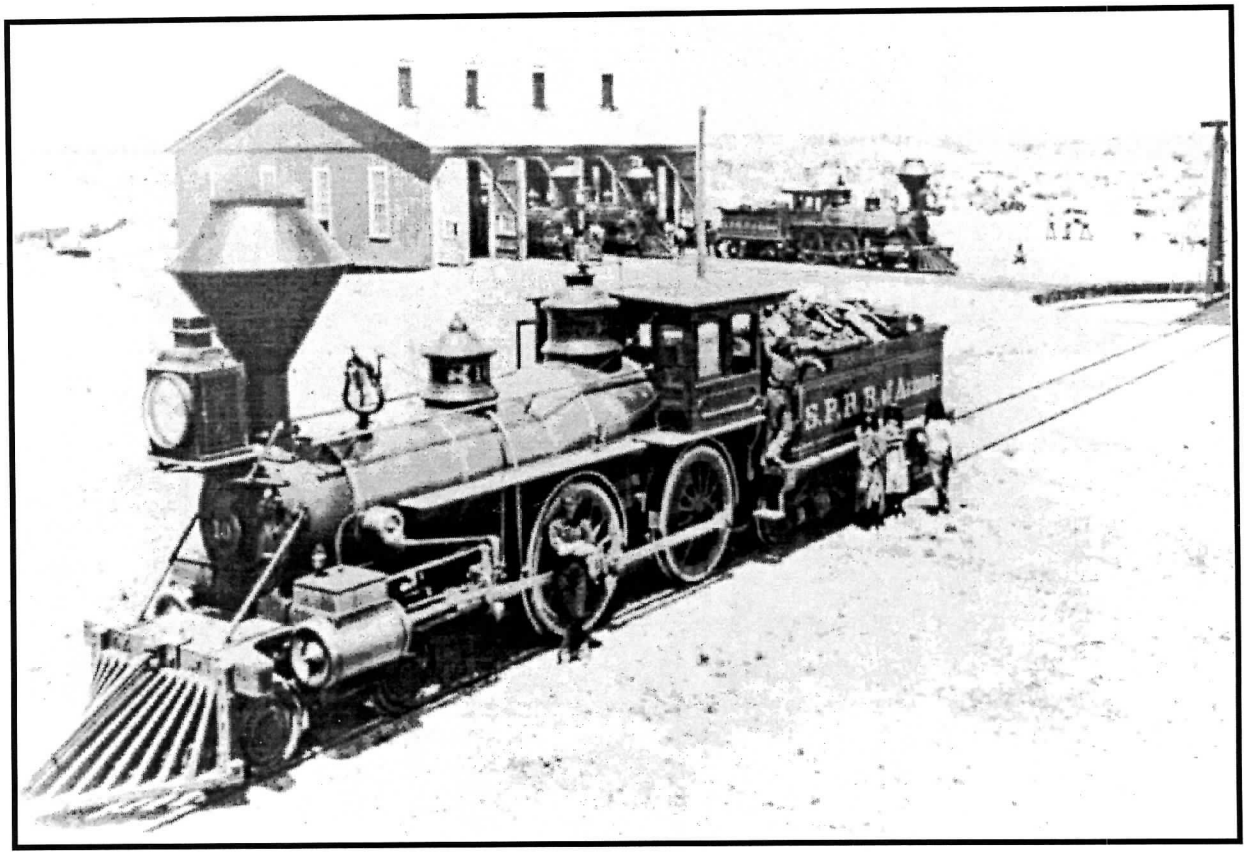
TRANSCONTINENTAL RAILROADING IN ARIZONA 1878-1940



A Component of the Arizona Historic Preservation Plan

prepared for:
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Arizona State Parks Board
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Arizona State Parks

TRANSCONTINENTAL RAILROADING IN ARIZONA 1878-1940

A Context for Preserving Railroad Related Properties

December 15, 1989

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To a Locomotive in Winter

THEE for my recitative,
Thee in the driving storm even as now, the snow, the winter-day declining,
Thee in thy panoply, thy measur'd dual throbbing and thy beat convulsive,
Thy black cylindric body, golden brass and silvery steel,
Thy ponderous side-bars, parallel and connecting rods, gyrating,
shuttling at thy sides,
Thy metrical, now swelling pant and roar, now tapering the distance,
Thy great protruding head-light fix'd in front,
Thy long, pale, floating vapor-pennants, tinged with delicate purple,
The dense and murky clouds out-belching from thy smoke-stack,
Thy knitted frame, thy springs and valves, the tremulous twinkle of thy wheels,
Thy train of cars behind, obedient, merrily following,
Through gale or calm, now swift, now slack, yet steadily careering;
Type of the modern--emblem of motion and power--pulse of the continent,
For once come serve the Muse and merge in verse, even as here I see thee,
With storm and buffeting gusts of wind and falling snow,
By day thy warning ringing bell to sound its notes,
By night thy silent signal lamps to swing.

Fierce-throated beauty!
Roll through my chant with all thy lawless music, they swinging lamps at night,
Thy madly-whistled laughter, echoing, rumbling like an earthquake, rousing all,
Law of thyself complete, thine own track firmly holding,
(No sweetness debonair of tearful harp or glib piano thine,)
Thy trills of shrieks by rocks and hills return'd,
Launch'd o'er the prairies wide, across the lakes,
To the free skies unpent and glad and strong.

WALT WHITMAN

GENERAL INTRODUCTION

As the great steel web of railroad systems tied the coasts together, Americans cheered, and saw their destiny made visible. Wilderness and civilization were converging as the steam engine, the ultimate symbol of technological achievement became, as Walt Whitman characterized it in "To a Locomotive in Winter," the "pulse of the continent." It seemed an organic, living entity which could express not only the ordered, precise, "metrical" manufacturing world, but also the "free skies unpent," the prairies wide," of the western American landscape.

This landscape now began to take a new form from the passage of the railroad. Almost every town site within the railroads' generous land grants was planned and promoted by engineers of the railroad companies, and was often named for railroad officials or financiers. Pre-railroad towns were affected too, welcoming a boom as the main line came through, or witnessing a decline as the new artery of transportation passed them by. Transcontinental railroads became both a means and a measure of western expansion. Subsistence farming, always rare in the west, gave way entirely to cash-creating production. The colonial status of western states prevailed; the railroad stimulated exploitation of raw materials, new agricultural products and natural resources, while manufacturing was still carried on in the populated, industrialized east and mid-west.

The railroads played their part not only in the formation of towns and development of the vast western natural resources, but also in defining a new American attitude toward the west. As travelers hastened in comfort and speed to the dramatic mountain, desert, and canyon scenery, and as railroad promotion, both visual and verbal encouraged travel to western wonders, the west became not only an escape from dirty, crowded cities, but an answer to European monuments of cultural continuity, and a symbol of American energy and progress.

In Arizona the transcontinental railroads profoundly influenced nearly every aspect of the development of the territory. Although railway companies initially saw Arizona as empty space to be crossed, they soon set to work to bring settlers who would produce marketable freight--livestock, ore, lumber, agricultural products--and to encourage tourists to travel to the unparalleled natural wonders of the region. The territory grew in response to the mainline railroads, a pattern which is still visible today.

As we observe the tangible and persistent elements of the transcontinental railroads in Arizona in the last decade of the twentieth century, we can see some of the hundred-year-old pattern of economic successes and failures, the strong presence of railroads in the rigid grid layouts of some towns, the abandonment or maintenance of operations in response to technology and finance, and the powerful claim on the imaginations of young and old that railroads still enjoy. It is appropriate at this time to take a close look at the historical background and material record of Arizona's transcontinental railways.

This in-depth analysis of a theme important in Arizona history is designed to help readers learn about transcontinental railroads and their material legacy. The study is a Planning Module (or "historic context study") of the State Historic Preservation Plan. The first section of this report, focusing on the history and physical development of the railroads, provides a basis for understanding the diversity of property types associated with them. To measure how well (or poorly) Arizona is doing in recognizing the preserving these properties, information is then tabulated about known (inventoried) versus predicted (from historical records) properties in the state. The latter data set will be especially useful to researchers conducting cultural resource investigations along the routes of Arizona's transcontinental lines. The data base is then assessed in the "Information Gaps" and Current State of Preservation" sections. Concluding sections provide perspectives on the significance and integrity of railroad properties and suggest goals and strategies the State Historic Preservation Office can take to manage these resources wisely.

HISTORY OF TRANSCONTINENTAL RAILROADING IN ARIZONA, 1878-1940

PART I: INTRODUCTION

The development and construction of transcontinental railroad lines across Arizona during the years from 1878 to 1883 needs to be viewed in the context of national expansion. On its own, Arizona Territory could neither justify nor support the building of such an expensive transportation system. Although the transcontinental railroads provided the territorial economy with a much needed boost and even pushed the area toward statehood, early railroading in Arizona was the means to an end. The Territory seemed unlikely to produce much revenue. Railroad officials therefore focused their efforts on crossing Arizona in the most expeditious manner. Their interest was in linking the Pacific with the Mississippi Valley. Nevertheless, the construction of the Southern Pacific and the Atlantic & Pacific (Santa Fe) Railroads proved to be historic milestones in opening Arizona to commercial development.

WESTERN RAILROAD CONSTRUCTION PRIOR TO 1878

The growth of rail transportation brought revolutionary changes to the economy of the United States. In 1827, when the first American railroad began operation, the country was relatively small and undeveloped. By the 1840s railroads had become the predominant form of transportation. More so than canals or wagon roads, railroads were able to rapidly move large quantities of goods to market at relatively low cost. It was no coincidence that the United States entered the industrial age just as railroading took hold. Interest in a transcontinental railway developed as soon as the nation acquired the Trans- Mississippi west and the Pacific coast during the 1840s. The California gold rush of 1849 dramatically pointed out the need for rail links to the Pacific. The land and sea routes available to `49ers to transport mail, manufactured goods, and people to California proved slow, cumbersome, and expensive. The best stage coach line, for example, required 25 days to cover the 2,812 miles from Tipton, Missouri to San Francisco; freight took more than six months. Because of these difficulties, Americans demanded a transcontinental railroad. By the mid-1850s Congress agreed. The magnitude of such an undertaking, however, prevented any quick action.

Who would pay for such an expensive railroad? Private capital was reluctant to invest in a transcontinental railway, realizing that most of the land between the Missouri River and the Pacific was vacant and unproductive. Little revenue could be generated to support such a railroad. Eventually it became evident that the federal government must subsidize the undertaking. Even the most vocal opponent of federal aid recognized that a Pacific Railway could not be built by any other means. By the late 1850s Congress was ready to provide the necessary financial support, but the impending

sectional crisis intervened. The federally sponsored railway surveys of 1853-54 had discovered five practical routes across the continent. Unfortunately, southern partisans wanted a southern (32nd parallel) route, while northerners demanded that the line go via South Pass, Wyoming. Not until the Civil War removed southern politicians from Congress could the deadlock be ended. With the south absent, Congress rapidly approved the financing of a Pacific Railway running from Omaha across South Pass to San Francisco.

On July 1, 1862, Congress passed the Pacific Railway Act, providing for the construction of the nation's first transcontinental railroad. To be completed by two separate companies--the Central Pacific and the Union Pacific--the legislation provided several types of subsidies. Land grants gave the companies long term compensation for their troubles. Each road was given a 400-foot right-of-way, plus ten (later increased to twenty) alternating sections of land on each side of the track for every mile completed. These lands could be sold by the companies to raise money and repay investors. Because the land grants did not provide an immediate source of cash, the government also lent the railroads between $16,000 and $48,000 per mile of track built depending on terrain.

Construction of the Central Pacific eastward began at Sacramento in 1863. Construction of the Union Pacific towards the west started from Omaha a year later. Little was accomplished, however, until after the Civil War, when both companies began to rush towards each other in a frenzied effort to get as much federal land and money as possible. Between 1867 and 1869 construction crews worked at a feverish pace, putting down as much as ten miles of track in one day. In the process they developed a basic method for long distance railroad construction. First surveyors were sent out far in advance to find the proper alignment, map the route, position curves, adjust gradients, and establish the center line of the track. The surveyors were frequently aided in their work by earlier government surveys which had already found the most practical routes across the continent. Nevertheless, the survey teams faced a difficult and demanding task, their small parties exposed to Indian attack, faced with a hostile environment, and forced to cope with unexpected conditions. The surveyors were followed by grading crews. Some of these workers came from the local area. The Mormons from Salt Lake City, for example, fell into this category; others, such as the Irish and Chinese were imported for the purpose. It was the task of the graders to clear brush and trees from the right-of-way, make cuts and fills, build bridges and trestles, and grade the roadbed. Their work would preferably be completed more than 30 miles in advance of the railhead so that tracklayers might face no delay. Rapid tracklaying became an art of the CP-UP line. Under the leadership of the Casement Brothers, the Union Pacific prepared construction materials at its main base at Omaha. All necessary rails, spikes, and hardware were sent to the front in special trains. At the railhead loads of ties were set well in front of the tracklayers, while a few miles to the rear, rails were unloaded, pulled into place, and spiked down, thereby completing another 30-foot section.

Construction camps were located at strategic spots. Most camps were short-lived tent cities where men and livestock stayed during temporary lulls in work. More substantial camps were needed at major supply posts and for contractors working on long term projects such as bridges and tunnels. Because big projects might require up to a year to complete, contractors provided simple comforts for their men. Most construction camps were notorious for their wild atmosphere as merchants, gamblers, prostitutes, and liquor dealers came in to help relieve the workers of their wages.

Nevertheless, most such camps were temporary and vanished once the work was completed, leaving in their wake only scattered refuse. Some of the more substantial supply camps, however, did grow into cities. Such towns as Cheyenne, Laramie, and Green River were originally construction camps. These had the advantage of such resources as water or coal, or were to become railroad division points, where stations and engine facilities were needed.

Through such feats of financing, engineering, and construction was the first transcontinental line completed. In May 1869 the Central Pacific and Union Pacific met at Promontory, Utah. Although the nation celebrated the driving of a golden spike, it soon became evident that additional transcontinental lines would be built. Ambitious men were already planning other railroads, two of which would eventually cross Arizona.

EARLY TRANSPORTATION ROUTES IN ARIZONA

The two routes destined to be used by the transcontinental railroads in Arizona were well known long before 1878. From the beginning of the American period in the southwest, there was considerable interest in finding the most practical way of crossing Arizona in order to reach the Pacific Coast. As Arizona itself grew in population it attempted to encourage the development of east-west links as a means of promoting economic development. As residents well knew, before any significant growth could occur there needed to be an economical method of importing manufactured goods and shipping raw materials to market. As early as 1850 it was obvious that two general routes, one in the south roughly following the 32nd parallel and the other across northern Arizona along the 35th parallel, might be used for transcontinental railroading. Arizona seemed especially well suited for a major transportation link because its geography avoided the costly necessity of crossing the Rocky Mountains. This became even more evident in 1854 when the United States concluded the Gadsden Purchase, acquiring southern Arizona from Mexico for the specific purpose of securing a preferred railroad route.

American military forces headed for California opened the extreme southern route during the war with Mexico (1846-48). Both General Stephen W. Kearny and Colonel Philip St. George Cooke took their troops into California along the lower portions of the Gila River. Their trailblazing efforts paved the way for the thousands of Argonauts that headed for the gold fields of California in the years after 1848. Although these emigrants used a variety of routes to reach Tucson, they usually followed the Santa Cruz River west of the "Old Pueblo" to its juncture with the Gila, then headed downstream to Yuma Crossing and into California. By the late 1850s the southern overland route, well known for its reasonable weather and lack of mountains, had seen well over 50,000 travelers.

As American interests in the southwest became more significant, the federal government employed the army's topographical engineering corps to explore the region. Apart from the general quest for knowledge, the military explorers consciously examined the possibilities for a railway line. By 1855 official explorations had uncovered the best routes across Arizona. It started in 1851 when Captain Lorenzo Sitgreaves led a group of men across the 35th parallel route, mapping the vast expanse of northern Arizona that now stretches between Winslow, Flagstaff, and Kingman.

Sitgreaves was followed in 1853-54 by an army party specifically charged by Congress with surveying a railroad route to the Pacific via the 35th parallel. Led by Lieutenant Amiel W. Whipple, this group made a careful reconnaissance of the country between the Zuni villages and the Colorado River. After reaching the Colorado River near Needles, California, Whipple continued on to Los Angeles, thus pioneering a route all the way to the coast. The report of Lt. Whipple, published in 1856, contained extensive maps and surveys. It also expressed great enthusiasm for northern Arizona, proclaiming it to be a natural route through lands destined for rapid settlement.

Meanwhile, the government assigned Lieutenant John C. Parke to collect information about the 32nd parallel route, especially that portion of the country between the Pima Indian villages and El Paso. Parke's expedition set out in January 1854 and found several acceptable routes east of Tucson, reporting that a lack of timber and water presented the biggest drawback to constructing a railroad. However, the terrain was relatively flat and construction crews were unlikely to encounter many engineering obstacles. Like Whipple, Parke gave his route a favorable recommendation. In 1855, Andrew B. Gray, a southern sympathizer employed by the Texas Western Railroad Company, made an independent survey of the southern route that confirmed Parke's observations. Gray's greatest variation was the recommendation that the route east of Tucson go through Apache Pass. West of Tucson, the Gray survey followed the already well known path through the Pima Villages and down the Gila Valley to Yuma. Although the Texas Western failed to build its railroad, the Gray survey route was generally the same one chartered by the Texas & Pacific in 1871 and built over by the Southern Pacific less than a decade later.

