



**HISTORIC PRESERVATION CERTIFICATION APPLICATION
PART 1 – EVALUATION OF SIGNIFICANCE**

NPS Project Number

Instructions: This page must bear the applicant's original signature and must be dated. The National Park Service certification decision is based on the descriptions in this application form. In the event of any discrepancy between the application form and other, supplementary material submitted with it (such as architectural plans, drawings and specifications), the application form takes precedence. A copy of this form will be provided to the Internal Revenue Service.

1. Property Name Sacramento Shops Historic District

Street 111 I Street

City Sacramento County Sacramento State CA Zip 95814-2204

Name of Historic District Sacramento Shops Historic District (proposed)

- National Register district certified state or local district potential district

2. Nature of request (check only one box)

- certification that the building contributes to the significance of the above-named historic district or National Register property for rehabilitation purposes.
 certification that the building contributes to the significance of the above-named historic district for a charitable contribution for conservation purposes.
 certification that the building does not contribute to the significance of the above-named district.
 preliminary determination for individual listing in the National Register.
 preliminary determination that a building located within a potential historic district contributes to the significance of the district.
 preliminary determination that a building outside the period or area of significance contributes to the significance of the district.

3. Project Contact (if different from applicant)

Name Matthew Davis Company Architectural Resources Group

Street 720 SW Washington Street, Suite 605 City Portland State OR

Zip 97205-3519 Telephone (971) 256-5320 Email Address m.davis@arg-pnw.com

4. Applicant

I hereby attest that the information I have provided is, to the best of my knowledge, correct. I further attest that [check one or both boxes, as applicable] (1) I am the owner of the above-described property within the meaning of "owner" set forth in 36 CFR § 67.2 (2011), and/or (2) if I am not the fee simple owner of the above-described property, the fee simple owner is aware of the action I am taking relative to this application and has no objection, as noted in a written statement from the owner, a copy of which (i) either is attached to this application form and incorporated herein, or has been previously submitted, and (ii) meets the requirements of 36 CFR § 67.3(a)(1) (2011). For purposes of this attestation, the singular shall include the plural wherever appropriate. I understand that knowing and willful falsification of factual representations in this application may subject me to fines and imprisonment under 18 U.S.C. § 1001, which, under certain circumstances, provides for imprisonment of up to 8 years.

Name _____ Signature _____ Date _____

Applicant Entity _____ SSN _____ or TIN _____

Street _____ City _____ State _____

Zip _____ Telephone _____ Email Address _____

NPS Official Use Only

The National Park Service has reviewed the Historic Preservation Certification Application – Part 1 for the above-named property and has determined that the property:

- contributes to the significance of the above-named district or National Register property and is a "certified historic structure" for rehabilitation purposes.
 contributes to the significance of the above-named district and is a "certified historic structure" for a charitable contribution for conservation purposes.
 does not contribute to the significance of the above-named district.

Preliminary Determinations:

- appears to meet the National Register Criteria for Evaluation and will likely be listed in the National Register of Historic Places if nominated by the State Historic Preservation Officer according to the procedures set forth in 36 CFR Part 60.
 does not appear to meet the National Register Criteria for Evaluation and will likely not be listed in the National Register.
 appears to contribute to the significance of a potential historic district, which will likely be listed in the National Register of Historic Places if nominated by the State Historic Preservation Officer.
 appears to contribute to the significance of a registered historic district if the period or area of significance as documented in the National Register nomination or district documentation on file with the NPS is expanded by the State Historic Preservation Officer.
 does not appear to qualify as a certified historic structure.

Date National Park Service Authorized Signature

NPS comments attached

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Property name Sacramento Shops Historic District NPS Project Number _____
Property address 111 I Street Sacramento Sacramento CA 95814-2204

5. Description of physical appearance

The Sacramento Shops Historic District comprises approximately 14 acres located north of downtown Sacramento, California. The district sits immediately north of the Amtrak rail lines and Sacramento Valley Station and is otherwise surrounded by acres of vacant land and recently platted rights-of-way to the west, north, and east. The district includes a tight cluster of eight nineteenth-century industrial buildings and one object (a turntable) that together constitute the core of what was once a much larger railroad shops complex. With the exception of a privy, the contributing buildings are large in scale, reflecting their historic association with the construction, repair and maintenance of railroad locomotives, freight cars, and passenger cars. Six of the eight buildings are masonry structures built in the American round-arched style, which was a popular choice for industrial, commercial and religious architecture in the late nineteenth century. The district's contributing buildings have generally undergone only minor exterior alterations since the period of significance and as a result the Sacramento Shops Historic District retains sufficient integrity to convey its historic significance.

Please see continuation sheets, pages 2 through 20.

Date(s) of building(s) 1867; 1868; 1869; 1873; 1888; 1889 Date(s) of alteration(s) various--see pages 2 through 20

Has building been moved? no yes, specify date _____

6. Statement of significance

The Sacramento Shops, constructed by the Central Pacific Railroad Company and operated in turn by the Central Pacific, Southern Pacific and Union Pacific Railroads, is an industrial district eligible for inclusion on the National Register of Historic Places under Criteria A (Events/Pattern of Events) and C (Architecture/Design). As one of the oldest and most prominent steam-era railroad shop complexes in the western United States, the Sacramento Shops Historic District is significant at the national level under Criterion A for its association with the development and expansion of the American railroad industry, from the construction of the transcontinental railroad through the beginning of the Southern Pacific Company's mid-twentieth-century transition from steam locomotives to diesel locomotives. It is also significant at the local level under Criterion C as a distinctive example of industrial architecture dating to the late nineteenth and early twentieth centuries. The period of significance begins in 1867, with initial construction of the site, and ends in 1947, by which time the Southern Pacific had initiated a concerted effort to replace its fleet of steam locomotives with diesel locomotives. The "dieselization" of the Southern Pacific's fleet of locomotives is related to substantial changes in the operation and physical fabric of the Sacramento Shops (e.g., the interior remodel of Car Shop No. 3 in 1948 and the removal of the Roundhouse in 1959) and is therefore an appropriate end date to the period of significance.

Please see continuation sheets, pages 21 through 59.

7. Photographs and maps. Send photographs and map with application.

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5. Description of physical appearance, cont.

The Sacramento Shops Historic District includes nine extant resources constructed during the period of significance, which extends from 1867 through 1947. Initial construction of these nine resources (eight buildings and one object) occurred between 1867 and 1888, during which time the core buildings, structures, and objects that form the Sacramento Shops complex were completed. The complex continued to expand through the early twentieth century, reaching maximum build-out (approximately 200 acres) by the late 1920s. The extant resources within the Sacramento Shops Historic District have experienced multiple rounds of addition and alteration.

Extensive alterations associated with the Southern Pacific's transition from steam locomotive to diesel technology, which began in earnest in 1947, fundamentally altered the appearance and circulation patterns of the Sacramento Shops. A large number of buildings, structures, and objects associated with the complex were subsequently removed in the late twentieth and early twenty-first centuries, leaving only a core group of facilities covering approximately 14 acres. These extant buildings and object—the Boiler Shop, Erecting/Machine Shop, Blacksmith Shop, Car Machine Shop, Planing Mill, Car Shop No. 3, Privy, Paint Shop, and Turntable—comprise the Sacramento Shops Historic District.

Initial Construction (1867-1888)

In the mid-nineteenth century, the land beneath the Sacramento Shops Historic District was a marshy slough adjacent to the city's riverfront. The slough and an adjacent lake, Lake Sutter, were gradually infilled with sand by the Central Pacific Company; by 1867, approximately twenty acres had been prepared for construction, though the complex would grow to cover approximately two hundred acres at maximum build-out. The first wave of construction, which was completed by 1869, included the Planing Mill, Erecting/Machine Shop, and the Blacksmith Shop, all of which were large, rectangular buildings constructed of brick in the American round-arched style. These buildings formed the heart of the Sacramento Shops complex, and they were grouped closely together in order to share a common power source.¹ Also included in this core group of facilities were a Roundhouse and an associated Turntable; although neither the Roundhouse nor the original Turntable remain extant, the present-day Turntable is installed on the same pivot point as its predecessor.

The Sacramento Shops experienced a second wave of new construction in the early 1870s. The Paint Shop and the Privy were completed by circa 1873, and a small wing off the southern elevation of the Planing Mill was expanded and renamed Car Shop No. 3 in 1872. All three were constructed from brick in the American round-arched style. With their completion, the organization of the Shops complex began to solidify, with the car-related facilities in the eastern portion of the complex and the locomotive-related facilities in the western portion. Common facilities, including the Blacksmith Shop and Privy, were located centrally or near the southern edge of the complex. Railroad spurs formed the northern and southern boundaries of the complex, with secondary lines providing access directly to certain buildings. One transfer table moved rolling stock between bays in the Paint Shop and Car Shop No. 3, while another moved locomotives between bays in the Erecting/Machine Shop. The Turntable directed locomotives into the Roundhouse or toward either side of the complex. Between and around the buildings, nearly three thousand eucalyptus trees were planted in the mistaken assumption that they would ward off the mosquitos breeding in what remained of Lake Sutter.²

The third wave of early development at the Sacramento Shops occurred in 1888 with the construction of the Boiler Shop and Car Machine Shop. The Car Machine Shop, which matched earlier development in material and style, was erected to the north of the Planing Mill. The Boiler Shop, a more utilitarian building featuring wood framing and corrugated metal cladding, joined the Erecting/Machine Shop at the western edge of the complex. Also in 1888, some existing facilities were expanded, as major additions significantly increased the size of Car Shop No. 3 and the

¹ Power was supplied to these three buildings by the Power House, a wing off of the southern elevation of the Planing Mill. This building was later made obsolete and removed.

² Mary A. Helmich with Kevin V. Bunker, *A Legacy in Brick and Iron* (Sacramento, CA: FYA Publications, 2018), 154.

Erecting/Machine Shop. These additions generally continued the original buildings' material, scale, and style.

Subsequent Development (1888-1947)

The Sacramento Shops complex continued to expand through the early twentieth century, eventually encompassing more than two hundred buildings and two hundred acres. The remainder of Lake Sutter was infilled in the 1900s and 1910s in order to increase the available land area, which had the secondary effect of reducing the mosquito problem. The eucalyptus trees that had covered the complex were removed due to concerns about their flammability, sensitivity to frost, and long roots that could compromise building foundations. A limited amount of greenery remained in the form of small gardens and a closely-clipped lawn on the transfer table runway between Car Shop No. 3 and the Paint Shop.³

Throughout the period of significance, the spatial layout of the Sacramento Shops complex was organized according to the specific type of rolling stock served. Locomotives continued to be constructed and serviced in the western portion of the complex, while car construction, repair, and maintenance remained concentrated in the eastern portion; the Blacksmith Shop, which served both locomotive and car activities, was located between the two portions, with other foundries, warehouses, and similar support facilities located to the south. At the height of activity, passenger car and freight car activities were separated, and the latter moved to new facilities a quarter-mile northeast of the Paint Shop; however, the general division of car and locomotive activities remained.

New buildings were added as necessary to support shop operations, and existing buildings were occasionally expanded or remodeled to accommodate increased workloads as well as new technologies. As locomotives increased in length, for example, the Turntable was necessarily replaced with larger models in 1895-1896 and again in 1943. Other alterations were related to fire damage or maintenance concerns. Major fires struck the Sacramento Shops in 1898 and again in 1917, resulting in the reconstruction of much of the Car Machine Shop, Planing Mill, and Car Shop No. 3. The reconstructed portions of these buildings are similar to the originals in form and style, but certain features—such as the double monitor roof on Car Shop No. 3—were altered in order to modernize the buildings and improve their function. The Blacksmith Shop, which suffered cumulative damage due to the intensity of the activities it housed, was refurbished in the late 1920s and 1930s with new, reinforced concrete walls containing large expanses of steel windows.

Changes Since the Period of Significance

The spatial arrangement of the Sacramento Shops complex remained fairly consistent throughout the period of significance, which ended in 1947. The transition from steam locomotives to diesel technology in the early postwar period was marked by a fundamental reorganization of the site and associated renovations to existing buildings. Circulation patterns were necessarily altered by the change in technology; diesel locomotives could move equally well in either direction, and so the importance of the Turntable was reduced and the Roundtable was removed entirely in 1959. The space devoted to car construction and repair was reduced as diesel locomotive facilities expanded from the western portion of the complex into the Car Machine Shop, the Planing Mill, the Blacksmith Shop, Car Shop No. 3, and the Paint Shop. While many of these buildings experienced interior alterations related to their change in use, exterior alterations were generally limited.

The majority of the buildings, structures, and objects that had comprised the Sacramento Shops complex were removed between the mid-1980s and early 2000s in connection with environmental remediation efforts at the site. In 1988, the Union Pacific Railroad and the Department of Toxic Substances Control (DTSC) entered into an Enforceable Agreement regarding the investigation and remediation of hazardous substances at the complex; following a change in ownership in 2007, S. Thomas Enterprises of Sacramento, LLC (STES) assumed responsibility for the remediation work, but Union Pacific resumed responsibility following a 2010 foreclosure on the property. Ultimately, remediation work resulted in the demolition and removal of foundry buildings, personnel shacks, stores buildings, storage tanks, and concrete bunkers, as well as the excavation of more than 50 percent of the area originally covered by the Sacramento Shops, the nearby Sacramento Valley Station, and associated trackage. In several places, including the areas immediately north of the extant buildings and the area formerly occupied by Car Shop No. 9, soil remediation extended from 5 to 34 feet below the then-current grade. Contaminated soil was removed or treated, and the excavated areas were backfilled with clean soil. The Union Pacific remained the Responsible Party

³ Helmich, *A Legacy in Brick and Iron*, 154.

under the 1988 Enforceable Agreement until 2015, when the property was purchased by DRV and a new Memorandum of Agreement (MOA) was established between DTSC and DRV.⁴

The landscape of the site has also been altered by the construction of new drainage swales, berms, paved roadways, and railroad tracks. In the years following completion of the Railyards Specific Plan in 2007, portions of the approved infrastructure, including several roads to the north and east of the district, were completed in the area formerly occupied by parts of the Sacramento Shops complex.⁵ Aside from a limited amount of trackage associated with the Turntable, all historically-associated railroad tracks were removed entirely around this time. The railroad tracks and heavy-rail passenger platforms beyond the southern boundary of the district were completed in 2012, and a short spur to the south of the Boiler Shop was added in the same year. Finally, the Locomotive Transfer Table between the Erecting/Machine Shop and the Boiler Shop was reconstructed in 2003.

The boundaries of the Sacramento Shops Historic District encompass eight contributing buildings and one contributing object, as well as one non-contributing building and one non-contributing object that were constructed or reconstructed after the period of significance. Two contributing buildings (the Erecting/Machine Shop and the Boiler Shop) and the non-contributing building and object (the Firing Line and the Locomotive Transfer Table) in the western portion of the complex are currently used for rolling stock restoration, maneuvering, and storage. The other contributing buildings (the Privy, Blacksmith Shop, Car Shop No. 3, Planing Mill, Paint Shop, and Car Machine Shop) and the contributing object (the Turntable) are currently unused. The areas surrounding the buildings are generally paved or covered with gravel, with little to no cultivated vegetation.

DISTRICT BOUNDARY JUSTIFICATION

The historic district boundary encompasses the cluster of extant resources that are associated with the Sacramento Shops during the period of significance (1867-1947), including the Boiler Shop, Erecting/Machine Shop, Blacksmith Shop, Car Machine Shop, Planing Mill, Car Shop No. 3, Privy, Paint Shop, and Turntable. While, historically, the Sacramento Shops complex extended well beyond this cluster, extensive environmental remediation activities beginning in the 1980s recontoured the land surrounding the boundary and cleared those areas of all buildings and associated features, with one exception. The lone exception is a steel water tower constructed in the early 1930s that is located approximately 500 feet north of the Paint Shop. The water tower was excluded from the district boundary due to its distance from the cluster of extant resources and because the land between the tower and extant resources bears no resemblance to its historic condition (as described in detail in the previous section) and would not be appropriate to include within the district.

CHARACTER-DEFINING FEATURES OF THE DISTRICT

The Sacramento Shops Historic District is visually characterized by a tightly-organized cluster of large, industrial buildings. The majority of these buildings are constructed of brick in the American round-arched style, although industrial modern and utilitarian forms that employ reinforced concrete, wood framing, and corrugated iron cladding are also represented. The buildings are situated closely together without formal intervening sidewalks or roadways. Historically, railroad tracks would have connected many of these resources. Vestiges of this circulation system may be observed in the Turntable, which is located at the northern boundary of the district and played a significant role in directing steam locomotives to various locations around the complex.

Within the boundaries of the Sacramento Shops Historic District, most open areas represent a loss of historic fabric and should not be considered character-defining features. For example, the large space separating the Paint Shop and Car Shop No. 3 was formerly a transfer table, used for moving cars between bays in the two buildings. The open space surrounding individual shop buildings is generally unimproved and without formal landscaping. Trees, in particular, were avoided after the turn of the twentieth century, as they are flammable and have deep roots that might disturb the foundations of the complex's numerous masonry buildings.⁶

Contributors to the Sacramento Shops National Register Historic District include eight contributing buildings and one contributing object (with original construction dates):

⁴ ESA, "Sacramento Railyards Specific Plan Update, KP Medical Center, MLS Stadium, & Stormwater Outfall: Draft Subsequent Environmental Impact Report," prepared for the City of Sacramento (June 2016): 4.4-34 - 4.4-37; 4.4-48; 4.8-11.

⁵ ESA, "Sacramento Railyards Specific Plan Update," 2-37 and 2-65.

⁶ Helmich, *A Legacy in Brick and Iron*, 154.

Contributing Buildings

- Boiler Shop (1888)
- Erecting/Machine Shop (1869)
- Blacksmith Shop (1869)
- Car Machine Shop (1888)
- Planing Mill (1869)
- Car Shop No. 3 (1872)
- Privy (1878)
- Paint Shop (1873)

Contributing Object

- Turntable (1869)

The district also includes one non-contributing building (Firing Line) and one non-contributing object (Locomotive Transfer Table).

Character-defining features of the district are summarized as follows:

- Dense urban-industrial character
- Large, rectangular building footprints
- Shared architectural features, including brick walls; large wall openings; series of arched, multi-light windows; gabled roofs with exposed trusses and roof monitors
- Site layout of buildings in close proximity without formal intervening roadways or sidewalks
- Utilitarian setting without formal landscaping

DISTRICT INTEGRITY

Although the Sacramento Shops achieved maximum build-out by the late 1920s, the organization of the complex and the appearance of its buildings, structures, and objects were continually altered in order to accommodate new technologies, cope with fluctuations in demand, and extend the useful life of the complex. Alterations and additions made during the period of significance do not necessarily diminish the integrity of a building or object within the Sacramento Shops Historic District; instead, they speak to the necessary adaptability of these industrial facilities.

Major alterations that have reduced the integrity of the district and its individual contributors are related to the Southern Pacific Company's transition from steam locomotives to diesel technology, which fundamentally altered the appearance and operation of the Sacramento Shops during the early postwar period. Even more extensive alterations, including the removal of numerous buildings and rail lines, occurred in the late twentieth and early twenty-first centuries as a result of change in ownership and environmental remediation efforts. As described below, despite these alterations, the Sacramento Shops Historic District retains sufficient integrity to convey its historic significance.

Location and Setting

Contributing buildings and features remain in their historic locations, and thus the district retains integrity of location. Integrity of setting has been reduced by the removal of numerous associated buildings and structures and by major modification of the surrounding landscape since the period of significance: the historic district covers less than one-tenth the area of the Sacramento Shops complex at maximum build-out (ca. late 1920s), and the rail lines that once provided access into and throughout the district have been removed. The immediate vicinity of the district has been reconfigured with new drainage swales and berms, and highways, roadways, and new rail lines surround the complex on all sides. Despite these modifications, however, the district maintains a degree of integrity of setting through its continued location on the edge of downtown and proximity to active rail lines and the Sacramento Valley Station.

Design, Materials, and Workmanship

The contributing buildings and object within the Sacramento Shops Historic District have undergone minimal exterior alteration since the period of significance and generally maintain a high level of integrity of design, materials, and workmanship. Many key interior features, such as the open floorplans of the Boiler Shop, Erecting/Machine Shop, and Paint Shop, are also intact. The contributing buildings are a cohesive, functionally-related group of industrial resources that exhibit common elements of industrial and utilitarian architecture, including large rectangular footprints; oversized door and window openings; gabled roofs with exposed trusses and roof

monitors; and the use of robust, readily-available materials such as brick, corrugated iron, and wood. Alterations experienced during the period of significance do not detract from the district's integrity, as this deliberate adaptability is indicative of their utilitarian style and industrial use.

Feeling and Association

Although the Sacramento Shops Historic District encompasses a relatively small portion of the facility's maximum build-out, the contributing buildings and object functioned as the historic core of the facility, represent some of the earliest, largest, and most important elements that were constructed as part of the Sacramento Shops complex. These resources generally maintain their historic scale, appearance and spatial arrangement, and their proximity to active rail lines and the Sacramento Valley Station maintains a tangible association between the district and the American railroad industry. For these reasons, the district retains integrity of feeling and association.

CONTRIBUTING RESOURCES

Boiler Shop

Physical Description

The Boiler Shop is a utilitarian industrial building that is rectangular in plan and clad with corrugated metal siding and corrugated roofing panels. (See Figure 7.) The single-story wood framed structure consists of a central gabled bay extending the length of the building from north to south and flanked by lower shed bays. A gabled monitor roof sits atop the central bay. Both the roof of the central bay and the roof monitor exhibit significant deterioration, with notable material loss at the building's south end. The Boiler Shop is 461 feet long and 151 feet wide, and the peak of the roof monitor is approximately 54 feet above grade.

The long east and west walls of the Boiler Shop are punctuated by multiple roll-up door openings and a few windows. The upper portions of the east and west walls have corrugated metal siding above, with translucent corrugated panels between louvered vents below. These translucent panels provide daylight to the building interior. The roof line of the eastern side bay varies, and includes a former riveting tower with gabled roof that projects above the adjacent structure. (See Figure 8.) The south elevation has a central roll-up door and three windows covered with translucent corrugated paneling. The north wall has corrugated metal cladding and three tripartite windows.

The Boiler Shop interior consists of a single large, open space with a concrete floor, a heavy timber and wrought iron truss system and exposed wood frame construction. (See Figure 9.) Segments of track extend inward from several of the openings in the east wall. Two overhead cranes (25-ton and 50-ton) are mounted on rails that run the length of the center bay. A drop table is located at the northern end of the central bay.

Construction and Use History

The extant Boiler Shop was initially constructed in 1888, replacing an earlier, smaller shop constructed ca. 1872. The Boiler Shop housed boiler maintenance and rebuilding operations, integral to the continued functionality of steam locomotives. Other work included the manufacture of steam and diesel locomotive pilots, repair of large rotary snow plows, the construction and maintenance of ferryboat boilers, "and construction of countless shop tools and equipment."⁷ The building also housed the Tender Shop, where steam locomotive tenders were maintained and overhauled.⁸

As diesel locomotives replaced steam locomotives in the early postwar period, the activities traditionally housed in the Boiler Shop were gradually phased out of operation. In the early 1950s, the northern portion of the building was modified to accommodate diesel truck repairs and

⁷ David Joslyn, "Souvenir of Visit to Southern Pacific Railroad Shops and Stores at Sacramento, California" [unpublished manuscript] (1952), Box 1, Folder 4 (3), MS 42 David Lindsay Joslyn Collection, California State Railroad Museum Library & Archives Collections, Sacramento, California; Carolyn Dougherty, LeeAnn Bishop Lands, J. Lawrence Lee, and Camille Vicenti, "Southern Pacific Sacramento Shops," Written Historical and Descriptive Data, Historic American Buildings Survey No. CA-303 (Washington, D.C.: National Park Service, U.S. Department of the Interior, 2002), 39.

⁸ Joslyn, "Souvenir of Visit to Southern Pacific Railroad Shops" [unpublished manuscript], Box 1, Folder 4 (3).

locomotive painting (as the Paint Shop had been repurposed for passenger car repair). By 1960, the entire building had been repurposed for truck maintenance.⁹

Key modifications to the Boiler Shop are summarized below.

- 1888-1889: Initial construction of the Boiler Shop, a 280-foot-long, 90-foot-wide building to the southwest of the Roundhouse and Turntable.¹⁰
- 1899: The Boiler Shop was extended to 440 feet in length and the northern and southern sides of the riveting tower were widened 26 feet.¹¹
- 1905: The Boiler Shop was widened to 135 feet. A riveting tower was constructed on the western side of the building by this date, and its shed-roofed sections were altered.¹²
- 1916: The Boiler Shop was remodeled one third at a time, with work beginning in this year and concluding in the next.¹³
- 1917: The height of the Boiler Shop's riveting tower was reduced and a new 50-ton overhead crane was installed in the main building. The Boiler Shop measured 152 feet wide by 392 feet in length at this time.¹⁴
- 1950s: The interior of the building was altered to accommodate diesel locomotive repairs.
- 1976: A drop table was added inside the Boiler Shop.¹⁵

Integrity

Alteration of the Boiler Shop since the period of significance has been limited primarily to interior changes related to the shift to diesel locomotive repairs. As a result, the utilitarian building maintains a high degree of integrity and is a contributing resource for its association with the development of the American railroad industry.

Erecting/Machine Shop

Physical Description

The Erecting/Machine Shop is a single-story building constructed in the American round-arched style. It is composed of two structures that share a common wall. (See Figure 10.) The eastern half was constructed in 1869 and later extended southward to its current dimensions. The western half was added in 1905. Together, the structures comprise the largest building on site, at 516 feet long by 181 feet wide.

The older, eastern half of the Erecting/Machine Shop is masonry construction and has a metal-clad gambrel roof with a 99-foot-wide gabled roof monitor. The peak of the monitor is 56 feet above grade, and louvered vents and wood windows with divided lights extend the length of the monitor. The northern wall features wood, arched multi-light windows set between brick pilasters. A metal roll-up door is located near the western end of this north wall. The western wall consists of a striking, 56-bay band of corbelled, arched window and door openings that are separated by brick pilasters and surmounted by a shallow stepped cornice. (See Figure 11.) The double-hung wood windows feature divided lights and cast iron sills. One door opening retains a divided light arched transom. The configuration of the southern wall, which has large window openings that have been partially infilled and two arched windows at the wall's upper portion, is similar to the north and south walls of the western half. This southern wall is gable-shaped and rises slightly above the adjoining gambrel roof.

The western half of the Erecting/Machine Shop is steel frame construction with brick infill and has a metal-clad gabled roof with a gabled roof monitor. The peak of the monitor is 65 feet above grade and wood windows with divided lights extend the length of the monitor. The north and south walls are mirror images, with brick pilasters, large window openings at ground level and arched windows above. Though infilled on the south, these first story window openings retain multi-light, wood

⁹ "Floor plan of Boiler Shop utilization of floor space after total dieselization" (April 7, 1953) Drawing NDB 1315, SMCC 206 (Source Record ID 10578), California State Railroad Museum Library & Archives Collections, Sacramento, California.

¹⁰ D. L. Joslyn, "The Sacramento General Shops" [unpublished manuscript] (1948), Box 1, Folder 4 (27), MS 42 David Lindsay Joslyn Collection, California State Railroad Museum Library & Archives Collections, Sacramento, California; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 12; "How the Railroad Shops Were Built," *Sacramento Daily Union*, October 4, 1896. An earlier, smaller Boiler Shop had been constructed ca. 1872, but this is no longer extant.

¹¹ Helmich, *A Legacy in Brick and Iron*, 98.

¹² "New Riveting Tower for Boiler Shop, Sac'to" (February 1902), Drawing 2606 / PSM, SMCC 203 + D (Source Record ID 6364), California State Railroad Museum Library & Archives Collections; Helmich, *A Legacy in Brick and Iron*, 98.

¹³ Helmich, *A Legacy in Brick and Iron*, 98.

¹⁴ Helmich, *A Legacy in Brick and Iron*, 98.

¹⁵ Helmich, *A Legacy in Brick and Iron*, 98.

windows on the north. The eastern bay on the north wall has been converted to house a metal roll-up door. The western wall consists of 25 bays set between brick pilasters. (See Figure 12.) Each bay consists of a pair of 13-foot-wide wood hinged doors with divided light transom and an arched window above. Painted numbers are located between the transom and arched window of each bay.

The interior of the Erecting/Machine Shop has a concrete floor and features exposed brick walls with no interior walls or lateral load resisting frames. The interiors are distinguished, and differentiated, by the exposed roof trusses. The eastern half has two, side-by-side wood and wrought iron trusses that rest on a center truss atop cast iron columns that extend the length of the building. A fourth wood truss supports the roof monitor. (See Figure 13.) The western half has a riveted, steel Fink truss atop steel columns that align with the 25 western bays. (See Figure 14.) Rail segments aligned with each of these bays extend into the building interior.

Construction and Use History

Constructed in the earliest phase of the Sacramento Shops' development, the Erecting/Machine Shop initially managed the assembly, overhaul, and repair of steam locomotives. It also crafted parts necessary for providing lighter maintenance (performed in the Roundhouse, constructed in 1869 and demolished in 1959), manufactured tools and equipment for use within the complex or on railroad lines, and at several points in its history, produced new steam locomotives. The Erecting/Machine Shop housed bench drills, lathes, planers, vertical and horizontal boring mills, shapers, slotters, drill presses, and grinders, which were used to craft, modify, and true various metal parts. These machines were initially powered by steam engines in the Engine and Boiler Rooms, to which they were connected via line shafts, but all were powered by electric motors by the early twentieth century. The building was extended several times in order to accommodate growing construction and maintenance needs. In 1922, the Sacramento Shops' Superintendent of Motive Power wrote that the Erecting/Machine Shop was "equipped for handling all classes of work needed on [Southern Pacific] lines from turning the smallest pin to the finishing of the largest shaft or cylinder on our steamers, as well as the making and repairing of all parts on locomotives."¹⁶

The transition from steam locomotives to diesel locomotives, which began in earnest in the early postwar period, effected a variety of changes to the interior layout of the Erecting/Machine Shop. New equipment was installed for heavy maintenance and repair work in the 1940s and 1950s, and maintenance bays were gradually rededicated for diesel locomotive work.¹⁷ The Erecting/Machine Shop remained in use for heavy diesel repair until 1992, when these activities were transferred to shops in Denver, Colorado.¹⁸

Key modifications to the Erecting/Machine Shop are summarized below.

- 1868-1869: Initial construction of the Erecting/Machine Shop was completed. At this time, the building measured 204 feet long by 100 feet wide. Its western, northern, and eastern walls were clad in brick, while its southern wall was clad in wood in order to facilitate future expansion.¹⁹
- 1870: A 50-foot-long overhead crane constructed at the Sacramento Shops was installed in the Erecting/Machine Shop.²⁰
- ca. 1875: By this date, the Erecting/Machine Shop was enlarged to the south by an addition measuring nearly 200 feet long and 100 feet wide. Again, its southern wall was wooden in anticipation of future expansion.²¹
- 1888: The Erecting/Machine Shop was again enlarged to the south. The 124-foot-long new addition featured a southern wall that was again clad in wood, but it was never extended further. A new steel crane was installed in the building's interior.²²
- 1895: Three steam engines in the Erecting/Machine Shop were replaced by two electric motors.²³

¹⁶ A.D. Williams, "From Bolts to Walking-Beams at Sacramento," *Bulletin* (Southern Pacific) 11, no. 2 (February 1922): 7.

¹⁷ Joslyn, "Souvenir of Visit to Southern Pacific Railroad Shops" [unpublished manuscript], Box 1, Folder 4 (1).

¹⁸ Helmich, *A Legacy in Brick and Iron*, 89.

¹⁹ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (16), California State Railroad Museum Library & Archives Collections; "City Intelligence: Railroad Works," *Sacramento Daily Union*, August 9, 1867; Helmich, *A Legacy in Brick and Iron*, 78.

²⁰ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (16), California State Railroad Museum Library & Archives Collections; Helmich, *A Legacy in Brick and Iron*, 78.

²¹ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (17), California State Railroad Museum Library & Archives Collections; "How the Railroad Shops Were Built," *Sacramento Daily Union*, October 4, 1896. The date of this addition is in dispute, with the *Sacramento Daily Union* noting 1872, and historian David Joslyn giving the date as 1875.

²² Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (19), California State Railroad Museum Library & Archives Collections.

²³ Helmich, *A Legacy in Brick and Iron*, 83.

