DOCUMENTATION BEFORE DEMOLITION:
THE USE OF HAER RECORDATION
AS PART OF THE MITIGATION PROCESS

Chandra Megan Miller
B.A., Humboldt State University, Arcata, 2008

PROJECT

Submitted in partial satisfaction of
the requirement for the degree of

MASTER OF ARTS

in

HISTORY
(Public History)

at

CALIFORNIA STATE UNIVERSITY, SACRAMENTO

FALL
2011
DOCUMENTATION BEFORE DEMOLITION:
THE USE OF HAER RECORATION
AS PART OF THE MITIGATION PROCESS

A Project

by

Chandra Megan Miller

Approved by:

_________________________________________, Committee Chair
Lee Simpson, Ph.D.

_________________________________________, Second Reader
Christopher McMorris, M.S.

_________________________________________
Date
Student: Chandra Megan Miller

I certify that this student has met the requirements for format contained in the University format manual, and that this project is suitable for shelving in the Library and credit is to be awarded for the Project.

_____________________, Graduate Coordinator
Patrick Ettinger, Ph.D.    Date

Department of History
Abstract

of

DOCUMENTATION BEFORE DEMOLITION:
THE USE OF HAER RECORDATION
AS PART OF THE MITIGATION PROCESS

by

Chandra Megan Miller

Working in the employ of JRP Historical Consulting, LLC (JRP), a cultural resources management firm based in Davis, California, the author, Chandra Miller, produced four Historic American Engineering Record (HAER) reports on four historic railroad grade separations in the City of San Mateo in San Mateo County, California. The recordation of the structures was part of the National Historic Preservation Act Section 106 compliance process to mitigate adverse effects to historic properties as a result of a Federal undertaking involving the grade separations. The four reports were submitted to the Library of Congress and are included as an appendix to this document. The purpose of this project is to place these railroad grade separations within the historic context of transportation technology and urban growth in the San Francisco Bay Area, discuss aspects of the history of historic preservation and HAER recordation, and present the process by which HAER reports are prepared as part of the Section 106 compliance documentation.

_________________________, Committee Chair
Lee Simpson, Ph.D.

_________________________
Date

iv
ACKNOWLEDGMENTS

For my partner in crime throughout this program, Emily Conrado. Better late than never.
# TABLE OF CONTENTS

Acknowledgments........................................................................................................ v

Chapter

1. PROJECT DESCRIPTION AND METHODOLOGY............................................... 1
   Introduction............................................................................................................. 1
   Project Purpose: Section 106 Compliance.............................................................. 2
   Project Methodology............................................................................................... 6
   Project Background................................................................................................. 9
   Description of Resource........................................................................................ 10

2. HISTORIC PRESERVATION: A BRIEF HISTORY ............................................. 12
   Recording Historic Resources: A History............................................................. 17
   Creation of the Historic American Building Survey (HABS).............................. 17
   Creation of the Historic American Engineering Record (HAER)....................... 19
   Covered Bridges and Appreciation of Engineering Structures.......................... 21
   Railroad Bridge Inventories.................................................................................. 23

3. HISTORIC CONTEXT .......................................................................................... 27
   The Transcontinental Railroad.............................................................................. 28
   California Settlement and Transportation Development..................................... 32
      Early Routes to California ............................................................................... 33
      Early Routes in California ............................................................................... 35
      The First California Railroad......................................................................... 36
      The San Francisco-San Jose Railroad............................................................... 37
Chapter 1

PROJECT DESCRIPTION AND METHODOLOGY

Introduction

In 2010, the Federal Transit Administration (FTA) and the Peninsula Corridor Joint Powers Board (JPB) contracted with JRP Historical Consulting, LLC (JRP), a cultural resources consulting firm based in Davis, California, to prepare four Historic American Engineer Record (HAER) reports for a series of 1903 Southern Pacific Railroad Underpasses and an associated masonry retaining wall in the City of San Mateo, San Mateo County, California. These five resources were previously inventoried and evaluated as a historic property, identified as the “San Mateo 1903 Underpasses.” The FTA determined that the San Mateo 1903 Underpasses were eligible for the National Register of Historic Places (NRHP) in 2002 and the California State Historic Preservation Officer (SHPO) concurred with this determination. The FTA and JPB are undertaking the demolition and replacement of these four railroad grade separations and the removal of the masonry retaining wall, which triggers Section 106 of the National Historic Preservation Act (NHPA). The resulting documentation of the structures before their replacement was prepared according to National Park Service (NPS) standards for submittal to the Library of Congress in 2010 and the reports are included as an appendix to this project. The author of this project played a central role in the creation of each HAER report and their submittal to the Library of Congress as part of the mitigation process.

1 SHPO concurred with JPB’s determination of eligibility in December 2002.
Project Purpose: Section 106 Compliance

Section 106 is a multi-step process that applies to federal agencies undertaking a project using federal funds which may affect historic properties. Federal agencies are required to take into account their actions on historic properties and allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking. An undertaking is defined by the NHPA in Title 36, Code of Federal Regulations, Part 800 as “a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal Agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval.” Historic properties are buildings, structures, objects, sites, and districts that are listed in or eligible for listing in the NRHP. ²

There are four key steps that comprise the Section 106 process: initiation of the Section 106 process, identification of historic properties, assessment of adverse effects, and resolution of adverse effects. These steps are carried out by the federal agency (or other agencies, as delegated by the federal agency. Each steps requires sufficient documentation, the standards of which are identified in the Section 106 regulations. In most cases, such as the FTA’s undertaking for the San Mateo 1903 Underpasses, the Section 106 process is carried out by the lead federal agency in consultation with SHPO. ACHP has the opportunity to actively participate in the process, either by invitation or by

its own initiative. This involvement occurs in relatively few projects. ACHP was not directly involved in the San Mateo 1903 Underpasses project.3

The first step in Section 106 is to initiate the process. During this step, the federal agency identifies if the project is considered an undertaking and establishes the project’s Area of Potential Effect (APE). If the agency concludes that the project has no potential to cause effects to known or potential historic properties, the Section 106 review process can end. If known or potential historic properties are within the APE, then the process continues. At this stage, the agency initiates plans to involve the public and relevant consulting parties on the project.4

The second step of the Section 106 process is to identify historic properties in the APE. During this step, the agency conducts public participation efforts and communicates with Native American tribes, groups, and individual, if appropriate. The APE can include various possible effects that the project could have on historic properties (discussed below). This means that even if a historic structure is not in the path of the Federal project, but can still be affected by sound or vibration, they would be studied during the Section 106 process. The agency is responsible for identifying resources in the APE that are historically significant and would be historic properties. Historic significance is identified as a property that is listed or eligible for listing in the NRHP. If

---

3 The procedures for implementing NHPA Section 106 are codified in Title 36, Code of Federal Regulations Part 800 (36 CFR 800).

4 Thomas F. King, Cultural Resource Laws and Practice: An Introductory Guide (Walnut Creek, CA: AltaMira Press, 2004), 94.
no property is identified as historic, then the process can end. Identified historic properties are then assessed to identify whether the project will cause an adverse effect.\(^5\)

The third step of the Section 106 process is to assess adverse effects. An adverse effect may include direct impacts such as physical damage or destruction of the property, alteration of the property, or removal from its original location. An adverse effect may also be indirect such as change in historic use, vibration impact or if it is affected by new visual or audible elements. If the agency concludes that the project will not cause adverse effects then the process can end, but if historic properties would be affected, Section 106 moves to its final stage to avoid, minimize, or reduce the adverse effect. The federal agency is responsible for altering ACHP that the undertaking will cause adverse effects to historic properties.\(^6\)

The fourth and final step of the Section 106 process is to resolve adverse effects. When historic properties are determined to be affected by a project, mitigation measures are identified and carried out. Mitigation measures can include ways to save the structure or if that is not possible, alternative solutions that would help reduce the adverse effect. The agency identifies mitigation measures in consultation with SHPO, usually with input from interested parties or Native Americans, as appropriate. Mitigation measures are stipulated in a Memorandum of Agreement (MOA) executed by the federal agency and SHPO. Other agencies may also be involved as concurring parties, for example.\(^7\)

---


\(^7\) King, *Cultural Resource Laws and Practice: An Introductory Guide*, 148-152; In some cases parties fail to agree to an MOA, which requires additional rounds of comments from consulting
For this project, the demolition, removal, and replacement of the San Mateo grade separations is under the control of the FTA and FTA provided funding for the project, thus the action constituted an “undertaking.” The FTA (as the federal agency) is required by law to study and evaluate historic properties that will be affected by the undertaking. JPB (operator of Caltrain and delegated agency to carry out Section 106 compliance steps) hired JRP to assist with its Section 106 compliance for this project. The San Mateo 1903 Underpasses had been previously determined eligible for listing in the NRHP in 2002 for a previous undertaking involving a project to electrify the Caltrain tracks running through San Mateo, and are considered a historic property for the purposes of Section 106 compliance. To establish whether JPB’s project was going to have an adverse effect on the historic properties, JRP prepared a Finding of Effect (FOE) for the Caltrain San Mateo Bridges Replacement Project. During the FOE process, JRP concluded the replacement project would have an adverse effect on the historic property. As a result of this finding, the FTA and JPB (acting as a concurring party) created an MOA with SHPO to mitigate these effects. Documentation of the San Mateo 1903 Underpasses was part of the mitigation actions agreed upon in the MOA, which is the main focus of this project. In early 2010, the author, Chandra Miller, initiated work on the project that culminated in the creation of four separate HAER documents, which JRP submitted to the Library of Congress in June 2010 (see Appendix).
Project Methodology

Ms. Miller, the author of these reports worked closely with JRP partner and architectural historian Christopher McMorris, who acted as manager for this project and actively worked on the inventory, evaluation, and effects analysis of the San Mateo 1903 Underpasses since 2001. Mr. McMorris assisted in the photograph recordation of the underpasses and had final editorial oversight of the project submittals. Ms. Miller acted as primary author of the reports and conducted additional research to supplement previously written historic contexts written by JRP. Each report was produced strictly adhering to the HAER guidelines established by the National Parks Service to meet the standards for inclusion in the Library of Congress permanent collection.

Research on historic bridges can be problematic due to the lack of documents that survive relating to their construction. Minutes from county commissioners’ meetings, contract bids, original plans, contracts with the builder or contractor’s name, the name of the engineer, historic photographs of the bridge, etc., are invaluable historic documents to create a historic context for a HAER report. In the case of the San Mateo 1903 Underpasses, the original plans for each bridge were on file in the JPB records, and included documents from the Southern Pacific Railroad which previously operated the Caltrain rail line on which the San Mateo underpass are located. These plans were reproduced using large format black and white photography and included in the reports.

The large format photography produced for the HAER reports were taken by William Dewey, who has decades of experience with this type of work and understands the photographic standards set by the NPS. A typical MOA or statement of work outlines
the maximum number of photographs required including contextual and detail views and reproductions of historic plans/drawings and photographs. For this project Mr. Dewey and Mr. McMorris completed the photography on a site visit and Dewey produced contact sheets of appropriate shots that were sent to JRP for selection. Once the multiple views were selected, they were integrated into an electronic draft of the report for review by JPB and the NPS. An electronic copy of the photographs included in the report was sent to the photographer to start the process of creating 4” x 5” large format black and white prints to mount in archival photomount cards in the report as well as the photograph negatives to go on file with the Library of Congress for future print reproductions.

As part of this publication process, copyright waivers were signed with the California State Railroad Museum and Library (Railroad Museum henceforth) in order to publish the historic photographs of the four underpasses from their collection within the four HAER reports. In return, the Railroad Museum was cited within the report as the source of the photographs and a copy of each HAER report was to be supplied to the Railroad Museum; however, as part of the MOA the Railroad Museum was already slated to receive copies of the HAER reports. In addition to the internal copyright waiver signed by the Railroad Museum, the NPS required an additional copyright waiver to be signed by the repository from which historic photographs or any other published material originated. In general, once submitted to the Library of Congress and then published online, the HAER documentation and all the elements within it, including historic photographs, become part of the public domain.
If a donating repository, such as the Railroad Museum, does not want their materials to be part of the public domain, then the historic photographs can be included in a field records folder at the end of the report that is not included with the body of the report. This folder is usually where materials that support or compliment the formal survey documentation, such as sketch maps, field drawing, notes, or other supplemental materials, and are processed and transmitted as informal documentation. The contents of the field records folder are housed separately in off-site non-public storage and are not available on the Library of Congress website. Researchers are welcome to use these records, but if there are copyright sensitive materials, the researcher must get permission from the donating repository, to view and/or use the restricted materials. For this project, the Railroad Museum allowed their materials to be included within the report are will be available on the Library of Congress website.\(^8\)

The final HAER submittal included two archival quality copies of each report on archival paper, archival photomount cards with large format 4” x 5” black and white prints, 8” x 10” black and white prints of the original plans and historic photographs, and a gold compact disc with Adobe (pdf) electronic files of each report. Seven non-archival copies were submitted to repositories as part of the MOA. Both archival copies were sent to the NPS Pacific office where they were reviewed to have met the standards. NPS then sent one copy to the Library of Congress and the other to the California SHPO for their collection.

Project Background

The rail line through San Mateo, located on the Peninsula south of South San Francisco, was originally constructed in the 1860s when the area was sparsely populated. In 1903, the line was upgraded which included installing a double track and steel plate girder railroad grade separations in San Mateo at East Poplar Avenue, Santa Inez Avenue, Monte Diablo Avenue, and Tilton Avenue. Being well over one hundred years old, these four structures were structurally deficient for the contemporary commuter rail line which ran on them. Furthermore, the construction of these grade separations occurred before the era of the automobile, and as time and technology progress, motor vehicles using the grade separations increased in size. As a result, the lowest of the grade separations, only measuring 8’ 6” in height, do not meet the modern maximum vehicular height allowance of 14’ and required replacement.9

The creation of these four HAER reports for the San Mateo 1903 Underpasses is the final step in a decade long process of recordation, evaluation, analysis, and mitigation to replace the four structures for safe vehicular traffic and also update the track system at the same time. In the early 2000s, Caltrain’s Electrification Program proposed to electrify the track system from San Francisco to Gilroy by installing nearly 200 miles of overhead electrical line to power the system through a series of substations. JPB hired JRP to inventory and evaluate the historic properties within the project’s historic architectural Area of Potential Effect (APE). The Historic Resources Inventory and Evaluation Report (HRIER) prepared by JRP concluded that the four San Mateo 1903

Underpasses and masonry wall (along Railroad Avenue on the east side of the tracks adjacent to the Monte Diablo and Tilton avenue underpasses) met the criteria for inclusion in the NRHP including. The report concluded that the structures were found to be significant at the local level under NRHP Criteria A and C. Under Criteria A, the underpasses are significant for their association with the development of northern San Mateo and with the growth of grade separation construction at the beginning of the twentieth century. The underpasses were the catalyst for growth in the area because it provided local residents improved access across the railroad track, which was an incentive for the development of northern San Mateo. The underpasses are also important as part of the early twentieth century grade separation movement as early examples that likely served to illustrate the benefits of constructing underpasses along the railroad route. The San Mateo underpasses were among a few grade separations in place at the time when automobiles became widely used. The character-defining features of the underpasses are their utilitarian design including the plate girders, densely built deck and support systems, pipe railings, date and manufacture plaques, and the reinforced concrete wing walls. The masonry retaining wall along Railroad Avenue is also a contributing element of these structures.

Description of Resource

The rail line running through San Mateo, which was originally constructed in 1864 between San Francisco and San Jose, was improved between 1901 and 1903. Improvements included double-tracking and the installation of steel plate railroad grade separations (also referred to as underpasses). In areas with increasing commercial and
residential development, like San Mateo, it was necessary to build structures to separate the railroad from other forms of traffic.

The San Mateo 1903 Underpasses are a series of four railroad bridges of similar design located along three-tenths of a mile of track over four parallel streets in the City of San Mateo (from north to south): East Poplar, Santa Inez, Monte Diablo, and Tilton avenues. From north to south, the underpasses have progressively lower clearance over the roads they pass. All of the bridges have substandard vertical clearance over the roadway:

- East Poplar Avenue: 13’-0”
- Santa Inez Avenue: 12’-3”
- Monte Diablo Avenue: 11’-1”
- Tilton Avenue: 8’-6”

Designed by the American Bridge Company for the Southern Pacific Railroad (SPRR), these structures are some of the earliest existing grade separations in California. Their construction provided safe travel for wagons, trains, and later automobiles in the expanding community of San Mateo. The development of the railroad through San Mateo in the 1860s is part of a broader context of transportation history in the United States and California. With the construction of the Transcontinental Railroad, the rail line through San Mateo had the potential to be part of this larger system linking east to west. In order to better understand the importance of the San Mateo underpasses within this context, an understanding of the transportation history of California in the nineteenth century, with an emphasis on railroad construction spurred by the building on the Transcontinental Railroad is necessary.
Chapter 2

HISTORIC PRESERVATION: A BRIEF HISTORY

Federal involvement in historic preservation dates back to the beginning of the twentieth century with the passage of the Antiquities Act of 1906 and the Historic Sites Act of 1935. The Antiquities Act was passed in an era of America’s history when looting Native American grave sites was a pastime. The act sought to protect historic and prehistoric ruins, monuments, and other objects of antiquity located on public lands, with the Department of the Interior acting as enforcer.¹⁰

In 1906, Congress formed the National Park Service as a unit of the Department of the Interior. In 1935, with the passage of the Historic Sites Act, the National Park Service became the agency to enforce this new law. This act made it a national policy to “preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States.” One of the directives of the National Park Service under this act is to “secure, collate, and preserve drawings, plans, photographs, and other data of historic and archaeologic sites, buildings, and objects,” which is the basis for the Historic American Buildings Survey / Historic American Engineering Record / Historic American Landscapes Survey (HABS / HAER / HALS) programs that are in place today.¹¹

¹¹ 16 U.S.C. 461; 16 U.S.C. 462(2); The Historic American Landscapes Survey (HALS) is a program initiated in 2001 to document historic landscapes in the United States with written and graphic records. See John A. Burns, Recording Historic Structures (Hoboken, N.J.: John Wiley & Sons, 2004), 2-4; National Parks Service, “Historic American Landscapes Survey (HALS),”
While the Historic Sites Act of 1935 brought awareness to preserve historic sites during the depression, it was the development practices of the post-World War II era that led to legislation that shapes historic preservation as it exists today. Rapid population growth, urban development, urban renewal, wide-spreading building projects, infrastructure creation, etc. occurred in the post-World War II era under the auspices of federally sponsored programs; however, countless buildings, structures, sites, and districts with historic value were destroyed in the name of progress during this period.¹²

The development and projects that were underway were increasingly viewed as federally supported assaults on the built environment. Since many of the historic buildings and sites being demolished were not significant on a national level, but were at the local level, it became evident that an additional mechanism was needed to protect these local resources. By the 1960s, the public outcry over the destruction of these resources reached Congress and the President. In response, the National Historic Preservation Act (NHPA) of 1966 was passed into law. This landmark act transformed the government’s responsibilities and role in identifying and preserving properties with historic significance.¹³

The NHPA requires federal agencies to take into consideration the effect of their project on historic properties. This includes properties listed in, and later revised to include properties eligible for listing in the National Register of Historic Places (NRHP),

---

which is composed of “districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture.” The NHPA also established the Advisory Council on Historic Preservation (ACHP), which serves to advise Congress and the Executive Branch regarding historic preservation issues and functions to serve the public’s interest as a watchdog for unnecessary government sponsored destruction of important cultural properties. The ACHP works closely with State Historic Preservation Officers (SHPOs) to mitigate the effects of federal undertakings upon significant cultural features and landscapes.

Section 106 is a driving force behind federal preservation activities, and has a profound effect on the federal government’s treatment of historic resources. As discussed above, Section 106 requires federal agencies that are proposing an undertaking to consider their effects on historic properties. Most Section 106 actions occur in consultation between a federal agency and SHPO. The ACHP does not regularly get involved with the mitigation process, nor was it involved in the 1903 San Mateo Underpasses project; however, understanding the role of the ACHP is necessary when discussing federal projects concerning historic properties.

The NHPA has undergone amendments since its passage in 1966. One amendment directs the Secretary of the Interior to develop “a uniform process and

16 36 CFR 800.1, September 2010.
standards for documenting historic properties by public agencies and private parties for purposes of incorporation into, or completing, the national historical architectural and engineering records within the Library of Congress.”\(^{17}\) The standards adopted to fulfill this directive were derived from HABS/HAER standards already in place. The documentation that is now created in compliance with this law adds hundreds of buildings and structures a year to the Library of Congress collection.\(^ {18}\) 

Additionally the law states that, “each Federal agency shall institute measures to assure that where, as a result of Federal action or assistance carried out by such agency, an historic property is to be substantially altered or demolished, timely steps are taken to make or have made appropriate records, and that such records then be deposited…in the Library of Congress…for future use and reference.”\(^ {19}\) These standards require mitigation HAER documentation to adequately explain and illustrate what is significant or valuable about the historic property being recorded; only reliable sources should be used to write about the resource, the documentation must be prepared on materials that are reproducible for ease of access, durable for long storage; and it also specifies that documentation must be shall be clearly and concisely presented.\(^ {20}\) 

For this Section 106 project, mitigation measures were outlined in an MOA between the FTA, JPB, and SHPO. The three agencies agreed upon the decision to proceed with the demolition and replacement of the San Mateo Underpasses under certain

\(^{17}\) National Historic Preservation Act of 1966. 16 U.S.C. 470a-7(b).
stipulations in order to take into account the effects of the undertaking on the historic properties. Under the MOA the FTA, as the lead federal agency, agreed to consult with the NPS Pacific Great Basin Field Office to determine the appropriate level and type of recordation of the San Mateo 1903 Underpasses before their demolition.

In the Section 106 review process, the NPS determines on a case by case basis the types of properties listed or eligible for listing on the NRHP at the state and local level, do not require documentation to be sent to the Library of Congress. Once the documentation has been produced using NPS standards specified by the field office, the documentation is sent to the regional office for approval and then transmitted to the NPS in Washington, D.C. The NPS office completes a final review of the documentation before submittal to the Library of Congress Prints and Photographs Division, which is the repository for these documents.²¹

If it is determined the mitigation documentation does not warrant to be sent to the Library of Congress, there are a number of options where the final report can be submitted. If for instance, a structure like a bridge is located on a state road and under Caltrans (California Department of Transportation) control, then the completed reports may be submitted to the Caltrans district office, the Caltrans Headquarters in Sacramento, a copy given to the county public works department where the bridge is located, etc. Archival quality reports are usually given to these types of departments. Copies given to local historical groups, libraries, or extra copies to have on file, are reproduced on non-

archival quality paper with high quality scans of the large format photography. The submittal of these reports to repositories is an important part of the mitigation process to provide documentation to interested parties, which partially addresses the adverse effect of the San Mateo 1903 Underpass’s demolition.22

For this federal project, JPB consulted with Rand Herbert, a principal at JRP, for a recommendation on the appropriate type and level of recordation needed for the San Mateo 1903 Underpasses. JPB requested concurrence from the NPS that Level II of the HABS/HAER standards would be the appropriate type and level of recordation for the proposed project, which was granted.

**Recording Historic Resources: A History**

*Creation of the Historic American Building Survey (HABS)*

The HABS program began in 1933 under the authority of the National Industrial Recovery Act through the New Deal’s Emergency Civil Works Administration. The program was part of legislation to act as a short-term relief project for unemployed architects to record the best examples of early American architecture. The creation of the HABS program directed attention to the number of important historic structures that were rapidly disappearing and the need for a comprehensive preservation standards. The success of the program was acknowledged and steps were taken to create a permanent program. A memorandum of agreement was signed in July 1934 by NPS, the American Institute of Architects, and the Library of Congress. Under this MOA, NPS would carry out the actual work to create the records (in the case of this project, the HAER report was

created for the NPS), the American Institute of Architects would identify and catalog structures, and the Library of Congress acted as curator of the collection and made the records available to the public.\textsuperscript{23} The AIA still retains an active role in the HAER program acting as a technical advisor through its Committee on Historic Resources.\textsuperscript{24}

With the establishment of HABS as a permanent federal program in 1934, the Historic Sites, Buildings, and Antiquities Act of 1935 later legitimized the HABS survey by authorizing the National Parks Service to secure, collate, and preserve drawings, plans, photographs, and other data of historic and archaeological sites, buildings, and objects.\textsuperscript{25} By the end of 1940 most of HABS federal funding was suspended as part of the wartime emergency, but survey work continued through 1957 with funding provided by AIA, NPS, and other organizations.\textsuperscript{26} In the post-World War II building boom period, draftsmen were unavailable for the program, so summer student programs were initiated and still produce a large portion of the documentation submitted to the Library of Congress each year. Today many of the documentation drawings, reports, and photographs are submitted by students through these summer programs, or by local organizations, or, by firms as sub-contractors to the government. The federal government lacks the funding and man power to be the sole author of HABS/HAER documentation,

\begin{itemize}
  \item Burns, \textit{Recording Historic Structures}, 19.
\end{itemize}
so federal agencies go to firms, such as JRP, to produce mitigation documentation that meets the standards created by the NPS. Unlike the HABS/HAER summer recording program, the mitigation documentation is administered through the external programs of the regional offices of the NPS.\textsuperscript{27}

\textit{Creation of the Historic American Engineering Record (HAER)}

In the past, houses and buildings were predominately recorded under the HABS program and too little attention was paid to systematically record industrial or engineering structures, with the exception of picturesque flour mills and covered wooden bridges. While industrial sites were not generally part of the preservation battles of the 1960s, these sites were beginning to be recognized by scholars and local activists for their historical significance and their vulnerability to urban renewal. This increasing interest in America’s engineering and industrial history in the 1960s occurred when the historic preservation movement was experiencing a revitalization. During this time, a new branch of the HABS program was developed, the Historic American Engineering Record.\textsuperscript{28}

Before the creation of the HAER program, there was an unofficial relationship between the HABS program and curators at the Smithsonian’s Museum of History and Technology (now the National Museum of American History), which dealt with matters of engineering history. Over the years, the Smithsonian Division of Mechanical & Civil Engineering and the HABS conducted a number of surveys of flour mills, iron works,

timber bridges, iron bridges, windmills, etc. The beneficial relationship between both organizations led to discussions on the possibility of recording engineering and industrial sites through HABS-type recording surveys. The first experimental survey under the auspices of the not-yet-created HAER program was recording the C.P. Bradway Machine Works in West Stafford, Connecticut in the summer of 1965. While the survey followed the traditional HABS guidelines to record the building itself; the bulk of the attention was devoted to machinery, the power-transmission system, turbines, etc. The completed report was submitted to the HABS collection at the Library of Congress and given a regular HABS number. Deemed a success, similar surveys were conducted in subsequent years until the first official HAER survey was mounted in 1969 to record industrial sites within the Mohawk-Hudson Area including the Delaware Aqueduct, the Troy Gaslight Company Gasholder House, and the Watervliet Arsenal Cast-Iron Storehouse. Thus, the HAER program was born.29

As a companion program to HABS, the 1969 Historic American Engineering Record was established and expanded the recording scope of the Library of Congress collections to include large and technically complex structures, mills, factories, foundries, canals, roads, and rail infrastructure. Similar to the HABS program, HAER is a cooperation between the NPS, Library of Congress, and the American Society of Civil

Engineers, with the goal to document our nation’s industrial heritage and establish a national record of significant engineering structures.\textsuperscript{30}

The advantages of both the HABS and HAER programs are their standard methodologies, durability of archival materials, reliability of archival storage methods, and accessibility of the reports to the public. Rare documents and materials used during the production of the report are copied and reproduced on archival paper, which creates a stable copy housed in the Library of Congress. The original large-scale photograph negatives are retained and used to make prints, so no degradation of the original image occurs. The written report material is stored with the large format photographs and any measured drawings which constitute a formal HAER recordation. This complete report makes an important addition to understanding historical engineering buildings and structures as part of America’s technological heritage.\textsuperscript{31}

\textit{Covered Bridges and Appreciation of Engineering Structures}

Bridge construction in America not only demonstrates the evolution of building technologies, but also had a much more enduring impact on engineering, manufacturing, and settlement patterns. Surviving bridges are tangible evidence of this legacy, but we are fast approaching the point of no return in saving some prime examples. Recognition of the importance of these engineering structures was first documented under the HABS program in the 1930s. Forty-five covered wooden bridges were photographed and thirty-


one had detailed architectural drawings prepared during this period. The selection of the bridges for recordation did not have anything to do with their historic significance, but rather the proximity of location to the unemployed architects enlisted by the American Institute of Architects through the HABS program. These covered bridges were not the typical early American historic buildings that made up the majority of early HABS documentation; however, their inclusion in the HABS program reveals the growing concern among civil engineers, historians, and building enthusiasts to preserve our country’s early “engineering heritage.”

