National Park Service
U.S. Department of the Interior

Manhattan Project National Historical Park
Tennessee, New Mexico, Washington

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Foundation Document

Draft for Public Review

MISSIONS OF THE NATIONAL PARK SERVICE AND THE DEPARTMENT OF ENERGY

NATIONAL PARK SERVICE

The National Park Service (NPS) preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The National Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.

The NPS core values are a framework in which the National Park Service accomplishes its mission. They express the manner in which, both individually and collectively, the National Park Service pursues its mission. The NPS core values are:

- **Shared stewardship**: We share a commitment to resource stewardship with the global preservation community.
- **Excellence:** We strive continually to learn and improve so that we may achieve the highest ideals of public service.
- **Integrity**: We deal honestly and fairly with the public and one another.
- **Tradition**: We are proud of it; we learn from it; we are not bound by it.
- **Respect**: We embrace each other's differences so that we may enrich the well-being of everyone.

The National Park Service is a bureau within the Department of the Interior. While numerous national park system units were created prior to 1916, it was not until August 25, 1916, that President Woodrow Wilson signed the National Park Service Organic Act formally establishing the National Park Service.

The national park system continues to grow and comprises more than 400 park units covering more than 84 million acres in every state, the District of Columbia, American Samoa, Guam, Puerto Rico, and the Virgin Islands. These units include, but are not limited to, national parks, monuments, battlefields, military parks, historical parks, historic sites, lakeshores, seashores, recreation areas, scenic rivers and trails, and the White House. The variety and diversity of park units throughout the nation require a strong commitment to resource stewardship and management to ensure both the protection and enjoyment of these resources for future generations.

DEPARTMENT OF ENERGY

The mission of the U.S. Department of Energy (DOE) is to enhance U.S. security and economic growth through transformative science, technology innovation, and market solutions to meet the nation's energy, nuclear security, and environmental challenges. The Department of Energy achieves its mission through an operational and programmatic framework that supports the following goals:

- **Science and Energy** – Advance foundational science, innovate energy technologies, and inform data driven policies that enhance U.S. economic growth and job creation, energy security, and environmental quality, with emphasis on implementation of the President's Climate Action Plan to mitigate the risks of climate change and enhance resilience to it.

- **Nuclear Security** – Strengthen national security by maintaining and modernizing the nuclear stockpile and nuclear security infrastructure; reducing global nuclear threats; providing nuclear propulsion; improving physical and cyber security; and strengthening key science, technology, and engineering capabilities.

- **Management and Performance** – Position the Department to meet the challenges of the 21st century and the nation's Manhattan Project and Cold War legacy responsibilities by employing effective management and refining operational and support capabilities to pursue Department missions. Managing assets in a sustainable manner that supports the DOE mission is a strategic objective under this goal.

The Department executes its mission at more than 50 sites throughout the U.S. covering more than 2.2 million acres of land.

[*The Arrowhead – this text will be a sidebar when formatted*.]
The arrowhead was authorized as the official National Park Service emblem by the Secretary of the Interior on July 20, 1951. The sequoia tree and bison represent vegetation and wildlife, the mountains and water represent scenic and recreational values, and the arrowhead represents historical and archeological values.

The DOE seal was authorized on May 15, 1978. The eagle represents the care in planning and the purposefulness of efforts required to respond to the nation's increasing demands for energy. The sun, atom, oil derrick, windmill, and dynamo serve as representative technologies whose enhanced development can meet these demands. The rope represents the cohesiveness in the development of the technologies and their link to our future capabilities. The lightning bolt represents the power of the natural forces from which energy is derived and the nation's challenge in harnessing the forces.

INTRODUCTION

Every unit of the national park system will have a foundational document to provide basic guidance for planning and management decisions—a foundation for planning and management. The core components of a foundation document include a brief description of the park as well as the park's purpose, significance, fundamental resources and values, and interpretive themes. The foundation document also includes special mandates and administrative commitments, an assessment of planning and data needs that identifies planning issues, planning products to be developed, and the associated studies and data required for park planning. Along with the core components, the assessment provides a focus for park planning activities and establishes a baseline from which planning documents are developed.

A primary benefit of developing a foundation document is the opportunity to integrate and coordinate all kinds and levels of planning from a single, shared understanding of what is most important about the park. The process of developing a foundation document begins with gathering and integrating information about the park. Next, this information is refined and focused to determine what the most important attributes of the park are. The process of preparing a foundation document aids park managers, staff, and the public in identifying and clearly stating in one document the essential information that is necessary for park management to consider when determining future planning efforts, outlining key planning issues, and protecting resources and values that are integral to park purpose and identity.

While not included in this document, a park atlas is also part of a foundation project. The atlas is a series of maps compiled from available geographic information system (GIS) data on natural and cultural resources, visitor use patterns, facilities, and other topics. It serves as a GIS-based support tool for planning and park operations. The atlas is published as a (hard copy) paper product and as geospatial data for use in a web mapping environment. The park atlas for Manhattan Project National Historical Park can be accessed online at: http://insideparkatlas.nps.gov/.

PART 1: CORE COMPONENTS

The core components of a foundation document include a brief description of the park, park purpose, significance statements, fundamental resources and values, and interpretive themes. These components are core because they typically do not change over time. Core components are expected to be used in future planning and management efforts.

BRIEF DESCRIPTION OF THE PARK

Established on November 10, 2015, Manhattan Project National Historical Park is managed through a collaborative partnership by the National Park Service and the U.S. Department of Energy to preserve, interpret, and facilitate access to key historic resources associated with the Manhattan Project. The Manhattan Project was a massive, top secret national mobilization of scientists, engineers, technicians, and military personnel charged with producing a deployable atomic weapon during World War II. The project began as a multifaceted effort requiring the rapid advancement of nuclear physics and multiple engineering strategies to produce functional weapons designs and critical quantities of fissile materials, and produced weapons of unprecedented destructive capacity. The project culminated with the Trinity Test on July 16, 1945, a few weeks before the United States dropped atomic bombs on Hiroshima and Nagasaki, Japan. Coordinated by the U.S. Army, Manhattan Project activities were located in numerous locations across the United States. The park incorporates three of the most significant locations, each of which played an essential role in the Manhattan Project: Oak Ridge, Tennessee; Los Alamos, New Mexico; and Hanford, Washington. As part of the enabling legislation, Congress identified facilities and areas eligible to be included in the park, some of which are currently included in the park, and others which may be included in the future. The Secretary of the Interior, in consultation with the Secretary of Energy, determines which of these areas to include in the park.

Oak Ridge, Tennessee

The Oak Ridge Reservation served as the administrative headquarters for the Manhattan Project. Initially known as the Clinton Engineer Works, the reservation also produced the enriched uranium used in the “Little Boy” bomb. Uranium was enriched here through multiple methods in discrete plant areas isolated by the ridges and valleys common to East Tennessee, and several key structures associated with these activities are included in the park. Located within the Y-12 National Security Complex, buildings 9731 and 9204-3 housed large arrays or “racetracks” of calutrons, which separated uranium isotopes with powerful electromagnets. On the western edge of the reservation, the enormous K-25 plant (now demolished) separated uranium isotopes using the gaseous diffusion method pioneered in Oak Ridge. Oak Ridge also demonstrated the production of plutonium through neutron irradiation of uranium at the X-10 Graphite Reactor, where the first gram quantities of human-produced plutonium were created. The world’s first continuously operating nuclear reactor, and designated a national historic landmark in 1966, the X-10 Graphite Reactor served as a prototype for the much larger reactors at the Hanford Site, including the B Reactor.