- 1904-1905: A 180-foot-wide, 520-foot-long addition was constructed along the west side of the Erecting/Machine Shop. The wooden wall at the southern elevation of the eastern part of the building was replaced with a brick wall.²⁴
- 1906: A 120-ton overhead travelling crane was mounted in the Erecting/Machine Shop using cribbing and screw jacks.²⁵
- 1941: Twenty-five double doors and windows in the Erecting/Machine Shop were repaired due to regular wear.²⁶
- 1955: Two engine pits within the Erecting/Machine Shop were infilled in order to increase the available area for diesel engine stripping, sub-assembly stripping, and cleaning of diesel engine components. Elsewhere in the building, the concrete floors were repaired.²⁷
- ca. 1960: A new 15-ton bridge crane was installed in the Erecting/Machine Shop.²⁸

Integrity

Alteration of the Erecting/Machine Shop since the period of significance is generally limited to modification of select windows and doors, along with interior changes related to the shift to diesel locomotives. As a result, the building maintains a high degree of integrity and is a contributing resource for its association with the development of the American railroad industry. It is also a distinctive example of the American round-arched architectural style that was a popular choice for commercial and industrial buildings in the second half of the nineteenth century.

Blacksmith Shop

Physical Description

The Blacksmith Shop is a single-story, rectangular-in-plan structure that is representative of the Industrial Modern style. The 90-foot-wide building is divided into north and south sections; the northern half is 167 feet long and the southern half is 145 feet long. (See Figures 15 and 16.) The building roof is supported by wood roof trusses and is clad in corrugated metal panels. The northern half of the building features a gabled roof and gabled roof monitor with flat roof portions to the north and east; the roof monitor is 22 feet wide and its peak is 45 feet above grade. The roof of the southern half of the building consists of one large gable with 30-foot-wide gabled roof monitor, the peak of which is 52 feet above grade. Clerestory openings in both roof monitors have been covered with wood boards.

Exterior walls consist of cast-in-place concrete walls with articulated piers and formwork markings. Fenestration on all four elevations consists of multi-light industrial steel sash with operable horizontal pivots and concrete sills. The building has several cargo entries consisting of paired wood or metal doors, including four each on the east and west walls and one in the center of the north and south walls. Several of these doors have inset personnel doors.

With the exception of small offices at the building's northwest and southeast corners, the Blacksmith Shop interior consists of a single, open space, with concrete floor and wood columns. (See Figure 17.) The wood roof trusses and wood framing, including hewn wood beams, are exposed. Multiple jib cranes are present.

Construction and Use History

The Blacksmith Shop was also constructed during the Sacramento Shops' initial phase of development. The building contained more than two dozen forge hearths and annealing furnaces and was equipped to produce both heavy and light forgings, from car axles, couplers, brake rods, and metal pilots to track spikes, bolts, fish plates, cut nails, and even horseshoes.²⁹ Within the first decade of its construction, the Blacksmith Shop was expanded to more than double its original footprint, and it housed fifty forges and other "modern labor-saving machinery."³⁰ The Blacksmith Shop was supported by several other buildings dedicated to iron working, including a General Foundry, Wheel Foundry, Hammer Shop (also called the Blacksmith Shop Extension, although it was a free-standing building),

²⁴ Helmich, *A Legacy in Brick and Iron*, 85.

²⁵ Helmich, *A Legacy in Brick and Iron*, 85.

²⁶ "Repairs to various buildings in the Sacramento Shop Grounds" (July 19, 1941), General Manager's Order No. 17345, Sac. 11603, California State Railroad Museum Library & Archives Collections, Sacramento, California.

²⁷ "Abandon Engine Pits and Repair Concrete Floor - Locomotive Erecting & Machine Shop, Sacramento General Shops" (October 12, 1955), General Manager's Order No. 64251, Sac. 15201-A, California State Railroad Museum Library & Archives Collections, Sacramento, California.

²⁸ Helmich, *A Legacy in Brick and Iron*, 89.

²⁹ "The Pacific Railroad Terminal Shops at Sacramento," *Mining and Scientific Press* 19, no. 5 (July 31, 1869): 72; Helmich, *A Legacy in Brick and Iron*, 90-91.

³⁰ "Central Pacific Railroad Company's Shops," *Sacramento Record-Union*, January 3, 1879.

Rolling Shop, Bolt and Nut Shop, and Punch and Shears Shop, none of which remain extant. This cast of buildings fluctuated over the years, as demand and technologies both changed. In the 1940s, the Blacksmith Shop was repurposed as the Welding and Machine Shop, and in the mid-1960s it contained a Locomotive Machine Shop as well as blacksmith, rod, and welding operations.³¹

Key modifications to the Blacksmith Shop are summarized below.

- 1869: Initial construction of the Blacksmith Shop. The building measured 60 feet wide by 145 feet long and featured a corrugated iron roof with a 22-foot-high monitor roof. The western, northern, and eastern walls were constructed from brick, while the southern wall was clad in corrugated iron to facilitate future expansion.³²
- 1873: The Blacksmith Shop was expanded to the south by a 90-foot-wide by 172-foot-long addition with 13-foot-high brick sidewalls and a corrugated iron roof.³³ At an unknown date, the office addition was constructed in the ell between the eastern elevation of the 1869 building and the northern elevation of the 1873 addition.
- 1876: Rolling mill machinery, designed and constructed on-site at the Sacramento Shops, was installed in the Blacksmith Shop.³⁴
- 1888: A second story was added to the office addition off the building's east side. Electric lights were installed.³⁵
- 1917: The northern wall of the Blacksmith Shop was replaced with new brick, punctuated by rectangular windows with concrete lintels.³⁶
- 1927: The southern section of the Blacksmith Shop was remodeled and the original brick walls were replaced with reinforced concrete. Plans to remodel the northern section of the building were delayed by the Great Depression.³⁷
- 1930: The rolling mill constructed and installed in 1876 was shut down.³⁸
- 1937: The corrugated iron roof over the southern section of the Blacksmith Shop was replaced with an asbestos cement roof.³⁹
- 1939: The northern section of the Blacksmith Shop was remodeled and the original brick walls were replaced with reinforced concrete. The office addition was removed and the northern section of the building was reconstructed flush with the southern section's eastern elevation, resulting in a regular footprint. The building's rotting redwood grillage foundation was replaced by concrete piers.⁴⁰
- 1939-1940: The corrugated iron roof over the northern section of the Blacksmith Shop was replaced with a Transite (asbestos cement) roof.⁴¹

Integrity

The Blacksmith Shop retains a high degree of integrity as it has experienced few alterations since the period of significance. It is a contributor to the historic district for its association with the development of the American railroad industry. In addition, since replacement of the building's windows and walls in the 1920s and 1930s, the building has been a representative example of the Industrial Modern architectural style.

³¹ Helmich, *A Legacy in Brick and Iron*, 94.

³² Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (33), California State Railroad Museum Library & Archives Collections; "City Intelligence: Central Pacific Blacksmith Shop," *Sacramento Daily Union*, October 13, 1869; "How the Railroad Shops Were Built," *Sacramento Daily Union*, October 4, 1896; Helmich, *A Legacy in Brick and Iron*, 90.

³³ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (33), California State Railroad Museum Library & Archives Collections.

³⁴ Helmich, *A Legacy in Brick and Iron*, 90.

³⁵ "Addition to office in Blacksmith Shop" (October 1888), Drawing C 180 / Book 3, Box 464 (X) (Source Record ID 12346), California State Railroad Museum Library & Archives Collections, Sacramento, California; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 98; Helmich, *A Legacy in Brick and Iron*, 91.

³⁶ Helmich, *A Legacy in Brick and Iron*, 91.

³⁷ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 99-100; Helmich, *A Legacy in Brick and Iron*, 94.

³⁸ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (34), California State Railroad Museum Library & Archives Collections.

³⁹ Helmich, *A Legacy in Brick and Iron*, 94.

⁴⁰ "Southern Pacific Railroad Sacramento Shops complex: view of multiple buildings" (1939), CSRM Negative 7077C, California State Railroad Museum Library & Archives Collections, Sacramento, California; "Remodel and Extend Blacksmith Shop" (January 10, 1939), General Manager's Order No. 7997, Sac. 10554/10534, California State Railroad Museum Library & Archives Collections, Sacramento, California; Helmich, *A Legacy in Brick and Iron*, 94.

⁴¹ "Renew Corrugated Iron Roof to Corrugated Transite Roof on the Portion of the Blacksmith Shop" (January 12, 1940), General Manager's Order No. 10780, Sac. 11061, California State Railroad Museum Library & Archives Collections, Sacramento, California; Helmich, *A Legacy in Brick and Iron*, 94.

Car Machine Shop

Physical Description

The Car Machine Shop is a three-story unreinforced masonry building in the American round-arched style. The rectangular-in-plan building is 190 feet (9 bays) long by 75 feet (3 bays) wide and has a corrugated-clad gable roof with metal roof decking. (See Figures 18 and 19.) The Car Machine Shop is immediately north of the Planing Mill and is stylistically quite similar to it. (See Figure 6.)

Building walls consist of load-bearing brick pilasters set atop a concrete foundation. Fenestration is comprised of arched corbelled wood windows with divided lights and brick sills. Building access is provided via wood hinged doors and metal roll-up doors at the first story bays of the east and west façades. Three additional wood hinged doors are located on the south façade (two doors) and north façade (one door). The central hinged doors on the east façade sit below a corbelled transom. The arched surrounds of all three roll-up doors are covered in protective metal plating.

A 25-foot-wide gabled roof monitor extends almost the entire length of the building. The peak of the monitor is 62 feet above grade and is perforated by five roof vents with conical caps. The roof monitor is covered by corrugated metal set between louvered vents. Steel trusses, in line with the exterior pilasters, support the roof and monitor above.

The first story of the Car Machine Shop interior is a single, open space with heavy timber columns, girders, and floor joists; riveted steel trusses; exposed brick walls; exposed second floor framing; and wood posts and brackets. (See Figure 20.) Multiple segments of east-west running track perforate the building's concrete floor. The second story has wood flooring, wood posts and brackets, and is divided by wood-framed partition walls. (See Figure 21.) A portion of the second story is open to the roof truss above.

An enclosed wood pedestrian Bridge with steel bracing connects the second story of the Car Machine Shop to the Planing Mill. (See Figure 22.) The Bridge is approximately 23 feet long and its underside sits approximately 18'6" above grade.

Construction and Use History

The Car Machine Shop was constructed in 1888, parallel to the northern elevation of the Planing Mill. The first floor housed operations for car construction and associated machinery, while the second floor was occupied by the Plating Department, the Brass Room, and the Upholstery Shop (previously in the Planing Mill). The Plating Department and Brass Room finished locks and car trimmings, and the Plating Department also replated silverware used in the dining cars. The Upholstery Shop included a storeroom, dyeing room, sleeping car equipment room, as well as a hair store and picking room in an attic space above the storeroom.⁴² By 1914, the first floor had been converted into a wheel shop.⁴³ In the 1940s, the Upholstery Shop moved back to the Planing Mill and the lower floor began to be used for diesel engine wheel work as well as wheel and axle work for passenger cars.⁴⁴ As passenger service declined and was eventually done away with altogether, the first floor was repurposed solely for diesel engine wheel work.⁴⁵

Key modifications to the Car Machine Shop are summarized below.

- 1888: Initial construction of the Car Machine Shop, a two-story brick building measuring 189 feet long by 75 feet wide.⁴⁶
- 1898: Fire destroyed all but the first story walls of the Car Machine Shop. The fire may have been the result of a live wire in the second story of the building.⁴⁷
- 1899: The Car Machine Shop was rebuilt on its original foundations; the new structure was similar to its predecessor except for the use of riveted steel roof trusses and horizontally pivoted clerestory windows. A bridge was constructed to join the Car Machine Shop with the Planing Mill around this time.⁴⁸

⁴² Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 115-116.

⁴³ "Ground plan showing location of wheel machines in car shop and yard storage tracks for wheels, Sacramento Shops" (August 12, 1914), Drawing 10058 / Special, SMCC 5839 (Source Record ID 3935), California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁴⁴ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (24), California State Railroad Museum Library & Archives Collections.

⁴⁵ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 119-120.

⁴⁶ Helmich, *A Legacy in Brick and Iron*, 160.

⁴⁷ "Fierce Fire at the Shops: Important Departments Suffer from Monday Morning's Blaze," *Pacific Bee* (Sacramento, California), November 9, 1898.

⁴⁸ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 113; "Sketch of Proposed Bridge bet. Planing Mill and Car Machine Shop at Sacramento" (April 5, 1899), Drawing 1055 /

- 1914: By this date, the first floor of the Car Machine Shop had been modified to feature in-floor rails for the movement of wheelsets.⁴⁹
- 1941: The Car Machine Shop's windows and roof were repaired due to standard wear.⁵⁰
- 1945: The Car Machine Shop's doors, tracks, tool shed, and office were altered to permit the installation of a larger wheel lathe and other equipment related to the manufacture of diesel locomotive wheels.⁵¹
- 1954: The corrugated iron roof of the Car Machine Shop was replaced and the steel truss roof frame was repainted.⁵²

Integrity

Alteration of the Car Machine Shop since the period of significance is generally limited to covering of the clerestory window openings, modification of select first story openings, and interior changes related to the shift to diesel locomotives. As a result, the building maintains a high degree of integrity and is a contributing resource for its association with the development of the American railroad industry. It is also a distinctive example of the American round-arched architectural style that was a popular choice for commercial and industrial buildings in the second half of the nineteenth century.

Planing Mill

Physical Description

The Planing Mill is a three-story unreinforced masonry building in the American round-arched style. The rectangular-in-plan building is 230 feet long by 91 feet wide and has a corrugated-clad gable roof with metal roof decking. (See Figure 24.) The Planing Mill is immediately south of the Car Machine Shop and is stylistically quite similar to it. (See Figure 6.)

Building walls consist of load-bearing brick pilasters set atop a concrete foundation. Fenestration is comprised of arched corbelled wood windows with divided lights. Windows on the south and west elevations are much narrower than fenestration on the north and east elevations. Building access is via wood hinged doors that occupy the north and south bays of the east elevation and a metal sliding door in the northernmost bay of the west elevation. (In addition, one bay on the south elevation has been infilled with a smaller wooden door.) Ghosting on the south wall indicates where the Powerhouse (since removed) formerly abutted the Planing Mill. (See Figure 25.)

A 22-foot-wide gabled roof monitor extends almost the entire length of the building. The peak of the monitor is 67 feet above grade and is perforated by four roof vents with conical caps. The roof monitor is covered by corrugated metal set between louvered vents. Steel trusses, in line with alternate pilasters, support the roof and monitor above.

The first story of the Planing Mill interior is a single, open space with exposed brick walls, wood trusses with steel tension rods, exposed second floor framing, concrete floor, and wood posts and brackets. (See Figure 26.) The second story has wood flooring, tongue-and-groove ceiling, and is divided by wood-framed partition walls. (See Figure 27.) Suspended, gravity-operated steel fire doors are extant on both stories.

An enclosed wood pedestrian Bridge with steel bracing connects the second story of the Planing Mill to the Car Machine Shop. (See Figure 22.) The Bridge is approximately 23 feet long and its underside sits approximately 18'6" above grade. An uncovered wood bridge connects the second story of the Planing Mill to the third story of the Privy.

PSM, SMCC 203 (Source Record ID 6599), California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁴⁹ "Ground plan showing location of wheel machines in car shop and yard storage tracks for wheels, Sacramento Shops" (August 12, 1914), Drawing 10058 / Special, SMCC 5839 (Source Record ID 3935), California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁵⁰ "Repairs to various buildings in the Sacramento Shop Grounds" (July 19, 1941), General Manager's Order No. 17345, Sac. 11603, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁵¹ Helmich, *A Legacy in Brick and Iron*, 160.

⁵² "Renew Corrugated Iron Roof and Repaint Steel Truss Roof Frame on Car Wheel Shop" (July 16, 1954), General Manager's Order No. 58856, Sac. 14960, California State Railroad Museum Library & Archives Collections, Sacramento, California.

Construction and Use History

Constructed in the earliest phase of the Sacramento Shops' development, the Planing Mill was also referred to as the "wood working and car manufactory" in the late nineteenth century.⁵³ For much of its history, the Planing Mill housed a variety of woodworking equipment on its first floor, for planing and shaping rough lumber into the raw components of passenger and freight cars. The second floor initially contained the Upholstery, Cabinetry, and Pattern Shops as well as the offices of the Master Mechanic, Master Car Builder, Superintendent of Motive Power and Machinery, draftsmen, and clerks.⁵⁴ The Pattern Shop and Upholstery Shops were both relocated to other buildings in 1888, allowing the Cabinetry Shop to expand. The Cabinetry Shop remained in the Planing Mill until 1944, when it was moved to the Sawmill (1924, no longer extant).⁵⁵ The Upholstery Shop and the Pattern Shop were relocated back to the second floor, and the first floor was used as a tool room and brass finishing shop.⁵⁶ After 1985, the first floor was used as Locomotive Wheel Shop No. 1, and the second floor contained a machine shop.⁵⁷

Key modifications to the Planing Mill are summarized below.

- 1867-1869: Initial construction of the Planing Mill was completed. A 46-foot-long by 90-foot-wide brick wing off the building's southern elevation (initially used as a paint shop and later expanded to become Car Shop No. 3) featured a southern wall clad in board-and-batten siding, to ease future expansion.⁵⁸
- ca. 1869: A 12,000-gallon water tank was erected on the western end of the Planing Mill's roof.⁵⁹
- ca. 1873: A bridge was constructed between the Planing Mill and the newly-constructed Privy.⁶⁰
- 1898: A fire originating in the second story of the Car Machine Shop destroyed all but the western and southern walls of the Planing Mill.⁶¹ The water tank collapsed in the fire.⁶²
- 1899: Following the fire, the Planing Mill's remaining walls were reinforced and the building was reconstructed on the same foundation. Steel trusses were installed in place of the original wooden trusses and clerestory windows with horizontal pivot sash were installed. The water tank was not replaced. A bridge was constructed to join the second floor of the Planing Mill with the Car Machine Shop.⁶³
- ca. 1914: The offices along the southern wall of the second floor of the Planing Mill were expanded between 1900 and this date.
- 1941: Deteriorated windows in the roof monitor of the Planing Mill were refurbished with new sash, glass, and trim.⁶⁴
- 1945: The roof trusses of the Planing Mill were badly rusted and were cleaned and repainted.⁶⁵

⁵³ "The Pacific Railroad Terminal Shops at Sacramento," *Mining and Scientific Press* 19, no. 5 (July 31, 1869): 72.

⁵⁴ "The Pacific Railroad Terminal Shops at Sacramento," *Mining and Scientific Press* 19, no. 5 (July 31, 1869): 72; Helmich, *A Legacy in Brick and Iron*, 137-138; Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (15), California State Railroad Museum Library & Archives Collections.

⁵⁵ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 47n68; "Move Cabinet Shop at Sacramento General Shops from Present Location to Saw Mill" (January 12, 1944), General Manager's Order No. 26806, Sac. 12525, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁵⁶ "Plan of tool room and brass room, Sacramento shops" (May 25, 1945), Drawing 24147 / Special, SMCC 5842 (Source Record ID 4034), California State Railroad Museum Library & Archives Collections, Sacramento, California; Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (15), California State Railroad Museum Library & Archives Collections.

⁵⁷ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 85.

⁵⁸ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 76-77; Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (15), California State Railroad Museum Library & Archives Collections; "City Intelligence: Railroad Works," *Sacramento Daily Union*, August 9, 1867; "How the Railroad Shops Were Built," *Sacramento Daily Union*, October 4, 1896; Helmich, *A Legacy in Brick and Iron*, 138.

⁵⁹ "City Intelligence: The Railroad Works," *Sacramento Daily Union*, June 25, 1869.

⁶⁰ Helmich, *A Legacy in Brick and Iron*, 139.

⁶¹ Helmich, *A Legacy in Brick and Iron*, 141.

⁶² Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 79.

⁶³ "Sketch of Proposed Bridge bet. Planing Mill and Car Machine Shop at Sacramento" (April 5, 1899), Drawing 1055 / PSM, SMCC 203 (Source Record ID 6599), California State Railroad Museum Library & Archives Collections, Sacramento, California; Helmich, *A Legacy in Brick and Iron*, 141; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 80.

⁶⁴ "Repairs to various buildings in the Sacramento Shop Grounds" (July 19, 1941), General Manager's Order No. 17345, Sac. 11603, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁶⁵ "Repaint trusses and interior of roof Upholstery and Pattern Shop" (October 24, 1945), General Manager's Order No. 32780, Sac. 12945, California State Railroad Museum Library & Archives Collections, Sacramento, California.

- 1950: An overhead crane was removed from the Planing Mill and installed in Car Shop No. 3.⁶⁶
- 1951: A drop ceiling was installed over the eastern side of the second floor of the Planing Mill.⁶⁷
- Unknown date: clerestory windows at roof monitor removed.
- Unknown date: partial infill or window replacement in multiple window openings.

Integrity

Alteration of the Planing Mill since the period of significance is generally limited to covering of the clerestory window openings, modification of select first story openings, and interior changes related to the shift to diesel locomotives. As a result, the building maintains a high degree of integrity and is a contributing resource for its association with the development of the American railroad industry. It is also a distinctive example of the American round-arched architectural style that was a popular choice for commercial and industrial buildings in the second half of the nineteenth century.

Car Shop No. 3

Physical Description

Car Shop No. 3 is a two-story unreinforced masonry building in the American round-arched style. The building, which is 308 feet long and 141 feet wide, is roughly rectangular in plan and abuts the south wall of the Planing Mill. (See Figure 28.) It has a double, divided-light roof monitor with low-pitched gabled roof and parapet. Brick firewalls break the building into three segments; the northernmost segment has been divided into two stories, while the southern two segments are single, double-height spaces. East and west walls at the first story, and at the second story of the northernmost portion of the building, are common bond brick with brick pilasters. The brick south wall, a remnant of the gabled Pattern Shop, which is no longer extant, extends higher than the building's roof. This wall features two suspended, gravity-operated steel fire doors.

The east wall features 13 arched corbelled, arched door or window openings, each of which has undergone some degree of infill. Most bays feature wood "keystones" with painted numerals. Narrow rounded arch windows are present between several pair of adjacent brick pilasters. First story windows on the west elevation consist of rectangular arrays of wood sash, divided-light windows with concrete lentils and brick sills. Fenestration at the upper story of this wall's northernmost portion consists of a band of narrow rounded arch windows. (See Figure 29.) A portion of the west wall is obscured by a projecting one-story addition clad in flat metal panels. An entry consisting of diagonal framing construction and inset wood doors in a large, squared opening is located near the northern end of the building's western wall. The building has multiple other wood hinged doors. A freight elevator with pyramidal roof and corrugated metal cladding occupies the building's northeast corner.

The interior of the southern and central portions of the building are each single, open spaces with a concrete floor, exposed brick walls, and exposed roof framing. (See Figure 30.) An exposed tension rod truss system sits atop wood posts and brackets. An overhead crane with tracks is located along the southern wall of the southern portion. The first story of the northern portion is an open space with exposed brick walls, wood posts and brackets, and exposed ceiling framing. (See Figure 31.) The second story has exposed brick walls, wood deck roof sheathing; exposed roof framing; a long span truss system; wood flooring; wood posts and brackets; and wood framed partition walls, casework and closets. In addition, a suspended, gravity-operated steel fire door leads to the second story of the Planing Mill.

Construction and Use History

Car Shop No. 3 originated as a small painting room built off the eastern corner of the Planing Mill's southern elevation. In 1872, a major addition enlarged the space and allowed it to be used for the final stages of car fabrication. Car Shop No. 3, as the building became known, was used for laying out, drilling, and preparing ironwork, as well as for general car assembly and repair. An 1888 addition to the south of the building housed the Truck Department on the first floor and the Pattern Shop (formerly in the Planing Mill) in the second.⁶⁸ By the mid-1940s, passenger car work

⁶⁶ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 93-94, 165-166; "Install Fifteen Ton Electric Crane in Locomotive Electric Shop" (October 13, 1950), General Manager's Order No. 47033, Sac. 14105, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁶⁷ "Repair Roof of Car Machine Shop Portion of the Upholstery Shop" (March 15, 1951), General Manager's Order 48133, Sac. 14202, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁶⁸ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (22), California State Railroad Museum Library & Archives Collections.

had significantly declined, and Car Shop No. 3 housed the Electric Shop, Pipe Shop, Air Compressor Shop, and Truck Shop for the Southern Pacific's new and increasingly large fleet of diesel locomotives.⁶⁹

Key modifications to Car Shop No. 3 are summarized below.

- 1867-1869: Initial construction of the Planing Mill, including a 46-foot-long by 90-foot-wide brick wing off the eastern end of the building's southern elevation. This wing would eventually be expanded to become Car Shop No. 3. The wing's southern wall was clad in board-and-batten siding, to ease future expansion.⁷⁰
- 1872: Car Shop No. 3 was lengthened to 307 feet long by a one-story brick addition. The addition featured a board-and-batten-clad southern wall and a corrugated iron roof with a roof monitor.⁷¹
- 1875: Fire destroyed a portion of Car Shop No. 3; it was reconstructed within three months.⁷²
- 1888: A two-story brick addition with an iron roof was constructed off the southern end of Car Shop No. 3. Known as the "Pattern Shop," this addition measured 95 or 96 feet long by 90 feet wide.⁷³
- 1899: A 25 horsepower freight elevator was installed at the northeastern corner of the building, serving both Car Shop No. 3 and the adjacent Planing Mill.⁷⁴
- 1916: Fire destroyed the center portion of Car Shop No. 3, leaving only the eastern wall untouched.⁷⁵
- 1917: Car Shop No. 3 was rebuilt after the fire of 1916. The western wall was moved ten feet to the west, and interior firewalls were constructed to divide the interior space into four or five bays. A roof monitor allowed additional natural lighting.⁷⁶
- 1941: Seventeen double doors and windows in Car Shop No. 3 were repaired due to regular wear.⁷⁷
- ca. 1948: The interior of Car Shop No. 3 was altered to accommodate a Locomotive Air Compressor Room, Pipe Shop, and Electric Shop.⁷⁸
- 1950: A crane was relocated from the Planing Mill into the middle bay of Car Shop No. 3, forcing the alteration of three wood columns; new steel columns and girders were installed to support both the wood truss and crane.⁷⁹ The elevator at the northeastern corner of Car Shop No. 3 was also replaced with a new hydroelectric model in this year, and the roof of the building was repaired to guard against leaks.⁸⁰
- 1954: Car Shop No. 3 was altered to brick-in eight arched doorways by installing steel plate bands in archways over the doors.⁸¹
- 1996: The addition at the southern end of Car Shop No. 3 (the Pattern Shop) was destroyed by fire.⁸²

⁶⁹ Helmich, *A Legacy in Brick and Iron*, 138-141.

⁷⁰ Helmich, *A Legacy in Brick and Iron*, 138.

⁷¹ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (21), California State Railroad Museum Library & Archives Collections; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 86-87; "How the Railroad Shops Were Built," *Sacramento Daily Union*, October 4, 1896; Helmich, *A Legacy in Brick and Iron*, 147.

⁷² Helmich, *A Legacy in Brick and Iron*, 147.

⁷³ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (22), California State Railroad Museum Library & Archives Collections; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 88; Helmich, *A Legacy in Brick and Iron*, 139.

⁷⁴ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 89; "Renewal of Elevator #13364, Car Shop No. 3" (August 20, 1948), General Manager's Order No. 40614, Sac. 13671, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁷⁵ Helmich, *A Legacy in Brick and Iron*, 141, 147.

⁷⁶ Helmich, *A Legacy in Brick and Iron*, 141, 147.

⁷⁷ "Repairs to various buildings in the Sacramento Shop Grounds" (July 19, 1941), General Manager's Order No. 17345, Sac. 11603, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁷⁸ Helmich, *A Legacy in Brick and Iron*, 147.

⁷⁹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 93-94, 165-166; "Install Fifteen Ton Electric Crane in Locomotive Electric Shop" (October 13, 1950), General Manager's Order No. 47033, Sac. 14105, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁸⁰ "Renewal of Elevator #13364, Car Shop No. 3" (March 23, 1950), General Manager's Order No. 40614, Sac. 13671, California State Railroad Museum Library & Archives Collections, Sacramento, California; "Repair Roof of Car Shop # 3, Sacramento Shops" (February 7, 1950), General Manager's Order No. 44241, Sac. 13957, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁸¹ Architectural Resources Group, "Sacramento Railyards Central Shops: Phase I Investigation and Documentation, Vol. 1," prepared for Thomas Enterprises, Inc., August 2006, 18.

⁸² Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 89.

Integrity

Alteration of car Machine Shop No. 3 since the period of significance has included interior modifications as well as bricking in numerous brick doorways. Even so, the building maintains sufficient integrity to be considered a contributing resource for its association with the development of the American railroad industry. It is also a representative example of the American round-arched architectural style that was a popular choice for commercial and industrial buildings in the second half of the nineteenth century.

Privy

Physical Description

The Privy is a three-story, unreinforced masonry building in the American round-arched style. (See Figure 32.) The rectangular-in-plan building is 30 feet (3 bays) long, 19 feet (2 bays) wide, and 37 feet tall. It has a gable roof atop simple pediments with louvered vents on the north and south façades. Corbelled brickwork defines the building's cornice. Walls have been clad in stucco, large sections of which have fallen from the building, revealing the brick beneath. Pilasters and belt courses divide the building's wall surfaces into individual "cells." Fenestration consists of arched, wood, double-hung windows with divided lights and projecting sills. Arched doorways are located in both first story bays on the south façade, as well as in all three levels of the north façade. Doors are flush wood doors at the first story and glazed at the third story. (Doors are no longer extant at the second story doorways on the north façade.) An uncovered wood bridge connects the Privy's third story to the second story of the Planing Mill to the north. Each of the Privy's three stories is divided into two north-south rooms. Along the common partition wall, each room includes nine toilet stalls with a single sink at the southern end.

Construction and Use History

The three-story Privy was constructed ca. 1873, at the center of the building cluster formed by the Erecting/Machine Shop, Blacksmith Shop, Car Shop No. 3, and Planing Mill. It was the largest and most centrally-located of numerous privies and washrooms built within the Sacramento Shops complex, and it retained its original function throughout its period of active use.⁸³

Key modifications to the Privy are summarized below.

- ca. 1873: Initial construction of the Privy, a brick building measuring 64 feet long by 33 feet wide.⁸⁴
- ca. 1900: The Privy's original hipped roof was replaced by a gable roof. The first-floor door was replaced by a window and access to the second floor was provided by a staircase outside of the Privy walls.⁸⁵
- ca. 1918: Flush toilets were installed in the Privy and the building's tall, sheet metal ventilation stack was removed by this date.⁸⁶
- ca. 1940s or early 1950s: Stucco was applied over exterior brickwork.⁸⁷

Integrity

The building retains a high degree of integrity as it has experienced few alterations. It is a contributor to the historic district for its association with the development of the American railroad industry. It is also a representative example of the American round-arched architectural style that was a popular choice for commercial and industrial buildings in the second half of the nineteenth century.

Paint Shop

Physical Description

The Paint Shop is an unreinforced masonry building in the American round-arched style and is the easternmost of the Sacramento Shop buildings. The rectangular-in-plan building is 308 feet long by 183 feet wide and has a complex roof combining gabled, hipped and flat portions, reflecting that

⁸³ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 122-123.

⁸⁴ Helmich, *A Legacy in Brick and Iron*, 144; "Three Story Workmen's Bldg, Wash and Lunch Room" (September 3, 1918), Drawings 13012 / Book 314, SMCC 210 (Source Record ID 14426), California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁸⁵ "Three Story Workmen's Bldg, Wash and Lunch Room" (September 3, 1918), Drawings 13012 / Book 314, SMCC 210 (Source Record ID 14426), California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁸⁶ Helmich, *A Legacy in Brick and Iron*, 144.

⁸⁷ Helmich, *A Legacy in Brick and Iron*, 144.

the building is essentially multiple structures that have been stitched together. The roof, which is perforated by multiple vents with conical caps, is clad with corrugated metal, standing seam, and asphalt shingle, and includes multiple skylights covered by translucent corrugated panels. Gabled portions along the western and southern edges meet at the hipped roof southwest corner; the remainder of the footprint is occupied by three gabled, single-story ells, a covered walkway with a flat roof, and a two-story hipped-roof portion at the building's northeast corner. (See Figures 33 and 34.) Building walls consist of load-bearing brick pilasters set atop a concrete foundation and feature arched corbelled window and door openings that vary by façade.

The west façade is composed of 15 large arched openings between brick pilasters. Each bay features a painted numeral mimicking a keystone. Nearly all of the arched openings have been modified through installation of metal roll-up doors, non-historic windows and/or non-historic personnel doors. Suspended, gravity-operated steel fire doors occupy the second and third bays, while the southernmost bay consists of a personnel door surrounded by arched diagonal framing construction. Two exterior cranes abut this façade.

The south façade is composed of nine large, arched corbelled windows with brick sills between brick pilasters. Mullions divide each window into six parts. Only limited portions of the historic multi-light glazing remain - several windows have been replaced with single light casement or fixed windows.

