National Register of Historic Places Evaluation and Preservation Plan for Los Alamos County Women's Army Corps (WAC) Dormitory

Final – September 2022

EXECUTIVE SUMMARY

Los Alamos County is planning to renovate the Women's Army Corps (WAC) Dormitory in Los Alamos, New Mexico for the purposes of re-using the building as a visitor center, exhibits, and offices. This report evaluates the historical significance of the WAC Dormitory to determine if the building is eligible for listing in the National Register of Historic Places (NRHP). The evaluation will identify the important aspects and features of the historic property with regard to the historic context, character-defining architectural features, and short- and long-term management recommendations. Based on the determination of eligibility, this report will also present recommended rehabilitation treatments for the WAC Dormitory. These recommendations take into consideration the County goals for the property.

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Acronyms and Abbreviations

ADA	American Disabilities Act
CFR	Code of Federal Regulations
DOE	Department of Energy
LANL	Los Alamos National Laboratory
MPNHP	Manhattan Project National Historic Park
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
RaLa	radioactive lanthanum-140
WAAC	Women's Army Auxiliary Corps
WAC	Women's Army Corps

CHAPTER 1: INTRODUCTION

Project Purpose

The County of Los Alamos (County) is situated at the foot of the Jemez Mountains on the Pajarito Plateau with an elevation ranging from 6,200 feet to 9,200 feet. Los Alamos is known for the historic accomplishments of its largest employer, Los Alamos National Laboratory. Los Alamos Laboratory was established as part of the Manhattan Project, a top-secret mission during World War II to produce a nuclear bomb. During the Manhattan Project, a 20-person dormitory was built at the site. The construction drawings for the dormitory are dated April 1943 and the current address of the building is 1725 17th Street. This 20-person dormitory was one of four, two for women and two for men.

In the "Enabling Legislation for Manhattan Project National Historical Park (MPNHP)," eligible areas are defined for each dormitory. For Los Alamos, "the former dormitory located at 1725 17th Street" is specifically noted. In the MPNHP Foundation Document (January 2017), the Women's Army Corps (WAC) Dormitory was identified in the related resources at Los Alamos as "park-eligible in the park legislation but not within the current park boundary."

The County purchased the WAC Dormitory property from the Christian Science Society in early 2020. The County wants to preserve and restore the building and use the property for interpretative and office space.

Research

A site visit was conducted to Los Alamos on May 9 - 12, 2022 to document the property and collect relevant data. To develop the historic context and prepare the evaluation, research was conducted at the Los Alamos County Historical County Archives and the University of New Mexico Center for Southwest Research and Special Collections.

Contact for additional information was made with:

- Los Alamos National Laboratory
- U.S. Army Corps of Engineers, Albuquerque District
- National Park Service (NPS), Southwest Regional Office
- Department of Energy, Los Alamos Office

Information was obtained from the following individuals:

- Minesh Bacrania - provided a high-resolution photograph of the elevations.
- Ruth Helmick Lier - provided information on her residence in the dormitory after World War II.

Additional research was conducted on-line at the following websites:

- NPS National Register of Historic Places (NRHP) Inventory
- Los Alamos National Laboratory publications
- Atomic Heritage Foundation
- DOE (DOE) Manhattan Project
- National Archives and Records Administration

Resources used to develop the context for this building are included at the end of this report.

Evaluation Method

The NRHP was established by the National Historic Preservation Act (NHPA), and is a list of buildings, structures, objects, sites, and districts that have demonstrated significance to United States history, architecture, archaeology, engineering and/or culture. The NRHP is maintained by the Secretary of the Interior and is managed by the National Park Service Keeper of the Register. Regulations for listing a property in the NRHP were developed by the Department of the Interior and are found in 36 Code of Federal Regulations (CFR) Part 60. The NHPA requires that federal agencies identify historically significant properties that are eligible for listing in the NRHP and manage those properties accordingly by considering the effects of their undertakings on properties listed in or eligible for listing in the NRHP (referred to as historic properties).

To be eligible for the NRHP, a property must meet certain NRHP evaluation criteria established in 36 CFR Part 60.4. The National Park Service published National Register Bulletin 15: *How to Apply the National Register Criteria for Evaluation* (NPS 1997) to provide guidance when assessing a property's eligibility for listing in the NRHP. Properties eligible for listing are generally over 50 years old and meet one or more of the following criteria:

- Criterion A: association with an event(s) that made a significant contribution to the broad pattern of history.
- Criterion B: association with a historically significant person.
- Criterion C: embodiment of the distinctive characteristics of a period, construction technique, or type; representing the work of a master; possessing high artistic value; or representing a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D: having yielded or having the potential to yield information significant to prehistory or history.

NRHP-eligible properties are classified as individual buildings, sites, structures, or objects. A building is a type of construction that is created to provide human shelter and can include houses, barns, hotels, churches, jailhouses, courthouses, etc. A structure is a building whose function is for something other than human shelter. An object is an artistic item that is usually small and simply constructed and moveable. A site is the location of an important event, human occupation, or activity, or building or structure (standing, in ruins, or removed) where the location retains historic, cultural, or archaeological value.

NRHP-eligible properties can also be classified as districts and landscapes. A district is a concentration, linkage, or continuity of sites, buildings, structures, and/or objects united historically or aesthetically by a plan or physical development. Districts are usually comprised of several types of resources that are connected and that express a visual sense of a historic setting. Landscapes can be purposefully designed landscapes that possess significance as a work of art; as a property that was purposefully designed by a master gardener, architect, or amateur based on a recognized design or style; as a property associated with a significant person, trend, or event; or as a property that has a relationship with architectural landscape theory or practice.

Integrity is defined by the National Park Service as a property's "ability to convey its significance." To be eligible for the NRHP, properties should retain most of the seven aspects of integrity. The aspects are:

1. Location—the original location
2. Design—the building layout and use of space, plan, form, and style

3. Setting—the environment of the resource
4. Materials—the construction and finishing materials used
5. Workmanship—the detail elements of craftsmen
6. Feeling—the sense of a particular time
7. Association—the link to event, person, or cultural resource.

When assessing integrity, the following actions should be taken:

- Determine which aspects of integrity are most important to the property using the historic context(s),
- Determine what characteristics the property must have to represent its significance, and
- Determine if those characteristics currently convey that significance, which may require a comparison to similar properties to make a determination.

Properties are sometimes modified to meet changing requirements and equipment needs. The modifications often extend the useful life of the property but can compromise its integrity to such a degree that it does not retain a sufficient level to be eligible for listing in the NRHP. Within a district, the majority of the properties from the district's period of significance must have integrity, including integrity of the plan or arrangement of properties within the district.

To evaluate the historic significance of a property, the historic context of the property must be established. The historic context is the pattern or trend of history that gives the property its meaning and importance and should focus on the theme, geographic limits, and period of time from which the property is being evaluated. A context places the property in a local, regional, or national pattern of history and provides a tool for comparing the history of the property to the history of the surrounding area. A historic context's theme should establish the area(s) of significance that the property represents and should describe how the property demonstrates that area(s) of significance. A list of often-used areas of significance include archaeology, agriculture, architecture, art, business, communications, community planning and development, conservation, economics, education, engineering, entertainment, ethnic heritage, exploration, health, industry, invention, landscape architecture, law, literature, maritime history, military, performing arts, philosophy, politics, religion, science, social history, and transportation.

A historic context also establishes a property's association with an event, person, architectural or engineering value, or potential to contain information. The physical features of a historic property that represent the area of significance and historic context should be documented as well. The historic context is the key to judging a property's significance. A historic property may be eligible for the NRHP under one or all criteria, it may have a broad range of dates or a specific date for its period of significance, and its level of significance can vary depending on which criterion and which period of significance is being defined.

In this report, chapter 2 provides the historic context for the WAC Dormitory. Chapter 3 provides a description of the property. Chapter 4 provides an NRHP evaluation of the dormitory. Chapter 5 provides preservation and treatment recommendations. Appendices include local ordinance, Secretary of Interior treatment standards and guidelines, copies of original plans (incomplete set), and report preparers resumes.

CHAPTER 2: HISTORIC CONTEXT

The Manhattan Project – Brief History

The Manhattan Project was a research and development undertaking during World War II that produced the first nuclear weapons. It was led by the United States with the support of the United Kingdom and Canada. From 1942 to 1946, the project was under the direction of Major General Leslie Groves of the US Army Corps of Engineers. Nuclear physicist Robert Oppenheimer was the director of the Los Alamos Laboratory that designed the actual bombs (NPS, The Manhattan Project website, N.d.).

The Manhattan Project was a massive, top secret national mobilization of scientists, engineers, technicians, and military personnel charged with producing a deployable atomic weapon for use 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. Weapons of unprecedented destructive capacity were produced. The project included the Trinity Test on July 16, 1945, a few weeks before the United States dropped atomic bombs on Hiroshima and Nagasaki, Japan (NPS, The Manhattan Project website, N.d).

Coordinated by the U.S. Army, Manhattan Project activities were located in numerous locations across the United States. Three of the most significant locations that played an essential role in the Manhattan Project included Oak Ridge, Tennessee for uranium enrichment production facilities, semiworks plant for production and separation of plutonium, and administrative headquarters; Los Alamos, New Mexico for designing and testing the bomb; and Hanford, Washington for plutonium production facilities (NPS, The Manhattan Project website; DOE Manhattan Project website, N.d).

Radioactivity had been discovered before the beginning of the century; however, the prospect of releasing large amounts of energy by nuclear chain reaction was not realized until the announcement of the discovery of fission and its experimental confirmation in January 1939. Fall of that year, the United States took steps to study fission and chain reactions. The work was further stimulated by two significant events: entry of the United States into World War II on December 8, 1941, and initiation of the first nuclear chain reaction on December 2, 1942, in the Metallurgical Laboratory of the University of Chicago (Greenwood 1974).

Wartime development of the atomic bomb itself was started in 1942 under direction of the Office of Scientific Research and Development. Dr. J. Robert Oppenheimer undertook investigation of its theoretical possibilities at the University of California in Berkeley with a small group of well-known physicists. By October their theoretical studies had progressed to the point where actual experimental work was necessary (Greenwood 1974). Oak Ridge was considered for the location of this part of the project; however, it was decided that it should be in a remote location.

Several locations in the Southwest were surveyed as possible sites for the required new laboratory. On Oppenheimer's recommendation, the search for a suitable site was narrowed to the vicinity of Albuquerque, New Mexico, where Oppenheimer owned a ranch. In October 1942, Major John H. Dudley of the Manhattan District was sent to survey the area. He recommended a site near Jemez Springs, New Mexico. On 16 November, Oppenheimer and others toured the site. Oppenheimer feared that the high cliffs surrounding the site would make his staff feel claustrophobic, while the engineers were concerned with the possibility of flooding. The group then moved on to a site in the vicinity of the Los Alamos Ranch School. Oppenheimer was impressed and expressed a strong preference for the site, citing its natural beauty and views of the Sangre de Cristo Mountains, which, it was hoped, would inspire those who would work on the project (NPS, The Manhattan Project website, N.d).

Figure 2-1. The Road to Los Alamos

Source: https://www.osti.gov/opennet/manhattan-project-history/Places/LosAlamos/la-making.html

Los Alamos Laboratory

The decision was made to center the weapon research, called Project Y, at the Ranch School. Governing considerations for its choice were the secrecy and safety that its remote and isolated location provided. Mild winters offered opportunities for outdoor work throughout the year. In addition, log buildings at the Ranch School could easily accommodate the 100 or so scientists and their families who it was believed would be required to work on the project (Greenwood 1974).