Many of America’s early covered wooden bridges share a common bond with later steel railroad bridges as structures constructed as necessary means of infrastructure. The names of many original designers or builders of historic bridges are lost through time, especially when they are not among the well known engineers of the day or the structure fails to be hailed a masterpiece of a particular designer. This anonymity found in wooden bridges can be seen in railroad bridges, such as the 1903 San Mateo Underpasses. Though it is known that the American Bridge Company manufactured the steel elements of the plate girder and the Southern Pacific Railroad installed the bridges, the human element of the structure has largely disappeared. The names of the original designers, engineers, and workmen who installed the underpasses, etc., have been lost to history. Wholesale replacement projects in the New Deal era and later in the post-World War II construction boom and urban renewal saw the destruction of historic engineering structures that did not have a seemingly important background and credibility to be saved.

---

from the wrecking ball. Seen as unsightly, dangerously narrow, or inadequate to carry
two lanes of vehicular traffic, their replacements were hailed as part of the progress of
American transportation. 33

Further interest in the significance of historic bridges and their preservation, grew
out of the larger historic preservation movement of the 1960s as America’s bicentennial
approached. Initially, interest was focused on wooden covered bridges as nostalgic
images of America’s rural past, but eventually grew to include other types of historic
bridges. The significance of historic bridges grew out of the awareness of their role as
representations of important engineering technology and as essential components of
regional growth. 34

_Railroad Bridge Inventories_

Railroad bridges are not always included in statewide historic bridge inventories
because generally highway departments are not responsible for railroad bridges; however,
they may be included in other historic bridge inventories. Some states, such as Indiana,
Ohio, and California, have developed statewide historic bridge programs to expedite the
Section 106 process and encourage agencies to restore and preserve their historic bridges.
Many old bridges need to be rehabilitated or replaced every year, and virtually all of
these projects are federally-funded and subject to federal historic preservation laws. In
the 1970s, the Federal Highway Administration recognized that it was inefficient to

33 Murtagh, _Keeping Time: The History and Theory of Preservation in America_, 155; John W.
Snyder, _Preserving Historic Bridges_ (Washington, D.C.: National Trust for Historic Preservation,

34 Snyder, _Preserving Historic Bridges_, 1; California Department of Transportation, _Historic
Highway Bridges of California_ (Sacramento: California Dept. of Transportation, 1990), 1.
continue to evaluate each historic bridge on a case-by-case basis. It encouraged the various state highway agencies to survey bridges on a comprehensive basis. From 1984 to 1986, Caltrans conducted a statewide inventory of highway bridges that had the potential for historic significance. The Historic Highway Bridge Inventory found 190 bridges eligible for the National Register of Historic Places adding to the 90 bridges previously found eligible for the National Register. The bridge inventory continues to expand and is continually updated to review bridges as they come of age may reveal their historic significance. The inventory also acts as a guide to look up the status of a bridge in a project area, or when a bridge needs rehabilitation or replacement.\(^\text{35}\)

In addition to being excluded from some state sponsored highway inventories, railroad companies, like private property owners, are often times reluctant to acknowledge the existence of historic structures on their property because of the perceived compliance issues relating to preservation and environmental laws, which can impede the initiation of a bridge survey. With proper planning and policy, bridge surveys can develop plans to allow a bridge to remain in place while structural or roadway improvement are made, or to rehabilitate a bridge if it is sound for continued use. The San Mateo underpasses were included in the Caltrans Historic Highway Bridge Inventory and listed as a Category 4, which means their status was undertermined and required additional research as of October 2011. This status allows for the possibility of historic significance, requiring further research about its history to determine its historical

status.\textsuperscript{36} Other states, such as New Jersey, have developed railroad bridge surveys with developed contexts to determine the historic significance of these resources.

The State of New Jersey implemented a railroad bridge survey that acts as an example for other state sponsored surveys to inventory and assist in the evaluation of historic railroad resources.\textsuperscript{37} Begun in 1990, the New Jersey Transit Historic Railroad Bridge Survey was made possible by a grant from what is now the Federal Transit Administration. Conducted in seven of the twelve counties in the state, the effort surveyed 344 railroad bridges on former railroad company lines which were under the operation of New Jersey Transit. To evaluate the significance of the bridges, categories were created including engineering, transportation, and community planning and development. The last category focused largely on grade separation structures, such as resources similar to the 1903 San Mateo Underpasses. The survey included a variety of bridge types such as plate girders, concrete arch, metal truss, stone arch, grade separation structures, movable bridges, etc. Upon completion of the survey in 1992, a number of bridges were recommended for inclusion in the National Register of Historic Places. Overall, the historic railroad bridge survey was the catalyst for improved communication between planners and engineers within New Jersey Transit to take historic preservation into consideration within its planning efforts.\textsuperscript{38}

\textsuperscript{36} California Department of Transportation, “Historic Bridge Inventory.” California Department of Transportation http://www.dot.ca.gov/hq/structur/strmaint/historic.htm (accessed October 2011).


The development and evolution of the historic preservation movement since the passage of the Antiquities Act of 1906 has changed how historic resources are treated in America. Greater understanding and appreciation of the built environment, first through the HABS program for buildings, and later HAER for engineering structures, has been achieved through federal involvement in historic preservation practices, especially with the role of the HABS/HAER program through the NPS. Through the HAER program, the 1903 San Mateo Underpasses, which may have been overlooked as a ubiquitous part of infrastructure, were recognized and recorded as an important part of our country’s railroad and industrial heritage. An understanding of railroad transportation in California and its influence on urban development is discussed in the next chapter to further illustrates the context in which the San Mateo Underpasses are significant.
Chapter 3

HISTORIC CONTEXT

Railroads in California encouraged economic growth by connecting markets, increasing land values, reducing transportation costs, etc. Transportation, especially in the form of railroads, fed the suburban growth of the San Francisco Bay Area. San Francisco, as one of the first cities in the state to have rail service with the completion of the San Francisco-San Jose Railroad in 1864, was poised to become the economic leader in the state as the terminus of a transcontinental railroad. Although its plans for economic dominance were dashed by the Central Pacific, the San Francisco-San Jose Railroad opened up a new era of railroad building in the Bay Area that spurred population growth in major cities. The high concentration of people in urban centers created the need to develop suburban areas. Interurban routes were developed to connect people from their suburban homes to their urban workplaces, which can be seen in the history of the San Mateo 1903 Underpasses. In order to understand the context in which the underpasses are significant for their association with the development of San Mateo as a suburb of San Francisco, a history of western expansion, the evolution of transportation technology in the west, and the influence of transportation on suburban growth is necessary.

While California was the most western of the frontier states, it was also the fastest growing during the period of Anglo settlement during the Gold Rush. Between 1845 and 1860, San Francisco grew into a city of 55,000 people crowded into a twelve-mile square

---

area that was starting to swell and looking for areas to expand to. The growth and development of San Francisco and the surrounding cities was dependent on new modes of transportation and adequate transportation networks.40

Railroad building was a defining characteristic of nineteenth-century America and the San Francisco Bay Area was no exception. Areas of sparse and sporadic settlement west of the Mississippi gave way to an age of rapid expansion thanks to the rise in transportation technology. The San Francisco Bay Area had railroad fever even before the completion of the San Francisco-San Jose Railroad in 1864. Railroad lines in the agricultural valleys such as of Napa and Santa Clara, were built during this period linking people, markets, and goods. In anticipation of economic development as soon as the rail line came through their communities, towns voted to incorporate and had a townsite surveyed months before the rail line construction crews were scheduled to arrive.41 Rail fever reached a pitch in the Bay Area with the building of the Transcontinental Railroad and the possibility of San Francisco as its terminus.

The Transcontinental Railroad

Without the impetus of the construction of a transcontinental railroad in the 1860s, San Francisco railroad construction might not have occurred until later, resulting in slower growth of the area. The rail line connecting San Jose, San Francisco, and Gilroy aimed to connect people, places, and markets, all required to

---

create a strong economy, which would lure the builders of the transcontinental railroad to end their route in San Francisco.\footnote{Fred A. Stindt, “Peninsula Service: A Story of the Southern Pacific Commuter Trains,” \textit{The Western Railroader} 20 (1957): 11.}

The real efforts to initiate construction of a transcontinental railroad began in the 1840s just as Oregon had become an American territory and previously held Mexican lands were newly won in the Mexican-American War. However, railroad building in the West would be more difficult than the East because the lack of established communities to secure building materials, a reliable labor force, as well as enough traffic to support the railroad once it was completed. The economics of railroad building would change in the 1860s with the construction of the Transcontinental Railroad when the railroad established towns and sold the newly surveyed lands to settlers. However, discussion of a transcontinental railroad subsided in the early 1840s, but was later revived by the discovery of gold in California in 1848.\footnote{Southern Pacific Company, \textit{Southern Pacific Company: Historical Sketch of the Origin and Development of the Transportation Properties Operated As a Part of the Southern Pacific System} (March 1933), passim.}

By the 1850s, railroads were spreading into the Midwest and the Mississippi River; however, the desire to extend the railroads of the east to the west coast grew into a public debate. The two main obstacles that stood in the way were the questions of whether the construction would be financed by private or government funds and which route to take. A series of fairly comprehensive Pacific Railroad surveys were conducted by the Army Engineers between 1853 and 1855. The results of these
surveys (two northern and two southern routes) were politically objectionable to both the Northerners and the Southerners. Thus, the issue remained unresolved until the start of the Civil War. With the secession of the South in 1861, and thus no longer part of the transcontinental debate, Northern Congressmen quickly chose a northerly route and agreed to provide federal aid for its construction. With the passage of the Pacific Railroad Act in 1862 Congress provided economic aid to the railroad’s builders, the Union Pacific Railroad (UPRR), which would start construction from Iowa westward, and the Central Pacific Railroad (CPRR), to build eastward from San Francisco. Congress provided incentives and loans to the railroads companies to aid the construction.44

Construction of the railroad began in Sacramento on January 8, 1863 and in Omaha on December 2, 1863 and finally met on May 10, 1869 in Promontory, Utah. Between 1864 and 1869 a total of 1,775 miles of rail were laid to complete the railroad link across the continent. This effort was perhaps the largest single construction project ever undertaken within the countryfraught with logistic, financial, and construction issues throughout. The Southern Pacific and Central Pacific railroads had built ahead of the frontier, so they used the railroad to open the West to

settlement, and thus build their own markets. This business model was a driving force behind the settling of the West, especially in California.\textsuperscript{46}

In the 1870s the Southern Pacific lines within California linked the state’s new settlements to the transcontinental railroad, and through it, to the East. Through a huge public relations campaign, the Southern Pacific promoted the West and encouraged settlement. Newcomers could take the transcontinental railroad to California, buy a plot of land in a town laid out by the railroad, and start up a business that would ship its products on the rail line. The company owned vast tracts of land in California and other western states through land grants received for railroad construction, and built new towns on land that the railroad owned.\textsuperscript{47} With the completion of the Transcontinental Railroad, an immense number of smaller lines fed to the larger system, encouraging settlement throughout the west. Between the 1880 and 1890, railroad mileage increased to over 40,000 miles, more than had been existence up to that time.\textsuperscript{48}

This was an era of rapid expansion connecting a thinly-settled west to a populated east, which would shape the development of what would become the most populous state on the west coast. The rapid growth of the San Francisco Bay Area during this period of railroad construction led to construction of the rail line through San Mateo; the 1903 Underpasses would later aid in the development of north San Mateo as a suburb of San

Francisco, which was bursting at the seams since the discovery of gold in 1848. A flood of people from all over the world poured into California, and it became quickly apparent that the rudimentary Indian foot trails were not adequate to move people and goods from the Bay Area to the inland gold fields. Transportation networks had to develop in this rapidly expanding population and economy.

*California Settlement and Transportation Development*

Before the discovery of gold at Coloma, American immigrants slowly began to populate California around areas such as Monterey, Los Angeles, and San Francisco (previously named Yerba Buena). Some Americans operated chanderies outfitting Pacific whaling ships and the increasing amount of merchant vessels entering the San Francisco and Monterey bays. Others farmed or ranched on land granted to them by the Mexican government. Under the naval occupation of Yerba Buena during the Mexican American War, the Anglo population increased from less than fifty in 1844 to more than 200 one year later. Before the discovery of gold was announced to the world in 1848, more than 1,000 Americans made up Yerba Buena’s permanent population, which had twelve stores and warehouses and an additional 192 structures. In 1849 the world truly rushed into California as a wave of people from all over the world came to seek their fortunes in the gold fields. Such a boom in population and economics was not enough to overcome years of obstacles to improve the transportation system in the state. It took

---

49 Thomas Berry, Sr., *Early California Gold, Prices, Trade* (Richmond, VA. University of Richmond: Bostwick Press, 1984), 7.
more than twenty years for the completion of the Transcontinental Railroad to connect
the west coast to eastern population centers and markets.

**Early Routes to California**

In 1849, most new arrivals to San Francisco were from the eastern states on a long
and taxing journey. There were several routes and means of travel, all of which
depended on cost, time, and mode of transportation, and each with its own deadly hazards
from shipwrecks or boiler explosions to diseases and desertions.\(^{50}\)

The earliest and cheapest mode of travel was a sailing voyage from one of
several ports on the American Atlantic coast around the tip of South America and
Cape Horn. The trip by sea took anywhere from five to eight months to complete, and
the rough waters and weather around the horn sometimes waylaid ships for weeks
while the passengers where perpetually seasick. An alternative route was to take a
ship or steamer down to the Isthmus of Panama, disembark, and traverse to the
western side of the jungle via canoe, mule, or even on the backs of native guides.
Disease was common during the weeklong journey through the jungle or while
waiting weeks at the Pacific harbor for a boat to arrive for San Francisco and many
travelers succumbed to disease; however, a railroad was built across the Isthmus in
1855, which shortened the route.\(^{51}\)

---


Lastly, overland travel across the Oregon Trail with the quintessential Conestoga wagon was a slower route, but there were many options and promises of shortcuts to speed their way to the gold fields. A northern route from St. Louis, Missouri followed the Platte River across the plains, over the Rockies, descending into the Utah desert into the Sierra Nevada and finally El Dorado. The southern route stretched from Missouri through Kansas and onwards to Santa Fe, New Mexico. The Santa Fe Trail, established in the 1820s as a trade route between the United States and Mexico, was the oldest wagon road in the United States and became one of the principal arteries that connected the East and West coasts before the transcontinental railroad. These overland routes, as well as countless others forged by trailblazers became the transportation arteries connecting the East and West coasts, and with the construction of the Transcontinental Railroad in the 1860s and following decades, many of the rail lines followed these early wagon roads.52

Without these established transportation routes to California, either by land or sea, populating California would have been a much slower process. These routes brought in people from all over the country and the world, creating a boom in the population. This created the need for improved transportation of people and goods within California, and the internal routes evolved from rutted wagon roads to interurban railways.53 The resulting evolution of transportation routes from rugged

---

trails to stream railroads and electric interurban railways would influence settlement patterns within the state and how people lived, worked, and played.

**Early Routes in California**

In the decades following the California gold rush, transportation along the San Francisco Peninsula was rough and slow going. With the establishment of San Jose as the state capitol between 1849 and 1852, transportation to the city was important as ever for the state to function, especially from San Francisco which was the hub of economic activity in the new state. Many travelers chose to take a steamboat or schooner from San Francisco and then overland to the capitol at San Jose to avoid the long, bumpy, and dusty, as well as the poor lodging conditions along the wagon routes. Wagon roads in the 1850s followed old Indian and Spanish trails while other roads continued into logging country towards the south that were connected by a series of small outposts on the coast. These wagon roads were seasonal due to the wet winters making the roads muddy and impassible. El Camino Real, the Spanish route along the coast of California connecting Los Angeles to San Francisco, remained the main route through the peninsula. The rutted wagon road of El Camino Real was dotted with road houses, also called mile houses for they were numbered for their approximate distance from San Francisco. These road houses, such as the San Mateo House located between San Jose and San Francisco, became small centers of commercial and residential hamlets that eventually grew into large communities. As the road houses appeared, important changes were taking place in

---

the Peninsula. More than 55,000 people lived at the extreme northeast tip of the Peninsula in San Francisco. San Mateo would become an exploitable resource to create a traffic corridor between San Francisco and the agricultural Santa Clara Valley that provided food for the hungry population and estates for the wealthy citizens of the city. 56

The First California Railroad

With the large population increase of the West by the 1850s, the settlers from the East Coast brought with them their notions of what a city should have, in terms of buildings, transportation, infrastructure, etc. This eastern population made a conscious decision to create an eastern civilization on the Pacific shores.57 The loudest clamor for a railroad was heard in Sacramento, which was the gateway to the gold fields. Sacramento was accessible via water ways from the San Francisco Bay, but transportation eastward into the hinterlands was slow going on rudimentary wagon roads that were in constantly poor condition and their use was highly dependent on weather conditions. A more reliable mode of transportation became a reality in 1856 with the completion of the 22-mile long Sacramento Valley Railroad line connecting Sacramento to Folsom. The route was designed and built by easterner Theodore Judah, who later became involved with the Central Pacific "Big Four" that built the western half of the transcontinental railroad.58

The Sacramento Valley route was the first commercial railroad east of the Mississippi and there were aspirations for it to become the western terminus of the transcontinental railroad, if it was ever realized. The Sacramento Valley line opened up the railroad era in California. Four years later a route between San Francisco and San Jose would start construction and within ten years the state went from twenty-two miles of railroad track to over a thousand miles.\textsuperscript{59}

**The San Francisco-San Jose Railroad**

Built on the wave of the railroad fever, the second route in the state was the fifty mile long San Francisco-San Jose Railroad (SF-SJRR), completed in early 1864. With the rapid growth of San Francisco due to the Gold Rush of 1848-49, the Peninsula and the Santa Clara Valley became an important food growing region. Much of the food was transported on ships to San Francisco harbor, but a railroad was considered a better way to serve the area. The first attempt to organize the construction on a rail line to serve the area was undertaken by the Pacific and Atlantic Railroad Company. The company failed two attempts to raise enough capital, for the route from San Jose to San Francisco. With San Jose no longer the state capitol, which resulted in a decline in trade, the population of the city declined, and so did its influence. A third attempt was made by the San Francisco and San Jose Rail Road Company, which also failed in their endeavors. The fourth and final company, formed in 1860, took the same name as its predecessor. What made this last attempt

successful was the support of the state legislature and the press to convince the voters of San Francisco, San Mateo, and Santa Clara counties to approve bonds for the railroad because there were aspirations for it to become the terminus of the transcontinental railroad.\(^{60}\)

The bond easily passed and W.J.L. Moulton, superintendent of construction for SF-SJRR, directed crews to begin work on the single line railroad starting at San Francisquito Creek (now in Palo Alto), which forms the boundary between San Mateo and Santa Clara counties, in May 1861. The route was sufficiently built by October 1862 when Governor Leland Stanford officiated the celebrations for completion of the railroad between San Francisco and Palo Alto, including tracks through San Mateo. Regular service on this segment began in January 1863.\(^{61}\) The SF-SJRR completed the rail line from San Francisco to San Jose and began services on the whole route in 1864. The Southern Pacific Railroad, which incorporated in 1865, acquired the SF-SJRR in 1868 and consolidated the separate railroad under the Southern Pacific name two years later.\(^{62}\) Regular daily passenger service in the initial years of operation on the peninsula consisted of a morning train and two afternoon round trips between San Francisco and San Jose. Despite low traffic and low profits, local residents and outsiders alike brought optimism to San Mateo. Stations sprang up on the route from

Coloma to Redwood City, shifting settlement eastward away from the old El Camino Real toward the new depots. The President of the SF-SJRR declared the completion of the line in 1864 as the “first link in the grand chain of railroads which is to bind the golden shores of the Pacific with the cornfields of the Mississippi Valley.” The hope of the citizens that backed the construction of the San Francisco-San Jose line was that it would become the terminus of the transcontinental railroad, and ensure a prosperous economic future for the area; however, the decision to locate the terminus in Oakland rather than San Francisco dashed any hopes of rapid economic development in San Mateo. Oakland boomed in size and diversity as it expanded its wealth, tax base, and population. Water, sewer, gas, telephone and electric lines were installed in the 1870s and 1880s. An efficient public transportation system comprised of horse car lines and cable cars connected Oakland to the nearby cities of Berkeley, San Leandro, and Hayward, creating suburban booms along the routes. By the 1880s, Oakland had become the hub of the East Bay metropolitan area that rivaled the older eastern city centers.

In the last quarter of the nineteenth century much of the land in eastern San Mateo and Santa Clara counties was still held in large tracts by wealthy businessmen, industrialists, and other California capitalists. Two notable landowners were Charles Polhemus, entrepreneur and SF-SJRR director who laid out and plotted the town of San Mateo, and San Francisco merchant William D. M. Howard, who had purchased part of

---

63 Hynding, *From Frontier to Suburb: The Story of the San Mateo Peninsula*, 64.
Rancho San Mateo in 1849. Howard’s family was the first to convert a Mexican-era rancho into a country estate along the peninsula. Through the first decades of the 1900s, the peninsula remained relatively undeveloped in terms of industry and commerce.\textsuperscript{66}

The lack of development in San Mateo did not fit the typical model of rapid urbanization after the construction of the major railroad through the town, which was a pattern experienced throughout the country. San Mateo failed to expand at the same rate of Oakland, and took more than forty years to become a growing and prosperous town. The failure of San Mateo to quickly expand after the construction of the SF-SJRR was largely due to the owners of the railroad, who retained large tracks of land for their country estates, which the Peninsula became famous for in the later part of the century. The subdivision of these large estates and sale of lots in the San Mateo area led to its incorporation in 1894, forty-four years after California became a state.\textsuperscript{67}

During the period from 1870 through 1900, the peninsula route was the only freight and long-distance passenger line that served San Francisco. Although streetcar companies in both San Francisco and San Jose vied for local customers, Southern Pacific was the only company that could offer transcontinental land route service into the heart of San Francisco (via Oakland). The connection between San Francisco and the southern Bay Area also encouraged suburban development and people started to commute to work


\textsuperscript{67} Scott, \textit{The San Francisco Bay Area: A Metropolis in Perspective}, 83.
by rail. Once out of San Francisco, many stations, like the one in San Mateo during the late nineteenth century, were merely stops in the rural landscape that served communities that were not much more than villages.68

From the 1870s through the end of the century, control of peninsula rail travel allowed the Southern Pacific’s leaders to concentrate their efforts to acquire other rail companies and to construct new lines elsewhere in the state and in the West. The company became the dominate railroad in California and the West, controlling well over 8,000 route miles throughout the western United States and ranging from Portland in the northwest to New Orleans in the south. One of the company’s biggest projects during the 1870s was the construction of a route down the center of the San Joaquin Valley that then crossed the Tehachapi Mountains, and finally led through the San Fernando tunnel into the Los Angeles basin. This access to southern California was crucial for the development of the Southern Pacific system, and the company did not add another major north-south route through the state until it completed its Coast Line between San Francisco and Los Angeles in 1901. The Southern Pacific connected San Francisco to Omaha, Nebraska via Ogden, Utah by combining lines with the UPRR to form the cross continental Overland Route. The company’s holdings included vast operations throughout California, as well as a steamship company that linked New Orleans with New York and other points in the eastern United States. These varied and wide-spread holdings of the Southern Pacific influenced economic

development throughout the state and certainly along the peninsula and the southern San Francisco Bay Area. 69

With the completion of the San Francisco-San Jose line, the new easy transportation meant that individuals could live in suburban areas and take a short train ride to work in the city center. As a result, a number of towns were platted including Mountain View, Mayfield, Menlo Park, Belmont, and San Mateo. The SF-SJRR had a major role in the urban development of the Peninsula. The combination of city and rural living lured professionals from the cities into areas with station stops, such as San Mateo. These station stops developed into small town centers where the local economy depended largely upon a nearby estate built by a wealthy San Franciscan as a retreat, such as Charles Crocker’s two Hillsborough mansions. 70 The Peninsula was developing a series of “stockbroker suburbs,” at the end of the nineteenth century as an emerging professional class with newly found wealth made use of the Southern Pacific’s commuter line. 71

The Southern Pacific commuter railroad established a pattern of suburban development for the wealthy; however, the construction of the San Francisco and San Mateo Railway (SFSMR) intended to open up the Peninsula to a wider economic base of people, such as working professionals and tradesmen. Rail service on the SFSMR began in April 1892 and development of the line reached San Mateo in December 1902, just

69 Hofsommer, The Southern Pacific, 1901-1985, 4-8; Signor, Southern Pacific’s Coast Line, 11-12.
70 Hynding, From Frontier to Suburb: The Story of the San Mateo Peninsula, 191-192.
before the construction of the four San Mateo underpasses.\textsuperscript{72} Competition for ridership in the San Mateo market between the SFSMR and the SPRR may have prompted the later to upgrade the route through San Mateo in 1903, which included the installation of the underpasses and double-tracking the route. To better understand the role of commuter lines and rail transport on the Peninsula, and its effect on populating the suburbs of San Francisco, an understanding of the transportation evolution that occurred in the area necessary.