The area making up the Oak Ridge Reservation includes evidence of human settlement dating back at least 14,000 years, long prior to the creation of the Clinton Engineer Works .Various American Indian tribes settled the area culminating in the Cherokee. European settlement began in what is now East Tennessee when in the second half of the 1700s, Long Hunters came through the Cumberland Gap into Cherokee-occupied land and first found this area. Various waves of settlers soon followed, including many Scots-Irish. By 1942, the nearly 60,000 acres along the north bank of the Clinch River taken for the Manhattan Project were occupied by a few sparsely populated farming communities in three valleys only a few tens of miles west of Knoxville. These communities included Scarboro, the Wheat community, Robertsville, and Elza.

The Tennessee Valley Authority completed the Norris Dam in 1936 on the Clinch River, providing electricity and flood control to the area and the project. Approximately 3,000 people were required to be displaced in very short order to make way for construction. For a variety of reasons the location was considered at the time ideal, and when General Leslie Groves was put in charge of the Manhattan Project he selected the site as the location of the project's first plant. Interesting to note, Tennessee Governor Prentiss Cooper initially declined to cede sovereignty over the land to the federal government, which gained the Clinton Engineer District a military restricted area designation rather than a military reservation.

Los Alamos, New Mexico

Los Alamos was the location of the laboratory where prominent scientists, engineers, technicians, and support personnel collaborated to design and fabricate the first nuclear weapons. The park includes several sets of structures widely dispersed around the laboratory grounds. On the eastern side of the grounds, the Pajarito Site includes the Battleship Bunker (TA-18-2), which protected scientists conducting implosion diagnostic tests; the Slotin Building (TA-18-1), which hosted criticality research; and the Pond Cabin (TA-18-29), which was built in 1914 and supported Emilio Segre's plutonium fission research. Located on the western side of the laboratory grounds, the three bunkered buildings (TA-8-1, TA-8-2, TA-8-3) and a portable guard shack (TA-8-172) are collectively known as the "Gun Site." These structures supported the development and final assembly of the "Little Boy" uranium gun-type bomb. Located just to the south is V-Site, an area within the lab that consists of two structures (TA-16-516 and TA-16-517) built for the testing and assembly of the high-explosives spheres used in plutonium implosion-type bombs. While not officially within the park boundary today, the nearby Los Alamos Historic District includes a group of houses and community buildings where project scientists and their families lived and gathered during the Manhattan Project era.

The occupation and use of New Mexico's Pajarito Plateau began as early as 10,000 BC, when foraging groups used the area for hunting and gathering. During the Coalition and Classic periods (AD 1150 to 1600), large pueblo villages were built on the plateau. The Pajarito Plateau was abandoned as a year-round residential area during the mid-1500s. At this time, new pueblos were constructed along the Rio Grande. The pueblo of Tsirege, occupied during the Classic period (AD 1325 to 1600), is on lands appropriated by the U.S. government during World War II and is ancestral to the Tewa speakers of the Pueblo de San Ildefonso. In 1680, the Pueblo peoples revolted against the Spanish. At this time, several Ancestral Pueblo sites located on the isolated Pajarito Plateau were reoccupied, as they offered natural protection and defense for groups of refugees. Evidence for Navajos and Jicarilla Apaches in the northern Rio Grande begins with the Spanish Colonial period. Pueblo, Athabaskan, Anglo, and Hispanic groups continued the seasonal use of the plateau for hunting, gathering, and grazing during the late 19th and early 20th centuries.

Formal homesteading on the Pajarito Plateau began in the late 1880s. By the late 1930s, 36 individuals had patented claims under the terms of the Homestead Act or related land legislation. During the homesteading years, families used the Pajarito Plateau for seasonal farming, ranching, and resource gathering. Many of these dry-land farmers—primarily Hispanic Americans from the nearby Rio Grande Valley settlements of San Ildefonso, Pojoaque, El Rancho, and Española—did not live on their claims year-round. Notable exceptions to the seasonal occupation of the Pajarito Plateau by Hispanic homesteaders included a few permanent ranches such as the Los Alamos Ranch School, located in the area of present-day downtown Los Alamos, and Anchor Ranch, located on land now occupied by the Los Alamos National Laboratory. The most well-known of the pre-Manhattan Project properties, the Los Alamos Ranch School, was established in 1917 by Ashley Pond, Jr.

In late 1942, the U.S. government appropriated U.S. Forest Service land and private property on the Pajarito Plateau for its secret atom-bomb project, including several large ranches and more than 30 homesteads.

Hanford, Washington

Initially known as the Hanford Engineer Works, the Hanford Site produced plutonium on an industrial scale. Its remote location offered a margin of safety given the dangerous nature of its activities, and the nearby Columbia River provided cooling water for its powerful nuclear reactors. The park includes the B Reactor, a production-scale reactor based on the design concepts of the X-10 reactor in Oak Ridge. The B Reactor was the first such nuclear reactor in the world and is today a national historic landmark. Along with two identical reactors at the Hanford Site, B Reactor produced the plutonium used in the Trinity Test and the "Fat Man" implosion-type bomb. The 221-T Building (T Plant) is eligible for inclusion in the park, but is excluded at present due to ongoing DOE mission requirements. It was the first structure built for the chemical separation of plutonium, and could be added to the park once the department's ongoing mission requirements have been completed.

The park also includes several sites from the communities of Hanford and White Bluffs that existed on the grounds before their residents were displaced by the Manhattan Project in 1943. These structures include the remnants of Hanford High School with a small portion of the former Hanford Construction Camp Historic District, the river-cobble structure of Bruggemann's Agricultural Complex Warehouse, the White Bluffs Bank, and the Hanford Irrigation District "Allard" Pump House.

Archeological evidence demonstrates the presence of American Indian tribes in the area for more than 10,000 years. The near-shore areas of the river contain village sites, fishing and fish processing sites, hunting areas, plant gathering sites, and religious sites, while upland areas were used for hunting, plant gathering, religious practices, and overland transportation. The Treaties of 1855 relocated most area tribes to permanent reservations elsewhere but reserved for the tribes certain rights of use. The first European Americans who came into the Hanford region were Lewis and Clark, who were soon followed by fur trappers, military units, and miners passing through on river passageways.

In the 1860s merchants set up stores, a freight depot, and a ferry at White Bluffs. Chinese miners began to work the gravel bars for gold, cattle ranches were established in the 1880s, and farmers, the railroads, and extensive government-sponsored irrigation followed soon after. Several small, thriving towns, including Hanford, White Bluffs, and Richland grew up along the river banks in the early 20th century. A spur line of the transcontinental railroad was completed in 1913, and local businesses sprang up, along with churches and schools, grange halls, and a cemetery.

