



GRADE SEPARATIONS – BYPASSES TO GREATER SAFETY

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ISSUE

Should the Peninsula Corridor Joint Powers Board (PCJPB) take on an enhanced role in coordinating and facilitating the completion of the grade separation projects along the Caltrain® Peninsula train corridor?

SUMMARY

There are 113 places where the Caltrain Peninsula train corridor intersects roads. Of these intersections, 42 are at-grade railroad crossings where roads and railroad tracks intersect at the same plane, necessitating the use of drop-down safety gates when trains pass in order to prevent accidents. Thirty of these “at-grade” crossings are in San Mateo County.¹ Caltrain describes at-grade crossings as a “particularly pressing and difficult issue within the corridor.”²

At-grade crossings raise safety concerns, contribute to traffic congestion, delay emergency vehicles and cause added pollution due to interruptions in the traffic flow when drop-down gates lower to allow a train to pass.³ Part of the solution for increasing safety and easing the congestion caused by lowered drop-down gates is to separate the railroad tracks from roads by building grade separations.⁴

Caltrain’s Corridor Vision Plan states “We need a unified corridor-wide strategy that ensures the most critical crossings are addressed and funded first. The current practice is that municipalities initiate and fund grade-separation efforts. Consequently, grade separations take place where funding is available, not necessarily where they are most needed. With a corridor-wide strategy, design, engineering and construction best practices can be shared; construction timing can be coordinated together with railroad projects; and grade crossings can be coordinated with station-area development.”⁵

¹ Zachery Clark, “Caltrain weighs grade crossing costs”, The Daily Journal, May 2, 2019. https://www.smdailyjournal.com/news/local/caltrain-weighs-grade-crossing-costs/article_5c52a9b2-6c8e-11e9-9418-470e4ee83502.html

² Peninsula Corridor Joint Powers Board, Caltrain Business Plan Quarterly Update, October 2018, Slide 41. http://www.caltrain.com/Assets/___Agendas+and+Minutes/JPB/2018/2018-10-04+BUSINESS+PLAN+SPECIAL+MEETING.pdf

³ San Francisco Bay Area Planning and Urban Research Association, Caltrain Corridor Vision Plan, February 23, 2017. https://www.spur.org/sites/default/files/publications_pdfs/SPUR_Caltrain_Corridor_Vision_Plan.pdf

⁴ California Public Utilities Commission, Section 190 Grade Separation Program, California Public Utilities Commission Rail Crossings Engineering Section February 2013. http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Safety/Rail/Rail_Crossings/190GradeSepOverview-v201708.pdf

⁵ San Francisco Bay Area Planning and Urban Research Association, Caltrain Corridor Vision Plan, February 23, 2017, page 29, accessed April 5, 2018.

Grade separations are expensive. Caltrain estimates that the cost to separate all 42 at-grade crossings could range from \$8.5 billion to \$11.1 billion (representing a range per separation of between \$202M-\$254M) in 2018 dollars.⁶

A new, corridor-wide approach that balances Caltrain's needs with those of the three counties in the Caltrain Peninsula train corridor is needed. The Grand Jury recommends:

1. The PCJPB create a Caltrain Peninsula train corridor Grade Separation Master Plan, including all at-grade crossings in the corridor, based on a prioritization that takes into account the needs and special circumstances of the cities and counties through which the corridor passes, with special attention to adjacent at-grade crossings so as not to limit future design alternatives.
2. In support of developing the Grade Separation Master Plan, the PCJPB should study other train corridors worldwide to learn how they implemented similar master plans, including methods developed for securing funding.
3. The PCJPB should engage with all cities on the Caltrain Peninsula train corridor to gain support for the Grade Separation Master Plan.
4. After completing the Grade Separation Master Plan, the PCJPB should offer to support funding and design efforts to the cities in the order determined by the prioritization in the master plan. If a city rejects such support for an at-grade crossing, the PCJPB should then proceed to support the next highest priority at-grade crossing in the plan.

GLOSSARY

- **At-Grade Crossings** – Locations where roads and railroad tracks intersect at the same plane, necessitating the use of drop down gates when trains cross in order to prevent accidents.
- **Caltrain** – The name under which the Peninsula Corridor Joint Powers Board operates passenger train service from San Francisco to Gilroy.
- **California Public Utilities Commission (CPUC)** - The commission that has jurisdiction over the safety of highway-rail crossings, including grade separations.
- **Grade Separation** - A method of constructing a junction of two or more surface transport systems at different heights (grades) so that they will not interrupt the traffic flow on other transit routes when they cross.

