Recreation from Reclamation

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Abstract

Recreation from Reclamation

In many rural areas of East Central Indiana the nearest large recreational facility is at least five to ten miles from potential users. While these people have to drive for recreational opportunities, they most likely would not have to drive to find the nearest quarry. There are hundreds of quarries scattered amongst the fields of Central Indiana. The question at hand is what are the potential benefits of using these quarry sites as large recreational facilities following quarrying operations?

Grant County is a rural county in East Central Indiana. It is approximately the midpoint between Marion and Allen Counties along I-69. Many other rural counties surround Grant County and there are very few large towns or cities. The residents are required to travel great distances at times to reach quality or specialty recreational activities. Just because there is ample farmland and open space available does not mean that opportunities for recreation must be suspended.

Irving Materials Inc. (IMI) has a number of quarries located in Grant County. Currently one of the quarries is closed for business and the property is for sale. This is the former Pipe Creek Stone Company found along Pipe Creek in the northwestern portion of the county. Limestone had been quarried out of the 572 acre site for almost 70 years! Operations ceased when it became uneconomical to continue excavating and the site was basically left untouched.

Many small communities surround the former Pipe Creek Stone Company near the intersection of Indiana Routes 13 and 18. The town of Mier, located at the intersection, is home to the high school that many of the county teenagers attend. The town of Sweetser, located a few miles to the east along IN Rt. 18, has begun the Sweetser Switch Trail which runs directly to the Pipe Creek Stone Company. Other towns, such as Swayzee and Converse, are also in close proximity to the quarry property.

The goal of this project is to develop a conceptual master plan for a recreational facility created on a reclaimed quarry site in East Central Indiana. More specifically, this large recreational facility at the Pipe Creek Stone Company will offer a plethora of activities and opportunities for people of all ages at all times throughout the year. There will be a focus on attracting both the surrounding residents as well as visitors from around the state, but most importantly, the facility will be close and inexpensive with something for everyone year-round.
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Part I – Introduction

"Quarries and other abandoned industrial sites should not be seen as eyesores, they should instead be viewed as great places within the natural landscape crying for Landscape Architects to help reveal their potential."

Preface
There are many reasons why I chose to research the reclamation of a limestone quarry into a public recreational facility. First of all, I love water. Limestone quarries typically become inundated with water after excavation ceases, and where there is water there is an enormous potential for recreation of all sorts. Secondly, I love outdoor recreation. There are numerous benefits that being active and being outside can provide. Some of the benefits are physical and others psychological, but they all promote a healthy and happy lifestyle. The final reason why I chose this project is because I strongly believe that abandoned quarries should be reclaimed and put to good use benefiting the surrounding communities rather than being left untouched and extremely dangerous. My hope is that the ideas formed within this reclamation project will influence others who are in search of a unique recreational experience.

Purpose of the Study
In many rural areas of East Central Indiana the nearest large recreational facility is at least five to ten miles from potential users. While these people have to drive for recreational opportunities, they most likely would not have to drive to find the nearest quarry. The question at hand is what are the potential benefits of using these quarry sites as large recreational facilities following quarrying operations?

Grant County is a rural county in East Central Indiana, with other rural counties surrounding it. Very few large cities or towns are located within these agrarian
communities, causing the residents to travel great distances at times to reach essential amenities, recreation included. All age and economic groups within society need appropriate recreational opportunities year-round and unfortunately some sectors of the population do not understand the importance of this. The citizens are left with a bare minimum of recreational activities; making due with what is available and trying to acquire more.

The importance of economic stimulation in all communities is understood. Central Indiana has been blessed with a plentiful amount of sand, gravel and limestone due to deposits left from the glaciers that crossed over the state many centuries ago. Hoosiers have taken advantage of these aggregates and have mined numerous sites across Central Indiana. Irving Materials, Inc. (IMI) is a company that has historically been involved in the extraction of aggregate materials. They have a number of quarries in Grant County including one that is no longer in operation. IMI, as well as other quarry companies, is not required to apply any reclamation techniques to the land after excavating and other daily activities have ceased. The Pipe Creek Stone Company, which is closed for business, remains disturbed and untouched.

The purpose of this study was to develop a conceptual master plan for a recreational facility focused on the needs of the surrounding communities, on a reclaimed quarry site in East Central Indiana. The processes needed to reclaim the quarry site, and to prepare the site for new uses were identified within the study. This project selected and applied, as appropriate, ecologically sensitive principles to the designs of both the nature and the recreational areas.
Significance of the Study

Landscape Architects need to be more involved in land reclamation projects. Currently Indiana does not require quarry operations to reclaim the site following excavation. Legislation is in the process and soon many of the quarries in progress will need to be retrofitted back into the landscape and Landscape Architects should be the people responsible for amending these sites.

In completing this case study; hopefully more professionals within the landscape architectural field will become involved in quarry reclamation. Transforming an abandoned quarry into a recreational facility is not an uncommon practice; however, very few case studies could be found where a Landscape Architect was responsible for the work. Through deep searching, only one Landscape Architecture firm was located that specialized in quarry and mine reclamation, Continental Landscape Architecture and Planning in New York state.

An end goal of this project is to publish material concerning quarry and mine reclamation processes and the new uses that can be derived from these old industrial sites. Much information has been gathered over a period of approximately six months and it is impossible to include everything learned in the process. The basics will be incorporated within this study, such as site inventory and analysis, current photographs collected of the site, information gathered from knowledgeable professionals, case studies that are closely related to the project, design strategies and programming, as well as the details of the final master plans for the entire site.
Guiding Questions

1. Can a master plan for a recreational facility “fit into” the processes of abandoned quarry reclamation?

2. What are the processes that must be implemented in the reclamation of a limestone quarry?

3. What are the types of case studies that could help and what has been learned from them?

4. What are the guiding principles of the project and how do they make the final concept successful?

5. What is the history and context of the chosen site and how will that influence the design?

6. What are the potentials of developing a water-based recreational facility on the site?

7. What amenities may be needed to attract potential users to a reclaimed quarry site in East Central Indiana?

Delimitations

The goal of the project is to develop a conceptual master plan; for that reason, if the client develops this project further, a Landscape Architecture firm must be hired to attempt the following.

