



**US Army Corps  
of Engineers,**  
St. Louis District

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# **Archaeological Research Collections Center Evaluations for the U.S. Department of Interior Bureau of Reclamation Great Plains Region**

## **Final**

**Mandatory Center of Expertise for  
the Curation and Management of  
Archaeological Collections**

**March 2004**

A-A No. 8

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Evaluations for the U.S. Department of Interior  
Bureau of Reclamation  
Great Plains Region**

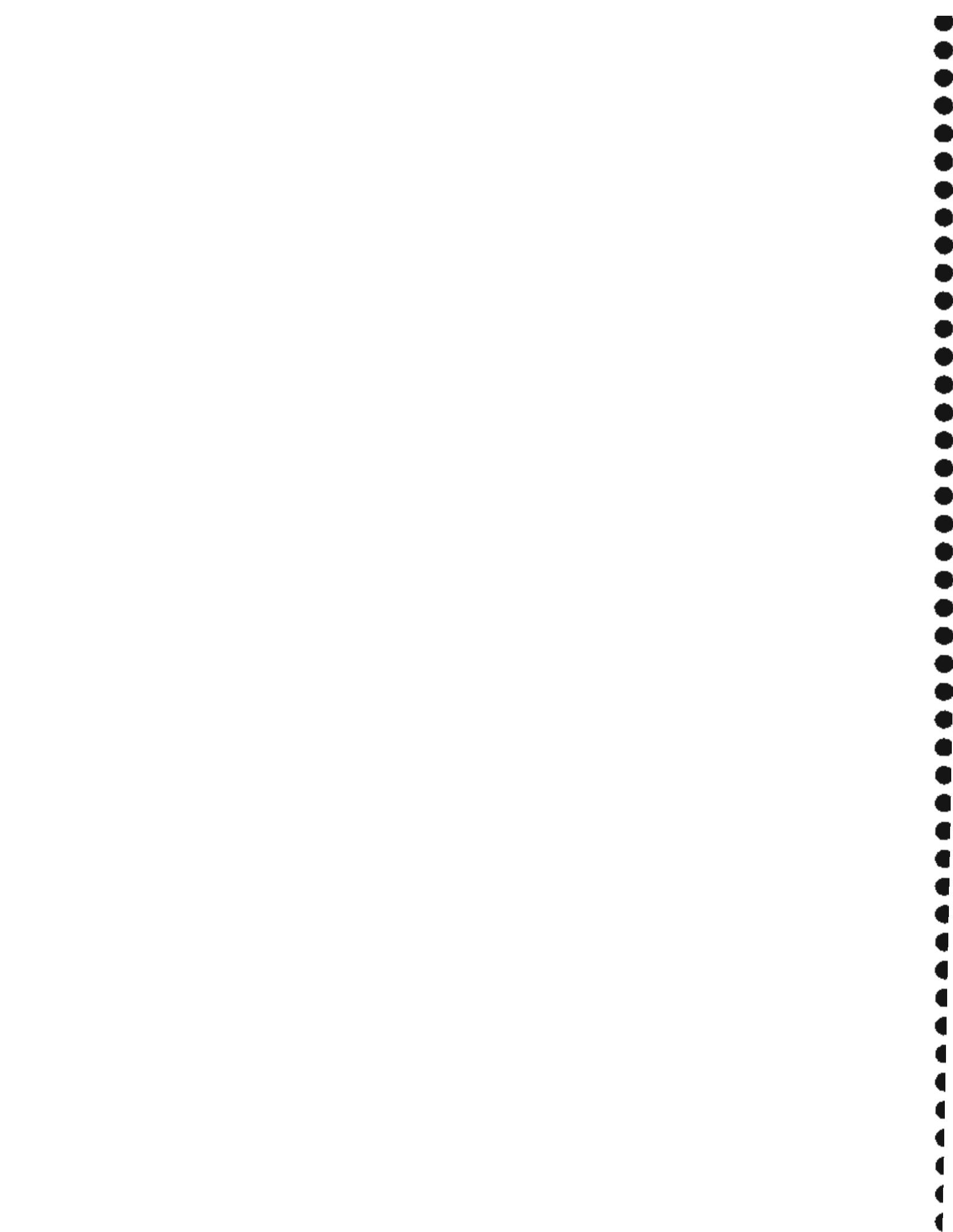
**Final**

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U.S. Army Corps of Engineers  
St. Louis District

Mandatory Center of Expertise  
for the Curation and Management  
of Archaeological Collections

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# Executive Summary

Pursuant to an Interagency Agreement No. 02AA601593 between the U.S. Department of the Interior, Bureau of Reclamation, and the U.S. Army Corps of Engineers, St. Louis District, (modification 003) dated August 28, 2002, repositories at three facilities—Wichita State University (WSU) Department of Anthropology, the University of Texas-San Antonio Center for Archaeological Research (CAR) and the Nebraska State Historical Society (NSHS)—have been evaluated based on the Federal standards contained in 36 CFR Part 79. Evaluations were based on building inspections at each facility, on-site discussions with staff, reviews of plans, and previously documented reports.

Findings are presented in separate evaluation chapters for each repository. The chapters provide verbal and graphic descriptions of each facility and compare existing building features to the requirements for federal repositories. A separate checklist is provided for each facility. None of the buildings meets federal repository standards and each chapter explains why. A cost estimate is provided to cover building features that, when installed, will bring each facility into compliance with federal standards. The NSHS facility (Chapter 2) meets local building codes, but the collections holding room in the basement poses significant opportunity for damage to archaeological materials. CAR (Chapter 3) meets neither local building codes nor federal standards, it contains a number of exiting deficiencies, and it lacks an automatic fire-suppression system. Nevertheless, CAR does have an intrusion-detection system installed on exterior doors. In the case of WSU (Chapter 4), the building meets local building codes but not federal standards, lacking both an intrusion-detection system and an automatic fire-suppression system. All three facilities have a professionally supervised staff of dedicated workers and students. None of the facilities engages in conservation, nor do they have a professional archivist on staff. They must rely on consultation with university archivists for assistance. Table 1 summarizes the major findings at each facility.

The estimated cost to bring Neff Hall at WSU into compliance with federal standards is \$123,901, and the estimated cost to bring CAR into compliance with federal standards is \$146,547. A cost estimate is not provided for the NSHS facility, and it is recommended that archaeological materials being stored in the basement of the Children's Museum be moved to a room above the basement level that is not subject to storm water damage.

**Table 1.  
Presence/Absence of Major Findings of Architectural Assessment**

	<b>WSU</b>	<b>CAR</b>	<b>NSHS</b>
<b>Heating, Ventilating, and Air Conditioning</b>			
Temperature and relative humidity monitoring	Yes	No	Yes
Air is filtered	Yes	No	Yes
Ultraviolet filters for light fixtures	No	No	No
<b>Security</b>			
Intrusion-detection system	No	Yes (doors only)	Yes
Special for small/fragile materials	Yes	No	No
Meets local building codes	Yes	No	Yes
Equipped with automatic fire-detection system	Yes	Yes	Yes
Equipped with automatic fire-suppression system	No	No	Yes
Emergency management plan in place	Yes	No	No
Written security procedures in place	No	No	No

In addition to these three repository evaluations, Chapter 5 provides updated costs (October 2002) for repository upgrades in Kansas (University of Kansas), Montana (Museum of the Rockies), Nebraska (University of Nebraska State Museum), North Dakota (North Dakota Heritage Center), Oklahoma (Museum of the Great Plains), South Dakota, and Wyoming (University of Wyoming). These costs were originally prepared for a joint Department of Defense (DoD)–U.S. Army Corps of Engineers (USACE) project to identify potential partners, to evaluate their capabilities to manage the archaeological collections, and to collect baseline financial information associated with such an endeavor. All figures presented in Chapter 5 are still predicated on the space required to appropriately curate DoD and USACE archaeological collections from that specific state.

# 1

## Introduction

As set forth in Modification No. 3 to Interagency Agreement No. 01AA601593 between the Bureau of Reclamation Great Plains Region and the U.S. Army Corps of Engineers, St. Louis District, USACE agreed to

assess the proposed physical curation facilities including, but not limited to, the structure, site, code requirements, Americans with Disabilities Act requirements, function and layout, equipment, fire prevention systems, security systems, and environmental control systems. Physical inspection of buildings will determine effectiveness of the facilities as collection storage facilities in accordance with 36 CFR Part 79. If any repository is deficient, then schematic diagram alternatives and preliminary cost estimates that can be used as guidance for bringing each building into compliance with 36 CFR Part 79 will be developed by the architect.

Additionally, USACE agreed to update repository upgrade costs that were generated for a joint curation options project for DoD and USACE.

The following four chapters present the findings of three on-site architectural inspections and the updated repository upgrade costs. The Nebraska State Historical Society was inspected on September 18–19, 2003. Neff Hall at Wichita State University in Wichita, Kansas, was visited October 31–November 1, 2002. The Center for Archaeological Research at the University of Texas, San Antonio, inspection was performed on January 16–17, 2003. This report describes existing conditions at each of these three repositories and compares them to requirements in 36 CFR Part 79, Curation of Federally-Owned and Administered Archeological Collections, which became effective in October 1990. Where differences occur between existing conditions and federal requirements, a cost estimate for remedial improvements is provided.



## 2

# Nebraska State Historical Society

The Nebraska State Historical Society (NSHS) is located at 1420 P Street in a building that is also known as the Lincoln Children's Museum building (Figure 1). NSHS occupies a portion of the third floor and a portion of the basement space. The third floor contains the office of the collections manager, laboratory, research, and cleaning/washing space and is shared with the Nebraska State Historic Preservation Officer. The Children's Museum uses a portion of the basement as exhibit and general storage space, and the remaining area is partitioned for use as a Collections Holding Room by the NSHS. Reclamation archaeological collections are housed in the basement.



Figure 1. Exterior view of the Nebraska State Historical Society building.

The Lincoln Children's Museum building is located directly across the street from the Museum of Nebraska History and one and one-half blocks from the State Historical Society (Figure 2). Metered street parking and garages are available for scholars and researchers who might use NSHS and BoR collections/archives in the building. A raised patio and entrance to NSHS (above sidewalk level) require disabled visitors to make arrangements to use the on-site parking lot prior to arrival. Typical museum patrons do not have access to the on-site

parking lot (Figure 3). In addition, access to the parking lot for building museum patrons and staff is limited and controlled, further minimizing vehicular traffic. The dashed white line in Figure 3 highlights the basement level storage position (below) in which the BoR collections are held. The parking lot surface is virtually flat and surface runoff drains into eight inlets that discharge into pipes located in the basement, five in the storage area. Pipes are suspended from the ceiling. Two inlets are located under the patio for a total of ten storm drainage pipes

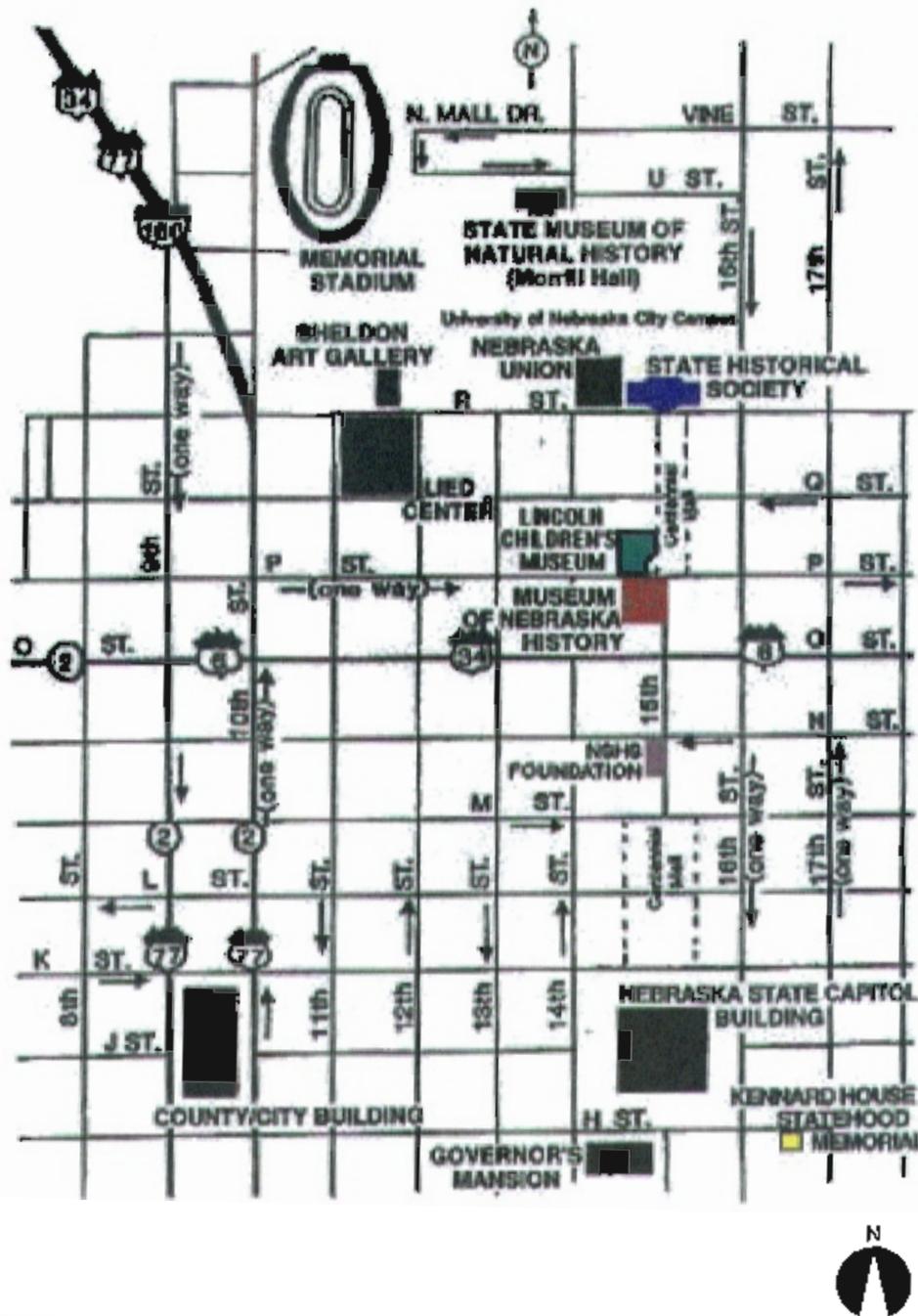


Figure 2. Map of downtown Lincoln, Nebraska.



**Figure 3. West side of the Children's Museum building showing the raised patio, parking lot, and the entrance to the NSHS facilities. The nearest public sidewalk is to the left. Accessible access (to the NSHS facility) is achieved by using the parking lot, then maneuvering to the building entrance, located behind the dark colored van.**

that enter and pass through the basement en route to the city storm drain system. Maintaining a dry environment in the storage room requires regular maintenance staff attention to the pipe joints.

Vehicular traffic over the parking surface is restricted by a control gate (Figure 4). Refuse containers are located in the public alley and eliminate the need for trash trucks to drive over the parking lot surface. A mulched area on the east side of the parking lot divides the city-owned plaza property from the Children's Museum property (Figure 5). The mulched strip was previously landscaped and the ground sloped toward the museum property, encouraging water to migrate into the collections holding room. Removal of the plant material and the creation of a swale (see Figure 5) improved drainage and significantly reduced storm-water flow into the basement level collections holding room.



**Figure 4. View (looking south) of the restricted parking lot. The Children's Museum is located on the right and the Museum of Nebraska History is in the background. The two overhead doors and one personnel door on the right side of the photograph lead to the freight elevator.**



**Figure 5. View of the east side of parking lot showing the mulched area that divides the city-owned plaza property (left) from the Children's Museum property (right). The collections holding room is below the parking lot.**

## The Building

The building was formerly operated as a storage facility. It is constructed of reinforced concrete (frame) and brick. Design work in 1999 for the current use consisted of complete rehabilitation of the interior of the building and the installation of new systems that brought the building up to contemporary building code standards. New doors, windows, finishes, exiting and signage systems, alarms, intrusion-detection system, intercom system, roof membrane, HVAC system, fire-suppression system (on each floor), and a new parking lot surface were added during rehabilitation. The Children's Museum organization moved into the building in the fall of 2000, and NSHS moved in approximately one year later.

NSHS shares space with the Children's Museum and the State Historical Preservation Officer. The Children's Museum occupies the entire first floor, second floor, and a portion of the basement. The NSHS shares the third floor with the SHPO and uses a portion of the basement for collections storage. The third floor and basement floor diagrams (Figure 6) on the following page indicate the location of NSHS space relative to the other building tenants.

