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Thesis
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Resource
& DIAGNOSTIC
C E N T E R
for Developmental Disabilities

North Dakota State University
NDSU LIBRARIES

**RESOURCE AND DIAGNOSTIC CENTER
FOR DEVELOPMENTAL DISABILITIES**

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

By

Erin Rae Kelash

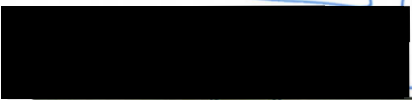
**In Partial Fulfillment of the Requirements
for the Degree of
Bachelor of Architecture**



Primary Thesis Critic



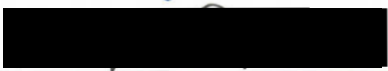
Secondary Thesis Critic



Blind Thesis Critic



Thesis Committee Chair



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**May 2005
Fargo, North Dakota**





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Resource & Diagnostic Center
saint cloud minnesota





T TYPOLOGY

The thesis will examine the consolidation of facilities which serve individuals with developmental disabilities. Affiliated with the CentraCare Health Plaza, the building will offer both medical and informational services through the diagnostic/ treatment center and the collection of organizational offices housed within it. Usage of the building would, additionally, be extended beyond normal office hours as families of children with special needs could use the facility for support group assemblies and educational seminars or classes.

typology



THEORETICAL PREMISE / UNIFYING IDEA

Psychology as it relates to architecture was investigated in order to determine appropriate design requirements for a resource and diagnostic center for individuals with developmental disabilities. The fundamental hypothesis of this thesis is that medical and psychological issues can inform proper health care design. Specifically, creating an environment which promotes both physical and psychological comfort is vital to the effectiveness of the treatment, research and education which takes place in this building.

Through research of architectural and psychological resources, elements such as scale, shape, lighting, materials, color, patterns, size, form and acoustics will be studied to determine their impact on physical and psychological comfort. From the findings, the center will then be developed in a manner which responds and is flexible to the different needs, sensitivities, and preferences of the building's users.

The psychological findings will be a precursor to all design decisions. A specific set of the findings, pertaining to neuroscience research, has assisted in the development of the project goals. These findings will direct the functional and aesthetic organization of spaces. Specifically, it is this designer's hope that the research will help to develop a healthy link between the employees of the building and the people they serve. Establishing a connection between employees and patients shall improve positive characteristics of spaces. A connection to the river and sensitivity to the acoustics of the site will also help guide the design.



PROJECT JUSTIFICATION

By consolidating the organizations, and the information they hold on the various topics related to developmental disabilities, time and resources can be used more efficiently. Additionally, the families of children with special needs, who are already under great demands, will benefit greatly by having these resources united in one building. Benefits to the community include raised awareness of these disorders, earlier diagnosis, proper training for educators, and provisions for a more supportive society.

Many studies have shown that well-designed environments can reduce anxiety, lower blood pressure, and lessen pain. Conversely, research has linked poor design or psychologically unsupportive surroundings to negative effects such as higher occurrence of delirium, elevated depression, greater need for pain drugs, and longer hospital stays. Not only will those of us who are architects benefit from the new knowledge base made possible by neuroscience, but future generations of school children, hospital patients, and office workers will have their environments more carefully tuned to their needs and desires.

Most architects are not aware of neuroscience research and consequently are not exposed to these potentials. Research results emerging from neuroscience are going to increase the knowledge base for architecture, offering exciting possibilities. It has been shown that people tend to react to stimulus in predictable ways. Oftentimes, we don't notice our surroundings which can then work upon us without any conscious resistance on our part. We only need to live briefly in a different environment to recognize how much our surroundings have formed us and our society in sensitivities, in values, in way of life. As designers, there is a responsibility to the human individualities who will come in contact with our buildings.

project justification

CLIENT DESCRIPTION

The OWNER of the facility is CentraCare Health Services.

The USERS of the Building include offices of several medical providers:

STAFF:

- Pediatrician
- Psychologist
- Psychiatrist
- Nurses
- Audiologist/Speech Therapist
- Occupational Therapists
- Physical Therapists
- Dentist
- Allergist/Dietician
- Optomotrist
- Research Staff



Fig. 1: Logos for Organizations

OFFICES: Additionally, staff of several service and volunteer organizations would be housed in the facility.

PACER

Parent Advocacy Coalition for Educational Rights

Services include referral, individual assistance/advocacy, workshops and training for parents. The technology center attached to this office, is used to assess what types of assistive technology, computer programs and adaptive toys/devices would benefit children with developmental disabilities best.

MNARC

Minnesota Association for Retarded Children

For over 50 years, this organization has provided services including individual and family advocacy and referral, networking with other agencies, parent education, developmental disability awareness, and recreational/social activities. Also affiliated with the organization is a large library of resources.



ARISE

A Recreational Inclusion Support Endeavor

Serves children and adults, up to age 21, with any type of disability, within 30 miles of St. Cloud. Provides assistance with school and community based programs outside the school day.

IEIC

Interagency Early Intervention Committee

A local council consisting of parents and representatives of the school district, other agencies, service providers, and county government who work together to better address the needs of children with disabilities ages birth to 5 years, and their families. This organization publishes a newsletter and sponsors projects, events, and informational workshops that empower parents and support them in making their own choices

MARCH OF DIMES

A small office for full-time and volunteer staff, which work to educate, improve the health of babies and prevent birth defects and infant mortality.

CATHOLIC CHARITIES CARITAS

Community based services which require traditional office space. Employees of Catholic Charities work in the community and private homes of families of children with disabilities, performing childcare services.

SPECIAL NEEDS NETWORK

Primarily volunteer based, this organization establishes a referral system for families to locate doctors, educators, psychologists, etc. who work with the developmentally disabled. Additionally, this group prepares and sends mailings to educate parents on the developmental stages of infants and young children.

DISABILITY LAW

A satellite office where disability lawyers from the Twin Cities area, can provide counsel to families from the St. Cloud area, on a limited schedule.

COUNTY SOCIAL WORKERS

Similar to the disability law offices, these spaces provide temporary space for social workers to meet with families and educators.

The building's program supports spaces for the SECONDARY USERS of the facility, for functions such as support groups, educational conferences, and personal research:

- Patients and their families
- Support Groups
- Educational Seminars, workshops
- Child care
- Visitors



MAJOR PROJECT ELEMENTS

ENTRY LOBBY

This will serve as the only entry to the building and is intended to be a space in which staff, patients and visitors interact.

MEDICAL CENTER

This wing of the building will house all the spaces which pertain to the diagnosis and treatment of individuals with developmental disabilities. It will be adjacent to the RESEARCH FACILITY and will also consist of office spaces, a waiting area, and reception.

RESEARCH FACILITY

Will support academic, medical and scientific investigations of developmental disabilities, pertaining to causes, diagnostic criteria, symptoms, and appropriate treatments for them.

PUBLIC SPACES

This area of the building will consist of CONFERENCE ROOMS, LOUNGES, CHILD CARE area, a LIBRARY, and TECHNOLOGY CENTER.

CHILD CARE

For temporary use, serviced on a volunteer basis.

CONFERENCE ROOMS / LOUNGES

One large conference room will be provided for large workshops, and educational venues. Two smaller conference rooms may also function as support group meeting spaces, in addition to two lounges, one geared towards adults, the other for teens.

LIBRARY and TECHNOLOGY CENTER

Will provide literature resources to visitors of the spaces, available for checkout. Additionally, the center will have Internet access for investigation of on-line resources.

OFFICES

Offices for several organizations and volunteer services as described in the User/Client Description.



LUNCHROOM

For staff of the facility to use on break times. A small kitchenette will be provided with storage space for cooking supplies, especially important for those individuals with strict dietary needs.

SHARED OFFICE RESOURCES

A space for copy and fax machines shall be located in a central location for small offices usage.

MAINTENANCE and HOUSEKEEPING SPACES

Large areas throughout the building will provide storage space for cleaning supplies and equipment.

LOCKER ROOMS

For staff of the building, especially those commuting to work.

CIRCULATION SPACES

Primary corridors will be oversized for ease of wayfinding and accessibility needs.

SERVER and MECHANICAL SPACE

Plentiful space will be provided to support the advanced technologies and HVAC system of the building.

ACCESSIBLE RESTROOMS

Restrooms will be provided throughout the building to minimize travelling distance to these areas.



Fig. 2: Map of Minnesota



Fig. 3: Traffic Access to Site

SITE SELECTION CRITERIA

The location chosen, must be able to support a medical building of this size and type.

The community should already have established volunteer and community organizations/services which assist the developmentally disabled population.

The site must be located near a major traffic artery, to support regional use of the building.

The site, would ideally, support public transportation to the building.

The site will not encourage urban sprawl or development on existing farmland.

The site should offer a connection with nature.



SITE DESCRIPTION

LOCATION

The site is located in the Upper Mid West in the center of Minnesota. Only sixty-five miles from the Twin Cities, the site is on the edge of the St. Cloud and Sartell city limits.

HISTORY

The city's location on the Mississippi River helped it grow into a prominent industrial and business center as well as a center of education. Germans were among the earliest immigrants in Stearns County. To the right is a picture of a 1912 granite quarry in St. Cloud.

MEDICAL FOUNDATIONS:

The area is a thriving medical community. With the goal of becoming the state's medical capital, this newly developed land is home to three independent medical institutes: Abbot Northwestern Specialty Care Center, Center for Diagnostic Imaging (CDI) and CentraCare Health Plaza. CentraCare has ownership of 126 acres of land, including the proposed site. Currently, the only building completed there is an impressive three-storey, 328,000 square foot facility offering services including cancer treatment, rehabilitation, pediatric care, and general medical examination. The remaining land, surrounded by a one-mile walking path, has been set aside for other medical buildings



Fig. 4: Site Context



Fig. 5: St. Cloud Granite Quarry

site information



Fig. 6: Saint Cloud State Library

ST. CLOUD STATISTICS

LOCATION

45.5 N, 94.052 W

POPULATION

59,000

The growth rate in the area is twice that of Minnesota, with a tri-county population of 231,809.

GEOLOGY

Sand deposits and granite



Fig. 7: People First Support Group

DEMOGRAPHICS

Most of population aged 20-55
Seven percent of the population ages 5-20, has a disability status.

COLLEGES

Saint Cloud State University
St. Benedict's University
St. John's Univeristy
Technical colleges

ECONOMY

Mid-tier economic market
Strong medical component.
.Retail, Restaurant activity, Education,
Manufacturing,
Technology, Optics, Printing

INCOME LEVELS

Slightly lower than state averages,
Median family income at \$51, 500.
Housing is primarily owner occupied, single,
detached units.



PROJECT EMPHASIS

Emphasis for this project will be placed on several items related to the psychological investigations and research being conducted by the designer. These goals include the following items.

Ease of wayfinding will be of high priority in the layout of the buildings spaces and circulation path, in order to promote efficient, healthful uses of physical and mental resources.

The encouragement of social interaction and network formation will also be considered in the layout of spaces, while maintaining patient and personal privacy throughout the building. For example, seating areas will be necessary to promote discussion, and workstation layout and proximity will be of great importance.

The building will also be one which supports varied learning styles with hands-on concrete experiences, and responds to the diverse needs of the children, their families, and the staff of the building.

The character of spaces shall provide for all aspects of health: psychological, physical, emotional and social, and shall utilize healthful materials and technologies, and provide a visual and physical connection to nature.

Personal goals include the desire to gain an appreciation of several professions' operations, and to discover solutions for meeting their needs.

Specific applications of the research findings will include making the building more comfortable for users, providing more natural light within the building, and making careful selection in aspects such as lighting, color, and pattern. This entails designing in a familiar, more residential-like manner, and creating a layout which upholds ease in wayfinding. Identifying appropriate proportions, imperfect but harmonious symmetry. While over-stimulation should be avoided, the space should be energetic, positive and encouraging.



