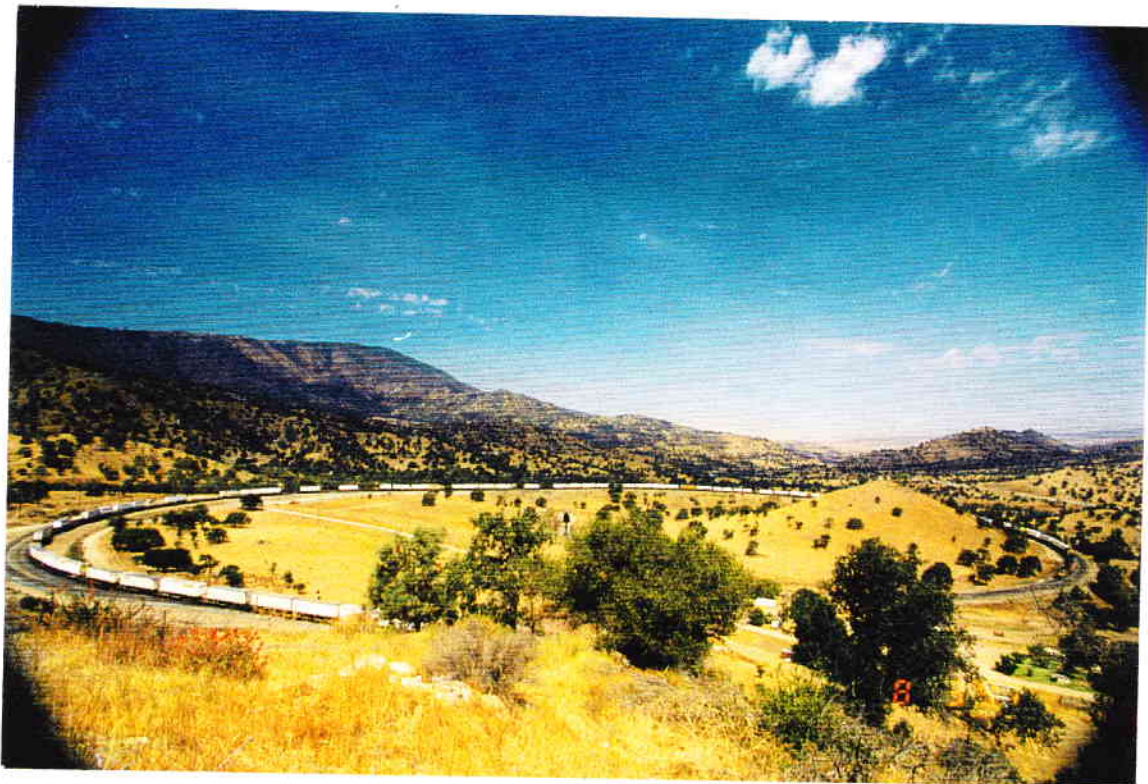


ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

NATIONAL HISTORIC CIVIL ENGINEERING LANDMARK
NOMINATION

TEHACHAPI PASS RAILROAD LINE
TEHACHAPI , CALIFORNIA

Constructed 1874-1876



Submitted By:
Los Angeles Section, ASCE

Submitted To:
Committee on History & Heritage
of American Civil Engineering
American Society of Civil Engineers
Washington DC

UNION PACIFIC RAILROAD COMPANY
ENGINEERING DEPARTMENT



Mailing Address:
Room 1000
1416 Dodge Street
Omaha, Nebraska 68179-1000

September 29, 1997

S. J. McLAUGHLIN
Vice President-Engineering Services
Room 1200
(402) 271-3018
FAX 402-271-5520
C. L. Jensen
Chief Engineer-M/W West
Roseville, California
(916) 789-6141
P. E. Jacquinot
Chief Engineer-M/W South
Spring, Texas
(713) 350-7508
J. C. Dowski
Chief Engineer-M/W North
Room 642
(402) 271-4722
E. P. Reilly
Chief Engineer-M/W Central
Room 642
(402) 271-5523
P. M. Abaray
Chief Engineer-Signals/Quality
(402) 271-3036
K. L. Wammel
Chief Engineer-Structures
(402) 271-5484

