



June 6, 2023

Ms. Lisa Dunning  
Task Order Contracting Officer's Representative  
U. S. Environmental Protection Agency, Region 7  
11201 Renner Boulevard  
Lenexa, Kansas 66219

**Subject: Contract No. 68HERH19D0018; Task Order No. 68E0719F0190  
Pottawatomie Courthouse Structural Evaluation  
106 Main Street, Westmoreland, Pottawatomie County, Kansas  
Building Upgrade Cost Analysis**

Dear Ms. Dunning:

Toeroek Associates, Inc. (Toeroek) and our teaming subcontractor, Tetra Tech, Inc. (Tetra Tech), (hereafter "Toeroek Team") are pleased to provide you this Structural Evaluation of the Pottawatomie Courthouse Site at 106 Main Street in Westmoreland, Pottawatomie County, Kansas (the Site).

This deliverable has been reviewed internally as part of Tetra Tech's quality assurance program, as well as Toeroek's quality assurance program, and is consistent with Toeroek's Quality Management Plan for the Resource Conservation and Recovery Act (RCRA) Enforcement and Permitting Assistance (REPA) contract. Documentation of this review is retained in the Toeroek Team's project files.

If you have any questions or comments, please contact Greg Hanna at 720-898-4102 or Kaitlyn Mitchell at 816-412-1742.

Sincerely,

Gregory J. Hanna  
Toeroek Team Program Manager

Kaitlyn Mitchell  
Toeroek Team Project Manager

Enclosure: Building Upgrade Cost Analysis

cc: Amber Krueger, EPA Region 7 (cover letter only)  
Heather Wood, Tetra Tech  
Toeroek Team Project Files

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**TARGETED BROWNFIELDS ASSESSMENT  
POTTAWATOMIE COURTHOUSE STRUCTURAL EVALUATION**

**POTTAWATOMIE COURTHOUSE  
106 MAIN STREET  
WESTMORELAND, POTTAWATOMIE COUNTY, KANSAS**



**Prepared for**

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
REGION 7**

Task Order	:	68E0719F0190
Subtask	:	15.02
EPA Region	:	7
Date Prepared	:	June 6, 2023
Contract No.	:	68HERH19D0018
Prepared by	:	Toeroek Associates, Inc.
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## **1.0 INTRODUCTION**

The U.S. Environmental Protection Agency (EPA) tasked Toeroek Associates, Inc. (Toeroek) and its teaming subcontractor, Tetra Tech, Inc. (Tetra Tech), (hereafter “Toeroek Team”), with providing technical support to the EPA Region 7 Targeted Brownfields Assessment (TBA) Program under Contract Number (No.) 68HERH19D0018, Task Order No. 68E0719F0190. EPA Region 7 requested that the Toeroek Team prepare a building upgrade cost analysis as part of the Structural Evaluation of the Pottawatomie Courthouse Site at 106 Main Street in Westmoreland, Pottawatomie County, Kansas (the Site).

The following proposed scope of work pertaining to the Site is based on findings from a Pre-Renovation Site Characterization by Stantec Consulting Services, Inc. (Stantec) in February 2022 (Stantec 2022). This cost analysis includes costs to address asbestos-containing materials (ACM) and lead-based paint (LBP) identified during the Pre-Renovation Site Characterization.

According to the TBA application completed by Pottawatomie County (the County), the County would prefer to renovate and reuse the building, which is listed in the National Historic Registry (NHR) (Pottawatomie County 2022). During subsequent discussions with EPA, the Toeroek Team was directed to prepare an estimate for complete demolition of the site buildings for use by the County. ACM costs included in this cost analysis assume removal of ACM before demolition of the Site.

According to the National Parks Service (NPS), listing of a property in the NHR places no restrictions on what a non-federal owner may do with that property, including destruction, unless the property is involved in a project that receives federal assistance, usually funding or licensing/permitting (NPS 2023). However, the Kansas Preservation Act of 1977 requires a review by the State Historic Preservation Office (SHPO) of a project undertaken by state and local government that might affect historical properties (Kansas Historical Society 2023). The County should consult with the Kansas SHPO to determine what review steps are necessary before demolition of the site buildings.