⁶ Peninsula Corridor Joint Powers Board, Caltrain Business Plan Quarterly Update, May 2019, slides 44-46. http://www.caltrain.com/Assets/_Agendas+and+Minutes/JPB/2019/Caltrain+Business+Plan+-+Quarterly+Update+-+May+2019.pdf

- **Peninsula Corridor Joint Powers Board (PCJPB)** - Created in 1996, the PCJPB owns (San Francisco to San Jose) and operates (San Francisco to Gilroy) Caltrain’s rail service. The PCJPB is the result of an agreement among San Francisco, San Mateo and Santa Clara Counties; it is made up of nine representatives, three from each county. It was established, in part, to “transfer assets from the State of California to local control.”⁷
- **Riverside County Transportation Commission (RCTC)** - The steward of Measure A sales tax dollars, which funds transportation improvements that Riverside County voters have approved.⁸
- **San Mateo County Transit District (SamTrans)** – The administrative body for the public transit and transportation programs in SMC. By contract it manages the operation of Caltrain and the SMC Transportation Authority.
- **SMC Transportation Authority (TA)** – The steward of Measure A (2004) sales tax dollars, the TA was formed in 1988 with the passage of the voter-approved half-cent sales tax for countywide transportation projects and programs, known as Measure A. In 2004, Measure A was extended through 2033.
- **Section 190 Funding-** The Grade Separation Program that provides state funds to local agencies to separate at-grade crossings.⁹

BACKGROUND

Since 1996, the PCJPB has owned and/or operated Caltrain, which runs 77 miles from San Francisco to Gilroy.¹⁰ Caltrain’s total service area has over 3 million residents.¹¹

Caltrain owns the railroad tracks between San Francisco and San Jose (and operates the tracks from San Jose to Gilroy). As Caltrain has planned for capital improvements, it has had to collaborate and coordinate these projects with the cities in the corridor.

Impact of Increased Ridership on Caltrain

Ridership has increased in recent years, with the weekday average at 62,400 trips in 2015, up from 24,600 in 1997. With increased demand, many trains have more passengers than seats. “Growth in jobs, uncoordinated land uses, and underinvestment in transit systems are now

⁷ Peninsula Corridor Joint Powers Board, “Joint Powers Agreement, Peninsula Corridor Project,” October 3, 1996. http://www.caltrain.com/Assets/_Executive/PDF/Joint+Powers+Agreement.pdf

⁸ “Current Commissioners,” Riverside County Transportation Commission, accessed April 5, 2018. <http://rctcdev.info/about-us/commissioners>.

⁹ “Railroad Crossing Funding Programs,” California Public Utilities Commission, accessed April 8, 2018. <http://www.cpuc.ca.gov/General.aspx?id=2891>

¹⁰ Caltrain, “Opening New Frontiers for 150 Years,” accessed March 23, 2018. <http://www.caltrain.com/about/Caltrain150/Milestones.html>

¹¹ Caltrain, “The Economic Impact of Caltrain Modernization,” Bay Area Council Economic Institute, June 2012. <http://documents.bayareacouncil.org/caltrainecon.pdf>

straining the Corridor’s transportation network.”¹² In response to the growth in ridership, Caltrain is planning to increase daily service to 114 trains per weekday in 2022 from the 92 weekday trains in service today.

Increasing the number of trains will have a negative impact on traffic congestion at at-grade crossings. “... higher train frequencies could impact local street circulation by requiring crossing gates to be down more often or for longer periods.”¹³ Caltrain has projected that the increase in gate down time will range between 28-39 minutes per day.¹⁴

Administrative Complexity

The complexity of the Caltrain Peninsula train corridor’s administration challenges efforts to complete grade separations. The Caltrain Peninsula train corridor runs through 17 cities, involves 10 public transit operators, C/CAG, and regional and state agencies.

DISCUSSION

Current Situation

There are 42 at-grade crossings in the Caltrain Peninsula train corridor.¹⁵ The at-grade crossings delay motorists, emergency vehicles, pedestrians and cyclists who have to wait until a train has passed. This situation is projected to get worse as Caltrain’s Short Range Transit Plan increases daily corridor train traffic to 114 trains per weekday by 2022, up from 92 trains per weekday today.¹⁶

Each grade separation in SMC presents unique challenges including traffic management during construction, disruption of businesses, and the need to purchase land. As a result, grade separation costs vary significantly. Caltrain estimates that the cost to separate all 42 at-grade crossings could range from \$8.5 billion to \$11.1 billion (representing an average range per separation of \$202M-\$254M) in 2018 dollars.¹⁷

¹² San Francisco Bay Area Planning and Urban Research Association, “The Caltrain Corridor Vision Plan, Appendix A,” Page 22, Section 2.11, accessed April 5, 2018.

https://www.spur.org/sites/default/files/publications_pdfs/Appendix_A_Existing_Conditions_and_Methodology.pdf

¹³ San Francisco Bay Area Planning and Urban Research Association, “Caltrain Corridor Vision Plan, How to keep the Bay Area’s innovation economy moving”, February 23, 2017, page 29, accessed April 5, 2018.

https://www.spur.org/sites/default/files/publications_pdfs/SPUR_Caltrain_Corridor_Vision_Plan.pdf.

¹⁴ Caltrain, “Caltrain Business Plan May 2019,” slide 38.

http://samtrans.granicus.com/MediaPlayer.php?view_id=3&clip_id=238.

¹⁵ Caltrain, “Grade Separation Overview,” August 25, 2016, accessed April 5, 2018.

