Bemidji State University Football Field Feasibility Report

May 15, 2012
Feasibility Study

Bemidji State University
Football Field

CERTIFICATION PAGE

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Date: May 15, 2012

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Executive Summary

The purpose of this Study is to satisfy the request by Bemidji State University (BSU) to determine the feasibility of renovating the existing Chet Anderson Stadium, BSU’s football field facility.

This Study is intended to provide a review and assessment of the available information, to perform planning level construction cost analysis, and to assist Bemidji State University in determining the feasibility of moving forward with this project.

This Study outlines three concept layouts for the proposed football field facility renovations. These layouts take into consideration of attempting to utilize existing structures. This process will allow for the ultimate development to occur in phases, while still having a functional facility. Each concept has positive and negative components which are listed along with the corresponding layout.

A cost estimate for the design and construction of the project is also included. The projected cost of the multi-use field facility is solely dependent on the amenities and features which are added to the site. A base cost is provided along with additional components to the project which should be carefully examined.
1.0 INTRODUCTION

Study Authorization
Karvakko Engineering, P.A. (KE) is pleased to provide this Feasibility Study for the proposed renovations to the Bemidji State University Football Field Facilities. Renovations would ultimately include the removal of the existing football field and supporting structures and replacing them with a new artificial turf playing field and new supporting structures. Karvakko Engineering, P.A. was procured by Bemidji State University to complete this Feasibility Study based on a proposal dated February 24, 2012 and a contract executed on March 8, 2012.

History
The existing Bemidji State University Football Field has been the home of BSU football since 1939. With its unique setting on Lake Bemidji, the stadium is in a prime location to capture the views which draw students nationwide to BSU, and allow players and spectators to experience the beauty of Northern Minnesota.

The original facility was built with a federal grant in the amount of $172,000 with the intended purpose of upgrading athletic facilities on campus. The stadium’s original construction consisted of concrete bleachers on the north and south side of the field allowing for a seating capacity of approximately 3,000 people.

Completed in 1941, the bleacher structures included a refreshment stand, first aid rooms, coaches’ offices, ticket booths and a passageway that was home to a 160’x11’ cinder track. Centered above the north side bleachers is an enclosed 14’x6’ press box which included a glass front to protect sports writers from weather conditions—a necessity for Bemidji football season.
Additional seating has since been installed, bringing the estimated capacity of nearly 4,000. While there have been other alterations and upgrades over the years, including a new scoreboard and grass playing surface in 1989, the main structures are the same today as they were nearly 75 years ago.

The facility was officially named the Chet Anderson Stadium on October 2, 1996, as a means of honoring Chester A. Anderson, Beaver Football Head Coach from 1955-1960 and again from 1962-1965. Under Anderson's lead, BSU was named Northern Intercollegiate Conference co-championships in 1957 and 1959.
2.0 PROJECT GOALS AND OBJECTIVES

Goals
It is our understanding that it is the intent of Bemidji State University (BSU) to explore the possibility of renovating the existing football field facility by 1) removal of one or both existing viewing stands; 2) removal of the track surface; 3) removal of the existing football field surface; 4) replace football surface with an artificial turf surface suitable for both football and soccer use; and 5) construct a new single structure stands to house the fans, press boxes, box seats, locker rooms and supporting infrastructure on the south side of the proposed field. We understand that it is the preference of BSU that the improvements are ready for use for the 2013 football season.

Objectives
Karvakko Engineering was tasked with completing the following:

1. A topographical survey of the entire football field facility and immediate surrounding areas. This was completed to determine site drainage, existing utilities and to determine if dimensionally there existed enough room to fit a new multi-use facility. Refer to Figure 1 for the topographic survey of the site.

2. Research of a suitable artificial turf. There are multiple methods and manufacturers for an artificial turf system. The greatest challenge is to maintain sufficient surface and subsurface drainage. The system(s) found and presented will ensure compatibility with BSU’s maintenance desires as well as suitability for use in the unique northern Minnesota locale.

3. Layout of proposed concepts. The multi-purpose field facility will be designed to be constructed within the existing constraints of the onsite buildings while still meeting the required dimensions required by NCAA regulations for both college football and soccer. This will allow for the optional phasing of construction of a complete facility.
3.0 EXISTING CONDITIONS

The results of the topographic survey conducted of the site are shown in Figure 1. The constraints of the survey extended from the northern edges of Hagg-Sauer and Bridgeman Halls to Diamond Point Park and from the western shores of Lake Bemidji through the American Indian Resource Center to Birchmont Drive.

Some of the notable items captured in the survey include portions of Hagg-Sauer hall, portions of Bridgeman Hall, the American Indian Resource Center and parking lot, the western shore of Lake Bemidji, the BSU Maintenance Road, the Lake Bemidji West Shore Trail, and the southern features of Diamond Point Park. Also located and mapped under the survey were utilities including: storm, sanitary, water, sprinkler, and electric utilities. Figure 1 also shows the existing ground topography on the field and the surrounding area.