In February 2023, Bob D. Campbell & Co. (BDC) developed a Structural Investigation Report on behalf of the Toeroek Team ([Attachment 1](#)) that conveyed costs associated with addressing structural deficiencies and bringing the building into compliance with the 2021 International Building Code (2021 IBC), should the County decide to renovate the building rather than demolish it. BDC estimated a cost of approximately \$576,000 to repair and stabilize the building in accordance with the 2021 IBC for fire safety.

The 2023 Structural Investigation Report did not include costs to address remediation, removal, or stabilization of ACM and LBP. Estimated ACM abatement costs included in this cost analysis may be used to estimate ACM abatement costs should renovation activities occur. The Pre-Renovation Site Characterization by Stantec did not provide sufficient detail on the quantity of on-site LBP to estimate costs for LBP removal or stabilization. Additional assessment would be required to estimate quantities and associated removal or stabilization costs of LBP.

## **2.0 BACKGROUND**

The Site consists of one parcel in Pottawatomie County (Parcel No. 075108330402300100001) encompassing approximately 1.27 acres and including two buildings—the 7,150-square-foot (SF) former Pottawatomie County Courthouse (Courthouse) and the 1,500-SF building formerly used as the County Jailhouse (Jail) (Stantec 2021). The Site is bounded north by Pottawatomie County Justice Center, east by South 2<sup>nd</sup> Street, south by Main Street, and west by North 1<sup>st</sup> Street (Stantec 2021).

According to the 2023 Structural Investigation Report, the Pottawatomie County Courthouse was originally constructed in 1884 and has been updated in approximately six phases over the years (BDC 2023). The original 1884 Courthouse was an approximately 60-foot east-west by 70-foot north-south two-story building with a partial basement and crawlspace. In 1897, a two-story addition was constructed at the north end of the east elevation of the building. In 1928, a two-story addition and new south entry were constructed at the center of the south elevation of the building. In 1929, a two-story addition was constructed on the south end of the west elevation. Between 1929 and 1976, a one-story vault structure was constructed north of the building at an undisclosed date. In 1976, a two-story addition was constructed at the south end of the east elevation just south of the 1897 addition. In 2008, the primary south roof truss structure underwent significant structural repairs.

According to the Structural Investigation Report, the Courthouse consists of limestone bearing walls with wood interior framing (BDC 2023). The roof has apparently been modified multiple times over the life of the building and sustained fire damage at an undisclosed date. The original roof structure does not appear to be present; a modern metal roof is on this building. The Structural Investigation Report cited minor foundation settling.

Stantec performed a Phase I Environmental Site Assessment (ESA) in May 2021 and identified the following business environmental risks (BERs) (Stantec 2021):

- Based on age of the buildings, ACM, LBP, and other regulated building materials (RBMs) may have been used in construction or maintenance of the buildings. These materials, if present, would pose a BER for the Site relevant to potential future maintenance, renovation, or demolition of the site buildings.
- Three water supply wells observed on the Site would require proper maintenance or closure to reduce potential for migration of any surface contaminants to underlying groundwater; therefore, posing a BER for the Site.

To confirm or eliminate these BERs, the May 2021 Phase I ESA recommended additional investigation including an RBM survey and evaluation of water supply well use.

The February 2022 Pre-Renovation Site Characterization identified the following (Stantec 2022):

- **ACM** throughout the buildings. Environmental Works, Inc. (EWI) (Stantec’s subcontractor) recommended removal or repair of damaged ACM to prevent further damage and exposure to asbestos-containing fibers. EWI also recommended removal of ACM that may be disturbed during future construction, renovation, and/or demolition activities in accordance with EPA, Occupational Safety and Health Administration, State of Kansas, and local regulatory requirements.
- **LBP** throughout the buildings. EWI recommended stabilization or removal of LBP in poor condition conducted by a Kansas Department of Health and Environment (KDHE)-licensed abatement contractor prior to any renovation or demolition activities.
- **Regulated Hazardous Building Materials (RHBM)** including fluorescent light bulbs and ballasts throughout the buildings. EWI also observed two mercury-containing thermostats, one in the lobby of the Courthouse and one in the Jail. Disposal of these materials is subject to federal, state, and local regulations. Proper maintenance of heating, ventilation, and air conditioning systems and a hot water heater observed in the Courthouse—or recycling or disposal of these if not in use in accordance with regulations—was recommended.
- **Lead** was detected in a soil sample collected from the south side of the Jail (side C) at a concentration of 441 milligrams per kilogram (mg/kg)—above the KDHE Tier 2 Risk-Based Standards for Kansas (RSK) Residential value of 400 mg/kg, but below the Non-Residential RSK of 1,000 mg/kg. Other soil samples collected from the Site detected lead concentrations and ranged from 87.3 to 201 mg/kg, below KDHE RSKs.

