

MINE REMEDIATION AND HISTORICAL ARCHAEOLOGY: A GOLD MINE'S TALE

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Empire Mine State Historic Park contains the Empire Mine Historic District, a sprawling landscape encompassing remains of numerous gold mining ventures. As DPR pursues remediation activities to reduce human exposure to contamination associated with past mining activity, Sonoma State University has conducted investigations to reduce potential effects on cultural resources. Presently, the Empire Mine serves as the anchor of the park, placed on the National Register as a historic district in 1977 for its distinguished gold mining history. Studies involved a survey of the entire 850-acre park, resulting in the discovery of 500 distinct historic-era resources, mostly archaeological in nature. Many of the historic-era operations, from early Gold Rush placer mining to large, turn-of-the-century incorporated hard-rock extraction and milling ventures have been long forgotten, as have their contributions to the gold mining history of the West. All of these resources were evaluated as potential contributors to the historic district, relying largely on Caltrans' timely research design developed specifically for gold mining contexts (California Department of Transportation [Caltrans] 2008). This paper describes the study and the 500 historic-era resources discovered.

The Empire Mine Historic District is an expansive gold mining landscape situated in the rural hills extending southeast from the town of Grass Valley, a small Gold Rush-era community located at the snow line of the Sierra Nevada's western slope. The historic district encompasses portions of Ophir, Osborn, and Union hills, which are separated by Little Wolf Creek and Woodpecker Ravine. The most heavily mineralized and richest gold veins in California are located in the Grass Valley Mining District, specifically those dipping below Ophir and Osborn hills. Eroded surface placers from exposed veins once filled the ravines and ephemeral drainages, and deeply buried Tertiary deposits have been mined on Union Hill. Various interests operated gold mines throughout the historic district from the Gold Rush until the Empire Star Mines Company ceased operations in 1956.

The historic district, initially mined during the California Gold Rush, developed into one of the world's most notable gold mines. This property qualifies for National Register of Historic Places (NRHP) listing under all four criteria. The historic context in which it is evaluated is gold mining in California's legendary Sierra Nevada mountain range, 1848–1957. Two generations of the Bourn family personally built up the mine between 1869 and 1929, navigating it from modest beginnings through the booms and busts characteristic of the industry. The Newmont Mining Company acquired the property in 1929 under its newly formed subsidiary, Empire Star Mines Company, Limited. The new owners benefited from the mining boom associated with the Great Depression. The Bourn Cottage and arrangement of domestic and mining infrastructure at the Empire Mine exemplifies the most profitable years of this facility. Much of the built environment was designed in the neoclassical tradition patterned after late medieval buildings by San Francisco architect Willis Polk. His architecture and landscape design, dating to the late 1890s and early 1900s, embody the characteristics of this distinctive architectural style, period, and construction, as well as representing the work of a master and possessing high artistic values. The surviving mining infrastructure concentrated at the park, as well as an even larger number of dilapidated facilities, exemplifies the historic district's association with areas of industry, invention, and engineering. Its many historic, non-aboriginal archaeological resources have the potential to contribute information necessary for understanding many facets of the history and historical archaeology of gold mining. In addition to

technology-related areas, contributing resources pertain variously to exploration, settlement, and agriculture in the Grass Valley Mining District. Ethnic Cornish immigrants with their knowledge of the hard-rock mining industry were solidly associated with the historic district, its culture, and its technology, as were a large number of miners of Irish descent.

A robust industry evolved over 100 years of gold mining in the region. William Clark (1979:54) noted in his *Gold Districts of California* that many famous engineers and geologists hailed from—and important inventions and improvements were made in—the gold mines around Grass Valley. The historic district hosted hundreds of extraction and milling operations of various sizes and eras, ranging from solitary prospectors to joint-stock or heavily capitalized companies. Many of the most successful mines in California operated in the park alongside the Empire Mine. Competing interests concentrated large tracts of mineral rights over time, eventually creating a vast mineral holding completely surrounding the city of Grass Valley. Periodically, old workings would be upgraded or new explorations launched. By the end of the period, the Empire Star mineral rights consisted of nearly 4,000 acres, of which about 22 percent rests below the park. The Empire Mine was the engine of this one-of-a-kind operation. Little development has occurred since the mine was abandoned in the 1950s.

