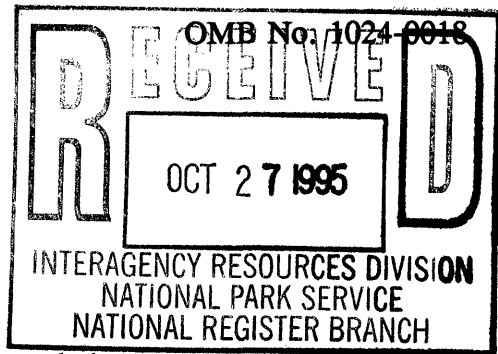


NPS Form 10-900-b
(March 1992)

United States Department of the Interior
National Park Service

**National Register of Historic Places
Multiple Property Documentation Form**



This form is used for documenting multiple property groups relating to one or several historic contexts. See instructions in How to Complete the Multiple Property Documentation Form (National Register Bulletin 16B). Complete each item by entering the requested information. For additional space, use continuation sheets (Form 10-900-a). Use a typewriter, word processor, or computer to complete all items.

New Submission Amended Submission

A. Name of Multiple Property Listing

Historic Resources of Yellowstone National Park

B. Associated Historic Contexts

Construction of the Road System in Yellowstone National Park, 1872-1966

(Name each associated historic context, identifying theme, geographical area, and chronological period for each.)

C. Form Prepared By

name/title Mary Shivers Culpin - Historian - National Park Service

street & number 15 Aloha Lane telephone (512) 729-3411

city or town Rockport state Texas zip code 78382

D. Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR Part 60 and the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. (See continuation sheet for additional comments.)

Shirley Baicker-wade, Deputy April 7, 1995
 Signature and title of certifying official Date

Wyoming State Historic Preservation Office
 State or Federal agency and bureau

In my opinion, the property meets () does not meet the National Register criteria. () See continuation sheet.

Mark F. Baumer, Interim SHPO July 10, 1995
 Signature of Commenting or Other Official Date

Montana State Historic Preservation Office
 State or Federal Agency and Bureau

In my opinion, the property meets () does not meet the National Register criteria. () See continuation sheet.

10/24/95
 Signature of Commenting or Other Official Date

National Park Service 11
 State or Federal Agency and Bureau

I hereby certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.

Kenny M. Lapsley 12/11/95
 Signature of the Keeper Date of Action

E. Statement of Historic Contexts

(If more than one historic context is documented, present them in sequential order.)

See continuation sheets.

F. Associated Property Types

(Provide description, significance, and registration requirements.)

See continuation sheets.

G. Geographical Data

Yellowstone National Park, Wyoming

H. Summary of Identification and Evaluation Methods

(Discuss the methods used in developing the multiple property listing.)

See Pages 477-484 of Historic Resource Study Volume I,
"The History of the Construction of the Road System in Yellowstone National Park, 1872-1966"

I. Major Bibliographical References

(List major written works and primary location of additional documentation: State Historic Preservation Office, other State agency, Federal agency, local government, university, or other, specifying repository.)

See continuation sheets.

Primary location of additional documentation:

- | | |
|---|---|
| <input type="checkbox"/> State historic preservation office | <input type="checkbox"/> Local government |
| <input type="checkbox"/> Other State agency | <input type="checkbox"/> University |
| <input type="checkbox"/> Federal agency | <input checked="" type="checkbox"/> Other |

Specify Repository: Yellowstone National Park Archives, Yellowstone National Park, Wyoming

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

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**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Section E Page 1

Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

I. THE EARLY YEARS, 1872-1883

A. History of Development in Park

SEE PAGES 1-23 in the accompanying History of the Construction of the Road System in Yellowstone National Park, 1872-1966.

B. Comparison with National Road Development

Prior to the American Civil War, the major developments in road construction in the United States had been turnpike projects of the late 18th and early 19th century and the "plank road" projects of the 1840s and 1850s. In 1854, one road authority stated that "the common roads of the United States are inferior to those of any other civilized country" and that "their faults are those of direction, of slopes, of shape, of surface, and generally of deficiency in all of the attributes of good roads."¹ Professor Phillip Mason author of *A History of American Roads*, wrote "The declaration would have been accurate at the beginning of the twentieth century as well. Indeed there is considerable evidence that the road system of the United States was in worse condition at the end of the nineteenth century than at the beginning."²

During the first three decades of the 19th century, several developments aided road building. A bituminous surface patent was awarded to John H. Cassell in 1834 and prior to that the Army engineers used the surfacing principals developed by the Scot, John McAdam for surfacing the Cumberland Road in 1824.³ The first cast-iron bridge was constructed over Dunlap's Creek near Uniontown, Pennsylvania, 1838 and two years later, William Howe received a patent for a truss bridge. However, a little later the growing popularity of the railroads caused an apathy towards improvements in road building and planning. Prior to the outbreak of the Civil War, several more technological advances gave promise for progress in road construction -- invention of blasting powder by L. duPont in 1856, use of gun powder and dump wagons for clearance of stumps, the introduction of the jaw rock crusher in 1858, and the first oil well in Oil Creek, Pennsylvania in 1859.⁴

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

The Early Years (continued)

All of the overland routes were no more than wagon trails and the only graveled turnpike west of the Mississippi used before the outbreak of the Civil War was the route between Prairieville and Paynesville, Missouri. Up to this time the Federal government had spent approximately 14 million dollars on road building in the states and territories. Most of the funds were derived from sale of public lands. The attention and control of the roads were given to the local areas instead of the state. Thus a decline in the construction of new roads and in the condition of extant roads.

After the Civil War ended, renewed interest in road construction took place. Debates over the attributes of the different surfacing methods began. The road builders in Central Park chose a gravel type because of the comfort qualities and easy maintenance. By 1869, and three years before Yellowstone was set aside, the first steam road-roller was used in Central Park. The use of this machine, plus the use of the steam-powered jaw rock crusher, created a rise in the mileage of surfaced roads. Prior to this, horse power compacted the gravel and broken stone surfaces. Just a year before the Park's creation, Portland cement began to be manufactured in the United States. An added advance was the introduction of a steam-mortar mixer in 1877. But, the most important factor toward the interest in good road construction was the establishment of the Columbia highwheeled bicycle factory in 1877.⁵

The widespread use of the rubber-tired bicycle prompted the users to organize and lobby for the construction of hard surfaced roads, particularly for roads in the East and Middle West. The bicycle users pushed for legislation for state aid which in turn led to Federal aid for road improvement. Together with more technological advances: the gyratory rockcrusher in 1881, an improved earth-scraper (the forerunner of the Fresno) in 1883, and the wheel scraper in 1884, more improved roads began to be seen.⁶ Urban areas began building block, asphalt, and brick paved roads, but hard surfaced road in the rural areas were yet to come.⁷ The same year that the Park was set aside, the first brick paved street was laid in Charleston, West Virginia and in 1879, the first extensive sheet asphalt surface was laid on Pennsylvania Avenue in Washington, D.C..

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

The Early Years (continued)

At the time of the Park's creation, many people had traveled from east to west following the mining frontier or as part of the migration to settlements in the West, however, all of the routes were well below or above the immediate park area. By 1872 and up to the time that the military assumed the responsibility for the road construction in the Park, the major wagon roads or routes in the region were the following:

- | | |
|--|--|
| Mullan Road | road completed by Army in 1863 extended from Fort Benton, Montana Territory to Walla Walla in Washington Territory. Road -- 624 miles long, 120 miles through forests where the road was cut 30 feet wide. Thirty miles of the road required rock and earth excavation. All equipment used was powered by man or horse. |
| Fisk Wagon Road | extended from Minnesota to Fargo in the Dakota Territory to Fort Union on the Dakota - Montana territories border, to Havre, turning southwest to Fort Benton. The route was opened by James Fisk in 1862. Federal government contributed \$5,000 towards construction. |
| Bozeman Trail | 1863, route planned to connect Bannack, Montana Territory to Fort Laramie in the Wyoming Territory. |
| Corrine, Utah to Virginia City, Montana Territory Road | used for supplying the Montana goldfields and hauling out the ore. In use for 20 years before Park creation. Several branches of the road allowed passage to the Bitterroot, into Deer Lodge Valley, and a branch led to Helena, Montana. Oregon Trail extended across Wyoming, but far to the south of the Park. Several cutoffs branched off at South Pass towards Fort Bridger or Lander. |

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

II. ARMY CORPS OF ENGINEERS ERA, 1883-1918

A. History of Development in Park

SEE PAGES 25-108 in the accompanying History of the Construction of the Road System in Yellowstone National Park, 1872-1966.

B. Comparison with National Road Development

Very little formal training in the scientific methods of road construction or road maintenance could be found in the United States before this period.⁸ By 1889, no state required the employment of trained men on their road projects and only seven states provided the option of hiring a surveyor for the layout and building of roads. While about thirty schools in the country offered some courses in the field, only the Lawrence Technical School of Harvard University offered a combined curriculum of practical experience and theory. Most of the other schools offered instruction in construction experience and theory, and instruction for the construction of macadam surface road and none for dirt roads, which most of the roads in the country were and would be for quite some time.⁹ Between the late 1880s and 1905, the training of professional engineers was accelerated. In 1890, Massachusetts Institute of Technology established the first chair in highway engineering. Vanderbilt University had developed a training program for local road officials in 1887 and many universities were adding courses in their engineering departments. By 1905, most engineering departments offered courses in highway engineering.¹⁰

During the late nineteenth century, many people were opposed to the idea of the federal government funding the roads for fear of government control of the highway system. Some backers of the Good Roads Movement favored a partial federal contribution with a National Highway Commission to explore the conditions of the road system or a partial contribution by the issuance of long-term, low interest rate loans to local governments. Another group hoped for full federal participation in the building of the nation's roads. The first public support for federal aid for public roads came from Albert Pope, a member of the Massachusetts Division of the League of American Wheelmen. Alexander Pope called for the creation of a Highway Commission to be placed in the Department of Agriculture which would provide recommended construction techniques and also information on the condition of roads across the United States.

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

Army Corps of Engineers Era (continued)

After several National League for Good Roads conferences and mounting congressional pressure, the Department of Agriculture set up an Office of Road Inquiry in 1893. However, the Secretary of Agriculture outlined the responsibility of the new office as "This department is to furnish information, not to direct and formulate any system of organization, however efficient or desirable it may be."¹¹

The new office began to take the lead in the push for improved roads. In 1895, Rhode Island appointed a civil engineer to head a state commission on highways.¹² The combined effects of trained personnel, public pressure for improved roads, and the marked progress in construction equipment, led to a more organized road program across the country. Despite the state of Kentucky, which had had a state highway policy as early as 1821 and a state highway department in place, no other states had a defined program. New Jersey voted for the first road appropriation in 1891 was followed by Massachusetts in 1892, Connecticut and California in 1895, and in New York, Vermont, and Maryland in 1895. The federal government's participation remained mostly in providing education and information to the States. In the region around Yellowstone National Park, state-aid came after the turn of the century, Wyoming in 1911, Idaho in 1905, and Montana in 1913.