<http://www.caltrain.com/Assets/Caltrain+Modernization+Program/Presentations/Grade+Separation+Update.pdf>

¹⁶ Caltrain, “Caltrain Short Range Transit Plan: FY2015-2024,” October 1, 2015.

http://www.caltrain.com/Assets/_Planning/Strategic+Plan/Strategic+Plan+FY2015+-+FY2024/Caltrain+Short+Range+Transit+Plan+-+FY2015-FY2024+-+Final.pdf

¹⁷ Caltrain, “Caltrain Business Plan May 2019,”

http://samtrans.granicus.com/MediaPlayer.php?view_id=3&clip_id=238, Slides 44-46.

CPUC Prioritization

The California Streets and Highway Code (S&H Code Section 2452¹⁸) requires the CPUC to furnish the grade separation funding priority list to the CTC and Caltrans by July 1 of every year. The CPUC uses a two-year process to establish the priority list for two consecutive fiscal years (e.g., fiscal years 2012-2013 and 2013-2014). Nominations are accepted in October before the first fiscal year (e.g., around October 2011), projects are ranked, and the initial priority list is issued before the start of the first fiscal year (e.g., around June 2012). For the second fiscal year, projects receiving an allocation during the first fiscal year are removed from the list, and the revised list is issued as the final priority list before the start of the second fiscal year (e.g., around June 2013). Cities have to wait approximately two years to nominate a project (for the next two year cycle) if it misses the nomination process.¹⁹

S&H Code section 2452 requires the CPUC to establish criteria and develop formulas for determining the priority of projects nominated for separation. The CPUC first developed the formulas in 1975; since then, they have been modified.²⁰

To create a prioritization of at-grade crossings, other California corridors have customized the CPUC equations to better meet their needs. For example, Riverside County (CA) used the CPUC equation as a starting point for prioritizing grade separations. They added other factors to their equation including residential noise, adjacent grade separations, local priority, and isolation of the location, among others, to develop a customized equation.²¹

Several SMC city managers said that a customized equation for SMC should include:

- the at-grade crossings' proximity to hospitals (so that emergency vehicles are not delayed) and,
- the number of fatalities at that crossing.^{22,23}

Cities interested in having an at-grade crossing prioritized for grade separation by the CPUC on a statewide list must follow the published CPUC process by providing information about the crossing.²⁴ However, submitting information about an at-grade crossing to the CPUC is not mandatory. During the last submission cycle, five of the seven SMC cities with at-grade

¹⁸ FindLaw, "California Code, Streets and Highways Code – SHC 2450," accessed April 5, 2018.

<http://codes.findlaw.com/ca/streets-and-highways-code/shc-sect-2450.html>

¹⁹ Grand Jury correspondence

²⁰ Ibid.

²¹ Riverside County Transportation Commission, "Grade Separation Priority Update Study for Alameda Corridor East (Riverside County)," March 2012, page 8. http://www.rctcdev.info/uploads/media_items/rctc-gradecrossingpriorityreport-final-withappendix-040612.original.pdf

²² Grand Jury interviews.

²³ Caltrain, "Caltrain Business Plan May 2019,"

http://samtrans.granicus.com/MediaPlayer.php?view_id=3&clip_id=238, Slide 35. Over 80 collisions occurred at Caltrain's grade crossings in the 10 years from 2009-2018. More than 30 of these collisions involved a fatality.

²⁴ California Public Utilities Commission, "Section 190 Grade Separation Program," August 2017, accessed April 5, 2018.

http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Safety/Rail/Rail_Crossings/190GradeSepOverview-v201708.pdf

crossings applied to get a prioritization.²⁵

Cities with at-grade crossings high on the CPUC's priority list use that information to encourage favorable consideration by the SMC Transportation Authority (TA) and other potential funding sources for funding.²⁶

The Grade Separation Project Process

A Public Works Director in SMC said, "There is no consistent policy or process for grade separations in SMC." The "typical" grade separation process is shown in Appendix B.

Today, cities must initiate the grade separation process.²⁷ Once information is supplied to the CPUC, and an at-grade crossing is listed on the CPUC prioritization list, the city prepares required reports in order to obtain a letter of agreement from Caltrain and initial funding from the TA. Once the design is complete, the city must seek additional funding from other sources. In SMC, it typically takes from 7-10 years from the start of planning process until construction begins.²⁸

The Importance of Grade Separations to The Public

The California Department of Transportation's "2018 California State Rail Plan"²⁹ includes the results of a survey made available through the Caltrain website. The survey received a total of 2,189 responses between January and March 2016. When asked, "What do you think Caltrans' highest priority should be for investments to enhance rail safety?" 72 percent of respondents said, "Improve crossings with grade separations."³⁰

Despite the importance the public puts on completing grade separations, a range of responses among cities were aired during grand jury interviews. For example:

- San Mateo (City) obtained funding and is completing a grade separation.³¹
- Menlo Park has analyzed design alternatives for decades.³²

²⁵ Grand Jury interview.

²⁶ Grand Jury interviews.