By the late 1850s, the two most practical east-west railroad routes across Arizona had been all but determined. Both had been surveyed by the army, traveled over by emigrants, and attracted the interest of private developers. However, pre-Civil War sectional feuding and a lack of financing prevented the construction of a railway along either alignment for another quarter century. In the interval, the routes were used as wagon and stage roads. Realizing that the north-south political split then tearing the nation apart would prevent federal support for a railroad, Congress authorized the construction of wagon roads as an interim solution. In 1858 Jesse B. Leach began construction of an eighteen-foot wide wagon road across southern Arizona. The Leach Wagon Road generally followed Parke's route, although with some modifications east of Tucson. From Maricopa Wells westward it followed the already well established Gila Valley route.

The 32nd parallel road quickly became the major transportation corridor through Arizona. To meet the demand for public transportation, stagecoach lines operated almost as soon as the road became useable. The first coach line across Arizona began in July 1857, following the route from El Paso to Yuma via Tucson. Known as the "Jackass Mail," the San Antonio and San Diego Stage Company sporadically carried passengers and mail for about a year. It was followed by the Butterfield Overland Mail, the first dependable transcontinental stage line. Beginning operations on September 18, 1858, the Overland Mail hauled passengers and mail from Tipton, Missouri, to San Francisco, using the 32nd parallel route through Tucson, the Pima villages, and Yuma. The company built some sixteen stage stations at strategic intervals along its 437 route miles in Arizona. With only a few exceptions, the Butterfield coaches followed the route later used by the Southern Pacific Railroad. Indeed, many early SP stations had once been Butterfield stage stops. Unfortunately, the Civil War forced the Overland Mail line

to move north and a transcontinental stage line never reappeared in the southwest. Nevertheless, the route remained well used. Once the necessary financing became available, railroad moguls would look toward southern Arizona as a practical way to cross the continent.

In the north, the army undertook the responsibility for constructing a wagon road from Fort Defiance to the Colorado River along the 35th parallel. This effort came in response to demands from California bound emigrants for better roads. In 1857 ex-Navy Lieutenant Edward F. Beale was chosen to build a road from Fort Defiance to California. Beale's effort gained additional significance because of his experimental use of camels. The resulting Beale Wagon Road followed the Little Colorado River, crossed Canyon Diablo, tracked somewhat north of the future towns of Flagstaff and Williams, then stretched on to the Colorado River near the current site of Bullhead City. In 1859 a second Beale expedition significantly improved the original road. During this era of road construction, Lieutenant Beale realized that a railroad line across northern Arizona must inevitably follow in his steps. This assumption proved correct when the Atlantic & Pacific Railroad was chartered in 1866 to follow the Beale route.

PART II: SOUTHERN PACIFIC

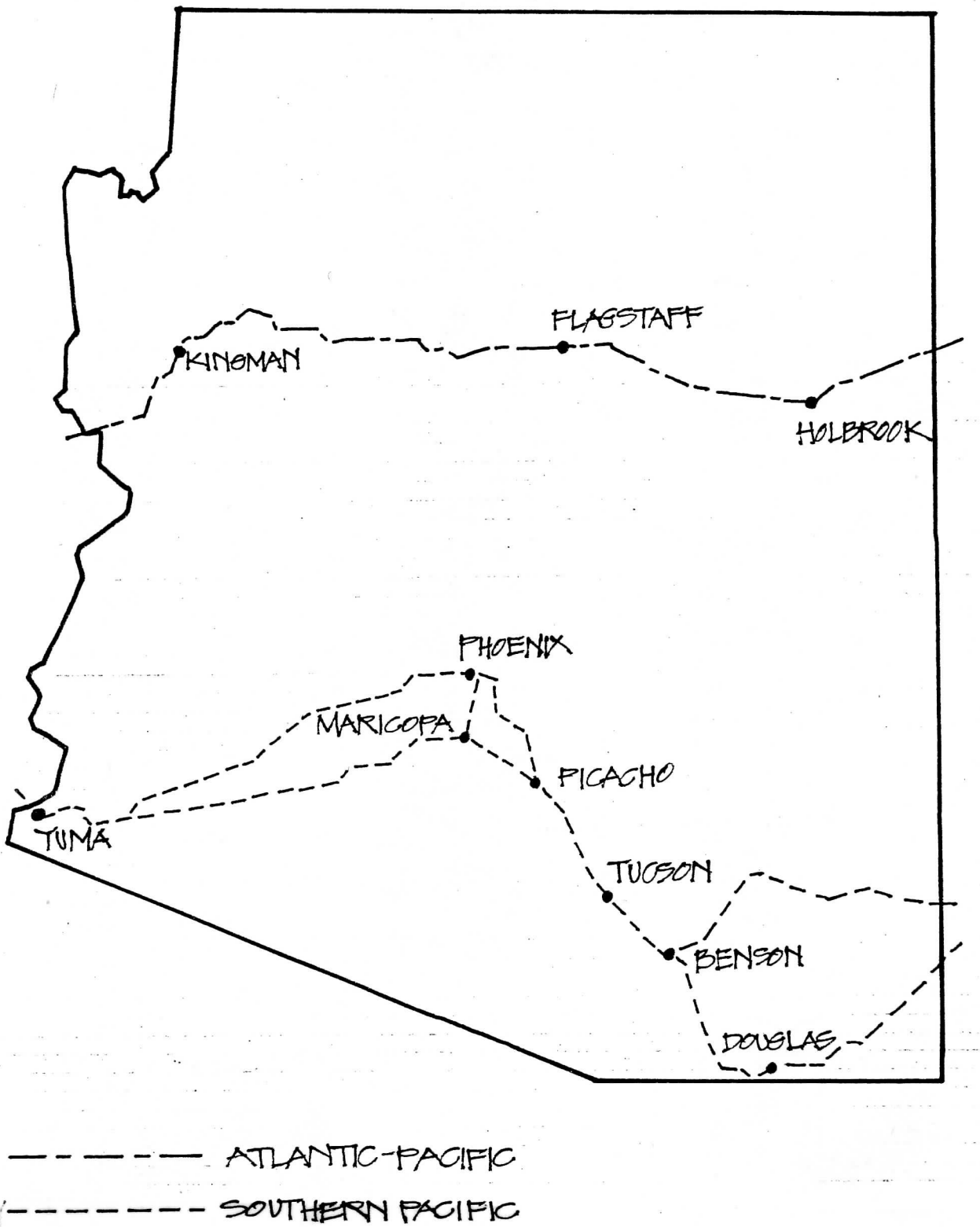
EARLY HISTORY OF THE SOUTHERN PACIFIC RAILROAD

The Southern Pacific Railroad Company was originally founded by the owners of the Central Pacific Railroad to protect their monopoly in California. Known as the "Big Four," Collis P. Huntington, Charles Crocker, Leland Stanford, and Mark Hopkins, had been instrumental in constructing the Central Pacific's portion of the first transcontinental railroad, then using the Central Pacific to build a rail empire in California. By the mid-1870s, when it seemed evident that other transcontinental rail lines were destined to be completed, the Big Four sought to forestall any competitor from penetrating the Golden State by building outward to the major border crossings. Rival companies would thus be forced to use Central Pacific rails to do business in California. As a front for the Central Pacific's monopolistic owners, the Southern Pacific was destined to play a major role in protecting the parent company. Somewhat by accident it built a transcontinental line of its own and eventually absorbed the parent Central Pacific.

Independently founded in 1865 to build a railway from San Francisco to the Los Angeles/San Diego area, then on to the Colorado River, the Southern Pacific originally planned to connect with a then as yet unidentified railway coming from the east. Realizing the strategic value of such a railroad, the Big Four acquired a controlling interest in the Southern Pacific in 1868. As a consequence, when the Texas & Pacific Railroad was chartered in 1871 to build a railway westward along the 32nd parallel route across Texas, New Mexico, and Arizona to the Colorado River, Congress favored the Big Four by providing that the T&P connect with the Southern Pacific at Yuma. During the mid-1870s, construction of the Southern Pacific finally began, with a mainline being built north from Los Angeles into the San Joaquin Valley, where tracklayers met with the Central Pacific at Goshen Junction in September 1876, thereby completing rail links between Los Angeles and San Francisco. Meanwhile, the Southern Pacific began to construct a line to the southeast from Los Angeles, headed for Yuma. Excited by the prospect of being the first Arizona city to have rail connections, the citizens of Yuma voted to provide the Southern Pacific with enough land to construct a station and yards if the first train arrived prior to July 1, 1878.

With this incentive in mind, construction crews continued down the Imperial Valley during the spring of 1877. As the tracklayers neared the Colorado River, the Big Four began to express a desire to continue eastward into Arizona, especially since the Texas & Pacific had barely reached Fort Worth and seemed unable to complete its portion of the line in a timely fashion. Realizing that their expensive line to Yuma would be a valueless branch without transcontinental connections, the Big Four explored the possibility of building their own southern transcontinental line.

Meanwhile, Chinese track gangs finished laying rail to the Colorado River by the end of April and train service between San Francisco and Arizona began operating the next month. Although the Southern Pacific terminal remained on the California side of the river pending completion of a bridge over the Colorado, goods bound for Tucson,



Northern and Southern Transcontinental Railroad Routes across Arizona, Showing Major Realignments and Points of Interest

Prescott, and other destinations poured into Arizona via the railroad. To help move freight and passengers inland the Southern Pacific even purchased several Colorado River steamboats. Bridge work at Yuma began in May 1877, with Chinese crews forming the first roadbed on Arizona soil as they graded the bridge approaches. About the same time, carpenters began to erect a four-stall roundhouse in Yuma. Boldly moving into territory supposedly reserved for the Texas & Pacific soon provoked a protest. Directors of the Texas & Pacific complained to the government that the SP should be prohibited from completing the Yuma bridge. Totally ignoring subsequent orders to halt construction, the Southern Pacific completed the bridge and brought the first train into Yuma on September 30, 1877.

Despite all the hoopla and fanfare, the Southern Pacific obviously lacked authority to build beyond the California border. To overcome this obstacle, the Big Four turned to Congress, hoping for federal authorization (and a federal land grant in Arizona and New Mexico) to proceed eastward until meeting the T&P. To cover up what was obviously a monopolistic venture, the Southern Pacific's management publicly separated itself from that of the Central Pacific. Even this move failed to persuade a Congress suddenly sensitive to charges of corruption and monopoly, and the desired legislation failed to materialize. Undaunted, the Southern Pacific opted to proceed without congressional approval. In a bold step, SP officials turned to the territorial legislatures of Arizona and New Mexico for authorization. After some debate, (and probably a few more bribes) both bodies agreed, and the Southern Pacific prepared to begin construction of a railway across the southern Arizona desert, using the corporate name of Southern Pacific Railroad Company of Arizona. The principal directors of the company were Charles F. Crocker, David D. Colton, A. P. K. Safford, Charles Hudson, and David Neahr, all tied in one way or another to the Central Pacific or Arizona politics.

CONSTRUCTION OF THE SOUTHERN PACIFIC ACROSS ARIZONA

The first phase of construction in Arizona came well before plans to build eastward were finalized. In addition to the bridge across the Colorado River, spur tracks, cattle pens, a variety of maintenance buildings, a fifty thousand gallon water tank, and an engine house were located at Yuma. Meanwhile, railroad surveyors had staked out the line up the Gila Valley as far as Gila Bend following the route used for years by pack mules, freight wagons, and stagecoaches. By October 1878 all was ready. Chief engineer William Hood had stockpiled a large amount of construction materials at Yuma in preparation for a rapid advance eastward. Using techniques pioneered on the Central Pacific and Union Pacific, flat cars were loaded with enough fifty-pound rail, spikes, and hardware to put down 660 feet of track each. As soon as the required outfit cars and Chinese laborers were on hand, the push began. By mid-November 1878 grading crews were in the field about fifteen miles ahead of the tracklayers, who started work on November 18, 1878. Unlike the later Atlantic & Pacific line across northern Arizona, the Southern Pacific handled the grading itself through the subsidiary Pacific Improvement Company, operated by James H. Strobridge. For construction of the Arizona line, Strobridge brought in a force estimated at 1,300 men, all but two hundred of whom were Chinese. This entire entourage traveled eastward as the railhead advanced in a special construction train which consisted of supply, dormitory, kitchen, tool, and powder cars, pushed by a locomotive.

Although the Southern Pacific line encountered few engineering obstacles, there was a continual need to crest small hills and make cuts in the rock. About 21 miles east of Yuma, near Gila City (Dome) a rocky area had to be blasted out, requiring the presence of a construction camp for several weeks. This tent city was said to have had a blacksmith shop and stock corrals, but no saloons. Once the cut was finished, tracklaying proceeded at a rate of up to one mile per day across the desert towards Tucson. By the end of December 1878 the front had stretched thirty miles east of Yuma to the budding town of Adonde Wells. With scheduled trains soon operating between Yuma and Adonde, the Southern Pacific made this site its first railroad center east of the Colorado River. With sidetracks, a turntable, hotel, and the usual collection of canvas habitations, Adonde seemed destined to grow in importance. The hostile environment, however, eventually condemned Adonde to obscurity.

At Mohawk, the line crossed a small summit, then advanced rapidly along the flat lands, arriving at Texas Hill in February 1879. Because of its location some 64 miles from Yuma, Texas Hill became a railroad stopping point, with an attractive company dining room, section houses, and a bunk house for Chinese laborers. Despite occasional shortages of rail, the tracklayers kept at work during the spring of 1878. On March 3, the first train arrived a Stanwix, making that desolate settlement the terminal city. Unfortunately, none of the railroad sites in this part of Arizona produced a satisfactory water supply. This fact necessitated bringing water in from Yuma by tank car, an expensive and inefficient burden. Finally, the company decided to install a five-mile wooden pipeline from the Gila River to Texas Hill in an effort to provide a permanent water supply. This arrangement existed until deep wells were drilled some years later.

From Stanwix, the pace of construction kept steady. On April 1, 1879, Gila Bend became the railroad terminus. Proceeding upgrade to Maricopa Summit, the line curved toward the southeast at the settlement of Maricopa, which saw its first train on April 29th. Maricopa (five miles west of the current town of Maricopa), immediately became an important site because of its location as the closest mainline point to Phoenix. Anticipating a boom in business, the Southern Pacific constructed a large hotel at Maricopa to accommodate stagecoach passengers. Soon the settlement was provided with other railroad buildings, including a 160-foot long SP warehouse and a two-story office building. For some time business boomed in Maricopa as Phoenix bound merchandise and passengers transferred to other means of transportation. Continuing eastward, the construction crews reached Casa Grande on May 19, 1879. At this point, the excessive heat and a lack of supplies persuaded company officials to suspend construction for the summer. As a result, Casa Grande served as a terminal city for almost six months. The Southern Pacific installed a number of tracks and a turntable. The settlement also assumed the air of a construction camp as supplies and men made its tent city home while awaiting orders to proceed. Meanwhile, merchandise destined for Tucson was transferred to wagons at this point.

Construction toward Tucson did not resume until January 1880, primarily for want of rails. By the end of February track gangs were within twenty miles of Tucson and a week later a major tent city was erected at Tucson to prepare the necessary yard facilities. In short order a 50,000 gallon water tank had been installed and a turntable was being readied for use. Finally, on March 20, 1880, the first train pulled into Tucson to the cheers of a large crowd. Soon thereafter, Chinese laborers began to construct a variety of railroad structures, thereby making Tucson the largest railroad center in southern Arizona. A large depot was constructed and a variety of yard and shop

facilities went up. A roundhouse was soon under construction along with various warehouses and section houses.

Tracklaying eastward from Tucson continued through the spring of 1880. By May 1, the line stretched some 28 miles upgrade to Pantano, where the railroad constructed a water tank and turntable. Pushing across a summit at Mescal, the line then dropped into the San Pedro River Valley to the newly named settlement of Benson. Regular service between Tucson and Benson began on June 22, 1880. This small town remained the end of regular service during the summer of 1880. As such it supported a number of railroad related structures, including a substantial wood-frame station and an eight-stall roundhouse and turntable.

Despite the fact that Benson remained the end of scheduled service during the summer, tracklayers continued their work. By the end of July the front had reached Dragoon Summit. From here the line descended down into the Sulphur Spring Valley to the sites of Cochise and Willcox. Then working upgrade, the Chinese laborers continued rapidly eastward to the settlement of Bowie. Despite occasional interruptions for lack of steel and summer flash flooding, the railroad advanced towards the New Mexico border. On September 15, 1880, the Southern Pacific began service to San Simon, just ten miles from the border. A week later, on September 22, the construction crews entered New Mexico, thus completing the mainline across Arizona.

To complete the transcontinental connection, the Southern Pacific continued to build its railway to the east, arriving at Lordsburg on October 18, 1880, and reaching El Paso in May 1881. Meanwhile, the Santa Fe, building south from Albuquerque, reached Deming, New Mexico, in March 1881 and connected with the Southern Pacific. This union marked completion of the nation's second transcontinental link. As will be seen in the story of the Atlantic & Pacific, the Santa Fe was not pleased with its Southern Pacific connection and turned to building a separate line across northern Arizona to reach the Pacific. In the interval, the Southern Pacific met the Texas & Pacific just east of El Paso in December 1881, thereby creating a third transcontinental link. Later the SP would build its own line all the way to New Orleans, completing what would later be called the Sunset Route.

