REvised
Regular Meeting Agenda

City of Black Hawk City Council
211 Church Street, Black Hawk, CO

May 24, 2017
Tour of Dory Hill Water Plant
1:00 p.m.

Regular Meeting
Immediately following Tour

Ringing of the Bell:

1. Call to Order:

2. Roll Call & Pledge of Allegiance:

3. Agenda Changes:

4. Conflicts of Interest: (Council disclosures are on file w/City Clerk & Sec. of State)

5. Introduction of New Employees: Janet Dennehy, Communications Officer
   Julie Seitzinger, Administrative Assistant

6. Public Comment: Please limit comments to 5 minutes

7. Approval of Minutes: May 10, 2017

8. Public Hearings:
   A. CB9, An Ordinance Amending Black Hawk Municipal Code, Chapter 16 Zoning, Article XVII Application Procedures and Submittal Requirements, Section 16-368, City Council Historic Review Process and Section 16-370 Fees
   B. Resolution 38-2017, A Resolution Approving a Certificate of Appropriateness for the Full Exterior Rehabilitation and Site Work for the Property Located at 211 Horn Street
   C. Resolution 39-2017, A Resolution Amending the City of Black Hawk 2016 Budget

9. Action Items:
   A. Resolution 40-2017, A Resolution Approving the First Amendment to the Demolition Permit Agreement Between the City of Black Hawk and Monarch Black Hawk, Inc.

10. City Manager Reports:

11. City Attorney:

12. Executive Session:

13. Adjournment:

Mission Statement

The mission of the City of Black Hawk is to progressively provide cost effective programs and services of the highest quality to the community.
Communication Officer Dennehy is a Dispatcher assigned to the night shift. She has lived in Granby for 20 years prior to joining the Department and is in the process of moving to the metro area. Before joining the City of Black Hawk she worked in the medical industry and owned a tow company. Janet has a daughter and a son, and loves to horseback ride, ski and snowmobile. Janet is a fan of the Avalanche and Notre Dame. She enjoys her new career and the challenges that come with dispatching emergency personnel. She was drawn to Black Hawk because while growing up she spent a significant of time in the area because some of her family lived here.
I moved here in January 2002 with my husband, fellow Black Hawk employee Stan McInturf. I am originally from Salt Lake City, Utah, but have always enjoyed Colorado. My favorite place in Colorado is the South Western corner. The area has wonderful camping, trains, wineries and beautiful scenery. Friends would describe me as friendly, always a helping hand and ready with a smile! My hobbies are golfing, quilting and photography. But my passion is to travel.

I have 6 other siblings, 3 sons, 2 daughters, 3 granddaughters and 4 grandsons and a granddaughter on the way! A bounty unmeasured. I became an employee of the City of Black Hawk on April 19, 2017 the 153rd Anniversary of Black Hawk’s Seal. On my first day I attended the Council Meeting, met the Alderman, the Mayor, residents, took pictures and ate some very good cakes. It was a great first day and one I will always remember. My position is Administrative Assistant at City Hall and as you may have guessed the coordinator for the Black Hawk Lantern Newsletter. I am excited about being a part of the City and participating in ways that give me a chance to make a difference in the place I work and hopefully live!
The meeting began immediately after the Joint Work Session with the Gilpin County Commissioners

1. CALL TO ORDER: The regular meeting of the City Council was called to order on Wednesday, May 10, 2017, at 2:35 p.m. by Mayor Spellman.

2. ROLL CALL: Present were: Mayor Spellman, Aldermen Armbright, Bennett, Johnson, Midcap, Moates, and Torres.

Staff present: City Attorney Hoffmann, City Manager Lewis, Finance Director Hillis, Public Works Director Isbester, Baseline Consultant Harris, Community Planning and Development Administrator Linker, NV5 Consultant McClelland, Police Chief Cole, Fire Chief Taylor, and Deputy City Clerk Martin.

PLEDGE OF ALLEGIANCE: Mayor Spellman led the meeting in the recitation of the Pledge of Allegiance.

3. EXECUTIVE SESSION: City Attorney Hoffmann recommended items number 2 and 5 for Executive Session for specific legal issues related to potential legislation and potential litigation.

MOTION TO ADJOURN INTO EXECUTIVE SESSION Alderman Bennett MOVED and was SECONDED by Alderman Johnson to adjourn into Executive Session at 2:36 p.m. to hold a conference with the City’s attorney to receive legal advice on specific legal questions, pursuant to C.R.S. § 24-6-402(4)(b) and to determine positions relative to matters that may be subject to negotiations, develop a strategy for negotiations, and/or instruct negotiators, pursuant to C.R.S. § 24-6-402(4)(e).

MOTION PASSED There was no discussion and the motion PASSED unanimously.
MOTION TO ADJOURN
Alderman Bennett MOVED and was SECONDED by Alderman Armbright to adjourn the Executive Session at 3:05 p.m.

MOTION PASSED
There was no discussion and the motion PASSED unanimously.

The open, regular session of the meeting resumed at 3:05 p.m.

4. AGENDA CHANGES: Deputy City Clerk Martin confirmed there were no agenda changes.

5. CONFLICTS OF INTEREST:
City Attorney Hoffmann asked Council to declare any Conflicts of Interest on any issue appearing on the agenda this afternoon other than those previous disclosures and conflicts that have already been disclosed and are on file with the City Clerk and Secretary of State. There were no conflicts noted from City Council.

City Attorney Hoffmann asked the audience if there were any objections to any member of Council voting on any issue on the agenda this afternoon. The audience had no objections.

6. PUBLIC COMMENTS: Deputy City Clerk Martin confirmed that no one had signed up to speak.

7. APPROVAL OF MINUTES: April 19, 2017 Regular Meeting
                           May 3, 2017 Special Meeting

MOTION TO APPROVE
Alderman Armbright MOVED and was SECONDED by Alderman Bennett to approve both sets of Minutes as presented.

MOTION PASSED
There was no discussion and the motion passed unanimously.

8. PUBLIC HEARINGS:

A. CB7-2017, An Ordinance Approving a Memorandum of Understanding Between the City of Black Hawk and the State of Colorado Governor’s Office of Information Technology (OIT) Public Safety Communications Network (PSCN) for a Shared Communications Site
Mayor Spellman read the title and opened the public hearing.

Police Chief Cole introduced this item. He said the State would like to update the two microwave systems on the Silver Gulch Radio Tower and the Miners Mesa Tower sites. He said currently the City owns the microwaves, and under the current Memorandum of Understanding (MOU) the State provides labor for maintaining them. The State cannot update them if they do not own them, and he said this new MOU would shift ownership to the State so that they would own and maintain them without jeopardizing our use.

PUBLIC HEARING: Mayor Spellman declared a Public Hearing on CB7, An Ordinance approving a Memorandum of Understanding between the City of Black Hawk and the State of Colorado Governor’s Office of Information Technology (OIT) Public Safety Communications Network (PSCN) for a Shared Communications Site open and invited anyone wanting to address the Board either “for” or “against” the proposed ordinance to come forward.

MOTION TO APPROVE Alderman Torres MOVED and was SECONDED by Alderman Armbright to Approve CB7, an Ordinance approving a Memorandum of Understanding between the City of Black Hawk and the State of Colorado Governor’s Office of Information Technology (OIT) Public Safety Communications Network (PSCN) for a shared Communications Site.

MOTION PASSED There was no discussion and the motion PASSED unanimously.

B. CB8-2017, An Ordinance Repealing and Reenacting Section 1-111 of the City of Black Hawk Municipal Code Modifying and Declaring the City’s Corporate Seal

Mayor Spellman read the title and opened the public hearing.

City Attorney Hoffmann reminded Council that at their April 19, 2017 meeting they agreed to add the Latin word “PERSERVERANDO” above the seal and the Latin phrase “NOLI ME TANGERE” below the seal. He said a modification of the City’s corporate seal is to be done by ordinance.

PUBLIC HEARING: Mayor Spellman declared a Public Hearing on CB8, An Ordinance repealing and reenacting Section 1-111 of the City of Black Hawk Municipal Code modifying and declaring the City’s Corporate Seal open and invited anyone wanting to address the Board either “for” or “against” the proposed ordinance to come forward.
MOTION TO APPROVE

Alderman Armbright MOVED and was SECONDED by Alderman Moates to Approve CB8, an Ordinance repealing and reenacting Section 1-111 of the City of Black Hawk Municipal Code modifying and declaring the City’s Corporate Seal.

MOTION PASSED

There was no discussion and the motion PASSED unanimously.

C. Local Liquor License Authority Consideration of a New Tavern Liquor License for JE Tavern, Inc. dba JE Tavern at the Gilpin, 111 Main Street, Unit A, Black Hawk, Colorado

Mayor Spellman read the title.

City Attorney Hoffmann reminded Council that they were acting as the Local Liquor Licensing Authority and the staff report identifies the findings they are required to make, which is based on the investigation and evidence presented on whether or not the reasonable requirements of the neighborhood have been met and whether or not the applicant is qualified to be a liquor licensee. He added that this tavern is technically a replacement liquor license for when the Canyon Casino closed, as the Gilpin Casino requires another licensed premise for their Common Consumption Area.

Robert Dill, Attorney for JE Tavern, Inc., business address, 455 Sherman Street, Suite 300, Denver, CO and T. Alan Roberts, General Manager of Gilpin Casino, were available on behalf of the applicant to answer any questions.

PUBLIC HEARING: Mayor Spellman declared the Public Hearing for the Liquor License Application for JE Tavern, Inc. open and invited anyone wanting to address the Board either “for” or “against” the license to come forward.

No one came forward to speak and Mayor Spellman declared the Public Hearing closed.

MOTION TO APPROVE

Alderman Bennett MOVED and was SECONDED by Alderman Midcap to approve the New Tavern Liquor License for JE Tavern Inc., dba JE Tavern at the Gilpin at 111 Main Street, Unit A, Black Hawk, Colorado.

9. ACTION ITEMS:

A. Local Liquor Authority Consideration of the Certification of a Promotional Association and Common Consumption Area for The Gilpin Association, Inc.
Mayor Spellman read the title.

Robert Dill introduced himself again for the record on behalf of the applicant The Gilpin Association, Inc.

City Attorney Hoffmann explained this request as a continuation of the Tavern application that was just approved. He said if City Council chooses to allow another Promotional Association, all necessary requirements have been met, and again this request is prompted by the closure of the Canyon Casino.

**MOTION TO APPROVE**

Alderman Armbright MOVED and was SECONDED by Alderman Bennett to approve the Certificate for a Promotional Association and Common Consumption Area for The Gilpin Association, Inc.

**MOTION PASSED**

There was no discussion and the motion PASSED unanimously.

**B. Resolution 36-2017, A Resolution Approving the Total Base Construction Bid and Project Budget for the Rehabilitation and Site Work for the Property Located at 241 DuBois Street**

Mayor Spellman read the title.

Community Planning and Development Administrator Linker and NV5 Consultant McClelland introduced this item. Linker said if approved the project would begin May 12 and the completion date is scheduled for February 6, 2018.

The applicant Derek Blake was present and asked if City Council had received his letter dated May 5, 2017, of which they confirmed they had.

**MOTION TO APPROVE**

Alderman Moates MOVED and was SECONDED by Alderman Torres to approve Resolution 36-2017, a Resolution approving the total base construction bid and project budget for the rehabilitation and site work for the property located at 241 DuBois Street.

**MOTION PASSED**

There was no discussion and the motion PASSED unanimously.

Mayor Spellman read the title.

Baseline Engineering Consultant Harris explained this was the first step in the new Disconnection process that was just recently approved by City Council. City Attorney Hoffmann confirmed this step is to simply find that the applicant is eligible for disconnection and to set the public hearing date for June 14, 2017.

**MOTION TO APPROVE**  
Alderman Bennett **MOVED** and was **SECONDED** by Alderman Armbright to approve Resolution 37-2017, a Resolution approving the contract with Kaiser Permanente in the estimated accepting a Petition for the Disconnection of the Arends Property from the City of Black Hawk, preliminarily approving said Disconnection, and setting a Public Hearing for June 14, 2017 concerning said Disconnection.

**MOTION PASSED**  
There was no discussion and the motion **PASSED** unanimously.

10. CITY MANAGER REPORTS:  
City Manager Lewis had nothing to report.

11. CITY ATTORNEY:  
City Attorney Hoffmann had noting to report.

12. ADJOURNMENT:  
Mayor Spellman declared the Regular Meeting of the City Council closed at 3:20 p.m.

________________________________________  
Michele Martin  
Deputy City Clerk

________________________________________  
David D. Spellman  
Mayor
RESOLUTION 38-2017
A RESOLUTION
APPROVING A
CERTIFICATE OF
APPROPRIATENESS FOR
THE FULL EXTERIOR
REHABILITATION AND
SITE WORK FOR THE
PROPERTY LOCATED AT
211 HORN STREET
TITLE: A RESOLUTION APPROVING A CERTIFICATE OF APPROPRIATENESS FOR THE FULL EXTERIOR REHABILITATION AND SITE WORK FOR THE PROPERTY LOCATED AT 211 HORN STREET

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BLACK HAWK, COLORADO, THAT:

Section 1. The City Council hereby determines to approve the Certificate of Appropriateness for the full exterior rehabilitation and site work for the property located at 211 Horn Street.

RESOLVED AND PASSED this 24th day of May, 2017.

________________________________________
David D. Spellman, Mayor

ATTEST:

________________________________________
Melissa A. Greiner, City Clerk
NOTICE OF PUBLIC HEARING

Notice is hereby given that the City of Black Hawk Board of Aldermen shall hold a public hearing concerning a Certificate of Appropriateness for full exterior rehabilitation and site improvements at 211 Horn Street, located on property described in Exhibit A and generally located at Marchant and Horn Streets, pursuant to the City of Black Hawk zoning ordinance.

The public hearing is to be held before the City of Black Hawk Board of Aldermen on Wednesday, May 24, 2017 at 3:00 p.m. or as soon as possible thereafter. The public hearing shall be held in the City of Black Hawk Council Chambers located at 211 Church Street, Black Hawk, Colorado, 80422, or at such other time or place in the event these hearings are adjourned.

ALL INTERESTED PARTIES MAY ATTEND

Melissa A. Greiner
City Clerk

EXHIBIT A

211 Horn Street –

S: 7 T: 3S R: 72W Subd: BLACK HAWK Block: 010 Lot: 005 THRU:- Lot: 008 & IMPS, N 32FT
CITY OF BLACK HAWK
REQUEST FOR COUNCIL ACTION

SUBJECT: Certificate of Appropriateness for full exterior rehabilitation and site improvements at 211 Horn Street.

RECOMMENDATION: The Historic Preservation Commission recommends the following motion to the Mayor and Board of Aldermen:

APPROVAL of Resolution No. 38-2017 for the Certificate of Appropriateness for full exterior rehabilitation and site work at 211 Horn Street based on the criteria set forth in the staff report dated May 12, 2017. The Certificate of Appropriateness application for 211 Horn Street meets the intent of the criteria outlined in the City of Black Hawk Historic Restoration and Community Preservation Fund Guide to Programs, Section 16-368 of the Black Hawk Municipal Code, and Sections 2, 3, 4, 5, 6 and 7.4 of the City of Black Hawk Residential Design Guidelines.

SUMMARY AND BACKGROUND OF SUBJECT MATTER:
The applicants, Benito and Patricia Torres, are requesting a Certificate of Appropriateness (CofA) for the rehabilitation of the historic house, outbuildings, and site at 211 Horn Street. The site contains an historic house and four outbuildings.

The following site and building features will be covered by this proposed rehabilitation:

Site
1. Existing Site Conditions
2. Exterior Street Stairs
3. Concrete Walkways
4. Stone Retaining Walls
5. Fencing

Historic Residence and Outbuilding
1. Roof / Gutters and Downspouts
2. Siding and Trim
3. Stone Foundation / Concrete Foundation
4. Doors
5. Windows
6. Porch
7. Paint
8. Additions
9. Historic Accessory Structures (Removal of Non-Historic Siding and Roof)
10. Lighting
After a discussion of the historic development of the building, the relevant portions of the Black Hawk Municipal code were reviewed, followed by an explanation of the existing conditions, proposed alterations, and evaluation of the proposal according to the relevant Residential Design Guidelines and the Secretary of the Interior’s Standards and Guidelines for Rehabilitation. The Historic Preservation Commission based their recommendation to City Council on a comprehensive discussion of the above material.

AGENDA DATE: May 24, 2017

WORKSHOP DATE: N/A

FUNDING SOURCE: Preservation Easement/Rehabilitation Grant

DEPARTMENT DIRECTOR APPROVAL: [ X ]Yes [ ]No

STAFF PERSON RESPONSIBLE: Cynthia L. Linker, CP&D Administrator

DOCUMENTS ATTACHED: Resolution No. 38-2017
Public Hearing Notice
Staff Report
Attachments A-H

RECORD: [ ]Yes [ X ]No

CITY ATTORNEY REVIEW: [ X ]Yes [ ]N/A

SUBMITTED BY: REVIEWED BY:
Cynthia L. Linker Jack D. Lewis, City Manager
BACKGROUND:
The applicants, Benito and Patricia Torres, are requesting a Certificate of Appropriateness (CofA) for the rehabilitation of the historic house, historic outbuilding, and site at 211 Horn Street.

The estimated date of construction for the original house located at 211 Horn is ca. 1900, although it is possible that it may predate this estimate. The property was first evaluated for its historic and architectural significance in 1986 when the National Park Service conducted a survey of historic resources in the communities of Black Hawk, Central City, and Nevadaville. In 1991, when Black Hawk was added to an expanded National Historic Landmark district, 211 Horn Street was counted as a “non-contributing” building to the historic district, meaning it had not retained sufficient integrity to contribute to the historic character of the district. The building originally was a simple one-story, gable-front-and-wing building. Later additions that occurred after the period of significance for the National Historic District include: changes to the roofline; extending the walls of the original porch and enclosing the porch; removing the original front door; adding an addition with chimney to the south; moving the front door to the south addition and adding a shed-roof porch at this location; multiple additions to the rear; changing the siding from painted horizontal lap to vertical stained board & batten; installing solar hot water panels on artist studio roof; replacing all windows and changing openings; and adding a two-story garage with apartment above on the north. The garage has chalet style carved balustrade on the second story balcony, and a garage door on the first floor. The garage façade has board & batten siding, but the other elevations have plywood panel siding. This non-historic garage is not included in the application, but will remain attached to the rehabilitated dwelling.

The intent of the CofA application as regulated by Section 16-368 of the City of Black Hawk Municipal Code is to ensure that all development and redevelopment is reviewed prior to construction, reconstruction, alterations or demolition. A CofA application requires Staff to review a proposed development for compliance with design and zoning standards as well as the Community Restoration and Preservation Program, and deem it acceptable for review by the Historic Preservation Commission (HPC). The regulations for a CofA have been reviewed by Staff and comments are included below. Attached to this staff report are the CofA supporting application documents. Excerpts from the supporting documents are included in the report. The HPC shall review the development and provide a recommendation to City Council.

The following site and building features will be covered by this proposed rehabilitation:

**Site**
1. Existing Site Conditions
2. Exterior Street Stairs
3. Concrete Walkways
4. Stone Retaining Walls
5. Fencing

**Historic Residence and Outbuilding**
6. Roof / Gutters and Downspouts
7. Siding and Trim
8. Stone Foundation / Concrete Foundation
9. Doors
10. Windows
11. Porch
12. Paint
13. Additions
14. Historic Accessory Structures (Removal of Non-Historic Siding and Roof)
15. Lighting

After a discussion of the historic development of the building, the relevant portions of the Black Hawk code will be reviewed, followed by an explanation of the existing conditions, proposed alterations, and evaluation of the proposal according to the relevant Black Hawk Municipal Code, City of Black Hawk Residential Design Guidelines and the Secretary of the Interior’s Standards and Guidelines for Rehabilitation.
Historic Development of the Property

Photographic Research: Historically, the dwelling at 211 Horn Street was a very small, gable-front-and-wing residence. In Figure 1 below, the gable-front portion is marked by the red circle. It has a low roof with shallow pitch. The south gable-front wing likely consisted of two small rooms, and did not extend very far into the rear of the lot. A small, crudely constructed shed is at the rear; it does not match the size or height of the existing rear shed. The yellow arrow points to a historic dwelling on the north that is no longer extant (the present house extends to the north into this lot).

Figure 1. Ca. 1900-1910s.
Figure 2 shows the front elevation of the house with both wings. There was likely one small room contained within the side-gable wing that extended to the north. A small porch is set within the ell. While this porch is over fifty years in age, it likely does not date from the historic district’s period of significance. This view again shows the low roof ridges, which contain two interior chimneys – one on each ridge. The retaining wall is level with the ground, and has stairs which are centered on the lot. [Note: The retaining wall rises dramatically for the property on the north. This is important to compare to the existing lot and house; see evaluation.]
Figure 3 provides a view from the adjoining lot on the north. By the 1950s, the structure known as the “artist studio”, visible in this photo, was attached to the rear of the house. The ground of the lot is nearly even with the ridge line of the original historic house.

Historic Research: The Gilpin County Assessor’s office, as well as the 1986 inventory form prepared by the National Park Service, indicates that the square footage of the house was substantially increased ca. 1972 to over 1900 square feet; the existing documentation does not indicate whether this was completely new construction, or a substantial remodel of the smaller historic home. Later additions expanded the square footage to 2011 square feet. When the National Park Service evaluated the district for National Historic Landmark status, it determined that this was not a “contributing” building to the district.
Evaluation: The residence at 211 Horn Street does not retain its appearance from the period of significance, and instead gives all indication of being a ca. 1970s residence. An anecdotal story states that the original house is encapsulated within the present structure. An interior examination has been completed by Wood Identification and Consultation Services (Attachment G) to date the different sections of the house. That investigation showed that, all of the structure south of the garage is historic under the fifty-year rule. While the exterior appearance and roof lines have changed significantly over time, in general the footprint has remained the same. The exception to this assessment is the sunroom that was installed over the historic patio, this was a modern addition. The following portions of the house have been determined to not be fifty years old: garage and 2nd story above; the north half of the wood shed behind the house and the fireplace on the south addition.

The front retaining wall and stairs are not in the original location. Historically, there was a significant change in grade from the historic house at 211 Horn, and the lot adjacent to the north. For the historic house to be encapsulated within the existing structure, a significant amount of grading was required. Furthermore, a comparison of historic photographs to the present conditions indicates that the small, gable-front portion (red oval in Figure 4 and 5) may not be in its original location.
Figure 5. 2010.

**REVIEW CRITERIA**

Applicable City of Black Hawk Regulations:
Certificate of Appropriateness:

Excerpts from:

City of Black Hawk  
Zoning Code  
Chapter 16-368, City Council historic review process

**Sec. 16-368. City Council historic review process.** Any person seeking to renovate the exterior of, add to or construct a new building shall be subject to the following procedures. Any such renovation, construction or demolition shall be subject to the City’s design standards.

**16-368(3)(a).** No building permit or site development plan shall be issued unless accompanied by a Certificate of Appropriateness (CofA) issued by the City Council for any of the following acts:

1. Construction of a new building, structure or improvement
2. Alteration or reconstruction of, or addition to, the exterior of any improvement;
3. Demolition of any improvement;
4. Construction or erection of or addition to any improvement upon any land located within the City;
5. Excavation requiring an excavation permit.

16-368(3)(f): Criteria for determining appropriateness of erection, construction, reconstruction, alteration. In determining the appropriateness of work (other than demolition) as proposed in an application for a site development plan or a building permit, the Board of Aldermen shall consider the following:

1. All plans, drawings and photographs as may be submitted by the applicant.
   
   *The applicant has submitted all required plans and building elevations* (see following pages and Attachments B & C).

2. Information presented at a public hearing held concerning the proposed work.
   
   *Findings and recommendations from Historic Preservation Commission will be presented to the Board of Aldermen at the Public Hearing scheduled for May 24, 2017.*

3. The purpose of this Chapter.
   
   *Staff finds the proposed development to be in conformance with the City of Black Hawk zoning and design standards.*

4. Compliance with the ordinances of the City and the payment of all fees required by the ordinances of the City.
   
   *The applicant has and will continue to pay all necessary fees required by the City.*

5. The historical and architectural style, the general design, arrangement, texture, materials and color of the development, building or structure in question or its appurtenance fixtures; the relationship of such features to similar features of the other buildings within the City and the position of the building, structure, park or open space in relation to public right-of-way and to other buildings and structures in the City.
   
   *The original historic residence was a small one-story “National folk: gable-front-and-wing” building (see Figure 2). The key character-defining features were the house’s form: a side gable wing and a front gable wing that join to form an L-shaped building. Typical features also include a porch set with the ell. The historic form and porch of this building will be reconstructed, including window and door openings on the primary façade. However, the south, north and east additions will remain, and will obscure the historic form of the building. As this is the sole character-defining feature of the building, it will likely still remain a non-contributing building within the National Historic District if reviewed by the National Park Service.*

6. The effects of the proposed work upon the protection, enhancement, perpetuation and use of the City which cause it to possess a special character or special historical or aesthetic interest or value.
   
   *The house is not a contributing building to the National Historic Landmark District, however, the HPC should review the proposed alterations and evaluate their effect on the historic property’s potential eligibility and how it complements the Landmark District.*
7. The design standards for the City.

The proposed structure has been reviewed against the City of Black Hawk Residential Design Guidelines for historic buildings. Sections 2, 3, 4, 5, 6 and 7 of the City of Black Hawk Residential Design Guidelines are the applicable sections; see below for description of proposed work, excerpts of the applicable sections, and evaluation of the proposed alterations.
Historic South Elevation (Ca. 1900-1910s.)

Existing South Elevation

Proposed South Elevation
Historic East (Rear) Elevation
Photos Unavailable

Existing East Elevation

Proposed East Elevation
Historic West (Front) Elevation (Ca. 1957)

Existing West (Front) Elevation

Proposed West (Front) Elevation
Historic North Elevation (Ca. 1950s)

Existing North Elevation

Proposed North Elevation
APPLICATION FOR EXTERIOR REHABILITATION

SITE:

1. Existing Site Conditions
The .35-acre lot is located on the east side of Horn Street in the Historic Residential (HR) zone of Black Hawk. The lot is situated approximately three to seven feet above the grade of Horn Street, and rises an additional 30’ to 50’ in topography to the rear of the lot. There is a stone retaining wall along the front property line, and a collection of low stone retaining walls are present behind the house and in the south yard. A set of stairs allow access from Horn Street into the south yard. There are two outbuildings located on the property (see below). There are concrete walkways along the west and south sides of the house (see below, and the Survey sheet in Attachment B).
Left: south yard of property, showing rock outcroppings and low historic retaining walls
Right: area just west of “Mountain Shop” showing rock wall.

Left: stone retaining wall along front boundary and gate to stairs.
Right: stone retaining wall along street
2.1: Site Design

2.2.1. Respect historic settlement patterns and traditional patterns of building alignment and orientation.

*The proposed rehabilitation will maintain the historic building and outbuilding in their original locations.*

2.2: Topography and Grade

2.2.1. Existing topography should be maintained whenever possible.

*The topography will be maintained throughout the site, with the exception of slight grading around the house.*

b. Where natural rocks remains in stable condition, leave it undisturbed.

*The natural rock outcroppings on the south side of the house will be undisturbed.*

2.2.5. All land that is visible from a public way shall be reclaimed in a manner described below. Preferred reclamation methods are: Plantings, as provided in the landscape standards; Natural rock, in a stable condition; Concrete retaining walls faced with native stone or appropriate wood cribbing.

*The land that is disturbed by construction will be seeded in native grass.*

**Relevant Site Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)**

Left: Concrete stairs accessing the artist studio and “Mountain Shop”.
Right: Retaining wall on north east side of property.
2.2.6. Retain existing natural drainage patterns where possible; design new drainage systems to complement and follow the existing terrain.
   a. Design drainage systems and storm water detention basins as amenities.

The drainage system at the east side of the house will be handled by a new concrete swale*. While this system is functional, it is not perceived as an amenity per the Guidelines in order to drain water from the north side of the house to the south, which follows the natural grade.

Section Notes:

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
2. **Exterior Street Stairs:**

The applicant proposes to replace the existing, non-historic concrete stairs with concrete steps adjacent to the garage. The new steps will provide access to the historic front door. The old stair opening in the stone wall will be removed and the area will be backfilled. The stone wall will be repaired using a lacing method. (see below, and sheet A300 in Attachment B).

*Historic Street Stairs*

*Existing Condition at Street on North End (North)*
Relevant Exterior Street Stairs Guidelines and Evaluation
Street stairs are not covered by the City of Black Hawk Residential Design Guidelines. In this instance, the “Secretary of the Interior’s Standards and Guidelines for Rehabilitation” were used to evaluate the proposal.
Recommended: Replacing in kind and entire feature of the site that is too deteriorated to repair if the overall form and detailing are still evident.

Not recommended: Removing a feature of the site that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

Adding conjectural features to the site, such as period reproduction lamps, fences, fountains, or vegetation that is historically inappropriate, thus creating a false sense of historic development. 

*The application proposes to install new concrete stairs located near the historic stair location. The application proposes to remove the existing non-historic stairs, and patch back the rock wall, near the entrance of the south addition.*

Section Notes:

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3. **Concrete Walkways:**

The applicant proposes to remove the existing concrete walkways that are currently in contact with the building, and replace with new concrete sidewalks. The concrete walkways at the rear of the house will provide drainage away from the house, while also providing access to the artist studio and the “Mountain Shop”. (below & sheet C201 in Attachment B).
Relevant Concrete Sidewalk Guidelines and Evaluation

Sidewalks are not covered by the City of Black Hawk Residential Design Guidelines. In these instances, the “Secretary of the Interior’s Standards and Guidelines for Rehabilitation” were used to evaluate the proposal.

Recommended: Replacing in kind and entire feature of the site that is too deteriorated to repair if the overall form and detailing are still evident.

Not recommended: Removing a feature of the site that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

Adding conjectural features to the site, such as period reproduction lamps, fences, fountains, or vegetation that is historically inappropriate, thus creating a false sense of historic development.

The application proposes to replace the existing non-historic concrete sidewalks. The existing sidewalks are not historic, and their removal and replacement does not damage any historic features.

