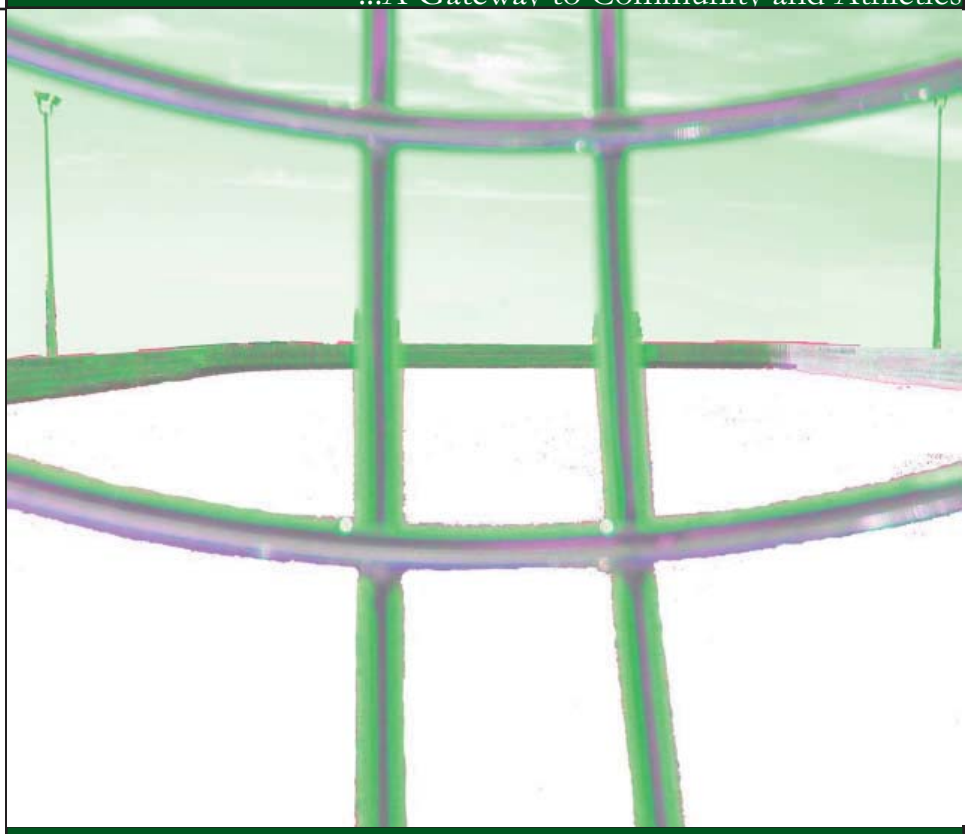
NDSU Hockey Arena

...A Gateway to Community and Athletics



North Dakota State University

Department of Architecture and Landscape Architecture

Architectural Thesis 2004-2005

Jesse J. Helland

NDSU HOCKEY ARENA...A GATEWAY TO COMMUNITY AND ATHLETICS

A Design Thesis Submitted to the
Department of Architecture and Landscape Architecture
of North Dakota State University

By

Jesse J. Helland

In Partial Fulfillment of the Requirements
for the Degree of
Bachelor of Architecture

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May 2005
Fargo, ND

NDSU Hockey Arena

...A Gateway to Community and Athletics

Fargo, North Dakota

NDSU Club Hockey was established in 1983. The success of the program was seen at a national level as NDSU teams won national championships in seven of their first eight seasons. With the help of faculty and students, the club was re-established during the 2003-2004 season by organizing a competitive team that played many top level clubs in the region. This season marks the first American Collegiate Hockey Association (ACHA) sanctioned schedule since 1999. As NDSU ventures into Division I athletics, there will be a large demand for a facility that will accommodate a large number of fans. This thesis project will be the design of a large-scale hockey arena in Downtown Fargo.

The site for this design is located in the heart of Downtown Fargo between First and Third Avenues north along Second Street and from Second Street to Third Street in downtown Fargo. This site will provide the setting for the union between NDSU and the community. This design will contribute to the sense of civic pride by giving a venue to the re-established hockey program at North Dakota State University. Through the analysis of this site and the study of the function of the facility, the design will concentrate on a

a number of important elements including context, structure, innovation and circulation. It will open the door to other events in the community and foster a partnership with many other downtown businesses. The design solution for this proposed project will meet the needs of the Fargo-Moorhead community and North Dakota State University by proving that organized athletics is part of a Civic Culture and informs Architecture.

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The design of the new NDSU Hockey arena is a thesis on large-scale, long span construction using the function of hockey and other athletic functions to unite the Greater Fargo-Moorhead communities. New construction of hockey arenas has boomed across the country in the last decade. Many universities and hockey organizations are building arenas with amenities for hockey and other sports like no other time period in the history of American athletics. Designers have been sensitive to athletes, spectators, building operators and the building's context and surroundings.

This facility will allow the community to unite for sports and many other activities in various ways. The intention of the arena is to bring our diverse community together for the enjoyment of hockey. The fan support for the University of North Dakota hockey team in Grand Forks, ND is important to the sense of pride and unity in that community. My goal in this thesis project is to design a facility that would give the Fargo-Moorhead community the same sense of pride and the same opportunity to facilitate a sporting event that unites the Red River Valley for the same reasons as Ralph Engelstad Arena in Grand Forks does.

This design will contribute to the sense of civic pride by giving a venue to the re-established hockey program at North Dakota State University. This facility will allow the fans that travel to Grand Forks to stay in Fargo and support NDSU athletics and other functions in Fargo.

The design of this facility will be the most state of the art of its kind in the area. Some of the arenas that will be similar to the NDSU Hockey Arena in the area will be Ralph Engelstad Arena in Grand Forks, ND, MTS Centre in Winnipeg, Manitoba and the Excel Energy Center in St. Paul, MN.

This thesis project will be the initial stepping stone to bringing the Club hockey program at NDSU to the national spotlight. The facility will catapult the hockey program and promote awareness in the University. The result one day will be a move to Division I hockey following the rest of the athletic programs.

My thesis project is a hockey arena for NDSU hockey for North Dakota State University and the Fargo-Moorhead community. This is a large-scale, long-span athletic arena designed primarily for the function of housing hockey games. Many other functions including concerts and other community and athletic functions will also take place in this facility. The building will respond to the historic context of downtown Fargo while fulfilling the technical and structural needs of this a large facility. The hockey arena will be used by North Dakota State University as the home to the men's and women's hockey teams. The new NDSU Hockey Arena will also serve as a venue for other sports, such as basketball, volleyball and wrestling on a part-time basis. This facility will serve as a fixture for the center of downtown and compliment many other buildings in close proximity such as the Fargo Civic Center. The design of the building will be large enough to support hockey at the NCAA Division I level as well as house all of the necessary support spaces.

North Dakota State University has gone through a very unique and challenging transition in the last two years. All of the athletics have made the transition from NCAA Division II to NCAA Division IAA. This is an exciting transition that has brought many changes and challenges to the University.

The theoretical basis, or unifying idea of this thesis is to explore contextual relationships as they relate to this new long-span, large-scale structure filling a gap in Downtown Fargo. The new NDSU Hockey Arena will be a destination for members of the Fargo-Moorhead community and visitors; alike supplying year-round attraction for tourism. It will enhance Fargo's quality of life, community recreational options and provide a vital asset for encouraging businesses to expand and help to establish the Fargo Renaissance Zone. Fargo's downtown is changing for the better, and this significant new project provides the power to accelerate this positive change and bring thousands more people downtown on a regular basis. This design will serve as a union for the building as it finds its place in the downtown setting as well as for the people who use the building as they will unite for the athletic functions of the building and celebrate Fargo's historic architecture downtown.

The basis of this thesis project is to design a large-scale, long-span structure and transition space in the historic downtown district of Fargo. The design will incorporate the best features and spectator amenities of the many new-generation sports centers built across North America in the past decade.

One area of emphasis for the project is the master plan of the site which will include many functional elements. The first element is the main arena. This will be the major fixture on the site. It will also be accompanied by an outdoor plaza that will act as a link to many of the other businesses downtown and the adjacent Fargo Civic Center.

Another major emphasis of the project will be the design of the structure. This will be very important to the appropriate function of the building. The arena will be a long span structure that will be constructed out of steel. It will span approximately 150' by 250' in the main arena. This will be supported by the rest of the structure that will house the support services.

A third area of emphasis will be on the treatment of the sensitive scale and functional issues of the streetscape image of downtown Fargo. This building will not only fit into the context of downtown, it will have to function at the same physical level as the rest of the buildings in this area of downtown. In order to accomplish this, many factors will have to be considered in the design such as Americans with Disabilities Act (ADA) requirements, excavation levels and transitional streetscape treatments.

The dynamic differences in functions of buildings in Downtown Fargo is great. Appropriate attention to detail and exterior scale and appearance will help my building mesh into the current context.

The exterior of the building is very important, but the primary function of the building is just as important of an emphasis. The interior of the building will be a state-of-the-art sports facility. This facility will cater to the training (both on ice and off) of the athletes as well as the comfort of the spectators and other users. This design will accommodate both the interior and exterior design elements of this project to make this the best place in the world to watch a hockey game.

The main major function of this facility will be to support a large number of people to see a hockey game. A majority of the space will be spectator seating and the ice sheet itself. There will also be luxury suites and training rooms for the athletes, support spaces for the arena, concourse and concession spaces and administrative offices. In order to display the history and tradition of NDSU Bison hockey, I will include a pro shop and a tradition hall displaying photos of players and significant games from the past. The pro shop will provide fans the opportunity to buy novelties, sports memorabilia and apparel.

The treatment of the outdoor spaces will also be very important. In order to link the two communities, I will design a plaza at the entry of the building with direct sight lines to Moorhead and downtown Fargo. Because the site is zoned Downtown Mixed Use (DMU), adequate parking is not a requirement. However, because of the large amount of people using this facility, I have decided to provide parking both on the site and also on two adjacent sites. The site directly to the north will be where I will develop a parking ramp that will provide parking for games and provide spaces to local businesses and city employees being displaced by the addition of the arena. The site directly to the south will be partially used for facility parking and handicap parking. Utilization of public transportation and other downtown parking structures and spaces will be critical for the optimal usage times of the arena. Because of the grade of the site, I won't need to develop any ADA accessiblity features.

The outdoorplaza will be large enough to support large gatherings and be a place for vendors to sell NDSU novelties and apparel to those entering the hockey games.

This facility will be one of the best in the country and will designed to promote NDSU as well as the community. The pro shop and tradition hall will both promote the University and its function in the facility. The concession areas will be strategically located throughout the arena concourses to promote the sale of concessions and novelties.

There will be a large amount of money spent on many digtal components to the arena that will be used for displays and graphics. One of these components will be an eight sided digital scoreboard that will show the play of the game as well as a score clock. There will also be a large screen band that will go around the main seating bowl perimeter that will be used solely for promoting NDSU and generating revenue through advertisement.


FARGO
NORTH DAKOTA
CITY OF PARKS
WELCOMES YOU
HAVE A SAFE AND HAPPY DAY

The NDSU Hockey Arena will be designed as a public facility used by the members of the cities of Fargo and Moorhead and surrounding communities. The arena will be owned and operated by North Dakota State University.

Personnel will be comprised of facility operators (four), coaches and staff (ten), student-athletes (50), university staff (ten) and facility managers (three). At peak usage, the arena will hold 8,000-11,000 people that will include the above facility personnel as well as event spectators. The facility operators will be responsible for maintenance and cleaning of the facility daily and especially before and after large events in the arena. The coaches and hockey staff will use the arena as a headquarters for practice, games, recruiting and training. The student-athletes will use the arena for practice, games, training and educational opportunities. This facility will also be a base for many university officials such as members of the athletic department. Athletic department officials will use the arena for marketing NDSU and the athletics department. Facility managers will use the arena to manage the day-to-day activities of the arena and also as a hub for marketing the arena and events. They will use this facility to draw exhibition sporting events, concerts and athletic/conference tournaments in addition to seasonal hockey functions.

The NDSU Hockey Arena will be in operation during hockey games, practice, and other athletic and public events. It can also be used for tours and events which only use a portion of the facility.

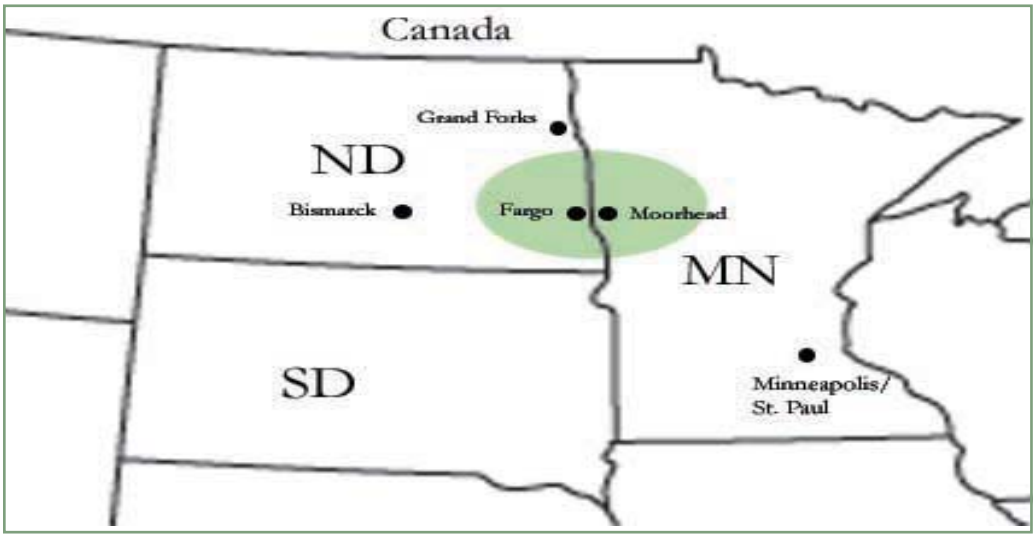
Parking will be an issue. Because the facility is classified as a downtown mixed-use facility, it can utilize many of the other parking facilities downtown.

Thousands of parking stalls are available in downtown within a five-minute walk of the site. In extreme cold or long distance parking, shuttle transportation will be provided to get people from parking lots to the arena during times of optimal use. On site parking will be available for regular employees of the facility.

The Fargo-Moorhead community is growing at a rate never-before seen. NDSU is also expanding in a new direction. The 2004-2005 school year marked the first year of the NDSU downtown campus which consists of the art and much of the architecture departments.

In order to stay in touch with the growing community and the university, I have decided to build this project on a site downtown. I envision an arena that will find itself in a central part of the community as well as a convenient space in the urban and university setting. This arena will bring awareness to the changing and growing downtown and will act as a link between the downtown campus and the main campus.

(Image obtained from www.usmaps.com. Modified by Jesse Helland.)



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Fargo-Moorhead as a metropolitan area has a population of approximately 170,000 people. This includes the greater Cass and Clay county areas. The city of Fargo itself has a population of approximately 73,000 people.

The top aerial photo shows a macro contextual view of downtown Fargo, including many of the surrounding residential areas. The boundaries of this photo are Eighth Avenue N., Main Avenue, Roberts Street on the West and the Red River and Moorhead, MN on the East. This photo shows the Downtown Fargo business district along Main Avenue and Broadway.

(Photo obtained from the City of Fargo Engineering Office. Modified by Jesse Helland.)

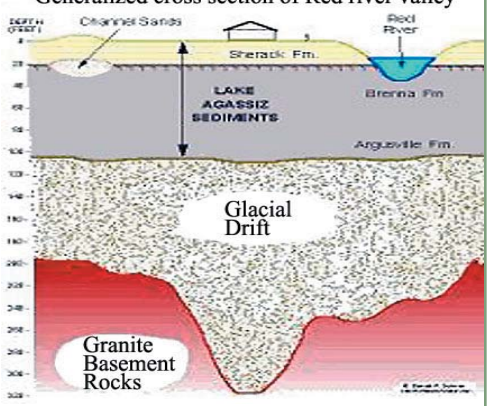
The bottom aerial photo shows a micro contextual view of the site. The photo shows the major built features influencing the site including the Fargo Civic Center and the Radisson Hotel. The major lines of transportation close to the site including First Avenue which links Fargo to Moorhead and Second Street and Fourth Street which are main North and South streets for this part of downtown.

(Photo obtained from www.terraserver.microsoft.com. Modified by Jesse Helland.)

The soils in the downtown area vary in composition. Much of the topsoil is composed of sand, silt and clay found in the Red River Valley that are deposits from ancient Lake Agassiz. There are three major layers to the stratigraphy beneath the surface that we are concerned about. Directly below the surface is the Sherack layer composed mostly of Lake Agassiz sediments. The next level down is called Brenna which is a transition layer that leads to glacial drift from past ice ages. Below that is a granitic layer that is incredibly stable and resembles the stability of mountainous regions in the United States. The substrate conditions of the soil of this site are very plastic and weak. This is due to the many layers of clay and its ability to absorb large amounts of water. The composition of the soil on the basin of the Red River Valley is almost 50/50 silt and clay which creates a liquid or fluid state in the soil. This creates very hazardous surface conditions for building and erecting structures. Clays are inherently weak and create a surface that is incredibly unsafe and unstable. The soil is usually deep (over 100 feet in most places to bed rock or glacial till) and poorly drained due to the adjacent streams and rivers and the glacial formation of the region.

The hydrologic systems of the site are dictated by the natural body of water in the region, the Red River of the North. This provides much of the water for the city and downtown. It is also the main draining destination for water that is collected in the city's storm water drainage system.

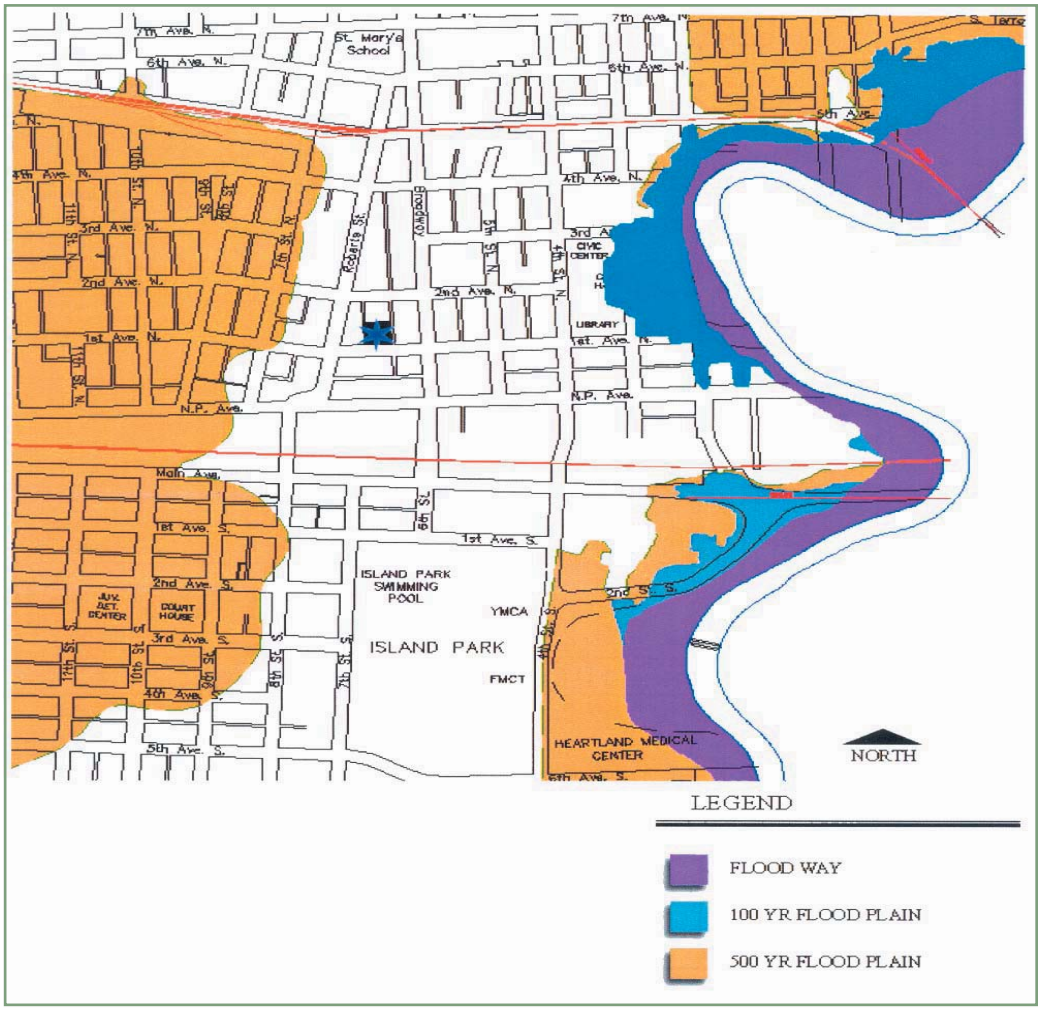
Generalized cross section of Red river valley



(Image obtained from www.usgs.gov.)

The site for this project is relatively flat and contains little or no topography. Vegetation is limited to street-side trees and storefront plantings. The design of the new NDSU Hockey Arena will include a plaza to compliment the existing plaza on the current Civic Center site. Because of the lack of vegetation, there is little or no natural acoustic barriers.

Because the site is located adjacent to the Red River, it is susceptible to flooding. However, according to Fargo's city planners, it is not in the city's protected 100 year flood plain.



(Image obtained from www.ci.fargo.nd.us. Modified by Jesse Helland)

The Upper Midwest has a very diverse climate. The climate ranges from very cold and relentless winters to many months of extreme heat in the summers. This environmental element is a key consideration to the design of a successful facility. The design of the new NDSU Hockey Arena will take into account the diverse climate conditions of the region and will meet the needs and expectations of the users during extreme times of the year.

In winter months, winds generally come from the North West. The summer months bring an almost constant South wind. Since Broadway is on a north-south axis, the same direction that the major winds blow, the tall, tightly spaced buildings do have an effect on how hard the wind blows down this street. This will be a major consideration in designing the orientation and exposure of major design elements such as the building plaza and building entrances and exits. Because Fargo is in the northern hemisphere, optimal solar orientation will be in the summer. The least optimal solar exposure will be in the winter.

View of site from Southwest corner in fall and in winter, respectively.

The annual average temperature ranges from about 37° F in northeastern North Dakota to 44° F along most of the southern border. However, annual averages are misleading because they hide the large seasonal temperature variations common throughout the state. January is the coldest month with average temperatures ranging from near 0° F in the northeast to 15° F in the southwest. The warmest month is July when average temperatures range from 65° F in the northeast to 71°- 72° F in the south. However, average August temperatures are only 1 to 2° F less than July's. The average annual temperature range (difference between July and January average temperatures) is very large, ranging from about 65° F in the east and northeast to 56° F in the southwest. It clearly illustrates the pronounced continental climate of the region.

Summer days are usually warm or even hot on occasion. The average number of days per year with maximum temperatures of 90° F or more range from 10 in the northeast to 24 in the west and south. Temperatures of 100° F or more occur nearly every year somewhere in the state, but they are most prevalent in the drier southwest and south-central regions where they average about two days per year. In the wetter east and northeast regions 100° F occurs only about 1 day every 4 or 5 years. The highest temperature ever recorded was 121° F at Steele, ND on July 6, 1936.

Winter temperatures are extremely variable in North Dakota depending on the air mass source and the extent of snow cover. In most years snow cover is widespread and when combined with arctic air masses, very low temperatures are common.
Below 0° F temperatures average about 40 to 70 days each year across the state. The lowest temperature ever recorded was minus

60° F at Parshall, ND on Feb 15, 1936. However, in years with little snow cover, air masses from the west or south produce winter temperatures in the 40s, 50s, and even 60s. For these reasons winter frontal passages often cause drastic temperature changes. Below 0° F temperatures have occurred as early as late October and as late as early April. Similarly 90° F days have occurred in April and October in some years. As is evident from these winter and summer extremes, autumn and spring frontal passages often cause high winds and extreme weather conditions.

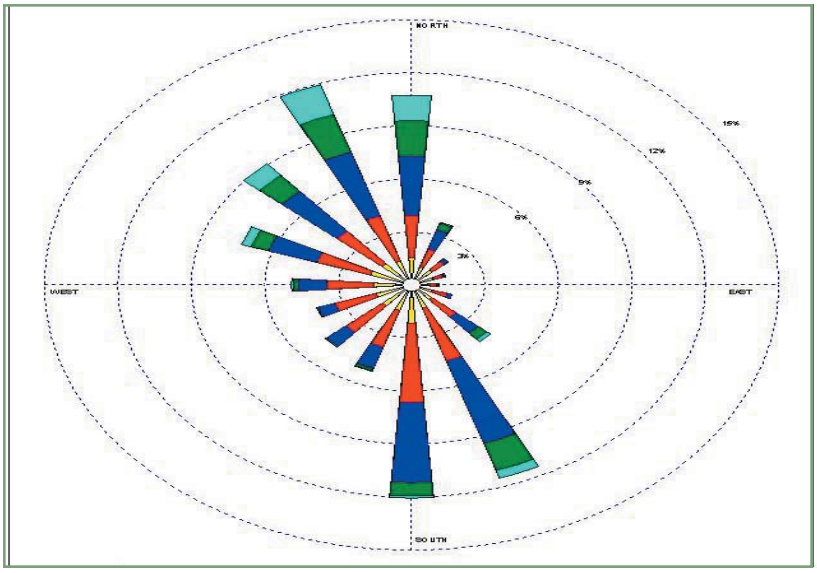
The average date of the last freeze in spring ranges from May 15 in the south to late May in the north and northeast. In the fall the first 32° F or lower temperature occurs between September 10 and 25. However, freezing temperatures have occurred as late as mid-June and as early as mid-August.

