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Held at the Silco Theatre field design meeting #1 was held from October 5-8, 2013. This appendix contains flyers, orientation materials, meeting notes, attendance lists and before and after graphics.

**APPENDIX E: XXX**  
xxx
Appendix A: Boston Hill Talking Points

Introduction to the Planning Project for Mine Safety & Trails Improvement on Boston Hill
November 2012

1) A team of planners, landscape architects and geologists is working on a plan to safeguard mines and improve trails on Boston Hill. The plan is scheduled to be completed by April 2013.

2) The team has been contracted by the Abandoned Mine Land (AML) program, a state agency within the Energy, Minerals & Natural Resources Department (EMNRD). AML has had mine safeguarding projects on Boston Hill in the past. The Boston Hill area is made up of City, County, BLM and private lands and includes some land that had mining activity post-1977.

3) AML is authorized by the Surface Mining Control and Reclamation Act (SMCRA) to address mines abandoned prior to 1977 and is funded through taxation on coal mining throughout the U.S. AML’s priorities are:
   i) Protecting the public from immediate hazards resulting from historic mining practices
   ii) Protecting the public from hazards that do not constitute immediate hazards
   iii) Reclamation of lands and water degraded by historic mining practices. Reclamation may include conservation measures that return land to productive purposes, e.g., agriculture or recreational uses.

4) AML is committed to a public outreach process to reach general agreement about an action plan to a) reduce public safety hazards in the Boston Hill area; b) protect wildlife habitat associated with mine features; c) improve recreational amenities in the area; and d) protect sensitive wildlife and plant species associated with historic mining areas. A team of landscape architects, planners and environmental scientists will be interviewing and speaking to community groups and individuals to get a sense of what Boston Hill means to them so that these factors can be considered in the development of a Plan of Action.

5) AML has the ability to fund reclamation work on Boston Hill according to the plan of action that may be developed. There are constraints, however:
   a) AML serves the entire state and has budget limitations.
   b) AML may be “sunsetted” and there may be a time limit on its funding.
   c) All AML funding must be closely tied to protecting public safety, especially hazard mitigation.
   d) If the community has no desire to implement any projects on Boston Hill, AML is willing to do nothing.

6) The team is very interested in your questions and input regarding the possibility of reclamation work on Boston Hill:
   a) What questions do you have about the proposed project?
   b) How do you use Boston Hill? How often? Where?
   c) How does Boston Hill benefit you, the city and/or your organization?
   d) Do you have any concerns about Boston Hill?
   e) Are there improvements/changes to Boston Hill you would like to see?

Thank you for your interest, your questions and your suggestions! If you would like more information, please contact:

Tim Karpoff, Meeting Facilitator  
505-280-4797  
timkarpoff@msn.com

Ken Romig, Project Manager  
505-923-9598  
kenr@dpsdesign.org

Appendix B: Communication Records

Communication Record

Project No.: 12-0089.001
Project: Boston Hill
Date: 10/25/2012
Time: 4:30 pm
Type: Meeting
Attending: Jeff Hill, WNMU, Joseph Gendron, Ken Romig, DPS
By: Ken Romig, DPS
Copies To: Ken Romig, File
Issue Date: 11/13/12

Discussion Items:
1. WNMU uses the Boston Hill site frequently for plant surveys and outdoor education.
2. Jeff Hill recognizes the danger the open mines pose to students and knows that the students hang out in the mines frequently.
3. Jeff also recognizes that the dangers pose liability issues for the city and others.
4. Jeff offered WNMU resources for study of the area including mammalian studies, GIS mapping and student research projects.
5. Hi vision would be to set up the Legal Tender for periodic tours.
6. WNMU President, Joe Sheppard, 538-6238, is very interested in service learning and can be approached.
7. WNMU mammalian studies, Randy Jennings (575) 538-6518.
8. Rolling Stones Geology Club
10. Micheal Metalia, Sculptor (575) 538-6538
11. WNMU professor for GIS- Cathy Whitman (575) 538-6253.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report
Communication Record

Project No.: 12-0089.001  
Project: Boston Hill  
Date: 10/26/2012  
Time: 1:00 pm  
Type: Meeting  
Attending: Claire Catlett, GRIP, Ken Romig, DPS  
By: Ken Romig, DPS  
Copies To: Ken Romig, File  
Issue Date: 11/13/12

Discussion Items:

1. Claire is the Vista Volunteer with GRIP (Gila Resources Information Project). GRIP is an independent group monitoring the mining in and around the Gila region. She teaches kids’ water quality monitoring, gives presentations and advocates for environmental stewardship. Her goal is the eradication of poverty through Healthy Community Resource Management.
2. Claire serves on a committee that is working with the greenways and trails groups to develop a bike/trail master plan with Community by Design (Charlie Dean).
3. Claire was aware of an effort to design an amphitheater near the Capilla area in the past.
4. Claire is also aware of a buried and long-forgotten stream in Silver City called Yankee Creek which sometimes runs in the spring and monsoon season through town. She’d like to reclaim the stream in some way.
5. Claire suggests the use of local labor and resources including the local local company - Steelworks. She was not aware who the local stone masons were.
6. Claire was aware that the mines have been used by the homeless and that liability and diverse landownership issues have hampered decisions about the Legal Tender mine.
7. Claire recommends we contact Bob Schiowitz, Former member of Friends of Boston Hill, who now works for the forest service(?), who maintains the trails.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report
Communication Record

Project No.: Boston Hill
Project: Boston Hill
Date: 12/18/12
Time: 2pm
Type: Telephone

Attending: Marshall Fisher
By: Marshall Fisher
Copies To: Ken Romig
Issue Date: 12/19/12

Discussion Items:
1. Marshall requested that no improvements be made to Boston Hill. He lives on West Cooper and considers the hill his backyard. He visits the caves and Raven pits periodically.
2. Improvements, mitigating the headwall hazards etc. is thought of as government babysitting people who ought to take responsibility for themselves.
3. One improvement that he sees that could mitigate the hazards, or address the concerns landowners have about liability is signage that states- hike at your own risk or stay on trails.
4. Marshall has never seen any homeless people living in the caves- nor is he aware of any person being hurt on the Hill.
5. Marshall does not think that human visitation contributes to a degradation of the wildlife (bat) habitat- except if people are throwing rocks or purposely disturbing habitat. Bats should not be the reason to keep people out of the bathroom.
6. Dumping is a problem and Marshall regularly takes a trash bag up to the area to clean up after people. He is a responsible user of the area.
7. Marshall also thinks that our best efforts to improve the area, make people safe or fence the mining features will be vandalized and it will be money wasted.
8. Marshall did state that if there were significant drops adjacent to the trails that protective nets may be an improvement he would agree is necessary.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report

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Communication Record

Project No.: 12-0089
Project: Boston Hill
Date: 12/18/12
Time: 2pm
Type: Telephone

Attending: Jim Gruel
By: Joseph Gendron
Copies To: Ken Romig
Issue Date: 12/19/12

Discussion Items:
1. I informed him about the current AML project and he indicated his interest in cooperating and signing a Consent-to-Entry form.
   a. He gave me his cell # (575-313-3126) so he could be contacted directly rather than thru his office.
2. He repeated his interest in ultimately making a deal with the Town for acquisition of the southern part of his property that includes the Legal Tender mine.
3. He alluded that he wasn’t sure of the property boundaries and thought the City owned some of the Legal Tender. I told him we verified ownership when we performed a property survey in 2001 and that a little more than half of the fenced in area was on his property.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report
Communication Record

Project No.: 12-0089.001
Project: Boston Hill
Date: 2/27/2013
Time: 9:00 am
Type: Phone

Who: Kevin Robinson, architect
By: Joseph Gendron
Copies To: Ken Romig, File
Issue Date: 2/28/13

Discussion Items:
1. I met with Kevin to look at possible amphitheater sites around the Adonis Pits. We liked a site that bordered Cooper Street, between the cemetery and La Capilla that included a Percha shale outcrop that had the potential to be shaped. This is outside of the Adonis Pits area but in the vicinity. We also looked at sites west of the animal shelter that also had potential.
2. He is going to do an evaluation process and probably present at least two sites for consideration and see what kind of reaction they get. If necessary, he would have additional sites that would be presented if objections surface to the two initial sites.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report

Communication Record

Project No.: 12-0089.001
Project: Boston Hill
Date: 3/15/2013
Time: 1:00 pm
Type: Field Visit

Who: Anthony Gutierrez, Grant County Planning Director
By: Joseph Gendron
Copies To: Ken Romig, File
Issue Date: 3/17/13

Discussion Items:
1. I met with Anthony to visit the abandoned mine features on the Globe claim owned by the County as well as the Legal Tender. Anthony had never been to either and did not think there were many people in County government who had except for Raul Turrieta in the Assessor’s office.
2. Anthony was appreciative of being taken on a tour of these features and was very impressed by their nature. We talked about the possibility of the County and the City getting together to look at options for the future as to how this land should be managed and by who.
3. Anthony will discuss this visit with the County Manager, John Saari, to make him aware of the situation and to discuss what to do with the property such as a possible land exchange with the City following hazard mitigation work. I invited him to the open house on March 21 and forwarded email invitation.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report

Communication Record

Project No.: 12-0089.001
Project: Boston Hill
Date: 2/27/2013
Time: 9:00 am
Type: Phone

Who: Kevin Robinson, architect
By: Joseph Gendron
Copies To: Ken Romig, File
Issue Date: 2/28/13

Discussion Items:
1. I met with Kevin to look at possible amphitheater sites around the Adonis Pits. We liked a site that bordered Cooper Street, between the cemetery and La Capilla that included a Percha shale outcrop that had the potential to be shaped. This is outside of the Adonis Pits area but in the vicinity. We also looked at sites west of the animal shelter that also had potential.
2. He is going to do an evaluation process and probably present at least two sites for consideration and see what kind of reaction they get. If necessary, he would have additional sites that would be presented if objections surface to the two initial sites.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report

Communication Record

Project No.: 12-0089.001
Project: Boston Hill
Date: 2/27/2013
Time: 10:00 am
Type: Phone

Who: Jim Gruel, Legal Tender Property Owner
By: Joseph Gendron
Copies To: Ken Romig, File
Issue Date: 2/28/13

Discussion Items:
1. Jim Gruel is “ready” to get rid of the south portion of the Legal Tender Claim where the openings are. He would propose to the Town that he trade them a portion of the claim for 2 acres the Town owns up Cottage San Road that is next to a trailer park that he owns.
2. I told him I would let Peter Russell at the Community Development Department know and see if a meeting is warranted to discuss.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report

Communication Record

Project No.: 12-0089.001
Project: Boston Hill
Date: 2/27/2013
Time: 5:00 pm
Type: Phone

Who: Peter Russell, Town of Silver City Community Development Director
By: Joseph Gendron
Copies To: Ken Romig, File
Issue Date: 2/28/13

Discussion Items:
1. I told him about my conversation with Jim Gruel and that with the AML project developing a plan for safeguarding, this is a prime time for the Town to consider acquisition. Also, AML may have a different approach to safeguarding public open space versus private land. He agreed on the timing and will bring up the subject with the Town Manager. He cautioned that the process would take time and would include the involvement of the City Attorney. He also wants Jim Coates involved and mentioned that he is leaving soon on a two week vacation.
2. One scenario he thought could be used in the meantime (after consultation with manager and attorney) was for the Town to write a letter to AML stating the Town’s intent so that appropriate planning could proceed.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report
Communication Record
Project No.: 12-0089
Project: Boston Hill
Date: 5/24/13
Time: Telephone
Attending: Ken Romig
By: Ken Romig
Copies To: Issue Date:

Discussion Items:
1. Tom walks Boston Hill frequently - possibly as much as twice or three times a week. He lives 4-5 blocks away and has been a resident of Silver City for 6 years.
2. He loves the ruggedness of Boston Hill and doesn’t want that to change though he does acknowledge that he has seen some dangerous shafts that could cause harm.
3. He enters Boston Hill from the south side which does not get much traffic and he has not been to the Legal Tender complex.
4. He would like to see more benches for rest.
5. Cell phone #: (575) 956-8731
6. Address: 315 11th Street
Silver City, NM 88061

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report
This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report

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This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report
Dear Sir,

As a hiker, I thought I would take the opportunity to say that I think there are too many trails on Boston Hill. There are many trails dissecting trails, completely unnecessary for anyone’s convenience, or for any reason I can imagine. As you know, preservation includes erosion control, but also conservation of plant, animal, bird, lizard, insect, microorganism, etc populations. They all work together, and they all begin to fall apart when any component is too greatly disturbed. Boston Hill is a great resource for our community! Thank you for your concern and involvement in its maintenance.

Angela Flanders
888 C Street, Silver City

To Whom It May Concern,

I have recently become aware of the meeting that will take place today concerning possible use and reclamation of Boston Hill. Unfortunately I am out of town for the holidays, but can speak to this as a home owner, at the foot of Boston Hill, on the Cheyenne Trail Head. I am also a frequent hiker there.

It is my opinion the nothing should be done on the Hill, and find that the trail work done by Aldo Leopold is a great way to not only maintain and improve trails, erosion, etc, but is accomplished locally with our own youth. I have also seen Youth Core workers there, again local young people.

I am not aware of any accidents or deaths related to the pits or caves. Accidents that have occurred seemed to be of the type that can occur on any trail, and that is why they are called accidents.

Please use these state resources elsewhere, where the need may be greater.

thanks,
Cecilia Stanford

From: Angela Flanders [aflanders@gmail.com]
Sent: Sunday, January 13, 2013 9:47 AM
To: Ken Romig
Subject: Boston Hill

My suggestion: don't do a damn thing. Why spend the money, use up energy and other natural resources to essentially get nowhere in the end. You can fix the area perfectly, but you can't fix people. Some folks just shouldn't be a part of the gene pool and are determined to eliminate themselves one way or another. If they don't do it on Boston Hill, they'll do it on the sidewalk downtown or in traffic. From a safety objective, maybe there should be a law against getting out of bed. Surely that would increase our safety level somewhat.

I guess if the government is compelled to do something then I suppose I could agree to a sign placed on your billboards that states something like, "If you step foot on this city property you automatically relinquish all legal rights to any claims whatsoever and if you get hurt you did it to yourself".

Dana Bates
dear Ken,
i would ask, if you personally were faced with a situation as you describe where you were personally responsible and liable, and your deligee, in this case WNMU, but it could be anyone, due to any cause, fell down on the job, would'nt you immediately or soon upon learning of non performance, have engaged a substitute ? your agency has made a report that alleges "extreme danger to the public" and yet, after many months and now, apparently after many years of having known about WNMU's failure to perform, is still not putting into place temporary if not completely adequate protection ? oil refineries, industrial sites, and many working mines i've observed have properly maintained chain link fences and no trespassing signs.

is there something amiss here? maybe this old mine feature isn't dangerous as your agency's report alleges, and the fencing should be removed.

i lived near the site in the mid 1970's and while the fence, even then had one or 2 holes in it , it was signed with no trespassing signs and was largely intact. no one to my knowlege , ever made any attempts to provide service to the enclosure to keep it intact and properly understood usage in place. what are we talking about here ? a few thousand dollars a year to keep a fence in order as opposed to a human life ? tell me how much money was spent on assessing the hazards on the hill and convince the parents of a dead child that they haven't suffered an avoidable loss due to obvious negligence.

dear mr romig,
the gravest mine features are on private land, and there's a chain link fence surrounding the site. a half a year has passed since this feature, already enclosed, was identified as extremely dangerous, isn't your department and the landowner wide open for great liability if some serious or lethal accident were to happen because the fence, which could be easily repaired and monitored and maintained isn't ? yours herbie

--- Original Message ---
From: marsden [mailto:marsden@zianet.com]
Sent: Friday, July 26, 2013 10:03 AM
To: marsden
Subject: Re: Community Field Design Meeting for Safeguarding Abandoned Mines on Boston Hill

I hope you have a chance to help us at the Field Design Meeting.

Thanks
ken

--- Original Message ---
From: marsden [mailto:marsden@zianet.com]
Sent: Friday, July 26, 2013 10:46 AM
To: marsden
Subject: Re: Community Field Design Meeting for Safeguarding Abandoned Mines on Boston Hill

--- Original Message ---
From: Ken Romig
To: Herbie
Sent: Friday, July 26, 2013 11:06 AM
Subject: RE: Community Field Design Meeting for Safeguarding Abandoned Mines on Boston Hill

Hi Herbie-

WNMU was the organization that was tasked to maintain the fencing and since the death of the biology professor who studied bat habitat, in the mines the fences have become more and more open to intrusion. It is the general opinion of many residents in Silver City and the landowners that the fencing will be breached and the site trespassed if fencing and signage only are used to deter visitors.

Ken
Dear Ms. Papin,

Thank you for your encouraging words. Boston Hill is a special place and the Abandoned Mine Land Program’s intention is for its work to improve conditions there for plant and animal life.

The Abandoned Mine Land Program and its contractor, Dekker Perich Sabatini, will keep you informed of upcoming meetings and events in the planning process.

John A. Kretzmann, P.E.
Program Manager
NM Abandoned Mine Land Program
1220 S. Saint Francis Drive
Santa Fe, New Mexico 87505
505.476.3423
505.476.3482 fax
John.Kretzmann@state.nm.us

-----Original Message-----
From: McGrath, Sarah, EMNRD
Sent: Tuesday, January 15, 2013 8:04 AM
To: Kretzmann, John, EMNRD
Subject: FW: Boston Hill
FYI

-----Original Message-----
From: Jane Papin [mailto:]
Sent: Monday, January 14, 2013 7:47 PM
To: McGrath, Sarah, EMNRD
Cc: tim@dpsdesign.org
Subject: Boston Hill

Hello Sarah and Ken,

Thank you both so much for all you do to protect Boston Hill.

I live several blocks from the Spring Street entrance and walk on the Hill usually five times a week. I love Boston Hill and its plant and animal life. I’m concerned about all the extra paths that have been worn and uncaring cyclists running over plants.

Thank you for staying in touch with me.

Jane Papin
Gentlemen:

I appreciate the time you spent introducing the community to AML this week. I am concerned about what I consider the over-emphasis on the legal Tender Mine issues, including anticipated roof collapse and bat habitat. While I recognize this property is part of your study area, it is not an active component of the trail system. Frankly, if the whole thing imploded it would solve most of the current problems, especially its use as party central for the bored youth of the area. Also it might afford some much needed parking for downtown residents and businesses.

