

Historical Background and Context

THE HISTORY AND PRESERVATION
OF THE COMMUNITY AUDITORIUM-GYMNASIUM
Historic Structure Report

MANZANAR
NATIONAL HISTORIC SITE

THE HISTORY AND PRESERVATION
of the
COMMUNITY AUDITORIUM-GYMNASIUM
MANZANAR NATIONAL HISTORIC SITE
CALIFORNIA

HISTORIC STRUCTURE REPORT

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EXECUTIVE SUMMARY

HISTORICAL BACKGROUND AND CONTEXT

Manzanar was one of ten internment camps which held native born Japanese and Japanese Americans evacuated from the West Coast of the United States during World War II. Construction of the facilities at the Manzanar War Relocation Center took place between 1942 and 1944. The site was selected to hold Japanese American evacuees in February 1942, and construction began the following month. The first evacuees arrived on March 21, 1942. Construction and remodeling of the buildings in the center was constant until 1944 when most major construction ended. Manzanar was closed when the last evacuees left on November 21, 1945.

After a National Park Service study of all ten sites, it was determined that Manzanar, a National Historic Landmark, presented the best opportunity for preservation and interpretation. The United States Congress established Manzanar National Historic Site on March 3, 1992.

The General Management Plan (GMP) for the park was completed in January 1997. In order to begin implementation of the GMP, which called for preservation of the three remaining buildings on the site and adaptive reuse of the Auditorium, the largest of the three, it is necessary to prepare an Historic Structure Report (HSR) for the Auditorium Building. In accordance with NPS-28, the Cultural Resource Management Guidelines, the report includes architectural and engineering analysis and recommendations. The recommendations reflect concurrence with national codes, Historic Preservation Standards and Guidelines, and NPS Management Guidelines. The HSR includes documentation of available historical records and evidence of the building's evolution and significance, documentation of existing conditions, proposals for specific treatment of the building, analysis of the effects of those treatments on the building, and recommendations for further studies. This HSR will serve as the programming, historic documentation and design recommendations document for schematic and design development.

THE MANZANAR AUDITORIUM-GYMNASIUM

The Auditorium Building was designed by the Farm Security Administration, U.S. Department of Agriculture. A survey of the educational needs of the 10 relocation centers undertaken in March 1943 reported that the high school auditorium at Manzanar would include two rooms for shop classes, a health unit, locker rooms, showers, and storage, in addition to the main assembly area. Evacuees began construction of the auditorium in February 1944 and completed it on September 20, 1944. The completed wood frame building had overall dimensions of 118 feet by 119 feet with an assembly area measuring 80 feet by 96 feet. The stage extended from the east side of the assembly area, and an elevated film projection room from the west. Attached to the north and south sides of the auditorium were single story areas (wings) used for dressing rooms, lockers, and offices. An area on the south wing extended 40'-9" beyond the east end of the auditorium and was used as a health clinic. The large arched roof of the auditorium was supported by five wood trusses. After the closing of Manzanar, the auditorium was purchased by Inyo County in 1947 and leased to the Veterans of Foreign Wars (VFW) who used the facility as a meeting hall until the early 1950s. When the VFW left the site, the south wing was removed from the building and is still serving as the VFW Hall and American Legion Post in Lone Pine, although it has been greatly altered. After the VFW use, Inyo County removed the stage and installed a concrete truck ramp in the east end of the building and used the structure as a maintenance facility until it was purchased by the National Park Service in 1996.

The structure was documented by the Historic American Buildings Survey in 1994. Construction drawings have not been found but there is a good collection of historic black and white photographs. A temporary fire and intrusion detection system was installed in 1995. The Denver Service Center designed a water, sewer and

EXECUTIVE SUMMARY

fire suppression system for the building in Fiscal Year 1997 and construction was underway in Fiscal Year 1998. A preliminary seismic evaluation of the building has been undertaken through a separate study.¹

MAJOR ISSUES IDENTIFIED IN PROJECT AGREEMENT

An HSR for the Auditorium is needed in order to implement the GMP Preferred Alternative to adaptively reuse the historic structure as an interpretive center. The HSR provides basic architectural and engineering information of the existing condition of the building through inspection, analysis, documentation, and rehabilitation recommendations in concurrence with applicable building codes and USDI Rehabilitation Standards and Guidelines for Rehabilitating Historic Buildings. Future work on the structure may have to be phased.

The main issue is how to preserve the integrity of the building's historic fabric, which has seen little maintenance in the past 50 years. While changes to the building appear minor, major changes have occurred in building codes and environmental requirements.²

RESEARCH TO PRODUCE HSR

Primary sources of historic data are the Records of the War Relocation Authority in the National Archives, Washington, D.C., records pertaining to Manzanar in the National Archives Sierra-Pacific Division in San Bruno, California, the University of California at Los Angeles Library, and the Manzanar newspaper, *Manzanar Free Press*. The overall history of Manzanar is found in the Historic Resources Study *The Evacuation and Relocation of Persons of Japanese Ancestry during World War II: A Historical Study of the Manzanar War Relocation Center*, by Harlan D. Unrau; National Park Service, 1996.

¹ FEMA 178/June 1992 *Seismic Evaluation, Manzanar Auditorium Building*, prepared by Martin/Martin, Inc. Wheat Ridge, Colorado, Final Report, December 1998.

² From Project Agreement.

MAJOR RESEARCH FINDINGS

There is reasonably good written and photographic documentation of the history and physical nature of the building and its use with the exception of construction drawings. Only one sheet of original construction drawings has been found to date. This documentation provides good information for the appearance of the exterior of the building and the interior of the auditorium/gymnasium space. The remaining physical presence of the interior of the north wing and the single available drawing provides the general layout of the south wing, but no interior details.

Physical investigation of the building in conjunction with historic documentation shows that the stage and the auditorium/gymnasium floor can be reconstructed with accuracy. With certain exceptions, the building is generally in reasonably good condition. The exceptions are deteriorated column bases in the south wall, badly weathered and deteriorated siding, missing and deteriorated exterior doors and extremely weathered and deteriorated windows. The building requires all new mechanical and electrical systems.

RECOMMENDATIONS FOR TREATMENT OR USE

It is proposed in the General Management Plan that the building be restored to its 1944-45 appearance, including reconstruction of the south wing, and adaptively used to present and interpret the history of the internment of native born Japanese and Japanese Americans evacuated from the West Coast of the United States during World War II.

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ACKNOWLEDGEMENTS

In 1993, when planning for the staffing, operation and development of Manzanar National Historic Site began, Tom Mulhern, Chief of the Division of Park Historic Preservation of the Western Regional Office of the National Park Service in San Francisco assigned the author of this history section, Regional Historian Gordon Chappell, to undertake a week's research in the National Archives in Washington, D.C., on the history of Manzanar. With initial focus on the physical history of Manzanar, this involved a search of the National Archives' Cartographic Branch in Alexandria, Virginia, for all plans and drawings relating to Manzanar and its buildings, a search for photographs of Manzanar in the Still Pictures Branch of the National Archives, and after completion of that work, in-depth research in the Civil Records Branch of the National Archives at 7th and Pennsylvania Avenue in the records of the War Relocation Authority. Aware that the only remaining buildings at Manzanar consisted of two small gatehouses and a large combined auditorium-gymnasium, the author, knowing that some day a historic structure report would be needed on each of these, focused special attention on obtaining copies of all documents that illuminated the history of these buildings. Dan Olson of the Division of Planning, in charge of the planning team working on Manzanar, supported this research with his encouragement and with funding.

In addition, as a second phase of research connected with the planning, Division Chief Mulhern sent the author to the Special Collections Department of the Research Library at the University of California at Los Angeles, where the records and papers of Manzanar Project Director Ralph Merritt's headquarters office had ended up. While looking into many aspects of the history of Manzanar, again the author sought especially material pertaining to the three buildings still at Manzanar.

Additionally, the author undertook research at three local San Francisco area depositories which possessed relevant material: the Records of the Bureau of Land Management (formerly the General Land Office) in the Sierra Pacific Division of the National Archives at San Bruno, California, the library of the Japanese-American Historical Society in San Francisco, and the library of the California Historical Society in San Francisco. The author also investigated the holdings of the Bancroft Library at the University of California's main campus in Berkeley, but those were largely duplicative of other holdings and did not contain anything useful specific to the auditorium not found elsewhere.³

In addition to Tom Mulhern, already mentioned, now with San Francisco Maritime National Historic Park, the author is indebted to NPS personnel George Turnbull, Superintendent, and David Look, Cultural Resources Team Leader in the National Park Service Pacific Great Basin Support Office, Historical Architect Robert Carper at the Denver Service Center, Historical Architect Robbyn Jackson, Cultural Landscape Historian Mark Luellen, and former curator, now National Natural Landmarks coordinator, Jonathan Bayless, all in the Pacific Great Basin Support Office, and Park Superintendent Ross Hopkins at Manzanar National Historic Site. At Manzanar National Historic Site, I examined the eight boxes of research accumulated by DSC Historian Harlan Unrau, which provided some key additional facts which I was able to use in this history. I am also indebted to Bill Michael, Director of the Eastern California Museum at Independence, California, and to the National Archives staffs in Washington, D.C., Alexandria, Virginia, and San Bruno, California, and the staff of the Special Collections Division of the Research Library at the University of California at Los Angeles. Harlan Unrau's research also included material I used from the National Archives branch at Laguna Niguel, California. I regret now that I failed to keep a record of the individual names of the librarians and archivists at these institutions who assisted me; anyway, they have my thanks.

³ The Bancroft Library's findings aid on the war relocation effort may be accessed through the Internet at: http://sunsite2.berkeley.edu:28008/dynaweb/oac/berkeley/bancroft/jvac/@_G_BookView.

ACKNOWLEDGEMENTS

Gordon Chappell
Senior Historian, San Francisco

I have been fortunate to have a most capable project team for the development of this report – Historical Architect Dave Snow, Structural Engineer Elizabeth Smith, Mechanical Engineer Andy Roberts, Electrical Engineer Chuck Svoboda and Project Manager Jon Holbrook.

We especially extend our appreciation to Mr. Archie Miyatake of San Gabriel, California for providing prints, and permission to reproduce them in this report, of historic photographs of the Auditorium-Gymnasium from the collection of Toyo Miyatake. These fine photographs provide not only an excellent record of the building in 1944 and 1945 but, more importantly, a significant part of the record of those American citizens who were so unfortunate to have been the victims of ignorance and prejudice. I hope that Toyo Miyatake's contribution to the record of history and to preservation of Manzanar will be further acknowledged for future visitors.

Robert L. Carper
Historical Architect, Denver

ADMINISTRATIVE DATA

HISTORIC STRUCTURE IDENTIFICATION

The Manzanar Auditorium-Gymnasium is also known just as the Manzanar Auditorium. Both names are used in this report. The park building number is HS-01 and the List of Classified Structures identification number is ID-LCS-5866.

LOCATION

The Manzanar Auditorium is located on the west side of U.S. Highway 395, approximately 6 miles south of the town of Independence and 10 miles north of the town of Lone Pine in Inyo County, California. The nearest major airports are in Las Vegas, Nevada (approximately 250 miles away) and in Ontario, California (approximately 230 miles); although there are limited flights into the Inyokern Airport, located near Ridgecrest about 82 miles to the south of Manzanar along Highway 395. Overnight accommodations are available in Lone Pine and Independence.⁴

USE

The building was constructed as an auditorium and gymnasium for the camp high school; and also included rooms for shop classes and a health unit. It was also used for community cultural events and other activities. After the camp was closed, the building was used as a VFW Post (1947 to early 1950s), then as a maintenance facility by Inyo County until 1996.

MODIFICATIONS

The primary modifications made to the building were after the period of historic significance, which is 1944-45. These modifications were: the removal of the south wing, ca. 1953-54; the enclosure of the main entrance, possibly between 1947 and 1954 but probably ca. 1954; replacement of the original auditorium/gymnasium floor with a concrete slab, removal of most of the stage and installation of a vehicle entrance in the east wall, and installation of a vehicle door in the south wall, all ca. 1954. None of these modifications are significant historically or architecturally and restoration of the original building configuration and details are recommended.

⁴ Ibid.

PROPOSED TREATMENT

It is proposed in the General Management Plan that the building be restored to its 1944-45 appearance, including reconstruction of the south wing, and adaptively used to present and interpret the history of the internment of native born Japanese and Japanese Americans evacuated from the West Coast of the United States during World War II.

RELATED STUDIES

The general history of Manzanar is documented in the Historic Resources Study The Evacuation and Relocation of Persons of Japanese Ancestry during World War II: A Historical Study of the Manzanar War Relocation Center, by Harlan D. Unrau; National Park Service, 1996.

CULTURAL RESOURCE DATA

Date listed in National Register: July 30, 1976.

Entered as a National Historic Landmark February 4, 1985.

Period of Significance: 1944-1945.

Context of Significance: The Community Auditorium-Gymnasium at Manzanar National Historic Site is part of the first internment camp for Japanese and Japanese-Americans forcibly removed from the West Coast early in World War II. The camp is a symbolic reminder that a nation of laws must honor the concept of freedom and the rights of its citizens. The Community Auditorium-Gymnasium was built by camp internees.⁵

RECOMMENDATIONS FOR DOCUMENTATION

As soon as practicable, catalogue and provide secure accessible storage of historic documents, photographs and information pertaining not only to the Auditorium but for the general history of Manzanar. Space is proposed to be included in the restored building in conjunction with the administrative activities.

⁵ This statement has been adapted from information in the List of Classified Structures data.

HISTORY

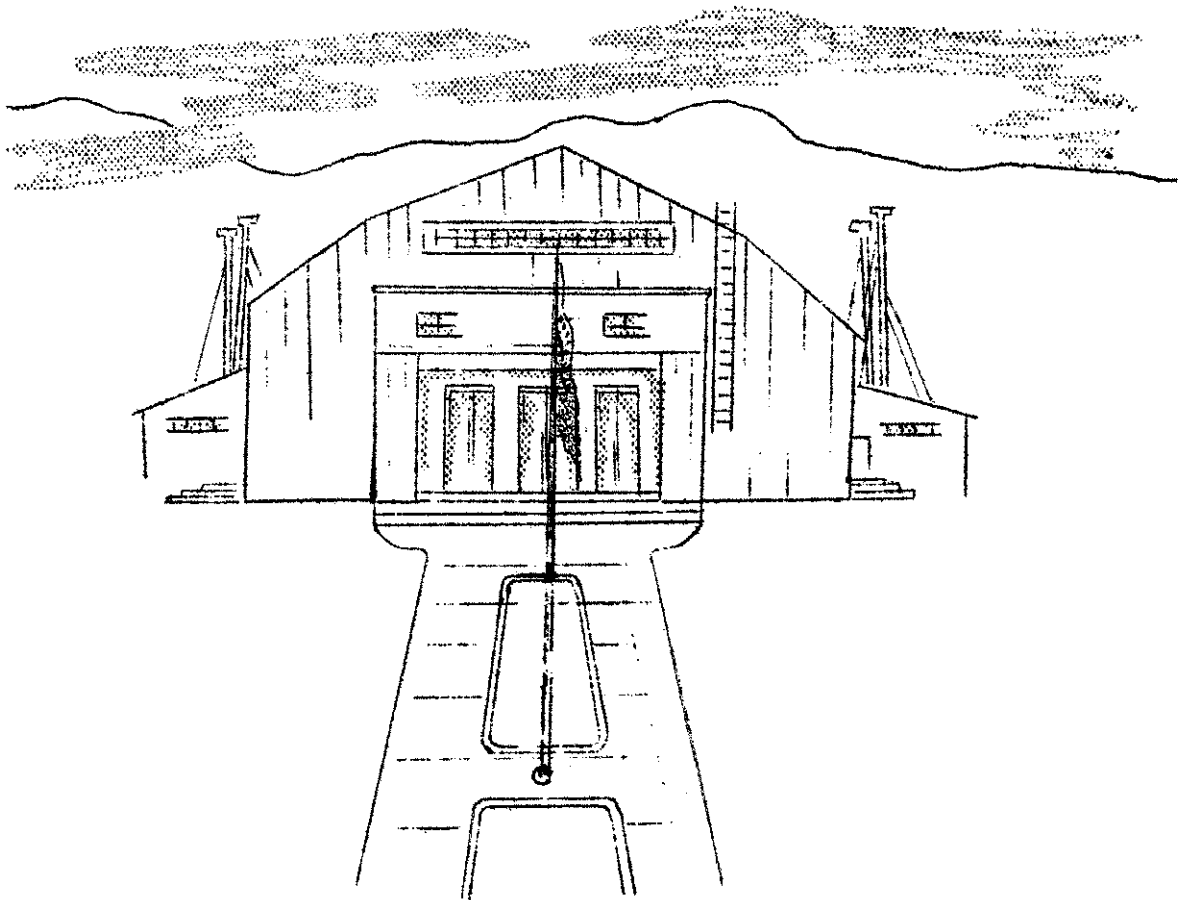
THE ONLY BUILDING CONSTRUCTED IN THE SCHOOL GROUP

THE
HISTORY
OF THE
COMMUNITY AUDITORIUM-GYMNASIUM
AT THE
MANZANAR WAR RELOCATION CENTER
IN THE
OWENS VALLEY OF CALIFORNIA

1942-1998

Senior Edition

THE SPOT



Drawing of the Front of the Auditorium-Gymnasium from the Manzanar School Yearbook
Credit: Inyo County Library, VRF, "Manzanar Camp Reports"

HISTORY

WARTIME “RELOCATION”

On the morning of December 7, 1941, naval carrier planes of the Empire of Japan attacked the U.S. Navy Base at Pearl Harbor, Oahu, Hawaii, the U.S. Army Air Corps' Hickam, Wheeler and Bellows Airfields, the Army's Schofield Barracks, and Kaneohe Naval Air Station, thus bringing the United States fully into the then already raging Second World War.⁶ The United States had many citizens who either were naturalized emigrants from, or the descendants of emigrants from, the enemy alliance or "Rome-Berlin-Tokyo Axis." There were also a substantial number of citizens of the enemy powers resident in the United States. Their legal status became immediately that of enemy aliens, subject, if the government chose to do so, either to exchange for American citizens held by the Axis powers, or internment in Department of Justice internment camps for the duration of the war. Their children and grandchildren, however, if born in the United States, had the legal status of American citizens, and many of these were young adults.

A number of citizens of Axis powers regarded suspiciously by the intelligence or law enforcement authorities indeed found themselves interned in Justice Department camps for the duration of the war, though only a small part of those who were in fact legally aliens of German or Italian or other European descent. Many from enemy European nations who were long time residents of the United States and who raised no suspicions of treasonous conduct simply continued to live quietly in the United States throughout the war, while others were refugees from the Fascist dictatorships.

The case of those of Japanese nationality and descent proved different. For various reasons stemming from various motives, a number of army officers, civilian government officials, politicians at local, statewide and federal levels of government, newspaper editors, columnists, radio commentators, and others, called for removing from the Pacific coast states not only enemy aliens of Japanese nationality (known in Japanese as Issei) but ALL of Japanese ancestry, including children and young adults who were American citizens due to having been born in the United States. This included even Japanese veterans of the U.S. Army during the First World War. The idea was to move these people into the interior of the United States where they would not pose the threat of sabotage of the war effort which some believed they might if left on the Pacific Coast. The means of implementing this involved moving these people to temporary assembly centers, then to ten new “relocation” camps built in the interior of the country, and once they were sponsored by other Americans and received job offers, to move them out of the camps to work in cities or rural areas away from the coasts. As it worked out, all of the Pacific Coast residents of Japanese ancestry moved to assembly centers and then to the ten permanent camps (permanent for the duration of the war only), but comparatively few moved either temporarily or permanently out of the camps into cities and rural areas in the interior, and once the war ended and the camps closed, many migrated back to the Pacific Coast states which had been their homes. Ironically, the entire relocation of the Japanese for reasons of security in fact was unnecessary at the time it began, an unnecessary drain on the war effort which served no useful purpose. J. Edgar Hoover, head of the Federal Bureau of Investigation, opposed it as unnecessary at the beginning, and now his reason is known. During the spring of 1941, before war broke out in the Pacific, the F.B.I. and the Office of Naval Intelligence jointly executed a "black bag job" on the Imperial Japanese Consulate in Los Angeles. Late one night, they and the Los Angeles police threw a discreet cordon around about nine city blocks in Los Angeles surrounding the Japanese consulate, turning away those who wished to enter the area with mention of a possible leak of gas or some such excuse. They had sprung from a California prison an experienced safe-cracker, and with his help broke into the Japanese consulate and into the consulate's classified documents safe. They copied

⁶ The literature on the attack on Pearl Harbor is extensive. The best reference, and the one used here, is Gordon W. Prange, *At Dawn We Slept; The Untold Story of Pearl Harbor*.

everything they found and replaced the originals as if untouched, so the consulate staff would not know what had happened. Subsequently reviewing the stolen document copies, they found a list of 450-plus Japanese intelligence agents then working on the West Coast. They also found a report that the Issei and Nisei (Japanese and Americans of Japanese ancestry) resident in the United States were not to be trusted by the Imperial Government because they had all become too Americanized, and were in fact "traitors to their culture." Therefore, the whole relocation business was unnecessary because the law enforcement authorities knew exactly who the spies were and who they weren't. It wasn't necessary to remove American citizens of Japanese ancestry (Nisei and Kibei) from the Pacific Coast states, and it wasn't necessary to remove the vast majority of Japanese enemy aliens (Issei); those Issei who were under specific suspicion due to statements they had made or actions they had taken could have been interned in Justice Department internment camps, leaving the vast majority of Issei at large.⁷ Therefore political rather than security considerations called forth the relocation program.

It is not the purpose of this study to deal with the many controversies and arguments which swirl around all aspects of the relocation of Japanese in the United States during the war. This is not a history of the war relocation endeavor or of any of the ten relocation centers. Rather this is the history of one building, the high school auditorium/gymnasium, at one of those camps, Manzanar, in the Owens Valley of eastern California.⁸

CREATION OF MANZANAR RELOCATION CENTER

Following the attack on Pearl Harbor on December 7, 1941, on December 11, 1941, the army activated the long-planned wartime Western Defense Command, established with headquarters at the Presidio of San Francisco, along with headquarters of Fourth Army. Lieutenant General John L. DeWitt commanded both. What had been the Ninth Corps Area command at the Presidio the army soon converted to the Ninth Service Command and moved its headquarters to Fort Douglas in Salt Lake City, although it still served under the command of General DeWitt at the Presidio of San Francisco. Nowhere in this military structure was there a contingent capable of handling relocation of Americans of Japanese ancestry and Japanese long-resident in the United States, although unable by law to become naturalized citizens. On March 10, 1942, therefore, under army Civil Affairs functions, General DeWitt established a civilian agency under the Army known as the Wartime Civil Control Administration to manage the rounding up and assembling of Japanese and Japanese Americans at "reception centers," mostly converted race track stables and stalls, and the creation and subsequent transfer of the Japanese and Japanese Americans to "relocation camps" to last the duration of the war. Eight days after creation of the Wartime Civil Control Administration, President Franklin Delano Roosevelt signed Executive Order No. 9102 on March 18, 1942, creating the War Relocation Authority, a civilian agency under the Office of Emergency Services (eventually it would be transferred to the Interior Department), to manage the relocation camps outside the Pacific Coast states once they had been set up, in essence to relieve the hard-pressed military establishment from having to manage the relocation for the duration of the war. (Ironically, two of the camps would be erected within California, one of the states from

⁷ Arnold Krammer, *Undue Process: The Untold Story of America's German Alien Internees* (New York: Rowman & Littlefield Publishers, Inc., 1997), pp. 31, 181-182.

⁸ For a history of Manzanar, see Harlan D. Unrau, *The Evacuation and Relocation of Persons of Japanese Ancestry during World War II: A Historical Study of the Manzanar War Relocation Center*. 2 vols. Denver: National Park Service, 1996. This constitutes what the National Park Service terms a "historic resources study." This study will be cited hereafter by the author's name and the volume and page numbers. The bibliography of this study lists a wide range of primary and secondary sources, including books by Roger Daniels and others, covering the history of the World War II "relocation" process, and the history of Manzanar, and both the National Park Service Pacific West Regional Office Historic Preservation Library and the Manzanar National Historic Site Library have a number of shelves of published works devoted to the subject.

which the Japanese and Japanese Americans were supposed to be entirely removed, a source of continuing controversy: Manzanar and Tule Lake.)

On March 21, 1942, the first advance group of Japanese Americans arrived at Manzanar to establish and begin construction of the "reception center" under the Wartime Civil Control Authority. On June 1, 1942, the Wartime Civil Control Authority transferred the camp to the War Relocation Authority, and it thus became Manzanar War Relocation Center rather than a "reception" camp.

In the spring months of 1942 the two agencies in sequence constructed Manzanar War Relocation Center, including a small military camp for military police guards, an administrative complex for the camp's paid W.R.A. staff, a large number of "barracks" for the Japanese and Japanese Americans to be interned in the camp, along with requisite mess halls, a camp hospital, warehouses, a camp power plant, and all the other infrastructure for what became, in effect, a small city, albeit one behind barbed wire and surrounded by eight sentry towers manned by military police with either shotguns or submachine guns.

THE MANZANAR HIGH SCHOOL AND ITS AUDITORIUM-GYMNASIUM

On February 6, 1943, the Manzanar camp newspaper, the *Manzanar Free Press*, reported that the War Relocation Authority headquarters had authorized construction of a high school "assembly hall" and the Public Works Division at Manzanar already had staked off the site in the firebreak between Blocks 7 and 13. Lucy Adams, head of the Community Services Department, and Shigeru Nakanishi, a draftsman in the Public Works Division, described the building. Mrs. Adams said that the "barn styled assembly hall will be used as a community assembly room and gymnasium as well as an auditorium." Glen Nakamura, chief draftsman in the public works division, added that motion pictures could also be shown in the building because it would contain a projection booth. It would also have a "regular size basketball court." Initial plans called for including a high school science laboratory, a workshop, and a "health room" in the building. Initial plans also called for an auditorium room 118 feet square, with a 30 by 22 foot stage, two dressing rooms, a storage room, two furnace rooms, a locker room, and a shower room. Enlargement of the proposed student wash room space was under consideration.⁹

Employees of the Farm Security Administration, a "New Deal" agency established by the Roosevelt Administration, had prepared the final plans for the combined auditorium-gymnasium and other buildings at Manzanar, probably around August 1942. A list of materials needed for each of the buildings, including a "Gymnasium," bore a date of August 5, 1942.¹⁰

Early in 1943 the War Production Board, in view of shortages of materials critical to the war effort, eliminated construction of new elementary and high school buildings at all ten war relocation centers, and in a report on the matter to Ralph Merritt, visiting Senior Engineers F.W. Thunberg and Education Advisor Robert E. Gibson laid out the need to remodel various barracks for use as classrooms and other school facilities. In the course of that memo, they told Merritt that

⁹ *Manzanar Free Press*, Friday, February 6, 1942; xerox copy of clipping supplied by Ross Hopkins, Superintendent, Manzanar N.H.S.

¹⁰ Senior Engineer A.M. Sandridge, Memorandum, December 7, 1944, to Project Director Ralph P. Merritt, National Archives, Washington, D.C., Record Group No. 210, Records of the War Relocation Authority, Entry No. 48, Box No. 220, Records of Relocation Centers, 1942-1946, Subject-classified General Files, Manzanar Relocation Center, Central Files, File No. 18.010 - Auditorium, hereafter cited as "NA Auditorium File."

Only a part of the high school building is to be completed[:] an auditorium, two rooms for shop, a health unit, locker rooms, showers, and storage closets. This is to be constructed in the fire break adjacent to Block 7, the block which is at the present time being utilized for high school classrooms.¹¹

This suggested that the initial conception was for a group of high school buildings which included an auditorium, a plan abandoned due to wartime shortages of construction materials.

BUILDING THE AUDITORIUM

The issue of the *Manzanar Free Press* published on Wednesday, January 5, 1944 reported that the Public Works Division of the Manzanar Relocation Center had announced that construction of the "long anticipated combined auditorium-gymnasium" at Manzanar would commence early that month. The newspaper described the proposed building as 118 feet square, with a seating capacity of 1,200 people. It would be erected in the fire break between Blocks 7 and 13 "facing the upper end" of the camp, or in other words, facing west to "B" Street. It would feature a 22 by 40 foot stage and a fireproof projection room for motion picture equipment. Its uses would include lectures, dances, and social gatherings. The Douglas fir floor in the main interior space would be large enough to accommodate one 80 by 96-foot basketball court. Wings on each side would house rest rooms, lavatories, and lockers. The building would be heated by an oil-fired forced draft furnace.¹²

LAYING A CORNERSTONE

Subsequently, Mrs. Lucy Adams, assistant project director in charge of Community management, chaired and organized a committee to arrange a cornerstone-laying ceremony, scheduled initially for Saturday, February 12, 1944. Following tradition in such activities, the committee planned to place a sealed metal box inside a concrete block that would be part of the building. It would contain copies of speeches by project director Ralph Merritt and the chairman of the Block Managers Assembly, Kiyoharu Anzei, one or more copies of the school newspaper and the *Free Press*, and a list of the high school student body. The ceremony itself would include numbers by the community band and the school chorus, a flag-raising ceremony at a flagpole to be erected in front of the site of the new building, and the aforementioned speeches by Merritt and Anzei. Mrs. Adams told the *Free Press* that she would also appoint a committee of representatives from the Community Activities Division, the Education Department, Cooperative Enterprises, and the Community Welfare Division to govern the uses of the auditorium-gymnasium after its completion.¹³

Prematurely, as it would turn out, the *Manzanar Free Press* reported in its issue for Saturday, February 12, that the cornerstone-laying ceremony that afternoon would initiate construction of the \$15,000 auditorium-gymnasium under the supervision of construction superintendent O.E. Sisler with direct supervision under

¹¹ F.W. Thunberg and Robert E. Gibson, Memorandum, "Report of building requirements at Manzanar Relocation Center," April 22, 1943, to Ralph Merritt. Xerox copy from the National Archives in the history files of the Pacific Great Basin Support Office, San Francisco. A historian with the Historic American Buildings Survey team working on Manzanar supplied this memorandum to the author, but without the identification of the box or file in the National Archives, although the memorandum may have been from Manzanar Central Files under a subject heading for construction with the file number 43.500.

¹² *Manzanar Free Press*, Vol. V, No. 2, Wednesday, Jan. 5, 1944, p. 1, cols. 1 and 2.

¹³ *Manzanar Free Press*, Vol. 5, No. 12, Wednesday, February 9, 1944, p. 1, col. 1.

J.W. Lawing assisted by K. Kunishige. The only problem was that a winter storm blew in either overnight or that morning, forcing postponement for a week of the ceremony the newspaper had described. More important, the paper revealed that construction of forms for the concrete footings had already begun under a foreman named I. Sakata some time during the week of February 6. Furthermore, later in a progress report on construction at Manzanar, Project Director Ralph Merritt claimed that construction activity had begun on January 28, 1944. Other outside carpenter crews would be assigned as work progressed on the wood-frame building. The Engineering Division planned to have mill work for the door jams, window casings, and interior finishes prepared in the carpenter shop at Warehouse 34 by Jim Araki and his crew. R.D. Feil and a camp electrical crew would do all the electrical wiring and other work. K. Bowker and his plumbing crew would install all the plumbing and the hot water system. J. Nakahama and his paint crew would do all the painting and interior decorating.¹⁴

The resurrected cornerstone ceremony began at 2 p.m. on Saturday, February 19, 1944, with a cold wind blowing down from the icy Sierra Nevada, before an audience of about 300 "in the firebreak 7-12." Merritt gave a speech amounting to a little over two single space typed pages. He said the building for which they were laying the cornerstone would "become the family living room for all the members of our Manzanar community." Herein, according to Merritt, children would gather for school classes and in the evening for plays and parties. Older people would gather in the auditorium "to consider the welfare of the community." People of all ages would come for lectures and motion pictures. "In truth it will not only be the living room but the family fireside where hopes and plans will be built for the future and where day by day living in harmony and helpfulness will be practices."

Merritt referred to the box to be placed in concrete containing records of the day the building was begun for "men of the future to read."

At some time, when the temporary wooden housing of this Manzanar has gone, as the houses and church and school of another Manzanar that once stood here have long since gone, then in that future day when the box in this corner stone is opened men will read of this strange war time community where men and women and children faced the greatest problems of life and each gave his answer according to his own heart.

Merritt's intention for the rest of his speech had been sabotaged by the storm-inflicted delay, for originally it had been scheduled for Lincoln's Birthday, so for the remainder of his speech Merritt described the man and quoted the words of Abraham Lincoln. He chose not to rewrite his speech, but gave it as he would have on Lincoln's Birthday. With assistant project director Lucy Adams as Mistress of Ceremonies, Kiyoharu Anzai spoke after Merritt, the substance of his comments not reported in the newspaper. The Manzanar Community Band provided appropriate music, and high school student body president George Nishimura led a flag-raising ceremony. Merritt and others expected completion of the auditorium in three months, in time to be used for high school graduation ceremonies.¹⁵

¹⁴ *Manzanar Free Press*, Vol. 5, No. 12, Wednesday, February 9, 1944, p. 1, col. 1; Ralph Merritt's office diary, kept for him by his secretary, entry for Sat., Feb. 12, 1944, Collection No. 122, Manzanar Collection, Box 47, Folder 1, Special Collections, University Research Library, University of California at Los Angeles: hereafter cited as "Merritt's office diary," and the date. A.M. Sandridge, Senior Engineer, Manzanar War Relocation Center, February 7, 1944, to the Free Press, Attn. Roy M. Takeno, NR Auditorium File.

¹⁵ *Manzanar Free Press*, Vol. 5, No. 16, Wednesday, February 23, 1944, p. 1, columns 1 and 2; Merritt's office diary, Sat. Feb. 19, 1944, "Address for Laying of Corner Stone, Manzanar Auditorium," by Ralph P. Merritt, attached to diary entry. The cornerstone later was looted of all its contents by a party or parties unknown. The broken cornerstone has been found in several pieces some distance north of the auditorium.

“MINOR” CHANGES

While not all of the correspondence has survived, apparently Assistant Project Director Lucy Adams appointed a Community Auditorium Committee to review plans for the building, possibly in a memorandum dated February 23 but no longer in the "Auditorium" file. Lee C. Poole served as chairman, with Dr. Carter, Mr. Nielsen, Mr. Fox, Mr. Murakami, Mr. Anzai, Mr. Nakano, Mr. Enseki, and Mr. Kohigashi as members. The committee met three times during the week of February 28, and on March 8, 1944, Poole sent a four and a half page typed memorandum to Mrs. Adams detailing suggested changes in the plans for the building, as well as lists of proposed stage furnishings and even stage paint, makeup, cosmetics, music racks, and the like. With regard to the structure itself, the committee made a number of suggestions, keyed to blueprints which apparently no longer exist:

I. Minor structural changes:

Since the high school gym [sic] classes are estimated to be about 75 students per class-hour for both boys and girls, it is observed that the locker room and dressing room facilities are much too crowded for practical purposes. The committee, therefore, recommends that the present storage facilities, Number 1 and Number 4 on Blue Print in MA-X816, be incorporated as part of the dressing room--locker room facilities and that the present Health Unit be used for storage capacity until such time as the Health clinic will be organized.

It is recommended that the Health Unit be equipped with a lavatory and toilet.

It is recommended that a dutch door be cut in the present wall dividing the storage room from the locker rooms and that the walls of the present storage room be shelved so as to make some 500 "open wall lockers". It is estimated that this will require 2000 Bd. ft. of lumber. It is proposed that a responsible student be put in charge each period to check in and out the baskets for students.

It is recommended that the space set aside for equipment and coach be reversed so that the students will not pass through the equipment room to see the coach.

It is recommended that the janitors' closets be removed from the toilet room and be placed in the corner of the storage rooms, Number 2 and 3 respectively, of the above named Blue Print in order to allow for the cutting of one door between the shower and toilet rooms. The cutting of this door will require putting the water closets on the opposite side of the room as they are now drawn. That the 7' x 40'6" x 21' area beneath the stage be floored and finished well enough that it might be used for additional storage space as may be required.

It is recommended that there be constructed beneath the mirrors of the dressing room and full length of the dressing room, an 18 inch shelf to be used as a makeup table. Also, above the mirrors it is recommended that an 18 inch shelf be constructed to be used for storing small properties and changes during productions

It is recommended that there be provided 1280 sq. ft. of screen wire, 1/2 inch mesh, to protect the windows from basketballs.

It is further recommended that two basketball backstops be constructed so that they will swing against the ceiling when not in use.

It is recommended that the projection room be fire proofed as required by Manual Release 40.4.6 J.

II. Wiring:

It is recommended that there be 20 ft. of footlights wired for three circuits; that there be two borders 20 ft. long wired for three colors, and set for lights every 4 inches.

There should also be four plugs set in the stage and four different positions as well as four 3-way outlets at the front of the stage and just above the floor to provide lights for orchestra playing for stage performances.

The present dressing rooms should have one light to every 2 ft. above the makeup mirrors.

III. Furniture and Equipment:

It is recommended that the seating be provided by the construction of two hundred ten (210) backless benches, 10 ft. long, 11 in. seat width, and 16 in. high. This size bench range 26 in. back to back to accommodate fifteen hundred (1500) people.

There should be built six 3 ft. racks joined by a pole for hanging clothes, three of which should be placed in each of the dressing rooms.

There should be an equivalent of 20 sq. ft. of mirrors for each dressing room approximately 2 ft. x 10 ft.

For stage productions, there should be one porch set consisting of a settee and four chairs.

IV. Equipment for Stage and Stage Productions:

There should be one front pull curtain as of [sic: should read "of as"] heavy material as is practical and arranged to push to both sides and clear the stage.

Immediately back of the front pull curtain there should be a header curtain approximately 5 ft. x 60 ft. This header should be of the same material as front pull curtain.

There should be a complete back pull curtain. It is suggested that this be of monks cloth and of some neutral color, size 14 ft. x 60 ft.

There should be four wing curtains 6 ft. x 14 feet. These may also be of monks cloth.

There should be two side curtains approximately 14 ft. x 18' also monks cloth with two additional strips 6 ft. x 14 ft. to make possible door and window openings on the stage setting, and three monks cloth headers approximately 5 ft. x 60 ft. to shield the overhead borderlights.

There should be one smooth drop curtain which could be rolled up to hang back stage and may be of muslin, color preferred sky blue.

V. Other Stage Settings:

There should be seven wood wings approximately 6 ft. x 14 ft. made of plywood or celotex.

There should be a picket fence of three 30" x 9' sections and one gate. There should be 38 stage braces made in the form of an "L" 6" x 1'.

There should be following pieces in an Interior Set:

Six pieces 6 ft. x 14 ft.; one piece to have a door opening, and one piece to have a window opening.

Three pieces 9 ft. x 14 ft.; one piece to have a double door opening, and one piece to have a window opening.

VI. Other Supplies and Stage productions:

One gallon of silver and gold type paint [probably meaning one gallon of each color] to be used for scenery and costumes.

Seven bolts of sateen in black, red, blue, green, yellow, gray and white. Seven bolts of cambric in the same colors.

Fifteen music racks with lights. It is suggested that the light shades, in this case, could be made out of tin cans.

It is further suggested that a stock of cosmetics and artists' makeup materials be purchased, such as crepe hair in gray, brown, black and white; face glue, one pound nose putty; grease paint; lipsticks; eye brow pencils; mascara; 10 pounds of cold cream; various colored makeup powders; and one bat of white wool for wigs (substitute, cotton).

VII. The following is the Estimated Costs of the above:

Benches 210, 10'x11"x16", @ 5.50	1155.00
Electrical wiring, floor plugs, footlights, border lights, dressing room lights, etc.	100.00
Curtain and Back drops:	
Monks cloth,	
Back curtain, 60' x 14'	
4 wing curtains, 6' x 14'	
2 side curtains, 18' x 14'	
2 " door or window drops 6' x 6'	
3 headers, 5' x 60'	
880 yds. @ .80	704.00
Muslin	
Back drop curtain, 14' x 40' , 187 yds. @ .20	37.40
Music Racks, 15 @ 3.00	45.00
Sateen, 7 colors, 210 yds., @ .35	73.50
Cambric, 7 colors , 210 yds., @ .35	73.50
Screen wire (Windows), 1280 sq. ft., @ .08	102.40
Lockers, 2000 bd. ft. @ 112.50	225.00
Stage Braces, 76 Bd. Ft. M, (1" x 6") , R.W. @ 120 M	8.25
Celotex; 7 wood wings, Interior set, 1500 sq. ft. @ .05	75.00
Fence 20 Bd. Ft. M, 1" x 4" , @ \$120	2.40
Shelving 80 Bd. ft. M (Dressing Room), 1" x 6" , @ 120 M	9.60
Mirrors , 40 sq. ft., @ \$1.60 sq. ft.	64.00
Clothes Hanger racks, 5' x 3', 14 Bd. Ft. M., 2" x 4" @\$70 M	.98

HISTORY

Porch and Interior Furniture set for Stage	50.00
Paint - Silver, gold, neutral, 5 gallons	15.00
Cosmetics	<u>25.00</u>
Estimated Total Amount	\$2766.00 ¹⁶

It is evident from the language in this memorandum that at least one and perhaps more members of the committee were, before the war, professionals in the theater arts. Unfortunately, nothing survives in the file to indicate which of the foregoing recommendations were followed, although the evidence of photographs suggests that many of them were followed.

On April 10, 1944, a draughtsman drew up a "Ceiling Plan" for the auditorium, which showed a plan of the ceiling framing, a section through the building showing a ceiling truss, and details of the end of a truss and the eave. This was the fifth of five sheets, whether all done on that same date or not being unknown, the others not having survived. Whether or not this plan was a part of the response to the March recommendations remains a matter for speculation.¹⁷

PROGRESS

On June 13, 1944, Manzanar Project Director Ralph Merritt reported to Director Dillon S. Myer on various construction projects, and in that letter said:

High School Auditorium – This project was started January 28, 1944. Construction was slowed considerably for the first month due to bad weather. After that date the construction progressed very nicely until April when due to relocation and seasonal leave, we lost a large number of our skilled employees. Finally by concentrating most of our skilled labor on this particular building we have completed enough to permit the commencement exercises on June 15. A great deal of finish carpenter work and installation of heating units and hot air ducts as well as painting and landscaping will be completed after graduation exercises are over. we expect to complete the entire building by August 1.¹⁸

That same day, in anticipation of its initial use, Merritt issued 11 regulations governing public assemblies in the "Manzanar Community Auditorium:"

The following safety regulations governing the use of the Manzanar Community Auditorium are hereby issued and are in full force:

- (1) Audiences in the gymnasium [auditorium] are to be limited to a maximum of 1280 persons.
- (2) standing in aisles and exits is prohibited.
- (3) The following aisles are to be maintained:
 - One six-foot center aisle from the front doors to the stage.
 - One six-foot center cross aisle between center side exits.
 - Side aisles are to be four feet wide.

¹⁶ Lee C. Poole, Memorandum, "Report of the Community Auditorium Committee, March 8, 1944, to Mrs. Lucy Adams, Assistant Project Director, Community Management Division, NR Auditorium File.

¹⁷ Record Group 210, Records of the War Relocation Authority, Entry No. 48, Box No. 220, File No. 18.010, National Archives.

¹⁸ National Archives, Record Group No. 210, Entry 16, Box 315, War Relocation Authority Headquarters Subject-Classified General Files, November 1942-December 1944, File No. 43.503#1 (Unrau research files, Manzanar NHS).

- (4) All exit doors must be unlocked during the time the audience is in the building. Corridors to exit doors must be kept free of obstructions and well lighted at all times, while building is occupied by an audience.
- (5) Decorations made of flammable materials must be kept to a minimum. Approval of decorations must be obtained from the Fire Protection Officer.
- (6) Smoking is prohibited during public assembly.
- (7) All assemblies must be under responsible supervision.
- (8) Competent operators of heating and lighting equipment must be in attendance.
- (9) Rows of seats shall be spaced so that not less than 27 inches is obtained from the front of one row to the front of the next.
- (10) A permit from the Fire Department must be obtained 24 hours in advance of each use. The use of the auditorium shall be subject to regulations prescribed by the Fire Protection Officer.
- (11) All WRA regulations pertaining to the fire safety of persons and property must be observed.¹⁹

These regulations primarily focused on safety, especially fire safety, and did not cover all aspects of management of the auditorium; further regulations would prove necessary.

A PROGRAM FOR THE OPENING

While construction of the auditorium/gymnasium crawled towards completion, the high school music teacher sat down and began composing an operetta, entitled "Loud and Clear," which Superintendent of Education Genevieve W. Carter announced on June 3 would be the first program to be given in the new building. A matinee performance of the operetta at 2 p.m. on June 15 "For the benefit of smaller children" actually would be the first use of the building, but the formal presentation of the operetta at 8:15 p.m. on Friday, June 16, 1944, would constitute the actual dedicatory performance in the building. Project Director Ralph Merritt again would speak briefly prior to the performance to inaugurate its use. Tickets for the operetta went on sale about June 10th: five cents apiece for the kiddie matinee, 25 cents for evacuees, 50 cents for others. Whether "others" included camp staff, or they got in free, remained unclear.²⁰

The story line of the operetta focused on the student body of a fictional college that faced closure due to lack of funds. The students set out to find a solution to the problem, which led to "many a laugh" as well as much heartache, but they refused to give up until finally they saved the college. Those playing characters in the operetta included Karie Shindo, Kow Maruki, Harry Tashima, Lillian Uyemura, Tsugi Sakata, Kazuko Nagai, Lillian Wakatsuki, Kiyomi Okazaki, Tommy Uyeda, Suzanne Anzai, and Noboru Yamazaki. The "Winston Chorus" of 36 singers (the Manzanar High School choir) contributed to the 19 musical numbers performed by the cast and the camp orchestra. Music instructor Frizzell had written all the scores.²¹

At the last minute, the performance nearly failed to take place. Apparently the camp administration had advertised it far and wide, bringing people in from all over the Owens Valley, including Bishop, Big Pine, Independence, and Lone Pine, some to have dinner in the Administrative Mess Hall prior to the performance. In the auditorium, meanwhile, a section of seats had been roped off for use by the parents of the performers.

¹⁹ From the Ralph Merritt Collection, Special Collections, University Research Library, University of California at Los Angeles.

²⁰ *Manzanar Free Press*, Vol. 5, No. 45, Saturday, June 3, 1944, p. 1, col. 3; Vol. 5, No. 47, Saturday, June 10, 1944, p. 1, col. 3.

²¹ *Ibid.*, Vol. 5, No. 47, Saturday, June 10, 1944, p. 1, col. 3; Vol. 5, No. 49, Saturday, June 17, 1944, p. 1, col. 2.

Faced with an influx of valley residents, camp administration decided to use this section of seats for the Caucasian visitors from outside the camp. When the performers and singers learned that, they staged an instant strike. They were not going to perform unless those seats were used for their parents. Louis Frizzell, probably on the verge of tears after all the work he had put in writing and composing the music for the operetta and directing and conducting it through numerous rehearsals, pleaded with his student performers as a personal favor to him to go ahead and present the operetta, and reluctantly, they did.²²

A GRADUATION CEREMONY

Two days later, Sunday evening June 18, 1944, an audience estimated at between 1100 and 1200 camp residents and staff attended the high school graduation ceremonies for 177 students clad in traditional caps and gowns in the new auditorium. Project Director Ralph Merritt presided, while Camp Superintendent of Education Genevieve Carter handed out the diplomas. Assistant Project Director Lucy Adams greeted the class of 1944, and introduced the commencement speaker, Dr. Cecil Dunn, professor of economics at Occidental College, who spoke on "Peace and our Responsibilities." Haruko Uyeda and Arnold T. Mayeda spoke for the graduating class. The Manzanar High School Parent Teacher's Association hosted a reception for the graduating class in Mess Hall 7 following the commencement exercises.²³

Subsequently, high school principal Rollin C. Fox chaired the committee assigned to apportion uses of the new auditorium/gymnasium. Other members included Dr. Genevieve Carter, superintendent of education, Joe Kohigashi representing Community Activities, fire chief Frank Hon, Koichi Masanuka representing Consumer Enterprises, Aksel Nielsen, also of Community Activities, and Frank Yasuda representing Town Hall. The committee decided that events planned by camp administration had the highest priority and preempted anything else scheduled to take place in the building. Otherwise, high school physical education classes, assemblies, and "other such activities" had use of the building on week days from 8 a.m. to 5 p.m. and on Saturday mornings. On Monday, Tuesday, Wednesday and Thursday evenings and on Saturday afternoons, the Community Activities Division could make use of the building. Saturday evenings and all day Sundays, Consumer Enterprises had use of the auditorium. Others who needed to use the building were to contact Principal Fox or other members of the committee, filling out a formal application for such use.²⁴

A MEMORIAL SERVICE

During the war, young Nisei men entered the armed services for combat in Europe against German and Italian forces, and before long, many of them had become casualties. This led to memorial services being held in the Auditorium, as Manzanar Acting Project Attorney Kent Silverthorne reported on Monday, August 14, 1944, apparently regarding a ceremony held in the auditorium the previous day

²² Merritt's office diary, Friday, June 16, 1944.

²³ *Manzanar Free Press*, Vol. 5, No. 49, Saturday, June 17, 1944, p. 1, cols. 1 and 2; Vol. 5, No. 50, June 21, 1944, p. 1, cols. 1 and 2. There are discrepancies between these two articles. The article before the event described Rollin C. Fox, the school principal, as superintendent of education, and Genevieve Carter representing the Parent Teacher Association along with Howard K. Murakami; the article after the event described Genevieve Carter as the superintendent of education. Harlan D. Unrau, *The Evacuation and Relocation of Persons of Japanese Ancestry during World War II: A Historical Study of the Manzanar War Relocation Center*, Vol. Two, p. 545, identified Rollin C. Fox as the second principal of the Manzanar High School, serving from 1943 until 1945, and on p. 547 identified Genevieve Carter as the Superintendent of Education.

²⁴ *Manzanar Free Press*, Vol. 6, No. 28, Saturday, September 30, 1944, p. 1, col. 5.

Sunday afternoon I attended the most impressive and moving memorial service I have ever experienced. The new auditorium, appropriately enough, was used for the first time to hold memorial services for Pfc. Frank Arikawa, a Nisei soldier who was killed in Italy on July 6. His parents have two other sons in the army. I had rather expected that they would be bitter over their loss, but on the contrary, they are proud that their son has given his life for his country.

On the surface the services were ordinary enough, but the implications were extremely dramatic. Many who wept, I am sure, wept not so much for Pfc. Arikawa as for those who under such strange and anomalous circumstances were gathered to pay him tribute.

First a squad of soldiers performed the ceremony of placing the flag at half-mast to the accompaniment of the Star Spangled Banner--a stirring ceremony under any circumstances. It tightened one's throat to see how meticulously Nisei and Issei held hat or hand over their hearts as the National Anthem was being played. (No, Mr. Hearst, I didn't see any fingers crossed.) Then the services in the auditorium were begun before a large audience. The platform was filled with speakers, not the least conspicuous of whom, was our Property Officer, Mr. Bromley, dressed in the full regalia of a Commander of the American Legion. The parents of Frank Arikawa are Buddhists but their children are Christians, so they insisted upon having Japanese Christian Ministers officiate. The fact that their prayers were rendered in broken, barely understandable English, certainly did nothing to detract from their significance. Christian hymns were sung--not too lustily, since fully three fourths of the audience was composed of Issei Buddhists. Mr. Merritt gave a splendid talk which I thought exceptionally honest and courageous. Mr. Bromley made a few appropriate remarks and read an original poem which was worthy of a Rupert [illegible]...²⁵ Mrs. Adams' tribute was especially effective because she addressed her remarks directly to the members of the Arikawa family who sat in the front row throughout the services.

The rest of the speakers were evacuees, Issei and Nisei. One Nisei boy gave a particularly fine talk; his thesis being that in spite of evacuation, in spite of the barbed wire, this is still the best country of all. The contrast between this and the Issei speakers who respectfully bowed to the chairman and then to the picture of the dead boy before speaking, or reading Japanese poems, was like something in a mixed up dream.²⁶

Clearly, the memorial service in the Auditorium had been a very moving ceremony.

On August 10, 1944, the chairman of the Auditorium Committee sent a memorandum to Camp Senior Engineer A.M. Sandridge reporting complaints that the entrance to the auditorium had insufficient lighting. The committee asked Sandridge to have lights installed above the main entrance, high enough so that the light bulbs could not be easily reached and stolen.²⁷

²⁵ The poet referred to probably was Rupert Brooke, an English poet killed in 1915 in the First World War in Europe. The author is indebted to NPS Historian Harry Butowsky of the Washington office for assistance in arriving at this conclusion.

²⁶ Quoted in a memorandum from Edwin E. Ferguson, August 23, 1944, to The Director (Dillon S. Myer) and Merrill Tozier. National Archives, Record Group No. 210, Records of the War Relocation Authority, Entry 20, Box 31, File: Manzanar Relocation Center, August 1944. Copy in Unrau research files, Manzanar N.H.S.

²⁷ Memorandum, Lee C. Poole, Chairman, Community Auditorium Committee, August 10, 1944, to Senior Engineer A.M. Sandridge, NA Auditorium File.

APPROPRIATE USES

The question of what uses of the auditorium were appropriate and which were not became more of an issue late in the summer of 1944. At a meeting of the Auditorium Committee on September 15, in which high school principal Rollin C. Fox replaced Lee Poole as the committee chairman because the latter had left Manzanar for a position elsewhere, the committee discussed progress in finishing the floor, which suggests that it had not been finished at the time the Auditorium went into use in June, and they also discussed the hanging of the curtains and draperies, and the placement of necessary signs in the building. The draperies and curtains had yet to be fireproofed--suggesting that it consisted of treatment of the cloth with a fire retardant chemical. The Co-op representative, Mr. Sugimoto, announced their intention to shorten the black out curtains so that they would terminate just short of the ledge below the windows; as it stood, they were too long. Then Fox read a letter that his predecessor, Poole, had sent to Merritt, which Merritt had returned to Poole with a notation, "Basketball out because floor is not able to stand it." The committee decided to raise the issue in a memorandum to Merritt as to precisely what activities should be permissible and what activities should not. In the meantime, the committee approved letting the College Relocation Committee use the auditorium for a dance on September 23 "if the auditorium were ready to be used . . ." ²⁸

On September 20, 1944, Committee Chairman Fox sent a memorandum to Merritt regarding use of the auditorium in which he said that the committee believed that Merritt's statement that the floor in the building would not accommodate basketball opened up the whole question of what activities would be permissible if the floor was to survive. (The committee wondered, incidentally, since to the best of their knowledge the building followed the standard plan for combined auditorium-gymnasiums and similar buildings at other camps which were indeed used for athletic activities, why the Manzanar auditorium could not be so used.) If the floor could not support basketball, the committee members mused, then it probably could not support volleyball, tumbling, boxing, fencing, badminton, wrestling, "rhythms," whatever that entailed, and calisthenics. The committee did believe permissible activities included social dancing, musicals, motion pictures, bazaars, assemblies, plays, singing activities, exhibits, lectures, and memorial services. In other words, if Merritt were correct about the inability of the floor in the building to accommodate the pounding it would get in a basketball game, it probably could not accommodate almost any other sports activity either. As built, it appeared that the "auditorium-gymnasium" was in fact only an auditorium. The committee went on to approve the serving of buffet refreshments such as punch and cookies and sandwiches in the building, but recommended against using the building for banquets and dinners due to the lack of serving facilities. ²⁹

COMPLETION OF THE AUDITORIUM/GYMNASIUM

Almost incidentally, Fox indicated that the auditorium was expected to be ready for general use "next Monday," which would be September 25, 1944, which probably should be considered the real date of the opening of the building, rather than June 16 or even June 15. ³⁰

FURTHER CONCERN REGARDING PROPER USES

²⁸ Minutes of Auditorium Committee meeting, September 15, 1944, NA Auditorium File.

²⁹ Rollin C. Fox, memorandum, September 20, 1944, to Project Director Merritt regarding use of the auditorium, NA Auditorium File.

³⁰ Ibid.

Responding the day after Fox wrote him, Ralph Merritt approved the uses the Auditorium Committee suggested, as well as permitting buffet snacks but not banquets or dinners, since such facilities were available in the mess halls, and answering a minor concern of the committee, agreed that kendo and judo groups not use the auditorium, as they already had suitable space elsewhere in the camp.

Regarding athletic uses of the building as a gymnasium, Merritt wrote:

I would also approve of tumbling, boxing, fencing, and wrestling if conducted on the usual mats, and badminton and setting-up exercises. I do not want to refuse the use of the auditorium for any proper purposes and my purpose is only to try to protect the building for the greatest use over the longest time for the largest number of people. The point is that the floor is constructed of wood nailed into place and any rhythmic or other jumping on the floor will loosen the nails and thereby destroy the usefulness of the building for many purposes. If calisthenics does not involve the jumping up and down on the floor that will loosen these nails they should not be prohibited, otherwise common sense should be applied and that portion which has to do with the destruction of the floor should not be permitted.

It is for this reason that basketball and volley ball must be prohibited even though the area of the building was made to conform to basketball court requirements.

Thus the auditorium would fulfill only partially its dual role as a high school gymnasium.³¹

Implementing Merritt's decisions, the Auditorium Committee issued on October 27, 1944, two mimeographed pages of regulations regarding the use of the Manzanar auditorium. It required every organization seeking such use to file a formal application on Form No. 1021A, obtainable in the high school office in Building 1-13-4. The regulations stated that when a function could be held successfully in an unused mess hall or some other building at Manzanar, use of the auditorium was not to be requested.

Standard use including the high school having the building Monday through Friday from 8 a.m. to 5:30 p.m., Friday evening, and Saturday mornings. The Community Activities Section had use of the building Monday through Thursday evenings and Saturday afternoons. The Cooperative had the use of the building on Saturday evenings and Sunday afternoons and evenings. Other organizations wanting to use the building had to clear such use with the sections assigned use by the above schedule in order to reserve any particular date. The regulations went on to say:

The auditorium may be used for such events as are sponsored by and approved by project administration, the Education Department, Community Activities, and Consumer Enterprises, and by such other organizations and groups as are sponsored by the project administration, and by community service groups and organizations. The use of the building by clubs, the purpose of which is primarily social or athletic in nature, or for private parties or private activities, will not be granted.

The regulations allowed only light refreshments to be served in the building, in order "to protect the building, floor, and the equipment from being soiled or damaged by spilled soft drinks or food items difficult to clean up."

³¹ Ralph P. Merritt, Project Director, Memorandum, September 21, 1944, to Chairman R.C. Fox of the Auditorium Committee, NA Auditorium File.

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If a function were likely to fill the auditorium, admission would be by ticket in order to control the number admitted so as not to exceed the building's capacity of 1280 seats. Organizations using the building could arrange seating as they wished, but had to replace everything as they had found it. The custodian would unlock the building when the person in charge of a function arrived, and not earlier. The organization using the building was responsible for informing Internal Security of their function in advance, two days in advance if a security detail was needed during the function to keep order.

The regulations established maximum prices to be charged for various functions: 25 cents per couple for dances, 15 cents per single person; 25 cents per individual for plays, musicals, short events, and other similar events; there would be no charge for motion pictures other than the charge by Community Enterprises. The committee, of course, could make exceptions to these charges if it so wished. Oddly enough, Federal tax of 20 per cent had to be paid on all admission fees, a wartime measure, and the regulations contained a chart of the tax due for a range of fees. Taxes for the regularly assigned uses would be paid by the responsible section, but other organizations had to remit directly to the Collector of Internal Revenue in San Francisco.³²

Early in November, 1944, the Manzanar administration attempted to purchase a piano for use in the auditorium, but ran into some sort of budget or procurement problem. Merritt wondered if one might be rented, if the Camp could not obtain permission to purchase one. As with other questions raised in correspondence, the outcome is unknown, but photos by Toyo Miyatake of events in the auditorium show a piano.³³

A QUESTION OF STRUCTURAL INTEGRITY

Around the same time Manzanar administration received two troubling letters from C.G. "Gail" Showalter, one dated October 10, 1942 but the year was believed to be a typographical error for 1944, and another dated October 17, 1944, in which this Showalter, a former employee of the camp, claimed to have sent "rough drawings," dimensions, and a thorough description of the auditorium to some civil engineer of his acquaintance overseas, apparently in the armed forces, in response to which the unnamed engineer apparently concluded that due to the omission of diagonal sheathing on the roof of the auditorium that the building was structurally weak and in danger of collapse. Furthermore, Showalter alleged that horizontal diagonal bracing and vertical diagonal bracing shown in detail on plan No. 26 5A had been omitted.

Showalter's letters raised issues important enough to warrant quoting them in their entirety. Showalter wrote first on October 10 from Lone Pine to A.M. Sandridge:

Dear Sandy:

As you know, I quit the job at Manzanar on June 10th[;] now I'll explain why,[;] as yet, this letter is between you and me and hope you can do something about it.

I was very much dissatisfied and disappointed [sic] when many structural points were changed in the auditorium but at the time could do nothing about it as only one man could be heard, so, after I quit I sent all the information on this building to a friend of mine, who is in the service, and is an

³² "Conditions Pertaining to Use of the Manzanar Auditorium," October 27, 1944, NA Auditorium File; Rollin C. Fox, [Minutes of the] Auditorium Committee Meeting, October 27, 1944, NA Auditorium File.

³³ Memorandum, Ralph P. Merritt to Edwin H. Hooper, November 6, 1944, NA Auditorium File; photos by Toyo Miyatake, Miyatake Studio, in the Pacific Great Basin Support Office library.

expert on figuring jobs of this kind,[;] this man is a structural engineer and holds licenses for all of Calif.

This is what he says, (I sent rough drawings, dimensions, and a thorough discription [sic].) "The substitutions you spoke of, particularly the elemination [sic] of the diagonal sheathing, makes the resistance to wind or earthquake loading practically non-existent. Figured the walls (20 ft high) of the main auditorium as the principal shear walls, this had to be so since there was no way to get the shear down into the walls of the low side sheds. This again would require the roof to be diagonally sheathed in order to carry your wind or earthquake loads into your main auditorium walls.

["]This, as you say, elimination of the roof and main auditorium wall diagonal sheathing absolutely messed the building up from a structural standpoint. Throwing additional vertical load (ceiling at plate level) on the trusses also overloads the frame from a standpoint of vertical loads. As the building now stands it is very poorly constructed for both vertical and horizontal loads, it sure is a mess. Diagonal sheathing on the outside shed walls has very little value on the whole structure and acts more or less very locally.

Showalter went on to claim "considerable field engineering experience" and wrote "it is my opinion that the building in question could fail structurally at any time . . ."³⁴

Sandridge did not answer Showalter promptly, if at all, and when by October 17 he had received no response, Showalter wrote directly to Ralph Merritt:

On June 10, 1944, I resigned my position as carpenter at Manzanar because I had become disgusted at the many vital structural changes made in the auditorium (under construction then) in direct violation of the original plans and having had some engineering experience along these lines, realized that this building could fail structurally at any time. So, in order to verify my suspicious, after leaving youre [sic] employ, I sent sketches and a thorough description of the changes and omissions to a very competent structural engineer who is now in the service so took some time to reach him as he was overseas, that is why this letter has been delayed,[.] I realize this should have been reported much sooner to someone who could do something about it."

Showalter told Merritt that he had written Mr. Sandridge but received no acknowledgement, and continued:

You might ask Mr Sandridge or Mr Sisler why diagonal roof sheathing shown in the original plans was laid vertical on the existing building also why all lateral bracing was left out and why diagonal sheathing on main auditorium walls was left out and horizontal siding substituted. The enclosed copy of the Engineers report will explain the importance of these structural points. This condition has given me some worry as I feel that the building is unfit for human occupancy.

I would suggest that you have a California licensed structural engineer check this building against the original plans. Calif engineers really have to know their business to be licensed.³⁵

Showalter expressed hope he would receive some reply.

³⁴ Gail Showalter, Oct. 10, 1942 [meant to read 1944], to A.M. Sandridge, National Archives, Record Group No. 210, Records of the War Relocation Authority, Entry 16, Headquarters, subject-classified general files, Box 315, File 43.503 No. 1. Xerox copy in park files.

³⁵ C.G. Showalter, Lone Pine, Calif., Oct. 17, 1944, to Ralph P. Merritt, *ibid*.

Officials in government bureaucracies, as is perhaps only natural, don't like criticism. Often the response is to impugn the motives of the critic. Rather than assume that Gail Showalter held sincere concerns about the structural stability of the auditorium in which clearly changes had been made from the original plans, Sandridge looked into Showalter's employment record at Manzanar, finding that he held a temporary appointment as a carpenter in the engineering section from April 10, 1943 to some time in June 1943, again from August 17, 1943 to September 4, 1943, and a permanent appointment as CPC-8 Foreman Carpenter from June 11, 1944, until he resigned on June 22, 1944. Sandridge quoted the reason shown on the separation sheet for his resignation as "Dissatisfied with working conditions." In a close-out interview with Personnel Officer D.H. Cox, however, Showalter cited as reasons for leaving:

(1) Transportation; (2) cost of living; (3) relationship with fellow employees; (4) lack [of] interest of work; (5) level or work unsuitable to ability; (6) salary received; and (7), the major reason, his immediate supervision--in other words, he did not get along with his supervisor, who was probably Sisler, or possibly Lawing.

Showalter had not said specifically that he had left due to concern over changes in the building, though in fact that could have been included in his differences with his supervisor. Sandridge looked also at the experience Showalter claimed, going back to 1923, finding that Showalter had worked as a carpenter for the Los Angeles Department of Water and Power, the California Division of Highways, the United States Engineer District [Corps of Engineers], and several private parties. Sandridge indicated that Showalter had shown no "engineering" experience, and little experience as a foreman, and claimed that his letter to Merritt made claims of experience his application for work at Manzanar had not shown.³⁶

The truth of the matter is that Showalter had raised some valid questions: changes had been made from the plans in construction of the Manzanar auditorium, apparently without reference to the opinion of any structural engineer, and as it would develop, final plans had never been sent to Washington for review, much less any plans that showed ad hoc changes in erecting the structure. Furthermore, while Showalter was not a qualified structural engineer, he had roughly 20 years of experience as a carpenter during which he probably learned something about the structure of balloon frame buildings and why certain bracing was needed in the frame. Furthermore, Sandridge's answer to the unidentified structural engineer telling Showalter that the building might not stand up to wind pressure or earthquake, was that it was not designed to be earthquake-proof. Perhaps Sandridge was unaware of the fact that one of the strongest earthquakes in the recorded history of California had struck nearby in the Owens Valley on March 26, 1872, with a series of strong foreshocks and aftershocks, killing 24 people at Lone Pine and some elsewhere.³⁷ Sandridge did not answer the issue of the effect of wind, although strong winds often blow down into the Owens Valley from the Sierra Nevada immediately to the west.

Ralph Merritt, however, was not willing to sweep the matter under a rug, figuratively speaking, and on November 2, 1944, sent Showalter's letters and Sandridge's response to Dillon Myer, Director of the War Relocation Authority in Washington. Merritt concluded, "Mr. Showalter is a local man whom I have known for some time as a carpenter and mill man. I do not know any reason why he is competent to judge engineering or structural design and there is no evidence that the person whom he quotes is a competent authority. However, it seems best to send these documents to you for consideration and advice."³⁸

E. J. Utz, head of the camp Operations Division told Merritt in a letter of November 14 that the statements from Showalter and the engineer he quoted were "badly garbled to the point where his meaning is not at all clear . . . " Utz said he and Senior Engineer Sandridge had concluded that Showalter was a disgruntled former employee of Manzanar using this complaint to embarrass Merritt's staff. While Showalter had worked at

³⁶ A.M. Sandridge, Senior Engineer, Memorandum, October 30, 1944, to Merritt, *ibid.*

³⁷ W.A. Chalfant, *The Story of Inyo*, Chapter XXIV, "El Temblor," pp. 259-264.

³⁸ Ralph P. Merritt, letter, November 2, 1944 to D.S. Myer, with enclosures, *ibid.*

Manzanar, Utz could find no record that he had been employed there in 1944 at the time the auditorium was built, and there was nothing on file to show that he was qualified to assess the structural integrity of the building.

Utz went on to say:

A careful study of the plans for the subject building leads us to believe that the matter of diagonal sheathing on the roof of the main building is of little consequence, provided the original plans showing 2" x 8" flat horizontal diagonal bracing was [sic] followed. The benefits derived from diagonal sheathing would probably provide diagonal bracing in excess of requirements, and any kind of solid sheathing provides additional stiffening. Since the plans were approved by a qualified engineer, we see no reason for concern, provided there were no serious structural deviations from the original plans.

The roof sheathing on the additions to the main building are very effective as stiffeners and braces to the main building; their effectiveness, however, depends to a great extent upon the manner in which roof members are attached to the main building. It is recommended that your engineer review the methods used in attaching the rafters of the additions to the main building to ascertain that details supplied on the plans prepared by the Farm Security Administration were complied with.

But it appeared that Mr. Showalter did have some valid concerns. Utz continued:

It appears from Mr. Showalter's letter that the horizontal diagonal bracing and the vertical diagonal bracing shown in detail on Plan #26 5A was omitted. We would like, therefore, to have details and a complete description of the methods used in attaching the ceiling to the bottom cord [sic-chord] of the roof trusses, in order that we can ascertain the extent this ceiling would replace the braces. This should be given early consideration.

Generally speaking, plans and specifications approved for a building should be followed. Exceptions to this rule should always be handled as provided for in the Engineering Manual Sections 40.3.5.

Thus even though Utz thought Showalter a disgruntled former employee, he did take the latter's criticism seriously enough to ask Merritt to have it investigated.³⁹

³⁹ E.J. Utz., Chief, Operations Division, Manzanar, November 14, 1944, to Project Director Merritt, NA Auditorium File.

The question of the structural stability of the building is not merely an academic matter. As mentioned in the narrative, at 2:30 a.m. on March 26, 1872, a Great Earthquake struck the Owens Valley, preceded by a smaller quake or foreshock near Lone Pine on March 17, a major aftershock followed the Great Quake at 6:30 the same morning, 200 aftershocks continued the rest of March 26 and 27th, and diminishing aftershocks occurred for some further time. The quake killed at least 26 and injured many more. Subsequent investigation revealed that Paiute Indian oral tradition recalled a similar quake around 1790. W.A. Chalfant, *The Story of Inyo*, pp. 259-264.

Although the Richter Scale for measuring the intensity of earthquakes did not exist in 1872, the U.S. Geological Survey has for various reasons and using various techniques gone back and estimated the magnitude of various past earthquakes, certainly all of the great quakes, including the one near Manzanar. The U.S. Geological Survey estimated the magnitude of the main quake near Lone Pine as 7.76 on the Richter Scale, and the major after shock that same day as 6.5. However, the times indicated by the U.S. Geological Survey do not square with Chalfant's chapter; he reported the main quake at 2:30 a.m. while the U.S.G.S. reported it at 10:30 a.m.; Chalfant reported the major aftershock at 6:30 a.m. while the U.S.G.S. reported it at 2:06 p.m. It may have been a case of people at the time not being able to judge

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Merritt sent Utz's letter to Senior Engineer Sandridge, who was ill at the time, and did not respond until December 7, 1944. With respect to the method of attaching the rafters of the north and south additions to the main building, Sandridge reported:

I have rechecked this personally and find that the detail supplied on the plans prepared by Farm Security Administration were complied with. They are nailed to the plate on which they rest, and in addition to this we have nailed each rafter to the studding where it joins the main building. This is shown on the attached plan which we have drawn to show bracing and method of attaching ceiling to the bottom of the cord [chord] of the roof trusses.

Sandridge went on to explain why the diagonal bracing had been omitted on the lower chord of the five roof trusses:

On the original plan horizontal diagonal braces of 2 x 8's laid flat and nailed to the top of cord [sic-chord] is shown. This bracing was on 18 foot centers. I believe that the reason that this type of bracing was shown on original plan was due to the fact that the ceiling was attached near the top of the trusses and directly under the roof. Consequently, bracing of this type was needed to not only brace the bottom cord [chord] but to help reduce vibration. In our material received for this building, there were not any 2 x 8's which were long enough to make a brace of this type without splicing in between the trusses. The type of furnace originally intended for this building could not be furnished. Four smaller heaters with less B.T.U. ratings were furnished to heat the main part of the auditorium. Consequently, it was necessary that we conserve on space to be heated as much as possible due to these reasons and other factors, we believed it more desirable to attach the ceiling to the bottom of the cord [chord] which not only reduced the space to heat but also made the building easier to clean by not having the trusses exposed so that they would catch dust. This was done by using 2 x 6 nailed to the bottom cord on 2 foot centers as described on attached plan. This not only served as bracing which has proved to be very effective but also made it an easy method of attaching celotex ceiling flush with the bottom cord.

It also turned out that while all other changes from the original drawings had been submitted to Washington for approval, inadvertently this one had not. Sandridge did not say whether or not he was sending it now, after the fact of construction. Apparently he did not.⁴⁰

In the end, it is not clear that any qualified structural engineer ever specifically addressed the questions raised by Showalter, since Utz was an administrator, and it seemed unlikely that his Camp Operations Division had a structural engineer on staff. Furthermore, with but the partial exception of Utz, it seemed clear that no one in the War Relocation Authority really understood the structural weaknesses in the building Showalter had identified. In retrospect, Showalter had quite correctly identified structural flaws in the completed building resulting from ad hoc changes from the original plans during its construction. Irrespective of the reasons for those changes, the people who made them had not understood how greatly they weakened the structural integrity of the building.

among foreshocks and aftershocks which were the main ones among the many, and it may be that some lesser shocks did the damage and were more evident than major shocks beneath the surface. For the U.S. Geological Survey data, I am indebted to Melanie Moreno in Menlo Park; however the data is available on the Internet at [HTTP://WWWNEIC.CR.USGS.Gov](http://WWWNEIC.CR.USGS.Gov). "NEIC" stands for National Earthquake Information Center.

⁴⁰ Senior Engineer A.M. Sandridge, Memorandum, December 7, 1944, to Project Director Ralph P. Merritt, NA Auditorium File.

A NEW "CUSTODIAN"

On November 20, 1944, Ralph Merritt appointed Community Activities Supervisor Aksel G. Nielsen custodian of the auditorium. Merritt mentioned that he did not believe that the Auditorium Committee of which Nielsen was a member could serve as custodian of the building, and he felt that Nielsen was the "logical person" to be "responsible for the building, to see that it is not mutilated, and to be responsible for the equipment in the building."⁴¹

A month later, on December 11, Merritt had Nielsen sign a sheet spelling out an even dozen duties of the "Manager," not custodian, of the Community Auditorium:

1. Be present and have the door open at least 1/2 hour before the beginning of any program in the auditorium. (Earlier on special occasions).
2. Be present for all programs in the auditorium (except regular school classes during the day).
3. Turn on the lights in the auditorium.
4. See that the place is locked up and lights out after each performance.
5. Check on the heating system to see that the heaters are working for and during each performance and that the room has the proper temperature.
6. Operate the stage lights when needed for special performances.
7. Operate the fans when needed.
8. Open or close windows as needed.
9. Check on the air throughout the auditorium during the entire performance. Open or shut the windows or turn on the fans, according to what is needed to get the proper temperature and ventilation.
10. Be custodian of all stage equipment.
11. Supervise the building whenever in use. This includes the following:
 - (a) warn anybody who misuses equipment
 - (b) take down names of violators if necessary
 - (c) report destruction or damage of equipment or facilities to the Supervisor of Community Activities.
 - (d) report trouble to the police immediately.
12. Other duties which may become apparent as need arises.⁴²

The list of duties hinted at one environmental aspect of Manzanar that the auditorium faced. The area being arid due to the withdrawal of most of the local water by the Los Angeles Department of Water and Power, some might assume that it was a scorching desert. Desert it was, and it could be hot during the summer months, though probably no hotter than California's Central Valley. Manzanar was at an elevation of about 4,000 feet, which tended to moderate the summers, but winter at Manzanar could be an icy horror; the camp did not get much snow, although it did receive some, but it suffered howling winds blowing eastward down from the snowy peaks of the Sierra Nevada immediately to the west, one of them, Mount Whitney, the highest point in the contiguous United States. Thus the auditorium manager at Manzanar had a real task in trying to keep the auditorium, equipped with an inadequate heating plant, warm enough for use in winter.

⁴¹ Ralph P. Merritt, Project Director, Memorandum November 20, 1944, to Aksel G. Nielsen, Community Activities Supervisor, NA Auditorium File.

⁴² "Duties of the manager of the Community Auditorium," December 11. 1944, NA Auditorium File.

On November 22, 1944, Auditorium Committee Chairman Rollin Fox sent a memorandum to Senior Camp Engineer Sandridge complaining about a strong draft coming down the ventilators in the Auditorium shower rooms when the wind blew--which seemed to be most of the time at Manzanar. High school teachers had asked Fox to have the vents closed off, but Fox didn't believe that was a real solution to the problem, and asked Sandridge to have one of the men in his Public Works Section see if there was any other solution. Sandridge had one of his men look into it, who then scribbled a note on the bottom of the memo: "Sandy: I called Fox on this and think I have him convinced that the present system is O.K."⁴³

A week later, Fox called another problem to Sandridge's attention:

I have been keeping track of the condition of the auditorium floor. From what I can determine, the sand and grit tracked in on shoes are being scuffed into the floor and cutting it up. In the auditorium proper, you'll notice that the use of street shoes for public meetings, dances, and the like is having its effect, too.

I do not know what [that] we can do much about this, nevertheless, it is a condition that justifies our knowing about it

Sandridge gave the memo to an employee of his Public Works Section, who scribbled another note, this time: "Sandy: This is what you get when you use D.[ouglas] F.[ir] flooring." Again, an environmental factor ruled: the soil of the alluvial fan on which Manzanar had been built featured a gritty natural mix of sand and gravel washed down over the eons from the rocky Sierra Nevada immediately to the west.⁴⁴

Sandridge did look into the matter further, however, and on December 12 sent a memorandum to Merritt:

The auditorium has a good sub-floor under the finish floor which can support approximately 100 pounds per square foot so it can safely care for all auditorium loads required of a building of this type. The top floor is regular 4 inch fir flooring of a fair grade. This flooring has butt joints with ends nailed, which is suitable for ordinary use but not for a basketball court. Regulation gym floors which are used for basketball are usually of a hard wood such as maple or oak and have tongue and grooved ends as well as sides. This fir flooring was laid as good as possible with men available, sanded and treated with a floor hardener. But I do not believe it will last very long if used for a basketball court as jumping and other sudden jars will loosen the ends and break the lower edge of gro[o]ves on this type of floor which would increase the maintenance costs and greatly lower the expected life of the present floor.

In fact, with ordinary gym classes, picture shows and other meetings which keep this building in use almost every day and part of every night the floor is now showing considerable wear. . . .⁴⁵

It seems likely that Douglas fir had been used for the finished floor either to keep down costs in what was, after all, a temporary building, or because harder woods such as maple or oak were in short supply due to other wartime needs.

⁴³ Rollin C. Fox, high school principal, memorandum November 22, 1944, to Mr. Sandridge, NA Auditorium File.

⁴⁴ Rollin C. Fox, Principal, Manzanar High School, November 30, 1944, to Mr. Sandridge, Public Works, NA Auditorium File.

⁴⁵ A.M. Sandridge, Senior Engineer, Memorandum, December 12, 1944, to Ralph P. Merritt, project director, NA Auditorium File.

On December 2, Rollin Fox reported that the janitors had been asking him to get paper towels for the auditorium. They had been getting them all along from the Public Works Section, but the staff in Warehouse 36 now refused to give him any more. That same day, in a separate memo, Fox asked Sandridge about progress in constructing some sectional platforms for use on the auditorium stage, which he had initially asked for near the end of October. Sandridge responded to both memos on December 15. With regard to paper towels, he said he understood that the schools had a separate supply of paper towels for their use, and Fox could get some by request to School Supply Officer Haberle. As for the sectional platforms, they had to be submitted in the Public Works budget for the upcoming quarter. If the Washington Office approved that quarterly budget, Public Affairs could go ahead with construction of the platforms.⁴⁶

MANAGEMENT PROBLEMS

Meanwhile, management of the auditorium had been unraveling. On December 19, 1944, Aksel Nielsen, who supposedly had that responsibility, sent a three page memorandum to Ralph Merritt, raising a number of concerns. First of all, he proposed that Fred Miyake be made manager. Then he pointed out that confusion reigned as to who was responsible for what with regard to the auditorium, whether Public Works, the High School, the Custodian, or the Auditorium Committee. "For instance," Nielsen complained, "we do not know who is responsible for the keys." In the past, Public Works Division had issued keys to several people in the high school, the Co-op, the janitors, Mrs. Adams, and one to Community Activities. Nielsen had a key, which he needed to retain so that he and the public address crew could get into the building when they needed to, but didn't have another to give to the proposed new manager.

Then there arose the question of who was responsible for supplies for the auditorium, as well as proposed changes in the building and repairs to it. Nielsen's Community Activities Section had no funds for such uses. Perhaps each section that used the building, such as the high school, should be responsible for their share of supplies. Nielsen had just recently sent requisitions to the Public Works Division for: more lights over the stage right inside the front curtain (where it was too dark for the orchestra and choruses to see to read music on the stage); for construction of a large storage closet under the stage for locking up supplies and small equipment such as footlights, spotlights, and stage supplies; signs in Japanese over the doors to the men's and women's rest rooms; repairing the windows so they could not be pried open from the outside; and other small repairs to windows and lights.

Although Merritt had appointed Nielsen manager of the auditorium on November 20 and spelled out his duties on December 11, as of December 19 Nielsen apparently did not believe that either the Auditorium Committee of which he was a member, or A.E. Sandridge, who headed the Public Works Division, took his role seriously. Thus he asked Merritt to officially notify the committee and Sandridge of his appointment and spell out to them who had responsibility for:

1. Distribution of keys
2. Decision as to when additional keys are needed and should be made for distribution.
3. The keeping of reserve keys
4. Setting up benches for performances and taking them away again and clean up the floor after each use. At present, the two janitors refuse to do so and Community Activities have no janitors as they were transferred to the Public Works long ago. Volunteers, as, for instance,

⁴⁶ Rollin C. Fox, Memorandum, December 2, 1944, to Sandridge, regarding paper towels in the auditorium; Fox, Memorandum, December 2, 1944, to Sandridge, regarding sectional platforms; A.W. Sandridge, Senior Engineer, Memorandum, December 15, 1944, to Fox; all in NA Auditorium File.

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- the coaches and players in the one-act plays recently put on in the auditorium, refuse to do janitorial work such as setting up benches and cleaning up afterwards.
5. What section pays for repairs, alterations or improvements in the auditorium.
 6. What is the exact authority and duty of the auditorium committee and whom does it represent. By that I mean, does each member represent the whole of the community or the section in which he works.
 7. Who decides when improvements in the auditorium are needed and should be made.
 8. Who is responsible for making out requisitions for alterations, repairs, and the like.⁴⁷

Clearly, management of the new auditorium was not going smoothly.

Acting Project Director Edwin H. Hooper responded clearly and concisely to Neilsen's request for clarification of authority and responsibility on December 30, 1944, citing Neilsen's November 20 appointment by Project Director Merritt, and adding the following instructions:

No. 1- Mr. Neilsen as Custodian has full responsibility for the building with the exception that the Auditorium Committee shall pass on who shall have use of the building at any particular time and advise Mr. Neilsen.

No. 2- Mr. Nielsen will be responsible for all keys. Public Works will furnish Mr. Nielsen with a list of all keys heretofore issued and with all surplus keys, taking Mr. Nielsen's receipt for same. It shall be agreed with Nielsen as to the keys Public Works will need.

No. 3- All additional keys needed will be requisitioned by Mr. Nielsen through the Supply Officer. It will be necessary because of the shortage of funds for Operation that each request for new keys be completely justified.

No. 4- All requests for maintenance and repairs shall be channeled through Mr. Nielsen to Public Works, which section is in charge of all maintenance and repairs. This does not include any changes of any kind whatsoever within the building itself as under present regulations it will be necessary for Public Works to have a complete understanding of what is desired and submit the request to Washington for approval.

No. 5- Public Works through its maintenance section will furnish janitorial service and janitorial supplies such as soap, toilet paper, brooms, towels, etc.

No. 6- It will be the responsibility of each section or activity using the auditorium to provide it's [sic] own stage props.

No. 7- No activity or section is to make any change in the lighting effects, etc. without the approval of the custodian. The custodian will upon request either approve or refer to Public Works for checking. In this connection it will be the custodian's duty to see that the Fire Department approves of any changes so as to eliminate fire hazards.

No. 8- Mr. Neilsen will be allowed two laborers on the Community Activities staff to set up and take down benches.⁴⁸

⁴⁷ Aksel G. Neilsen, Supervisor, Community Activities, Memorandum, December 19, 1944, to Ralph P. Merritt, to the attention of E.H. Hooper, Acting Project Director; NA Auditorium File.

A copy was sent to the Personnel Division for action on the last paragraph.

Unfortunately, this clear delineation of authority did not solve all the problems. A New Year's Eve function in the auditorium resulted in damage which, Merritt wrote, "with proper supervision probably would not have happened."

Someone had broken one of the water pipes in the men's lavatory, not to mention one of the tops to the toilet tanks. Someone had, deliberately or otherwise, stopped up one of the toilets, which had consequently flooded the floor. Someone had thrown two unused rolls of toilet paper in the waste container. A broken whiskey bottle lay on the floor. Water in the hall, apparently from the stopped up toilet, had run under the partition into the office of the Supervisor of Men's Athletics. Someone had broken one of the window openers; another had been bent. In one or two places it appeared and smelled as if someone had vomited on the floor. Much of the punch at the refreshment stand in the main room apparently had ended up on the floor.

In calling all of this damage to the attention of Aksel Nielsen on January 9, 1945, with a copy of the memo to Mr. Fox, Ralph Merritt concluded:

The above sounds as though rather considerably was wrong [sic]. I wish here to state that the damage was probably no more than would have happened in any auditorium in any city where there were that many persons present; however, I desire to point out that funds for the maintenance of the auditorium and for the balance of the Manzanar Projects are going to be very hard to secure and that we must extend every effort to see that no damage is done to the auditorium so that it will be in good order for the use of the people of the Center for as long as the Project operates.⁴⁹

But this memorandum did not settle the issue in Merritt's own mind, and he continued to mull it over.