Average annual precipitation ranges from about 14 to 22 inches from northwestern to southeastern North Dakota. This increase reflects the decreasing distance to the Gulf of Mexico which is the water source for most of the state's precipitation. On average, about 75 percent of the annual precipitation falls between April to September, and 50 - 60 percent falls during April through July. The coldest months, November through February, average only about 0.50 inch per month, mostly in the form of snow.

Measurable precipitation (0.01 inch or more) occurs on an average of 65 to 100 days during the year, but over 50 percent of these events produce less than 0.10 inch. Although there are fewer precipitation days in the northwest, there is no defined rain day pattern across the state. Most of the summer rainfall is produced

Most of the summer rainfall is produced during thunderstorms which occur on an average of 25 to 35 days per year. On the average, it rains on one of every 3 or 4 days during the summer.

Despite its northern location, North Dakota's annual snowfall of 25 to 45 inches is less than other northern states. The average date of snow cover is late November to early December. Blizzards do not occur frequently in North Dakota. On the average there are only 2 to 3 blizzards per year in North Dakota. Blizzard conditions seldom last more than 2 days. However, a few famous blizzards have persisted for 4 days or more.



January Wind Rose
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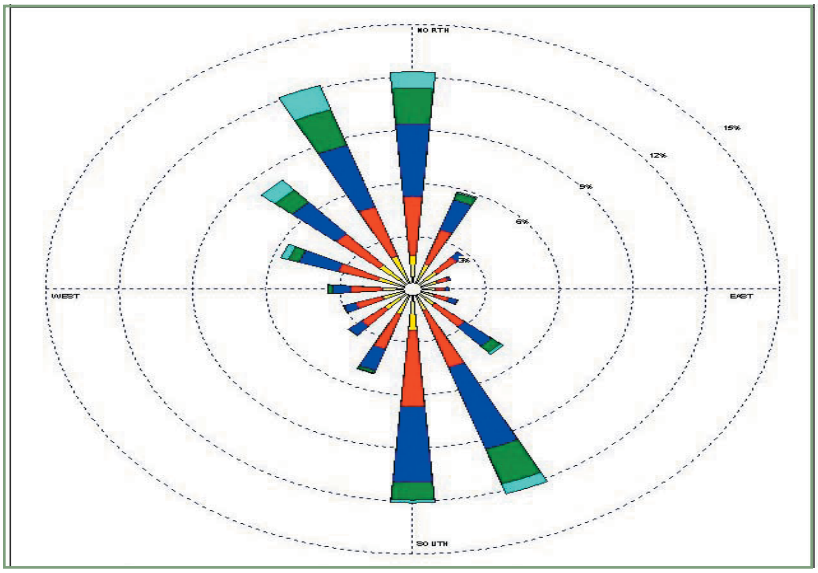

February Wind Rose
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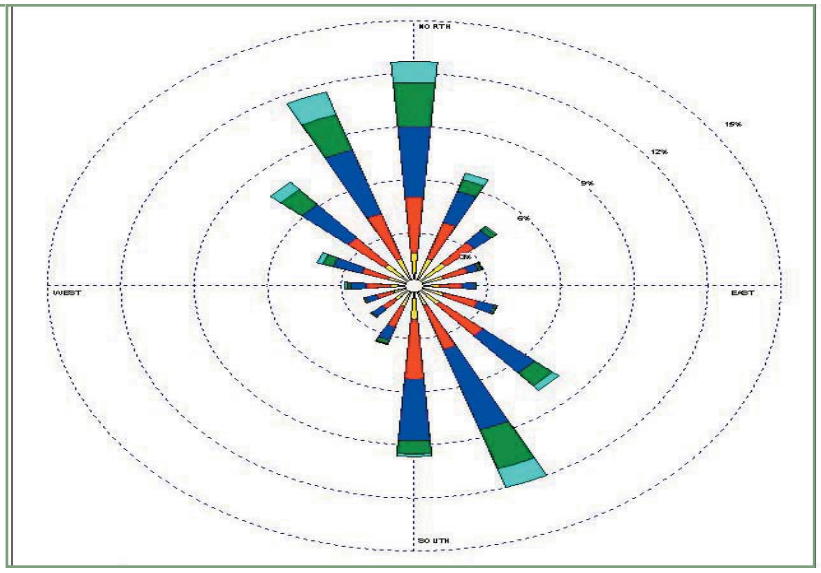

March Wind Rose
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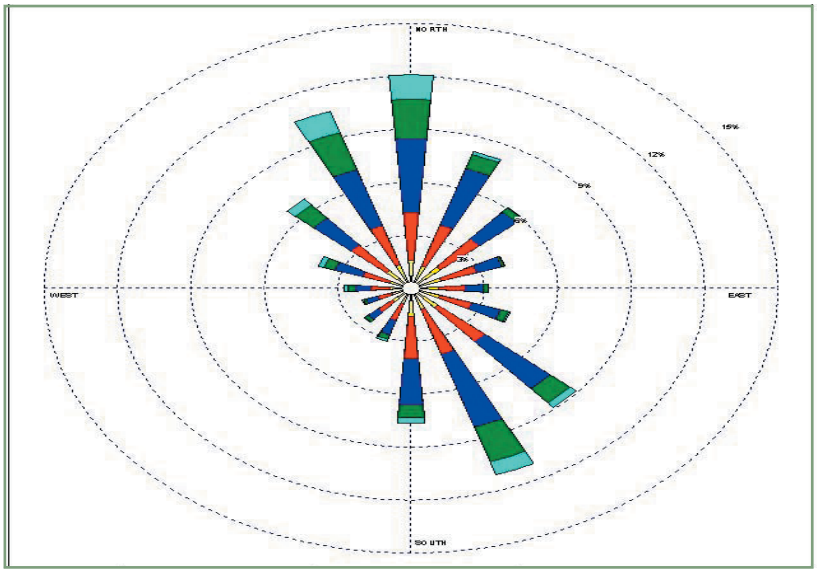

April Wind Rose
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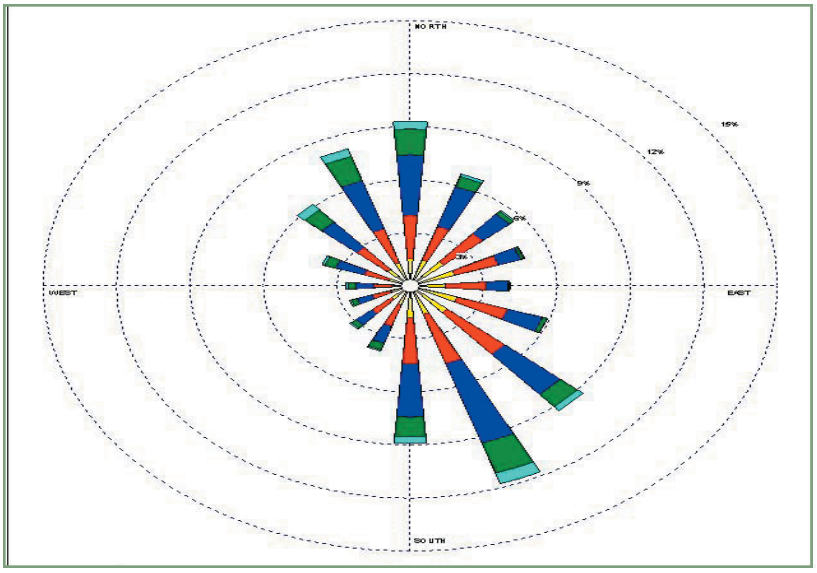

May Wind Rose
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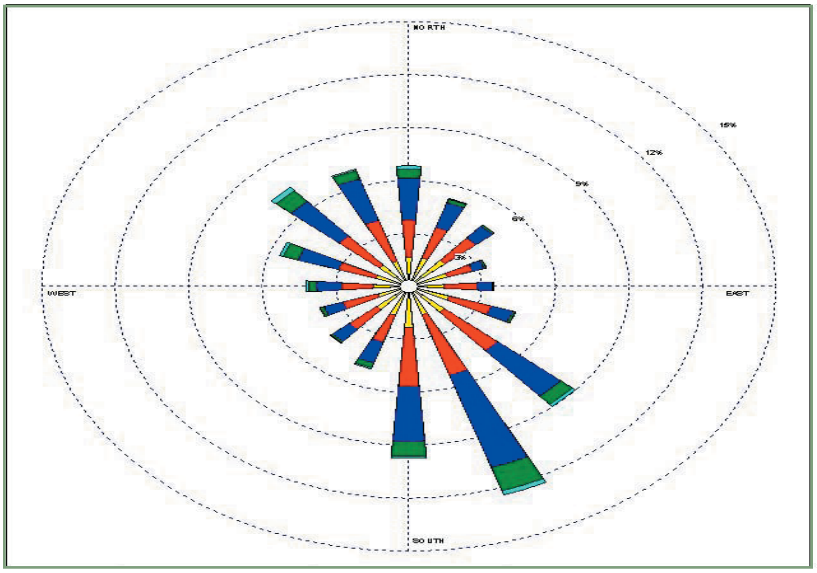

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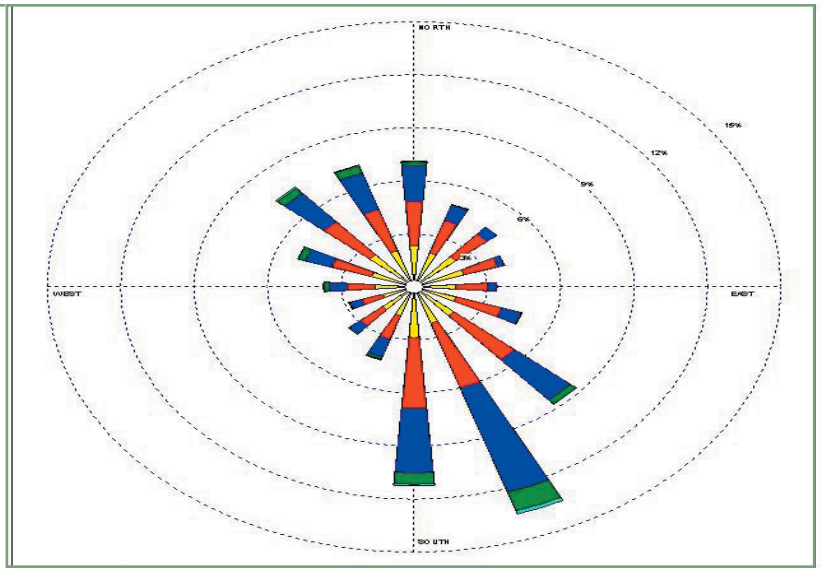

July Wind Rose
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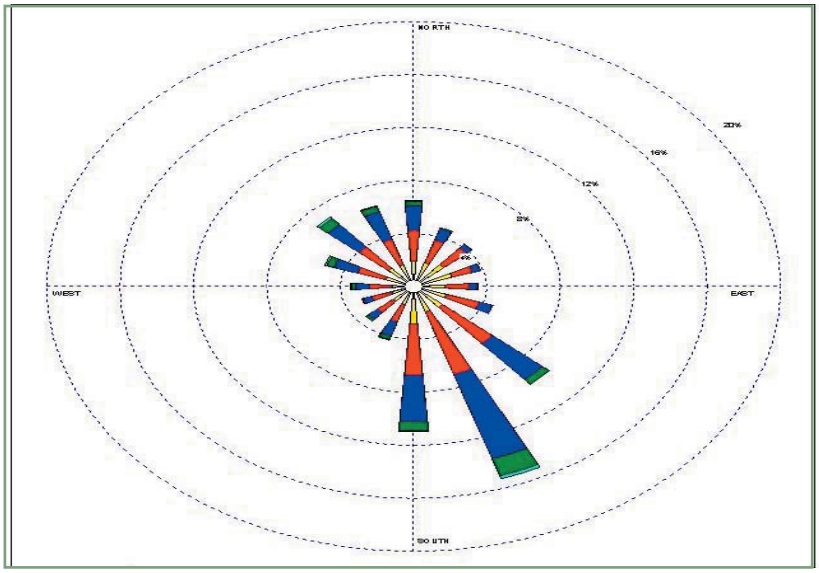

August Wind Rose
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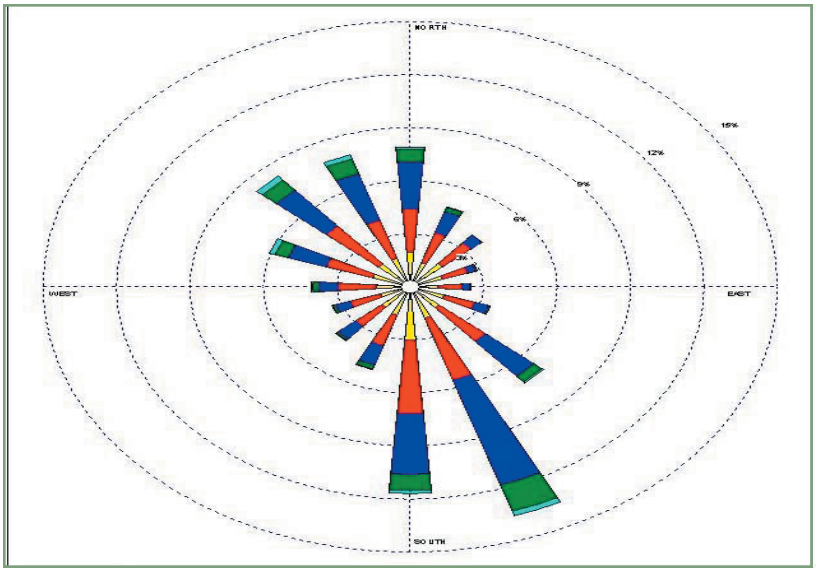

September Wind Rose
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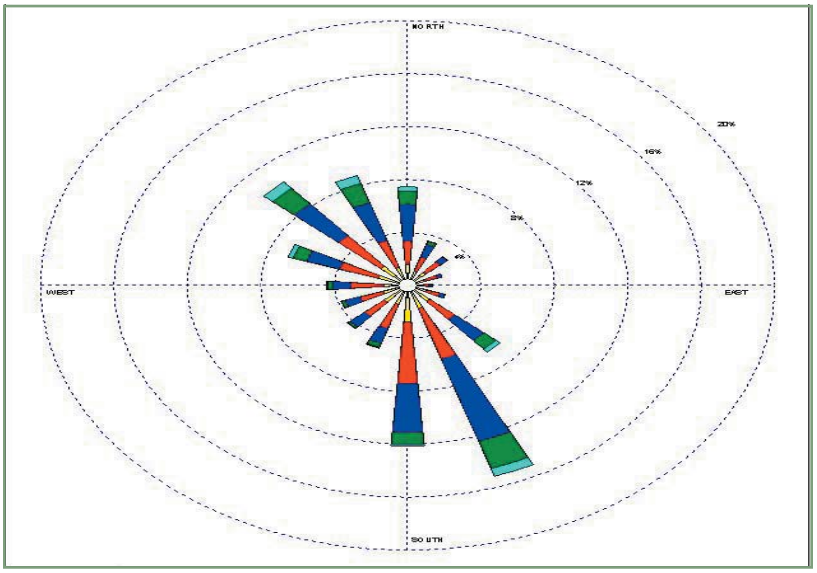

October Wind Rose
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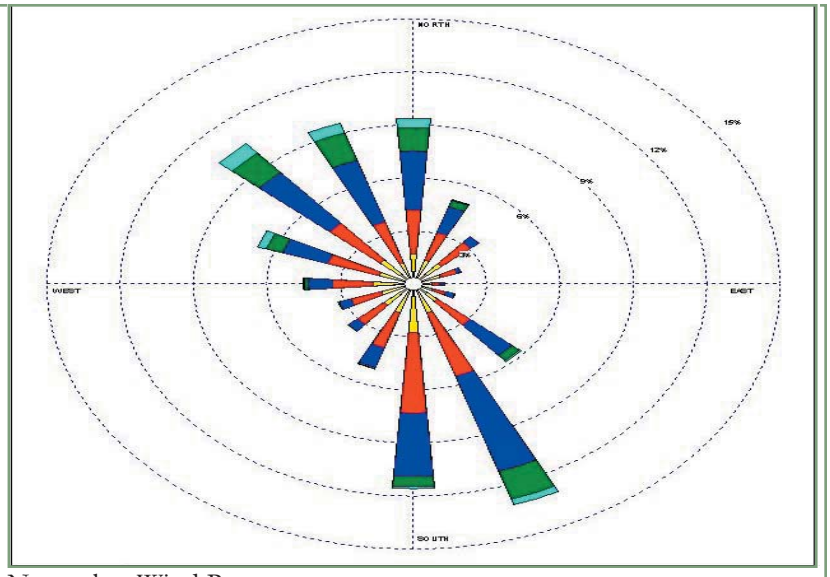

November Wind Rose
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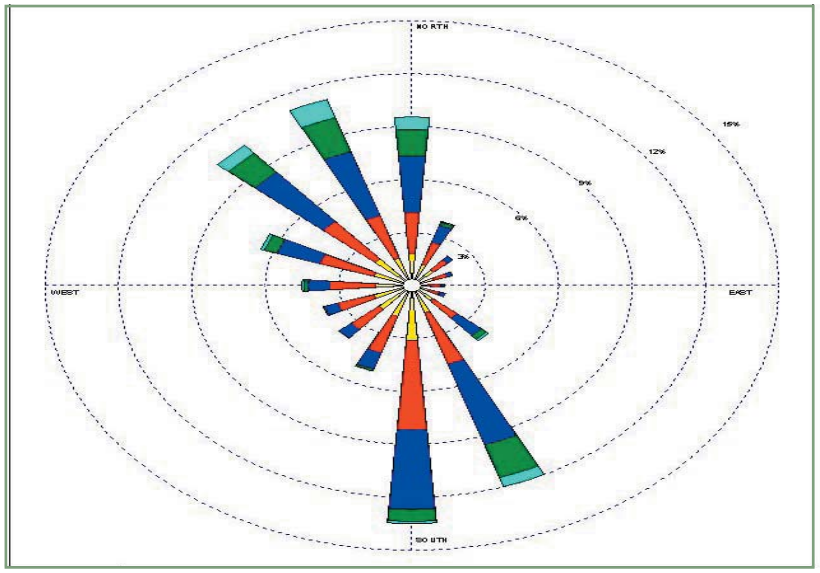

December Wind Rose
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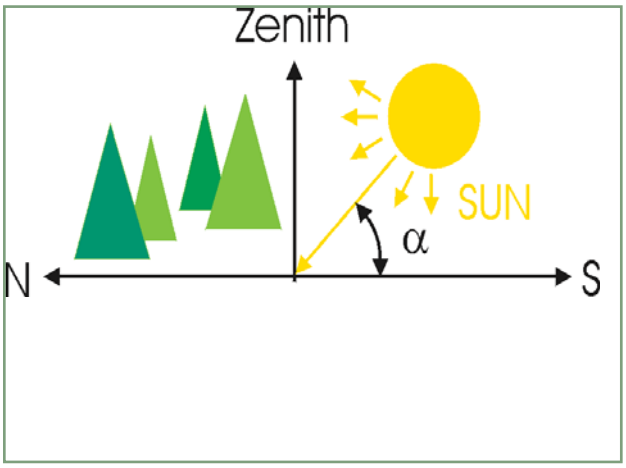
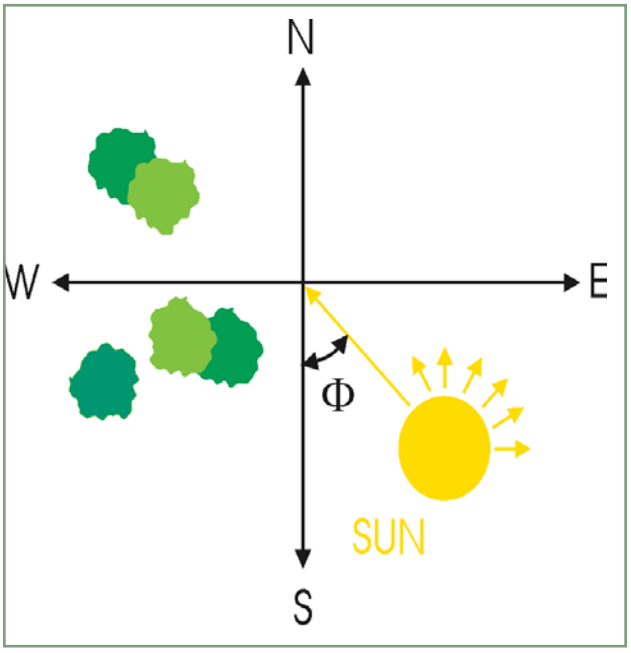
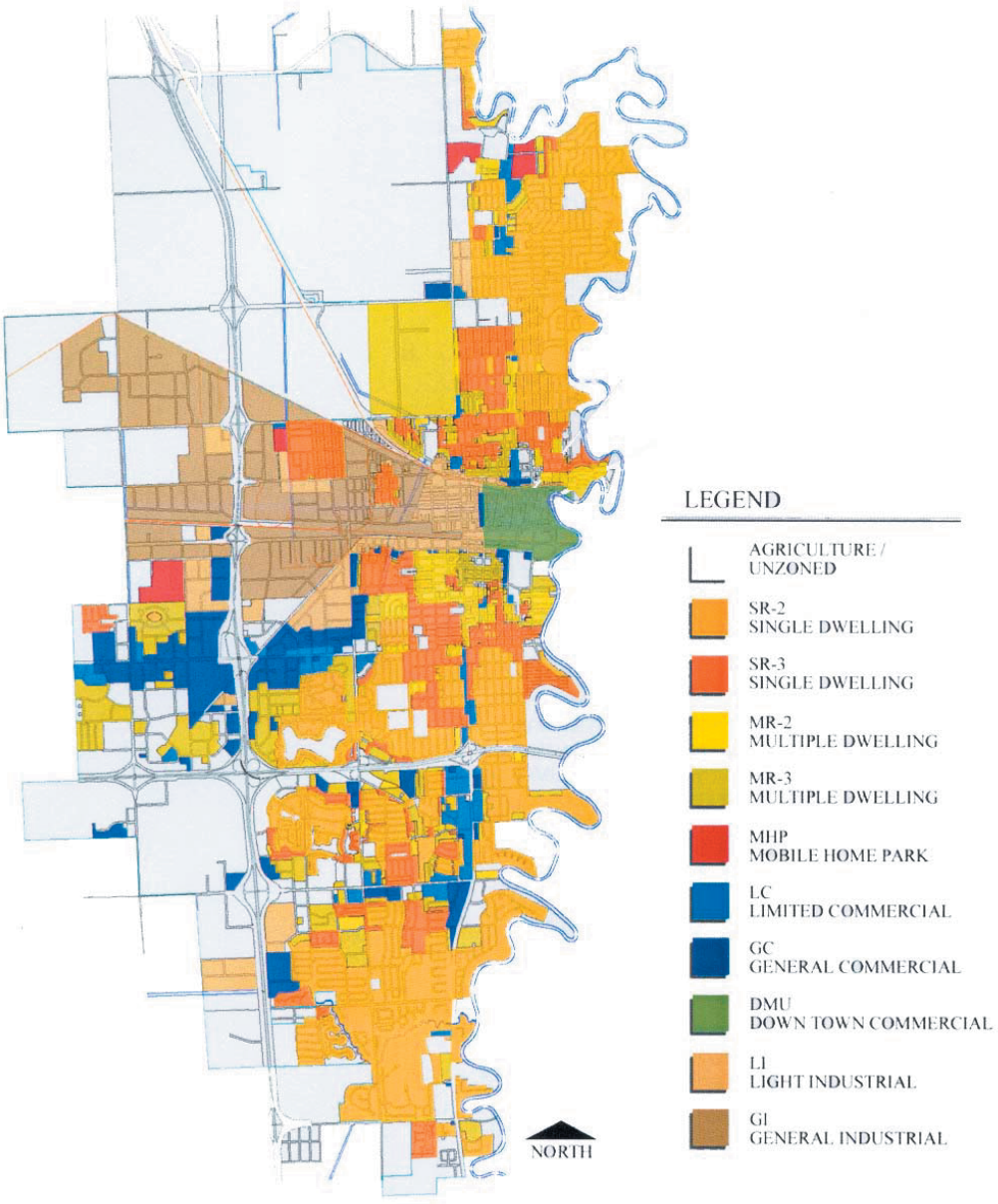


Altitude diagram.
(Image obtained from
www.ci.fargo.nd.us.
Modified
by Jesse Helland)



Azimuth diagram.
(Image obtained from
www.ci.fargo.nd.us.
Modified
by Jesse Helland.)



(Image obtained from www.ci.fargo.nd.us. Modified by Jesse Helland.)

§20-0212 DMU, Downtown Mixed-Use District

A. Description

The DMU (Downtown Mixed-Use) district is intended to preserve and enhance the City's downtown area. The district allows a broad range of uses in order to enhance downtown Fargo's role as a commercial, cultural, governmental and residential center. In recognition of existing public facility capacity and downtown planning goals, very intensive development is allowed, with high building coverage, large buildings, and buildings placed close together. Development is intended to be pedestrian-oriented with a strong emphasis on a safe and attractive streetscape.

B. Uses

Uses are allowed in the DMU district in accordance with the Use Table of Sec. 20-0401.

C. Dimensional Standards

Development within the DMU district is subject to the dimensional standards of Article 20-05.

D. Design Standards

1. General

a. Intent

The DMU Design Standards are intended to cre
ate and maintain a general visual quality
and appearance that will be appealing to people
who work in the DMU district and to
those who come to the downtown area for goods,
services, entertainment or leisure.
The regulations are also intended to stimulate and

protect investment in the DMU district through the establishment of high standards with respect to materials, details, and appearance.

b. Applicability

The DMU Design Standards of this subsection apply throughout the DMU district, unless otherwise expressly stated.

c. Review Procedure

Review for compliance with the Design Standards of this subsection shall be carried out in accordance with the Site Plan Review Procedures of Sec. 20-0910.