Section Notes:

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4. **Retaining Walls:**

The application proposes to do no work to the roadside stone retaining wall except for where the wall needs to be repaired at the existing stairs and rebuilding the wall near the new steps and entry porch to help with drainage. The application proposes to install two new concrete retaining walls behind the house to retain the hillside while also providing a path for drainage. The new concrete walls will be stained (“Cork” color) on all visible surfaces. The existing stone retaining wall between the “Mountain Shop” and the “Artist Studio” will be reconstructed taller and longer than it currently exists. The application proposes to rebuild the three stone retaining walls in the south yard.

*Proposed Concrete Retaining Walls at Rear of House*

*Proposed Concrete Stain Color*
2.4 Retaining walls

2.4.1 Historic stone walls and other site features should be repaired or restored, replacing only those portions that are deteriorated beyond repair.

The application proposes to reconstruct all of the existing site retaining walls. The Atkinson-Noland Investigation Report (Attachment E) stated that each of the existing site retaining walls are stable from an engineering perspective. However, there is a
need to reconstruct the wall between the “Mountain Shop” and “Artist Studio” in order to support the “Mountain Shop” as well as to divert water around the house. The lower retaining wall in the south yard is collapsed in several sections and needs to be reconstructed in order to properly retain the second tier in the yard. The application proposes that the upper two retaining walls in the south yard are deteriorated to a point that reconstruction is the best option.

2.4.2. Native stone retaining walls are encouraged. A. Stone walls should be similar in appearance to those seen historically, including finishing, joining and heights. *All of the walls proposed to be reconstructed are proposed to be grouted native stone. While the rock walls will be grouted, they will be required to appear dry stacked in order to match the remaining historic walls on the property.*

2.4.3. Retaining walls should be of dry stone or stone masonry and be compatible with other features onsite. a. Where any rock retaining walls are removed, an equal amount of rock wall shall be constructed as a part of the project. b. All rock retaining walls shall have a dry stack appearance; false materials are inappropriate. d. Unfazed concrete, Jersey Barriers, artificial brick or stone, smooth block or concrete, slump block, stucco and rustic brick are not appropriate for use as retaining walls. *Similar to the guideline above, the four new retaining walls are proposed to be grouted native stone. While the rock walls will be grouted, they will be required to appear dry stacked in order to match the remaining historic walls on the property. The reconstructed retaining wall between the “Mountain Shop” and “Artist Studio” will be longer and taller than the existing wall. The portions of the roadside retaining wall being repaired will lace native stone in with the existing stone to create a more seamless repair.*

*The new concrete retaining wall located behind/above the house does not meet the City of Black Hawk Residential Design Guidelines for materials. However, only a small portion will be visible from the public right-of-way due to its location and topography. To help limit the visual impact, the concrete will be stained where exposed.*

**Discussion Question:**

1. Does the stained concrete retaining wall located behind the house affect the overall historic district?
   
   HPC: No, stained concrete is consistent with the Design Guidelines and other projects in the District.
5. **Fencing:**

The application proposes to demolish the wood picket fence along the front property line, and replace it with new decorative black steel fencing. The fence will extend along the entire west side of the property, and will be placed on top of the stone retaining wall. The decorative metal fence will also extend a short distance on the south property line. A 4’ high woven wire fence will be placed along the remaining south side and rear property line to connect to the “Mountain Shop”. Fencing will dead-end into the rear of the artist studio thereby creating a fulling enclosed yard. (see below and sheet A000 and A101 in Attachment B for fence location and specs.)

*Existing wood fence along top of roadside wall*
Relevant Fencing Guidelines and Evaluation

2.3: Fencing

2.3.1. Painted wood, wrought iron, picket, woven wire, rail or stone fences are appropriate in residential-type areas.

A new wrought iron fence will be installed along the front property line, as well as a short distance along the south side. New woven wire fencing in a similar design will be installed along the south side and rear property line. The proposed fence material is appropriate according to the City of Black Hawk Residential Design Guidelines.

2.3.4. Fences shall be similar to those seen historically.

The style of the new wrought iron fence does not replicate the historic fences in Black Hawk, and is therefore not compatible with the City of Black Hawk Residential Design Guidelines. The proposed woven wire fence is similar to those seen historically. The historic fence appears to be wood picket in one photograph.
### Discussion Question:

1. Is the design of the proposed wrought iron fence appropriate with the City of Black Hawk Residential Design Guidelines?
   *HPC*: *The design is acceptable and is consistent with the previously approved fence styles.*

2. Does the fence design have a negative impact to the District?
   *HPC*: No, since the design is seen throughout Marchant Street and the District

3. Is the design too elaborate for the look of an historic miner’s cottage?
   *HPC*: The design is seen along Marchant Street and throughout the District.

### Section Notes:
6. Roof / Gutters and Downspouts

Existing Roof / Gutters and Downspout Conditions

The historic north side gable wing currently has a single sloped roof that was modified when the garage was built sometime in the 1970s. This non-historic roof line will return to the historic form seen in the historic photos. The historic entry porch roof line was modified to match the pitch of the historic east west gable. The historic center gable and historic south addition retain their historic roof lines with no modification. The artist studio above the rear of the house had a solar hot water system installed over its historic roof creating an unbalanced gable favoring the southern exposure. The rear patio was enclosed at an unknown date to make it into a sunroom. The existing roof material is asphalt shingles, but historically would have likely been wood shingles. Gutters appear to have been added sometime after the 1950s.

Top: 1957; note that the north wing has a gable roof. Note the entry porch has a low pitch hip roof.
Bottom: 2016; note that the north wing roof has been modified to a single slop shed roof with a large overhang. Note the historic entry porch was fully enclosed and the roof was modified to extend the historic east west gable roof pitch.
2016. The solar hot water system was added sometime after the 1970s.

2016. Sunroom roof enclosing the historic patio.

Proposed Roof Alterations
The applicant proposes to replace the existing light gray asphalt shingle roof with new dark gray asphalt shingles. (see below and Attachment D)

Owens Corning, Duration Series, Estate Gray

Roof / Gutters and Downspouts
The application proposes to retain the roof shape in the front of the historic east west gable with slight modifications to the rear to accommodate drainage at the rear of the house. The south addition will not be modified. The non-historic roof line on the north wing will return to the historic form seen in the historic photos. The historic entry porch roof line will also be modified to match the low-pitch hip roof seen in the historic photos. The glass panels enclosing the rear patio will be removed to make the patio open to the environment. (see pages A203, A300 & A301 of Attachment B). The proposed project will also add half-round* galvanized* metal gutters and round downspouts.

Relevant Roof Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)

3.2: Roofs

3.2.A.1. Preserve the original roof form. This includes the roof’s shape and decorative features. The east west gable and south addition gable will be retained, and the original north wing gable and entry porch roof will be reconstructed; this meets the City of Black Hawk Residential Design Guidelines. The roofs over the rear of the house are not visible from the City’s R.O.W., but will be simple shed roofs based on the historic framing found encapsulated inside the house.

3.2.B.2. When repair or replacement is necessary, use materials similar to the original. The existing asphalt shingle roof leaks. The proposed replacement gray asphalt shingles meet the City of Black Hawk Residential Design Guidelines.

3.2.C.3. Half round galvanized gutters are historically appropriate and preferred on residential homes. The project proposes to install half round galvanized gutters and round downspouts; this meets the City of Black Hawk Residential Design Guidelines.

Discussion Question:
1. Is the dark gray color compatible with the house?
   
   HPC: The color is compatible with the house and surrounding landscape.
7. Siding and Trim

Existing Siding Conditions
The house has a board and batten style siding on all the historic portions of the house. Although the date of installation is unknown, based on photographs, the board and batten siding was likely installed in the 1960s or 1970s. The artist studio has a collection of siding materials including a rough log siding and panelized v-groove siding.

![board and batten siding](image1)

*Left: board and batten siding*

![rough log siding on artist studio](image2)

*Right: rough log siding on artist studio*

In multiple locations on the interior of the house, the historic clapboard siding was found to be encapsulated. The wood investigation report (Attachment G) notes that the board and batten siding is not historic due to the nails used in the installation. The historic photos also support the belief that the encapsulated clapboard siding is historic, if not the original siding.

![Encapsulated historic siding](image3)

*Left: Encapsulated historic siding*

![Encapsulated siding at historic entry porch](image4)

*Right: Encapsulated siding at historic entry porch*
Proposed Siding Alterations
The application proposes to remove and replace all of the non-historic board and batten siding and trim. The replacement siding will be installed based on the details found in the encapsulated historic siding. The east west gable, the north wing, and the artist studio will all have 5” horizontal lap siding. The remainder of the historic house will have 4” horizontal lap siding. The difference in siding reveal is to help distinguish the different phases in which the house was constructed. Corner boards and exterior window trim (covered in the “windows” section) will be based on the encapsulated details and will be consistent throughout. The historic entry porch will have vertical v-groove tongue and groove siding to replicate the appearance of the enclosed porch seen in the historic photos. (see Sheets A300 & A301, Attachment B).

Relevant Siding Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)

3.3: Exterior Materials: Wood Siding and Masonry
3.3.A.1. Original historic finish materials should be preserved, rehabilitated and/or repaired.

The application proposes to replace all the non-historic existing siding which meets the City of Black Hawk Residential Design Guidelines, as well as the Secretary of the Interior’s Standards and Guidelines for Rehabilitation.

a. If portions of wood siding must be replaced, be sure to match the lap dimensions of the original.

The application proposes to replace all existing siding on the house with size, profile and detailing that matches the historic siding encapsulated within the house. This meets the City of Black Hawk Residential Design Guidelines for replacement details.

3.3.C.1. Protect and maintain significant stylistic elements.

a. Avoid removing or altering any historic material or significant features.
b. Repair historic building features that are deteriorated where feasible.
c. When disassembly of an historic element is necessary for its restoration, use methods that minimize damage to the original materials.

Any significant stylistic elements that were historic to the house were removed with the installation of the board and batten siding. Based on historic photos, the house had a simple design with no decorative trim work like other houses in the City. Reconstructing the historic enclosed entry porch will restore one significant stylistic element to the front of the house. The entry porch will match the historic scale and style seen in the historic photographs. This method meets the City of Black Hawk Residential Design Guidelines, as well as the Secretary of the Interior’s Standards and Guidelines for Rehabilitation.
Discussion Question:

1. Is the replacement of all the siding supported by the City of Black Hawk Residential Design Guidelines and the SOI Standards?

   *HPC:* Replacing all the siding on the house, which is non-historic, with size, profile and detailing matching the historic siding encapsulated within the house is supported and meets the City of Black Hawk Residential Design Guidelines for replacement details.
8. Masonry – Stone Foundation – Concrete Foundation

Existing Masonry Conditions
Due to the grading around the house, there are no areas where a stone foundation is visible from the exterior. The oldest portions of the house have stone foundations that have been reinforced with concrete. The remainder of the house sits on a concrete foundation. Brick veneer has been added to the west elevation as well as the south elevation. The condition of the stone foundation is unknown because it is currently inaccessible from all sides for testing.

*Brick veneer over concrete foundation on south elevation*

*Note no foundation is visible at the front of the house*
Proposed Masonry Alterations
The application proposes to install a new concrete foundation beneath the entire house. On the west and south elevations, an exposed concrete curb will be installed to protect the house framing and siding from water. (see below & sheet A300 in Attachment B).
The application proposes to replicate the appearance of the original stone wall beneath the east west gable by using a natural stone veneer* on the west elevation (see below and sheet A300 in Attachment B).

Examples of rock wall treatments

Relevant Masonry Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)

3.3: Exterior Materials: Wood Siding and Masonry

3.3.B.4. Repair or replacement of mortar should be done by a masonry professional experienced in historic masonry repair.

*The application proposes to replace what is left of the historic stone foundation of the house with a frost protected concrete foundation. Replacement of the existing concrete foundation meets the City of Black Hawk Residential Design Guidelines, but replacing the existing stone foundation does not meet the City of Black Hawk Residential Design Guidelines.

3.3.C.2. Replace missing original features in kind where feasible

b. Where reconstruction of an element is impossible, develop a compatible new design that is a simplified interpretation of the original.

**The application proposes to restore the appearance of the east west gable foundation with stone veneer instead of masonry construction. This is a compatible new design.**

Discussion Question:

1. Is stone veneer, rather than stone construction, acceptable for the east west gable foundation?

   **HPC:** The stone veneer, rather than stone construction, is acceptable and consistent with other projects in the District.

Masonry – Stone Foundation – Concrete Foundation
9. Doors:

Existing Door Conditions
All of the historic doors have been replaced with modern doors. The existing configuration of doors does not match the historic photographs.

Left: note current entrance door only in the south addition. Right: note historic entrance door was located at the entry porch

Proposed Door Alterations
The application proposes to retain the existing door in the south addition. The applicant also proposes to recreate the enclosed entry porch to function as the main entry door. There will also be new doors installed at the south addition (36” wide), the rear patio, and the artist studio. All new doors will be wood and as shown below. (see below and Sheets A300 & A301 Attachment B).
Relevant Door Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)

3.4: Doors

3.4.1. Retaining and preserving original doors and door openings is preferred rather than replacement.

All original doors have been previously replaced. All original openings will be preserved; this meets the City of Black Hawk Residential Design Guidelines.

3.4.2. Retain and preserve the functional, proportional and decorative features of a primary entrance.

a. Such features can include frames, sills, heads, jambs* and moldings*.

b. Door materials should be wood or appear similar to wood.

The historic enclosed front porch entrance is being reconstructed. This was the historic primary entrance. The details of the enclosed front porch are based off of the historic photos. This meets the City of Black Hawk Residential Design Guidelines.

3.4.5. Avoid changing the position of historic doors.

b. Also avoid adding additional doors to facades* that are visible from the street.

The new front door being proposed is being added where a historic door had been removed; this meets the City of Black Hawk Residential Design Guidelines.

3.4.6. When replacing doors, use designs similar to those found historically on comparable buildings in Black Hawk.

c. Contemporary ornate doors are discouraged on “contributing” buildings, unless photographic evidence can substantiate their historic use.
The new front door opening on the west elevation will match the historic front door width. The proposed wood door for this location will not match the two historic front entry doors, thus distinguishing “old” from “new construction.” This partially meets the City of Black Hawk Residential Design Guidelines. Door 6 in the east historic addition will be replaced with a 36” door to match the existing door. This is preferable to making the front door 36”.

3.4.7. If heat loss or energy conservation is a concern, consider installation of a storm door instead of replacing a historic entry door.
   a. wood storm door is preferred. A colored metal storm door, featuring a simple design, may be appropriate.

   Full view, metal screen doors are proposed for all door locations, which will allow the design of the historic front doors to remain visible from the public right-of-way; this meets the City of Black Hawk Residential Design Guidelines, although a wood door is preferred.

3.5.C.6. Genuine, transparent glass shall be used in all windows and doors.

   Transparent glass is proposed for all doors, which meets the City of Black Hawk Residential Design Guidelines.

Discussion Question:

1. Do the door styles complement, but not imitate, the original historic doors?
   
   HPC: The door styles proposed are acceptable and distinguish “old” construction from “new” construction.

Section Notes:
10. Windows:

Existing Window Conditions
According to the site investigation conducted by Wood Identification and Consultation Services, all of the windows are modern dual-pane replacements. Based on historic photos as well as evidence in the framing, the window sizes and locations appear to have changed on the west elevation. Historically, there were two windows in the north wing and one double hung window was in the east west gable. Respectively, these windows were 6/6 and 4/4 divided light windows. The windows on the enclosed entry porch were large non-divided windows. The windows in the south addition do not appear in any available photos. The window surrounds appear to be consistent throughout the building.

*Left: ca. 1957*  
*Right: 2016*
**Proposed Window Alterations**
The application proposes to replace all windows. Both replacement and new windows on the additions will be wood with aluminum cladding*. The windows will be 6/6 double-hung on the north wing, 4/4 double-hung on the east west gable, 1/1 double hung on the south addition, and fixed windows in the artist studio. The Marvin window shown below is an example; the muntin* patterns will be as described and shown on sheets A300 and A301 in Attachment B.

![Marvin window replacement]

**Relevant Window Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)**

3.5: **Windows**

3.5.A.1. Identify, retain and preserve the functional and decorative features of windows found historically.

*The application proposes to replace all of the non-historic windows with windows that match the historic appearance; this meets the City of Black Hawk Residential Design Guidelines. The existing single window on the north wing will be replaced with two separate windows per the information gleaned from historic photos.*

3.5.C.1. If replacement is necessary, replace in-kind. However, window materials that appear similar to wood may be considered on a case-by-case basis.

*The replacement windows will be wood with aluminum cladding; Marvin Windows Next Generation Ultimate Clad Double Hung series. The hardware will be satin nickel finish.*

a. Wood windows are preferred, however metal or clad windows may be considered if the dimension of their frame elements, and their finishes, appear similar to that of wood.

*The proposed replacement windows meet the City of Black Hawk Residential Design Guidelines.*
3.5.C.2 Use windows that are similar in size, proportion and orientation to those seen historically on houses in the neighborhood.

a. Double-hung windows, with frame dimensions that are similar to those used historically, are encouraged.

The proposed replacement windows fall within the City of Black Hawk Residential Design Guidelines.

b. More flexibility is allowed on sides of the building that are less visible from the public way.

The proposed replacement windows on all sides of the house fall within the City of Black Hawk Residential Design Guidelines.

3.5.C.3. Avoid changing the position of historic windows.

All historic window openings are being restored.

3.5.C.4. Maintain the historic subdivisions of windows.

b. Where multiple-pane windows are appropriate, true divided lights* are preferred. This especially true for windows that are at ground level and close to sidewalks and walkways where the window details may be clearly seen.

c. Do not use “internal” muntins that are stuck between two layers of glass. Snap-in muntins may be used on larger areas of glass in new construction, provided they are installed on both sides of the glass.

The replacement windows will be 6/6 double-hung on the north wing, 4/4 double-hung on the east west gable, 1/1 double hung on the south addition, and fixed windows in the artist studio; this meets the City of Black Hawk Residential Design Guidelines. None of the windows will have true divided lights. Instead there will be a 5/8” simulated divided light*, with a metal grille* between the glass; aluminum grille on the exterior; and a wood grille on the interior. The replacement window simulated divided lights are not inappropriate according to the design guidelines.

3.5.C.6. Genuine, transparent glass shall be used in all windows and doors.

Transparent glass panes are proposed for all windows; this meets the City of Black Hawk Residential Design Guidelines.

Discussion Question:

1. Do the proposed replacement windows (wood with aluminum cladding) meet the City of Black Hawk Residential Design Guidelines?

HPC: The replacement windows are consistent with other projects and meet the Design Guidelines.
11. Porch:

Existing Porch Conditions
The house currently only has a porch on the south addition. The roof of the south addition extends over this porch. The porch has simple square posts with 2x4 bracing at the top. The ceiling is open to the roof sheathing and has exposed roof rafters. The porch is all concrete with no wood decking.

Left: porch posts

Right: Porch ceiling

Concrete porch
Proposed Porch Alterations
The applicant proposes to retain the columns and rafters of the porch. The concrete porch will be replaced with a wood porch to more closely conform to what would have been seen historically. The applicant also proposes to reconstruct the enclosed entry porch. This will be habitable space within the house, but from the exterior it has been designed to resemble a porch that was enclosed, as was often found historically.

Relevant Porch Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)
3.6: Porches

3.6.1. Original porches should be preserved.
The existing porch on the south addition is historic under the 50-year rule, and will be retained; this meets the City of Black Hawk Residential Design Guidelines. The columns and rafters will be retained, although the concrete porch will be replaced with a wood porch to more closely conform with what would have been seen historically.

Discussion Question:

1. Does the porch design meet the City of Black Hawk Residential Design Guidelines and SOI Standards?
HPC: The existing porch on the south addition will be retained and meets the Guidelines and Standards.

Section Notes:
12. **Paint:**

**Existing Paint Conditions**  
The house is currently painted maroon with no trim or accent colors.

**Proposed Paint Alterations**  
The proposed paint scheme is shown below, as well as in Attachment D.
4. Paint, Paint Colors and Lead Paint Issues

4.1: Color

4.1.1. Use historic color schemes.

_The proposed colors are from Sherwin Williams’ line of paint colors that were developed for historic houses. Paint colors from this line are approved for use on Black Hawk’s historic homes._

4.1.2. Develop a color scheme for the entire building that coordinates all the façade elements.

_The illustration on the previous page shows the coordinating paint scheme for the house._

4.1.3. Use muted colors for the base and brighter colors for accents.

_The main color is muted, and the accent colors are lighter or brighter._

4.1.4. Leave natural masonry finishes unpainted when feasible.

_The stone foundation will be unpainted._

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**Section Notes:**

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13. Additions:

Existing Additions
The house has undergone several additions and alterations over the years; see the summary of the alterations at the beginning of this report. The original house was the east west gable. Subsequently, the north wing, south addition, and one or two rear additions were added on. In the 1970s, a two-story garage was added on the north side of the north wing. This consists of a two-car garage with a full living area above. The addition is accessed in the north east corner of the north wing.

Proposed Alterations to Additions
The application proposes to retain all additions that were built prior to 1966 (the north wing, south addition, and rear additions) which were found to be historic under the 50-year rule. The garage and living space above will be fully excluded from the project, as it is non-historic. The applicant declined the option to include it in the project at their cost as well as the option to demo the garage entirely.

Non-Historic Garage
Relevant Additions Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)

5. Additions to Historic Structures

5.1. Preserve older additions that have achieved historic significance in their own right.
   a. Examples may be a porch or a kitchen wing that was added to the original building early in its history.
   b. Most alterations 50 years and older have achieved historical significance.
   *This proposal retains and rehabilitates the historic additions that occurred prior to 1966 – based on the 50-year rule of the City’s Grant Program.*

5.2. More recent alterations that are not historically significant may be removed.
   *The application proposes to retain the non-historic garage, but exclude it from any work. The chimney on the south side of the house will be removed, as it is not historic.*

5.3. Design additions to historic buildings so that they do not destroy or obscure any significant historic architectural or cultural material.
   *The application proposes no additions.*

5.4. Additions should be compatible in size and scale with the main building and surrounding neighborhood.
   a. Additions should be visually subordinate to the primary historic building. Set back and step down additions from primary facades, or set them apart from the main building and connect them with a “link”.
   *The application proposes no additions, however, retaining the links to separate additions from the original historic buildings helps distinguish “old” from “new” construction. The reconstruction of the enclosed entry porch has also been designed in such a way as to be historically compatible.*

Section Notes:

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____________________________________________________________________
____________________________________________________________________

Additions
14. Historic Accessory Structures:

Existing Accessory Structure Conditions
There is a one-story shed on the east hillside behind the house. It is made up of both historic and non-historic portions. The southern 2/3 is historic while the northern 1/3 is non-historic. The shed is in good condition except for a portion of wall that has collapsed in the rear of the historic portion (see photos below). A wooden lean-to is also present behind the shed on the hillside. It is believed to not be historic due to the framing material used.

“Mountain Shop”

“Mountain Shop”
Proposed Alterations to Accessory Structures

The historic portion of the “Mountain Shop” will have a new roof installed and the structure stabilized. The homeowner will decide whether or not the non-historic portion of the “Mountain Shop” will have a new roof installed, once the cost is determined. The lean-to behind the “Mountain Shop” will be removed if necessary to complete the work on the shed.
Relevant Accessory Structures Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)

6. Historic Accessory Structures

6.1.1. The preservation of accessory structures is strongly encouraged. 

*The application proposes to preserve the historic features of the accessory structure.*

Section Notes:
15. Exterior Lighting:

Existing Exterior Lighting Conditions
The house currently has a light at the south addition door and a flood light adjacent to the chimney on the south elevation.

Proposed Exterior Lighting

Relevant Exterior Lighting Guidelines and Evaluation (City of Black Hawk Residential Design Guidelines)
7.4. Exterior Lighting

7.4.1. Lighting fixtures should contribute to the overall historic character of a house or neighborhood.  
*The proposed light fixtures are compatible with those that may have been found historically in Black Hawk.*

7.4.2. Lighting should be functional not just historically decorative.  
*The proposed lighting is functional.*

7.4.3. All lighting should focus downward.  
*The lantern-type lights are shielded from up-lighting.*

Section Notes:
STAFF & CONSULTANT COMMENTS:
All grants must adhere to the eligibility requirements. The project was evaluated using these standards and staff found the elements of the proposal are in accordance with the ordinance submittal requirements.

The historic preservation consultant from Three Gables Preservation has evaluated the information provided for the proposed rehabilitation of the historic residence, outbuilding and site at 211 Horn Street, and on the preceding pages have provided the evaluations on those elements that meet the City of Black Hawk Residential Design Guidelines and the Secretary of the Interior’s Standards for the Treatment of Historic Properties, and for those elements that do not meet these guidelines.

SUMMARY:
The Historic Preservation Commission (HPC) evaluated the application, the comments in the report, and testimony by staff, consultants, and the applicant. Due to the magnitude of the project’s scope of work, questions were provided at the end of select sections for a starting point for the HPC’s discussion. In addition to the questions at the end of the sections, the HPC considered two general questions:

Summary questions
1. Do any of the proposed treatments negatively impact character-defining features of the historic building?
   
   **HPC:** The proposed treatments will return and maintain the encapsulated architectural features.

2. Does the HPC believe that, after rehabilitation, this building will be more “contributing” to the historic character of the National Historic Landmark district? And if so, why?
   
   **HPC:** Yes, the building will be more “contributing” to the District because the applicant is willing to bring back the architectural features once encapsulated and lost. The work will appropriately preserve the historic character of the District.

The Commission discussed if there was sufficient evidence that the Certificate of Appropriateness application meets the intent of the criteria outlined in the City of Black Hawk Historic Restoration and Community Preservation Fund Guide to Programs, Section 16-368 of the Black Hawk Municipal Code, and Sections 2, 3, 4, 5, 6 and 7.4 of the City of Black Hawk Residential Design Guidelines.

At the conclusion of its discussion, the Historic Preservation Commission talked about recommendations to the Board of Aldermen approval, conditional approval, or denial of the Certificate of Appropriateness application for 211 Horn Street as submitted and included in this staff report. If the HPC determined that a recommendation for conditional approval is appropriate, their discussion focused on which elements should be included as conditions. If the HPC determined that a recommendation for denial was appropriate, the discussion focused on which elements do not meet the intent of the program and guidelines or if the proposed work would not appropriately promote preservation of the historic character of the City.
RECOMMENDATION:

HPC recommends to the Board of Aldermen APPROVAL of the Certificate of Appropriateness for full exterior rehabilitation and site work at 211 Horn Street based on the criteria set forth in the staff report dated May 12, 2017. The Certificate of Appropriateness application for 211 Horn Street meets the intent of the criteria outlined in the City of Black Hawk Historic Restoration and Community Preservation Fund Guide to Programs, Section 16-368 of the Black Hawk Municipal Code, and Sections 2, 3, 4, 5, 6 and 7.4 of the City of Black Hawk Residential Design Guidelines.

ATTACHMENTS:

A. Cultural Resource Evaluation Form
B. PEH Architects Partial Construction Document Plan Set
C. PEH Architects Partial Construction Document Specifications
D. PEH Architects Paint Colors
F. Terracon – Geotechnical Report
G. Wood Identification and Consultation Services – Structural and Architectural Materials Assessment
H. Glossary
ATTACHMENT A

CULTURAL RESOURCE FORM
1. Current Address: **211 Horn**

2. Resource Number: **5GL.7.380**

3. NHL Resource Number: **B10-N**

4. Resource Name:

5. Purpose of this current site visit (check as many as apply)
   - [X] Site is within a current project area
   - [X] Resurvey
   - [X] Update of previous site form(s)
   - ___ Surface collection
   - ___ Testing to determine eligibility
   - ___ Excavation
   - ___ Other

6. Previous Recordings:
   - [X] 1986 National Park Service Survey
   - [X] 1991 National Historic Landmark Nomination
   - [X] 1998 Re-survey
   - [X] 2004 Photo survey
   - ___ Other: ___ Photograph
   - ___ Photograph

7. Exterior alterations since 1986: **1999 – replace rock wall, permit valuation $9,754.**

8. Additional historical background: **The Sanborn maps do not include Horn Street. The original portion of the house (encased by the 1972 addition and alterations) is visible in historic photographs purportedly dating from 1890 and 1900. Deed research may determine a more accurate construction date.**

**Ca. 1880s** ___ Construction date ___ Estimate from 1986 NPS Survey [X] New estimate

Sources of information:

Sanborn Maps
   - ___ 1886
   - ___ 1890
   - ___ 1895
   - ___ 1900
9. Changes to Location or Size Information: n/a

10. Revised National Historic Landmark District - Contributing Building Eligibility Assessment:
    Contributing _____ Non contributing _____ Need data.

11. National Register - Individual Eligibility Assessment:
    Eligible _____ Not eligible _____ Need data

12. Is there National Register district potential? Yes ____ No _____
    Discuss: Any potential historic district would not have boundaries extending to include this property.

13. Local Designation - Individual Eligibility Assessment:
    Eligible _____ Not eligible _____ Need data

14. Is there Local district potential? Yes ____ No _____
    Discuss: Any potential historic district would likely have boundaries which excluded this property.