Six days later, Merritt wrote a telling memorandum to his assistant project director, Lyle G. Wentner, with copies to no one else:

I wonder if you would be kind enough to review the original appointment of Mr. Fox as Chairman of the Auditorium Committee, the later appointment of Aksel Nielsen as Custodian, and the two unsigned letters prepared by Mr. Hooper for my signature pointing out what Mr. Hooper considers to be failures in the handling of the Auditorium. My feeling is that the problem goes much deeper than the gang of boys misusing the physical equipment of the building. The question is, in what way should the Auditorium be used and who should promote its best use in the remaining months of Manzanar. After you have gone over the problem, I would like to talk it over with you with the thought that the auditorium might best be put in your handling and that we should see that such social functions as may be approved will have sufficiently strong backing to prevent the type of thing that occurred on New Year's Eve when the Community Activities section sponsored a dance, or on Christmas Eve when a small group of evacuees had a dance which they were not able to control.⁵⁰

⁴⁸ Edwin H. Hooper, Acting Project Director, Memorandum, December 30, 1944, to Aksel G. Nielsen, A.M. Sandridge, Lyle G. Wentner, and Rollin C. Fox, NA Auditorium File.

⁴⁹ Ralph P. Merritt, Memorandum, January 9, 1944 [should read 1945], to Aksel G. Nielsen, Community Activities Supervisor, with copy to Mr. Fox, NR Auditorium File.

⁵⁰ Ralph P. Merritt, Project Director, Memorandum, January 15, 1945, to Assistant Project Director Lyle G. Wentner, regarding Supervision of the Auditorium, NA Auditorium File.

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Clearly Project Director Ralph Merritt was unhappy with management of the auditorium up to this time. While he had been able to anticipate for some time that World War II seemed to be progressing toward victory over Germany and, later Japan, and the probable closing of the Manzanar War Relocation Center some time in 1945, nevertheless until that happened he had to run the camp efficiently, and the operation of the auditorium seemed anything but efficient.

THE INTRODUCTION OF VOLLEYBALL

While Wentner considered the issues involving management of the auditorium, seven individuals representing various clubs and organizations interested in youth problems at Manzanar signed a joint memorandum to Ralph Merritt asking that the playing of volleyball be allowed in the auditorium, and that the floor be painted with lines laying out two volleyball courts. These people also anticipated that their remaining time at Manzanar was "definitely limited," and wanted to maximize use of the auditorium for that shortening interval of time. These groups wanted to use the building for sports that could not be played outdoors during winter, and specifically one sport: volleyball. "They feel that the sports program is one of the best Americanizing influences as well as the best means of keeping young people occupied and out of trouble."

Although it may be advisable to prohibit the playing of certain sports in the auditorium, we should like to have volleyball removed from the list of sports excluded. We feel that volleyball should not have been included in the prohibited list in the first place as it involves no hard running or constant jumping. In order to prove our point, we should like to state the following concerning rules and regulations for volleyball:

A volleyball team plays on a 30 x 30 foot square with six players on each side. Each player is supposed to stay within his allotted 10 x 10 foot square. Thus the distance he travels is so short that he is never able to get up much speed. Five of the players pass the ball and good passers keep their feet on the floor without any jumping. Only one player, the "spiker", jumps when attempting to kill the ball. However, the jump is straight up with a previous run of only one or two steps which makes his jump no harder than when some of the movie fans step up on the benches and jumps down on the floor again. In fact, it would probably be lighter inasmuch as the player would wear gym shoes or play barefooted. Furthermore, it will take a long time to develop "spikers" who can really jump and "kill" the ball.

Anyway, this collection of groups wanted two volleyball courts painted on the auditorium floor, as well as the necessary stanchions to carry two nets. If school funds could not be used, Community Activities section would be willing to pay the costs. Those signing the memorandum included [illegible] Sakaguchi, chairman of the Men's Club, Frank Yasuda, chairman of CACA, whatever that was, Barbara Dougherty, Advisor of the Youth Council, James Smith, a coach at the high school, Clyde L. Simpson, former principal of the elementary school, Rollin C. Fox, principal of the Manzanar High School, and Aksel Nielsen, supervisor of Community Activities.⁵¹

Meanwhile, as a part of the ongoing management of the auditorium, Senior Engineer A.M. Sandridge sent auditorium custodian Axel Nielsen on January 26, 1945, a list of 43 auditorium keys, either to doors or to various lockers, with the names of individuals to whom they had been issued. That same day, Assistant Director Lyle Wentner sent a memorandum to Ralph Merritt laying out proposed revisions to regulations for the use of the auditorium for motion pictures:

⁵¹ Memorandum, signed by the seven individuals listed in the narrative, January 22, 1945, to Ralph Merritt, NA Auditorium File.

Beginning the weekend of Saturday, February 3 and 4, and every weekend thereafter, motion picture shows will begin promptly at 7 p.m. instead of 6:30 p.m.

Doors will be open at 6:30 p.m. This will allow one-half hour to admit and seat those attending the show.

Admission will be by tickets only without exception--all tickets to be dated for each show.

There will be two ticket takers and two doors open to prevent congestion between 6:30 and 7 o'clock. All tickets will be torn in half at the time of admission. One-half of the ticket will be retained by the customer and one-half by the person designated to receive the tickets. Not more than 1280 tickets shall be issued by the Co-op for any one occasion.

Everyone occupying a seat, whether adult or child, must have a ticket for admission.

The doors of the Auditorium will be closed at 7 p.m. and no one will be admitted after that time.

Mr. Nielson is responsible for instructing all ticket handlers in their duties.

The custodian of the building is not to open the Auditorium until all arrangements for admission have been made.⁵²

Whether Wentner had yet gotten together with Merritt to fully discuss the auditorium management problems is unknown, but clearly he had gotten a grip on some of those problems.

Three days later, however, on January 29, 1945, Wentner submitted to Merritt five recommendations regarding auditorium management for the director to consider:

1. The Community Activities section had been charged with full responsibility for granting use permits based upon the attached revisions of the regulations. Mr. Fox, Mr. Nielsen, and Mr. Yasuda have given their approval to these revisions.
2. The Assistant Project Director in charge of Community Management [i.e., Wentner himself] shall give final approval on all permits.
3. The Auditorium committee be discontinued on the basis that its functions are no longer needed.
4. The new conditions of use permit provide for more effective controls and at the same time encourages more extensive use by all groups in the community of Auditorium facilities.
5. It is specifically recommended that regulations be relaxed to permit volleyball, badminton, and paddle tennis in the Auditorium.⁵³

The central file contained no memorandum indicating what action Merritt took on Wentner's recommendations, but he probably approved them all. It is clear that the Public Works Division did paint lines outlining two volleyball courts on the auditorium floor.

Human nature being what it is, no amount of regulation could anticipate and mitigate all problems with auditorium management. On the afternoon of February 8, Community Activities Supervisor Axel Nielsen and High School Principal Rollin Fox visited the auditorium to make some check on the facilities. They found that the motion picture projection crew from the Co-op was holding a private screening of films for an

⁵² Lyle G. Wentner, Assistant Project Director, Community Management Division, Memorandum, January 26, 1945, to Ralph P. Merritt, NA Auditorium File.

⁵³ Lyle G. Wentner, Memorandum, January 29, 1945, to Ralph P. Merritt, NA Auditorium File.

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audience of 18; while not clear, it sounded as if they were projecting the films on a screen within the projection booth. "This, as you know, is against the rules and violates our agreement in several ways," Nielsen wrote Co-op General Manager K. Arai later that afternoon. Nielsen went on to say:

First, a sign on the door states that only the projectionists should enter the booth and that no more than four should be present at any one time. Second, the auditorium is used for classes during the day and the school has been constantly complaining that your boys are running back and forth in the auditorium during the class periods. This time it was not only boys but also girls who disturbed the class by going to the movies in the middle of the afternoon. Third, as you know the agreement is that the Co-op is to have the use of the auditorium, including the projection room, Saturday evening and Sunday afternoon and evening. If any Co-op employees need to enter the building outside the time when the building is turned over to them they should secure permission in advance from those concerned. This would mean that in order to enter the auditorium during a school day permission must be secured from Mr. Fox. If your boys wish to enter at any other time please have them secure permission from me.

If you find difficulty in controlling the movie crew, I would suggest that the keys be turned back to us and that they be loaned to you every weekend or that we have the auditorium custodian open the building for you. We are not only concerned with disturbances in the auditorium but also about destruction and thefts. Since last evening, a turnbuckle was stolen from the badminton courts and the only way we can check on who enters and leaves the building is by keeping a close check on the use of the keys.

Will you please talk to your movie crew and make sure that they understand the regulations and our agreement. Also please inform them that the light was on in the projection room late Monday evening after the auditorium was closed up and dark.

As a postscript, Nielsen added that if a room was needed for previewing movies to be shown in the auditorium, the high school could supply a room for the purpose.⁵⁴

PROGRAMS PLANNED FOR 1945

Meanwhile, some time around the first of the year, Aksel Nielsen had a list of programs planned for the auditorium in 1945 drawn up. Keeping in mind that the high school used the building on weekdays and other sections had certain times assigned on evenings or weekends for use of the building, this undated list provided some idea of the kinds of programs held in the building.

DATE	ACTIVITY	IN CHARGE
January		
Sat. & Sun. 20, 21	Japanese Talent Show	Mr. S. Takeyasu
Fri. 26	Recorded Concert	Mr. Joe Sakai
February		
Thu. & Fri. 1, 2	Educational Movies	Dr. G. Schwesinger & Mr. M. Shiosaki
Thu. & Fri. 8, 9	Japanese Dancing	Mr. S. Takeyasu
Fri. 16	Concert, Music Hall	Mr. H.F. Thorne & Mr. S. Nakamura
March		

⁵⁴ A.G. Nielsen, memorandum, February 8, 1945, to K. Arai, Co-op General manager, NA Auditorium File.

Thu. & Fri. 1, 2	Open	
Thu. & Fri. 8, 9	Japanese Drama and Music	Mr. S. Takeyasu
Fri. 16	American Talent Show and Quiz	Mr. S. Ishii & Miss Harumi Hino
Thu. 23	Pre-Easter High School Party	Mr. R.C. Fox
Thu. & Fri. 29, 30	American Drama	Mr. T. Higashi
April		
Fri. 6	Senior Play	Mr. R.C. Fox
Thur. & Fri. 12, 13	Japanese Talent Show	Mr. S. Takeyasu
Fri. 20	Oratorical Contest	Mr. T. Higashi
Fri. 27	Elementary School Pageant	Mr. E.B. Dykes
May		
Fri. 4	Spring Dance	Mr. S. Ishii & Miss Harumi Hino
Fri. 11	High School Music Night	Mr. R. C. Fox ⁵⁵

THE CLOSING OF MANZANAR WAR RELOCATION CENTER

Throughout this year an accelerating number of Manzanar residents left on what originally had been called "indefinite leave" but soon changed to "terminal departure" as the Manzanar War Relocation Center and indeed the War Relocation Authority faced the waning phase of World War II. On May 8, 1945, after spending his first night in the White House, President Harry Truman, who had so unexpectedly inherited leadership of the United States after the death of Franklin Delano Roosevelt, announced to the American people the surrender of Nazi Germany. With that surrender, armed forces of America and its allies that had been devoted to crushing the Axis in Europe could turn their efforts to the Pacific Theater against the one remaining Axis power, Japan. The end of the Pacific War was so apparently near that on July 13, War Relocation Authority Director Dillon S. Myer announced that the Manzanar camp would close by November 30, 1945. Now the War Relocation Authority could not push people out fast enough. Meanwhile, the war marched ever closer to the Japanese home islands, and now, the result of all of the scientific prowess of the Allies, and particularly of the United States, could be brought to bear against the Empire of Japan. At 8:15 a.m. and 17 seconds on August 6, 1945, a B-29 Flying Fortress named "Enola Gay" dropped the world's first nuclear bomb used in combat on Hiroshima, and when that did not result in surrender of the Japanese Empire, three days later on August 9, another superfortress, this one named "Bock's Car," dropped a second atomic bomb, this one on the city of Nagasaki. Six days later, after a radio announcement that it would do so on August 14, on August 15, 1945, Emperor Hirohito spoke over the radio to his subjects accepting the conditions of the Potsdam Declaration of the Allied Powers, thus bringing World War II to a close with the de facto surrender of the Empire of Japan, that country's first military defeat in 2,500 years.⁵⁶

On August 18, the *Manzanar Free Press* published Instruction No. 129 from Washington authorizing camp directors to forceably evict residents who, after due warning, had failed or refused to arrange to move out of the camp. Project Director Merritt issued his own directive reinforcing Myer's order on August 29. The schools at Manzanar did not open in September, and use of the auditorium phased out. On September 2, 1945, on the foredeck of the battleship *U.S.S. Missouri* in Tokyo Bay, representatives of the Emperor of Japan

⁵⁵ Aksel G. Nielsen, Supervisor, Community Activities, "Planned Programs in the Community Auditorium 1945," NA Auditorium File.

⁵⁶ John Costello, *The Pacific War*, pp. 590-596; Ronald H. Spector, *Eagle Against the Sun; The American War with Japan*, pp. 555-558; William Craig, *The Fall of Japan*, pp. 69-313.

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signed the instrument of surrender in the presence of a delegation of Allied officers led by General Douglas MacArthur. Departures from Manzanar accelerated in September and October, and at 11 a.m. on November 21, 1945, the last of the evacuees left Manzanar.⁵⁷

As a part of the work of closing down the Manzanar War Relocation Center after the end of World War II, the remaining key staff members prepared a massive report on the history and physical history of the camp. Project Director Ralph Merritt convened a final staff meeting of the Manzanar staff on February 15, 1946, and on that same day submitted the report of nearly 1,600 pages to Washington. Senior Engineer Arthur M. Sandridge and Oliver E. Sisler, the Camp Superintendent of Maintenance and Construction, authored the "Engineering Section" of the report, which in a copy with hand-numbered pages extended from page 989 through page 1057. They provided the best description of the auditorium-gymnasium building found in War Relocation Authority files, a description of the building at the conclusion of its use by the Manzanar community:

The gymnasium-auditorium, which was used for various Center activities, was the only building constructed in the school group. All construction of the other units for the schools was canceled by the WRA and the school buildings that were used were provided by remodeling existing barrack-type buildings.

The gymnasium-auditorium structure classified as gymnasium type A, had an overall width of 118 ft. and a length of 119 ft. The main auditorium floor was 80 x 96 feet square [sic]. The stage at the east end of the main floor was 22 feet deep with an overall width of 30 feet.

On each side and adjacent to the stage, a dressing-room provided space for equipment and stage trappings.

A wooden truss, supported on each end by wooden columns, supported the proscenium arch which had a clearance of 12 feet from the finished floor.

Extending the full length of the main section, and, on each side, a one-story shed-type section was constructed. This portion housed the toilets, dressing-rooms, lockers, and offices. The one-story shed-type section on the south side extended 40 ft. 9 in. beyond the east end and was used as a health unit.

The auditorium-gymnasium was built on piers placed approximately 8 feet on centers each way. Girders were of 6 in. x 10 in. material with 2 in. x 6 in. floor joists, spaced 12 inches on centers. All floors were double; the first or subfloor was of 1 in. x 6 in. Douglas fir shiplap laid diagonally, while the finished floor was 1 in. x 4 in. tongue-and-grooved Douglas fir, sanded and varnished.

The walls of the main section were 20 feet high. Posts, 12 in. x 12 in., supported five Pratt-type wooden trusses. These trusses were constructed with split ring connectors and bolts. The ceiling joists were of 2 in. x 6 in. material. Roof purlins were 2 in. x 10 in. lap jointed at each end and solid at each lap.

Diagonal sheeting was laid over the purlins, and then split-sheet roofing was applied, mopped on with hot asphalt.

⁵⁷ Unrau, Vol. II, pp. 793-795.

A shed-type roof was build [sic - meant built] over the stage; 2 in. x 12 in. joists spaced on 24-inch centers with 2 rows of solid bridging were used on this section. Sheeting of 1 in. x 6 in. shiplap was laid and split-sheet roofing was mopped on.

A concrete porch, 9 ft. x 31 ft. 5 in., was built across the front for an entrance to the three sets of double doors. Above this porch the moving picture projection booth, 8 ft. 6 in. x 30 ft. 11 in., was housed. This was divided into two rooms; one for the machines and the other for the rewinding of the films. The entire area of both rooms was lined with fireproof asbestos board.

Two inside stairways leading from the main floor to this booth furnished access and a means of escape in case of fire.

The one-story shed section, housing the toilets, dressing-rooms, locker rooms, and health room, was constructed with 2 in. x 4 in. studding, with 2 in. x 12 in. rafters spaced 24 inches on centers, and bridged with solid blocking, sheeted and roofed, the same as for the other portions of the building.

The exterior wall finish was 1 in. x 6 in. V shiplap painted to protect it from the weather. The interior wall finish was of the same material. The auditorium ceiling was finished with 1/2-inch fibre board applied to the ceiling joists flush with the underside of the bottom cords [chords] of the trusses. All ceilings in the remaining portion of the building were of the same material.

Heating was provided by H.C. Little forced draft automatic oil heaters. These heaters were placed in the most strategic points. Two were under the stage and forced the heat directly into the main auditorium through screened grills. Two others were placed at the front, in the room adjacent to the main floor, and supplied heat in main room. Two others were connected to overhead ducts and forced the hot air through the grills into the toilets, shower rooms, and offices. The dressing-rooms and health unit were provided with independent space heaters.

The hot-water system consisted of a 250-gallon Hanson boiler located under the stage and connected with necessary piping running from this point to the health unit, showers, wash rooms, and toilets.

Electric wiring was installed for the proper illumination and operation of all equipment including four Trane 125 P. projector fans installed in the ceiling of the auditorium. Special footlights and over head lighting were provided for the stage.

Plumbing and sewage were installed according to plans with the necessary connections made to the sewer and water mains.⁵⁸

Sandridge and Sisler thus described the building at the time the camp was preparing to close in 1945.

On March 10, 1946, the War Relocation Authority turned the buildings and structures, "fixed assets" in bureaucratic terminology, over to the General Land Office of the Department of the Interior, while movable property and consumer goods became the responsibility of the War Assets Administration, for disposal. President Harry S. Truman issued an executive order liquidating the War Relocation Authority effective June

⁵⁸ Arthur M. Sandridge and Oliver E. Sisler, "Engineering Section," War Relocation Authority, Final Report, Manzanar War Relocation Center, Chapter 2, WRA Construction, Part I, New Construction, B, Gymnasium-Auditorium, pp. 20-23 in the handwritten page numbers in the Engineering Section, which were, again in hand-written numbers, pages 1008 through 1011 of the full report, on file in the National Archives.

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30, 1946. On July 16, 1946, the General Land Office was absorbed into a new Interior Department bureau, the Bureau of Land Management.⁵⁹

Shortly after the General Land Office received responsibility for Manzanar's buildings, the agency dispatched five field examiners from Washington to conduct an appraisal of the property. Late in April and in early May, 1946, the field examiners prepared and submitted an "Appraisal Report: Buildings, Improvements, and Designated Personal Property, Manzanar Relocation Center, Manzanar, California."⁶⁰ In the section entitled "Appraisal Report of Buildings and Structures," Item No. 156 in the unpaginated document consisted of the appraisal of the auditorium:

Dimension lumber	59,268 bd. ft.		
Ship lap	59,983 "		
T & G flooring	15,432 "		
Outside rustic	15,075 "		
Shelving, etc.	<u>1,686</u> "		
Total lumber	141,444 bd. ft.		
90% salvable	136.300 bd. ft.	\$40 M.	\$5,542.00
Plumbing fixtures			435.00
Pipe valves and fittings			239.72
Hanson water heater and tank, cost \$400			
50% salvage value			200.00
Riveted iron stack, 28' x 26", \$.30 ft		6.40	
62 doors mixed, with locks, 1.75 ea.			108.50
175 sash, hinged, 4 lts., .50 "			87.50
24 - 8" frosted globes, .50 "		12.00	
25 - 10" frosted globes, .60 "			15.00
35 enamel reflectors, 14" screened		<u>21.00</u>	
Gross Salvage			\$6,579.12
Cost of wrecking, 180 days @ \$12		<u>2,160.00</u>	
Net salvage			\$4,419.12

The "Cost of wrecking" figure proved irrelevant with respect to this building since no one demolished it.⁶¹

A War Assets Administration "Fixed Assets Inventory" which included the auditorium listed its internal spaces:

AUDITORIUM, HIGH SCHOOL, exterior walls V joint siding painted, room interiors lined with V joint siding and gypsum wall board, auditorium lined partially with V joint siding and wall board, 5 built-up wood roof trusses to support roof over auditorium, gambrel roof, covered with mineral surfaced roll roofing, 2 rooms 11'x 14', 2 rooms 9'x13', 2 rooms 8'x9', 2 rooms 8'x12', 2 rooms 12'x13', stage 24'x40', 2 rooms 4'x9', 1 hall 4'x52', 1 room 20'x27', 1 room 11'x20', 1 hall 4'x48', 2

⁵⁹ Unrau, Vol. II, p. 805.

⁶⁰ Unrau, Vol. II, p. 805.

⁶¹ "Explanatory Notes / Appraisal of Buildings and Structures," Item No. 156, in the Sierra Pacific Division of the National Archives at San Bruno, California, Record Group no. 49, General Land Office, San Francisco Regional Office, Division of Land Planning, Records related to the disposal of Manzanar and Tule Lake War Relocation Centers, 1945-1948, Box 919, Folder 82177, Manzanar Relocation Center, 2089902 - SRP - BFE.

halls 5'-6"x15', 1 room 5x15', 1 room 20'x36', 1 room 12'x15', 2 rooms 15'x16', auditorium 80'x96', 1 room 14'x15', 1 room 19'x32', 1 room 12'x19', WRA construction.

This document estimated the War Relocation Authority's cost for the building as \$30,375.89, and recommended a depreciation of \$5,315.78, for a total appraised value of \$25,060.11.⁶²

On April 25, 1946, Field Examiner Ernest R. Cushing of the General Land Office prepared an inventory and appraisal of the equipment and furnishings in the auditorium. A small number of the items could be considered part of the building's fixtures, such as two H.C. Little DU 42 heaters, three H.C. Little DU 44 heaters, four H.C. Little DU 46 heaters, five 25 1/2 by 19 1/2 inch wall mirrors, and two metal dispensers for paper towels. Other items on the list fell into the category of furnishings. Camp carpenters had made the 174 six foot long 16 by 11 1/2 inch backless wooden benches along with another 137 that were eight feet long. The auditorium also contained 54 miscellaneous metal or wooden chairs, 49 of them folding chairs, a waste paper basket and two white enameled trash containers, a couple of fire extinguishers, a 12 foot high painter's ladder, four electric light reflectors, probably used on the stage, a garden rake, stage curtains including back and side drops, with pulleys and rope, window drapes and curtains, a special purpose desk, and a couple of silk American flags, with standards. Cushing listed the acquisition costs of each of these items, as well as an appraisal price. He totaled only the latter, the resulting sum being \$1,838.50 appraisal value.⁶³

Cushing had a number of comments to add to the appraisal:

The mechanical equipment such as heaters and fire extinguishers are carried in the inventory with no depreciation. The heaters were purchased at considerably below retail prices and the unit costs as listed are below present OPA [Office of Price Administration] ceilings. The fire extinguishers, so far as could be learned have never been used and with refilling of fluid are as in good condition as when originally purchased.

The project made material in the auditorium was constructed for a definite purpose and many of the articles were poorly constructed. Their resale demand is doubtful and accordingly a reduction of 50% from the unit cost for depreciation is being made. The special purpose desk is a ticket collecting disk and has no value for resale, consequently the unit cost was reduced from \$8.00 to \$1.00, the probable value of the lumber involved in its construction.

The material purchased for the auditorium is carried in the appraisal with a depreciation but of 25% from the unit cost, to compensate for wear and tear. Only one of the two silk American flags could be located in the auditorium, one having been obviously removed during the interval between the taking of the two inventories. The window draperies and curtains are heavy and dyed black, having been made on order as blackout curtains for the windows. Having been made according to special specifications and the need for such articles having passed, the unit cost was reduced from \$400.00 to \$100.00, which it is believed would represent a fair price for the material involved.

⁶² National Archives, Laguna Niguel, California, Pacific Southwest Region, Record Group No. 270, Records of the War Assets Administration, Real property Disposal Case Files, Folder Title: Manzanar Relocation Center - Manzanar, CA, Fixed Asset Inventory, Box No. 89.

⁶³ "Manzanar Relocation Center / Manzanar, California / Inventory and Appraisal of Equipment and Furnishings of Auditorium," signed by Ernest R. Cushing, Field Examiner, San Francisco, California, April 25, 1946, one sheet of data with title sheet, in the National Archives, Sierra Pacific Division, at San Bruno, California; Record Group No. 49, Records of the Bureau of Land Management (successor to the General Land Office), Series 95, Box 919, File No. 82177; a copy of this document appears as Appendix B in this report.

Indeed, as Cushing indicated, there was not much need for blackout curtains in peacetime.

PRESERVATION OF THE AUDITORIUM

The land on which Manzanar stood had been leased from the Los Angeles Department of Water and Power with a proviso that 90 days after termination of the camp, the buildings and improvements erected by the U.S. Government would be removed. That did not happen. The lease also contained a proviso that the L.A.D.W.P. could indicate whether it wished to acquire buildings and improvements in lieu of site restoration. Exercising that option, on November 28, 1945, and again on January 8, 1946, L.A.D.W.P. indicated a desire to purchase eight apartment and dormitory structures in the WRA personnel housing area, with their furnishings, the auditorium with its equipment and fixtures, 11 buildings in the camp hospital complex, water and sewer systems that served these particular buildings, and the camp's entire electrical distribution system. Later it asked for the laundry in the personnel area also. A court stipulation dated March 27, 1946, notified one and all that these buildings and utility systems were not to be removed.

With respect to the auditorium, according to an internal memorandum the Los Angeles Department of Water and Power apparently intended to interest local organizations in purchasing the building and leasing the land on which it stood:

Auditorium: This is a very large structure and it is doubtful if the Department would have sufficient use to justify its maintenance. There would no doubt be numerous activities by the various civic organizations in the county which could be conducted in the auditorium under rental agreements. After thorough consideration it appears that the best solution regarding this facility would be to interest local organizations in the possibility of purchase by a large group and leasing the site from the Department for its maintenance.⁶⁴

Mysteriously, a sheet in the files of the Los Angeles Department of Water and Power dated March 7, 1946, listing "Structures and Equipment at Manzanar Relocation center needed by department of Water and Power" included the Auditorium, (Structure 51): "Entire structure together with incidental equipment and fixtures. Also portions of water distribution system and sewage disposal system adequate to serve this facility."⁶⁵ Despite this list, the Los Angeles Department of Water and Power decided it did not need the auditorium building.

The War Assets Administration, which inherited the responsibility for disposal of the assets of the Manzanar camp, ultimately declined to sell piecemeal certain parts of the infrastructure to be left in place, and instead chose to advertise all the buildings and structures for sale with the condition that they either be dismantled or be moved off site. The auditorium went into this category of disposal.

The subsequent history of the dismantling of the camp is long and complex. Some buildings and structures were sold intact to be moved off the site either into nearby towns or to rural ranches and farms. Some were retained on site and leased out for some years. Many others were demolished.

⁶⁴ Burton S. Grant, Assistant Chief Engineer of Water Works, November 23, 1945, to Samuel B. Morris and Laurance E. Goit, Los Angeles Department of Water and Power Historical Records, Administrative and Executive Files, Manzanar Relocation Center, Correspondence - Removal of Buildings, Nov. 1945--Apr. 1946, Unrau research files.

⁶⁵ Unsigned list dated March 7, 1946, Los Angeles Department of Water and Power, Water Executive Office Historical Records, Administrative and Executive Files, Manzanar Relocation Center, Correspondence - Removal of Buildings, Nov. 1945--Apr. 1946.

A BUILDING FOR WAR VETERANS

As demolition began, California Congressman Clair Engle and Senator William F. Knowland appealed to the War Assets Administration to sell the auditorium to the Turner Barnes Post, No. 8036, of the Veterans of Foreign Wars for use as a clubhouse. The War Asset Administration then withdrew the auditorium from demolition and authorized its disposal to a local governmental agency that would handle the conveyance of the building to the Veterans of Foreign Wars. That local agency would be the government of Inyo County, whose county seat was in Independence. The county could purchase the building for its salvage value but then would either have to move it or lease the land on and around it from the Los Angeles Department of Water and Power.⁶⁶

In a long article about the "town" which housed Japanese-Americans during the war being "hailed away" which appeared in the *Los Angeles Times* on Monday, December 2, 1946, reporter Frank Finch noted, "Although most of Manzanar looks like it had been the target of an atomic bomb, a few buildings will remain, temporarily at least. Inyo County purchased the center's 1280-capacity auditorium for \$6500 and will turn it over to the veterans for use as a social center."⁶⁷ Four days later, on December 6 the *Inyo Register* published an editorial giving Ralph Merritt credit for "'Re-Distributing' Manzanar," in which it noted among 11 specific benefits to the public of Inyo County: "A 1280-capacity auditorium secured for veterans and turned over to southern Inyo Legion groups for recreational and social purposes."

Formal acquisition of the auditorium by the county took place early in 1947. Effective January 1, 1947, the Los Angeles Department of Water and Power leased to Inyo County for a period of five years (with subsequent renewals) a rectangle of land extending 1,445 feet by 320 feet with the longer axis running roughly east-west.⁶⁸ The auditorium stood close to the western boundary of this tract, and the west boundary included a paved street, probably a section of B Street, and a fire hydrant, while the east boundary abutted the western edge of the right-of-way of north-south U.S. Highway No. 395. The acreage between the east end of the building and the highway could be used as a parking lot. On January 6, 1947, the War Assets Administration authorized the county to take possession of the auditorium pending sale for \$6,200. The actual transfer of ownership took place on February 11, 1947, the date on the deed from the War Assets Administration to the County of Inyo in exchange for ten dollars "and other valuable consideration in hand paid."⁶⁹

⁶⁶ Cecil L. DeWolfe, Deputy Regional Director for Real property Disposal, War Assets Administration, August 29, 1946, telegram to Paul C. Williams, Director, Urban and Rural Division, Office of Real Property Disposal, War Assets administration, Washington, D.C., reporting request from Congressman Clair Engle to sell the auditorium to the veterans, recommending that the building be exempted from the demolition order. Laguna Niguel, Record Group No. 270, File No. 1; John McMurray, Inyo County, September 27, 1946, to Senator William F. Knowland; John J. O'Brien, Deputy Administrator, office of Real property Disposal, October 17, 1946, National Archives, Laguna Niguel, Record Group No. 270, File No. 2. Copies of these documents are in the Unrau research files at Manzanar N.H.S.

⁶⁷ *Los Angeles Times*, Monday, December 2, 1946, pp. 1, 3.

⁶⁸ Letter, Laurance E. Boit, Chief Engineer of Water Works and Deputy General Manager, Los Angeles Department of Water and Power [actually signed by District Agent T.R. Silvius in Independence] to County of Inyo, April 10, 1947, copy supplied by the Eastern California Museum, Independence, California. This was the cover letter enclosing Lease No. OVRL-2505.

⁶⁹ Unrau, Vol. II, p. 815; Bill of Sale, accompanied by a letter from Clarence W. Hull, Director, Legal Division, War Assets Administration, Office of Real Property Disposal, Los Angeles, February 14, 1947, to Board of Supervisors, County of Inyo, from the collections of the Eastern California Museum, Independence, California.

Inyo County leased the auditorium to the Independence Chapter of the Veterans of Foreign Wars until November 5, 1951, apparently with a sequence of renewals. According to a member of the Veterans of Foreign Wars, it was probably in late 1953 or early 1954 that the county allowed the V.F.W. to remove the single story south wing of the auditorium and move it in four sections into the southwestern portion of the town of Lone Pine. There they reassembled it into two sections set at right angles to form the shape of an "L", facing east and south. The V.F.W. and American Legion remodeled them into a meeting hall and club house for each organization, though perhaps most members of one organization were also members of the other. Veterans of Foreign Wars Post No. 8036 occupied the portion of the "L" facing to the east, while the American Legion occupied the portion of the "L" facing south; the two sections joined at the north end of the V.F.W. hall and the west end of the American Legion hall. The new location of the buildings lay at the dead end of Gene Autry Lane, just west of Washington Street. The relocated, realigned, and remodeled south wing of the auditorium remained the property of Inyo County at its new location, on land owned by the Trustees of the Town of Lone Pine, California.⁷⁰

A COUNTY HIGHWAY DEPARTMENT GARAGE

The county converted the rest of the auditorium, on its original site, into a county highway department garage and shop, cutting a large door in the center of the east wall and removing the stage to provide access to vehicles for repair and maintenance. The county dismantled the fir floor, using the wood to build partitions and make other modifications to the building and to build shelves for automotive parts in the north wing. In place of the wood floor, the county poured a new concrete floor to accommodate the county vehicles. The county continued to use the building for this purpose until 1995, when the National Park Service purchased the building.

Thus a half century after its construction as a building intended for a brief and temporary span of use, the Manzanar Auditorium-Gymnasium survived as the last major structure of the Manzanar War Relocation Center, consigned to enter the lists of buildings destined for historic preservation.

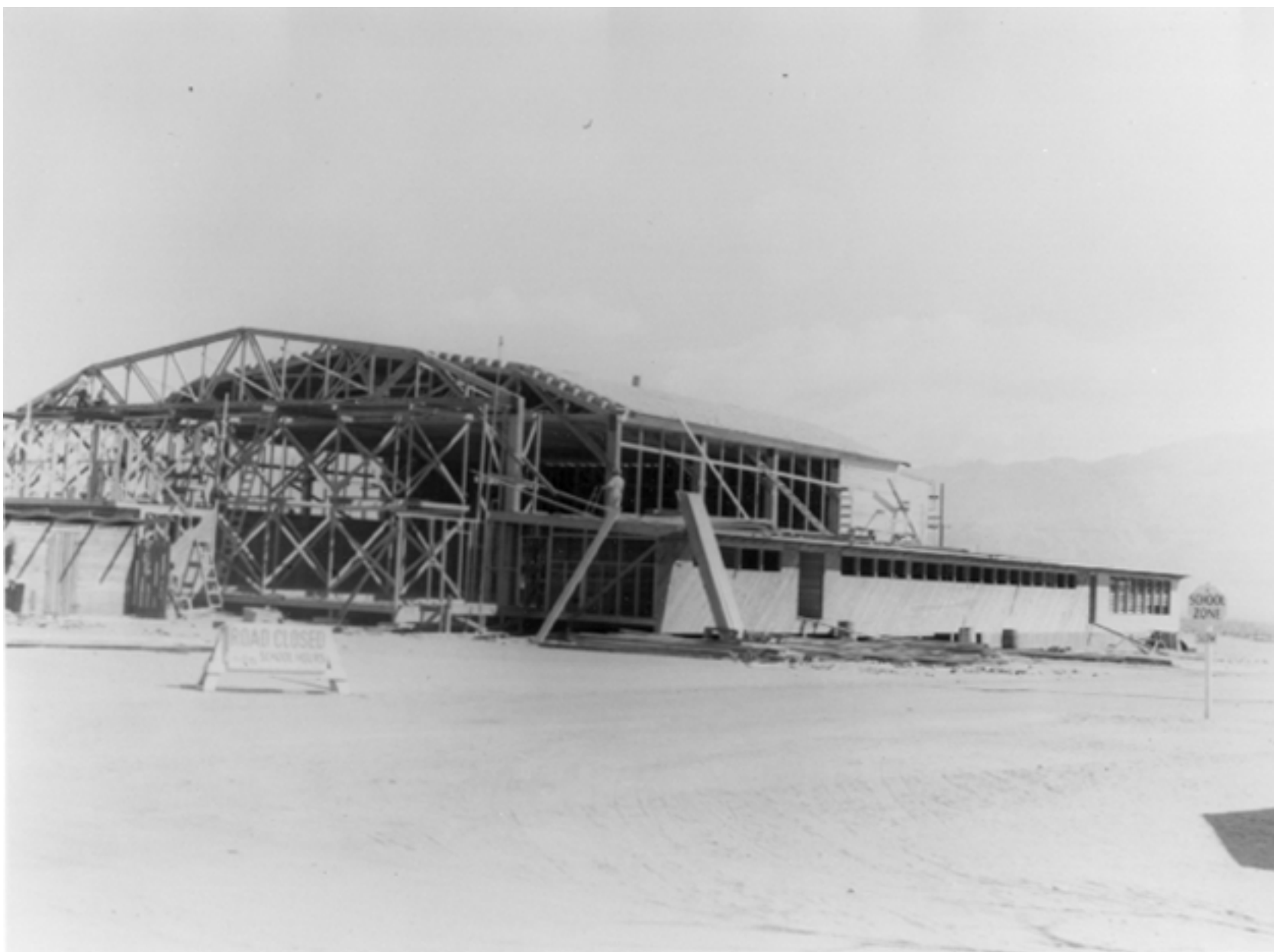
A note from the Clerk of the Inyo County Board of Supervisors indicated that on June 10, 1952, he had sent H.G. Frew of the Los Angeles Department of Water and Power in Independence a new signed lease for the auditorium site, which amounted to a renewal of the lease. Presumably others followed at five year intervals.

⁷⁰ The author examined the exterior and interior of this building at its present location on the afternoon of September 3, 1998, with the guidance of Jim Palsrok.

HISTORIC PHOTOGRAPHS

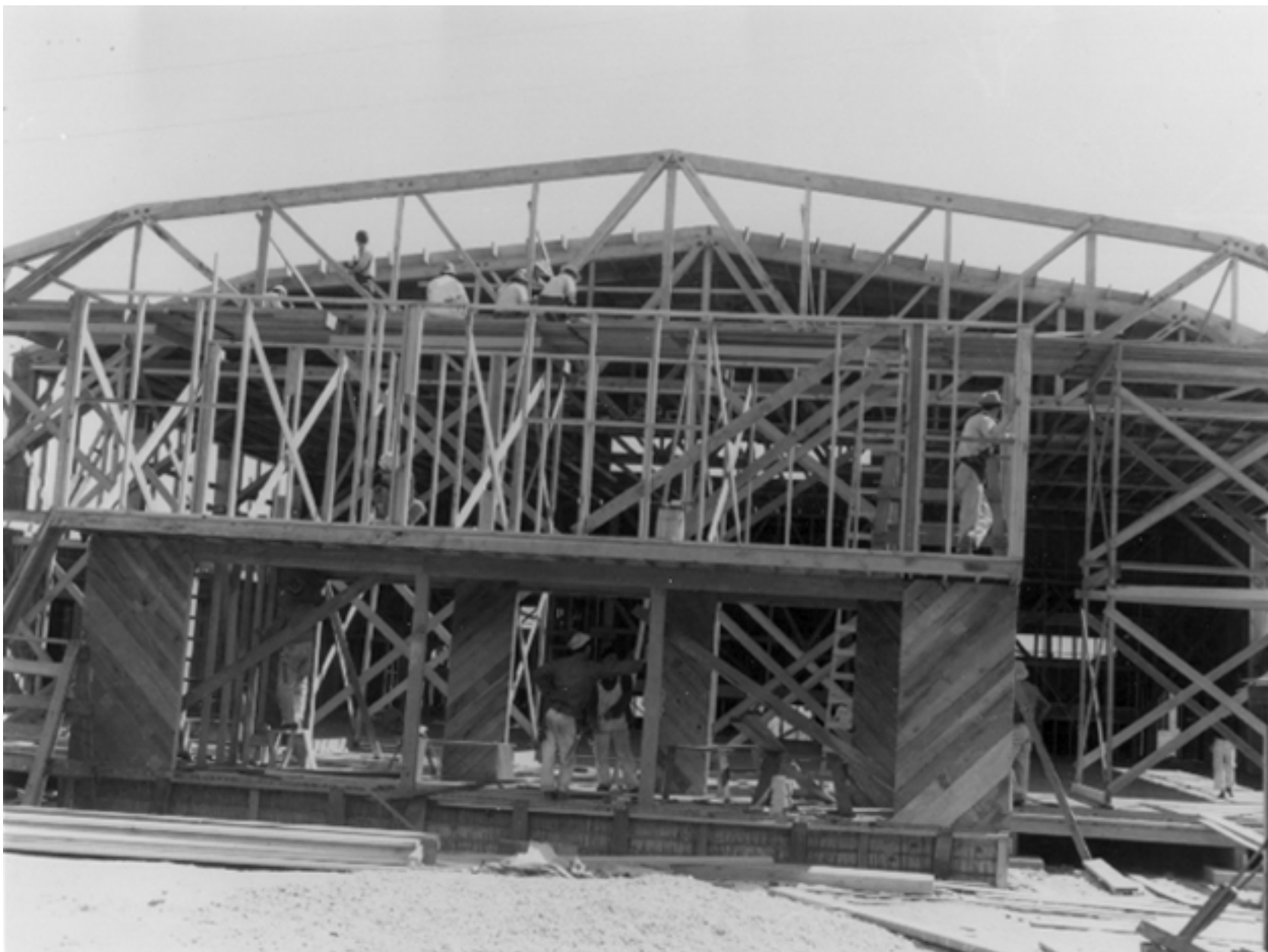
HISTORIC PHOTOGRAPHS

Photo 1. The Manzanar Auditorium-Gymnasium under construction. View of southwest corner and south wing. 1944. University of California at Los Angeles Collection.



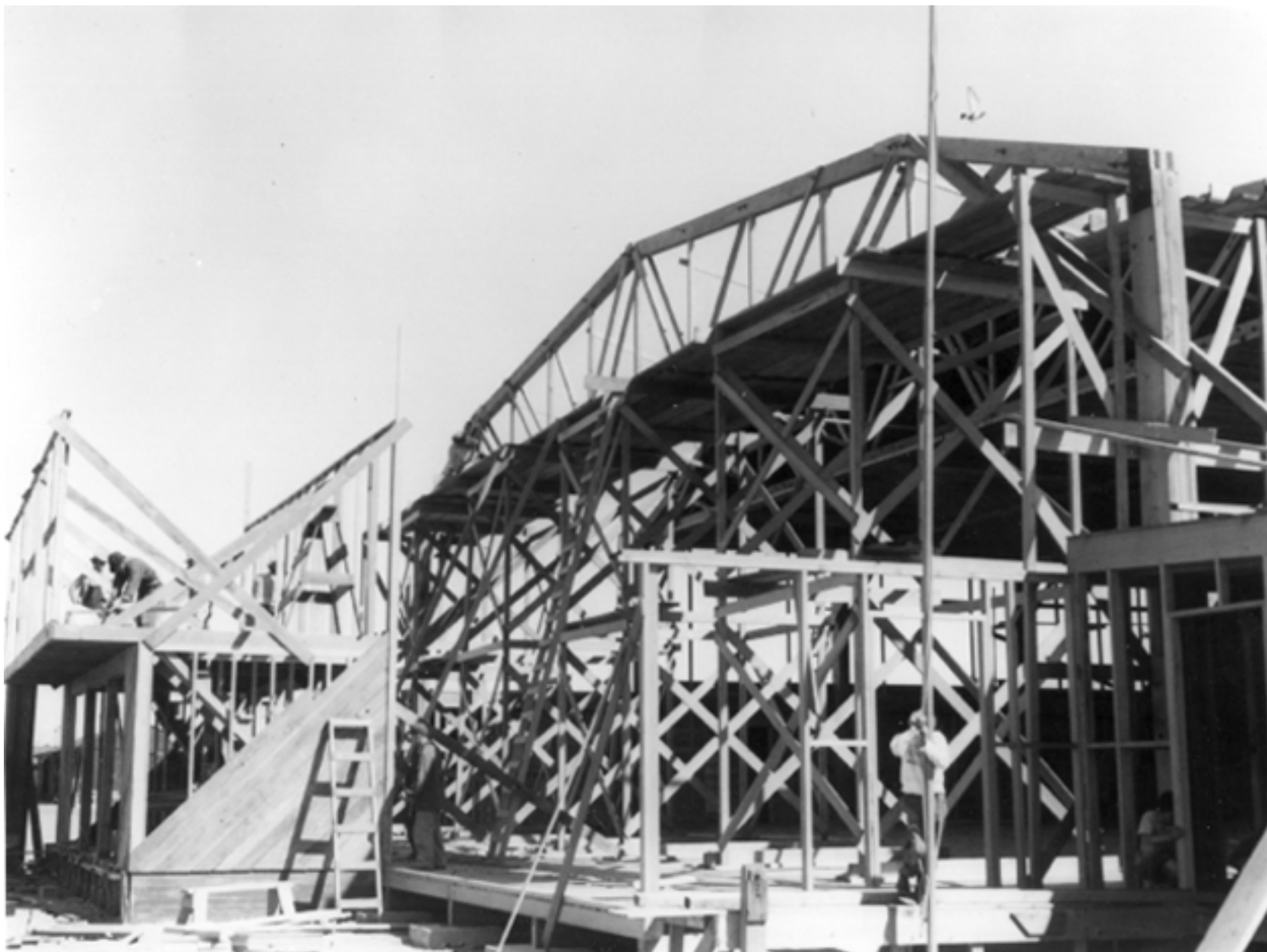
HISTORIC PHOTOGRAPHS

Photo 2. Part of west end of building under construction showing roof trusses and framing at west entrance and second story projection room. 1944. University of California at Los Angeles Collection.



HISTORIC PHOTOGRAPHS

Photo 3. Southwest corner of building under construction. Main west entrance is at left with framing of projection room above it being assembled. The extreme northwest corner of the south wing is at the lower right. 1944. University of California at Los Angeles Collection.



HISTORIC PHOTOGRAPHS

Photo 4. View during construction of northwest corner of auditorium from the interior showing the westernmost roof truss in place. The roof and ceiling framing has been installed to the next truss to the east. 1944. University of California at Los Angeles Collection.



Photo 5. This group is probably the construction crew, who were camp internees, with what are presumed to be some of the camp administration officials in the center row. Project Director Ralph Merritt is in the center of the middle row (sixth from right). The group is at the northwest corner of the building. May 1, 1944. Toyo Miyatake Collection, No. 1277, courtesy Archie A Miyatake, San Gabriel, California.

Toyo Miyatake became the official camp photographer and thus documented not only the construction of the auditorium, but many of the major activities that took place in the building, including high school graduation ceremonies and special events. Most of the historic photographs included in this report were taken by Mr. Miyatake, with permission for their use and prints provided by Archie A. Miyatake.



HISTORIC PHOTOGRAPHS

Photo 6. Construction of the framing of the projection room over the main west entrance. View toward the west from the building interior. The three openings in the lower wall would receive the entrance doors. 1944. National Archives, Neg. No. 210-GG-588.



Photo 7. One of the few views of the east end of the Auditorium, this view is from the northeast. The horizontal siding has been installed on the walls of the auditorium and stage sections, but the north wing is still showing the diagonal sheathing. In the lower portion of the east stage wall is a double doorway opening flanked to each side by window openings, each of which would receive three sash units. At the northerly end of this same wall at the second floor level is also a window opening, which also would have three sash units. A similar window opening is at the opposite end of this wall, just outside the photograph. 1944. Eastern California Museum Collection, MERR 7, 94.82.1.

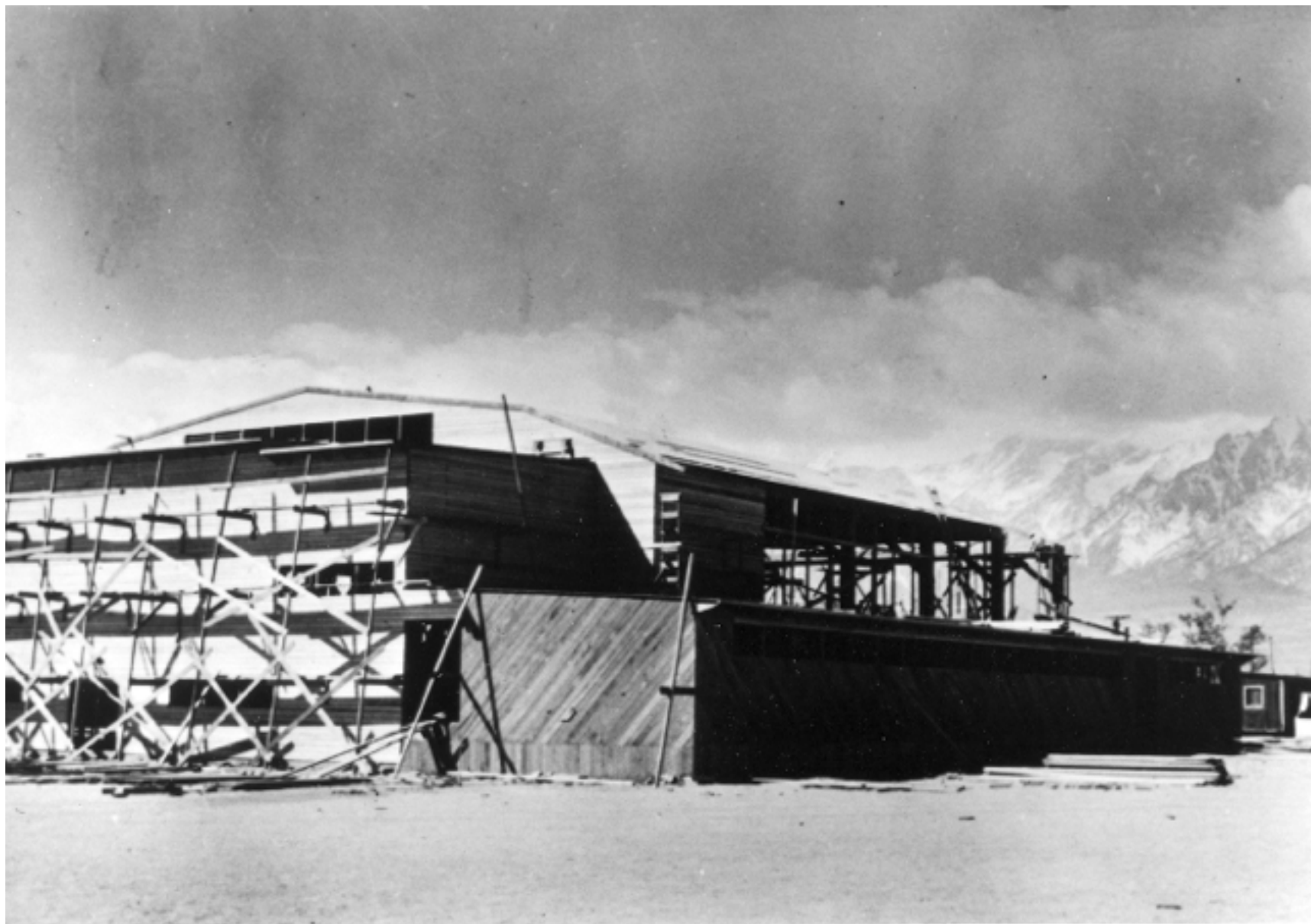


Photo 8. The completed exterior of the Manzanar Auditorium-Gymnasium, 1944 or 1945. View from the northwest of the west main entrance, with the north wing at the left. The entry walk, flagpole and some plantings are in place. A storage building still remains or has been added to the south of the entry walk. Toyo Miyatake Collection, No. 87-C, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 9. View from the southwest of the completed auditorium, with the south wing at the right, 1944 or 1945. The bank of louvered openings at the upper center of the west wall ventilate the attic. A similar set of louvers is found in the east wall of the attic. The ladder provided access to the roof and an attic access hatch is visible in the roof beyond the ladder. Two access hatches are also visible on the roof of the projection room. These hatches no longer exist. Access to the attic is now through one of the louver openings. The high vent stacks were furnace flues. Two inverted v-shaped ventilator covers are seen on the roof of the south wing, which were repeated on the north wing. These ventilated the shower rooms. The south wing arrangement appears to have been a mirror image of the north wing except for the extension to the east, which had considerably greater window area, and housed the health unit. Toyo Miyatake Collection, No. 87-D, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 10. View toward the east from the southeast corner of the main building. At the extreme right is the northeast corner of the south wing extension which contained the health unit, which indicates that the window configuration was similar on both the north and south sides of the extension. The activity may have been a fire safety demonstration. The fire truck, at "A" Street, was one of two camp fire trucks. One of the fire trucks is now back at Manzanar, having been previously used by the City of Bishop. A second power line in the background is parallel to Highway 395. Toyo Miyatake Collection, No. 402, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 11. Persons gathered at the west entrance to the auditorium are found in other photos dating this photo to April 5, 1945. The ceremony was a memorial service for Sgt. Kiyoshi Robert Nakasaki and Pfc. Sadao Munemori, who were killed in action in Italy. Because there are no flowers or shrubs in the planting beds or adjacent to the entrance walk, it is possible that other photos showing plantings were taken later in 1945. Toyo Miyatake Collection, No. 169, courtesy Archie A. Miyatake, San Gabriel, California.



HISTORIC PHOTOGRAPHS

Photo 12. View, probably in 1945, toward the southwest from the west main entrance of the auditorium showing plantings along the entrance walk. The barracks in the background are in Block 8. Toyo Miyatake Collection, No. 415, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 13. Auditorium interior, probably during the first high school graduation ceremony, held in 1944. The interior work had not yet been completed. The painting was incomplete – the wall wainscot paint colors are not yet finished and the doors and trim do not have their finish colors. Also the seating appears to be all folding wooden chairs, indicating that the wooden benches had not yet been built or completed. Although the stage backdrop curtains are not visible here, which could imply they were still being made, it is possible that they are pulled upward or aside because they do not appear in some later photos. Toyo Miyatake Collection, No. 691, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 14. In this view later in 1944 or possibly in 1945 of the auditorium stage, it can be seen that the painting has been completed, with medium and darker brown used on the doors and trim and for the wainscoting delineation on the walls. The northeast and southeast exit doorways are also visible and the wooden benches are in use. The ceiling light fixtures and hot air circulation units are still in place. Toyo Miyatake Collection, No. 91, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 15. High School graduation ceremony in 1945. Here again is illustrated the final paint scheme. The stage backdrop curtains are shown and curtains at the north windows can be seen at the extreme left. Toyo Miyatake Collection, No. 703, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 16. In the background are the three main entrance doorways in the interior west wall of the auditorium during the 1944 high school graduation showing that the walls, doors and trim had not yet been given their finish coats of paint. Toyo Miyatake Collection, No. 694, courtesy Archie A. Miyatake, San Gabriel, California.



HISTORIC PHOTOGRAPHS

Photo 17. The west interior wall of the auditorium during the 1945 high school graduation ceremony showing the final paint scheme. Window curtains (including black curtains for daytime movie viewings as well as evening “blackout” use) are seen as well as the wooden benches. Toyo Miyatake Collection, No. 702, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 18. This view toward the southwest corner of the auditorium also provides a close-up view of the wooden benches. 1944 or 1945. The window curtains had not been installed at this time. Fire extinguishers are seen on two of the columns of the south wall. The hangers or evidence of their locations are extant. Toyo Miyatake Collection, No. 171-i(L), courtesy Archie A. Miyatake, San Gabriel, California.



HISTORIC PHOTOGRAPHS

Photo 19. West wall and northwest corner of auditorium, probably in 1945. The window and black-out curtains are seen at the north windows. A long pole in the northwest corner may have been for operating the windows. Only every other sash unit of the lowest row were operable. Toyo Miyatake Collection, No. 286, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 20. West main entrance of auditorium, April 5, 1945. Photo taken during the memorial service for Sgt. Kiyoshi Robert Nakasaki and Pfc. Sadao Munemori. The entry portico was divided by two simple posts. At the left (north) side the ticket booth door and window are visible, both of which are still extant. Toyo Miyatake Collection, No. 170-B, courtesy Archie A. Miyatake, San Gabriel, California. This photo is also in the Eastern California Museum Collection, Brown Album.



Photo 21. Another view at the west main entrance during the April 5, 1945 memorial service showing details at the doorways. The three double entry door sets and the closers are no longer in place but the light sockets are extant. Toyo Miyatake Collection, No. 170-A, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 22. South wall of auditorium interior. This view toward the southwest corner shows in clear detail the windows, a fire extinguisher at the far column, bolting of the built-up columns and the painting scheme. The window curtains however are not yet in place. 1944 or 1945. Toyo Miyatake Collection, No. 614, courtesy Archie A. Miyatake, San Gabriel, California.



HISTORIC PHOTOGRAPHS

Photo 23. Auditorium interior south wall, view toward southeast corner. 1944 or 1945 Toyo Miyatake Collection, No. 541, courtesy Archie A. Miyatake, San Gabriel, California.



HISTORIC PHOTOGRAPHS

Photo 24. Northwest corner and north wall of auditorium interior. 1944 or 1945. Toyo Miyatake Collection, No. 189, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 25. Auditorium interior, northeast corner and front of stage, 1944 or 1945. Toyo Miyatake Collection, No. 191, courtesy Archie A. Miyatake, San Gabriel, California.



HISTORIC PHOTOGRAPHS

Photo 26. Southeast corner of auditorium interior, 1944 or 1945. For some activities, the stage became temporary storage for the benches. Toyo Miyatake Collection, No. 817, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 27. Manzanar Project Director Ralph P. Merritt delivering eulogy during memorial service for Pfc. Arikawa, first evacuee from Manzanar to be killed in action while serving in the U.S. Army. August 6, 1944. The stage curtains may have been taken down for resumption of painting. The door had not yet been installed in the opening in the upper left corner of the stage space. The doorway was to an unfinished room at the north side of the stage space. There is a similar space at the south side. There is no evidence of either stair or ladder access to either space. Toyo Miyatake Collection, No. 171-D, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 28. Another view of the north side of the stage. At this time, possibly late 1944, the door had been installed at the upper stage level, additional painting completed and some stage curtains rehung. Toyo Miyatake Collection, No. 708-B, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 29. View of stage, possibly late 1944, after the doors leading off-stage had been installed and probably most of the painting completed. The stage curtains that had been installed earlier have probably been taken down for the painting work. Toyo Miyatake Collection, No. 843, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 30. Close-up view of stage taken during the 1944 high school graduation ceremony. This shows the overhang at the front of the stage. This view again illustrates that the painting was incomplete at this time. Toyo Miyatake Collection, No. 686, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 31. Another view of the stage during the 1944 high school graduation. A small window-like opening is seen at the south side of the stage, and adjacent to it a smaller opening for an electrical panel. At the far right is one of a pair of openings and speaker(duplicated at the opposite side of the stage) of the public address system. Toyo Miyatake Collection, No. 700, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 32. The stage during the 1945 high school graduation. Note the full array of stage curtains. The footlight trough is more visible in this view. Toyo Miyatake Collection, No. 687-C, courtesy Archie A. Miyatake, San Gabriel, California.

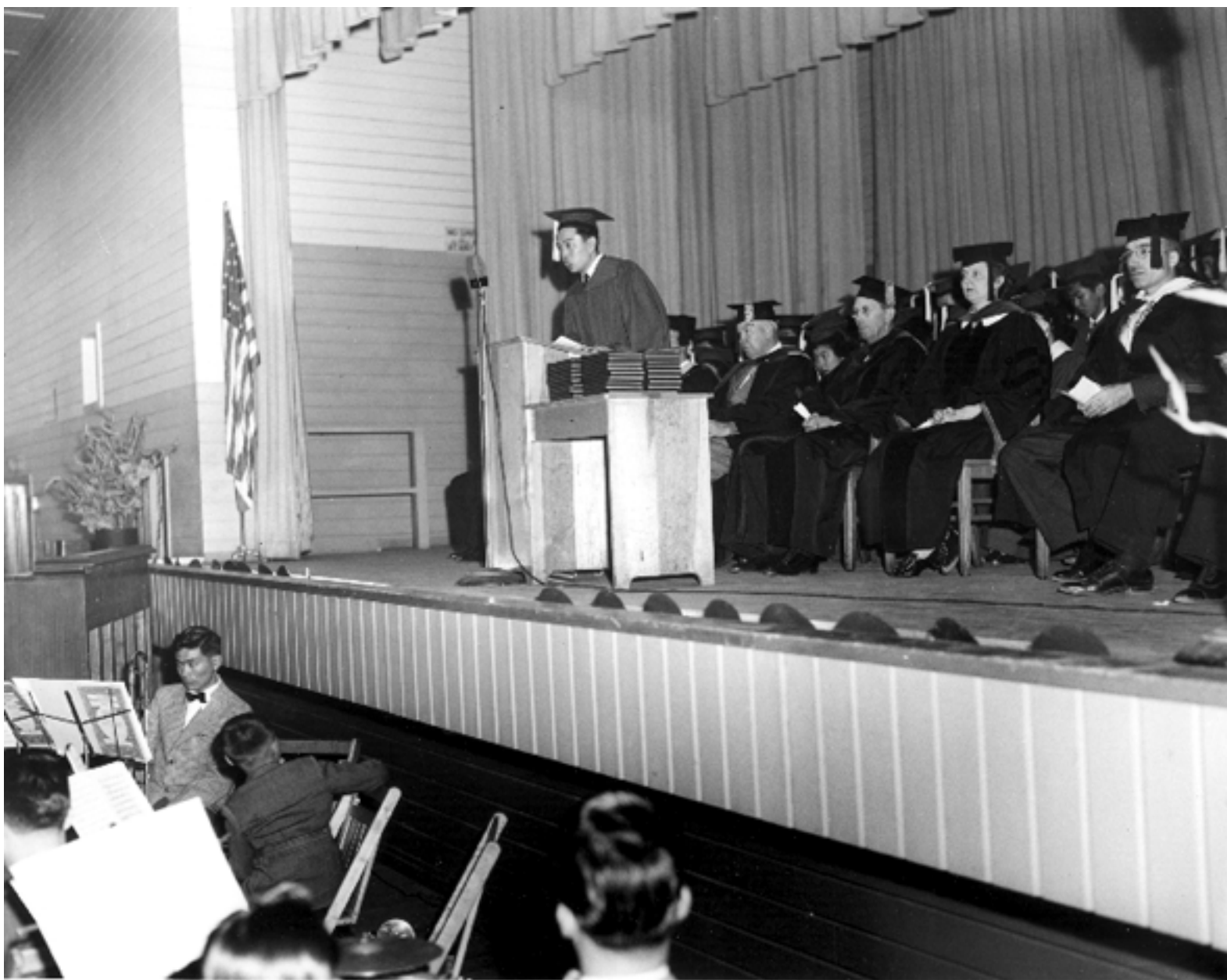


Photo 33. This close-up taken during the 1945 high school graduation provides more detail of the footlighting. Toyo Miyatake Collection, No. 687-D, courtesy Archie A. Miyatake, San Gabriel, California.

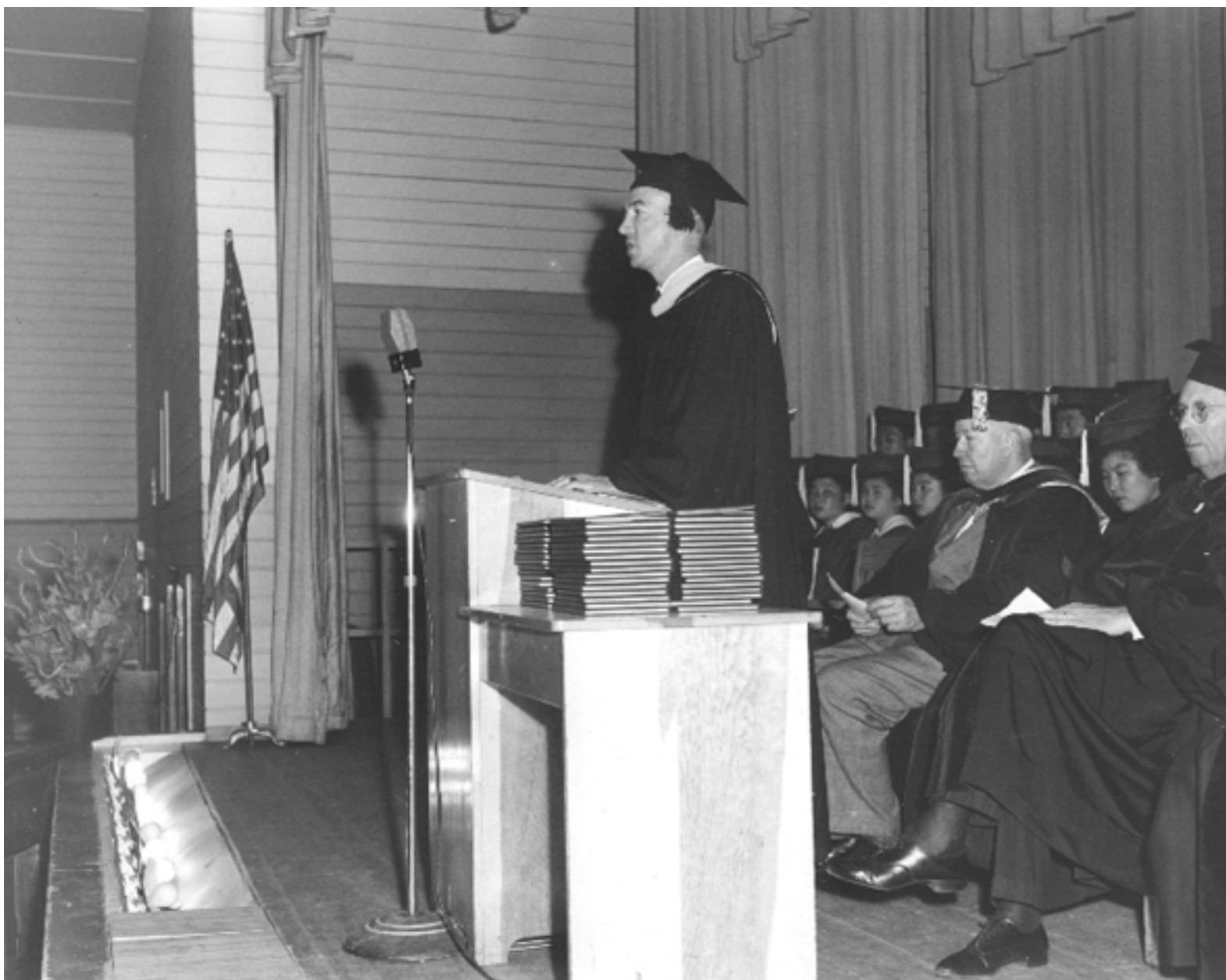


Photo 34. A view from the stage, probably late 1944 or early 1945, shows the footlight sockets and wiring. The window and black-out curtains at the north wall windows are also illustrated. On the sides of two columns, just above the dark portion of the painted wall wainscot, are cleats for curtain pulls. Some of these are still extant, as well as pulleys in the ceiling above adjacent to the columns for drawing the black-out curtains. Toyo Miyatake Collection, No. 95, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 35. The auditorium was used between 1947 and 1954 by the Veterans of Foreign Wars. This view of the auditorium from the southwest was shortly after the south wing was removed, probably 1954. The VFW moved the south wing structure to Lone Pine and placed it there in an L-shaped configuration. It is still in use by the local VFW chapter and the Lone Pine American Legion Post. The doorways in the second and fourth bays from the west were probably added after 1947. The horizontal board wall finish which was originally within the interior of the south wing and then exposed to the exterior was cedar, typical of the interior wall finish. The exterior siding on the other hand was Douglas Fir. Also exposed by the removal of the south wing and visible in this photo are the concrete footings supporting columns in the main south wall of the auditorium. The cornerstone is in the left center foreground. The pine tree near the west main entrance had substantially increased its height since 1945. Toyo Miyatake Collection, No. 87-G, courtesy Archie A. Miyatake, San Gabriel, California.



Photo 36. After removal of the south wing by the VFW, Inyo County modified the auditorium building for use as a maintenance facility. This view, probably mid- to late-1954, shows that the stage has been removed and a vehicle access opening constructed in the east exterior wall. The windows that were originally in the space beneath the stage had not yet been removed. The auditorium-gymnasium floor has also been removed. The concrete pads which had provided support for the floor framing were used to fill in spaces between framing and footings at the perimeter of this space before earth fill and a concrete slab were installed. This new floor level is lower than the original floor surface leaving the original floor level and base trim position still visible. Some of the original wood flooring was used on new walls in the former stage space. Toyo Miyatake Collection, No. 87-F, courtesy Archie A. Miyatake, San Gabriel, California.



HISTORIC PHOTOGRAPHS

Photo 37. West (main) entrance of the auditorium. This view shows that a small pine tree had been planted on each side of the entrance walks, although they are still small so this photo may have been taken about the time the camp was closed, late 1945, or sometime later. The entryway had also not yet been enclosed. Eastern California Museum Collection, MERR 8.



HISTORIC PHOTOGRAPHS

Photo 38. View to the north with the front entrance features and west end of the auditorium-gymnasium building. Barracks Block 13 is just north of the auditorium. The Sierra Nevada mountains are in the background. There are no other buildings visible but the steps at the southwest corner of the building are visible at the extreme right, so this photo was probably taken between 1947 and 1954, most likely in the later part of that period as evidenced by the growth of the two pine trees. The west entrance is unenclosed, indicating that the enclosure was possibly constructed after 1954. Eastern California Museum Collection, NOM 47, 94.80.10a.



PHYSICAL DESCRIPTION AND ANALYSIS

PHYSICAL DESCRIPTION AND ANALYSIS

SITE

The entrance to the site from highway U.S. 395 is to the east of the building. In the GMP, visitor parking is proposed to the east of the building. An interim plan of operation is under development in order to open the park to visitors. Aspects that may differ between the interim and ultimate (GMP) plan recommendations include entrance to the park, visitor flow and directions. The historic entrance to the building is on the west side, opposite the park entrance and proposed visitor parking. Parking and circulation around and into the building needs to be addressed. Design of the parking as well as restoration of landscape features in the building's vicinity will be important for both interim and ultimate use.

Photographs taken in 1944 and 1945 show parts of the building and surrounding site from shortly after the September 1944 completion of the building and into the next year. These photos indicate that the block which the building occupied was barren ground and the only site development and landscaping was the approach to the west main entrance. A wide concrete sidewalk had two planting beds bordered with concrete curbs and with a flag pole between them. This configuration was aligned with the center of the main entrance. Various photos show these beds had been planted with flowers. Still later a view toward the southwest from just outside the entrance shows that shrubs bordering the walk had been put in as well as a pine sapling on each side of the walk near the entrance. These trees are seen in late 1940s to early 1950s photos as having grown to perhaps twelve to fifteen feet in height.

The trees and plantings no longer exist, nor does the curb around the planting beds or the flagpole. The concrete walk, or at least most of it, still exists but sections of it are broken and the west end is buried under sand and gravel.

ARCHITECTURAL DESCRIPTION AND ANALYSIS

Character Defining Features

Exterior.

- Central gambrel roofed auditorium/gymnasium element with projecting two-story entrance element at west elevation and single story shed roofed "wings" on both north and south sides. South wing extended east 40'-9" beyond east wall of main structure.
- V-groove shiplap siding, horizontal except vertical on main west wall and first story of west entrance.
- Exterior doors – wood, two panel.
- Windows – four-light fixed and awning:
 - On north and south sides of gymnasium above wings – bank of units three vertically by 16 horizontally.
 - Rows of single units along north and south exterior walls of wings.
 - Single units or groups of three units at other locations.

Interior.

- Main auditorium/gymnasium open space; ceiling of four foot by eight foot panels with 1x2 battens over joints, walls finished with painted V-groove horizontal shiplap, (historic) floor of 1x4 tongue and groove Douglas Fir, clear varnish finish, and the stage at the center of the east wall. The ceiling finish appears to have been a flat white which was actually the factory primer on the fiber board panels. The wall paint scheme appears to have been a dark brown wainscot (to 5 courses = 50”), a medium beige (to 10 courses = 100”) and then a light beige to the ceiling. The stage ceiling and walls were similar to the assembly room; some activities were held before the stage curtains were installed.
- Industrial style painted metal pendant reflector light fixtures in auditorium/gym, with wire guards, in a 5 by 7 grid.
- Four suspended fan units in the auditorium/gym.
- Ceiling finishes in the other spaces consisted of fiber board panels similar to the auditorium, painted or unpainted shiplap boards or gypsum board.
- Wall finishes in the other spaces consisted of painted V-groove siding similar to the auditorium, painted or unpainted shiplap boards, painted gypsum board, or in some cases no finish was applied to the framing.
- Floors in the other spaces were primarily 1x4 t&g wood or concrete.
- Interior doors – (historically) predominantly wood two-panel.
- Auditorium seating – wooden benches.
- Window coverings – valence and side panels of a material probably similar to the stage curtains and black-out curtains. Wooden cleats (most still exist) were screwed to the sides of columns to secure the pull cords for the black-out curtains.

Exterior Description and Analysis

Roofing System. The roof form of the main auditorium-gymnasium space is a low-pitched gambrel formed by the roof trusses. The wings, west entrance and stage sections have low-pitched shed roofs. Roof sheathing consists of 1x6 shiplap (5-inch exposure). On the main auditorium roof, the sheathing was installed perpendicular to the purlins (that is, parallel to the trusses).⁷¹ The existing roofing is a mineral surfaced roll roofing, reportedly installed by the county (date unknown). The type of original roofing is difficult to discern from the historic photographs, but it was probably an asphaltic roll roofing. In fact, it was described as black mineral-surfaced split-sheet roll roofing (3 feet by 36 foot rolls, 116 pounds per roll), “mopped on with hot asphalt.”⁷² The asphalt bond coat occasionally leaked through the sheathing board joints, observable on the underside from the attic. There are no visible nail penetrations when the roof sheathing is inspected from the underside in the attic so the roofing may not have been nailed in addition to the asphalt mopping as indicated in the proposed building material list. It is possible that the original roofing still exists under the later application.

There are occasional water stains on roof sheathing and framing indicating some past leakage, but no deterioration was observed. Inspection along the eaves is difficult because of the low pitch of the roof and no crawlway surface. If deterioration exists it is likely to be found along the eaves, which are susceptible to deterioration because of overflowing gutters or damage to roofing or eave enclosure. Flashings are probably from more than the most recent roofing effort. Gutters and downspouts at the main roof are reported to have

⁷¹ See the related information in the historic data section of this report. The 1946 War Relocation Authority report (Appendix B) described the roof sheathing (sheeting) as laid diagonally; in fact it was laid perpendicular to the purlins.

⁷² See the 1942 material list for the building as proposed, Appendix A, and the 1946 report, Appendix B.

been installed at the time of the last roofing application. Gutters and downspouts do not show in historic photographs.

Exterior Walls and Siding. The exterior walls are wood frame construction with diagonal 1x6 board sheathing. Most of the building is finished with painted horizontal wood siding except for the main west wall and the ground level of the main west entrance, which have vertical siding. This exterior siding consists of both horizontal and vertical "V" groove Douglas Fir wood siding, 3/4 inches thick with a 5-inch exposure. On the south elevation, the lower portion of the wall that was originally the interior wall within the south wing has cedar siding which was used for a majority of the interior finish. For the most part, the siding is in poor condition, having received few paint coatings since the structure was constructed. Current efforts to preserve the siding using a new weathered wood primer look promising. This work was done under a recent contract which included all of the exterior except the west side of the building. Areas of severely deteriorated siding, mostly on the south elevation, were replaced with cedar, and all repainted. The west elevation will be treated separately. The siding there is in such deteriorated condition that it can't be preserved without having an adverse effect on the structure's historic appearance.

The west entrance configuration has been altered. The original entryway was open with two posts that divided the opening into thirds. The flanking enclosed end portions of the ground level entrance structure were the stairways to the projection rooms above. The stairs and projection rooms still exist. At a later time, at least by ca. 1954, this entryway was enclosed and a double door installed in the center and a window in each of the flanking sections. The original three double entry doorways in the main west wall of the assembly room still exist but the doors were removed. It appears that one of the original doors was installed in the in-fill wall.

Windows. The historic windows have been modified little since their installation. They are remarkably simple and consistent in detail on all elevations of the structure, consisting of single and multiple configurations of a single 4 light wood sash that is 1-3/4 inches thick, 4 feet wide by 3 feet 3 inches high, except on the north wing and in the east wall they are approximately 2 feet 3 inches in height.

In single and selected alternating first-course locations when ganged, these sashes open awning style where the top rail of the sash is set with hardware into a grooved wood slot and allowed to slide while simultaneously pivoting. When open, it appears they were held in place by the mere friction of the hardware gliding in the slotted wood stop (see drawing H11). Fixed sashes had no hardware and appeared to be face-nailed. No flashing or sealant was visible, nor did they appear to be used when the windows were installed. Furthermore, when the sashes were glazed, historically, the glass panes were not set into putty, instead they were installed against the bare wood of the sash. The bottom rail of the sash is not shaped to fit (seat) against the sill accurately and may have been designed purposely as a drip.

In a damper climate, the lack of these appropriate flashing details (particularly at vertical joints between sashes), sealant, and maintenance would have likely left the windows in a far more deteriorated condition in a shorter period of time.

The actual condition of the majority of the sash units on the north and south clerestories (where there are three courses of sash) is very poor, and in their current state they provide only limited protection from wind-driven rain. The rails and stiles are severely weathered and warped, and most of the glazing putty has broken down, the glass points rusted, the glass panes cracked, broken, and missing. A number of these sash units have been stockpiled inside the building.

Most of the windows of the north wing have a grid of steel bars applied to the exterior for security reasons, probably installed after 1954. Because visual inspection of these window sash was impaired by the security

grilles, it is difficult to assess their condition. or what kind of damage may have been caused by the installation of the security grilles.

Most of the window units have severely deteriorated wood on the exterior surfaces and many are warped. The wood is deteriorated and warped because of paint deterioration and consequent exposure to hot sun, ultraviolet degradation, wind, rain and snow.

Doors. The historic doors are wood rail, stile, and panel construction. These doors, interior as well as exterior, were of unusually lightweight construction with 1/4 inch plywood panels (primary exterior doors appear to have been glazed in the upper panels) and no more than 1-1/2 inch thick rails and stiles. Because of this design, few of the exterior doors have survived the ravages of time. Vulnerable to severe weather, rough use, and repeated break-ins, most have been replaced by vandal resistant contemporary doors of solid wood or steel. Two exceptions are at exterior exit locations (room 106 and hall 113) where components of historic doors (some likely interior) and their black-metal panic hardware are still extant.

South Wing. The original south wing was described as containing toilets, dressing rooms, lockers and offices, similar to the north wing, but in addition the extension to the east contained a health unit.⁷³ The exterior design of the south wing was a mirror image of the north wing, with the exception of the health unit extension. During the period that the VFW used the building, some doorways were added in the south wall of the assembly room leading to spaces in the wing. After the wing was removed, ca. 1953-54, most of the original and added doorways were removed. Then a vehicle doorway was added at the west end of the south wall (at the southwest corner of the assembly room).

Interior Description and Analysis

Attic. Wood joists between the bottom chords of the roof trusses, with blocking at mid-span, provide the nailing grid for the panels of the auditorium-gymnasium ceiling. The bottom of the joists are flush with the bottom of the truss chords. The top surface of the ceiling panels has a considerable layer of dust blown into the attic over the years through the louvres at the ends of the attic. Before removal of ceiling material, this dust needs to be vacuumed out.

Ceiling Materials and Finishes. The majority of the ceilings in the building were historically finished with 4 foot by 8 foot fiberboard panels with 3/4" by 1-1/2" wood battens covering the joints. The ceilings of the gym/assembly room and some rooms of the north wing are of this fiber composition board known as "Celotex", "Firtex," "beaverboard" or various other brand or generic names, listed only as insulation board in the 1942 proposed construction material list and "fibre" board in the 1946 report. It is one-half inch thick and had a white factory prime coat. No finish paint coat was added. This is a flammable material and should be removed and replaced. It is also sagging and very dirty and in some areas broken and missing.

Ceilings in some rooms in the building were finished with shiplap boards (painted and un-painted) or with 3/8" gypsum board (see finish schedule).

Wall Materials and Finishes. The majority of the historic interior walls are finished with painted horizontal "V" groove siding. In some rooms shiplap boards were used or 3/8" gypsum board (see finish schedule). Most of the non-historic wall in-fills have been constructed using remnants salvaged from the demolition of the historic auditorium/gymnasium floor.

⁷³ See the historic data section and the 1946 report, Appendix B.

Interior Paint Scheme. The historic paint colors and schemes are visible in many locations where items have been removed from the walls. In the auditorium/gym a light beige color is visible where the historic baseboards were removed; this was probably the base color of the primer. A dark brown finish color was used on the first 10 siding courses (to approximately 50-inches above the floor), medium beige the next 10 siding courses (to 100-inches), and light beige the rest of the way up to the ceiling line. These colors are visible in other parts of the building. After ca. 1954, most of the interior was painted medium gray.

Finish Floors. The original floor of the gymnasium/assembly room was a wooden gymnasium floor system. Flooring was of 1x4 tongue and groove (3-1/4 inch exposure) Douglas fir, varnished. The framing was supported on a grid of concrete pads. This was removed and replaced with a concrete slab, ca. 1954, when the building became a maintenance facility. Portions of the wood floor were used to fill in part of the original stage opening. The existing concrete floor is below the level of the original wood floor, and remnants of the original floor can be seen at the perimeter of the room.

The historic floors that escaped demolition are primarily in the north wing. They also consist of 1x4 tongue and groove (3-1/4 inch exposure) vertical grain Douglas Fir strip flooring laid over diagonal 1 x 6 shiplap subflooring on 2 x 6 floor joists.

In historically wet locations there are thin concrete slabs poured directly over the 1 x 6 subfloor. In general the floor system of the north wing appears to be under-designed, even by residential standards, as they deflect excessively under the live load of one individual. It seems likely that the auditorium/gym floor would have been of similar construction but historic documentation indicates that this floor system was supposedly designed for a loading of 100 pounds per square foot.⁷⁴

Interior Doors. Some of the historic interior doors are extant, some have been modified, some are missing and others have been relocated or replaced. With some exceptions, interior doors were also wood two panel, without glazing. Most extant historic doors need repair. Non-historic, badly damaged and missing doors will need to be replaced with new replicating the historic design.

Major Modifications from the Historic Period

Major modifications made were:

- Enclosure of main entrance – probably after 1954, but possibly between 1947 and 1954.
- Removal of wood gymnasium floor, installation of concrete slab floor – ca. 1954.
- Removal of stage and addition of vehicle access opening, east wall – ca. 1954.
- Removal of south wing – ca. 1953-54.
- Doorway modifications in south wall of gymnasium – additional doorways added between 1947 and 1953; various doorways removed or added ca. 1954 or later.

Enclosure of the main entrance at the west end of the building appears to have been accomplished with little modification of the original opening. The siding surrounding the opening, both exterior and interior, remains in place. The two original posts may still exist within the in-fill wall. The wall finishes within the entryway, ticket booth and stairwell enclosures remain intact. The original three double entrance doors and their hardware were removed, but the light fixtures above the doorways still exist.

The main floor of the auditorium is currently a concrete slab that was installed by the county (see historic photo 36) when they adapted the structure as a maintenance garage (ca. 1954). In order to satisfy this new

⁷⁴ See historic data.

function, major modifications were also made to the auditorium's structure so that it could accommodate heavy equipment.

At the east elevation, which was the back wall of the original stage, a 14 foot wide by 15 foot high opening was created by removing the exterior wall and stage floor framing. This required demolition of the stage's east wall down to the finish grade. There also was a double door here that provided access from the exterior to the space under the stage (historic photo 7).. Additionally, there is physical evidence that another original double door opening that would have been an exit at the southeast corner of the building was removed (at the end of Hall 121). Currently the opening is covered with siding.

In addition to the removal of the original stage floor (historic photo 36), its two flanking stair wells were also razed. Paint ghosts of the stairs are visible in basement rooms 118 and 119. In this same historic photograph, the wood gym/auditorium floor has been removed along with flooring at the same elevation in Hall 121. The concrete footings are still in evidence in this photo, but current physical investigation indicates that many of them, if not all, were relocated and stacked with boulders to create a retaining wall for the slab fill around the perimeter of the gymnasium space. The entire gym/auditorium (123), the hall at the southeast corner (121), and a room of undetermined use at the west end of the north wing (106), were all back-filled and a concrete slab poured wall-to-wall.

Concrete ramps were poured in a number of locations where a difference in elevation between the new slab and earlier wood and concrete finish floors had to be accommodated. The largest was poured in room 118, the basement beneath the central 1/3 of the stage that was removed. A large metal roll-up door was installed on the east auditorium wall, transforming the stage space into a two story entry alcove that has been open to the elements ever since this modification was made. Other concrete ramps installed were at the northeast corner of the gym/auditorium slab to the wood floor of Hall 113, from the gym/auditorium slab to historic basement slabs (Rooms 116 and 119), and from the auditorium/gym slab to the historic wood floor in Hall 107.

Evidence of the wood auditorium/gym floor being employed as wall sheathing can be seen on the in-fill of the stage opening at the auditorium/gym east wall. From basement rooms 116 and 119, the varnished floor boards can be seen on the east side of this wall which still have their painted red and black game markings. The north and south walls of the vehicle entry 118 were created in a similar manner with historic flooring used as wall sheathing.

By comparing photos from the historic period with photos when the south wing was removed, the various changes in doorways in the south wall of the auditorium can be seen. (Also see the existing conditions drawings in this report). At the west main entrance, a wall was built to enclose the originally open entry. One central double door was installed, flanked on both sides with a set of windows. The three original sets of double entry doors were removed.

Hazardous Materials

Removal of buried fuel tanks and contaminated soil was accomplished by the county before National Park Service ownership of the building. There was a hydraulic vehicle lift in the floor of the auditorium/gym which was removed and a concrete slab installed at that location. Square concrete slabs were also poured to fill footing holes after removal of an overhead lift. Also the surface of the interior concrete slab was removed in areas where oil had accumulated from vehicle maintenance operations.

An asbestos survey and abatement effort was accomplished in 1996. Abatement was reported to have been completed on October 9, 1996.⁷⁵ The material found and consequently removed was an asbestos containing wall and ceiling board historically installed for fireproofing in the projection booth rooms, in furnace room spaces, around furnace vent flues and in a room later used for welding.

A lead-based paint survey was conducted in 1997. Almost all of both exterior and interior finishes tested contain lead.⁷⁶ The soil within 10 to 12 feet of the building also contains lead accumulated from weathering and paint chips from the building walls. All construction and maintenance work must be conducted in accordance with federal and state regulations. Where historic materials can be preserved, new paint can be used to provide encapsulation.