Up until 1904, no new important construction methods had been used across the country. At that time there were 2,151,570 miles of rural roads of which only 153,662 had any type of surfacing material. Of the surfaced miles, 38,622 miles were finished with water-bound macadam; 114,899 miles with gravel, sand-clay, plank, shell, or other low-type surfaces; and 141 miles with surfaces better than macadam. Of the latter 141 miles, 123 miles were surfaced with brick, of which 104 miles were found in West Virginia and Ohio and 18 miles of bituminous surfaced roads, of which 13 miles of bituminous macadam and 3 miles of asphalt were found in Ohio and 2 miles of tarred road found in Tisbury, Massachusetts. At this time, of the 2,500 miles of California roads many were oiled earth roads and 18 miles of road were petrolithic roads.¹³

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

Army Corps of Engineers Era (continued)

After 1904, the method of construction began to reflect the needs of the newer types of vehicles using the roads. Prior to that time, the majority of traffic were horsedrawn, steel-tired vehicles. With the increased use of automobiles, the type of road surfaces took on more attention. Up until 1916, the Office of Public Roads participated in the construction of experimental roads. In 1905, in a joint successful experiment with the Madison County, Tennessee, road officials and the new Federal Office of Public Roads, Texas crude oil was used as binder for earth and macadam roads. At the same time, the Rhode Island State Highway Department began experimenting with using bituminous concrete as a surfacing material for their rural roads.¹⁴ The weaker binding materials were substituted with tars and asphalts. By 1914, there were 10,500 miles of bituminous surfaced roads. As a result of the experimentation, the Office of Public Roads' bituminous road binder specifications was adopted by most state highway departments as the standards for the industry. As vehicles got heavier and more trucks and buses emerged, a heavier road base was needed. Concrete, bituminous concrete on concrete or macadam bases, brick, block or other rigid type surfaces were used.¹⁵

After the turn of the century, the importance of "prompt and intelligent maintenance" was seen across the country. The King split-log drag assisted in keeping well-graded dirt roads in good shape for about \$8.00 per mile per year. It was a very effective piece of maintenance equipment.¹⁶ Other construction and maintenance equipment produced during the first part of the twentieth century were the following:

- steel forms for concrete work
- gasoline engines used as power unit for hoisting and excavation
- diesel engines developed
- crawler tracks used on tractors and cranes
- wooden-boomed excavator rigged with drag bucket (1903), the forerunner of the drag line
- sheepsfoot roller (1907) for embankment work
- first portable crushing and screening plant (1910)¹⁷

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

Army Corps of Engineers Era (continued)

The demands for the improved roads were mostly to connect towns with shipping points, i.e., railroads or ports, or to connect agricultural towns with each other. In states like Wyoming where settlement was sparse and the important lines of travel not clearly defined, the development of roads were mainly feeders towards the railheads. The town-to-town system came later. The other aspect of road development would be the farm to market approach, found in the more agricultural smaller states. This approach produced the diffusion of traffic over many roads and postponed the identification of the most important routes. Thus, two different patterns, farm to market and trunk-line, had developed.

In 1912, the Post Office Appropriation Act, which provided \$500,000 for post roads, began the formalized program for the construction of roads in the country by a rational technical process. The act only provided one third of the cost with the local governments paying the two-thirds. Seventeen states participated in the program and 425 miles of road were built.¹⁸ Experimental roads were constructed in Virginia and Maryland and the first post road was built one year later in Alabama. As a result of increased truck traffic throughout the country and increased traffic traveling at higher speeds, construction of reinforced concrete pavements of greater thickness emerged and the construction of wider lanes appeared.¹⁹

Not only did the construction techniques improve, but the planning of road systems took on new dimensions. Probably the first controlled access road system was in Central Park in New York City. Four depressed streets crossing the Park were used for horse-drawn trucking traffic and stone bridges and streets with retaining walls crossed over them. Philadelphia and other eastern cities had boulevards built just after the turn of the century. These are forerunners of today's divided freeways and controlled access parkways. The first cloverleaf design for an interchange was patented in 1916 to Arthur Hale of Maryland. Before 1900, large vehicular bridges and viaducts had been constructed in urban areas.

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

Army Corps of Engineers Era (continued)

Just after the turn of the century, the genesis for the modern parkway was the result of a conservation issue:

The original conception of the Bronx River Parkway arose from a project to prevent stream pollution of the Bronx River and not to build a limited-access highway. It is a striking illustration of the manner in which conservation of one resource frequently leads to that of others. The death of animals in the Bronx Zoological Garden was traced to the pollution of the Bronx River and it was decided to protect the headwaters by controlling the area through which the stream passed. The parkway was conceived as the best means to this end; it was to become the first modern highway of parkway design in America.²⁰

The New York Parkway Law of 1906 is credited with being the first law passed in the country which limits access to public roads within public parks. It would be 1937 before a similar act passed for freeways.

In addition to the Bronx River Parkway as a planned road system, the thrust for named highways became a promotional tool. An example in the Yellowstone National Park region was the Lincoln Highway, which extended from New York to San Francisco, crossing the southern part of Wyoming.

In 1912, Congress stipulated to the Forest Service that 10% of their revenue should be spent toward the construction of roads and trails through the national forests. In 1913, the U.S. Forest Service, which was also in the Department of Agriculture, formalized an agreement with the Office of Public Roads to construct the roads within national forests. Five highway engineers were assigned, one each to the five forest districts. Three years earlier, a private group, the Crater Lake Highway Commission, hired a road expert to direct the construction of the road through Crater Lake National Forest to the Crater Lake National Park and to plan a road and trail system for the park.²¹

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Historic Resources of Yellowstone National Park
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Army Corps of Engineers Era (continued)

Since there was no agency for the national parks and monuments to coordinate the road construction activities within the parks, each superintendent, with the exception of Yellowstone, Mount Rainier, and Crater Lake National Parks, was in charge of his own road construction program. The Army Corps of Engineers supervised the construction of the roads in the excepted areas. This disjointed approach of the parks toward road construction led the Secretary of the Interior to seek assistance from the Office of Public Roads. In 1914, the Office of Public Roads positioned an engineer and a field survey crew in Yosemite National Park and assured the Interior Secretary that he would place engineers in five other parks.²²

In 1903, four years after the creation of Mount Rainier National Park, the Congress appropriated \$10,000 for the survey of a road which would be under the direction of the U.S. Army Corps of Engineers. The following year, an additional \$30,000 appropriation enabled the Army to complete the survey and begin actual construction. The engineering officer in charge at Mount Rainier had "written the already-famed Capt. H.M. Chittenden at Yellowstone National Park for typical sections of that park's roads and drawings and photographs of bridges that Chittenden built."²³ In 1906, Chittenden left Yellowstone National Park and assumed the responsibility for the road construction at Mount Rainier National Park until 1908. At the end of 1908, 19-1/2 miles of road had been finished with plans for an additional 3-1/2 miles. The Army Corps left Mount Rainier National Park in 1912. By 1916, the government built-road extended 20.4 miles from the Park entrance to Paradise Valley.

In 1910, eight years after the creation of Crater Lake National Park, the U.S. Army Corps of Engineers assumed the responsibility for the planning of a road system in the Park. By 1916, 47 miles of "excellent dirt roads" had been completed and plans for their paving scheduled. Before leaving Crater Lake National Park in 1919, a "crude road" encircled the lake.²⁴

Shortly after the commitment to the Secretary of the Interior, the Office of Public Roads, created a new division within the agency, the National Park and Forest Roads, headed by T. Warren Allen. By the time that the Congress passed the Federal Aid Road Act of 1916, the Office of Public Roads, was maintaining 160 miles of road, constructing another 170 miles of road and planning for the construction of an additional 477 miles.²⁵ Several important highway projects were initiated at this time--Road across Rabbit Ears Pass in the Routt National Forest

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

Army Corps of Engineers Era (continued)

in Colorado, the Trinity River Road in Trinity County, California which eventually connected the upper Sacramento Valley with the coast at Humboldt Bay, and the road up to Mount Hood, in Oregon. An example of a road project in Montana is the Bitterroot-Bighole Road in Beaverhead National Forest.²⁶

After the submittal of many bills for federal aid for road construction in 1916, President Woodrow Wilson signed one of the most important pieces of road legislation, the Federal Aid Road Act, which would pledge federal aid for the construction of surfaced rural roads.²⁷ The act appropriated \$75,000,000 to be used over a five-year period. States had to have a state highway department in order to qualify for funds. In 1916, 42 of the 48 states qualified and the remaining 6 had them in place by 1920. The act also enjoined the states the obligation of the maintenance of the roads. The old Office of Road Inquiry, which had the name of Office of Public Roads from 1905 until 1915, then it became the Office of Public Roads and Rural Engineering, was the office to disperse and supervise the funds. In 1918, the agency became the Bureau of Public Roads.²⁸ After the United States entered World War I, there was a lapse in the construction and maintenance of the roads across the country.

For the most part, the roads found across the country toward the end of this period could be described as:

built for horsedrawn steel-tired traffic traveling at a top speed of 8 miles per hour. In recognition of the limited capability of animal-drawn conveyance to ascend grades, gradients seldom exceeded 5 percent, and this resulted in rather crooked locations carefully selected to avoid steep grades, closely fitted to the terrain, with small cuts and fills to save grading costs. Side slopes in both cuts and fills were as steep as the natural materials would allow, usually 1-1/2 feet horizontal to 1 foot vertical. . . . 105 feet was a generous radius for horizontal curves. This would enable a four-horse team and wagon having a total length of 50 feet to round a curve without leaving a 12 foot travelled way. Vertical curves were seldom used; . . . The wagon roads were inconspicuous and, from economic necessity, 'rested lightly on the land.' However, it is doubtful that their builders considered this fact as an esthetic advantage for their work or, for that matter, that they gave much thought to the appearance of the road itself.²⁹

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

III. NATIONAL PARK SERVICE/BUREAU OF PUBLIC ROADS, 1918-1966

A. History of the Development in Park

SEE PAGES 109-182 in the accompanying History of the Construction of the Road System in Yellowstone National Park, 1872-1966.

B. Comparison with the National Road Development

Lack of manpower and materials during World War I left the roads across the country in a bad state. All road work during the previous two years had been only essential projects that were vital toward the war effort. However, the year following the Armistice, Congress increased the \$75,000,000 appropriation to \$200,000,000 for the period ending 1921. Even though the country faced materials and labor shortages, high costs of materials, strikes, and general unrest, during the fiscal year 1920, the road construction projects surpassed by 25 percent all previous work completed under the Federal Aid Act.³⁰ Between 1917 and the end of the fiscal year in June of 1922, Wyoming had been apportioned \$4,313,175 and had completed the construction of 413.7 miles; Montana had been apportioned \$7,045,713 and had completed the construction of 556.7 miles and Idaho with \$4,298,925 had completed the construction of 409.5 miles.³¹

One of the results of World War I, the need to create a system of highways of military importance, coincided with the Federal officials desire to establish a classified systems of highways. In addition to the imposition of a tax on fuel for motor vehicles, first instituted by Oregon in 1919 and soon after followed by many states, a new Federal Highway Act of 1921 provided the needed funds for the construction of these new systems. The new act, which promoted the construction of roads of more than local significance, required:

that all Federal-aid funds be expended on a primary system of highways limited to 7 percent of the State's total highway mileage on November 9, 1921. This interconnected system included two classes of highways: (1) Primary or interstate highways, comprising 3/7 of the system, and (2) secondary or intercounty highways, comprising the remainder. No more than 60 percent of the funds apportioned were to be expended on the primary or interstate highways.³²

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

Bureau of Public Roads, 1918-1966 (continued)

The increased registration of vehicles from 7,565,446 in 1919 to 19,937,274 in 1925 produced a cause and effect phenomenon on road building. The "better, faster" car demanded a "wider, safer, and more nearly straight" road. The demands changed the surface to concrete and increased both the width and numbers of lanes. The changing patterns of vehicle useage by the public also encouraged new types of roads.³³

The changes also increased the highway research both at the national and state level. The studies included the investigation of materials--sand, gravel, stone, bituminous materials, cement, brick, and concrete; the investigation of the stresses developed in the structure of roads and bridges by live loads, by temperature, and by other natural causes; investigation into the determination of the forces applied to road surfaces by standing and moving vehicles; analyses of subgrade soils and tests of methods designed for their improvement; and investigation of the flow of water through drainage structures, on the run-off from drainage areas, and the impact of moisture on soils.³⁴

During this time, several types of roadways were developed or perfected, parkways, freeways, expressways, inter-regional highways and roads built for scenic driving or tourist routes. The parkway concept was further expanded with the building of the parkway through Westchester County, New York, and the Long Island State Parkways. One of the landscape architect's associated with these projects, Gilmore Clark, also offered plans for improvements in Yellowstone National Park. Clark was considered by some to be the most important landscape architect in the United States in the early 1930s.³⁵ The Merritt Parkway in Connecticut was built during the 1930s and opened in 1940. The freeway, which was also a limited access road, was opened to all sorts of traffic as opposed to the parkway which in most cases was restricted to passenger automobiles. The 1930s and 1940s saw a rise in freeway and parkway construction, with the most well-known being the Davison Limited-Access Highway in Detroit, the two-level expressway along the Pittsburg waterfront, the Lake Shore Drive in Chicago, the Pulaski Skyway built between Jersey City and Newark, New Jersey and the Arroyo Seco Parkway between Los Angeles and Pasadena, California.