What is the status of negotiations with the owners of the Legal Tender Mine, assuming that you’ve been talking with them?

I suggest the next set of meetings focus on other issues, although they may not be as relevant to the safeguarding mission. My primary concern center on trails -- their ease of use -- and maintaining the status quo in terms of number and condition.

I’ve commented previously about the proliferation of trails which I see as an environmental threat: it increases the potential for erosion and for harming fragile grasses and other soil retention mechanisms.

The entire Boston Hill Open Space/Trail System is rich with history, environmental and geological features and culture. I would recommend doing a series of interpretive signs (not just directional) about what it used to be like and how it came to be a public asset.

People should know, for instance, that there was a small gauge railroad that went through the south end, including what it was intended for/how long it lasted, etc.

I think removing chain link fence should be at the very bottom of the priority list. The initial material cost and installation was likely pretty steep; while the fences are unsightly, at least they provide information about hazards. Even though they’ve been breached, I suspect that would provide some defense against accident and/or injury (the fence does not eliminate liability but it might mitigate).

There are other matters tangential to the main mission. I think bat habitat is one of these, as are increasing the number of parking spaces at trailheads, removing non-native plant species, and making good durable directional signage.

In closing, I hope that you are successful about encouraging increased surveillance and maintenance by the Town. Vandalise is an on-going issue, one which increased vigilance would minimize.

Thanks for you time--
Nancy Cliff

Tim Karpoff:

Thanks very much for your thoughtful message and ideas. I’m passing it on to a few people on the team.

I don’t want to get ahead of the planning too much and comment on the merits of each suggestion, but I’ll make a couple general remarks. First, I think the team agrees that the "rough" look should be preserved. This is because of our general low-impact orientation, and because of what we’ve heard from community members.

Second, the question you raise about safety is a key one. What is “safe,” and how do we support safe situations and behavior without overly restricting people? This will be a question we’ll be wrestling with during the planning.

So, there’s a lot of work to do regarding concepts and definitions and how to translate that thinking into design. We were grateful for the participation and the interest in helping out that we saw at the meeting. I went over to the Wellness Coalition the next morning and thanked the YCC for their interest--those folks were really great at the meeting and want to stay involved.

I hope to see you at future meetings on Boston Hill. Thanks again for your suggestions.

Best,
Tim Karpoff

--- Original message ---

From: Spike Flanders <cnspikeflanders@gmail.com>
Date: 03/25/2013 7:10 PM (GMT-07:00)
To: timkarpoff@msn.com
Cc: ncliff49@gmail.com; Ken Romig; jcoates@silvercitymail.com; doug.romig@gmail.com; john.kretzmann@state.nm.us

Spike,

I think removing chain link fence should be at the very bottom of the priority list. The initial material cost and installation was likely pretty steep; while the fences are unsightly, at least they provide information about hazards. Even though they’ve been breached, I suspect that would provide some defense against accident and/or injury (the fence does not eliminate liability but it might mitigate).

There are other matters tangential to the main mission. I think bat habitat is one of these, as are increasing the number of parking spaces at trailheads, removing non-native plant species, and making good durable directional signage.

In closing, I hope that you are successful about encouraging increased surveillance and maintenance by the Town. Vandalise is an on-going issue, one which increased vigilance would minimize.

Thanks for you time--
Nancy Cliff
has should be preserved, if possible. I do not think that we need paved paths. I do not think that we need steps cut into the rock. I suppose the deep mine shafts need to be filled. I do think that the old workings need to be left alone. If someone wants to investigate them, why not let them? They aren't very deep. My guess is that the danger would be very low. If there was a problem with "falling rocks" I would think that the prospect could be inspected and any problem remedied.

I think that just about all the fences need to be removed. They are not doing what is expected. Most have been compromised. The haven't been maintained in years. As they are now, they are useless. They certainly do not keep people out of any mines. And why should we keep people out of the mines? I think we do (or) just have to minimize the danger. People have an interest in these mines and do want to go into them. My guess is there would be more injuries on the trails than in the mines.

I suppose some signage could be helpful. What might the signs say? "Danger, Precipitous Cliff Nearby, Stay Away". Sometimes signs like this draw people to look over the edge. This leads me to think that any overhangs that we do not need fences or walls or warnings. Why prevent people from looking over the edge? As one of the biggest dangers. I would think that the prospect could be eliminated or, at least, minimized.

I deo think you need to hold more public meetings.

Lastly, I think the idea of making Boston Hill some sort of tourist attraction is ridiculous. My own thoughts are of how "safe" do we have to be and how "safe" do we want to get?

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Lastly, I think the idea of making Boston Hill some sort of tourist attraction is ridiculous. My own thoughts are of how "safe" do we have to be and how "safe" do we want to get?

Thank you.

C. N. "Spike" Flanders
Project Overview

The New Mexico Abandoned Mine Land (AML) Program

The New Mexico AML Program, part of the New Mexico Energy, Minerals, and Natural Resources Department, addresses the reclamation of abandoned mines throughout the state on both public and private property.

- AML is a federally-funded state program, formed through the passage of the Surface Mining Control and Reclamation Act (SMCRA).
- AML is funded through a tax on existing coal mined within a state. AML works on abandoned hard-rock mines (i.e. Boston Hill) when obvious hazards are apparent. AML has worked on Boston Hill in the past.
- AML program funding sunsets in 2021.

AML STAFF

John Kretzmann, PE, AML Program Manager
Sarah McGrath, Project Manager
AML Priorities

The AML program funding priorities:

- **Priority 1:** Protect public health, safety and property from immediate hazards resulting from historic mining practices.

- **Priority 2:** Protect the public from hazards that do not constitute immediate hazards.

- **Priority 3:** Restore lands and water degraded by historic mining practices. Restoration must facilitate the higher priority reclamation.

AML and Boston Hill

The Unique Nature of Boston Hill

- **Characteristics of Boston Hill**
  - Proximity to Silver City
  - Hard-rock mining
  - Wildlife habitat

- **Boston Hill Landownership**
  - Multiple landowners
  - Diverse stakeholder interests

AML’s unique funding and organizational capacity

- **Funding Limitations**
  - State and Federal oversight

- **Limited Program Operations and Maintenance for constructed facilities**
  - Organizational structure

- **Program Sunsets in 2021**
Safeguarding Abandoned Mines on Boston Hill | Silver City, NM

AML Approach

- Recognizes diverse landownership
- Integrate local knowledge and expertise into design
- Respect the legacy of mining
- No action option

Planning Team

PRIME
Dekker Perich Sabatini
Albuquerque

SUBCONTRACTS
Golder Associates, Inc. - data creation and mgmt.
Silver City, Albuquerque
Karpoff & Associates - public outreach/facilitation
Silver City, Albuquerque
Dos Rios Consultants, Inc. - archeology
Silver City
Ecosphere Environmental Services, Inc. - environmental
Durango
Caspersen Engineering - structural engineering
Silver City
Joseph Gendron, PE - community liaison and civil engineering
Silver City
Scope of Work

- Phase I - Assessment
- Phase 2 - Plan
- Phase 3 - Design
- Phase 4 - Construction Assistance

Phase I - Assessment

Pre-Planning Scope

- Gather Information
  - Regulatory framework
  - Research (biological, archaeological, historical)
  - Developing a plan for public meetings

- Map
  - GIS mapping of existing conditions
  - Assessment of hazards

- Communicate
  - Public outreach
  - Primary stakeholders
  - Interview landowners
  - Website

- Develop a plan
  - Develop public outreach strategy to engage public
  - Develop a schedule
  - Report
Current Project Status

- Research
  - Regulatory framework
  - History
  - Archaeology - ongoing
  - Biological - ongoing

- Interviews
  - City Manager of the Town of Silver City
  - Landowners - ongoing
  - Silver City Residents - ongoing
  - Non-profit groups - ongoing

- Mapping
  - GIS assistance from the City and County
  - GIS data integration - ongoing

- Site Reconnaissance
  - Ongoing

Current Mapping

[Map of Boston Hill with highlighted area]
Phase 2 - Plan

- Public Meetings and Field Design Sessions
  - Develop community consensus
  - Host at least one public meeting
  - Interview stakeholders
  - On-site design sessions with stakeholders
    - Full Scale mock-ups of improvements

- Draft a Report
  - Integrate community vision into design
  - Develop report for AML and community

Phase 3 - Design

- Develop Schematic Design
  - Prepare designs, elevations and sections
  - Cost estimates
  - 3-D model the design
  - Coordinate design with experts in biology, engineers, archaeological resources
  - Refine design for bidding
Phase 4- Construction Assistance

- Monitor construction
- Review construction at substantial completion

Brewster Hill

- Preliminary Project Schedule
  - Phase 1 – Assessment
    - Completion in March, 2013
  - Phase 2 – Plan
    - Spring, 2013
  - Phase 3 – Design
    - Summer, 2013
  - Phase 4 – Construction Assistance
    - TBD
Appendix E: Technical Memorandum

TECHNICAL MEMORANDUM

Date: March 15, 2013
Project No.: 123-80045

To: Ken Romig

From: Douglas Romig, CPSS

cc: dromig@golder.com

RE: TECHNICAL REVIEW OF BOSTON HILL OPEN SPACE ENVIRONMENTAL CHARACTERIZATION DATA

1.0 INTRODUCTION

Boston Hill is an abandoned mine lands property purchased by the Town of Silver City, New Mexico in 2000 as an open space preserve. It was the Town’s first open space acquisition and is located adjacent to, and accessible from, the historic downtown area. The area serves the Silver City community as a recreational amenity.

Boston Hill is a former iron and manganese mining district. The first mining claim was filed for Boston Hill in 1870 after silver chloride ore was discovered at the Chloride Flat area west of the Boston Hill (DE&S 1999). Soon after Silver City was connected to a railroad in 1883, manganese ore, including silver-bearing manganiferous ore, was mined from Boston Hill and shipped by railcars. In 1893, the price of silver dropped, prompting the mining of iron ore at the site. In 1916, as most of the silver was mined out, the mining of manganiferous iron ore increased in order to meet the needs of the steel industry. Underground mining ceased after World War II though ore continued to be mined from the surface cuts across the site and continued until 1980. Figure 1 shows the locations on the major mining claims in the Boston Hill mining district.

Mining in the area left highwalls, shafts, adits, open stopes and underground workings that may represent public safety hazards. The New Mexico Abandoned Mine Land (AML) Program, an agency of the New Mexico Energy, Minerals and Natural Resources Department, is conducting a planning effort to safeguard hazardous conditions that are a result of historic mining on Boston Hill. The AML Program has initiated a public outreach process to reach general community agreement about an action plan to: a) reduce public safety hazards in the Boston Hill area; b) protect wildlife habitat associated with mine features; and c) improve recreational amenities in the area.

Dekker/Perich/Sabatini (DPS) has been hired by the AML to lead the planning effort. DPS has initiated contact with several community members and groups to determine the level of interest in safeguarding public hazards at Boston Hill. DPS is also evaluating environmental conditions at the site and assembling available site characterization data for public presentation and comment.
As part of its Phase II investigation, NMED conducted environmental sampling of soils, sediments, and waste rock materials at the site to provide a preliminary assessment of metal concentrations. NMED's objectives of their Phase II ESA was to determine whether metal concentrations were elevated above that of surrounding, unmined (i.e. background) areas and presented potential exposure risks. Groundwater samples were also collected from two nearby wells to determine whether groundwater contamination existed and whether it could be attributed to the site.

The NMED found isolated occurrences of certain heavy metals at elevated concentrations above background, though concentrations were not sufficient to pose a threat to human health from exposure resulting from recreation use. Groundwater samples taken from nearby wells also had metal concentrations above water quality drinking standards. These results were provided to Silver City to assist the Town with its decision to purchase Boston Hill property. Following a presentation from DE&S and NMED, the Town unanimously agreed to purchase the property as an open space.

Some community members have expressed concerns over high metal concentrations reported for waste rock materials at the site. DPS directed Golder Associates, Inc. (Golder) to provide a technical review of the Phase II ESA to better understand the character of the site and evaluate potential human health risks. This technical memorandum provides a review of the methods and data reported in the Limited Phase II Sampling Report (NMED, 1999). Technical reviewers are Golder senior scientists who are familiar with the Silver City area as well as these types of environmental investigations at historic mine sites. Reviewers include Tom Stapp, Senior Chemist; Doug Romig, Senior Soil Scientist; and Clay Kilmer, Senior Hydrogeologist.

This memo provides a general summary of the Phase II report and gives additional context to the site environmental conditions relative to casual recreational use as the AML and the Silver City community considers possible safeguarding activities. Section 2 provides a description of NMED's scope of work and a summary of the 1999 site assessment results. Section 3 discusses several data quality issues related to the waste rock sampling, analytical methods and results. A discussion of NMED's human health risk assessment is given in Section 4. Section 5 reviews the results of the groundwater data provided in the Phase II report. Finally, Golder provides some general conclusions.

### 2.0 SUMMARY OF 1999 ESA

NMED conducted a limited Phase II Evaluation of the Boston Hill site in September 1999 to determine if surface soils at the site contained levels of metals elevated above that of surrounding, unmined (i.e. background) areas as well as health-based screening levels promulgated by the Environmental Protection
Soil and waste rock materials were tested using an x-ray fluorescence (XRF) spectrometer to evaluate metal concentrations. The XRF analysis is a field screening method that has the benefits of providing quick results at a low cost, compared to laboratory analytical results that are more accurate, but more costly with a longer turnaround time. Approximately one-third of the samples were sent to the laboratory for confirmational analyses, including both total metals analysis and extractable metals using the Toxicity Characteristic Leaching Procedure (TCLP). NMED states they took a conservative approach to site sampling by biasing sample locations in areas that potentially contained higher metal concentrations.

For XRF results, a significant number of Boston Hill samples had metal concentrations that exceeded three times the mean background levels. Further, XRF analyses indicated that iron, manganese, lead, and arsenic may exceed human health medium-specific screening levels for an industrial exposure scenario (EPA, 1999). However, the confirmational laboratory data indicated that metal concentrations were as much as an order of magnitude lower than the XRF results. Generally laboratory results were found to be below health-based screening levels associated with an industrial-use risk scenario. Thus, NMED considered their risk analysis conservative due to the uncertainties associated with the use of the XRF. Based on the results of the soil analyses, NMED concluded:

- "A significant number of the analytical results exceeded three times the mean background concentrations for this study; however, metals concentrations in the soils generally appeared to be below screening levels associated with an industrial use scenario for the site."
- "Soils contaminated with lead were encountered in the area of the Comanche Pit where concentrations for lead exceeded concentrations for an industrial exposure scenario. Minor cleanup of soils will likely be necessary in this area."
- "Contaminated soils appear to be migrating offsite during precipitation events. Additional work may be necessary to prevent this migration."

Groundwater samples collected from wells on or near the site were found to contain levels of beryllium, iron, thallium, and manganese that were slightly elevated above NMWQCC or EPA standards. However, NMED reported that both samples were unfiltered and one well may have been sampled incorrectly (insufficiently purged) to ensure a representative sample of groundwater. Based on the results groundwater analyses, NMED concluded:

- "The number of ground water samples collected was not sufficient to determine if elevated metals levels in ground water can be attributed to onsite mining activities. Additional sampling including the installation of monitoring wells would be necessary to characterize the shallow ground water in this area."
- "Although neither of the wells that were sampled is presently used for drinking water, usage could change in the future. NMED recommends that these wells not be used for drinking water."

### 3.0 WASTE ROCK ANALYSES

Golder's primary concern with the Phase II ESA is the use of the XRF data to make definitive conclusions about metal contamination on the site, particularly when the concentrations are poorly correlated with laboratory analyses. NMED expressed a similar cautious tone relative to the XRF results and qualified their conclusion that the site did not present a significant exposure risk. While the XRF data can be a useful when properly calibrated, NMED's report indicates there are several problems with interpretation.
In this section, we evaluate XRF instrumentation and calibration, spectral responses, data quality, and sample heterogeneity and preparation related to the interpretation of metal concentrations reported at Boston Hill.

Golder regards the XRF data presented in the NMED report as acceptable from a gross screening effort used to identify metals that may be elevated above background. Inaccuracies do exist, particularly for the key elements of iron and manganese, due to the performance issues with the XRF spectrometer including spectral peak overlap, calibration to a simple rather than a complex matrix, and sample heterogeneity. However, the use of an XRF unit as a screening instrument usually precludes such detail. Improvements could be made to better prepare the samples and calibrate the instrument to site conditions. That said, the responses of the XRF unit as a screening device in NMED’s study are skewed to be more protective when compared to industrial screening exposure guidance.

3.1 XRF Spectrometer

Most XRF spectrometers operate by exposing soil matrices to radioactive materials contained in the instrument. The radiation excites atoms of the elements being reported so that electrons are expelled from orbital shells around the atom. Light (fluorescence) is then emitted when the electrons re-enter the orbital shell. The XRF detector reads the fluorescence by measuring both the wavelength and the number of photons per unit time. The instrument is then able to determine the specific elements based on their characteristic spectral signature which corresponds to the wavelength response and elemental concentrations in the sample which is related to the photon count rate.

The instrument used to perform field XRF surveys at the Boston Hill site was a Spectrace Model 9000 (S-9000). The S-9000 spectrometer was an early entry to the market for rapid screening metals in soil, as well as other important applications (lead in paint, etc.). Multiple improvements have been made to XRF instrumentation since the S-9000 was introduced including advances in detectors, software, and sample preparation protocols to improve instrument response and accuracy.

At the time of NMED’s study, the S-9000 was capable of reporting most metal concentrations as long as soil matrices were not complicated. But the mineralized materials at Boston Hill are not simple and the calibration algorithms used to process the S-9000 detector responses were poorly adapted to the calibration to a simple rather than a complex matrix, and sample heterogeneity. However, the use of an XRF unit as a screening instrument usually precludes such detail. Improvements could be made to better prepare the samples and calibrate the instrument to site conditions. That said, the responses of the XRF unit as a screening device in NMED’s study are skewed to be more protective when compared to industrial screening exposure guidance.

3.2 XRF Metal Concentration Data Quality

X-ray florescence results for 26 metals are tabulated in Tables A-1 and compared to 23 or 24 total metal analytes from the confirmation laboratory results (Appendix B). In general, recorded XRF data does not compare favorably with laboratory totals and there is a distinct trend towards higher XRF concentrations compared to total concentrations. In many cases, XRF data are two orders of magnitude greater than totals measured in the lab.