On November 25, 1942, the Under Secretary of War directed acquisition of the site which comprised about 800 acres of ranch property, 2,900 acres in homesteads and grazing land, and 45,000 acres in public domain land supervised by the Forest Service. In January 1943, the University of California was selected to operate the new laboratory, and a formal nonprofit contract was soon drawn with the Manhattan Engineer District of the War Department (The Manhattan Engineer District was the code name for the wartime nuclear research effort seeking development of an atomic bomb). The first scientists arrived on the "The Hill" in April to begin their historic research. During the period from 1943 to 1946, the laboratory was devoted to its secret wartime mission of developing an atomic weapon (Greenwood 1974). Because it was secret, Los Alamos was referred to as "Site Y" or "the Hill". Birth certificates of babies born in Los Alamos during the war listed their place of birth as PO Box 1663 in Santa Fe (NPS, The Manhattan Project website, N.d).

Dr. Oppenheimer, as Laboratory Director, supervised the scientific research aimed at developing atomic weapons. Major General Leslie R. Groves of the Manhattan Engineer District assumed overall responsibility for the War Department. The list of scientific leaders at Los Alamos during the war years included many with diverse backgrounds and training: Enrico Fermi, Bruno Rossi, and Emilio Segre from Italy; Niels Bohr from Denmark; John von Neumann and Edward Teller from Hungary: Stanislaw Ulam from Poland; I. I. Rabi and Victor Weisskopf from Austria; Hans Bethe and Rolf Landshoff from Germany; George Kistiakowsky from Russia; a British contingent including Sir James Chadwick, Cyril Smith, Otto Frisch, and W. G. Penney. Other well-known scientists who came to Los Alamos included

Eric Jette, Robert Bacher, Philip Morrison, Robert Wilson, William Parsons, Joseph Kennedy, Kenneth Bainbridge, Richard Feynman, Edwin McMillan, John Manley, Nick Metropolis, Darol Frohman, Donald Homig, L. D. P. King, Alvin Graves, Samuel Allison, Carson Mark, Charles Critchfield, Luis Alvarez, Norman Ramsey, and many, many others (Greenwood 1974).

Two bomb designs were created at Los Alamos, which also created a significant theoretical hurdle. The first design, which used uranium, was a gun-type bomb: one mass would be shot at another to create a "supercritical" mass of the size required to begin a fission chain reaction. The design was rather straightforward, so the scientists were reasonably confident in its construction and execution. The second design was an implosion-type bomb that used plutonium and was unlike anything that had ever been made before. It required the core of the bomb to be surrounded by conventional explosives that, when detonated, would compress the core metal to criticality. The challenge was that the compression had to be completely uniform. This introduction of an implosion model required a great deal of theory and computation to predict how to make it work (McDonald n.d.).

Theoretical studies first had proved the feasibility of a nuclear fission bomb. The next enormous step was to actual field test the bomb with full instrumentation. A desolate desert test site was picked - the Jornada del Muerto (Journey of Death) trail near Alamogordo, in southern New Mexico. The code name for the test was "Trinity." Preparation began in early spring of 1945. Final assembly of the gadgetry (test bomb) was made in a deserted ranch house on the night of July 12. Two days later the unit was elevated to the top of a 100-foot tower and tedious instrumentation began. By pre-dawn of July 16 all was ready, and at 5:29:45 a.m., there occurred the "unprecedented, magnificent, beautiful, stupendous, and terrifying" detonation of the world's first nuclear fission bomb, with an estimated force equivalent to 20,000 tons of Trinitrotoluene, or more commonly known as TNT (Greenwood 1974).

Figure 2-2. Triunity Test July 16, 1945

Source: https://www.osti.gov/opennet/manhattan-project-history/Places/LosAlamos/la-making.htmlosti.gov/opennet/manhattan-project-history/Resources/photo_gallery

Since 1943, the laboratory has also been making contributions to fundamental scientific knowledge and to peaceful applications of atomic energy. The world's first enriched-uranium reactor was designed and built at Los Alamos and began operation in 1944. The world's first plutonium-fueled reactor went into operation at Los Alamos in 1946. This was also the world's first fast-neutron reactor. The laboratory also developed a reactor using uranium phosphate fuel and another using molten plutonium, both for the first time anywhere. Several rocket propulsion reactors have been built and ground tested, with flight tests scheduled in the next few years. The laboratory conducts research in many other peaceful fields, including chemistry and metallurgy, biology and medicine, thermionic electricity, plasma physics, instrument development and electronic computing (Greenwood 1974).

Women Civilians at Los Alamos

Manhattan Project leaders J. Robert Oppenheimer and General Leslie R. Groves scoured the country looking for anyone and anything that would help achieve their goal of building a "gadget." They did not discriminate; women or men, young or old, Ph.D. or nominal technical experience—all were considered. The war was relentless, and people around the country were willing to disrupt their lives, leaving faculty positions or graduate studies, if it meant helping to end the fighting. Each individual who contributed to the Manhattan Project helped make possible a historic scientific achievement that was kept secret until the first atomic bomb was used in 1945 (McDonald n.d.).

Only a small fraction of the women at Los Alamos worked as scientists. Most women found themselves at the Hill because their husbands had been recruited to work on the Manhattan Project. Women were isolated from the outside world and from intellectual life due to the stringent regulations which prevented scientists from discussing the project with their spouses. To limit the effects of life in an isolated community and keep up morale, the Los Alamos administration encouraged women to work. The majority of female residents were employed on a part-time basis as teachers, administrative assistants, laboratory technicians, nurses, and switchboard operators (Atomic Heritage Foundation 2014).

During the Manhattan Project, 640 women worked at Los Alamos, about 11 percent of the total workforce (LANL 2018) and played a very important role in varying aspects of the Manhattan Project. Women participated in both a civilian and a military capacity (Atomic Heritage Foundation 2014). The following are descriptions of contributions by a few women who worked at Los Alamos.

From a military standpoint, the WAC provided much of the administrative and clerical manpower and generally "filled-in" wherever they were needed. Civilian women worked as nurses, physicists, engineers, machine operators, maids, runners, drivers, chemists, typists, filers, doctors, inspectors, researchers, teachers, veterinarians, cryptographers, draftswomen, pipefitters, glass blowers, secretaries, and gauge watchers. In most instances they were over-worked and under-paid compared to their male counterparts. Although most of the women were white, there were also Hispanic, Native American, and African American women involved (Atomic Heritage Foundation 2014).

In 1944, chemist Lilli Hornig conducted plutonium research at Los Alamos, where she was physically segregated from her male colleagues. "I worked in a cubbyhole … I was really just cut off from everything else," she said in an interview. "I don't know if that was because we were women or because we were doing work that we had to be segregated, but I suspect the former because it wasn't the only place that it happened to me" (LANL, 2018). Hornig felt that many men at that time were "not fond of women scientists generally" and often treated them as assistants rather than equals. "I was being asked to produce the readings, the data would go to someone else," she remembered. "If I asked questions, that was all right … but I never engaged anybody in what we could call a technical discussion, and I resented that very much … I was unhappy, and that was the working situation" (LANL, 2018).

Although common, this working situation was not typical for all women, or men at Los Alamos. In 1943, for example, nuclear physicist Jane Hamilton Hall received a raise "to bring her salary in line with those of comparable physicists on the project," according to her division leader. In 1946, Hall's performance review states that she was "not of secondary importance" on a project that she worked on with her husband. Hall went on to become the laboratory's only female assistant director (LANL, 2018).

Hall, a physicist in Hanford, Washington, was also engaged in health physics and the pursuit of ways to protect radiation scientists working on the reactors. Hall and her husband had been working at the Metallurgical Laboratory in Chicago when they were recruited to help set up the reactors at Hanford; however, Hall was not allowed to work on the reactors with her husband again due to anti-nepotism rules, so she began research in the Health Physics Division. When Hall came to Los Alamos in late 1945, she worked on neutron diffusion and reactor research. In 1946, Hall and her husband worked as co-group leaders on a project to develop the world's first fast plutonium reactor, called Clementine. This reactor would facilitate exploring the use of plutonium as a reactor fuel and enable further research about its use in weapons (McDonald n.d.).

Mathematician Naomi Livesay, teaching assistant at the University of Illinois, received an invitation to join the Project in 1943. She was assigned to a group that would be programming a new IBM computer to calculate the predicted shock wave from an implosion-type bomb. Livesay had been trained at IBM headquarters and had used the machines for statistical research while working at Princeton, so she had the ideal background (McDonald n.d.).

Prior to the arrival of the IBM machine, the term "computers" referred exclusively to individuals who were employed to do calculations by hand. Many of these computers were women, and quite a few were wives of Manhattan Project scientists. Some of the women had degrees in mathematics and the sciences and often took jobs as computers because of discrimination in their own fields. As a consequence, many of the women who became computers were vastly overqualified for their positions. At Los Alamos, approximately 20 computers worked in the T-5 Computation group by the end of the summer of 1943 (LANL, 2018). When the IBM machine arrived, Livesay was assigned to help supervise its use. The machine had to be programmed with wires and punch cards for each mathematical operation, and although it was faster than manual computation, it was still laborious. "One of our shock-wave calculations took us nearly three months, working six days a week, 24 hours a day, two operators per shift," describes Livesay in her memoir. Once it was completed by the machine, she and her colleague would manually check the output. It would take her and another mathematician six to eight hours of intense work (McDonald n.d.).

Dorothy McKibbin**,** a 45-year-old single mother and bookkeeper, was hired by J. Robert Oppenheimer in 1943 to be the first point of contact for Manhattan Project scientists before they headed "up the hill" from Santa Fe to Los Alamos. Known as the "first lady of Los Alamos," she was the gatekeeper and was stationed in a nondescript adobe at 109 E. Palace Avenue in Santa Fe until the office closed in 1963 (LANL, 2018).

Librarian Charlotte Serber was the only female group leader of the Manhattan Project. She organized and protected secret documents in a space that featured a document room, a vault, and a ditto (copying) machine (LANL, 2018).

Mary Frankel, with degrees in both psychology and mathematics, became a junior scientist in the Computation group (T-5) in the Spring of 1943. She became an expert in using numerical methods to solve physical equations and was in charge of setting up the problems for the staff to run on desk calculators (LANL, 2018).

Explosives technician, Frances Dunne, was recruited to work at Los Alamos in 1944 and was part of the assembly crew for the Trinity test the following year. She was the only woman in the Explosives Assembly group. Her small hands and manual dexterity were key considerations because she could adjust the trigger in the high-explosive shells of model weapons better than her male counterparts (LANL, 2018).

Nuclear physicist Elizabeth "Diz" Riddle Graves came to Los Alamos with her husband, Al Graves. When she arrived, Graves joined the Research Division and began applying her expertise to examining the role of neutrons in the gadget. The gadget relied on nuclear fission reactions. Fission happens when a heavy atom (such as uranium or plutonium) absorbs a neutron and splits. When this occurs, more neutrons are released, which can cause fission in other atoms. This potentially leads to a runaway chain reaction and a cataclysmic release of energy. Therefore, in order to control a fission reaction for use in a bomb, the scientists of the Manhattan Project had to understand how to control neutrons (McDonald n.d.). Graves measured various materials and their ability to scatter high-energy neutrons. This work would help her group select a material to be used as a reflector to surround the core of the bomb. The reflector would keep neutrons inside, close to the core mass, so that the fission would continue and speed up the growth of the chain reaction. Graves also calculated neutron-multiplication effects in uranium metal in order to further understand how the neutrons would interact with the target element (McDonald n.d.). During the first experimental test of the gadget, the Trinity test, Graves was pregnant, so she and her husband stayed at a cabin in Carrizozo, New Mexico, 50 miles from the test site, to observe and measure the explosion's aftermath. They monitored the spread of radiation with a Geiger counter, the electromagnetic radiation with a shortwave radio (to see if it got disrupted), and the ground shock with a seismograph (McDonald n.d.).