1. Organize a team of professionals to thoroughly evaluate the site and to develop it correctly.

2. Precise topographical data are not yet available for the proposed project site. If the data can be located, it may be possible to conduct an engineering study for the proposed topography modifications.

3. Conduct an archeological study of the land since a portion of the land is within a FEMA floodplain. The land immediately on either side of Pipe Creek is located within the 100-year floodplain and is zoned as a special flood hazard area inundated by a 100-year flood, however, no base flood elevations for this area have been determined. The rest of the site, the majority, is zoned to be an area outside of the 500-year floodplain.

4. To offer step-by-step instructions on how to prepare the land for construction and reclamation.
Definition of Key Terms

East Central Indiana – East Central Indiana is a geographic area in the state of Indiana which typically refers to the area loosely bound from Kokomo and Indianapolis in the west to the Ohio state line in the east.

Ecologically sensitive – Ecologically sensitive is being aware of present environmental issues and applying sustainable techniques to the design process and implementation.

Large recreational facility – A large recreation facility is somewhere in size between a Community Park (20 acres and larger) and a Regional Park (over 100 acres). Opportunities for a variety of year-round recreational activities exist for people of all ages at large recreational facility.

Pit – A Pit is an area within a quarry that has been, or is being, excavated and dug into a large hole in order to extract the aggregate materials found under the topsoil. Pits are found in all sizes and shapes and often fill with water if a pump is not constantly running in order to keep the water out.

Quarry – Quarry is a noun as well as a verb. Quarry as a noun is an open excavation usually for obtaining building stone, slate, or limestone. Quarrying is also a noun and that means the business, occupation, or the act of extracting useful materials from quarries. Quarry (ied) as a verb means to dig or take from (extract) as from a quarry. (Merrian Webster’s Collegiate Dictionary Tenth Edition, 1996)

Reclamation – Reclamation is restoration to use, recovery, the act of reclaiming. Reclaiming is to rescue from an undesirable state, to make available for human use. (Merrian Webster’s Collegiate Dictionary Tenth Edition, 1996)

Sustainable development – Sustainable development maintains the overall quality of life and guarantees continuing access to natural resources and avoids lasting environmental damage. (Ruano, 1999, 10)

Water ski lake – A water ski lake is a lake that is used strictly for water skiing, wake boarding and barefooting. If constructed by excavating, a ski lake is typically somewhere around 2,100 feet long and about 300 feet wide. These lakes are long and linear and only have enough room for one boat and one skier to ski at a time. There is enough room on most water ski lakes to include both a slalom course and a jump, but not much more.

Water skiing – Water skiing is a recreational and competitive water sport. A skier is pulled at various rope lengths behind a motor boat on one or two skis typically. Competitive water skiing includes slalom skiing, trick skiing, and jumping. Wakeboarding and barefooting are also popular recreational and competitive water sports that most water skiers participate in as well.
Assumptions

1. That the land owner is willing to permit use of the property for learning purposes.

2. Basic principles of ecological sensitivity will be applied throughout the design.

3. If the master plan is accepted, then the job of the Landscape Architecture firm is to inform the landowner that rezoning must occur, and the appropriate documentation will be prepared to submit to the county.
Part II – Review of the Related Literature

Historical Perspective

Water has always been a very important part of life throughout history. Not only has water provided food and transportation, it has also provided recreational opportunities, whether it be swimming, bathing, or relaxing to the sounds of moving water. Most cultures have regarded water as the major focus in their gardens, and many felt that “no garden can exist without water” (Taylor, 1993, 7).

“Nothing enlivens a garden so much as water.
Splashing or dripping, glistening ripples over stone,
or reflections on a smooth surface, all can give a
LIVELINESS and TRANQUILITY that no other
garden feature can provide” (Taylor, 1993, 26).

The Moors, Muslims, Spanish, Medieval Christians, Renaissance Italians, Chinese, and Japanese all introduced water into their garden designs in various ways. Examples of the different designs are included. Upon arriving in southwestern Europe (Spain), the Muslims began sharing their knowledge of functional and aesthetic gardens focused on water with the Moors and other Spaniards. Muslim gardens were not grand or breathtaking, but simple and realistic. Christians in the medieval period formed “paradise gardens” located within monasteries. The water in these types of gardens was used for numerous activities, such as religious ceremonies, drinking, watering, and bathing. Entering into the renaissance, the Italians led the way with advanced hydraulic creations.
Their huge magnificent tiered gardens were quite inspirational across Europe. The Chinese looked towards water as a god and as an icon of pureness. The Japanese felt that water was critical, but they also formed rock/Zen gardens that are to mimic a body of water. This variety of designs influenced the way that the rest of Europe and the United States designed their gardens.

As the seventeenth and eighteenth centuries approached, garden design continued to evolve. The French commissioned gardens to be built that would emphasize the owners' social or political importance. Versailles is an excellent example. There were so many water features that an entire crew of gardeners had to know precisely when to turn on one pump and turn off another so that the gardens looked as if the water features were unending. After attempting the formal French and Italian styles, the English created the romantic landscape of the countryside. They designed free form and picturesque landscapes. These designs included both large and small lakes to be constructed in very natural settings. The English romantic landscape made its way into the United States with the help of Andrew Jackson Downing in the nineteenth century. One of his writings, Treatise on the Theory and Practice of Landscape Gardening, focused on the landscape complementing the architecture, as well as the landscape having overall unity.

"A lake is the landscape’s most beautiful and expressive feature. It is earth’s eye, looking into which the beholder measures the depth of his own nature" (Henry David Thoreau).