Fall Semester 2004:

Week One:	October 4-8
<i>7 October</i> Research	<i>Thesis proposal due</i> Specific organization requirements
Week Two:	October 11-15
<i>14 October</i> Research	<i>Student critic preference slips due in office</i> Psychology and Design
Week Three:	October 18-22
<i>21 October</i> Research Meeting	<i>Primary and Secondary Critics announced</i> Case Studies First meeting with Primary advisor
Week Four:	October 25-29
<i>28 October</i> Develop	<i>Last day of AR/LA561 Class</i> Program definitions, storyboard
Week Five:	November 1-5
Develop	Program production continues
Week Six:	November 8-12
<i>11 November</i> Research Develop	<i>Veterans' Holiday</i> Program production continues
Week Seven:	November 15-19
<i>19 November</i> Research Develop	<i>Final presentation for 571 Supreme Court</i> Program production continues
Week Eight:	November 22-26
<i>25-26 November</i> Research Develop	<i>Thanksgiving Holiday</i> Program production continues
Week Nine:	November 29 - December 3
Research Develop	Program production continues
Week Ten:	December 6-10
<i>9 December</i> <i>10 December</i> Research	<i>Last day of classes</i>
Week Eleven:	December 13-17



17 December *Last day of finals, no exams this week*
Research

Week Twelve: December 20-24
Christmas Break

Week Thirteen: December 27-31
Research, Portfolio Work, Job Hunt

Spring Semester 2005

Week Fourteen: January 3-7
Research

Week Fifteen: January 10-14
11 January *Classes Begin*
Form Studies and Models

Week Sixteen: January 17-21
17 January *Martin Luther King Holiday*
Form Studies and Models

Week Seventeen: January 24-28
Conceptual and Schematic Design

Week Eighteen: January 31 - February 4
Conceptual and Schematic Design

Week Nineteen: February 7-11
Conceptual and Schematic Design

Week Twenty: February 14-18
Design Development

Week Twenty-one: February 21-25
21 February *President's Holiday*
Design Development

Week Twenty-two: February 28 - March 4
Design Development

Week Twenty-three: March 7-11
7-11 March *Mid-Semester Reviews*
Design Development

Week Twenty-four: March 14-18
Spring Break
Storyboard Presentation Layout

plan for proceeding



Job Search Continues

Week Twenty-five:	March 21-25
<i>25 March</i>	<i>Easter Holiday</i>
Presentation Drawings, Model	
Week Twenty-six:	March 28 - April 2
<i>28 March</i>	<i>Easter Holiday</i>
Presentation Drawings, Model	
Week Twenty-seven:	April 4-8
Presentation Drawings, Model	
Week Twenty-eight:	April 11-15
Presentation Drawings, Model	
Week Twenty-nine:	April 18-22
Finalize Presentation Boards and Model	
Week Thirty:	April 25-29
<i>25 April</i>	<i>Thesis Projects due at 4:30 in Memorial Union</i>
<i>26-27 April</i>	<i>Annual Thesis Exhibit in Memorial Union</i>
<i>28 April</i>	<i>Reviews begin</i>
<i>29 April</i>	<i>Draft of Thesis Document due to Primary Critic</i>
Week Thirty-one:	May 2-6
<i>6 May</i>	<i>Last day of classes</i>
<i>5 May</i>	<i>Last Reviews</i>
Week Thirty-two:	May 8-13
<i>12 May</i>	<i>Final Thesis Documents due in Department Office</i>
<i>13 May</i>	<i>Commencement at 4:00 pm at Fargo dome</i>
Final Exams	

NOTE:

The design methodology has thus far included developing an inventory of needs through the research of case studies and communication with the organizations. Next, a matrix of relationships between spaces will be developed, and structural and material alternatives will be analyzed in order to make the most appropriate selections.



PREVIOUS STUDIES

SECOND YEAR

Form studies
Nativity Elementary Library
Design Your Own Space
World Trade Center Projects
Copenhagen School of Architecture
Bridge Charette

THIRD YEAR

NDSU Arboretum; Wood Structure
Aging in Place; Universal Design
Dance Studio; Steel Structure
Masonry Competition
BWBR Competition

FOURTH YEAR

Fargo Urban Design
Urban Housing; Marvin Windows Competition
San Francisco Highrise Design

FIFTH YEAR

Olympic Gallery
United States Supreme Court Building



Fig. 8: Urban Design Board Layout

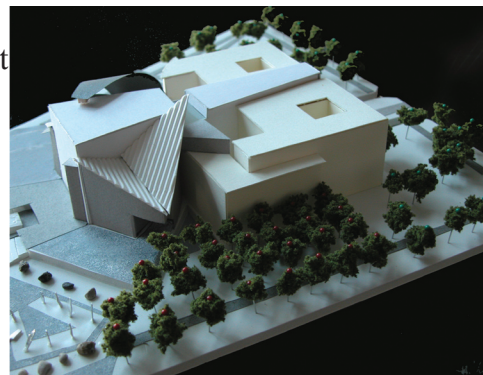


Fig. 9: Supreme Court Model

previous design experience



WHAT IS THE PAST TREATMENT OF THE DISABLED?

Institutionalization used to be the method of “treatment” for the disabled. The Welsch case of 1987 marked the last child left at state hospital. Since deinstitutionalization, mainstreaming of children with disabilities has become the norm. Minnesota was the first state to submit a plan to use federal funding to build community facilities. In 1990 President Bush, passed into law the Americans with Disabilities Act, which had a large impact on architecture and design. In the last several decades, much progress has been made in the care and understanding of people with disabilities. However, much research is still necessary in developing appropriate treatments.

WHAT ARE THE CURRENT SOCIAL TRENDS AND DEVELOPMENTS THAT SUPPORT THIS PROJECT?

Nationwide, the rates of diagnosis of developmental disabilities are increasing. Advanced awareness and research has helped establish earlier diagnosis, providing better treatment. Awareness has also been increased in the media. NFL quarterback Doug Flutie, and popular novelist Nick Hornby openly discuss their children’s cases. Additionally, there exists a trend in the health care industry of specialization of treatments, suggesting the success of this facility

WHAT ARE DEVELOPMENTAL DISABILITIES?

Developmental disabilities are severe and chronic neurological conditions that manifest before the age of 22. Nearly four million Americans have developmental disabilities. These neurological conditions result in the impairment of:

GENERAL INTELLECTUAL FUNCTIONING

IQ less than 70

LIMITED ADAPTIVE BEHAVIOR

- self-care,
- home living,
- social skills,
- community use,
- health and safety,
- functional academics,
- leisure and work.

They include, but are not limited to Autism, cerebral palsy, hearing or vision loss, mental retardation, attention deficit hyperactivity disorder, and Down syndrome.



WHAT ARE DEVELOPMENTAL DELAYS?

Developmental delays are slowed or impaired development of a child under 5 years old who is at risk of having a developmental disability because of the presence of one or more of the following:

- chromosomal conditions
- congenital syndromes
- metabolic disorders
- prental/perinatal infections
- significant medical problems
- low birth weight
- one or both parents have DDs.

SCIENTIFIC FINDINGS RELATED TO AESTHETICS

The scientific approach to aesthetics began with Wundt and Fechner 1874-1876. Aesthetic pleasure results when arousal is produced by visual stimuli. Arousal produces adrenaline, and lowers the stress hormone cortisol. A decrease in cortisol increase immunoglobulin levels, which boosts the immune system.

Fibonacci and Gestalt Theories suggest that the brain is programmed to search for patterns of coherence. Subjects prefer a rectangular form based on golden section. Children make drawings based on images stored in that part of their memory laid down by genetics. Houses, trees, figures are placed exactly where the Golden Section demand they should be placed.

COLOR STUDIES

Color studies have also been analyzed to determine appropriate palette for the different spaces within the building.

Youth prefer warm exciting colors while older prefer cooler colors. Red and yellow should be used where creative activity is desired. Green and blue promote quiet activity or concentration. Cool color and low illumination provides less distractions and has calming effect on agitated, nervous individuals, and can also be used where monotonous tasks are performed. Red can aid depressive treatment, in combination with high illumination, it increases alertness and outward orientation. With warm colors time is overestimated, weight seems heavier, objects appear larger, rooms appear smaller. To visually prepare one for the room color, paint entry a complimentary color. Walls opposite of window should be light in color to reflect not absorb daylight. Providing changes in lighting, accent walls, and artwork stimulates the nervous system.

IMMUNE SYSTEM, THE BRAIN, and OUR ENVIRONMENTS

Sometimes a stress response is needed to achieve peak performance, but it can also become a negative force on the immune system.

Only 35% of complex traits like these diseases and possibly our stress response is determined by genetics, thus 65% is determined by environment!

Patients who are recovering should be active and the environment a stimulating one. Low levels of serotonin are associated with depression and risk taking. Levels can be increased by motor activity such as walking. Circadian rhythms in the brain and body are entrained by light. Hospital rooms should be brightly lit and kept on a 24 light/dark cycle.

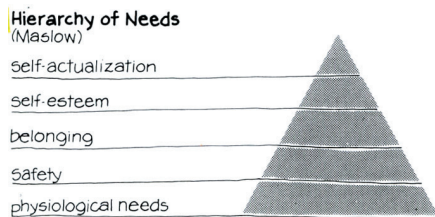


Fig. 10: Maslow's Hierarchy of Needs

MOTIVATING FACTORS AFFECTED BY ENVIRONMENT and INFLUENCED BY DESIGNERS:

- a. friendship formation
- b. group membership—support groups
- c. personal space
- d. personal status
- e. territoriality
- f. communications
- g. cue searching
- h. personal safety



THEORIES RELATED TO ARCHITECTURE AND THE MIND

NGS theory

Neuronal groups form in random and highly variable manner of connection in developmental stages. In the absence of a master plan, connections just happen by self-selection. Once a child is born and begins to ‘behave’ in his new environment, some of the connections between neuronal groups are strengthened and some are weakened. Each time we experience a similar behavior these associated neuronal groups are recalled from memory and reentered after use. The more often this reinforcement occurs, the more rapid is our brain’s response and the more vivid the experience. Our experience with an architectural setting is much the same. We receive sensory signals from our eyes, ears, nose and sense of touch a few microseconds after they have been collected by core consciousness, they become an event in extended consciousness. Machiavellian intelligence is the power to predict the actions of others and thereby manipulate them

Proshansky

Identified 3 factors underlying the influence of architectural settings:

1. the physical setting of the home, school and neighborhood in which a child learns some of his most significant social roles.
2. In each role a particular architectural setting has properties that influence what is expected in terms of behavior.
3. In each setting, a child must learn the environmental skills needed to use them, or change them to derive satisfaction from them.

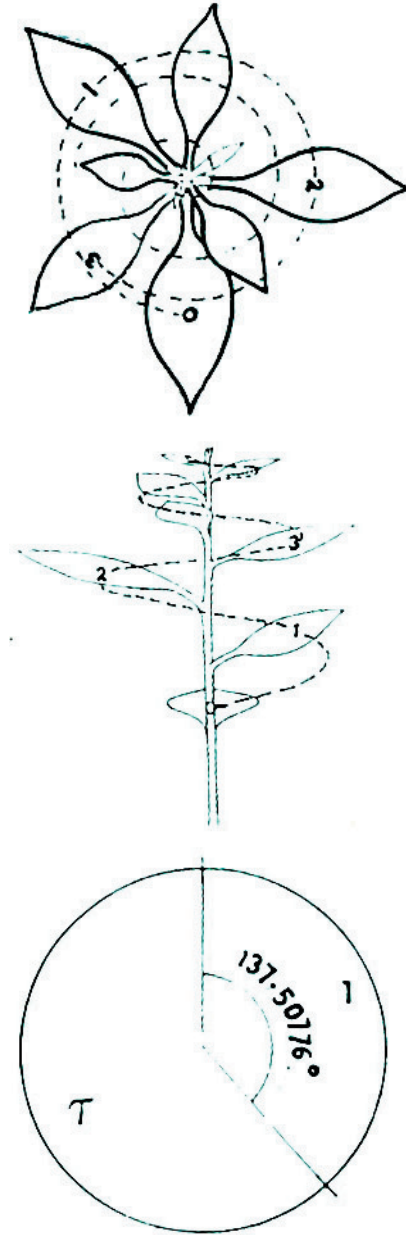


Fig. 11: The Mathematical Fibonacci’s Sequence Illustrated in 3 dimensions.

research results

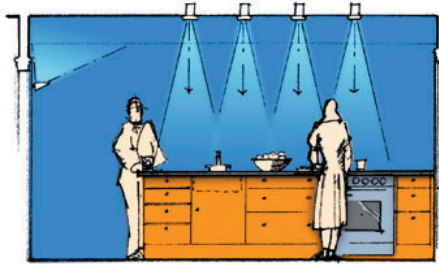


Fig. 12: Task Lighting Diagram

VISUAL CONSIDERATIONS

Light and movement both play a role in visual experiences and stimulation.

The human eye has considerable degree of tolerance when it comes to harmony in color/form. SEE APENDIX A

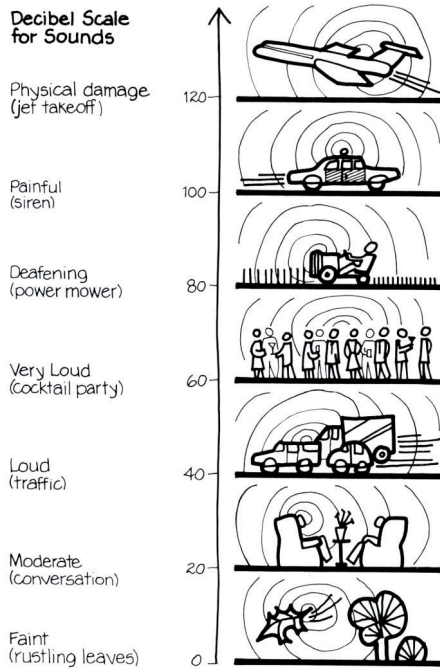


Fig. 13: Normal Auditory Thresholds

Red-orange is the most symbolically charged color

Perceived weight depends upon:

- Size in relation to the whole

- Perceived frame of reference

- The hue, intensity, brightness

- Relative impact of its texture

- Emblematic associations

- Symbolic links

- Complexity of shape and content

AUDITORY CONSIDERATIONS

Ear is acutely aware of slight off-key.

Even infants prefer accoustical harmonies.

OLFACTORY CONSIDERATION

For some individuals, sensitivity to odors can cause discomfort and distractions, therefore, the design must be especially sensitive to reducing allergan exposure.



COMPONENTS OF THE BRAIN

CORPUS CALLOSUM

The bridge between the right and left hemispheres of the brain expressed as the bridge between workers and patients.