⁷⁵ Project Close Out Report, Death Valley (Scotty's Castle) and Manzanar, CAL Inc., Vacaville, California, November 22, 1996.

⁷⁶ Lead-Based Paint Survey, conducted by Cal Inc, Vacaville, California, contract order No. 1443PX8000-97-117, April 14, 1997.

Pest Control. An inspection for pests, and some control and decontamination was undertaken in 1995, also before the building was transferred to the NPS. The problems identified, along with proposed means of control and decontamination, were rodents (rats and mice) associated with the Hantavirus, bees, subterranean termites and owls. Of particular concern was the rodent infestations around and in the building, which included deer mice, a primary host of the Hantavirus. Bees were found in the walls of the building. Termite damage was found in wood members near or having soil contact. Barn Owls had apparently gained access through holes to the ceiling spaces above the former stage, which now is essentially outdoors.⁷⁷

The rodent problem was a major concern. Removal and decontamination was reported underway in October of 1995. Owl nesting houses were provided outside the building. Nesting sites in the former stage ceiling and the damaged ceiling panels which allowed the birds access to the ceiling spaces were removed. These actions are reported to have accomplished a successful relocation.

STRUCTURAL SYSTEMS ANALYSIS

Description of Structural Systems

The entire building is wood framed. The lumber used throughout the building appears to have been good quality. For example, visible stud framing in the upper portions of the stage end of the building exhibits grading stamps showing select structural grade rated at 1200 psi. Much of the wood is stamped as being Douglas Fir. Most of the visible framing is in good condition, but termite damage has been identified in the crawl space of the north wing where framing is in contact with soil or concrete.⁷⁸ The individual components of the building are described below.

Gravity Load Resisting System.

Roof Framing — The roof is a low-pitched gambrel formed by Pratt type trusses at 16-feet on center that span the full width of the auditorium. The trusses are constructed from 2-inch dimension lumber, and all joints are bolted with split-ring connectors. The top chord, bottom chord, and some of the web members consist of multiple 2x members--either doubled or tripled, depending on the location. Inter-truss 2x6 cross bracing occurs along the longitudinal centerline of the building. Diagonal knee braces connect each truss to its supporting column. The trusses support 2x10 (1-1/2"x9") purlins perpendicular to, and framed over the top of, the trusses at 24-inches on center. Full 2x10 blocking between purlins occurs at each truss and at mid-span of the purlin. Roof sheathing consists of 1x6 shiplap boards (5-inch exposure) perpendicular to the purlins (parallel to the trusses). No deterioration or failures of the roof framing were observed. Longitudinal cracks were observed, however, in the top chords of the trusses at the connection where the knee brace connects.

The roof framing at the north and east wings consists of straight 1x sheathing on 2x12 roof rafters at 24" on center. In the west wing, the roof framing consists of straight 1x sheathing on 2x8 rafters at 24" on center.

Attic Framing — Attic framing consists of 2x6 (1-1/2"x5-3/8") joists at 24 inches on center spanning between the bottom chords of the trusses. The joists are notched to rest on 2x3 (1-5/8"x2-1/2") ledgers attached to the bottom chords of the trusses. The bottom edge of both the ledgers and the joists are flush with the bottom of

⁷⁷ Letter, to Superintendent, Manzanar NHS from Pestmaster Services, Bishop, CA, August 23, 1995; also letter to Western Region Office, NPS, from Pestmaster Services, Bishop, CA, October 9, 1995.

⁷⁸ See footnote 10.

the truss chord. The joists are blocked at mid-span with 2x4s laid flat that serve the dual purpose of also providing a nailer for the ceiling panels.

Wall Framing — The exterior walls are 2x4 or 2x6 (depending on the location) stud walls with 1x6 board sheathing. At all “exterior” walls, the sheathing is diagonal. At all “interior” walls, there is no sheathing; the wall finishes are applied directly to the studs. In this context, “exterior” is defined as walls or portions of walls visible from the exterior of the building, and “interior” is defined as all other walls. The implication of these definitions is that the portions of the walls of the auditorium space that are above or outside the adjacent building wings have diagonal sheathing, but the sheathing terminates at the point where the wing begins and the wall becomes part of the interior of the building. All of the truly exterior walls of the building wings have diagonal sheathing.

There are large areas of windows in the north and south walls of the auditorium and a long stretch of shallow windows in the north wing. There are also large door openings in the east wall and in the south wall near the west corner.

The trusses are supported by built-up columns located at the perimeter of the auditorium. The columns generally consist of three 2-1/2"x14-1/2" and two 1-1/2"x 14-1/2" members, bolted together with six pairs of 5/8"-diameter bolts. These columns are exposed at the interior of the north and south walls of the auditorium/gymnasium space. The truss-to-column connections consist of 1/4-inch steel gusset plates bolted to each side of the connection. The bottom portion of these plates is visible from the interior of the auditorium. Diagonal knee braces connect each truss to its supporting columns. The braces, consisting of a 2x6 at each face of the column, are bolted to the column and to the top and bottom chords of the truss. These braces are visible in the gymnasium below the ceiling level.

In three locations at the south wall of the auditorium/gymnasium, the bottoms of the columns were found to be considerably deteriorated from a combination of termite and rot damage (see photos 13 and 14, Appendix J), resulting in a lack of positive bearing between the column and the footing. In one case, there exists a 6" air gap between the bottom of the column and the top of the pier. In another case, the historic pier was capped with additional concrete, possibly by the county, to fill in the gap between the rotted column base and the pier. The column has continued to disintegrate, however. It should be noted that these columns were historically protected by the south wing that was removed ca. 1954. Once it was removed, they were exposed to the elements, and, in one case, the close proximity of a hose bib.

Floors — The floor of the auditorium is a slab-on-grade. This was installed ca. 1954 when the building became a maintenance facility.

The floors in the east wing consist of diagonal 1x sheathing on 2x joists. The joists in the remaining stage area are at 12" on center.

The upper floor of the west wing (the Projection Room) has 2" of concrete on wood subflooring. The lower floor is a concrete slab-on-grade and appears to be the original floor.

A crawl space extends under most of the north wing. The floor framing consists of 1x diagonal sheathing on 2x6 (1-5/8"x5-3/8") joists at 16" on center. The joists span between the north wall of the auditorium and the north wall of the north wing. A 5-3/8"x9" beam running longitudinally down the centerline of the wing provides an intermediate line of support. The beams, both at the centerline and the perimeter, are supported by wood posts (two 3-1/2"x5-3/8") resting on 2x plates sitting on 28"x28" concrete footings. There are no visible connections between the joists, beams, posts, and footings. The floor in the restroom area has a thin concrete slab poured over the top of the wood-framed floor. The wood-framed floor was removed in the north

wing west of the restroom, and a concrete slab-on-grade was installed in its place. A skirt surrounds the north wing below the floor framing consisting of vertical 1x siding spanning between the bottom of the beam and a 2x installed between the posts just above the concrete footings. The floor framing in the north wing should be investigated further for rot or insect damage, as the floor deflects noticeably under the load of only one individual.

Foundations — As previously stated, the auditorium floor is a slab-on-grade, as is the lower floor of the west wing and a portion of the north wing. The west wall of the auditorium is supported by 28"x28" footings at approximately 8 feet on center. The top of footing elevation is about 16 inches below the slab-on-grade elevation. The east wall of the auditorium is supported by concrete grade beams. The bottom portion of the stud wall is below the auditorium slab-on-grade and is, therefore, in contact with concrete and soil on its west face.

The north wall of the auditorium is supported by wood beams on wood posts on concrete footings. It is assumed that historically the south wall was supported in a similar fashion as the north wall. Presently, however, a concrete grade beam exists along the bottom of the wall. Soil was placed against this grade beam such that the bottoms of the columns supporting the trusses were below grade. The columns supporting the trusses bear on tapered concrete piers. There is no evidence that the columns are anchored to the piers.

At the east wing, the exterior wall is supported by a concrete foundation wall visible in the low storage rooms. The exterior grade is near or in some places above the top of this concrete wall, placing the wood wall in contact with soil. It is unknown whether the concrete supporting the wall is a grade beam or stem wall and footing.

At the north wing, the interior and perimeter beams are supported by wood posts on concrete footings. The footings along the perimeter are visible from the exterior.

The depths of all foundation elements are unknown.

Lateral Load Resisting Systems. A copy of the report "FEMA 178/June 1992 Seismic Evaluation of the Manzanar Auditorium Building" (MARTIN/MARTIN Consulting Engineers, December 1998) is included in Appendix J. This report includes descriptions of the lateral load resisting system, its deficiencies, and rehabilitation recommendations. The recommendations intend to strengthen the building to the point of being life-safe, meaning that occupants will be able to escape the building during a severe earthquake but that the building itself may experience severe damage, even to the point of not being salvageable. Further consideration should be given to determine if additional strengthening beyond a life-safety level would be appropriate and feasible.

Structural Analysis and Findings

Loads. The following loads--derived from the Uniform Building Code, 1997 edition, unless otherwise noted--were used in the analysis of the building components:

Live Loads		
Roof Live Load	20 psf	
Snow Load, Pg	30 psf	(from Public Works Dept., Inyo County)
Snow Load, Pf	18 psf	
Attic	10 psf	
Floor Live Load	100 psf	

Seismic - Zone 4	
Wind - 70 mph, Exposure C	
Dead Loads	
Roof	10 psf
Attic/Ceiling	10 psf
Floor	10 psf

Gravity Load Deficiencies and Recommendations.

Roof Framing — An analysis was run to determine the stresses in all of the truss members. The truss top and bottom chord members are significantly overstressed, while the web members are generally acceptable. Also, several of the bolted truss connections are severely overstressed. The trusses will likely require the addition of steel elements along both sides of the top and bottom chords with new steel gusset plates at the panel point connections to bring them up to the design load capacity. The cracked top chord members could be repaired with new metal straps extending along the diagonal web member, around the top of the top chord, and back down the opposite side of the web member, designed to transfer all of the tension in the diagonal member. (See Figure 8, Appendix J.)

The capacity of the roof purlins is adequate for the design load, but the ceiling joists are overstressed and will need to be upgraded by sistering a new joist along one side of each existing joist.

Wall Framing — The built-up columns have sufficient capacity in their current configuration. The rot at the bottoms of the columns needs to be repaired, however. The damaged wood should be removed, and either new wood can be spliced to the existing columns or new concrete pedestals can be cast between the bottom of the column and the existing footings.

Floor Framing — The floor framing in the north wing should be investigated further for rot or insect damage, and analyzed for its load carrying capacity.

Foundations — The foundations may need to be supplemented with additional concrete to raise the elevation in order to get the wood out of contact with the soil.

Seismic Deficiencies and Recommendations. Complete descriptions of the deficiencies and rehabilitation recommendations are included in the report contained in Appendix J. A summary of the recommendations is as follows:

1. **Wood Decay** - The decay of the wood columns needs to be repaired. (See Figure 7, Appendix J.) On the south, the repair will be relatively simple, because the columns are easily accessible. On the north, east, and west walls, portions of the concrete slab-on-grade will have to be removed so that new portions of columns can be spliced in or so that the top of footing elevation can be raised to elevate the column bases from being in contact with the soil.
2. **Inadequate Shear Walls** - The lack of shear walls is a serious deficiency. The lack of adequate sheathing and the presence of large and numerous door and window openings render the existing walls severely overstressed. Certain portions of the walls should be designed as plywood shear walls or have new steel rod diagonal bracing installed. New concrete grade beams or enlarged footings will be required at the bases of these walls. The suggested locations for these shear walls are shown in Figures 2, 4, 5, 6, and 7, Appendix J.

3. Unbraced Cripple Walls at North Wing Crawl Space - The posts in the crawl space need to be more adequately braced. The added shear walls or diagonal bracing in the north wing can be designed to also brace the crawl space.
4. Inadequate Roof Diaphragms - The inadequate straight 1x roof sheathing could be corrected with an engineered plywood diaphragm installed over the 1x straight sheathing. An alternate solution is to locate the diaphragm at the ceiling level by augmenting the ceiling bracing to act as a diaphragm. This solution would also require the installation of additional bracing between the roof and the ceiling, but it would spare having to remove the existing roofing.
5. Lack of Diaphragm Chords and Struts - The discontinuous 2x wall top plates are prevented from acting as a diaphragm chord. Light gauge steel straps should be installed across the discontinuities. (See Figure 3, Appendix J.) The 2x top wall plates can function as drag struts, provided they are adequately sized and connected.
6. Inadequate Connections and Ties - Inadequate connections between structural components can be remedied for each specific deficiency.
 - The roof diaphragm should be connected to the diaphragm chords and drag struts when the sheathing is installed, or with appropriate connectors to the alternative roof-ceiling bracing system.
 - The beam-to-post and post-to-foundation connections in the north wing should be improved with light-gauge connectors fastened to the wood and anchor bolted to the concrete.
 - The north wing footings may need to be connected, if required by further analysis. This could be done with either continuous steel members anchor bolted to the footings or with a slab-on-grade installed around and doweled to the footings.
7. No Ceiling Bracing - Additional ceiling diaphragm bracing is needed because of the 80-foot ceiling diaphragm span and could be supplied by one of the following: 2x diagonals installed in the horizontal plane at the ceiling level; plywood added in alternate bays of the ceiling joists; or additional 2x cross bracing between the trusses (similar to what presently occurs at the building centerline). Either of the first two solutions could be designed to act as the primary diaphragm, as previously discussed.

MECHANICAL SYSTEMS ANALYSIS

Purpose

The Manzanar Auditorium building is planned to be rehabilitated and adaptively reused for Manzanar National Historic Site interpretive and administrative functions. Because the National Park Service will be a long-term owner and occupant of this structure, it is in the best interest of the Government that long-term operating costs are as low as practically possible. To keep operating costs at a minimum, it is essential that all potential mechanical systems and building envelope treatments considered for inclusion into future designs be analyzed with respect to these costs. Efforts should be made to reduce construction and operating costs as much as possible, while maintaining historical integrity, aesthetics, comfort, simplicity of operation, ease of maintenance, and sustainability, particularly low environmental impact.

This section describes, analyzes, and makes recommendations for proposed building envelope treatments, heating, ventilating, and air conditioning (HVAC), and plumbing systems in the Auditorium building at the Manzanar site.

Recommendations Summary

Building Envelope. Because of the substantial energy savings that will result, the walls, floors, and roofs of the building should be insulated as much as is practical as part of any rehabilitation work. Insulated glazing units are also recommended for implementation for the same reason. In addition to reducing energy consumption, insulating the building has the added benefits of reducing mechanical system sizes and increasing interior comfort levels. Although insulating the gym walls will result in even greater energy savings, it is not recommended to do so unless a suitable insulation methodology that does not require the removal or destruction of the interior finishes can be implemented.

Heating, Ventilating, and Air Conditioning System. The systems recommended for implementation as part of any rehabilitation work are as follows:

- Single-stage evaporative coolers and hydronic (hot water) radiant floor heating system for the gym and stage areas, with a propane-fired makeup air unit for ventilation in the heating season.
- Air cooled package air conditioners with hot water heating coils for the remaining spaces in the building to be conditioned.
- High efficiency propane-fired hot water boilers to provide hot water for the radiant floor heating system and the hot water coils associated with the package air conditioners.
- Toilet exhaust systems in all of the new restroom spaces.

Plumbing Systems. It is recommended that all of the piping in the building be replaced with new piping. New domestic water heaters should be provided as necessary. All new plumbing fixtures and fittings shall be water-conserving (low-flow) type.

Fire Protection Systems. It is recommended that portable fire extinguishers be installed in strategic locations throughout the building. When the south wing is reconstructed, it should be fully sprinklered, with its sprinkler system connected to the existing (1998) dry pipe sprinkler system in the Auditorium building.

Building Envelope

Historic Conditions. The existing Auditorium building was constructed in 1944 and is fairly typical of temporary military buildings built during this period. It is a wood frame structure, with single-glazed wood sash windows and little (if any) insulation in the walls and roofs. There is no insulation in any of the walls and the only roof that was insulated is the north wing roof. The north wing roof is insulated with 2 inches of "Kimsul" cellulose batt insulation that was installed as part of the original construction. It is assumed that the south wing roof was insulated in a similar manner.

It appears that the exterior of the building had light-colored walls during the historic period which would have helped with keeping the building cooler by reflecting more solar heat than they absorbed. However, it also appears that the roof was covered with black mineral cap asphaltic roll roofing which would have added a considerable amount of heat to the spaces below by absorbing more solar heat than it reflected.

Existing Conditions. Other than the modifications listed in the Architectural Analysis section of this document, vandalism, and the ravages of time, the building and building envelope remain much the same as they were when originally constructed in 1944. The major modifications that affect mechanical systems design in the building are as follows:

New Roof — The present roofing system consists of white mineral cap asphaltic roll roofing. This is a more desirable color of roofing material from a cooling standpoint since it reflects more solar heat than a comparable black roof would. If the existing roof is replaced at some point with a black roof to match the historic conditions, this will need to be taken into account in any new cooling systems designs.

Concrete Floor in Gym — When the building was converted to a vehicle maintenance facility, the original wood frame floor in the gym was removed and replaced with a concrete floor on fill. This floor represents not only additional thermal mass in the building, but also presents an opportunity to install a hydronic radiant floor heating system in the gym area.

Removal of the South Wing Structure — Reconstruction of the south wing will represent additional heating and cooling loads that would not presently be accounted for.

Because it is a lightweight frame structure, the Auditorium building does not have a great deal of thermal mass. Thermal mass acts as a "heat battery". The mass absorbs and releases heat in the interior of the building, and acts to stabilize the temperatures inside the building. The less mass there is inside a building, the greater the interior temperature swings during the day; conversely, the more mass there is inside a building, the smaller the interior temperature swings during the day. Since this building has little mass to reduce interior swings during the day, the only reasonable option that can be implemented to reduce interior temperature swings and to reduce the size of the mechanical cooling and heating equipment is to add insulation to the building envelope.

Recommended Treatments. Because of the poor insulating qualities of the majority of the building envelope, insulation should be added to the building envelope. To accurately gauge the effects of treatments related to the building envelope, cooling and heating load calculations were performed for various alternatives as follows:

- Alternative 1 - Existing Building (with South Wing Added On), No Treatments
- Alternative 2 - Insulate Floors, Ceilings, and Walls (no insulation in gym walls)
- Alternative 3 - Insulate Floors, Ceilings, and Walls (with insulation in gym walls)
- Alternative 4 - Install Insulated Glazing (no insulation in gym walls)
- Alternative 5 - Install Insulated Glazing (with insulation in gym walls)

In all of the alternatives presented above, the south wing is added into the load calculations, fully insulated and provided with insulated glazing as it would be if reinstalled on the existing building. All of the alternatives are "additive", i.e., Alternative 3 adds insulation to the Alternative 2 case, Alternative 4 adds insulated glazing to the Alternative 2 case, etc.

ENVELOPE ALTERNATIVE NUMBER	BUILDING COOLING LOAD, ENVELOPE ONLY (TONS) ^A	BUILDING HEATING LOAD, ENVELOPE ONLY (MBH) ^B	BUILDING COOLING LOAD, WITH INTERNAL AND VENTILATION LOADS (TONS) ^A	BUILDING HEATING LOAD, WITH VENTILATION (MBH) ^B
1	20.3	443	53.5	677
2	14.1	335	44.6	565

3	13.2	291	43.4	521
4	12.6	240	42.3	470
5	11.7	224	41.4	454

^a1 Ton = 12,000 BTU (British Thermal Units) per hour cooling capacity

^b1 MBH = 1,000 BTU per hour

Alternative 2 vs. Alternative 1 — As can be seen from the numbers presented in the table above, the most marked reduction in cooling and heating loads occurs when the majority of the building is insulated (excluding the gym walls). Because this treatment results in the largest reduction of cooling and heating loads, it is recommended that as much insulation as possible be installed in the building walls (R11), ceilings (R30), and floors (R19) as part of any rehabilitation work. This will not only save energy, but will reduce mechanical equipment sizes necessary to properly condition the building and will increase occupant comfort.

Alternative 3 vs. Alternative 2 — Insulating the gym walls in addition to insulating the remainder of the building also results in reductions of cooling and heating loads, but not as great as the reductions resulting from the addition of insulation modeled in Alternative 2. Because the interior surfaces of the gym are in good condition and it would be difficult and expensive to remove the interior surfaces to add insulation, it is recommended that insulation not be added to the gym walls, unless some other method that does not require removal or destruction of the interior finishes (such as using blown-in insulation) can be implemented.

Alternative 4 vs. Alternative 2 — Adding insulated glazing reduces the heating loads by almost the same amount (approximately 100 MBH) as insulating the building does. However, the cooling loads are not reduced as dramatically. The reason for this is twofold. First, the temperature difference for conduction through the glass in the summer is not as great as it is in the winter, reducing the effect of the improvement in insulating qualities of the glass. Second, the shading coefficient for clear double glazing is 0.88 vs. 1.0 for clear single glazing. This represents only a 12 percent reduction in the solar gain into the building spaces. Given all of this, it is still recommended to add insulated glazing to the building as part of any rehabilitation work to reduce the heating load to save energy, reduce heating equipment sizes, and increase occupant comfort.

Alternative 5 vs. Alternative 4 — The discussion here is the same as that for Alternative 3 vs. Alternative 2.

Heating, Ventilating, and Air Conditioning

Historic Conditions. The Auditorium building was originally equipped with oil-fired forced air furnaces. The main gym space (Room 123) was heated with four furnaces, one in Room 104, one in Room 115, one in Room 120, and one in the south wing, directly across the gym from Room 104. Heat for the north wing was provided by another furnace in Room 104 and (probably) unit heaters in Rooms 110 and 111. Flue locations shown in the historic photographs and physical evidence inside the building support these locations. The flue locations shown in the historic photographs also indicate that the heating systems in the south wing were a mirror image of the ones in the north wing. Destratification of heated air in the high ceiling gym space (Room 123) was provided by four fan units located on the ceiling. These units were vertical projection unit heaters with no heating coils installed. No permanent heating systems appear to have been installed in any of the spaces in the east or west wings of the building.

No cooling systems, other than doors and operable windows, were provided in the original construction. Ventilation was provided by doors and operable windows in most of the areas of the building. Ventilation for the restrooms and shower rooms in the north and south wings was provided by what appear in the historic photographs to be roof-mounted gravity ventilators.

Existing Conditions All of the original furnaces and unit heaters have been removed from the building at some time in the past. Three of the four historic thermostats that controlled the furnaces for the gym (Room 123) are still in place; the thermostat that was located on the south wall is missing. Heating during the period that Inyo County used the building for a maintenance facility was provided by various gas-fired and electric appliances. High intensity radiant heaters are installed near the ceiling, mostly at the west end of the room, to provide spot heating. A horizontal projection unit heater is installed in Room 110. A through-the-wall room air conditioner provides heat (electric) in Room 111. Heat in Room 109 is provided by an electric wall heater. An electric unit heater is currently being added to Room 117 under the Package D164 construction contract. A 1,000 gallon propane storage tank, located near the northwest corner of the fenced enclosure surrounding the building, provides gas to all of the gas-fired appliances. In addition to the space heating appliances, the propane tank also supplied gas to a heat treating oven that was located in Room 104.

Although the fuel oil tank(s) supplying the original furnaces have been removed, some of the piping that supplied the furnaces is still intact inside the building. One-fourth inch oil supply lines for the oil-fired furnaces and unit heaters are still visible in Rooms 104, 110, 111, 115, and 120. What appear to be two 1/2 inch oil lines penetrate the floor in Room 117; their function is unknown.

Evaporative coolers and window air conditioners were installed to provide cooling during the period that Inyo County used the building. Four large evaporative coolers were installed to provide cooling in the gym (Room 123). Two of the coolers that were mounted on the roof of the north wing have been removed because of structural safety concerns. The other two coolers, located on the south and west sides of the building, are still in place. A through-the-wall air conditioner is installed in Room 111.

Recommended Treatments. To make the Auditorium building suitable for year-round park operations, modern HVAC systems will need to be installed to provide comfort conditions inside the building. Different types of HVAC systems and energy sources that may be suitable for use in this project are discussed below. These discussions outline features, advantages, and disadvantages of each type of system and are general in nature. Because of economics and/or considerations related to the building, there are several types of HVAC systems that were considered and rejected:

1. Direct Resistance Electric Heating: As far as being flexible and integrating with the building itself, direct resistance electric heating would be a good choice for this project. However, the operating costs would be excessive in the winter (both consumption and demand charges would be high). Also, the electrical service may not be able to handle a heating load of approximately 140 KW (this is the peak heating load with building envelope treatment Alternative 4) in addition to the other electrical loads in the building.
2. Fuel Oil Heating: Fuel oil could be used to fire boilers or furnaces as was done historically, but presents some difficulties. First, fuel oil is not commonly used as a heating fuel in the Owens Valley area. The heating fuel of choice is propane (natural gas could be used, but is not presently available). Second, the use of fuel oil as a heating fuel requires a storage tank. Whether this tank is located above or below ground, it is required to have overfill spill prevention devices and secondary containment with leak monitoring. Underground fuel oil piping must have a secondary containment also.
3. Air-to-Air Heat Pumps: Air-to-air heat pumps are a more energy-efficient choice for heating than direct resistance electric heat. Another advantage is that cooling can be provided also with the same piece of

equipment. The major drawback of air-to-air heat pumps is that the heating capacity drops off as the outside temperature decreases and the cooling capacity drops off as the outdoor temperature increases. At low temperatures (typically around 20 degrees F), the heating capacity drops off so much that the heat pump cannot produce enough heat energy to adequately heat the indoor spaces. At this point, a supplemental heat source (typically direct resistance electric heat) must be turned on to provide additional heat energy. In colder climates, icing of the outdoor air coil can occur, requiring additional energy to defrost the coils.

4. Ground-Coupled Heat Pumps: Although ground-coupled heat pumps are very energy efficient and would be a good choice for this project, there is a drawback in using them here. Because wells approximately 200 feet deep would need to be drilled to form the ground heat exchanger, they would likely penetrate into the water table below the site. The water rights for this water table are owned by Los Angeles Department of Water and Power (LADWP) and unless a variance were granted, drilling these wells would be prohibited.
5. Solar Assist: Because of the historic nature of this structure, any type of active solar system collectors mounted on the building proper will be unacceptable. Active solar panels could be mounted on a ground array, but adequate site space near the building may not be compatible with other site features such as parking and landscaped areas.

The major cooling and heating load is in the gym area, which (using building envelope Alternative 4) represents 53 percent of the total cooling load and 60 percent of the total heating load in the building. This being the case, and because it is the single largest space in the building, the gym is the one area of the building that should receive the most efficient cooling and heating systems to reduce energy consumption. To provide the most efficient cooling and heating possible, two systems in particular are being recommended for implementation in the gym: evaporative cooling and hydronic radiant floor heating.

Evaporative cooling is used extensively in desert climates and has one of the lowest operating costs of any type of cooling system. It is also frequently used to cool large spaces that would be uneconomical to cool in any other fashion. If the acceptable space cooling temperature in the gym can be raised from 75°F to 80°F, it will be practical to use single-stage evaporative coolers to cool the space. With the increased air quantities that are required with evaporative cooling, there will be good air motion through the space, contributing to a sense of cooling comfort by the occupants.

Two possible location options are available for the evaporative cooling units. One option is to locate the units in the attic above the gym and draw air in through the existing attic ventilation louvers. Supply ductwork would be provided in the attic to connect to new supply diffusers at the ceiling of the gym (consideration was given to reusing the historic fan units at the ceiling as supply air diffusers, but with the air quantities required, the historic fan units are too small and would be quite noisy). Support structures and catwalks would have to be provided to install and service the units in the attic. The other option is to locate the units in the third floor storage rooms flanking the stage (Rooms 301 and 302). Openings in the outside walls would have to be provided to install the units from the outside and to provide outside air to the units through louvers installed in the openings. Supply air would be introduced into the gym through grilles mounted high on the east wall. In both cases, relief air pathways would need to be provided for the evaporative coolers. The historic furnace air openings into the gym can function as relief air outlets. Plenums or ducts connecting the furnace air openings with exterior louvers or with the spaces under the north and south wings would need to be provided to complete the relief air pathways to the building exterior. The relief air openings will be provided with automatic dampers that will open when the evaporative coolers are running and will close when they are shut down. This eliminates the need to manually open and close doors or windows to create relief air routes for the evaporative coolers.

One of the drawbacks of using any type of forced air heating in a space with a high ceiling is that hot air will collect at the ceiling of the space, leaving the zone between the floor and 8 feet above the floor relatively cold. Also, with higher than normal temperature air in the upper part of the space, the temperature difference between the inside and outside of the building is increased, resulting in additional heat loss. Both of these issues were addressed historically in the Auditorium building by installing destratification fan units at the ceiling to force the warm air back down to the floor level where it was needed. To avoid hot air stratification problems, it is proposed that a hydronic (hot water) radiant floor heating system be implemented in the gym. This type of system puts the heat where it is needed: at the floor level where the occupants are. Because the main heating effect is radiant rather than convective, the air in the space is heated less than it would be with a forced air system. Even though the air temperature is less than it would be normally, the occupants feel comfortable because they are receiving most of the heat radiantly (in the same fashion that a person feels warmer on a cold day when the sun is shining). Since the air is not being heated directly, very little (if any) stratification occurs. Studies have shown that with radiant floor heating systems in spaces with high ceilings, the temperature difference between the air one foot above the floor and the air at the ceiling is in the range of 2°F. With a lower space temperature and little or no stratification, heating energy savings will be substantial compared to a conventional forced air heating system.

A radiant floor heating system can be incorporated into restoration work that is done to the floor in the gym. To increase the control responsiveness of the radiant floor and to mitigate heat loss out of the bottom and sides of the floor, it is recommended that rigid insulation be installed on top of the existing concrete floor slab under any new wooden floor that will be installed. The insulation can be channelled and the hot water piping (cross-linked polyethylene) for the radiant floor can be installed in the insulation channels directly below the wooden subfloor material. Heat for the radiant floor system will be provided by hot water boilers located in a boiler room located in the area under the reconstructed stage. Since it is directly connected to the gym area, the stage area can be cooled and heated by the evaporative coolers and radiant floor heating system serving the gym proper.

During the cooling season, ventilation for the gym and stage will be provided by the evaporative coolers. The controls can be configured such that during occupied hours, the evaporative cooler fans would run continuously and during unoccupied hours, the evaporative cooler fans would run only when the thermostat called for cooling. Because the outside air quantities that the evaporative coolers supply to the space are considerably larger than that required by ASHRAE 62⁷⁹ it is recommended that a separate ventilation system, sized only as large as need be for ventilation air, be provided in the gym for the heating season. This system would consist of a propane-fired makeup air unit, located in the attic space above the gym. Although they were too small for the evaporative cooler supply air, the historic ceiling fan units in the gym are large enough to supply tempered ventilation air into the gym space. The heating ventilation unit would operate during occupied hours and would be shut down during unoccupied hours.

The other major areas of the building that need to be conditioned are the existing north wing, some of the rooms in the existing west wing (Rooms 201 and 202), some of the rooms in the existing east wing (Rooms 204, 205, 208, and 209), and the reconstructed south wing. Since it appears that these spaces will be primarily office, visitor contact, and support spaces, it is recommended that air-cooled packaged air conditioning units be implemented to provide cooling to these spaces for maximum comfort and temperature control. To preserve the historic scene on the exterior of the building as much as possible, each air conditioning unit should be equipped with centrifugal fan condensing sections so that the entire air conditioning unit can be located inside the building envelope. This eliminates having any type of air

⁷⁹ ASHRAE 62-89, *Ventilation for Acceptable Indoor Air Quality*

conditioning equipment visible outside the building, but necessitates the installation of louvers in the building walls for the condensing air to enter and exit through.

The air conditioning unit for the north wing and Rooms 204 and 205 can be located in a room in the space under the reconstructed stage. The air conditioning unit for the south wing and Rooms 208 and 209 can be located in a similar space. Condenser air for both of these units can be provided through louvers located in the historic window openings communicating with the space under the stage on the east face of the building. Supply and return air ductwork for the north and south wings can be routed in the crawlspaces under the wings, with floor mounted supply and return air grilles serving the spaces above. The air conditioning unit for the west wing can be located in Room 202, with the condenser air being provided through a louver located in the historic window opening in the same room. Ventilation air will be provided to all spaces by the air conditioning units per ASHRAE 62.

Heating for the spaces served by the packaged air conditioners will be provided by hot water heating coils at each unit. Hot water for the heating coils will be provided by the same boilers that supply heat to the radiant floor heat system. It is recommended that high efficiency propane-fired hot water boilers be implemented to further reduce heating energy consumption. High efficiency boilers will also allow greater design flexibility for flue routing and combustion air pathways.

A single 1,000 gallon propane tank is currently located near the northwest corner of the existing cyclone fence around the Auditorium building. This existing propane tank should be relocated to a location near the new utility building. Using the heating load calculated for envelope Alternative 4, it appears that a second 1,000 gallon tank will need to be added to meet the load. To avoid frequent refills, a third 1,000 gallon tank may be desirable to increase the propane storage capacity. New underground gas piping would be run from the propane tank farm location to the boiler room location in the building.

Toilet exhaust systems will be provided for all of the public and private restrooms in the building. Reconstructed gravity ventilators on the roofs of the north and south wings may be adapted to serve as toilet exhaust air outlets. In addition to installing new HVAC systems in the building, removal of existing heating and cooling equipment, and associated piping needs to be done as part of any rehabilitation project.

Plumbing Systems

Historic Conditions. The original domestic water system consisted of galvanized steel piping. Soil waste and vent piping in the building is cast iron, with galvanized steel being used for smaller diameter piping. Although there is evidence that domestic hot water was available during the historic period (hot water connections exist for the lavatories in Room 109), there is no evidence of the water heaters themselves.

Plumbing fixtures that were installed in the north wing restroom (Room 109) were 4 water closets, 3 urinals, and 4 lavatories. There was a mop sink installed in the janitor's closet (Room 108). The north wing also contained a shower room, but it is not known how many showers were installed in the shower room. It is assumed that the original south wing of the building had numbers and types of plumbing fixtures similar to the north wing.

Existing Conditions. The only functional plumbing fixtures remaining in the Auditorium building are one water closet, one urinal, and one lavatory in the north wing restroom (Room 109). All of the other historic plumbing fixtures have been removed at some time in the past. There is a small electric tank-type water heater located in Room 109 adjacent to the lavatory to provide hot water for hand washing. Most of the historic water and soil piping is extant in Room 109. The water and sewer services in the building are

currently being supplied by a new water supply and sewage disposal system installed under the 1998 utility improvement construction contract (Package D164).

Recommended Treatments. Because of the age of the piping, and the fact that much of the historic piping has already been removed from the building, it is recommended that all of the existing piping in the building be removed and replaced with new piping. The configuration of the new piping will depend on new fixture layouts proposed for the restrooms. In the case of the domestic water piping, all of it should be replaced with copper pipe and fittings. The soil, waste, and vent piping should be replaced with cast iron no-hub pipe and fittings. Domestic water will be supplied by the new water supply system and sewage will be directed into the new sewage disposal system.

Depending on the amount of domestic water use, the water heater(s) may be electric or gas. If the domestic water use is limited to lavatories in the private and public restrooms, it is recommended that small point-of-use electric tank-type water heaters can be used. If any showers are going to be installed for park staff use, a gas-fired tank-type water heater should be installed. All new plumbing fixtures and fittings shall be water-conserving (low-flow) type.

Fire Protection Systems

Historic Conditions. Historically the interior of the structure was protected by manual fire extinguishers. There is evidence of this in the historic photographs. Exterior fire protection was provided by two fire trucks (one of which is still extant at the Auditorium building site), and by six fire hydrants near the Auditorium and in adjacent barracks blocks.

Existing Conditions. All of the historic fire extinguishers are gone, but their locations can still be ascertained. At some time in the past, fire hose reels were installed on the walls in the northwest and southeast corners of the gym. These fire hose reels are functional and are currently being fed with water from the domestic water system. One historic, non-functional fire hydrant is located outside the cyclone fence west of the building and a second, functional fire hydrant is located inside the fence east of the building.

As part of the 1998 utility improvement construction contract (Package D164), a complete dry pipe automatic sprinkler system was installed throughout the Auditorium building. This system is fed by a 25 horsepower electric fire pump and 20,000 gallon fire water reservoir located in a new utility building northeast of the Auditorium building. Two new fire hydrants have been installed near the building inside the cyclone fence enclosure that are fed by the same fire pump and reservoir.

Recommended Treatments. Portable fire extinguishers should be provided in strategic locations throughout the building. When the south wing is reconstructed, it should be fully sprinklered. Provision has been made in the new dry pipe sprinkler system to extend that system into the south wing for fire protection.

ELECTRICAL SYSTEMS ANALYSIS

Given the proposed adaptive re-use of the auditorium building in conjunction with the existing upgraded water system and potential additional future loads, it is anticipated that the existing 400 amp service will need to be upgraded to 600 amp service. The existing circuit transformer cabinet (with meter) adjacent to the south wall of the building will need to be relocated when the south wing is reconstructed. It is recommended that a new free-standing circuit transformer cabinet and meter be placed adjacent to the new utility service pole southeast

of the building. From that location, overhead power can be brought in to the building as was done historically at or near the historic weatherhead location. As an option, this building service could be underground if necessary working clearances over the roof of the south wing cannot be attained.

All existing electrical wiring within the building should be replaced. Some original lighting fixtures still exist on the exterior, including those at the west entrance and probably those at the upper corner of the east elevation. Most of the auditorium/gymnasium ceiling fixtures are still in place although the majority of the wire guards are missing. To the extent possible, it is recommended that historic lighting fixtures be rehabilitated and reinstalled. For necessary replacements, it may be possible that similar designs are available. These fixtures would be for general lighting of the historic space. Supplementary lighting, specific exhibit lighting and task lighting should be incorporated into the exhibit, book sales and other modules as much as possible.

The temporary fire and intrusion alarm system that was installed by the county prior to transfer of the building to the National Park Service was not intended to be a complete, permanent installation, but rather to provide a badly needed interim warning system. A complete new fire detection system is recommended, with linkage to the fire suppression system. A new intrusion alarm system with notification capabilities as required for site operations is recommended.

The adaptive re-use will require new telecommunications systems in the building and will require additional dedicated phone lines than are currently in use.

TREATMENT AND USE

TREATMENT AND USE

ULTIMATE TREATMENT AND USE

As defined in the General Management Plan, developed on the basis of the authorizing legislation, the structure will be used as an interpretive center. The building exterior and the assembly room will be the primary focus for the visitor experience. The assembly room will contain the visitor entrance and contact, and most importantly, exhibits relating the story of Manzanar. An audio/visual theatre and a book sales area might also be included or could be located in other building spaces. The assembly room and stage will be restored to the historic period. The spaces in the north wing will be rehabilitated and used for visitor related or administrative functions.

Also proposed in the GMP is reconstruction of the missing south wing of the building. The NPS policy [NPS Management Policies--NPS-2] with regard to reconstructions is that "A vanished structure may be reconstructed if (1) reconstruction is essential to public understanding of the cultural associations of a park established for that purpose, (2) sufficient data exist to permit reconstruction on the original site with minimal conjecture, and (3) significant archeological resources will be preserved in situ or their research values will be realized through data recovery."

Along with historic photographs and other documentation, this south wing can be reconstructed so that its exterior appearance will be historically accurate. Some documentation exists that indicates that the south wing interior was almost a mirror image of the north wing; however, the interior would be adaptively used so interior restoration is not necessary. The missing wing exists as part of the VFW and American Legion Post in Lone Pine. Although modified, it is believed that enough original integrity remains to provide corroboration of original construction. The roof eave is identical to that of the north wing of the auditorium and the siding appears to be the same as the original of the auditorium building. A paint examination could be done for confirmation. Near the VFW/American Legion Posts is an original, but stuccoed, Manzanar barracks building.

REQUIREMENTS FOR TREATMENT

Legal and regulatory requirements include meeting the provisions of the USDI Rehabilitation Standards and Guidelines for Rehabilitating Historic Buildings, NPS Cultural Resources Management Guideline (NPS-28), as well as building code, life safety, accessibility, fire protection, energy conservation and hazardous materials standards and regulations.

Life Safety

Requirements are governed by the Uniform Building Code (UBC) and the Life Safety Code (NFPA 101). The occupancy category is assembly, Type A-2.1 (UBC, Table 3-A). The construction type is frame (Type V – Table 5-B). This assembly occupancy is not permitted in a frame building unless it has one hour fire protection characteristics which can be achieved with a fully automatic fire suppression system. (This exception having been used, the suppression system cannot be used again to offset other requirements). An automatic fire suppression system has been installed.

The greatest requirements for emergency egress are of course the public spaces. The auditorium/gym contains 7,680 square feet of floor space. At 15 square feet per person, the basic occupancy load is 512 persons. This will be increased for space used in either the north or south wing for the audio-visual presentation or book

sales. For an audio-visual presentation space, the occupancy load is calculated using 7 square feet per person. In either case the total for calculation of the required exit door width using say 1,000 square feet of the north wing would be 512 plus 1,000/7 equals 655 persons. The required exit door width is 131 inches $[(655)(0.2)]$ or approximately 11 feet. Assuming three double doorways at the west entry and restoration of one double doorway exit from each of the northeast and southeast corners of the building, this requirement is more than met with the total of the five historic openings being approximately 25 feet. The maximum travel distance to any exit may not be greater than 250 feet (UBC 1004.2.5.2.2).

If the audio-visual space is in the north wing the required exit door width for 1,000 square feet of space used would be 28.6 inches from that space, with two exit paths required. This indicates that each doorway from that space may be single leaf (i.e., double doorways are not required).

Any other necessary exit path into the exit paths from the auditorium/gym, such as from the north or south wings or spaces in the stage section, will add to the volumes described above. Even so it would appear that the five primary exit doorways (existing and restored) will meet the requirements (but see accessibility below). There are (and would be) additional separate exits from both the north and south wings for uses in those spaces. The requirements for those spaces will also need to be calculated when those uses are designed in detail.

Accessibility

Although the initial impression is of a flat site, there is a slope from west to east such that the grade at the east end of the building is more than three feet below the auditorium floor level. Even at the west entrance there are two steps, totaling 15 and 1/2 inches, from the sidewalk level to that of the auditorium floor. It will be necessary to construct fully accessible pathways to at least all of the primary entrances and the design must be as unintrusive as possible.

Also the entrance doorways will need to be modified to provide the minimum required accessible width. The historic double doorways are 60 inches in width, each leaf being 30 inches. These doorways (two at the east side of the building and at least one at the west entrance) will need to be widened to a minimum of 34 inches for each leaf (68 inches for the opening). This may be achievable, but most likely not more, at the two east entries because of the limiting width of the hallways (halls 113 and 121). An option may be to provide automatic operators so that both door leaves will open simultaneously. Some doorways within the building will also need to be widened so that all spaces on the main floor will be accessible. The spaces below the stage and those at stage level will not be accessible without the installation of an elevator or lift. If means of access is not feasible or would be unnecessarily expensive, the uses of these spaces will need to be limited.

Accessibility requirements are found in the Uniform Federal Accessibility Standards (UFAS).

Fire Protection

As noted above, an automatic fire sprinkler system has been installed in the building at the time of preparation of this report.⁸⁰ When this construction contract is completed, the building will be fully protected with a

⁸⁰ Construction contract 1443-CX-8360-97-004, issued September 1997. As of the end of June 1998, the sprinkler system installation was complete except for punch list items. The utility building to the northeast of the auditorium had been constructed but the water supply well had not been drilled and the emergency generator was not installed, so the system was not yet functional.

permanent fire suppression system. The fire suppression system was designed in accordance with NFPA 13. A temporary fire and intrusion alarm system was installed by the county prior to transfer of the building to the National Park Service. This system was not intended to be a complete, permanent installation, but rather to provide a badly needed interim warning system.

Energy Conservation

Efficiency of the heating and air conditioning systems depends not only on the type of equipment used but also on the building envelop. Reduction of heat gain and heat loss can be achieved relatively easily by insulating the auditorium/gym ceiling, providing double glazing in replacement windows, and insulating the roof and walls of the reconstructed south wing. Where replacement ceilings are required, such as in the north wing and stage areas, these portions can also be insulated. To preserve interior finishes which are in good condition, especially in the auditorium-gymnasium space, it is recommended that these finishes not be removed. For the construction of shear walls or other structural and repair work, it is recommended that the exterior siding and sheathing be removed for access. These sections of walls can then be insulated from the exterior. Portions of some existing exterior walls may thus remain uninsulated but, as discussed in the mechanical systems analysis section, this will not have a significant effect on energy useage. For a vapor retarder at the exterior walls, it is recommended that the interior paint system be specified to contain a vapor blocking component. Also see the mechanical systems analysis section of this report for analysis of alternatives and for standards.

Hazardous Materials

The primary concern for construction and maintenance activities will be lead-containing paint. Much historic material can be preserved, especially within the building interior, and can be refinished with new paint to provide encapsulation. All construction and maintenance activities must be conducted in accordance with federal and state regulations for the handling of materials having lead containing finishes or for the disposal of materials having lead containing finishes.

Functional Requirements

Exhibits. The story of Manzanar will be the primary focus of the interpretive program. Exhibits will be located in the auditorium/gymnasium space. The historic sense of time and place relative to the exhibits will be the character of the auditorium/gymnasium restored to its historic period (1944-45). Restoration of the stage is included in the restoration program. It is suggested that one of the historic character defining features of this space were the benches for audience seating and that a small section of benches set before the stage be part of the exhibit concept. The stage and seating could be used, not for the interpretive audio/visual program, but for presentations during special events. One of the exhibits to be considered for building into the initial period is the historic camp fire truck which has been donated by the Bishop Fire Department and is now in the building. Means of moving the truck in and out of the building needs to be provided, as well as constructing a section of the restored auditorium/gym floor with the strength necessary to support the truck. In the future, if a demonstration block is reconstructed, consideration could also be given to reconstructing the simple camp fire department building, which was in Block 13, north of the auditorium, for display of the fire truck. This would provide additional space in the auditorium for other exhibits.

Audio/Visual. Space for an introductory audio/visual presentation for visitors could be provided either in the auditorium/gym space or in one of the wings. It is proposed that the space in the north wing that was the historic locker/shower rooms, or alternatively a portion of the south wing, would have the advantage of easier sound control than constructing a sound controlling enclosure in the auditorium/gym.

Visitor Contact and Information. This function should be in the auditorium/gym and can be combined with the book sales area.

Book Sales. In addition to a portion of the auditorium/gym for book sales, or alternatively in the north wing, space needs to be provided elsewhere in the building for storage of books and other items that will be offered. Assuming that this function may be operated by a cooperating association, an office space should be provided as well.

Shipping/Receiving Room. A space will be needed for packing and unpacking of deliveries of books and other stock for the book sales and for supplies. This space will also be needed for exhibit maintenance or replacement.

Restrooms. The minimum required numbers of fixtures is derived from the building occupancy. Part of the building is assembly and part is office occupancy. The minimum required numbers of fixtures (from UBC) are:

Public restrooms — water closets = 5 men, 5 women
lavs = 5 men, 5 women

Staff restrooms — water closets = 2 men, 2 women
lavs = 1 men, 1 women

Adjustments to the above minimums are made for the ratio of urinals to water closets in the men's restroom(s) and to provide a higher ratio of water closets in women's restroom than men's. In the case of the 5 water closets for the public men's room, 2 of those can be urinals (not more than 50%). For the women's room, the number of water closets should be increased above the minimum if possible. A minimum of one additional is suggested. Combining the public and staff restrooms would be more efficient utilization of space but is usually not desirable. Note that these are minimum requirements found in UBC. Other standards may recommend a greater number of fixtures, especially for public uses.

Visitor count information for other sites in the area indicate a higher visitation level than previously estimated. Tour buses will also be expected to significantly contribute to the visitor load. The above discussed minimum requirements tend to be inadequate for fluctuations generated by tour bus groups, special events and periods of high visitation. It is suggested that rest room facilities should be provided at greater than minimum requirements. However, this would severely impact the available space in the building, particularly for staff offices, described below. Other alternatives for public restrooms should be studied. One possibility would be a comfort station adjacent to the visitor parking, say southeast of the auditorium, to handle tour buses and periods of high visitation.⁸¹

First Aid. Provide a small room generally convenient to both the public and staff areas but private for emergency and first aid needs.

Staff Offices. Personnel will include the superintendent, an administrative technician, a clerk-typist, park rangers (one supervisory plus 2 full-time and 4 seasonal), and maintenance staff (one supervisory plus 4 full time and 4 seasonal).⁸² In the park ranger category, the numbers of interpretive and law enforcement personnel are not specified. The total staff proposed is 11 full-time and 8 seasonal. The guideline for office space is found in the NPS Space Management Guideline which states that office space "...should not exceed an average of 125 square feet per person for the primary office area, plus 22 per cent for office support space."⁸³ Office support space means activities that include library or reference space, meeting rooms, file and storage space. The maximum area would thus be 2,897 square feet for a total staff of 19 persons [(19)(125) + 22%]. This amount of space will not be available even with the reconstructed south wing. Using only the 11 full time staff the maximum area would be 1,678 square feet [(11)(125) + 22%]. The available area is estimated to be in the range of 1,300 to 1,700 square feet; therefore there will need to be a maximizing of open and shared space. Ultimately, additional space may be necessary at another location.

Other. Janitorial, supplies storage (office and rest room) and mechanical equipment.

TREATMENT ALTERNATIVES CONSIDERED

Reconstruction of South Wing

Functional requirements for building use as outlined in the GMP show the need for the space that would be provided by the south wing. If the south wing was not reconstructed, all of the visitor related activities as well as the interpretive exhibits would need to be accommodated in the auditorium space. This would result in reduced space for exhibits or recreation of part of the historic seating, or both, and public restrooms would be

⁸¹ The present visitation at the Interagency Visitor Center in Lone Pine, California exceeds 250,000 per year and is projected to be double that in the future. This visitor center is a partnership of eight agencies – Inyo County, Mono County, California Fish and Game, California Department of Transportation (CALTRANS), Los Angeles Department of Water and Power (LADWP), U.S. Fish and Wildlife Service, Bureau of Land Management and the National Park Service. Fifteen buses per day are common. On the weekend of September 19 and 20, 1998, the center had 1,400 visitors on each day. U.S. Highway 395 (presently being widened from two to four lanes) currently serves 5-6 million people per year, 85% recreation oriented. Sixty-five per cent of the traffic is from southern California, with a population of approximately 14 million. This population is forecasted to reach 15 million by the year 2010. The annual Manzanar Pilgrimage event has been attended by 3,500 people. (Information provided by Superintendent to Robert L. Carper on September 24, 1998).

⁸² Draft GMP and EIS, December 1995, pg. 32.

⁸³ Space Management Guideline, NPS-89, Release No. 1, National Park Service, October 1994.

minimal. There would also be insufficient space for the proposed level of staffing, probably requiring additional space elsewhere.

Siding

Preservation versus replacement of the siding was one of the concerns from the outset of NPS management of the site. As part of the recent repainting work some replacement was done in combination with application of a stabilizing primer for weathered wood as a potential means of preserving historic fabric. The effectiveness of this stabilizing primer can be monitored in the interim period before building restoration and adaptive use. In conjunction with this treatment, siding can be replaced over time on an as-required basis. However, because of extreme deterioration at the west wall and the structural work that will be necessary on all of the building, most of the siding will probably be replaced.

Windows

The conclusion reached after evaluation in this study is that most windows should be replaced. The wood members are extremely weathered causing reduction of wood strength, loss of cross-section and poor paint bonding characteristics. Many of the sash frame members are warped as well causing loss of weather protection and glazing failures.

Doors

Most historic doors are missing or in poor condition. The historic doors were not durable and provided poor security because of their lightweight construction. For replacement doors, and for repair where possible, design and construction provisions for better durability, security and accessibility should be incorporated.

Reconstruction of Stage: The modifications made in the 1950s are not significant to the building history and the original stage configuration should be reconstructed to properly interpret the site history.

Auditorium/Gymnasium Floor

Alternatives for reconstructing this floor to its historic appearance are (1) to remove the existing concrete slab and earth fill (ca. 1954) and reconstruct the floor system similar to the original, but with increased load carrying capacity, or (2) to retain the existing concrete slab and construct a reproduction wood floor using the slab for support. The second alternative is recommended, with advantages discussed below.

Auditorium/Gymnasium Ceiling

Replacement with a material similar to the original would not provide needed improvement of fire resistance of the building or provide rigidity for support of ceiling insulation. Gypsum board is recommended even though the additional weight will require strengthening of the ceiling framing system but other factors also contribute to the need for this strengthening.

Insulation of Walls

Because of the good condition of the interior wall boarding in the auditorium-gymnasium space, it is important to disturb this material as little as possible. As described in the mechanical systems analysis, the effect of insulation versus no insulation in some of the walls is not as significant as ceiling insulation or insulating window glazing. However, it will be necessary to remove siding and sheathing on many large wall sections for structural or other work, which will permit installation of insulation from the exterior. This can be unfaced batt insulation. It is suggested that a vapor-retardant paint system be used on the interior wall boarding along with some means of sealing the joints of this interior board finish. For the in-fill of the east stage wall and for the south wing reconstruction, batt insulation and a standard vapor retarder film can be installed.

Type of HVAC Equipment and Locations

Locating cooling equipment in the attic was considered to minimize visible elements on the building exterior and to minimize ducting. However, this alternative was rejected because it would require large ceiling grilles for air supply as well as more structural reinforcing. Ceiling grills would probably be more visually intrusive than wall grilles because the large expanse of ceiling draws attention to it. Heating for the auditorium space is proposed to be a radiant grid in the floor. Mechanical equipment for the north and south wings as well as the auditorium space is proposed to be located in the lower level spaces below the stage. The mechanical systems analysis of this report describes advantages and disadvantages of other alternative heating and air-conditioning systems.

RECOMMENDED TREATMENTS

Roofing

The timing for replacement of the roofing will be influenced by the design selected for providing the needed resistance in the roof system for earthquake loading. The preferred method would be to install truss bracing in the attic in conjunction with a full auditorium ceiling diaphragm. This approach would permit retention of the existing roofing for as long as the system remains watertight. When replacement is necessary, new roofing should be a black mineral surfaced roll roofing similar to the original. It is also important to maintain flashings to prevent entry of water into the walls.

Gutters and Downspouts

Although the building did not originally have gutters and downspouts, preservation of siding and windows would be enhanced by retention of the existing gutters and downspouts, with repairs and improvement, then future replacement when needed. The most important locations are the main roof eaves to reduce splashback from the wing roofs on windows and siding.

Exterior Siding

The majority of the west elevation siding, and large sections of siding on other elevations, will require replacement in-kind following structural work. Repainting should be done in the correct historic color following a paint analysis.

Main (West) Entrance Restoration

Very little needs to be done to restore the historic appearance of the west entrance, as this portion of the building has not been significantly modified:

- Remove in-fill at west wall to expose historic columns (see historic photos).
- Install reproduction wood panel doors at the three original entrance openings. The replacements should be constructed and detailed in such a manner that would improve security and longevity without compromising historic appearance. (Also see doors below.)

Stage Restoration

Reconstruction of the original stage and the restoration of the exterior east elevation of the building to its original appearance is proposed in the GMP. Based on historic photo documentation and physical evidence, the stage and associated stair access can be restored with minimal conjecture.

- Remove existing in-fill wall framing and sheathing at the east auditorium\gym wall and at north and south wall of the existing vehicle entry 118.
- Remove concrete ramp down to historic concrete level in the center section of the original stage space (the present ramp, space No. 118). Preserve the historic concrete slab if possible.
- In-fill and blend new exterior wall with existing east wall to restore historic stage back wall.
- Restore and reestablish historic stage opening.

- Restore and reestablish historic stage floor.
- Reestablish historic stair access on both north and south sides of stage.

Auditorium/Gym Floor Restoration

The existing (ca. 1954) concrete slab is in good condition. Rather than removal of the slab and the earth fill to reconstruct the wood floor framing in its original configuration, there would be advantages in retaining the concrete. A radiant heating grid could be installed along with a new flooring system on sleepers which would have the same appearance as the original but would have greater strength as well as offering a good radiant heating system. Although most of the perimeter of the existing slab will need to be removed and replaced for structural work, the overall cost may be less than demolition of all of the existing slab and reconstruction of the former type framing system.. This would also still provide space for electrical conduit for exhibit power and lighting.

The most prudent approach to restoration of the auditorium/gym floor would be to leave the concrete slab in place and construct the new wood floor framing on treated wood sleepers. Not only are there economic advantages to this approach, but the concrete would act as an effective termite barrier in this area, though other perimeter locations would still require measures to protect the structure from termites. To prevent termite access to the flooring system, termite shields will be necessary at the perimeter of the floor and all joints in the concrete slab.

South Wing

Review of the functional requirements for operation of the facility indicates that reconstruction of the south wing will be needed to provide adequate space for necessary staff and public functions. As shown in the accompanying concept drawings, public restrooms and staff operations or visitor related functions would be the most appropriate uses for the reconstructed adaptively used space. The exterior would be reconstructed in its historic detail but the interior would be organized and constructed for present day functions. Except for the relationships to exterior door and window openings, there is no need to reconstruct the historic interior wall configurations. It is proposed that the public restrooms be in the section that historically was the health unit, which extended beyond the east end of the main building, to minimize disturbance in the interpretive areas while providing the greatest convenience to the visitor parking and bus drop-off areas. There is adequate information from historic photos, documentary data, the existing north wing and the remaining fabric of the south wing in Lone Pine for comparison to restore the exterior historic appearance of the south wing.

Window Restoration

Most of the exterior surfaces of the the wood sash members are too deteriorated to retain paint and in addition many are too warped to be usable. By salvaging usable sash members and glass, it may be possible to reassemble some units from original material. (All repair work and disposal of materials must be managed in accordance with federal, state and local regulations pertaining to lead paint). The recommended primary approach is replacement along with possible design modifications to provide other protection and energy saving benefits. Additionally, the sash will require flashing and weather-sealing detailed in such a manner so as not to affect the historic appearance. There also appears to be historic hardware that could be rehabilitated

and reinstalled in new or rehabilitated operable sash. The following factors should be considered in determination of the final treatment approach:

- New glazing of tempered or an impact resistant material (polycarbonate glazing) will provide protection of the building interior and its contents from vandalism.
- New UV blocking glass will provide protection of exhibit items and furnishings from ultraviolet degradation.
- New insulating glazing will reduce heat gain and consequently provide energy savings. An alternative would be separate interior mounted glazing panels. However, the thickness of the sash members is adequate for insulating glazing units without adversely affecting the historic appearance of the windows and this would therefore be the preferred approach. Analysis of the relative benefit of insulating glazing in terms of cooling load energy use reduction is found in the mechanical systems analysis section of this report.

Salvage all wood sash and determine which units have enough integrity to warrant preservation.

Salvage all operable hardware and rehabilitate as required.

Install new or rehabilitated window sash so that they can be removed. New units, fixed or operable, will require flashing and weatherstripping.

Door Restoration

Replacement doors that match their historic counterparts in appearance will have to be detailed in such a manner that they can withstand the rigors of daily use and also be resistant to break-ins. Some doorways will require widening, also with new doors, for accessibility. Most hardware will need to be replaced to meet accessibility standards. Repair and refinishing of historic doors will need to be accomplished in accordance with lead paint regulations.

- Salvage all historic doors and panic hardware.
- Install new doors and frames where required. New exterior units, fixed or operable, will require flashing and weatherstripping.
- Install new historically-compatible lock-sets and panic hardware on all doors that require security and are required emergency exits. Provide accessible hardware as required.

Ceilings

For replacement ceilings, especially in the auditorium/gym, the new material/system will need to provide an appearance in texture, configuration and color similar to the historic as well as improve the fire resistance of the building. A more rigid material is also needed to prevent sagging (“oil-canning”) of the ceiling finish, especially with the addition of insulation. Gypsum board will meet these requirements, although it may be possible to use other lighter-weight materials to achieve these requirements. (A fire-rated separation is not required between the auditorium and attic spaces.) Also the acoustical qualities of the material or its surface treatment need to be considered for the assembly room.

Interior Walls

Preserve interior wall boarding to the extent possible. The most important spaces are the auditorium/gymnasium and the west entrance, which are fortunately in relatively good condition. To avoid loss of historic interior fabric, the portions of these walls exposed to the exterior but not requiring exterior siding removal for structural or other work can be left uninsulated.

Much of the stage space will need to receive replacement boarding, probably including extant original material that has a build-up of bird droppings. Before final action a test cleaning panel is recommended followed by lab tests to determine if detrimental chemicals remain in the paint or wood.

When the vehicle entrance through the former stage space was constructed in the 1950s, the stage side of the remaining and new walls were covered with flooring from the auditorium floor. When this material is removed for restoration of the stage, samples need to be salvaged for the building artifact collection.

In the spaces of the north wing and adjacent to the stage, remove post-historic period wall materials, replace deteriorated or damaged material, but otherwise retain as much sound original material as possible.

Finishes

Repaint the interior in its original color scheme. As described above the primary scheme in the auditorium/gymnasium was a dark brown color on the first 10 board courses (to approximately 50-inches above the floor), medium beige the next 10 courses (to 100-inches), and light beige the rest of the way up to the ceiling line. It appears that these colors were used in other parts of the building as well. A paint analysis will be needed to determine the exact color hues. Wood floors will need a durable clear finish.

Compatible Exhibit Entrance and Floor Modifications

A compatibly designed garage type door should replace the existing rolling door at the exterior wall, southwest corner of the auditorium/gym. The new floor in this area will need to be designed to accommodate the weight of the historic fire truck. If in the future an alternative means of protecting and exhibiting the fire truck is provided, such as reconstruction of the fire station in Block 13, the door could be removed and the wall restored to its original appearance. Alternatively, these provisions would not be required if it is determined to protect and exhibit the fire truck at another location prior to adaptive use of this building.

The space toward the west end of the north wing which now has a concrete floor has double door access both to the auditorium/gymnasium space and the exterior. These are historic double door openings. It is recommended that this space be used for shipping and receiving and a work space. This will provide a work space for setting up, changing and maintenance of exhibits. The double doors should be adequate for moving exhibit components in and out of the exhibit areas.

Exhibit Systems

Because the auditorium/gymnasium space is the primary significant interior space (and perhaps more significant than the exterior of the building) it is recommended that exhibit systems be designed as units

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independent of the building, and not more than 8 feet in height when open above, or 10 feet when enclosure is needed. Enclosed or partially enclosed modules can be acoustically designed for incorporation of interactive interpretive components, such as oral histories, videos and computer-driven programs. Electrical service can be provided by a floor outlet grid for each module for lighting, special exhibit case climate control, audio-visual and other equipment.

Hazardous Materials

Prepare a management plan for lead containing finishes.

Pest Management

Prepare an integrated pest management plan for the site. Determine what additional inspections and testing are necessary. Critical treatment needs are for termites and removal of bee nests in building walls.

Visitor Circulation and Site Restoration

As proposed in the General Management Plan, it is appropriate to provide visitor parking east of the building (nearest the entrance to the historic site from U. S. Highway 395) because of the interpretation of the historic context of the camp to the west of the building. This however presents the difficult practical problem of enticing visitors to walk around the building from the parking to the historic main entrance on the west side. And this will be particularly undesirable for people needing an easily accessible entrance. The main west entrance and the two east entrances, even though the later were historically secondary, will be equally important for emergency egress, accessibility and visitor convenience. Therefore, it is proposed that site design incorporate the concept of shaping the ground with earth fill to provide ramping with hard walking surfaces toward the entrances with a minimum need for handrails to minimize the visual modifications to the site. Ground surface drainage must still be accommodated as well.

Because the site was historically dirt without any plantings except at the west entrance, walkways to and around the building should be surfaced with a material that will be of the same color as the surrounding dirt grounds. However, the concrete entrance walks and planting beds at the west entrance are recommended to be restored and replanted, and a replacement flagpole installed.

Structural

Provide additional earthquake resistance analysis for a performance based design to determine the feasibility of providing an acceptable degree of building protection beyond life-safety requirements but within an acceptable level of fabric intervention. See the “Structural Analysis and Findings” section earlier in this report and the seismic evaluation, Appendix J, for more complete descriptions of the recommended treatments for the structural systems.

Roofs and Auditorium Ceiling. Modify roof trusses to relieve overstressed members and joint connections.

Provide roof bracing or diaphragms to resist lateral (earthquake) loading. For the auditorium-gymnasium roof, the preferred method would be a truss bracing system rather than a roof surface diaphragm. This would avoid the difficulty of preparing or removing the asphalt coating on the historic sheathing to receive a plywood diaphragm. See the seismic evaluation (Appendix J) for additional information. Increase load-carrying capacity of auditorium-gymnasium ceiling framing by sistering new joists along existing joists.

Provide diaphragm bracing in the plane of the auditorium-gymnasium ceiling. It is proposed that this be integrated with the preferred roof bracing approach as described in the seismic evaluation.

Walls. Remove deteriorated wood at bases of truss columns and replace with new wood or with concrete pedestals. Anchor the truss columns to their footings.

Eliminate soil to wood contact along the interior face of the auditorium walls and walls of the north wing below the concrete floor slabs and along the exterior face of building walls.

Provide shear wall capacity to provide resistance to lateral (earthquake) loading. Sections of walls need to be designed as either diaphragm shear walls or with braced frames. New concrete grade beams or enlarged footings at the base of these walls may be needed.

Provide bracing for the cripple walls in the north wing crawl space. The new shear walls or diagonal bracing in the north wing can be designed to also brace the crawl space.

Where the top plates of the walls are discontinuous at the ends of the auditorium trusses, install light gauge steel straps across the discontinuities. Connect the roof system bracing or diaphragm to the diaphragm chords and struts.

Floors. Investigate the north wing floor framing for rot or insect damage and install new framing members as needed to improve its load-carrying capacity.

Install light gauge beam-to-post and post-to-foundation connectors in the north wing crawl space.

Foundations. Install new concrete grade beams or enlarged footings at the base of new shear walls or new braced frames.

Provide means of interconnecting footings of the north wing, if required by further analysis, by either bolting continuous steel members to the footings or installing a slab-on-grade around, and doweled into, the footings.

Mechanical Systems

Building Envelope. The walls, floors, and roofs of the building should be insulated as much as is practical without removal or destruction of the interior finishes in the auditorium-gymnasium section. Insulated window glazing units are also recommended.

Heating, Ventilating, and Air Conditioning System. The systems recommended for implementation are:

- Single-stage evaporative coolers and hydronic (hot water) radiant floor heating system for the gym and stage areas, with a propane-fired makeup air unit for ventilation in the heating season.
- Air cooled package air conditioners with hot water heating coils for the remaining spaces in the building to be conditioned.
- High efficiency propane-fired hot water boilers to provide hot water for the radiant floor heating system and the hot water coils associated with the package air conditioners.
- Toilet exhaust systems in all of the new restroom spaces.

Plumbing Systems. It is recommended that all of the piping in the building be replaced with new piping. New domestic water heaters should be provided as necessary. All new plumbing fixtures and fittings shall be water-conserving (low-flow) type.

Fire Protection Systems. When the south wing is reconstructed, it should be fully sprinklered, with its sprinkler system connected to the existing (1998) dry pipe sprinkler system in the Auditorium building. It is recommended that portable fire extinguishers be installed in strategic locations throughout the building.

Electrical Systems

Upgrade site power supply as required. Relocate the circuit transformer cabinet and meter to the new utility pole location and provide an overhead drop to the building at the historic location.

Replace all wiring systems within the building.

Restore historic exterior and auditorium-gymnasium space lighting fixtures or replace as required with similar fixtures for general lighting.

Provide separate supplementary lighting, specific exhibit lighting and task lighting incorporated into exhibit, book sales and other functional modules as much as possible.

Provide a new fire detection system, a new intrusion detection system and new telecommunications systems.

Evaluation of Effects

Reconstruction of South Wing. An accurate reconstruction of the exterior can be accomplished from historic documentation. The space is required for operation and interpretation of the historic site.

Reconstruction of Stage and Auditorium/Gym Floor Restoration. Accurate reconstruction can be accomplished from historic documentation and physical evidence. This will restore the most important interior space to its period of significance.

Siding Replacement. Much of the siding is badly deteriorated and warped. All of the original siding is contaminated with lead containing paint. Siding replacement will probably be necessary on wall sections where structural improvements are required. Replacement of siding on other wall areas on an as-required basis will also be a loss of historic fabric but this needs to be considered as a cyclic renewal of the exterior cladding of the building. Good maintenance will reduce the frequency of needed replacement in the future.

Windows. Loss of historic fabric will occur by replacement of most windows but this cannot be avoided because of extreme deterioration of the originals.

Doors. Loss of historic fabric will occur by replacement of most still extant exterior doors required because of deterioration, damage and requirements for durability, security and accessibility.

Replacement of Ceiling Materials. Loss of historic fabric will occur by replacement of most ceiling materials required because of deterioration and the need to improve the fire resistance of the building. The replacement material can be finished to have an appearance similar to the historic ceilings.

PROJECT PHASING

Site water supply and fire suppression has been undertaken as a first phase, and is nearly complete.

To the extent that construction funding may need to be done in small increments, at least initially, high priority work recommended includes:

1. Structural work, especially repair of rotted column bases and seismic strengthening, and exterior weatherization.
2. Completion of exterior repairs and restoration.

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3. Basic electrical system upgrading and installation of permanent fire and intrusion detection system.
4. Windows and exterior doors.

ESTIMATED CONSTRUCTION COST

Rehabilitation of the building as described and recommended in this report is:

Structural and exterior rehabilitation	\$ 657,500
Interior rehabilitation, including stage reconstruction	522,300
South wing reconstruction	279,300
Mechanical systems	417,400
Electrical systems	<u>182,400</u>
Total, net construction, 1998 dollars	\$ 2,058,900
Inflation to 2001 (4% per year)	<u>257,100</u>
	\$ 2,316,000

This includes restoration of historic site features at the west entrance and site work for accessible entrances. The sub-categories above are not intended to be compared to any previous estimates because the items included in each sub-category will not be the same. The above does not include furnishings, exhibits, visitor parking or other structures.

RECOMMENDED ADDITIONAL DOCUMENTATION AND STUDIES

1. Paint analysis to determine historic period exterior and interior colors.
2. HABS documentation of VFW/American Legion Post in Lone Pine, which consists of the extant portions of the original south wing of the Auditorium.
3. Future documentation of the record of treatment.

DRAWINGS

Auditorium, Sheet 1 of 16

Ground Level Floor Plan, Sheet 2 of 16

Second Level Floor Plan, Sheet 3 of 16

Third Level Floor Plan, Sheet 4 of 16

Reflected Auditorium Ceiling Plan, Sheet 5 of 16

Auditorium Attic Plan, Sheet 6 of 16

Auditorium Roof Plan, Sheet 7 of 16

North and East Elevations, Sheet 8 of 16

South and West Elevations, Sheet 9 of 16

Window Details, Sheet 12 of 16

Door Elevations, Sheet 13 of 16

Proposed Floor Plan, Alternative 1, Ground Level, Sheet 14 of 16

Proposed Floor Plan, Alternative 2, Ground Level, Sheet 15 of 16

Proposed Floor Plan, Alternative 3, Ground Level, Sheet 16 of 16

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National Archives, Washington, D.C.

Record Group No. 210, Records of the War Relocation Authority

Entry No. 48, Records of Relocation Centers, 1942-1946
Subject-Classified General Files

Box No. 70 Manzanar Relocation Center
Relocation Center Records
Manzanar Final Reports
File: Vol. 5, Engineering Section

Box No. 71 Manzanar Relocation Center
Relocation Center Records
Manzanar Final Reports

Box No. 220 Manzanar Relocation Center
Central Files
File No. 18.010 - Auditorium

Box No. 224 Manzanar Relocation Center
Central Files
File No. 41.079A - Project Director's Bulletins

National Archives, San Bruno, California (Sierra-Pacific Division)

Record Group No. 49; Records of the Bureau of Land Management (successor to the General Land Office)

Series No. 95

Box No. 919

File No. 81277 - Explanatory Notes - Appraisal of Buildings and Structures — Manzanar
Relocation Center

Inventory and Appraisal of Equipment and Furnishings of Auditorium

National Archives, Laguna Niguel, California (Pacific Southwest Region)

Record Group No. 210, Records of the War Relocation Authority

File No. 1

File No. 2

University of California at Los Angeles, University Research Library, Special Collections

Collection No. 122, Manzanar Collection (Principally if not exclusively the records of Project Director Ralph Merritt's
Administrative Office at Manzanar)

Box No. 47, Folder 1, Ralph Merritt's office diary, presumably kept for him by his secretary

Manzanar National Historic Site, Park Headquarters, Manzanar, California

Research files compiled by NPS Historian Harlan Unrau in writing historic resources study on Manzanar: 8
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Correspondence and Bill of Sale of Auditorium, War Assets Authority to County of Inyo

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NEWSPAPERS

Manzanar Free Press. A complete run of this newspaper in Collection No. 122, Manzanar Collection, in the Special
Collections Library of the University Research Library at the University of California at Los Angeles is the set used
in research for this report. It is believed the National Archives also has a complete run of the paper, and several
other repositories may have partial or complete runs.

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Window evaluation and recommendations, draft report, Gordon White, Historical Architect, GOGA/PRES 1996. See Appendix E.

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APPENDIXES

- A. Excerpt from “List of Materials for Community Facilities, Manzanar Relocation Center,” prepared by the Farm Security Administration, August 5, 1942.
- B. “Engineering Section,” by Arthur M. Sandridge and Oliver E. Sisler, Manzanar Relocation Authority, February 1946, part of the War Relocation Authority, *Final Report, Manzanar War Relocation Center*, “Chapter 2, WRA Construction, Part I, New Construction, B. Gymnasium-Auditorium.” Document on file in National Archives.
- C. HABS drawings and report (HABS No. CA-2399A)
- D. Conceptual sketches of site and building use prepared for site utilities planning, DSC, October 1996.
- E. Door and window analysis and repair recommendations, prepared by Gordon White, National Park Service, Presidio Project Office, San Francisco, August 1996.
- F. Details of furnace flue enclosures and vent details in Projection Room and furnace rooms originally constructed in part with asbestos materials, recorded by George Voyta, August 1996, before asbestos abatement work.
- G. Existing Finishes Schedule.
- H. Mechanical Systems Data.
- I. Structural Calculations.
- J. “FEMA 178/June 1992 Seismic Evaluation, Manzanar Auditorium Building...,” Final Report, Martin/Martin, Inc., Wheat Ridge, Colorado, December 1998.

APPENDIX A: LIST OF STRUCTURAL MATERIALS

Excerpt from "List of Materials for Community Facilities, Manzanar Relocation Center," prepared by
the Farm Security Administration, August 5, 1942.

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GYMNASIUM

Junior Senior High School

	NUMBER OF PIECES	SIZE	GRADE	NO. RD. FT. OR QUANTITY	COST
<u>CONCRETE FOR FOOTINGS AND FLOOR SLABS</u>					
Concrete Footings (cu. yds. needed)			1:2:4 mix		
		Portland Cement		173 sacks	
		Sand		14 cu. yds.	
		Gravel 1" and under		29 cu. yds.	
Concrete Floors (cu. yds. needed)			1:3½ mix		
		Portland Cement		85 sacks	
		Sand		11 cu. yds.	
<u>LUMBER FOR SUB-FLOOR CONSTRUCTION</u>					
Sleepers, End Stage	84	6" x 10" 16'-0"	Creosoted No. I.D.F.	6720	
Sleepers, Wings	32	4" x 10" 18'-0"	Creosoted No. I.D.F.	1901	
Sleepers, Porch	8	4" x 6" 12'-0"	Creosoted No. I.D.F.	202	
Outside Steps	15	2" x 4" 14'-0"	No. I.D.F.	148	
Stage Sleepers	72	2" x 4" 16'-0"	No. I.D.F.	781	
Joists	223	2" x 6" 20'-0"	No. I.D.F.	4460	
Joists	227	2" x 6" 18'-0"	No. I.D.F.	4086	
Joists	65	2" x 8" 8'-0"	No. I.D.F.	676	
Joists	85	2" x 8" 16'-0"	No. I.D.F.	1768	
Joists					
Blocking	101	2" x 6" 16'-0"	No. I.D.F.	1621	
Joists					
Bridging	10	2" x 3" 16'-0"	No. I.D.F.	80	
Flooring (sub)	18,758	1" x 4"	No. 2 D.F.	18,758	
	sq. ft.				
Flooring	12,083	1" x 4" T & G	"C" V.G.D.F.	12,083	
Finish	sq. ft.				
Joists under					
Stage	40	2" x 6" 12'-0"	D.F. No. 2	225	
Joists, sleepers					
Joists footings	50	¾" x 1½" x 14"			
Green finish &					
Sub-floor	12 squares	6 lb. Bldg. Paper			
Joists at Sleeper					
Joists	40	1" x 2" x 16'-0"	D.F. #2	100	

GYMNASIUM

Junior - Senior High School

ITEM	NUMBER OF PIECES	SIZE	GRADE	NO. BD. FT. OR QUANTITY	COST
<u>LUMBER FOR ALL FRAMING & INTERIOR FINISH</u>					
<u>RIGHT & LEFT</u>	48	2" x 4"	8'-0"	No. 1 D.F.	264
<u>WING</u>	306	2" x 4"	8'-0"	No. 2 D.F.	1683
<u>Wall Framing</u>	80	2" x 4"	10'-0"	No. 1 D.F.	560
	44	2" x 4"	10'-0"	No. 2 D.F.	308
	66	2" x 4"	12'-0"	No. 1 D.F.	528
	28	2" x 4"	14'-0"	No. 1 D.F.	252
	14	2" x 4"	14'-0"	No. 2 D.F.	126
	10	3" x 4"	8'-0"	No. 1 D.F.	80
	20	3" x 4"	14'-0"	No. 1 D.F.	280
	22	2" x 3"	10'-0"	No. 1 D.F.	110
	4	2" x 2"	8'-0"	No. 1 D.F.	12
<u>Plywood</u>	27	4'-0" x 8'-0" x 5/16"	W.F.		864 sq.ft.
<u>Sheathing</u>		1" x 6"	No. 2 D.F.		2360
<u>Siding, Flush</u>		1" x 8" Shiplap	"C" D.F.		1900
<u>AUDITORIUM</u>	14	2" x 4"	10'-0"	No. 1 D.F.	98
<u>Wall Framing</u>	7	2" x 4"	10'-0"	No. 2 D.F.	49
	8	2" x 4"	12'-0"	No. 1 D.F.	64
	131	2" x 4"	12'-0"	No. 2 D.F.	1048
	72	2" x 4"	16'-0"	No. 1 D.F.	792
	16	2" x 4"	16'-0"	No. 2 D.F.	176
	4	2" x 4"	18'-0"	No. 1 D.F.	48
	166	2" x 4"	18'-0"	No. 2 D.F.	1992
	8	2" x 10"	10'-0"	No. 1 D.F.	126
	16	2" x 10"	12'-0"	No. 1 D.F.	320
	88	2" x 10"	16'-0"	No. 1 D.F.	2376
	6	2" x 10"	20'-0"	No. 1 D.F.	198
	8	2" x 6"	8'-0"	No. 1 D.F.	64
	4	2" x 6"	18'-0"	No. 1 D.F.	72
	3	2" x 4"	10'-0"	No. 1 D.F.	21
	1	4" x 4"	12'-0"	No. 1 D.F.	16
	1	4" x 4"	8'-0"	No. 1 D.F.	8
	24	3" x 6"	12'-0"	No. 1 D.F.	432
<u>heathing</u>		1" x 6" random			
		length	No. 2 D.F.		6100
<u>siding (Interior)</u>		1" x 6" flush			
		shiplap	"C" D.F.		2200
<u>ndow Guards</u>		1 1/4" x 6"	"C" D.F.		2700 l.f.
<u>msul Insulation</u>		2" thick			330 sq.ft.

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GYMNASIUM

Junior & Senior High School

	NUMBER OF PIECES	SIZE	GRADE	NO. BD. FT. OR QUANTITY	COST
<u>CEILING ROOM</u>					
CEILING					
Framing	13	2" x 4" x 10'-0"	No. 1 D.F.	91	
	23	2" x 4" x 12'-0"	No. 1 D.F.	164	
	88	2" x 4" x 18'-0"	No. 2 D.F.	1056	
	1	2" x 6" x 10'-0"	No. 2 D.F.	10	
	14	2" x 6" x 12'-0"	No. 1 D.F.	168	
	11	2" x 6" x 12'-0"	No. 2 D.F.	132	
	41	2" x 6" x 16'-0"	No. 2 D.F.	656	
	4	3" x 6" x 10'-0"	No. 1 D.F.	60	
	2	4" x 6" x 12'-0"	No. 2 D.F.	48	
	2	2" x 8" x 12'-0"	No. 1 D.F.	32	
	30	2" x 8" x 14'-0"	No. 1 D.F.	772	
	2	2" x 8" x 12'-0"	No. 1 D.F.	12	
	1	2" x 2" x 10'-0"	No. 1 D.F.	4	
Ring (Interior)		1" x 6" Flush			
		Shiplap	"C" D.F.	1100	
Flooring		1" x 4" T & G	"C" V.G.D.F.	480	
Finish (Wall)		$\frac{1}{2}$ " Gypsum bd.		4000 sq.ft.	
<u>PROJECTION</u>					
<u>ECOTH</u>					
Wall Framing	3	2" x 4" x 8'-0"	No. 1 D.F.	18	
	61	2" x 4" x 8'-0"	No. 2 D.F.	366	
	24	2" x 4" x 10'-0"	No. 1 D.F.	168	
	16	2" x 4" x 12'-0"	No. 1 D.F.	128	
	4	2" x 4" x 12'-0"	No. 2 D.F.	32	
	1	2" x 4" x 14'-0"	No. 1 D.F.	9	
	4	2" x 4" x 14'-0"	No. 2 D.F.	36	
	2	2" x 6" x 10'-0"	No. 1 D.F.	20	
	1	2" x 6" x 12'-0"	No. 1 D.F.	12	
	3	3" x 4" x 14'-0"	No. 1 D.F.	42	
	3	2" x 3" x 10'-0"	No. 1 D.F.	15	
	1	2" x 2" x 12'-0"	No. 1 D.F.	4	
	2	4" x 6" x 8'-0"	No. 1 D.F.	32	
	1	6" x 8" x 8'-0"	No. 1 D.F.	32	
	1	6" x 8" x 18'-0"	No. 1 D.F.	72	
Wall Finish		$\frac{1}{2}$ " Gypsum board		988 sq.ft.	

GYMNASIUM

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ITEM	NUMBER OF PIECES	SIZE	GRADE	NO. BD. FT. OR QUANTITY	COST
<u>HEALTH UNIT</u>					
Wall Framing	23	2" x 4" x 8'-0"	No. 2 D.F.	138	
	11	2" x 4" x 10'-0"	No. 1 D.F.	77	
	30	2" x 4" x 12'-0"	No. 1 D.F.	240	
	5	2" x 4" x 12'-0"	No. 2 D.F.	40	
	7	2" x 3" x 12'-0"	No. 1 D.F.	42	
	3	2" x 2" x 12'-0"	No. 1 D.F.	12	
	4	3" x 4" x 14'-0"	No. 1 D.F.	56	
	6	3" x 4" x 8'-0"	No. 2 D.F.	48	
Sheathing (Interior)		1" x 6" random length	No. 2 D.F.	260	
<u>LUMBER FOR ROOF FRAMING & CEILING FINISH</u>					
Rafters and	51	2" x 12" x 24'-0"	No. 1 D.F.	2448	
Blocking	125	2" x 12" x 22'-0"	No. 1 D.F.	5500	
	5	2" x 12" x 20'-0"	No. 1 D.F.	200	
	2	2" x 12" x 18'-0"	No. 1 D.F.	72	
	56	2" x 12" x 16'-0"	No. 1 D.F.	1692	
	14	2" x 12" x 14'-0"	No. 1 D.F.	392	
	5	2" x 12" x 12'-0"	No. 1 D.F.	120	
	3	2" x 12" x 10'-0"	No. 1 D.F.	60	
	4	2" x 12" x 8'-0"	No. 1 D.F.	64	
	18	2" x 6" x 10'-0"	No. 1 D.F.	180	
	20	2" x 10" x 18'-0"	No. 1 D.F.	600	
	16	2" x 8" x 14'-0"	No. 1 D.F.	304	
	33	2" x 8" x 12'-0"	No. 1 D.F.	628	
	20	2" x 8" x 10'-0"	No. 1 D.F.	260	
Purlins and	276	2" x 10" x 18'-0"	No. 1 D.F.	8280	
Blocking	126	2" x 10" x 12'-0"	No. 1 D.F.	2484	
	5	2" x 10" x 10'-0"	No. 1 D.F.	85	
Eaves Closer	9	2" x 4" x 22'-0"	No. 1 D.F.	135	
	2	2" x 4" x 20'-0"	No. 1 D.F.	27	
	8	2" x 4" x 18'-0"	No. 1 D.F.	96	
	4	2" x 4" x 14'-0"	No. 1 D.F.	38	
	19	2" x 4" x 12'-0"	No. 1 D.F.	162	
Roof Sheathing		1" x 6" random length	No. 2 D.F.	21,000	
Tack Strip	975 l.f.	1" x 2"	No. 1 D.F.	164	
Fascia	525 l.f.	1" x 6"	No. 1 D.F.	265	
Ceiling Mould	3000 l.f.	1" x 3"	No. 1 D.F.	750	
Jant Strip	150 l.f.	2" x 2"	No. 1 D.F.	52	
Ceiling Fin.		$\frac{1}{2}$ " Insulation Board		19,100 sq.ft.	
Ceiling Fin.		$\frac{1}{2}$ " Gypsum Board		660 sq.ft.	