\textit{Early Urban Transportation in the Bay Area}

Transportation technology democratized the nineteenth century by opening up unsettled lands to all. Steamboats and the railroads moved the masses across the country, but it was the omnibus, horse car, and electrified railroad that brought people to the developing suburbs. Omnibuses were horse drawn carriages used on city streets while horse cars followed a tracked route. Omnibus and horse car inspired suburbs in the 1840s and 1850s back east in Philadelphia and Chicago, for example, mirrored the expansion of the Bay Area suburbs that occurred in the late nineteenth century.\textsuperscript{73}

The pattern of growth in the San Francisco Bay Area was largely shaped by transportation lines, which were extended when capitalists and real estate developers saw opportunities. With the expansion of transportation lines, the population was distributed


among a wider area, which stimulated the growth of towns. By the end of the 1880s, every county in the Bay Area had rail facilities.\textsuperscript{74}

The evolution from omnibus to horse car increased the traveling distance from city centers and made possible cheap daily commuting.\textsuperscript{75} Traveling at the break neck speed of six miles per hour, these horse-drawn passenger cars proved popular and profitable. Real estate speculation and development followed the newly laid horse car routes, and opened up regions to families unable to afford their own horse and carriages or were unable to commute on the steam-driven railroad. This opened up a new era where “not only the merchant, the wealthy manufacturer, and persons well to do in the world, occupy each an entire dwelling, but tradesmen of the most humble class can have a house to themselves.”\textsuperscript{76} San Mateo is a perfect example of this model, where tradesmen such as businessmen, clerks, and shop workers commuted to work from San Mateo and lived in the same neighborhood with the gardeners, bakers, and other workers employed by the city and estates.\textsuperscript{77}

The electric streetcar railway improved upon the horse driven streetcar and became one of the most rapidly accepted innovations in transportation technology. Between 1890, almost 70 percent of street railways were horse powered, and by 1902, 97 percent were electric.\textsuperscript{78} The evolution in transportation technology had a direct effect on the growth of suburbs. With public transportation reaching speeds up to ten miles an

\textsuperscript{74} Scott, \textit{The San Francisco Bay Area: A Metropolis in Perspective}, 75.
\textsuperscript{75} Scott, \textit{The San Francisco Bay Area: A Metropolis in Perspective}, 50.
hour versus two to three miles an hour by horse car, the electric car increased the distance from work to home. In addition, electric streetcars had an advantage over the Southern Pacific steam engines in a number of ways. Streetcars could start and stop quickly and easily, were not noisy or gave off smoke, steam, and other pollutants, which are characteristics more suited for city travel. Steam powered trains were limited to running on lines outside of city centers, and instead served lightly populated suburban or rural areas. By upgrading the Southern Pacific line through San Mateo, the steam engine powered line was able to provide additional trains and expand their timetable to lure ridership in San Mateo and further the development of the northern San Mateo area.79

History of Railroad Grade Separations

Increasing urbanization in areas with established railroad lines created safety concerns across the United States during the late nineteenth century. A state report in the late 19th-century lamented,

The public appetite for separation of grades, at all possible places, has been whetted to the point of positive demand by the occurrence this year of several deplorable accidents which would have been avoided if the crossings had not been made at grade. The railroad crossing board early in the year took the position that all crossings of steam railroads should be made either overhead or underground where practicable...There is absolutely no way to adequately protect life and property at all railroad crossings except by a separation of grades.80

One of the first states to pass legislation to deal with unsafe railroad grade crossings was Michigan. Passed in 1893, the law provided that a petition of at least twenty citizens or the request from a board of supervisors or similar body, was required to request an inquiry to construct a grade separation where railroad tracks intersected a city, county, township, state, or territorial road. Once the petition or request was submitted, there was an established period of time to contact interested parties regarding a formal investigation of the site for the proposed grade separation. Similar to contacting interested parties as part of the modern Section 106 process, the period of time was allowed to address comments and concerns of local property owners, business owners, as well as railroad and streetcar companies that would be affected by the grade separation project. The 1893 law also provided guidance for compensation payments to property owners for damage or perceived damage to their property through the construction. The cost to construct the grade separation was shared by the railroad company and the city, county, or township in which it was installed; however, the maintenance of the structures including the retaining walls along the road within the railroad track right of way, fell largely on the railroad companies.81

Pre-dating the railroad grade legislation in Michigan, concerned citizens of San Mateo filed a petitioned with the California Board of Railroad Commission on August 25, 1891 for the construction of a railroad bridge over Poplar Avenue. San Mateo citizens requested the Board to act on their behalf to request that the Southern Pacific

Railroad raise the railroad tracks crossing over Poplar Avenue so that the roadbed could be “pierced” to permit vehicles to pass under the railroad. The matter was referred to a commissioner who submitted a report to the Railroad Commission a few months later on October 19, 1891. The railroad company, upon the report’s recommendation, responded that they would indeed build. Research for this report did not reveal when the Southern Pacific Railroad built a bridge over Poplar Avenue or if there was further pressure to construct additional railroad crossings along the track as northern San Mateo continued to develop.\footnote{Board of Railroad Commissioners of the State of California, “Annual report of the Board of Railroad Commission of the State of California for the Year Ending November 1, 1891, Volume 12,” 80.} Construction of the underpass, instead of an at-grade crossing at Poplar Avenue, eliminated what would have been a very steep and very long approach that would take up valuable land in the developing area. With the raising of the track, a masonry retaining wall also had to be constructed for the new railroad bed and to protect the extant adjacent street (North Railroad Avenue).

During the first quarter of the twentieth century, large cities all over the country grappled with the safety concerns of at-grade railroad and highway crossings. By 1913, more than nineteen states had passed some sort of legislation to aid in the elimination of dangerous at-grade crossings.\footnote{“Grade Separation Laws and Requirements,” \textit{Railway Age Gazette} (December 12, 1913): 1118-1121.} Grade crossing conditions were worse in California than any other state, totaling more than five percent of the deaths and injuries reported to the
Interstate Commerce Commission in 1914. Even so, there was little direct funding in California to construct safe grade separations during the early part of the twentieth century, but a shift began in the 1920s.

In 1926 the California Railroad Commission began to record all accidents that involved railroad property. After collection of data for fourteen years, the statistics revealed 82% of all railroad crossing accidents occurred within cities when they accounted for only 52% of the total crossings in the state. These 1920s California statistics reflected the same problems that had been documented across the country since the late nineteenth century.

After the publication of the 1926 railroad accident statistics, the California Railroad Commission developed a policy in 1931 to place a majority of the financial burden of establishing railroad crossings on county governments. Previously, costs between railroad companies and counties were fifty-fifty; however, the new requirements stated that the railroad companies were required to pay all expenses to prepare their tracks for crossing improvements and counties were to pay for paving across the right of way. The cost burden shift was brought about by the Commission because it was their opinion that motor vehicle traffic benefits more from grade crossings than railway traffic. This decision represented a major change in policy with long lasting implications that county governments would be economically responsible to

---

construct/update railroad grade crossings to protect their communities, rather than sharing half the cost with the railroad company. A new funding program within the next few years of this decision, would help to aid the construction costs in the state for grade separations.

In June 1935, the United States Congress appropriated funds to eliminate hazards at grade crossings across the country. The funds were allotted according to the total railroad mileage and population within a state. California ranked third in the amount of funds received from the program during the fiscal years 1936 to 1939. A major driving force behind passing this legislation was not merely public safety concerns, but largely job creation as the country was still trying to pull out of the Depression. California and other states were criticized for not working on improving grade crossings earlier, but it took the unemployment situation as the impetus behind the construction program under the umbrella of the Public Works Administration. In San Mateo County alone there were more than fifty-two grade crossings on the Southern Pacific main line in 1931, which would require $4,690,000 to eliminate the dangerous at-grade crossings. The cost associated with the number of unsafe crossings in San Mateo County was a major roadblock to eliminate the unsafe grade separations, which was one of many common problems relating to railroad grade separations throughout the state.

---

Now with funding available to improve railroad crossings, there were other problems relating to construction. In areas that had already been built up, raising or lowering the grade of the road or railroad cut off access to adjoining property, potentially making the adjoining properties useless. Property or business owners might seek from property loss or the perceived loss of value due to the new grade construction. In some cases, the building of a grade separation might call for the reconfiguration of a business district completely. As a result of property damage, adverse public opinion, and the need to better traffic crossings than what was in place, could force the construction of a grade separation on a new alignment. Other issues include relocating utilities such as water, sewer, and telephone lines. Due to this federal program, between 1936 and 1939 a total of seventy-three structures were built or reconstructed in California at an average cost of $154,000.88

Fortunately for the northern San Mateo community that grew around the 1903 underpasses, they were spared from the troubles of roadway and railway traffic safety issues that plagued California for decades. It is not known if the 1903 plate girder underpasses replaced an original wood structure that would have been built when the original track was laid in 1864. During the era of railroad construction where companies were racing each other to complete first with the least amount of money spent, inadequate grade crossings criss-crossed the state. Due to haste and “economics,” millions of dollars were spent by later generations when it was proven that these older grade separations

88 F.W. Panhorst, “Need for Improved Bridges and Grade Separation Structures on the California Highway System,” 2-6, Caltrans Transportation Library and History Center, Structure Maintenance Historical Collections, General Information File, File 11027.
were too dangerous and could not meet the increasing demands placed upon them by the increasing population. The foresight of the Southern Pacific to upgrade their system through San Mateo, including the installation of the plate girder underpasses in 1903, saved not only the railroad additional funds in the decades after their construction, but also potentially saved the lives of members of the community by providing safe travel for train and street traffic.

The development of the transportation networks in California from rudimentary trails in the Gold Rush era to interurban railways of the late nineteenth and early twentieth centuries, completely transformed the settlement patterns of the San Francisco Bay Area. Even though San Francisco was not chosen as the terminus of the Transcontinental Railroad, the evolution of local transportation routes from steam and electric railroads to interurban railways aided in the suburbanization of San Francisco’s outlying areas, including San Mateo, completely transformed how people, places, and markets were connected.
Chapter 4

CONCLUSION

The nation and the state of California are facing a growing crisis: they must address the growing deterioration of existing infrastructure, while providing increased services and infrastructure improvements to a constantly expanding and mobile population. Transportation is one of the critical infrastructure needs of the country and the state. Throughout California the need for road and bridge repairs, transit services and other critical transportation needs are staggering. The San Mateo 1903 Underpasses provided safe travel for trains and street traffic for more than 100 years; however, due to the increasing size of vehicles and increased surface street traffic, the grade separations as an essential, but ubiquitous element of city infrastructure, required replacement. To bring the underpasses up to modern code, there was no other option but demolition and replacement.

Under the Section 106 mitigation measures outlined in the MOA between the FTA and SHPO, with JPB as a concurring party, the three agencies agreed upon the decision to proceed with the project under certain stipulations in order to take into account the adverse effect the undertaking was going to have on the underpasses, which were considered as a historic property for purposes of Section 106 compliance. Under the MOA, FTA, as the lead federal agency agreed to consult with National Parks Service, Pacific Great Basin Field Office to determine the level and type of recordation of the San Mateo 1903 Underpasses before their demolition. The responsibility of the FTA was to ensure that the recordation met the standards recommended by the NPS. Archival copies
of the documentation were to be sent to SHPO, and to the NPS, the latter for dissemination to the Library of Congress. It was also FTAs responsibility to send non-archival quality reports to previously identified archives and repositories.89

Preserving the existence of the San Mateo 1903 Underpasses through documentation is important because the resulting documentation increases our knowledge and understanding of our built environment and have a deeper cultural significance as catalysts for growth in the San Mateo and the greater San Francisco Bay Area. Such documentation, including recordation of significant architectural, engineering, and landscape resources broadens our experience of our country’s history and environment.

The built environment is sometimes the only tangible evidence of events in history. The San Mateo Underpasses are among the earliest known grade separations in California, and once they are demolished, the documentation will be one of the few remnants of their existence. As a historic documentation program, HAER documentation provides academic information about historic resources that may be otherwise too far or difficult to visit for researchers, or are no longer in existence.

If all agencies took the same stance to demolish and replace bridges, buildings, and other apparently unimportant properties, our knowledge and understanding of the built environment would be much different. If it had not been for the federal government’s involvement in historic preservation in the 1930s with the passage of the Historic Sites Act that extended and expanded the HABS/HAER programs after their initial creation during the work programs era during the depression, who knows how

89 “Memorandum of Agreement Between the Federal Transit Administration and the California State Historic Preservation Officer,” May 1, 2008.
many historic buildings, industrial sites, engineering marvels, and historic landscapes would have been lost to the bulldozer without any record of their existence.
ACRONYMS AND ABBREVIATIONS

ACHP: Advisory Council on Historic Preservation
APE: Area of Potential Effect
CEQA: California Environmental Quality Act
CFR: Code of Federal Regulations
CRHR: California Register of Historical Resources
FOE: Finding of Effect
FTA: Federal Transit Administration
HABS: Historic American Building Survey
HAER: Historic American Engineering Record
HDP: Heritage Document Program
HRIER: Historic Resources Inventory and Evaluation Report
JPB: Peninsula Corridor Joint Powers Board
MOA: Memorandum of Agreement
NHPA: National Historic Preservation Act
NPS: National Parks Service
NRHP: National Register of Historic Places
OHP: Office of Historic Preservation
SF-SJRR: The San Francisco-San Jose Railroad
SPRR: Southern Pacific Railroad
SHPO: State Historic Preservation Officer
GLOSSARY OF TERMS AND DEFINITIONS

Area of Potential Effects (APE): The APE is the geographic area or areas where an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

Historic Preservation: The research, excavation, protection, restoration, and rehabilitation of buildings, structures, objects, districts, areas, and sites significant in the history, architecture, archaeology, or culture of the local area or the nation.

Memorandum of Agreement (MOA): The document that records the terms and conditions agreed upon to resolve the adverse effects of an undertaking upon historic properties.

National Historic Preservation Act: The federal law enacted in 1966, and later amended, that authorizes federal assistance for historic preservation. The act established the National Register of Historic Places (NRHP), and methods by which properties could be documented and nominated. Title II of the Act created the Advisory Council on Historic Preservation (ACHP).

Section 106 of the National Historic Preservation Act of 1966 (NHPA): Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties, that are listed in or eligible for listing in the National Register of Historic Places. Section 106 affords the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated...
by Section 106 is outlined in regulations 36 CFR Part 800-Protection of Historic Properties.

**Undertaking:** A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance, and those requiring a Federal permit, license or approval.
APPENDIX
EAST POPLAR AVENUE UNDERPASS
(Bridge No. 33C0091)
East Poplar Avenue at North Claremont Street
San Mateo
San Mateo County
California

HAER No. CA-2274

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Pacific West Region
1111 Jackson Street, Suite 700
Oakland, CA 94607
HISTORIC AMERICAN ENGINEERING RECORD

EAST POPULAR AVENUE UNDERPASS
(Bridge No. 35C0091)

HAER No. CA-2274

Location: The East Poplar Avenue Underpass (Bridge No. 35C0091) is located southwest of intersection of East Poplar Avenue and North Claremont Street in the City of San Mateo, County of San Mateo, California.

USGS San Mateo Quadrangle 7.5 minute, 1997
UTM Coordinates: 10.4158748.559106

Date of Construction: 1903; sacrificial beams added 2006

Engineer: American Bridge Company, New York

Builder: Southern Pacific Railroad

Present Owner: Peninsula Corridor Joint Powers Board (PCJPB)
1250 San Carlos Avenue
San Carlos, California 94070

Present Use: Railroad Bridge

Significance: The East Poplar Avenue Bridge is part of the historic property identified as the "San Mateo 1903 Underpasses" that was determined eligible for listing in the National Register of Historic Places in 2002. The bridge, along with three others, is significant at the local level for its association with the development of northern San Mateo, with the growth of grade separation construction during the early twentieth century, and as an example of an important early phase of development within the evolution of underpass design.

Report Prepared by: Christopher McMorris, Partner / Architectural Historian
Chandra Miller, Research Assistant
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, California 95618

Date: June 2010
I. DESCRIPTION OF EAST POPLAR AVENUE BRIDGE

The East Poplar Avenue Bridge is one of four similar railroad bridges located along three-tenths of a mile of track over four parallel streets in the City of San Mateo (from north to south): East Poplar, Santa Inez, Monte Diablo, and Tilton avenues. From north to south, the underpasses have progressively lower clearance over the roads they pass, accounting for the change in elevation between Burlingame to the north and San Mateo town center to the south. The tracks are part of the main railroad line on the San Francisco Peninsula between San Francisco and San Jose and are owned by the Peninsula Corridor Joint Powers Board (PCJPB). The PCJPB operates the Caltrain commuter rail service on these tracks. The East Poplar Avenue Bridge is located between Ramona Street and North Claremont Street in a densely developed residential area of northern San Mateo with houses and apartment buildings in close proximity to the structure along tree lined streets and mature landscaping. Caltrans’ bridge number for the structure is 35C0091.

The structure is a through plate girder bridge with concrete wing wall abutments. The bridge has three simply supported spans consisting of one 36’ long main span and two 8’ approach spans. The East Poplar Avenue Bridge is slightly skewed (-12 degrees) to the roadway alignment. East Poplar Avenue is the most northerly of the group of four bridges and the tallest of them with a clearance height of 13’ to the roadway it spans. The bridge’s main span has three steel through-plate girders parallel to the tracks. The bridge deck and girder rest on riveted steel support bents with cross bracing. Approach spans consist of closely spaced small steel I-beams with timber deck planks on top to retain and support the ballast. Retaining the ballast on each bridge are wood walls topped with pipe railings at either end of the girders. The bridge superstructure supports two ballasted railroad tracks, primarily used by Caltrain passenger trains with some Union Pacific Railroad (UPRR) freight trains. The bridge date of construction is stamped on the southwest side along with a small cast iron plaque indicating it was constructed by the American Bridge Company of New York in 1903. The original concrete abutments have been added to over time, and single cast iron pipe runs along the outside of the western girder on the bridge. The PCJPB installed sacrificial beams on either side of the bridge in 2006 to prevent tall vehicles from hitting and damaging the underpass. The sacrificial beams are steel tubes that are 14” square in cross section. They run horizontally along the outside of the bridge’s plate girders approximately one foot from the girders and they rest on footings attached to the top of the concrete wall abutments.
II. HISTORICAL INFORMATION

[The following historical narrative is based on, and excerpted from, JRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)” (2001), JRP Historical Consulting, “Inventory and Evaluation of Historic Resources, Caltrain Five Bridges Project,” (2006), and JRP Historical Consulting, “Finding of Adverse Effect: Caltrain San Mateo Bridges Replacement Project, Caltrain MP 17.20, 17.24, 17.45, and 17.53, In the City of San Mateo, San Mateo County, California,” (2006). Citations from the reports are provided in footnotes and references are provided in Section III.]

The East Poplar Avenue Bridge is one of four underpasses in San Mateo situated on the former Southern Pacific Railroad route between San Francisco and San Jose. The underpasses are historically significant for their association with the development of northern San Mateo and with the growth of grade separation construction during the early twentieth century. The structures embody distinctive engineering characteristics of type, period, and method of construction that are representative of features once common to railroad underpasses, yet are illustrative of an important phase of development within the evolution of underpass design. Southern Pacific built the East Poplar Avenue bridge during the company’s phase of upgrades and development during the early twentieth century.

Construction and Development of the Southern Pacific Railroad along the San Francisco Peninsula

The history of the railroad on the San Francisco Peninsula coincides with creation of the State of California in 1850 and the transportation difficulties that the new state faced. San Jose, the first state capital, was only about forty miles south of San Francisco, which was rapidly growing in response to the Gold Rush and its aftermath. Although the Spanish-era El Camino Real roadway provided some north-south connections along the peninsula, travel between the two cities was a time-consuming and arduous journey via mostly rough and unreliable roads. Railroad lines were well established in the eastern United States by this time, but the transcontinental link was almost 20 years away and California’s early railroad investors had many obstacles to contend with, not the least of which were obtaining the necessary funding and kindling public support. Also a problem was the geography of the San Francisco Peninsula itself. This narrow neck of land alternately presented craggy inlets, steep gradients, and boggy tidelands between San Francisco
and San Jose that would prove to be a challenge to the railroad industry into the twentieth century.

The first three attempts to connect San Francisco and San Jose by rail failed before construction could begin. The Pacific and Atlantic Railroad Company, formed in September 1851 by a group of San Francisco and San Jose investors, made the first two efforts. The group failed to raise sufficient funds through the sale of stock to begin construction, folded in 1853, and reorganized later the same year only to face waning interest in the railroad venture caused by a financial slump and the move of the state capital, first to Vallejo and then Sacramento. In 1857, San Francisco capitalists formed the San Francisco – San Jose Railroad Company, but the failure of the two earlier attempts, as well as criticism from San Francisco newspapers that favored steamship lines, caused the company to disband. Finally in 1860, with an upturn in the economy fueled by the silver boom in Nevada, the San Francisco – San Jose Railroad Company (SF-SJRR) was revived. This time the company had political support from Congressman Timothy Phelps and the financial support from the San Francisco business community, two factors that led to favorable reporting from San Francisco’s influential newspaper, the California Alta. Voters in San Francisco, San Mateo, and Santa Clara counties approved bond measures used to purchase $100,000 worth of railroad stock. This strong foundation allowed the company to finally succeed in establishing a rail link between San Francisco and San Jose, which passed through what became the City of San Mateo.1

W.J.L. Moulton, superintendent of construction for SF-SJRR, directed crews to begin work on the single line railroad starting at San Francisquito Creek (now in Palo Alto), which forms the boundary between San Mateo and Santa Clara counties, in May 1861. Construction of the line was slowed by both the Civil War, which hindered the delivery of construction materials from the eastern states, and by heavy storms and flooding in the winter of 1861-62. The route was sufficiently built by October 1862 when Governor Leland Stanford officiated at celebrations for completion of the railroad between San Francisco and Mayfield (now the California Avenue Station in Palo Alto), including tracks through San Mateo. Regular service on this segment began in January 1863.2

EAST POPLAR AVENUE UNDERPASS  
(Bridge No. 35C0091)  
HAER No. CA-2274  
(Page 5)

The SF-SJRR completed the rail line from San Francisco to San Jose and began services on the whole route in 1864. The Southern Pacific Railroad, which incorporated in 1865, acquired the SF-SJRR in 1868 and consolidated the separate railroad under the Southern Pacific name two years later.\(^3\) Regular daily passenger service in the initial years of operation on the peninsula consisted of a morning train and two afternoon round trips between San Francisco and San Jose. Other than the general alignment, this single-track railroad had little in common with the modern system, which was developed over the years by successive upgrades and changes by Southern Pacific (and more recently by Caltrain) in response to periods of substantially increased traffic. The original route that was constructed in the 1860s differed from the modern alignment in one major way — it followed a longer route that left San Francisco and headed southwest to Valencia Street and Bernal Heights, past the San Miguel Hills and over the western shoulder of San Bruno Mountain before turning southeast and running along Colma Creek to San Bruno. This section was called the Ocean View line, the Valencie Street line, or “the Cemeteries” for the large number of burial grounds it passed near Colma. Helper engines were needed on the most mountainous portions of this route that climbed to about 300 feet above sea level in a distance of about five miles. As discussed below, Southern Pacific completed the construction of a new route along the coast and flat lands on the east side of the peninsula in 1907 to replace the Ocean View line. This was dubbed the Bayshore Cutoff.\(^4\)

During the period from 1870 through 1900, the peninsula route was the only freight and long-distance passenger line that served San Francisco. Although streetcars companies in both San Francisco and San Jose vied for local customers, Southern Pacific was the only company that could offer transcontinental land route service into the heart of San Francisco. The connection between San Francisco and the southern Bay Area also encouraged suburban development and people started to commute to work by rail. Once out of San Francisco, many stations, like the one in San Mateo during the late nineteenth century, were merely stops in the rural landscape that served communities that were not much more than villages. In the last quarter of the nineteenth century, much of the land in eastern San Mateo and Santa Clara counties was still held in large tracts by wealthy businessmen, industrialists, and other California capitalists. Two notable landowners were Charles Polhemus, entrepreneur and SF-SJRR director who laid out and platted the town of San Mateo, and San Francisco merchant William D. M. Howard, who

\(^3\) Donovan L. Hofsommer, The Southern Pacific, 1901-1985 (College Station, TX: Texas A&M University Press, 1986), 4; Sigmon, Southern Pacific’s Coast Line, 5-7.

had purchased part of Rancho San Mateo in 1849. Howard's family was the first to convert a Mexican-era rancho into a country estate along the peninsula. Through the first decades of the 1900s, the peninsula remained relatively undeveloped in terms of industry and commerce.\textsuperscript{5}

From the 1870s through the end of the century, control of peninsula rail travel allowed the Southern Pacific's leaders to concentrate their efforts to acquire other rail companies and to construct new lines elsewhere in the state and in the West. The company became the dominate railroad in California and the West, controlling well over 8,000 route miles throughout the western United States and ranging from Portland in the northwest to New Orleans in the south. One of the company's biggest projects during the 1870s was the construction of a route down the center of the San Joaquin Valley that then crossed the Tehachapi Mountains, and finally led through the San Fernando tunnel into the Los Angeles basin. This access to southern California was crucial for the development of the Southern Pacific system, and the company did not add another major north-south route through the state until it completed its Coast Line between San Francisco and Los Angeles in 1901. The Southern Pacific connected San Francisco to Omaha, Nebraska via Ogden, Utah by combining lines with the UPRR to form the cross continental Overland Route. The company's holdings included vast operations throughout California, as well as a steamship company that linked New Orleans with New York and other points in the eastern United States. These varied and wide-spread holdings gave the company influence over economic development throughout the state and certainly along the peninsula and the southern San Francisco Bay Area.\textsuperscript{6}