2. Demolition

The standards of this subsection apply in the event of building demolition.

a. Exposed Walls

Any building walls left exposed as a result of demolition shall be given a finished architectural appearance that is similar to the front facade of the subject building. At the applicant's option, a false infill facade may be used as an alternative to refinishing the exposed wall. The wall treatment shall be in place within 60 days of the date of demolition, unless a longer time period is approved at the time of approval of the demolition plans. Prior to approval of the demolition plans the applicant shall provide a letter of credit, a paid-in-full receipt from a contractor, a

performance bond or escrow deposit adequate to ensure that the proposed wall treatment will be completed. The amount of the financial guarantee must be equal to at least 100 percent of the estimated total cost (labor and materials). The City shall be authorized to use such financial guarantee to complete the work if the required wall treatment is not in place by the date stated on the approved performance guarantee form.

b. Vacant Lots

Any lots left vacant after demolition shall be paved or landscaped to ensure a dust-free surface. The paving or landscaping shall be in place within 30 days of the date of demolition, unless a longer time period is approved at the time of approval of the demolition plans. Once installed, the landscaping or paving shall be continuously maintained in serviceable condition. Prior to approval of the demolition plans the applicant shall provide a letter of credit, a paid-in-full receipt from a contractor, a performance bond or escrow deposit adequate to ensure that the proposed landscaping or paving will be completed. The amount of the financial guarantee must be equal to at least 100 percent of the estimated total cost (labor and materials).

The City shall be authorized to use such financial guarantee to complete the work if the required paving or landscaping is not in place by the date stated on the approved performance guarantee form. Landscaping or paving required by this subsection must be maintained in serviceable condition.

c. Maintenance

Any lots left vacant after demolition shall be con tinuously maintained and kept free of debris and litter.

d. Screening

A fence, wall or landscape buffer shall be provid-ed to partially screen vacant lots from view of adjacent property, including sidewalks and public rights-of-way. The required screen shall have a minimum height of 2 ½ feet and a maximum height of 3 feet.

Screens may exceed 3 feet in height if they are at least 50 percent transparent.

e. Lighting

Vacant lots resulting from demolition shall be il luminated to sidewalk lighting standards.

3. Building Siting and Design

The standards of this subsection apply to all develop ment.

a. Front Setback

No front setback shall be required unless build-ings immediately adjacent to the subject site are set back, in which case a setback equal to

the average setback of the adjacent buildings shall be required. In no case shall set backs of greater than 10 feet be required.

b. Materials

1.) Required

All walls visible from the street shall be finished with architectural materials such as brick, glass, stone, ceramic, stucco, pre-cast panels, exterior insulation finish systems (e.g., dryvit), or curtain walls. When the DMU development is detached/attached single family or small scale multi-dwelling in nature, typical residential structure exterior materials may be accepted (e.g. residential grade vinyl siding, composite brick, residential grade steel siding.)

2.) Prohibited

The following materials shall not be used on walls that are visible from the street: metal panels; non-residential grade metal siding; non-residential grade wood-based materials; asphalt; concrete blocks or cinder blocks; provided, that use of architectural metal panels and metal panels for enclosure of mechanical equipment shall be permitted, and use of wood-based materials for architectural treatment shall be permitted. Concrete block may be used only if it is burnished,

standing flute or sculptured. Mirrored glass or one-way glass with a reflectance of greater than 40 percent shall be prohibited from covering more than 40 percent of the exterior walls. Residential grade metal siding and wood based materials are prohibited on all DMU development with the exception of attached/detached single family residential development and small scale multidwelling residential development.

c. Ground-Floor Transparency

At least 35 percent of the ground-floor facade of buildings along sidewalks shall be comprised of windows, doors and other transparent elements (e.g., glass block) that allow views into buildings, plazas or arcades. Calculations shall be based on the linear footage of the ground floor, and said transparent elements shall be a minimum of four feet in height.

(1) Existing buildings along side walks to which interior renovations or structural improvements are proposed shall be excluded from this requirement only if they do not already meet the 35 percent transparency requirement. In those cases, the transparency re-

requirement shall meet or exceed the percentage of ground floor transparency provided by the ex isting structure.

(2) The Zoning Administrator shall have the authority to allow less than 35 percent ground floor transparency adjacent to sidewalks, provided that the subject wall of the structure includes architectural features which offer visual relief from a blank wall through the use of texture, recessed patterns, or other design features that add visual relief. The decision of the Zoning Administrator may be appealed to the Board of Adjustment.

(3) Residential development, where dwell ing units occupy the first floor, shall be excluded from these requirements.

4. Parking

A fence, wall or landscape buffer shall be provided to partially screen surface level parking lots from view of adjacent property, including sidewalks and public rights-of-way. Fences or walls shall be constructed with materials and details similar to or compatible with those of the structures in the surrounding area. The required screen shall have a minimum height of 2 ½ feet and a maximum height of 3 feet. Screens may exceed 3 feet in height if they are at least 50 percent transparent.

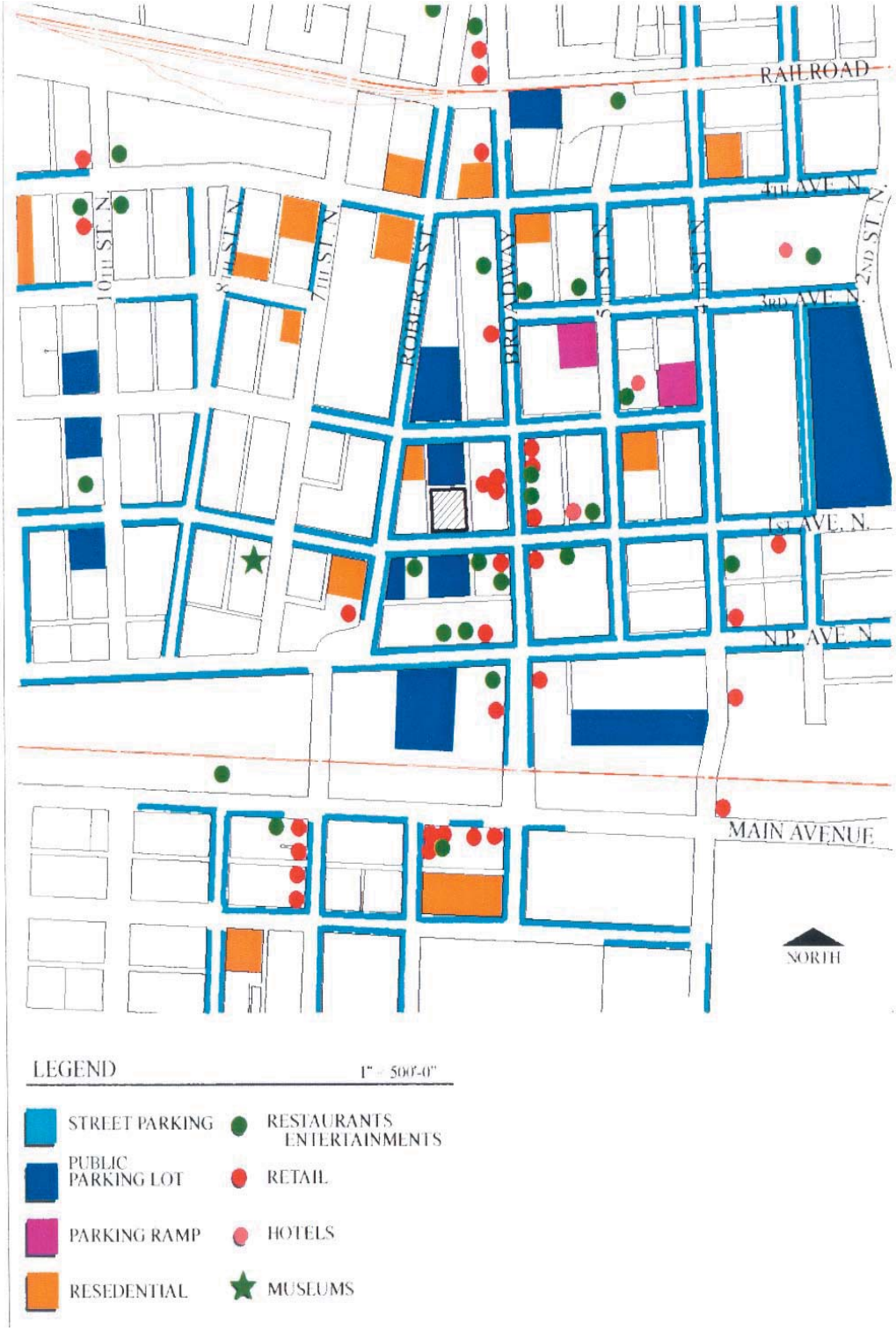
5. Lighting

Parking lots and vacant lots resulting from demo lition shall be illuminated to sidewalk levels.

6. Parking Structure Screening

Parked vehicles shall be screened from view of adjacent streets by walls at least 2 ½ feet tall.

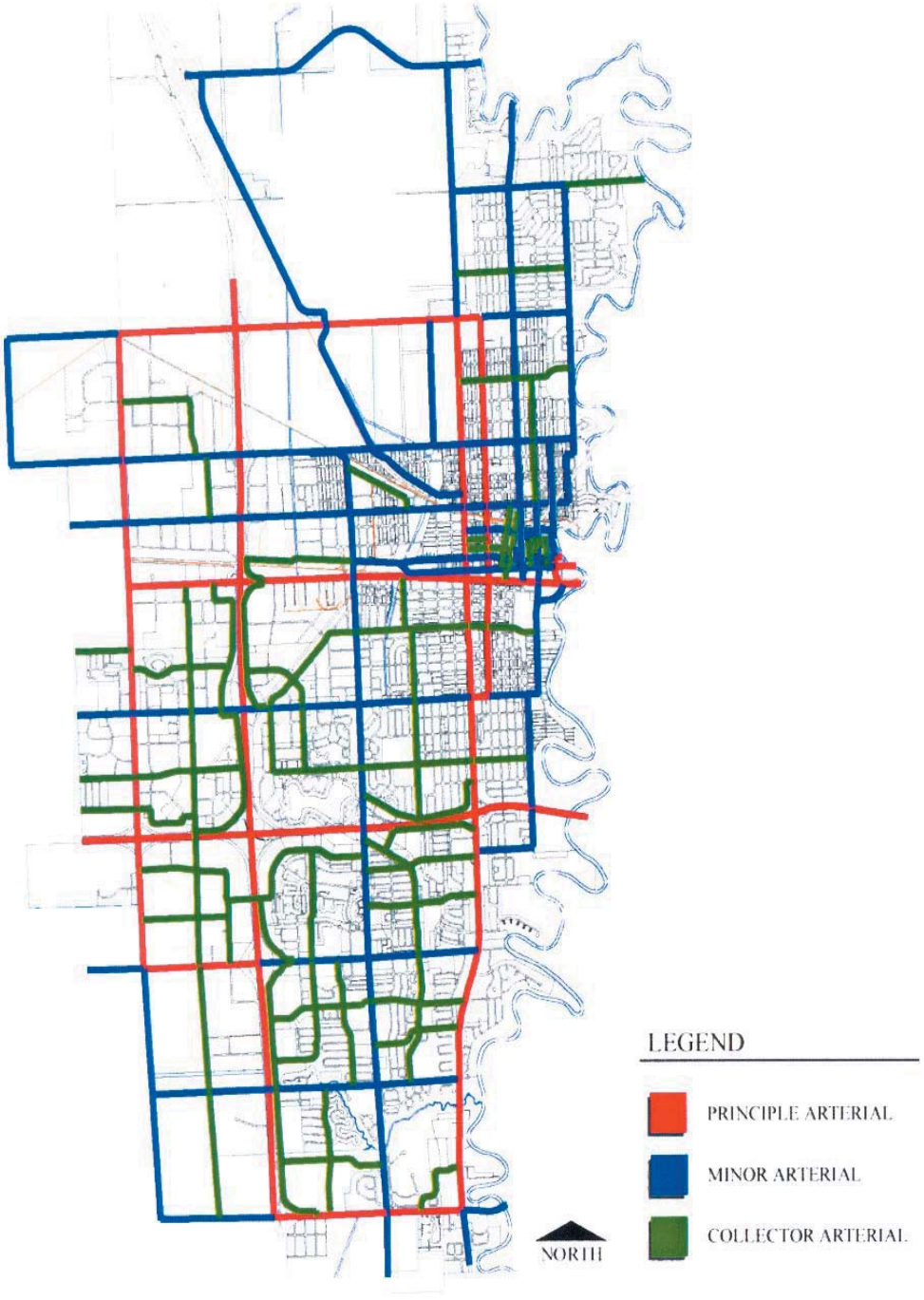
Source: 2985 (1999), 4163 (2001) (Fargo City Zoning Ordinance).



(Image obtained from www.ci.fargo.nd.us. Modified by Jesse Helland.)

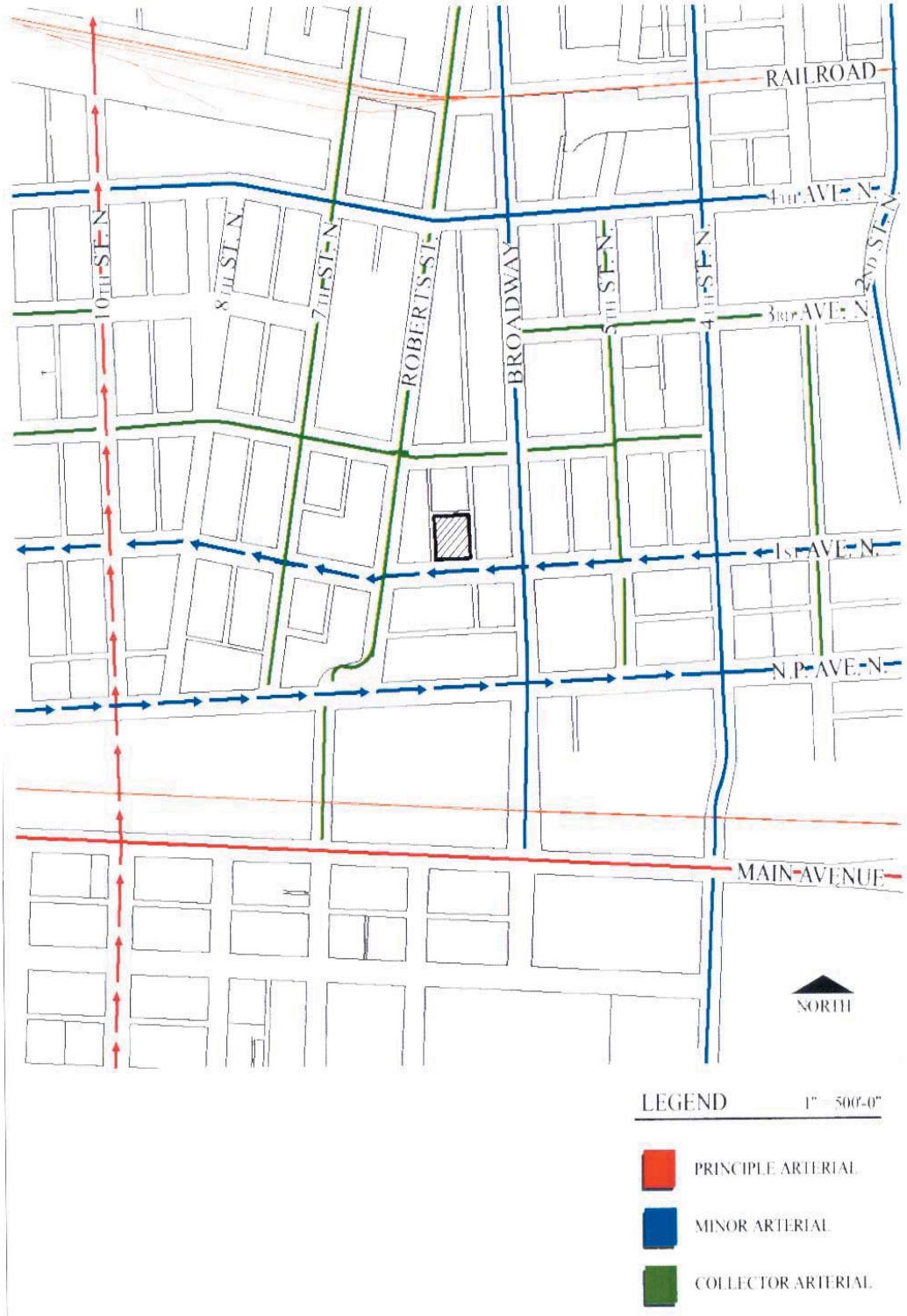
Downtown Fargo has had a perpetual parking problem that has not caught up to the expansion of downtown Fargo. However, there are many parking spots around the downtown area that can be used for this facility. A combination of on-street parking, parking ramps and the utilization of public transportation from parking spots to the arena will need to be utilized in order for fluid traffic circulation and high utilization of downtown resources.

(Image obtained from www.ci.fargo.nd.us. Modified by Jesse Helland.)



(Image obtained from www.ci.fargo.nd.us. Modified by Jesse Helland.)

Downtown Transportation Map



(Image obtained from www.ci.fargo.nd.us. Modified by Jesse Helland.)

(AutoCad plat plan obtained from MeritCare Health System. Modified by Jesse Helland.)

The lot dimensions for this site are nominally 300' x 600' x 200'. An opportunity lies in the existing Civic Center/Public Library/City Hall site for master planning.

Downtown Material Fabric

The materials of downtown are relatively consistent. They range from brick and masonry materials to granite facade treatments and modern metal materials. A key component to designing to compliment urban material fabric is to be sensitive to the existing contextual materials. Although there are many buildings downtown with many functions, the design of this arena will fit into the entire urban fabric and context.

View of the site from the North.

View of the site from the West.

View of the site from the South.

View from the site to the North.

View from the site to the East.

View from the site to the Southwest.

There are three main points to the concept of this thesis project that I tried to pinpoint and study relative cases pertaining to them. The main concept points are building and site circulation, contextual response and success, and materiality. All of these studies are of the same building type and function, but have their own unique characteristics.

I chose the Ralph Engelstad Arena on the University of North Dakota campus in Grand Forks as a study for building and site circulation. Wide corridors and numerous points of entry allow the building to empty quickly. Four main elevators and stairwells maintain the building's excellent vertical circulation. To speed vertical circulation, two sets of escalators move people directly to the upper level of the arena. Once outside of the arena, the site also empties very quickly. The site is located along two of Grand Forks' main roadways. The parking lots pour out to Columbia Road and Gateway Drive in just a few minutes. It's been said that a spectator can hear the final buzzer, make their way to their vehicle and be off the site in less than twenty minutes.

I chose the MTS Centre in Winnipeg, Manitoba as a study on contextual relations and historic downtown fabric. This new facility is the most modern ice arena in North America and also maintains the contextual integrity of the historic district of downtown Winnipeg.

I chose to study the material choices and material expression of the Wells Fargo Arena in DesMoines, Iowa. The use of metals, masonry and glass give this arena a unique character and innovative appearance.

Ralph Engelstad Arena

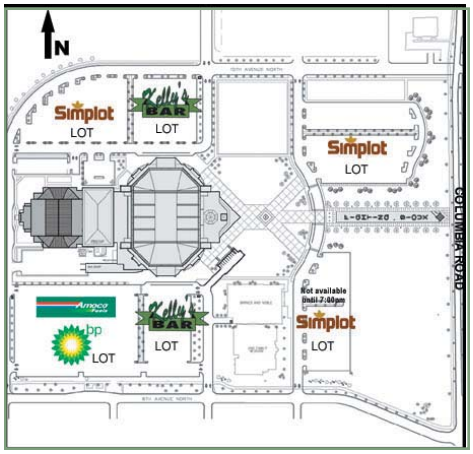
Grand Forks, North Dakota

Ralph Engelstad Arena, which opened in 2001 and is one of the premier college hockey arenas in the nation, is home to the North Dakota men's and women's hockey teams. The arena seats 11,406 fans and is also used on occasion for Fighting Sioux home basketball games. Amenities include an eight-screen video scoreboard and an adjacent Olympic-sized practice rink.

(Image obtained from www.theralph.com.)

The 400,000 square foot arena is nothing but first class. All concourse floors are granite, each seat is constructed of leather and cherry wood, and there are 48 luxury suites and two enormous club rooms featuring the longest freestanding bars in the state. There is a training facility featuring a 10,000 sq. ft. weight room, an underwater treadmill and fourteen locker rooms.

(Image obtained from www.theralph.com.)



(Image obtained from www.theralph.com.)

MTS Centre

Winnipeg, Manitoba

The MTS Centre is located in Winnipeg, Manitoba and soon will be the new home to the Manitoba Moose.

(Image obtained from www.mtscentre.com.)

The building will be completed in 2004 and will be the newest fixture in Winnipeg's historic downtown context. The 440,000 square foot, 15,000 seat center will be among the most modern on the continent and be capable of attracting world-class entertainment to Winnipeg.

(Image obtained from www.mtscentre.com.)

The design incorporates the best, well-tested features and spectator amenities of the many new-generation entertainment and sports centres built across North America over the past decade. It represents the leading-edge of facilities now being designed. Some of the design features include private suites, event suites, club seats, quality food outlets, a club seat lounge and a restaurant and sports bar - all surrounding the action. It will also include three concourses, retail outlets, ample restrooms and easy entry and exit. The ice surface converts from standard North American professional hockey dimensions (85 ft. by 200 ft.) to international hockey dimensions (100 ft. by 200 ft.).

(Image obtained from www.mtscentre.com.)

Image obtained from www.mtscentre.com.

Wells Fargo Arena

DesMoines, Iowa

The Iowa Sports Center is the newest addition to the DesMoines River Front Project. The sports center is an addition of a civic center named Hy-Vee Hall and hockey arena called Wells Fargo Arena adjacent to the existing auditorium known as Veterans Memorial Auditorium. The hockey arena is approximately 430,000 square feet and has a maximum capacity for hockey and basketball of 17,500.

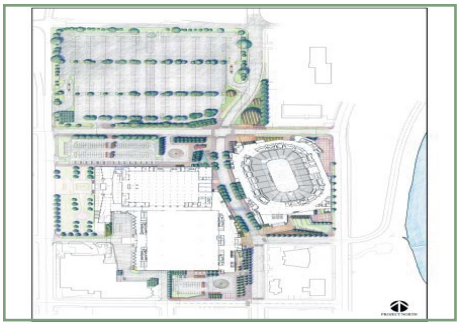
Wells Fargo Arena will feature wide concourses, unobstructed sightlines, comfortable seating, upscale concessions, modern fan amenities, state-of-the-art video boards, and seating and entertainment options for everyone.

The most important feature of this project is its ability to fit into the downtown/civic center fabric by responding to the historic context. The choice of materials is sensitive to the context as well as

(Image obtained from www.iowaeventscenter.com.)


(Image obtained from www.iowaeventscenter.com.)


(Image obtained from www.iowaeventscenter.com.)


(Image obtained from www.iowaeventscenter.com.)