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

Bureau of Public Roads, 1918-1966 (continued)

The first long-distance highway which was built for all types of traffic was the Pennsylvania Turnpike which ran east-west for 159.6 miles across Pennsylvania. The turnpike was constructed along an abandoned railroad right-of-way between Harrisburg and Pittsburgh.³⁶

During the 1930s 85 percent of the traffic, both personal and business, were for distances of 20 miles or less, but some of those who traveled for some great distances traveled for pleasure as tourists. The scenic routes which cross state and national parks and forests, often traverse beautiful scenery, high mountains, primeval forests, deep canyons, and along lakes and rivers. These routes vary from the typical limited or controlled access roads by their purpose, to reach a scenic objective, and in their design, "the greatest scenic value with the least disturbance to the natural beauty of the adjacent terrain, . . . Bridges and tunnel entrances are skillfully constructed to harmonize with the landscape and to give esthetic appearance."³⁷

While the "greatest progress in the development" of these roads were built in the 1930s, the road system in Yellowstone was the first to "give access to the scenic splendors in our National Parks."³⁸ In Spencer Miller, Jr.'s "Modern Highway in America," he recognizes the following other park roads:

1. Glacier Point Highway (1935) in Yosemite National Park
2. Trail Ridge Road (1935) in Rocky Mountain National Park
3. Skyline Drive (1930s) in Shenandoah National Park
4. Skyline Drive (1943) as Blue Ridge Parkway
5. Natchez Trace
6. East side Highway (1940) in Mount Rainier National Park
7. Mount Vernon Memorial Highway and George Washington Memorial Parkway (1932)

Other roads that Miller recognized were the Apache Trail and the Boulder Dam-Kingman Highway in Arizona, the Columbia Gorge Highway along the Columbia River, the Feather River Highway across the Sierras, the Carmel-San Simeon Highway along the California coast, the Boston Mountain Scenic Drive in the Ozarks, and the Storm King Highway along the west side of the Hudson River.³⁹

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

Bureau of Public Roads, 1918-1966 (continued)

The road building of the 1930s increased rather than decreased as one might have thought with the country in a depression. However, building roads was a sanctioned method for attacking unemployment. At the same time, in Nazi Germany, Hitler was promoting the construction of the autobahn. Several of the New Deal economic programs participated in road building activities raising the federal aid to roads from about 10 percent to 40-50 percent. When the New Deal programs began, there were slightly over three million miles of roads, excluding city streets, with approximately less than half rated as improved or with an all-weather surface, such as gravel. The Public Works Administration contributed funding for highway construction, bridge construction, and grade crossing elimination projects. The Works Progress Administration mostly participated in local road projects and the Civilian Conservation Corps built fire and access roads in the more remote areas such as national and States parks, and national forests. The Tennessee Valley Authority funded many highway construction projects in their locale.⁴⁰

As World War II was breaking out in Europe in 1939, the Bureau of Public Roads presented a long-range program for a nationwide highway system based on the state survey reports written during the 1930s. The plan called for the creation of two highway systems. One would be a national interstate system, limited to 40,000 miles, that would connect the major metropolitan areas. The second system proposed embraced important secondary and railway-feeder roads, rural-free-delivery mail routes, and public school bus routes. These proposals were highly acclaimed by local, state, and federal officials, but largely ignored due to the pending war and the possible necessity for military preparedness.⁴¹

The following year, the Federal Highway Act of 1940 provided "that, on request of the Secretaries of War and Navy or the head of any other official national defense agency and by order of the Federal Works Administrator, Federal-aid highways funds previously authorized could be used, without matching, to pay for preliminary engineering and for supervising the construction of projects essential to the national defense."⁴² In 1941, 78,000 miles were designated as strategic and approximately 20 percent of those miles were inadequate.

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Bureau of Public Roads, 1918-1966 (continued)

During the war years, in addition to the funds and construction curtailments, the rationing of construction materials, fuel, tires, and other needed items, and the labor shortages, the national road programs were stalemated.

After World War II was over, the government planned to remedy the postwar road problems by following the design standards for primary roads set just before the war or in some cases the refinements of the existing standards and the new standards developed for the feeder roads and the secondary roads published by the American Association of State Highway Officials (AASHO) in 1945. In most cases, these standards were adopted by most Federal-aid projects, but were not accomplished in a smooth manner.⁴³

The major step for the post-war road program actually took place the year before the war ended, the passage of the Federal Aid to Highway Act of 1944. This legislation authorized \$500 million to be spent for each of the first three post-war years; it authorized federal money for road projects in urban areas; it empowered the construction of a Secondary Road System and it designated the National System of Interstate Highways.

The new highway system would also be guided by the following recommendations from the *Interregional Highways* report which had been submitted to President Roosevelt in 1944:

The system would be both urban and rural in extent.

Roadways and structures would be designed to serve vehicles of the types and numbers to be expected from the date of construction.

Intersections with cross-roads and railroads would be separated in grade.

Rural sections would be designed for safe travel at a speed of 75 m.p.h. in flat topography; urban sections for 50 m.p.h.

Traffic lanes would be 12 feet wide.

Shoulders would be 10 feet wide except in mountainous topography.

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Bureau of Public Roads, 1918-1966 (continued)

Embankments 10 feet or less in height would have side slopes no steeper than 1 foot vertically to 4 feet horizontally. The roadway width on bridges would be at least 6 feet greater than the width of the pavement of the approach roadway; on short bridges the roadway width would be as great as the width of approach roadway, including shoulders. There were other details for the design and construction of the system, including such items as signs and markings, lighting and landscaping.⁴⁴

It would be 1956 before the legislation for funding and construction of the system was passed. The legislation required the joint approval of both the Secretary of Commerce, who now had the Bureau of Public Roads, and the state highway departments for setting the standards for the highway system. Many of the recommendations from the 1944 report became part of the standards.

Between 1944 and 1954, road construction activity rose tremendously and major advances in construction equipment occurred. Among the developments were the following:

- self-powered equipment for onsite material stabilization which increased the productivity and control of stabilized bases and subbase courses. (1945)
- rubber-tired bulldozer (1947)
- vibrating roller (1948)
- carbide insert on rock bits
- hydrostatic drive to construction equipment
- more powerful units for earthworks and other phases of construction were developed
- triple-drum concrete paver (1959)
- electronic controls in concrete batch plants (1950)
- transit mixers
- slipform pavers

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Bureau of Public Roads, 1918-1966 (continued)

automatic slope and grade controls for asphalt paver
screens (early 1960s)
helicopter designed for hoisting and hauling a 6-ton
payload for inaccessible areas
sonic pile driver

The Interstate Highway Act of 1956 authorized the construction of 41,000 miles of toll-free express highways with the Federal-aid funding 90 percent of the project. The money for these projects came from new excise taxes imposed on motor fuels, tires and tubes, buses, trucks, and trailers, and a use tax on trucks exceeding thirteen tons weight. The money was placed in a highway trust fund.⁴⁵

By 1958, \$3.5 billion of federal-aid was used on more than 12,000 projects to either build or improve 34,000 miles of roads across the country. Six years later, \$4 billion funded 7,000 projects for only 18,000 miles of roads, indicating that the more costly shorter projects were the ones in or near the urban areas.

With the Interstate system well underway in 1964, attention was centered on safety, highway beautification, and ecological, historical, and recreational concerns.⁴⁶ Mrs. Lady Bird Johnson was a major promoter of highway beautification. The highway engineers knew that the system, which was scheduled for completion by 1972, would soon be out-dated. The year before, in 1963, Congress directed the state highway departments and the Bureau of Public Roads to begin plans for the next twenty years.⁴⁷

Not too surprisingly, throughout the evolution of the roads and road systems in the United States, "the highway user, in the collective sense, had dictated the character of the highway by his manner of operation on it and by the extent of his willingness to pay, through road user imports, for roads that would sustain that type of operation. . . . every highway project has represented a compromise between the ideal in design characteristics on the one hand and economic reality on the other."⁴⁸

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Historic Resources of Yellowstone National Park
Name of Multiple Property Listing

ASSOCIATED PROPERTY TYPES

NAME OF PROPERTY TYPE - ROADS

The roads, which were built for the planned system in Yellowstone National Park, were constructed over many decades with many different standards, many different techniques, many different materials, and under many administrators. While the Grand Loop Road has basically the same configuration as it was first built, many of the present day roads may be on the original alignment or in many cases, the alignment could be off several hundred yards or more. This is also true of the entrance roads. The roads began as not much more than muddy tracks, then they were widened somewhat to accommodate the wagons and carriages. By 1883, the standard for the roads were as follows:

18 feet width road, well rounded up in the center, and provided with suitable side ditches and cross culverts; that all trees be removed for a width of 30 feet; that on side hill cuttings the fill be retained by a dry stone wall, and that an ample ditch be placed on the up hill side at least a rod from the road to catch the snow water and convey it to the natural water courses, and that where there are meadows or marshes that cannot be drained and must be crossed, the corduroy be replaced by a good plankroad. That all culverts be of stone or 3 inch plank, and that all bridges be well constructed of good sawed lumber.

It was during this period, 1883, that the Army Corps of Engineers officer, Dan Kingman, expressed his concern for the appearance and quality of the park as a result of man's impact.

By 1905, most of the roads had a width of from 18 to 20 feet and a recommendation was made to increase the width of the Grand Loop to "at least 25 feet," building the stone guard walls in mortar and reconstructing the existing ones in mortar, clearing the dead and down timber for 100 feet as a fire precaution and for scenic appearances.

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PROPERTY TYPE - ROADS (continued)

By the 1930s most surfaced roads extended from 18 to 20 feet with a ruling grade of 5 percent, with some 6 percent, and a few 7 percent. By this time, the steep and narrow ditches flanking the roads had been substituted with broad shallow type ditches and there was an increased use of riprapped embankments. Landscape details in curbing at pullouts, stone culverts, and stone masonry head walls with pipe culverts, cement rubble masonry guard wall, were prevalent.

The curves were designed to be "long, carefully compounded curves with gradual changes in length of radii." The culverts were designed to be subordinate to the natural surroundings. The design guidelines were outlined in the 1938 National Park Service publication, *Park and Recreation Structures*.

The culvert proper is sometimes of local stone when this is abundant and workable, but if it must be of concrete or of galvanized iron, reasonable concealment of the fact is to be striven for. The head wall, by extending well into the culvert opening, should avoid disclosing that it is a mere veneer. Natural rock is certainly the preferred material for the head wall, laid either dry or in mortar.

By 1935, the width of the roads had been raised to 28 feet, shoulder-to-shoulder, for the Grand Loop and 26 feet, shoulder-to-shoulder, for the entrance roads and the Park was using the Standard Specification for Forest Road Construction, Form F.R.50 Revised 1932, for the wooden guardrail. In 1940, the State of Wyoming recommended that the Park abandon the standard log guardrail in favor of the post and reflector type adopted by the state. Instead, the Park began using a native stained post, 8 inches in diameter, with a reflector placed on each post, spaced 40 to 50 feet apart. Over the years, newer generations of log guard rail design have been used and many linear feet of rail existing in the Park in 1991 are a weathering steel beam, supported by wood posts. While the steel beam is not a natural material like the stone or log railing, it does weather to a rustic shade and does blend in the wooded sections of the Park.