In an interview, physicist Joan Hinton recalled that during her time as a graduate student at the University of Wisconsin, she began to notice people were disappearing from her department. She also noticed that the Van de Graaff accelerator had gone missing. Then one day she received a letter offering her war-related work in New Mexico. When she went to the library to check out a book to read more about her destination, she found listed on the borrowing card the names of all the people who had disappeared from her department. Hinton accepted the job with the Manhattan Project and moved to Los Alamos to work with physicist Enrico Fermi's group, building the first reactor to use enriched uranium for fuel. She also joined a second group that built reactors to test assemblies of enriched uranium and plutonium (McDonald n.d.).

A significant effort was made by the Project leadership to recruit locally as well, which again included students. Floy Agnes "Aggie" Naranjo Lee was a member of the Santa Clara Pueblo who came to Los Alamos in 1945 when she finished her Bachelor of Science degree at the University of New Mexico (McDonald n.d.). Lee worked as a technician in the hematology laboratory at Los Alamos. She collected and examined blood samples from Manhattan Project scientists, including Louis Slotin after a criticality-experimental accident that exposed him to a fatal dose of radiation in 1946. Lee, in an interview, described how Manhattan Project officials told the local public that Los Alamos was a "hideout for pregnant WACs. Santa Fe loved that story — they believed it" (LANL, 2018).

Physicist Elda Anderson, Ph.D. in atomic spectroscopy, is credited with preparing the first sample of nearly pure uranium-235 acquired by Los Alamos for experimentation (LANL, 2018). Anderson had been recruited to Los Alamos from Princeton University, where she worked in the Office of Scientific Research and Development. She was there on sabbatical from her position as Chair of the Physics Department at Downer College in Milwaukee, Wisconsin. Anderson's time on Project Y was spent examining the fission process and measuring parameters such as the number of neutrons produced per fission and the possible time delay before the emission of neutrons. Anderson's work at Los Alamos led

to an interest in the emerging field of health physics: the study of protecting people and their environment from the effects of ionizing radiation (McDonald n.d.).

After the war ended, many scientists left Los Alamos; they returned to their faculty positions or their graduate studies. Elda Anderson changed careers and became one of the founders of modern health physics. She became the first chief of education and training in the new Health Physics Division at Oak Ridge Laboratory. She established the professional certification agency, the American Board of Health Physics, and helped create the Health Physics Society, which now gives an annual Elda Anderson award for excellence (McDonald n.d.).

Joan Hinton left physics completely after the war. Naomi Livesay and her husband moved to England to pursue their science careers and start a family. Agnes Naranjo returned to school, earned a Ph.D. in zoology, and pursued a career in radiation biology and cytogenetics. She served as director of the Department of Tissue Culture at the Pasadena Foundation for Medical Research and was a senior scientist at the Jet Propulsion Laboratory, also in Pasadena, California, before returning to Los Alamos to be a radiobiologist in the Laboratory's Mammalian Biology Group (McDonald n.d.).

Some scientists never left Los Alamos and helped it transition into the national laboratory it is today. Elizabeth Graves continued to work on weapons, improving the ones that had been used in the war and exploring new ones. Her husband Alvin was injured in the Slotin incident, the accident in 1946 that killed his colleague, Louis Slotin. She was tasked with calculating the dosage of her husband's exposure without knowing he was the subject in question. Fortunately, Alvin survived, although he did suffer badly from radiation sickness. They both continued to work at the laboratory, and Elizabeth became a group leader in the Physics Division, where she remained until her death in 1972 (McDonald n.d.).

Jane Hall also stayed at the laboratory. After building the Clementine reactor, Hall quickly moved into management, first as assistant technical associate director and then as the laboratory's assistant director in 1955. She was the first of only three women so far to act in this capacity. Hall ultimately became one of the country's most influential advisors on nuclear weapons when, in 1966, President Lyndon Johnson appointed Hall to a six-year term on the General Advisory Committee of the Atomic Energy Commission (McDonald n.d.).

Women's Army Corps at Los Alamos

The Women's Army Corps was the women's branch of the United States Army. It was created as an auxiliary unit, the Women's Army Auxiliary Corps (WAAC) on 15 May 1942 by Public Law 77–554, and converted to an active duty status in the Army of the United States as the WAC on 1 July 1943. One of the purposes of the statute was to permit women to fulfill the work of Army men so that the men could serve overseas. However, the stated primary purpose was to increase the efficiency of the Army and make available to the national defense "the knowledge, skill and special training of the women of the Nation." Many women began enrolling for duty in the WAAC and welcomed the opportunity to be of service to their country during World War II (Bell 1993).

Nearly 150,000 American women served in the Women's Army Corps during World War II. Many of these women served throughout the world with the Army Ground Forces, the Army Service Forces, and the Army Air Forces, in a variety of supporting, non-combat roles. The majority of WACs served with the Army Service Forces (Atomic Heritage Foundation 2018, WAC 2018).

The WAC played a crucial role in the Manhattan Project. More than 400 WACs worked on the top-secret mission, primarily at the three major sites: Los Alamos, Oak Ridge, and Hanford. Hanford had the smallest group of WACs and Los Alamos had the largest group. A few WACs were also employed at

office sites in New York, Washington D.C., and Chicago. The first detachments of the WAC were sent to project sites in 1943. Frances W. House served as the first commanding officer of the WAC detachments in the Manhattan District. She was succeeded by Arlene G. Scheidenhelm (Atomic Heritage Org, WAC 2018).

On April 17, 1943, the First Provisional WAAC Detachment was activated at Fort Sill, Oklahoma. *A History of Company "D" WAC Detachment, Manhattan District* prepared by the Los Alamos National Laboratory (LANL) states that the activation order was contained in a secret letter from the Adjutant General Army Services Forces, Washington, D.C. The letter also stated that due to the isolated position and undesirable living conditions of the Project, the War Department was cautious about bringing in too many WAACs at once. Consequently, the first group was used more or less as an experiment (Bell 1993).

That first group six Auxiliaries: Leota T Germer, Florence E. Mallon, Ruth I. Millwright, Mabel B. Wolven, Frances E. Steele, and Anna E. Oliver, under the command of 3rd Officer, Helen E. Mulvihill, reported for duty at Los Alamos, New Mexico on April 21, 1943. Later they were joined by Mabel Wood, who came alone, then by Lee Brickhouse Klein and two others. Three of the original WAACs did not reenlist when the WAACs at Los Alamos were sworn into the regular Army, August 24, 1943. (Bell 1993).

The working program for WACs was not well defined at first, and many were put on basic jobs, although many of them had technical qualifications; however, as they proved their abilities, they were placed in practically every department on the Project (Truslow 1973). The women provided important support services, not only for post operations, but also in the Technical Area (where the science and laboratory buildings located). Some actively participated in the research and experiments. Others were accountants, bookkeepers, secretaries, clerks, record keepers, document clerks, draftsmen, commissary workers, workers in the Post Exchange, coordinators of transportation, travel and building equipment services, laboratory technicians, postal workers, payroll clerks, personnel office workers, fabricators of parts, supply and property clerks, telephone operators, medical technicians, motor pool drivers and dispatchers, librarians, cooks and scientists. (Bell 1993; Truslow 1973).

Security at Los Alamos was extremely tight. A number of WACs were assigned directly to the Security Office, working under Major Peer de Silva, Intelligence Officer, and his staff. They served as secretaries, typists, clerks, and cryptographers. They typed security questionnaires and worked on clearances. Newspapers and magazines were scanned for any references to Los Alamos or persons working there. People working in the technical area had had to pass high security checks before assignment. Many of the directives were handled orally but those which were put in writing were burned when there was no further need for them (Bell 1993).

One WAC described duty “We fell out for roll call at 7 a.m. in full uniform. We were supposed to do daily calisthenics outdoors, but happily we quit after a brief try because Lieutenant Betty Miller could not stand the soldiers' cat calls and wolf whistles as they observed our exertions. We were excused from K.P. We shared West Mess with the SEDs (Special Engineer Detachment). The cooks were men; among them was Charles "Smokey" Stover who later owned the popular restaurant La Mesita in Pojoaque. Pretty young Spanish girls served the food onto our metal trays as the line moved quickly past and, even if the food was sometimes unappetizing, at least the servers were attractive. The menus were standard Army fare: meat, potatoes, gravy, vegetable, salad, bread and butter, dessert, horrible coffee, and, occasionally, a dish called ‘Something on a Shingle.’ Some of the WACs bulged so alarmingly on this husky diet that a special WAC mess was eventually built where the menu leaned more to feminine requirements. No men were allowed except on specified occasions” (Roensch 1993).

Some women in the WAC worked as scientists and engineers, while others began in clerical and service jobs, but trained and later transitioned to technical and research positions. Often overshadowed by the work of such historic luminaries as Dr. J. Robert Oppenheimer and physicist Enrico Fermi, several women at Los Alamos made significant contributions to Project Y, including Norma Gross, Mary Miller, and Myrtle Bachelder (NPS, Women's Army Corps Dorm, N.d).

Norma Gross, a chemist, joined the WAC during the war in order to stay near her husband, who was in the Army and had been assigned to Los Alamos (McDonald n.d.). Gross, a chemist, produced radioactive lanthanum-140 (RaLa). The Fat Man bomb design included layers of explosive lenses that directed shock waves inward, compressing a plutonium core and forcing it to go supercritical (NPS, Women's Army Corps Dorm, N.d). The RaLa experiments investigated the symmetry of those explosive forces and provided crucial information for the design of the implosion-type weapon. Even with the extensive calculations that were being done to predict the feasibility of the implosion model, experiments were still needed to verify the compression on the core of the bomb. As the explosion compressed the core, the radiation of the gamma rays would decrease. By detecting and measuring the gamma rays, Gross and her coworkers could understand what was happening to the density inside the core to verify the compression model. These tests were the implosion experiments that most affected the final design of the implosion weapon, according to Los Alamos National Laboratory historian Ellen McGehee (McDonald n.d.).

Dr. Mary Miller, PhD in chemistry, conducted foundational research into plutonium. She studied precious samples of this new metal, and developed the methodology for creating plutonium foils, which she fabricated herself. Miller established standards for collecting and studying plutonium that enhanced scientists' understanding of the Trinity Test (NPS, Women's Army Corps Dorm, N.d).

Myrtle Bachelder led a group of WAC members who studied and measured the composition and purity of uranium sent to Los Alamos. The more conventional gun-type weapon designed by Project Y used uranium to sustain a chain reaction (compared to the implosion-type, plutonium-based weapon). Through spectroscopy, Bachelder discovered techniques for X-radiation and purification of uranium ores (NPS, Women's Army Corps Dorm, N.d).

Jane Heydorn arrived in Los Alamos in 1944 and began work as a telephone operator, monitoring calls for leaks of classified information. She later developed bomb-testing equipment as an electronics technician and then went on to operate Clementine, the world's first fast neutron nuclear reactor (LANL, 2018).

Rebecca Diven graduated from USC in June of 1941 and specialized on national defense work at Cal Tech in 1943. She began her work for the Manhattan Project at Los Alamos in 1944, where she developed a quartz fiber microbalance to weigh extremely small amounts of plutonium (Atomic Heritage Foundation, N.d).