The main building entrance (off P Street) provides access directly to the first floor Children's Museum exhibit space and one can in turn gain access to the NSHS space from this room. This entrance is monitored by an attendant. A separate entrance for use by NSHS and the SHPO personnel to the third floor, and a second entrance to the museum are located on the East side, adjacent to the parking lot. Use of the NSHS entrance is monitored and controlled with A/V equipment. Stairs and a passenger elevator are available to access the upper floors and basement. The building complies with the ADA.

NSHS third floor space is organized as research (Figure 7), office, laboratory, washing, and circulation. The research area can be used by visiting scholars or by staff for meetings. This area can be monitored from the Collection Manager's office as can the laboratory (Figures 8 and 9). Contained in the laboratory are washing sinks, drying racks, storage shelving, worktables, and a few computers (Figures 10 and 11). Materials can be conveniently moved into the building, to the third floor for processing, and again to the basement for storage by using the freight elevator on the east side of the building (Figures 12 and 13).

The Collections Storage Room for NSHS is located directly below the parking lot (Figure 14). Runoff from the parking surface flows into the storm drain pipes suspended from the underside of the deck and in turn to the city's storm water system (Figure 15). Four drain lines (joints) have developed leaks, and three have been repaired. On the day of site inspection, the fourth line was being scheduled for repair. The fragile nature of the drain lines and joints is expected to be a source of constant repair by building maintenance personnel.

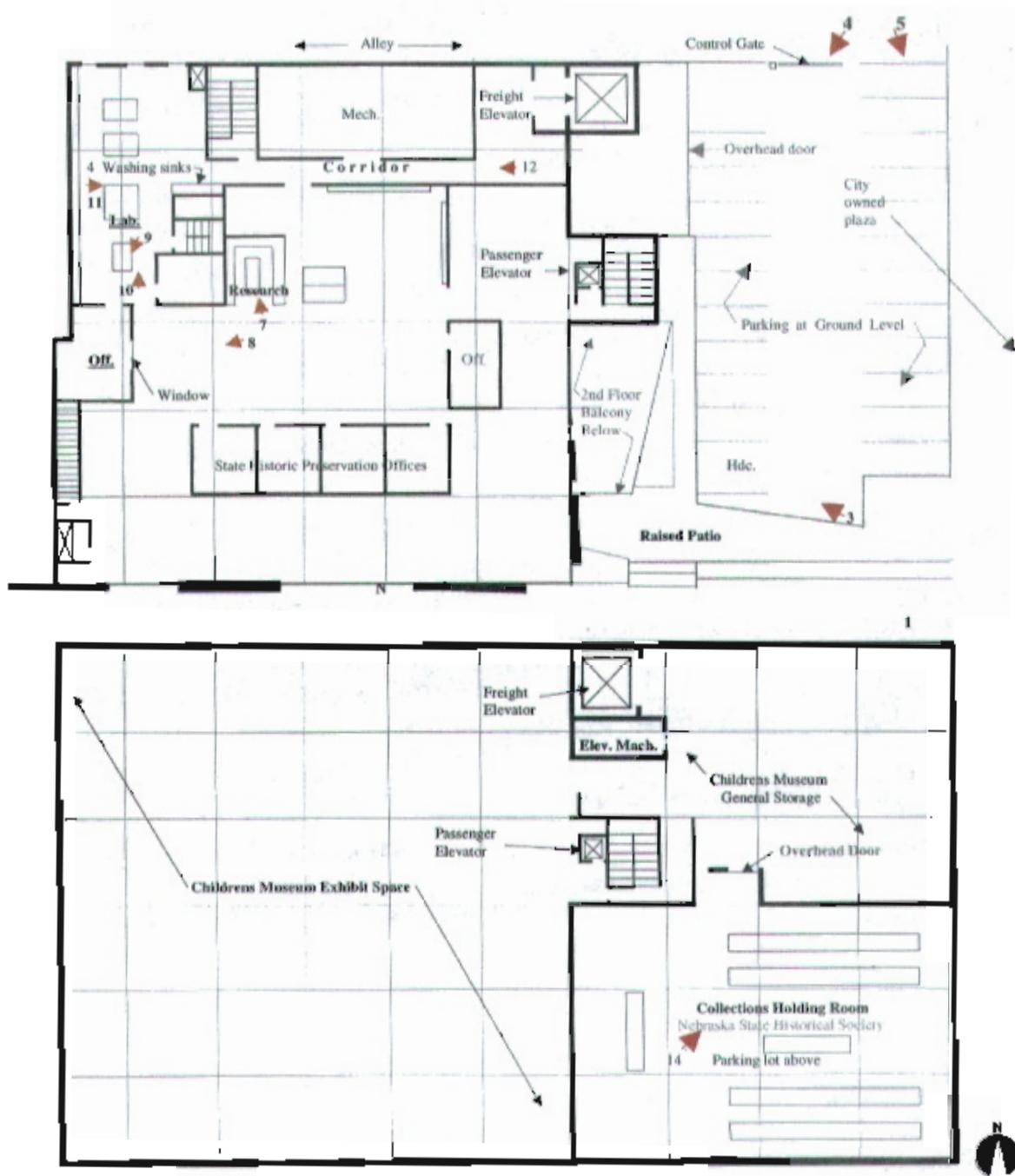
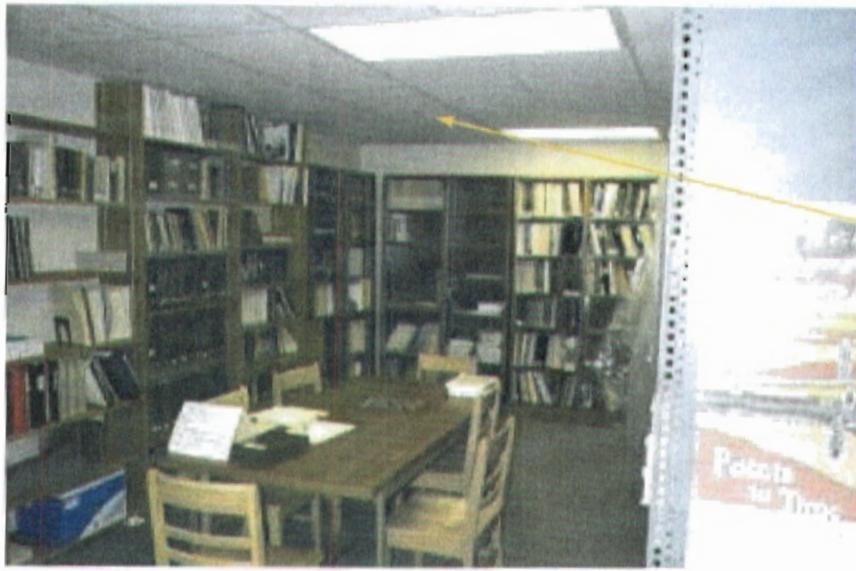
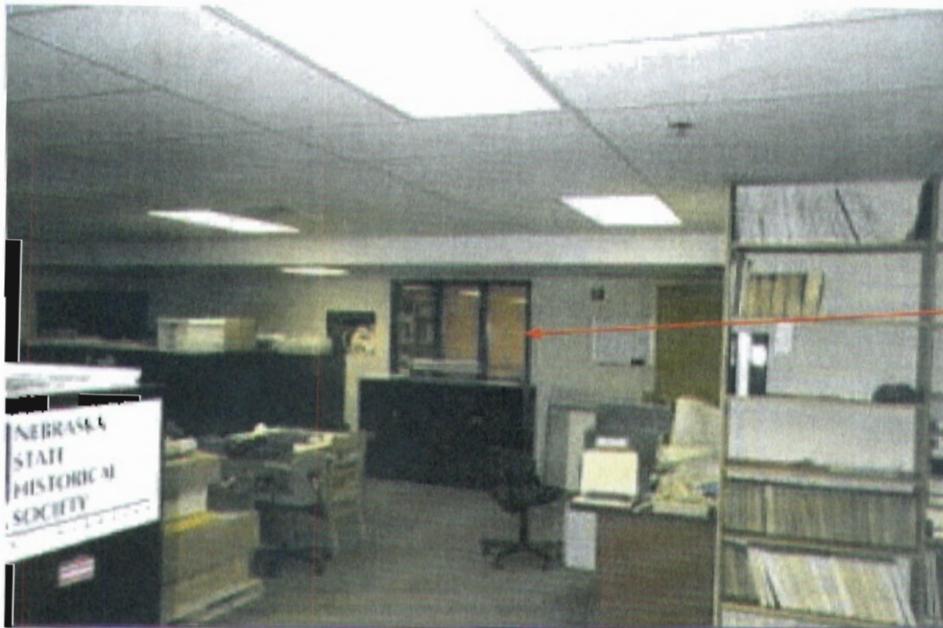


Figure 6. Third floor (top) and basement flood (bottom) diagrams. The numbered arrows correspond to the other figures in this chapter.



Sprinkler system head for the water-based fire-suppression system installed throughout the building

Figure 7. NSHS third floor research area.



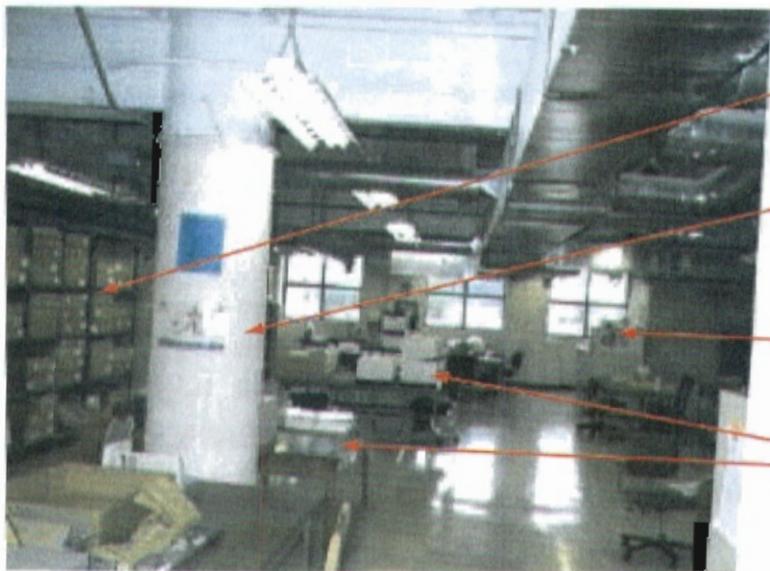
Collections manager's office window affords visibility to the research area

Figure 8. View from the research area toward the collection manager's office. The manager's office is strategically located for dual monitoring of the research area and the laboratory.



Collection manager's office affords visibility to the laboratory

Figure 9. View from the laboratory toward the collection manager's office. Both the research area and laboratory can be visually monitored by one person.



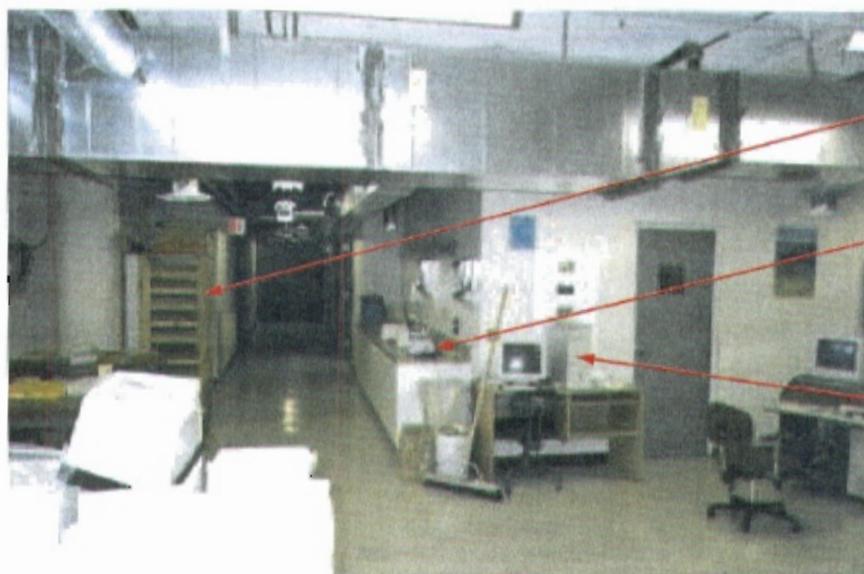
Shelving

Reinforced concrete column (typical)

Hygrothermograph

Worktables

Figure 10. View of the third floor laboratory.

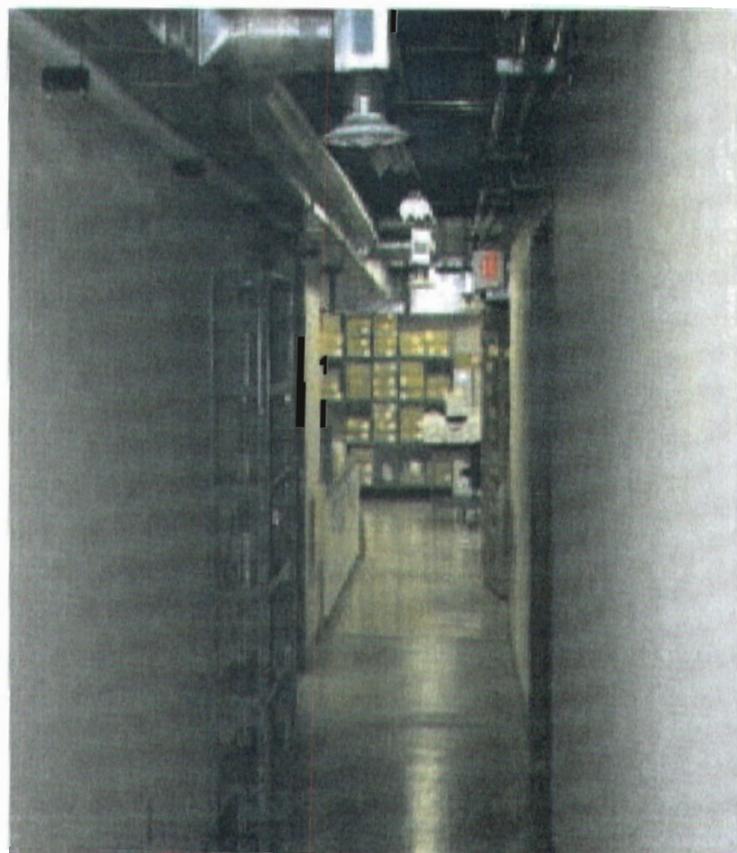


Drying racks

Four stainless steel washing sinks

Computer workstations

**Figure 11.** View taken from the laboratory looking down corridor that leads to the freight elevator. Archaeological materials can be easily moved into the building through the freight elevator to the washing area and, in turn, processed for storage.



**Figure 12.** View of the laboratory through the third floor corridor.



Figure 13. Freight elevator at the first floor.



Underside of parking deck

Figure 14. View of the Collections Holding Room in the basement of the Children's Museum.

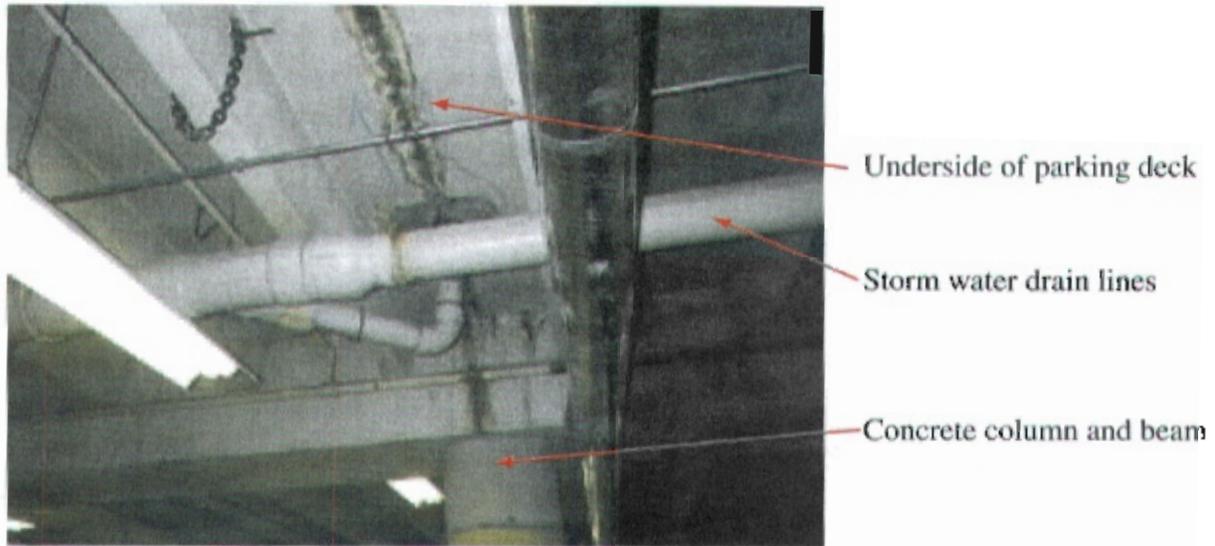


Figure 15. View of the underside of the concrete parking deck showing piping that collects drainage from the surface above.