The California Department of Parks and Recreation (DPR) acquired the approximately 856-acre Empire Mine State Historic Park in 1974. An impressive and well-maintained built environment is centrally located around the Empire Mine. The spectacular built environment enjoys heavy visitation, and houses park facilities and staff residences, thereby continuing its role as the mine's core. Small, shaded rural roads continue to access the arrangement of turn-of-the-century buildings situated behind tall stone fences. The mine yard and cottage grounds still emphasize the boom-era setting of the mine. Other buildings are nearby, reflecting rural settlement dating back to the 1870s, as well as mine development as recent as 1947. Recreational trails and service roads still lead away from the center. Much of the mining infrastructure beyond is abandoned and in various states of decay. Some of the trails incorporate historic alignments that pass heavily mined or inhabited areas, while others wind their way through fields of mining features such as waste dumps and placer mining landscapes. There are hundreds of resources present that clearly convey the property's relationship to its gold mining legacy, particularly when considered in concert. Fire suppression activity and invasive plant abatement have rendered much of the landscape visible and natural. Minimal alterations include signage at some of the historic properties and fencing at some areas where hazardous conditions exist. A dense assortment of archaeological property types—from dwellings to complex mines—is linked by transportation and water conveyance structures. Some areas contain a lone wagon road alongside a heavily prospected gully or hillside. Massive waste rock dumps and surface plant ruins are not uncommon. Combined, they form a recognizable mining landscape.

The Empire Mine Historic District was listed in the NRHP as an individual property in 1977 (Welts 1976) and is also designated as a National Historic Landmark (reference no. 77000169; Office of Historic Preservation 1990). The nomination lists 19 contributing buildings/structures that add to the historic district's significance under historical archaeology, architecture, and industry for the periods 1800–1899 and post-1900. No other elements were listed, including the awkward exclusion of any archaeological resources. Several other substantial mines and numerous smaller mine claims as well were eventually taken over by the Empire venture. The historic district boundary was established to “encompass the entire Empire Mine property” (Welts 1976:36), though it actually encompassed only the park as it was configured in 1976, about 20 percent of the property holdings.

Recently, historical mining remains were found to contain elevated levels of metals that have contaminated the soil and water (Department of Toxic Substances Control 2006). Ongoing characterization and remediation efforts began in the early 1990s. Remediation activities are subject to the California Environmental Quality Act (CEQA), and certain actions are also subject to Section 106 of the National Historic Preservation Act and its regulations in 36 CFR §800. DPR is the lead agency under CEQA for the Empire Mine Site Characterization and Remediation Project. Several remediation areas were identified that are related to historic mining, including mill tailings sites, ruins of a cyanide plant,

mine drain water discharge, and waste dumps. Future alterations will occur in association with remediation, and public interpretive enhancements will consistently be modified. DPR elected to update the historic district since it was adequate to address potential impacts from remediation activities on historic remains. This paper presents the inventory and evaluation process used to bring the nomination up to date. A companion paper in this volume highlights some examples of how this information benefited some of the actual remediation projects, as well as findings that stemmed from additional targeted studies.

EMPIRE MINE HISTORIC DISTRICT INVENTORY

The first step of any survey is to develop predictions about the types and locations of resources. Generally cultural resource predictions are based on archival research and a cultural resources records search (National Park Service [NPS] 1985:36). The historic context prepared for this project (Selverston 2008), combined with the results of the records search, indicated that the majority of the project area would contain dense remains from substantial and enduring gold mining combined with fewer remains from settlement endeavors. Research provided the names, locations, dates, and duration of activity and occupation, and data on the evolution of numerous mines and settlements throughout the park. No known prehistoric resources or Native American ethnographic sites were identified within the park during pre-field research.

