

***Mountaintop Mine Restoration: Land Ethics and Sustainability in
the Mining Landscape***

A Thesis

Submitted to the

Faculty of Miami University

In partial fulfillment of

Master of Architecture

Department of Architecture and Interior Design

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2019

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Abstract

The topic of this paper concerns the Appalachian region and their approach to land reuse after mining operations conclude. The primary location under specific investigation includes the coal fields of West Virginia, a state with a rich coal mining heritage. West Virginia is a leader in coal production for the United States, but with renewable power sources and clean energy on the rise, the state's economy has suffered decline. This then leads to the following questions: How can mountaintop removal restoration in West Virginia be possible after years of decimation? Can a restoration plan provide an alternative regional identity that also reflects the regional history, and how can the local community become a stakeholder and benefit from the restoration process? The central part of West Virginia is the primary mined using mountaintop removal method, and Lost Creek is the landscape focus to consider a reuse of land decimated by generations of mining. The research examines and evaluates the effectiveness of similar recent case studies conducted in other countries such as the Lusatia region in Germany. In addition, the following methodologies are conducted: discussion with mining operations and reclamation companies in order to better understand the current mining processes, exploring the Lost Creek site through observational strategies and interviewing individuals living within these mining communities. This research leads to an architectural intervention that can serve as an educational opportunity for land reuse within the state of West Virginia. The envisioned proposed design will help aid in the community discussion about a new community identity inclusive of economic opportunities for these diminishing communities. The goal is to allow these communities to flourish and be rebuilt.

Introduction

The Appalachian region is home to many mining operations and mining methods for extracting coal from the earth. The problem arises once the mining process is complete and many mining areas are left inadequately restored thus creating a desolate landscape.

These forgotten mining areas create a dynamic place for architects to design and get involved by restoring the landscape and/or develop the site to advance relations to the local community. Restoration in the heart of the state of West Virginia, among the Appalachian Region can allow for strong mining heritage to be maintained, encourage economic growth, expand community connection and allow others to come together to celebrate and acknowledge West Virginia's mining history throughout restoration efforts.

According to Merriam-Webster Dictionary, restoration can be defined as; "a representation or reconstruction of the original form," while, reuse is defined; "to use again especially in a different way or after reclaiming or reprocessing."¹ Both restoring and reusing mining land is the focus of this paper therefore, through careful examination of current and past mine restoration projects worldwide, including; Germany's Lake District, Allmannajuvet zinc mine in Sauda, Norway, Virginia Mining Corporation, Leveling Appalachia and other research on West Virginia's restoration efforts. Understanding mountaintop removal and conducting interviews from those in the communities and mining companies are also important to better understand current and past mining projects. This information is being utilized to best comprehend practices to better the proposition of a mining reuse and restoration project in Lost Creek.

Methodology

Through the examination and evaluation of the effectiveness of similar precedence studies experiencing similar factors, can a viable solution be devised? A plan is then set to carry out the research process. Interviews with local mining companies and ask a series of questions to gain an improved understanding of current mining methods and restoration processes to better analyze what procedures can be improved upon. Finally, interviews conduct interviews with several local individuals near Lost Creek W.V. to better understand and illustrate local perceptions regarding mining culture and the effects that mining has on their lifestyle. Questions regarding need-based design and heritage will be incorporated to gain a deeper

¹ Merriam-Webster

understanding of the areas design needs, so that the design is community based and reflects the area. How do you feel about the mountain top removal process? If these sites where to be repurposed, what do you believe could be built that would benefit the community? Do you believe that educating individuals about the states mining heritage is important or are these practices better forgotten? Do you have any personal connections to the land or to the mining industry?

To best understand the possibilities for West Virginia, case studies of similar conditions can globally offer the opportunity to consider the effect of reclamation strategies and implementation. Directly relating to this topic is the idea of mine reuse and therefore the following case studies will be explored throughout; Germany's Lake District, Allmannajuvet zinc mine in Sauda, Norway, Virginia Mining Corporation, Leveling Appalachia and other research on West Virginia's restoration efforts. These projects predominantly center on the reuse of mining land as well as create an improved approach to land reuse and allow these areas to educate and provide economy for the local communities. These case studies are primarily located outside of the United States due to their more advanced progressiveness efforts regarding mining reuse that the United States has not yet attained.

Understanding Mountain Top Removal

Mountaintop removal coal mining is an extremely destructive form of mining that is devastating to Appalachia. Over the past few decades, over 2,000 miles of streams and headwaters that once provided drinking water for millions of Americans have been permanently buried or destroyed. An area roughly the size of the state of Delaware has been decimated.² Local coal field communities routinely face devastating floods and adverse health effects because of this process. Natural habitats among West Virginia and some of America's oldest forests are forever changed due to mountain top removal coal mining. The process of mountain top removal begins with the deforestation of the site prior to mining operations. As a result, the lumber is either

sold for commercial use or burned. Once the area is cleared, miners use explosives to blast away the mountain to expose the coal seams beneath. The debris is then relocated by various methods to areas of the site previously mined. If the topography of the site isn't adequate to handle the amount of spoil produced from the excavation process then debris is dumped into nearby valleys, creating what is known as a valley fill. The ecosystem of this valley is drastically changed as it is buried by the large amounts of debris. An excavator then removes the coal, and where it is then transported to a processing plant. Once coal removal is complete, the site is re-graded and covered in topsoil which will allow for natural vegetation to regrow. Lastly, grass seed mixture is spread and fertilized, and depending on surface land and owners wishes further action can be taken regarding land use, such as adding trees to restore wildlife habitat, creation of pasture, or developmental endeavors.

West Virginia Mining Culture

To better understand the culture and the individuals that inhabit West Virginia a cultural documentary titled; "Leveling Appalachia," conducted by Yale University in 2009 covered the mining practices primarily conducted in West Virginia. This video sheds light on the lives of the individuals living and working in the region by conducting interviews and receiving personal statements. The documentary displays an insightful viewpoint showing individuals perspectives while also reflecting their feelings and experiences with the local mining. Several prominent individuals such as, Senator Joe Mansion and White House energy cabinet members voiced their opinions on mining practices and what is being done with the land after the resources are extracted. Based on these highly instated individuals' personal statements the current mining practice is deemed to not be a harmful practice to the environment but is an economical factor. On the contrary, many of the local community members in certain areas believe that the mining operation held precedence over the local's way of living. Local individuals state that many people left the area due to mining operations and the

² Leveling Appalachia

constant sound of machinery and blasting, while others said that the landscape that they originally loved was being sold to the highest bidder for financial gain rather than for the common good. The option for many is then left debating between leaving the area due to mining environment or to stay and adapt to their new surroundings. The majority of the individuals living in these mining areas are often poor and unable to escape or compete with mining operations for land use, thus making these individuals feel forgotten.

Experts in "Leveling Appalachia" state that 500-600 feet of mountains were removed either from the top or in a bench method.³ This leaves tremendous amounts of soil to be relocated as well as create a scar on the landscapes that without help will always be evident. Current restoration policies only require minimal restoration efforts to be made, thus leaving the area worse than the original condition. Under the current regulations, water runoff must be contained or treated before returning to the stream system. As for the land species of natural vegetation they are replanted to avoid erosion. These species primarily include types of grasses and undergrowth species that can thrive in less than ideal conditions. Trees and shrubs are often not planted due to cost but are expected to grow naturally in these reclaimed spaces, which often do not occur.⁴ Officials and residents believe that these sites need to be better restored to allow for wildlife and renewable resources to regenerate or to plan developmental efforts bringing more economic stability to the region. These sites possess great opportunity to create something from these barren sites that would invigorate the local economy and provide a scenic and historic experience for individuals to enjoy.

Allmannajuvet Zinc Mine

The Allmannajuvet zinc mine located in Sauda, Norway was originally a large mining operation which began in 1881 and closed in 1899. The mine was abandoned due to a changing market and the expense of extraction. At the mine's peak it contained 160 employees and was a major contributor to the Norway zinc export.⁵ Allmannajuvet is

a ravine or canyon located along the river Storelva. The ravine is located in a rural, forested area along the Norwegian County Road 520. (See figure 1)

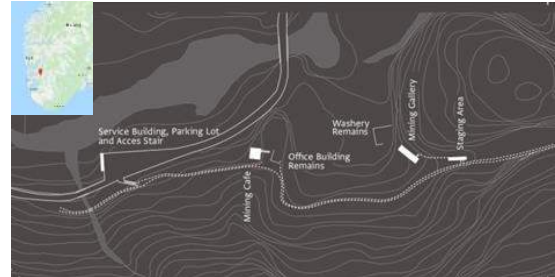


Figure 1: Map of Allmannajuvet zinc mine; "Allmannajuvet Zinc Mine Museum / Peter Zumthor."

The Allmannajuvet zinc mine is one of 18 attractions along the Norwegian National Tourist Routes which travel through the country's unique natural landscape. In 2002, the Norwegian Public Roads Administration commissioned Peter Zumthor to design a tourist route facility which provides a welcoming atmosphere and provide an educational experience bringing Sauda's mining history back to life.⁶ Zumthor's structures were inspired by the mining operation and meant to reflect the experiences of the workers' strenuous everyday lives. Allmannajuvet installations consist of; a museum building, café, restroom and parking facilities. These structures are connected by the original paths and stairs used during the mine's operation. The main construction materials consist of 18 mm plywood sheets and jute burlap, coated with a German acrylic material (PMMA). The majorities of the structures are supported using thin stilts or embedded directly into the rocky surroundings. These suspended structures modestly fit into the harsh surroundings as well as promote vernacular building traditions which the project aims to memorialize. (See figure 2)

³ Leveling Appalachia

⁴ Reclamation in Mining

⁵ Peter Zumthor

⁶ Peter Zumthor



Figure 2: Views of the Allmannajuvet zinc mine; "Allmannajuvet Zinc Mine Museum / Peter Zumthor."