²⁷ San Francisco Bay Area Planning and Urban Research Association, Caltrain Corridor Vision Plan, February 23, 2017, page 29, accessed April 5, 2018.

https://www.spur.org/sites/default/files/publications_pdfs/SPUR_Caltrain_Corridor_Vision_Plan.pdf

²⁸ Grand Jury interviews. However, in one extreme example, studies of a grade separation for Ravenswood Avenue in Menlo Park began in 1950's and a design has not yet been finalized.

²⁹ California Department of Transportation, "2018 California State Rail Plan Appendix A," accessed April 5, 2018. http://www.dot.ca.gov/californiarail/docs/CSRP_Appendices_10102017.pdf

³⁰ Ibid.

³¹ Caltrain, "Caltrain Awards Contract for 25th Avenue Grade Separation," accessed April 5, 2018.

http://www.caltrain.com/about/MediaRelations/news/Caltrain_Awards_Contract_for_25th_Avenue_Grade_Separation_Project.html

³² City of Menlo Park, "Project history – Below is the timeline for the Ravenswood Avenue Railroad Grade Separation Project," accessed on April 5, 2018. <https://www.menlopark.org/1077/Project-history>

- Atherton does not currently have plans to undertake grade separations.³³ However, “Atherton supports grade separations at its two at-grade crossings, and it does not have a source of funding to complete grade separations. If grade separations at those at-grade crossings were proposed and funded by other agencies, the Town would support them.”³⁴

A “Piecemeal” Approach Rather Than a Corridor-wide Plan

A member of the San Mateo Board of Supervisors stated, “There is no current plan to prioritize grade separations. Prior to the commencement of Caltrain’s recent business plan process, corridor-wide grade separations have not been focused on.” The Caltrain Peninsula train corridor “has a multi-billion dollar problem and we have handled it in a piecemeal way.”³⁵

A San Mateo Daily Journal article stated “In August [2019], board members will decide if Caltrain should grow to 12 trains per hour or as many as 16 trains per hour in the coming decades and, if those scenarios are selected, then the cost of improving the 42 at-grade crossings could be as high as \$11.1 billion, according to the report.”³⁶

With the current city-by-city approach, grade separation projects emerge where there is local interest, political will, grade separation project expertise and funding, and not necessarily where there is the most potential positive impact. Further, the current approach does not take into account the impact that a grade separation’s design in one city will have on the available design alternatives in a nearby city. For example, if Menlo Park constructed an elevated grade separation at Ravenswood Avenue, then Atherton would be limited in the design alternatives it could consider.

As the 2018 California State Rail Plan stated “... the CPUC put out an annual list of prioritized grade separation projects, an additional study or criteria is needed to consider grade separations not as stand-alone safety or traffic relief projects, but rather as rail corridor based projects. When organized and pursued strategically as part of an identified corridor, grade-separation projects can dramatically improve rail capacity and passenger service.”³⁷

Caltrain also supports the need for a corridor-wide view. Caltrain’s Corridor Vision Plan states, “We need a unified corridor-wide strategy that ensures the most critical crossings are addressed and funded first. The current practice is that municipalities initiate and fund grade-separation efforts. Consequently, grade separations take place where funding is available, not necessarily where they are most needed. With a corridor-wide strategy, design, engineering and construction

³³ Grand jury interview.

³⁴ Grand Jury correspondence.

³⁵ Grand Jury interview.

³⁶ [Zachery Clark, The Daily Journal, “Caltrain weighs grade crossing costs”, May 2, 2019. \[https://www.smdailyjournal.com/news/local/caltrain-weigh-grade-crossing-costs/article_5c52a9b2-6c8e-11e9-9418-470e4ee83502.html#utm_source=smdailyjournal.com&utm_campaign=%2Fnewsletters%2Fheadlines%2F%3F-dc%3D1556805610&utm_medium=email&utm_content=headline\]\(https://www.smdailyjournal.com/news/local/caltrain-weigh-grade-crossing-costs/article_5c52a9b2-6c8e-11e9-9418-470e4ee83502.html#utm_source=smdailyjournal.com&utm_campaign=%2Fnewsletters%2Fheadlines%2F%3F-dc%3D1556805610&utm_medium=email&utm_content=headline\)](https://www.smdailyjournal.com/news/local/caltrain-weigh-grade-crossing-costs/article_5c52a9b2-6c8e-11e9-9418-470e4ee83502.html#utm_source=smdailyjournal.com&utm_campaign=%2Fnewsletters%2Fheadlines%2F%3F-dc%3D1556805610&utm_medium=email&utm_content=headline)

³⁷ California Department of Transportation, “2018 California State Rail Plan Appendix A,” accessed April 5, 2018. http://www.dot.ca.gov/californiarail/docs/CSRP_Appendices_10102017.pdf

best practices can be shared; construction timing can be coordinated together with railroad projects; and grade crossings can be coordinated with station-area development.”³⁸

When asked if there is a corridor-wide plan for future grade separation projects, a Caltrain official confirmed that one is in the works. The Caltrain official said, “We’re right now contemplating what the scope [of the plan] would be. We can do [grade separation projects] in a manner that is far more efficient than we do today. You have 42 [remaining grade separation projects] between San Francisco and San Jose so what is the best way to do that? ... It needs to be phased...”³⁹

Options for A Corridor-Wide Plan

Other California train corridors have created corridor-wide entities that employ expertise in acquiring funding, designing, and constructing grade separations.