### Heating, Ventilating, and Air Conditioning (HVAC)/Structural

A forced-air heating, ventilating, and air conditioning system has been installed in the building, and during a recent inspection found to be operating in satisfactory condition (Figure 16). Both the third floor laboratory and collections holding room in the basement have Oakton hygrometers installed for monitoring of temperature and relative humidity, each with a multiple-day recording period. During the site inspection, the hygrometer located in the



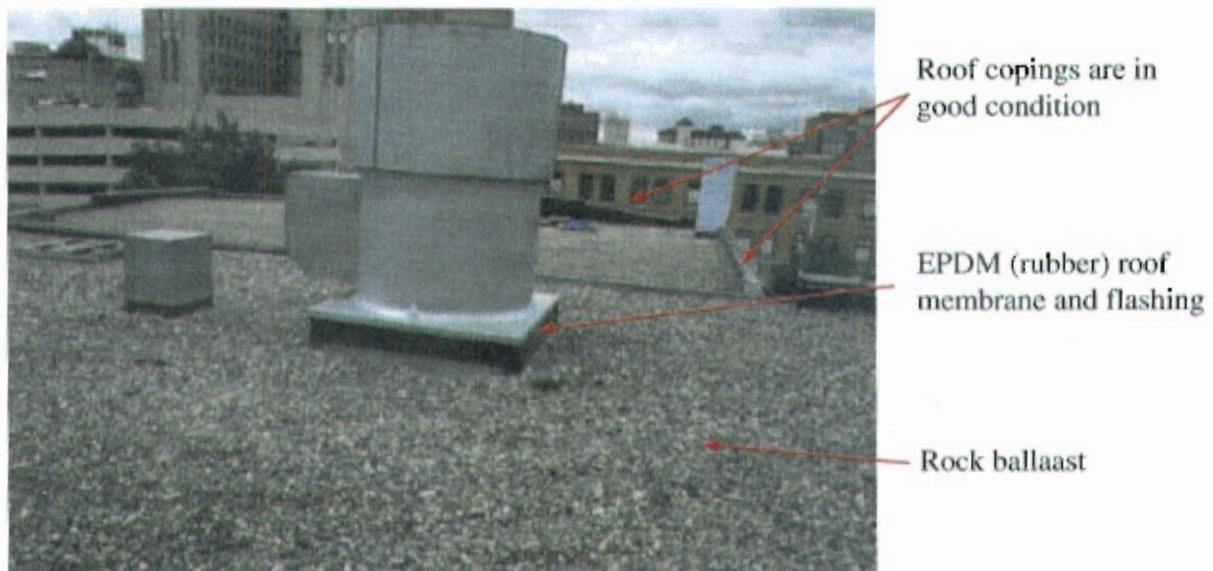
Figure 16. The HVAC unit (center) is elevated above the surface by structural steel. The structural supports (arrows) absorb vibrations, minimize joints between the metal equipment and roof membrane, and aid in the prevention of roof leaks.

laboratory showed readings of 74° F with a two-degree fluctuation for the week. The RH reading ranged from a low of 48% to a high of 68%. In contrast, the basement climate readings were stable showing a constant temperature of 65 degrees F and a constant RH reading of 45%. The collections manger indicated both instruments are in good working condition. An emergency generator ensures uninterrupted electrical power to the building in the event there is a power outage by the local utility supplier (Figure 17).



**Figure 17. View of the emergency generator.**

The primary structural material of the Children's Museum building is reinforced concrete. Some structural steel additions were made during rehabilitation efforts. Other noticeable materials include brick, tile, and exterior insulation and finish system. The roof membrane and flashing are in good condition (Figure 18). The entire structure is in good condition.



**Figure 18. The rubber ballasted roof system is in good condition, as are the equipment flashing and perimeter coping joints.**

## **Building Codes**

The city of Lincoln, Nebraska, enforces the International Building Code (2000). The Children's Museum Building complies with this code.

## Repository Evaluation & Compliance with 36 CFR Part 79

### 1. Can the following curatorial activities be conducted for archaeological materials?

Activity	
<input type="checkbox"/> Accessioning	Yes
<input type="checkbox"/> Labeling	Yes
<input type="checkbox"/> Cataloging	Yes
<input type="checkbox"/> Storage	Yes
<input type="checkbox"/> Conduct inventory	Yes
<input type="checkbox"/> Conservation	No (Conservation done in Omaha)*
<input type="checkbox"/> Study	Yes**
<input type="checkbox"/> Registration	Yes

### 2. Can records be maintained to professional archival standards?

Type of Records	
<input type="checkbox"/> Small paper records	Yes
<input type="checkbox"/> Photographic records	Yes
<input type="checkbox"/> Audiovisual records	No
<input type="checkbox"/> Electronic records and media	Yes
<input type="checkbox"/> Oversized records and drawings	Yes (Flat files for drawings)

### 3. Can archaeological materials and records be protected from excessive temperature, relative humidity, dust, airborne contaminants, fungus, pests, sunlight, and UV light?

Equipment	
<input type="checkbox"/> Heating, Ventilation, A/C equipment	
Temperature monitoring	Yes
Relative humidity monitoring	Yes
Air filtering for the entire building	Yes (Filters changed monthly)
Exhaust devices for laboratories	Yes
<input type="checkbox"/> Security system	Yes, IDS, A/V, Push pad entry
<input type="checkbox"/> Special security for fragile, valuable, small items	No (Bagged with other materials)
<input type="checkbox"/> Intrusion detection system	Yes
<input type="checkbox"/> Windows and doors	Yes
<input type="checkbox"/> Fluorescent light fixtures and UV filters	No
<input type="checkbox"/> Pest deterrent and prevention devices	Yes

### 4. Is the building safe for human occupancy and was it constructed in accordance with recognized design standards and safeguards?

Standard	
<input type="checkbox"/> National Electrical Code	Yes
<input type="checkbox"/> Local Building Code (2000 IBC)	Yes
<input type="checkbox"/> Equipped with a fire detection system	Yes
<input type="checkbox"/> Equipped with an automatic sprinkler system	Yes

### 5. Can the facility be managed in accordance with standards set forth in 36 CFR Part 79?

Management Tool	
<input type="checkbox"/> Emergency Management Plan	No (Plan applies to another bldg.)
<input type="checkbox"/> Written security procedures:	No
limits access to keys	Yes/No (Students have access)
limits access to the collection	Yes/No (Students have access)
<input type="checkbox"/> Qualified museum professionals on staff:	
Collection Manager	Yes
Archivists	No (Use University archivist)
Registrar	Yes

\* **Conservation:** At the Lincoln location, only cleaning, bagging, and boxing are done. Acetone is used in this building. A floor-mounted air filter is located in the lab.

\*\* **Study:** Ability to monitor people doing research.

## Summary and Recommendations

The Lincoln Children's Museum building underwent extensive design and rehabilitation efforts in 2000. Professional design was followed up with construction work that complies with local building code. The structure is equipped with an operational fire sprinkler system and an intrusion detection system (IDS). The building is in good condition, and in all but one respect would serve admirably as a repository for Federal collections.

The Nebraska State Historical Society utilizes the eastern portion of the basement in the building to store archaeological collections including materials owned by Reclamation. The eastern side of the basement was built beyond the building walls above. A parking lot was then built over this portion of the basement such that the underside of the parking lot is the ceiling for part of the basement. The parking lot is open (not covered) and the surface is virtually flat, consequently, drainage is funneled into storm inlets and conduits located on the basement ceiling. Drain lines run through the collections holding room and exit through a basement wall en route to a city storm water sewer. Any leaks from pipe joints result in moisture entering the collection holding room, an unfortunate condition that has already occurred. Indeed, at the time of site inspection one of four pipe joints, found to leak, was awaiting repair and buckets were resting on the floor to catch water. The potential for serious water damage to collections stored in the basement of this building is significant, but to date no Reclamation collections have been damaged.

The site inspection revealed a deep sense of care being given to Reclamation collections housed in the building. The curatorial staff members have covered storage racks with polyethylene sheet film and the maintenance staff displays serious awareness of the concerns to keep this space dry (Figure 19).



Figure 19. Basement curation space.

The Children's Museum Building meets the local building code and most requirements for a federal repository; however, the storage space for archaeological materials does not adhere to the intent of the 36 CFR Part 79. The location of the artifact storage room in the basement, under the parking lot, with storm drainage passing through, and susceptible to leaking, renders artifacts stored in the basement at high risk of serious water damage.

A cost estimate is not provided in this document. It is recommended that archaeological materials being stored in the basement of the Childrens Museum now be moved to a room above the basement level that is not subject to storm water damage.

### 3

## University of Texas, San Antonio Center for Archaeological Research

The University of Texas, San Antonio, Center for Archaeological Research is located in a 20,100-square-foot, pre-engineered metal building (Figure 20) that was constructed in 1974 and was initially used as a library processing facility. The building now houses CAR and is located on a portion of the campus that resembles a suburban office park more than a college campus. The facility serves motorists rather than pedestrians.



Figure 20. View of the exterior of the 20,100-square-foot, pre-engineered metal building that houses CAR.

The site of the Center for Archaeological Research is on northwest portion of the University of Texas, San Antonio property (Figures 21 and 22). The site resembles one closely associated with a commercial business park rather than a traditional university environment. Direct vehicle access for emergency services, delivery, pick up, and loading and unloading of materials is available at this location, and might not exist if the facility were located elsewhere on campus. Employee and visitor parking spaces are directly in front of the building and within reasonable walking distance to the entrance.

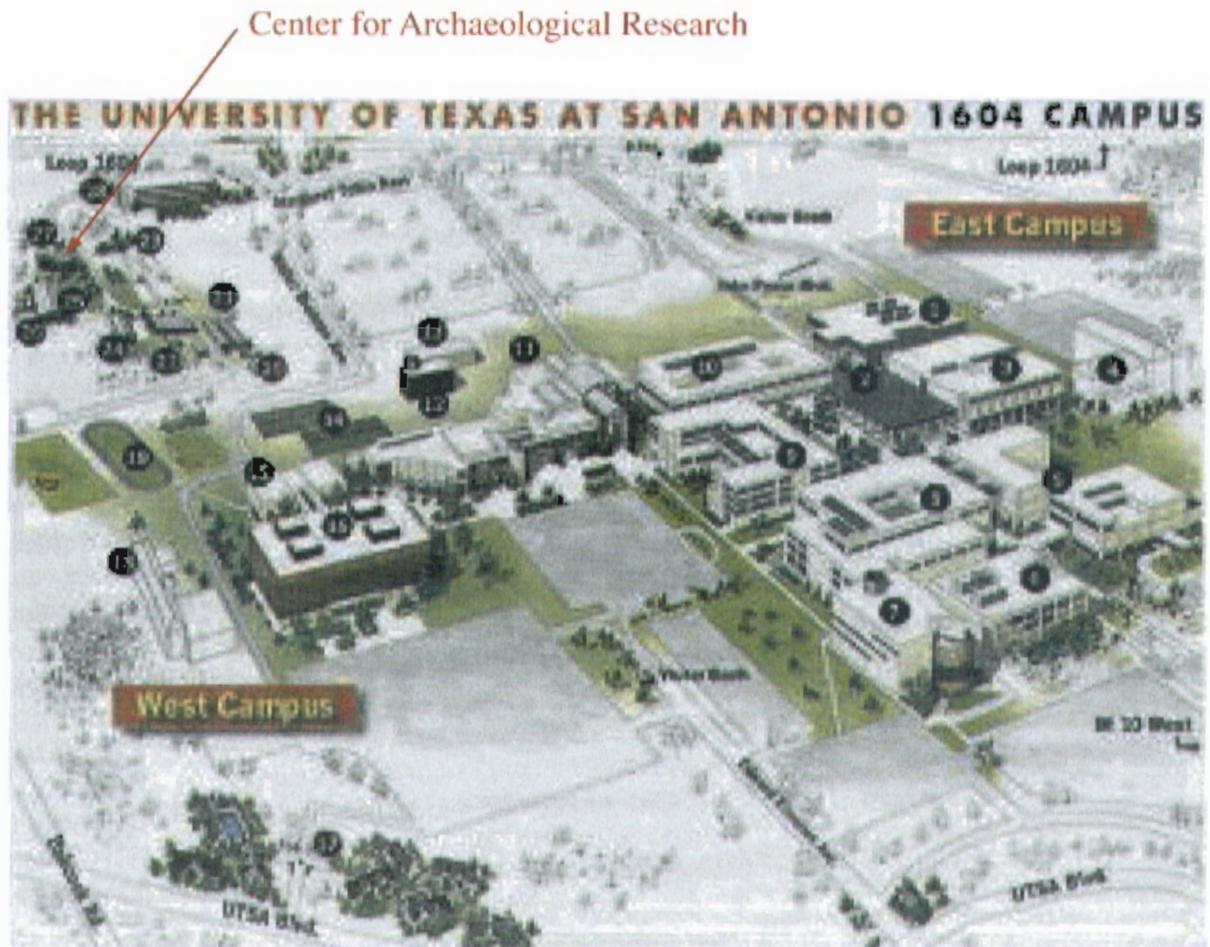


Figure 21. Aerial drawing of the University of Texas at San Antonio, Texas, showing the relationship of CAR to the USTA campus.



The South loading dock is the only accessible entrance to the CAR



North loading dock

Main entrance

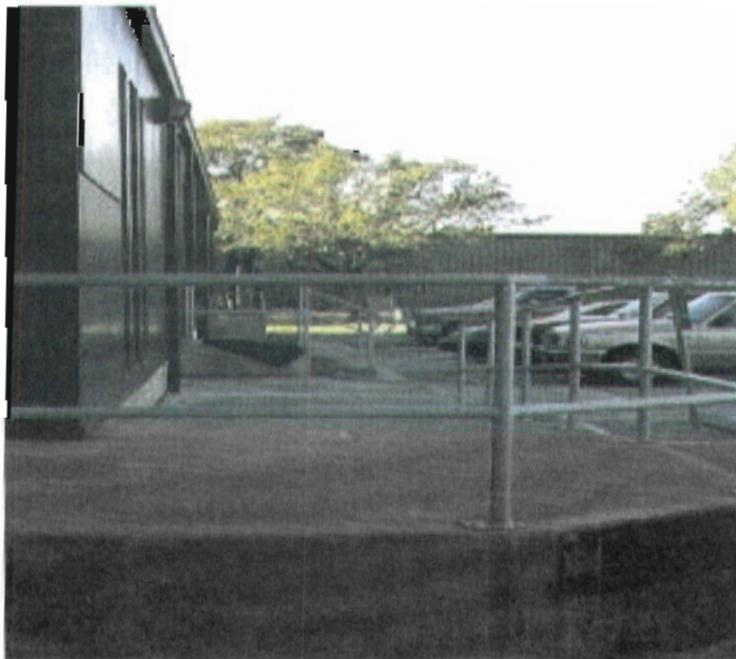
Figure 23. Front or east side of CAR. The main entrance is in the center. Facing the parking lot are 10 large windows.



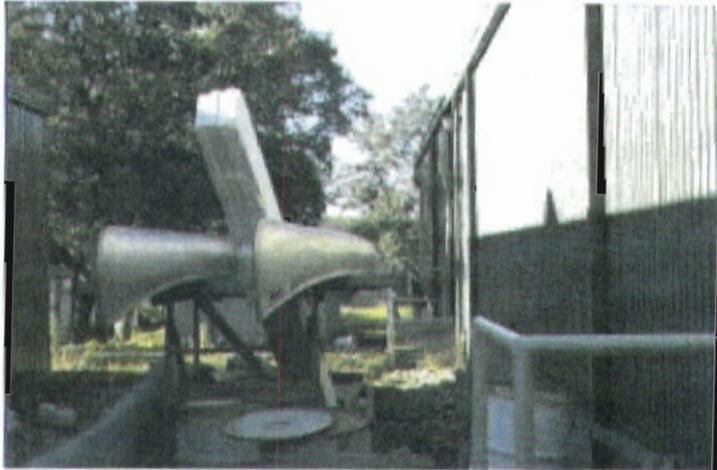
Figure 24. Loading dock and staff door on the north end of CAR used by the ROTC program component that also has use and control of a portion of the space inside.