### 3.0 ACM ABATEMENT COSTS ASSOCIATED WITH DEMOLITION

Before any building demolition activity, ACM in the buildings must be removed and sent off Site for proper disposal. [Table 1](#) breaks down ACM abatement costs, and [Table 2](#) totals all costs associated with ACM at the Site. Estimated abatement costs were gathered from local vendors, and the quantities of ACM derived from the 2022 Pre-Renovation Site Characterization (Stantec 2022). Costs listed per SF or linear foot (LF) include both removal and disposal costs.

Estimated cost for abatement of the ACM associated with the Courthouse and Jail is \$87,096. Additional costs for oversight and sampling are considered variable based on requirements and duration of abatement. Estimated cost associated with oversight and sampling is \$10,000. Preparation of a final abatement report is estimated at \$3,500. Estimated total cost is \$100,596.

**TABLE 1**  
**ACM ABATEMENT COSTS**

Material Description	Material Locations	Estimated Quantity	Cost/Unit (\$/SF or \$/LF) <sup>1</sup>	Total Cost <sup>1</sup>
Transite Wall Panels	Basement ceilings, basement staircase walls, and ceilings (Courthouse)	560 SF	\$8	\$4,480
Vinyl Floor Tile and Mastic	1 <sup>st</sup> Floor – Lobby; Rooms 1, 3, 4, 5, 6, 8, 9, 12, 13; 2 <sup>nd</sup> Floor – Rooms 15, 16, 17, 18, 19, 20, 21, 22, 23, and corridor 2 (Courthouse)	5,820 SF	\$4	\$23,280
Transite Pipe Run	Flu pipe extending to exterior (Jail)	12 LF	\$200	\$200
Linoleum	1 <sup>st</sup> Floor – Room 1 vault entry (Courthouse)	4 SF	\$4	\$16
Popcorn Ceiling Texture	2 <sup>nd</sup> Floor – Rooms 15, 16, 17, and 18 (Courthouse)	820 SF	\$12	\$9,840
Plaster	1 <sup>st</sup> Floor – Room 9 Walls/Ceiling (Courthouse)	1,500 SF	\$10	\$15,000
White Window Caulk	Around windows (Courthouse)	40 windows (assuming 14 LF per window)	\$8	\$4,480
Off-White Window Caulk	Around windows (Jail)	12 windows (assuming 10 LF per window)	\$150	\$1,800
Roofing Material	Roofs (Courthouse and Jail)	7,000 SF	\$4	\$28,000
<b>Total ACM Abatement Cost</b>				<b>\$87,096</b>

**Notes:**

<sup>1</sup> Costs do not include prevailing wage rates and should be considered an estimate. Costs should not be used for bidding purposes.

ACM Asbestos-containing material  
 LF Linear feet  
 SF Square feet

**TABLE 2**

**TOTAL ACM REMOVAL COSTS**

<b>Line Item</b>	<b>Cost</b>
Abatement of asbestos-containing material (ACM)	\$87,096
Final abatement report	\$3,500
Oversight and sampling	\$10,000
<b>Total ACM Removal Costs</b>	<b>\$100,596</b>

#### 4.0 LBP REMOVAL COSTS ASSOCIATED WITH DEMOLITION

LBP removal by demolition would include removal of all surfaces and components finished with LBP during demolition of the Courthouse and Jail. If an entire building is to be demolished, the presumption is that the bulk demolition debris—including the LBP—would not be hazardous waste, and no additional analysis would be necessary (EPA 1993, U.S. Department of the Army 1993). Debris from demolition of the Courthouse and Jail may be sent for disposal as non-hazardous construction and demolition (C&D) waste. However, if debris from complete demolition is presumed non-hazardous, then demolition of painted surfaces should proceed in a manner that does not chip, shred, mulch, or mill the LBP for safety of workers.