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SYNOPSIS

Junior High School

NUMBER OF PIECES	SIZE	GRADE	AMOUNT, FT. OR QUANTITY	COST
368 rolls	116 lbs. per roll 3'-0" wide x 36'-0" long black mineral surfaced split sheet			
460 lbs.	Asphalt			
820 lbs.	7/8" large headed roofing nails			
185 lbs.	Cotton mop yarn			
Insulation	2" thick		16,000 sq.ft.	
Staples for Kimsul	5000 staples to a box		5 boxes	
Apple Hammer	Sold by Bostitch-Western Co., S.F. & L.A.		3 hammers	

EXTERIOR WALL FINISH

Exterior Sheathing	1 x 6 random length	No. 2 D.F.	9800
Exterior Siding	1 x 6 Flush Siding	"C" D.F.	2300
Exterior Siding	1 x 6 "V" Siding	"C" D.F.	7900
Corner Boards 15	1" x 4" x 12'-0"	No. 1 D.F.	60
Corner Boards 20	1" x 3" x 12'-0"	No. 1 D.F.	60
Corner Boards 8	1" x 6" x 10'-0"	No. 1 D.F.	40

MISCELLANEOUS LUMBER & MATERIALS

Lockers 33	1" x 12" x 18'-0"	No. 1 D.F.	600
Lockers 15	1" x 12" x 12'-0"	No. 1 D.F.	180
Lockers 66	1" x 12" x 10'-0"	No. 1 D.F.	660
Lockers 19	1" x 4" x 12'-0"	No. 1 D.F.	76
Shelves 12	1" x 12" x 18'-0"	No. 1 D.F.	216
Shelves 7	1" x 6" x 18'-0"	No. 1 D.F.	63
Shelves 17	1" x 4" x 12'-0"	No. 1 D.F.	68
Clovers 72	1" x 8" x 16'-0"	No. 1 D.F.	764
8	2" x 4" x 12'-0"	No. 1 D.F.	64
4	2" x 8" x 16'-0"	No. 1 D.F.	86
4	2" x 3" x 16'-0"	No. 1 D.F.	32
	1/2" x 3/4"	"C" D.F.	1200 l.f.
Door Flaps 10	4'-0" x 8'-0" x 1/2" S2S Plywood		320 sq.ft.
Toilet Stalls 4	4'-0" x 10'-0" x 3/4"	W.P. Plywood	160 sq.ft.
Toilet Stalls 10	2" x 2" x 14'-0"	D.F. No. 1	47
Toilet Stalls 5	1" x 2" x 14'-0"	D.F. No. 1	13

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GYMNASIUM

Junior - Senior High School

ITEM	NUMBER OF PIECES	SIZE	GRADE	NO. BD. FT. OR QUANTITY	COST
Plywood for ducts and registers		$\frac{1}{4}$ " thick	Sound 1 side	600 sq.ft.	
Trim for Plywood Registers	2	1" x 2" x 10'-0"	D.F. #1	4	
Joists for Furred Ceiling	111	2" x 2" x 8'-0"	D.F. #1	296	
Health Unit	8	4'-0" x 5'-0" x $\frac{1}{8}$ "	S2S Plywood	160 sq.ft.	
Health Unit	8	3'-0" x 5'-0" x $\frac{1}{8}$ "	S2S Plywood	120 sq.ft.	
Health Unit	2	2" x 4" x 12'-0"	D.F. #1	16	
Health Unit	8	2" x 2" x 14'-0"	D.F. #1	38	
Health Unit	8	2" x 2" x 18'-0"	D.F. #1	48	
Health Unit	9	4'-0" x 5'-0" x $\frac{1}{2}$ "	S2S Plywood		
Health Unit	2	2" x 4" x 14'-0"	D.F. #1	19	
Health Unit	9	2" x 2" x 8'-0"	D.F. #1	27	
Health Unit	9	2" x 2" x 12'-0"	D.F. #1	36	
Basketball Stops	2	4'-0" x 6'-0" x $\frac{1}{2}$ "	S2S Plywood	48 sq.ft.	
	6	2" x 4" x 12'-0"	D.F. #1	48	
	4	2" x 8" x 18'-0"	D.F. #1	96	
	6	2" x 4" x 16'-0"	D.F. #1	64	
	6	2" x 6" x 14'-0"	D.F. #1	84	
	2	Standard Basket			
		Ball Goal & Net			
	10	12" x 14' Crystal			
		Sheet Mirrors			
Frame for Mirrors	5	1" x 2" x 12'-0"	"C" D.F.	10	
	90 squares	6 lb. bldg. paper			
Clothes Poles	30	$\frac{1}{2}$ " Rd. x 10'-0"		300 l.f.	
Clothes Collars	100	Stock			
Hardwood Grilles		5/16" x 1-5/8" (net)	Oak	700 l.f.	
Hardwood Grilles		1" x 2"	Oak	100 l.f.	
Hardwood Grilles		2" x 3"	Oak	160 l.f.	
Hardwood Grilles		1" x 2"	Oak	60 l.f.	
Creosote	65	gallons		65 gals.	

NAILS

230 lbs.	20d Common Nails
500 lbs.	16d Common Nails
125 lbs.	12d Common Nails
1400 lbs.	8d Common Nails
350 lbs.	8d Casinr Nails
100 lbs.	6d Finishing Nails
30 lbs.	4d Cement Coated Nails
260 lbs.	4d Box Nails
35 lbs.	4d Brads

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GYMNASIUM

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ITEM	NUMBER OF PIECES	SIZE	GRADE	NO. BD. FT. OR QUANTITY	COST
<u>GLASS AND DOORS</u>					
Doors, 2 pan					
Upper Glass	1	2'-8" x 6'-8" x 1-3/8"			
Doors, 2 pan					
Upper Glass	8	2'-6" x 6'-8" x 1-3/4"			
Doors, 2 pan Wood	6	2'-6" x 7'-0" x 1-3/4"			
Doors, 2 pan Wood	2	3'-0" x 6'-8" x 1-3/8"			
	4	3'-0" x 6'-8" x 1-3/8"			
	7	2'-8" x 6'-8" x 1-3/8"			
	28	2'-6" x 6'-8" x 1-3/8"			
Doors, 1 pan Wood	4	2'-0" x 4'-0" x 1-1/8"			
Doors, 2 pan					
Latch	2	2'-8" x 6'-8" x 1-3/8"			
Frames, Exterior	3	1-1/8" x 6-5/8"-5'-0" x 7'-0"		81	
	4	1-1/8" x 6-5/8"-5'-4" x 6'-8"		108	
	2	1-1/8" x 6-5/8"-3'-0" x 6'-8"		48	
	1	1-1/8" x 6-5/8"-2'-8" x 6'-8"		24	
Sill	3	2" x 8" x 16'-0"		63	
Trim	10	1 x 3" x 20'-0"		50	
Stops	10	1/2" x 3-7/8" x 20'-0"		60	
Stops(Int. Doors)	56	1/2" x 1 1/2" x 18'-0"		170	
Glass(Doors)	4	1'-0" x 1'-8"	S.S. "B" Grade		
Glass(Doors)	32	11" x 1'-8"	S.S. "B" Grade		
Door Trim					
(Interior)	56	1" x 2" x 18'-0"		170	
Door Frames					
(Interior)	56	1" x 4" x 18'-0"		340	
Door Trim					
(Interior)	70	3/4" - 1/2" x 16'-0"		1120 l.f.	
Door Trim					
(Exterior)	18	1/2" - 1/2" x 16'-0"		188 l.f.	
Sash 4L	112	4'-0" x 3'-4" x 1-3/4" (A)			
Sash 2L	75	4'-0" x 2'-4" x 1-3/8" (B)			
Sash 2L	12	4'-0" x 2'-4" x 1-3/4" (E)			
Glass (Sash)	448	1'-9-5/8" x 1'-5" S.S. "B" Grade			
Glass (Sash)	116	1'-9-5/8" x 1'-10" S.S. "B" Grade			
	58	1'-9-5/8" x 1'-10" S.S. Obscure			
Nitty	675 lbs.				
Glazing Tacks	7 lbs.				

GYMNASIUM

Junior - Senior High School

Material List for (5) - 80 ft. Span Roof Trusses
With Columns: Gymnasium Type "A" (Sheet A-7)

ITEM	NUMBER OF PIECES	SIZE	GRADE	NO. BD. FT. OR QUANTITY	COST
Upper Chord	10	3" x 10" x 18'-0"	Select		
			Struct D.F.	450	
Upper Chord	20	2" x 10" x 18'-0"	Select		
			Struct D.F.	600	
Upper Chord	20	3" x 10" x 28'-0"	Select		
			Struct D.F.	1400	
Lower Chord	20	3" x 10" x 24'-0"	No. 1 Dim D.F.	1200	
Lower Chord	10	3" x 10" x 32'-0"	No. 1 Dim D.F.	800	
Scabs	5	3" x 10" x 12'-0"	No. 1 Dim D.F.	150	
Scabs	10	2" x 10" x 8'-0"	No. 1 Dim D.F.	165	
Web Members	5	3" x 4" x 10'-0"	No. 1 Dim D.F.	50	
Web Members	5	3" x 4" x 18'-0"	No. 1 Dim D.F.	90	
Web Members	10	3" x 4" x 6'-0"	No. 1 Dim D.F.	60	
Web Members	10	2" x 6" x 20'-0"	No. 1 Dim D.F.	200	
Web Members	5	3" x 6" x 14'-0"	No. 1 Dim D.F.	105	
Web Members	20	2" x 4" x 10'-0"	No. 1 Dim D.F.	135	
Web Members	10	3" x 4" x 8'-0"	No. 1 Dim D.F.	80	
Web Members	10	3" x 4" x 10'-0"	No. 1 Dim D.F.	100	
Web Members	5	3" x 4" x 18'-0"	No. 1 Dim D.F.	90	
Web Members	20	2" x 6" x 12'-0"	No. 1 Dim D.F.	240	
Web Members	5	2" x 4" x 18'-0"	No. 1 Dim D.F.	60	
Filler	5	3" x 6" x 8'-0"	No. 1 Dim D.F.	60	
Knee Brace	20	3" x 6" x 18'-0"	No. 1 Dim D.F.	540	
Scabs	5	3" x 16" x 8'-0"	No. 1 Dim D.F.	160	
Column	20	2" x 16" x 22'-0"	No. 1 Dim D.F.	1175	
Column	30	3" x 16" x 22'-0"	No. 1 Dim D.F.	2640	
Total				10,550	

Material List for (1) 50 Ft. Span Stage Truss
With Columns: Gymnasium Type "A" (Sheet A-6)

Upper Chord	4	3" x 6" x 16'-0"	No. 1 Dim D.F.	96
Lower Chord	4	3" x 6" x 16'-0"	No. 1 Dim D.F.	96
Web Members	1	3" x 8" x 12'-0"	No. 1 Dim D.F.	24
Web Members	1	2" x 12" x 16'-0"	No. 1 Dim D.F.	32
Web Members	1	3" x 6" x 12'-0"	No. 1 Dim D.F.	18
Web Members	1	2" x 6" x 16'-0"	No. 1 Dim D.F.	16
Web Members	1	3" x 6" x 12'-0"	No. 1 Dim D.F.	18
Web Members	1	2" x 6" x 16'-0"	No. 1 Dim D.F.	16

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ITEM	NUMBER OF PIECES	SIZE	GRADE	NO. BD. FT. OR QUANTITY	COST
Web Members	1	3" x 4" x 12'-0"	No. 1 Dim D.F.	12	
Web Members	1	2" x 4" x 16'-0"	No. 1 Dim D.F.	13	
Web Members	1	3" x 4" x 14'-0"	No. 1 Dim D.F.	14	
Scabs	1	2" x 6" x 12'-0"	No. 1 Dim D.F.	12	
Filler	1	3" x 6" x 6'-0"	No. 1 Dim D.F.	9	
Column	4	2" x 10" x 22'-0"	No. 1 Dim D.F.	147	
Column	2	3" x 10" x 22'-0"	No. 1 Dim D.F.	100	
Filler	1	3" x 4" x 10'-0"	No. 1 Dim D.F.	10	
Filler	1	3" x 10" x 6'-0"	No. 1 Dim D.F.	15	
Total				648	

Rough Hardware for (6) Trusses With Columns
(5-80'-0" span trusses + 1-30'-0" span truss)
Sheets (A-6 and A-7)

Split Rings	612	4" ϕ	
Split Rings	1144	2 $\frac{1}{2}$ " ϕ	
Shear Plates	216	2-5/8" ϕ	
Machine Bolts	11	3/4" ϕ x 5"	+ 10% on bolts and washers
Machine Bolts	22	3/4" ϕ x 7"	
Machine Bolts	11	3/4" ϕ x 10"	
Machine Bolts	22	3/4" ϕ x 12"	
Machine Bolts	86	3/4" ϕ x 14"	
Machine Bolts	11	3/4" ϕ x 18"	
Machine Bolts	22	1/2" ϕ x 7"	
Machine Bolts	68	1/2" ϕ x 10"	
Machine Bolts	108	1/2" ϕ x 14"	
Machine Bolts	66	1/2" ϕ x 18"	
M.I. Washers	462	3/4" ϕ	
M.I. Washers	550	1/2" ϕ	
Cut Washers	70	3/4" ϕ	
Steel Plates	20	3" x 1/2" x 24"	
Steel Plates	20	2 $\frac{1}{2}$ " x 1" x 15"	
Steel Anchor Plates	10	8" x 5/8" x 4'-6"	
Steel Anchor Plates	2	6" x 1/2" x 4'-6"	
Steel Base Plates	10	11" x 1/4" x 1'-4"	
Steel Base Plates	2	11" x 1/2" x 10"	

MANZANAR
Structural Materials
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GYMNASIUM

Junior - Senior High School

Material List for Truss Bracing - 80 Ft. Span
Truss - Gymnasium Type "A"

ITEM	NUMBER OF PIECES	SIZE	GRADE	NO. BD. FT. OR QUANTITY	COST
Truss Bracing	31	2" x 8" x 20'-0"	No. 1 D.F.	830	
Truss Bracing	35	2" x 8" x 24'-0"	No. 1 D.F.	1120	
<u>ROUGH HARDWARE FOR BRACING</u>					
Machine Bolts	32	$\frac{1}{2}$ " \emptyset x 15"			
M.I. Washers	64	$\frac{1}{2}$ " \emptyset			

APPENDIX B: ENGINEERING SECTION, 1946

Excerpts from the "Engineering Section," by Arthur M. Sandridge and Oliver E. Sisler, Manzanar Relocation Authority, February 1946, part of the War Relocation Authority, *Final Report, Manzanar War Relocation Center*, "Chapter 2, WRA Construction, Part I, New Construction, B. Gymnasium-Auditorium." Document on file in National Archives.

ENGINEERING SECTION

by

ARTHUR M. SANDRIDGE
Senior Engineer
June 15, 1942—March 1, 1946

and

OLIVER E. SISLER
Superintendent, Maintenance and Construction
October 12, 1942—February 15, 1946

Manzanar Relocation Authority
Manzanar, California

February 1946

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CHAPTER 1

BASIC CONSTRUCTION

The story of the construction of the Manzanar War Relocation Center, its maintenance, and operation from March 1942, to November 1945, is related in the following report.

Construction began in March 1942, when an area of desert land in Owens Valley was cleared of sage brush and a temporary city was set up for 10,000 people. To establish this Center, it was necessary for engineers and construction men to prepare plans; to construct buildings, water and sewer systems, and all other facilities necessary for a city of this size; and to do this as expeditiously as possible.

The following temporary buildings and appurtenant facilities at Manzanar were constructed under the supervision of the U.S. Engineers of the Los Angeles Metropolitan Area.

I WATER AND SEWAGE DISPOSAL SYSTEMS

(Contractor: Vinson and Pringle, Los Angeles, California)

A Water

A concrete dam and settling basin were constructed on Shepherd Creek, approximately 3,250 feet north and west of the Center in T 14S, R35 E, Sec. 9, assuring the Center of an adequate water supply. Water was carried through an open flume from the settling basin to the storage reservoir. This reservoir, 120 ft. x 180 ft. with a capacity of 540,000 gallons, was constructed with 45-degree earth embankments reinforced with wire mesh and lined with concrete. Two 14-inch calico gates regulated the water within the reservoir. One gate emptied into a control spillway and the other emptied into a 14-inch supply line.

From the reservoir the water was carried through 4,650 feet of 14-inch welded steel pipe into a 90,000 gallon steel storage tank. An 8 ft. x 22 ft. chlorinator house of temporary frame construction was built adjacent to the storage tank for the housing of an E.T.H. chlorinator machine, Clayton valve, sand traps, meters, and a 6-inch by-pass line. The water line from the reservoir to the storage tank was laid in the open ditch that carried the temporary water supply into the camp area. This line was insulated by covering it with an earth fill. Drainage facilities were provided by the installation of hexagonal wooden culverts placed below the level of the pipe line.

The construction of the pipe line and the steel storage tank was done by the Los Angeles Bureau of Power and Light. The insulation of the pipe line and the installation of the wooden drainage culverts were done by C. J. Paradise Company, of Los Angeles.

From the storage tank a 12-inch distribution main of welded steel pipe, equipped with 12-inch Sparling meter with a capacity of 2,000 gallons of water per minute, carried the water to branch mains throughout the Center. There were 5,170 feet of 12-inch, 6,340 feet of 10-inch, 8,822 feet of 8-inch, 29,745 feet of 6-inch cast-iron pipe and 706 feet of galvanized steel pipe installed to construct the system of water distribution mains. All service lines installed were of galvanized iron pipe ranging in size from 3/4-inch to 2 1/2 inches. A total of 40,266 lineal feet was used on this installation.

An emergency stand-by system was installed to supplement the water supply during freezing weather and in the event of a bad

fire, which would necessitate the use of more than the normal amount of water supplied by Shepherd Creek. This installation was made at well 75, and consisted of one 10,000-gallon redwood storage tank, and two 4-inch 50 horse power motor driven Fairbanks Morse booster pumps. Water was pumped through a master meter into the storage tank by the City of Los Angeles pump with a 75 horse power electric motor. From the tank the water was pumped into the mains by the Fairbanks Morse booster pumps.

There were 34 6-inch, 20 8-inch, 15 10-inch, and 8 12-inch gate valves installed throughout the water system to facilitate the control of water within the Center.

Fire protection was provided by the installation of 84 fire hydrants and, as an additional protection for the hospital, an automatic sprinkler system was placed in seven ward buildings, the hospital mess, and the covered walks. This system was made up of 522 sprinkler heads. In the covered walks a 3-inch pipe was used and reduced to 1-inch pipe in the wards and mess hall.

E Sewage Disposal

The sewage disposal system, as installed, consisted of a collection and outfall system and a sewage treatment plant. During the construction period temporary septic plant, 100 ft. x 20 ft. x 6 ft., was used. All sewage entering this tank was treated with chlorine.

The collection system within the Center consisted of 2,500 lineal feet of 18-inch, 1,100 lineal feet of 15-inch, and 26,502 lineal feet of 8-inch vitrified clay pipe. A siphon was constructed to carry the outfall line under the Los Angeles aqueduct. This siphon was made up of two 12-inch cast-iron pipes encased in concrete.

After leaving the outfall sewage line, the raw sewage entered the treatment plant which had a designed capacity of 1.25 million gallons per day, and was composed of the following units; (1) grit chamber, (2) scum and distribution box, (3) clarifier, (4) control house, (5) digester, (6) chlorine contact tank, and (7) sludge beds.

The grit chamber, scum and distribution box, clarifier, digester, and chlorine tank were all constructed of concrete.

The sewage first passed through the grit chamber which was equipped with bar screens; then it entered the parshall flume. The metering and extension of the chlorination system was done within the flume. The sewage left this unit to enter the distribution box, which consisted of two calico gates.

The clarifier unit was a tank constructed of concrete, 60 feet in diameter and 9 feet in depth. This tank was equipped with the necessary mechanism to properly process the sewage that entered this chamber. The rate of flow of this tank varied from 500 to 1750 gallons per minute.

The control house was a 32 ft. x 58 ft. frame building with concrete floors, rustic siding and roll roofing. This building contained the office room, laboratory, metering, the chlorinator control, and other equipment. Manual and automatic type control chlorinators were used, with a maximum capacity of 200 pounds of chlorine per unit for each 24 hours. Each tank was equipped with a meter to register the flow of chlorine within its working range.

The sludge and scum pumps were housed in a concrete pit, 16 ft. x 14 ft. x 5 ft., with a frame roof covered with roll roofing to protect them from the weather.

The sludge digester was the 2-stage type, 40 feet in diameter with 22 feet 6 inches overall water depth. The water depth in the upper compartment was 12 feet 3 inches and the lower compartment was 10 feet. The digester was arranged with a horizontal concrete tray separating the lower and upper compartments which were operated in series. Intensive mixing was provided in the upper compartment followed by quiescent settling in the lower compartment. The two compartments were connected by exterior piping.

The chlorine contact tank was made of reinforced concrete with reinforced concrete baffle walls. The dimensions were 8 ft. x 16 ft. 6 in. x 38 ft., equipped with three standard manhole frames and covers. A 6-inch cast-iron pipe to the scum pump line removed any collection of material in the bottom of the tank. An 18-inch cast-iron influent pipe served the contact tank from the clarifier.

The chlorinated sewage was removed to the drainage area through an 18-inch vitrified clay pipe.

Four sludge or drying beds, 50 ft. x 100 ft., were constructed. The ground surface was leveled and dikes or berms $3\frac{1}{2}$ feet high were constructed. Then six inches of sand was placed in each bed. The sludge was carried to these beds through a 6-inch cast-iron pipeline.

The plant was located east of the Center approximately 1,000 feet in T 14 S; R 35 E; S.W. $\frac{1}{4}$ of Sec. 12.

II ELECTRICAL DISTRIBUTION AND SIGNAL SYSTEM

A Electricity

Electricity was furnished by the Los Angeles City Bureau of Power and Light from its power station on Cottonwood Creek. The system consisted of 58,400 lineal feet of overhead distribution lines and service to 730 buildings. A master switch controlled the entire camp, and a master meter registered all the electricity used within the camp. In addition to lighting the buildings, 190 alley and street lights were served.

To service the camp, 79 transformers as listed below were installed:

<u>Size</u>	<u>Number</u>
2 K.V.A.	2 ea
3 K.V.A.	2 ea
5 K.V.A.	7 ea
7½ K.V.A.	4 ea
10 K.V.A.	2 ea
15 K.V.A.	33 ea
25 K.V.A.	24 ea
37½ K.V.A.	5 ea

B Telephone

The telephone system was installed by the Interstate Telegraph Company. The telephone wires were strung on across arms that were installed on existing power poles. A 40-line switch board ~~was installed on the system.~~ on the system. The installation of seven miles of 3-circuit #9 wire and seven miles of 2-circuit #12 N.B.S. copper wire was necessary for the completion of this project.

C Fire and Police Signal System

A signal system was installed by the Interstate Telegraph Company under contract with the U.S. Signal Corps and was deemed

7

a necessity to provide the Center with a signal system adequate for the needs of both the Fire Protection and Internal Security Sections.

Outside installations included cross arms and approximately 1,500 feet of lead covered cable and 20,700 lineal feet of 2-wire telephone line.

Inside plant and station equipment consisted of the installation of an additional strip of 10 jacks in existing switchboard and the installation of 21 telephone instruments, drops, protectors and appurtenances.

III BUILDINGS AND STRUCTURES

A General Group

Griffith and Company of Los Angeles were the general contractors on all temporary buildings and structures within the Center. This included the installation and furnishing of all plumbing equipment and fuel oil lines.

These temporary buildings were regular Army Theater of Operations (T.O.) type of construction, supported on precast concrete blocks, 14 in. x 14 in. x 8 in. These blocks were placed on 10-foot centers down the sides and through the center. Girders constructed of 2 in. x 6 in. material, spiked together to form 2 in. x 6 in. for the outside and 6 in. x 6 in. for the center span, supported 2 in. x 6 in. floor joists spaced 2 feet on centers. The floors were 1 in. x 6 in. tongue and groove or 1 in. x 6 in. shiplap. The walls were framed from 2 in. x 6 in. material spaced 8 feet on centers. A 2 in. x 4 in.

nailing girt, spaced half the distance between the top and bottom plates, furnished center nailing for the sheathing that was applied vertically. The rafters were of 2 in. x 4 in. material spaced 48 inches on centers with a double 1 in. x 6 in. ceiling joist or cord, and 2 in. x 6 in. knee bracing on every other set of rafters. The roof was sheathed with 1-inch random width sheathing and covered with 45-pound roll roofing. The walls and gables were covered with 15-pound building paper, held in place by 3/8 in. x 2 in. lath or batts. The barrack-type buildings were equipped with sliding 4-light sash windows, size 36 in. x 40 in., and 12 sash on each side. The warehouse group had the same type window but was reduced to six windows to each side with a 5 ft. x 7 ft. double door in each end.

The buildings of the foregoing description that were constructed are listed in Table 1.

TABLE 1
NUMBER, TYPE, AND SIZE OF BUILDINGS CONSTRUCTED IN MANZANAR

Type	Size in feet	Use	Number
Barracks (apartments)	20 x 100	evacuee	504
Mess halls	40 x 100	evacuee	36
Bath and latrines	20 x 30	evacuee	73
Recreation halls	20 x 100	evacuee	36
Ironing rooms	20 x 28	evacuee	36
Laundries (cement floor)	20 x 50	evacuee	36
Warehouses	20 x 100	storage	40
Car garages (no floors)	20 x 100	Government cars	2
Truck garages (no floors)	20 x 100	Government trucks	2
Total			764

B Military Police Group

(Contractors: Griffith and Company, Los Angeles, California)

The general construction of the building at the Military Post was typical of the general group in the Center except for the following changes. The exterior walls were covered with 1 in. x 10 in. drop siding and the interior walls and ceilings were lined with $\frac{1}{8}$ -inch sheet rock. All exterior walls were painted as a protection against the weather. A list of these buildings is found in Table 2.

TABLE 2

NUMBER, TYPE, AND SIZE OF BUILDINGS CONSTRUCTED AT MILITARY POST

Type	Size in feet	Number
Barracks	20 x 100	4
Officers' quarters	20 x 100	1
Administration and store room	20 x 100	1
Recreation building	20 x 100	1
Mess halls	20 x 100	1
Guardhouse	20 x 50	1
First aid station	20 x 28	1
Bath and latrines (cement floors)	20 x 30	1
Motor repair building (cement floors)	31 x 79	1
Total		12

C Administration Group

Contractors: Griffith and Company, Los Angeles, California)

The general construction of the Administration building was the same as at the Military Post, with the exception of the reception building or police station and the service station. These two buildings

were of the same construction as those in the general group. An enumeration and description of these buildings is given in Table 3.

TABLE 3
NUMBER, TYPE, AND SIZE OF ADMINISTRATION BUILDINGS

Type	Size in feet	Use	Number
Administration buildings	40 x 100	offices	2
Administrative service station	20 x 30	storage	1
Family apartment buildings	20 x 100	4 apartments each	2
Men's dormitories	20 x 100	6 apartments each	2
Women's dormitories	20 x 100	6 apartments each	2
Provost building	20 x 50	community government	1
Mess hall	20 x 100	dining-room	1
Reception building	20 x 100	police station	1
Total			12

D Hospital Group, Including Childrens Village

The group of hospital buildings was of the same type of construction as the general group with the exception of the heating plant. This building was wood frame construction with the walls and roof covered with galvanized corrugated iron. All buildings within this group were spaced a minimum of 50 feet apart and connected with covered walks. These structures were of wood-frame construction with wood floors covered with linoleum. The height was 8 ft 3 in. from the finished floor to the top of the plate line, with an overall width of 6 ft. 7 in.

The walks connecting the hospital administration building with the wards, mess hall, and morgue were closed on the sides with double-hung windows spaced, approximately, 9 feet on centers. These

walks connecting the nurses' and doctors' quarters to the ward walks were open on the sides with a hand rail extending the full length of each walk.

The heating system consisted of 3 Kewanee 60-H.P. oil-fired steam boilers, equipped with Johnston automatic oil burners, and all necessary piping valves, pumps, and radiators for complete and adequate heating of all buildings, and for washing and sterilizing in all wards, operating rooms, offices, clinics, and laundry.

The Childrens Village (orphanage) buildings were in a separate group and were not heated by the hospital heating plant. Each building within this group was heated by oil-burning space heaters.

The hot water system consisted of one 60-gallon H.C. Little automatic hot-water heater for each building.

The buildings in the hospital group are listed in Table 4.

TABLE 4

NUMBER, TYPE, AND SIZE OF BUILDINGS IN HOSPITAL GROUP

Type	Size in feet	Capacity	Number
Administration building	25 x 33 7		1
Obstetrical ward	25 x 33 7	35 beds	1
General wards	25 x 33 7	35 beds ea	4
Isolation wards	25 x 150½	30 beds, ea	2
Mess hall	40 x 60	—	1
Doctors' quarters	20 x 100	5 doctors	1
Nurses' quarters	20 x 100	23 nurses	1
Hospital laundry	20 x 100	—	1
Hospital morgue	23 x 33½	—	1
Heating plant	40 x 38	—	1
Warehouses	20 x 100	—	2
Childrens Village	25 x 150	33 beds, ea	3
Total			19

E Miscellaneous Group

Under this miscellaneous group are listed and described all buildings and structures not included in the groups previously discussed.

1 Refrigerator Warehouses (Contractors: Griffith and Company, Los Angeles, sublet to Hugh Robinson and Sons, Los Angeles.)

There were two refrigerator warehouses that had an overall size of 20 ft. x 100 ft. with approximately 7 ft. 6 in. ceilings. The refrigerator rooms proper were 20 ft. x 80 ft. with 7-ft. ceilings, and were insulated with 6 inches of Palco-wool on the sides, ceilings, and floors. The doors at each end, 3 ft. 6 in. x 6 ft. 6 in., had 4 inches of Palco-wool for insulation. The interiors of these rooms were ceiled with 1-inch tongue-and-groove ceilings. The exterior finish was 1-inch sheeting covered with 15-pound building paper and 3/8 in. x 2 in. batts to hold the paper in place. An annex, 20 ft. x 40 ft. connecting the two refrigerator houses, was used for meat cutting and the sorting of fruits and vegetables.

Each room had four evaporator condensers, recold humid-air type, model Su. 255, that were spaced equally in length of the room with end units $\frac{1}{2}$ spacing from the wall. These units, operating on defrost, maintained a 34-degree to 36-degree temperature in the meat refrigerator, and 38- to 40-degree temperature in the vegetable refrigerator.

The compressor and condensing units were housed in a 10 ft. x 10 ft. room, an integral part of the refrigerator rooms. The

compressors were Brunner, model E, Type C, driven by a $7\frac{1}{2}$ -H.P. 220-volt, 3-phase Fairbanks Morse electric motors. Drayer Hanson condensing units, model $1\frac{1}{4}$ -inch, L-3, $\frac{1}{4}$ -H.P. were used on both units.

2 Net Garnishing or Camouflage Buildings (Contractors: Q.R.S. Neon Corporation, Los Angeles, California)

Five buildings were constructed for the garnishing or camouflaging of nets for Army use. Three of these buildings were of uniform size and construction. They were 300 ft. x 24 ft. with an overall height of 18 ft. from finished floor to plate line. Two of these buildings had additions, 12 ft. x 20 ft., with shed roofs and were used as offices for the group.

Heavy construction was used throughout. Posts measuring 6 in. x 12 in. on 10-foot centers supported a double set of 2 in. x 6 in. rafters bolted to each side of the post. These rafters were tied together with a 2 in. x 6 in. cord and 2 in. x 6 in. knee braces, extending from approximately 2 feet below the plate line forming a modified form of scissors truss. Intermediate 2 in. x 6 in. rafters with 2 in. x 6 in. cords and spaced 2 feet on centers completed the roof framing. The roof was covered with 1-inch random-width sheathing laid diagonally and covered with 90-pound roll roofing.

The walls were constructed with two horizontal 2 in. x 4 in. nailing girts and 2 in. x 6 in. verticals spaced on 2-foot centers. The sides were covered with 10-inch drop siding from the floor to 10 feet above. The ends were covered from the floor to the ridge. The walls were braced with 2 in. x 6 in. bracing. Cement floors were used throughout.

Another building of this group, typical in every detail except for size, was 24 ft. x 100 ft. with an adjoining open shed for storage 60 ft. x 100 ft. This shed had 8-foot walls open on one side, and covered on one side and one end with 10-inch drop siding. Two-by-six rafters, spaced on 4-foot centers were sheeted with 1-inch random-width sheeting and roofed with roll roofing. A wood floor of 1 in. x 6 in. sheeting was used in this addition.

A cutting shed, 150 ft. x 24 ft. 6 in., was used in conjunction with the net garnishing or camouflage buildings. All the materials necessary for the construction or fabrication of the nets were processed within this building.

It was constructed of 2 in. x 4 in. floor joists with 1 in. x 6 in. shiplap flooring, 2 in. x 6 in. studding 8 feet long, spaced on 4-foot centers, 2 in. x 6 in. knee braces with every fourth set of rafters. The rafters were 2 in. x 6 in., spaced 3 ft. 4 in. on centers. One side was left open while the other side was sheeted from the floor to the plate line with 10-inch drop siding. Both ends were sheeted from the floor to the ridge with the same material.

All necessary tables, benches, drum reels, and storage cabinets were installed.

3 Oil-storage Tanks and Platforms (Contractors: Griffith and Company, Los Angeles, California)

There were 37 oil-storage tanks and platforms constructed, one in each block and one at the Military Post. They were constructed for the storage of fuel oil for distribution through pipe lines to the hot-water heaters (and later the ranges) in the mess halls, to

the hot-water boilers in the boiler rooms attached to the latrines, and to the boiler in the rooms attached to the laundries. Fuel oil was also stored in these tanks for daily distribution to the evacuees to be used in the spare heaters in their barracks.

The storage-tank platforms rested on 12-in. x 12 in. concrete piers projecting approximately 12 inches above the natural grade, and of sufficient depth to insure a solid footing. Four posts, 6 in. x 6 in. x 5 ft., spaced 7 feet on centers with a 6 in. x 6 in. cap projecting 2 feet beyond the posts, formed the bents for a deck or floor of 3 in. x 10 in. x 12 ft. Douglas fir. A gable roof, covered with roll roofing, was used. This roof was open on the gables and was supported by 2 posts, 4 in. x 4 in. x 5 ft., at each corner with 3 intermediate studs of 2 in. x 4 in. material. Plates, 2 in. x 4 in., and ties were used for support and for bracing the roof. The under-structure was braced horizontally and diagonally with 2 in. x 6 in. material.

There were 12 cylindrical galvanized iron tanks which had a capacity of 2,450 gallons each, and 25 tanks which had a capacity of 1,250 gallons each.

There were two 6,000 gallon reinforced concrete tanks at the hospital boiler house used for the storage of fuel oil for the hospital boilers. These tanks were buried below grade.

4 Observation or Watch Tower (Contractor: Charles I. Summer, Lone Pine, California)

There were eight towers supported on 24 in. x 24 in. concrete piers embedded in the ground a sufficient depth to insure a sound

footing sufficient to take care of the weight and wind load. Each pier had anchor straps for the securing of the 6 in. x 6 in. corner posts. These towers were 8 feet square at the base and 6 feet square at the top. The corner posts, 6 in. x 6 in., were of Douglas fir. There were two platforms on each tower. The lower one, 6 ft. x 10 ft., was enclosed with 2 in. x 6 in. joists and 2 in. x 6 in. flooring with 1 in. x 8 in. shiplap and two sash windows, 2 ft. x 3 ft. 6 in., were installed on each side. The upper platform was 8 ft. x 12 ft. with 2 in. x 8 in. girders, 2 in. x 6 in. joists, and 2 in. x 6 in. flooring. A railing of 2 in. x 4 in., with 2 in. x 4 in. posts encircled this platform. A 2,000 candle power searchlight was mounted on each tower. All towers were securely braced, both horizontally and diagonally.

5 Fencing (Contractor: C.J. Paradis, Los Angeles, California)

The fencing project consisted of the removal of 5,000 lineal feet of old fencing and the installation of 18,871 lineal feet of new fence of 5-strand barbed wire around the boundaries of the Center area.

IV LAND IMPROVEMENT

(Contractor: C.J. Paradis, Los Angeles, California)

Land improvements were of a temporary nature. Streets, alleys, and building sites were graded off to allow for the passage of motor vehicles, and then given a light coat of penetrating oil. No primary grading of the streets or drainage structures was done by this firm.

CHAPTER 2

WRA CONSTRUCTION

I NEW CONSTRUCTION

All construction and remodeling performed by WRA was under a force account system. No contractors were used for any phase of this work.

A Staff Housing

Nineteen buildings were erected to house the appointed personnel; 14 were of the 4-family unit type, 3 were dormitories, and 1 was a central laundry. Of these 19 buildings, 18 were erected south and adjacent to the administrative group. Another building of the 4-family unit type was built near the hospital group and was used for the housing of the Chief Medical Officer and the appointive nurses.

The 4-family unit-type staff building were 20 ft. x 94 ft., supported on three rows of concrete piers spaced 10 feet on centers the full length of the building. Girders of 6 in. x 10 in. Douglas fir, built up from 2 in. x 10 in. timbers, supported 2 in. x 6 in. floor joists spaced 24 inches on centers. All walls and partitions were framed from 2 in. x 4 in. Douglas fir excepting the dividing partitions between the apartments. These were made with 2 in. x 8 in. plates, top and bottom, with staggered 2 in. x 4 in. studding spaced 24 inches on centers. This double partition was sound-deadened with Kimsul insulating felt; it also enclosed all the water pipes for the adjoining baths and kitchens.

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The rafters were 2 in. x 4 in. spaced 48 inches on centers with a 1 in. x 6 in. placed flat and midway between each set of rafters. The 1 in. x 6 in. redwood sheathing was securely nailed to the rafters and to the 1 in. x 6 in. which acted as a stiffener for the roof. Roofing was the split-sheet type, each sheet overlapping the preceding sheet by more than half the width of the roll giving a double thickness to the whole roof.

The exterior was covered with 1 in. x 6 in. V shiplap. A 1 in. x 3 in. sloping water table was placed around the building 4 inches below the finished floor line, and the space below this point was boxed in with 1 in. x 6 in. redwood sheathing, forming a tight base to keep out cold, trash, animals, and the like.

All floors were single thickness 1 in. x 4 in. tongue-and-groove Douglas fir. Each building contained two 2-bedroom apartments with a living room, kitchen, and bath in each apartment, and two 1-bedroom apartments including a living-room, kitchen, and bath in each.

The interiors of these buildings were lined with 5/8-inch plaster board; awning-type windows were used throughout. Cabinets were built and installed in each kitchen.

The three dormitories were the same in type ~~as the buildings~~ 24 ft. x 140 ft. in size. Each building contained 10 double- and 3 single-bedrooms, 2 shower rooms, 2 toilets, 1 bathroom, 1 linen room, and 1 furnace room which was also used as a utility room and was equipped with 2 double-compartment cement wash trays and a hot-water boiler.

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The rafters were 2 in. x 4 in. spaced 48 inches on centers with a 1 in. x 6 in. placed flat and midway between each set of rafters. The 1 in. x 6 in. redwood sheeting was securely nailed to the rafters and to the 1 in. x 6 in. which acted as a stiffener for the roof. Roofing was the split-sheet type, each sheet overlapping the preceding sheet by more than half the width of the roll giving a double thickness to the whole roof.

The exterior was covered with 1 in. x 6 in. V shiplap. A 1 in. x 3 in. sloping water table was placed around the building 4 inches below the finished floor line, and the space below this point was boxed in with 1 in. x 6 in. redwood sheeting, forming a tight base to keep out cold, trash, animals, and the like.

All floors were single thickness 1 in. x 4 in. tongue-and-groove Douglas fir. Each building contained two 2-bedroom apartments with a living room, kitchen, and bath in each apartment, and two 1-bedroom apartments including a living-room, kitchen, and bath in each.

The interiors of these buildings were lined with 5/8-inch plaster board; awning-type windows were used throughout. Cabinets were built and installed in each kitchen.

The three dormitories were the same in type ~~as the apartment buildings~~ 24 ft. x 140 ft. in size. Each building contained 10 double- and 3 single-bedrooms, 2 shower rooms, 2 toilets, 1 bathroom, 1 linen room, and 1 furnace room which was also used as a utility room and was equipped with 2 double-compartment cement wash trays and a hot-water boiler.

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All of these buildings were supplied with 120- and 220-volt electrical current, the former for lighting and the latter for cooking. All installations were made according to approved plans.

Plumbing was installed and sewer connections were made, also, according to approved plans.

All buildings were painted two coats on the exterior wall, interior trim, and floors. The ceilings and interior walls were painted with cold-water paint or kalsomine.

B Gymnasium-Auditorium

The gymnasium-auditorium, which was used for various Center activities, was the only building constructed in the school group. All construction of the other units for the schools was canceled by the WPA and the school buildings that were used were provided by remodeling existing barrack-type buildings.

The gymnasium-auditorium structure classified as gymnasium type A, had an overall width of 118 ft. and a length of 119 ft. The main auditorium floor was 80 x 96 feet square. The stage at the east end of the main floor was 22 feet deep with an overall width of 30 feet.

On each side and adjacent to the stage, a dressing-room provided space for equipment and stage trappings.

A wooden truss, supported on each end by wooden columns, supported the proscenium arch which had a clearance of 12 feet from the finished floor.

Extending the full length of the main section, and, on each side, a one-story shed-type section was constructed. This portion

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housed the toilets, dressing-rooms, lockers, and offices. The one-story shed-type section on the south side extended 40 ft. 9 in. beyond the east end and was used as a health unit.

The auditorium-gymnasium was built on piers placed approximately 8 feet on centers each way. Girders were of 6 in. x 10 in. material with 2 in. x 6 in. floor joists, spaced 12 inches on centers. All floors were double; the first or subfloor was of 1 in. x 6 in. Douglas fir shiplap laid diagonally, while the finished floor was 1 in. x 4 in. tongue-and-grooved Douglas fir, sanded and varnished.

The walls of the main section were 20 feet high. Posts, 12 in. x 12 in., supported five Pratt-type wooden trusses. These trusses were constructed with split ring connectors and bolts. The ceiling joists were of 2 in. x 6 in. material. Roof purlins were 2 in. x 10 in. lap jointed at each end and solid at each lap.

Diagonal sheathing was laid over the purlins, and then split-sheet roofing was applied, mopped on with hot asphalt.

A shed-type roof was build over the stage; 2 in. x 12 in. joists spaced on 24-inch centers with 2 rows of solid bridging were used on this section. Sheeting of 1 in. x 6 in. shiplap was laid and split-sheet roofing was mopped on.

A concrete porch, 9 ft. ~~across the front~~ across the front for an entrance to the three sets of double doors. Above this porch the moving picture projection booth, 8 ft. 6 in. x 30 ft. 11 in., was housed. This was divided into two rooms; one for the machines and the other for the rewinding of the films. The entire

area of both rooms was lined with fireproof asbestos board.

Two inside stairways leading from the main floor to this booth furnished access and a means of escape in case of fire.

The one-story shed section, housing the toilets, dressing-rooms, locker rooms, and health room, was constructed with 2 in. x 4 in. studding, with 2 in. x 12 in. rafters spaced 24 inches on centers, and bridged with solid blocking, sheeted and roofed, the same as for the other portions of the building.

The exterior wall finish was 1 in. x 6 in. V shiplap painted to protect it from the weather. The interior wall finish was of the same material. The auditorium ceiling was finished with 1/2-inch fibre board applied to the ceiling joists flush with the underside of the bottom cords of the trusses. All ceilings in the remaining portion of the building were of the same material.

Heating was provided by H.C. Little forced draft automatic oil heaters. These heaters were placed in the most strategic points. Two were under the stage and forced the heat directly into the main auditorium through screened grills. Two others were placed at the front, in the room adjacent to the main floor, and supplied heat in main room. Two others were connected to overhead ducts and forced the hot air through the grills into the toilets, shower rooms, and offices. The dressing-rooms and health unit were provided with independent space heaters.

The hot-water system consisted of a 250-gallon Hanson boiler located under the stage and connected with necessary piping running

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from this point to the health unit, showers, wash rooms, and toilets

Electric wiring was installed for the proper illumination and operation of all equipment including four Trane 15 P. projector fans installed in the ceiling of the auditorium. Special footlights and overhead lighting were provided for the stage.

Plumbing and sewage were installed according to plans with the necessary connections made to the sewer and water mains.

C Poultry Farm

A group of 15 buildings were constructed for the poultry farm south and west of the Center, adjacent to the fence surrounding the Center as shown in Appendix 1, Figure 1. In this group were the following structures:

<u>Type</u>	<u>Number</u>
Warehouses connected at one end	2
Brooder houses	8
Laying houses	<u>6</u>
Total	16

The warehouse and office building was of U-type construction with an overall area of 3,800 sq. ft. (70 ft. x 80 ft.). The warehouse or feed storage space was in the two wings, each wing being 20 ft. x 60 ft. with a total floor area of 2,400 sq. ft. The office and egg-storage rooms were each 16 ft. x 20 ft., and the dressing and packing room which connected the two wings was 20 x 30 ft.

The building was built with a continuous concrete footing which projected 6 inches above the finished floor line. All floors were of concrete, troweled to a smooth finish. The walls were

constructed of 2 in. x 4 in. studding plates. The studding was cut 7 feet long and spaced 2 feet on centers. The walls were completed by 1 in. x 6 in. sheathing covered with 15-lb. building paper held in place with $\frac{3}{8}$ in. x 2 in. batts.

The rafters were of 2 in. x 6 in. material with 2 in. x 4 in. cross ties and bracing spaced 3 feet on centers, covered with 1 in. x 6 in. redwood sheathing and split-sheet roll roofing. The windows were 4 ft. x 2 ft. 4 in. frameless, awning type.

A butane-fired scalding kettle, used for the dressing of poultry, was installed in the dressing and picking room.

There were eight brooder houses, 14 ft. x 24 ft., divided into two equal-sized rooms, each being large enough for the brooding of 500 baby chicks. The floors and foundations were concrete with the foundation walls projecting 6 inches above the finished floor as a protection against flooding from the storm waters. The studding was of 2 in. x 4 in. material, spaced 2 feet on centers, cut 6 ft. 6 in. for the back wall and 7 ft. 6 in. for the front wall, making a shed-type roof. The rafters were 2 in. x 4 in. material, spaced on 4 feet centers with 2 in. x 4 in. supports running at right angles to the rafters. Roof sheathing was 1 in. x 6 in. redwood covered with split-sheet roll roofing.

The walls were sheathed with 1 in. x 6 in. shiplap, painted to protect it from the weather. The windows were the frameless awning type. Kerosene-burning brooders were used, and were vented through the roof with 6-inch galvanized piping. Outside runs

constructed of chicken netting and wood posts were constructed the full length of each building. These runs were 16 feet wide and were divided in the center with fencing of the same type.

There were six laying houses, 20 ft. x 192 ft., divided into eight units per building. Each unit had an area of 20 ft. x 24 ft., large enough for the housing of 175 hens. The floors and foundations were of concrete, the foundation projecting 6 inches above the finished floor.

The walls were framed from 2 in. x 4 in. material, cut 7 feet long and spaced 2 feet on centers with 2 in. x 4 in. plates, top and bottom. The siding was 1 in. x 6 in. shiplap while the roof was framed with 2 in. x 4 in. rafters and 2 in. x 4 in. cords, each set braced to form a truss. They were spaced 4 feet on centers and sheeted with 1 in. x 6 in. redwood. Split-sheet roll roofing was used. The dividing partitions between each unit was 1 in. x 6 in. shiplap with 2 in. x 4 in. studding. Each section was provided with a 2 ft. x 2 ft. roof vent equipped with a trap door for the regulation of heat and air. Sufficient roosts and laying boxes were installed to adequately care for the maximum number of hens housed in each section. The exteriors of all buildings were painted to protect them from the weather.

Outside runs, 20 ft. x 24 ft., of 2-inch mesh chicken wire and wood posts were constructed for each section or compartment. Wood feeding troughs were built and used for the feeding of mash and other feed.

All buildings of this group, including the warehouses, laying pens, and brooder houses, were provided with running water, piped

in from the center mains and lighted by electricity from the connections to the lines within the Center.

D Root Cellar

The root cellar was constructed for the storage of root vegetables grown on the Project farms. An excavation was made 6 feet in depth and sufficient in size to receive the building. The dimensions of this building was 26 ft. x 100 ft. A continuous footing of concrete was poured across the ends down both sides. Two footings running lengthwise and spaced 10 feet in from the outside line of the building were also put in. A 2 in. x 6 in. mud sill was bolted to the outside footings and 2 in. x 6 in. studding 8 feet long, spaced 18 inches on centers with a double 2 in. x 6 in. plate, were installed.

Extending through the interior of the building and resting on the interior footings, a 2 in. x 6 in. plate was laid. From this plate, and extending to 6 in. x 6 in. girders that supported the rafters, 4 in. x 6 in. posts were placed spaced 10 feet on centers and securely braced with knee braces to the 6 in. x 6 in. plates. Two rows of these posts, 3 feet from the center line of the building, acted as supports for the rafters.

Rafters of 2 in. x 6 in. Douglas fir with 2 in. x 6 in. Douglas fir cords, bolted to the ~~2 in. x 6 in. plates~~ on centers. Roof sheeting was of 1-in. Douglas fir securely nailed. The roof was 90-lb. mineral-surfaced felt roofing.

A center runway, 6 feet wide, extended the full length of the building and was flanked on both sides with storage bins. These

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bins were equipped with 1 in. x 6 in. wood floors with 1-in. spacing between the boards which rested on 2 in. x 6 in. floor joists spaced on 24-inch centers raised sufficiently from the ground to allow free circulation of air. There were 10 bins installed on each side of the runway, partitioned off with 1 in. x 6 in. boards with a 1-inch space between each.

Installed over each bin were air vents, which were 2 feet square and extended 2 feet above the finished roof. They were equipped with manually operated dampers.

The inside of the exterior wall was covered with 1 in. x 6 in. boards from floor to plate line, spaced 1 in. apart.

The outside of the exterior walls was covered with 1-inch random sheathing from the top plate line half way to the mud sill. From this point on, an air vent extended from the front of the building down both sides and connected with a 3 ft. x 3 ft. tunnel vent located in the center of the rear end. The air vent around the building was built by placing 2 in. x 4 in. supports out on a 45-degree angle and attached to the studding at a point corresponding to the exterior wall sheathing. These air-vent rafters or supports were covered with heavy building paper to prevent moisture from entering the building.

A double refrigerator-type door, 6 ft. x 8 ft., was installed in one end.

A dirt ramp was graded off from regular grade to the building entrance which provided easy loading and unloading facilities for

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produce delivered to and from the building. An electric line was run into the building to provide lighting for the handling of produce stored there.

The construction was completed by back filling around the walls and covering the roof with a layer of straw topped off with 8 inches of clay.

E Hog Farm

The hog project was located 2,600 feet from the southwest corner of the Center.

The feed storage building was 20 ft. x 80 ft. with the floor and footings of concrete. The footings projected 6 inches above the finished floor. This was necessary to keep flood waters from entering the building and damaging the stored feed. The walls were 8 feet in height, framed with 2 in. x 6 in. studs and plates. The studdings were placed 4 feet on centers with one 2 in. x 6 in. horizontal nailing girt spaced half the distance between the top and bottom plates. Double doors, 6 ft. x 8 ft., were placed in each end. The siding was 1 in. x 8 in. D.F. sheeting covered with 15-lb. building felt held in place by 3/8 in. x 2 in. batts.

The rafters were 2 in. x 4 in. Douglas fir spaced 4 feet on centers. Each set was trussed with 2 in. x 4 in. cords and braced with knee braces on each third set. The roof was sheathed with 1 in. x 12. Douglas fir and covered with 90-lb. mineral-surfaced roofing.

The farrowing pens and houses were built as a unit. They were sheds 4 feet high on the back and 6 feet high on the front. Studs,

2 in. x 4 in., were used with 1 in. x 6 in. sheeting. The roof was covered with 45-lb. roll roofing. Each house was divided into six pens or sections 8 ft. by 5 ft. each with doors both front and rear connecting to outside pens. These pens on one side were provided with cement floors for feeding. A concrete gutter or trough, 12 inches wide and 4 inches deep, extended the full length of the feeding platforms. This was used as a catch trough for non-edible material.

There were three hog houses, 20 feet square, with a partition in each building equally dividing the floor space. These houses were constructed from rough 1-inch material with 2 in. x 4 in. posts. They had shed-type roofs, 4 feet high on the low side and 6 feet high on the high side. Each house was surrounded by board panel fencing. Of this fencing 2,070 lineal feet was constructed, using 250 posts, 4 in. x 4 in. x 6 ft. and 8,280 lineal feet of rough 1 in. x 6 in. material was used in the paneling. Additional pens were built in which 864 lineal feet of 30-inch hog-fencing and 108 4 in. x 4 in. x 8 ft. posts were used. For feeding, 4,310 sq. ft. of concrete platform or decking was constructed.

Water was piped from George's Creek to concrete watering troughs installed in each pen. Electricity for lighting was provided by extending the lines from the center to the farm.

F Industrial Latrines

Two latrines were constructed in the warehouse section of the industrial area where their construction was justified by the number of people employed in this section. They were 16 ft. x 24 ft. with a center partition separating the men's section from the women's.

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The foundations and floors were of concrete. Studdings, 2 in. x 4 in. x 8 ft. and spaced 2 feet on centers, were covered with 1-inch sheathing and building paper held in place by 3/8 in. x 2 in. batts.

The roof was framed from 2 in. x 4 in. material. The rafters were placed on 3-foot centers, sheathed with 1-inch material, and roofed with split-sheet roll roofing. Windows were of the frameless awning type, size 4 ft. x 2 ft. 4 in., while the doors were made from the material on hand. The women's section was equipped with five toilets, a wash basin, and a floor drain. The men's section was equipped with three toilets, two urinals, a wash basin, and a floor drain.

Cold water was supplied by tapping the main water line but no hot water facilities were provided. A small oil-burning space heater was installed in each room as a protection against freezing during periods of extreme cold.

G New Garage

A garage building was constructed in the motor pool area 60 feet west of the old garage. The construction was justified by an acute shortage of space for the repair and maintenance of automotive equipment.

The garage had a frontage of 48 feet and a depth of 30 feet, outside dimensions, with concrete floors, footings, and a 6-inch concrete curb to keep storm waters from flooding the floors. It was divided into three stalls of equal size--one stall for lubrication, one for washing, and the other for painting.

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The walls were 12 feet high, framed from 2 in. x 6 in. lumber, spaced 2 feet on centers and covered with 1 in. x 6 in. V shiplap. The roof was constructed by placing double 2 in. x 6 in. rafters or plates over the outside walls and 2 center partitions. Studding, 2 in. x 6 in., placed 2 feet on centers, supported these rafters or plates. The framing was completed by purlins of 2 in. x 8 in. material, spaced 2 feet on centers and blocked solid over the rafters and down the center of each span. Sheeting of 1 in. x 6 in. material laid at right angles to the joists and covered with split-sheet roll roofing, mopped on, completed the roof construction. The partitions were of 2 in. x 6 in. studding spaced 2 feet on centers and sheathed on one side with 1 in. x 6 in. V shiplap from the floor line to the ridge.

Each stall was provided with a 12 ft. x 12 ft. door opening equipped with accordian folding doors, made in four sections and supported by an overhead track. Windows were the double-hung type, 3 ft. 4 in. x 5 ft. 6 in.

Heating was provided by an H.C. Little D.U. 46 oil-burning heater installed in a 6 ft. x 6 ft. addition, located in the rear or west side of the main building. Through ducts leading from the heater to each stall the hot air was circulated by the ~~heater~~ fan within the heater.

An air-driven Weaver heavy duty twin-post hoist was installed in the lubrication room. Water was piped into the building for use in washing equipment and cleaning floors. The floors were provided

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with sumps and floor drains which were connected to the sewer mains. Electricity for lighting and the operation of tools and equipment was connected with lines adjacent to the building. Each room or stall was equipped with a work bench for use by the workmen employed.

The exterior of the walls, windows, and doors was painted to protect the lumber from the weather.

H Addition to the Caucasian Mess Hall

An addition was made to the original Caucasian mess hall that had been constructed under the supervision of the U.S. Engineers. This addition was justified to provide adequate accommodations for the appointed personnel. This building was of the same type construction as the old section, with dimensions of 20 ft. x 100 ft. The foundation was of concrete blocks with 4 in. x 6 in. girders and 2 in. x 6 in. joists.

The east side of the old section was removed and the top plate was reinforced by the addition of 4 in. x 6 in. girders, supported by 4 in. x 6 in. posts spaced 8 feet on centers. The roof was gabled the same as the old section with one end of the rafters resting on the center girder. This formed a gutter through the center of the building, which was raised in the center in order to drain the water to the rear and front.

The north end, or kitchen section, was re-arranged for the convenience of the cooks and kitchen help. A storage room, office, scullery, and utility room and bath were added. Additional hot water was provided in the addition of a 9 ft. x 22 ft. room with a

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concrete floor, where a Hanson boiler that was not being used in one of the blocks was moved in and connected to the existing piping, thus assuring an adequate supply of hot water for cooking, dish washing, and cleaning.

I Rock Sentry Houses and Police Posts

Three sentry buildings were constructed; two of them being within the Center and one at the entrance of the Military Post. These were all constructed of native stone, hand cut, and set in cement mortar. The sentry house at the main gate of the Center was 13 ft. x 13 ft. x 9 ft. on the outside, while the inside measured 11 ft. x 11 ft. x 8 ft. The MP post in the Center measured 8 ft. x 10 ft. x 8 ft., and the sentry house at the military camp measured 5 ft. x 7 ft. x 7 ft.

The outside walls of all three were built on a batter of approximately 1 1/2 inch per foot of rise but the inside walls were built plumb. In three walls windows were installed and a glass-paneled door in the fourth. Floors and floor joists were of wood. The roofs were of hip type with 2 in. x 4 in. rafters and 1 in. x 6 in. sheathing covered with cedar shingles.

Each building was equipped with inside electric lights and canopied exterior lights. These exterior lights were necessary for the identification of persons entering or leaving the Center or Military Post area at night.

J Childrens Village Heater Room

In the Childrens Village, used as an orphanage, an H.C. Little automatic oil-burning hot-water heater had been installed in a room

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adjacent to the living and sleeping quarters; but as a safety measure, the heater was moved to a 6 ft. x 6 ft. outside room adjacent to the main building. This latter room was constructed with a cement floor, with 2 in. x 4 in. studding spaced 2 feet on centers covered with 1-inch sheathing and 15-lb building paper. The roof was shed type with 2 in. x 4 in. rafters and 1-inch sheathing covered with roll roofing.

K Boiler Room at Military Post

To provide an adequate supply of hot water for the kitchen and mess hall at the Military Post, a shed-type room, 7 ft. x 10 ft., was constructed on the east side of the kitchen, where a boiler (Pan American type 40B, size 185), which was supplied by the Army, was installed by WRA.

This building had a concrete floor; the studdings were of 2 in. x 4 in. material spaced 2 feet on centers and sheathed with 1 in. x 6 in. V shiplap. The roof was of 2 in. x 4 in. rafters and 1 in. x 6 in. sheathing covered with 90-lb. mineral-surfaced roofing.

L Gas Service Station

To expedite the servicing of the automotive equipment at Manzanar and to provide storage for the oil and grease, a 1-room building, was constructed approximately 50 feet west of the motor pool office. This room, 10 ft. x 16 ft., with a concrete floor projecting 4 feet beyond the front side of the building, was constructed with 2 in. x 4 in. rafters spaced 2 feet on centers with 1-inch sheathing covered with building paper. The roof was shed type with

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2 in. x 6 in. rafters spaced 4 feet on centers extending 4 feet beyond the front wall forming a canopy or shade for changing tires.

The walls were 7 feet in the clear on the low side and 8 feet on the high side or front. Casement type sash windows were installed in the back wall and a sash of the same type was used on each side of the door, which was placed in the center of the front wall. A work bench, oil-drum rack, and tire racks were built.

Electric lines were extended from the motor pool to provide light for the servicing of cars after dark or for emergency calls during the night.

M Oil Distribution Sheds

Oil sheds were constructed in each block, adjacent to the oil tanks, to house the oil containers and distributing cans; to protect them from dust, dirt, and inclement weather, and to provide a regular storage place as protection against fire. There were 26 such sheds each 4 ft. x 6 ft. x 5 ft. enclosed on two sides and one end, with a door on the other end. One was located in each block on the south side of the oil distribution tanks.

They were framed with 2 in. x 3 in. studding in the corners and 2 in. x 2 in. plates, top and bottom. The siding and roof were of 1 in. x 4 in. tongue-and-groove flooring, applied vertically to the wall. The roof was sloped 6 inches for drainage, then covered with 90-lb. roll roofing. The exteriors were painted as a protection against the weather.

N. Dehydration Plant

A dehydration plant was installed to provide facilities for the processing of surplus vegetables raised on the Center farms. This

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project consisted of a drying room constructed with 2 in. x 4 in. material for framing and covered with 1 in. x 4 in. tongue-and-groove flooring. The room was fitted with racks for holding the ventilated trays.

The equipment for drying or dehydrating consisted of an oil-fired furnace or blower that forced the hot air into the room through ducts. The room ducts and trays were constructed by the Engineering Section while all machinery installations were made by the Industrial Section.

O Rice Malt Room

The construction of a rice malt room was necessary for the preparation of rice malt used in the making of miso, a Japanese food, to supplement the mess hall diet. This room was built in the north end of camouflage building 4 and was 12 feet square with 7-foot ceilings. It was framed with 2 in. x 4 in. material and ceiled inside and out with 1 in. x 4 in. tongue-and groove flooring. Hot-air ducts and electric lights were installed. The lights were connected from a line within the camouflage building, while the hot-air ducts were connected to a heater and blower used within the camouflage building for the dehydration of vegetables.

P Men's Latrine in Block 15

The men's latrine in block 15 was almost totally destroyed by a wind storm so that reconstruction became necessary. A small portion of the west and south walls was left standing and had to be replumbed and braced. The wrecked section was torn apart and cleaned

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of nails that were re-used in the reconstruction. Very little new material was necessary since the plumbing to the boiler installations was not damaged.

Q Duck Boards for Food Warehouses

In order to comply with WRA regulations governing food storage as set forth in the Handbook, Mess Operations, 50.6.11, the construction of duck boards for the food warehouses was considered justified. These boards were constructed with three 2 in. x 6 in. stringers, 8 feet long and spaced one inch apart to allow for ventilation. This made a panel 8 feet long and 4 feet wide. By placing these panels side by side various sized platforms could be arranged to suit the requirements of the crated or sacked foods that were placed upon them.

R Garbage Can Wash Rack

As an absolute necessity in cleaning and sterilizing daily 250 garbage cans was a garbage can wash rack. This was built adjacent to the hospital boiler house which provided steam for the operation.

A concrete platform, 18 ft. x 35 ft., was built and two steam and hot water cleaners were installed. These cleaners consisted of a circular steel pipe perforated to allow for the flow of steam and hot water. The cans were placed, with the bottom side up, over these rings and a flow of hot water and steam was applied, cleaning and sterilizing the can in one operation. The grease and garbage thus removed was washed into a grease trap and sump that was connected to the main sewer line.

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S Hospital Incinerator

To provide a sanitary method to dispose of contaminated refuse from the hospital wards, morgue, and operating room, an incinerator was built. This structure was of native stone with outside dimensions of 8 ft. x 8 ft. x 6 ft. and a stack 12 feet high of the same material. It contained a fire box, 4 feet in width and 5 feet in depth, with an overall height of 3 ft. 6 in. A grate of 1 1/2-inch pipe raised 16 inches from the bottom was installed. The space beneath the grate acted as an ash depository and also regulated the draft through two sheet-metal doors that were installed on the ash depository; another two were placed on the fire box.

As a safety measure to prevent the spread of fire, a cement slab was laid extending 4 feet on each side of the incinerator and 10 feet out in front.

T Building Schedule and Costs

Table 5 gives a schedule of building construction completed by the Engineering Section at Manzanar after the WRA assumed control of the Center on June 1, 1942. The floor area, dates of construction, and estimated and final cost are given for each job.

II UTILITY EXTENSION CONSTRUCTION

In order to provide water, sewage disposal, electric lights, and power to the buildings and other structures built and maintained by WRA, it was necessary to add extensions to the utilities. A description of such construction followed.

A Staff Housing

The staff housing was constructed in an area so far removed from existing power lines and utilities that it was necessary to

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TABLE 5
SCHEDULE OF WRA BUILDING CONSTRUCTION
AND COSTS AT MANZANAR

Project	Area in sq. ft.	Date started	Date compl.	Est. cost	Final cost
Staff housing	32,000	1/15/43	3/31/44	\$123,972	\$110,633
Gymnasium-auditorium	14,140	1/28/44	9/30/44	25,250	30,356
Poultry farm	29,528	7/ 8/43	12/31/43)	65,047	21,784
Hog farm	3,040	9/ 1/43	4/30/44)		7,615
Foot cellar	2,600	7/ 5/43	10/28/43	1,916	1,438
Industrial latrines	768	9/ 8/43	11/ 1/43	3,000	2,433
New garage	1,440	11/20/44	4/23/45	1,149	2,301*
Caucasian mess	2,000	5/ 1/43	7/ 1/43	2,000	1,680
Rock sentry and police station	284	10/ 1/43	5/10/44	800	700
Boiler room, Military Post	70	6/ 1/44	7/ 5/44	100	100
Gas service station	160	11/ 1/42	12/ 6/42	125	125
Oil-distribution sheds	624	4/ 8/43	12/ 2/43	1,250	1,014
Dehydration plant	233	7/29/43	9/30/43	600	428
Rice malt room	270	10/16/43	12/17/43	233	233
Men's latrine, bl. 15	600	6/14/43	6/26/43	121	121
Duck boards	2,000	8/ 1/44	10/6 /44	236	236
Total	89,787	---	---	225,844	181,196

* Includes \$924 for hoist and \$150 for heater, making a total of \$1,074 that was not included in the original estimated cost of building.

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install five new poles complete with cross arms, insulators, brackets, and guy wires. There were 920 lineal feet of primary wiring, 2,850 lineal feet of secondary wiring, six 50-K.V.A., two 15-K.V.A., one 37 1/2-K.V.A., and one 7 1/2-K.V.A. transformers installed.

To bring water to the buildings and to provide fire protection it was necessary to install 1,323 feet of 3-inch and 270 feet of 2-inch black iron pipe, and 830 feet of 1 1/4-inch galvanized iron pipe, including bibbs and gate valves. For additional fire protection, three 3-inch and two 6-inch fire hydrants were installed.

The sewer lines consisted of 1,025 feet of 8-inch, 510 feet of 6-inch, and 1,294 feet of 4-inch vitrified clay pipe, as well as six brick-lined manholes complete with cast-iron rings and covers.

B Poultry and Hog Farms

To provide lighting to the poultry farm, five poles were set and 1,924 lineal feet of electric wiring was used. For the same purpose at the hog farm, eight poles were set and 5,200 lineal feet of wiring was used.

To supply water and fire protection to the poultry farm, 1,777 feet of 4-inch and 65 feet of 2-inch black iron pipe, 95 feet of 1-inch galvanized iron pipe, and four 3-inch fire hydrants were installed.

Water for the hog farm was supplied from George's Creek through 800 feet of 8-inch concrete irrigation pipe into a concrete box or tank 10 feet square and 6 feet deep, where the water was

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carried through 250 feet of iron pipe to the feeding pens. From this point the water was distributed through 415 feet of 1-inch pipe and 195 feet of 1/2-inch pipe.

C New Garage

Electric lighting and power for the new garage was provided by extending approximately 750 feet of wire from a 15-K.V.A. transformer located on a pole at the south end of the reefer house.

A 1-inch water line of 100 lineal feet was extended from the old garage building and connected with water piping installed within the building.

The disposal of sewage was taken care of through the installation of 400 lineal feet of 4-inch vitrified clay sewer pipe and one brick-lined manhole.

D Well 169

To provide a stand-by source for domestic water supply in the event that Shepherd Creek should freeze over during the winter months, and to increase pressure in the mains in case of fire, a 9 ft. x 9 ft. frame building with concrete floor and base was constructed to house the installation of a 20-H.P. Pomona pump and motor, complete with 6-inch suction pipe and one 20-H.P. 220-volt ~~220-volt magnetic starter~~ 20-H.P. 220-volt magnetic starter.

To connect with the mains, 400 lineal feet of 6-inch steel pipe, complete with fittings, was laid. For electrical connections to this pump, it was necessary to install 3,200 lineal feet of overhead wire and one 15-K.V.A. transformer.

E Enlargement of Reservoir

In order to provide an adequate supply of domestic water for the camp, the storm reservoir on Shepherd Creek was enlarged from 540,000 gallons to approximately 900,000 gallons. This was done by raising the concrete-lined embankments to a sufficient height.

III REMODELING CONSTRUCTION

A Reflooring of Warehouses

The original flooring that was laid in the 40 warehouses was of single thickness, 1 in. x 6 in. shiplap. Owing to the constant wear and tear, it became necessary to refloor 30 of these buildings, which had an area of 1,881 square feet per building. This required approximately 2,351 square feet of 1 in. x 4 in. Douglas fir flooring per building.

B Interior Lining of Partitions in Evacuee Buildings

The evacuee barracks were originally constructed with three cross partitions of plywood running from the ceiling to the ridge, supported by 2 in. x 4 in. studding plates and cross ties. No interior linings or ceilings were provided for the walls, floors, or ceilings. It was found that four apartments to a building were insufficient in number to accommodate the family groups included in a population of 10,000 evacuees. In addition, the walls, flooring, and ceilings afforded too little protection against the cold winds and dust prevalent during the winter months and early spring.

To provide sufficient housing and livable quarters for the evacuees, the USEED supplied the material to WRA (except for the

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plasterboard) for partitions and floor covering. The walls and ceilings in 460 barrack buildings were lined with plaster board, and an average of two partitions per building were added to make additional apartments. The floors were covered with Mastipave floor covering in all apartments. There were 36 mess halls which were ceiled with plaster board. Mastipave floor covering was used in 20 of these buildings. Each buildings, with the exception of the mess halls, was 20 ft. x 100 ft. with an inside floor area of 1,881 square feet. Approximately 3,780 square feet of plaster board and 222 square yards of Mastipave floor covering was used in each of the 460 barrack buildings. The 36 mess halls required 5,564 square feet of plaster board and 445 square yards of Mastipave floor covering per building.

Each of the 30 recreation halls required 3,564 square feet of plaster board. In each of 20 of them 222 square yards of Mastipave floor covering was used.

C Relocation and Records Offices

Since the Relocation Office in building 4 and the Records Office in building 5, both in block 1, depended on each other for data concerning evacuee records, more space and safer storage were needed; as a result, an addition or annex, 20 ft. x 40 ft., typical T.O.-type construction, was built connecting these two buildings. This annex was partitioned off into three rooms for use of The Relocation Officer and his assistant. In buildings 1-4 and 1-5, partitions were rearranged to provide more convenient handling of the work for both the Relocation and Records Offices.

D Electric Work and Plumbing in Warehouse 5

In order to handle the maintenance program more efficiently and release space for other use, the following work was done.

A board partition was built dividing the electrical and plumbing warehouse into two sections. The north section of the building was used by the electrical unit and for the storage of plumbing supplies. One corner, 12 ft. x 16 ft., was partitioned off for an office. The rest of the space was utilized with wood shelves and bins for the storage of electrical and plumbing supplies. The south section of the building was left vacant.

E Hospital

The hospital ward floors and most of the enclosed walks were constructed without any floor covering, but due to excessive mopping and cleaning, they soon became badly worn and in need of either replacing or extensive repairing. To avoid the expense of this repair, and to make the floors easier to clean and more sanitary, Mastipave floor covering was laid in seven wards, each having a floor space of 25 ft. x 150 ft., and in 500 lineal feet of enclosed walks. For all this it required 3,100 square yards of Mastipave and 200 gallons of linoleum paste.

Then, too, when the hospital was constructed, no interior wall covering was provided for the walls or ceilings. In order to keep this building clean, it was found necessary to cover the walls and ceilings with plaster board. This was a difficult job because the overhead sprinkler system, and other piping that had been installed overhead, necessitated the use of additional furring and blocking in

order to leave the sprinkler system exposed below the ceiling line. Approximately 3,500 square feet of plaster board and 2 in. x 3 in. material for furring and backing was used.

As Caucasian doctors replaced evacuee doctors who were relocating, it became necessary to remodel the doctors' quarters, for the Caucasian doctors requested housekeeping facilities which had not been supplied to the evacuee doctors occupying the same building. This building was of typical barrack-type construction and was divided into four apartments of equal floor space. Very little remodeling was done within the rooms, but sinks, kitchen cabinets, and storage closets were installed.

F Schools

In view of the revocation by the War Production Board of construction of new buildings for school purposes, it was found necessary to convert existing temporary barracks into school rooms. To meet minimum standards with regard to space requirements, lighting, heating, and sanitation, the following work was done for the high school in block 7 and for the elementary school in block 16. In these buildings 54 partitions, 20 ft. x 8 ft., had to be removed and 41 new partitions constructed. The installation of 312 additional windows was necessary to afford sufficient and proper lighting. To provide separate entrances to the classrooms and to comply with fire regulations, 155 new doors were installed. Approximately 90 additional lighting fixtures were added to give sufficient illumination for night classes. Mastipave floor covering was laid in five buildings.

The woodwork in all classrooms was painted, and the walls and ceilings were kalsomined. Shelving was installed in the supply rooms; 30 drinking fountains were added.

In the south half of building 8, block 16, a 4-burner electric range, a refrigerator, and a sink were installed for use in conjunction with the adult English classes. These installations were considered necessary by the Education Section to augment and develop an adult English program where English was taught functionally to Issei men and women through classes in family cooking, food, nutritive values, and child development, as stipulated by the WRA Washington Office.

Oil-fired space heaters, connected to outside oil supply tanks, were installed in 42 classrooms in the school buildings.

In block 7, building 10, a homemaking program was developed in the high school. This room was made over into a model 2-room apartment; a 4-burner electric range and a refrigerator were installed. In blocks 2 and 7, the ironing rooms were remodeled and used as clothing rooms for the high school students. The chemistry and physics classes were conducted in the remodeled laundry room in block 7.

Facilities were provided for preschool classes in the following locations: building 14, block 1; in half of building 15 ~~in blocks 9, 20, 23, and 32~~; in one-third of building 16 in blocks 17, 30, and 31, and in building 15, block 11.

G Mattress Factory at Warehouse 25

In the cotton mattress factory a training program for many evacuees who had no trade, was developed to facilitate relocation.

In addition to the occupational training it provided, the manufacture of these cotton mattresses made it possible to replace the old straw ticks and thus eliminate a fire hazard.

The necessary remodeling was done in warehouse 25 and consisted in reinforcing the underpinning and girders and laying a 1 in. x 4 in. floor over the original flooring. Work benches were constructed and a motor-driven blower and shredding machine were installed. To operate the electrical equipment an additional 25-K.V.A. transformer was also installed.

H Community Hostel

A community hostel was set up in building 15, block 34, to provide treatment and care for patients whose illnesses were not serious enough to demand full hospitalisation, thus relieving the crowded condition at the hospital. The following remodeling work was done in the hostel:

A barrack-type building, 20 ft. x 100 ft. located directly east of the hospital and close enough for the convenience of the hospital staff was partitioned into three sections. One section was for men, another for women, while in between the two sections were baths, toilets, and a diet kitchen. An H.C. Little hot-water heater was installed in a ~~separate building~~ building to supply hot water to the bathrooms and kitchen.

Wooden ramps equipped with hand rails were installed at all exit doors as an aid to those who needed this kind of help in entering and leaving the building.

I Warehouse 36

Quarters were needed to replace the maintenance office and store room that were destroyed by fire on July 28, 1944. For this purpose the north half of warehouse 36 was remodeled and used as an office by the maintenance unit. Plaster board was placed on its ceiling and walls, and additional windows were added. Mastipave floor covering was laid on the floor; the ceiling and the walls were kalsomined.

The south half of the building was fitted with shelving and bins for the storage of equipment, supplies, and materials.

J Appointed Personnel Recreation Building

To provide recreational facilities for the appointed personnel, many of whom did not have automobiles or other means of transportation to the nearby towns, an existing barrack-type building was remodeled. Partitions were relocated and the building divided into three rooms. The south room was used for floor games and other activities, the center room for light refreshments, and the north room for cards, reading, and table games. In the refreshment room a serving counter, sink, and four booths with tables and benches were installed; as also a butane hot water heater to supply hot water for washing dishes and the wash rooms. The floors were covered with Mastipave, and the walls and ceilings were kalsomined.

K Canteen and General Store

Building 14, block 8, was used by the Business Enterprises for a canteen and store building. The flooring was so badly worn from

constant use that a new floor was laid over the old one. The walls and ceiling were covered with plaster board so as to make the building more easily heated, to keep perishables from freezing in winter, and to eliminate dust that sifted in through cracks and around windows of unlined walls.

L Motor Pool Office

The Motor Pool office was formerly located in a portion of a barrack-type building in block 2 which was not conveniently located to the garage and storage lot. To provide adequate office space for the handling of affairs pertinent to transportation, and old USED office building was moved adjacent to both the fenced parking lot and the garage. This building required very little remodeling and repairs. An additional partition was added and the location of two existing ones changed. Floors were patched and the walls and ceilings were kalsomined. A counter was built in the dispatcher's office and electric wiring extended from the power line adjacent to the building.

M Administration Building

The Administration building was originally constructed without any wall or floor covering and was divided into 4 large offices. In order to eliminate dust and dirt, and ~~because of the interior~~ interior was lined with plaster board and the floors covered with Mastipave.

Because the number of appointed personnel increased and more duties were added, it became necessary to divide the interiors into smaller offices which gave each office more privacy. The partitions

were of plaster board constructed in the same manner as were those in other buildings in the Center.

H Butcher Shop

To provide more storage space and to facilitate the handling of meat stored in the reefer house, the following work was done:

All the meat-hanging racks were removed and replaced with racks of heavier material which doubled the capacity of the original installation.

During the heat of the summer, the temperature in the room housing the refrigeration machinery often rose to such a degree as to interfere with the normal operation of this equipment. To overcome this difficulty the interior of the room, housing the refrigeration machinery for the meat and vegetable storage, was lined with plaster board and a 16-inch suction fan was installed in each room to draw in outside air.

C Shoyu Factory

The shoyu factory for the making of shoyu, a Japanese food manufactured from soybeans and used in the mess halls to supplement the regular food, was set up in the ironing room and the laundry building in block 1. To provide sufficient space for the manufacture of this article, an addition was built connecting the two buildings.

This addition was of regular army T.O.-type construction with 2 in. x 4 in. rafters spaced 4 feet on centers. The roof and walls were sheathed with 1-inch material. The roof was covered with 15-pound building paper. A ^{concrete} floor was laid and a floor drain

was installed which connected with the sewer line.

P Equipment Shed 4

Equipment shed 4 was used by the Agriculture Section for the storage of seed and fertilizer. It was originally built with the front side open to store farm equipment. However, for the storage of seed and fertilizer, the front side had to be closed in to keep out the rain, snow, and dust.

Studding of 2 in. x 6 in. material was placed 4 feet on centers with horizontal cross ties also spaced 4 feet on centers. Sheathing of 1 in. x 12 in. was used, the whole exterior was recovered with 15-lb. building paper, and a new roof of 90-lb. felt was applied. Large louvers were installed in each end of the building to provide ventilation.

Q Evacuee Post Office

The location of a plaster board partition was changed in the evacuee post office to provide more work and storage space; approximately 200 square feet of additional shelving was installed.

R Engineering Office

Additional office space was needed in the Engineering Office building for drafting and to relieve a generally overcrowded condition. Partitions were changed to make use of an additional 15 feet of the building for a drafting room. The room was equipped with files for plans and maps, and new equipment, such as drafting tables, a blue-printing machine, and a washing tray were added.

A door opening was made, connecting the main office with the drafting room. A partition was moved to provide more space in the

Senior Engineer's office. The lights were rearranged to provide better lighting.

IV REFRIGERATION

Refrigeration for the Center was supplied by electrically operated equipment of different sizes and types for storage buildings, mess halls, and appointed personnel quarters.

For the storage of vegetables and meats two refrigerated warehouses were used with a storage capacity of approximately 11,000 cubic feet. Each warehouse was equipped with four evaporator condensers of humid-air type. The compressors were Brunner, model E, type E.C., driven by $7\frac{1}{2}$ -H.P., 220-volt, 3-phase Fairbanks Morse electric motors. Drayer Hanson condensing units were used, equipped with $1\frac{1}{4}$ -H.P. Pacific Pumping Co., $1\frac{1}{4}$ -inch water pump. Mess halls within the Center and at the Military Post were equipped with 35 20-cubic foot refrigerators: 32 Supercold, 2 Viering, and 1 Catalina.

The 40-cubic foot refrigerators in the mess halls, at the hospital, and at other locations included: 37 Ward, 1 Supercold, and 1 Barker Bros. In addition, there were three 50-cubic foot Hussman-Ligionier boxes for replacements, and a 4-body Market Forge, model SMA, forced-air type unit, with York compressor, was installed at the hospital morgue.

Exclusive of the morgue installation and the refrigerated warehouses, there were 77 commercial refrigerators within the Center.

Domestic or household installations comprised 90 units and consisted of the following:

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<u>Number</u>	<u>Size in cu. ft.</u>	<u>Make</u>
63	8	Coldspot
7	7	Westinghouse
2	9	Westinghouse
11	7	Frigidaire
6	9	Frigidaire
1	3	General Electric

CHAPTER 3

LAND IMPROVEMENTS

Manzanar Relocation Center comprised an area of 5,464.09 acres all in T.14 S R 35E, except the garbage pit in T. 14 S R 36 E. (See map "Land Improvements" Appendix 1, Figure 6.) The following is a brief description of this acreage:

<u>Location</u>	<u>Area in acres</u>
Project bounded area	5,414.90
Well 75, 150 ft. x 600 ft., along the east right of way of U.S. highway 395	2.07
Well 92	.72
Pipeline to well 92	1.90
Road to Well 92	1.70
Road to sewage treatment plant	5.30
Main trunk-line sewer pipe	5.10
Sewage treatment plant	6.30
Sewage outfall ditch	6.20
Garbage pit east of Owens River	<u>19.90</u>
Total	5,464.09

The program for land improvements consisted of the following: clearing and developing Center and agriculture ~~land~~ constructing irrigation and drainage system, streets and roads, bridges and culverts, and fencing.

I CLEARING AND DEVELOPING

Most of the land to be developed had at one time been covered with orchards or farms which meant that extensive further development was not needed. The Center's program consisted of

clearing sage and other smaller brush and leveling the land for irrigation. Because of wind erosion of the light sandy soil, leveling of the agricultural land was extensive. In all, approximately 360 acres were cleared and improved. Approximately 80 percent of the Center area and 1 percent of the agricultural land had been cleared and developed by WCCA, the rest so developed was cleared and improved by the WRA Agricultural and Engineering Sections. The cost for this work is not available.

II IRRIGATION AND DRAINAGE

Approximately 12.3 miles of irrigation ditches and pipelines were constructed for agricultural purposes. The water from George's Creek, Bair's Creek, and Shepherd Creek was distributed for irrigation through pipelines and ditches by gravity. As these creeks are fed by melting snow on the Sierra Nevada mountains west of the Center, there is considerable fluctuation of the streams. George's and Shepherd Creeks flow some all year, but Bair's Creek dries up in late summer. Due to the fluctuation and the insufficient supply of water for the late crops, the irrigation system at Manzanar was supplemented by the City of Los Angeles' water and power wells in the area. Wells 76 and 95 supplied water for the fields south of the Center and well 92 for part of the fields north of the Center. Because of a crooked casing, well 99, in the north area, could not be used.

The WRA Engineering Section built a concrete dam on Shepherd Creek and distributed water from there to farm-area ditches through open laterals lined with rock and concrete. These laterals were approximately 6 feet wide at the top, 3 feet wide at the bottom,

and 3 feet deep. Wood flumes were constructed over coulees in this system. The farm area had a system of open ditches lined with rubble and concrete. These ditches were approximately 3 feet wide at the top, 1 foot wide at the bottom, and $1\frac{1}{2}$ feet deep with wood gates for controlling the water.

A concrete dam was built on George's Creek and connected by 7,450 feet of 12-inch concrete pipeline with the control box. This in turn connected with the existing system on Bair's Creek, from which the outlet emptied into open ditches lined with rubble and concrete that distributed the water in the south fields. Wood gates were installed in these ditches for controlling the water.

The entire irrigation system, including the pipelines from the wells and all open-lined laterals, cost approximately \$27,980. As the Cost Accounting Section does not have the cost records for 1942, and only part for 1943, this cost was arrived at from available records in the Engineering Section. It is believed to be as close an estimate as can be obtained. For the irrigation system see map "Land Improvements" Appendix 1, Figure 6. Pipe lines and ditches constructed for irrigation were as follows:

<u>Construction</u>	<u>Size in Inches</u>	<u>Linear Feet</u>
<u>Pipes</u>		
Concrete	12-inch	9,740 feet
Concrete	10-inch	700 "
Concrete	8-inch	2,015 "
Steel	12-inch	3,129 "
Steel	8-inch	1,676 "
Total pipe lines		17,260 "
<u>Ditches</u>		
Open concrete-lined		49,902 "
Total: irrigation pipe and ditches		67,162 "
		(approx. 12.3 miles)

III STREETS AND ROADS

There were approximately 14 miles of oiled-surface streets in the Center and $1\frac{1}{2}$ miles of oiled-surface roads in the farm area outside of the Center fenced area, making a total of $15\frac{1}{2}$ miles. Approximately $5\frac{1}{2}$ miles of dirt roads were constructed in the farm area, and to the reservoir and sewage treatment plant.

The cost for street and road construction was low due to the type of sandy soil which required very little additional gravel before the surface could be oiled. Due to the topography of the Center and the small amount of rainfall, the streets and roads were elevated very little above the adjacent ground. This factor also made it unnecessary to install many drainage structures.

All surfacing of streets and roads was by the penetration method using M.C. 2 asphalt, except at the entrance to the Center from highway 395 and the one block on First Street, which was road-mixed to carry heavy traffic of large freight trucks.

The U.S. Engineers contracted for surfacing 151,808 square yards of streets at a cost of \$14,574. As this work was done on parts of different streets, it is difficult to give a mileage breakdown separate from surfacing done by WRA.

WRA surfaced new streets and parking areas for staff housing completed surfacing of streets in the Center, and constructed and surfaced roads in the farm area. The penetration coat of M.C. 2 asphalt applied cost approximately $2\frac{1}{2}$ cents per square yard.

IV BRIDGES

The bridge on the farm road over the north fork of Shepherd Creek was 12 ft. long and 20 ft. wide with stone masonry walls and wood superstructures and deck. The cost was approximately \$250.