The relative percent difference (RPD) is a measure of variability between laboratory and XRF results. Golder calculated RPDs for metals with confirmation analysis (Table 1). Data quality objectives set by the EPA require RPDs for XRF data compared to confirmation samples to be less than or equal to 30% to accept XRF measurements (EPA SOP, 1995 and EPA, 2007). Only a few Boston Hill samples met the data quality objectives for barium, copper, manganese, lead and zinc (Table 1). Generally, samples with low RPDs were associated with low to moderate total metal concentrations.

<table>
<thead>
<tr>
<th>Metals Symbol</th>
<th>Relative Percent Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver Ag</td>
<td>185.8 to 196.9%</td>
</tr>
<tr>
<td>Arsenic As</td>
<td>no samples with both XRF and total metals data</td>
</tr>
<tr>
<td>Barium Ba</td>
<td>12.8 to 113.6%</td>
</tr>
<tr>
<td>Cadmium Cd</td>
<td>196.7 to 196.7%</td>
</tr>
<tr>
<td>Copper Cu</td>
<td>17.2 to 178.1%</td>
</tr>
<tr>
<td>Iron Fe</td>
<td>36.6 to 167.3%</td>
</tr>
<tr>
<td>Mercury Hg</td>
<td>196.7 to 199.7%</td>
</tr>
<tr>
<td>Manganese Mn</td>
<td>27.1 to 181.3%</td>
</tr>
<tr>
<td>Nickel Ni</td>
<td>197.3 to 198%</td>
</tr>
<tr>
<td>Lead Pb</td>
<td>2.5 to 132.9%</td>
</tr>
<tr>
<td>Thallium Th</td>
<td>92.4%</td>
</tr>
<tr>
<td>Zinc Zn</td>
<td>1.7 to 90.2%</td>
</tr>
</tbody>
</table>

The following subsections describe how some issues can lead to relatively large differences (high RPD) in the reported data.

3.2.1 Overlapping Spectral Response

Limitations in instrument resolution and matrix effects may cause problems analyzing some elements. Under certain conditions, spectral responses may overlap and make it difficult to determine accurate concentrations or discern one metal from another. For example, manganese is especially high in RPD, owing to the tight grouping of spectral lines for manganese, iron, and chromium in an XRF response. When relatively high levels of iron exist (>10,000 mg/kg), overlapping spectral lines can skew the ability of the instrument software to adequately separate iron from manganese, and concentrations can become inaccurate.

The XRF also appears to be overestimating lead values by a factor of about 2. Inaccuracies can be reported because arsenic and lead compete strongly on the XRF when concentrations of either one...
exceed values of 200 to 500 mg/kg. However, XRF responses for arsenic values did not compare to laboratory values, particularly for sample BHS011 where arsenic was not detected in the confirmational testing despite a high XRF reading. Errors associated with these spectral interferences may be the case for several samples including BHS008 and BHS005.

Finally, several metals including titanium, strontium, zirconium, molybdenum, rubidium, tin, and uranium are not reported by the laboratory, yet detectable concentrations for titanium, strontium, and zirconium were reported for the XRF. Therefore, single XRF response of uranium in sample BSH005 cannot be confirmed. Golder believes the uranium response for this sample could be associated with misidentified spectral peaks from the presence of naturally occurring strontium or zirconium.

3.2.2 XRF Calibration
NMED was not specific regarding the calibration of the XRF instrument, except to indicate they used standard protocols. There is no disclosure in the report that “empirical” calibrations were employed, thus Golder presumes the NMED used a simple or benign matrix to calibrate the S-9000. An empirical calibration of the XRF would have required up-front characterization of site soils by laboratory methods and thereby improve the capability on the instrument. Empirical calibrations use known metal concentrations in a sample that are then correlated to instrument response to reduce RPD.

It is often not practical to empirically calibrate XRFs for screening level assessments such as the one conducted at Boston Hill. Thus, for preliminary screening investigations the practice of conservatively comparing 3X background data to site soil responses is commonly employed. However, due to the issues stated previously with the S-9000, reported high concentration in background samples may also be affected by the simple matrix calibration.

3.2.3 Sample Heterogeneity and Preparation
The largest increase of RPD between laboratory data and XRF results is also associated with the heterogeneous nature of the samples. After the XRF data was recorded, site soils were mixed and submitted to the fixed laboratory. This procedure would have likely affected the precision on the XRF tested soil compared to the fixed laboratory analysis.

To address this, NMED attempted to draw a correlation between grain sizes and XRF concentration of elements for the samples at Boston Hill (NMED, 1999; Table A-2), though no discussion was provided in their report. Table A-2 illustrates a general trend towards higher XRF concentrations associated with coarser grain sizes.

The precision and accuracy of both XRF and laboratory analysis is greatly improved when soils are dried, sieved, and ground to a uniform size prior to testing (EPA, 2007). Sample preparation methods for the Boston Hill soils were not detailed beyond the application of a bench test for separation of particle sizes (Table A-2). More robust sample preparation procedures may have lowered the RPD of XRF versus laboratory results.

4.0 HUMAN HEALTH RISK ASSESSMENT
Human health risk assessment according to the EPA is the process to characterize the nature and magnitude of health risks to humans (e.g., residents, workers, recreational visitors) who may be exposed to chemicals contaminants, now or in the future. Risk is dependent on the following factors:

- How much of a chemical is present in an environmental medium (e.g., soil, water, air);
- How much contact (exposure) a person or ecological receptor has with the contaminated environmental medium, and
- The inherent toxicity of the chemical.

The EPA has developed exposure scenarios that are generally based on long-term (chronic) exposure to hazardous substances and assume that exposure comes through the following pathways; ingestion of contaminated soil, inhalation of contaminated soil particles, inhalation of volatile chemicals, and absorption of contaminants through the skin. The difference between the residential and industrial exposure scenarios used in the Phase II ESA has to do with duration and method of exposure. The industrial exposure scenario assumes exposure for eight hours a day, five days a week and puts more emphasis on ingestion rather than inhalation. The residential scenario assumes that a child is exposed, places more emphasis on ingestion, and uses longer exposure periods.

The industrial exposure scenario used by NMED considers a longer duration than would be expected for recreational exposure and therefore gives a conservative indication of risk to human health. Tables 5 and 6 of the Phase II report compares Boston Hill XRF results to EPA Region VI Human Health Medium-Specific Screening Levels in both residential and industrial worker site use scenarios (EPA 1999).

Because of the issues related to XRF data quality discussed in Section 3, Golder believes it is more appropriate to evaluate potential exposure risks using laboratory data for total metal concentrations. Additionally, recreational use exposure scenarios have been developed since NMED completed its investigation. In this section we will discuss human-health risks at Boston Hill based on these newer guidance for recreational uses.
4.1 Exposure Scenarios

Golder believes the casual recreational uses such as hiking, mountain bike riding and bird watching at Boston Hill are quite different from residential and industrial exposure scenarios presented in the ESA because recreational users would be onsite infrequently and for shorter periods of time. More appropriate exposure scenarios have been contemplated by the Bureau of Land Management (BLM) for occasional use of land impacted by mining. The BLM established risk management criteria (RMC) for heavy metals on mining sites on Public Lands as they relate to recreational use and wildlife habitat (BLM 2004). The RMCs were developed using available toxicity data and EPA exposure assumptions. The BLM recommends using the RMCs to determine the potential health hazards are present at a site and if action, by either resource management or remediation, should be considered. Furthermore, the BLM as well as other federal agencies often apply these RMC to determine if soil remediation should be conducted on public lands that have been impacted by mining. Golder recognizes the BLM screening procedure was not available at the time of the Boston Hill investigation by NMED.

Human exposure scenarios were developed for individuals who use BLM lands for camping and all-terrain vehicle (ATV) driving. The camper scenario is a more restrictive scenario indicative of a chronic level of exposure assuming a 14-day exposure duration. Campers may be exposed to metals by inhalation of dust; accidental ingestion of soil by hand-to-mouth activities (eating, drinking and smoking); and small children may ingest larger amounts of soil than adults. The ATV driver scenario assesses acute exposures for individuals who may stir up and inhale dust while riding on unimproved roads or trails.

Table 2. Recreational Risk Management Criteria for Human Exposure to Soils at Mining Sites

<table>
<thead>
<tr>
<th>Metal</th>
<th>Camper</th>
<th>ATV Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mg/kg</td>
<td>mg/kg</td>
</tr>
<tr>
<td>Antimony</td>
<td>50</td>
<td>700</td>
</tr>
<tr>
<td>Arsenic</td>
<td>20</td>
<td>300</td>
</tr>
<tr>
<td>Cadmium</td>
<td>70</td>
<td>950</td>
</tr>
<tr>
<td>Copper</td>
<td>5000</td>
<td>7000</td>
</tr>
<tr>
<td>Lead</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Manganese</td>
<td>19000</td>
<td>250000</td>
</tr>
<tr>
<td>Mercury</td>
<td>40</td>
<td>500</td>
</tr>
<tr>
<td>Nickel</td>
<td>2700</td>
<td>38000</td>
</tr>
<tr>
<td>Selenium</td>
<td>700</td>
<td>9600</td>
</tr>
<tr>
<td>Silver</td>
<td>700</td>
<td>9600</td>
</tr>
<tr>
<td>Zinc</td>
<td>40000</td>
<td>500000</td>
</tr>
</tbody>
</table>

The concept behind the RMC is that people will not experience adverse health effects from metal contamination in their lifetimes while exposure is limited to soil, sediments, and waters with concentrations at or below the RMC. Risk is evaluated for soil concentrations exceeding RMCs with concentrations below the RMC considered very low to no risk. Concentration between 1-10 times the RMC are considered to pose a low to moderate risk; these occurrences may pose a chronic threat. Media concentrations exceeding RMCs by more than 10 are considered to pose a high risk and those exceeding RMCs by 100-fold are considered to pose an extremely high risk for humans. Based on lab data presented in the ESA, only one sample presented a low risk to human health for lead.

Table 7 of the Phase II report presents selected metal concentrations (Manganese, iron, lead, and arsenic) based on laboratory analyses and compares them to EPA industrial and residential exposure scenarios. In their evaluation, NMED found only one sample to have lead concentrations exceeding EPA guidance. We are uncertain why NMED limited their evaluation to these specific metals and took a comprehensive approach based on all the data available. Golder assembled all the laboratory data for total metals in Table 3 and included BLM RMCs and updated EPA soil screening levels (EPA 2012). Based on the data presented in Table 3, Golder confirms NMED’s estimate the potential lead risk with sample BHS008, but we’d qualify it as a low risk to human health based the BLM guidance. Additionally, Golder estimates a low risk associated with arsenic in 2 samples based on current industrial worker exposure scenarios. Note that the EPA industrial guidance for arsenic is different relative to the BLM camper scenario, thus Golder believes the risk associated with arsenic is acceptable at Boston Hill.

5.0 GROUNDWATER

Twelve geologic units are exposed at the site ranging in age from Upper Cambium to Quaternary with Precambrian granite and metamorphosed rocks underneath. Entwistle (1944) indicates there is limited folding and numerous faults in the area. The predominate dip of the geologic units is 15 degree to the southeast (Cunningham 1974).

Trauger (1972) reports that other than Quaternary alluvium in the southeast and southwest of the site, the rock units are not water-bearing except for local areas in the immediate vicinity of fractures and faults. Groundwater flow direction is to the southeast approximating the dip of rock units with a hydraulic gradient at nearly 0.02 according to a water-level contour map (Trauger, 1972). With the exception of the Silver Spot mine, no water was encountered in the underground mines at Boston Hill (Entwistle 1944).

The Phase II ESA did not include discussion of published data (Trauger, 1972) on groundwater depth or gradient direction of the area, or geometric relationship of groundwater sampling well locations relative to geologic units or mining areas (Cunningham, 1974). Based upon review of these resources, Golder concludes that the wells sampled by NMED (BH-W-001 and BH-W-002) penetrate different stratigraphic units that are separated by approximately 300 feet of intervening strata. According to the groundwater gradient projection (Trauger 1972, Figure 3), wells BH-W-001 and BH-W-002 are located upgradient or sidegradient respectively of mining disturbances at Boston Hill.
Groundwater samples were collected from two wells in the vicinity of Boston Hill on September 1999 (Figure 2). NMED sampled groundwater at one well located within the Boston Hill site boundary (BHW-001, Onsite well); the other was located approximately 900 feet northeast of the site boundary (BHW-002, Klaus well). Samples from these two wells were collected and analyzed for total metals using EPA protocols (SW846 2007).

Documentation of the groundwater sampling methods employed during the limited Phase II investigation does not identify the water-bearing units penetrated by the wells and in the case of BHW-002 includes no information on depth of completion or static water level. NMED reported that well BHW-0002 may have been inadequately purged such that turbidity may have been present in the sample.

Analytical results indicated that barium, cadmium, cobalt, copper, iron, manganese, thallium, and zinc were detected in the water samples collected. Beryllium, iron, manganese, and thallium were found in concentrations exceeding NMWQCC or EPA standards in samples collected from one or both wells. Previous groundwater sampling of BHW-001 (SWAT Laboratory 1996) reported a total dissolved solids concentration of 244 mg/L, indicating the water had a low level of salinity and was suitable for livestock consumption. No metals analyses were performed on the 1996 sample. The N MED reported that concentration of 244 mg/L, indicating the water had a low level of salinity and was suitable for livestock consumption. No metals analyses were performed on the 1996 sample. The N MED reported that insufficient data was collected during the Phase II investigation to attribute the elevated metals in groundwater to the Boston Hill mining activities.

5.1 Interpretation of Groundwater Analyses

Analysis of water samples for total metals is a conservative method. The total metals approach was developed to account for potential erroneous low concentrations when trace metals form precipitates in sample containers between the time of sample collection and the time of laboratory analysis. To overcome this problem, acid is placed in the sample containers to maintain trace metals in solution until the laboratory can perform the analysis. The total metals analytical approach is often deployed initially to identify potential environmental problems associated with toxic metals.

Total metals analytical methods requires water samples to be digested in acid prior to analysis. Total metals analyses are very sensitive, but yield erroneously high metal concentrations when turbid samples are analyzed. Common earth metals such as iron and manganese, as well as other less common metals are normally bound in mineral matrices and not mobile in groundwater in oxidizing shallow groundwater environments. When turbid water samples are acid-digested, immobile metals present in suspended solids are dissolved into the sample, which bias and yield analytical results with higher metal concentrations. Where rigorous well purging to obtain turbidity-free water samples is not feasible, field filtered samples may be collected to remove turbidity prior to acidifying the samples.
We conclude that limited Phase 2 groundwater data indicates that barium, cadmium, cobalt, copper, iron, manganese, thallium, and zinc may potentially be present in groundwater in the vicinity of Boston Hill; however due to lack of information on sampling methods and sample turbidity, detections of these metals is unconfirmed. Additionally, based upon available regional groundwater gradient projection, wells BHW-001 and BHW-002 do not appear to be located in areas that are downgradient of mining disturbances at Boston Hill.

6.0 GENERAL CONCLUSIONS

Our general impression of the Phase II ESA is that the investigation was performed in accordance with standard protocols for a screening level assessment and the NMED used prescribed EPA methodology for laboratory work. However, Golder believes the XRF data are generally unreliable given the poor correlation with laboratory data due to issues related to instrument calibration, overlapping spectral responses, and sample heterogeneity. Thus, Golder would not make any definitive conclusions about metal contamination on the site base on XRF responses and would rely on confirmational sample data to assess any potential exposure risks.

Based on laboratory data, one sample of the 24 taken at Boston Hill appears to present an acceptable human health risk for lead for a recreational camper exposure scenario. Golder believes the camper exposure scenario is conservative given the more casual recreational day uses at Boston Hill. Though Golder used a different exposure model, our assessment of human health risks with the metals is similar to NMED’s.

Golder is unable to make definitive conclusions about groundwater impacts with the limited data provided in the Phase II report. Groundwater impacts remain unknown given the samples were collected improperly and taken from wells not downgradient from the site. However, Golder suspects the elevated metals found in the water samples are most likely associated with the suspended sediment rather than mine-related impacts because the majority of mine working did not intersect groundwater. This remains unconfirmed.

Finally, Golder concurs with NMED Phase II report that Boston Hill presents low risks to expose recreational users to metals associated with the mine wastes.

7.0 REFERENCES


Appendix F: Draft Report On The Evaluation of the Boston Hill Project

To: Abandoned Mine Lands Bureau
   Environmental Coordinator

From: Dr. J. Scott Altenbach
   Department of Biology
   University of New Mexico
   Albuquerque, NM 87131

Subject: Draft Report on Evaluation of the Boston Hill Project

Date of Evaluation: April 23, 2013

Feature dimensions are given as linear distances across the opening (adit portal, or shaft/open stope collar) and the depth of the feature.

Features: NW shaft, S shaft/stope, S shaft, shaft 01, shaft 13, shaft 08

Observations: These are all prospects less than 8’ deep, have no sign of wildlife use and have no bat use potential.
Recommendation: Safeguard by any means at any time.

Feature: 4

Observations: This is a 6’ x 8’ by 20’ blind open stope. There was no sign of bat use and low potential for bat use. A barn owl was nesting with a small clutch of eggs in a stope portion in one of the ribs.
Recommendation: This feature should be protected with a closure which allows access for barn owls. Closure construction should be from the beginning of August through the end of April to minimize impact on barn owl nesting behavior.

Feature: 5

Observations: This is a 5’ x 7’ x 10’ blind adit with no bat sign or owl sign and very low bat use potential.
Recommendation: Safeguard by any means at any time.

Feature: 6

Observations: This 8’ x 10’ x 10’ blind shaft with no sign of bat or owl use and very low use potential.
Recommendation: Safeguard by any means at any time.

Feature: 7

Observations: This is a 6’ x 8’ x 25’ shaft which has been stoped in the ribs along the strike of the ore body being prospected. No sign of bat use was observed but there was a barn owl present and considerable whitewash on the ribs. The feature presents minimal bat habitat.
Recommendation: If this feature is protected it should be protected with a closure which allows access for barn owls. Closure construction should be from the beginning of August through the end of April to minimize impact on barn owl nesting behavior.