Between April 21, 1943, and December 31, 1945, there was a constant increase in the numbers of enlisted women in the WAC Detachment. On December 31, 1945, that total number assigned was 192. That did not include all who had served at Los Alamos because some of the women had been transferred or released from the service by that date. As the Army demobilized, the numbers decreased so that as of October 15, 1946, there were remaining only one officer and 32 enlistees (Bell 1993). The detachment was deactivated on October 19, 1946. (LANL 2018; Bell 1993).

Figure 2-3. WACs at Los Alamos

Source: https://www.atomicheritage.org/history/womens-army-corps-wac

After the war ended, the WACs, were demobilized from the Manhattan District. Many women left their wartime positions, and returned to their homes, or took on lower paid positions labelled as "women's work." Women were encouraged to do this to open up positions for returning male veterans. Other women involved in the Manhattan Project went on to have productive careers in science, technology, and other fields (NPS, Women's Army Corps Dorm, N.d). Norma Gross moved to New York and began teaching and doing research in organic chemistry (McDonald n.d.). Some women continued to serve in WAC, and WAC remained as the women's unit of the military. Some women did continue to serve in a variety of positions through the WACs in other U.S. conflicts such as the Korean War and the Vietnam War. In 1948, Congress passed the Women's Armed Services Integration Act, guaranteeing that women would have a permanent place in U.S. military service. In 1978, the Army abolished the WAC and women were fully integrated into the regular Army, serving in the same units as men (Atomic Heritage Org, WAC 2018).

Los Alamos

Los Alamos, unlike Oak Ridge and Hanford, was a military post, with a military commander and staff, and various military units to perform post engineer and security functions. In many cases, for security reasons, project planners decided to provide on-site accommodations and community services for all military personnel and civilian scientists and technicians, as well as for their families. Nontechnical civilian employees working in unclassified jobs did not pose a security risk and could reside in neighboring small towns. They did, however, have access to on-site housing based on its availability and their family need (www.otis.gov LA-town).

As recently as 1942 there was nothing on Los Alamos Mesa except a few houses and buildings used by the Los Alamos Ranch School. Due to the isolation, secrecy and wartime shortages, the Manhattan Engineer District not only built a laboratory to develop an atomic bomb, but also a community to house its personnel and to service it. By direction, all construction was of a temporary nature. More than 5,000 persons were crowded into Army-style barracks, Quonset huts, barrack-style apartments, and a very few prefabricated houses. By the war's end crowded atop Los Alamos Mesa was a laboratory and a town (Los Alamos History 2021).

The stone and log buildings of the Los Alamos Ranch School for Boys formed the core of the community, with the new houses, dormitories, barracks, service, and other buildings of the nontechnical area located to the northeast and with the facilities of the technical area located to the south along the rim of Los Alamos Canyon. The school's Fuller Lodge housed visitors and a dining hall. The classrooms were converted to a Post Exchange and other shops. The arts and crafts building became lab director J. Robert Oppenheimer's house. The nearby masters' houses became residences for other top Project administrators. These houses were the only houses in Los Alamos to have tubs instead of showers, so this group of buildings quickly became known as "Bathtub Row" (www.otis.gov LA-town).

The unpredictable expansion of the bomb program consistently outran available housing. The total population in January 1943 was about 1,500. By the end of the year, it was estimated at 3,500 and in December 1944, it was 5,675. A year later, with a sharp increase during 1945, it was estimated at 8,200. There was an urgency at Los Alamos to complete facilities in the shortest possible time and at the lowest cost in terms of manpower and critical materials. Family housing units consisted of conventional houses, apartments, and duplexes, which the Army felt were of particular value for recruiting essential personnel and for ensuring security. These were supplemented by winterized hutments, hut apartments, and government and privately owned trailers. The combined capacity of these various types of housing could accommodate more than 600 families (www.otis.gov LA-town).

Single individuals resided in barracks or dormitories, with the best equipped dormitories reserved for unmarried scientific personnel. Civilian service personnel, such as firemen, janitors, and hospital attendants, occupied more cheaply built units. Most enlisted men had quarters in theater of operations-type barracks and enlisted women in modified mobilization-style units. To counter the unsatisfactory housing conditions, the isolation, and the strict security regulations, the Army gave considerable effort to providing residents with efficient, low-cost, and attractive food and service facilities. Meals were available to civilians at cost in several conveniently located mess halls and Army personnel ate at the regular military messes. Limited food service was available in the post exchanges. In March 1945, the post opened a new cafeteria specifically designed and operated to improve community morale. Open to everyone, it was better equipped, furnished, and decorated than the regular messes and served a more elaborate menu (www.otis.gov LA-town).

Commissary facilities began operations in March 1943 with privileges only available to Los Alamos residents; however, the majority of employees who lived offsite had little opportunity to do their shopping in nearby communities because of commuting distances. Consequently, the post commander ordered extension of commissary privileges to all who worked at Los Alamos. The Army set up the first "trading post" in a small log building of the ranch school in early 1943, but eventually opened outlets in several other locations, including one near the entrance of the technical area (www.otis.gov LA-town).

Life at Los Alamos

In almost every respect, life at Los Alamos was abnormal. From the makeup of the community to the insular, almost penal-like restrictions made necessary by the intense security, Los Alamos was unlike any other community in America. The first residents were remarkably homogeneous. Highly educated scientists, almost all-white males, and their families, they were in their twenties or thirties, healthy, and middle class. Some were recent arrivals to the country, but all shared a common purpose and a common employer (www.osti la-life).

Work and security shaped life at Los Alamos. The official hours of work in the laboratory were eight hours a day for six days a week, but many groups, particularly research groups, worked more irregular and usually much longer hours. Work and what little non-work time existed was strictly controlled. Los

Alamos was surrounded by a high barbed wire fence and armed guards, and secrecy became a way of life. Laboratory members were not allowed personal contact with relatives nor permitted to travel more than 100 miles from Los Alamos. A chance encounter with a friend outside the confines of Los Alamos had to be reported in detail to the security force. Letters were read and censored before mailing (www.osti la-life).

Soot from coal, wood and oil burning stoves and furnaces, and dust from the streets fell in endless layers on every surface. Winter snows and summer rains left streets and yards mired in mud. This was a significant change to the comfortable campus settings familiar to most on the staff. These conditions were offset somewhat by the beauty of the mountain setting and the conscious effort to promote educational, cultural, and recreational activities. In spring 1943, Walter Cook, a professor of education from the University of Minnesota, was brought in to design a model school system for gifted students. Scientists at the lab taught the more advanced students and provided lectures for a broader audience. More than 30 recreational and cultural organizations were formed, and home-grown talent provided concerts and amateur theater. Movies were shown several times a week. Outdoor activities included hiking, horseback riding, skiing, and ice skating. Golfers built a rough nine-hole golf course. Parties and dancing were popular on weekends. Alcohol was consumed freely when it could be obtained (www.osti la-life).

One woman resident wrote “there were the Officers' Club and the non-commissioned officers’ club which many of the women enjoyed, especially on Saturday nights. The theatre building where movies were shown at least three nights a week was also used for Saturday night dance. Horseback riding was popular, and if one didn't know how to saddle up a horse, the MPs were cooperative in assisting them. Ice skating was a favorite pastime of many at the pond in the canyon - a beautiful place in winter surrounded by trees clothed with lace-like ice and snow. They skated to music provided by portable victrolas or radios” (Bell 1993).

Los Alamos also grew more diverse over time. Ongoing construction as the lab and town grew brought construction workers, machinists, and other skilled workers. To relieve some of the constant labor shortage, General Leslie Groves brought in a contingent of the WAC in August 1943 and, beginning in late 1943, a group of enlisted personnel in the Special Engineer Detachment. By August 1944, military personnel made up 42 percent of the laboratory. Many became technicians, draftsmen, or scientific assistants. A few had master's degrees or doctorates, usually in the physical sciences. Some became junior scientists or higher. Despite the growing diversity, Los Alamos did have a class structure. At the top of the Hill society were the scientists and their families, followed by administrators and Army officers, other civilians, and finally the lower ranked enlisted men and women. Housing, dining facilities, and other perks of class and rank reflected these social realities. The inadequacy of the facilities at Los Alamos nonetheless encouraged neighbors to work together to solve their problems. The residents of Los Alamos developed a close-knit community during the war. A sense of excitement, of devotion, and of patriotism prevailed (www.osti la-life).

Housing

Dormitories were provided for single men and female civilians, and there were a few dormitories for married couples without children. All of the better dormitories were to house scientific personnel. Some rooms were made available to key personnel of the service organization working under the Commanding Officer. At the end of 1946, there were 36 dormitories with approximately 1,253 living quarters and 55 barracks providing another 1,496 individual units (Truslow 1973).

Civilians and officers could bring families to Los Alamos; married noncommissioned officers could bring families no closer than Albuquerque. There were plenty of civilian dormitories for men, some for woman, and some for married couples. If a soldier married a civilian resident, they could live in her dorm as long as he fulfilled his Army duties. If a WAC married a civilian, she stayed in the WAC barracks. If a WAC

married a soldier, each remained with his own outfit. If a WAC became pregnant, she was discharged and shipped out. By late 1945, so many soldiers and WACs had married that an apartment was set aside where couples could live together for 2-week periods on a rotating schedule. It was possible for married GIs to keep house together for two weeks out of three months (Roensch 1993).

Troop housing was to have been 40 ft^2 per enlisted man and 50 ft^2 per enlisted woman, as provided by the war department circulars on the subject; however, the rapid growth of the military units and the lack of barracks space made it impossible to adhere to that policy. Housing structures used were Theatre of Operations type or modified mobilization type (also referred to as WWII temps) as in the case of WAC barracks buildings. Units housed were the Special Engineer Detachment, WAC Detachment, Military police Detachment, and the Provisional Engineer Detachment. Some barracks not in use by the Army were used for civilian barracks or converted dormitories (Truslow 1973).

Barracks life for the women at Los Alamos was similar to that on almost any other Army post. The first groups to arrive were housed in apartments barren of furniture except for beds. In August 1943, the first WAC barracks, No. T-228, was completed and the women moved there. It had a capacity for housing at least 60 WACs. Later, as the unit grew, it was necessary to construct three additional barracks: T-240, T-40, and T-251. Because of its proximity to the central post, T-40 was used by nurses, medical WACs, and telephone operators who might be required on duty at any hour (Bell 1993).

Each floor of Building T-228, the first barracks, was a long room without partitions. Beds were arranged side by side with an aisle in the middle. Heads of beds were toward the outside walls. Uniforms and shirts were hung on racks along the walls, and at the foot of each bed was a footlocker for other clothing. There were specific rules for the arrangement of the clothing in the footlocker. Shoes and boots were lined up under the bed. On the wall behind each bed was a cabinet to hold personal items - combs, brushes, make up, note paper, books, etc. The top floor of Building T-228 opened out onto a sunroof for top floor resident use. At the other end of the building was a stairway leading down to the latrine, first floor quarters and the exit (Bell 1993).

One resident described T-40 as “soon we saw a series of familiar-looking two-story buildings painted green, residences for civilians. We stopped at the WAC orderly room and entered to report to our commanding officer Lt. Helen Mulvihill. She was delicate, self- possessed and friendly. Upon welcoming us, she sent us with an escort to our barracks. We found the usual bunks row on row, but not double-deckers. Each bunk had a cupboard and a footlocker. The floors were hardwood and waxed. It was an H-shaped barracks with about 50 bunks in each wing. The wings were connected by latrines, showers and laundry. The private individual showers and two private bathtubs were a luxury we had missed since joining the Corps” (Bell 1993).