The bridge on the farm road over the south fork of Shepherd Creek was 12 ft. long and 15 ft. wide with stone masonry walls and wood superstructures and deck. The cost was approximately \$150.

The cattle guard on the road to the sewage treatment plant was 9 ft. long and 14 ft. wide. Railroad steel rails were installed on 6-inch centers laid on timber stringers placed on concrete abutments. The cost was approximately \$200.

V FENCING

The fence constructed around the Center was contracted for through the U.S. Engineers and is described in Chapter 1, Basic Construction.

WRA constructed fences for the chicken and hog farm, the cost of which is included in Table 5. Other existing fences in the area that were repaired were at the cattle farm, but as this was considered maintenance, the cost is not available under construction.

CHAPTER 4

OPERATION UTILITIES, JANITORIAL SERVICE, AND MAINTENANCE

I OPERATION UTILITIES

A Water

The main source of supply for domestic water was from Shepherd Creek, with an auxiliary supply from wells 75 and 169. The water from Shepherd Creek was impounded within a cement-lined reservoir connected to the creek by a cement-lined ditch and settling basin. From the reservoir the water was carried through a steel pipe into a 90,000-gallon storage tank and distributed from there through mains and laterals throughout the Center area.

Shepherd Creek rises in the Sierra Nevada Mountains and is fed from a chain of snow-fed lakes. Because of this, the stream fluctuates from a maximum of 47 second-feet during early summer to a minimum of 3 second-feet during the winter.

The wells were equipped with electrically driven pumps which were used to augment the water supply during the acute shortage in the winter and also to supply adequate pressure within the mains in case of fire.

Although the water is of the purest type, ~~and is not~~ against contamination from any source, two chlorinators were used; one was installed on the supply ditch above the reservoir and the other was located above and adjacent to the storage tank.

The operation and maintenance of the water supply system was under the direct supervision of the utilities superintendent.

He trained and supervised three crews of four evacuees, each working three shifts of eight hours per day, seven days per week. These men were employed in cleaning screens; regulating control valves and gates; cleaning sand traps, storage reservoir, and tank; checking for and cleaning the stream of debris; operating the well pumps when necessary; and servicing the chlorinating machines.

B Sewage Disposal

The sewage disposal system as installed consisted of an outfall system and a sewage treatment plant. Sewage from the Center was carried through the laterals into the mains and thence to the sewage treatment plant.

This plant consisted of a grit chamber, scum and distribution box, clarifier, digester, chlorine contact tank, sludge beds, and a control house that contained an office room, laboratory metering gauges, chlorinator control, and other equipment.

A crew of six evacuees under the supervision of the utilities superintendent maintained and operated the plant. An evacuee chemist was employed to test the water and sewage. The following tests were made on water: algar plates for bacteria count, and ~~and other tests for~~ fermentation tubes to tests for coli. Tests were made on sewage for suspended and dissolved solids, and for determination of dissolved oxygen. B.O.D. tests were also made for oxygen consumed.

C Electric Power, Signal System, and Refrigeration

The electric power, signal, and refrigeration utilities were originally under the supervision of an electrical engineer

who supervised two crews of approximately six men each. One crew was for maintenance and repair of the electrical system, while the other crew handled refrigeration. The signal system, consisting of telephones, and the police and fire signals was maintained by the Interstate Telegraph Company.

The above method of maintaining these utilities did not prove too satisfactory. The electrical engineer was very proficient in handling the electrical section, but lacked experience on refrigeration. Consequently, practically all units on refrigeration had to be shipped out of the Center for repairs.

During the year 1945, acting on an order from the Washington Office, the position of electrical engineer was abolished and in its place two positions were set up, one for an electrical foreman and the other for a foreman of refrigeration. This plan worked much better. The refrigerator foreman and a crew of two men serviced and repaired all refrigeration equipment for both domestic and commercial boxes, including the installations in the two refrigerated warehouses. Very little equipment was sent outside the Center for repairs excepting the sealed units that were returned to the factory for replacements.

The electrical foreman performed his duties in a very satisfactory manner, being assisted by from one to four evacuees, depending on the amount and type of work on hand. All maintenance and repairs of electrical equipment, excepting for the rewinding of large motors, were done in the Center's repair shop. These were shipped to an electrical shop in Los Angeles.

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At the time the Center closed the condition of the equipment that was in operation was fair. Certain units, no longer in operation, needed considerable work done upon them to put them in good working order.

II JANITORIAL SERVICE

Janitorial services were under the direct supervision of the assistant superintendent of construction and maintenance. An evacuee general foreman, directly responsible to the assistant superintendent of construction and maintenance, gave direct supervision to evacuee foreman of these services.

All supplies and material for the janitors were obtained from the central warehouse upon written requests signed by the assistant superintendent of construction and maintenance.

During the school term, a crew of 28 men and women were employed in the servicing of all buildings connected with both the high school and the elementary school. These schools included the following buildings:

<u>Number</u>	<u>Size</u>
30 barracks divided into classrooms	20 ft. x 100 ft.
1 clinic and recreation room	40 ft. x 100 ft.
1 health unit	20 ft. x 40 ft. 9 in.
1 auditorium-gymnasium	118 ft. x 119 ft.
4 latrines and shower rooms	20 ft. x 30 ft.
1 library and	
2 home economics rooms	40 ft. x 100 ft.

The duties of the janitors consisted of sweeping and dusting all of the classrooms, cleaning windows and woodwork, and

servicing and cleaning latrines and shower rooms. During severe winter weather, it was necessary to have the school buildings warm enough for classes when the school days began in the mornings. For this duty a crew of four men were detailed to service and check approximately 70-oil burning space heaters in the classrooms.

A group of 36 men and women serviced the following buildings: Their duties consisted of cleaning, sweeping, dusting, servicing the toilets and showers, changing linen, washing windows and woodwork, and changing linen in the dormitories.

A group of 30 men and women were employed in the servicing of 68 latrines and shower rooms located in the various blocks. Their duties consisted of hosing and mopping the floors of both the latrines and shower rooms; scouring and washing down all toilets, urinals, slop sinks, and wash troughs; spraying with disinfectants; and placing deodorants as needed.

The Administration office buildings, post office, and Town Hall, included 19 buildings having an area of 49,000 square feet of floor space; three dormitories with an area of 3,360 square feet of floor space; three buildings in the Childrens village with an area of 10,250 square feet of floor space.

III MAINTENANCE

A maintenance office and warehouse were maintained to facilitate control of different maintenance crews and maintenance supplies. All maintenance was under the supervision of the assistant superintendent of construction and maintenance and in turn of several appointed personnel foremen of different units. The foremen

were assisted by evacuee foremen who also acted as coordinators of different crews. Each crew was supervised by an evacuee crew leader or foreman who answered directly to his general foreman.

The office was in charge of an evacuee chief clerk or manager who supervised a force of approximately 10 clerks, typists, and storekeepers. In this office all records and accounts pertinent to this section were handled. All cost accounts and time sheets were also prepared by the office staff, and a log was kept on oil consumption of space heaters, hot-water boilers, kitchen ranges, and the hospital steam plant. A weekly breakdown was made of all records and a copy submitted to the Senior Engineer in charge of operations. A perpetual inventory of all stock on hand was maintained in the office and a copy was submitted to Property Control at the end of each month.

In order to carry out the maintenance program needed to assure efficient operation of all activities involved, it was necessary to train men for the various crafts and trades as listed below.

A Tinsmiths

Six tinsmiths assumed responsibility for the maintenance construction and repair of all sheet-metal work, including kitchen sinks, wash troughs, urinals, roof jacks, stove pipes, and other equipment.

B Machine Shop

Maintenance and repair of all equipment and machines, except automotive, for all sections in the Center including Agriculture, Mess, Quarters, and Engineering was performed in the machine shop by two men.

C Stoves and Coolers

Duties in the maintenance of stoves and coolers consisted of overhauling, repairing, and maintaining approximately 2,000 space heaters and the servicing and repairing of 90 oil fired mess hall ranges. Twelve men were employed at this job.

D Garbage Crew

The edible garbage was kept separately and used to feed Project-raised hogs. The inedible was hauled approximately four miles to the garbage pit and covered with dirt. The empty garbage cans, numbering approximately 250 per day, were washed and sterilized before being returned to the mess halls. All of this work was performed by a garbage crew of 19 men.

E Rubbish Crew

Rubbish and debris that accumulated around the buildings throughout the Center was collected, salvage material was sorted. Magazines and papers were saved and baled, and all useless cans were crushed for shipment. Nineteen men were employed in this crew.

F Emergency Crew

A crew of 11 men was used to perform emergency jobs, to fill-gaps in the ranks of regularly assigned workers who were off duty on account of sickness or other reasons, and for emergency work for which there was not any assigned crew.

G Grounds and Yard Crew

The grounds and yard crew, composed of 36 men, collected and disposed of all rubbish from the streets and the inside of blocks. They cut and disposed of all weeds, grass, and other combustible material that might create a fire hazard to the Center.

H Grease Crow

A crew of 16 men was employed to remove and salvage grease from approximately 100 grease traps located in mess halls, laundry rooms, and the garbage can sterilization plant. Waste fat from the butcher shop, together with the grease trap collections, was dehydrated, deodorized, and then packed in drums for shipment.

I Oil Distribution

Oil distribution was a major job and occupied 51 men. One 1,400-gallon tank truck with a 13-man crew, working two shifts, seven days per week, serviced all block tanks, and transferred approximately 8,000 gallons of oil daily from the main storage tanks to the block tanks.

One 600-gallon tank truck, and one rack truck with five-gallon cans, serviced the rest of the Center, including all space heaters and hot-water boilers in the office buildings, schools, auditorium, hospital, personnel quarters, hostel, kitchens, motor pool, Military Post, the water plant, and the sewage disposal plant.

J Hospital Plant

Three ~~XXXXXX~~ equipment, consisting of vacuum water and booster pumps, were operated at the hospital by a boiler crew of 16 men. Hourly inspections were made and reports submitted on all water gauges and recording instruments. These men were employed 24 hours per day, seven days per week.

K Hot Water Boiler Operators

The boiler crew of 16 men operated 24 hours per day, seven days per week. They serviced 170 H.C. Little and Hanson hot-water boilers, repairing and maintaining 45 H.C. Little space heaters and seven hot-air furnaces.

This equipment supplied all the hot water for the Center except for the hospital. This also included the auditorium, offices, and other public buildings.

L Water Barrel Crew

A crew of six men serviced and inspected water barrels that were placed in all the blocks and around the hospital, warehouses, and office buildings.

M Maintenance Carpenters

Due to the fact that all buildings and structures within the Center were of temporary construction, the cost of maintenance was very high. It was necessary to make general repairs to roofs, floors, doors, steps, and underpinnings on 883 buildings and structures within the Center Military Post, and chicken and hog farms. In all, 31 men were employed for this work.

staff housing, Military Post, Childrens Village, and the hospital.

O Gardening

The Center was located in an area subject to severe wind and dust storms throughout most of the year. These dust storms created a great menace to the health and well being of the inhabitants and increased the cost of maintenance of motors and other equipments.

To overcome the dust condition, extensive plantings of lawn, shrubs, and trees were made around the hospital, Childrens Village, administrative offices, staff housing, and other public buildings. A crew of 45 men planted the lawns, trees and shrubs, and maintained and cared for them after they were planted.

P Carpenter Shop

The carpenter shop employing four men was maintained for the repairing and rebuilding of administration office furniture and fixtures, staff housing furniture, kitchen cabinets, screen doors, and windows.

Q Painters

Five men were employed at painting and kalsomining which were required to keep the interior of the hospital, Childrens Village, mess halls, office buildings, and staff housing sanitary and clean.

R Irrigation and Roads

A crew of 40 men was employed to maintain and repair approximately 14 miles of oil-surfaced streets within the Center and 1½ miles of oil-surfaced roads in the farm area. There were 5½ miles of dirt roads to grade and [REDACTED] en route to the reservoir and sewage [REDACTED] 12,455 lineal feet of concrete irrigation pipe [REDACTED] feet of steel irrigation pipe, 49,902 lineal feet of concrete-lined ditches to maintain and repair. During the rainy periods and the time of melting snows, the flood waters were spread and controlled to keep debris and soil from entering the Los Angeles aqueduct.

CHAPTER 5

CLOSING PHASES

As the evacuee foremen and other key employees left the Center on relocation in the latter half of 1945, it became difficult to operate and maintain the Project plant. Appointed personnel were hired to replace some of these evacuee employees, but in most cases these new staff members were not on the job in time to obtain the proper training prior to taking over their duties.

Most of the experienced appointed personnel supervisors remained, however. With their full cooperation, operation and maintenance functions were carried on with a minimum of interruption in necessary services. During this time there was a maximum of 45 appointed personnel in the Engineering Section to carry on all work: operation and maintenance, cleaning up and disposing of a large amount of trash in blocks vacated by the evacuees, taking of inventory of equipment and supplies, and returning tools and other equipment to be declared surplus.

Considering the project conditions prevailing during closing:

██

██

██

APPENDIX 1
MAPS AND PLANS

- Figure 1 Organization of Engineering Section, July 1944**
- Figure 2 Camp Layout**
- Figure 3 Water Distribution**
- Figure 4 Sanitary Sewer System**
- Figure 5 Electrical System and Fire Alarm Telephones**
- Figure 6 WRA Construction Plot Plan**
- Figure 7 Land Improvements**

NOTE NOT COPIED IN SEPT, 1993

APPENDIX C: HABS DRAWINGS

(INSERT 11X17 FOLDOUT HABS DRAWING CA-2399 (359/25000, SHEET 1 OF 2))

APPENDIXES

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(INSERT 11X17 FOLDOUT DRAWING CA-2399 (359/25000, SHEET 2 OF 2))

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(INSERT 11X17 FOLDOUT HABS DRAWING CA-2399A (359/25001), SHEET 1 OF 9)

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(INSERT 11X17 FOLDOUT HABS DRAWING CA-2399A (359/25001), SHEET 2 OF 9)

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(INSERT 11X17 FOLDOUT HABS DRAWING CA-2399A (359/25001), SHEET 3 OF 9)

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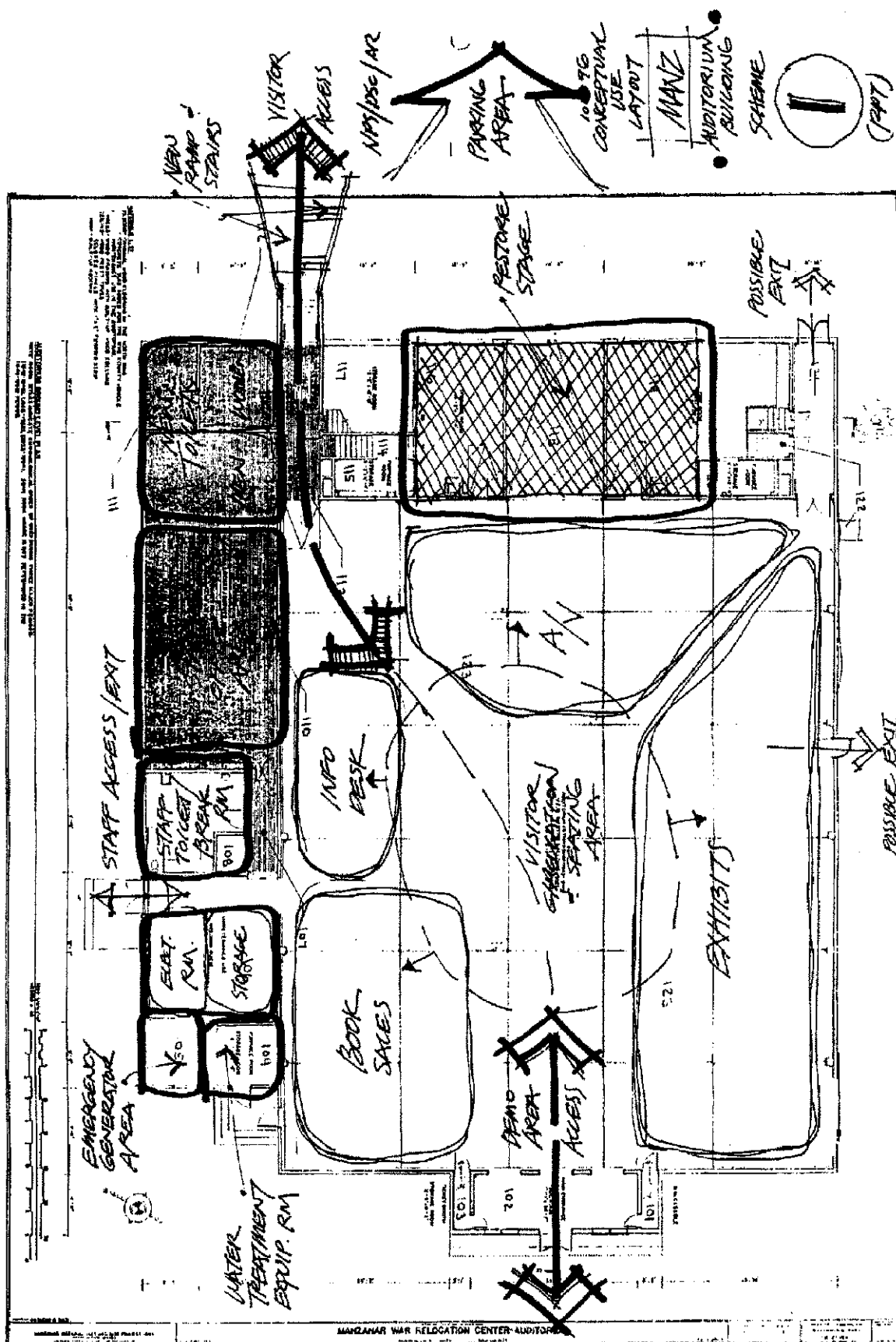
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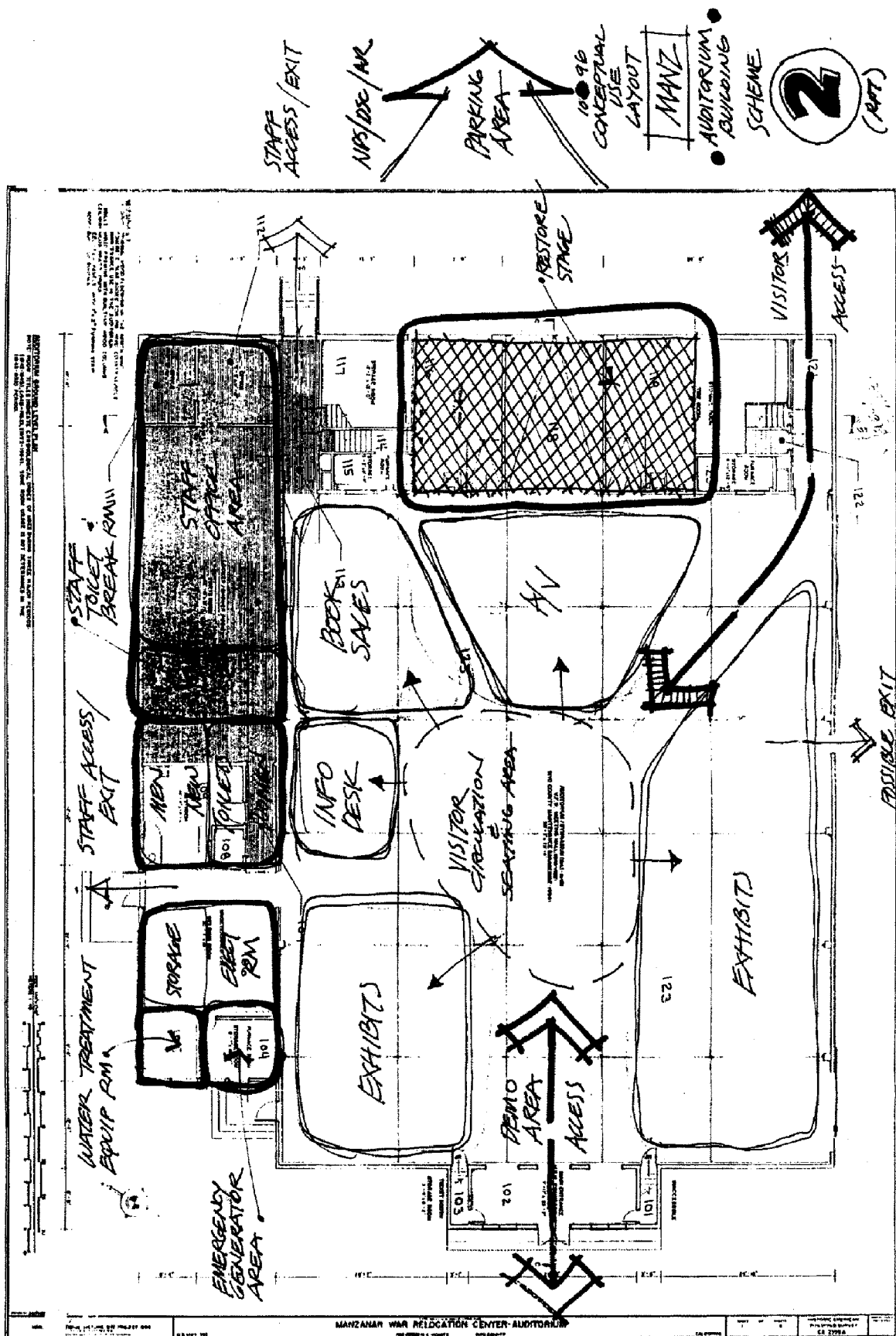
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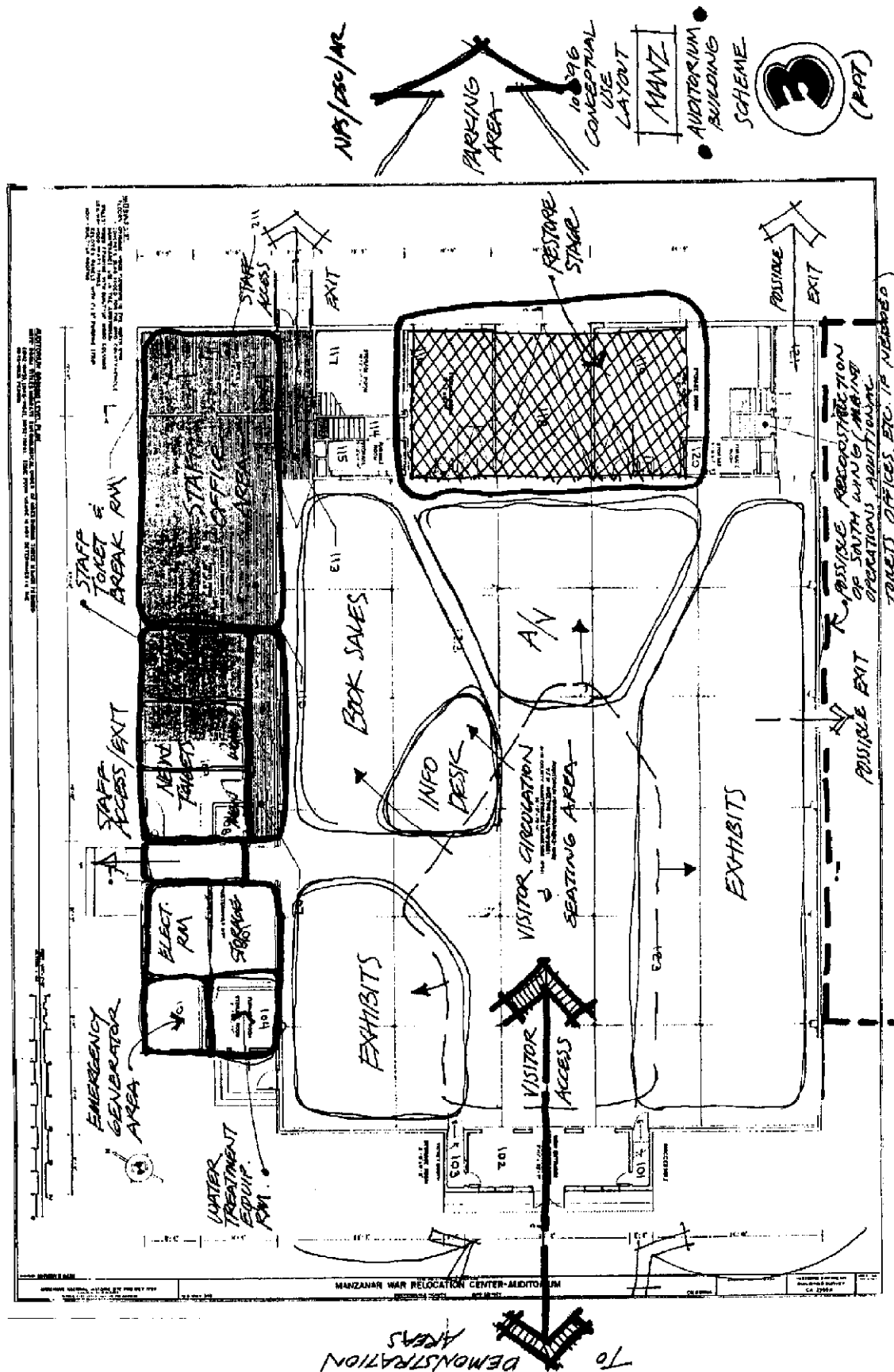
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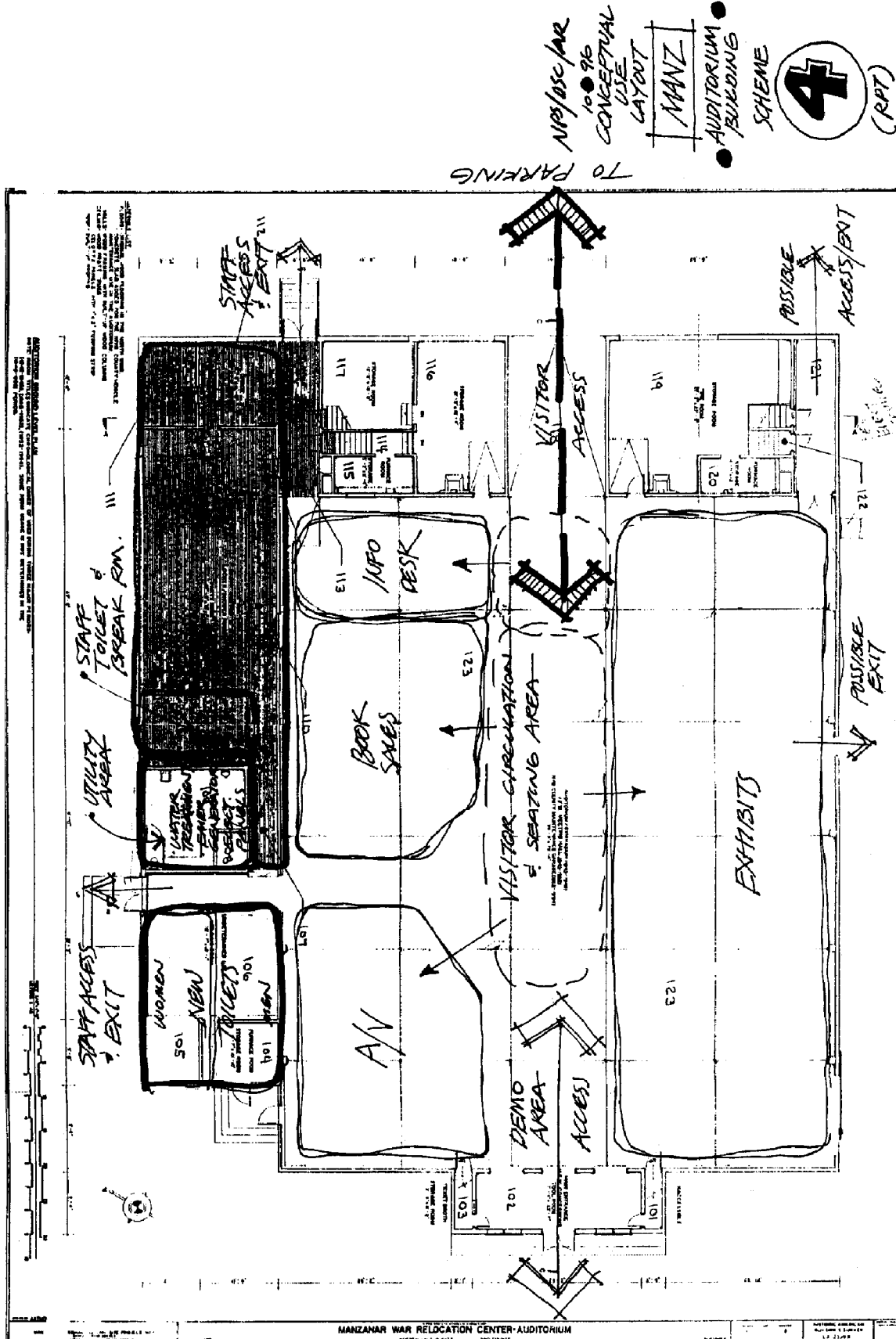
Conceptual sketches of site and building use prepared for site utilities planning, DSC, October 1996.

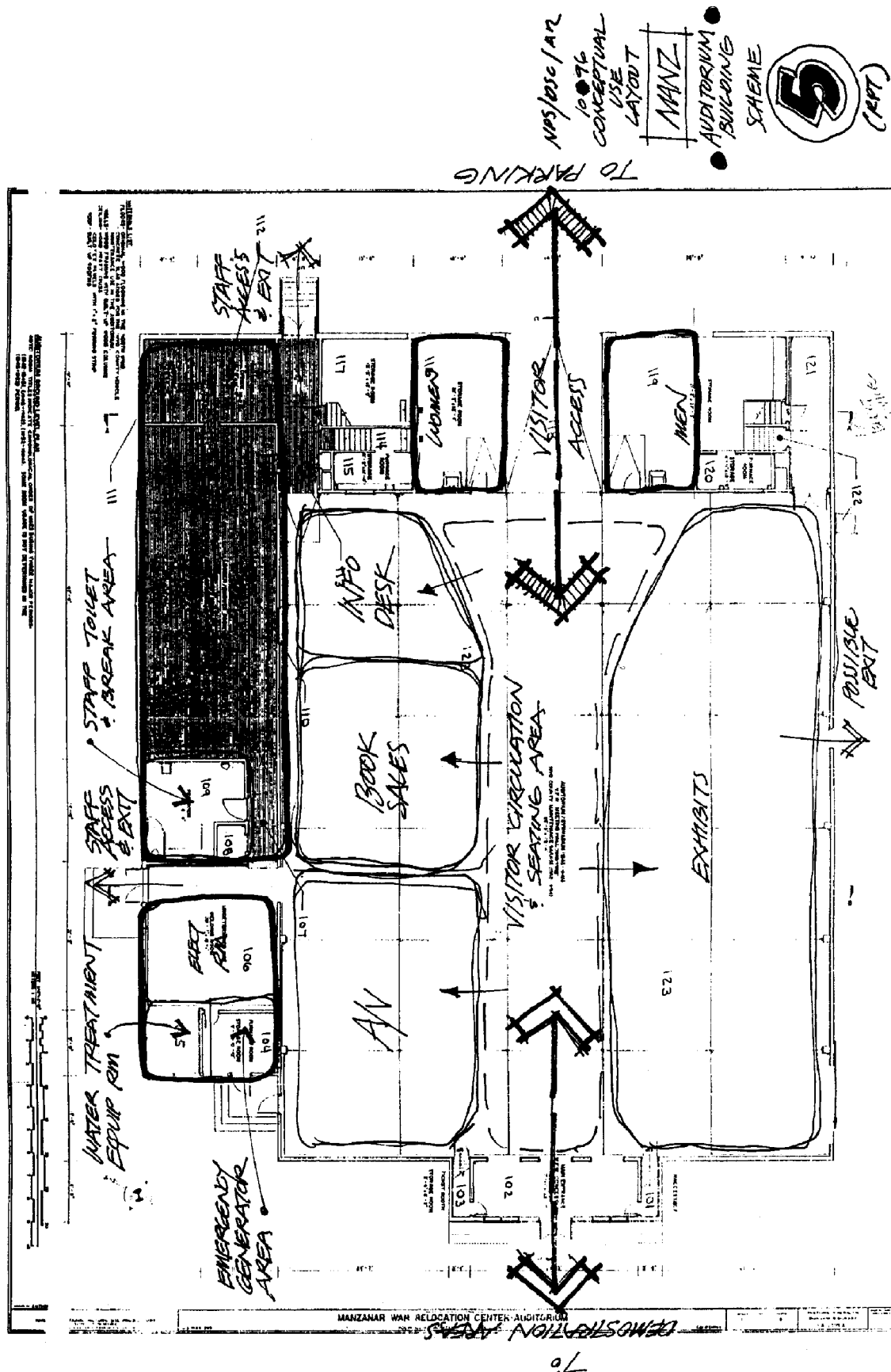












APPENDIX E: DOOR AND WINDOW ANALYSIS AND RECOMMENDATIONS

Door and window analysis and repair recommendations, prepared by Gordon White, National Park Service, Presidio Project Office, San Francisco, August 1996.



National Park Service
PRESIDIO PROJECT OFFICE
Planning & Professional Support
Building 102, Montgomery Street - P.O. Box 29022
San Francisco, CA 94129



FACSIMILE COVER SHEET

IN REPLY REFER TO:

D24 (WR-GOGA-PRES)

DATE: SEPTEMBER 10, 1996

PAGES: 17 (INCLUDING COVER)

TO: ROSS HOPKINS, MANZANAR NHS
619-878-2949 FAX

FROM: GORDON WHITE

RE: AUDITORIUM REPAIRS

COMMENTS:

Ross,

I spoke with Robbyn yesterday and learned of the Auditorium break-in. Glad they didn't do more. Attached are the pages from my field work for your use. I am finishing up the report this week - sorry I haven't gotten to it sooner. After I circulate the report to the select group here I'd like comments so I can finalize the document and get it back to you before the next unfortunate incident. I hope all else is well as can be, and thanks again for the opportunity to do work at Manzanar - I enjoyed it immensely.

Gordon

cc: Robbyn Jackson, PGBSSO, 744-4043
George Voyta, DEVA, 619-786-2392

C:\GOW\PROJECTS\MANZANAR\FTROS601

If there are problems with this transmittal, please call: Gordon White, 415-561-4488

Park MANZANAR NHS		NATIONAL PARK SERVICE		Sheet
Area		DENVER SERVICE CENTER		of
Project	By	GOW	Checked	Pkg.
Feature DOOR 3 CLOSURE	Date	8.20.16	Date	Account

■ REMOVE (6) DOORS FOR STORAGE BY N.P.S.
 ■ CLOSURE REQUIRES ONE FULL SHT. PLYWOOD & ONE PARTIAL SHT.
 ■ JAMB DETAIL SHOWN - HEAD & THRESHOLD SIM.

2x4 D.F. #2 OR DMR.
 3/16" HOLE THROUGH BOLT w/ COTTER PIN
 6x6 D.F. POST
 PAINTABLE SILICONE CAULK
 INTERIOR
 JAMB
 (N) WOOD SCREWS 2 1/2" x #10
 EXTERIOR
 PAINTABLE SILICONE CAULK
 3"
 1 1/2" 1 1/2"
 1/8" EXTERIOR GRADE PLYWOOD
 3/4" x 10" CARRAIGE BOLT (ZINC) w/ WASHERS BOTH ENDS

59 1/2"
 48 1/2"
 6'-0"
 3"
 BOLT TYP.
 2x4 TYP.
 6x6
 FRAMING PLACEMENT DIAGRAM

NOTES: 12 BOLTS PLACED AS SHOWN @ LEFT. APPLY ONE COAT PRIMER & ONE COAT FINISH PAINT TO PLYWOOD EDGES & EXTERIOR FACE BEFORE INSTALLATION. APPLY SECOND COAT FINISH PAINT AFTER INSTALLATION

Park	MANZANAR NHS		NATIONAL PARK SERVICE		Sheet
Area			DENVER SERVICE CENTER		of
Project			By	GOW	Checked
Feature	DOOR SIZES		Date	8.20.16	Date
					Pkg.
					Account

Door #	W x H OPNG SIZE	W x H DOOR SIZE(S)	NOTES
1 A B	4'-11" x 6'-7 ³ / ₄ " 59 ¹ / ₂ " x 79 ¹ / ₂ "	2'-5 ³ / ₈ " x 6'-7 ³ / ₈ " 2'-5 ¹ / ₂ " x 6'-7 ³ / ₄ "	
2	3'-0" x 6'-8"	Same	
3	3'-0" x 6'-8"	Same	
4 A B	4'-11 ¹ / ₂ " x 6'-8"	29 ¹ / ₂ " x 6'-7 ³ / ₄ " 29 ¹ / ₂ " x 6'-7 ³ / ₄ "	unable to measure door widths.
5 A B	5'-0" x 6'-8"	29 ¹ / ₈ " x 6'-7 ³ / ₄ " 30 ¹ / ₄ " x 6'-7 ³ / ₄ "	
6 Metal clad w/ Steel frame	28 x 67	Same	29 ¹ / ₄ " Clear * width
7 WD. ROLLING	11'-8 ³ / ₄ " x 11'-0 ¹ / ₂ "	N/A	± 2x6 FRAMING
8 B OUTER Roll up OPNG DOOR	14'-3" x 15'-1"	N/A	

* MUST BE WIDENED TO BE ACCESSIBLE ENTRANCE

Park MANZANAR NHS	NATIONAL PARK SERVICE		Sheet
Area	DENVER SERVICE CENTER		of
Project	By GDW	Checked	Pkg.
Feature DOOR 3 CLOSURE	Date 8.22.96	Date	Account

■ JAMB DETAIL - HEAD & THRESHOLD SIM.
 ■ REMOVE & DISCARD (E) DOOR.

2x4 D.F. #2 OR BTR
 1/16" HOLE THROUGH BOLT w/ COTTER PIN, TYP.
 INTERIOR
 (N) 2 1/2" x #10 WD SCREWS COUNTER SINK.
 40 BA. JAMS SC HEAD
 EXTERIOR
 1/8" EXT. GRADE PLYWOOD
 3/4" x 10" CARRIAGE BOLT (ZINC) w/ WASHERS BOTH ENDS
 PAINTABLE SILICONE CAULK
 3" TYP.

6'-0"
 3'-0"
 BOLTS
 2x4's
FRAMING PLACEMENT
DIAGRAM

NOTES: 6 BOLTS PLACED AS SHOWN.
 APPLY ONE COAT PRIMER & ONE COAT FINISH PAINT BEFORE INSTALLATION TO PLYWOOD EDGES & EXTERIOR FACE.
 APPLY SECOND COAT PAINT AFTER INSTALLATION.

Park	MANZANAR NHS		NATIONAL PARK SERVICE		Sheet
Area			DENVER SERVICE CENTER		of
Project	By	GOW	Checked	Pkg.	
Feature	Date	8.21.96	Date	Account	
<p> 8 REMOVE (E) ORIGINAL DOORS FOR STORAGE BY N.P.S. INSTALL (N) SOLID CORE FLUSH DOORS (1 3/4") IN (E) OPENING. PRIME & PAINT (2 COATS FINISH) BOTH FACES & ALL EDGES. EAST DOOR TO HAVE ASTRAGAL </p> <p> ■ <u>HARDWARE:</u> </p>					

Park	MANZANAR NHS		NATIONAL PARK SERVICE DENVER SERVICE CENTER	Sheet
Area				of
Project	By	GOW	Checked	Pkg.
Feature	DOOR 5 CLOSURE	Date	8.22.16	Account

• CLOSURE REQUIRES 1 FULL SHT. PLYWOOD & ONE PARTIAL SHT.
 • JAMB DETAIL. HEAD & THRESHOLD SIM.
 • REMOVE & RETAIN (F) DOORS FOR STORAGE BY N.P.S.

2x4 D.F. #2 OR BETTER, TYP.
 3/16" HAE THROUGH BOLT w/ COTTER PIN, TYP.

INSIDE
 JAMB
 5 1/2"
 3"
 OUTSIDE
 1 1/2" 1 1/2"
 PLYWOOD EDGE

1 1/8" PLYWOOD, EXTERIOR GRADE
 6x6 D.F. POST
 3/4x10" CARRIAGE BOLT (ZINC) w/
 WASHERS BOTH ENDS.
 PAINTABLE SILICONE CAULK

48"
 6'-9"
 32"
 8"
 BOLTS
 2x4
 6x6
 FRAMING PLACEMENT
 DIAGRAM

NOTES: 12 BOLTS PLACED AS SHOWN @ LEFT.
 APPLY 1 COAT PRIMER & ONE COAT FINISH
 PAINT TO PLYWOOD EDGES & EXTERIOR
 FACE BEFORE INSTALLATION. APPLY
 SECOND COAT FINISH PAINT AFTER
 INSTALLATION.

Park	MANZANAR NHS		NATIONAL PARK SERVICE DENVER SERVICE CENTER	Sheet
Area				of
Project	By	GDN	Checked	Pkg.
Feature	DOOR 7 - ROLL UP	Date	8.22.96	Date
				Account

- OPENING SIZE: 11'-3 3/4" WIDE X 11'-0" HIGH
- EXPOSURE: OPENING FACES SOUTH
- WIND LOAD: LOAD CLASS C - 70 MPH
- CONSTRUCTION: WOOD FRAMING - INSTALL DOOR ON INTERIOR OF OPENING.
- DOOR SPECS: 20 GAUGE ROLLING STEEL SERVICE DOOR w/ FLAT SLATS; WEATHERSTRIPPING (INCLUDING HOOD BAFFLE); END LOCKS.
- MOTOR: GEAR DRIVE w/ MOUNTING BRACKET BUILT INTO GUIDES OR HEADPLATE.
- CONTROLS: EXTERIOR KEY OPERATED SWITCH & INTERIOR PUSH-BUTTON OPERATOR, BOTH ADJACENT TO DOOR; SAFETIES (AUTO OFF @ FULL OPEN & FULL CLOSE)
- WARRANTY: 3 YR. ON PRODUCT & INSTALLATION
- FINISH: PRIME COAT BOTH SIDES - WHITE
- ACCEPTABLE MANUFACTURERS: NORTH AMERICAN (FIRST CHOICE), WINDSOR, ATLAS DOOR, SOUTHWESTERN.
- NOTES: INSTALLER TO DO ALL FRAMING REQ'D FOR INSTALLATION. SUBMIT SHOP DRAWINGS OF MOUNTING DETAILS TO N.P.S. FOR REVIEW & APPROVAL.
- EXISTING CONDITIONS: PLUMBING & ELECTRICAL MUST BE MOVED BEFORE INSTALLATION. THIS WORK BY N.P.S.

Park	MANZANAR NHS		NATIONAL PARK SERVICE	Sheet
Area			DENVER SERVICE CENTER	of
Project	By	GOW	Checked	Pkg.
Feature (H) FRAMING @ LA DORR	Date	8-21-96	Date	Account

PREFERRED ALTERNATIVE

(H) SIDING TO MATCH SURROUNDING *

(E) FRAMING

(H) 2x6 D.F. FRAMING

(H) 3/4" CDX PLYWOOD

(N) 15# FELT

(H) V-GROOVE SIDING TO MATCH SURROUNDING. ALIGN GROOVES W/ ADJACENT (E) SIDING.

EXTERIOR

INTERIOR

(H) 5/8" x 12" J BOLT w/ C.I. WASHER

(H) 2x6 P.T. D.F. PLATE WET SET.

(H) 8"x12" CONC. FTG. w/ #4 REBAR TOP & BOTTOM

6" MIN

2"

12"

(E) CONC. RAMP

8"

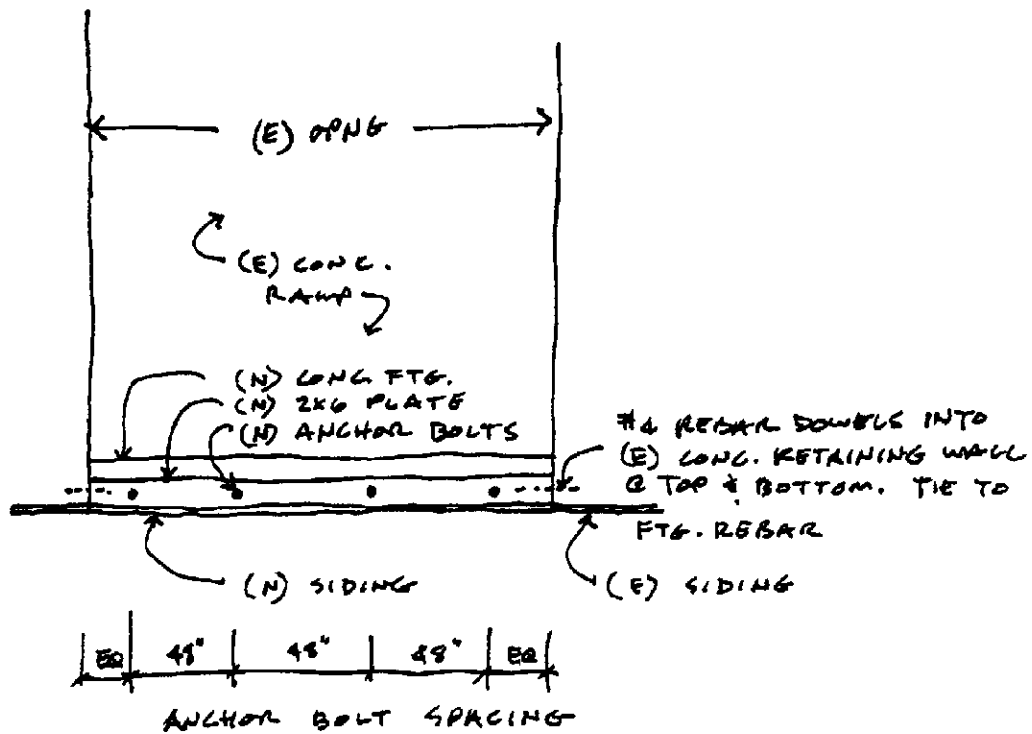
NOTE: OVERALL OPNG. DIMENSION:
14'-3" WIDE x 15'-1" HIGH
(E) FRAMING TO (E) FRAMING WIDE
(E) GRADE TO HEAD FRAMING HIGH

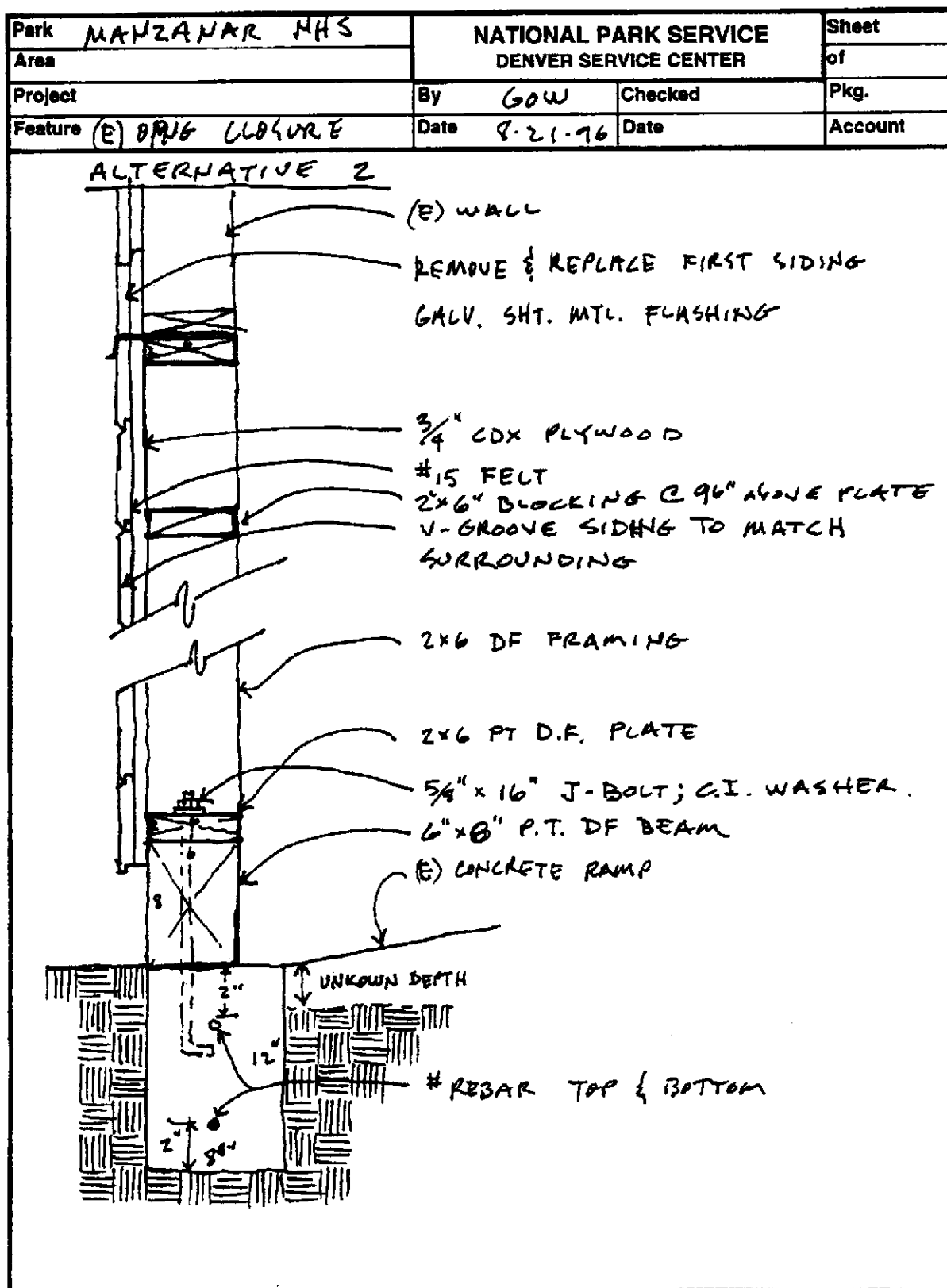
* REMOVE & REPLACE FIRST ROW SIDING ABOVE OPNG.

Park	MANZANAR NHS		NATIONAL PARK SERVICE DENVER SERVICE CENTER		Sheet
Area					of
Project		By	GOL	Checked	Pkg.
Feature	LG. OPNG CLASURE	Date	9.21.96	Date	Account

PLAN VIEW INFO

PREFERRED ALT.





Park	MANZANAR		NATIONAL PARK SERVICE DENVER SERVICE CENTER	Sheet	
Area				of	
Project		By	LOW	Checked	Pkg.
Feature	DOOR STORAGE RACK	Date	8-22-96	Date	Account

RM. 120 - DOOR STORAGE

7 1/2"

2 1/2"

5 1/2"

2 3/4"

2 1/2"

7 1/2"

2"

7"

2x4

2x6 NAILED TO STUD WALL

2x4 FRAMING D.F. STD. OR BTR.

2x4 D.F. PL. PLATE W/ 8" ANCHOR BOLT SET IN EPOXY

(N) PLATE W/ ANCHOR BOLTS AS SHOWN

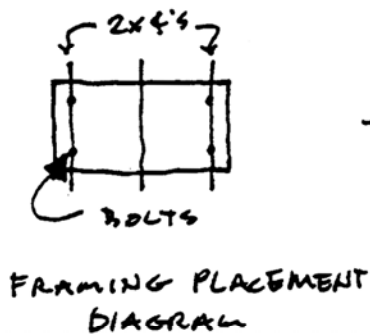
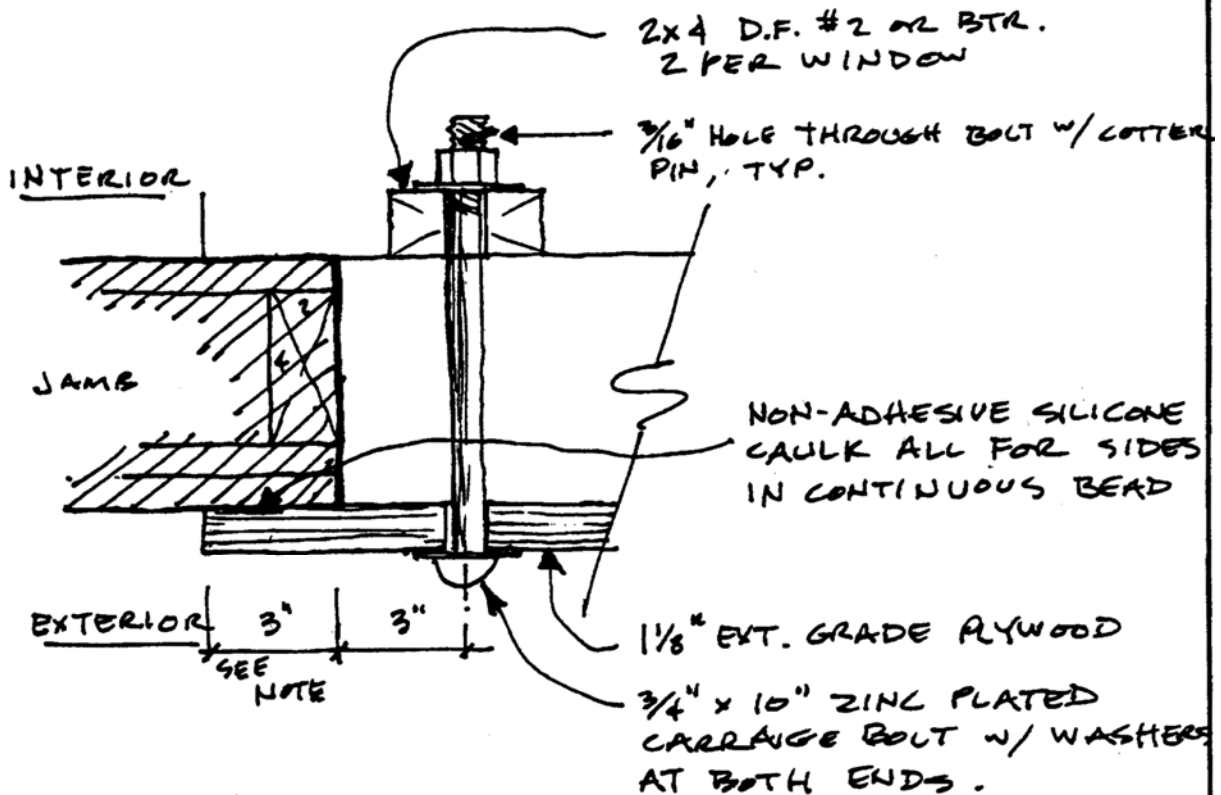
Park MANZANAR NHS		NATIONAL PARK SERVICE		Sheet
Area		DENVER SERVICE CENTER		of
Project		By GSW	Checked	Pkg.
Feature LOWER WINDOWS		Date 8.22.96	Date	Account

WINDOW NO.	SECURITY MEASURE
1 & 2	NONE NECESSARY.
3 A, B, C	REMOVE (E) PLYWOOD, INSTALL BOARD-UP ASSEMBLY.
4A, B, C	NONE NECESSARY
4D	REMOVE (E) METAL GRATE, REMOVE PLYWOOD WINDOW, INSTALL BOARD-UP ASSEMBLY, REINSTALL METAL GRATE.
5A	NONE NECESSARY.
5B	REMOVE A/C UNIT & PLYWOOD, INSTALL BOARD-UP ASSEMBLY.
5C	REMOVE (E) PLYWOOD, REMOVE WINDOW, INSTALL (N) BOARD-UP ASSEMBLY.
5E & 5G-M 5E & 5G-M 9 WINDOWS	REMOVE OVERLAPPING (E) METAL GRATE, REMOVE PLYWOOD, REMOVE WINDOW, INSTALL BOARD-UP ASSEMBLY, REINSTALL METAL GRATE . GRATES 3-6 REMOVE & DISCARD.
5D, G	THE SAME AS ABOVE EXCEPT REINSTALL METAL grate over window 5P.

Park MANZANAR NHS		NATIONAL PARK SERVICE		Sheet
Area		DENVER SERVICE CENTER		of
Project	By GDW	Checked	Pkg.	
Feature LOWER WINDOWS	Date 8.22.96	Date	Account	
WINDOW NO.	SECURITY MEASURING			
6 & 7	REMOVE (6) PLYWOOD, INSTALL BOARD-UP ASSEMBLY			
8 & 9	NONE NECESSARY.			
10 & 11	NONE NECESSARY.			
12 & 13	SEE ATTACHED PAGES ON UPPER WINDOWS.			

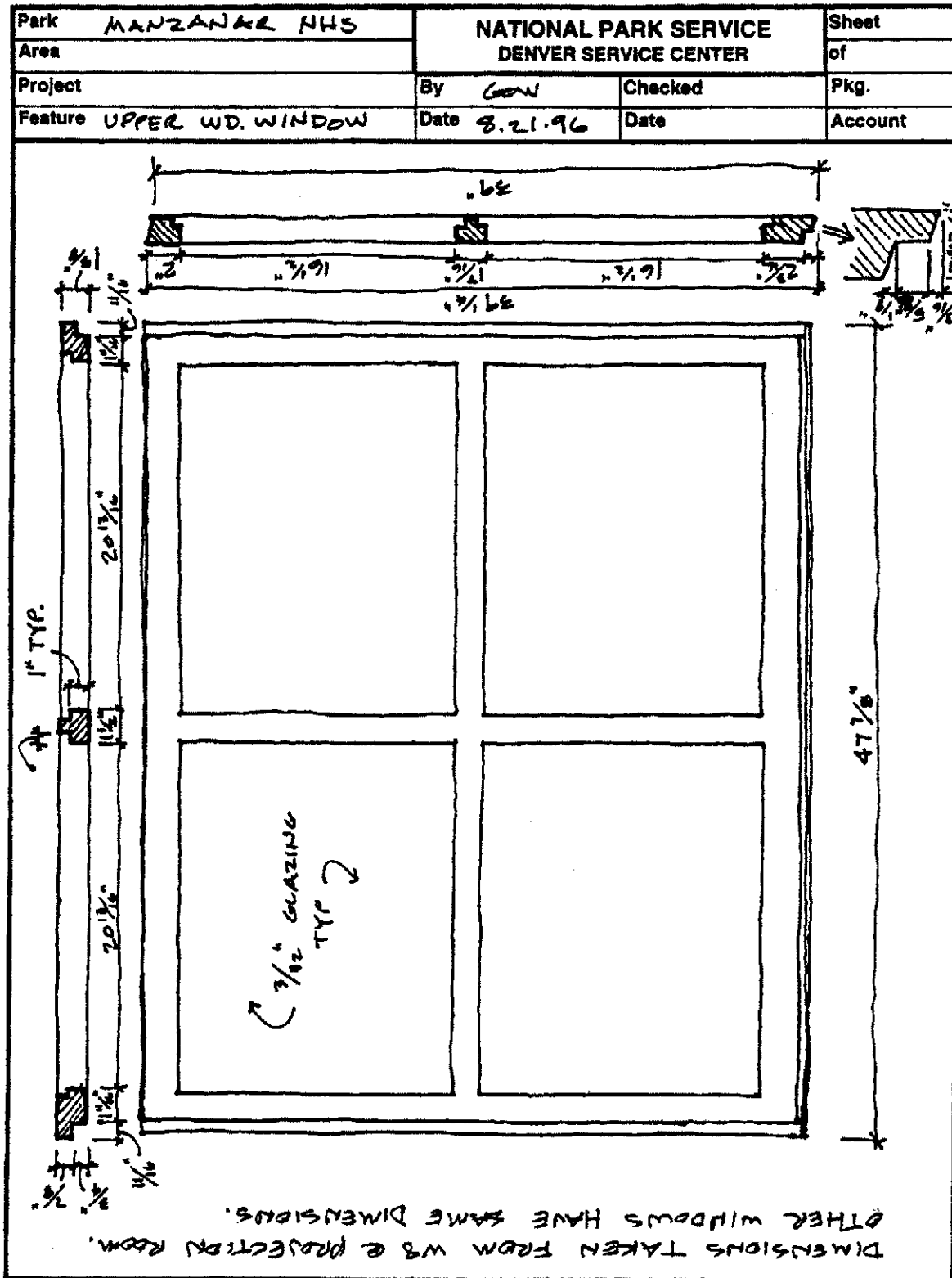
Park MANZANAR NHS	NATIONAL PARK SERVICE		Sheet
Area	DENVER SERVICE CENTER		of
Project	By GOW	Checked	Pkg.
Feature LOWER WINDOW BOARD-UP	Date 8.22.16	Date	Account

■ JAMB DETAIL - HEAD & SILL SIM.



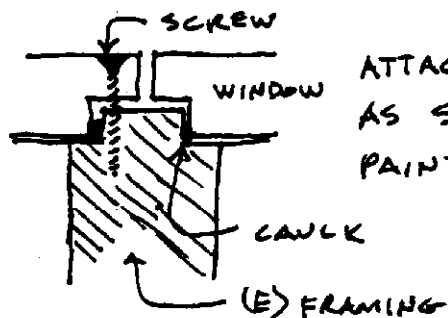
NOTES: 4 BOLTS PER WINDOW PLACED
AS SHOWN. APPLY 1 COAT PRIMER
AND ONE COAT FINISH PAINT TO
PLYWOOD EDGES & EXTERIOR FACE
BEFORE INSTALLATION. APPLY
SECOND FINISH COAT PAINT AFTER
INSTALLATION.

[illegible]



Park MANZANAR NHS	NATIONAL PARK SERVICE DENVER SERVICE CENTER		Sheet
Area			of
Project	By GOW	Checked	Pkg.
Feature UPPER WINDOWS	Date 8.22.76	Date	Account

- SET FIXED WINDOWS IN NON-ADHESIVE SILICONE CAULK, CONTINUOUS @ ALL FOUR EDGES:



ATTACH WINDOW w/ BRASS WD. SCREW AS SHOWN. COUNTERSINK, FILL $\frac{1}{2}$ PAINT OVER.

- REMOVE $\frac{1}{2}$ & REPLACE ALL UPPER WINDOWS ON SOUTH ELEVATION. (N) WINDOWS TO MATCH ORIGINALS. IN DIMENSION $\frac{1}{2}$ JOINERY. RETAIN UNBROKEN GLAZING FOR USE IN ~~REPLACEMENT~~ NORTH WINDOWS. $\frac{1}{2}$ STORAGE BY N.P.S.

APPENDIX F: FURNACE FLUE AND VENT DETAILS

Details of furnace flue enclosures and vent details in Projection Room and furnace rooms originally constructed in part with asbestos materials, recorded by George Voyta, August 1996, before asbestos abatement work.

"MANZANAR AUDITORIUM" ASBESTOS DETAILS

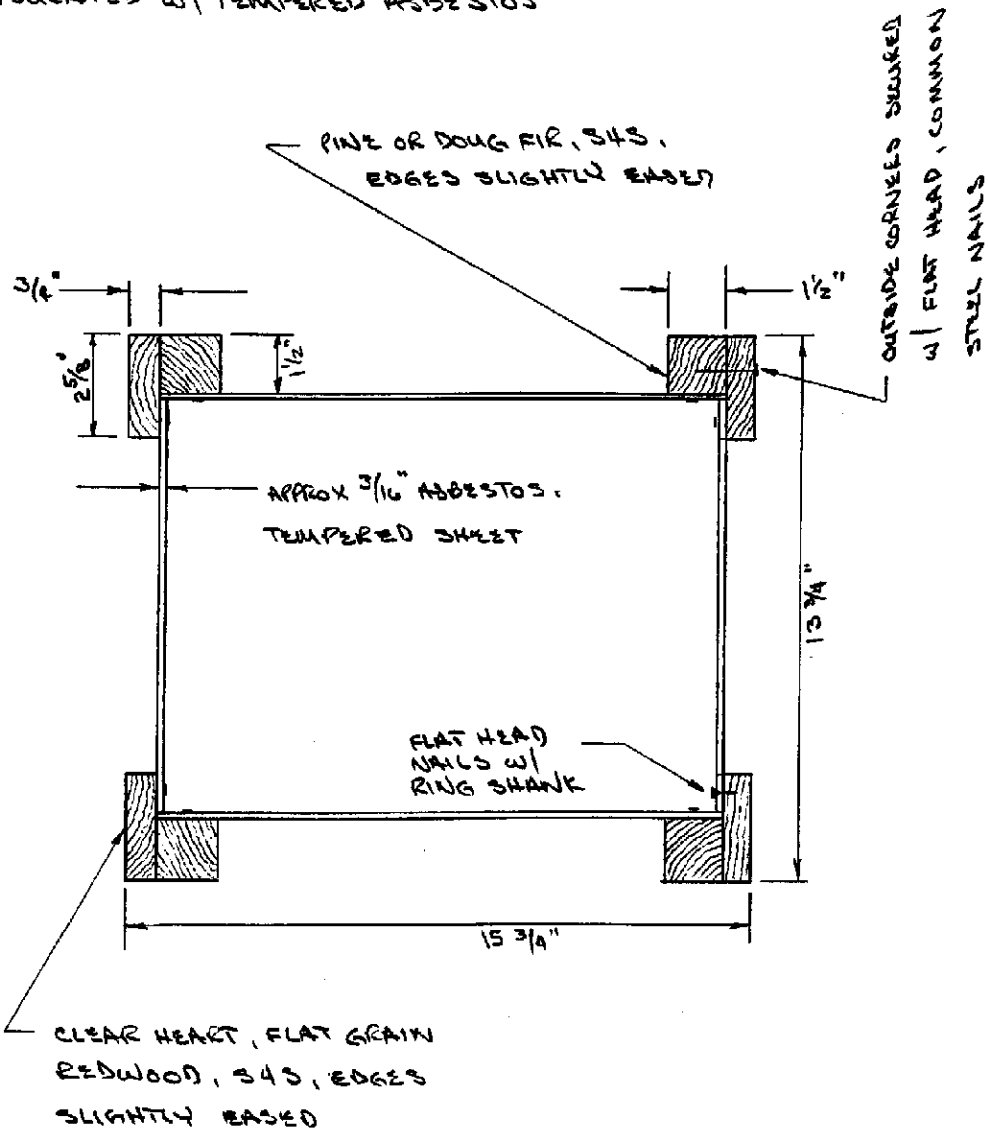
THE FOLLOWING SKETCHES OF ASBESTOS DETAILS WERE DONE SHORTLY BEFORE THE ASBESTOS REMOVAL CONTRACT TOOK PLACE. THIS INFORMATION WILL BE USEFUL IN THE EVENT THESE FEATURES ARE TO BE RECREATED IN THE FUTURE, USING SOME SIMILAR APPEARING MATERIAL.

AUGUST 2ND, 96
MANIZ AUDITOR
PAGE # 1

AUDITORIUM, MANIZMAR
Room #205 FURNACE FLUE DETAIL

DURING NEXT MONTHS SCHEDULED "ASBESTOS REMOVAL" AT MANIZ, A FEW BUILDING DETAILS MAY BE LOST. AMONG THESE IS THE ASBESTOS INSULATED, FLUE COVER. IT IS ASSEMBLED IN SUCH A MANNER, THAT ONCE THE PRESSED ASBESTOS PANELS ARE REMOVED ... THE FOUR TRIM BOARD CORNERS WILL NOT REMAIN IN PLACE. THIS IS ASSUMING THEY SURVIVE THE PROCESS OF ASBESTOS REMOVAL.

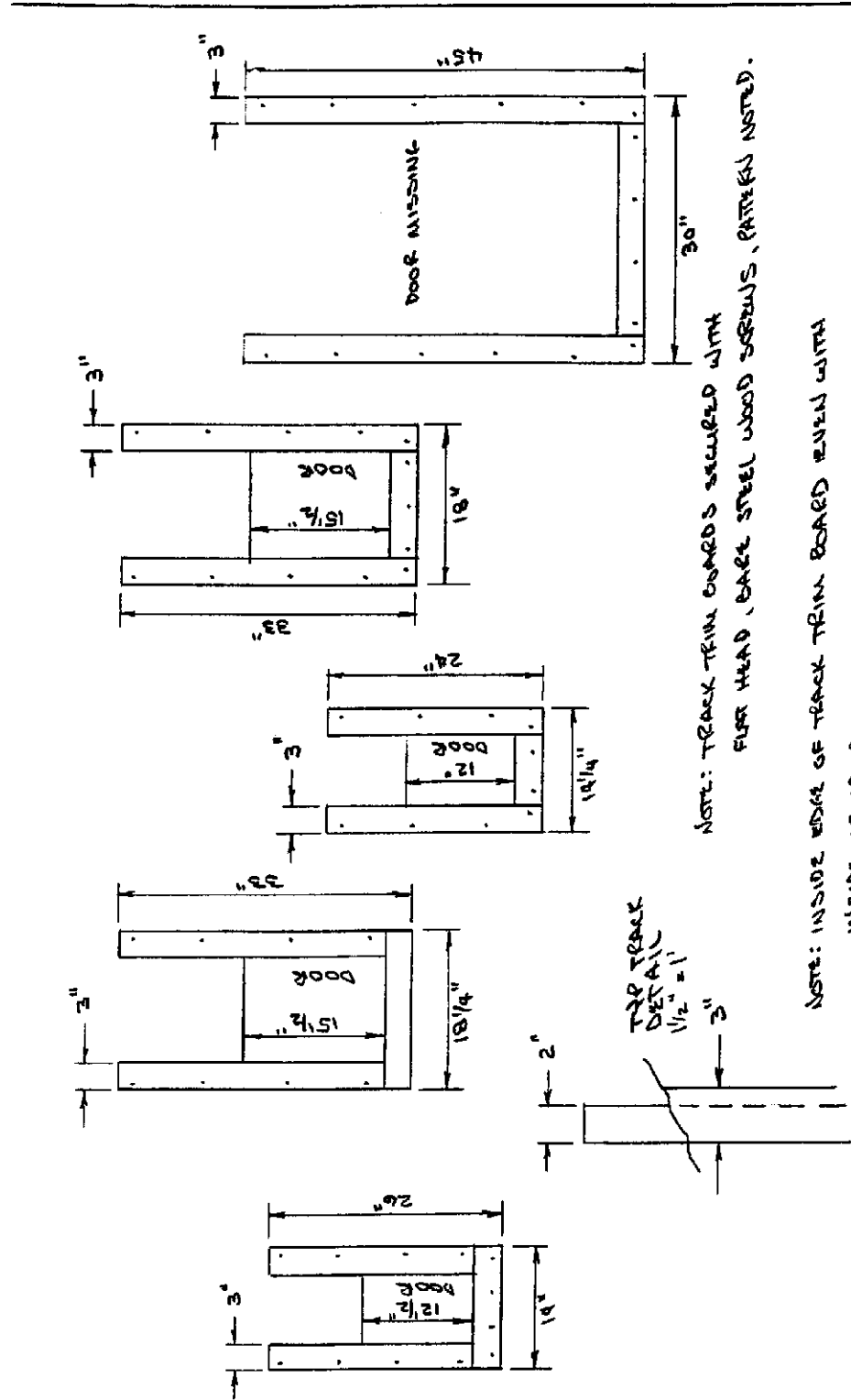
THE ATTACHED SKETCH REPRESENTS THE TYPICAL FLUE ENCLOSURE SYSTEM USED THROUGHOUT THE BUILDING. I BELIEVE SOME ENCLOSURES WERE PAINTED, WHILE OTHERS WERE LEFT BARE WOOD.

MAN/2 AUDITORIUM
ROOM # 205TYPICAL FURNACE FLUE ENCLOSURE
INSULATED W/ TEMPERED ASBESTOS

AUG 11, 1960 3"=1' "ASBESTOS DETAIL SECTION" DRWN. GEO. VOTTA

MAZANNAE AUDITORIUM
PROTECTION ROOM
201, EAST ELEVATION

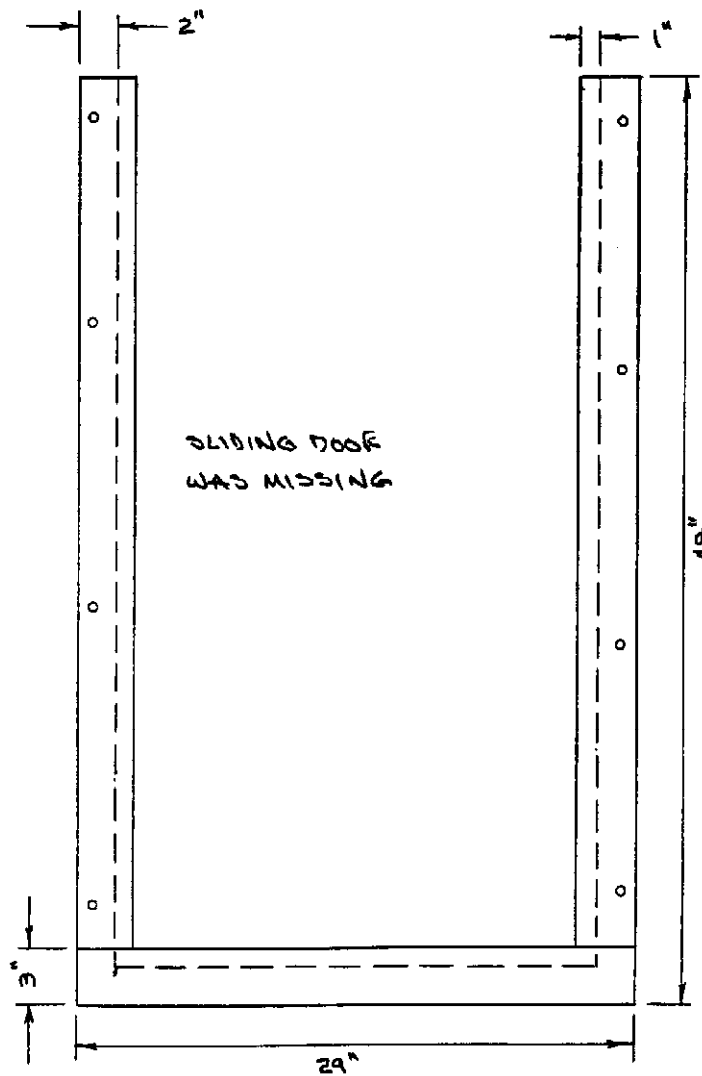
" ORIGINAL SLIDING DOOR VENTS
MADE OF TEMPERED ASBESTOS



AUGUST 11, 1946 "ASBESTOS REIN. DETAIL" SCALE 3/4" = 1' G.W. JOTTA

"
ORIGINAL SLIDING DOOR UNIT
MADE OF TEMPERED ASBESTOS

MANZANAR AUTOMOBILE
FURNACE ROOM
#104, SOUTH ELEVATION



AUG 11, 1996

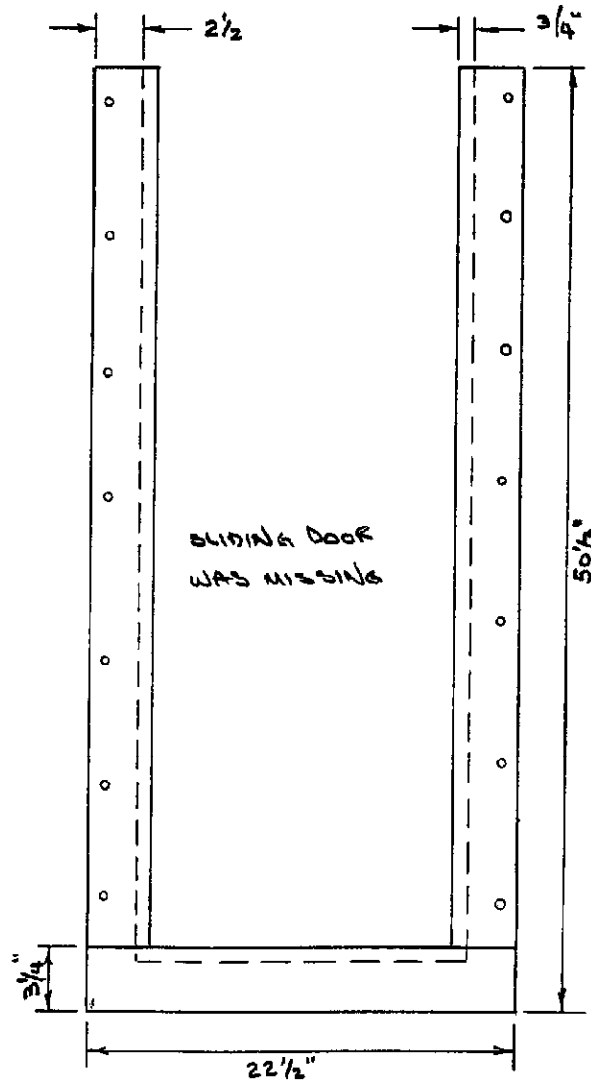
1 1/2" = 1'

"ASBESTOS ELEV. DETAIL"

DRAWN BY VOTTA

ORIGINAL SLIDING DOOR VENT
MADE OF TEMPERED ASBESTOS

MANZANAR AUTODROM
FURNACE ROOM
104, EAST ELEVATION



AUG 11, 1996

1/2" = 1'

"ASBESTOS ELEV. DETAIL"

DRAWN BY G. VORTA

APPENDIX G: EXISTING FINISHES SCHEDULE

DEVA-004-35

AUDITORIUM BUILDING MANZANAR NATIONAL HISTORIC SITE

RM#	CEILING	N. WALL	E. Wall	S. WALL	W. WALL	FLOOR	MISC.
101	STAIR	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	OLD CONC.	CLOSET
102	GYP. BD. (PAINT)	PAINT. VERT BD.	PAINT. VERT BD.	PAINT. VERT BD.	PAINT. VERT BD.	OLD CONC.	ENTRY
	GYP.						
103	BD, STAIR, PAINT ED SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	OLD CONC.	TICKET OFF.
	RNDM UNPAINTED SHIPLAP	RNDM UNPAINTED SHIPLAP	RNDM UNPAINTED SHIPLAP	RNDM UNPAINTED SHIPLAP	RNDM UNPAINTED SHIPLAP	LIN UNFIN. WOOD FLOOR	FURNACE
104	SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	NEW CONC.	(POOR)
105	CELOTEX	PAINTED. SHIPLAP	NONE	PAINTED. SHIPLAP	PAINTED. SHIPLAP	NEW CONC.	
	CELOTEX	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	NEW CONC.	
106	(POOR)	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	UNFIN. WOOD FLOOR	
107	CELOTEX	PAINTED. SHIPLAP	CELOTEX	PAINTED. SHIPLAP	NONE	UNFIN. WOOD FLOOR	
	(POOR)	PAINTED. SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	OLD CONC., SL ON FL	JAN CL
108	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	OLD CONC.	REST RM
109	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	UNFIN. WOOD FLOOR LIN	LOCKER RM
	PAINTED. SHIPLAP, CELOTEX EX. GYP. BD., P	PAINTED. SHIPLAP, UNPAINTED ED SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	WOOD FLOOR, PAINTED	
110	12x12 ACST TILE	PAINTED. SHIPLAP, CELOTEX & BATTS	PAINTED. SHIPLAP, CELOTEX & BATTS	CELOTEX, CELOTEX & BATTS	PAINTED. SHIPLAP, CELOTEX & BATTS	WOOD FLOOR, UNPAINTED	
111	CELOTEX P	CELOTEX	PAINTED. SHIPLAP	PAINTED. SHIPLAP	PAINTED. SHIPLAP	WOOD FLOOR, UNPAINTED	
112	CELOTEX P	PAINT. VERT BD.	PAINT. VERT BD.	PAINT. VERT BD.	PAINT. VERT BD.	WOOD FLOOR, UNPAINTED	
113	CELOTEX P					OLD CONC., UNPAINTED WOOD FLOOR, STAIR	STAIRWELL
114	GYP. BD.	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	OLD CONC.	BOILER RM
115	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	OLD CONC.	

DEVA-004-35

AUDITORIUM BUILDING
MANZANAR NATIONAL HISTORIC SITE

RM#	CEILING	N. WALL	E. Wall	S. WALL	W. WALL	FLOOR	MISC.
116	WOOD FRAMING	PAINT. VERT BD., GYP. BD.	WOOD FRAMING	WOOD FRAMING	VARN. WOOD FLOOR	OLD CONC., NEW RAMP	UNDER STAGE
117	GYP. BD.	GYP. BD.	GYP. BD.	WOOD FRAMING	GYP. BD. P	OLD CONC.	
118	CELOTEX	PAINT. VERT BD.	PAINT. VERT BD.	PAINT. VERT BD.	PAINT. VERT BD., WOOD FLOOR, PAINTED	UNPAINTED WOOD FLOOR, NEW CONC., UNPAINTED D WOOD FLOOR	STAGE
119	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING, VARN. WOOD FLOOR	OLD CONC., NRMP	
120	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	OLD CONC.	BOILER RM
121	CELOTEX P	PAINT. VERT BD.	PAINTED. SHIPLAP	PAINT. VERT BD.	PAINT. VERT BD.	NEW CONC.	HALL
122	GYP. BD.	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	UNPAINTED WOOD FLOOR, STAIR	NEW CONC.	STAIRWELL
123	CELOTEX (POOR COND.)	PAINT. HORIZ. AND VERT BD.	PAINT. HORIZ. AND VERT BD.	PAINT. HORIZ. AND VERT BD.	PAINT. HORIZ. AND VERT BD.	NEW CONC.	AUD/GYM
201	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	OLD CONC.	PROJ PROJ RM
202	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	UNPAINTED SHIPLAP	OLD CONC.	FILM REW
203	GYP. BD., PAINTED	N/A	PAINT. VERT BD.	N/A	PAINT. VERT BD.	WOOD FLOOR, (PAINTED)	STAIRWELL
204	GYP. BD., PAINTED	GYP. BD., PAINTED	GYP. BD., PAINTED	GYP. BD., PAINTED	GYP. BD., PAINTED	WOOD FLOOR, (PAINTED)	G. OFFICE
205	GYP. BD., PAINTED	GYP. BD., PAINTED	GYP. BD., PAINTED	GYP. BD., PAINTED	GYP. BD., PAINTED	WOOD FLOOR, PAINTED	G. STORAGE
206	CELOTEX	PAINT. VERT BD.	PAINT. VERT BD.	N/A	PAINT. VERT BD.	WOOD FLOOR, PAINTED	STAGE
207	GYP. BD., PAINTED	N/A	PAINT. VERT BD.	N/A	PAINT. VERT BD.	WOOD FLOOR, PAINTED	STAIRWELL

DEVA-004-35

AUDITORIUM BUILDING
MANZANAR NATIONAL HISTORIC SITE

RM#	CEILING	N. WALL	E. Wall	S. WALL	W. WALL	FLOOR	MISC.
208	GYP. BD., PAINTED	GYP. BD., PAINTED	GYP. BD., PAINTED	GYP. BD., PAINTED	GYP. BD., PAINTED	WOOD FLOOR, PAINTED	DRESS
209	GYP. BD.PT	PAINT. VERT BD.	GYP. BD.PT	GYP. BD.PT	GYP. BD.PT	WOOD FLOOR (PAINTED)	DR STOR
210	CELOTEX	N/A	PAINT. VERT BD.	PAINT. VERT BD.	PAINT. VERT BD.	WOOD FLOOR	STAGE
211	GYP. BD.	PAINT. VERT BD.	PAINT. VERT BD.	PAINT. VERT BD.	PAINT. VERT BD.	STAIR, WOOD FLOOR	STAIRWELL
212	GYP. BD.	PAINT. VERT BD.	PAINT. VERT BD.	GYP. BD.	GYP. BD.	STAIR	STAIRWELL
301	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FLOOR	
302	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FRAMING	WOOD FLOOR	

APPENDIX H: MECHANICAL SYSTEMS DATA

Mechanical Systems - General

The following items represent general information and requirements pertinent to the analysis and design of mechanical systems and related building components for the Manzanar Auditorium building.

Climatic Data Climatic data used for calculating space cooling and heating loads for the Manzanar Auditorium building are as follows:

Design conditions for Independence, California (taken from ASHRAE Publication SPCDX, "Climatic Data for Region X, Arizona, California, Hawaii, Nevada") -

Latitude - 36.8°N

Elevation - 3,950'

Winter Design -

Outdoor Temperature (0.2% Design) -	19°F
Indoor Temperature (office and support spaces) -	72°F
Indoor Temperature (gym and stage) -	65°F
Heating Degree Days -	3,932

Summer Design -

Outdoor Temperature, Dry Bulb (0.5% Design) -	101°F
Mean Coincident Outdoor Wet Bulb Temperature (0.5% Design) -	60°F
Indoor Temperature (office and support spaces) -	75°F
Indoor Temperature (gym and stage) -	80°F

Domestic Water Conservation Plumbing fixtures and fittings shall be selected to comply with the following criteria (NPS Tech Bulletin 92-1 recommendations) to insure water and energy conservation:

Water Closets -	1.6 gallons per flush
Urinals -	1.0 gallons per flush
Showerheads -	2.5 gallons per minute at 80 psi
Kitchen Faucets -	2.2 gallons per minute at 60 psi
Lavatories (residential) -	2.2 gallons per minute at 60 psi

Heating and Ventilating Systems The design of the heating, ventilating, and air conditioning systems shall conform to the requirements of the 1997 Uniform Mechanical Code (UMC).

Plumbing and Domestic Water Heating Systems The design of the plumbing and domestic water heating systems shall conform to the requirements of the 1997 Uniform Plumbing Code (UPC). The building water supply shall be individually metered in accordance with NPS Staff Directive 78-10, which requires that the water service to all NPS buildings and other facilities be metered at the use point.