We anticipated that various resource types would constitute a rural historic landscape. The NPS (1999:2) defines a rural historic landscape as “a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features.” For mining landscapes specifically, the NPS (1992:9) predicts “standing buildings, structures, and other architectural remains; machinery; archaeological remains; and landscape features such as mine waste rock dumps, mill tailings, water delivery systems, open pits, and roads.” The NPS also advises that archaeological remains may be the most abundant property category. Our expectations based on the preliminary research far exceeded what the existing NRHP nomination implied, which consisted of only 19 standing buildings.

Given these expectations, a feature-driven survey approach was chosen as the most efficient method, involving detailed documentation of every feature encountered (Selverston 2009a). This strategy recognizes complete systems, in which individual features are viewed as potential components of a larger and/or more complex process, or feature system. Hardesty (1988:9) defined the feature system “as a group of archaeologically visible features and objects that is the product of specific human activity.” Past activity leaves a suite of surviving interrelated elements, so when one component is identified, survey for associated elements ensues (e.g., a mine portal is typically upslope from a waste dump, and tailings are always associated with a mill). For example, lode mines typically contain a shaft, waste dump, and hoist. When one of these is found, we look for the other components. Though looking for associations between features was a specific goal, we did not try to tease out site or locus boundaries in the field.

Field survey was carried out in May, June, and July 2008, with a crew of two to five people. The survey team traversed the entire park on transects averaging 75 ft. apart, and varying between 45 and 150 ft. depending on the density of resources, vegetation, topography, facilities, and the park boundary. The only substantial area omitted from the survey was the approximately 35-acre mill tailings pond. The impoundment was constructed in order to prevent Empire Mine’s mill tailings from entering the waterways, as required in 1917 by the California Debris Commission. The exterior boundary was mapped, but the pond of tailings was avoided as a safety precaution. It was assumed that evidence of earlier activities would be buried by tailings and not visible. Attention was paid to areas particularly dense with resources—most of the park—in order to sort out feature systems and determine their relative order so that the evolution of events could be recreated. In contrast, large, complicated areas of redundant, overlapping features—such as prospected hillsides or sluiced creek beds—were generally documented by

a single boundary as a particular landscape type. Doing so did not hinder assigning property types to all identified resources, and we decided that the intrasite intricacies within the boundaries of these resources could wait until future phases as necessary.

Field crews assigned a unique context number to every resource discovered, typically at the feature level. Data were collected, the location recorded, and photographs taken for every context. The data collected included functional type (such as foundation or waste dump), dimensions, material, form, and descriptive detail when appropriate. Artifact lists based on what could be seen on the surface were developed to characterize deposits. The location of every feature was taken using a global positioning system (GPS) unit or by determining distance and bearing to a known landmark. Photographs were taken to visually document most features and landscapes, with the exception of redundant feature types or where precluded by poor field conditions, such as bad lighting or thick vegetation.

Feature types identified throughout the park as a result of the field survey, and the quantity of each, are presented in Table 1. Each feature type represents a distinct element of a site, or a single building, structure, object, or landscape. This tally includes both specific elements with known functions, such as the built environment of the mine yard and historic cottage grounds, as well as components of the park's historic fabric, such as foundations of ruined mine, mill, and residential buildings and structures. All of these features are above ground. A single prehistoric resource exists within the park: a bedrock milling feature on a small knoll on the north side, or navigational right bank, of South Fork Wolf Creek.