15. Photograph Types and Numbers: Digital, <.jpg> format. 211 Horn-1.JPG, 211 Horn-2.JPG


17. Recorder(s): Deon Wolfenbarger 18. Date(s): July 19, 2010

19. Recorder Affiliation: Three Gables Preservation

20. Attachments (check as many as apply)
    - Photographs [X]
    - Site sketch map
    - U.S.G.S. map photocopy
    - Other

21. Official determination (OAHP USE ONLY)
    - Determined Eligible
    - Determined Not Eligible
    - Need Data
    - Nominated
    - Listed
    - Contributing to N.R. District
    - Not Contributing to N.R. Dist
Current Address: 211 Horn
Resource Number: 5GL.7.380
NHL Resource Number: B10-N

Current Photographs
Date: 04/09/2009 & 01/21/2010
Current Address: 211 Horn
Resource Number: 5GL.7.380
NHL Resource Number: B10-N

2004 Photograph

1998 Resurvey Photograph
Current Address: 211 Horn
Resource Number: 5GL.7.380
NHL Resource Number: B10-N

1986 Survey Photograph

Gilpin County Assessor’s Photographs
Historic photographs

Ca. 1900
Historic photographs (cont.)

ca. 1912
ATTACHMENT B

PEH ARCHITECTS PARTIAL CONSTRUCTION DOCUMENT
PLAN SET
Click to view the PDF file.
Project Manual

211 Horn Street
Black Hawk, CO

5/8/17
CD Submission

PEH ARCHITECTS
1319 Spruce Street Suite 207 Boulder, CO 80302
phone: 303-442-0408 email: peheinz@peharchitects.com
# TABLE OF CONTENTS

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  Appendix F: ResCheck Compliance Certificate
  Appendix G: PCM Asbestos Clearance Report
General Conditions and Modification to General Conditions:

These Outline Specifications are intended only to establish a scope and quality of work and are not intended to be complete detailed specifications. Where only one manufacturer is indicated, provide products of that manufacturer. “Equal” products may be submitted concurrently but shall not be submitted as a substitute without prior authorization.

It is implied and required that work which is not fully specified and/or detailed shall comply with applicable, recognized standards of the construction industry for the intended use of work, and shall be complete.

Where there is a conflict between the specifications and the drawings or within the specifications, the Contractor is to assume the higher quality, more expensive product or detail is to be used. It is the responsibility of the Contractor to ask for clarification from the Architect/Design Team.

Dimensions take precedence over scaled drawings. Large scale drawings take precedence over small scale drawings. Concrete and masonry dimensions are to face of concrete or masonry. Wood or steel stud construction is dimensioned to face of finished material unless noted otherwise. Do not scale drawings unless directed by the architect.

Before starting each portion of work, the contractor shall carefully study and compare the various drawings and other contract documents relative to that portion of work. The contractor shall field verify any existing condition related to that portion of work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the contract documents; however, any errors, inconsistencies or omissions discovered by the contractor shall be reported to the architects as an RFI.

Any discrepancies found between the drawings and specifications, and site conditions, or any inconsistencies or ambiguities in the drawings or specifications shall be immediately reported to the owner, in writing, who will promptly resolve such inconsistencies or ambiguities in writing. Work done on unreported discrepancies, inconsistencies or ambiguities by the contractor shall be done at the contractor’s risk.
1 GENERAL CONDITIONS SUPPLEMENT

Summary of Work: (Project Description)

This project consists of a two-story historic structure to be finished as indicated on the drawings. Scope is defined in these Outline Specifications and Drawings dated 5/8/17. The project is located at 211 Horn Street, Black Hawk, Colorado.

General Alternate Requirements:

General: The description for each alternate is recognized to be incomplete and abbreviated, but implies that each change must be complete for the scope of work affected. Refer to applicable sections and to applicable drawings for the specific requirements of the Owner, whether or not references are so noted in the description of each alternate. Modify surrounding work as required to integrate with the work of each alternate. Each alternate shall be priced to include all labor, materials, and general conditions associated with completing the work.

1. Alternate #1: Rough-in for future connection to garage plumbing
   GC to extend, as shown in the plans, domestic hot/cold water pipes and natural gas pipes for future connection to the garage appliances and fixtures. Alternate to include pipe that would be considered additional to what is needed for standard fixtures of the base bid. All pipes to terminate in the attic over the MUD room and be accessible via a flush mount metal access panel. See plans for additional notes. Water pipes are ear-marked for the future connection of 1 toilet, 1 lavatory, 1 shower and hose-bib. The gas pipe is ear-marked for the future connection of a gas furnace to heat the 2nd floor over the garage.

2. Alternate #2: 14” sun tube
   Install a 14” round Velux pitched TMR in lieu of the 10” round as specified in section “8 Doors and Windows” of this project manual.

3. Alternate #3: New roofing at northern (non-historic) portion of Mountain shop
   Removed and replace the existing asphalt shingles at the northern section of the Mountain shop designated as non-historic on sheet A000. Existing plywood sheathing is assumed sufficient and to be reused. GC shall include roofing paper, drip edge to match specifications for rehabilitation for the southern portion. Match the roofing spec used in Alternate #7.

4. Alternate #4: Gas service to back of Studio
   GC to extend, as shown in the plans, the natural gas piping to the east elevation of the 2nd floor studio space. Alternate to include pipe that would be considered additional to what is needed for standard fixtures of the base bid. See plans for additional notes. Gas pipe is ear marked for the future connection of a gas furnace at the shed.

5. Alternate #5: Rough-in at Studio for lavatory
   GC to extend, as shown in the plans, the waste/vent piping at the 2nd floor studio space. Alternate to include pipe that would be considered additional to what is needed for standard fixtures of the base bid. See plans for additional notes.
6. **Alternate #6: Reconstruct the low height site stone retaining walls.**

Reconstruct the three low-height retaining walls at the south side of the house (highlighted in the image below). Reconstructed walls shall be mortared stone walls with frost protected foundation or be built on solid bedrock per construction details, to include rear wall drainage. Walls shall be built to match the existing top of wall and bottom of wall locations as shown on the civil drawings. Photographs of existing conditions shall be documented and submitted by the GC prior to reconstruction.

“Reconstruction” of walls shall mean that the contractor is to carefully remove, clean, and reconstruct the existing rock walls in conformance with the Black Hawk standard wall details (see sheet C301). Salvage stone from existing walls to be reused in the reconstruction of the new wall. Reconstructed walls shall match the aesthetic of the existing wall removed. There may be need for various wall aesthetics to match existing conditions. New stone shall be brought on as needed to complete the work.

“INSERT IMAGE”
7. **Alternate # 7 - Full Rehabilitation of the Historic Wood Shed:**

Rehabilitate the wood shed east of the Studio. Rehabilitation of the wood shed shall be extensive to maintain existing historic features while bolstering the structural and weather resistant integrity. Construction drawings have not been created, but will be provided if cost of this alternate is approved by City Council. In an effort to describe the scope of rehabilitation the following bulleted list is provided in addition to the sketch following the bulleted narrative.

   a) Roofing – Remove existing roofing. Install new roofing over continuous ice and water shield over new sheathing over existing board sheathing.
      a. Gutters are not to be replaced.
      b. UnaClad UC601 corrugated panels, 24 gauge galvanized steel, silver metallic finish with exposed fasteners.

   b) Siding - Existing weathered board and batten siding to remain. Install new cedar board and batten siding at rear (east) side of shed. New and existing boards to remain untreated (allowed to naturally weather).

   c) Framing - Existing to remain.

   d) Structural reinforcing - Install a new post and beam line tight to east wall of shed. Saw cut concrete floor install new concrete footing to bear on assumed bedrock - dowel to bedrock. Some excavation of soil is expected.

   e) Foundation - Existing foundations to remain.

   f) CMU retaining wall - remove and replace grouted CMU wall where wall is out of plumb.

   g) Windows - Existing glazing putty contains asbestos. GC to tape the windows so the glazing does not come loose, and put poly down on the ground. Wrap the windows in that poly once removed and put in dumpster. Replace fixed wood sash window with new multi-lite single pane sash. Sash to be painted a dark brown and caulked into place. Replace interior and exterior wood stops.

   h) Interior Door - Existing to remain.


   j) Trees - Remove two large trees at rear of shed to facilitate installation of a new retaining wall.

   k) Stone retaining wall - Install a new stone retaining wall behind the shed (historic portion and non-historic portion). Stone retaining wall is anticipated to be greater than 4 feet in height. Stone wall shall be grouted and property founded on frost depth concrete footing or doweled to bedrock.

   l) Concrete Drainage swale - install a concrete drainage swale behind the shed (historic portion and non-historic portion). Concrete drainage swale shall be a minimum of 6” below the top of the CMU retaining wall.

   m) Wood lean-to - fully demolish the three-sided wood lean-to east of the shed. Regrade area as necessary to blend with natural grading.

"INSERT IMAGE"
SITE WORK

Site Access: Horn Street

Demolition: Coordinate with demo plan and site plans

Grading-Excavating: Excavate as required to install foundation improvement and provide 30” depth crawl space under house. Excavate/backfill site to install underground utilities per Civil Drawings.

Bedrock removal is expected and is to be included within the contractor’s base bid. Bedrock removal shall be included for foundations, crawlspace, retaining walls, underground drain, radon piping, and domestic plumbing. Contractor to become familiar with Geotech report, and coordinate with drawings.

Drain Pipe: See Civil Drawings

Extra Dirt: Remove from site.

Top Soil: Spread evenly on disturbed areas.

Landscaping: Seed all disturbed grading; Steep slopes with “multi-color high altitude seed mix” and front yard areas with “Wear Tolerant” turf grass, each are from Arkansas Valley Seed. Provide erosion control mat and temporary irrigation until completion of project. Soil retention blanket shall be a machine produced mat consisting of 70% agricultural straw and 30% coconut fiber. The blanket shall be covered with biodegradable netting having an approx. 5/8”x5/8” mesh on top and bottom, and be sewn together with cotton, biodegradable or photodegradable thread.

Irrigation System: N/A

Site Fence: Section 5: Ornamental guardrail and Section 5: Wire Metal Fencing

Retaining Walls: See Section 4: Masonry

Tree Removal: Remove or cut down trees as shown on the site plan. Removal shall include grinding out stump to a minimum of 12” below grade.

Sandstone Path: N/A
3 CONCRETE

Strength: See structural drawings.

Concrete: Ready-mix.

Thickness: 4” U.N.O.

Control joints: ¾” depth tooled or saw cut.

Expansion joints: ½” expansion filler material with plastic leveling screed peel-off caulk strip. ½” wide x ½” deep polyurethane non-sag self-leveling sealant. Provide at all junctions of slab and building, foundations, rock walls or other vertical improvements.

Reinforcing: Fibermesh or as noted in the drawings.

Finish: Light broom exterior, steel trowel interior.

Exposed Vertical Conc.: All exposed vertical concrete at foundations and retaining wall shall have a smooth light broom and uniform finish. Provide trowel on finish.

Protective coating: N/A

Conc. Stain: N/A

Walkways: 4” concrete with deep tooled control joints at 4’x4’ spacing (or as shown on plan) over 4” compacted road base. Provide expansion joints at all junctions of slab, building and rock walls as noted above.

Driveway: N/A

Exterior Patio: 4” thick with broom finish over 4” compacted road base. Provide expansion joints at all junctions of slab and building as noted above. Control joints as shown on plans.

Drainage Swale: 4” thick with broom finish over 4” compacted road base. Provide expansion joints at all junctions of slab and building as noted above. Control joints at 12’-0” O.C. maximum.

Concrete Stairs: 6” min. thickness, ½” bull nose, broom finish

Concrete Retaining Wall: See structural plans and details. Concrete at retaining walls to be stained (see Section 9: Painting/Staining)

Conc. Splash block: 12”w x 24”l x 3”h precast reinforced concrete splash block (Copeland Enterprises or equal).
Stone Retaining Wall: Existing stone wall material shall be cleaned of mortar and is to be reused where possible, see Civil general notes. New stone shall be irregular, rough, uncut native stone and should be integrated throughout the wall with the reused existing stone to maintain consistency of adjacent and existing wall. Each wall is to be constructed using similar size face of stones as the observed measurements provided in the Stone Masonry Foundation and Retaining Wall Evaluation Re: Appendix E. Coursing to be roughly horizontal and match the existing aesthetic of existing wall construction, stone color, and variation. Wall batter and location shall be constructed as specified by Civil.


Stone Veneer (foundation): Native stone, roughly 4” to 6” thick. Coursing to be roughly horizontal with irregular, rough, un-cut rubble of 50 square inches maximum (16”x3” to 7”x7”) in face diameter. Provide reinforcing ties as detailed/specifyed by structural.

Stone Veneer Mortar: ASTM C270 Type O. Mortar joint to be flush with face of stone. Proportions of 1: 2: 9 (Portland: Lime: sand)

Stone Foundation: N/A

Stone Foundation Mortar: N/A

Brick Chimney: N/A

Brick Chimney Mortar: N/A
# METALS

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel Items</td>
<td>Primed 1 coat.</td>
</tr>
<tr>
<td>Foundation Bolts</td>
<td>½” x 10”. ASTM A307 or A36, see structural drawings.</td>
</tr>
<tr>
<td>Post Stirrups</td>
<td>1/8” steel. See Structural Drawings.</td>
</tr>
<tr>
<td>Beam/Post Straps</td>
<td>1/8” steel. See Structural Drawings.</td>
</tr>
<tr>
<td>Connectors</td>
<td>1/8” steel strapping or Simpson connectors. See Structural Drawings.</td>
</tr>
<tr>
<td>Handrail @ site stairs</td>
<td>1 ½” Diameter steel pipe with welded joints. Grind joints smooth. Powder coat black. Field touch up paint w/ black polyurethane paint. Provide vertical post or shop manufactured bracket at 6’-0” O.C. max.</td>
</tr>
<tr>
<td>Ornamental Guardrail</td>
<td>See drawings for details, powder coated black (shop painted with field touch-ups using polyurethane paint). Grind all welds smooth. Panel at sloping grade to be installed on a rake to follow finished grade (top and bottom rail to follow slope of finished grade; posts &amp; pickets to be vertical).</td>
</tr>
<tr>
<td>Wire Metal Fencing</td>
<td>See drawings for details. All posts and horizontal rails to be mild steel allowed to naturally rust. Grind all welds smooth. Wire fencing (48” height) to be galvanized 8 ga., woven single loop, LIMITED SUPPLY available 1st quarter of 2017 at American Iron Fence (217-773-3778) <a href="http://www.arusticgarden.com">http://www.arusticgarden.com</a>. Wire tied at each steel post and at 24” O.C. top and bottom. Panel at sloping grade to be installed on a rake to follow finished grade (top and bottom rail to follow slope of finished grade; posts to be vertical).</td>
</tr>
<tr>
<td>Material</td>
<td>Specification</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Studs:</td>
<td>Hem Fir, #2 or better, U.N.O.  See Structural Plans.</td>
</tr>
<tr>
<td>Framing Lumber:</td>
<td>Hem Fir, #2 or better, U.N.O.  See Structural Plans.</td>
</tr>
<tr>
<td>Roof Trusses:</td>
<td>N/A</td>
</tr>
<tr>
<td>Beams:</td>
<td>See Structural Plans.</td>
</tr>
<tr>
<td>Backing for Accessories:</td>
<td>2x6 U.N.O., backing shall be provided at the following locations: 36” above tub/shower floor and at shelf standards in Laundry and Stor. rooms.</td>
</tr>
<tr>
<td>Wall Sheathing:</td>
<td>½” CDX plywood or 7/16” OSB - APA rated 24/16 exp 1, blocked and nailed U.N.O., Re: Structural.</td>
</tr>
<tr>
<td>Roof Sheathing:</td>
<td>½” CDX plywood or 15/32” OSB, APA 32/16, nailed, Re: Structural. Provide additional layer(s) of plywood sheathing where aligning to existing plank sheathing. 2x6 T&amp;G structural decking at Covered Porch, see structural drawings for specification.</td>
</tr>
<tr>
<td>Subfloor:</td>
<td>¾” T&amp;G “Sturd-I-Floor”, glue and screw install per structural.</td>
</tr>
<tr>
<td>Soffit:</td>
<td>5/8” x 6” tongue and groove V-groove beadboard, smooth pine or doug fir, painted. To be installed parallel to the wall face. Miter joint and align rake/eave junctions.</td>
</tr>
<tr>
<td>Fascia:</td>
<td>6” fascia = 7/8” x 6” actual, rough western red cedar, clear vertical grain, plowed for soffit. Running trim to have bevel joint oriented to shed water. Pre-prime all 6 sides and field cuts prior to install.</td>
</tr>
<tr>
<td>Interior Trim:</td>
<td>All trim to be a poplar or solid wood (no finger joint material) paint grade. See drawings for profiles.</td>
</tr>
<tr>
<td>Base:</td>
<td>See “interior trim”</td>
</tr>
<tr>
<td>Casing:</td>
<td>See “interior trim”</td>
</tr>
<tr>
<td>Material:</td>
<td>See “interior trim”</td>
</tr>
<tr>
<td>Window:</td>
<td>See “interior trim”</td>
</tr>
<tr>
<td>Door:</td>
<td>See “interior trim”</td>
</tr>
</tbody>
</table>
Exterior Trim @ Horz Lap: 7/8" Smooth western red cedar, clear vertical grain. 7/8" thickness is based on ripping 8/4" rough sawn into 2 boards. Running trim to have bevel joint oriented to shed water. Siding is not to project past the edge of the trim. Trim available at Wood Source (303-297-8310) or equal. Pre-prime all 6 sides and field cuts prior to install.

Corner: 4" trim = 7/8" x 4" actual. Rip one board per corner to maintain a 4" exposure on each wall face.

Window: 4" trim = 7/8" x 4" actual for jamb. Include ripped 2"x4" rough sawn sill extension w/ sloped top and drip edge krf cut. 7/8"x4" actual for head include ripped ½" actual thickness for cap overhead trim. See Elevation Drawings.

Door: 4" trim = 7/4" x 4" actual rough sawn for head and jamb. Thicker trim at door is needed for storm doors.

Mounting Blocks: Provide one solid board at all wall mounted equipment (butt joint boards not acceptable). Board sizes to be coordinated with equipment to allow full flush mount. Provide flashing at top of board. Paint board to match siding. Do not interrupt trim or casing to install mounting blocks. Sizes as follows:

- Light fixture: 8"x8"x7/8"
- Elec. Outlets: 8"x8"x7/8"
- Hose bib: 8"x8"x7/8"
- Exhaust wall cap: Coordinate with wall cap size (min. 1" larger on each 4 sides).
- Elec. Meter/disconnect: Coordinate with equipment size (min. 1" larger on each 4 sides).
- Pipe penetrations: No mounting blocking, cut siding tight around pipe penetrations.

Exterior Siding @ Garage: Match existing board and batten siding, to include dimensions, species, cut and texture. Wood siding is anticipated to be a custom milling. Approximate dimensions are 3" x 3/4" batten over 12" x 3/4" boards. Pre-prime. Siding is to be painted to match existing. Fasteners to be located per WWPA recommendations (exposed and flush with siding surface).

V-Groove Siding @ Enclosed Porch: Same as “soffit” specification. Pre-prime all 6 sides and field cuts prior to installation.
### Deck:

**Decking:** Stained 5/4x6 “custom clear” smooth cedar S4S with eased edge. Picture frame deck edges (no exposed end grain). Grade C+better.

**Fasteners:** Concealed. Tiger claw TC-1 or equal.

**Top Rail:** N/A.

**Guardrail:** N/A.

**Sawn Baluster:** N/A.

**Posts:** Existing posts to remain.

**Porch:** N/A

### Exterior Stairs @ studio:

**Stringer:** 2x12 P.T. and 1x12 finish stringers cedar (C+better) painted.

**Treads:** 5/4x6 clear cedar (C+better) S4S with eased edge, stained.

**Riser:** Ripped 1x8 cedar (C+better) smooth, painted.

**Handrail:** See Section 5: Metals

**Top Rail:** 2x6 cedar (C+better) smooth, ripped to slope top edge, stained.

**Balusters:** 2x4 and 2x6 cedar (C+better) smooth, stained

**Sawn Balusters:** N/A.

**Newel Post:** 4x4 clear cedar, stained.
7 THERMAL AND MOISTURE PROTECTION

Roofing: Asphalt, Owens Corning Duration Shingles, “Estate Gray”.

Warranty: Limited lifetime warranty with 10 year true protection

Roofing Paper: N/A - provide continuous ice & water shield.

Ice + Water Shield: Install continuous Ice + Water Shield.

Valley Flashing: Lace asphalt shingles over valley. 3'-0" ice and water shield (1'-6" each side of valley).

Membrane Roofing: 60 mil black EPDM roofing. Fully adhered roofing assembly per manufacturer requirements. Firestone, Carlisle, or equal. Note: Roof sheathing must be screwed to rafters.

Roof Accessories:

Drip Edge: 24 gauge galvanized, pre-finished.

Roof Vent: N/A

Soffit Vent: N/A

Gutters: Galvanized 24 gage steel. Not painted. Hidden clips with roof bracket/strap (under roofing) @ 18" O.C.

Size/Shape: 6" Half Round, with reverse bead (coordinate w/ clips).


Size/Shape: 4" circular.

Also provide 2x4 rectangular downspout at the garage. GC to verify downspout size. Painted.

Drainage Plane at Concrete Retaining Wall: American Wick Drain, “Sheet drain” drainage plane. 0.39" (10mm) depth polypropylene sheets. They are formed with dimples and a spunbond polypropylene fabric on one side. (Fabric to be on “dirt” side). Wrap fabric edge over top of plastic dimple sheet near top of grade. Hold drainage plane 2" below finished grade. Drainage plane to freely drain to perforated foundation drain system (wrapped in clean aggregate and geotextile fabric - see Civil drawings).

Masonry Weep: N/A
**Insulation:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall:</td>
<td>R-24 depth, 2lb. closed cell spray foam by Bayseal (R-6.9/Inch).</td>
</tr>
<tr>
<td>Under Roof:</td>
<td>R-49 depth, 2lb. closed cell spray foam by Bayseal (R-6.9/Inch). Provide intumescent paint in exposed attic areas as required by local code and per manufacturer’s instructions. (Contractor’s option to use closed cell spray foam with class 1 fire rating).</td>
</tr>
<tr>
<td>Flat Ceiling:</td>
<td>N/A</td>
</tr>
<tr>
<td>S.O.G. Conc. Floor:</td>
<td>2 layers of 1” rigid insulation (R-10 total) stagger joints Owens Corning “Foamular 250” (25psi) or equal.</td>
</tr>
<tr>
<td>Foundation @ S.O.G.:</td>
<td>1 layer of 2” rigid insulation (R-10 total) adheared to concrete foundation prior to backfill. Owens Corning “Foamular 250” (25 psi) or equal.</td>
</tr>
<tr>
<td>Foundation @ crawl:</td>
<td>R-15 depth, 2lb. closed cell spray foam by Bayseal (R-6.9/Inch). Provide intumescent paint in exposed crawl space areas as required by local code and per manufacturer’s instructions. Provide 2’ of R-15 spray foam on crawl space floor over vapor barrier, see drawings. (Contractor’s option to use closed cell spray foam with class 1 fire rating).</td>
</tr>
<tr>
<td>Foam Insulation:</td>
<td>All electrical outlets and wire holes in plates/joists, windows and exterior doors (low expanding foam @ doors and windows).</td>
</tr>
<tr>
<td>Pipe Insulation:</td>
<td>See Mechanical Plans.</td>
</tr>
<tr>
<td>Vapor Barrier:</td>
<td>Class A - 15 mil, Stego Industries or equal. 12” overlap of sheet, 6” up foundation walls. Tape all seams with manufacturer’s tape. Seal all penetrations with manufacture’s tape. Tape to be 3.75” minimum width. Follow manufacturer’s installation instructions.</td>
</tr>
<tr>
<td>Building Paper or WRB (Weather Resistive Barrier):</td>
<td>Tyvek “Drain Wrap” vapor permeable infiltration barrier with vertical drainage channels. Minimum 6” vertical overlap. Manufacturer approved tape at all seams, flashing head AND PENETRATIONS.</td>
</tr>
<tr>
<td>Asphaltic Waterproofing:</td>
<td>Bituminous Damproofing - Provide 2 coats of an asphalt emulsion conforming to ASTM D1 187 to exterior vertical concrete surfaces of the foundation and at concrete retaining walls. Do not extend above grade. Do not apply to stone foundation or stone veneer.</td>
</tr>
</tbody>
</table>
DOORS AND WINDOWS

New Windows:

Brand: Marvin

Type: Next Generation Ultimate Clad Double Hung

Interior: Pine, factory applied prime. G.C. to paint per "Section 9c Interior Trim"

Jamb Extensions: Exclude factory jamb extensions. G.C. to provide poplar 1x extensions installed in the field – custom depth to match wall thickness. (See details in plans)

Exterior: Factory applied AAMA 2605-05 finish. Color to be “Wineberry.”

Glass: LOE-272, Double Pane clear U.N.O. U-Value 0.33 (provide decorative glass as noted in window schedule).

Tempered Glass: See Window Schedule on plans.

Egress: See Window Schedule on plans.

Screens: Aluminum full screen frame to match window finish. Charcoal fiberglass screen mesh.

Divided Lights: 5/8" SDLS simulated divided lite w/ spacer bar. Square interior sticking.

Hardware: Satin nickel finish sash lock and sash lift.

Flashing: Flash per manufacturer’s instructions (See window details on plans).

Warranty: Glazing - 20 year seal failure/10 year stress crack - Non-glazing components - 10 years Exterior cladding – 20 years

Additional Window Notes: G.C. is encouraged to schedule a pre-walk with Marvin representative for flashing and building paper installation.

Site-built window(s): Double pane w/ Low-E Clear (hard coat low-E PPG 500 SunGate annealed glass on the 2nd surface) tempered glass 1” thick with grey super spacer. Field measure glass and install per details in drawings. Glass thicknesses, interior 3/16", exterior 1/4". Tempering per window schedule.
Skylights: 10” round Velux pitched TMR with rigid reflective tunnel. Include ZTC energy kit. Provide additional rigid tubes as needed to meet installation design per drawings. Seal all joints in tube with manufacture PVC tape. Spray exterior of tube with spray foam insulation to meet roofing insulation specifications.

Mirrors: (also see Section 10: Specialties for med cabinet)

Plate: ¼” frameless, polished edge.

Size: Per plan (see interior elevations).

Location: Bath

Doors:

Interior Passage Doors: Solid wood, painted – see door schedule.

Existing Ext. Doors: N/A

Exterior Doors: Solid Wood, painted - see door schedule.

Exterior Utility Room Door: N/A

Exterior Storm Doors: Larsen - Elegant Easy Vent with Retractable Screen Away - Full view #146FVE with white finish. Larsen “Quickfit” lockset & deadbolt with key to match entry door (satin nickel finish). Clear tempered low-e coated glass (no bevel) with retractable screen). GC to verify and provide custom sizing.

Door Frames Interior and exterior door frames to be finger-joint material. Provide kerf for weather stripping at exterior doors.

Weather seals: Install/provide new at all new and existing exterior doors.

Thresholds: Adjustable oak top sill with anodized aluminum exterior (Pemko or equal). Exterior finish to be anodized dark bronze aluminum. Provide aluminum sill extension to ensure full coverage at door threshold.

Hinges: 3 per door, finish to be satin nickel, (3 ½”x3 ½” @ 1 3/8” doors and 4”x4” @1 ¾” doors).
## A. DRYWALL/PLASTER

<table>
<thead>
<tr>
<th>Material:</th>
<th>Gypsum wallboard - regular tapered edges throughout.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finish Level:</td>
<td>Level 4 finish, provide paper board furring, plywood</td>
</tr>
<tr>
<td></td>
<td>furring, and other accessories to ensure gyp board is</td>
</tr>
<tr>
<td></td>
<td>plumb with the following tolerances: 1/16” per foot,</td>
</tr>
<tr>
<td></td>
<td>1/8” per 8 feet. Install furring at all new stud walls</td>
</tr>
<tr>
<td></td>
<td>and rough sawn stud walls, to ensure continuous plumb</td>
</tr>
<tr>
<td></td>
<td>plane.</td>
</tr>
<tr>
<td>Wet Locations:</td>
<td>1/2” Dens-Shield underlayment. Coordinate with wall</td>
</tr>
<tr>
<td></td>
<td>tile specification.</td>
</tr>
<tr>
<td>Thickness:</td>
<td>1/2” U.N.O. – Provide 5/8” Type-X at ceiling framing</td>
</tr>
<tr>
<td></td>
<td>that exceeds 16” O.C.</td>
</tr>
<tr>
<td>Joint Treatment:</td>
<td>Butt Joint.</td>
</tr>
<tr>
<td>Corner Treatment:</td>
<td>Square.</td>
</tr>
<tr>
<td>Attachment:</td>
<td>All drywall must be screwed.</td>
</tr>
<tr>
<td>Wall Finish:</td>
<td>Medium texture with knockdown</td>
</tr>
<tr>
<td>Ceiling Finishes:</td>
<td>Smooth</td>
</tr>
<tr>
<td>No Finish Area:</td>
<td>N/A</td>
</tr>
</tbody>
</table>
PAINTING/STAINING

Additional Product: Provide (1) un-used full gallon of each finish paint (interior and exterior) at end of project for home owner storage and use.

Paint Primer: Provide (1) coat of primer for all painted areas prior to applying the required listed number of finish coats of paint per each material section. Primer shall be of contrasting color to finish paint.

Exterior Wood: 3 coats satin acrylic latex over 1 coat primer. 3 color scheme. Exterior paint to be applied with either brush or roller only (spray allowed with back roll). All paint by Sherwin Williams A-100 exterior latex A82 series or equal (coordinate w/ exterior rendering in Appendix).

Body: Sherwin Williams “Downing Stone SW2821”

Accent: Sherwin Williams “Crabby Apple SW7592”

Trim, soffit and porch ceiling: Sherwin Williams “Pure white #SW7005”

Deck & Wood Stair Stain: GC to submit 12x12 cured system sample (with all 3 coats) for approval.

SuperDeck Semi-Transparent Oil:
- 1st Coat: SW Superdeck Deck Wash
- 3rd Coat: SW Superdeck Premium Waterborne Solid Color Deck Stain, “SW3568 Weathered Gray”

Breathable Waterproof Finish: N/A

Concrete Stain: Prep: Use H&C Etching Solution on all surfaces to be stained.

Stain: Apply the first coat using a pump-up sprayer on a dry surface using caution to avoid track lines. A circular motion with the wand is best. Back-roll to avoid drip lines. H&C Semi-Transparent Decorative Stain can be applied full strength or diluted with water to lighten the color, if desired. Do not exceed a 4:1 (water to stain) mix ratio. Assume 2 or 3 coats of stain may be needed to achieve desired color. Color to be "CORK”.

Finish: Apply one coat of H&C Paver Sealer Natural.


10 SPECIALTIES

Crawl Space Vents: N/A – Crawl space to be mechanically conditioned. See Mechanical Drawings.