Observations: This 12’ deep blind shaft with no sign of bat or owl use and very low use potential.
Recommendation: Safeguard by any means at any time.
Feature: 9

**Observations:** There are two separate features here. The first (A) is a large open stope with a stoped out rib on the north making an undercut. There is a 20' drop from the collar above this undercut to the sill below. A person can easily walk in and out of this stope. The undercut portion of the stope has the potential for bat night roost activity although no bat sign was observed. *Neotoma* sign and a large middlen were observed in the stope.

The second (B) is an adit/open stope with a 2’ x 5’ portal and an oval underground stoped area roughly 15’ x 20’ and about 7’ high. No bat sign was observed but there is both night roosting potential and hibernation potential.

**Recommendation:** The first feature (A) can be safeguarded by any means at any time. The second feature (B) could be closed by any means at any time with visual inspection immediately before to be sure no unexpected occupants are present.

Feature: 10

**Observations:** This 6’ x 7’ x 15’ blind shaft with no sign of bat or owl use and very low use potential.

**Recommendation:** Safeguard by any means at any time.

Feature: 11

**Observations:** This 6’ x 7’ x 20’ blind shaft with no sign of bat or owl use and very low use potential.

**Recommendation:** Safeguard by any means at any time.

Feature: 12

**Observations:** This is a 3’ x 7’ shaft/open stope likely not more that 15’ deep. However it is filled with barbed wire and other trash which prevents entry and evaluation. Bat entry is possible.

**Recommendation:** The feature should be evaluated after removal of the wire and trash. If it is to be closed destructively, closure should be done in the warm season, from the beginning of May through the end of September, with heavy smoke bombing at night followed by exclusion with 1 inch mesh or poultry netting for 48 hours before closure.

Feature: 14

**Observations:** This is a cut with a 10’ highwall. There is no potential for wildlife use.

**Recommendation:** No recommendation.

Feature: Tunnel A

**Observations:** This is a 30’ x 20’ x 20’ open stope with a 30’ x 10’ undercut stoped area on the north side. There was guano from *Corynorhinus townsendi* and at least one species of *Myotis* in this stoped portion. There is obviously night roosting activity here and the potential for maternity activity.

**Recommendation:** The stope collar should be closed with cable netting fitted with 6” x 12” angle iron windows for bat entry. Construction should avoid the warm season. Construction should be from the beginning of October through the end of April.

Feature: Legal Tender Mine and associated shafts/open stopes in three fenced areas

The underground mine is large, with multiple openings, and has highly significant bat use. Of great concern to me is the extreme danger the site presents. The underground portion of the mine is dangerous with large slabs on the back that are cracked nearly around. There is evidence of extensive visitation. There are numerous campfire sites, large amounts of trash including alcoholic beverage containers, exploded fireworks and clothing scattered in many areas of the underground. This appears to be a well used party site. Building fires underground, even in a mine with multiple openings and generally good ventilation, is extremely dangerous because of the possibility of carbon dioxide accumulation in low lying areas. Many deaths have occurred in abandoned mines because of this. Of greater concern to me is the extreme danger the surface openings in the fenced areas present as fall hazards even to the wary. The sides of some of the shaft/open stopes entries have loose rock on a solid rock surface making slipping and falling highly likely. I have spent much of my life working in and around abandoned mines and have evaluated many thousands of abandoned mines in 12 states. The likelihood of falling into these openings makes this among the most dangerous sites I have seen. It is absolutely astonishing to me that falls and death or injuries have not occurred here. The responsible parties should consider the safeguarding of these features a critical priority.

Of importance from a wildlife management perspective is the tremendous negative impact to bat use presented by the magnitude of the human visitation to the underground parts of this mine. There is maternity activity and hibernation by *Corynorhinus townsendi* and use by several other bat species as well. Both of these activities are highly vulnerable to disturbance. Under the best of circumstances, disturbance of bats during maternity activity will result in the death of the bat pups. Repeated disturbance during hibernation will likely result in the death of the bats. I suspect that the negative impact to bats in this area has been significant.

**Summary of Recommendations:**
Part of the Town's Trails and Open Spaces initiative, the Boston Hill, San Vicente Creek, and other trail areas keep important parts of Silver City's natural environment and historic areas available to citizens and visitors.

In an effort to provide an enhanced visitors experience as well as a Town Asset, this presentation proposes developing an outdoor concert & entertainment space that takes advantage of the natural features of the Boston Hill Open Space and its proximity to downtown Silver City.

We have identified an appropriate site based on a number of metrics, from existing infrastructure, accessibility, traffic, natural siting opportunities, and minimizing impact to surrounding residential neighborhoods.

The Adonis Pits are a short 0.75 mile walk, drive, or bike from the downtown Silver City Core. The Amphitheatre is currently designed to hold 1000-1200 people in the site proper.

This presentation reflects a schematic level of design only and is intended to illustrate just one possible solution for the project.

Appendix G: Town Of Silver City Ampitheater Study

Project Overview

Part of the Town's Trails and Open Spaces initiative, the Boston Hill, San Vicente Creek, and other trail areas keep important parts of Silver City's natural environment and historic areas available to citizens and visitors.

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Appendix G: Town Of Silver City Ampitheater Study

Project Overview

The Adonis Pits are a short 0.75 mile walk, drive, or bike from the downtown Silver City Core.

This presentation reflects a schematic level of design only and is intended to illustrate just one possible solution for the project.
Primary Site

The Adams Pits, located just off Cooper Street is the suggested Primary Site:

The site should be:
- Accessible to visitors with disabilities
- Provisions for parking in Town Zoning requirement
- Utilities should be located nearby
- The siting of the stage should take advantage of views, aircraft and the natural terrain for possibilities.

Initial code analysis requires spaces for 400 cars, this number can be reduced, through variances and after parking evaluation measures, but there is a strategic planning view, this is the number one issue from finding the location possibilities. The La Capilla "bowl" could possibly be developed for off-street parking as an additional or alternative site.

The Chihuahua Hill neighborhood bothers the site to the North and we believe the proposed site is located a sufficient distance to provide a buffer to those residents. Noise analysis will have to be conducted prior to any proposed development.

The site is also directly North of the La Capilla Cemetery and we propose extending the natural berm as a buffer between the cemetery and the site.

The Senior Center across Cooper Street has a nature walk developed that could be extended and linked to the outdoor venue, creating an added benefit for our Seniors.

The proximity to downtown Silver City should prove to be a benefit to the annual Blues Festival, Pickemania, and other vacation events where staging can occur and the Gough Park at Boston Hill simultaneously.

Materials & Methods

This Adonis Pits, located just off Cooper Street is the suggested Primary Site:

- Steel was chosen for ease of construction, durability and its ability to be easily disassembled and repurposed or recycled.
- The storage wings are concrete block and stucco.
- The roof is metal with metal decking and concrete topping.
- The proposed roofing material is fabric sunshade.
- The stage frame is metal frame with metal decking and concrete topping. This too can be disassembled and repurposed should the need arise. A modular frame also allows for expansion.

- The seating should take advantage of the natural bowl shape at the primary site. Orientation will have to be performed to ensure safety and views.
- The terraced steps have concrete retaining block for schematic purposes, this can be refined and alternate materials can be suggested.
- The sharp rocky features of Boston Hill do not lend themselves well for seating. The terraces created allow something more forgiving than the existing site soils.

The ultimate goal is to enhance the site potentials of Boston Hill to create a venue that provides an intimate outdoor concert and entertainment space.
### Appendix H: Town Of Silver City Demographics

<table>
<thead>
<tr>
<th>Subject</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td><strong>HOUSEHOLDS BY TYPE</strong></td>
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<tr>
<td>Total households</td>
<td>4,473</td>
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<tr>
<td>Family households</td>
<td>56.0%</td>
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<tr>
<td>with own children under age of 18</td>
<td>19.8%</td>
</tr>
<tr>
<td>Married-couple family</td>
<td>33.0%</td>
</tr>
<tr>
<td>with own children under age of 18</td>
<td>8.0%</td>
</tr>
<tr>
<td>Male householder, no wife present, family</td>
<td>4.4%</td>
</tr>
<tr>
<td>with own children under 18 years</td>
<td>2.4%</td>
</tr>
<tr>
<td>Female householder, no husband present, family</td>
<td>18.6%</td>
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<tr>
<td>with own children under 18 years</td>
<td>9.4%</td>
</tr>
<tr>
<td>Nonfamily households</td>
<td>44.0%</td>
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<tr>
<td>Householder living alone</td>
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<tr>
<td>65 years and over</td>
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<tr>
<td>Households with one or more people under 18 years</td>
<td>24.0%</td>
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<tr>
<td>Households with one or more people 65 years and over</td>
<td>33.8%</td>
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<table>
<thead>
<tr>
<th>Subject</th>
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<tbody>
<tr>
<td><strong>SCHOOL ENROLLMENT</strong></td>
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<tr>
<td>Population 3 years and over enrolled in school</td>
<td>2,883</td>
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<tr>
<td>Nursery school, preschool</td>
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<tr>
<td>Kindergarten</td>
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<tr>
<td>Elementary school (grades1-8)</td>
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<td>High school (grades 9-12)</td>
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<td>College or graduate school</td>
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<th>Subject</th>
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<tr>
<td><strong>EMPLOYMENT STATUS</strong></td>
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</tr>
<tr>
<td>Population 16 years and over</td>
<td>8,649</td>
</tr>
<tr>
<td>In labor force</td>
<td>54.8%</td>
</tr>
<tr>
<td>Civilian labor force</td>
<td>54.8%</td>
</tr>
<tr>
<td>Employed</td>
<td>59.8%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>4.8%</td>
</tr>
<tr>
<td>Armed forces</td>
<td>0.0%</td>
</tr>
<tr>
<td>Not in labor force</td>
<td>45.2%</td>
</tr>
<tr>
<td>Civilian labor force</td>
<td>4,742</td>
</tr>
<tr>
<td>Percent unemployed</td>
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<th>Subject</th>
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<tr>
<td><strong>VETERANS</strong></td>
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<tr>
<td>Civilian population 18 years and over</td>
<td>8,368</td>
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<td>Civilian veterans</td>
<td>11.7%</td>
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<th>Subject</th>
<th>Percent</th>
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<tr>
<td><strong>U.S. CITIZENSHIP STATUS</strong></td>
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<tr>
<td>Foreign-born population</td>
<td>779</td>
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<tr>
<td>Naturalized U.S. citizen</td>
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<tr>
<td>Not a U.S. citizen</td>
<td>48.1%</td>
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<table>
<thead>
<tr>
<th>Subject</th>
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<tr>
<td><strong>LANGUANGE SPOKEN AT HOME</strong></td>
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<tr>
<td>Population 5 years and over</td>
<td>9,727</td>
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<tr>
<td>English only</td>
<td>65.1%</td>
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<tr>
<td>Language other than English</td>
<td>34.9%</td>
</tr>
<tr>
<td>Spanish</td>
<td>31.8%</td>
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<table>
<thead>
<tr>
<th>Subject</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EMPLOYMENT STATUS</strong></td>
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</tr>
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</tr>
<tr>
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<td>54.8%</td>
</tr>
<tr>
<td>Civilian labor force</td>
<td>54.8%</td>
</tr>
<tr>
<td>Employed</td>
<td>59.8%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>4.8%</td>
</tr>
<tr>
<td>Armed forces</td>
<td>0.0%</td>
</tr>
<tr>
<td>Not in labor force</td>
<td>45.2%</td>
</tr>
<tr>
<td>Civilian labor force</td>
<td>4,742</td>
</tr>
<tr>
<td>Percent unemployed</td>
<td>8.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCHOOL ENROLLMENT</strong></td>
<td></td>
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<tr>
<td>Population 25 years and over enrolled in school</td>
<td>7,049</td>
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<tr>
<td>Less than 9th grade</td>
<td>6.9%</td>
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<tr>
<td>9th to 12th grade, no diploma</td>
<td>10.2%</td>
</tr>
<tr>
<td>High school graduate (include equivalency)</td>
<td>24.0%</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>26.3%</td>
</tr>
<tr>
<td>Associates degree</td>
<td>7.5%</td>
</tr>
<tr>
<td>Bachelors degree</td>
<td>12.8%</td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>12.4%</td>
</tr>
<tr>
<td>Percent high school graduate or higher</td>
<td>82.9%</td>
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<tr>
<td>Percent of bachelor degree or higher</td>
<td>25.2%</td>
</tr>
<tr>
<td>Subject</td>
<td>Percent</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>OCCUPATION</td>
<td></td>
</tr>
<tr>
<td>Civilian employed population 16 years and over</td>
<td>4,325</td>
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<tr>
<td>Management, business, science, and arts occupations</td>
<td>40.6%</td>
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<tr>
<td>Service occupations</td>
<td>21.5%</td>
</tr>
<tr>
<td>Sales and office occupations</td>
<td>19.1%</td>
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<tr>
<td>Natural resources, construction, and maintenance occupations</td>
<td>10.8%</td>
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<tr>
<td>Production, transportation, and material, moving occupations</td>
<td>8.2%</td>
</tr>
<tr>
<td>INDUSTRY</td>
<td></td>
</tr>
<tr>
<td>Civilian employed population 16 years and over</td>
<td>4,325</td>
</tr>
<tr>
<td>Agriculture, forestry, fishing, and hunting, and mining</td>
<td>9.8%</td>
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<tr>
<td>Construction</td>
<td>5.8%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1.2%</td>
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<tr>
<td>Wholesale trade</td>
<td>1.4%</td>
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<tr>
<td>Retail trade</td>
<td>8.4%</td>
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<tr>
<td>Transportation and warehousing, and utilities</td>
<td>1.7%</td>
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<tr>
<td>Information</td>
<td>2.6%</td>
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<tr>
<td>Finance and insurance, and real estate and rental and leasing</td>
<td>3.8%</td>
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<tr>
<td>Professional, scientific, and management, and administrative and waste management services</td>
<td>7.8%</td>
</tr>
<tr>
<td>Educational services, and health care and social assistance</td>
<td>36.8%</td>
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<tr>
<td>Arts, entertainment, and recreation, and accommodation and food services</td>
<td>12.7%</td>
</tr>
<tr>
<td>Other services, except public administration</td>
<td>4.0%</td>
</tr>
<tr>
<td>Public administration</td>
<td>4.0%</td>
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<table>
<thead>
<tr>
<th>Subject</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCOME AND BENEFITS</td>
<td>(IN 2011 INFLATION ADJUSTMENT DOLLARS)</td>
</tr>
<tr>
<td>Total households</td>
<td>4,473</td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>9.5%</td>
</tr>
<tr>
<td>$10,000 to $14,999</td>
<td>11.0%</td>
</tr>
<tr>
<td>$15,000 to $24,999</td>
<td>22.3%</td>
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<tr>
<td>$25,000 to $34,999</td>
<td>11.4%</td>
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<tr>
<td>$35,000 to $49,999</td>
<td>15.6%</td>
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<tr>
<td>$50,000 to $74,999</td>
<td>13.0%</td>
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<td>$75,000 to $99,999</td>
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<td>$100,000 to $149,999</td>
<td>4.3%</td>
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<tr>
<td>$150,000 to $199,999</td>
<td>0.6%</td>
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<tr>
<td>$200,000 or more</td>
<td>1.1%</td>
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<thead>
<tr>
<th>Subject</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL</td>
<td></td>
</tr>
<tr>
<td>All families</td>
<td>18.3%</td>
</tr>
<tr>
<td>All people</td>
<td>20.6%</td>
</tr>
<tr>
<td>Under 18 years</td>
<td>34.0%</td>
</tr>
<tr>
<td>Related children under 18 years</td>
<td>34.0%</td>
</tr>
<tr>
<td>Related children under 5 years</td>
<td>41.7%</td>
</tr>
<tr>
<td>Related children 5 to 17 years</td>
<td>30.4%</td>
</tr>
<tr>
<td>18 years and over</td>
<td>17.4%</td>
</tr>
<tr>
<td>18 to 64 years</td>
<td>22.4%</td>
</tr>
<tr>
<td>65 years and over</td>
<td>4.0%</td>
</tr>
<tr>
<td>People in families</td>
<td>20.2%</td>
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<tr>
<td>Unrelated individuals 15 years and over</td>
<td>22.1%</td>
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<tr>
<td>Subject</td>
<td>Percent</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------</td>
</tr>
<tr>
<td>SEX AND AGE</td>
<td></td>
</tr>
<tr>
<td>Total population</td>
<td>10,337</td>
</tr>
<tr>
<td>Male</td>
<td>47.5%</td>
</tr>
<tr>
<td>Female</td>
<td>52.5%</td>
</tr>
<tr>
<td>Under 5 years</td>
<td>5.9%</td>
</tr>
<tr>
<td>5 to 9 years</td>
<td>3.7%</td>
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<tr>
<td>10 to 14 years</td>
<td>6.0%</td>
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<tr>
<td>15 to 19 years</td>
<td>7.4%</td>
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<tr>
<td>20 to 24 years</td>
<td>8.9%</td>
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<tr>
<td>25 to 34 years</td>
<td>9.4%</td>
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<tr>
<td>35 to 44 years</td>
<td>10.8%</td>
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<tr>
<td>45 to 54 years</td>
<td>12.2%</td>
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<tr>
<td>55 to 59 years</td>
<td>8.2%</td>
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<tr>
<td>60 to 64 years</td>
<td>7.0%</td>
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<tr>
<td>65 to 74 years</td>
<td>9.9%</td>
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<tr>
<td>75 to 84 years</td>
<td>7.2%</td>
</tr>
<tr>
<td>85 years and over</td>
<td>3.6%</td>
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<table>
<thead>
<tr>
<th>Subject</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>RACE</td>
<td></td>
</tr>
<tr>
<td>Total population</td>
<td>10,337</td>
</tr>
<tr>
<td>Caucasian</td>
<td>75.5%</td>
</tr>
<tr>
<td>African American</td>
<td>6%</td>
</tr>
<tr>
<td>Native American</td>
<td>4.3%</td>
</tr>
<tr>
<td>Asian</td>
<td>1%</td>
</tr>
<tr>
<td>Some other race</td>
<td>15.9%</td>
</tr>
</tbody>
</table>

### TABLE OF CONTENTS

**Phase II**

APPENDIX A: PUBLIC MEETING................................................................. II

Public Meeting notices were posted at the entries of all Boston Hill trailheads and at the Silko Theatre. Notices were sent via email to stakeholder lists and the meeting was held the evening of April 3, 2013 at the Silko Theatre. The material in Appendix A represent the advertisements, the presentation materials and the meeting notes from that meeting.

