ADAPTIVE ARCHITECTURE:
DESIGN FOR A DECLINING GLOBAL POPULATION

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ADAPTIVE ARCHITECTURE:
DESIGN FOR A DECLINING GLOBAL POPULATION

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

By

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

May 2010
Fargo, North Dakota
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TITLE
ADAPTIVE ARCHITECTURE: DESIGN FOR A DECLINING GLOBAL POPULATION

SUMMARY
In the face of a declining human population, our ability to plan for and adapt to future circumstances will be essential if we, as a global community, are to not only preserve our built environment, but also ensure its continued growth in a responsible manner.

We cannot afford to ignore or be indifferent to the issue of population decline. And while it will require the cooperation and coordination of a large number of groups to develop a comprehensive plan, we as architects and members of the design community have a responsibility to develop our own set of criteria that will ensure the consistent design of buildings that are sustainable, adaptable, and durable.

Through the design of a 50,000 square foot multi-purpose office environment in downtown Fargo for Lutheran Social Services of North Dakota and its partnering organizations, I hope to illustrate the adaptable design strategy that I have developed through my research on population decline and sustainable architectural methods. The design and its underlying strategy will be showcased through the use of plans, sections, perspectives, and photographs of the physical model.

KEY WORDS
Population Decline, Sustainable Design, Adaptable Design
With birthrates in developed countries currently declining or projected to decline in the near future, who is going to, and how will they, maintain the built environment to prevent it from falling into ruin?
STATEMENT OF INTENT

TYPOLOGY
Adaptive and sustainable multi-purpose office complex

THE THEORETICAL PREMISE / UNIFYING IDEA

CLAIM
The built environment must now be designed with adaptability, reasonable maintainability, and a much longer life span, to allow a smaller workforce the ability to properly care for and preserve past, present, and future construction.

SUPPORTING PREMISES
Global population growth is starting to level off and will eventually begin to decline. This reduced population will be faced with difficult questions about how to move forward and adapt to future circumstances, as well as how to maintain a global built environment with fewer people.

Care for and preservation of existing construction, as well as a well articulated plan for future construction will be key strategies in preventing what would best be described as “ghost towns and cities” from developing on a global scale.

The built environment we have created is and continues to be one of the most important accomplishments of our civilization. To neglect it and allow it to fall into a state of disarray or to halt its advancement would mark the beginning of a new, disturbing era in human history.

Preserving and maintaining the built environment will become increasingly important in the very near future. Failure to do so will not only have consequences aesthetically and architecturally, but economically as well.

CONCLUSION
In the face of a declining human population, our ability to plan for and adapt to future circumstances will be essential if we, as a global community, are to not only preserve our built environment, but also ensure its continued growth in a responsible manner.
We cannot afford to ignore or be indifferent to the issue of population decline. And while it will require the cooperation and coordination of many groups to develop a comprehensive plan, we as architects and members of the design community have a responsibility to develop our own set of criteria that will ensure the consistent design of buildings that are sustainable, adaptable, and durable.
Today, we as members of a global civilization are faced with many difficult social issues. Issues such as global warming, dwindling natural resources, outbreaks of disease, and the threat of nuclear war are constantly covered by the media, sometimes to the point of exhaustion. But what about population decline? This important issue receives little or no attention from the various news agencies, and most people are unaware that it even exists. This state of unawareness can continue no longer.

The effects of population decline have the potential to be far-reaching, and the one area that will be affected the fastest and most directly will be the size of the global workforce. The economies of countries around the world depend on their workforces. Their growth is directly related to the growth of both the workforce and the general population around the world. So without any type of plan in place, what is going to happen to these countries and their economies when workforces and populations begin to level off or decline?

Another aspect of population decline to consider is this: with fewer people available to do the same amount, and potentially even more work, how will cities, states, and countries find the manpower necessary to maintain their infrastructures? And beyond that, with fewer people paying taxes and the price of labor and materials increasing, how are we going to pay for it? But we as a society can’t just let our infrastructure and buildings fall apart, can we? So what then do we do in a situation like this when the financial cost of maintenance becomes too great, but the societal cost of not maintaining these elements is even greater? It is these types of important questions that make us realize that the ways in which we have survived and evolved as a civilization may not be viable in the future.
Now that the effects of population decline on the condition of our built environment have been realized, the question becomes, what will we do about it? Will we stop new construction and put all of our time and resources into maintaining what has already been built? Or will we begin to design and build our environment in a responsible way that will not only allow it to continue to grow, but will also allow both new and old construction to be maintained for much longer periods of time with fewer resources? This is the challenge. And this is where architects can play an important role in solving a major problem caused by population decline.

The questions that have been asked here are all important, and there are many other difficult and possibly controversial questions that need to be asked in regards to population decline. And while the answers to some of these questions may be very complicated and eye-opening, it is important, for the sake of future generations, that an open discussion begins now.

This thesis will investigate these questions on a much more detailed level in an attempt to develop a comprehensive answer to the larger question that faces architects: How can we design our built environment with adaptability, reasonable maintainability, and a much longer life span, to allow a smaller workforce the ability to properly care for past, present, and future construction?
USER/CLIENT DESCRIPTION

THE CLIENT

Lutheran Social Services of North Dakota [LSSND]: Fargo Branch

Founded in Fargo in 1919, LSSND started as the Lutheran Children’s Finding Society, an organization whose mission was to care for and find safe, loving homes for “orphaned, homeless, abandoned, neglected, and dependent children” (Our, 2008). Since then, LSSND has grown into an organization that offers a range of 21 services and programs to the citizens living in LSS’ eight regions of North Dakota (Search, 2008). Program centers in Fargo, Bismarck, Grand Forks, Minot, and Williston help coordinate and manage these services (Contact, 2008).

People living in LSSND’s Region Five, which consists of Cass, Ransom, Rich-land, Sergeant, Steel, and Trail counties, have access to 13 of LSSND’s 21 services. These include adoption services, troubled youth counseling and supervision, addiction counseling, food services for the hungry and needy, in-patient psychiatric care for children and teens, disaster relief, in-home assistance for senior citizens, and refugee resettlement (Search, 2008). Currently nine of these 13 services are offered directly from the program center in Fargo. The new Fargo Program Center will directly offer 11 of these 13 services, with the Luther Hall and Great Plains Food Bank programs continuing to operate from satellite sites.

THE USERS

Staff of the Fargo Branch of LSSND

The workforce that will be occupying the new Fargo Program Center will consist of the President and Vice Presidents of LSSND, counselors, social workers, and IT, Accounting, Human Resources, Communication, and Development staff.

Numbers

In order for LSSND to properly manage and coordinate the day-to-day operations of its social programs and administrative responsibilities, an estimated 50 to 55 full-time workers will be employed at the new facility.

Peak Usage

For the most part, use of the building by the workforce will occur during normal business hours. However, due to the nature and requirements of some of the services LSSND offers, there will be times when employees will need to access the building after normal business hours.
Parking
As the new Program Center will be located in downtown Fargo, employees will be encouraged to use mass transit to commute to and from work. For those who choose not to use mass transit, there will be on-street parking and pay-to-park lots and ramps.

Physical Restrictions
Any physical restrictions of the workforce will be handled on an individual basis. Keeping this in mind, both the building and the site will be designed in a manner that allows anyone with such restrictions the same accessibility as any other user.

Medical and Mental Health Issues
As with physical restrictions, any medical and mental health issues of the workforce will be handled on an individual basis.

Partner Organizations’ Staff
In the new Program Center, LSSND will partner with three different organizations: The Eastern North Dakota Evangelical Lutheran Church in America [ENDELCA] Bishop; Lost and Found Ministries, which has developed an extensive resource library regarding addiction, as well as abuse, marriage, parenting, spirituality, and grief (Lost, n.d.); and Recovery Worship, which aims to provide recovering addicts of all kinds, spiritual growth and support (Recovery, n.d.).

Numbers
The ENDELCA Bishop’s office and Lost and Found Ministries will employ a total of eight full-time personnel at the new facility. Recovery Worship will only require one part-time employee to arrange and conduct its program’s affairs.

Peak Usage
As with the staff of LSSND, use of the building by the partnering organizations’ full-time staff will mainly occur during normal business hours. There is however the possibility that some employees may need to access the building after normal business hours. Recovery Worship’s part-time employee will use the building on Sunday mornings when they hold their worship service, Saturday nights during their large gathering, and three to four nights during the week for their smaller group meetings.
Parking
Employees of the partnering organizations will also be encouraged to take advantage of the public transportation options in Fargo. However, those who still choose to drive will have the same parking options as the staff of LSSND.

Physical Restrictions
Any physical restrictions among the employees of the partnering organizations will be handled on an individual basis.

Medical and Mental Health Issues
Any medical and mental health issues among the partnering organizations' employees will also be handled on an individual basis.

Clients and Recipients of LSSND's and its Partnering Organizations' Social Programs and Services
Because LSSND and its partnering organizations offer so many different types of programs, the groups of people that will come to the new Fargo Program Center seeking assistance, counseling, or guidance will be extremely diverse. They will include families looking to adopt, troubled children and teenagers, people recovering from addiction, people recovering from a disaster, refugees, senior citizens, and volunteers.

Numbers
For LSSND, an average day will bring between 30 and 40 visitors to the new Fargo Program Center. This number, however, can increase greatly if one of the groups or programs is having a meeting or is accepting walk-in appointments. Examples of these situations are when New American Services takes walk-ins on Wednesdays, or when Gambler’s Choice holds their meeting on Tuesday and Thursday nights.

For the partnering organizations, the ENDELCA Bishop’s Office and the Lost and Found Ministries’ Resource Library will bring an additional 1,000 to 1,200 walk-ins to the new facility every month. Recovery Worship can expect to see about 100 to 150 in attendance for worship every Sunday, as well as a varying number of people coming to their large gathering on Saturday nights and smaller group meeting held three to four times during the week.
Peak Usage
Regarding LSSND, with the exception of New American Services and Gambler’s Choice, usage of the building by visitors of its other programs will be even throughout the week and occur during normal business hours. Usage by clients of New American Services will also occur during normal business hours, but as mentioned earlier, there will be a spike in the number of visitors on Wednesdays due to the acceptance of walk-in appointments. In regards to Gambler’s Choice, while there may be some usage of the building during normal business hours by people in this program, the majority of usage will be on Tuesday and Thursday nights during meetings.

Peak usage of the building by visitors of the ENDELCA’s Bishop’s Office or the Lost and Found Ministries Resource Library will occur during normal business hours. Use of the building by members of Recovery Worship will occur on Sunday mornings during their worship service, Saturday nights during their large gathering, and three to four nights a week for their smaller group meetings.

