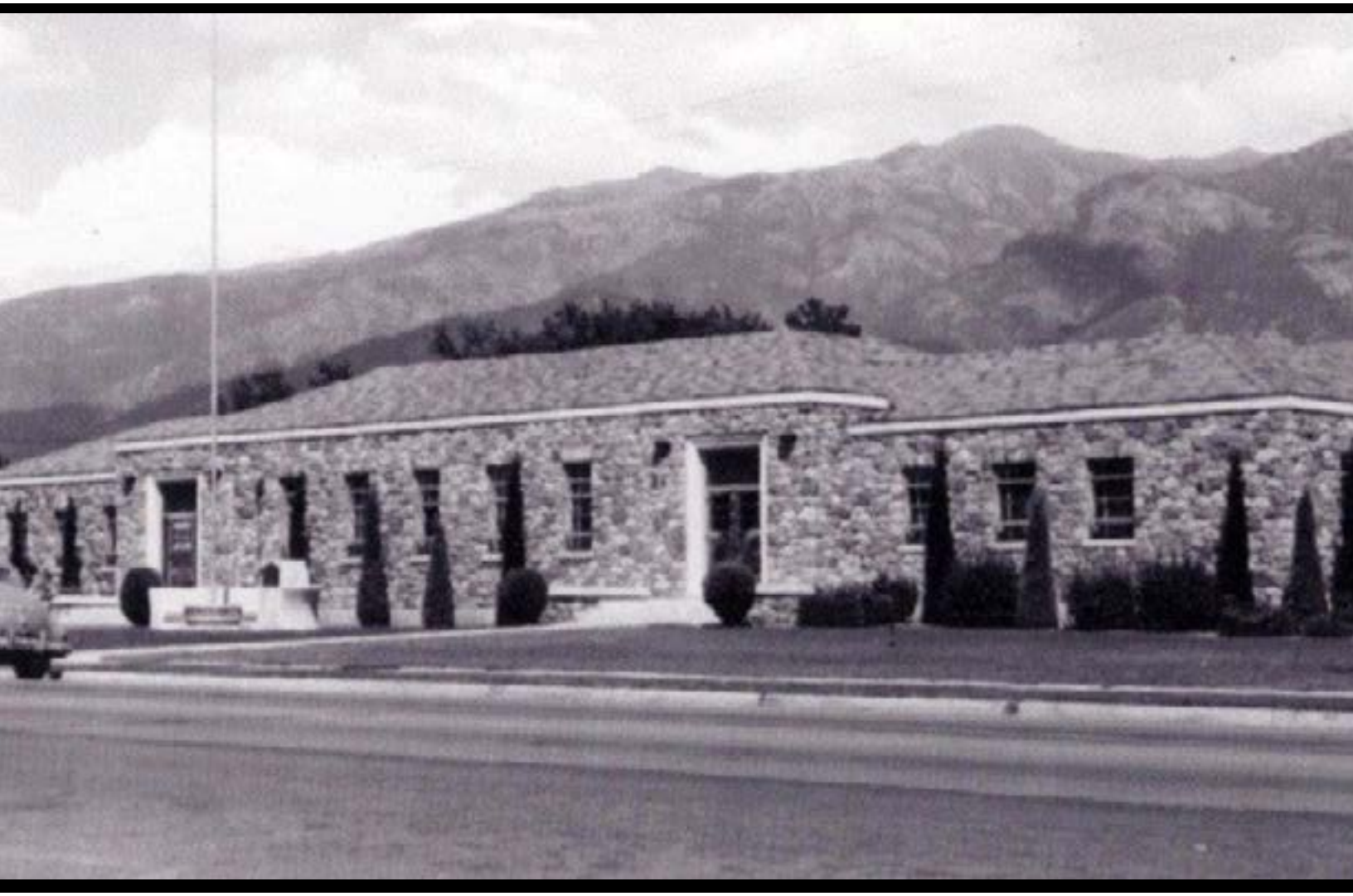
KAYSVILLE CITY BUILDING REPORT -

HISTORIC BUILDING CONDITION ASSESSMENT AND RECOMMENDATION REPORT



FFKR ARCHITECTS

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TAB ONE
EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

HISTORY

The Kaysville Municipal Building originally housed city offices, a library, kitchen, assembly hall, and a concrete vault for city records. The building was designed by the Salt Lake City based architectural firm of Ashton and Evans. Construction began in earnest in late 1941 but was halted after the attack on Pearl Harbor and not resumed until 1943 with completion in 1944. Funding for the building came in part through a WPA (Works Progress Administration) grant. The one-story structure was built using the native stone from nearby canyons.

Roger Roper, architectural historian, paints a descriptive picture of the building:

"Even the design of the building was progressive in concept. While most WPA projects were designed in a style labeled PWA/WPA MODERNE, "This is a one-story building, constructed of rubble-faced veneer, that has a low-pitched, truncated hipped roof. There is a large central rectangular block flanked by smaller rectangular wings. Symmetrically arranged, the building has two front entrances located to the side on the central section. While each of these entrances has a cast stone architrave, the rest of the openings are unornamented. The stone was quarried locally and matches that of the earliest rock homes built in the area. The straight-forward classicism of the building is unusual for PWA-sponsored buildings, for it lacks the more abstract, streamlined appearance often associated with this period of Utah architecture."

ARCHITECTURAL

The building is in fair condition architecturally though it is currently used as surplus storage for the City. The exterior envelope of the building is not performing well, but there remain opportunities for improvement and remediation of these issues. The primary recommendations for improvement are:

- Landscape / irrigation modifications to prevent water intrusion
- Repointing exterior masonry walls
- Repair of or / Replacement of exterior doors
- Repair of or/ Upgrade existing windows
- Repair / Stabilization of precast concrete elements at the entrances and cornices
- Repair / replacement of the roofing membrane (largely driven by structural enhancement)
- Repair of / Replacement of water damaged and wall finishes, flooring, ceilings, etc.
- Insulating the foundations from the inside as well as the exterior wall.

The majority of the building's architectural components are in good condition and the exceptions listed above generally reflect conditions which are isolated to limited areas and represent a scope of work that can be accomplished with reasonable effort.

EXECUTIVE SUMMARY

STRUCTURAL

This report presents the results of the seismic evaluation of the Kaysville Historic Library located at 44 North Main Street Kaysville, Utah. The seismic evaluation consisted of a Tier 1 screening procedure per ASCE 41-17 Seismic Evaluation and Retrofit of Existing Buildings [1]. Nonstructural elements were not included as part of this evaluation.

The evaluation identified the following ten potential deficiencies in the building. It is important to note that this evaluation only highlights deficiencies deemed likely from cursory checks and investigations, and items may prove adequate upon further review. Also, many of these items stem from the same structural issues, and structural retrofit measures often mitigate several deficiencies. For this reason, we have lumped the deficiencies in to two categories 1) deficiencies due to inadequate structural detailing and 2) deficient wood diaphragms.

1. Site Concerns:
    a. Liquefaction (Unknown)
2. Inadequate Structural Detailing:
    a. Load Path
    b. Wall Anchorage
    c. Transfer to Shear Walls
    d. Girder-Column Connection
    e. Beam, Girder, and Truss Supports
3. Weak Wood Diaphragms:
    a. Cross Ties
    b. Straight Sheathing

MECHANICAL & PLUMBING

The existing mechanical systems are of standard efficiency and are considered to be at their expected service life. The overall performance and efficiency of the mechanical systems can be greatly improved through:

- Replacement of the entire mechanical system with high efficiency equipment.

Provisions for exhaust from the restrooms and janitor's closet

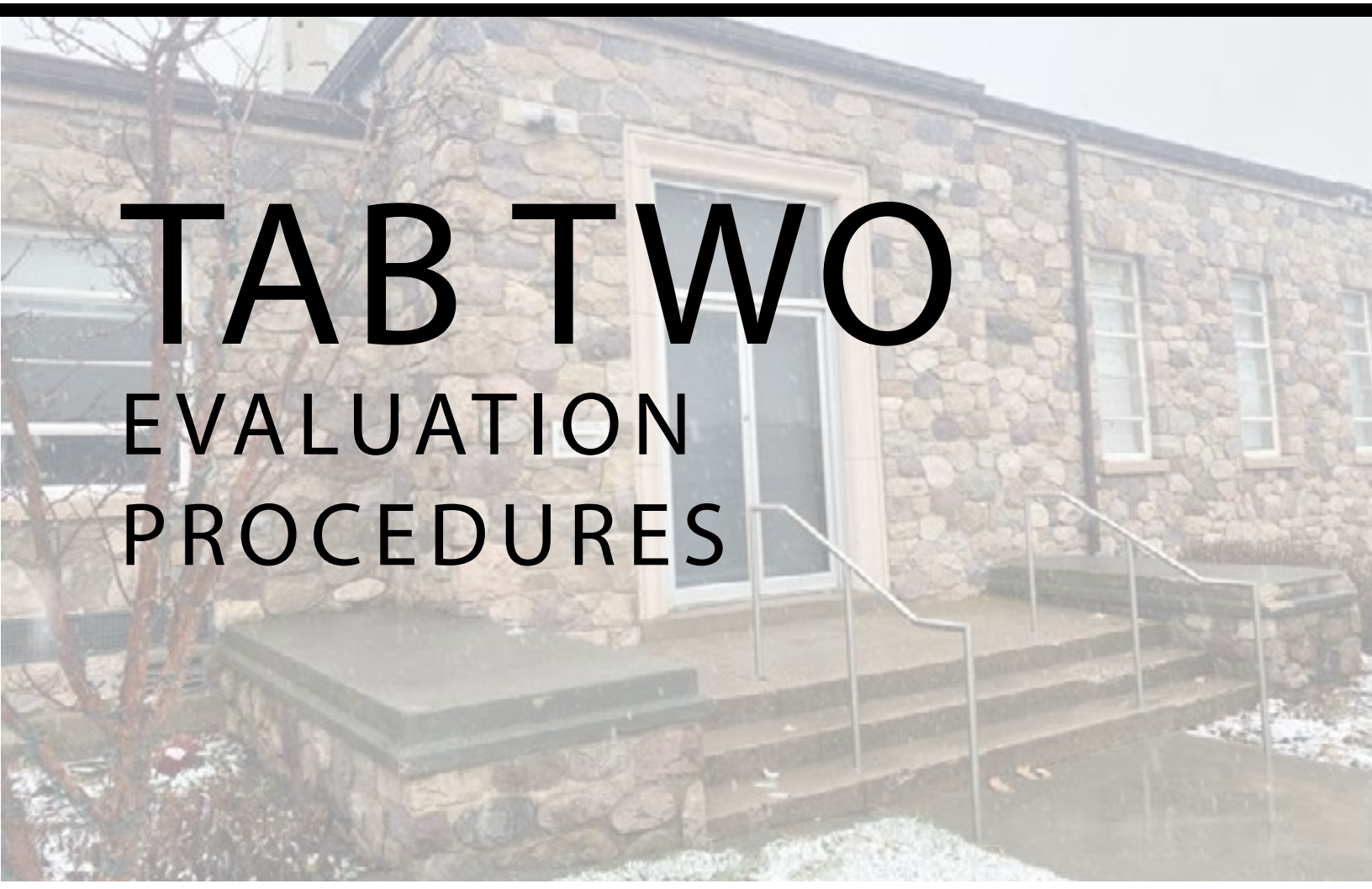
- Provisions for zoned controls of the new mechanical system
- Improved air filtration
- Provide positive building static pressure by providing minimum outdoor air

The plumbing fixtures are newer replacement fixtures. The plumbing may still be utilized in its current condition but it may be the time to incorporate new water efficient fixtures.

ELECTRICAL SYSTEMS

The building's electrical systems are at their service life. The building's exterior and interior conduit, meters and panelboards are outdated. Interior circuits may be insufficient for the building's future needs.

The lighting is outdated and inefficient and comprised of T12 fluorescent fixtures and incandescent lamps. All existing lighting should be replaced with LED lighting for better light distribution and maximum energy efficiency. Lighting controls are simple toggle switches and should be replaced with occupancy sensors and other automatic controls. Emergency egress lighting should be installed.



TAB TWO
EVALUATION PROCEDURES

EVALUATION PROCEDURES

The FFKR team was led by

Steven D Cornell, AIA
Architect

STRUCTURAL

Reaveley Engineers
Jan Moore, SE
Principal Structural Engineer

MECHANICAL, ELECTRICAL AND PLUMBING

Spectrum Engineering
Jamie McCullough PE
Principal Mechanical / Plumbing Engineer

David Hinckley, PE
Principal Electrical Engineer

COST ESTIMATING

Cost Engineers
Anthony Anzer

EVALUATION PROCEDURES

The building evaluation was conducted on December 9, 2021 and was the basis for determining the current condition of the building and its systems and identifying potential recommendations for future upgrades. The report that follows contains an architectural and engineering evaluation of the historic Kaysville Municipal Building's structural, architectural, mechanical, plumbing, electrical, lighting, fire alarm and audio-visual systems and is intended to serve as a baseline for recommended maintenance, systems upgrade or replacement, and accessibility improvements. A summary of the findings of the evaluation follows (by discipline).

TAB THREE
HISTORICAL USES OF THE BUILDING

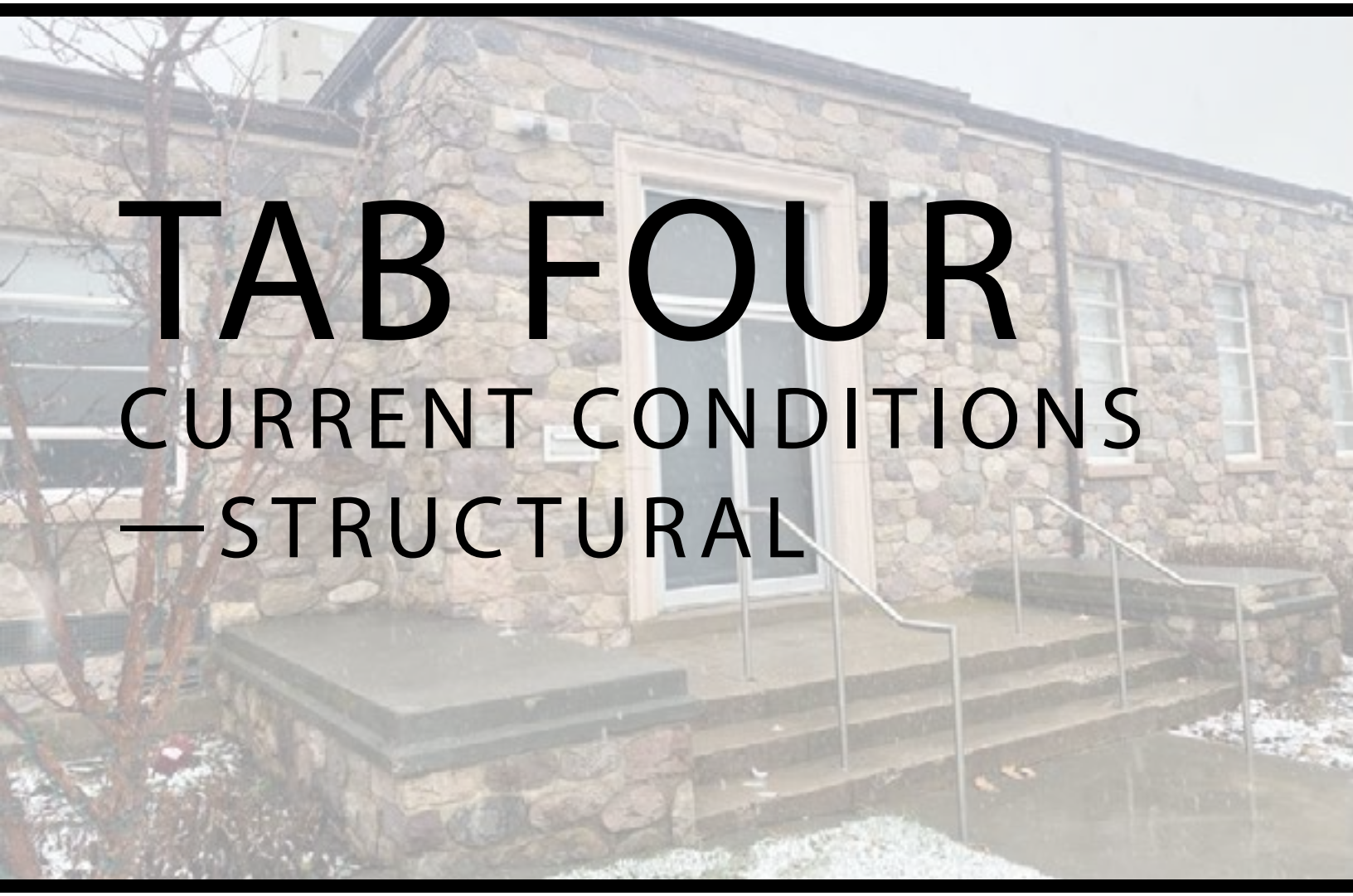
HISTORICAL USES OF THE BUILDING

Originally intended as the defacto symbolic City Hall and Library, it also would house the the city's administrative staff. Due to material shortages during World War II, the construction of the City Hall was put on hold. The project was restructured and reenvisioned to house the Davis County Health Department and was awarded a government grant as a result. The building housed the health department into the mid 1950s.

From 1962 until 2015 it was home to the Kaysville Public Library. The library was housed in the north half of the building and the City Hall and offfices were housed in the central section and the south wing. The library expanded into the entire building when Kaysville built new city offices in 1987.

The large central section of the building was to be used originaly for health lectures. Once the health department moved out, this would likely have been used for City meetings.

The LeConte Stewart art gallery was constructed in 1987 once the city offices relocated to a new building.



TAB FOUR
CURRENT CONDITIONS —STRUCTURAL

CURRENT CONDITIONS - STRUCTURAL

EXECUTIVE SUMMARY

This report presents the results of the seismic evaluation of the Kaysville Historic Library located at 44 North Main Street Kaysville, Utah. The seismic evaluation consisted of a Tier 1 screening procedure per ASCE 41-17 *Seismic Evaluation and Retrofit of Existing Buildings* [1]. Nonstructural elements were not included as part of this evaluation.

Background Information

The structure was built in the early 1940's and initially served as Kaysville's City Hall. There are no known construction documents for the building and thus this evaluation is based solely on a site observation conducted on December 9th, 2021. It is understood that the building was renovated in 1987 to serve as a library, but limited structural modifications were observed.

Appendix A provides a basic schematic plan of the building. It is a single-story wood-framed structure. The perimeter is comprised of thick stone walls negligibly anchored to the perimeter stud wall. There is a full crawl space below the floor structure where multi-ply 2x floor beams are supported by wood and concrete posts founded on shovel formed concrete footings. These beams support the 2x floor joists running in the East-West direction. The wood roof trusses bear on the east and west wood stud walls as well as the interior wood bearing wall. The thick stonewalls are acting as the de facto lateral system for the building as there is no other lateral system currently.

The building site is located near the Wasatch Fault in a region of a high seismicity. According to seismologists, the chance of a magnitude 7.0 or greater earthquake occurring on the Wasatch fault in the next 100 years is in the 25th percentile. Because this property was constructed in the 1940's, before sufficient seismic design and accurate seismic hazard were implemented into building codes, damage is anticipated in the event of a substantial earthquake. The objective of this ASCE-41 Tier 1 evaluation is to better understand what the potential building deficiencies are in terms of seismic performance.

Tier I Potential Deficiencies

The evaluation identified the following potential deficiencies in the building. Both the wood frame (W1) and unreinforced masonry (URM) checklists were reviewed in order to consider the thick stone perimeter wall as either a heavy façade or the primary lateral system. It is important to note that this evaluation only highlights deficiencies deemed likely from cursory checks and investigations, and items may prove adequate upon further review. Also, many of these items stem from the same structural issues, and structural retrofit measures often mitigate several deficiencies. For this reason, we have lumped the deficiencies in to three categories 1) site concerns, 2) deficiencies due to inadequate structural detailing and 3) deficient wood diaphragms.

- Site Concerns:
  - Liquefaction (W1 & URM)
- Inadequate Structural Detailing & Lack of Lateral System:
  - Load Path (W1 & URM)
  - Shear Stress Check (W1 & URM)
  - Wall Anchorage (URM)
  - Transfer to Shear Walls (URM)
  - Wood Posts (W1)

  - Girder-Column Connection (URM & W1)
  - Wood sills (W1)
  - Roof Chord Continuity (W1)
  - Stone Wall Proportions (URM)
- Weak Wood Diaphragms:
  - Cross Ties (URM)
  - Straight Sheathing (W1 & URM)
  - Long diaphragm spans (W1 & URM)
  - Diagonally Sheathed and unblocked diaphragms (W1 & URM)

The potential deficiencies prevent the building from achieving a Collapse Prevention structural performance level for a significant seismic event. The explanation of this structural performance target and the seismic event considered for the evaluation are explained in detail in the Evaluation Basis section of the report. Mentioned in the report, but not directly highlighted in the ASCE-41 Tier 1 deficiencies is the structural damaged sustained by water intrusion.

General Findings

Our cursory observation found the building to be typical of 1940's era construction – robust gravity framing with an insufficient lateral force resisting system and detailing. As shown in Figure 2 below, the building resides very near the Wasatch fault and in a region of high seismicity. Over ten potential deficiencies were found in the Tier 1 "Screening Phase," which indicated that a significant structural scope would be required to bring the building up to current code-level seismic performance. In its current condition, structural collapse would be likely in the event of a major earthquake.

EVALUATION BASIS

ASCE 41-17 [1] is a nationally recognized standard that addresses the seismic performance of existing buildings. The Tier 1 "Screening Phase" procedure allows potential deficiencies to be identified given the required performance level, seismic hazard, site geology, and building information available. The following sections of this report presents the basis for the evaluation.

Building Information

The roof of this 1940's, single-story, building has straight sheathing supported by wood trusses that bear on the east and west wood stud walls as well as the interior wood bearing wall (see photos 5-9). The main floor has diagonal 1x sheathing supported by wood joists. These joists are supported by multi-ply 2x beams in the crawl space supported by isolated posts and shovel formed foundations (see photos 15-17). The de facto lateral system is comprised of stone perimeter walls (see photos 1-4). A concrete mechanical and coal storage space resides in the central-east portion of the building (see photos 13 & 14). Drawing SK-1 in Appendix A shows the basic structural framing based on site observations and initial assumptions. This information shown provides the structural basis for the evaluation.

Seismic Hazard and Site Geology

The site is located in close proximity to the Wasatch Fault (see Figure 2). ASCE 41-17 defines a minimum level of lateral force for use in the evaluation of existing structures. These ground motions are related to seismic response coefficients obtained from United States Geological Survey (USGS) contour maps developed in cooperation with the National Earthquake Hazards Reduction Program (NEHRP). The contour

maps are separated into two categories—short and long periods, which correspond to a vibration period of 0.2 seconds and 1.0 seconds, respectively. The period of a structure is the amount of time required to complete one cycle of natural vibration. A stiff building will have a short period, and a flexible building will have a long period. The level of seismicity at the site is defined as "High" per Section 2.5 of ASCE 41-17. The seismic response coefficients at the ATC for the BSE-2E (5% in 50 years) seismic hazard are:

	Short Period	Long Period
Latitude = 41.035672°	S_s = 1.068 g	S_1 = 0.588 g
Longitude = -111.938162°	F_a = 1.20	F_v = 1.813
Soil Site Class = D-default	S_{XS} = 0.967 g	S_{X1} = 0.573 g

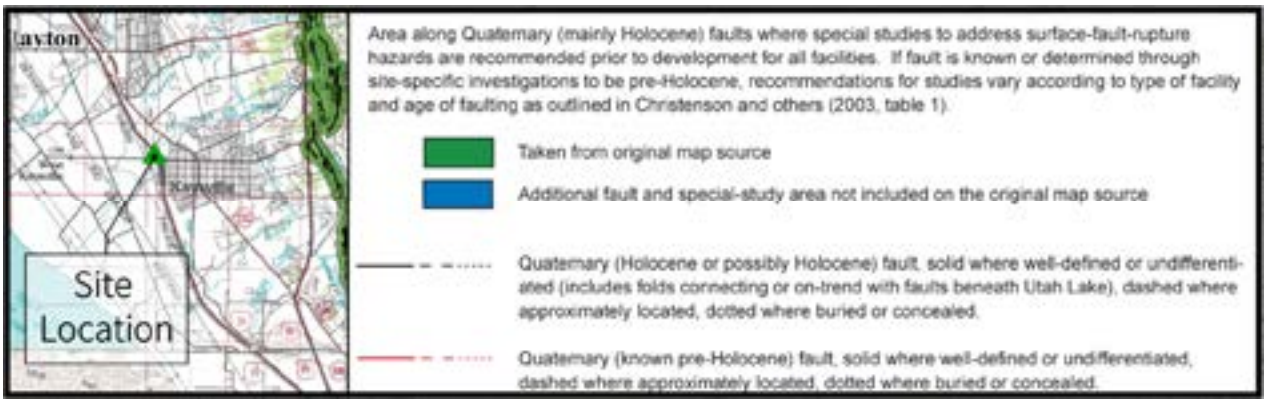


Figure 1 Surface Fault Rupture Special Study Areas from Supplement Map to Utah Geological Survey Circular 106

At the time of this report, a geotechnical investigation has not been completed. For this initial review, the Default D soil class was assumed, as prescribed by ASCE-41 when a geotechnical investigation is not conducted. Experience in this region confirms that this soil classification is most likely to be confirmed by a geotechnical investigation.

Figure 2 shows the 2008 Utah Geological Survey Liquefaction Hazard Map and indicates that the site is at the boundary of the high liquefaction potential region. Liquefaction is the process by which saturated, loose soils lose shear strength and shear stiffness due to ground shaking and consequently lose structural bearing capacity. The characterization of the local geology and the level of seismicity suggest that liquefaction is possible during a major seismic event. A more in-depth geological investigation would be required to determine the potential for liquefaction.