Precise definitions were used in the field when assigning feature type. For example, the term "prospect" was applied to any exploratory excavation with all the removed soil and/or rock deposited adjacently. When spoils extended away from and represented more material than the visible excavation, the term "waste dump" was assigned. Feature-system-based principles allowed a better understanding in the field of observed remains. For example, depressions similar to prospects associated with waste dumps were understood to be collapsed mine portals, and what appeared to be short ditches or races running downslope were recognized as collapsed adits. The term "hole" was used for any opening in the ground without a definable waste dump or surface plant, and these were perceived to be air vents or other such supporting functions, as well as unintended cave-ins.

The nearly 1,700 individual contexts recorded during the survey have been assembled into 499 discrete properties representing 30 unique property types. The functions of five of the resources have not been identified, comprising the unknown property type category. About 25 percent of the total—numbering 125 properties—is composed of multiple features relating to gold mining, habitation, or both. Table 2 lists the variety of property types present and the number of each. These properties represent distinct feature systems that share a common historical or physical association. In some cases, the association is well known, as is the case of the Empire Mine and several other gold mines that have been interpreted in the park. For other properties, the historic association has yet to be identified. Table 2 is organized by complexity, with the most diverse property types at the top of each column. "Complex" sites, such as a lode mine complex, contain elements related to a specific economic activity, in this case mining, and domestic use. These property types have rich research potential because of the complementary nature of their components that allows technology to be understood in light of the social and demographic dynamics. At the other end of the spectrum are simple prospects, amounting to 45 percent of the total identified properties. We feel this provides an initial assessment of the number and complexity of sites in the historic district. Any of the identified properties may be—and have been—reclassified in light of new findings.

Our effort, with the capable assistance of Judith Marvin, also readdressed the multiple standing historic buildings and structures in the historic district, and we determined they could be grouped into more meaningful property types, as opposed to stand-alone architecture. We lumped nine industrial buildings and structures associated specifically with the surface plant and refinery of the Empire Mine and Mill Complex, consisting of the machine shop, hoist house, transformer house, stamp mill ruins, lime shed, cyanide plant ruins, mine manager's office/refinery, and engineer's office / model room / core shed. Another structure erected at the edge of the Empire Mill ruins appears to be a rudimentary and low-

Table 1. Identified feature types in the Empire Mine Historic District.

FEATURE TYPE	COUNT	FEATURE TYPE	COUNT	FEATURE TYPE	COUNT
Adit	42	Flat	31	Pond	1
Artifact	2	Flume	2	Pool	1
Artifact deposit	103	Foundation	168	Privy	5
Automobile	1	Garage/carriage house	7	Prospect	445
Bedrock milling feature	1	Garden shed	1	Pumphouse	1
Berm	6	Gate	2	Ramp	8
Blacksmith's shop	1	Guest cottage	3	Reservoir	3
Canal	1	Headframe	1	Road	124
Cellar	5	Hoist	1	Shaft	69
Channel	8	Hoist house	1	Shed	3
Chicken house/coop	2	Hole	35	Single family dwelling	10
Chimney	2	Landscaping	2	Single family dwelling/ conservatory	1
Cistern	3	Lime shed	1	Sluice box	1
Clubhouse	1	Machine shop	1	Tailings	5
Compressor building	1	Machinery	2	Tool shop	1
Corral/stable	2	Mill structure	1	Trail	9
Culvert	1	Mine manager's office/ refinery	1	Tramway	2
Cut	21	Mining landscape	23	Transformer house	4
Cut bank	29	Monitor	8	Utility line	14
Dairy	1	Monument	23	Vegetation	3
Dam	15	Mound	8	Wall	60
Depression	6	Orchard	4	Waste dump	138
Ditch	125	Ore bins	1	Water box	1
Drain outlet	2	Penstock	14	Water tank	1
Engineer's office	1	Pipe	8	Well	2
Fence line	37	Placer tailings	2	Wood shed	2
Total Features / Contexts: 1,684					

funded ore-processing facility. Structures associated with other mining ventures include two transformer houses at the Pennsylvania Mine and Mill and a headframe and ore bins at the Rowe Mine. The former transformer house on the Cassidy Mine has been utilized as a shed for the adjoining residence for many years and is included with that dwelling site.