The interior of each structure is painted dark to reference the dark mining conditions as well as provide an interesting gallery space that highlights the historical mining equipment due to the sharp contrast in color. Allmannajuvet is a successful installation because innovative art and architecture allows individuals to immerse in an experience that is thought-provoking.

Lignite Mine

The Lignite Mine restoration of Lusatia in Germany serves as a historical case study of how the land can be reused. Germany's Lake District located southeast of Berlin was once a Lignite mining region known for environmental destruction and pollution is now a tourist attraction. (See figure 3) Lignite mining in this region began in 1844, along with factories that prospered from its production.

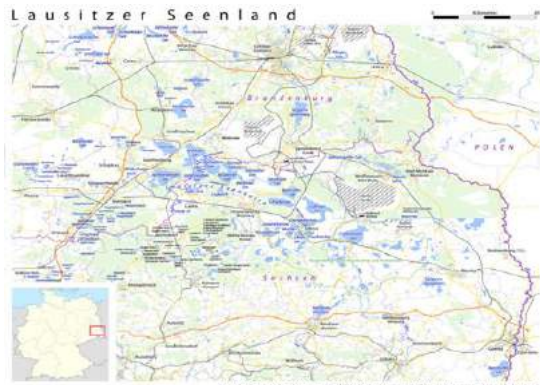


Figure 3: Map of Germany's Lake District located southeast of Berlin that was once a Lignite mining region; Pritzen, Peter Mellgard.

The German government pursued a mining policy that resulted in the nationalization of mining, and thus ensuing environmental destruction and pollution of the air, ground, and water on a massive scale. This decision to expand the mines was rationalized by its ability to create thousands of new jobs. At its peak in 1975, Germany was the world's largest coal producer employing roughly 140,000 people.⁷ Not only was the environment effected but also multitudes of villages were demolished in the 1980s to make room for an expanding mine. 136 small and medium towns have been swallowed up by the mines, their residents resettled or evicted. 25,000 people have lost their homes over the years.⁸ Furthermore, in 1992 a decision was made to close the mine in Lusatia. (See figure 4)



Figure 4: The Lignite Mine at its final days of operation; Pritzen, Peter Mellgard

Once the mines where closed the debate began on what to do with the deep, open pits; how can the German government repair the environment? Then to reinvent an entire region that was economically dependent on mining, and a job that created a sense of pride. In 1994, the government set up the Lausitz and Middle Germany Mining Administrative Company, or LMBV to rehabilitate all the former state-owned mining areas by floods the old mines and turning them into lakes. The flooding of the old mine began in 1998. The agency was then tasked to treat and clean water polluted by mining, replant forests, sustain wildlife, and to use remaining land for renewable power resource such as solar panels and wind turbines, and encourages agriculture. Today this approach to land reuse has proven to be effective by recreating an economic system

⁷ Peter Mellgard

⁸ Peter Mellgard

for the region and restoring the population that previously existed. To date the LMBV has created 24 artificial lakes in this part of Lusatia and is now Europe's largest artificial lake area.⁹ However, with these advancements; some residents dislike the changes due to their pride of their past. Another group that was beneficial to the restoration effort was the IBA who came to Lusatia in 2000 and help the region, by celebrate the mining history and at the same time create a nice and interesting area. Projects included marinas, beaches boating opportunities, (See figure 5) a former power plant restored for art exhibits, and towers where tourists can observe the former mines.



Figure 5: Lusatia marina and beach area that was repurposed after the closing of the mines; Pritzen, Peter Mellgard.

The rehabilitation process has had problems over the years due to remnants of pollution that will take years to heal. For example, parts of the Spree River in eastern Germany has turned rust-orange, from residual mine waste. There are also fears that the polluted water could spread to other river systems and disrupt the ecosystem. Today individuals believe that the tourist industry will provide a stable local economy. With the new lakes springs amenities such as hotels, campgrounds, restaurants, and guided tours displaying the regions industrial heritage, such as the factory, and an 11,000-ton conveyor bridge in nearby town. The coal mining industry may have scarred this land, but its legacy is driving the region into a new future.

Hawks Nest

On a much smaller scale, mine restoration involving the Hawks Nest mine in Buchanan, Virginia is another case study being examined. The Virginia Department of Mines, Minerals and Energy (DMME) believe that the conservation efforts being performed today go above and beyond the scope of work previously accepted decades before. The major concerns the DMME has in the restoration efforts included water quality, which contain; runoff, soil composition for farmable and structural purposes, and additionally the use; for further development or to be replanted to achieve its former status.¹⁰ The DMME evaluated the community's needs and made provisions to best suit their needs while also restoring the environment.

The site at Hawks Nest has now been developed into a centralized sports facility for the community to enjoy, where previously land availability was an issue. The facility now includes a track, baseball and softball fields, playground, horse stables and ridding arena. Aside from creating a functional space for individuals to enjoy the site also boosts a restored stream with flourishing native species due to water quality efforts taking place. The state of Virginia plans to use this site to serve as an example for future restoration projects. The department has made steps that allow for better communication to occur so that they can plan to make certain sites usable based on individuals needs or to restore the land back to its original status. With such a proactive and extensive approach to mine reclamation the local communities as well as the environment benefit from the efforts made from the DMME.



Figure 6: DMME efforts at Hawks Nest mine in Buchanan

⁹ Peter Mellgard

¹⁰ Reclamation in Mining

Discussion of Findings

Based on the research conducted and evaluation of previous case studies several factors seem to reoccur and form a pattern. Although each case study was vastly different in many regards such as; location, scale, time and effectiveness, each was dealt with in a similar manner. One factor that reoccurred was the focus on creating a secondary source of revenue from the local economy that can fill the void of mining. In the case studies involving the Allmannajuvet zinc mine in Norway and German Lake District mines, both restructured their unique surroundings to accommodate a tourist attraction into the region. The tourist industry allows the regions to sustain themselves and promote growth to an otherwise diminishing region. Both places are also able to provide educational experiences for individuals visiting the region by informing them of the historical heritage and the importance of the mining operations once held. The educational aspect of these studies are effective due to the ability to reuse existing materials and conditions remaining from the mining operation period or by creating an interactive and interesting environments, by allowing individuals to learn and explore thus enhancing their overall experience among the land.

Both mine restoration efforts are able to provide a better understanding of the design approaches that other countries have made to use a blighted landscape and evolve it into something beneficial to the local economy as well as reflect the local heritage of a region. The mining region in Germany is the most beneficial in terms of understanding the sociological effects that an occupation has on a region. The region in Germany resembles the proposed design site of Lost Creek among the Appalachian hills. This region has

undergone similar economical paths and needs a way to reinvent the areas identity, while also respecting the rich mining heritage of the Appalachian region.

In all the mine restoration projects specific focus on the community and interactions occurred. The mine restoration that specifically accommodated the needs of the community was the Hawks Nest mining site. This site created a centralized recreational facility for the community to enjoy, thus providing a public experience that promoted health and human interactions. This need was directly related to the towns need for modern facilities and a lack of developable land.

Glimpses of the social and sociological aspects involved within each restoration of mined landscape are also a reoccurring theme. In each case study there is a strong mining identity associated with the region. For each reuse situation the mining heritage is incorporated into the design to bridge the historical importance into the new design. This is a viable option that can allow individuals to retain their heritage, while also providing them with an alternative that they can claim as their own and take additional pride in.

Conclusion

Throughout the research, understanding and the researcher's personal connection to the Appalachian region of West Virginia the design aims to further choose a proposed site and obtain connections with those involved with mining operations. This will then allow for further progress in the projects process and bring about additional information to better the project with the utilization of all the proposed methods of data collection and examination.

Interview Questions

1. How has mountain top mining affected your lifestyle?
2. How do you feel about the mountain top removal process?
3. If these sites were to be repurposed, what do you believe could be built that would benefit the community?
4. Do you believe that educating individuals about the states mining heritage is important or are these practices better forgotten?
5. Do you have any personal connections to the land or to the mining industry?

Sources

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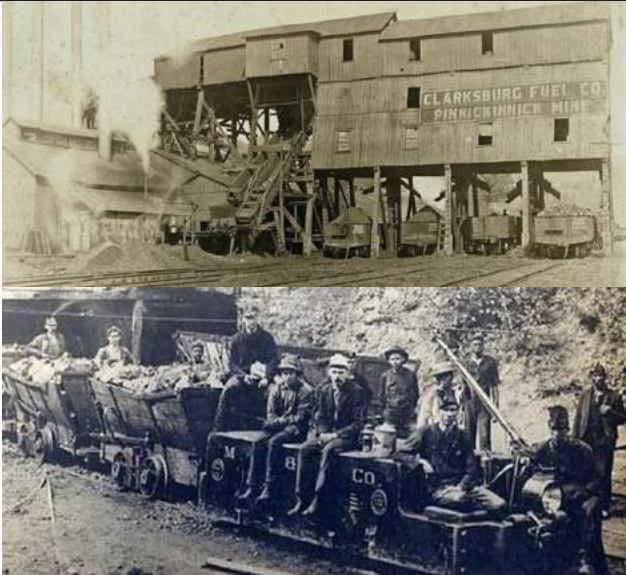
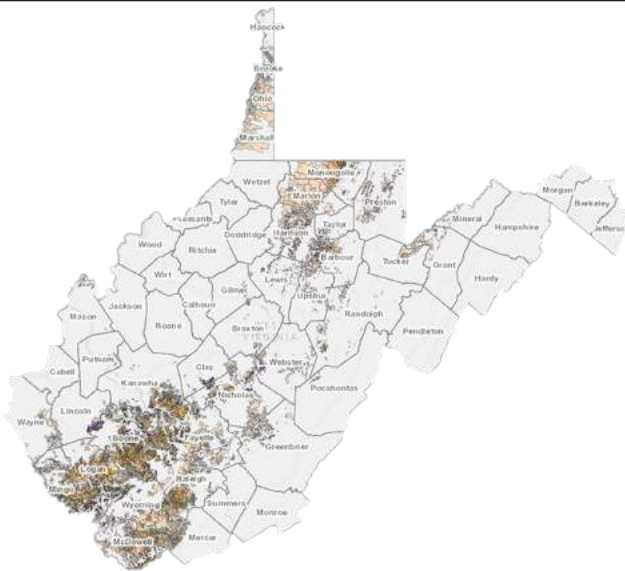
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Mine Restoration In West Virginia