First story entries on the east façade are similar to the arched entries on the west façade. As with the east façade, the arched openings have been infilled with a variety of roll-up doors, personnel doors, and contemporary windows, with one opening retaining the diagonal framing construction from the period of significance. Several of the arched openings have wood "keystones" with painted numerals. Some, too, have protective metal plating. The two-story portion of the building features arched, corbelled windows with cast iron sills. These windows are double-hung with divided lights. An entry composed of double doors beneath an arched, divided light transom occupies the central eastern bay of this portion of the building. An arched, louvered vent with cast iron sill is located in the uppermost part of this bay. A covered walkway with a flat roof is located between this two-story portion and the gables to the south. At the building exterior, this walkway manifests as a single door surrounded by a wall of industrial sash windows.

The building interior has exposed brick walls, a concrete floor, and open roof trusses. (See Figure 35.) Most of the interior is devoted to three large spaces, corresponding to the southern portion of the building, the western portion of the building, and the two gables south of the two-story office portion. The western space has a wood truss, the southern space has a wood and steel truss, and the other open space has a steel truss. An overhead crane, seemingly a non-historic addition, is located in the southern space. A brick partition wall with arched openings separates the southern open space from the rest of the interior. Five corbelled arched windows with divided lights and brick sills mark the internal wall that separates the northeastern open space from the covered walkway. (See Figure 36.) A doorway has been cut into the westernmost window opening. One of the building's original painting sheds is located immediately north of the walkway, within the two-story portion of the building. The south wall of the painting shed is lined with arched windows. An office, restroom and workshop wrap around this painting shed.

An open wood staircase leads from the painting shed up to the second-story portion of the building, which is composed of one larger room with two smaller rooms at the eastern end. This area features wood wall sheathing, ceiling and flooring; wood posts and brackets; and wood window surrounds.

Construction and Use History

The Paint Shop was constructed in 1872, after it became apparent that the small painting wing off the southern elevation of the Planing Mill was insufficient to accommodate all of the painting activities at the Sacramento Shops. The building was initially constructed with five painting bays in which passenger cars and cabooses were painted, varnished, and lettered. The northernmost bay featured a second floor dedicated to office space.⁸⁸ The Paint Shop also produced furniture glass, art glass, and mirrors, mixed paints for the Maintenance Department, and painted signs and equipment.⁸⁹

As passenger service declined and the Southern Pacific increased its fleet of diesel locomotives in the late 1940s, the Paint Shop was altered to house car repair as well as painting. The northern portion of the building, including the former office space, contained a scrub room, lye pits,

⁸⁸ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (22), California State Railroad Museum Library & Archives Collections.

⁸⁹ A.D. Williams, "From Bolts to Walking-Beams at Sacramento," *Bulletin* (Southern Pacific) 11, no. 2 (February 1922): 28.

rubber room, paint storage room, paint mixing room, and varnishing room, and later the Carpet Shop. Smaller rooms were sectioned off along the southern wall of the building to house the Air Conditioning Department, a tool room, and an office. By the end of the 1950s, the Paint Shop had acquired all of the passenger car repair functions formerly housed in Car Shop No. 3. Painting was moved into a shed constructed off the eastern elevation of the building (no longer extant). When passenger service was taken over entirely by Amtrak in 1971, the Paint Shop was repurposed again, this time for diesel locomotive rebuilding operations.⁹⁰

Key modifications to the Paint Shop are summarized below.

- 1872-1873: Initial construction of the Paint Shop, a 228-foot-long by 70-foot-wide brick building with five parallel painting bays and a corrugated iron roof with wooden skylights.⁹¹
- 1894: The Paint Shop was widened in order to accommodate longer rolling stock.⁹²
- ca. 1900: Between 1898 and 1903, a 183-foot-long by 84-foot-wide addition was constructed off the Paint Shop's southern elevation. Four of the five painting bays were demolished and replaced with one open space measuring 114 feet by 160 feet. The northernmost painting bay was retained because its walls supported part of the second-floor office.⁹³
- ca. 1917: The Paint Shop's wooden floors were replaced with concrete by this date, and the alley to the south of the lone remaining painting bay was covered with a roof of corrugated iron.⁹⁴
- 1941: 35 double doors and windows in the Paint Shop were repaired due to regular wear.⁹⁵
- Late 1940s: The Paint Shop was altered to accommodate passenger car repairs, after this activity was moved from the Planing Mill and Car Shop No. 3 in order to expand diesel locomotive operations.⁹⁶
- 1950s: Rotting wood skylights in the roof of the Planing Mill were replaced with aluminum skylights.⁹⁷
- 1953: The interior of the Paint Shop was painted white in order to increase reflectivity and brighten the interior.⁹⁸
- 1955: An annex for painting activities (removed ca. 1995) was constructed off of the Paint Shop's western elevation, adjacent to bays two and three.⁹⁹
- After 1976: Two exterior cranes added at west wall of Paint Shop.¹⁰⁰

Integrity

Alteration of the Paint Shop since the period of significance is generally limited to modification of select first story openings, interior changes related to the shift to diesel locomotives, and addition of two exterior cranes to the building's west wall. As a result, the building retains integrity and is a contributing resource for its association with the development of the American railroad industry. It is also a representative example of the American round-arched architectural style that was a popular choice for commercial and industrial buildings in the second half of the nineteenth century.

⁹⁰ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 111-114.

⁹¹ Joslyn, "The Sacramento General Shops" [unpublished manuscript], Box 1, Folder 4 (22), California State Railroad Museum Library & Archives Collections; "How the Railroad Shops Were Built," *Sacramento Daily Union*, October 4, 1896; Helmich, *A Legacy in Brick and Iron*, 155.

⁹² Helmich, *A Legacy in Brick and Iron*, 157.

⁹³ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 108; "The Shops That Were Destroyed," *Sacramento Bee*, November 8, 1898; "Ground plan of shops showing future extensions" (June 1903), Drawing 3558 / PSM, SMCC 203 (Source Record ID 14544), California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁹⁴ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 110; Helmich, *A Legacy in Brick and Iron*, 157.

⁹⁵ "Repairs to various buildings in the Sacramento Shop Grounds" (July 19, 1941), General Manager's Order No. 17345, Sac. 11603, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁹⁶ Helmich, *A Legacy in Brick and Iron*, 157.

⁹⁷ "Repair roof of Car Shop 3, Sacramento Shops" (February 7, 1950), General Manager's Order No. 44241, Sac. 13957, California State Railroad Museum Library & Archives Collections, Sacramento, California; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 113.

⁹⁸ "Repaint Portion of Interior of Coach Paint Shop, Sacramento" (August 19, 1953), General Manager's Order No. 58678, Sac. 14780, California State Railroad Museum Library & Archives Collections, Sacramento, California; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 113.

⁹⁹ "Paint spray shops at Coach Paint Shop: typical sections and details" (September 14, 1955), Drawing CE 22803 / 3, Box 647 + D (Source Record ID 57853), California State Railroad Museum Library & Archives Collections, Sacramento, California.

¹⁰⁰ EarthExplorer.usgs.gov, Aerial Photo Single Frame Collection, "AR5760023740014," captured July 9, 1976.

Turntable

Physical Description

The Turntable comprises a circular pit with a central pivot point on which a narrow steel span may be rotated. The pit, which measures approximately 100 feet in diameter, is lined with concrete and features a curved, vertical retaining wall around its perimeter. The steel span extends the diameter of the pit and may be rotated upon a pivot point affixed to the center of the pit. The deck of the span contains a single set of tracks flanked by metal railings. An open, pointed arch constructed of steel latticework straddles the center of the span, directly over the pivot point below, and connects the apparatus to several overhead electrical lines. A small plywood cab, seemingly a replacement or a temporary structure, is located at one end of the span, where it comes into contact with the perimeter of the pit. Two short stretches of track extend from the edge of the pit in a westerly direction; these have been truncated beyond approximately 230 feet.

Construction and Use History

The first Turntable was installed in the initial phase of the Sacramento Shops' development. Situated immediately south of the Roundhouse, the Turntable was used to route steam locomotives to any of several tracks radiating outward from its central pivot point, thereby directing locomotives to the various shop buildings and Roundhouse stalls for maintenance and repairs. The Turntable was also used to reverse the direction of steam locomotives, which were unable to reverse independently.

Locomotives and tenders gradually increased in length and weight over the course of the late nineteenth and early twentieth centuries, necessitating the replacement of the Turntable and the alteration and eventual demolition of the Roundhouse.¹⁰¹ The importance of the Turntable declined as the Southern Pacific replaced its fleet of steam locomotives with diesel engines, as the latter were able to run equally well in either direction and rarely needed to be turned. However, some repositioning of diesel locomotives was necessary in order to direct them toward particular shop buildings, and so the Turntable remained in use through the diesel era and was not removed when the Roundhouse was demolished in 1959.¹⁰²

Key modifications to the Turntable are summarized below.

- 1868: Initial construction of the Turntable Pit and installation of a 55-foot-in-diameter, wooden A-frame Turntable.¹⁰³
- 1869: The 55-foot-in-diameter wooden Turntable was replaced with a 56-foot-in-diameter, manually-operated iron Turntable. The same pivot point was used.¹⁰⁴
- 1895 or 1896: The 56-foot-in-diameter iron Turntable was replaced with a 70-foot-in-diameter model, again using the same pivot point.¹⁰⁵
- ca. 1906: The Turntable was electrified.¹⁰⁶
- 1942: The 70-foot-in-diameter Turntable was replaced with a 100-foot-in-diameter model, again on the same pivot point.¹⁰⁷

Integrity

The removal of the Roundhouse in 1959 has somewhat reduced the Turntable's integrity of setting, as the two resources were closely related with regard to location and operation. However, the Turntable itself, which dates to 1942, has experienced little alteration since the period of significance and is a distinctive example of steam-era railroad equipment. The Turntable maintains a degree of integrity and is a contributing resource for its association with the development of the American railroad industry.

¹⁰¹ The Roundhouse was demolished in 1959 (Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 72).

¹⁰² Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 16n13, 62, 72.

¹⁰³ Helmich, *A Legacy in Brick and Iron*, 72.

¹⁰⁴ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 11; Helmich, *A Legacy in Brick and Iron*, 72, 195.

¹⁰⁵ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 219; Helmich, *A Legacy in Brick and Iron*, 76.

¹⁰⁶ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 191-192.

¹⁰⁷ Robert A. Pecotich, *Southern Pacific's Sacramento Shops . . . Incubator of Innovation* (Berkeley, California: Signature Press), 309; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 43n55.

NONCONTRIBUTING RESOURCES

Locomotive Transfer Table

Physical Description

The present-day Locomotive Transfer Table consists of a moveable transfer table and the stationary runway upon which this moves. (See Figure 38.) It is located between the Boiler Shop and the Erecting/Machine Shop. The transfer table itself is a narrow, moveable metal platform flanked by a short metal railing. One set of rail tracks extend the length of the platform, allowing the transfer table to accommodate and move a locomotive. A rectangular cab with metal-clad walls and a convex, metal-clad roof is situated near the eastern end of the platform. A steel lattice tower atop the western end of the cab's roof links the transfer table to an electrical line suspended over the runway. The transfer table sits on eight pairs of wheels that align with eight steel tracks set into the floor of the concrete runway. The runway tracks lay perpendicular to the transfer table and allow it to slide up and down the length of the runway.

The platform and cab were completely re-built by the California State Railroad Museum in 2003 with new materials. While the present-day transfer table is similar in scale to its predecessor, it has a contemporary appearance and is not a historic reconstruction.¹⁰⁸ As a result, the Locomotive Transfer Table retains insufficient integrity of design, materials, workmanship, feeling and association to be considered a contributing object to the Sacramento Shops district.

Firing Line

Physical Description

The Firing Line was added to the Sacramento Shops between 1957 and 1964 and replaced an earlier firing line in the same location.¹⁰⁹ (See Figure 39.) It is a utilitarian industrial building that is rectangular in plan. The single-story steel-framed structure features a gable roof with metal ridgeline capping and minimal eave overhang. The roof is punctuated by two narrow, rectangular covered vents on either side of the ridgeline and a cylindrical metal chimney near the northwestern corner of the building.

Vertically-oriented corrugated metal siding covers the upper two-thirds of the Firing Line's lateral façades. The lower third of the lateral façades and the gable ends of the building are uncovered. A shed-roofed addition clad in corrugated metal siding extends off the northern façade of the building, and a metal door and louvered vent punctuate the addition's western façade.

The interior of the Firing Line consists of a single large, open bay with exposed steel trusses and a concrete floor that extends slightly beyond the gable end walls of the building. Two sets of tracks extend the length of the concrete floor, and a series of electric lights are suspended from the centerline of the building's roof.

Because it was added to the site after the period of significance, the Firing Line is a non-contributing building to the Sacramento Shops Historic District.

¹⁰⁸ Author interview with Albert J. Di Paolo, Chief Mechanical Officer, California State Railroad Museum, February 26, 2020.

¹⁰⁹ EarthExplorer.usgs.gov, Aerial Photo Single Frame Collection, "AR1EJA000020118," captured August 5, 1947; EarthExplorer.usgs.gov, Aerial Photo Single Frame Collection, "ARMPTF1610B0621," captured June 27, 1956; EarthExplorer.usgs.gov, Aerial Photo Single Frame Collection, "ARM6669701R1790," captured April 22, 1966. The Firing Line may have been relocated from El Paso (Author interview with Albert J. Di Paolo, Chief Mechanical Officer, California State Railroad Museum, February 26, 2020).

**HISTORIC PRESERVATION CERTIFICATION APPLICATION
PART 1 – EVALUATION OF SIGNIFICANCE**

Property name Sacramento Shops Historic District NPS Project Number _____
Property address 111 I Street Sacramento Sacramento CA 95814-2204

6. Statement of significance, cont.

GENERAL HISTORY OF THE SACRAMENTO SHOPS

The Sacramento Shops Historic District reflects the history and development of the railroad in the American West, from the construction of the transcontinental railroad through the early post-World War II period. The Central Pacific Railroad broke ground on the complex in 1867, two years prior to the completion of the transcontinental railroad, and by 1869, the Sacramento Shops were described as "the largest iron-working and wood-working establishments in operation west of St. Louis, or even Chicago."¹ The complex expanded the number and range of its facilities in the decades that followed, earning a reputation for self-sufficiency, productivity, and innovation in rolling stock design.

In 1885, the Central Pacific Railroad was leased to a holding company, the Southern Pacific Company, and the Sacramento Shops began to operate under a new corporate identity. The Shops continued to expand, as the Southern Pacific altered existing buildings and added new ones to meet the fluctuating demand of the late nineteenth century and early twentieth centuries. The complex reached maximum build-out in the late 1920s, following expansion in the boomtime after World War I.

Like most American businesses, the Southern Pacific Company struggled through the economic depression of the 1930s. The Sacramento Shops complex was little changed until the end of the decade, when activity increased in the lead-up to the United States' entry into World War II. The Shops supported the war effort by maintaining the massive volume of rolling stock required to move servicemen and supplies around the country, significantly expanding their workforce in the process in order to meet wartime demands.

In the early postwar period, the Southern Pacific Company committed to phasing out steam locomotives in favor of diesel engines. This decision triggered a decade-long transitional period, during which steam and diesel locomotive operations shared space at the Sacramento Shops. By the end of this transition, diesel locomotives maintenance and repair operations dominated the complex and had resulted in the overhaul or removal of buildings and equipment. Additional facilities were removed in the late twentieth and early twenty-first centuries, leaving only the Boiler Shop, Erecting/Machine Shop, Blacksmith Shop, Car Machine Shop, Planing Mill, Car Shop No. 3, Privy, Paint Shop, Turntable, Locomotive Transfer Table, and Firing Line within the boundaries of the Sacramento Shops Historic District at the time of this writing.

The following sections provide an overview of the development and activity at the Sacramento Shops Historic District from the formation of the Central Pacific Railroad through the present. This is followed by discussions of the district's eligibility under Criteria A and C.

The Central Pacific Railroad and Early Development of the Sacramento Shops: 1861-1885

The Sacramento Shops were established by the Central Pacific Railroad, which incorporated in 1861 and constructed the western portion of the transcontinental railroad between 1863 and 1869. The Central Pacific initially purchased locomotives from suppliers in the eastern United States and contracted locally in Sacramento for assembly and repair, circumventing the need to construct its own intensive shop facilities. Temporary wooden shops for tool and materials storage, forging, and car construction and repair were built on H and I Streets in Sacramento within a few years of the railroad's incorporation. The Central Pacific, however, quickly recognized the need for expanded facilities, and construction began on the present-day site of the Sacramento Shops Historic District in 1867. Leland Stanford, one of the founders of the Central Pacific Railroad, later justified the decision to stockholders by emphasizing the relative remoteness of the American West: "Far removed as we are from manufacturing centers, shops complete for the manufacture of cars and locomotives are a necessity."²

¹ "The Pacific Railroad Terminal Shops at Sacramento," *Mining and Scientific Press* 19, no. 5 (July 31, 1869): 72.

² Robert A. Pecotich, *Southern Pacific's Sacramento Shops: ...Incubators of Innovation* (Berkeley, CA: Signature Press, 2010), 18; John H. White, Jr., "The Railroad Reaches California: Men, Machines, and Cultural Migration,"

Building Construction

Land for the Sacramento Shops was deeded from the City of Sacramento to the Central Pacific Railroad soon after the latter had incorporated. At the time, the site comprised thirty acres of slough along the city's riverfront, as well as the adjacent marshy lake known variously as Lake Sutter, Sutter's Lake, Old Slough, and China Slough (the latter term referred to the lake's proximity to Sacramento's Chinatown, Yee Fow). The lake was originally a clear body of water connected to the river, but it was cut off from fresh water by a railroad levee and gradually filled with sand and refuse. The Central Pacific's first shop buildings were constructed on approximately twenty acres of former slough.³

Several buildings were constructed during the first phase of development, which began in 1867. Initial efforts were based on plans by a team of Central Pacific employees, including John Woolaver, a draftsman, and Joseph R. Wilkinson, an engineer who would later become the Central Pacific Railroad's Resident Engineer in Sacramento. Pilings were driven into the infilled slough, and foundations of redwood grillage, rubble, and granite were laid beginning in 1867. Local quarryman S. D. Smith held the contract for providing the granite used in these first foundations.⁴

The first building completed was the "colossal" two-story Planing Mill, alternatively referred to as the "wood working and car manufactory."⁵ The building included two wings off of its southern elevation: the larger, eastern wing was used for painting and would later be enlarged to serve as Car Shop No. 3. The smaller, western wing was the Power House (no longer extant), containing a stationary steam engine and shaft system used to power the woodworking and machining equipment in both the Planing Mill and the Erecting/Machine Shop (completed by 1869). The Power House's 160-horsepower Corliss steam engine was built with castings made in Folsom, California, and locally at Goss & Lambard's Sacramento Iron Works, with most of the machine work completed by the latter. Water for the steam engine was supplied by two artesian wells, each 75 feet deep and operated by friction pulleys. The stack covering the Power House comprised some 660,000 bricks and was surmounted by an iron cap weighing one ton.⁶

Following the Planing Mill and its two small wings, the Roundhouse, Turntable, Erecting/Machine Shop, and Blacksmith Shop were completed in quick succession. The Erecting/Machine Shop and the Blacksmith Shop were situated immediately southwest of the Power House, which supplied power to their machinery via a drive system that extended first to the Erecting/Machine Shop and by extension to the Blacksmith Shop; secondary drive shafts within each individual building worked with an array of clutches, leather belts, and pulleys to power individual machinery. The Erecting/Machine Shop included eleven pits adapted for locomotive repairs and a 50-foot-long wooden crane. It was stocked with a variety of machinery to be utilized for locomotive repairs, including "a colossal lathe for turning locomotive driving wheels 6½ feet in diameter, a drill for boring out and smoothing the center of car wheels, nut-tapping machines, very large iron planing machines, [and] a slot-cutting machine for keying positions and the like."⁷ The nearby Blacksmith Shop contained thirty forges and three steam hammers. Together, these buildings were intended to perform all of the railroad's heavy repair work and locomotive construction and assembly; routine or "running" maintenance was conducted at smaller servicing shops, which were constructed at various points along the rail line, or at the Sacramento Shops in the stalls of the Roundhouse.⁸

The semi-circular Roundhouse (no longer extant), which was located at the northern end of the early complex, was the only building in the first phase of construction without a pile foundation. Instead, it was constructed on a foundation of thick blocks of granite. When complete, the Roundhouse contained twenty-nine stalls, twenty-eight of which were equipped to accommodate locomotives and one of which was devoted to office use. Water for the steam engines was supplied from a two-story side tower that housed a 65,000-gallon water tank on its roof, offices on its first and second stories, and seven 1,000-gallon sheet-iron oil reservoirs in its cellar. A

California Historical Quarterly 52, no. 2 (Summer 1973): 139; David L. Joslyn, "The Romance of the Railroads Entering Sacramento," *The Railway and Locomotive Historical Society Bulletin* 48, (March 1939): 26.

³ Historic Environment Consultants, "Central Pacific/Southern Pacific Railroad Railyards: Historic Property Inventory and Evaluation Report" prepared for the Union Pacific Railroad Company, March 1998, 5.

⁴ "City Intelligence: Railroad Works," *Sacramento Daily Union*, August 9, 1867; "Local Matters," *Pacific Bee* (Sacramento, CA), June 29, 1878; Joslyn, "The Romance of the Railroads," 27; Robert E. Draper, *Sacramento City and County Directory for 1869* (Sacramento, CA: H. S. Crocker & Co., 1869), 175.

⁵ "The Pacific Railroad Terminal Shops at Sacramento," *Mining and Scientific Press* 19, no. 5 (July 31, 1869): 72.

⁶ "The Pacific Railroad Terminal Shops at Sacramento," *Mining and Scientific Press* 19, no. 5 (July 31, 1869): 72; Joslyn, "The Romance of the Railroads," 27.

⁷ "The Pacific Railroad Terminal Shops at Sacramento," *Mining and Scientific Press* 19, no. 5 (July 31, 1869): 72.

⁸ Pecotich, *Southern Pacific's Sacramento Shops*, 23; "The Pacific Railroad Terminal Shops at Sacramento," *Mining and Scientific Press* 19, no. 5 (July 31, 1869): 72.

manually-operated iron Turntable was installed immediately south of the Roundhouse and was able to direct locomotives directly into any of its stalls.⁹

The core of the Central Pacific's Sacramento Shops, including the Planing Mill, Erecting/Machine Shop, Blacksmith Shop, Roundhouse, and Turntable, was complete by 1869. Over the next two decades, the existing shop buildings were expanded by various additions, and new specialized buildings were added to the complex. The eastern wing off the southern elevation of the Planing Mill was significantly enlarged to serve as Car Shop No. 3 (1871-1872), and the three-story, freestanding brick Privy (ca. 1873) was later constructed in the ell between these two facilities. Painting activities were moved from a temporary wooden building (ca. 1867, no longer extant) to a new brick Paint Shop building (ca. 1873), which included five bays and a two-story office wing that initially housed the company's draftsmen. A 60-foot-long pit transfer table (since removed) was constructed between the Paint Shop and Car Shop No. 3. The Blacksmith Shop and Erecting/Machine Shop were both enlarged to the south (ca. 1872 and 1875, respectively), and the latter's original wooden crane was replaced with a steel crane in the 1880s. The first Boiler Shop was constructed from wood and corrugated iron near the southwestern corner of the complex (ca. 1872, no longer extant). Several other buildings (no longer extant) were also completed by the end of the nineteenth century, including a wheel, brass, and iron foundries; a warehouse managing parts, hardware, paints, and scrap; a reclamation shop managing recyclable materials; and production shops for bolts, pipes, and copper sheet metal products. The activities housed in all of these buildings contributed to the independent operation of the Sacramento Shops, a necessity given the relative remoteness of the American West.¹⁰

Shop Activities

In this early phase of the Sacramento Shops' existence, activity was focused on the assembly, construction, and repair of steam locomotives and railroad cars. The Central Pacific Railroad's first locomotive engines were produced in manufacturing centers in the eastern United States, shipped by boat around Cape Horn to San Francisco, and transported by river schooner to Sacramento. This process was time-consuming and costly, although it grew less so after the completion of the transcontinental line in 1869. During several periods in the railroad's history, the company's executives deemed the outside purchase of locomotives to be the most economical and expedient option to expand their fleet.¹¹

The volatility of manufacturers' prices and protracted delivery schedules, however, led the company to pursue on-site construction of locomotives, which could be accomplished according to more predictable schedules and costs. The Sacramento Shops produced their first locomotive, CP 173, in 1872; it was quickly followed by an order for ten more. The decision to produce such a quantity of locomotives at the shops likely catalyzed the development of some of the heavy machinery shops and equipment, such as the Boiler Shop (ca. 1872) and the iron rolling mill installed in the southern end of the Blacksmith Shop (ca. 1876, enlarged ca. 1879). Regardless, because the method of manufacturing locomotives closely followed that of repair, the Shops were, in general, already well-equipped to perform this task.¹²

The locomotion manufacturing process began with the development of plans by the railroad's drafting department, which was led by George Allen Stoddard between 1872 and 1908. Many of the Central Pacific's late-nineteenth century locomotives, including CP 173, were built to designs by Andrew Jackson Stevens, who served as the railroad's General Master Mechanic from 1870 through his death in 1888. Necessary components and/or raw materials were produced on-site or ordered from outside manufacturers, then gathered together in the Erecting/Machine Shop for assembly. Once complete, a locomotive would be pulled from the Erecting/Machine Shop and mated to its tender, painted and lettered in the Paint Shop, and prepared for service. Each type of locomotive built in the Sacramento Shops was distinct, and therefore each had its own unique fabrication procedure.¹³

The Sacramento Shops were also equipped to repair and construct other types of rolling stock, including freight cars and passenger cars. The latter were particularly labor-intensive, requiring two weeks to build (including interior casework and seating) and two weeks to paint and varnish. As

⁹ "City Intelligence: Railroad Works," *Sacramento Daily Union*, August 9, 1867; Pecotich, *Southern Pacific's Sacramento Shops*, 23; "The Pacific Railroad Terminal Shops at Sacramento," *Mining and Scientific Press* 19, no. 5 (July 31, 1869): 72; Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey No. CA-303*, 11.

¹⁰ Joslyn, "The Romance of the Railroads," 28; Helmich, *Legacy in Brick and Iron*, 195-196; Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey No. CA-303*, 218-219.

¹¹ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey No. CA-303*, 197-198.

¹² Pecotich, *Southern Pacific's Sacramento Shops*, 36; Joslyn, "Sacramento General Shops," 20-21; Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey No. CA-303*, 198-199.

¹³ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey No. CA-303*, 30-35.

a result, although the Sacramento Shops turned out a number of passenger cars in the 1870s and 1880s, the company purchased most of its passenger cars from the Pullman Palace Car Company and other builders. Freight cars, which were less detailed in construction and higher in demand, were constructed in greater volume. Wooden, metal, and mechanical components from the Planing Mill, Blacksmith Shop, and other specialty departments (the Cabinet and Upholstery Shops in the second floor of the Planing Mill, for instance) were conveyed to Car Shop No. 3, where cars were assembled or repaired. When completed, freight and passenger cars were moved from Car Shop No. 3 to the Paint Shop by way of the transfer table between the two buildings. They were painted, varnished, and lettered in the Paint Shop, then released for use.¹⁴

In addition to rail-related construction, the Sacramento Shops also produced components for river steamers and ferryboats, including boilers and the "walking beams" that interconnected the piston rod of the vertical steam engines and the paddlewheel cranks that powered many Bay Area side-wheelers and ferries. Other ship components produced at the Sacramento Shops during the late nineteenth century include engine condensers, cylinders, engine parts, and miscellaneous hardware. In 1877, the Shops even produced a new pump for the City of Sacramento's waterworks; this remained in use until 1903.¹⁵

The Southern Pacific Company in the Late Nineteenth Century: 1885-1900

The founders of the Central Pacific Railroad pushed to expand their transportation holdings in the American West through the end of the nineteenth century, absorbing numerous smaller lines and extending their own trackage throughout California and across the United States. Faced with a complicated management structure, rising expenditures, and declining revenues in the early 1880s, the founders decided to create a holding company to streamline management and provide a more efficient mechanism for distributing traffic, investment capital, expenses, and profits. The holding company, the Southern Pacific Company, was incorporated in 1884. In early 1885, the Central Pacific Railroad and all of its affiliated lines were leased to the holding company, and all were essentially subsumed under the Southern Pacific Company's name and corporate identity.

Over the next decade and a half, the Southern Pacific Company focused on modernizing and integrating its many disparate holdings. The Sacramento Shops, now bearing the name of the Southern Pacific Company rather than the Central Pacific Railroad, underwent a period of expansion that increased the material capacity and the range of repair work possible on-site. This wave of development included the construction of new, specialized facilities as well as the expansion of existing shops throughout the site.

Building Construction and Alteration

The late nineteenth century saw the construction of new facilities at the Sacramento Shops, along with substantial expansion of existing buildings. In general, these improvements reflect the Southern Pacific's effort to increase capacity while maintaining existing fabric and flexibility in use. The Car Machine Shop, which was completed in 1888, was the largest of the new buildings constructed during this period. The first floor, which was organized into twenty-seven bays (nine bays long by three bays deep), housed operations for car construction and associated machinery, while the second floor included the Plating Shop, Brass Room, and Upholstery Shop (the latter was previously located in the Planing Mill).¹⁶

Also in 1888, the ca. 1872 Boiler Shop (no longer extant) was moved to the western edge of the complex and repurposed as a Brass Foundry and Spring Shop. It was replaced by a larger building (the present-day, extant Boiler Shop), which was situated slightly west of the original building's footprint in order to make room for a new 40-foot, steam-powered Locomotive Transfer Table between the new Boiler Shop and the Erecting/Machine Shop. In the same year, the Erecting/Machine Shop was expanded by an addition to its southern elevation. A Blacksmith Shop Extension (no longer extant), a freestanding building to the south of the Blacksmith Shop, was also constructed around this time; whereas the original Blacksmith Shop was outfitted only to forge iron, the Extension provided facilities that could also cast iron. A freestanding Rolling Mill (no longer extant), located to the south of the Paint Shop and also completed in 1888, further augmented the Sacramento Shops' metal-working facilities.¹⁷

¹⁴ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 107.

¹⁵ Pecotich, *Southern Pacific's Sacramento Shops*, 33; "Removing Stevens Pump," *Sacramento Bee*, May 23, 1903.

¹⁶ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 115-116.

¹⁷ "How the Railroad Shops Were Built," *Sacramento Daily Union*, October 4, 1896; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 11-12, 39n98, 97n154, 199. The Sacramento Shops' first rolling mill was installed in the southern end of the Blacksmith Shop.

A second burst of improvements came in 1890, when the Paint Shop was expanded by an addition to its southern elevation, the Pattern Shop annex was constructed to the southern elevation of Car Shop No. 3, and the transfer table between the two was lengthened to service the new Paint Shop stalls. In 1895 or 1896, the 56-foot Turntable installed in 1869 was replaced with a 70-foot apparatus that could accommodate new, lengthier rolling stock.¹⁸

On November 7, 1898, the Planing Mill and the Car Machine Shop were both badly damaged by a major fire that likely originated in the Upholstery Shop, then located on the second floor of the Car Machine Shop; only the first-floor walls of the Car Machine Shop and the south and west walls of the Planing Mill survived the blaze.¹⁹ Because these buildings were essential to car construction and repair, the Southern Pacific Company commenced reconstruction almost immediately. The standing walls were retained, and each building was rebuilt on its original foundation within approximately two months. A year later, a second-story bridge was constructed between the Car Machine Shop and the Planing Mill.²⁰

The Paint Shop was also remodeled during this period. Four of the five painting bays were demolished (the northernmost bay was retained because it was located beneath the second-floor offices), making the interior into a single continuous, open space; workspace more than doubled, and track space for painting tripled.²¹ In this new configuration, the Paint Shop was not only able to accommodate a greater number of cars, it also had the flexibility to expand the range of services that it was able to provide. This emphasis on versatility, also observed in the reuse of the ca. 1872 Boiler Shop, reflects the fluctuating needs of the Southern Pacific Company and the adaptability of the Sacramento Shops in the late nineteenth century.