House Numbers: 4” high, Aged Bronze (dark color numbers over light siding paint). Schlage Classic House numbers.

Medicine Cabinets: N/A

Fireplace: N/A

Attic Ladder: N/A

Bathroom Accessories: See Appendix B for selection(s). See interior elevations for mount height(s) and location.

  Towel Ring: See Appendix B.

  Towel Rod: See Appendix B.

  Robe Hook: See Appendix B.

  Shower Curtain Rod: Barclay Products 60” straight shower rod. Available at Home Depot. BATH – Model # 4100-60-SN, satin nickel.

  Toilet Tissue Holder: See Appendix B.

Custom shower:

  Shower Pan: N/A

  Glass Wall/Door: N/A
ATTACHMENT D

PEH ARCHITECTS PAINT COLORS
SIDING COLOR
SHERWIN WILLIAMS
DOWNING STONE SW2821

SHINGLES
OWENS CORNING
DURATION SERIES
ESTATE GRAY

TRIM, SOFFIT, CEILING
SHERWIN WILLIAMS
PURE WHITE SW7005

DECK STAIN COLOR
SHERWIN WILLIAMS SUPERDECK
WEATHERED GRAY SW3568
SEMI-TRANSPARENT STAIN

ACCENT COLOR
SHERWIN WILLIAMS
CRABBY APPLE SW7592
MATCH TO MARVIN COLOR

WINDOW TRIM
MARVIN
WINEBERRY

211 HORN STREET
BLACK HAWK • COLORADO
Investigation Report

Masonry Foundation and Retaining Wall Evaluation

211 Horn Street
Black Hawk, Colorado

ANA Project #16-021

Prepared for:
Ms. Cynthia L. Linker
Community Planning and Development Administrator
PO Box 68, 211 Church Street
Black Hawk, CO 80422

Prepared by:
Atkinson-Noland & Associates, Inc.
Consulting Engineers
2619 Spruce Street
Boulder, CO 80302
(303) 444-3620

October 10, 2016
1 Introduction and Background
Atkinson-Noland & Associates, Inc. (ANA) has prepared this report of findings and analysis of masonry retaining walls and foundation walls at 211 Horn Street in Black Hawk, Colorado. ANA performed observations at CMU foundation walls in the garage and under the house, and stone retaining walls at the roadside, south property line, garden, and at the back of the home. Site plan drawings were not available at the time of investigation.

This report includes documentation of current conditions of masonry walls, results of simple structural analysis, and results of laboratory mortar testing.

Andrew Geister, P.E. and Josh Potter of ANA were on site September 8, 2016 to perform the investigation and collect mortar samples. Scott McClelland of NV5 coordinated site access and provided direction on the scope of the investigation.

2 Approach and Methodology
The typical approach that ANA followed was to observe, photograph, and note conditions at each wall investigated. Wall characteristics such as height, thickness, batter, and solidity were documented. The majority of wall characteristics were determined with visual observations and physical measurements; batter was determined using a laser level, and thickness was determined using ground penetrating radar and physical measurements. Wall solidity was observed using a fiber optic borescope inserted into joints between units. Observations were conducted at multiple locations and heights for each wall investigated.

A simple gravity analysis incorporating the wall characteristic data collected on site was performed to evaluate factors of safety for each wall against overturning and sliding. Factors of safety, from the American Association of State Highway and Transportation Officials (AASHTO), are 1.5 for sliding and overturning and 3.0 for bearing capacity.

A series of laboratory tests were performed to determine mortar binder/aggregate ratios, aggregate gradation, and the presence or absence of portland cement. A recommended mortar type for repairs, repointing, and rebuilding is based on these findings.

3 Findings and Analysis
3.1 Garage CMU Walls
Concrete masonry walls, visible from the garage interior, retain soil and function as foundation walls for the north and east walls of the house (Figure 1).
CMU walls measured 4’-8” in height from the top of the poured concrete footing to the bottom of the garage ceiling, and are built with 8” nominal (7-5/8” actual) thickness concrete masonry units. Surface penetrating radar scans of the garage walls found no reinforcing or grout in CMU cells. These findings were confirmed by the use of a sounding hammer throughout and videoscope observations at holes drilled into mortar joints at two locations.

Masonry face surface profile measurements at CMU garage walls are listed in Table 1. Walls appeared to be built relatively plumb without intentional batter. A slight negative batter was measured at one location along the east wall.

### Table 1. Garage wall surface profile measurements.

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>North wall, west end</td>
<td>3/8 in.</td>
<td>0.7 %</td>
</tr>
<tr>
<td>North wall, middle</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>East wall, north end</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>East wall, south end</td>
<td>-1/2 in.</td>
<td>-0.9 %</td>
</tr>
</tbody>
</table>

Although no visible moisture was observed during the investigation, efflorescence and staining indicating previous dampness were observed in localized areas along the east wall. Since the CMU cells are hollow, the source of moisture is likely not from groundwater or exterior runoff, since water infiltrating into the wall from the exterior would travel down to the bottom of empty cells rather than to the interior. A bathroom is located directly above one of the efflorescence areas, and plumbing pipe runs along the top of the east wall. It appears likely that condensation or leaks from the plumbing and possibly excess humidity from the bathroom are sources of moisture causing the observed efflorescence and water staining.

Analysis results for the CMU wall, listed in Table 2, show adequate capacity for shear, but inadequate capacity for flexure, assuming that the wall is retaining soil full height. It is possible, however, due to the presence of shallow bedrock, the amount of soil retained by the wall is less than assumed in the
analysis, especially since no cracking or distress was observed that would indicate the wall is overstressed.

Table 2. Wall analysis results for garage walls.

<table>
<thead>
<tr>
<th>Stability Analysis</th>
<th>Flexure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M_u$ 7823 in-lb $bending moment$</td>
</tr>
<tr>
<td></td>
<td>$M_{cr}$ 3888 in-lb $cracking moment$</td>
</tr>
<tr>
<td></td>
<td>$FS = \frac{M_{cr}}{M_u}$ 0.5</td>
</tr>
<tr>
<td>Shear</td>
<td>$V_u$ 1089 lb $shear force$</td>
</tr>
<tr>
<td></td>
<td>$V_n$ 4710 lb $nominal shear strength$</td>
</tr>
<tr>
<td></td>
<td>$FS_{sl}$ 4.32</td>
</tr>
</tbody>
</table>

References:

3.2 Sunroom CMU wall
The east and south walls of the sunroom consist of CMU (Figure 2) which were found to be unreinforced and hollow. Three small bracing walls are visible extending toward the original stone retaining wall within the small crawlspace created under the concrete walkway above. These walls were also found to be unreinforced and hollow, and in variable condition. Debonded mortar joints as well as displaced and loose units were observed in these locations. Only limited contact between CMU and the stone wall was observed, and it appears the primary function of these small CMU walls was to support the metal deck used to cast the concrete walkway above rather than to provide lateral support to the stone.

Figure 2. CMU walls in sunroom with openings to crawlspace containing small CMU support walls and original stone masonry retaining wall.
The sunroom CMU wall only retains soil up to 32” above the floor and doesn’t appear to provide lateral support to the original stone masonry retaining wall behind it. If the existing concrete walkway above and the CMU walls are to be removed, the stability of the original stone masonry retaining wall is not likely to be affected. The existing soil currently retained by the CMU would likely need to be removed or retained otherwise. Dimensions and surface profile measurements are shown in Table 3.

Table 3. Dimension measurements at sunroom CMU wall.

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Thickness</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunroom CMU</td>
<td>6’-10”</td>
<td>7-5/8 in.</td>
<td>-¾ in.</td>
<td>-0.3 %</td>
</tr>
</tbody>
</table>

Analysis results for the wall show adequate capacity in shear, but less than typically accepted factor of safety for flexure. Analysis results for the wall are shown in Table 4.

Table 4. Wall analysis for sunroom CMU wall.

<table>
<thead>
<tr>
<th>Stability Analysis</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flexure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$M_u$</td>
<td>2820 in-lb</td>
<td>bending moment</td>
</tr>
<tr>
<td>$M_{cr}$</td>
<td>3888 in-lb</td>
<td>cracking moment</td>
</tr>
<tr>
<td>$FS = \frac{M_{cr}}{M_u}$</td>
<td>1.38</td>
<td></td>
</tr>
<tr>
<td><strong>Shear</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$V_u$</td>
<td>356 lb</td>
<td>shear force</td>
</tr>
<tr>
<td>$V_n$</td>
<td>4710 lb</td>
<td>nominal shear strength</td>
</tr>
<tr>
<td>$FS_{sl}$</td>
<td>13.2</td>
<td></td>
</tr>
</tbody>
</table>

References:

### 3.3 Crawlspace Stone Masonry Retaining Wall

Portions of a stone masonry retaining wall are visible through the two openings in the east wall of the sunroom (Figure 3) and is covered by the concrete walkway above. Wall dimension and surface profile measurements are shown in Table 5. A gravity stability analysis of the wall (Table 6) shows adequate capacity against overturning, sliding, and bearing.

The degree of mortar fill in joints between stones varied by location. The portion of the wall visible through the left opening contained 70%-75% filled mortar joints. The portion of the wall visible through the right opening were less than 20% filled with mortar. Most joints in this location contained only soil.
Table 5. Dimension measurements at crawlspace wall.

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Bottom Thickness</th>
<th>Top Thickness</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Side Opening</td>
<td>2'-4&quot;</td>
<td>9 in.</td>
<td>16 ½ in.</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Right Side Opening</td>
<td>2'-0&quot;</td>
<td>11 in.</td>
<td>7 in.</td>
<td>20 in.</td>
<td>83 %</td>
</tr>
</tbody>
</table>

Table 6. Gravity stability analysis for crawlspace wall.

<table>
<thead>
<tr>
<th>Stability Analysis</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Overturning</td>
<td>ΣMr</td>
<td>881</td>
<td>in-lb</td>
<td>restoring moment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ΣM0</td>
<td>464</td>
<td>in-lb</td>
<td>overturning moment</td>
<td></td>
</tr>
<tr>
<td>FSot = ΣMr/ΣM0</td>
<td>1.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sliding</td>
<td>μΣV</td>
<td>128</td>
<td>lb</td>
<td>sliding resistance force</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P*a-h</td>
<td>58.0</td>
<td>lb</td>
<td>sliding force</td>
<td></td>
</tr>
<tr>
<td>FSsl</td>
<td>2.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bearing</td>
<td>x = ΣMa/ΣV</td>
<td>0.16</td>
<td>ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b/6</td>
<td>0.10</td>
<td>ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>e</td>
<td>0.14</td>
<td>ft</td>
<td>e &gt; b/6, resultant is outside the middle third</td>
<td></td>
</tr>
<tr>
<td></td>
<td>σmax</td>
<td>947</td>
<td>lb/ft²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSbc</td>
<td>4.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References:
3.4 House Brick Wainscot
Portions of south and west exterior walls of the home contain a brick wainscot at the base of the wall (Figure 4). Wood siding and poured concrete foundations are visible continuing behind the brick, indicating the brick at these locations serves only as a veneer, and does not provide any structural support to the walls.

![Figure 4. Brick veneer wainscot at west (left) and south (right) exterior walls.](image)

3.5 South Roadside Wall Segment
Stone masonry walls run along the roadside at the east and along the south boundary with the adjacent property. Wall thickness at the tops of walls was taken by direct measurement and found to be 17 to 19 inches consistently with 18 inches being typical. At the bottoms of walls, thickness was detected using radar and confirmed with drilled holes in joints and videoscope observations and found to be 25 to 27 inches throughout the segment. Measurement locations for the south roadside wall segment are shown in Figure 5. Wall height and batter measurements are listed in Table 7.

A gravity stability analysis of the wall shows adequate resistance against sliding but capacities against overturning and bearing below typically accepted factors of safety (Table 8).

Mortar joints were observed solidly filled at the upper 2 feet of the wall, and approximately 30% filled below, including joints between stone wythes.
Figure 5. Measurement locations at south facing wall segment.

Table 7. Height and batter measurements at south facing wall segment.

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9'-1&quot;</td>
<td>1 in.</td>
<td>0.9 %</td>
</tr>
<tr>
<td>2</td>
<td>5'-1&quot;</td>
<td>5 in.</td>
<td>8.2 %</td>
</tr>
<tr>
<td>3</td>
<td>3'-9&quot;</td>
<td>3 in.</td>
<td>6.7 %</td>
</tr>
<tr>
<td>4</td>
<td>2'-10&quot;</td>
<td>3 ½ in.</td>
<td>10.3 %</td>
</tr>
</tbody>
</table>

Table 8. Gravity stability analysis for south facing wall.

**Stability Analysis**

**Overturning**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Sigma M_r$</td>
<td>50068 in-lb</td>
<td>restoring moment</td>
</tr>
<tr>
<td>$\Sigma M_0$</td>
<td>44622 in-lb</td>
<td>overturning moment</td>
</tr>
<tr>
<td>$FS_{ot}$</td>
<td>$\frac{\Sigma M_r}{\Sigma M_0}$</td>
<td>1.12</td>
</tr>
</tbody>
</table>

**Sliding**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\mu \Sigma V$</td>
<td>1893 lb</td>
<td>sliding resistance force</td>
</tr>
<tr>
<td>$P_{a-h}$</td>
<td>1228.1 lb</td>
<td>sliding force</td>
</tr>
<tr>
<td>$FS_{sl}$</td>
<td>1.54</td>
<td></td>
</tr>
</tbody>
</table>

**Bearing**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$x = \frac{\Sigma M_0}{\Sigma V}$</td>
<td>0.14 ft</td>
<td></td>
</tr>
<tr>
<td>$b/6$</td>
<td>0.35 ft</td>
<td></td>
</tr>
<tr>
<td>$e$</td>
<td>0.90 ft</td>
<td></td>
</tr>
<tr>
<td>$\sigma_{max}$</td>
<td>3,292 lb/ft$^2$</td>
<td></td>
</tr>
<tr>
<td>$FS_{bc}$</td>
<td>1.22</td>
<td></td>
</tr>
</tbody>
</table>

*Note: $e > b/6$, resultant is outside the middle third*
The east facing and stair portion of the south wall segment thickness matched that of the other parts of the segment, 17 to 19 inches at the top, and 25 to 27 inches at the bottom. Measurement locations for the east-facing south roadside wall segment are shown in Figure 6. Wall height and batter measurements are listed in Table 9.

A gravity stability analysis of the wall shows adequate resistance against sliding but capacities against overturning and bearing below typically accepted factors of safety (Table 10).

Mortar joints were observed solidly filled at the upper 2 feet of the wall, and approximately 30% filled below, including joints between stone wythes.

![Figure 6. Measurement locations at east facing south wall segment.](image)

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6'-2&quot;</td>
<td>1 in.</td>
<td>1.4 %</td>
</tr>
<tr>
<td>2</td>
<td>7'-0&quot;</td>
<td>3 ½ in.</td>
<td>4.2 %</td>
</tr>
<tr>
<td>3</td>
<td>8'-2&quot;</td>
<td>5 ¼ in.</td>
<td>5.4 %</td>
</tr>
<tr>
<td>4</td>
<td>9'-4&quot;</td>
<td>12 ½ in.</td>
<td>11.2 %</td>
</tr>
</tbody>
</table>
Table 10. Height and batter measurements at east facing south wall segment.

Stability Analysis

Overturning

\[ \Sigma M_r = 51859 \text{ in-lb} \quad \text{restoring moment} \]
\[ \Sigma M_0 = 48377 \text{ in-lb} \quad \text{overturning moment} \]

\[ \text{FS}_{ot} = \frac{\Sigma M_r}{\Sigma M_0} = 1.07 \]

Sliding

\[ \mu \Sigma V = 1955 \text{ lb} \quad \text{sliding resistance force} \]
\[ P_{a-h} = 1295.8 \text{ lb} \quad \text{sliding force} \]

\[ \text{FS}_{sl} = 1.51 \]

Bearing

\[ x = \frac{\Sigma M_A}{\Sigma V} = 0.09 \text{ ft} \]
\[ \frac{b}{6} = 0.35 \text{ ft} \]
\[ e = 0.96 \text{ ft} \]

\[ \sigma_{max} = 3,400 \text{ lb/ft}^2 \]

\[ \text{FS}_{bc} = 1.18 \]

References:


3.6 Middle Roadside Wall Segment

The middle roadside wall segment thickness at the top of the wall changed at locations along its length. From the stairs to 21’-9” from the north end, the top thickness measured 18 inches +/- ½ inch and the bottom thickness varied from 25 to 30 inches. At this point the top of wall thickness steps down to 12 inches and gradually tapers to 5 inches thick at the north end, while the bottom thickness was detected as 15 to 16 inches in this portion. Height and batter measurement locations for the middle roadside wall segment are shown in Figure 7. Wall height and batter measurements are listed in Table 11.
Table 11. Height and batter measurements at middle roadside wall segment.

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2'-10&quot;</td>
<td>1 ½ in.</td>
<td>4.4 %</td>
</tr>
<tr>
<td>2</td>
<td>5'-0&quot;</td>
<td>2 in.</td>
<td>3.3 %</td>
</tr>
<tr>
<td>3</td>
<td>7'-4&quot;</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>4</td>
<td>6'-9&quot;</td>
<td>-1/4 in.</td>
<td>-0.3 %</td>
</tr>
</tbody>
</table>

Deeply eroded joints and missing mortar were observed at nearly all visible wall surfaces at the narrower (northern) portion of the middle roadside wall. At the thicker (southern) portion, joints were observed to be 60-70% filled with mortar. Gaps and voids between stones were detected between stone wythes throughout the east facing walls at borescope observations. Mortar joints along the stair elevation were solidly filled.

Gravity stability analysis results for the wall, shown in Table 12, using the worst-case loading condition at the maximum measured height, show adequate capacities against sliding and overturning, but less than typically accepted factors of safety for bearing.

Table 12. Gravity stability analysis of middle roadside wall.

**Stability Analysis**

**Overturning**

\[
\Sigma M_r = 40627 \text{ in-lb (restoring moment)} \\
\Sigma M_0 = 22891 \text{ in-lb (overturning moment)} \\
FS_{ot} = \frac{\Sigma M_r}{\Sigma M_0} = 1.77
\]

**Sliding**

\[
\mu \Sigma V = 1475 \text{ lb (sliding resistance force)} \\
P_{a-h} = 780.4 \text{ lb (sliding force)} \\
FS_{sl} = 1.89
\]

**Bearing**

\[
x = \frac{\Sigma M_r}{\Sigma V} = 0.58 \text{ ft} \\
b/6 = 0.35 \text{ ft} \\
e = 0.47 \text{ ft} \\
\sigma_{max} = 2,566 \text{ lb/ft}^2 \\
FS_{bc} = 1.56
\]

**References**


3.7 North Roadside Wall Segment

The top of the north roadside wall segment measured 16 inches at corners, and typically 15 inches throughout its length, varying only slightly to a minimum of 14 inches. The thickness at the bottom of the wall measured 17 inches for 1/3 of the length from the south end, and 20 inches for the remainder. The 17 inch thick section was noted to be relatively solid at the interior, while many voids between stones were detected internally throughout the 20 inch thick section.

Height and batter measurement locations for the north roadside wall segment are shown in Figure 8. Wall height and batter measurements are listed in Table 13.

![Image of north roadside wall segment with measurement locations](image)

**Figure 8. Measurement locations at north roadside wall segment.**

**Table 13. Height and batter measurements at north roadside wall.**

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1'-11”</td>
<td>2 in.</td>
<td>8.7 %</td>
</tr>
<tr>
<td>2</td>
<td>4'-0”</td>
<td>4 in.</td>
<td>8.3 %</td>
</tr>
<tr>
<td>3</td>
<td>5'-8”</td>
<td>3 ¼ in.</td>
<td>5.5 %</td>
</tr>
</tbody>
</table>

Approximately 90% of joints were mortar-filled to within 1-2 inches of the wall face. Approximately 70% of these mortar joints appeared to be a harder, darker, more modern mortar, while the original mortar, where observed, was much more soft and crumbled easily.

Gravity stability analysis results for the wall, shown in Table 14, show that the wall is adequate for sliding but found less than typically accepted factors of safety for overturning and bearing capacity.
Table 14. Results of gravity wall analysis for north roadside wall.

### Stability Analysis

#### Overturning

\[
\Sigma M_r = 15243 \text{ in-lb} \quad \text{restoring moment}
\]
\[
\Sigma M_0 = 10562 \text{ in-lb} \quad \text{overturning moment}
\]

\[
FS_{ot} = \frac{\Sigma M_r}{\Sigma M_0} = 1.44
\]

#### Sliding

\[
\mu \Sigma V = 853 \text{ lb} \quad \text{sliding resistance force}
\]
\[
P_{a-h} = 466.0 \text{ lb} \quad \text{sliding force}
\]

\[
FS_{sl} = 1.83
\]

#### Bearing

\[
x = \frac{\Sigma M_A}{\Sigma V} = 0.26 \text{ ft}
\]
\[
b/6 = 0.24 \text{ ft}
\]
\[
e = 0.45 \text{ ft}
\]

\[
\sigma_{max} = 1,484 \text{ lb/ft}^2
\]

\[
FS_{bc} = 2.70
\]

**e > b/6, resultant is outside the middle third**

### References


### 3.8 Upper Tier Garden Wall

Three tiers of dry stacked stone retaining walls are present in the south garden and yard area of the property. Joints between stones do not contain mortar; some contain soil, but most are empty. Dimension measurement locations are shown in Figure 9, and measurements are listed in Table 15.

![Figure 9. Measurement locations at upper tier garden wall.](image-url)
Table 15. Dimension measurements at upper tier garden wall.

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Bottom Thickness</th>
<th>Top Thickness</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2'-0&quot;</td>
<td>12 in.</td>
<td>8 in.</td>
<td>5 ¾ in.</td>
<td>21.9 %</td>
</tr>
<tr>
<td>2</td>
<td>2'-8&quot;</td>
<td>16 in.</td>
<td>9 in.</td>
<td>11 ½ in.</td>
<td>35.9 %</td>
</tr>
<tr>
<td>3</td>
<td>2'-1&quot;</td>
<td>13 in.</td>
<td>7 in.</td>
<td>4 ¾ in.</td>
<td>17.0 %</td>
</tr>
<tr>
<td>4</td>
<td>2'-6&quot;</td>
<td>16 in.</td>
<td>9 ½ in.</td>
<td>½ in.</td>
<td>1.7 %</td>
</tr>
<tr>
<td>5</td>
<td>2'-6&quot;</td>
<td>12 in.</td>
<td>13 in.</td>
<td>4 in.</td>
<td>13.3 %</td>
</tr>
<tr>
<td>6</td>
<td>1'-8&quot;</td>
<td>12 in.</td>
<td>13 in.</td>
<td>3 ¾ in.</td>
<td>18.8 %</td>
</tr>
<tr>
<td>7</td>
<td>2'-0&quot;</td>
<td>14 in.</td>
<td>12 in.</td>
<td>7 ½ in.</td>
<td>31.3 %</td>
</tr>
<tr>
<td>8</td>
<td>2'-0&quot;</td>
<td>20 in.</td>
<td>19 in.</td>
<td>10 ½ in.</td>
<td>43.8 %</td>
</tr>
</tbody>
</table>

Gravity stability analysis results for the upper tier garden wall, listed in Table 16, show adequate capacities for overturning, sliding, and bearing.

Table 16. Results of gravity stability analysis for upper tier garden wall.

Stability Analysis

Overturning
\[ \Sigma M_r = 5235 \text{ in-lb} \]
\[ \Sigma M_0 = 1101 \text{ in-lb} \]
\[ FS_{ot} = \frac{\Sigma M_r}{\Sigma M_0} = 4.76 \]

Sliding
\[ \mu \Sigma V = 294 \text{ lb} \]
\[ P_{a-h} = 103.2 \text{ lb} \]
\[ FS_{sl} = 2.85 \]

Bearing
\[ x = \frac{\Sigma M_A}{\Sigma V} = 0.67 \text{ ft} \]
\[ b/6 = 0.22 \text{ ft} \]
\[ e = -0.01 \text{ ft} \]
\[ \sigma_{max} = 396 \text{ lb/ft}^2 \]
\[ FS_{bc} = 10.09 \]

3.9 Middle Tier Garden Wall

The middle tier garden wall is also a dry stacked stone with only soil or empty joints between stones. Dimension measurement locations are shown in Figure 10, and measurements are listed in Table 17. Gravity stability analysis results for the middle tier garden wall, listed in Table 18, show adequate capacities for overturning, sliding, and bearing.
Table 17. Dimension measurements at middle tier garden wall.

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Bottom Thickness</th>
<th>Top Thickness</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2' - 5&quot;</td>
<td>8 in.</td>
<td>10 in.</td>
<td>15 in.</td>
<td>51.7 %</td>
</tr>
<tr>
<td>2</td>
<td>2' - 7&quot;</td>
<td>15 in.</td>
<td>15 in.</td>
<td>15 ½ in.</td>
<td>50.8 %</td>
</tr>
<tr>
<td>3</td>
<td>1' - 1 ½&quot;</td>
<td>15 ½ in.</td>
<td>15 in.</td>
<td>7 in.</td>
<td>27.5 %</td>
</tr>
<tr>
<td>4</td>
<td>1' - 1 ½&quot;</td>
<td>11 in.</td>
<td>8 in.</td>
<td>2 ½ in.</td>
<td>18.5 %</td>
</tr>
</tbody>
</table>

Table 18. Results of gravity stability analysis for middle tier garden wall.

**Stability Analysis**

**Overturning**

\[
\Sigma M_r = 1409 \text{ in-lb} \quad \text{restoring moment}
\]

\[
\Sigma M_0 = 819 \text{ in-lb} \quad \text{overturning moment}
\]

\[
FS_{ot} = \frac{\Sigma M_r}{\Sigma M_0} = 1.72
\]

**Sliding**

\[
\mu \Sigma V = 178 \text{ lb} \quad \text{sliding resistance force}
\]

\[
P_{a-h} = 84.7 \text{ lb} \quad \text{sliding force}
\]

\[
FS_{sl} = 2.10
\]

**Bearing**

\[
x = \frac{\Sigma M_r}{\Sigma V} = 0.16 \text{ ft}
\]

\[
b/6 = 0.11 \text{ ft}
\]

\[
e = 0.17 \text{ ft}
\]

\[
\sigma_{max} = 464 \text{ lb/ft}^2
\]

\[
FS_{bc} = 8.63
\]

**Figure 10. Middle tier garden wall measurement locations.**
3.10 Lower Tier Garden Wall
The lower tier of garden wall consists essentially of stones placed around areas of exposed bedrock without mortar. Dimension measurement locations are shown in Figure 11, and measurements are listed in Table 19. Gravity stability analysis results for the middle tier garden wall, listed in Table 20, show adequate capacities for overturning, sliding, and bearing.

\[\text{Figure 11. Lower tier garden wall measurement locations.}\]

\[\text{Table 19. Dimension measurements at lower tier garden wall.}\]

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Bottom Thickness</th>
<th>Top Thickness</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1'·2”</td>
<td>10 in.</td>
<td>10 in.</td>
<td>3 ¾ in.</td>
<td>26.8 %</td>
</tr>
<tr>
<td>2</td>
<td>1'·9”</td>
<td>12 in.</td>
<td>12 in.</td>
<td>2 ¾ in.</td>
<td>10.7 %</td>
</tr>
</tbody>
</table>
Table 20. Results of gravity stability analysis for lower tier garden wall.

<table>
<thead>
<tr>
<th>Stability Analysis</th>
<th>Overturning</th>
<th>Sliding</th>
<th>Bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\Sigma M_r$</td>
<td>$\Sigma M_0$</td>
<td>$\Sigma V/V$</td>
</tr>
<tr>
<td></td>
<td>2004 in-lb</td>
<td>311 in-lb</td>
<td>179 lb</td>
</tr>
<tr>
<td>FS$_{ot}$</td>
<td>$\Sigma M_r/\Sigma M_0$</td>
<td>6.44</td>
<td></td>
</tr>
<tr>
<td>FS$_{sl}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surrey</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS$_{bc}$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References

3.11 Wall Along Eastern Edge of Property
A stone masonry wall runs behind the house along the eastern edge of the property from near the roadside at the north to near the outbuildings at the south. Dimension measurement locations are shown in Figure 12, and measurements are listed in Table 21. Gravity stability analysis results for the East wall, listed in Table 22, show adequate capacities for overturning, sliding, and bearing. Most joints were observed to be empty with 20%-30% filled to a depth of 1-2 inches from the surface.

![Figure 12. East wall measurement locations.](image)
### Table 21. Dimension measurements at East wall.

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Bottom Thickness</th>
<th>Top Thickness</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3’-0”</td>
<td>22 in.</td>
<td>16 in.</td>
<td>1 ¼ in.</td>
<td>3.5 %</td>
</tr>
<tr>
<td>2</td>
<td>3’-4”</td>
<td>18 in.</td>
<td>15 in.</td>
<td>3 ½ in.</td>
<td>8.8 %</td>
</tr>
<tr>
<td>3</td>
<td>2’-11”</td>
<td>18 in.</td>
<td>15 in.</td>
<td>3 ¼ in.</td>
<td>9.3 %</td>
</tr>
<tr>
<td>4</td>
<td>1’-8”</td>
<td>19 in.</td>
<td>14 in.</td>
<td>2 in.</td>
<td>10.0 %</td>
</tr>
<tr>
<td>5</td>
<td>0’-11”</td>
<td>19 in.</td>
<td>14 in.</td>
<td>1 in.</td>
<td>9.1 %</td>
</tr>
</tbody>
</table>

### Table 22. Results of gravity stability analysis for east wall.

**Stability Analysis**

**Overturning**

\[
\Sigma M_r = 8835 \text{ in-lb } \quad \text{restoring moment}
\]

\[
\Sigma M_0 = 2150 \text{ in-lb } \quad \text{overturning moment}
\]

\[
FS_{ot} = \frac{\Sigma M_r}{\Sigma M_0} = 4.11
\]

**Sliding**

\[
\mu \Sigma V = 482 \text{ lb } \quad \text{sliding resistance force}
\]

\[
P_{a-h} = 161.2 \text{ lb } \quad \text{sliding force}
\]

FS\_sl = 2.99

**Bearing**

\[
x = \frac{\Sigma M_A}{\Sigma V} = 0.66 \text{ ft}
\]

\[
b/6 = 0.25 \text{ ft}
\]

\[
e = 0.09 \text{ ft} \quad \text{e < b/6, resultant lies within the middle third}
\]

\[
\sigma_{max} = 671 \text{ lb/ft}^2
\]

FS\_bc = 5.96

**References**


### 3.12 Small Wall Under Fence

A small dry stack stone masonry wall supports a chain link fence behind the house. Dimension measurement locations are shown in Figure 13, and measurements are listed in Table 23. Gravity stability analysis results for the fence wall, listed in Table 24, show adequate capacities for overturning, sliding, and bearing.
Table 23. Dimension measurements at fence wall.