Mining West Virginia

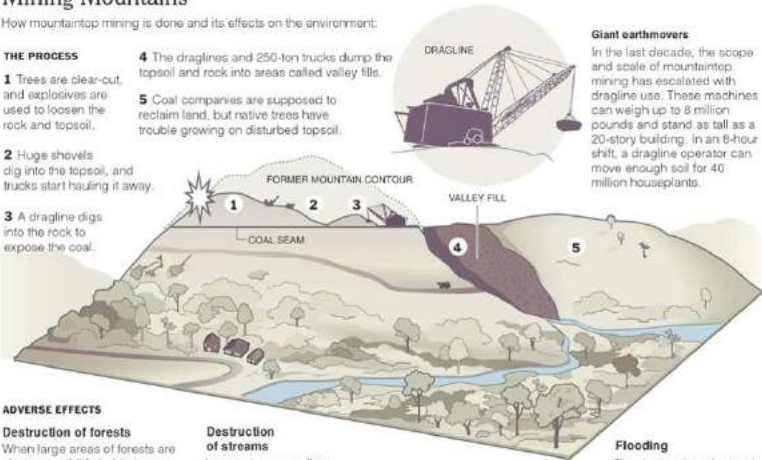


Mining Mountains

How mountaintop mining is done and its effects on the environment:

THE PROCESS

- 1 Trees are clear-cut, and explosives are used to loosen the rock and topsoil.
- 2 Huge shovels dig into the topsoil, and trucks start hauling it away.
- 3 A dragline digs into the rock to expose the coal.
- 4 The draglines and 250-ton trucks dump the topsoil and rock into areas called valley fills.
- 5 Coal companies are supposed to reclaim land, but native trees have trouble growing on disturbed topsoil.



ADVERSE EFFECTS

Destruction of forests

When large areas of forests are clear-cut, wildlife habitats are destroyed. Wildlife and plantlife become more vulnerable to predatorial species.

Destruction of streams

In recent years, valley fills have buried or damaged 1,200 miles of streams.

Blasting

Explosions can cause damage to home foundations and wells.



















Giant earthmovers

In the last decade, the scope and scale of mountaintop mining has escalated with dragline use. These machines can weigh up to 8 million pounds and stand as tall as a 20-story building. In an 8-hour shift, a dragline operator can move enough soil for 40 million houseplants.



Sources: Arch Coal Inc., West Virginia Department of Environmental Protection, Ohio Valley Environmental Coalition, Natural Resources Defense Council

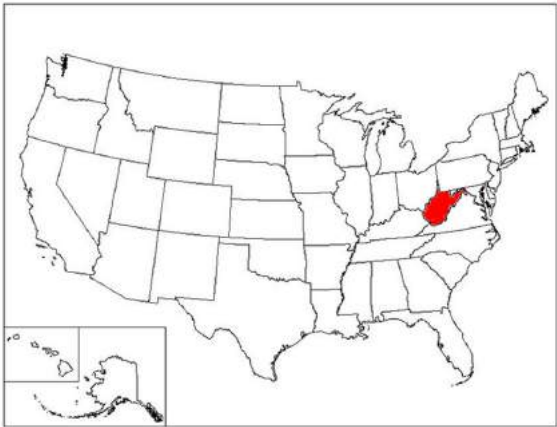
Alisa Nazzari/The New York Times

COAL ASH POLLUTANT	HEALTH IMPACTS					
<div>As</div> <div>74.92159</div> <div>ARSENIC</div>	INGESTION		INHALATION	ABSORPTION		
	 nervous system damage	 cardiovascular issues	 urinary tract cancers	 lung cancer	 skin cancer	
<div>Hg</div> <div>200.59</div> <div>MERCURY</div>	EXPOSURE					
	POSES PARTICULAR RISK TO CHILDREN, INFANTS, AND FETUSES		 nervous system damage	 developmental defects like reduced IQ and mental retardation		
<div>Pb</div> <div>207.2</div> <div>LEAD</div>	EXPOSURE					
	THERE IS NO SAFE LEVEL OF LEAD EXPOSURE, PARTICULARLY FOR CHILDREN					
	 brain swelling	 kidney disease	 cardiovascular problems	 nervous system damage	 death	
<div>Cr</div> <div>51.996</div> <div>CHROMIUM</div>	INGESTION			FREQUENT INHALATION		
	 stomach ulcers	 intestinal ulcers	 stomach cancer	 anemia	 asthma	 wheezing

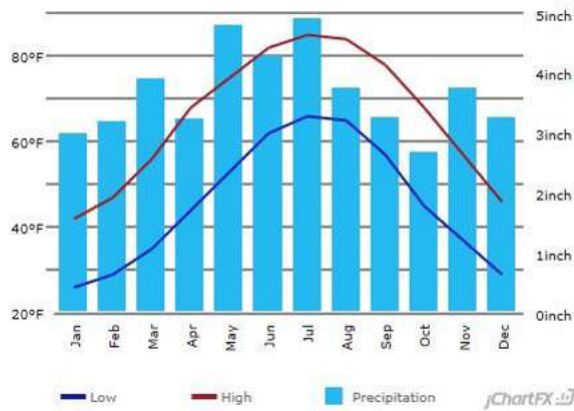


Site Analysis

Charleston, West Virginia



Charleston Climate Graph - West Virginia Climate Chart

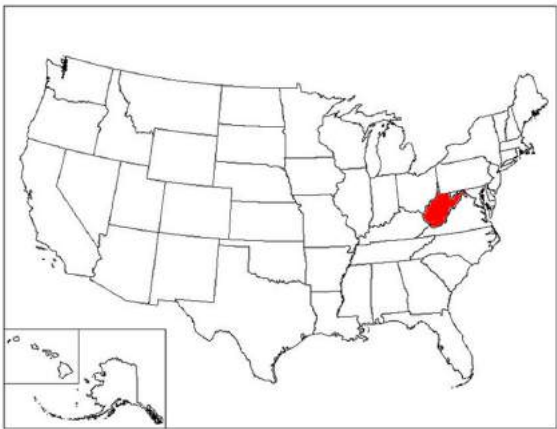


Charleston weather averages

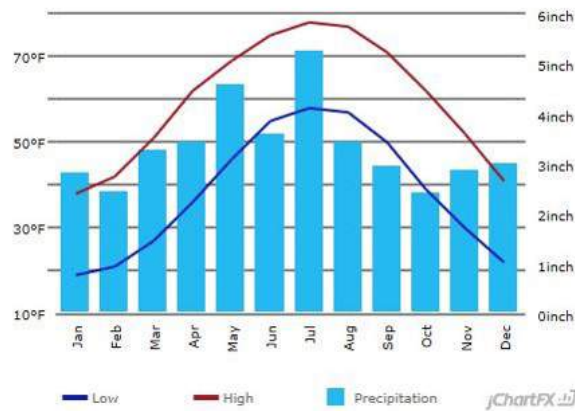
Annual high temperature:	65.7°F
Annual low temperature:	45.7°F
Average temperature:	55.7°F
Average annual precipitation - rainfall:	44.02 inch
Days per year with precipitation - rainfall:	-
Annual hours of sunshine:	-
Av. annual snowfall:	36 inch



Bud, West Virginia

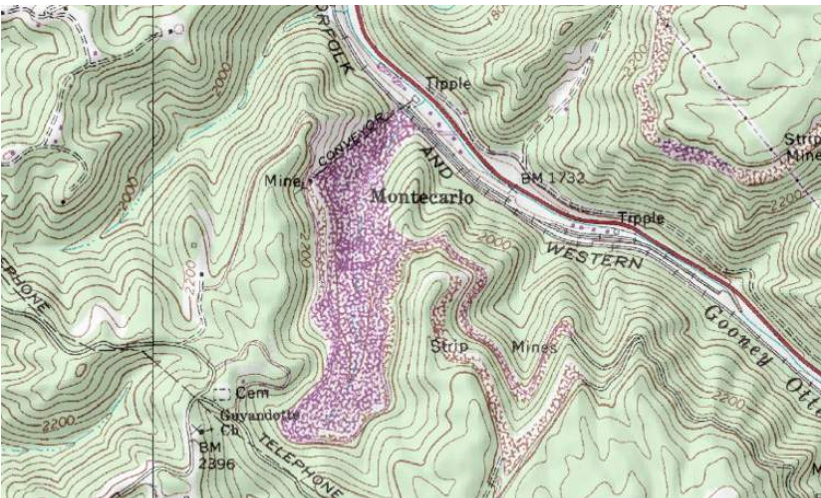


Beckley Climate Graph - West Virginia Climate Chart

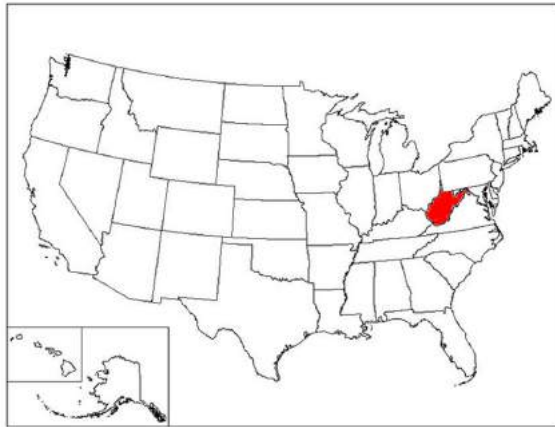


Beckley weather averages

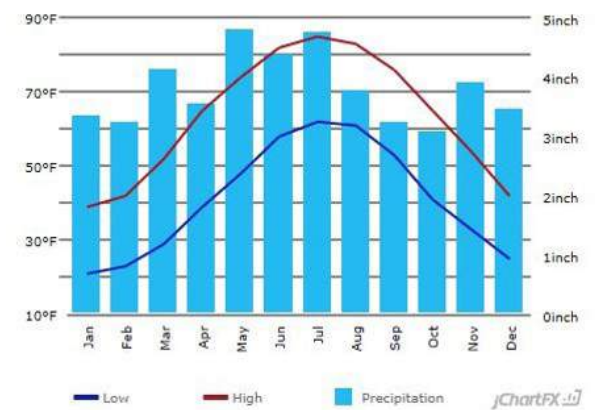
Annual high temperature:	59.8°F
Annual low temperature:	38.3°F
Average temperature:	49.05°F
Average annual precipitation - rainfall:	39.97 inch
Days per year with precipitation - rainfall:	-
Annual hours of sunshine:	-
Av. annual snowfall:	48 inch