**Figure 25. View of the main entrance to CAR. The finished floor elevation is approximately twenty-four inches above grade. The door is kept locked and serves primarily as an exit. All exterior doors are equipped with an IDS; however, windows are not.**



**Figure 26. ADA-accessible ramp at the south loading dock.**



**Figure 27.** View of the west side of CAR.



**Figure 28.** View of the south side of CAR.



**Figure 29.** View of the north side of CAR.

Much of the building's interior is organized as an open plan without floor-to-ceiling partitions (Figure 30); however, administrative offices are located in the front of the building, where floor-to-ceiling partitions separate offices from processing space. A previous building code analysis recommended that this space be separated from the storage space by a one-hour fire rated partition and door. The analysis also recommended the addition of a visible exit sign (Figure 31).

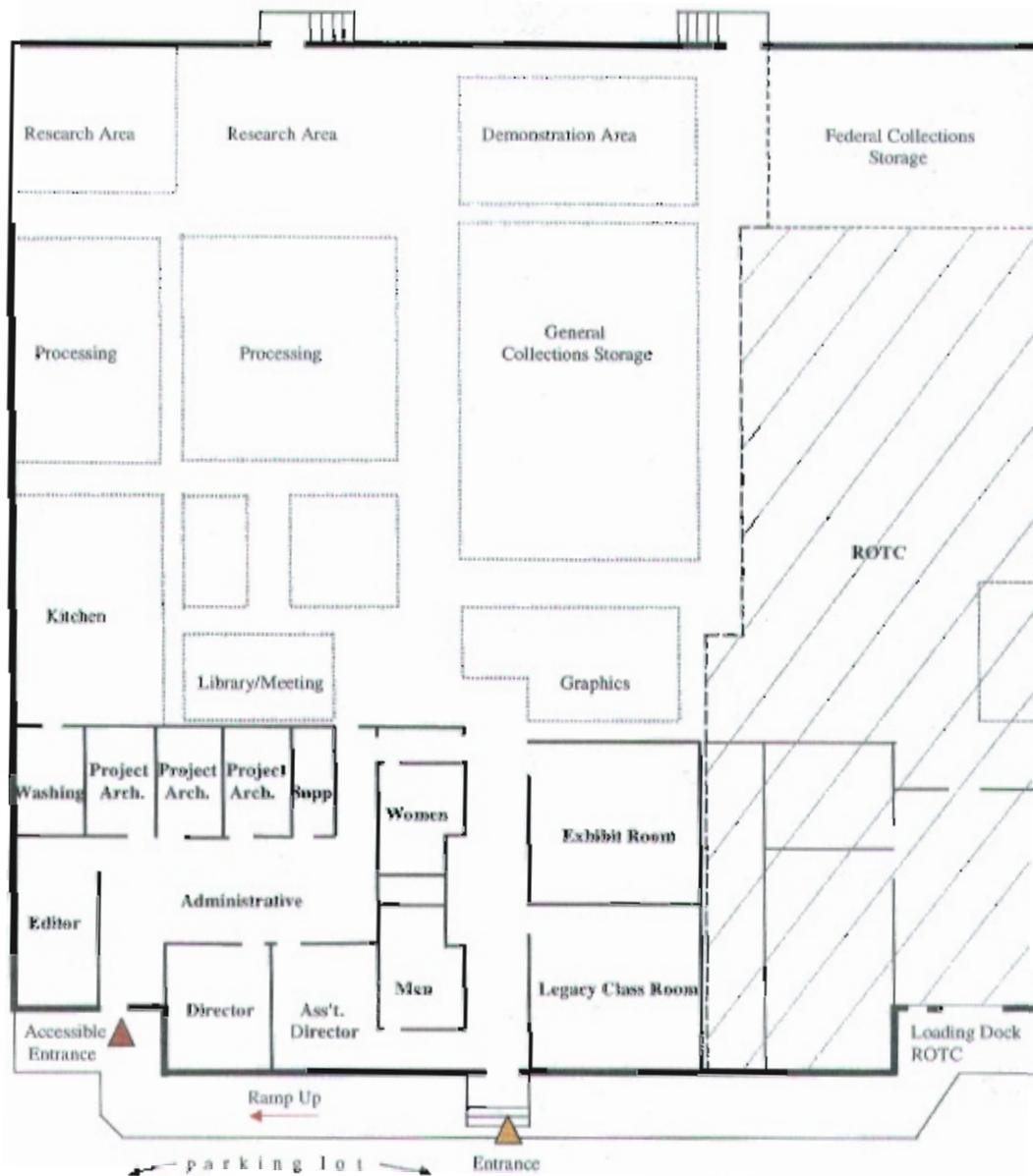
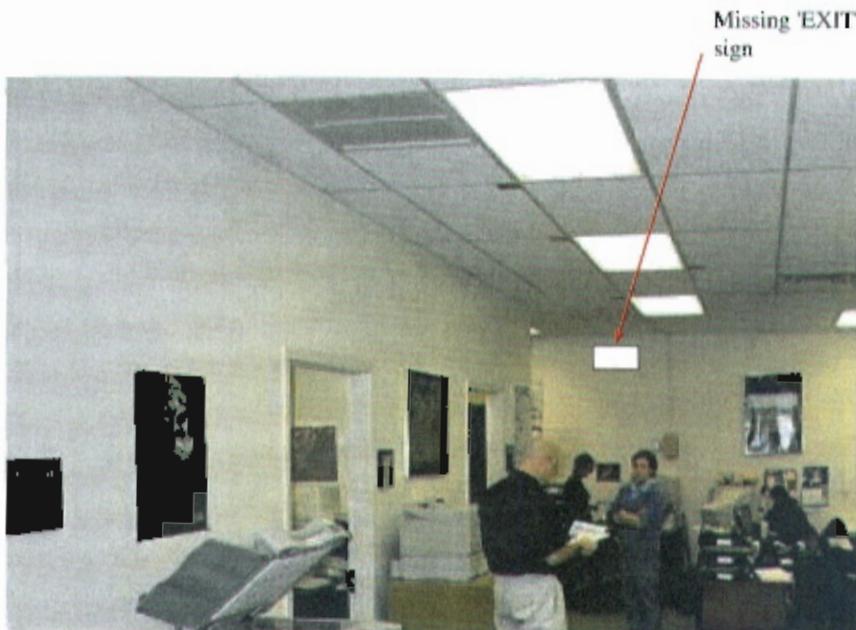


Figure 30. Floor plan diagram (not to scale).



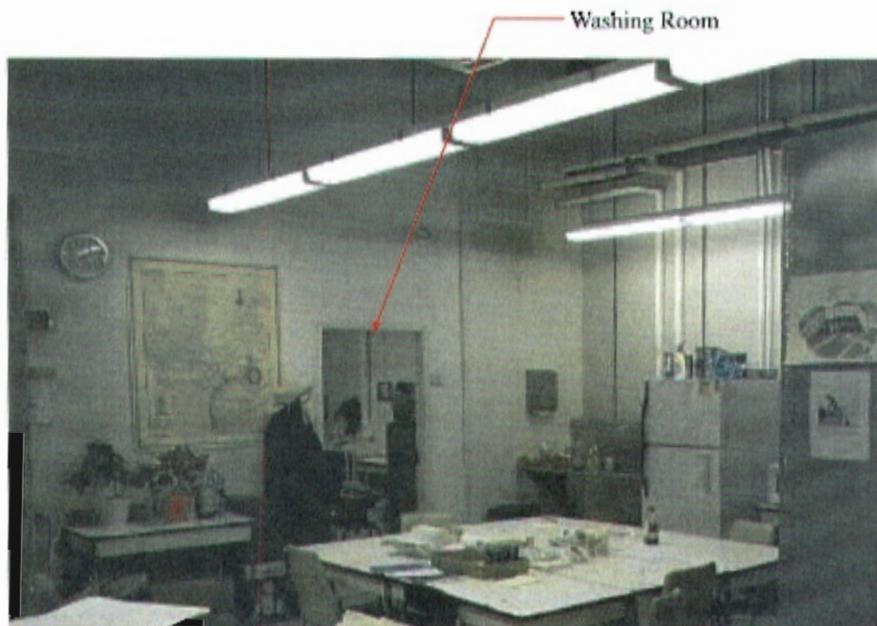
**Legend**

- Exterior Wall
- Interior Walls
- //// ROTC Space
- - - Chain link fence partition
- ..... Designated space - no walls



**Figure 31.** View of the administrative offices in the front of the building. A previous building code analysis recommended the addition of a visible exit sign.

The open floor plan at CAR allows the staff flexibility in arranging furniture that would not otherwise be possible if floor-to-ceiling partitions were used to divide work areas. The washing room (Figure 32) is located within the partitioned space but is accessed from the kitchen area. The door can be closed, and the occasional mess resulting from cleaning



**Figure 32.** View of the washing room (red arrow) and the kitchen (foreground) from the processing space.

operations is not disruptive to other parts of the building. Furniture and electrical conduit positioning define the work areas. The space accommodates accessioning, labeling, and cataloging activities (Figure 33). A demonstration area is located toward the back of the building (Figure 34), and staff members use this area during sessions with local school groups. Next to this demonstration area is a federal collections holding area that is separated from the demonstration area by a chain link fence partition (see Figure 34). The fence partition and locked gate serve as a security barrier, although they offer no protection to the archaeological materials from light, dust, temperature extremes, or fire that could be generated in other parts of the building. Other archaeological collections are stored on shelves located within the open floor space (see Figure 33). Various material processing areas and a small library/meeting space (Figure 35) are located within sight of each other to enhance communication between staff members.

Insect infestation at CAR is monitored and controlled with glue boards (Figure 36). At the time of the facility inspection, CAR staff members were planning to consult with an entomologist for identification and deterrence measure recommendations associated with local pests.



Figure 33. View of the open work areas at CAR.



**Figure 34. View of the demonstration area (foreground) and the federal collections holding area (background).**



**Figure 35. The library/ meeting/research space illustrates the multipurpose philosophy for the work space at CAR.**



**Figure 36. Insect infestation at the CAR is monitored and controlled with glue boards, such as the one shown above.**

## Heating, Ventilating, and Air Conditioning (HVAC)/Structural

The structure was one of the original UTSA campus buildings and initially used as a library processing facility. This building has a five-inch-thick concrete floor and a concrete foundation, and it is framed with rigid steel bents located at 25-foot spacing (Figure 37). Steel pipe columns serve as intermediate supports. Exterior walls are insulated metal panels. The roof is composed of corrugated metal panels with blanket insulation.

All of the building systems are in good condition and are functioning properly. The inspection found no rust or corrosion of the steel structure and no sagging of roof insulation. The forced-air HVAC system is not filtered, although a spot check for dust on horizontal surfaces resulted in negative findings. A record of temperatures and relative humidity levels is not maintained for this building.



Figure 37. The photograph above illustrates the structural framing system, HVAC ductwork, and lighting in the CAR facility.

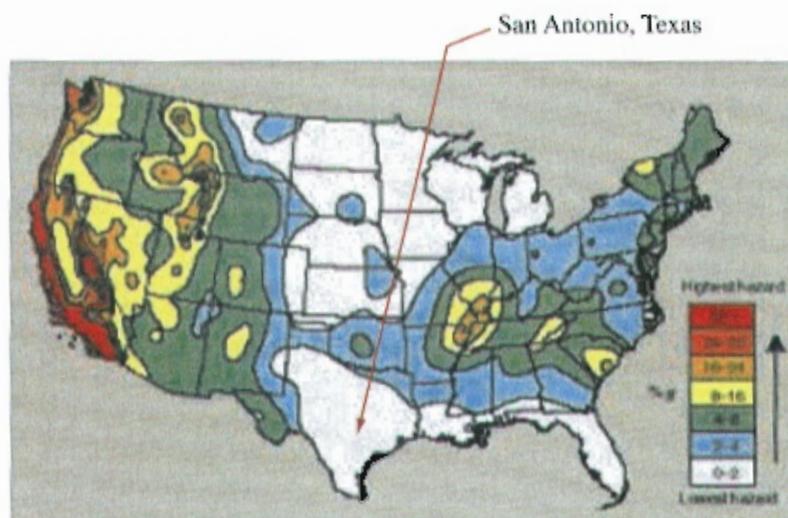


Figure 38. USGS National Seismic Hazard Map. San Antonio, Texas, is located in a low hazard seismic zone.

## Building Codes

On July 1, 2002, a life-safety study of the CAR facility was conducted by Schirmer Engineering Corporation (SEC) and resulted in a preliminary report that identified numerous life-safety and building code issues that should be corrected. The report also made recommendations for remediation. The SEC report did not reference the Code of Federal Regulation, specifically 36 CFR Part 79, that identifies qualities of an acceptable federal repository; however, this report does.

Listed below is a summary of concerns and building code violations at the CAR as presented in the SEC report and 36 CFR Part 79. The SEC report cites local and state building codes and identified deficiencies due to the following.

- Obstructions to exiting due to an improperly swinging door
- Improperly locked doors
- Excess in exiting travel distance
- Narrow path of exit travel
- Lack of secondary means of egress and obstructions to safe exiting at the west side of the building
- Lack of fire separation walls between the storage areas and offices
- Lack of fire rated doors
- Lack of adequate emergency lighting
- Visual obstructions
- One missing exit sign
- Lack of an automatic fire protection system

The federal curation regulation mandates compliance with local codes and, in addition, an operational fire-detection and fire-suppression system. CAR has a fire-detection system but not an automatic fire-suppression system. CAR does not comply with local building codes or the federal regulation.

Code compliant issues at CAR are exacerbated because space usage is shared with the ROTC program that occupies approximately twenty-five percent of the building at the north end. CAR and ROTC spaces are separated by chain-link-fence partitions rather than traditional walls. The fence materials provide some security between spaces but are of no value in containing fire, smoke, noise, temperature, relative humidity, and insects. As a result, problems that might develop on the ROTC side of the building could migrate to the CAR side of the building.

A number of the code-related issues mentioned above pertain to the ROTC space—e.g., improperly locked doors, lack of a secondary means of egress, and the lack of a fire suppression system. Additionally, ROTC use necessitates opening the large overhead door at the northeast side (see Figure 5) of the building, and this jeopardizes CAR's ability to maintain environmental control in their assigned space.

## Security

On October 16, 2001, a university employee conducted a security survey of CAR and presented written recommendations for improvements to the system. Similar to the life-safety study, recommendations did not reference the federal curation regulation, although they were consistent with it in explaining the need for an operational intrusion-detection and intrusion-deterrent system and protection of small, easily pocketed objects. The security survey also recommended installation of a card-reader system on exterior doors, a monitoring system, an audible door alarm for two remotely located west-facing doors, a closed-circuit television system for exterior monitoring, interior motion detectors, additional interior partition fencing, lockable cases to improve security for small objects, the development of written security procedures, and initiation of an internal key control/locked key box system.

The east-facing exterior wall includes large glass windows that are not equipped with an intrusion-detection system, as are the doors (see Figure 4). Entry through windows would, therefore, allow uninterrupted access to the CAR space. This concern could be resolved with the installation of interior motion detectors as recommended in the security survey.

Since the security survey was conducted in October 2001, access to keys and the archaeological collection has been restricted; however, an emergency management plan has not been fully developed nor have other security concerns been resolved. As a result, CAR is not in compliance with university security concerns or the federal curation regulation.

The 2002 university security survey shows concern for protection of people and physical assets inside the building, although it makes recommendations that are beyond basic concerns for archaeological curation purposes. For example, the installation of a card reader/monitoring system on exterior doors would duplicate existing monitoring that is performed by personnel working in the administrative area; therefore, this is somewhat redundant. In terms of protecting archaeological assets, the installation of a card reader/monitoring system for a secure storage room (rather than the entrance) in combination with monitoring all exiting would provide better protection for archaeological materials than would the installation of card readers on exterior doors. In addition, the author disagrees with the need for additional chain-link fence partitions, because installation could result in additional building code violations related to exiting.

A minimum level of security protection would address unsophisticated criminal behavior directed toward opportune targets that present little risk. Breaking and entering and smash-and-grab techniques are common, as is theft by insiders. It is critical, therefore, to focus security improvements toward protecting archaeological collections.