W. E. Wimmer
Senior Assistant
Vice President-Engineering
Management
Room 1030
(402) 271-4345
FAX 402-271-6674
T. T. Ogee
Chief Engineer-Design
(402) 271-4946
J. M. Sundberg
Chief Engineer-Equipment/Systems
(402) 280-7200
G. R. Lilly
Chief Engineer-Track Programs
(402) 280-7520
J. A. Rugg
Chief Engineer-Construction
(402) 271-5449
T. F. Connors
General Director-Planning
(402) 280-7201

Committee on History and Heritage
American Society of Civil Engineers
Los Angeles Section
1651 East 4th St., S244
Santa Ana, CA 92701

Dear Sir:

This will acknowledge the request for Union Pacific Railroad Company's support for nomination of the Tehachapi Loop as a National History Civil Engineering Landmark, as discussed in Mr. Warren A. Minner's September 5, 1997 letter to Union Pacific's Bill Wimmer.

Union Pacific has no objection to nomination of the Tehachapi Loop track as a National Historic Civil Engineering Landmark if such designation will not affect Union Pacific's ability to relocate, rehabilitate, maintain or otherwise change the character or nature of the loop track or, if necessary, remove the track. As I am sure you will understand, it is imperative that we retain the capability and flexibility of using the track as required for Union Pacific's future operations. Prior to nominating the Loop track as a Landmark, please confirm in writing that the designation will satisfy this condition.

Yours truly,

Tom T. Ogee

CC: Stan McLaughlin - Room 1200
Bill Wimmer - Room 1030
Lynn Jensen - Roseville

DARRELL V. DAUGHERTY
City Manager
THOMAS F. SCHROETER
City Attorney
REX A. MASON
City Engineer
DENNIS WAHLSTROM
Public Works Superintendent
A. A. ANTHONY
Fire Chief
RONALD D. CUNNINGHAM
Finance Officer
DAVID A. JAMES
Econ. Dev. Dir./City Planner



JOHN H.E. ROMBOUTS
Mayor
PHILIP A. SMITH
Mayor Pro-Tempore
MARIANA B. TEEL
Council Member
JAMES D. FRANKLIN
Council Member
TONY MONTANA
Council Member
JEANETTE M. HAUBRICH-KELLEY
City Clerk
ROSE B. FRENG
City Treasurer

September 25, 1997

Committee on History & Heritage
American Society of Civil Engineers
Los Angeles Section
1651 East 4th Street, S244
Santa Ana, CA 92701

SUBJECT: TEHACHAPI PASS RAILROAD LINE
National Historic Civil Engineering Landmark

Dear Committee Members,

Have you ever seen a train going through your town with ten diesel engines pushing and pulling over a hundred fully loaded freight cars? I have seen nineteen engines on one train. Have you ever heard the screeching of steel wheels on the track as trains loop around themselves in a 360-degree loop in 4,000 feet of track and gain 77 feet of elevation? Can you imagine engines totaling 40,000 horsepower struggling to push and pull 14,000 tons of freight up a 2.5% grade? Can you picture over 3,000 Chinese labors building eleven bridges, blasting and digging eighteen tunnels, grading the right-of-way and laying 55 miles of track over a 4,000 foot elevation pass? Where do you see over 50 trains a day come and go—railroad track and ties replaced every five years, frequent derailments because of the steep grades with thousands of curves, where a single set of track carries the most tonnage in the world and is used by two of the largest railroads in the country?