Ice level	Qty	SF
Athletic Spaces		
Officials Locker	1	275
Toilet/shower	1	280
Large Locker Room (women's visitor)	1	1,400
Toilet	1	500
Shower	1	330
Coach	1	110
Stick prep	1	350
Large Locker Room (women's home)	1	1,400
Toilet	1	500
Shower	1	330
Coach	1	110
Stick Prep	1	350
Changing	1	420
Drying	1	160
Coach	1	190
Office	2	110
Reception	1	180
Office	1	200
Conference	1	250
Training	1	350
Intramural Storage	1	350
Small Locker Room	6	720
Toilet	6	150
Shower	6	170
Coach	6	180
Toilet/shower	6	100
Training/gym	1	11,250
Open Space	1	4,950
Subtotal		33,905 SF

Ice level (Continued)	Qty	SF
Treadmill	1	280
Nutrition	1	180
Weight Office	1	250
Shower/sauna	1	350
Parent's Lounge	1	1,060
Large Locker Room (men's home)	1	1,600
Sauna	1	215
Shower	1	400
Hot Tub	1	240
Drying	1	180
Toilet	1	425
Changing	1	425
Rehab	1	750
Training	1	750
Exam	1	120
Office	1	225
Office	1	170
Office	1	150
Conference	1	280
Coaches Locker	1	280
Equipment	1	1,100
Equipment Storage	1	600
Prep	1	200
Skate	1	100
Player Lounge	1	900
Classroom	1	700
Audio/visual	1	170
Press/interview	1	870
Toilet	2	200
Subtotal		13,370 SF

Ice level (Continued)	**Qty**	**SF**
Laundry	1	260
Toilet	2	200
Large Locker Room (men's visitor)	1	1,330
Stick Prep	1	100
Shower	1	250
Toilet	1	500
Coach	1	120
Ice Sheet	1	19,800
Player's Box	2	290
Media Box	1	20
Penalty Box	1	270
Subtotal		23,630 SF
Ice Level Athletic Spaces Total		**70,995 SF**

Building Support Spaces

Ice level (Continued)	**Qty**	**SF**
Mechanical	1	1,200
Service Kitchen	1	2,450
Food Storage	1	1,055
War Room	1	190
Zamboni Room	1	15,850
Maintenance Staff	1	1,300
Toilets	2	100
Maintenance Shop	1	1,300
Tool Shop	1	300
Storage	1	150
Storage	1	350
Storage	1	600
Electrica1	1	30
Subtotal		24,875 SF

Ice level (Continued)	**Qty**	**SF**
Storage	1	160
Electrical	1	150
Storage	1	615
Storage	1	1,100
Electrical	1	200
Laundry	1	200
Janitor	1	180
Break	1	300
Office	1	180
Elevator	4	100
Stair	4	650
Storage	1	610
Subtotal		4,445 SF
Ice Level Building Support Spaces Total		**29,320 SF**
User Spaces		
Seating	1	4,850
Ice Level User Spaces Total		**4,850 SF**
Ice Level Total		**105,165 SF**
Main Concourse	**Qty**	**SF**
Building Support Spaces		
Staff	4	165
Electrical	4	90
Communication	4	60
Concessions	6	1000
Beverage	6	240
Storage	6	170
Subtotal		9,720 SF

Main Concourse (Continued)	Qty	SF
Restrooms		
Men	4	600
Women	4	600
Women	2	840
Family	4	200
Men	2	700
Women	2	700
Elevator	4	100
Stair	4	550
Receiving	1	5000
Mechanical	1	350
Communications	1	150
Electrical	1	300
Inventory	1	750
Storage	1	400
	Subtotal	19,630 SF
Main Concourse		
Building Support Spaces	**Total**	**29,350 SF**
User Spaces		
Entry	5	600
Lobby	1	1200
Tradition Hall	1	2000
Pro Shop	1	2500
Seating	1	21950
Main Concourse		
User Spaces	**Total**	**28,250 SF**

Main Concourse (Continued)	Qty	SF
Administration Spaces		
Management Office	1	1075
Ticket office	1	500
Conference	1	250
Office	3	120
Office	1	100
Office	1	150
Stair	1	90
Restroom	1	60
Operating Manager	1	250
Concessions Manager	1	600
Security/first aid	1	600
Main Concourse		
Administration Spaces	**Total**	**4,035 SF**

Main Councourse Total	**61,635 SF**

Suite Level	Qty	SF
Building Support Spaces		
Catering	4	500
Electrical	4	70
Mechanical	4	100
Communications	4	50
Restroom	4	60
Tv	4	200
Elevator	4	100
Stair	4	550
Building Support Spaces	**Total**	**6,520 SF**

Suite Level (Continued)	Qty	SF
User Spaces		
Suites	20	600
User Spaces Total		**12,000 SF**
Administration spaces		
Office	1	450
Office	2	300
Conference	1	400
Reception	1	1,100
Supply	1	200
Toilet	1	80
Administration Spaces Total		**2,830 SF**
Suite Level Total		**21,350 SF**

Upper Level	Qty	SF
Building Support Spaces		
Concessions	5	500
Beverages	5	200
Storage	5	150
Communications	5	35
Electrical	5	30
Staff	5	85
Restrooms		
Men	4	450
Women	4	500
Media	1	600
Elevator	4	100
Stair	4	550
Building Support Spaces Total		**12,000 SF**

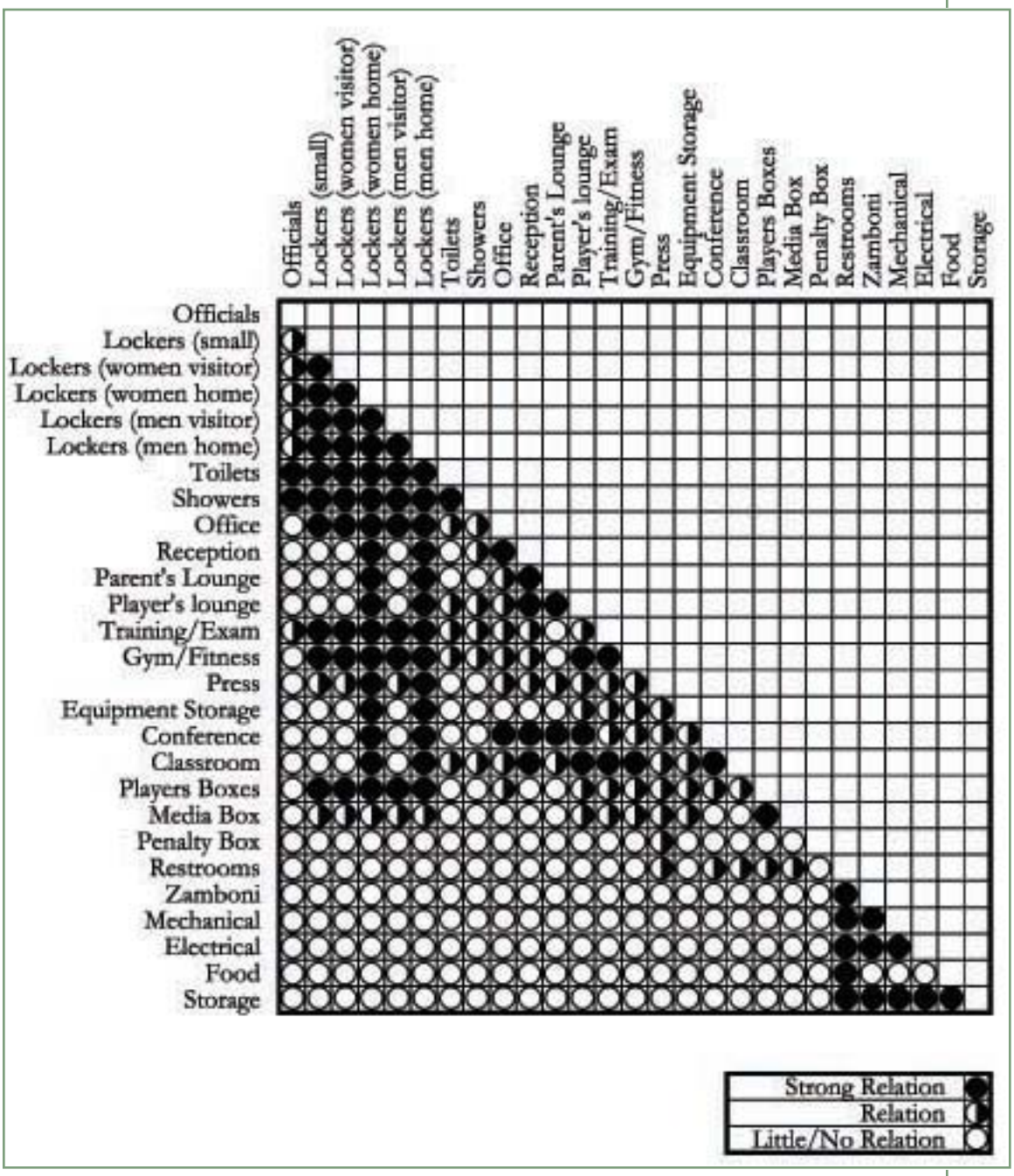
Upper Level (Continued)	Qty	SF
Upper Level	**Total**	**12,000 SF**

Press Box Level

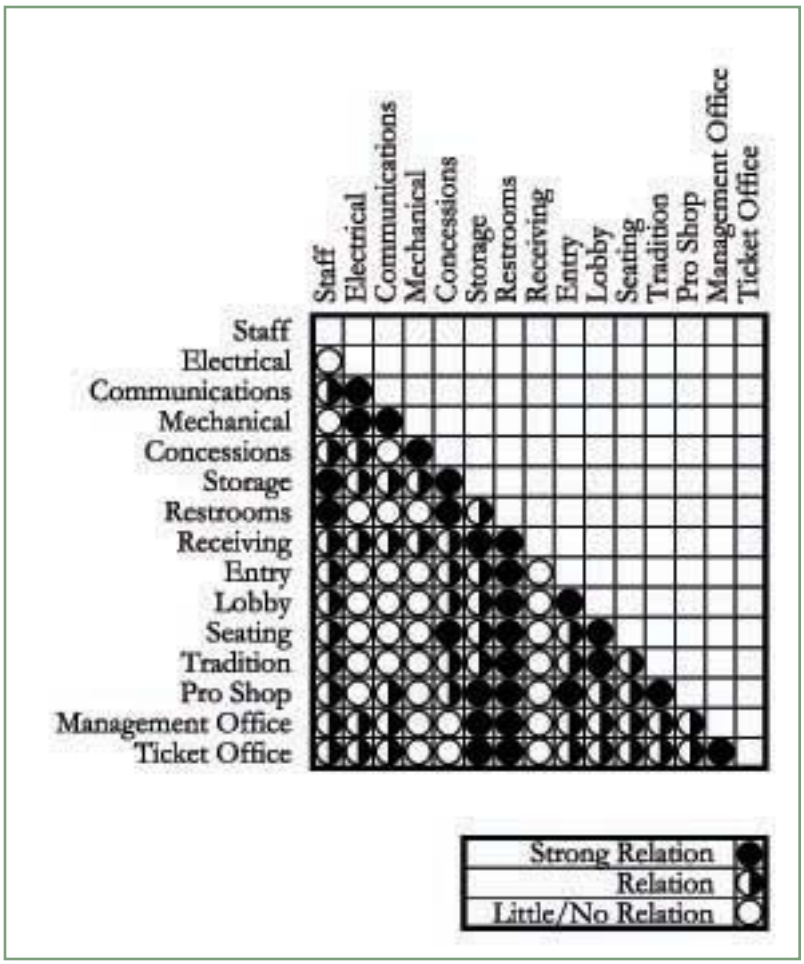
Press Box Level	Qty	SF
Building support spaces		
Spotlight Platform	4	175
Mechanical	4	1000
Catwalk	1	2000
Stair	1	550
Elevator	1	100
Building Support Spaces	**Total**	**7,350 SF**
User spaces		
Seating	1	26,000
User Spaces	**Total**	**26,000 SF**
Administration spaces		
Coaches Box	2	170
Press Box	1	200
Administration Spaces	**Total**	**540 SF**
Press Box Level	**Total**	**33,890 SF**

Building Total Square Footage	**234,040 SF**
Gross Square Footage Factor	**x 1.50**
Gross Building Square Footage	**351,060 SF**

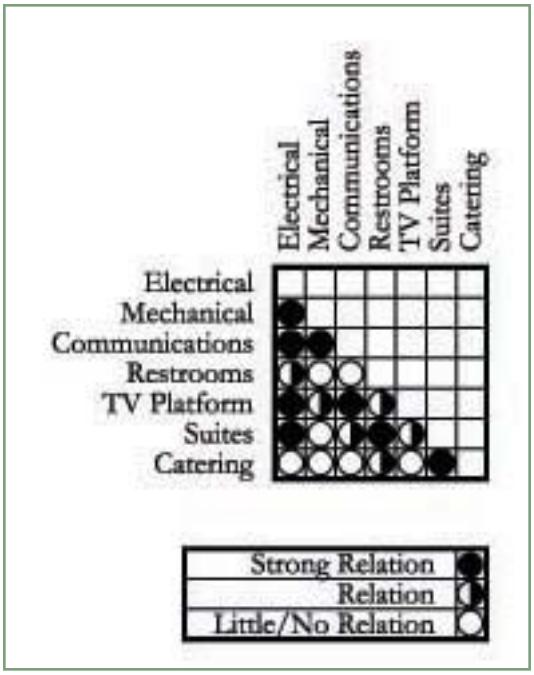
Ice Level Spatial Matrix



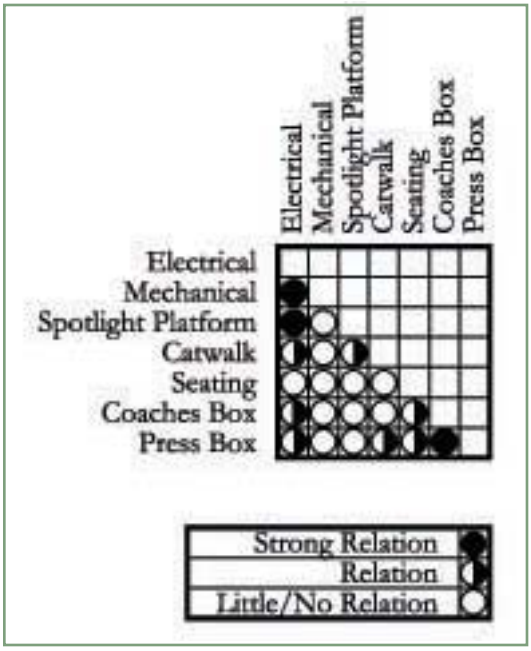
Main Concourse Level Spatial Matrix



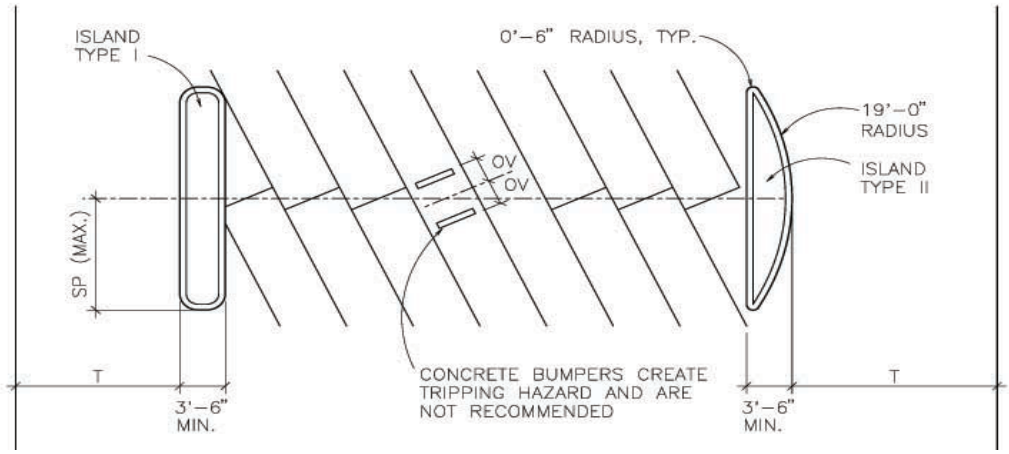
Suite Level Spatial Matrix



Press Box Level Spatial Matrix



Parking Standards



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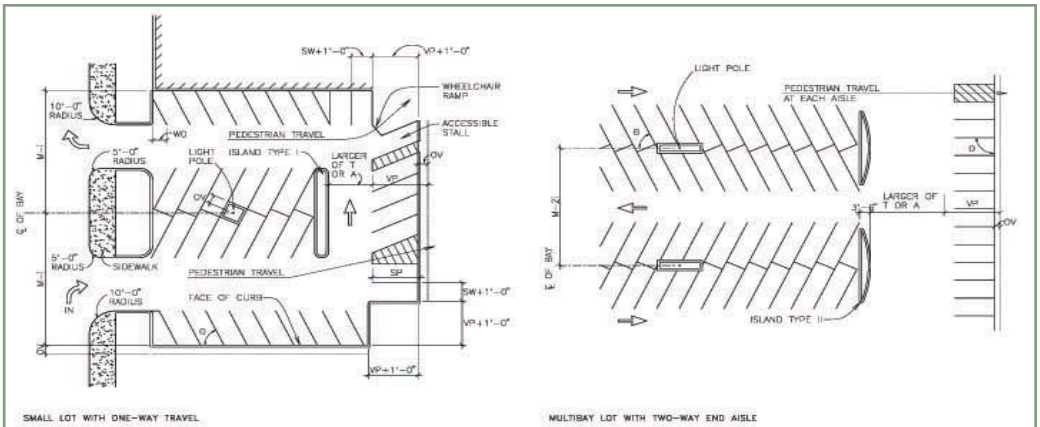

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River System/flooding Diagram

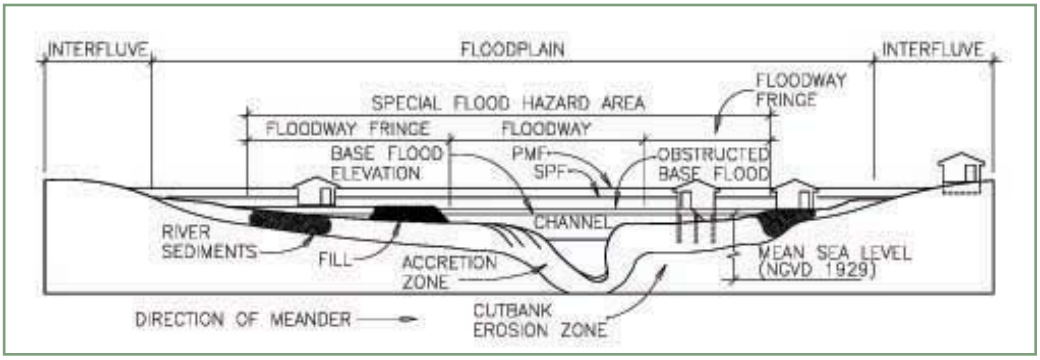
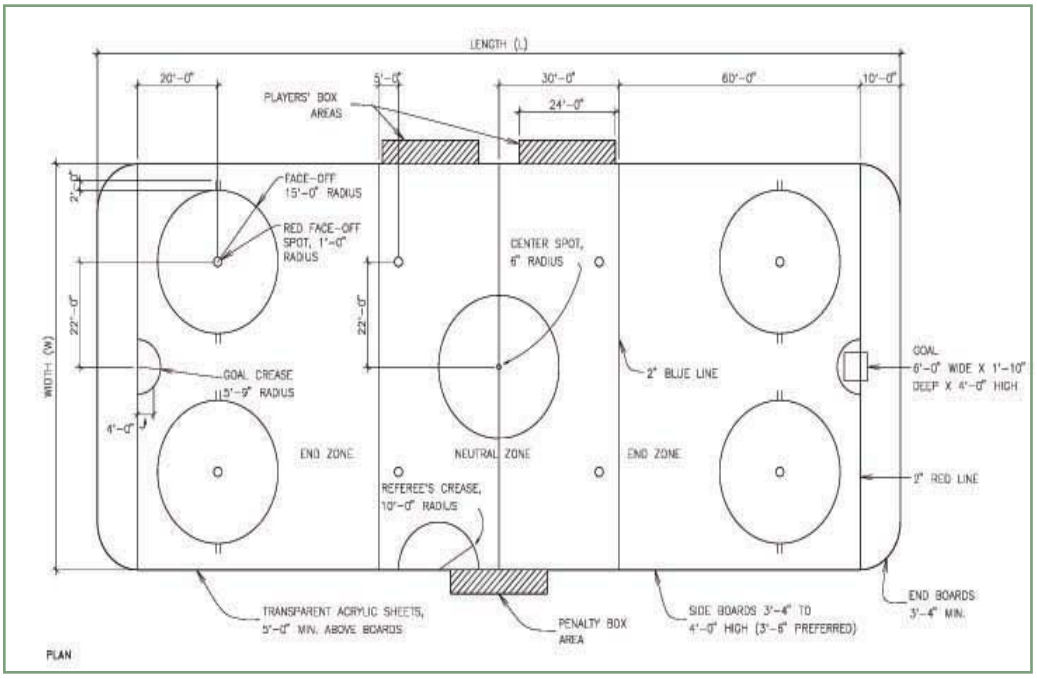


Image obtained from Architectural Graphic Standards CD-ROM.

Ice Hockey Rink Standards



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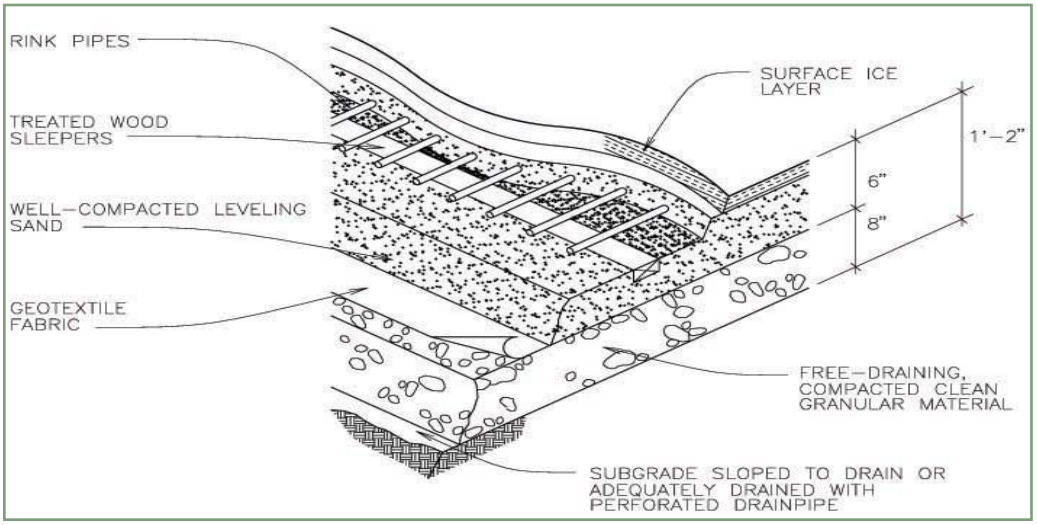

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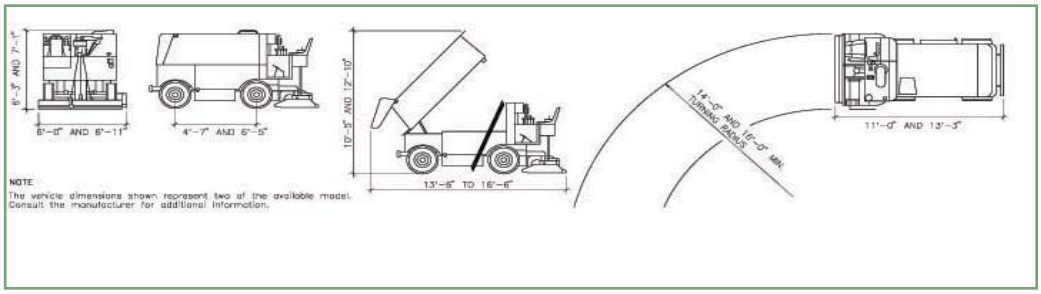
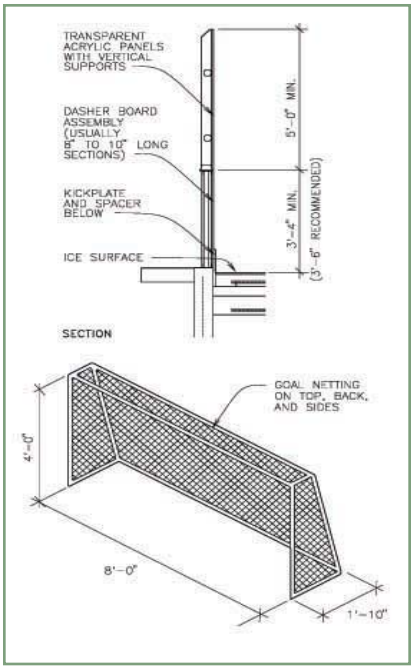
Zamboni Standards



(Image obtained from Architectural Graphic Standards CD-ROM.)

Ice Hockey Net Standards



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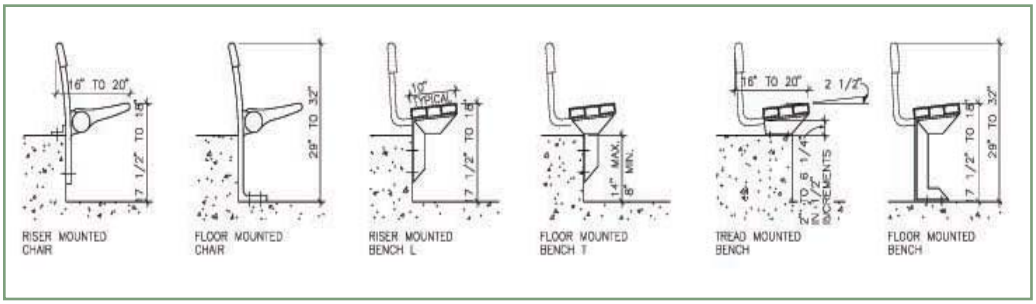
Seating Standards



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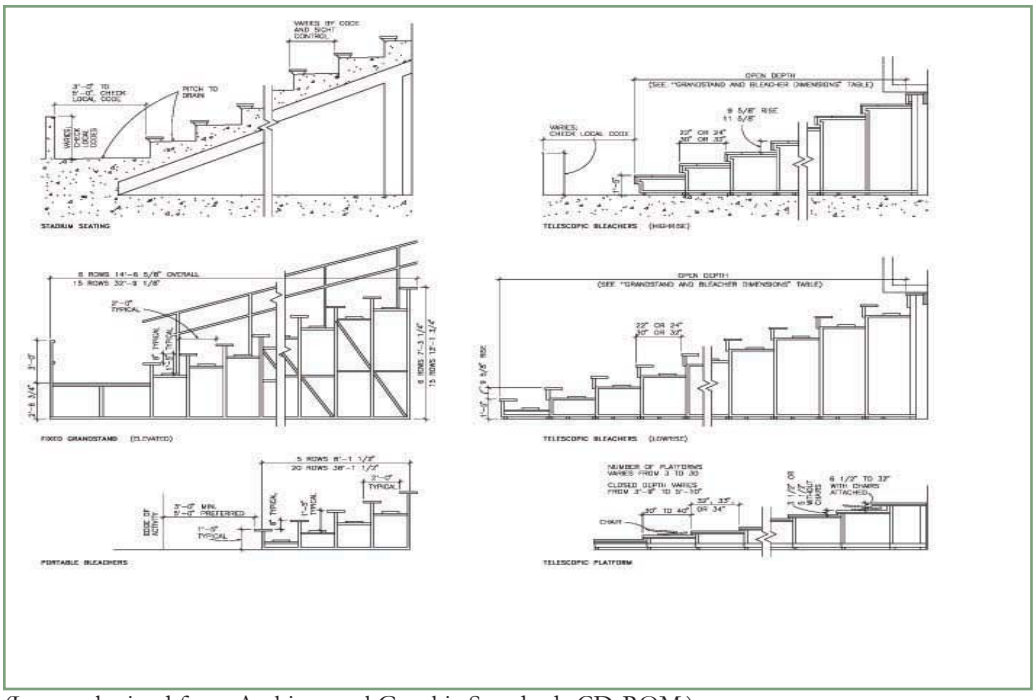

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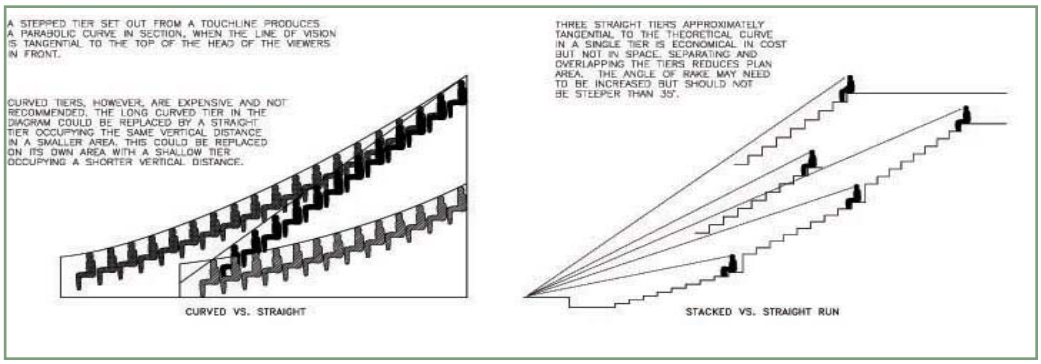
Sight Lines



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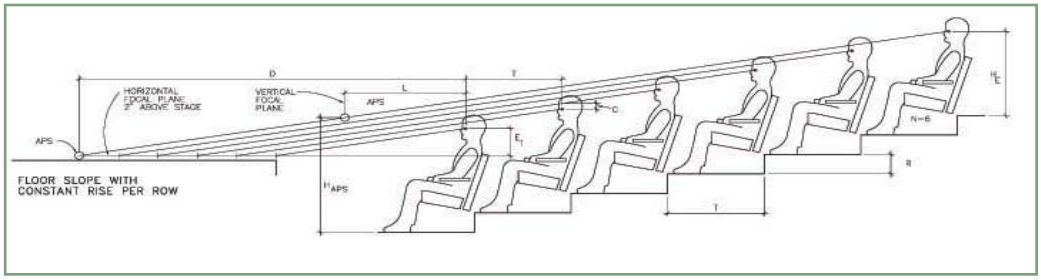

(Image obtained from Architectural Graphic Standards CD-ROM.)