Lakes are still being constructed and designed by Landscape Architects today. Many housing developments have either a natural or man-made water feature, and
uncountable business parks also encompass a lake or pond. Recreation is almost always found near water bodies no matter what the size. Created artificially or naturally, people of all nations love to be close to water and always have.

**Relevant Theory**

Looking closely at the issue of a reclaimed quarry recreation facility focused on outdoor enthusiasts, many theories of both design and recreation need to be researched in order to provide the potential users with an enjoyable environment.

Recreation theory has been formed through population shifts. From the early 1900s on, the population of the United States has increasingly moved out of the rural countryside and into the big cities. However, not many people were aware that urban life lacked the wholeness of life in contact with nature’s processes (Jensen, 1995, 13). The great outdoors offer cultural, sociological, and spiritual values as well as psychological, physiological, and educational benefits. Writers, artists, and musicians base much of their work on the outdoors. Outdoor recreation offers excitement and adventure that are not easily obtained elsewhere. Spiritually, nature refreshes and strengthens an individual. Psychologically, nature contributes to one’s daily well-being. Outdoor recreation betters health and provides fun, adventure, and inspiration. Aldo Leopold also promotes the idea that students can be stimulated to learn through outdoor experiences (Jensen, 1995, 14-16). Based off of these values and benefits, it would seem like a good idea to create a facility with these positive effects.

Although exact theories of quarry reclamation could not be located, much information is available to increase one’s knowledge of the process. The process allows for flexibility and creativity in both the engineering and the designing aspects of the
project. As reclamation studies increase, theories will be formed to better assist professionals as well as students who wish to solve these unique problems.

**Case Studies**

There are numerous case studies available for the proposed project. Quarry and mine reclamation has been occurring for years across the country as companies close old facilities and move to new locations, leaving behind, or selling off their property to be developed as appropriately. While some of these quarries are abandoned and left untouched, others are transformed into popular recreational facilities or housing developments, offering numerous opportunities to the local communities.

Case studies were located in the Midwest that offered great examples of sand, gravel and limestone quarries that are now used for various recreational activities. The Portage Quarry Recreation Club, Inc. located in Bowling Green, Ohio, is a very popular recreation spot. The main draws to this facility are SCUBA diving and pro-beach volleyball.

This private club has a swimming section, a large beach with three full size beach volleyball courts, hydro-bikes (a new way to move across the water), and a dive shop. The club has simulated crashed cars, wrecked boats, and other hidden treasures under the
water for the SCUBA divers to explore. The depth of the water reaches 70 feet and there are various shelves for different levels of experience.

Through personal experiences, an old gravel quarry that became both a small recreational area and a water ski lake was located in Muncie! The Muncie Water Bowl is a private recreational facility owned by the Irving family, who has historically been involved with sand, gravel and limestone quarries throughout East Central Indiana.

Currently the site consists of two pits, one very small and circular used for swimming and paddle boats, and the other much larger and longer pit is used strictly for water skiing by members of both the Muncie Water Ski Association and the Ball State Water Ski Team. There is road encompassing the small pit which serves as a track for Junior High Cross Country meets and practices. Along the western portion of the small pit, on either side of the road, tents can be set up for camping or there are electric hook ups closer to the water ski lake for RVs. There is also one open-air picnic shelter located on the top of the hill above the small pit where spectators gather to watch the cross county meets or where organizations get together for special events. Close to the swimming pit, there is a large concession area and sheltered seating as well as a miniature golf course and a basketball court, both in need of major renovations. The sand beach along the southeastern portion of the swimming pit is
always filled during the summer months with people of all ages. Often during the warm months concerts will be held at the Muncie Water Bowl that many people attend.

The Members of the Muncie Water Ski Association come from nearby towns, including Indianapolis and Kokomo, just to ski at the Water Bowl for at least two decades. Tournament water ski boats are the only boats allowed on the lake, and only one boat runs at a time. The approximately 16 acre lake is naturally filled with clean clear water, plenty deep for water skiing. The lake is long enough for almost all forms of water skiing and a floating slalom course is installed which many of the members take advantage of. Wakeboarding is also very popular at this site and a National Ski League wakeboard tournament is held here each summer. No homes have ever been built around the lake, and it is reasonable to speculate that a reclamation process did not occur prior to the water skiers’ arrival.

"In the absence of natural perfection (long, narrow waterways protected from wind and crowds), water skiers have taken to constructing private sites that have burgeoned into the nation’s most popular skiing communities"

(Barton, 30, 2000).
The town of Newberry Springs, California, is located in the middle of the Mojave Desert about two hours east of Los Angeles. In 1968, Jack Horton and his wife bought a large piece of property there and built the "first-ever man-made tournament ski lake" (Benzel, 71, 1997). They were in search of their own private paradise, and the desert was the answer. A second ski lake was dug next to the first and then eight other lakes appeared eventually throughout the small town making Newberry Springs "the man-made lake capital of the world" (Benzel, 70, 1997). For every 90 inhabitants there is a lake! Hundreds of other man-made private water ski lakes have been since developed worldwide, and most have used Horton's original design as a base.

Whether the lake is in the middle of the desert or nearing the Canadian boarder, water ski lakes all look the same. The lakes are typically around 2,000 feet long with turn islands at either end. Boat drivers pull skiers around these islands to prevent waves from the boat to roll down the lake after the boat makes the turn, which would then create a bumpy and uncomfortable skiing experience. Water ski lakes are about 300 feet wide
to accommodate a ski jump sited on the lake near the slalom course. The banks of these lakes have no natural shape to them; they are simply long and straight. To prevent erosion some owners have allowed riparian vegetation to grow along the banks, such as reeds and other grasses, while other owners have rimmed their lakes with rip rap. Most lakes have berms or trees encompassing them to attempt to block any unwanted wind. This project is not proposing to create an actual water ski lake as these case studies demonstrate; however, this study is proposing to include, among the other recreation types, a water skiing environment with similar features and benefits.