The Riverside County Transportation Commission (RCTC) was formed to create a regional grade separation master plan. In 2006, the RCTC developed a funding strategy for completing grade separations. In 2012, the RCTC applied a Multicriteria Analysis⁴⁰ “using nine criteria as inputs for prioritization.”⁴¹ The result was a master plan that prioritized grade separations in that corridor.⁴²

Kern County established the Greater Bakersfield Separation of Grade District (GBSGD). The duties of the district are “To separate at-grade crossing of streets with railroads by means of underpasses or overpasses, thereby facilitating the flow of traffic and improving public safety.”⁴³

The GBSGD has completed the “Prioritization of Crossings”, which focuses on allowing the county to allocate financial resources to projects that would provide the greatest benefit to traffic flow improvements, freight movement, passenger movement, and safety.”⁴⁴ The GBSGD hired

³⁸ San Francisco Bay Area Planning and Urban Research Association, Caltrain Corridor Vision Plan, February 23, 2017, page 29, accessed April 5, 2018.

https://www.spur.org/sites/default/files/publications_pdfs/SPUR_Caltrain_Corridor_Vision_Plan.pdf

³⁹ Grand Jury correspondence.

⁴⁰ National Academies Press, Prioritization Procedure for Proposed Road Rail Separation Projects Along Specific Rail Corridors (2019),” “MCA is the most common approach cited in literature for making assessment and prioritization decisions about grade separations.” See page 8.

⁴¹ Ibid.

⁴² Kern Council of Governments, “Grade Separation Prioritization Report,” March 2011, accessed April 10, 2019. http://wordpress.kerncog.org/wp-content/uploads/2010/03/KernCounty_GradeSepStudy_DRAFT.pdf

⁴³ Kern County California, Board, Commissions & Committees, accessed April 10, 2019. <https://www.kerncounty.com/bos/boards/Grtr-bak.aspx>

⁴⁴ Kern Council of Governments, “Grade Separation Prioritization Report,” March 2011, accessed April 10, 2019. http://wordpress.kerncog.org/wp-content/uploads/2010/03/KernCounty_GradeSepStudy_DRAFT.pdf

one person to focus on obtaining funding for grade separations and one person to work with the PUC to design grade separations.^{45,46}

The Recommended Approach

The PCJPB should take on an enhanced role in the completion of grade separations along the Peninsula Corridor train corridor. The PCJPB is the “governing body for the Caltrain Peninsula commuter rail transit service between San Francisco, San Jose and Gilroy.”⁴⁷ The PCJPB has the necessary, corridor-wide perspective because its board is comprised of three representatives from each of the three counties in the corridor. The three-county perspective is essential, as grade separations should be seen “not as stand-alone safety or traffic relief projects, but rather as rail corridor based projects.”⁴⁸

The PCJPB’s enhanced role should include the creation of a Caltrain Peninsula train corridor grade separation master plan that ensures the most critical at-grade crossings are addressed and funded first. Secondly, the PCJPB could support cities with the most critical at-grade crossings in obtaining funding, designing and project managing grade separation efforts.

An enhanced role for the PCJPB would have several advantages:

1. The PCJPB would develop a grade separation master plan, including prioritization that would incorporate (a) intercity spillover effects ignored in the current CPUC approach, and (b) factors such as nearby emergency vehicle traffic and track fatalities.
2. The PCJPB would bring expertise in acquiring funding for high priority projects and avoid the possibility of Caltrain Peninsula train corridor grade separation projects competing against one another for the same Measure A funds. Further, PCJPB is prepared to compete against other California train corridors that are vying for State funding.
3. The PCJPB would bring technical and regulatory expertise to grade separation projects. Since it has already participated in the design of grade separations along the corridor, and

⁴⁵ Grand Jury interview.

⁴⁶ A SMC LAFCo representative explained that creating special district in SMC requires either a petition of voters, or a resolution by a public agency or a resolution by the Board of Supervisors. Street and Highway Code 8115-8123 concerning formation of grade separation districts was enacted in 1949 prior to creation of LAFCOs, but LAFCo law (Section 56036.5) defines a grade separation district as a district subject to LAFCo jurisdiction. The resolution must be accompanied by an application that includes a definition of services provided and a 5-year funding plan. Once LAFCo receives the resolution and application, it can approve or deny the request. If LAFCo concludes that an existing county entity could provide the services defined in the request for consideration, the request is denied. The LAFCo representative anticipated that the application for a SMC Grade Separation Special District would be denied because they thought an existing entity could take on grade separation efforts. As a result, SMC needs a different approach to prioritize and complete grade separation projects.