Lost Creek, West Virginia

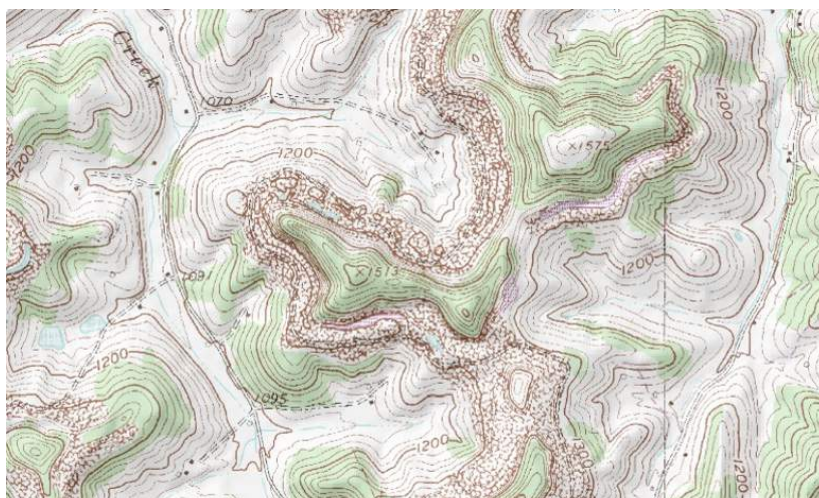


Clarksburg Climate Graph - West Virginia Climate Chart



Clarksburg weather averages

Annual high temperature:	63.3°F
Annual low temperature:	41.1°F
Average temperature:	52.2°F
Average annual precipitation - rainfall:	45.62 inch
Days per year with precipitation - rainfall:	-
Annual hours of sunshine:	-
Av. annual snowfall:	25 inch



Site Interviews

Interview Questions & Responses

1. How do you feel about the mountain top removal process?
2. If these sites where to be repurposed, what do you believe could be built that would benefit the community?
3. Do you believe that educating individuals about the states mining heritage is important or are these practices better forgotten?
4. Do you have any personal connections to the land or to the mining industry?



Single Male, Age 41

1. I think that it's destructive but it provides people with jobs, and it what's the states is known for.
2. I would want the land to become a nature center for people to enjoy the landscape and its wildlife. I love the outdoors and would love to have a place to teach other about my passion.
3. I believe that it's important for individuals to understand the states heritage as well as learn from its mistakes.
4. The only connection I have to the land is my family farm we're I raise cattle and tend the land. I plant a garden, hunt and my family fishes in the farm pond behind the house.



Single male, Age 32

1. I feel like it's an abomination on the landscape and the process should be outlawed or better controlled.
2. I would like to see them be restored as close as possible and maybe have small nature trails for individuals to walk and experience nature.
3. I believe that individuals would be wise to understand the past but be ashamed of the destruction that some take pride in.
4. The land is a living thing and needs to be treated as such and not just destroyed for capital gain.



Single Female, Age 23

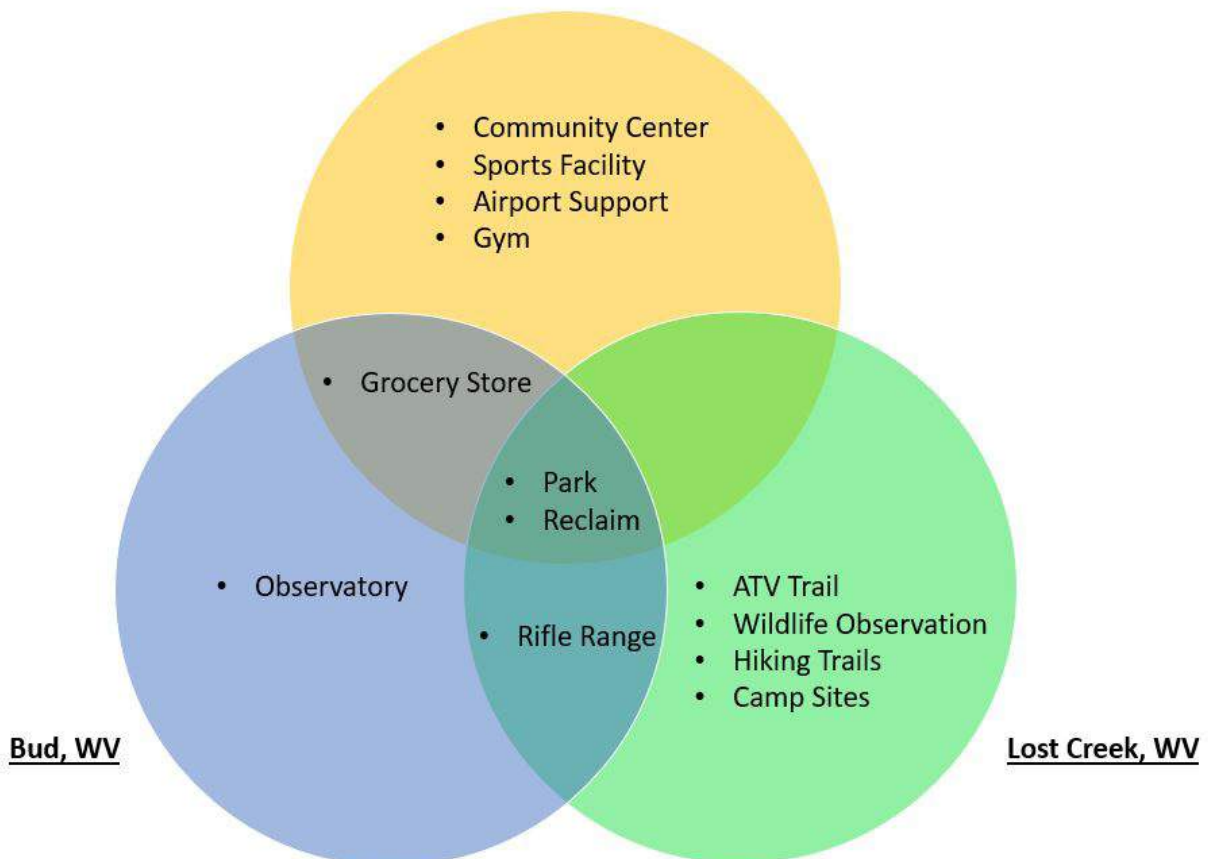
1. I'm not extremely sure about the whole thing but I'd assume that they remove the mountain.
2. I would like to see a dog park or a shelter be built where people can go have cookouts and relax. I believe that if something like this was built out of the way, instead of the sorry excuse of a park in town then I would much rather go there.
3. I think that it should be forgotten if people are destroying the land, I don't want to be associated with this kind of practice.
4. No



Couple Male / Female, Age 58 / 53

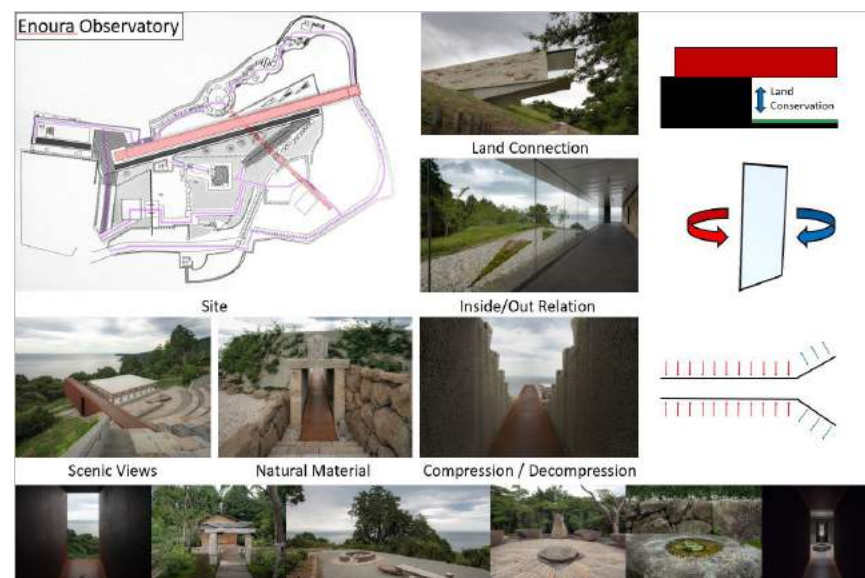
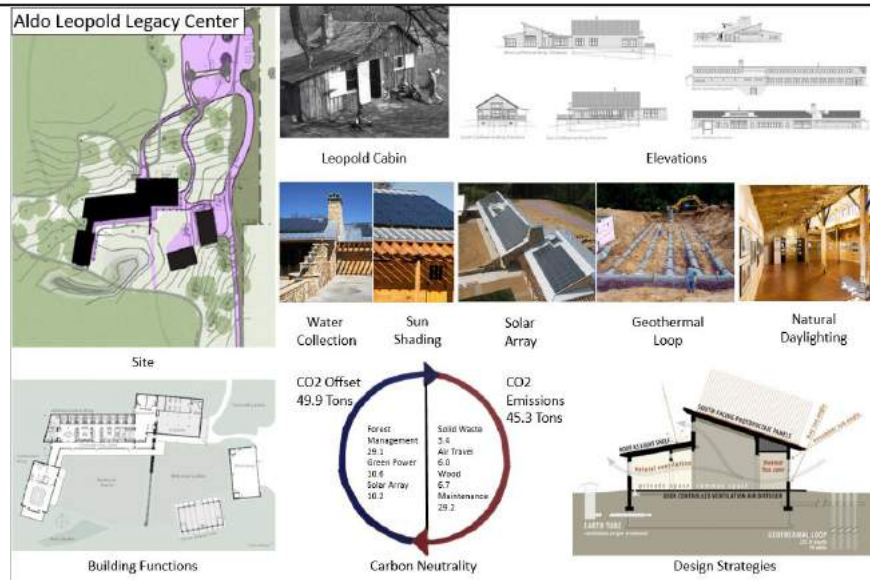
1. I feel like it has taken from the beauty of the area by destroying the icon the state is known for. I believe it's a brutal way of obtaining the coal from the land when other methods are less intrusive.
2. I think that these areas would be perfect for a rifle range for people to go shoot for fun or even hold competitions. It's sucks that I can only shoot handguns at the local ranges. I think a good rifle range would draw people in.
3. I believe that they should have an understanding of what happened. I think it's a good thing to educate individuals about the states history. West Virginia history was one of my favorite classes growing up, but that's because I'm into history.