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Wall Height</th>
<th>Bottom Thickness</th>
<th>Top Thickness</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2'-5&quot;</td>
<td>17 in.</td>
<td>15 in.</td>
<td>2 in.</td>
<td>6.9 %</td>
</tr>
<tr>
<td>2</td>
<td>2'-5&quot;</td>
<td>17 in.</td>
<td>15 in.</td>
<td>2 in.</td>
<td>6.9 %</td>
</tr>
</tbody>
</table>

Table 24. Results of gravity stability analysis for fence wall.

Stability Analysis

Overturning

\[ \Sigma M_r = 5514 \text{ in-lb, restoring moment} \]
\[ \Sigma M_0 = 819 \text{ in-lb, overturning moment} \]

\[ FS_{tot} = \frac{\Sigma M_r}{\Sigma M_0} = 6.73 \]

Sliding

\[ \mu \Sigma V = 331 \text{ lb, sliding resistance force} \]
\[ P_{a-h} = 84.7 \text{ lb, sliding force} \]

\[ FS_{sl} = 3.90 \]

Bearing

\[ x = \frac{\Sigma M_A}{\Sigma V} = 0.68 \text{ ft} \]
\[ \frac{b}{6} = 0.24 \text{ ft} \]
\[ e = 0.03 \text{ ft} \]

\[ \sigma_{max} = 460 \text{ lb/ft}^2 \]

\[ FS_{bc} = 8.70 \]

\[ e < \frac{b}{6}, \text{ resultant lies within the middle third} \]

References


3.13 Stacked Stone Behind House

Directly behind the house, there are stones that may be remnants of a wall, though they do not currently appear to function as a wall (Figure 14). No mortar is present in the wall and most stones are not arranged closely enough to form true joints. Dimension measurements are listed in Table 25. A gravity stability analysis is not appropriate since the stones are intermittently piled along the slope of the hill rather than acting as a functional retaining wall.

![Figure 14. Stacked stone behind house.](image)

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Bottom Thickness</th>
<th>Top Thickness</th>
<th>Overall Batter</th>
<th>Batter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'-4&quot;</td>
<td>17 in.</td>
<td>15 in.</td>
<td>17 in.</td>
<td>106 %</td>
</tr>
</tbody>
</table>

4 Mortar Evaluation

A total of 4 mortar samples were evaluated by ANA. Sample identification and location are described in Table 26.

![Table 26. Mortar sample identification.](image)
4.1 Analysis Techniques
Chemical mortar examination followed the method described by Middendorf, et al\textsuperscript{1}. The method is based on the use of acid digestion and chemical analysis to identify soluble silica resulting from Portland cement hydration. Aggregate sieve analysis followed requirements of ASTM C136, \textit{Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates}. The method is based on acid digestion of the binder and sieve analysis of the aggregate. The results of acid digestion of the mortar samples are shown in Table 27. Samples S2, S3, and S4 contained binder/aggregate ratios typical of modern and historic masonry mortars. Samples S1 and S5 contained binder/aggregate ratios that would be considered over-sanded by today’s mortar standards.

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Mass before acid digestion (g)</th>
<th>Mass after acid digestion (g)</th>
<th>Binder mass (g)</th>
<th>Aggregate mass (g)</th>
<th>Binder volume (cm(^3))</th>
<th>Aggregate volume (cm(^3))</th>
<th>Total volume (cm(^3))</th>
<th>Binder (%)</th>
<th>Aggregate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>62.80</td>
<td>59.12</td>
<td>3.68</td>
<td>59.12</td>
<td>5.74</td>
<td>46.13</td>
<td>51.88</td>
<td>11</td>
<td>89</td>
</tr>
<tr>
<td>S2</td>
<td>54.80</td>
<td>45.17</td>
<td>9.63</td>
<td>45.17</td>
<td>15.03</td>
<td>35.25</td>
<td>50.28</td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>S3</td>
<td>62.74</td>
<td>55.10</td>
<td>7.64</td>
<td>55.10</td>
<td>11.92</td>
<td>43.00</td>
<td>54.92</td>
<td>22</td>
<td>78</td>
</tr>
<tr>
<td>S4</td>
<td>71.32</td>
<td>53.89</td>
<td>17.43</td>
<td>53.89</td>
<td>27.20</td>
<td>42.05</td>
<td>69.26</td>
<td>39</td>
<td>61</td>
</tr>
<tr>
<td>S5</td>
<td>55.60</td>
<td>52.93</td>
<td>2.67</td>
<td>52.93</td>
<td>4.17</td>
<td>41.30</td>
<td>45.47</td>
<td>9</td>
<td>91</td>
</tr>
</tbody>
</table>

4.2 Aggregate Sieve Analysis
The aggregate gradation curves, plotted in Figure 15, show the mortar aggregates of the samples compared to the gradation range of coarse and fine aggregates as specified by ASTM C144, \textit{Standard Specification for Aggregate for Masonry Mortars}. The aggregate colors are shown in Figure 16. Ideally, the aggregate for the replacement mortar should match the color and gradation of the existing mortar aggregates. Trial mixtures may be required to arrive at a mix that matches the original mortar with respect to color and texture.

Figure 15. Aggregate distribution by sieve size for mortar samples.

Figure 16. Aggregate distribution and color for furnished mortar samples.
4.3 Binder Content and Recommended Mortar Formulation

In-place mortar throughout the property appears to have originally been a lime-based mix, due to its relative softness and light binder color. Mortar appearance varied from stone masonry retaining walls to garage CMU walls and where repointing was apparent. Samples were analyzed for the presence of portland cement using the Middendorf method.

The chemical analysis results of the supplied mortar samples are summarized in Table 26. All samples contained at least a minor portland cement component. Sample S1 contained very little binder content, Samples S2 and S3 matched most closely with a Type S mortar although Sample S3 would be considered over-sanded by modern mortar standards. Samples S4 and S5 match most closely with a Type K mortar.

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Sample Mass (g)</th>
<th>Aggregate Mass (g)</th>
<th>Soluble Silica (g)</th>
<th>Volumetric Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Portland Cement</td>
</tr>
<tr>
<td>S1</td>
<td>10.00</td>
<td>9.64</td>
<td>0.06</td>
<td>1</td>
</tr>
<tr>
<td>S2</td>
<td>10.00</td>
<td>7.22</td>
<td>0.37</td>
<td>1</td>
</tr>
<tr>
<td>S3</td>
<td>10.00</td>
<td>8.72</td>
<td>0.12</td>
<td>1</td>
</tr>
<tr>
<td>S4</td>
<td>10.00</td>
<td>8.32</td>
<td>0.12</td>
<td>1</td>
</tr>
<tr>
<td>S5</td>
<td>10.00</td>
<td>8.42</td>
<td>0.10</td>
<td>1</td>
</tr>
</tbody>
</table>

For repointing joints, crack repair, and rebuilding at stone masonry, ANA recommends the use of Type K mortar, with starting volumetric proportions of 1 part portland cement, 3 parts lime, and 9 to 12 parts sand. Type K mortar is relatively low strength and accommodating to historic masonry. Alternatively, where additional durability may be preferred, Type O mortar may be used. If used, Type O mortar should meet requirements of ASTM C270, Standard Specification for Mortar for Unit Masonry with volumetric proportions of 1 part portland cement, 2 parts lime, and 7 to 9 parts sand. Type O mortar is somewhat more suitable for locations that receive increased weather exposure. At CMU walls, the use of Type N mortar is recommended. Type N mortar has volumetric proportions of 1 part portland cement, 1 part lime, and 5 to 6 parts sand. Table 27 summarizes recommended mortar mixes for repairs.
Table 29. Summary of recommended repair mortar types.

<table>
<thead>
<tr>
<th>Recommended Mortar Type</th>
<th>Volumetric Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Portland Cement</td>
</tr>
<tr>
<td>Type K: Repairs and repointing at stone masonry.</td>
<td>1</td>
</tr>
<tr>
<td>Type O: Alternate at stone masonry where additional durability is desired.</td>
<td>1</td>
</tr>
<tr>
<td>Type N: Repairs and Repointing at CMU walls.</td>
<td>1</td>
</tr>
</tbody>
</table>

The minor portland cement component detected in mortar samples indicates that stone masonry construction may have taken place around the time it was gaining widespread use in the United States, circa early 1900’s.

5 Repair and Rebuilding Recommendations

Wall sections with cracked or heavily eroded mortar should be repaired using a deep repointing process, raking mortar out to a depth of at least 2 inches and pointing with new compatible mortar in lifts of no more than 1-¼ inches, compressing each lift and allowing to become thumbprint hard before proceeding with the next lift. This process most likely applies to most stone masonry wall surfaces where not already repointed or originally built dry-stacked.
February 8, 2017

City of Black Hawk
P.O. Box 68
Black Hawk, Colorado 80422

Attn: c/o Scott McClelland
   E: scott.mcclelland@nv5.com

Re: Geotechnical Engineering Report
   Proposed 211 Horn Street Improvements
   211 Horn Street
   Black Hawk, Colorado
   Terracon Project No. 25175025

Mr. McClelland:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering exploration for the above referenced project. This study was performed in general accordance with our proposal number P25175025, dated January 20, 2017. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning improvements to the existing building located at 211 Horn Street in Black Hawk, Colorado.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,

Terracon Consultants, Inc.

Scott B. Myers, P.E.
Geotechnical Department Manager

William D. Rethamel, P.E.
Senior Project Engineer

Enclosures
cc: Addresssee (PDF)
   1 - File
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- Exhibit A-1 | Field Exploration Description
- Exhibit A-2 | Site Location
- Exhibit A-3 | Test Pit Exploration Plan
- Exhibits A-4 to A-8 | Test Pit Logs

## APPENDIX B – LABORATORY TESTING
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## APPENDIX C – SUPPORTING DOCUMENTS
- Exhibit C-1 | General Notes
- Exhibit C-2 | Unified Soil Classification
- Exhibit C-3 | Description of Rock Properties
EXECUTIVE SUMMARY

A geotechnical engineering exploration has been prepared for the proposed improvements for the existing building located at 211 Horn Street in Black Hawk, Colorado. Based on the information obtained from our subsurface exploration and the laboratory testing completed, the following geotechnical conditions will need to be considered:

- Based on the geotechnical engineering analyses, new foundation elements for the existing building may consist of spread footings underlain by native sand soils, gneiss bedrock or new engineered fill, provided the owner is willing to accept the associated risk of movement.

- As an alternative to new foundation elements for the existing building, the strength of the existing subgrade soils may be improved by implementing a ground modification technique. A ground modification technique that reduces the risk of damage to the existing foundation system, such as permeation grouting, would be an applicable ground modification technique for the subsurface conditions encountered at this site.

- Loose and low strength soils may be encountered on the site. Prior to placing fill or constructing foundations on soft/loose subgrade soils, it may be necessary to stabilize these soils with several passes of relatively heavy construction equipment along the bottom of the excavation to densify these materials.

- Based on the 2015 International Building Code, the seismic site classification for this site is C.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled GENERAL COMMENTS should be read for an understanding of the report limitations.
GEOTECHNICAL ENGINEERING REPORT
PROPOSED 211 HORN STREET
211 HORN STREET
BLACK HAWK, COLORADO
Terracon Project No. 25175025
February 8, 2017

1.0 INTRODUCTION

A geotechnical engineering report has been prepared for the proposed improvements for the existing building located at 211 Horn Street in Black Hawk, Colorado.

As part of our subsurface exploration, a representative from our office observed and documented the subsurface conditions exposed in five exploratory test pits. The test pits had been excavated prior to our site observation. Test Pit Logs along with a Test Pit Exploration Plan are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil and bedrock
- Groundwater levels
- Earthwork
- Lateral earth pressures
- Seismic site classification
- Subgrade improvement
- New foundation design and construction
- Drainage

2.0 PROJECT INFORMATION

2.1 Project Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed construction</td>
<td>We understand the proposed improvements include the construction of new foundation elements for the existing building.</td>
</tr>
<tr>
<td>Anticipated foundation systems</td>
<td>Shallow spread footings</td>
</tr>
<tr>
<td>Maximum loads</td>
<td>Walls: 1 to 2 klf (assumed)</td>
</tr>
<tr>
<td></td>
<td>Columns: 2 to 5 kips (assumed)</td>
</tr>
<tr>
<td>Grading</td>
<td>None reported</td>
</tr>
<tr>
<td>Excavation depth</td>
<td>Up to about 3 feet (assumed)</td>
</tr>
<tr>
<td>Free-standing retaining walls</td>
<td>None reported</td>
</tr>
</tbody>
</table>
2.2 Site Location and Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>The proposed improvements will be made to the existing building located at 211 Horn Street in Black Hawk, Colorado. The general location of the proposed project is 39.8040° N 105.49402 W.</td>
</tr>
<tr>
<td>Existing improvements</td>
<td>An existing two-story building is located on the subject site. The existing building appears to have been a single-family residence. The existing building is constructed on a spread footing foundation system with slab-on-grade floors.</td>
</tr>
</tbody>
</table>

3.0 SUBSURFACE CONDITIONS

3.1 Typical Profile

Based on observation of the subsurface conditions exposed within the exploratory test pits, subsurface conditions on the site can be generalized as follows:

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Approximate Depth to Bottom of Stratum below Existing Site Grade</th>
<th>Consistency/ Relative Density/ Hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete floor slab or foundation</td>
<td>About 6 to 18 inches, Observed in Exploratory Test Pit Nos. 1 to 4, only</td>
<td>N/A</td>
</tr>
<tr>
<td>Native soils consisting of sand with varying amounts of silt, gravel and cobbles</td>
<td>About 10 inches to 6.5 feet</td>
<td>Not determined*</td>
</tr>
<tr>
<td>Bedrock consisting of gneiss**</td>
<td>About 1 to 7 feet, Maximum depth of exploratory test pits</td>
<td>Not determined*</td>
</tr>
</tbody>
</table>

* - Because test pits had been excavated prior to our observation, the relative density of the soils and hardness of the bedrock could not be determined.
** - Possible gneiss bedrock was encountered in Test Pit Nos. 1 and 5.

Due to the depth and limited access of Test Pit Nos. 1 and 5, our field engineer was not able to verify that the material observed in the bottom of the test pit was gneiss bedrock. The material was hard
when probed with a metal probe and portions of the base of the excavation appeared to be gneiss bedrock; however, it is possible the material in the bottom of the test pit is not bedrock.

Stratification boundaries on the test pit logs represent the approximate location of changes in soil and material types; in-situ, the transition between materials may be gradual. Further details of the test pits can be found on the Test Pit Logs in Appendix A.

Based on laboratory test results, the on-site granular soils are considered to be non-expansive. Results of water soluble sulfate testing performed on samples obtained during our field exploration indicated “not applicable” and “moderate” severity with an exposure class of S0 and S1, respectively, based on the American Concrete Institute guidelines. A summary of laboratory test results is included in Appendix B.

3.2 Groundwater

The test pits were observed for the presence of groundwater at the time of our site visit. The groundwater levels are noted on the Test Pit Logs, and are summarized below.

<table>
<thead>
<tr>
<th>Test Pit No.</th>
<th>Depth to groundwater at time of test pit observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>None observed</td>
</tr>
<tr>
<td>2</td>
<td>None observed</td>
</tr>
<tr>
<td>3</td>
<td>None observed</td>
</tr>
<tr>
<td>4</td>
<td>None observed</td>
</tr>
<tr>
<td>5</td>
<td>None observed</td>
</tr>
</tbody>
</table>

These observations represent the groundwater condition at the time of our site visit, and may not be indicative of other times or at other locations. Groundwater levels can be expected to fluctuate with varying seasonal and weather conditions.

Zones of perched and/or trapped groundwater may also occur at times in the subsurface soils overlying bedrock, on top of the bedrock surface or within permeable fractures in the bedrock materials. The location and amount of perched water is dependent upon several factors, including hydrologic conditions, type of site development, irrigation demands on or adjacent to the site, fluctuations in water features, seasonal and weather conditions.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the test pits were observed. Groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the test pit logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.
4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

Based on subsurface conditions observed in the test pits, the site appears suitable for the proposed construction from a geotechnical point of view provided certain precautions and design and construction recommendations outlined in this report are followed. We have identified geotechnical conditions that could impact design and construction of the proposed improvements.

4.1.1 Difficult Excavation
Because cobbles were observed in the test pits, we anticipate excavations in the subsurface soils will be difficult and may require the use of excavation equipment capable of removing cobbles and small boulders. In addition, due to the granular nature of the on-site soils we anticipate the sides of the excavations will be subject to sloughing and caving.

4.2 Earthwork

The following presents recommendations for site preparation, excavation, subgrade preparation and placement of engineered fills on the project. All earthwork on the project should be observed and evaluated by Terracon.

4.2.1 Site Preparation
Strip and remove existing vegetation, demolition debris, organics and other deleterious materials from new foundation element locations, if applicable. All exposed surfaces should be free of mounds and depressions that could prevent uniform compaction.

Stripped materials consisting of vegetation, unsuitable fills and organic materials should be wasted from the site or used to revegetate landscaped areas or exposed slopes after completion of grading operations.

Where possible, new foundation element locations should be initially graded to create a relatively level surface to receive fill and to provide for a relatively uniform thickness of fill beneath the proposed elements. All exposed areas that will receive fill, once properly cleared, should be moisture conditioned to near optimum moisture content and compacted.

Although evidence of underground facilities such as septic tanks and existing foundations were not observed in the test pits during the site reconnaissance, such features could be encountered during construction. If unexpected fills or underground facilities are encountered, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.
Due to the presence of cobbles, we anticipate that heavy-duty excavation equipment capable of removing cobbles and small boulders will be required to complete the necessary excavations.

### 4.2.2 Material Types

Engineered fill should meet the following material property requirements:

<table>
<thead>
<tr>
<th>Fill Type</th>
<th>USCS Classification</th>
<th>Acceptable location for placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-site sand and gravel soils</td>
<td>SM, SP, SP-SM</td>
<td>On-site sand and gravel soils are considered suitable for reuse as compacted fill below foundation areas provided granular soil particles are less than 6 inches in diameter.</td>
</tr>
<tr>
<td>Imported soils</td>
<td>Varies</td>
<td>Imported soils meeting the gradation outlined herein can be considered acceptable for use as engineered fill beneath foundations.</td>
</tr>
</tbody>
</table>

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the geotechnical engineer for evaluation.
2. Care should be taken during the fill placement process to avoid zones of dis-similar fill. Improvements constructed over varying fill types are at a higher risk of differential movement compared to improvements over a uniform fill zone.
3. If granular soils with particle sizes on the order of 6 inches are used as fill for this project, care must be taken when placing these materials to reduce the risk of nesting and the creation of voids between the particles.

Imported soils for general fills (if required) should meet the following material property requirements:

<table>
<thead>
<tr>
<th>Gradation</th>
<th>Percent finer by weight (ASTM C136)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6”</td>
<td>100</td>
</tr>
<tr>
<td>No. 4 Sieve</td>
<td>50-100</td>
</tr>
<tr>
<td>No. 200 Sieve</td>
<td>15-25</td>
</tr>
</tbody>
</table>

- Liquid Limit……………………………………………………….30 (max)
- Plasticity Index………………………………………………..15 (max)
- Maximum Expansive Potential (%)……………………………………0.5*  

*Measured on a sample compacted to approximately 95 percent of the ASTM D698 maximum dry density at optimum water content. The sample is confined under a 200 psf surcharge and submerged.

### 4.2.3 Compaction Requirements

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift.
### Item Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill lift thickness</td>
<td>8-inches or less in loose thickness when heavy, self-propelled compaction equipment is used</td>
</tr>
<tr>
<td></td>
<td>4 to 6-inches in loose thickness when hand-guided equipment (i.e. jumping jack, plate compactor) is used</td>
</tr>
<tr>
<td>Compaction requirements 1</td>
<td>Minimum of 98% of the material's standard Proctor maximum dry density (ASTM D698)</td>
</tr>
<tr>
<td>Moisture content cohesionless soil (sand and gravel)</td>
<td>-3 to +3 % of the optimum moisture content</td>
</tr>
</tbody>
</table>

1. We recommend that engineered fill be tested for water content and compaction during placement. Should the results of the in-place density tests indicate the specified water or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified water and compaction requirements are achieved.

2. Water levels should be maintained low enough to allow for satisfactory compaction to be achieved.

### 4.2.4 Excavation and Trench Construction

Excavations into the subsurface soils will encounter a variety of conditions. Excavations into the on-site granular soils will be subject to sloughing and caving. The individual contractor(s) is responsible for designing and constructing stable, temporary excavations as required maintaining stability of both the excavation sides and bottom. All excavations should be sloped or shored in the interest of safety following local and federal regulations, including current Occupational Safety and Health Administration (OSHA) excavation and trench safety standards.

Soils penetrated by the proposed excavations may vary significantly across the site. The soil classifications are based solely on the materials observed in the exploratory test pits. The contractor should verify that similar conditions exist throughout the proposed area of excavation. If different subsurface conditions are encountered at the time of construction, the actual conditions should be evaluated to determine any excavation modifications necessary to maintain safe conditions.

As a safety measure, it is recommended that all vehicles and soil piles be kept to a minimum lateral distance from the crest of the slope equal to no less than the slope height. The exposed slope face should be protected against the elements.

### 4.2.5 Grading and Drainage

All grades must be adjusted to provide positive drainage away from the structure during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented during construction. Water permitted to pond near or adjacent to the perimeter of the structure (either during or post-construction) can result in significantly higher soil movements than those discussed in this report. As a result, any
estimations of potential movement described in this report cannot be relied upon if positive drainage is not obtained and maintained, and water is allowed to infiltrate the fill and/or subgrade.

Exposed ground should be sloped at a minimum of 5 percent grade for at least 10 feet beyond the perimeter of the structure. Backfill against footings and in utility trenches should be well compacted and free of all construction debris to reduce the possibility of water infiltration. After building construction and prior to project completion, we recommend that verification of final grading be performed to document that positive drainage, as described above, has been achieved.

4.2.6 Earthwork Construction Considerations
Upon completion of grading operations, care should be taken to maintain the moisture content of the subgrade. Construction traffic over prepared subgrade should be minimized and avoided to the extent practical. Subsequent wetting of these materials will result in undesirable movement.

The site should also be graded to prevent ponding of surface water on prepared subgrade or in excavations. In areas where water is allowed to pond over a period of time, the affected area should be removed and allowed to dry out.

Although the exposed subgrade is anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. Should unstable subgrade conditions develop, stabilization measures will need to be employed. Options for subgrade stabilization can include removal of unsuitable material and replaced with approved fill material. An alternative can include the use of TX-140 Tensar geogrid (or approved equivalent) overlain by Colorado Department of Transportation (CDOT) Class 5 or 6 aggregate base course. The depth of aggregate base course will depend on the severity of unstable soils.

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during overexcavation operations, excavations, subgrade preparation; placement and compaction of controlled compacted fills, and backfilling of excavations into the completed subgrade.

4.2.7 Water Soluble Sulfate Test Results
The following table lists the results of laboratory water soluble sulfate testing. The test results may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials that will be used for project construction:

<table>
<thead>
<tr>
<th>Test Pit No.</th>
<th>Sample depth (feet)</th>
<th>Soluble Sulfate$^1$ (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.5 – 6.5</td>
<td>&lt;1</td>
</tr>
<tr>
<td>2</td>
<td>0.5 – 1.0</td>
<td>51</td>
</tr>
</tbody>
</table>
Responsive ■ Resourceful ■ Reliable

4.3 Foundation Recommendations

Based on the geotechnical engineering analyses, new foundation elements for the existing building may consist of spread footings underlain by native soils, bedrock or new engineered fill, provided the owner is willing to accept the associated risk of movement.

4.3.1 Spread Footing Design Recommendations

Design recommendations for new spread footings are presented in the following paragraphs.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overexcavation/modification depth</strong></td>
<td>If encountered, all existing fill must be removed</td>
</tr>
<tr>
<td><strong>Supporting stratum</strong></td>
<td>Native soils or new engineered fill</td>
</tr>
<tr>
<td><strong>Maximum net allowable bearing pressure¹,²</strong></td>
<td>2,500 psf</td>
</tr>
<tr>
<td><strong>Minimum dead load pressure</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Void Thickness, if needed</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Coefficient of friction (sliding)</strong></td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Ultimate Passive lateral equivalent fluid pressure³</strong></td>
<td>360 pcf</td>
</tr>
<tr>
<td><strong>Minimum footing dimensions</strong></td>
<td>Isolated footings: 24 inches</td>
</tr>
<tr>
<td><strong>Minimum embedment below finished grade for frost protection⁴</strong></td>
<td>3 feet</td>
</tr>
<tr>
<td><strong>Approximate total movement from foundation loads⁵</strong></td>
<td>About 1 inch</td>
</tr>
<tr>
<td><strong>Estimated differential movement from foundation loads⁵,⁶</strong></td>
<td>About ½ to ¾ inch</td>
</tr>
</tbody>
</table>
1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. This pressure assumes that any existing fill or lower strength soils, if encountered, will be excavated and replaced with engineered fill.

2. Maximum allowable soil bearing pressure can be increased by 1/3 for wind or seismic loads.

3. For evaluating resistance to lateral movement (or sliding). The sides of the excavation for new spread footings should be nearly vertical and backfill must be compacted to at least 95 percent of the standard Proctor maximum dry density for the passive earth pressure value to be valid. The passive resistance and the friction factor are ultimate values. As such, appropriate factors of safety should be applied to these values.

4. For perimeter footings, footings beneath unheated areas, and footings that will be exposed to freezing conditions during construction. Interior footings may bottom at a minimum depth of 12 inches below finished grade in heated areas.

5. Foundation movement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of engineered fill, and the quality of the earthwork operations and footing construction.

6. Differential settlement is considered over a distance of about 40 feet.

7. Because gneiss bedrock could not be definitively identified in Test Pit Nos. 1 and 5, it is imperative that excavations for new foundation elements be observed to verify that gneiss bedrock is exposed in the base of the excavations prior to footing construction. The presence of gneiss bedrock within the base of the excavations should be documented prior to the placement of concrete for footings.

8. No fill may be placed below spread footings constructed on the gneiss bedrock. If excavations unintentionally extend below the bottom of the spread footings, additional concrete or flow fill should be placed in these areas.

Footings should be proportioned on the basis of equal total dead load pressure to reduce differential movement between adjacent footings. Additional foundation movements greater than those presented in the previous table could occur if water from any source infiltrates the foundation soils; therefore, proper drainage should be provided in the final design and during construction and throughout the life of the structure. Failure to maintain the proper drainage as recommended in the “Grading and Drainage” section of this report will nullify the movement estimates provided above.

### 4.3.2 Spread Footing Construction Considerations

New spread footings should only be considered if some foundation movement can be tolerated. The spread footings should be constructed on native soils, bedrock or new engineered fill.

While highly unlikely, unstable subgrade conditions may be encountered at the base of the footing excavations constructed on the native soils. Unstable subgrade soils will need to be stabilized prior to backfilling excavations and/or constructing foundation. The use of angular rock, recycled concrete and/or gravel pushed into the yielding subgrade is considered suitable means of
stabilizing the subgrade. The use of biaxial geogrid materials in conjunction with gravel could also be considered and could be more cost effective.

Unstable subgrade conditions should be observed by the geotechnical engineer to assess the subgrade and provide suitable alternatives for stabilization. Stabilized areas should be observed and documented prior to continuing construction to assess the stability of the subgrade.

4.4 Ground Modification

As an alternative to constructing new foundation elements for the existing building, the performance of the subgrade soils below the existing foundation system may be improved by implementing a ground modification technique. Permeation grouting is a ground modification technique that could be implemented at this site and would improve the performance of the soils below the existing foundation system and reduce the risk of damage to the existing foundation. The zone of soil that should be modified using this technique should extend vertically to the underlying gneiss bedrock and to an equal distance laterally. Based on observations of the subsurface conditions exposed in the exploratory test pits, the depth to the gneiss bedrock varied from about less than 1 foot to 6/1/2 feet below the relative ground surface at each test pit location. Because bedrock was not definitively identified in Test Pit Nos. 1 and 5, permeation grouting may need to extend below the depths of the “Possible gneiss Bedrock” presented in the Test Pit Logs. Prior to permeation grouting, additional explorations could be performed to better define the depth to the gneiss bedrock and required depth of the permeation grouting.

Because permeation grouting is a performance-based ground modification technique, we recommend a specialty contractor be contacted to provide the appropriate permeation grouting plan and anticipated performance of the subsurface soils after the permeation grouting has been performed.

4.5 Seismic Considerations

Based on our subsurface exploration and laboratory testing, it is our opinion that the soils have a low risk of liquefaction. The following table presents the seismic site classification based on the 2015 International Building Code:

<table>
<thead>
<tr>
<th>Code Used</th>
<th>Site Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 International Building Code (IBC) ¹</td>
<td>C</td>
</tr>
</tbody>
</table>

1. In general accordance with the 2015 International Building Code.
2. The 2015 International Building Code (IBC) requires a site soil profile determination extending a depth of 100 feet for seismic site classification. The current scope requested does not include the required 100 foot soil profile determination. The test pits for this exploration extended to a maximum depth of about 7 feet and this seismic site class definition considers that similar soil and bedrock conditions exist below the maximum depth of the subsurface exploration. Additional exploration to deeper depths could be performed to confirm the conditions below the current depth.
of exploration. Alternatively, a geophysical exploration could be utilized in order to attempt to justify a higher seismic site class.