Shop Activities

The 1888 death of Andrew Jackson Stevens, who had designed seventy-four new steam locomotives constructed at the Sacramento Shops, marked the end of an era with regard to on-site locomotive construction. Stevens' successor, Henry J. Small, encouraged the purchase of locomotives from outside manufacturers and shifted the primary focus of locomotive operations at the Sacramento Shops toward assembly and repair. Only one new locomotive was designed and built at the shops under Small's tenure as General Master Mechanic, which lasted from 1888 to 1902. Small focused his efforts on implementing standardization measures, converting the shops from steam to electrical power, and initiating a major rolling stock rebuild program. The Southern Pacific operated more than seven hundred locomotives, nine hundred passenger cars, and fifteen thousand freight cars on its Pacific System in the last decade of the 1890s, and all of these were serviced, repaired, and occasionally upgraded or refurbished in the Sacramento Shops.²²

"Running repair" of steam locomotives, which entailed monthly inspection and routine repairs to the engines' wheels, boilers, fireboxes, staybolts, brakes, signals, gauges, and valves, occurred in the Roundhouse and typically took a matter of hours. "Heavy repair" of steam locomotives was a more intensive process that drew on the activities of multiple shops. It began with an initial inspection, after which the fire in the locomotive's firebox was extinguished and the water in its boiler was drained. The locomotive was then moved to the Erecting/Machine Shop, where connecting parts were removed and an overhead crane lifted the locomotive off of its wheels and onto a set of blocks. Next, the locomotive was entirely disassembled: all parts were labeled and sorted, then distributed to the various specialty shops for repair and refinishing. Any parts that were beyond repair were replaced with new components that were either ordered or crafted on-site. Following what could amount to weeks of repair work, the locomotive was reassembled, lubricated, and finished with a fresh coat of paint in the Paint Shop.²³

Passenger and freight cars, being less mechanically complex, followed a simpler but still intensive assessment, servicing, and repair process that involved activities housed in the Planing Mill, Car Machine Shop, Car Shop No. 3, Pattern Shop, and Paint Shop. The Sacramento Shops also constructed a

¹⁸ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 219; Helmich, *Legacy in Brick and Iron*, 195.

¹⁹ "Fierce Fire at the Shops: Important Departments Suffer from Monday Morning's Blaze," *Pacific Bee* (Sacramento, CA), November 9, 1898; "Aftermath of the Big Fire," *Sacramento Daily Union*, November 8, 1898; "Sacramento Car Shops," *Santa Cruz Surf*, November 7, 1898.

²⁰ "New Shops Will Go Up: Buildings to be Nearly Finished in about Sixty Days," *Sacramento Bee*, November 10, 1898; "Sketch of Proposed Bridge bet. Planing Mill and Car Machine Shop at Sacramento" (April 5, 1899), Drawing 1055 / PSM, SMCC 203 (Source Record ID 6599), California State Railroad Museum Library & Archives Collections, Sacramento, California.

²¹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 108-109.

²² Timothy S. Diebert and Joseph A. Strapac, *Southern Pacific Company Steam Locomotive Compendium* (Huntington Beach, CA: Shade Tree Books, 1987), 14; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 12, 173, 204-205; Helmich, *Legacy in Brick and Iron*, 169, 214.

²³ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 20-22.

broad array of new rolling stock during the late nineteenth century, including passenger coaches, freight cars, baggage cars, mail cars, and cabooses. These cars were generally produced for use on Southern Pacific mainlines, but they were also sometimes commissioned by other railroads owned or controlled by the Southern Pacific holding company.²⁴

Shop activities were disrupted briefly in 1894 when the American Railway Union (ARU) called for a national boycott of Pullman Palace Car Company products. The Pullman Company supplied a large number of cars for the Southern Pacific Company and its subsidiaries, and Southern Pacific leadership denounced the strike. However, thousands of Southern Pacific employees—including two-thirds of the Sacramento Shops' workforce—honored the boycott, which originated in Chicago on June 26, 1894, and began in Sacramento two days later. The California militia were called to break the strike in Sacramento, but because many local militiamen belonged to the ARU or were friendly with its members, they sympathized with the striking union men and did little to force its end. Federal troops from San Francisco arrived in early July and proceeded to occupy the city for two months. Popular support for the strike diminished following the intentional derailment of a Southern Pacific train departing from Sacramento, and the Sacramento Shops had reopened by July 18, 1894. The strike ended nationally four days later, following the arrest of the ARU's founder in Chicago.²⁵

The Harriman Era and the Early Twentieth Century: 1900-1917

Following the death of Southern Pacific Company president Collis P. Huntington in 1900, nearly fifty percent of the company's stock was purchased by railroad magnate Edward H. Harriman, who already controlled the Union Pacific and Illinois Central Railroads. By 1901, Harriman had been elected president of the Southern Pacific, and the "Harriman Lines" included approximately 18,000 miles of rail line throughout North America. The massive, sudden increase in rolling stock, coupled with a trend toward larger and heavier locomotives, placed greater demand on the Sacramento Shops' repair facilities and prompted a brief, concentrated period of expansion that was primarily focused on the alteration and enlargement of existing buildings. Harriman's period of ownership over the Southern Pacific also saw the implementation of a set of "common standards," developed at the Sacramento Shops and intended to streamline equipment and operations across the Harriman Lines.²⁶

Recessions in 1907-1908 and 1913-1914 forced the Southern Pacific Company to reduce both staff and hours, diminishing output and stunting the growth heralded by Harriman's takeover, which lasted from 1901 until his death in 1909. The Sacramento Shops and the Southern Pacific Company in general were plagued with recurrent economic insecurity at this time, achieving a short-term stability only with the United States' entry into World War I.

Building Construction and Alteration

The early twentieth century saw a number of operational challenges that led to substantial changes in the physical fabric of the Sacramento Shops. First, Harriman's takeover of the Southern Pacific Company significantly increased the volume of rolling stock that was serviced by the shops. Second, the locomotives of the early twentieth century were larger and heavier than their predecessors, placing greater physical demands on repair facilities that had been constructed for an earlier, significantly smaller generation of locomotives. Third, Harriman's administration instituted a rigid set of common standards across the breadth of the Harriman Lines, expanding upon the standardization efforts that had been advanced by Henry J. Small in the late twentieth century.²⁷

Despite the magnitude of these changes, the Southern Pacific Railroad did not choose to significantly redesign the Sacramento Shops complex; instead, existing buildings were altered and expanded to accommodate new practices and larger rolling stock, and new facilities were added when no existing building or structure was suited to meet a particular need. In 1904 and 1905, a new erecting shop addition was constructed along the western elevation of the existing Erecting/Machine Shop, effectively doubling the building's footprint, and the Boiler Shop was widened with a lateral addition across the eastern elevation. In the next year, two additional bays were added to the Paint Shop.

Some of the early twentieth-century modifications that occurred at the Sacramento Shops complex were associated with modernization efforts advanced by Small, who was a major proponent of electric motive power. By 1910, the Power House's Corliss engine was no longer in use, and the shop

²⁴ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 178

²⁵ Helmich, *Legacy in Brick and Iron*, 165; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 152-153; "The Shops Opened: Several Hundred Men Go to Work This Morning," *Sacramento Bee*, July 18, 1894.

²⁶ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 40.

²⁷ Diebert and Strapac, *Steam Locomotive Compendium*, 15.

buildings were fully electrified. The Locomotive Transfer Table between the Erecting/Machine Shop and the Boiler Shop was replaced by an innovative new "pitless" version, which featured a ground-level cap that allowed workers to walk across the structure and mechanisms of the transfer table, which were largely below ground level.²⁸

The last major construction developments during this period were associated with a second major fire, which ripped through Car Shop No. 3 in late November 1916. The fire burned the building's eight southernmost bays, sparing the five northern bays, the eastern wall, and the southern party wall that joined Car Shop No. 3 to the Pattern Shop annex. The building was quickly reconstructed, this time incorporating fire safety measures such as internal brick firewalls. The rebuilt Car Shop No. 3 extended the footprint of the destroyed portion to the west by about ten feet, enabling the building to accommodate longer cars.²⁹

Shop Activities

The imposition of common standards impacted activity within all of the railroad shops affiliated with Harriman-controlled lines. The Sacramento Shops did not produce new locomotives during this period, but they maintained and repaired locomotives and cars manufactured to the new common specifications. The early twentieth century also saw the introduction of battery-powered electric headlights, the conversion of all wood-burning locomotives to oil, and the conversion of older locomotives to superheated steam. Locomotive repair and refurbishment continued to be concentrated in the (newly expanded) Erecting/Machine Shop and the Boiler Shop during this time period.³⁰

With regard to other rolling stock, the Sacramento Shops continued to construct, repair, and maintain both passenger cars and freight cars during the early twentieth century. In 1906, the Shops produced an experimental all-steel passenger car with a frame constructed in the Boiler Shop, followed by the company's first all-steel postal car in 1907 and then an all-steel coach in 1908. The Southern Pacific Company ultimately chose to purchase its steel passenger cars from outside suppliers, but the Sacramento Shops remained active in the maintenance and repair of these all-steel constructions. Beginning in 1911, the Southern Pacific purchased only all-steel passenger cars, and by 1913, fully one-third of its passenger fleet was steel.³¹

World War I and the United States Railroad Administration: 1917-1920

The outbreak of World War I in Europe triggered a surge in demand for American-made goods, and the Southern Pacific Company's economic position stabilized after recurrent recessions in the late nineteenth and early twentieth century. After the United States' entrance into the war, employment at the Sacramento Shops climbed to 2,200 people (including, for the first time, women), and the Sacramento Shops' output increased substantially.³²

In order to maximize efficiency and advance the war effort, the federal government took possession of all American railroads on December 28, 1917. The U.S. Railroad Administration (USRA), under the direction of William G. McAdoo, "promised stringent control and centralized management of routing and distribution of freight traffic as well as joint use of terminals, shops, and equipment."³³ Railroads were eventually returned to private control on March 1, 1920, following the Transportation Act of 1920.

Building Construction and Alteration

Although the Sacramento Shops' output increased while under control of the USRA, the complex itself experienced relatively little change during World War I and in the immediate postwar years. Materials were rationed and funds were concentrated on the most immediate needs of the war effort, with the result that improvements were made only where absolutely necessary to meet production requirements. Although the Shops recommenced in-house locomotive construction in 1917, car repairing and manufacturing facilities were the primary focus of war-era expansions and upgrades. Car Shop No. 3, which had been partially destroyed by fire in 1916 and rebuilt in early 1917, was

²⁸ Joslyn, "The Romance of the Railroads," 27; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 191; 219.

²⁹ "Southern Pacific Shops Damaged by \$43,000 Fire," *Sacramento Bee*, November 27, 1916

³⁰ Diebert and Strapac, *Steam Locomotive Compendium*, 15.

³¹ Pecotich, *Southern Pacific's Sacramento Shops*, 305; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 177-178.

³² Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 135-137.

³³ Don L. Hofsommer, *The Southern Pacific, 1901-1985* (College Station, TX: Texas A&M University Press, 1986), 73.

renovated in the same year. The five northern bays, which had survived the 1916 fire, were replaced with a two-story building in the style of the 1917 rebuild.³⁴

Shop Activities

The Sacramento Shops were kept busy during the war years as employees constructed, repaired, and serviced the locomotives, passenger cars, and freight cars that conveyed troops and supplies. In 1917, Southern Pacific Company auditors determined that Southern Pacific equipment was performing three times the service that it had during the recession of 1913-1914.³⁵ Intensified use translated to increasing activity in the Sacramento Shops, which were still the largest railroad shop facilities in the West.³⁶

The Sacramento Shops resumed locomotive construction in 1917, when the commercial builders that typically supplied locomotives were unable to handle the volume of orders they received. Sixty-six locomotives were constructed at the Shops during World War I. The Sacramento Shops also manufactured boilers, frames, and running gear for locomotives to be assembled at other company shops in Ogden, Utah; Los Angeles, California; Houston, Texas; and Algiers, Louisiana. This was a transitional period with regard to steam locomotives, as oil became a more popular fuel source than coal; oil provided higher heat value per pound, was less expensive to handle, and burned cleaner. Several of the Southern Pacific Company's locomotives were converted to oil in the early twentieth century, and some of this work was likely performed at the Sacramento Shops.³⁷

Aside from locomotive construction, the Sacramento Shops' primary focus of wartime production was on car construction, repair, and maintenance. The Southern Pacific Company constructed several different 40-ton freight car classes in 1917 and 1918, including two hundred Class G-40-I gondolas (open-topped cars) constructed at the Sacramento Shops in December 1917. The Shops also built hundreds of boxcars and stock cars during the USRA era, including five hundred Class B-40-5 cars constructed in early 1918. Additionally, the Southern Pacific Company was compelled by the USRA to purchase one thousand boxcars from external manufacturers in support of the war effort. It is likely that many of these were serviced and repaired at the Sacramento Shops over the course of their use.³⁸

Record Years and Continued Expansion: 1920-1929

Following the dissolution of the USRA in 1920, ownership and operation of the Southern Pacific Company returned to the private sector. The flush postwar economy carried the company through the end of the decade; although passenger service gradually declined, the company's 1928 annual report celebrated record freight earnings.³⁹ Machinists, boilermakers, blacksmiths, sheet metal workers, electricians, carmen, pattern makers, upholsterers, painters, mill hands, cabinet makers, platers and polishers, car cleaners, clerks, and draftsmen all found steady employment at the Sacramento Shops through the end of the decade, at which point the Wall Street Crash of 1929 plunged the country into the Great Depression.

Building Construction and Alteration

By 1928, the Sacramento Shops complex encompassed more than two hundred individual buildings and structures and had grown to cover approximately 200 acres. In line with earlier trends of reuse, adaptation, and expansion, many existing buildings were altered in order to accommodate the increasingly large volume of rolling stock produced, repaired, and serviced in the Sacramento Shops. In 1927, the southern half of the Blacksmith Shop was renovated with the addition of reinforced concrete walls and broad sections of glazing designed to maximize interior lighting and ventilation. (Alterations to the northern half of the building were postponed due to the effects of the Great Depression.)⁴⁰

The boom years also saw a variety of new construction, including a new iron foundry, steel foundry, rolling mill, sawmill (1923), and oxy-acetylene gas plant (1923), none of which remain extant. Some of this construction concerned the Shops' internal distribution of consumable and recoverable

³⁴ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 46n65, 166.

³⁵ Hofsommer *Southern Pacific*, 73.

³⁶ Hofsommer, *Southern Pacific*, 139.

³⁷ Hofsommer, *Southern Pacific*, 139.

³⁸ Pecotich, *Southern Pacific's Sacramento Shops*, 181; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 46.

³⁹ "Past Year Was One of Prosperity," *Bulletin* (Southern Pacific) 17, no. 2 (February 1929): 11.

⁴⁰ Pecotich, *Southern Pacific's Sacramento Shops*, 201; "Organization of Sacramento Shops" (January 6, 1920), Drawing 14042 / Book 329, SMCC 210 (Source Record ID 10833), California State Railroad Museum Library & Archives Collections, Sacramento, California.

materials such as sheet metal, paints, oils, switches and track bolts, lumber, and bar iron; by the end of the decade, eleven individual "shops" or supply centers, each with their own foreman and subordinate stockmen, were located within the Sacramento Shops complex. A general store building, measuring 60 feet wide by 500 feet long and containing all general supplies for shop maintenance and transportation, was constructed at the northern end of the site in 1920. A car materials store was constructed immediately north of the general store in 1928, followed by a paint and oil store in 1929. To the south of the Shops complex, a new passenger depot was constructed between H and I Streets in 1926.⁴¹

Shop Activities

Shop activity boomed throughout the second decade of the twentieth century, buoyed by a strong postwar economy and increased freight and passenger traffic. The Southern Pacific projected the acquisition of \$12 million worth of cars and \$3 million worth of locomotives during the 1920s, with sixty percent of the cars and seventy percent of the locomotives to be manufactured in the Sacramento Shops. The remaining locomotives were largely acquired from the three major American locomotive works: Baldwin in Pennsylvania, American (Alco) in New York, and Lima in Ohio.⁴²

Manufacture and assembly aside, the majority of activity in the Sacramento Shops in the 1920s was focused on maintenance, repair, and refurbishment. A few technological advances marked this period, including the introduction of one-piece cast steel engine beds, feedwater heaters, and booster engines for locomotives, but these had relatively little impact on the Shops' overall repair and maintenance processes.⁴³ The same shop practices and workflows established in the late nineteenth century continued, albeit on a larger scale.⁴⁴

The Great Depression and Subsequent Recovery: 1929-1941

The stock market crash in October 1929 precipitated a difficult period for the Southern Pacific Company, whose fortunes mirrored those of other American businesses during the Great Depression. Total revenues in 1930 were the lowest the company had experienced in a decade, and they continued to plummet through the first part of the 1930s. More than half of Southern Pacific employees were let go between 1929 and 1933, and those who remained received only a fraction of their pre-Depression salaries. As a result of the dramatic decline in employee numbers, many railroad operations had to be temporarily discontinued; the Sacramento Shops were one of only four Southern Pacific shop complexes that were still operating full five-day shifts by early 1934. Before business rebounded in the early 1940s, the Southern Pacific was forced to reduce train service, abandon hundreds of miles of trackage, and embrace a variety of new machinery and programs intended to cut costs, increase efficiency, and attract customers. The Sacramento Shops experienced relatively little change to its physical fabric during the 1930s due to the economic strain of the Great Depression.⁴⁵

Building Construction and Alteration

A decline in business and stock prices significantly curtailed the Southern Pacific Company's operations and investment capital during the Great Depression; as a result, the Sacramento Shops experienced little alteration or new construction during the early 1930s. A few buildings, including the Steel Foundry and Rolling Mill, were closed entirely due to untenable operating costs. Not until the latter part of the decade did the Shops experience any significant alterations.

The first major improvements during this period occurred near the end of the decade, in response to damage incurred by a severe storm that struck all of northern and central California in early February 1938. The storm caused widespread wind damage throughout the Sacramento Valley; at the Sacramento Shops, the Roundhouse lost its southwestern end wall and roof, and large portions of the

⁴¹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 47n68; Pecotich, *Southern Pacific's Sacramento Shops*, 187-188. The passenger depot remains extant and was listed on the National Register of Historic Places in 1975 (National Register of Historic Places, Southern Pacific Railroad Company's Sacramento Depot, Sacramento, Sacramento County, California, National Register #75000457).

⁴² Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 47; Hofsommer, *Southern Pacific*, 139.

⁴³ One-piece steel engine beds combined the discrete components of a locomotive's frame and cylinder block into a unified casting; feedwater heaters were fuel-saving devices that pumped water from a locomotive's tender and used exhaust steam to heat it before it entered the boiler; booster engines assisted a locomotive in starting heavy trains and in accelerating to road speed.

⁴⁴ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 48-50.

⁴⁵ Hofsommer, *Southern Pacific*, 118-120; "2,200 Railroad Men Will Work Five Days a Week," *Sacramento Bee*, December 31, 1934.

Foundry were blown away entirely.⁴⁶ After the storm damage was mitigated, additional alterations and upgrades to existing buildings were performed in 1939 and 1940. The brick walls at the northern side of the Blacksmith Shop, which had suffered from mortar deterioration and were out of plumb, were replaced with reinforced concrete walls with broad expanses of multilight steel windows. Additionally, the northern portion of the building was widened to match the width of the southern portion (an addition constructed ca. 1872), the corrugated iron roof was exchanged for corrugated asbestos-cement, and the concrete pier foundation replaced the rotting redwood grillage.⁴⁷ Within this same period, the Planing Mill's clerestory windows were replaced and the Power House's stack was removed.⁴⁸

Shop Activities

Shop operations languished in the early part of the decade due to the effects of the Great Depression. The Southern Pacific, however, was intent on reviving passenger service revenues and so embarked on a major modernization and passenger car refurbishment program in the mid-1930s. Much of this work was performed at the Sacramento Shops. The company first experimented with air conditioning in 1932, installing ice-activated systems on fourteen dining cars. Between 1934 and 1936, the Sacramento Shops installed this type of air conditioning on 165 coaches and other passenger cars, at an average cost of \$6,000 per car.⁴⁹ Through the end of the decade, the Sacramento Shops upgraded much of the Southern Pacific passenger car stock with amenities including foam rubber seats, fluorescent lights, telephones, and radios, as well as hydraulic snubbers and rubber isolators to provide a smoother ride. Mechanical air conditioning systems were introduced in 1937 and soon replaced the ice-activated systems, as the Southern Pacific Company strove to compete with private automobiles and attract more riders to its passenger lines.⁵⁰

Despite the substantial economic investment represented by the passenger car refurbishment program, freight transportation remained the most important source of the Southern Pacific Company's revenue at this time. The Sacramento Shops serviced and upgraded the company's existing rolling stock, adding steel sheathing, improved air brakes, and power hand brakes to boxcars. The Shops also continued to construct new freight cars on site, including hundreds of gondolas and stock cars (the latter used reclaimed trucks and underframes). Car Shop No. 9 was converted from a freight car repair area to a freight car construction shop, with an assembly line-like system of "unit construction" to increase efficiency. At one end of the line, wheels and trucks from the Car Machine Shop were assembled; from there, the car followed a standardized system through which it received a body bolster and steel draft sills; wood sills, framing, and flooring; a superstructure, siding, and linings; trimmings, ladders, and doors; roofing; spray painting; and lettering. At the end of the process, the car was weighed and inspected for completeness.⁵¹

The Sacramento Shops produced its last steam engine in 1937. This locomotive may have been constructed because of the 1936 increase in economic activity and a related increase in car loadings, or simply because the components for the assembly were available. A limited number of diesel engines had been introduced to the Southern Pacific system around this period, but as they did not surpass steam locomotives in popularity until after World War II, this factor was not immediately responsible for the Shops' cessation of steam locomotive production. The Sacramento Shops continued repairing and refurbishing steam locomotives for another two decades and purchased new steam engines from external sources, notably Baldwin Locomotive Works and Lima Locomotive Works.⁵²

⁴⁶ "Damage from Severe Storm is Inestimable," *Sacramento Bee*, February 10, 1938; Pecotich, *Southern Pacific's Sacramento Shops*, 257-258.

⁴⁷ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 101-102; "Remodel and Extend Blacksmith Shop" (January 10, 1939), General Manager's Order No. 7997, Sac. 10554/10534, California State Railroad Museum Library & Archives Collections, Sacramento, California; "Renew Corrugated Iron Roof to Corrugated Transite Roof on the Portion of the Blacksmith Shop" (January 12, 1940), General Manager's Order No. 10780, Sac. 11061, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁴⁸ Architectural Resources Group, "Sacramento Railyards Central Shops: Phase I Investigation and Documentation, Vol. 1," prepared for Thomas Enterprises, Inc., August 2006, 16-17.

⁴⁹ "2,200 Railroad Men Will Work Five Days a Week," *Sacramento Bee*, December 31, 1934; Sam R. Leedom, "Sacramento Shops Hum with Activity as the Whole National Joins in Joyous Celebration of Railroad Week," *Sacramento Bee*, June 11, 1935.

⁵⁰ "Transformation of Railroad Cars Is Wrought Here," *Sacramento Bee*, March 30, 1936; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 167.

⁵¹ Pecotich, *Southern Pacific's Sacramento Shops*, 298; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 167, 175.

⁵² Pecotich, *Southern Pacific's Sacramento Shops*, 270.

World War II and Wartime Production Demands: 1941-1945

Activity at the Sacramento Shops increased in the lead-up to the United States' entry to World War II; by February 1941, the Southern Pacific's corporate magazine reported that the Sacramento Shops were operating six days a week, preparing for anticipated wartime demand.⁵³ Following the attack on Pearl Harbor in December 1941 and the country's subsequent entry into the war, demand pushed the Shops to run their machines for 10 to 12 hours, seven days a week. The Shops' existing workforce, depleted by the draft and competition with other wartime industries, was augmented by returning retirees, teenagers, women, and Mexican nationals. At the height of the war, employment peaked around 7,000 people.⁵⁴

Demand for transportation services and products provided by the Sacramento Shops spiked during the war, but building material and labor shortages precluded any comprehensive improvement programs during the early 1940s. The Southern Pacific Company's continued reluctance to fully embrace diesel locomotives, coupled with War Production Board limitations on diesel engine production and distribution, also forestalled some of the major construction or conversion projects that would mark the postwar era.⁵⁵ As a result, the basic layout and fabric of the Sacramento Shops changed relatively little during this period, although interior alterations were somewhat common.

Building Construction and Alteration

Due to wartime rationing and the Southern Pacific Company's continued reliance on steam locomotives, only minimal changes were made to the Sacramento Shops' locomotive repair and overhaul facilities during World War II. However, the urgent demand for troop and supply mobility prompted a number of interior alterations and conversions of existing railcar construction and servicing facilities. In 1944, the Cabinet Shop was moved from the second floor of the Planing Mill to the slightly more modern, better-ventilated Sawmill (1923).⁵⁶ In the next year, the Car Machine Shop was extensively remodeled in order to accommodate a larger wheel lathe and supporting equipment; the southernmost track leading into the building was moved 4 feet to the south, and its corresponding end doors were subsequently rebuilt.⁵⁷

Other improvements to the Sacramento Shops complex were necessitated by the ever-increasing length and weight of modern rolling stock. In 1942, Southern Pacific replaced the Shops' 70-foot turntable, installed in 1895 or 1896, with a second-hand 100-foot turntable removed from another facility. This new turntable was still too small to accommodate modern cab-forward type locomotive, but it did allow Roundhouse access for contemporary locomotives other than cab-forwards.⁵⁸ Following the replacement of the Turntable, the Roundhouse was subsequently enlarged in 1943; the building's front (southern) wall was removed and its original peaked roof was replaced by a flat roof with skylights, while its back (northern) wall was left largely intact.⁵⁹ Both Transfer Tables were also rebuilt to accommodate larger locomotives and cars before the end of 1945.⁶⁰

General improvements related to building maintenance and obsolescence were also performed during this period. Most notably, the Power House (made virtually redundant by the ubiquity of electric motors) was demolished in 1943 and replaced with a smaller structure sheathed in asbestos-cement (no longer extant).⁶¹ Around the same time, the deteriorated brick walls of the Privy were covered in stucco.⁶²

⁵³ "SP Expands Its Plant: More Cars, More Locomotives, and More Jobs in Big Building Program," *Bulletin* (Southern Pacific) 25, no. 2 (February 1941): 3.

⁵⁴ "Women Take Over Tough Jobs to Relieve Manpower Shortage," *Bulletin* (Southern Pacific) 26, no. 11 (November 1942): 3; Pecotich, *Southern Pacific's Sacramento Shops*, 311-312; Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 52, 136.

⁵⁵ Pecotich, *Southern Pacific's Sacramento Shops*, 315; Claude Wiatrowski, *Railroads across North America: An Illustrated History* (Minneapolis, MN: MBI Publishing Company and Voyageur Press, 2007), 106; Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 55; Mark G. Mapes, "Losing Steam: The Decision-Making Process in the Dieselization of the Pennsylvania Railroad," Ph.D. dissertation, University of Delaware, 2000, 12, 310.

⁵⁶ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 47n68; "Move Cabinet Shop at Sacramento General Shops from Present Location to Saw Mill" (January 12, 1944), General Manager's Order No. 26806, Sac. 12525, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁵⁷ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 119-120.

⁵⁸ Pecotich, *Southern Pacific's Sacramento Shops*, 309, Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 43n55.

⁵⁹ Pecotich, *Southern Pacific's Sacramento Shops*, 309.

⁶⁰ Pecotich, *Southern Pacific's Sacramento Shops*, 321.

⁶¹ Pecotich, *Southern Pacific's Sacramento Shops*, 308.

⁶² Architectural Resources Group, "Sacramento Railyards Central Shops: Phase I Investigation and Documentation, Vol. 1," prepared for Thomas Enterprises, Inc., August 2006, 17.

Shop Activities

Due to a high demand for transportation and manufacturing services, the Sacramento Shops generally ran on two ten-hour shifts during the height of World War II; maintenance and a few other crucial departments were staffed twenty-four hours a day. Although the Shops did not construct any new locomotives of their own during this period, more than one hundred decommissioned steam locomotives were put back into service in order to meet the pressing need to move troops and supplies around the country. Car Shop No. 3 began to service and repair a small number of diesel switchers, purchased by the Southern Pacific Company in the late 1930s and early 1940s, but the primary focus remained on the repair and maintenance of steam locomotives.⁶³ Because the company's existing fleet of locomotives experienced such heavy use during the war, the Shops performed many major repairs and refurbishments in the early 1940s.⁶⁴

The other major focus of Shop activity was the construction and maintenance of non-powered rolling stock such as freight and passenger cars. As early as February 1941, ten months prior to the United States' entry into World War II, the Shops were busy constructing one hundred and twenty-five new 53-foot-long flat cars in anticipation of traffic increases associated with the war; these were the largest flat cars built at the Shops up to this time, and they were capable of carrying two heavy military vehicles simultaneously. Nonessential passenger equipment was converted to chair cars in order to increase passenger capacity and move troops efficiently. In response to an uptick in mail, the Shops also refurbished a number of postal baggage cars by doubling the size of the mail apartments from 15 feet to 30 feet.⁶⁵

Not all of the Sacramento Shops' wartime activity involved rail- or transportation-related endeavors, however; the Shops' specialized machinery and highly skilled workforce enabled the facility to fabricate large items for non-railroad uses, as well. In 1942, for example, the Shops were commissioned to manufacture a 43-foot plate-bending roller for the Kaiser Shipyards in Portland, Oregon, where it was used in the construction of the bottom-side hull plates of Kaiser's Liberty Ships.⁶⁶

The Postwar Era and the Transition to Diesel: 1945-1960

For the Southern Pacific Company and the Sacramento Shops, the postwar era was marked by the gradual, but total, transition from steam locomotives to diesel locomotives. It was in 1947 that the Southern Pacific first committed to a systematic process of dieselization, analyzing the most efficient approach to the process and creating a timeline for the replacement of its steam locomotives. The company began to operate its first road freight diesel locomotives (SP 6100 through SP 6119) in the same year, demonstrating its commitment to this major transition. The Sacramento Shops complex, which had been purposefully designed to accommodate steam locomotive maintenance and repairs, was significantly altered as a result of the Southern Pacific's decision. For this reason, 1947 marks the end of the period of significance for the Sacramento Shops Historic District.⁶⁷

During the late 1940s and 1950s, the Sacramento Shops continued to service steam locomotives while simultaneously reorienting their workflow, converting their facilities, and training their workforce to repair and rebuild an ever-growing number of diesel locomotives. The last official run of a steam locomotive on a Southern Pacific main line occurred in October 1958; it was the last of a short series of excursions conducted for rail enthusiasts. In 1960, with the transition to diesel locomotives effectively complete, the Southern Pacific hired a team of consultants to make recommendations for the reorganization and renovation of the company's shop facilities. This

⁶³ The Southern Pacific Company expanded their stock of diesel switchers in the early 1940s but continued to rely on steam power rather than buying into the new diesel freight locomotives advertised by the Electro-Motive Division of General Motors in 1939 and 1940; the company had built up a large fleet of relatively modern steam locomotives that were just approaching depreciation, and it felt that these would carry the Southern Pacific through the 1960s (Pecotich, *Southern Pacific's Sacramento Shops*, 315; Wiatrowski, *Railroads across North America*, 106). After the United States entered World War II, the War Production Board restricted the production of diesel engines to established models only and determined which roads would get them, limiting the Southern Pacific's ability to move forward with dieselization (Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 55; Mapes, "Losing Steam," 12, 310).

⁶⁴ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 146-147, 162; Pecotich, *Southern Pacific's Sacramento Shops*, 313.

⁶⁵ Pecotich, *Southern Pacific's Sacramento Shops*, 306-307, 330.

⁶⁶ "We Help to Build Ships: Huge Plate Bending Rolls for Kaiser Yards Are Being Finished at the Sacramento Shops," *Bulletin* (Southern Pacific) 26, no. 9 (September 1942): 3; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 185; Pecotich, *Southern Pacific's Sacramento Shops*, 310.

⁶⁷ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 56, 220; Hofsommer, *Southern Pacific*, 211.

development marks the conclusion of the transitional phase and the realization of the Southern Pacific's dieselization efforts.⁶⁸

Building Construction and Alteration

The dieselization of the Southern Pacific's locomotive fleet resulted in a major overhaul of the Sacramento Shops' locomotive repair and maintenance facilities. Diesel engines represented a completely new technology, demanding different repair processes and equipment from their steam-powered predecessors. Additionally, the standard multi-unit diesel locomotives were much longer than any steam locomotives that the Shops had serviced in the past; whereas the largest Southern Pacific steam locomotive measured 125 feet in length, including tender, the typical four-unit diesel freight locomotive measured approximately 200 feet in length. Although some Southern Pacific districts saw the addition of complete, purpose-built diesel service facilities in the early postwar period, the Sacramento Shops were obligated to develop heavy diesel repair facilities within the confines of the existing complex.