The Urban Land Institute also created a book of case studies that focused on a wide range of recreational communities, the *Recreational Development Handbook*. Treasure Lake in Clearfield County, Pennsylvania, is an interesting case. This community was set on more than 8,000 acres in rural western Pennsylvania. Two large man-made lakes (280 and 200 acres) are the core of the site, with a 202 slip marina, six beach complexes (ULI, 1981, 135) and a campground along the shores. The potentially 7,000 – 10,000 units are grouped around the lakes as well. A winter sports complex is also on the site to keep visitors and residents occupied in the colder months with snow skiing.
Recreation has been a major theme within the case studies, especially water-based recreation. Aside from opportunities to play, housing is popular along bodies of water. Creating areas of natural habitat is also an extremely beneficial alternative use to a limestone quarry. The varieties of case studies help to recognize the potentials of the old limestone quarry.

**Design Issues, Trends, and New Ideas**

Landscape Architects are slowly becoming involved with quarry and mine reclamation. Through deep searching, only one Landscape Architecture firm was located that specialized in quarry and mine reclamation, Continental Landscape Architecture and Planning in New York state. Peter Loyola, a principal at that firm offered insight as to the role that Landscape Architects play in mine and quarry reclamation projects. Landscape Architects are hired to conceptualize master plans for these abandoned or soon to be abandoned quarries. They work with soil scientists, hydrologists, biologists, and engineers, to name a few, to develop the most appropriate uses and functions for the site.

Continental Landscape Architecture and Planning has completed a variety of reclamation projects. One example of the type of work that this firm does is found at Alfred State University in Alfred, New York. There a roughly 300-acre site was available for the University, of which about 100-acres was a sand and gravel quarry. The client wanted sports training facilities for some of the collegiate athletes as well as an Energy Research Center. Based on that information, the Landscape Architect worked with biologists and others to design an appropriate solution. In the end, the site was comprised of a football stadium, a track, a baseball diamond, and a practice football field. The site also housed an Energy Research Center and a sculpture garden. With respect to
the quarry, the team worked to keep storm water on the site and filter it through wetlands.

A second project completed by this firm dealt with a municipal incinerator. This project required the firm to fill a 30-acre pit that was 50’ deep in order to develop a recreational facility on top. The firm worked out an agreement with the municipal incinerator where the fly ash (leftovers) was mixed to form slurry, a low strength concrete. This concrete was then used to fill the pit and baseball fields and tennis courts were constructed on top. These two projects reveal very unique situations that arise when dealing with mining or quarrying operations.

Landscape Architects benefit communities and individuals alike and over time these people will come to recognize the role of Landscape Architects as consultants for the design and reclamation of industrial sites or other “eyesores.”
Part III – Site Context and Selection

Criteria for Site Selection

In order to accomplish all of the goals of this project, one major requirement was needed: a site. For a successful reclamation project a site must be chosen that can accommodate three main functions: reclamation, recreating and water skiing.

In East Central Indiana there are hundreds of quarries dotting the landscape. The companies that own and extract from these quarries are not required by law to restore the sites back to their original uses, as strip mining coal companies are, once they are through with them. Many of the quarry sites in East Central Indiana are left virtually untouched until someone decides to develop on them. The point of this study was that there are numerous opportunities for a reclamation project in East Central Indiana.

As stated previously, the selected site must be able to accommodate reclamation, recreation and water skiing. The selected quarry should have sufficient land surrounding the pits to accommodate additional recreation activities and entertainment. The site should also have long straight-aways for water skiers to ski on, similar to a man-made water ski lake. A very important aspect of the quarry is its proximity to major cities where potential users do not have to drive far. If the selected site is nowhere near a city that can offer people and additional amenities, then the project would not be successful. The site needed to be located within an hour drive of Muncie to allow for site visits throughout the course of the study and to ensure that the appropriate data would be collected with relative ease as well as to offer an alternative recreation facility for people who live within an hour of the site.
Description of Site and Context

A limestone quarry that is no longer in production was chosen in East Central Indiana as the proposed site for the study with the help of Dr. John Motloch (Professor of Landscape Architecture, Ball State University) and IMI (Irving Materials Inc.). The site is 572-acres, of which 300-acres will be the focus of the design, located just south of Indiana State Route 18 on Grant County road 700 west. Swayzee is the official town that the quarry lies in, but it is also very close to Sweetser and Marion to the east, Converse to the west and Mier to the north.

Diagram of Redefined Site Boundaries on Pipe Creek Stone Company, Phases I & II
Mr. Ray Rich of IMI was very helpful in explaining the history of the Pipe Creek Stone Company (the selected quarry site) and the processes that took place within the quarry. Excavation of this quarry began in the late 1920’s by Irving Brothers Stone and Gravel Quarries. Prior to quarrying, the entire site was farmland, covering portions of two townships within Grant County, Sims and Richland. The main aggregate of this quarry was crushed limestone along with some gravel. The entire site was not fully quarried because economically it was not worth it. The quarry’s equation to determine whether it is economical to continue extracting is that they will move three feet of topsoil for every ten feet of material found below. As excavation moved west, limestone began to be found in thinner bands and under more topsoil. Therefore, only about half of the site was quarried, while the remaining land was leased off to farmers for continued crop production.

*Photograph of farmland that was never quarried.*

In the early 1990’s, Irving Brothers Stone and Gravel Quarries was sold off to Irving Materials Inc (IMI). Long ago the two separate companies were each started by a brother within the Irving family. The two companies then merged and IMI took control of all of the remaining Irving Brothers Stone and Gravel Quarries. A few years after IMI took over the Pipe Creek Stone Company stopped production of all aggregates. The quarry now remains as a maintenance and repair shop for all of IMI’s machinery, as well as a dumping ground for unused or unwanted aggregate materials. The farmland is still
being leased out and the pits formed from the quarrying serve as recreational areas for
IMI employees. Employees are allowed to fish and camp along the pits which are filled
with water. Unfortunately, the quarry remains just as IMI left it when excavations
stopped in the mid to late 1990’s; no reclamation procedures have been applied to the
site.