By the end of 1881, the Southern Pacific railway line through Arizona was part of a nationwide system. As such it was destined to be developed and improved, not only for the purposes of speedy passenger and freight service to the Pacific, but for developing the southern Arizona economy.

MAINLINE OPERATIONS

The completion of a four hundred-mile railroad mainline across southern Arizona brought many changes to the Territory. Economical transportation permitted the development of large scale mining activities, opened the agricultural fields of central Arizona, and brought in tourists and health seekers. With easy access to the outside world, a few towns blossomed into major cities. Tucson, in particular, received a significant economic boost as it grew into the Southern Pacific's most important railroad center between Los Angeles and El Paso. Not only did the city house a mainline division point, it also serviced many of the Arizona branch lines. Some of the smaller towns

along the line, however, never achieved their predicted potential and all but faded from the scene, especially after World War II when mining began to lose its significance.

A regular business in through freight and passengers developed as soon as the Southern Pacific completed its transcontinental linkups. Although the SP possessed new locomotives and rolling stock, it soon became obvious that much of the original roadbed was incapable of withstanding regular service in the unpredictable Arizona climate. Flooding and washouts occurred with disturbing frequency, all across the Territory. In the summer of 1882, for example, storms destroyed the roadbed in a number of locations, disrupting service for almost a week. Such occurrences happened regularly during the early years, forcing the company to rebuild portions of the line and install new bridges and culverts. Although this became an ongoing headache, no major realignments were attempted until 1888 (see the section on relocations).

The railway was completed long before regular dining car service became available on the Sunset Route. As a consequence, the company constructed several hotels and dining rooms to serve both passengers and crews. In May 1881 the railroad built an elaborate establishment at Tucson, known as the San Xavier Hotel. The two-story, 63 x 189 foot structure, once described as "an Arizona modification of Swiss architecture" (quoted in Myrick,1975, p. 72), also contained a freight depot and dining room. Complete with overhanging roofs and wide porches to ward off the sun, the L-shaped building became a Tucson landmark until it burned in June 1903. A similar building was opened at Yuma in June 1881. Called the Southern Pacific Railroad Hotel, the Yuma structure housed the passenger depot and a dining room. The two-story, wood-framed Campbell House at Bowie was completed in January 1882 and served as a meal stop before being destroyed by fire a year later. The railroad quickly rebuilt the hotel, using railroad cars as temporary dining facilities until the work could be completed.

During the early years of rail travel in Arizona, all Southern Pacific trains stopped at these company-owned hotels to allow passengers to refresh themselves after a hot and dusty ride. Weary patrons were usually allowed a half-hour to order and consume their meals, which led to some interesting experiences. When William Henry Bishop's train stopped at Yuma in 1883, he commented on the dining accommodations: "We were served in the same dining room by Mexicans, Chinamen, Irish, American, and a tame Apache," all of whom shot dishes at customers "as out of a catapult" (quoted in Trennert, 1988, p. 355). Bishop bore the confusion with remarkable calm, noting that "one does not expect too much of his waiter in Arizona."

The railroad operated many stations along its route in Arizona. The number of stations was determined more by the need for telegraph operators than by paying passengers. In the days before electronic signals and the telephone, train operations were controlled by order boards and hand-operated semaphores located at strategic intervals. (At such stations, operators received instructions from dispatchers regarding the location of trains and where they should meet. Written orders were then handed to crews). Because the mainline was a single track operation, long passing sidings were needed every few miles. Most sidings required a station of some sort. These buildings usually contained an office and living quarters for the telegraph operator. Because many of the agents were also authorized to sell tickets, the larger stations were equipped with waiting rooms and baggage facilities. By 1900 the following locations had stations of various design: Yuma, Blaisdell, Tacna, Aztec, Sentinel, Gila Bend, Estrella, Maricopa, Casa Grande, Arizola, Red Rock, Rillito, Tucson, Vail, Pantano, Benson,

Dragoon, Cochise, Willcox, Bowie, and San Simon. Around each of these stations a visitor would find the usual collection of maintenance structures, water facilities, section houses, and outbuildings.

Passenger service on the Sunset Route was never heavy. As late as the first decade of the present century, only the Sunset Limited between Los Angeles and New Orleans provided daily passenger traffic, supplemented of course by several local trains. Nevertheless, in 1907 the company constructed a new passenger station at Tucson. The massive brick structure, built in the Mission Revival style, was decorated with paintings and murals by the noted artist Maynard Dixon. Meanwhile, Tucson had established itself as a major railroad center, with the Southern Pacific housing its Tucson Division headquarters (operated as the Gila Subdivision from Yuma to Tucson and the Lordsburg Subdivision from Tucson to Lordsburg) in the Old Pueblo. In order to service locomotives and to provide power for the helper district east of Tucson, a 25-stall roundhouse, machineshop, and many support buildings were erected. This complex burned in September 1910, destroying just about everything. Soon thereafter, the company constructed a new thirty-stall roundhouse, machine and blacksmith shops, and car repair facilities. By 1920 Tucson was home of the largest railroad center in Arizona, a position which it retains to this day.

Adding to the Southern Pacific rail complex in Arizona were the facilities of the Pacific Fruit Express, a refrigerator car line operated jointly with the Union Pacific Railroad. To serve the large number of refrigerator cars moving perishable fruits and vegetables to market from Arizona, California, and Mexico, the PFE constructed a huge icing plant at Tucson adjacent to the SP yards. This facility manufactured ice and utilized loading platforms capable of icing forty or more cars at one time. The Tucson facility also included a car repair shop. In addition, the PFE constructed a large icing facility at Yuma and maintained smaller operations at Phoenix and Mesa after completion of the Phoenix cutoff in 1926.

A major change for the railroad came with the switch from coal to oil as the primary fuel for steam locomotives. Not favored with nearby sources of coal, the SP had been forced to import its fuel from great distances. After experiments in California proved the reliability of oil-fired locomotives, the SP switched fuels in Arizona shortly after the turn of the century. Although oil became the fuel of choice and was used exclusively west of Tucson, the company had access to some coal in New Mexico and continued to operate a few coal-fired locomotives east of Tucson prior to the end of World War II. During the First World War, the National Railway Administration, in an effort to strengthen the national transportation system, erected concrete coaling towers at Tucson, Mescal, and Bowie. Although still standing and in good condition seventy years later, it is doubtful if these structures were much utilized. Oil remained the preferred fuel and several major oil storage facilities were constructed. (Among those known to exist were ones at Yuma, Tucson, and Bowie).

Other communities in Arizona were enhanced by the presence of the railroad, although on a smaller scale. Railroad improvements often affected an entire settlement. Such could be said of company operated wells, often drilled at considerable expense. When the line was completed in 1881, water, always a precious commodity, was readily available at only a few locations. As a result, the Southern Pacific drilled many wells, some of which were utilized to supply town sites. Because of the highly mineralized

content of desert water sources, the company was also forced to install water softening facilities at several locations. In 1888, some ten locations, including Texas Hill and Estrella, were known to have large brick cisterns for holding water. Wherever watering facilities and water tanks existed, one would also find pumphouses and other associated structures.

Some towns also benefitted from the construction of branch lines. Among the more important branches (often constructed by subsidiary companies owned by the Southern Pacific) were the Maricopa and Phoenix Railroad, completed in 1887, which operated a line from Phoenix to Phoenix Jct. (Phoenix Jct. is now the site of Maricopa and is located five miles east of the original town of Maricopa, which was renamed Heaton). Beginning in 1894 the Gila Valley, Globe and Northern Railway began construction of a railroad from Bowie to Globe. When this line was finished in 1899 it tapped the rich mining country of Pinal County and significantly enhanced Bowie's importance. In 1914 the Tucson, Cornelia and Gila Bend Railroad opened its line from Gila Bend to Ajo, thereby reaching the copper mines in the Ajo Valley. Finally, in 1909-1910, the Tucson and Nogales Railroad connected Tucson with Mexico (the SP already owned the Sonora Railway, which soon evolved into the Southern Pacific of Mexico). By the time these branches were combined with the El Paso and Southwestern Railroad, which served Bisbee and Douglas via Benson and became part of the SP in 1924, the Southern Pacific empire in southern Arizona was quite impressive.

MAJOR RELOCATIONS AND THE 1926 PHOENIX CUTOFF

For political and economic reasons, the original 1878-1881 mainline was constructed in a somewhat hasty fashion, making it susceptible to flooding and washouts. This fact necessitated line relocations once company finances permitted. Although some of the changes were rather minor, several major realignments were required. In 1891, the massive floods that struck Arizona forced the Southern Pacific to undertake several construction projects and in the fall of that year, after suffering numerous disruptions, the company opted to relocate much of the line between Yuma and Adonde, a total distance of almost thirty-six miles. This effort required the use of over three hundred laborers and necessitated at least two construction camps (one near Yuma and the other at Gila City). The new line generally went south of the 1878 alignment, easing grades and avoiding several dangerous gullies and washes. A few years later (1899), the company built a new bridge at Yuma. In 1926 the present span across the Colorado River was installed a short distance upstream from the old bridge and trackage through the city was moved several blocks to the east, completing a move that eliminated the use of any of the original right-of-way from the Colorado River to Adonde, with the exception of a few miles near Gila City (Dome).

The area east of Tucson along Cienega Creek also presented the railroad with significant problems, its floods washing out the roadbed with some regularity. The nineteen miles between Vail and Pantano were especially vulnerable. In 1888 the railroad decided to rectify the problem by moving the nine miles of mainline extending from Vail to Pantano to higher ground, an effort which required a thousand Chinese laborers. After the rains of 1891 tore up more track, the SP continued its relocation program by restructuring the ten mile district from Pantano to Mescal. This new line became operational in 1892. These realignments left Pantano some distance from the

new tracks, necessitating a relocation of the entire settlement. In 1892 company engineers also decided to move the original line between Sibyl and Dragoon slightly to the north in an effort to find dryer footing. That eleven-mile change was completed the same year.

The line changes occurring between 1888 and 1892 amounted to a total of sixty-nine miles and significantly improved the railroad's reliability as it crossed unpredictable desert washes. By 1892 much of the uncertainly of rail travel in southern Arizona had been eliminated, although washouts continued to disrupt service from time to time.

Without doubt, the most significant railroad construction project in Arizona since the completion of the transcontinental lines came during the mid-1920s, when the Southern Pacific built a supplemental mainline. Leaving the old eastbound line at Wellton and running northeast to Phoenix, the new line then turned south, rejoining the original trackage at Picacho. Although the new mainline, with a total distance of 210.6 miles, was not technically part of the original transcontinental alignment and did not replace the existing 1878-81 trackage, it did place Phoenix on the mainline. After 1926 almost all passenger traffic was diverted through Phoenix, although through freight operations continued to utilize the more direct route. The new line, known officially as the Phoenix Subdivision, was needed because Phoenix had developed into the state's most important city. As such, there was heavy political and economic pressure to make it a mainline city.

Phoenix, of course, had been linked with the Southern Pacific since 1887, when the Maricopa and Phoenix Railroad was completed. Nevertheless, the image of being at the end of a branch line irritated city fathers, who demanded that the state capital be on the mainline. Despite completion of a Santa Fe (Santa Fe, Prescott and Pacific) line from Ash Fork to Phoenix in 1895 and the Arizona Eastern line (SP) extending east toward Hayden, Phoenix remained out of the mainstream well into the twentieth century. Indeed, passengers coming to Phoenix had to change trains at Ash Fork or Maricopa. Even the construction of an elaborate new Union Station in 1923 failed to quiet complaints. Many proposals, of course, had been advanced to correct the situation, but nothing had materialized. Finally, in 1924, the Southern Pacific began to seriously consider the possibility of such a line. Spurred on by fears that some rival railroad might secure permission to build a connecting line first, the SP announced in June 1924 that it would construct a new mainline through Phoenix.

During the summer of 1924, three field survey teams marked out the new route. The basic alignment went north from Picacho to the crossing of the Gila River near the present site of Coolidge, then slanted northwest across the Gila River Indian Reservation to connect with an existing branch line that ran between Chandler and Phoenix. The western segment of the new line extended west to Buckeye over existing trackage, then crossed the Gila Bend Mountains at Montgomery Pass to rejoin the old mainline at Wellton. Work began on the Picacho-Chandler segment on January 5, 1925, using grading crews under contract to C. E. Crowley. The tracks were set with ninety-pound rail on redwood ties and at one time as many as one thousand men were working on the project. The biggest engineering challenge on this portion of the line was the Gila River Bridge, which required nine 150-foot steel spans. Despite problems with high water, the line from Picacho to Phoenix opened for business on August 1, 1926.

On the west end, the Southern Pacific awarded the grading contract to the Utah Construction Company, which then subcontracted out various portions of the 97-mile segment. On May 24, 1925, construction eastward began at Wellton. Meanwhile, grading crews had started westward from a camp at Hassayampa headed for Montgomery Pass. Severe summer temperatures soon forced suspension of work at both ends. By the fall of 1925, however, an estimated 1,200 men and six hundred mules were back at work and making good progress. Several steel bridges were necessary on this segment, the most impressive being a twelve-span bridge across the Gila at Antelope Hill. These structures were completed in time for a celebration to be held at Phoenix on October 15, 1926, marking the completion of the so-called "Phoenix Cutoff." Within a month of that event, regular passenger and freight service was passing through the "mainline" city of Phoenix.

The placement of Phoenix on the mainline went a long way toward making the city a railroad center. By the 1930s at least three transcontinental passenger trains a day passed through Phoenix. When combined with the arrival and departure of AT&SF trains from Ash Fork and various locals, Phoenix Union Station became a very busy place. The enhanced use of rail lines in the valley prompted the Southern Pacific to construct a large Spanish Colonial revival style station at Mesa in 1931, its interior decorated with two large murals. The Phoenix yards were also upgraded, with the installation of additional tracks and engine facilities. A roundhouse, powerhouse, and car shop, along with the PFE ice plant, made the Southern Pacific operation at Phoenix quite substantial. The new mainline also brought some changes as the older routes became obsolete. In the face of declining business, for example, the last local passenger train between Phoenix and Maricopa ran on April 17, 1933, and the line was abandoned south of West Chandler in 1935.

Since 1940 there have been a few noteworthy line changes, primarily for the purpose of reducing grades and curves or eliminating duplication. In each instance portions of the old roadbed have been abandoned in favor of a new alignment. Among the more notable relocations was the 1952 construction of 13.5 miles of new line just east of Tucson to accommodate the expansion of Davis-Monthan Air Base and the 1960 new line across Mohawk Summit. In 1962 the 3.5 miles between Fenner and Sibly also received attention. On the Phoenix Subdivision the company decided in 1964 to abandon a fifteen-mile segment across the Gila River Indian Reservation in favor of a 7.5-mile link between Poston and Magma. This change meant that mainline trains headed for Phoenix now go via the old Hayden branch and the Chandler line is once again a branch. All of these recent locations have been of minor importance and were done largely for operational convenience.

PRESENT STATUS

The Southern Pacific Railroad remains a significant transportation line across southern Arizona. Although still a single-track operation, the use of computers and electronic signaling has eliminated the need for such items as train orders and station agents. Today radio communication with the dispatcher informs the crew of their exact status. As a consequence, over the past three decades many of the old stations have been demolished, as have been maintenance structures such as section houses. The *reduction*

of passenger service has also taken its toll. Since 1971 Amtrak has operated the Sunset on a tri-weekly schedule. The only mainline Southern Pacific stations remaining in passenger use are those at Phoenix and Tucson. The stations at Casa Grande and Willcox are still used as offices. All others have since been demolished or converted to other purposes. Yard and engine facilities have likewise been streamlined. Roundhouses and turntables are gone, as are most water tanks and wells. Nevertheless, Tucson remains a significant railroad center as it services engines, serves as division headquarters, and supports the PFE car repair facility. More trains than ever have operated on the Southern Pacific in Arizona since its merger with the Denver & Rio Grande Western in 1988. So, despite the many changes over the past century, the original transcontinental line remains largely intact.

PART III: SANTA FE

EARLY HISTORY OF THE ATCHISON, TOPEKA AND SANTA FE RAILROAD

In October 1858 frontier speculator Cyrus K. Holliday and a group of friends gathered in the town of Atchison, Kansas, to discuss the possibility of building a railroad from their home state to Santa Fe, New Mexico. The men who met in the small Kansas store were short on funds but filled with vision. Realizing that thousands of Americans were heading west over the Santa Fe Trail, Holliday dreamed of constructing a railroad along the same route, thereby tapping the American southwest. Financial realities prevailed, however, and the investors decided to charter a much smaller company, the Atchison and Topeka Railroad, to operate between the two namesake cities. Nevertheless, Holliday continued to dream of one day reaching New Mexico.