## Repository Evaluation & Compliance with 36 CFR Part 79

### 1. Can the following curatorial activities be conducted for archaeological materials?

Activity	
<input type="checkbox"/> Accessioning	Yes
<input type="checkbox"/> Labeling	Yes
<input type="checkbox"/> Cataloging	Yes
<input type="checkbox"/> Storage	Yes (enclosed by fence partition)
<input type="checkbox"/> Conduct inventory	Yes
<input type="checkbox"/> Conservation	No
<input type="checkbox"/> Study	Yes
<input type="checkbox"/> Registration	Yes

### 2. Can records be maintained to professional archival standards?

Type of Records	
<input type="checkbox"/> Small paper records	Yes
<input type="checkbox"/> Photographic records	Yes
<input type="checkbox"/> Audiovisual records	Yes
<input type="checkbox"/> Electronic records and media	Yes
<input type="checkbox"/> Oversized records and drawings	Yes

### 3. Can archaeological materials and records be protected from excessive temperature, relative humidity, dust, airborne contaminants, fungus, pests, sunlight, and UV light?

Equipment	
<input type="checkbox"/> Heating, Ventilation, A/C equipment	
Temperature monitoring	No
Relative humidity monitoring	No
Air filtering for the entire building	No
Exhaust devices for laboratories	NA (No labs)
<input type="checkbox"/> Security system (Intrusion Detection)	Partial
<input type="checkbox"/> Special security for fragile, valuable, small items	No
<input type="checkbox"/> Windows and doors	Doors only
<input type="checkbox"/> Fluorescent light fixtures have UV filters	No
<input type="checkbox"/> Pest deterrent and prevention devices	Partial

### 4. Is the building safe for human occupancy and was it constructed in accordance with recognized design standards and safeguards?

Standard	
<input type="checkbox"/> National Electrical Code	Partial
<input type="checkbox"/> Local Building Code	No
<input type="checkbox"/> Equipped with a fire detection system	Yes
<input type="checkbox"/> Equipped with an automatic sprinkler system	No

### 5. Can the facility be managed in accordance with standards set forth in 36 CFR Part 79?

Management Tool	
<input type="checkbox"/> Emergency Management Plan	partial (not complete)
<input type="checkbox"/> Written security procedures:	No
limits access to keys	Yes
limits access to the collection	Yes
<input type="checkbox"/> Qualified museum professionals on staff:	
Collection Manager	Yes
Archivists	No
Registrar	Yes

## **Cost Estimate**

As presented earlier, the CAR facility does not meet local building codes or the federal curation regulation, 36 CFR Part 79. The cost estimate presented is based on minimum additions to the building that will bring the facility up to federal standards.

## **Code Compliance**

The building has serious code violations involving exiting that should be resolved, and these issues are exacerbated because the building is shared with the ROTC organization. The chain-link partitioning system between the two groups has resulted in minimizing means of exiting during an emergency situation. Two of the seven exiting shortcomings in the building are in the ROTC space, and the rest are located on the CAR side of the building. CAR was also cited for (1) the lack of a fire-rated partition between their administrative and storage spaces and (2) one wiring inconsistency at the electrical control panel. In addition, the entire building should have an automatic sprinkler system installed.

## **Environmental Control and Monitoring**

The building has a total of six heating, ventilating, and air conditioning units (HVAC) (Figures 9 and 10), and none is filtered. A method to monitor temperature and relative humidity levels in the building was not found, but hygrothermographs have been ordered. In addition, artifact protection from ultraviolet light produced from fluorescent light fixtures does not exist.

## **Security**

The security system in the building consists of an intrusion-detection system for exterior doors but none for the windows. If a thief came through one of the front windows there would be no means of alerting officials to the unauthorized entry. At the time of inspection, there were no means to provide added protection to small, valuable artifacts, and access to the federal collection was being controlled solely by availability of access keys. Current industry standards suggest that a secure storage room or vault be provided and that access to this room be monitored. The most reliable manner to do this is with a card reader and monitoring system for both the federal collections and small, easily stolen items.

**Federal Repository Evaluation & Compliance with 36 CFR Part 79**  
**University of Texas at San Antonio**  
**Center for Archaeological Research**  
**Cost Estimate**

Deficiency/Item	Quantity	Unit	Unit Cost	Total
<b>Environmental control and monitoring</b>				
Hygrothermographs	1	ea	750.00	750.00
Air Filters & installation	6	ea	1,000.00	6,000.00
UV filters for fluorescent lamps	1	sum	500.00	500.00
<b>Security</b>				
Intrusion Detection System (Windows)	10	ea	200.00	2000.00
Secure storage room or vault	1	ea	5000.00	5,000.00
Card Readers with Key Pad (SS Room)	1	ea	1,700	1,700.00
Cards for reader	2	ea	5.00	10.00
Door Hardware & Electric Strike	1	ea	500.00	500.00
Central Processing Unit	1	ea	5,000.00	5,000.00
<b>Building Code &amp; CFR Compliance</b>				
<i>Exiting</i>				
Second means of exiting from ROTC space	1	sum	10,000.00	10,000.00
Panic hardware installation in ROTC space	1	sum	1,000.00	1,000.00
Rehand vestibule door to restroom	1	sum	1,000.00	1,000.00
Exit sign in administration area	1	ea	200.00	200.00
Emergency lighting (storage space)	10	ea	250.00	2,500.00
Additional A/V alarm & strobe lights	10	ea	200.00	2,000.00
<i>Separation of space with fire partitions &amp; doors</i>				
Separate corridor from storage room	1	sum	2,000.00	2,000.00
Separate office from storage room	1	sum	10,000.00	10,000.00
<i>Wiring</i>				
Wiring changes to control panel	1	sum	500.00	500.00
<i>Fire Supression System</i>				
Automatic sprinkler system	20,100	sf	2.50	50,250.00
Dismantle & reassemble ceiling	3,780	sf	1.50	5,670.00
Subtotal				109,580.00
Professional Fees/Expenses 10%				10,658.00
Subtotal				117,238.00
Contingencies 25%				29,309.50
<b>Total</b>				<b>146,547.50</b>

# 4

## Wichita State University

### Department of Anthropology

### Neff Hall

Neff Hall houses the department of anthropology, the Lowell D. Holmes Anthropology Museum, and the Emory Lindquist Honors Center. Neff Hall is centrally located in a park-like setting on the WSU campus. Constructed in 1951, the facility initially housed the College of Business Administration. The building has open space on three sides, including a spacious courtyard at the front or West side (Figure 39). An extensive underground campus utility network exists at WSU and around Neff Hall. The building is accessible to campus pedestrians at the north (Figure 40) and south entrances, but not the main entrance. Vehicle access to the building is limited to maintenance and emergency needs (Figure 41). Due to the



Figure 39. Main entrance to Neff Hall.



**Figure 40. The north entrance to Neff Hall is under a canopy. The concrete pavement was constructed with a modest surface slope away from the doors. The building underwent extensive remodeling a few years ago to include significant accessibility provisions that conform to ADA.**

central location on campus and the perimeter road system, the building is somewhat remote from parking lots.

This results in the building being hard to locate for a first-time visitor and challenging for a disabled scholar who might drive to campus. A mixture of overstory trees, small flowering trees, and deciduous and evergreen shrub foundation plantings enhances the image of the building.

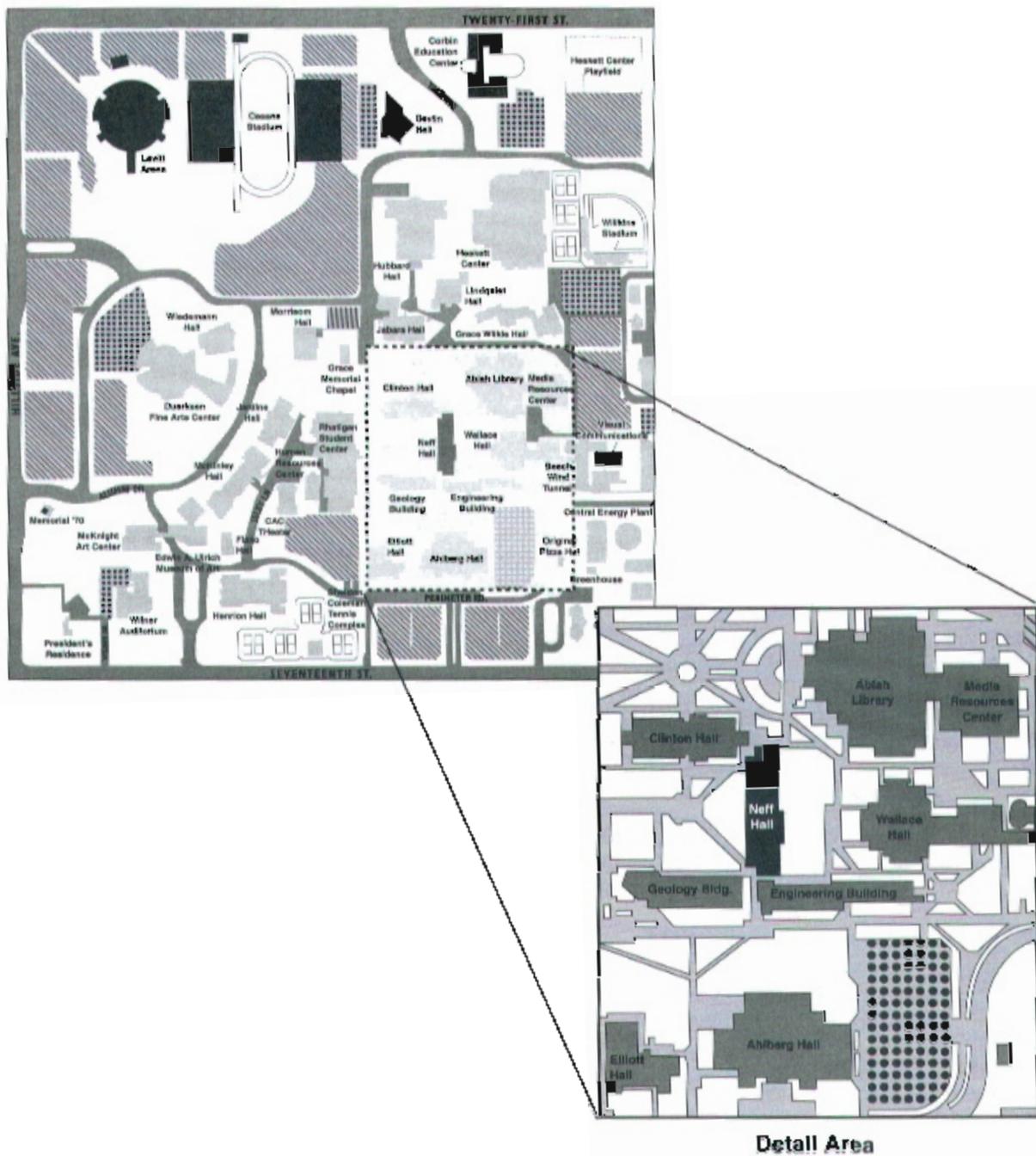


Figure 41. Partial campus map of Wichita State University. Note how inaccessible Neff Hall is to the campus parking lots; the closest one is located east of Ahlberg Hall.

## The Building

Neff Hall houses the Department of Anthropology and the Lowell D. Holmes Anthropology Museum. As a university department, classroom, laboratory, office, and storage spaces are accommodated inside the building. As a museum, exhibit space, office, storage, and workroom spaces are also needed and accommodated (Figure 42). The school has a strong nontraditional enrollment, and many students work during the day and attend class during the afternoon and evening. As a result, the building is open late at night for student and faculty use. The museum component attracts some non-student visitors.

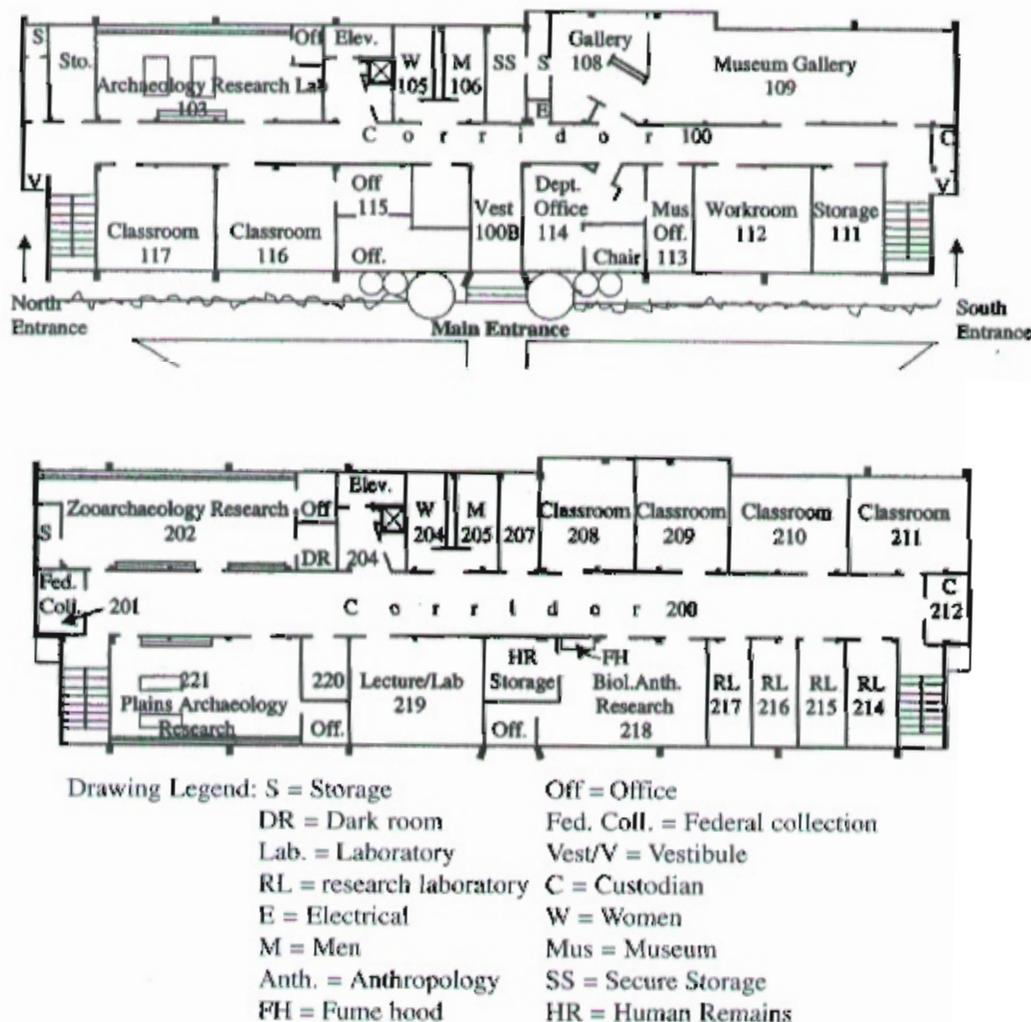
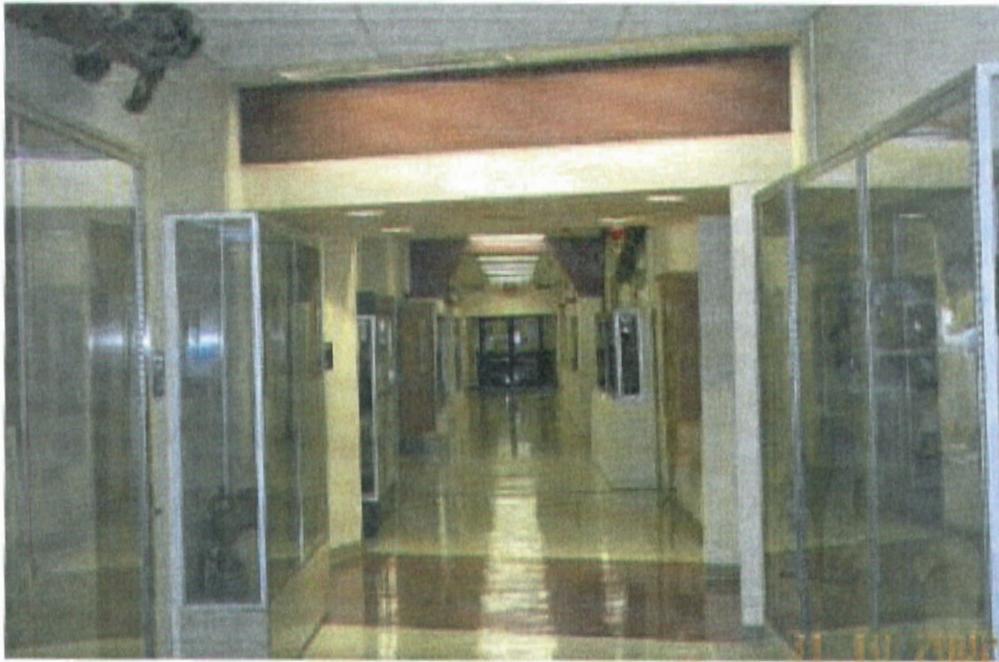


Figure 42. First floor plan diagram (top) and second floor plan diagram (bottom) of Neff Hall.