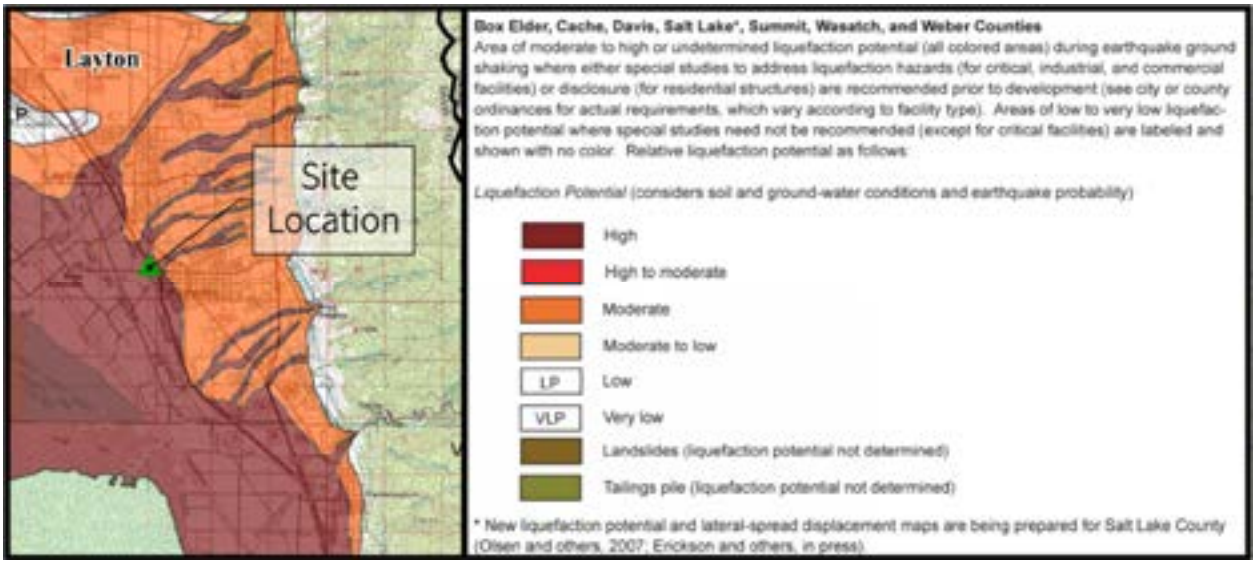


Figure 2 – Liquefaction potential from Supplement Map to Utah Geological Survey Circular 106

Tier 1 Evaluation Performance Objective

The ASCE 41-17 [1] methodology is a performance-based approach where building performance targets are set for a given seismic hazard. In order to meet the Basic Performance Objectives for Existing Building (BPOE), assuming a Risk Category II building (per Table 2-2 of ASCE 41-17 [1]), the Tier 1 screening checklists are based on the Collapse Prevention structural performance level for the BSE-2E seismic event. Collapse Prevention is defined to mean that in a post-earthquake damage state, the structure has damaged components and continues to support gravity loads but retains no margin of safety against collapse. The BSE-2E (Basic Safety Earthquake-2) defines a ground motion intensity based on probability. The BSE-2E is a substantial ground motion where there is a 5% probability that the earthquake intensity will be exceeded in 50 years.

POTENTIAL STRUCTURAL SEISMIC DEFICIENCIES

An ASCE 41-17 Tier 1 screening consists of a series of checklists and simple quick check calculations that are used to identify potential structural seismic deficiencies for a given building. Cursory on-site investigations were carried out to approximate the existing conditions of the building. Items in the Tier 1 checklists were marked as Compliant (C), Non-compliant (NC), Not Applicable (N/A), or Unknown (U). For copies of the completed checklists, please see Appendix B. For supporting photographs and calculations used to support determinations on the checklists, please see Appendices C & D respectively. The following summarizes the results of the Tier 1 evaluation. Several potential deficiencies were found, and these are listed below.

1. Load Path: Noncompliant – A well-defined load path to transfer seismic forces to the foundation was not observed. Due to the year of construction, and spot observations, existing diaphragm to wall connections are likely inadequate.
2. Liquefaction: Unknown - Liquefaction can result in severe differential settlement which has the potential to overstress the framing members of the structure. According to the Supplement Map

to Utah Geological Survey Circular 106 (Liquefaction Special Study Areas, Wasatch Front, Utah), the property resides within the boundary of the High Liquefaction Potential Zone. Please see Figure 2.

3. Shear Stress Check: Noncompliant- The shear stress check shows that both the shear strength of the stone walls and current gyp board walls are insufficient to resist the forces of a major earthquake.
4. Wall Anchorage: Noncompliant – Exterior stone walls are dependent on the floor and roof diaphragm for lateral support, but no anchorage was observed for out-of-plane earthquake forces.
5. Transfer to Shear Walls: Noncompliant – Floor and roof diaphragms must be connected to the shear walls to provide a complete load path for the transfer of diaphragm shear forces, but no anchorage was observed.
6. Girder-Column Connection: Noncompliant – The absence of a substantial connection between the girders and supporting columns may allow the girders to slide off bearing supports as the structure deforms in an earthquake. No positive connections between beams and posts were observed in the crawl space below the main floor.
7. Wood Posts: Noncompliant – Wood posts not observed to be connected to concrete footings. The absence of connection between posts and foundation may allow the posts to slide off bearing supports.
8. Wood Sills: Noncompliant – Wood sills not observed to be bolted to the foundation. The absence of a connection between the wood sills and the foundation is gap in the load path that limits the ability of shear walls to resist seismic forces.
9. Roof Chord Continuity: Noncompliant – Chord elements were not observed at the roof level. Diaphragms with discontinuous chords are more flexible and experience more damage around the perimeter than properly detailed diaphragms.
10. Stone Wall Proportions: Noncompliant – Slender unreinforced stone bearing walls with large height-to-thickness ratios have a potential for damage caused by out-of-plane forces that may result in falling hazard and potential collapse of the structure.
11. Cross Ties: Noncompliant – Continuous cross ties between diaphragm chords are needed to develop out-of-plane wall forces into the diaphragms. Aligned floor joists were observed to be stacked adjacent but no meaningful connection to provide continuous cross ties.
12. Straight Sheathing: Noncompliant – Straight-sheathed diaphragms are flexible and weak relative to other types of wood diaphragms and not suitable where large force demands are anticipated.
13. Spans: Noncompliant – Long-span diaphragms often experience large lateral deflections and large diaphragm shear demands, and straight-sheathed diaphragms are generally not suitable.
14. Diagonally Sheathed and Unblocked Diaphragms: Noncompliant – The shear capacity of the diagonally sheathed floor may be inadequate for the anticipated shear demand provided the long diaphragm span.

CONCLUSIONS & NEXT STEPS

An ASCE 41-17 Tier 1 Evaluation was performed where the building was evaluated for a Collapse Prevention structural performance level in the event of a BSE-2E Seismic Hazard (5% chance of exceedance in 50 years). The structure was found to have many potential deficiencies that prevent it from meeting the specified

performance objectives. The age of the building, the high seismicity of the site, as well as the extent of the potential deficiencies found in the Tier 1 screening procedure, suggest that retrofit measures will be needed to bring the building to the minimal BPOE performance level.

As part of the historic renovation, we understand improvements to the building, including alterations to existing building structure, are being considered. Although we have considered the stone walls as an unreinforced masonry system by incorporating the URM checklist, the strength of these unique stone walls would be difficult to quantify. We suggest considering them as heavy façade elements and creating an interior lateral system independent of the stone walls. Conceptually, the following voluntary seismic measures can be taken to address the deficiencies described above:

- Provide new shear wall that incorporate the existing perimeter wood stud walls to create a lateral system for the building.
- Introduce new detailing to provide a complete lateral force load path.
- Provide positive connections between the main floor support beams and the supporting posts.
- Introduce new interior shear walls to reduce the diaphragm spans and demands.
- Based on the observed water intrusion, remove and replace the existing diaphragms with properly nailed sheathing to withstand seismic forces.
- Provide strapping between floor joists to provide adequate cross ties.
- Consider bracing heavy stone façade in important locations of egress.

Should programming or architectural modifications trigger a full-seismic upgrade, we would recommend a ASCE 41 Tier 2 analysis to analyze these potential deficiencies more accurately and provide retrofit solutions that are code compliant.

REFERENCES

[1] American Society of Civil Engineers, & Structural Engineering Institute. (2017). *Seismic evaluation and retrofit of existing buildings: ASCE/SEI, 41-17*.

[2] International Code Council. (2017). *2018 IEBC: International Existing Building Code*.

Photograph 1 – North-West Exterior of Building

Photograph 2 – North Exterior of Building

Photograph 3 –East Exterior of Building

Photograph 4 – Reentrant Corner on North-West side (South-West side similar)

Photograph 5 – Roof truss framing viewed from attic access

Photograph 6 – Straight 1x Roof Sheathing

Photograph 7 – Roof truss bearing on sill plate at top of stone wall in mech room (special case) More commonly bearing on interior stud wall. Left: Observed in coal storage room with precase cap beyond, Right: Observed east of attic access

Photograph 8 – Metal lath ceiling exposed above drop ceiling

Photograph 9 – Interior Bearing Systems. Left: Wood stud wall running North-South on East side of building, Right: Beam – header configuration on North-West side of building

Photograph 10 – Perimeter wood stud walls exposed on the North (left) and South (right) perimeter walls were excessive water damaged was observed.

Photograph 11 – Damage to main floor system observed in North-East corner (left), North region (right) and other locations throughout building where water intrusion has occurred.

Photograph 12 – Wire anchorage observed between stone wall and wood stud interior wall

Photograph 13 – Mechanical room interior. Left: interior of stone wall, Right, concrete interior wall at crawl space access.

Photograph 14 – Underside of coal storage, six inch concrete slab with steel wide flange support beams

Photograph 15 – Multi-ply 2x support beam in crawl space supporting joist and supported by post. Left: top of post, Right: shovel formed concrete footing

Photograph 16 – 2x4 ledger supporting floor joists.

Photograph 17 – Diagonal 1x floor sheathing

Photograph 17 – Main floor joist bearing condition at corner

TAB FIVE
—ARCHITECTURAL ASSESSMENT & RECOMMENDATIONS

ARCHITECTURAL

A Exterior

Foundation wall at southwest corner.

Wall at southwest corner.

Keystone lintel on west elevation.

Damage to wall along east elevation.

Exterior Walls and Foundations:

Description

The concrete foundation walls are exposed on the exterior. The foundation walls bear on continuous concrete footings. Pier footings on the interior of the building, beneath the floor, are visible in the crawl space and consist of stacked blocks which in turn support the wood framed floor structure.

The exterior walls are comprised of an archaic cavity wall with an exposed stone veneer forming the outside assembly and a stud wall forming the interior assembly. The cavity between the two assemblies is narrow, about 1 inch. The facing stone is a native field stone, split-faced, and the walls are largely monolithic, but with embellishments over the west, north and south windows and doors with a flat keystoned lintel.

The stone veneer is stacked and grouted against a proprietary system comprising a a welded wire mesh which is woven into a paper air infiltration barrier. The wire mesh is attached to the wood stud framing via a wire, looped around the mesh and nailed to the wood studs. The 2x4 wood studs are faced with the original "gypsum lath board." The walls are insulated with an archaic batt insulation.

Assessment

From a visual examination of the exterior, the stone and the grout appear to be in good condition overall. The concrete foundation does not show any signs of shifting or sinking and there is only some expected minor exterior cracking.

The foundation is subject to water infiltration given that the landscaping abuts the foundation walls. The gutters drain into downspouts at each corner of the building as well as on the front projecting block, on the inside of the two stoops at the west facing entry. The

ARCHITECTURAL

Landscaping abutting the wall at the north-west corner. .

Subfloor condition at northwest corner.

Subfloor condition at northeast corner.

downspouts are piped into the ground at the foundation and it is not clear where the water is being directed and or collected. There are observable low spots in the landscaping on the north end of the building (against the building) that will collect water from rain or from the irrigation.

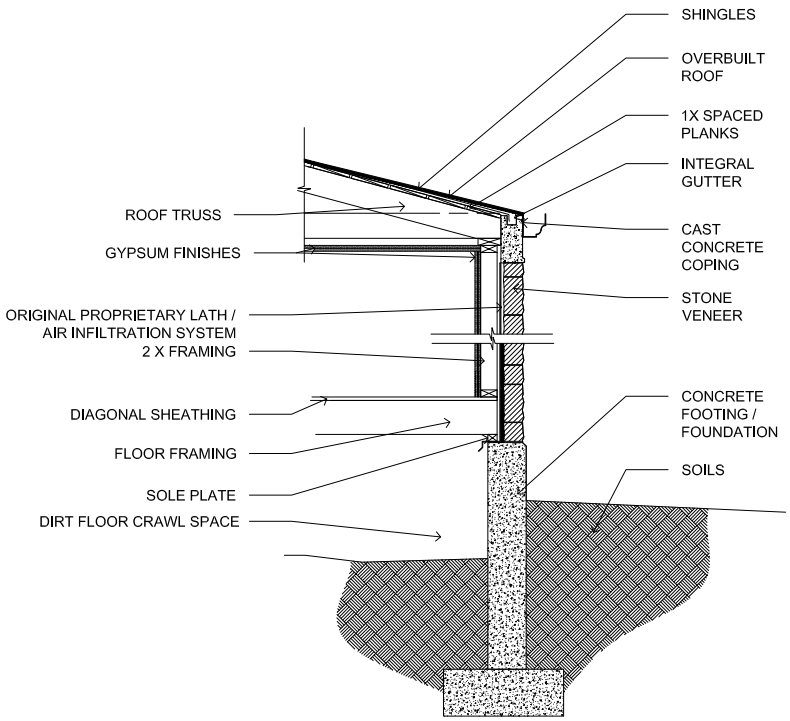
On the interior of the building there is visible damage and this is especially apparent at the northwest corner. The floors have sagged and the sheetrock is damaged from prolonged water infiltration. It is not clear where or how the water is infiltrating the building, whether from the roof or the foundation. The sheetrock in this area has been removed and the interior of the wall is visible. There is significant corrosion and deterioration of the wire mesh and paper air infiltration barrier. The wire mesh is rusted out, entirely in some areas, and the paper backing has disintegrated. The wire ties to the studs are also corroded.

There is one other area that has been exposed in the southeast corner of the building and in this area the wire mesh and the paper air infiltration barrier appears new and undamaged, in pristine condition.

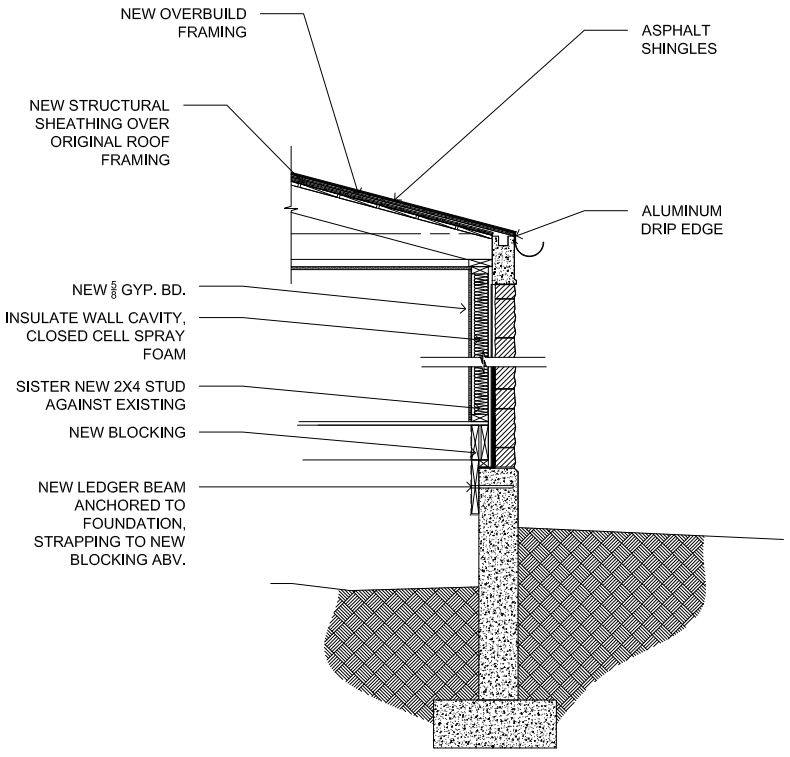
Overall, the interior wood stud walls appear to be in good condition and it is assumed that the water infiltration is limited to key areas, likely at the northwest and northeast corners of the building.

On a subsequent visit, the floor at the northeast and northwest corners had been removed and a closer inspection of the bearing condition of the stud wall on the foundation wall was possible. There was significant water damage in these areas as a result of a faulty drain pipe (moreso at the northwest corner). The pipe was ostensibly original to the building and appears to have been connected into the integral gutter system (to be described later). The pipe has for years been leaking onto the wood sole plate (wood 2x atop the foundation wall) as well as the framing, the foundation wall and footing. there is a significant level of wood rot and deterioration in this area.

ARCHITECTURAL



EXISTING WALL SECTION



PROPOSED WALL SECTION

As mentioned, this allowed a close inspection of the bearing condition of the stud wall and stone on the foundation wall. The stud wall rests on its own sill plate above the diagonally sheathed sub-floor and floor joists. The floor joists rest on the wood sole plate which in turn rests on the foundation. Interestingly, the sole plate is very narrow, likely 2 1/2" wide and it is on this that the joists bear. The stone itself sits squarely atop the foundation wall. There is a metal drip edge that appeart to extend from the exterior edge of the foundation to the inside edge and sits below the sole plate. The dimension of joist bearing on the sole plat is inadequate and in fact the stud above sits proud of the inside face of the sole plate, so there is not a direct line of force from the stud wall to the foundation.

Recommendations

1. At a minimum, the soils abutting the foundation should be replaced with a drainable gravel medium, about 24 inches wide and as deep as the footing. The landscaping and irrigation should not abut the building. This will allow any water that does drain against the building to be collected and dispersed into the surrounding soils as well as allowing it to evaporate back out. If water does enter the walls, it has a means to escape as vapor into the drainable fill.

2. The gutters and downspouts should be replaced and the downspouts should be hard-piped to either a dry sump in the yard or to the storm water system.

3. The mortar should be closely inspected and where damaged, loose, missing, etc., or if it consists of a hard cement-based mortar that was installed as a later repair, then it should be removed and repointed. The mortar should be removed using hand tools only, especially on this building which has uneven joints. Power tools such as metal grinders will damage the stone. The damaged mortar should be removed to a minimum depth of 2 to 2-1/2 times the width of the joint to ensure an adequate bond and to prevent mortar "popouts." The new mortar should

ARCHITECTURAL

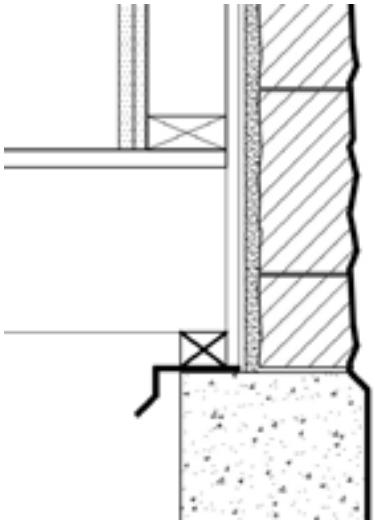
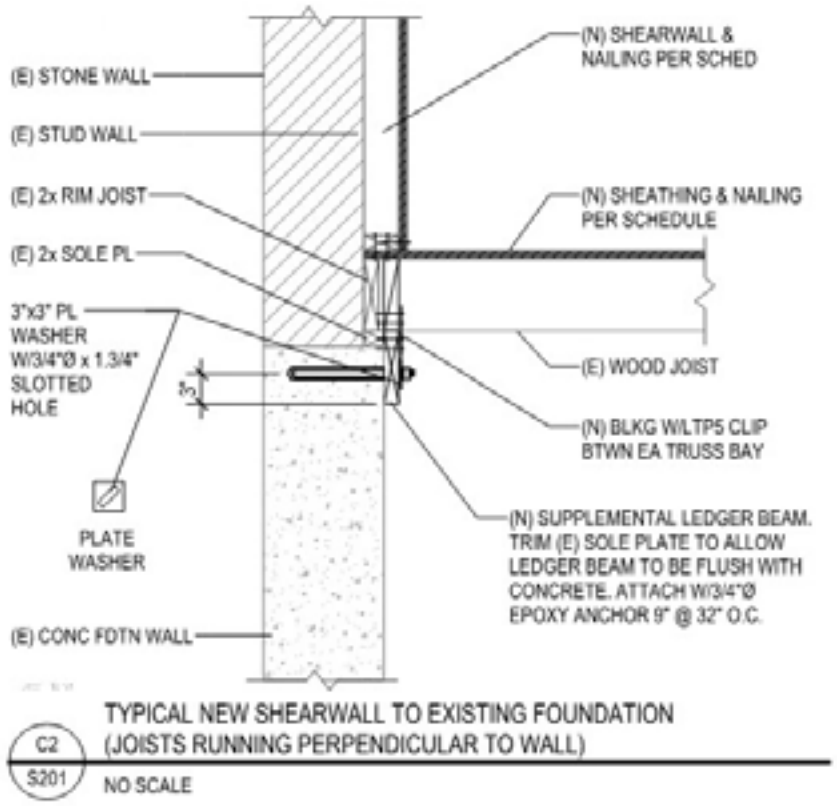


Figure: Existing condition at foundation wall showing sole plate and bearing condi-ton of joists.



match as closely as possible, the color, texture and composition of the original mortar. Finding the right mortar mix is essential to the longevity of the stone and each historic building is unique. A mortar compatible with the historic mix should be selected. Although the stone itself has a high compressive strength, the new mortar must be softer (measured in compressive strength) than the stone units, have greater vapor permeability. This is critical during conditions which may shift the wall (seismic event, foundation settlement, etc.) because the mortar will crack first and the stone units will simply shift, thus preserving the integrity of the stone. A typical mortar matching the historic mortar may consist of the following:

• 1 part Portland cement

• 2-1/2 parts sand

• Hydrated lime = to not more than 15% of the cement's volume (lime should conform to ASTM C 207, Type S, or Type SA, Hydrated Lime for Masonry Purposes).

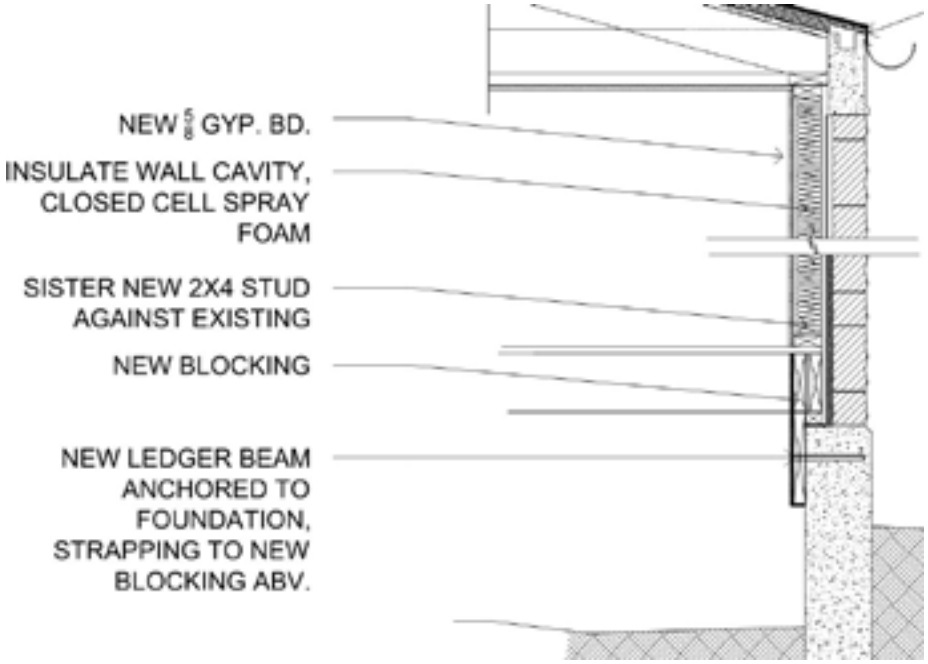
4. Because the flooring will be removed (addressed later in this report) for access to the crawl space, the entire back side of the foundation walls should be covered with a rigid insulation board to improve the thermal efficiency.

5. On the interior of the wall, the original gypsum lath board finishes should be removed from the interior side of the wall around the entire perimeter, thus exposing the wood framing in place. The insulation should be removed. This portion of work should be done in conjunction with the structural improvements recommended in this report. Once the backside of the stone is exposed around the entire perimeter, the paper backing should be removed and as well as any corroded wire lath.

The recommended thermal and structural upgrade to the wall consists of the following (See Structural Sheets S101, S201, and Architectural Sheet A3.1):

- Installation of a new ledger beam around the entire perimeter, anchored into the foundation wall.

ARCHITECTURAL



- Installation of new wood blocking between floor joists, anchored into the stone masonry.

- At key locations indicated on S101, new shear walls will be constructed to resist lateral forces. This includes plywood sheating over the stud walls and positively connects the roof diapragm to the foudnation wall. The plywood will then be faced with a new 5/8" gypsum board panel, and finished in the interior side. In areas without the shear wall, two layers of gypsum board will likely have to be installed to achieve a flush wall finish.

- Once the structural improvements are complete, new closed cell spray foam insulation can be introduced into the stud space and an air barrier installed on the face of stud.

Cutouts for plugs and switches should be closely coordinated with the new plywood sheathing layout.

ARCHITECTURAL

Original roof shown framed behind cast concrete coping.

Overbuilt roof showing flare to front of cast concrete coping.

Roofing

Description

The hipped roof structure is comprised of wood framing and site-built trusses spaced at 24" on center. The trusses are decked with the original 1x plank sheathing. Newer plywood or OSB (Oriented Strand Board) can be seen through the narrow spaces in the sheathing and was likely installed at the time that the current roofing was installed.

Originally the roof structure contained integral gutters which were hidden behind the cast concrete coping block at the top of the wall. The gutters were likely problematic (water infiltration) and were eventually framed over. If one compares the current roof line with the original roof line there is a distinct difference. Currently, the hipped roof flares out at the base and terminates at the front of the coping, yet in early photos of the building, the roof line does not flare out, and instead terminates behind the coping, because of the integral gutter. The current flared condition is an overbuild of the roof. Remnants of the gutter can still be seen in the attic space.