Financial problems prevented any significant advancement until 1863, when the company secured a federal land grant of some three million acres in Kansas as an encouragement to build westward. At that point, the company changed its name to the Atchison, Topeka and Santa Fe Railroad. With the uncertainties of the Civil War and continued financial difficulty frustrating plans, it took Holliday five more years to find a company willing to construct his railroad. In the fall of 1868 construction finally began at Topeka and by 1870 rails had reached Atchison. By that time, the Santa Fe had only two years to reach the Colorado border or lose its land grant. Building rapidly across the prairies, the railroad arrived at the state line on December 28, 1872, just three days before the deadline. With the land grant secured, the pace of construction slowed, the railhead reaching La Junta, Colorado, in 1873.

At La Junta, the company proposed dividing its line. Officials were torn between continuing on to Santa Fe and building a line up the Arkansas River into the booming gold fields near Leadville. Although the Colorado venture possessed some financial merit, the Santa Fe was frustrated in its effort to enter the Rockies after losing a dispute with the Denver & Rio Grande Railroad (this was the so-called "Rio Grande War" which almost brought rival construction crews to blows). A frustrated Santa Fe gave up its hopes for a Colorado empire and returned to completing the original goal. After determining that the city of Santa Fe could not realistically be situated on the railroad's mainline, the construction front pushed on to Albuquerque, arriving on April 15, 1880.

Even before reaching New Mexico, Santa Fe officials realized that the old Santa Fe trade they planned to capture would not provide sufficient revenue. With these realities in mind the board of directors, under the leadership of Thomas Nickerson and William B. Strong turned their thoughts to making their company a transcontinental railroad. From New Mexico westward lay the 35th parallel route, often regarded as one of the most practical ways to reach the Pacific. By constructing a railway across New Mexico and Arizona, then into California via the Mohave desert, the Santa Fe felt well positioned to reap a substantial profit. Such a line seemed to offer the potential of avoiding dependence on other companies in order to reach the coast (in 1881, for example, the AT&SF met the SP at Deming, New Mexico, which gave the Santa Fe access to California, though totally dependent on the SP). Although the Southern Pacific possessed a monopoly in California and could be expected to oppose any rival, Santa Fe managers were determined

to push westward on their own. Unfortunately, they were not authorized to build west of Albuquerque.

It soon became apparent that the Atlantic & Pacific Railroad might be acquired by the Santa Fe. The A&P had been chartered by Congress on July 27, 1866, to build a railway from Springfield, Missouri, across the Indian Territory to the Colorado River, then to San Diego. This alignment basically followed the 35th parallel route, especially across New Mexico and Arizona. A major asset attached to the A&P charter was a federal land grant that included a 200-foot right-of-way and twenty odd numbered sections of land per mile on each side of the tracks across New Mexico and Arizona. Among the original investors in the A&P were John C. Fremont and A.K.P. Safford, future governors of Arizona Territory, and several prominent Arizona businessmen. Unfortunately, the A&P went bankrupt in 1876 after completing only 361 miles of track in Missouri and the Indian Territory. The company fell into possession of the St. Louis and San Francisco Railroad (Frisco), itself suffering from financial problems. In a November 1879 deal known as the Tripartite Agreement, directors of the Frisco, A&P, and Santa Fe agreed that the AT&SF would acquire a half interest in the A&P, and then use the A&P charter to complete a transcontinental railway. Despite some last minute opposition from the Southern Pacific, by 1880 the Santa Fe (operating under the Atlantic & Pacific name) was ready to continue westward. Santa Fe officials wanted to build the line as rapidly as possible, correctly anticipating that the SP would attempt to cut them off.

CONSTRUCTION OF THE ATLANTIC & PACIFIC ACROSS ARIZONA

As soon as the agreement to acquire an interest in the A&P was finalized, the Santa Fe began to prepare for the construction of a railroad across northern Arizona. Under the leadership of General Manager William Barstow Strong, surveying and construction crews gathered at Albuquerque. Early in 1880 Strong detailed his trusted chief engineer, Albert A. Robinson, to supervise construction efforts. Almost immediately Robinson set crews westward to make a final survey and set an alignment between Albuquerque and the Colorado River. The survey team, led by Lewis Kingman, consisted of some twenty men and five wagons. Setting out in April 1880 they quickly located the line along the Rio Puerco to the site of present Holbrook, then west along the Little Colorado River to Sunset Crossing near Brigham City. From there Kingman, assisted by W.A. Drake, H.R. Holbrook, and J.E. Early, moved to the western end of the line, then waited until the summer of 1881 to stake out the middle part of the route across the high country of northern Arizona. By mid-summer 1881 the initial surveying was completed. In large part Kingman was guided by the report of Lieutenant Whipple's 1853-54 expedition and by a survey made by the Union Pacific in 1867-68. The topography would prove difficult in several locations, but as a rule the route seemed well suited to rapid construction. Some Arizona newspapers predicted that the line would be finished before the winter of 1882.

Using Isleta, New Mexico, a few miles south of Albuquerque, as the starting point, A&P crews began the push westward during the summer of 1880. Even before this, the company entered into grading and tie cutting contracts with various individuals. Although the details of each agreement were different, the company followed a general practice of hiring local construction firms to clear and grade portions of the line. Some contractors also agreed to do bridge work and one contracted to build a tunnel. These

entrepreneurs saw an opportunity to cash in on the construction boom and readily offered their services. Among the more notable contractors helping to prepare the grade across Arizona were Price, King and Co., who set up a camp near Flagstaff to prepare some fifty-four miles of roadbed, John W. Young, son of Brigham Young, who put groups of Mormons to work as graders and tie cutters near Flagstaff and in the Little Colorado River Valley, and Col. J. T. Simms, who contracted for the bridge and tunnel work in Johnson's Canyon. The grading crews operated out of base camps, clearing trees and brush, removing rocks with black powder explosives, and forming the roadbed with mule-drawn Fresno scrapers. Tie cutters usually secured their needs from the nearest stand of trees. Considering that much of the line was crossed by washes and ravines, a goodly number of timber bridges were required before the rails could be set down. The Arizona segment also needed five steel bridges, which were ordered from eastern manufacturers. Under the contracting system, which was used across all of Arizona, the grade, bridges, and ties were supposed to be ready by the time the track gangs arrived. By the summer of 1881 more than two thousand men were at work in northern Arizona preparing the A&P grade.

The first rail actually put down in Arizona consisted of a two and a half mile segment in Querino Canyon, which was installed sometime during the summer of 1880. Because the two-mile long sandstone canyon, located just west of the present site of Houck, only contained enough room for a single rail line, Robinson rushed construction crews to this remote location to forestall an expected attempt by the Southern Pacific to block the way by building its own line in the Canyon. Despite the fact that Indians chased the construction crews away on at least one occasion, this short segment was completed and apparently stood idle for nearly a year before track crews coming from the east made a connection.

Once he was no longer needed to lead the surveyors, Lewis Kingman assumed control of the construction crews. By February 13, 1881, the railroad had reached Wingate (Gallup), New Mexico. From here, Kingman prepared for a gigantic effort to construct the line in one push all the way to Needles, California. The A&P reportedly collected over 800 car loads of rail at Bacon Springs near Wingate in hopes of working across Arizona without interruption. The rails used on the A&P were light by today's standards, weighing fifty-two or fifty-six pounds per yard and set on untreated wooden ties. A large percentage of the track crews were Irish, a fact which drew praise from Arizona newspapers prejudiced against the Chinese. Said the March 25, 1881, issue of the Weekly Arizona Miner, "the Directors of the 35th Parallel R.R. certainly deserve much credit for employing none but white labor in building their great transcontinental railway from the Atlantic to the Pacific. Mongolian labor is below par with these people" (WAM, 3-25-81). Despite such local sentiment, Kingman employed anyone willing to work, including Hispanics, Apaches, and Navajos. The ethnic composition of construction crews varied greatly among companies. Companies generally preferred to *hire local labor*, but in remote country such as Arizona, relatively few men were available. Recruitment officers thus traveled to the urban areas of the United States in search of common laborers. These usually tended to be recent immigrants. The Southern Pacific preferred Chinese gangs secured in California, while the Santa Fe recruited Irish immigrants in the mid-west. Some attempts were also made to recruit Mormons from Salt Lake City. Ethnic construction workers were generally unskilled laborers working under the supervision from American bosses. The Indians proved especially good workers and established a close association with the Santa Fe which still exists. Once put

into motion, the track gangs were able to set down and spike into place one to two miles of railroad per day. The crews lived on a "Boarding Train" which traveled just behind the track layers to provide sleeping and eating facilities.

During the late spring and summer of 1881 the railhead pushed westward into Arizona. Entering the Territory at Lupton on the first of May, the rails worked their way down the bed of the Rio Puerco through sandstone cliff country. Noted the Miner on April 8, 1881, "the whole country north of Prescott along the 35th parallel road is alive with advance workmen, who are preparing the roadbed of the Atlantic and Pacific Railroad, which is coming along from the East at break-neck rate." Just west of Houck, the crews connected with the previously built line through Querino Canyon, then proceeded downgrade towards the old Sanders trading post. Despite a promising start, several things conspired to slow progress. An unanticipated lack of manpower proved a significant problem for both grading contractors and track gangs, slowing construction considerably. Despite advance planning, workers could not be secured in sufficient numbers to maintain the desired pace. Then in July and August, severe storms swept the north country, wiping out large sections of roadbed. From contemporary newspaper stories, it appears that trackage was completed through Chambers, Navajo, and Adamana in July 1881, and that crews arrived at Horsehead Crossing (renamed Holbrook) about the end of July. Flooding, however, prevented any regular train service. As a result, rail service actually arrived at Chambers on August 31, 1881, at Navajo Spring on September 10, 1881, and at Holbrook on September 24, 1881.

During October the track teams began to work upgrade toward the San Francisco Peaks. By the first week in November the railhead was several miles west of Holbrook and progressing rapidly. At this time construction materials were still coming from the supply camp established at Bacon Springs, New Mexico. This fact indicates that no significant construction camp had thus far been established in Arizona. Despite continuous progress, events occasionally conspired to disrupt work. During November, for example, a railway worker shot and killed a Navajo he suspected of horse stealing, thus throwing the railhead into turmoil. This caused a stop in work until an army detachment stationed at the front took control of the situation. By Thanksgiving the end of track had reached Breed's store, twelve miles east of Brigham City (Winslow).

A major milestone was reached on the first of December 1881, when the rails arrived at Winslow. Being the end of a division, Winslow immediately assumed importance as the company began to move "construction material, extra engines, cars, etc." to the town (WAM, 12-2-81). A visitor to Winslow in January 1882 noted that "the town at present consists of a row of tents about one-fourth of a mile in extent" (WAM, 1-27-82). All passenger service terminated at Winslow for the next seven months. Serving as the end of track terminal and being a division point meant that major servicing facilities, a roundhouse, and yards were necessary. Track crews, however, did not slow down, covering almost ten miles per week until December 19, 1881, when they reached Canyon Diablo. At that point construction came to an abrupt halt.

The Canyon Diablo Bridge presented the A&P with its greatest engineering challenge in Arizona. Located some twenty-six miles west of Winslow, the steep, 550-foot wide limestone canyon cut 225 feet into the surrounding plateau. These sheer canyon walls had always presented an obstacle to east-west travel in northern Arizona and Santa Fe engineers had early recognized the magnitude of the problem presented by

"Devil's Canyon." John M. Price & Co., received the primary construction contract, with T.F. Richardson, the railroad engineer in charge, providing overall supervision. Well before the railroad reached the Canyon, work had started on the bridge. To accommodate the 240 men working on the span, a significant construction camp known as Canyon Diablo was established on the east rim. This tent city was regarded as a rowdy place, complete with saloons and an occasional gunfight.

During the winter and spring of 1881-82, crews prepared the masonry pedestals and abutments necessary to support the steel structure. The eleven-span bridge was prefabricated by the Central Bridge Works of Buffalo, New York, at a reported cost of $250,000. Parts were shipped by rail to the construction front in the fall of 1881, then hauled by mule-team to the canyon and assembled on site. Rising some 222 1/2 feet above the canyon floor, the Canyon Diablo Bridge made a spectacular sight. Mounted on pedestals of locally quarried sandstone, the bridge would have been completed much earlier had not the prefabricated structure been a few feet short on each end, thus requiring several months for replacement spans to be manufactured and delivered. As frustrating as this delay may have been, it did enable grading crews to catch up on their work and finish the roadbed well to the west. On July 1, 1882, the Canyon Diablo Bridge was certified and the first train inched across the spectacular canyon. Although frail in appearance, the bridge could support thirty times the weight of any train that might run over it.

Once clear of Canyon Diablo, the front marched rapidly westward. Some fifty miles of track were installed in the seven weeks following July 1. At Canyon Padre, five miles west of Canyon Diablo, a 330-foot steel bridge had been completed by Price & Co. ahead of time, permitting track gangs to continue without a pause. The first rain chugged into Flagstaff on August 1, 1882. By the time the railroad reached this mountain town, it had become a booming settlement of one hundred houses. Most residents were in one way or another connected with supplying the railroad or catering to construction crews. Flagstaff was dominated by several lumber mills. The E. E. Ayers mill, purchased in 1881 and sent to Flagstaff in pieces, towered over the other operations.

By the end of August, the tracklayers had reached Volunteer (Bellemont). The Prescott Miner was particularly impressed with this location because railroad engineers discovered a good water supply. The newspaper wrote that water service crews had constructed two large water tanks at Volunteer. The water came from a spring located a mile to the southwest where a small stationary engine pumped water through a four-inch pipe to the station. For several weeks Volunteer was the official terminus of the A&P and goods and passengers headed for Prescott transferred to wagons at this point.

By September 1, 1882, the railhead had reached the settlement of Williams, giving it the temporary honor of being "end of track." With a population of about five hundred, Williams was tentatively scheduled to become a division point, and in October 1882 surveys were made for a roundhouse and other buildings. Meanwhile, crews were idled until the tunnel in Johnson's Canyon, a gorge of basalt set over limestone, could be finished. Located between Williams and Ash Fork, the line through Johnson's canyon required the boring of a short but difficult tunnel and construction of two bridges (between mileposts 388 and 389). The tunnel contract plus ten miles of grading had been awarded to J.T. Simms, a man with previous contracting experience. The tunnel was to be approximately 366 feet long, 14 x 19 feet in diameter, and at one point 125

feet below the surface. A major stumbling block proved to be an unexpected segment of Malpais rock. Prefabricated steel bridges were ordered from Delaware while the drilling went on. By April 1881 Simms had men working on both ends of the tunnel and a construction camp named Simms appeared near the tunnel. In May 1882 the town of Simms was said to have had two stores and several saloons. Water was hauled in from Williams. Col. Simms apparently encountered several problems in finishing his work, including a lack of sufficient manpower. At one point he went to California in an unsuccessful effort to hire 500 Chinese laborers. As a consequence, the tunnel and bridge work was not finished until the fall 1882.

The track gangs resumed laying steel sometime in October, and quickly pushed the front through Ash Fork and on to Seligman, which became the line's terminal point about the first of December. Seligman, rather than Williams, became the division point, and the necessary facilities were soon under construction. A few miles west of Seligman the line crossed Chino Canyon. Because of the potential for flash floods, the railroad installed a six hundred-foot wrought iron viaduct across the canyon. The first train crossed the Chino Bridge on December 6th, and tracklaying recommenced two days later.

By this time A&P officials were getting anxious to reach the Colorado River, knowing that the SP was building a line eastward from Mohave to Needles. Fearing that the SP would actually build into Arizona, company management decided to speed up construction, giving up plans for a steel bridge at Needles in favor of a temporary pile structure. They also opted to employ a variety of construction shortcuts in an effort to get the rails down as fast as possible.

From Chino Canyon the railhead headed northwest toward Peach Springs. Because of the natural springs, water service crews had arrived in advance of the front to install the necessary pipe and machinery to bring water to trackside. Meanwhile, the track layers upped their pace, putting down as much as two and a half miles of steel a day. By the end of January 1883 the construction workers and boarding train had arrived at Peach Springs. Here the railroad installed a large, 50,000 gallon water tank. The Mohave County Miner described this structure as follows: "the foundation of the tank is built of sandstone, nicely cut and fitted and the woodwork has been nicely painted, the whole presenting a very creditable appearance." Because of the availability of water, Peach Springs took on the appearance of a railroad center. In addition to a station, some twelve miles of side track was installed and "material for the roundhouse at Peach Station is on the way to that place. The roundhouse, when completed, will have six stalls" (MCM, 3-11-83).

West of Peach Springs the A&P installed another tank and pump at Truxton. The Mohave County Miner remarked on March 18, 1883, that "the A. & P. railroad company's officials are getting in a hurry to lay track. They have been putting down from two to two and a half miles per day. The carpenters could not keep out of the way with the bridges, so shoo-flying [temporary tracks around the trouble spot] and plugging [filling in the gap with debris] had to be resorted to. Only about one half of the bridges are completed, the culverts or small bridges are cobbled up with ties and rails and run over and left to be bridged hereafter. The large bridges are shooflied or run around." Using such hasty construction methods, the line advanced rapidly. The railhead reached Hackberry on March 15th, and the first train rolled into Kingman on March 27, 1883. Here tracklaying came to a halt for several weeks because of a lack of rail.

During the break, "all the bridge builders and carpenters will be sent to the river at once" (MCM, 3-25-83).