The building is well maintained, clean, and had no visible sign of insect infestation. Extremely wide corridors allow for display cases and exhibits to be installed on both sides without encroaching on the safe width required for exiting (Figure 43). As reported, the campus fire marshal monitors this situation. Wide corridors also exist on the second floor (Figure 44).



**Figure 43. First floor corridor in Neff Hall.**



**Figure 44. Second floor corridor in Neff Hall.**

Most workrooms, like the Plains Archaeology Research Room and Laboratory (Figures 45 and 46), have a lavatory or sink. The temperature in this multipurpose room was 71.6° F, and the relative humidity was 40%. The professor's office has a direct connection to this room.

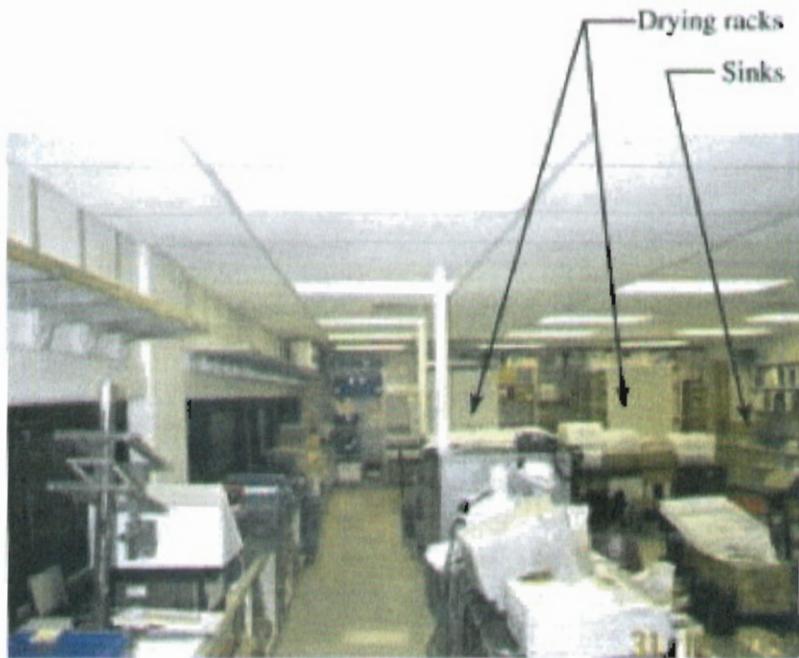


Figure 45. The Plains Archaeology Research Room and Laboratory (Room 221) is located on the second floor of Neff Hall.

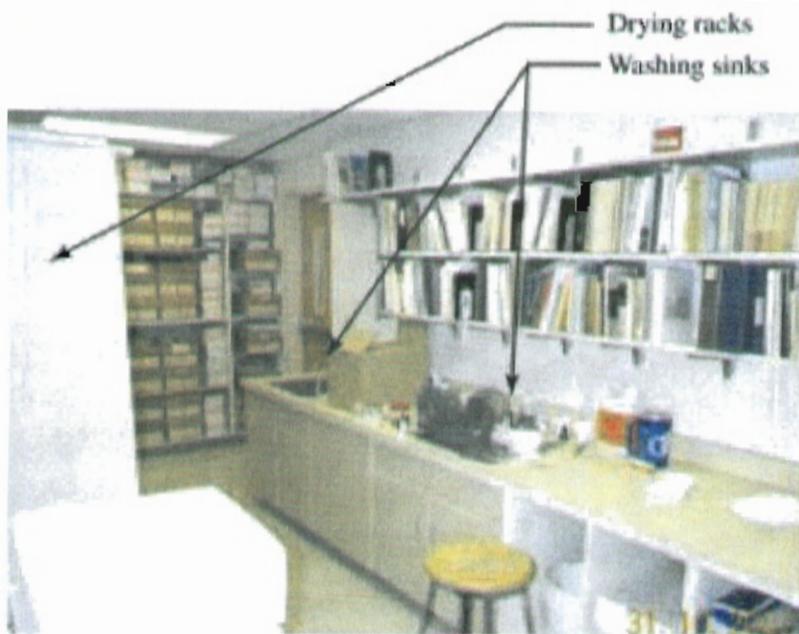


Figure 46. Lavatory, sink, and drying racks in Room 221.

Electrical power to the rooms is supplied inside power poles that extend from the ceiling and are aligned along the center of the room. This is a typical method used to supply electrical power to the center of large rooms such as the Zooarchaeology Research Laboratory (Figure 47). Only one room (Room 218) in Neff Hall has a fume hood, which is vented to the exterior (Figure 48). As reported, acetone is the only chemical used in the building and is used only with the aid of the fume hood.

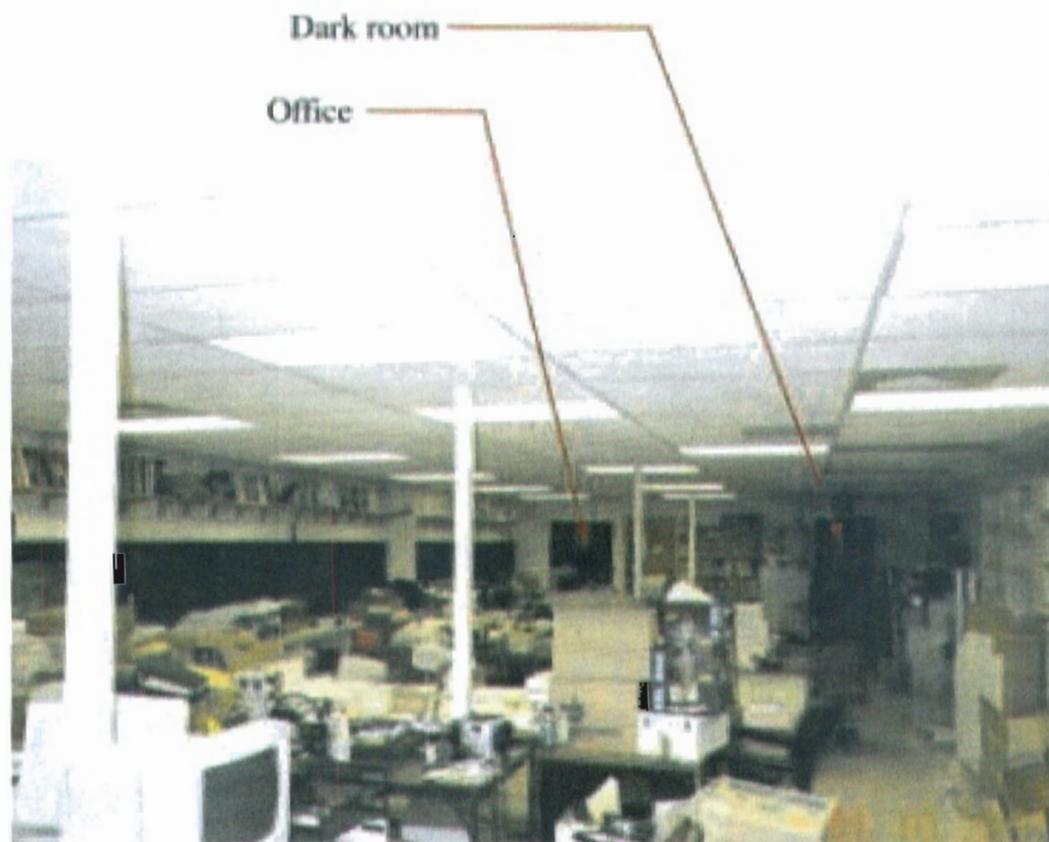
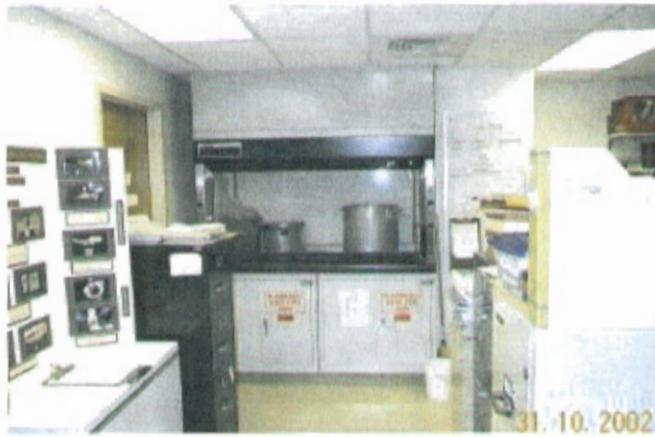


Figure 47. The Zooarchaeology Research Laboratory (Room 202) at WSU. Note the poles in the middle of the room that are used for electrical wiring.

Room 201 is used exclusively for the storage of federally owned archaeological materials that have been cleaned, catalogued, and boxed to professional standards (Figure 49). Unfortunately, this room (and the rest of the building) is not equipped with an automatic sprinkler system. The temperature in this room at the time of the assessment was 62.9° F, and the relative humidity was 61%. A portion of the Museum gallery, Room 109, can be seen in Figure 50.



**Figure 48.** The fume hood in Room 218 is vented directly to the exterior.



**Figure 49.** Collections storage room for federal collections that have been appropriately processed.



**Figure 50.** A student-built exhibit in the Museum gallery.

## Heating, Ventilating, and Air Conditioning (HVAC)/Structural

Neff Hall is a two-story reinforced concrete and masonry structure. Columns, beams, floors, and roof substrate are concrete (Figure 51). Exterior walls are concrete masonry units and brick. Interior walls and partitions are concrete masonry units and/or metal studs and gypsum wallboard. The building is structurally adequate for the purpose for which it was originally designed (e.g., educational above the K-12 level) and for which it is currently being used.

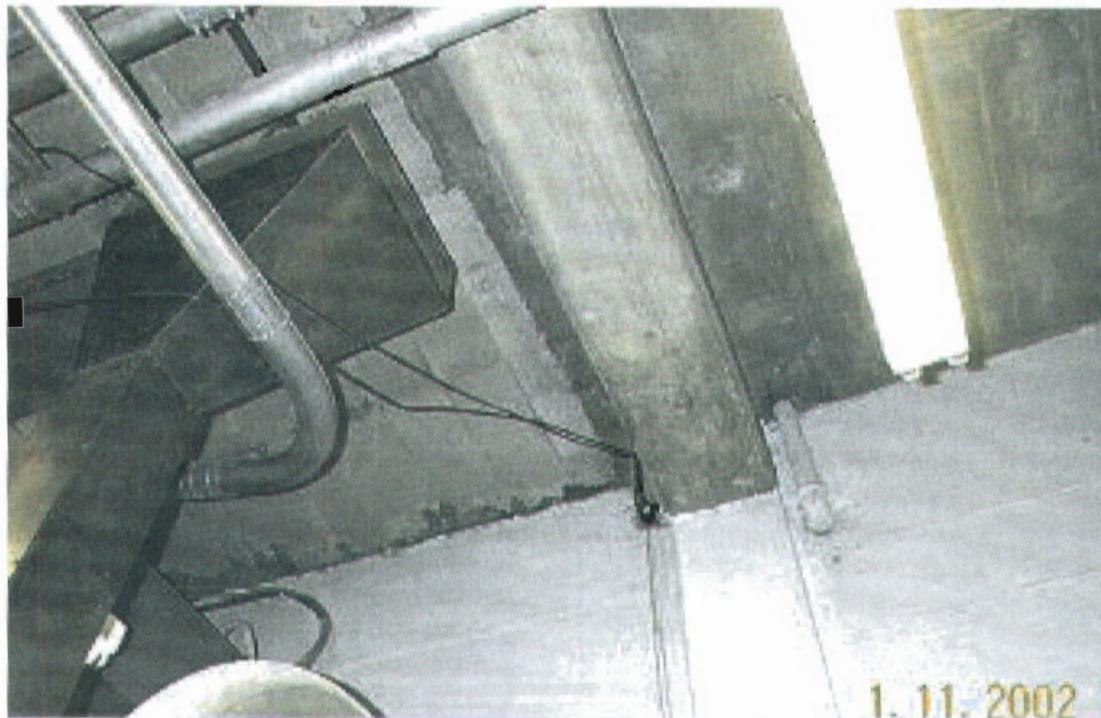


Figure 51. Concrete beams and floor are visible in the partial basement.

However, if Neff Hall were a federal repository, the occupancy or primary use (as defined by building codes) could change and storage functions could occupy more floor space than now. As a result, the building, while now structurally adequate, could become inadequate if subjected to a significant increase in floor loading as a result of expanded storage functions. To further explain, the current occupancy (as defined by the 1994 Uniform Building Code) is "B" or Business, and the corresponding live floor load for design purposes is 50 pounds per square foot. If storage functions were to increase beyond 10% of the total building area, a reclassification to "S" or storage would be appropriate. If that occurred, a review for structural adequacy would require comparison to the minimum code-mandated design loads for a storage occupancy, as follows.

Storage	Light—125 pounds per square foot (psf)
	Heavy—250 pounds per square foot

Most storage needs for an archaeological curation building are similar to a library stack room, or 125 pounds per square foot as shown above for light storage. A collection composed primarily of lithics should be housed in a structure designed for heavy loads or 250 p/sf. Regardless, Neff Hall was not designed for either of these two conditions.

Neff Hall is in a low earthquake hazard area of the United States, and as a result, the probability of an earthquake occurring and subsequent damage and injury are minimal (Figure 52). Below is a seismic hazard map that illustrates seismic zones through the United States.