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PROPERTY TYPE - ROADS (continued)

After World War II, many of the shoulders were surfaced creating three lane road sections, which invited higher speeds and hazardous passing conditions. The Park's landscape architect reiterated the National Park Service philosophy, "The standards of roads within the parks do not necessarily need to comply with highway standards outside of the parks and moreover the parks, of necessity, should set standards of their own."

In 1956, the National Park Service and the Bureau of Public Roads agreed to a number of specific design and construction details:

a minimum width of 26 feet will be used which included 22 feet of pavement and 2 feet shoulders on either side

native grass shoulders plant mix surfacing to be included on all parking areas in lieu of bituminous surface treatment

all standard AASHO regulatory signs to be installed

road striping

parking areas painted delineator strips to be used instead of minimal aggregate guide markers

bituminous gutters to be used, minimum 8-inch diameter guide posts to be substituted wherever possible for guardrail with certain hazardous locations maintaining some guardrail replacement.

12-inch diameter logs would replace the 18-inch logs or stone found in parking areas.

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PROPERTY TYPE - ROADS (continued)

The standards set for the MISSION 66 program called for "the landscape architect and the highway engineer [to] exercise imagination, ingenuity, and restraint to conserve park values," however, the tremendous flexibility of application of these weaker standards produced some sections, such as the Old Faithful Interchange. The park road widths currently extend from 22 feet to 32 feet, and even up to 66 feet on bypasses.

In 1963, the Bureau of Public Roads were described in a national magazine as:

rapidly converting Yellowstone's road system into a network of broad shouldered, high-speed highways, with startling cuts and fills slashing wide, leveled ways through rolling forest and meadows. A result is that the park, though dedicated as a nature sanctuary, is a meeting ground for through routes, with heavy summer traffic converging from all directions.

By 1983, when the latest standards for Park Roads were developed, the purpose of the Park Roads was defined as:

A park road should be fundamentally designed to maintain an overall continuing sense of intimacy with the countryside or area through which it passes. The purpose of park roads remains in sharp contrast to that of the Federal and State highway systems. Park roads are not intended to provide fast and convenient transportation; they are intended to enhance visitor experience while providing safe and efficient accommodation of park visitors. . . . They are not, therefore, intended nor designed as continuations of the State and Federal-aid network.

The newest standards provide for a varying minimum road width, dependent on the average daily traffic. At the extreme end, with an average of 8,000 vehicles, the width could be as much as 12 feet, 4 lanes, with 4 foot shoulders, except in urban areas where the should could be 8 feet. The shoulders could be dirt, gravel, paved, turf, stabilized turf or a combination of surfaces, depending upon bicycle use, climate, land surface type, maintainability and aesthetic goals.

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PROPERTY TYPE - ROADS (continued)

In addition to the Grand Loop and the Entrance Roads, there are several secondary roads in the Park which for the most part have not been improved to the latest standards. In many cases they are narrow, dirt roads which probably are more similar to the appearance of the roads during the historic period. Examples of this category are the Bunsen Peak Road and the Blacktail Deer Plateau Road. These secondary roads are used for side trips for scenic or wildlife viewing.

This general overview illustrates the evolutionary aspects of this type of resource as it responded to changing needs, materials, funds, and techniques. Included as part of this property type and considered as features of the road are the guardwalls, guardrails, culverts, embankments and pullouts.

SIGNIFICANCE

The Grand Loop Road, the five Entrance Roads, and the secondary roads are significant according to the Criteria established by the National Register of Historic Places in the following ways:

CRITERION A. -- Resources that are associated with events that have made a significant contribution to the broad patterns of our history.

NATIONAL LEVEL

At the national level of significance the planned road system in Yellowstone National Park is the first, large-scale designed planned system giving people access into the "scenic splendors" in the country. While the plans and designs for Central Park precede Yellowstone National Park by approximately 16 years, the scope of project and the size differ significantly. The first superintendent, Nathaniel P. Langford envisioned this scheme long before anything of this magnitude had been executed anywhere else in the country. One of the significant considerations is the fact that the early configuration providing accessibility to the major geologic and scenic wonders is almost a mirror image of the extant system.

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PROPERTY TYPE - ROADS (continued)

In addition to the significance of the concept, importance should also be given to the fact that this undertaking was in an isolated region at a time when road building across the country was in its infancy. Even after the railhead reached the park boundary, in 1883, the difficulty of transport and the logistics of building a road system covering this very large, geologically challenging region with challenging climatic conditions makes the construction effort momentous.

The system also represents the important position of the Army Corps of Engineers role in the development of the Park. Before the turn of the century, there was no national road system only road districts, within states, and a few state-built public roads. The Federal government had been responsible for the roads in Washington D.C., the roads to government posts (which in most cases were no more than trails), roads on military reservations, and for building the road system in Yellowstone National Park. Since the Park covers over 3,400 square miles, it is reasonable to suggest that the park road system was one of their most ambitious road projects. Capt. Dan Kingman of the Army Corps of Engineers established the first road standards for a park in 1883; he also is credited with setting the philosophy for roads in a wilderness setting. The techniques devised for building a road through a sensitive area such as a park were in many cases the collaboration between the Bureau of Public Roads engineers and the landscape architects of the National Park Service. Their techniques and philosophy were adopted not only in other parks, but in some state highway departments.

STATE LEVEL

The configuration of the road system in Yellowstone National Park was important toward the development of the surrounding towns and approach roads to the Park.

CRITERION B -- resources that are associated with the lives of persons significant in our past.

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PROPERTY TYPE - ROADS (continued)

STATE LEVEL

U.S. Army Corps Engineering Officer Hiram Martin Chittenden is considered significant under Criterion B at a State Level for his vital and innovative role in the development of the road system in Yellowstone National Park, for his role in the very early recognition of Yellowstone's place in history in the United States, for his other important historical contributions to the literature of the American West, and for his role toward the development of the design philosophy which the National Park Service later adopted for its roads and building programs.

Hiram Chittenden, who graduated third in his West Point Class of 1884, arrived in the Park for a short period, 1891-1893, to supervise the Army Corps' construction of the road system. His most important accomplishment for that period was the completion of the Old Faithful to West Thumb route and on to the Grand Canyon via the Lake Hotel area. Poor funding scheduling and lack of funds hampered any real achievements for his first stay in the Park, but he was immediately recognized as "zealous, untiring, and remarkably efficient." When he was transferred in the spring of 1893, the Acting Superintendent Anderson expressed his unhappiness with Chittenden's transfer, "The unfortunate relief of Lieutenant Chittenden last spring has been a most serious blow to road building here. He was greatly interested in his work, tireless in his attention to it, and ably equipped for it."

For the short period that Chittenden spent in the Park during the early 1890s, he developed a sense of the importance of Yellowstone in American history. He researched the area history and while later stationed in Louisville, Kentucky and Columbus, Ohio, he wrote *The History of Yellowstone Park*, which was published in 1895.

Chittenden was called back to the Park in 1899, at the urgency of Sen. Thomas Carter of Montana and Mr. Huntley, one of the Park's concessioners. General Wilson of the Army Corp of Engineers asked him to return to the Park "to take full charge of the Park, including the Superintendency" to which he replied, "No Superintendency," but "I would like to be placed in charge of the road work." It was during his second period in the Park, 1899-1906 that Chittenden heavily influenced the road program, the Park appearance, and philosophy.

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PROPERTY TYPE - ROADS (continued)

Immediately upon returning to the Park, Chittenden took on the construction of the very important Mammoth Hot Springs to Golden Gate section. Chittenden selected a location and invited the Park officials, and the Cavalry officers in charge of Park administration, to take a look. "They had to go on foot because the ground was so rough and as we clambered through the mass of rocks which is now known as Silver Gate they unanimously declared that it was a fine location for scenery but impossible to build." Chittenden inquired if that was all they had to say and then he proceeded to build it to his specifications. The following year, Chittenden built the Golden Gate viaduct which replaced the rickety wooden trestle built in the 1880s. Chittenden felt that the construction of the viaduct was the "most difficult piece of work I executed while I was in the Park."

The 200 feet Golden Gate Viaduct was a series of eleven concrete arches, built into the cliff wall on the inner side. The work was carried out under extraordinary working conditions. The site was described in a Livingston, Montana newspaper:

The execution of this work was one of extraordinary difficulty. This arose first from the conformation of the canyon and its influence upon the winds, which prevailed during the entire season. The canyon is practically the small end of a funnel, which gathers up the wind on the plateau above and conveys it to the lower country. The wind was high nearly every day during the work. At times, it attained the force of a gale with sufficient power to pick up stones half an inch in diameter. When it came to mixing the concrete it was found almost impossible to conduct the work during the middle of the day. The dust and cement filled the eyes and lungs of the workmen in spite of goggles and handkerchiefs. On this account men kept constantly quitting, notwithstanding increased pay for concrete work, and their places had to be filled with new and inexperienced men.

Prior to this time, and with his experience with the appropriations for construction of the roads and the inefficient distribution, Chittenden formulated a plan for the completion of the 300 mile road system. He pressed for a one time appropriation of \$300,000, which he felt would be sufficient to complete the system. Chittenden envisioned the need for two types of appropriations, one for construction and one for maintenance. He pointed out in his reports to

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PROPERTY TYPE - ROADS (continued)

Congress that the only time real progress was made on the system was in 1891 when two appropriations for a combined total of \$120,000 were used to construct 60 miles of road. While maintenance had been carried out to some extent, Chittenden should be attributed with giving maintenance a major place in the Park budget and in the daily operations of the park.

During this time, Chittenden built the first East Entrance Road, including the construction of the first Fishing Bridge, he shifted a dangerous section of the Gardiner to Mammoth Hot Springs road to the left side of the Gardner River, and he worked on the South Entrance Road into the Teton Forest Reserve. Chittenden felt that it was time to perfect and embellish the road system. He proposed to clear all dead and down timber for the distance of 100 feet and to thin the living trees to allow grass to grow among them to encourage the game that frequented the area. He planned to rebuild the retaining walls with fine masonry and position strong guard rails at the most precarious points; the slopes and cuts would be thoughtfully aligned and where possible small watercourses would be carried along the routes. Chittenden felt that "In these and other ways the roads will themselves be made one of the interesting features of this interesting region."

Other important engineering feats of Chittenden's were the construction of the North Entrance Arch, the Yellowstone River Bridge, and the Mount Washburn Road. Captain Chittenden felt that the heavily traveled, highly visible northern park entrance at Gardiner, Montana, deserved an impressive entrance gate. The Northern Pacific Railway's train station, designed by Robert Reamer, had been completed adjacent to the park boundary on the western edge of Gardiner and a new route into the park was scheduled for construction. Chittenden, who called Reamer "an architect of great originality and particularly skillful in adapting his work to natural surroundings," believed that with the completion of the train station, the time was right to further improve the North Entrance with a compatible entrance arch. Reamer had submitted a draft design which Chittenden disliked. At a conference in the United States Commissioner Judge John Meldrum's office, Chittenden proposed new suggestions for design which were accepted. The arch was dedicated in the attendance of President Theodore Roosevelt, in 1903. The monumental arch, with the definite Army Corps of Engineers detailing, stands as a fitting memorial toward their significant work in the Park.

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PROPERTY TYPE - ROADS (continued)

Of the nine important bridges built in the Park during 1903, the most impressive and certainly most significant was the Melan Arch bridge over the Yellowstone River, above the Upper Falls. The steel and concrete bridge was completed with great difficulty, however, Chittenden felt that its location merited an artistic design because of its prominent location. For many years the idea of a bridge in this location had been contemplated, but lack of funds prevented its construction. Chittenden spent considerable time on site selection. Not wanting to introduce an artificial structure at the most desirable and obvious site, the brink of the Upper Falls where the gap narrows to 50 feet, Chittenden chose a 120-foot span between two jutting rocks, about 1/2 mile above the Upper Falls at the rapids, with the roadway at the center being 43 feet above the low water in the river. Despite the volcanic rhyolite rock being of inferior quality for construction, Chittenden stated, ". . . still from the fact that it has resisted for an indefinite geological period the action of the river, it must have considerable stability." Including dangerous rapids just below, Chittenden had many obstacles to overcome. One of the most serious was the construction of the framework and related framing. All of the rough material was cut locally, but the finer lumber came from the Pacific Northwest. Using a small dynamo connected to the rock-crusher engine and a temporary plant to provide artificial light, the crews were able to complete the concrete work by working around the clock. A detailed description of both the bridge and the construction of the bridge and a sketch plan of the working site, illustrating the gravel piles, the sluices for washing sand, the cement and crushed rock storage, the dynamo, the boilers and the working camp can be found in *Engineering News*, for January 4, 1904. The article is entitled "Reinforced Concrete Arch Bridge over the Yellowstone River, Yellowstone National Park," by Hiram Chittenden.