Parking
Many clients of both LSSND’s and its partnering organizations’ programs will, for a variety of reasons, not have a driver’s license or access to a vehicle. They will rely on public transportation to get to the new Fargo Program Center. Clients who do have a car are still encouraged to take public transportation in an effort to reduce pollution, parking problems, and traffic congestion in the downtown area. Visitors that do choose to drive to the downtown site will have the same parking options as the staff.

Physical Restrictions
It will be assumed that a fair percentage of the clients of the Senior Companions program will have some type of physical restriction, with limited mobility being the most common. For all other client groups and members, physical restrictions will be handled on an individual basis.

Medical and Mental Health Issues
When looking at the many different client groups, it becomes evident that some will be more likely than others to have individuals who are suffering from medical and/or mental health issues. These issues will likely include anxiety, depression, stress, compulsive behavior, loneliness, and withdrawal.
Special Needs
Because of the wide variety of programs offered, the types of special issues that clients of all of these organizations may be dealing with will vary dramatically. These issues will be social, cultural, ethnic, and economic in nature. Examples would be the addict who has lost his family, his friends, his home, and his job to his addiction; the refugee who has had to flee from his or her home country because of war, and is now living in a foreign country with an unfamiliar culture; or the family whose home and possessions have been completely destroyed in a natural disaster.

Unidentified Future Occupants
It is important to consider the unidentified user groups that might occupy this building in the future; whether it is 50, 100, or 300 years from now. It is impossible to know how many of them there will be or what their parking requirements, physical restrictions, medical and mental health issues, or social, cultural, ethnic, and economic statuses might be. Because of this, what must be determined now is what components, technologies, and materials a building’s design must utilize today in order for it to possess the ability to successfully adapt to unknown users and circumstances in the future.
As mentioned earlier, this facility will not only be the new home for the Fargo Branch of Lutheran Social Services of North Dakota, but will also provide spaces for three other partnering organizations: The ENDELCA Bishop, Lost and Found Ministries, and Recovery Worship. The spaces are meant to be functional, adaptable, sustainable, and durable for not only the previously mentioned organizations, but also for the unidentified organizations that will occupy this building hundreds of years from now. The building’s design is intended to illustrate the ideas and conclusions that have been drawn from research conducted on the larger issue of population decline and the broader typology of adaptable and sustainable design.

The interior spaces of the building can be divided into three categories: LSSND’s spaces, public spaces, and partner spaces.

**LSSND**

**Administrative Offices:** This will include offices for the President and Vice Presidents of LSSND, and for the IT, Accounting, Human Resources, Communications, and Development departments. These spaces, along with the Social Programs and Services Offices, must be technologically integrated to allow users the ability to quickly and easily connect and convey information with other people; whether it is another person in the office or someone on the opposite side of the world.

**Social Programs and Services Offices:** These spaces will accommodate the employees and clients of the 11 services that LSSND will offer from this building. They must be designed in a manner that allows and encourages collaboration between different programs.

**Employee Lounge:** This space must be separated from the Social Programs and Services Offices to allow employees to truly relax by removing themselves from their “work” environment.

**Waiting Room:** Because many of the people that come to LSSND for the first time are hesitant or are in crisis mode, it is extremely important that this space feel both welcoming and secure.
MAJOR PROJECT ELEMENTS

PUBLIC

Meeting Rooms: These should be of different sizes and shapes.

Large Multi-Purpose Room: This space should accommodate 200 to 300 people and be designed so that it can easily be divided into smaller spaces.

Commercial Kitchen: This must be connected to the Large Multi-Purpose Room.

PARTNER

Office space for the Bishop and staff of the ENDELCA

Resource Center: This space will house the resource libraries of Gambler’s Choice, Lost and Found Ministries, and the Bishop of the ENDELCA. The general public will have access to the Resource Center and will be able to check-out materials.

Chapel space for Recovery Worship: The chapel should be connected to the Large Multi-Purpose Room and be designed so that depending on the situation, the chapel can either be open to or closed off from it.
Located in the upper-Midwest region of the United States along the Canadian border, North Dakota is among a group of states commonly referred to as the Great Plains. These Plains, with their fertile soils, offer some of the best farming land in the country. Because of this the states in this region have economies that are largely agriculturally based.

Weather conditions in this part of the country are notorious for being extreme. Temperature differences between the highs of the summer months and the lows of the winter months can sometimes reach 130 degrees.
Located along the Red River on North Dakota’s eastern border, Fargo is continually expanding its city limits. With a population of almost 100,000 and an additional 60,000 living in the neighboring towns of West Fargo and Moorhead, Fargo is the largest city and metropolitan area in the state.
Located in the heart of downtown Fargo just two and a half blocks from the Red River, this 42,000 square foot site possesses many advantageous qualities in regards to the nature of this thesis project, as well as, the needs of the client. Sitting at the corner of heavily traveled NP Avenue and Fourth Street, this site offers LSSND accessibility, visibility, and room to grow.

Users of this site will be within close proximity to several mass transit options. The MAT Bus central terminal and Jefferson Bus Line’s terminal are located directly across the street from the site, and just five blocks north of the site, Amtrak Trains has its terminal. Making these options as convenient as possible are keys to getting people to use them.

In addition to convenient public transportation options there are many important civic and municipal buildings that are either within walking distance or a short bus ride from the site. The Fargo Public Library, City Hall, the Civic Center, the Post Office, Federal Court, Municipal Court, and the Fargo Housing Authority are all within five blocks of the site. The Cass County Courthouse and the Cass County Annex are only nine blocks away.

MICRO: SITE
PROJECT EMPHASIS

Until now, architecture has largely been regarded as a three-dimensional enterprise. The emphasis of this design project will be to develop and propose a new type of four-dimensional architecture; an architecture that truly takes the dimension of time into consideration. This new type of architecture will produce a final design solution that will successfully meet the needs of the current user group(s), as well as have the ability to adapt to the needs of user groups hundreds of years into the future.

Asking and answering questions about what the world and human civilization might be like 300 years from now, as well as investigating adaptable and sustainable construction materials and technologies will be important components in the development of this four-dimensional architecture.

A PLAN FOR PROCEEDING

DEFINITION OF A RESEARCH DIRECTION

To ensure that the research conducted for and about this thesis is comprehensive, relevant, and useful, the following areas will be investigated: the theoretical premise/unifying idea, project typology, historical context, site, and programmatic requirements.

DESIGN METHODOLOGY

The research for this thesis will follow a Mixed Method Quantitative/Qualitative Approach and will employ a Concurrent Transformative Strategy that will yield both quantitative and qualitative data. The perspective of this strategy will be guided by premises developed in the Theoretical Premise/Unifying Idea.

The quantitative data that will be compiled will be both statistical and scientific in nature. Statistical data includes information that is either gathered and analyzed locally, or obtained through an archival search. Scientific data is information that is either obtained directly through instrumentation and/or an experiment, or obtained through an archival search.
A PLAN FOR PROCEEDING

The qualitative data that will be compiled will be gathered from direct observation, surveys, interviews, or through an archival search.

The types and amount of data collected will be determined by the specific research requirements of each premise. These investigations will yield information that will be analyzed, interpreted, and reported at various stages of the research process, and will be presented through both text and graphic illustration. This information will be the foundation for a base of knowledge necessary to successfully complete the goals of the emphasis of the project.

DOCUMENTATION OF THE DESIGN PROCESS

A properly executed design process requires the utilization of many different types of media. Because of this, various methods will be employed to ensure its accurate and comprehensive documentation. Any electronically produced materials (i.e. drawings, models, renderings, illustrations, photographs) will be stored electronically by saving copies of each individual work to a separate folder. Any physically produced materials (i.e. hand drawings, sketches, physical models) will be saved both electronically and physically. Materials will either be digitally scanned or photographed, and the digital copy will be saved in the same folder with the copies of the electronic materials. The original drawings or sketches will then be placed in a folder to be referenced at a later time. In an effort to ensure the completeness of the documentation, this process of duplicating, saving, and compiling both electronic and physical materials will occur every two weeks.

At the conclusion of the design process, the final solution will be presented through digitally produced plans, sections, and perspectives, as well as in the form of a physical model. This final solution, along with all of the preceding research and design that guided and influenced it, will be compiled and preserved in a bound thesis book. This book will then be catalogued at the NDSU Architecture Library to be referenced and used by future scholars.
PREVIOUS STUDIO EXPERIENCE

ARCH 271: Fall Semester 2002
Instructor: Vincen Hatlen
Tea 2: Music Venue and Tea Room – Fargo, ND
Prairie Images: Rural Architecture Design Studio – North Dakota

ARCH 272: Spring Semester 2003
Instructor: Milton Yergens
Lofty Intentions: Business and Residential Building – Fargo, ND
Master Plan of Coptic Christian Community – Toronto, ON
Coptic Christian Church – Toronto, ON

ARCH 371: Fall Semester 2003
Instructor: Ron Ramsey
Shaker Barn: Concert and Theatre Hall – New Lebanon, NY
Pipestone National Monument: Museum for Sacred Rock Quarry – Pipestone, MN

ARCH 372: Spring Semester 2004
Instructor: Steve Martens
Fluid Motion: Dance, Fitness, and Community Center – Fargo, ND
Minnesota Valley Masonry Resource Center – South West Minnesota

ARCH 471: Fall Semester 2004
Instructor: Harold Jenkins
Urban Planning and Design of The West 7th District – St. Paul, MN
West 7th Public Library – St. Paul, MN

ARCH 472: Spring Semester 2005
Instructor: Frank Kratky
Sustainable Mixed-Use High Rise – San Francisco, CA
NDSU Downtown Campus 2 – Fargo, ND

ARCH 571: Fall Semester 2005
Instructor: Vincen Hatlen
Fargo Public Library – Fargo, ND

ARCH 771: Fall Semester 2009
Instructor: Regin Schwaen
Hotel for Hector International Airport – Fargo, ND
If you were to ask people what they thought or knew about population decline, you would probably get one of two reactions; either a blank stare or another question, “What population?” This is because according to a study of 417 newspapers and magazines in 11 countries (The United States of America, The United Kingdom, Australia, New Zealand, Germany, Austria, Switzerland, France, Spain, Italy, and Japan), most people are unaware of the issue of population decline. This lack of awareness or disinterest can be blamed on a lack of media coverage, as well as on our tendency to dismiss anything we consider to be a long-term problem that possesses no immediate threats or changes to our daily lives. But population decline isn’t a long-term problem to be dealt with in the distant future. Its effects can already be seen in countries around the world, with the Czech Republic, Ukraine, and Armenia currently being the three most affected (Caldwell & Schindlmayr, 2003). Its implications are far reaching and have the potential to cause economic, demographic, cultural, and societal disturbances in countries throughout the world. That is why, as we have done with the issue of global warming, it is important that we come to understand the causes of population decline and then, based on those understandings, make detailed plans and changes in our behavior that will allow us to deal with and adapt to a world with fewer people in it. This paper will investigate some of the causes of population decline, look at how it will impact various aspects of our societies, explain why it is important that we successfully plan for and adapt to population decline, and propose architecturally-based solutions that will allow us to adapt.