Charleston, WV



Case Studies

Case Studies

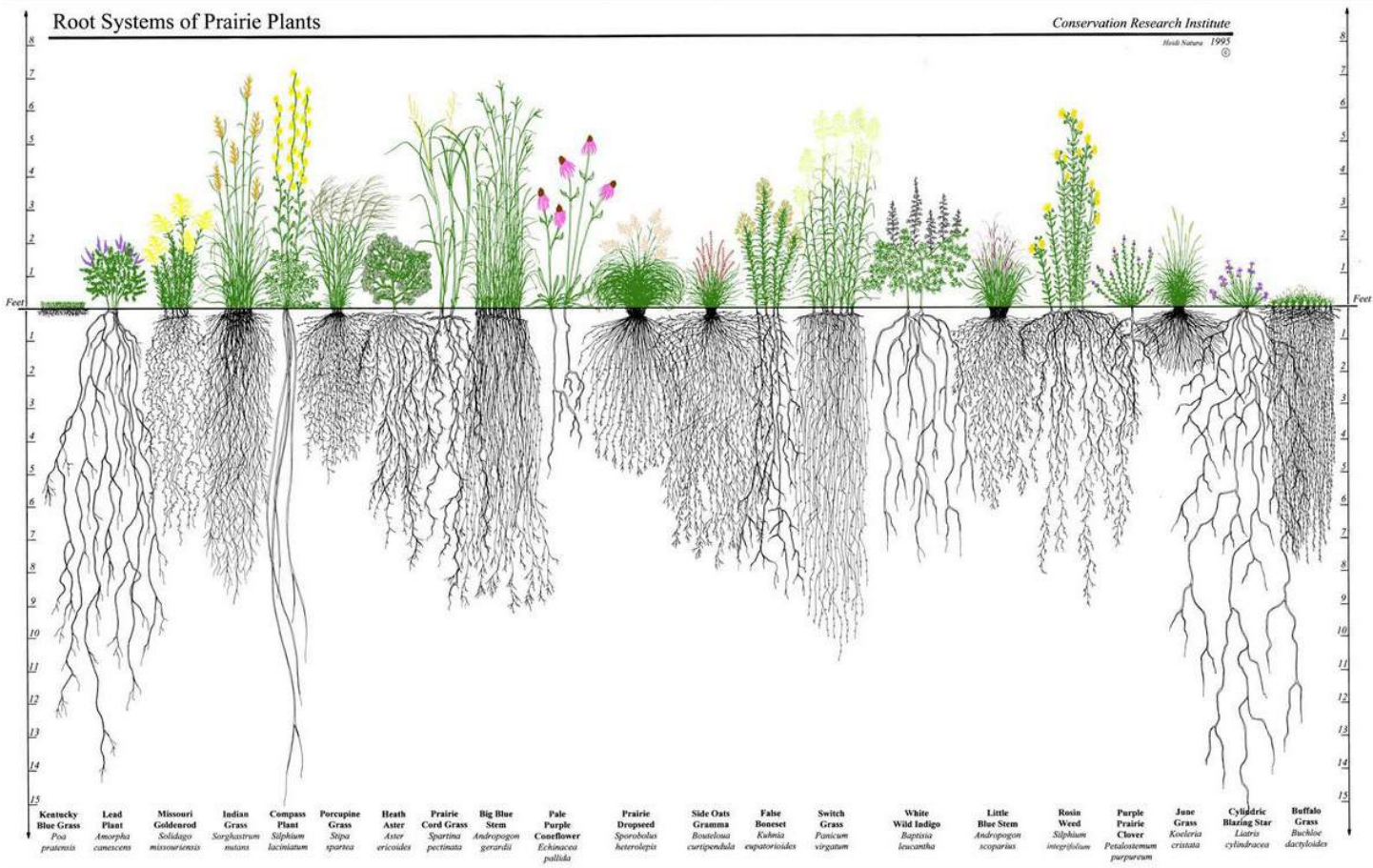
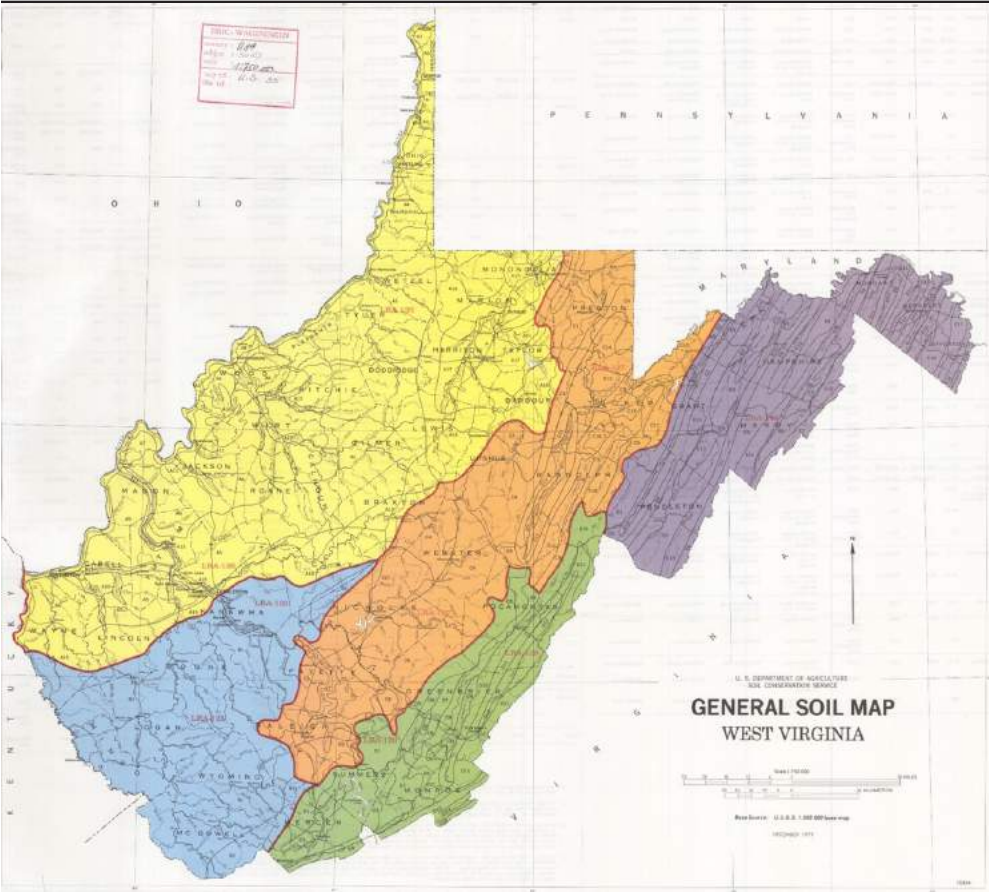


Regenerative Design

Lost Creek Time Progression



Soil Composition



Site Zones



ZONE I – Barren Landscape

The visual remnants of the mining operations exposed debris embankments and barren land clearings required extensive soil management, and native vegetation restoration. This strategy proved successful in restoring native plant communities and strengthening wildlife habitat. The vision is to allow these zones to vegetate naturally and maintain the health of the soil. In regions where natural vegetation does not occur these scared zones will serve as a reminder of the indoctrinations process.



Zone II – Lake / Shoreline

With the growth of natural aquatic vegetation the lake becomes a suitable refuge for birds and wildlife, and the vegetation provides a multitude of services including water filtration, and erosion and sedimentation control. This natural and intricate water reuse system is instrumental in balancing ground and surface water to create aquatic stability and enhancing the health and biological diversity of the lake.



ZONE III – Wetlands

The management of the wetland is possible through use of diverse vegetation that provide a suitable ecosystem for specific species on the site. The seclusion of the wetland allow wildlife to utilize the resource and allow the sites wildlife carry capacity to expand. The wetland will also utilize a water treatment and testing process to educate individuals as well as provide a stable ecosystem.