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Jesse Helland
Arch. 561
22September2004

NDSU Hockey Arena

A Gateway to Community and Athletics
North Dakota State University
Fargo, ND

NDSU Club Hockey was established in 1983. The success of the program was seen at a national level as NDSU teams won national championships in seven of their first eight seasons. After financial difficulties, the NDSU Hockey Club disbanded in 1999. The club hockey program was re-established during the 2002-2003 season. With the help of faculty and students, the club finally got off the ground during the 2003-2004 season by organizing a competitive team that played many top level clubs in the region. This season marks the first American Collegiate Hockey Association (ACHA) sanctioned schedule since 1999. As NDSU ventures into Division I athletics, there will be a large demand for a facility that will accommodate a large number of fans. Many universities, such as the University of Alabama-Hunstville, that have had successful club hockey programs have made the move to NCAA Division I hockey. This is an attainable goal for the NDSU Club. An attainable goal for the community and the university as a whole is to demonstrate this union through architecture. The site for this design is located between second and third avenues north along Broadway in downtown Fargo. This site will provide the setting for the union between NDSU and the community.

This facility will allow the community to unite for sports and many other activities in various ways. The intention of the arena is to bring our diverse community together for the enjoyment of hockey. The support for the Fighting Sioux hockey team in

team in Grand Forks is great. When the doors opened at the new Ralph Engelstad Arena, officials at the arena estimated that one half of the season tickets sold went to people from outside of Grand Forks. Eighty percent of those people come from Fargo. Fargo has the interest and is ready to support a team. The fan support for the University of North Dakota hockey team in Grand Forks is important to the sense of pride and unity in that community and the same would be true in Fargo.

This design will contribute to the sense of civic pride by giving a venue to the re-established hockey program at North Dakota State University. This facility will allow the fans that travel to Grand Forks to stay in Fargo and support NDSU athletics and other functions in Fargo. It will also open the door to other events in the community and foster a partnership with many other downtown businesses. Through the analysis of this site and the study of the function of the facility, a solution for this proposed project will meet the needs of the Fargo-Moorhead community and North Dakota State University by proving that organized athletics is part of a Civic Culture and informs Architecture.

Jesse Helland

Thesis Proposal

October 7, 2004

Title

NDSU Hockey Arena

A Gateway to Community and Athletics

North Dakota State University

Fargo, ND

Building Typology

My thesis project is a hockey arena for NDSU hockey for North Dakota State University and the Fargo-Moorhead community. This is a large-scale athletic facility designed primarily for the function of housing hockey games. Many other functions including concerts and other community and athletic functions will also take place in this facility. The building will respond to the historic context of downtown Fargo while fulfilling the technical and structural needs of this a large facility. The hockey arena will be used by North Dakota State as the home to the men's and women's hockey teams as well as serving as a large capacity facility for other sports such as basketball, volleyball and wrestling. This facility will serve as a fixture for the center of downtown and compliment many other buildings in close proximity such as the Fargo Civic Center. The design of the building will be large enough to support hockey at the NCAA Division I level as well as facilitate all of the necessary support spaces.

Theoretical Basis or Unifying Idea

North Dakota State University has gone through a very unique and challenging transition in the last two years. All of the athletics have made the transition from NCAA Division II to NCAA Division IAA. This is an exciting transition that has brought

many changes and challenges to the University.

The theoretical basis or unifying idea that I plan to explore with my design is contextual relationships as they relate to this new long-span, large-scale structure filling a gap in Downtown Fargo. The new NDSU Hockey Arena will be a destination for members of the Fargo-Moorhead community and visitors alike supplying year-round attraction for tourism. It will enhance Fargo's quality of life, community recreational options and provide a vital asset for encouraging business to expand and help to establish the Fargo Renaissance Zone. Fargo's downtown is changing for the better, and this significant new project provides the power to accelerate this positive change and bring thousands more people downtown on a regular basis. This design will serve as a union for the building as it finds its place in the downtown setting as well as for the people who use the building as they will unite for the athletic functions of the building and celebrate Fargo's historic architecture downtown.

User/Client Description

The NDSU Hockey Arena will be designed as a public facility used by the members of the cities of Fargo-Moorhead and surrounding communities. The arena will be owned and operated by North Dakota State University.

Personnel will be comprised of facility operators (four), coaches and staff (ten), student-athletes (50), university staff (ten) and facility managers (three). At peak usage, the facility will hold 8,000-11,000 people that will include the above facility personnel as well as event spectators. The facility operators will be responsible for maintenance and cleaning of the facility daily and especially before and after large events in the arena. The coaches and hockey staff will use the facility as a headquarters for practice, games, recruiting and training. The student-athletes will use the arena for practice, games, training and educational opportunities (using the facility classroom and technology networks). This facility will also be a base for many university officials such as members of the athletic department. Athletic department officials will

use the arena for office space and marketing for NDSU and the Athletics Department. Facility managers will use the facility to manage the day-to-day activities of the arena and also as a hub for marketing the arena and events. They will use this facility to draw exhibition sporting events, concerts, athletic/conference tournaments in addition to the seasonal hockey functions.

The NDSU Hockey Arena will be in operation during hockey games, practice, and other athletic and public events. It can also be used for tours and events which only use a portion of the facility.

Parking will be an issue. Because the facility is classified as a downtown mixed-use facility, it can utilize many of the other parking facilities downtown. Thousands of parking stalls are available in downtown within a five-minute walk of the site. In extreme cold or long distance parking, shuttle transportation will be provided to get people from parking lots to the arena during times of optimal use. On site parking will be available for regular employees of the facility.

Major Project Elements

Arena Spaces

- One regulation sized ice sheet – 200'x85' to be easily expanded to international size of 100'x200'
- Mechanical/Refrigeration Room
- Electrical Rooms
- Internal loading/unloading zone
- Storage – Alternate layout equipment (basketball courts, concert stages, etc.)
- Zamboni Room
- Stadium seating – large capacity
- Handicap Accessible viewing areas
- Concession areas

- Concession areas
- Concourse (stadium circulation)
- Public restrooms
- Suites/private box seating
- Lobby
- Ticket office
- Hall of Fame
- Pro shop
- Restaurant/bar
- Building circulation (horizontal, vertical)

Athletic Spaces

- Locker rooms – 4 main locker rooms (NDSU men and women, op ponent)
  - To include showers and toilets
- Locker rooms – 6 for other teams (community youth hockey, Con cordia College), concurrent functions
  - To include showers and toilets
- Athletic training room – to include weight training and aquatic training, rehabilitation
- Player lounge
- Player classroom
- Referee locker rooms – 2
- Officials locker rooms – 2

Administrative Spaces

- Coaches offices
- Administrative assistant office
- Meeting rooms

Site Access

- Parking
  - Fargo City Parking Ramp
  - Local business and pay parking lots
  - On-site employee/handicap parking
  - Utilize MAT transportation to and from parking facilities
- Visiting team bus drop-off/load – internal
- Plaza – pedestrian site access

Design Choices

- Material pallet
  - Match contextual materials, historical materials in down town Fargo
- Structural design
  - Steel structure - expressive steel trusses, sensitive column cladding materials

Site Information

The site for this project is centrally located in the heart of Downtown Fargo along Second Street from First Avenue to Third Avenue North and stretching to Third Street North. I chose this site because of two main emphasis of my design. The first is the context of this particular piece of land. It is located across the street to the east of the Fargo Civic Center and the Red River also acts as a backdrop to the east of the site. The Fargo Civic Center is a facility that has recently been updated and can facilitate events with a seating capacity for concerts of about 6,000 people. The capacity for sporting events such as basketball is about 4,000. The seating capacity of the NDSU Hockey Arena will be 8,000 for hockey and 11,000 for concerts. The central access to this site is important relative to the size of the entire community and the new NDSU Hockey Arena will act as a catalyst to the redevelopment of downtown Fargo.

The second reason for choosing this site is because of the potential for development of the current site and similar characteristics of the site. The site is currently used for parking for Civic Center employees and city vehicles. This site sits along a main visual artery from downtown Fargo as one can see from Fourth Street through the site to the Hjemkomst Center in Moorhead, MN. The Fargo Civic Center is a modern building that has relatively modest material palette. The design of the new NDSU Hockey Arena will use more materials from the downtown context. A plaza that would link to the Civic Center and the NDSU Hockey Arena would be very desirable structures on this site.

The new NDSU Hockey Arena would also be a great addition to the already established NDSU Downtown. It would be an advancement in state-of-the-art architecture and would be an inspiration to the architecture school downtown. The new NDSU Hockey Arena will make the connection downtown between the athletic community and the academic community at NDSU with its proximity to the downtown school building on N.P. Avenue. This has been where the emphasis has been from the university President and the Athletics Department since the move to Division I athletics and the major student recruiting that has taken place the last three years. This facility would also expand the options of members of the community that can be used for NDSU functions as well as functions for the Fargo-Moorhead community. It will be a place of unity and gathering to celebrate architecture and athletics.

This site is located in the heart of the downtown business district and would fuel the local restaurant, bar, and hotel economies. Businesses of a wide variety occupy Downtown Fargo including banks, restaurants, bars, retail outlets, professional offices and many others. These businesses range from long-standing operations to recently developed establishments.

Fargo-Moorhead as a metropolitan area has a population of approximately 170,000 people. This includes the greater Cass and Clay county areas. The city of Fargo itself has a population of approximately 73,000 people. The city of Fargo gives the area they refer to as downtown a population of about 3,700 people. This includes the River as the east border, 7th Ave. north as the northern border, and university as the west and 6th Ave. south as the southern border. This population includes people of many different origins and cultures.

Fargo is in the heart of the Red River Valley. Through the years, Fargo has acted as a railroad expansion town. It was the next big city after Minneapolis- St. Paul and therefore saw a quick rise in population. The city itself originally consisted of nothing more than tent after tent for railroad engineers and workers. It soon saw its dawn as a city with the construction of the bridge crossing the Red River of the North. Fargo developed quickly and it began to rely heavily on people heading west with the railroad or those hunting and trapping in the area. The development of the metropolitan area that has become the Fargo-Moorhead community has seen many changes over the course of the last century and a half. Some of these changes include numerous floods and a devastating fire that wiped out nearly all of downtown in the late 1800's. Fargo has also seen numerous businesses in manufacturing come and go in downtown. The recent Downtown Renaissance Zone has seen many business popping up in Downtown Fargo once again thanks to tax breaks and other economic incentives. Downtown Fargo is now experiencing a resurgence and looks ahead to a bright future of private and public success. Major landmarks downtown include some of the historically preserved buildings such as the Hotel Donaldson, the two major railroad lines that cross downtown at the north and south, and Fargo's Civic Center to name a few.

The Upper Midwest has a very diverse climate. The climate ranges from very cold and relentless winters to many months of extreme heat in the summers. This environmental element is a key ingredient to the design of a successful facility.

The design of the new NDSU Hockey Arena will take into account the diverse climate conditions of the region and will meet the needs and expectations of the users during extreme times of the year.

The site for this project is relatively flat or contains little or no topography. Vegetation is limited to street-side trees and storefront plantings. The design of the new NDSU Hockey Arena will include a plaza to compliment the existing plaza on the current Civic Center site. Because of the lack of vegetation, there is little or no natural acoustic barriers.

The soils in the downtown area vary in composition. Much of the topsoil is composed of sand, silt and clay found in the Red River Valley that are deposits from ancient Lake Agassiz. There are three major layers to the stratigraphy beneath the surface that we are concerned about. Directly below the surface is the Sherack layer composed mostly of Lake Agassiz sediments. The next level down is called Brenna which is a transition layer that leads to glacial drift from past ice ages. Below that is a granitic layer that is incredibly stable and resembles the stability of mountainous regions in the United States. The substrate conditions of the soil of this site are very plastic and weak. This is due to the large amounts of clay and its ability to absorb large amounts of water. The composition of the soil on the basin of the Red River Valley is almost 50/50 silt and clay which creates a liquid or fluid state in the soil. This creates very hazardous surface conditions for building and erecting structures. Clays are inherently weak and create a surface that is incredibly unsafe and unstable.

The hydrologic systems of the site are dictated by the natural (past and present) body of water in the region, the Red River of the North. This provides much of the water for the city and downtown. It is also the main draining destination for water that is collected in the city's storm water drainage system.

In winter months, winds generally come from the North West. The summer month

bring an almost constant South wind. Since Broadway is on a north-south axis, the same direction that the major winds blow, the tall, tightly spaced buildings do have an effect on how hard the wind blows down this street. This will be a major consideration in designing the orientation and exposure of major design elements such as the building plaza and building entrances and exits. Because Fargo is in the northern hemisphere, optimal solar orientation will be in the summer. The least optimal solar exposure will be in the winter.

There are many important transportation arteries that exist in Downtown Fargo that were important factors in choosing this site. They are North Broadway and Fourth Street which run north and south. The two main lines of transportation that lead to the site that run east and west are Main Avenue and Seventh Avenue North.

There are many great views from this site. From the second level concourse of this arena, one will be able to view many of the historic buildings of Fargo and Moorhead and the Red River. Historic store fronts will be visible from street level and the main level concourse of the arena.

Project Emphasis

The basis of this thesis project is to design a large-scale, long-span structure and transition space in the historic downtown district of Fargo. The design will incorporate the best features and spectator amenities of the many new-generation sports centers built across North America in the past decade.

One area of emphasis for the project is the master plan of the site which will include many elements. The first element is the main arena. This will be the major fixture on the site. It will also be accompanied by an outdoor plaza that will act as a link to many of the other businesses downtown and the adjacent Fargo Civic Center.

Another major emphasis of the project will be the design of the structure. This will be very important to the appropriate function of the building. The arena will be a long span structure that will be constructed out of steel. It will span approximately 150' by 250' in the main arena. This will be supported by the rest of the structure that will house the rest of the support services.

A third area of emphasis will be on the treatment of the sensitive scale and functional issues of the streetscape image of downtown Fargo. This building will not only fit into the context of downtown, it will have to function at the same level (physically) as the rest of the downtown buildings in this area of downtown do. In order to accomplish this, many factors will have to be considered in the design such as ADA requirements, excavation levels and transitional streetscape treatments.

The dynamic differences in functions of buildings in downtown Fargo is great. Appropriate attention to detail and exterior scale and appearance will help my building mesh into the current context. The exterior of the building is very important, but the primary function of the building is just as important of an emphasis. The interior of the building will be a state-of-the-art sports facility. This facility will cater to the training (both on ice and off) of the athletes as well as the comfort of the spectators and other users. This design will accommodate both the interior and exterior design elements of this project to make this the best place in the world to watch a hockey game.

Plan for Proceeding

The design considerations that will be researched will include everything from site conditions to building materials. A thorough site analysis will be conducted. With the help of case studies and other design methods, I will have an understanding of what materials and building forms will be chosen for use with this building type. The context of Downtown Fargo will also help me narrow my options.

what materials and building forms will be chosen for use with this building type. The context of Downtown Fargo will also help me narrow my options.

Design Methodology

Research for this facility design will include a number of design methodologies. They will include, but won't be limited to case studies, interviews and design matrices. I will study arenas of similar size, scale and contextual characteristics. Four arenas will be studied in particular. MTS Centre in downtown Winnipeg, Manitoba; Ralph Engelstad Arena in Grand Forks, ND; Resch Center in Green Bay, WI; and Bob Peters Arena in Bemidji, MN. Whenever possible, I will visit these arenas in person and interview the architect(s) involved with the design of these facilities. I will also interview coaches of the teams that call these arenas home. I will talk to NDSU Bison head coach Brian Wilkie to see what his desires and expectations would be of a new arena and how the design of a new arena would increase the university's chances of landing an NCAA Division I hockey team. I will also interview members of the NDSU Athletic Department to see what their interest would be in a new arena and a new hockey team and its importance in the NDSU athletic community.

I will also spend a great deal of time researching building systems including long-span structures and urban infill of a building of this scale. This will lead me to research and study cases of similar downtown contextual issues. The form of this building will be derived from the function within the structure and the function and performance of the outdoor plaza and surrounding buildings.

The underlying concept of this design is the building's structure and the context of downtown Fargo. This will drive the design of this facility. I envision a facility in downtown Fargo that will combine a large stadium element surrounded by an elegant support area and an outdoor amenity that will serve the public and the university.

Documentation of the Design Process

The knowledge gained in the research and design development will be recorded and applied to this thesis project. The documentation will be recorded and published in the Final Thesis Program/Document to be submitted for evaluation May 12, 2005. The process will also be recorded through AutoCAD drawings, Form.Z renderings, sketches, models and photographs. This process will be compiled during and after the design of my thesis project starting in the fall and ending in the spring semester.

Weekly meetings with advisors will ensure the documentation of this process will take place between 8:00 am and 5:00 weekdays. The documentation will occur in the design studio during the design period (Spring semester 2005).

Schedule of Work

By the beginning of the Spring 2005 semester, the thesis program will be written and the foundation for design elements will be in place. The first week of the design process will involve the study of potential building forms derived from the program. A site plan and analysis will accompany conceptual site relationships and plans at the end of the second week of design. Site planning/masterplanning will conclude after week three. Week four will be concentrated on space planning along with the building's structural layout. Forms, massing and structural patterns will be explored and designed in week five. Circulation patterns both vertically and horizontally will be explored during week six. Materials studies and selection will lead to exterior form and elevation studies in week seven. Building assemblies will be discovered in week eight. Week nine will mark the midpoint and will be a time for meetings and reviews with advisors and will be a time to head into spring break and week ten to tie up any loose ends. Week eleven will be a time to review all site, structural and mechanical designs. Interior relationships and finishes will be designed in week twelve.

Finishing touches will be added and presentation materials will be prepared in the last three to four weeks of class. Organizing and maintaining a steady pace to this work schedule will be crucial to the design process during the spring semester.

Fall Semester 2004

T	24 Aug	Classes begin
T	24 Aug	1st Thesis meeting during AR/LA 561 Course
F	27 Aug	1st Draft of Thesis Statement of Intent due, 1:00 pm Arch 106 3 copies distributed to faculty for review
W	01 Sept	Thesis Statements returned to Arch 106 office by faculty
R	02 Sept	Thesis Statements returned to students in class
M	06 Sept	Labor Day Holiday
R	09 Sept	Revised Thesis Statement of Intent due to AR/LA 561 Instructor
R	16 Sept	Marked-up Thesis Statement of Intent available in AR/LA 561
T	04 Oct	Student critic preference slips & faculty preference slips availiable
R	07 Oct	Thesis Proposal/Cover/Abstract due: to AR/LA 561 In structor (2 copies)
R	14 Oct	Students and Faculty return preference slips to main office
R	21 Oct	Primary and Secondary Critics announced
R	28 Oct	Last day of AR/LA 561 Class
R	11 Nov	Veterans' Day Holiday
M-F	15-19 Nov	Final week of AR/LA 571 Design Studio / presentations

W	24 Nov	Draft Thesis Program due to Primary Critic (1 copy)
R-F	25-26 Nov	Thanksgiving Holiday
R	09 Dec	Final Thesis Program due to Primary Critic (1 copy)
F	10 Dec	Last day of classes
R	16 Dec	Program grade due to AR/LA 561 course instructor
M-F	13-17 Dec	Final Examinations

Spring Semester 2005

T	11 Jan	Classes begin
M	17 Jan	Martin Luther King, Jr. Holiday
M	21 Feb	President's Day Holiday
M-F	07-11 Mar	Mid-semester Thesis Reviews
M-F	14-18 Mar	Spring Break
W	23 Mar	4th year Statements of Intent due in AR/LA 472
F-M	25-28 Mar	Easter Holiday
M	25 Apr	Thesis Projects due at 4:30pm in the Memorial Union Ball room
T-W	26-27 Apr	Annual Thesis Exhibit in the Memorial Union Ballroom
R-R	28 Apr-05 May	Final Thesis Reviews
F	29 Apr	Draft of Thesis document Due to Primary Critics
F	06 May	Last day of classes
M-F	09-13 May	Final examinations
R	12 May	Final Thesis Document due at 4:30pm in the Department office
F	13 May	Commencement at 4:00pm Fargodome

Previous Studio Experience

2nd Year - Fall: Professor Milton Yergens

Additive/Subtractive Forms

Dwelling Wall

Bistro – Downtown Fargo Urban Infill – Fargo, ND

2nd Year - Spring: Professor Vince Hatlen

Downtown Fargo Pocket Vest Park – Atomic Coffee – Fargo, ND

Prairie Green – Rural Energy Efficient Residence – Rural Moorhead, MN

College of Business Administration Building – NDSU – Fargo, ND

3rd Year - Fall: Professor Steve Martens

Fort Abercrombie Museum and Interpretive Center – Abercrombie, ND

Bemidji Municipal Airport – Bemidji, MN

3rd Year - Spring: Professor Mohamed Elnahas

Chattanooga Theater and Performing Arts Center (Steel Competition) – Chattanooga, TN

West Acres Bank (Masonry Competition) – Fargo, ND

4th Year - Fall: Professors Cindy Urness, Mark Barnhouse, Joshua Walter

Urban Design Studio – Downtown Fargo Revitalization – Fargo, ND

4th Year - Spring: Professor Frank Kratky

Medium Density Housing (Marvin Windows Competition) – Moorhead, MN

Bioclimatic Urban Highrise Infill – San Francisco, CA

5th Year - Fall: Professor Steve Martens

Historic Preservation Studio - Revitalizing Historic Downtown Valley City, ND

Reference List/Resources

Books

Crane. Dixon (1991). The Shape of Space: Outdoor Sports Spaces. New York, NY: Van Nostrand Reinhold.

Nagashima, Koichi (1995). Athletic & Recreational Facilities Facilities. Tokyo, Japan: Nissha Printing Co., LTD.

Individuals

Bill Schoen, Schoen Associates
Brian Wilkie, North Dakota State University Hockey Club
John Peterson, MeritCare Health System
Roger Helland, Widseth Smith Nolting and Associates, Inc.