Presently, the building has been retrofitted with aluminum gutters that extend around the entire building. Downspouts are located at the four corners of the building as well as on the front projecting block on the west face to the inside of the two entry stoops. These all are piped below grade, but it is unclear where the water is ultimately being directed and collected.

The roofing is new and consists of an architectural grade asphalt shingle that is laid over a newer OSB sheathing.

Assessment:

The architectural grade asphalt roofing appears to be in good condition overall.

The roof trusses, 1x planking also appear to be in good condition with no visible damage or defects to the wood members.

The gutters and downspouts are in fair condition. There is some observable

ARCHITECTURAL

Existing trusses in attic.

Existing trusses in attic.

Existing trusses in attic.

water staining and mortar damage on the walls that appear to be a result of damage to the downspouts..

Recommendations:

1. Due to the seismic recommendations, the asphalt roofing and OSB sheathing (as well as the overbuilt roof) need to be removed.

2. Blocking framing will be introduced around the perimeter of the building and will connect the truss to the diapragm and to the existing stud wall. New sheathing will be installed over the roof trusses. The overbuild will be rebuilt once the structural sheating is installed and the connections completed.

3. In certain areas (at egress points) the blocking (and the stud wall below) will be anchored into the cast concrete coping block and the stone masonry.

4. In addition, as depicted on Sheet S102, new collector walls will be constructed to drag the shear forces from the diapragm and to the foundation. These collector walls will be located below the existing wood trusses aligned with the edges of the projecting central block. The truss will be mechanical clipped to the new collector wall.

5. As part of the reroof, new painted aluminum drip edge flashings and half round painted gutters should be installed at all eaves. The gutter should be a half round gutter, painted aluminum, but not the K-style gutter found on modern residential structures, and which are currently found on the building. New round downspouts should be installed and these should be hard-piped to either a dry sump in the yard or to the storm water system.

ARCHITECTURAL

Existing door at northwest entry.

Existing windows at north elevation.

Exterior Doors and Windows

Description

Most of the windows appear to be the original steel windows. There are various window sizes and shapes in the one-story structure with the most elaborate being on the west facing façade. The glazing is single pane, uninsulated glazing.

The exterior cast concrete sill at all the windows has a sloped top surface. Typically, these are just a single cast component, but if the window is wider, as is the case on the north and west façades, then it consists of multiple units, joined with a cement mortar.

The two sets of double doors and transoms currently on the west elevation are not original. The current doors are aluminum storefront doors that appear to date to the 1960s.

There are three doors on the east elevation, one to access the basement mechanical room and two that provide access to the main level spaces. Each of these is a hollow metal door with a hollow metal frame. There are two louvered panels on either side of the door to the basement mechanical room that provide fresh air into the space.

Assessment

The steel windows are in relatively good condition overall. The thermal efficiency of the windows is however inefficient. The single pane glazing is inadequate and will not meet desired U values. Furthermore, the steel windows are considered a thermal bridge allowing heat to escape to the exterior through the highly conductive steel. In modern windows, the windows are thermally broken with an insulated stop between the interior and exterior assemblies.

The doors are in good condition overall but are not well insulated or well sealed.

The two sets of storefront doors on the west elevation are not original and have only a single pane with uninsulated glass.

None of the doors have accessible hardware except for the main entry door on the east side.

The original doors were paneled wood

ARCHITECTURAL

Original entry door and transom at west elevations.

Original steel window and cast concrete sill.

Original steel window and cast concrete sill.

Original steel window and cast concrete sill.

doors with upper tripartite divided horizontal lites and a transom above.

Recommendations

1. Because the steel windows are in good condition, our recommendation is to retain and restore them.

First and foremost, the windows require some general maintenance which may involve paint removal, glass repair, hardware repair, caulking/sealing at joints, etc. The joint between the steel frame and the stone opening needs to be sealed. If the open joint is excessive, a backer rod should be installed and an elastomeric caulk should be used to seal the joint. Otherwise, the windows are in good condition.

The most cost-effective thermal upgrade of the existing window would involve a storm window insert installed on the inside to increase the thermal efficiency of the window. This both preserves the original steel windows, preserves the look and feel but also provides a robust thermal upgrade to an otherwise inefficient window. Storm window inserts are both cost effective and have a low impact on the look and feel of the original window. This can be done on the interior or the exterior of the window. These can be custom built and friction fitted into the opening and are easily removeable for cleaning and maintenance. The storm window insert can be upgraded to increase STC ratings (better acoustics) and to minimize UV light entering the building.

2. The two sets of doors on the west elevation should be replaced with doors consistent with the period of the building. Originally, both of these entries would have had a vestibule associated with them, in fact the south entry still does. Having the vestibule increases the thermal efficiency of the entry, as well as provides a more historically accurate space and so we recommend restoring the north vestibule.

Replacing the west entry doors and transom with new doors and transom provides an opportunity to install a door with increased thermal efficiency as well as providing modern, code compliant

ARCHITECTURAL

East entry door. Note lack of clearances on the strike side of the door.

door operation.

3. The doors on the east elevation should also be replaced with an insulated hollow metal door and frame. This provides an opportunity to install a door with increased thermal efficiency as well as providing modern, code compliant operation.

The main entry which is also the designated accessible entry should be fitted with an automatic actuator to meet accessibility requirements.

The east doors, while they are recommended to be an insulated hollow metal door, can have a single panel lite to provide a more attractive approach to the building.

ARCHITECTURAL

West entry stoop and stair.

West entry stoop and stair.

West entry stoop and stair.

Exterior Building Accessories (West Stoops, Cast Stone Elements, etc.)

West Stoops

Description

There are two stoops with stone haunches at the two west entrances to the building, that are original. The walls of the haunches are composed of the same stone as seen on the building these are capped with a cast concrete coping, with a parge coat that may or may not be original. The coping flares out at the base to provide a drip edge over the stone. The tops of the copings are sloped to drain the water to the edges. A newer aluminum railing has been added to either side of the stair to the inside of the haunches. The steps are poured in place concrete and the landing sits about 6 inches below the finished floor of the building. The concrete steps are poured to the irregular surface of the stone face.

Assessment

The condition of both stoops and haunches is poor. The concrete caps on the haunches are failing. The parge coat is deteriorated and large sections of concrete have spalled away. The concrete stairs are significantly chipped and damaged, especially at the nosings. The concrete coping appears to be a low-density unreinforced concrete. The joints between the concrete stairs and the haunches is prone to water infiltration due to the irregular surface of the stone face and the lack of any sealant. A similar issue is seen at the joint between the stair and the wall of the building.

The landscaping abuts right up against the haunches and there appears to be a significant amount of water damage at the base of the wall.

Recommendations

1. The concrete steps should be removed and replaced with a standard compressive strength concrete with proper reinforcing. The stairs should be reconfigured to allow even entry into the building at the landings. The concrete landing should be sloped slightly to the stairs and away from

ARCHITECTURAL

West entry stoop and stair.

West entry stoop and stair.

the building and the haunches. Eliminating the step at the entry door will increase compliance with building code thus reducing liability risk to the owners.

2. New handrails should be installed for the revised rise and run of the new stair. The handrails should be a modern handrail, unembellished, with a galvanized or stainless steel finish.

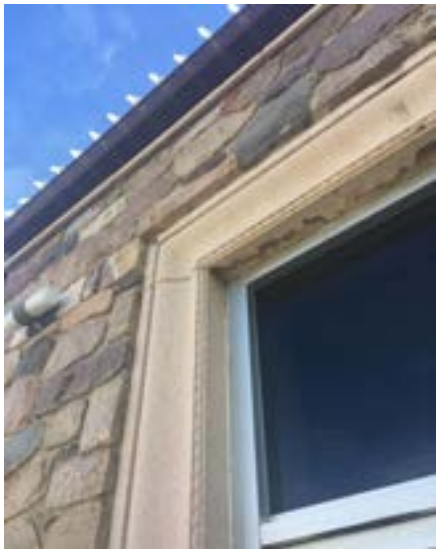
3. At a minimum, the soils around the haunches should be replaced with a drainable gravel medium, about 24 inches wide and as deep as the base or the footing. The landscaping and irrigation should not abut the haunch. This will allow any water that does drain against the building to be collected and dispersed into the surrounding soils and will allow it to evaporate back out. If water does enter the wall of the haunch, it has a means to escape as vapor into the drainable fill.

4. There are two options on the concrete copings. The first recommendation would be to repair them in place. The second preference would be to replace them, if repairs are infeasible. It will be necessary to engage a specialty contractor to perform this work, whether repairing or replacing.

If repairing, removing the damaged and loose material and creating a bondable surface (ragged surface) and reforming the new concrete around stainless steel pins epoxied to the original material. The new concrete will necessarily match the profiles of the existing. The parge coat should be removed and replaced with a new parge coat matching the original, thus achieving a uniform texture.

If replacing, care should be taken to match the existing profiles exactly. A new parge coat should match the original. The top surfaces should be sloped to the outside, away from the stair and the coping should be anchored to the stone wall.

ARCHITECTURAL



West entry cast stone door casing.

West entry cast stone door casing.

West entry cast stone door casing.

Back side of cast stone coping.

Cast Stone Door Casings

Description

On the west elevation, both sets of entry doors are framed with a cast stone door surround comprised of 3 units on each jamb and 1 unit at the header. They have a simple ogee profile with a fretted motif. The door surround terminates into the step at the entry.

Assessment

These elements are in very good condition overall. The issues revolve around open joints between the units or between the units and the adjacent wall, or between the units and the door. Where the cast stone meets the step at the entry there is a significant joint between the two materials where the concrete is scribed around the cast stone.

Recommendations

1. The cast stone elements should be preserved in place. The joints between the cast stone units should be repointed with an appropriate lime-based mortar (see above). The joints between the cast stone and the doors and wall should be caulked and sealed with an elastomeric caulk.

Cast Stone Copings

Description

The top of the exterior walls is capped with a cast stone coping. This is a simple rectangular block which flares out at the base to provide a drip edge over the stone.

Assessment

These elements are in very good condition overall though only the front of the cast stone was observed and a very limited amount on the back where the wall had been opened on the interior. The issues revolve around open joints between the units or between the units and the adjacent wall as well as ensuring that these elements are securely attached to the wall.

Early image depicting west elevation cast stone coping.

Recommendations

1. The cast stone elements should be preserved in place. The joints between the cast stone units should be repointed with an appropriate lime-based mortar (see above). The joints between the cast stone and the wall should be caulked and sealed with an elastomeric caulk.

2. The cast stone copings should be anchored to the framing at areas above entries to the building to minimize risk of failure at egress point. The structural sheet S102 indicates where these areas are located.

ARCHITECTURAL

B Interior

East entry condition.

West entry condition.

Access and Building Code

Description

Being a single-story building, accessibility is more easily managed. The largest issues facing accessibility in the building are providing required clearances to access restrooms, required clearances and accessible fixtures in restrooms, accessible drinking fountains, installing accessible hardware on doors, etc.

Assessment

The two entries on the west facing facade are not accessible. These originally would have served as the main entry points, one for the City office and one for the Health Department. These are both accessed via a stair and the landing sits about 6 inches below the finished floor.

The accessible entry is now located on the east side of the building where the grading has been raised considerably to accomodate this.

The clearances around the main east entry door are not adequate to meet current code.

The two restrooms are both mostly code compliant lacking certain features such as vertical grab bars in the accessible stall, not meeting reach requirements for someone in a wheelchair, etc.

Recommendations

1. Because there is an accessible entry on grade on the east side of the building there is no need to install an accessible ramp. The accessible parking stalls should provide a clear and unobstructed path to the accessible entry. There are currently ramps providing access through the north and south sides of the building from the street side back to the rear where the main entry is located.

2. All entry doors need to be equipped with compliant accessible hardware which allows individuals with disabilities to grasp

ARCHITECTURAL

Interior ceiling condition, looking north.

Interior ceiling condition, looking north.

and operate the doors.

The restrooms on the main level are currently designed to be multi-occupant with segregated genders. The restrooms in their current configuration are largely accessible. Simple additions such as the installation of vertical grab bars, plumbing piping covers, and providing amenities within reaching distance (such as paper towel dispensers) would greatly improve the accessibility and function of the restrooms.

If the plumbing fixtures are replaced with new fixtures this would be a good time to upgrade the restrooms to meet code in every respect..

Finishes (Ceiling, Lights, Walls, Flooring, etc.)

Ceilings / Lights

Description

The ceiling finishes on first glance all date to the renovation done when the building was converted fully to the library (1987).

The ceilings are generally lower, finished with suspended 2x4 acoustic tiles with flourescent light fixtures throughout, either recessed 6" cans in the grid, recessed grid lights, strip lighitng and spot lighting.

Upon closer inspection, the grid ceiling was installed below the original ceiling which is largely intact. The original ceiling is also mostly acoustic tiles, thought adhered directly to the underside of the gypsum lath board. The borders are embellished in the main central space with a decorative plaster element.

Because the ceiling of the central block was higher currently there is a gabled design with hard gypsum board finishes in the central block. Above this is ostensibly the original ceiling, though it was not directly observed.

Assessment

The newer ceiling is in good condition, however its design is inconsistent with the time period of the original space.

All of the existing light fixtures are

ARCHITECTURAL

Original ceiling condition.

Original ceiling condition.

Southwest vestibule, which remains intact.

fluorescent and do not currently meet energy code (See Electrical Section).

Recommendations (See Architectural Sheet A1.4 for proposed ceiling plans.)

1. The existing suspended acoustic ceiling and grid should be removed.

2. The existing lighting should be removed.

3. The original ceiling should be restored. Because there are acoustic tile adhered to the gypsum lath, they may be asbestos containing. The City should engage a qualified testing agency to test these for asbestos. If they are asbestos containing, they should be abated and replaced with a similar looking acoustic tile that can be glued to the gypsum substrates. If they do not contains asbestos, then they can remain. Because we have not directly observed these, there may be a fair amount that are damaged or missing and so it may make sense economically to replace them with new acoustic tiles.

The damage to the smooth decorative plaster borders can be replicated if necessary. It is unclear the extent to which this element is damaged or not. Because this is a character defining feature of the original space, this should be restored rather than replaced.

4. New lighting should be installed (See Electrical Section for more discussion).

Walls

(See Discussion of Exterior walls in Exterior Section)

Description

The walls are all wood framed and most appear to be original with original finishes.

The interior arrangement has been modified over the years to accomodate different users, but it was largely by subtraction rather than addition.

In its current configuration, it reflects the layout when it was a library, up until 2015. The entries on the west have been largely abandoned, (the south one is used only for emergency egress) and the vestibule

ARCHITECTURAL

Wall condition, looking west.

Wall condition, showing existing finishes.

on the north has been dismantled.

The walls in the main "library" space all have a stained wood base trim, wood chair rail and a paneled wainscoting that is covered with a wall fabric.

The windows all have a marble sill, original to the building. The edge of the sill is flush with the wall. The windows are not cased, the wall simply continues into the jamb.

The south corridor appears original and their may have been a similar corridor on the north.

Assessment

As stated the interior walls are mostly original, and all are in very good condition. If original, they are likely to be framed to the underside of the structure.

The Davis County Clipper article from 1944 describes the interior as having "apple green walls and birchwood paneling throughout the structure..."

While the apple green walls are long gone, many of the finishes appear to remain. The base and chair rail are likely not original, however, the new chair rail appears to have been attached to the original chair rail, which is still in place. The wainscoting paneling may also be original, however the paneling is obscured by the wall fabric.

The finishes are mostly in good condition outside of normal wear and tear.

Recommendations:

See Architectural Sheet A1.2 and A1.3 for proposed demolition and new work scope.

1. Some of the new work is required by structural such as the collector walls that divide up the existing space where the central block meets the north and south wings of the building.

2. The north vestibule on the west side should be reconstructed to match the vestibule on the south.

3. New vestibules should be constructed a tthe north and south entries on the east elevation. The new entry doors should be reconfigured to meet the required code clearances.

4. Because the structural upgrade is calling

ARCHITECTURAL

Flooring condition, showing existing finishes.

Flooring condition, showing existing finishes.

for the existing gypsum lath board finishes on the exterior walls to be removed, the original wood trim should be salvaged where possible and reused. See discussion of exterior walls in previous section which indicates that the exterior walls will all be finished with new gypsum board paneling.

5. The finishes on the walls should be restored. The wall fabric on the wainscoting should be removed and the paneleing restored. The new chair rail should be removed and the original restored. Where existing trim cannot be restored, new trim should be replicated to match the original.

Flooring

Description

The floors are all carpeted currently with the exception of the restrooms and some of the storage and utility closets.

The original subfloor is a diagonally laid sheathing and there may be a more modern particle board floor above that, though this was not directly observed.

Assessment

The flooring, the carpeting and the tile in the restrooms is in fair condition. The carpeting has water damage in areas where water has leaked into the building.

Recommendations

1. Because the structural upgrades require that the existing flooring and subflooring be removed, even though it is in fair condition, it will be removed.

2. New sheathing per structural will replace the original diagonal sheathing.

3. New carpeting (Carpet tiles) should be installed throughout except for the restrooms, mop rooms, etc. where new tile will be installed.

Interior Doors

Description

The Davis County Clipper article from 1944 describes the doors as “gumwood doors.” Many of these original gumwood doors

ARCHITECTURAL

Original door condition, at southwest entry.

New door condition, at LeConte Stewart entry.

Original door condition, at restroom.

are extant in the building. Newer doors have been installed which mimic the finishes on the original doors such as the doors on the Le Conte Stewart Room. The original doors have a boodend pattern on the veneer, the newer doors do not.

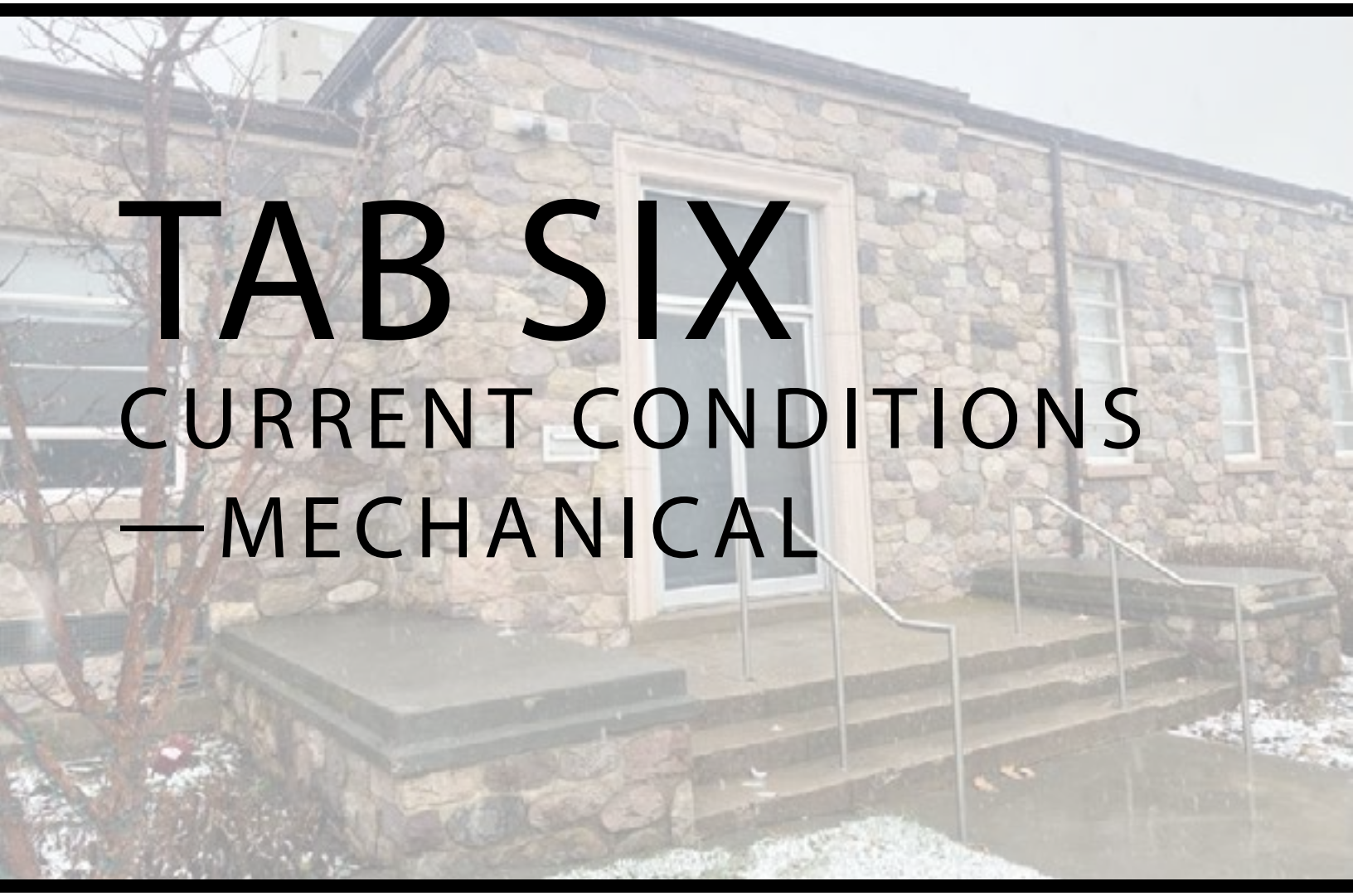
Assessment

The original doors are in good condition overall, though they lack accessible hardware throughout.

Recommendations:

1. The existing original doors should be restored. The hardware should be replaced to meet accessibility standards.

2. New doors should replicate the original, especially the new vestibule doors at the entry points.



TAB SIX
CURRENT CONDITIONS —MECHANICAL

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Technology Engineering
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ENGINEERING STUDY

Date:	April 15, 2022		
To:	Steve Cornell	**From:**	Jamie McCullough, PE
Company:	FFKR	**Email:**	jmm@spectrum-engineers.com
Job:	Kaysville Library Study	**Phone:**	801-401-8458
Job No.	210692dh	**Re:**	
Via:	Email		
Cc:		**Email:**	jmm@spectrum-engineers.com

INTRODUCTION

This purpose of this report is to provide recommendations and potential solutions to facilitate optimal functionality, cost effectiveness, and code adherence. A site visit was made to observe existing systems and conditions. No as-built drawings were available.

Jamie McCullough, PE conducted the site visit and developed this report.

GENERAL BUILDING CONDITIONS

The existing municipal building is single story, roughly 5,000 ft^2. There is a large library area along with multiple small offices, and restrooms. The ceiling is a combination of grid and hard lid. There is a crawl space underneath the building with piping and utilities.

There is an existing boiler room with access on the East side in the middle of the building. Said boiler room is as low as the crawl space. There are stairs down from the street level to the floor. It has a hard lid ceiling at the same height as the ceiling in the finished spaces. There is a small room within the boiler room and it is open to structure above. There is an old coal fired boiler that has been decommissioned in that room. It's unknown how when the unit was decommissioned. There is also a water heater in that room. The room is poorly utilized and there is space for HVAC and plumbing equipment if the boiler was removed. The existing air handler units are on the roof.

The building is an historic brick building, single story with a crawl space under the floor. It's about 120 feet by 40 feet and the ceiling is about 8'. There is an attic and a pitched roof. It is assumed that the building has essentially no insulation besides the multiple wythes of brick wall.

ASSESSMENT OF EXISTING HVAC

HVAC system consists of 2 air handlers on the roof, ducted above ceiling to the various spaces. Air handlers are dx cooling and gas heat. One of the units no longer functions. It is unknown the condition of the second unit but it is assumed its condition is similar. Outside air requirements are met by the air handlers when functioning properly. Exhaust system is limited to the exhaust fans in the restrooms. Code and or design deficiencies are noted as follows:

- HEATING – Heating loads are not being met by the single functioning AHU. And the one unit that is working is a poor choice to be used for new construction based on its assumed age and condition.
- COOLING – Same for cooling.
- OUTSIDE AIR – Outside air code minimums are not being met by the one functioning AHU. It was likely being met when both units were functioning.
- CONTROLS – The Tstats for the existing AHU's are outdated and possibly not functioning properly. There is one Tstat per AHU.
- HAZMAT – The existing boiler and associated ductwork are insulated with what is likely asbestos material requiring special abatement. This might be why the boiler wasn't demolished previously.

OPTIONS FOR HVAC

All existing mechanical equipment and ductwork should be demolished and start new with one of the below options:

- OPTION A – Replace AHU's with new AHU's (dx cooling, gas heat) on roof to match the heating/cooling/ventilation requirements of the proposed new spaces. Run ductwork above the ceiling to registers/grilles/diffusers in the various spaces. This is by far the easiest and most economical option. The downsides include:
    - Only two zones for the whole building meaning poor Tstat control for the different spaces
    - AHU's are still visible from the East side of the building and don't fit the historic nature of the building.
    - Boiler room would remain wasted space.
- OPTION B – Replace AHU's with new AHU's (dx cooling, gas heat) on roof for a VAV electrical reheat system. Run ductwork above the ceiling to VAV's serving the various spaces. AHU's provide 50-65 degree F air to VAV's year round and the VAV's provide additional electrical resistance heat as needed. This will allow for excellent zoning for all the various spaces. The downsides include:
    - More expensive than option A.
    - Higher electrical loads for the VAV reheat.

- AHU's are still visible from the East side of the building and don't fit the historic nature of the building.
- Boiler room would remain wasted space.