The bridge held a special place in Yellowstone history and it was not without a fight that the bridge was removed in 1961. In 1947, A.W. Burney, the Assistant Chief of Development for the National Park Service called it one of "significant interest because it is one of the first reinforced concrete arch bridges of this type (Melan Arch) constructed in this country. It was designed by and erected under the supervision of Capt. Hiram M. Chittenden, Engineer Corps, U.S. Army." Burney recalled that an *The Railway and Engineering Review* article, dated September 5, 1903, also described its design and construction.

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PROPERTY TYPE - ROADS (continued)

By 1959, the now-called Chittenden Bridge had been condemned, but a movement arose to have the bridge retained. Gen. J. A. Code, who was a first assistant to the head of the Signal Corps during World War II stated "That bridge should be retained as a memorial to early bridge building in America. It should be closed to vehicular and foot traffic. There isn't a bridge in the world that can compete with it in beauty and unique setting."

For the next two years efforts were made to preserve the bridge and build its replacement in a different location. However, the final decision was made to replace the 1903 bridge with a new bridge on the same site. In a letter to General Chittenden's family, Lemuel Garrison, superintendent of Yellowstone National Park, wrote:

. . . there have been further developments concerning construction of the Chittenden Memorial Bridge. These developments demand additional respect of General Chittenden's engineering prowess. The site he selected for his bridge is not only the best, but is also the most logical site for a bridge across the Yellowstone River. As Mr. Scoyen wrote you, a site upstream was selected for the Chittenden Memorial Bridge, but as engineering data accumulated it became increasingly clear that costs for a bridge there would be staggering. The more the problem was studied, the more Bureau of Public Roads engineers and our own experts realized that the site selected by General Chittenden is the only logical site to construct the new bridge. Accordingly, we will remove the old bridge this summer and immediately start construction on the new. A plan has not yet been approved for the new bridge, but I can tell you what we will try to do. We will erect a reinforced concrete arch which we hope will be as fine a contribution to contemporary bridge design as the original was to earlier concepts of bridge design. This is a high standard of achievement, but we will do our best. We will not attempt a slavish copy of Chittenden Bridge. It is unique and any copy would detract from the value of the original by not measuring up to its beauty and grace. I know General Chittenden would use the results of modern engineering research in designing the bridge if he were to tackle the job today, and, somehow I don't think he would approve of copying a previous design. . . . I think, however, that

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PROPERTY TYPE - ROADS (continued)

a new bridge of clean design similar to that General Chittenden built, on the site he selected, and named Chittenden Memorial Bridge will be a most fitting tribute to that fine engineer. We will place there a memorial tablet whereon all may read of General Chittenden and why we honor him.

Another major engineering feat was the construction of the road over Mount Washburn, where Chittenden found that the presence of solid rock on most sections of the road made construction very difficult and slow. Ten years after its completion, Franklin Lane, the secretary of the interior, wired the retired General Chittenden to announce that in an August 2, 1913 ceremony, the road over Mount Washburn had been dedicated and christened the Chittenden Road. An immediate response came from the Chief Geographer, R. M. Marshall, who was responsible for changing the name on the newly published maps. In a letter to General Chittenden, he stated "There can not be too much Chittenden for me in this world, geographically."

Finally in 1959, General Chittenden's contributions were honored by the Park changing the road signs from "Mt. Washburn Road" to read "Chittenden Road to Mt. Washburn."

Chittenden's accomplishments toward the history of the American West did not only include the publication of the first comprehensive book on the history of the Park and still one of the classic of Yellowstone literature, but he wrote several other major works.

In regard to *The History of Yellowstone National Park*, which was Chittenden's first book, the author had the privilege to be able to explore the region, examine its history, and perceive its place in the country's history. After its 1895 publication, Chittenden continued to revise it, with other editions being published.

The other classics of Western American history that he authored were the *American Fur Trade of the Far West*, the *History of Early Steamboat Navigation on the Missouri River*, and the collaborative work with Alfred T. Richardson, *The Life, Letters, and Travels of Father Pierre Jean de Smet*. In addition to these works, he also authored *War or Peace*, *Flood Control*, and *Letters to an Ultra-Pacifist*. Chittenden's writings have been praised by his contemporaries and later historians:

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PROPERTY TYPE - ROADS (continued)

Frederick Jackson Turner

characterized the *American Fur Trade of the Far West* as "excellent" and admitted that the book's map showing the western fur trade posts "furnished the basis for the map of western posts and trails in (Turner's) *Rise of the New West.*"

Grace Lee Nute

characterized the fur trade history as "remains the best general account available."

Ray Billington

found the fur trade history "the most useful work on the fur trade."

Chittenden's accomplishments did not only relate to Yellowstone National Park and his literary efforts, but after leaving Yellowstone for the Pacific Northwest, he continued with engineering projects. Besides serving as the President of the Port Commission of Seattle, he supervised the construction of the docking and terminal facilities, he was active in many other water or flood projects on the West Coast, and most importantly he was responsible for the design and construction of the locks which raised the seagoing vessels 19 feet from Puget Sound to Lake Washington. At the time of their construction, they were the fourth largest locks in the world. In 1956, President Dwight Eisenhower signed a bill in which the locks were named the "Hiram Chittenden Locks." The locks were listed on the National Register of Historic Places on December 14, 1978.

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PROPERTY TYPE - ROADS (continued)

Hiram Chittenden is listed in both the *Dictionary of American Biography and A Biographical Dictionary of American Civil Engineers, Vol. II*. At the dedication of the Chittenden Memorial Bridge in Yellowstone National Park on August 9, 1963, Chittenden was described as:

at least a triple threat to man. He had three distinguished careers with national and lasting recognition in each -- engineering, history, and conservation. As if these weren't enough to keep him busy, he became a student of international affairs, writing one book and a number of articles in this field. There was a book of poetry along the way, and the design of two monuments to attest to his artistic nature. As an engineer, he left his major marks here in Yellowstone, and in Seattle where the Chittenden Locks identify his contribution to the Port of Seattle. But it was here in Yellowstone that his greatest engineering accomplishments were made in a national sense. Thus he sensed when summing up his career he said: 'My work in the Yellowstone Park will stand out as perhaps most important in the construction line of anything which I have accomplished. . . . It was in the fullest sense a labor of love. . . . In every important respect the Yellowstone Park has so far fulfilled the expectation of its founders and has justified the wisdom of its creation.'

CRITERION C -- resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

STATE LEVEL

Under Criterion C the road system in Yellowstone National Park represents the continuing design philosophy first recognized by the Army Corps of Engineers and then later expounded upon by the landscape architects of the National Park Service. The use of the road has remained the same, however some changes have been made to meet the needs of visitors, to improve with advancing technology, and to meet weather, natural and geologic concerns. What one sees today does not exist exactly as it was first constructed. The road alignments, width of roads, surfacing

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PROPERTY TYPE - ROADS (continued)

materials, guardwalls and guardrail, culverts and traffic patterns have changed and been altered many times. Despite the fact that the road has had many changes and certainly does not look like it did during the historic period, it is the continuation of the philosophy of design that is most important. It is not the road alignment, width of the road, surfacing material or traffic patterns that are significant. The designed features such as the guardrails or guardwalls, the culverts, embankments, and designed pullouts are considered as part of the system and impart to the visitor a feeling of "blending with nature." The continuation of the earlier design philosophy in most cases has produced a modern road system with a high degree of feeling. Many historic components of the earlier system are extant, i.e. bridges, culverts, guardwalls and guardrails.

As the first designed road system for a national park or other reservation, it served as a model for other park areas. The consistent concern from Capt. Dan Kingman in 1883, through the work of the landscape architects of the National Park Service demonstrates the National Park Service's role as a leader in the landscape architecture field. The use of native materials compatible with the landscape and the concern for scarring or excavation has been a model for state park systems, moreover techniques used by the National Park Service were adopted by some state highway departments. In an article entitled, "America's Park Highways," the Deputy Chief Engineer of the Bureau of Public Roads L.I. Hewes, cites the importance of the philosophy of the National Park Service and its influence across the country:

In all the work in the National Parks, the Bureau of Public Roads has been guided in its design by the Landscape Division of the National Park Service. . . . The influence of the park landscaping methods has been felt by the bureau's entire organization and has resulted in better looking roads outside the parks. The highway departments of the Western states have been influenced by the results achieved on the park roads, and there has been a noticeable improvement during the last few years in the appearance of the roads constructed by the states themselves.

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PROPERTY TYPE - ROADS (continued)

In addition to Dan Kingman's setting the first park road standards in 1883, he also instilled a philosophy of wilderness road construction. Chittenden followed Kingman's thoughts showing his concern for man's imprint on the park. In addition to his concern for the siting and the artistic development of the Yellowstone Bridge, Chittenden wrote:

As a general policy, the extension of the system should be restricted to actual necessities. The Park should be preserved in its natural state to the fullest degree possible. While it is true that highways are the least objectionable of all forms of artificial change in natural conditions, still they should not be unnecessarily extended, and the great body of the Park should be kept inaccessible except on foot or horseback. But a road once found necessary should be made as perfect as possible. So far as it may detract from scenery, it is far less objectionable as a well-built work than if left in a rough and incomplete state. The true policy of the government in dealing with this problem should therefore be to make the roads limited in extent as will meet actual necessities, but to make such as are found necessary perfect examples of their class.

Soon after the National Park Service resumed the responsibility for the construction of the roads in Yellowstone, a national landscape engineering office was created and the earlier philosophy was continued. As part of the cooperative agreements with the Bureau of Public Roads, the National Park Service landscape architects controlled the appearance of the road system and all landscaping details. By the 1930s, standardized plans for guardrails, guardwalls, and culverts were on the shelf. Another standard that marked a park road was the flattening and rounding of the slopes and cuts. In 1935 and 1938, the design philosophy was expressed in the publication of two books by Albert Good, *Park Structures and Facilities* and *Park and Recreation Structures*.

One other area of significance for the Yellowstone roads was the association with the nationwide Roadside Improvement Program under the leadership of Mrs. John D. Rockefeller. It would be difficult to pinpoint any particular resource in the park to that association, but the work done in the park as a result of that program was very important to the park's appearance and to the moral of the park employees, who gained more pride from their work.

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PROPERTY TYPE - ROADS

CRITERION D -- This criteria does not apply to this property type. See the registration requirements for explanation.

REGISTRATION REQUIREMENTS

The registration requirements for the Property Type - Roads, will be for roads that are Historic Districts and those that will be submitted as an individual resource. The Grand Loop is considered one Historic District. Each Entrance Road is a Historic District and each secondary road will be submitted as a Historic District.

Under Criterion A, the following Registration Requirements are listed:

1. the road must have been built as part of the designed, planned system.
2. Locational integrity is not absolutely required, as the road's configuration (connecting the most important scenic and wonders of the Park) changed many times over the last 119 years. The important point is that any variation adheres to the original purpose or function of the road. Often the road alignment was moved to another route because of geology, natural features, settlement, habitat, etc.
3. Design integrity is more important under Criterion C and will be discussed in that section.
4. Workmanship integrity will be discussed under Criterion C.