![View into main entrance of site off of 700 West.](image)

![Aerial view of largest pit](image)

The quarry left six large pits scattered across the site. The largest of the pits has
ample room to allow for a variety of activities to take place within it, even possibly water
skiing. A second pit, which is hidden from view, is very close to being long enough for
water skiing, while the remaining four pits could quite possibly be used for activities such
as wildlife habitat, fishing, or swimming. Topographic data was scare, so the depth of
the water in the pits had been estimated, and Ray Rich guesses that the water in the
largest pit reaches at least 20 feet deep.
Pipe and Stoney Creeks run through the site, and the quarry operators have altered both. Large berms have been built up along Pipe Creek so that the quarrying would not disturb the creek and so that the quarry itself would not become inundated during a flood, since a portion of the site is within the 100-year floodplain. Stoney Creek is a small tributary of Pipe Creek. This creek has been reconfigured as well to suit the needs of the quarry operations. As Stoney Creek exits the site and heads east past County road 700 west, it is lost as farmers have over the years installed drain tile to keep their land dry and out of flood danger. These two creeks offer a great deal of potential to the future design and function of the site.

As mentioned earlier, the site has not been reclaimed at all. Huge piles of aggregate still remain, as do the mountains of topsoil and other materials that covered the limestone. Originally this site varied only 12 feet in elevation from County road 700 west to Indiana State Route 13 to the west of the site. It would be very difficult, time consuming, and expensive to put the land back to its original shape. However, some regrading must occur to make the site usable as a recreational facility. Many of the pit
walls are very steep, tall and rocky and for safety reasons some of these rock walls must be transformed, especially in the area around the largest pit.

The areas surrounding the Pipe Creek Stone Company offer incredible amounts of potential to the future of the site. A railroad runs along the northern boundary of the site, but it is used very rarely for transporting crops from a local granary. A second railroad also used to run along the northern edge, but it is currently in the process of being developed into the Sweetser Switch Trail. The Sweetser Switch Trail is an asphalt recreational trail for walking, running, biking, and rollerblading, much like the Cardinal Greenway which is expanding rapidly in the Delaware County/Muncie area. Currently the trail runs from the small town of Sweetser to about three miles west which puts it very, very close to the proposed project site! The town of Mier is located at the intersection of Indiana State Routes 18 and 13, just northwest of the quarry. Oak Hill High School is found at this juncture also. With a trail and a school located so close to the study site, the future design of the quarry has potential for creating a very accessible draw for both the high school students as well as the citizens of Sweetser and Mier.
Geographically, the proposed study site is located within reasonable driving distances from many large towns and cities. The town of Marion is less than ten miles to the east along Indiana State Route 18. Interstate 69 is less than 15 miles from the site, which makes Ft. Wayne nearly 60 miles away to the north, and Muncie and Anderson about 45 miles away to the south. Indianapolis is also around 60 miles away to the south. Kokomo is approximately 25 miles away to the west, while Huntington and Manchester are both almost 30 – 35 miles to the north.

The Pipe Creek Stone Company is also located in relatively close proximity to many colleges and universities in Indiana. This site could potentially offer recreation for the students, faculty and staff. Indiana Wesleyan University (in Marion) is less than 10 miles from the site. Taylor University (Upland) and Indiana University – Kokomo are both about 25 miles from the old quarry. Both Manchester College and Huntington
College are approximately 30 miles away. Ball State University and Anderson University range from 50 – 40 miles from the site respectively.

Environmentally, the Mississinewa Reservoir is nearby offering additional recreation and possible educational connections. The closest part of the reservoir is only 7 – 8 miles just north of the study site!

The site itself, as well as the adjacent areas, makes it undeniable that numerous positive functions will take place within this abandoned limestone quarry!
Part IV – Project Requirements

Project Goals and Objectives

The current City of Marion Comprehensive Plan proved extremely valuable in deciding how to manage the quarry site. Based off of the following comments, it became more than obvious that the rural residents were in need of recreation, and this limestone quarry is in a central position to link the surrounding small towns. Below are three recommendations that the authors of the City of Marion Comprehensive Plan noted as important concerning recreation throughout Grant County.

1. Outside of Marion and Gas City, no comprehensive recreational agency exists to implement any recreational needs. Therefore, some form of city-county park department is recommended for Grant County. This department can be staffed with existing personnel as a central core.

2. In order to provide specific facilities as outlined in the above table (not shown), the county department needs to establish miniparks throughout the small towns, with a minimum of one per community. These should be closely coordinated with school-operated facilities.

3. Specific facilities demonstrated in the table above (not shown) should be developed as needed.

Originally the goals of the project were reversed, but upon further investigation the needs of the adjacent communities far out-weighed the needs of the local water skiers. Therefore the scope of the project is focused on offering a plethora of activities and entertainment which would lure the neighbors in. Water skiers will still be more than
welcomed at this facility although the majority of the design will not deal with water skiing.

- **Attract users from surrounding communities**
  - Provide numerous recreation and entertainment activities year-round
    - Combination of recreation and supporting amenities for the users
    - Create Seasonal and Multi-seasonal Programs
- **Offer local water skiers an alternative place to ski**
  - Create a water skiing environment throughout the site
    - Determine safe and desirable water skiing areas
    - Provide skiers with appropriate support amenities

**Potential Users of the Site**

The "client" that is being used in the formation of this recreational facility is the entire surrounding community. This site will be attempting to offer the local residents activities and entertainment opportunities that are currently lacking in their region. The adjacent towns were searched for existing parks and recreation activities whether at schools, in neighborhoods or on the outskirts of the municipality. Some parks were located, but more are definitely needed. According to the City of Marion Comprehensive Plan based on the population the county has a shortage of public recreational facilities. The activities which are going to be implemented on the Pipe Creek Stone Company site will reflect these deficits and will hopefully meet the needs of all the local citizens.