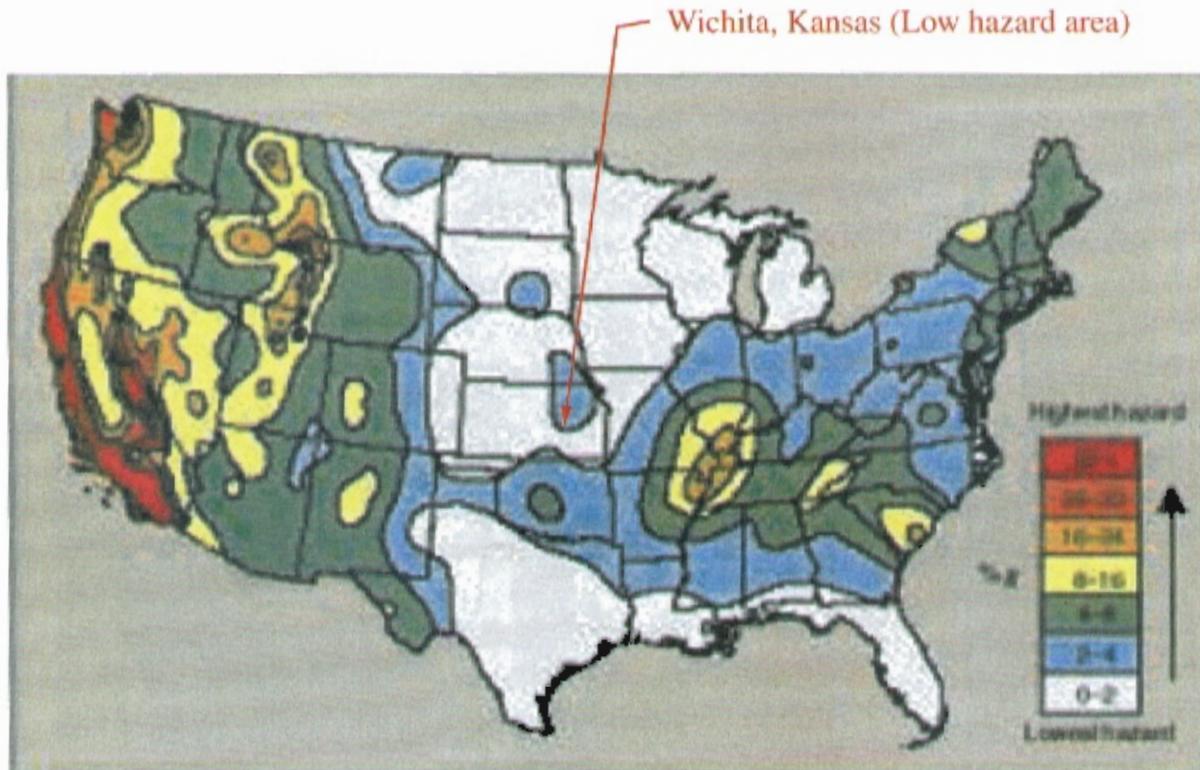
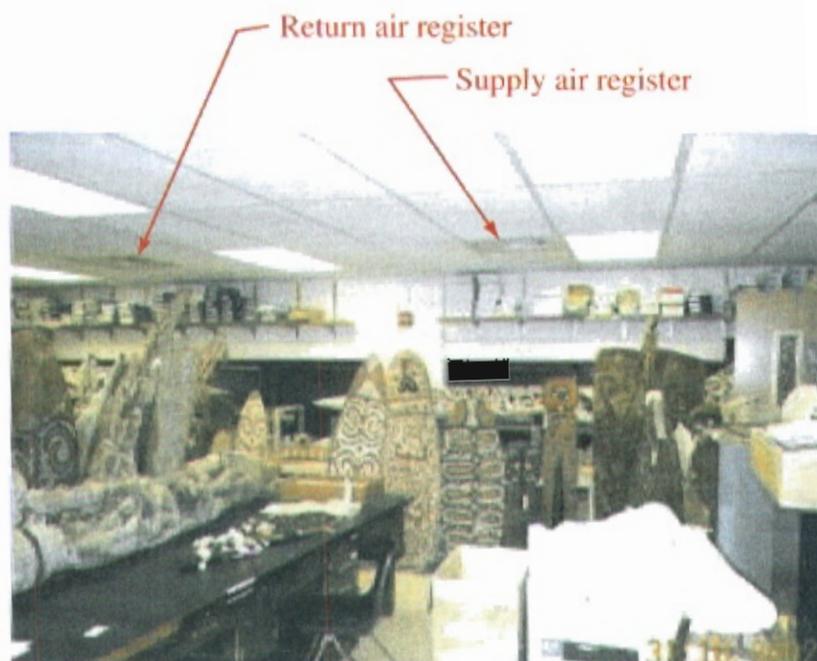
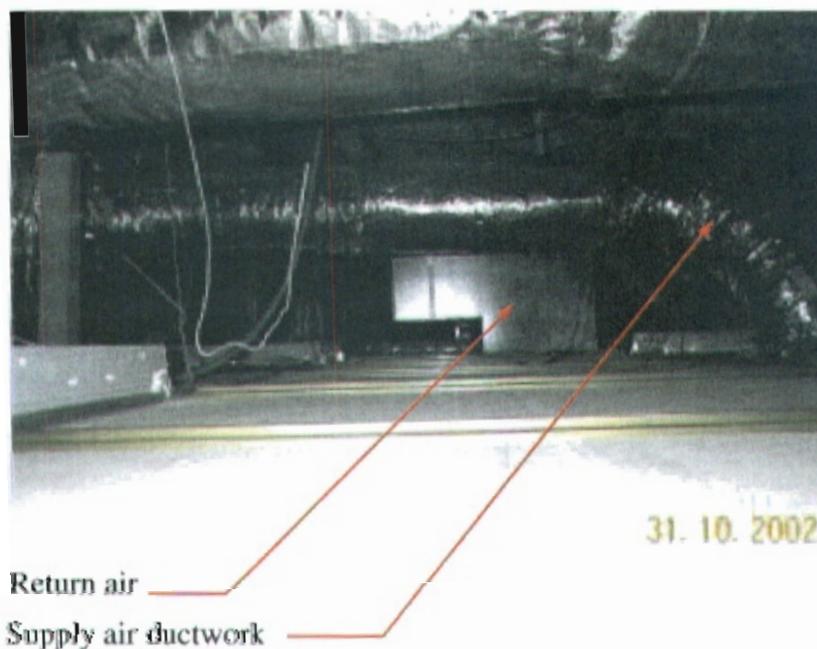


Figure 52. U.S.G.S. National Seismic Hazard map. A crosscheck with the seismic zone map of the U.S. contained in UBC Chapter 16 indicates Wichita, Kansas, is located in Zone 1.

Wichita State University maintains a central energy plant that supplies 80–85% of the heating and cooling needs to the entire campus by way of a two-pipe water system. Neff Hall benefits from this system. From the central plant, either hot or chilled water is pumped to the building where it is routed to and circulated through individual fan-coil units for either heating or air conditioning needs. (At Neff Hall, fan coil units are located in the plenum, attached to the underside of the floor or roof above.) The fan-coil units heat or cool air that in turn is blown through ductwork into individual classroom, labs, or offices for conditioning. Ventilation is accomplished by drawing air through ceiling registers (Figures 53 and 54) and the plenum (space between the ceiling and floor or roof above) to the fan-coil unit for reheating or re-cooling. In addition, supplemental air conditioning units are located outside,



**Figure 53.** Room 103 is referred to as the Southwest Archaeological Research Lab, and it contains the Asmat Western New Guinea collection. Supply and return air registers are mounted in the ceiling.



**Figure 54.** Photograph taken above the ceiling in Room 202 showing the supply air ductwork and a partial sheet metal duct, which is connected to the return air register mounted in the ceiling.

on the east side of the building. Together the two systems supply the heating and cooling needs for the building. Air is not re-circulated in the corridors where plenums do not exist.

At the WSU campus, windows for most buildings, including Neff, are equipped with exterior mounted sunshades. The shades greatly reduce the light entering the windows, reduce the cooling load during the summer months, and minimize potential damage to

archaeological materials from exposure to sunlight. However, the sunshades offer no security enhancements to the building.

## Building Codes

Generally, when a community or state adopts a model building code it is done to provide minimum standards for the protection of life, limb, property, the environment, and the safety and welfare of the users, occupants, and general public. Among other criteria, buildings are reviewed based on their intended use or occupancy, size, construction materials, and position on the site. Based on these criteria, Neff Hall complies with the local and state building codes. Nevertheless, Neff Hall does not have an automatic fire suppression system, which is mandatory by 36 CFR Part 79.

Per the 1994 Uniform Building Code, UBC (local code), and the National Fire Protection Association Code (NFPA 101 followed by the state of Kansas), the concrete construction materials used for Neff Hall allow the building to be classified as "fire-resistive," which means the likelihood of the building structure burning is minimal. Neff Hall serves students above the 12th grade and falls under the UBC occupancy classification as "B" or business. The location of Neff Hall on the WSU campus is such that the space immediately adjacent to three exterior sides is essentially open and not occupied by another building. As a result, the likelihood of a fire (in Neff) spreading to or from an adjacent building is negligible. Because the building is open on three sides, typical area limitations for this type of structure, at 8,000 square feet per floor, can be doubled. In other words, the maximum area per floor is 16,000 square feet or a total for both floors of 32,000 square feet. The actual size of Neff is 29,004 square feet. The UBC and NFPA were referenced to determine whether the building was required to have an automatic sprinkler system installed, and in both situations it was not. Typically, if the local and state building codes do not require an automatic fire suppression system, one will not be installed and the situation at Neff is normal. Code-required detection, alarm, and communication systems have been installed and are visible to users of the building (Figure 55). In the event of a fire, the alarm is energized and an auto-dialer system calls the police department and reads a recorded message.

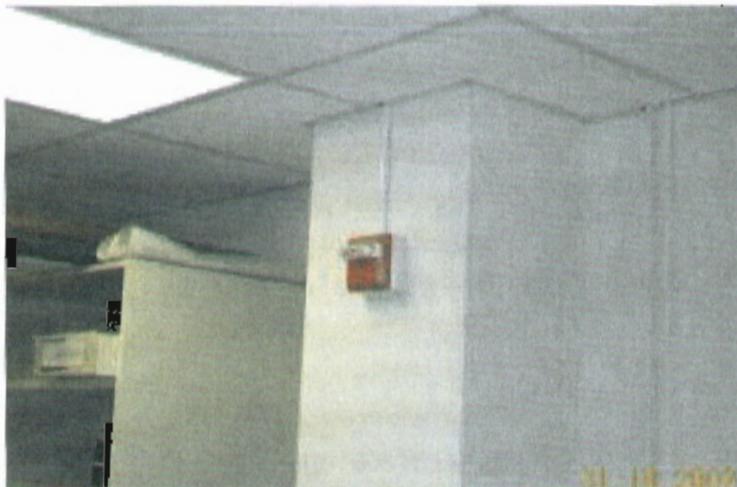


Figure 55. Fire alarm enunciator in Room 202.

## Security

Neff Hall is open to students and faculty from 6:00 a.m. to approximately 10:00 p.m. Being somewhat non-traditional, many students who use the building work during the day and attend afternoon and evening classes. It is common for students and faculty to work late at night in the building. For the most part, laboratory room doors are kept locked from the hall side and access is monitored with sign-in/sign-out logs. Access to room keys is restricted. The storage room currently used for federal collections (Room 201) has only two keys outstanding. Like many rooms in the building, the door to this room is always kept locked.

Located just north of the Gallery on the first floor is a storage room (Room 108). Located to the north of the first storage room is a second or secure storage room. One must travel through the first storage room in order to access the second. Like the first, the second storage (secure storage) room is kept locked and few people know of its existence.

The department chairman, Dr. Moore-Jansen, has instituted a records organization system at Neff Hall that requires each faculty member to coordinate records and accessioning with the Museum Director. Although faculty members generate their own records, the coordination process helps to ensure that all records can be accounted for and that some centralized control is in place. Small paper records are kept in file folders and photographic records are generally kept in binders. Both types of records are filed in locked cabinets.

Neff Hall houses a public museum function and is attractive to visitors due to the items exhibited in the corridors and the museum gallery. The building is patrolled by campus police on a frequent basis; an intrusion detection system has not been installed.

In contrast to local and state building codes, 36 CFR Part 79 requires federal repositories to have an operational fire detection and suppression system. At Neff Hall, an operational fire detection system has been installed but a fire suppression system has not. Instead, individual, wall-hung fire extinguishers have been placed around the building for use by staff in the event of a fire. The facility has an emergency management plan in place and the department coordinator attends training in addition to organizing occasional drills as practice for an emergency situation. The lack of an automatic fire suppression system suggests a higher likelihood of damage or destruction to archaeological materials in the event of a fire during the late night/early morning hours than would be expected if an automatic fire suppression system were in place.

## Repository Evaluation & Compliance with 36 CFR Part 79

### 1. Can the following curatorial activities be conducted for archaeological materials?

Activity	
<input type="checkbox"/> Accessioning	Yes
<input type="checkbox"/> Labeling	Yes
<input type="checkbox"/> Cataloging	Yes
<input type="checkbox"/> Storage	Yes
<input type="checkbox"/> Conduct inventory	Yes
<input type="checkbox"/> Conservation	No
<input type="checkbox"/> Study	Yes
<input type="checkbox"/> Registration	Yes

### 2. Can records be maintained to professional archival standards?

Type of Records	
<input type="checkbox"/> Small paper records	Yes
<input type="checkbox"/> Photographic records	Yes
<input type="checkbox"/> Audiovisual records	Yes
<input type="checkbox"/> Electronic records and media	Yes
<input type="checkbox"/> Oversized records and drawings	Yes

### 3. Can archaeological materials and records be protected from excessive temperature, relative humidity, dust, airborne contaminants, fungus, pests, sunlight, and UV light?

Equipment	
<input type="checkbox"/> Heating, Ventilation, A/C equipment	
Temperature monitoring	Yes
Relative humidity monitoring	Yes
Air filtering for the entire building	Yes
Exhaust devices for laboratories	Yes
<input type="checkbox"/> Security system	No
<input type="checkbox"/> Special security for fragile, valuable, small items	Yes
<input type="checkbox"/> Intrusion detection system	No
<input type="checkbox"/> Windows and doors	No
<input type="checkbox"/> Fluorescent light fixtures and UV filters	No
<input type="checkbox"/> Pest deterrent and prevention devices	No

### 4. Is the building safe for human occupancy and was it constructed in accordance with recognized design standards and safeguards?

Standard	
<input type="checkbox"/> National Electrical Code	Yes
<input type="checkbox"/> Local Building Code	Yes
<input type="checkbox"/> Equipped with a fire detection system	Yes
<input type="checkbox"/> Equipped with an automatic sprinkler system	No

### 5. Can the facility be managed in accordance with standards set forth in 36 CFR Part 79?

Management Tool	
<input type="checkbox"/> Emergency Management Plan	Yes
<input type="checkbox"/> Written security procedures:	No
limits access to keys	Yes
limits access to the collection	Yes
<input type="checkbox"/> Qualified museum professionals on staff:	
Collection Manager	Yes
Archivists	No
Registrar	Yes

## **Cost Estimate**

As presented earlier, the building meets current local building code standards for its occupancy and use; however, it does not meet 36 CFR Part 79 standards for a facility housing federal collections. The following cost estimate is based on minimum additions to the building that will bring the facility up to 36 CFR Part 79 standards.

## **Security System**

An IDS is needed for exterior entry points. The building does not have an automatic intrusion detection system, and building management relies on campus security patrols and sign-in/sign-out registers at laboratory rooms to protect collections. The items listed in the cost estimate are based on providing a minimum level of automated protection against unsophisticated criminals interested in opportune targets. Breaking and entering and smash-and-grab techniques are common as is theft by insiders. Protecting against these types of possibilities is considered a minimum, but acceptable, level of security. As a result, an intrusion detection system should be installed that, when energized, will alert campus police to unauthorized entry. The cost estimate includes magnetic door switches on all six exterior doors and motion detectors in all first floor rooms. Motion detectors in first floor classrooms are alternatives to having an IDS system installed on each window. These provisions will discourage theft and alert officials to unauthorized entry after normal hours.

Measures are needed to secure the storage room and the federal collections room. Access into the secure storage room and the federal collections storage room is not monitored or recorded. Current curatorial standards suggest that access to both of these rooms be monitored and recorded. Doors to both rooms should therefore be equipped with card readers with key pads, an electric strike, and each entry recorded on a CPU. These provisions will provide a minimum level of protection.

## **Automatic Sprinkler System**

As mentioned in the preceding pages, the building's main function is to serve academic uses rather than as storage space, and at no time is it anticipated that storage functions will exceed 10% of the available space. Local building codes do not require a sprinkler system based on current space utilization but the CFR does if the institution is to become a recognized federal repository. A federal repository will accommodate storage, research, and study space. As a result, fire protection for more than a storage room should be provided. In this instance, cost provisions for an automatic sprinkler system covering 50% of the building are considered adequate and therefore presented in the estimate. Insofar as an existing suspended acoustical ceiling is in place, the assumption was made to disassemble the existing ceiling before sprinkler pipe installation and then reassemble it after installation of the piping. A cost for this effort is included.

**Protection from UV Radlation**

Standard, unfiltered fluorescent lamps, as exist in Neff, produce UV radiation that can damage a collection. UV filter sleeves can block over 99% of the UV rays and provide protection from UV light for archaeological materials. The cost estimate includes provisions for installing UV filters around existing fluorescent tubes.

**Federal Repository Evaluation & Compliance with 36 CFR Part 79  
Wichita State University  
Neff Hall  
Cost Estimate**

Deficiency/Item	Quantity	Unit	Unit Cost	Total
<b>Environmental control and monitoring</b>				
UV Filters for light fixtures	1	Sum	500	500.00
<b>Security</b>				
Balanced Magnetic Door Switches (Exterior)	6	ea	200	1,200.00
Motion Detectors (First Floor Classrooms)	14	ea	1,500	21,000.00
<i>Secure Storage Room/Federal Collections Room</i>				
Card Readers with Key Pad	2	ea	1,700	3,400.00
Cards	2	ea	5	10.00
Door Hardware & Electric Strike	2	ea	500	1,000.00
Central Processing Unit	1	ea	5,000	5,000.00
<b>Building Code &amp; CFR Compliance</b>				
Automatic sprinkler system (50% of building)	14,500	sf	2.50	36,250.00
Dismantle & reassemble ceiling	14,500	sf	1.50	21,750.00
Subtotal				90,110.00
Professional Fees/Expenses 10%				9,011.00
Subtotal				99,121.00
Contingencies 25%				24,780.25
<b>Total</b>				<b>123,901.25</b>

## 5

# Updated Curation Facility Costs

In 1996 the St. Louis District initiated a nationwide technical study to identify potential partners that might be interested in serving as long-term repositories for Department of Defense (DoD) and U.S. Army Corps of Engineers (USACE) archaeological collections. The mission was to evaluate potential partners' capabilities to manage archaeological collections, and to collect baseline financial information associated with such an endeavor. The process that was implemented involved four steps—(1) a preliminary screening, (2) a secondary screening, (3) on-site repository evaluations, and (4) placement of information into a decision-support model.