In the early months of 1943 about 1,500 people in the three towns had their property condemned for a top secret war project. Property owners were compensated, but many felt the appraised value of their land, which reflected expansive infrastructure and improvements, was less than fair. At the same time, the government set up fences and checkpoints to bar the former land owners from returning, and to prevent American Indian tribes from entering to exercise their treaty rights.

Park Management

Manhattan Project National Historical Park is administered by the Department of Energy and National Park Service under a memorandum of agreement that specifies the roles and responsibilities of both agencies. The National Park Service will provide administration, interpretation, education, and technical assistance in support of resource preservation efforts. The Department of Energy will continue to be responsible for management, operations, maintenance, access, and historic preservation activities of the historic Manhattan Project sites, as all current sites included in the park are currently under its custody and control. The two agencies will collaborate in the identification and development of partnership arrangements and other strategies to tell the complete story of the Manhattan Project and its legacy.

Visitor Access

Due to ongoing national security requirements and cleanup activities, some sites included in the park are not currently accessible, specifically, buildings 9731 and 9204-3 at Oak Ridge and all sites at Los Alamos. All other park sites are accessible only via organized bus tours, including the X-10 Graphite Reactor, the K-25 plant, B Reactor, and Hanford pre-Manhattan Project historic structures. As part of their ongoing collaboration, the National Park Service and the Department of Energy will endeavor to develop innovative and virtual approaches to connect park visitors with key resources, as they work to expand safe physical access to these sites.

BRIEF HISTORY OF THE MANHATTAN PROJECT

Introduction

The Manhattan Project is the story of some of the most renowned scientists of the 20th century combining with industry, the military, and tens of thousands of Americans working at locations across the country to translate original scientific discoveries into an entirely new kind of weapon. When the existence of this nationwide, secret project was revealed to the American people following the atomic bombings of Hiroshima and Nagasaki, most were astounded to learn that such a far-flung, government-run, top-secret operation existed, with physical properties, payroll, and a labor force comparable to the automotive industry. At its peak, the project employed 130,000 workers and, by the end of the war, had spent $2.2 billion.

Neutrons, Fission, and Chain Reactions

The road to the atomic bomb began with revolutionary discoveries in physics. In the early 20th century, physicists conceived of the atom as a miniature solar system, with extremely light negatively charged subatomic particles, called electrons, in orbit around a much heavier positively charged nucleus.

In 1919, Ernest Rutherford, working in the Cavendish Laboratory at Cambridge University, detected a high-energy particle with a positive charge being ejected from the nucleus of an atom. He named this subatomic particle the proton. The number of protons in the nucleus of the atom defines the element. Hydrogen, with one proton and an atomic number of one, came first on the periodic table and uranium, with ninety-two protons, last. However, many elements existed at different weights even while displaying identical chemical properties. This discovery would have important implications for nuclear physics, as these isotopes of the same element could have markedly different nuclear properties.

A third subatomic particle, first identified in 1932 by James Chadwick at Cambridge University, explained this difference in mass. Named the neutron because it has no charge, the number of neutrons could vary among nuclei of atoms of the same element. Atoms of the same element but with varying numbers of neutrons are called isotopes. For instance, all uranium atoms have 92 protons in their nuclei and 92 electrons in orbit. Uranium–238, which accounts for more than 99% of natural uranium, has 146 neutrons in its nucleus. Uranium–235 has 143 neutrons in its nucleus, and this isotope makes up less than 1% of naturally occurring uranium.

An unexpected discovery by researchers in Nazi Germany in late 1938 radically changed the direction of both theoretical and practical nuclear research. The radiochemists Otto Hahn and Fritz Strassmann found that when they bombarded uranium with neutrons emitted from a mixed radium-beryllium source, the uranium atoms split into two lighter elements, and even more significantly, the products of the experiment weighed less than that of the original uranium atom. Albert Einstein's formula, $E=mc^2$, which states that mass and energy are equivalent, suggested the loss of mass resulting from this process must have been converted into energy. Lise Meitner, a former colleague of Hahn who fled to Sweden to escape the Nazis, and her nephew, Otto Frisch, calculated that so much energy had been released that a previously undiscovered process must be at work. Borrowing the term for cell division in biology, Frisch named the process fission.

Fission of the uranium atom had another important characteristic besides the immediate release of energy. This was the emission of neutrons. The energy released when fission occurred in uranium caused several neutrons to "boil off" the two main fragments as they split apart. Physicists speculated that these secondary neutrons might collide with other uranium atoms and cause additional fission, creating a self-sustaining "chain reaction" if the mass of uranium was of appropriate size, shape, and density, which would emit a continuously increasing amount of energy. Such a reaction could generate a large amount of energy, and if uncontrolled could create an explosion of huge force.

The Atomic Bomb and the Manhattan Project

The possible military uses for uranium fission were apparent to the world's leading physicists. In August 1939, Albert Einstein and physicist Leo Szilard wrote a letter to President Franklin D. Roosevelt to warn him that recent uranium fission research suggesting a chain reaction in a sufficiently large mass of uranium could conceivably lead to the construction of "extremely powerful bombs." A single bomb, Einstein warned, could potentially destroy an entire seaport. Einstein called for government support of uranium research, noting ominously that German physicists were engaged in uranium research and that Germany had stopped the export of uranium.

President Roosevelt and his advisers reacted cautiously to the Einstein letter, initially providing only limited federal funding for this research. No one as yet knew whether an atomic weapon was even possible, or whether a bomb could be produced in time to affect the outcome of the war. Researchers discovered early on that uranium–238 could not sustain a chain reaction required for a bomb, but theorized that the much less abundant uranium–235 might be able to do so. Natural uranium ore consisted of less than 1% uranium–235. Separating uranium–235 from uranium–238 also proved to be extremely difficult and expensive. The two isotopes were chemically identical and therefore could not be separated by chemical means. With their masses differing by less than 1%, other means of separation were problematic at best. No proven efficient method existed for physically separating the two isotopes in any quantity.

At the same time, a second possible path to a bomb gradually emerged. Researchers studying uranium fission products at the University of California, Berkeley, discovered a new, "transuranium" element by subjecting uranium–238 to deuteron bombardment (deuterons are stable particles consisting of a proton and neutron). During this process, transuranium nuclei captured neutrons and through a process known as beta decay yielded a new chemical element with an atomic number of 93. This element was named neptunium, which itself, over time, decayed to yet another transuranium element. The chemist Glenn T. Seaborg identified this as element 94 in February 1941, which he later named plutonium. He subsequently proved that the plutonium–239 isotope was 1.7 times as likely as uranium–235 to fission. His discovery suggested the possibility of producing large amounts of the fissionable plutonium in a uranium pile, or reactor, as it later came to be called, using natural, unseparated uranium and then chemically separating the plutonium. Seaborg and others believed this process might be less expensive and simpler than building uranium isotope separation plants.