THE CEREBELLUM

The Occipital Lobe

Manages visual processes

The Temporal Lobe

Sound and speech comprehension, memory

Parietal Lobe

Movement, orientation, calculations, recognition

Frontal lobe

Integrates thinking, conceptualizing and emotions.

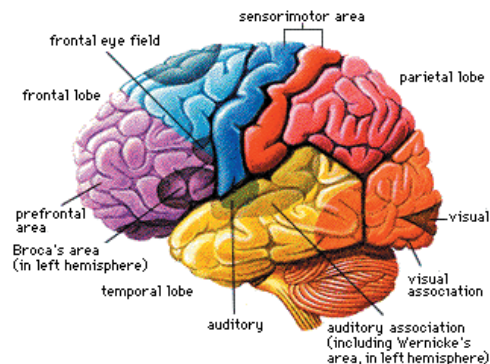


Fig. 14: Diagram of Brain Structure

TEN BILLION NEURONS

Dendrites: electrical signals

Axon: receivers

Synapses: the roots, gaps

LEFT BRAIN

Concentrates on the detail

Processes in a serial, step-by-step manner

Discriminates

RIGHT BRAIN

Panoramic

Spatial focus

Recognizes connections, apprehends

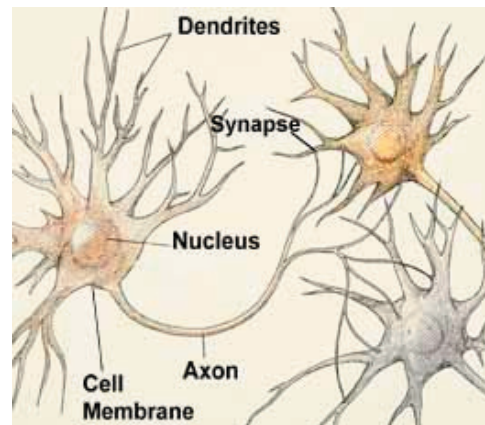


Fig. 15: Diagram of Nerve Structure

research results

Each group of people with a specific physical handicap will have problems with certain site elements which require the use of the ability they have lost to one degree or another.

Handicap / Site Element Relationship

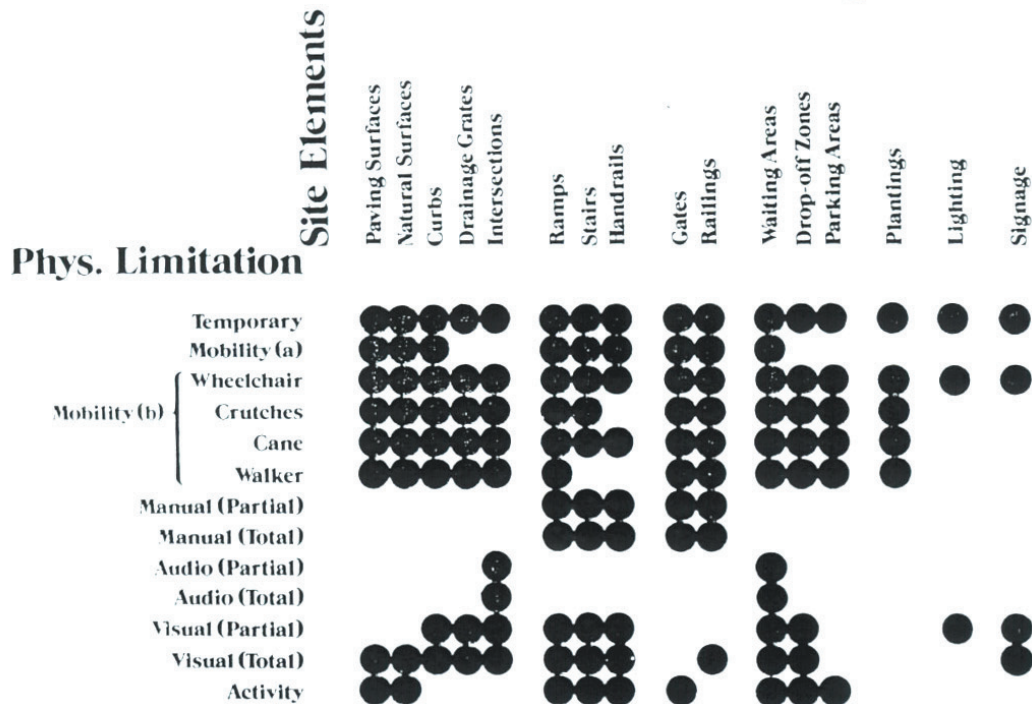


Fig. 16: Diagram Showing Handicap Relations to Site Design

HOW DOES THIS PROJECT RELATE TO OTHER PROJECTS THROUGHOUT HISTORY?

The building is similar in that it consolidates resources to advance research, and adopts the human-centered design movement that began in 1977. It also adopts the planetree model which stresses intensive patient education, family involvement in care giving and the importance of physical environment in promoting health. See also the Case Studies that follow.



HARDY, HOLZMAN, PFIEFFER

The following two buildings are both set in parklike suburban settings, are modest in scale and order, enhance the value of openness, and humanize an environment which is usually one of hygienic hysteria.

COLUMBUS OCCUPATIONAL CENTER Columbus, Indiana 1974

STRENGTHS OF THE DESIGN

Functions out in open, promoting interaction.
Closed private functions at perimeter
The internal public grid of circulation is outlined with skylights. Colored structure accentuates building's layers. The landscape is clearly visible from within.



Fig. 17: Columbus Entry Lobby

EYE INSTITUTE Philadelphia, Pennsylvania 1978

STRENGTHS OF THE DESIGN

Brings light, space, color, comfort into educational environment. Irregularly shaped open areas define major circulation path

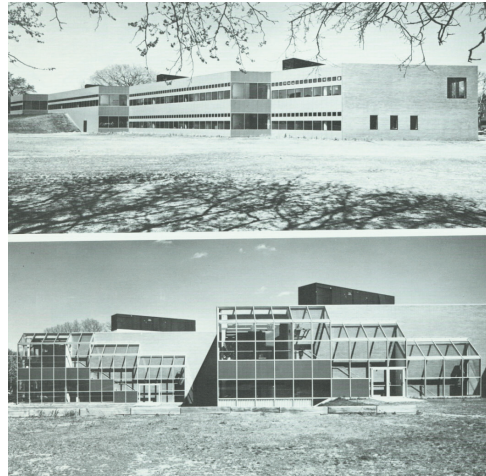


Fig. 18: Exterior of Eye Institute



Fig. 19: Exterior Facade

HEART INSTITUTE

Davenport, IA
Flad & Associates
80,000 sq.ft.

Genesis Medical Center and Cardiovascular Medicine PC share the facility to provide their patients with a convenient, facility focused on overcoming heart disease.

The building includes 20 physician and medical provider offices, a 9,000-square-foot rehabilitation area and a 174-seat auditorium with meeting and food service spaces.



Fig. 20: Rehabilitation and Cardio Space

STRENGTHS OF THE DESIGN

The lobby, with glass on one side and exterior brick on the other, creates a dramatic but peaceful space that acts as a transition between the outdoors and treatment areas.

Bold colors and shapes have been employed to create an uplifting, invigorating space in the rehabilitation gymnasium.



MAYO CLINIC PEDIATRIC UNIT
Rochester, MN
Hammel Green and Abrahamson, Inc

The formal name is the Mayo Eugenio Litta Children's Hospital. It was designed to make the hospital stay less frightening for children. Closed-circuit televisions allow parents to watch their children.

Kitchens, laundry facilities, lounge areas, showers and an exercise bike are provided to families in each unit. The Sister Joseph Patient and Visitor Library has more than 150 videocassettes for children fiction and reference books, and Internet access. Because pets can be very helpful in the healing process, registered therapeutic pets are allowed to visit. Three developmentally appropriate play areas are available for infants and toddlers, school-aged children and teen lounge space. Art is incorporated throughout the building, and includes:

Tiles of original art from pediatric patients and school children.

Perpetual calendar/mirror marking a wide variety of childrens' activities.

Bronze statues, Disney drawings, ceiling art, and an animal alphabet rug.

STRENGTHS OF THE DESIGN

Features personal touches, to create a more comfortable environment, and meets the various needs of families and different aged children.

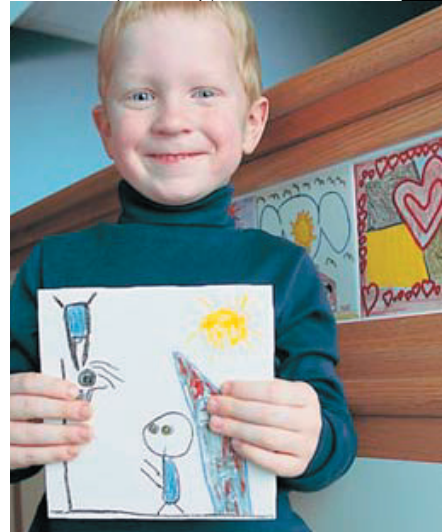


Fig. 21: Patient with Tile Art



Fig. 22: Counters at Service Area



Fig. 23: Exterior of Library



Fig. 24: Exterior Window

ILLINOIS REGIONAL INSTITUTE FOR THE BLIND

Chicago, Illinois 1978
Stanley Tigerman
32,000 sq.ft.

One of the first barrier-free buildings in the United States. The site is located at SW corner of Univ. of Illinois at Chicago, in which the building takes on the shape of an isosceles triangle. The building features red exterior walls (metal panels with bright red baked enamel yellow structure, blue ducts, and black doorways.

STRENGTHS OF THE DESIGN:

The building takes advantage of the fact that blind does not imply total loss of vision. Hence, the brilliantly colored exterior and interior. The walls are circular and rubber flooring is used to enhance safety of movement. Countertops are shoulder high except at service areas, where they are lowered. Textures and sound are used to create an internal map for the user, and a 165 foot hypotenuse wall has a window which reflects the interior circulation plan which is linear and easily memorized.



MIND INSTITUTE
Medical Investigations of
Neurodevelopmental Disorders
University of California-Davis;
Sacramento, CA 2003
Hammel Green and Abrahamson, Inc

The project is a ten acre campus, on which three of five buildings were completed in 2003. It accommodates children and families as patients and research subjects. The environment is protective but not constraining with earthtone colors which are soothing.

STRENGTHS OF THE DESIGN:

There is one entry to the building which is used by all. The learning resource center, which was the key request, is located just feet from the entry. The waiting rooms include comfortable living room furniture, without fixating patterns. Aquarium and Disney videos, present, appeal to the autistic children.

Exam interview rooms look like home and have unobstructed vision lines, so children cannot hide from view. Technology allows for play back from every angle. Assessment tables are at children's height and made of natural wood with rounded edges.



Fig. 25: Waiting Area



Fig. 26: Playground Space



Fig. 27: Plan of Campus

case studies



Fig. 28: CentraCare Campus Plan



Fig. 29: Building and Pond



Fig. 30: Drop-off Area

CENTRACARE CAMPUS

St. Cloud, Minnesota

Hammel Green and Abrahamson, Inc

CentraCare Health Systems is the largest employer in St. Cloud,

This is the largest building project in Central Minnesota in 50 years. The 120 acre site includes a 3-level building totaling 330,000 sq.ft at a total cost of \$54 million.

The building integrates a continuum of health programs, and a state-of-the-art diagnostic/treatment facility under one roof. There are 1319 parking stalls with drop offs at each entry.

The structure is designed flexibly and can be added onto vertically or horizontally, The remaining campus design allows for separate structures with a maximum capacity of 1.5 million sq.ft.



A patient tower overlooks the Sauk River and a one-mile fitness trail surrounding the site. Inside, the woodland, prairie and river devise a theme for the circulation pavilions, allowing nature to play several roles in the healing process. The site is landscaped beautifully with ponds and natural vegetation.

The project has eased congestion at St.Cloud's hospital while creating a convenient, accessible, patient-friendly environment.

DESIGN STRENGTHS:

Details of interior match exterior, providing for a comfortable transition from outdoors to indoors. Ample daylighting is provided in interior spaces, and hallways are sufficient in size. The building is beautifully lit at nighttime.



Fig. 31: Themed Entry



Fig. 32: Patient Tower



Fig. 33: New CentraCare Building Offsite



BUILT ENVIRONMENT INVENTORY

RESIDENTIAL AREA is located to the west of the site, which is surrounded by newer homes and Chantry Park. Provides a nice backdrop for a building that strives not to be institutional in nature.

COMMERCIAL

Hennen's furniture

Medical buildings

- Abbot Northwestern Specialty Care Center,
- Centra Care Health Plaza, Diagnostic Center.

COMING SOON

A new Centra Care building contracted by Miller Construction.

Northwest Professional Center which will provide office and medical space from 2,000-20,000 sq.ft for lease in the fall 2005.

NATURAL INVENTORY

Sauk River borders site on the south side of the site, is lined with natural woodlands, and restored prairie grasses, providing excellent views and acting as a visual and acoustical screen for the site. The river also adds a bit of dynamic topography to the otherwise relatively flat site and accounts for the direction of drainage on the site. Wonderful farmland exists around the site, most closely on the North side.

REGIONAL RELATIONSHIPS

The Bridge of Hope makes area more accessible than it formely was. Increased accessibility to the site will exist once rail connection is established between St.Cloud to Minneapolis. Several small communities in the surrounding area rely on St.Cloud for ammenties their towns do not offer. Consolidating Central Minnesota's services into one building where travel times are under 30 minutes is appopriate. The project also has ties to several school districts in the area.