- OPTION C – Essentially the same as Option A but new HVAC units located in the boiler room. Duct could be run above ceiling or in crawl space. The unit and ductwork would remain hidden, better preserving the historic feel of the building. The downsides include:
  - Only 2 zones for whole building.
  - Rework the exterior wall of boiler room to facilitate the necessary louvers and air intake for the equipment. Equipment flu(s) will need to be routed through wall or up to roof.
  - Necessitates demolishing the old boiler including any and all hazardous material remediation that comes with it. Depending on the HAZMAT testing results, this could be a very expensive task.
- OPTION D – One new AHU located in the boiler room, sized adequately for the whole building. Duct would be run above ceiling to VAV boxes. VAV boxes could be located to accomplish any desired zoning and control. The downsides include:
  - More expensive.
  - Rework the exterior wall of boiler room to facilitate the necessary louvers and air intake for the equipment. Equipment flu(s) will need to be routed through wall or up to roof.
  - Higher electrical loads for the VAV reheat.
  - Necessitates demolishing the old boiler including any and all hazardous material remediation that comes with it. Depending on the HAZMAT testing results, this could be a very expensive task.
- OPTION E – Utilize VRF system. Locate condensers in the boiler room and ducted FCU's above ceiling to serve spaces. This option is more efficient than the others, does not require any gas connection, can remain completely hidden from the exterior, and also offers excellent zoning and control. It is, however, the most expensive option. Other downsides include:
  - Approximately same price as D.
  - Rework the exterior wall of boiler room to facilitate the necessary louvers and air intake for the equipment. Equipment flu(s) will need to be routed through wall or up to roof, in the case of utilizing a DOAS.
  - Requires exterior louvers to facilitate outside air duct to RA side or indoor FCU's. This can be ducted from the boiler room or a DOAS unit to prevent multiple exterior louvers.
  - Necessitates demolishing the old boiler including any and all hazardous material remediation that comes with it. Depending on the HAZMAT testing results, this could be a very expensive task.

HVAC RECOMMENDATIONS

It is my recommendation for cost effectiveness to go with either Option A or B, depending on the level of zoning and control desired. However, if performance and historic feel of the building weigh heavily and it's important to keep AHU's off the roof, I would go with Options E. This option give the best performance and keep all equipment hidden, protecting the historic feel. Options C, D, and E all carry a large and somewhat unknown expense of demolishing the old boiler but the advantages are significant and that boiler room space is wasted anyway.

I don't think making an exterior mech yard away from the building to house AHU's or VRF condensers and adequately hiding/screening such will cost much less than locating in the boiler room and will have other drawbacks: running ductwork underground into building or having exposed duct, not sure how we get duct into the attic space without adding a chase or losing square footage, and even if a VRF system is utilized – meaning only line sets connect yard to building – It will be hard to hide said line sets, and exterior yards don't fit the desired historic feel much more than rooftop units.

ASSESSMENT OF EXISTING PLUMBING

Existing plumbing consists of DCW entering the building from the West, traversing the building in the crawl space to the boiler room, where it connects to a water heater. DCW and DHW are piped from there through the crawl space to existing plumbing fixtures including: mop sink, water fountain, and two restrooms with flush tank WC's and lavs. DCW main appears to be 1.5" service. Sanitary sewer runs in the crawl space and out to the West where it connects to civil in the road. It appears to be a 4" service. There isn't any storm sewer connection. The roof drains are gutter type that are daylighted to the landscaping areas around the building. The building utilizes natural gas, the meter is located on the West side in landscape area, North of building centerline. Code and design issues are noted as follows:

- DCW – Existing DCW service is adequate size for proposed new fixture count but will limit the new WC's to flush tank.
- DHW – Existing WH is adequately sized and appears to be in good condition and is the only plumbing equipment that could be reused.
- SANITARY SEWER – Existing 4" line is adequately sized and appears to slope sufficiently to the West.
- ROOF DRAINS/STORM SEWER – New building will utilize gutters and downspouts as well, no roof drains or storm sewer service necessary.
- VENTS – Existing vents were difficult to see due to ceiling in the way.
- NATURAL GAS – Service size looks good. However, a leak was observed in the gas pipe fitting just before the meter. This will need to be remedied.

RECOMMENDATIONS

It is recommended to reuse existing water main until it gets to the boiler room. Re-pipe all DCW, DHW, and vent from that point as new. All plumbing fixtures, equipment and piping, except for water heater to be demolished. It is recommended that the existing SS main in the crawl space be camera scoped to determine whether it can be reused or not. It is likely that it can be reused and the only new SS piping will be to connect new fixtures to the existing main. Because the existing DCW and SS lines are in the crawl space, which is readily accessible as well as an area that sustains minimal damage in the case of a leak, these two mains are worth reusing to save money if the camera scope in the SS looks good.

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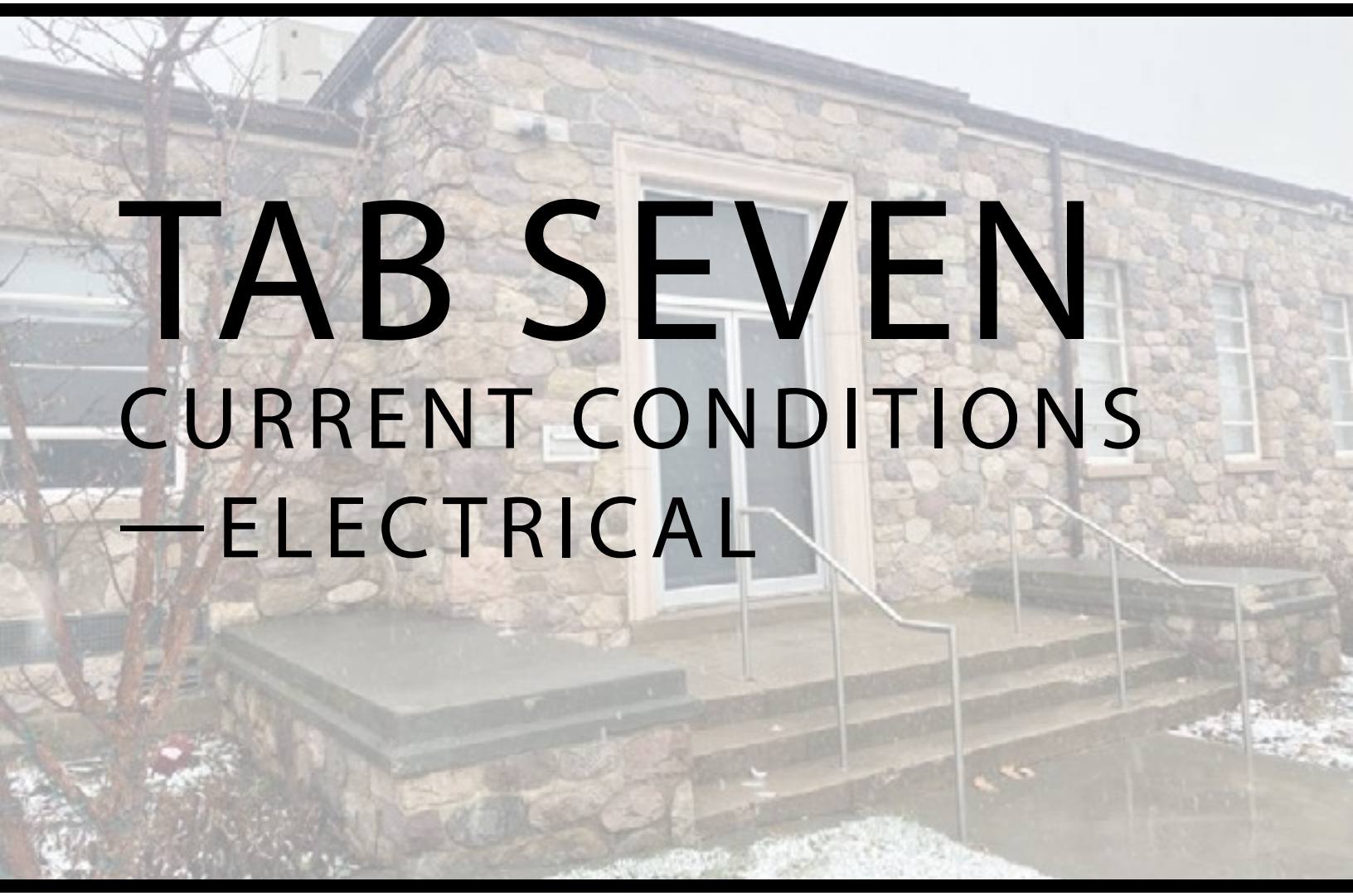
See existing pictures below of existing space for reference:



TAB SEVEN

CURRENT CONDITIONS —ELECTRICAL

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Memo

Date:	May 11, 2022		
To:	Steve Cornell	**From:**	David Hinckley, PE
Company:	FFKR	**Email:**	dgh@spectrum-engineers.com
Job:	Kaysville Library Study	**Phone:**	801-401-8435
Job No.	210692dh	**Re:**	
Via:	Email		
Cc:		**Email:**	dgh@spectrum-engineers.com

Steve

Please find below my findings from our site visit on December 9, 2021 and March 14, 2022.

Power:

The building is currently served by a 3 phase, delta high leg transformer east of the building across the parking. It is a newer transformer that was installed in the past couple of years by Kaysville Power. It feeds a 400A panel with a main breaker in the boiler room on the east side of the building. The panel and adjacent branch panel are older but are in acceptable condition. The main panel is 3 phase (120/240V 3 Phase high leg) and the sub panels are 1 phase (120/240V 1 Phase). One of the panels do have plumbing piping below (a Code violation) so if the new program would allow for an electrical room it would be preferred to not tie into this panel that does not have the NEC required clearances. Where ceiling tiles were lifted, some MC cabling was not adequately supported.

Lighting:

The building is lit by fluorescent lighting throughout. The fluorescents seem to be primarily T8 lamps. There are several track lights as well as incandescent down lights. This far exceeds current energy codes. If any improvements are made (even 10% of the lights affected) then this will trigger a requirement to comply with current energy code (IECC 2018). LED lighting would then be required to be installed throughout the space. Emergency lighting does not appear to be adequate with sporadic “bug-eye” lights providing some backup illumination but not enough to light the egress path. Light switches are too high to meet ADA requirements (48” max).

Fire Alarm:

The fire alarm system is very old. Occupant load is small enough that a full fire alarm system may not be required for a B type occupancy so I’d recommend just deleting out the old system. If fire alarm is

desired for the new space, the old panel should be replaced with notification and initiation devices installed as required by IFC 2021 and NFPA 72.

Recommendations:

Remove all track lighting and incandescent down lights. Provide new LED lighting with integral battery packs where required to meet minimum light levels. Add in occupancy sensors as required by IECC 2018 (I would estimate about 15 would need to be added). Re-locate the branch panel that has plumbing piping underneath it (which does not meet the Electrical Code requirement of having panel clearance from floor to ceiling. Lower light switches to 46" to center so that they comply with ADA codes. Provide additional support straps for M.C. cabling above grid ceiling to comply with NEC required supports.

Existing fluorescent lighting. Some track lighting also exists.

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Existing 3 phase, 120/240V high leg panel

Old panel (unless desired by Owner or if monitoring other items, could be deleted)

Salt Lake City Office
324 South State Street, Suite 400, Salt Lake City, UT 84111 [p] 801-328-5151 [e] info@spectrum-engineers.com

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Panel with plumbing piping running underneath.

Light switches above ADA height.

TAB EIGHT
COST ESTIMATE

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

S U M M A R Y

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section				Cost / SF	TOTAL
02 Existing Conditions				$18.29	$116,804
03 Concrete				$5.34	$34,114
04 Masonry				$8.89	$56,731
05 Metals				$6.16	$39,361
06 Wood & Plastics				$28.30	$180,697
07 Thermal & Moisture Protection				$25.76	$164,474
08 Doors & Windows				$14.20	$90,685
09 Finishes				$29.20	$186,439
10 Specialties				$3.90	$24,890
11 Equipment				$0.39	$2,500
12 Furnishings					In FF&E
21 Fire Suppression					Not Included
22 Plumbing				$6.45	$41,174
23 Heating, Ventilating and Cooling				$49.91	$318,653
26 Electrical				$31.55	$201,448
27 Communications				$6.22	$39,686
28 Electronic Safety & Security				$9.85	$62,892
31 Earthwork				$1.11	$7,095
32 Exterior Improvements				$1.71	$10,915
33 Utilities					No Work Required
Sub-Total (Construction Only)		6,385	SF	$247.23	$1,578,558
General Contractor General Conditions	10.0%			$24.72	$157,856
General Contractor Bond	3.0%			$7.42	$47,357
General Contractor Overhead & Profit	8.0%			$19.78	$126,285
Sub-Total (Construction Only)		6,385	SF	$299.15	$1,910,056
Unknown Conditions / Contingency (Allow)	15.0%			$44.87	$286,508
Inflation to Mid-Point of Construction					Not Included
TOTAL (Construction Only)		6,385	SF	$344.02	$2,196,564

Estimate

Notes: Costs are for construction only (bid day). Costs are an opinion of probable cost.
Costs are based on an open competitive bid basis among 4-5 contractors.
Costs Do Not include inflation. Add 8.5%/yr (compounded) for Inflation.

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section	Quantity	UoM	Unit Cost	Total
02 Existing Conditions				
Site Related:				
Remove Landscaping / Irrigation	1,900	SF	$1.35	$2,565
Site Patch & Repair (Allowance)	1	LS	$7,500	$7,500
Building Related:				
Hazardous Materials Abatement				Not Required
Remove Existing Roof Sheathing				Maintain Existing
Remove Existing Plywood Floor Sheathing	1,790	SF	$1.75	$3,133
Remove Roofing Structure Overbuild	1,790	SF	$6.70	$11,993
Remove & Replace Structural Joists (Selective)	1	LS	$12,500	$12,500
Remove Asphalt Roofing System, Trim & Accessories	6,730	SF	$2.10	$14,133
Remove Existing Door & Frame	11	LEAF	$365.00	$4,015
Remove Existing Window & Frame	525	SF	$18.75	$9,844
Remove Ext Wall Gypsum Board to Expose Framing	4,560	SF	$2.00	$9,120
Remove Stud Framed Wall	840	SF	$6.70	$5,628
Remove Column Wrap	60	SF	$20.10	$1,206
Remove Building Finishes - Floor, Wall & Ceiling	6,385	SF	$2.20	$14,047
Building Demolition, Selective (Allowance)	6,385	SF	$1.35	$8,620
Temporary Shoring, Lifting & Bracing	1	LS	$12,500	$12,500
			$18.29	**$116,804**

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section	Quantity	UoM	Unit Cost	Total
03 Concrete				
Concrete Drill, Dowel / Epoxy Anchor (Allowance)	340	EA	$87.10	$29,614
Concrete Epoxy Injection, Crack Infill (Allowance)	1	LS	$2,500	$2,500
Concrete Testing, 24-Hour (Allowance)	1	LS	$2,000	$2,000
			$5.34	**$34,114**
04 Masonry				
Existing Stone Veneer, Structural Stabilization	2,470	SF	$6.70	$16,549
Existing Stone Veneer, Tool & Repoint (15%)	740	SF	$54.30	$40,182
			$8.89	**$56,731**
05 Metals				
Foundation Column Anchors - Hardware / Connections	2,160	LBS	$4.95	$10,692
Floor Framing - Metal Hardware / Brackets / Etc. (Struct)	1,915	LBS	$5.35	$10,245
Roof Framing - Metal Hardware / Brackets / Etc. (Struct)	2,355	LBS	$5.70	$13,424
Metal Hardware / Hold-Downs / Brackets / Etc. (Struct)	1	LS	$5,000	$5,000
			$6.16	**$39,361**

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section	Quantity	UoM	Unit Cost	Total
06 Wood & Plastics				
Wood Floor Sheathing, Plywood	6,385	SF	$5.50	$35,118
Wood Roof Sheathing, Sheathing over Existing	6,730	SF	$5.15	$34,660
Wood Roof Framing Structure (Roof Overbuild)	1,790	SF	$8.70	$15,573
Wood Header / Collector Beams, Roof & Exterior Wall	625	BF	$12.75	$7,969
Wood Wall Sister Framing, Exterior Wall (Structural)	800	BF	$13.40	$10,720
Wood Interior Shear Wall Framing / Sheathing (Struct)	1,465	BF	$20.10	$29,447
Wood Blocking / Ledger Beams, Floor (Structural)	2,520	BF	$16.75	$42,210
Trim / Casings (Allowance)	1	LS	$5,000	$5,000
Millwork / Casework / Cabinetry				In Other Budget
			$28.30	**$180,697**
07 Thermal & Moisture Protection				
Waterproofing / Dampproofing, Foundation	1,440	SF	$5.15	$7,416
Vapor Barrier / Air Infiltration Barrier, Building	6,385	SF	$2.00	$12,770
Roofing Barrier - Ice & Water Shield	2,235	SF	$3.00	$6,705
Batt Insulation, Roof	6,730	SF	$3.35	$22,546
Spray Foam Insulation, Building (Allowance)	6,385	SF	$5.35	$34,160
Asphalt Architectural Shingle Roofing, Flashings, Etc.	6,730	SF	$9.05	$60,907
Pre-Finished Rain Gutters / Downspouts	380	LF	$37.50	$14,250
Pre-Finished Flashings, Wall	200	LF	$16.10	$3,220
Joint Sealants & Firesafing	1	LS	$2,500	$2,500
			$25.76	**$164,474**

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section	Quantity	UoM	Unit Cost	Total
08 Doors & Windows				
New Exterior Window, Insulated Glazing & Frame	525	SF	$67.00	$35,175
Exterior Entry Door, Frame & Hardware - Double	4	PAIR	$6,030	$24,120
Exterior Door, Frame & Hardware - Single	6	LEAF	$3,350	$20,100
Interior Door, Frame & Hardware - Single	3	LEAF	$3,183	$9,548
Architectural Louvers w/ Accessories	20	SF	$87.10	$1,742
			$14.20	**$90,685**
09 Finishes				
Exterior Walls, New Gypsum Bd over Existing Framing	2,340	SF	$4.00	$9,360
Interior Wall Framing, Sound Batt & Gypsum Board	1,300	SF	$18.10	$23,530
Interior Wall Furring Framing & Gypsum Board	350	SF	$13.40	$4,690
Interior Dropped Ceiling Framing & Gypsum Board	650	SF	$11.05	$7,183
Existing Plaster Ceilings, Restore	2,300	SF	$10.70	$24,610
Floor Finishes, Public (Library)	4,150	SF	$8.05	$33,408
Floor Finishes, Admin / Support	2,235	SF	$6.70	$14,975
Acoustical Tile Ceiling w/ Grid	3,435	SF	$4.95	$17,003
Paint, Wall & Ceiling Finishes	5,940	SF	$2.70	$16,038
Paint, Doors & Frame	17	EA	$604.00	$10,268
Paint, Window Frame	525	SF	$5.70	$2,993
Paint, Trim / Miscellaneous	1	LS	$3,750	$3,750
Upgraded Finishes (Allowance)	1	LS	$10,000	$10,000
Finishes - Floor, Wall & Ceiling (Patch & Repair Allow)	6,385	SF	$1.35	$8,631
			$29.20	**$186,439**

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section	Quantity	UoM	Unit Cost	Total
10 Specialties				
Building Specialties - Bath Accessories, Signage, Etc	6,385	SF	$3.35	$21,390
Building Amenities, Remove & Reinstall (Allow)	1	LS	$3,500	$3,500
			$3.90	**$24,890**
11 Equipment				
Library Equipment / Asset Security				Not Included
Building Equipment, Remove & Reinstall (Allow)	1	LS	$2,500	$2,500
			$0.39	**$2,500**
12 Furnishings				
Window Coverings				Not Included
Furnishings, Loose (Work Stations, Chairs, Library Book Shelving)				In FF&E
				Not Included

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section	Quantity	UoM	Unit Cost	Total
21 Fire Suppression				
Fire Sprinkler System				Not Included
				Not Included
22 Plumbing				
Remove Existing Plumbing Fixtures	6,385	SF	$1.75	$11,174
Repair Natural Gas Meter Leak	1	LS	$2,500	$2,500
New Plumbing Fixtures w/ Piping	10	EA	$2,250	$22,500
Plumbing System, Patch & Repair (Allowance)	1	LS	$5,000	$5,000
			$6.45	**$41,174**
23 Heating, Ventilating and Cooling				
Remove Existing HVAC System	6,385	SF	$5.05	$32,244
Ductwork & Air Devices w/ Accessories	6,065	LBS	$11.40	$69,141
HVAC Equipment (AHU's / VAV's / EF's, Etc)	6,385	SF	$20.10	$128,339
HVAC Piping & Specialties	6,385	SF	$4.35	$27,775
HVAC Control System - BACnet / BAS	6,385	SF	$8.05	$51,399
HVAC Test & Balance	56	HR	$174.20	$9,755
HVAC Commissioning				Not Included
			$49.91	**$318,653**

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section	Quantity	UoM	Unit Cost	Total
26 Electrical				
Existing Transformer to Remain				Reuse Existing
Main Electrical Panelboard w/ Accessories				Reuse Existing
Remove Electrical Sub-Distribution / Lighting System	6,385	SF	$4.00	$25,540
LED Lighting - Building, Emergency & Exit	6,385	SF	$12.50	$79,813
Power Outlets / Distribution / Occupancy Sensors	6,385	SF	$8.70	$55,550
Branch Circuitry & Conduit	6,385	SF	$4.35	$27,775
Electrical Specialties	6,385	SF	$2.00	$12,770
Electrical Commissioning				Not Included
			$31.55	**$201,448**
27 Communications				
Telecomm / Data System, Rough-in (Allowance)	6,385	SF	$2.30	$14,686
Audio / Visual Systems (Allowance)	1	LS	$25,000	$25,000
			$6.22	**$39,686**
28 Electronic Safety & Security				
Remove Existing Special Electrical Systems (Allow)	6,385	SF	$0.65	$4,150
Fire Alarm System, New Panel, Equip & Devices	6,385	SF	$4.35	$27,775
Access Control System (Allow)	6,385	SF	$1.50	$9,578
Security System (Allow)	6,385	SF	$3.35	$21,390
			$9.85	**$62,892**

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section	Quantity	UoM	Unit Cost	Total
31 Earthwork				
Building Related:				
Foundation Drainage Grading	1,900	SF	$2.55	$4,845
SWPPP / Erosion Control	1	LS	$2,250	$2,250
			$1.11	**$7,095**
32 Exterior Improvements				
Perimeter Fill & Reconfigure Irrigation (Drainage)	1,900	SF	$3.35	$6,365
Landscaping - Infill, Patch & Repair (Allow)	500	SF	$6.10	$3,050
Protect Existing Site Elements	1	LS	$1,500	$1,500
Site Furnishings & Improvements (Trash Bin, Bike Racks)				Not Included
			$1.71	**$10,915**

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section		Quantity	UoM	Unit Cost	Total
33 Utilities					
Existing Utilities to Remain				No Work Required	
				No Work Required	
Sub-Total (Construction Only)				**$247.23**	**$1,578,558**
General Contractor General Conditions	**10.0%**			**$24.72**	**$157,856**
General Contractor Bond	**3.0%**			**$7.42**	**$47,357**
General Contractor Overhead & Profit	**8.0%**			**$19.78**	**$126,285**
Sub-Total (Construction Only)				**$299.15**	**$1,910,056**
Unknown Conditions / Contingency (Allow)	**15.0%**			**$44.87**	**$286,508**
Inflation to Mid-Point of Construction					**Not Included**
TOTAL (Construction Only)				**$344.02**	**$2,196,564**

Estimate Notes:
Costs are for construction only (bid day). Costs are an opinion of probable cost.
Costs are based on an open competitive bid basis among 4-5 contractors.
Costs Do Not include inflation. Add 8.5%/yr (compounded) for Inflation.

Kaysville, Utah

Kaysville Public Library
Stabilization & Remodel (Old Rock Municipal Building)

Conceptual Retrofit - Construction Cost Estimate
May 25, 2022

Section	Quantity	UoM	Unit Cost	Total

CONTRACTOR GENERAL CONDITIONS NOTES:

General Conditions Include :

- Mobilization / Demobilization
- Project Management
- Superintendent
- Administrative Assistant
- Scheduling
- Layout
- Permits
- Project Safety & Signage
- Office Supplies
- On-Site Communications
- Large Equipment
- Temporary Barricades
- Temporary Power
- Resource Protection
- Clean-Up
- As-Built Drawing Overview & Verification

Soft Cost NOT included in Construction Cost Estimate:

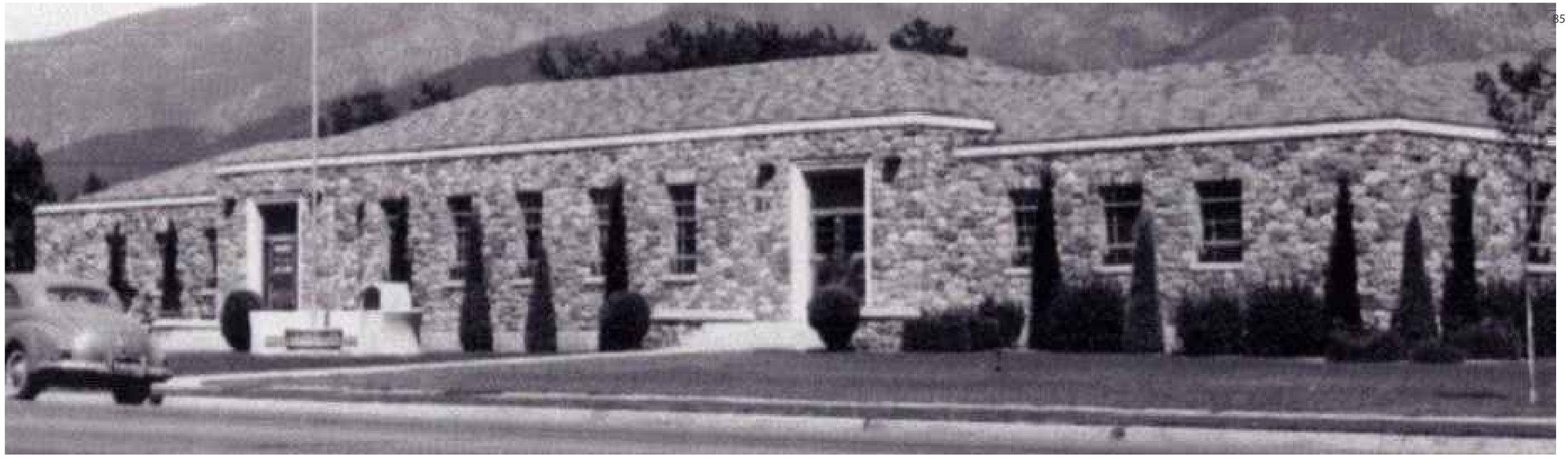
- Owners Overhead
- Planning Services
- A&E Design and Construction Administration
- Owners Rep.
- Commissioning Agent
- Special Testing and Inspections
- Owners Design Contingency

Estimate Notes:

Costs are for construction only (bid day). Costs are an opinion of probable cost.
Costs are based on an open competitive bid basis among 4-5 contractors.
Costs Do Not include inflation. Add 8.5%/yr (compounded) for Inflation.