Because the Southern Pacific Company's transition from steam locomotives to diesel was spread over a ten-year period, many of the steam locomotive servicing and repair facilities within the Sacramento Shops were converted in phases. For example, four bays within the Erecting/Machine Shop had been allocated to diesel maintenance by 1952, and this number increased to seven (plus an eighth for a diesel engine transfer track) by 1953.⁶⁹

Car Shop No. 3, which was ideally suited to diesel repair because of its large, flexible interior space and proximity to the Erecting/Machine Shop, was also converted in the mid- to late-1940s and 1950s. Passenger car repair and refurbishment moved out of Car Shop No. 3 to the Paint Shop, and the building instead housed shops for repairing air brakes, governors, and injectors. Car Shop No. 3 experienced several major alterations associated with its conversion, including the addition of a new, more efficient electro-hydraulic elevator in 1949, the infill of many unused doors in the eastern wall, and the installation of an overhead crane taken from the Planing Mill in 1950.⁷⁰

With Car Shop No. 3's passenger car repair activities now located in the Paint Shop, a new painting annex was constructed off the latter's western elevation (this was removed ca. 1995). With regard to routine maintenance, the building's rusting roof was also repaired during this period, and two rotting wood skylights were replaced with new aluminum units.⁷¹

The Car Machine Shop, to the north of the former Planing Mill, was also upgraded in connection with the Southern Pacific's intensified focus on diesel locomotives. Within this building, the Wheel Shop received new, high-speed machines for more precise and efficient reconditioning of wheel and axel units; these improvements in turn necessitated the installation of better lighting and layout modifications. Like the Paint Shop, the Car Machine Shop was also subject to routine maintenance activities in order to extend its useful life: in 1954, the building's corrugated iron roof was replaced and the steel truss roof frame was repainted.⁷²

In addition to the multiple building conversions that characterized the Sacramento Shops during the early postwar period, three new, prefabricated buildings with utilitarian, galvanized corrugated sheet metal exteriors were erected for diesel maintenance purposes. A disassembly and cleaning shop for diesel engines was constructed to the east of the Turntable, which was left intact to position diesel locomotives entering the shops for servicing. A new masking and painting shed was constructed to the north of the Boiler Shop, now dedicated to diesel truck repair facilities. Finally, a load-test shed, where overhauled engine-generator sets were load-tested into stationary dynamic brake grids, was also constructed to the north of the Boiler Shop. None of these buildings is extant.⁷³

⁶⁸ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 69, 221; Hofsommer, *Southern Pacific*, 241.

⁶⁹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 67.

⁷⁰ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 93-94, 165-166; "Install Fifteen Ton Electric Crane in Locomotive Electric Shop" (October 13, 1950), General Manager's Order No. 47033, Sac. 14105, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁷¹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 113-114.

⁷² "Renew Corrugated Iron Roof and Repaint Steel Truss Roof Frame on Car Wheel Shop" (July 16, 1954), General Manager's Order No. 58856, Sac. 14960, California State Railroad Museum Library & Archives Collections, Sacramento, California.

⁷³ Pecotich, *Southern Pacific's Sacramento Shops*, 346-347.

Shop Activities

During the early postwar period, the Sacramento Shops were primarily tasked with heavy repair operations. While lighter servicing activities were redirected to some of the Southern Pacific's smaller shop complexes, the Sacramento Shops were utilized (and often reconfigured) for diesel locomotive repairs and rebuilds, freight car construction and repair, and locomotive and car wheel reconditioning. Passenger car construction and refurbishments, now located in the Paint Shop, were minimized due to declining ridership.⁷⁴ With regard to locomotive operations, the 1950s were a decade of transition, as the Sacramento Shops struggled to develop rational and efficient diesel engine repair and maintenance processes within the confines of their existing steam-era facilities. Steam locomotive repair and maintenance continued at the Sacramento Shops through the late 1950s, but these efforts were gradually eclipsed by diesel operations. Steam operations ceased entirely by the end of the decade, at which time the Southern Pacific Company committed fully to diesel locomotives.

As the company transitioned away from steam locomotives, the Sacramento Shops gradually began to develop a completely new workflow for the repair and maintenance of diesel engines; this would be perfected in the 1960s and 1970s, following the complete dieselization of the Southern Pacific's fleet. In the early postwar period, however, the transition was only partway underway, and diesel and steam locomotives shared space within the shops. Both diesel and steam locomotives first entered the Erecting/Machine Shop to be stripped into component parts. Diesel locomotive components were filtered to different shops, including those in former Car Shop No. 3 and in the Car Machine Shop. During this period, diesel and steam locomotive facilities shared space within the Sacramento Shops complex, although the space devoted to diesel operations increased with each passing year.

Dieselization and Corporate Consolidation: 1960-present

By 1960, dieselization of the Southern Pacific's locomotive fleet was complete, and the Sacramento Shops ceased virtually all work related to steam locomotive repair and maintenance.⁷⁵ This development resulted in extensive alteration to the Shops complex, which had been designed in the steam era and had struggled to accommodate both steam and diesel repair activities during the late 1940s and 1950s. With the aid of outside consultants and inspiration from General Motors' Electro-Motive Diesel plant in LaGrange, Illinois, the Sacramento Shops reworked their maintenance facilities to optimize diesel locomotive operations.⁷⁶

The contemporary era was also marked by the consolidation and reorganization of many American railroads. The Southern Pacific Railroad had formally merged with its longtime holding company, the Southern Pacific Company, in 1955, and in 1959, the Central Pacific Railroad did the same. In 1971, the newly-created Amtrak took over the operation of many inter-city passenger trains, including those operating over Southern Pacific Company rails, allowing the Southern Pacific to focus exclusively on freight transportation and distribution. In 1988, the Southern Pacific Company was acquired by Rio Grande Industries, the holding company for Denver & Rio Grande Western Railroad, and a year later, the two functionally combined as the Southern Pacific Lines. The Southern Pacific Lines were purchased by Union Pacific in 1996, functionally combining the Southern Pacific, Denver & Rio Grande Western, and other subsidiaries under the Union Pacific name. Most freight car switching operations were relocated to improved railyards at Roseville and Antelope. The Southern Pacific was formally merged into Union Pacific in 1998, and in 1999, the Union Pacific permanently closed the Sacramento Shops.⁷⁷

Building Construction and Alteration

While the immediate postwar period had been marked by a tenuous and increasingly uneven balance between diesel and steam locomotive repair operations, the complete dieselization of the Southern Pacific's fleet freed the Sacramento Shops to overhaul their locomotive facilities with a singular focus on diesel operations. The Roundhouse was demolished in 1959 to make room for new diesel support facilities, including a new Engine Parts Cleaning Building; this was equipped with a 25-ton bridge crane, twelve jib cranes, engine disassembly facilities, and several specialized cleaning machines. The first floor of the former Planing Mill was reused as a Roller Bearing Shop, and the Boiler Shop was converted to a Truck Shop. The Blacksmith Shop was converted to serve as a Locomotive Machine Shop, although it also continued to house limited blacksmith, rod, and welding

⁷⁴ Pecotich, *Southern Pacific's Sacramento Shops*, 345.

⁷⁵ The last recorded steam locomotive work at the Sacramento Shops by the Southern Pacific Company was in 1969, when a steam engine was cosmetically converted into a replica of the Central Pacific Railroad's *Jupiter* for the centennial celebration of the completion of the transcontinental line (Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey No. CA-303*, 162).

⁷⁶ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey No. CA-303*, 69-71.

⁷⁷ Helmich, *Legacy in Brick and Iron*, 275.

operations. The Firing Line building was erected to the north of the Boiler Shop, possibly moved to the Sacramento Shops from other shops in El Paso.⁷⁸

Few other new buildings were constructed within the complex during the late twentieth century, as the Shops focused fairly narrowly on diesel locomotive repair and refurbishment and on freight car construction and repair. The complex operated in relative stasis until the mid- to late-1980s, when a failed merger with the Santa Fe Railway forced the Southern Pacific Company to break up and privatize much of the real estate owned by its holding company, the Southern Pacific Land Company. Sale and land use laws required extensive environmental remediation at these locations and the Sacramento Shops complex became one of the largest Superfund cleanup sites in the country. The foundry buildings, personnel shacks, store buildings, storage tanks, and concrete bunkers were necessarily razed, and the landfill that had infilled Lake Sutter was excavated and reburied elsewhere. Following the Union Pacific's acquisition in 1996, more structures were removed and the landscape was contoured with new drainage swales and berms. In 2012, the rail lines and heavy-rail passenger platforms associated with Amtrak were relocated approximately 1,000 feet north of their historic location, resulting in further modifications to land formerly associated with the Sacramento Shops. Of the original Shop facilities, only the Boiler Shop, Erecting/Machine Shop, Blacksmith Shop, Car Machine Shop, Planing Mill, Car Shop No. 3, Privy, Paint Shop, Turntable, Firing Line, and a water tower are extant as of this writing (the Locomotive Transfer Table was reconstructed by the California State Railroad Museum in 2003).⁷⁹

Shop Activities

From 1960 through their closure in the 1990s, the Sacramento Shops honed their operations to focus on diesel locomotive repair and rebuilds and on freight car construction and repair. Running maintenance and routine inspection of diesel locomotives was transferred to other Southern Pacific shops in Roseville, California, in 1965, allowing the Sacramento Shops' locomotive works to concentrate more exclusively on heavy maintenance, repair, and rebuilding. Other rolling stock operations also became more concentrated, as passenger car construction and maintenance were gradually abandoned and freight car operations were expanded.⁸⁰

Facilitated by the major overhaul of the early 1960s, new processes for diesel locomotive maintenance and repair were put into place at the Sacramento Shops. Following an initial inspection, a locomotive slated for repair entered the north end of the Erecting/Machine Shop, where it was stripped into its component parts. The locomotive's trucks were removed to the truck cleaning area and serviced in the former Boiler Shop. The diesel engine and generator were removed by an overhead crane and separated; the engine was then moved to the Engine Parts Cleaning Building, where it was entirely disassembled for mechanical cleaning; the cleaning machine could accommodate two tons of engine parts at a single time. Cleaned parts were then distributed among many sub-assembly shops for repair or reassembly, or returned to the Erecting Shop where the engine was reassembled in a piecemeal fashion, the overhead crane moving it from station to station through the center bay. Major electrical components, including the main generator and traction motors, and mechanical components, such as the air compressor and radiators, followed their own cleaning and repair processes. After these were reinstalled in the locomotive, it was moved to the Firing Line for testing. Finally, the locomotive was painted and returned to active service.⁸¹

By 1970, the Southern Pacific's fleet of diesel locomotives were beginning to show their age, and company President Benjamin F. Biaggini authorized a new program of locomotive reconstruction and refurbishment. More than a thousand locomotives were rebuilt and modernized at the Sacramento Shops between 1970 and 1989, as part of three successive diesel maintenance programs: the R8 Program (1970 to 1976), the General Rehabilitation and Improvement Program, or GRIP (1977-1980), and the M-99 Program, or GRIP II (1979-1989). The R8 program was implemented at both the Sacramento Shops and at Southern Pacific facilities in Houston, Texas, but GRIP and GRIP II were unique to the Sacramento Shops. These programs reduced company procurement and inventory costs while maintaining activity at the Sacramento Shops nearly to the end of the twentieth century.⁸²

⁷⁸ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 72, 104; author interview with Albert J. Di Paolo, Chief Mechanical Officer, California State Railroad Museum, February 26, 2020.

⁷⁹ Helmich, *Legacy in Brick and Iron*, 274-275; author interview with Albert J. Di Paolo, Chief Mechanical Officer, California State Railroad Museum, February 26, 2020.

⁸⁰ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 166.

⁸¹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 72-74.

⁸² Helmich, *Legacy in Brick and Iron*, 254-257.

SIGNIFICANCE UNDER CRITERION A: THE RAILROAD INDUSTRY

The Sacramento Shops Historic District is significant for its substantial role in the development of the American railroad industry, beginning with the Shops' initial construction in 1867 and concluding with the Southern Pacific Company's transition from steam to diesel power, which began in earnest in 1947. For much of the period of significance, the Sacramento Shops were the largest railroad repair and maintenance facility in the western United States. They were also one of the most comprehensive shop complexes in the country; the Shops' expansive facilities, specialized equipment, and skilled labor force enabled the complex to successfully construct, repair, and maintain a wide variety of rolling stock over the course of its operational lifetime. In this way, the Sacramento Shops complex was critical to the physical expansion of the railroad in the American West, beginning with the completion of the first transcontinental railroad and continuing through the twentieth century with the growth of the Southern Pacific Company. The Sacramento Shops also played a notable role in both World War I and World War II mobilization efforts by maintaining an expanded fleet of locomotives and other rolling stock dedicated to the transportation of supplies and troops. In the postwar period, as the Southern Pacific replaced its fleet of steam locomotives with new diesel-powered machines, the Sacramento Shops were overhauled to accommodate the different repair and maintenance requirements of this new technology. The scope of activities performed at the Sacramento Shops narrowed, and the complex no longer enjoyed the same preeminent position among the Southern Pacific's railroad repair facilities.

The Sacramento Shops Historic District's prominent place within the American railroad industry extended throughout its 1867 to 1947 period of significance. During this time, the Shops exhibited independent innovation while also implementing and promulgating national standards for rolling stock repair and maintenance. Due to the diversity and intensity of the complex's engagement with railroad technologies, as well as its prominence in the development of railroad operations in the American West, the Sacramento Shops Historic District possesses national significance under Criterion A.

The Transcontinental Railroad: The Genesis of the Sacramento Shops

The Sacramento Shops were established during the wave of building activity that accompanied the development of the transcontinental railroad, a transportation route that connected the population and production centers of the eastern United States with the wild, sparsely inhabited West. The railroad was touted as a critical infrastructure development that would expand commercial markets, raise land values, facilitate American settlement of the West, encourage new business, reduce unemployment, improve the mail service, and promote national unity. Its construction, however, was hindered by a lack of capital and by disagreement over which route the line should follow. These obstacles hindered the construction of a transcontinental line until the early 1860s, when the Civil War induced Congress to facilitate the venture with federal loans and subsidies. The Central Pacific Railroad, working east from Sacramento, and the Union Pacific Railroad, working west from Omaha, Nebraska, overcame seemingly insurmountable financial and geographical challenges in the decade that followed, and the transcontinental line was completed in May 1869. The first buildings at the present-day Sacramento Shops complex were constructed during the height of this activity, to serve the company's existing fleet of rolling stock and in anticipation of the high traffic loads that would follow completion of the railroad. In this way, the Shops were both a product and a facilitator of the transcontinental railroad, one of the most significant transportation projects in American history.⁸³

The Central Pacific Railroad and the Transcontinental Line

California's railroad infrastructure grew incrementally during the mid-nineteenth century, as multiple small, speculative companies funded the development of short stretches of line. The state's first railroad company, the Sacramento Valley Railroad (SVRR), incorporated in 1852 and spent nearly three years raising capital before it finally broke ground on a 22.5-mile-long section of track between Sacramento and Folsom, California. The company's small array of shops were initially located in Sacramento near Front and R Streets, but these were relocated to Folsom when the line became operational in 1856.⁸⁴

The Sacramento Valley Railroad's chief engineer and surveyor was Theodore D. Judah, a major proponent of the transcontinental railroad and the impetus for the formation of the Central Pacific

⁸³ Rick Ewig, "The Railroad and the Frontier West," *Organization of American Historians Magazine of History* 3, no. 2 (Spring 1988): 9.

⁸⁴ "The Days When the Central Pacific Was Young," *Bulletin* (Southern Pacific) 9, no. 5 (May 1920): 22; Richard J. Orsi, *Sunset Limited: The Southern Pacific Railroad and the Development of the American West, 1850-1930* (Berkeley, CA: University of California Press, 2007), 5-6; Hecteman, *Sacramento's Southern Pacific Shops*, 11.

Railroad. Judah was convinced that the optimal route for a transcontinental railroad would carry the line across the Sierra Nevada range, and he spent several years in an unsuccessful attempt to attract Eastern investors and secure federal aid. While performing additional survey work for the Sacramento Valley Railroad in 1860, he identified a promising route that would carry the line from Sacramento, through the Donner Pass, and through the Truckee River Canyon to the Nevada border.

Judah immediately moved to capitalize on the discovery: after numerous public meetings and unsuccessful appeals to wealthy San Francisco businessmen, Judah managed to gather a handful of local investors whose net worth was likely no more than \$350,000.⁸⁵ These men were storekeepers, hardware dealers, grocers, and dry goods merchants by trade, and they referred to themselves as "the Associates." The core group, who came to be known as "the Big Four," were Collis P. Huntington, Mark Hopkins, Leland Stanford, and Charles Crocker. The company was legally incorporated as the Central Pacific Railroad on June 27, 1861, with Stanford as president, Huntington as vice president, Hopkins as treasurer, and Judah as chief engineer.⁸⁶

With the cost of construction estimated at more than \$10 million, the fledgling company lobbied furiously for federal subsidies. The Civil War, which had been declared just a few months prior to the railroad's incorporation, convinced many Congressmen that the military advantage of a transcontinental line was worth the inordinate cost. In the absence of representatives from the Southern states, Congress approved a northerly route and agreed to provide federal aid to the project. Through the Pacific Railway Act of 1862, the Central Pacific was authorized to construct tracks from the navigable waters of the Sacramento River to the eastern boundary of California, and the Union Pacific Railroad was authorized to complete the connection westward from the Missouri River at Omaha, Nebraska. Both lines were awarded rights-of-way, ten alternate sections of public land for each mile of track laid, and the right to take timber and stone from the public domain.⁸⁷

The Pacific Railway Act also authorized the federal government to provide the companies with a loan of thirty-year government bonds at a fixed rate for each mile of trackage laid. However, the federal subsidies and loans together were still insufficient to cover the cost of construction across the Sierra Nevada, and the Central Pacific continued to lobby for state subsidies; Leland Stanford, recently elected governor of California, was instrumental in these efforts. Eager to begin construction and aware of the need for tangible progress to inspire investor confidence, the company scraped together a small amount of capital from its few stockholders in late 1862 and early 1863. On January 8, 1863, the Central Pacific broke ground on the western end of the transcontinental line. The ceremony took place at the intersection of Front and K Streets, near the banks of the Sacramento River and approximately one-half mile from the Sacramento Shops Historic District.⁸⁸

Despite a brief management crisis in late 1863 and the constant threat of insolvency, the Central Pacific Railroad continued to work its way toward the Nevada border. The company was bolstered by local subsidies as well as the Pacific Railway Act of 1864, which modified the 1862 law in favor of the railroads.⁸⁹ In 1866, Congress dispensed with the prescribed endpoints set for the Central Pacific and the Union Pacific railroads, encouraging each to build as much as it was able. Fueled by fresh capital and the prospect of a competition with the Union Pacific, the Central Pacific's rail line pushed through the Sierra Nevada range by late 1867 and reached the Nevada border in 1868. Finally clear of the mountains, the railroad raced across the comparatively moderate terrain of the Great Basin and met the Union Pacific's line in Promontory, Utah, on May 10, 1869. The first through passenger train arrived in Sacramento from Omaha, Nebraska, just over two weeks later.⁹⁰

Siting and Early Development of the Sacramento Shops

The Central Pacific's interim shops—precursors to the present-day Sacramento Shops complex—developed concurrently with the railroad itself. The first known building erected by the company was a small shed on the levee near the foot of I Street, constructed in 1863 and used for storing tools. Other machinery and service buildings were constructed on 6th Street near H Street, less than a mile to the southeast of the present-day Sacramento Shops complex. These buildings were outfitted relatively simply, as the Central Pacific Railroad contracted out much of its heavy

⁸⁵ Richard White, *Railroaded: The Transcontinentals and the Making of Modern America* (New York, NY: W.W. Norton & Company, 2011), 18.

⁸⁶ Orsi, *Sunset Limited*, 7.

⁸⁷ Orsi, *Sunset Limited*, 9-10; White, *Railroaded*, 17-18.

⁸⁸ Orsi, *Sunset Limited*, 11;

⁸⁹ Among other things, the Pacific Railway Act of 1864 doubled the public land grant promised in the Act of 1862 from ten sections to twenty for every mile of track construction. It also reduced the federal bond loan to a second mortgage and allowed the railways to sell their own first-mortgage bonds, equal in amount to the government subsidy (White, *Railroaded*, 26-28; Orsi, *Sunset Limited*, 14).

⁹⁰ Orsi, *Sunset Limited*, 14-17.

repair and assembly work in the early years of its existence. The company's first locomotive, for example, was purchased from a Philadelphia manufacturer, shipped by boat to Sacramento, and assembled by Goss & Lambard's Sacramento Iron Works on I Street between Front and 2nd Streets.⁹¹

As the Central Pacific continued to extend its line eastward, it required an increasingly high volume of rolling stock to transport supplies, workers, and visiting dignitaries between Sacramento and the construction front. Cars could be constructed in the company's existing Sacramento facilities, but locomotives had to be purchased from manufacturers in the eastern United States, shipped around Cape Horn, and then transported via river schooner to the Sacramento port in an expensive, time-consuming, and occasionally unreliable process. Sacramento's relative remoteness from East Coast manufacturing centers impelled the Central Pacific Company to develop more sophisticated shop facilities locally, even prior to the completion of the transcontinental line, and was therefore a major factor in the establishment of the present Sacramento Shops complex.

For the site of its new railroad shops, the Central Pacific Railroad selected the Sacramento slough and an adjacent marshy lake known locally as Lake Sutter, Sutter's Lake, Old Slough, or China Slough; the City of Sacramento had deeded this land to the Central Pacific in 1862, along with right-of-way along Front Street, I Street, and B Street. When construction began in 1867, one account noted that pilings were driven into four feet of standing water. Sand and silt were hauled by wagon from the American and Sacramento Rivers, gradually raising the grade and increasing the buildable area of the site. When the first phase of construction was completed, the shops covered approximately twenty acres of former slough.⁹²

In addition to the environmental ramifications of this massive infill effort, the siting of the Sacramento Shops had a substantial and deliberate impact on the city's early Chinese community, which had developed a small Chinatown along the lake's southern shore. Known as Yee Fow, or Second City, Sacramento's Chinese community was concentrated in this location from the 1850s through the late nineteenth century, at which point it was dispersed by actions of the Central Pacific Railroad as well as by rampant, legalized Sinophobia within the larger community. The Central Pacific's work to fill in Lake Sutter closed off access from the slough to the river by 1880, effectively eliminating the local Chinese fishing industry and hampering the many Chinese laundries that had established themselves along the shore. Yee Fow contracted in size, and the railroad succeeded in filling Lake Sutter by the early twentieth century.⁹³

Innovation in Design and Process at the Sacramento Shops

The core of the Sacramento Shops complex, including several buildings that remain extant and are located within the bounds of the Historic District (i.e., the Planing Mill, the Blacksmith Shop, and the Erecting/Machine Shop), was completed in time for the driving of the final spike in the transcontinental railroad. Over the next several decades, as the Central Pacific Railroad expanded its trackage and built up its fleet of rolling stock, the Sacramento Shops also developed in scale and complexity. One reason for this development was a general necessity born from the relative isolation of the American West in the late nineteenth century: fuel and raw materials were relatively scarce in the West, and the country's major manufacturing centers—including those that produced nearly all American locomotives—were concentrated along the East Coast. For these reasons, the Sacramento Shops were outfitted to perform both manufacture and repair of mechanical equipment and rolling stock, and they were unusually independent and self-reliant in operation.⁹⁴

The Sacramento Shops' self-sufficiency and broad array of general machinery provided the complex with the physical resources necessary to engineer complex, creative solutions for an ever-expanding railroad operation. The complex also employed a relatively high concentration of skilled engineers and craftspeople. As a result of these conditions, the Shops were the source of numerous innovations with regard to rolling stock design and repair during the late nineteenth and twentieth centuries. These were critical in placing the Central Pacific Railroad, and later the Southern Pacific Company, at the forefront of the railroad industry in the late nineteenth and early twentieth centuries. The technological innovations produced at the Sacramento Shops, the majority of which are associated with freight car and steam locomotive construction and repair, establish

⁹¹ Hecteman, *Sacramento's Southern Pacific Shops*, 11.

⁹² Joslyn, "The Romance of the Railroads," 26-27.

⁹³ Hecteman, *Sacramento's Southern Pacific Shops*, 37-38; John C. Jenkins, "Sutter Lake or China Slough," *Golden Notes* 13, no. 1 (December 1966): 3-5. Other blows to the Yee Fow community came from the federal and local governments. In 1882, United States Congress passed the Chinese Exclusion Act, preventing further Chinese immigration and stirring Sinophobic sentiment across the country, and in 1886, the board of trustees of the City of Sacramento criminalized Chinese habitation within city limits. The white labor movement also fueled anti-Chinese sentiment, as Sacramento's white residents lobbied against Chinese employment and formed pro-white labor groups such as the Sacramento Order of Caucasians.

⁹⁴ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 5-6.

the Shops' particular significance within the overall context of railroad and transportation history.

Engineers, Draftsmen, and Craftspeople

The innovations of the Sacramento Shops were made possible not only by physical tools and machinery, but also by the effort, skill, and creativity of the employees of the Central Pacific and later the Southern Pacific railroads. Many made notable, individual contributions to the railroad industry during their time at the Sacramento Shops, while others participated in more collaborative endeavors to improve quality and efficiency with regard to rolling stock construction, repair, and maintenance. Although these innovations were produced by individuals, they are inextricably linked to the site of their development and serve to elevate the complex's significance within the railroad industry.

The accomplishments of Benjamin Welch, Stephen Uren, George Allen Stoddard, Andrew Jackson Stevens, and Henry Small stand out as representative of the Sacramento Shops' innovative efforts during the late nineteenth and early twentieth centuries. These individuals' foremost accomplishments and innovations are summarized below.

- Benjamin Welch, the Central Pacific Railroad's first master car builder, invented the Bucker snowplow and designed the company's first "immigrant car" designed to provide inexpensive transportation for settlers coming West.⁹⁵
- Stephen Uren, foreman of the Blacksmith Shop in the late nineteenth century, obtained eight patents for devices to recycle scrap iron and to manufacture small components such as nuts, links, spikes, and slotted bolts.⁹⁶
- George Allen Stoddard, the Shops' first draftsman and the Central Pacific's first official photographer, designed and constructed a rolling mill, two wheel foundries, and a steam-powered locomotive transfer table.⁹⁷
- Andrew J. Stevens, General Master Mechanic between 1870 and 1888, was a prolific inventor and designer who filed two dozen patents in his time at the Sacramento Shops. These included a broad array of inventions intended to increase the efficiency and the lifespan of Southern Pacific locomotives, such as an efficient, "monkey motion" mechanical linkage for opening and closing steam locomotive cylinder valves. He also patented a steam hoist for coal and freight that was constructed and used in the Sacramento Shops as well as other shops in the Southern Pacific system.⁹⁸
- Henry J. Small, General Master Mechanic between 1888 and 1902, guided the Sacramento Shops' conversion to electrical motive power. He also promoted standardization in both equipment and operation, reducing the number of standard patterns used by the Southern Pacific from 550 to just 44. Small's interest in advancing standardization across the industry was echoed by Edward H. Harriman, whose work to implement common standards is described in the following section.

Innovators such as these promoted an environment for experimentation and innovation that catalyzed additional technological, operational, and procedural developments at the Sacramento Shops complex. This unique environment and the advances that it fostered secured the Shops' prominence within the American railroad industry during the late nineteenth and early twentieth century.

Innovations in Locomotive Design

New locomotives were designed and constructed at the Sacramento Shops between 1870 and 1889, and again between 1917 and 1937.⁹⁹ The first period of locomotive construction was initiated at the urging of General Master Mechanic Andrew Jackson Stevens, who argued "that locomotives could be turned out of the Sacramento shops for less than their cost in the East."¹⁰⁰ Stevens also contended that locomotives designed by Eastern manufacturers were not suited to the specific conditions of the West, including unusually long hauls, uneven trackage, alkaline water, and long, steep grades. He felt that each locomotive should be designed for the unique conditions it would face over the

⁹⁵ Joslyn, "Romance of the Railroads, 28; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 204.

⁹⁶ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 204.

⁹⁷ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 204.

⁹⁸ John Gardner, "A Biography—Cast in Bronze," *Sacramento Bee*, July 31, 1943; Helmich, *Legacy in Brick and Iron*, 272; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 210. According to historian and former Sacramento Shops employee David Joslyn, Stevens was also responsible for a number of other inventions that he didn't patent.

⁹⁹ As described in the section "General History of the Sacramento Shops," beginning on page 35 of this nomination, the Shops also purchased locomotives from other manufacturers.

¹⁰⁰ "A Good Man Gone," *Sacramento Bee*, February 11, 1888.

course of its use, and the Sacramento Shops were well-positioned to produce such specialized machinery.¹⁰¹

Under Stevens' direction, the Sacramento Shops constructed a number of new and innovative locomotives in the late twentieth century. Not all were successful: for example, the 154,000-pound *El Gobernador*, the largest steam locomotive in the world at the time it was built, was too heavy for most bridges and possessed a boiler too small to supply adequate steam to its massive engine. Completed in 1883 and placed into service in 1884, the *El Gobernador* was returned to the Sacramento Shops in 1894 and eventually scrapped. However, the vast majority of the locomotives designed or refurbished during Stevens' tenure represented successful innovations. Not only did these support the company's operations, they also distinguished the Sacramento Shops from other railroad facilities of the day.¹⁰²

Throughout the period of significance, the Shops also performed heavy repair operations, refurbishments, and complete rebuilds, some of which employed innovative new technologies or incorporated nonstandard modifications designed to improve locomotive performance. New locomotive components, many of which were developed in-house at the Shops, were tested frequently and always according to a standardized process. Experimental parts or modifications were initially installed on a handful of test subjects; the performance of these locomotives was carefully tracked, and if the modification proved beneficial to the machines' operation, it was deployed in greater numbers.¹⁰³ In early 1901, for example, Master Mechanic H. Heintzelman directed the Boiler Shop foreman to test out a new and popular brand of boiler tubes, writing, "I wish you would give these tubes special inspection, and keep a close record of them when they are put into service."¹⁰⁴

Other innovations were developed in response to the peculiar challenges posed by the physical landscape of the West. In the early 1900s, the Southern Pacific purchased two articulated steam locomotives capable of pulling heavier loads, but found that these produced an inordinate amount of exhaust gasses when climbing uphill. In confined spaces such as the long show shed and tunnels on the line over the Sierra Nevada range, or in the many tunnels on the climb up to Tehachapi in southern California, this could prove deadly for crewmembers in the cab at the back of the locomotive. In response to this major safety concern, a team of Southern Pacific engineers at the Sacramento Shops created plans for a new articulated steam locomotive with the cab in the front; essentially, the entire locomotive, excluding the tender, was rotated 180 degrees. These "cab forward" locomotives were produced by Baldwin Locomotive Works based on the Southern Pacific's designs, and many were presumably serviced and repaired at the Sacramento Shops.¹⁰⁵

Innovations in Rail Car Design

The Sacramento Shops produced and refurbished thousands of rail cars during the period of significance, including a variety of passenger cars and specialized freight cars. The Shops frequently experimented with innovative new designs and components, some of which had major implications for safety and efficiency. In 1880, for example, A.J. Stevens announced that the Sacramento Shops had developed a wrought-iron wheel that was allegedly "lighter in weight, more durable, and less liable to accident" than cast-iron wheels, then the industry standard.¹⁰⁶ On a typical forty-car train, the use of wrought-iron wheels in place of cast-iron could save approximately forty tons of weight; this translated to a corresponding fuel savings, as well as reduced wear on locomotives.

In 1906, the Shops produced an early, experimental, steel-bodied passenger car. Steel-bodied cars were significantly safer for passengers due to their increased structural strength, which reduced the likelihood of "telescoping" in the event of a collision; they were also more durable and reduced tractive effort in hauling. The Sacramento Shops' first steel car was built on a frame that had been constructed in the Boiler Shop, and it featured luxuries such as an arched roof, mahogany interior, electric lights, and steam heat. The Shops' first all-steel postal car followed in 1907, and an all-steel coach was completed in 1908. Although the Southern Pacific ultimately decided to purchase its steel passenger cars from the Pullman Car Company and other manufacturers, the

¹⁰¹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 206-207.

¹⁰² Helmich, *Legacy in Brick and Iron*, 81.

¹⁰³ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 240.

¹⁰⁴ "Master Mechanic H. Heintzelman to J. M. Dunnigan, Foreman, Boiler Shop" (January 3, 1901), MS 10, California State Railroad Museum Library & Archives Collections, Sacramento, California.

¹⁰⁵ Helmich, *Legacy in Brick and Iron*, 272; Ed Gordon, "On the Rails—The Southern Pacific Cab Forward," *Tehachapi News*, June 15, 2011.

¹⁰⁶ "A New Wrought-Iron Car Wheel," *National Car Builder* 11, no.3 (March 1880): 43.