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PROPERTY TYPE - ROADS (continued)

5. Feeling is important for Criterion A and it is closely related to the integrity of design because a visitor must be able to recognize that the road is "different" from those outside of the Park boundary. The road must possess enough physical attributes of the National Park Service design philosophy to convey that feeling to the visitor. Since the road is an evolutionary resource, the question of well-executed reconstruction of a guardwall or a compatibly designed culvert, or other feature, should not detract from its eligibility.
6. Portions of an old road should not be considered eligible, as any visible evidence actually represents a failure of the landscape architect's program of total road obliteration. As a new or better route was constructed, in most cases, the landscape architects called for the road to be revegetated in order to eliminate a scar on the natural environment. The exception to this requirement would be the older roads that became some of the Park's secondary roads, such as the Mammoth Hot Springs to Gardiner or the Blacktail Deer Plateau Road. Another exception would be the roads that were built for other purposes, such as the Old Marysville Road in the Southwest part of the Park.
7. Only designed pullouts will be considered for eligibility. Throughout the Park, there are many pullouts or expanded shoulders for cars to use for viewing or for overtaking by the traffic. These should not be considered eligible or as a contributing feature.

Under Criterion B, the Registration Requirement for Criterion A and C are sufficient.

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PROPERTY TYPE - ROADS (continued)

Under Criterion C, the Registration Requirements are the following:

1. The road and its features should retain sufficient evidence of the design philosophy harmonizing with the environment as expressed and executed during the historic period. The elements of the philosophy are:
 - a. the introduction of certain elements of grace in alignment -- the road lies gently on the landscape
 - b. the use of architecturally pleasing structures--manmade features such as culverts, walls, curbing etc. were constructed of natural materials and their scale was compatible with the natural environment
 - c. the protection of trees, shrubs, and other natural growths from destruction and damage--this provided undisturbed vegetation along the road, which offered a feeling of a natural setting
 - d. diminution of scars--large cuts and fills were avoided.
2. The road must evoke a feeling that it is a park road and an image that it is distinctive from those found outside the boundary of the park.

NAME OF PROPERTY TYPE - BRIDGES

DESCRIPTION

The bridges in Yellowstone National Park have ranged from the first bridge to cross the Yellowstone River, crudely built log spans, Army truss and steel girder bridges, log causeways, log trestle viaducts, important Melan Arch Bridge, a concrete viaduct, single to multiple reinforced concrete slab bridges, concrete arch bridges with stone veneer facings, timber trestle, concrete girder bridges with masonry piers, a 8-span timber and log bridge to a 962 foot steel deck truss bridge.

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Historic Resources of Yellowstone National Park
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PROPERTY TYPE - BRIDGES (continued)

The first bridge to cross the Yellowstone River, the Baronett Bridge, was a log structure built one year before the Park was established. After its destruction by fire set by the Nez Perce on their exit from the Park in 1877, the bridge was replaced. By that time the second Park superintendent, Philetus Norris, found bridging the Yellowstone River at that point was not as much of a problem as bridging the Gibbon, Firehole and Madison rivers where unusual geologic conditions existed. He found it easier to cut slopes through the grassy turf for fording or placing long, limber poles or foot logs. These covered the placid, water-flow from the geyser or hot spring formations. However, bridge building did progress with 12 bridges being built in 1881.

When the Army Corps of Engineers arrived in the Park in 1883 to assume the responsibility for road construction, Lt. Dan Kingman described the bridges as "covered with small poles, and then even long stretches of corduroy to weary and vex the people who were obliged to travel over them." When he developed the first park road standards, he called for the bridges to be "constructed of good sawed lumber." By 1885, Kingman had constructed the first wooden trestle through the Golden Gate Canyon. By 1889, 21 more bridges had been built in the park of which 4 were considered substantial, but the new engineering officer in charge felt that as appropriations warranted, they should all be replaced with iron or stone structures.

By 1896, there was an awareness that the crossing near the Grand Canyon of the Yellowstone should be a structure of an attractive design, preferably an iron bridge. Seven years later, Chittenden would design and construct the Melan Arch bridge. In 1901, Chittenden began replacing many of the wooden bridges with rock-filled wooden abutments and piers with steel constructed bridges either solid concrete abutments or tubular piers. One year later, the old wooden trestle through the Golden Gate was rebuilt with a concrete viaduct.

In addition to the construction of the Melan Arch bridge in 1903, 8 other important bridges were built continuing the replacement of the older wooden bridges with steel or concrete bridges. An inspection of the Park bridges conducted in 1909 by Capt. Wildurr Willing called for the replacement of more of the 19th century bridges with steel structures.

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PROPERTY TYPE - BRIDGES (continued)

After the admission of the automobile and the creation of the National Park Service, an important policy statement regarding the national parks was made by the Secretary of the Interior. The portion of which pertained to roads and bridges in the parks called for:

In the construction of roads, trails, and buildings, and other improvements, particular attention must be devoted always to the harmonizing of these improvements with the landscape. This is a most important item in our program of development and requires the employment of trained engineers who either possess a knowledge of landscape architecture or have a proper appreciation of the aesthetic value of park lands.

From that time until the National Park Service and the Bureau of Public Roads began their collaborative working relationship, most of the bridges in the Park were merely repaired. The next extensive bridge program would be in the 1930s, however, the Cub Creek Bridge on the East Entrance Road would be the first bridge project for the two agencies. (1926)

With the new working agreement of the National Park Service landscape architects responsible for the architectural details of construction, the appearance and types of bridges changed from steel constructed to concrete arched bridges faced with stone veneer, timber and log, or concrete girder bridges with stone abutments. The National Park Service admitted that "a bridge will always look like a bridge no matter what attempts are made to blend it into the surroundings or how much money is expended on it." However, the landscape architects did promote the use of masonry arch bridges that blended with the landscape, as the most desirable type, particularly where "ruggedness of the landscape is the rule."

During the first two decades many of the remaining steel bridges were moved to other locations in the Park to satisfy a need. Some of the steel Army bridges were relocated in the adjoining national forests.

Between 1926 and 1939, 30 major bridges were built in the park. With the exception of two of the remaining Army bridges and one bridge designed but not built during this time, the bridges being nominated as part of this documentation come from this period.

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PROPERTY TYPE - BRIDGES (continued)

Minimal work was done during the World War II years and as a part of the MISSION 66 program initiated in 1956, 14 of the older bridges were scheduled for replacement. By 1966, fourteen new bridges had been built and for the most part, these new bridges blended with the environment, despite the fact that their design moved away from the obvious rustic design of the pre-World War II era. During the 1970s, four more bridges were constructed.

Tracing the different types of bridges used in Yellowstone and the approximate periods of their use supports the fact that this road system is an evolutionary resource. Over the years, most if not all of the log railings and posts have been replaced most of the decks have been replaced. These changes are mostly due to the climatic conditions or the type of materials used. In some cases, concrete spalling etc. has called for the reconstruction of some portions.

SIGNIFICANCE

The bridges in Yellowstone National Park are significant according to the Criteria established by the National Register of Historic Places in the following ways:

CRITERION A -- Resources that are associated with events that have made a significant contribution to the broad patterns of our history.

NATIONAL LEVEL

Although segregated as a separate Property Type for documentation purposes the bridges in the park are a part of the road system, thus the significance found under Property Type--Roads, also applies to the bridges.

CRITERION B -- Resources associated with the lives of persons significant in our past.

While two of Chittenden's major achievements were bridges, neither exists today. The reconstructed Golden Gate Viaduct does not have enough integrity from the Chittenden era to have the association.

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PROPERTY TYPE - BRIDGES (continued)

CRITERION C -- Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

STATE LEVEL

Under Criterion C, the bridges can represent the National Park Service’s design philosophy of harmonizing the manmade features with the surroundings. The bridges are the resources on the road system which maintain the best integrity and clearly represent the works of the landscape architects of the National Park Service.

CRITERION D -- Resources that have yielded, or may likely to yield, information important in prehistory or history.

STATE LEVEL

Under Criterion D, the Baronett Bridge Site is significant at the State Level for its position as the first bridge to cross the Yellowstone River. The bridge, which predated the creation of the Park by one year, gave access to the Cooke City mines from the Yellowstone Valley. As one of the first of two private parties doing business in the Park at the time of its establishment, the site is also important for Concessions History which will be developed later. The site’s cultural deposits can contribute to our understanding of the late nineteenth century transportation frontier and the settlement and development.

REGISTRATION REQUIREMENTS

The Registration Requirements for the Property Type--Bridges are the following:

CRITERION A -- Resources that are associated with events that have made a significant contribution to the broad patterns of our history.

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PROPERTY TYPE - BRIDGES (continued)

NATIONAL LEVEL

Under Criterion A, the following Registration Requirements is listed:

1. the bridge must have been constructed as part of the planned road system in the Park.
2. the bridge must meet the National Register of Historic Places criteria for the 50-year consideration, however, Criteria Consideration G should be used on any bridge which was designed during the historic period (1872-1941), but not constructed until later as a result of the U.S. entry into World War II.
3. the bridge should meet the integrity of Location, however, Criteria Consideration B is applicable to the two remaining Army-built bridges. As the movement turned from the construction of steel bridges to more modern types, many the Army built were relocated within the Park and into the surrounding national forests. The two extant army bridges and the North Entrance Arch are the most visible reminders of the Army Corps presence in the Park. While there are two buildings associated with the Army Corps, they are not an obvious association.

Criterion B is not applicable for the bridges in Yellowstone.

Under Criterion C, the Registration Requirements are the following:

1. the bridge must have sufficient integrity to express the design philosophy of the National Park Service--harmonizing any manmade features with the environment.
2. the bridge is eligible for listing if any replacements or reconstructed portions have adhered to the original design.

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PROPERTY TYPE - BRIDGES (continued)

Under Criterion D, the Registration Requirements are the following:

1. the bridge site must have significant importance in the history of the Park or of the region.
2. bridge sites of nonextant bridges should not be considered eligible unless the bridge were known to have been a significant engineering example and the cultural remains could potentially yield important information about its construction or design.

**NAME OF PROPERTY TYPE--BUILDINGS AND STRUCTURES
ASSOCIATED WITH THE CONSTRUCTION OF THE ROAD SYSTEM
IN YELLOWSTONE NATIONAL PARK**

DESCRIPTION

The types of buildings and structures associated with the construction of the road system in Yellowstone National Park are entrance stations or entrance arches, buildings constructed in the Mammoth Hot Springs area for offices, equipment, and residences, road camp buildings and sites, and the site of the Baronett Bridge Complex.

The interpretive kiosks in pullouts were not built as part of the road program and thus will be addressed in a future Historic Context for History of the Administration of the Park-Subcontext--Interpretation/Education.

The first buildings associated with the road were those found at the Baronett Bridge Site. The toll cabin is addressed under Criterion D in the Property Type--Bridge portion.

There are two extant historic entrance structures, the Northeast Entrance Station and the North Entrance Arch (Gardiner Arch). The North Entrance Arch was built in 1903 to the design of Hiram Chittenden to be compatible with the recently completed Gardiner train station designed by Robert Reamer. The columnar basalt stone arch has two battered towers, fifty feet in height,

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

with an arch curtain five feet thick and is built to the same height as the towers. The structure is capped with a concrete roof and shingled with chippings from the cut stone used in the arches construction. The style reflects the Army Corps of Engineers and the use of the stone was compatible with the train station that was long ago removed. In 1921, a compatibly designed stone building which housed a ranger and was used as a checking station, was built near the arch. This new building replaced "an unsightly tent arrangement." Over the years the building was altered by the enclosure of the porch. In 1937, the building was destroyed by fire and until 1991 temporary buildings have been used on the North Entrance, several hundred yards from the arch, inside the park. During the summer of 1991, a compatibly designed stone and log building was built.

The historic context discusses the entrance stations on the other entrance roads and photographs illustrate their design. For the most part, the historic entrances were rustic log structures.