TAB NINE

APPENDIX – A
ARCHITECTURAL PLANS



SITE MAP

MATERIALS LEGEND

- BRICK
- STONE
- CONCRETE
- FRAME WALL
- DEMO WALL
- GENERAL DEMO, SEE NOTE.

PROJECT TEAM

PROJECT ARCHITECT
FFKR ARCHITECTS
730 PACIFIC AVENUE
SALT LAKE CITY, UT. 84104
801.521.6186

STRUCTURAL
REAVLEY ENGINEERS
675 E 500 S - SUITE 400
S.L.C., UT 84102
801.486.3883

MEP
SPECTRUM ENGINEERS
324 S STATE ST. SUITE 400
S.L.C., UT 84111
801.328.5151

SHEET INDEX

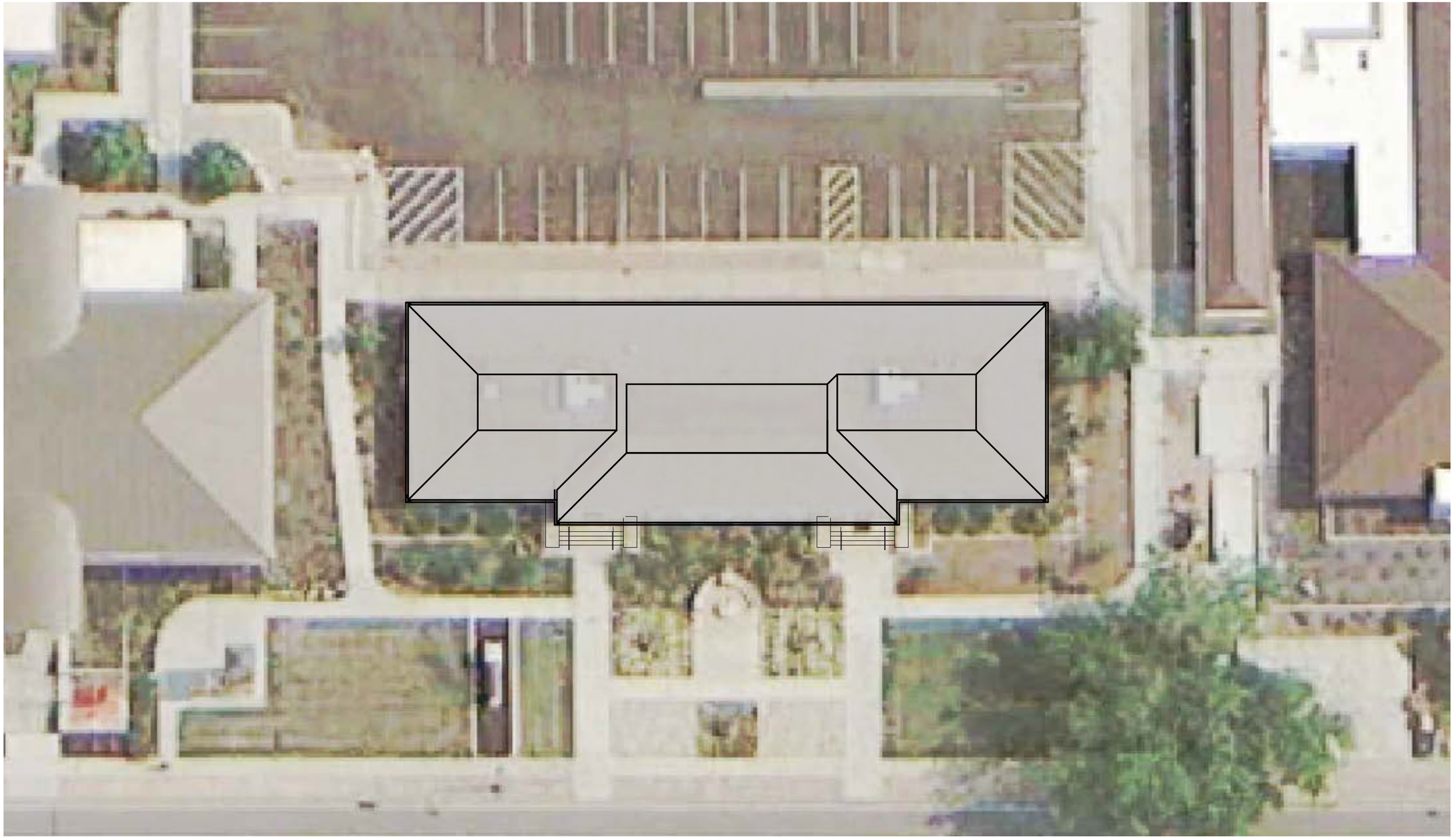
G-1.1 COVER SHEET
A-0.1 SITE PLAN
A-1.1 EXISTING FLOOR PLANS
A-1.2 DEMO FLOOR PLANS
A-1.3 PROPOSED FLOOR PLANS
A-1.4 REFLECTED CEILING PLAN
A-1.5 ROOF PLAN
A-2.1 EXTERIOR ELEVATIONS
A-3.1 BUILDING SECTIONS

KAYSVILLE OLD ROCK MUNICIPAL BLDG
44 N. MAIN ST., KAYSVILLE, UT. 84037

FFKR ARCHITECTS
730 Pacific Avenue • Salt Lake City, Utah 84104
O 801.521.6186 • FFKR.COM

COVER SHEET

NO SCALE
G1.1



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FFKR ARCHITECTS
730 Pacific Avenue • Salt Lake City, Utah 84104
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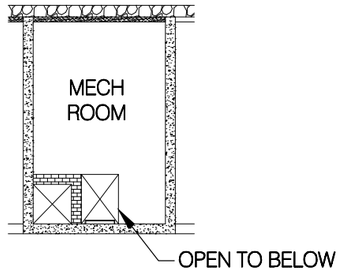
0 10' 20' 40'

SITE PLAN

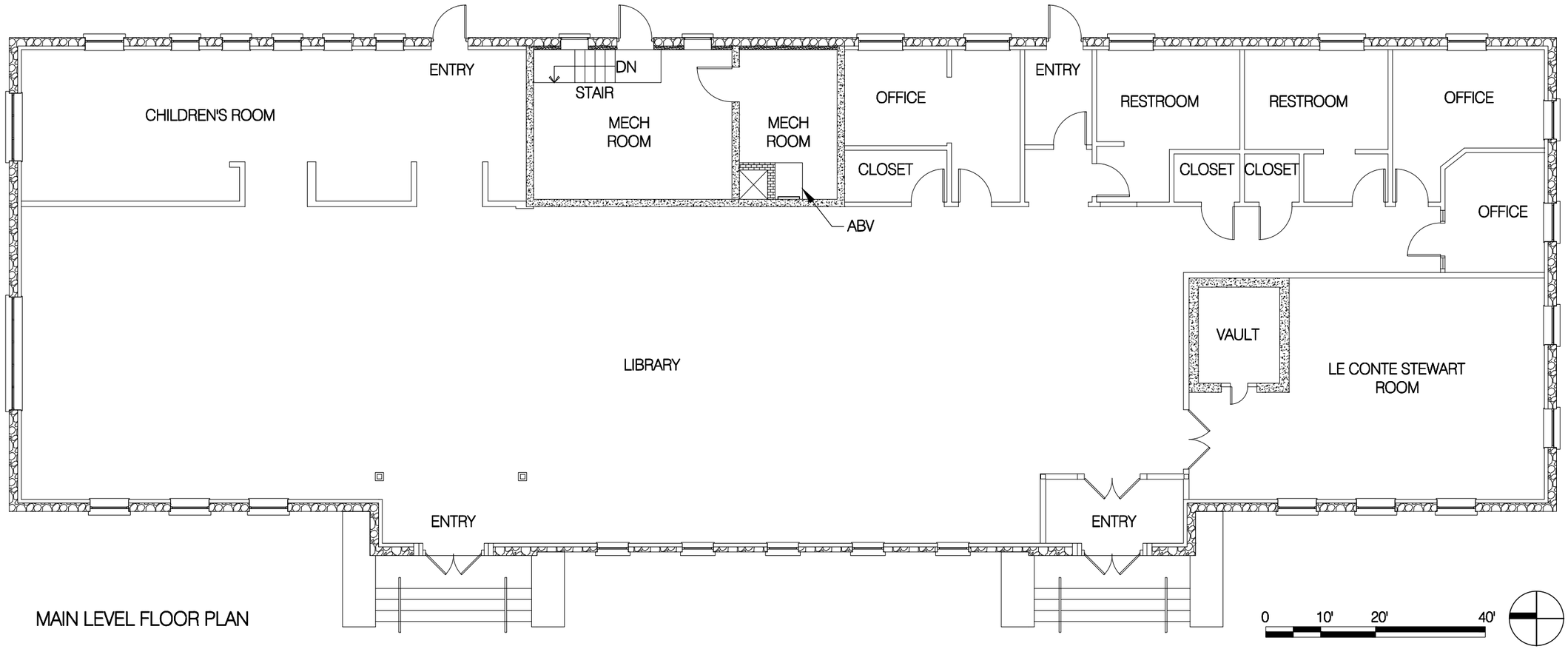
SCALE: 1" = 20'-0"
A0.1

MATERIAL LEGEND

- BRICK
- STONE
- CONCRETE
- FRAME WALL



UPPER LEVEL MECHANICAL ROOM



MAIN LEVEL FLOOR PLAN

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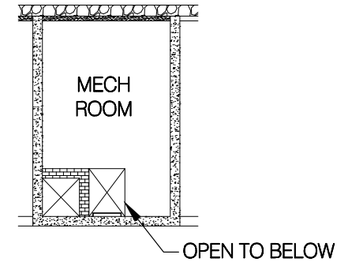
EXISTING FLOOR PLANS

SCALE: 1" = 10'-0"
A1.1

MATERIAL LEGEND

- BRICK
- STONE
- CONCRETE
- FRAME WALL
- DEMO WALL
- GENERAL DEMO, SEE NOTE.



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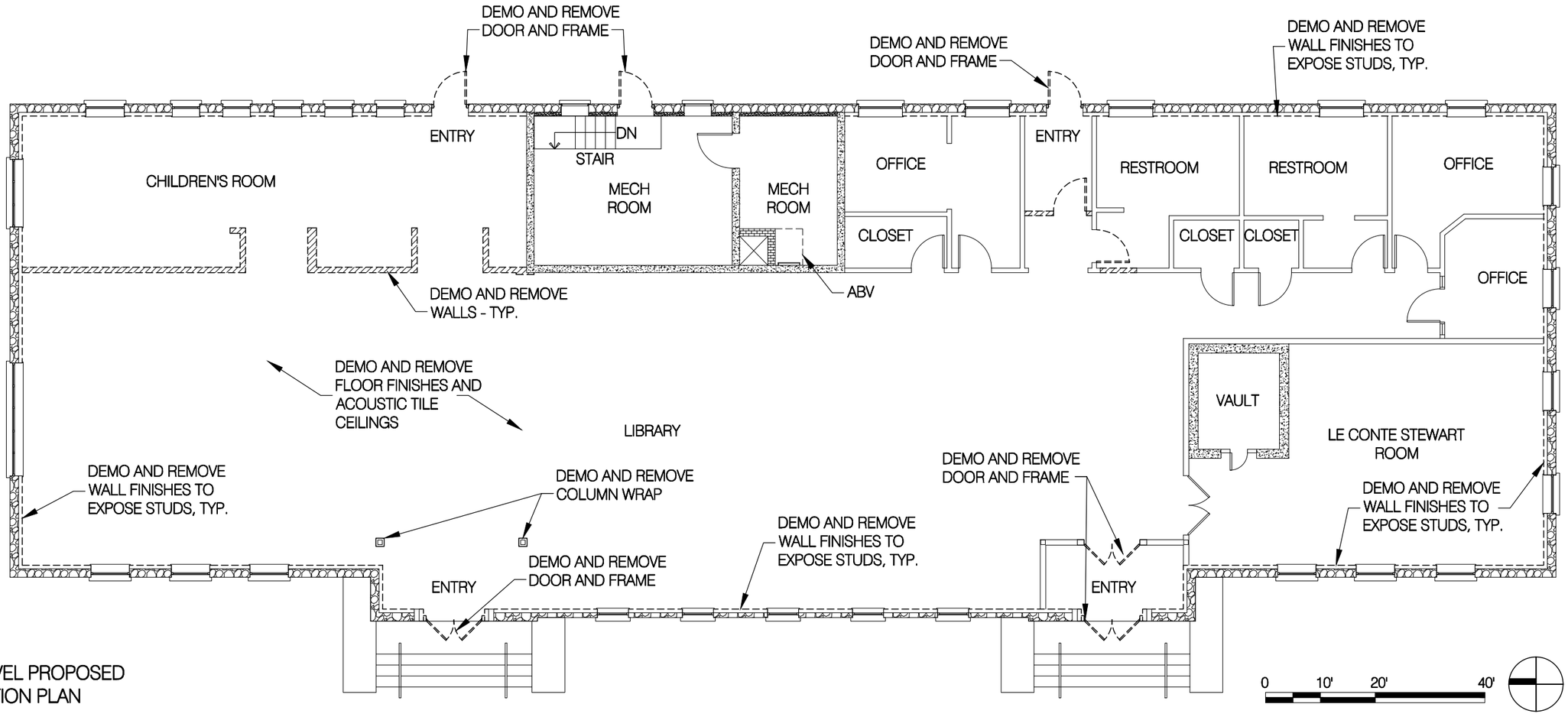

MAIN LEVEL PROPOSED
DEMOLITION PLAN

KAYSVILLE OLD ROCK MUNICIPAL BLDG
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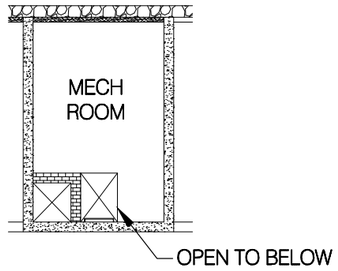
PROPOSED DEMOLITION FLOOR PLANS

SCALE: 1" = 10'-0"
A1.2

MATERIAL LEGEND

- BRICK
- STONE
- CONCRETE
- FRAME WALL
- NEW WALL



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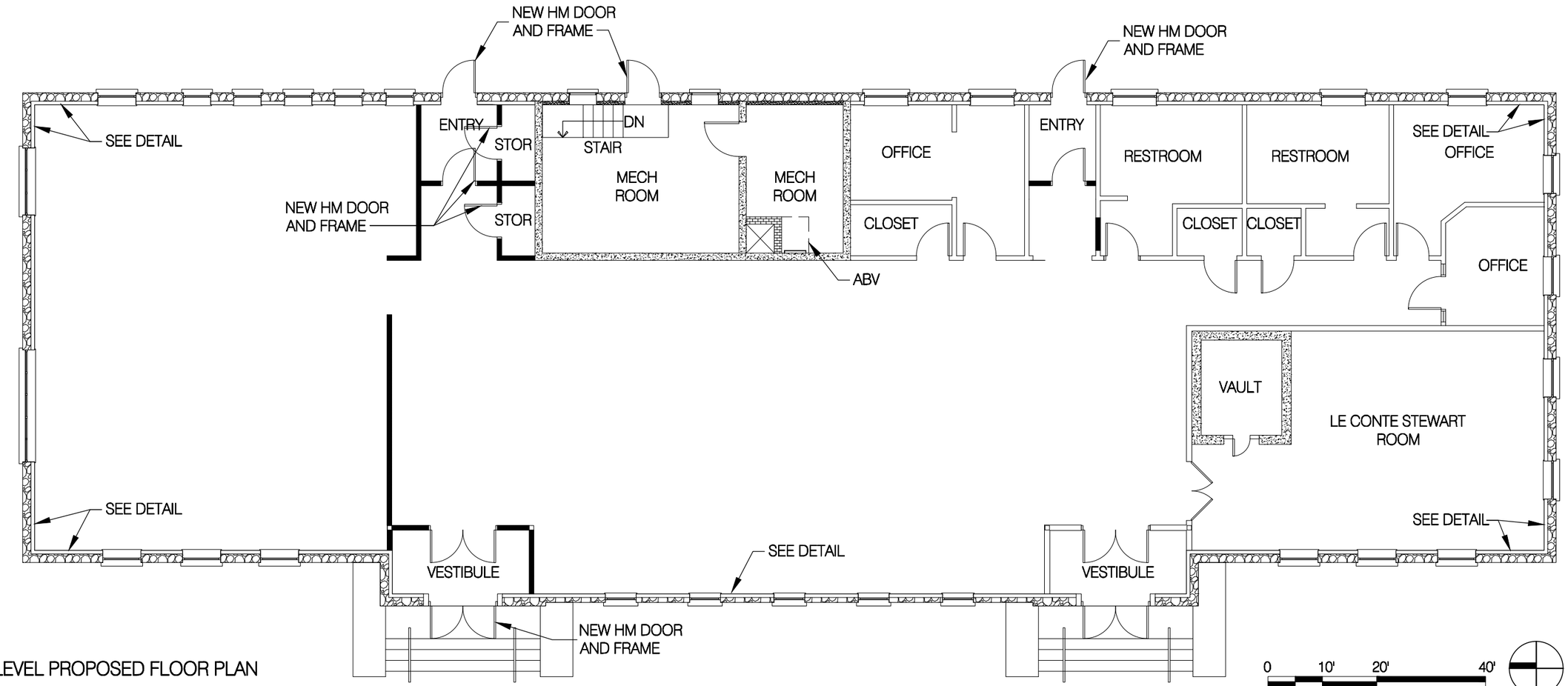

MAIN LEVEL PROPOSED FLOOR PLAN

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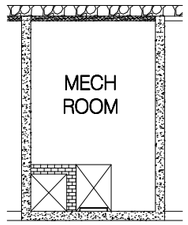
PROPOSED FLOOR PLANS

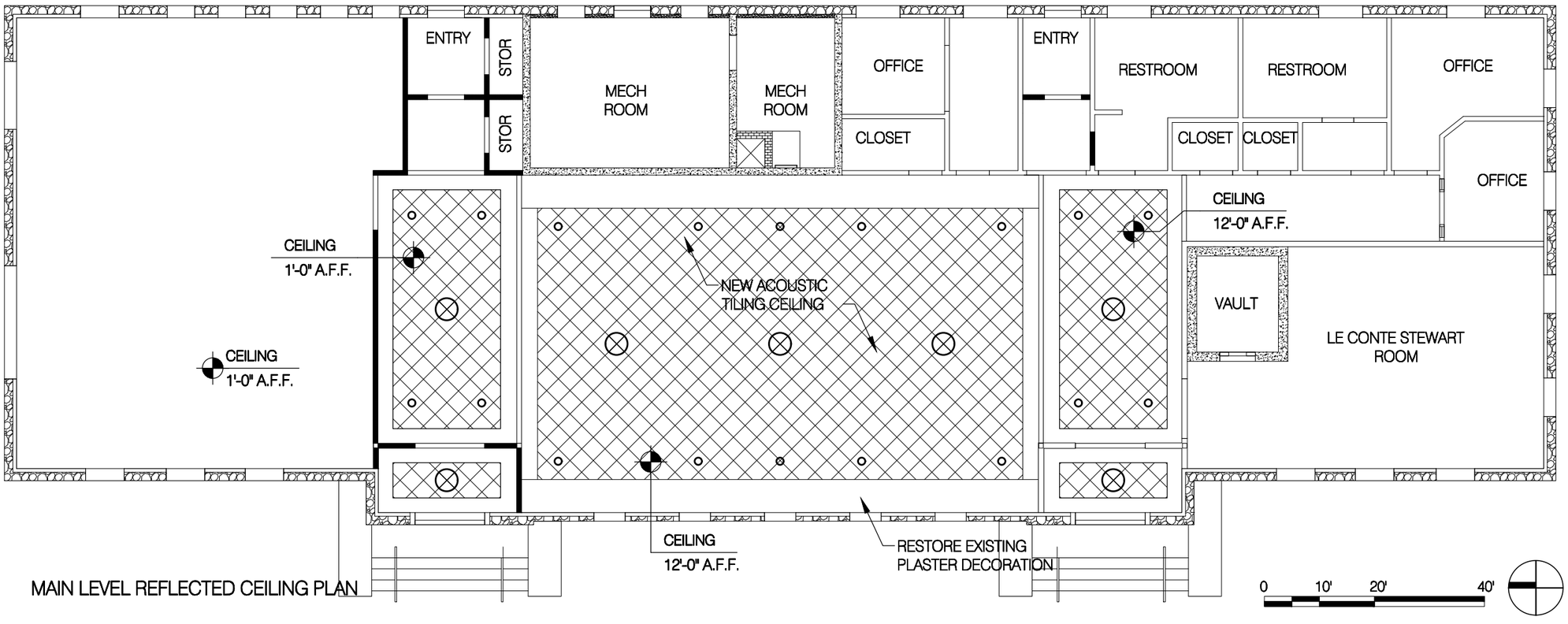
SCALE: 1" = 10'-0"
A1.3



UPPER LEVEL MECHANICAL ROOM

MATERIAL LEGEND

- BRICK
- STONE
- CONCRETE
- EXISTING WALL / HEADER
- NEW WALL
- SUSPENDED LIGHT
- RECESSED CAN LIGHT



MAIN LEVEL REFLECTED CEILING PLAN

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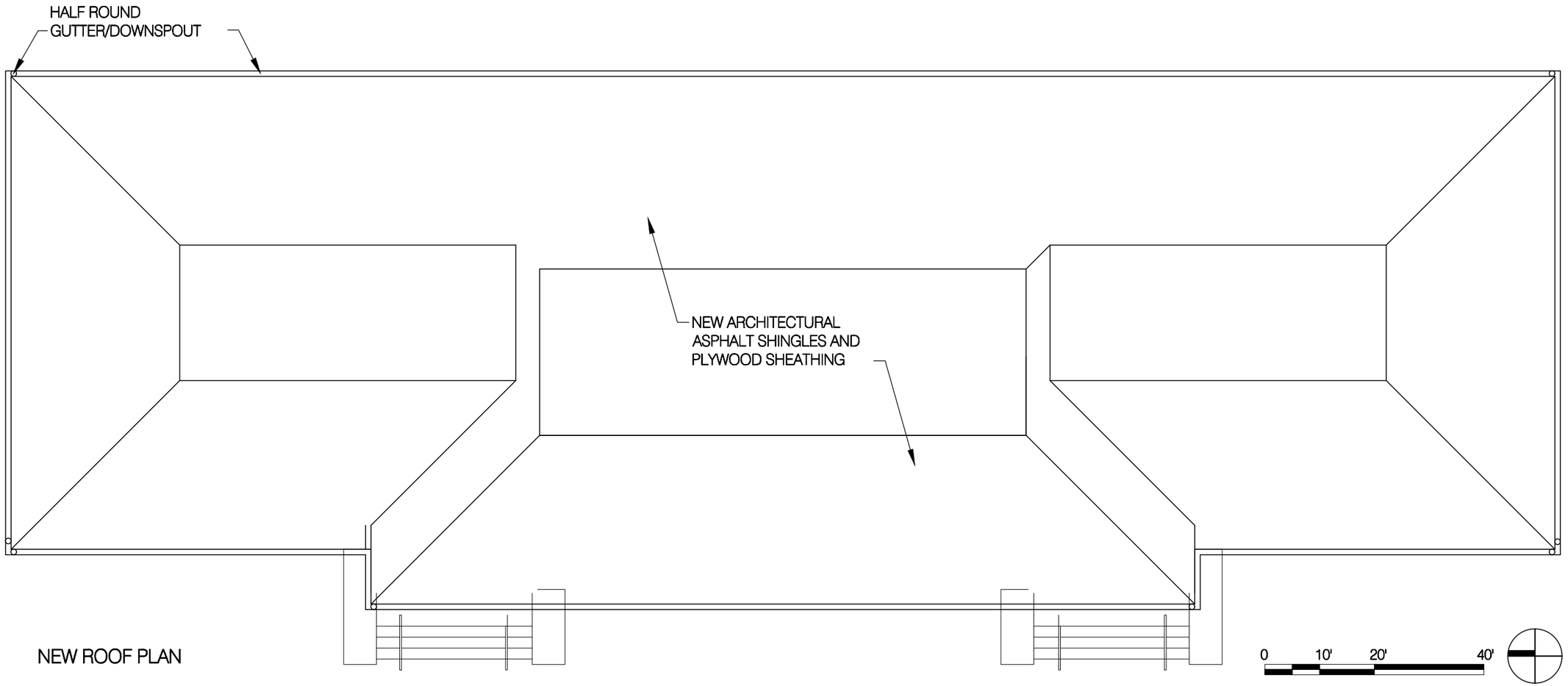
PROPOSED REFLECTED CEILING PLANS

SCALE: 1" = 10'-0"
A1.4



NEW ROOF PLAN

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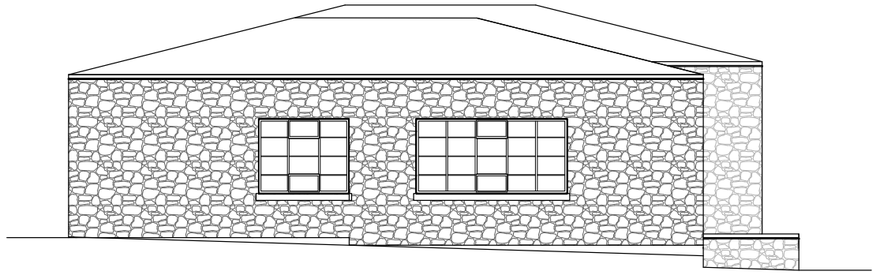
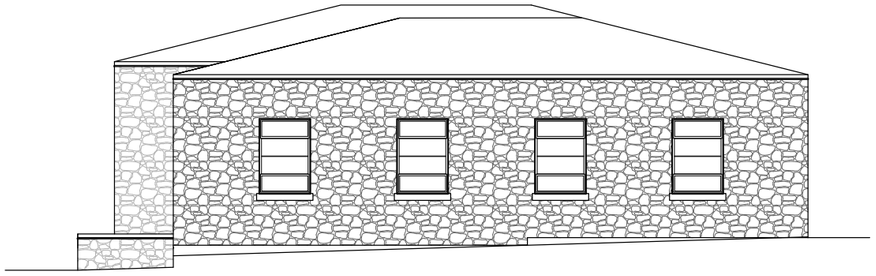
NEW ROOF PLAN