**Early San Mateo Residential Development**

The town of San Mateo began in the 1860s and evolved in response to railroad spurred development along the peninsula in subsequent decades and in the early twentieth century. Charles Polhemus laid out and plotted the town of San Mateo in 1862. Polhemus purchased parcels along strategic points of the Peninsula railroad and carefully planned for the railroad to pass through the eastern portion of his property. The town limits extended from the San Mateo Creek on the north to present-day Fifth Avenue on the south, and west to east from South


\textsuperscript{6} Helmstetter, _The Southern Pacific, 1901-1983_, 4-8; Singer, _Southern Pacific's Coast Line_, 11-12.
Ellsworth Avenue (formerly A Street) to Delaware Street (formerly D Street), leaving the
northern portion of town, where the East Poplar Avenue bridge would be built, initially
undeveloped. Pollenius put 176 lots on the market before the railroad was completed, and by
1865 had sold all but forty parcels. The commercial district for San Mateo was now focused
towards the railroad tracks and away from El Camino Real, the peninsula’s main north-south
roadway. The downtown area of San Mateo grew slowly but steadily through the years, and the
railroad offered San Mateo businesses, ranchers, and farmers an affordable means to ship their
products to market in San Francisco. It also encouraged residential settlement surrounding the
commercial district.7 Railroad access made San Mateo and its surrounding environs attractive to
wealthy San Franciscans who purchased large tracts of land for summer and weekend estates.
Like most of the land surrounding the town of San Mateo, the area north of San Mateo Creek
remained undeveloped and was in the possession of a handful of property owners until the 1890s.
Until that time, attempts to expand San Mateo’s borders were unsuccessful, as most of the
families refused to subdivide their land.8

William D. M. Howard’s estate El Cerrito was situated on much of the land to the north of San
Mateo Creek and the developing town of San Mateo. This large estate contained orchards and
vast gardens. In 1889, the merchant’s son, William H. Howard, subdivided a portion of the
family estate to create a subdivision called the Western Addition. The newly created subdivision
originally stretched southeast from Poplar Avenue towards D Street (currently Delaware Street),
past San Mateo Creek, and west towards Camino Real (County Road) and was bisected by the
railroad. This included the area where the East Poplar Avenue and other San Mateo underpasses
were subsequently built. The real estate firm Briggs, Fergusson and Company aggressively
advertised the attributes of both San Mateo and the subdivision, contributing to its success.9

The success of the Western Addition changed San Mateo, which until that time had been largely
comprised of wealthy residents with estates and their staff. The smaller, more economical town
lots of the new subdivision attracted a different kind of resident. San Francisco’s businessmen,
clerks, and shop workers commuted to work from San Mateo and shared neighborhoods with the
gardeners, bakers, and other workers employed by the city and estates. Of the thirty-three
Western Addition blocks, divided by streets laid in an irregular grid, twenty-three of them were

---

8 Donald P. Ringler, San Mateo, USA: the Golden Years, (San Mateo: San Mateo Bicentennial Committee, 1975),
9 Postel, San Mateo: A Centennial History, 98-99; Map of the Subdivision in Blocks of the Western Addition of the
Town of San Mateo (1889).
quickly divided into regular small city lots. The remaining blocks were later divided, some of which were larger and contained irregularly shaped lots. By the early 1890s, lots along the east side of the railroad at Tilton Avenue were being developed. By the turn of the twentieth century, the parcels nearest the railroad tracks were more developed than those located further west. Ten Southern Pacific's San Mateo station plat and property ownership maps reveal that the railroad purchased additional right-of-way in 1901 and 1902 from roughly 15 property owners on the east side of the tracks between Bellevue Avenue (north of East Poplar Avenue) south to Monte Diablo Avenue. This was in anticipation of impending upgrades to the rail line through San Mateo. As discussed below, construction the East Poplar Avenue Bridge and other San Mateo underpasses in 1903 helped facilitate the development of the Western Addition and northern San Mateo.\(^{11}\)

San Mateo's population grew substantially during the early twentieth century with the modernization and completion of double tracks down the peninsula in the initial years of the twentieth century, along with the implementation of faster, more frequent train service that spurred suburban development along the line. Many San Francisco residents sought new homes within a reasonable commute to the City of San Francisco after the 1906 earthquake. While San Mateo suffered some damage from the quake, it was minor in comparison with the damage experienced in San Francisco. Within four years of the disaster, 10,000 people immigrated to San Mateo County; a pattern repeated throughout the San Francisco Bay Area. Some new towns formed in unincorporated areas along the peninsula, while existing communities also grew with the new inhabitants who required houses and services. This trend continued into the 1910s and 1920s and led to the emergence of new subdivisions that developed on former larger estates. While many San Mateo residents commuted to San Francisco and other peninsula cities, others worked on nearby farms and dairies. During the 1910s and 1920s, San Mateo became a predominantly middle class commuter suburb for affluent professionals such as doctors, attorneys, and bankers, though the neighborhood along the railroad tracks remained largely inhabited by working class individuals and families.\(^{12}\)

\(^{10}\) Map of the Subdivision in Blocks of the Western Addition of the Town of San Mateo (1889); Sanborn Maps, San Mateo, (1891 and 1897); Sanborn Fire Insurance Map, San Mateo, California, (1891-1901).

\(^{11}\) Postel, San Mateo, 98-99.

\(^{12}\) Byrd, From Frontier to Suburb, 188-190, 209; Stanger, History of San Mateo County, 114.
Southern Pacific’s Early Twentieth Century Development and Construction of the San Mateo Underpasses

Edward Henry Harriman gained control of Southern Pacific in 1901 and ushered in a new phase of development for the company. Harriman was from New York and had quit school to work in a Wall Street brokerage at the age of fourteen. He rose through the ranks of the brokerage fast enough to buy himself a seat on the New York Stock Exchange by the age of 22 in 1870. His marriage, in 1879, to the daughter of the president of the Ogdensburg & Lake Champlain Railroad introduced Harriman to railroad ownership and he soon turned his assertive business style to that industry. By 1887 he was vice president of the Illinois Central Railroad and ten years later he was a director of the Union Pacific Railroad, one of Southern Pacific’s toughest competitors. When the last of Southern Pacific’s founders, Collis P. Huntington, died in 1900, Harriman immediately made a bid for the railroad stock held by his estate. It took the better part of a year to convince the various shareholders and associates to sell, but by March 1901 Harriman’s Union Pacific had acquired 38 percent of Southern Pacific, a figure that would later rise to 46 percent. Almost immediately Harriman instituted improvements to the Southern Pacific system, including changes to the line between San Francisco and San Jose.13

Under Harriman’s leadership, the Southern Pacific double tracked the line between San Francisco and San Jose and widened the right-of-way in most places to accommodate four tracks. Harriman ordered the installation of a second track between San Jose and San Bruno ahead of the construction of the largest project along the line, the Bayshore Cutoff. Thirty-nine miles of the new double track rail line was ready by late 1903, including the segment through San Mateo. In addition to constructing new track, Southern Pacific modernized the line by constructing new bridges, trestles, and other track features. Several new bridges and trestles along the peninsula route were part of this improvement program. Southern Pacific constructed the improved line in areas with increasing commercial and residential development, which necessitated building some structures that would separate the railroad from other forms of traffic. These included the installation of four nearly identical underpasses in San Mateo, including the

---

structure at East Poplar Avenue, which the American Bridge Company designed for Southern Pacific in 1903.14

During the early twentieth century, Southern Pacific contracted with the American Bridge Company to design and build various bridges in California. The American Bridge Company was originally founded in 1870 in Chicago, Illinois, and operated as an independent company in the Midwest. In the late 1890s independent bridge companies began consolidating, and in 1900 twenty-eight of the largest steel fabricators and constructors consolidated into the American Bridge Company, taking the name of one of the contributing companies. The following year American Bridge Company became a subsidiary of United States Steel Corporation, the corporation formed by J.P. Morgan that virtually controlled the United States steel industry. American Bridge Company became the American Bridge Division of US Steel and because of its financial backing, the new company commanded a great percentage of steel bridge building projects across the country and won major contracts throughout the world, using the projects to further develop the use of steel in bridge construction. The American Bridge Company remained a subsidiary of the US Steel Corporation until 1987, when it became privately owned.

The American Bridge Company built many bridges in California, including a third of metal truss roadway bridges in the first few decades of the twentieth century and, over time, several well known roadway structures in the state, such as both the original 1927 Carquinez Strait Crossing (now demolished) and the second Carquinez Strait bridge built in 1958, the cantilever 1941 Pit River Bridge and Overhead on Interstate 5 at Lake Shasta, the Schuyler Heim Lift Bridge at the Port of Los Angeles built in 1946, and the Cold Spring Canyon Bridge in Santa Barbara built in 1963. In addition to the bridges in San Mateo, Southern Pacific also had the American Bridge Company design and build several grade separations along the Bayshore Cutoff in the southern portion of San Francisco, where Southern Pacific built multiple underpasses and overpasses in 1906 and 1907 on which local roads passed under or over the railroad. An interesting bridge Southern Pacific had American Bridge Company build that separated the railroad from other traffic was the double decker I Street Bridge over the Sacramento River in Sacramento. Constructed in 1911, it is a moveable swing bridge that carries the railroad on the lower deck and other vehicles on the roadway on the upper deck. Southern Pacific had American Bridge Company design and build other bridges in the San Francisco Bay Area, including the through

EAST POPLAR AVENUE UNDERPASS
(Bridge No. 35C0091)
HAER No. CA-2274
(Page 11)

plate girder Napa River railroad bridge, spanning Napa River, east of Soscol Avenue, in Napa in 1928 and the deck girder Willow Street Underpass in San Jose in 1935.\(^5\)

The four through plate girder railroad bridges at the north end of San Mateo were built to carry the new double tracked rail line over East Polpar Avenue, Santa Inez Avenue, Monte Diablo Avenue, and Tilton Avenue. From north to south, the underpasses have progressively lower clearance over the roads they pass, accounting for the change in elevation between Burlingame to the north and San Mateo town center to the south. Southern Pacific constructed these underpasses as the Western Addition was developing, partially in response to a local petition to construct a grade separation. The railroad company had agreed in 1891 to build the underpass at East Polpar Avenue and to raise the tracks such that the railroad "roadbed could be pierced to permit vehicles to pass under the railroad."\(^6\) Besides the one petition in 1891, it is unclear whether Southern Pacific received pressure from local developers or civic leaders to construct the underpasses as a way to help the northern section of San Mateo develop further. Certainly, the inclusion of these structures made the area more attractive over time, as residents could easily traverse the railroad tracks and developable space was not taken up with long approaches that would have been necessary for at-grade crossings at any of these four roads. Southern Pacific may have been convinced to build the bridges because of the sheer size of the berm on which the railroad ran at this location. At-grade crossings at this location would have either been very steep or have required long approaches. Included in the construction of the new double track and underpasses was the random ashlar masonry wall that retained the new railroad bed and protected the extent adjacent street (North Railroad Avenue). Southern Pacific also modernized its rail line down the San Francisco Peninsula in the early 1900s in part to compete with the interurban electric railways emerging at the time. The United Railway Company began service on its own tracks between San Mateo and San Francisco in 1902. As the interurban railways drew passengers away from Southern Pacific’s service, the large railroad may have been

\(^5\) California Department of Transportation, *Historic Highway Bridges of California*, 1990, 43; American Bridge Company, “100 Years of Innovation,” online history at www.americanbridge.net/AboutUs/Brochure.pdf (accessed 2010), BRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4),” prepared for Parsons Transportation Group, 2001; *Brotherhood of Locomotive Firemen and Engineers Magazine*, November 1907, 632; *Railway and Locomotive Engineering*, February 1912, 42; Matt C. Buschoff, Matthew A. Sterner, and Scott Thompson, “Historic American Engineering Record, Napa River Railroad Bridge, Spanning Napa River, east of Soscol Avenue, Napa, Napa County, CA HAER CA-525,” The Bayshore Cutoff included construction of grade separations in San Francisco in 1906 and 1907 at 22nd Street, 23rd Street, Jerrold Avenue, Quint Street, Williams Avenue, and Paul Avenue; BRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Five Bridges Project,” July 2006.

\(^6\) Board of Railroad Commissioners of the State of California, “Annual report of the Board of Railroad Commission of the State of California for the Year Ending November 1, 1891, Volume 12,” 80.
convinced to build the underpasses in San Mateo to show its good will towards the city’s officials and residents and to display the railroad’s modern, stable, and up-to-date character. Following construction of these underpasses, this area just north of downtown San Mateo grew quickly with houses filling in the ever decreasing number of vacant lots on either side of the tracks.17

In addition to the development of San Mateo, the East Poplar Avenue bridge and other San Mateo underpasses are also associated with the wider development of grade separations in the early twentieth century along the San Francisco Peninsula and elsewhere in California. These San Mateo structures are among the earliest grade separations in the state and as such are precursors to later grade separations built as motor vehicle usage increased along the peninsula, and throughout the state, between the 1910s and 1930s. Although automobiles had begun to appear in San Mateo by 1903, it is unlikely that Southern Pacific installed these underpasses specifically for automobile use, but they became useful to that end. As stated, the underpasses provided greater access for residents on both sides of the track, and relative to the sheer size of the railroad bed, the underpasses prevented the need for long or very steep approaches that would have been built for at-grade crossings. During the first few decades of the twentieth century, particularly along the San Francisco Peninsula, automobile and motor vehicle use increased dramatically. At the same time, railroad traffic intensified and the accident rates at railroad grade crossings grew quickly. Along with concern for the deaths and injuries at railroad crossings, the business community found there to be negative economic consequences for delays caused by at-grade crossings. State officials and concerned civic leaders promoted grade separations as the means to improve public safety and improve local economies. There was a drive to build many underpasses and overpasses, particularly in the 1920s and 1930s, and many were built essentially following the successful model of the underpasses at San Mateo. The enormous costs associated with construction of such structures led to disputes between the state, local municipalities, and railroads over the apportionment of the costs, but public funding helped many get built.18 The four San Mateo underpasses are the earliest grade separations along the former Southern Pacific Coast Line between San Francisco and Gilroy, and they are among a

17 Construction of these underpasses also coincided with the President Theodore Roosevelt’s campaign visit to Burlingame in May 1903. He arrived by train. While this, nor the United Railway Company competition, can be directly linked to the construction of the San Mateo railroad bridges, these events may have influenced their construction or their schedule for completion.
18 Alan Hynding, From Frontier to Suburb, 35, 70, 92, 95, and 112; Stanger, South from San Francisco: The Life Story of San Mateo County, (146; Alexander and Ham, History of San Mateo County, (Burlingame, CA, 1916), 53 and 103-104; L. Wickett, Historic Resources Inventory form on San Mateo Railroad Avenue railroad bridges, July 1989, and Southern Pacific Railroad Company, “San Mateo” Station Plat, November 1907.
small group of such structures within entire state. In a 1950 article regarding the history of bridges in California, California Division of Highways highway engineer F.W. Panhorst presented an unnamed 1902 Southern Pacific underpass in Atascadero (likely at Capistrano Avenue) as one of the state's earliest grade separations. This assertion corresponds with dates of construction culled from Caltrans bridge logs, which also show that very few early twentieth century (pre-1910) underpasses still exist in California particularly in the San Francisco Bay Area.\(^\text{18}\)

The design of the San Mateo underpasses, and the materials Southern Pacific used to build them, indicate the railroad's efforts to modernize their bridges away from timber to durable and long-lasting steel. Their design with steel plate girders, steel supports, steel stringers, and concrete abutments became common for grade separations along the peninsula and across the state. Later examples of adorned through plate girder underpasses on concrete abutments along this railroad line include the Madrones Underpass along old US Highway 101 (now State Route 82) in southern Santa Clara County, designed by the California Division of Highways and built in 1933, and the Army Street underpass in San Francisco and the Lafayette Street underpass in Santa Clara, both constructed in 1936. While the San Mateo structures may have not directly affected the design of later structures, the success that Southern Pacific had with such structures influenced later bridge building. From the early to mid-twentieth century, Southern Pacific built many steel through plate underpasses, and bridge engineers improved and altered the design of such underpasses to improve performance and safety qualities. The Army Street underpass in San Francisco, for example, was originally built in 1907 with a very similar design to these structures in San Mateo. As Army Street's motor vehicle traffic load increased, its steel supports on either side of the roadway became hazardous, and the city and Southern Pacific rebuilt the underpass with concrete supports. This type of underpass design continued to be used after World War II, for example, at Evans Avenue in San Francisco in 1964 and across Interstate 280 in San Jose in 1969, although reinforced concrete bridges became increasingly standard from the 1930s onward.\(^\text{20}\)


\(^{20}\) JRP Historical Consulting Services, "Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)," prepared for Parsons Transportation Group, 2001.
EAST POPLAR AVENUE UNDERPASS
(Bridge No. 3SC0091)
HAER No. CA-2274
(Page 14)

The through plate girder railroad bridges in San Mateo are a structural type that were commonly built for railroads at the time and while not technically bold from an engineering standpoint, the four bridges in San Mateo, including the East Poplar Avenue structure, are illustrative of an important early phase of development within the evolution of underpass design. Their design was a precursor to later grade separation underpasses built as motor vehicle usage increased along the peninsula during the first half of the twentieth century. These early railroad structures are now a rare example of early grade separations in the San Francisco Bay Area.

III. SOURCES

Published Sources:


Board of Railroad Commissioners of the State of California. “Annual report of the Board of Railroad Commission of the State of California for the Year Ending November 1, 1891, Volume 12.”

California Department of Transportation. Historic Highway Bridges of California. Sacramento: Department of Transportation 1990.

Hofsommer, Donovan L. “For Territorial Dominion in California and the Pacific Northwest: Edward H. Harriman and James J. Hill.” In Richard J. Orsi, ed. California History:
EAST POPLAR AVENUE UNDERPASS
(Bridge No. 35C0091)
HAER No. CA-2274
(Page 15)


Unpublished Sources


JRP Historical Consulting Services. “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4).” Prepared for Parsons Transportation Group, 2001.


Electronic Sources


Maps

Bromfield, D. Map of the Town of San Mateo, San Mateo County, California. 1891.


EAST POPLAR AVENUE UNDERPASS  
(Bridge No. 35C0091)  
HAER No. CA-2274  
(Page 17)

Plans and Drawings


The above plans are on file at the Peninsula Corridor Joint Powers Board (PCJPB) headquarters at 1250 San Carlos Ave, San Carlos, California 94070.

Supplemental Information


2. A photographic view of the East Poplar Avenue Bridge is available at the California State Railroad Museum Library, 1111 11th Street, Sacramento, California 95814.
IV. PROJECT INFORMATION

This Historic American Engineering Record report was prepared to fulfill, in part, requirements of the Memorandum of Agreement (MOA) between the Federal Transit Administration and the California State Historic Preservation Officer, signed in April 2009, for the proposed project to demolish and replace the four railroad bridges including the East Poplar Avenue Underpass. The Federal Transit Administration, California State Historic Preservation Officer, and Peninsula Corridor Joint Powers Board (PCJPB) were signatories on the MOA. Partner / Architectural historian Christopher McMorris of JRP Historical Consulting, LLC and Research Assistant Chandra Miller prepared this document for the PCJPB. Mr. McMorris conducted the field inspection in April 2010. William B. Dewey prepared the photographic images for the project.

The narrative text in this report is based on JRP Historical Consulting Services reports entitled, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)” (2001), JRP Historical Consulting, “Inventory and Evaluation of Historic Resources, Caltrain Five Bridges Project,” (2006), and JRP Historical Consulting, “Finding of Adverse Effect: Caltrain San Mateo Bridges Replacement Project, Caltrain MP 17.20, 17.24, 17.45, and 17.53, In the City of San Mateo, San Mateo County, California,” (2006). Research conducted for the 2001 and 2006 reports was undertaken at the California State Railroad Museum Library, California State Archives, California State Library, University of California Bancroft Special Collections, and the San Mateo County Historical Society.
LOCATION MAPS

Figure 1: Location Map
Figure 2. Project Vicinity
[Circles indicate location of the four San Mateo 1903 Underpasses]
HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

EAST POPLAR AVENUE UNDERPASS (Bridge No. 35C0091)
East Poplar Avenue at North Claremont Street
San Mateo
San Mateo County
California

HAER No. CA-2274

INDEX TO BLACK AND WHITE PHOTOGRAPHS

William B. Dewey, Photographer, April 2010

1. OBLIQUE VIEW SHOWING SOUTHWEST SIDE OF UNDERPASS, CAMERA FACING NORTH.

2. OBLIQUE VIEW SHOWING NORTHEAST SIDE OF UNDERPASS, CAMERA FACING SOUTH.

3. OBLIQUE VIEW SHOWING NORTHEAST SIDE OF BRIDGE PLATE GIRDER, SACRIFICAL BEAM, RIVETED STEEL SUPPORT BENTS WITH CROSS BRACING, AND DECK FLOOR ABOVE ROADWAY, CAMERA FACING WEST.

4. VIEW SHOWING RIVETED STEEL SUPPORT BENTS WITH CROSS BRACING WITH CONCRETE WING WALL ABUTMENT BEHIND, CAMERA FACING NORTHWEST.

5. VIEW SHOWING SOUTHEAST SIDEWALK AND CONCRETE ABUTMENT WALL WITH T-BEAM DECK FLOOR ABOVE SIDEWALK, CAMERA FACING NORTHEAST.

6. VIEW SHOWING NORTHWEST ABUTMENT WALL AND SIDEWALK WITH SCALE STICK, CAMERA FACING NORTHEAST.

7. DETAIL VIEW SHOWING RIVETED STEEL SUPPORT BENTS WITH GUSSET PLATE, CROSS BRACING, AND DECK FLOOR SUPPORTS ABOVE ROADWAY AND SIDEWALK, CAMERA FACING SOUTH.

8. DETAIL VIEW SHOWING STRINGERS ABOVE SIDEWALK, RIVETED STRINGERS ABOVE ROADWAY, PLATE GIRDER AND SUPPORT BENT, CAMERA FACING SOUTHWEST.
EAST POPLAR AVENUE UNDERPASS
(Bridge No. 35C0091)
HAER No. CA-2274
INDEX TO PHOTOGRAPHS (Page 2)

9 DETAIL VIEW SHOWING 1903 AMERICAN BRIDGE COMPANY PLAQUE ON PLATE GIRDER ON SOUTHWEST SIDE OF BRIDGE, CAMERA FACING NORTHEAST.

10 DETAIL VIEW OF 1903 DATED PLAQUE ON PLATE GIRDER ON SOUTHWEST SIDE OF BRIDGE, CAMERA FACING NORTHEAST.

11 VIEW OF TRACK TOWARDS THE EAST POPLAR AVENUE UNDERPASS FROM GRADE CROSSING AT EAST BELLEVUE AVENUE SHOWING BRIDGE DECK, CAMERA FACING SOUTHEAST.

INDEX TO BLACK AND WHITE ENGINEERING DRAWINGS

12 AMERICAN BRIDGE COMPANY, DETROIT PLANT. “FOR SOUTHERN PACIFIC CO. I-DDOUBLE TRACK THROUGH BALLAST FLOOR SPAN, POPLAR AVE BRIDGE, SAN MATEO.” MARCH 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

13 AMERICAN BRIDGE COMPANY, DETROIT PLANT. “FOR SOUTHERN PACIFIC, 36’ D.T. THRU SKEW PL. GDR. SPAN, POPLAR AVE, SAN MATEO, COAST DIV., DETAILS OF GIRDERS.” MARCH 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

14 AMERICAN BRIDGE COMPANY, DETROIT PLANT. “FOR SOUTHERN PACIFIC, 36’ D.T. THRU SKEW PL. GDR. SPAN, POPLAR AVE, SAN MATEO, COAST DIV., DETAILS OF FLOOR.” MARCH 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

15 AMERICAN BRIDGE COMPANY, DETROIT PLANT. “FOR SOUTHERN PACIFIC, 36’ D.T. THRU SKEW PL. GDR. SPAN, POPLAR AVE, SAN MATEO, COAST DIV., DETAILS OF FENTS AND BRACING.” MARCH 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

INDEX TO BLACK AND WHITE HISTORIC PHOTOGRAPHS

16 UNDATED HISTORIC PHOTOGRAPH CIRCA 1903-10 OF EAST POPLAR AVENUE BRIDGE, CAMERA FACING SOUTHWEST. ON FILE AT THE CALIFORNIA STATE RAILROAD MUSEUM LIBRARY, SACRAMENTO, CALIFORNIA.
EAST POPLAR AVENUE UNDERPASS
(Bridge No. 35C0091)
HAER No. CA-2274
INDEX TO PHOTOGRAPHS (Page 3)

PHOTOGRAPHIC KEY
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2274-3
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2274-7
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2274-8
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2274-11
MONTE DIABLO AVENUE UNDERPASS

HAER No. CA-2276

Monte Diablo Avenue, between North Claremont Street and Ramona Street
San Mateo
San Mateo County
California

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service
Pacific West Region
1111 Jackson Street, Suite 700
Oakland, CA 94607
HISTORIC AMERICAN ENGINEERING RECORD

MONTE DIABLO AVENUE UNDERPASS

HAER No. CA-2276

Location: The Monte Diablo Avenue Underpass is located between North Claremont Street and Ramona Street on Monte Diablo Avenue in the City of San Mateo, County of San Mateo, California.

USGS San Mateo Quadrangle 7.5 minute, 1997
UTM Coordinates: 10.559405, 4158461

Date of Construction: 1903; sacrificial beams added 2006

Engineer: American Bridge Company, New York

Builder: Southern Pacific Railroad

Present Owner: Peninsula Corridor Joint Powers Board (PCJPB)
1250 San Carlos Avenue
San Carlos, California 94070

Present Use: Railroad Bridge

Significance: The Monte Diablo Avenue Bridge is part of the historic property identified as the "San Mateo 1903 Underpasses" that was determined eligible for listing in the National Register of Historic Places in 2002. The bridge, along with three other underpasses and a stone retaining wall, is significant at the local level for its association with the development of northern San Mateo, with the growth of grade separation construction during the early twentieth century, and as an example of an important early phase of development within the evolution of underpass design.