⁴⁷ Bayrail Alliance, “Peninsula Joint Powers Board,” accessed April 10,2019. <http://www.bayrailalliance.org/pcjpb/>

⁴⁸ California Department of Transportation, “2018 California State Rail Plan Appendix A,” accessed April 5, 2018. http://www.dot.ca.gov/californiarail/docs/CSRP_Appendices_10102017.pdf

has already worked with the CPUC on these projects, it understands the process of getting state approvals.⁴⁹

4. The PCJPB understands that the requirement for grade separation set by the current regulatory framework may be out of pace with the ongoing plans and desires of many communities on the corridor.⁵⁰ Further, the PCJPB employs project managers who have completed grade separations projects.⁵¹
5. The PCJPB has experience working with cities on grade separation projects. Their staff is aware of the perspectives that cities bring to these projects.⁵²

As one Caltrain official said, “In general, I believe that Caltrain either already has, or can readily procure, the required core technical skills to support the kinds of grade separation projects we do today. On a technical level we are the only entity in the corridor with any real experience constructing and building these kinds of projects and the only organization with the detailed knowledge of how they have to work and integrate with the railroad’s increasingly complicated systems (positive train control and signaling systems and, soon, the electrified infrastructure).”

Adopting a corridor-wide grade separation master plan will have challenges. It is clear from grand jury interviews with SMC city managers that some cities would resist a regional approach if it meant receiving a lower priority status for their city’s grade separation project(s). However, as shown in Riverside and Kern Counties, adopting a corridor-wide approach that provides expertise in funding, design, and project management would bring efficiencies that would speed the process of completing grade separations.

FINDINGS

- F1. In SMC, grade separation projects are initiated by cities.
- F2. Cities with grade separation project expertise have an advantage in gaining funding over cities without that expertise.
- F3. A Caltrain Peninsula train corridor grade separation master plan does not exist.
- F4. The CPUC’s annual list of prioritized grade separation projects does not include all at-grade crossings in the Caltrain Peninsula train corridor.
- F5. Other California train corridors have customized the CPUC’s prioritization equation.

⁴⁹ Grand Jury interviews.

⁵⁰ Caltrain, “Caltrain Business Plan May 2019,” slide 34.

http://samtrans.granicus.com/MediaPlayer.php?view_id=3&clip_id=238,

⁵¹ Ibid.

⁵² Grand Jury interview.

- F6. Caltrain plans on increasing train traffic (114 weekday trains by 2022, up from today's 92 weekday trains), which will be increase "gate down" time at at-grade crossings.
- F7. As of 2018, the cost of building a grade separation in the corridor could range from \$202M -\$264M, according to the "Caltrain Business Plan, April 2019."
- F8. In SMC, it typically takes from 7-10 years from the start of the grade separation planning process until construction begins.
- F9. The design of a grade separation in one city can limit the design alternatives in an adjacent city.
- F10. Other California counties have developed corridor-wide approaches to address the challenges of completing grade separations.
- F11. The PCJPB is the governing body of the Caltrain Peninsula train corridor.
- F12. The PCJPB has experience in obtaining funding, designing and project managing grade separation projects. It also understands the regulatory environment.

RECOMMENDATIONS

- R1. By March 31, 2020, the PCJPB should create a Caltrain Peninsula train corridor Grade Separation Master Plan, including all at-grade crossings in the corridor, based on a prioritization that takes into account the needs and special circumstances of the cities and counties through which the corridor passes, with special attention to adjacent at-grade crossings so as not to limit future design alternatives.
- R2. By September 30, 2019, in support of developing the Grade Separation Master Plan, the PCJPB should study other train corridors worldwide to learn how they implemented similar master plans, including methods developed for securing funding.
- R3. By September 30, 2019, the PCJPB should engage with all cities on the Caltrain Peninsula train corridor to gain support for the Grade Separation Master Plan.
- R4. By May 31, 2020, shortly after completing the Grade Separation Master Plan, the PCJPB should offer to support funding and design efforts to the cities in the order determined by the prioritization in the master plan. If a city rejects such support for an at-grade crossing, the PCJPB should then proceed to support the at-grade crossing with the next highest priority in the plan.

REQUEST FOR RESPONSES

Pursuant to Penal Code Section 933.05, the Grand Jury requests responses as follows:
From the following governing body:

- The Peninsula Corridor Joint Powers Board

The governing body indicated above should be aware that the comment or response of the governing Commission must be conducted subject to the notice, agenda, and open meeting requirements of the Brown Act.

METHODOLOGY

The Grand Jury reviewed documents and websites, and conducted interviews as listed below.