Seven buildings and ancillary structures are associated with dwellings and other non-industrial activities grouped to create the Bourn Cottage grounds of the Empire Mine and Mill Complex, including the Bourn Cottage, Clubhouse, Stable Block / Visitor's Center, Conservatory, Bourn Garage, Starr Garage, and a pumphouse. Several other inventoried architectural resources were grouped into nine single-family dwellings and their ancillary structures representing the residences of early settlers and mine workers.

Table 2. Identified property types in the Empire Mine Historic District.

PROPERTY TYPE	COUNT	PROPERTY TYPE	COUNT	PROPERTY TYPE	COUNT
Lode mine and mill complex	4	Ranch complex	2	Dam / reservoir	4
Lode mine complex	6	Homestead complex	1	Ditch	40
Placer mine complex	5	Dwelling	17	Penstock	2
Mining landscape complex	2	Artifact deposit	28	Drain outlet	3
Ancillary mining complex	1	Ranch element	2	Wagon road	30
Lode mine and mill	5	Corral	1	Rural road	36
Lode mine	24	Orchard	1	Tramway	1
Placer mine	7	Fence line	6	Hole	10
Mining landscape	14	Utility line	9	Prospect	222
Tailings impoundment	3	Monument	8	Unknown	5
Total Identified Properties: 499					

Empire Mine Historic District Evaluation

Technically, contributing resources are those that add to the historic associations (gold mining in the Sierra Nevada), historic architectural qualities, or archaeological values for which a property is significant because they were present during the period of significance (1848–1957), relate to the documented significance of the property, and possess historic integrity or are capable of yielding important information about the period; noncontributing resources do not add any of these assets either because they have no relationship to the historic context or lack the integrity to convey their significance (NPS 1997:16). This study did not isolate any resources failing to meet the threshold (Selverston 2009b).

Although so many resources contribute to the historic district’s significance, they do so at varying scales and under different NRHP criteria. The many resources contributing to the historic district’s overall significance represent a range of values. Each specific value must be established in order to help determine what to do about potential negative impacts. Resources contributing under Criteria A, B, and C typically have interpretive values that may be diminished. Different classes of resources have variable data potential that also must be taken into account. Many contributors have both types of values to consider. Following are assessments of the historic district within the context of each NRHP Criterion of Consideration to expand on the variable values applicable.

Criterion A: Events

Properties can be eligible for the National Register if they are associated with events that have made a significant contribution to the broad patterns of our history.

Gold mining in the Sierra Nevada played a pivotal role in the history of California, the West, and the United States. The lure of gold pulled large numbers of people from all over the world to what was largely an unexplored peripheral frontier, drastically and permanently changing the region. Gold mining interests shaped the social, economic, and political character of California. Industries ranging from banking to the foundry trade formed to support mining. Gold mining supplemented the incomes of many in the general population and helped some survive tough economic times. The industry was a major employer in California, experiencing only two real slumps before waning after the 1940s. Many of the mineral industry’s technological advances sprang from innovations made in California during the historic district’s period of significance and exemplified in the park’s resources.

The historic district is eligible to the NRHP for its association with important events and processes in the history of gold mining in the Sierra Nevada. Early placer mining and lode prospecting are evident along every creek, ravine, and slope of the park. Several areas are so dense with the remains of gold mining that they represent historic landscapes clearly conveying their significance. Surface plants were constructed around mine portals. Structures built over successful strikes were upgraded or replaced during times of growth in the industry. Evidence of this punctuated activity is displayed in the many mines identified. Simple examples survive only as a collapsed portal, waste dump, and, usually, a road. Mills that evolved in tandem with hard-rock mining are also represented. The homes of miners from different phases, both standing and in ruins, are present throughout the park; so, too, are the remains of small ranches that developed in support of the gold mining industry. A network of transportation and water delivery systems connects virtually every major feature of the historic district.