APPENDIX B: KLEINFELDER PHASE II SITE............................................. III

Appendix B is for information only and represents a separate contracted study of Legal Tender Mine Complex commissioned by the AML program. The study is integral to our understanding of the conditions of the abandoned Legal Tender Mine Complex.

APPENDIX C: FIELD DESIGN MEETING #1............................................. XIX

Held at the Silko Theatre field design meeting #1 was held from Aug 8-10, 2013. This appendix contains flyers, orientation materials, meeting notes and attendance lists.

APPENDIX D: FIELD DESIGN MEETING #2........................................... XXII

Held at the Silko Theatre field design meeting #1 was held from October 5-8, 2013. This appendix contains flyers, orientation materials, meeting notes, attendance lists and before and after graphics.

APPENDIX E: XXX

xxx
Appendix A: Public Meeting
Hazards Associated with Boston Hill Mines
Open House Community Meeting, Silver City, New Mexico March 21, 2013

BOSTON HILL
BIOLOGICAL RESOURCES

NATIVE PLANTS

INTRODUCED PLANTS

ANIMALS
Safeguarding Abandoned Mines on Boston Hill | Silver City, NM

BOSTON HILL
SAFEGUARDING SOLUTIONS

ENTRANCES

EDGES

BRIDGES

PATHS

EVENING FLIGHT

EXISTING CONDITIONS

The garden place is a possibility of increasing oneself in nature and penetrating it. This one spot on the earth becomes a door, a gate, a niche, a grotto, a cave, a corridor leading inward.

Every stone setting is reminiscent of ancient times, of the Stone Age, of Stonehenge and of the caves and dolmens, a breath of a cemetery wafts around them.

This way leads into the interior of the earth, into its bowels, into the subconscious of the earth.

The place as a separate zone. Hearing the grass grow all around.

Open House Community Meeting, Silver City, New Mexico

March 21, 2013
Meeting Minutes

Project No.: 12-0089.001
Project: Plan and Design for Safeguarding Abandoned Mines on Boston Hill
Date/Time: 03/21/2013, 5:30-8:00pm
Place: Silco Theatre, Silver City

Attending: Ken Romig, Noah Shumate, DPS; Tim Karpoff, Karpoff and Associates; Doug Romig, Jen Pepe, Golder Associates; Joseph Gendron, P.E.; Meaghan Vallero, Marc Concilovich, Kleinfelder; John Kretzmann, AML Program Director.

By: Noah Shumate, Luna Idriess
Copies To: Parties Present

Discussion Items:

The Open House / Public Meeting schedule was as follows:

Open House 5:30 to 6:30 PM
Presentation 6:30 to 7:00 PM
Discussion 7:00 to 8:00 PM

For the Open House portion, guests were encouraged to view the large format poster boards which presented four topics (at four “stations”) relative to mine safeguarding at Boston Hill:

- Existing conditions of the mining areas and their Geology (Doug Romig and Jen Pepe, Golder Associates)
- Existing hazards and current safeguarding measures (Meaghan Vallero and Marc Concilovich, Kleinfelder)
- Cultural/historical and biological aspects (Joseph Gendron, PE)
- Opportunities for uses and mitigation strategies/potentials (Ken Romig, D/P/S)

Attendees throughout the evening were mostly local, concerned citizens of Silver City. Also in attendance were representatives of the local Youth Conservation Corps (YCC) who showed much enthusiasm for the project, especially with regard to how they often work on fence and trail projects in the region and that their organization could become an asset in the long term maintenance of Boston Hill.

The formal presentation portion of the meeting was in PowerPoint format and generally followed the flow of the four topics mentioned above. Tim Karpoff opened the presentation by thanking everyone for attending. Each of the team members then introduced themselves.

John Kretzmann began with an overall presentation of the AML program. Doug Romig presented on the overall site location and its attributes, followed by Marc Concilovich who discussed the hazards associated with Boston Hill and mine safeguarding in general. Next, Joseph Gendron discussed the various cultural, historical, and biological features of the site; and lastly, Ken Romig spoke to some of the potentials and opportunities for creating safeguards on Boston Hill that seek to mitigate hazards on-site while also respecting the biology and aesthetics of the natural surroundings.

Once the presentation was complete, Tim Karpoff then led an open discussion to gather comment on what the public feels are values and/or opportunities for the Boston Hill site in light of the presentation noted above. Those results – noted on large-format sketch boards during the meeting – are listed below.

Values- What to Keep in Mind

- Transition the apparent risk into the “experience of risk” without sacrificing the feeling of exploring the mines
- The mine hazards equal an experience that is unique
- Awareness… what protocols for safety, maintenance, etc. to follow?
- Visitors use common sense – there are hidden features/dangers present (like the Grand Canyon)
- Safety and curiosity need balance
- Do not change what doesn’t need it
- Preserve the natural beauty of the site
- Construction, need to know what they are doing (the familiar)
- ADA considerations, not too accessible – don’t want to lose the natural beauty/settings of the site
- City needs awareness of on-going responsibilities
- Do’s want to miss out on this opportunity
- Concern for obliterating natural beauty to maintain safeguarding measures
- Town needs to take interest and maintain the site also
- Area is not static – it will change over time (consider this in design and visioning)
- Do not destroy, rehabilitate
- Let some area go back to natural
- Preserve flora/fauna (controlling humans, not just controlling mines)

Opportunities- What Can We Do?

- Signage of potential hazards
- History and safety exhibit on trailheads
- Danger to pets- need fresh laws
- Preserve it, have tours
- Tours = Group maintenance
- Rock work, natural native stone
- Stabilizing the Legal Tender mine? Maintain natural look
- Qualities of construction, keep natural and rough
- Fence private land vs. appropriate safeguarding
- Could the Town acquire private land within Boston Hill
- Legal tender safeguard = Town acquisition
- Design for an experience with less risk.
- Design for low maintenance
- Plan should include maintenance plan schedule
- Site visit @ next public gatherings
- Plan to involve community to maintain
- These are man-made- naturally eroding
- Not engineered features
- Need a clear criteria for work
- Zoning – could help protect habitat and the site

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Minutes
### Attendance Record

**Meeting Date and Time:** 21-Mar-13

<table>
<thead>
<tr>
<th>Name</th>
<th>Representing</th>
<th>Telephone</th>
<th>Fax</th>
<th>E-mail</th>
</tr>
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<tbody>
<tr>
<td>Tim Karpoff</td>
<td>Self</td>
<td>(505) 280-4797</td>
<td></td>
<td><a href="mailto:timkarpoff@msn.com">timkarpoff@msn.com</a></td>
</tr>
<tr>
<td>Gary Stailey</td>
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<td>(505) 280-9060</td>
<td></td>
<td><a href="mailto:gary_stailey@ymail.com">gary_stailey@ymail.com</a></td>
</tr>
<tr>
<td>Andrew Lindloff</td>
<td>Gria</td>
<td>(575) 538-8078</td>
<td></td>
<td><a href="mailto:andrew.well@mounds.info">andrew.well@mounds.info</a></td>
</tr>
<tr>
<td>Ken Kepperlee</td>
<td>Bayou Seco</td>
<td>(575) 534-0298</td>
<td></td>
<td><a href="mailto:bayou.seco@awl.com">bayou.seco@awl.com</a></td>
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<tr>
<td>Marilyn Gendron</td>
<td>Self</td>
<td>316-9934</td>
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<tr>
<td>Jamie Thomson</td>
<td>Self</td>
<td>534-9040</td>
<td></td>
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<tr>
<td>Carolyn Moore</td>
<td>The Wellness Coalition</td>
<td>956-7138</td>
<td></td>
<td><a href="mailto:Carolyn@wellnesscoalition.org">Carolyn@wellnesscoalition.org</a></td>
</tr>
<tr>
<td>Christopher</td>
<td>The Wellness Coalition</td>
<td>519-8974</td>
<td></td>
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<tr>
<td>Sam Austin</td>
<td>The Wellness Coalition</td>
<td>(706) 369-6129</td>
<td></td>
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<tr>
<td>Trevor DesRotters</td>
<td>The Wellness Coalition</td>
<td>(575) 634-8185</td>
<td></td>
<td><a href="mailto:cytive8th@hotmail.com">cytive8th@hotmail.com</a></td>
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<tr>
<td>Jeannie McElrue</td>
<td>Bayou Seco</td>
<td>534-0284</td>
<td></td>
<td><a href="mailto:bayou.seco@aw.com">bayou.seco@aw.com</a></td>
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<tr>
<td>Hiram S. Lewis</td>
<td>Self</td>
<td>388-4367</td>
<td></td>
<td><a href="mailto:hoosfer101@comcast.net">hoosfer101@comcast.net</a></td>
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<tr>
<td>Cindy Gagnon</td>
<td>Self</td>
<td>654-2387</td>
<td></td>
<td><a href="mailto:conneg431@robinhub.net">conneg431@robinhub.net</a></td>
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<tr>
<td>CNF (? Illegible)</td>
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<td>534-9385</td>
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<tr>
<td>Susan Hill</td>
<td>Self</td>
<td>388-9069</td>
<td></td>
<td><a href="mailto:susiwilak@cybermesa.com">susiwilak@cybermesa.com</a></td>
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<tr>
<td>Mary Ann Finn</td>
<td>Self</td>
<td>388-2043</td>
<td></td>
<td><a href="mailto:gilamonsterbiles@yahoo.com">gilamonsterbiles@yahoo.com</a></td>
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<tr>
<td>Stacy D-Mrazik</td>
<td>Self / Casperson</td>
<td>(248) 240-5029</td>
<td></td>
<td><a href="mailto:drc@comcast.net">drc@comcast.net</a></td>
</tr>
<tr>
<td>Nancy Griff</td>
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<tr>
<td>Mandy Whitesburg</td>
<td>The Wellness Coalition</td>
<td>314-0665</td>
<td></td>
<td><a href="mailto:mandy@wellnesscoalition.org">mandy@wellnesscoalition.org</a></td>
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<td>John Rivera</td>
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<td>Henry Faio</td>
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<tr>
<td>Jeff Romano</td>
<td>The Wellness Coalition</td>
<td>(520) 401-3996</td>
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<tr>
<td>Sue Bemben</td>
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<td>388-1417</td>
<td></td>
<td><a href="mailto:bemben@wellchamber.com">bemben@wellchamber.com</a></td>
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<tr>
<td>Joe Bemben</td>
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<tr>
<td>Nick Seltov</td>
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<td><a href="mailto:seldev@wellchamber.com">seldev@wellchamber.com</a></td>
</tr>
<tr>
<td>Pat Dunn</td>
<td></td>
<td>338-5290</td>
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**Meeting Attendance Record 3-21**

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<tr>
<td>Sandra Jeffries</td>
<td>Self</td>
<td>(575) 654-0091</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Michele Griege</td>
<td>NM00H GC Trails Group</td>
<td>538-8573 (121)</td>
<td></td>
<td><a href="mailto:michelegriege@state.nm.us">michelegriege@state.nm.us</a></td>
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<tr>
<td>Gail Stanford</td>
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**Meeting Attendance Record 3-21**

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Who is AML?

The New Mexico Abandoned Mine Land (AML) Program

The New Mexico AML Program, part of the New Mexico Energy, Minerals, and Natural Resources Department, addresses the reclamation of abandoned mines throughout the state on both public and private property.

- AML is a federally-funded state program, formed through the passage of the Surface Mining Control and Reclamation Act (SMCRA).

- AML is funded through a tax on existing coal mined within a state. AML works on abandoned hard-rock mines (i.e. Boston Hill) when obvious hazards are apparent. AML has worked on Boston Hill in the past.

- AML program funding sunsets in 2021.
AML Priorities

The AML program funding priorities:

- Priority 1: Protect public health, safety and property from immediate hazards resulting from historic mining practices.

- Priority 2: Protect the public from hazards that do not constitute immediate hazards.

- Priority 3: Restore lands and water degraded by historic mining practices. Restoration must facilitate the higher priority reclamation.

AML and Boston Hill

The Unique Nature of Boston Hill

- Characteristics of Boston Hill
  - Proximity to Silver City
  - Hard-rock mining
  - Wildlife habitat

- Boston Hill Land Ownership
  - Multiple landowners
  - Diverse stakeholder interests

AML’s unique funding and organizational capacity

- Funding Limitations
- Limited Program Operations and Maintenance for constructed facilities
AML Safeguarding Approach

- Recognizes diverse landownership
- Integrates local knowledge and expertise into design
- Respect the legacy of mining
- No action option

Phase I - Assessment - Current Phase
Phase 2 - Plan
Phase 3 - Design
Phase 4 - Construction Assistance

Scope of Work
Current Project Status

- Research
  - Regulatory framework
  - History
  - Biological
- Interviews
  - City Manager of the Town of Silver City
  - Landowners—ongoing
  - Silver City Residents—ongoing
  - Non-profit groups—ongoing
- Mapping
  - GIS assistance from the City and County
  - GIS data integration—ongoing
- Site Reconnaissance
  - Ongoing
- Public Meeting

Presentation Organization

Station #1
Boston Hill Geologic Hazard Analysis

Station #2
Legal Tender Complex Geo-Hazards

Station #3
Biological and Cultural Resources

Station #4
Possibilities and Opportunities
Land Ownership Map

Station #1 - Geologic Hazard Analysis

- Topographical analysis
- Identify fall hazards associated with highwalls
- Mine openings
- Field Survey to characterize potential physical hazards

Hazard Mapping

- > 10 feet
- 1H:1V or steeper
Safeguarding Abandoned Mines on Boston Hill

Station #1 - Geologic Hazard Analysis

Shaft Risk Categories

No Fall Hazard

- Fall Hazard, Easy Egress (Easy walk out)
- Fall Hazard, Difficult Egress (Difficult climb out)
- Fall Hazard, No Egress (Requires Rescue)

Pit Risks

High Walls (Fall Risk)
- Potential fall distance over 50 feet in many locations
- Rocks at crest may often be loose and undercut
Station #1 - Geologic Hazard Analysis

Rock Falls Near Paths from (Risk Above and Below):
- Oversteepened Slopes
- Eroded Weak Rock
- Dipping Beds

Safeguards in Place:
- Warning Signs
- Fences
- Cable Netting
Kleinfelder Study Areas – Legal Tender Mine

- Mine Entrances
- The Raceway
- Trail to Spring Street
- The Coliseum
- The Ballroom
- The Fire Pit Room
Qualitative Risk Assessment

Hazard Category

- Potential rock fall

Hazard Category

- Falling from height
Qualitative Risk Assessment

Hazard Category

- Collapse of chamber/entrapment

Additional hazard categories:

- Trips/slips
- Disorientation
- Air quality
What is risk?
Risk = (probability of occurrence) × (severity of consequence)

**Severity**
- **Low (1)**: Injury requiring minor first aid treatment.
- **Moderate (2)**: Injury requiring EMS or search and rescue response. Hospitalization or emergency treatment.
- **High (3)**: Critical debilitating injury or fatality.

**Risk Matrix**

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<th>Description</th>
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<td>Very Probable</td>
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<td>Event highly likely to occur</td>
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<td>Probable</td>
<td>2</td>
<td>Event may or may not occur</td>
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<td>Least Probable</td>
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<td>Event less likely to occur</td>
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**Probability**

<table>
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<th>Risk Severity Value</th>
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<td>2</td>
</tr>
<tr>
<td>Trips/slips</td>
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<td>1</td>
</tr>
<tr>
<td>Collapse of chamber/entrapment</td>
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<td>3</td>
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**Risk Ranking Classification**
- **Rock fall**: High
- **Falling from height**: Low
- **Trips/slips**: Low
- **Collapse of chamber/entrapment**: High
### Risk Matrix – The Fire Pit Room

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<th>Risk Severity Value</th>
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<td>Rock fall</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>Extreme</td>
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<tr>
<td>Falling from height</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>High</td>
</tr>
<tr>
<td>Trips/slips</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>Low</td>
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<tr>
<td>Collapse of chamber/</td>
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<td>3</td>
<td>6</td>
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### Risk Matrix – The Raceway

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<tbody>
<tr>
<td>Rock fall</td>
<td>3</td>
<td>3</td>
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<tr>
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### Risk Matrix

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### Risk Matrix – The Coliseum

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<td>Trips/slips</td>
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### Risk Matrix – Surface Hazards

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Safeguarding Possibilities

Station #4: Possibilities and Opportunities
Concepts

Station #4 - Possibilities and Opportunities

What Next?
Phase 2- Plan

- Public Meetings and Field Design Sessions
  - On-site design session with stakeholders
  - Mock-ups of improvements
  - Develop community consensus
- Draft a Report
  - Integrate community vision into design
  - Vet design solutions with AML and community
  - Develop report for AML and community

Phase 3- Design

Phase 4- Construction Assistance

- Develop Schematic Design
  - Prepare designs, elevations and sections
  - Cost estimates
  - 3-D model the design
  - Coordinate design with experts in biology, engineers, archaeological resources
  - Refine design for bidding
- Monitor construction
- Review construction at substantial completion
Preliminary Project Schedule

- Phase 1 – Assessment
  - Completion in March, 2013

- Phase 2 – Plan
  - Late April/Early May, 2013

- Phase 3 – Design
  - Summer, 2013

- Phase 4 – Construction Assistance
  - TBD

Discussion
Appendix B: Kleinfelder Phase II Site

May 7, 2013
Project No.: 130875

Mr. John Kretzmann, Program Manager
Abandoned Mine Land Program
1220 S. Saint Francis Drive
Santa Fe, NM 87505

SUBJECT: Phase II Site Characterization Data Summary
Legal Tender Mine
Silver City, NM

Dear Mr. Kretzmann:

Kleinfelder West, Inc. (Kleinfelder) has prepared the following Site Characterization Data Summary of the Legal Tender Mine in Silver City, New Mexico. The work was performed in accordance with the scope of services presented in our proposal dated February 14, 2013. The work was performed for the Abandoned Mine Lands Program of the State of New Mexico (State). The site characterization and data collection effort was performed by Kleinfelder on March 4 through March 8, 2013. The data collected included geologic rock mass characterization and discontinuity mapping data within the mine. In addition, geologic hazard observations were performed within the mine and at the surface. This information was used to perform a qualitative evaluation of risk and subsequent development of risk matrices for presentation to the Town of Silver City at a public meeting held on March 21, 2013.