Report Prepared by: Christopher McMorris, Partner / Architectural Historian
Chandra Miller, Research Assistant
JRP Historical Consulting, LLC
2850 Sutliff Street
Davis, California 95618

Date: June 2010
MONTE DIABLO AVENUE UNDERPASS
HAER No. CA-2276
(Page 2)

I. DESCRIPTION OF MONTE DIABLO AVENUE BRIDGE AND MASONRY WALL

The Monte Diablo Avenue Bridge is one of four similar railroad bridges located along three-tenths of a mile of track over four parallel streets in the City of San Mateo (from north to south): East Poplar, Santa Inez, Monte Diablo, and Tilton avenues. From north to south, the underpasses have progressively lower clearance over the roads they pass, accounting for the change in elevation between Burlingame to the north and San Mateo town center to the south. The tracks are part of the main railroad line on the San Francisco Peninsula between San Francisco and San Jose that is owned by the Peninsula Corridor Joint Powers Board (PCJPB). The PCJPB operates the Caltrain commuter rail service on these tracks. The Monte Diablo Avenue Bridge is located between North Claremont Street and Ramona Street adjacent to North Railroad Avenue in a densely developed residential area of northern San Mateo with houses and apartment buildings in close proximity to the structure along tree lined streets and mature landscaping. Caltrans does not have a bridge number assigned to this structure.

The structure is a through plate girder bridge with concrete wing wall abutments. The bridge has three simply supported spans consisting of one 36′ long main span and two 8′ long approach spans. Monte Diablo is the second most southerly of the group of four bridges with a clearance height of 11′-1″ to the roadway it spans. The bridge’s main span has three steel through-plate girders parallel to the tracks. The bridge deck and girder rest on riveted steel support bents with cross bracing. Approach spans consist of closely spaced small steel I-beams with timber deck planks on top to retain and support the ballast. Retaining the ballast on each bridge are wood walls topped with pipe railings at either end of the girders. The bridge superstructure supports two ballasted railroad tracks, primarily used by Caltrain passenger trains and some Union Pacific Railroad (UPRR) freight trains. The bridge date of construction is stamped on the southwest side along with a small cast iron plaque at the northwest end of the southwest side indicating it was constructed by the American Bridge Company of New York in 1903. The original concrete abutments have been added to over time, and single cast iron pipe runs along the outside of the southwestern girder on the bridge. The PCJPB installed sacrificial beams on either side of the bridge in 2006 to prevent tall vehicles from hitting and damaging the bridge. The sacrificial beams are steel tubes that are 14″ square in cross section. They run horizontally along the outside of the bridge’s plate girders approximately one foot from the girder, and they rest on footings attached to the top of the concrete wall abutments. The PCJPB also replaced the much of the concrete footing on the southern support bent in 2006.
MONTE DIABLO AVENUE UNDERPASS
HAER No. CA-2276
(Page 3)

A dry-laid random ashlar masonry retaining wall runs along the east side of the tracks parallel to North Railroad Avenue along the railroad property line from Monte Diablo Avenue to approximately 50 feet south of Tilton Avenue. The retaining wall stands approximately 7' tall at Monte Diablo Avenue and gradually decreases to approximately 3' tall near the Tilton Avenue underpass to the south. A concrete and brick addition was added to the top of the retaining wall. This likely occurred in 1929, the date found inscribed in concrete of this addition.

II. HISTORICAL INFORMATION

[The following historical narrative is based on, and excerpted from, JRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)” (2001), JRP Historical Consulting, “Inventory and Evaluation of Historic Resources, Caltrain Five Bridges Project,” (2006), and JRP Historical Consulting, “Finding of Adverse Effect: Caltrain San Mateo Bridges Replacement Project, Caltrain MP 17.20, 17.24, 17.45, and 17.53, In the City of San Mateo, San Mateo County, California,” (2006). Citations from the reports are provided in footnotes and references are provided in Section III.]

The Monte Diablo Avenue Bridge is one of four underpasses in San Mateo situated on the former Southern Pacific Railroad route between San Francisco and San Jose. The underpasses are historically significant for their association with the development of northern San Mateo and with the growth of grade separation construction during the early twentieth century. The structures embody distinctive engineering characteristics of type, period, and method of construction that are representative of features once common to railroad underpasses, yet are illustrative of an important phase of development within the evolution of underpass design. Southern Pacific built the Monte Diablo Avenue bridge during the company’s phase of upgrades and development during the early twentieth century.

In addition, the masonry retaining wall located between Tilton and Monte Diablo avenues is a contributing element of the historic property that includes the Monte Diablo Avenue bridge, the San Mateo 1903 Underpasses. Constructed along North Railroad Avenue, the wall was built as part of the improvements to the rail line in 1903 along with the four San Mateo underpasses. The wall was built to retain the railroad bed and ballast and to protect the adjacent street. A brick and mortar addition was later added to the top of the original dry-laid ashlar wall. More recent additions to the wall include a series of approximately 12” x 3” wood boards stacked two tall and bolted together along the top of the north and south ends of the wall; however, these
additions on top of the retaining wall are part of ongoing maintenance of the track and are not elements that contribute to the significance of the structure.

Construction and Development of the Southern Pacific Railroad along the San Francisco Peninsula

The history of the railroad on the San Francisco Peninsula coincides with creation of the State of California in 1850 and the transportation difficulties that the new state faced. San Jose, the first state capital, was only about forty miles south of San Francisco, which was rapidly growing in response to the Gold Rush and its aftermath. Although the Spanish-era El Camino Real roadway provided some north-south connection along the peninsula, travel between the two cities was a time-consuming and arduous journey via mostly rough and unreliable roads. Railroad lines were well established in the eastern United States by this time, but the transcontinental link was almost 20 years away and California’s early railroad investors had many obstacles to contend with, not the least of which were obtaining the necessary funding and kindling public support. Also a problem was the geography of the San Francisco Peninsula itself. This narrow neck of land alternately presented craggy inlets, steep gradients, and boggy tidal lands between San Francisco and San Jose that would prove to be a challenge to the railroad industry into the twentieth century.

The first three attempts to connect San Francisco and San Jose by rail failed before construction could begin. The Pacific and Atlantic Railroad Company, formed in September 1851 by a group of San Francisco and San Jose investors, made the first two efforts. The group failed to raise sufficient funds through the sale of stock to begin construction, folded in 1853, and reorganized later the same year only to face waning interest in the railroad venture caused by a financial slump and the move of the state capital, first to Vallejo and then Sacramento. In 1857, San Francisco capitalists formed the San Francisco – San Jose Railroad Company, but the failed legacy of the two earlier attempts, as well as criticism from San Francisco newspapers that favored steamship lines, caused the company to disband. Finally in 1860, with an upturn in the economy fueled by the silver boom in Nevada, the San Francisco – San Jose Railroad Company (SF-SJRR) was revived. This time the company had political support from Congressman Timothy Phelps and the financial support from the San Francisco business community, two factors that led to favorable reporting from San Francisco’s influential newspaper, the California Alta. Voters in San Francisco, San Mateo, and Santa Clara counties approved bond measures used to purchase $100,000 worth of railroad stock. This strong foundation allowed the company
MONTE DIABLO AVENUE UNDERPASS
HAER No. CA-2276
(Page 5)

to finally succeed in establishing a rail link between San Francisco and San Jose, which passed through what became the City of San Mateo.¹

W.J.L. Moulton, superintendent of construction for SF-SJRR, directed crews to begin work on the single line railroad starting at San Francisquito Creek (now in Palo Alto), which forms the boundary between San Mateo and Santa Clara counties, in May 1861. Construction of the line was slowed by both the Civil War, which hindered the delivery of construction materials from the eastern states, and by heavy storms and flooding in the winter of 1861-62. The route was sufficiently built by October 1862 when Governor Leland Stanford officiated at celebrations for completion of the railroad between San Francisco and Mayfield (now the California Avenue Station in Palo Alto), including tracks through San Mateo. Regular service on this segment began in January 1863.²

The SF-SJRR completed the rail line from San Francisco to San Jose and began service on the whole route in 1864. The Southern Pacific Railroad, which incorporated in 1865, acquired the SF-SJRR in 1868 and consolidated the separate railroad under the Southern Pacific name two years later.³ Regular daily passenger service in the initial years of operation on the peninsula consisted of a morning train and two afternoon round trips between San Francisco and San Jose. Other than the general alignment, this single-track railroad had little in common with the modern system, which was developed over the years by successive upgrades and changes by Southern Pacific (and more recently by Caltrain) in response to periods of substantially increased traffic. The original route that was constructed in the 1860s differed from the modern alignment in one major way – it followed a longer route that left San Francisco and headed southwest to Valencia Street and Bernal Heights, past the San Miguel Hills and over the western shoulder of San Bruno Mountain before turning southeast and running along Colma Creek to San Bruno. This section was called the Ocean View line, the Valencia Street line, or "the Cemeteries" for the large number of burial grounds it passed near Colma. Helper engines were needed on the most mountainous portions of this route that climbed to almost 300 feet above sea level in a distance of about five miles. As discussed below, Southern Pacific completed the construction of a new

route along the coast and flat lands on the east side of the peninsula in 1907 to replace the Ocean View line. This was dubbed the Bayshore Cutoff.4

During the period from 1870 through 1900, the peninsula route was the only freight and long-distance passenger line that served San Francisco. Although streetcar companies in both San Francisco and San Jose vied for local customers, Southern Pacific was the only company that could offer transcontinental land route service into the heart of San Francisco. The connection between San Francisco and the southern Bay Area also encouraged suburban development and people started to commute to work by rail. Once out of San Francisco, many stations, like the one in San Mateo during the late nineteenth century, were merely stops in the rural landscape that served communities that were not much more than villages. In the last quarter of the nineteenth century much of the land in eastern San Mateo and Santa Clara counties was still held in large tracts by wealthy businessmen, industrialists, and other California capitalists. Two notable landowners were Charles Polhemus, entrepreneur and SF-SJRR director who laid out and plotted the town of San Mateo, and San Francisco merchant William D. M. Howard, who had purchased part of Rancho San Mateo in 1849. Howard’s family was the first to convert a Mexican-era rancho into a country estate along the peninsula. Through the first decades of the 1900s, the peninsula remained relatively undeveloped in terms of industry and commerce.5

From the 1870s through the end of the century, control of peninsula rail travel allowed the Southern Pacific’s leaders to concentrate their efforts to acquire other rail companies and to construct new lines elsewhere in the state and in the West. The company became the dominate railroad in California and the West, controlling well over 8,000 route miles throughout the western United States and ranging from Portland in the northwest to New Orleans in the south. One of the company’s biggest projects during the 1870s was the construction of a route down the center of the San Joaquin Valley that then crossed the Tehachapi Mountains, and finally led through the San Fernando tunnel into the Los Angeles basin. This access to southern California was crucial for the development of the Southern Pacific system, and the company did not add another major north-south route through the state until it completed its Coast Line between San

Francisco and Los Angeles in 1901. The Southern Pacific connected San Francisco to Omaha, Nebraska via Ogden, Utah by combining lines with the UPRR to form the cross continental Overland Route. The company’s holdings included vast operations throughout California, as well as a steamship company that linked New Orleans with New York and other points in the eastern United States. These varied and widespread holdings gave the company influence over economic development throughout the state and certainly along the peninsula and the southern San Francisco Bay Area.⁶

**Early San Mateo Residential Development**

The town of San Mateo began in the 1860s and evolved in response to railroad spurred development along the peninsula in subsequent decades and in the early twentieth century. Charles Polhemus laid out and plotted the town of San Mateo in 1862. Polhemus purchased parcels along strategic points of the Peninsula railroad and carefully planned for the railroad to pass through the eastern portion of his property. The town limits extended from the San Mateo Creek on the north to present-day Fifth Avenue on the south, and west to east from South Ellsworth Avenue (formerly A Street) to Delaware Street (formerly D Street), leaving the northern portion of town, where the Monte Diablo Avenue bridge would be built, initially undeveloped. Polhemus put 176 lots on the market before the railroad was completed, and by 1865 had sold all but forty parcels. The commercial district for San Mateo was now focused towards the railroad tracks and away from El Camino Real, the peninsula’s main north-south roadway. The downtown area of San Mateo grew slowly but steadily through the years, and the railroad offered San Mateo businesses, ranchers, and farmers an affordable means to ship their products to market in San Francisco. It also encouraged residential settlement surrounding the commercial district.⁷ Railroad access made San Mateo and its surrounding environs attractive to wealthy San Franciscans who purchased large tracts of land for summer and weekend estates. Like most of the land surrounding the town of San Mateo, the area north of San Mateo Creek remained undeveloped and was in the possession of a handful of property owners until the 1890s. Until that time, attempts to expand San Mateo’s borders were unsuccessful, as most of the families refused to subdivide their land.⁸

William D. M. Howard’s estate El Cerrito was situated on much of the land to the north of San Mateo Creek and the developing town of San Mateo. This large estate contained orchards and

---

Mateo suffered some damage from the quake, it was minor in comparison with the damage experienced in San Francisco. Within four years of the disaster, 10,000 people immigrated to San Mateo County; a pattern repeated throughout the San Francisco Bay Area. Some new towns formed in unincorporated areas along the peninsula, while existing communities also grew with the new inhabitants who required houses and services. This trend continued into the 1910s and 1920s and led to the emergence of new subdivisions that developed on former larger estates. While many San Mateo residents commuted to San Francisco and other peninsula cities, others worked on nearby farms and dairies. During the 1910s and 1920s, San Mateo became a predominantly middle class commuter suburb for affluent professionals such as doctors, attorneys, and bankers, though the neighborhood along the railroad tracks remained largely inhabited by working class individuals and families.12

Southern Pacific’s Early Twentieth Century Development and Construction of the San Mateo Underpasses

Edward Henry Harriman gained control of Southern Pacific in 1901 and ushered in a new phase of development for the company. Harriman was from New York and had quit school to work in a Wall Street brokerage at the age of fourteen. He rose through the ranks of the brokerage fast enough to buy himself a seat on the New York Stock Exchange by the age of 22 in 1870. His marriage, in 1879, to the daughter of the president of the Ogdensburg & Lake Champlain Railroad introduced Harriman to railroad ownership and he soon turned his assertive business style to that industry. By 1887 he was vice president of the Illinois Central Railroad and ten years later he was a director of the Union Pacific Railroad, one of Southern Pacific’s toughest competitors. When the last of Southern Pacific’s founders, Colfax P. Huntington, died in 1900, Harriman immediately made a bid for the railroad stock held by his estate. It took the better part of a year to convince the various shareholders and associates to sell, but by March 1901 Harriman’s Union Pacific had acquired 38 percent of Southern Pacific, a figure that would later rise to 46 percent. Almost immediately Harriman instituted improvements to the Southern Pacific system, including changes to the line between San Francisco and San Jose. 13

Under Harriman’s leadership, the Southern Pacific double tracked the line between San Francisco and San Jose and widened the right-of-way in most places to accommodate four

tracks. Harriman ordered the installation of a second track between San Jose and San Bruno ahead of the construction of the largest project along the line, the Bayshore Cutoff. Thirty-nine miles of the new double track rail line was ready by late 1903, including the segment through San Mateo. In addition to constructing new track, Southern Pacific modernized the line by constructing new bridges, trestles, and other track features. Several new bridges and trestles along the peninsula route were part of this improvement program. Southern Pacific constructed the improved line in areas with increasing commercial and residential development, which necessitated building some structures that would separate the railroad from other forms of traffic. These included the installation of four nearly identical underpasses in San Mateo including the structure at Monte Diablo Avenue, which the American Bridge Company designed for Southern Pacific in 1903.14

During the early twentieth century, Southern Pacific contracted with the American Bridge Company to design and build various bridges in California. The American Bridge Company was originally founded in 1870 in Chicago, Illinois, and operated as an independent company in the Midwest. In the late 1890s independent bridge companies began consolidating, and in 1900 twenty-eight of the largest steel fabricators and constructors consolidated into the American Bridge Company, taking the name of one of the contributing companies. The following year American Bridge Company became a subsidiary of United States Steel Corporation the corporation formed by J.P. Morgan that virtually controlled the United States steel industry. American Bridge Company became the American Bridge Division of US Steel and because of its financial backing, the new company commanded a great percentage of steel bridge building projects across the country and won major contracts throughout the world, using the projects to further develop the use of steel in bridge construction. The American Bridge Company remained a subsidiary of US Steel until 1987 when it became privately owned.

American Bridge Company built many bridges in California, including a third of metal truss roadway bridges in the first few decades of the twentieth century and, over time, several well known roadway structures in the state, such as both the original 1927 Carquinez Strait Crossing (now demolished) and the second Carquinez Strait bridge built in 1958, the cantilever 1941 Pit River Bridge and Overhead on Interstate 5 at Lake Shasta, the Schuyler Heim Lift Bridge at the Port of Los Angeles built in 1946, and the Cold Spring Canyon Bridge in Santa Barbara built in 1963. In addition to the bridges in San Mateo, Southern Pacific also had American Bridge

Company design and build several grade separations along the Bayshore Cutoff in the southern portion of San Francisco, where Southern Pacific built multiple underpasses and overpasses in 1906 and 1907 on which local roads passed under or over the railroad. An interesting bridge Southern Pacific had American Bridge Company build that separated the railroad from other traffic was the double-decker 1 Street Bridge over the Sacramento River in Sacramento. Constructed in 1911, it is a moveable swing bridge that carries the railroad on the lower deck and other vehicles on the roadway on the upper deck. Southern Pacific had American Bridge Company design and build other bridges in the San Francisco Bay Area, including the through plate girder Napa River railroad bridge, spanning Napa River, east of Soscol Avenue, in Napa in 1928 and the deck girder Willow Street Underpass in San Jose in 1935.

The four through plate girder railroad bridges at the north end of San Mateo were built to carry the new double tracked rail line over East Poplar Avenue, Santa Inez Avenue, Monte Diablo Avenue, and Tilton Avenue. From north to south, the underpasses have progressively lower clearance over the roads they pass, accounting for the change in elevation between Burlingame to the north and San Mateo town center to the south. Southern Pacific constructed these underpasses as the Western Addition was developing, partially in response to a local petition to construct a grade separation. The railroad company had agreed in 1891 to build the underpass at East Poplar Avenue and to raise the tracks such that the railroad “roadbed could be pierced to permit vehicles to pass under the railroad.” Besides the one petition in 1891 for East Poplar Avenue, it is unclear whether Southern Pacific received pressure from local developers or civic leaders to construct the 1903 underpasses, including the structure at Monte Diablo Avenue, as a way to help the northern section of San Mateo develop further. Certainly, the inclusion of these structures made the area more attractive for businesses and homes, and so it was not taken up with large approaches that would have been necessary for at-grade crossings at any of these four roads. Southern Pacific may have been convinced to build the bridges because of the sheer size of the berm on which the railroad ran at

---

10 California Department of Transportation, *Historic Highway Bridges of California*, 1990, 43; American Bridge Company, “100 Years of Innovation,” online history at www.americanbridge.net/AboutUs/Brochure.pdf (accessed 2010), JRIP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Califain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4),” prepared for Parsons Transportation Group, 2001; *Brotherhood of Locomotive Firemen and Engineers Magazine*, November 1907, 632; *Railway and Locomotive Engineering*, February 1912, 42. Matt C. Bucshoff, Matthew A. Sterner, and Scott Thompson, “Historic American Engineering Record, Napa River Railroad Bridge, Spanning Napa River, east of Soscol Avenue, Napa, Napa County, CA HAER CA-322,” The Bayshore Cutoff Included construction of grade separations in San Francisco in 1906 and 1907 at 22nd Street, 23rd Street, Jerrold Avenue, Quin Street, Williams Avenue, and Paul Avenue, JRIP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Califain Five Bridges Project,” July 2006.

16 Board of Railroad Commissioners of the State of California, “Annual report of the Board of Railroad Commission of the State of California for the Year Ending November 1, 1891, Volume 12,” 80.
MONTE DIABLO AVENUE UNDERPASS  
HAER No. CA-2276  
(Page 12)

this location. At-grade crossings at this location would have either been very steep or have required long approaches. Included in the construction of the new double track and underpasses was the random ashlar masonry wall that retained the new railroad bed and protected the extant adjacent street (North Railroad Avenue). Southern Pacific also modernized its rail line down the San Francisco Peninsula in the early 1900s in part to compete with the interurban electric railways emerging at the time. The United Railway Company began service on its own tracks between San Mateo and San Francisco in 1902. As the interurban railways drew passengers away from Southern Pacific’s service, the large railroad may have been convinced to build the underpasses in San Mateo to show its good will towards the city’s officials and residents and to display the railroad’s modern, stable, and up-to-date character. Following construction of these underpasses, this area just north of downtown San Mateo grew quickly with houses filling in the ever decreasing number of vacant lots on either side of the tracks.17

The Monte Diablo Avenue bridge and other San Mateo underpasses are also associated with the wider development of grade separations in the early twentieth century along the San Francisco Peninsula and elsewhere in California. These San Mateo structures are among the earliest grade separations in the state and as such are precursors to later grade separations built as motor vehicle usage increased along the peninsula, and throughout the state, between the 1910s and 1930s. Although automobiles had begun to appear in San Mateo by 1903, it is unlikely that Southern Pacific installed these underpasses specifically for automobile use, but they became useful to that end. As stated, the underpasses provided greater access for residents on both sides of the track, and relative to the sheer size of the railroad berm, the underpasses prevented the need for long or very steep approaches that would have been built for at-grade crossings. During the first few decades of the twentieth century, particularly along the San Francisco Peninsula, automobile and motor vehicle use increased dramatically. At the same time, railroad traffic intensified and the accident rates at railroad grade crossings grew quickly. Along with concern for the deaths and injuries at railroad crossings, the business community found there to be negative economic consequences for delays caused by at-grade crossings. State officials and concerned civic leaders promoted grade separations as the means to improve public safety and improve local economics. There was a drive to build many underpasses and overpasses, particularly in the 1920s and 1930s, and many were built essentially following the successful model of the underpasses at San Mateo. The enormous costs associated with construction of such

17 Construction of these underpasses also coincided with the President Theodore Roosevelt’s campaign visit to Burlingame in May 1903. He arrived by train. While this, nor the United Railway Company competition, can be directly linked to the construction of the San Mateo railroad bridges, these events may have influenced their construction or their schedule for completion.
MONTE DIABLO AVENUE UNDERPASS
HAER No. CA-2276
(Page 13)

structures led to disputes between the state, local municipalities, and railroads over the apportionment of the costs, but public funding helped many get built. The four San Mateo underpasses are the earliest grade separations along the former Southern Pacific Coast Line between San Francisco and Gilroy, and they are among a small group of such structures within entire state. In a 1950 article regarding the history of bridges in California, California Division of Highways Assistant State Highway Engineer F.W. Panhorst presented an unnamed 1902 Southern Pacific underpass in Atascadero (likely at Capistrano Avenue) as one of the state’s earliest grade separations. This assertion corresponds with dates of construction culled from Caltrans bridge logs, which also show that very few early twentieth century (pre-1910) underpasses still exist in California particularly in the San Francisco Bay Area.

The design of the San Mateo underpasses, and the materials Southern Pacific used to build them, indicate the railroad’s efforts to modernize their bridges away from timber to durable and long lasting steel. Their design with steel plate girders, steel supports, steel stringers, and concrete abutments became common for grade separations along the peninsula and across the state. Later examples of unadorned through plate girder underpasses on concrete abutments along this rail line include the Madrone Underpass along old US Highway 101 (now State Route 82) in southern Santa Clara County, designed by the California Division of Highways and built in 1933, and the Army Street underpass in San Francisco and the Lafayette Street underpass in Santa Clara, both constructed in 1936. While the San Mateo structures may have not directly affected the design of later structures, the success that Southern Pacific had with such structures influenced later bridge building. From the early to mid-twentieth century, Southern Pacific built many steel through plate underpasses, and bridge engineers improved and altered the design of such underpasses to improve performance and safety qualities. The Army Street underpass in San Francisco, for example, was originally built in 1907 with a very similar design to these structures in San Mateo. As Army Street’s motor vehicle traffic load increased, its steel supports on either side of the roadway became hazardous, and the city and Southern Pacific rebuilt the underpass with concrete supports. This type of underpass design continued to be used after World War II, for example, at Evans Avenue in San Francisco in 1964 and across Interstate 280.

18 Alan Hynding, From Frontier to Suburb, 35, 70, 92, 93, and 112; Stagner, South from San Francisco: The Life Story of San Mateo County, 146; Alexander and Hamm, History of San Mateo County, (Burlingame, CA, 1916), 53 and 103-104; L. Wielkert, Historic Resources Inventory form on San Mateo Railroad Avenue railroad bridges, July 1989; and Southern Pacific Railroad Company, “San Mateo” Station Plat, November 1907.
in San Jose in 1969, although reinforced concrete bridges became increasingly standard from the 1930s onward.20

The through plate girder railroad bridges in San Mateo are a structural type that were commonly built for railroads at the time and while not technically bold from an engineering standpoint, the four bridges in San Mateo, including the Monte Diablo Avenue structure, are illustrative of an important early phase of development within the evolution of underpass design. Their design was a precursor to later grade separation underpasses built as motor vehicle usage increased along the peninsula during the first half of the twentieth century. These early railroad structures are now a rare example of early grade separations in the San Francisco Bay Area.

20 JRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4),” prepared for Parsons Transportation Group, 2001.
III. SOURCES

Published Sources


Board of Railroad Commissioners of the State of California. “Annual report of the Board of Railroad Commission of the State of California for the Year Ending November 1, 1891, Volume 12.”

California Department of Transportation. Historic Highway Bridges of California. Sacramento: Department of Transportation 1990.


“Official Map of San Mateo County.” Compiled by George V. Kneese, County Surveyor, 1927.


Unpublished Sources


JRP Historical Consulting Services. “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4).” Prepared for Parsons Transportation Group, 2001.


Southern Pacific Railroad Company. “Profile: Main Line, Coast Division, San Francisco-Santa Barbara.” Updated through 1909, California State Archives, Sacramento, CA.

MONTE DIABLO AVENUE UNDERPASS
HAER No. CA-2276
(Page 17)

Electronic Sources


Maps

Bromfield, D. Map of the Town of San Mateo, San Mateo County, California. 1891.


Supplemental Information


2. A historic photograph of the Monte Diablo Avenue Bridge is available at the California State Railroad Museum Library, 111 I Street, Sacramento, California 95814.