If either of the buildings are not to be demolished, any debris from partial demolition or LBP abatement, such as removal or sand-blasting of painted fixtures, would require hazardous waste characterization testing via toxicity characteristic leaching procedure (TCLP) analysis for metals. If the debris is determined to be non-hazardous, it also may be sent for disposal as non-hazardous C&D waste. Debris must be sent for disposal as hazardous waste if TCLP analysis indicates as such. Any partial demolition and/or LBP abatement must occur according to state and federal LBP abatement requirements.

[Table 3](#) lists inventory of LBP Stantec observed during the site characterization (Stantec 2022). It does not list quantities of LBP observed, although it does identify materials and condition (which would benefit demolition crews). Additional assessment to quantify LBP would be necessary to generate abatement costs.

**BUILDING UPGRADE COST ANALYSIS  
SITE 15 – POTTAWATOMIE COURTHOUSE STRUCTURAL EVALUATION  
WESTMORELAND, KANSAS**

**TABLE 3**

**LBP OBSERVED IN THE SITE BUILDINGS**

<b>Building Floor</b>	<b>Room</b>	<b>Material/Location</b>	<b>Paint Color</b>	<b>Condition</b>
1	8	Metal/Trim	Brown	Intact
1	8	Metal/Door	Brown	Intact
1	7	Metal/Door	Beige	Intact
1	1	Metal/Door	Beige	Intact
1	1	Metal/Trim	Beige	Intact
1	1	Metal/Door	Black	Intact
1	Fire/Emergency Mgmt.	Metal/Door	Beige	Intact
1	Fire/Emergency Mgmt.	Metal/Trim	White	Intact
1	Fire/Emergency Mgmt.	Metal/Door	Black	Intact
1	Court Storage	Plaster/Wall	White/Beige	Intact
1	Court Storage	Concrete/Ceiling	Beige	Intact
1	Court Services Storage	Metal/Door	Beige	Intact
2	Courtroom	Wood/Trim	Blue	Intact
2	Courtroom	Wood/Windowsill	Blue	Intact
2	Courtroom	Wood/Window Panel	Blue	Intact
2	Courtroom	Metal/Door	Green	Intact
2	Courtroom	Metal/Ceiling	Beige	Intact
2	Room 15 Hall	Wood/Trim	Blue	Intact
2	Room 15 Hall	Wood/Window (above doorway)	Blue	Intact
2	Room 15	Metal/Door	Beige	Intact
2	Room 15	Metal/Door	Black	Intact
2	Room 15	Metal/Trim	Blue	Intact
2	Room 16	Wood/Window	Beige	Intact
Exterior	Courthouse	Wood/Door Trim	Brown	Peeling
Exterior	Jail	Wood/Overhang	Brown	Intact
Exterior	Jail	Metal/Door	Brown	Intact
Interior Door	Jail	Metal/Door	White	Intact
Interior Walls	Jail	Concrete/Wall	White	Peeling
Interior Trim	Jail	Metal/Trim	White	Intact
Interior Ceilings	Jail	Concrete/Ceiling	White	Intact
Interior Windows	Jail	Wood/Window	Grey	Intact
Interior Walls	Jail	Concrete/Wall	Grey	Intact
Interior Walls	Jail	Concrete/Wall	White	Intact
Exterior	Court	Wood/Trim	Brown	Intact
Exterior	Jail	Wood Trim	Brown	Peeling

## 5.0 TOTAL BUILDING DEMOLITION COSTS

The Toeroek Team has prepared a cost estimate for total demolition of the buildings using Remedial Action Cost Engineering and Requirements (RACER) cost estimating software ([Appendix A](#)). The following were included in the calculation of total construction cost:

- Costs associated with non-explosive demolition, including of a multilevel masonry-building;
- Dump charges;
- Wheel loader usage; and
- Semi dump truck usage.

In addition to construction costs, total costs listed in [Table 4](#) include costs of design, construction management, project management, and a 30 percent contingency to account for any unforeseen costs. The total estimated cost for construction activities related to building demolition is \$399,435. With the additional costs associated with ACM abatement, total demolition cost is estimated at approximately \$500,000.