In early 1942, the United States decided to proceed with a full-scale program to build an atomic weapon. This project was assigned to the U.S. Army Corps of Engineers. The Corps set up the Manhattan Engineer District—so called because the initial headquarters was in Manhattan, New York—commanded by Brigadier General Leslie R. Groves. Secrecy and fear of a major accident dictated that the production facilities be located at remote locations. Due to ongoing uncertainties as to which processes for producing fissionable material would work, both of the paths explored by scientists—isotope separation of uranium-235 and production of plutonium in a uranium pile—were given approval. By the end of the war, Groves and his staff expended approximately $2.2 billion on production facilities, towns, and research laboratories scattered across the nation.

Groves located the production facilities for uranium isotope separation at the Clinton Engineer Works, a 92–square–mile parcel carved out of the Tennessee hills just west of Knoxville. (The name Oak Ridge was not widely used for the reservation until after the war.) Groves placed three separation methods into production: gaseous diffusion, electromagnetic separation, and liquid thermal diffusion. These processes each separated uranium-235 and uranium-238, and ultimately provided material that would be used in an atomic weapon.

Meanwhile, much of the research work on producing plutonium, including design of the piles, took place at the Metallurgical Laboratory (Met Lab) at the University of Chicago. On December 2, 1942, on a racket court on campus, researchers headed by the Italian-émigré physicist Enrico Fermi achieved the world's first self–sustaining chain reaction in a graphite and uranium pile. Groves authorized construction of a pilot reactor and plutonium separation facility at the X-10 area of the above-described Clinton Engineer Works. Due to space and power generating limitations, Groves then chose a more permanent location near Hanford, Washington, on the Columbia River, because of its isolation, long construction season, and access to cooling water and hydroelectric power. Three water-cooled reactors, designated by the letters B, D, and F, and corresponding chemical separation facilities were built at the Hanford Engineer Works.

Bomb Design

Design and fabrication of the first atomic weapons became the responsibility of the newly established Los Alamos Laboratory, located at a virtually inaccessible location high on a mesa in northern New Mexico. Headed by J. Robert Oppenheimer, the laboratory assembled a remarkable array of scientists from universities across the United States. Designing the bomb was not an easy task. Precise calculations and months of experimentation were required to obtain the optimum specifications of size and shape. For the bomb to work, sufficient fissionable material needed to be brought together in a critical mass, which would initiate a chain reaction that released the greatest possible amount of energy before being blown apart and dispersed in the explosion. The most direct approach became known as the gun method, which used conventional artillery technology to fire one subcritical mass at high speed into the other, forming a supercritical mass. The gun method was used for the uranium–235 bomb.

Los Alamos scientists discovered that the gun method would not work for plutonium. Impurities in the plutonium would set off a predetonation after a supercritical mass had been reached but before the optimum configuration for a chain reaction had been attained. As an alternative, scientists turned to the relatively uncertain implosion method. With implosion, conventional explosives would create symmetrical shockwaves directed inward to compress a subcritical mass of plutonium, resulting in a supercritical mass and causing a chain reaction.

Two bomb models were developed by spring 1944, and were drop-tested (without fissionable materials) from a specially modified B–29 bomber. The plutonium implosion prototype was named "Fat Man" and the uranium gun prototype was named "Little Boy." Field tests with the uranium prototype eased doubts about the design, so that a full-scale test prior to combat use was deemed unnecessary. The plutonium device was more problematic. It would have to be tested before use.

The Trinity Test

The test shot was dubbed "Trinity" by Oppenheimer. Test planners chose a flat, desert scrub region in the northwest corner of the isolated Alamogordo Bombing Range in southern New Mexico. The site was several hundred miles from Los Alamos, and the nearest offsite habitation was 20 miles away. Scientists, workers, and other observers would be withdrawn almost 6 miles and sheltered behind barricades during the test with little concern for dangers from blast, fragments, and heat.

Scientists were well aware that the blast would create potential radiation hazards. Plutonium fission products from the device, as well as the now-radioactive ground debris, would be swept into a growing fireball and lifted high into the air, posing a serious hazard from radioactive fallout. Groves feared legal culpability if the fallout was severe, so Army intelligence agents located and mapped everyone within a 40-mile radius of the test site. Test planners set up an elaborate offsite monitoring system and prepared evacuation plans if exposure levels became too high.

On July 16, 1945, the Trinity device, positioned on top of a 100-foot steel tower, containing just over 13 pounds of plutonium, detonated over the New Mexico desert with an explosive yield of approximately 21 kilotons. The predawn blast, which temporarily blinded the nearest observers 10,000 yards away, created an orange and yellow fireball about 2,000 feet in diameter. The initial fireball flattened into a dense white mushroom cloud 25,000 feet in height. The blast left a shallow crater 10 feet deep and some 400 yards across. Due to the thermal updraft that drew the cloud so high, little fallout was dropped on the test site beyond 1,200 yards of ground zero, but the mushroom cloud dropped a large amount of radioactive fallout as it dispersed toward the north-northeast.

Hiroshima and Nagasaki, Japan

The Manhattan Project owed its existence to fear that Nazi Germany was developing an atomic weapon, but the surrender of Germany in spring 1945 turned the focus of the program to perfecting a device that could be used against Japan in the ongoing war in the Pacific. American strategists thought that an invasion of the Japanese Home Islands might be required to end the conflict, and planning for the invasion, codenamed Operation Downfall, began more than a year before the Trinity test. Estimates of casualties resulting from an invasion and defeat of Japan varied widely, with the upper range numbering in the millions for the United States, its allies, and the Japanese military and civilians.

President Harry S Truman and his advisors were well aware that successful development and deployment of an atomic weapon could alter strategic calculations for ending the war. Plans were made for launching an attack with these weapons from recently captured Tinian Island (now part of the Commonwealth of the Northern Mariana Islands) in the Pacific, within striking distance of Japan by B-29 bombers. Truman formed an Interim Committee of top officials charged with recommending the proper use of atomic weapons. The group considered whether a demonstration of the bomb might possibly convince the Japanese to surrender. This was rejected, however, out of fear that the bomb could malfunction, the Japanese might put U.S. prisoners of war in the area, or they might manage to shoot down the plane. In addition, the shock value of the new weapon could be lost. These reasons and others convinced the group that the bomb should be dropped without warning on a "dual target"—a war plant surrounded by workers' homes.

On August 6, 1945, just three weeks after the Trinity test, the United States dropped the "Little Boy" uranium bomb on Hiroshima, Japan. A B-29 bomber named *Enola Gay* lifted off in the predawn hours from Tinian Island and released the first atomic weapon in history over Hiroshima. "Little Boy" detonated with a yield of 13 kilotons at nearly 2,000 feet above the city, to maximize its destructive effects.

The effects of the explosion were both devastating and indiscriminate, a lethal combination of blast overpressure, extreme heat, and radiation effects that killed between 90,000 and 166,000 people. Half of the fatalities came from the initial blast and firestorm, and those who did not perish immediately in the blast suffered for days or weeks before finally succumbing to gruesome burn injuries or acute radiation sickness. Hiroshima suffered the loss of more than one-third of its population, and the complete destruction of two-thirds of its buildings.