Every Saturday morning, the commanding officer formally inspected the premises. Friday night was dubbed "G.I. night." The WACs scrubbed the areas under and around their beds, saw that everything was in perfect order, shined their shoes, pressed their clothes and performed assigned tasks in the common areas. Fortunately, the WACs at Los Alamos were not subjected to KP (kitchen police) duty (Bell 1993).

Figure 2-4. Men's Dormitory T-128 May 1946

Source: Los Alamos National Laboratory

Captain Helen E. Mulvihill Dean and six enrollees arrived from Fort Sill, Oklahoma on April 21, 1943. On May 17, 1943, she wrote:

> "We are in new quarters. We now have our own little rambling cottage which the girls have named 'WAAC Shack.' It certainly is pretty with spyrea all around - and a border of iris and bed of tulips in bloom. We changed eating places today, and instead of eating at the regular mess, we are now eating at what used to be an expensive lodge. We are served our meal's on chinar plates and served in courses by handsome Mexican boys in brilliant satin shirts, white duck pants and brilliant scarves or cummerbunds" (Bell 1993).

Later as new buildings at Los Alamos were completed, the WAC enlistees moved into a new barracks and the officers into another building. Lt. Dean (promoted from Captain) describes the new living conditions in a letter dated September 20, 1943:

> "We've been moving all day for what I hope if our last move for the duration. My Jr. officer and I have a sort of suite of rooms. We each have a tiny room of our own and share a tiny bathroom with shower… Instead of having the girls scattered all over the post and my office being moved daily, we are now in one section – the girls in a nice new barracks and the company office, recreation room, and officers' quarters in another building" (Bell 1993).

Mobilization Construction - World War II Temporary Housing

In 1940, the United States undertook one of the largest domestic construction projects in the history of this country: building facilities to train men and women for military service in World War II. The nation rose from the depression to meet the demands of the war. It also changed forever many design and construction practices and techniques. In order to facilitate the mobilization program, the Quartermaster

Corps' Construction Division and the Corps of Engineers' Construction Division were merged and by the beginning of 1942, the construction program proceeded under the direction of the Army Corps of Engineers. Since then, the Corps of Engineers has provided the engineering support to all Army installations for the construction and maintenance of its buildings and grounds. But never since then, has it had the challenge of World War II mobilization requirements (DoD Legacy Program 1992).

In response to the German Army's invasion of continental Europe, the United States quickened mobilizing for war in June 1940. But before the U.S. soldiers could fight abroad, they had to be housed and trained in the continental United States. The building program began in earnest in the fall and, responding to current military events, rapidly surged forward. In fall 1939, the Army consisted of little more than 200,000 men, a number that was already straining the War Department's housing capacity. By November 1944, the Army was able to provide adequate housing for over 6 million troops in the United States. For the first time, the War Department needed to accommodate a substantial standing Army that would be stationed in the U.S. indefinitely. The Army needed immediate plans for accommodating all these incoming men (NPS, World War II Mobilization Effort, N.d).

The Army's two construction divisions, the Quartermaster General and the Army Corps of Engineers, established five principles to guide mobilization construction plans: speed, simplicity, conservation of materials, flexibility, and safety. Using these principles, the construction divisions drew up standard building plans for simple wood-frame structures; the buildings were made with inexpensive and prefabricated materials and could be constructed in assembly-line fashion (NPS, World War II Temporary Construction, N.d). Construction took place at break-neck speed, as a result of readily available labor resources and ingenuity with building materials. Construction crews at Fort Ord in Monterey, California boasted that they could finish a building every 54 minutes (NPS, World War II Mobilization Effort, N.d).

Some of the typical elements of the Army's WW II buildings include:

- Long, rectangular shape
- Gable roof
- Horizontal wood siding
- "aqua medias" (the 1st story projecting overhang) which provide protection from rain
- Multi-paned, double-hung windows (NPS, World War II Temporary Construction, N.d).

Only 270,000 out of the total 6 million troops were lodged in buildings labeled "permanent. " A small number were billeted in tents. Most of these troops were lodged, fed, and supplied in more than thirty thousand "temporary" wooden buildings, nearly all of them constructed in a few short years (DoD Legacy Program 1992). The Army built its mobilization structures with the expectation that they would be "temporary," lasting from five to 20 years. An Army inventory in March 1985 showed that nearly 24,000 of these "temporary" World War II buildings were still standing and that a large but undetermined number were still in use (DoD Legacy Program 1992).

While the existence of these buildings testifies to the soundness of Army construction, their condition nevertheless deteriorated in subsequent years. As maintenance costs climbed higher, it became clear to military planners that the Army of the 1980s could no longer be housed either comfortably or inexpensively in 1940s Army barracks. By early February 1984, a plan was approved to raze over 38 million square feet of World War II-era buildings by 1990, which constituted over a third of the Army's inventory of such buildings (DoD Legacy Program 1992).

Los Alamos Post WWII

After the war, the country plunged into the Cold War, and it was determined that the Laboratory would continue. In 1947, the Atomic Energy Commission took over operations of the Laboratory programs. The Los Alamos Technical Area was moved across the Canyon to the South Mesa, where it is still located today. By mid-1947, the first permanent housing units for the new Laboratory site were being occupied. From that time on apartment and housing construction has been a priority program. All of the original temporary technical facilities were demolished, including the icehouse and several of the Ranch School structures. As fiscal year 1950 ended (July 1, 1950), Los Alamos had approximately 2,800 houses and apartments on four mesas. It has 1,225 dormitory rooms, and 160 trailer spaces in its Trailer Park. Comparatively few of the temporary wartime housing units from the original site remained, and they were scheduled for eventual removal (Los Alamos History, 2021).

The Zia Company was contracted to run the Los Alamos Laboratory and the community of Los Alamos in 1946. They managed the town until the early 1960s and continued to manage the Laboratory until 1986. The dormitory was used for housing teachers after the war.

Ruth Helmick Lier came to Los Alamos in August 1951 at the age of 22 to teach Science at the New Los Alamos High School on Diamond Drive. The Los Alamos Schools/AEC assigned her to a room on the second floor of a “Priority teachers’ dormitory.” Lier’s dorm was next door to the WAC dorm. Lier described her experience. “Due to the many fire hazards of these wooden dorms, it was forbidden in 1951 to cook or have any heating elements in our rooms (no electric coffee makers or hair dryers in those days). I had one outlet to use to plug-in an electric-radio Clock (purchased at the original Metzgers Hardware store). In the great room downstairs near fireplace was a tiny cooking area along a wall with small stove with oven and a small sink. It was used for making snacks, popcorn, boil coffee or tea, cookies etc. All the singles from the various types of dorms downtown ate 3 meals a day at the cafeteria next to the Post Office in Central Ave. This was about 3 blocks across the community center to the cafeteria and a social spot. The building had beautiful hardwood floors so no carpet. The Zia maids cleaned, waxed and polished all our floors daily, including our rooms (Lier 2021).”

Today, the Landmark District consists of the nine extant structures of the Ranch School; the Fuller Lodge, currently used as the community center; the house directly to the north of the lodge, which is used a museum; the small stone powerhouse at 2150 Juniper Street, which is used by the Red Cross; and the five private residences which constituted "Washtub Row," from 1964 Juniper Street through 1300 and 1350 20th Street to 1967 and 1984 Peach Street. The private houses were purchased by Laboratory scientists who have continued on at Los Alamos, and the few alterations have largely been in terms of new rooms, porches, and windows. On the southern shore of Ashley Pond is a memorial shelter, built on the site of the icehouse, out of icehouse stones. In the 1950s, the WAC Dormitory was leased to, and later purchased by, the Christian Science Society. The Society sold the building to Los Alamos County in 2019. The Society preserved much of the dormitory’s original 1940s style.

CHAPTER 3: DESCRIPTION OF THE DORMITORY

Existing Conditions

The existing site consists of the two-story dormitory building, driveways on the north and south side of the building as well as concrete sidewalks and landscaping. Both parking lots have access on 17th Street and 18th Street. The north driveway has very large turning radii to 17th street. It appears that the north driveway was a street in the 1940s. The asphalt parking lots and driveways are weathered with potholes. The sidewalks are narrow and in poor condition with some possible trip hazards. The site perimeter walks do not conform to current zoning requirements. The landscaping consists of mature over-story trees along with overgrown juniper bushes and grasses (Figure 3-1).

Figure 3-1. Dormitory Landscape

Source: J. Aaron

The building is a rectangular, two-story building with a one-story extension on the north and south ends. The building, as were most buildings at Los Alamos, was designed by W. C. Kruger, a prominent Albuquerque architect. He modified the World War II temporary 20-man dormitory plans. The first floor is approximately 112 feet by 30 feet, and the second floor is approximately 70 feet by 30 feet. The first story roof peak is 16’ 6” and the second story roof peak is 24 feet 6 inches. Total square footage is 5,373 ft^2.

The building exterior is clapboard wood siding with corner boards, both painted white. The window sashes are also wood painted white. The partially exposed concrete foundation has been covered with a brick veneer. The gabled roof is covered with asphalt shingles. The original elevation drawings call out wood shingles (Figure 3-2). The roof rafter tails, also painted white, overhang the exterior walls about 24 inches. There are no gutters or down spouts.

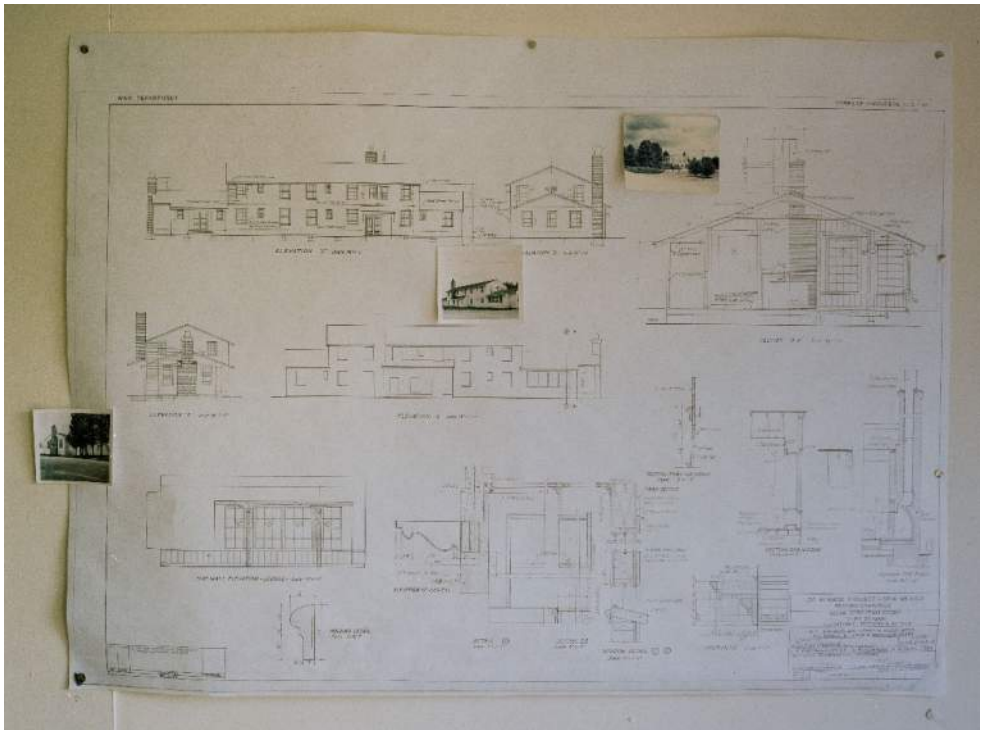


Figure 3-2. Dormitory Elevation Drawings

Source: Minesh Bacrania

The windows are wood sashed windows. In the bedrooms, there is one six over six double hung sash window. Each bathroom has a four-over-four double hung sash window. The panes in the bathroom window are textured obscured glass. The lounge on the first floor (the sanctuary while a church) has four abutting six over six sash windows on the east and west elevations (approximate 3' by 5' opening). The north elevation has a 12-over-12 wood sash window flanking each side of the brick fireplace chimney. Most of the larger bedroom windows and east and west sanctuary window sets are flanked by wood shutters, painted black. The bedroom and lounge window have hooks for hanging screens. The second-floor north elevation has two six-over-six double hung windows in the bedrooms with a fire escape window at the end of the central hallway. The fire escape window has nine lights. The second-floor south elevation has two six-over-six double hung windows in the bedrooms with a small central window with three horizontal lights. Black louvered shutters were added at a later date around most of the larger windows.