**TABLE 4  
 TOTAL DEMOLITION COSTS**

Line Item	Cost
<b>Abatement of asbestos-containing materials</b>	<b>\$100,596</b>
Capital costs associated with demolition	
Construction costs	\$231,021
Construction management	\$23,102
Remedial design	\$34,653
Project management	\$18,482
<b>Capital and Construction Total costs</b>	<b>\$307,258</b>
Contingency (30% of capital costs)	\$92,177
<b>Demolition</b>	<b>\$399,435</b>
<b>Total Costs</b>	<b>\$500,031</b>
<b>Total Costs (rounded)</b>	<b>\$500,000</b>

## 6.0 REFERENCES

- Bob D. Campbell & Co. (BDC). 2023. Structural Investigation Report, Pottawatomie County Courthouse Structural Assessment. April 5.
- Kansas Historical Society. 2023. Site Protection. Accessed May 15.  
<https://www.kshs.org/p/site-protection/14658>
- National Parks Service. 2023. National Register of Historic Places, Frequently Asked Questions. Accessed May 15, 2023. <https://www.nps.gov/subjects/nationalregister/faqs.htm>
- Pottawatomie County. 2022. Targeted Brownfields Assessment Application Form, Pottawatomie County Courthouse. May 16.
- Stantec Consulting Services Inc. (Stantec). 2021. Phase I Environmental Site Assessment, Former Pottawatomie County Courthouse and Jail, 106 Main Street, Westmoreland, Kansas 66549. May 21.
- Stantec Consulting Services Inc. (Stantec). 2022. Pre-Renovation Site Characterization: Asbestos-Containing Materials, Lead-Bearing Paint and Regulated Hazardous Building Material Inventory Surveys and Soil Sampling, Former Pottawatomie County Court House and Jail Property. February 2.
- U.S. Department of the Army. 1993. Lead-based paint contaminated debris waste characterization study, No. 27-26-JK44-92. U.S. Army Environmental Hygiene Agency. Interim Final Report. May
- U.S. Environmental Protection Agency (EPA). 1993. Applicability of RCRA disposal requirements to lead-based paint abatement wastes. EPA 747-R-93-006. March

**APPENDIX A**

**BUILDING DEMOLITION COST ESTIMATE**

**Cost Estimate for Building Demolition  
Site 15 - Pottawatomie Courthouse Site  
Westmoreland, Pottawatomie County, Kansas**

<b>TABLE 1</b>				
<b>COST SUMMARY</b>				
<b>Description</b>	<b>Capital Cost</b>	<b>Institutional Controls</b>	<b>Operation &amp; Maintenance</b>	<b>Total</b>
Building Demolition	\$399,000	\$0	\$0	\$399,000

**Cost Estimate for Building Demolition  
Site 15 - Pottawatomie Courthouse Site  
Westmoreland, Pottawatomie County, Kansas**

**COST ESTIMATE  
BUILDING DEMOLITION**

Table 2			
Cost Summary			
Building Demolition			
Source	Description	Subtotal	Total (Rounded)
Table 3	Capital Cost	\$ 307,258	\$ 399,000
	Contingency		\$ 92,177.38
	<b>Total</b>		<b>\$ 399,000</b>

Overhead and Profit (O&P)

Means	15%	
RACER	35%	Assumed markup for costing purposes
Contractor quote	15%	Assumed prime contractor markup for costing purposes
Professional judgment	0%	

Inflation 3.12% Avg. annual inflation from 2015 to 2023

**Cost Estimate for Building Demolition  
Site 15 - Pottawatomie Courthouse Site  
Westmoreland, Pottawatomie County, Kansas**