Finishing the line from Kingman to Needles in a timely manner proved frustrating. In early April work began on the Needles bridge, the sixty-foot green pine piles being brought in from Flagstaff to Kingman by rail, then hauled overland to the river by mule-team. By mid-April tracklayers were back at work south of Kingman and within a month they had reached the Colorado river. Unfortunately, work on the bridge was delayed. The bridge was originally intended to be temporary, but company officials decided to make the 1700-foot trestle permanent, thus delaying completion by six weeks. Then nature intervened. During June the Colorado River flooded, wiping out much of the partially completed structure. It took about a month before crews could safely resume work. Finally, on August 3, 1883, A&P tracklayers spiked down the last rails into Needles, completing construction across Arizona.

At Needles the A&P made connections with the Southern Pacific, which had completed its line from Mohave several months earlier. The junction enabled A&P passenger and freight trains to connect with Pacific Coast traffic. The A&P clearly expected an immediate increase in business, announcing that Kingman would become an eating station as soon as a substantial dining room and depot could be constructed. Although the Santa Fe now had obtained a second transcontinental connection, dependence on the rival Southern Pacific for business was obviously unsatisfactory. As a consequence, after intense negotiations, an agreement was reached in April 1884, whereby the A&P purchased the Southern Pacific line from Mohave to Needles and secured trackage rights into Oakland and San Francisco in exchange for compensation elsewhere. This agreement broke the Southern Pacific monopoly in California and made the Santa Fe a truly transcontinental railroad.

MAINLINE OPERATIONS

In 1883 a government official provided the following description of the recently completed railway line across northern Arizona: "The Atlantic & Pacific is a well-constructed railroad, excellent in location, running through interesting country. The road is well-built, laid with 56-pound steel rails 30 feet long, averaging sixteen ties to the rail, fastened with double angle joints. Bridges are of wood and iron, first class in every respect, many marvels of engineering skill. The passenger equipment is of the latest patterns and improvements and the locomotives are of the most improved makes" (quoted in Duke and Kistler, 1963, p.13).

Although the above statement may have been superficially accurate, it was also true that the A&P line did not become a major transcontinental transportation route for many years. For the Santa Fe, which was more interested in developing Kansas, Oklahoma, and Texas, the railroad across New Mexico, Arizona, and California remained of secondary importance. Indeed, the line from Albuquerque to California was regarded as a branch line until the 1890s. Nevertheless, the coming of the railroad provided a major boost to the economy of northern Arizona. Various towns along the right-of-way blossomed. With economical transportation available, Holbrook and Peach Springs developed into stock shipping centers, Flagstaff and Williams became major lumbering sites as well as jumping off points for the Grand Canyon, and Kingman became a supply

center for the mines of Mohave County.

Railroad related facilities were developed at several locations in the years following 1883. Winslow became the most important railroad town in northern Arizona, especially after 1897 when division headquarters were transferred there from Gallup. As a division point, Winslow grew more than other towns. The Santa Fe constructed its only shop and repair facilities in Arizona at this point, eventually making Winslow the largest rail center between Needles and Albuquerque. Well before the turn of the century, the office of the division superintendent, road repair crews, engine crews, and shop employees were stationed at Winslow (a 1916 list of service buildings shows a 25-stall roundhouse, machine and blacksmith shops, pipe and electric shops, a railroad hospital, scales, and various other items). Seligman, the other division point in Arizona, never witnessed the same growth. Many other railroad towns, such as Flagstaff, Williams, and Kingman also supported a collection of railroad related structures. For example, an 1885 list of railroad structures at Williams shows two section houses, two employees cottages, an engine house, blacksmith shop, coaling facilities, and a water tank. Stations, of course, were constructed at almost every settlement.

The AT&SF prospered during the 1880s, enabling it to upgrade some of its facilities. During the decade new or expanded yards, sidings, depots, roundhouses, shops, water facilities, and offices were constructed. The most significant improvement involved rebuilding the tracks. New and heavier rail was set down, deteriorating ties replaced, and some ballast installed. Most of the improvements, however, failed to reach the line across Arizona. Aside from routine maintenance, the A&P line seldom received attention. By the 1890s a number of problems began to surface. Because of a lack of wells, water could be secured at only a few locations and water for engines had to be brought in by tank car from New Mexico. The roadbed had also deteriorated. Many of the original wooden bridges needed replacement, untreated ties had rotted, and the tracks across Arizona had yet to be ballasted. The A&P seemed to be dying of neglect. Things became so bad that the famous California Limited, the pride of the Santa Fe, which first operated between Chicago and Los Angeles in 1892, was taken out of service in 1896 because of equipment and roadbed problems.

The Santa Fe line across Arizona might have been sold in the mid-1890s, had it not been for Edward P. Ripley, who became president of the railroad following the Panic of 1893. Convinced that his company needed a strong transcontinental presence, Ripley set out to refurbish the line west of Albuquerque. In 1896, the Santa Fe acquired full ownership of the A&P, changing its name to the Santa Fe Pacific Railroad. In addition to purchasing new locomotives and passenger cars, the line received many structural improvements. In 1899 the Santa Fe Pacific began a two-year program to replace all wooden bridges with steel structures. Although dozens of bridges were replaced, perhaps the most significant replacement was the new span built over the Colorado River. The original 1883 pile bridge across the river at Needles had never been satisfactory. Floods frequently damaged the structure and caused disruptions in service. In 1888 the company decided to eliminate the problem by building a steel span across the river at Topock, several miles downstream from Needles. This 1,100 foot cantilever bridge was completed in May 1890 and required some 13 miles of new track. In 1900 the railroad also replaced the original Canyon Diablo bridge with a stronger structure.

Providing an adequate water supply across Arizona became another priority. New, deep wells were drilled at such locations as Yucca, Adamana, Seligman, and Holbrook. In an effort to secure a reliable water source, the company also constructed four dams and storage reservoirs between 1897 and 1901. These structures, at Walnut, Williams, Johnson's Canyon, and Seligman, permitted the company to eliminate the use of non-revenue water trains, which had been hauling as many as forty carloads of water per day to dry areas. Another innovation that improved efficient operations in Arizona was the introduction of oil burning locomotives in 1894. Conversion to oil, especially west of Winslow, permitted the company to eliminate coal chutes, ash pits, and other cumbersome facilities (of course, the company needed to install oil facilities. At Hackberry, for instance, a major oil storage area consisting of tanks, pump houses, and unloading facilities was constructed). By 1901, Ripley had turned a derelict line into a major transportation artery. Symbolically, by 1902 the California Limited had resumed daily service. Because of this rebuilding, notes one author, "Santa Fe thus became the first class transcontinental mainline that Colonel Cyrus K. Holliday had envisioned" (quoted in Duke and Kistler, 1963, p.60).

Another feature of the Ripley era was the construction of major branch lines, inspired by a desire to tap new Arizona markets, especially those connected with agriculture and tourism. In 1895 a line from Ash Fork to Phoenix was completed, providing access to the mines around Prescott and the farms of the Salt River valley. In 1901 the branch from Williams to Grand Canyon opened for traffic, providing direct tourist connections of Arizona's greatest attraction. In addition, a number of independent logging railroads connected with the mainline between Flagstaff and Williams. These branches generated additional mainline revenues and solidified the Santa Fe's presence in Arizona.

FRED HARVEY AND TOURISM

Closely associated with the Santa Fe Railway in the southwest was the Fred Harvey Company. Although railroads used dining cars as early as 1853, many western railroads required passengers to take their meals at various station stops. English-born Fred Harvey became associated with the Santa Fe in 1876 when he opened a lunch counter at Topeka. The initial success of this business soon prompted Harvey to open a series of restaurants and hotels along the Santa Fe line, many of which were staffed with the famous "Harvey Girls." Fred Harvey establishments followed the A&P across Arizona, and Harvey restaurants were opened at Holbrook, Winslow, Williams, Ash Fork, Seligman, and Kingman. All of the original dining rooms were of simple design, providing a place where travelers could purchase something to eat during a ten-to-thirty minute station stop. Several of the early Harvey diners in Arizona were hastily put into service. The restaurant which opened at Holbrook in 1884, for example, was at first housed in five boxcars. Despite a dingy outside appearance, the interior was attractively painted, the tables covered by linen, and set with silverware. The menu, typical of Harvey establishments, consisted of blue point oysters, whitefish in Madera sauce, capon with hollandaise sauce, roast beef, baked veal pie, several vegetables and salads, and pies, cakes, and coffee. A similar type of operation was said to have started at Williams in 1887.

As time went on, the Harvey Houses were improved, frequently being incorporated into the depot itself. Because of the reasonable prices, clean facilities, and cheerful service, Fred Harvey dining rooms became famous in the southwest. Prior to 1900, the Harvey Company concentrated exclusively on meeting the needs of travelers and railroad employees. After the turn of the century, however, the company turned to the construction of hotels and resort facilities, spurred on by the growing economic significance of tourism. In short order, a series of resort hotels, with names related to the Spanish and Indian heritage of the southwest, were constructed at strategic locations along the line. The La Posada appeared at Winslow, the Fray Marcos went up at Williams, the Escalante was built at Ash Fork, and the Havasu appeared at Seligman. Most of these structures incorporated a southwestern motif, yet they varied significantly from structure to structure. The Havasu in Seligman contained only 19 rooms, while the Fray Marcos at Williams was much larger. During the early years of the 20th century these hotels were utilized by visitors headed for the Grand Canyon, Petrified Forest, Painted Desert, and the Indian Country. The Fred Harvey Company also dominated the touring business at such locations as Grand Canyon, where hotels such as El Tovar and Bright Angel Lodge were constructed. Although Mr. Harvey died in 1901, his family carried on the tradition. The 1902 formation of the Fred Harvey Indian Department strengthened links between train travel and tourism in Arizona by providing visitors with a variety of native arts and crafts. Between 1900 and 1930, Fred Harvey hospitality was a well-known attraction in the southwest.

MAJOR RELOCATIONS

Since 1900 the Santa Fe line across Arizona has been improved on several occasions. In particular, line relocations have occurred at several locations in an effort to reduce grades, lessen curves, and eliminate speed restrictions. Nevertheless, the great majority of trackage still follows the original 1881-83 route. Among the most notable relocations were those occurring during the upgrading program of 1907-1912. During this era the Santa Fe built a new five-mile line just east of Crookton and an eleven-mile line from Corva to Supai which bypassed Johnson's Canyon. Both lines were intended to lessen uphill grades, and did not result in the closing of the original trackage, which was still used on downhill tonnage.

Despite the new lines, the district from Crookton to Williams remained an operational problem for the Santa Fe. In the late 1950s the company embarked on its most extensive realignment in Arizona by completing a new, double track line from Williams Jct. to Crookton, a distance of forty-four miles. The $20 million relocation eliminated heavy grades and clearance restrictions, thereby permitting faster freight operations. One part of the old double track mainline from Williams to Ash Fork remained in use to serve the Phoenix connection, but after the project was completed in 1960 the Johnson's Canyon tunnel was abandoned, and both Williams and Ash Fork lost their significance as mainline railroad towns. Many of the facilities in these towns were torn down or abandoned. To provide for passengers headed for the Grand Canyon or Phoenix, the Santa Fe constructed a new station at Williams Jct.

The railroad also continued to replace bridges. The 1900 bridge at Canyon Diablo never proved satisfactory because of a ten mile per hour speed restriction across the structure. Although this limitation may not have proved an inconvenience as long as

passenger trains paused at the Canyon to give tourists a glimpse of the spectacular sight, it disrupted freight schedules. By World War II, the bridge had become obsolete. As Keith Bryant explains, "the narrow but extremely deep canyon had to be rebridged, and engineers selected a site north of the existing bridge. Before the massive concrete piers could be poured, concrete was pumped into the cracks in the limestone walls. A false-work built from both sides of the canyon allowed workmen to erect the steel supports, but huge safety nets were hung below the iron workers as a precaution. The bridge consisted of a 300-foot hinged arch with 120-foot simple truss spans at either end for a total length of 544 feet. The roadbed, ballast and rails were continuous over the bridge, which had no speed restrictions. The bridge opened in September 1947" (quoted in Bryant, 1947, p.278). The Santa Fe also found it necessary to construct a new bridge across the Colorado River at Topock. The 1890 cantilever span had been the source of continuing problems as trains became heavier. The middle of the bridge began to sag under the load, even though a center pier was installed in 1910. During the heavy traffic of World War II, the Santa Fe finally committed itself to constructing a new 1,506 foot span, which was completed in 1945.

PRESENT STATUS

Modern technology has changed the look of railroading in northern Arizona. These changes have eliminated many traces of the early era. The double track mainline, laid with welded rail and supported by a modern communication system, has eliminated the need for many structures. After the Second World War passenger business went into a decline, causing the elimination of many small stations as streamliners sped across Arizona. Eventually, even the first-class trains were cut as passenger revenues declined. By 1963 only four passenger trains in each direction operated across Arizona. When the National Railroad Passenger Corporation (Amtrak) took over national passenger service on May 1, 1971, the number of daily passenger trains dropped to one each way. By this time only the stations at Winslow, Flagstaff, and Kingman remained in use. Most of the others have long since been demolished.

The transition from steam to diesel power also brought changes. Water service facilities were no longer necessary. Such items as water tanks and stand pipes became obsolete (although many tanks remain standing). The only engine servicing facilities remaining in Arizona are at Winslow. All roundhouses are gone. The use of diesel locomotives meant that some division points could be eliminated. Seligman was first downgraded to a crew change point, and then in 1985 crews began running through from Needles to Winslow. The old Havasu Hotel at Seligman, which has been used for offices, was closed. The trains don't even stop at Seligman anymore. Track maintenance procedures have also been streamlined, ending the need for section-houses and maintenance stations at every siding.

The modern day Santa Fe Railway across Arizona has kept up with the times. One must look hard to find reminders of the past.

PROPERTY TYPES ASSOCIATED WITH TRANSCONTINENTAL RAILROADING

It is convenient to group classes of property types in three major functional divisions. The first includes properties associated with system construction, operation, and maintenance, while the second isolates properties associated with the administration of the railroad, including resources designed for both supervisors and employees. The final division treats commercial aspects of the railroad, including passenger and freight facilities. These functions, of course, are not separate, and many of these activities overlap in one building or location. It is, for example, arbitrary to separate administration from operation, or employee housing from passenger stations. Also arbitrary for the purpose of convenience, is the standardization of terms applied to certain classes of property.

I. System Construction and Operation

The most basic class of property associated with the construction and operation of the railway is trackage and its immediately associated elements of grade, roadbed and ballast. The grade is the level, prepared ground surface on which the roadbed is laid. The roadbed is the prepared, solid surface, including the ballast (broken stone, gravel, cinders, or clinkers) on which the superstructure (ties, rails, frogs, plates, etc.) rests. In cases where old alignments are bypassed and abandoned, actual rails are often removed, but grades remain easily perceivable on the landscape. Similarly, structures to support the progress of trackage, including bridges, tunnels and culverts, though they may be replaced or remodeled, are still characteristic and distinguishable railroad features.

Bridges, which allowed the railroad to cross rivers, canyons, roadways and other obstructions, were of many types on the transcontinental routes in Arizona, and they represent a broad range of bridge technology. Log or lumber trestles were among the earliest bridges erected, but were soon replaced, usually with stone and steel structures of various types. Classes of bridges in Arizona include simple deck spans, simple truss deck spans and through trusses (either Pratt or Howe), half-through steel arches, and cantilevers. Most are of steel and rest on stone or timber piers.

The only tunnel on the transcontinental line in the early period was on the AT&SF at Johnson's Canyon, and it was a single track tunnel with a later curved steel ceiling. This tunnel and its associated bridges have been abandoned, the bridges having been replaced with earthen fills.

Transverse drains, or culverts, under the railroad were made of wood or stone, though most have now been replaced with concrete.

During initial survey, construction, or major realignment, camp sites were established to house laborers, supervisors, and livestock, and to assemble building materials. Although many were made up entirely of rolling dormitory, dining, and other work cars, camps on the surface ranged in size and complexity from a few tent platforms and corrals to full-scale towns complete with log or lumber buildings, wells, latrines,

trash dumps, dining halls, saloons, stores, and even churches. Some camp sites were used more than once, and may thus exhibit multiple components.

During initial construction and regular operation, a variety of raw materials were needed for both building and fuel. Quarries related to railroad operation in Arizona include those for building stone and ballast (rock or cinders). Some lumbering activities, including timber cutting and sawmills, were carried on specifically for the construction of the railway.

Another essential ingredient for the operation of the railroad was water, which provided energy to drive locomotives. To supply this resource, dams, reservoirs, pipelines, wells, and storage tanks were constructed in many locations. Dams, made of stone, concrete, steel or earth were often some distance from the water stops on the line, and water was brought to appropriate locations by pipeline. Water tanks, usually of wood or steel, were raised on cribbed towers, piers, or platforms, and pumping devices were provided to raise water into the tank. Locomotives were filled either directly from the tower or from standpipes located next to the rails. Steam was used until the 1950s in Arizona.

Fuel for railway operation has varied through time, and different kinds of structures have been used to aid in the fueling of locomotives. Coaling stations, which could be made of wood, steel, or cement, consisted generally of a pit which could accept loads of coal from freight cars, a tower into which coal was lifted via conveyor buckets or an elevator, and a tipple which would fill and dump into the locomotive tender. As oil burning locomotives became common, oil storage tanks, with their accompanying pump house and standpipe, appeared at fueling stops. Associated with coal-fired engines were ash pits, crossed by a section of track so a locomotive could dump an accumulation of ash and clinkers. The ash pit was usually provided with a lower track giving access to the cooled clinkers which could be hauled away for use as ballast.