Three days later, on August 9, 1945, another B-29 bomber named *Bock's Car* lifted off from Tinian Island carrying the "Fat Man" plutonium implosion-type bomb. Unable to attack its primary target of Kokura due to poor visibility, the crew released "Fat Man" over its secondary target, the city of Nagasaki. "Fat Man" detonated 1,700 feet above the city with a yield of 22 kilotons. The explosion was contained by the steep hills that surrounded ground zero; still, between 60,000 and 80,000 people were killed by the combined effects of the bomb. Those who survived the bombings faced the loss of family members, destroyed livelihoods, and a lifetime of significantly increased risk of leukemia and other cancers due to radiation exposure.

The destructive effects of the two atomic bombs, combined with the Soviet invasion of Japanese-occupied Manchuria on August 9, led Japan to surrender on August 14. The United States and its allies began their occupation of Japan on August 28, the first foreign occupation in the history of the Japanese nation.

From the Second World War to the Cold War

The end of World War II brought with it a whole new set of issues and problems, not least of which revolved around the dilemma of what to do with the nuclear genie now that it had been let out of the bottle. The discovery of nuclear energy, as President Truman told Congress in October 1945, "began a new era in the history of civilization." While this new era held the promise of perhaps limitless energy for peaceful purposes, the prospect of the proliferation of atomic weapons was alarming. Controls over nuclear energy were clearly desirable. In the immediate aftermath of the war, the United States sought with mixed success to implement regimes for controlling and regulating the atom at both the domestic and international levels.

On the domestic front, Truman called for the establishment of an Atomic Energy Commission to take over the Manhattan Project's material resources and "to control all sources of atomic energy and all activities connected with its development." Congress passed the Atomic Energy Act of 1946, creating the new agency, and Truman signed it into law on August 1. The act transferred authority from the Army to the new Atomic Energy Commission and continued the government monopoly in the field of atomic research and development.

Efforts to implement international control were less fruitful. The United States proposed the establishment of an international atomic development authority that would control all atomic research and development activities that might pose a danger to world security and possess the power to license and inspect all other such projects. This effort was rejected by the Soviet Union, then in the midst of its own atomic weapons development effort.

This impasse was part of the onset of a new global struggle between the United States and the Soviet Union. The breathing space between the Second World War and the Cold War was very brief. Already in March 1946, Winston Churchill warned of an "iron curtain" that had descended across Eastern Europe as the Soviet Union sought to maintain its influence over territories it occupied. A year later, President Truman asked for funds for overseas economic and military assistance for nations threatened by Communism, known as the Truman Doctrine. The United States refused to surrender its atomic deterrent without adequate controls, believing that Soviet troops posed a threat to Western Europe and recognizing that American conventional forces had rapidly demobilized. In this atmosphere of mutual suspicion, the Cold War set in.

Atomic weapons, as a result, rapidly became the cornerstone of Cold War military strategy. Oak Ridge and Hanford continued to produce nuclear materials. Los Alamos continued research, design, and construction of useable weapons. To learn more about weapons effects, the military held a test series called Operation Crossroads, during the summer of 1946 at Bikini atoll in the Marshall Islands. Many more tests would follow. In 1949, the Soviet Union successfully tested its first atomic device. In the 1950s, the United States and Soviet Union developed thermonuclear weapons, which increased the potential destructive power of nuclear weapons one thousand fold and more. The number of weapons on both sides increased exponentially.

Legacy

The legacy of the Manhattan Project is both enormous and complex. The development and use of atomic weapons helped bring an end to World War II, the largest and most destructive war in human history. In doing so, the bombings of Hiroshima and Nagasaki took an enormous physical and economic toll on the people of those cities. Manhattan Project activities also left behind impacts in the United States, including a significant number of people displaced from their homes, lands and waters; traditional use areas used for hunting, fishing, and gathering; and sacred sites; to make way for the various Manhattan Project sites, and the effects of environmental contamination from nuclear processing and testing activities.

The Manhattan Project and use of atomic weapons set the stage for the Cold War. The next half century would feature the United States and Soviet Union vying for global supremacy, with vast arsenals of nuclear weapons possessed by both sides poised to end civilization in an instant. Proliferation of nuclear weapons in more recent years has made the global security environment more complex, and arguably much more dangerous.

The Manhattan Project was also responsible for a number of monumental scientific and technological advancements, becoming the organizational model behind the remarkable achievements of American "big science" during the second half of the 20th century. Manhattan Project research significantly advanced the understanding of nuclear physics and led to a number of nonmilitary applications of nuclear science, including nuclear power and nuclear medicine.

PARK PURPOSE

The purpose statement identifies the specific reason(s) for establishment of a particular park. The purpose statement for Manhattan Project National Historical Park was drafted through a careful analysis of its enabling legislation and the legislative history that influenced its development. Enabled by legislation signed into law by Congress on December 19, 2014, the park was established by the Secretary of Energy and the Secretary of the Interior on November 10, 2015. The purpose statement lays the foundation for understanding what is most important about the park.

> *Managed in partnership by the Department of Energy and the National Park Service, Manhattan Project National Historical Park preserves and interprets the nationally significant historic sites, stories, and legacies associated with the top-secret race to develop an atomic weapon during World War II, and provides access to these sites consistent with the mission of the Department of Energy.*

PARK SIGNIFICANCE

Significance statements express why a park's resources and values are important enough to merit designation as a unit of the national park system. These statements are linked to the purpose of Manhattan Project National Historical Park, and are supported by data, research, and consensus. Statements of significance describe the distinctive nature of the park and why an area is important within a global, national, regional, and systemwide context. They focus on the most important resources and values that will assist in park planning and management.

The following significance statements have been identified for Manhattan Project National Historical Park. (Please note that the sequence of the statements does not reflect the level of significance.)

1. The Manhattan Project was an unprecedented, top-secret World War II government program in which the United States rushed to develop and deploy atomic weapons before Nazi Germany. The use of these weapons by the United States against Japan in August 1945 ultimately became one of the most important historical events of the 20th century.

2. During the Manhattan Project, the U.S. Army directly or indirectly employed nearly 600,000 workers and some of the world's leading scientists at more than 30 sites nationwide, including three primary centers of operations established at Los Alamos, New Mexico; Oak Ridge, Tennessee; and Hanford, Washington. This effort channeled revolutionary scientific and engineering innovations into an entirely new kind of weapon, ushering in the nuclear age.

3. Initially identified as the only location for the Manhattan Project, the Oak Ridge Reservation was eventually tasked with the production of enriched uranium as well as the management of the nationwide project. Three revolutionary enrichment processes were developed and implemented simultaneously at the reservation, where thousands worked in cavernous industrial facilities to produce incremental amounts of weapons-grade uranium. Oak Ridge provided the fissile material for the "Little Boy" atomic weapon dropped on Hiroshima, Japan.

4. Los Alamos became the location where world-renowned scientists and engineers led by J. Robert Oppenheimer gathered in laboratories to design and develop the world's first atomic weapons. Merely 26 months after the start of the project, the Los Alamos team conducted the first successful nuclear test at the Trinity Site in southern New Mexico in July 1945, and assembled the two atomic weapons the United States dropped on Japan one month later in August 1945.