Table 3								
Capital Cost								
Building Demolition								
Item	Description	Quantity	Unit	Source	Year	Unit Price	Unit Price (Incl. O&P and Inflation)	Total Cost
<b>Construction Subtotal</b>								<b>\$ 231,021</b>
<b>Building Demolition</b>								<b>\$ 231,021</b>
1	Multilevel, masonry, nonexplosive, building demolition	164,984	ft <sup>3</sup>	RACER	2015	\$ 0.19	\$ 0.33	\$ 54,096
2	Dump Charges	4,537	ea	Contractor quote	2023	\$ 24.88	\$ 28.61	\$ 129,813
3	966, 4.0 CY Wheel loader	24	hrs	RACER	2015	\$ 135.15	\$ 233.23	\$ 5,597
4	26 CY, Semi dump truck	196	hrs	RACER	2015	\$ 122.74	\$ 211.81	\$ 41,515
Construction subtotal								\$ 231,021
Construction management <sup>1</sup>		10%						\$ 23,102
Remedial design <sup>1,2</sup>		15%						\$ 34,653
Project management <sup>1</sup>		8%						\$ 18,482
<b>Capital Cost Subtotal</b>								<b>\$ 307,258</b>

Notes:

- 1 Based on "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" (EPA 2000).
- 2 Remedial design includes developing plans and specifications, such as a remedial action work plan, design analysis, and construction cost estimating.
- CY Cubic yard
- ea Each
- ft<sup>3</sup> Cubic foot
- hrs Hours
- O&P Overhead and profit
- RACER Remedial Action Cost Engineering and Requirements System

Reference:

EPA. 2000. "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study." EPA 540-R-00-002, Office of Solid Waste and Emergency Response 9355.0-75. July.

**ATTACHMENT 1  
STRUCTURAL INVESTIGATION REPORT**



PRINCIPALS

*President*

Christopher A. Beverlin, P.E.

Clark A. Basinger, P.E.  
Michael J. Falbe, P.E.  
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*Administrative Manager*  
James M. Spena

April 5, 2023

Reed Niemack  
Toeroek Associates, Inc.  
300 Union Blvd, Suite 520  
Lakewood, CO 80228

RE: Structural Investigation Report  
Pottawatomie County Courthouse Structural Assessment  
106 Main St  
Westmoreland, Kansas

Dear Reed:

Per your request, we visited the above referenced building on Wednesday, February 22, 2023. The purpose of our visit was to review the structural condition of this existing 138-year-old structure which has been modified several times over the years. In summary, although as would be expected with an 1884 structure, there are areas of the building in need of some repair and maintenance. That being stated, we do feel that the overall structure is in good physical condition and is a strong candidate for rehabilitation/renovation at this time. If areas of concerns/maintenance are addressed in the near future, this structure can have a long and extended future service life.

The Pottawatomie County Courthouse has been constructed in approximately six phases over the years. The original 1884 courthouse structure was an approximately 60' east/west by 70' north/south two-story building with a partial basement with crawlspace over non-basement areas. In 1897, a two-story addition was added at the north end of the east elevation of the building. In 1928, a two-story addition/new south entry was added at the center of the south elevation of the building. In 1929, a two-story addition was added on the south end of the west elevation. Additionally, a one-story vault structure was constructed north of the structure at some undisclosed point in time. In 1976, a two-story addition was constructed at the south end of the east elevation just south of the 1897 addition to the building. In 2008, significant structural repairs were performed on the primary south roof truss structure. It is our understanding that these are the primary dates and times of original construction and supplemental additions performed on this courthouse.