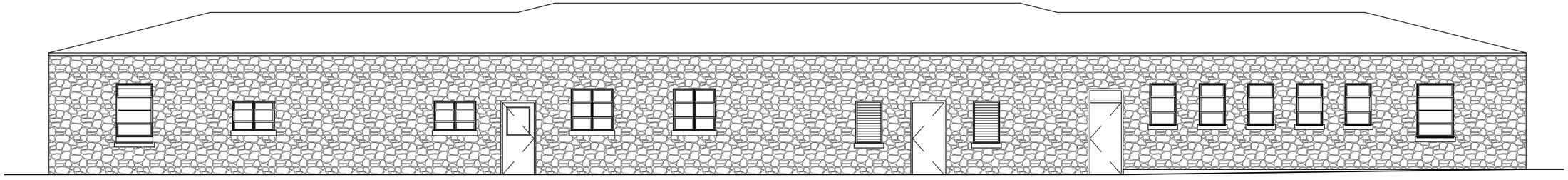
SCALE: 1" = 10'-0"
A1.5



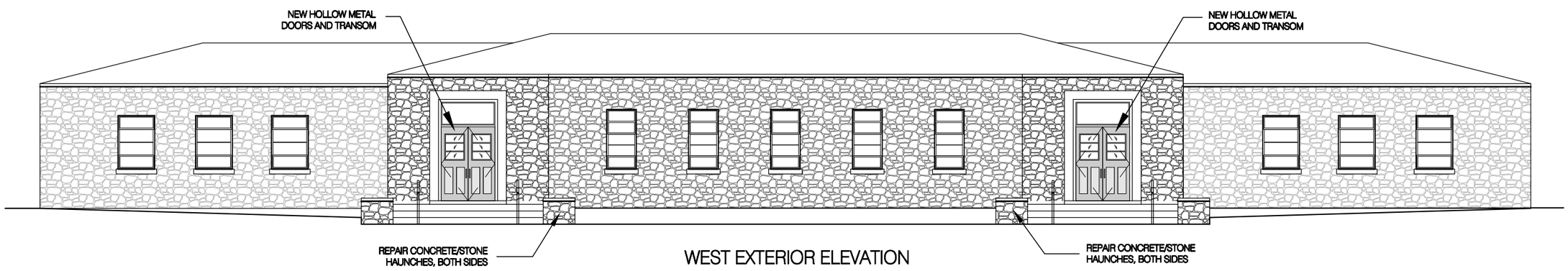
NORTH EXTERIOR ELEVATION



SOUTH EXTERIOR ELEVATION



EAST EXTERIOR ELEVATION



WEST EXTERIOR ELEVATION

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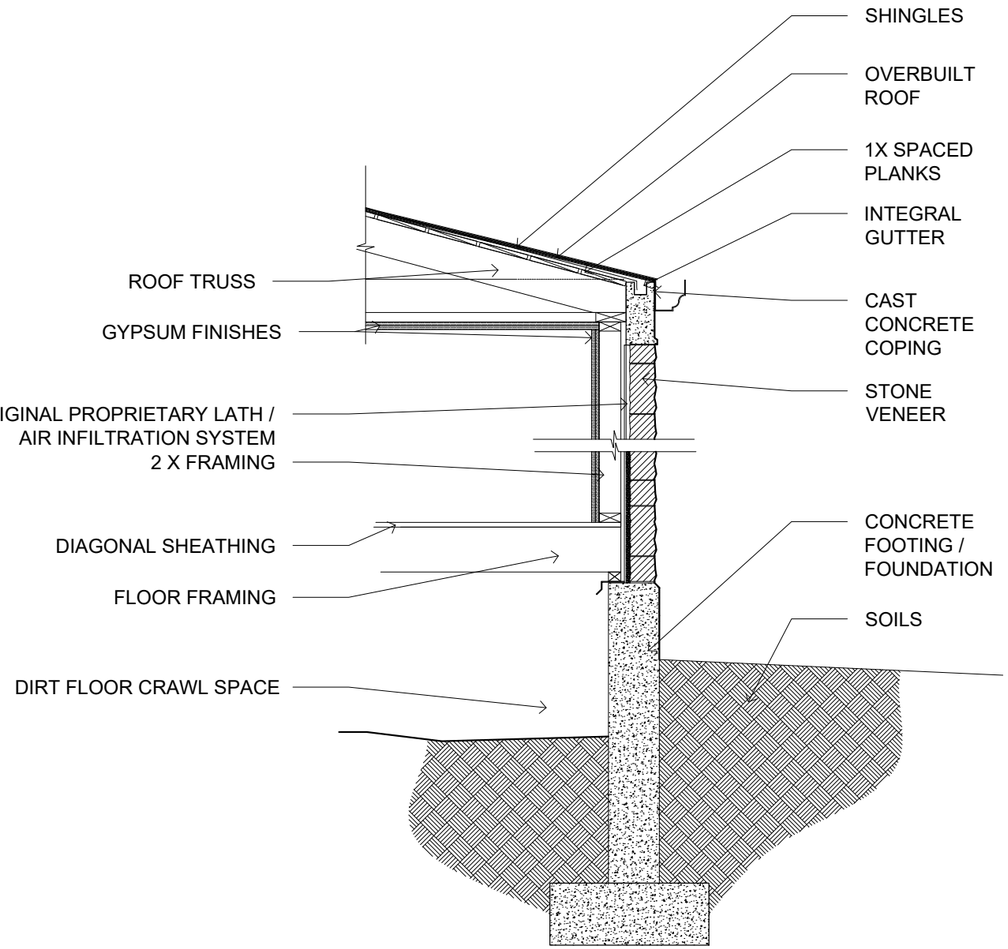
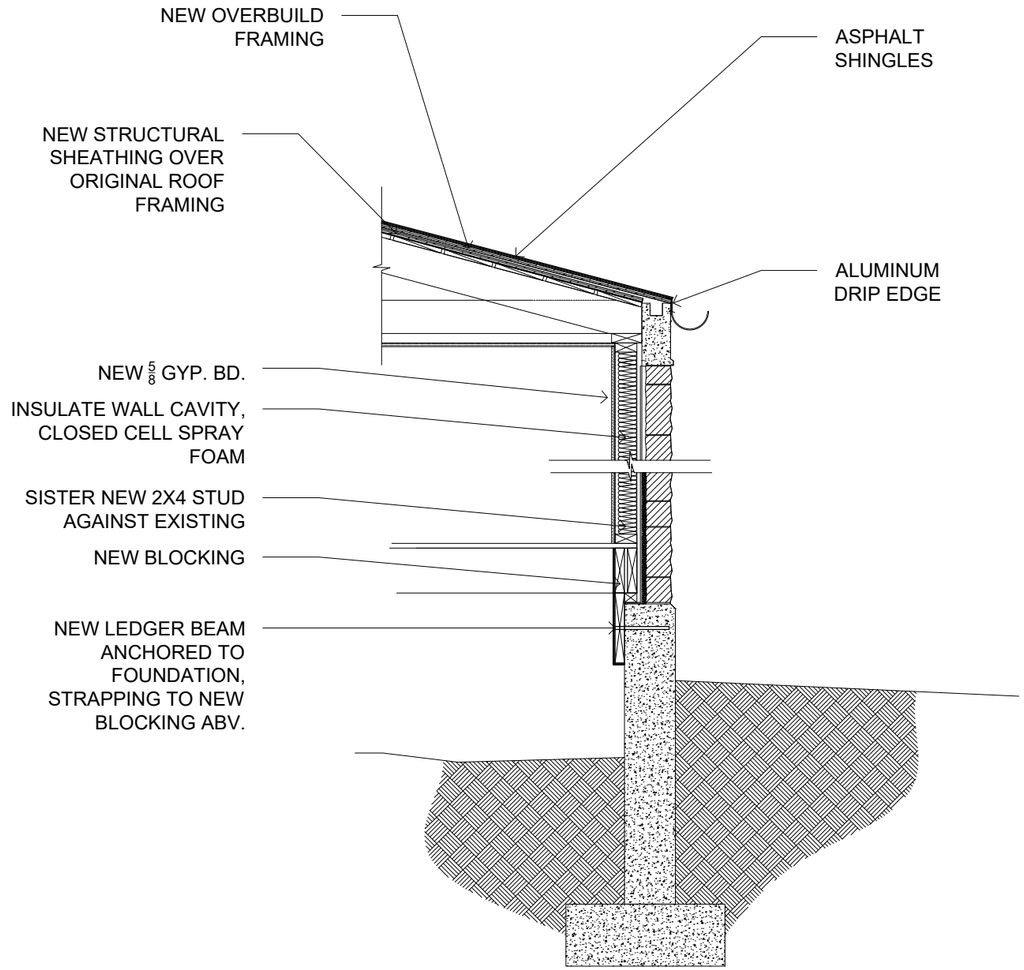
0 5' 10' 20'

EXTERIOR ELEVATIONS

SCALE: 1" = 10'-0"
A2.1



EXISTING WALL SECTION



PROPOSED WALL SECTION

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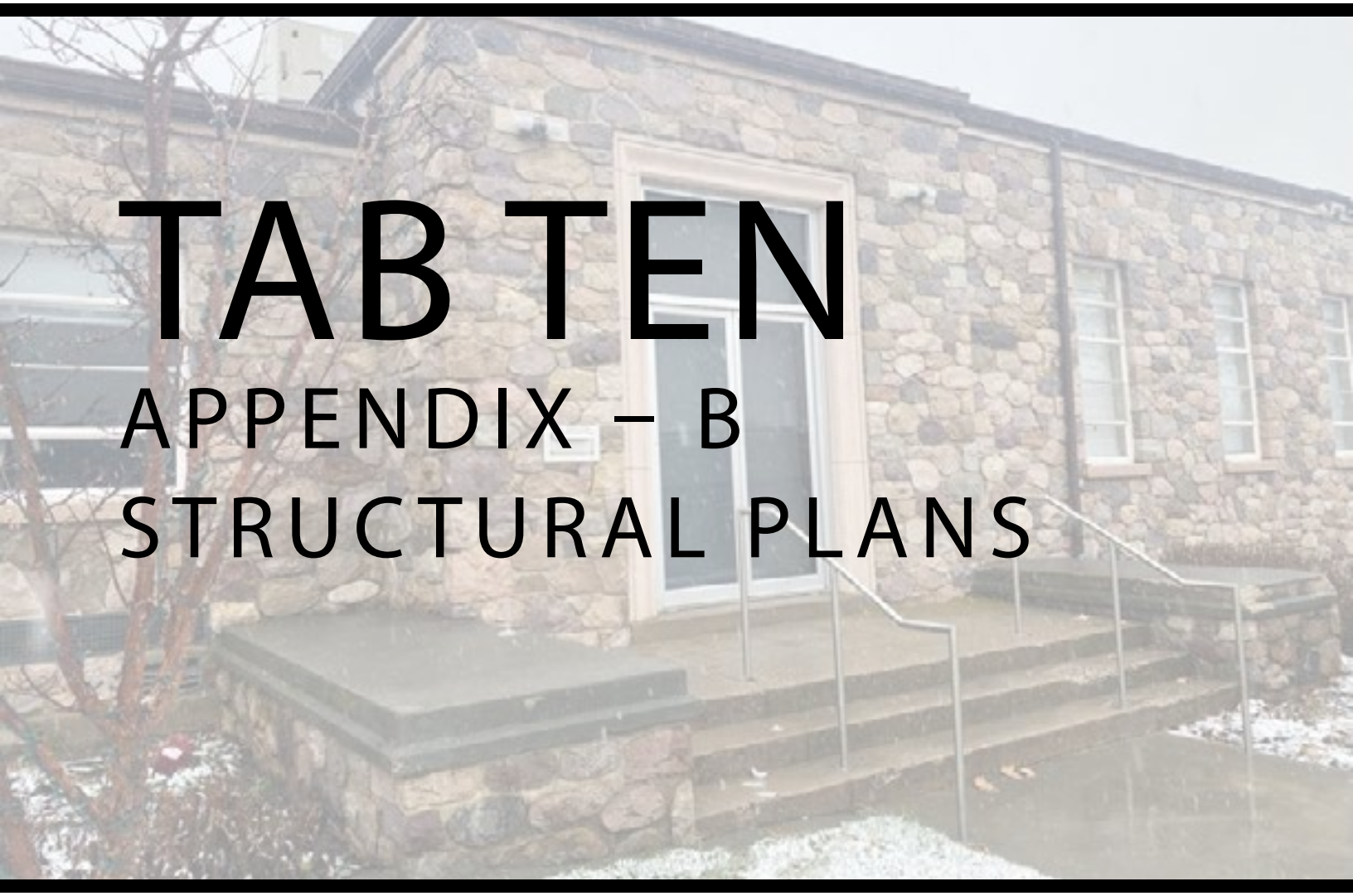
0 1' 2' 4'

BUILDING SECTIONS

SCALE: 1/2" = 1'-0"
A3.1



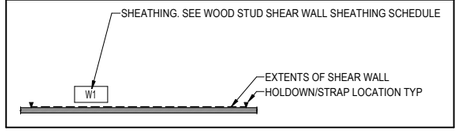
TAB TEN

APPENDIX – B
STRUCTURAL PLANS

PLAN LEGEND

- FOOTING STEP
- FOOTING - CONTINUOUS
- FOOTING - THICKENED SLAB
- FOOTING - SQUARE FOOTING - RECTANGULAR FOOTING - MAT FOOTING
- CHANGE IN ELEVATION
- SLAB BLOCK-OUT AT COLUMN
- SLAB CONTROL/CONSTRUCTION JOINT
- SPECIAL SLAB OR DECK AREA
- SPECIAL SLAB OR DECK AREA
- SPECIAL SLAB OR DECK AREA
- RECESSED/DEPRESSED SLAB
- OPENING
- CONCRETE HOUSEKEEPING PAD
- WOOD DIAPHRAGM SHEATHING
- CONCRETE WALL
- CONCRETE WALL - RECESSED (FDTN PLAN) CONCRETE LINTEL (FRAMING PLAN)
- CONCRETE WALL - RECESSED AT DOOR
- CONCRETE PIER IN CONCRETE WALL. TOP OF PIER RECESSED BELOW SLAB.
- CONCRETE COLUMN
- CONCRETE JAMB COLUMN POURED MONOLITHIC WITH CONCRETE WALL
- MASONRY WALL
- MASONRY WALL - RECESSED (FDTN PLAN) MASONRY LINTEL (FRAMING PLAN)
- MASONRY COLUMN IN MASONRY WALL
- STEEL STUD WALL - STRUCTURAL
- STEEL HEADER IN STEEL STUD WALL
- BRICK WALL
- BRICK WALL - RECESSED (FDTN PLAN) BRICK LINTEL (FRAMING PLAN)
- BRICK COLUMN IN BRICK WALL
- WOOD STUD WALL
- WOOD HEADER IN WOOD STUD WALL
- NON-BEARING WOOD WALL. SEE ARCH
- STEEL/WOOD BEAM OR GIRDER
- STEEL/WOOD JOIST OR PURLIN
- STEEL BRACED FRAME - ABOVE
- STEEL BRACED FRAME
- STEEL BEAM OR GIRDER
- STEEL JOIST OR PURLIN
- WOOD COLUMN
- EXISTING FOOTING - CONTINUOUS
- EXISTING FOOTING - THICKENED SLAB
- EXISTING FOOTING - SQUARE, RECTANGULAR, OR MAT
- EXISTING CONCRETE SHEAR WALL, FOUNDATION WALL OR RETAINING WALL
- EXISTING OPENING THROUGH CONCRETE WALL
- EXISTING CONCRETE PIER IN CONCRETE WALL. PIER RECESSED BELOW SLAB.
- EXISTING CONCRETE COLUMN
- NEW OPENING THROUGH EXISTING CONCRETE WALL
- EXISTING MASONRY WALL
- EXISTING OPENING THROUGH MASONRY WALL
- NEW OPENING THROUGH EXISTING MASONRY WALL
- EXISTING MASONRY COLUMN IN MASONRY WALL
- EXISTING STEEL COLUMN - TUBE
- EXISTING STEEL COLUMN - WIDE FLANGE
- EXISTING STEEL COLUMN - PIPE
- EXISTING STEEL BRACED FRAME
- EXISTING SLAB BLOCK-OUT AT COLUMN
- EXISTING SLAB CONTROL/CONSTRUCTION JOINT
- EXISTING STEEL BEAM OR GIRDER
- EXISTING STEEL JOIST OR PURLIN
- EXISTING CROSS BRIDGING
- EXISTING HORIZONTAL BRIDGING
- EXISTING TO BE REMOVED
- EXISTING OPENING

WOOD WALL LEGEND



ABBREVIATIONS

@	AT
AB	ANCHOR BOLT (S)
ABV	ABOVE
ALT	ALTERNATE
APPROX	APPROXIMATE
ARCH	ARCHITECT(URAL)
BLDG	BUILDING
BLW	BELOW
BM	BEAM
BOT	BOTTOM
BRG	BEARING
BTWN	BETWEEN
CJ	CONSTRUCTION JOINT OR CONTROL JOINT
CJP	COMPLETE JOINT PENETRATION
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CTR	CENTER
D.B.	DECK BEARING
db	DIAMETER OF REINFORCING BAR
DBA	DEFORMED BAR ANCHORS
DBL	DOUBLE
DET	DETAIL
DIA (OR Ø)	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DK	DECK
DN	DOWN
DWG	DRAWING
DWL	DOWEL
E.F.	EACH FACE
E.J.	EXPANSION JOINT (SEISMIC SEPARATION JOINT)
E.W.	EACH WAY
EA	EACH
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
ENG	ENGINEER
EQ	EQUAL
EQUIP	EQUIPMENT
EXIST (E)	EXISTING
EXP	EXPANSION / EXPOSED
EXT	EXTERIOR
F.D.	FLOOR DRAIN
F.F.	FINISH FLOOR
F.V.	FIELD VERIFY
FDTN	FOUNDATION
FIN	FINISH
FL	FLOOR
FT	FOOT
FTG	FOOTING
GA	GAUGE
GALV	GALVANIZED
GLB	GLU-LAMINATED BEAM
GR	GRADE
GSN	GENERAL STRUCTURAL NOTES
HB	HORIZONTAL BRIDGING
HORIZ	HORIZONTAL
HSA	HEADED STUD ANCHORS
HSS	HOLLOW STRUCTURAL STEEL
HT	HEIGHT
I.F.	INSIDE FACE
IBC	INTERNATIONAL BUILDING CODE
ICC	INTERNATIONAL CODE COUNCIL
IN	INCH
INSUL	INSULATION
INT	INTERIOR
JST	JOIST
JT	JOINT
K	KIPS - 1,000 POUNDS
KLF	KIPS PER LINEAL FOOT
KSF	KIPS PER SQUARE FOOT
KSI	KIPS PER SQUARE INCH
LBS	POUNDS
Ld, Lt, Lsb, Lsbt, Ldc, Lsc	SEE CONCRETE REINFORCING BAR DEVELOPMENT AND LAP LENGTH SCHEDULE
LF	LINEAL FOOT
LFRS	LATERAL FORCE RESISTING SYSTEM (SFRS & WFRS)

ABBREVIATIONS

LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LSH	LONG SIDE HORIZONTAL
LSV	LONG SIDE VERTICAL
MAS	MASONRY
MAX	MAXIMUM
MCJ	MASONRY CONTROL JOINT
MECH	MECHANICAL
MFGR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
NIC	NOT IN CONTRACT
NORM	NORMAL
NTS	NOT TO SCALE
O.C.	ON CENTER
O.F.	OUTSIDE FACE
OPNG	OPENING
OPP	OPPOSITE
OWSJ	OPEN WEB STEEL JOIST
P.T.	POST-TENSIONED
PAF	POWDER ACTUATED FASTENER
PCF	POUNDS/CUBIC FOOT
PJP	PARTIAL JOINT PENETRATION
PL	PLATE
PLF	POUNDS/LINEAL FOOT
PNL	PANEL
PSF	POUNDS/SQ FOOT
PSI	POUNDS/SQ INCH
R.D.	ROOF DRAIN
REINF	REINFORCING
REQD	REQUIRED
SDS	SELF-DRILLING SCREW
SFRS	SEISMIC FORCE RESISTING SYSTEM
SHT	SHEET
SI	SPECIAL INSPECTION (SP. INSP.)
SIM	SIMILAR
SOG	SLAB ON GRADE
SQ	SQUARE
STAG	STAGGERED
STD	STANDARD
STIFF	STIFFENER
STL	STEEL
STRUCT	STRUCTURAL
T & B	TOP AND BOTTOM
T.O.	TOP OF
TEMP	TEMPERATURE
THDS	THREADS
TOC	TOP OF CONCRETE
TOCP	TOP OF CONCRETE PIER
TOF	TOP OF FOOTING
TOS	TOP OF SLAB
TOST	TOP OF STEEL
TOW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
W.P.	WORK POINT
W/	WITH
WF	WIDE FLANGE
WFRS	WIND FORCE RESISTING SYSTEM
WT	WEIGHT
WWF	WELDED WIRE FABRIC
YD	YARD

STRUCTURAL DRAWING LIST

SHT NO.	SHT NAME
S001	LEGENDS AND ABREVIATIONS
S100	FOOTING AND FOUNDATION PLAN
S101	FIRST FLOOR FRAMING PLAN
S102	ROOF FRAMING PLAN
S201	DETAIL SHEET
S202	DETAILS

EXISTING BUILDING NOTES

1. CONCEPTUAL RETROFIT OPTION SKETCHES. NOT FOR CONSTRUCTION. ALL DIMENSIONS AND CONFIGURATION SHOWN FROM SITE OBSERVATION AND REQUIRE FIELD VERIFICATION.

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△ DATE REVISION

PROJECT NUMBER Project Number

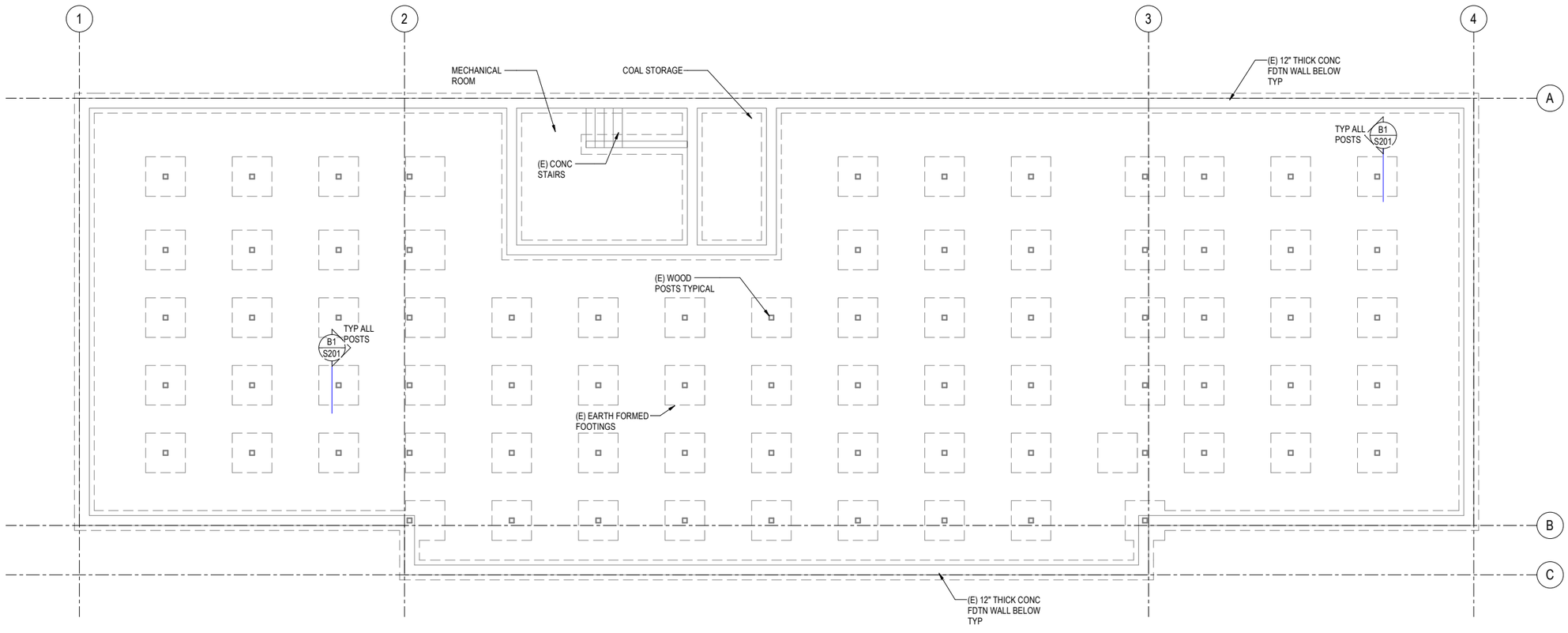
LEGENDS AND ABREVIATIONS

S001

4/15/2022 9:05:30 AM

REFERENCE NOTES

EXISTING BUILDING NOTES
1. CONCEPTUAL RETROFIT OPTION SKETCHES. NOT FOR CONSTRUCTION. ALL DIMENSIONS AND CONFIGURATION SHOWN FROM SITE OBSERVATION AND REQUIRE FIELD VERIFICATION.