The one extant rustic log example is the Northeast Entrance Station, which was designated a National Historic Landmark under the Architecture in the Parks theme in 1987. The nomination called the entrance station "a classic in terms of its rustic design. Its pristine, nearly original condition makes it outstanding in the National Park system, and perhaps unique, for its architectural integrity.

The buildings that were constructed by the U.S. Army Corps of Engineers for housing, offices, and equipment storage were primarily constructed during the 1902-1903 period at the Mammoth Hot Springs/Fort Yellowstone area. Prior to that time, the Army Corps personnel were authorized to use some of the buildings the Cavalry had built at Camp Sheridan, the forerunner of the nearby Fort Yellowstone. The Camp Sheridan buildings that the engineering group used were the warehouse, guard house, quartermaster stable, and office. None of these buildings exist.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

During the 1902-1903 period, most of the buildings for the engineering group were built adjacent to the very finely constructed and attractive Fort Yellowstone. Chittenden first built a reservoir at the base of the Mammoth Terraces in 1901 and the following year the reservoir provided the source of power for the hydroelectric plant. These resources will not be addressed during Part I, but will be addressed when the overall evaluation of the Mammoth Hot Springs area is completed.

The first year of construction, 1902, Chittenden completed the following buildings:

- 1 commissary and storehouse, 100'x 24', one story
- 1 shop, 80'x 24', 2 stories, the upper used as quarters
- 1 shed, 100'x 20'
- 1 shed, 200'x 20'
- 1 stable, 30' x 40'
- 1 bunkhouse, 30' x 40'

The following year, Chittenden completed the U.S. Engineers Office, which was the second building constructed of stone since the U.S. Commissioner's house was completed in 1891, and an attractive cottage-style residence for himself to the rear of the Engineer's Office. Upon completion of the various buildings at Mammoth Hot Springs, Chittenden felt that:

This is the only point in the Park where an extensive transformation of natural conditions by the work of man has been permitted. Yet it was unavoidable here, and in yielding to this necessity, the effort has been made to provide a substitute that would be in harmony with the natural surroundings, and would itself be a feature of interest.

The Engineer's Office was a contrast in style to the other Army engineer buildings, which were simple, wooden frame buildings with wood shingle roofs. The photographs found in the Historic Context, Chapter III, illustrate the style of the buildings.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

In 1908 the engineers built a storage barn, adding a chimney in 1913 and another cottage on Avenue E. During June, 1915, the engineers built a wagon shed. Upon the departure of the cavalry troops in 1916, the engineers took over several of the buildings of Fort Yellowstone. They used the double set of stone officers quarters, 2 sets of wooden officers quarters, 2 sets of NCO quarters 1/2 of the double stone barracks, the stone blacksmith shop, and a stone stable.

The only extant buildings constructed by and for the U.S. Army Corps of Engineers are the Engineer's Office and the Chittenden House.

The other type of resource associated with this property type is the road camp (or site of road camp).

The first reference of a road camp established by the military was Kingman's 1885 road camp near the Norris Geyser Basin, but Kingman's reports give very good detailed information on the number of laborers, the type of work and their pay. An 1883 report lists the daily ration for the construction crews.

Upon Chittenden's return to the park in 1899, he began to consider the supplying and positioning of the necessary number of men in the appropriate locations for work. By 1901, the government provided housing and subsistence for which the workers paid forty cents a day. All of the working parties lived in a camp. Then in 1902-1903, additional quarters were built at Mammoth Hot Springs.

Prior to leaving Yellowstone, Chittenden made a long list of recommendations for the road projects in the Park. Among those was his proposal for road camps for crews of 13 to 15 men including a cook. Besides bunkhouses and messhalls, the camps should have buildings in which to store forage to avoid damaging the roads by hauling forage during the spring when the roads were soft. His idea was for two crews to work from one camp, with each crew responsible for about five miles of road. The road camps would be situated approximately 8 to 10 miles apart. This scheme would provide a systematic method for general maintenance, sprinkling, and development of the road system.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

Following Chittenden's suggestion, Lt. Ernest Peek established a number of camps during 1907, including a permanent camp with floor and framed tents near Obsidian Cliff and Canyon Junction. A permanent camp was started on the Lake to Canyon Road and one at Beryl Springs. Three very rough houses were finished on the Continental Divide between West Thumb and the Upper Geyser Basin. Barns were built at two of the houses and the timber cut for the third house.

In 1908, Peek expanded the number of road camps to include ones at Excelsior Geyser, Upper Geyser Basin, West Thumb, Lake and Trout Creek. The third barn, which was started in 1907, was completed at Spring Creek on the Continental Divide Road. Peek found that having these accommodations greatly increased the productivity, as before the road camps were built, the crews had to sleep on the ground. Before the summer of 1908, Peek planned to build a barn at Beaver Lake and at Trout Creek. Peek saved money by having mangers built at Beaver Lake, Beryl Springs, Excelsior Geyser, Upper Geyser Basin, West Thumb, Lake, Trout Creek, Canyon, and two other places on the Lake to Canyon Road. These mangers prevented the needless waste caused by feeding on the ground. In 1909 another barn and a warehouse were built at Beaver Lake.

In 1910, permission was given to the contractors, Moore and Moore of Eldridge, Montana, to build a small log cabin within the park boundary. The contractor had to build the cabin on a site selected by the noncommissioned officer stationed at the Gallatin Station, out of view of the road. The contractor did have permission, under certain restrictions to cut logs in the Park for its construction. About 1913, a 26' x 34' barn was built at Trout Creek road camp, a log storehouse was built at the East Entrance, a log cabin/storehouse was built at the Lake sprinkler camp, and a 25' x 130' wagon shed with storage loft was built at Mammoth Hot Springs. The following year, barns were built at the Gibbon Meadow and Grand Canyon camps and cabins were built at Beaver Lake and Grand Canyon camps. In 1915, telephones were installed at most of the camps.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

In 1915, the year automobiles were permitted to enter the Park, Maj. Amos Fries, who was known for running a "tight ship," decided that the practice of building bunkhouses and barns was not practical. He felt that for them to be effective required placing them in locations that would offset the long commutes the crews had to make which was too costly. He preferred the use of 15' x 24' tents.

In 1919, most of the road work was routine maintenance and many of the road crews were pulled off road work to fight fires, however, some of the camps, corrals, and equipment were moved around to other locations in the Park. In 1921, wooden messhalls were built for the road camps at Tower Junction, Madison Junction, Excelsior Geyser, and at Gibbon Meadows. Most of the building material came from the razed Yellowstone Western Stage Company buildings at West Yellowstone. Each of the 16' x 22' buildings contained a kitchen, dining room, and cook's bedroom. The roof extended six feet beyond the front wall to form a porch, which was enclosed by screening. The doors and windows were also screened. A 16' x 26' log mess house and a 16' x 30' log stable were built at the Lewis River road camp.

After the Bureau of Public Roads began supervising the road work in Yellowstone, the prospects of a greatly expanded roadwork program lasting many years was evident. The road camp facilities for the road crews were examined and tentative proposals offered an improved housing situation.

By 1926, twenty road camps within the boundaries of the Park had log and/or frame constructed buildings. The status of the road camps in 1926 is listed:

Mammoth Hot Springs:

1 building with 7 private rooms and a dormitory provided with iron bunks sufficient for 30 men. The building was described as "nothing more than a shell and not suited for winter use." There are 14 small rooms above the old carpenter shop which housed the truck drivers, barn men, commissary employees and other semi-permanent employees. Three men lived on the north side of McFarland's shop, which had no toilet, or bathing facilities.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

Recommended: That the old carpenter shop be partitioned off to construct 4 or 5 private rooms and a bathroom for the permanent mechanics. Additional quarters for single permanent employees such as blacksmiths, carpenters, mechanics, and head barnmen should be provided.

Beaver Lake: has a log mess-house and frame stable.

Recommended: A frame bunkhouse for 10 men, repairs to present stable, repairs to messhouse new fir floor, and a large range with hot water tank.

Norris: has a log and frame stable, frame messhouse, frame bunkhouse with log trim, frame house for foremen, and another frame building.

Recommended: The present frame messhouse, which was described as "too large and unsightly," should be razed and a new one built. The stable and bunkhouse need painting or staining and the two small frame buildings should be moved to a "less conspicuous" location.

Gibbon Meadow: has log stable and frame messhouse; nothing was recommended for additions, but it was recommended that when the road through the Gibbon Canyon was completed, the road crew should be located at Norris.

Madison Junction: has a frame messhouse, log storehouse with the horses being stabled in one end of the storehouse.

Recommended: A log bunkhouse for 12 men. It was felt that a stable was not needed in this location because motor equipment will probably be used on this section after its completion.

Excelsior Geyser: has frame messhouse and log stable.

Recommended: Frame bunkhouse.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

Old Faithful: has frame messhouse and frame officer's house.

Recommended: Frame bunkhouse for camp cleaners, sprinkler man and truck driver, frame stable for camp cleaner's teams, sprinkler team, and ranger's horses.

Spring Creek: has frame bunkhouse, small frame house for cook and frame stable. Nothing required.

Delacy Creek: has frame messhouse and bunkhouse and frame stable. Nothing required.

Dry Creek: has frame messhouse and bunkhouse and frame stable. Nothing required.

West Thumb: has frame messhouse, frame bunkhouse, frame grainary and log and slab shed for stable.

Recommended: The present messhouse and bunkhouse located in the new auto campground should be razed and an entire unit, messhouse, bunkhouse and stable built on the hill south of the auto campground.

Lake: has a log messhouse, several old sheds, and log building used for bunkhouse.

Recommended: New log or frame stable, raze all old sheds, build additional room on messhouse for cook's quarters. Either remodel the old bunkhouse or build new one.

Trout Creek: has log mess building and frame stable.

Recommended: Frame bunkhouse, small stable should be built back of messhouse -- the old stable should be razed.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

Canyon: has log messhouse and log stable.

Recommended: New bunkhouse for 15 men and build additional room on messhouse for cook's quarters.

Dunraven Pass: has frame messhouse, frame stable with log trim, and frame bunkhouse with log trim. Nothing required.

Tower Junction: has frame messhouse and old log stable.

Recommended: Log or frame bunkhouse and a new stable built behind the messhouse; the old stable should be razed.

Blacktail Deer: has log messhouse and log stable.
Creek

Recommended: Messhouse, bunkhouse, and stable. An entire new layout should be built in a new location nearer the road.

Virginia Meadows: has log messhouse.

Recommended: Small log or frame bunkhouse and small log or frame stable.

West Gallatin: has nothing.

Recommended: Log messhouse, log bunkhouse.

Cook City Road: has nothing.

Recommended: There should be two units on this section, one about Lamar Canyon and the other at Devil's Well, and a messhouse bunkhouse, and stable built at each place.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

Turbid Lake: has nothing.

Recommended: An entire unit--bunkhouse, messhouse, and stable. Cub Creek has log messhouse, log bunkhouse, log stable, and log bathhouse. Nothing is required.

East Entrance: has nothing.

Recommended: An entire unit--either log or frame messhouse, bunkhouse, and stable.

Lewis River: has log messhouse and log stable.

Recommended: Log bunkhouse.

In 1927, the Park sent bunkhouse and mess house blueprints to Thomas Vint, chief of the landscape architecture division, in the National Park Service Field Headquarters in San Francisco for approval. Generally, these utilitarian type buildings were constructed from standard designs found in the files in the park. The older bunkhouse design had a "bull-pen" arrangement for sleeping and the revised drawings offered separate sleeping rooms and a separate room and office for the foreman. The rationale for the changes in design was that the foreman needed privacy to prepare the cost reports and time sheets and that in many cases the foremen were required to do paper work at night. The move for separate sleeping areas would provide more comfort and privacy and thus less friction for crews whose ages varied from 18-year-olds to men in their fifties. Tidiness and cleanliness of the building was also an issue. Each sleeping room was designed for two men using double-tier bunks. The new designs for the mess house included a separate sleeping room for the cook on the first floor and framing the building 2 1/2 or 3 feet above the ceiling to provide two additional rooms for extra men or transients if necessary.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

The plans called for three team stables with the possibility of lengthening it an additional nine feet if space were needed for more stock. The resident engineer in Yellowstone preferred a rough lumber exterior on the frame building using the standard stain, however, cost estimates for the addition of log trim fell within the allotment from the appropriation. One year later in 1927, the road camp building program changed "because of conditions that could not have been foreseen."