This building was constructed of wide, thick, limestone bearing walls constructed of limestone from nearby quarries in the region along the Kansas River. The 1884 structure has an approximately 2' to 3' thick perimeter limestone bearing walls and is subdivided into thirds with two approximately 2' thick limestone bearing walls dividing the 60' east/west segment into three approximately equal 20' segments with approximately 2' thick interior load bearing walls and 3' thick exterior load bearing walls. Framing for the first and second floors of the original building is relatively simple with a series of 2x12 (1<sup>3</sup>/<sub>4</sub>" by 11<sup>1</sup>/<sub>2</sub>") wood members at 16" centers supporting a wood floor with finishes atop the floor. The roof structure consists of a series of trusses spanning the entire 60' between each and west exterior load bearing walls. Two trusses, approximately 15' from the exterior north and south walls are the primary support trusses supporting hip members at each of the four corners. Between these two primary trusses are a series of trusses at approximately 10' centers supporting the structure between these two primary trusses, with 2x6 (1<sup>3</sup>/<sub>4</sub>" by 5<sup>1</sup>/<sub>2</sub>") members at 16" centers spanning truss to truss. Roof framing consists of variable sized purlins and hip members with no consistent pattern ranging in size from 2x6 members at 24" centers acting as rafters to cut 2x9 (1<sup>3</sup>/<sub>4</sub>" by 8<sup>1</sup>/<sub>2</sub>") to 2x14 (1<sup>3</sup>/<sub>4</sub>" by 13<sup>1</sup>/<sub>2</sub>") members at 24" centers carrying flatter roof sections. The 2x6 members at 16" center roof rafters are reinforced with stiff-backs consisting of double 2x6s spanning approximately 10' long. These various 2x6 rafters have a series of 1x members supporting them of various sizes and geometry. This roof, which has performed satisfactorily over the years, has apparently be modified many times over its 138-year life. At some time in the past, this roof structure did sustain a fire that damaged some members of the roof which we will discuss later in this report. The original roof structure does not appear to be present, with a modern metal roof structure presently serving as the roof on this building. In 2008, Pikel Engineering of Wamego, Kansas, designed a tension tie and reinforcement for the primary south roof truss on the building. This truss stabilization project, noted on their drawings which were present in the building, appears to be well-engineered and designed. It appears to have originated from the stress observed at these trusses in 2008. Around the perimeter of this structure, various structural steel fire escapes have been added over the years. Foundation settlement, although relatively minor, has occurred at

various areas over the years, but is particularly evident in the vault structures which were lined with movement sensitive plaster.

We evaluated the building in accordance with the 2021 International Building Code and the Kansas State Historic Preservation Office guidelines. Evaluation of this structure indicated a fairly well-constructed and designed building in most areas. This structure, constructed primarily of stone masonry and wood, was evaluated based on information from the National Lumber Manufacturers Association. Wood of this age is substantially stronger than present day wood based on a higher quality used for the production of lumber at the earlier portions of the 20<sup>th</sup> century. Based upon recommended allowable stresses by the National Lumber Manufacturers Association, we have evaluated all flexural stresses of the original wood structure based on a allowable flexural bending stress of 1,600 PSI for #1 Douglass Fir, which we feel is the closest match to the lumber observed in this building.

Our inspection of the building produced the following items of concern in need of repair for rehabilitation of the building:

1. **Fire Damage** – Evaluation of the roof structure indicated a fairly well-designed roof, however, some areas of concern with various roof elements were observed. There is approximately 1,500 square feet (SF) of fire damage as outlined in the following pictures:



Based on the damaged observed, we recommend full replacement with equivalent sized members for all fire-damaged wood. We estimate the cost of this repair at \$90,000.00.

2. **Stiff-back Support** – The sloping rafters appear to need supplemental stiff-back support, which is presently constructed in rather unusual and variable patterns as shown in the following pictures:



We recommend reinforcement of all existing stiff-backs with a conventional reinforcing pattern. We estimate the cost of this repair at \$18,000.00.

3. **Hip Member Support** – The hip members at the roof structure are 2x12 single-wood members spanning 19'-6". These hip members are obviously low in structural capacity and in need of supplemental reinforcement. We estimate the cost of this repair at \$10,000.00.
4. **Roofing Material Replacement** – Although not structural in nature, we also feel there may be a desire to remove the metal roof and replace this with a more original roofing material that fits with the aesthetic of the building's historical architecture. We estimate the cost of this repair at \$168,000.00.
5. **Floor Framing** – Review of the first and second floor structures consisting of the rather simple framing of the 2x12s at 16" centers spanning east/west from bearing wall to bearing wall indicated a very well-designed floor more than capable of supporting present day live load of 100 lbs. per square foot (PSF) for a building of public use as required by today's building codes. Our only comment relative to the condition of these interior structures is that there is a need for some tuck-pointing/re-grouting/repair of stone masonry and shown in the following pictures:





We estimate the cost of this repair along with repair of item #6 below at \$125,000.00.