BIBLIOGRAPHY

- Bayrail Alliance, “Peninsula Joint Powers Board,” accessed April 10, 2019.
<http://www.bayrailalliance.org/pcjpb/>
- California Department of Transportation, “2018 California State Rail Plan Appendix A,” accessed April 5, 2018.
http://www.dot.ca.gov/californiarail/docs/CSRP_Appendices_10102017.pdf
- California Public Utilities Commission, *Section 190 Grade Separation Program*, California Public Utilities Commission Rail Crossings Engineering Section August 2017, accessed April 5, 2018.
http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Safety/Rail/Rail_Crossings/190GradeSepOverview-v201708.pdf
- Caltrain, “Caltrain Awards Contract for 25th Avenue Grade Separation,” accessed April 5, 2018.
http://www.caltrain.com/about/MediaRelations/news/Caltrain_Awards_Contract_for_25th_Avenue_Grade_Separation_Project.html
- Caltrain, “Grade Separation Overview,” August 25, 2016, accessed April 5, 2018.
<http://www.caltrain.com/Assets/Caltrain+Modernization+Program/Presentations/Grade+Separation+Update.pdf>
- Caltrain, “Opening New Frontiers for 150 Years,” accessed March 23, 2018.
<http://www.caltrain.com/about/Caltrain150/Milestones.html>
- Caltrain, “Caltrain Short Range Transit Plan: FY2015-2024,” October 1, 2015.
http://www.caltrain.com/Assets/_Planning/Strategic+Plan/Strategic+Plan+FY2015+-+FY2024/Caltrain+Short+Range+Transit+Plan+-+FY2015-FY2024+-+Final.pdf

- Caltrain, “The Economic Impact of Caltrain Modernization,” Bay Area Council Economic Institute, June 2012. <http://documents.bayareacouncil.org/caltrainecon.pdf>
- City of Menlo Park, “Project history – Below is the timeline for the Ravenswood Avenue Railroad Grade Separation Project,” accessed on April 5, 2018. <https://www.menlopark.org/1077/Project-history>
- Clark, Zachery “Caltrain weighs grade crossing costs”, The Daily Journal, May 2, 2019, https://www.smdailyjournal.com/news/local/caltrain-weighs-grade-crossing-costs/article_5c52a9b2-6c8e-11e9-9418-470e4ee83502.html
- Kern Council of Governments, “Grade Separation Prioritization Report,” March 2011, accessed April 5, 2019. http://wordpress.kerncog.org/wp-content/uploads/2010/03/KernCounty_GradeSepStudy_DRAFT.pdf
- Peninsula Corridor Joint Powers Board, Caltrain Business Plan Quarterly Update, May 2019, slides 44-46. http://www.caltrain.com/Assets/___Agendas+and+Minutes/JPB/2019/Caltrain+Business+Plan+++Quarterly+Update+++May+2019.pdf
- Peninsula Corridor Joint Powers Board, *Caltrain Business Plan Quarterly Update*, October 2018, Slide 41. http://www.caltrain.com/Assets/___Agendas+and+Minutes/JPB/2018/2018-10-04+BUSINESS+PLAN+SPECIAL+MEETING.pdf
- Peninsula Corridor Joint Powers Board, “Joint Powers Agreement, Peninsula Corridor Project,” October 3, 1996. http://www.caltrain.com/Assets/_Executive/PDF/Joint+Powers+Agreement.pdf
- Riverside County Transportation Commission, “Grade Separation Priority Update Study for Alameda Corridor East (Riverside County,” March 2012, page 8. http://www.rctcdev.info/uploads/media_items/rctc-gradecrossingpriorityreport-final-withappendix-040612.original.pdf
- San Francisco Bay Area Planning and Urban Research Association, *Caltrain Corridor Vision Plan*, February 23, 2017, page 29, accessed April 5, 2018. https://www.spur.org/sites/default/files/publications_pdfs/SPUR_Caltrain_Corridor_Vision_Plan.pdf
- “San Mateo County Measure A Grade Separation Programs”, San Mateo County Transportation Authority, August 4, 2016. http://www.smcta.com/Assets/___Agendas+and+Minutes/TA/Board+of+Directors/Presentations/2016/2016-0804+Grade+Separation+Program.pdf

Interviews

- SMC City Public Works Directors
- Representatives of:
 - South San Francisco
 - Burlingame
 - City of San Mateo
 - Redwood City
 - Atherton
- Officials with Caltrain
- Officials with the San Mateo County Transportation Authority
- Officials from the California Public Utilities Commission
- A supervisor on the SMC Board of Supervisors
- A senior member of the San Mateo County management team
- An official from the Riverside County Transportation Commission
- An official from the Kern County Separation of Grade Special District
- An official from SMC LAFCo