In 1929, the National Park Service's Washington Office requested the closing and dismantling of the camps due to lack of construction funds, however, a new road camp was built at Lake consisting of a messhouse, a 20-man bunkhouse, a 3-stall stable, and a stable each at Canyon and West Thumb.

The following year, restored funding enabled some camps to be reestablished on a more permanent basis using the revised plans for bunkhouses and messhouses. A typical completed road camp included the messhouse costing \$1,424.00, the bunkhouse costing \$1,140.00, and the stable costing \$855.00.

In 1930, two groups of road camps were built according to the standard plans, the Bacon Rind Creek camp and the camp 3 1/2 miles west of the East Entrance which served the crew stationed for work between the East Entrance and Sylvan Pass. The two camps were identical in construction. The messhouse was a 1 1/2 story frame building, 18' x 32', with vertical siding and battens, consisting of a kitchen, pantry, and a mess hall on the first floor and three partitioned sleeping rooms and bath in the alcove upstairs. The bunkhouses, 18' x 30', were of the same construction, but partitioned into 5 sleeping rooms and a common room with a built-on shower. Each sleeping room accommodated two men. The bunkhouse was framed two feet lower than the messhouse and the upper portion floored and had a ceiling which provided space for tools and equipment for winter storage. The stables were of frame construction, 16' x 28'. The building was divided into double stalls to house three teams. The upper floor contained the hay loft and grainery which had a tin lined rodent proof oat bin.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

During 1931, the landscape architecture division of the National Park Service took a strong stand on appearance not only of the recently built structures, but also the conditions of the abandoned road camps, with the results that they were left in better condition than before. A few years later the C.C.C. assisted in the cleanup of old sites, removal of old buildings and the cleanup of old dump grounds.

Many of the road camps later housed road maintenance crews and over the years, many of the buildings have been relocated throughout the park or removed.

During the extensive road projects work of 1930s and into the 1940s, many of the contracts obligated the contractors to return the road camps to their natural conditions upon completion of the work. Sometimes buildings were left under certain conditions, such as:

With regards to the matter of removal of buildings and cleanup at the camp occupied by Strong and Company, contractors at Canyon, we are agreeable to leaving the N.P.S. mess hall, bunk house and barn. The remainder of the buildings are of such flimsy construction that to retain them pending their further use in subsequent contracts would not be practical. These shacks would require maintenance and protection which is not warranted by their value.

Toward the end of the 1940s, the Park tended to encourage the contractors to use space within the Park's utility areas. In reference to the use of an old camp at Riverside Geyser, Superintendent Rogers believed that "The scenic value of the Riverside Geyser outweighs any economic value the campsite might have. In fact there is not much consequence in making a comparison. Furthermore the use of the road and campsite detracts materially from the enjoyment of the views of the geyser."

There are a few isolated road camp buildings throughout the Park, however, the last most intact road camp at West Thumb, burned during the fires of 1988.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

SIGNIFICANCE

NATIONAL LEVEL

One building and one structure associated with the construction of the road system in Yellowstone National Park are significant at the National Level under Criterion A and Criterion C. The Northeast Entrance Station was designated a National Historic Landmark in 1988. The nomination called it "a classic in terms of its rustic design. Its pristine, nearly original condition makes it outstanding in the National Park system, and perhaps unique, for its architectural integrity."

The other nationally significant structure is the North Entrance Arch. It is significant for both Criterion A, and Criterion C. Under Criterion A, the arch is significant for the following reasons:

1. it is an integral part of the road system
2. it is associated with the role of the U.S. Army Corps of Engineers' significant contribution toward the development of the road system and its standards
3. it is the earliest attempt in recognizing the importance of an entrance at a park; it serves as the transition from the rest of the country into "a special place."
4. for nearly 90 years it has served as a symbol of Yellowstone National Park.

Under Criterion C, the arch is important for its design. Long before there was a National Park Service directive for compatible design, Chittenden designed this arch to be compatible with the well-known architect, Robert Reamer's design of the train station at Gardiner, Montana and its surroundings. In addition, the actual design of the arch is significant. The use of the columnar basalt to achieve a certain effect is significant. Despite maintenance and some restoration, the arch maintains a high degree of integrity.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

STATE SIGNIFICANCE

The Engineer's Office and the Chittenden House are significant at the State Level under Criterion A, Criterion B and Criterion C.

Under Criterion A, the two buildings are and were significant buildings associated with the U.S. Army Corps of Engineers association with the development of the road system in Yellowstone National Park. These were the most permanent buildings and the only ones that required design. The others, which have all been demolished, were typical, functional buildings, similar in style to those found in the park and other parks, such as Glacier National Park.

The interior of the Chittenden House has lost its integrity, but the first floor of the Chittenden House retains much of its integrity. Specific details will be found on the individual nomination form.

The buildings at Fort Yellowstone that the Army Corps of Engineers used after the Cavalry's withdrawal in 1916, are not significant under this context. While the engineers used them for two years, their importance is drawn from their association with the Cavalry's administration of Yellowstone National Park.

LOCAL SIGNIFICANCE

The road camp buildings and the road camp sites were evaluated for local significance under Criterion A, Criterion C, and Criterion D.

Under Criterion A, the existing remnants are isolated, or they have been relocated without their component structures thus losing the feeling of setting and association. They fail to represent a road camp. Their integration into another functional complex such as housing diminishes their significance as examples of "road camp."

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

Under Criterion C, the individual buildings have lost their design integrity by the modification of the building to meet new functional requirements. The buildings do not qualify for the Criteria Consideration B.

In 1988, the Bacon Rind Dorm from the old Bacon Rind Road Camp on the Gallatin Highway was determined not eligible by the Montana Historic Preservation Office. The dorm has been altered and moved to the West Entrance of Yellowstone National Park.

The only resources that might have applied under Criterion D are the road camp sites, sites of old entrance stations, or miscellaneous buildings constructed at Mammoth Hot Springs. It is doubtful that significant information could be yielded from the entrances, stations, sites, road camp sites, or the miscellaneous buildings that could not be discerned from historic photographs, documentation, or historic site plans. In the case of the miscellaneous buildings at Mammoth Hot Springs, the site of the engineers old buildings have been reused for building sites for other functions. Photographs of the buildings can be found in the Historic Context.

As part of the Historic Context, an effort was made to include information about the crews who built the roads, their camps, the equipment, their employment, and other details. This information can be found in different places in the Historic Context. Sometimes it is included within the text and/or endnotes, or it could be visual in a photograph. The road camps within Yellowstone National Park are probably no different than the hundreds of road camps used for the construction of state roads. If road camps sites are thought to be significant, ones outside Yellowstone National Park would probably retain more integrity than those within the boundary as one of the usual contract stipulations was that the camp be returned to as near natural condition as possible. An effort would have been made to obliterate the site and revegetate. The dumps that may have had an association with the road camps should not be considered as eligible also. One such dump was examined by archeologists during the summer of 1990. Their conclusion was "It is unlikely that any additional mitigation of this site would contribute to the history of the Park. Therefore, no further work is recommended."

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

Several of the contractors who built the roads have records, photographs, movie film, and other details which could be of interest to any one interested in road camps. Among the contractors who have maintained their records are Lowermilk and Sons of Denver, Colorado and Morrison-Knudsen of Boise, Idaho. The sites of the crews from the earlier period were housed in tents and the camps would have been of a very temporary nature. It would be difficult to differentiate those camp sites from any other camp sites of visitors, etc.

REGISTRATION REQUIREMENTS

The Registration Requirements for the Property Type--Buildings and structures associated with the construction of the road system in Yellowstone National Park will address the resources as included in an Historic District, such as the Entrance Station and the North Entrance Arch or as individual buildings such as the Engineer's Office, the Chittenden House, and the road camp buildings or sites.

Under Criterion A, the following Registration Requirements are listed:

1. the entrance structure and entrance stations must have integrity of Setting and Location
2. the Engineer's Office and the Chittenden House must have integrity of Location. These two buildings will be nominated individually at this time, however, they will be placed within the Fort Yellowstone Historic District at a later date. The other buildings within the proposed Fort Yellowstone Historic District are associated with the Calvary and the management of the Park. The Calvary buildings that the Army Corps Engineers used after 1916, will be part of the Fort Yellowstone Historic District for their association with the management of the Park, but mention will be made of the engineers' use. The Setting is not as important for the individual listing of the buildings as buildings are to be listed for their association with the road construction and their setting within Fort Yellowstone has changed considerably prior to and after their construction.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

- 3. the road camp must have integrity of Setting and Location. The planned road camps of the 1920s and 1930s had standardized designs and prescribed functional buildings or structures, such as a messhouse, bunkhouse, and stable. All three buildings should be present to be eligible.
- 4. the road camps must have integrity of Feeling and evoke a sense of "roadcamp"

Under Criterion C, the following Registration Requirements are listed:

- 1. The interiors of the Engineer's Office and the Chittenden House must possess significant design integrity to reflect the historic function; the floor plans, materials and workmanship must have sufficient integrity to reflect the feeling of the historic period. The exterior of the buildings must possess significant integrity of design, workmanship and materials to evoke their period of construction.
- 2. The entrance building and arch must possess significant integrity of design, workmanship and materials to evoke their period of construction.
- 3. If an individual road camp building is found to be within another use area and it retains the highest level of integrity of location, design, workmanship, and materials to evoke it as a good example of a road camp building, it could be eligible. It is important that the building not have extensive modifications. In order for the building's interior to be eligible, it must possess significant design integrity to reflect the historic function; the floor plans, materials and workmanship must have sufficient integrity to reflect the feeling of historic period.

Criterion D does not apply to these resources. See the Significance Statement.

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

**B. LIST OF PROPERTIES ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER
OF HISTORIC PLACES**

1. Grand Loop Historic District
 - a. Seven Mile Bridge
 - b. Obsidian Creek Bridge
 - c. Gibbon River Bridge (4.9 miles from Norris Junction)
 - d. Gibbon River Bridge (6.1 miles from Norris Junction)
 - e. Nez Perce Creek Bridge
 - f. Firehole River Bridge near Morning Glory Pool
 - g. Army Bridge at end of Fontain Freight Road
 - h. Isa Lake Bridge
 - i. Otter Creek Bridge
 - j. Tower Creek Bridge
 - k. Lava Creek Bridge
 - l. Gardner River Bridge
 - m. road

2. North Entrance Road Historic District
 - a. North Entrance Arch
 - b. road

3. Northeast Entrance Road Historic District
 - a. Lamar River Bridge
 - b. FHWA Creek Bridge
 - c. RWC Creek Bridge
 - d. Pebble Creek Bridge
 - e. Soda Butte Creek Bridge (6.4 miles from entrance)
 - f. Soda Butte Creek Bridge (3.3 miles from entrance)
 - g. TLF Creek Bridge
 - h. Northeast Entrance Station National Historic Landmark
 - i. road

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PROPERTY TYPE - BUILDINGS AND STRUCTURES (continued)

4. East Entrance Road Historic District
 - a. Fishing Bridge
 - b. Sedge Creek Bridge
 - c. Pelican Creek Bridge
 - d. Cub Creek Bridge
 - e. road

5. South Entrance Road Historic District
 - a. Crawfish Creek Bridge
 - b. road

6. West Entrance Road Historic District
 - a. road
7. Chittenden House (Mammoth Hot Springs)
8. Engineers Office (Mammoth Hot Springs)
9. Baronett Bridge Site
10. Bunsen Peak Road
11. Mammoth to Gardiner Road (old road)
12. Mount Washburn Road
13. Blacktail Deer Plateau Road
14. Fountain Freight Road

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