TEHACHAPI IS OUR NAME—RAILROADING IS OUR GAME

Our community of 30,000 residents is at the summit of the Tehachapi Pass where this amazing stretch of railroad crosses the Sierra Nevada Mountains and connects northern and southern California with the rest of the United States. Our modern beginning started over 120 years ago with the railroad. Our heritage and economy center around the greatest railroad engineering feat in the United States and seventh in the world. Train enthusiasts from all over the country and the world come to Tehachapi to view the wonder of "The Loop" and marvel at the trains that pass through our community. We built a railroad park over twenty years ago and continue to memorialize the railroad


Page 2
Tehachapi Pass Railroad Line
September 25, 1997

through restoration of our depot; creating a heritage center on 2½ acres leased from Union Pacific; preserving one of the last steam engine water towers; building a freight car loading/unloading facility. In addition, expanding our museums with old steam engines, rolling stock, historic signals and other memorabilia; building and planning an observation point/rest stop near the famous Tehachapi Loop.

We strongly urge the American Society of Civil Engineers to approve the nomination of this critical and important Tehachapi Pass Railroad Line as a National Civil Engineering Landmark. As further evidence of our community interest and dedication to this famous railroad engineering feat, we have prepared a videotape on Tehachapi Railroad history to help us in our depot restoration project. We also are starting the planning on the Tehachapi Heritage Center which is mentioned above.

Thank you for your support of this project. Please do not hesitate in call me at any time if you have any questions. My home telephone number is (805) 822-3565.

Sincerely,



JOHN H.E. ROMBOUTS
Mayor for City of Tehachapi

JR/ch

Enclosures

I:\letters\council\tehloop2



TEVE A. PEREZ
Second District Supervisor

Tracy Nelson
Chief of Staff

Michael G. Halpern
Field Representative

BAKERSFIELD OFFICE
1115 Truxtun Avenue, Fifth Floor
Bakersfield, CA 93301-4639
(805) 861-2537
(805) 631-2819 Fax
E-Mail:
perez@lightspeed.net

Jason Caudle
Field Representative

TEHACHAPI OFFICE
206 South Mill Street
Tehachapi, CA 93561
(805) 823-0164
(805) 823-0165 Fax
E-Mail:
jcaudle@lightspeed.net

Don Maben
Field Representative

MOJAVE OFFICE
1775 Hwy. 58
Mojave, CA 93501
(805) 824-4631
(805) 824-8970 Fax
E-Mail:
dmaben@lightspeed.net

Internet Home Page
<http://www.kerncounty.net/bos/perez.htm>

10-1-97

Committee on History & Heritage
American Society of Civil Engineers
Los Angeles Section
1651 East 4th Street, S244
Santa Ana, CA 92701

Dear Committee Members,

Let me start this letter by thanking you for everything you are doing to preserve and identify Historic Civil Engineering Landmarks. Too many times we lose our history because people do not realize the importance. Thankfully, we have people like you who are committed to the preservation of such landmarks.

I am delighted to hear that the Committee on History and Heritage of American Civil Engineering has the opportunity to recognize the Tehachapi Railroad Pass Line as a National Civil Engineering Landmark. As you may already know, the railroad has served Kern County in numerous ways. From the first settlers to the current residents, this railroad has shipped goods, created towns, and continues to provide communities with educational and tourist opportunities. By designating this portion of track as national landmark your committee highlights one of the most important parts of our area's history for all to see. I strongly urge the American Society of Civil Engineers approve the nomination of this critical and important Tehachapi Pass Railroad Line as a National Civil Engineering Landmark.

Let me repeat that it is most gratifying to know there are individuals who share my love and pride in this great nation, and devote themselves and their efforts to preserving an important part of our American Heritage for the benefit of future generations.

Sincerely,

Steve A. Perez, Chairman
Kern County Board of Supervisors

Daniel Steinberg
President
Tehachapi Loop Railroad Club
Tehachapi, California

Committee on History and Heritage
American Society of Civil Engineers
Warren Minner

October 7, 1997

Re: Recognition of the Tehachapi Pass Railroad Line as a National
Historic Civil Engineering Landmark.