A country’s population growth or decline is directly linked to its fertility rate. By definition, the fertility rate is the average number of children a woman will bear throughout her reproductive life. This number can range anywhere from 1.1 in industrialized countries to 4.6 in developing third-world countries. Without taking immigration into account, for a country to maintain its current population the fertility rate should be on average around 2.1. The fertility rate that will sustain a country’s population is referred to as the replacement rate. If the fertility rate is consistently above the reproduction rate the country’s population will increase. However, if the fertility rate drops below the reproduction rate for a prolonged period of time, the country’s population will level off and eventually decline (Sachs, 2008). The latter of these two scenarios is what is being observed in countries all around the world, with the lowest fertility rates of 1.1 being seen in the Czech Republic, Ukraine, and Armenia (Caldwell & Schindlmayr, 2003). It is this decrease in fertility rates in countries all over the world that is responsible
for the predicted leveling off and eventual decline of the global population.

When trying to determine the cause of the decline of fertility rates in countries across the globe it quickly becomes apparent that there isn’t one, universal answer. Decreased fertility rates are a product of varying combinations and degrees of economic and cultural influences in a country or region. To illustrate this fact, we can look at the specific causes of fertility rate declines in Russia and Japan.

In Russia the decreased fertility rate can be attributed to three main causes, the first of which is the overall health of Russia’s infants, children, and women of reproductive age. Infant mortality in Russia is between twenty and thirty deaths for every 1,000 live births, three times higher than the United States. Eleven percent of newborns possess some sort of birth defect, while sixty percent of newborns also show symptoms of allergies or rickets, a disease caused by a vitamin D deficiency. As these children mature their health generally continues to decline, and by the end of their schooling, only one-fifth of Russian children are considered healthy. For women of child-bearing age, as well as early teens, gynecological pathologists have found reproductive abnormalities in 40 to 60 percent of those examined. During pregnancy, 75 percent of women experience some type of complication, and the death rate during child birth is 50 for every 1,000. This is six times higher than in the United States (Russia’s, 1998).

The second cause is demographics. Russia is seeing a decrease in the number of marriages. The correlation between marriage and fertility is simple and direct: a decrease in marriages results in a decrease in the number of children being born. The other demographic issue affecting fertility is the number of women of child-bearing age. A brief reduction of births after World War II has created a reduced number of women of reproductive age in Russia’s overall population (Russia’s, 1998).

The third and final cause affecting Russia’s fertility rate is the economy. When Russia transitioned from communism to capitalism, its citizens were forced to adjust from a system that provided work and housing for almost everyone, to a system that was driven by competition and created a feeling of financial and personal insecurity. This insecurity caused many couples to decide against having children. A survey of 3,000 Russian women found that 75 percent of them blamed a lack of income and financial security on their decision to not
have children. Carl Haub, director of information and education at the Population Reference Bureau, said that Russia’s decline in fertility rate is “a direct result of the collapse of the economy and a general lack of confidence in the future” (Russia’s, 1998, p. 6).

While the reasons for Russia’s decreased fertility rate would be best described as the product of several different negative circumstances, the reasons for Japan’s dropping fertility rate are the exact opposite. The decrease was, and continues to be, largely the result of the increasing rights, freedoms, and opportunities that the women of Japan now have. The first of these opportunities has been increased levels of education. A change in Japan’s value system has created an emphasis on the importance of individualism and equality between the sexes. This change has made it possible for, and encouraged, women to pursue higher levels of education. The number of females completing junior college or university increased from seven percent in 1965 to 40 percent in 1997 (Caldwell & Schindlmayr, 2003).

Another opportunity that is now available to Japanese women is an increase in the number of available jobs, a direct result of Japan’s rapid economic growth and urbanization (Kosai, Saito, & Yashiro, 1998). A combination of increased education and a careful consideration of the way Japan’s fixed employment practices, which make the re-entry of women into good job markets after child rearing very restricted, would affect their lives, made more women decide to put off marriage for employment opportunities (Kosai et al., 1998). This decision of putting work before marriage was also the result of the collapse of arranged marriages, the increasing acceptance of premarital sexual relations for women, and the ability of both women and men to maintain a quality lifestyle by continuing to live at home with their parents. These influences caused the number of women working before marriage to increase from 50 percent in 1955 to 96 percent in 1995, and the number of women working for pay to increase from 30 to 90 percent during the same time period. As a result of delaying marriage for employment opportunities, the mean age of marriage for females rose from 24.5 years in 1975 to 27.7 years in 1995. Additionally, by 1995 the percentage of women remaining unmarried through their reproductive lifetimes reached five percent (Caldwell & Schindlmayr, 2003). The combination of increased women’s rights and changing economic environments and social values has caused Japan’s fertility rate to drop from 4.5 in 1947 to 1.4 in 1996, far below the replacement rate (Kosai et al.).
If we step back and look at the reasons for declining fertility rates on a global scale, it becomes clear that there are specific influences that can be seen on a relatively consistent basis throughout the majority of countries facing falling fertility rates. These influences are similar to those seen in Japan. Countries are becoming industrialized, and with this change comes increased educational and employment opportunities, gains in equality between the sexes, and a movement away from agriculturally-based economies. It also brings with it a shift in the cultural and societal values of a country. Consumerism, negative views of the expense of raising children, easier access to better contraception, the focus on job satisfaction, and the perception that the joy of children can be replaced by joy that technology and electronic media can bring are all changes in thinking that have made people put off or decide against having children (Caldwell & Schindlmayr, 2003).

Now that the causes of declining fertility rates and their relation to population growth are understood, it is important to look at the impact a reduced population will have on the world as we know it today. Population decline has the potential to cause both positive environmental change, as well as negative changes in economies around the world. We will use the current situation in Europe to illustrate the possible environmental advantages a reduced global population would have.

Today countries throughout Europe, including Germany, Italy, and Spain, are facing decreasing populations (Decline, 2005). But before this decrease, Europe had experienced a significant increase in its overall population. Western Europe’s population, for example, has grown by 27 percent since 1950. This growth and its resulting dense population distribution put a number of tremendous pressures on Europe’s environment. One of these pressures was the farming industry. To feed Europe’s dense population farmers were relying heavily on the use of pesticides and fertilizers to produce maximum yields from their land. This heavy reliance resulted in fertilizer and pesticide levels that were, respectively, two and three times higher per hectare than in the United States. These chemicals eventually made their way from the farmers’ fields into the rivers, compounding the continent’s pollution problems. The Thames River, for example, now has nitrogen levels that are four times higher than the Delaware River and 200 times higher than the Nile. But the farming industry is only one of a number of sources of Europe’s pollution. In Austria, the damaging environmental effects from these various sources of pollution have resulted in
35 percent of mammals, 37 percent of birds, and 66 percent of fish being endangered, compared to ten, seven and two percent, respectively, in the United States (Grant, 2001).

In light of these examples of the environmental damage that has been caused by increasing populations, imagine the effect a decrease in our numbers would have on the Earth. Fewer people would mean a decrease in the amount of food, shelter, clothing, goods, and energy needed, all of which have a direct or indirect relationship to the natural environment. A decrease in the demand for these items would translate into a decrease in the pressure our presence puts on the environment. This reduced stress would allow the environment to begin to recover from the damage it has sustained over the last century.

While a decrease in our numbers would have a potentially good effect on the environment, these changes could also have severe economic consequences. These consequences would first come in the form of a decreased labor force and consumer market. This is of particular significance because the majority of developed countries in the world have global, capitalistic economies (Sweezy & Owens, 1974). These economies depend on a continual, increasing production of goods and services for their growth, and the production of those goods and services is dependent upon an expanding labor force and consumer market.

The second consequence is the effect a country’s aging population would have on its social programs. Elderly citizens rely on programs like Social Security, pensions, and government health care to survive. These programs are supported by taxes and contributions from “working age” individuals in the labor force. So what happens to these programs in a country where people are living longer, but fewer people are born and eventually working? The result is that there is a narrowing in the ratio of working age people to retired people. This narrowing then has the potential to bankrupt these social programs because there will not be enough working people to support the retired people (Chamie, 2004). This type of situation is already occurring in the United States where Social Security is facing mounting problems due to the retirement of the Baby Boom Generation.

The third potential economic consequence of reduced populations is essentially a product of the first; it is an increase in the wage and/or price structure (Spengler, 1972). If there are fewer people available to do the same amount
of, and potentially more work, the demand for their labor will increase. This demand will translate into higher wages being paid to employees by employers in an attempt to attract and retain workers in a labor-starved economy (Sweezy & Owens, 1974). Employers will then pass the incurred cost of higher employee wages on to the consumers in the form of inflated prices for goods and services. To better understand the implications of a situation like this, we can use the cost of construction materials and the cost of maintaining the United States infrastructure as examples.

The construction materials industry is dependent upon labor. It requires numerous people working at multiple stages to transform a raw material into the finished product that is delivered to the construction site. This type of a system makes the price of the finished product susceptible to increases in labor costs; small increases throughout the process result in a noticeably higher final price. The need for the product to be delivered to the site also means that the price of the material is affected by increases in fuel and transportation costs. Cement is a perfect example. Roughly 20 percent of its overall cost is the result of fuel prices. It can only be assumed then, that as the availability of labor, raw materials, and oil decreases, but their demand increases, there will be significant price increases throughout the construction materials industry. This is important to consider, because the cost and feasibility of new construction projects is largely based on the cost and availability of materials. If prices become too high, proposed construction projects may be abandoned (Rowse, 2009). This would only add to the list of economic disruptions facing developed countries.

It is also important for the United States to properly maintain its infrastructure because a “sound, well-functioning infrastructure in a country is essential for its sustained economic growth, international competitiveness, public health, and overall quality of life” (Mirza, 2006, p. 641). However, a study conducted between 1998 and 2005 by the American Society of Civil Engineers found that the U.S.’ infrastructure was in desperate need of repair because of a lack of maintenance. The study looked at 17 categories of infrastructure, including aviation, bridges, roads, dams, and energy, and revealed that the condition of the country’s infrastructure received an overall grade of a D. It also found that as of 2005, it would take $1.6 trillion to repair and improve the country’s infrastructure (Mirza, 2006). If the U.S. cannot afford to make these repairs in the current economic climate, how will it ever be able to afford to make necessary improvements in a world with much higher labor and material costs due
to a decrease in the supply of both? And if we find that we will never be able to properly maintain our infrastructure, what economic and societal implications will this inability bring with it?