ZONE IV – Meadow

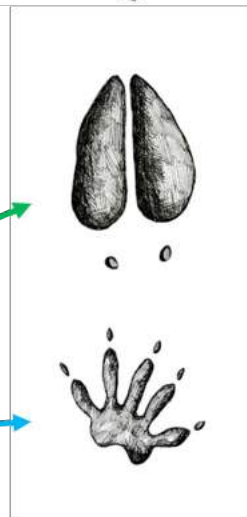
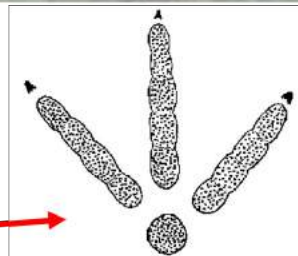
The management of the meadow region is home to seasonally-changing native grass and wildflowers. This native growth provides biological diversity and help sustain the wildlife and bird populations in this regional well as provide crucial erosion prevention.



ZONE V – Forest

The forested region is unique as it was not harvested during the mining process. The forested area is comprised of multiple species that are mature and provide a suitable habitat for wildlife. The forested area provides partial shading for site as well as the benefits of providing oxygen and better air quality. These mature species promote the reseedling of the site using traditional methods of planting.

Site Zones



Before / After



Before / After

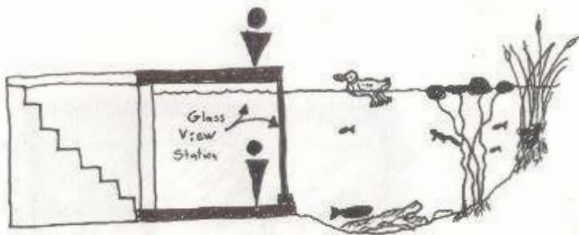
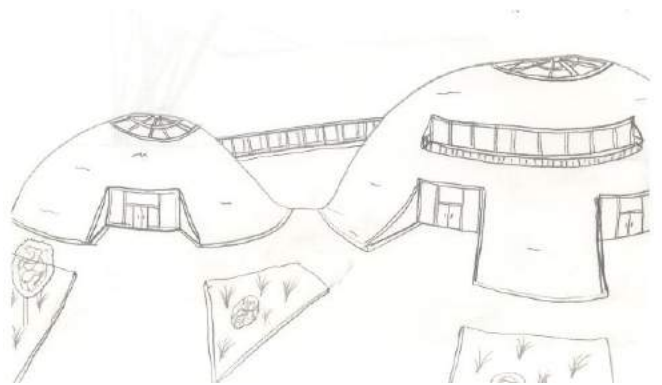
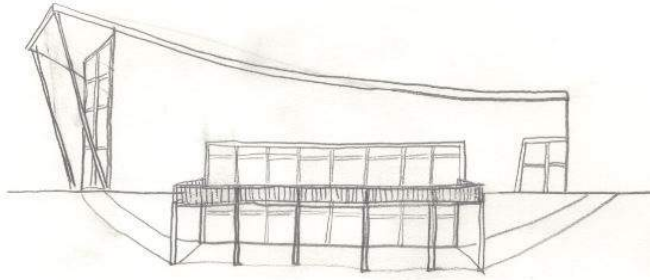


-  Permeable Pavers
-  Geothermal
-  Solar Array
-  Forest Management
-  Wind Turbine
-  Biodiversity

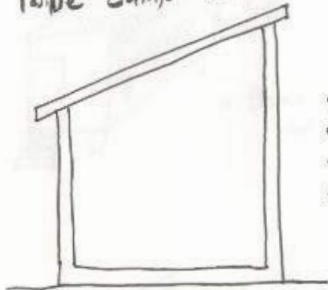


Concept Sketches & Final Design

Concept Sketches



Possible camp locations



Trail Support
Quality

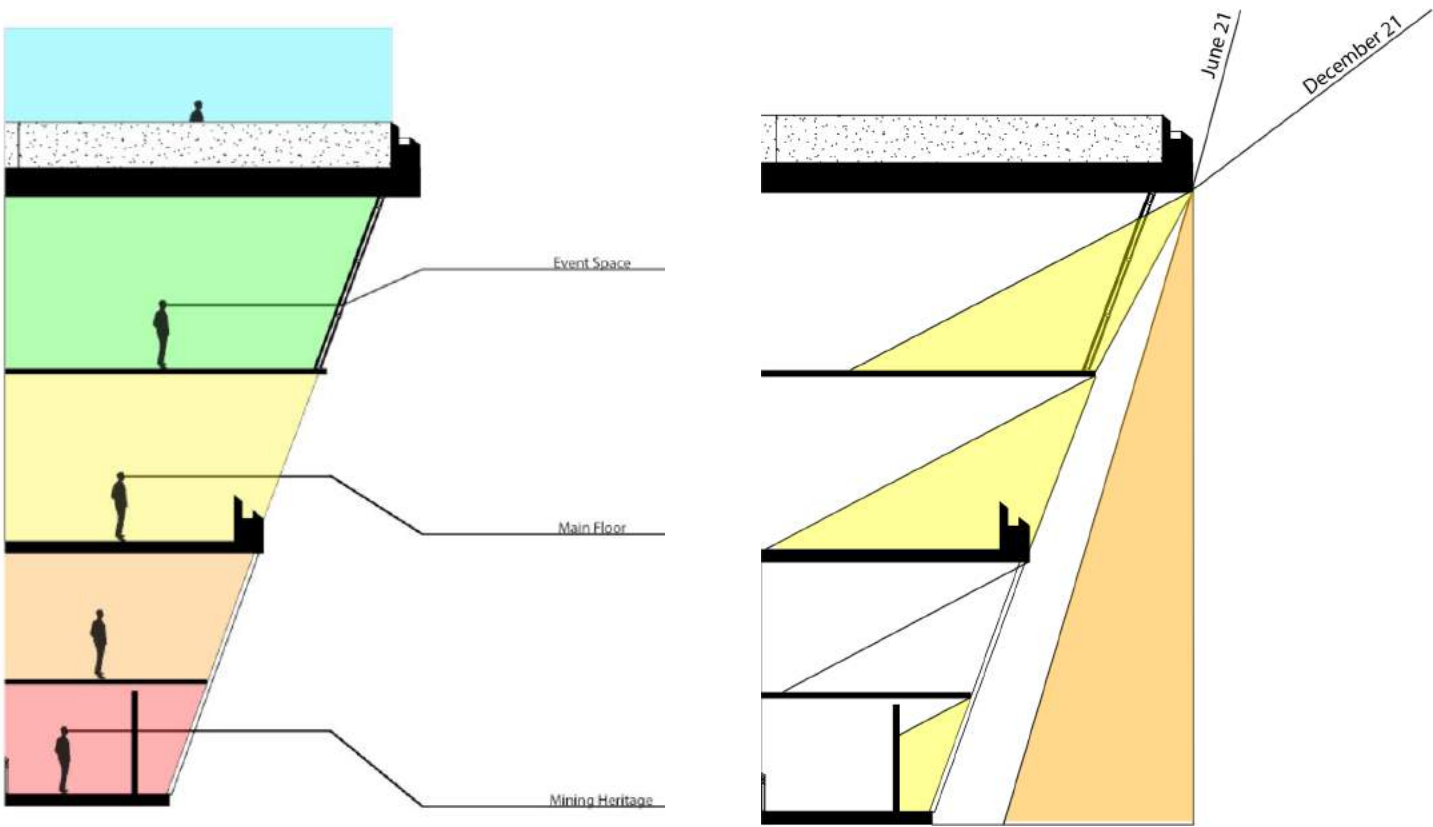
- Restrooms
- Handicap transportation
- Small concession stand
- Shuttle Turn about