3. No historic plans were located for the Monte Diablo Bridge. Plans for the other San Mateo 1903 Underpasses are on file at the Peninsula Corridor Joint Powers Board (PCJPB) headquarters at 1250 San Carlos Ave, San Carlos, California 94070.
IV. PROJECT INFORMATION

This Historic American Engineering Record report was prepared to fulfill, in part, requirements of the Memorandum of Agreement (MOA) between the Federal Transit Administration and the California State Historic Preservation Officer, signed in April 2009, for the proposed project to demolish and replace the four railroad bridges including the Monte Diablo Avenue Underpass. The Federal Transit Administration, California State Historic Preservation Officer, and Peninsula Corridor Joint Powers Board (PCJPB) were signatories on the MOA. Partner / Architectural historian Christopher McMorris of JRPL Historical Consulting, LLC and Research Assistant Chandra Miller prepared this document for the PCJPB. Mr. McMorris conducted the field inspection in April 2010. William B. Dewey prepared the photographic images for the project.

The narrative text in this report is based on JRPL Historical Consulting Services reports entitled, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)” (2001), JRPL Historical Consulting, “Inventory and Evaluation of Historic Resources, Caltrain Five Bridges Project,” (2006), and JRPL Historical Consulting, “Finding of Adverse Effect: Caltrain San Mateo Bridges Replacement Project, Caltrain MP 17.20, 17.24, 17.45, and 17.53. In the City of San Mateo, San Mateo County, California,” (2006). Research conducted for the 2001 and 2006 reports was undertaken at the California State Railroad Museum Library, California State Archives, California State Library, University of California Bancroft Special Collections, and the San Mateo County Historical Society.
LOCATION MAPS

Figure 1: Location Map
MONTE DIABLO AVENUE UNDERPASS
HAER No. CA-2276
(Page 20)

Figure 2. Project Vicinity
[Circles indicate location of the four San Mateo 1903 Underpasses]
HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

MONTE DIABLO AVENUE UNDERPASS
Monte Diablo Avenue, between North Claremont Street and Ramona Street
San Mateo
San Mateo County
California

INDEX TO BLACK AND WHITE PHOTOGRAPHS

William B. Dewey, Photographer, April 2010

1 CONTEXTUAL VIEW SHOWING NORTHEAST SIDE OF UNDERPASS, CAMERA FACING SOUTHWEST.

2 OBLIQUE VIEW SHOWING NORTHEAST SIDE OF BRIDGE, CAMERA FACING SOUTH.

3 OBLIQUE VIEW SHOWING SOUTHWEST SIDE OF UNDERPASS, CAMERA FACING NORTHEAST.

4 DETAIL VIEW SHOWING SOUTHWEST SIDE OF UNDERPASS WITH 1903 PLAQUE ON PLATE GIRDER, CAMERA FACING NORTHEAST.

5 VIEW SHOWING SOUTHEAST SIDEWALK AND CONCRETE ABUTMENT WALL WITH I-BEAM DECK FLOOR ABOVE SIDEWALK, NOTE SCALE STICK ON SUPPORT BENT, CAMERA FACING NORTHEAST.

6 DETAIL VIEW SHOWING SACRIFICIAL BEAM, RIVETED STRINGERS ABOVE ROADWAY AND SIDEWALK, CAMERA FACING SOUTHWEST.

7 VIEW SHOWING RIVETED STEEL SUPPORT BENTS WITH CROSS BRACING AND CONCRETE WING WALL ABUTMENT BEHIND, CAMERA FACING SOUTH.

8 DETAIL VIEW SHOWING STRINGERS ABOVE SIDEWALK, DECK FLOOR SUPPORTS ABOVE ROADWAY, SACRIFICIAL BEAM AND 1903 DATED AMERICAN BRIDGE COMPANY PLAQUE ON PLATE GIRDER ON SOUTHWEST SIDE OF UNDERPASS, CAMERA FACING NORTHEAST.

9 VIEW SHOWING DRY-LAID ASHLAR MASONRY WALL, CONCRETE WALL ABUTMENT AND BRIDGE STRUCTURE ON NORTHEAST SIDE OF UNDERPASS, CAMERA FACING SOUTHEAST.
MONTE DIABLO AVENUE UNDERPASS
HAER No. CA-2276
INDEX TO PHOTOGRAPHS (Page 2)

10 OBLIQUE VIEW SHOWING ASHLAR MASONRY WALL WITH CONCRETE
    ADDITION ABOVE, BALLAST AND TRACKS LOOKING TOWARDS TILTON
    AVENUE, CAMERA FACING SOUTHEAST.

11 VIEW OF RAIL LINE ABOVE MONTE DIABLO AVENUE, CAMERA FACING
    NORTH.

INDEX TO BLACK AND WHITE HISTORIC PHOTOGRAPHS

12 UNDATED HISTORIC PHOTOGRAPH CIRCA 1903-10 OF MONTE DIABLO
    AVENUE BRIDGE, CAMERA FACING SOUTHWEST. ON FILE AT THE
    CALIFORNIA STATE RAILROAD MUSEUM LIBRARY, SACRAMENTO,
    CALIFORNIA.
PHOTOGRAPHIC KEY
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS
HAER CA-2276-7
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS
HAER CA-2276-10
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS
HAER CA-2276-11
SANTA INEZ AVENUE UNDERPASS
(Bridge No. 35C0090)
Santa Inez, Avenue, between Ramona Street and North Claremont Street
San Mateo
San Mateo County
California

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Pacific West Region
1111 Jackson Street, Suite 700
Oakland, CA 94607
HISTORIC AMERICAN ENGINEERING RECORD

SANTA INEZ AVENUE UNDERPASS
(Bridge No. 35C0090)

Location: The Santa Inez Avenue Underpass (Bridge No. 35C0090) is located between Ramona and North Claremont Street on Santa Inez Avenue in the City of San Mateo, County of San Mateo, California.

USGS San Mateo Quadrangle 7.5 minute, 1997
UTM Coordinates: 10.559277.4158601

Date of Construction: 1903; sacrificial beams added 2006

Engineer: American Bridge Company, New York

Builder: Southern Pacific Railroad

Present Owner: Peninsula Corridor Joint Powers Board (PCJPB)
1250 San Carlos Avenue
San Carlos, California 94070

Present Use: Railroad Bridge

Significance: The Santa Inez Avenue Bridge is part of the historic property identified as the “San Mateo 1903 Underpasses” that was determined eligible for listing in the National Register of Historic Places in 2002. The bridge, along with three others, is significant at the local level for its association with the development of northern San Mateo, with the growth of grade separation construction during the early twentieth century, and as an example of an important early phase of development within the evolution of underpass design.

Report Prepared by:
Christopher McMorris, Partner / Architectural Historian
Chandra Miller, Research Assistant
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, California 95618

Date: June 2010
I. DESCRIPTION OF SANTA INEZ AVENUE BRIDGE

The Santa Inez Avenue Bridge is one of four similar railroad bridges located along three-tenths of a mile of track over four parallel streets in the City of San Mateo (from north to south): East Poplar, Santa Inez, Monte Diablo, and Tilton avenues. From north to south, the underpasses have progressively lower clearance over the roads they pass, accounting for the change in elevation between Burlingame to the north and San Mateo town center to the south. The tracks are part of the main railroad line on the San Francisco Peninsula between San Francisco and San Jose that is owned by the Peninsula Corridor Joint Powers Board (PCJPB). The PCJPB operates the Caltrain commuter rail service on these tracks. The Santa Inez Avenue Bridge is located between Ramona Street and North Claremont Street in a densely developed residential area of northern San Mateo with houses and apartment buildings in close proximity to the structure along tree-lined streets and mature landscaping. Views of the bridge deck adjacent to the railroad tracks is largely obscured from outside the railroad right-of-way. Caltrans’ bridge number for the structure is 35C0090.

The structure is a through plate girder bridge with concrete wing wall abutments. The bridge has three simply supported spans consisting of one 36’ long main span and two 8’ long approach spans. Santa Inez is the second most northerly of the group of four bridges with a clearance height of 12’-3” to the roadway it spans. The bridge’s main span has three steel plate girders parallel to the tracks. The bridge deck and girder rest on riveted steel support bents with cross bracing. Approach spans consist of closely spaced small steel I-beams with timber deck planks on top to retain and support the ballast. Retaining the ballast on each bridge are wood walls topped with pipe railings at either end of the girders. The bridge superstructure supports two ballasted railroad tracks, primarily used by Caltrain passenger trains and some Union Pacific Railroad (UPRR) freight trains. The bridge date of construction is stamped on the northeast side on a small cast iron plaque indicating it was constructed by the American Bridge Company of New York in 1903. The original concrete abutments have been added to over time. The PCJPB installed sacrificial beams on either side of the bridge in 2006 to prevent tall vehicles from hitting and damaging the underpass. The sacrificial beams are steel tubes that are 14” square in cross section. They run horizontally along the outside of the bridge’s plate girders approximately one foot from the girders and they rest on footings attached to the top of the concrete wall abutments.

There are limited opportunities to safely view the deck of the Santa Inez Avenue Bridge because of the structure’s configuration in relationship to adjacent properties and its location along the
busy railroad corridor. Therefore, there is no photographic view of the bridge deck and tracks included with this report. This structure is very similar to the other three bridges that comprise the San Mateo 1903 Underpasses.

II. HISTORICAL INFORMATION

[The following historical narrative is based on, and excerpted from, JRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)” (2001), JRP Historical Consulting, “Inventory and Evaluation of Historic Resources, Caltrain Five Bridges Project,” (2006), and JRP Historical Consulting, “Finding of Adverse Effect: Caltrain San Mateo Bridges Replacement Project, Caltrain MP 17.20, 17.24, 17.45, and 17.53, In the City of San Mateo, San Mateo County, California,” (2006). Citations from the reports are provided in footnotes and references are provided in Section III.]

The Santa Inez Avenue Bridge is one of four underpasses in San Mateo situated on the former Southern Pacific Railroad route between San Francisco and San Jose. The underpasses are historically significant for their association with the development of northern San Mateo and with the growth of grade separation construction during the early twentieth century. The structures embody distinctive engineering characteristics of type, period, and method of construction that are representative of features once common to railroad underpasses, yet are illustrative of an important phase of development within the evolution of underpass design. Southern Pacific built the Santa Inez Avenue bridge during the company’s phase of upgrades and development during the early twentieth century.

Construction and Development of the Southern Pacific Railroad along the San Francisco Peninsula

The history of the railroad on the San Francisco Peninsula coincides with creation of the State of California in 1850 and the transportation difficulties that the new state faced. San Jose, the first state capital, was only about forty miles south of San Francisco, which was rapidly growing in response to the Gold Rush and its aftermath. Although the Spanish-era El Camino Real roadway provided some north-south connection along the peninsula, travel between the two cities was a time-consuming and arduous journey via mostly rough and unreliable roads. Railroad lines were well established in the eastern United States by this time, but the transcontinental link was almost 20 years away and California’s early railroad investors had many obstacles to contend with, not
the least of which were obtaining the necessary funding and kindling public support. Also a problem was the geography of the San Francisco Peninsula itself. This narrow neck of land alternately presented craggy inlets, steep gradients, and boggy tidelands between San Francisco and San Jose that would prove to be a challenge to the railroad industry into the twentieth century.

The first three attempts to connect San Francisco and San Jose by rail failed before construction could begin. The Pacific and Atlantic Railroad Company, formed in September 1851 by a group of San Francisco and San Jose investors, made the first two efforts. The group failed to raise sufficient funds through the sale of stock to begin construction, folded in 1853, and reorganized the same year only to face waning interest in the railroad venture caused by a financial slump and the move of the state capital, first to Vallejo and then Sacramento. In 1857, San Francisco capitalists formed the San Francisco – San Jose Railroad Company, but the failure legacy of the two earlier attempts, as well as criticism from San Francisco newspapers that favored steamship lines, caused the company to disband. Finally in 1860, with an upturn in the economy fueled by the silver boom in Nevada, the San Francisco – San Jose Railroad Company (SF-SJRR) was revived. This time the company had political support from Congressman Timothy Phelps and the financial support from the San Francisco business community; two factors that led to favorable reporting from San Francisco’s influential newspaper, the California Alta. Voters in San Francisco, San Mateo, and Santa Clara counties approved bond measures used to purchase $100,000 worth of railroad stock. This strong foundation allowed the company to finally succeed in establishing a rail link between San Francisco and San Jose, which passed through what became the City of San Mateo.1

W.J.L. Moulton, superintendent of construction for SF-SJRR, directed crews to begin work on the single line railroad starting at San Francisco Creek (now in Palo Alto), which forms the boundary between San Mateo and Santa Clara counties, in May 1861. Construction of the line was slowed by both the Civil War, which hindered the delivery of construction materials from the eastern states and by heavy storms and flooding in the winter of 1861–62. The route was sufficiently built by October 1862 when Governor Leland Stanford officiated at celebrations for completion of the railroad between San Francisco and Mayfield (now the California Avenue

SANTA INEZ AVENUE UNDERPASS
(Bridge No. 35C0090)
HAER No. CA-2275
(Page 5)

Station in Palo Alto), including tracks through San Mateo. Regular service on this segment began in January 1863.\(^2\)

The SF-SJRR completed the rail line from San Francisco to San Jose and began services on the whole route in 1864. The Southern Pacific Railroad, which incorporated in 1865, acquired the SF-SJRR in 1868 and consolidated the separate railroad under the Southern Pacific name two years later.\(^3\) Regular daily passenger service in the initial years of operation on the peninsula consisted of a morning train and two afternoon round trips between San Francisco and San Jose. Other than the general alignment, this single-track railroad had little in common with the modern system, which was developed over the years by successive upgrades and changes by Southern Pacific (and more recently by Caltrain) in response to periods of substantially increased traffic. The original route that was constructed in the 1860s differed from the modern alignment in one major way—it followed a longer route that left San Francisco and headed southwest to Valencia Street and Bernal Heights, past the San Miguel Hills and over the western shoulder of San Bruno Mountain before turning southeast and running along Colma Creek to San Bruno. This section was called the Ocean View line, the Valencia Street line, or “the Cemeteries” for the large number of burial grounds it passed near Colma. Helper engines were needed on the most mountainous portions of this route that climbed to almost 300 feet above sea level in a distance of about five miles. As discussed below, Southern Pacific completed the construction of a new route along the coast and flat lands on the east side of the peninsula in 1907 to replace the Ocean View line. This was dubbed the Bayshore Cutoff.\(^4\)

During the period from 1870 through 1900, the peninsula route was the only freight and long-distance passenger line that served San Francisco. Although streetcar companies in both San Francisco and San Jose vied for local customers, Southern Pacific was the only company that could offer transcontinental land route service into the heart of San Francisco. The connection between San Francisco and the southern Bay Area also encouraged suburban development and people started to commute to work by rail. Once out of San Francisco, many stations, like the one in San Mateo during the late nineteenth century, were merely stops in the rural landscape.

---


that served communities that were not much more than villages. In the last quarter of the
nineteenth century much of the land in eastern San Mateo and Santa Clara counties was still held
in large tracts by wealthy businessmen, industrialists, and other California capitalists. Two
notable landowners were Charles Polhemus, entrepreneur and SF-SJRR director who laid out
and plotted the town of San Mateo, and San Francisco merchant William D. M. Howard, who
had purchased part of Rancho San Mateo in 1849. Howard’s family was the first to convert a
Mexican-era rancho into a country estate along the peninsula. Through the first decades of the
1900s, the peninsula remained relatively undeveloped in terms of industry and commerce.¹

From the 1870s through the end of the century, control of peninsula rail travel allowed the
Southern Pacific’s leaders to concentrate their efforts to acquire other rail companies and to
construct new lines elsewhere in the state and in the West. The company became the dominate
railroad in California and the West, controlling well over 8,000 route miles throughout the
western United States, from Portland in the northwest to New Orleans in the south. One of the
company’s biggest projects during the 1870s was the construction of a route down the center of
the San Joaquin Valley that then crossed the Tehachapi Mountains, and finally led through the
San Fernando tunnel into the Los Angeles basin. This access to southern California was crucial
for the development of the Southern Pacific system, and the company did not add another major
north-south route through the state until it completed its Coast Line between San Francisco and
Los Angeles in 1901. The Southern Pacific connected San Francisco with Omaha, Nebraska via
Ogden, Utah by combining lines with the UPRR to form the cross continental Overland Route.
The company’s holdings included vast operations throughout California, as well as a steamship
company that linked New Orleans with New York and other points in the eastern United States.
These varied and wide-spread holdings gave the company influence over economic development
throughout the state and certainly along the peninsula and the southern San Francisco Bay Area.²

Early San Mateo Residential Development

The town of San Mateo began in the 1860s and evolved in response to railroad spurred
development along the peninsula in subsequent decades and in the early twentieth century.

¹ Frank Stanger, South From San Francisco (San Mateo County Historical Association, 1963), 146-60; Joseph A.
Blum, “South San Francisco: The Making of an Industrial City,” California History 63 (Spring 1984): 114-134;
“Official Map of San Mateo County,” compiled by J. V. Neuman, County Surveyor (1909); “Official Map of San
Mateo County,” compiled by George V. Knese, County Surveyor (1927); Donald P. Ragler, San Mateo, USA: the
Golden Years. (San Mateo: San Mateo Bicentennial Committee, 1975); S; Mitchell Postel, San Mateo: A Centennial
² Holcomb, The Southern Pacific: 1901-1983, 4-8; Signor, Southern Pacific’s Coast Line, 11-12.
Charles Polhemus laid out and plotted the town of San Mateo in 1862. Polhemus purchased parcels along strategic points of the Peninsula railroad and carefully planned for the railroad to pass through the eastern portion of his property. The town limits extended from the San Mateo Creek on the north to present-day Fifth Avenue on the south, and west to east from South Ellisworth Avenue (formerly A Street) to Delaware Street (formerly D Street), leaving the northern portion of town, where the Santa Inez Avenue bridge would be built, initially undeveloped. Polhemus put 176 lots on the market before the railroad was completed, and by 1865 had sold all but forty parcels. The commercial district for San Mateo was now focused towards the railroad tracks and away from El Camino Real, the peninsula's main north-south roadway. The downtown area of San Mateo grew slowly but steadily through the years, and the railroad offered San Mateo businesses, ranchers, and farmers an affordable means to ship their products to market in San Francisco. It also encouraged residential settlement surrounding the commercial district.\(^7\) Railroad access made San Mateo and its surrounding environs attractive to wealthy San Franciscans who purchased large tracts of land for summer and weekend estates. Like most of the land surrounding the town of San Mateo, the area north of San Mateo Creek remained undeveloped and was in the possession of a handful of property owners until the 1890s. Until that time, attempts to expand San Mateo's borders were unsuccessful, as most of the families refused to subdivide their land.\(^8\)

William D. M. Howard's estate El Cerrito was situated on much of the land to the north of San Mateo Creek and the developing town of San Mateo. This large estate contained orchards and vast gardens. In 1889, the merchant's son, William H. Howard, subdivided a portion of the family estate, creating a subdivision called the Western Addition. The newly created subdivision originally stretched southeast from Poplar Avenue towards D Street (currently Delaware Street), past San Mateo Creek, and west towards El Camino Real (County Road) and was bisected by the railroad. This included the area where the Santa Inez Avenue and other San Mateo underpasses were subsequently built. The real estate firm Briggs, Fergusson and Company aggressively advertised the attributes of both San Mateo and the subdivision, contributing to its success.\(^9\)

The success of the Western Addition changed San Mateo, which until that time had been largely comprised of wealthy residents with estates and their staff. The smaller, more economical town

---

7 Postel, San Mateo: A Centennial History, 40; Signor, Southern Pacific's Coast Line, 28 and 39.
9* Postel, San Mateo: A Centennial History, 98-99; Map of the Subdivision in Blocks of the Western Addition of the Town of San Mateo (1889).
lots of the new subdivision attracted a different kind of resident. San Francisco’s businessmen, clerks, and shop workers commuted to work from San Mateo and shared neighborhoods with the gardeners, bakers, and other workers employed by the city and estates. Of the thirty-three Western Addition blocks, divided by streets laid in an irregular grid, twenty-three of them were quickly divided into regular small city lots. The remaining blocks were later divided, some of which were larger and contained irregularly shaped lots. By the early 1890s, lots along the east side of the railroad at Tilton Avenue were being developed. By the turn of the twentieth century, the parcels nearest the railroad tracks were more developed than those located further west.\textsuperscript{10} Southern Pacific’s San Mateo station plat and property ownership maps reveal that the railroad purchased additional right-of-way in 1901 and 1902 from roughly 15 property owners on the east side of the tracks between Bellevue Avenue (north of East Poplar Avenue) south to Monte Diablo Avenue. This was in anticipation of impending upgrades to the rail line through San Mateo. As discussed below, construction the Santa Inez Avenue Bridge and other San Mateo underpasses in 1903 helped facilitate the development of the Western Addition and northern San Mateo.\textsuperscript{11}

San Mateo’s population grew substantially during the early twentieth century with the modernization and completion of double tracks down the peninsula in the initial years of the twentieth century, along with the implementation of faster, more frequent train service that spurred suburban development along the line. Many San Francisco residents sought new homes within a reasonable commute to the City of San Francisco after the 1906 earthquake. While San Mateo suffered some damage from the quake, it was minor in comparison with the damage experienced in San Francisco. Within four years of the disaster, 10,000 people immigrated to San Mateo County; a pattern repeated throughout the San Francisco Bay Area. Some new towns formed in unincorporated areas along the peninsula, while existing communities also grew with the new inhabitants who required houses and services. This trend continued into the 1910s and 1920s and led to the emergence of new subdivisions that developed on former larger estates. While many San Mateo residents commuted to San Francisco and other peninsula cities, others worked on nearby farms and dairies. During the 1910s and 1920s, San Mateo became a predominantly middle class commuter suburb for affluent professionals such as doctors,

\textsuperscript{10} Map of the Subdivision in Blocks of the Western Addition of the Town of San Mateo (1889); Sanborn Maps, San Mateo, (1891 and 1897); 5; Sanborn Fire Insurance Map, San Mateo, California; (1891-1901).
\textsuperscript{11} Postel, San Mateo, 98-99.
attorneys, and bankers, though the neighborhood along the railroad tracks remained largely inhabited by working class individuals and families.\textsuperscript{12}

**Southern Pacific’s Early Twentieth Century Development and Construction of the San Mateo Underpasses**

Edward Henry Harriman gained control of Southern Pacific in 1901 and ushered in a new phase of development for the company. Harriman was from New York and had quit school to work in a Wall Street brokerage at the age of fourteen. He rose through the ranks of the brokerage fast enough to buy himself a seat on the New York Stock Exchange by the age of 22 in 1870. His marriage, in 1879, to the daughter of the president of the Ogdensburg & Lake Champlain Railroad introduced Harriman to railroad ownership and he soon turned his assertive business style to that industry. By 1887 he was vice president of the Illinois Central Railroad and ten years later he was a director of the Union Pacific Railroad, one of Southern Pacific’s toughest competitors. When the last of Southern Pacific’s founders, Collis P. Huntington, died in 1900, Harriman immediately made a bid for the railroad stock held by his estate. It took the better part of a year to convince the various shareholders and associates to sell, but by March 1901 Harriman’s Union Pacific had acquired 38 percent of Southern Pacific, a figure that would later rise to 46 percent. Almost immediately Harriman instituted improvements to the Southern Pacific system, including changes to the line between San Francisco and San Jose.\textsuperscript{13}

Under Harriman’s leadership, the Southern Pacific double tracked the line between San Francisco and San Jose and widened the right-of-way in most places to accommodate four tracks. Harriman ordered the installation of a second track between San Jose and San Bruno ahead of the construction of the largest project along the line, the Bayshore Cutoff. Thirty-nine miles of the new double track rail line was ready by late 1903, including the segment through San Mateo. In addition to constructing new track, Southern Pacific modernized the line by constructing new bridges, trestles, and other track features. Several new bridges and trestles along the peninsula route were part of this improvement program. Southern Pacific constructed the improved line in areas with increasing commercial and residential development, which necessitated building some structures that would separate the railroad from other forms of traffic.

\textsuperscript{12} Hynding, *From Frontier to Suburb*, 188-190, 209; Stagner, *History of San Mateo County*, 114.
SANTA INEZ AVENUE UNDERPASS
(Bridge No. 35C0090)
HAER No. CA-2275
(Page 10)

These included the installation of four nearly identical underpasses in San Mateo, including the structure at Santa Inez Avenue, which the American Bridge Company designed for Southern Pacific in 1903.14

During the early twentieth century, Southern Pacific contracted with the American Bridge Company to design and build various bridges in California. The American Bridge Company was originally founded in 1870 in Chicago, Illinois, and operated as an independent company in the Midwest. In the late 1890s independent bridge companies began consolidating, and in 1900 twenty-eight of the largest steel fabricators and constructors consolidated into the American Bridge Company, taking the name of one of the contributing companies. The following year American Bridge Company became a subsidiary of United States Steel Corporation, the corporation formed by J.P. Morgan that virtually controlled the United States steel industry. American Bridge Company became the American Bridge Division of US Steel and because of its financial backing, the new company commanded a great percentage of steel bridge building projects across the country and won major contracts throughout the world, using the projects to further develop the use of steel in bridge construction. The American Bridge Company remained a subsidiary of the US Steel Corporation until 1987, when it became privately owned.