- **Teenagers**
  - Local mostly, hopefully find something entertaining to do to stay out of trouble – concerts, sports, other activities
- College Students
  - Indian Wesleyan, Taylor University, Ball State, IU-Kokomo, etc.
  - Camping and other recreational opportunities for a weekend or over break
- Families
  - Local or distant
  - Camping, day-time activities, or indoor evening activities
- Retirees
  - Local mainly, some distant
  - Relaxing atmosphere, family parties, camping, concerts, club house activities
- Water Skiers
  - Young to old, all ability levels, usually families or young couples
  - Local or distant, but must be a member of that Water Ski Club
Part V – Design Process

Design Process

The design process began in August of 2002. An idea to use water and recreation as integral elements of the design already existed, which made it relatively easy to find a site. Once the site was located, with the help of Dr. John Motloch and IMI, data collection commenced.

First a site visit with Mr. Ray Rich of IMI took place. Many corners of the site were seen and the history of the Pipe Creek Stone Company was uncovered. Following that visit, two other trips were made to the site. Many photographs of the existing conditions were taken and hard to reach places were attained by foot. Walking the land and seeing first hand how disturbed the site is forced three dimensional thinking throughout the design process.

Maps were gathered from a variety of sources as were other relevant government documents. Books also were collected from the library and professors and the Internet was explored for any related topics and issues. By the time all of this data was compiled, it was time to begin designing on paper and to scale.

With guidance and advice from Dr. John Motloch, diagrams to better understand the character of the site were developed prior to creating a program or schematic design. Such diagrams consist of Site Inventory, Site Analysis Management Zones, and Site Analysis Edge Conditions. The Site Inventory shows the locations of important elements on or adjacent to the quarry. The Site Analysis Edge Conditions highlights the edge conditions of the pits which illustrates the drastic changes that occur across the site close
to the water. The Site Analysis Management Zones locates areas of unique interest throughout the site that offer possibilities for recreation.

A Schematic Design was produced along with a program of use for the Pipe Creek Stone Company. This early design focuses on opportunities that are found within each of the Management Zones. Following this design, exact sizes and shapes were researched for the proposed amenities to better understand the grouping of activities and the amount of land that is needed for each.

The Master Plan for the entire site was designed based off of the Schematic Design. Due to the size of the site, this plan was drawn at a scale of one inch equals 200 feet. The Master Plan shows the basic solution to the entire 300-acre quarry site. One of the management zones was chosen for further detailing because the greatest amount of activities and entertainment are anticipated in that area. The plan for this management area was designed at a scale of one inch equals 50 feet. Even at 1:50 the degree of detail is not very thorough; therefore the three focal points within the larger area were chosen to be developed at one inch equals 20 feet. Altogether, five plans were completed showing the site at various levels of detail.
## Site Analysis

<table>
<thead>
<tr>
<th>Slope Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Steep</td>
</tr>
<tr>
<td>Steep Slope</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
</tbody>
</table>
Site Analysis

1. Environmental
   - Most rainy
   - Provides water material

2. "Population"
   - Many small
   - Possible development

3. Hochzeit
   - Very local
   - Sheltered

4. Field
   - Flat farmland
   - Center

5. Landscape
   - Most wet
   - Very useable

6. Terrain
   - Shallow
   - Good for buildings
Schematic Design

Wetlands
- Natural area for migration
- Small, shallow pits

Fishing Lake
- Parking
- Boat Docks
- Good Fish Habitat

Multi-Purpose Lake
- Club House
- Concession Area
- Parking
- Swimming Area
- Paddle Boats
- Beach
- Sports
- Trails
- Overflow water skiing/water activities
Part VI – The Program

Warm Weather Activities

- Camping
- Concerts/Plays
- Fishing
- Hiking/Biking
- Indoor Banquets/Parties/Activities
- Paddle Boats
- Hydro Bikes
- Picnics
- Running/Rollerblading
- Sports – Court & Field
- Swimming
- Tanning
- Wake Boarding
- Walking
- Water Skiing

Cool Weather Activities

- Cross Country Skiing
- Holiday Activities/
  Easter Egg Hunt/
  Halloween Haunted
  Trails/Christmas Sleigh
  Rides/etc.
- Ice Fishing
- Ice Skating
- Indoor Activities/
  Dancing/Drawing/Cards
- Sledding
- Warming House

The Program

Since one of the project goals is to attract the local population, a wide variety of leisure activities must be provided. The majority of users would visit this recreational
facility in the warmer months in order to take advantage of the water sports and camping. However, the site will offer activities throughout the colder months as well.

A club house would be an appropriate amenity for the site and can be used year-round. The clubhouse would have computers, small conference rooms or banquet rooms and concession areas. These spaces can be rented out for special functions and classes of all sorts can be held here. A campground located within this facility will supply a nice get-a-way for local and distant visitors. Hook ups for RVs will be provided, but the majority of the sites will be for tents. An amphitheater will be located along the waterfront and can be used for a variety of entertainment purposes. Local bands and musicians can host concerts throughout the warm months or small plays and shows can be performed on the floating stage as well.

Outdoor play and sport areas are also needed for the area, offering various forms of recreation and entertainment. Open lawn is great for any field sport and it is also nice for relaxation. Beach areas will provide sand volleyball courts and lots of sand for tanning, digging and sculpturing. The water itself will be open for swimming, fishing, water skiing, paddle boats, hydro bikes, etc. Many of these water sports will be segregated to minimize user conflicts and to ensure safety.

Paths and trails would move the users easily around the site and through very unique spaces all with minimal use of vehicles. Some of the trails will connect with the Sweetser Switch Trail which allows users a variety of entry and exit points and also encourages the development of other trails into the nearby communities. Unique portions of the site will be dedicated to wildlife habitat and conservation which can be very educational to all potential users.
The activities to take place in the cooler months will be centered around the club house. The club house will act as a warming house to those ice fishing on the fishing lake, to those ice skating on the multi-purpose lake or the water ski lake, to those cross country skiing along the trails and to those who are sledding down the closest hill. The club house will continue sponsoring classes throughout the cooler months in areas such as dancing, drawing and sewing. In addition, special holiday activities will be hosted on the site. For example an Easter Egg Hunt on the club house lawn, Halloween Haunted Trails along a portion of the trails and Christmas Sleigh Rides through the open spaces and along the trails.