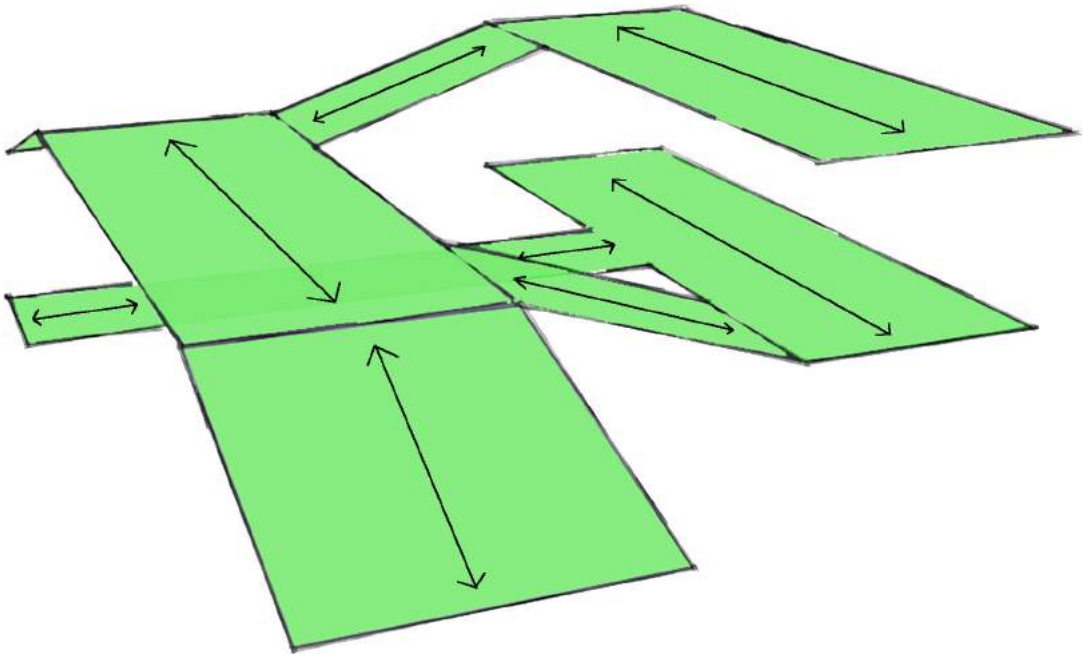
Inside/outside
relation

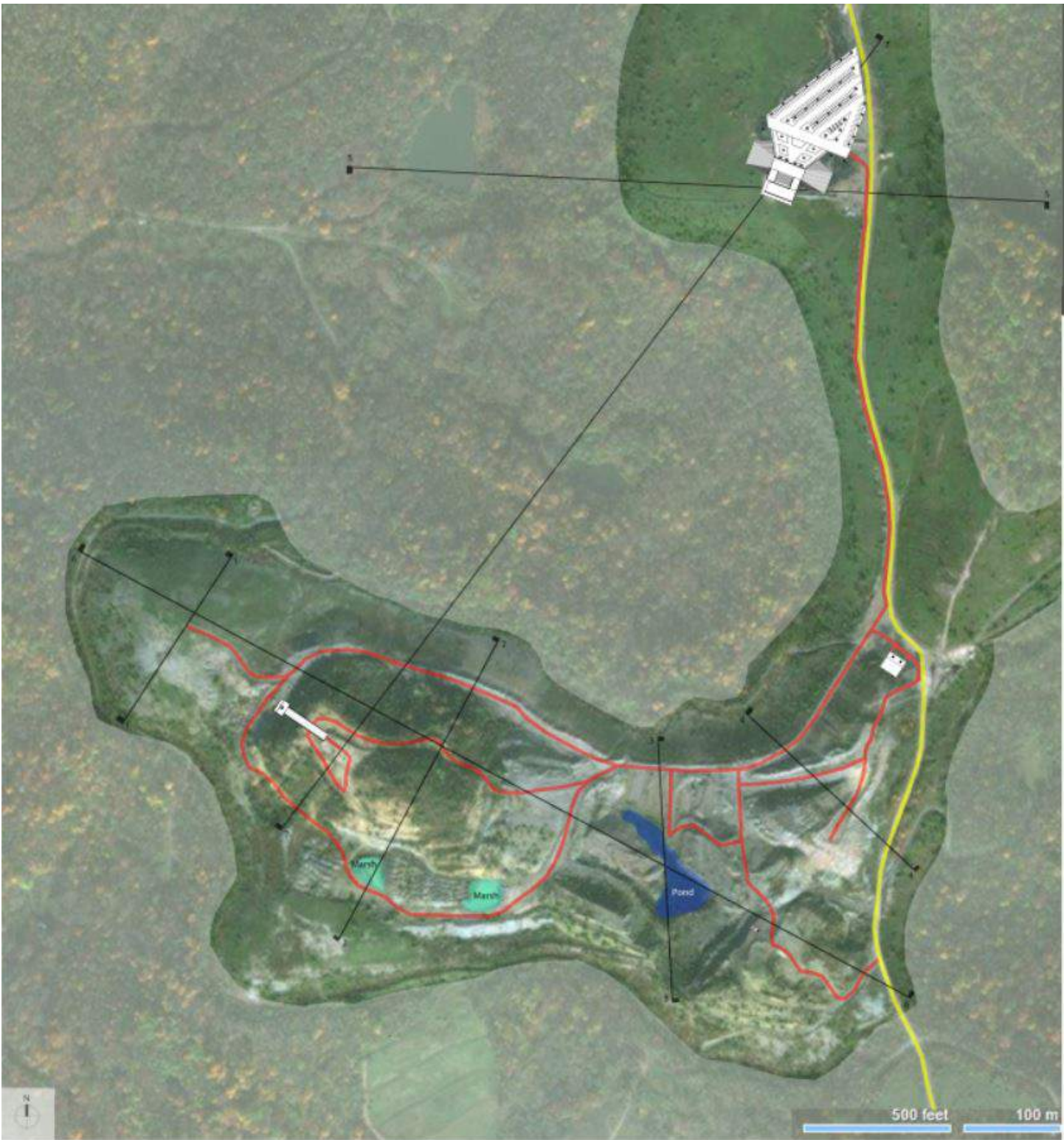


Concept Sketches

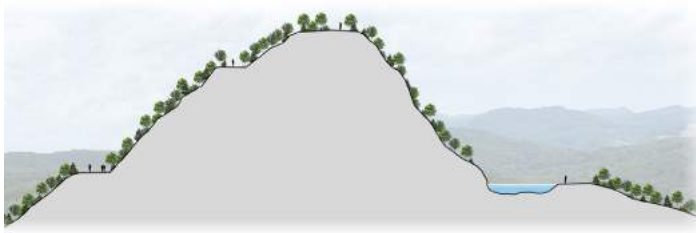
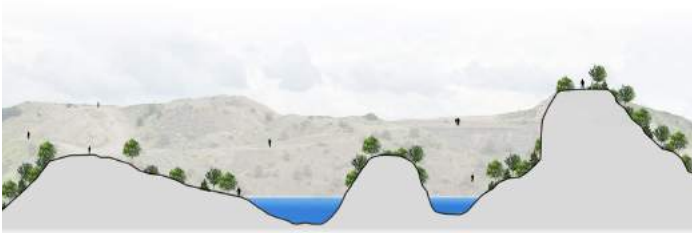


Interior Experience





SiteMap



Lost Creek Discovery Center




Discovery Opportunities within Landscape




Mountaintop Mine Restoration: Land Ethics and Sustainability within Mining Landscape


Context




State



County





Historical Context

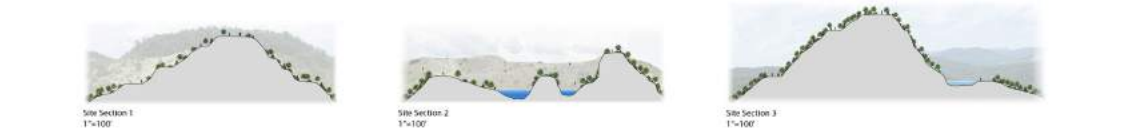


Project Description

This site is an abandoned mining site situated 10 miles south of the Clarksburg West Virginia, outside the small town of Lost Creek along Coal Mine Road. Through the mining process the landscape was affected in terms of the visual aspect of the landscape, wildlife, water quality, air quality, and soil composition. The design for the post-mining site serves as a commitment to land stewardship, sustainability and education. The site consists of a series of dynamic natural ecosystems that were altered due to mountaintop removal mining operations for the harvesting of its natural resource in coal. The mission of the design is a visualization of a destroyed natural environment and its return back to nature in a new way that helps visitors to contemplate the natural landscape and realize the long process of nature. Through an application of ecological principles, a transformation of the mineral landscape and evolution into a sustainable ecosystem for individuals to enjoy through the landscape.

Understanding Mining Process

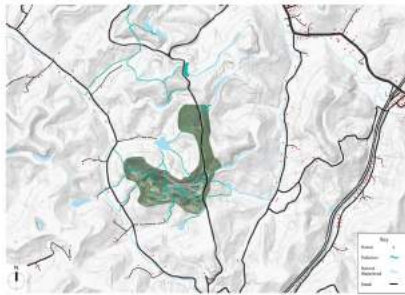




Site Conditions



West Virginia Mining Map



Site Pollution

COAL ASH POLLUTANT	HEALTH EFFECTS				
	ENVIRONMENT	WATER	SOIL	AIR	ADVERSE EFFECTS
As ARSENIC	Impaired habitat damage	Contaminated water	Contaminated soil	Impaired lung function	Lung cancer
Hg MERCURY	Impaired habitat damage	Contaminated water	Contaminated soil	Impaired lung function	Lung cancer
Pb LEAD	Impaired habitat damage	Contaminated water	Contaminated soil	Impaired lung function	Lung cancer
Cr CHROMIUM	Impaired habitat damage	Contaminated water	Contaminated soil	Impaired lung function	Lung cancer

Coal Associated Health Concerns



ZONE I - Barren Landscape

The visual remnants of the mining operations exposed debris embankments and barren land. Despite extensive soil management, and native vegetation restoration, this challenge proved successful in providing native plant communities and reestablishing wildlife habitat. This vision is to allow these zones to regenerate naturally and maintain the health of the site in regions where natural vegetation does not occur. These zones will serve as a reminder of the industrial process.



Zone II - Lake / Shoreline

With the growth of natural aquatic vegetation the lake becomes a suitable refuge for birds and wildlife, and the vegetation provides a multitude of services including water filtration, erosion and sedimentation control. This natural and reliable water source system is instrumental in balancing ground and surface water to create aquatic stability and enhancing the health and biological diversity of the lake.



ZONE III - Wetlands

The management of the wetland is possible through use of diverse vegetation that provide a suitable ecosystem for specific species on the site. The selection of the wetland allows wildlife to utilize the resource and allow the site visible capacity to expand. The wetland will also utilize a water treatment and testing process to allocate freshwater as well as provide a public recreation.



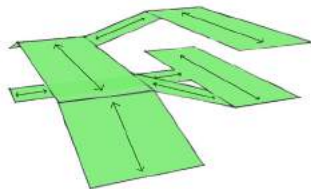
ZONE IV - Meadow

The management of the meadow region is home to seasonally changing native grass and wildflowers. This native growth provides biological diversity and help sustain the wildlife and bird populations in the region as well as provide a public recreation.

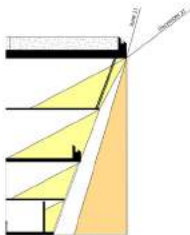


ZONE V - Forest

The forested region is unique as it was not harvested during the mining process. The forested area is composed of multiple species that are mature and provide a suitable habitat for wildlife. The forested area provides partial shading for site as well as the benefits of providing oxygen and better air quality. These mature species provide the monitoring of the site using traditional methods of planning.