SOCIAL AND HISTORICAL CONTEXT OF THE SITE

Has been vacant prior to CentraCare building. Exists in a supportive community, with advanced medical base. Several organizations already help the area and the community supports medical expansions because many are employed in these types of job fields.



CHALLENGES AND OPPORTUNITIES
Shouldn't become a backyard "shed" to CentraCare, needs to be fitting but distinct. Maximize beauty of site and provide views. Safety of users, especially children need to be kept in mind. The site should be fully accessible.

TOPOGRAPHY

On a slightly elevated ridge
Building should not be diagonal to contours. Building should accentuate the land forms.

VEGETATION

Trees lining the river will be preserved.
Woodlands and grass will be protect with trails surrounding the site.
Ponds of Centra Care are lined with natural vegetation which help with water treatment.

VIEWS

Will be sheltered from highway view
Residential park will have view towards space
Views to CentraCare and opening along river are beautiful.

SUSTAINABILITY

Site chosen prevents sprawl of buildings onto the precious farmland important to the region. Southern exposure for passive heating is maximized. The site chosen for this design keeps with CentraCare's goals of preserving the natural resources of the area

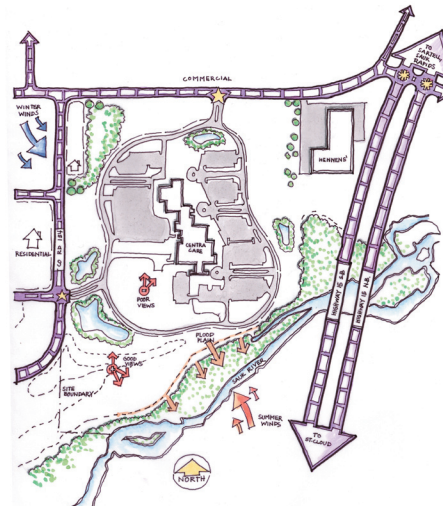


Fig. 34: Site Analysis Diagram



Fig. 35: Diagnostic and Imaging Center North of Site.



Fig. 36: Abbot Northwestern

site analysis

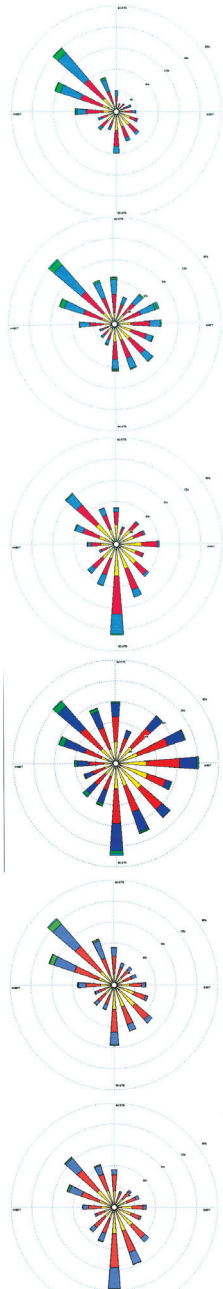


Fig. 37: NOAA
Wind Roses

NOISE

Trees screen traffic noise from highway, such that there is minimal disruption.

Natural sounds of birds and river

SOILS

Sands, sp, sp-sm

Suitable for building

Natural resources of granite are abundant in the city, and are found just south of the site.

WEATHER IMPACTS

The climate of the area is consistent with Central Minnesota:

Cold, dry winters.

Hot, humid summers

Climate of extremes

Average monthly precipitation is greatest during the summer months, with rainfall generally around four inches.

More often than not, the last day that the temperature drops below 32 degrees is sometime after May 11.

WIND

Prevailing winds, from the south and northwest, gust at average speeds under 5 meters per second, year round.

Natural and built screening from the winds will be essential.

TRAFFIC INVENTORY

Highway 15: This four-lane artery quickly leads to Interstate 94 and intersects with Highways 75, 23, 25, and 10, connecting each of the smaller, surrounding communities to St. Cloud. 60 mph.

Centra Care Parking: 20mph;

20th Street North—40 mph;

County Road 134: 40 mph

PEDESTRIAN AMMENITIES

1 mile fitness trail/walking path.



HEALTH ISSUES

Medical facilities on adjacent site
 No pollution
 Openness of site, uncongested

IMPACTS OF DEVELOPMENT

Drainage off-site to river
 More appropriate than developments occurring on farmland
 Small enough to preserve surroundings

SOLAR EXPOSURE

Trees to the South are distant enough to provide excellent solar exposure, but no shade on site.
 No building shadows from surrounding facilities fall on the site.

CODE CONSIDERATIONS

Currently dedicated to CentraCare expansion.
 ADA very appropriate for typology
 Site is set back from property lines
 Height restrictions are not applicable to the low-rise structure, thus the chosen size and scale are fitting, and any building material for office/medical facilities is appropriate here.

CIRCULATION

The pedestrian walking path is one mile in length. Public transportation bus route is nearby. Vehicles are traveling at slower speeds on roads nearest site. Other traffic is essentially CentraCare’s parking lot and a few dirt bikes

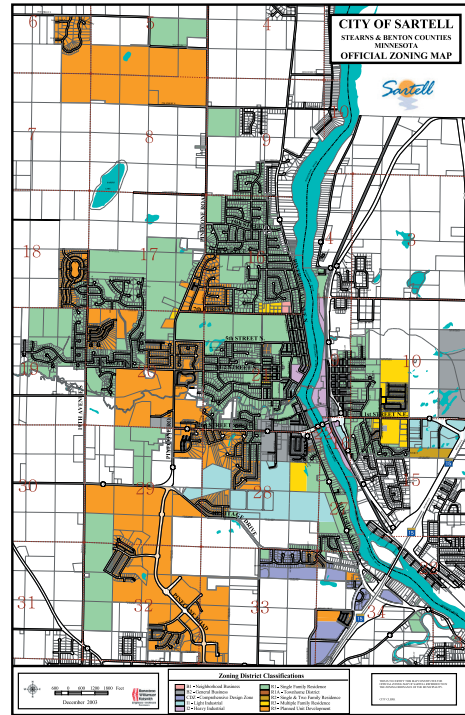


Fig. 38: Sartell Zoning Map

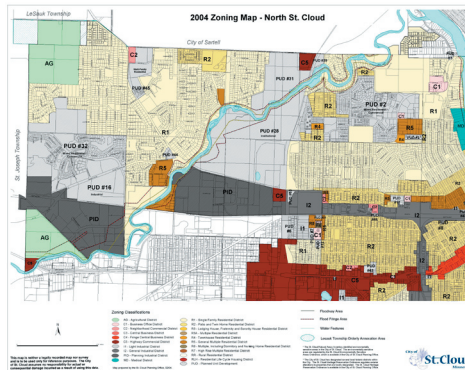


Fig. 39: St. Cloud Zoning Map

site analysis



QUALITATIVE CONSIDERATIONS

A program supplemented with human behavioral goals

LIGHTING

Should fall on faces of people not objects. The color of light must be appropriate so as to render flesh tones appropriately. Moving light can be either intriguing or disturbing. Lighting from below should be avoided because it has dramatic and disturbing effects.

WALLS

Should either be low or a minimum of six feet in height.
Appropriate height to length ratios fall between 1: 1/2 to 1:1/3 half to one-third

CALMING ENVIRONMENT

This can be established by visibility of what is going on, and opportunities for privacy. Spaces inhabited for long periods of time need external views, not just roof lights.

WAYFINDING

Spatial orientation is a fundamental skill, which plays a more significant role in memory than color or symbols. Difficult paths are problems for patients with thought or memory disorders. Perceptual organization can be established through continuity and transitions, hierarchy, centrality, interlinking, and visible activity.

PRIVACY

There are cultural and individual differences in expected levels of privacy. Non-claustrophobic spaces can be provided through perceived sufficiency of light and air.

MATERIALS

Provide durability, low-maintenance, tactile experience, and beauty.
Hypo-allergenic carpeting for appropriate accoustics and warmth.

STRUCTURE AND ENVELOPE CONSIDERATIONS

A system which supports an open plan is necessary to provide a feeling of openness. Natural light and exterior views should be provided without compromising patient privacy. Windowsill height should not exceed 3 feet above the floor and should be fixed and sealed to eliminate infiltration.

Note: Lack of windows in ICUs is associated with higher rates of anxiety, depression, and delirium. Viewing sunshine apparently can alleviate depression. Window views of natural settings have restorative influences. The results imply that design and siting decisions should take into account the quality of views from windows.



PROGRAM SUMMARY

PUBLIC SPACES
8950 s.f.

MECHANICAL SPACE
4700 s.f.

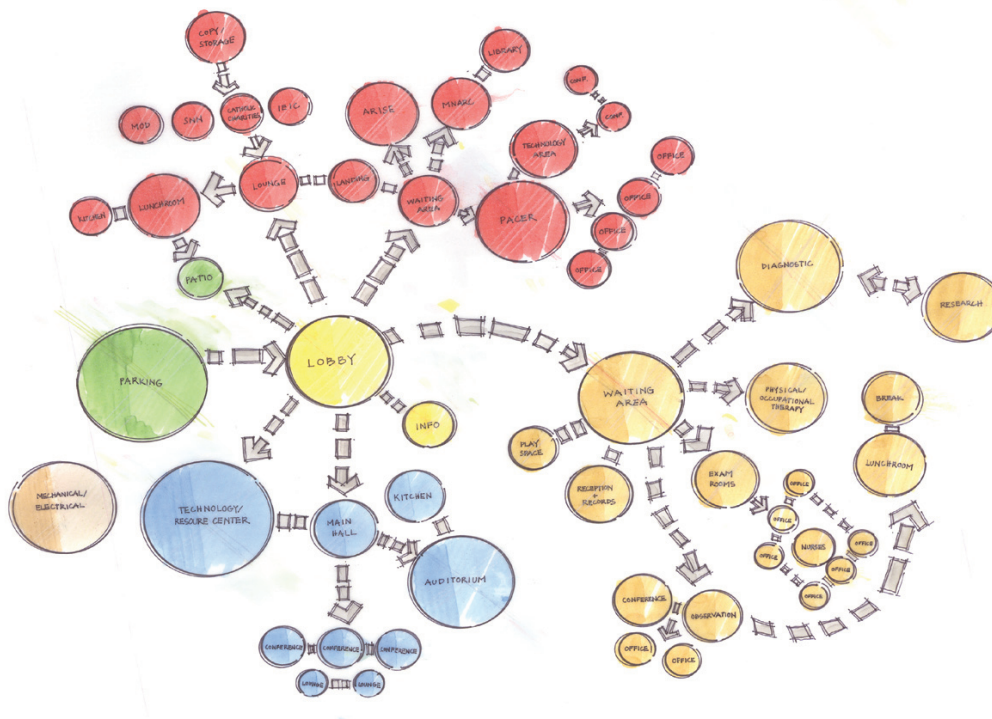
OFFICES
8740 s.f.

CIRCULATION
3500 s.f.

DIAGNOSIS
5680 s.f.

BUILDING TOTAL
32,000 s.f.

GROSS TOTAL
23,600 s.f.



program summary

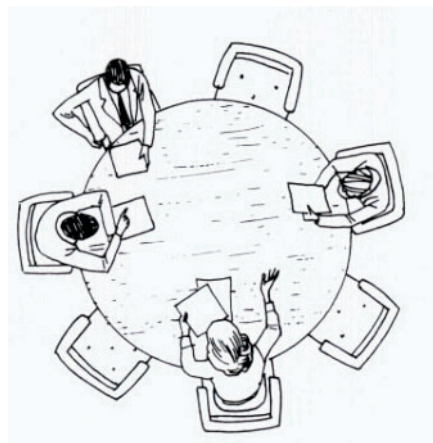
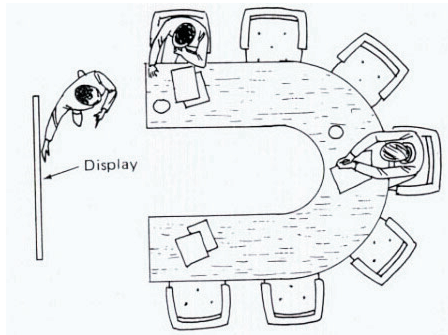


Fig. 40: Conference Seating Configurations Which Support Social Interaction

SPATIAL REQUIREMENTS

ENTRY LOBBY

800 s.f.
Used 24 hours a day
Automatic door openers
Telephones
Bulletin boards
Information calendar
Vending machines

Qualitative Elements

Terrazzo style flooring
Provide a transition from exterior to interior
Cheerful, bright, and comfortable
Visual stimuli overhead
Clarity of entrance and exit
Color coding and/or “You are here” map.

PUBLIC SPACES

Qualitative Elements

Seating allocated wherever chance meetings and conversation may occur. There exists importance of functional and physical proximity, and these should not be located in basement. Will be used during business, evening hours and weekends.

LARGE AUDITORIUM/LECTURE ROOM

2800 s.f.
Capacity: 350
Can be subdivided.
Elevated Seating

3 CONFERENCE ROOMS

350 s.f. each
Capacity: 10-20
Will be used for support groups, workshops, training, etc. Seating should be flexible.



KITCHEN

400 s.f.