APPENDIX I: STRUCTURAL CALCULATIONS

Park	MANZ (DEVA 004-35)		NATIONAL PARK SERVICE DENVER SERVICE CENTER	Sheet	1
Area	AUDITORIUM			of	
Project	By	E. SMITH	Checked	Pkg.	
Feature	Date	9-21-98	Date	Account	

LOADS (UBC 1997)

WIND - 70 mph, Exposure C

SEISMIC - ZONE 4

SNOW - 30 psf
 ↑ From Public Works Dept. 760-878-0209

$$P_f = C_e I P_g = 10.6(1.0)(30) = 18 \text{ psf}$$

ROOF LIVE LOAD - $L_r = 20 \text{ psf}$

ATTIC LIVE LOAD - 10 psf

ATTIC DEAD LOAD - 10 psf (Assumed)

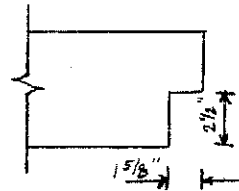
ROOF DEAD LOAD - 10 psf (Assumed)

Park	MANZ (DEVA 004-35)		NATIONAL PARK SERVICE DENVER SERVICE CENTER	Sheet	2
Area	AUDITORIUM			of	
Project		By	E. SMITH	Checked	
Feature		Date	9-22-98	Date	
<p style="text-align: center;">CAPACITY OF ^{ROOF} PURLINS</p> <p>ASSUME DF No. 1</p> <p>1 1/2" x 9" @ 24" O.C.</p> $F_b' = F_b \cdot C_D \cdot C_M \cdot C_L \cdot C_F \cdot C_r = (1000)(1)(1)(1)(1.1)(1.15) = 1265 \text{ psi}$ $M = F_b' \cdot S = (1265 \text{ psi}) \left(\frac{1.5(9)^2}{6} \right) \left(\frac{1}{12} \right) = 2135 \text{ ft} \cdot \text{lb}$ $M = \frac{w l^2}{8}$ $w = \frac{8M}{l^2} = \frac{(8)(2135 \text{ ft} \cdot \text{lb})}{(16 \text{ ft})^2} = 67 \text{ plf}$ $\frac{67 \text{ plf}}{2'} = \boxed{33 \text{ psf}}$					

Park MANE (DEVA 004-35)	NATIONAL PARK SERVICE DENVER SERVICE CENTER		Sheet 3
Area AUDITORIUM			of
Project	By E. SMITH	Checked	Pkg.
Feature	Date 9-22-98	Date	Account

CAPACITY OF CEILING JOIST

1 1/2" x 5 3/8" @ 24" w/ notch



F_b :

$$R_B^2 = \frac{I_c d}{b^2} = \frac{[(1.63)(8)(12) + (3)(5 \frac{3}{8})](5 \frac{3}{8})}{(1.5)^2} = 412$$

$$F_{bE} = \frac{K_{bE} E'}{R_B^2} = \frac{(0.438)(1700,000)}{412} = 1806 \text{ psi}$$

$$F_b^* = F_b \cdot C_D \cdot C_M \cdot C_F \cdot C_r = (1000)(1)(1)(1.3)(1.15) = 1495 \text{ psi}$$

$$C_L = 0.88$$

$$F_b' = (0.88)(1495) = 1317 \text{ psi}$$

$$M = F_b' \cdot S = (1317 \text{ psi}) \left(\frac{1.5)(5.375)^2}{6} \right) \left(\frac{1}{12} \right) = 793 \text{ ft-lb}$$

$$w = \frac{8M}{L^2} = \frac{(8)(793)}{16^2} = 25 \text{ plf}$$

$$\frac{25 \text{ plf}}{2'} = \boxed{12 \text{ psf}} \quad \leftarrow \text{CONTROLS}$$

$$F_v' = F_v \cdot C_D \cdot C_M = (95)(1)(1) = 95 \text{ psi}$$

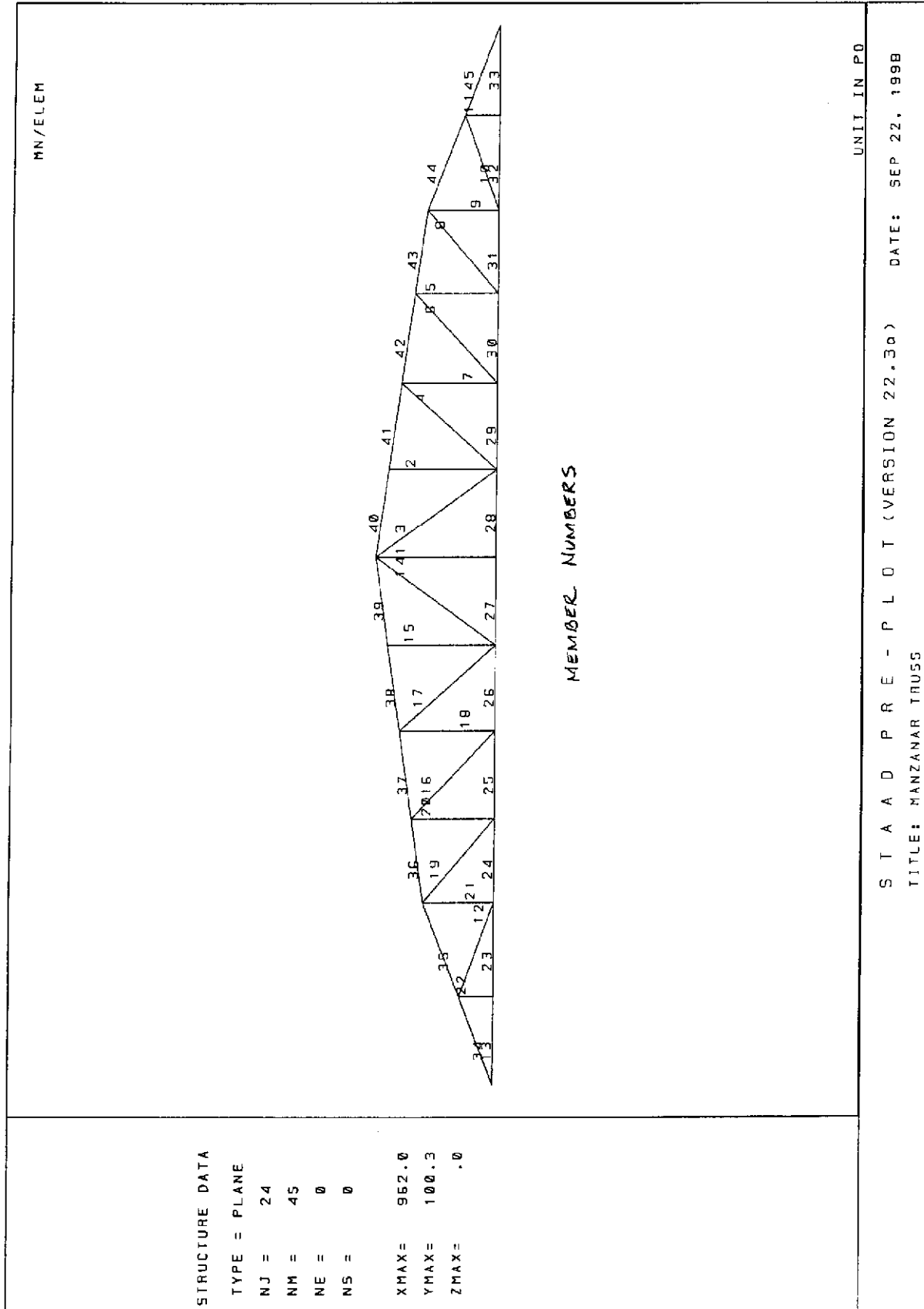
$$V = \frac{2}{3} F_v' \cdot A = \left(\frac{2}{3} \right) (95 \text{ psi}) (2.875)(1.5) = 273 \text{ lb}$$

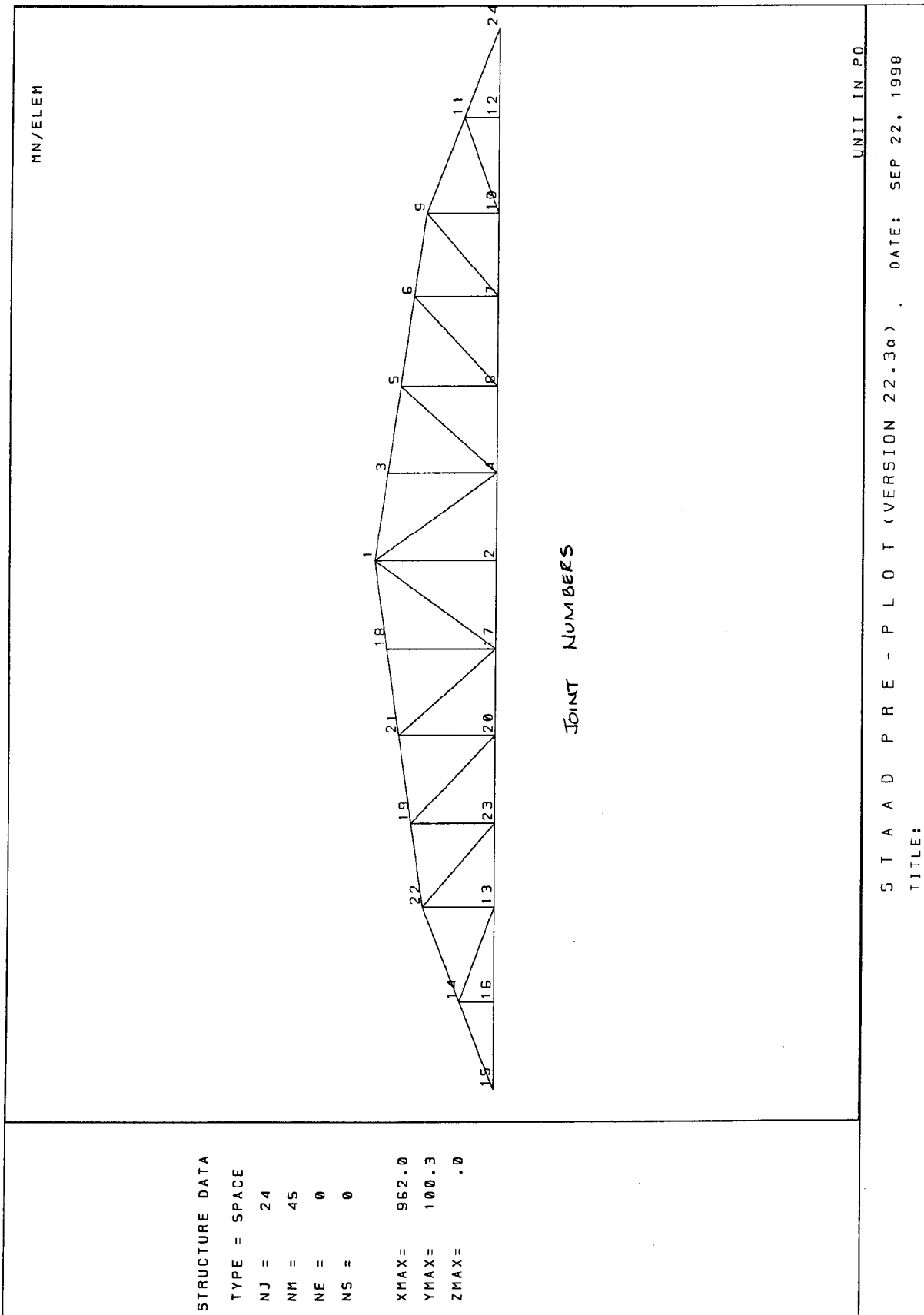
$$w = \frac{2V}{L} = \frac{(2)(273)}{16} = 34 \text{ plf}$$

$$\frac{34 \text{ plf}}{2'} = 17 \text{ psf}$$

$$4240 = (16)(12) / 240 = 0.8$$

$$\Delta = \frac{5wL^4}{384EI} \rightarrow 0.8 = \frac{(5)(w)(16)^4(1728)}{(384)(1700000)(1.5)(5.375)^3} \rightarrow w = 18 \text{ psf (D+L)}$$





truss.anl

PAGE NO. 1

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*****
*
*      S T A A D - III
*      Revision 22.3a
*      Proprietary Program of
*      Research Engineers, Inc.
*      Date=   SEP 28, 1998
*      Time=   7:46:25
*
*      USER ID: nps
*****

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1. STAAD PLANE MANZANAR AUDITORIUM - TRUSS
2. *
3. *
4. * NOTE: THIS ANALYSIS DOES NOT EVALUATE ALL POSSIBLE LOAD
5. * COMBINATIONS. IT WAS RUN AS A PRELIMINARY CHECK OF THE
6. * STRESS IN THE TRUSS MEMBERS AND ADEQUATELY DEMONSTRATES
7. * THAT MANY MEMBERS ARE SIGNIFICANTLY OVERSTRESSED.
8. *
9. *
10. INPUT WIDTH 72
11. UNIT FEET KIP
12. JOINT COORDINATES
13. 1 40.083 8.356 .000
14. 2 40.083 .000 .000
15. 3 46.770 7.488 .000
16. 4 46.770 .000 .000
17. 5 53.308 6.639 .000
18. 6 60.037 5.765 .000
19. 7 60.037 .000 .000
20. 8 53.308 .000 .000
21. 9 66.341 4.946 .000
22. 10 66.341 .000 .000
23. 11 73.474 2.394 .000
24. 12 73.474 .000 .000
25. 13 13.826 .000 .000
26. 14 6.693 2.394 .000
27. 15 .000 .000 .000
28. 16 6.693 .000 .000
29. 17 33.397 .000 .000
30. 18 33.397 7.488 .000
31. 19 20.130 5.765 .000
32. 20 26.859 .000 .000
33. 21 26.859 6.639 .000
34. 22 13.826 4.946 .000
35. 23 20.130 .000 .000
36. 24 80.167 .000 .000
37. MEMBER INCIDENCES
38. 1 1 2
39. 2 3 4
40. 3 1 4
41. 4 5 4
MANZANAR AUDITORIUM - TRUSS

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-- PAGE NO. 2

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*
42. 5 6 7
43. 6 6 8
44. 7 8 5
45. 8 9 7
46. 9 10 9
47. 10 10 11
48. 11 11 12
49. 12 13 14
50. 13 15 16
51. 14 1 17
52. 15 18 17
53. 16 19 20
54. 17 21 17
55. 18 20 21
56. 19 22 23
57. 20 19 23
58. 21 13 22
59. 22 14 16
60. 23 16 13
61. 24 13 23
62. 25 23 20
63. 26 20 17

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By inspection, most top chord
and bottom chord members
are overstressed, and several
connections are completely
deficient. (See sample
forces / stresses indicated.)

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64.      27      17      2
65.      28      2      4
66.      29      4      8
67.      30      8      7
68.      31      7     10
69.      32     10     12
70.      33     12     24
71.      34     15     14
72.      35     14     22
73.      36     22     19
74.      37     19     21
75.      38     21     18
76.      39     18      1
77.      40      1      3
78.      41      3      5
79.      42      5      6
80.      43      6      9
81.      44      9     11
82.      45     11     24
83. UNIT INCHES KIP
84. MEMBER PROPERTY AMERICAN
85. * CERTAIN TRUSS MEMBERS ARE DOUBLED OR TRIPLED.  THESE MEMBERS
86. * HAVE ZD = 3 OR 4.5 ACCORDINGLY.
87. 13 23 TO 33 36 TO 43 PRI YD 9. ZD 3.
88. 34 35 44 45 PRI YD 9. ZD 4.5
89. 3 6 8 14 16 19 PRI YD 5.5 ZD 3.
90. 1 2 4 5 7 9 TO 12 15 17 18 20 TO 22 PRI YD 5.5 ZD 1.5
91. MEMBER RELEASE
92. 13 34 36 40 44 START FZ
93. 33 35 39 43 45 END FZ
94. MEMBER TRUSS
95. 1 TO 12 14 TO 22
96. CONSTANT
97. E 1700. ALL
    MANZANAR AUDITORIUM - TRUSS
*
98. SUPPORT
99. 15 PINNED
100. 24 FIXED BUT FX FZ MX MY MZ
101. UNIT FEET POUND
102. LOAD 1 DEAD + LIVE
103. *ROOF DEAD
104. MEMBER LOAD
105. 34 TO 45 UNI GY -160.
106. *ATTIC DEAD
107. MEMBER LOAD
108. 13 23 TO 33 UNI GY -160.
109. *ROOF LIVE
110. MEMBER LOAD
111. 34 TO 45 UNI GY -320.
112. *ATTIC LIVE
113. MEMBER LOAD
114. 13 23 TO 33 UNI GY -160.
115. PERFORM ANALYSIS

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-- PAGE NO. 3

PROBLEM STATISTICS

```

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 24/ 45/ 2
ORIGINAL/FINAL BAND-WIDTH = 17/ 3
TOTAL PRIMARY LOAD CASES = 1, TOTAL DEGREES OF FREEDOM = 69
SIZE OF STIFFNESS MATRIX = 828 DOUBLE PREC. WORDS
REQRD/AVAIL. DISK SPACE = 12.07/ 6651.8 MB, EXMEM = 1958.4 MB

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++ Processing Element Stiffness Matrix.      7:46:26
++ Processing Global Stiffness Matrix.      7:46:26
++ Processing Triangular Factorization.      7:46:26
++ Calculating Joint Displacements.          7:46:26
++ Calculating Member Forces.               7:46:26

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116. UNIT INCHES POUND
117. PRINT MEMBER FORCES ALL
    MANZANAR AUDITORIUM - TRUSS
*

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-- PAGE NO. 4

MEMBER END FORCES STRUCTURE TYPE = PLANE

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ALL UNITS ARE -- POUN INCH

MEMBER	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	-2437.54	.00	.00	.00	.00	.00
		2	2437.54	.00	.00	.00	.00	.00
2	1	3	2661.90	.00	.00	.00	.00	.00
		4	-2661.90	.00	.00	.00	.00	.00
3	1	1	-9844.42	.00	.00	.00	.00	.00
		4	9844.42	.00	.00	.00	.00	.00
4	1	5	4192.54	.00	.00	.00	.00	.00
		4	-4192.54	.00	.00	.00	.00	.00
5	1	6	4902.44	.00	.00	.00	.00	.00
		7	-4902.44	.00	.00	.00	.00	.00
6	1	6	-3480.88	.00	.00	.00	.00	.00
		8	3480.88	.00	.00	.00	.00	.00
7	1	8	196.70	.00	.00	.00	.00	.00
		5	-196.70	.00	.00	.00	.00	.00
8	1	9	-10701.92	.00	.00	.00	.00	.00
		7	10701.92	.00	.00	.00	.00	.00
9	1	10	-4197.83	.00	.00	.00	.00	.00
		9	4197.83	.00	.00	.00	.00	.00
10	1	10	2252.76	.00	.00	.00	.00	.00
		11	-2252.76	.00	.00	.00	.00	.00
11	1	11	-456.32	.00	.00	.00	.00	.00
		12	456.32	.00	.00	.00	.00	.00
12	1	13	2252.71	.00	.00	.00	.00	.00
		14	-2252.71	.00	.00	.00	.00	.00
13	1	15	-78182.43	1862.11	.00	.00	.00	1641.57
		16	78182.43	279.65	.00	.00	.00	61906.51
14	1	1	-9845.00	.00	.00	.00	.00	.00
		17	9845.00	.00	.00	.00	.00	.00
15	1	18	2663.09	.00	.00	.00	.00	.00
		17	-2663.09	.00	.00	.00	.00	.00

MANZANAR AUDITORIUM - TRUSS

-- PAGE NO. 5

← Top chord - to - bottom
chord connection
force : 78.2 k

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- POUN INCH

MEMBER	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
16	1	19	-3480.90	.00	.00	.00	.00	.00
		20	3480.90	.00	.00	.00	.00	.00
17	1	21	4192.70	.00	.00	.00	.00	.00
		17	-4192.70	.00	.00	.00	.00	.00
18	1	20	196.62	.00	.00	.00	.00	.00
		21	-196.62	.00	.00	.00	.00	.00
19	1	22	-10701.85	.00	.00	.00	.00	.00
		23	10701.85	.00	.00	.00	.00	.00
20	1	19	4902.44	.00	.00	.00	.00	.00
		23	-4902.44	.00	.00	.00	.00	.00
21	1	13	-4197.88	.00	.00	.00	.00	.00
		22	4197.88	.00	.00	.00	.00	.00
22	1	14	-456.25	.00	.00	.00	.00	.00
		15	456.25	.00	.00	.00	.00	.00

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23	1	16	-78182.44	176.60	.00	.00	.00	-61906.52
		13	78182.44	2105.96	.00	.00	.00	-20666.09
24	1	13	-76046.79	1375.11	.00	.00	.00	20666.00
		23	76046.79	642.17	.00	.00	.00	7056.39
25	1	23	-84466.55	1061.33	.00	.00	.00	-7056.60
		20	84466.55	1091.95	.00	.00	.00	5820.51
26	1	20	-87109.95	976.21	.00	.00	.00	-5820.68
		17	87109.95	1115.95	.00	.00	.00	338.81
27	1	17	-78017.21	920.75	.00	.00	.00	-338.93
		2	78017.21	1218.77	.00	.00	.00	-11616.20
28	1	2	-78017.20	1218.87	.00	.00	.00	11616.48
		4	78017.20	920.97	.00	.00	.00	335.79
29	1	4	-87109.96	1115.99	.00	.00	.00	-335.69
		8	87109.96	976.17	.00	.00	.00	5821.07
30	1	8	-84466.52	1091.94	.00	.00	.00	-5821.12
		7	84466.52	1061.34	.00	.00	.00	7056.50
31	1	7	-76046.77	642.17	.00	.00	.00	-7056.47
		10	76046.77	1375.11	.00	.00	.00	-20666.11

MANZANAR AUDITORIUM - TRUSS

-- PAGE NO. 6

*

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- POUN INCH

MEMBER	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
32	1	10	-78182.52	2105.96	.00	.00	.00	20666.13
		12	78182.52	176.60	.00	.00	.00	61906.59
33	1	12	-78182.43	279.65	.00	.00	.00	-61906.69
		24	78182.43	1862.11	.00	.00	.00	-1641.62
34	1	15	83962.00	2596.45	.00	.00	.00	-1641.56
		14	-82812.88	616.19	.00	.00	.00	86098.98
35	1	14	80889.77	342.16	.00	.00	.00	-86099.11
		22	-79664.80	3081.68	.00	.00	.00	-38424.86
36	1	22	85454.35	2139.10	.00	.00	.00	38424.77
		19	-85061.22	886.82	.00	.00	.00	9339.44
37	1	19	88022.36	1391.13	.00	.00	.00	-9339.69
		21	-87602.83	1838.79	.00	.00	.00	-8885.69
38	1	21	85095.45	1699.98	.00	.00	.00	8885.62
		18	-84687.94	1438.26	.00	.00	.00	1467.83
39	1	18	85030.78	1205.42	.00	.00	.00	-1467.71
		1	-84614.14	2003.86	.00	.00	.00	-30831.29
40	1	1	84614.16	2003.96	.00	.00	.00	30831.38
		3	-85030.80	1205.80	.00	.00	.00	1460.71
41	1	3	84688.05	1438.37	.00	.00	.00	-1460.59
		5	-85095.57	1699.87	.00	.00	.00	-8883.39
42	1	5	87602.80	1838.75	.00	.00	.00	8883.25
		6	-88022.32	1391.17	.00	.00	.00	9338.94
43	1	6	85061.20	886.83	.00	.00	.00	-9338.93
		9	-85454.34	2139.09	.00	.00	.00	-38424.79
44	1	9	79664.85	3081.68	.00	.00	.00	38424.72
		11	-80889.81	342.16	.00	.00	.00	86099.10
45	1	11	82812.88	616.19	.00	.00	.00	-86099.05
		24	-83962.00	2596.45	.00	.00	.00	1641.61

MANZANAR AUDITORIUM - TRUSS

-- PAGE NO. 7

*

truss.anl

***** END OF LATEST ANALYSIS RESULT *****

118. PRINT MEMBER STRESSES ALL
 * MANZANAR AUDITORIUM - TRUSS

-- PAGE NO. 8

MEMBER STRESSES

ALL UNITS ARE POUN/SQ INCH

MEMB	LD	SECT	AXIAL	BEND-Y	BEND-Z	COMBINED	SHEAR-Y	SHEAR-Z
1	1	.0 1.00	295.5 T 295.5 T	.0 .0	.0 .0	295.5 295.5	.0 .0	.0 .0
2	1	.0 1.00	322.7 C 322.7 C	.0 .0	.0 .0	322.7 322.7	.0 .0	.0 .0
3	1	.0 1.00	596.6 T 596.6 T	.0 .0	.0 .0	596.6 596.6	.0 .0	.0 .0
4	1	.0 1.00	508.2 C 508.2 C	.0 .0	.0 .0	508.2 508.2	.0 .0	.0 .0
5	1	.0 1.00	594.2 C 594.2 C	.0 .0	.0 .0	594.2 594.2	.0 .0	.0 .0
6	1	.0 1.00	211.0 T 211.0 T	.0 .0	.0 .0	211.0 211.0	.0 .0	.0 .0
7	1	.0 1.00	23.8 C 23.8 C	.0 .0	.0 .0	23.8 23.8	.0 .0	.0 .0
8	1	.0 1.00	648.6 T 648.6 T	.0 .0	.0 .0	648.6 648.6	.0 .0	.0 .0
9	1	.0 1.00	508.8 T 508.8 T	.0 .0	.0 .0	508.8 508.8	.0 .0	.0 .0
10	1	.0 1.00	273.1 C 273.1 C	.0 .0	.0 .0	273.1 273.1	.0 .0	.0 .0
11	1	.0 1.00	55.3 T 55.3 T	.0 .0	.0 .0	55.3 55.3	.0 .0	.0 .0
12	1	.0 1.00	273.1 C 273.1 C	.0 .0	.0 .0	273.1 273.1	.0 .0	.0 .0
13	1	.0 1.00	2895.6 T 2895.6 T	.0 .0	40.5 1528.6	2936.2 4424.2	69.0 10.4	.0 .0
14	1	.0 1.00	596.7 T 596.7 T	.0 .0	.0 .0	596.7 596.7	.0 .0	.0 .0
15	1	.0 1.00	322.8 C 322.8 C	.0 .0	.0 .0	322.8 322.8	.0 .0	.0 .0
16	1	.0 1.00	211.0 T 211.0 T	.0 .0	.0 .0	211.0 211.0	.0 .0	.0 .0
17	1	.0 1.00	508.2 C 508.2 C	.0 .0	.0 .0	508.2 508.2	.0 .0	.0 .0

← Bottom chord stress

* MANZANAR AUDITORIUM - TRUSS

-- PAGE NO. 9

MEMBER STRESSES

ALL UNITS ARE POUN/SQ INCH

MEMB	LD	SECT	AXIAL	BEND-Y	BEND-Z	COMBINED	SHEAR-Y	SHEAR-Z
18	1	.0	23.8 C	.0	.0	23.8	.0	.0

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truss.anl								
		1.00	23.8 C	.0	.0	23.8	.0	.0
19	1	.0	648.6 T	.0	.0	648.6	.0	.0
		1.00	648.6 T	.0	.0	648.6	.0	.0
20	1	.0	594.2 C	.0	.0	594.2	.0	.0
		1.00	594.2 C	.0	.0	594.2	.0	.0
21	1	.0	508.8 T	.0	.0	508.8	.0	.0
		1.00	508.8 T	.0	.0	508.8	.0	.0
22	1	.0	55.3 T	.0	.0	55.3	.0	.0
		1.00	55.3 T	.0	.0	55.3	.0	.0
23	1	.0	2895.6 T	.0	1528.6	4424.2	6.5	.0
		1.00	2895.6 T	.0	510.3	3405.9	78.0	.0
24	1	.0	2816.5 T	.0	510.3	3326.8	50.9	.0
		1.00	2816.5 T	.0	174.2	2990.8	23.8	.0
25	1	.0	3128.4 T	.0	174.2	3302.6	39.3	.0
		1.00	3128.4 T	.0	143.7	3272.1	40.4	.0
26	1	.0	3226.3 T	.0	143.7	3370.0	36.2	.0
		1.00	3226.3 T	.0	8.4	3234.7	41.3	.0
27	1	.0	2889.5 T	.0	8.4	2897.9	34.1	.0
		1.00	2889.5 T	.0	286.8	3176.3	45.1	.0
28	1	.0	2889.5 T	.0	286.8	3176.4	45.1	.0
		1.00	2889.5 T	.0	8.3	2897.8	34.1	.0
29	1	.0	3226.3 T	.0	8.3	3234.6	41.3	.0
		1.00	3226.3 T	.0	143.7	3370.0	36.2	.0
30	1	.0	3128.4 T	.0	143.7	3272.1	40.4	.0
		1.00	3128.4 T	.0	174.2	3302.6	39.3	.0
31	1	.0	2816.5 T	.0	174.2	2990.8	23.8	.0
		1.00	2816.5 T	.0	510.3	3326.8	50.9	.0
32	1	.0	2895.6 T	.0	510.3	3405.9	78.0	.0
		1.00	2895.6 T	.0	1528.6	4424.2	6.5	.0
33	1	.0	2895.6 T	.0	1528.6	4424.2	10.4	.0
		1.00	2895.6 T	.0	40.5	2936.2	69.0	.0
34	1	.0	2073.1 C	.0	27.0	2100.2	64.1	.0
		1.00	2044.8 C	.0	1417.3	3462.0	15.2	.0
MANZANAR AUDITORIUM - TRUSS								
							-- PAGE NO.	10

← Top chord stress

MEMBER STRESSES

ALL UNITS ARE POUN/SQ INCH

MEMB	LD	SECT	AXIAL	BEND-Y	BEND-Z	COMBINED	SHEAR-Y	SHEAR-Z
35	1	.0	1997.3 C	.0	1417.3	3414.5	8.4	.0
		1.00	1967.0 C	.0	632.5	2599.5	76.1	.0
36	1	.0	3165.0 C	.0	948.8	4113.7	79.2	.0
		1.00	3150.4 C	.0	230.6	3381.0	32.8	.0
37	1	.0	3260.1 C	.0	230.6	3490.7	51.5	.0
		1.00	3244.5 C	.0	219.4	3463.9	68.1	.0
38	1	.0	3151.7 C	.0	219.4	3371.1	63.0	.0
		1.00	3136.6 C	.0	36.2	3172.8	53.3	.0
39	1	.0	3149.3 C	.0	36.2	3185.5	44.6	.0
		1.00	3133.9 C	.0	761.3	3895.1	74.2	.0
40	1	.0	3133.9 C	.0	761.3	3895.1	74.2	.0
		1.00	3149.3 C	.0	36.1	3185.4	44.7	.0
41	1	.0	3136.6 C	.0	36.1	3172.7	53.3	.0
		1.00	3151.7 C	.0	219.3	3371.0	63.0	.0

```

                                truss.anl
42   1   .0   3244.5 C   .0   219.3   3463.9   68.1   .0
      1.00  3260.1 C   .0   230.6   3490.7   51.5   .0

43   1   .0   3150.4 C   .0   230.6   3381.0   32.8   .0
      1.00  3165.0 C   .0   948.8   4113.7   79.2   .0

44   1   .0   1967.0 C   .0   632.5   2599.5   76.1   .0
      1.00  1997.3 C   .0   1417.3  3414.5   8.4   .0

45   1   .0   2044.8 C   .0   1417.3  3462.0   15.2   .0
      1.00  2073.1 C   .0    27.0   2100.2   64.1   .0

```

***** END OF LATEST ANALYSIS RESULT *****

119. PLOT BENDING FILE
 120. PLOT DISPLACEMENT FILE
 121. PRINT SUPPORT REACTIONS
 * MANZANAR AUDITORIUM - TRUSS

-- PAGE NO. 11

```

SUPPORT REACTIONS -UNIT POUN INCH   STRUCTURE TYPE = PLANE
-----
JOINT  LOAD   FORCE-X   FORCE-Y   FORCE-Z   MOM-X   MOM-Y   MOM Z

15     1       .01  32584.51   .00       .00       .00       .00
24     1       .00  32584.49   .00       .00       .00       .00

```

***** END OF LATEST ANALYSIS RESULT *****

122. FINISH

***** END OF STAAD-III *****

**** DATE= SEP 28,1998 TIME= 7:46:27 ****

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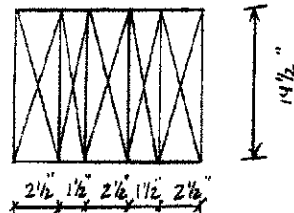
*****
*       For questions on STAAD-III, contact:       *
*       Research Engineers, Inc at                  *
* West Coast: Ph- (714) 974-2500 Fax- (714) 921-2543 *
* East Coast: Ph- (508) 688-3626 Fax- (508) 685-7230 *
*****

```

Park	MANZ (DEVA 004-35)	NATIONAL PARK SERVICE DENVER SERVICE CENTER		Sheet	13
Area	AUDITORIUM			of	
Project		By	E. SMITH	Checked	Pkg.
Feature		Date	9-24-98	Date	Account

BUILT-UP COLUMN

Assume



2 conditions:

1. $d = 14\frac{1}{2}"$, $L_c = 15'$, $K_f = 1$
2. $d = 10\frac{1}{2}"$, $L_c = 11'$, $K_f = 0.75$

$$\textcircled{1} F_{CE} = \frac{(0.3)(1700,000)}{[(15)(12)/14.5]^2} = 3309$$

$$F_c^* = F_c \cdot C_D \cdot C_M \cdot C_F = (1450)(1.15)(1)(0.9) = 1500$$

$$C_p = 0.88$$

$$\textcircled{2} F_{CE} = \frac{(0.3)(1700,000)}{[(11)(12)/10.5]^2} = 3227$$

$$C_p = 0.66 \text{ (Includes } K_f)$$

$$P = F_c^* \cdot A = (0.66)(1500)(10.5")(14.5") = 151^k > 32.6^k \quad \text{From STAAD anal.}$$

However, bolting pattern does not meet built-up column requirements.

Check to see if column is ok as is. (See next page.)

Park	MANZ (DEVA 004-35)	NATIONAL PARK SERVICE DENVER SERVICE CENTER		Sheet 14
Area	AUDITORIUM			of
Project		By E. SMITH	Checked	Pkg.
Feature		Date 9-28-98	Date	Account

BUILT-UP COLUMN, CONT.CAPACITY OF 1 1/2" x 14 1/2"

2 Conditions:

$$1. \quad l_e/d = (15')(12)/14.5" = 12.4$$

$$2. \quad l_e/d = (5')(12)/1.5" = 40 \quad \leftarrow \text{(Note: 5' is approx. spacing between bolts.)}$$

$$F_{CE} = \frac{(0.3)(1700,000)}{40^2} = 319$$

$$F_c^* = 1500$$

$$C_F = 0.20$$

$$P = (0.20)(1500)(1.5")(14.5") = 6525 \text{ lb}$$

CAPACITY OF 2 1/2" x 14.5"

$$F_{CE} = \frac{(0.3)(1700,000)}{[(15')(12)/2.5"]^2} = 885$$

$$C_F = 0.49$$

$$P = (0.49)(1500)(2.5")(14.5") = 26,640 \text{ lb}$$

$$\Rightarrow P_{\text{total}} = (3)(26.6 \text{ k}) + (2)(6.5 \text{ k}) = 92.8 \text{ k} > 32.6 \text{ k}$$

OK



FEMA 178 / June 1992 Seismic Evaluation MANZANAR AUDITORIUM BUILDING

Manzanar National Historic Site
Inyo County, California

FINAL REPORT

December 1998

Prepared for:



The National Park Service
Denver Service Center
12795 W. Alameda Parkway
P.O. Box 25287
Denver, Colorado 80255

Prepared by:



MARTIN/MARTIN, Inc.
4251 Kipling
Wheat Ridge, Colorado 80034

NPS Project No. DSC-605-17A
Task Order No. 3
Contract No. 1443-CX-2000-97-037
Contract Date: July 18, 1997

MARTIN/MARTIN

Consulting Engineers
4251 Kipling, P.O. Box 4001
Wheat Ridge, Colorado 80034-4001
303 431 6100

December 2, 1998

Mr. Brian Tallent, P.E.
National Park Service
12795 W. Alameda Pkwy.
Denver, CO 80225

RE: FEMA 178 Seismic Evaluation of the Manzanar Auditorium Building
Inyo County, California
MARTIN/MARTIN Project No. 13310.04

Dear Brian,

MARTIN/MARTIN is pleased to submit this final report for your use. A seismic evaluation of the Manzanar Auditorium Building was performed in accordance with FEMA 178 / June 1992 at the request of the National Park Service in accordance with Task Order 3 of Contract No. 1443CX2000-97-037.

The Manzanar Auditorium Building is a wood framed structure constructed in 1944 by the Federal Government for the Manzanar war relocation camp and remodeled in 1954 by Inyo County for use as the county maintenance facility. The building is deteriorated in places on the outside, but is in fair condition inside.

This evaluation uncovered several deficiencies in the seismic load resisting systems. These include:

1. Decay at the bottom of wood columns on the south wall and potential decay of wood below the slab-on-grade on the north, east and west auditorium walls.
2. Lack of adequate shear walls in the auditorium space and the adjoining north, east, and west wings.
3. Inadequate bracing of the north wing cripple walls enclosing the crawl space.
4. Inadequate roof diaphragms due to straight (i.e. perpendicular) 1x roof sheathing on all roofs.
5. Inadequate roof diaphragms due to discontinuous diaphragm chords and collectors on all roofs.

December 2, 1998
Mr. Brian Tallent, P.E.
Page 2

6. Inadequate connections and ties between structural elements including:
 - Wood columns in the auditorium and posts in the crawl space of the north wing do not appear to be connected to the supporting concrete foundations.
 - Spread footing foundations in the north wing are not tied together.
 - Shear walls are not adequately connected to foundations.
 - The roof diaphragms are not adequately connected to the walls.
7. Top chords of the wood trusses are cracked at the knee brace connection locations.
8. The ceiling of the auditorium space lacks horizontal bracing.

Due to these deficiencies, the building is expected to perform poorly in the "design" seismic event. Rehabilitation is recommended. Principal ideas for rehabilitation are to add new concrete foundations to separate wood from soil, create a new roof diaphragm by adding plywood, make the diaphragm chords and collectors continuous by adding light gauge steel connectors, and create new shear walls or steel rod braced frames at selected bays. The foundations in these selected bays must also be enhanced.

The attached report discusses these items in detail.

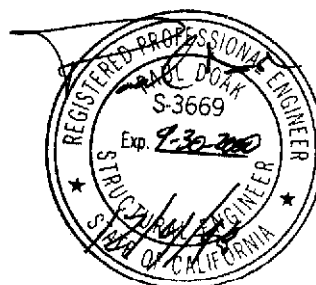
Sincerely,



Paul Doak, P.E., S.E.
Principal

PD/bm

Enclosures



MARTIN/MARTIN

Consulting Engineers

**FEMA 178 Seismic Evaluation
Manzanar Auditorium Building
December, 1998**

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North Wing	2-3
East Wing	3
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**FEMA 178 Seismic Evaluation
Manzanar Auditorium Building
December, 1998**

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Consulting Engineers

FEMA 178 Seismic Evaluation Manzanar Auditorium Building December, 1998

1.0 INTRODUCTION

At the request of the National Park Service, MARTIN/MARTIN conducted a seismic evaluation of the Manzanar Auditorium Building in Inyo County, California. The work conforms to FEMA 178/June 1992 as modified in the Task Order #3 contract. These limitations are described in Section 5.2.

The evaluation consisted of a data gathering phase conducted onsite July 20, 21, and 22, 1998; an analysis phase in which base shears and stress checks were performed; and development of ideas for rehabilitation.

This seismic evaluation was performed on the building as it existed during our site visit in July 1998. Figure 1 contains a ground floor plan with the different building areas labeled. This figure, as well as all others, is from the Historic American Building Survey conducted in 1994 by the National Park Service.

2.0 BUILDING DESCRIPTION

The Manzanar Auditorium Building was constructed in 1944 by the United States Government as an assembly building for the Manzanar War Relocation Center. The construction is wood framing supported by concrete slab-on-grade and concrete spread footings. In 1954, the building ownership was transferred to Inyo County, and it then served as a county maintenance facility. Numerous modifications to the structure were made by the county including removing the stage area in the east wing, replacing the raised wood floor in the auditorium with concrete slab-on-grade, and adding a large wall opening to the east exterior wall (Photo Nos. 1 and 2) and the south exterior wall near the southwest corner (Photo Nos. 3 and 4). The south wing of the building was removed in the early 1950's.

2.1 GRAVITY LOAD RESISTING SYSTEM

Auditorium:

The roof of the auditorium consists of 1x wood sheathing on 2x10 joists spaced at 24 inches on center, spanning to wood trusses spaced at 16 feet on-center (Photo No. 7). The 1x sheathing is placed straight (i.e. perpendicular) to the joists. The trusses span approximately 80 feet and are supported by built-up wood columns along the north and south walls of the auditorium. The trusses and columns are knee braced (Photo No. 5 and Figure No. 8). The ceiling consists of Celotex panels supported by 2x6 ceiling joists spaced at 24 inches on center spanning to the truss bottom chord (Photo No. 8).

Exterior building walls consist of horizontal lapped siding (vertical siding at the west elevation) over diagonal 1x redwood sheathing attached to 2x4 or 2x6 studs spaced at 16 to 24 inches on center (Photo Nos. 9, 10, and 11). Walls, which were exterior in the original construction, have diagonal redwood sheathing while the interior walls have horizontal 1x sheathing (Photo No.

MARTIN/MARTIN

Consulting Engineers

**FEMA 178 Seismic Evaluation
Manzanar Auditorium Building
December, 1998**

12). The interior wall covering is horizontal 1x lapped siding (Photo No. 6). Several walls which are now exterior were originally interior. These do not have diagonal redwood sheathing.

There are large areas of windows in the auditorium north and south walls and a large sliding door opening in the south wall near the west corner. The east wall of the auditorium was originally the proscenium wall for the stage. A proscenium truss remains spanning 29 feet to wood columns. The original 29 foot stage opening has been partially infilled; a 14 foot wide opening remains for an overhead coiling door.

The wood columns are supported on tapered concrete footings. As mentioned, the floor of the auditorium is concrete slab-on-grade. The west wall of the auditorium is supported by 28" x 28" concrete spread footings spaced approximately 8 feet on center. The top of footing elevation is about 16 inches below interior slab-on-grade elevation. The exterior west wall is assumed to be supported on wood beams and posts in the area between the floor and footings, but this was not visible and therefore not confirmed.

The auditorium north wall is carried on wood beams supported on wood posts set on concrete spread footings (Photo No. 16).

The auditorium south wall has diagonal 1x sheathing from the roof down to the window sill elevation. Below this, only horizontal sheathing exists because this was an interior wall in the original construction when the south wing was present. The original support for the south wall is assumed to be wood beams and posts to match the north wall. These have been removed and a concrete grade beam added to close off and support the bottom of wall. Exterior grade was also raised which placed the bottom of wood columns below finished grade (Photo No. 14).

The auditorium east wall, either side of the stage area, has horizontal 1x sheathing on 2x4 studs extending down to the furnace room and storage room grade beams. This wood is also below the auditorium slab-on-grade elevation and therefore the west wall face appears to be exposed to soil. This wall sandwiched a remaining section of raised wood floor in the auditorium (Photo No. 21). This floor framing remnant now reduces the load carrying capacity of the wall because the wall lacks horizontal bracing at this level.

North Wing:

The north wing framing consists of straight 1x roof sheathing on 2x12 wood joists spaced at 24 inches on center which span between the auditorium north wall and the north wall of the north wing. These load-bearing walls consist of 2x4 studs spaced at 24 inches in center. The few interior walls in the north wing are constructed with 2x4 studs with horizontal 1x sheathing. The wood floor of the north wing covers a 3 foot high crawl space. The wood floor consists of wood flooring applied over diagonal 1x wood subfloor supported by 2x6 floor joists spaced at 12 or 16 inches on center, which are carried by wood beams spanning between wood posts resting on

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concrete footings (Photo No. 15). The north wing has a perimeter cripple wall which encloses the crawl space (Photo Nos. 15 and 17). The footings supporting the perimeter posts of the north wing are exposed on the exterior (Photo No. 9).

East Wing:

The east wing has been extensively revised since the original construction. A large 14 foot wide door opening was added on the east elevation, and a 30 foot wide section of the stage was removed. This is currently the main entry into the building and goes under the existing proscenium truss.

The roof framing in this area is straight 1x roof sheathing on 2x12 joists spanning east-west spaced at 24 inches on center and supported by the load bearing exterior east wall of 2x4 and 2x6 studs and the load bearing auditorium east wall. Foundations under the east exterior wall consist of a concrete grade beam, which was visible in the low storage rooms beneath the original stage. Exterior grade on the east side is above the top of grade beam; the wood wall framing is in contact with soil.

Floors in the east wing consist of wood flooring over diagonal 1x wood subfloor on 2x joists. Joists are spaced at 12 inches on center in the remaining stage area.

West Wing:

The west wing consists of the projection room and original main entry. The roof construction is straight 1x sheathing over 2x8 joists spaced at 24 inches on center which are supported by load bearing 2x4 studs. The floor of the projection room has 2 inches of concrete over wood subflooring, and is supported on 2x4 wall studs. The original ground floor in the west wing appears to be concrete slab-on-grade and the walls appear to be supported by a down-turned edge of the slab-on-grade.

2.2 LATERAL LOAD RESISTING SYSTEM

Auditorium:

In the north-south direction, the auditorium has two lateral load resisting systems. The knee-braced trusses can act as moment frames, and the wood walls on grids 2 and 8 can act as shear walls. In the east-west direction, the only apparent lateral system is the roof diaphragm spanning between the north and south auditorium walls (on grids A and H), which must act as shear walls.

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North, East, and West Wings:

The north, east and west wings have a lateral system consisting of 1x roof and floor sheathed diaphragms spanning to diagonal 1x sheathed walls which act as shear walls. Some diagonal blocking was observed in the interior, horizontally sheathed walls of the east wing (Photo No. 12). These are helpful but have limited strength and stiffness.

The building characteristics are summarized on the FEMA 178 Data Summary Sheet in Appendix A.

3.0 DEFICIENCIES IN THE SEISMIC LOAD RESISTING SYSTEM

3.1 LIST OF DEFICIENCIES

The primary deficiencies are summarized below. The deficiencies are noted in the FEMA 178 evaluation statements contained in Appendix A. The deficiencies are ranked in order of importance with the first item judged as being the most detrimental.

3.1.1. Wood Decay

The wood columns on the south elevation are decayed. All five built-up wood columns on the south wall of the building are in contact with soil. Three show signs of decay caused apparently by termite damage. The worst column has about 12 inches completely removed out of a total column depth of 15 inches (Photo Nos. 13 and 14). The other two columns are expected to be decayed as well, but there is no visible damage.

The decayed columns have reduced strength to support gravity loads, and reduce the strength of the truss-kneebrace-column lateral system.

Wood on the north, west and east auditorium walls also extends below the interior slab-on-grade elevation by about 16 inches and is apparently in contact with soil. Therefore, decay is also expected in these bearing walls.

3.1.2. Inadequate Shear Walls

Auditorium and North Wing:

There are inadequate shear walls in the east-west direction of the auditorium. The north and south walls have too many wall openings (both windows and doors), diagonal 1x sheathing (and horizontal 1x sheathing below the window sill elevation) instead of plywood sheathing or rod bracing, and inadequate foundations to resist shear and overturning reactions. The north and west walls of the north wing have numerous window and door openings, leaving little wall to act

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as shear wall. The common wall between the north wing and the auditorium, although having some solid wall sections, has horizontal (i.e. perpendicular) 1x sheathing because it is an interior wall. Perpendicular sheathed walls are inadequate to resist seismic forces because they have little strength and are flexible. They are not accepted by building codes.

East and West Wings:

The north shear wall of the east wing (on grid G) is discontinuous at the ground floor; it rests on the wood floor framing instead of extending down to a foundation.

3.1.3. Unbraced Cripple Walls

The north wing cripple wall surrounding the crawl space exterior is inadequately braced. Some 2x6 diagonal braces were observed but these do not provide the required strength due to their slenderness and poor connections.

3.1.4. Inadequate Roof Diaphragm Sheathing

All roof diaphragms have straight (i.e. perpendicular) 1x roof sheathing instead of diagonal 1x roof sheathing or plywood. Perpendicular sheathed roof diaphragms are also inadequate to resist seismic forces are also not accepted by building codes.

3.1.5. Inadequate Roof Diaphragm Chords and Drag Struts

The double 2x top wall plates cannot function as the roof diaphragm chords or as diaphragm drag struts because the plates are not adequately spliced. At the north and south auditorium walls, the top plates are interrupted at each column (Photo No. 19). In addition, the top plates on the east and west auditorium walls are butt spliced at each break in roof slope (Photo No. 10).

3.1.6. Inadequate Connections and Ties

There are inadequate connections and ties between the various structural components. These are grouped into four categories. One, the auditorium roof diaphragm is not adequately tied to the north and south shear walls on grids A and H.

Two, the shear walls are not connected to the foundation. There are some ½ inch diameter sill bolts but they are too widely spaced to be effective or altogether missing. Due to the aspect ratio (height to length) of the shear walls, wall holddowns to resist wall overturning forces are required, but none were observed. Also, many walls bear on wood beams on wood posts and as such are not connected to the foundation. These walls have little shear and overturning resistance and therefore cannot function as shear walls.

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Three, the wood columns do not appear to be connected to their foundation, although this could not be confirmed by visual observation. On the north wing floor framing the floor beams are not connected to the supporting posts, and the posts are not connected to the spread footings (Photo No. 15).

Four, the footing foundations are not interconnected on the north wing (Photo No. 15). Interconnection of footings is necessary to prevent individual footings from moving.

3.1.7. Roof Truss Cracking

The roof truss top chords constructed of built-up 1½ inch and 2½ inch wide members have a noticeable split at the panel point where the knee brace connects to the top chord (Photo No. 20). This is typical at each end of each truss.

3.1.8. Ceiling Bracing

The 2x framing with Celotex panels forming the auditorium ceiling has no horizontal bracing (Photo No. 8). The west end wall, on grid 8, is framed with a joint at the ceiling level (platform framing). The west end wall relies on the ceiling to laterally support the wall, but the ceiling is unable to provide this bracing.

3.2 CONSEQUENCE OF DEFICIENCIES

The building has serious decay in the wood columns and suspected decay in wood bearing walls, lacks adequate diaphragms and shear walls, lacks cripple wall bracing, and lacks connections between structural elements. The building is expected to perform poorly when subject to the design earthquake. Partial or total collapse may occur. The cracked roof trusses and decayed wood columns also reduce the gravity load (dead, live, and snow load) carrying capacity of the building.

These deficiencies need to be corrected to ensure the safety of the building occupants.

4.0 REHABILITATION**4.0.1. Wood Decay**

The decay of the wood columns on the south wall can be repaired. The damaged wood can be removed and replaced by installing a new wood column, or preferably, the concrete support can be raised to avoid wood/soil contact. This is shown in Figure 7. It may also be possible to repair the columns having minor decay with epoxy, but decay will continue unless the wood is separated from soil.

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The wood below slab-on-grade elevation at the auditorium north, east, and west walls is more difficult to correct. The first step is to confirm this suspected condition by removing selected portions of the interior slab-on-grade down to the footing elevation. If wood is in contact with soil, a new concrete grade beam could be added between footings. These are shown in Figure 2. Alternately, the concrete slab-on-grade could be removed, interior grade lowered to the footing elevation, and a new wood floor over crawl space installed. This solution has the added benefits of being an historically accurate recreation of the original construction and offers opportunities to route electrical, plumbing, and HVAC services under the floor. This solution is expected to be more costly than adding new concrete grade beams.

4.0.2. Inadequate Shear Walls

The lack of adequate shear walls is a significant problem. The large number of wall openings, both windows and doors, combined with 1x sheathing renders the walls severely overstressed. It is suggested a bay or two on each wall be selected and designed as a new plywood shear wall or new diagonal steel rod braced frame. These must extend from the roof level down to the foundations. These added shear walls and/or bracing would act as the vertical component of the lateral load system for the building; the existing walls should not be combined with the new walls/bracing. Overturning problems are expected at the base of these bays. A new concrete grade beam with new footings or enlarged existing new footings will be required to transfer the lateral shear and overturning forces into the supporting soil. The suggested locations for added shear walls/diagonal braces are shown in Figures 2, 4, 5, 6, and 7.

The added walls or braces on the north wing way may be objectionable if the existing windows are to be kept clear. There are alternate (also more expensive) means, such as moment frames, of providing lateral support. These issues should be explored during the building renovation design.

4.0.3. Unbraced Cripple Walls at North Wing Crawl Space

The added shear walls or diagonal bracing in the north wing can be designed to also brace the crawl space.

4.0.4. Inadequate Roof Diaphragms

The inadequate roof diaphragms caused by perpendicular 1x roof sheathing can be resolved by removing the roofing and installing an engineered plywood roof diaphragm over the 1x sheathing. This is shown in Figure 3. An alternate solution in the auditorium is to locate the roof diaphragm at ceiling level by augmenting the ceiling bracing to also function as the building diaphragm. Vertical bracing must be added between the roof and the ceiling with this solution, but it avoids the cost of re-roofing. A similar idea may be used for the north, east and west wings by attaching the new plywood to the underside of the roof joists.

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The roof gravity load carrying capacity must be checked in either case to ensure the added weight can be safely supported.

4.0.5. Lack of Diaphragm Chords and Drag Struts

The two 2x wood top wall plates are prevented from acting as a diaphragm chord because they are discontinuous. This is readily remedied by installing light gauge steel straps across the discontinuity. The steel straps must be engineered and properly nailed.

The added shear walls or diagonal bracing bays in item 4.0.2 are at discrete locations. Diaphragm drag struts are needed to receive the uniform shear from the roof diaphragms and deliver the concentrated lateral force to the added shear wall/braced bay. The two 2x top wall plates may function as the drag struts provided they are adequately sized and connected.

4.0.6. Inadequate Connections and Ties

Inadequate connections and ties between structural components can be solved for each deficient category.

- The roof diaphragm which is being enhanced with plywood, can be connected to the diaphragm chords and collectors at the same time.
- The existing wall connections to the foundations are no longer a concern because new shear walls/rod bracing will be used with new foundations.
- The north wing beam-to-post and post-to-foundation connections can be added using light gauge connectors fastened to the wood and expansion bolted to the concrete.
- The requirement to interconnect foundation elements should be reviewed by a geotechnical engineer who considers the seismic characteristics of the site and the stability of the surface soils. It is probable this requirement can be removed. If it remains, new steel elements (angles or pipes) could be used by expansion bolting them to the footings. Alternatively a 3 to 4 inch thick concrete slab-on-grade added to the ground in the crawl space should adequately interconnect the existing footings if properly designed and doweled to the footings.

4.0.7. Roof Truss Cracking

The cracked roof trusses can be repaired by extending new metal straps from the diagonal truss members around the top of the top chord and back down the opposite side of the diagonal

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member (Figure 8). This new metal strap should be designed to transfer all of the tension in the diagonal member. This will avoid imposing cross grain tension on the top chord members.

4.0.8. Ceiling Bracing

Replacing the existing Celotex ceiling with a gypsum board ceiling will improve the bracing but still does not satisfy the building code due to the 80 foot ceiling diaphragm span. Alternatively, 2x wood diagonals can be added in the horizontal plane of the ceiling, or plywood added in alternate bays to the top or bottom of the ceiling joists (Figure 3). This solution can also be designed to act as the primary building diaphragm as discussed in item 4.0.4.

Still another solution is to add more vertical bracing from the ceiling to the roof. Currently only one line of vertical bracing occurs at truss midspan and these are flimsy, single 2x wood bracing members. Vertical bracing could be installed at each, or perhaps alternate, truss panel points. This would reduce the span length of the ceiling diaphragm by transferring load up to the roof diaphragm.

5.0 SUMMARY

5.1 CONCLUSIONS

The Manzanar Auditorium Building, according to this evaluation, is vulnerable to collapse during a significant earthquake. However, this conclusion is tempered with the fact that the building has withstood perhaps minor earthquakes and certainly significant winds during its 56 year life. Wood buildings have inherent redundancies and abilities to resist lateral loads that are difficult to quantitatively evaluate. In addition, the main auditorium building is buttressed by the north, east, and west wings, and the quality of workmanship and the quality of timber used 50 years ago is often superior to those used today.

Nonetheless, the building has not experienced a design level earthquake and this evaluation is intended to address that occurrence. It is recommended that the seismic load resisting system be strengthened when the building is remodeled. The required work is relatively straightforward and does not require special construction expertise. It can be relatively economically incorporated during the remodeling period. Many of the rehabilitation suggestions need to be considered concurrent with the remodel. The most economical solution will be one that fits readily into the remodel. The final decision on which solution to employ and its location should not be made until the remodel and seismic rehabilitation work are considered concurrently.

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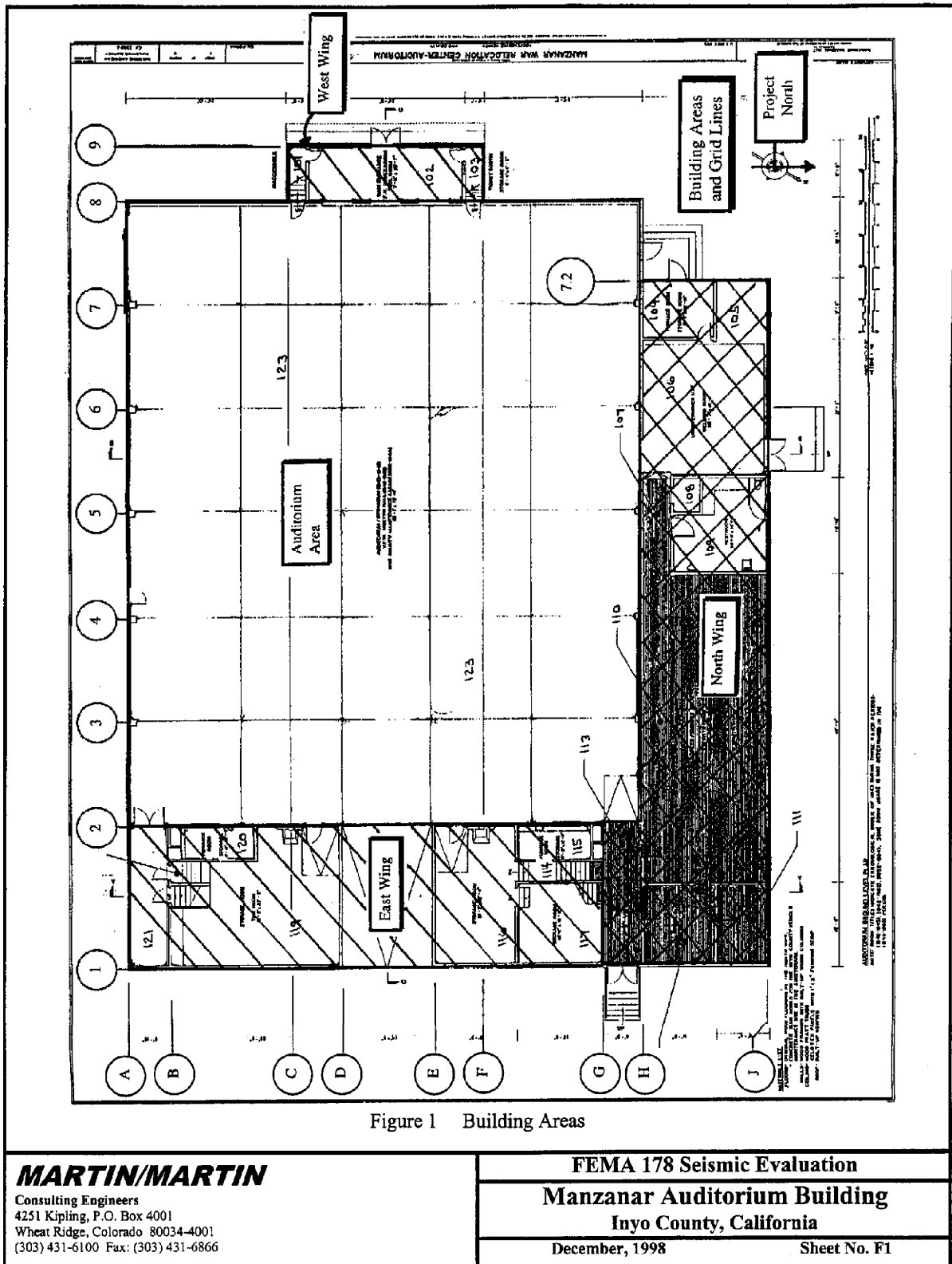
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5.2 REPORT LIMITATIONS

This report did not address the following items at the request of the National Park Service:

1. An evaluation of the gravity load capacity of the structure was not performed.
2. A seismic evaluation of components, cladding and other nonstructural elements was not performed. This is not a significant issue on this building because there are very few nonstructural elements present.
3. Selective demolition was not performed to uncover hidden areas. Therefore, questions such as the possible connection between wood columns and footings and wood exposed to soil could not be addressed.
4. No quantitative material testing was performed.
5. This evaluation was only for the life-safety criteria contained in FEMA 178. The criteria used asks whether the building will remain standing in order to allow occupants to exit safely after an earthquake. Evaluation and rehabilitation recommendations are not offered to address continued operation of the building during or after an earthquake, to address the reduction of repair costs after an earthquake, or to address the reduction of damage to nonstructural elements or building components.
6. The soils and geologic information herein are based on observations of the foundations and the surface soils. The seismic site coefficient was estimated based on these observations. A detailed geotechnical report was not available for the site. Likewise, liquefaction potential and evaluation of surface fault rupture potential are unknown.
7. A construction cost estimate is not included.



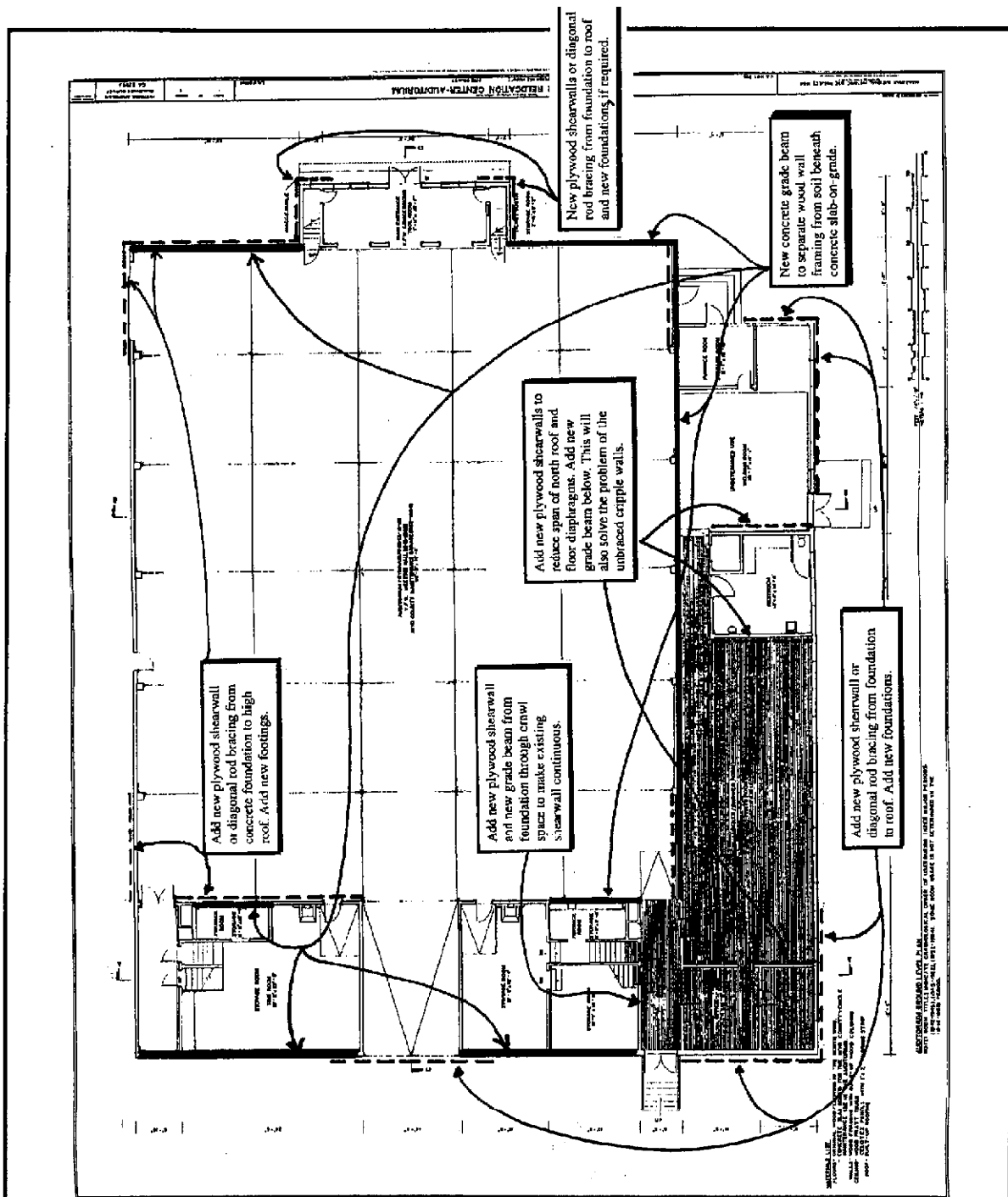


Figure 2 First Floor Plan Added Walls and Grade Beam

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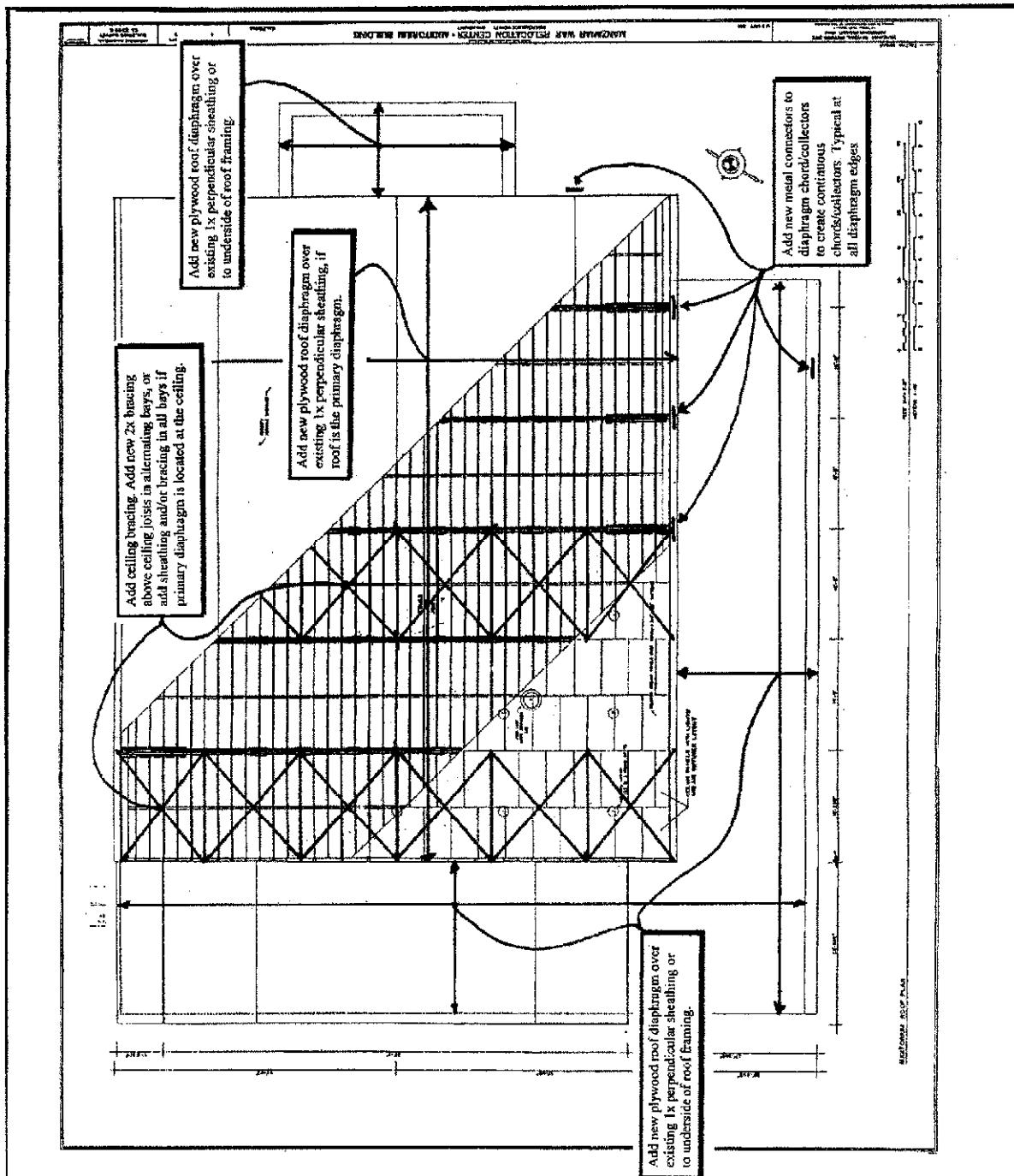


Figure 3 Roof / Ceiling Plan Added Roof Diaphragm

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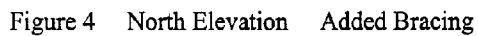
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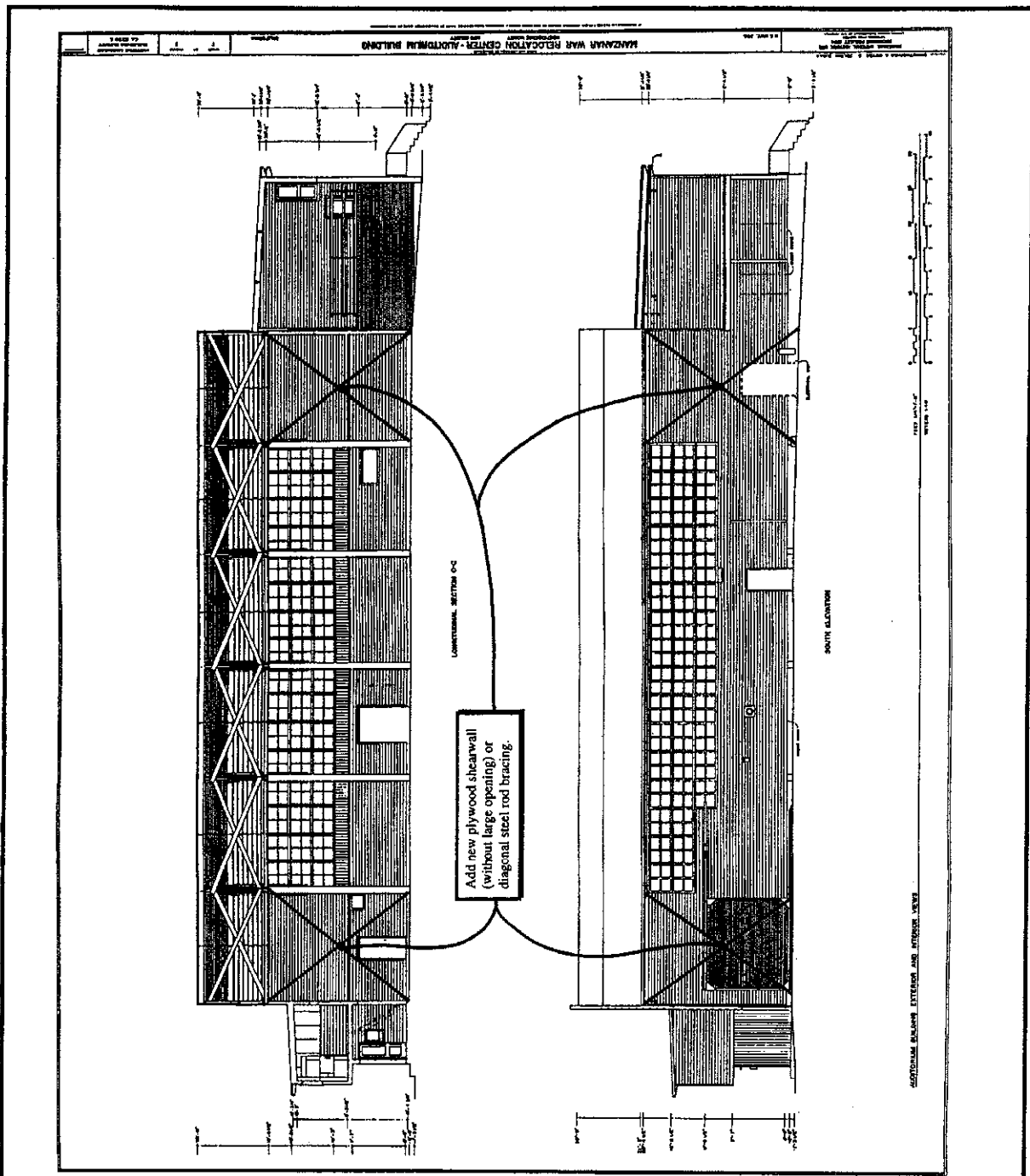


Figure 5 Auditorium Area Added Bracing

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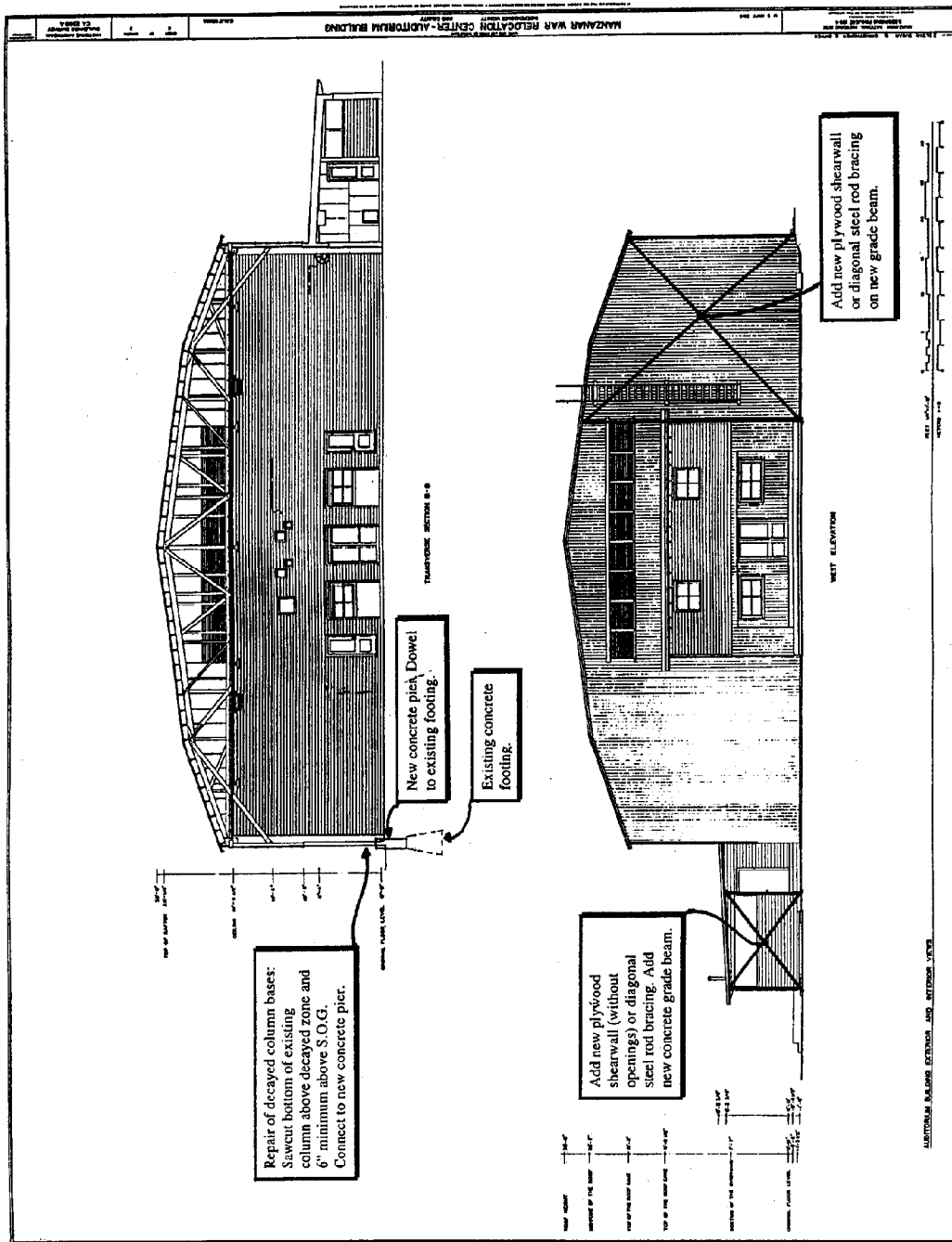


Figure 7 West Elevation Added Bracing & Repair of Decayed Columns

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Photo No. 1
East Elevation



Photo No. 2
North and East Elevations

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Photo No. 3
South and west Elevations

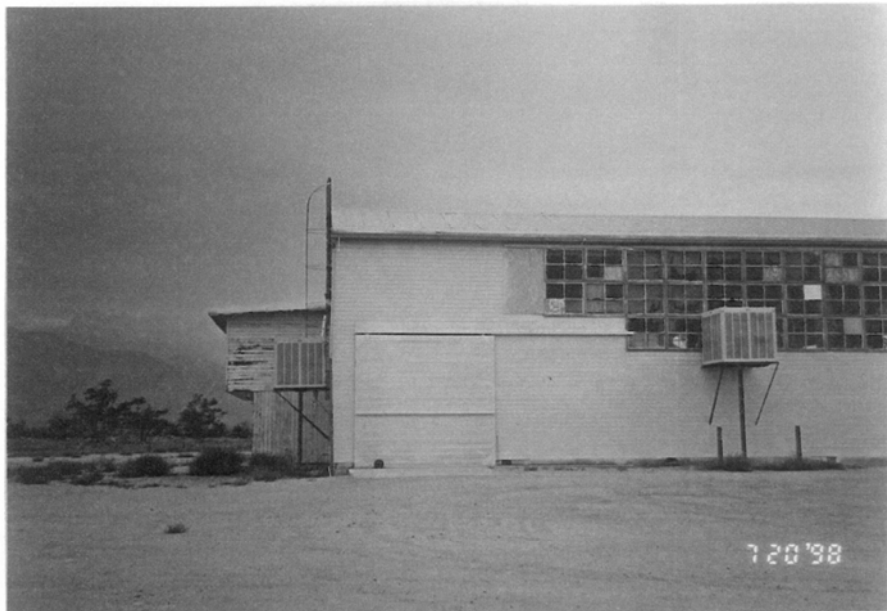


Photo No. 4
Large Added Door Opening in South Wall

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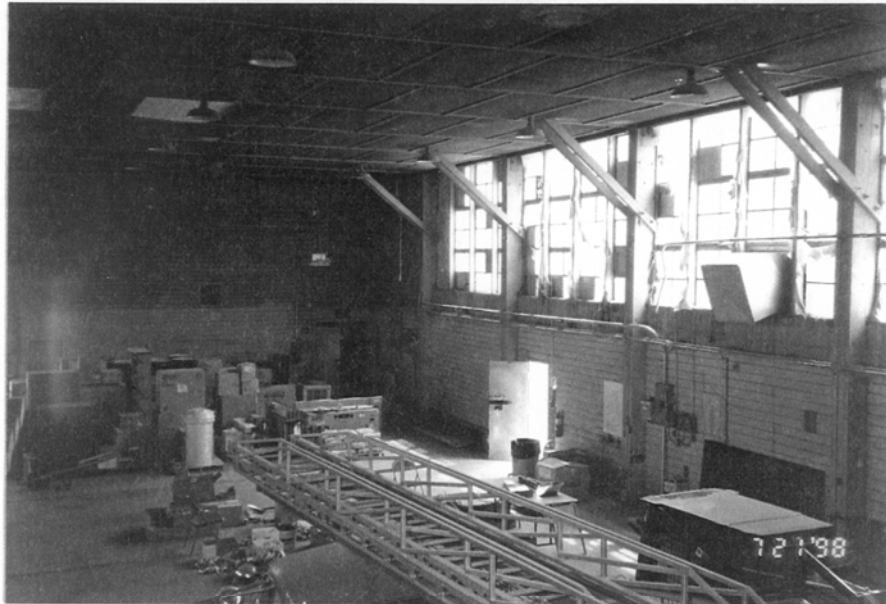


Photo No. 5
Knee Braces Attached to Wood Columns, South Wall



Photo No. 6
Wall Openings on Grid A at Grid 7

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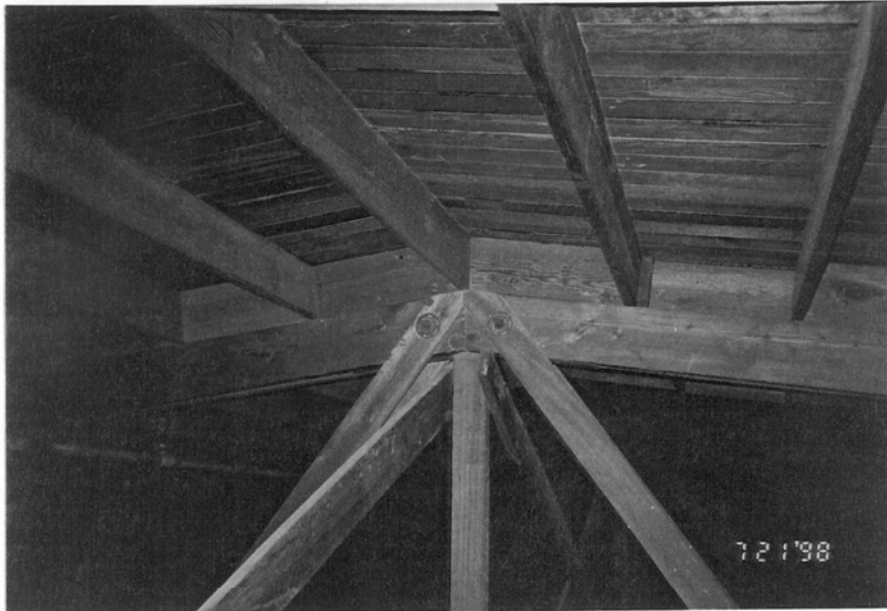


Photo No. 7
Wood Roof Framing in Auditorium



Photo No. 8
Auditorium Ceiling Framing

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Photo No. 9
Exposed Footings on North Wall of North Wing

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Photo No. 10
Typical exterior Wall Framing Showing Diagonal Wall Sheathing

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Photo No. 11
Typical Exterior Wall Framing

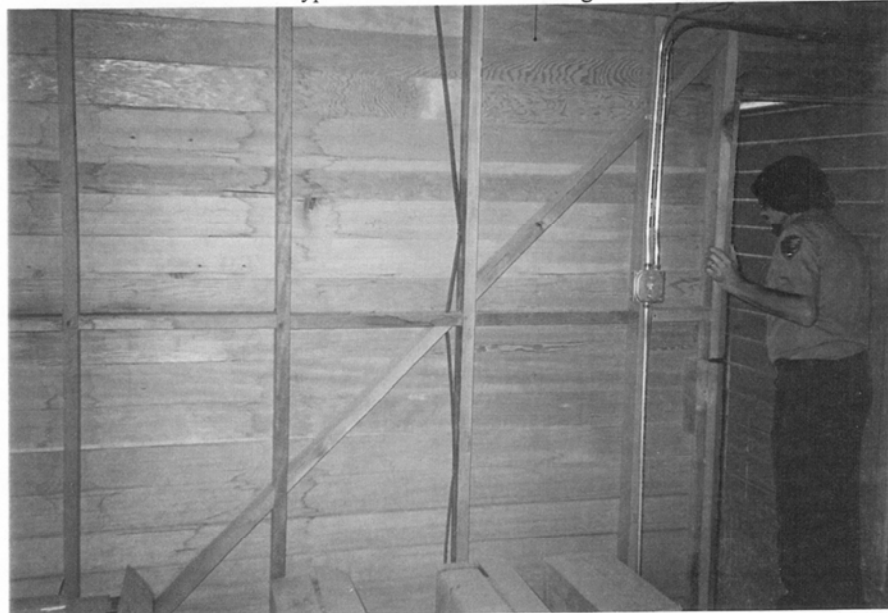


Photo No. 12
Interior Wall with Diagonal Wood Blocking

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Photo No. 13
Bottom of South Column at Grids A-4



Photo No. 14
Decayed Bottom of Column

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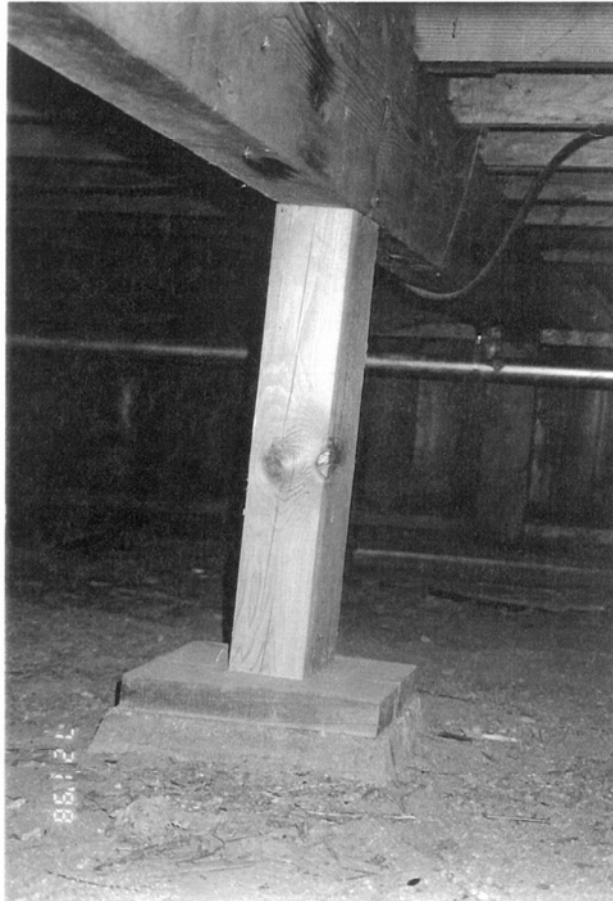


Photo No. 15
Floor Beam, Post and Footing in Crawl Space of North Wing

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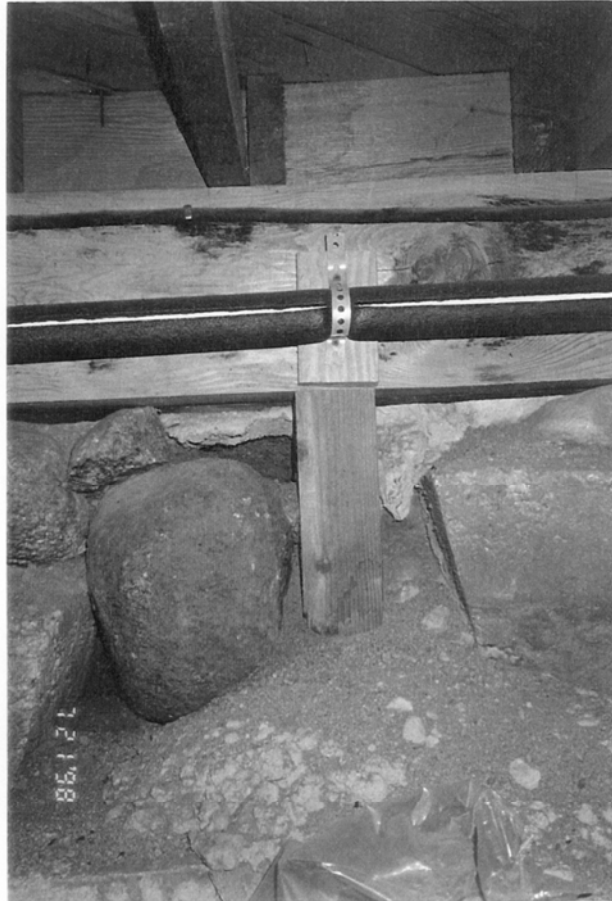


Photo No. 16
Wood Framing on Grid H in Contact with Soil

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Photo No. 17
Unbraced Cripple Wall at North Wing

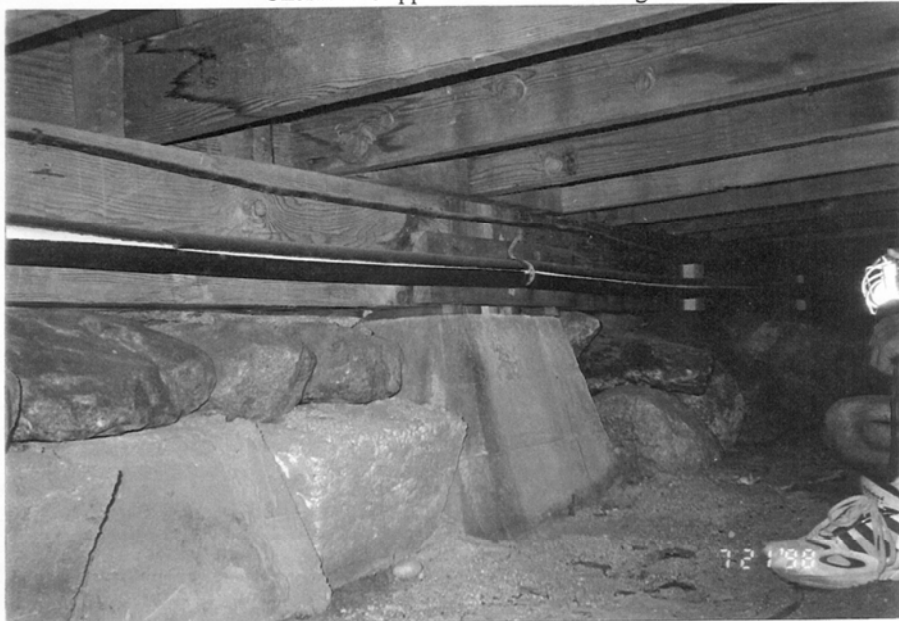


Photo No. 18
Tapered Footing Supporting Wood Column at Grids H-3

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Photo No. 19
Two 2x Top Wall Plate Discontinuous at Truss to Column Connections

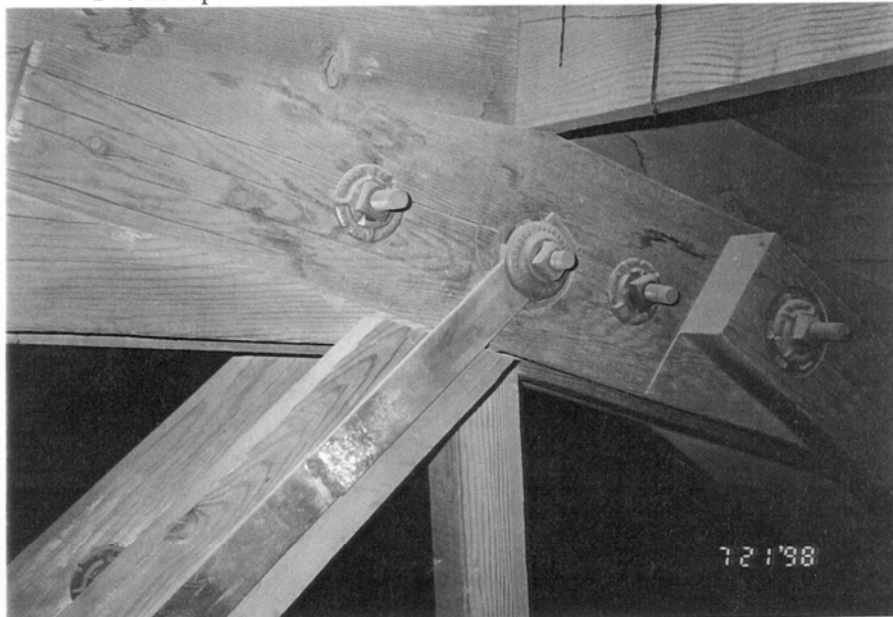


Photo No. 20
Cracked Truss Top Chord at Diagonal Connection

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Original
Wood
Floor
Remnant

Photo No. 21
Auditorium East Wall with Remnant of the Original Wood Floor

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Appendix A
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FEMA 178 / JUNE 1992
DATA SUMMARY SHEET
MANZANAR AUDITORIUM BUILDING

BUILDING DATA

Year built: 1944 Year(s) remodeled: 1954
 Date of Evaluation: July 1998
 Area, (sq. ft.): 14,700 Length: 126' Width: 100'

CONSTRUCTION DATA

Roof framing: Straight 1x wood sheathing on 2x wood framing at 24" on center on wood trusses in the auditorium, and straight 1x wood sheathing on 2x wood rafters in the north, east, and west wing.
 Intermediate floor framing: Wood flooring on 1x diagonal wood sheathing on 2x wood framing at 12" or 16" on center.
 Ground floor Auditorium: Slab-on-grade. Basement: Not applicable.
 Ground floor North Wing: Wood framing over 1x diagonal wood sheathing on 2x wood framing on wood beams and posts.
 Exterior walls: Wood lap siding on diagonal 1x redwood sheathing or horizontal pine sheathing on 2x wood framing at 16 or 24" on center.
 Openings: Numerous windows and large door openings.
 Columns: Built-up wood. Foundations: Cast-in-place shallow spread footings.
 General condition of structure: Fair.
 Evidence of settling: None.