5. At a massive industrial complex at Hanford, Washington, the United States engineered and built the world's first full-scale nuclear reactor, uranium fuel fabrication facilities, and plutonium separation plant in only 18 months. Hanford's facilities produced the plutonium used in the first successful test of a nuclear device at Trinity Site, and the "Fat Man" plutonium bomb dropped on Nagasaki, Japan, on August 9, 1945.

6. The wartime urgency surrounding the Manhattan Project led to the displacement of generations-old settlements and tribal communities as many people were forced to sacrifice homes, lands and waters, sacred sites, and the exercise of treaty rights to make way for covert military industrial sites and communities.

7. The two atomic weapons used by the United States on the Japanese cities of Hiroshima and Nagasaki unleashed an enormous and unprecedented amount of death and devastation for an individual weapon. An estimated 90,000–166,000 people were killed or died within months after the "Little Boy" uranium bomb was dropped on Hiroshima on August 6, 1945. An estimated 60,000–80,000 people were killed or died within months after the United States bombed Nagasaki using the "Fat Man" plutonium bomb three days later.

8. The colossal destructive power of nuclear weapons became a fundamental dynamic of the ensuing Cold War between the United States and the Soviet Union, a concept commonly referred to as deterrence through Mutual Assured Destruction, and spurred other nations to develop nuclear weapons of their own.

9. The development and production of nuclear weapons in the United States and around the world has had profound consequences for human health and the environment, from radiation exposure from the use and testing of nuclear weapons to the chemical and radiological waste that remains from decades of nuclear weapons development.

10. Scientific and technological advances made during the Manhattan Project in the pursuit of nuclear weapons contributed to progress in many areas, such as materials science, biology,

nuclear medicine, nuclear energy, the nuclear Navy, supercomputing, precision machining, astronomy, and the Department of Energy's National Laboratory System.

FUNDAMENTAL RESOURCES AND VALUES

Fundamental resources and values (FRVs) are those features, systems, processes, experiences, stories, scenes, sounds, smells, or other attributes determined to warrant primary consideration during planning and management processes because they are essential to achieving the purpose of the park and maintaining its significance. Fundamental resources and values are closely related to a park's legislative purpose and are more specific than significance statements.

Fundamental resources and values help focus planning and management efforts on what is truly significant about the park. One of the most important responsibilities of NPS managers is to ensure the conservation and public enjoyment of those qualities that are essential (fundamental) to achieving the purpose of the park and maintaining its significance. If fundamental resources and values are allowed to deteriorate, the park purpose and/or significance could be jeopardized.

There are other resources that are currently not included within the boundary of Manhattan Project National Historical Park (and therefore cannot be considered fundamental resources), but are nonetheless important to consider as part of the broader context and setting of the park. These related resources, found later in this document, represent a thematic connection that could enhance the experience of visitors or the interpretation of the story of the Manhattan Project.

The following fundamental resources and values have been identified for Manhattan Project National Historical Park:

Oak Ridge, Tennessee

- **K-25 Building Site**

  The K-25 building pioneered industrial-scale uranium enrichment using the gaseous diffusion method. Built in March 1945, the mammoth 44-acre building produced enriched uranium feed material for the Y-12 electromagnetic separators for further enrichment, including some of the uranium used in the "Little Boy" weapon that was dropped on Hiroshima. The U-shaped building, which measured a half-mile long and 1,000 feet wide, continued to produce highly enriched uranium used in thermonuclear weapons during the Cold War until production ceased in 1964. The K-25 building has since been demolished, and its footprint will remain undeveloped.

- **X-10 Graphite Reactor**

  The world's first continuously operating nuclear reactor, the X-10 Graphite Reactor produced the first significant amounts of plutonium ever made and served as a prototype for the B Reactor at Hanford. The engineered reactor is a "pile" of graphite blocks measuring 24 feet per side, penetrated by horizontal air-cooled channels that contained the uranium fuel slugs. The graphite blocks served as a neutron moderator, which helped to sustain a nuclear chain reaction. Designed and built in less than 10 months, it went into operation on November 4, 1943. After the war, X-10 was used for a wide variety of scientific purposes, including the production of stable isotopes, until being shut down in 1963. Today, the reactor face and control room are accessible to the public. The reactor building is a national historic landmark.

- **Y-12 Plant Buildings 9731 and 9204-3**

  Buildings 9731 and 9204-3 at the Y-12 National Security Complex pioneered the electromagnetic separation method for uranium enrichment. Building 9731 was the first building constructed at the Y-12 site, and contains the world's only three alpha calutron magnets as well as three beta calutron magnets. These calutrons were used as test beds for the rest of the Y-12 complex. Building 9204-3 contains the last two remaining Beta racetracks in America. One of these racetracks was in use as recently as 1998 for the separation of stable isotopes, and remains on standby for potential future use.

Los Alamos, New Mexico

- **Pond Cabin (TA-18-29)**

  The Pond Cabin (TA-18-29), a log structure, was built in 1914 by settler Ashley Pond and supported Emilio Segre's plutonium fission research. The Pond Cabin is at the Pajarito site, in Pajarito Canyon, on the Los Alamos National Laboratory grounds.

- **Battleship Bunker (TA-18-2)**

  The Battleship Control Building was constructed to support implosion diagnostic tests for the plutonium implosion-type bomb design. A cast-in-place concrete bunker, it is known as the "battleship building" because the west end of the building is shaped like a bow of a ship, shielded with a steel plate. This Battleship Control Building is at the Pajarito site, in Pajarito Canyon, on the Los Alamos National Laboratory grounds.

- **Slotin Building (TA-18-1)**

  The Slotin Building was constructed at the end of the Manhattan Project. It was the location of the criticality accident that led to the death of scientist Louis Slotin. The accident significantly influenced future criticality safety programs. The building remained in use during the Cold War. The Slotin Building is at the Pajarito site, in Pajarito Canyon, on the Los Alamos National Laboratory grounds.

- **Gun Site Buildings**

  The Gun Site area of Los Alamos was used during World War II to test the gun-type weapon designs known as "Thin Man" and "Little Boy." Gun Site buildings consist of three concrete, earth-covered bunkers (Laboratory and Shop [TA-8-1], Shop and Storage [TA-8-2], Diesel Generator Building [TA-8-3]) and a portable guard shack (TA-8-172). Components of "Little Boy" combat units were also assembled at the Gun Site before being shipped to the Pacific.

- **V-Site**

  The V-Site buildings include the Assembly Building (High Bay) (TA-16-516) and Workshop (TA-16-517), and were constructed to support the assembly of the plutonium implosion-type bomb. They were also used to assemble the high-explosives sphere for the Trinity device, known as the Gadget. V-site was located well away from other facilities at Los Alamos, for safety as well as security reasons, as this is the location where all elements of the implosion-type bomb design finally came together.