American Bridge Company built many bridges in California, including a third of metal truss roadway bridges in the first few decades of the twentieth century and, over time, several well known roadway structures in the state, such as both the original 1927 Carquinez Strait Crossing (now demolished) and the second Carquinez Strait bridge built in 1938, the cantilever 1941 Pit River Bridge and Overhead on Interstate 5 at Lake Shasta, the Schuyler Heim Lift Bridge at the Port of Los Angeles built in 1946, and the Cold Spring Canyon Bridge in Santa Barbara built in 1963. In addition to the bridges in San Mateo, Southern Pacific also had American Bridge Company design and build several grade separations along the Bayshore CutOff in the southern portion of San Francisco, where Southern Pacific built multiple underpasses and overpasses in 1906 and 1907 on which local roads passed under or over the railroad. An interesting bridge Southern Pacific had American Bridge Company build that separated the railroad from other traffic was the double decker 1 Street Bridge over the Sacramento River in Sacramento. Constructed in 1911, it is a moveable swing bridge that carries the railroad on the lower deck and other vehicles on the roadway on the upper deck. Southern Pacific had American Bridge

Company design and build other bridges in the San Francisco Bay Area, including the through plate girder Napa River railroad bridge, spanning Napa River, east of Soscol Avenue, in Napa in 1928 and the deck girder Willow Street Underpass in San Jose in 1935.\textsuperscript{13}

The four through plate girder railroad bridges at the north end of San Mateo were built to carry the new double tracked rail line over East Poplar Avenue, Santa Inez Avenue, Monte Diablo Avenue, and Tilton Avenue. From north to south, the underpasses have progressively lower clearance over the roads they pass, accounting for the change in elevation between Burlingame to the north and San Mateo town center to the south. Southern Pacific constructed these underpasses as the Western Addition was developing, partially in response to a local petition to construct a grade separation. The railroad company had agreed in 1891 to build the underpass at East Poplar Avenue and to raise the tracks such that the railroad “roadbed could be pierced to permit vehicles to pass under the railroad.”\textsuperscript{46} Besides the one petition in 1891 for East Poplar Avenue, it is unclear whether Southern Pacific received pressure from local developers or civic leaders to construct the 1903 underpasses, including the structure at Santa Inez Avenue, as a way to help the northern section of San Mateo develop further. Certainly, the inclusion of these structures made the area more attractive to residents, as residents could easily traverse the railroad tracks and developable space was not taken up with long approaches that would have been necessary for at-grade crossings at any of these four roads. Southern Pacific may have been convinced to build the bridges because of the sheer size of the berm on which the railroad ran at this location. At-grade crossings at this location would have either been very steep or have required long approaches. Included in the construction of the new double track and underpasses was the random ashlar masonry wall that retained the new railroad bed and protected the extent of the adjacent street (North Railroad Avenue). Southern Pacific also modernized its rail line down the San Francisco Peninsula in the early 1900s in part to compete with the interurban electric railways emerging at the time. The United Railway Company began service on its own tracks

\textsuperscript{13} California Department of Transportation, *Historic Highway Bridges of California*, 1990, 43; American Bridge Company, “100 Years of Innovation,” online history at www.americanbridge.net/AboutUs/Ebrochure.pdf (accessed 2010); JRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4),” prepared for Parsons Transportation Group, 2001; *Brotherhood of Locomotive Firemen and Engineers Magazine*, November 1907, 632; *Railway and Locomotive Engineering*, February 1912, 42; Matt C. Buschoff, Matthew A. Stein, and Scott Thompson, “Historic American Engineering Record, Napa River Railroad Bridge, Spawning Napa River, east of Soscol Avenue, Napa, Napa County, CA HAER CA-321,” The Phaychon Cutoff included construction of grade separations in San Francisco in 1906 and 1907 at 22nd Street, 23rd Street, Jerrold Avenue, Quint Street, Williams Avenue, and Paul Avenue; JRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Five Bridges Project,” July 2006.

\textsuperscript{16} Board of Railroad Commissioners of the State of California, “Annual report of the Board of Railroad Commission of the State of California for the Year Ending November 1, 1891, Volume 12,” 80.
between San Mateo and San Francisco in 1902. As the interurban railways drew passengers away from Southern Pacific’s service, the large railroad may have been convinced to build the underpasses in San Mateo to show its good will towards the city’s officials and residents and to display the railroad’s modern, stable, and up-to-date character. Following construction of these underpasses, this area just north of downtown San Mateo grew quickly with houses filling in the ever decreasing number of vacant lots on either side of the tracks.17

The Santa Inez Avenue bridge and other San Mateo underpasses are also associated with the wider development of grade separations in the early twentieth century along the San Francisco Peninsula and elsewhere in California. These San Mateo structures are among the earliest grade separations in the state and as such are precursors to later grade separations built as motor vehicle usage increased along the peninsula, and throughout the state, between the 1910s and 1930s. Although automobiles had begun to appear in San Mateo by 1903, it is unlikely that Southern Pacific installed these underpasses specifically for automobile use, but they became useful to that end. As stated, the underpasses provided greater access for residents on both sides of the track, and relative to the sheer size of the railroad berm, the underpasses prevented the need for long or very steep approaches that would have been built for at-grade crossings. During the first few decades of the twentieth century, particularly along the San Francisco Peninsula, automobile and motor vehicle use increased dramatically. At the same time, railroad traffic intensified and the accident rates at railroad grade crossings grew quickly. Along with concern for the deaths and injuries at railroad crossings, the business community found there to be negative economic consequences for delays caused by at-grade crossings. State officials and concerned civic leaders promoted grade separations as the means to improve public safety and improve local economics. There was a drive to build many underpasses and overpasses, particularly in the 1920s and 1930s, and many were built essentially following the successful model of the underpasses at San Mateo. The enormous costs associated with construction of such structures led to disputes between the state, local municipalities, and railroads over the apportionment of the costs, but public funding helped many get built.18 The four San Mateo underpasses are the earliest grade separations along the former Southern Pacific Coast Line

17 Construction of these underpasses also coincided with the President Theodore Roosevelt’s campaign visit to Burlingame in May 1903. He arrived by train. While this, nor the United Railway Company competition, can be directly linked to the construction of the San Mateo railroad bridges, these events may have influenced their construction or their schedule for completion.
18 Alan Hynding, From Frontier to Suburb, 35, 70, 92, 95, and 112; Stanger, South from San Francisco: The Life Story of San Mateo County), 146; Alexander and Hamm, History of San Mateo County, (Burlingame, CA, 1916), 53 and 103-104; L. Wickert, Historic Resources Inventory form on San Mateo Railroad Avenue railroad bridges, July 1989, and Southern Pacific Railroad Company, “San Mateo” Station Plat, November 1907.
SANTA INEZ AVENUE UNDERPASS
(Bridge No. 35C0090)
HAER No. CA-2275
(Page 13)

between San Francisco and Gilroy, and they are among a small group of such structures within entire state. In a 1950 article regarding the history of bridges in California, California Division of Highways highway engineer F.W. Panhorst presented an unnamed 1902 Southern Pacific underpass in Atascadero (likely at Capistrano Avenue) as one of the state’s earliest grade separations. This assertion corresponds with dates of construction culled from Caltrans bridge logs, which also show that very few early twentieth century (pre-1910) underpasses still exist in California particularly in the San Francisco Bay Area.¹⁹

The design of the San Mateo underpasses, and the materials Southern Pacific used to build them, indicate the railroad’s efforts to modernize their bridges away from timber to durable and long lasting steel. Their design with steel plate girders, steel supports, steel stringers, and concrete abutments became common for grade separations along the peninsula and across the state. Later examples of unadorned through plate girder underpasses on concrete abutments along the rail line include the Madrones Underpass along old US Highway 101 (now State Route 82) in southern Santa Clara County, designed by the California Division of Highways and built in 1933, and the Army Street underpass in San Francisco and the Lafayette Street underpass in Santa Clara, both constructed in 1936. While the San Mateo structures may have not directly affected the design of later structures, the success that Southern Pacific had with such structures influenced later bridge building. From the early to mid-twentieth century, Southern Pacific built many steel through plate underpasses, and bridge engineers improved and altered the design of such underpasses to improve performance and safety qualities. The Army Street underpass in San Francisco, for example, was originally built in 1907 with a very similar design to these structures in San Mateo. As Army Street’s motor vehicle traffic load increased, its steel supports on either side of the roadway became hazardous, and the city and Southern Pacific rebuilt the underpass with concrete supports. This type of underpass design continued to be used after World War II, for example, at Evans Avenue in San Francisco in 1964 and across Interstate 280 in San Jose in 1969, although reinforced concrete bridges became increasingly standard from the 1930s onward.²⁰

²⁰ JRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4),” prepared for Parsons Transportation Group, 2001.
The through plate girder railroad bridges in San Mateo are a structural type that were commonly built for railroads at the time and while not technically bold from an engineering standpoint, the four bridges in San Mateo, including the Santa Inez Avenue structure, are illustrative of an important early phase of development within the evolution of underpass design. Their design was a precursor to later grade separation underpasses built as motor vehicle usage increased along the peninsula during the first half of the twentieth century. These early railroad structures are now a rare example of early grade separations in the San Francisco Bay Area.

III. SOURCES

Published Sources


Board of Railroad Commissioners of the State of California. “Annual report of the Board of Railroad Commission of the State of California for the Year Ending November 1, 1891, Volume 12.”


Unpublished Sources


JRP Historical Consulting Services. “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4).” Prepared for Parsons Transportation Group, 2001.


Electronic Sources


Maps

Bromfield, D. Map of the Town of San Mateo, San Mateo County, California. 1891.


Plans and Drawings

SANTA INEZ AVENUE UNDERPASS
(Bridge No. 35C0090)
HAER No. CA-2275
(Page 17)

American Bridge Company, Detroit Plant. "For Southern Pacific, 36'-0" D.T. Thru Skew Plat. 
February 1903.


American Bridge Company, Detroit Plant. "For Southern Pacific, 36'-0" D.T. Thru Skew Plat. 
Girder Span – For Santa Inez Ave. Details of Struts – Diagonal Bracing, Columns, 
Transverse Girder, T.C." Sheet 4 of 4. February 1903.

The above plans are on file at the Peninsula Corridor Joint Powers Board (PCJPB) headquarters 
at 1250 San Carlos Ave, San Carlos, California 94070.

Supplemental Information

1. Location and Project Vicinity maps are from Appendix A of “Finding of Adverse Effect: 
    Caltrain San Mateo Bridges Replacement Project, Caltrain MP 17.20, 17.24, 17.45, and 

2. Photographic views of the Santa Inez Avenue Bridge are available at the California State 
    Railroad Museum Library, 1111 Street, Sacramento, California 95814.
IV. PROJECT INFORMATION

This Historic American Engineering Record report was prepared to fulfill, in part, requirements of the Memorandum of Agreement (MOA) between the Federal Transit Administration and the California State Historic Preservation Officer, signed in April 2009, for the proposed project to demolish and replace the four railroad bridges including the Santa Inez Avenue Underpass. The Federal Transit Administration, the California State Historic Preservation Officer, and the Peninsular Corridor Joint Powers Board (PCJPB) were signatories on the MOA. Partner / Architectural historian Christopher McMorris of JRP Historical Consulting, LLC and Research Assistant Chandra Miller prepared this document for the PCJPB. Mr. McMorris conducted the field inspection in April 2010. William B. Dewey prepared the photographic images for the project.

The narrative text in this report is based on JRP Historical Consulting Services reports entitled, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)” (2001), JRP Historical Consulting, “Inventory and Evaluation of Historic Resources, Caltrain Five Bridges Project,” (2006), and JRP Historical Consulting, “Finding of Adverse Effect: Caltrain San Mateo Bridges Replacement Project, Caltrain MP 17.20, 17.24, 17.45, and 17.53, In the City of San Mateo, San Mateo County, California,” (2006). Research conducted for the 2001 and 2006 reports was undertaken at the California State Railroad Museum Library, California State Archives, California State Library, University of California Bancroft Special Collections, and the San Mateo County Historical Society.
Figure 2. Project Vicinity
[Circles indicate location of the four San Mateo 1903 Underpasses]
HISTORIC AMERICAN ENGINEERING RECORD
INDEX TO PHOTOGRAPHS

SANTA INEZ AVENUE UNDERPASS
(HAER No. CA-2275
(Bridge No. 35C0090)
Santa Inez Avenue, between Ramona Street and North Claremont Street
San Mateo
San Mateo County
California

INDEX TO BLACK AND WHITE PHOTOGRAPhS

William B. Dewey, Photographer, April 2010

1. CONTEXTUAL VIEW SHOWING NORTHEAST SIDE OF UNDERPASS, CAMERA FACING SOUTHWEST.

2. OBLIQUE VIEW SHOWING NORTHEAST SIDE OF UNDERPASS, CAMERA FACING SOUTHWEST.

3. OBLIQUE VIEW SHOWING SOUTHWEST SIDE OF UNDERPASS, CAMERA FACING EAST.

4. VIEW SHOWING RIVETED STEEL SUPPORT BENTS WITH CROSS BRACING WITH CONCRETE WING WALL ABUTMENT BEHIND, AND SACRIFICIAL BEAM, CAMERA FACING SOUTH.

5. VIEW SHOWING SOUTHEAST SIDEWALK AND CONCRETE ABUTMENT WALL WITH L-BEAM DECK FLOOR ABOVE SIDEWALK, NOTE SCALE STICK, CAMERA FACING NORTHEAST.

6. VIEW SHOWING SOUTHEAST ABUTMENT WALL AND SIDEWALK, CAMERA FACING NORTHEAST.

7. DETAIL VIEW OF AMERICAN BRIDGE COMPANY PLAQUE ON PLATE GIRDER ON NORTHEAST SIDE OF UNDERPASS, CAMERA SOUTHWEST.

8. DETAIL VIEW SHOWING RIVETED STEEL SUPPORT BENTS WITH GUSSET PLATE AND CROSS BRACING, ALONG WITH DECK FLOOR SUPPORTS ABOVE ROADWAY AND SIDEWALK, CAMERA FACING NORTH.

9. DETAIL VIEW SHOWING STRINGERS ABOVE SIDEWALK, RIVETED STRINGERS ABOVE ROADWAY, PLATE GIRDER AND SUPPORT BENT, CAMERA FACING SOUTHWEST.
10 DETAIL VIEW OF NORTHWEST CONCRETE AND MASONRY ABUTMENT WALL, CAMERA FACING WEST.

11 DETAIL VIEW SHOWING PROPERTY LINE MARKER AT SOUTHWEST ABUTMENT WALL, CAMERA FACING NORTH.

INDEX TO BLACK AND WHITE ENGINEERING DRAWINGS

12 AMERICAN BRIDGE COMPANY, DETROIT PLANT. “FOR SOUTHERN PACIFIC 36’ – 0” D.T. THRU SKEW PLAT. GIRDER SPAN - FOR SANTA INEZ AVE. DETAILS OF DIAGRAM.” SHEET 1 OF 4. FEBRUARY 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

13 AMERICAN BRIDGE COMPANY, DETROIT PLANT. “FOR SOUTHERN PACIFIC 36’ – 0” D.T. THRU SKEW PLAT. GIRDER SPAN - FOR SANTA INEZ AVE. DETAILS OF GIRDER, GUSSETS AND PL’S.” SHEET 2 OF 4. FEBRUARY 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

14 AMERICAN BRIDGE COMPANY, DETROIT PLANT. “FOR SOUTHERN PACIFIC 36’ – 0” D.T. THRU SKEW PLAT. GIRDER SPAN - FOR SANTA INEZ AVE. DETAILS OF FLOOR.” SHEET 3 OF 4. FEBRUARY 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

15 AMERICAN BRIDGE COMPANY, DETROIT PLANT. “FOR SOUTHERN PACIFIC 36’ – 0” D.T. THRU SKEW PLAT. GIRDER SPAN - FOR SANTA INEZ AVE. DETAILS OF STRUTS – DIAGONAL BRACING, COLUMNS, TRANSVERSE GIRDER T.C.” SHEET 4 OF 4. FEBRUARY 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

INDEX TO BLACK AND WHITE HISTORIC PHOTOGRAPHS

16 UNDATED HISTORIC PHOTOGRAPH CIRCA 1903-10 OF SANTA INEZ AVENUE BRIDGE, CAMERA FACING SOUTHWEST. ON FILE AT THE CALIFORNIA STATE RAILROAD MUSEUM LIBRARY, SACRAMENTO, CALIFORNIA.

17 MARCH 1, 1928 DATED PHOTOGRAPH OF SANTA INEZ AVENUE BRIDGE, CAMERA FACING NORTHEAST. ON FILE AT THE CALIFORNIA STATE RAILROAD MUSEUM LIBRARY, SACRAMENTO, CALIFORNIA.
PHOTOGRAPHIC KEY
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS
HAER CA-2275-1
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTIONS
HAER CA-2275-6
TILTON AVENUE UNDERPASS (Bridge No. 35C0087)
Tilton Avenue, between North Claremont Street and North B Street
San Mateo
San Mateo County
California

HAER No. CA-2277

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Pacific West Region
1111 Jackson Street, Suite 700
Oakland, CA 94607
HISTORIC AMERICAN ENGINEERING RECORD

TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)

HAER No. CA-2277

Location: The Tilton Avenue Underpass (Bridge No. 35C0087) is located between North Claremont Street on the northeast and North B Street on the southwest on Tilton Avenue in the City of San Mateo, County of San Mateo, California.

USGS San Mateo Quadrangle 7.5 minute, 1997
UTM Coordinates: 10.559537.4158312

Date of Construction: 1903; sacrificial beams added 2006

Engineer: American Bridge Company, New York

Builder: Southern Pacific Railroad

Present Owner: Peninsula Corridor Joint Powers Board (PCJPB)
1250 San Carlos Avenue
San Carlos, California 94070

Present Use: Railroad Bridge

Significance: The Tilton Avenue Bridge is part of the historic property identified as the “San Mateo 1903 Underpasses” that was determined eligible for listing in the National Register of Historic Places in 2002. The bridge, along with three other underpasses and a stone retaining wall, is significant at the local level for its association with the development of northern San Mateo, with the growth of grade separation construction during the early twentieth century, and as an example of an important early phase of development within the evolution of underpass design.

Report Prepared by: Christopher McMorris, Partner / Architectural Historian
Chandra Miller, Research Assistant
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, California 95618

Date: June 2010
I. DESCRIPTION OF TILTON AVENUE BRIDGE AND MASONRY WALL

The Tilton Avenue Bridge is one of four similar railroad bridges located along three-tenths of a mile of track over four parallel streets in the City of San Mateo (from north to south): East Poplar, Santa Inez, Monte Diablo, and Tilton avenues. From north to south, the underpasses have progressively lower clearance over the roads they pass, accounting for the change in elevation between Burlingame to the north and San Mateo town center to the south. The tracks are part of the main railroad line on the San Francisco Peninsula between San Francisco and San Jose that is owned by the Peninsula Corridor Joint Powers Board (PCJPB). The PCJPB operates the Caltrain commuter rail service on these tracks. The Tilton Avenue Bridge is located between North Claremont Street on the northeast and North B Street on the southwest. It is also adjacent streets that flank the tracks, both of which are North Railroad Avenue. The structure is situated in a densely developed residential area of northern San Mateo with houses and apartment buildings in close proximity to the structure along tree lined streets and mature landscaping. Caltrans' bridge number for the structure is 35C0087.

The structure is a through plate girder bridge with concrete wing wall abutments. The bridge has three simply supported spans consisting of one 36' long main span and two 8' long approach spans. Tilton Avenue is the most southerly of the group of four bridges with the shortest clearance height of 8'-6" to the roadway it spans. The bridge's main span has three steel through-plate girders parallel to the tracks. The bridge deck and girder rest on riveted steel support beams with cross bracing. Approach spans consist of closely spaced small steel I-beams with timber deck planks on top to retain and support the ballast. Retaining the ballast on each bridge are wood walls topped with pipe railings at either end of the girders. The bridge superstructure supports two ballasted railroad tracks, primarily used by Caltrain passenger trains and some Union Pacific Railroad (UPRR) freight trains. There is no plaque or mark on the bridge to indicate the year of construction or its builder. The original concrete abutments have been added to over time, and single cast iron pipes run along the outside of the northeastern girder on the bridge. The PCJPB installed sacrificial beams on either side of the bridge in 2006 to prevent tall vehicles from hitting and damaging the underpass. The sacrificial beams are steel tubes that are 14" square in cross section. They run horizontally along the outside of the bridge's plate girders approximately one foot from the girders and they rest on footings attached to the top of the concrete wall abutments.

A dry-laid random ashlar masonry retaining wall runs along the east side of the tracks parallel to North Railroad Avenue along the railroad property line from Monte Diablo Avenue to
approximately 50 feet south of Tilton Avenue. The retaining wall stands approximately 7' tall at Monte Diablo Avenue and gradually decreases to approximately 3' tall near the Tilton Avenue underpass to the south. A concrete and brick addition was added to the top of the retaining wall. This likely occurred in 1929, the date found inscribed in concrete of this addition.

II. HISTORICAL INFORMATION

[The following historical narrative is based on, and excerpted from, JRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)” (2001), JRP Historical Consulting, “Inventory and Evaluation of Historic Resources, Caltrain Five Bridges Project,” (2006), and JRP Historical Consulting, “Finding of Adverse Effect: Caltrain San Mateo Bridges Replacement Project, Caltrain MP 17.20, 17.24, 17.45, and 17.53, In the City of San Mateo, San Mateo County, California,” (2006). Citations from the reports are provided in footnotes and references are provided in Section III.]

The Tilton Avenue Bridge is one of four underpasses in San Mateo situated on the former Southern Pacific Railroad route between San Francisco and San Jose. The underpasses are historically significant for their association with the development of northern San Mateo and with the growth of grade separation construction during the early twentieth century. The structures embody distinctive engineering characteristics of type, period, and method of construction that are representative of features once common to railroad underpasses, yet are illustrative of an important phase of development within the evolution of underpass design. Southern Pacific built the Tilton Avenue bridge during the company's phase of upgrades and development during the early twentieth century.

In addition, the masonry retaining wall located between Tilton and Monte Diablo avenues is a contributing element of the historic property that includes the Tilton Avenue underpass, the San Mateo 1903 Underpasses. Constructed along North Railroad Avenue, the wall was built as part of the improvements to the rail line in 1903 along with the four San Mateo underpasses. The wall was built to retain the railroad bed and ballast and to protect the adjacent street. A brick and mortar addition was later added to the top of the original dry-laid ashlar wall. More recent additions to the wall include a series of approximately 12" x 3" wood boards stacked two tall and bolted together along the top the masonry wall north of Tilton Avenue and a contemporary K-rail concrete barrier placed on top of the masonry wall south of Tilton Avenue. These additions on
top of the retaining wall, however, are part of ongoing maintenance of the track and are not
elements that contribute to the significance of the structure.

Construction and Development of the Southern Pacific Railroad along the San Francisco Peninsula

The history of the railroad on the San Francisco Peninsula coincides with creation of the State of
California in 1850 and the transportation difficulties that the new state faced. San Jose, the first
state capital, was only about forty miles south of San Francisco, which was rapidly growing in
response to the Gold Rush and its aftermath. Although the Spanish-era El Camino Real roadway
provided some north-south connection along the peninsula, travel between the two cities was a
time-consuming and arduous journey via mostly rough and unreliable roads. Railroad lines were
well established in the eastern United States by this time, but the transcontinental link was almost
20 years away and California's early railroad investors had many obstacles to contend with, not
the least of which were obtaining the necessary funding and kindling public support. Also a
problem was the geography of the San Francisco Peninsula itself. This narrow neck of land
alternately presented craggy inlets, steep gradients, and boggy tidelands between San Francisco
and San Jose that would prove to be a challenge to the railroad industry into the twentieth
century.

The first three attempts to connect San Francisco and San Jose by rail failed before construction
could begin. The Pacific and Atlantic Railroad Company, formed in September 1851 by a group
of San Francisco and San Jose investors, made the first two efforts. The group failed to raise
sufficient funds through the sale of stock to begin construction, folded in 1853, and reorganized
later the same year only to face waning interest in the railroad venture caused by a financial
slump and the move of the state capital, first to Vallejo and then Sacramento. In 1857, San
Francisco capitalists formed the San Francisco – San Jose Railroad Company, but the failed
legacy of the two earlier attempts, as well as criticism from San Francisco newspapers that
favored steamship lines, caused the company to disband. Finally in 1860, with an upturn in the
economy fueled by the silver boom in Nevada, the San Francisco – San Jose Railroad Company
(SF-SJRR) was revived. This time the company had political support from Congressman
Timothy Phelps and the financial support from the San Francisco business community, two
factors that led to favorable reporting from San Francisco's influential newspaper, the California
Alta. Voters in San Francisco, San Mateo, and Santa Clara counties approved bond measures
used to purchase $100,000 worth of railroad stock. This strong foundation allowed the company
to finally succeed in establishing a rail link between San Francisco and San Jose, which passed through what became the City of San Mateo.¹

W.J.L. Moulton, superintendent of construction for SF-SJRR, directed crews to begin work on the single line railroad starting at San Francisquito Creek (now in Palo Alto), which forms the boundary between San Mateo and Santa Clara counties, in May 1861. Construction of the line was slowed by both the Civil War, which hindered the delivery of construction materials from the eastern states, and by heavy storms and flooding in the winter of 1861–62. The route was sufficiently built by October 1862 when Governor Leland Stanford officiated at celebrations for completion of the railroad between San Francisco and Mayfield (now the California Avenue Station in Palo Alto), including tracks through San Mateo. Regular service on this segment began in January 1863.²

The SF-SJRR completed the rail line from San Francisco to San Jose and began services on the whole route in 1864. The Southern Pacific Railroad, which incorporated in 1865, acquired the SF-SJRR in 1868 and consolidated the separate railroad under the Southern Pacific name two years later.³ Regular daily passenger service in the initial years of operation on the peninsula consisted of a morning train and two afternoon round trips between San Francisco and San Jose. Other than the general alignment, this single-track railroad had little in common with the modern system, which was developed over the years by successive upgrades and changes by Southern Pacific (and more recently by Caltrain) in response to periods of substantially increased traffic. The original route that was constructed in the 1860s differed from the modern alignment in one major way – it followed a longer route that left San Francisco and headed southwest to Valencia Street and Bernal Heights, past the San Miguel Hills and over the western shoulder of San Bruno Mountain before turning southeast and running along Colma Creek to San Bruno. This section was called the Ocean View line, the Valencia Street line, or “the Cemeteries” for the large number of burial grounds it passed near Colma. Helper engines were needed on the most mountainous portions of this route that climbed to almost 300 feet above sea level in a distance of about five miles. As discussed below, Southern Pacific completed the construction of a new

TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)
HAER No. CA-2277
(Page 7)

route north of San Bruno along the coast and flat lands on the east side of the peninsula in 1907 to replace the Ocean View line. This was dubbed the Bayshore Cutoff. 3

During the period from 1870 through 1900, the peninsula route was the only freight and long-distance passenger line that served San Francisco. Although streetcar companies in both San Francisco and San Jose vied for local customers, Southern Pacific was the only company that could offer transcontinental land route service into the heart of San Francisco. The connection between San Francisco and the southern Bay Area also encouraged suburban development and people started to commute to work by rail. Once out of San Francisco, many stations, like the one in San Mateo during the late nineteenth century, were merely stops in the rural landscape that served communities that were not much more than villages. In the last quarter of the nineteenth century much of the land in eastern San Mateo and Santa Clara counties was still held in large tracts by wealthy businessmen, industrialists, and other California capitalists. Two notable landowners were Charles Polkemus, entrepreneur and SF-SJRR director who laid out and plotted the town of San Mateo, and San Francisco merchant William D. M. Howard, who had purchased part of Rancho San Mateo in 1849. Howard’s family was the first to convert a Mexican-era rancho into a country estate along the peninsula. Through the first decades of the 1900s the peninsula remained relatively undeveloped in terms of industry and commerce. 4