4.6 Lateral Earth Pressures

Based on our understanding of the proposed construction, no below grade walls will be constructed. However, we have provided the following information if walls less than about 6 feet in height are to be constructed. Walls with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to those indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown. Active earth pressure is commonly used for design of walls that are able to move in order to "mobilize" the active earth pressures. The "at-rest" condition assumes no wall movement. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls.

![Lateral Earth Pressures Diagram]

**EARTH PRESSURE COEFFICIENTS**

<table>
<thead>
<tr>
<th>Earth Pressure Conditions</th>
<th>Coefficient For Backfill Type</th>
<th>Equivalent Fluid Density (pcf)</th>
<th>Surcharge Pressure, p₁ (psf)</th>
<th>Earth Pressure, p₂ (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active (Ka)</td>
<td>0.33</td>
<td>40</td>
<td>(0.33)S</td>
<td>(40)H</td>
</tr>
<tr>
<td>At-Rest (Ko)</td>
<td>0.50</td>
<td>60</td>
<td>(0.50)S</td>
<td>(60)H</td>
</tr>
<tr>
<td>Passive (Kp)</td>
<td>3.0</td>
<td>360</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

1. Granular materials are considered to be sands or gravels with a maximum of 20 percent passing the No. 200 sieve.
Applicable conditions to the above include:

- For active earth pressure, wall must rotate about base, with top lateral movements of about 0.002 H to 0.004 H, where H is wall height
- For passive earth pressure to develop, wall must move horizontally to mobilize resistance.
- Uniform surcharge, where S is surcharge pressure
- In-situ soil backfill weight a maximum of 120 pcf
- Horizontal backfill, compacted to at least 95 percent of standard Proctor maximum dry density
- Loading from heavy compaction equipment not included
- No hydrostatic pressures acting on wall
- No dynamic loading
- No safety factor included in soil parameters

To control hydrostatic pressure behind earth-retaining walls we recommend that a drain be installed below the foundation of the wall with a collection pipe leading to a reliable discharge. If this is not possible, then combined hydrostatic and lateral earth pressures should be calculated for lean clay backfill using an equivalent fluid weighing 90 and 100 pcf for active and at-rest conditions, respectively. For granular backfill, an equivalent fluid weighing 85 and 90 pcf should be used for active and at-rest, respectively. The hydrostatic pressure from the groundwater should be assumed to be applied at a depth of 6 feet below the finished ground surface. These pressures do not include the influence of surcharge, which should be added. Heavy equipment should not operate within a distance closer than the exposed height of retaining walls to prevent lateral pressures more than those provided.

The preceding data are also applicable to cast-in-place concrete or modular block retaining walls up to 6 feet in height. **If taller single walls, tiered walls, or Mechanically Stabilized Earth (MSE) walls will be included in the proposed development, additional site-specific studies and laboratory testing will be required.** In addition, the wall designer should perform standard wall design practices including analysis for overturning, sliding, bearing capacity and global stability, and results of these analyses should be provided for our review. Additional sampling, laboratory testing and document review associated with retaining walls is beyond the original scope of work but can be performed as a separate scope, for a separate fee.

## 5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing...
services during excavation, foundation construction and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon observations of the subsurface conditions exposed in the test pits performed at the indicated location and from other information discussed in this report. This report does not reflect variations that may occur between the test pits, across the site or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.
APPENDIX A
FIELD EXPLORATION
Field Exploration Description
The locations of the exploratory test pits are presented in Exhibit A-3. The latitude and longitude coordinates of the test pit locations were obtained by a recreational grade GPS unit. The accuracy of the latitude and longitude values is typically about +/- 25 feet when obtaining the values using this method. The accuracy of the test pit locations should only be assumed to the level implied by the methods used.

The test pits were pre-excavated prior to our site visit. Lithologic logs of the test pits were recorded by the field engineer based on observations of the materials exposed in the sides of the test pits and the spoil piles adjacent to the test pits. Bulk samples were obtained from the sides of the test pits and from the spoil piles.

Groundwater observations were performed during our observations of the subsurface conditions exposed in the exploratory test pits. We understand the test pits will be backfilled by others at a later date.
Approximate Test Pit Location

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

LEGEND

1. Approximate Test Pit Location

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.
CONCRETE, (About 18 inches)

SILTY SAND (SM), with gravel, trace cobbles, medium to coarse grained, brown

POSSIBLE GNEISS BEDROCK, brown

Test Pit Terminated at 7 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Test pit was pre-excavated

Abandonment Method:
Test pit to be backfilled by others

Notes:
Due to the depth of the test pit and limited access, our field engineer was not able to verify that the material observed in the bottom of the test pit was gneiss bedrock. The material was hard when probed with a metal probe and portions of the base of the excavation appeared to be gneiss bedrock; however, it is possible the material in the bottom of the test pit is not bedrock.

WATER LEVEL OBSERVATIONS
None observed
**TEST PIT LOG NO. 2**

**PROJECT:** 211 Horn Street Improvements  
**SITE:** 211 Horn Street  
Black Hawk, Colorado  
**CLIENT:** City of Black Hawk

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>LOCATION</th>
<th>WATER LEVEL OBSERVATIONS</th>
<th>ATTERBERG LIMITS</th>
<th>PERCENT FINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>CONCRETE, (about 6 inches)</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>1.0</td>
<td>POORLY GRADED SAND (SP), with gravel, medium to coarse grained, brown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>GNEISS BEDROCK, brown</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Test Pit Terminated at 1 Foot**

**Notes:**
- **Advancement Method:** Test pit was pre-excavated
- **Abandonment Method:** Test pit to be backfilled by others
- **Water Level Observations:** None observed
- **Stratification lines are approximate. In-situ, the transition may be gradual.**

---

**Test Pit Log No. 2**

**Location:** See Exhibit A-2  
Latitude: 39.80397°  
Longitude: -105.49405°

**Notes:**
- **Project No.:** 25175025
- **Excavator:** Pre-excavated
- **/operator:** N/A
- **Test Pit Started:** 1/26/2017
- **Test Pit Completed:** 1/26/2017
- **Exhibit:** A-5
- **Project No.:** 25175025
- **Exhibit:** A-5
### Test Pit Log No. 3

**PROJECT:** 211 Horn Street Improvements  
**CLIENT:** City of Black Hawk

**SITE:** 211 Horn Street  
Black Hawk, Colorado

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>LOCATION</th>
<th>GRAPHIC LOG</th>
<th>WATER LEVEL OBSERVATIONS</th>
<th>ATTERBERG LIMITS</th>
<th>PERCENT FINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>Concrete</td>
<td>(about 6 inches)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>Poorly Graded Sand (SP)</td>
<td>with gravel, medium to coarse grained, brown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>Gneiss Bedrock</td>
<td>brown</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Test Pit Terminated at 1.5 Feet*

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:  
Test pit was pre-excavated

Abandonment Method:  
Test pit to be backfilled by others

Notes:

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

None observed

**Test Pit Started:** 1/26/2017  
**Test Pit Completed:** 1/26/2017

Excavator: Pre-excavated  
Operator: N/A

Project No.: 25175025  
Exhibit: A-6
### TEST PIT LOG NO. 4

**PROJECT:** 211 Horn Street Improvements  
**SITE:** 211 Horn Street  
Black Hawk, Colorado  

**CLIENT:** City of Black Hawk

**LOCATION**  
See Exhibit A-2  
Latitude: 39.80393°  
Longitude: -105.49394°

<table>
<thead>
<tr>
<th>DEPTH (FT.)</th>
<th>WATER LEVEL OBSERVATIONS</th>
<th>LL-PL-PI</th>
<th>PERCENT FINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>CONCRETE, (about 6 inches)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>POORLY GRADED SAND (SP-SM), with silt, organics, and gravel, medium to coarse grained, brown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>GNEISS BEDROCK, brown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Test Pit Terminated at 2.5 Feet**

Stratification lines are approximate. In-situ, the transition may be gradual.

**Advance Method:**  
Test pit was pre-excavated

**Abandonment Method:**  
Test pit to be backfilled by others

**Notes:**

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**  
None observed

**Test Pit Started:** 1/26/2017  
**Test Pit Completed:** 1/26/2017  
**Excavator:** Pre-excavated  
**Operator:** N/A  
**Project No.:** 25175025  
**Exhibit:** A-7
**TEST PIT LOG NO. 5**

**PROJECT:** 211 Horn Street Improvements  
**CLIENT:** City of Black Hawk

**SITE:**  
211 Horn Street  
Black Hawk, Colorado

---

**LOCATION**  
See Exhibit A-2  
Latitude: 39.80387°  
Longitude: -105.49397°

**DEPTH**

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>WATER LEVEL OBSERVATIONS</th>
<th>ATTERBERG LIMITS</th>
<th>LL-PL-PI</th>
<th>PERCENT FINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>5.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**POORLY GRADED SAND (SP-SM),** with silt and gravel, fine to coarse grained, brown

**POSSIBLE GNEISS BEDROCK,** brown to gray

*Test Pit Terminated at 5.5 Feet*

---

**ADVANCEMENT METHOD:**  
Test pit was pre-excavated

**ABANDONMENT METHOD:**  
Test pit to be backfilled by others

**Notes:**  
Due to the depth of the test pit and limited access, our field engineer was not able to verify that the material observed in the bottom of the test pit was gneiss bedrock. The material was hard when probed with a metal probe and portions of the base of the excavation appeared to be gneiss bedrock; however, it is possible the material in the bottom of the test pit is not bedrock.

---

**WATER LEVEL OBSERVATIONS**  
None observed

---

**Test Pit Started:** 1/26/2017  
**Test Pit Completed:** 1/26/2017

**Excavator:** Pre-excavated  
**Operator:** N/A

**Project No.:** 25175025  
**Exhibit:** A-8

---

Stratification lines are approximate. In-situ, the transition may be gradual.

---

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.
APPENDIX B
LABORATORY TESTING
Laboratory Testing Description
Samples retrieved during the field exploration were returned to the laboratory for observation by the project geotechnical engineer, and were classified in general accordance with the Unified Soil Classification System and Description of Rock Properties in Appendix C.

At this time, an applicable laboratory-testing program was formulated to determine engineering properties of the subsurface materials. Following the completion of the laboratory testing, the field descriptions were confirmed or modified as necessary, and the Test Pit Logs were prepared. The Test Pit Logs are included in Appendix A.

Laboratory test results are included in Appendix B. These results were used for the geotechnical engineering analyses and the development of foundation and earthwork recommendations. All laboratory tests were performed in general accordance with the applicable local or other accepted standards.

Selected soil samples were tested for the following engineering properties:

- Grain size distribution
- Atterberg limits
- Water soluble sulfate content
## SUMMARY OF LABORATORY TEST RESULTS

**211 Horn Street Improvements - Black Hawk, Colorado**  
**Terracon Project No. 25175025**

<table>
<thead>
<tr>
<th>Boring No.</th>
<th>Depth (ft.)</th>
<th>USCS Class.</th>
<th>Particle Size Distribution, Percent Passing by Weight</th>
<th>Atterberg Limits</th>
<th>Water Soluble Sulfates (mg/l)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-1/2”</td>
<td>#4</td>
<td>#10</td>
<td>#40</td>
</tr>
<tr>
<td>1</td>
<td>1.5 - 6</td>
<td>SM</td>
<td>100</td>
<td>88</td>
<td>83</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>0.5 - 1</td>
<td>SP</td>
<td>100</td>
<td>62</td>
<td>44</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>0.5 - 1</td>
<td>SP</td>
<td>100</td>
<td>55</td>
<td>43</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>0.5 - 2</td>
<td>SP-SM</td>
<td>100</td>
<td>98</td>
<td>95</td>
<td>67</td>
</tr>
<tr>
<td>5</td>
<td>0 - 5</td>
<td>SP-SM</td>
<td>100</td>
<td>91</td>
<td>85</td>
<td>54</td>
</tr>
</tbody>
</table>

### Notes:
- Initial Dry Density and Initial Water Content are in-situ values unless otherwise noted.
- * = Partially disturbed sample
- - = Compression/settlement
- NV = no value
- NP = non-plastic

### Remarks:
1. Remolded Compacted density (about 95% of ASTM D698 maximum density near optimum moisture content)
2. Remolded Compacted density (about 95% of ASTM D1557 maximum density near optimum moisture content)
3. Water added to sample
4. Dry density and/or moisture content determined from one ring of a multi-ring sample
5. Minus #200 Only
7. Moisture-Density Relationship Test Method ASTM D1557/AASHTO T180

Exhibit B-4
APPENDIX C
SUPPORTING DOCUMENTS
GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING

- Auger
- Shelby Tube
- Split Spoon
- Rock Core
- Macro Core
- Modified California Ring Sampler
- Grab Sample
- No Recovery
- Modified Dames & Moore Ring Sampler

WATER LEVEL

- Water Initially Encountered
- Water Level After a Specified Period of Time

FIELD TESTS

- (HP) Hand Penetrometer
- (T) Torvane
- (b/f) Standard Penetration Test (blows per foot)
- N N value
- (PID) Photo-ionization Detector
- (OVA) Organic Vapor Analyzer

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

RELATIVE DENSITY OF COARSE-GRAINED SOILS

(More than 50% retained on No. 200 sieve.)

Density determined by Standard Penetration Resistance includes gravels, sands and silts.

<table>
<thead>
<tr>
<th>STRENGTH TERMS</th>
<th>Standard Penetration or N-Value Blows/ft.</th>
<th>Ring Sampler Blows/ft.</th>
<th>Descriptive Term (Density)</th>
<th>Descriptive Term (Consistency)</th>
<th>Unconfined Compressive Strength, Qu, psi</th>
<th>Standard Penetration or N-Value Blows/ft.</th>
<th>Ring Sampler Blows/ft.</th>
<th>Consistency of Fine-Grained Soils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Loose</td>
<td>0 - 3</td>
<td>0 - 6</td>
<td>Very Soft</td>
<td>0 - 1</td>
<td>&lt; 3</td>
<td>&lt; 30</td>
<td>&lt; 20</td>
<td>Weathered</td>
</tr>
<tr>
<td>Loose</td>
<td>4 - 9</td>
<td>7 - 16</td>
<td>Soft</td>
<td>500 to 1,000</td>
<td>2 - 4</td>
<td>30 - 49</td>
<td>20 - 29</td>
<td>Firm</td>
</tr>
<tr>
<td>Medium Dense</td>
<td>10 - 29</td>
<td>19 - 58</td>
<td>Medium-Stiff</td>
<td>1,000 to 2,000</td>
<td>5 - 7</td>
<td>50 - 89</td>
<td>30 - 49</td>
<td>Medium Hard</td>
</tr>
<tr>
<td>Dense</td>
<td>30 - 50</td>
<td>59 - 98</td>
<td>Stiff</td>
<td>2,000 to 4,000</td>
<td>8 - 14</td>
<td>10 - 18</td>
<td>50 - 79</td>
<td>Hard</td>
</tr>
<tr>
<td>Very Dense</td>
<td>&gt; 50</td>
<td>&gt; 99</td>
<td>Very Stiff</td>
<td>4,000 to 8,000</td>
<td>15 - 30</td>
<td>19 - 42</td>
<td>&gt; 79</td>
<td>Very Hard</td>
</tr>
<tr>
<td>Hard</td>
<td>&gt; 8,000</td>
<td>&gt; 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; 42</td>
<td></td>
</tr>
</tbody>
</table>

CONSISTENCY OF FINE-GRAINED SOILS

(50% or more passing the No. 200 sieve.)

Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance.

<table>
<thead>
<tr>
<th>BEDROCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ring Sampler Blows/ft.</td>
</tr>
<tr>
<td>&lt; 20</td>
</tr>
<tr>
<td>20 - 29</td>
</tr>
<tr>
<td>30 - 49</td>
</tr>
<tr>
<td>40 - 89</td>
</tr>
<tr>
<td>50 - 79</td>
</tr>
<tr>
<td>&gt; 79</td>
</tr>
</tbody>
</table>

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<table>
<thead>
<tr>
<th>Descriptive Term(s) of other constituents</th>
<th>Percent of Dry Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>&lt; 15</td>
</tr>
<tr>
<td>With</td>
<td>15 - 29</td>
</tr>
<tr>
<td>Modifier</td>
<td>&gt; 30</td>
</tr>
</tbody>
</table>

GRAIN SIZE TERMINOLOGY

<table>
<thead>
<tr>
<th>Major Component of Sample</th>
<th>Particle Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulders</td>
<td>Over 12 in. (300 mm)</td>
</tr>
<tr>
<td>Cobbles</td>
<td>12 in. to 3 in. (300mm to 75mm)</td>
</tr>
<tr>
<td>Gravel</td>
<td>3 in. to No. 4 sieve (75mm to 4.75 mm)</td>
</tr>
<tr>
<td>Sand</td>
<td>No. 4 to #200 sieve (4.75mm to 0.075mm)</td>
</tr>
<tr>
<td>Silt or Clay</td>
<td>Passing #200 sieve (0.075mm)</td>
</tr>
</tbody>
</table>

RELATIVE PROPORTIONS OF FINES

<table>
<thead>
<tr>
<th>Descriptive Term(s) of other constituents</th>
<th>Percent of Dry Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>&lt; 5</td>
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<tr>
<td>With</td>
<td>5 - 12</td>
</tr>
<tr>
<td>Modifier</td>
<td>&gt; 12</td>
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PLASTICITY DESCRIPTION

<table>
<thead>
<tr>
<th>Term</th>
<th>Plasticity Index</th>
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<tbody>
<tr>
<td>Non-plastic</td>
<td>0</td>
</tr>
<tr>
<td>Low</td>
<td>1 - 10</td>
</tr>
<tr>
<td>Medium</td>
<td>11 - 30</td>
</tr>
<tr>
<td>High</td>
<td>&gt; 30</td>
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</table>
# Unified Soil Classification System

## Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests

<table>
<thead>
<tr>
<th>Coarse Grained Soils: More than 50% retained on No. 200 sieve</th>
<th>Clean Gravels: Less than 5% fines</th>
<th>Gravels with Fines: More than 12% fines</th>
<th>Sands: 50% or more of coarse fraction passes No. 4 sieve</th>
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</thead>
<tbody>
<tr>
<td>Gravels: More than 50% of coarse fraction retained on No. 4 sieve</td>
<td>Cu ≥ 4 and 1 ≤ Cc ≤ 3&lt;sup&gt;E&lt;/sup&gt;</td>
<td>Cu &lt; 4 and/or 1 &gt; Cc &gt; 3&lt;sup&gt;E&lt;/sup&gt;</td>
<td>Fines classify as CL or CH</td>
</tr>
<tr>
<td></td>
<td>GW Well-graded gravel&lt;sup&gt;F&lt;/sup&gt;</td>
<td>GP Poorly graded gravel&lt;sup&gt;F&lt;/sup&gt;</td>
<td>GC Clayey gravel&lt;sup&gt;GM&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravels with Fines: More than 12% fines</td>
<td>Fines classify as ML or MH</td>
<td>Fines classify as CL or CH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GM Silty gravel&lt;sup&gt;GM&lt;/sup&gt;</td>
<td>GC Clayey gravel&lt;sup&gt;GM&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sands with Fines: More than 12% fines</td>
<td>Fines classify as ML or MH</td>
<td>Fines classify as CL or CH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SM Silty sand&lt;sup&gt;GM&lt;/sup&gt;</td>
<td>SC Clayey sand&lt;sup&gt;GM&lt;/sup&gt;</td>
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<table>
<thead>
<tr>
<th>Fine-Grained Soils: 50% or more passes the No. 200 sieve</th>
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</thead>
<tbody>
<tr>
<td>Silts and Clays: Liquid limit less than 50</td>
</tr>
<tr>
<td>Inorganic: PI &gt; 7 and plots on or above “A” line</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Organic: Liquid limit - oven dried</td>
</tr>
<tr>
<td>Liquid limit - not dried</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Silts and Clays: Liquid limit 50 or more</th>
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</thead>
<tbody>
<tr>
<td>Inorganic: PI plots on or above “A” line</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Organic: Liquid limit - oven dried</td>
</tr>
<tr>
<td>Liquid limit - not dried</td>
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</table>

<table>
<thead>
<tr>
<th>Highly organic soils: Primarily organic matter, dark in color, and organic odor</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT Peat</td>
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---

<sup>A</sup> Based on the material passing the 3-inch (75-mm) sieve  
<sup>B</sup> If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.  
<sup>C</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.  
<sup>D</sup> Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.  
<sup>E</sup> Cu = D<sub>60</sub>/D<sub>10</sub>  
<sup>F</sup> If soil contains ≥ 15% sand, add “with sand” to group name.  
<sup>G</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.  
<sup>H</sup> If fines are organic, add “with organic fines” to group name.  
<sup>I</sup> If soil contains ≥ 15% gravel, add “with gravel” to group name.  
<sup>J</sup> If Atterberg limits plot in shaded area, soil is a CL-ML, silt, or clay.  
<sup>K</sup> If soil contains 15 to 29% plus No. 200, add “with sand” or “with gravel,” whichever is predominant.  
<sup>L</sup> If soil contain ≥ 30% plus No. 200 predominantly sand, add “sandy” to group name.  
<sup>M</sup> If soil contains ≥ 30% plus No. 200 predominantly sand, add “gravelly” to group name.  
<sup>N</sup> PI plots on or above “A” line.  
<sup>O</sup> PI plots below “A” line.  

---

[Diagram](#) for classification of fine-grained soils and fine-grained fraction of coarse-grained soils.
DESCRIPTION OF ROCK PROPERTIES

WEATHERING

Fresh
Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.

Very slight
Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.

Slight
Rock generally fresh, joints stained, and discoloration extends into rock up to 1 in. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.

Moderate
Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show claley. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.

Moderately severe
All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist’s pick.

Severe
All rock except quartz discolored or stained. Rock “fabric” clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.

Very severe
All rock except quartz discolored or stained. Rock “fabric” discernible, but mass effectively reduced to “soil” with only fragments of strong rock remaining.

Complete
Rock reduced to “soil”. Rock “fabric” not discernible or discernible only in small, scattered locations. Quartz may be present as dikes or stringers.

HARDNESS (for engineering description of rock – not to be confused with Moh’s scale for minerals)

Very hard
Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist’s pick.

Hard
Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.

Moderately hard
Can be scratched with knife or pick. Gouges or grooves to ¼ in. deep can be excavated by hard blow of point of a geologist’s pick. Hand specimens can be detached by moderate blow.

Medium
Can be grooved or gouged 1/16 in. deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1-in. maximum size by hard blows of the point of a geologist’s pick.

Soft
Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.

Very soft
Can be carved with knife. Can be excavated readily with point of pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

Joint, Bedding, and Foliation Spacing in Rock

<table>
<thead>
<tr>
<th>Spacing</th>
<th>Joints</th>
<th>Bedding/Foliation</th>
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<tbody>
<tr>
<td>Less than 2 in.</td>
<td>Very close</td>
<td>Very thin</td>
</tr>
<tr>
<td>2 in. – 1 ft.</td>
<td>Close</td>
<td>Thin</td>
</tr>
<tr>
<td>1 ft. – 3 ft.</td>
<td>Moderately close</td>
<td>Medium</td>
</tr>
<tr>
<td>3 ft. – 10 ft.</td>
<td>Wide</td>
<td>Thick</td>
</tr>
<tr>
<td>More than 10 ft.</td>
<td>Very wide</td>
<td>Very thick</td>
</tr>
</tbody>
</table>

a. Spacing refers to the distance normal to the planes, of the described feature, which are parallel to each other or nearly so.

<table>
<thead>
<tr>
<th>Rock Quality Designator (RQD) a</th>
<th>Joint Openness Descriptors</th>
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<tr>
<td>RQD, as a percentage</td>
<td>Openness</td>
</tr>
<tr>
<td>Exceeding 90</td>
<td>Excellent</td>
</tr>
<tr>
<td>90 – 75</td>
<td>Good</td>
</tr>
<tr>
<td>75 – 50</td>
<td>Fair</td>
</tr>
<tr>
<td>50 – 25</td>
<td>Poor</td>
</tr>
<tr>
<td>Less than 25</td>
<td>Very poor</td>
</tr>
</tbody>
</table>

a. RQD (given as a percentage) = length of core in pieces 4 in. and longer/length of run.

Revised Report:

Structural and Architectural Materials Assessment for 211 Horn St., Black Hawk, Gilpin County, Colorado

Submitted to:

The City of Black Hawk
211 Church Street
Black Hawk, CO 80422

Submitted by:

Kimberly Dugan
Wood Identification and Consultation Services
P.O. Box 550
Lafayette, Colorado 80026

February 2, 2017
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<td>2</td>
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<td>Historical Research</td>
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<td>Exterior Doors - Main Building</td>
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<td>Exterior Doors - Outbuildings</td>
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<td>241 Dubois: Memo on Construction History</td>
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Structural and Architectural Materials Assessment for 211 Horn St., Black Hawk, Gilpin County, Colorado

BACKGROUND

Kimberly Dugan of Wood Identification and Consultation Services (WICS) was asked to conduct a structural and architectural materials assessment of the building (the Building), located at 211 Horn St., Black Hawk, Colorado. The purpose of the investigation was to determine the construction history and the approximate age of alterations to the building, which is located within a National Historic Landmark district. The period of significance for the district has been identified as 1859 - 1918.

SCOPE OF WORK

There were questions regarding the construction history and age of the Building and two associated outbuildings, as well as the condition of the structural and exterior architectural wood elements. The completed scope of work and this report provides information on the approximate age and construction history of the three buildings based on an examination of the structural wood and architectural components and associated metal fasteners and hardware.

The scope of work included the following tasks:

• Conducting a site visit to photograph and document existing conditions, followed with an assessment report.
• Conducting a condition investigation, including moisture content measurements to determine whether conditions exist that are favorable to the growth of wood decay fungi and to identify areas of moisture intrusion.
• Examining accessible roof and floor framing to determine dimensions, spacing, and fastener type as well as to identify evidence of alterations or indicators of age.
• Examining exterior architectural wood elements such as window sashes, siding, and trim to determine fastener type and identify evidence of alterations or indicators of age.
• Examining structural wall framing.
• Removing a minimum of 8 wood species samples to identify the wood species or wood species groups for structural and architectural elements of interest.

Additions known to have been completed fewer than 50 years ago, including the attached 2-car garage with second-story living space, was not included in this scope.
FIELD PROCEDURES

Ms. Dugan conducted the investigation of the structural and architectural materials of the Building on October 23 and December 30, 2016. The investigation was based on a combination of visual inspection, moisture content measurement, species identification, and historical research. These methods are described below.

Visual Inspection

Visual examination of the structural and architectural elements of the Building allows for identifying components that are incongruous with surrounding material and that may be indicative of an alteration or repair. Identifying structural member dimensions, spacing, and the types of fasteners used can also provide information on the construction sequence and approximate age of the materials.

Species Identification

The Building is primarily a wood frame structure with wood siding and trim. Identifying wood species can aid in interpretation of historic construction or repair campaigns. Wood species were identified by removing small samples from which the species or species group was identified under microscopic examination. Fourteen samples were removed to identify species of key architectural and structural wood elements to aid in developing historical documentation.

Moisture Content Measurements

Prolonged exposure to moisture can produce undesirable conditions and long-term maintenance issues for wood in a structure. Excessive shrinkage or swelling, checking, loose connections, and decay are typical problems. Limited moisture diagnostics were conducted to determine whether further investigation to identify any sources of moisture causing decay was warranted.

Moisture content measurements identify wood with favorable moisture levels for the growth of wood-decay fungi. Generally, if the moisture content is less than 20 percent wood-decay fungi are unable to grow. While fungi may be present at lower moisture contents they are unable to continue to deteriorate the wood without sufficient moisture. Moisture contents from 20 to 30 percent indicate areas of concern where sufficient moisture is present for fungi to grow but not sufficient to indicate advanced decay. Moisture contents above 30 percent indicate that the wood has reached fiber saturation point (FSP), and, if exposure has been prolonged, is generally an indication of advanced decay with internal voids and / or surface deterioration.

Historical Research

Other materials may be present that can help to determine the age of modifications and the construction sequence of the Building. Material with stamps, maker’s marks, logos, or other identifying components can be researched to find date ranges for production and/or distribution.
FINDINGS

Nomenclature

The Building has been modified significantly since its original construction, ca. 1880s (see Appendix C). In its current configuration, the Building has an irregular rectangular footprint and is oriented on an approximate north-south axis. There have been multiple additions; the existing additions are shown in a simplified floor plan (Figure 1) below.

Figure 1. Existing Building with identified additions: 1) original 1-story building (blue), 2) 1-story side gable addition (green), 3) shed roof addition (purple), 4) bathroom addition (pink), 5) great room addition (turquoise), 6) utility hall addition (orange), 7) front entry addition (yellow), 8) greenhouse addition (red), and 9) 2-story garage and living space addition (red dotted line). Not to scale.
Because the age of construction is of particular relevance for this investigation, terms that are commonly used throughout this report are defined below to avoid confusion.

“Historic” identifies an element that is 50 years of age or older;

“Modern” identifies an element that is less than 50 years old;

“Original” identifies an element that dates to the construction of the building.

Based on historical photographs:

• The original structure was a 1-story side gable wood frame house that underwent at least eight alterations and/or additions since its construction ca. 1880 (Existing Building 1 in Figure 1).

• Between ca. 1880 and ca. 1910, no apparent changes occurred.

• By ca. 1957, there is a small front porch addition similar in location and footprint of Addition 7. Also present ca. 1957 is a small shed located above the house in the current location of the attached outbuilding.

• In 1972, county assessor records indicate significant square footage was added to the Building. That square footage most likely includes Addition 9. See Appendix C for historical photographs.

Figure 2. West elevation of the Building; the modern 2-story garage addition (Addition 9) is just to the left and out of the picture frame).

For ease of reference, the additions will be referred to by the numerical identifiers provided in Figure 1 throughout this report. These additions refer to the existing configuration of the Building; the location and dimensions of Additions 6 and 7 have changed since the date of original construction. Addition 9, the attached two-car garage with living space above is known to be modern construction and was not included in this assessment.
Two outbuildings were included in the scope of work: a small attached shed and a workshop. The shed is a small side gable building clad with plywood siding on the north, south, and west sides and split log siding on the east elevation (Figures 3 and 4). The workshop is composed of two sections with a shed roof that slopes to the east (Figure 5). The north workshop section is clad in a modern siding panel board, and the south section is clad with board and batten siding (Figures 6 and 7).