The center of the park is the Empire Mine and Mill Complex, which is composed of hundreds of standing buildings and structures, objects, and archaeological features. The Empire Mine is the largest property of the park in every respect. It has the largest number of elements, covers the most acreage, and offers a rare collection of historic buildings, related to both mining and its attendant domestic and social functions. Most of this built environment is testimony to the lode-mining boom around the turn to the twentieth century. The owner of the operation, William B. Bourn, Jr., brought in San Francisco architect and friend Willis Polk to create mine buildings and residences. The visually stunning cottage grounds and mine yard are dividends on five decades of investment and consolidation, and a down payment on another five decades of the same. By the end of the gold mining period, the Empire Mine was one of the oldest, largest, deepest, longest running, and richest gold mines in the Sierra Nevada.

The historic district is rich in other gold mining features. The W.Y.O.D. Mine and Mill Complex, for example, offers an impressive intact waste dump little changed from when the mine was in operation. It also contains the ruins of a late-nineteenth-century surface plant, stamp mill, and superintendent's home. Local miners started the operation in the 1870s. They named it Work Your Own Diggings, to provide an alternative mode of production in this heavily capitalized industry. A Michigan native, Charles Brockington, has been credited with the success of the mine, where he served as superintendent from 1886 to 1892 (Prisk 1895:82). A legal conflict over mineral rights with the neighboring Pennsylvania Mine erupted in the early 1900s, resulting in W.Y.O.D.'s demise, with its property forfeited. The Empire Mine had absorbed both operations by 1911 and continued development and milling from the Pennsylvania shaft until a tramway linking back to the Empire facility was constructed in 1920.

Dense clusters of gold mining-related resources on the slopes of Osborn Hill provide a sense of the early scramble for gold that took place throughout the Sierra Nevada. This historic landscape begins in the bed of Little Wolf Creek, where surface placer miners left a landscape characteristic of their earliest efforts, and continues up Sebastopol Ravine, where site after site provides another chapter in the historic district's gold mining story. The landscape here is composed of large depressions, berms, waste dumps of angular rock, fenced shafts, and ruins of stone, brick, and cement. Artifact deposits abound. Mining in Sebastopol Ravine began in the 1850s and followed the industry's characteristic boom and bust cycle that led to the consolidations of claims and eventual incorporation into the Empire Mine.

The historic district contains hundreds of individually documented properties, each of which represents some aspect of gold mining during the period of significance. Several technologies (lode, milling, and placer) and multiple scales (from tiny to large) are in evidence. The park's historic landscape reflects these processes on a large scale, as well as the functional and historic linkages between its individual components. The historic district is important at the state level for its association with the events and processes of gold mining in California's Sierra Nevada, 1848–1957.

Criterion B: Persons

Properties may be eligible for the NRHP if they are associated with the lives of persons significant in our past.

The Bourn family played an essential role in the development of the Empire Mine and in the growth of California's gold mining industry in general. The well-documented efforts to grow the mine by William B. Bourn, Sr., W. B. Bourn, Jr., and George W. Starr (a nephew and cousin) spanned six decades, and led to the operation being called the "Quartz Crowned Empress of the Sierra Nevada" and members of the family as "Bonanza Kings" (Chalmers 2006:69; Egan 1998). In 1900, the *Mining and Scientific Press* described the property as a "showplace" (Bohakel 1980:12). The family's faith in the Empire Mine time and time again fueled innovations that rippled back to the foundries of San Francisco and propelled engineers to other mines around the world. Dividends not only led to expansion and continued upgrades of the facilities in the historic district but also allowed the family to participate in business, policy, and the vibrant social scene in the West Coast's premier port city of San Francisco.