RISK EVALUATIONS

The purpose of the site characterization was to collect qualitative mine geologic hazards data, analyze the data, and to prepare a qualitative risk ranking of the geologic hazards that could be used to judge the relative safety of the mine in its current condition. The site characterization was performed on various areas within the Kleinfelder study area, including the ground surface and the following underground areas: the Ballroom, the Fire Pit Room, the Raceway and the Coliseum as presented on Figure 1. In each study area, the following potential hazards were evaluated:

- Potential for rock fall
- Potential for falling from height
- Potential for trips/slips
- Potential for disorientation
- Potential for collapse of chamber/entrainment

Kleinfelder assessed the potential for the hazards listed above by performing visual observations, analyzing photos, and examining data provided by Wilson and Company’s 3D LIDAR survey. Comments relating to the qualitative assessment of each hazard potential are shown in Figures 3 through 7. Based on these hazard potential assessments, the potential for risk was qualitatively evaluated in each study area. To evaluate the potential for risk, Kleinfelder created a Risk Matrix which considered the probability of a hazard occurring and the severity of harm to people should that hazard occur. Hazard probability and severity levels were qualitatively assigned numerical classifications to rank each potential hazard. The Risk Matrix and a description of risk probability/severity are shown on Figure 2.

Using the risk matrix, Kleinfelder performed a qualitative risk evaluation for each study area. The potential hazards in each study area were identified and assigned a numerical risk value according to the Risk Matrix shown in Figure 2. Risk evaluation results for each study area are presented on Figures 3 through 7.

RISK PRESENTATIONS

Kleinfelder presented the results of our qualitative geologic hazards study in a public meeting to the Town of Silver City, New Mexico on March 21, 2013. This included a brief presentation to discuss our work and summarize our findings as well as an exhibit booth with an open-discussion PowerPoint presentation, photographs, and poster boards. A copy of the PowerPoint presentation and exhibit slides are provided on the attached CD.
ROCK MASS CHARACTERIZATION AND DISCONTINUITY MAPPING

Rock mass and rock discontinuity data was collected in several underground areas of the mine to assist in our qualitative evaluation of risk. Rock mass data, discontinuity data, and a location map are presented in Appendix A.

Rock mass data collection included:

- Locality type
- Rock feature length
- Rock feature height
- Rock mass color
- Rock mass grain size
- Intact rock uniaxial compressive strength
- Rock mass fabric
- Rock mass block size
- Rock mass state of weathering
- Number of discontinuity sets

The rock discontinuity data collected included:

- Location of the discontinuity
- Type of discontinuity
- Discontinuity dip angle and direction
- Discontinuity persistence
- Discontinuity termination
- Discontinuity aperture width
- Discontinuity filling (or lack of)
- Discontinuity wall strength
- Discontinuity surface roughness and shape
- Barton’s joint roughness coefficient (JRC) value
- Presence or lack of water
- Discontinuity spacing

Kleinfelder used the rock mass and discontinuity data to assist in our qualitative evaluation of the hazards within the underground workings. This data may be also used for future quantitative analysis of stability at the Legal Tender Mine.

DISCUSSION

Kleinfelder performed qualitative evaluations of the areas of the mine most accessible to the public. Extreme risks were identified in almost all areas of the surface and underground rooms. The ground surface of the mine is characterized by a rugged, uneven grade containing numerous open chutes and stopes ranging from 5 to 50 feet in diameter. Hiking trails are popular on Boston Hill and many pedestrians frequent the ground surface area of the Legal Tender mine without knowledge of the openings that exist. One of these large openings, or collapsed stopes is The Coliseum which has steep, vertical walls which presents a fall danger to those at the surface and a rock fall hazard to anyone inside.

Entrance to the underground portion of the mine is through the Ballroom which contains many overhanging loose blocks present at the entrance arch. There is also an adit on the north side of the Ballroom leading to the surface which shows evidence of tabular block failures. Falling rock is also an extreme hazard in the Fire Pit room which is littered with rock debris of varying sizes (cobbles to table-sized blocks) and has broken lagging in the roof holding back rock. Additional areas of concern are the Raceway and Southeastern Rooms and Drifts. They have minimal access to natural light and they are extensive, with many unexplored passages in the Southeastern Rooms and Drifts and multiple ledges and levels in the Raceway. This creates the risk of disorientation, potential entrapment and falls from heights along with tabular block failures and cracked pillars.

Given the many observed hazards and the severity of the risk levels currently present, the State should consider immediate implementation of measures to prevent people from entering the fenced-in area. This includes fortifying the existing fence to keep people from entering the mine or traversing the surface. Warning signs should also be posted to alert people of the extreme safety hazards at the Legal Tender Mine.

LIMITATIONS

This work described in this summary was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder’s profession practicing in the same locality, under similar conditions and at the date the services are
provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), summary, opinion, or instrument of service provided.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues covered in this summary with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner’s budget, tolerance of risk and expectations for future performance and maintenance.

The information included on graphic representations in this summary has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. These documents are not intended for use as a land survey product nor are they designed or intended as a construction design document. The use or misuse of the information contained on these graphic representations is at the sole risk of the party using or misusing the information.

This summary may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the summary. The observations presented in this summary should not be extrapolated to adjacent sites or used for other projects without our written approval.
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**Risk Probability**

<table>
<thead>
<tr>
<th>Probability Category</th>
<th>Probability</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Least Probable</td>
<td>1</td>
<td>Event less likely to occur</td>
</tr>
<tr>
<td>Probable</td>
<td>2</td>
<td>Event may or may not occur</td>
</tr>
<tr>
<td>Very Probable</td>
<td>3</td>
<td>Event highly likely to occur</td>
</tr>
</tbody>
</table>

**Severity of Harm**

- **Low**: Injury requiring minor first aid treatment
- **Moderate**: Injury requiring EMS or search and rescue response, hospitalization or emergency treatment
- **High**: Critical, incapacitating or fatal injury

**Risk Matrix**
### Risk Evaluation, Ballroom

<table>
<thead>
<tr>
<th>Potential Hazard</th>
<th>Risk Probability Value</th>
<th>Risk Severity Value</th>
<th>Risk Value (probability x severity)</th>
<th>Classification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock Fall</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Falling from height</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>Lower</td>
<td></td>
</tr>
<tr>
<td>Trip/Slip</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Lower</td>
<td></td>
</tr>
<tr>
<td>Deorientation</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>Lower</td>
<td></td>
</tr>
<tr>
<td>Collapse of structure/entrapment</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>High</td>
<td></td>
</tr>
</tbody>
</table>

**Risk Evaluation, Fire Pit Room**

<table>
<thead>
<tr>
<th>Potential Hazard</th>
<th>Risk Probability Value</th>
<th>Risk Severity Value</th>
<th>Risk Value (probability x severity)</th>
<th>Classification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock Fall</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>Falling from height</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Trip/Slip</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Deorientation</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Collapse of structure/entrapment</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>High</td>
<td></td>
</tr>
</tbody>
</table>
### Risk Evaluation, The Raceway

<table>
<thead>
<tr>
<th>Potential Hazard</th>
<th>Risk Probability Value</th>
<th>Risk Severity Value</th>
<th>Risk Value (probability x severity)</th>
<th>Classification</th>
<th>Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock fall</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>Extreme</td>
<td>Areas of loose surficial rocks observed around rim. Instability will continue to erode. Several areas of potentially loose blocks observed in rim and core.</td>
</tr>
<tr>
<td>Falling from height</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>High</td>
<td>Rim of coliseum approximately 60 feet in height</td>
</tr>
<tr>
<td>Translodes</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>Low</td>
<td>100% of floor covered in rubble. Light conditions during day vary.</td>
</tr>
<tr>
<td>Disorientation</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>Low</td>
<td>Light is poor during daylight hours</td>
</tr>
<tr>
<td>Collapse of channel/entrapment</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>High</td>
<td>One underground exit available through coliseum. Coliseum is open to the surface via open vertical shafts.</td>
</tr>
</tbody>
</table>

### Risk Evaluation, Coliseum

<table>
<thead>
<tr>
<th>Potential Hazard</th>
<th>Risk Probability Value</th>
<th>Risk Severity Value</th>
<th>Risk Value (probability x severity)</th>
<th>Classification</th>
<th>Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock fall</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>Extreme</td>
<td>2 chimneys open to surface. Dis- and E-W faults intersect here causing brecciated zones with numerous potentially loose blocks. Potential sliding failure observed on right. Wedge failures observed on crown. Separation of bedding along dipping cleat can create coliseum (circular talus).</td>
</tr>
<tr>
<td>Falling from height</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>High</td>
<td>Approx. 4 accessible ledges observed between 75 and 8 feet in height. Area is relatively dry. Estimate 65% of floor covered in rubble. Light conditions during day vary.</td>
</tr>
<tr>
<td>Translodes</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>Low</td>
<td>Estimate 65% of floor covered in rubble. Light conditions during day vary. Light is variable but present from the openings. Low probability of getting lost.</td>
</tr>
<tr>
<td>Disorientation</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>Low</td>
<td>Light is variable but present from the openings. Low probability of getting lost.</td>
</tr>
<tr>
<td>Collapse of channel/entrapment</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>High</td>
<td>Multiple exits available, open within 20 feet of surface. Intersecting faults and brecciated zones may continue to fail. Evidence of surface water infiltration observed. Continued raveling/failure of crown probable.</td>
</tr>
</tbody>
</table>
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Sources:
1. Bing maps, (c) 2010 Microsoft Corporation and its data suppliers
2. LIDAR point cloud image from Wilson & Company, Inc., March 2013

LEGEND
- Kleinfelder Project Area (fenced) + Rock Mass and Discontinuity Data Location

ROCK MASS AND DISCONTINUITY DATA LOCATIONS
APPENDIX
A-1
<table>
<thead>
<tr>
<th>Legal Tender Mine Geologic Hazards Characterization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open House Exhibit</td>
</tr>
</tbody>
</table>
Legal Tender Mine Location

Limits of Legal Tender Mine

- Mine deepens from west to east
- Depth ranging from 10 feet to 130 feet
- Rooms, pillars, drifts (tunnels)
Kleinfelder Study Areas

Legal Tender Mine – Geologic Hazard Characterization

Risk Ranking

Severity of Consequence

Probability

Risk Rating

The Ballroom
The Raceway
The Coliseum
The Fire Pit Room
The Ballroom
The Ballroom

The Fire Pit Room
The Fire Pit Room

The Coliseum
The Coliseum

Legal Tender Mine – Geologic Hazard Characterization

The Raceway
The Raceway
The Surface
Appendix C: Field Meeting #1

TOWN OF SILVER CITY PRESENTATION
NM ABANDONED MINE LAND PROGRAM
Plan and Design for the Safeguarding of Abandoned Mines on Boston Hill in Silver City, New Mexico
Community Field Design Meeting, August 6-10, 2013
Agenda

**Thursday, August 8**
- 8:30 AM  Introductions
- 8:45 - 9:30  Project Overview
  Design Orientation
- 9:30 - 10:00 Dr. Altenbach Boston Hill Bat Habitat presentation
- 10:00 - 11:30 Visit Legal Tender Complex
  Teams Plan/Design on site
- 11:30 - 1:00 Lunch
- 1:00 - 3:30 Teams Plan/Design on site
- 4:00 - 5:00 Regroup and discuss

**Friday, August 9**
- 8:30 - 11:30 Teams Plan/Design on site
- 11:30 - 1:00 Lunch
- 1:00 - 4:00 Teams Plan/Design on site
- 4:00 - 5:00 Regroup and discuss

**Saturday, August 10**
- 9:00- 11:30 Teams Plan/Design on site
- 11:30 - 1:00 Lunch
- 1:00- 3:00 Presentations of Results- Wrap up

What is AML?

The New Mexico Abandoned Mine Land (AML) Program

The New Mexico AML Program, part of the New Mexico Energy, Minerals, and Natural Resources Department, addresses the reclamation of abandoned mines throughout the state on both public and private property.

- AML is a federally-funded state program, formed through the passage of the Surface Mining Control and Reclamation Act (SMCRA).
- AML is funded through a tax on existing coal mined within a state. AML works on abandoned hard-rock mines (i.e. Boston Hill) when obvious hazards are apparent. AML has worked on Boston Hill in the past.
- AML program funding sunsets in 2021.

AML STAFF

John Kretzmann, PE, AML Program Manager
James Smith, AML Project Manager
AML Priorities

The AML program funding priorities:

- Priority 1: Protect public health, safety and property from immediate hazards resulting from historic mining practices.

- Priority 2: Protect the public from hazards that do not constitute immediate hazards.

- Priority 3: Restore lands and water degraded by historic mining practices. Restoration must facilitate the higher priority reclamation.

AML and Boston Hill

The Unique Nature of Boston Hill

- Characteristics of Boston Hill
  - Proximity to Silver City
  - Hard-rock mining
  - Wildlife habitat

- Boston Hill Land Ownership
  - Multiple landowners
  - Diverse stakeholder interests

AML’s unique funding and organizational capacity

- Funding Limitations
- Limited Program Operations and Maintenance for constructed facilities

(c) J. Scott Altenbach, Rat Conservation International
Preliminary AML Safeguarding Approach on Boston Hill

- Recognizes diverse landownership
- Integrates local knowledge and expertise into design
- Respects the legacy of mining
- No action option

Phase I - Assessment: Current Phase
Phase 2 - Plan
Phase 3 - Design
Phase 4 - Construction Assistance

Scope of Work
Current Task II Project Status

- Site Reconnaissance  
  - 80% done
- Public Meeting  
  - March 15, 2013
- Community Field Design Meeting  
  - August 8 – 10, 2013
  - Possible second meeting - TBD

Public Meeting Outcomes

Values - What to Keep in Mind
- The abandoned mine features are manmade and are now naturally eroding.
- Transition the apparent risk into the “experience of risk” without sacrificing the feeling of exploring the mines.
- Safety and curiosity need balance.
- City needs awareness of on-going responsibilities.
- Don’t miss out on this opportunity.

Opportunities - What Can We Do?
- Stabilizing the Legal Tender mine? Maintain natural look, keep natural and rough with rock work and native stone.
- Minimize engineered features.
- Legal tender safeguard = Town acquisition.
- Signage of potential hazards, safety and history at trailheads.
Goals of the Community Field Design Meeting

- Stakeholders, and landowners collaboratively design the safeguarding features that may be constructed on Boston Hill.
- The form is derived from participants and users, creating a space that is of the site.
- The AML program recognizes that Boston Hill is a community resource and that there are diverse opinions regarding the appropriate safeguarding measures that respect landowner prerogatives and reflect community sentiment.

Field Design meetings will integrate community input into design decisions without sacrificing landowner concerns.

Design-thinking big

- Envision Boston Hill as the center of Silver City and the town emanates outward. What patterns would develop?
- Imagine Boston Hill may when Silver City surrounds the 550 acres.
- What does Boston Hill represent to the Town of Silver City?
- Envision materials/details/forms that give a sense of place.
Approach

Site
**Design Process**

Logistics: Team members and AML staff will break into groups with attendees to plan and design at sites of concern.

**Planning task:**
- Identify safety concern(s). Measure extent of hazard(s). Draw it, take pictures of conditions. Take note of frequency of visitation (if possible). Proximity to trail, visible deterioration of wall(s), ceilings and stopes, etc...
- Identify prominent views.

**Design Task:**
- List possible solutions, list strengths and weaknesses of each potential solution, draw and discuss solutions and construction feasibility.
- Stake and string line or paint alignments of walls, gateways, columns, intersections of walls, possible paths
- Stake locations of views, prominent points, special overlooks
- Take pictures of staked alignments, bench locations. Note the locations on the maps. Note length, height

**Safety Focus**

- No entry into Legal Tender Mine, shafts or adits.
- Please sign the Waiver Form
- Please wear good shoes, sunscreen, and hat
Design Orientation

- **Approach - elements**
  - Entries/gateways
  - Drives/Parking and Paths
  - Grade/slope
  - Wayfinding/trail marking
  - Repose/Rest/seating
  - Glimpses-Views framed and unframed-discovery
  - Arrival

- **Site - elements**
  - Entries/ gateways
  - Defining space Walls/Columns
  - Boundaries
  - Paths and trails/sequence of spaces
  - Gathering/Centers
  - Repose/rest/seating
  - Views down into Silver city
  - Exit
Meeting Minutes

Project No.: 12-0089.001
Project: Safeguarding Boston Hill
Date: Wednesday, August 7, 2013
Place: Boston Hill, Silver City, NM
Attending: Dekker/Perich/Sabatini, AML
By: Lana Idriss, Ken Romig
Copies To: Parties Present
Issue Date:

Discussion Items:
1. Team Orientation Site Visit to the Legal Tender mine complex
   a. Overall Site Visit Notes:
      i. Looked at the feasibility of stabilizing
      ii. Portions of the complex for human entry
      iii. Safeguarding the mines for who? Partyimg teenager, caver/spelunker, visitors, residents who know
      the risk
   b. Looked at entrance and approach into the site.
      i. Currently there are no trash receptacles at entrance or places for people to sit.
      ii. There is a kiosk at the entrance of the trailhead and a water fountain
      iii. Signs along the trail leading to legal tender have been vandalized
      iv. Beautiful views leading up the hill, 8-10% slope, would be nice to have places to stop catch your
      breath and observe
   c. Legal Tender
      i. Fences are breached, signs are shot up
      ii. Overall discussions concerned levels of danger associated with access to the underground
      workings. Priority will be given to certain areas based on the proximity to trail access and level of
      danger associated with them.
   d. East Mine Entry and Fire Pit Room
      i. Discussed safety hazards of falling rock and loose debris over the entrance (collar) of the mine
      ii. Columns supporting the mine roof have spalling and cracking associated from compressive forces
      iii. Observed signs of old bat guano and one bat
      iv. Graffiti, Trash and frequent use was evident
   e. Coliseum
      i. The Coliseum is currently fox habitat
      ii. Steep slope with loose rock surrounding the collar of the coliseum

2. Safeguarding Abandoned Mines on Boston Hill | Silver City, NM
3. Must be protected from sun exposure
4. Off-gassing is negligible
   iv. Backfilling
      1. Process is the use of waste rock to fill mine openings or subsidence
   v. Bat Compatible Steel Enclosure
      1. 4x4 HSS filled with concrete and manganal steel bar
      2. Often have access gates for maintenance or bat research
      3. Non-structural
      4. Allows views to interior of mine workings
   vi. Buckhead Rock Wall
      1. Mortared native/waste rock wall
      2. Non structural
   vii. Geosynthetically Confined Soil
      1. Have bearing capacities and safety factors more than 10 times those of mechanically
      stabilized earth walls
      2. Facing options include natural vegetation, wire mesh, natural stone, concrete block, or
      sculpted shotcrete
      3. Even the lightest walls are designed to withstand loads over 20 tons per square foot

   g. Other possibilities to keep the experience of the mine
      i. Bridge
      ii. Steel steps, into workings
      iii. Overlooks
      iv. Entrance access to only a certain point
      v. Amphitheater to observe bats, study geology and vegetation

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is
received within 10 calendar days of issue.