**Figure 3.** South elevation of the attached shed.

**Figure 4.** East elevation of the attached shed with split log siding.
Figure 5. West elevation of the workshop.

Figure 6. Northwest corner of the workshop, north section, clad in modern siding panel board.

Figure 7. South section of the workshop with modern board and batten siding.
General Construction – Structural Wood Elements

Framing - Main Building

In the original Building 1, the roof framing consists of full dimension 2 x 4 rafters toenailed to each other and spaced approximately 24 inches on center (Figure 8). The ceiling joists act as ties for the rafters. All lumber is rough sawn with predominantly circular saw marks. Visible fasteners are square cut nails. The majority of members are full dimension or near-full dimension members. The quality of the wood is consistent throughout the entire length of the attic. There are a few areas of moisture staining and areas with visible recent repairs, but overall the roof framing appears to be in good condition.

Figure 8. Attic framing in the original Building 1; view to the north.

The structural wood wall framing in the original Building 1 and Addition 2 is rough-sawn full dimension 2 x 4s. Fasteners within the original Building 1 and Addition 2 wall framing are cut nails (Figure 9). In the remaining additions and the two associated outbuildings, the fasteners are round wire nails.

Figure 9. Cut nail fasteners within Addition 2 wall framing.
There was no access to the floor framing within the Building or any of the additions at the time of the field investigation. There does not appear to be a crawl space. Floor joists, if present, likely rest on the ground. Tongue and groove flooring of various widths can be found in Additions 2 and 3.

The roof framing for Addition 2 are large beams that slope to the west to create a shed roof. These beams are clearly an alteration of the historic roof based on photographs and evidence of the former gable peak on the north interior wall (Figure 10) of Addition 2.

![Figure 10. Roof framing in Addition 2 are large timber beams spaced serval feet apart. The original gable roofline is partially outlined by the wall sheathing (red).](image)

There are multiple layers of roof framing over Additions 3, 4, and 6. The lowest layer of roof framing in Additions 3 and 4 is a combination of rough sawn 2 x 4 and 2 x 6 rafters and surfaced, dimensioned 2 x 6 ties (Figures 11 and 12). An extension of the modern beam roof of Addition 2 can be found above Addition 3 (Figure 13).

![Figure 11. Rough sawn rafters with modern, surfaced ties, Addition 3, view to the north.](image)
Figure 12. View of the roof and interior wall framing within Addition 3 and a portion of Addition 4, far left, view to the east.

Figure 13. View of the modern roof framing of Addition 2 extending to the east over the shed roofs of Additions 3, 4, and 6.

Addition 3 has no exterior wall framing; it has a rubble stone wall to the east and ties into the former exterior wall of Original Building 1 on the west. The only wall framing is interior wall framing that defines the bathroom addition, Addition 4. Addition 4 has horizontal open plank sheathing and wall studs that line stone rubble walls (Figure 14). The wood sheathing and studs are in poor condition with visible evidence of deterioration.
Figure 14. View of the wall framing in poor condition within Addition 4.

Roof framing in Addition 5 is heavy timber beams spaced approximately 4 feet apart running to a central ridge beam (Figure 15). The wall framing is surfaced and dimensioned studs with diagonal wall sheathing (Figure 16). A portion of the south facade of Original Building 1, along with the original window opening and clapboard siding is still extant behind the modern 2 x 4 wall framing.

Figure 15. View of the modern roof and wall framing within Addition 5 and the remaining south exterior facade of the original Building.
Addition 6 and 7 have modern 2 x 4 rafters that form shed roofs (Figures 17 and 18). Addition 6 has no wall framing, as the rafters bear on the (former) exterior wall of Addition 2 and the east wall is CMU. The roof sheathing is weathered and moisture stained, but the rafters have no evidence of weathering or staining and appear to be relatively new construction. Because the roof sheathing boards are weathered on the interior face, they may have been repurposed from another structure or Addition 6 may not have been enclosed and/or conditioned space when first constructed.

Addition 7 has modern 2 x 4 roof and wall framing, tar-impregnated moisture barrier, and board roof sheathing (Figure 18). Evidence indicates that Addition 7 is not historic; however, the historic clapboard siding of the original Building 1 can be seen as well as the paint outline of a historic front porch addition (no longer extant) that appears in photographs taken ca. 1957.
Figure 18. View of Addition 7, view to the west. The outline of the porch present in photographs dating to ca. 1957 can be seen on the historic siding, upper left.

Addition 8 is a greenhouse addition attached to the east side of Addition 5. It has modern glazing, doors, windows, and CMU walls (Figure 19). Based on the modern materials used in its construction, Addition 8 does not date to the period of significance and was not assessed in detail.

Figure 19. View of Addition 8, view to the south.

Framing - Outbuildings

The accessible roof framing of the attached shed is rough sawn, full dimension 2 x 4 rafters with a ridge beam and 2 x 6 rafter ties (Figure 20). The roof sheathing is made from boards that were repurposed from another structure, based on the different paint and stain colors visible on the boards. The wall framing is full dimension rough sawn 2 x
4s; insulation and interior finishes prevented a full assessment of the wall framing. There are two windows, one on the south elevation and one on the east elevation. The window on the south elevation is a 6-lite fixed sash with wood mullions. The window on the east elevation is a single lite and is covered on the exterior by a metal cover.

Figure 20. Repurposed roof sheathing and rough sawn rafters and ties in the attached shed; view to the west.

The attached shed has a steep roof pitch that does not correspond with the framing visible inside the structure (Figure 21). This altered roofline houses what appears to be a passive solar heating system, which is likely a modern alteration to the structure.

Figure 21. South elevation of the attached shed with passive solar panels and a steeply pitched roof that does not match the slope of the visible interior roof framing.

The workshop is comprised of two sections; in the north portion, there is a shed roof that slopes to the east and a poured concrete slab foundation (Figure 22). The roof rafters are modern, surfaced, and dimensioned 2 x 6s spaced 24 inches on center with modern plywood sheathing (Figure 23). The walls are modern 2 x 4s spaced 16 inches
on center with modern plywood sheathing. There is a modern aluminum frame window on the west wall. All identified fasteners are round wire nails.

**Figure 22.** Modern wall framing, modern plywood sheathing, and a concrete slab foundation in the workshop, view to the west. Note the moisture staining on the plywood just above the sill plate.

**Figure 23.** Modern roof framing in the workshop, northern section, view to the east.

In the south section of the workshop, there are surfaced, dimensioned 2 x 6 rafters spaced 24 inches on center and board sheathing (Figure 24). The wall joists are modern 2 x 4s spaced 24 inches on center; insulation and interior finished prevented full assessment of the wall framing. The foundation is poured concrete with concrete masonry block (CMU) around the perimeter (Figure 25). There are two windows, one on the south wall and one on the west wall.
Species Identification

Fourteen samples were removed for species identification. Given the assumed construction date of the Building (ca. 1880s), historic materials such as siding would likely have been produced by local saw mills with locally available material. Trees with native ranges extending into Colorado that were commonly used in early western settlement construction include western yellow pine (a hard pine species group that includes ponderosa pine and lodgepole pine), Engelmann spruce, and Douglas-fir. It should be noted that all of these tree species are still used today for structural and architectural applications, so decisions regarding the age of the wood in a building cannot be based on species alone. A complete list of species identification samples and their locations can be found in Appendix A.

Samples were taken of framing members and architectural finish members. All of the samples were identified either as western yellow pine or Douglas-fir, except for the historic siding of the original Building 1, which was identified as eastern white pine.
(Pinus strobus). Eastern white pine only grows in the eastern half of the U.S. and was commonly used in home-building kits for window sashes, trim, and siding that could be mail-ordered and shipped via railroad, ca. 1890 - 1920.

**Moisture Content**

Moisture content measurements were taken around the perimeter of the Building and the two outbuildings on the lowest exposed trim and siding elements, as well as under windows and along exterior sills. On the interior of the Building, moisture content measurements were taken on the wood floor around room perimeters. In all areas the moisture contents were below the 20 percent threshold for active wood decay fungi. The average readings in these locations were between 5 and 10 percent, except for an area on the floor of Addition 3, where moisture contents were between 13 and 19 percent. This area is near the bathroom area (Addition 4) and there is visible evidence of wood decay on both the floor and the roof framing above (Figure 26).

![Figure 26. Addition 3, with areas of high moisture content and visible evidence of wood deterioration in red.](image)

**Age of the Structural and Architectural Wood Elements**

Determining the exact age of the structural and architectural wood elements by visual inspection alone is generally not possible. In conjunction with species identification and historical research and documentation, however, it is sometimes possible to determine the sequence in which materials were added or altered by examining the materials and fasteners in detail.

A key identifier can be the type of fastener used to hold wood members or architectural elements together. Wire nails, in common use today, were not mass produced until the early 1890s. Prior to the development of the wire nail, nails were machine-cut from sheets of metal or made by hand. By 1900, more wire nails were being purchased than
machine-cut nails, and by 1920, over 90 percent of the nails sold in the U.S. were wire nails.¹

While wire nails have flat, circular heads and round shafts, machine cut nails, which predate wire nails, were typically stamped or cut from a sheet of metal, generally resulting in square or rectangular heads and square shafts. The visible fasteners identified on the structural components of the Original Building 1 and Addition 2 are cut nails. Wire nails were found in Additions 3 - 7, the attached shed, and the workshop.

Window hardware can also potentially be used to determine approximate dates of construction. The windows within the Building, however, are all modern replacement windows based on the dual-pane construction and the locking mechanisms (Figure 27). On the interior of the Building, in original Building 1 and Addition 2, openings in the framing where the historic windows are visible, but the sashes and glazing are gone (Figures 28 and 29).

Figure 27. Modern window hardware and dual pane glazing of the window on the west interior elevation of Addition 1.

For structural framing elements, dimensions can sometimes give an indication of age. Modern dimension lumber is marketed by nominal size (e.g., 2 x 4s or 2 x 8s), but the actual size of the lumber is smaller, due in part to surfacing of the wood. Rough-sawn lumber, or lumber that has no surface finish, often varies in width and thickness. Sawmills began to use planers ca. 1870 to size rough-sawn lumber into more uniform dimensions before shipping, and modern lumber is surfaced on all four sides. National lumber size standards did not exist until 1924. In 1900, the most common thickness for joists, rafters, and wall studs was 2 (actual) inches; modern lumber joists, rafters, and studs are typically 1 ½ inches in thickness, and are surfaced (planed) on all sides rather than rough-sawn.

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Measurement of the accessible roof and wall framing members of original Building 1, Additions 2, 3, and 4, and the attached shed shows a range of widths and thicknesses in the rough sawn lumber, which indicates the lumber was milled prior to the 1924 national size standard. Surfaced dimension lumber of 1 5/8 inches by 3 1/2 inches was identified in portions of Additions 3 and 4 and in Additions 5, 6,7, and the workshop.

Electrical wiring can also help to provide evidence of age. In Addition 5, the electrical wiring appears to be ungrounded “12/2 NM Romex” with a synthetic jacket braid (Figure 30). The outlet receptacles are also ungrounded. Changes to the 1962 National Electric Code required grounding, suggesting that the electrical wiring was installed prior to 1962.

![Figure 30. An ungrounded outlet and silver electrical cable with no ground wire, Addition 5.](image)

*Exterior Siding and Trim - Main Building*

The current exterior of the Building has board and batten siding fastened with round wire nails. Based on historical photographs, it is a modern alteration and is not historic or original to the construction.

However, there is white clapboard siding on what are now interior walls (the exterior north and south walls of the original Building 1 - see Figures 15 and 18) that matches that visible in photographs dated to ca. 1957. The wood species of this siding is eastern white pine, a tree species that is not native to the western half of the country and was used extensively for millwork, trim, and exterior siding. From the 1890s through 1918, such material was often purchased from the east coast through mail-order catalogs and delivered via railroad to homes in western states.

---

Board and batten siding can be found on the (formerly exterior) east elevation of original Building 1 and Addition 2. These areas are now the interior west walls of Additions 3 and 6. Within the area of Addition 3, the board and batten siding is painted green, the battens have eased edges, and round wire nails have been used as fasteners (Figure 31). Within the area of Addition 6, the board and batten siding appears to be in much poorer condition, has been partially painted white, and is fastened with square cut nails (Figure 32). Based on species identification of samples, the boards and battens of both areas were milled from western yellow pine.

**Figure 31.** Board and batten siding of the original Building’s east exterior wall, visible in Addition 3.

**Figure 32.** Board and batten siding of the historic Addition 2’s east exterior wall, visible in Addition 4.

Historically, it was common for houses to have more expensive finishes such as clapboard siding installed only on the visible facades. Based on the presence of square cut nail fasteners and the poor condition of the board and batten siding within Addition 6, it is likely that the siding is original to the construction of Addition 2. In contrast, the
overall good condition of the board and batten siding within Addition 3, the presence of wire nail fasteners, the eased edges of the battens, and the green paint (a common color choice in the 1950s and 1960s) indicate that the siding likely dates to ca. 1950s.

**Exterior Siding and Trim - Outbuildings**

The attached shed has plywood sheet siding and plain wood trim on all exterior elevations except the east elevation, which is split-log siding (see Figure 4). This split-log siding matches the siding that can be seen in photographs that date to ca. 1950s (see Figure 36 and Appendix C).

The workshop is sided with a combination of modern siding board sheets and modern board and batten siding (see Figures 6 and 7). Galvanized wire nails are visible on the battens.

**Exterior Doors - Main Building**

There are two doors into the Building: one is located on the west elevation of Addition 5, and one is located on the south elevation leading into modern Addition 8. Both exterior doors have modern hardware and do not appear to be historic or to date to the period of significance.

**Exterior Doors - Outbuildings**

The attached shed has a weathered solid wood, four panel door with an enameled door knob representative of hardware common to ca. 1900 (see Figure 3). There are two exterior doors on the workshop; both have modern hardware and do not appear to be historic.

**Historical Documentation**

Close examination of historical photographs has provided additional evidence of the general timeline of construction for various additions. The likely date of original construction, based on the presence of square cut nails in both Original Building 1 and Addition 2 suggests an initial construction date prior to 1900. A photograph dating ca. 1880s shows a small single story rectangular building that appears to be Original Building 1 with what appears to be an outhouse and a small shed (Figure 33).
Unfortunately there is a gap in the photographic record until approximately 1957; a
hand-dated photograph provides a view of both Original Building 1, Addition 2, and the
front porch addition (what is now Addition 7 - Figure 34).

Close examination of this photograph reveals that Addition 5 was under construction at
the time of this photograph. Figure 35 is a close-up, digitally enhanced image of the
west elevation of Original Building 1 that shows the diagonal sheathing of the wall
framing of Addition 5.
Figure 35. Diagonal sheathing of Addition 5, and a horizontal board used as a concrete form for the foundation.

Additional examination of another historic photograph provides more evidence that Addition 5 as well as Additions 3, 6, and the attached shed are greater than 50 years of age (Figure 36). The split log siding on the shed in the photograph is the same siding that still exists on the east elevation of the attached shed (see Figure 4). A small segment of the Addition 5 chimney is visible behind the Addition 2 chimney, and the shed roof for Additions 3 and 6 are partially visible.

Figure 36. View of Original Building 1, Addition 2, and what is now the attached shed. View to the south. Photo courtesy of Deon Wolfenbarger.
SUMMARY OF THE INVESTIGATION

The findings of the wood investigation can be summarized as follows:

The Building

- Based on a limited number of samples removed, the existing structural wood framing of the Building come from trees with native habitats that extend into Colorado and include the Black Hawk area. Although this finding does not rule out the possibility that the timber was shipped in from another geographic region, it is relatively unlikely, given the predominance of these locally available tree species.

  - One exception is the historic siding on the north and south exterior walls of original Building 1 which was identified as eastern white pine (*Pinus strobus*).

- All existing windows and hardware are modern replacements.

- The two entry doors are modern replacements.

- The lumber using in the construction of the roof and wall framing in Original Building 1, Addition 2 (wall framing only), and portions of Additions 3 and 4 are rough sawn, full dimension members spaced 16 inches on center. Most members have circular saw marks visible on the wide faces. The quality and appearance of the wood is consistent throughout these portions of the Building. The dimensions vary +/- 1/2 inch or more from standard dimensions. This variance indicates that the lumber within Original Building 1, Addition 2 (walls only), and portions of Additions 3 and 4 was milled prior to the standardization of lumber sizes, ca. 1924.

  - The lumber used in the construction of Additions 5, 6, and 7, is modern dimension, surfaced lumber.

  - Metal fasteners used for structural framing within Original Building 1 and Addition 2 are cut nails. Wire nails were identified in Additions 3 through 8 and on the exterior siding of the Building.

  - The structural floor framing was not accessible at the time of the investigation. Floor framing, if it is present, is likely to be structurally compromised; additional investigation by a structural engineer is recommended.

  - The roof rafters of the original Building 1 are full dimension 2 x 4s (24 inches on center) toenailed to each other with no ridge beam present. The ability of the roof framing to withstand snow and wind loads should be investigated by a structural engineer.
• Original Building 1, Addition 2, Addition 3, and Addition 4 definitively date to the period of significance based on historical photographs and physical evidence of framing members, architectural elements, and fasteners.

  o Additions 2, 3, 4, and 6 have had alterations to their roof lines. Addition 2 originally had a gable roof, while Additions 3, 4, and 6 had shed roofs.

• Addition 5 is an addition that is more than 50 years old based on the historic photograph, wood framing, electrical cable, and sheathing materials.

• Addition 6 in its current configuration does not date to the period of significance. However, there is enough evidence, based on the painted area of the board and batten siding and the presence of weathered roof sheathing boards and roofing material (visible from the electrical/mechanical space above the ceiling), to determine that a shed roof structure existed in the same or similar footprint, and that shed roof structure was likely constructed more than 50 years ago. Additionally, there is some photographic evidence to support that there was a shed roof addition in the current addition location (see Figure 36).

• Addition 7 in its current configuration does not date to the period of significance and is not 50 years old or older. Addition 7 does encompass the footprint of the ca. 1950s front porch addition.

• Addition 8 does not date to the period of significance and is not 50 years old or older.

• Additions 3 and 4 show evidence of moisture intrusion in the form of water stains on the structural roof framing and visible evidence of wood decay fungi on rafters, wall studs, and floor wearing surfaces. Exposure to moisture can lead to deterioration of structural framing members. The condition of all framing members within Additions 3 and 4 should be assessed to determine the need for reinforcement or replacement.

• The Building under investigation qualifies for the Preservation Program, according to the following guidelines:
  
  ▪ Original Building 1, Addition 2, Addition 3, and Addition 4 were constructed during the period of significance of 1859-1918. Additions 5 and 6 was constructed more than fifty (50) years prior to the date of the application (2016), however, based on the investigation, Addition 6 has been at least partially reconstructed (there are new rafters, a concrete floor, and the east wall is CMU block).

The Attached Shed

• Based on historical photographs, species identification, investigation of the existing roof framing, siding (east elevation only), and metal fasteners, the
attached shed is 50 years old or older, although the roof line was altered (likely ca. 1970 - 1980) for a passive solar system.

• **The attached shed under investigation qualifies for the Preservation Program, according to the following guidelines:**

  - The attached shed was constructed more than 50 years before 2017 and is within a national historic landmark district.

**The Workshop**

• The roof framing and wall framing is constructed of modern dimension lumber and has wire nail fasteners. The siding on both sections of the workshop is modern material. Both sections of the workshop have poured concrete foundations (the southern portion of the workshop has a poured concrete foundation with short CMU block walls).

• The windows and doors are modern.

• The workshop is not visible in historic photographs that date to ca. 1950.

• **The workshop does not qualify for the Preservation Program.** Although a historic structure may have existed in the same or similar footprint, the existing building is constructed of modern materials and there is no evidence of the building in historic photographs.
APPENDIX A

Species Identification Table

Architectural and/or Historical Feature Table
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Member</th>
<th>Location</th>
<th>Dimensions</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>wall stud</td>
<td>modern addition 5, east wall</td>
<td>1 5/8&quot; x 3 1/2&quot;</td>
<td>Douglas-fir (Pseudotsuga menziesii)</td>
</tr>
<tr>
<td>2</td>
<td>white lap siding</td>
<td>original building 1, south exterior of wall</td>
<td>5 3/4&quot; wide</td>
<td>eastern white pine (Pinus strobus)</td>
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<tr>
<td>3</td>
<td>window frame</td>
<td>original building 1, south interior of wall</td>
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<td>western yellow pine (Pinus spp.)</td>
</tr>
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<td>window frame</td>
<td>original building 1, west wall</td>
<td></td>
<td>western yellow pine</td>
</tr>
<tr>
<td>5</td>
<td>rough sawn wall stud</td>
<td>original building 1, south wall, infill in historic window opening</td>
<td>2 1/8&quot; x 4&quot;</td>
<td>Douglas-fir</td>
</tr>
<tr>
<td>6</td>
<td>horizontal board sheathing</td>
<td>original building 1, south wall</td>
<td>western yellow pine</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>vertical board sheathing</td>
<td>original building 1, east exterior of wall</td>
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<td></td>
</tr>
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<td>8</td>
<td>vertical batten</td>
<td>original building 1, east exterior of wall</td>
<td>3/4&quot; x 2 7/8&quot;</td>
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</tr>
<tr>
<td>9</td>
<td>tongue and groove flooring</td>
<td>addition 3</td>
<td>Douglas-fir</td>
<td></td>
</tr>
<tr>
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### Table A-2. Architectural and/or Historical Features

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<tr>
<th>Building</th>
<th>Are original (to the construction date ca. 1880)?</th>
<th>Date to the period of significance (1859 - 1918)?</th>
<th>Are greater than 50 years old?</th>
<th>Reflect the original design intent for the building?</th>
<th>Reflect period or regional styles or building practices?</th>
<th>Reflect changes to the building from major periods or events?</th>
<th>Are examples of exceptional craftsmanship or design?</th>
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<td>Partially (interior locations only)</td>
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</tr>
<tr>
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<td>Partially - east elevation</td>
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<td>Partially - east elevation</td>
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APPENDIX B

Discussion of Physical Evaluation (Doors/Windows)

Discussion of Main Building, Outbuildings, Alterations/Additions
Physical Evaluation (Doors/Windows) - Main Building

1. Condition of the paint - not applicable.

2. Condition of the frame and sill - only one original window frame remains (the south wall of the original Building 1). The sill has been partially removed, but the existing window frame is in fair condition.

3. Condition of the sash (rails, stiles and muntins) - there are no original or historic sashes.

4. Glazing problems - not applicable. All existing windows are modern.

5. Hardware - not applicable. All existing windows are modern.

6. The overall condition of the window (excellent, fair, poor, and so forth) - not applicable. All modern windows are in good condition.

7. The pattern of the openings and their size - the pattern of the openings in the south and west elevations of Original Building 1 and the south elevation of Addition 2 are consistent with those visible in historical photographs (on the west and south elevations).
   
   A. The original windows within original Building 1 were 4-lite, double hung (based on historic photographs) The openings that remain measure 30-1/2” x 66”.
   
   B. The original door of original Building 1 is not visible in historic photographs and no longer exists. The opening that currently exists for the historic door measures 35” x 85”.
   
   C. The original windows on the west elevation of Addition 2 were 6-lite double hung (based on historical photographs). The openings that remain measure 39-1/2” x 57-1/2”.
   
   D. The original door of Addition 2 is not visible in historic photographs and no longer exists. The door opening in Addition 2 measures 35-1/2” x 83”.

8. Proportions of the frame and sash - since all windows are modern replacements, the proportions of the frame and sash were determined to have no historical significance.

9. Configuration of window panes - all windows are modern replacements.

10. Muntin profiles - not applicable.

11. Type of wood - not applicable.

12. Paint color - not applicable.

13. Characteristics of the glass - not applicable.

14. Associated details such as arched tops, hoods, or other decorative elements - not applicable.
Main structure, outbuildings, alterations/additions:

1. Does the building represent a variety of periods of construction, additions, and modifications, not all of which may be significant?

All of the buildings represent a variety of periods of construction and modifications.

- For the Building (main structure), Additions 7 through 9 are not more than 50 years old. Additions 3 through 6 are at least 50 years old; Additions 3, 4, and 6 may date to the period of significance. Addition 2 and the original Building 1 date to the period of significance.
- The attached shed is at least 50 years old but has had its siding and roof line modified, ca. 1970 - 1980.
- The workshop has been reconstructed with materials less than 50 years old. This reconstruction may be in the footprint of a historic structure, and may include elements repurposed or reused from its historic configuration, but there is no evidence that the workshop has any significant historic fabric remaining.

2. Does the building have physical problems that require repair?

Main Building - There are several areas of concern within the Building. The dimensions and connections of the roof rafters should be assessed by a structural engineer to determine the roof framing’s adequacy to support existing and anticipated loads. The floor framing could not be assessed at the time of the investigation and is likely in poor condition, if it exists. The floor wearing surface and roof framing within Addition 3 and the wall framing within Addition 4 shows signs of significant deterioration by wood decay fungi. The glazing used for the roof of Addition 8 has a minimal slope that allows snow build-up and may not be rated for use as roofing material. Additions 3, 4, and 6 may not meet current light and ventilation requirements.

Attached Shed - The plywood siding shows evidence of moisture intrusion and failure near ground level. The presence and condition of any floor framing could not be determined at the time of the investigation.

Workshop - The workshop is in generally good condition.

3. What construction materials and systems are known to exhibit distress or deterioration?

Main Building - In addition to those systems identified in response to question 2, the rubble walls of Addition 4 are partially collapsing and the electrical system is in need of replacement. Additions 3, 4, and 6 may not meet current code requirements for ceiling height.

Outbuildings - see responses to question 2 above.

4. Does the building have code or functional problems that interfere with its use?

Main Building - A thorough building inspection is recommended to identify all potential issues. Possible code issues that were noted include overstressed roof framing elements, ungrounded electrical outlets, lack of a crawl space or crawl space access, lack of adequate light and ventilation, lack of appropriate clearances in the bathroom (Addition 4), and ceiling height concerns.
Outbuildings - no possible code issues were identified.

5. Is the building in use?
All buildings are in use.

6. Is a new or more intensive use planned?
This investigator is unaware of any new or more intensive use planned for the Building or its associated outbuildings.
APPENDIX C

211 Horn: Research on Construction History
This memo provides information gathered on what portion, if any, of 211 Horn is historic. For the purposes of the city’s grant program, “historic” is defined as fifty years or older.

**Photo research:** Historically, the dwelling at 211 Horn Street was a very small, gable-front-and-wing residence. (here is no photographic evidence that the “wing” [Addition 2] was part of the original construction. Given the difference in the style of the historic windows [6-lite vs. 4-lite] between the wing and the gable-front building, it seems likely that the wing was constructed at a different time than the gable front. In Figure 1 below, the gable-front portion is marked by the red circle. It has a low roof with shallow pitch. The south gable-front wing likely consisted of two small rooms, and did not extend very far into the rear of the lot. A small, crudely constructed shed it at the rear; it does not match the size or height of the existing rear shed. The yellow arrow points to a historic dwelling on the north that is no longer extant (the present house extends to the north into this lot).

Figure 1. Ca. 1900-1910s.
Figure 2 shows the front elevation of the house with both wings. There was likely one small room contained within the side-gable wing that extended to the north. A small porch is set within the ell. While this porch is over fifty years in age, it likely does not date from the historic district’s period of significance. This view again shows the low roof ridges, which contain two interior chimneys – one on each ridge. The retaining wall is level with the ground, and has stairs which are centered on the lot. [Note: The retaining wall rises dramatically for the property on the north. This is important to compare to the existing lot and house; see evaluation.] Portions of the attached shed and Addition 5 are visible in this photograph (yellow arrows).

Figure 2. ca. 1957

Figure 3 provides a view from the adjoining lot on the north. By the 1950s, there is another shed with a gable-front roof at the rear of the lot. The roof pitch of this shed does not match the existing gable-front addition that is currently attached to the present house. Viewed from the interior of the shed, the roof framing likely does match the pitch as it appears in this photograph. Additionally, the split log siding on the east elevation matches the siding in Figure 3. The ground of the lot is nearly even with the ridge line of the original historic house.
Figure 3. Ca. 1950s

**Historic research:** The Gilpin County Assessor’s office, as well as the 1986 inventory form prepared by the National Park Service, indicates that the square footage of the house was substantially increased ca. 1972 to over 1900 square feet; the existing documentation does not indicate whether this was completely new construction, or a substantial remodel of the smaller historic home. The physical evidence from this investigation indicates that the great room addition (Addition 5) was constructed ca. 1957 and Additions 3, 4, and 6 are at least 50 years old. The alterations in the roof line over Additions 2, 3, 4, and 6, Addition 7, Addition 8, and Addition 9 likely were constructed ca. 1970 - 1980. Later additions expanded the square footage to 2011 square feet. The National Park Service indicated that this was not a “contributing” building to the district.
**Evaluation:** The residence at 211 Horn Street does not retain its appearance from the period of significance, and instead gives all indication of being a ca. 1970s residence. An anecdotal story states that the original house is encapsulated within the present structure; interior examination would be required to prove this, and may still be inconclusive. This investigation indicates that the original building, historically significant additions, and additions greater than 50 years of age remain “encapsulated” inside the existing modern construction. If indeed encapsulated, then only a very small portion of the exterior historic façade remains (see red ovals in Figures 3 and 4); this front portion no longer retains its historic horizontal clapboard. The following portions of the house are not fifty years old: garage and 2nd story above; wing connecting to the garage (this wing is in fact, historic); rear gable-front addition with steeply pitched roof; and the south addition with large fireplace (the south addition with the fireplace is greater than 50 years old).

The front retaining wall and stairs are not in the original location. Historically, there was a significant change in grade from the historic house at 211 Horn, and the lot adjacent to the north. For the historic house to be encapsulated within the existing structure, a significant amount of grading was required. Furthermore, a comparison of historic photographs to the present conditions indicates that the small, gable-front portion (red oval in Figure 3 and 4) may not be in its original location. No evidence was found during this investigation to indicate the gable-front portion of the original house has been moved.