Dear Committtee Members :

I am writing you on behalf of the Tehachapi Loop Railroad Club. We are mostly Tehachapi region residents interested in railroading. We are historians, educators, engineers, modelers, and exhibitors in railroad faire. In this case we, our fifty-plus members are heartily endorsing your consideration of the Tehachapi Pass Railroad Line as a National Civil Engineering Landmark.

Our own public display of an HO scale model of the Tehachapi Loop in the lobby of the Mountain Crossing Restaurant attests to the world wide interest in the Tehachapi Pass Railroad Line. Our Guest Book at this rural restaurant site is signed by people from all over the world and U. S.A.; all here to visit the "Famous Tehachapi Loop".

You have a comprehensive report of the details of this historical and engineering feat. What you don't have is the "Oohs and Aahs" of the young and old who see the Loop, whether it be for the first or hundredth time. The excitement of all to see two trains looping themselves is beyond words. When our member guides recount the history to newcomers to the Loop, there is an almost discernable disbelief, jaw dropping in awe and wonder. When the senses are stimulated by the SIGHTS and SOUNDS of six or more diesel locomotives pulling 90 or more box cars, gondolas, flatbeds and timber cars, the response is always the same: GOOSE BUMPS! What a testimony to this Civil Engineering accomplishment.

Your Committee will be reviewing the formal nominating document. We hope to support that document from our unique perspective as railroad enthusiasts. The membership of the Tehachapi Loop Railroad Club encourages your recognition of the Tehachapi Pass Railroad Line as a National Historic Civil Engineering Landmark.

Sincerely ,
Daniel Steinberg



The Greater Tehachapi Chamber of Commerce

POST OFFICE BOX 401 • TELEPHONE (805) 822-4180
TEHACHAPI, CALIFORNIA 93581

October 7, 1997

Committee on History & Heritage
Los Angeles Section
1651 East 4th Street, S244
Santa Ana, CA 92701

SUBJECT: TEHACHAPI PASS RAIL ROAD LINE
National Historic Civil Engineering Landmark

Dear Committee Members:

The Greater Tehachapi Chamber of Commerce very strongly supports and encourages the American Society of Civil Engineers in their efforts to have the Tehachapi Pass Railroad Line from Caliente to Tehachapi including the Tehachapi Loop declared a "NATIONAL HISTORIC CIVIL ENGINEERING LANDMARK".

This line played a major role in early California history in fact our wonderful mountain town had its beginning because of the railroad. Every year we have tourists and railroad enthusiasts literally from all over the world who have come to Tehachapi in order to view this amazing railroad engineering feat.

Our community would be pleased to have the line given national recognition by the civil engineering profession.

Sincerely,

GREATER TEHACHAPI CHAMBER OF COMMERCE

Carol Lawhon
Manager

HISTORIC CIVIL ENGINEERING LANDMARK

NOMINATION FORM

TO: Committee on History and Heritage
American Society of Civil Engineers
1015 16th Street, NW, Suite 600
Washington, DC 20005

DATE:

TYPE: National Landmark

ASCE SECTION: Los Angeles

Gentlemen,

This is to nominate the following for designation as an Historic Civil Engineering Landmark:

TEHACHAPI PASS RAILROAD LINE

BRIEF DESCRIPTION:

Southern Pacific Railroad Tracks through the Tehachapi Mountains from **Caliente to Tehachapi, California**. This very steep mountain line completed in 1876 includes the world famous Tehachapi Loop, first of it's kind. It was a formidable mountainous crossing and a portion of the final link in the first railroad line running between San Francisco and Los Angeles.

LOCATED AT: Tehachapi Mountains **COUNTY:** Kern **STATE:** California

LATITUDE AND LONGITUDE:

Please furnish below the latitude and longitude to the nearest minute (or U.T.M. coordinates) and as an appendix a detailed local map and a vicinity map showing access from a major city or the interstate.