Sacramento Shops' early experimentation with this form likely influenced the company's decision to phase out wood passenger cars in favor of the new all-steel versions.¹⁰⁷

The majority of the Southern Pacific's revenue was related to freight movement, and so it is unsurprising that the Sacramento Shops also developed a number of innovations related to freight car construction and design. The Southern Pacific handled a broad array of freight including perishable foodstuffs, livestock, forestry products, mining materials, and delicate finished goods; these disparate loads required specialized car types and/or equipment to ensure that they could be packed efficiently and shipped to their destinations safely. The Shops designed and produced individualized solutions for their customers, including some of the first refrigerator cars. The earliest of these were cooled with ice harvested from frozen lakes, while later models employed chemical and mechanical technologies. Other proprietary car designs include a "combination" box car capable of serving as a livestock carrier or a conventional boxcar, and a "double-sheathed" boxcar that was lined and could accommodate loads up to 20,000 pounds. Specialized car construction at the Sacramento Shops was phased out beginning in the early 1940s, and all car construction was transferred to shops in Roseville, California, in 1980.¹⁰⁸

Innovations in Shop Operations

In addition to innovations in rolling stock design and technology, the Sacramento Shops were pioneers in certain aspects of industrial operations and process. In particular, the Shops were known for their comprehensive recycling program and reclamation activities, which were born from their initial isolation in the American West. The Sacramento Shops operated a recycling program that served the entire Pacific Division of the first the Central Pacific and later the Southern Pacific Railroads. Every two to three months, the Stores Department would deploy several "scrap trains" to collect materials from all of its facilities and return them to the Sacramento Shops for recycling. At the Shops, thousands of tons of scrap metal were unloaded from the trains using an electro-magnet. The scrap heap, which was located to the northwest of main buildings, was sorted and materials were allocated to the appropriate shop buildings. If items could not be reused in their original form, they were repaired or melted down and repurposed by the Blacksmith Shop or one of the complex's foundries (no longer extant). Scrap iron was combined with limestone, ferrosilicon, ferromanganese, and other elements, then melted and recast. Packing materials, rubber hoses, and tools were all cleaned and reused when possible, and even the zinc from old batteries was recovered in order for future use. The Sacramento Shops' extensive program earned the Southern Pacific Company special recognition during World Wars I and II, when wartime rationing made their reclamation activities even more critical.¹⁰⁹

The Sacramento Shops and the Harriman Lines: Standardization of Equipment and Operation

By the turn of the twentieth century, the Southern Pacific Company controlled nearly 10,000 miles of rail line from the Pacific Coast to New Orleans, making it one of the largest transportation corporations in the world. The unexpected death of the company's president in 1900 led to a power vacuum, and a majority of the Southern Pacific's stock was subsequently acquired by the Union Pacific Company under direction of railroad magnate Edward H. Harriman. Harriman's control over both the Southern Pacific and the Union Pacific introduced radical changes to the American railroad industry, as approximately 18,000 miles of rail fell under his direction by the end of 1901.¹¹⁰

The Harriman era, which lasted from 1901 through Harriman's death in 1909, saw the physical and managerial overhaul of his combined enterprises. Most significantly, Harriman instituted "standardized" railroad equipment and operations across the Union Pacific Railroad and Southern Pacific Company. Rolling stock for both companies were ordered and maintained to a set of common specifications, operating rules were made consistent, and trackage was similarly standardized, with the result that safety, efficiency, and profitability increased in the first decade of the twentieth century. Harriman's common standards, a relatively radical concept at the time of their development, were produced in the Sacramento Shops' drafting department and engineering offices.¹¹¹

As the largest and most comprehensive railroad shops on the West Coast, the Sacramento Shops were not only instrumental in developing Harriman's common standards, they were also critical in implementing and upholding them. The Shops' role in the standardization of the largest combined

¹⁰⁷ Pecotich, *Southern Pacific's Sacramento Shops*, 305; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 177-178.

¹⁰⁸ Helmich, *Legacy in Brick and Iron*, 167; Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 176.

¹⁰⁹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 200-201.

¹¹⁰ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 40.

¹¹¹ Diebert and Strapac, *Steam Locomotive Compendium*, 15.

railroad network in early twentieth-century America further elevates the district's significance within the context of railroad and transportation history.

The Harriman Lines

Edward Harriman began his career in the railroad industry in 1882, when he purchased and reorganized the financially troubled Lake Ontario Southern Railroad. Harriman had a particular skill for managing and rebuilding struggling lines, and by the end of the nineteenth century, he was a director of both the Illinois Central Railroad and the Union Pacific Railroad. He had guided the latter out of bankruptcy in the mid-1890s, earning himself a reputation as "the most competent railroad man in the world."¹¹² The railroads which Harriman controlled were known collectively as the "Harriman Lines."

Recognizing the inherent and strategic value of the Southern Pacific Company, Harriman had spent years attempting to add the corporation to his growing portfolio. Collis P. Huntington, the Southern Pacific's president and the last surviving member of the Big Four, resisted Harriman's efforts by declining to sell any part of his company and even refusing to sign an agreement that would grant Harriman's holdings perpetual access to the Pacific. However, Huntington's unexpected death in August 1900 created an opportunity for Harriman to gain a foothold in its operation.¹¹³

At Harriman's direction, the Union Pacific Railroad began to purchase Southern Pacific stock on the free market as well as from Huntington's heirs. By spring of 1901, the Union Pacific owned nearly fifty percent of Southern Pacific Company stock, and Harriman's position of power within the company was without dispute. By 1901, Harriman had been elected chairman of the Southern Pacific, and by 1903, he was its company president. The Harriman Lines encompassed approximately 3,000 locomotives and 90,000 freight cars operating across 18,000 miles of track. To organize these vast holdings into a single efficient and manageable system, Harriman implemented a combined management structure and carefully considered ways to consolidate resources, eliminate redundancies, and increase productivity and efficiency.¹¹⁴

The Harriman Common Standards

Harriman's commitment to efficiency led him to institute a set of common standards across his many disparate holdings. Standards for structures, equipment, operating rules, and even stationery were drawn up and adopted within a period of a few short years. The "Harriman Common Standards" were a revolutionary development that decreased costs and increased efficiency across the combined Harriman Lines, and they had a marked impact on the operation and development of rail systems and equipment in the twentieth century.

The Harriman Standards were formulated through careful analysis and with contributions from a broad range of department heads and general managers. The Sacramento Shops' own Henry J. Small, who was promoted from General Master Mechanic to Superintendent of Motive Power and Machinery in 1902, was a longtime advocate for common locomotive standards within the Southern Pacific system. Final authority over the Harriman standards was had by the Director of Operations and Management, Julius Kruttschnitt, who had previously managed the Southern Pacific's Texas lines.¹¹⁵

Although Henry Small relocated to San Francisco following his promotion, the Sacramento Shops were imperative in the formulation of certain aspects of the Harriman Standards.¹¹⁶ The locomotive design specifications and innovations that were advanced under Harriman were designed in the Sacramento Shops' drafting rooms, which were more robustly staffed than the Union Pacific's Mechanical Department offices in Omaha, Nebraska. The Union Pacific, unlike the Southern Pacific Company, had weathered bankruptcy in the 1890s and was not as well-positioned to provide the manpower for this massive undertaking. As a result, the Sacramento Shops played a significant role in the development of the Harriman Standards for locomotive and equipment design.¹¹⁷

By the fall of 1904, the Harriman Standards for rolling stock design had been completed and adopted across the Harriman lines. Every feature of locomotives and cars ordered by the Union Pacific and Southern Pacific was built to a rigid and comprehensive set of specifications, and whenever possible, individual parts and fixtures for similar types of rolling stock were to be made

¹¹² Hofsommer, *Southern Pacific*, 9.

¹¹³ Hofsommer, *Southern Pacific*, 12.

¹¹⁴ "Common Standard Locomotives," *American Engineer and Railroad Journal* 79, no. 5 (May 1905): 154; Helmich, *Legacy in Brick and Iron*, 175.

¹¹⁵ Helmich, *Legacy in Brick and Iron*, 169; Hofsommer, *Southern Pacific*, 28.

¹¹⁶ Small returned briefly to Sacramento after the 1906 earthquake and fire in San Francisco (Helmich, *Legacy in Brick and Iron*, 169).

¹¹⁷ Diebert and Strapac, *Steam Locomotive Compendium*, 15.

interchangeable. The advantages of this approach were many. First, the number of items for inventory was substantially reduced, as a smaller number of items were common to a greater array of classes; this had the related benefit of reducing unit costs, because the purchasing division was able to place larger orders for a reduced variety of items. Second, equipment downtime was reduced because of the use of interchangeable mechanical components. Third, standardized equipment could be moved through and across divisions according to need, as all of the railroad shops associated with the Harriman Lines were equipped to manage all of the companies' rolling stock.¹¹⁸

Legacy of the Harriman Common Standards

The expansive rail empire that Harriman had amassed was dismantled soon after his death, which occurred unexpectedly in September 1909. In 1908, the federal government had sued to break up the Union Pacific-Southern Pacific merger on the grounds that the combination restricted trade and violated the Sherman Anti-Trust Act of 1890. The Circuit Court rejected the government's suit, but the Supreme Court ruled in its favor in 1913, and the Harriman Lines subsequently divested themselves of the Southern Pacific Company.¹¹⁹

The separation of the Harriman Lines ended standardization across the Union Pacific Railroad and the Southern Pacific Company. However, the merits of standard equipment designs, interchangeable machinery components, and centralized purchasing had been established, and both companies continued to maintain their own (now disparate) common standards for years to come.¹²⁰ During the Harriman era and afterward, standardized equipment specification and operational systems had a pervasive impact on the Sacramento Shops, as they delineated the rolling stock construction, maintenance, and repair activities that occurred at all Southern Pacific support facilities.

Wartime Production Activities at the Sacramento Shops

The wartime activities of the Sacramento Shops reflect greater trends in the American railroad industry during the First and Second World Wars. In both wars, demand for rolling stock increased and the workforce expanded to new demographics including women, retirees, teenagers, and (in World War II) Mexican nationals. In addition, the Sacramento Shops and the Southern Pacific Company in general received praise for their extensive and systematic recycling programs, necessitated by wartime rationing and facilitated by a long history of self-sufficiency.¹²¹ The productivity and efficiency of the Sacramento Shops during both World Wars underscores their contributions to American defense activities and supports their significance within this period of American transportation history.

The Sacramento Shops during World War I

The outbreak of World War I coincided with the opening of the Panama Canal, and these events together created a brief economic downturn for the American railroad industry. Within two years, however, the situation had changed dramatically: Europeans came to rely heavily on American-made products and overland shipping resurged, stimulating the country's industrial manufacturing and rail transportation industries. The uptick in production and traffic flow was further increased in 1917, when the United States itself entered the global conflict.

The American railroad industry responded to increased traffic volumes by creating the Railroad War Board, which pledged to increase efficiency by operating the country's independent carriers as a single system. However, the efforts of the voluntarily-created organization struggled to meet the demand for movement of troops and supplies, and on December 28, 1917, President Woodrow Wilson directed the federal government to take possession of the railroads. Under the direction of William G. McAadoo, the new United States Railroad Administration (USRA) operated all American railroads as a single enterprise. The distribution and routing of freight traffic was centrally managed, and terminals, shops, and railroad equipment were shared.¹²²

The USRA was unparalleled in the historic of the American railroad industry. Julius Kruttschnitt, who was elevated to the role of Southern Pacific Company President in 1918, urged his employees to continue to dedicate themselves to the work at hand, for the success of the war effort and to "maintain the character of service on the Southern Pacific Lines so as to keep them in the highest

¹¹⁸ Hofsommer, *Southern Pacific*, 29; Diebert and Strapac, *Steam Locomotive Compendium*, 15.

¹¹⁹ Lloyd J. Mercer, "Dissolution of the Union Pacific-Southern Pacific Merger," *Railroad History* 164 (Spring 1991): 62.

¹²⁰ Helmich, *Legacy in Brick and Iron*, 217.

¹²¹ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey No. CA-303*, 200.

¹²² Hofsommer, *Southern Pacific*, 73.

rank of American railroads."¹²³ William Sproule, Kruttschnitt's predecessor as President, wrote in early 1918: "Every officer of this company believes it is his duty as a citizen, besides being his duty as a railroad man, to do at this time everything that can be done to make the operations of the railroad a success."¹²⁴

The wartime activity of the Sacramento Shops reflects the patriotism and urgency expressed in Sproule's declaration. Demand for locomotives and rolling stock increased rapidly as the United States shuttled servicemen and supplies across the nation. Car manufacturing, repair, and maintenance was a major focus of activity at the Shops during the wartime years, as was recycling. The Southern Pacific Company's corporate magazine reflects the nationwide emphasis on conservation and efficiency, as it warned employees, "Waste and Extravagance are Germany's Silent Allies."¹²⁵ To cope with wartime shortages and to conserve precious material for military use, the Sacramento Shops instituted a broad and comprehensive recycling program. The Shops were especially well-positioned for this endeavor, given the extent of the site's facilities. One of the Shops' most innovative recycling efforts involved the transformation of used locomotive superheater boiler flues into staves for all-steel locomotive pilots. The staves were so durable that many were utilized through the 1950s.¹²⁶

Wartime employment at the Sacramento Shops peaked around 2,200 individuals, up from approximately 1,800 prior to the United States' declaration of war.¹²⁷ Like many other industries at the time, the Sacramento Shops struggled to maintain a full staff, as able-bodied young men enlisted or were drafted into the military. The extreme labor shortage led the Sacramento Shops to hire their first female employees, who typically performed lighter duties such as car and locomotive cleaning, scrap sorting, and stock organization. Women employees were generally well-regarded by their coworkers; one foreman praised his female employees' attention to detail, saying, "they do their work very well and are found to be very expert upon certain lines of fine work, particularly in the pattern department."¹²⁸

The Sacramento Shops in the Interwar Period

World War I was officially ended on November 11, 1918. A brief panic arose in the railroad industry when Director General McAdoo suggested that the USRA retain control over the railroads for five years after armistice, but private management was ultimately restored on March 1, 1920, through the Esch-Cummins or Transportation Act of 1920. Heavy use of railroad lines and equipment during the war had left much of the Southern Pacific's infrastructure and rolling stock in poor condition, and the years immediately following the war were largely devoted to repair and maintenance efforts.¹²⁹

Servicemen returned to their peacetime occupations, and most of the women who had taken their places at the Sacramento Shops returned to their prewar roles as full-time mothers and homemakers. However, some women remained employed, at least for a time; one article in the company magazine notes that these women left "one by one," often after marrying a fellow employee. By August 1920, only thirteen women remained on the Shops' payroll. The contributions of these remaining female employees were recognized in a 1921 union agreement, which regarded them equal to male employees and directed that they should receive equal pay.¹³⁰

In general, the experiences of the Sacramento Shops mirrored those of other American industries during the interwar years. Business—particularly freight traffic—boomed through the 1920s, and the company's 1928 annual report celebrated record freight earnings. However, the Wall Street Crash of 1929 and the ensuing Great Depression forced the Southern Pacific Company to reduce hours, wages, and staffing. The Sacramento Shops fared better than some, as they were one of only four Southern Pacific shop complexes that were able to operate five full-day shifts weekly by early 1934, but they suffered nonetheless. Recovery began slowly in the late 1930s and early 1940s, in the lead-up

¹²³ Hofsommer, *Southern Pacific*, 73; "Julius Kruttschnitt Is Elected to the Presidency of the Company," *Bulletin* (Southern Pacific) 6, no. 14 (July 15, 1918): 1.

¹²⁴ William Sproule to Julius Kruttschnitt, February 4, 1918, Southern Pacific Company Executive Department file 510.5, Box 50.

¹²⁵ "Waste and Extravagance are Germany's Silent Allies," *Bulletin* (Southern Pacific) 6, no. 11 (June 1, 1918): 8.

¹²⁶ Helmich, *Legacy in Brick and Iron*, 94.

¹²⁷ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 135.

¹²⁸ "S.P.'s 'City of Shops' a Story of Perfection," *Bulletin* (Southern Pacific) 9, no. 8 (August 1920): 13;

Helmich, *Legacy in Brick and Iron*, 209.

¹²⁹ Hofsommer, *Southern Pacific*, 76-77.

¹³⁰ "S.P.'s 'City of Shops' a Story of Perfection," *Bulletin* (Southern Pacific) 9, no. 8 (August 1920): 13;

Helmich, *Legacy in Brick and Iron*, 209.

to World War II, and activity and employment boomed again with the United States' entrance into the conflict on December 11, 1941.¹³¹

The Sacramento Shops during World War II

As during the previous global conflict, the activities of the Sacramento Shops complex reflected broader trends in American transportation and industrial production during World War II. Thanks to rolling stock and property improvements completed during the latter part of the Great Depression (the replacement of the Blacksmith Shop walls, for example) and experience gained during the turmoil of World War I, the Southern Pacific Company as a whole was relatively well-prepared to rise to meet rapidly increasing traffic volumes. The company participated in a massive movement of U.S. Army and National Guard troops in the summer of 1940, and it delivered a significant amount of building materials and training equipment for new military posts in the months that followed.¹³² Government traffic increased significantly in 1941, as the company moved thirty to fifty passenger trains for the army, navy, and Civilian Conservation Corps every week. Beginning February 1941, the Southern Pacific established a six-day work week for all of its locomotive, freight, and passenger car repair shops, declaring that its "number one job [was] the speedy and efficient movement of freight and passenger traffic involved in Uncle Sam's gigantic defense program of construction and training."¹³³ Following the attack on Pearl Harbor in December 1941 and the United States' subsequent entry into the war, traffic volumes increased even further; in 1942, one year into the conflict, the Southern Pacific recorded the largest transportation load in company history.¹³⁴

At the height of the war, as many as 7,000 employees were engaged by the Sacramento Shops in support of the war effort. Most departments ran on two ten-hour shifts, with maintenance and a few other departments on twenty-four-hour-a-day staffing schedules.¹³⁵ As in World War I, activity at the Shops was focused on rolling stock production, maintenance, and repair, and on a comprehensive recycling program necessitated by wartime rationing. Unable to purchase or construct the number of locomotives necessary to meet the pressing need for troop and supply mobility, the Sacramento Shops put more than one hundred decommissioned steam locomotives back into service. Hundreds of new freight cars were constructed to support the movement of supplies, while nonessential passenger equipment, such as observation cars and women's dressing rooms, was converted to chair cars in order to increase passenger capacity and move troops comfortably and efficiently.¹³⁶

Although the Sacramento Shops' wartime activity was primarily related to the transportation of troops and supplies, their specialized machinery and highly skilled work force enabled the facility to fabricate large items for use in other aspects of the war effort. In 1942, the Shops were commissioned by the Kaiser Shipyards in Portland, Oregon, to manufacture "mammoth steel rolls for bending presses used in the shaping of steel plates" for the construction of the bottom-side hull plates of Kaiser's Liberty Ships.¹³⁷ These rolls were the largest ever turned on the Sacramento Shops' lathes. The Shops may also have produced ship's anchors in the complex's foundry buildings.¹³⁸

As in World War I, industries across the nation lost a significant number of employees to enlistment and the draft: the Southern Pacific reported that by the end of 1942, the company's workforce was short approximately 10,000 men. To meet the unprecedented demand, the Sacramento Shops' remaining workforce was augmented by retirees, teenagers, women, and Mexican nationals. Returning retirees were preferred because of their experience, and the upper age limit for mechanics was raised from fifty-five to sixty-five within a few months of the United States' entry into the war. By May 1942, the lower age limit was reduced to sixteen, and men who worked at "white collar" jobs during the week were encouraged to take a second job with the Southern Pacific on the weekends. The Southern Pacific's wartime labor force was also augmented by a number of Mexican

¹³¹ "Past Year Was One of Prosperity," *Bulletin* (Southern Pacific) 17, no. 2 (February 1929): 11; Hofsommer, *Southern Pacific*, 120; "2,200 Railroad Men Will Work Five Days a Week," *Sacramento Bee*, December 31, 1934.

¹³² Hofsommer, *Southern Pacific*, 190.

¹³³ "SP Expands Its Plant: More Cars, More Locomotives, and More Jobs in Big Building Program," *Bulletin* (Southern Pacific) 25, no. 2 (February 1941): 3; *Bulletin* (Southern Pacific) 25, no. 4 (April 1941): 3.

¹³⁴ "'42 Load again Tops Record: Still Greater Difficulties in 1943, Warns President, Pointing out How Each May Help SP's War Effort," *Bulletin* (Southern Pacific) 27, no. 1 (January 1943): 2.

¹³⁵ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 146-147.

¹³⁶ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 162; Pecotich, *Southern Pacific's Sacramento Shops*, 307.

¹³⁷ "We Help to Build Ships: Huge Plate Bending Rolls for Kaiser Yards Are Being Finished at the Sacramento Shops," *Bulletin* (Southern Pacific) 26, no. 9 (September 1942): 3.

¹³⁸ Pecotich, *Southern Pacific's Sacramento Shops*, 310.

nationals, commonly called *braceros*, authorized to work under the Mexican Farm Labor Agreement of 1942.¹³⁹

When these measures alone failed to fill the Southern Pacific's job rosters, the company moved to recruit female employees. Large-scale hiring of female employees in August 1942, and nearly 2,000 "railroadettes" were engaged by January 1943. The company's magazine celebrated their contributions, declaring, "woman-power is out to do a he-man's job for the railroad, as elsewhere in the industry."¹⁴⁰ At the Sacramento Shops, some of these women performed detailed work in the pattern, upholstery, and mechanical departments, while others were engaged as painters, machinery operators, riveters, tractor drivers, shop clerks, or locomotive and coach cleaners; for the first time in company history, many worked alongside men at locomotive and car construction or maintenance.¹⁴¹

The activities of the Sacramento Shops during the First and Second World Wars are reflective of the conditions that impacted nearly all American industries during these global conflicts. High demand pushed the Shops to expand their operations, hours, and payroll. Like other industries, they focused on reducing waste and increasing efficiency by refurbishing existing equipment and recycling material; faced with a depleted workforce, they lengthened their shifts and altered regular hiring practices to include men who were either too old or too young to enlist, Mexican *braceros*, and a significant number of women. The massive output of the Sacramento Shops during both conflicts is indicative of their successful contribution to the war effort and underlines the significance of the Sacramento Shops Historic District within this period of history.

Postwar Dieselization: A New Era at the Sacramento Shops

Diesel engines were first introduced to American rail service in the 1920s. The earliest diesel locomotives were not yet a viable replacement for steam locomotives, which had been the industry standard for more than a century, but they represented the beginning of a technological movement that would revolutionize almost every aspect of the American railroad industry. Diesel locomotives possess certain advantages over their steam-powered predecessors: they start up and shut down more easily, require less fuel, and run equally well in either direction. Multiple diesel engines may be linked together to increase traction power, enabling crews to move longer and heavier loads across challenging grades. Diesel locomotives also feature interchangeable manufactured components, reducing the time, material, and skilled labor involved in maintenance and repair operations.¹⁴²

Industry-wide, the transition from steam to diesel locomotives began in the 1930s, after the most difficult years of the Great Depression had passed. Established locomotive manufacturers Baldwin and ALCo, joined by the relatively new Electro-Motive Division (EMD, later "Electro-Motive Diesel") of General Motors, developed and marketed increasingly powerful diesel locomotives. With the added benefit of increased fuel economy and reduced maintenance requirements, many American railroads began to gradually replace decommissioned steam locomotives with new diesel models. By 1938, railroad companies were purchasing more new diesel locomotives than steam locomotives. The Southern Pacific Company was comparatively slow to engage the new technology, operating its first diesel locomotive on a passenger train, the *City of San Francisco*, in 1936, and acquiring its first diesel yard switcher locomotive in 1939.¹⁴³

The Southern Pacific Company expanded their stock of diesel switchers in 1940 and 1941 but continued to rely on steam power for all freight and most passenger traffic. The Southern Pacific had built up a large fleet of relatively modern steam locomotives that were just approaching depreciation, and the company felt that these would continue to meet the its need through the 1960s.¹⁴⁴ Meanwhile, EMD began to advertise its first road freight diesel locomotives in 1939 and 1940, and many other American railroads hurried to place their orders. The Burlington and the Santa

¹³⁹ "Men & Women: Railroad Short 10,000 Workers as Year Ended," *Bulletin* (Southern Pacific) 27, no. 1 (January 1943): 5; "Women Take Over Tough Jobs to Relieve Manpower Shortage," *Bulletin* (Southern Pacific) 26, no. 11 (November 1942): 3; Pecotich, *Southern Pacific's Sacramento Shops*, 311-312; Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 136; Helmich, *Legacy in Brick and Iron*, 209.

¹⁴⁰ "Women Take Over Tough Jobs to Relieve Manpower Shortage," *Bulletin* (Southern Pacific) 26, no. 11 (November 1942): 4.

¹⁴¹ "Women Take Over Tough Jobs to Relieve Manpower Shortage," *Bulletin* (Southern Pacific) 26, no. 11 (November 1942): 4; "Men & Women: Railroad Short 10,000 Workers as Year Ended," *Bulletin* (Southern Pacific) 27, no. 1 (January 1943): 5; Helmich, *Legacy in Brick and Iron*, 209.

¹⁴² Albert Churella, "Corporate Response to Technological Change: Dieselization and the American Railway Locomotive Industry during the Twentieth Century," *Business and Economic History* 25, no. 1 (Fall 1996): 27; Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 53-54.

¹⁴³ Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 57.

¹⁴⁴ Pecotich, *Southern Pacific's Sacramento Shops*, 315; Wiatrowski 106.

Fe Railroads, in particular, were frontrunners in the transition from steam to diesel; the Santa Fe placed orders for twenty two-unit sets of EMD's 1,350-horsepower FT locomotives in 1941 alone.¹⁴⁵

After the United States entered World War II, the War Production Board restricted the production of diesel engines to established models only and determined which companies would get them, limiting many railroads' ability to move forward with dieselization.¹⁴⁶ The Southern Pacific owned no road freight diesel locomotives by the conclusion of the war; as the majority of the company's revenues were related to freight traffic, this placed it near the bottom of the industry in terms of dieselization. By the end of 1946, a year before the company acquired its first road freight diesel locomotive, thirty other major American railroads already had 1,275 freight diesels in service or on order.¹⁴⁷ Finally, in 1947, the Southern Pacific made the decision to gradually replace all of its steam locomotives with diesel. It began operating its first road freight diesel locomotives (SP 6100 through SP 6119) in the same year, demonstrating its commitment to this major transition.¹⁴⁸

During the transitional period that spanned the late 1940s and 1950s, the Sacramento Shops struggled to accommodate both steam and diesel locomotive operations. Confined to buildings that had been designed and arranged for steam locomotive operations, the complex was no longer at the vanguard of railroad shop operations in the American West. New facilities and equipment was necessary to support diesel maintenance and repair, such as portable scaffolding, used for one-the-ground engine work; piston racks; linoleum-topped benches for sub-assemblies; universal positioners with adaptors to accommodate different cylinder heads; cleaning tanks for carbon-removal from various engine components; electrical equipment for testing the output of generators; and numerous other apparatuses that had to be developed within the confines of the existing complex.¹⁴⁹

The complete transition to diesel freed the Sacramento Shops to end steam locomotive operations, but the fact remained that the complex had been designed for steam-era processes and was not as well-positioned to perform diesel operations. The activities that took place at the Shops gradually narrowed to focus on heavy repair operations and freight car construction and repair. Other operations were transferred to newer and better suited Southern Pacific facilities, and the preeminence of the Sacramento Shops diminished within the Southern Pacific system and the American railroad industry.

Comparison

Only a handful of steam-era railroad shop complexes remain extant in the United States today, the majority of which are located east of the Mississippi River. Known complexes (in addition to the Sacramento Shops) include:

- Spencer Shops (Spencer, North Carolina)¹⁵⁰
- Milwaukee Railroad Shops (Sioux City, Iowa)¹⁵¹
- Northern Pacific Railroad Shops (Brainerd, Minnesota)¹⁵²
- Atchison, Topeka & Santa Fe Railway Shops (Albuquerque, New Mexico)¹⁵³
- St. Paul, Minneapolis and Manitoba Railway Company Shops (St. Paul, Minnesota)¹⁵⁴
- Rensselaer and Saratoga Railroad Green Island Shops (Green Island, New York)¹⁵⁵
- Baltimore and Ohio Railroad Martinsburg Shops (Martinsburg, West Virginia)¹⁵⁶
- Baltimore and Ohio Shops (Baltimore, Maryland)

¹⁴⁵ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 59, 60n9; Mapes, "Losing Steam," 311.

¹⁴⁶ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 55; Mapes, "Losing Steam," 12, 310.

¹⁴⁷ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 50.

¹⁴⁸ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 56, 220; Hofsommer, *Southern Pacific*, 211.

¹⁴⁹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 64-65.

¹⁵⁰ National Register of Historic Places, Southern Railway Spencer Shops, Spencer, Rowan County, North Carolina, National Register #78001972.

¹⁵¹ National Register of Historic Places, Milwaukee Railroad Shops Historic District, Sioux City, Woodbury County, Iowa, National Register #100002243.

¹⁵² National Register of Historic Places, Northern Pacific Railroad Shops Historic District, Brainerd, Crow Wing County, Minnesota, National Register #88003024.

¹⁵³ National Register of Historic Places, Atchison, Topeka & Santa Fe Railway Locomotive Shops, Albuquerque, Bernalillo County, New Mexico, National Register #14000859.

¹⁵⁴ National Register of Historic Places, St. Paul, Minneapolis and Manitoba Railway Company Shops Historic District, St. Paul, Ramsey County, Minnesota, National Register #86003564.

¹⁵⁵ National Register of Historic Places, Rensselaer and Saratoga Railroad: Green Island Shops, Green Island, Albany County, New York, National Register # 73001161.

¹⁵⁶ National Register of Historic Places, Baltimore and Ohio Railroad Martinsburg Shops, Martinsburg, Berkeley County, West Virginia, National Register #03001045.

- Central of Georgia Shops (Savannah, Georgia)

With the exception of the Baltimore and Ohio Shops in Baltimore and the Central of Georgia Shops in Savannah, all of these complexes have been listed on the National Register of Historic Places in recognition of their significance within the history of American transportation and industry. The Sacramento Shops Historic District is more comprehensive and more intact than the majority of these railroad shops complexes, as it possesses a range of extant buildings and objects related to locomotives operations, car operations, and general operations. The Sacramento Shops Historic District also holds the singular distinction of being the earliest major railroad shops complex in the western United States, which further distinguishes the district's significance within the context of American transportation history.

Criterion A Summary

As one of the largest and most intact railroad shop complexes in the United States today, the Sacramento Shops Historic District is nationally significant under Criterion A in the area of transportation. The Sacramento Shops performed an imperative role in the development of the transcontinental railroad by constructing and maintaining rolling stock, and boasted an unusual degree of self-sufficiency as a result of their relatively isolated location in the American West. The Shops were a center for innovation in rolling stock design and were crucial to the development of the common standards that revolutionized the Southern Pacific Company in the early twentieth century. The Sacramento Shops also made significant contributions to the war effort during the First and Second World Wars, as they maintained a large volume of rolling stock that was crucial to moving troops and supplies around the United States. The primacy of the Shops within the context of American transportation finally began to wane with the Southern Pacific Company's decision to replace its fleet of steam locomotives with new diesel technology, which was inherently at odds with the design and organization of the steam-era facility.

SIGNIFICANCE UNDER CRITERION C: INDUSTRIAL ARCHITECTURE & DESIGN

The Sacramento Shops Historic District is significant under Criterion C at the local level as a distinctive collection of functionally-related resources that illustrate national trends in industrial architecture and design during the period of significance (1867-1947). Functional necessity, material availability, and aesthetic concern all impacted the arrangement and appearance of the Sacramento Shops complex. Likewise, the needs of the Central Pacific Railroad (later the Southern Pacific Railroad) had a substantial impact on the appearance of the shop buildings and site features, as nearly all of these were altered in order to meet changing demands, embrace new and developing technologies, and extend their service lives.

At maximum build-out (ca. late 1920s), the Sacramento Shops complex covered approximately two hundred acres and encompassed more than two hundred buildings, structures, and objects. Buildings and associated features were removed, replaced, added, and altered according to the needs of the Shops, which fluctuated due to changes in demand and the introduction of new technologies. The vast majority of buildings and structures included within the complex were demolished during the late twentieth and early twenty-first centuries, leaving the core group of facilities encompassed by the Sacramento Shops Historic District. The style and construction of the extant resources reflect broad trends in American industrial architecture, such as the popularity of the American round-arched style in the late nineteenth century and the growing prominence of reinforced concrete for industrial use during the early twentieth century. The additions and alterations that these resources have experienced since their initial construction are also notable, in that they reflect changing uses and the deliberate adaptability of industrial architecture.