The dormitory has three entrances. There are two doors on the west elevation and one on the south elevation. The north end of the west elevation has double wood doors. The doorway is approximately three and a half steps up from the ground to the lounge floor. The steps and landing are capped with red brick and flanked by metal pipe railing. The stair and an interior landing measuring 8 feet by 4 feet (now covered with wood flooring) were capped with brick. To date, original floor plans have not been located and trees obscure the views of the entrance in historic photographs. The doors are solid wood with three lower panels and two-over-two fixed lights. The entrance on the south end of the west elevation is

recessed in a space about 3 feet deep by 8 feet. The double doors are also solid wood with three lower panels and two-over-two fixed lights. This entrance is at ground level. The recess was once enclosed with a partial wood slat wall with screens and double screen doors (Figure 3-3). There is also a single door on the south elevation. The original elevation drawing (shown above) does not show this door. Photographs of other matching dormitories also do not show a door on this elevation. It has a storm door which is broken, and a wood door with three lower panels and two-over-two fixed lights. A concrete sidewalk and small concrete landing are in front of the door. The door is approximately one foot above ground. This door is flanked by Doric pilasters and an entablature surmounted by an acorn pediment (Figure 3-4).

Figure 3-3. Dormitory West Entrances and Elevation
Source: J. Aaron

Figure 3-4. South Entrance and Elevation

Source: J. Aaron

On the east elevation is a one-story mechanical room approximately 16-feet by 24-feet. It projects out from the east elevation by about 4 feet. It has two six-over-six wood sashed, double hung windows, (the lower half of the southernmost window is boarded up), a door of vertical wood slats and two small louvered vents covered with wire mesh (Figure 3-5). The room has unfinished plywood walls and houses the electrical and mechanical equipment for the dormitory. There are notes and signatures written on the walls by previous repair persons and visitors (Figure 3-6), including a noted motor change on April 25, 1944.

Figure 3-5. Mechanic Room on East Elevation

Source: J. Aaron

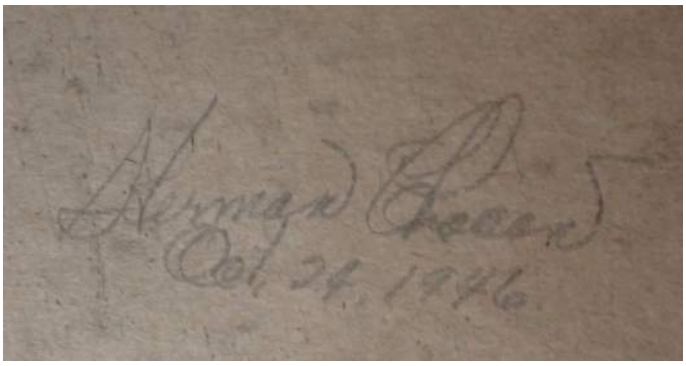


Figure 3-6. Signature on Mechanical Room Wall

Source: J. Aaron

There are two chimneys. One chimney serves as a vent for the mechanical system. It is on the south wall of the mechanical room, which is a simple 3-foot square, red brick chimney rising 4 feet above the second story roof. The second chimney is on the north end of the building and vents a fireplace in the lounge. The base of the chimney is 2-feet by 7-feet. Approximately 10 feet above the ground, the central portion of the chimney narrows to 2 feet by 4 feet and extends about 4 feet above the peak of the roof. The 18-inch portion of each side of the chimney stair-steps back into the dorm. This chimney has three layers of corbelling at the top (Figure 3-7). It originally had a chimney pot. A flue lines the inside of both chimneys and extends about the height of the brick.

Figure 3-7. North Chimney

Source: J. Aaron

The first floor had ten 9-feet by 12-feet bedrooms with 8-foot-high ceilings (two of the bedrooms have been modified, see below). Each bedroom has a 4-foot by 2-foot-deep closet, built-in lower cabinet with upper shelves (Figure 3-8). The bedrooms have one window, but the end bedrooms have two windows. The floors are wood, and the walls and ceiling are gypsum board. The interior doors are five-recessed-panel wood doors. Two bedrooms share a bathroom accessed from inside the bedroom. The bathroom is 5-feet by 5-feet with a small sink and toilet against the outer wall and a small 32-inch square shower against the inner wall. The first floor had five bathrooms.

Figure 3-8. Bedroom, Built-In and Bathroom

Source: J. Aaron

The first floor also has the mechanical room, a small janitor's closet with sink, a 10-foot by 12-foot storage room with floor to ceiling built-in storage cabinets on one wall. The bedrooms, janitor's closet and storage room are all accessed from the center 5-foot by 82 ½ -foot central hall. The ceiling in the hall is 8 feet high. The hall ends on the south at an exterior door, and on the north into the lounge.

The lounge, which functioned as the sanctuary when owned by the Science Christian Church, is 28-feet deep (north to south) and 20-feet wide east to west with a ceiling height approximately 11-feet (Figure 3-9). There is a 4-foot by 20-foot recess on the east and west sides of the lounge with ceilings at 8-feet. Two columns on each edge of the lower ceiling frame these recesses. The columns are surmounted with wood carved capitals. The west side has the double doors to exit the room. The north ends of the recesses have built-in natural stained selves and lower cabinet. The doors and back wall are natural stained wainscot. The central portion of the north wall is paneled in the same natural stained wainscot, as are the eight feet of the perpendicular 8-foot wall. The remaining walls are gypsum board with a 2-foot-high wainscot on the lower portion of the wall. The is a 16- to 18-inches deep window seat flanking the centered fireplace. The fireplace is redbrick with a wood mantel. A platform and pulpit have been added to the north end of the room in front of the fireplace. The south wall of the lounge originally had a door to close off the hallway, and built-in shelves on the south end of the recesses These shelves have been removed, likely when the bedroom walls were removed.

Figure 3-9. Northwest Corner of Lounge

Source: J. Aaron

The upper six feet of the two interior walls of the two bedrooms that are adjacent to the lounge have been removed to enlarge the sanctuary. The lower two feet have been covered in wainscot and painted white. Square columns have been added to frame the original doorway and inner corner. The closet, built-in cabinet and shelves and doorway to bathroom have been retained (Figure 3-10).

Figure 3-10. Bedroom, Built-In, and Bathroom

Source: J. Aaron

The southern-most west entrance leads into a small entry. There are three steps up to the main floor and hallway. On the right is a switch back flight of stairs to the second floor (Figure 3-11). The second floor has ten 9-foot by 12-foot bedrooms with 8-foot-high ceilings. There is also an "L" shaped about 86 ft^2 room with wood shelves for storage cross from the stairs.

The eight bedrooms have a 4-foot by 2-foot-deep closet, built-in lower cabinet with upper shelves. The bedrooms have one window, but the north-end bedrooms have two windows. The floors are wood, and the walls and ceiling are gypsum board. Some rooms have had carpeting installed over the wood flooring. The interior doors are five-recessed-panel wood doors, except for the two inner bedrooms on the east side. The lower two panels in these doors have been replaced with wood louvres. These rooms include the cold air return for the heating system. Two bedrooms share a bathroom accessed from inside the bedroom. The bathroom is 5-foot by 5-foot with a small sink and toilet, plus a small 32-inch square shower. The second floor has five ¾ bathrooms. The two rooms on the south end differ from the other eight bedrooms. These two bedrooms share a bathroom that had the shower and toilet against the inside wall and the sink on the outer wall. The shower has been removed. These rooms had a 4-foot by 4-foot closet and no built-ins. The closet in the southwest bedroom has been removed and a doorway added. As with the first floor, there is a central hall. The north end of the hall leads to a half flight of stairs leading to a 9-light fire escape window. There was a small platform and ladder on the exterior leading to the ground. It has been removed.

Figure 3-11. Interior of Southwest Entrance

Source: J. Aaron

Many of the fixtures (lights, mirrors, faucets, toilets, and sinks) in the bathrooms are original (Figure 3-12). Some have been replaced, and some removed. Electricity is provided throughout the dormitory through metal conduit and outlets mounted to the walls. The light fixtures are original, as are many of the vent grates and thermostats.

Interior Ceiling Grate
Source: Mullen Heller Architecture

Bathroom Sink
Source: Mullen Heller Architecture

Interior Ceil Light in Lounge
Source: J. Aaron

Built-in Cabinets in Upstairs Storage Room
Source: J. Aaron

Figure 3-12. Interior Fixtures
Source: J. Aaron

CHAPTER 4: EVALUATION OF HISTORIC SIGNIFICANCE

As stated in Chapter 1, to be eligible for the NRHP, a property must meet certain NRHP evaluation criteria established in 36 CFR Part 60.4. The evaluation of the WAC Dormitory is presented below.

Evaluation for Listing in the National Register of Historic Places

To qualify for the National Register, a property must be significant. In other words, it must represent a significant part of the history, architecture, archaeology, engineering, or culture of an area, and it must have the characteristics that make it a good representative of properties associated with that aspect of the past. The significance of a historic property can be judged and explained only when it is evaluated within its historic context.

The historic context within which to evaluate this dormitory is provided in Chapter 2. The dormitory was constructed by the Army in 1943 to house women working on the Manhattan project during World War II to develop an atomic weapon to assist with ending the war. The themes of the historic context as it relates to the dormitory are military, community planning and development, and social history.

In accordance with the National Register Criteria, the historic context may relate to one of the following:

- An event, a series of events or activities, or patterns of an area's development (Criterion A);
- Association with the life of an important person (Criterion B);
- A building form, architectural style, engineering technique, or artistic values, based on a stage of physical development, or the use of a material or method of construction that shaped the historic identity of an area (Criterion C); or
- A research topic (Criterion D).

The National Register Bulletin 15: *How to Apply the National Register Criteria for Evaluation* (NPS, 1997) was reference for this evaluation. Under Criterion A: association with an event(s) that made a significant contribution to the broad pattern of history. A property can be associated with a specific event marking an important moment in American history. The bulletin states “Mere association with historic events or trends is not enough, in and of itself, to qualify under Criterion A. The property's specific association must be considered important as well.”

The WAC Dormitory is the only remaining Army-constructed temporary housing unit at Los Alamos from the World War II Manhattan project period. It was constructed in 1943 during the major build up needed to provide working and living accommodations for scientists, researchers, and base support for the laboratory. The dormitory has private bedrooms for the occupants and a common space for entertaining. Life at Los Alamos was abnormal and access to social amenities outside the laboratory for most employees was restricted. Because of the secrecy and security, the Army had to provide all forms of work facilities as well as community and social amenities for both single and married employees, and military and civilian personnel.