The existing west end of the football field is approximately only 6" higher than the east end zone. The existing playing surface also has a crowned cross section. The center of the field is approximately 1-2 feet higher than the edges with a 2% cross slope.

The track that surrounds the football field is a cinder surfaced track that encompasses the football field. The track runs between the field and the stands on the north side of the field and on the south side of the south set of stands. It has been noted that if the field is renovated with an artificial turf playing field surface it is desired that the track is removed as it is not needed for use by the college anymore.
4.0 PROJECT ALTERNATIVES

Proposed Field Requirements:
The National Collegiate Athletic Association (NCAA) has specific requirements and guidelines for athletic fields used in college sports. Football fields have very specific dimensions, while soccer fields leave some field dimensions and options up to the individual school and its facilities. The soccer field dimensions will need to be discussed in further detail before proceeding with the proposed field design. Constructing the size of soccer field desired may impact the feasibility of phasing an artificial turf field project. Overlaying the soccer and football fields on the same footprint will create a unique circumstance. It should be noted and understood that the field lines for both sports will be overlaid upon one another. Each sport will have to understand that this is a limitation of the artificial turf system as the lines are not painted onto the field; rather the striping is pre-installed and cannot be removed to accommodate each individual sport.

The footprint of an NCAA regulation football field is 384’ long by 184’ wide. The 384’ length accounts for the 100 yard field, two 10 yard end zones, and a 12’ buffer zone on each end of the field. The 184’ width accounts for the 160’ wide playing surface and a 12’ buffer zone on each side of the field. In addition to this width, there needs to be room for a coaching and team area along each side of the field for the home and opposing team.

As discussed above, the footprint of an NCAA regulation soccer field can vary. The total width of a regulation soccer field varies between a minimum of 195’ and a maximum of 240’. Also a 20’ buffer zone is required along each sideline of the field. The total length of the field can vary between 330’ and 360’. A 20’ buffer zone is also required behind each of the goals. The minimum size of newly constructed field is 210’ wide by 345’ long; with the 20’ surrounding buffer zones factored in the total minimum footprint of a proposed soccer field is 250’ wide by 385’ long. It should be noted that these size regulations are an NCAA administrative rule and may be altered by prior written mutual consent.
The total minimum footprint required for a shared football/soccer facility is 250’ wide by 385’ long or 96,250 square feet (2.21 acres). The NCAA has regulations for striping that will have to be accounted for if the two fields are overlaid. The Proposed Construction Alternatives Section discusses in further detail how the minimum footprints of the fields relate to construction phasing alternatives.

**Artificial Turf Field Options:**

While researching artificial turf options, one company stood out amongst its competition by offering a high quality product that is required for this project and for the University. FieldTurf has installed artificial turf fields for playing or practicing for at least 21 of the 32 NFL teams (including the Minnesota Vikings), over 100 D-1 NCAA schools, and over 1,000 high school fields. Our research indicated that no other artificial turf companies offer the same quality and dependability that FieldTurf can offer for an artificial turf field. For their superior surfaces that have been chosen by so many other organizations, we believe that a FieldTurf surface would be the most ideal playing surface for a football/soccer field on the BSU campus. If it is desired by the University as the project moves forward, other artificial turf sources could be brought in to showcase their products for a comparison against FieldTurf.

The most important part of an artificial turf field installation, regardless of the brand of field, is the sub-surface drainage. It is critically important for wet-weather functionality as well as longevity of the structure that the field is well draining. This is further complicated by the relatively flat topography that is desired for the field surface. The sub-surface drainage of an artificial turf field on the BSU Campus will be particularly challenging to design due to its close location to Lake Bemidji and the high water table that exists in the area immediately adjacent to the lake where the field is located. Our research into the sub-surface drainage possibilities do show that it will be feasible to install an artificial turf playing surface on the site of the existing football field.

The sub-surface drainage can be achieved through a series of specific well-draining layers of coarse rock placed under the field incorporated with piping system to drain the excess water away from the field area.
quickly. It would be recommended that during the design phase of the project that soil borings be performed in the area so that the exact sub-structure for the field can be designed based on soils encountered and water table depth found from the borings.

**Proposed Construction Alternatives:**

Three potential alternatives exist for the construction of a multi-sport artificial turf field on the site of the existing BSU football field. The three alternatives allow for multi-phased construction to provide options to allow for construction based on available funding and construction timelines. Each of the alternatives has positives and negatives including project costs, ease of maintenance, construction time, field use availability, facility amenities, and spectator experience.

The first alternative is to demolish both sets of stands, remove the track, construct the artificial turf playing field, and construct new stands on the south side of the field. Incorporated into the stands would be an athletic facility including locker rooms, coaching facilities, maintenance facilities and other amenities to be identified during design. It is our understanding of the project that this option is the ultimate goal of the project.