119° - 37' longitude x 35°- 18' N latitude (Caliente) to 118°- 27' longitude x 35°- 8' N latitude (Tehachapi).

OWNER:

The proposed landmark owner:

Union Pacific Railroad Company. Originally constructed by the Southern Pacific Railroad Company, now part of the Union Pacific Railroad Company.

In support of this nomination the following information is provided:

1. DATE OF CONSTRUCTION: and other significant dates

1853 - Government surveys by Lieutenant R. S. Williamson

1866 to 1872 - surveys by SPRR

1874 to 1876 - construction

September 1876 - opened to traffic. In continuous use since that time.

2. KEY CIVIL ENGINEERS: and other professionals associated with project

William Hood - Chief Engineer SPRR

J. B. Harris - Chief of Construction SPRR

3. HISTORIC SIGNIFICANCE OF THIS LANDMARK:

This was a portion of the last and final link in the first railroad line connecting San Francisco to Los Angeles. It was a primary factor in the early growth of the State of California. It is still a major factor in the booming economy and prosperity of the Los Angeles area and the State of California. It not only opened up communications and trade with San Francisco but also with the east coast and other 47 states. Railroad line construction by the Southern Pacific Railroad Company continued eastward from Mojave after completion of this project. This line east is now part of the Santa Fe system.

Historic Facts

- a. This mountain railroad line is simple in concept but very steep and was difficult to construct. At the time of construction, 1874, many people felt it would never be completed. They thought the railroad line would go no further than the town of Caliente which is at the beginning of the steep climb out of the San Joaquin Valley to the Tehachapi Pass. William Hood, Chief Engineer and J.B. Harris, Chief Construction of the Southern Pacific Railroad proved them to be wrong. The line was completed in September 1876 and immediately put into operation. It has been in use continuously since that time for a period of 121 years.
- b. To keep the gradient of the tracks down to an acceptable level, William Hood swerved the line in serpentine fashion from side to side and at one point back over itself at the famous Tehachapi Loop. Tunnels were also blasted and dug out along the way to avoid short radius turns. The result was a steep line of 2.2% average gradient but still usable by the trains and locomotives of that day.
- c. The Tehachapi Pass line starts at the south end of the San Joaquin Valley in Bakersfield (elevation 400'). It climbs 3628' up the north slope in 50 miles to the Tehachapi Summit (elevation 4028') and then descends 1279' down the south slope in 18 miles to Mojave. The steep portions of the line in the Tehachapi Mountains average 2.2% in grade with a maximum of 2.52% on the north slope and 2.34% on the south slope.

- d. The line was built using blasting powder and hand tools (picks, shovels and horse drawn plows, scrapers and carts). It was blasted and dug through solid and decomposed granite. It was completed in less than 2 years time. The work force exceeded 3000 men at its peak. Almost all of the workman were Chinese laborers. The Chinese laborers were hired by the Southern Pacific Railroad through "Brokers" from Canton, China. Most of the workers stayed in California after the completion of the railroad, settling in Los Angeles, San Francisco and other California cities.
- e. About two-thirds of the mountain crossing is double track. The remaining one-third is single track including that which passed through 18 tunnels, most of which were blasted through granite rock. Since the original construction 6 tunnels have been abandoned, some of which were extensively damaged during the 1952 Tehachapi Earthquakes.
- f. The line crosses over several creeks on 10 bridges. Originally there were numerous water towers for the old steam locomotives. All that remains today are the foundations except for one water tower located in the City of Tehachapi.
- g. Because of the steep grades between Caliente and Tehachapi, additional helper locomotives must be added to each train to pull the grade or brake the descent of the trains. The extra locomotives are usually cut out of the trains at the Tehachapi Summit switch and return to Bakersfield. Up to 12 or more diesel locomotives are required for each consist.
- h. In the late 1800's, the Santa Fe Railroad, in order to compete with the Southern Pacific Railroad, constructed a parallel railroad line from San Francisco down the San Joaquin Valley until it reached the Tehachapi Mountain Pass area, here, after cost studies were made, they decided not to construct a parallel line through the Tehachapi Mountains. It simply was too costly. Instead, they negotiated a contract with the Southern Pacific Railroad and joined the two lines together just east of Bakersfield. The Tehachapi Pass line carries both the trains of the Southern Pacific and Santa Fe Railroads over it between Bakersfield and Mojave. There they divide into two separate lines again. Southern Pacific was said to have agreed to this to help pay for a portion of its enormous cost of the Tehachapi Pass line.
- i. The combined use of this line by these two major railroads makes it one of the most heavily traveled and congested in the world. Passenger trains no longer use this line except under special circumstances. The average use of this partly single track line is 36 trains per day. It is a main line in the United States Railroad System which passes more tonnage of freight each year than most other single line tracks in the world. It is one of the oldest works of civil engineering in California.