Development History and Extant Resources

Currently, the Sacramento Shops complex encompasses nine extant resources constructed during the period of significance, which stretches from 1867 through 1947. During the initial wave of development, which began with groundbreaking in 1867 and ended immediately before the completion of the transcontinental line in 1869, the core buildings, structures, and objects that formed the Sacramento Shops complex were completed. These early facilities were planned and designed not by a single architect, but by a cohort of Central Pacific Railroad staff. Contemporary newspaper announcements documenting the progress of the complex note that the project was led by John Woolaver, a draftsman, and Joseph R. Wilkinson, a civil engineer, but these men likely collaborated with George Stoddard, the company's Head Draftsman, Chief Engineer Samuel S. Montague, Engineer Joseph Graham, Master Mechanics Edwin F. Perkins and Isaac Graves, and Master Car Builder Benjamin Welch. Woolaver, a Harvard-educated architect who had been lured west by the California Gold Rush, was also involved in the design of the Central Pacific Railroad Hospital in Sacramento; he died in

1869, however, and did not see its completion. Wilkinson remained in the employ of the Central Pacific for decades afterward, becoming the company's Resident Civil Engineer and eventually relocating to San Francisco.¹⁵⁷

The first architectural plans for the Sacramento Shops complex were complete by August 1867, with construction finished by 1869. Several extant resources at the complex date to this period, including the Planing Mill, Erecting/Machine Shop, and Blacksmith Shop; additionally, the extant Turntable is constructed on the same pivot point as the original Turntable that was installed in 1868. The buildings constructed during this initial phase of construction housed some of the most critical operations performed at the Sacramento Shops complex, from assembling and repairing steam locomotives to producing the metal and wood components necessary to build and maintain all manner of rolling stock. Many were large brick constructions inspired by contemporary American round-arched architecture, while others were simpler, more utilitarian constructions clad in board-and-batten siding and corrugated iron. In style and form, the Sacramento Shops are reflective of major trends in railroad shop architecture established in the eastern United States.¹⁵⁸

Following the opening of the transcontinental railroad line in 1869, the Sacramento Shops began to service a growing fleet of locomotives, passenger cars, and freight cars. The increased volume and variety of work led to several periods of expansion, the first occurring in the early 1870s. The Paint Shop, the three-story Privy, and the first Boiler Shop (no longer extant) were all completed by circa 1873, and a small wing off the southern elevation of the Planing Mill was expanded and renamed Car Shop No. 3 in 1872. With the exception of the first Boiler Shop, which was utilitarian in design, these buildings were constructed with brick and echo the American round-arched style features of the Planing Mill, Erecting/Machine Shop, and Blacksmith Shop.¹⁵⁹

A third wave of expansion began in 1888, coinciding with the appointment of Henry J. Small as General Master Mechanic. Small halted the production of new locomotives onsite, but he initiated a major rolling stock rebuilding program that lasted approximately three decades. Small's initiative necessitated a major infrastructure program that included the construction of the extant Boiler Shop and the Car Machine Shop, as well as major additions that significantly expanded the area of Car Shop No. 3 and the Erecting/Machine Shop. In general, these new constructions mimicked their neighbors in material and style. The Boiler Shop is a large, wood-framed building with corrugated iron cladding in the utilitarian style, while the Car Machine Shop and the additions to Car Shop No. 3 and the Erecting/Machine Shop were executed in the American round-arched style.

The Sacramento Shops continued to expand over the next several decades, reaching maximum build-out around 1930; at this time, the complex comprised more than two hundred buildings, structures, and objects, many of which were relatively small support facilities and material stores.¹⁶⁰ Throughout the life of the complex, existing buildings were altered in order to accommodate fluctuating demand and the introduction of new technologies, and new buildings were added when funding permitted and necessity required. The most comprehensive phase of alteration occurred in the postwar period and was related to the Southern Pacific Company's efforts to replace its fleet of steam locomotives with diesel engines, which began in earnest with the company's purchase of its first road freight diesel locomotives in 1947.

The vast majority of the Sacramento Shops facilities were removed in connection with environmental remediation efforts beginning in the late 1980s, or following the closure of the shops in 1999. However, the core of the complex—including some of the oldest and largest shop buildings, which were in relatively constant use and housed some of the most critical shop operations—remains extant. The Boiler Shop, Erecting/Machine Shop, Blacksmith Shop, Car Machine Shop, Planing Mill, Car Shop No. 3, Privy, Paint Shop, and Turntable all date to the period of significance and are located within the boundaries of the proposed district.

¹⁵⁷ "City Intelligence: Railroad Works," *Sacramento Daily Union*, August 9, 1867; "Supervisors," *Daily Bee* (Sacramento, CA), August 8, 1867; "Attention, Pioneers!," *Sacramento Daily Union*, April 27, 1869; "Local News: Central Pacific Railroad Hospital," *Daily Bee* (Sacramento, CA), December 30, 1869; "Local Matters: Personal Notes," *Weekly Bee* (Sacramento, CA), June 29, 1878; "To Commence Ballasting," *Daily Bee* (Sacramento, CA), March 27, 1879; "The Railroad Shops: Interesting Facts in Relation Thereto," *Daily Bee* (Sacramento, CA), December 24, 1880; "Resident Engineer Dead," *Sacramento Bee*, May 31, 1905; Helmich, *Legacy in Brick and Iron*, 65;

¹⁵⁸ Helmich, *Legacy in Brick and Iron*, 65; Betsy Hunter Bradley, *The Works: The Industrial Architecture of the United States* (Oxford: Oxford University Press, 1999), 235.

¹⁵⁹ Helmich, *Legacy in Brick and Iron*, 65. Subsequent changes to the Blacksmith Shop removed its American round-arched features.

¹⁶⁰ For a labelled map of these resources, see "Station plan of Sacramento. Scale: 1:100" (March 1927), Sacramento Division A 89, Sacramento Shops Drawer (Source Record ID 18109), California State Railroad Museum Library & Archives Collections, Sacramento, California.

Layout

The arrangement of the extant Sacramento Shops buildings is typical of comprehensive industrial site planning in the late nineteenth- and early twentieth-century railroad industry. Contemporary literature notes that for large, general repair shops, the preferred layout was a separation of the buildings and facilities devoted to locomotives, passenger cars, and freight cars, with multifunctional and service buildings at the center.¹⁶¹ This arrangement was intended to increase productivity by maximizing motion economy: as rolling stock entered a shop complex, it was immediately sorted into the appropriate department, wherein specialized employees performed necessary maintenance or repair work. The process of moving rolling stock and material around the complex was facilitated by numerous rail spurs and mechanical apparatuses, including turntables, which could reorient locomotives; transfer tables, which could distribute locomotives along a large number of shop tracks; and overhead traveling cranes, which could lift materials and rolling stock over obstacles and through buildings.¹⁶²

The Sacramento Shops complex reflects the division of activity recommended by steam-era engineers, specifically the "complete transfer table layout."¹⁶³ This arrangement, in which "the various departments [are] grouped along separate transfer tables," was described by Walter G. Berg of the Lehigh Valley Railroad in his early twentieth-century treatise on American railway shop organization. In the earliest years of the Sacramento Shops, locomotive activities were generally concentrated on the western half of the complex, while passenger car and freight car activities were located to the east; each "department" was served by its own transfer table. The Erecting/Machine Shop and the Boiler Shop formed the core of the locomotive-related facilities; the Locomotive Transfer Table (reconstructed in 2003) is located between the two buildings, which feature transverse track segments leading into individual service bays.¹⁶⁴ The passenger car- and freight car-related facilities are similarly organized, with a transfer table located between Car Shop No. 3 and the Paint Shop; the Car Machine Shop and portions of the Planing Mill were also regularly engaged in car maintenance, repair, and construction activities at various points in the complex's history.

Some facilities served both locomotive and car operations and so were necessarily located at the heart of the complex. These all-important buildings include the Blacksmith Shop and Planing Mill, which produced metal and wooden components for all manner of rolling stock; the three-story Privy, which was the largest washroom on the site; and the Power House (no longer extant), which powered the belt-driven machines in the Planing Mill, Erecting/Machine Shop, and the Blacksmith Shop before the introduction of electric motors in the early twentieth century.¹⁶⁵ Auxiliary shops, which served either locomotive or car operations, were arranged as satellites around the complex and were moved as needed. The Upholstery Shop, for example, was relocated from the Planing Mill to the Car Machine Shop in 1888, then back again in the 1940s.¹⁶⁶

As the Sacramento Shops expanded in the late nineteenth and early twentieth centuries, freight car work was largely relocated to new facilities at the northeast of the complex (no longer extant).¹⁶⁷ In this way, the Sacramento Shops came to reflect another arrangement described by Walter Berg: the "combination of transfer table and longitudinal layout" featuring a "longitudinal freight car shop" (meaning that tracks carried rolling stock through the length of the shop, without transverse movement facilitated by a transfer table) and transfer tables for the locomotive and passenger car departments.¹⁶⁸

The general division of locomotive and car activities at the Sacramento Shops remained fairly constant until the early postwar period, when the transition to diesel began in earnest;¹⁶⁹ at this

¹⁶¹ Walter G. Berg, *American Railway Shop Systems* (New York, NY: The Railroad Gazette, 1904), 30-36; Maham H. Haig and B. W. Benedict, *Railway Shop Up to Date: A Reference Book of Up to Date American Railway Shop Practice* (Chicago, IL: Crandall Publishing Company, 1907), 12.

¹⁶² Berg, *American Railway Shop Systems*, 12, 31.

¹⁶³ Berg, *American Railway Shop Systems*, 28.

¹⁶⁴ Aaron Isaacs, "Inside the California State Railroad Museum," *Heritage Rail Alliance*, May 9, 2019, <https://heritagerail.org/2019/05/inside-the-california-state-railroad-museum/>. The reconstructed table is welded rather than riveted and is not a contributing feature to the Sacramento Shops Historic District.

¹⁶⁵ Helmich, *Legacy in Brick and Iron*, 71.

¹⁶⁶ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 47n68; D. L. Joslyn, "The Sacramento General Shops" [unpublished manuscript] (1948), Box 1, Folder 4 (24), MS 42 David Lindsay Joslyn Collection, California State Railroad Museum Library & Archives Collections, Sacramento, California.

¹⁶⁷ After 1920, the bulk of freight car repair operations were concentrated in Car Shop No. 9, which grew to cover more than 60 acres by 1936. As the country recovered from the Great Depression and demand for freight cars increased, Car Shop No. 9 was repurposed for freight car construction. The facility ceased operations in 1980 and is no longer extant.

¹⁶⁸ Berg, *American Railway Shop Systems*, 18.

¹⁶⁹ Dougherty et al., "Southern Pacific Sacramento Shops," Historic American Buildings Survey No. CA-303, 49.

time, passenger car service declined and an ever-increasing percentage of floor area was devoted to locomotive repair and maintenance work. The division between locomotive and car operations was blurred as Car Shop No. 3 came to house the Electric Shop, Pipe Shop, Air Compressor Shop, and Truck Shop; the first floor of the Car Machine Shop was remodeled to accommodate diesel locomotive wheel work; and the Paint Shop was repurposed for diesel locomotive rebuilding efforts.¹⁷⁰ The freight car operations at the northeastern portion of the complex were eventually removed, further altering the site's intended layout and marking the transition away from the steam era and the height of activity at the Sacramento Shops.

Style

The specialized functions and uniform styling of nineteenth-century industrial buildings effected a discernible industrial aesthetic. Whereas the dominant commercial, civic, and residential styles favored elaborate ornamentation, draftsmen and civil engineers favored simplicity and designed for function rather than architectural effect. This pragmatic mentality resulted in relatively stark building designs, in which style was expressed through the inherent expressive qualities of material and form. The intrinsic aesthetic qualities of brick, whose small masonry units offered "the perfect way both to express simplicity and harmony in design and to emphasize structural elements, provide relief from monotony, and develop and inherent ornamental language," led many industrial designers to the American round-arched architectural style.¹⁷¹ Reinforced concrete, which became common in industrial architecture in the early twentieth century, advanced a new "industrial modern" style that "relied on massing, fenestration, and broad shadows for utilitarian effect."¹⁷² Wood framing and corrugated iron, which are more economical to erect and offer more flexibility after construction, were frequently employed in simpler, utilitarian-style structures. All three of these industrial architectural styles—American round-arched, industrial modern, and utilitarian—are represented by the extant buildings at the Sacramento Shops complex.

American Round-Arched Style

The American round-arched style is an American interpretation of the German *Rundbogenstil* (literally "round-arched style"), an early nineteenth-century architectural style that blended classical and medieval elements and relied on locally available masonry materials, especially brick. Characteristics of *Rundbogenstil* architecture include modeled surrounds around arched door and window openings, elaborate brick corbelling, and series of pilasters and horizontal bands that form repetitive grid patterns. By the mid-nineteenth century, segmentally-arched windows and polychrome brick were also common elements of the *Rundbogenstil*.¹⁷³

The *Rundbogenstil* was brought to the United States in the 1840s by German and central European immigrants, notably Charles Blesch, Henry Engelbert, and Alexander and Edward Saeltzer. The term *Rundbogenstil* was rarely used in America; instead, architects and designers employed a variety of terms that convey classical and medieval European influence, such as *Byzantine*, *Romanesque*, *Norman*, *Lombard*, *Anglo-Norman*, and *Lombard-Venetian*. Architectural historian Kathleen Curran suggests the term "American round-arched style" to encapsulate the varied iterations and interpretations of the *Rundbogenstil* in America, including those as applied to industrial buildings.¹⁷⁴

Although its earliest applications were in religious architecture and public buildings such as Alexander Saeltzer's Astor Library in New York City (1849), the American round-arched style quickly became popular for utilitarian commercial and industrial architecture. According to architectural historian Betsy Hunter Bradley, the basic tenets of the style "expressed many of the ideals of the engineering aesthetic. The forms were familiar to masons and were easy and economical to build because no additional materials or trades were necessary for the execution. [...] Most important, the round-arched style was generated by—not applied to—a building's structure."¹⁷⁵ In other words, the American round-arched style combines structural necessities with aesthetic appeal, making it a particularly pragmatic and attractive selection for industrial designers and engineers.

Many of the extant buildings at the Sacramento Shops complex exhibit elements of the American round-arched style. The Erecting/Machine Shop, Car Machine Shop, Planing Mill, Car Shop No. 3, Privy, and Paint Shop all feature round-arched or segmentally-arched window and door openings, brick corbelling, and rows of pilasters. The corbelling and prominent windowsills produce a

¹⁷⁰ Helmich, *Legacy in Brick and Iron*, 138-141; Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 111-114, 119-120.

¹⁷¹ Bradley, *The Works*, 235.

¹⁷² Bradley, *The Works*, 253, 238.

¹⁷³ Bradley, *The Works*, 235.

¹⁷⁴ Kathleen Curran, "The German Rundbogenstil and Reflections on the American Round-Arched Style," *Journal of the Society of Architectural Historians* 47, no. 4 (December 1988): 351-373.

¹⁷⁵ Bradley, *The Works*, 237.

"gridded" effect on the building façades, in a characteristic application of the style. Early photographs of the Blacksmith Shop indicate that it too was originally constructed in the American round-arched style, although alterations in the 1920s and 1930s replaced the building's late-nineteenth-century walls with reinforced concrete walls punctuated by rectangular steel-sash windows.¹⁷⁶

Industrial Modern Style

Industrial Modernism emerged in the United States during the first decades of the twentieth century. The established industrial or engineering aesthetic shared some natural similarities with modern architecture, namely an emphasis on volume and regularity in massing, a lack of applied ornamentation, and a dependence on materials and proportion for architectural effect. The industrial application of the style was catalyzed by new building technologies, especially the popularization of reinforced concrete and curtain walls: reinforced concrete was fire-resistant and permitted the construction of continuous bands of multi-light windows, ideal for providing natural light and ventilation to the occupants of industrial buildings. The industrial modern style, like the American round-arched style, was regarded to combine functionality with aesthetic appeal, and so it quickly grew in popularity among industrial designers.¹⁷⁷

Within the Sacramento Shops district, the industrial modern style is exhibited by the Blacksmith Shop, which was largely reconstructed in the late 1920s and late 1930s. The building was initially constructed in 1869 in the American round-arched style, but the harsh atmosphere created by the forging activities within the Blacksmith Shop eventually degraded its original brick walls. The walls in the southern section of the building were replaced by reinforced concrete walls in 1927; plans to complete a full remodel were delayed by the Great Depression, with the result that the walls in the northern section weren't replaced until 1939.¹⁷⁸ Despite the delay in project completion, however, the design of the remodeled Blacksmith Shop is cohesive. Elements of the industrial modern style include large, rectangular expanses of multi-light steel-sash windows and a smooth, unornamented exterior.

Industrial Utilitarian Style

Many industrial buildings do not adhere to a defined architectural style; however, they possess a distinct engineering aesthetic governed by practical needs and the inherent qualities of the materials employed in construction. Architectural historian Betsy Hunter Bradley has identified distinctive design criteria that apply to these utilitarian buildings, including "a regularity of form and articulation imposed by programmatic needs for light and ventilation," "a reliance on framed construction," and "an emphasis on rationalized simplicity in design." The aesthetics of the industrial utilitarian style are, therefore, governed by the functional aspects of industrial buildings.¹⁷⁹

The Boiler Shop, which was initially constructed in 1888 but, like the Blacksmith Shop, was replaced incrementally in the first part of the twentieth century, is typical of utilitarian industrial buildings. Its design and materials prioritize economy and functionality: the building's raised monitor served to provide light and ventilation while maximizing the open interior space, and the corrugated metal cladding provides economical, fire-resistant coverage while facilitating future alteration and expansion. Applied ornamentation is limited to signage on the southern and western façades.

Materials

The materials employed in the construction of the Sacramento Shops are typical of late-nineteenth and early-twentieth century industrial construction, and they provide a physical record of the complex's evolution over time. Materials were deliberately selected for economic, functional, and aesthetic purposes, and they reflect prevailing trends in industrial architecture and the specialized needs of individual shop buildings. Thoughtful material selection contributed to the

¹⁷⁶ "Southern Pacific Railroad Sacramento Shops complex: exterior view of buildings" (1870-1879), Source Record ID cscrm_000041 [Photograph], California State Railroad Museum Library & Archives Collections, Sacramento, California.

¹⁷⁷ Bradley, *The Works*, 239, 244-253; Betsy Hunter Bradley, "Industrial Modernism: Architecture and Ideology," *Journal of the Society of Architectural Historians* 54, No. 4 (December 1995): 508.

¹⁷⁸ "Remodel and Extend Blacksmith Shop" (January 10, 1939), General Manager's Order No. 7997, Sac. 10554/10534, California State Railroad Museum Library & Archives Collections, Sacramento, California; Helmich, *Legacy in Brick and Iron*, 94.

¹⁷⁹ Bradley, *The Works*, 226.

adaptability of individual buildings and the complex as a whole, enabling the Sacramento Shops to nimbly respond to changes in demand and technology.

Brick, wood, corrugated iron, and reinforced concrete are the primary building materials represented in the extant buildings at the Sacramento Shops complex. In the late nineteenth century, brick and corrugated iron were favored for their durability and fire resistance, especially important in the Erecting/Machine Shop, Boiler Shop, Blacksmith Shop, and the several foundries that once supported Shop operations. Thick brick walls segmented by strategic, regularly-spaced pilasters were also resistant to the vibrations created by heavy machinery, such as the planing machines and band saws in the Planing Mill, the cranes in the Erecting/Machine Shop, and the boring and wheel-turning machines in the Car Machine Shop. Corrugated iron provided a more affordable and adaptable option than brick, and it was employed in facilities such as the Boiler Shop and the various storage and materials shops located around the complex.

The Blacksmith Shop, originally constructed from brick, was refurbished in the late 1920s and 1930s by steel reinforced concrete, reflecting a major trend in materials usage and industrial construction in the first part of the twentieth century. In 1907, engineer Sanford Thompson wrote that, "reinforced concrete has provided for the manufacturer an entirely new building material. Indestructible, economical and fireproof, it offers under most conditions features of advantage over every other type of construction."¹⁸⁰ Reinforced concrete reduced floor vibration for heavy machinery, required fewer interior columns for support, resisted fire damage, and allowed for greater window area, which consequently increased natural lighting and ventilation. The material was a popular choice for industrial buildings and factories through World War II.¹⁸¹

Wood is a less permanent and less durable material than corrugated iron, brick, or concrete, but it was also a critical and commonly-used material within the Sacramento Shops complex, especially for window sash and trim. Wood was appreciated for its relative affordability, ease of construction, and the flexibility it allowed. Some of the earliest brick buildings at the Sacramento Shops complex, including the Erecting/Machine Shop, the Blacksmith Shop, and Car Shop No. 3 were constructed with wooden, board-and-batten-clad southern walls in order to facilitate future expansion.¹⁸²

Renovation, Reorganization, and Reuse

The Sacramento Shops complex was conceived as a flexible collection of industrial buildings capable of adapting to fluctuating demand and the introduction of new technologies.¹⁸³ The compact arrangement of core facilities, the utilitarian design of buildings and structures, and the thoughtful use of materials all contributed to the flexibility of the complex, a vital characteristic that contributed to its extended period of active use. As detailed in the section "General History of the Sacramento Shops," all of the extant buildings within the Sacramento Shops Historic District exhibit alterations and additions that reflect their evolving use. Conversions to adopt new machinery and to expand or reallocate space were common (e.g., the ca. 1875, 1888, and 1904-1905 additions to the Erecting/Machine Shop), as were drastic measures to extend the useful life of individual buildings (e.g., the replacement of the Blacksmith Shop's original brick walls with reinforced concrete). In this way, the history of the Sacramento Shops complex is inscribed in its extant built resources.

Despite decades' worth of alterations, the Sacramento Shops remained fairly consistent in their arrangement and related patterns of use for the duration of the steam era. However, the transition to diesel that occurred in the early postwar period was at odds with the steam-era layout of the complex, resulting in massive functional reorganizations and related renovations of existing buildings. The exterior appearance of the extant buildings changed relatively little, but the buildings' interior arrangement and the allocation of activities within the complex was

¹⁸⁰ Sanford Eleazer Thompson, *Reinforced Concrete in Factory Construction* (New York, NY: Atlas Portland Cement Company, 1907), 1.

¹⁸¹ Bradley, *The Works*, 155.

¹⁸² D. L. Joslyn, "The Sacramento General Shops" [unpublished manuscript] (1948), Box 1, Folder 4 (16, 21), MS 42 David Lindsay Joslyn Collection, California State Railroad Museum Library & Archives Collections, Sacramento, California; "City Intelligence: Railroad Works," *Sacramento Daily Union*, August 9, 1867; Helmich, *Legacy in Brick and Iron*, 78, 147; "Southern Pacific Railroad Sacramento Shops complex: view of multiple buildings" (1910-1919), Source Record ID cscrm_000023 [Photograph], California State Railroad Museum Library & Archives Collections, Sacramento, California; Dougherty et al., "Southern Pacific Sacramento Shops," *Historic American Buildings Survey* No. CA-303, 86-87; "How the Railroad Shops Were Built," *Sacramento Daily Union*, October 4, 1896.

¹⁸³ The pragmatically designed buildings and structures that comprise the Sacramento Shops are what writer Stewart Brand has termed "Low Road buildings." Notable for their economy and adaptability, Low Road buildings "should be robust enough to take the major changes in use [they] will attract" (Stewart Brand, *How Buildings Learn: What Happens after They're Built* [New York, NY: Penguin Books, 1994], 194). Low Road buildings are those that are designed for flexibility, to be altered to meet the creative needs of inhabitants.

fundamentally changed. Dieselization effected a new intensity of renovation, reorganization, and reuse within the Sacramento Shops; this represented a break with the original design intent of the complex and so marks the end of the period of significance.

Comparison

No other late-nineteenth century railroad shop complexes remain extant in the western United States. However, the early twentieth-century Atchison, Topeka & Santa Fe Railway Shops Historic District in Albuquerque, New Mexico reflects some of the same organizational considerations, architectural styles, and material usage seen in the Sacramento Shops.¹⁸⁴ Like the Sacramento Shops, the Albuquerque Shops include a machine shop with an attached erecting bay, a boiler shop, and a blacksmith shop at the core of the complex, and the extant locomotive buildings are organized into the same "complete transfer table layout" that characterized the Sacramento Shops in the early and later phases of its history.¹⁸⁵ The Albuquerque Shops also display the utilitarian styling and use of reinforced concrete that is observed in the Sacramento Shops' Blacksmith Shop.

The architectural and engineering trends represented by the Sacramento Shops complex can also be observed in other types of industrial campuses, such as the United Iron Works (UIW) Historic District in nearby San Francisco. The UIW were established in 1884, fifteen years after construction had begun on the Sacramento Shops. Before the end of the century, the UIW had established itself as the premiere West Coast ship construction and repair yard. Several of the older buildings within this complex are stylistically and materially similar to those erected in the first phase of development at the Sacramento Shops: Building 113/114 at the UIW, for example, is directly comparable with the Erecting/Machine Shop at the Sacramento Shops. Both large, one-story buildings are constructed from brick with corrugated iron roofs, and both feature arched window openings, pilasters, and corbelling characteristic of the American round-arched style. Both buildings are also central to major industrial complexes that developed in the late-nineteenth-century American West, although the Erecting/Machine Shop was constructed for locomotive operations and Building 113/114 formerly housed shipbuilding activities.¹⁸⁶

Criterion C Summary

The Sacramento Shops Historic District constitutes a distinctive collection of functionally-related resources that are significant under Criterion C at the local level. The district, which includes many of the Sacramento Shops' oldest and most important buildings, reflects a spatial layout that was popular among steam-era railroad shops and was recommended by contemporary experts in the field. The individual resources within the district, which include six brick buildings in the American round-arched style, one industrial modern building with reinforced concrete walls, and one corrugated metal-clad industrial utilitarian building, speak to national trends in the style and material composition of industrial architecture, as well as the complex's unique requirements for future adaptability. Overall, the Sacramento Shops Historic District is an excellent example of industrial architecture dating to the period of significance (1867-1947).

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¹⁸⁴ National Register of Historic Places, Atchison, Topeka & Santa Fe Railway Locomotive Shops, Albuquerque, Bernalillo County, New Mexico, National Register #14000859.

¹⁸⁵ Berg, *American Railway Shop Systems*, 28.

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Rensselaer and Saratoga Railroad: Green Island Shops, Green Island, Albany County, New York, National Register # 73001161

Southern Pacific Railroad Company's Sacramento Depot, Sacramento, Sacramento County, California, National Register #75000457.

Southern Railway Spencer Shops, Spencer, Rowan County, North Carolina, National Register #78001972.

St. Paul, Minneapolis and Manitoba Railway Company Shops Historic District, St. Paul, Ramsey County, Minnesota, National Register #86003564.

Union Iron Works Historic District, San Francisco, San Francisco County, California, National Register #14000150.

Interviews

Albert J. Di Paolo, Chief Mechanical Officer, California State Railroad Museum. Sacramento, California (February 26, 2020).

**HISTORIC PRESERVATION CERTIFICATION APPLICATION
PART 1 – EVALUATION OF SIGNIFICANCE**

Property name Sacramento Shops Historic District NPS Project Number _____
Property address 111 I Street Sacramento Sacramento CA 95814-2204

7. Photographs and Maps, cont.



Figure 1. Sketch map depicting historic district boundary and location of contributing resources; boundary of property owned by DRV; location of water tower (outside of historic district boundary); and boundary of property owned by the State of California. The State of California currently owns property including the Boiler Shop and Turntable and leases the Erecting/Machine Shop from DRV. Background image Google Maps, May 2018.



Figure 2. Sketch map depicting district boundary and contributing resources. Background image Google Maps, May 2018. The dotted line denotes the district boundary; solid lines denote contributing resources.

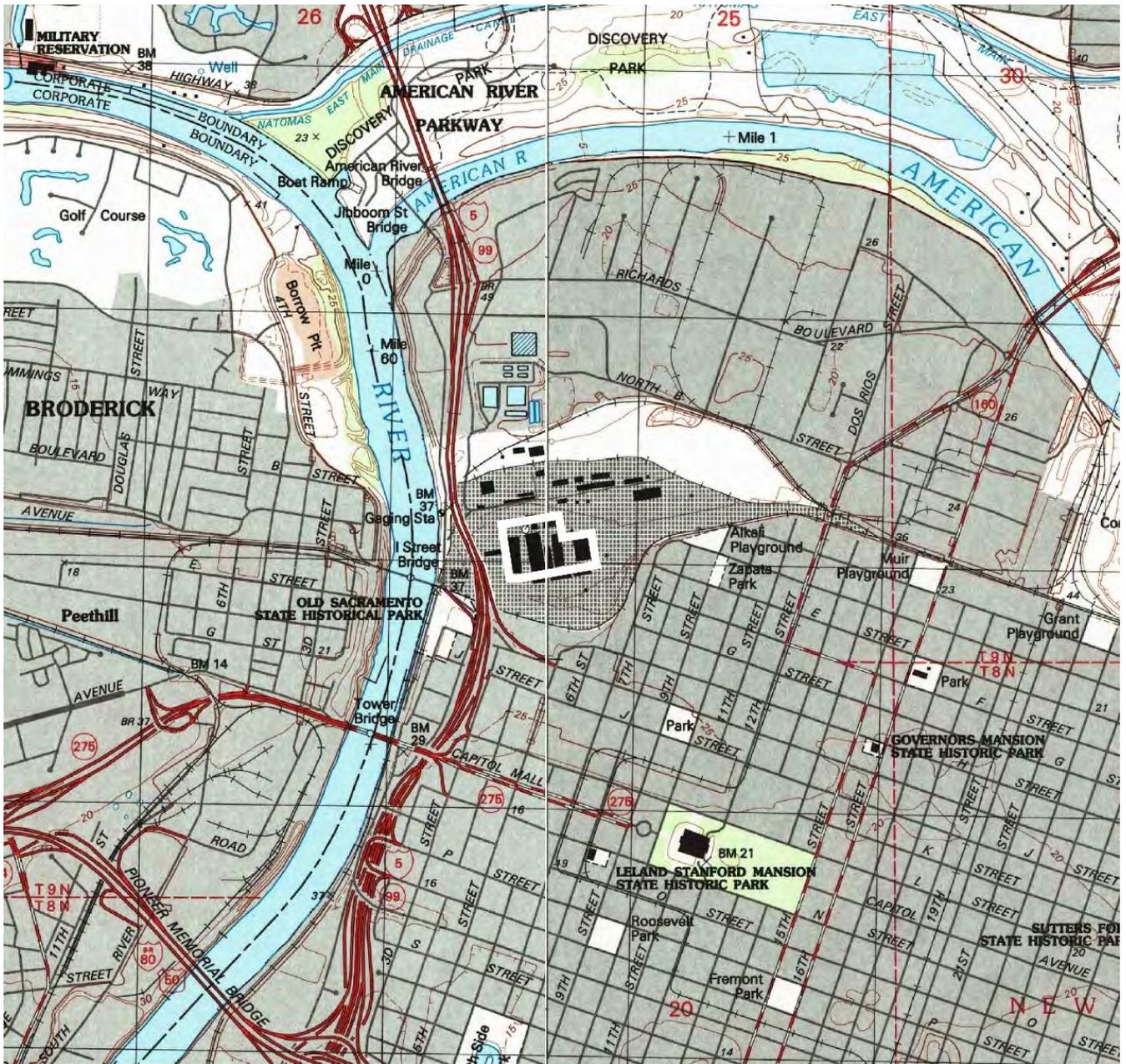


Figure 3. Sacramento Shops Historic District Location Map, USGS Topographic Map (Sacramento East Quadrangle, 1992; Sacramento West Quadrangle, 1992).

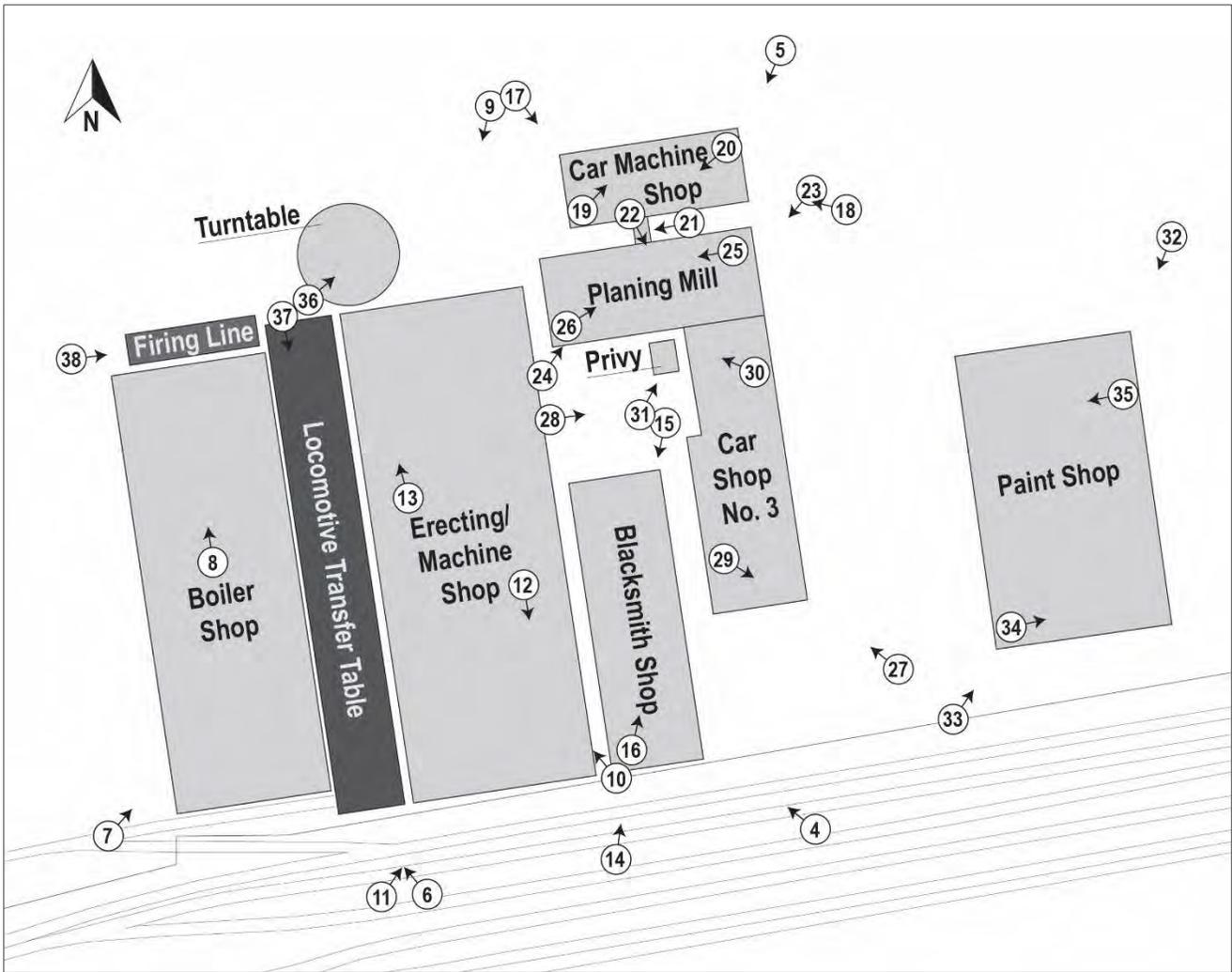


Figure 4. Photo Key. Light gray footprints denote contributing resources and dark gray footprints denote noncontributing resources. Circles indicate the location from which photographs were taken, and arrows denote camera direction.