A small portion of those potential economic implications can be seen in a report released on Canada’s infrastructure. It found that as of 2006, Canada’s infrastructure deficit was CAN$125 billion. If allowed to deteriorate without any maintenance, it said that the deficit could easily grow to around CAN$1 trillion in 60 years (Mirza, 2006). This is an increase of 800 percent. If the same increase is applied to the U.S. infrastructure deficit, it would mean that by 2055 the deficit would approach $13 trillion. It is clear that something needs to be done about this problem before it is compounded by the issue of population decline.

After considering the economic consequences mentioned above, an important question is raised: How will developed countries and their economies not only survive, but continue to grow in a world where populations are falling? While there is no single answer to this question, there are a few different ideas that, if used in conjunction with one another, could help countries deal with their declining populations and the problems they create. The first is to promote immigration from less developed countries to developed countries. The reason for this is that while developed countries will be facing population declines, developing countries will be experiencing increases in their populations until sometime around the middle of this century. These developing countries will be unable to offer enough domestic employment opportunities to support their increasing populations. Their citizens will then be forced to migrate to wealthier countries in search of work. The end result in Europe will be a large increase in migrant workers from Africa and Asia, and North America seeing an increase in workers from Central and South America (Chamie, 2004).

While immigration will play a vital role in this issue, it can not solve all of the problems associated with population decline. To illustrate this fact we can look at the situation facing Italy, which has a fertility rate of 1.2. According to a UN report, in order for Italy to keep its working age to retirement age ratio constant, they would need 120 million immigrant workers by the year 2050. This migration would equal an average of 2.2 million people every year, and result in Italy’s population tripling in size compared to 1995 (Grant, 2001). This report essentially highlights the fact that a migration of this magnitude would not be
Economically or environmentally feasible for a country of Italy’s size. Next, governments in developed countries should take a hard look at their current policies that are either affected by or are affecting population decline, and make any necessary changes, which may be very hard and/or unpopular. These changes may include raising the age of retirement, reducing elderly benefits and health care coverage, raising taxes, reassessing labor force participation, and making a life that includes a career and children easier for couples to maintain (Chamie, 2004; Chamie, 2003; Decline, 2005).

Lastly, industries should reassess their current philosophies and procedures to find areas where changes and improvements can be made. The ultimate goal of these improvements would be to increase productivity and resource efficiency throughout an industry. One change would be the implementation of improved technology to increase the productivity of a smaller work force (Kosai et al., 1998). Another might be increasing on-the-job training in an effort to increase productivity from employees, or implementing training programs that focus on retaining older employees in a work environment where technology and job tasks may change frequently (Schiller, 2005). While some changes may be relevant and effective among a majority of the world’s industries, others will be more specific to a particular industry. To illustrate the specific changes an industry could make, we will look at the profession of Architecture.

The main overall change that the profession of Architecture can make that will help address some of the issues associated with population decline would be to consistently design buildings that are sustainable, durable, and adaptable. To successfully execute this broad overall change/goal, there are several specific changes that need to be made in the thinking, methods, and materials used throughout the profession. The first of these changes is that buildings can no longer be viewed as having a life-span of only 40 to 60 years. This current view is resulting in 200,000 buildings being demolished in the United States every year (Knecht, 2004). In the future when there are fewer workers and the price of labor becomes more and more expensive, who is going to tear all of these buildings down? And who is going to pay for their demolition? It becomes clear that the way buildings are currently designed will not be viable in the future. Architects need to begin designing buildings that have the capability to last hundreds of years. One of the best ways to do this is to select materials and building systems that require minimal effort to maintain.
If a building is now able to last hundreds of years, chances are that it will have to accommodate several different user groups throughout its lifespan. This means that in addition to being durable, architects must also design buildings with the ability to adapt to the changing needs of different groups. These buildings “would be stable, yet they would accommodate new technologies and also allow changes in the organization of work” and “in the life-styles of building occupants” (Kendall, 1999, p. 1). For an architect to design a building that is truly adaptable, they must not only consider its present requirements, but also try to anticipate its future requirements as well. This can be done by considering how various issues will affect our lives in the future. Examples would be increasing fuel and energy costs, as well as our increasing dependence on technology that will change the way we live and work.

Another change that will be required is the way buildings are designed and constructed. We need to transition from our current “open-loop” system that encourages a “cradle-to-grave” mentality, to a “closed-loop” system that promotes a “cradle-to-cradle” philosophy (Kendall, 1999; Knecht, 2004; Boulanger & Boulanger, 2004). The way our current system works is that resources first have to be extracted from the earth. These resources are then processed to create base materials. These base materials are then used by manufacturers to make finished products, which will then be used by the consumer until they are no longer useful. At this point, the products will be brought to a landfill and discarded. This linear process requires energy input at every step and results in continual depletion of resources with no re-use (Mirza, 2006). This is the reason that 30 to 40 percent of the waste in our landfills comes from the construction or demolition of our built environment, and that every year the United States produces a half ton of construction waste or demolition debris per capita (Knecht, 2004). In addition to being environmentally destructive, in a future where labor resources and natural resources are stretched thin and prices continue to rise, this type of process will prove to be unprofitable.

A “closed-loop” system, on the other hand, is the same as the “open-loop” system until the point where the consumer no longer has a use for the product. While some products will still end up in the landfill, a majority of products will be reused, repaired, or rehabilitated to be used again by consumers (Mirza, 2006). This type of system is already in use in various countries by their construction industries, as well as many other industries. For example, in the Netherlands
demolition debris is simply not allowed, everything must be reused or recycled. This way of thinking was brought about by a number of factors. In Europe land is scarce, the value of materials is higher, the availability of raw materials is more restricted, and regulations are tough. These regulations are the result of environmental legislation that was passed that “requires producer responsibility for collecting, sorting, and recycling of discarded products at the end of their service life. Manufacturers work with recycling companies and their own supply chains to manage the reuse and recycling of their products to control the life-cycle costs” (Knecht, 2004, p. 182). The U.S. needs to follow the lead of Europe, and adopt and enforce polices like these which have both economic and environmental benefits.

These ideas of adaptability and a transition towards a “closed-loop” system are the driving forces behind a new way of designing that is starting to gain increased attention. “Designing for Disassembly” is “the concept of planning projects in such a way as to facilitate future renovation” and eventual demolition. Its benefits include building adaptability, as well as waste management, resource conservation, and reductions in atmospheric emissions by designing buildings with components that “can be reused or recycled, reducing the requirement for ongoing resource extraction to produce newly manufactured materials” (Catalli & Williams, 2001, p. 27).

Design for Disassembly consists of the following principles:

*Design for versatility, which allows a component, assembly, or system to accommodate different uses with little change.*

*Design for durability to allow a material to remain unchanged over its expected life while performing its function.*

*Plan for easy access, which allows a component or an assembly to be easily approached with minimal damage and impact to it and adjacent assemblies.*

*Favor simplicity of design, which reduces the complexity of assembling materials, thus facilitating disassembly.*

*Opt for independence of material assemblies to allow for minimal dam*
age to adjacent assemblies during their removal, repair, and disassembly.

Expose connections wherever possible to facilitate disassembly.

Make materials or components with the shortest anticipated life cycle more accessible than those with longer anticipated life cycles (Catalli & Williams, 2001, p. 27).

It also includes selecting building products and materials that “produce little waste in their use and installation and have a high value for reuse and recycling” (Knecht, 2004, p. 183) Bradley Guy from the Penn State University Hamer Center for Community Design supports this last idea by advocating the use of simpler materials, and arguing “that the closer a material is to its natural state, the higher its potential for reuse” (Knecht, 2004, p. 188).

The New York-based architecture firm Croxton Collaborative used the ideas of designing for disassembly in the design of Rinker Hall at the University of Florida. This led to, among other decisions, the selection of steel over concrete for the structural system; an avoidance of layers of fireproofing, sheetrock, and other finishes; concrete floor slabs that were either left exposed or covered in floor tiles rather than in carpet or padding; and in anticipation of future change and reuse, partitions that do not connect to columns (Knecht, 2004).

The final change that needs to take place in architecture is that buildings simply need to be more sustainable. The only way that this can truly happen is if the first three changes occur. As Randy Croxton of Croxton Collaborative stated, “If a building doesn’t support change and reuse, you have only an illusion of sustainability” (Knecht, 2004, p. 184).

Architecture is important to every society. Shelley Penn (2007), an Associate Victorian Government Architect in Australia, writes that, “Architecture feeds our souls and psyches, provides spiritual sustenance, and enriches our lives” (p. 16). It provides qualitative cultural value, as well as quantitative economic value. Good architecture has been shown to speed up recovery from illness, encourage children to stay in school, increase productivity in employees, and achieve higher financial returns (Penn, 2007). Today, however, the value of
architecture is lost on a great many people. Juhani Pallasmaa (1999), an architect, author, and professor at the University of Technology Helsinki, writes, “Architecture is too often viewed as a short-lived speculative commodity rather than as a cultural and metaphysical manifestation that frames collective understanding and value” (p. 25).

That is why we must ensure that the changes outlined earlier do occur and that the resultant practices become commonplace throughout the field of architecture. Otherwise, in a future world where human and natural resources will be in decreased supply and the economic cost of construction will become higher, failure to enact change could lead to architecture being viewed as a wasteful, self-centered enterprise that is a burden on our human, natural, and economic resources. The consequences of this could very well put the future of architecture in jeopardy, potentially ending the progression of one of our civilization’s greatest accomplishments.

SUMMARY

This research has shown that population change is a very complex issue with countless factors determining whether populations rise or fall, and at what rate that change occurs. These factors are also indirectly responsible for the ways and degrees in which population change affects our world’s countries, governments, and industries. Ultimately the most important findings of this research are that there is a solid basis for the ideas proposed within the theoretical premise/unifying idea, and that the assumptions behind these ideas are accurate and legitimate. The following paragraphs will explain the organization of the research, as well as summarize its various findings along the way.

As the focus of this research was on population decline and its potential consequences, it was first important to establish the role fertility rates play in population change. In order for countries to maintain their current population, their fertility rates need to be, on average, 2.1. The countries that are facing population declines have fertility rates that are far below this point and have been for a prolonged period of time.

To understand why the fertility rates in developing countries are falling below this important number of 2.1, the specific causes of Russia’s and Japan’s decline were explored, as well as the recurring causes seen throughout the world.
This led to the discovery that decreasing fertility rates are the product of varying combinations and degrees of economic and cultural influences in a country or region. But in general, decreasing fertility rates are the product of the changes that occur in countries as they become industrialized; increased educational and employment opportunities, gains in equality between the sexes, movement away from agriculturally based economies, and shifts in its cultural and societal values are the most common causes.