Committee on History & Heritage

- j. This line is the crowning achievement and legacy of chief engineer William Hood of the Southern Pacific Railroad. The loop has become one of the seven wonders of the railroad world. It has been imitated by other railroads several times at other locations since Tehachapi was constructed. It is known and respected by railroad engineers, railroad personnel and enthusiasts throughout the world.
- k. This line has been previously honored by several state historical societies at 4 locations; Caliente, Bealville, and twice at the Loop.

4. COMPARABLE OR OTHER SIMILAR PROJECTS: Both in the United States and other countries.

<u>NAME</u>	<u>LOCATION</u>	<u>CONSTRUCTION DATE</u>
Georgetown, Breckenridge and Leadville RR	Colorado, U.S.A.	1884
Kicking Horse Pass	Yoho National Park, Canada	1885
Hiwassee	Tennessee, U.S.A.	1890
Williams Loop Sierra Nevada Crossing	Northern California, U.S.A.	1905
Lotschberg	Switzerland	1915

5. UNIQUE FEATURES: or characteristics which set this proposed landmark apart from other civil engineering projects, including those in #4. above.

- a. This railroad line includes the first known use of a loop (track crosses over itself) to gain elevation in railroad engineering history.
- b. The world famous loop has a circumference of about 3800' and rises 77' as the line crosses back over itself. Train enthusiasts from all over the country and, indeed, the world, travel to Tehachapi to view the trains going up and down the north slope and especially around the loop. The setting is beautiful (wooded mountains) and the trains travel slowly (25 mph maximum) which provides good photographic opportunities.
- c. The steep portions of the line in the Tehachapi Mountains has a maximum grade of 2.52% on the north slope. These grades exceed the customary maximum grade of 2.0% desired for railroad lines and may be the steepest on any major railroad line in the United States. The steep grades require the use of extra locomotives for the trains which go both up and down the grade.

- d. The Southern Pacific Railroad Company had special locomotives built for use on this track because of the steep grades. One is pictured in the appendix item 3, The Early Days, page 25. Another is the famous cab forward "Mallet" locomotive. The cab was placed forward on these locomotives to protect the engineer and brakeman from excessive smoke which developed in the tunnels of the Tehachapi Pass Railroad Line and the Sierra Nevada Crossing.
- e. This line including the world famous loop was recently voted number 1 of a list of other worldwide train lines for best viewing and photographing by the readers of "Trains" magazine.

6. THE PROJECTS CONTRIBUTION:

(1) To the Civil Engineering Profession:

The Tehachapi Pass Railroad Line was completed in record time considering it was constructed through solid and decomposed granite mountains in less than 2 years time without the use of power tools. It was constructed using blasting powder, horses and hand tools. The unique loop, first of its kind, was constructed to gain elevation in a particularly steep area without increasing the slope of the line to an unacceptably steep grade.