From his wheelchair in 1928, William Bourn, Jr., offered the Empire to local Nevada City mining engineer and head of Newmont Mining Corporation, Fred Searls, Jr. (McQuiston 1986:63). Searls and his mine manager, Fred W. Nobs, formed the Empire Star Mines Company, Ltd., in 1929 (Bohakel 1980:18). Combined, these assets made the company California's number one gold producer in 1930. Fred Nobs continued in the same innovative manner as his predecessors. Gold production in the state began to steadily rise annually from its depressed state in 1929, and the Empire Star Mines Company grew in tandem. The prosperity that the mine delivered to the local economy resulted in Grass Valley being described as thriving with business, despite the Great Depression (Bohakel 1980:20).

No property better represents the accomplishments of these important mining men. The Empire Mine is where they achieved preeminence in their trade. The buildings and arrangement, along with the sheer scale of the mining empire they created, are clear and present. The historic district is significant at the state level for its association with the lives of William Bowers Bourn, Sr., W. B. Bourn, Jr., and George W. Starr, and at the local level for its association with Fred Searls and Fred Nobs.

Criterion C: Design/Construction

Properties may be eligible for the NRHP if they embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction.

The Empire Mine and Mill Complex is the most stunning of the hundreds of properties that contribute to the historic district's significance. It is an excellent representation of the distinctive characteristics and construction methods of the gold mining industry in the Sierra during the period of significance and includes many elements that, though lacking individual distinction, are distinguishable within the historic district context. The primary components contributing to the historic district's eligibility under Criterion C are discussed here.

The buildings designed by Willis Polk embody the distinctive characteristics of his architectural style, period, and construction, as well as representing the work of a master and possessing high artistic values. The "Cottage," designed as a summer home for Bourn, was erected in the English Tudor Manor style popular in architect-designed landmarks in the United States in the 1890s and early 1900s. The style was patterned after late medieval buildings with Renaissance detailing that were popular during the Elizabethan and Jacobean periods in English history. The building was constructed of local rough-hewn granite, with brick window and door surrounds and trim. The residence features a steeply pitched side-gabled roof, parapeted gables, dormers, multiple chimney shafts, round-arched entryways, wood casement windows with diamond-pane glazing, front-façade and side porches, and other elements of the style. When completed in May 1897, it was described as "without parallel in California" (*San Francisco Chronicle*, May 2, 1897, quoted in Kirker 1960:120).

The nearby Clubhouse, Gardener's Residence, garages, and portions of the Stable Block are of frame construction in Polk's distinctive shingle style but share some medieval-derived elements. The walls are clad in irregularly patterned wood shingles, with gabled shingle roofs and diamond-paned casement windows. The Clubhouse features an elaborately decorated brick chimney with multiple shafts,

as well as an octagonal three-story tower linking its two wings. The reflection pools and gardens, terraces, ornamental plantings, fountains, *allées*, lawns, walkways, stone walls and fences, and other landscape features all contribute to both the site's and historic district's significance.

The mine and mill buildings of the mine yard are architecturally significant in their own right. The Engineer's Office and Refinery, as well as a portion of the Stable Block, share many of the same architectural characteristics of the Bourn Cottage, including granite and brick construction, parapeted gables, and casement windows with diamond leaded-glass panes, but in a simplified style. Although the headframe and mill building, ancillary structures, and much of the original equipment are no longer extant, the remaining buildings comprise an architectural entity that is representative of its period and method of operation. The remainder of the core mining and milling complex consists of the transformer building, hoist house, compressor building, steel headframe, and carpenter and blacksmith/machine shop, as well as the incline shaft portal; they are homogeneous industrial structures, clad in rusting corrugated metal. All date to the late 1890s and early 1900s era of the mine operations when manager George Starr replaced and refurbished the deteriorating facilities and the mine entered its most productive period, coincidental with the revitalization of the mining industry in Nevada County. All of the buildings have gable roofs and are of frame construction, with stone foundations or partial walls, roof coverings and wall claddings of corrugated steel, multi-light windows, and broad and pedestrian doors. The buildings appear eligible under Criterion C as good examples of late-nineteenth and early-twentieth-century mine and mill structures that embody the distinctive characteristics of their type, period, and method of construction.