If advertised adequately and managed efficiently, this quarry site has the potential to become a great recreational facility for the rural Grant County population and anyone else interested in a unique setting with lots of fun activities to participate in or to observe all the time!

Site Amenities

- Gated Entrance
- Trails
- Nature Areas
- Fishing Lake
- Water Ski Lake
- Campground
- Fire Tower
- Multi-Purpose Lake
- Club House/Concessions
- Paddle Boat/Hydro Bike Rental
- Water Taxi/Shuttle
- Playing Fields and Courts
- Beach
- Amphitheater
Part VII – Final Design Development

Master Plan

After many conceptual diagrams, preliminary plans and meetings with professors, the final design for the entire site master plan was completed. One main road loops through the site with only one entry/exit point. The road does branch off to take visitors directly to their desired destinations, by-passing certain areas. Trail systems encompass the quarry site and users can walk, run, rollerblade, bike and hike. With over five miles of trails in varying terrain, a person has the opportunity to choose where and how far they want to go. Most of the trails are asphalt, but some are also crushed limestone. Wooden bridges and overlooks help to move the users through the site and provide great views of this unique landscape.

The Main Entrance is still located where the current entrance to the site is, as shown in previous diagrams. A boulevard and a Gate House, where visitors will stop prior to entering in order to check in, have been added. A parking lot for the Pipe Creek Stone Company Sweetser Switch Trail connection is located in the far northeastern corner of the site, allowing users quick access to the trail without having to drive throughout the facility. The Quiet Area of the site that encourages passive recreation was originally the most recently disturbed section of the site. Now the area has naturalized slopes leading into the small lake with trails, bridges and overlooks around it.

The Natural Habitat portion is a wetland environment created out of the existing “pot hole” pits. These pits are shallow and small with added riparian vegetation and boardwalks. The “pot holes” have also been linked together via recreated streambeds.
This area will offer migrating birds a pleasant resting spot and environmental education to users.

The Water Ski Lake was formed by extending an existing pit and is surrounded by riparian vegetation and a small beach. A launch ramp, dock, and parking for both towing vehicles with trailers and other vehicles were added to provide accessibility to the lake. A small shelter was also included to make shade available to those who don’t want to be in the full sun.

The Campground is situated along the eastern side of the main road, just north of the Beach. RVs and tents will be allowed and the essential hookups will be available. Before entering the Campground, visitors have to chance to stop at the Fire Tower. The Fire Tower is located to give amazing views of the entire Pipe Creek Stone Company Recreational Facility to those who are not afraid of heights. Many people may not realize the drastic topography changes if they did not look into the site from above.

The Multi-Purpose Lake is the area where the greatest amounts of visitors are anticipated to be on a regular basis. The lake is the center for most of the activities and entertainment found on the site. The Amphitheater, the Beach, and the Club House are the main focal points within the Multi-Purpose Lake region and these four areas will be discussed in greater detail in the following sections.

The Triangle Pit has been designated as the Fishing Lake because the existing conditions lend to fishing. Only non-motorized fishing boats can be used for environmental and safety reasons. The boat launch will be the already existing ramp that was created for machinery to enter and exit the pit during operation. A dock and parking have also been added to that area to make the lake appealing to all fishermen.
Multi-Purpose Lake Plan

As mentioned earlier, the Multi-Purpose Lake is anticipated to have the largest amounts of visitors due to the location of many opportunities for recreation and entertainment. The lake itself is the largest of all the others found on the site and therefore the greatest amount of activities can take place there. It is also the most unique lake in the Pipe Creek Stone Company. There are steep cliff walls which make up many of the edges, islands were left in random locations, and “fingers” were formed from piling fill during excavation. This zone should not be withheld from the visitors and users of the site, so instead the main functions take place along this lakefront.

Peninsulas jut out into the water and they are wonderful places to draw people to because of the views afforded toward the water. Overlooks, an amphitheater and a club house have all been strategically placed on peninsulas around the edge of this large lake. In other areas around the lake, picnic areas have been located, a beach has been constructed, parking for various spots have been designated and nature walks have been laid out.

The lake and the surrounding land have not been designed to its fullest extent; allowing for future expansion of activities or placement of new structures. For example, if needs be, the lake could also serve as overflow for water skiing and wake boarding. As for the present design of the Multi-Purpose Lake, it will adequately suit the needs of the surrounding community.
Multi-Purpose Lake Plan
Amphitheater Plan

An amphitheater can add a lot of excitement and interest to a recreational facility. Local groups can sponsor concerts, small symphonies, recitals, plays or even speakers at this amphitheater. When choosing an appropriate location for the amphitheater, special consideration was given to vicinity of neighbors, proximity to other highly used sections of the site and the amount of land that would need to be moved to create a successful theater space.

Originally, the amphitheater was to be placed between the Water Ski Lake and the Multi-Purpose Lake as a focal point at the true center of the entire site. However, as designing continued, that location would not work with the flow of the site. Instead a location was chosen along the edge of the Multi-Purpose Lake. The selected site is shaped like a crook and has a huge mountain of fill on top of the land. The curve existed and the slope existed, all that was needed for that site was a stage and ways to get there.

The idea of a floating stage is quite unique. Basically, there was no land to put a stage on that lined up with the curve or the slope of the land, so the stage had to go out in the water. Having the stage float makes it very easy to load and unload as well as easy to ensure the maintenance of the platform. A pontoon or other small barge type boat can also be used to transport people or goods to the amphitheater.