Organizations

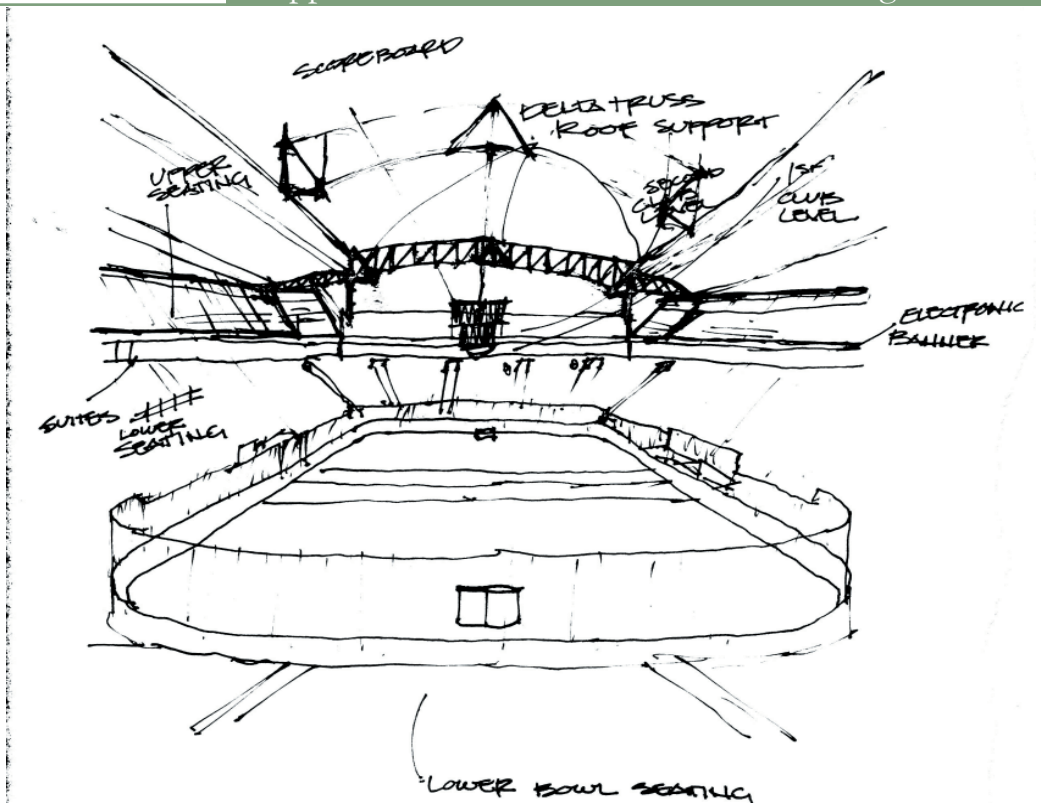
Fargo City Planning Office
MeritCare Health System

Interviews

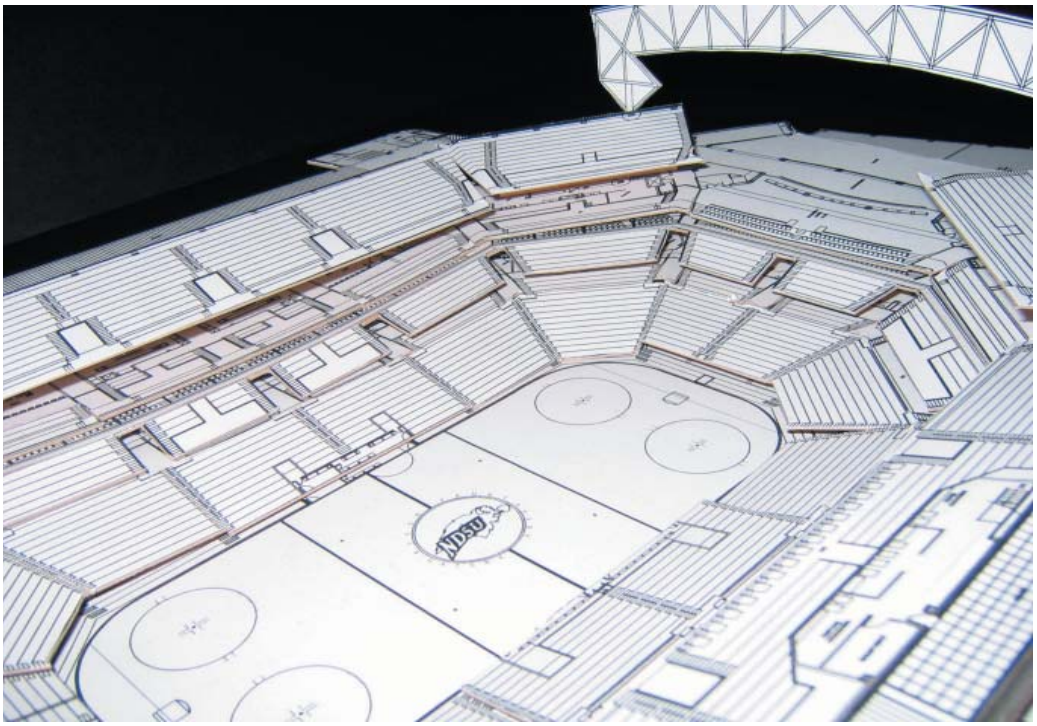
Bill Schoen, Schoen Associates
Roger Helland, Widseth Smith Nolting & Associates Inc.

Websites

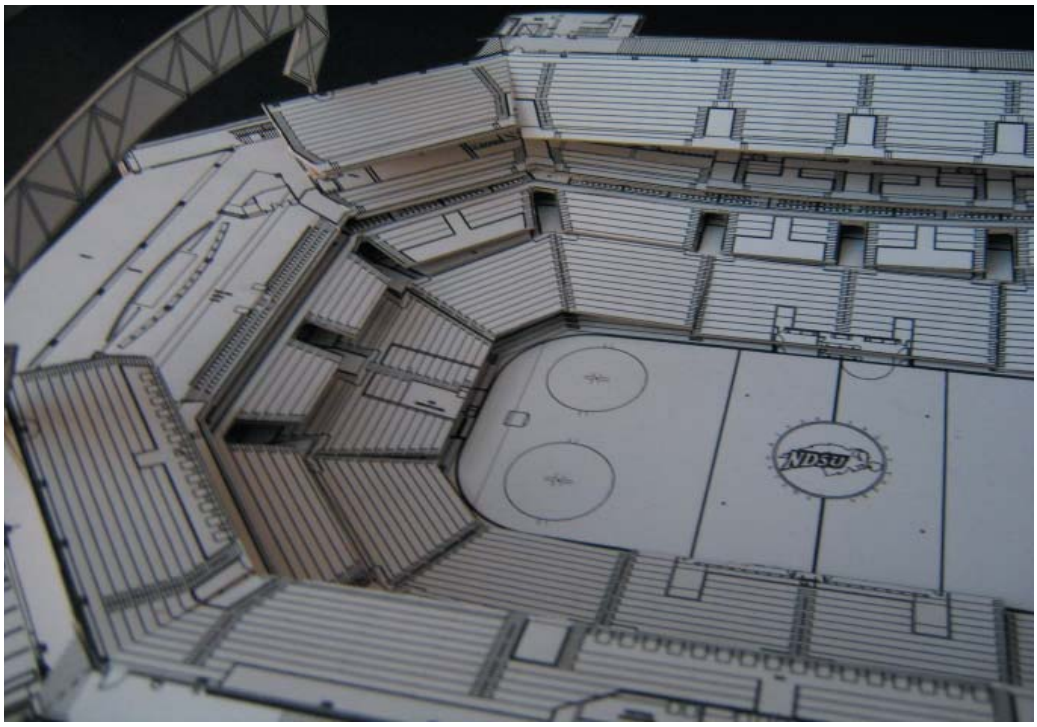
http://www.mtscentre.com/
http://www.pmiwi.com/resch.html



Preliminary Arena Interior Sketch.



Preliminary Arena Interior Model.



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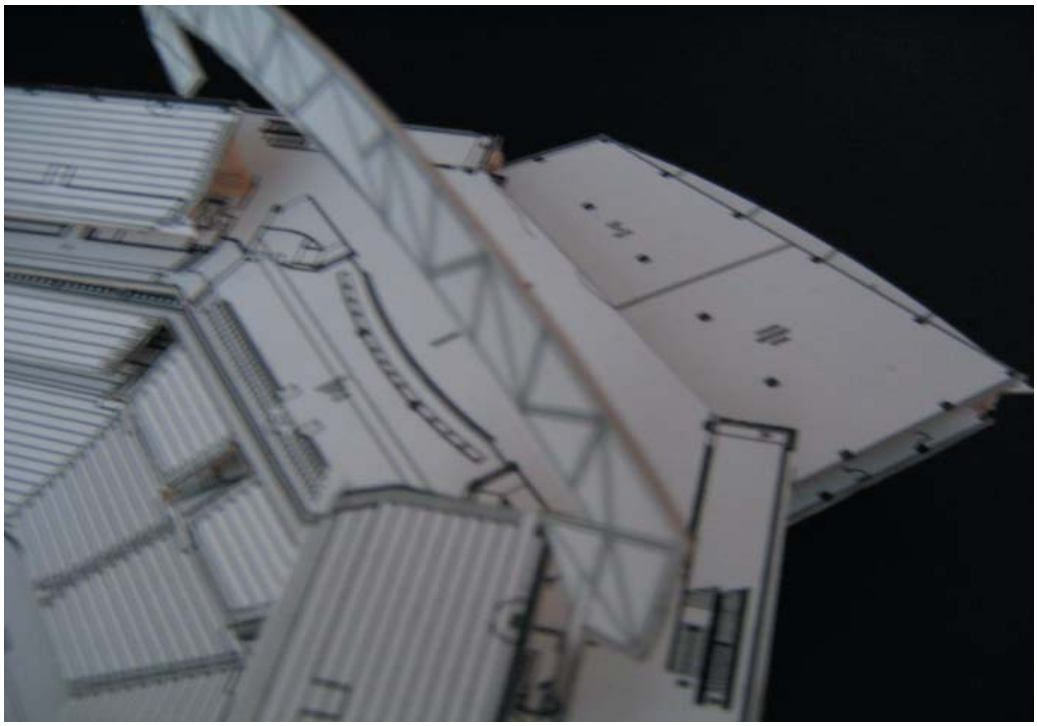

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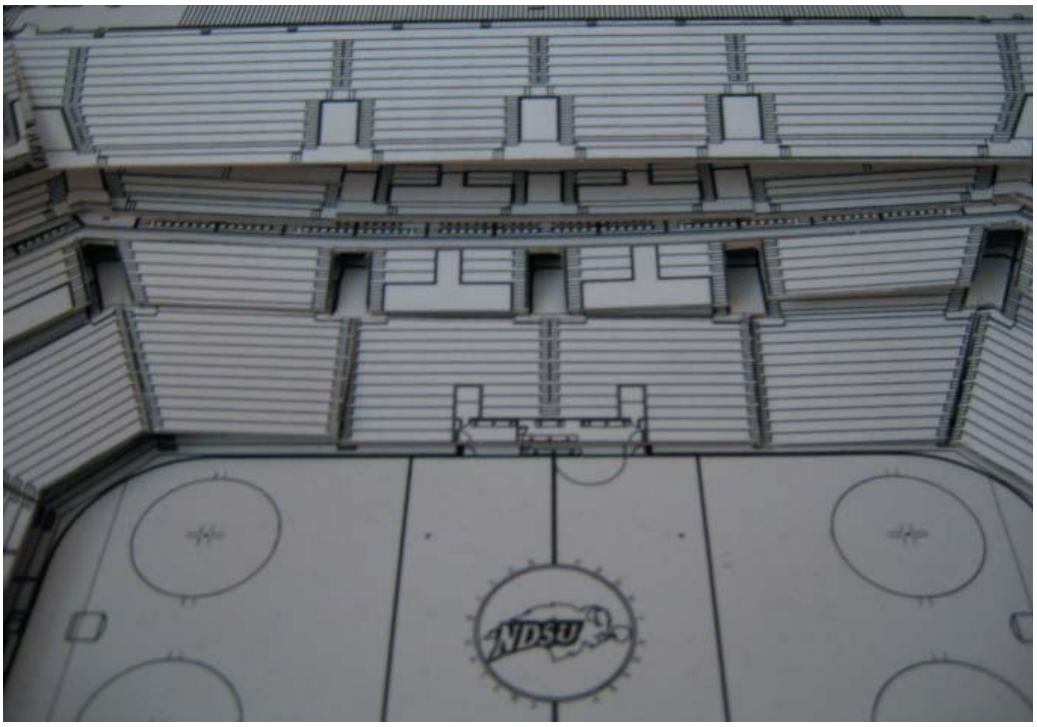

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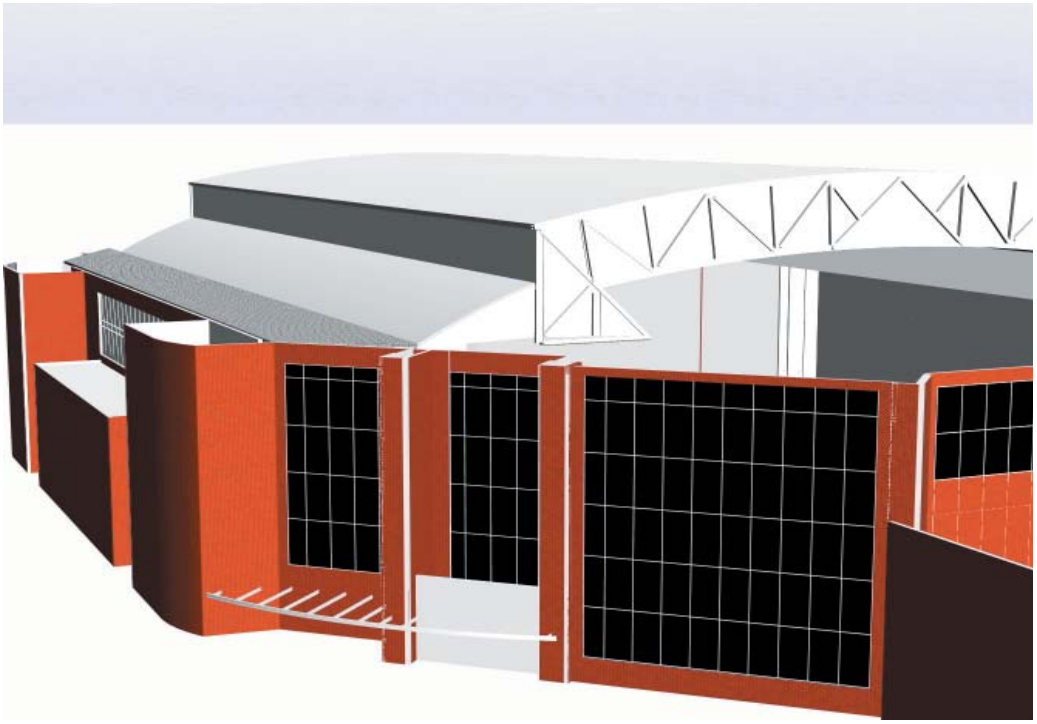
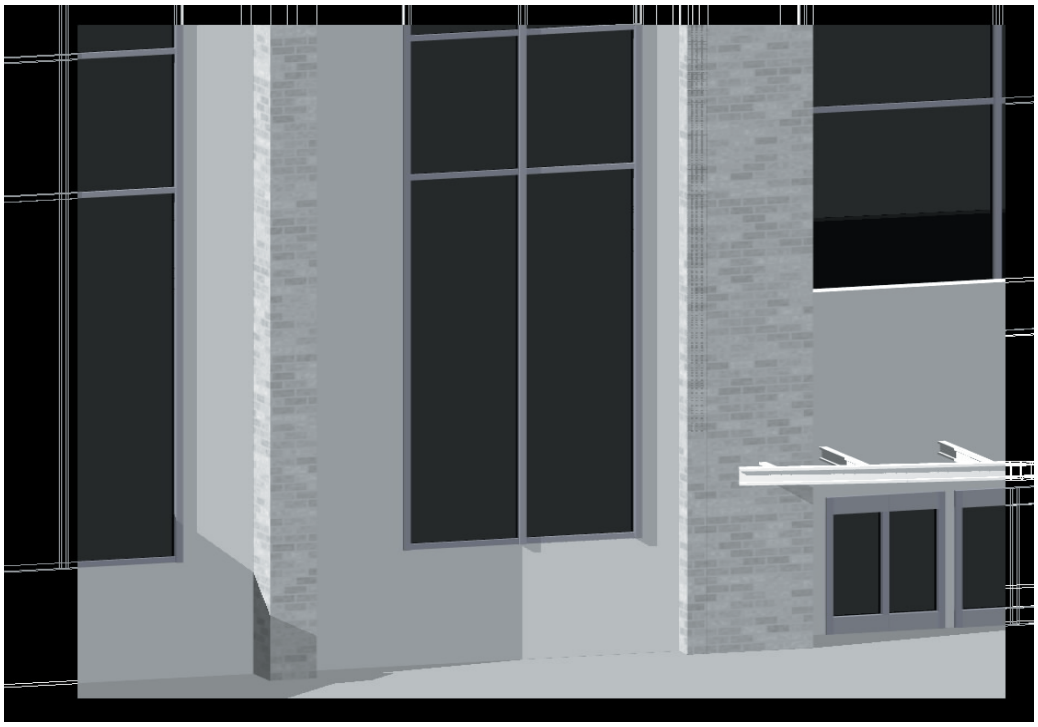
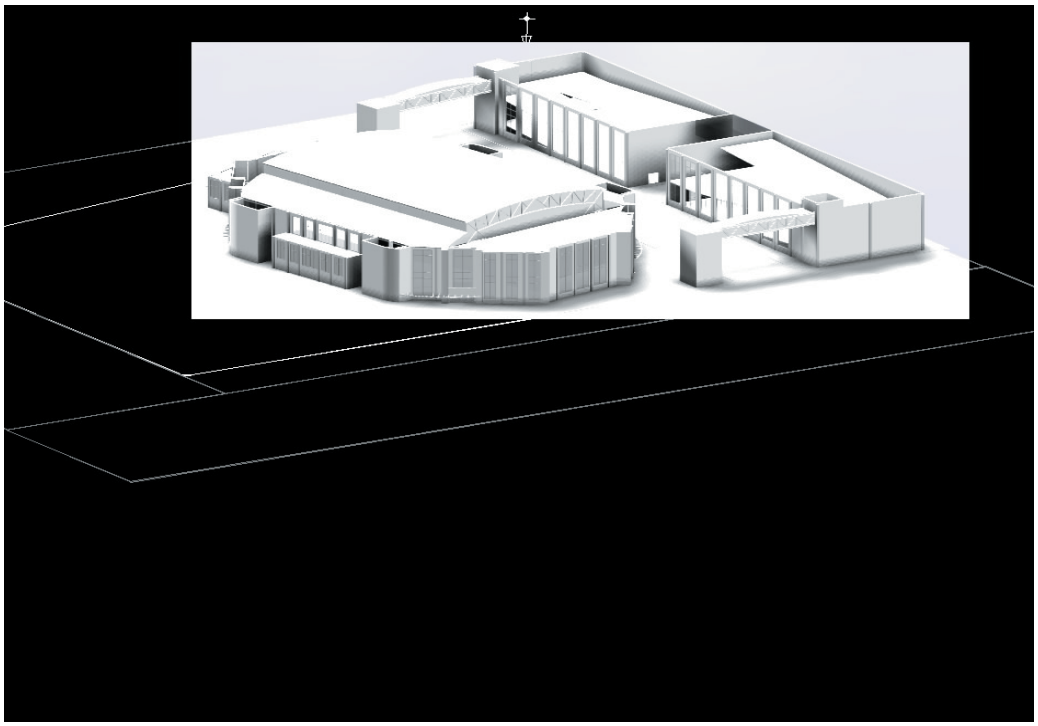


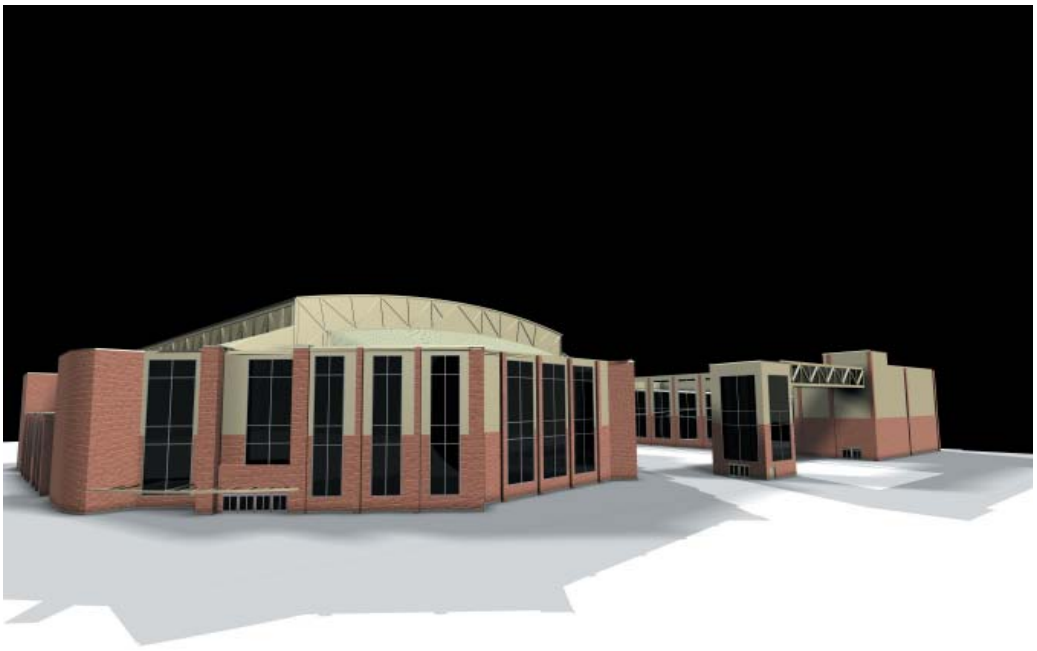
Preliminary Entry Perspective.



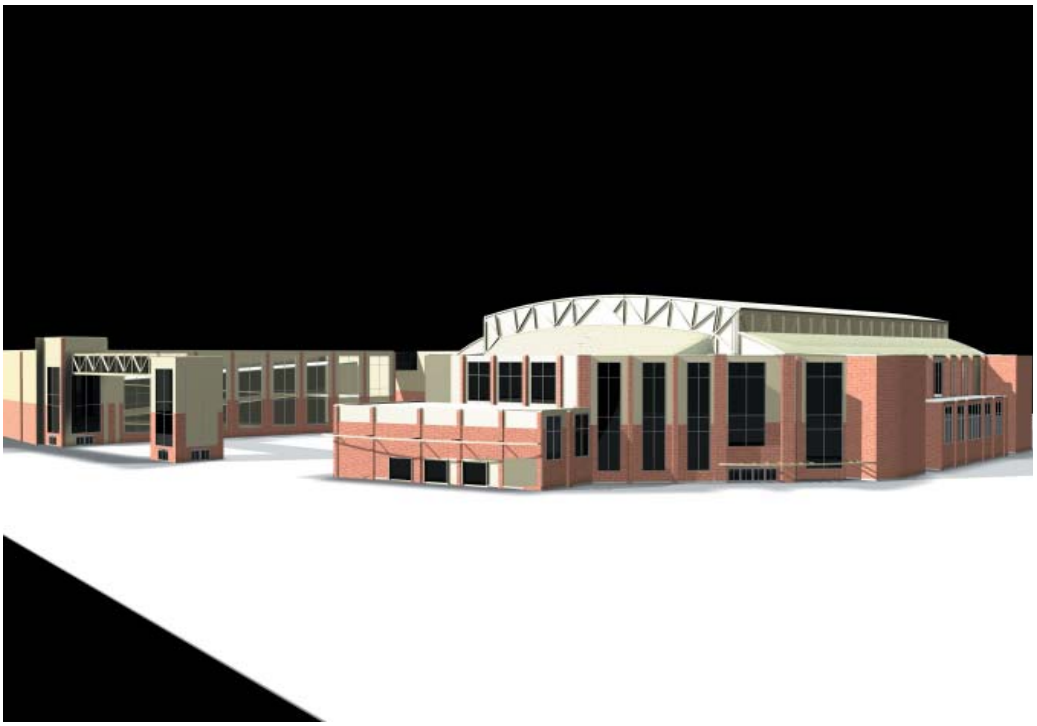
Preliminary Material Study.



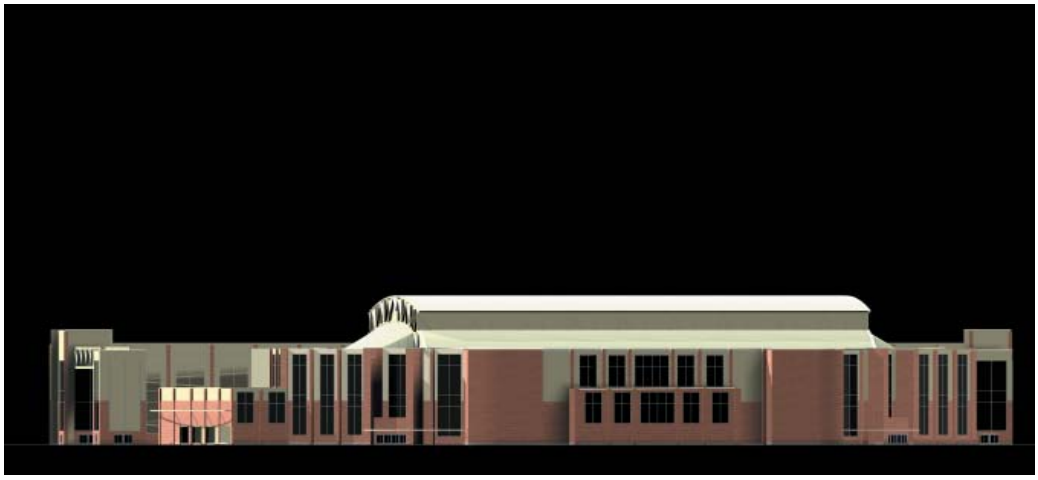
Preliminary Site Model.



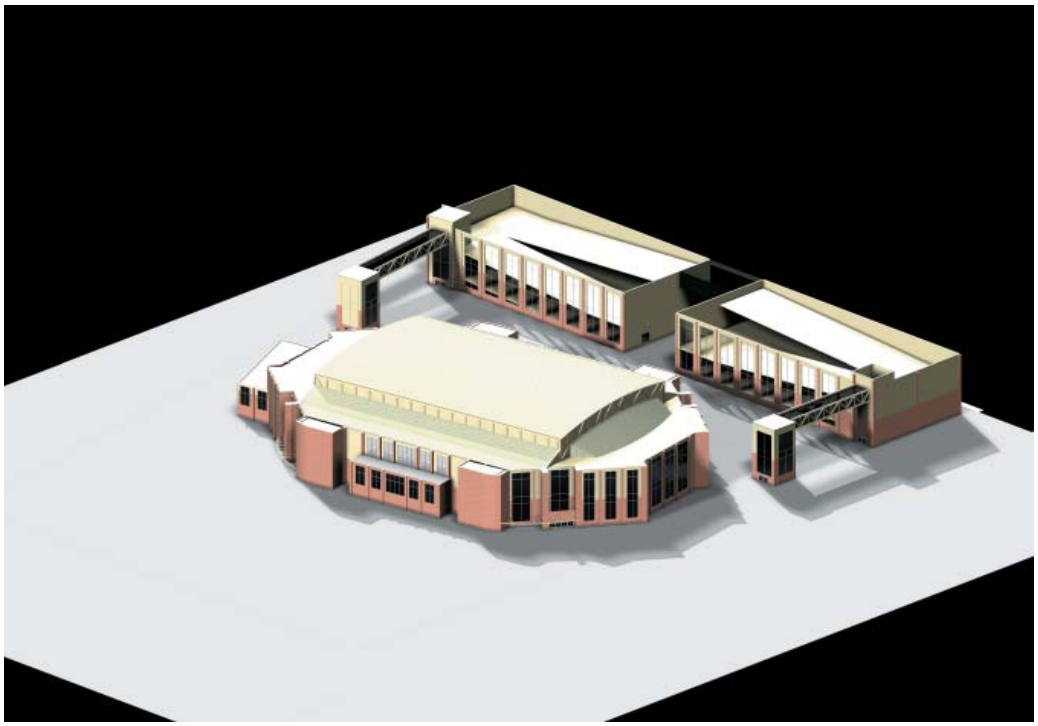
Exterior Arena Rendering - view from fourth street.