**Figure 4.** 2010. Red oval indicates possible historic portion; yellow areas indicate new construction.
Summary: Very little (if any) of the historic residence at 211 Horn Street remains. At most, a small section of the façade may contain historic interior framing; the windows and siding are not historic.

**Summary:**

**ca. 1880s** - based on a historical photograph, the 2-room, single story building was constructed (Original Building 1).

**ca. 1890s** - the side-gable wing (Addition 2) was likely constructed, based on stylistic differences between the window styles of the two structures. The presence of square cut nails indicates that Addition 2 was constructed prior to 1900. It is likely that this residence, like many homes in Black Hawk during this time period, had at least one exterior attached shed for storing wood (possibly Additions 3 and 6) and a stone or rubble-lined root cellar cut into the hillside (possibly Addition 4). No accessory buildings matching the two that presently exist have been identified in historic photographs.

**ca. 1900 - 1950** - no historical photographs have been located of this time period.

**ca. 1957** - The room with the fireplace (Addition 5), as well as Additions 3, 4, and 6, and the attached shed are visible in historic photographs. Analysis of the structural framing, fasteners,
and electrical wiring indicate that these additions were either constructed or significantly modified during this time period.

**ca 1970s - 1980s** - Alterations to the roof over Additions 2, 3, 4, and 6 were likely made. Other alterations including the construction of Addition 7, 8, and 9, the alteration of the roofline of the attached shed for the passive solar system, and reconstruction or new construction of the workshop likely occurred at this time.
Attachment H

GLOSSARY

As-Built  Architectural plans that show the existing conditions of a building.

Ashlar  Stone masonry pattern of rectangular stones set without continuous joints and appear to follow a random pattern, although a large pattern may be repeated.

Asphalt Roll Roofing  Asphalt roll roofing or membrane is a roofing material commonly used for buildings that feature a low sloped roof pitch. The material is based on the same materials used in asphalt shingles; an organic felt or fiberglass mat, saturated with asphalt and faced with granular stone aggregate.

Board of Aldermen  An elected six-member panel authorized with decision-making powers for the governance of the City of Black Hawk.

Building Official  The City official charged with the responsibility of administering and enforcing the City's building codes.

Certificate of Appropriateness (COA)  The official document issued by City Council approving an application or permit for the erection, moving, demolition, alteration or addition to, or the external construction or external restoration of a historic landmark. A COA, once issued, will expire under the same conditions as its associated building permit. A recommendation for approval must be provided by the Historic Preservation Commission.
**Chamfered**  
A chamfer is a transitional edge between two faces of an object.

**City Council**  
The elected Board of Aldermen, plus the Mayor.

**City Staff**  
An employee of the City of Black Hawk.

**Cladding**  
Window cladding looks very similar to the frame and sits around the perimeter of a window. It is sealed to the glass with a sealant, such as silicone, and is designed to direct water away from any of the underlying wood of the window frame, which ultimately prevents rotting.

**Concrete Stain**  
Stain applied to concrete surfaces to protect and aesthetically enhance vertical or horizontal surfaces.

**Contributing**  
Contributing shall refer to any resource located within an identified historic District that represents that period and area of significance associated with that geographic area.

**Contributing Structure**  
Any building, structure, or object included on the property which adds to the historical integrity or architectural qualities that make the historic district significant and is used for defining context and which retains a significant amount of its physical integrity and character-defining features.
Corner boards  Board placed at the corners of exterior walls to provide a neater appearance and to protect the ends of the wood siding

Course  A horizontal row of bricks, stone, or other masonry units.

Cut nails  Cut nails, were cut from iron plates, has a rectangular shank that tapers only on the two opposing sides. The early cut nails were "Headed" by hammering.

Designated Historic Resource  A public or private building, home, replica, structure, object, property, park or site that has importance in the history, architecture, archeology or culture of the City, State or Nation, as designated by the Historic Preservation Commission.
Dormer  A dormer is a roofed structure, often containing a window, that projects vertically beyond the plane of a pitched roof.

Dry stack  *(also: dry masonry, dry stone, dry wall, dry rubble construction)* Masonry work laid without mortar. A self-supporting rubble or ashlar wall built without mortar.

Ell  An extension or wing of a building that is at right angles to the length of the building.

Elevation  Any face of a building or side of a room. In a drawing, the same or any part of it, represented in two dimensions. A scale drawing of the upright parts of a structure.

Façade  The principal face or front elevation of a building.
**Field stone**  Small uncut boulders or large stones used in their natural form for fences, crude walls, and so on.

**Flood Plain**  Also known as a flood zone. An area defined by FEMA according to varying levels of flood risk and type of flooding.

**Fretwork**  Patterns or decoration on a surface made by cutting into or through the surface.

**Frieze**  Any plain or decorative band, or board, on top of a wall immediately below the cornice; sometimes decorated with ornamentation. Porch cornices may likewise be decorated with friezes. A common example, the *spindled porch frieze*, is illustrated.
Gable  *[also gable end]* The triangular end of an exterior wall in a building with a ridged roof

Gable Roof A sloping (ridged) roof that terminates at one or both ends in a gable

Galvanized Is the process of applying a protective zinc coating to steel or iron, to prevent rusting.

Glazing Fitting glass into windows and doors

Grading The work of ensuring a level base, or one with a specified slope, for construction work such as a foundation, surface draining, a base course for a road or sidewalk, etc.
Grille  Grilles were originally used to divide large glass sheets into smaller sections that were easier to manufacture and distribute. However, as technological advancement makes manufacturing large glass sheets and strong window frames a feasible option, the use of grilles has been shifted from utility to aesthetics to still create the divide lite aesthetic. Grilles are also referred to as muntins.

Guide to Programs  This policy and procedures document, related to the Historic Restoration and Community Preservation Fund.

Habitable  A space in a building or structure for living, sleeping, eating or cooking that is conditioned and has electrical and plumbing services.

Half Round Gutter  A channel of wood or metal running along the eaves of a house, used for catching and carrying off rainwater and water from melting snow. Half round refers to the shape of the gutter, and is a type that was traditionally found on historic buildings.
**Hip roof**  A roof with an external angle formed by the meeting of two sloping roofs

**Historic Preservation Commission (HPC)**  A five-member appointed panel charged with the review and recommendation of modifications to the historic components of the City of Black Hawk.

**Jamb**  A side post or surface of a doorway or window.

**Lap siding**  A type of siding that consists of boards that are thicker on one edge than the other; the bottom (thick) edge of one board overlaps the top (thin) edge of the board below.

**Light**  A fixed pane of glass (see Windows – parts of)

**Masonry**  Work constructed by a mason using stone, brick, concrete blocks, or similar materials
**Molding**  A continuous decorative band; serves as an ornamental device on both the interior and exterior of a building. Often serves the function of obscuring the joint formed when two surfaces meet.

**Mortar**  A mixture of plaster, cement or lime with a fine aggregate and water; used for pointing and bonding bricks or stones.

**Muntin**  One of the thin strips of wood used for holding panes of glass within a window, also referred to as a grille. (see Windows - parts)

**National Historic District Landmark**  All properties within the Historic Residential District zoning designation are included within the National Historic District Landmark. The full boundaries of this Landmark District can be obtained from City staff.

**National Historic Landmark Period of Significance**  1859 to 1918.

**Noncontributing Building**  A building, regardless of age, that has lost its integrity. These buildings do retain value as residential or commercial properties, but do not possess the significance and/or physical integrity necessary to be listed as contributing.
**Outbuildings**  A building devoted exclusively for storage and not habitable and not attached to a principal building by any roofed structure, which may or may not be included as part of the Qualified Property. Improvements to these structures will be at the discretion of the City. Examples of outbuildings include, but are not limited to: sheds, outhouses, coal sheds, carriage houses, detached garages, and carports. Outbuildings may be subject to additional regulations as outlined in the currently adopted version of the International Residential Code.

**Outfall**  A location where an underground drain system penetrates a wall, allowing the water to flow out. Often the pipe is covered with a rodent screen to protect the system from debris.

**Permeation Grouting**  Soil Permeation Grouting is typically used to reduce soil permeability, improve soil cohesion, improve the structural characteristics of the soil, or, as often the case, a combination of some or all of these goals. It involves the injection of grout at low pressures into the soil matrix in an effort to permeate or encapsulate the individual soil grains without otherwise disturbing the natural state of the soil.
Pilaster  A rectangular column or shallow pier attached to a wall; quite frequently decoratively treated so as to represent a classical column with a base, shaft and capital.

Property Owner (Owner)  Property Owner per recorded City documents, or designated representative as provided with written permission via a signed and notarized “Affidavit of Permission” or “Power-of-Attorney” from the Property Owner.

Qualified Professional  An individual licensed or appropriately experienced in the discipline within which a recommendation is needed.

Qualified Properties  Properties within City limits which were constructed more than fifty (50) years prior to the date of the application and are designated as a national landmark or within a national historic landmark district. NOTE: Properties may have both historic and non-historic components; however, the intent of the Program is only for the historic portion of the structure.

Quoins  Large stone, or rectangular pieces of wood or brick, used to decorate and accentuate the corners of a building; laid in vertical services with, usually, alternately large and small blocks.
Residential Design Guidelines  City of Black Hawk Residential Design Guidelines: Guidelines developed to help achieve the goal of preserving the City’s character with exterior improvements to buildings. Please contact City staff for a copy of these Guidelines.

Reveal  The portion of a wood element that is fully visible after installation. (example below has a 6” reveal despite being an 8” board)

Rubble  (also rubblework) Masonry built of rubble or roughly quarried stones.

Saltbox  A roof characterized by a short slope on one side, and a long slope on the other, which sometimes sweeps close to the ground
Sashes  The framework into which panes are set. (See Window-parts of)

Secretary of the Interior Standards  The United States Secretary of the Interior's Standards for Treatment of Historic Properties.

Sheathing  The board or panel material used in floor, wall and roof assemblies of construction. One function is to form a surface onto which other materials can be applied.

Shed roof  A roof consisting of one inclined plane.

Sill  The framing member that forms the lower side of an opening, such as a door sill. A window sill forms the lower, usually projecting lip on the outside face of a window (see Window-parts of).
**Simulated Divided Lights**  
One piece of glass with detachable muntins or grilles, attached to both the interior and exterior of the glass.

**Solar Panel**  
A panel designed to absorb the sun’s rays as a source of energy for generating electricity or heating.

**Standing Metal Seam**  
Standing seam systems are premium metal roofing designed to hide fasteners by using concealed side laps or concealed clips. These can be either snap together systems or mechanically fastened panels.

**Substantial Completion**  
The stage in the progress of the work when the work, or designated portion thereof, is sufficiently complete in accordance with the contract documents so that the owner can occupy or utilize the work for its intended use.
**Swale**
A low tract of land; the term can refer to a natural landscape feature or a human-created one. Artificial swales are often designed to manage water runoff.

**Tongue & Groove**
A joint composed of a rib (tongue) received by a groove.

**True Divided Lights**
Multiple small panes of glass that are separated by muntins or grilles.
**Veneer**
A decorative layer of brick, wood, or other material used to cover inferior structural material thereby giving an improved appearance at a low cost.

**Window (parts of)**

**Wire nails**
As the name implies, wire nails are formed from wire. Usually coils of wire are drawn through a series of dies to reach a specific diameter, then cut into short rods that are then formed into nails. The nail tip is usually cut by a blade; the head is formed by reshaping the other end of the rod under high pressure,
RESOLUTION 39-2017
A RESOLUTION
AMENDING THE CITY OF BLACK HAWK 2016 BUDGET
STATE OF COLORADO  
COUNTY OF GILPIN  
CITY OF BLACK HAWK

Resolution No. 39-2017

TITLE: A RESOLUTION AMENDING THE CITY OF BLACK HAWK 2016 BUDGET

WHEREAS, upon due and proper notice, published or posted in accordance with the law, a public hearing was held on May 24, 2017 on the proposed amendments to the 2016 budget, and interested persons were given the opportunity to register any objections to the proposed amended budget.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF ALDERMEN OF THE CITY OF BLACK HAWK, COLORADO, THAT:

Section 1. That the budget as amended and attached hereto, is hereby approved and adopted as the 2016 amended budget of the City of Black Hawk.

Section 2. That the amended budget hereby approved and adopted shall be signed by the Mayor and made a part of the public records of the City.

Section 3. That the sums for 2016, on the attached amended budget, are hereby appropriated from the revenue of each fund, for the purposes stated.

RESOLVED AND PASSED this 24th day of May, 2017.

_______________________________
David D. Spellman, Mayor

ATTEST:

_______________________________
Melissa A. Greiner, City Clerk
CITY OF BLACK HAWK
REQUEST FOR COUNCIL ACTION

SUBJECT: 2016 Budget Amendment

RECOMMENDATION: Staff recommends the following motion to the Mayor and Board of Aldermen:

MOTION TO APPROVE: Resolution # 39 -2017, A Resolution amending the City of Black Hawk 2016 Annual Operating Budget.

SUMMARY AND BACKGROUND OF SUBJECT MATTER: See Attached.

AGENDA DATE: May 24, 2017

WORKSHOP DATE: N/A

FUNDING SOURCE: Refunding Bonds

DEPARTMENT DIRECTOR APPROVAL: [X] Yes [ ] No

STAFF PERSON RESPONSIBLE: Lance Hillis, Finance Director

DOCUMENTS ATTACHED: Amendment Detail by Account

RECORD: [ ] Yes [X] No

CITY ATTORNEY REVIEW: [X] Yes [ ] N/A

SUBMITTED BY: ______________________  REVIEWED BY: ______________________

Lance Hillis, Finance Director  Jack D. Lewis, City Manager
<table>
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<tr>
<th>Department</th>
<th>Account Number</th>
<th>Account Description</th>
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<th>Proposed Adjustment</th>
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<td>PRINCIPAL PAYMENT OF 2006 BONDS</td>
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RESOLUTION 40-2017
A RESOLUTION APPROVING THE FIRST AMENDMENT TO DEMOLITION PERMIT AGREEMENT BETWEEN THE CITY OF BLACK HAWK AND MONARCH BLACK HAWK, INC.
STATE OF COLORADO
COUNTY OF GILPIN
CITY OF BLACK HAWK

Resolution No. 40-2017

TITLE: A RESOLUTION APPROVING THE FIRST AMENDMENT TO DEMOLITION PERMIT AGREEMENT BETWEEN THE CITY OF BLACK HAWK AND MONARCH BLACK HAWK, INC.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BLACK HAWK, COLORADO, THAT:

Section 1. The City Council hereby approves the First Amendment to Demolition Permit Agreement between the City of Black Hawk and Monarch Black Hawk, Inc. as set forth in Exhibit A, and authorizes the Mayor to execute the same on behalf of the City.

RESOLVED AND PASSED this 24th day of May, 2017.

________________________________________
David D. Spellman, Mayor

ATTEST:

________________________________________
Melissa A. Greiner, City Clerk
FIRST AMENDMENT TO DEMOLITION PERMIT AGREEMENT

THIS FIRST AMENDMENT TO DEMOLITION PERMIT AGREEMENT (the "Agreement") is made this 24th day of May, 2017, by and between the CITY OF BLACK HAWK, COLORADO (the "City"), and MONARCH BLACK HAWK, INC., a Colorado corporation (the "Developer").

RECITALS:

A. The Developer is the owner of certain real property located in the City of Black Hawk known as the Monarch Casino property, which is more particularly described in Exhibit A attached hereto and made a part hereof (the "Property").

B. The City and the Developer entered into that Demolition Permit Agreement dated November 28, 2016 (the “Original Agreement”), by which the Developer agreed to cause all pedestrian traffic to be transported via a shuttle as a condition of the issuance of a demolition permit in lieu of constructing a temporary sidewalk, as more particularly described in Exhibit B to the Original Agreement, and subject to the specific conditions and obligations of Developer for the benefit of the City as set forth in the Original Agreement.

C. The City and the Developer desire to enter into this First Amendment to extend the time by which the closure of the Demolition Permit Area as defined in the Original Agreement is authorized to all pedestrian traffic, and continuing the indemnity set forth in the Original Agreement by the Developer in favor of the City for any potential liability associated with pedestrian traffic in the Demolition Permit Area.

D. The City and Developer specifically desire to extend the time to include the continuation of the specific conditions and obligations of the Developer, including the indemnity in favor of the City as set forth in the Original Agreement, through the completion of the Monarch Casino Project (the “Project”), which shall include completion of the exterior façade remodel of the existing casino property, and the completion of the construction of the new hotel tower in and adjacent to the Demolition Permit Area, said completion of all components to be evidenced by the issuance by the City of a final Certificate of Occupancy.

AGREEMENT:

NOW, THEREFORE, for and in consideration of the mutual promises and covenants contained herein, the sufficiency of which are mutually acknowledged, the parties hereto agree as follows:

1. Purpose. The purpose of this First Amendment is to set forth the terms and conditions for the Developer being able to continue construction of the Project without satisfaction of the condition requiring the construction of a Temporary Sidewalk. All conditions contained herein are in addition to any and all requirements of the City of Black Hawk Building Codes, the City of Black Hawk Home Rule Charter, any and all state statutes, and any other sections of the City of Black Hawk Municipal Code, and are not intended to supersede any requirements contained therein.
2. **Closure of Demolition Permit Area to All Pedestrian Traffic.** The Developer shall cause the Demolition Permit Area to be closed in its entirety to all pedestrian traffic through signage, traffic control barriers, and the use of pedestrian shuttles for the time determined necessary by the City Manager, or the City Manager’s designee, in conjunction with the construction of the Project by the Developer.

3. **Breach by the Developer; the City’s Remedies; Indemnity.** In the event of a breach of any of the terms and conditions of this First Amendment by the Developer, and if such breach is not cured within five (5) business days after Developer’s receipt of written notice of such breach from the City, the City Council shall be notified immediately and the City, may take such action as permitted and/or authorized by law, this Agreement, or the ordinances and Charter of the City to protect the public health, safety and welfare, and to protect the citizens of the City from hardship and undue risk. These remedies include, but are not limited to:

   a. The revocation of any building permit issued for the Project; and/or

   b. Any other remedy available at law; and

   c. Because of the inherently dangerous nature of the construction activity, and the requirement that the Demolition Permit Area remain closed to all pedestrian traffic, the Developer specifically agrees to indemnify and hold harmless the City, its officers, employees, agents or servants from any and all suits, actions, and claims of every nature and description caused by, arising from, or on account of any act or omission of the Developer, or of any other person or entity for whose act or omission the Developer is liable, with respect to this First Amendment, including but not limited to claims arising from pedestrians entering into the Demolition Permit Area and claims of third parties arising from impacts otherwise caused by the issuance of building permits, right-of-way permits and any other associated permits without satisfaction of the condition requiring the construction of a Temporary Sidewalk; and the Developer shall pay any and all judgments rendered against the City as the result of any suit, action, or claim, together with all reasonable expenses and attorneys’ fees incurred by the City in defending any such suit, action or claim. Developer and the City specifically acknowledge and agree that Developer is assuming any and all risk associated with the City’s potential risk under the Colorado Governmental Immunity Act, C.R.S.§ 24-10-101, et seq. (the "Immunity Act"), to the extent the provisions of the Immunity Act could be deemed to have been waived pursuant to C.R.S. § 24-10-106 by the conditions of this First Amendment. Provided however, the parties hereto understand and agree that the City, its officers, and its employees, are relying on, and do not waive or intend to otherwise waive by any provision of this Agreement, the monetary limitations (presently three hundred fifty, thousand dollars ($350,000) per person and nine hundred ninety thousand dollars ($990,000) per occurrence) and all other rights, immunities, and protections provided by the Immunity Act.

4. **Waiver of Defects.** In executing this Agreement the Developer waives all objections it may have concerning defects, if any, in the formalities whereby it is executed, or concerning the power of the City to impose conditions on the Developer as set forth herein, and
concerning the procedure, substance, and form of the ordinances or resolutions adopting this Agreement.

5. **Modifications.** This Agreement shall not be amended except by subsequent written agreement of the parties.

6. **Termination.** This Agreement shall terminate upon the first to occur of the construction of a Temporary Sidewalk approved by the City as more particularly described in Exhibit B to the Original Agreement, or the issuance of a Certificate of Occupancy for the Project.

7. **Release of Liability.** It is expressly understood that the City cannot be legally bound by the representations of any of its officers or agents or their designees except in accordance with the City of Black Hawk Municipal Code and the laws of the State of Colorado.

8. **Captions.** The captions to this Agreement are inserted only for the purpose of convenient reference and in no way define, limit, or prescribe the scope or intent of this Agreement or any part thereof.

9. **Binding Effect.** This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, successors, and assigns as the case may be.

10. **Governing Law.** The laws of the State of Colorado shall govern the validity, performance and enforcement of this Agreement. Should either party institute legal suit or action for enforcement of any obligation contained herein, it is agreed that venue of such suit or action shall be in Gilpin County, Colorado.

11. **Notice.** All notice required under this Agreement shall be in writing and shall be hand-delivered or sent by registered or certified mail, return receipt requested, postage prepaid, to the addresses of the parties herein set forth. All notices so given shall be considered effective seventy-two (72) hours after deposit in the United States mail with the proper address as set forth below. Either party by notice so given may change the address to which future notices shall be sent.

Notice to the City:  
City Manager  
City of Black Hawk  
P.O. Box 68  
Black Hawk, Colorado  80422

With copy to:  
Corey Y. Hoffmann  
Black Hawk City Attorney  
Hoffmann, Parker, Wilson & Carberry, P.C.  
511 16th Street, Suite 610  
Denver, Colorado  80202

Notice to Developer:  
Monarch Black Hawk, Inc.  
Attn: CEO  
With a copy to General Counsel
3800 S. Virginia St.
Reno, Nevada  89502

11. Except as modified herein, the Original Agreement remains in full force and effect and is hereby ratified by the City and the Developer.

WHEREFORE, the parties hereto have executed this First Amendment on the day and year first above-written.

CITY OF BLACK HAWK, COLORADO

___________________________________
David D. Spellman, Mayor

ATTEST:

___________________________________
Melissa A. Greiner, City Clerk

APPROVED AS TO FORM:

___________________________________
Corey Y. Hoffmann, City Attorney

DEVELOPER

By: ________________________________
Name: ____________________________
Title: _____________________________

STATE OF COLORADO )

) ss.

COUNTY OF _______________________

The foregoing instrument was subscribed, sworn to, and acknowledged before me this _______ day of _______________________, 20__, by ______________________________ as the ______________________________ of (Developer) _______________________

My commission expires: __________________________
DEMOLITION PERMIT AGREEMENT

THIS DEMOLITION PERMIT AGREEMENT (the "Agreement") is made this 28th day of November, 2016, by and between the CITY OF BLACK HAWK, COLORADO (the "City"), and MONARCH BLACK HAWK, INC., a Colorado corporation (the "Developer").

RECOLALS:

A. The Developer is the owner of certain real property located in the City of Black Hawk known as the Monarch Casino property, which is more particularly described in Exhibit A attached hereto and made a part hereof (the "Property").

B. The Developer has obtained a Demolition Permit, with conditions, and one of the conditions requires the construction of a pedestrian sidewalk in order to allow pedestrian access on Main Street during demolition activities (the "Temporary Sidewalk"), which Temporary Sidewalk would be located on property owned by a private property owner.

C. As of the date of this Agreement, the Developer has been unable to acquire or otherwise secure the permission necessary to construct the Temporary Sidewalk, and thus seeks to provide a mechanism by which the Developer will cause all pedestrian traffic to be transported via a shuttle, and otherwise close the Demolition Permit Area as more particularly described in Exhibit B, attached hereto and incorporated herein by this reference, to all pedestrian traffic of any kind.

D. The City and the Developer desire to enter into this Demolition Permit Agreement which memorializes the closure of the Demolition Permit Area to all pedestrian traffic, and includes an indemnity by the Developer in favor of the City for any potential liability associated with pedestrian traffic in the Demolition Permit Area.

AGREEMENT:

NOW, THEREFORE, for and in consideration of the mutual promises and covenants contained herein, the sufficiency of which are mutually acknowledged, the parties hereto agree as follows:

1. **Purpose.** The purpose of this Agreement is to set forth the terms and conditions for the Developer being able to obtain a Demolition Permit without satisfaction of the condition requiring the construction of a Temporary Sidewalk. All conditions contained herein are in addition to any and all requirements of the City of Black Hawk Building Codes, the City of Black Hawk Home Rule Charter, any and all state statutes, and any other sections of the City of Black Hawk Municipal Code, and are not intended to supersede any requirements contained therein.

2. **Closure of Demolition Permit Area to All Pedestrian Traffic.** The Developer shall cause the Demolition Permit Area to be closed in its entirety to all pedestrian traffic through signage, traffic control barriers, and the use of pedestrian shuttles for the time determined necessary by the City Manager, or the City Manager’s designee, in conjunction with the demolition of the Developer’s existing parking garage, and the demolition permit issued by the
City to cause such demolition, but in no event later than the expiration, completion or termination of the demolition permit. Provided, however, the City and Developer acknowledge and agree that the Demolition Permit Area may be required to be closed to all pedestrian traffic following the expiration, completion or termination of the demolition permit, and that the City Manager may authorize an extension of this Agreement in the event construction activities require the Demolition Permit Area to remain closed to pedestrian traffic.

3. Breach by the Developer; the City's Remedies; Indemnity. In the event of a breach of any of the terms and conditions of this Agreement by the Developer, and if such breach is not cured within five (5) business days after Developer’s receipt of written notice of such breach from the City, the City Council shall be notified immediately and the City, may take such action as permitted and/or authorized by law, this Agreement, or the ordinances and Charter of the City to protect the public health, safety and welfare, and to protect the citizens of the City from hardship and undue risk. These remedies include, but are not limited to:

   a. The revocation of the Demolition Permit; and/or

   b. Any other remedy available at law; and

   c. Because of the inherently dangerous nature of the activity, and the requirement that the Demolition Permit Area remain closed to all pedestrian traffic, the Developer specifically agrees to indemnify and hold harmless the City, its officers, employees, agents or servants from any and all suits, actions, and claims of every nature and description caused by, arising from, or on account of any act or omission of the Developer, or of any other person or entity for whose act or omission the Developer is liable, with respect to this Demolition Permit Agreement, including but not limited to claims arising from pedestrians entering into the Demolition Permit Area and claims of third parties arising from impacts otherwise caused by the issuance of the Demolition Permit without satisfaction of the condition requiring the construction of a Temporary Sidewalk; and the Developer shall pay any and all judgments rendered against the City as the result of any suit, action, or claim, together with all reasonable expenses and attorneys’ fees incurred by the City in defending any such suit, action or claim. Developer and the City specifically acknowledge and agree that Developer is assuming any and all risk associated with the City’s potential risk under the Colorado Governmental Immunity Act, C.R.S.§ 24-10-101, et seq. (the “Immunity Act”), to the extent the provisions of the Immunity Act could be deemed to have been waived pursuant to C.R.S. § 24-10-106 by the conditions of this Demolition Permit Agreement. Provided however, the parties hereto understand and agree that the City, its officers, and its employees, are relying on, and do not waive or intend to otherwise waive by any provision of this Agreement, the monetary limitations (presently three hundred fifty, thousand dollars ($350,000) per person and nine hundred ninety thousand dollars ($990,000) per occurrence) and all other rights, immunities, and protections provided by the Immunity Act.

4. Waiver of Defects. In executing this Agreement the Developer waives all objections it may have concerning defects, if any, in the formalities whereby it is executed, or concerning the power of the City to impose conditions on the Developer as set forth herein, and
concerning the procedure, substance, and form of the ordinances or resolutions adopting this Agreement.

5. Modifications. This Agreement shall not be amended except by subsequent written agreement of the parties.

6. Release of Liability. It is expressly understood that the City cannot be legally bound by the representations of any of its officers or agents or their designees except in accordance with the City of Black Hawk Municipal Code and the laws of the State of Colorado.

7. Captions. The captions to this Agreement are inserted only for the purpose of convenient reference and in no way define, limit, or prescribe the scope or intent of this Agreement or any part thereof.

8. Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, successors, and assigns as the case may be.

9. Governing Law. The laws of the State of Colorado shall govern the validity, performance and enforcement of this Agreement. Should either party institute legal suit or action for enforcement of any obligation contained herein, it is agreed that venue of such suit or action shall be in Gilpin County, Colorado.

10. Notice. All notice required under this Agreement shall be in writing and shall be hand-delivered or sent by registered or certified mail, return receipt requested, postage prepaid, to the addresses of the parties herein set forth. All notices so given shall be considered effective seventy-two (72) hours after deposit in the United States mail with the proper address as set forth below. Either party by notice so given may change the address to which future notices shall be sent.

Notice to the City: City Manager
City of Black Hawk
P.O. Box 68
Black Hawk, Colorado 80422

With copy to: Corey Y. Hoffmann
Black Hawk City Attorney
Hoffmann, Parker, Wilson & Carberry, P.C.
511 16th Street, Suite 610
Denver, Colorado 80202

Notice to Developer: Monarch Black Hawk, Inc.
Attn: CEO
With a copy to General Counsel
3800 S. Virginia St.
Reno, Nevada 89502
WHEREFORE, the parties hereto have executed this Agreement on the day and year first above-written.

CITY OF BLACK HAWK, COLORADO

ATTEST:

Melissa A. Greiner, City Clerk

APPROVED AS TO FORM:

Corey A. Hoffman, City Attorney

DEVELOPER

By:  
Name:  
Title:  

STATE OF COLORADO

COUNTY OF Gilpin

The foregoing instrument was subscribed, sworn to, and acknowledged before me this 20th day of November, 2016, by Loretta Sanchez as the Notary of (Developer).

My commission expires:  September 26, 2016

(S E A L)

LORETTA SANCHEZ
Notary Public
State of Colorado
Notary ID: 20124943906
Notary Public expires 09-26-2020
Exhibit B
Monarch Casino
No Pedestrian Traffic Area

Aerial Photograph Date: 2014
Date: 11-23-16

State Highway 119
Monarch Casino
Old Parking Garage
Main Street
Isle of Capri
New Parking Garage

No Pedestrian Traffic