From the 1870s through the end of the century, control of peninsula rail travel allowed the Southern Pacific’s leaders to concentrate their efforts to acquire other rail companies and in to construct new lines elsewhere in the state and in the West. The company became the dominate railroad in California and the West, controlling well over 8,000 route miles throughout the western United States and ranging from Portland in the northwest to New Orleans in the south. One of the company’s biggest projects during the 1870s was the construction of a route down the center of the San Joaquin Valley that then crossed the Tehachapi Mountains, and finally led through the San Fernando tunnel into the Los Angeles basin. This access to southern California was crucial for the development of the Southern Pacific system, and the company did not add


another major north-south route through the state until it completed its Coast Line between San Francisco and Los Angeles in 1901. The Southern Pacific connected San Francisco with Omaha, Nebraska via Ogden, Utah by combining lines with the UPRR to form the cross continental Overland Route. The company’s holdings included vast operations throughout California, as well as a steamship company that linked New Orleans with New York and other points in the eastern United States. These varied and wide-spread holdings gave the company influence over economic development throughout the state and certainly along the peninsula and the southern San Francisco Bay Area.6

Early San Mateo Residential Development

The town of San Mateo began in the 1860s and evolved in response to railroad spurred development along the peninsula in subsequent decades and in the early twentieth century. Charles Polhemus laid out and plotted the town of San Mateo in 1862. Polhemus purchased parcels along strategic points of the Peninsula railroad and carefully planned for the railroad to pass through the eastern portion of his property. The town limits extended from the San Mateo Creek on the north to present-day Fifth Avenue on the south, and west to east from South Ellsworth Avenue (formerly A Street) to Delaware Street (formerly D Street), leaving the northern portion of town, where the Tilton Avenue bridge would be built, initially undeveloped. Polhemus put 176 lots on the market before the railroad was completed, and by 1865 had sold all but forty parcels. The commercial district for San Mateo was now focused towards the railroad tracks and away from El Camino Real, the peninsula’s main north-south roadway. The downtown area of San Mateo grew slowly but steadily through the years, and the railroad offered San Mateo businesses, ranchers, and farmers an affordable means to ship their products to market in San Francisco. It also encouraged residential settlement surrounding the commercial district.7 Railroad access made San Mateo and its surrounding environs attractive to wealthy San Franciscans who purchased large tracts of land for summer and weekend estates. Like most of the land surrounding the town of San Mateo, the area north of San Mateo Creek remained undeveloped and was in the possession of a handful of property owners until the 1890s. Until that time, attempts to expand San Mateo’s borders were unsuccessful, as most of the families refused to subdivide their land.8

---

6 Hofsommer, The Southern Pacific, 1901-1983, 4-8; Signor, Southern Pacific’s Coast Line, 11-12.
7 Postel, San Mateo: A Centennial History, 40; Signor, Southern Pacific’s Coast Line, 28 and 39.
TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)
HAER No. CA-2277
(Page 9)

William D. M. Howard’s estate El Cerrito was situated on much of the land to the north of San Mateo Creek and the developing town of San Mateo. This large estate contained orchards and vast gardens. In 1889, the merchant’s son, William H. Howard, subdivided a portion of the family estate, creating a subdivision called the Western Addition. The newly created subdivision originally stretched southeast from Poplar Avenue towards D Street (currently Delaware Street), past San Mateo Creek, and west towards El Camino Real (County Road) and was bisected by the railroad. This included the area where the Tilton Avenue and other San Mateo underpasses were subsequently built. The real estate firm Briggs, Ferguson and Company aggressively advertised the attributes of both San Mateo and the subdivision, contributing to its success.9

The success of the Western Addition changed San Mateo, which until that time had been largely comprised of wealthy residents with estates and their staff. The smaller, more economical town lots of the new subdivision attracted a different kind of resident. San Francisco’s businessmen, clerks, and shop workers commuted to work from San Mateo and shared neighborhoods with the gardeners, bakers, and other workers employed by the city and estates. Of the thirty-three Western Addition blocks, divided by streets laid in an irregular grid, twenty-three of them were quickly divided into regular small city lots. The remaining blocks were later divided, some of which were larger and contained irregularly shaped lots. By the early 1890s, lots along the east side of the railroad at Tilton Avenue were being developed. By the turn of the twentieth century, the parcels nearest the railroad tracks were more developed than those located further west.10 Southern Pacific’s San Mateo station plat and property ownership maps reveal that the railroad purchased additional right-of-way in 1901 and 1902 from roughly 15 property owners on the east side of the tracks between Bellevue Avenue (north of East Poplar Avenue) south to Monte Diablo Avenue. This was in anticipation of impending upgrades to the rail line through San Mateo. As discussed below, construction of the Tilton Avenue Bridge and other San Mateo underpasses in 1903 helped facilitate the development of the Western Addition and northern San Mateo.11

San Mateo’s population grew substantially during the early twentieth century with the modernization and completion of double tracks down the peninsula in the initial years of the twentieth century, along with the implementation of faster, more frequent train service that

9 Postel, San Mateo: A Centennial History, 98-99; Map of the Subdivision in Blocks of the Western Addition of the Town of San Mateo (1889).
10 Map of the Subdivision in Blocks of the Western Addition of the Town of San Mateo (1889); Sanborn Maps, San Mateo, (1893 and 1897); 5; Sanborn Fire Insurance Map, San Mateo, California, (1893-1901).
spurred suburban development along the line. Many San Francisco residents sought new homes within a reasonable commute to the City of San Francisco after the 1906 earthquake. While San Mateo suffered some damage from the quake, it was minor in comparison to the damage experienced in San Francisco. Within four years of the disaster, 10,000 people immigrated to San Mateo County; a pattern repeated throughout the San Francisco Bay Area. Some new towns formed in unincorporated areas along the peninsula, while existing communities also grew with the new inhabitants who required houses and services. This trend continued into the 1910s and 1920s and led to the emergence of new subdivisions that developed on former larger estates. While many San Mateo residents commuted to San Francisco and other peninsula cities, others worked on nearby farms and dairies. During the 1910s and 1920s, San Mateo became a predominantly middle class commuter suburb for affluent professionals such as doctors, attorneys, and bankers, though the neighborhood along the railroad tracks remained largely inhabited by working class individuals and families.\textsuperscript{12}

Southern Pacific’s Early Twentieth Century Development and Construction of the San Mateo Underpasses

Edward Henry Harriman gained control of Southern Pacific in 1901 and ushered in a new phase of development for the company. Harriman was from New York and had quit school to work in a Wall Street brokerage at the age of fourteen. He rose through the ranks of the brokerage fast enough to buy himself a seat on the New York Stock Exchange by the age of 22 in 1870. His marriage, in 1879, to the daughter of the president of the Ogdensburg & Lake Champlain Railroad introduced Harriman to railroad ownership and he soon turned his assertive business style to that industry. By 1887 he was vice president of the Illinois Central Railroad and ten years later he was a director of the Union Pacific Railroad, one of Southern Pacific’s toughest competitors. When the last of Southern Pacific’s founders, Collis P. Huntington, died in 1900, Harriman immediately made a bid for the railroad stock held by his estate. It took the better part of a year to convince the various shareholders and associates to sell, but by March 1901 Harriman’s Union Pacific had acquired 38 percent of Southern Pacific, a figure that would later rise to 46 percent. Almost immediately Harriman instituted improvements to the Southern Pacific system, including changes to the line between San Francisco and San Jose.\textsuperscript{13}

\textsuperscript{12} Hynding, \textit{From Frontier to Suburb}, 188–190, 209; Shaver, \textit{History of San Mateo County}, 114.

TILTON AVENUE UNDERPASS  
(Bridge No. 35C0087)  
HAER No. CA-2277  
(Page 11)

Under Harriman’s leadership, the Southern Pacific double tracked the line between San Francisco and San Jose and widened the right-of-way in most places to accommodate four tracks. Harriman ordered that a second track be installed between San Jose and San Bruno ahead of the construction of the largest project along the line, the Bayshore Cutoff. Thirty nine miles of the new double track rail line was ready by late 1903, including the segment through San Mateo. In addition to constructing new track, Southern Pacific modernized the line by constructing new bridges, trestles, and other track features. Several new bridges and trestles along the peninsula route were part of this improvement program. Southern Pacific constructed the improved line in areas with increasing commercial and residential development, which necessitated building some structures that would separate the railroad from other forms of traffic. These included the installation of four nearly identical underpasses in San Mateo, including the structure at Tilton Avenue, which the American Bridge Company designed for Southern Pacific in 1903.  

During the early twentieth century, Southern Pacific contracted with the American Bridge Company to design and build various bridges in California. The American Bridge Company was originally founded in 1870 in Chicago, Illinois, and operated as an independent company in the Midwest. In the late 1890s independent bridge companies began consolidating, and in 1900 twenty-eight of the largest steel fabricators and constructors consolidated into the American Bridge Company, taking the name of one of the contributing companies. The following year American Bridge Company became a subsidiary of United States Steel Corporation, the corporation formed by J.P. Morgan that virtually controlled the United States steel industry. American Bridge Company became the American Bridge Division of US Steel and because of its financial backing, the new company commanded a great percentage of steel bridge building projects across the country and won major contracts throughout the world, using the projects to further develop the use of steel in bridge construction. The American Bridge Company remained a subsidiary of US Steel until 1987 when it became privately owned.

American Bridge Company built many bridges in California, including a third of metal truss roadway bridges in the first few decades of the twentieth century and, over time, several well known roadway structures in the state, such as both the original 1927 Carquinez Strait Crossing (now demolished) and the second Carquinez Strait bridge built in 1958, the cantilever 1941 Pit

---

TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)
HAER No. CA-2277
(Page 12)

River Bridge and Overhead on Interstate 5 at Lake Shasta, the Schuyler Heim Lift Bridge at the Port of Los Angeles built in 1946, and the Cold Spring Canyon Bridge in Santa Barbara built in 1963. In addition to the bridges in San Mateo, Southern Pacific also had American Bridge Company design and build several grade separations along the Bayshore Cutoff in the southern portion of San Francisco, where Southern Pacific built multiple underpasses and overpasses in 1906 and 1907 on which local roads passed under or over the railroad. An interesting bridge Southern Pacific had American Bridge Company build that separated the railroad from other traffic was the double decker 1 Street Bridge over the Sacramento River in Sacramento. Constructed in 1911, it is a moveable swing bridge that carries the railroad on the lower deck and other vehicles on the roadway on the upper deck. Southern Pacific had American Bridge Company design and build other bridges in the San Francisco Bay Area, including the through plate girder Napa River railroad bridge, spanning Napa River, east of Soscol Avenue, in Napa in 1928 and the deck girder Willow Street Underpass in San Jose in 1935.13

The four through plate girder railroad bridges at the north end of San Mateo were built to carry the new double tracked rail line over East Poplar Avenue, Santa Inez Avenue, Monte Diablo Avenue, and Tilton Avenue. From north to south, the underpasses have progressively lower clearance over the roads they pass, accounting for the change in elevation between Burlingame to the north and San Mateo town center to the south. Southern Pacific constructed these underpasses as the Western Addition was developing, partially in response to a local petition to construct a grade separation. The railroad company had agreed in 1891 to build the underpass at East Poplar Avenue and to raise the tracks such that the railroad “roadbed could be pierced to permit vehicles to pass under the railroad.”46 Besides the one petition in 1891 for East Poplar Avenue, it is unclear whether Southern Pacific received pressure from local developers or civic leaders to construct the 1903 underpasses, including the structure at Tilton Avenue, as a way to help the northern section of San Mateo develop further. Certainly, the inclusion of these

13 California Department of Transportation, Historic Highway Bridges of California, 1990, 43; American Bridge Company, “100 Years of Innovation,” online history at www.americanbridge.net/AboutUs/EBrochure.pdf (accessed 2010), JRP Historical Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Electrification Project,” San Francisco to Gilroy (MP 0.0 to 77.4),, prepared for Parsons Transportation Group, 2001; Brotherhood of Locomotive Firemen and Engineers Magazine, November 1907, 632; Railway and Locomotive Engineering, February 1912, 42; Matt C. Busch, Matthew A. Sterner, and Scott Thompson, “Historic American Engineering Record, Napa River Railroad Bridge, Spanning Napa River, east of Soscol Avenue, Napa, Napa County, CA HAER CA-326,” The Bayshore Cutoff included construction of grade separations in San Francisco in 1906 and 1907 at 22nd Street, 23rd Street, Jerrold Avenue, Quint Street, Williams Avenue, and Paul Avenue; JR Railway Consulting Services, “Inventory and Evaluation of Historic Resources Caltrain Five Bridges Project,” July 2006.
structures made the area more attractive overtime, as residents could easily traverse the railroad tracks and developable space was not taken up with long approaches that would have been necessary for at-grade crossings at any of these four roads. Southern Pacific may have been convinced to build the bridges because of the sheer size of the berm on which the railroad ran at this location. At-grade crossings at this location would have either been very steep or have required long approaches. Included in the construction of the new double track and underpasses was the random ashlar masonry wall that retained the new railroad bed and protected the extant adjacent street (North Railroad Avenue). Southern Pacific also modernized its rail line down the San Francisco Peninsula in the early 1900s in part to compete with the interurban electric railways emerging at the time. The United Railway Company began service on its own tracks between San Mateo and San Francisco in 1902. As the interurban railways drew passengers away from Southern Pacific’s service, the large railroad may have been convinced to build the underpasses in San Mateo to show its good will towards the city’s officials and residents and to display the railroad’s modern, stable, and up-to-date character. Following construction of these underpasses, this area just north of downtown San Mateo grew quickly with houses filling in the ever decreasing number of vacant lots on either side of the tracks.  

The Tilton Avenue Bridge and other San Mateo underpasses are also associated with the wider development of grade separations in the early twentieth century along the San Francisco Peninsula and elsewhere in California. These San Mateo structures are among the earliest grade separations in the state and as such are precursors to later grade separations built as motor vehicle usage increased along the peninsula, and throughout the state, between the 1910s and 1930s. Although automobiles had begun to appear in San Mateo by 1903, it is unlikely that Southern Pacific installed these underpasses specifically for automobile use, but they became useful to that end. As stated, the underpasses provided greater access for residents on both sides of the track, and relative to the sheer size of the railroad berm, the underpasses prevented the need for long or very steep approaches that would have been built for at-grade crossings. During the first few decades of the twentieth century, particularly along the San Francisco Peninsula, automobile and motor vehicle use increased dramatically. At the same time, railroad traffic intensified and the accident rates at railroad grade crossings grew quickly. Along with concern for the deaths and injuries at railroad crossings, the business community found there to be negative economic consequences for delays caused by at-grade crossings. State officials and

17 Construction of these underpasses also coincided with the President Theodore Roosevelt’s campaign visit to Burlingame in May 1903. He arrived by train. While this, nor the United Railway Company competition, can be directly linked to the construction of the San Mateo railroad bridges, these events may have influenced their construction or their schedule for completion.
concerned civic leaders promoted grade separations as the means to improve public safety and improve local economics. There was a drive to build many underpasses and overpasses, particularly in the 1920s and 1930s, and many were built essentially following the successful model of the underpasses at San Mateo. The enormous costs associated with construction of such structures led to disputes between the state, local municipalities, and railroads over the apportionment of the costs, but public funding helped many get built. The four San Mateo underpasses are the earliest grade separations along the former Southern Pacific Coast Line between San Francisco and Gilroy, and they are among a small group of such structures within entire state. In a 1950 article regarding the history of bridges in California, California Division of Highways Assistant State Highway Engineer F.W. Panhorst presented an unnamed 1902 Southern Pacific underpass in Atascadero (likely at Capistrano Avenue) as one of the state’s earliest grade separations. This assertion corresponds with dates of construction culled from Caltrans bridge logs, which also show that very few early twentieth century (pre-1910) underpasses still exist in California particularly in the San Francisco Bay Area.

The design of the San Mateo underpasses, and the materials Southern Pacific used to build them, indicate the railroad’s efforts to modernize their bridges away from timber to durable and long lasting steel. Their design with steel plate girders, steel supports, steel stringers, and concrete abutments became common for grade separations along the peninsula and across the state. Later examples of undorned through plate girder underpasses on concrete abutments along this rail line include the Madrone Underpass along old US Highway 101 (now State Route 82) in southern Santa Clara County, designed by the California Division of Highways and built in 1933, and the Army Street underpass in San Francisco and the Lafayette Street underpass in Santa Clara, both constructed in 1936. While the San Mateo structures may have not directly affected the design of later structures, the success that Southern Pacific had with such structures influenced later bridge building. From the early to mid-twentieth century, Southern Pacific built many steel through plate underpasses, and bridge engineers improved and altered the design of such underpasses to improve performance and safety qualities. The Army Street underpass in San Francisco, for example, was originally built in 1907 with a very similar design to these

---

18 Alan Hynding, *From Frontier to Suburb*, 35, 70, 92, 93, and 112; Stanger, *South from San Francisco: The Life Story of San Mateo County* (San Mateo, CA, 1910), 53 and 103-104; L. Wickers, Historic Resources Inventory from San Mateo Railroad Avenue railroad bridges, July 1989; and Southern Pacific Railroad Company, “San Mateo” Station Plat, November 1901.

structures in San Mateo. As Army Street's motor vehicle traffic load increased, its steel supports on either side of the roadway became hazardous, and the city and Southern Pacific rebuilt the underpass with concrete supports. This type of underpass design continued to be used after World War II, for example, at Evans Avenue in San Francisco in 1964 and across Interstate 280 in San Jose in 1969, although reinforced concrete bridges became increasingly standard from the 1930s onward.20

The through plate girder railroad bridges in San Mateo are a structural type that were commonly built for railroads at the time and while not technically bold from an engineering standpoint, the four bridges in San Mateo, including the Tilton Avenue structure, are illustrative of an important early phase of development within the evolution of underpass design. Their design was a precursor to later grade separation underpasses built as motor vehicle usage increased along the peninsula during the first half of the twentieth century. These early railroad structures are now a rare example of early grade separations in the San Francisco Bay Area.

---

20 JRP Historical Consulting Services, "Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)," prepared for Parsons Transportation Group, 2001.
III. SOURCES

Published Sources:


Board of Railroad Commissioners of the State of California. “Annual report of the Board of Railroad Commission of the State of California for the Year Ending November 1, 1891, Volume 12.”

California Department of Transportation. *Historic Highway Bridges of California.* Sacramento: Department of Transportation 1990.


TILTON AVENUE UNDERPASS
(Bridge No. 35C0067)
HAER No. CA-2277
(Page 17)


Unpublished Sources


JRP Historical Consulting Services. "Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4)." Prepared for Parsons Transportation Group, 2001.


Southern Pacific Railroad Company. "Profile: Main Line, Coast Division, San Francisco-Santa Barbara." Updated through 1909, California State Archives, Sacramento, CA.

TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)
HAER No. CA-2277
(Page 18)

Electronic Sources


Maps

Bromfield, D. Map of the Town of San Mateo, San Mateo County, California. 1891.


Plans and Drawings


TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)
HAER No. CA-2277
(Please 19)

The above plans are on file at the Peninsula Corridor Joint Powers Board (PCJPB) headquarters at 1250 San Carlos Ave, San Carlos, California 94070.

Supplemental Information


2. Photographic views of the Tilton Avenue Bridge are available at the California State Railroad Museum Library, 1111 Street, Sacramento, California 95814.

IV. PROJECT INFORMATION

This Historic American Engineering Record report was prepared to fulfill, in part, requirements of the Memorandum of Agreement (MOA) between the Federal Transit Administration and the California State Historic Preservation Officer, signed in April 2009, for the proposed project to demolish and replace the four railroad bridges including the Tilton Avenue Underpass. The Federal Transit Administration, California State Historic Preservation Officer, and Peninsula Corridor Joint Powers Board (PCJPB) were signatories on the MOA. Partner/Architectural historian Christopher McMorris of JRH High Consulting, LLC and Research Assistant Chandra Miller prepared this document for the PCJPB. Mr. McMorris conducted the field inspection in April 2010. William B. Dewey prepared the photographic images for the project.

TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)
HAER No. CA-2277
(Page 20)

LOCATION MAPS

Figure 1: Location Map
Figure 2. Project Vicinity
[Circles indicate location of the four San Mateo 1903 Underpasses]
HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)
Tilton Avenue, between North Claremont Street and North B Street
San Mateo
San Mateo County
California

HAER No. CA-2277

INDEX TO BLACK AND WHITE PHOTOGRAPHS

William B. Dewey, Photographer, April 2010

1  CONTEXTUAL VIEW SHOWING SOUTHWEST SIDE OF UNDERPASS, CAMERA FACING SOUTHWEST.

2  OBLIQUE VIEW SHOWING NORTHEAST SIDE OF UNDERPASS FLANKED BY ASHLAR MASONRY RETAINING WALL, CAMERA FACING WEST.

3  OBLIQUE VIEW SHOWING SOUTHWEST SIDE OF UNDERPASS, CAMERA FACING NORTHEAST.

4  VIEW SHOWING RIVETED STEEL SUPPORT BENTS WITH CROSS BRACING, CONCRETE WING WALL ABUTMENT BEHIND, AND SACRIFICAL BEAM, CAMERA FACING SOUTH.

5  VIEW SHOWING RIVETED STEEL SUPPORT BENTS CROSS BRACING, CONCRETE WING WALL ABUTMENT BEHIND, CAMERA FACING SOUTHEAST.

6  VIEW SHOWING DETAIL OF SUPPORT BENT AND CROSS BRACING, CAMERA FACING SOUTH.

7  DETAIL VIEW SHOWING SUPPORT BENTS, PLATE GIRDER, RAILING, AND SACRIFICAL BEAM ABOVE ROADWAY AND SIDEWALK NOTE SCALE STICK, CAMERA FACING NORTHEAST.

8  DETAIL VIEW SHOWING RIVETED STEEL SUPPORT BENTS WITH CROSS BRACING, AND DECK FLOOR SUPPORTS ABOVE ROADWAY AND SIDEWALK, CAMERA FACING NORTHEAST.

9  VIEW SHOWING DECK OF TILTON AVENUE UNDERPASS AND RAILROAD TRACKS, CAMERA FACING NORTHWEST.
TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)
HAER No. CA-2277
INDEX TO PHOTOGRAPHS (Page 2)

10 DETAIL VIEW OF ASHLAR MASONRY WALL BETWEEN TILTON AND MONTE DIABLO AVENUES, CAMERA FACING NORTHWEST.

11 DETAIL VIEW OF ASHLAR MASONRY WALL BETWEEN CORNER OF TILTON AND NORTH RAILROAD AVENUES, CAMERA FACING SOUTH WEST.

12 VIEW OF ASHLAR MASONRY RETAINING WALL, METAL FENCE, AND BALLAST OF RAIL LINE LOOKING TOWARDS TILTON AVENUE, CAMERA FACING NORTHWEST.

INDEX TO BLACK AND WHITE ENGINEERING DRAWINGS

13 AMERICAN BRIDGE COMPANY, DETROIT PLANT. "FOR SOUTHERN PACIFIC CO., 2 - 35'-4" DOUBLE TRACK BALLAST FLOOR SPANS GENERAL DIAGRAM." SHEET 1 OF 5. JANUARY 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

14 AMERICAN BRIDGE COMPANY, DETROIT PLANT. "FOR SOUTHERN PACIFIC CO. 2 DOUBLE TRACK THRO. GIRDER SPANS 35'-4", DETAILS OF GIRDERS & GUSSETS." SHEET 2 OF 5. JANUARY 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

15 AMERICAN BRIDGE COMPANY, DETROIT PLANT. "FOR SOUTHERN PACIFIC COMPANY, 2 DOUBLE TRACK THRO. GIRDER SPANS 35'-4", DETAILS OF FLOOR." SHEET 3 OF 5. JANUARY 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

16 AMERICAN BRIDGE COMPANY, DETROIT PLANT. "FOR SOUTHERN PACIFIC COMPANY, 2 DOUBLE TRACK THRO. GIRDER SPANS 35'-4", DETAILS OF COLUMNS AND GIRDERS." SHEET 4 OF 5. JANUARY 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.

17 AMERICAN BRIDGE COMPANY, DETROIT PLANT. "FOR SOUTHERN PACIFIC COMPANY, 2 DOUBLE TRACK THRO. GIRDER SPANS 35'-4", DETAILS OF BRACING." SHEET 5 OF 5. JANUARY 1903. ON FILE WITH THE PENINSULA CORRIDOR JOINT POWERS BOARD.
TILTON AVENUE UNDERPASS
(Bridge No. 35C0087)
HAER No. CA-2277
INDEX TO PHOTOGRAPHS (Page 3)

INDEX TO BLACK AND WHITE HISTORIC PHOTOGRAPHS

18  UNDATED HISTORIC PHOTOGRAPH CIRCA 1903-10 OF TILTON AVENUE BRIDGE, CAMERA FACING SOUTHWEST. ON FILE AT THE CALIFORNIA STATE RAILROAD MUSEUM LIBRARY, SACRAMENTO, CALIFORNIA.

19  MARCH 1, 1928 DATED PHOTOGRAPH OF TILTON AVENUE BRIDGE, CAMERA FACING NORTHEAST. ON FILE AT THE CALIFORNIA STATE RAILROAD MUSEUM LIBRARY, SACRAMENTO, CALIFORNIA.
PHOTOGRAPHIC KEY
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2277-1
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2277-2
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2277-8
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2277-9
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2277-11
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2277-15
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2277-16
HISTORIC AMERICAN ENGINEERING RECORD
SEE INDEX TO PHOTOGRAPHS FOR CAPTION
HAER CA-2277-19
BIBLIOGRAPHY


Board of Railroad Commissioners of the State of California. “Annual report of the Board of Railroad Commission of the State of California for the Year Ending November 1, 1891, Volume 12.”


“Grade Separation Laws and Requirements.” *Railway Age Gazette* (December 12, 1913): 1118-1121.


JRP Historical Consulting Services. “Inventory and Evaluation of Historic Resources Caltrain Electrification Project, San Francisco to Gilroy (MP 0.0 to 77.4),” 2000.


“Memorandum of Agreement Between the Federal Transit Administration and the California State Historic Preservation Officer,” May 1, 2008.


“Official Map of San Mateo County.” Compiled by George V. Kneese, County Surveyor, 1927.

Panhorst, F.W. “Need for Improved Bridges and Grade Separation Structures on the California Highway System.” Caltrans Transportation Library and History Center, Structure Maintenance Historical Collections, General Information File, File 11027.


San Francisco Chronicle.