Adjacent to conference rooms, for small catering venues, and snack preparation.

TECHNOLOGY AND RESOURCE CENTER

2400 s.f



Fig. 41: Sample of Assistive Devices and Supplies

CHILD CARE CENTER

300 s.f.

Temporary, staffed by volunteers
Play areas to accommodate children with and without disabilities. Activities should provide for motor skill development and stimulating sensory experiences. This would include built-in storage spaces.

LOUNGES

Adult lounge 180 s.f.

Teen lounge 180 s.f.

RESTROOMS

At least 840 s.f.

Provide for family-style restrooms and ample distribution of them throughout the building. Two near main entry, two outside auditorium, two in medical center, and two at each waiting area.



Fig. 42: Sample of Signage in Building, Must Have Braille Print



DIAGNOSTIC AND THERAPY CENTER

Qualitative Elements

All are likely PT office hours

WAITING ROOM

600 s.f.

RECEPTION AND MEDICAL RECORDS

400 s.f.

Should have views to outside

MEDICAL OFFICES

150 s.f. each

Psychologist, Psychiatrist, Neurologist, Pediatrician

SHARED OBSERVATIONAL AREA

225 s.f.

CONFERENCE AND VIEWING

150 s.f.

For discussions with parents. Tables with rounded edges, natural wood, and at child height.

EXAMINATION ROOMS

Three at 75 s.f. each

DIAGNOSTIC IMAGING

1000 s.f.

PET, CT, MRI scan

X-ray observation

Should be well-lit

SPECIALIST OFFICES

150 s.f. each

Nurses, Dental, Optometrist, Allergist/Dietician, Audiologist/ Speech Therapist

PHYSICAL/ OCCUPATIONAL THERAPY

800 s.f.

PHARMACY

150 s.f.

LOCKER ROOMS

200 s.f.

MEDICAL EQUIPMENT/ SUPPLIES

200 s.f.

STORAGE

100 s.f.

TWO ACCESSIBLE RESTROOMS

140 s.f.

RESEARCH

600 s.f.

5-10 people in a lab setting

Variable hours

programmatic requirements



ORGANIZATIONAL OFFICES

Qualitative Elements

Proximity is important in initiating contact.
Arrange so traffic doesn't approach from rear
Concentrate entering traffic to one point.
Task specific lighting with local controls.
Means for personalization, i.e. photos, plants,
name slots, storage.
Establish clear boundaries and subdivide large
groups.

SHARED SPACES

1000 s.f.
Worker cafeteria for approximately 50 staff.

FOUR ACCESSIBLE RESTROOMS

280 s.f. total
Receptionist for all
Copy and printing facilities

ARISE

(A Recreational Inclusion Support Endeavor)
Two offices 250 s.f.
Mailing Supplies and Storage 50 s.f.
Staff Training Area 350 s.f.

TRANSITION PLANNING OR IEIC

(Interagency Early Intervention Committee)
500 s.f.
5-6 employees.
Vocational / education displays

MARCH OF DIMES

450 s.f.
Small office

MNARC

MN Association for Retarded Children
Five Offices 1000 s.f.
Resource Library 500 s.f.
A lending library with updated
materials including video tapes,
books, pamphlets

CATHOLIC CHARITIES

1650 s.f.
6-10 offices in open plan style.

COUNTY SOCIAL WORKERS

400 s.f.
2-6 offices or cubicles

SPECIAL NEEDS NETWORK

650 s.f.
One coordinator office and space
for several volunteers. Computers
and phone lines for organizing
database. Mail preparation area.

DISABILITY LAW CENTER

200 s.f.
One office to be shared by a
lawyer and attorney from
Minneapolis satellite office.



Fig. 43: Accessible Tables for Conference or Lunchroom Setting

PACER

Parent Advocacy Coalition for Educational Rights

OFFICE SPACE

2000 s.f.

5 offices and 20 cubicles for employees and volunteers. Spaces must be fully accessible.

TECHNOLOGY CENTER

400 s.f.

Open to families to bring their children in for assessment of what types of assistive technology/ computer programs/ adaptive toys and devices may be most beneficial.

ENTRY

120 s.f.

Bookcase type display built into a wall for brochures and literature. Wall of pictures of children who have been helped by PACER over the years.

TWO SMALL CONFERENCE ROOMS

200 s.f.

Must accommodate 4 - 5 people

Parents often come here to meet with a staff

LARGER CONFERENCE ROOM

150 s.f.

10-12 people

STORAGE AREA

150 s.f.

Presentation, publication/technology supplies.

TWO ACCESSIBLE RESTROOMS

140 s.f.



OUTDOOR SPACE

PATIO

1000 s.f.

Large paved space near the building accommodating several people activities at once. Provides orientation within the building.

PLAYYARD AND GARDEN

Qualitative Elements

Moving water gives sense of life, still water stimulates unity and rest.

Good visibility from interior.

Raised beds and in-ground planters

Data from studies show that 10 minutes of time spent daily in gardens improved Alzheimer's residents health on 7 of 8 variables.

FURNITURE

Provide shading devices

Wheelchair swing

Bird baths, bird houses

Fences with plantings along them

Nighttime lighting

PARKING

At least 100 spaces

Provide more than necessary handicapped parking spaces with cut edges on sidewalks leading into the building. Also include drop-off area.

MICELLANEOUS FUNCTIONS

STORAGE / HOUSEKEEPING 230 s.f..

CIRCULATION 3500 S.F.

MECHANICAL 4700 s.f.



Fig. 44: Design Which Integrates Indoors and Outdoors



Fig. 45: Sample Furniture, Wheelchair Swing



PEOPLE IN PLACES

Experiencing, using, and changing the built environment by Jay Farbstein and Min Kantrowitz

We build images of places out of fragments of our experience selected for their significance to us. The experience may be from own direct sensation of the place, or it may be based on indirect knowledge such as hearing or reading about it or seeing a picture of it. Because all our senses are involved, the image can be an aroma or texture, as well as a visual picture. Selected fragments are organized into a coherent image, which reminds us of the place and helps us to recognize it.

Our eyes are sensitive to a limited spectrum of light energy at certain levels of brightness. We distinguish light and dark, and most of us can see a range of colors. In fact, a very large proportion of our information about places comes to us through our eyes; as light reflects off surfaces of the architectural setting we can see colors, shapes, things, materials, textures, people, and activities. Because we have two eyes; we are able to judge distances, to orient ourselves, and to move around easily in space.

Our ears hear a range of sounds. This varies from the low rumble of a diesel engine (which we feel as well as hear) to the high wail of a siren. Sounds tell a lot about the size of a place, and what's happening there, as people laugh, shout or move around, the wind rustles leaves, water gurgles, or a truck roars past in the distance.

Touching a place can give us a wide variety of sensations: cold, hard stone, a yielding sofa, warm, damp grass. We are able to gather this information because our skin and muscles contain nerves sensitive to pressure, heat, cold, and pain. Places smell, too. They may smell dry, fresh, old, or stuffy. We can also taste places -- or more likely, the things in them.

Each of our five senses has its own capabilities which differ from those of other living creatures. It is our brains, however, which seek, process, and make sense of information. The human brain has the ability to select and organize this information into stable, recognizable images of architectural settings which we interpret in terms of our shared cultural experiences. Equipped with concepts and categories, we fit our raw sensory experiences, like pieces of a puzzle, into a meaningful whole.

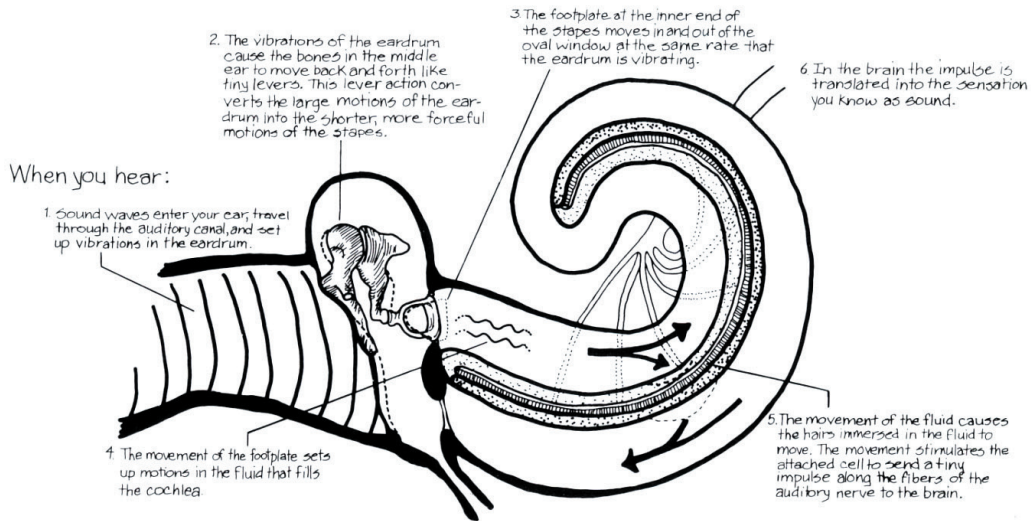


Fig. 46: Diagram of How Ear Works

Color Vision

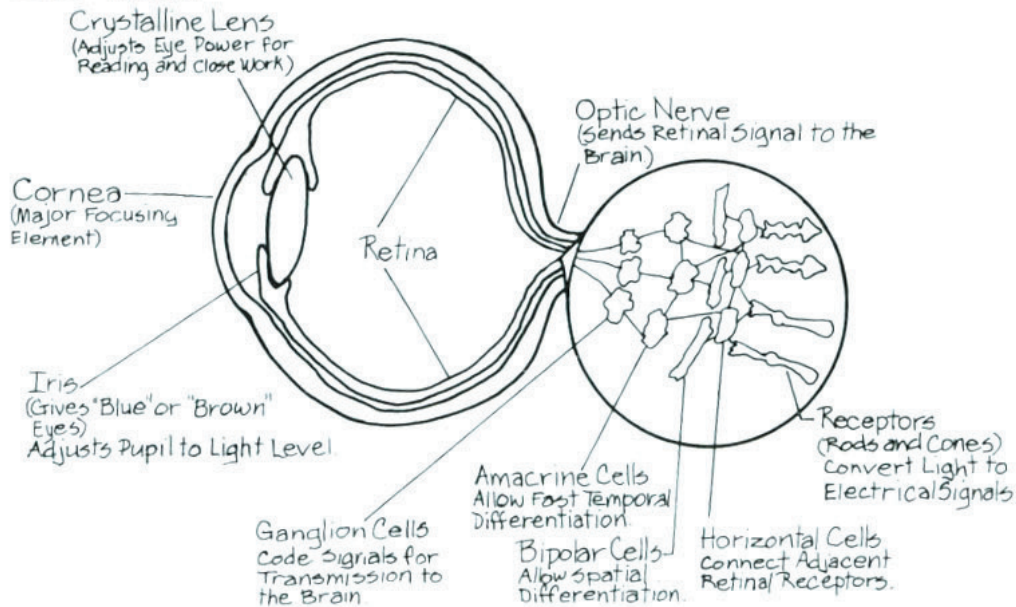


Fig. 47: Diagram of How Eye Works



STATEMENT OF INTENT

RESOURCE AND DIAGNOSIS CENTER

Designing for Psychological and Physiological Health

Each of us has different sensitivities, preferences, and needs. This became ever obvious to my family fourteen years ago when my two-year old brother was diagnosed with autism. My parents, upon receiving this news, were faced with many questions about the treatments, financial and educational resources available, and the rights of the disabled. During my family's search for answers, understanding and healing my parents discovered and established wonderful resource networks and support groups for families of children with special needs. With this education, our lives and environment were transformed: our daily routine became more structured and everything from the manner in which we communicated to the food that we ate was modified. As a designer, I feel both a desire and a responsibility to create architectural spaces that minimize the negative impact on those with special needs and create a healthier environment for all of us.

Within St. Cloud and the smaller communities that surround it, there are several organizations that are improving and expanding their services to the disabled. Despite this growth, the needs of hundreds of parents and children are not being met as efficiently or as well as they should. Therefore, I propose as a thesis project the development of a regional resource and diagnosis center for developmental disabilities to consolidate the resources and offices of these organizations, which would allow effective research and distribution of services.

Additionally, I propose that this center be developed adjacent to St. Cloud's Centra Care medical facility. The other buildings in this area are not only appropriate in size for this project, but are also of a similar typology, consisting of offices and medical clinics. The location, near a main highway through St. Cloud, is one that is easily accessible from any of the smaller communities.

The underlying premise of this design is that medical issues can be conceptualized in order to inform proper health care design. Because the psychological impact of architecture is too easily and subconsciously ignored, I will investigate in my thesis research the influence that architectural elements such as lighting, materials, color, patterns, size, form and acoustics have on physical and psychological comfort. From the findings, I will develop this center in a manner which accommodates individuals who may be afflicted with certain sensitivities. The building's function demands the creation of flexible architecture to accommodate various comforts and preferences.