A1 / S100 FOOTING AND FOUNDATION PLAN

SCALE: 3/16" = 1'-0"

N

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△ DATE REVISION

PROJECT NUMBER Project Number

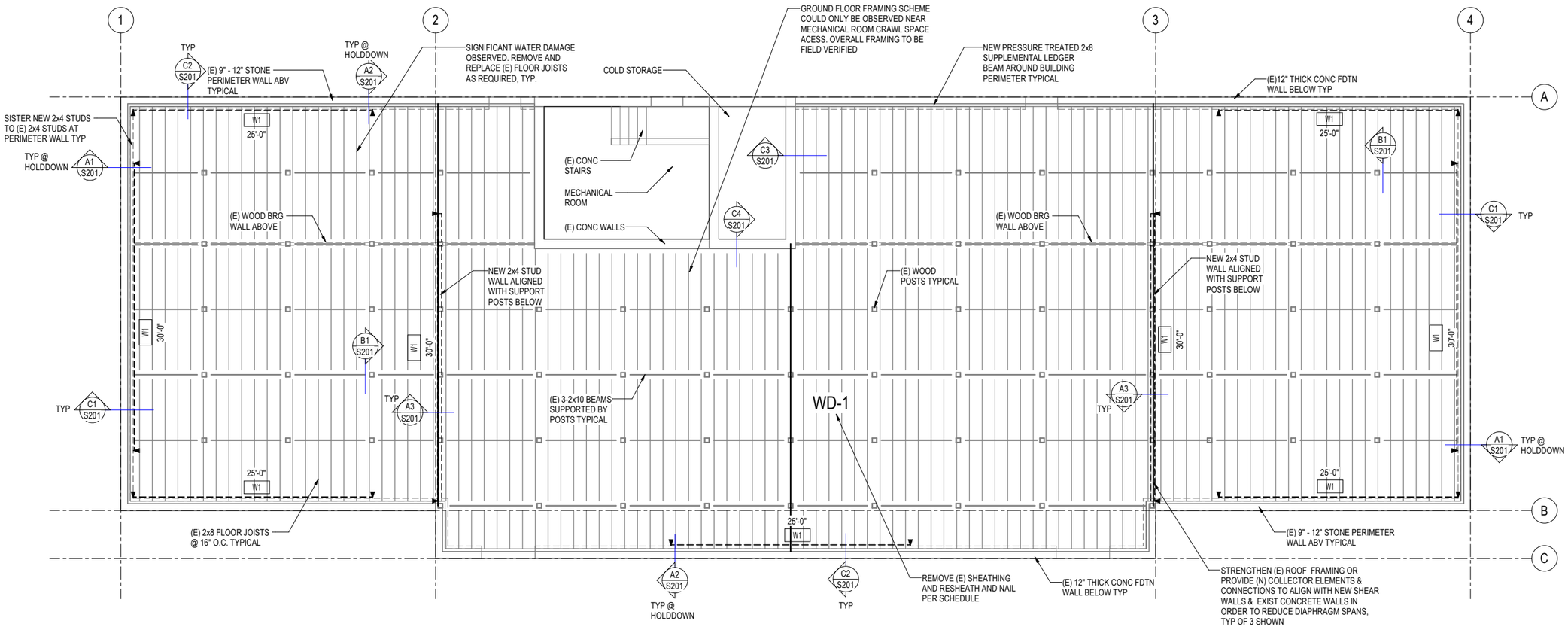
FOOTING AND FOUNDATION PLAN

S100

4/15/2022 9:05:30 AM

REFERENCE NOTES

EXISTING BUILDING NOTES
1. CONCEPTUAL RETROFIT OPTION SKETCHES. NOT FOR CONSTRUCTION. ALL DIMENSIONS AND CONFIGURATION SHOWN FROM SITE OBSERVATION AND REQUIRE FIELD VERIFICATION.



A1 S101 FIRST FLOOR FRAMING PLAN

SCALE: 3/16" = 1'-0"

N

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PROJECT NUMBER Project Number

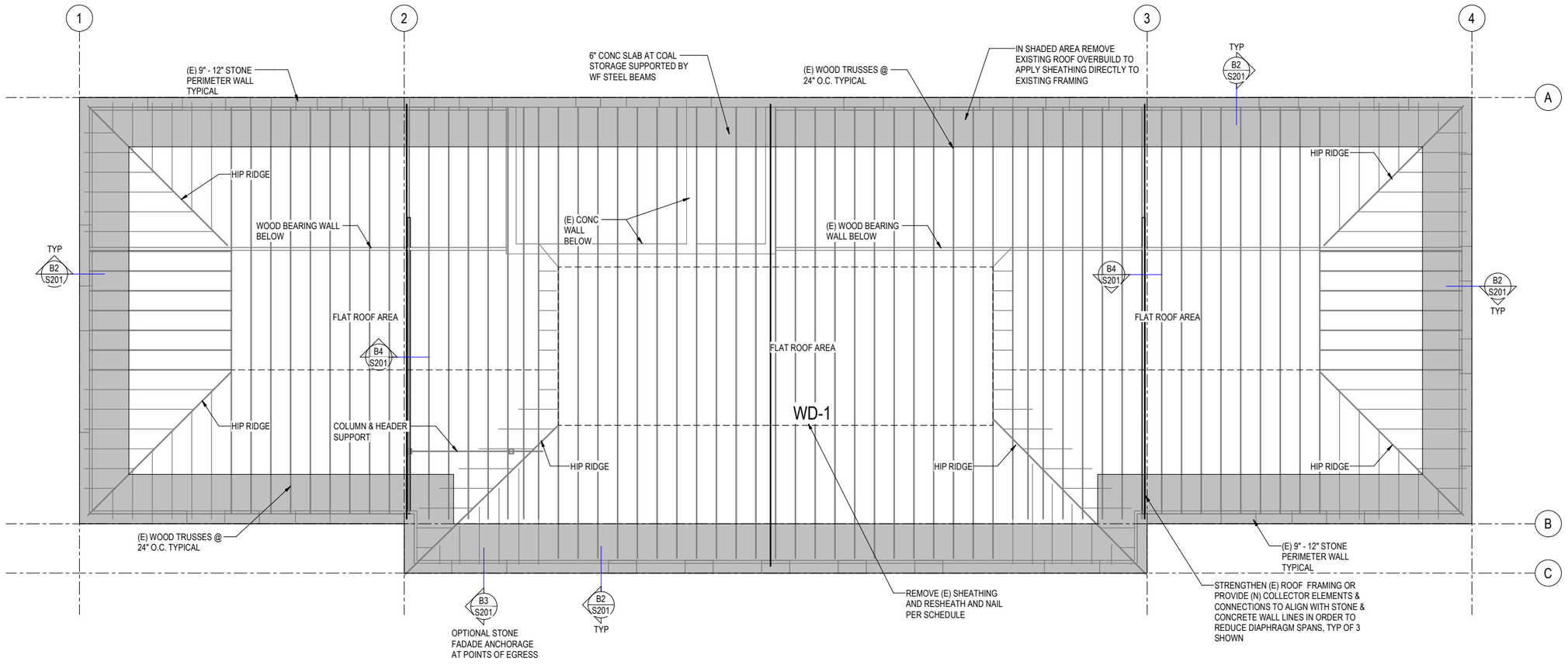
FIRST FLOOR FRAMING PLAN

S101

4/15/2022 9:05:31 AM

REFERENCE NOTES

EXISTING BUILDING NOTES
1. CONCEPTUAL RETROFIT OPTION SKETCHES. NOT FOR CONSTRUCTION. ALL DIMENSIONS AND CONFIGURATION SHOWN FROM SITE OBSERVATION AND REQUIRE FIELD VERIFICATION.



A1 / S102 ROOF FRAMING PLAN

SCALE: 3/16" = 1'-0"

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△ DATE REVISION

PROJECT NUMBER Project Number

ROOF FRAMING PLAN

S102

4/15/2022 9:05:31 AM

EXISTING BUILDING NOTES
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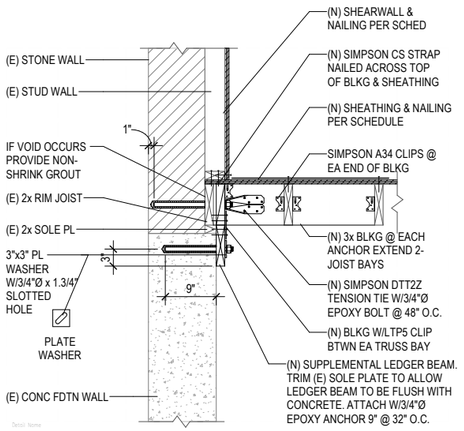
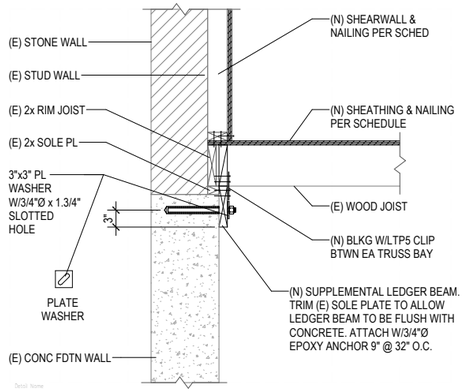


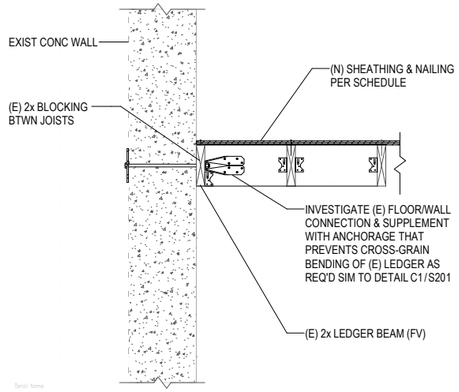
C1 / S201 — TYPICAL NEW SHEARWALL TO EXISTING FOUNDATION (JOISTS RUNNING PARALLEL TO WALL)

NO SCALE



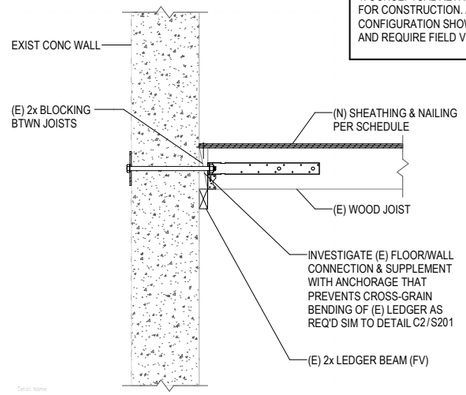
C2 / S201 — TYPICAL NEW SHEARWALL TO EXISTING FOUNDATION (JOISTS RUNNING PERPENDICULAR TO WALL)

NO SCALE



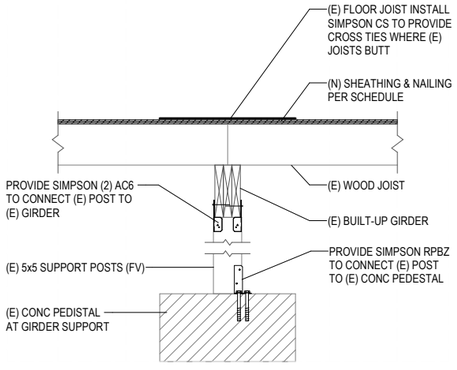
C3 / S201 — FLOOR ANCHORAGE TO CONCRETE WALL (JOISTS RUNNING PARALLEL TO WALL)

NO SCALE



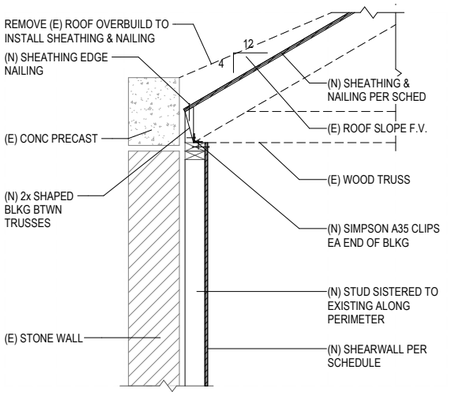
C4 / S201 — FLOOR ANCHORAGE TO CONCRETE WALL (JOISTS RUNNING PERPENDICULAR TO WALL)

NO SCALE



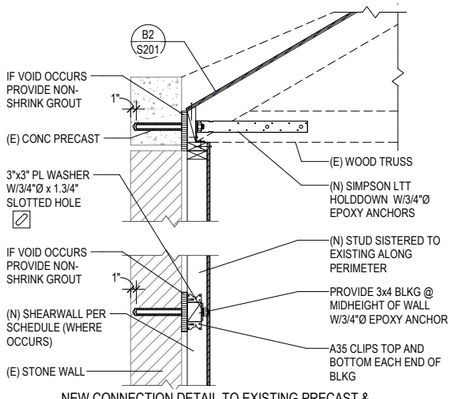
B1 / S201 — FLOOR ANCHORAGE TO EXISTING WOOD POSTS

NO SCALE



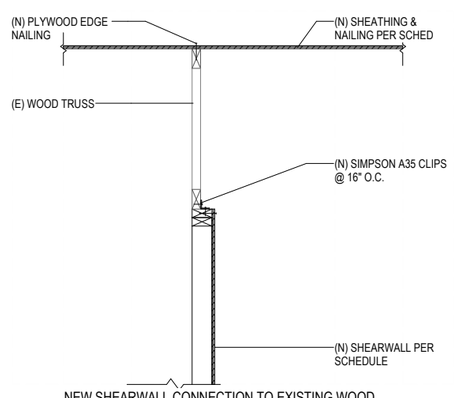
B2 / S201 — ROOF TRUSS/DECK CONNECTION TO STONE WALL

NO SCALE



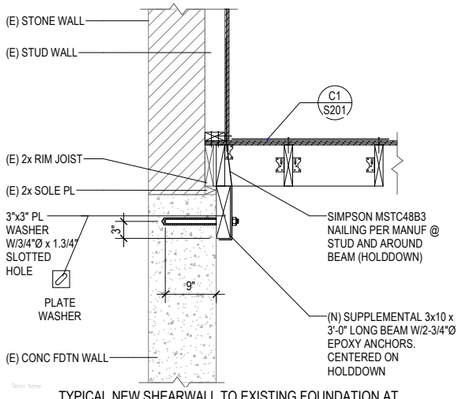
B3 / S201 — NEW CONNECTION DETAIL TO EXISTING PRECAST & STONE WALL AT POINTS OF EGRESS

NO SCALE



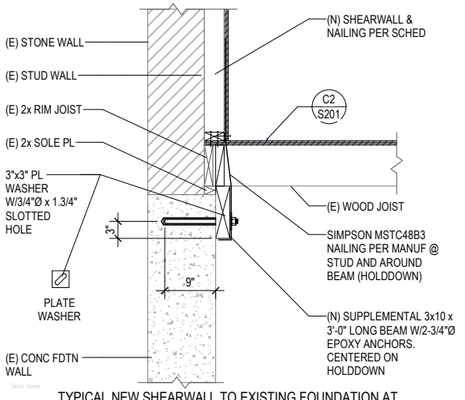
B4 / S201 — NEW SHEARWALL CONNECTION TO EXISTING WOOD TRUSS

NO SCALE



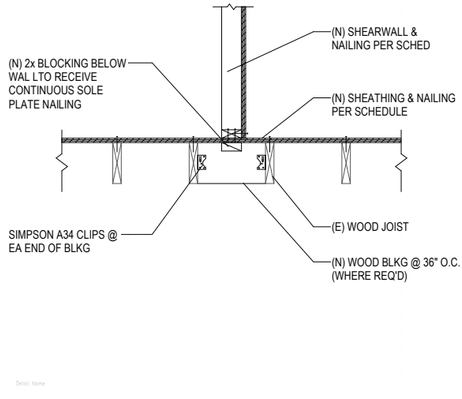
A1 / S201 — TYPICAL NEW SHEARWALL TO EXISTING FOUNDATION AT HOLDDOWN

NO SCALE



A2 / S201 — TYPICAL NEW SHEARWALL TO EXISTING FOUNDATION AT HOLDDOWN

NO SCALE



A3 / S201 — NEW SHEARWALL CONNECTION TO EXISTING FLOOR

NO SCALE

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44 North Main Street
Kaysville, Utah
Conseptual Retrofit - 04/15/2022

△ DATE REVISION

PROJECT NUMBER Project Number

DETAIL SHEET

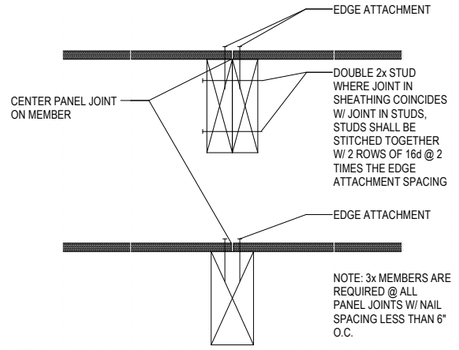
S201

4/15/2022 9:05:31 AM

WOOD SHEAR WALL SHEATHING SCHEDULE

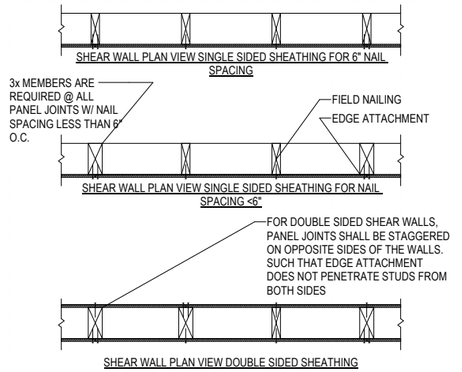
MARK	WALL SHEATHING THICKNESS	SIDES	PANEL EDGE NAILING SIZE	PANEL EDGE NAILING SPACING	BOTTOM PLATE ANCHORAGE: ANCHOR BOLTS IN CONCRETE	BOTTOM PLATE ANCHORAGE: FASTENING TO WOOD	HOLD DOWN	REMARKS	ALLOWABLE SHEAR CAPACITY (plf)
W1	9/16"	ONE SIDE	10d	4"	SEE DETAIL	2-ROWS OF 16d @ 6" O.C. STAGGERED	SEE DETAIL		510

NOTES:
1. WHERE STUDS MUST BE CUT DUE TO THE PLACEMENT OF ANCHOR BOLTS OR OTHER PRODUCTS, AN ADDITIONAL STUD SHALL BE INSERTED ALONG SIDE.
2. THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS AND BLOCKING SHALL BE 3" NOMINAL FOR ALL PANEL EDGE NAIL SPACING LESS THAN 6" O.C. SEE DETAIL C3/S202 FOR ADDITIONAL INFORMATION.
3. NAILS SHALL BE LOCATED AT LEAST 3/8" FROM PANEL EDGES
4. SHEATHING SHALL BE INSTALLED WITH 1/8" GAP BETWEEN SIDE JOINTS AND 1/16" GAP AT END JOINTS.
5. ALL NAILS SHALL MEET THE REQUIREMENTS FOUND IN THE GSN. IF USED, BOX NAILS SHALL BE GALVANIZED.
6. STUDS IN SHEAR WALL SHALL BE SPACED AT A MAXIMUM OF 16" O.C.
7. ALL PANEL NAILING AT INTERMEDIATE FRAMING MEMBERS SHALL BE 12" O.C. MAXIMUM.



C3 / S202 TYPICAL WOOD SHEAR WALL PANEL JOINT DETAIL

NO SCALE



C4 / S202 SHEARWALL NAILED FACE OF FRAMING MEMBERS - PLAN VIEW

NO SCALE

WOOD DIAPHRAGM SCHEDULE

LEVEL	WOOD SHEATHING THICKNESS	WOOD SHEATHING EDGES	COMMON NAIL SPACING A	COMMON NAIL SPACING B	COMMON NAIL SPACING C	NAIL SIZE
WD-1	5/8" OR 19/32"	NO BLKG REQ'D	6"	6"	12"	8d

NOTES:
1. SEE DETAIL A3/S202 FOR TYPICAL WOOD DIAPHRAGM SHEATHING PANEL LAYOUT.
2. SEE DETAIL A3/S202 FOR TYPICAL WOOD DIAPHRAGM SHEATHING PANEL EDGE BLOCKING.
3. COMMON NAIL SPACING CRITERIA:

A. CONTINUOUS WOOD SHEATHING PANEL EDGES AND DIAPHRAGM BOUNDRY EDGES.
B. ALL OTHER WOOD SHEATHING PANEL EDGES.
C. INTERMEDIATE WOOD SHEATHING PANEL SUPPORTS (IN FIELD NAILING).
D. ALL SHEATHING SHALL BE A.P.A. RATED EXPOSURE 1.

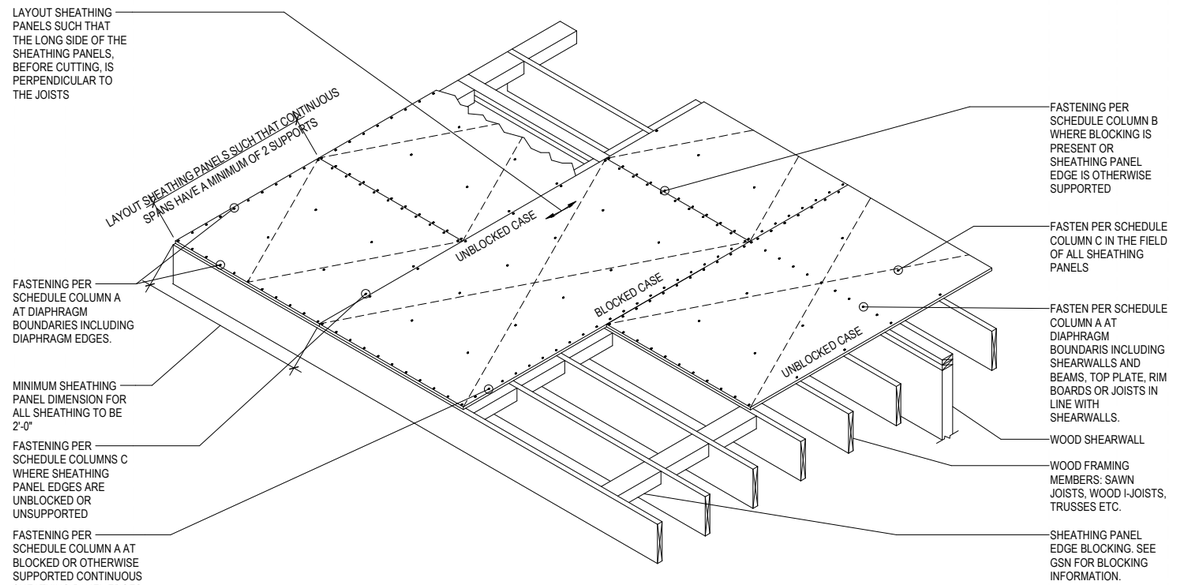
EXISTING BUILDING NOTES

1. CONCEPTUAL RETROFIT OPTION SKETCHES. NOT FOR CONSTRUCTION. ALL DIMENSIONS AND CONFIGURATION SHOWN FROM SITE OBSERVATION AND REQUIRE FIELD VERIFICATION.

MINIMUM NAILING SCHEDULE

	CONNECTION	NAILING
1.	JOIST TO SILL OR GIRDER, TOENAIL	3- 8d
2.	BRIDGING TO JOIST, TOENAIL EACH END	2- 8d
3.	1" x 6" SUBFLOOR TO EACH JOIST, FACE NAIL	2- 8d
4.	WIDER THAN 1" x 6" SUBFLOOR TO EACH JOIST, FACE NAIL	3- 8d
5.	2" SUBFLOOR TO JOIST OR GIRDER, BLIND AND FACE NAIL	2- 16d
6.	SOLE PLATE TO JOIST OR BLOCKING	16d @ 16" O.C.
7.	TOP PLATE TO STUD, END NAIL	2- 16d
8.	STUD TO SOLE PLATE	4-8d, TOENAIL OR 2-16d, END NAIL
9.	DOUBLE STUDS, FACE NAIL	16d @ 24" O.C.
10.	DOUBLED TOP PLATES, FACE NAIL	16d @ 16" O.C.
11.	TOP PLATES, LAPS AND INTERSECTIONS, FACE NAIL	2- 16d
12.	CONTINUOUS HEADER, TWO PIECES	16d @ 16" O.C. ALONG EACH END
13.	CEILING JOISTS TO PLATE, TOENAIL	3- 8d
14.	CONTINUOUS HEADER TO STUD, TOENAIL	4- 8d
15.	CEILING JOISTS, LAPS OVER PARTITIONS, FACE NAIL	3- 16d
16.	CEILING JOISTS TO PARALLEL RAFTERS, FACE NAIL	3- 16d
17.	RAFTER TO PLATE, TOENAIL	3- 8d
18.	1" BRACE TO EACH STUD AND PLATE, FACE NAIL	2- 8d
19.	1" x 8" SHEATHING OR LESS TO EACH BEARING, FACE NAIL	2- 8d
20.	WIDER THAN 1" x 8" SHEATHING TO EACH BEARING, FACE NAIL	3- 8d
21.	BUILT-UP CORNER STUDS	16d @ 24" O.C.
22.	BUILT-UP GIRDER AND BEAMS:	20d @ 32" O.C. AT TOP AND BOTTOM AND STAGGERED 2- 20d AT ENDS AND AT EACH SPLICE
23.	2" PLANKS	2- 16d AT EACH BEARING

NOTES:
1. COMMOM OR BOX NAILS SHALL BE USED EXCEPT WHERE OTHERWISE STATED. SEE GENERAL STRUCTURAL NOTES.