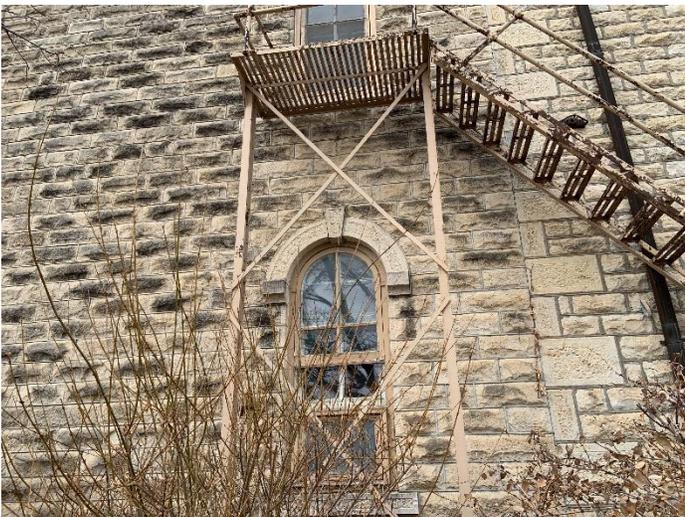
6. **Foundation Settlement** – Some foundation settlement has occurred over the past 138 years and some cracking has occurred, particularly in the vault areas, and is in need of repair as shown in the following pictures:





It may be prudent at the vault structure to remove the plaster and repair the stone to its original condition. These settlement cracks, which are quite old, are strictly cosmetic repairs to extend the serviceable life of this building.

- 1976 Addition Framing** – The structural load capabilities of the 1976 addition with wood framing and stone façade does not match the structural framing of all other portions of this building. The 1976 addition was constructed of 2x10 (1<sup>1</sup>/<sub>2</sub>" by 9<sup>1</sup>/<sub>4</sub>") floor joists at 16" centers spanning east/west 14'-4". This is more of a residential type live load design and is in need of structural reinforcement if this space is to be part of any renovation of this building. We estimate the cost of this repair at \$10,000.00
- Exterior Fire Escapes** – In review of the exterior of this building, structural steel fire escapes which were not part of the original construction but added at some time over the years (most probably in 1928/1929), are structurally inadequate by present day building code and would not satisfactorily serve as a means of egress for the building. Their demolition and reconstruction are recommended as part of any renovation of this building. The following pictures depict the condition of these fire escapes:





We estimate the cost of this repair at \$80,000.00

9. **Exterior Stone Masonry** – Around the exterior of this building, the stone masonry is in need of cleaning and limited tuck-pointing as shown in the following pictures:



The masonry joints between the original 1884 structure and the additions constructed over the years are in need of special cleaning and tuck-pointing to restore them to their original conditions as shown in the following pictures:



We estimate the cost of the repair at \$75,000.00

10. **Future Tree Removal** – Although not in the present scope, there are some rather large trees in close proximity to this building as shown in the following pictures:



Although we are not advocating for it at this time, there will be a day when these trees will threaten the integrity of this building and most probably will be in need of future removal.

We have attached our engineers' estimate for the repair of this building, which we feel is approximately \$576,000.

In summary, although as would be expected with an 1884 structure, there are areas of the building in need of some repair and maintenance. That being stated, we do feel that the overall structure is in good physical condition and is a strong candidate for rehabilitation/renovation at this time. If areas of concerns/maintenance are addressed in the near future, this structure can have a long and extended future service life.

Please call if you have any questions.

Sincerely,

**BOB D. CAMPBELL & CO.**  
*Structural Engineers*



Michael J. Falbe, P.E., Principal

MJF/js

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## Repair Estimates

1. **Fire Damaged Wood and Deck Replacement**  
1,500 SF @ \$60/SF = \$90,000
2. **Reinforcement of Roof Rafters**  
3,600 SF @ \$5/SF = \$18,000
3. **HIP Reinforcement**  
4 @ \$2,500 = \$10,000
4. **Roofing Replacement**  
4,200 SF @ \$40/SF = \$168,000
5. **Interior Masonry Repair – Vaults/Tuck-pointing/Settlement**  
Estimated lump sum ~ \$125,000
6. **1976 Building Addition Second-Floor Reinforcement**  
Estimated lump sum ~ \$10,000
7. **Demolition and Reconstruction of Fire Escapes**  
2 @ \$40,000 each = \$80,000
8. **Stone and Masonry Cleaning and Limited Tuck-Pointing**  
7,500 SF @ \$10/SF = \$75,000

Total Estimate = \$576,000