LATERAL FORCE RESISTING SYSTEM

	<u>East-west</u>	<u>North-south</u>
Model building type:	<u>Wood bearing wall system</u>	<u>Wood bearing wall system</u>
Building period T:	<u>0.15 seconds</u>	<u>0.17 seconds</u>
Unreduced base shear,	$V = [(0.80A_v \times S)/(R \times T^{2/3})] \times (W)$ or $V = [2.12A_a/R] \times W$ = 13% W = 33 kips	
Response Modification Coefficient, R:	<u>6.5</u>	<u>6.5</u>

EVALUATION DATA

$A_a = 0.4$ $A_v = 0.4$
 Site soil profile type: S₂ Site soil coefficient, S = 1.2

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Manzanar Auditorium Building
Appendix A
 December, 1998

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FEMA 178 / JUNE 1992
EVALUATION STATEMENTS FOR BUILDING TYPE 2:
WOOD, COMMERCIAL AND INDUSTRIAL

BUILDING SYSTEMS

T	<input type="checkbox"/>	N/A	LOAD PATH: The structure contains a complete load path for seismic force effects from any horizontal direction that serves to transfer the inertial forces from the mass to the foundation.
<input type="checkbox"/>	F	N/A	REDUNDANCY: The structure will remain laterally stable after the failure of any single element.
T	<input type="checkbox"/>	N/A	VERTICAL DISCONTINUITIES: All shear walls, infilled walls, and frames are continuous to the foundation.
T	<input type="checkbox"/>	N/A	DETERIORATION OF WOOD: None of the wood members shows signs of decay, shrinkage, splitting, fire damage, or sagging and none of the metal accessories is deteriorated, broken, or loose.
<input type="checkbox"/>	F	N/A	OVERDRIVEN NAILS: There is no evidence of overdriven nails in the shear walls or diaphragms.

SHEAR WALLS

T	<input type="checkbox"/>	N/A	SHEARING STRESS CHECK: The building satisfies the Quick Check of the shearing stress in wood shear walls.
T	<input type="checkbox"/>	N/A	OPENINGS: Walls with garage doors or other large openings are braced with plywood shear walls or are supported by adjacent construction through substantial positive ties.
T	<input type="checkbox"/>	N/A	WALL REQUIREMENTS: All walls supporting tributary areas of 24 to 100 square feet per foot of wall are plywood sheathed with proper nailing or rod braced and have a height-to-depth (H/D) ratio of 1 to 1 or less or have properly detailed and constructed hold-downs.
T	<input type="checkbox"/>	N/A	CRIPPLE WALLS: All exterior cripple walls below the first floor level are braced to the foundation with shear elements.

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**Manzanar Auditorium Building
Appendix A
December, 1998****Page A3 of A4****DIAPHRAGMS**

T	F	N/A	REINFORCING AT OPENINGS: There is reinforcing around all diaphragm openings that are larger than 50 percent of the building width in either plan dimension.
T	F	N/A	SHEATHING: None of the diaphragms consist of straight sheathing or have span/depth ratios greater than 2 to 1.
T	F	N/A	SPANS: All diaphragms with spans greater than 24 feet have plywood or diagonal sheathing.
T	F	N/A	UNBLOCKED DIAPHRAGMS: Unblocked wood panel diaphragms consist of horizontal spans less than 40 feet and have span/depth ratios less than or equal to 3 to 1.
T	F	N/A	SPAN/DEPTH RATIO: If the span/depth ratios of wood diaphragms are greater than 3 to 1, there are nonstructural walls connected to all diaphragm levels at less than 40-foot spacing.
T	F	N/A	DIAPHRAGM CONTINUITY: None of the diaphragms are composed of split-level floors or have expansion joints.
T	F	N/A	CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation..

CONNECTIONS

T	F	N/A	WOOD SILLS: All wall elements are bolted to the foundation sill at 6-foot spacing or less with proper edge distances for concrete and wood.
T	F	N/A	WOOD POSTS: There is positive connection of the posts to the foundation and the elements being supported.

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Manzanar Auditorium Building
Appendix A
 December, 1998

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FEMA 178 / JUNE 1992
EVALUATION STATEMENTS FOR
FOUNDATIONS AND GEOLOGIC SITE HAZARDS

CONDITION OF FOUNDATIONS

<input checked="" type="checkbox"/>	F	N/A	FOUNDATION PERFORMANCE: The structure does not show evidence of excessive foundation movement such as settlement or heave that would affect its integrity or strength.
<input checked="" type="checkbox"/>	F	N/A	DETERIORATION: There is no evidence that foundation elements have deteriorated due to corrosion, sulphate attack, material breakdown, or other reasons in a manner that would affect the integrity or strength of the structure.

CAPACITY OF FOUNDATIONS

T	<input checked="" type="checkbox"/>	N/A	OVERTURNING: The ratio of the effective horizontal dimension, at the foundation level of the seismic resisting system, to the building height (base/height) exceeds 1.44.
T	<input checked="" type="checkbox"/>	N/A	TIES BETWEEN FOUNDATION ELEMENTS: Foundation ties adequate for seismic forces exist where footings, piles, and piers are not restrained by beams, slabs, or competent soils or rock.
T	F	<input checked="" type="checkbox"/> N/A	LATERAL FORCE ON DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil.
T	F	<input checked="" type="checkbox"/> N/A	POLE BUILDINGS: Pole foundations have adequate embedment.
<input checked="" type="checkbox"/>	F	N/A	SLOPING SITES: The grade difference from one side of the building to another does not exceed one-half story.

GEOLOGIC SITE HAZARDS

T	F	N/A	LIQUEFACTION: Liquefaction susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 feet under the building.
<input checked="" type="checkbox"/>	F	N/A	SLOPE FAILURE: The building site is sufficiently remote from potential earthquake-induced slope failures or rockfalls to be unaffected by such failures or is capable of accommodating small predicted movements without failure.
T	F	N/A	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site is not anticipated.

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Manzanar Auditorium Building

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Appendix B1, Load Sheets
December, 1998

Location	Description	Unit Weight (psf)
Roof Loads		
Auditorium Roof Dead Loads		
Uniform Loads:	New Rolled asphalt roofing	2
	Assumed original asphalt roofing	2
	Insulation (assume 1" rigid under roofing)	1
	1 x wood sheathing	3
	2 x roof joists at 24" o.c.	2
		<u>10 psf</u>
Ceiling Loads:	2 x ceiling joists at 24" o.c.	1
	Celotex ceiling panels	0.5
	Lights	0.5
	Sprinkler piping	1.5
		<u>3.5 psf</u>
Roof Truss Weight:	Top Chord:	
	3x9x16'	96 lbs.
	2-2x9x16'	96
	2-3x9x27'	324
		<u>516</u>
	Bottom Chord:	
	2-3x9x40'	480 lbs.
	Web Verticals:	
	2-3x4x3'	12 lbs.
	1-3x4x6'	12
	1-3x6x7'	25
	1-3x4x7'	15
	1-3x4x8'	17
	1/2-3x6x9'	16
		<u>97</u>
	Web Diagonals:	
	2-3x6x18'	123 lbs.
	1-3x4x8'	17
	2-2x6x9'	36
	2-2x4x10'	26
	1-3x4x10'	20
	2-2x6x11'	44
		<u>266</u>
	Truss Bridging:	
	1/2-2-2x6x24'	65 lbs.
	Truss Columns:	
	3-3x16x21'	630 lbs.
	2-2x16x21'	210
		<u>840</u>
	Half Truss Weight =	2264 lbs.
	Truss Weight per foot =	68 plf
	Truss weight smeared =	<u>4 psf</u>
	Total Auditorium roof load =	18 psf

*Snow loads less than 30 psf are negligible in seismic analysis per
FEMA 178 Sect. 2.4.2.

g:\projects\13310_04\calcs\manzanar\Load-sht.xls

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Manzanar Auditorium Building

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Appendix B1, Load Sheets

December, 1998

**North, East, and West Wing
Roof Dead Loads**

Uniform Loads:
Same as Auditorium Roof _____ 10 psf

Floor Loads

North Wing Floor over crawl space

Wood flooring (3/4" x 3 1/4" T & G) 4 psf
1 x diagonal wood subfloor 3
2x6 at 12" o.c. 2
6 x 10 beams at 10' o.c. 2
_____ 11 psf

**East Wing floor at Civil Defense Room
and old Stage floor**

Wood flooring (3/4" x 3 1/4" T & G) 4 psf
1 x diagonal wood subfloor 3
2x12 at 12" o.c. 4
1/2" gypsum board ceiling 2
Lights and misc. 2
_____ 15 psf

Projection room floor in West Wing

2" concrete topping 20 psf
1 x diagonal wood subfloor 3
2x16 at 16" o.c. 1
1/2" gypsum board ceiling 2
Lights and misc. 1
_____ 27 psf

Wall Loads

Typical exterior walls

3/4" exterior lap siding 2 psf
1 x nominal diagonal redwood sheathing 3
3/4" interior lap siding 2
2 x framing at 16" o. c. 1
_____ 8 psf

Typical interior wall

3/4" exterior lap siding 2 psf
3/4" interior lap siding 2
2 x framing at 16" o. c. 1
_____ 5 psf

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Appendix B2, Building Weights
Dec., 1998

Location:	Item	Width or Height (ft)	Length (ft)	Area (ft ²)	Unit Weight (psf or plf)	Weight (kips)
North Roof Level:						
	North Roof	23	106	2438	10	24.4
	North Wing N. Wall	106	4	424	8	3.4
	North Wing E. Wall	26	5	130	8	1.0
	North Wing W. Wall	20	5	100	8	0.8
	Proj. Room N. Wall	8	12	96	8	0.8
	Proj. Room W. Wall	8	31	248	8	2.0
	Proj. Room S. Wall	8	12	96	8	0.8
	Auditorium N. Wall	12	97	1164	8	9.3
	Auditorium E. Wall	12	81	972	8	7.8
	Auditorium S. Wall	12	97	1164	8	9.3
	Auditorium W. Wall	12	81	972	8	7.8
	N. Civil Def. Room Floor	13	22	286	15	4.3
	S. Civil Def. Room Floor	13	22	286	15	4.3
	N. Upper Storage Floor	14	22	308	15	4.6
	S. Upper Storage Floor	14	22	308	15	4.6
	East Wall	11	40	440	8	3.5
	N. Stage/Office N. Wall	9	14	126	8	1.0
	N. Stage/Office E. Wall	9	14	126	8	1.0
	N. Stage/Office S. Wall	9	14	126	5	0.6
	N. Stage/Office Floor	14	22	308	15	4.6
	S. Stage/Storage N. Wall	9	14	126	5	0.6
	S. Stage/Storage E. Wall	9	14	126	8	1.0
	S. Stage/Storage S. Wall	9	14	126	8	1.0
	S. Stage/Storage Floor	14	22	308	15	4.6
Level Weight (kips) =						103.2

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FEMA 178 / June 1992 Seismic Evaluation
Manzanar Auditorium Building

Appendix B3, Base Shear

Coefficients:

$A_v = 0.4$ [NEHRP Map #3, 1994 Edition]
 $A_h = 0.4$ [NEHRP Map #4, 1994 Edition]
 $S = 1.2$ [FEMA 178, Table 2.1 - Soil Profile Type S2]
 $R = 6.5$ [FEMA 178, Table 2.4.3.1 - Bearing Wall-Light Framed Walls w/Shear Panels]

Periods:

$$T_a = (0.05 * h_n) / \sqrt{L} \quad \text{[FEMA 178, Sec. 2.4.3.2, Method 1c.]}$$

North-South Direction:

$L = 100.0$ ft [Building Dimension in N-S Direction]
 $h_n = 33.0$ ft [Building Height]

$$T_a = 0.165 \text{ seconds}$$

East-West Direction:

$L = 127.0$ ft [Building Dimension in N-S Direction]
 $h_n = 33.0$ ft [Building Height]

$$T_a = 0.146 \text{ seconds}$$

Seismic Design Coef.:

$$C_s = (0.80 * A_v * S) / (R * T^{2/3}) \quad \text{[FEMA 178, Sec. 2.4.3.1, Eq. 2-4]}$$

$$C_{s \max} = (2.12 * A_h) / R \quad \text{[FEMA 178, Sec. 2.4.3.1, Eq. 2-5]}$$

North-South Direction:

$C_s = 0.20$
 $C_{s \max} = 0.13$

$$C_s = 0.13 \text{ [Use lesser of above]}$$

East-West Direction:

$C_s = 0.21$
 $C_{s \max} = 0.13$

$$C_s = 0.13 \text{ [Use lesser of above]}$$

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Manzanar Auditorium Building

Appendix B3, Base Shear

Base Shear:

$$V = C_s * W \quad [\text{FEMA 178, Sec. 2.4.3.1, Eq. 2-3}]$$

North-South Direction:

$$V = 32.6 \text{ kips}$$

East-West Direction:

$$V = 32.6 \text{ kips}$$

Vertical Distribution Factors:

$$C_{vx} = w_x * h_x^k / \text{sum}(w_i * h_i^k) \quad [\text{FEMA 178, Sec. 2.4.3.7, Eq. 2-9}]$$

$$k = 1.0 \quad [\text{for buildings with } T < 0.5 \text{ sec}]$$

$$w_2 = 147.1 \text{ kips} \quad [\text{weight of upper roof level}]$$

$$w_1 = 103.2 \text{ kips} \quad [\text{weight of north roof level}]$$

$$h_2 = 29.0 \text{ feet} \quad [\text{mean height of upper roof level}]$$

$$h_1 = 12.0 \text{ feet} \quad [\text{mean height of north roof level}]$$

$$C_{v2} = 0.775$$

$$C_{v1} = 0.225$$

Base Shear Vertical Distribution:

$$F_x = C_{vx} * V \quad [\text{FEMA 178, Sec. 2.4.3.7, Eq. 2-8}]$$

North-South Direction:

$$F_2 = 25.3 \text{ kips}$$

$$F_1 = 7.3 \text{ kips}$$

East-West Direction:

$$F_2 = 25.3 \text{ kips}$$

$$F_1 = 7.3 \text{ kips}$$

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Manzanar Auditorium Building
Inyo County, California
Appendix C
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Page C1

GLOSSARY OF TERMS

BRACED FRAME is essentially a vertical truss designed to resist lateral forces parallel to the plane of the braced frame. Lateral forces are resisted by axial tension and compression on the frame members.

CHORD is the boundary element of a diaphragm or shear wall that resists axial forces due to bending of the diaphragm.

DIAPHRAGM is a horizontal or nearly horizontal system acting to transmit lateral forces to the vertical elements.

DRAG STRUT (Collector) is a member or element of a diaphragm provided to transfer lateral forces from the diaphragm to the vertical elements of the lateral system (shear walls or bracing).

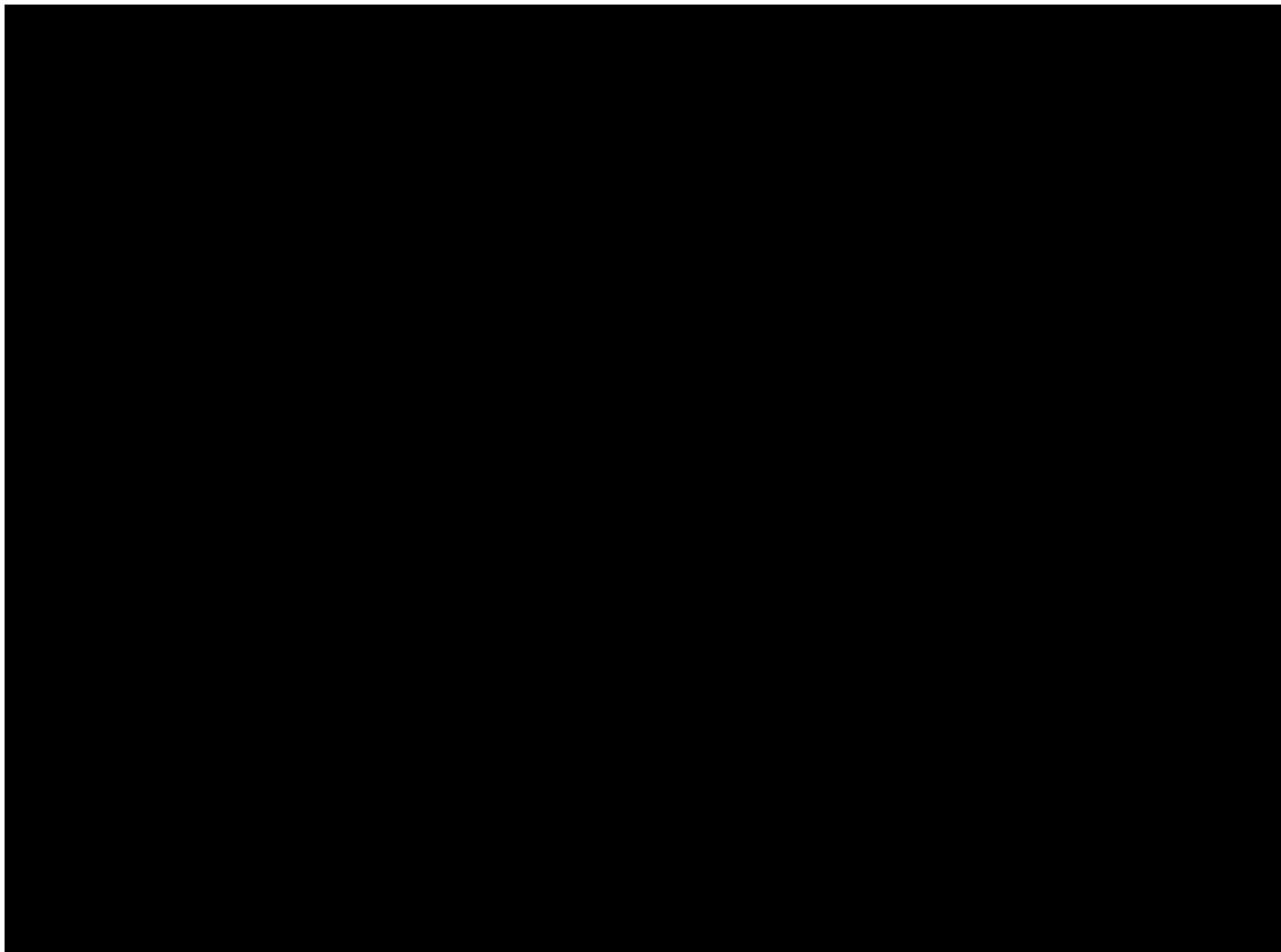
MOMENT FRAME is an assemblage of beams and columns connected to resist lateral forces in the plane of the frame by bending the beams and columns.

SHEAR WALL is a wall designed to resist lateral forces parallel to the plane of the wall.

HISTORIC PHOTOGRAPHS

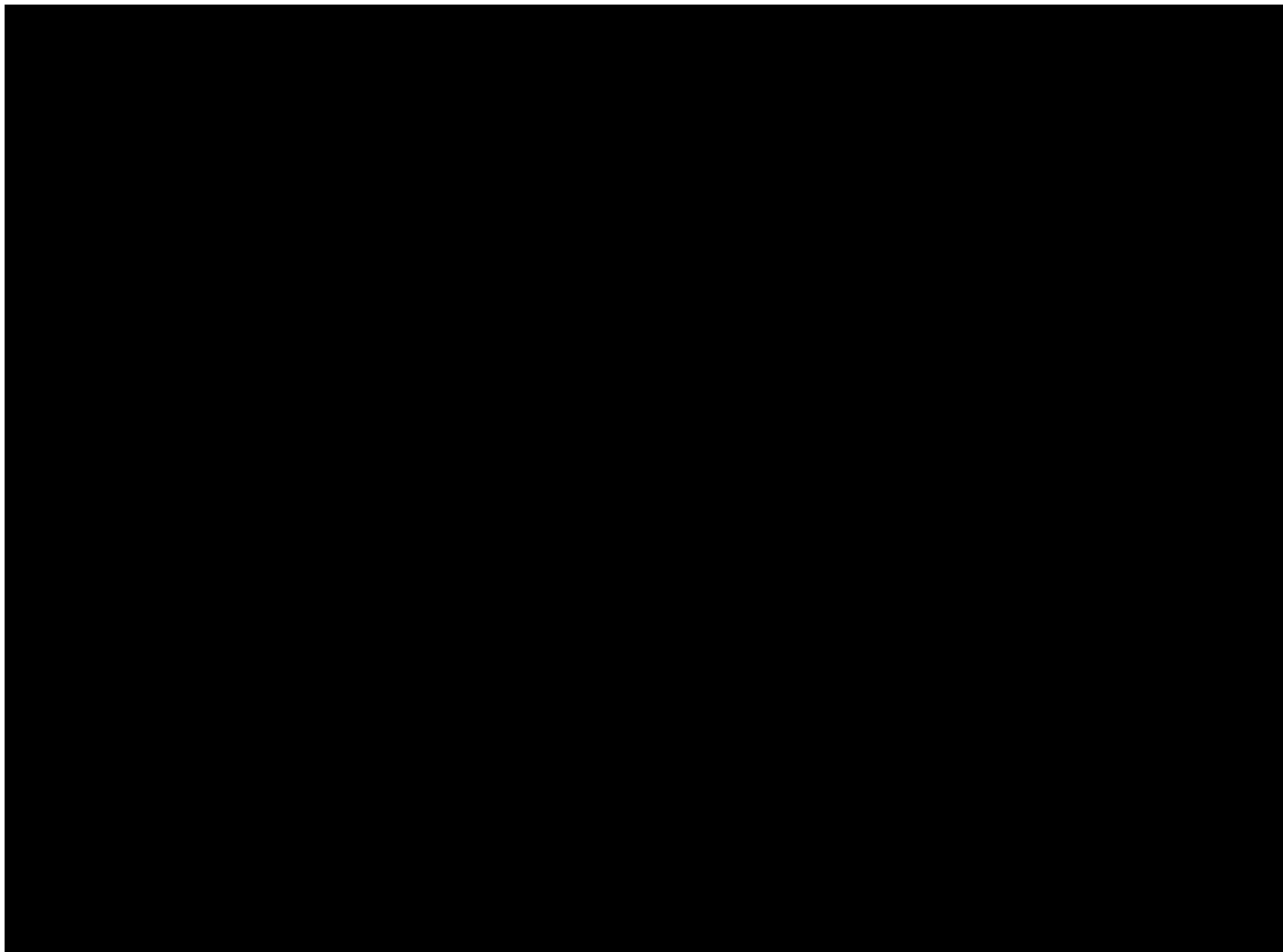
HISTORIC PHOTOGRAPHS

Photo 1. The Manzanar Auditorium-Gymnasium under construction. View of southwest corner and south wing. 1944. University of California at Los Angeles Collection.



HISTORIC PHOTOGRAPHS

Photo 2. Part of west end of building under construction showing roof trusses and framing at west entrance and second story projection room. 1944. University of California at Los Angeles Collection.



HISTORIC PHOTOGRAPHS

Photo 3. Southwest corner of building under construction. Main west entrance is at left with framing of projection room above it being assembled. The extreme northwest corner of the south wing is at the lower right. 1944. University of California at Los Angeles Collection.

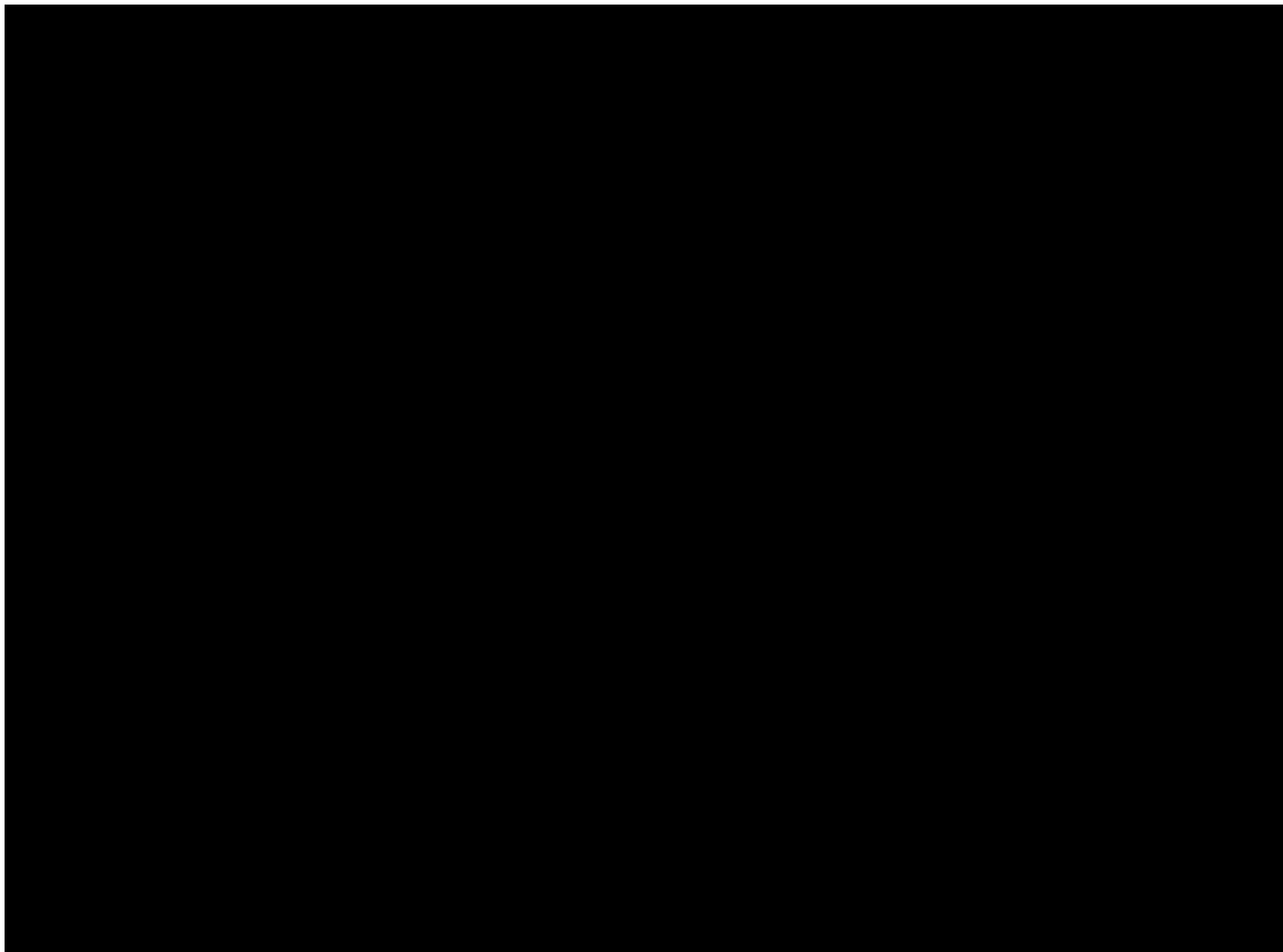
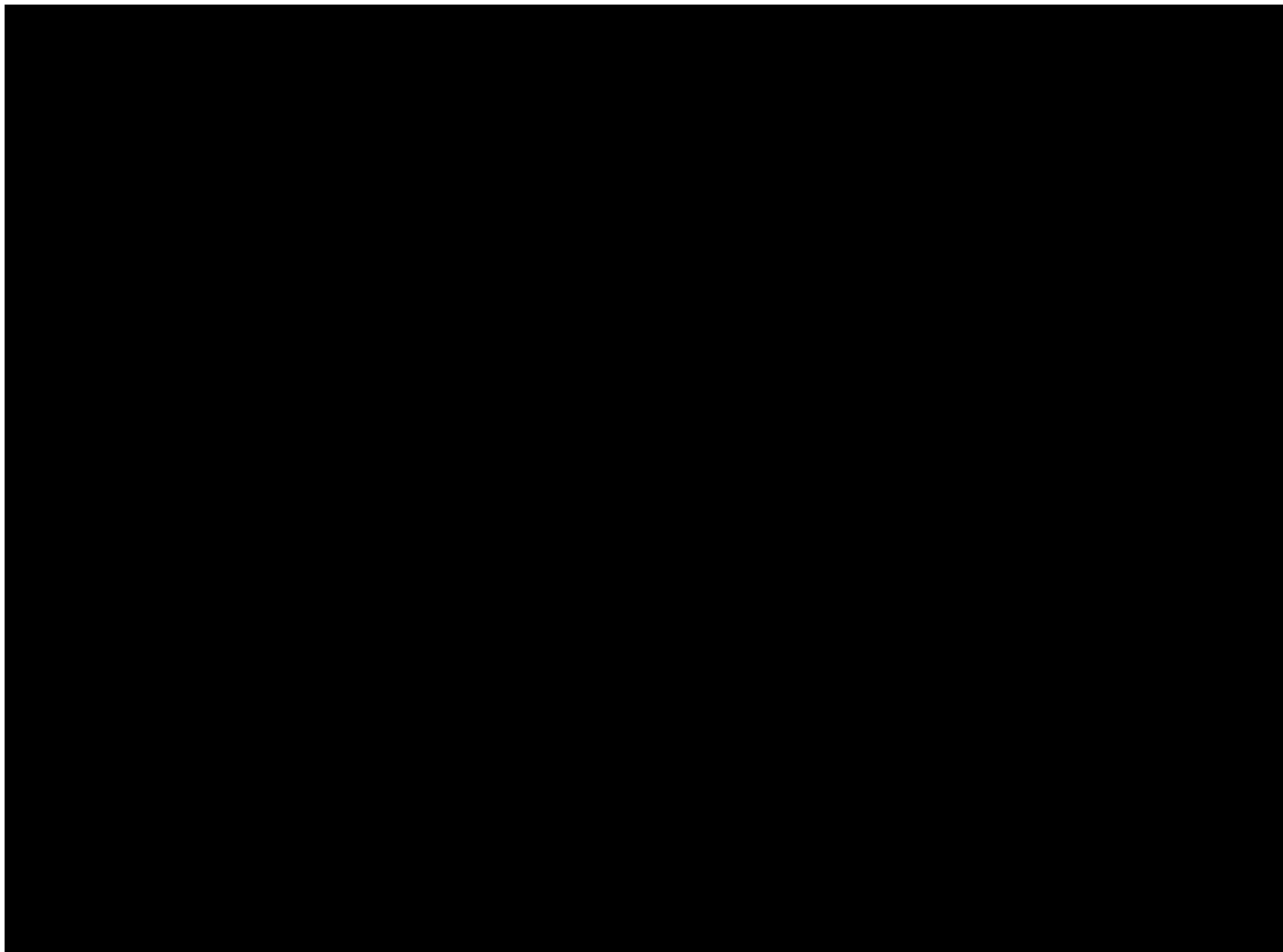


Photo 4. View during construction of northwest corner of auditorium from the interior showing the westernmost roof truss in place. The roof and ceiling framing has been installed to the next truss to the east. 1944. University of California at Los Angeles Collection.



HISTORIC PHOTOGRAPHS

Photo 5. This group is probably the construction crew, who were camp internees, with what are presumed to be some of the camp administration officials in the center row. Project Director Ralph Merritt is in the center of the middle row (sixth from right). The group is at the northwest corner of the building. May 1, 1944. Toyo Miyatake Collection, No. 1277, courtesy Archie A Miyatake, San Gabriel, California.

Toyo Miyatake became the official camp photographer and thus documented not only the construction of the auditorium, but many of the major activities that took place in the building, including high school graduation ceremonies and special events. Most of the historic photographs included in this report were taken by Mr. Miyatake, with permission for their use and prints provided by Archie A. Miyatake.

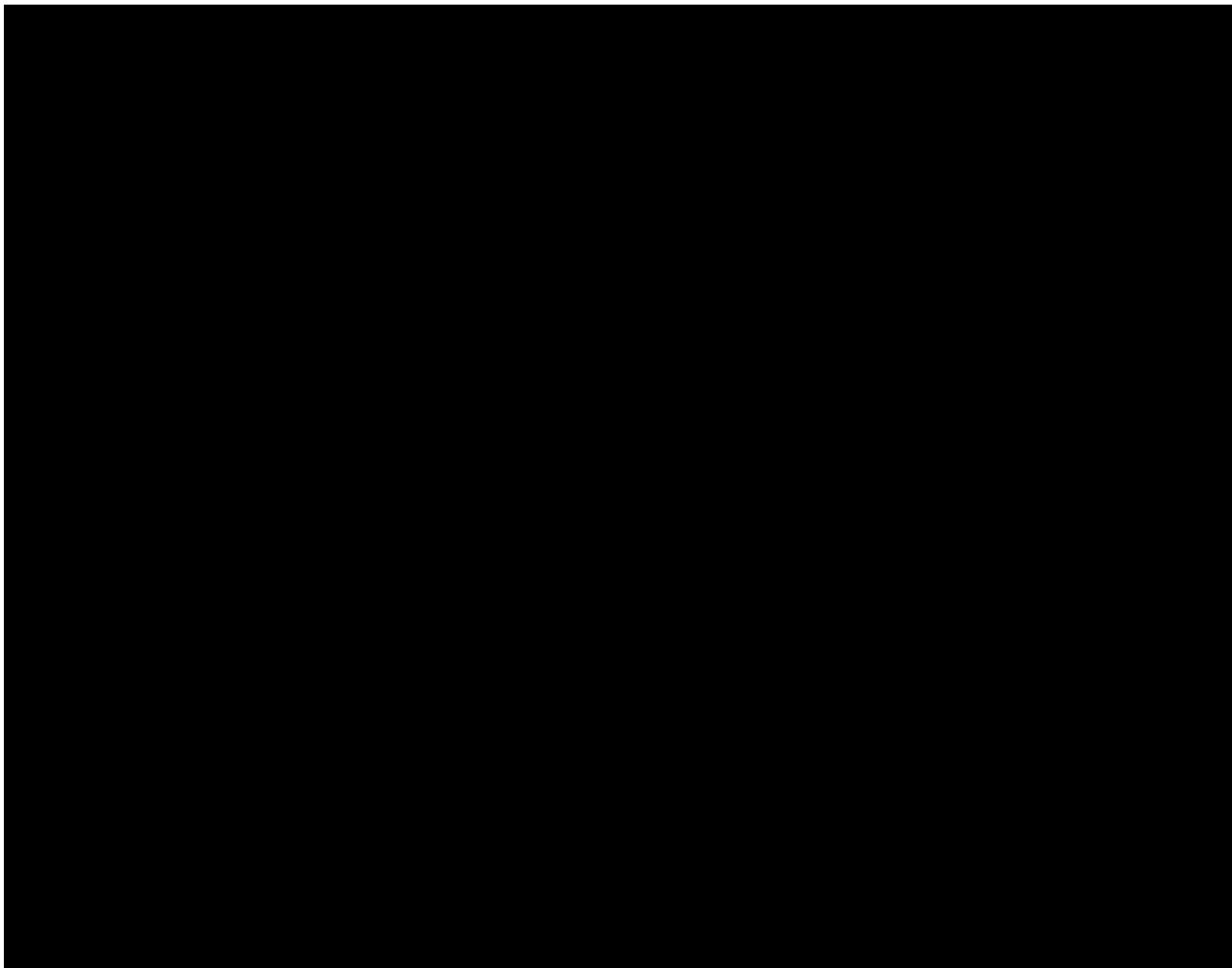


Photo 6. Construction of the framing of the projection room over the main west entrance. View toward the west from the building interior. The three openings in the lower wall would receive the entrance doors. 1944. National Archives, Neg. No. 210-GG-588.

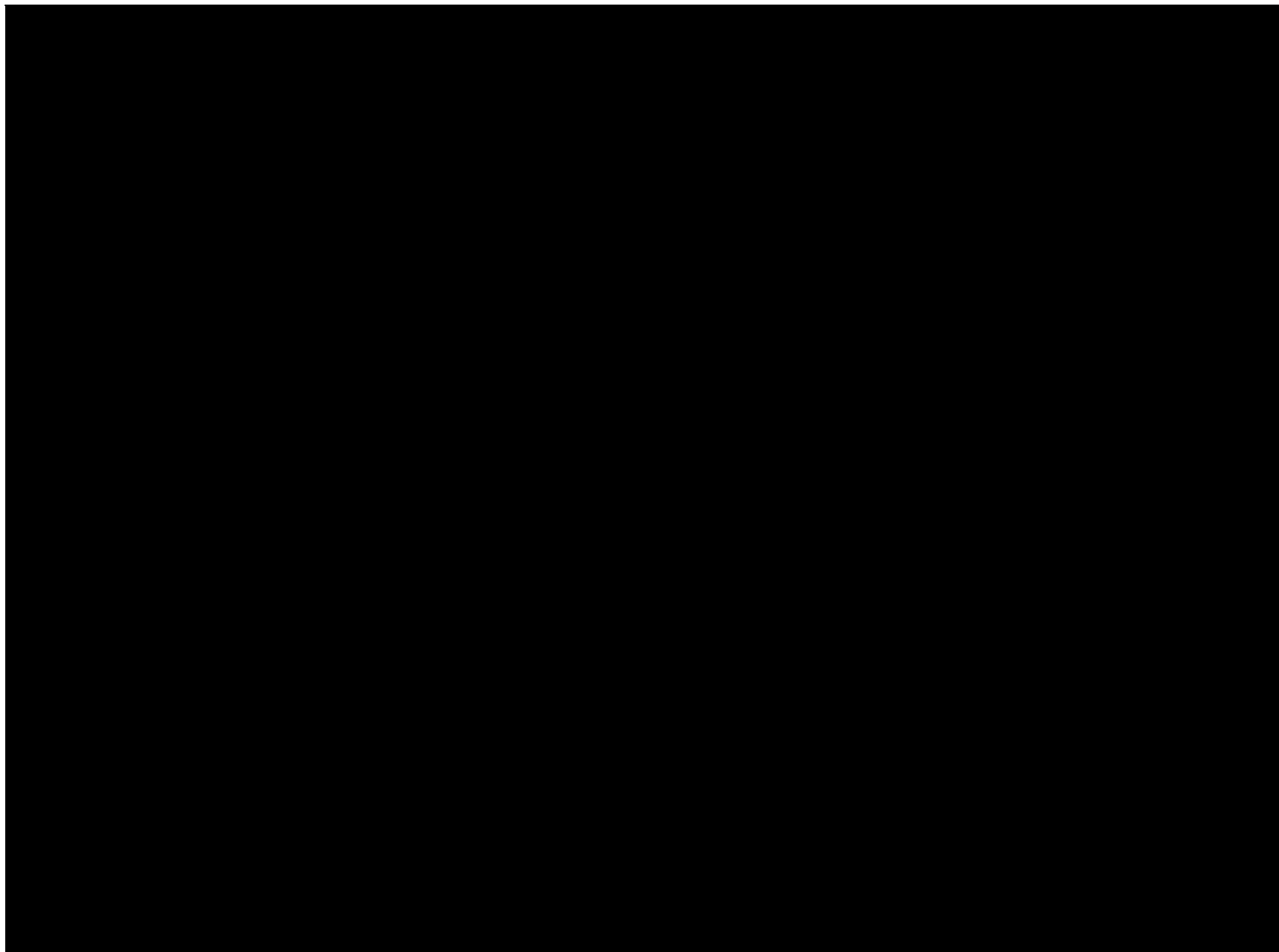


Photo 7. One of the few views of the east end of the Auditorium, this view is from the northeast. The horizontal siding has been installed on the walls of the auditorium and stage sections, but the north wing is still showing the diagonal sheathing. In the lower portion of the east stage wall is a double doorway opening flanked to each side by window openings, each of which would receive three sash units. At the northerly end of this same wall at the second floor level is also a window opening, which also would have three sash units. A similar window opening is at the opposite end of this wall, just outside the photograph. 1944. Eastern California Museum Collection, MERR 7, 94.82.1.

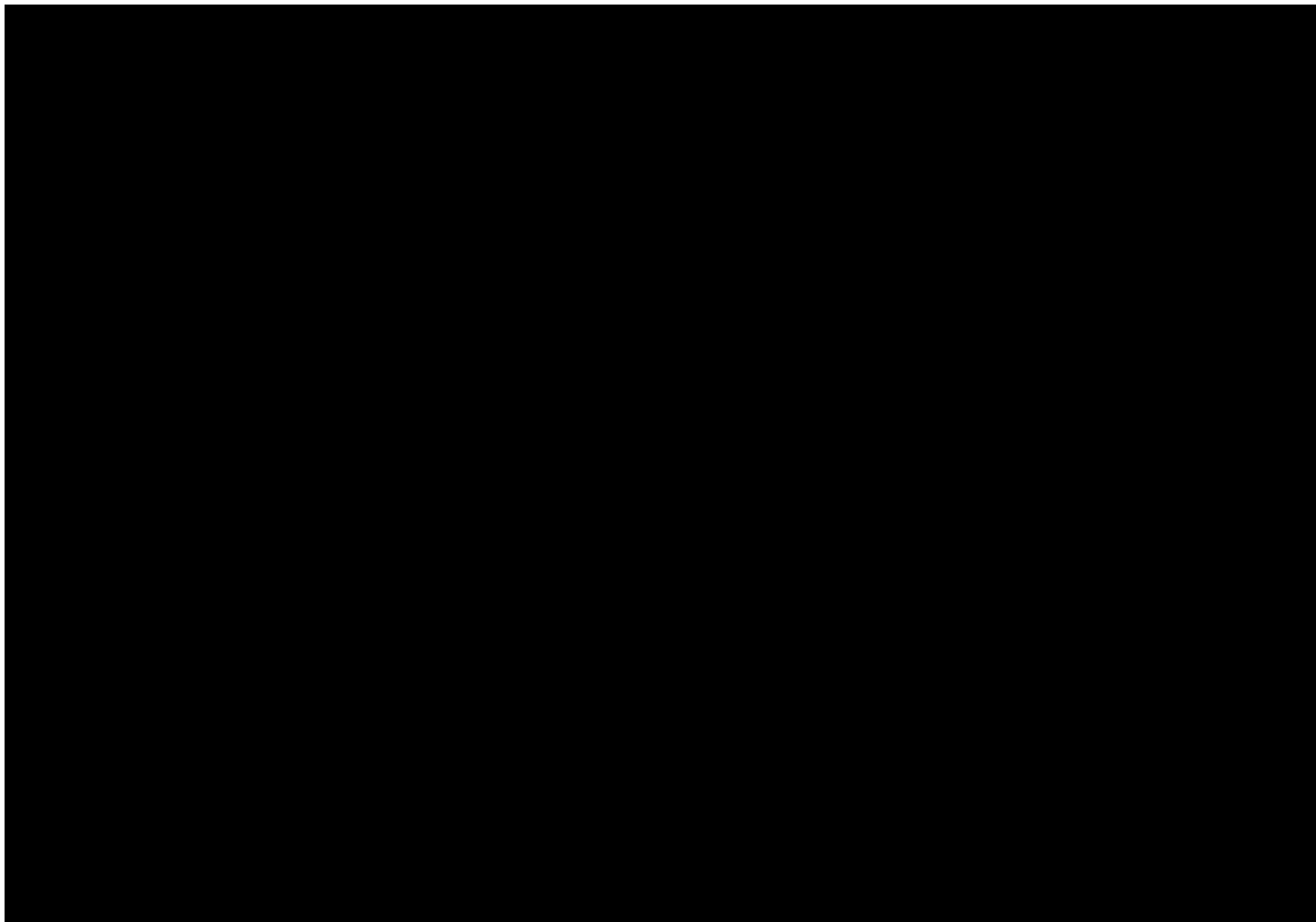


Photo 8. The completed exterior of the Manzanar Auditorium-Gymnasium, 1944 or 1945. View from the northwest of the west main entrance, with the north wing at the left. The entry walk, flagpole and some plantings are in place. A storage building still remains or has been added to the south of the entry walk. Toyo Miyatake Collection, No. 87-C, courtesy Archie A. Miyatake, San Gabriel, California.

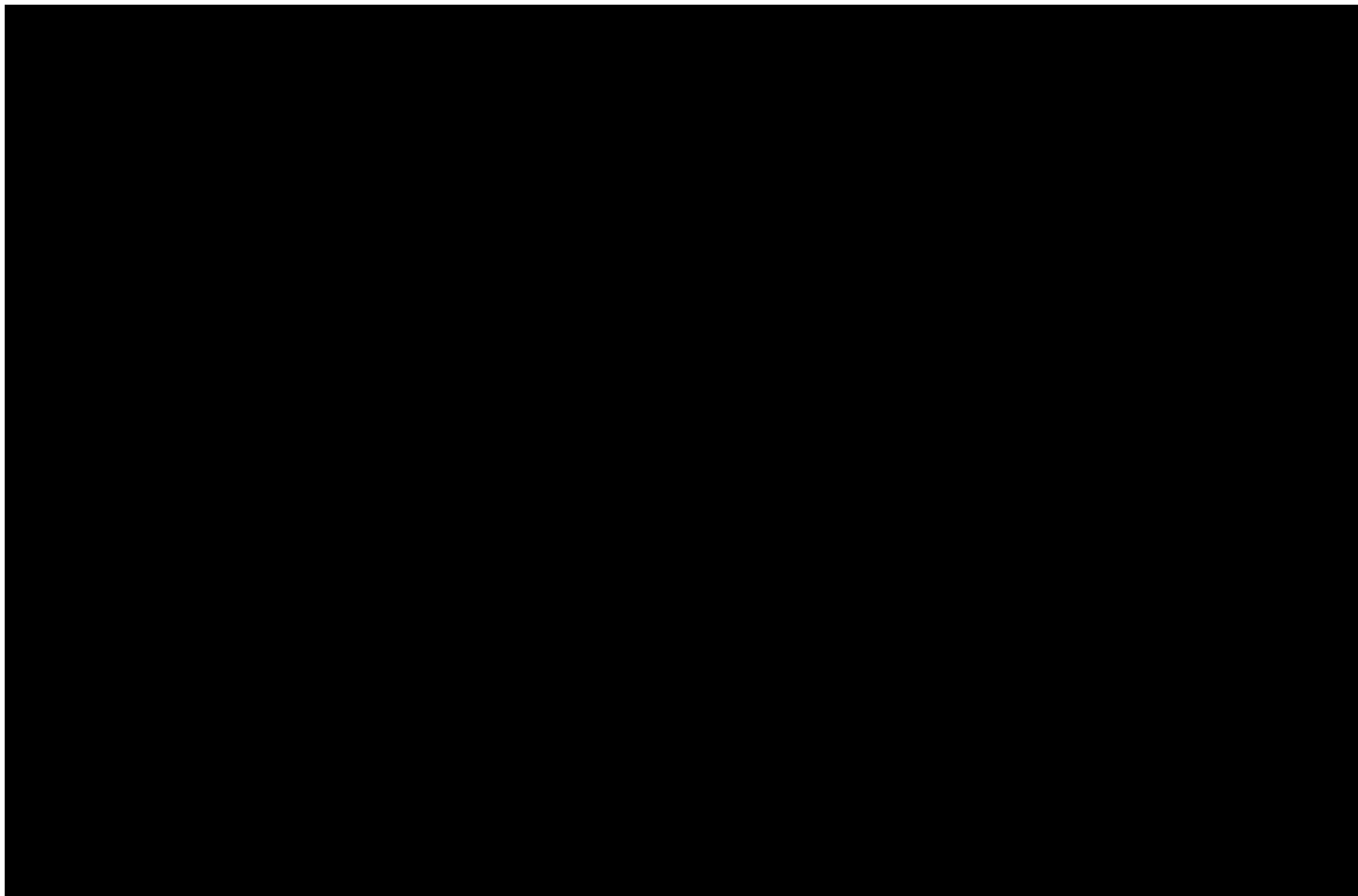


Photo 9. View from the southwest of the completed auditorium, with the south wing at the right, 1944 or 1945. The bank of louvered openings at the upper center of the west wall ventilate the attic. A similar set of louvers is found in the east wall of the attic. The ladder provided access to the roof and an attic access hatch is visible in the roof beyond the ladder. Two access hatches are also visible on the roof of the projection room. These hatches no longer exist. Access to the attic is now through one of the louver openings. The high vent stacks were furnace flues. Two inverted v-shaped ventilator covers are seen on the roof of the south wing, which were repeated on the north wing. These ventilated the shower rooms. The south wing arrangement appears to have been a mirror image of the north wing except for the extension to the east, which had considerably greater window area, and housed the health unit. Toyo Miyatake Collection, No. 87-D, courtesy Archie A. Miyatake, San Gabriel, California.

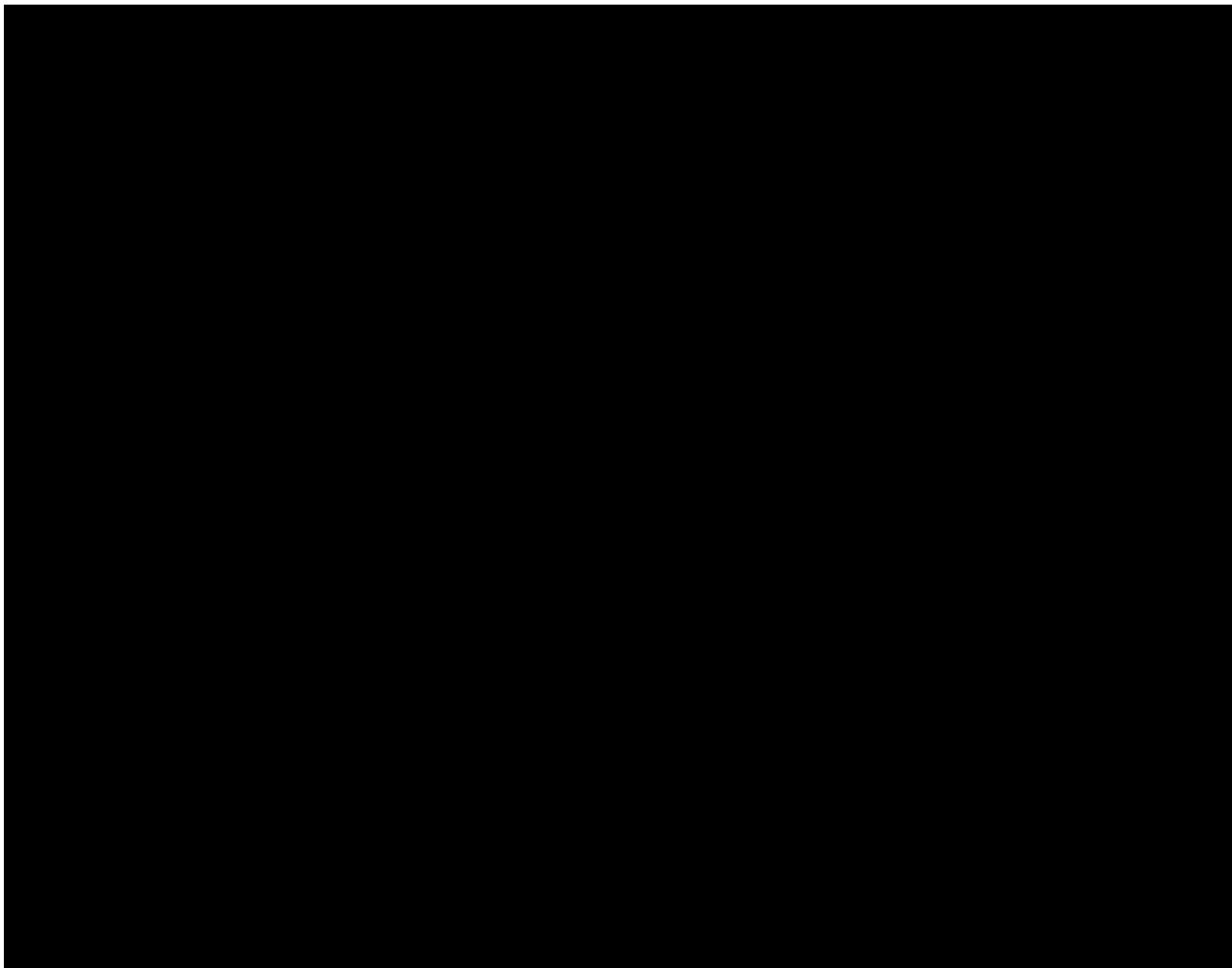


Photo 10. View toward the east from the southeast corner of the main building. At the extreme right is the northeast corner of the south wing extension which contained the health unit, which indicates that the window configuration was similar on both the north and south sides of the extension. The activity may have been a fire safety demonstration. The fire truck, at "A" Street, was one of two camp fire trucks. One of the fire trucks is now back at Manzanar, having been previously used by the City of Bishop. A second power line in the background is parallel to Highway 395. Toyo Miyatake Collection, No. 402, courtesy Archie A. Miyatake, San Gabriel, California.

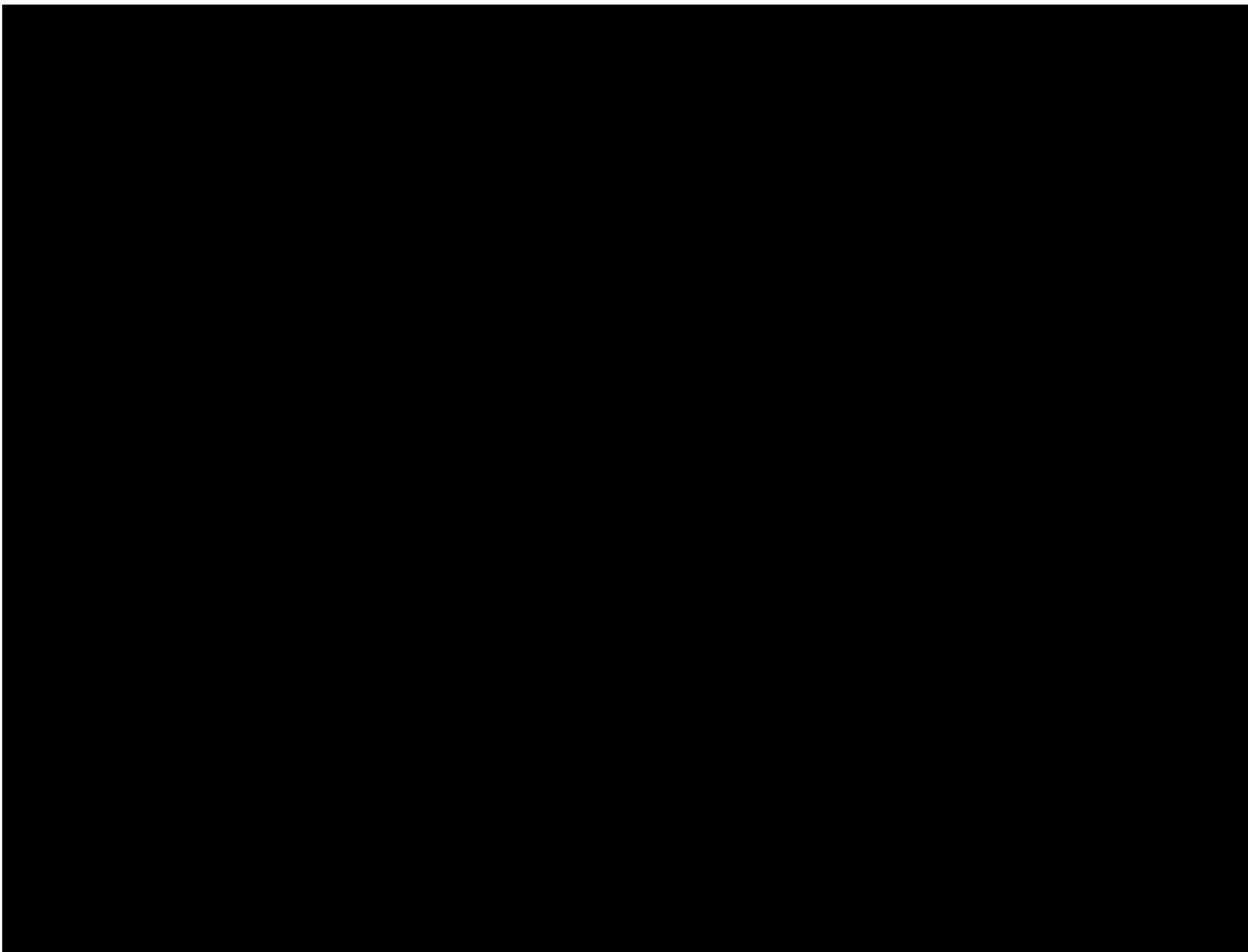


Photo 11. Persons gathered at the west entrance to the auditorium are found in other photos dating this photo to April 5, 1945. The ceremony was a memorial service for Sgt. Kiyoshi Robert Nakasaki and Pfc. Sadao Munemori, who were killed in action in Italy. Because there are no flowers or shrubs in the planting beds or adjacent to the entrance walk, it is possible that other photos showing plantings were taken later in 1945. Toyo Miyatake Collection, No. 169, courtesy Archie A. Miyatake, San Gabriel, California.

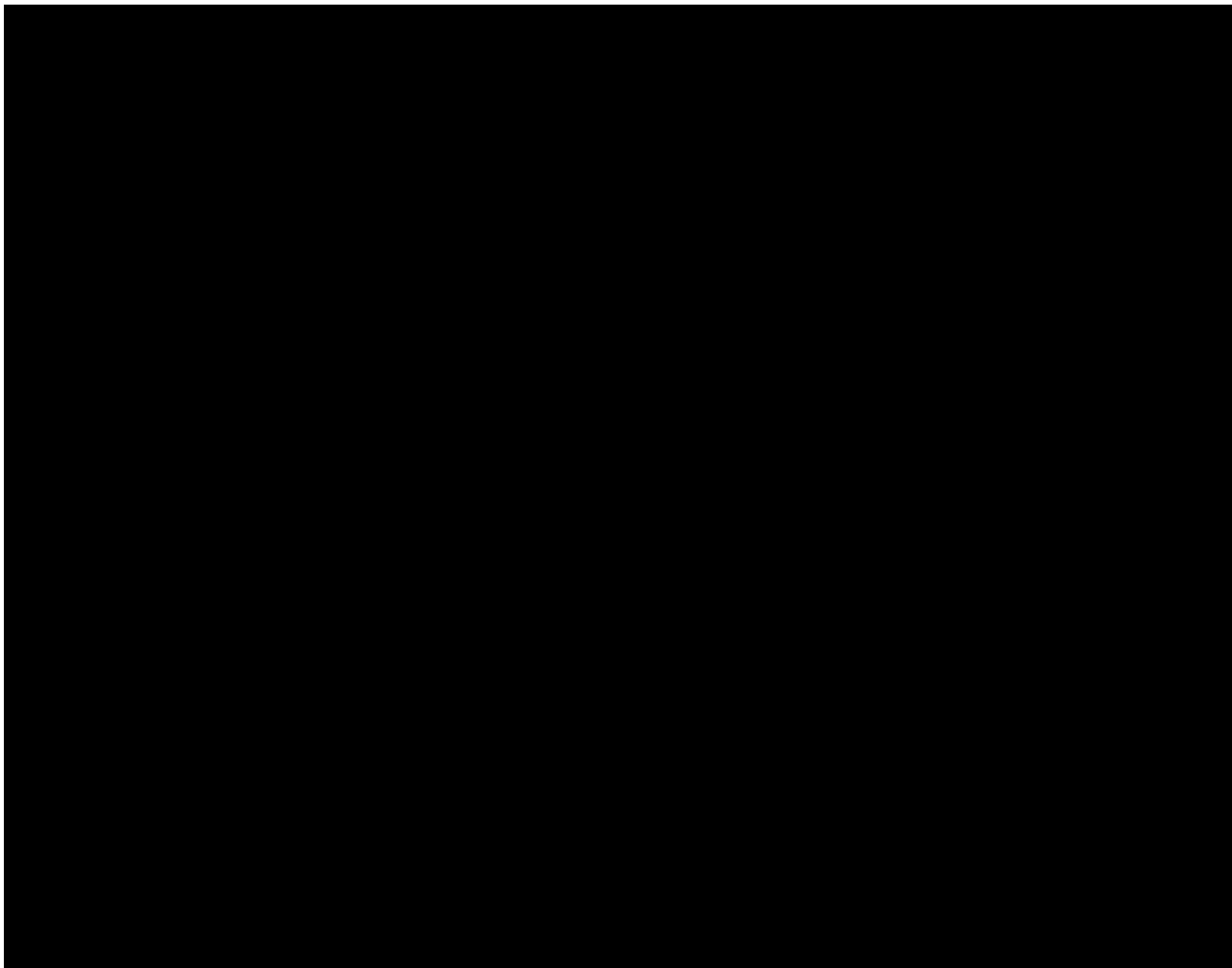


Photo 12. View, probably in 1945, toward the southwest from the west main entrance of the auditorium showing plantings along the entrance walk. The barracks in the background are in Block 8. Toyo Miyatake Collection, No. 415, courtesy Archie A. Miyatake, San Gabriel, California.

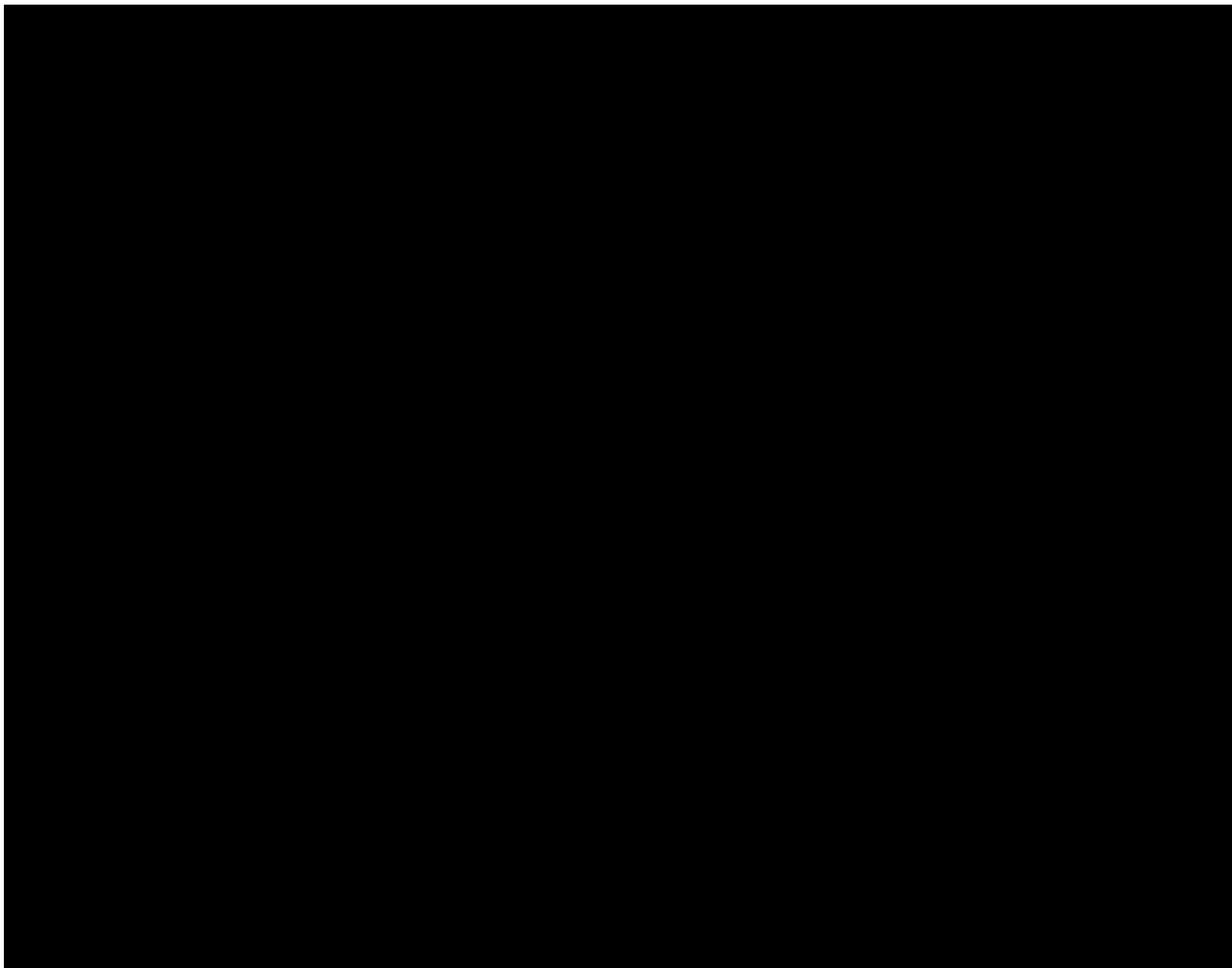


Photo 13. Auditorium interior, probably during the first high school graduation ceremony, held in 1944. The interior work had not yet been completed. The painting was incomplete – the wall wainscot paint colors are not yet finished and the doors and trim do not have their finish colors. Also the seating appears to be all folding wooden chairs, indicating that the wooden benches had not yet been built or completed. Although the stage backdrop curtains are not visible here, which could imply they were still being made, it is possible that they are pulled upward or aside because they do not appear in some later photos. Toyo Miyatake Collection, No. 691, courtesy Archie A. Miyatake, San Gabriel, California.

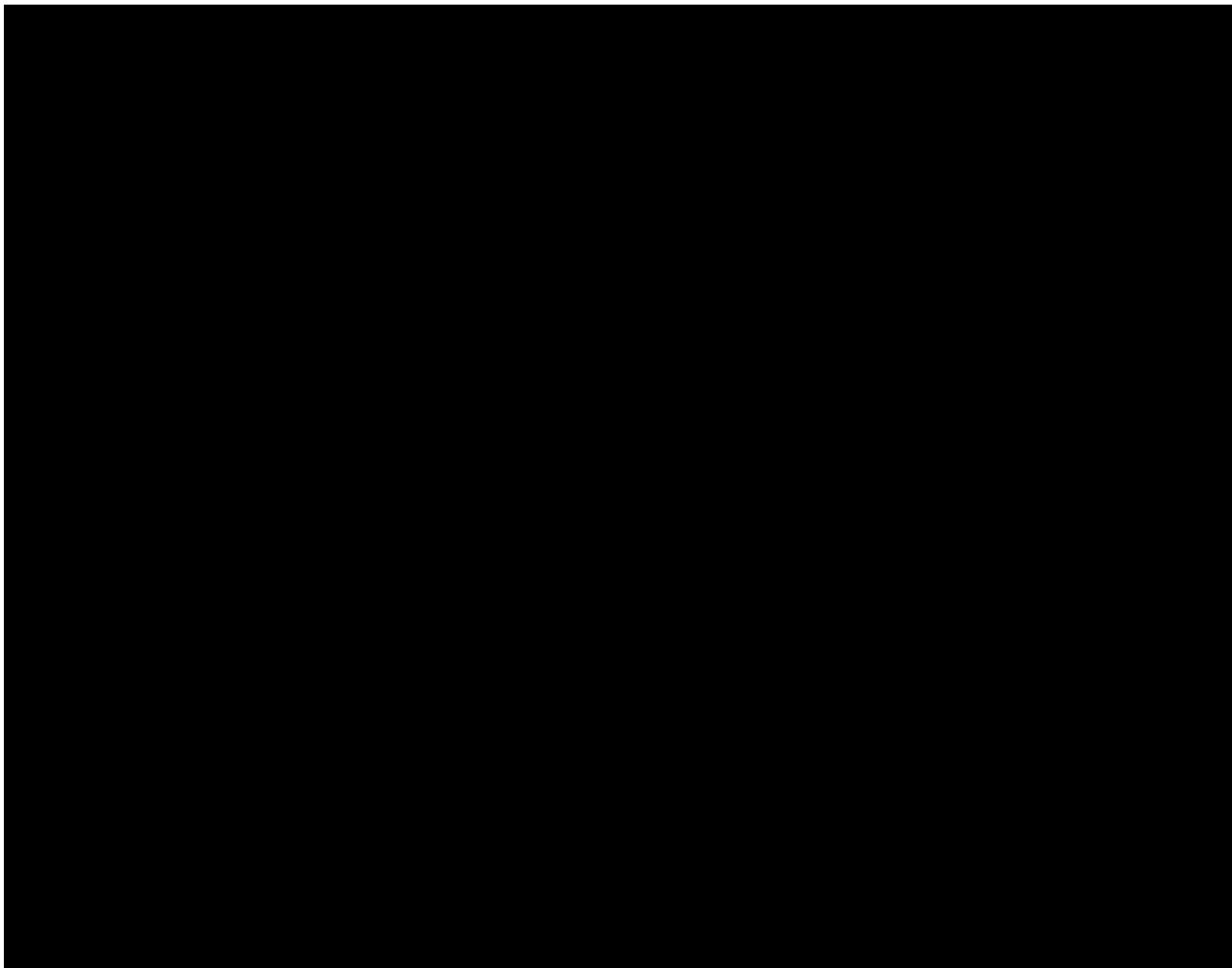


Photo 14. In this view later in 1944 or possibly in 1945 of the auditorium stage, it can be seen that the painting has been completed, with medium and darker brown used on the doors and trim and for the wainscoting delineation on the walls. The northeast and southeast exit doorways are also visible and the wooden benches are in use. The ceiling light fixtures and hot air circulation units are still in place. Toyo Miyatake Collection, No. 91, courtesy Archie A. Miyatake, San Gabriel, California.

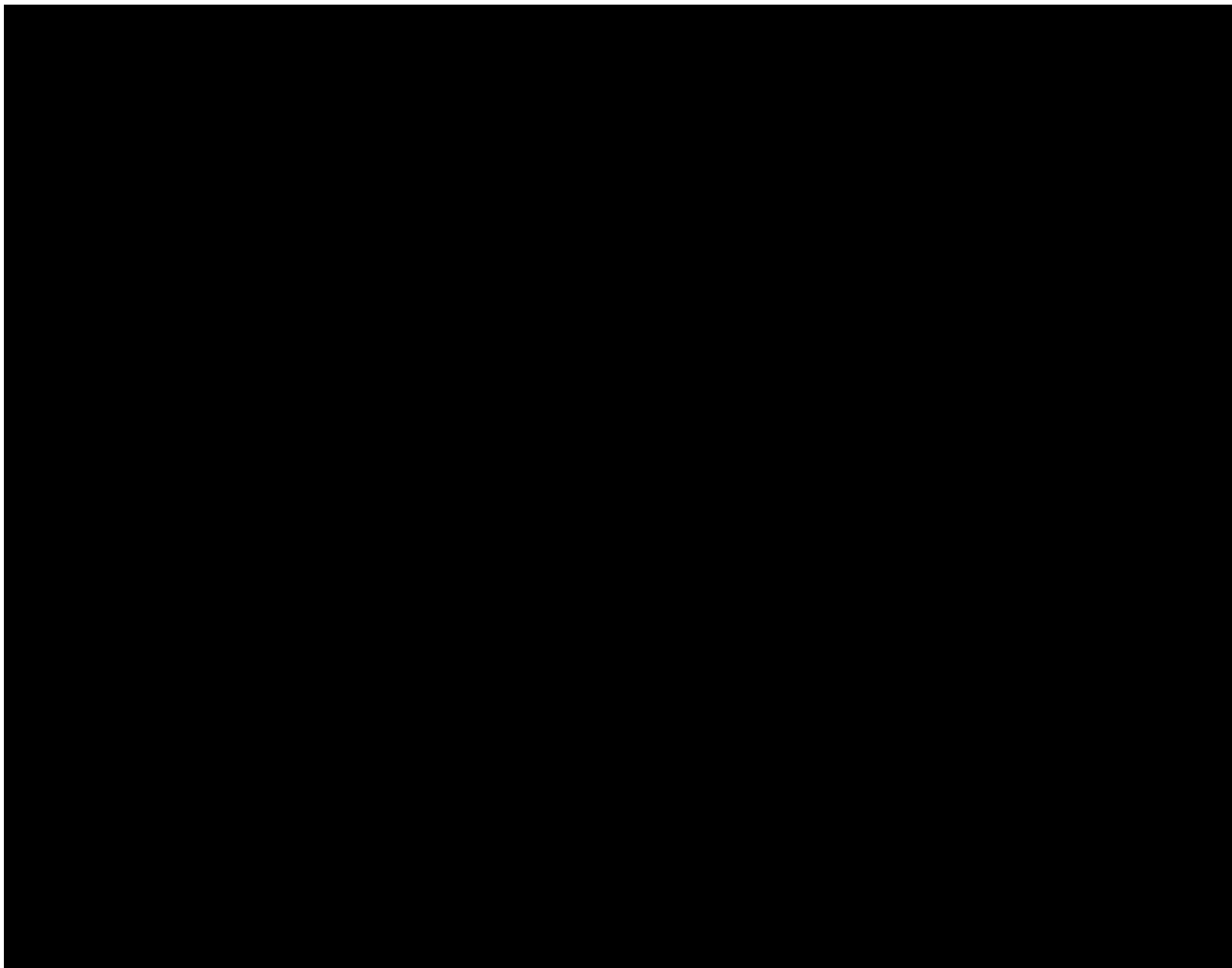


Photo 15. High School graduation ceremony in 1945. Here again is illustrated the final paint scheme. The stage backdrop curtains are shown and curtains at the north windows can be seen at the extreme left. Toyo Miyatake Collection, No. 703, courtesy Archie A. Miyatake, San Gabriel, California.

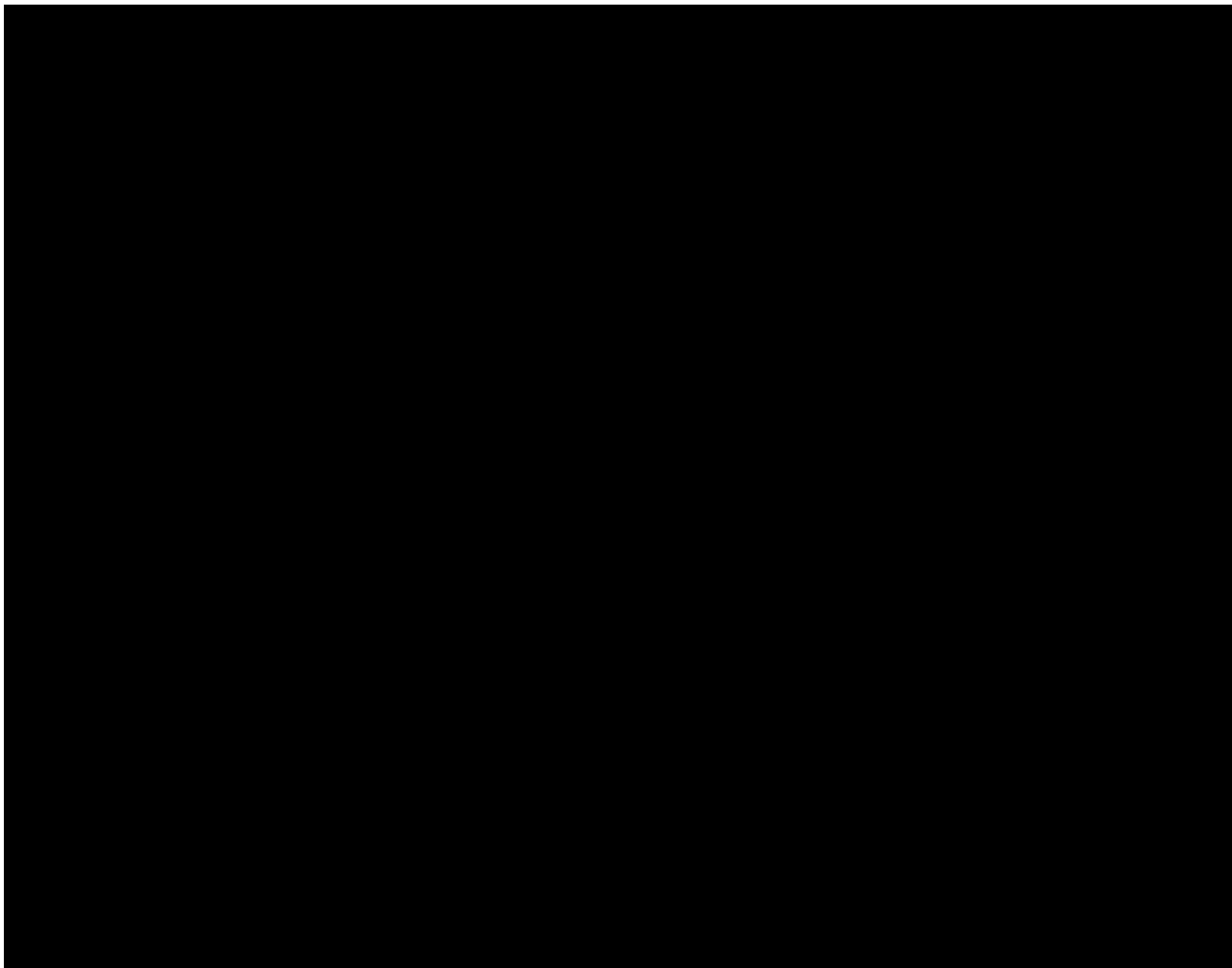
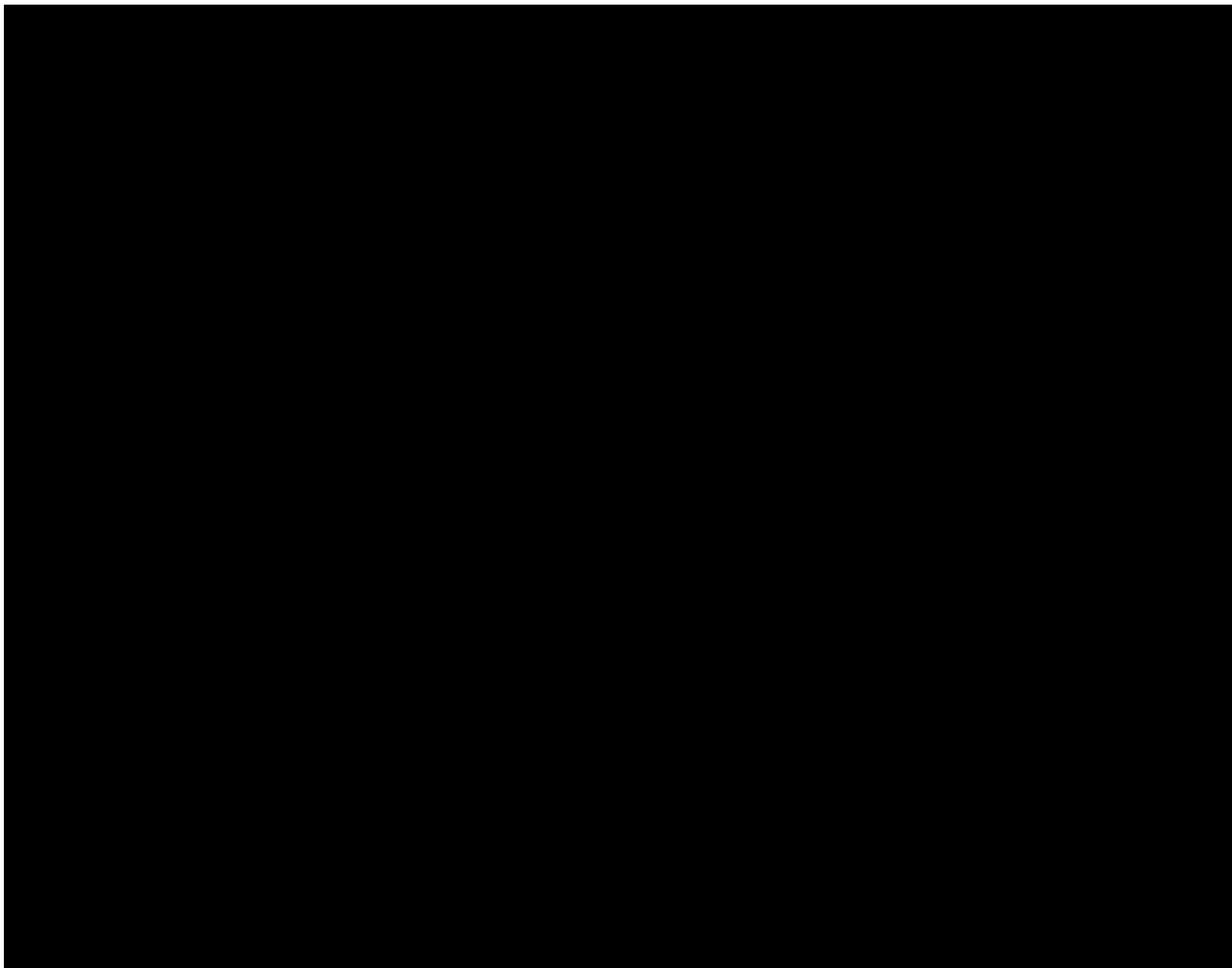


Photo 16. In the background are the three main entrance doorways in the interior west wall of the auditorium during the 1944 high school graduation showing that the walls, doors and trim had not yet been given their finish coats of paint. Toyo Miyatake Collection, No. 694, courtesy Archie A. Miyatake, San Gabriel, California.