A3 / S202 WOOD DIAPHRAGM ISOMETRIC DETAIL

NO SCALE

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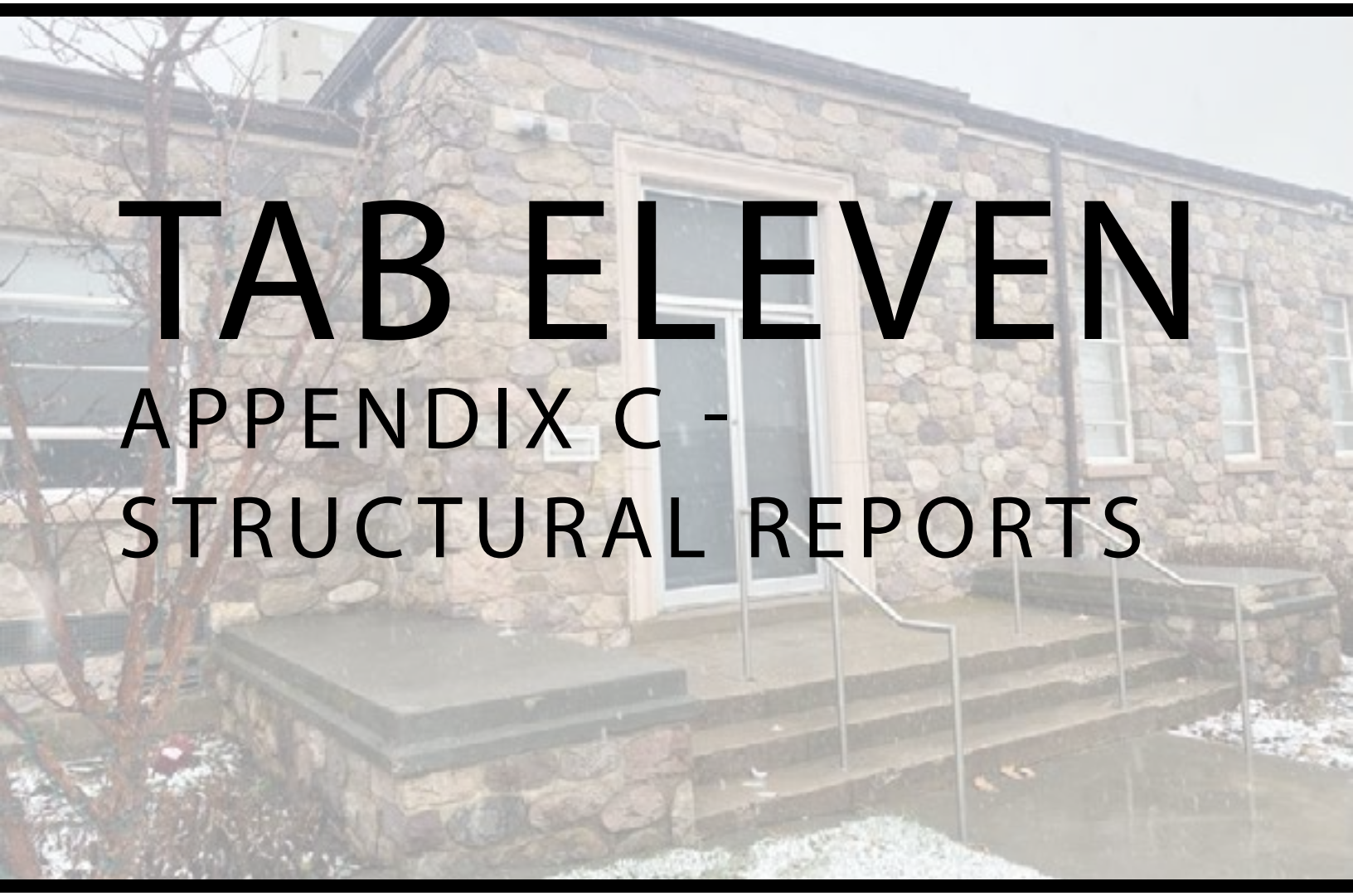
DETAILS

S202

4/15/2022 9:05:32 AM



TAB ELEVEN

APPENDIX C - STRUCTURAL REPORTS

APPENDIX C
SUMMARY DATA SHEET

BUILDING DATA

Building Name: Kaysville Historic Library Date: 12/9/2021
Building Address: 44 North Main Street, Kaysville, UT
Latitude: 41.035672 Longitude: -111.938162 By: JEM

Year Built: 1944 Year(s) Remodeled: Original Design Code: unknown
Area [ft² (m²)]: 6100 sq. ft. Length [ft (m)]: 215 ft Width [ft (m)]: 160 ft
No. of Stories: 1 Story Height: 11 ft Total Height: 24 ft

USE ☐ Industrial ☒ Office ☐ Warehouse ☐ Hospital ☐ Residential ☐ Educational ☒ Other: civic

CONSTRUCTION DATA

Gravity Load Structural System: Wood roof trusses bearing on wood stud walls and interior wood walls. Main floor 2x joists supported by perimeter footings and pier footings
Exterior Transverse Walls: wood stud walls Openings? Yes
Exterior Longitudinal Walls: wood sud walls Openings? Yes
Roof Materials/Framing: 1x sheathing supported by 24" o.c. wood roof trusses
Intermediate Floors/Framing:
Ground Floor: 2x8 @ 16" o.c. joists supported by (3) 2x10 girders supported by crawl space posts
Columns: Wood columns addition in North-West Region Foundation: Continuous perimeter w/ interior pier footings
General Condition of Structure: Extensive Water Damage Observed
Levels Below Grade? None (Crawl Space below elevated main floor)
Special Features and Comments:

LATERAL-FORCE-RESISTING SYSTEM

	Longitudinal	Transverse
System:	De facto URM Stone Walls	De facto URM Stone Walls
Vertical Elements:	Unreinforced Stone Walls w/ 2X4 stud to the interior	Unreinforced Stone Walls w/ 2X4 stud to the interior
Diaphragms:	Diagonal 1x sheathing supported by wood joists / trusses	Diagonal 1x sheathing supported by wood joists / trusses
Connections:	No positive connections observed	No positive connections observed

EVALUATION DATA

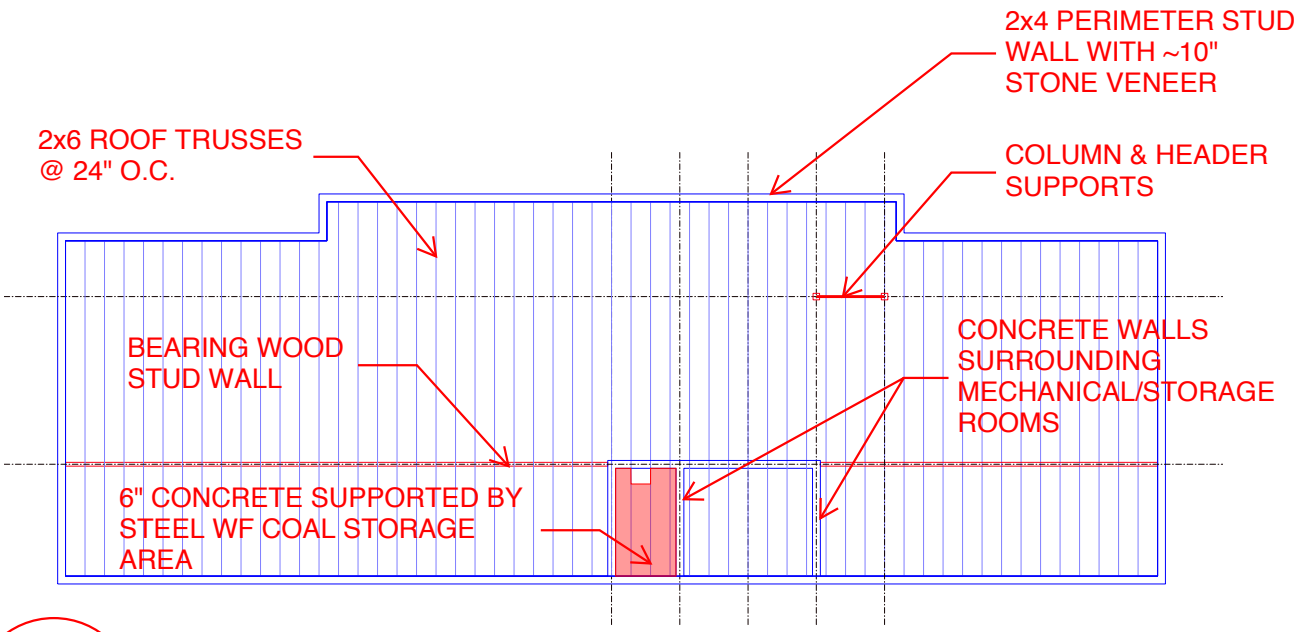
BSE-1N Spectral Response Accelerations: S_{DS} = 1.068 S_{D1} = 0.588
Soil Factors: Class = assumed D- Default F_a = 1.2 F_v = 1.813
BSE-2E Spectral Response Accelerations: S_{XS} = 0.967 S_{X1} = 0.573
Level of Seismicity: High Performance Level: Collapse Prevention
Building Period: T = 0.12 sec
Spectral Acceleration: S_a = 0.96 g
Modification Factor: $C_m C_1 C_2$ = 1.0 Building Weight: W = 917 kips
Pseudolateral Force: $V = C_m C_1 C_2 S_a W$ = 884 kips (Elastic Response)

BUILDING CLASSIFICATION: URM

REQUIRED TIER 1 CHECKLISTS

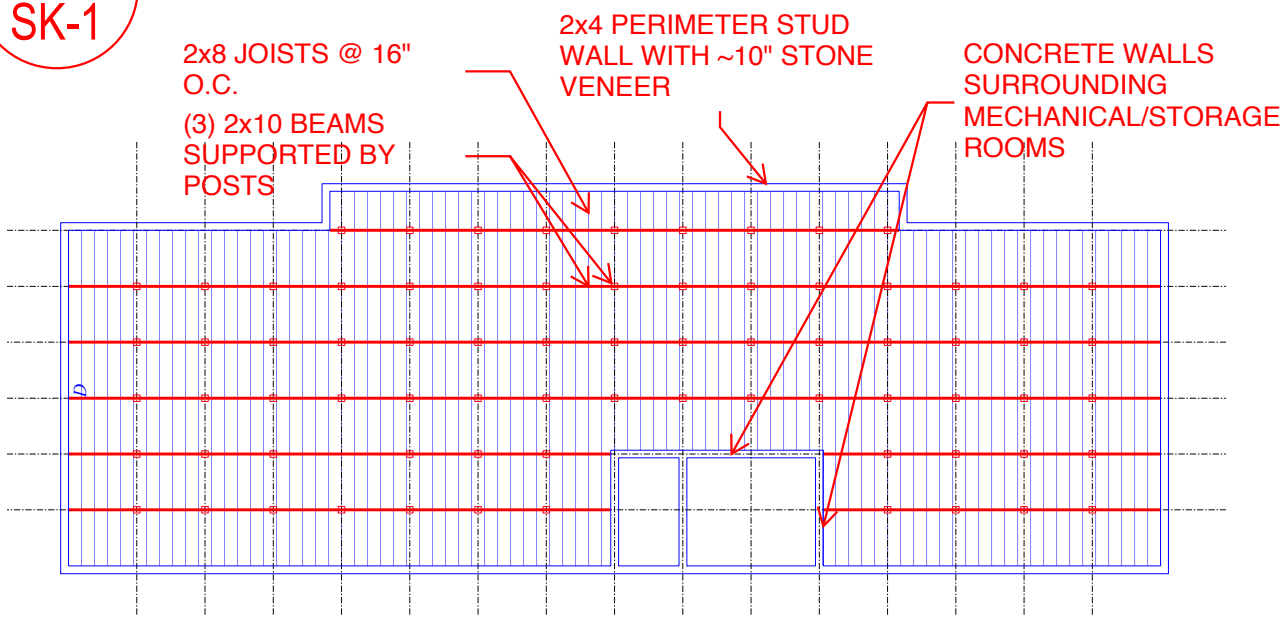
	Yes	No
Basic Configuration Checklist	☒	☐
Building Type URM Structural Checklist	☒	☐
Nonstructural Component Checklist	☐	☒

FURTHER EVALUATION REQUIREMENT:



2
SK-1

ROOF LEVEL SCHEMATIC FRAMING PLAN



1
SK-1

MAIN LEVEL SCHEMATIC FRAMING PLAN

INFORMATION FROM STRUCTURAL OBSERVATIONS. EXISTING FRAMING TO BE FIELD VERIFIED.

Kaysville Historic Library

Table 17-2. Collapse Prevention Basic Configuration Checklist

Status	Evaluation Statement	Comments
Low Seismicity		
Building System—General		
C (NC) N/A U	LOAD PATH: The structure contains a complete, well-defined load path, including structural elements and connections, that serves to transfer the inertial forces associated with the mass of all elements of the building to the foundation.	Critical structural connections to complete basic load paths not observed. See **Photos 7 & 16.**
(C) NC N/A U	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.25% of the height of the shorter building in low seismicity, 0.5% in moderate seismicity, and 1.5% in high seismicity.	There are not buildings in close proximity.
C NC (N/A) U	MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure.	Historic coal storage with latter access not considered as mezzanine.
Building System—Building Configuration		
C NC (N/A) U	WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above.	Single-story structure.
C NC (N/A) U	SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not less than 70% of the seismic-force-resisting system stiffness in an adjacent story above or less than 80% of the average seismic-force-resisting system stiffness of the three stories above.	Single-story structure.
(C) NC N/A U	VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation.	No vertical irregularities.
(C) NC N/A U	GEOMETRY: There are no changes in the net horizontal dimension of the seismic-force-resisting system of more than 30% in a story relative to adjacent stories, excluding one-story penthouses and mezzanines.	No geometric irregularities.
C NC (N/A) U	MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered.	Single-story structure.
(C) NC N/A U	TORSION: The estimated distance between the story center of mass and the story center of rigidity is less than 20% of the building width in either plan dimension.	Symmetric structure. No torsional issue by inspection.

continues

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Kaysville Historic Library

Table 17-2 *(Continued)*. Collapse Prevention Basic Configuration Checklist

Status	Evaluation Statement	Comments
Moderate Seismicity (Complete the Following Items in Addition to the Items for Low Seismicity)		
Geologic Site Hazards		
C NC N/A U	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building.	The site resides at the boundary of High Liquefaction Potential region per current Utah Geological Survey (UGS) information (See **Figure 2**). Further site investigation required to make a determination.
C NC N/A U	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure.	The site is not in close proximity to potential slope failure hazard.
C NC N/A U	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated.	The site is not in close proximity to the fault (See **Figure 1**).
High Seismicity (Complete the Following Items in Addition to the Items for Moderate Seismicity)		
Foundation Configuration		
C NC N/A U	OVERTURNING: The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than $0.6S_a$.	See **Calculation 1.**
C NC N/A U	TIES BETWEEN FOUNDATION ELEMENTS: The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C.	Lateral system along building perimeter, which is supported by continuous wall footings.

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

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Kaysville Historic Library

Table 17-4. Collapse Prevention Structural Checklist for Building Types W1 and W1a

Status	Evaluation Statement	Comments
Low and Moderate Seismicity		
Seismic-Force-Resisting System		
C NC N/A U	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2.	There are at least 2 walls in each principal direction.
C **NC** N/A U	SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: Structural panel sheathing 1,000 lb/ft (14.6 kN/m) Diagonal sheathing 700 lb/ft (10.2 kN/m) Straight sheathing 100 lb/ft (1.5 kN/m) All other conditions 100 lb/ft (1.5 kN/m)	See **Calculation 2.**
C NC **N/A** U	STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system.	Single-story, no exterior stucco
C NC **N/A** U	GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building.	
C NC **N/A** U	NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces.	No narrow shear walls
C NC **N/A** U	WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor.	Single-story
C NC **N/A** U	HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-1.	Non-sloping site

continues

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Kaysville Historic Library

Table 17-4 *(Continued)*. Collapse Prevention Structural Checklist for Building Types W1 and W1a

Status	Evaluation Statement	Comments
C NC N/A U	CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels.	The cripple walls observed.
C NC N/A U	OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces.	Not observed
Connections		
C NC N/A U	WOOD POSTS: There is a positive connection of wood posts to the foundation.	No connection observed. See **Photo 15.**
C NC N/A U	WOOD SILLS: All wood sills are bolted to the foundation.	No connection observed. See **Photo 17.**
C NC N/A U	GIRDER–COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support.	No connection observed. See **Photo 15.**
High Seismicity (Complete the Following Items in Addition to the Items for Low and Moderate Seismicity)		
Connections		
C NC N/A U	WOOD SILL BOLTS: Sill bolts are spaced at 6 ft or less with acceptable edge and end distance provided for wood and concrete.	Deficiency captured by wood sills. Bolting not observed See **Photo 17.**
Diaphragms		
C NC N/A U	DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints.	No split-level floors or expansion joints observed.
C NC N/A U	ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation.	No chord element observed. See **Photo 6.**
C NC N/A U	STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered.	The roof diaphragm is straight sheathed and exceeds 2:1 aspect ratio. See **Photo 6.**
C NC N/A U	SPANS: All wood diaphragms with spans greater than 24 ft (7.3 m) consist of wood structural panels or diagonal sheathing.	Straight sheathing observed at roof diaphragm and spans greater than 24 ft. See **Photo 17.**
C NC N/A U	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (12 m) and have aspect ratios less than or equal to 4-to-1.	Diagonal sheathing observed at floor diaphragm and spans greater than 40 ft. See **Photo 17.**
C NC N/A U	OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing.	Alternate diaphragms not observed.

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

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Table 17-2. Collapse Prevention Basic Configuration Checklist

Status	Evaluation Statement	Comments
Low Seismicity		
Building System—General		
C (NC) N/A U	LOAD PATH: The structure contains a complete, well-defined load path, including structural elements and connections, that serves to transfer the inertial forces associated with the mass of all elements of the building to the foundation.	Critical structural connections to complete basic load paths not observed. See **Photos 7 & 16.**
(C) NC N/A U	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.25% of the height of the shorter building in low seismicity, 0.5% in moderate seismicity, and 1.5% in high seismicity.	There are not buildings in close proximity.
C NC (N/A) U	MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure.	Historic coal storage with latter access not considered as mezzanine.
Building System—Building Configuration		
C NC (N/A) U	WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above.	Single-story structure.
C NC (N/A) U	SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not less than 70% of the seismic-force-resisting system stiffness in an adjacent story above or less than 80% of the average seismic-force-resisting system stiffness of the three stories above.	Single-story structure.
(C) NC N/A U	VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation.	No vertical irregularities.
(C) NC N/A U	GEOMETRY: There are no changes in the net horizontal dimension of the seismic-force-resisting system of more than 30% in a story relative to adjacent stories, excluding one-story penthouses and mezzanines.	No geometric irregularities.
C NC (N/A) U	MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered.	Single-story structure.
(C) NC N/A U	TORSION: The estimated distance between the story center of mass and the story center of rigidity is less than 20% of the building width in either plan dimension.	Symmetric structure. No torsional issue by inspection.

continues

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Table 17-2 *(Continued)*. Collapse Prevention Basic Configuration Checklist

Status	Evaluation Statement	Comments
Moderate Seismicity (Complete the Following Items in Addition to the Items for Low Seismicity)		
Geologic Site Hazards		
C NC N/A U	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building.	The site resides at the boundary of High Liquefaction Potential region per current Utah Geological Survey (UGS) information (See **Figure 2**). Further site investigation required to make a determination.
C NC N/A U	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure.	The site is not in close proximity to potential slope failure hazard.
C NC N/A U	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated.	The site is not in close proximity to the fault (See **Figure 1**).
High Seismicity (Complete the Following Items in Addition to the Items for Moderate Seismicity)		
Foundation Configuration		
C NC N/A U	OVERTURNING: The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than $0.6S_a$.	See **Calculation 1.**
C NC N/A U	TIES BETWEEN FOUNDATION ELEMENTS: The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C.	Lateral system along building perimeter, which is supported by continuous wall footings.

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

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Table 17-36. Collapse Prevention Structural Checklist for Building Types URM and URMa

Status	Evaluation Statement	Comments
Low and Moderate Seismicity		
Seismic-Force-Resisting System		
C NC N/A U	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2.	There are at least 2 walls in each principal direction.
C NC N/A **U**	SHEAR STRESS CHECK: The shear stress in the unreinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 30 lb/in.^{2} (0.21 MPa) for clay units and 70 lb/in.^{2} (0.48 MPa) for concrete units.	See **Calculation 2.** Unknown for Stone Walls.
Connections		
C **NC** N/A U	WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support are anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7.	Wall anchorage at diaphragm level not observed. See **Photos 7 &16.** Wall anchorage provided by interior wood studs observed but not adequate by inspection. See **Photos 10 &12.**
C NC **N/A** U	WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers.	No connection observed. See **Photo 7 & 16.**
C **NC** N/A U	TRANSFER TO SHEAR WALLS: Diaphragms are connected for transfer of seismic forces to the shear walls.	Transfer mechanism no observed. **Photo 7 & 16.**
C **NC** N/A U	GIRDER–COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support.	No connection observed. See **Photo 15.**
High Seismicity (Complete the Following Items in Addition to the Items for Low and Moderate Seismicity)		
Seismic-Force-Resisting System		
C **NC** N/A U	PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than the following: Top story of multi-story building 9 First story of multi-story building 15 All other conditions 13	See **Calculation 3.** ASCE-41 does not have considerations for stone walls. Does not meet IEBC criteria.
C NC **N/A** U	MASONRY LAYUP: Filled collar joints of multi-wythe masonry walls have negligible voids.	Stone walls
Diaphragms (Stiff or Flexible)		
C NC N/A U	OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length.	No diaphragm openings adjacent to shear walls observed.
C NC N/A U	OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft (2.4 m) long.	No diaphragm openings adjacent to exterior shear walls observed.
Flexible Diaphragms		
C **NC** N/A U	CROSS TIES: There are continuous cross ties between diaphragm chords.	Potential cross ties exist in the form of aligned joists, but not continuous based on observed connection.

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Table 17-36 *(Continued)*. Collapse Prevention Structural Checklist for Building Types URM and URMa

Status	Evaluation Statement	Comments
C NC N/A U	STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered.	The roof diaphragm is straight sheathed and exceeds 2:1 aspect ratio. See **Photo 6.**
C NC N/A U	SPANS: All wood diaphragms with spans greater than 24 ft (7.3 m) consist of wood structural panels or diagonal sheathing.	Straight sheathing observed at roof diaphragm and spans greater than 24 ft. See **Photo 17.**
C NC N/A U	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (12.2 m) and aspect ratios less than or equal to 4-to-1.	Diagonal sheathing observed at floor diaphragm and spans greater than 40 ft. See **Photo 17.**
C NC N/A U	OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing.	Alternate diaphragms not observed.
Connections		
C NC N/A U	STIFFNESS OF WALL ANCHORS: Anchors of concrete or masonry walls to wood structural elements are installed taut and are stiff enough to limit the relative movement between the wall and the diaphragm to no greater than 1/8 in. before engagement of the anchors.	Wall anchors not observed.
C NC N/A U	BEAM, GIRDER, AND TRUSS SUPPORTS: Beams, girders, and trusses supported by unreinforced masonry walls or pilasters have independent secondary columns for support of vertical loads.	Observed trusses bear directly on wood stud wall interior to stone.

Note: C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.

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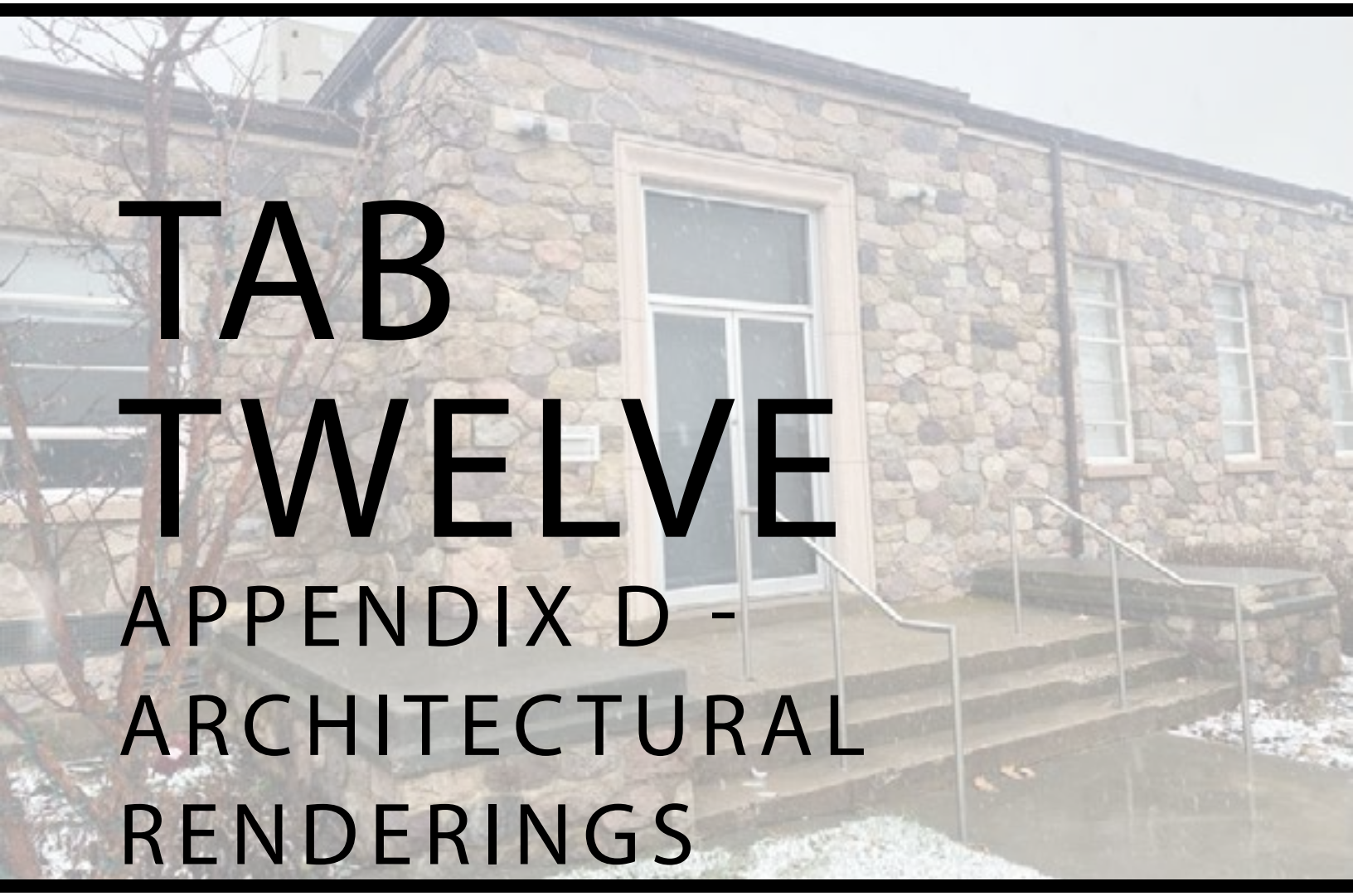

TAB TWELVE

APPENDIX D - ARCHITECTURAL RENDERINGS

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