Next, it was important to understand the impact, both positive and negative, that decreases in populations could have. The benefits of a decreased population are that it would relieve some of the pressure our presence has placed on the environment, allowing it to begin to recover. The negative impacts include a number of economic consequences. A reduced labor force and consumer market, failure of government social programs, and increases in price and wage structures are all possible in the wake of a decreased global population.

In light of all the potential negative effects that might occur as a result of population decline, the question became: what could governments and industries do to overcome or offset these changes? It was determined that the best answer was a multi-solution approach; that by employing a number of different ideas, governments and industries would have the greatest chance of mitigating the adverse effects of population decline. These ideas included encouraging immigration to maintain labor forces, making changes to government programs and guidelines, and increasing productivity and resource efficiency throughout the world’s industries by reassessing, and making changes to, current philosophies and procedures.

The field of architecture was then highlighted to illustrate the specific ways a particular industry would be vulnerable to the effects of population decline. Changes were then proposed based on those vulnerabilities. It was found that due to its wasteful and inefficient nature, the way buildings are designed and built today would not be economically or environmentally feasible in a future world with decreased labor and natural resources. The only way to ensure architecture’s survival into the distant future was for it to make changes in its thinking and methods that would result in the consistent design of durable, adaptable, and sustainable buildings that promote reuse and accommodate change.
Lastly, the research ended with a discussion inspired by the third supporting premise of the theoretical premise/ unifying idea; it was a discussion on why it is important that architecture make these needed changes and allow itself to grow and survive into the distant future. The answer to this question of “Why?”, was, in the end, very simple: because architecture is important. And for architecture to fall victim to this new world and its new circumstances would be a great loss for the world and mark the end of one of our civilization’s greatest accomplishments.
THE NEW ADMINISTRATION BUILDING OF ENTORY AG
ETTLINGEN, GERMANY
Located in Ettlingen, Germany, this 120,000 square foot administration building for Entory AG, a subsidiary of the banking and financial services group Deutsche Borse, thoughtfully meets the needs of the company and its 350 employees. Designed by the architecture firm Behnisch, Behnisch, and Partner, the building’s major program elements include several different sizes and configurations of office spaces, a seminar room, conference spaces, a staff restaurant, a moat, a pool, a garden, and roof terraces (Kugel, 2003).

The site on which the Entory AG building sits is in a transition area between the crowded town of Ettlingen and its neighboring countryside. This essentially rural site has views of fruit orchards to the north and the Black Forest to the east. In response to the natural qualities of the site, the designers felt it best that the building’s form not be “large” or “self-enclosed” (Behnisch, 2003). They decided that the best solution would be a building that reached out into the landscape. This decision led to the final additive and subtractive rectilinear geometries that define the building’s overall form.

Shifting floors that are “pushed and pulled back like desk drawers” create the two five-story office wings that extend from the center of the building and give it its crude L-shaped plan. The inside corner of this “L” is used to create a semi-enclosed space for the garden and pool (Kugel, 2003). The central space from which the building extends is home to the staff restaurant, as well as foyer spaces that are surrounded by informal breakout areas, meeting spaces, and conference spaces that allow employees to work together in a “variety of ways and in flexible configurations” (Kugel, 2003; Behnish, 2003, p. 167). With its direct views to the neighboring garden and pool, this central space promotes social interaction by giving people a wonderful area to meet.
In the wings of the building, the designers provided the company and its employees with multiple sizes and arrangements of office spaces. There are individual, group, and open plan spaces that encourage and accommodate different ways of working (Kugel, 2003). In reviewing the floor plans of the building, it is revealed that the designers have placed all of the office spaces along the perimeter of the building. This allows every office access to natural light, natural ventilation, and views to the outside.

The organization of the office spaces within the building’s plan is just one of the ways in which the designers addressed various environmental and human issues. To control glare and excessive heating caused by the sun, external blinds are used to shade the building’s glass façade. Another example is how, in an effort to avoid uncomfortable drafts common to air-driven mechanical systems, designers chose a radiant system to heat and cool the building (Kugel, 2003).
The Entory AG building is organized around various sizes of bays created by the building’s irregular grid of circular concrete columns. These columns support the building's concrete floor slabs which house the plastic piping used in the building’s radiant mechanical system. Around the concrete structure, designers wrapped a palette of glass and metal, giving the building its modern look. To this facade, designers have also incorporated a translucent material that, in the presence of changing sunlight, changes color. This entire composition rests on 150 concrete piles that extend 26 feet into the ground (Kugel, 2003).

The New Administration Building of Entory AG has illustrated three areas of design that are relevant to this thesis project. The first area is how to successfully organize the spaces related to an office building. The designers of the Entory AG building expertly arranged the various types of spaces within the interior in way that promoted interaction among employees, as well as accommodated new ways of working. Second, this case study illustrated different “sustainable” strategies that are particularly important in the design of an office building. Offices with access to natural sunlight and ventilation, radiant heating and cooling systems that increase employees’ comfort, and external blinds that reduce glare and solar heat gain are just a few of the environmentally and human conscious decisions designers made when designing this building. Finally, it showed how a site can impact the design and form of a building. In this case the building’s shifting floors and “L” shaped plan were the products of initial reactions designers had to this semi-rural site and its wonderful views.
THE CHAPEL OF ST. IGNATIUS
SEATTLE, WASHINGTON
Designed by Steven Holl, the Chapel of St. Ignatius is located on the campus of Seattle University in Seattle, Washington. Completed in 1997 at a cost of $3.25 million, this 6,100 square foot chapel includes a narthex, a procession hall, a main worship space, a choir space, two smaller chapel spaces, a bride’s room, and a vesting sacristy (Olson, 1997). Three other important program elements not located within the chapel’s walls are the bell tower, the reflecting pool, and the “thinking field” (Holl, 1999). The chapel was the university’s first freestanding place of worship in its 105-year history, and its purpose, according to the vision of the university’s president emeritus Reverend William J. Sullivan, was to be “an architectural gift” to both the university and the community (Olson, 1997, p. 41).

In response to the university’s need for more common green space, the chapel was placed in the center of an old street. This placement allowed green spaces to be created to the north, south and west, with a future green space also planned for the east. It also created a situation where, by working together, the chapel, bell tower, reflecting pool, and thinking field jut out onto the pedestrian mall, breaking the campus’s grid. The effect of this fracture is that people slow down and acknowledge the chapel, which creates an opportunity for the chapel then to invite people, no matter what their faith, to come inside (Holl, 1999).
The irregular shapes and additive massing of the chapel are the result of Holl’s idea that the chapel should resemble seven bottles of light in a stone box. Six of these seven bottles relate to certain program elements within the chapel: the narthex, the procession hall, the main gathering space, the reconciliation chapel, the choir, and the chapel of the Blessed Sacrament. The seventh bottle is represented by the bell tower. His inspiration for these “bottles of light” came from a book written by St. Ignatius titled The Spiritual Exercises. In it Ignatius speaks about the inner lights and darknesses a person must discern in order for him or her to achieve the inner freedom necessary to make good and just decisions (Holl, 1999).

These “bottles,” however, do much more than just give the chapel its unusual form, they are the source of its defining character. The “bottles” are actually light scoops, and set within the glazed mouth of each light scoop is a brightly colored lens. As light passes through this lens, the color of the light is transformed. The result is that interior walls, floors, and ceilings of the chapel are painted in both natural and colored light (Olson, 1997). One visitor to the chapel said the following: “I was like a child – both awestruck and excited to ask my questions. I could not figure out where all the light was coming from and how did all of those colors come through clear windows? How was there so much life there?” (Holl, 1999, p. 11).
The interior of the building is organized by an axis that runs through the entire site. The main program elements are located along this axis, while secondary spaces are positioned off of it. In addition to creating a hierarchy of space, the axis also creates a clear processional route. People are drawn from the “thinking field”, up a gently sloped ramp along the reflecting pool, to the chapel’s large wooden doors. Upon entering the chapel they are directed past the narthex, through the procession hall, and into the main worship space.

The curved and rectilinear geometry of the chapel is achieved by using a combination of concrete, steel, and metal paneling. 21 interlocking concrete panels are used to create the chapel’s perimeter walls. These panels were cast on site and then, after curing, tilted upright and moved into position through the use of a crane. The concrete is finished with an acid based ochre colored stain (Olson, 1997). This color is meant to resemble the stone used in churches in Rome (Yehuda, 1997).
The roof and light scoops are created by an intricate configuration of steel framing. This framing system is supported in two different ways, the first of which is on the interior of the chapel. In very precise locations the framing system is supported by circular steel columns hidden within the chapel's interior walls. The framing system's second line of support occurs at the perimeter of the building where it is held up by bearing pockets that have been cast into the backs of the concrete panels. When fully constructed, the curved steel roof structure can easily achieve the spans required of it, the longest being 45 feet. To make the roof and light scoops water-tight, the steel frame has been wrapped in Rheinzink, a pre-weathered solid zinc roofing material (Olson, 1997).

The case of The Chapel of St. Ignatius demonstrates two very important ideas that are valuable to this thesis project. The first is the importance of natural light and the effect it has on the users of a building. The chapel illustrated this not only in the way in which it captured the light, but also in its ability to transform it into brilliant colors. The second idea is how the placement of a building on a site can not only transform the site, but also the surrounding area. In this case the chapel and its reflecting pool were able to transform an old street, and by doing this, also created three large green spaces in the surrounding area with a fourth planned for the future.
The Earl W. Brydges Library in Niagara Falls, New York was completed in 1973 at a price of $5.1 million (Public, 1975). Designed by Paul Rudolph, the library’s distinguishing characteristic is its angled and sloped concrete block walls. These walls were, among other important reasons, a response to Rudolph’s desire that the library “open its arms to the citizens of Niagara Falls” (Bibliotheca, 1976). Housed within these distinctive walls is the library’s extensive program. It includes office spaces, a children’s library, workrooms, a garage, a shipping area, meeting spaces, open and closed stacks, circulation desks, a space for audio-visual materials, a conference room, an auditorium, a public lounge, an employee lounge, and a reproduction area (Nakamura, 1977).

The library was intentionally placed along the city’s main street in an economically depressed area. The reason for the selection of this location was that the city hoped that by making the library very visible, and a focal point of the area, it would encourage development and economic improvements in the area (Public, 1975).

The site on which the library sits is part of one of the city’s “superblocks.” This particular “superblock” has schools, a playground area, a park, and a parking facility. The library was positioned on the site to make it accessible by both car and foot. One of its main entrances faces the street, while the other faces the plaza and playground. People are drawn into the library by its distinctive walls (Bibliotheca, 1976).