Being able to attract capable scientists and workers to the laboratory was vital to the success of the project. Housing was essential to attracting qualified people. Only four 20-man dormitories were constructed, two for men and two for women. It is not known if this dormitory was built specifically to house WAC or civilian women, however, it appears to have been used by both civilian women and WAC based on the descriptions women provided in interviews of their unique bedroom/bathroom configurations. No further evidence has been found to support a definitive conclusion. The WAC and civilian women provided critical services during World War II and the Manhattan project. This building

conveys these important aspects of the historic context and illustrates one type of living quarters during this period. Therefore, the dormitory is eligible for the NRHP under Criterion A.

To be significant under Criterion B: Person, the person(s) associated with the property must be individually significant within a historic context. The criterion is generally restricted to those properties that illustrate (rather than commemorate) a person's important achievements. Although women and WACs made many important contributions to the Manhattan Project, the dormitory is not where these contributions took place, and the dormitory does not illustrate those accomplishments. The building was designed by W.C. Kruger. W.C. Kruger and Associates have a number of other buildings that are listed on the NRHP, including the Los Alamos U.S. Post Office. However, this design is a modification of an Army mobilization design, and not representative of his original works. Therefore, the dormitory does not meet this criterion.

To be significant under Criterion C: Design/Construction, properties are significant for their physical design or construction, including such elements as architecture, landscape architecture, engineering, and artwork. To be eligible under Criterion C, a property must meet at least one of the following requirements:

- Embody distinctive characteristics of a type, period, or method of construction.
- Represent the work of a master.
- Possess high artistic value.
- Represent a significant and distinguishable entity whose components may lack individual distinction.

These housing building types, although mass produced, are historically important. Their architecture is straightforward, based on simple calculations of cost, efficiency, and speed of construction. The war mobilization buildings are significant for their design, construction, and technological innovation. Techniques such as the standardization of plans, prefabrication of units, and assembly-line approach to construction were largely pioneered in the construction of these mobilization structures. They were also partially responsible for raising the building standards to include such amenities as central heating, indoor plumbing, and electricity. Mobilization construction also had a tremendous impact on the economy, facilitating the recovery of the building industry following the Great Depression. The dormitory embodies the distinctive characteristics of a type, period, or method of construction, including:

- Long, rectangular shape
- Gable roof
- Horizontal wood siding
- “aqua medias” (the 1st story projecting overhang) which provide protection from rain
- Multi-paned, double-hung windows.

Therefore, the dormitory is eligible for the NRHP under Criterion C.

Criterion D: Information Potential, most often applied to archeological districts and sites. Criterion D can also apply to buildings, structures, and objects that contain important information. To be significant under Criterion D, the dormitory must be, or must have been, the principal source of the important information. The dormitory does not meet Criterion D, the physical building would not likely additional important information.

Evaluation of Integrity for Listing in the National Register of Historic Places

Integrity is defined by the NPS as a property's "ability to convey its significance." To be eligible for the NRHP, properties should retain most of the seven aspects of integrity including location, design, setting, materials, workmanship, feeling, and association.

Location is the place where the historic property was constructed. The dormitory is in the location it was built.

Design is the combination of elements that create the form, plan, space, structure, and style of a property. As stated above, the dormitory embodies the distinctive characteristics of a type, period, or method of construction for WWII temporary housing. There have been no additions to the building. It retains its form, plan, and space. The roof line and siding are original.

Setting is the physical environment of a historic property. The dormitory was located in the northeastern portion of the laboratory in an area with other dormitories, houses, barracks, mess hall, and social amenities. Although the setting is still predominantly residential with social amenities, the relationship to other military dormitories and barrack, and the military features are no longer extant.

Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. The majority of the original materials are extant and convey the significance of the style.

Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. Similar to the design, the distinctive style and materials of the WWII temporary housing are intact and covey the workmanship in the construction. The methods of construction and finishes are intact.

Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. Predominant materials used in construction of the dormitory include the clapboard wood siding, multi-paned windows, gable roof, and interior finishes. These materials have been retained. The building retains feeling.

Association is the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. The association has been compromised by the removal of the majority of the WWII laboratory.

The building retains aspects for location, design, materials, workmanship, and feeling; therefore, the building retains integrity.

Period of Significance

The period of significance for the WAC Dormitory began in 1943, when it was constructed and ends in the 1950s, when the Christian Science Society began church services in the building.

Character-Defining Features

The important character defining features of the dormitory include:

- Original circulation patterns indicated by the placement of the sidewalks
- Mature trees

- Rectangular shape of the building, with smaller second story
- Gabled shingle roof (shingle not original)
- Exterior white painted clapboard wood siding with corner boards
- Wood-sashed multi-paned, double hung windows with screens, and storm windows
- Two west side double door entrances - one entrance is recessed into building with a screened area which provides access to the private portion of the dormitory, and the other door provides access to the lounge (more public part of the building)
- Exterior wooden double doors with three lower panels and two over two fixed lights
- Projecting mechanical room with windows, door, vents, and unfinished plywood interior
- Two brick chimneys and brick capped northwest entry stairs
- Interior layout of bedrooms, bathrooms, halls, storage rooms with built in storage cabinets (1st floor)/shelves (2nd floor) and lounge. Separation of the private and public spaces.
- Repetitive size of each bedroom including built-in closet, shelves and cabinet, finishes, gypsum board walls, five panel wood doors, and wood floor
- Wood floors, gypsum board, and interior doors throughout
- Layout and fixtures in bathrooms, double access to bathrooms
- Access to rooms from central hall
- Lounge, with columns and carved capitals, recesses, built-in natural stained selves, lower cabinet, wall and wainscot, wood paneling, window seats, and brick fireplace, and wood mantel
- Original fixtures, including lights, mirrors, faucets, toilets, sinks, electrical conduit and outlets, vents, grates, and thermostats

Alterations to Original Building

The building retains many of its original design, materials, and finishes. Alterations that have occurred include:

- Driveways on the north and south side of the building have been added
- Concrete walk around perimeter of the lot was added
- Juniper bushes are not part of the original landscape
- Brick veneer on concrete foundation was added (Figure 4-1)
- Some glass windowpanes have been replaced
- Black louvered shutters were added at a later date around most of the larger windows (Figure 4-2)
- The interior landing at the northwest entry steps has been covered with wood flooring. It is unknown if the original brick is underneath the flooring.
- South entrance with small concrete landing with Doric pilasters and an entablature surmounted by an acorn pediment appear to have been added
- Removal of the two walls in each of the two bedrooms adjacent to the lounge
- Some bathroom fixtures have been removed or replaced
- Platform and pulpit were added (Figure 4-3)
- Built-in shelves on the south walls of the lounge have been removed
- Low wainscot added on the walls that were once part of the hallway
- Removal of shower in the south upstairs bathroom
- Removal of the closet in the southwest bedroom, and the addition of a door connecting the two southern bedrooms
- Second floor exterior fire escape platform and ladder have been removed

Figure 4-1. Foundation Brick Veneer and Brick-capped Stair

Source: Mueller Heller Architecture

Figure 4-2. Black Shutters

Source: J. Aaron

Figure 4-3. Interior of Lounge with Platform and Pulpit

Source: J. Aaron

CHAPTER 5: TREATMENT RECOMMENDATIONS

The WAC Dormitory is currently eligible for listing on the NRHP. To retain the integrity of the historic property as it undergoes construction for re-use, future treatment recommendations are provided in this chapter.

Los Alamos County Goals for the Dormitory

Los Alamos County intends to repurpose the dormitory to provide space for an extension to the Manhattan Project National Historical Park in Los Alamos and to provide administrative offices for the National Park Service in Los Alamos County. In the conceptual scheme, the first floor will house administrative offices, a meeting space, and "restored" room to be an exhibit to reflect the dormitory arrangement from the 1940's. Additional displays could be included in the renovated space. The second floor could be additional exhibit space and a live-in suite.

The WAC Dormitory is one of two authentic Manhattan Project era buildings still standing and relatively unaltered. Restoring and preserving the building exterior, with the intention of achieving National Historic Register status and inclusion in the park and walking tour, is the highest priority for Los Alamos County. The County intends to have the building listed on the NRHP either individually or, preferably, as a contributing resource to the Los Alamos Scientific Laboratory National Historic Landmark District; therefore, the historic integrity and character defining features of this building need to be preserved. In order to meet the re-use the dormitory, the building would need modifications to bring it up to building safety and American Disabilities Act (ADA) codes; therefore, some changes will be required. To guide such preservation work, the National Park Service has developed standards and guidelines for treatment to historic buildings. The Secretary of the Interior's Standards for the Treatment of Historic Properties are historic preservation principles that promote historic preservation best practices.

Conceptual Design

The building will serve as the MPNHP visitor center and office space. Alterations to the interior will be made to accommodate the new uses including a large gathering space for park exhibits and presentations, new visitor restrooms, and park employee offices. The new layout will include physical separation between the uses, providing privacy for park employees. The original character of the building will be preserved wherever possible, but the functionality of the space for the new occupants will take priority.

The dormitory will serve as a history museum and exhibit space with one or more dorm rooms restored to their original condition to serve as a demonstration exhibit and homage to the women that lived there. Alterations to the interior will be made to accommodate the new use, like larger gathering spaces, reception area, and visitor restrooms. However, any changes made will be purposeful and minimal, preserving the original character of the space wherever possible. There will also be exterior exhibits free to the public to visit at any time of day.

Although the public showed great support for a housing component, the County is not equipped to manage a residential housing property. However, a single occupant live-in suite will be included in the WAC Dormitory to provide a transient lodging space for a County or Park Service employee. The single-occupancy suite will have a bedroom, bathroom, and small living area including a kitchenette, all of which will be ADA compliant. Despite the modernization, the new live-in suite will consider and reflect the original character of the dorms, preserving the nostalgia and attraction of staying at the dormitory.

Overall, this renovation will aim to restore and preserve the exterior of the building as a historical structure while updating the site and interior to accommodate the modern mixed-use functions. All

interior renovations will strike a balance between modern efficiency and historical sensitivity. The MPNHP visitor center and exhibit space being in a historical building will bolster the user experience while the live-in suite will fill a need for both the County and National Park Service, allowing Los Alamos to be a more viable and attractive option for potential seasonal employees. This mixed-use, flexible approach will transform the WAC Dormitory into a national tourist destination, acting as a hub for the community, a place for neighborhood gatherings, educational activities, and local exhibit space.

Secretary of Interior Standards for Treatment

The standards put forth four distinct approaches to the treatment of historic properties—preservation, rehabilitation, restoration, and reconstruction—with accompanying guidelines for each. One set of standards will apply to a property undergoing treatment, and depends upon the property's significance, existing physical condition, the extent of documentation available and interpretive goals (if applicable).

The standards are a series of concepts about maintaining, repairing, and replacing historic materials, as well as designing new additions or making alterations. The guidelines offer design and technical recommendations to assist in applying the standards to a specific property. The standards and guidelines provide a framework for decision-making about work or changes to a historic property.

The standards and guidelines include both the exterior and the interior and extend to a property's landscape features, site, environment, as well as related new construction. State and local officials can use these standards and guidelines in reviewing both Federal and nonfederal rehabilitation proposals.

Propose treatment recommendations are based on whether project is for preservation, rehabilitation, restoration, or reconstruction. These are defined by the National Park Service as:

> Preservation may be considered as a treatment when the property's distinctive materials, features, and spaces are essentially intact and thus convey the historic significance without extensive repair or replacement; and when a continuing or new use does not require additions or extensive alterations.
>
> A property will be used as it was historically or be given a new use that maximizes the retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.
>
> Rehabilitation may be considered as a treatment when repair and replacement of deteriorated features are necessary, when alterations or additions to the property are planned for a new or continued use.
>
> Restoration may be considered as a treatment when the property's design, architectural, or historical significance during a particular period of time outweighs the potential loss of extant materials, features, spaces, and finishes that characterize other historical periods; when there is substantial physical and documentary evidence for the work; and when contemporary alterations and additions are not planned.
>
> Reconstruction may be considered as a treatment when a contemporary depiction is required to understand and interpret a property's historic value (including the re-creation of missing components in a historic district or site); when no other property with the same associative value has survived; and when sufficient historical documentation exists to ensure an accurate reproduction.