Exterior Arena Rendering - view from second street.



Exterior Arena Rendering - North Elevation.



Exterior Arena Rendering - site axonometric view.

NDSU Hockey Arena

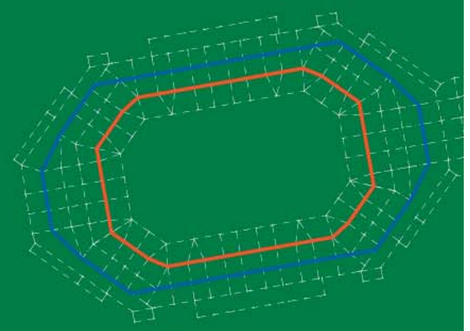
... A Gateway to Community and Athletics

RIVERFRONT

PROJECT INTRODUCTION

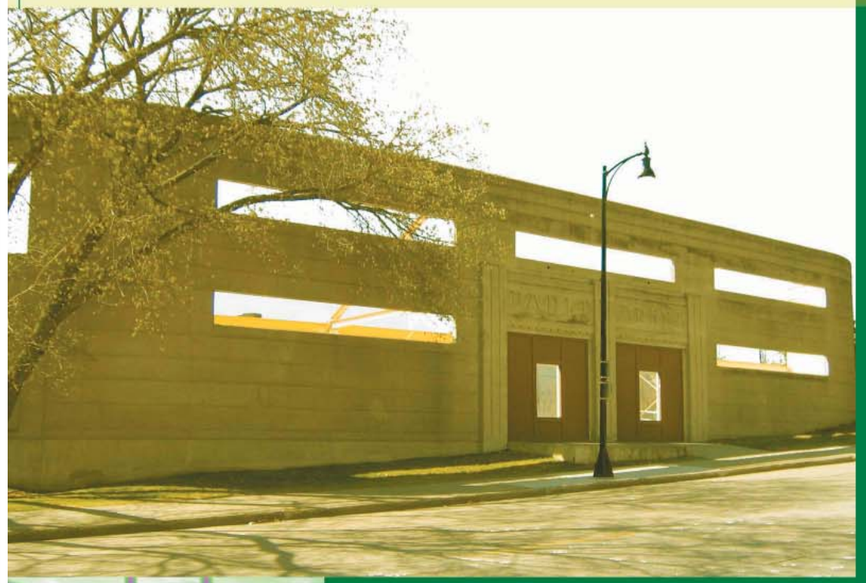
Riverfront NDSU Gateway Arena is a project conceived to develop a precedent changing the way people in the Fargo-Moorhead Community view athletics. This arena is designed to unite people and the community for the enjoyment of hockey. Riverfront NDSU Gateway Arena will have the ability to facilitate up to 8,500 hockey spectators in a state-of-the-art environment. Retractable seating will allow the facility to expand the ice sheet from the standard sheet size (85'x200') to Olympic size (100'x200') and reducing the capacity to 6,000. Two seating bowl levels and a suite level will give fans every opportunity to get the best possible view of the game. Two levels of Club Lounges are located at the ends of the arena that include seating and bars. Circulation into the seating is from the concourse forcing people to walk through the concourse and past the many concession stands. Exterior circulation to the site is from the downtown via first, second and third avenues north and fourth and second streets and from Moorhead via the three downtown bridges. A parking structure is available across first avenue with skyways connecting to the open concrete patio on the Hockey Arena site. A large LCD screen visible from fourth street will allow pedestrians to view the events taking place inside the Hockey Arena. A plaza on the site is a public amenity designed to act as a link between the Hockey Arena and the proposed expansion for the Civic Center. This project proves a community's unity can be informed by Architecture.

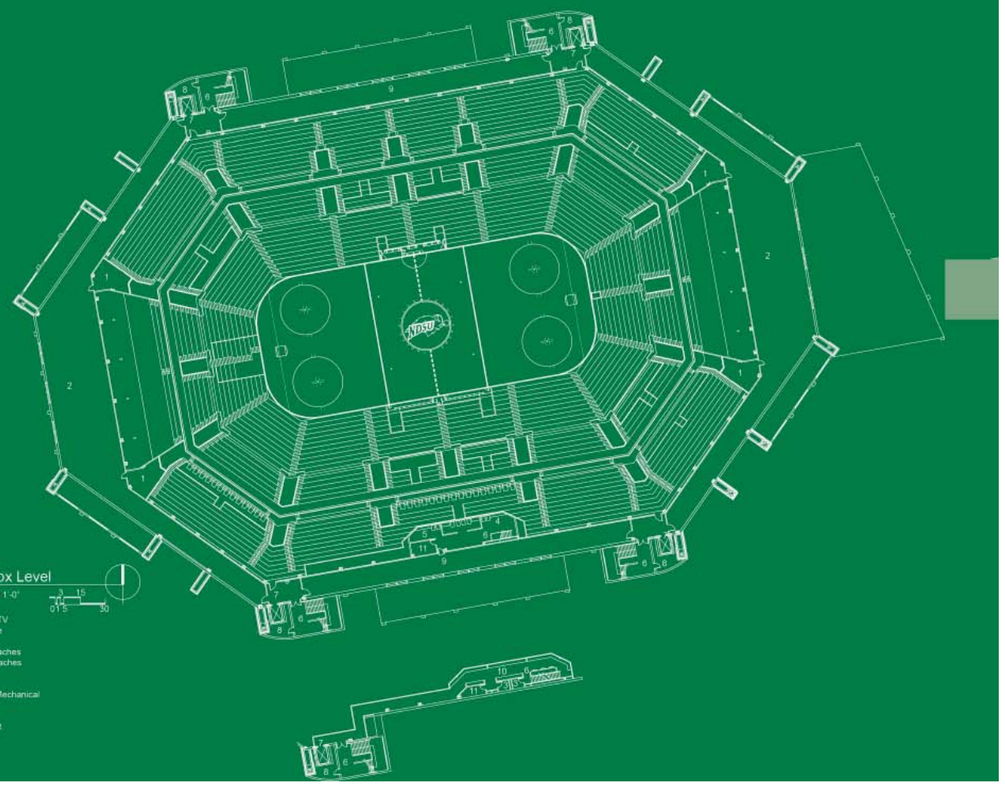
Partial West Elevation
Material Study



Structure/HVAC Plan

Scale: 1/64" = 1'-0"





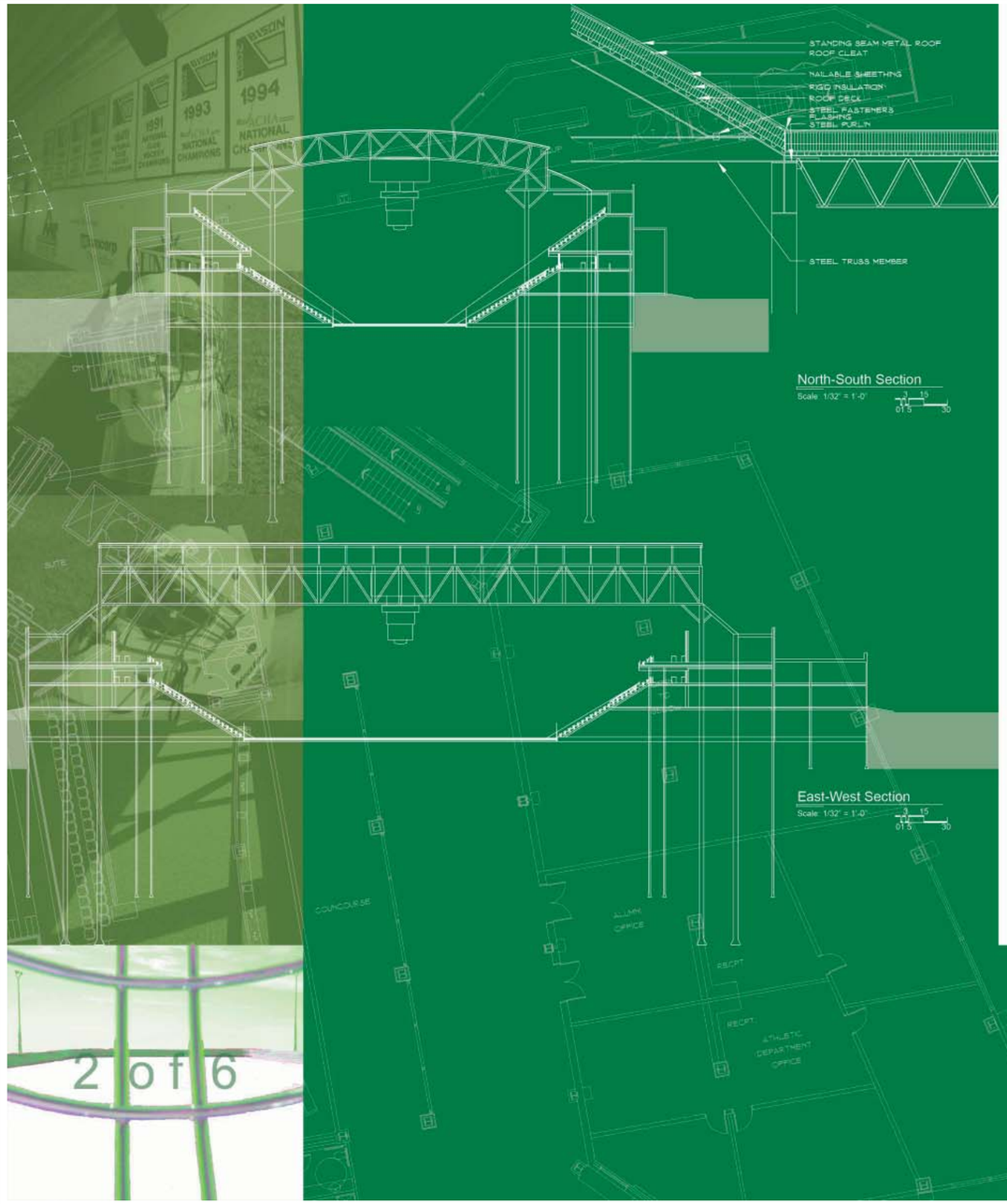
Press Box Level

Scale: 1/32" = 1'-0"

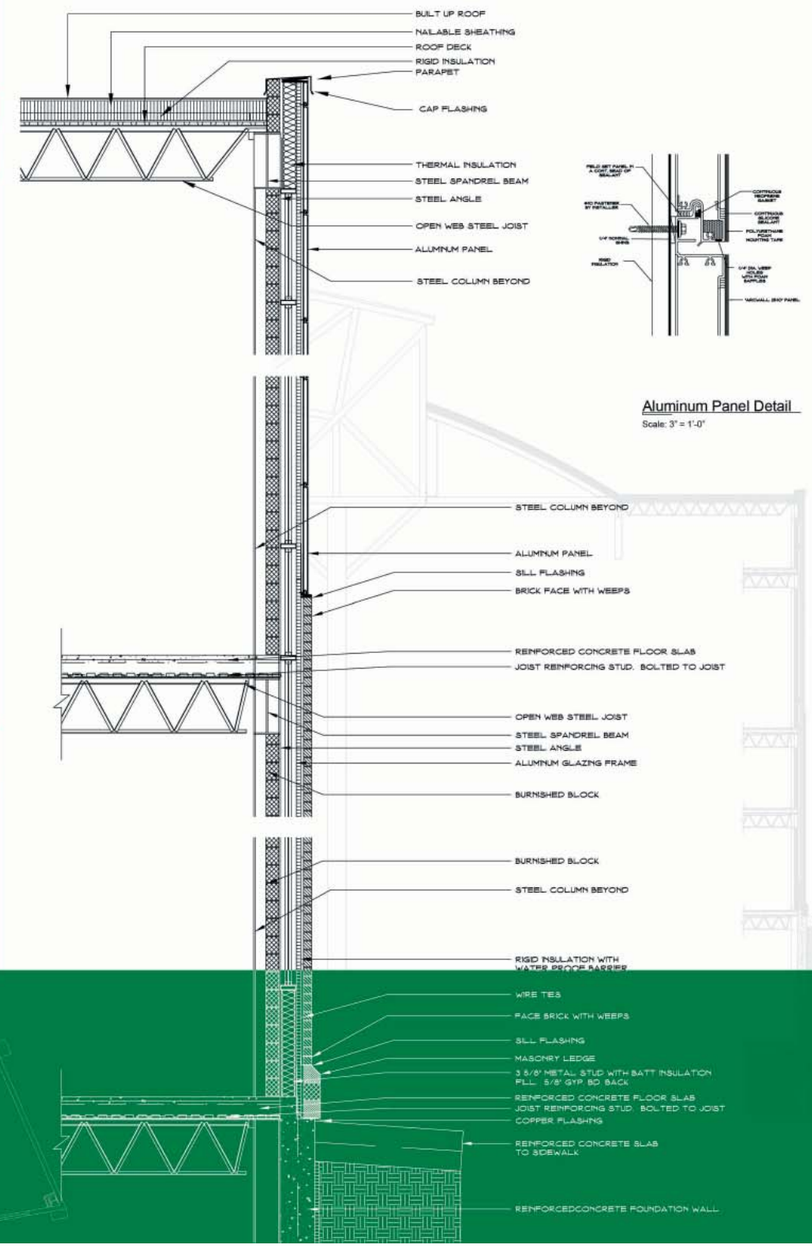
1. Spotlight/TV
2. Penthouse
3. Toilet
4. Home Coaches
5. Visitor Coaches
6. Stair
7. Elevator
8. Elevator Mechanical
9. Corridor
10. Media
11. Equipment

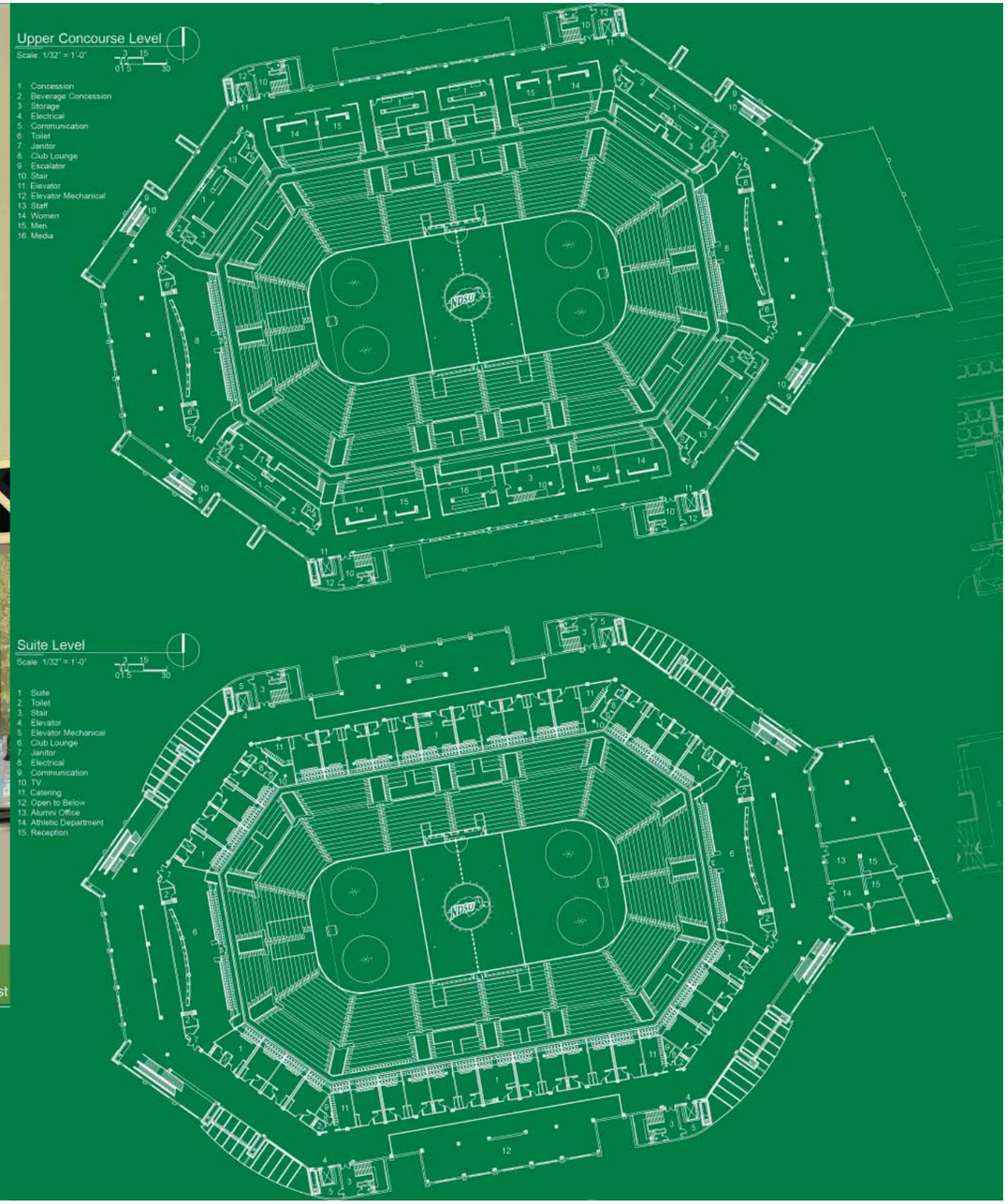
PROJECT BACKGROUND

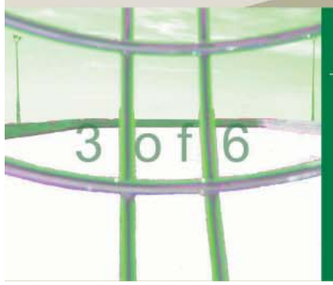
Indoor Hockey started in Fargo in the 1930's with the addition of the Fargo Arena in Island Park. The building was renovated in the 1950's and surrendered its hockey duties to the John E. Carlson Coliseum in the 1960's and later became Fargo's downtown swimming pool. The NDSU Hockey Club was established in 1983. The team brought national notoriety to the school by winning seven national championships in their first eight seasons. NDSU Club Hockey was re-established in 2003 after a four year absence and is making great strides to continue its championship tradition. This facility will help the club recruit the finest players to North Dakota State University as well as being the cornerstone in getting Men's and Women's Division I Ice Hockey teams to NDSU.


STANDING SEAM METAL ROOF
ROOF CLEAT
NAILABLE SHEETHING
RIGID INSULATION
ROOF DECK
STEEL FASTENERS
FLASHING
STEEL PURLIN
STEEL TRUSS MEMBER
North-South Section
Scale: 1/32" = 1'-0"
East-West Section
Scale: 1/32" = 1'-0"
SITE
CONCOURSE
ALUMNI OFFICE
RECPT.
ATHLETIC DEPARTMENT OFFICE

2 of 6


BUILT UP ROOF
NAILABLE SHEATHING
ROOF DECK
RIGID INSULATION
PARAPET
CAP FLASHING
THERMAL INSULATION
STEEL SPANDREL BEAM
STEEL ANGLE
OPEN WEB STEEL JOIST
ALUMINUM PANEL
STEEL COLUMN BEYOND
Aluminum Panel Detail
Scale: 3" = 1'-0"
STEEL COLUMN BEYOND
ALUMINUM PANEL
SILL FLASHING
BRICK FACE WITH WEEPS
REINFORCED CONCRETE FLOOR SLAB
JOIST REINFORCING STUD, BOLTED TO JOIST
OPEN WEB STEEL JOIST
STEEL SPANDREL BEAM
STEEL ANGLE
ALUMINUM GLAZING FRAME
BURNISHED BLOCK
BURNISHED BLOCK
STEEL COLUMN BEYOND
RIGID INSULATION WITH WATER PROOF BARRIER
WIRE TIES
FACE BRICK WITH WEEPS
SILL FLASHING
MASONRY LEDGE
3 5/8" METAL STUD WITH BATT INSULATION FILL. 5/8" GYP. BD. BACK
REINFORCED CONCRETE FLOOR SLAB
JOIST REINFORCING STUD, BOLTED TO JOIST
COPPER FLASHING
REINFORCED CONCRETE SLAB TO SIDEWALK
REINFORCEDCONCRETE FOUNDATION WALL

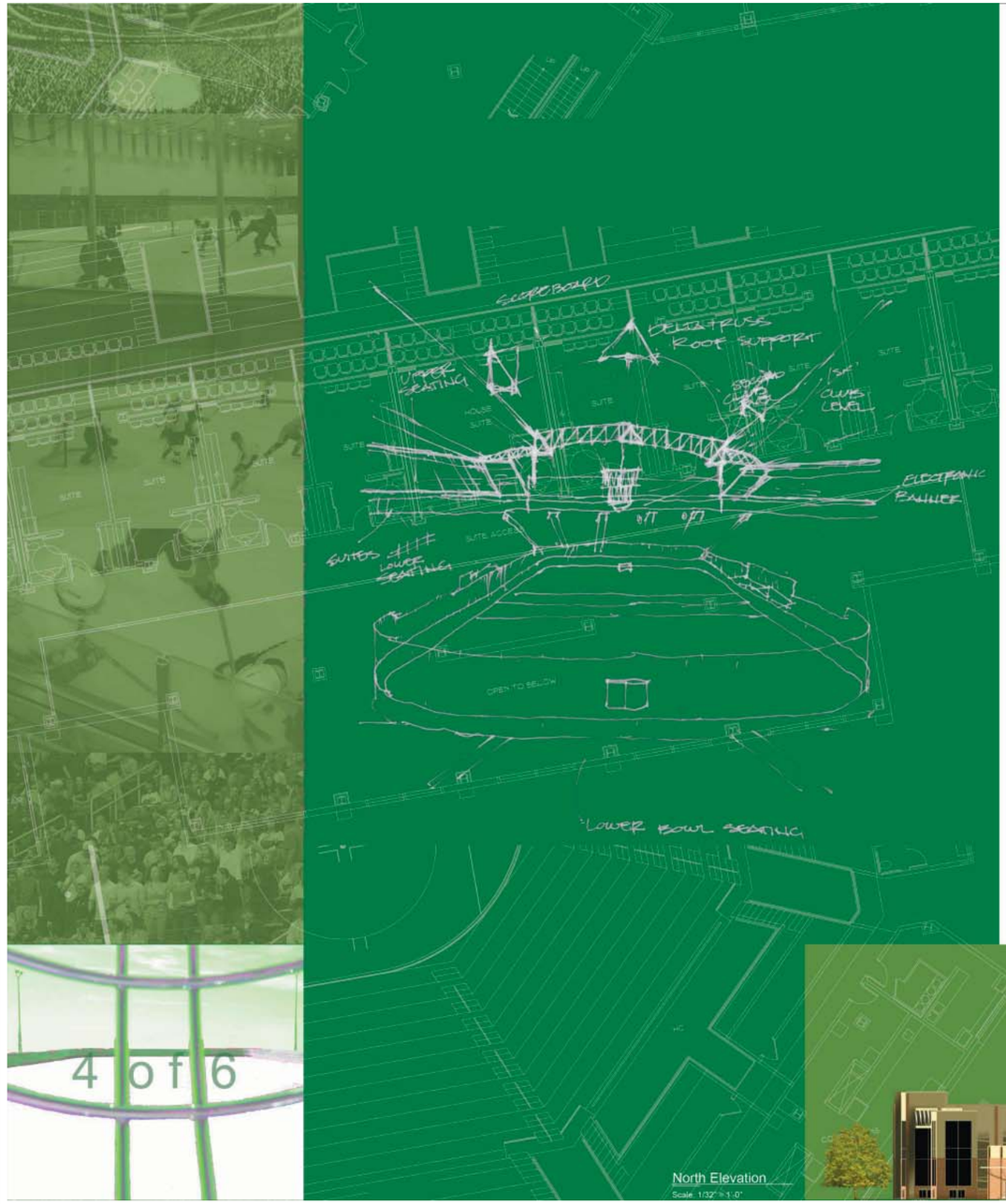


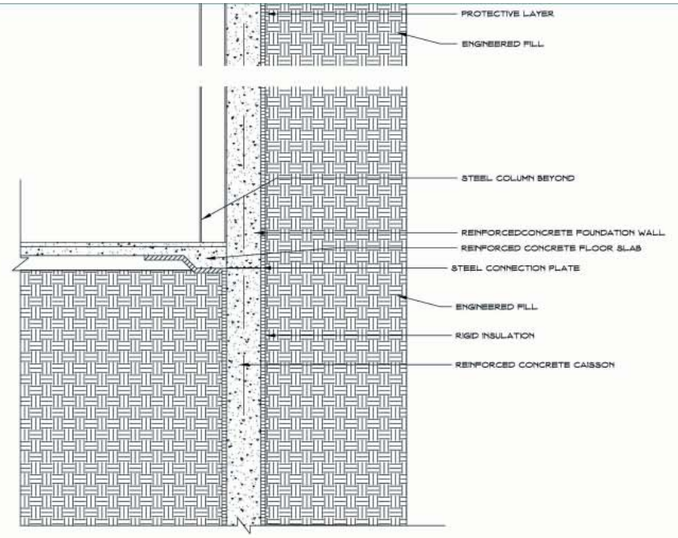


Building Perspective View of Digital Video Screen Looking Southeast

PROJECT DEVELOPMENT

The Riverfront NDSU Gateway Hockey Arena is a long-span steel structure that has come to life by understanding the building components using four main methods. Conceptually, the process has been brought to the level of developed design through concept sketches and models. Two dimensional drawings were used to develop the spaces and define public ways of circulation as well as develop the building materials in building and wall sections. The process of developing the mass of the building and solving structural components began with a conceptual floor plate model and evolved into a presentation model showing building mass and structural connection. Three dimensional modeling was used to depict the exterior of the building and its relationship to the site.