Independent power plants often provided the source of electricity for activities at a station site, including pumps, lighting, and signals. Consisting of a large boiler and generator, the power plant was generally housed in its own building.

Additional specialized structures or buildings were required as railway support activities became increasingly complex. Freight cars would be iced to take perishable produce to market in saleable condition, and ice was also needed in passenger services, so ice plants were operated at several points along the line. These usually consisted of several structures, including a cooling tower, ice house or storage facility, and long loading platforms.

Provision also had to be made for locomotives to take on sand, which was dispensed through a dome hopper at the top or front of the engine to increase friction between the track and the wheels, thereby improving traction. For this purpose, some points on the line furnished a complex called a sand house, which would include bins or sheds in which to store sand, a covered, ventilated dryer, usually provided with some sort of heater, and a tower of wood or steel with a lift and gravity feed dispenser.

In a consolidation yard, where trains would be made up and cars sorted, a yard tower from which this activity could be supervised might be found. Often a frame

structure, it would be raised above the level of the trains so that the yard foreman would have a clear view of yard activities.

Although they might be found in a number of locations, the watchman's sheds were usually small, single story buildings providing shelter for a crossing guard who controlled surface traffic near tracks in a town.

A considerable number of structures and buildings were also associated with the maintenance of track, cars, and locomotives. Roundhouses or engine houses, large buildings of wood, metal, concrete or brick, were used to store, service and repair locomotives. Adjacent to these might be machine and blacksmith shops, where parts could be made or repaired. To move locomotives in and out of these buildings, an outdoor turntable, consisting of a pivoting section of track over a pit, was located close by. Because of the hot Arizona sun, work on freight and passenger cars would frequently be performed in a car shed, a roofed, open-sided structure which covered several sections of track. The car shed might also be used to store cars and cabooses. Separate one-story wood or metal sheds were commonly used to store hand cars and other maintenance of way vehicles. Tool sheds of varying types would also be present at maintenance locations.

II. Administration

The day-to-day administration of a railway system required a variety of structures and buildings for supervisors and employees. Systems office buildings, which could be of any style or material, and large or small in size, would usually be present at division points. In locations with busy yards, there would generally be a yard office, where yard supervisors and other administrators would have offices, and where crews would check in and have lockers and shower rooms. In a yard where two or more tracks, or more particularly where two or more railways came together, there might be an interlocking tower, a raised structure where the yard supervisor could view the activity of the junction.

In addition to providing places for work and administration, railroads often furnished employee housing and recreational facilities. At strategic points on the line, a multiple-unit dormitory or bunkhouse was constructed. This might be used by crews off duty, or for men working on construction or repair projects. (In nineteenth century and current railroad worker's parlance, at least on the Santa Fe, this kind of building is called a "section house," but for purposes of this report, the more descriptive term will be used.) A section house here will mean a detached residence, often for use by an agent and his family. It was a single family dwelling, usually of one story, of wood, brick, stucco, or even metal. In larger towns or division points, employees might be provided with some sort of recreational facility, which might be a club house, meeting hall, library, billiard room or the like. In some locations a mess hall or dining room was available. This could be a separate building or incorporated as a part of the other group services. In a construction camp, a dining hall might be a large, partially walled tent. At early construction camps or railheads, additional employee services might take the form of a commissary or company store.

III. Commerce

The commercial activities of railways, including the hauling of freight and passengers, required certain specialized buildings and structures. Most passenger stations served both commercial and operational functions. Between 1877 and 1970, when passenger service was still an important feature of company business, the average station, big or small, had a sheltered waiting room, a ticket office, baggage area, and telegraph office. Many stations also contained living quarters for the agent. The agent sold tickets, aided passengers, and communicated with train crews (both freight and passenger) by passing on orders or setting the train order board. Long after passenger service ended at most stations, the agent remained to direct local operations. Larger stations might include a variety of other services, including hotel rooms, restaurants, and shops. Occasionally these services were housed in a separate building, large or small in scale.

The handling of freight involved an array of structures, including warehouses, loading docks, scales, and scale houses, and freight offices. All of these functions might be combined with a passenger station, but a freight depot would not make provision for passengers.

TRANSCONTINENTAL RAILROAD PROPERTY TYPE OUTLINE
And Sites Listed on the Arizona Historic Property Inventory

I. System

A. Construction and development

1. Camp

a. survey

b. construction

BLM AZ 020-1340, Gila Bend
ASM AZ T:15:12, Buchan siding
BLM AZ 050-1048, Atlantic and Pacific
SP construction kitchen, Willcox
BLM AZ 020-1411, Yucca

2. Roadbed, grade, track

3. Bridge

SP San Pedro Bridge, Benson
AT&SF Canyon Diablo Bridge
CNF AR 03-04-02 1199 trestle
CNF AR 03-04-02 1198 log trestle
CNF AR 03-04-02 1196 trestle
SP Bridge Yuma
SP Salt River Bridge
First A&P bridges site

4. Tunnel — AT&SF Johnson's Canyon tunnel

5. Culvert

6. Materials source

a. quarry

1) stone
2) ballast — NA 10667, cinder pit
3) coal

b. lumber, sawmill

B. Operation, system and stock

1. Water system

a. pipeline

b. storage tank, tower, fuel and water tanks, standpipe
Kingman

c. dam, reservoir, well
Ash Fork Steel Dam
AT&SF dam at Williams
Walnut Canyon Dam

2. Fuel

a. coaling tower — Coaling Station, Bowie
Coaling Station, Tucson

b. oil tank — SP oil house #3,Tucson

c. ash pit

d. sand house and tower

3. Power plant, boiler room

4. Other

a. ice house, ice plant, cooling tower

b. watchman's shed

c. yard tower

d. signal, order board

C. System and Stock Maintenance

1. Roundhouse, engine house

2. Turntable

3. Car shed

4. Workshop, blacksmith shop

5. Tool shed

6. Locomotives/rolling stock AT&SF Locomotive #3759, Kingman

7. Phone booth

II. Administration

A. System

1. Office building — SP offices, Phoenix
AT&SF offices, Winslow, La Posada

2. Interlocking tower

3. Yard office

B. Employees

1. Bunk house

2. Section house — AT&SF employee's house, Williams (destroyed)
Fourteen AT&SF cottages, Winslow

3. Club house, meeting hall, recreation room

4. Mess hall, dining room

5. Commissary, company store

III. Commerce

A. Passenger

1. Station — SP Depot, Yuma
SP station/hotel site, Yuma
Blaisdell depot site, Yuma
SP depot, Casa Grande
Union station, Phoenix
SP depot, Gila Bend (moved)
SP depot, Mesa (destroyed)
AT&SF depot, Holbrook
AT&SF station, Winslow (La Posada)
AT&SF station, Williams (Fray Marcos)
SP station, Benson (destroyed)
SP station, Tucson
SP station, Willcox
AT&SF depot, Kingman
SP station, Tempe
KNF AR-03-07-01 885, Aubrey
ASM AZ G:9:5 Antares

2. Hotel — SP station/hotel site, Yuma
SF Hotel Offices, La Posada, Winslow
SF RR Fray Marcos Hotel, Williams

3. Restaurant

4. Shops, stores

B. Freight

1. Depot	SP Freight depot, Tucson SF freight depot, Flagstaff AT&SF Freight depot, Williams SP station and freight depot, Tempe SP express office, Yuma SP freight depot, Yuma
2. Warehouse	SP outbuilding, Tucson (#75) SP outbuilding, Tucson (#74) SP storage building, Tucson (#73)
3. Scale house	

* Abbreviations used:

BLM	=	Bureau of Land Management
ASM	=	Arizona State Museum
CNF	=	Coconino National Forest
KNF	=	Kaibab National Forest
NA	=	Museum of Northern Arizona
SP RR	=	Southern Pacific Railway
AT&SF RR	=	Atchison, Topeka, and Santa Fe Railway

TRANSCONTINENTAL RAILROAD SITES IN ARIZONA
PREDICTED PROPERTIES

To arrive at the following list of probable railroad sites in Arizona, we began with an array of maps and basic sources. These included the data in the USGS surveys (Darton 1915, 1933), the General Land Office Maps, the county atlases, current USGS maps, and the Sanborn Fire Insurance maps for towns and cities. In arriving at this basic list, we also consulted Arizona Place Names (Granger 1960) and the files of the Arizona State Library and Archives. Where necessary, these sources are indicated on the list next to the locations. In some cases, possible railroad sites were located which had no obvious place name designations; these are included in the list with only their township and range referents. Some place names were found on early railroad maps but no other information was found to indicate what facilities were found at that location--these names are included on this list. It is also possible to designate sites by their railroad milepost numbers, but as the references for these have changed through time, this system was not used here.

For purposes of this list, a "station" will have here its railroad usage, which means any location where a train might stop, from a major passenger depot to a train order stop. A "siding" is simply an additional track or tracks for passing or loading. Significantly absent from this assemblage are references to most construction camps, which were usually too ephemeral to be recorded by map makers.

ATCHISON, TOPEKA, AND SANTA FE RAILROAD
PREDICTED PROPERTIES IN ARIZONA, EAST TO WEST

Lupton [T23NR31E]
station

Allentown [T22NR30E/22]
station, 2 tool houses, 2 houses (GLO)

Houck [T22NR29E/SE1/4]
siding, coal chute, water tank, section house, signal maintenance residence, two story depot with residence

Querino [T21NR29E]
[T22NR29E/26]
tank, mill, Bennet's store and house, saloon, corral (GLO)

[T22NR29E/33]
boarding house (GLO)

Sanders [T21NR28E/13:14]
station, section house (GLO)

Chambers [T21NR27E/25]
depot, telegraph station, water tank (USGS)

Navajo [T20NR26E/24]
station, cemetery (USGS, GL0)

[T20NR26E/28]
engine house and tank (GLO)

Bibo (USGS Pinta) [T20NR26E/31]
siding

Adamana (GLO Carrizo) [T18NR23E/8]
station, small hotel (ASLA hotel and P.O. fire 6/9/66)

Carrizo [T18NR22E/13?]

Aztec (USGS Arntz) [T18NR22E/30]
siding, school (ASLA)

Holbrook [T17NR21E/6]
platform, station, restaurant (Sanborn 1890), railroad depot with freight house and platform, 40,000 gallon water tank, (Sanborn 1896), enlarged depot, standpipe, 150,000 gallon pumping station near town (Sanborn 1910), freight platform, section house with outhouse, hand car shed, depot and freight house, steel standpipe, 67,500 gallon filter tank, well and pump house (Sanborn 1916), 2 tool houses, Holbrook Ice and Light plant (Sanborn 1927)

Penzance [T17NR20E/5?]
siding

Joseph City [T18NR19E/21]
junction

Manila [T18NR18E/15]
siding

Hardy (USGS Hibbard) [T18NR17E/11]
siding

Hobson [T18NR16E/1?]

Winslow [T19NR15E/25]
town, *division point*; roundhouse, brick hot water tank, steel hot water tank, blacksmith shop, machine shop, turntable, office, freight house, lamp and tool house, hospital, company reading and bath rooms, passenger depot and hotel (Sanborn 1910), pipe shop, electric shop (Sanborn 1915), ice plant with 50,000 gallon water tank, 13 dwellings (Sanborn 1927)

Moqui [T19NR14E/12?]

Dennison [T20NR14E/31]
siding, station (GL0)

Sunshine [T20NR12 1/2E/13]
station, tank, bridge 306A (GLO)

Canyon Diablo [T21NR12E]
bridge, 2 former bridge foundations, 2 construction camps, shed, station, telegraph, graves, ruins (USGS)

Hibbard [T21NR11E/22]
siding, loading pens, 2 tanks, Babbitt Bros. trading post (GLO)

Padre Canyon Bridge [T21NR11E/21:22]
bridge, old bridge site, construction camp

[T21NR11E/21]
old water tank (GLO)

Angell [T21NR1OE/23]
siding, station telegraph, section house, "Y" siding, water tank (GLO)

Winona (Darling) [T21NR9E/14]
station (GLO), ballast quarry--cinder pit

Cosnino [T21NR9E/18]
station, siding, section house (GLO)

Cliffs T21NR8E/8]
siding, station, Walnut Canyon Dam, sandstone quarry

Flagstaff [T21NR7E/16:17]
water tank, scale house, passenger station, freight house, (Sanborn 1890), water tank, coal shed, office, scales, tool house, bunkhouse, dwelling with billiard room, water tank on trestle, (45,000 gallon), stage office, waiting room, baggage, freight, proposed platform (Sanborn 1892), section houses, tank, scales, stage office, passenger/freight office, shed, platform, coal shed, tool house (Sanborn 1895), tool house, coal bin, 2 section houses, standpipe, passenger/freight, scale, shed (Sanborn 1901), tool house, 2 section houses, standpipe, coal bin, locomotive standpipe, passenger/freight depot, proposed platform and freight house (Sanborn 1910), coal sheds, pump house, hand car shed, wood and coal yard, section house, 2 dwellings, standpipe, depot, separate freight house, stage building, hose on reel, scale, well and electrical (Sanborn 1916)

Riordan [T21NR6E/15:22]
siding

Bellemont T21NR5E/2]
station, section house, residence, P.O., water tank (GLO)

Nevin
siding, cinder pit (GLO)

Maine [T21NR4E/26]
siding, section house (GLO)

Chalender [T21NR3E/I]
station, siding (GLO), P.O. to 1897 (ASLA)

Horn [22NR3E/36]
siding, store, pumphouse, tank (GL0)

Williams [T22NR2E/28:33]
station, tool house (GLO), 3 dwellings, bunkhouse, help's sleeping room, oil house, coal house, iron storage, tool house, blacksmith, pump house, stone cistern, express office, depot, offices, oil shed, coal shed 2 ice houses (Sanborn 1892), section house, section tenements, Hotel Fray Marcos and station, round house (Sanborn 1910)

Supai (GLO Soupai) [T21NR1E/2]
siding, junction, section house, pump and water tank (GL0)

Sereno [T22NR1E]
siding

Johnson's Canyon [T21NR1W]
tunnel, Simm's construction camp

McLellan [T21NR1E/5:4]
siding, sheep corral, log house cemetery (GLO)

Corva [ ]
Junction

Daze [T22NR1W]

Fairview [ ]
siding

Ash Fork [T21NR2W]
town, 2 water tanks; Harvey Hotel "Escalante", station, junction (Darton 1933), 2 freight sheds, tower, depot and Harvey House, 25,000 gallon concrete cistern, 50,000 gallon *steel tank* 100 feet above base, coal storage, duplex, dwelling, freight storage (Sanborn 1927)

Pineveta (Moore Peneveta) [T22NR3W]
section house (Moore)

Horseshoe Bend/ Gleed [ ]
section house (Moore)

Crookton [T22NR9W]
siding, section house, telegraph station (Moore)

Pan [ ]
section house (Moore)

Seligman [T23NR6W/36, T22NR6W/I]
town, division point, Harvey House, reading room, round house, tanks, machine shop, oil tanks (GLO), station house, roundhouse moved from Williams, rock dam, turntable, sand house, oil spout, water spout, "Y", pens, pump house, power house, Harvey House, (Havasu), reading room, section houses, company supply store (Moore)

Chino [T23NR6W/32:33]
siding (GLO)

Aubrey (GLO Audley) [T23NR7W/4]
station, ditch, reservoir (GLO), section house (Moore)

Pica [T24NR8W/17:20]
station, standpipe (GLO), water tank (county atlas), wells (Darton)

Yampai [T24NR9W/2]
depot, house, bunkhouse, "Y" (GLO), section house (Moore) scenic Yampi or Yampai canyon (USGS)

Fields [T25NR9W/32]
flag station, bridge (GLO)

Nelson [T25NR1OW/35]
depot, P.O. and store, lime quarry and kiln (GLO) Nelson Canyon tunnel, bridge (Armitage, 1947)

Ballast Pit [T25NR1OW/29]
ballast pit (GLO)

Shipley [T25NR1OW/30]
siding (GLO)

Peach Springs [T25NR11W/26]
corral, section house, water tank (GLO), town, station, roundhouse

Cherokee [T24NR11W/7]
station (GLO)

Truxton [T24NR12W/19]
siding, telegraph

Crozier [T24NR13W/35]
siding, station, water tank, pump house, house (GLO)

Valentine [T23NR13W/10:15]
town, school, train order station, homestead (GLO)

Hackberry [T23NR14W/13]
trestle, section house, depot, pump house (GLO)

Antares [T24NR14W/31]
station (GLO)

Hualapai (USGS Walapai) [T223NR15W/28]
siding

Sombra [T22NR16W/12]

Berry [T22NR16W/27:34]
siding (GLO)

Louise (County atlas Getz) [T21NR16W/8?]
siding

Kingman [T21NR17W/24 SW1/4]
passenger station with freight house and platform, elevated coal bins (Sanborn 1890), Harvey eating house, depot with freight house, coal bunkers, pump station, water tank (Sanborn 1901), office, iron, lime storage on platform, 2 coal sheds, freight platform 3 dwellings, AT&SF station, freight house, pump house, pumping station, 20,000 gallon underground oil tank, oil pump, 2 dwellings, section house, 2 sheds, 2 coal sheds, Mexican tenements made of ties, 150,000 gallon standpipe, water purifying standpipe (Sanborn 1916), 2nd standpipe, 150,000 gallon well and pump house, 2 small section houses

McConnico [T20NR17W/4:5]
siding, Junction (GLO)

Harris [T20NR17W/9]
siding

Hancock [T20NR17W/18]
station (GLO)

Griffith [T20NR17W/31]
siding, junction

Drake [T19NR17W/7]
siding

Kaster [T19NR17W/30]
siding

Athos [T18NR17W/7:18]
siding, station (GLO)

Yucca [T17NR18W/12]
warehouse, tool houses, pump house, depot, water tanks, 2 houses, hut, store, cottages (GLO), BLM AZ-020-1411

Haviland T16NR18W/19:20]
siding

Franconia [T15NR19W/8]
siding, station 2 houses (GLO)

Powell [T16NR20W/8]
siding, station, old line junction, 2 houses (GLO)

Topock [T15NR21W/2]
siding
[T16NR21W/35]
pump station (GLO)

Mellen [T115NR21W/3?]
Mellen's tank (GLO)

Topock Bridge [T15NR21W/2:3]
Colorado River Bridge, old bridge site, construction camp

Colorado River Bridge [T8SR23W/35]
original bridge 1878, swing span 1895, current bridge 1926

Yuma [T8SR23W/21:22]
SP Hotel, platform, oil house, ice house, caboose shed, lime house (Sanborn 1893), car repair shed and yard, club house, freight house, hose cart shed (Sanborn 1911), round house, turn table, power house, yard office, 150,000 gallon water tank, tool house, hose cart shed, hand cart house, store house, pump house, bunk house, steel oil tank on steel frame (Sanborn 1927)

Patio [ ]
Yuma yard, freight station, 2 story yard office

Ivalon [T9SR23W/1:2]
east yard (USGS)

Araby [T9SR22W/4]
station,section house--realigned site, archaeological site

Fortuna [T8SR21W/31]
passing siding

Blaisdell [T8SR21W/30]
single story station, P.O.