PROPOSAL

RESOURCE AND DIAGNOSTIC CENTER FOR DEVELOPMENTAL DISABILITIES

THESIS PROPOSAL
ERIN R. KELASH
7 · OCTOBER · 2004

A. User/Client Description

The resource and diagnostic center will be of mixed use. Adjacent to several other medical institutions including Central Minnesota's largest building project in fifty years, the CentraCare Health Plaza, the building will consist of a diagnostic center whose staff would include a receptionist, doctors, psychologists and researchers. The building would also consolidate the offices of several local organizations that serve families with developmental disabilities, including Catholic Charities Caritas, ARISE (A Recreational Inclusion Support Endeavor), the Special Needs Network, PACER (Parent Advocacy Coalition for Educational Rights, and ARC Central Minnesota. Usage of the building would be extended beyond normal office hours by including the final aspect of the client base; residents of over fifteen cities and towns within a 30 mile radius of St. Cloud could have access to the center's library, meeting rooms, multimedia resources, and educational tools. In addition to the organizational and medical services offered in the building, families of children with special needs could use the facility for support group assemblies and for educational seminars and classes.

B. Major Project Elements

The program will include the following in the design of the building:

- An entry lobby for reception, directory, and announcements
- Office/meeting space for psychologists and parents
- Examination and observation rooms
- Organization offices, and storage
- Lounge, café
- Conference rooms
- Classroom, lecture area
- Library and multimedia stations
- Server and mechanical space
- Delivery docks
- Circulation space
- Restrooms



C. Site Information

The site, which is located in the center of Minnesota, 65 miles from the Twin Cities, is ideal for two reasons. Located just off Highway 15, at the southern edge of the Sartell, an efficient connection leads to Interstate 94 and intersects with Highways 75, 23, 25, and 10. Public transportation is available to the site as well.

Secondly, the area is a thriving medical community. With the goal of becoming the state's medical capital, this newly developed land is home to three (soon four) independent medical institutes: Abbot Northwestern Specialty Care Center, Center for Diagnostic Imaging (CDI) and CentraCare Health Plaza. CentraCare has ownership of 126 acres of land, including the proposed site. Currently, the only building completed there is an impressive three-storey, 328,000 square foot facility offering services including cancer treatment, rehabilitation, pediatric care, and general medical examination. The remaining land, surrounded by a one-mile walking path, has been set aside for other medical buildings.

The site chosen for this design keeps with CentraCare's goals of preserving the natural resources of the area. The Sauk River, on the south side of the site, is lined with natural woodlands, and restored prairie grasses, providing excellent views and acting as a visual and acoustical screen for the site. The river also adds a bit of dynamic topography to the otherwise relatively flat site and accounts for the direction of drainage on the site. Additionally, this site prevents sprawl of buildings into the precious farmland important to the region. Natural resources of granite are abundant in the city, and are found just south of the site.

Landmarks near the site include the Bridge of Hope, named in memory of abducted child, Jacob Wetterling, which crosses the Mississippi River. An older residential area is located to the west of the site, which is surrounded by newer homes that are part of the area's tremendous growth, and housing boom. The growth rate in the area is twice that of Minnesota, with a tri-county population of 231,809.

St. Cloud is a mid-tier economic market and regional center for retail, restaurant activity, healthcare, and financial services. Education, manufacturing, technology, optics, and printing are main industries in the region. Three major universities account for the large college population in the area. Income levels in the area are slightly lower than state averages, with the median family income at \$51,500. Seven percent of the population, ages 5-20, has a disability status. Housing is primarily owner-occupied, and single, detached units.

The climate of the area is consistent with the rest of Minnesota. Prevailing winds, from the south and northwest, gust at average speeds under 5 meters per second, year round. Average monthly precipitation is greatest during the summer months, with rainfall generally around four inches.



D. Project Emphasis and Justification

Firstly, the design of a building such as the one proposed here is necessary for several reasons. In the last several decades, much progress has been made in the care and understanding of people with disabilities. However, much research is still necessary in developing appropriate treatments. By consolidating the organizations that have the most information on these topics, researchers' time and resources can be used most efficiently. Additionally, the families of children with special needs, who are already under great demands and perhaps stress, will benefit greatly by having these resources united in one building. Perhaps most importantly, the benefit to the community, in raising awareness of these disorders will surpass other profits. Early diagnosis, proper training for educators, and provision for a supportive community are among the advantages.

The focus of the project will be on the research and subsequent development of design as it relates to psychological impacts. It is fitting to place emphasis on psychology in the design of a building which functions around and serves families and children's with special needs, sensitivities, and preferences. Both interior and exterior design will be developed in a manner whose form, shape, color, etc. create comfortable and appropriate spaces for people of all types.

E. Plan for Proceeding

The next step in the process will be to continue research. The research will be directed towards case studies of medical facilities and psychological findings that relate to design. Furthermore, making contacts with the organizations that will use the building is vital to the process and the development of an inventory of needs. Understanding construction in the St. Cloud area will also be included in the gathering of information.

The psychological findings will be a precursor to all design decisions. They will help direct the functional and aesthetic organization of spaces. Specifically, it is this designer's hope that the research will help her to develop a healthy link and relationship between the employees of the building and the people they serve. A connection to the river and sensitivity to the acoustics of the site will also help guide the design.

The design process will be documented through recording of the major findings in a binder for the project. Diagramming of ideas and relationships, through sketches, will be another mode of notation. Three-dimensional study models will be significant as well.

The following provides a general outline and schedule that will aid efficient conduct in the next few months of this project:



Fall Semester 2004:

Week One:	October 4-8
<i>7 October</i> Research	<i>Thesis proposal due</i> Specific organization requirements
Week Two:	October 11-15
<i>14 October</i> Research	<i>Student critic preference slips due in office</i> Psychology and Design
Week Three:	October 18-22
<i>21 October</i> Research Meeting	<i>Primary and Secondary Critics announced</i> Case Studies First meeting with Primary advisor
Week Four:	October 25-29
<i>28 October</i> Develop	<i>Last day of AR/LA561 Class</i> Program definitions, storyboard
Week Five:	November 1-5
Develop	Program production continues
Week Six:	November 8-12
<i>11 November</i> Research Develop	<i>Veterans' Holiday</i> Program production continues
Week Seven:	November 15-19
<i>19 November</i> Research Develop	<i>Final presentation for 571 Supreme Court</i> Program production continues
Week Eight:	November 22-26
<i>25-26 November</i> Research Develop	<i>Thanksgiving Holiday</i> Program production continues
Week Nine:	November 29 - December 3
Research Develop	Program production continues
Week Ten:	December 6-10
<i>9 December</i> <i>10 December</i> Research	<i>Last day of classes</i>
Week Eleven:	December 13-17



17 December *Last day of finals, no exams this week*
Research

Week Twelve: December 20-24
Christmas Break

Week Thirteen: December 27-31
Research, Portfolio Work, Job Hunt

Spring Semester 2005

Week Fourteen: January 3-7
Research

Week Fifteen: January 10-14
11 January *Classes Begin*
Form Studies and Models

Week Sixteen: January 17-21
17 January *Martin Luther King Holiday*
Form Studies and Models

Week Seventeen: January 24-28
Conceptual and Schematic Design

Week Eighteen: January 31 - February 4
Conceptual and Schematic Design

Week Nineteen: February 7-11
Conceptual and Schematic Design

Week Twenty: February 14-18
Design Development

Week Twenty-one: February 21-25
21 February *President's Holiday*
Design Development

Week Twenty-two: February 28 - March 4
Design Development

Week Twenty-three: March 7-11
7-11 March *Mid-Semester Reviews*
Design Development

Week Twenty-four: March 14-18
Spring Break
Storyboard Presentation Layout



Job Search Continues

Week Twenty-five:	March 21-25
25 March	Easter Holiday
Presentation Drawings, Model	
Week Twenty-six:	March 28 - April 2
28 March	Easter Holiday
Presentation Drawings, Model	
Week Twenty-seven:	April 4-8
Presentation Drawings, Model	
Week Twenty-eight:	April 11-15
Presentation Drawings, Model	
Week Twenty-nine:	April 18-22
Finalize Presentation Boards and Model	
Week Thirty:	April 25-29
25 April	Thesis Projects due at 4:30 in Memorial Union
26-27 April	Annual Thesis Exhibit in Memorial Union
28 April	Reviews begin
29 April	Draft of Thesis Document due to Primary Critic
Week Thirty-one:	May 2-6
6 May	Last day of classes
5 May	Last Reviews
Week Thirty-two:	May 8-13
12 May	Final Thesis Document due in Department Office
13 May	Commencement at 4:00 pm at Fargodome
Final Exams	

F. Previous Studio Experience

Second Year.

- Form Studies
- Nativity Elementary Library
- Design your own Space
- Word Trade Center Project
- Copenhagen School of Architecture
- Bridge Charette



Third Year.

NDSU Arboretum, Wood Structure
Aging in Place, Universal Design
Dance Studio, Metal Structure
Masonry Competition
BWBR Competition

Fourth Year.

Fargo Urban Design
Urban Housing, Marvin Windows Competition
San Francisco Highrise Design

Fifth Year.

Olympic Gallery
United States Supreme Courthouse

G. Bibliography and Resources

Journal Publications.

Peck, R. L. (2004, March). Seeking Answers to Autism: A Tour of the MIND Institute. Health Care Design, 3-8.

Books.

Elder, J., & Rubin, A.I. (1980). Building for People: Behavioral Research Approaches and Directions. Washington, D.C: US Dept of Congress.

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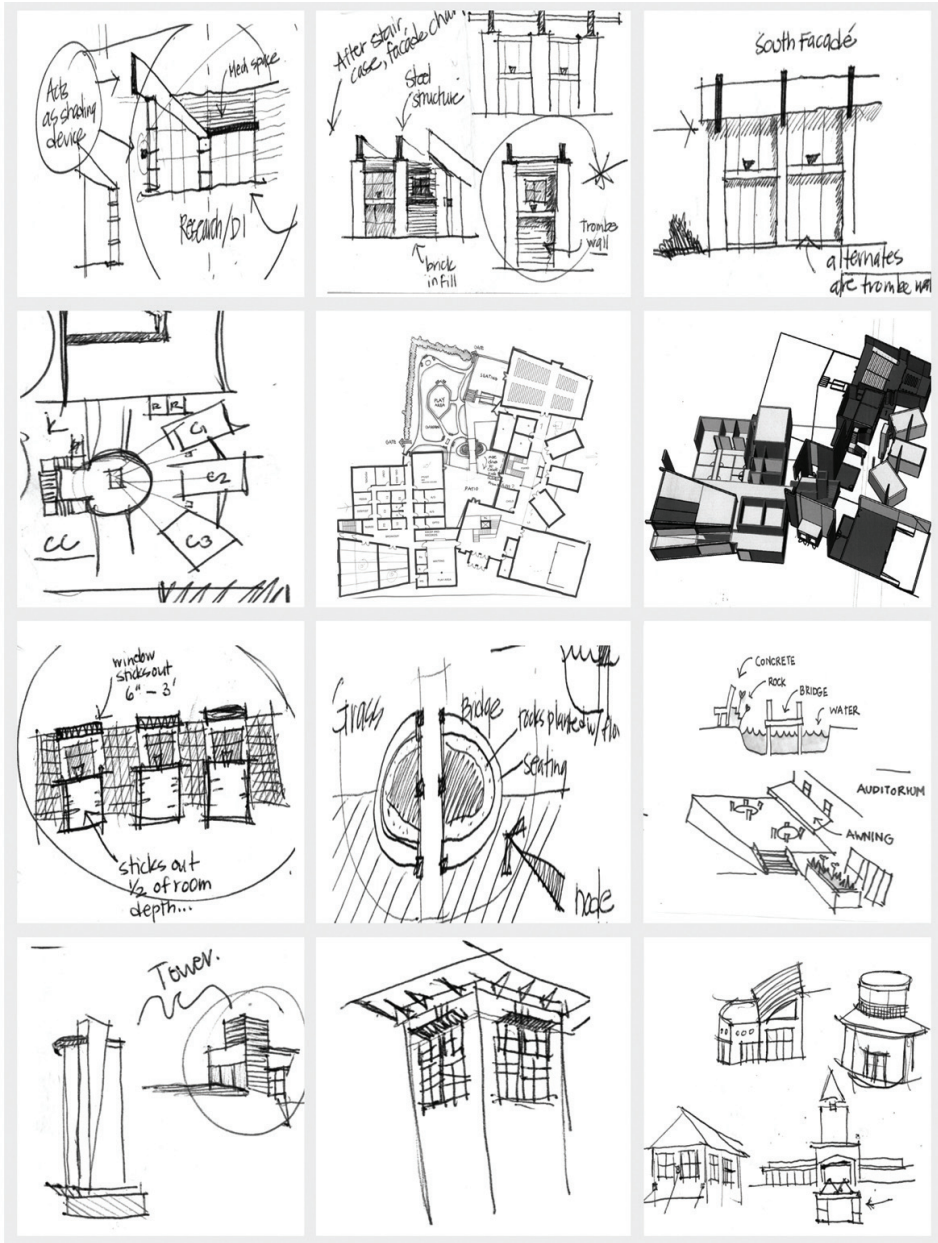
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- Fig. 1 Logos for Organizations; March of Dimes: www.modimes.org/ 2004
PACER: www.pacer.org
- Fig. 2 Map of Minnesota; [www.sitesatlas.com/ Maps/Maps/MN1.htm](http://www.sitesatlas.com/Maps/Maps/MN1.htm) World Sites Atlas
Madrid, Spain
- Fig. 3 Map of Site Context www.centracare.com/maps/art/plaza_area_map.jpg
- Fig. 4 Site Context; www.yahoo.com
- Fig. 5 Granite Quarry of St.Cloud; Campbell Granite Quarry, St. Cloud, 1912. MHS visual
resources, HD6.2 r48
- Fig. 7. People First Support Group; www.peoplefirstofnh.org St. Cloud State Learning Resource
Center; www.schooldesigns.com 2003 Primedia Business Magazines & Media
- Fig. 8 and 9 Previous Coursework by Erin Kelash.
- Fig. 10 Maslow's Hierarchy of Needs; Building For People p.16
- Fig. 11 Fibonacci in 3D From SMITH p.79
- Fig. 12 Task-Specific Lighting; Illustration by Markus Earley: www.bobvila.com
- Fig. 13 Decibel Scale; Building For People p.127
- Fig. 14 Regions of the Brain; MJ Farabee: www.emc.maricopa.edu/faculty/farabee/BIOBK/brain.gif 2001
- Fig. 15 Nerve Structure; www.med.harvard.edu
- Fig. 16: Diagram Showing Handicap Relations to Site Design; Unknown
- Fig. 17 Columbus Entry Lobby; NORMENT p.94.
- Fig. 18 Exterior of Eye Institute; SORKIN p.98-99
- Fig. 19 Exterior Façade; Heart Institute: www.flad.com
- Fig. 20 Rehabilitation and Cardio Space: www.flad.com
- Fig. 21 Patient with Tile Art; www.mayoclinic.org/childrenshospital/ Mayo Foundation for
Medical Education and Research ©2001-2004
- Fig. 22 Counters at Service Area; UNDERHILL p.56
- Fig. 23 Exterior of Library; UNDERHILL p.55
- Fig. 24 Exterior Window; UNDERHILL p.54
- Fig. 25 Waiting Area; www.iestwincities.org/iida/iida-2004/Mind.jpg