Figure 5. View of Erecting/Machine shop (left) and Blacksmith Shop (right), looking northwest (corresponds to hardcopy photo 1 of 35).



Figure 6. View of Car Shop No. 3 (left), Planing Mill (center) and Car Machine Shop (right), looking southwest (corresponds to hardcopy photo 2 of 35).



Figure 7. View of south and east façades, Boiler Shop, looking northwest (corresponds to hardcopy photo 3 of 35).



Figure 8. View of west façade, Boiler Shop, looking northeast (corresponds to hardcopy photo 4 of 35).



Figure 9. View of Boiler Shop interior, looking north (corresponds to hardcopy photo 5 of 35).



Figure 10. View of north façade, Erecting/Machine Shop, looking southwest (corresponds to hardcopy photo 6 of 35).



Figure 11. View of east façade, Erecting/Machine Shop, looking northwest (corresponds to hardcopy photo 7 of 35).



Figure 12. View of west and south façades, Erecting/Machine Shop, looking northeast (corresponds to hardcopy photo 8 of 35).

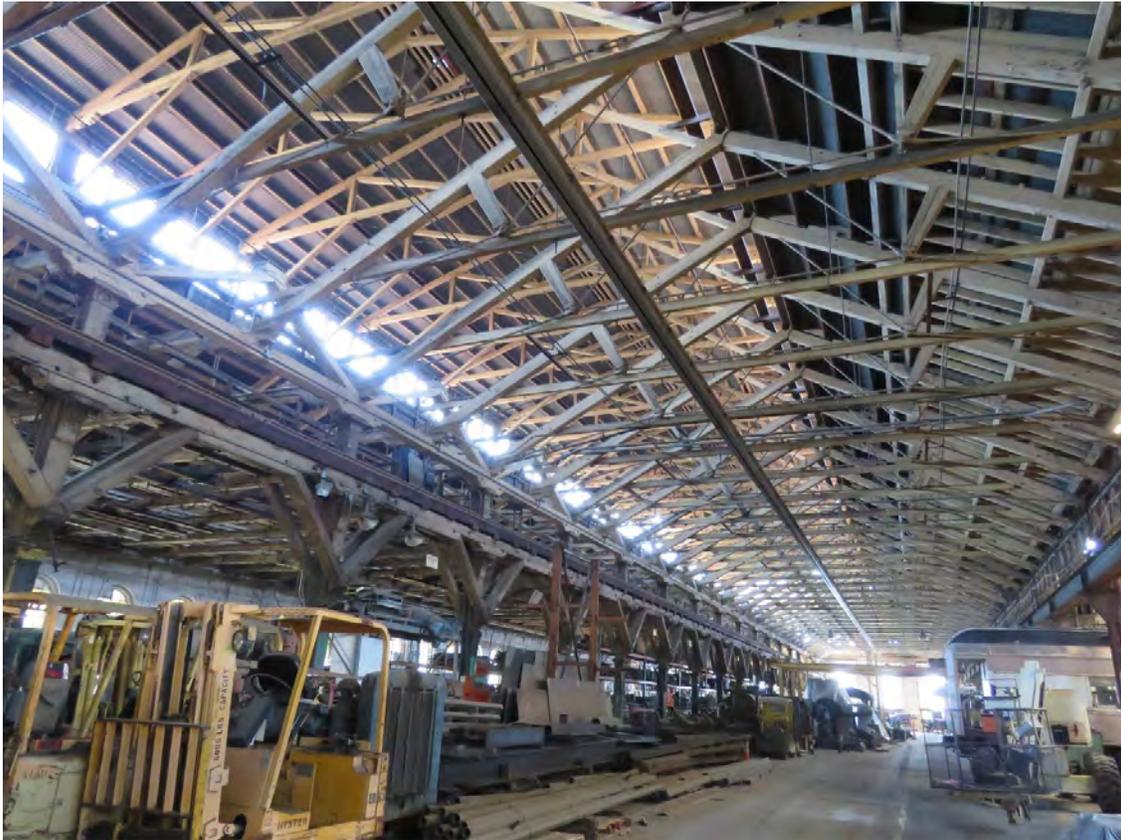


Figure 13. View of interior of eastern half, Erecting/Machine shop, looking south (corresponds to hardcopy photo 9 of 35).



Figure 14. View of interior of western half, Erecting/Machine shop, looking north (corresponds to hardcopy photo 10 of 35).



Figure 15. View of west and south façades, Blacksmith Shop, looking northeast (corresponds to hardcopy photo 11 of 35).



Figure 16. View of east and north façades, Blacksmith Shop, looking southwest (corresponds to hardcopy photo 12 of 35).



Figure 17. View of Blacksmith Shop interior, looking north (corresponds to hardcopy photo 13 of 35).



Figure 18. View of north and west façades, Car Machine Shop, looking southeast (corresponds to hardcopy photo 14 of 35).



Figure 19. View of south and east façades, Car Machine Shop, looking northwest (corresponds to hardcopy photo 15 of 35).



Figure 20. View of first floor interior, Car Machine Shop, looking northeast (corresponds to hardcopy photo 16 of 35).



Figure 21. View of second floor interior, Car Machine Shop, looking southeast (corresponds to hardcopy photo 17 of 35).



Figure 22. View of Bridge connecting Car Machine Shop and Planing Mill, looking west (corresponds to hardcopy photo 18 of 35).



Figure 23. View of Bridge interior, looking south-southeast (corresponds to hardcopy photo 19 of 35).



Figure 24. View of east and north façades, Planing Mill, looking west-southwest (corresponds to hardcopy photo 20 of 35).



Figure 25. View of west and south façades, Planing Mill, looking northeast (corresponds to hardcopy photo 21 of 35).

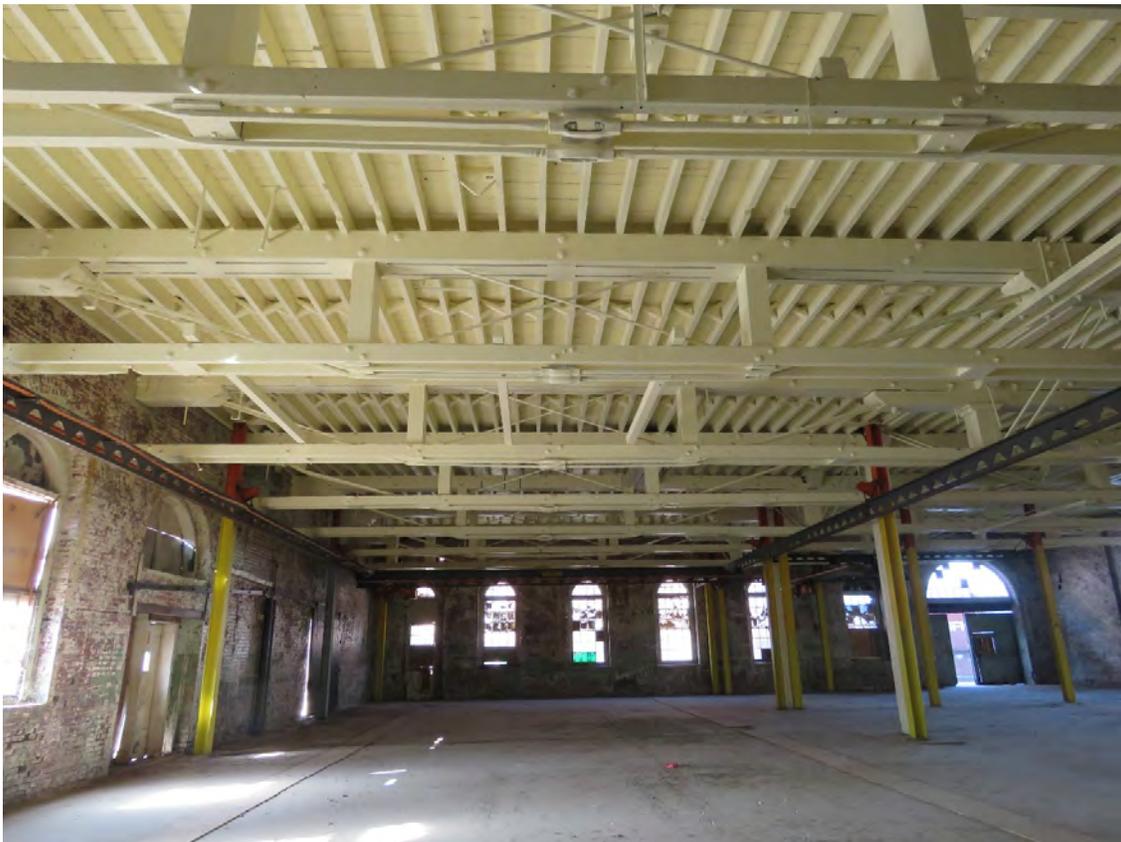


Figure 26. View of first floor interior, Planing Mill, looking west (corresponds to hardcopy photo 22 of 35).



Figure 27. View of second floor interior, Planing Mill, looking northeast (corresponds to hardcopy photo 23 of 35).



Figure 28. View of south and east façades, Car Shop No. 3, looking northwest (corresponds to hardcopy photo 24 of 35).



Figure 29. View of northern portion of west façade, Car Shop No. 3, looking east (corresponds to hardcopy photo 25 of 35).

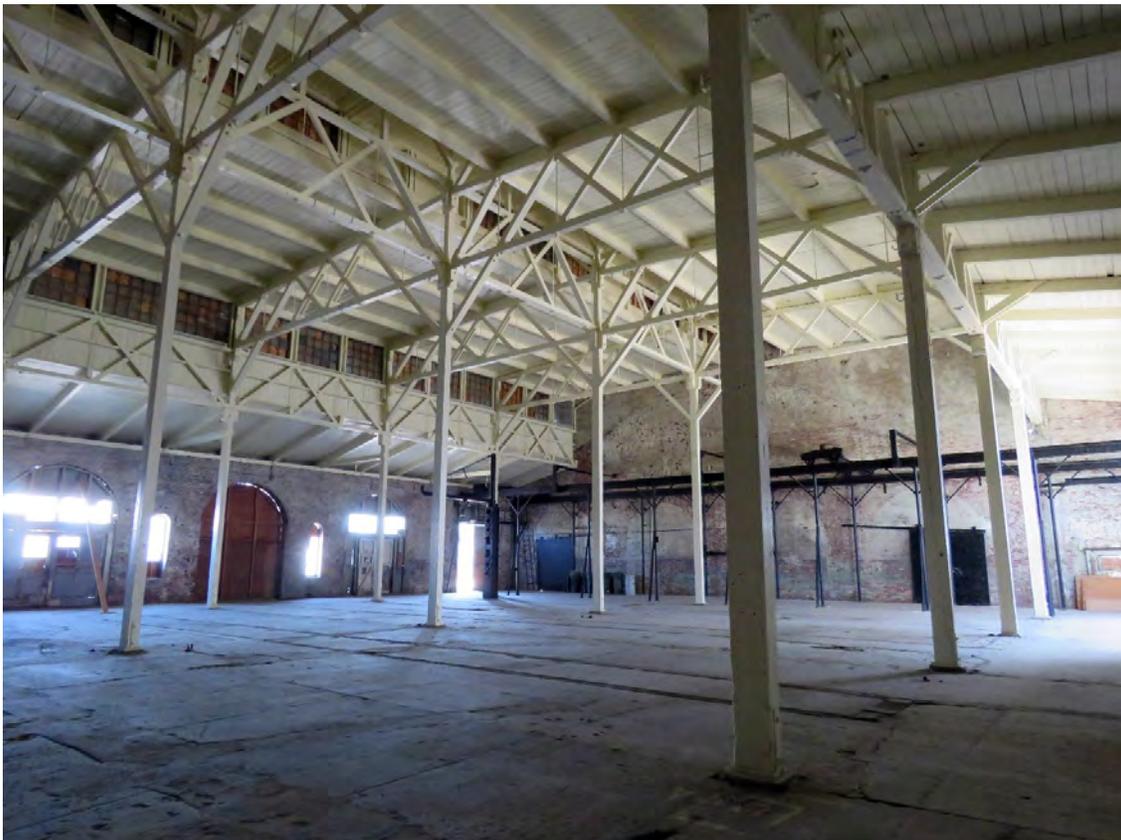


Figure 30. View of southern portion interior, Car Shop No. 3, looking southeast (corresponds to hardcopy photo 26 of 35).



Figure 31. View of northern portion interior, Car Shop No. 3, looking northwest (corresponds to hardcopy photo 27 of 35).



Figure 32. View of west and south façades of Privy, looking northeast (corresponds to hardcopy photo 28 of 35).



Figure 33. View of east and north façades, Paint Shop, looking southwest (corresponds to hardcopy photo 29 of 35).



Figure 34. View of west and south façades, Paint Shop, looking northeast (corresponds to hardcopy photo 30 of 35).



Figure 35. View of Paint Shop interior, looking east (corresponds to hardcopy photo 31 of 35).



Figure 36. View of covered alley, Paint Shop, looking west (corresponds to hardcopy photo 32 of 35).



Figure 37. View of Turntable and Turntable Pit, looking northeast (corresponds to hardcopy photo 33 of 35).



Figure 38. View of reconstructed Transfer Table, looking south (corresponds to hardcopy photo 34 of 35).



Figure 39. View of Firing Line, looking east (corresponds to hardcopy photo 35 of 35).

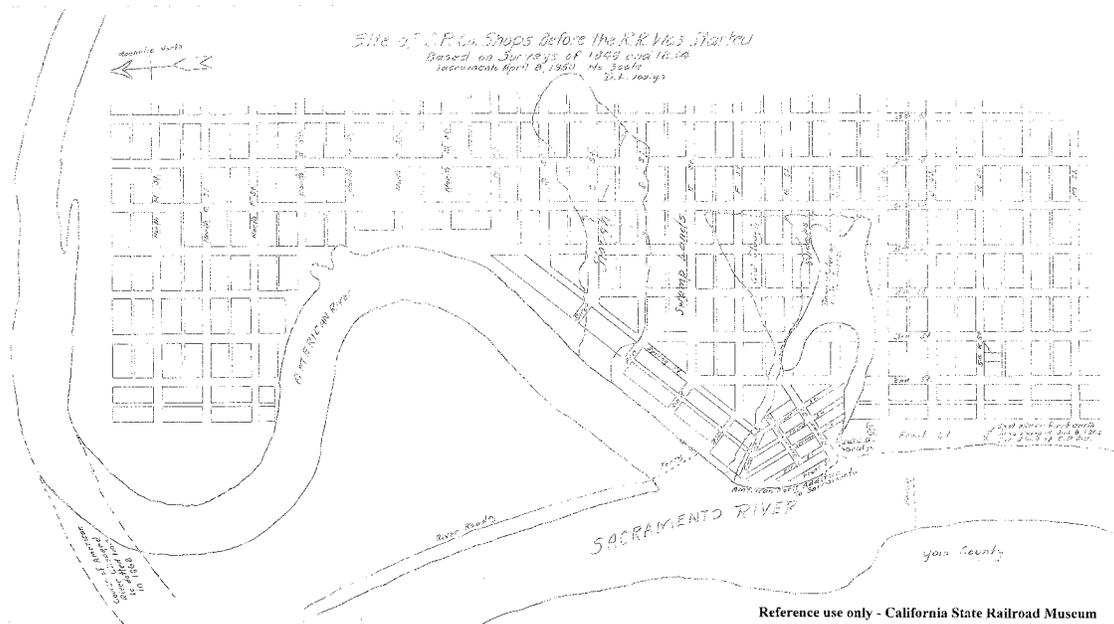


Figure 40. Sketch map depicting the site ca. 1854, prior to construction of the Central Pacific Railroad and the Sacramento Shops (David Joslyn, 1950).

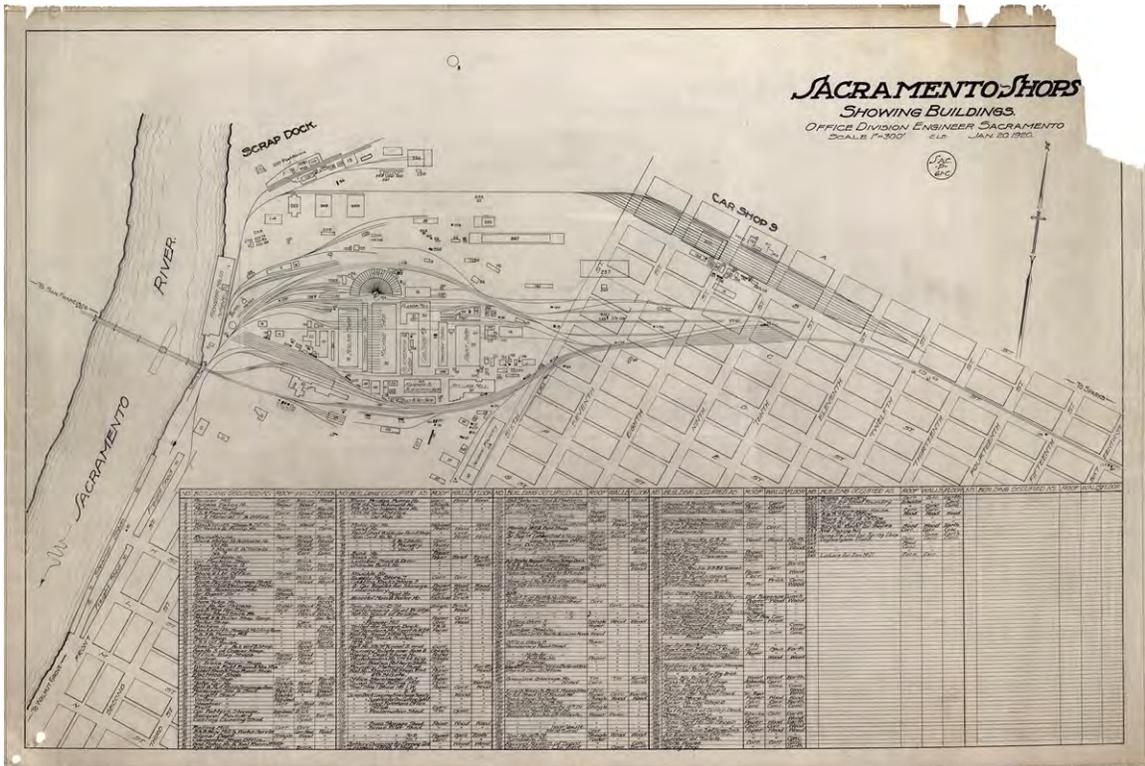


Figure 41. Map of the Sacramento Shops (1920).



Figure 42. Aerial view of the Sacramento Shops, facing northeast (1925).

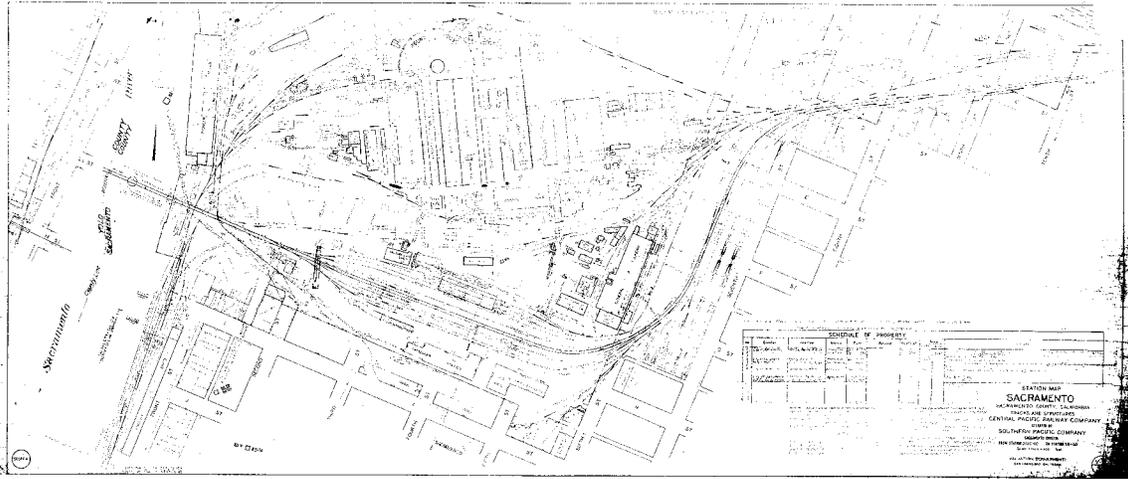


Figure 43. Map of the Sacramento Shops approaching full build-out (1926).



Figure 44. Aerial view of the Sacramento Shops at the end of the period of significance (1947).

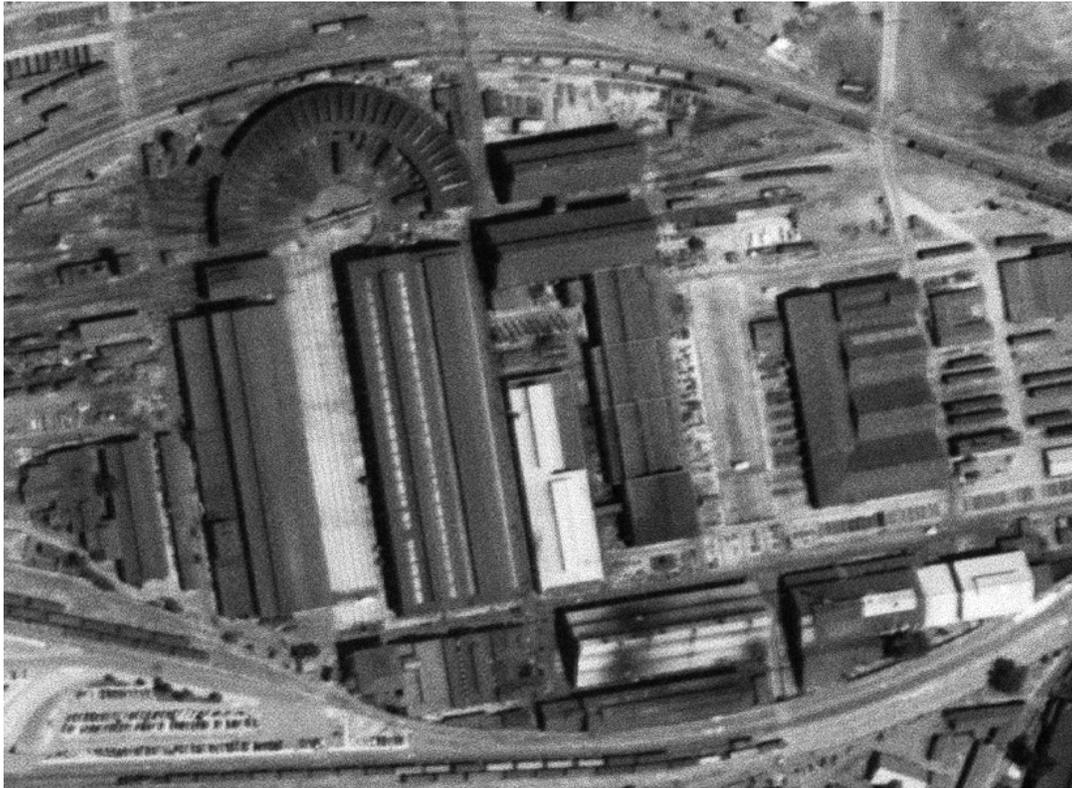


Figure 45. Detail view of previous figure (1947 aerial) showing the district at the end of the period of significance.



Figure 46. From left to right: view of Blacksmith Shop, Power House (no longer extant), Planing Mill, Privy, and Car Shop No. 3, facing north (1870s). Note the original brick walls of the Blacksmith Shop and the board-and-batten-clad southern wall of Car Shop No. 3.



LIBRARY

Figure 47. From left to right: view of Car Shop No. 3 and eastern façade of Planing Mill, facing northwest (1873). This photograph was captured prior to the 1898 fire that damaged the Planing Mill and the 1916 fire the damaged Car Shop No. 3.



LIBRARY

Figure 48. View of Roundhouse and Turntable, facing north (1874). The Roundhouse was removed in 1959 as part of the Southern Pacific Company's transition from steam locomotives to diesel.



Figure 49. From left to right: view of Turntable, Planing Mill and Erecting/Machine Shop, facing southeast (1883). The water tank visible on the western side of the Planing Mill roof collapsed in a fire in 1898.

Note that the major addition covering the western façade of the Erecting/Machine Shop was not constructed until 1904-1905. The locomotive on the Turntable is El Gobernador, which was constructed at the Sacramento Shops. At 154,000 pounds, it was the largest steam locomotive in the world at the time it was completed.



Figure 50. Car Machine Shop following a major fire in November 1898, view northwest. The Car Machine Shop and Planing Mill were both impacted by the fire, which originated in the second floor of the Car Machine Shop. Both buildings were reconstructed on their original foundations by the end of the following year.



Figure 51. From left to right: view of Boiler Shop, Roundhouse (no longer extant) and Turntable, Locomotive Transfer Table, and Erecting/Machine Shop, facing north (ca. 1910).

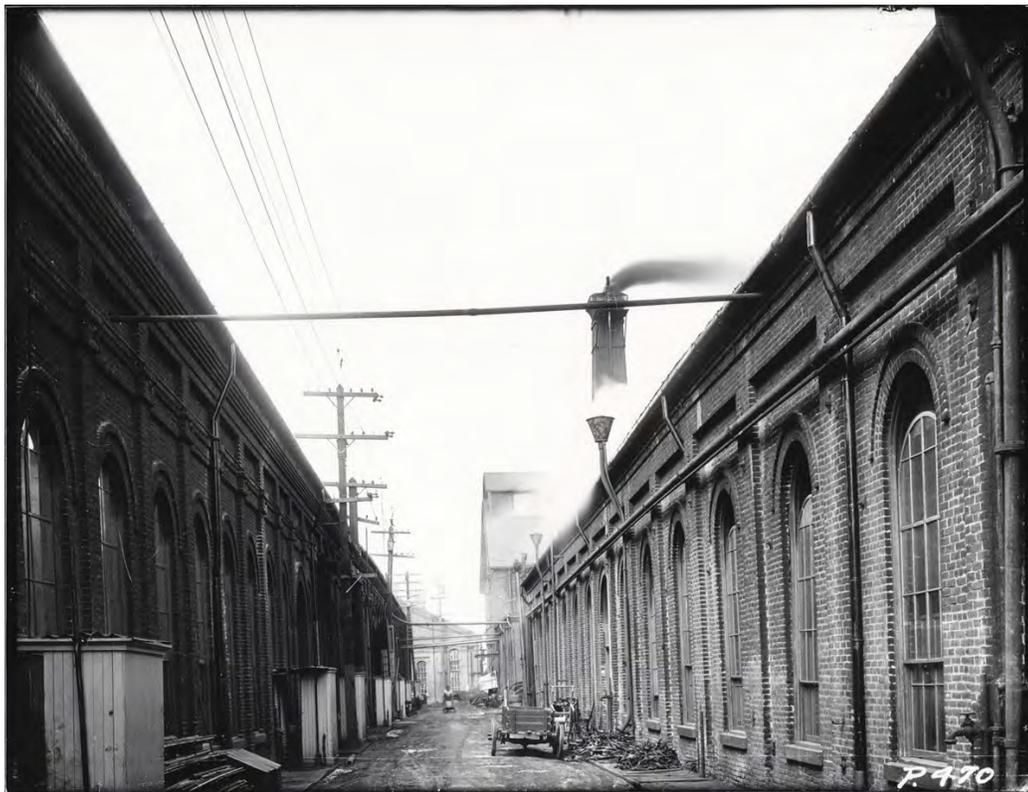


Figure 52. View of Erecting/Machine Shop (left) and Blacksmith Shop, facing north, with the Roundhouse (no longer extant), Planing Mill and Power House visible in the distance (1910s). The brick walls and arched windows of the Blacksmith Shop were replaced with reinforced concrete walls with rectangular steel windows in 1927 and 1939. The brick chimney of the Power House (visible behind the Blacksmith Shop) was removed in 1940.



Figure 53. Celebration of the arrival of the Southern Pacific's first 3-cylinder compound 4-10-2 class locomotive in the 1920s. In the background, from left to right: both ends of the Roundhouse (no longer extant), the Car Machine Shop, the Planing Mill, and the northwestern corner of the Erecting/Machine Shop, facing east.



Figure 54. View of Boiler Shop interior during the steam era (undated).

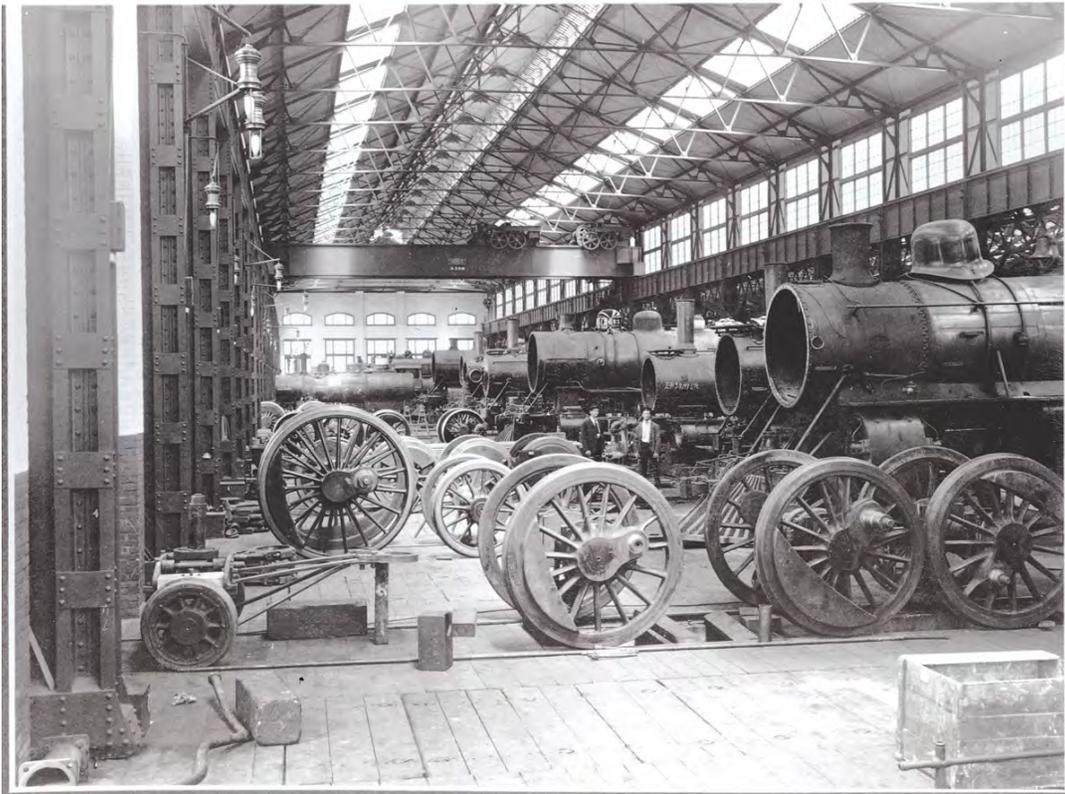


Figure 55. View of Erecting/Machine Shop interior during the steam era (undated).



Figure 56. From left to right: view of Blacksmith Shop, Planing Mill, and Car Shop No. 3 (1939). The southern portion of the Blacksmith Shop had been renewed with reinforced concrete walls in 1929, and the addition to the northern portion is under construction in this photograph. The brick chimney of the Power House was removed in 1940, approximately one year after this photograph was taken.