Dome (Gila City) [T8SR21W/12]
station, schoolhouse, Dome Hotel, depot (GLO 1919), Gila City (GLO 1891), water tank (USGS), double roof section house, construction camp

Granite [T8SR20W/18]
siding, spur, granite quarry, rock crusher (GLO 1919)

Ligurta [T9SR20W/2 (GLO T8SR20W)]
siding, flag station (GLO)

Adonde (Wells) [ ]
station, tent houses, hotel, turntable, in 1879 had double roof section houses, realignment 1891

Wellton [T9SR18W/5:6]
town, 2 water tanks, pump house, train order station, junction for cut off for Phoenix

Asher (Noah) [T9SR18W/2]
passing siding (Granger--Max B. Noah)

Tacna [T8SR17W/25]
town, siding

Gael [T8SR17W/25]
siding (Granger--water siding/Robert Gael)

Colfred [T8SR16W/28]
siding (Granger--Col. Fred Crocker)

Pembroke [ ]
station, water siding

Mohawk [T8SR15W/13]
order station, section house (1879)

Kim [ ]
siding

Texas Hill [T8SR13W]
construction site, 5 miles wooden pipeline from Gila River

Stoval (Chrystoval/ Texas Hill) [T8SR13W/4]
siding, station (30 people in 1913)

Musina [T7SR12W]

Dateland [T7SR12-13W]
siding

LeSage [T7SR12W/19]
well

Aztec [T7SR12W/13]
siding, station, well, steel water tank

Stanwix [T7SR1OW/6:7]
freight and passenger station under construction 1879

Sentinel [T6SR9W/32]
siding, 2 water tanks, large pump house

Tartron [T6SR8W/29]
siding (Granger--Tarton)

Piedra (Painted Rock) [T6SR7W/16]
siding, Painted Rock station (GLO 1893), cemetery (USGS)

Theba [T6SR6W/9]
siding

Smurr (Sumurr) [T6SR5W/6]

Gila (Bend) [T5SR4W/31]
town, junction, reservation, yard office, office, 310,000 gallon steel tank, steel fuel oil tank, oil pump, sump, 5 dwellings, SP power house (boiler room, engine room), sump pump house, round house turntable, sand house, dryer, oil, hose cart, car shed, SP depot with freight house, hospital, dwelling, hose cart 8 dwellings (Sanborn 1931)

Coledon [T5SR4W/27?]
corrals (Granger--Cole 1909)

Bosque [T5SR3W/22]
siding, site of locomotive explosion, cemetery, foundation (Granger--Phoenix Wood and Coal Co.)

Ocapos [T5SR3W/13]
siding, cemetery (USGS) (Granger--rev. So. Pa. Co.)

Shawmut [T5SR2W]
siding

Estrella [T5SR2W]
passenger depot, outhouses, shed, root cellar, bunk house, train order hoop post, car body bunk house, 2 portable houses, 2 septic tanks, 34 foot car body, section house, tie house, tool house, cistern, toilet, 2 adobe bunkhouses, signal tool house, signal maintainer's house, water tank

Buchan [T4SR1W/34]
siding

Mobile [T4SR1E/28:29]
station, section house, 6 bunkhouses (34 foot and 28 foot car bodies), tool house, cistern, portable house, pumper's house, cesspool, garage, tool house, school house, toilets

Enid [T4SR1E/24]
siding, section house, bunk house, tool house, cistern, portable house, tie-lined dugout, outhouse, tie shed

Heaton (from. Maricopa) [T4SR2E/14]
hotel, SP warehouse, office (5 miles west of Maricopa, name changed in 1887)

Maricopa [T4SR3E/28]
station, junction, pumping station, water tank, freight depot, frame platform, hose house, passenger depot (two story), stock pen, track scale, 3 car bodies for switch man, telegraph office, 3 car bodies for telegraph operator

Cowtown [ ]
2 mi. east of Maricopa

Lirim [T5SR4E/8?]
siding

Bon [T5SR4E/24]
siding (Granger-- H.G. Bonorden)

Nunez [T6SR5E/4?]
siding, (Granger--Ventura Nunez)

Casa Grande [T6SR6E/30:29]
town, construction terminus, passenger station,(original 1879) freight house, platform, platform with shed (Sanborn 1890), freight platform (Sanborn 1914)

Arizola [T7SR6E/12?]
station, P.O., townsite 1893, hotel burned 1894 (ASLA), 30 people living here 1933

Toltec [T7SR7E/21:27]
siding

Eloy [T8SR8E/6]
town, station, agricultural shipping

Picacho [T8SR8E/15]
single story station, junction, switch tower 1 mile west, train order station

Ocatilla [ ]
siding, train order station

Wymola [T9SR9E/10]
siding

Montrose [T9SR1OE/30]
siding

Redrock [T1OSR1OE/4] 2
story station, junction, water tank

Avra [T1OSR1OE/22 or 23?]
siding

Naviska (Desert) [T1OSR1OE/36]
siding

Marana (GLO Wakefield) [T11SR11E/22]
siding (Granger--P.O. 1924)

Papago [ ]
siding

Rillito [T12SR12E/6]
single story station, water tank (GLO)

Cortaro [T12SR12E/26]
siding, 80 people 1933

Kino Siding [T13SR13E]
siding

Jaynes [T13SR13E/8]
siding

Stockham [ ]
siding (John Stockam, Jr.--Granger, 1960)

Tucson [T14SR14E/18, T14SR13E/12:13]
town, iron works, San Xavier Hotel, (destroyed 1903) depot (2nd constructed 1907, remodeled 1942), agent's house, ice house store room, car shop, machine shop, boiler, round house bunk house (Myrick 1975)

Polvo [T14SR14E/28]
siding

Wilmot [T15SR14E/I?]
siding

Rankin [T15SR14E/8]
siding

Esmond (Papago) [T15SR15E/25]

Cruz [ ]
siding

Rita [T15SR15E/26?]

Vail [T16SR16E/16]
station 1905-06, Walter Vail (Granger 1960)

Irene [T16SR16E/24]
siding

Empire [T16SR16E/24:25]

Cienea Creek [T16SR17E/19:30]
2 bridges, scenic

Pantano [T16SR17E/34]
section houses,water tank, moved 1892, original had single-station, telegraph, turntable, water tank, P.O. 1880

Marsh [T16SR17E/26]
siding

Buell [T17SR18E/7]
siding

Catalina [T17SR18E/4]
siding

Amole [T17SR18E/3]
siding

Mescal [T17SR19E/5]
single story train order station, junction, overpass, coaling tower

Chamiso [T16SR19E/36]
siding

Benson [TIISR20E/10]
express office, dwelling, station, freight house, connected dwelling, tank house, coal platform (Sanborn 1890), water tank, coal shed, storage, coal, depot, office, hand car, hose cart, dwelling between tracks (Sanborn 1931)

San Pedro River Bridge [T17SR20E/II]
bridge

Fenner [T17SR21E/7]
siding

Curvo [T16SR21E/9]
siding

Sibyl [T17SR21E/15]
single story train order station

Tully [T17SR21E/2:11]
siding (Granger--P.O. 1880)

Ochoa [T17SR22E/5?]
siding

Lancha [T16SR22E/34?]
siding

Dragoon [T16SR23E/19]
single story station (Dragoon Summit GLO)

Manzoro [T16SR23E/14]
siding (Granger--Manzora, Golden Rule Mine)

Cochise [T15SR24E/20]
town, hotel, store, train order station, depot with freight house, office dwelling, 2nd platform (Sanborn 1927), two story station built in 1898, reduced to one story in 1941, retired in 1959

Hado [T14SR24E/27]
siding

Willcox [T13SR25E/31 T14SR25E/6]
town, junction, depot with freight house (built 1880), telegraph office, platform, pump house with well and tank, ice house, warehouse with platform (Sanborn 1893)

Drury [T13SR25E/16]
siding

Raso [T12SR26E/36]
siding, railroad pass

Alrich [T12SR26E/34]
siding

Luzena [T12SR27E/32:33]
siding, section house (GL0)

Cholla [T12SR27E/35]
siding

Bowie [T13SR28E/3:4]
town, junction, section house (GLO) fire January 5, 1984, (ASLA) hose cart, depot, hotel, freight house, tent on frame, rooms in row, laundry, office, storage, two 50,000 gallon water tanks, supply house, office, pump house, 5 dwellings, dwelling of old ties, oil tanks, depot hotel rooms across street (Sanborn 1915)

Holt [T13SR29E/7]
siding (Granger--Col. J.M. Holt, cattle shipping)

Olga [T13SR29E/14]
siding

Karro [T13SR30E/21]
siding

San Simon [T13SR31E/30]
town, station, water tank, coal shute, telegraph, water tank

Bawtry [T13SR31E/34:35]
siding

Vanar [T14SR32E/5]
siding

SOUTHERN PACIFIC RAILROAD PHOENIX CUT OFF
PREDICTED PROPERTIES IN ARIZONA WEST TO EAST

Ming [T8SR17E/30]
siding

Gila River Bridge [T8SR17W/21]
bridge

Yano [T8SR17W/21]
construction camp

Roll [T8SR17W/2:10]
station (Granger--John H. Roll, P.O.)

Tyson [T7SR16W/23]
siding

Growler [T7SR15W/15:16]
siding, train order station

Burger [T6SR14W/33:34]
siding

Kofa [T6SR14W/25]
siding, station

Clanton [T6SR13W/16:31]
station

Horn [T6SR13W/11:12]
siding, station Fort Horn Military reservation (USGS)

Athel [T5SRIIW/20]
siding

Hyder [T5SRIIW/I]
siding, single story wooden station

Camel [T4SRIOW/27]
siding

Montezuma [T4SR9W/18]
siding (ASM survey)

Papago [T4SR8W/16]
siding (ASM survey)

Saddle [T3SR8W]
train order station, water (ASM survey)

Harqua [T2SR7W/20]
station (GLO)

Gillespie [T2SR7W/16]
siding (ASM survey)

Crag [TISR6W/31:32]
siding (ASM survey)

Arlington [TISR6W/13:24]
train order station, water, Arlington corral 1900 (ASLA)

Dixie [TISR5W/10]
siding

Hassayampa [TISR5W/12:13]
siding, station, construction point

Palo Verde [TISR4W/5:4]
siding

Conger [TISR4W/3:4]
siding

Buckeye [TINR3W/32 TISR3W/5]
town

Liberty [TINR2W/29]
siding, station

Norton [TINRIW/I9]
station

Litchfield [TINRIW/16]
single story mission revival station 1926, junction

Agua Fria River Bridge [TINRIE/11:14]
bridge

Cashion [TINRIE/7:18]
siding

Tolleson [TINRIE/9]
station

Fowler [TINRIE/1:2 TINR2E/6:7]
siding

Pipeola [ ]

Cotpro [ ]

Campo [TINR2E/12]

Phoenix [ ]
city, many properties, 1926 and after

Salt River Bridge [TINR4E/16]

bridge

Tempe [TINR4E/21]
town, station (original wooden single story, destroyed by fired in 1923, present brick 1926, now a restaurant), junction

Normal Junction [TINR4E/23]
station

Frankenburg [TINR4E/24]
siding

Mesa [TINR5E/22]
AZ Eastern depot with freight house, section hand car shed, 8 dwellings, ice company, factory (Sanborn 1923), 2 story mission revival station built in 1931, destroyed by fire

McQueen [TINR5E/34]
siding, junction

Tremaine [TISR5E/10]
siding

Falfa [TISR5E/15]
siding

Chandler [TISR5E]
town, single story mission revival station

Serape [ ]
siding

Santan [ ]
siding (Granger--town)

Dock [ ]
siding, end of line, section houses, corrals

Olberg [ ]
station (Granger--P.O. 1927)

Blackwater [ ]
station (Granger--P.O. 1907-1931)

Poston [ ]
siding, station

Gila River Bridge [ ]
bridge

Coolidge [T6SR8E/22]
town, one and one-half story mission revival station with freight house, hotel fire 1936 (ASLA)

Randolf [T6SR8E/IO]
station, packing shed (Granger--Col. Epes Randolph, P.0. 1925)

La Palma [T6SR8E/27]

Topaz [ ]
siding

Peak [ ]

Information Gaps

There have been railroad systems in Arizona for more than one hundred years, thousands of miles of track have been laid, legions of workers have spent lifetimes on the railways, uncounted photographs have been taken and endless reams of paper consumed in railroad business, and yet only a tiny percentage of this enormous activity remains in the state's records today.

The Nature of the Information Gaps

The gaps in our information are of principally two types: I) documentary or archival, and 2) physical. The documentary resources, including historic records, letters, diaries, account books, annual reports, employees; schedules, photographs, blueprints, drawings, plans and other paper records, are far from complete. This is in some degree due to the historic pattern of development of the railroads themselves--companies were based in cities outside of Arizona; they were sold, consolidated or abandoned while their records remained in their various headquarters, rarely becoming the focus for nationwide archival collections or computerization. Those documents that do exist in Arizona are scattered throughout the state in several public and private institutions, including the Arizona Department of Library and Archives, Special Collections at the University of Arizona, the Arizona Collection at Arizona State University, the Arizona Foundation, Special Collections at Northern Arizona University, the Museum of Northern Arizona in Flagstaff, and Sharlot Hall Museum in Prescott. Particularly scarce in the documentary resources of all of these collections are contemporary accounts or official papers concerning the construction and maintenance of the massive physical plant for the transcontinental systems.

There is no systematic catalogue or inventory of the holdings of all institutions, so each must be visited separately when research is undertaken. Moreover, the finding aids of most of these libraries and archives are limited, their cross-referencing of railroad materials, particularly of photographs, generally minimal. The photograph collections themselves are surprisingly small, and often composed of individual locomotives, wrecks, or unhelpful postcard views. Construction, operation, and even buildings and structures (with the possible exception of stations) are not well documented in any known photographic collections.

It is beyond the scope of this report to locate and examine private collections or those in each small historical society in the state. At present, no agency is known to have an active program of collection of railroad materials, nor do large agencies keep track of the location of private or smaller holdings in any formal way.

The lack of information about the physical manifestations of the transcontinental railroad effort in Arizona is, at first glance, surprising. After all, it is all around us, archaeological survey is going on constantly, community surveys are becoming common, and the systems are still operating. But the record of formal recording of railroad sites is probably only a fraction of the potential volume of material. One of the most problematical situations is the lack of standardization in the archaeological site records in the state. Each agency uses different forms, different numbering systems, different ways of marking maps, and different standards for completeness of records when

undertaking surveys. There is thus little comparability between the work of the USDA Forest Service, the Arizona State Museum, the Museum of Northern Arizona, and the numerous private contractors within the state. It has also frequently been the case that agencies contracting to undertake archaeological surveys are concerned primarily with prehistoric resources, and often ignore or record in a perfunctory manner the historic material in their assigned regions. Although there are some recent exceptions to this practice, this behavior has contributed, and still produces, a thin record of the physical railroad resources in Arizona.

Adding to these difficulties is the indifference of the railroad companies to the documentation of the historic resources they still own and use. No railroad company in Arizona has granted owner consent to National Register nomination of historic railroad buildings or structures.