- Fig. 26 Playground Space; <http://www.architectureweek.com>
- Fig. 27 Plans of Campus; www.ucdmc.ucdavis.edu/news/images/MIND_art4_hi.jpg
- Fig. 28 CentraCare Campus Plan: www.centracare.com/plaza/plaza_map.html
- Fig. 29 Building and Pond; Photo by Erin Kelash 2004
- Fig. 30 Drop-off Areas; Photo by Erin Kelash 2004
- Fig. 31 Themed Entry; Photo by Erin Kelash 2004
- Fig. 32 Patient Tower; Photo by Erin Kelash 2004
- Fig. 33 New CentraCare Building Offsite; Photo by Erin Kelash 2004
- Fig. 34 Site Analysis Diagram; Drawn by Erin Kelash 2005
- Fig. 35 Diagnostic and Imaging Center North of Site; Photo by Erin Kelash 2004
- Fig. 36 Abbot Northwestern; Photo by Erin Kelash 2004
- Fig. 37 NOAA Wind Roses; ftp address; recorded in 1961.
- Fig. 38 Zoning Map of Sartell www.sartellmn.com/zoning.htm City of Sartell, MN © 2004
- Fig. 39 Zoning Map of St.Cloud; Map prepared by the St.Cloud Planning Office 02/04
<http://ci.stcloud.mn.us/Web/departments/Planning/zoning%20map/zoningmap.htm>
- Fig. 40 Conference Seating Configurations Which Support Social Interaction, Unknown
- Fig. 41 Sample of Assistive Devices and Supplies; Simon Technology Center: www.pacer.org
- Fig. 42 Sample of Signage in Building, Must Have Braille Print; ; www.ssgraphicsco.com
- Fig. 43 Accesible Tables for Conference or Lunchroom Setting; www.ki-inc.com
- Fig. 44 Design Which Integrates Indoors and Outdoors; Prisma Building in Numberg, Germany
www.edcmag.com
- Fig. 45 Sample Furniture, Wheelchair Swing; www.outsidetoyspro.com
- Fig. 46 Diagram of How Ear Works; Building For People p.142
- Fig. 47 Diagram of How Eye Work; Building For People.



Sketching, Sketch-up, and Sketch models were used as decision-making tools during the design process.



My design process began with the typology selection and site decisions. After careful consideration, I chose a site in St. Cloud, Minnesota. To determine the specific site, I first established several site goals. First, I wanted the building to be located near a major traffic artery that would assist in regional access to the site. Furthermore, I sought a site which would not promote urban sprawl or farmland developments, but which would provide a strong connection with nature. Based on an analysis of the site, I determined that the best location for the building in terms of solar access, views, and other important amenities of the site, would be the southwest corner

Next, I developed a concept for the building form and functions, which is explained on my presentation boards. I created several sketch models of the form of the building and began a bubble diagram to organize the interior spaces. The final solution consists of a large entry between the two branches of the building; the exterior void was developed as a therapeutic garden.

As I worked on the plans, I simultaneously developed sections, elevations, HVAC and structural layout. The final step consisted of board layout, model building and verbal presentation. The verbal presentation is summarized on the disk included in the rear of this document.



Resource & Diagnostic Center

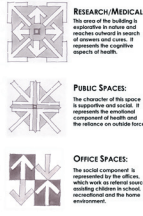
saint cloud minnesota

CONCEPT AND GOALS

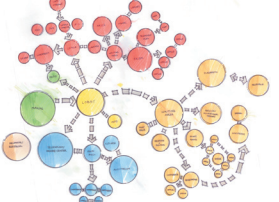
Central Minnesota RESOURCE AND DIAGNOSTIC CENTER for Developmental Disabilities

PROJECT DESCRIPTION:
Medical and office building, which consolidates resources for the developmentally disabled.

PROJECT GOALS:
Provide for physical access to diagnostic, treatment, education and services for the developmentally disabled.
Provide for positive psychological, physical and social well-being, through visual and physical connections with nature.
Establish an environment which is responsive to the needs of the children, their families and the staff occupying the building.
Promote social interaction and encourage network formations while responding to privacy needs.
Provide spaces which support related learning, play and activities.
Organize the building to assist in wayfinding, and utilize natural and sustainable materials and technologies.



PROJECT CONCEPT:
The design represents a vision, beyond the concept of the building. The building consists of three individual parts, which represent the cognitive, social and emotional components of health, which have been designed and located within the building. Coming together to use the site together through one the experience.

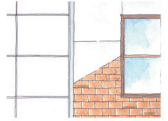


SPATIAL ARRANGEMENTS:
The design program defines the location of spaces, and the necessary connections between each. The arrangement is associated with the research and medical area of the building, while blue represents public spaces, and red design organization to the other functions.



ENTRY PERSPECTIVE:
The entry features a drop-off, covered canopy and glass entry space. Upon approach the visitor is immediately aware of the three distinct areas of the building.

MATERIAL SELECTION:
Material choices were based on local availability, sustainability and appropriateness to the life and function of the building. The exterior palette consists of brick, metal panels, aluminum accents, and a glass curtain wall. The interior features materials such as limestone, cork flooring, low VOC, hypoallergenic, non-polluted fabrics.



GARDEN FEATURES:
FURNITURE: Seating and playground equipment is fully accessible and includes wheel chair swing.
SPACE: Interstitial provides for shading of seating areas, while the building also provides for shaded entry spaces.
RAISED PLANTERS: Raised planters back and planters allow individuals with physical limitations to enjoy the full sensory and tactile experience of the garden.
CONNECTIVE WALKWAY: Curved, low to the ground to reduce the risk of increased walking. Includes three dual-level raised beds or window boxes of various sizes and in cognitive processing and inclusive design to other users.



GARDEN PERSPECTIVE:
In the rear of the building, there is a large patio and garden space, which is intended to support social interaction and provide for the enjoyment of all by users.

project solution

56

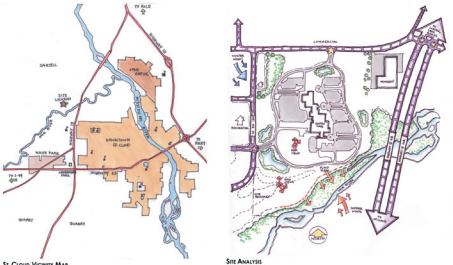
North Dakota State University

LOCATION AND SITE

SANIT CLOUD:
Located in the center northwest of Minnesota, Saint Cloud is home to a thriving medical community. The population is growing rapidly, increasing the need for various local medical and social facilities to serve the needs of residents.

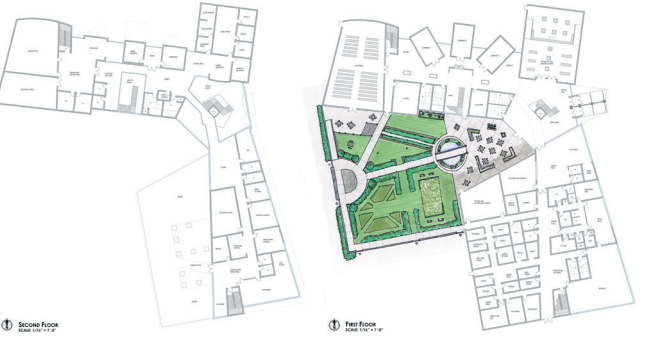
CENTRI-CARE HEALTH PLAZA:
The site for the proposed design sits on a 120-acre medical campus, just north of the Heart of Cloud. Owned by Centri-Care, the prime central business district. The site is currently occupied by various medical and social facilities, including a 100,000-sq-ft medical building, a 100,000-sq-ft medical building, and a 100,000-sq-ft medical building. The design of the campus allows for expansion in the current building as well as the addition of independent structures.

SITE ANALYSIS:
The best surrounding the Centri-Care campus is used for a variety of functions. To the north there are several medical buildings, which include Albert Northwestern Specialty Care Center for Diagnostic Imaging and Treatment, and the Heart of Cloud. To the south, there are several medical and office buildings. In the east of the site is the Heart of Cloud, which is off the primary north-south axis. To the west, there is the Heart of Cloud. The western edge of the site features a small pond and single-family residences.

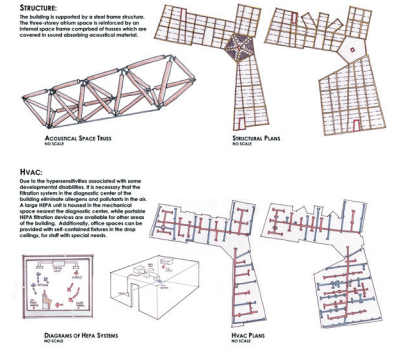
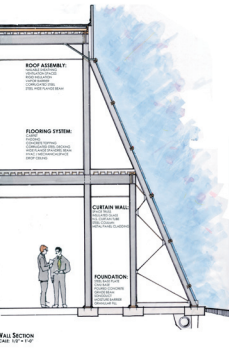


NATURAL FEATURES OF THE SITE INCLUDE THE SAUK RIVER, REDWOOD PRAIRIE GRASSLAND AND WOODLANDS BORDERING THE RIVER.

FLOOR AND GARDEN PLANS



STRUCTURE AND HVAC



Design Strategies for Psychological Health



ACCESS AND LAYOUT



Site Plan
SCALE 1:100

SITE LAYOUT:
The building is placed on the southeast corner of Centerline property, establishing that all access lead independent from the existing facility. The garage cars of the parking access below the common along one of the site's existing existing roads. The placement takes advantage of the best view on the site, while maintaining good access to the south. The building has frontage and is in proximity, on the building height steps down and allows the rear garden access to the sun, while still providing shade on the parking, along the building.

ELEMENTS OF WAITING:

Essential to the design of this facility is ease of way-finding. In accompanying elements, ensure ease of way-finding through the building, visitors are served both here and there.



WAITING:
Main waiting area located with natural light, abundant plants, and low temperature paint. Additionally, way-finding is provided with art and signage to serve to direct cars through one way out of the building.



CORRIDORS:
Corridors are designed to be clear and unobstructed, with clear paths and lighting. Additionally, signs throughout the building are placed to direct the way-finding.



SIGNAGE:
The only way each visitor with a map of the layout of the building. Additionally, signs throughout the building are placed to direct the way-finding.



FORM AND VOLUME:
The building is designed to be a simple, clean, and modern structure. The form and volume are designed to be functional and efficient, with a focus on creating a sense of openness and light.

DIAGNOSTIC CRITERIA

Developmental disabilities are severe and chronic neurological conditions that manifest before the age of 22 resulting in the impairment of:

GENERAL INTELLECTUAL FUNCTIONING

LIMITED ADAPTIVE BEHAVIOR

Communication Skills
Social and Communication Skills
Reading and Writing
Functional Academics
Self-care and Health

DESCRIPTION OF DEVELOPMENTAL DISABILITIES

AUTISM

Autism spectrum disorders (ASDs) are a group of developmental disabilities that are caused by an abnormality in the brain and encompass a broad spectrum of symptoms, socially inappropriate behavior, and communication skills. The symptoms of autism spectrum disorders are characterized by a lack of social interaction and communication skills. The symptoms of autism spectrum disorders are characterized by a lack of social interaction and communication skills. The symptoms of autism spectrum disorders are characterized by a lack of social interaction and communication skills.

CEREBRAL PALSY

Cerebral palsy is a group of chronic conditions affecting body movement and muscle coordination. It is caused by abnormal development or damage to the brain, usually occurring during the prenatal period, during or shortly after birth, or during infancy. Cerebral palsy is characterized by a lack of muscle control and coordination, which can affect the arms, legs, and torso. The symptoms of cerebral palsy are characterized by a lack of muscle control and coordination, which can affect the arms, legs, and torso.