Websites

- Barbara Wood, “Atherton has little interest in elevating train tracks,” The Almanac, December 7, 2017. <https://www.almanacnews.com/news/2017/12/07/atherton-has-little-interest-in-elevating-train-tracks>
- California Public Utilities Commission, “Railroad Crossing Funding Programs,” accessed April 8, 2018. <https://www.cpuc.ca.gov/General.aspx?id=2891>
- Caltrain, “Board of Directors,” accessed April 5, 2018. <http://www.caltrain.com/about/bod.html>
- Caltrain, “Caltrain Awards Contract for 25th Avenue Grade Separation,” accessed April 5, 2018. http://www.caltrain.com/about/MediaRelations/news/Caltrain_Awards_Contract_for_25th_Avenue_Grade_Separation_Project.html
- FindLaw, “California Code, Streets and Highways Code – SHC 2450,” accessed April 5, 2018. <http://codes.findlaw.com/ca/streets-and-highways-code/shc-sect-2450.html>
- Metropolitan Transportation Commission, “Plan Bay Area 2040 Final Plan.” accessed April 5, 2018. <https://www.2040.planbayarea.org/forecasting-the-future>
- Riverside County Transportation Commission, “Current Commissioners,” accessed April 5, 2018. <http://rctcdev.info/about-us/commissioners>.
- The Daily Journal, September 25, 2017, “Inching Ahead” https://www.smdailyjournal.com/news/local/inching-ahead/article_5c63161a-a18f-11e7-9940-37072a787dcc.html

APPENDIX A – CALTRANS/CPUC GRADE SEPARATION PRIORITIZATION EQUATION

The Caltrans Section 190 Grade Separation Program authorizes funds for grade separation projects. “Funding decisions are based on a priority list of grade separation projects with the use of two formulas. The first formula [shown below] is used for the crossings nominated for separation or elimination.”⁵³ The second formula is used to evaluate existing grade separations that are in need of alteration or renovation.

The CPUC grade separation equation:

$$P = V * (T+0.1*LRT) * (AH + 1) / C + SCF$$

P= priority index number

V= Average Daily Vehicle Traffic

T= Average Daily Freight or Commuter Train Traffic

LRT= Light Rail Traffic

C= Cost Share to be allocated from the Grade Separation Fund

AH= Accident history

SCF=Special Conditions Factor

The CPUC grade separation equation for existing grade separations in need of alteration or renovation is:

$$P = V * (T+0.1*LRT) / C + SCF$$

P= priority index number

V= Average Daily Vehicle Traffic

T= Average Daily Freight or Commuter Train Traffic

LRT= Light Rail Traffic

C= Cost Share to be allocated from the Grade Separation Fund

SCF=Special Conditions Factor

⁵³ “MCA is the most common approach cited in literature for making assessment and prioritization decisions about grade separations.” See “Prioritization Procedure for Proposed Road Rail Grade Separation Projects Along Specific Rail Corridors (2019)”, Page 8.

APPENDIX B – TYPICAL GRADE SEPARATION PROCESS

The following is a “typical example” of the process followed by recent projects. It is not intended to be a prescriptive or rigidly defined process. Some of the steps below were different for projects that have been completed over the last two decades and could change in the future.⁵⁴

1. A city and Caltrain gather information about an at-grade crossing. The information is sent to the CPUC in order to be put on the statewide prioritization list. As a Public Works Director said, “The city is the initial driver. Cities are always the driver of the project.”⁵⁵
2. The city begins two-way communications (typically forums) with the public. A Project Study Report is funded and completed by the city and/or Caltrain. Funding for the report can come from several sources (typically, the TA and/or the city). (San Mateo provided \$12 million for a grade separation project study report. Burlingame provided \$500,000 for reports on the Broadway project.)⁵⁶
3. The National Environmental Policy Act⁵⁷ and the California Environmental Quality Act⁵⁸ requirements are met. (An EIR may or may not be required under NEPA; under CEQA grade separations are exempt from EIRs.)
4. The completed reports are sent to the funding sources, including the TA and/or CPUC. They are required to obtain funding for a project’s final design phase.
5. Cities need a letter of agreement from Caltrain in order for the TA to proceed with the funding request. The TA evaluates the jurisdiction’s request and decides whether to apply Measure A⁵⁹ funds to the project.⁶⁰
6. With TA approval (or other funding) and after the Project Study Report is complete, 15-35% of design work is completed. After acquisition of funding for final design, Caltrain usually manages the development of the grade separation’s design. However, designs can be driven by the city. Caltrain and a review panel, which includes the CPUC, must approve designs.
7. Once the design is completed, the city seeks additional funding from several sources, including the CPUC, the TA, California state government, and the federal government, among others.

⁵⁴ Grand jury interview.

⁵⁵ Grand Jury interview.

⁵⁶ “CalMod and High-High Speed Rail Joint Local Policy Maker Group,” High Speed Rail, August 24, 2017.

⁵⁷ <https://www.epa.gov/laws-regulations/summary-national-environmental-policy-act>, Accessed February 18, 2019.

⁵⁸ <https://www.wildlife.ca.gov/Conservation/CEQA/Purpose>, accessed February 18, 2019.

⁵⁹ Measure A, which went into effect in 2009, includes funds for more local community shuttle service, railroad/street grade separations, ferry service to South San Francisco and Redwood City, and a major infusion of tax dollars for pedestrian and bicycle projects.

⁶⁰ Grand Jury interview.

8. Once the design is finalized, the right-of-way acquisition process begins and utility relocation efforts are initiated.
9. The city and Caltrain update the public on the project throughout the project development process. Once construction funding is secured and the project can proceed to construction, the public is notified of the impending work.
10. Construction begins subject to coordination with the railroad's overall program of capital improvements.

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