End of Minutes
Meeting Minutes

Project #: 12-0089.001
Project: Safeguarding Boston Hill
State: Thursday August 8th, 2013
Place: Boston Hill, Silver City, NM
Attending: Dekker/PerICH/Sabatini, AML, Dr. Altenbach, One Community Member
By: Lana Idriss

Copies To: Parties Present
Issue Date: MM-2013-08-08.doc

Discussion Items:
1. Project Orientation/Design Overview
   a. What is AML? AML is a federally funded state program, formed through the passage of the Surface Mining Control and Reclamation Act (SMCRA)
   b. AML priorities are to protect the public health, safety and property from immediate hazards resulting from historic mine practices; protect the public from hazards that do not constitute immediate hazards; restore lands and water degraded by historic mining practices; restoration of hard rock mines such as Boston Hill must facilitate the higher priority reclamation.
   c. Uniqueness of Boston Hill, proximity to Silver City, Hard Rock Mining, Wildlife Habitat.
   d. Boston Hill has multiple landowners and diverse stakeholders.
   e. Values to keep in mind—The abandoned mine features are manmade and are now naturalized, transition and apparent risk into the “experience of risk” without sacrificing the feeling of exploring the mines. Design may balance, safety and curiosity.
   f. Opportunities—What can we do? Maintain natural look, keep natural and rough with rock work and native stone, and minimize engineered features. Provide signage of potential hazards, safety and history at trailheads.
   g. Goals of the Community Field Design Meeting: Stakeholders and landowners collaboratively design the safeguarding measures that respect landowner prerogatives and reflect community sentiment.

2. Dr. Altenbach Presentation
   a. Bats only have 1 baby per year
   b. Bats are most vulnerable when they are in hibernation, if disturbed by people or equipment, they will not have enough energy to survive through the spring.
   c. Bats cannot shift their migratory patterns due to human disturbance, which means they will have to find new places to hibernate and breed.
   d. Whispers can be extremely disruptive to bats because of their hearing.
   e. Never shine a light on a bat when it is in hibernation.
   f. Boston Hill has shown evidence that it once inhabited more bat habitat because of the old bat guano found on the mine floors. If you were to close up the interiors of the mine from human disturbance you would see an increase in the bat population almost immediately.
   g. The first fossils that we have of bats are still very similar to the bats we have today.
   h. Boston Hill has multiple landowners and diverse stakeholders.
   i. Values to keep in mind—The abandoned mine features are manmade and are now naturalized, transition and apparent risk into the “experience of risk” without sacrificing the feeling of exploring the mines. Design may balance, safety and curiosity.
   j. Opportunities—What can we do? Maintain natural look, keep natural and rough with rock work and native stone, and minimize engineered features. Provide signage of potential hazards, safety and history at trailheads.
   k. Goals of the Community Field Design Meeting: Stakeholders and landowners collaboratively design the safeguarding measures that respect landowner prerogatives and reflect community sentiment.

3. Site Visit (team) to the Legal Tender complex
   a. Stop 1 (East Mine Entry)
      i. Existing Conditions
         1. On BLM property
         2. Loose Rock at Entrance, Falling Debris and loose rock around collar
         3. Cracking columns
         4. Spalling of mine ceiling
         5. Graffiti
         6. Trash and spent fireworks
         7. As little as 6’ depth loose rock ceiling
      ii. Discussion
         1. Double cable netting – easy to vandalize
         2. Slotcrete or Gunite
         3. Backfill and put up a gate
         4. Fill depression in and create an amphitheater seating for bat observation
         5. Tours, transfer the property to the city with the university providing bat tours
         6. Establish paths on stable ground in areas not subject to collapse
         7. Create concrete sculptures that provide views in like the land artist Donald Judd
         8. (The Bedroom) The area next to where the east entry could be placed (under the bridge) you could provide cable netting to support the debris under the collar, but still allow people to enter in to a certain spot. We would need to evaluate where to stop the entry
      iii. Solutions
         1. Tire plug with bat compatible enclosure to the south
         2. Grade for observation platform

   b. Stop 2 (North Mine Entry and Side Entries into Raceway)
      i. Existing Conditions
         1. On BLM property
         2. Spalling/Cracking of ceiling
         3. Loose rock along the collar
         4. Clear off debris at top of overhang on bridge
      ii. Discussion
         1. Some of the openings could be tire plugged
         2. Drill into the supports and cave in it
         3. Could plug with a stone wall
         4. If you saved the view in, you would need to close the side views, and maintain a view light to a light shaft shining through.
         5. Create a bulkhead or wall and construct a view port through it with bars
         6. Create a steel mesh or backing with shotcrete to stabilize entrance
      iii. Solutions
         1. Tireplug some of the openings, but leave one that allows the light to shine in for views.
         2. Create a rock bulkhead wall with a rectangular steel frame opening with bars.
         3. Net it and only keep a shaft of light to the left.
         4. Glue rocks with polyurethane (inject post and anchor)
         5. View window could support keystone arch
         6. Build solid steel bars with structural tubing and concrete to provide a view in

   c. Stop 3 (Coliseum)
      i. Conditions
         1. On private property
         2. Steep significant pit
         3. High walls with loose rock
         4. Pit could be 40’ deep
      ii. Discussion
         1. Create a series of steel steps into the coliseum, close off works before entry.
         2. Suspension bridge, over chasm
         3. Cover the whole thing with cable netting to prevent people from sliding off the edge
         4. Build a stable foundation for a bridge and provide cable netting underneath it
         5. Close off the openings at the bottom and allow a catwalk down in there. (note loose rock rock around the collar makes this dangerous and difficult to do)
         6. Create a low wall around the area
         7. Could we have a bridge without netting?
         8. Mitigate people not the hazard by creating a wall with walkways viewing into the coliseum
         9. Improved trail system creates a barrier-in this option you would not net the feature
         10. Generations that are growing up need to be integrated into the site safeguarding process.
      iii. Solutions
         1. Mohammeda near the gate with bars
         2. Establish paths on stable ground in areas not subject to collapse
         3. Create concrete sculptures that provide views in like the land artist Donald Judd
         4. Take away mesh fencing and run metal wire through the existing poles, but still allow people to enter in to a certain spot. We would need to evaluate where to stop the entry

   d. Stop 4 (North Mine Entry and Raceway)
      i. Conditions
         1. On private property
         2. Steep significant pit
         3. High walls with loose rock
         4. Pit could be 40’ deep
      ii. Discussion
         1. Create a series of steel steps into the coliseum, close off works before entry.
         2. Suspension bridge, over chasm
         3. Cover the whole thing with cable netting to prevent people from sliding off the edge
         4. Build a stable foundation for a bridge and provide cable netting underneath it
         5. Close off the openings at the bottom and allow a catwalk down in there. (note loose rock rock around the collar makes this dangerous and difficult to do)
         6. Create a low wall around the area
         7. Could we have a bridge without netting?
         8. Mitigate people not the hazard by creating a wall with walkways viewing into the coliseum
         9. Improved trail system creates a barrier-in this option you would not net the feature
         10. Generations that are growing up need to be integrated into the site safeguarding process.
      iii. Solutions
         1. Mohammeda near the gate with bars
         2. Establish paths on stable ground in areas not subject to collapse
         3. Create concrete sculptures that provide views in like the land artist Donald Judd
         4. Take away mesh fencing and run metal wire through the existing poles, but still allow people to enter in to a certain spot. We would need to evaluate where to stop the entry

   e. Stop 5 (north Mine Entry and Raceway)
      i. Conditions
         1. On private property
         2. Steep significant pit
         3. High walls with loose rock
         4. Pit could be 40’ deep
      ii. Discussion
         1. Create a series of steel steps into the coliseum, close off works before entry.
         2. Suspension bridge, over chasm
         3. Cover the whole thing with cable netting to prevent people from sliding off the edge
         4. Build a stable foundation for a bridge and provide cable netting underneath it
         5. Close off the openings at the bottom and allow a catwalk down in there. (note loose rock rock around the collar makes this dangerous and difficult to do)
         6. Create a low wall around the area
         7. Could we have a bridge without netting?
         8. Mitigate people not the hazard by creating a wall with walkways viewing into the coliseum
         9. Improved trail system creates a barrier-in this option you would not net the feature
         10. Generations that are growing up need to be integrated into the site safeguarding process.
h. Stop 8 (Represents the Ceiling subject to Collapse)
   i. Conditions
      1. Thin ceiling over underground mine works could collapse under weight
      2. Lots of loose rugged rock along the edges
      3. Jagged stone edges
      4. Loose rock around edges
   ii. Discussion
      1. Low wall with warning signage
      2. Net the entire area
      3. Knock down rock spires in middle and collar to mitigate maintenance
      4. Netting may have vertical fencing to discourage bikes
      5. Great geology at collars
      6. Loose rock surrounding the collar
      7. Flat viewing platform at the edge
      8. Deep narrow pit (extremely dangerous)
      9. Large Trees of Heaven growing in the bottom
      10. Breached fence
   iii. Solution
      1. Net and take down the big stones
      2. Build a stable foundation for a bridge and provide cable netting underneath it. Bridge
         point
      3. Anchor nets further back
      4. Provide informational signage to give people an understanding of the site’s history (could
         include historical photographs)
      5. Ceiling collapses create deep shafts
      6. Lots of loose rugged rock along the edges
      7. High walls and rock fall potential
      8. Take mesh off the fence and run a wire cable through it to make it look nicer
      9. This shaft could become a part of phase 2 because it is off the main path
      10. This shaft has a slope of unknown horizontal distance.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is
received within 10 calendar days of issue.

End of Minutes
Meeting Minutes

Project No.: 12-0089.001
Project: Safeguarding Boston Hill
Date: Saturday, August 10th, 2013
Place: Boston Hill, Silver City, NM

Attending: Dekker/Perich/Sabatini, AML, Two Community Members
By: Lana Idriss
Copies To: Parties Present
Issue Date: 

Discussion Items:

1. Morning Orientation
   a. Ken Romig presented the current status of the project to several community members at the meeting.
   b. Presentation Outline:
      i. Abandoned Mine Land Program (AML) – its enacting legislation, purpose and mission
      ii. AML’s safeguarding process in complex sites such as Boston Hill
      iii. AML’s history on Boston Hill
      iv. Boston Hill’s unique traits and qualities
      v. Boston Hill’s planning and design team
      vi. Current status of the project
      vii. Assessment and Public Meetings outcomes
      viii. Field Design Meetings
      ix. Purpose
      x. Site Visits and current status of safeguarding solutions
      xi. Follow Up
      xii. Next meeting and future opportunities for community input

2. Morning Site Visit
   a. Stop #1 Mine Entry Near Fire Pit
      i. Discussion
         1. Close off one portion of the entry with tire plugs, and create an amphitheater/bat viewing area to the south of the Entry. The amphitheater could incorporate the existing large boulders. (Community requested to do as little disturbance as possible and to keep natural)
         2. A overhang view platform inside a portion of the cave was considered during this visit (just north of the entry) Discussion of allowing the public into this viewing area was considered. If this approach was taken we would need to stabilize and support the platform from underneath with either a tire plug or waste rock support
   b. Stop #2 Coliseum
      i. Discussion
      ii. The coliseum is on private property. A low wall with a trail system, and some viewing platforms around the coliseum may be the best solution. Warning signage would be placed around this area.
   c. Results- Wrap Up Meeting
      i. Several community members attended this meeting and were interested in incorporating a children’s art and science program into Boston Hill. They have several murals around town and were interested in working on educational signage about the mines, geology, and vegetation that exists on the site.
      ii. Another community member, Wendy Phillips, owns a property near the trail head of Boston Hill and was interested in displaying boards from the project on her property. She is very interested in having educational infrastructure on the mountain for tours, students, and families.

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Legend

- Friday 9th of August Site Visit Stops
- Saturday 10th of August Site Visit Stops
- Thursday 8th of August Site Visit Stops

Off Map to the East
## Attendance Record

<table>
<thead>
<tr>
<th>Name</th>
<th>Representing</th>
<th>Telephone</th>
<th>Fax</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew Lindlof</td>
<td>Gila Resources Inf. Program</td>
<td>(575) 538-8078</td>
<td></td>
<td><a href="mailto:andrew@gilaresources.info">andrew@gilaresources.info</a></td>
</tr>
<tr>
<td>Allyson Sink</td>
<td>Grip</td>
<td></td>
<td></td>
<td><a href="mailto:gial@gilaresources.info">gial@gilaresources.info</a></td>
</tr>
<tr>
<td>Teri Matchman</td>
<td>TOSL</td>
<td>534-6374</td>
<td></td>
<td><a href="mailto:tmatchman@me.com">tmatchman@me.com</a></td>
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<tr>
<td>Jim Coates</td>
<td>Citizen/Resident</td>
<td></td>
<td></td>
<td><a href="mailto:jcoates@me.com">jcoates@me.com</a></td>
</tr>
<tr>
<td>Frank Drysdale</td>
<td>Self</td>
<td></td>
<td></td>
<td><a href="mailto:fcdrysdale@yahoo.com">fcdrysdale@yahoo.com</a></td>
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<tr>
<td>Marty Eberhardt</td>
<td>SWNM Audubon</td>
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<tr>
<td>Peter Lewis</td>
<td>Structural</td>
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<td></td>
<td><a href="mailto:rlew@me.com">rlew@me.com</a></td>
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<tr>
<td>Patricia Taber</td>
<td>SWNM Audubon</td>
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<td>Nick Selbel</td>
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<td>Robert Southworth</td>
<td>MRTC Murals</td>
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<td>Zoe Wolfe</td>
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<td>Lee Gruber</td>
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<td>Nancy Cliff</td>
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<tr>
<td>Craig Freas</td>
<td>Self</td>
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</tr>
<tr>
<td>David Shah</td>
<td>Citizen/Resident</td>
<td>(207) 319-4081</td>
<td></td>
<td><a href="mailto:dshiah@comcast.net">dshiah@comcast.net</a></td>
</tr>
<tr>
<td>Wendy Phillips</td>
<td>Grip</td>
<td>(303) 579-6033</td>
<td></td>
<td><a href="mailto:wendancer@gmail.com">wendancer@gmail.com</a></td>
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### Memory AML

August 8 - 10, 2013

## Appendix D: Field Meeting #2

### Safeguarding Abandoned Mines on Boston Hill

**Community Field Design Meeting**

Public input sought for safeguarding abandoned mine features on Boston Hill. Please attend for some of all of the event, visit the site and give your feedback to the design team.

**When**

Saturday, October 5th Through Tuesday, October 8th

**Where**

Slisco Theatre
311 N Ballard St.
Silver City, NM

**Agenda**

- Overview, Orientation, and Site Visits
  - October 8th
- Site Visits, Planning, and Design
  - October 8th
- Site Visits, Design Description, and Dr. Altenbach Presentation
  - October 8th
- Wrap-Up

For more information contact Kan Reuning at 505-923-1358.
PRELIMINARY AGENDA

Project No.: 12-0089
Project: Field Design Meeting #2
Plan and Design for Safeguarding Abandoned Mines on Boston Hill
Venue: Silco Theatre
Date: 9/6/13

Note: The purpose of the Field Design Meeting is to discuss and design safeguarding measures on Boston Hill with stakeholders and significant discussions will happen on Boston Hill. The Silco Theatre venue is only a gathering and presentation space. Planning team member, Ken Romig, can be reached at (505) 259-4516 for residents to coordinate a place to meet up and discuss the project. This agenda is subject to change.

Saturday, October 5
8:30-8:45 Introductions
8:45 - 9:30 Project Status and Field Design Orientation
10:00 - 11:30 Teams Plan/Design on site
11:30 - 1:00 Lunch
1:00 - 3:30 Teams Plan/Design on site
4:00 - 5:00 Regroup and discussion

Sunday, October 6
AM No meeting
1:00 - 4:00 Teams Plan/Design on site
4:00 - 5:00 Regroup and discussion

Monday, October 7
9:00- 11:30 Teams Plan/Design on site
11:30 - 1:00 Lunch
1:00- 3:00 Teams Plan/Design on site
5:30-7:00 Public Presentation by Dr. Altenbach, Bat Specialist

Tuesday, October 8
9:00- 11:30 Teams Plan/Design on site
PM No meeting
6:00 Team Presentation to Silver City Town Council

END OF AGENDA
Hazards Associated with Boston Hill Mines
Open House Community Meeting, Silver City, New Mexico
March 21, 2013
Who is AML?

The New Mexico Abandoned Mine Land (AML) Program

The New Mexico AML Program, part of the New Mexico Energy, Minerals, and Natural Resources Department, addresses the reclamation of abandoned mines throughout the state on both public and private property.

- AML is a federally-funded state program, formed through the passage of the Surface Mining Control and Reclamation Act (SMCRA).

- AML is funded through a tax on existing coal mined within a state. AML works on abandoned hard-rock mines (i.e. Boston Hill) when obvious hazards are apparent. AML has worked on Boston Hill in the past.

- AML program funding sunsets in 2021.

AML STAFF

John Kretzmann, PE, AML Program Manager
James Smith, P.E., Project Manager
The AML program funding priorities:

- Priority 1: Protect public health, safety and property from immediate hazards resulting from historic mining practices.
- Priority 2: Protect the public from hazards that do not constitute immediate hazards.
- Priority 3: Restore lands and water degraded by historic mining practices. Restoration must facilitate the higher priority reclamation.