As mentioned earlier these distinctive walls do much more than just invite people into the building. First, they allow the building’s design to elegantly meet the library’s need for its floor plates to gradually decrease in area from the ground level to the third floor (Bibliotheca, 1976). Second, they give the building a human scale by reducing its height at ground level (Public, 1975). Third,
they accommodate any future expansion of the library by allowing its floors to be easily extended (Bibliotheca, 1976). And finally, the use of natural light is a very important consideration in the design of libraries. Here, the walls help create the "soft, glare-less" natural light that illuminates the interior of the library. By extending past the library’s glass perimeter, they limit the amount of direct sunlight that reaches the interior. Natural light is also brought into the interior spaces through the use of clerestories angled in different directions, allowing them to catch as much natural light as possible (Public, 1975). The principal reading room is a great example of these two design ideas working together. This space is naturally lit from light coming in through side windows, as well as light coming in from the clerestories at the top of the library’s three story open central space (Bibliotheca, 1976).

In the interior of the building, Rudolph used the idea of a centralized circulation space to organize the floor plans of the library’s three levels. This type of design has produced a very logical layout where public spaces are made visible by placing them in relatively close proximity to this central space; non-public spaces such as the offices and garage are, on the other hand, hidden by placing them farther away. Whether a person enters the first floor via the entrance, or the second or third floor via the stairwell, they have immediate access to the floors’ public services (Bibliotheca, 1976).
Concrete and steel were the two main materials used to create the jaggedly asymmetrical, yet visually balanced, form of the Earl W. Brydges Library. Steel columns clad in striated concrete block create the library’s angled grid system. These columns are placed so that the library’s poured-in-place concrete beams and floor slabs have only to span, at most, 40 feet. To create the library’s distinctive sloping and angled interior and exterior walls, Rudolph chose to use concrete block. With the incorporation of steel tie rods, these concrete block exterior walls are able to support the outward thrust created by the library’s roof (Public, 1975).

In investigating the Earl W. Brydges Library three lessons can be learned that apply to this thesis project. The first lesson is how to control natural light. Rudolph used the library’s angled walls to control the amount of direct sunlight that penetrated into the interior. By instead relying on reflected light, he was able to achieve the “soft, glareless” light that illuminates the interior. The second lesson was in the way the building was placed on the site. The library was positioned in such a way that made it highly visible, welcoming, and accessible.
by both car and foot. The final lesson was in the organization of space. Rudolph used the idea of a central circulation space to create floor plans that organized spaces in a logical manner making them easily understood by users of the library.

**SUMMARY**

Lutheran Social Services of North Dakota’s new facility would best be described as an office building. But because of their new partnerships with the Bishop’s Office of the Eastern North Dakota Evangelical Lutheran Church in America, Lost and Found Ministries, and Recovery Worship, the new facility will also include a chapel and a small library. Because of this, rather than only research office projects, I felt it was important that I also investigate examples of finely designed chapels and libraries. The three projects that were ultimately chosen to comprise the case study series are, at first glance, very different. It is only after a thorough investigation that important similarities can be found between the cases. These similarities offer a great deal of value to the overall research of this thesis project.

The first similarity between all of the projects was the importance that was placed on the use and control of natural light. In the New Administration Building of Entory AG [NABEAG], offices were placed along the perimeters of the building to allow employees access to natural light. The light was controlled by external blinds that helped prevent glare and solar heat gain. In the Chapel of St. Ignatius [CSI], light was captured and transformed by its irregularly curved light scoops, to create the brilliant colors that famously paint the chapel’s interior. And in the Earl W. Bridges Library [EWBL], side windows, angled walls, and clerestories all work together to capture and control the natural light that enters the interior.

The second similarity was that each project had a defining characteristic that played an important role in its overall success. In the case of the NABEAG, it was the building’s shifting floors. For the CSI, it was the light scoops. And at the EWBL, it was its angled and sloping walls. These defining characteristics not only help the overall success of a project, but they are also what gets “stuck” in a user’s mind. They are what the users associate a project with, long after leaving the building and the site.

Third, site was an important factor in every one of these three projects. In all of these cases, not only was the building affected by the site, but the site was, in
the end, affected by the building. At the NABEAG, designers felt that the natural characteristics of the site required the building to reach out into the landscape. This idea led to the building’s crude “L” shaped plan. This plan, in turn, facilitated improvements to the site such as a landscaped garden and pool. In the case of the CSI, the chapel was placed in the middle of an old street on campus. In reaction to this, Holl designed a building that was long and rectilinear, ensuring it would fit within the site’s boundaries. By placing the building there, not only was an unused street taken back, but three large green spaces were created in the area surrounding the chapel. And with the EWBL, its site prompted Rudolph to design two main entryways that acted like open arms welcoming the public into the library. It also dictated the placement and angles of the prominent clerestories at the top the building. In regards to effect the building had on the site and the surrounding area, this issue was, from the very beginning, an important consideration in the selection of the library’s site. The library was intentionally placed in an economically depressed area of the city in the hope that its presence would encourage economic improvements.

Finally, each project used clearly defined circulation spaces to organization interior spaces in a logical and well thought out manner. In the NABEAG, designers divided the building into three areas: two work areas and one social area. The two work areas, which consisted of different sizes and configurations of office and work spaces, were organized around the central social area. This layout accommodated and encouraged interaction among the company’s employees. At the CSI, Holl continued the site’s processional route into the chapel’s interior, creating a linear circulation space around which the interior spaces were organized. Primary spaces were placed directly along the circulation space, while secondary spaces were placed off of it. And in the case of the EWBL, central circulation spaces were used on each floor to organize the library’s public and private spaces. Like the CSI, public spaces were placed in close proximity to the circulation space, while private spaces were more hidden. This resulted in accessible floor plans that were easily understood by visitors of the library.

The similarities among these projects represent issues that are of particular importance to this thesis project. The value that they offer is their ability to illustrate different solutions to the same condition. The knowledge gained from an understanding of the reasons for, and ideas behind these solutions, will allow me to address the various issues of this thesis with the same thoughtfulness and detail as was exhibited by the designers of the case studies presented.
Every project has a context within which it is set and must react to. In the case of this thesis project there is both a rich physical and social context. The physical context in this case refers to the material existence of Fargo, North Dakota. The social context refers to the issues and characteristics of not only Fargo, but more importantly, Lutheran Social Services of North Dakota [LSSND]. This portion of the research will attempt to explain and understand both types of contexts by investigating their extensive histories. An understanding of each entities’ origins and histories, will provide the basis for assumptions that will be made in regards to the condition of their existence in the distant future.

Fargo’s beginnings can be traced all the way back to the early part of the nineteenth century. Euro-Americans from the eastern United States came to the Red River Valley because of the fur trade. Around 1818, Hudson’s Bay Company, the North West Company, the American Fur Company, and the Columbia Fur Company were all using the Red River to transport goods to Canada. For the next 40 years, the Red River continued to be relied on, in limited use, as a means of transporting small amounts of goods (Holzkamm, Dormanen, & Danbom, 2001).

In 1859 the first steamboat was launched on the Red River. This milestone marked the beginning of the river’s use as a major north-south transportation route. Not only was the Red used to transport raw goods and materials, it was also used by immigrants traveling to Manitoba. This increase in the river’s use brought with it many more people to the area that would later become Fargo. The river would continue to be heavily used as a transportation route until 1878. In 1878, the St. Paul and Pacific Railroad connected with the Canadian Pacific Railroad at St. Vincent, Minnesota. This created a direct connection between St. Paul and Winnipeg, and meant that people and goods could be transported much faster, as well as year round. The river would continue to be used to varying degrees until 1915, when steamboating on the Red River finally disappeared (Holzkamm et al., 2001).

While the fur trade and steamboating brought people to this area, the city of Fargo is a direct result of the railroads. Without them, Fargo would not be the city it is today. The railroads first came to the area in 1871, when on December 31st, the Northern Pacific Railroad reached Moorhead, Minnesota. Nearly 600 railroad workers continued to work through the first half of the next year to build a bridge over the Red. On June 6, 1872, the bridge was completed and the first train entered Fargo (Holzkamm et al., 2001).
Once the railroad had reached Fargo, Northern Pacific needed a way to encourage settlement of this area; settlement that would ultimately increase their own business and profits. A Northern Pacific Railroad land agent by the name of James G. Power came up with the idea of developing “bonanza” wheat farms on Northern Pacific’s railroad land. This idea proved to be extremely successful, and resulted in more than 90 “bonanza” farms of at least 3,000 acres each, being operated in the area. These farms, and the national and international attention they received, attracted immigrants from the United States and Canada, as well as central and northern Europe. The large number of settlers that would come to the Red River Valley between the late 1870’s and early 1880’s made Fargo an important center for trade (Holzkamm et al., 2001).

The increased trade and development that was taking place in Fargo caught the attention of the railroad industry and prompted it to increase the number of connections between Fargo and other areas. The Great Northern Railroad built connections between Fargo and St. Paul in 1880, and between Fargo and the north parts of the Red River Valley in 1882. That same year, and continuing through 1883, Northern Pacific built lines that connected Fargo with Lisbon and LaMoure. The Chicago, Milwaukee, St. Paul and Pacific Railroad also built a connection with Fargo and connecting lines to Ortonville and Edgeley. All of these connections made Fargo a prominent city in the upper-Midwest’s railroad network, and resulted in increased development from wholesalers and warehouseman, as well as farm implement and agricultural service firms (Holzkamm et al., 2001).

Fargo’s fast growth came in the form of weak, wooden structures, the vulnerabilities of which would be illustrated on June 7, 1893. On this date, a fire started on what is today Main Avenue, and quickly spread throughout the downtown area. By the time the fire had been extinguished, 31 blocks of the city had been completely destroyed. The fire ended up being, to a certain extent, a blessing in disguise. The citizens of Fargo would work together and build more than 246 new buildings in less than a year. Many of these new, brick structures were designed by regional architects and helped create a much safer and more beautiful city (City, 2009). Many of these buildings are still standing today and continue to add to the beauty and architectural history of downtown Fargo.

Between the fire and the beginning of the Great Depression, Fargo continued to experience growth and prosperity, becoming the major retail center between St. Paul and Spokane. It also became an important center for wholesale and distribution. In 1922, Kansas City was the only city in the United States that
distributed more agricultural machinery than Fargo (Holzkamm et al., 2001).

Fargo’s population growth had mainly come in the form of people moving to the area from other parts of the United States, specifically from an area north of central Ohio and southeast Iowa. A 1920 census showed that of the 21,961 people living in Fargo, 18,173 had originally been born in the United States. The remaining residents had come mainly from Norway, Sweden, English Canada, and Germany (Holzkamm et al., 2001).

With the onset of the Great Depression, the economic progress in Fargo came to a halt. While the city fared the poor economic climate better than the rest of the state, it still experienced unemployment, wage reductions, and decreased population growth (Holzkamm et al., 2001).