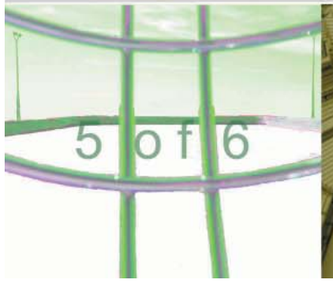
Wall Section Detail
Scale: 1/2" = 1'-0"

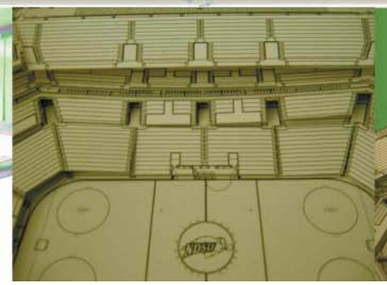
SIGNIFICANT PROJECT ELEMENTS

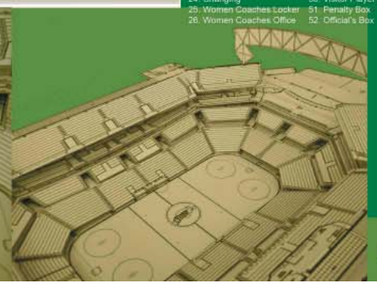
This long-spanned, light weight steel structure has many material components that comprise of the building's structure, connectivity, exterior and interior aesthetic. Steel structure and curtain wall systems hold up and envelope most of the building assembly. Concrete flooring and masonry interior material are also used. Burnished block is used as a structural material to anchor the curtain wall as well as an interior finish material. The interior materials are conducive to activity such as hard Terrazo floors with flowing patterns and soft colored burnish block walls directing the flow of circulation. Material accents at nodes of transportation act as marketing tools aligning people with concessions and souvenirs. The steel roof structure creates an illusion of a space within a space because of its size and span.

Building Perspective View from Red River Looking Southwest

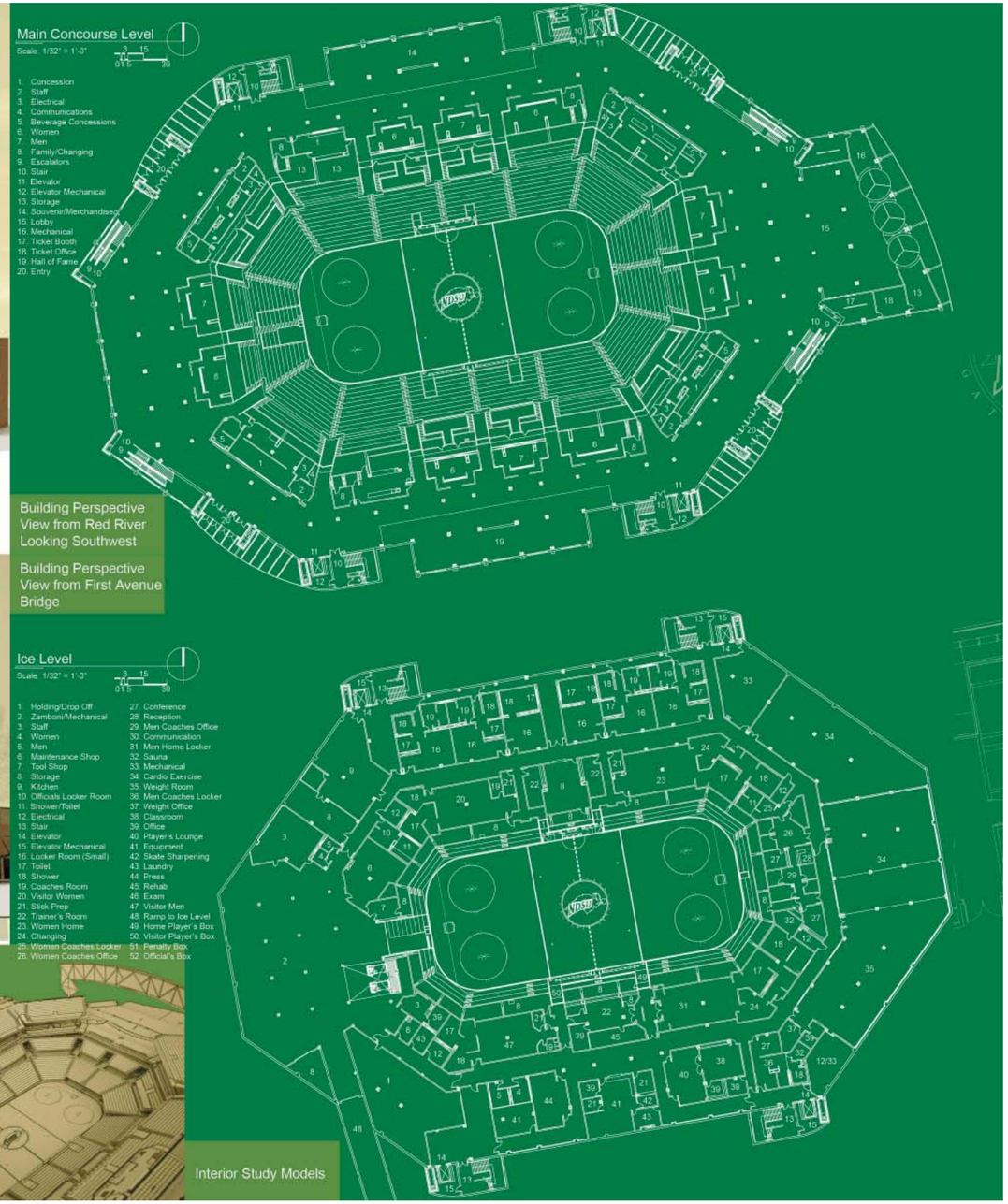
Building Perspective View from First Avenue Bridge

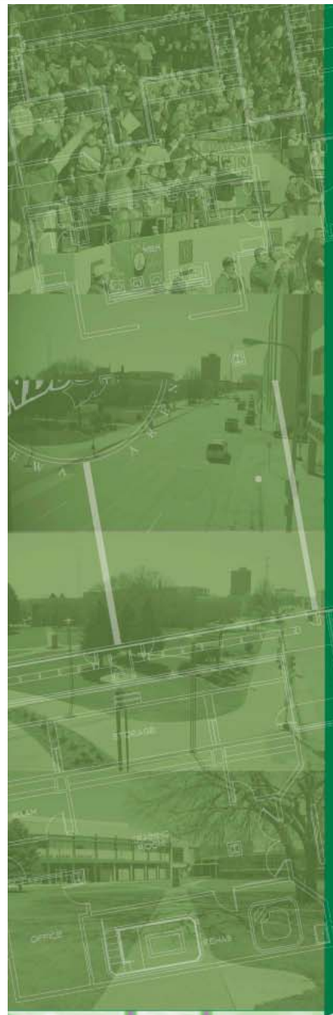






Interior Study Models



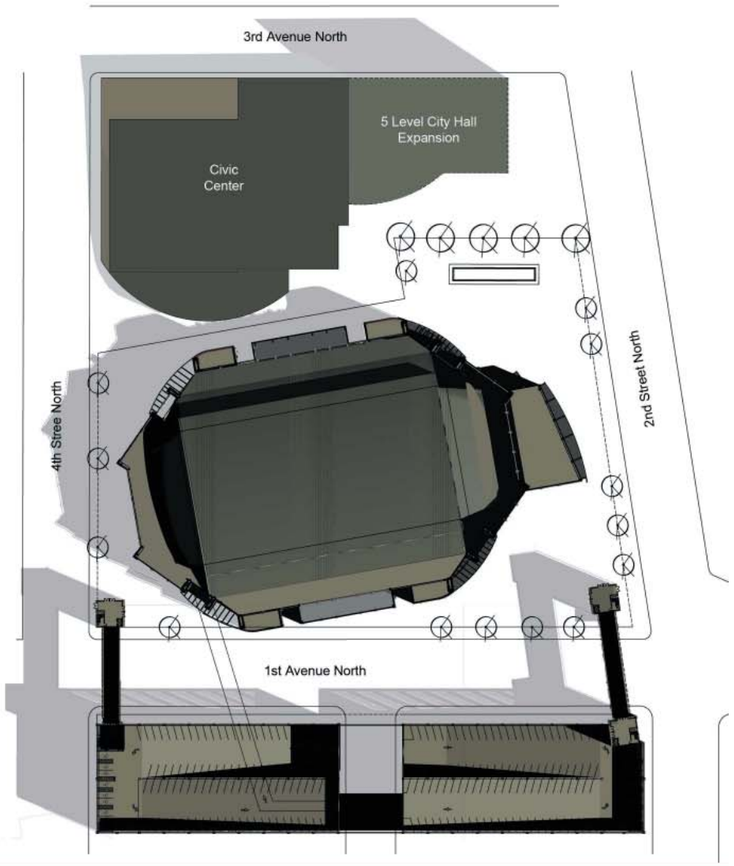


SITE INFORMATION

Downtown Fargo is growing at a faster rate than ever before. As the community has grown, downtown has become more and more important. North Dakota State University is also experiencing many changes. Athletics has recently made the move to Division I and Club Hockey has been resurrected. Fargo has developed a plan for this site that will provide a corridor from downtown Fargo to Moorhead. My design adds to that plan creating more of a Gathering space or meeting node in the downtown fabric with many amenities including the Riverfront NDSU Gateway Arena, a parking structure with skyways and a plaza.

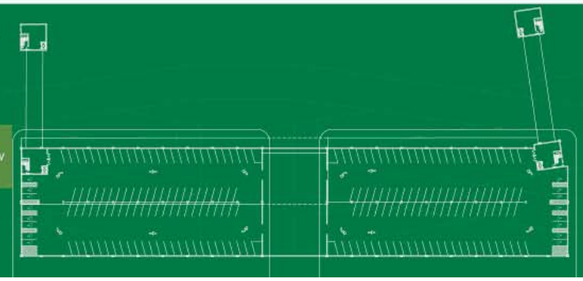
The site of the Riverfront NDSU Gateway Arena lies between second and fourth streets, both sides of first avenue and up to the current Fargo Civic Center. Cooperating with the City of Fargo's Downtown Master Plan, I have removed two buildings. The Fargo Public Library which is being planned for another location and the Fargo City Hall. I have proposed space for a City Hall expansion connecting to the Civic Center on the east side of the site. I took out third street as it wasn't a downtown through street and seemed to only service City Hall and the Parking lot that has been replaced with my parking structure. City Hall can now be serviced by third avenue north and second street. The Plaza is a public amenity consisting of trees, seating and a large planting structure.

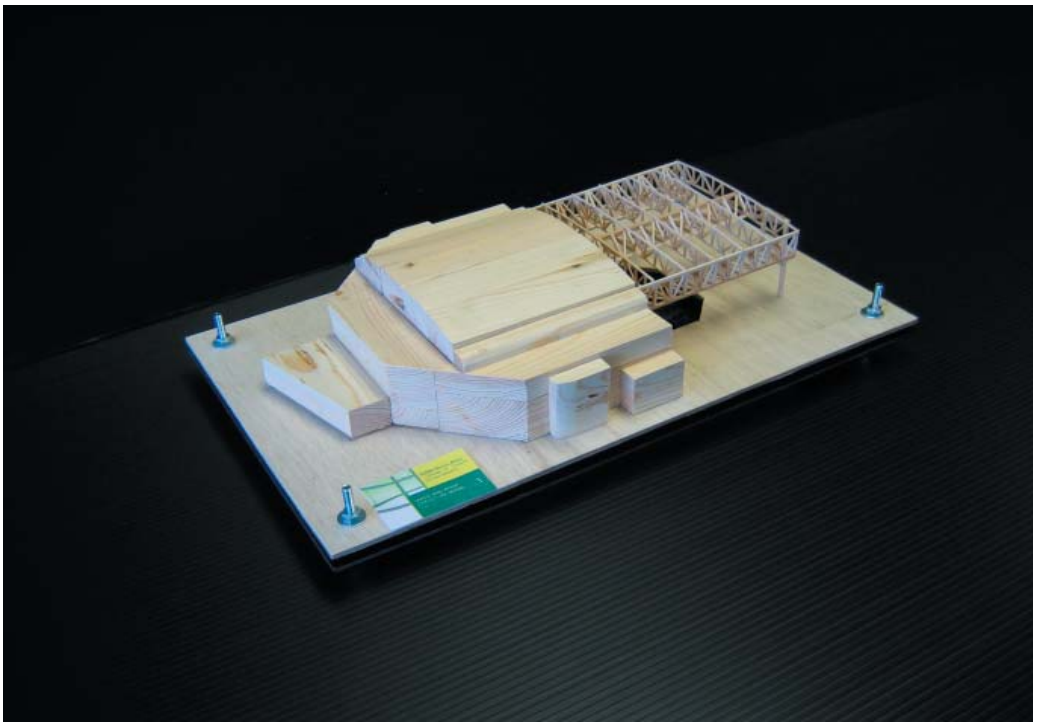
The contextual surroundings of downtown are quite diverse. Masonry construction dominates this part of downtown along with some contemporary and modern materials such as metal panel and concrete construction. The surrounding context consists of commercial, residential and mixed-use spaces.



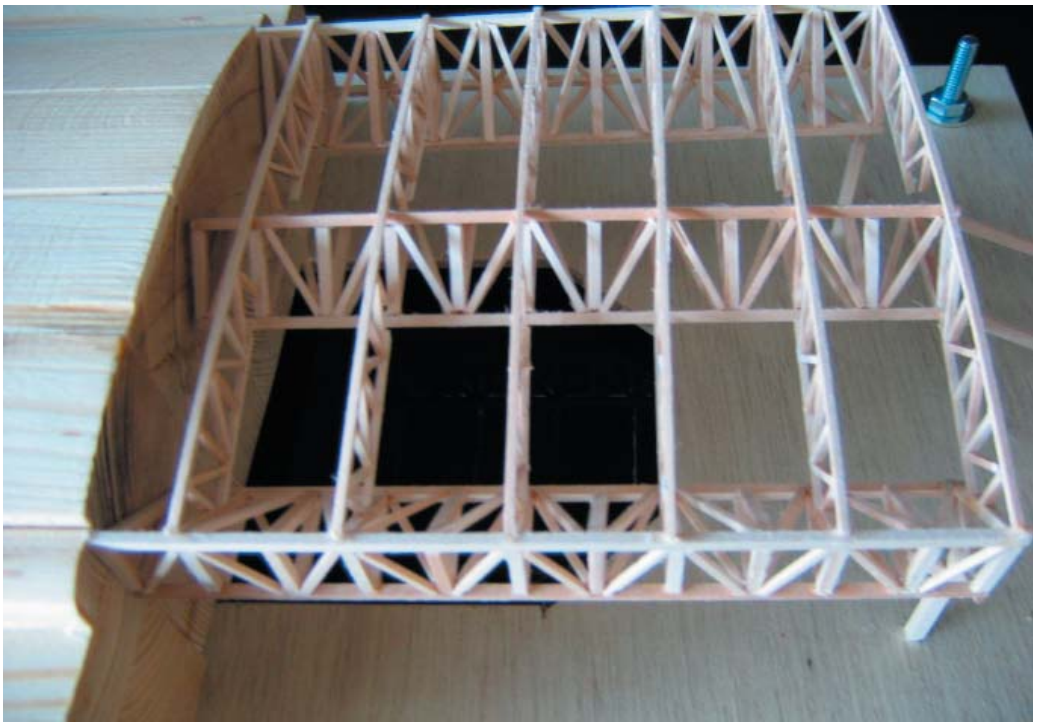
Site Plan
Scale: 1/64" = 1'-0"

Site Axonometric View





Presentation Mass/Roof Structure Model.



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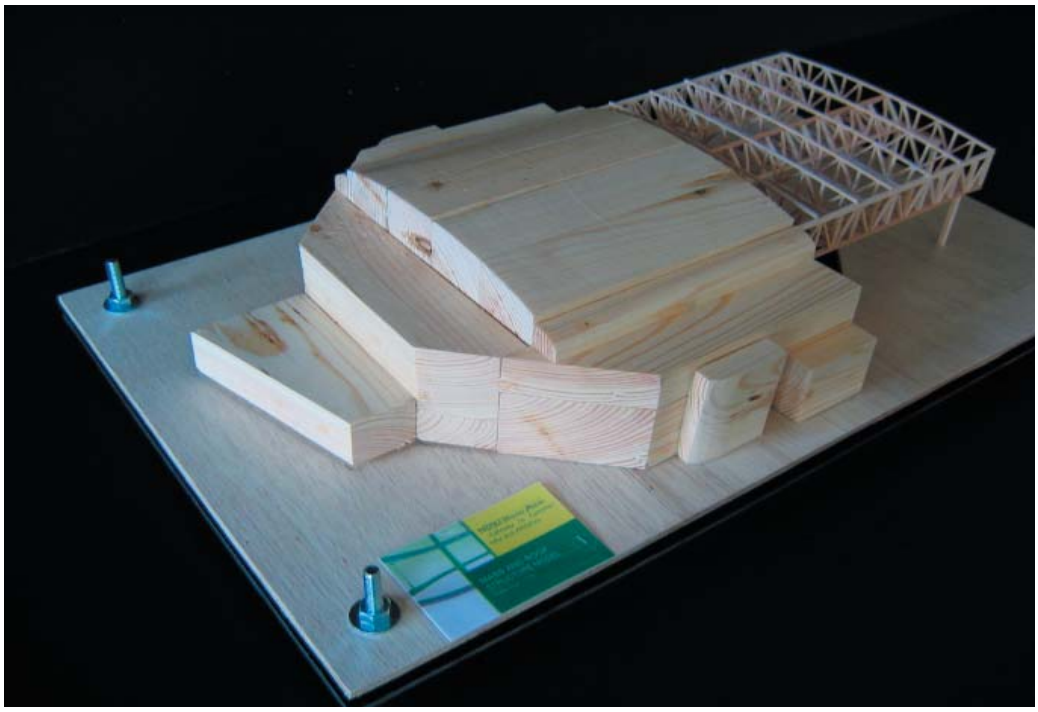

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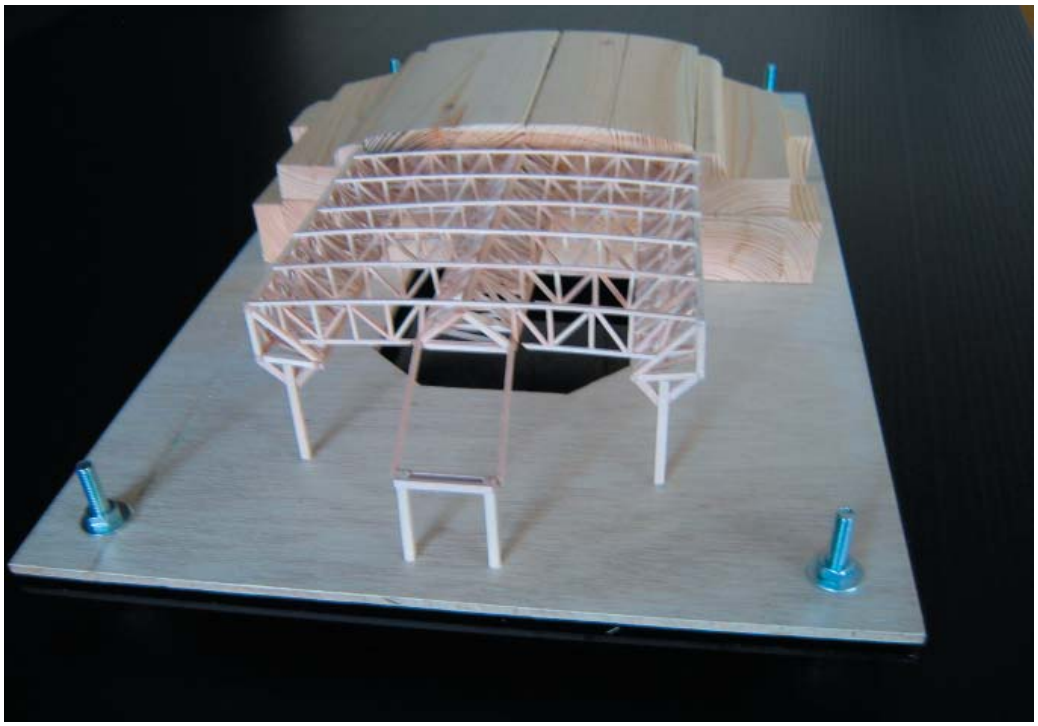

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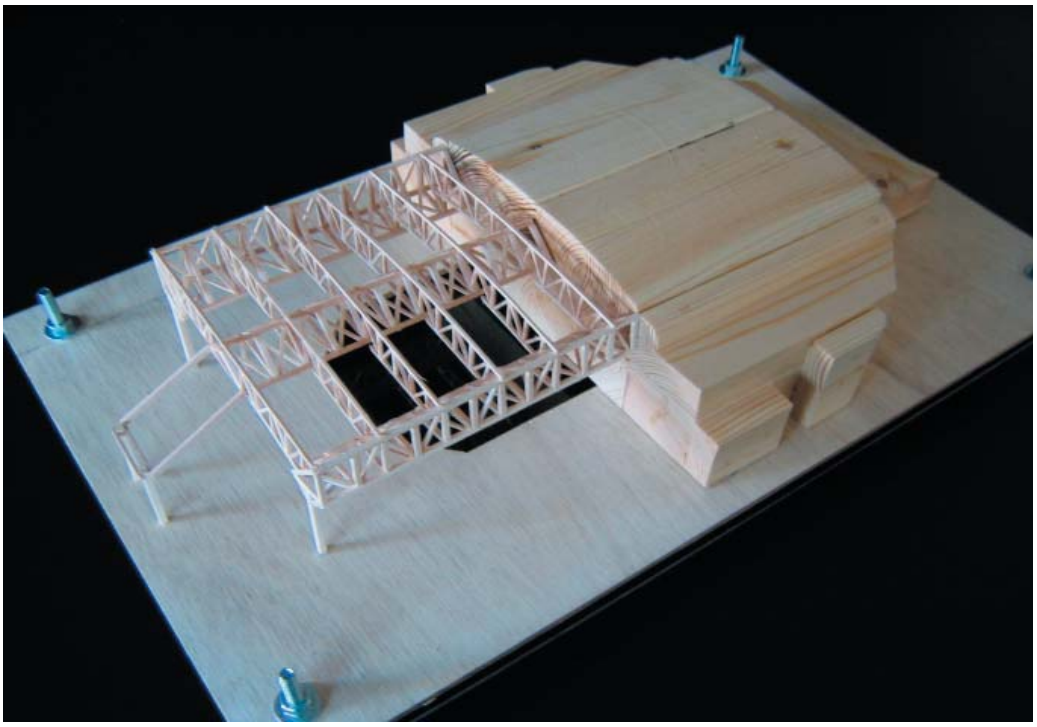

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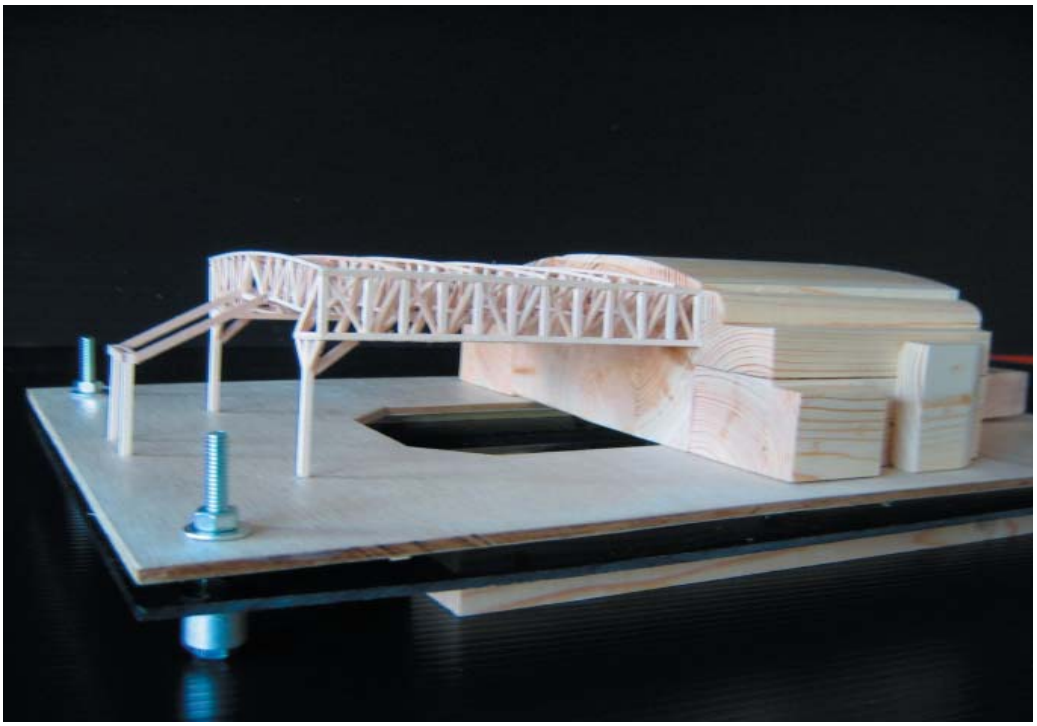

Presentation Mass/Roof Structure Model.

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