Current Project Status:

- Assessment Phase- 90% complete
- Plan Phase
  - Public Meeting: April 23, 2013
  - Field Design Meetings: August 7-10, 2013, September 5-8, 2013
- Design Phase
- Construction Administration Phase
Recreation Resources

Stakeholder Concerns

- The AML program recognizes that Boston Hill is a community resource and that there are diverse opinions regarding the appropriate safeguarding measures that respect landowner prerogatives and reflect community sentiment.

- Protect the environment.

- Both public and private landowners want safeguarding measures.

- Residents feel more comfortable on Boston Hill the more they visit.

- Indiscriminate trail development is diminishing the enjoyment of the Boston Hill Open Space.
Field Design Meeting #1

Possibilities and Opportunities
Possibilities and Opportunities

Goals for Safeguarding Measures

- A balanced approach must be struck between type of safeguarding improvement and respecting the sense of place
- Preserve a visitors sense of risk-taking when visiting Boston Hill
- Preserve the much-loved rugged landscape character of Boston Hill
- Preserve and protect the native plant and animal habitats
- Safeguarding improvements should consider all the risk-taking behaviors.
Management Challenges

- Open Spaces require civic and community resources including maintenance and operation budgets.
- Volunteer groups have managed to construct and maintain many trails, however, volunteers cannot address all the pressing issues nor maintain all the trails on Boston Hill.
- Boston Hill needs a more permanent solution to maintenance, management, and operations concerns

Mine Entry

Before

After
Long Trench

Before

After

Phase 3- Design
Phase 4- Construction Assistance

- Develop Schematic Design
  - Prepare designs, elevations and sections
  - Share design with stakeholders
  - Cost estimates
  - 3-D model the design
  - Coordinate design with experts in biology, engineers, archaeological resources

  Develop Construction Documents
  - Bid

- Monitor construction

- Review construction at substantial completion
Thank you

Questions

Shaft Risk Categories

Station #1 - Geologic Hazard Analysis

- Fall Hazard, Easy Egress (Easy walk out)
- Fall Hazard, No Egress (Requires Rescue)
- Fall Hazard, Difficult Egress (Difficult climb out)
- No Fall Hazard

Thank you
Station #1 - Geologic Hazard Analysis

**High Walls (Fall Risk)**
- Potential fall distance over 50 feet in many locations
- Rocks at crest may often be loose and undercut

**Rock Falls Near Paths from (Risk Above and Below):**
- Oversteepened Slopes
- Eroded Weak Rock
- Dipping Beds

**Pit Risks**
Safeguards in Place:

- Warning Signs
- Fences
- Cable Netting
Kleinfelder Study Areas – Legal Tender Mine

- The Coliseum
- The Raceway
- The Ballroom
- Mine Entrances
- Trail to Spring Street
- The Fire Pit Room

Qualitative Risk Assessment

- Hazard Category
- Potential rock fall
Qualitative Risk Assessment

Hazard Category

✓ Falling from height

✓ Collapse of chamber/entrainment

Legal Tender Mine – Geologic Hazard Characterization

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33
**Qualitative Risk Assessment**

**Hazard Category**

Additional hazard categories:

- Trips/slips
- Disorientation
- Air quality

---

**What is risk?**

Risk = (probability of occurrence) × (severity of consequence)

**Severity**

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<td>Injury requiring EMS or search and rescue response. Hospitalization or emergency treatment.</td>
<td>Critical debilitating injury or fatality.</td>
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**Risk Matrix**

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<td>Description</td>
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<td>Event may or may not occur</td>
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**Risk Ranking Value System**

- *Increasing*
  - Risk Ranking Value System
  - Potential Severity of Harm
    - Low
    - Moderate
    - High
  - Probability
    - Very Probable (1)
    - Probable (2)
    - Least Probable (3)
### Risk Matrix – The Ballroom

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### Risk Matrix – The Fire Pit Room

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<td>Trips/slips</td>
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Legal Tender Mine – Geologic Hazard Characterization

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## Risk Matrix – The Coliseum

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<td>3</td>
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<td>Low</td>
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### Risk Matrix

<table>
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<tr>
<th>Probability of harm occurring</th>
<th>Potential Severity of Harm</th>
<th>Very Likely</th>
<th>Likely</th>
<th>Possibly</th>
<th>Unlikely</th>
</tr>
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<tr>
<td>Very Probable (1)</td>
<td>Low (1)</td>
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<td></td>
<td></td>
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<tr>
<td>Probable (2)</td>
<td>Moderate (2)</td>
<td></td>
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<tr>
<td>Least Probable (3)</td>
<td>High (3)</td>
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</table>
Meeting Minutes

Project No.: 12-0089.002
Project: Safeguarding Boston Hill
Date: Saturday, October 5, 2013
Place: Boston Hill, Silver City, NM

Attending: Dekker/Perich/Sabatini, AML; Golder, Silver City citizens.
By: Noah Shumate, Ken Romig

Copies To: Project Team
Issue Date: 11/15/2013

Discussion Items:
1. Team Orientation
   a. Saturday’s meeting began with orientation for any interested citizens who wished to join the site visits scheduled from October 5-8. Orientation consisted of a brief slide presentation lead by Ken Romig to introduce the team, discuss the Boston Hill Site, the need for safeguarding the abandoned mine areas, and options for safeguarding.
   b. Orientation questions/discussion items:
      i. The no-action option was also presented, meaning that if citizen input determined that no safeguarding measures were wanted, the Abandoned Mine Lands (AML) would not pursue any measures at the sites.
      ii. Citizen question: Can the Town do this work without public input/support?
      iii. Answer: Yes, but the focus has been public outreach throughout the project. The Legal Tender mine site is top priority. Also, the Town doesn’t want to take ownership/maintenance of the land unless safeguarding measures are planned and/or in place.
      iv. Citizen comment: Whatever design is done, address all concerns of landowners, the Town, and citizens.
      v. Design/construction timing: there will be a pause between design and construction. There will be a need for a NEPA environmental assessment if funded federally.
      vi. Citizen question: what funding is being provided for this project?
      vii. Answer: the AML, which has funding flexibility considering the project conditions.
      viii. Citizen comment: look into grant opportunities such as those provided by Freeport McMoran.
         i. This had been looked into earlier, and FM does not want to be involved at this time due to liability concerns.
      ix. Citizen comment: consider the potential for “too much funding,” especially if these sites are not used often.
      x. Team comment: we want to get more people involved and discuss the value of safeguarding measures. Some citizens may resent the measures, but we need continued outreach.
      xi. Team comment: it may be possible to take advantage of researching grant opportunities during the environmental assessment phase between design and construction.
   c. The project team along with citizens in attendance then reconvened at the Spring Street trailhead of Boston Hill to visit the Legal Tender mine.
2. Site Visit Notes at Key Points – Legal Tender
   a. Saturday’s site visit followed the map points very closely. The only exception was a discussion of point number 11 (the “Moon gate” or “Hidden Garden”) alongside Number 1 (the “Amphitheater” and “Ballroom”).
   b. Number 1: Number 1 will require some fill/closing of the underground workings entry as well as raising grade in key areas. At bat gate will be installed also. Ken Romig marked the points for the bat gate location with yellow spray paint.
      i. Area of rock column fracturing was also observed which will require reinforcement and possibly shotcrete coating.
      ii. Blue tape was used to mark the approximate location of raised grade for a “ballroom balcony.” Amphitheater seating would be placed to the north of the large Juniper located in the area. The seating would be large boulders available in the area.
      iii. The possibility of allowing human entry into the “ballroom” underground workings was discussed, but would depend on Owner approval and understanding of liability as well as allowing entry only when bats are not hibernating.
Meeting Minutes

Project No.: 12-0089.002
Project: Safeguarding Boston Hill
Date: Sunday, October 6, 2013
Place: Boston Hill, Silver City, NM

Attending: Dekker/Perich/Sabatini, AML, Golder, one Silver City citizen.
By: Noah Shumate, Ken Romig

Copies To: Project Team
Issue Date: 11/15/2013

Discussion Items:
1. Team Orientation
   a. Sunday’s meeting required no orientation since no new citizen members were present.

2. Site Visit Notes at Key Points – Legal Tender
   a. Sunday’s site visit continued where Saturday left off.
   b. Point Number 7 was divided into two points, ‘A’ and ‘B’.
   c. Number 8: Named the ‘Rain Garden’.
   d. Number 9: This area was divided into two points, ‘A’ and ‘B’.
   e. Number 10: The competency of rock was questioned for anchoring cable netting overall and two points (‘A’ and ‘B’) were also identified.
   g. Number 6: Much discussion at this location. Tentatively named the “Coliseum”. Possible options include any of the following, or a combination thereof:
      i. Cutting the existing fence posts to 4’ and installing new chain link mesh and/or wildlife fencing (if wildlife fence is used, use cable strands not thin wire).
      ii. Creating “anti-bike” openings in fencing and strategic rock/wall placement to deter bicyclists in some dangerous areas.
      iii. Other bike deterrents: flagging or rock yard/boulders in key areas, or providing a specific circuit for bikes outside the mine workings area.
      iv. Using low rock walls instead of chain link wire fences.
      v. The need to “fence out” pedestrians.
      vi. Keeping the current fence since it deters vehicles/bikes, but gets breached. The barbed wire should be removed.
      vii. Use different alignments of wall/fence depending on their function (edge of pit vs. perimeter of underground workings, etc.).
      viii. Safety vs. an inviting feature (do fences/walls invite challenge for bicyclists?).
      ix. Approach the Town for artists to design and build unique fences/walls.
      x. The need for any fencing at all (why have it?).
   1. It prevents bicyclists from getting a fast run into mine areas or riding over cable nets.
   2. It is safer for bikers.

3. The GCS and low seat wall solutions need to be integrated along the perimeter of area 7.

4. Further discussion of Number 12, fencing.
   i. Is fencing a necessity for the entire area perimeter (Numbers 1 – 11)?
   ii. Partial boundary fencing may be useful, such as along the south and east edges.

5. Numbers 3, 5, and 6: trails and boundaries need to be discussed and investigated further.
   i. Matrix of options for area Number 6:
      i. At the re-grouping session at the Silco Theater, Ken and Noah presented a matrix of design options for area Number 6, the “Coliseum”, based on team discussions from the Oct. 7 site visit (see below for example).
### Meeting Minutes

**Project No.:** 12-0089.002  
**Project:** Safeguarding Boston Hill  
**Date:** Monday, October 7, 2013  
**Place:** Boston Hill, Silver City, NM

**Attending:** Dekker/Perich/Sabatini, AML, Golder.  
**By:** Noah Shumate, Ken Romig

**Copies To:** Project Team  
**Issue Date:** 11/15/2013

#### Discussion Items:

1. **Team Orientation**
   a. Monday’s meeting required no orientation since no new citizen members were present.

2. **Site Visit Notes at Key Points – Legal Tender**
   a. Monday’s site visit was largely focused on staking wall locations per Sunday’s discussions.  
   b. Number 11: Rock wall alignment from ‘Moon gate’ to area Number 5 was staked and measured in GIS.  
   c. Number 3 & 6: Rock wall alignment was staked and measured in GIS.  
   d. Number 5, areas between 3 & 1:  
      i. Two features between these areas will be cable netted.  
   e. Number 6, 7, & 8:  
      i. Trail alignment to circular gathering area was staked and measured in GIS.  
   f. Trail alignments (general):  
      i. Alignment from area Number 10 to Long Trench Bridge was staked and measured in GIS.  
      ii. Alignment from south to Bridge was staked and measured in GIS.  
   g. Fencing:  
      i. Measurements in GIS were made of the extent of existing fencing to be kept.  
      ii. Existing fence posts will be kept but cut to 4’ height, and new chain link fabric will be installed.  
      iii. The remainder of fence will be removed.  
   h. **The concept and utility of boulder/rock yards or rocky mounds was discussed.**  
   i. They may discourage bicycling through the safeguard areas, but may be too labor intensive to install/move from other areas of the site.  
   j. Further discussion of this safeguarding measure is needed.  
   k. Lastly, the team outlined a trail alignment from area Number 3 (‘Ballroom’) to the potential overlook location at area Number 6.

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_This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue._

**End of Minutes**
Discussion Items:

1. Team Orientation
   a. Tuesday’s meeting required no orientation since no new citizen members were present.

2. Site Visit Notes at Key Points – Legal Tender East
   a. Number 1: Cable netting should be provided over this area.
   b. Number 2: Total closure via foam and/or toroid method.
   c. Number 3: Wall and netting will be required.
   d. Fencing: total removal.

3. Site Visit Notes at Key Points – the ‘Basement’
   a. Number 1: shaft
      i. Need confirmation if bat/owl habitat.
      ii. Number 1.A., north: total closure
      iii. Number 1.B., south: puff/foam with culvert.
   b. Number 2: the complex
      i. Number 2.A., vertical puff/foam enclosed.
      ii. Number 2.B., toroid enclosed.
      iii. Number 2.C., toroid enclosed.
   c. Number 3: shaft and tunnels
      i. The team observed bats inside the shaft area.
      ii. Install bat cupola and rock bulkhead at tunnel.
   d. Number 4: shaft
      i. Grated enclosure at seating height.
   e. Number 5: backfill subsiding adit located north, just outside the fenced area.

4. Site Visit Notes at Key Points – ‘Cenote Seco’
   a. Create an overlook with steel guardrails.
   b. Rock wall will be required around the entire feature. Location of a potential wall was staked and measured with GIS.
   c. Fencing: total removal.

5. Site Visit Notes at Key Points – the Shafts/tunnels off Cooper & Spring Street trailheads
   a. Shaft 15: 10’x21’ and 11’ deep.
      i. The shaft should be backfilled with 7’ of material.
   b. Shaft 09
      i. Plug and backfill with granular fill.
      i. Cut trees in shaft and fill.
   d. Shaft 11: 8’x13’, 10’ deep.
      i. Cut trees in shaft and fill.
   e. Shaft 12: 19’ deep.
      i. Needs to be cleaned out and checked for bat habitat before determining a solution.
   f. Tunnel A:
      i. Should be cable netted and bat compatible.

6. Site Visit Notes at Key Points – the Shafts to the south of Boston Hill
      i. Wear and tear on existing cable netting.
      ii. Check for habitat, cover with finer cable mesh.
   b. Shaft 02: 31’x30’ (measured for cable netting), 21’ deep.
      i. Cover with cable netting.
   c. Shaft 03: 8’x10.5’, 7’ deep.
      i. Backfill 3’.
      ii. Shaft 07: 31’x15’ (measured for cable netting) 24’ deep (2’ of water in bottom).
      i. Owl habitat is likely.
      ii. Cover with cable netting.
   d. Shaft 04: 21’x16’ (measured for cable netting) 20’ deep
      i. Owl habitat is likely.
      ii. Cover with cable netting.

7. General notes:
   a. Cable nets come in 10.5’ widths and overlap a minimum of 6”. Measurements for shaft openings to receive cable nets (above) have factored for these dimensions.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.
Hazards Associated with Boston Hill Mines

Open House Community Meeting, Silver City, New Mexico  March 21, 2013
Appendix E: xx
<table>
<thead>
<tr>
<th>Shaft ID</th>
<th>Shaft Type</th>
<th>Coordinate</th>
<th>Longitude (WGS84)</th>
<th>Latitude (WGS84)</th>
<th>Height (ft)</th>
<th>Width (ft)</th>
<th>Preferred Safeguarding method</th>
<th>Shaft Egress Elevation (ft)</th>
<th>Shaft Egress Location</th>
<th>Shaft Egress Comments</th>
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<tbody>
<tr>
<td>Shaft 01</td>
<td>Adit</td>
<td>The Ballroom</td>
<td>32.7673375</td>
<td>-108.2856637</td>
<td>30</td>
<td>60</td>
<td>None</td>
<td>66.2</td>
<td>BLM</td>
<td>Yes, frequent daily entry, signage on fencing</td>
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<tr>
<td>Shaft 02</td>
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<td>None</td>
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<td>Yes, frequent daily entry, signage on fencing</td>
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<td>Adit</td>
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<td>-108.2856637</td>
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<td>None</td>
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<td>BLM</td>
<td>Yes, frequent daily entry, signage on fencing</td>
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<tr>
<td>Shaft 04</td>
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<td>None</td>
<td>66.2</td>
<td>BLM</td>
<td>Yes, frequent daily entry, signage on fencing</td>
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**Safeguarding Abandoned Mines on Boston Hill | Silver City, NM**

**Subsistence Models**

- Shaft 01: Adit/Tunnel, The Ballroom
- Shaft 02: Adit/Tunnel, The Ballroom
- Shaft 03: Adit/Tunnel, The Ballroom
- Shaft 04: Adit/Tunnel, The Ballroom
- Shaft 05: Adit/Tunnel, The Ballroom

**Preferences for Safeguarding Methods**

- Shaft 01: Adit/Tunnel, The Ballroom
- Shaft 02: Adit/Tunnel, The Ballroom
- Shaft 03: Adit/Tunnel, The Ballroom
- Shaft 04: Adit/Tunnel, The Ballroom
- Shaft 05: Adit/Tunnel, The Ballroom

**Preferred Safeguarding Method**

- Shaft 01: Adit/Tunnel, The Ballroom
- Shaft 02: Adit/Tunnel, The Ballroom
- Shaft 03: Adit/Tunnel, The Ballroom
- Shaft 04: Adit/Tunnel, The Ballroom
- Shaft 05: Adit/Tunnel, The Ballroom

**Safeguarding Abandoned Mines on Boston Hill | Silver City, NM**

**Preferred Safeguarding Method**

- Shaft 01: Adit/Tunnel, The Ballroom
- Shaft 02: Adit/Tunnel, The Ballroom
- Shaft 03: Adit/Tunnel, The Ballroom
- Shaft 04: Adit/Tunnel, The Ballroom
- Shaft 05: Adit/Tunnel, The Ballroom

**Preferred Safeguarding Method**

- Shaft 01: Adit/Tunnel, The Ballroom
- Shaft 02: Adit/Tunnel, The Ballroom
- Shaft 03: Adit/Tunnel, The Ballroom
- Shaft 04: Adit/Tunnel, The Ballroom
- Shaft 05: Adit/Tunnel, The Ballroom

**Preferred Safeguarding Method**

- Shaft 01: Adit/Tunnel, The Ballroom
- Shaft 02: Adit/Tunnel, The Ballroom
- Shaft 03: Adit/Tunnel, The Ballroom
- Shaft 04: Adit/Tunnel, The Ballroom
- Shaft 05: Adit/Tunnel, The Ballroom