Criterion D: Information Potential

Properties may be eligible for the NRHP if they have yielded, or may be likely to yield, information important in prehistory or history.

This study relied on the research design addressing the research potential of mining properties that was developed in 2008 for Caltrans by a team of historical archaeologists and historians. The document lists six important research themes important to historians and archaeologists, providing a model for assessing the information potential of the historic district. Properties that have the potential to contribute to these themes contribute to the historic district's significance under Criterion D. The themes (Caltrans 2008:113) include the following:

- 1) Technology: mining and technological developments.
- 2) Historical ethnography / cultural history: stories of mining sites and their populations.
- 3) Ethnicity: studies of distinctive cultural groups associated with mining and cross-cultural interactions.
- 4) Gender and family: the roles of women and children.
- 5) Economy: market development, consumption, and class.
- 6) Policy: law, regulation, and self-governance.

Hardesty (2003) has noted, "Whatever the approach to assessing the significance of historical mining resources, it is clear that the landscape concept is pivotal." A landscape approach amplifies the potential of individual sites because it emphasizes the contribution of each toward the system of interrelated parts that constitutes the historic district's mining history. Considering approximately 500 properties in concert affords opportunities for relative dating, comparative analysis, and detailed examination of change over time at a grand scale. Reno (1990:56) has noted, "Due to the relatively large size of most [mining] districts, it has often proved impractical for archaeological researchers to study entire districts in detail." The Empire Mine Historic District offers a rare opportunity to compare mining technology on an uncommonly large scale and across time.

The historic district's contributing elements can be conceived as "information containers" (Hardesty 1987:79). Some elements date particular mining activities. Others help identify the ethnicity or class of their creators, or hint at their ideologies. Artifacts that can be traced to their place of manufacture

help understand commodity flow, articulating the Empire Mine with the world system. Some mining features contain information about technology and the sequence of activities.

It is useful to examine the data potential of such a large number of resources by grouping them. The property types in the historic district represent several classes of properties that share common characteristics. The 30 property types identified in the historic district represent seven common classes of properties: complex resources containing vestiges of both technology and community, exclusively mining technology, exclusively mining community, water systems, transportation networks, prospects, and relatively simple resources. These property classes reflect basic categories of data potential. Complex mining properties, for example, contain vastly different types of information than simple properties. Table 3 provides the number of properties within each class, as well as the various property types comprising each.

The original nomination was updated to reflect new understanding of the historic district (Selverston 2010). The State Historical Resources Commission recently consented to our nomination update in February 2013. The information gathered in support of the update has been and will continue to be used to ensure that the historic district's significant values are protected during environmental remediation activities as well as other future projects or undertakings that occur in the park. The companion papers in this volume highlight examples of how cultural resources were addressed during specific remediation activities.

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Table 3. Property classes and types of the Empire Mine Historic District.

PROPERTY CLASS			PROPERTY TYPE	
	COUNT	PERCENT		COUNT
Complex mining group	18	4	Ancillary mining complex	1
			Lode mine and mill complex	4
			Lode mine complex	6
			Mining landscape complex	2
			Placer mine complex	5
Mining technology group	63	12	Hole	10
			Lode mine	24
			Lode mine and mill	5
			Mining landscape	14
			Placer mine	7
			Tailings impoundment	3
Mining community group	50	10	Artifact deposit	28
			Dwelling	17
			Homestead complex	1
			Ranch complex	2
			Ranch element	2
Water system group	49	10	Dam/reservoir	4
			Ditch	40
			Drain outlet	3
			Penstock	2
Transportation group	67	13	Wagon road	30
			Rural road	36
			Tramway	1
Prospecting group	222	45	Prospect	222
Simple group	30	6	Corral	1
			Fence line	6
			Monument	8
			Orchard	1
			Unknown function	5
			Utility line	9