The superior job of railroad engineering done by the Southern Pacific Railroad is confirmed by the following facts. This line is still used today, 121 years after its completion, almost unchanged. The Loop design which was the state of the art design at the time of construction has since been incorporated into many other railroad lines as listed in 4. above. This line in essence was a successful prototype for many subsequent railroad projects.

(2) To the State and Nation:

By completion of the first railroad line between San Francisco and Los Angeles it opened up trade and commerce between Los Angeles and San Francisco and between California and the other 47 states. It was and still is a major factor in the growth of the state and its economy. It carries an average daily traffic of 36 trains per day. It transports more freight each year than most other single track railroad lines in the world.

7. PUBLISHED REFERENCES:

"Tehachapi" by John R. Signor - Golden West Books, 1983.

"Tehachapi: Railroading on a Desert Mountain" by Steve Schmollinger - Boston Mills Press Book, 1993.

"Historical Site Markers - Kern County" by William G. Hample

"California Railroad Era" - W. McAfee

8. ADDITIONAL DOCUMENTATION:

“Tehachapi: Railroading on a Desert Mountain” by Steve Schmollinger - Boston Mills Press Book, 1993. This book is included with this application.

9. CITATION:

The American Society of Civil Engineers hereby declares the Union Pacific Railroad Company, formerly Southern Pacific Railroad Company, tracks from Caliente to Tehachapi through the Tehachapi Mountains to be a National Historic Civil Engineering Landmark.

This outstanding feat of Civil Engineering not only advanced the state of the art of railroad engineering but was a primary factor in the early growth of the State of California. It contains the world famous Tehachapi Loop, first of its kind to be used in a railroad line. It was a portion of the last and final link in the first railroad line connecting San Francisco to Los Angeles. It is still a major factor in the booming economy and prosperity of the Los Angeles area and the State of California.

Construction Dates	1874-1876
Chief Engineer	William Hood
Chief of Construction	J. B. Harris
Construction Crew	over 3000 Laborers, mostly Chinese from Canton, China.
Construction	by blasting powder, hand picks, shovels and horse drawn plows, scrapers and carts through solid and decomposed granite.
Owner	Union Pacific Railroad Company. Originally constructed by Southern Pacific Railroad Company.
Used by	Union Pacific Railroad Company and Burlington Northern Santa Fe Railroad Company.
Daily train traffic	Approximately 36 trains per day

10. LETTERS OF SUPPORT:

Letters from (see following pages):

- Union Pacific Railroad Company (Owner)
- City of Tehachapi
- Kern County, California
- Tehachapi Loop Railway Club
- Greater Tehachapi Chamber of Commerce

Committee on History & Heritage

If this nomination is approved for designation as a National Historic Civil Engineering Landmark by the Board of Direction of ASCE, we understand that the undersigned will have the major responsibility for the public presentation ceremony of the plaque and for plaque maintenance.

PREPARED BY:

Warren A. Minner
Member, Southern San Joaquin Branch,
Los Angeles Section ASCE History & Heritage Committee

Roger A. Teal
Member, Los Angeles Section ASCE History & Heritage Committee

RESPECTFULLY SUBMITTED:

Irving Sherman
Chairman, Los Angeles Section ASCE History & Heritage Committee

Los Angeles Section ASCE Secretary

Los Angeles Section ASCE President

APPENDIX

<u>ITEM</u>	<u>SHEET</u>
“Battling the Tehachapis”	5 Pages
The Tehachapi Pass Railroad Line.....	2 Pages
The Early Days, 1870-1900	21 Pages
Location Maps	Sheets 1 & 2
Route Map.....	Sheet 3
Route Map.....	Sheet 4
Route Profile.....	Sheet 5
Reasons for National Landmark Classification	Sheet 6
Pictures	10 Pages
Slide and Black & White Photo.....	1 Page