Hanford, Washington

- **B Reactor**

  The B Reactor is the first full-scale production nuclear reactor in the world. Together with the D and F Reactors, the B Reactor produced the plutonium used in the Trinity Test and the "Fat Man" bomb dropped on Nagasaki, Japan. The reactor's core consists of a "pile" of graphite blocks which held uranium fuel slugs and served as a neutron moderator, sustaining a nuclear chain reaction. B Reactor is a national historic landmark and is accessible via guided tours.

- **Hanford High School**

  Hanford High School was a focal point of the pre-Manhattan Project community of Hanford, Washington. The school was vacated when the town of Hanford was condemned for the Manhattan Project, and was used for a short time as office space. Only the outer shell of the original structure remains intact. The current property within the park also includes a small portion of the Hanford Construction Camp, where more than 50,000 workers lived in tents and barracks during the construction of the Hanford Engineer Works.

- **White Bluffs Bank**

  The White Bluffs Bank building is the only remaining structure of the pre-Manhattan Project community of White Bluffs, Washington. When first constructed, it was claimed to be robbery-proof, though it was robbed twice in its operating history due to an easily breached wooden roof. The bank building, a small 25-foot by 30-foot single-story concrete block structure, is currently undergoing a comprehensive rehabilitation to replicate the period appearance and facilitate public visitation.

- **Bruggemann's Agricultural Complex Warehouse**

  Located within two miles of the B Reactor, the warehouse building at Bruggemann's Agricultural Complex is the only remaining structure on the approximately 530-acre farm property that was confiscated by the federal government. The structure is part of one of the few intact independent farming operations representing the pre-Manhattan Project era in the Northwest. The warehouse itself is a unique structure constructed of Columbia River cobblestone placed into a concrete matrix. While the facility itself is behind a fence awaiting stabilization and improvements, visitors can walk around it on existing roads.

- **Hanford Irrigation District Pump House**

  The Hanford Irrigation District Pump House, also known as the "Allard" Pump House, was built by the Hanford Irrigation and Power Company to raise water more than 50 feet to a 36-mile irrigation network for farms in the Priest Rapids Valley. When completed, area newspapers called the project "the largest pumping plant in the world." The project enabled large scale farming and orchards in the area, which in turn supported individual farms and community business in the towns of Hanford and White Bluffs. The building shell and roof of the pump house are intact.

RELATED RESOURCES

The following related resources are currently not included in the boundary of Manhattan Project National Historical Park, but are nonetheless important to consider as part of the broader context and setting of the park. These related resources represent a thematic connection that would enhance the experience of visitors or the interpretation of the story of the Manhattan Project. They have close associations with park fundamental resources and the purpose of the park and represent a connection with the park that often reflects an area of mutual benefit or interest, and collaboration, between the park and owner/stakeholder.

Some of the following related resources are buildings and structures managed by the Department of Energy that have been identified in the park's enabling legislation as eligible for inclusion in the park, but are currently not included in the park boundary. Other resources identified in this section are outside of the park boundary and are not owned or managed by the Department of Energy, but have connections to the broader history of the Manhattan Project at one of the park's three units. The following does not constitute an exhaustive list of related resources and others may be identified in the future. Moreover, identification of these resources in this document does not suggest intent to acquire them; rather they are listed here to illustrate the broader landscape and historical context in which the park units exist.

Oak Ridge, Tennessee

The Congressional legislation establishing the Manhattan Project National Historical Park noted the Alexander Inn as a related resource associated with the Manhattan Project:

- **Alexander Inn (Guest House)**

  The Manhattan Project Guest House served as the only hotel for the Clinton Engineer Works. Visiting scientists, dignitaries, and many workers stayed here upon arrival in Oak Ridge. It was later known as the Alexander Inn, and in 2015 was restored as a senior living center known as the Alexander Guest House. Saved from ruin by a Department of Energy grant, the front façade of the inn has been restored to its 1944 appearance and is protected by preservation easements. The Alexander Inn received the Advisory Council on Historic Preservation's 2016 Chairman's Award for excellence in historic preservation.

Other related resources not owned by Department of Energy or the National Park Service that are also related to the history and significance of the Oak Ridge Reservation include buildings that pre-date the Manhattan Project as well as buildings that were constructed during the Manhattan Project. Some such resources include the Freels Bend Cabin, several pre-Manhattan Project churches at the Oak Ridge National Laboratory and East Tennessee Technology Park, Chapel on the Hill, Jackson Square, dormitories, homes built for scientists and engineers in Oak Ridge, and other resources associated with the Manhattan Project that are identified in two previous national register nominations: Oak Ridge Historic District (1991) and Oak Ridge Turnpike Checking Station (1992).

Los Alamos, New Mexico

The following related resources at Los Alamos were identified as park-eligible in the park legislation but are not within the current park boundary.

- **Quonset Hut (TA-22-1)**

  Manhattan Project scientists and engineers perfected the final "trap-door" design of the "Fat Man" weapon in the Los Alamos Quonset hut (TA-22-1). The high-explosives sphere and associated components of "Fat Man" were assembled in the Quonset hut and then transported to Tinian Island. After the war, the building was used as a detonator research facility for almost 40 years.

- **Concrete Bowl (TA-6-37)**

  The Concrete Bowl (TA-6-37) is an outdoor experimental area that was used to conduct plutonium recovery research. Scientists devised several methods to contain the Trinity device's plutonium in the event of failure. The 200-foot diameter concrete bowl was built for water recovery experiments where small-scale, high-explosives tests were detonated in a redwood water tank on an approximately 50-foot-high tower located in the center of the bowl, which would effectively contain the debris from the test shots.

- **Q-Site (TA-14-6)**

  TA-14-6 is a wood-frame building that was constructed as a darkroom and shop to support small-scale implosion tests. At Q-Site, scientists studied cylinder implosions using the flash photography method, a high-speed photographic technique that relied on the rotating prism camera.

- **K-Site (TA-11-1, TA-11-2, and TA-11-3)**

  K-Site supported experiments that were conducted using the betatron diagnostic method. This method involved the detonation of a test implosion between two buildings, one housing a betatron machine that emitted X-rays at the instant of the explosion and the other housing a cloud chamber to record the data. TA-11-1 served as the control building for the firing experiments at K-Site. Building TA-11-2 housed the betatron machine and TA-11-3 housed the cloud chamber.

- **L-Site (TA-12-4)**

  TA-12-4 is a firing pit that was used for high-explosives experiments that supported the development of the "Fat Man" implosion-type bomb. At the L-Site firing area, the physical remains of firing tests were examined after each shot as part of the terminal observation method of implosion diagnostics. The 12-foot-deep pit is lined with 3/4-inch steel plate and capped with a steel lid.

- **S-Site (TA-16-58)**

  TA-16-58 is a one-story, single-room, high-explosives storage magazine. This small building was constructed with reinforced concrete floor and walls. The magazine is encircled by a protective earthen berm and its roof is built of wood to serve as an upward path for the force of an accidental explosion.

Although the tunnel and vault facility at Los Alamos was not specifically identified in the park's enabling legislation, it is also a related resource owned and managed by the Department of Energy.