HEARING OR VISION LOSS

Hearing or vision loss can affect a child's ability to learn both to speak and to understand spoken language. It is essential that the child's form with hearing loss or loss of sight that hearing before 2 years of age. People with hearing loss may communicate using speech, sign language, Braille, or a combination of these. Additionally, the child's form with hearing loss or loss of sight that hearing before 2 years of age. People with hearing loss may communicate using speech, sign language, Braille, or a combination of these.

MENTAL RETARDATION

Mental retardation is a condition characterized by a lack of mental ability, which is significantly below the average range for a child of the same age, and by a lack of ability to function in the community. Children with mental retardation are often characterized by a lack of ability to function in the community. Children with mental retardation are often characterized by a lack of ability to function in the community.

ATTENTION DEFICIT DISORDER

Attention deficit disorder (ADD) is a form of the most common childhood behavioral disorder and can persist through adolescence and into adulthood. The cause is currently unknown. ADD is characterized by a lack of attention, hyperactivity, and impulsivity. Children with ADD are often characterized by a lack of attention, hyperactivity, and impulsivity.

DOWN SYNDROME

Down syndrome is a chromosomal abnormality, usually due to an extra copy of the 21st chromosome. It is characterized by a lack of mental ability, which is significantly below the average range for a child of the same age, and by a lack of ability to function in the community. Children with Down syndrome are often characterized by a lack of mental ability, which is significantly below the average range for a child of the same age.

MAJOR PROJECT ELEMENTS:

- Organizational Offices
- Diagnostic and Medical Center
- Research Facility
- Medical Offices
- Technology and Multimedia Center
- Library
- Conference and Workshop Spaces
- Child Care Areas
- Lounges, Waiting, Reception
- Accessible Restrooms
- Circulation Space
- Maintenance and Storage
- Mechanical and Server Space

USER / CLIENT DESCRIPTION:

The building would be located in Centerline, Oregon. The building would be used by a wide range of users, including children, adults, and the general public. The building would be used by a wide range of users, including children, adults, and the general public.

ORGANIZATIONAL OFFICES:

The following is a brief description of the services provided to the developmentally disabled by various offices located in the building:

FACER

FACER (Family and Community Education Resource) provides services and support to parents, families, and the community. The organization provides services and support to parents, families, and the community.

MNARC

MNARC (Mental Health and Neurological Assessment and Research Center) provides services and support to children and adults. The organization provides services and support to children and adults.

ARISE

ARISE (Autism Research and Intervention Services) provides services and support to children and adults. The organization provides services and support to children and adults.

IEIC

IEIC (Inclusive Education and Intervention Center) provides services and support to children and adults. The organization provides services and support to children and adults.

MARCH OF DIMES

MARCH OF DIMES (March of Dimes Foundation) provides services and support to children and adults. The organization provides services and support to children and adults.

CATHOLIC CHARITIES CENTER

CATHOLIC CHARITIES CENTER (Catholic Charities) provides services and support to children and adults. The organization provides services and support to children and adults.

SPECIAL NEEDS NETWORK

SPECIAL NEEDS NETWORK (Special Needs Network) provides services and support to children and adults. The organization provides services and support to children and adults.

DISABILITY LAW

DISABILITY LAW (Disability Law) provides services and support to children and adults. The organization provides services and support to children and adults.

COUNTY SOCIAL WORKERS

COUNTY SOCIAL WORKERS (County Social Workers) provides services and support to children and adults. The organization provides services and support to children and adults.

INTERIOR CHARACTER



PUBLIC SPACES:
Creating public space on the building's ground floor, providing a warm, inviting atmosphere. Additionally, the public spaces serve to provide a warm, inviting atmosphere. Additionally, the public spaces serve to provide a warm, inviting atmosphere.



CHILD SPACES:
The main area designed to be a child's space in the medical waiting area. It features a table and chairs, and a table with chairs. The main area designed to be a child's space in the medical waiting area.



AUTISM:
The autism room is connected to the main area by the building, and provides a warm, inviting atmosphere. Additionally, the autism room is connected to the main area by the building.



WORKSTATIONS:
The workstation area is designed to be a functional and efficient workspace. The workstation area is designed to be a functional and efficient workspace.

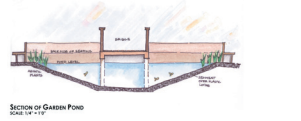
PASSIVE DESIGN IMPLEMENTATION



SUSTAINABILITY GOALS:
The building is designed to be a sustainable and efficient structure. The building is designed to be a sustainable and efficient structure.



IMPLEMENTATION OF GOALS:
The building is designed to be a sustainable and efficient structure. The building is designed to be a sustainable and efficient structure.



SECTION OF GARDEN POND:
The garden pond is designed to be a functional and efficient water treatment system. The garden pond is designed to be a functional and efficient water treatment system.



DIAGRAM OF BIOLOGICAL GREY WATER TREATMENT AT SITE:
The diagram shows the biological grey water treatment process at the site. The diagram shows the biological grey water treatment process at the site.

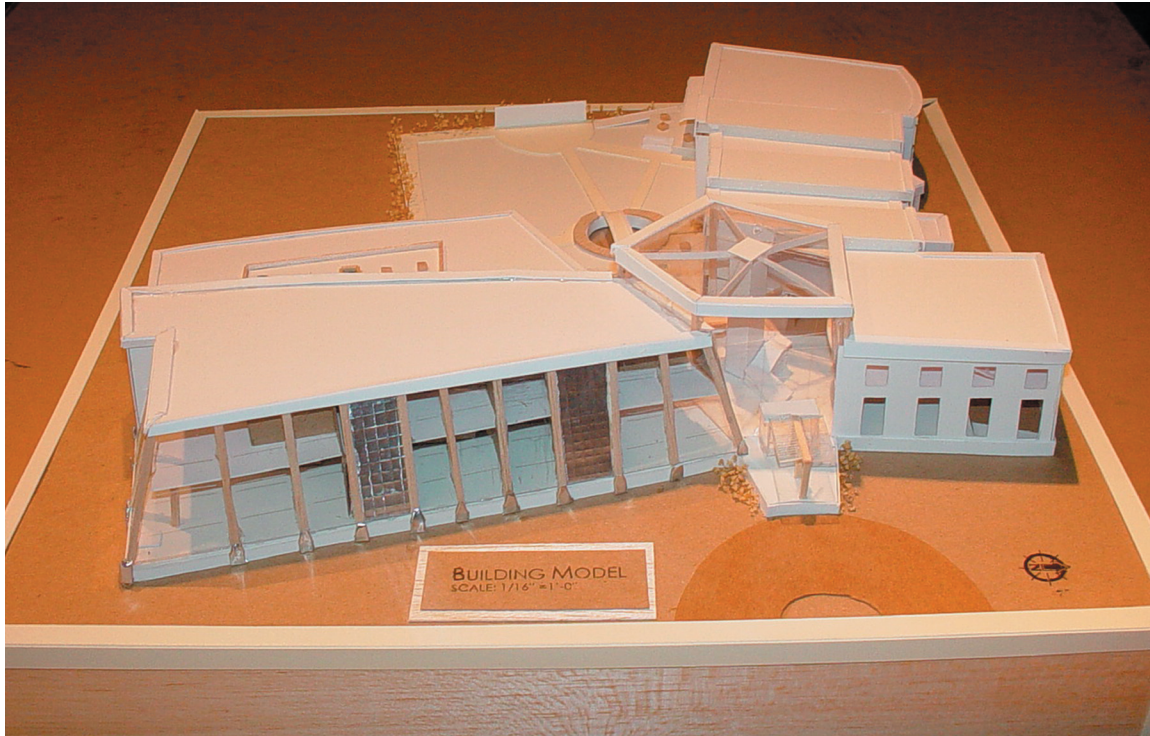


BUILDING SECTION
SCALE 1/4" = 1'-0"

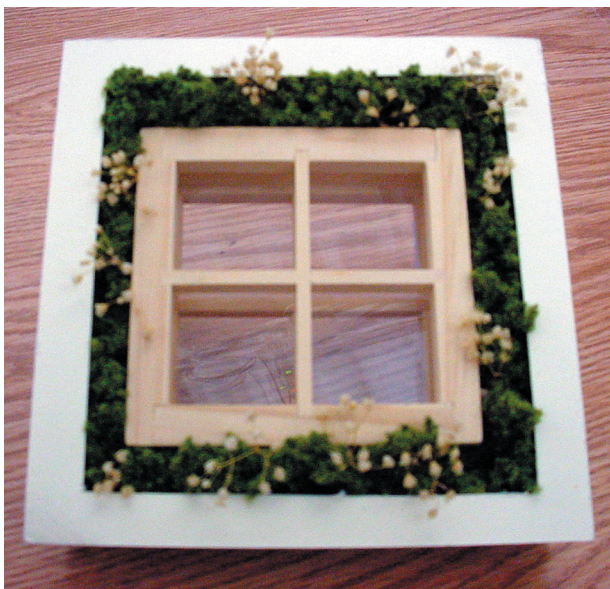
DEVELOPMENTAL DISABILITIES

Project solution

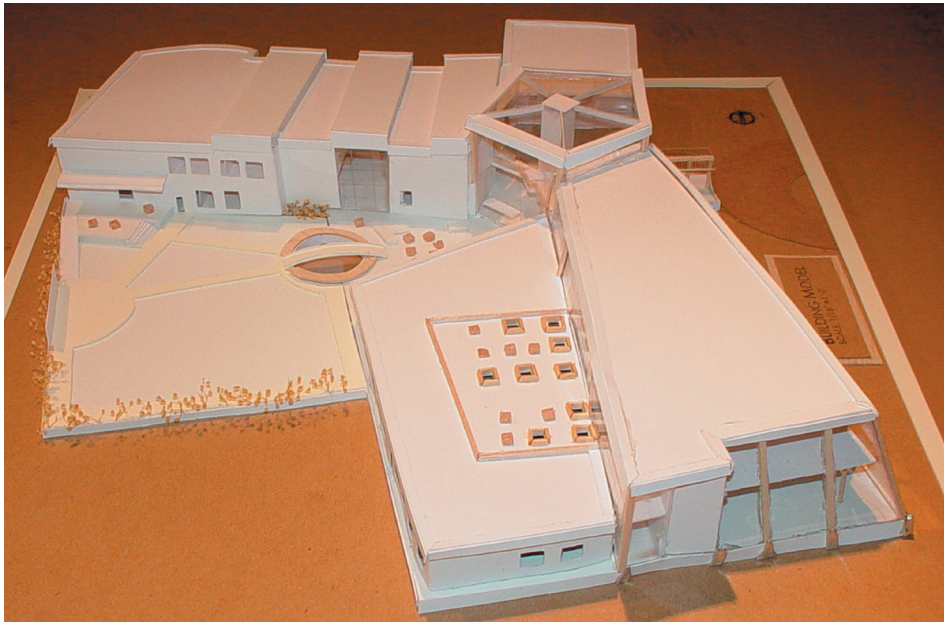
PROGRAMMATIC ELEMENTS



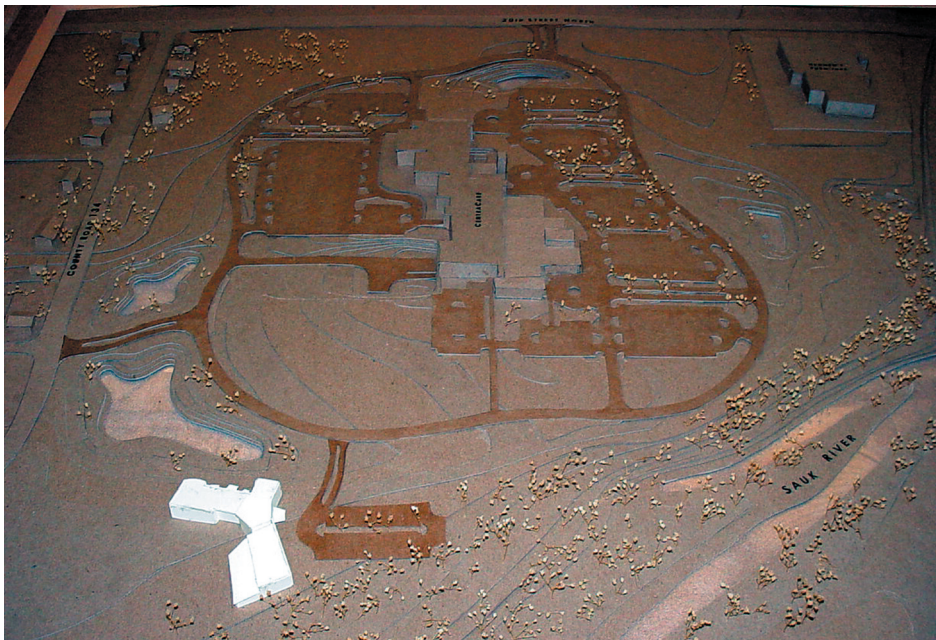
BUILDING MODEL



SKYLIGHT DETAIL



BUILDING MODEL



SITE MODEL

project solution



ERIN KELASH

HOMETOWN:

QUOTE:
“THE BEST TWO
PLACES AT NDSU
ARE EHLY HALL
AND THE WEST
DINING CENTER!”



digital presentation



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