There will be a trail that encompasses the amphitheater, which will be closed off to non-concert goes, on concert nights, to avoid disruptions or conflicts. Lawn seats and a picnic area will be available close to the water’s edge to provide a variety of seating types and so that people can enjoy the entertainment in their own individual way.
Section of Amphitheater Peninsula

![Diagram of Amphitheater Peninsula]

Sketch of Amphitheater Seating

![Sketch of Amphitheater Seating]
Amphitheater Plan
Beach Plan

Where there is water, there needs to be a beach, people expect that and look forward to that. The beach at the Muncie Water Bowl is packed almost every single day during the summer, and there is no reason why this beach won’t also be full. Beaches offer a variety of activities, both passive and active.

The Beach location was chosen because that area already has a “natural” slope down into the water. This was the site where the quarry trucks and other heavy equipment entered and exited this pit. A large section of this beach area requires excavation to remove the steep cliff wall lining on a portion of the beach site.

The parking lot for the beach was strategically placed over Stoney Creek to offer easier access to the beach from the parking. If dropped off in the turn around of the lot, a person does not have to walk very far to the beach, the water or picnic facilities. Stoney Creek has been severely altered in its day, so the parking lot will allow the creek vegetation to continue gowing and pedestrians can observe that as well as they cross over the creek.

The beach itself has ample room for many activities, but most importantly just relaxing in the sun. Lounge chairs and umbrellas will be available for use. People of all ages are encouraged to “play” in the sand and to enjoy this unique man-made beach. Sand volleyball courts are set up behind the main beach to avoid conflicts and injuries. Open-air picnic shelters are located near the volleyball courts so that spectators can watch from the shade if so desired. There is also an area above the beach in a shaded place for picnicking and cooling off, and a moveable concession stand will be found in various locations around the area during very active weeks. Trails run through this area linking
the beach to the club house and to the amphitheater and a water taxi is also available on busy summer days to transport people from the club house to the beach and vice versa.

Section of Beach Area

Sketch of Open-Air Shelter
Beach Plan
Club House Plan

A club house acts as the heart of a recreational facility, whether it be a golf course or a county park. The club house will act as the center of attention as it is the only substantial architectural structure on the property. This large recreational facility at the Pipe Creek Stone Company was in need of a social gathering place and a club house can meet all the wants of the surrounding community.

When design first began, the Club House was located in the northern portion of the site near the Main Entrance. After realizing that this building has the potential to host a variety of recreational and entertainment activities, it was determined that it should be located in close proximity to the majority of events that will occur throughout the site. The large peninsula on the north side of the Multi-Purpose Lake turned out to be the perfect location for this club house.

Not only would the club house look like a beacon in the darkness, it furthermore renders amazing views out across the lake and toward the beach and the amphitheater. For the purpose of these views and that most of the activity around this club house will happen on the south side, extensive seating and gathering spaces were created. The two-story building will feature a wrap-around deck along the second floor as well as a wrap-around patio along the main floor. Informal gardens will surround the club house giving users the chance to leisurely stroll through them and the gardens will also act as a screen or buffer to separate the outdoor seating spaces. The largest outdoor gathering space will be found directly to the south of the club house. The second floor deck opens up to a wide entertaining space, where overflow dancing can spill out to, and the main floor patio extends out towards the dock and invites people up from the waterfront.
The southern end of the peninsula needs to be terraced so that there is easy access to the water. At the waterfront, there will be a sizeable dock with two small structures or huts on it. One hut will offer rentals of paddle boats and hydro bikes to the users and the other hut will have basic concession goods. Some table and chairs will be provided on the dock, but the majority of the concessions and seating will occur on the club house patios and decks. This large dock is where the water taxi drops off many people and picks up others to take back to the beach. If water skiers and wake boarders are allowed on the Multi-Purpose Lake they will be able to dock their boats here as well.

**Sketch of Club House Deck and Patio**
Section of Club House South to Water Front

Section of Club House East to Water

Pedestrian Bridge over Multi-Purpose Lake towards Beach Area
Part VIII – Conclusions

I will honestly say that I have learned much more than I ever anticipated to working on my final thesis project. I have learned not only about quarry reclamation and recreation, I have learned about myself and what drives me. I have found my motivation within the Landscape Architecture profession and it deals with water and recreation. I plan to use what I have learned from this year long process and apply it to my life as my career within the profession evolves.

My project turned out good. There are a few things that did not get done due to time constraints, but for the most part my thesis is complete. If I did have all the time in the world I would have detailed every piece of the Pipe Creek Stone Company Recreational Facility that I designed. I also would like to have found out more about the actual engineering of reclaiming a quarry and how it is actually done, because that may change the way my designs are interpreted.

Overall, I was happy with my final product and I am extremely grateful for all of the help and support that so many of my friends, family, colleagues, professors and professionals have given me.
Part IX – Appendices

Data Collection Strategies

In order to comprehend a project of this scale, large amounts of detailed information was required. Many site base maps were gathered from Bracken Library at Ball State University, from the Grant County Auditor and Planning offices, and from the United States Department of Agriculture. Many photographs of the existing site were collected both personally and from Ray Rich.

- 1995 USGS map at 1":24,000'
- 1968 Groundwater Availability map at 1":1mile
- GIS maps at 1":400' and 1":200'
- 2002 FEMA Flood Insurance Rate Map
- Zoning map of site and surrounding area
- USDA Soil Survey of Grant County
- 2002 Aerial photograph of site at 1":200'
- 1999 – 2003 City of Marion Parks and Recreation Master Plan
- Current City of Marion Comprehensive Plan

Books


**Thesis**


**Periodicals**


**Online Resources**


Interviews

Personal communication, Mr. Peter Loyola, Principal Landscape Architect at Continental Landscape Architecture and Planning, via telephone conversation, January 2003.

Personal communication, Dr. John Motloch, Professor of Landscape Architecture at Ball State University, Ball State University, Muncie/Indiana, September 2002 through April 2003.

Personal communication, Mr. Ray Rich, Property Manager of Grant County Irving Materials Inc. quarries, Pipe Creek Stone Co. and Pipe Creek Jr., Swayzee/Indiana, October and November 2002.