Reasons for the Information Gaps

The reasons for the gaps in our knowledge are for the most part readily apparent: collections are disparate and unsystematic, physical surveys have frequently ignored historic material, and the commercial operators are not supportive in the documentation effort. But efforts to find out about some aspect of railroad history are going on all the time, by railroad buffs, scholars, planners, architectural historians, historical archaeologists, film makers, novelists, biographers, playwrights, and poets. Still, each is isolated from the another, so the interest in railroad information appears sporadic and disparate. Since there appears to be no steady and predictable use of this information, there is no systematic demand for collection and documentation.

Ways to Fill the Information Gaps

To improve access to railroad information in the state, several actions on the part of archives might be encouraged. First, a statewide computerization of archival resources should be undertaken. At present, archivists in the state are having an active discussion about the MARC-AMC format, an international archival computer access system which is already in place in many states and some European cities. Meanwhile, expanded finding aids and detailed cross-referencing of existing catalogues should help to reveal more railroad-related resources already in collections. Active collecting of historical railroad documents, along with their appropriate information (including, for example, oral histories) should be undertaken by all institutions which maintain this kind of archive.

To improve the situation concerning archaeological railroad resources, two goals are of equal importance: 1) improved training of surveyors to appreciate and recognize historic railroad material as it appears in the archaeological record, and 2) standardization of archaeological site recording for the state. This goal, already a priority of the SHPO, should be pursued aggressively with both staff and funding. Another avenue to follow in improving knowledge and preservation of physical resources is that of diplomacy. Appropriate political efforts and active relationships with the railroad administration must be undertaken if mutual understanding is to be gained concerning commercially viable railways and significant historic resources.

Many of the solutions that would ameliorate the information gaps--data entry, archival cataloguing, active collection, photograph copying, archaeological training, computerization--require liberal application of professional staff time and monetary support. But active and unified support will be necessary to preserve and maintain the physical and documentary resources that are important evidence in Arizona's developmental history.

CURRENT STATE OF PRESERVATION

As the transcontinental railroad system grew from 1877 to 1920, more and more resources developed along the right-of-way. The complexity of the railroads' operation and maintenance facilities is evident in the property type descriptions. Between 1920 and the end of World War II, railroad development reached a plateau. Since the war, the number of extant historic resources has been steadily and significantly declining. The reasons for the loss of resources, in all property type categories, are both independent from and intrinsic to railroad operation and development.

Internal Factors Affecting the Preservation of Transcontinental Railroad Property Types

The principal cause of the loss of railroad-related properties is the change in railroad technology. The shift to diesel locomotives changed railroad operations much as the transition from propeller to jet engines revolutionized the airline industry. Diesel locomotives could pull heavier loads over longer distances, so sidings became less frequent. The necessity for water and oil stops (and earlier coal stops) vanished.

Only a few steel water tanks and stand pipes (many given to local communities) remain. With longer and heavier loads the roadbed had to be improved. Following World War II, many bridges were replaced, culverts were strengthened, and dangerous sections of track were realigned. Ballast quarries were still needed and were developed into large mining operations. The post-war era also saw a shift away from icing facilities to refrigerated freight cars.

The change from steam to diesel led to a diminished need for maintenance facilities. Most roundhouses, turntables, and machine shops were closed. Only in Tucson are car sheds still in use. As maintenance became mechanized, facilities for tools and equipment were spread further and further apart.

Both the Santa Fe and Southern Pacific have continued to consolidate their administrative activities, so that now only Winslow and Tucson remain strong centers of railroad operations in Arizona. The Phoenix Southern Pacific yard still has a switching tower, but it dates to the 1950s. Employee housing, section houses and recreational facilities are gone or have changed use and ownership.

The property type still well represented by a variety of buildings is that of commerce. This is probably the result of superior construction, continued use by the railroads for administrative or operational functions, or adaptive use by local communities. Most of these structures are passenger and freight stations, as well as some Harvey houses. Winslow, Flagstaff, Williams and Kingman on the Santa Fe, and Yuma, Phoenix, and Tucson on the Southern Pacific have the best examples, most in the Mission Revival or Spanish Colonial Revival styles. Early or minor stations, usually of wood, have been dismantled or destroyed by the railroads themselves.

It is somewhat ironic that the very forces for destruction of resources are those that often preserve the archaeological evidence of railroad activity. In the periodic

consolidation, economization and restructuring efforts by the railroads, many once important sites were simply abandoned. A few, like Pantano and Vail, were completely bulldozed away, but many sites, from construction camps to watering stations, from cattle chutes to coaling stations, still exist.

External Factors Affecting the Preservation of Transcontinental Railroad Property Types

The primary factor affecting the preservation of railroad related properties has been the growth of other forms of transportation. Both commercial airline travel and personal automobiles have greatly reduced or eliminated the demand for railroad passenger service. Freight service has been most affected by Federal funding of the interstate highway system which has made trucking an economical and feasible alternative to rail shipping. Highway development also obviated the need for all industrial warehousing functions to be tied to the railroad right-of-way.

As Arizona's growth exploded after World War II, regional development shifted away from the dirty, noisy industrial railroad areas, so the few remaining resources continued to stand in static, unchanging, depressed areas of communities, far away from airports or freeway interchanges. In some cases, as in Yuma, Tempe, and Williams, new uses have been found for historic railroad resources. Increasing nostalgia for railroading may play a significant part in preserving or redeveloping other railroad resources, including those in Phoenix, Tucson, and some northern Arizona towns.

The Arizona environment has also contributed to the deterioration of railroad properties. The extreme temperature fluctuations, violent winds, heavy rains, hot summers and severe winters all take their toll on unmaintained roofs, drainage systems, exposed wood, brick, and even stone and concrete. Unless resources are regularly maintained, natural forces quickly complete the damage that was initiated by man.

Today the vast majority of railroad related properties are archaeological sites. Extant examples of the creative architectural and engineering works associated with the development of the transcontinental railroad in Arizona are rare indeed. If viewed in the context of the once extensive accumulation of resources, with attention to the extreme importance the railroad had in the development of the territory, it is obvious that the small percentage of resources remaining should be preserved. To determine what is realistically feasible, we must look more closely at the integrity of the remaining resources and at the over all preservation goals.

INTEGRITY EVALUATION CRITERIA

Once a railroad related property is identified and classified into an appropriate property type its integrity must be evaluated. Integrity is the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property s historic.period. The quality of integrity can be applied in seven ways: l) location, 2) design, 3) setting, 4) materials, 5) workmanship, 6) feeling, and 7) association. Because integrity is a quality, its evaluation can and does vary depending upon 1) the property type, 2) the property category (building, structure, object, site or district), and 3) the criteria of eligibility (A,B,C, or D). A generalized view of applying these qualities of integrity is outlined in the table.

APPLICATION OF INTEGRITY QUALITIES

Property Type I: System Related Properties

In general, system related properties will be designated as structures, districts, or sites and in rare instances objects or buildings. Therefore, of the seven ways of applying integrity, location, setting, materials and feeling are more important than design, workmanship or association, except for steel bridges where engineering design and workmanship should be considered, and locomotives and rolling stock, where design and workmanship can be important factors.

For the alignment itself, integrity becomes the key factor for eligibility since significance can be applied to the whole system. Districts which combine several aspects of the system (i.e. grade, bridge, tank, signals, etc.) should be preferred over structure or site nominations. These districts must have integrity of location, setting, and feeling, and, if possible, of materials. Although some abandoned alignments without rails or ties could be considered if multiple features or scenic values are present, the materials of grade, track or ties should not constitute integrity without location, setting or especially feeling unless the district is archaeological in nature. Only specific "high quality" areas meeting multiple criteria and outstanding aspects of the property type should be considered for districts.

Bridges constructed of steel are often unique engineering works and should all be considered eligible if they contain integrity of materials, design, feeling and workmanship. Often setting will add to their integrity but is not essential in evaluating it. Not only are extant bridges important as structures, but earlier bridge locations should be carefully considered for eligibility as sites under criterion D. In these cases materials and location will be the key factor for integrity.

Because only two tunnels exist that are associated with the transcontinental system, they should be considered eligible even if their integrity is marginal. Location and materials should be the key integrity qualities.

Construction and survey camp sites which meet criterion D must have integrity of location and materials. These types of historical sites have become increasingly important in understanding the management as well as the cultural and technological aspects of railroad construction.

CATEGORIES

CRITERIA	BUILDING(S)	DISTRICT	SITE	STRUCTURE	OBJECT
A. Event Association	Location Materials Feeling Association	Location Setting Materials Feeling Association	Location Setting Feeling Association	Location Materials Feeling Association	Materials Feeling Association
B. Person Association	Materials Feeling Association	Location Setting Materials Association	Location Setting Association	Materials Feeling Association	Materials Feeling Association
C. Distinctive type work of a master high artistic value	Design Workmanship Materials Feeling	Setting Design Feeling Materials	Setting Design Feeling	Design Workmanship Materials Feeling	Design Workmanship Materials Feeling
D. Likely to yield or has yielded	Workmanship Materials	Location Materials	Location Materials	Workmanship Materials	Materials Workmanship

HISTORIC

HISTORIC

ARCHITECTURAL

ARCHAEOLOGICAL

Integrity Qualities/Generalized Application

Materials sources, including quarries and lumbering sites, should have direct association with the development of the railroads and have integrity of location, setting, and feeling. A resource in this category should have outstanding qualities of association or setting to be considered for eligibility.

Operationally related properties will be primarily structures and objects. If at all possible these individually eligible properties should be placed within a larger district nomination. Pipelines should have integrity of workmanship and materials, and location and feeling if possible. In addition, dams should have integrity of design and location, and if possible, setting. Water storage tanks and towers should have at a minimum integrity qualities of workmanship and materials, with design and feeling often considered. Location becomes important if the structure is associated with an event and feeling is important if association with a person is specified. Fuel related properties (coaling stations, oil tanks, ash pits or sand houses) are all structures and should have workmanship and material areas of integrity. Other operational properties, including power plants, ice houses, watchman's sheds, and yard towers all have a technical purpose connected with human occupation, so these properties are more correctly labeled buildings rather than structures. These buildings could meet criterion C or D but would rarely qualify as having design integrity. Many of these rare buildings are more likely to yield information, and therefore materials and workmanship are the most important qualities. Feeling may add integrity to a distinctive building meeting criteria C.

Signals and related structures should only be nominated as contributing elements of a district, while locomotives and rolling stock which can be associated with Arizona's transcontinental railroads must have integrity of materials and workmanship.

Property Type II: Administration Related Properties

Administrative properties should all fall under the category of buildings unless they are archaeological sites or are part of a larger historic district. System related administration properties include office buildings, interlocking towers, and yard offices. These buildings, eligible under criteria C, must have integrity of workmanship, materials and feeling, and in some instances, design. If these are archaeological sites, integrity of location and materials is required. If the buildings themselves are likely to yield information, workmanship and materials are required.

Employee related administrative properties include bunkhouses, section houses, club houses, mess halls or commissaries. Like system related properties, these properties are primarily buildings and require the same types of integrity (workmanship, materials, feeling) but many of these buildings will have a design integrity factor which should be considered. Again, archaeological sites must have integrity of location and materials, whereas buildings likely to yield information must have integrity of workmanship and materials.

Property Type III: Commerce Related Properties

Like administrative properties, commerce related properties usually fall within the building category. These buildings are where the public interfaces with the railroads and, therefore in most cases, they have been designed, so design is generally a key ingredient of the integrity of commerce related railroad properties. Existing passenger stations, hotels, restaurants or shops should all be evaluated on their design integrity. Workmanship, materials and feeling all play an important part of integrity evaluation under criterion C. Many of these buildings are significant as advances in construction technology and may appropriately be eligible under criterion D. Workmanship and materials are the key integrity factors for buildings likely to yield information. If, as has happened in many cases, the buildings are destroyed, evolution of these archaeological sites should be based upon the integrity issues of location and materials.

Freight depots, warehouses or scale facilities should be evaluated much as passenger stations, but design may take a less important role than workmanship, materials and feeling. In some cases freight facilities classified under criterion D may yield more substantive data about railroad operations. For freight related archaeological sites, location and materials are the overriding integrity factors.

As with systems related properties, commerce related properties should be included with multi-property historic districts. In these districts, setting, design, and feeling are the most important integrity factors.

Because of the vast destruction of most significant railroad related properties, integrity evaluations should be deemed adequate if the property meets only the minimum standards of integrity.

GOALS AND STRATEGIES FOR TRANSCONTINENTAL RAILROAD PROPERTIES

There are four major goals in the effort to document and preserve railroad related properties in Arizona. It is first necessary to identify, or inventory predicted properties according to the Secretary of the Interior's Standards for Archaeology and Historic Preservation (Department of the Interior, 1983). These inventoried properties must then be reviewed by a professional who can evaluate their integrity and level of preservation. Various agencies may then register a property or district by completing National Register of Historic Places forms according to the guidelines issued in the National Register Bulletin. Once properties have been listed or determined eligible, decisions must be made to treat the property in terms of accepted preservation standards. Treatments can include stabilization, restoration, rehabilitation, maintenance, mitigation, preservation, reconstruction, and interpretation.

A number of strategies or actions may be undertaken to achieve these goals, and they may usually be classed as efforts to influence a person or group to undertake an activity, to establish a program that will lead to achievement of a goal, or to initiate a regulation that will encourage certain parties to take action in regard to historic properties.

The State Historic Preservation Officer may take a number of actions that would aid in the goal of identification of transcontinental railroad properties in Arizona. A significant advancement of knowledge could be achieved if the SHPOs of states along the railroad lines concerned were to form a consortium, and as such approach the major corporate officials of the railroad and encourage them to aid in identification by allowing access to railroad archives and records. Other public agencies, including the National Park Service, the Arizona Department of Transportation, the Bureau of Land Management, and the Bureau of Indian Affairs should be encouraged to inventory in a standard manner all railroad properties within their jurisdictions.

When reviewing and commenting on projects pursuant to the State and National Historic Preservation Acts, the SHPO should be aware of the possible occurrence of transcontinental railroad properties at the locales listed in the "Predicted Properties" section of this report. The SHPO should encourage agencies conducting compliance investigations in these areas to consider the occurrence and possible National Register eligibility of historical-archaeological remains as well as architectural resources which could be impacted by their undertakings.

Identification of sites would also be aided if an agency holding archives could be encouraged to act as a clearing house for documentation of railroad materials. This function might be performed by the Arizona State Library and Archives or the Arizona Historical Society. Development of clearing house records might be aided if research in these areas were encouraged in history departments of state universities and colleges.

Programs to improve identification would include the continued sponsorship by the SHPO of community surveys, in which many railroad related properties are documented in detail. Through its Survey and Planning and Certified Local Governments grants programs, the SHPO should fund projects to identify, evaluate and register

architectural properties associated with the two transcontinental railroads. It would also be helpful to undertake a training program and to establish detailed standards for archaeologists and others who are involved in survey of regions that incorporate railroad material.

The SHPO might initiate legislation (like A.R.S. 41-861), aiding identification by requiring all state agencies to inventory their railroad properties and to provide notification if any of these properties are scheduled for demolition.

As the goal of evaluation requires specialists to undertake determination of eligibility and integrity, the SHPO may encourage those agencies with appropriate professionals to undertake evaluation of railroad sites, and it should continue its program to have staff and consultants evaluate inventoried properties.

By the same token, the SHPO should encourage those agencies with trained personnel to complete National Register nominations of their properties or districts, and under the continuing program established by the SHPO, nomination of districts related to the transcontinental railroads in Arizona should be made a priority. The program of community surveys should continue to encourage district nominations as the final result, so that consultants and volunteers contribute to the registration effort.

If owners object to listing of railroad properties on the National Register, the SHPO should pursue formal DOEs from the Keeper so that the properties will be afforded consideration and some protection in advance of federal undertakings. Eligible properties should be placed on the State Register so that they will have consideration and protection in advance of state undertakings.

Treatment of railroad properties may take a variety of forms. The most challenging is that of approaching the owners of the properties (i.e., the railroads) at administrative levels and finding some common ground for action regarding historic resources. A consortium of SHPOs might encourage the railroads to take advantage of tax incentives available for these properties, to find community recipients for unused historic buildings and structures, and to preserve and maintain in a sensitive way the buildings they continue to own and use. The SHPO should also encourage any state agencies owning railroad properties to maintain, stabilize and interpret their resources in an appropriate manner.

The SHPO should support transactions which would transfer abandoned railroad properties to federal, state, or other protective ownership. In some cases, railroad properties must be moved in order to be preserved. While preservation in place is always preferable, railroad companies often require properties to be moved when they are given or sold to other owners. If a property has been listed on or determined eligible for the Register, the SHPO should encourage the new owner to submit moving plans to the SHPO for review so that the property will not be dropped from the National Register (36 CFR 60.14 [b]).

To encourage interest and preservation of railroad resources in Arizona, the SHPO might develop "Railroads of Arizona," an interpretive video or film program for in schools, public libraries, clubs, etc. An expanded interpretive program of this nature might ultimately be a railroad state park, in which an existing district of operating railroad properties might be provided for Arizona citizens. Although rolling stock could

be collected here, it would be preferable to preserve it on the lines and in context. The SHPO should actively support the Rails to Trails movement, a national effort to keep railroad easements intact and adaptively reuse the lines as well as the historic properties that occur along them.

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