Exterior Moment / Journey



Daylighting / Shading



Interior Experience



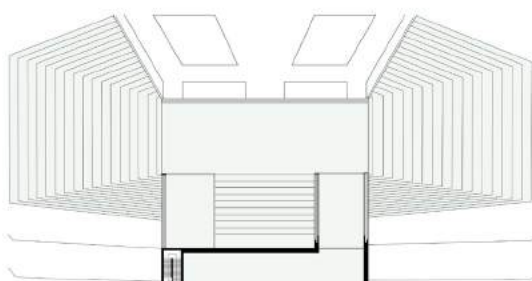
Site Section 4
1"=100'



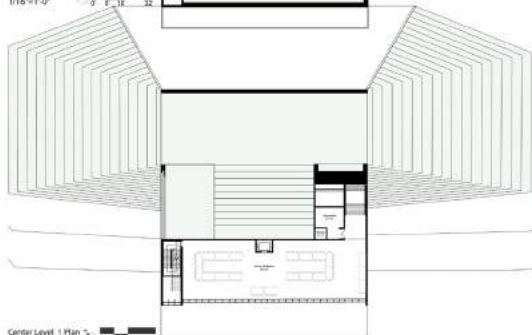
Site Section 5
1"=100'

Final Boards

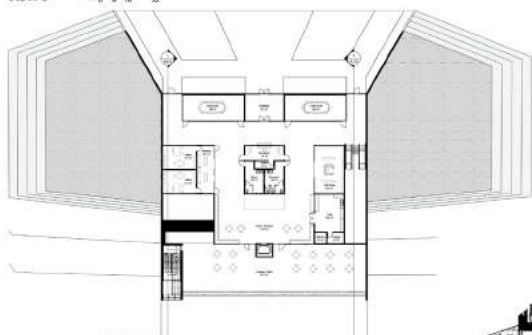
Lost Creek Discovery Center



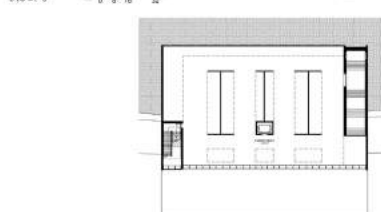
Center Roof Plan
1/16"=1'-0"



Center Level 1 Plan
1/16"=1'-0"



Center Grade Plan
1/16"=1'-0"



Center Sub-Level 1 Plan
1/16"=1'-0"



Center Sub-Level 2 Plan
1/16"=1'-0"



Southern Facade



Stairs



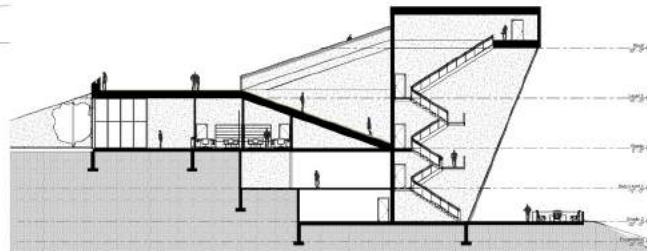
Entry Facade



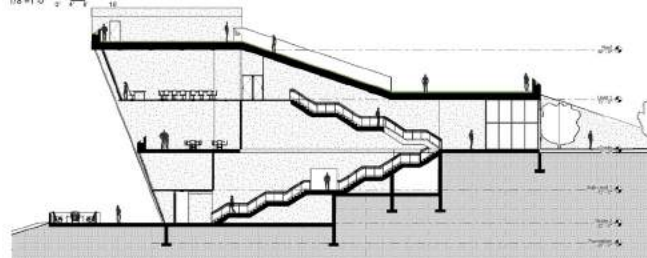
Outdoor Deck



Outdoor Movie



Section 1
1/8"=1'-0"



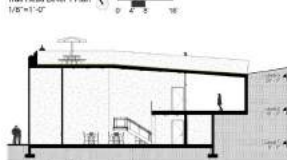
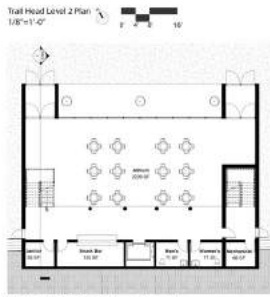
Section 2
1/8"=1'-0"



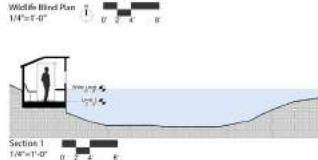
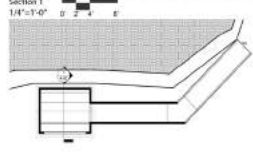
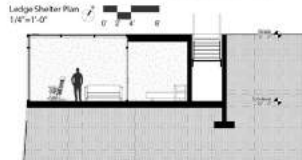
Site Section B
1"=100'

Final Boards

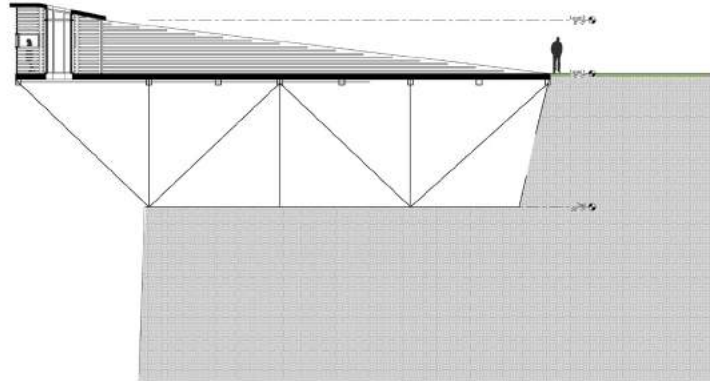
Discovery Opportunities within Landscape



Trail Head Interior



Overlook Interior



Site Section 7
1"=100'

ADDENDIUM

The premise of the thesis revolved around the ideals that through advocacy and an ethical alternative, can the perception of mountaintop mining be altered in West Virginia. The site, is an abandoned mining site located south of the Clarksburg West Virginia, outside the small town of Lost Creek along Coal Mine Road. Through the mining process the landscape was drastically effected in terms of the landscape, wildlife habitat, water and air quality, and soil composition. I believe that the design implemented achieves the original goal as the design for the post mine site serves as a commitment to land stewardship, sustainability and education. Addressing the site conditions as a series of dynamic natural ecosystems that were altered due to mountain top removal mining destruction was influential in the narrative of regenerative process. The premise of the design is a visualization of a destroyed natural environment and its return back to nature in a new way that invites visitors to contemplate the scared landscape and realize the forgiveness of nature. Through an application of ecological principles, a transformation of the mined landscape can evolve into a sustainable ecosystem for individuals to enjoy. Through the resilience of these ecosystems a reconnection with wildlife, improve regional watershed quality, and encourage recreational opportunities can be achieved. Though an application of these principles as well as the design program, fosters the idea of advocacy for the mined landscape and fulfils the goal previously set.

THESIS REFLECTION

The presentation of the thesis went very well, as I was able to clearly convey my issue concerning mountain top removal mining, and proposed steps to help achieve goal of the landscapes restoration as well as creating a cluster of designs that aided in the stewardship of the landscape. The presentation style led the viewer on an experiential journey starting at the discovery center and progressed to the other structure within the landscape sequentially, until they reached the mountain overlook which serves as a place of remembrance as you view the scared mountain side. Addressing the flaws in the presentation is the 3D projection mapping

the illustrated a time presentation, as well as the decision only design four boards when there was sufficient amounts of material to fill another without condensing or excluding information. The criticism from the review was mixed. Most individuals appreciated the careful understanding of the mining process, site transformation process, and the individual interview process. Comments that where split concerned the discovery opportunities within the landscape, such as the overlook, site shelter, blind and trail head. While most of these installations where seen as useful and creative, some elements could have been strengthened. The issue of the presentation was that of the main structures concept and the parking lot area. The concept of understanding the mining heritage and the ascension to knowledge was fundamentally a good progression, but forcing the user's path needs further improvement. Starting the user on the lowest level would have been more beneficial to progression concept. The parking lost was meant to show only show the sites capability to support large crowds, instead was a regency to flattening the site just as the mine process. Then finally the selection of material could have been improved to create a richer experience for viewers.

MOVING FORWARD

Moving forward with the design a more detailed look at the progression through the main space by the creation of an underground parking lot and bringing the occupants up through structural more naturally that previous process. Graphically allowing for more space and information is crucial to vividly conveying design ideas. With further progression and understanding of ecological issues I would like to submit proposals to the state of West Virginia to use as a prototype for changing perceptions of the state and to restore our landscape for future generations to enjoy.

ACCNOLOGMENT

I would like to take this time to personally thank the individuals placed in my life that have helped me with my journey to achieve this accomplishment. First, I would like to thank my high school drafting teacher Mr. Venderlick that originally got me interested in architecture and design, and pushing me to pursue my passion for architecture. Following my passion I applied to Fairmont State University in their architecture program. The professors Kirk Morphew, and Philip Freeman being the only faculty did an outstanding job at motivating and teaching us beneficial material that made complete to our colleagues of larger departments. The faculty as well as my class pushed each other to help produce the best possible work. Philip Freeman was always willing to offer professional advice and help attaining intern positions as well as jobs after graduation, and even aided in my decision to attend Miami University. The success of my Fairmont State experience wasn't made clear until I arrived at Miami. While at Miami the entire staff was so always willing to help in my architectural development. I would like to thank all the people that provided me with the help and encouragement throughout my thesis process, these individuals include Diane Fellows, John Becker, Mary Rogero. I would especially like to thank my committee members for their patience, insight, and support throughout the thesis process. I could not have selected a better committee for my thesis. All were willing to put in the extra effort and meet and discuss ideas for the betterment of my thesis. I would next like to thank my fellow classmates for their support and friendship throughout our journey together. Through collaboration and assisting one another, I believe we bettered one another. I would like to thank my family for the continued support and encouragement as I neared my goal. Finally I would like to thank my fiancé and soon to be wife Lauren Phillips for her patience, support, and faith in my throughout my journey.

Thank You,

Grant Evan DeLancey