This alternative would create a new, improved spectator experience, while providing a player-friendly field with improved user-friendly facility amenities. Also, one main benefit of this option is the flexibility that is available for field placement and soccer field size. This option would provide the most opportunities to build the facility as desired by the University. The downsides to this alternative include a longer funding and design time. It would most likely take additional planning and design time to implement a facility that meets the needs of BSU athletics for years to come. Besides the design time and additional upfront costs of constructing this alternative, it would be difficult to accomplish construction of the full project without disrupting part of a season of sports.

The second alternative would demolish the track and the stands on the north side of the field and construct the artificial turf playing field. In the future the south stands could be removed and replaced with the new athletic facility and stand structure. This alternative is depicted in Appendix A, Concept 1.
This option is undesirable as there would not be adequate seating capacity in the near future before the new stands could be built. Also, it is our understanding that some seating areas in the north stands have been recently improved and it would be undesirable to lose these areas without having a place to relocate them to. One option that would help to alleviate the strain on the seating shortage would be to install temporary bleachers along the north side of the field. It may be possible to utilize existing portable bleachers that the university has or it would be possible to rent or purchase additional bleachers for temporary use. The best option for bleachers would most likely be dependent on future plans for the south stand replacement portion of the project. The positives of the second alternative include flexibility in placement and size of the fields while minimizing the design and construction time while reducing upfront construction costs.

The third alternative would remove the track, leave both the north and south stand structures in place, and place the artificial turf fields between them. This alternative is depicted in the Appendix, Concept 2. This would create some issues with the placement and use of the soccer field. The distance between the existing stands is 230 feet. The minimum distance required for new construction of an NCAA soccer field is 250 feet. It may however be possible to either get a variance from the NCAA for a smaller field, or depending on the size and location of the field, it may be possible to not use the soccer field until the rest of the facility can be upgraded to allow the appropriate buffer zones around the field.

The most alluring aspect of the third option is the cost and quickness of design and construction. However, with the construction of this option, some recessions will have to be made by the University, the players, and the spectators. The location and size of the fields constructed as well as the immediate amenities surrounding the field will be dictated by the constraints of placing the field within the defined footprint that is determined by the existing stands. There will be minimal flexibility in how the fields can be positioned to achieve all of the necessary size regulations.

Regardless of the alternative chosen, it will be important to have a plan of the ultimate facility in mind prior to the design phase of the project. It will be cost efficient for the University to provide the necessary support infrastructure including water, sanitary, storm, electric, and communication utility installation prior to the field being placed.
5.0 COST ESTIMATE

The cost of constructing this project can vary depending upon many aspects of the project. Several factors will influence the amount that a new artificial turf playing surface will cost. The cost of the project is driven by the amount of renovation that is desired as well as the phasing of the construction work.

We have broken down some of the major costs that could be anticipated depending on the project alternative that is chosen by BSU. The artificial turf surface itself is estimated to cost between $500,000 and $550,000. The field subgrade preparation and drainage infrastructure are estimated to cost approximately $450,000 to $500,000 which would also include removing the existing track surface and some minor surface infrastructure work to tie the new field into its surroundings. Also it can be assumed that project design, management, and contingency can account for 20% of the total project cost. With these figures in mind the minimum investment to have an artificial turf multi-use field on the current football field location would be approximately 1.14 million dollars to 1.26 million dollars.

The estimated project cost above does not include many project amenities or options that are discussed in the above project alternatives. Some of the items that are not included in the estimated cost include; building demolition and hazardous materials abatement, building construction and/or renovations, perimeter fencing, field lighting, and site utility improvements. Depending upon the degree of improvements desired the potential cost for the field could potentially increase significantly.

A site utility plan should be a part of any of the alternatives chosen or any field construction. With the complex sub-surface structure that is being built to support the field surface and provide drainage, it is important to have the foresight during the design phase to look at the underground infrastructure that needs to be installed for both present and future construction plans. Figure 2 depicts the existing utility infrastructure surrounding the football field and shows the location of existing water, sanitary, and storm utilities that may have to be adapted to fit the ultimate construction of the multi-use field facility. Although the upfront cost of the utility work may seem expensive for future development, it is crucial that the utilities are installed as installation in the future will prove costly if existing infrastructure is in the way of the installation.

Maintenance costs of the football and soccer field facility are an important aspect to consider when looking at the long-term cost/benefit of an artificial turf field versus a natural turf field. The biggest maintenance cost saving benefit that an artificial turf field provides is that there are no mowing and
watering activities that are required to maintain pristine playing surfaces. With an artificial turf field there are still maintenance activities that must occur on a regular basis as recommended by the manufacturer, however, the labor and cost of these maintenance activities is far less than that of a natural turf field. The typical lifespan of a turf field is 10 years. Artificial turf fields are known to last much longer than their designed lifespan, however for budgeting the 10 year lifespan should be taken into account. Another factor to take into account that is difficult to quantify is the durability and availability of an artificial turf field the playing surface is virtually available at all times for use versus a natural turf surface where wear is a perpetual concern.
4.0 BIBLIOGRAPHY


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