, if there are any questions, feel free to contact me.

Sincerely

Susan Gygi, PE  
Project Manager  
SF Planning Department