After the Great Depression, Fargo’s economic and physical growth resumed. The city expanded to the north and to the south, and constructed several elementary schools in response to the post World War II Baby Boom. Prosperity continued into the 1960s, and with it came the consequences of perceived “progress”. Fargo’s mayor at the time, Herschel Lashkowitz, “aggressively and successfully” pursued funding offered by the government for the construction of urban renewal projects. These projects resulted in large sections of historic, masonry buildings in the downtown area being demolished and replaced with banks and strip malls (Holzkamm et al., 2001). One is left to wonder if these products of “progress” were worth their cultural and historical cost.

The downtown area’s problems got even worse in 1972 when the West Acres Shopping Mall was built on the city’s southwest border. Located within the mall were stores such as Dayton’s, Sears, and J. C. Penney. Local, downtown retailers could not compete with these national stores, and as a result, the retail center of Fargo soon moved from downtown to the city’s southwest edge. This shift resulted in growth and development now mainly occurring in the areas around West Acres. With new stores, offices, and houses now being built in southwest Fargo, business in the downtown area continued to decline (Holzkamm et al., 2001).

The decline of business and overall life in the downtown area continued until the end of the twentieth century. Prior to that point, city leaders had tried a number of different ideas in an effort to bring energy back to the downtown area. Unfortunately nothing had worked. Then in 1999, the city started its Renaissance Zone Revitalization Program. The program, which is still active to-
day, offers tax incentives to owners who make aesthetic improvements to their buildings in Fargo’s downtown. The program has been an amazing success, and has helped transform the downtown area into a nationally recognized center for retail and culture.

In the spirit of revitalization, the new downtown facility of LSSND will be a great asset to downtown Fargo. Not only will it increase the architectural diversity of this area, but it will also, through the very nature of the programs LSS offers, increase the cultural and demographic diversity.

Since 1919, LSSND has been a valuable asset to the city of Fargo, as well as the entire state of North Dakota. The organization as it exists today is a product of the growth and change it has experienced over the last nine decades. The following timeline will illustrate the evolution that has allowed LSSND to become such a positive influence throughout North Dakota.

1919 – On February 24, the Lutheran Children’s Home Finding Society, one of LSSND’s founding organizations, is started. Its mission was to care for abandoned and unwanted children.

1925 – The Lutheran Inner Mission Society, another founding organization of LSSND, is formed in order to expand Reverend C.J. Fylling’s chaplaincy services. That same year, Luther Hall is opened as a residence hall for girls coming to Fargo in search of work.

1929 – The Home Finding Society’s name is changed to the North Dakota House of Mercy. With its own delivery room and nursery, the House of Mercy is able to provide care for as many as 33 women.

1936 – The Lutheran Welfare Society [LWS] of North Dakota, another one of LSSND’s founding organizations, is opened with the purpose of caring for “dependent, neglected, and illegitimate” children.

1937 – The services offered by the House of Mercy and the Lutheran Inner Mission are consolidated under the LSW of North Dakota.

1940 – The Nellie Svee Memorial Children’s Home is opened in Devil’s Lake, ND. Its purpose was to provide shelter, food, and clothing to children of parents who were trying to recover from the Great Depression.
1942 – Due to the demand of World War II, Luther Hall begins housing student nurses attending St. Luke’s School of Nursing. That same year, the War-Time Children’s Home is temporarily opened in a fraternity house at North Dakota State University.

1945 – The LSW begins offering services for unwed mothers.

1947 – The services of the War-Time Children’s Home are consolidated with Luther Hall.

1948 – The LSW sponsors the establishment of the Lutheran Resettlement Service of North Dakota. Its mission was to aid in the resettlement of European refugees who were forced to leave their country as a result of World War II. That same year, in an attempt to better serve Western North Dakota, the LSW opens offices in Bismarck and Minot.

1950 – The new Svee Children’s Home is opened in Fargo. The Devil’s Lake home subsequently closes, as services are transferred to the new Fargo location.

1952 – The LWS’ new administrative building is built in Fargo. This building is still used by LSSND as its main office.

1956 – Church synods vote in favor of officially making the LWS part of the Lutheran Church. The Society is now funded by congregational support.

1957 – In response to the devastation caused by the tornado that damaged 100 residential blocks in Fargo, the Svee Home opens its doors and provides shelter to 27 displaced people.

1962 – A new wing is added onto the LWS’ administrative building.

1963 – The name of Svee Memorial Children’s Home is changed to Svee Rehabilitation. The home now becomes a residential treatment center for mentally handicapped young men.

1968 – The LWS begins opening Senior Citizen Centers across North Dakota as part of the Older Americans Act. That same year, the LWS changes its name to Lutheran Social Services of North Dakota.
1969 – As part of the Lutheran Church’s participation in the National Crisis Programs for Minorities, LSSND begins offering Native American programs. These programs included a youth exchange program, the F-M Indian Club, and referral services that aided Native Americans in making the transition from life on the reservation to life in the city.

1970 – LSSND opens an office in Grand Forks, ND.

1972 – LSSND opens an office in Williston, ND. That same year the F-M Activity Center for the developmentally disabled opens in Fargo, and the FRIENDS Volunteer Program is started.

1975 – In response to the Vietnam War, the Lutheran Resettlement Service begins helping Indo-Chinese refugees. In the end, 41 families, equaling 204 individuals, are resettled. That year LSSND also opens an office in Rugby, ND.

1976 – LSSND opens an office in Devils Lake, ND.

1979 – The Friends of Hospice program is started. This program, which today is known as Hospice of the Red River Valley, educates people on how to assist terminally ill patients and coordinates volunteers for in-home care.

1980 – Contract counseling begins in Fargo, with counseling services in Bismarck, Minot, Grand Forks, Oakes, Ellendale, and Williston to follow in the future.

1981 – LSSND starts the Senior Companion Program. This program helps seniors maintain their independence with the support of volunteers. That same year, Luther Hall begins providing residential child care to female adolescents.

1983 – The Greater Fargo-Moorhead Area Food Bank is started to collect and distribute surplus food to those in need. This distribution is made possible through the assistance of the Food Bank’s numerous member agencies.

1984 – The Svee Rehabilitation Home expands its services to help developmentally disabled women. That same year the Greater Fargo-Moorhead Area Food Bank changes its name to the Great Plains Food Bank.

1988 – LSSND adds Youth Advocacy Services, Independent Supported Living Arrangements, and Addictions Outreach for Recovery to the list of programs it
HISTORICAL CONTEXT

now offers. That same year Luther Hall expands its services to offer residential treatment to adolescent boys.

1990 – LSSND begins offering the Homebuilders program, which provides in-home counseling to families.

1991 – Luther Hall becomes a licensed residential treatment center for adolescents and children.

1992 – LSSND launches its Daily Bread Program.

1993 – LSSND adds Child Care Resource and Referral to its list of services offered.

1997 – In response to the Flood of 1997, which caused extensive damage and disruption to areas along the Red River, LSSND begins its Lutheran Disaster Response program.

1999 – LSSND starts the Gamblers Choice program (Lutheran, n.d.).

Present – With plans underway to build a new administrative office in Fargo, LSSND sells its old administrative building and the Svee Rehabilitation Home to Olivet Lutheran Church.

LSSND has grown to become an agency that now offers 21 services and social programs to the citizens of North Dakota. This timeline has shown their ability to successfully evolve as an organization by adapting to changing circumstances and situations. Their mission is to continue to be a positive force in the Fargo-Moorhead community by providing help and support to those in need. As they have done in the past, their success will rely on their ability to adapt to a changing world. The design of their new facility must encourage and easily accommodate this change on which their continued growth and success depends.
GOALS FOR THE THESIS

ACADEMIC
This thesis project addresses the two different, yet related, issues of population decline and adaptive architecture. The duality of this project has led me to develop two different sets of academic goals, each having been influenced by one of the two specific issues. In regards to population decline, the first goal is to simply make people aware of this issue. Most people have heard nothing about the falling fertility rates and declining populations of developed countries. The second goal focuses on the overall complexity of this issue. Population decline is a multi-faceted problem. There are countless articles, graphs, and figures that have been written and calculated addressing all of these facets. The problem is that they are scattered across the intellectual landscape. My hope is that someone can read the research I have conducted, and from this one source, get a good understanding of the causes of, implications of, and possible solutions for population decline. My last goal is that upon reading my thesis, any skeptics who did not believe in population decline would come to acknowledge that it is a real issue that raises some very difficult questions.

Regarding adaptive architecture, my first goal is that people come to understand the connection between architecture and population decline, and see how one can affect the other. Next, I hope that the reasons we need changes in architecture, as well as the ways in which we can change, are clearly stated. It’s important that people realize that the way we have been designing buildings will not be economical or environmentally feasible in the future. Finally, I hope to demonstrate that while important, there is more to sustainable architecture than just LEED ratings, green roofs, and sun shades. True sustainability in architecture means buildings that can withstand time, easily adapt to changing needs, and promote reuse.

PROFESSIONAL
The professional goals that I have developed reflect my desire to illustrate my abilities relevant to a career in architecture. The first goal is for my thesis to demonstrate my ability to thoroughly research a broad, complex issue, and apply the knowledge I have gained to a specific project. In the case of my thesis, I will be using the knowledge that I have gained from my research on population decline and adaptive architecture to design a new facility for Lutheran Social Services of North Dakota. My second goal is that my thesis will illustrate my ability to write in a clear and professional manner. The next goal for my thesis
is that it will demonstrate my ability to not only research, but also successfully implement new and developing materials, construction methods, and technologies into a building project. And finally, I hope that my final presentation drawings and boards will showcase my ability to use a number of different software applications to create a dynamic presentation that clearly and professionally conveys my design ideas.

PERSONAL

I have developed three personal goals that I hope will keep me motivated and focused throughout this entire process. My first goal is time management. It is very important that I keep myself on track so that I will have the proper amount of time necessary to complete the tasks in front of me at the highest level I am capable of. Secondly, during my college career I have had to jump over a number of hurdles. And to be fair, a percentage of those hurdles were placed in my path by no one else’s fault but my own. These hurdles resulted in many ups and downs and a fair share of uncertainty. I want this project to be a positive culmination of my long college career, allowing me to leave on the highest note possible. Lastly, my hope is that if I can achieve all of the other goals I have set for myself, through their achievement, I will be able to meet my final goal: to be a nominee for the McKenzie Award.
SITE ANALYSIS

NARRATIVE

In architecture, buildings, and often their designers, are the stars of the show. Their photographs and accolades are plastered on the covers and pages of various publications. The interesting forms, organizational layouts, and materials of these buildings are what captivate the public. But where did the ideas for these forms, layouts, and materials come from? What was the reason for their selection? The answer is, in many instances, the site.

Every site has a personality. It can be hot or cold, windy or calm, friendly or hostile, slow or fast. These characteristics can be very powerful and influential pieces in the design process. We as designers must remember that before we can design a building worthy of publication, we must first observe, listen to, and feel the site on which it will be built.