HISTORIC PHOTOGRAPHS

Photo 17. The west interior wall of the auditorium during the 1945 high school graduation ceremony showing the final paint scheme. Window curtains (including black curtains for daytime movie viewings as well as evening “blackout” use) are seen as well as the wooden benches. Toyo Miyatake Collection, No. 702, courtesy Archie A. Miyatake, San Gabriel, California.

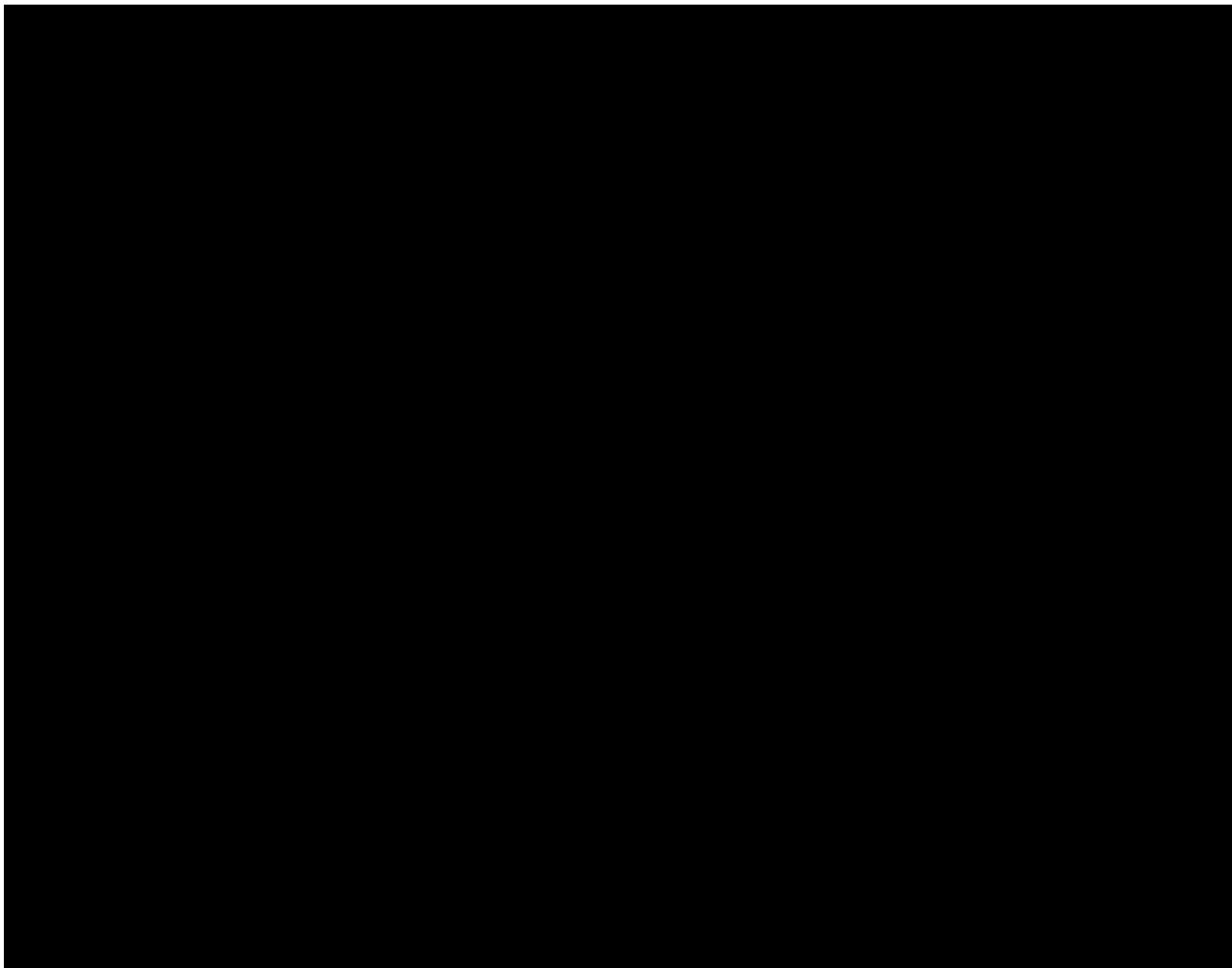
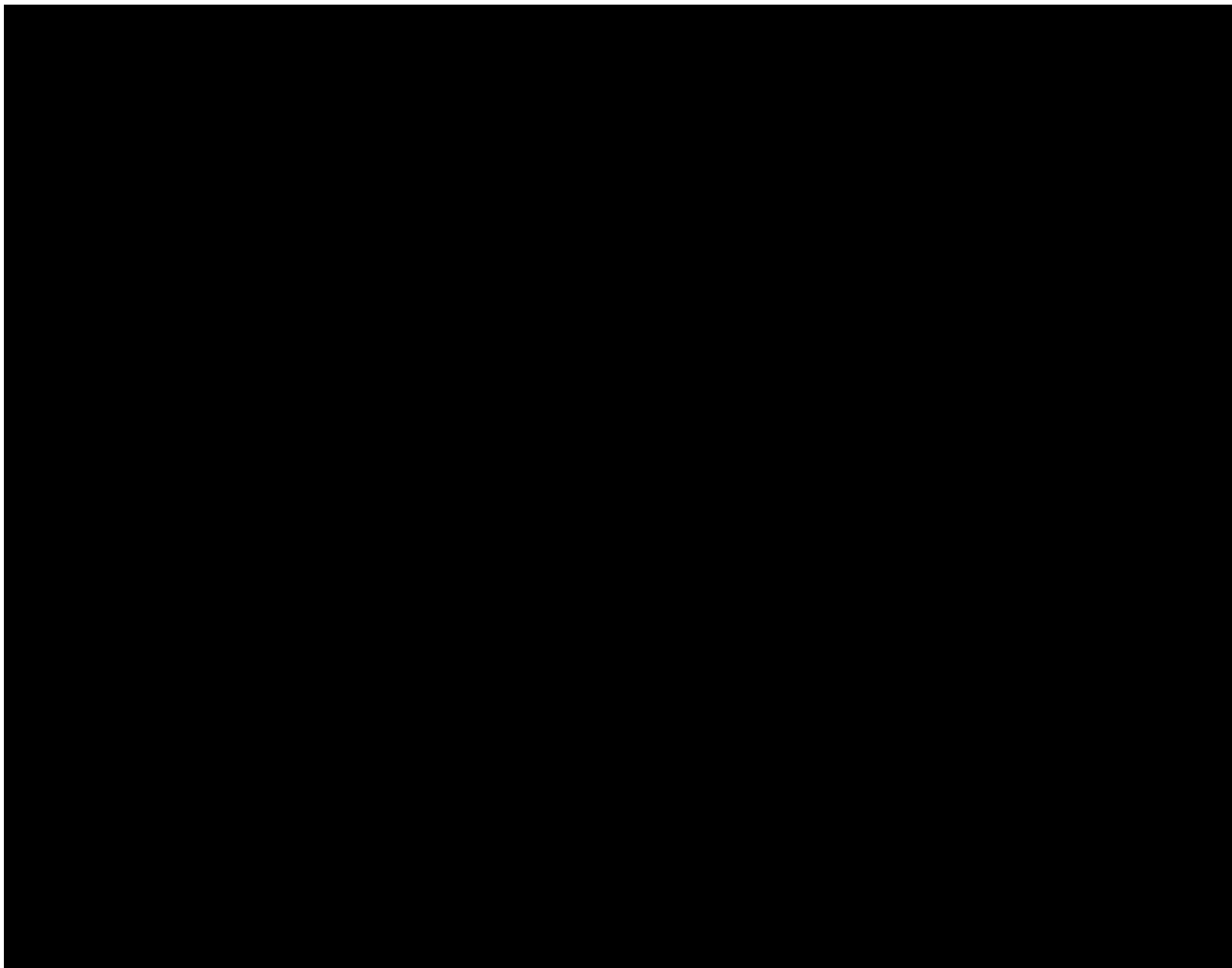
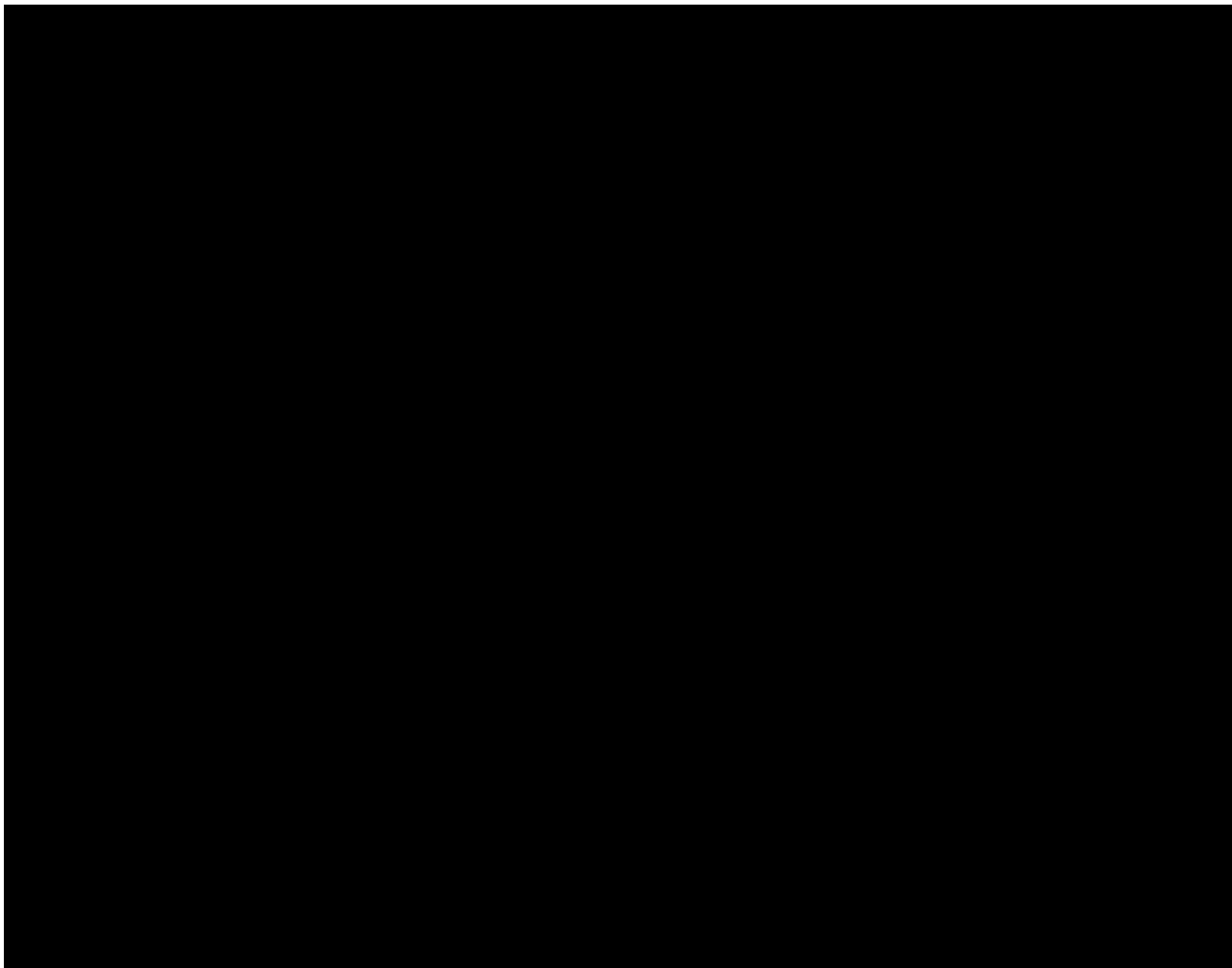


Photo 18. This view toward the southwest corner of the auditorium also provides a close-up view of the wooden benches. 1944 or 1945. The window curtains had not been installed at this time. Fire extinguishers are seen on two of the columns of the south wall. The hangers or evidence of their locations are extant. Toyo Miyatake Collection, No. 171-i(L), courtesy Archie A. Miyatake, San Gabriel, California.



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Photo 19. West wall and northwest corner of auditorium, probably in 1945. The window and black-out curtains are seen at the north windows. A long pole in the northwest corner may have been for operating the windows. Only every other sash unit of the lowest row were operable. Toyo Miyatake Collection, No. 286, courtesy Archie A. Miyatake, San Gabriel, California.



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Photo 20. West main entrance of auditorium, April 5, 1945. Photo taken during the memorial service for Sgt. Kiyoshi Robert Nakasaki and Pfc. Sadao Munemori. The entry portico was divided by two simple posts. At the left (north) side the ticket booth door and window are visible, both of which are still extant. Toyo Miyatake Collection, No. 170-B, courtesy Archie A. Miyatake, San Gabriel, California. This photo is also in the Eastern California Museum Collection, Brown Album.

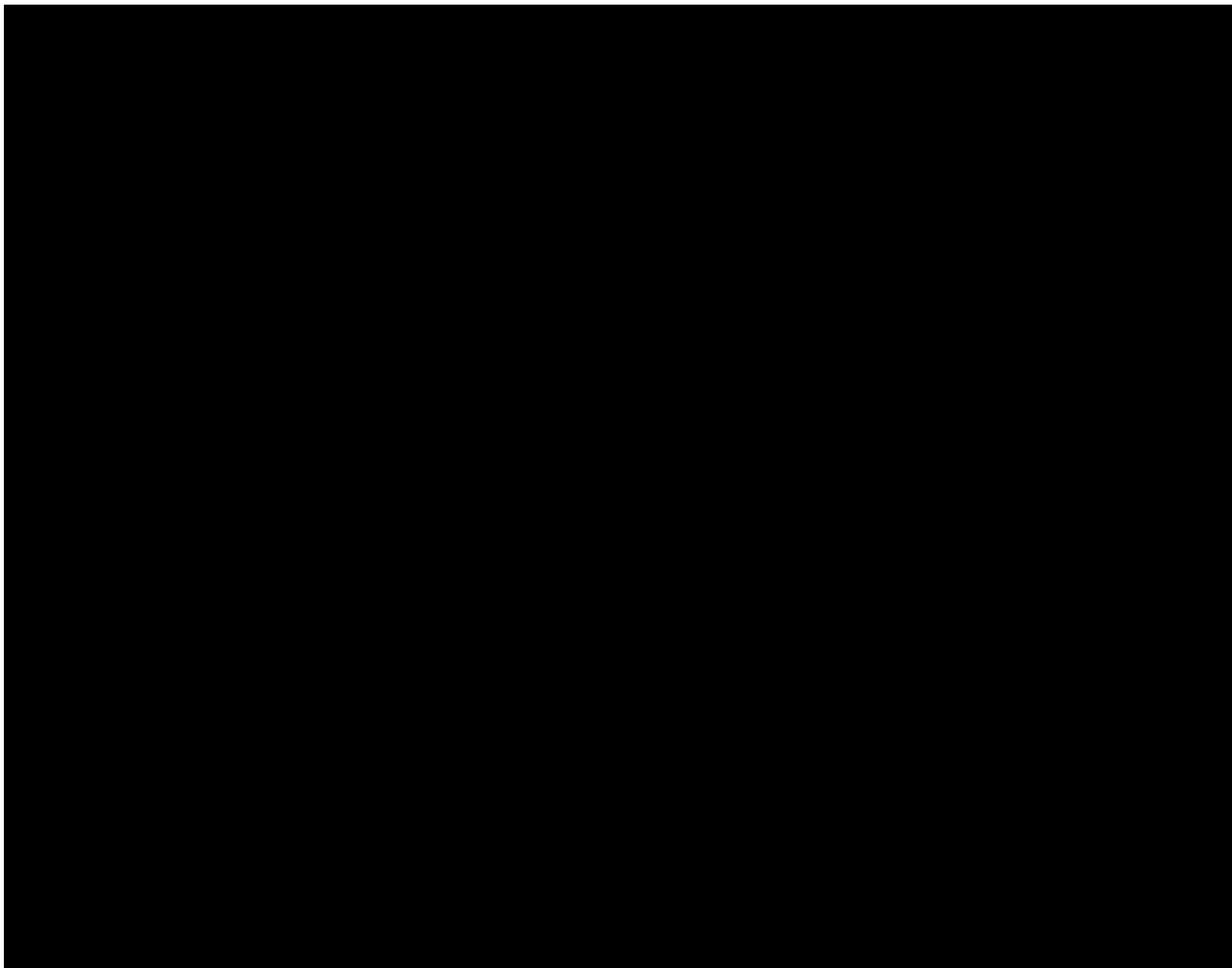


Photo 21. Another view at the west main entrance during the April 5, 1945 memorial service showing details at the doorways. The three double entry door sets and the closers are no longer in place but the light sockets are extant. Toyo Miyatake Collection, No. 170-A, courtesy Archie A. Miyatake, San Gabriel, California.

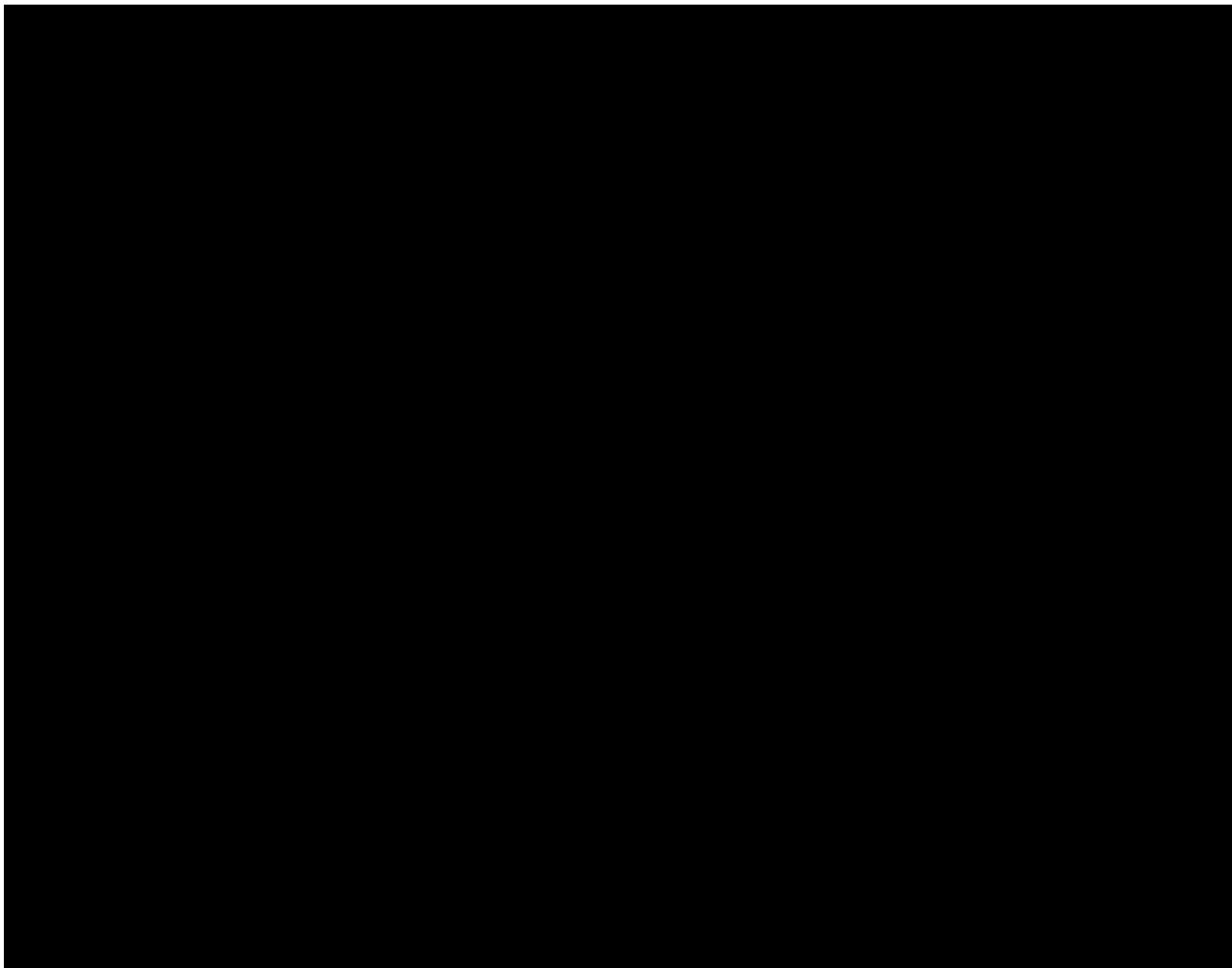
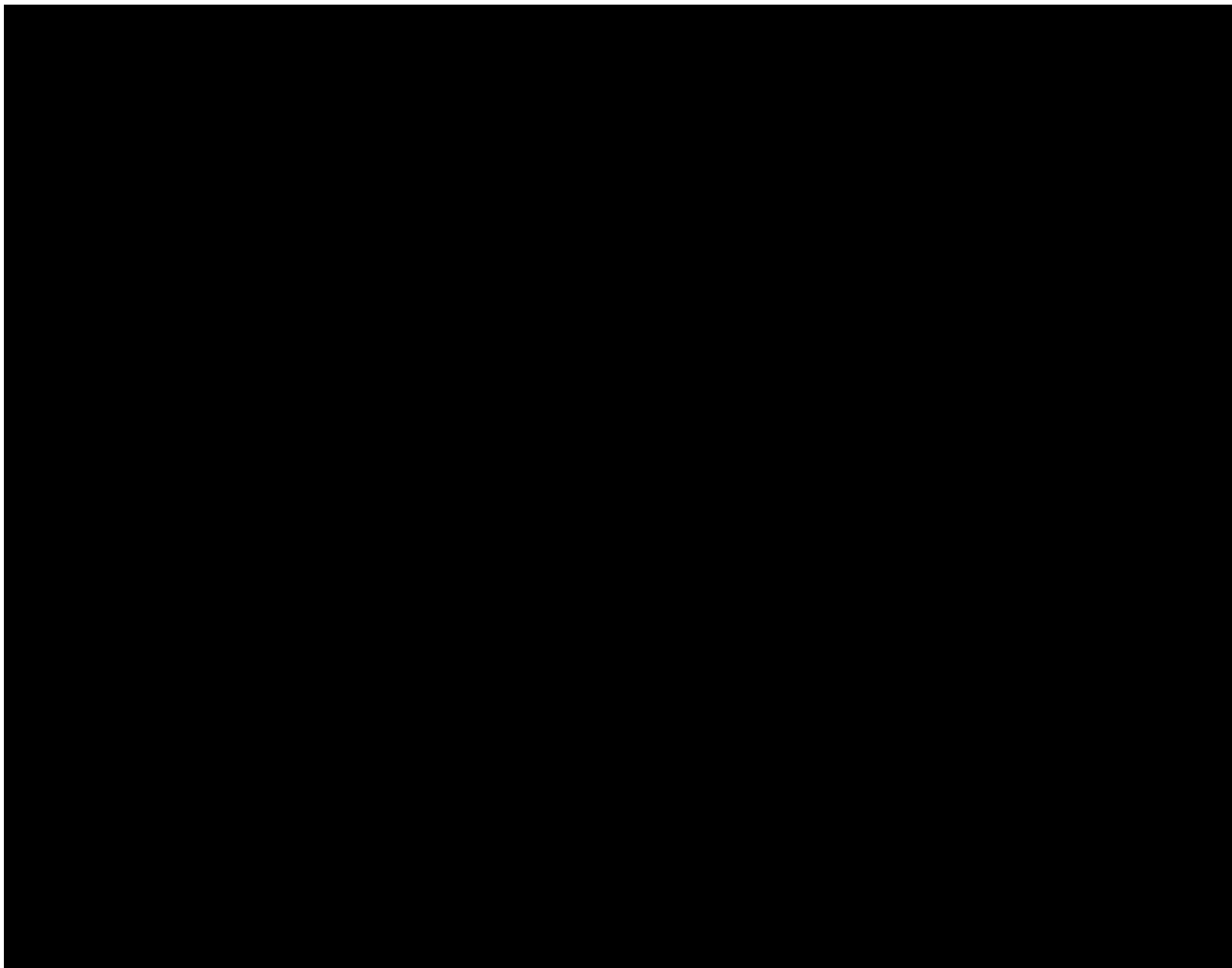
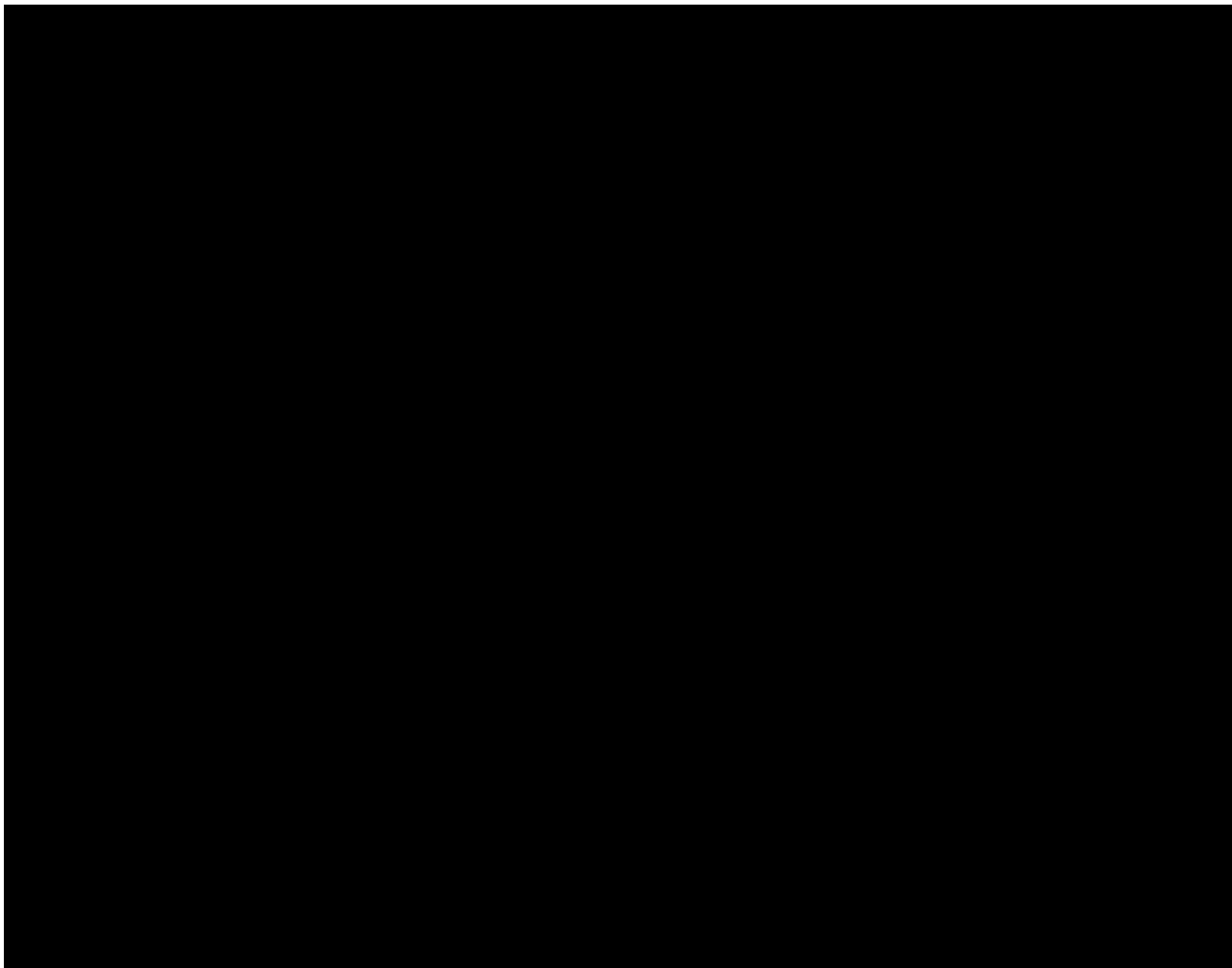


Photo 22. South wall of auditorium interior. This view toward the southwest corner shows in clear detail the windows, a fire extinguisher at the far column, bolting of the built-up columns and the painting scheme. The window curtains however are not yet in place. 1944 or 1945. Toyo Miyatake Collection, No. 614, courtesy Archie A. Miyatake, San Gabriel, California.



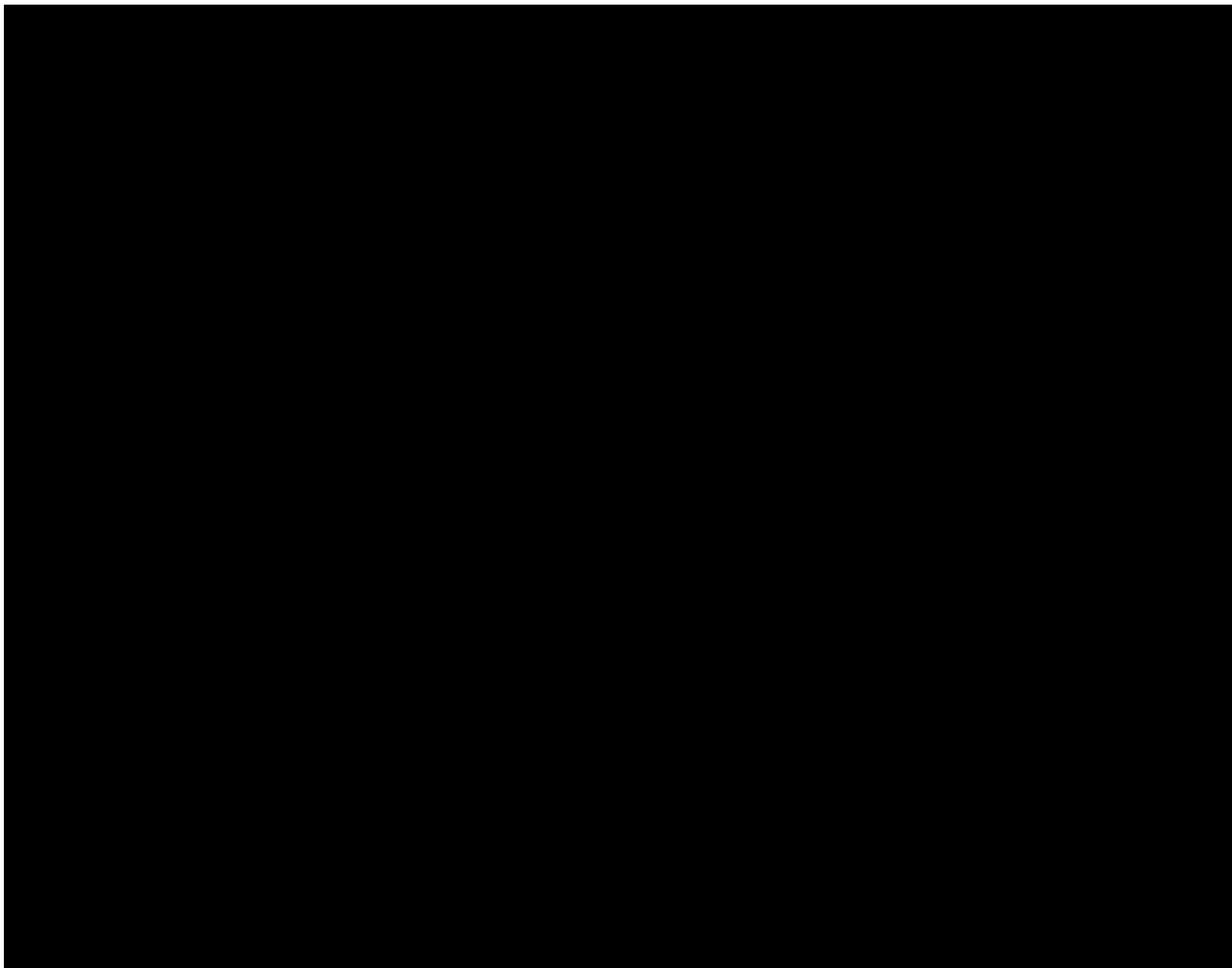
HISTORIC PHOTOGRAPHS

Photo 23. Auditorium interior south wall, view toward southeast corner. 1944 or 1945 Toyo Miyatake Collection, No. 541, courtesy Archie A. Miyatake, San Gabriel, California.



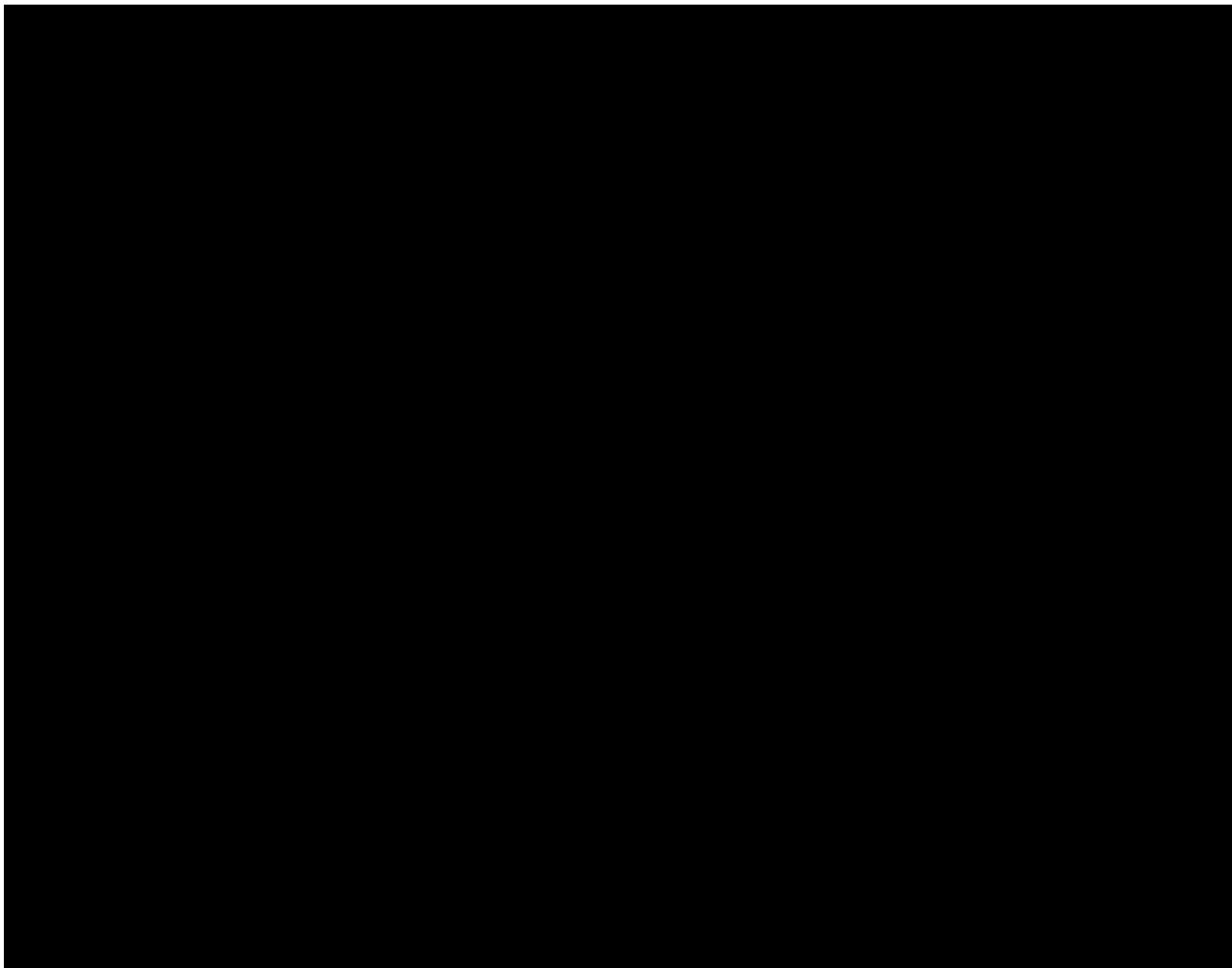
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Photo 24. Northwest corner and north wall of auditorium interior. 1944 or 1945. Toyo Miyatake Collection, No. 189, courtesy Archie A. Miyatake, San Gabriel, California.



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Photo 25. Auditorium interior, northeast corner and front of stage, 1944 or 1945. Toyo Miyatake Collection, No. 191, courtesy Archie A. Miyatake, San Gabriel, California.



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Photo 26. Southeast corner of auditorium interior, 1944 or 1945. For some activities, the stage became temporary storage for the benches. Toyo Miyatake Collection, No. 817, courtesy Archie A. Miyatake, San Gabriel, California.

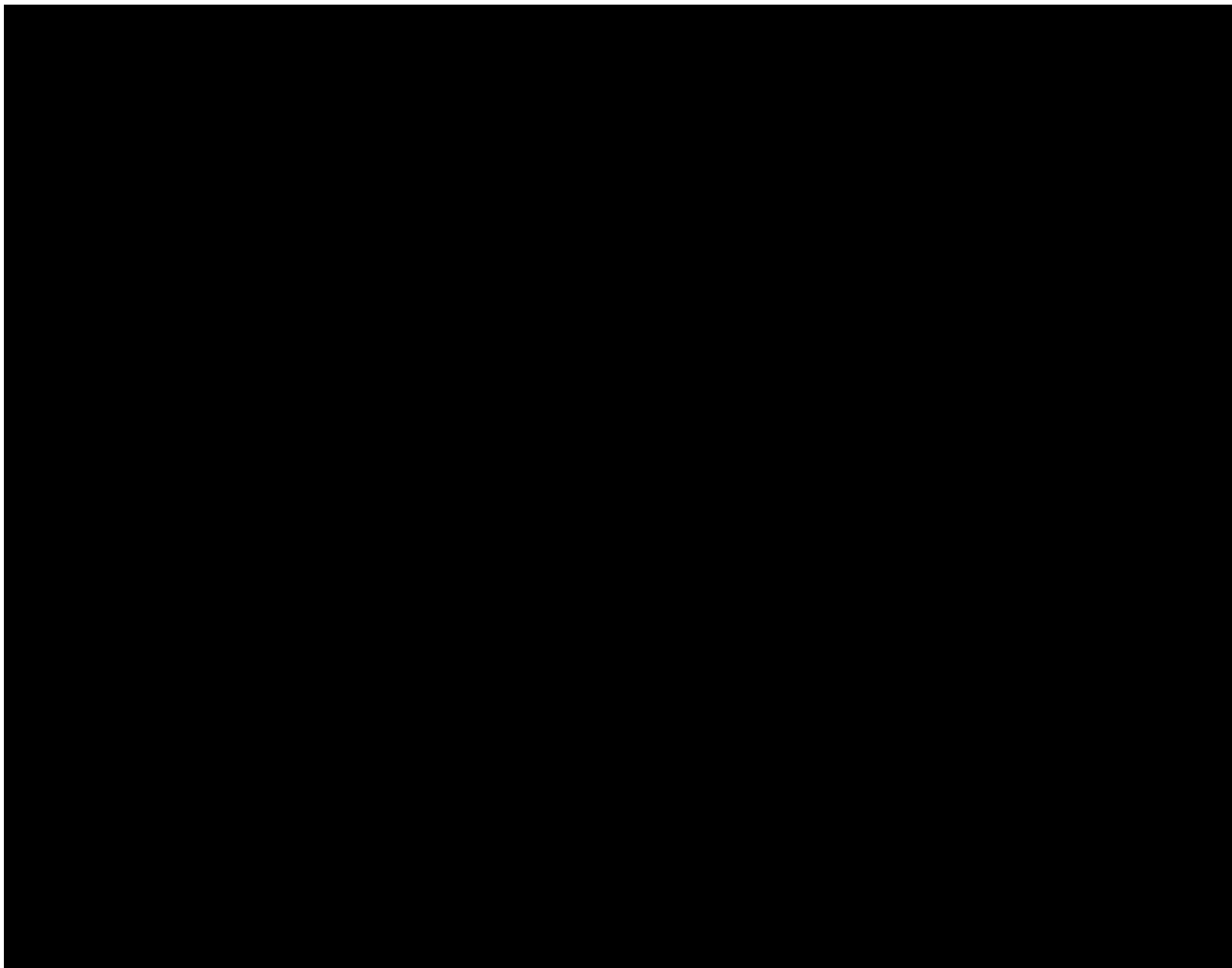


Photo 27. Manzanar Project Director Ralph P. Merritt delivering eulogy during memorial service for Pfc. Arikawa, first evacuee from Manzanar to be killed in action while serving in the U.S. Army. August 6, 1944. The stage curtains may have been taken down for resumption of painting. The door had not yet been installed in the opening in the upper left corner of the stage space. The doorway was to an unfinished room at the north side of the stage space. There is a similar space at the south side. There is no evidence of either stair or ladder access to either space. Toyo Miyatake Collection, No. 171-D, courtesy Archie A. Miyatake, San Gabriel, California.

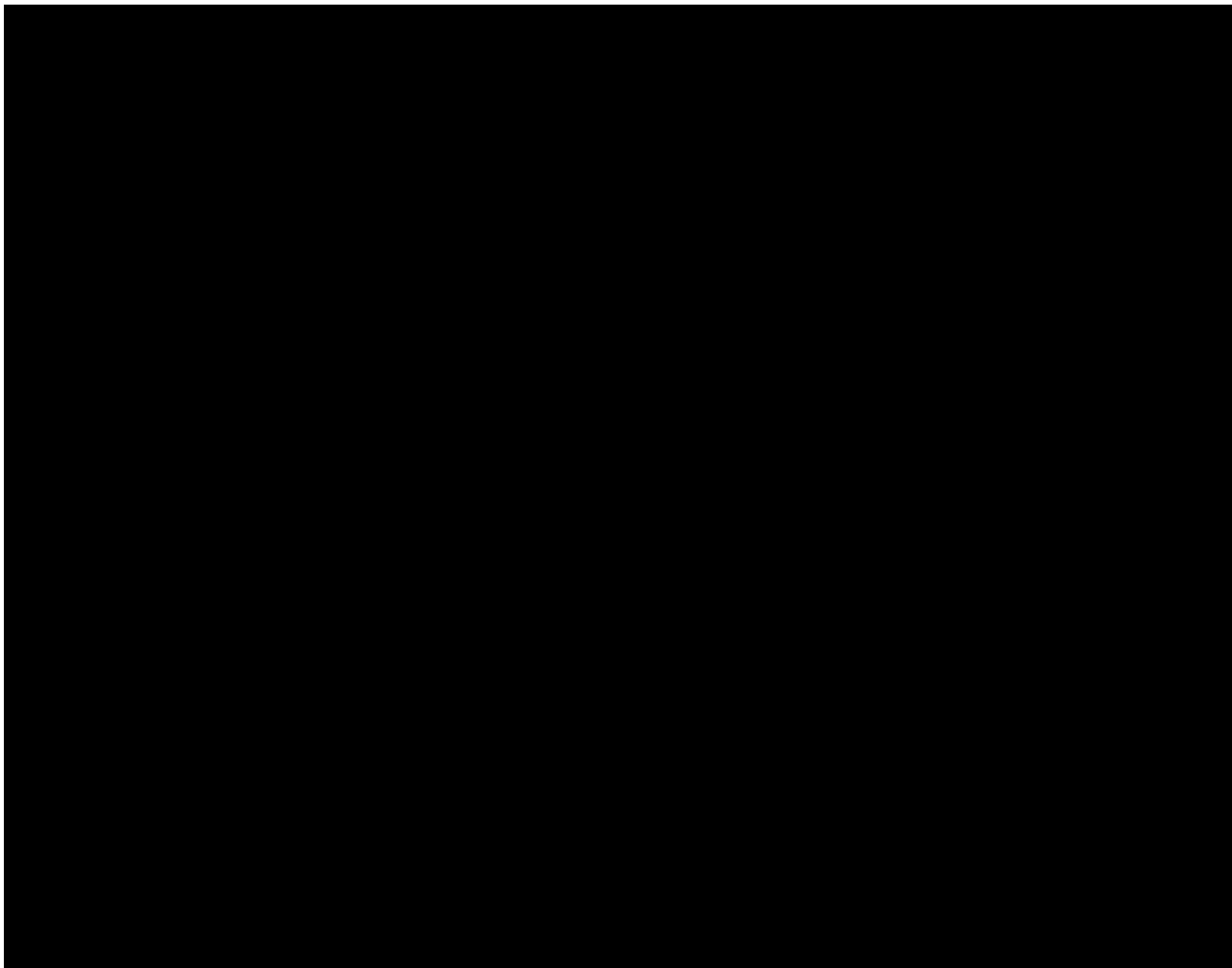


Photo 28. Another view of the north side of the stage. At this time, possibly late 1944, the door had been installed at the upper stage level, additional painting completed and some stage curtains rehung. Toyo Miyatake Collection, No. 708-B, courtesy Archie A. Miyatake, San Gabriel, California.

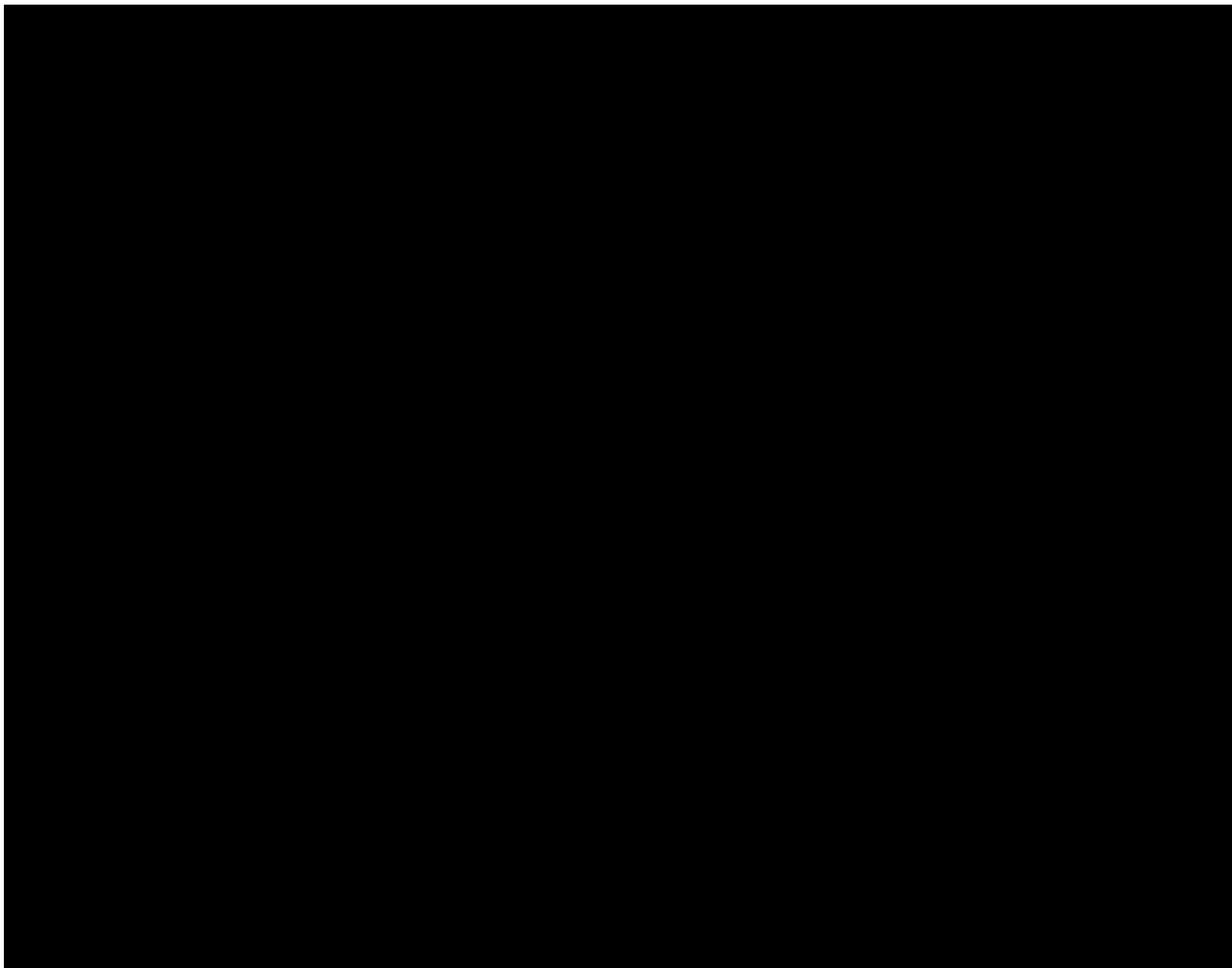


Photo 29. View of stage, possibly late 1944, after the doors leading off-stage had been installed and probably most of the painting completed. The stage curtains that had been installed earlier have probably been taken down for the painting work. Toyo Miyatake Collection, No. 843, courtesy Archie A. Miyatake, San Gabriel, California.

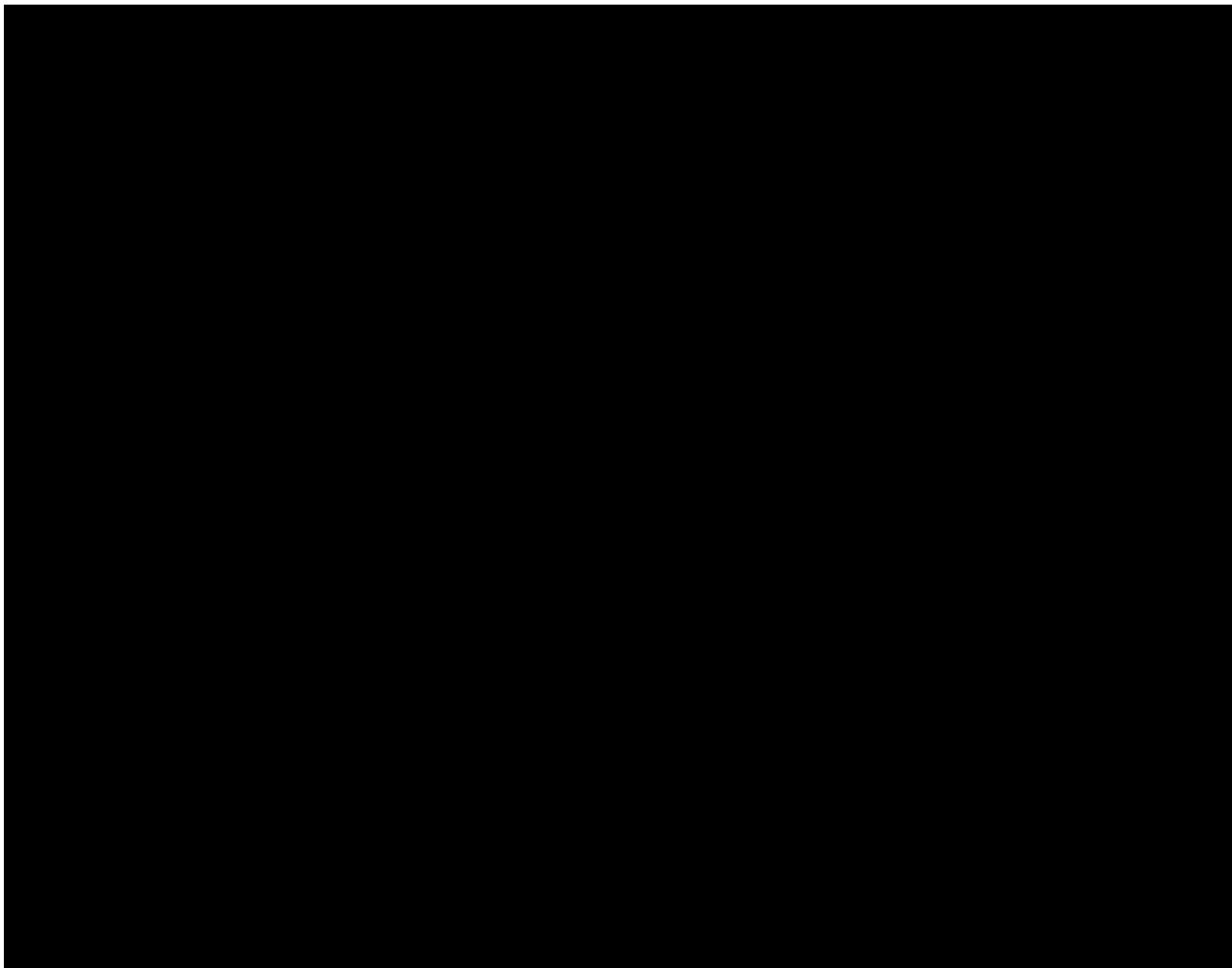


Photo 30. Close-up view of stage taken during the 1944 high school graduation ceremony. This shows the overhang at the front of the stage. This view again illustrates that the painting was incomplete at this time. Toyo Miyatake Collection, No. 686, courtesy Archie A. Miyatake, San Gabriel, California.

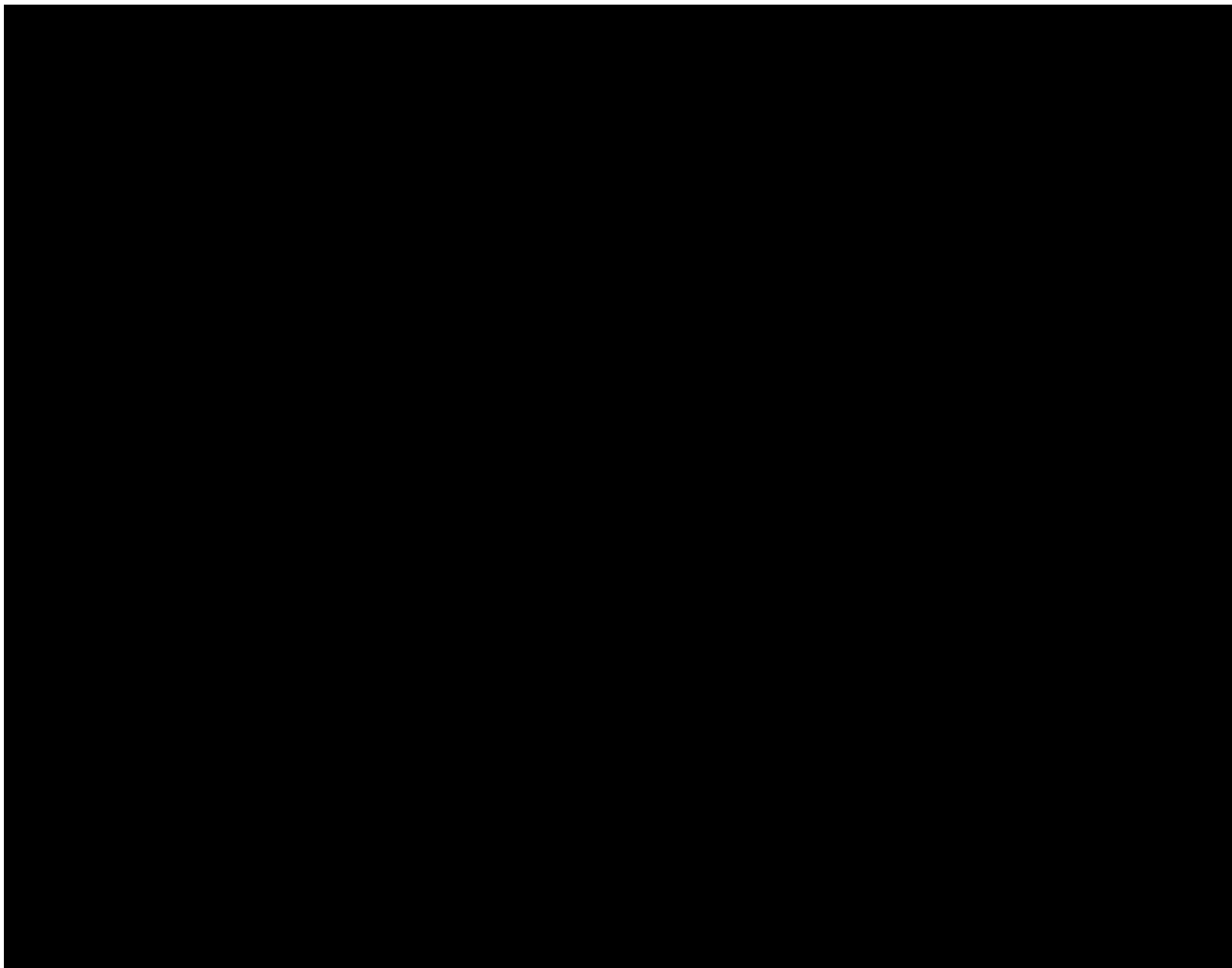


Photo 31. Another view of the stage during the 1944 high school graduation. A small window-like opening is seen at the south side of the stage, and adjacent to it a smaller opening for an electrical panel. At the far right is one of a pair of openings and speaker(duplicated at the opposite side of the stage) of the public address system. Toyo Miyatake Collection, No. 700, courtesy Archie A. Miyatake, San Gabriel, California.

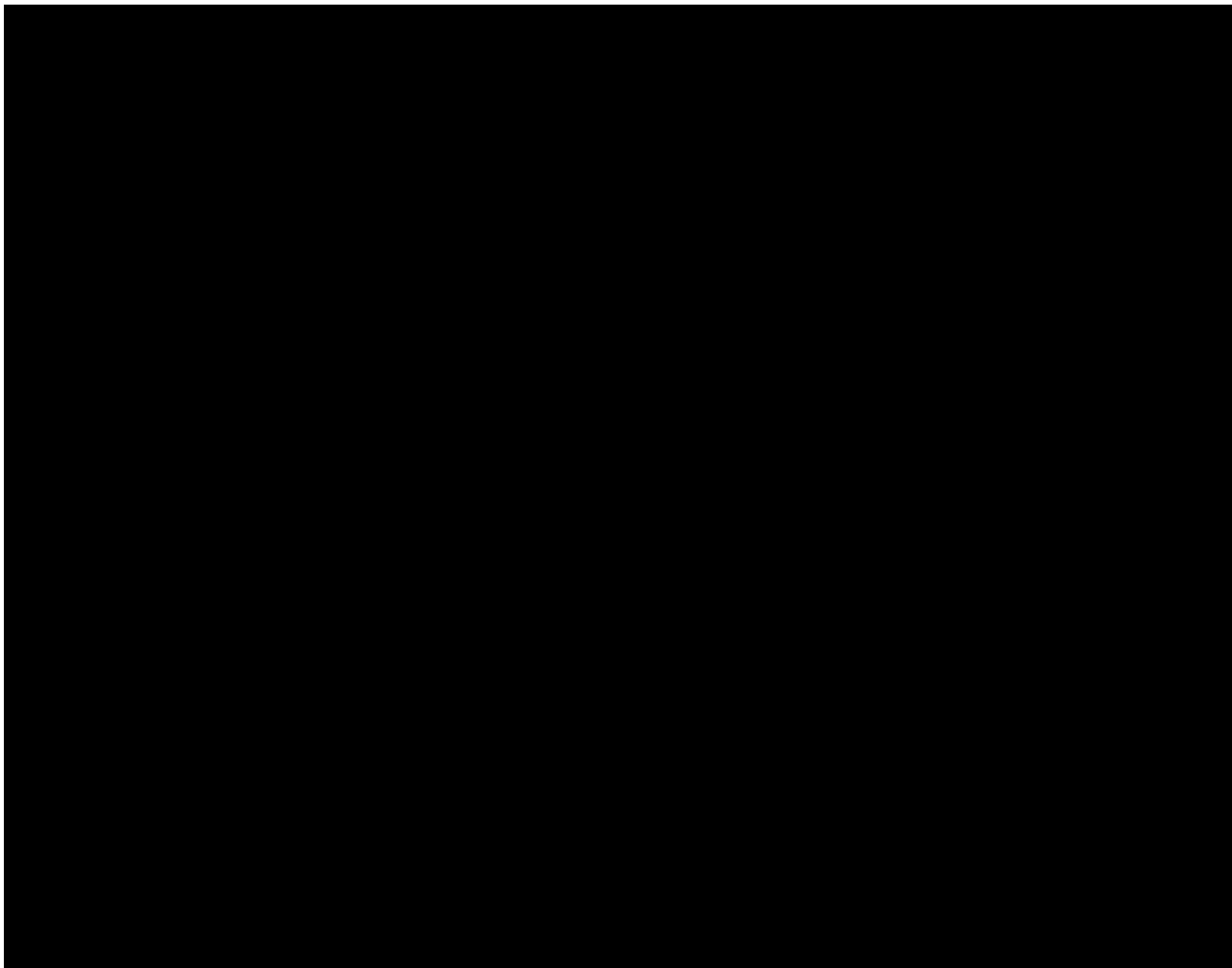


Photo 32. The stage during the 1945 high school graduation. Note the full array of stage curtains. The footlight trough is more visible in this view. Toyo Miyatake Collection, No. 687-C, courtesy Archie A. Miyatake, San Gabriel, California.

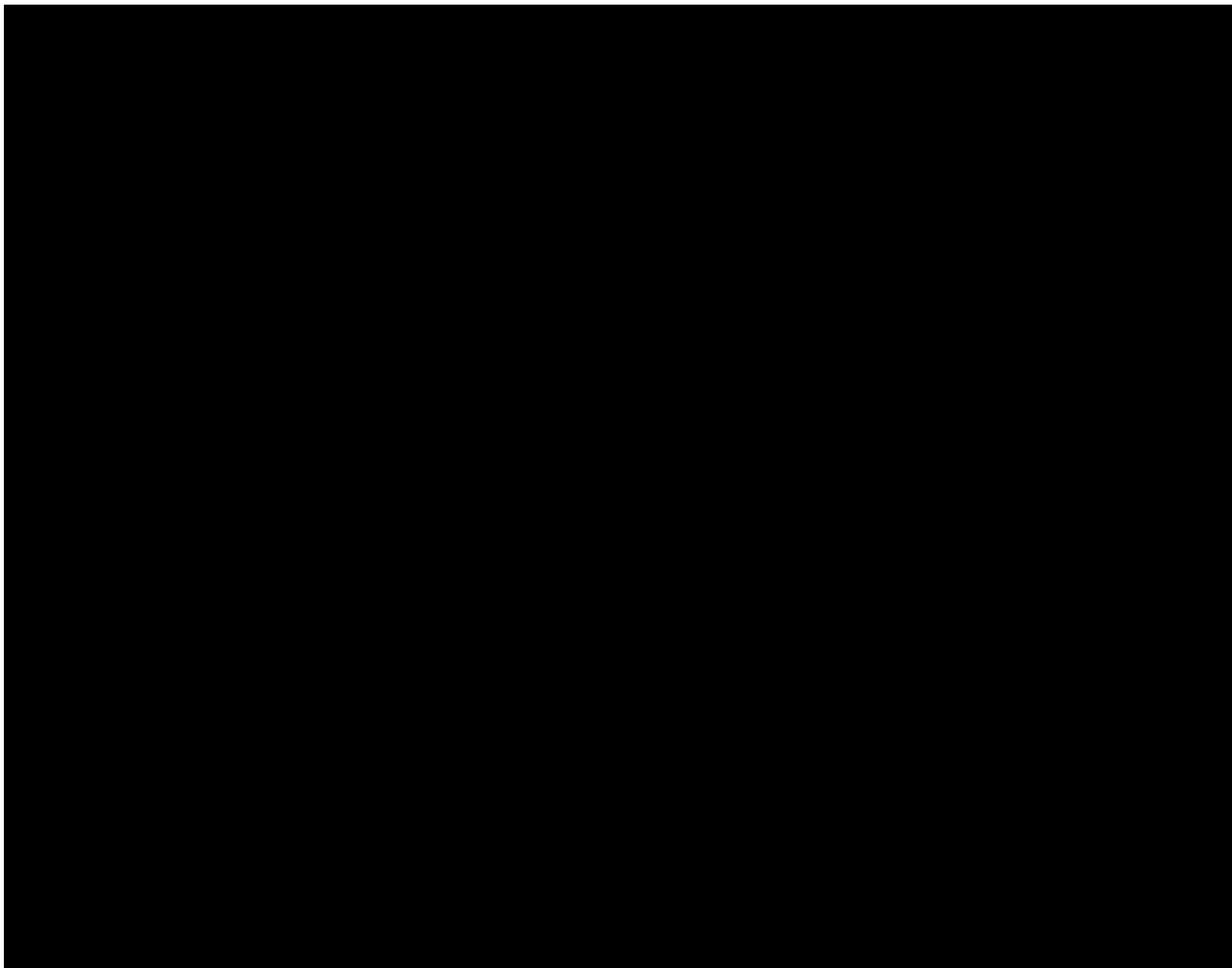


Photo 33. This close-up taken during the 1945 high school graduation provides more detail of the footlighting. Toyo Miyatake Collection, No. 687-D, courtesy Archie A. Miyatake, San Gabriel, California.

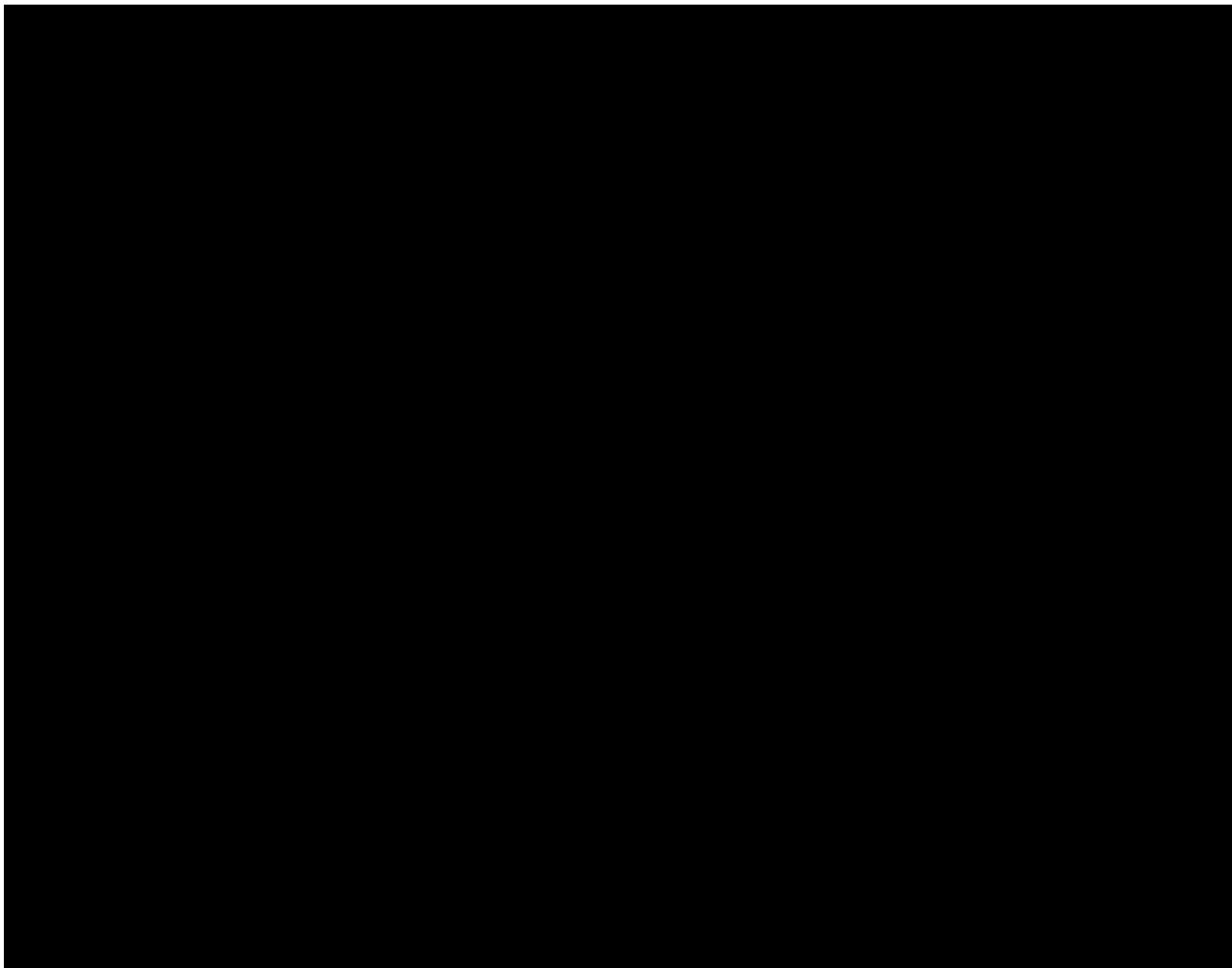


Photo 34. A view from the stage, probably late 1944 or early 1945, shows the footlight sockets and wiring. The window and black-out curtains at the north wall windows are also illustrated. On the sides of two columns, just above the dark portion of the painted wall wainscot, are cleats for curtain pulls. Some of these are still extant, as well as pulleys in the ceiling above adjacent to the columns for drawing the black-out curtains. Toyo Miyatake Collection, No. 95, courtesy Archie A. Miyatake, San Gabriel, California.

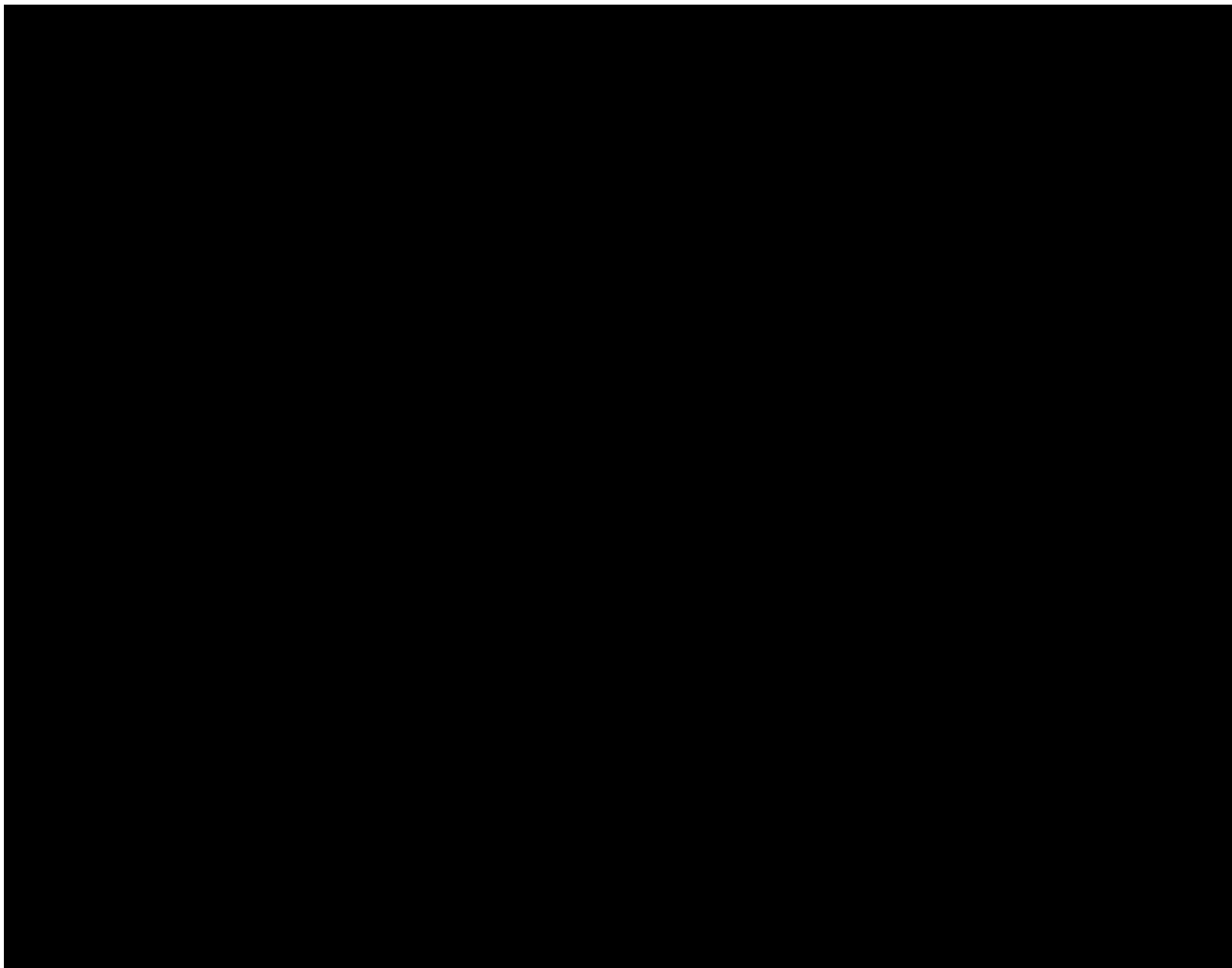


Photo 35. The auditorium was used between 1947 and 1954 by the Veterans of Foreign Wars. This view of the auditorium from the southwest was shortly after the south wing was removed, probably 1954. The VFW moved the south wing structure to Lone Pine and placed it there in an L-shaped configuration. It is still in use by the local VFW chapter and the Lone Pine American Legion Post. The doorways in the second and fourth bays from the west were probably added after 1947. The horizontal board wall finish which was originally within the interior of the south wing and then exposed to the exterior was cedar, typical of the interior wall finish. The exterior siding on the other hand was Douglas Fir. Also exposed by the removal of the south wing and visible in this photo are the concrete footings supporting columns in the main south wall of the auditorium. The cornerstone is in the left center foreground. The pine tree near the west main entrance had substantially increased its height since 1945. Toyo Miyatake Collection, No. 87-G, courtesy Archie A. Miyatake, San Gabriel, California.

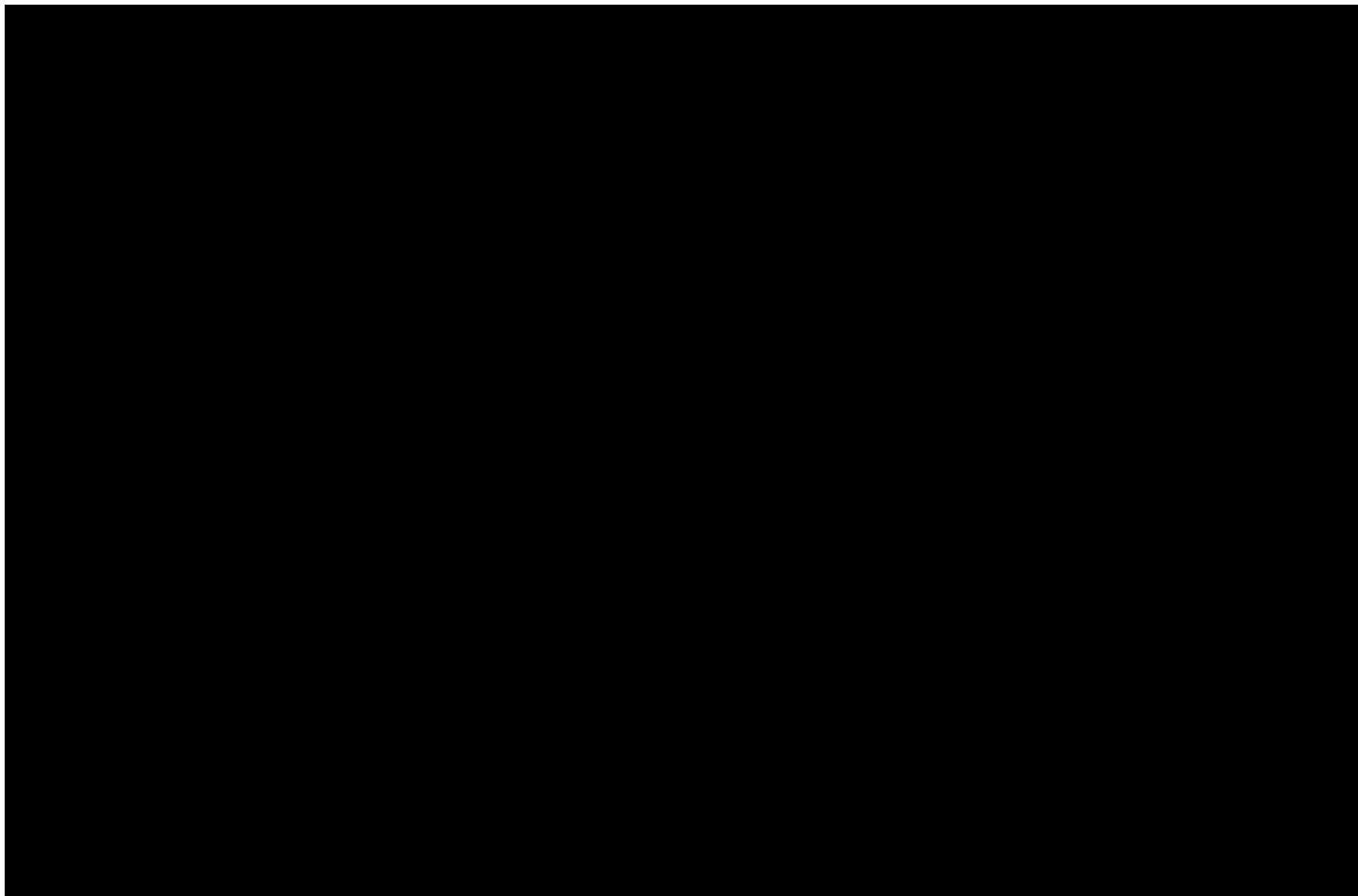


Photo 36. After removal of the south wing by the VFW, Inyo County modified the auditorium building for use as a maintenance facility. This view, probably mid- to late-1954, shows that the stage has been removed and a vehicle access opening constructed in the east exterior wall. The windows that were originally in the space beneath the stage had not yet been removed. The auditorium-gymnasium floor has also been removed. The concrete pads which had provided support for the floor framing were used to fill in spaces between framing and footings at the perimeter of this space before earth fill and a concrete slab were installed. This new floor level is lower than the original floor surface leaving the original floor level and base trim position still visible. Some of the original wood flooring was used on new walls in the former stage space. Toyo Miyatake Collection, No. 87-F, courtesy Archie A. Miyatake, San Gabriel, California.

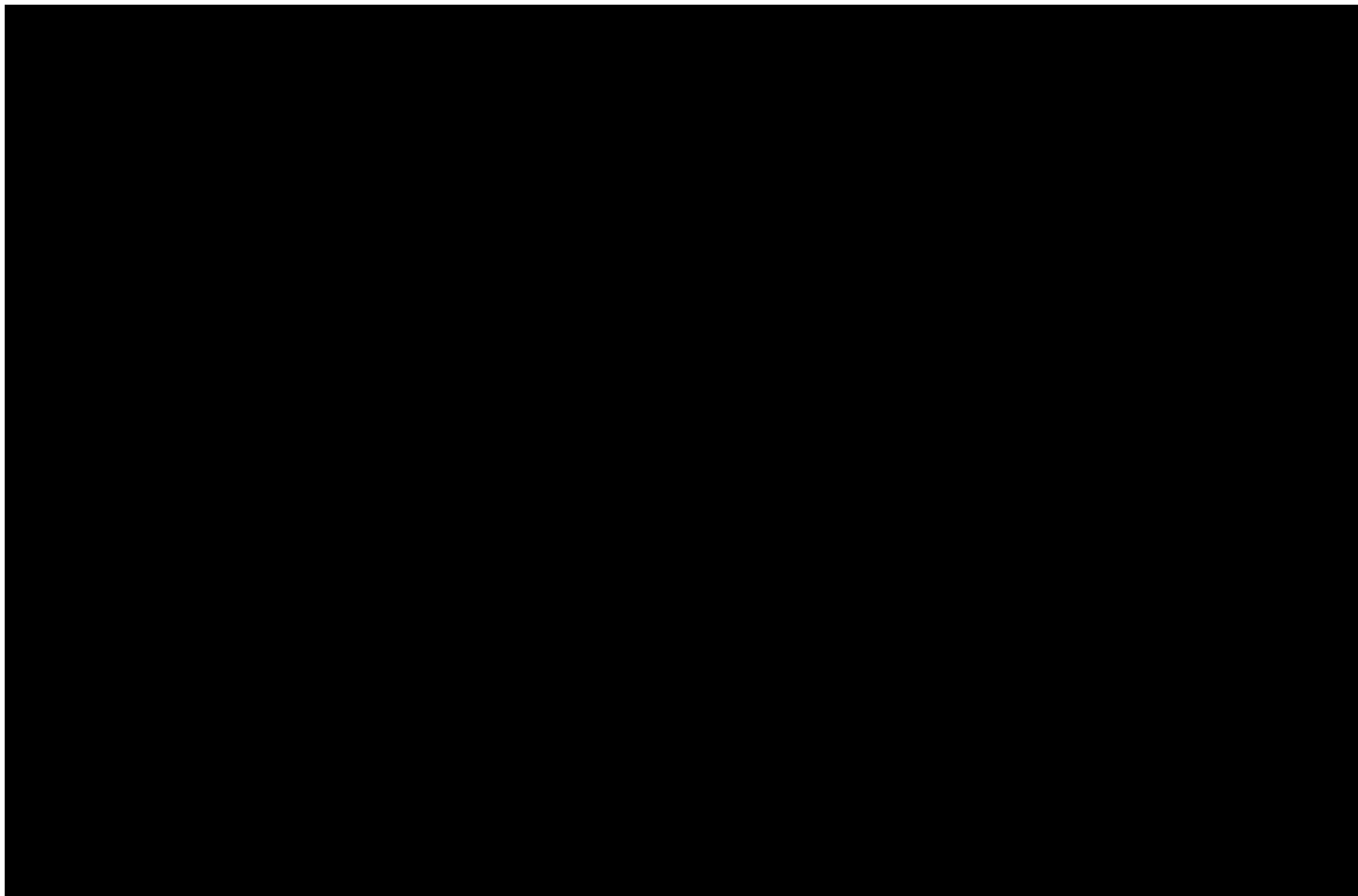
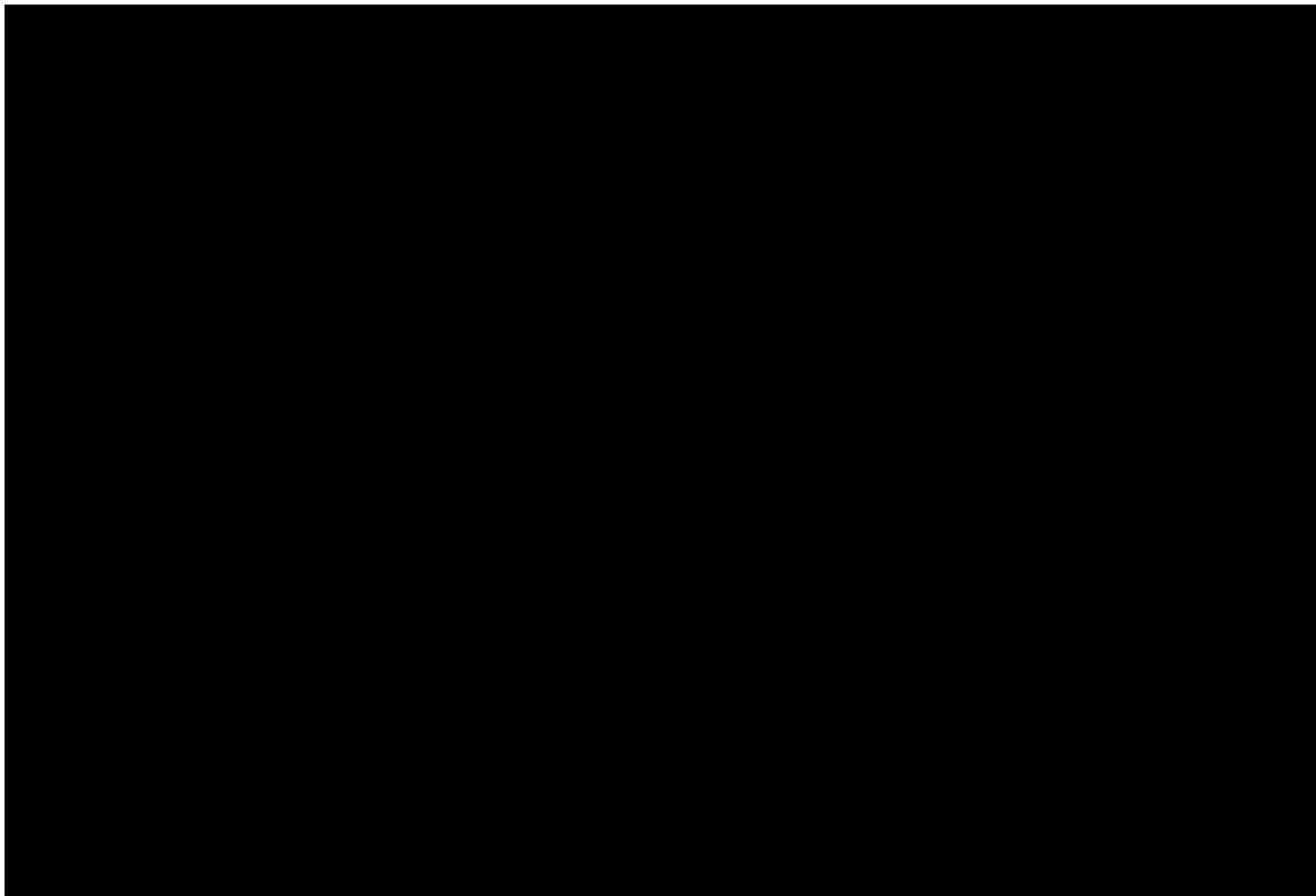


Photo 37. West (main) entrance of the auditorium. This view shows that a small pine tree had been planted on each side of the entrance walks, although they are still small so this photo may have been taken about the time the camp was closed, late 1945, or sometime later. The entryway had also not yet been enclosed. Eastern California Museum Collection, MERR 8.



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Photo 38. View to the north with the front entrance features and west end of the auditorium-gymnasium building. Barracks Block 13 is just north of the auditorium. The Sierra Nevada mountains are in the background. There are no other buildings visible but the steps at the southwest corner of the building are visible at the extreme right, so this photo was probably taken between 1947 and 1954, most likely in the later part of that period as evidenced by the growth of the two pine trees. The west entrance is unenclosed, indicating that the enclosure was possibly constructed after 1954. Eastern California Museum Collection, NOM 47, 94.80.10a.