- **Tunnel and Vault (TA-41-1)**

  TA-41-1 is a unique tunnel and vault facility and is one of the best examples of Cold War architecture at Los Alamos. TA-41-1 was built between 1948 and 1949, at the beginning of the Cold War era. Extending 230 feet into the north wall of Los Alamos Canyon, the vault functioned as a storage facility for components and nuclear material used in the nation's first nuclear weapon stockpile. The tunnel and vault facility also includes a small side room used during the early 1950s for initial experiments by Frederick Reines and Clyde Cowan that led to the discovery of the neutrino and the awarding of the Nobel Prize in Physics.

The Los Alamos Scientific Laboratory National Historic Landmark District was identified in park legislation. The contributing buildings and features of the historic landmark district are located outside of the current park boundary and are not managed by the Department of Energy.

- **Los Alamos Scientific Laboratory National Historic Landmark District**

  The Los Alamos historic landmark district is located in the geographic and social center of the town of Los Alamos. Notable buildings contributing to the historic landmark district include Bathtub Row residences, where top Project Y scientists stayed, and Fuller Lodge, a large log building designed by architect John Gaw Meem that was used during the war as a center for community activities. Two additional Manhattan Project properties, the former East Cafeteria and the former Women's Army Corps dormitory, are located in the downtown area but are not part of the historic landmark district.

- **The Women's Army Corps Dormitory**

  The dormitory building housed some of the Women's Army Corps members stationed at Los Alamos. The site is privately owned.

- **East Cafeteria**

  The East Cafeteria was the favorite mess hall for the military members of the Manhattan Project. The structure is currently the Los Alamos Performing Arts Center.

Hanford, Washington

The T Plant at Hanford is eligible to be included in the park but is excluded at this time due to ongoing DOE mission requirements.

- **221-T Chemical Separation Building**

  Completed in December 1944, the 221-T Chemical Separation Building, or T Plant, was the world's first large scale plutonium separation facility. Plutonium had to be chemically separated from irradiated uranium slugs that had passed through Hanford's production reactors. After further refinement, the plutonium was shipped to Los Alamos. Due to high radiation levels, workers were protected by seven feet of concrete and used periscopes, closed-circuit television sets, and remote control devices to operate equipment. A massive and open structure, measuring 800 feet long, 65 feet wide, and 80 feet high, the T Plant ceased chemical separation activities in 1956 but remains in use to support cleanup work at Hanford.

The following related resources at Hanford were identified in the park legislation but are not within the current park boundary.

- **White Bluffs Historic District**

  The town of White Bluffs was the first European American community on the Hanford Site and became a focal point in the Northwest for regional transportation of goods and agricultural development. The historic district includes all three locations of the town, as well as the former locations of the White Bluffs Cemetery, White Bluffs High School, White Bluffs Blacksmith Shop, numerous foundations, remnants of orchards, ornamental trees and shrubs, the original road system, and the sites of facilities associated with Manhattan Project operations.

- **Town of Hanford and Hanford Construction Camp Historic District**

  This historic district comprises both the original Hanford town site, occupied between 1907 and early 1943, as well as facilities of the Manhattan Project era of 1943 to 1945. The area contains an extant road system, numerous foundations, rows of ornamental trees, remnants of orchards, and artifacts. The Hanford and White Bluffs historic districts are examples of the impact of U.S. government policies on the development of the West, including relocation of American Indian tribes, the Homestead Act, and the Newlands Water Reclamation Act, as well as the completion of a transcontinental rail link to the area.

- **Bruggemann's Agricultural Complex**

  Operated from prior to 1900 through 1943, the agricultural complex is an abandoned irrigated farm, orchard, and fruit packing/shipping facility. The complex includes the Bruggemann Warehouse, which is in the Manhattan Project National Historical Park boundary, as well as foundations from a processing facility, grain silo, and assorted outbuildings, and about 23,000 feet of irrigation line of various types. It is one of the few remaining intact independent farming operations from the pre-war era in the Northwest and reflects the development of various irrigation techniques over the decades.

Additionally, related resources at Hanford not identified in the park legislation and outside of the current park boundary include the irrigation canal head wall, Vernita ferry landing sites, and the "Alphabet Homes" of Richland, Washington, described below.

- **"Alphabet Homes" of Richland, Washington**

  In 1943, the Army Corps of Engineers gave Spokane architect Albin Pherson less than 90 days to design a government-owned community to house thousands of Manhattan Project workers and their families. Each housing plan was given a letter of the alphabet for ease in identification. Today, some of these homes are included in the City of Richland's Gold Coast Historic District.

- **Portions of the Hanford Irrigation and Power Company's Irrigated Lands**

  This discontinuous area includes historic resources most closely associated with the Hanford Irrigation District "Allard" Pump House, which is included in the national park. These include the headwall for and portion of the massive canal system (the Hanford Ditch), the farmstead owned and worked by the irrigation pump house's operator, Sam Allard, and portions of the irrigated lands that retain visual evidence of their past use, including plough lines and stumps from orchards that were cut down by the U.S. government after it acquired the land.

- **100-B Reactor Area**

  This area contains the remains of the complex infrastructure that once supported operation of the B Reactor, including systems to pump water from the Columbia River to cool the reactor, water treatment facilities, power houses, cooling ponds, and security checkpoints. In addition to the B Reactor building, the River Pump House and Reservoir facilities are still intact and in use to support cleanup work at the Hanford Site.

INTERPRETIVE THEMES

Interpretive themes are often described as the key stories or concepts that visitors should understand after visiting a park—they define the most important ideas or concepts communicated to visitors about a park unit. Themes are derived from, and should reflect, park purpose, significance, resources, and values. The set of interpretive themes is complete when it provides the structure necessary for park staff to develop opportunities for visitors to explore and relate to all park significance statements and fundamental resources and values.

Interpretive themes are an organizational tool that reveal and clarify meaning, concepts, contexts, and values represented by park resources. Sound themes are accurate and reflect current scholarship and science. They encourage exploration of the context in which events or natural processes occurred and the effects of those events and processes. Interpretive themes go beyond a mere description of the event or process to foster multiple opportunities to experience and consider the park and its resources. These themes help explain why a park story is relevant to people who may otherwise be unaware of connections they have to an event, time, or place associated with the park.

The following interpretive themes have been identified for Manhattan Project National Historical Park:

- The "secret cities" created for the Manhattan Project, and the sacrifice and displacement connected to them, exemplified this massive wartime effort and demonstrate remarkable opportunities to reflect on the extraordinary lengths to which people and nations go to protect their futures.

- The revolutionary science and engineering that fueled the race to create the world's first atomic weapon make these places a powerful illustration of technological innovation and collaboration, and offer guidance and insight into solving today's complex problems.

- From beginning to end, the Manhattan Project, its World War II context, and the many complex decisions that led to the incomprehensible destructive power of nuclear weapons prompts us to confront the profound choices and consequences that the world continues to struggle with today.

- The Manhattan Project thrust humanity into the nuclear age and forever changed the world, provoking consideration of dramatic scientific and technological advances as well as severe human costs and environmental consequences.