Upon visiting the downtown site for Lutheran Social Services’ new facility, the initial feelings a person experiences are ones of dilapidation and desolation. This is because, with the exception of two small buildings, the site is occupied by two run-down parking lots. The buildings currently there are extremely unattractive and add nothing to the downtown area and its revitalization mission. The first building is a 24-hour adult book store which has a reputation for attracting some less-than-desired individuals. The second building used to be the home of the Twin City Army store, but has been vacant for more than 15 years.
The parking lots occupying the west and east ends of the site have almost a post-apocalyptic feeling. Rusted cables stretch between rusted parking signs that rise crookedly from the pavement. Dust, sand, and rocks from winters past litter the lots, signs that they haven’t been swept in years. Weeds grow from the cracks in the potted, uneven asphalt. And in the east parking lot, rusted and bent steel beams are used as parking curbs. Throughout the site there is a complete absence of life, human or plant.

Making the situation worse, the area that directly surrounds the site offers nothing in aesthetic value, and seems to only amplify the site’s unwelcoming nature. Across the street, to the east and to the west, are more parking lots. These lots, like the ones on-site, exhibit a complete lack of design consideration. Across the street to the south are two bus terminals. These terminals, while very functional, add nothing in the form of architectural value to the area. And bordering the site on its north edge, there is an alleyway and an old brick building. This building is of no architectural significance, and essentially acts as a wall, running the entire length of the site without offering any relief in the form of openings, jogs, or changes in materials.

After visiting the site, it became clear that this project must transform the site from its current condition into an oasis among its neighboring landscape of asphalt and architectural mediocrity. To successfully do this, the new site plan must, in addition to incorporating a well designed and well placed building, include a focus on the importance of trees, plants, grass, and water; natural elements that reach out to people and encourage human activity and interaction. By facilitating this human involvement, the site will be able to get back its life which it had lost, and so desperately needed.
QUALITATIVE ASPECTS

Photographic Inventory and Analysis of the Site and Surrounding Area

1. WEST SIDE OF SITE

LOCATIONS OF PHOTOGRAPHS
2. METRO AREA TRANSIT BUS TERMINAL

3. STATE BANK OF FARGO BUILDING AND PARKING LOT WEST OF THE SITE
4. ALLEYWAY RUNNING ALONG THE SITE’S NORTH EDGE
5. JEFFERSON BUS LINES TERMINAL

6. EAST END OF THE FRS BUILDING
SITE ANALYSIS

7. BUILDINGS AND PARKING LOT EAST OF THE SITE

8. EAST END OF SITE
Abstract Plan Studies

BUILDINGS

MAJOR PARKING LOTS
SITE ANALYSIS

PAVED AREAS

TREES AND GREEN AREAS
MAJOR TRANSPORTATION ROUTES
SITE ANALYSIS

Site Sections

LOCATIONS OF SECTION CUTS

A
B
C
D
E
**Distress**
The site, in its current state, exhibits multiple forms of distress. There are rundown and abandoned buildings; there is a complete lack of vegetation; and there are parking lots whose condition and appearance are so awful that it is almost staggering. These three forms have then in turn created the fourth form of distress; an absence of “positive” human activity on the site.

**Human Characteristics**
The only signs of human use or activity on the site are either people walking to or from their cars that have been parked there, or people walking in or out of the adult book store. Neither of these uses or activities would be considered “positive”, especially when the site is located in a thriving downtown area and possesses so much potential.

**Light Quality**
Direct sunlight in this half of the world comes from the south. As a result of this, one of the main determinants of how much sunlight a site will receive is what type of masses, whether it is buildings, landforms, or even trees, are located to the south of the site. Their size, placement, and density will all affect the amount and quality of sunlight an area will receive. In the case of this particular site, the only masses located to the south are the two 15 foot tall bus terminals. But because of their relatively short height and their distance away from the site, there will still be uninterrupted sunlight available to the site throughout the year.

**Wind**
With Fargo located in the Red River Valley, an area known for its vast, open landscapes devoid of hills and trees, wind is always an issue. However, unlike downtown areas in larger cities that have dense configurations of tall buildings that create a tunnel effect increasing the wind’s speed, the buildings in Fargo’s downtown, especially around the site, are relatively spread out and are on average only three to four stories tall. Therefore the wind speed on and around the site should not be significantly affected by the surrounding built environment.
The numbers in parentheses on the map above represent the average number of vehicles that travel on that particular road on an average day.

The site is surrounded on all sides by either roads or alleyways. NP Avenue North, which is located on the site’s south edge, is one of the downtown area’s main vehicular routes. From University Drive North to Fourth Street North, NP Avenue is a one-way street that accommodates eastbound traffic. At the intersection of NP Avenue North and Fourth Street the road becomes a two-way street accommodating traffic traveling to and from Moorhead.
Along its east and west edges the site is bordered by Fourth and Fifth Street North. These two-way streets accommodate north and southbound traffic in the downtown area. While Fifth Street would be considered a minor vehicular route, Fourth Street experiences a significant amount of traffic. This can be attributed, in part, to the important facilities that are located along this route, such as the Fargo Public Library, the Civic Center, City Hall, and Merit Care Hospital. It can also be attributed to the fact that Fourth Street offers a direct connection between Thirteenth Avenue South and Nineteenth Avenue North.

A narrow alleyway runs along the site’s north border. This alley, which creates an inter-block connection between Fourth and Fifth Street, experiences minimal traffic. It is mainly used for deliveries to the adjacent businesses and as an additional access point to the parking lots that currently occupy the site.

First Avenue North runs along the north edge of the block on which the site is located. This one-way street is another one of the main vehicular routes in the downtown area. It accommodates westbound traffic from the river to University Drive North, at which point it becomes a two-way street.

With the city’s main bus terminal being located directly across NP Avenue, the site will experience a large amount of continuous bus traffic. The site’s south and west edges will be affected the most as the buses either travel north on Fifth Street or turn east onto NP Avenue when they depart the terminal.

Noise
An inventory of the noise around the site reveals that the sources are all transportation based. Vehicular traffic on NP Avenue and Fourth Street, bus traffic on NP Avenue and Fifth Street, and even train traffic from the tracks located one block south of the site all produce noise that can be heard on the site.

Topography
As previously mentioned, land in the Red River Valley is extremely flat. West of the Red River the terrain rises at a rate of three and a half feet for every one mile (Holzkamm et al., 2001). Located four blocks west of the river the topography of the site matches the overall topography of the region, having a slope of less than one percent.
Pedestrian Traffic

The majority of pedestrian traffic around the site will occur on the sidewalks of NP Avenue, Fourth Street, and First Avenue North. Among these three areas the highest concentration of people will be in front of the two bus terminals on NP Avenue. Throughout the day, people gather around this area waiting their buses to arrive and depart.

Climate

Fargo’s climate is classified as humid continental. This type of climate is characterized as having greater temperature fluctuations than other climates. Proof of this can be seen in Fargo’s record high and low temperatures. In July of 1936 Fargo’s temperature reached 114 degrees Fahrenheit. In January of 1887 the temperature dropped to forty-eight degrees Fahrenheit below zero (Holzkamm et al., 2001). The difference between the high and low temperatures is an astonishing 162 degrees.
SITE ANALYSIS

Cloudiness

Snowfall
Temperature

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SITE ANALYSIS

Humidity

Wind Speed
Soil Conditions and Water Table
The soil on this site is classified as a Fargo silty clay with a smooth surface. This type of soil is level, deep, and poorly drained due to its slow permeability. A high available water capacity and slow runoff create a water table that, during its seasonal high, fluctuates between zero and three feet (United, 1985).

Slope and climate
As stated before, the site is completely flat. Because of this, the area will not experience any unique solar climate conditions because of topography.
Flooding

Every spring the waters of the Red River rise, causing it to spill out over its banks. Whether or not this annual flooding is a minor event or a potential disaster is a result of how much rain and snow the region receives during the late fall, winter, and early spring. In March of 2009 the Red River in Fargo reached a record high of 40.78 feet, 22 feet above normal flood stage. This record flooding was the result of a wet fall and spring, as well as a snowy winter. With Fargo’s downtown located next to the river, depending on their specific location, flooding can be a threat to buildings in that area. This particular site, however, is not in danger of being flooded as it is located out of the floodway, as well as the 100 and 500-year floodplains.

Sun Angle
Shading

June 21 @ 5:00AM

June 21 @ 7:00AM

June 21 @ 9:00AM

June 21 @ 11:00AM
SITE ANALYSIS

June 21 @ 1:00PM

June 21 @ 3:00PM

June 21 @ 5:00PM

June 21 @ 7:00PM
PROGRAMMATIC REQUIREMENTS

LSSND

Executive Offices: 1 @ 230ft + 3 @ 210ft _____________________________ 860ft
Administrative Offices: 7 @ 96ft ______________________________ 672ft
Social Programs and Services Offices (Manager): 4 @ 96ft ______ 384ft
Social Programs and Services Offices (Employee): 39 @ 64ft ___ 2,496ft
Social Programs and Services Offices (Intern): 7 @ 48ft _________ 336ft
Meeting Spaces (Closed): 1 @ 550ft + 1 @ 310ft ________________ 860ft
Meeting Spaces (Open): 1 @ 375ft + 1 @ 325ft _________________ 700ft
Employee Lounge: 1 @ 1,750ft ____________________________ 1,750ft
Waiting Room: 1 @ 3,000ft _________________________________ 3,000ft

PUBLIC

Lobby / Atrium: 1 @ 5,550ft ________________________________ 5,500ft
Meeting Spaces (Closed): 1 @ 260ft + 1 @ 235ft ______________ 495ft
Meeting Spaces (Open): 1 @ 380ft _____________________________ 380ft
Large Multi-Purpose Room: 1 @ 7,200ft ______________________ 7,200ft
Commercial Kitchen: 1@ 1,325ft _____________________________ 1,325ft

PARTNER

Bishop’s Office: 1 @ 200ft ________________________________ 200ft
ENDELCA Offices: 6 @ 96ft _________________________________ 576ft
ENDELCA Breakroom: 1 @ 585ft _____________________________ 585ft
Resource Center: 1 @ 4,585ft ______________________________ 4,585ft
Chapel: 1 @ 4,650ft _________________________________ 4,650ft

Initial Total = 36,554ft

The addition of restrooms, circulation spaces, storage spaces, and mechanical rooms results in a facility with a...

Total Building Area = 50,000ft
REFERENCES


ITEMS


**Images 1 - 3:** Google Earth


REFERENCES


*Any images not listed were produced by the author.
PERSONAL IDENTIFICATION

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MY QUOTE ABOUT NDSU
“A lot of people go to college for ten years. They’re called doctors.”