The field team consisted of experts in three areas—architecture, collections management, and administration. These three critical subject areas provided a concise and pointed overview necessary to determine the acceptability and suitability of that institution to provide long-term curation services to DoD and USACE. The architect assessed the building and its support systems. The collections management specialist collected information on an institution's staff, collections management policies and practices, and support services. The administrative specialist collected organizational infrastructure information.

The architect performed a building evaluation through observation, building code review, and interviews with the institution's staff. The evaluation focused on the general adequacy of the fire-suppression system, fire detection, HVAC systems, security, building construction and structure, plumbing, building egress, handicapped accessibility, regulatory and site issues, and space use. The goal of the building evaluation was to determine the suitability of the facility to provide proper long-term care of DoD's and USACE's archaeological collections.

Finally, cost estimates were generated for potential curation partners based on meeting the requirements of 36 CFR Part 79 and housing a certain volume of DoD and USACE archaeological materials. If new construction appeared warranted, then a cost estimate for a new facility was prepared.

The following pages present updated costs for facilities in Colorado, Kansas, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, and Wyoming. Prior to determining an appropriate inflation/escalation rate for the October 1998 cost estimates, the original estimates were reviewed, analyzed, and recalculated. After this, the estimates were updated based on October 2002 costs. Finally, adjustments were made for the volume of Reclamation archaeological collections (i.e., artifacts and associated documentation) and the amount of space that may be required to house Reclamation collections. The cost estimates provided to Reclamation should be viewed as median costs.

<b>University of Colorado Museum</b>	<b>Building</b>	<b>Est. Cubic Ft</b>	<b>Est Repository Sq Ft <sup>1.7</sup></b>	
	Old Geology	315	536	
Renovation of repository and support space			1,339*	
<b>Est. Cost</b>				
<b>Construction Costs</b>	<b>per sq ft</b>	<b>GSF</b>	<b>Subtotal</b>	
Interior Demolition	\$5.00	1,339	\$6,695.00	
Interior Construction	\$6.60	1,339	\$8,837.40	
Interior Electrical	\$11.95	1,339	\$16,001.05	
Interior Finishes	\$10.75	1,339	\$14,394.25	
HVAC	\$20.60	1,339	\$27,583.40	
Curation Shelving/Equipment	\$65.00	536	\$34,840.00	
		<b>Subtotal</b>	\$108,351.10	
Contractor O & P 10%			\$10,835.11	
		<b>Subtotal</b>	\$119,186.21	
Contingencies 25%			\$29,796.55	
		<b>Subtotal</b>	\$148,982.76	
Location Factor 94%			-\$8,938.97	
		<b>Subtotal</b>	\$140,043.79	
Escalation 12%			\$16,805.25**	
<b>Cost per sq ft of repository</b>		<b>\$117.16</b>	<b>TOTAL</b>	<b>\$156,849.04</b>

\* Estimated gross square feet (GSF) required for collections storage and necessary support spaces.

\*\* Escalation from October 1998 to October 2002.

**University of Kansas  
Museum of Anthropology**

**Building Est. Cubic Ft Est Repository Sq Ft** <sup>1.7</sup>

New Facility 285 485

New construction

**Est. Cost** 1,211\*

<b>Construction Costs</b>	<b>per sq ft</b>	<b>GSF</b>	<b>Subtotal</b>
Sitework	\$18.20	1,211	\$22,040.20
Substructure	\$10.50	1,211	\$12,715.50
Superstructure	\$15.00	1,211	\$18,165.00
Exterior Closure	\$14.45	1,211	\$17,498.95
Roofing	\$8.05	1,211	\$9,748.55
Interior Construction	\$6.60	1,211	\$7,992.60
Interior Finishes	\$10.75	1,211	\$13,018.25
Plumbing	\$8.35	1,211	\$10,111.85
HVAC	\$20.65	1,211	\$25,007.15
Interior Electric	\$11.95	1,211	\$14,471.45
Other Electrical	\$1.45	1,211	\$1,755.95
Curation Shelving/Equipment	\$65.00	485	\$31,525.00
		<b>Subtotal</b>	\$184,050.45
Contractor O & P 10%			\$18,405.05
		<b>Subtotal</b>	\$202,455.50
Contingencies 25%			\$50,613.87
		<b>Subtotal</b>	\$253,069.37
Location Factor 86%			\$-35,429.71
		<b>Subtotal</b>	\$217,639.66
Escalation 12%			\$26,116.76**
<b>Cost per sq ft of repository</b>	<b>\$201.24</b>	<b>TOTAL</b>	<b>\$243,756.42</b>

\* Estimated gross square feet (GSF) for collections storage and necessary support spaces.

\*\* Escalation from October 1998 to October 2002.

Museum of the Rockies	Building	Est. Cubic Ft	Est. Repository Sq Ft	1.7
	New Addition	295	502	
Construction of addition of repository and support space				
	Est. Cost		1,254*	
Construction Costs	per sq ft	GSF	Subtotal	
Sitework	\$18.20	1,254	\$22,822.80	
Substructure	\$10.50	1,254	\$13,167.00	
Superstructure	\$15.00	1,254	\$18,810.00	
Exterior Closure	\$14.45	1,254	\$18,120.30	
Roofing	\$8.05	1,254	\$10,094.70	
Interior Construction	\$6.60	1,254	\$8,276.40	
Interior Finishes	\$10.75	1,254	\$13,480.50	
Plumbing	\$8.35	1,254	\$10,470.90	
HVAC	\$20.65	1,254	\$25,895.10	
Interior Electric	\$11.95	1,254	\$14,985.30	
Other Electrical	\$1.45	1,254	\$1,818.30	
Curation Shelving/Equipment	\$65.00	502	\$32,630.00	
		<b>Subtotal</b>	\$190,571.30	
Contractor O & P 10%			\$19,057.13	
		<b>Subtotal</b>	\$209,628.43	
Contingencies 25%			\$52,407.11	
		<b>Subtotal</b>	\$262,035.54	
Location Factor 97%			\$-7,861.07	
		<b>Subtotal</b>	\$254,174.47	
Escalation 12%			\$30,500.94**	
<b>Cost per sq ft of repository</b>	<b>\$227.06</b>	<b>TOTAL</b>	<b>\$284,675.41</b>	

\* Estimated gross square feet (GSF) for collections storage and necessary support spaces.

\*\* Escalation from October 1998 to October 2002.

**State Historical Society  
of North Dakota**

	<b>Building</b>	<b>Est. Cubic Ft</b>	<b>Est. Repository Sq Ft <sup>1.7</sup></b>
	New Addition	410	697
<b>Construction of additional floor</b>			
<b>Est. Cost</b>			
<b>Construction Costs</b>	<b>per sq ft</b>	<b>GSF</b>	<b>Subtotal</b>
Superstructure	\$15.00	697	\$10,455.00
Interior Demolition	\$5.00	697	\$3,485.00
Exterior Closure	\$14.45	697	\$10,071.65
Roofing	\$8.05	697	\$5,610.85
Interior Construction	\$6.60	697	\$4,600.20
Interior Finishes	\$10.75	697	\$7,492.75
Plumbing	\$8.35	697	\$5,819.95
HVAC	\$12.00	697	\$8,364.00
Interior Electric	\$11.95	697	\$8,329.15
Curation Shelving/Equipment	\$65.00	697	\$45,305.00
		<b>Subtotal</b>	\$109,533.55
Contractor O & P 10%			\$10,953.36
		<b>Subtotal</b>	\$120,486.91
Contingencies 25%			\$30,121.73
		<b>Subtotal</b>	\$150,608.64
Location Factor 86%			\$-21,085.21
		<b>Subtotal</b>	\$129,523.43
Escalation 12%			\$15,542.81*
<b>Cost per sq ft of repository</b>	\$208.13	<b>TOTAL</b>	\$145,066.24

\* Escalation from October 1998 to October 2002.

<b>Museum of the Great Plains</b>	<b>Building</b>	<b>Est. Cubic Ft</b>	<b>Est. Repository Sq Ft</b> <sup>1.7</sup>
	Main Museum	535	910
Creation of mezzanine level			
<b>Est. Cost</b>			
<b>Construction Costs</b>	<b>per sq ft</b>	<b>GSF</b>	<b>Subtotal</b>
Interior Demolition	\$5.00	910	\$4,550.00
Interior Construction	\$6.60	910	\$6,006.00
Interior Finishes	\$10.75	910	\$9,782.50
Curation Shelving	\$65.00	910	\$59,150.00
Lighting Under Mezzanine	\$1.40	910	\$1,274.00
Curation Shelving - Mezzanine	\$65.00	910	\$59,150.00
		<b>Subtotal</b>	\$139,912.50
Contractor O & P 10%			\$13,991.25
		<b>Subtotal</b>	\$153,903.75
Contingencies 25%			\$38,475.94
		<b>Subtotal</b>	\$192,379.69
Location Factor 82%			\$-34,628.34
		<b>Subtotal</b>	\$157,751.35
Escalation 12%			\$18,930.16*
Cost per sq ft of repository	\$194.26	<b>TOTAL</b>	\$176,681.51

\* Escalation from October 1998 to October 2002.

University of Nebraska  
State Museum

	Building	Est. Cubic Ft	Est. Repository Sq Ft <sup>1.7</sup>
Renovation of vacant structure	Reunion Building	208	354
	<b>Est. Cost</b>		884*
Construction Costs	per sq ft	GSF	Subtotal
Interior Demolition	\$5.00	884	\$4,420.00
Roof/Exterior Closure Repairs	\$8.05	884	\$7,116.20
Interior Construction	\$6.60	884	\$5,834.40
Interior Finishes	\$10.75	884	\$9,503.00
Plumbing	\$8.35	884	\$7,381.40
HVAC	\$20.65	884	\$18,254.60
Interior Electric	\$11.95	884	\$10,563.80
Other Electrical	\$1.45	884	\$1,281.80
Curation Shelving/Equipment	\$65.00	884	\$57,460.00
		<b>Subtotal</b>	\$121,815.20
Contractor O & P 10%			\$12,181.52
		<b>Subtotal</b>	\$133,996.72
Contingencies 25%			\$33,499.18
		<b>Subtotal</b>	\$167,495.90
Location Factor 82%			\$-30,149.26
		<b>Subtotal</b>	\$137,346.64
Escalation 12%			\$16,481.60**
<b>Cost per sq ft of repository</b>	\$174.01	<b>TOTAL</b>	\$153,828.24

\* Estimated gross square feet (GSF) for collections storage and necessary support spaces.

\*\* Escalation from October 1998 to October 2002.

South Dakota (Unknown)	Building	Est. Cubic Ft	Est Repository Sq Ft <sup>1.7</sup>
	New Facility	72	122
New construction			
	Est. Cost	306*	
Construction Costs	per sq ft	GSF	Subtotal
Sitework	\$18.20	306	\$5,569.20
Substructure	\$10.50	306	\$3,213.00
Superstructure	\$15.00	306	\$4,590.00
Exterior Closure	\$14.45	306	\$4,421.70
Roofing	\$8.05	306	\$2,463.30
Interior Construction	\$6.60	306	\$2,019.60
Interior Finishes	\$10.75	306	\$3,289.50
Plumbing	\$8.35	306	\$2,555.10
HVAC	\$20.65	306	\$6,318.90
Interior Electric	\$11.95	306	\$3,656.70
Other Electrical	\$1.45	306	\$443.70
Curation Shelving/Equipment	\$65.00	122	\$7,930.00
		<b>Subtotal</b>	\$46,470.70
Contractor O & P 10%			\$4,647.07
		<b>Subtotal</b>	\$51,117.77
Contingencies 25%			\$12,779.44
		<b>Subtotal</b>	\$63,897.21
Location Factor 86%			\$-8,945.61
		<b>Subtotal</b>	\$54,951.60
Escalation 12%			\$6,594.19**
<b>Cost per sq ft of repository</b>	\$201.13	<b>TOTAL</b>	\$61,545.79

\* Estimated gross square feet (GSF) for collections storage and necessary support spaces.

\*\* Escalation from October 1998 to October 2002.

University of Wyoming  
Department of Anthrology

	Building	Est. Cubic Ft	Est. Repository Sq Ft
	Ag Building A	206	350
Renovation and additional support space			
	Est. Cost		876*
<b>Construction Costs</b>	<b>per sq ft</b>	<b>GSF</b>	<b>Subtotal</b>
Interior Demolition	\$5.00	876	\$4,380.00
Interior Construction	\$6.60	876	\$5,781.60
Interior Finishes	\$10.75	876	\$9,417.00
Interior Electric	\$11.95	876	\$10,468.20
HVAC	\$12.00	876	\$10,512.00
Curation Shelving/Equipment	\$65.00	350	\$22,750.00
Automatic Fire Sprinkler System	\$2.50	876	\$2,190.00
		<b>Subtotal</b>	\$65,498.80
Contractor O & P 10%			\$6,549.88
		<b>Subtotal</b>	\$72,048.68
Contingencies 25%			\$18,012.17
		<b>Subtotal</b>	\$90,060.85
Location Factor 84%			\$-14,409.74
		<b>Subtotal</b>	\$75,651.11
Escalation 12%			\$9,078.13**
<b>Cost per sq ft of repository</b>	<b>\$96.78</b>	<b>TOTAL</b>	<b>\$84,729.24</b>

\* Estimated gross square feet (GSF) for collections storage and necessary support spaces.

\*\* Escalation from October 1998 to October 2002.

A cost estimate for Texas is not included in the preceding pages, but an estimated cost for capital improvements for Reclamation's collections in Texas can be determined by calculating the per cubic foot cost for capital improvements in Texas in the DoD and USACE potential partner study and multiplying this figure by the volume of Reclamation collections in Texas.

$$\$330/\text{ft}^3 \times 615 \text{ ft}^3 = \$202,950$$

If this estimate for Texas is added to the capital improvement costs in the preceding pages the total cost for capital improvements to facilities curating Reclamation collections is approximately \$1,510,000.

Finally, in order to provide Reclamation with a gross estimate for the cost of curating all of their archaeological collections in one location, we have prepared a cost estimate for a curation facility in Bozeman, Montana. We caution Reclamation to use this estimate carefully because it is based on an evaluation at the Museum of the Rockies in the late 1990s. Should Reclamation decide to pursue this avenue we strongly recommend involving an architect or architectural firm with archaeological repository design experience in the planning phase.

<b>BoR Facility</b>	<b>Building</b>	<b>Est. Cubic Ft</b>	<b>Est. Repository Sq Ft <sup>1.7</sup></b>
	New Addition	3,000	5,100
New Construction			
	<b>Est. Cost</b>		12,750*
<b>Construction Costs</b>	<b>per sq ft</b>	<b>GSF</b>	<b>Subtotal</b>
Sitework	\$18.20	12,750	\$232,050.00
Substructure	\$10.50	12,750	\$133,875.00
Superstructure	\$15.00	12,750	\$191,250.00
Exterior Closure	\$14.40	12,750	\$183,600.00
Roofing	\$8.00	12,750	\$102,000.00
Interior Construction	\$6.60	12,750	\$84,150.00
Interior Finishes	\$10.70	12,750	\$136,425.00
Plumbing	\$8.30	12,750	\$105,825.00
HVAC	\$20.60	12,750	\$262,650.00
Interior Electric	\$11.90	12,750	\$151,725.00
Other Electrical	\$1.40	12,750	\$17,850.00
Curation Shelving/Equipment	\$65.00	5,100	\$331,500.00
		<b>Subtotal</b>	\$1,932,900.00
Contractor O & P	10%		\$193,290.00
		<b>Subtotal</b>	\$2,126,190.00
Contingencies	25%		\$531,547.50
		<b>Subtotal</b>	\$2,657,737.50
Location Factor	97%		\$-79,732.13
		<b>Subtotal</b>	\$2,578,005.37
Escalation	12%		\$309,360.64**
<b>Cost per sq ft of repository</b>	<b>\$226.46</b>	<b>TOTAL</b>	<b>\$2,887,366.01</b>

\* Estimated gross square feet (GSF) for collections storage and necessary support spaces.

\*\* Escalation from October 1998 to October 2002.