Although much of the dormitory building material is original, for this project, the rehabilitation treatment is recommended in order to accommodate the new use and to keep the building viable for its new use. If the building is occupied and used, funding for repairs and maintenance can be justified.

Appendix B contained the rehabilitation treatment standards and guidelines.

Recommendations for Maintaining Character

As stated in the previous chapter, the dormitory building retains a high degree of integrity. Much of the original materials is extant as well as the overall design and layout. The dormitory needs some exterior and interior alterations in order to assure its continued use, but it is important that such alterations do not destroy character defining spaces, materials, and finishes. The removal of historic materials or alteration of features and spaces that characterize a property should be avoided.

The list of existing important character defining features of the dormitory were provided in the previous chapter. Recommendations for maintaining character include the following:

Setting - The exterior setting should be maintained to the extent practical. The mature trees on the west side of the dormitory should be retained if healthy, and not causing damage to the building or creating a safety (fire or trip) hazard. The outside circulation has been primarily used for access (driveway), parking and walking. These uses should be retained.

Any new additions or structures on the property will be differentiated from the old; however, also be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and setting. New additions and adjacent or related new construction will be done in such a manner that if removed in the future, the essential form and integrity of the historic property and setting would be unimpaired.

Exterior Building - The overall shape and size of the dormitory should be retained. Any additional structures should be separated if at all possible. The shingled gabled roof, exterior white painted clapboard wood siding with corner boards, two brick chimneys, wood-sashed multi-paned, and double hung windows with screens should be retained. The two west side double door entrances should be retained. If possible, the screened enclosure for the recessed entrance should be restored. The exterior wooden three panels and two over two fixed lights doors should be retained. The projecting mechanical room with windows, door, vents, and unfinished plywood interior should be retained.

Building Interior layout – To the extent feasible the interior rooms should be retained. The repetitive size of each bedroom and including built-in closet, shelves, and cabinet are important features, as is the access off a central hall corridor. To retain the feeling, groups of these rooms, not a single room, should be retained to get a sense for living conditions, room size and layout, privacy and bathroom access, and circulation for the former residents.

Building interior finishes - The plaster walls, five panel wood doors, and wood floor are important finishes to maintain. Where possible, bathroom fixtures should be retained. Detailed finishes in the lounge, including columns and carved capitals, the recesses, built-in natural stained selves, lower cabinet, wall and wainscot, wood paneling, window seats, brick fireplace, and wood mantel should be retained. Original fixtures, including lights, electrical conduit and outlets, vents, grates, and thermostats should be retained although they would not need to be functional.

When possible, deteriorated historic features will be repaired rather than replaced. If replacement is required due to the severity of deterioration, the new feature will match the old feature in design, color, texture, material, and other visual qualities. Replacements should be documented for the historic record.

Safety and building code upgrades, ADA compliance renovations, and other maintenance upgrades should be made to that they could be removed in the future or be as non-visual as possible.

Other Recommendations

This report and other documents, photographs, floor plans, etc. that provide information on the history and physical appearance of the dormitory should be archived at the Los Alamos Historical Society and with the National Park Service. As new information is discovered, it should also be provided to Los Alamos Historic Society and National Park Service. These materials will provide valuable information for exhibit and interpretation, as well as serve as mitigation for the changes and alteration.

Upon completion of renovation, the dormitory building should be formally nominated to the NRHP either individually or as part of the historic district. This will provide a new baseline of current condition and character defining features for any future needed alterations.

SOURCES CITED AND REVIEWED

Atomic Heritage Foundation

N.d. Rebecca Bradford Diven. Accessed May 2022 at https://www.atomicheritage.org/profile/rebecca-bradford-diven

2003 Collections, Becky Diven Interview. Date of Interview: April 8, 2003. Los Alamos Accessed May 2022 at https://www.manhattanprojectvoices.org/oral-histories/rebecca-bradford-divens-interview

2014 Women and the Bomb https://www.atomicheritage.org/history/women-and-bomb. Thursday, June 5, 2014.

2018 Women's Army Corps (WAC) History Page Type: Women & Minority Communities, Date: Friday, April 27, 2018 accessed May 2022 at https://www.atomicheritage.org/history/womens-army-corps-wac

Bacrania, Minesh

N.d. Los Alamos Project, Volume I: Dormitory. Accessed May 2022 at https://bacrania.net/The-Los-Alamos-Project-Manhattan-Project-Dormitory. Also, via email.

Bell, Iris

1993 Los Alamos WAACs/WACs, World War II 1943-1946, Printed by Coastal Printing Incorporated, Sarasota, FL.

DoD Legacy Program

1992 World War II and The U.S. Army Mobilization Program: A History of 700 and 800 Series Cantonment Construction including Historic American Buildings Survey Mitigation Documentation for Camp Edwards, Massachusetts Fort McCoy, Wisconsin. Legacy Resources Management Program United States Department of Defense. Mar 24, 1992.

DOE Manhattan Project Website, accessed May 2022

N.d. https://www.osti.gov/opennet/manhattan-project-history/Places/LosAlamos/la-town.html

N.d. https://www.osti.gov/opennet/manhattan-project-history/Places/LosAlamos/la-life.html

N.d. https://www.osti.gov/opennet/manhattan-project-history/Places/LosAlamos/la-security.html

N.d. https://www.osti.gov/opennet/manhattan-project-history/Places/LosAlamos/la-postwar.html

Greenwood, Richard

1974 Historic Sites Survey, Washington DC Jan 14, 1974. Form No. 10-300a (Rev. 10-74) Los Alamos Scientific Laboratory. DOI NPS National Register of Historic Places Inventory.

Hammond, William M.

N.d. Hammond. The Women's Army Corps in World War II. A Commemoration of World War II Service, U.S. Army Center of Military History. CMH Pub 72–15.

Lier, Ruth Helmick

2021 Personal correspondence with Los Alamos County representative December 1, 2021.

Los Alamos National Laboratory (LANL)

2018 All News Science Briefs, 2018, March A short history of women at Los Alamos March 22, 2018.

Los Alamos Historical Society

2021 75th Anniversary of The Zia Company: Inside the Archives, 4/1/2021. Accessed May 19, 2022: https://www.losalamoshistory.org/history-blog/75th-anniversary-of-the-zia-company-inside-the-archives

McDonald, Rebecca

N.d. Women Scientist of the Secret City, October 2017 accessed: https://www.lanl.gov/discover/publications/1663/2017-october/_assets/docs/1663_30_WomenScientists1.pdf

National Park Service (NPS)

N.d. The Manhattan Project, National Park Service accessed May 2022 at https://www.nps.gov/mapr/learn/historyculture/index.htm

1997 National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation

N.d. Women's Army Corps Dorm accessed May 2022 at https://www.nps.gov/places/000/wac-dorm.htm#:)

N.d. World War II Mobilization Effort. Golden Gate National Recreation Area. No date. Accessed May 2022 at https://www.nps.gov/articles/world-war-ii-mobilization-effort.

N.d. World War II Temporary Construction. Golden Gate National Recreation Area no date. Accessed May 2022 at https://www.nps.gov/articles/ww2-tempconstruction.htm

Roensch, Eleanor (Jerry) Stone

1993 Life Within Limits. The Los Alamos Historical Society, Los Alamos New Mexico, 1993.

Truslow, Edith C.

1973 Manhattan District History, Nonscientific Aspects of Los Alamos Project Y 1942 thorough 1946. Los Alamos Scientific Laboratory of the University of California, March 1973. USAEC, Contract W-7405-ENG.

Appendix A

Los Alamos County Historic Preservation Municipal Code

- **ARTICLE XV. - HISTORIC PRESERVATION**
- **Sec. 16-610. - Authority; purpose.**

(a) Authority. As the preservation of historic assets within the county has been determined by the county council to be a legitimate purpose of government, this Article is adopted pursuant to and furthers the purposes of NMSA 1978, §§ 3-21-1 et seq., (Municipal and County Zoning Regulations); NMSA § 3-22-1 et seq., (Historic Districts and Landmarks Act); and NMSA §§ 18-6-1 et seq., (Cultural Properties Act).

(b) Purpose. The county council hereby declares that the archeological and historical heritage of the county is one of the county's most valued and important assets; that the public has an interest in the preservation of all prehistoric and historic ruins, sites, trails, primitive or historic roads—excluding existing modified thoroughfares, structures, objects and similar places and things for their scientific and cultural information and value; that the neglect, desecration and destruction of prehistoric and historic sites and objects results in an irreplaceable loss to the public. The term "prehistoric and historic sites and objects" includes, but is not limited to, real and personal property, including structures and ruins, that have historical and/or archeological significance. Therefore, the purpose of this article is to establish a cooperative approach for the protection and enhancement of the county's unique heritage and identity through the protection of historic sites, structures, and artifacts and through the designation of districts and landmarks of historical or archeological significance. This article is further intended to:

(1) Create a reasonable balance between private property rights and the public's interest in preserving the county's historic properties;

(2) Allow for the preservation, protection and enhancement of archeological and historical sites and objects within the county;

(3) Foster civic pride in the beauty and accomplishments of our past;

(4) Provide educational opportunities for Los Alamos residents of all ages;

(5) Enhance and promote the county's ability to attract tourists and other visitors while respecting the privacy of individual building occupants;

(6) Promote the continued use, adaptive reuse, and maintenance of historic or architecturally significant properties;

(7) Ensure that the exterior design and appearance of new structures and improvements within a historic district will be compatible with the established character of that district;

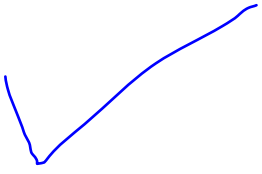
(8) Provide owners of properties of historic significance with helpful information and other potential incentives for the preservation, maintenance and improvement of their properties; and

(9) Establish efficient and simple administrative systems to carry out the purposes of this article utilizing, wherever possible, approval procedures already in existence.

The municipal code also contains provisions for:

- Sec. 16-612. - Designation of historic landmarks and historic districts.
- Sec. 16-613. - Historic property alteration certificate.
- Sec 16-614. - Temporary restraint of demolition.
- Sec. 16-615. - Demolition by neglect.
- Sec. 16-616. - Economic hardship.
- Sec 16-617. - Enforcement; violation; penalties.
- Sec. 16-618. - Public safety exclusion.

Note: There are federal laws protecting historic properties, most applicable being the National Historic Preservation Act. However, in this case, there is no federal agency involvement required, so compliance with this act is not required in this situation.



Appendix B

Secretary of Interior's Treatment Standards and Guidance for Restoration

Secretary of Interior's Standards for Rehabilitation

The following Standards for Rehabilitation are the criteria used to determine if a rehabilitation project qualifies as a certified rehabilitation. The intent of the Standards is to assist the long-term preservation of a property's significance through the preservation of historic materials and features. The Standards pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and the interior of historic buildings. The Standards also encompass related landscape features and the building's site and environment, as well as attached, adjacent, or related new construction. To be certified, a rehabilitation project must be determined by the Secretary to be consistent with the historic character of the structure(s) and, where applicable, the district in which it is located. The following Standards are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility.

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.
(https://www.nps.gov/tps/standards/rehabilitation.htm)

Guidelines for Rehabilitating Historic Buildings