ARCHITECTURAL
THESIS

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BALL STATE UNIVERSITY
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NORTH CENTRAL INDIANA
VOCATIONAL & SPECIAL EDUCATION
LEARNING CO-OPERATIVE
PLYMOUTH, INDIANA

STUDIO CRITICS:
PROF. R. FISHER
PROF. R. KOESTER

NORTH CENTRAL INDIANA
VOCATIONAL & SPECIAL EDUCATION
LEARNING CO-OPERATIVE
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FOREWORD

As an introduction to this project it would do well to examine and discuss some of the decisions and thoughts that preceded and ultimately influenced me in my decision as to what I would choose as my area of thesis study.

As a starting point I think it is important as well as very helpful for a designer to have had some type of relationship, the more personal the better, or experience with the type of project he is to be involved with. This relationship not only gives him insight into the project design but also how the users will experience it.

Proceeding from there it seemed a natural step for me to consider an educational facility. As with most people my age, I have spent at least two-thirds of every year of the last seventeen years of my life in a school of one type or another.

Spending this much time in an environment presents one with a great opportunity to experience its good aspects as well as its inadequacies much like the knowledge one gains by living in a culture other than his own even if only for a short period of time.

So armed with this bulk of first-hand information and experience I felt I could put it to good use in designing an educational facility, keeping in mind
as much as possible my personal experiences as well as input from fellow students and faculty gained over the years I set out to design a vocational/special education facility that would be sympathetic to these needs.
ACKNOWLEDGEMENT

In the process of assembling and documenting a project such as this it goes without saying that I was assisted directly as well as indirectly by a great number of people. Naturally I was given a great deal of assistance, motivation and guidance by studio critic, Professor Robert Fisher but in addition to his criticisms and praises I feel that just as importantly many thanks must go out to my classmates and friends who also provided the necessary motivation and input to do a good job, especially David Stoops and James Morog. And finally, my family whose confidence in me and what I was doing was a source of motivation and self-confidence.
The subject of this thesis study is the North Central Indiana Vocational and Special Education Learning Co-operative. The student population is composed of students from ten different school districts located in four northern Indiana counties (Fulton, Marshall, St. Joseph, Starke), each of which lack the students and financing to support on their own all of the programs that are contained in this project. Consequently those ten districts would combine students and financing to make the project feasible.

As the name implies, the two major program areas of this facility are oriented toward the student inclined toward a career in a trade such as automotive, metals, HVAC repair, medical/dental, plus business and office trades. The other half of the program is directed toward those students with learning disabilities as well as physical handicaps. This portion of the program would be along traditional education guidelines but geared to those students particular academic level.

In addition to the physical facilities to support these programs the project includes support areas such as a media center, cafeteria, lobby, administration area and outdoor work and play areas.

The site chosen was selected due to its proximity to the town of Plymouth which is where the majority of the students would be coming from. Also considered was the

North Central Indiana Vocational & Special Education Learning Co-operative
fairly central location of the site in relation to the remaining nine districts.
CONCEPTUAL THEME

In any design problem, from a house right on up to a major commercial or industrial complex, the conceptual theme of the project is a very important and essential basis for many design decisions that can range from what type of structural system is to be used as well as what interior finishes will be. It is for this reason that I will deal with the conceptual themes of this project in some detail.

At the outset I was somewhat at a loss as to a conceptual basis for this project. This was due in part to the site that was ultimately chosen for the project. As it turned out, the site was in a very rural setting with no other buildings of any sort around it. Due to this fact, early on I realized that to be successful in such a stark setting the building must develop and present a strong definite character of its own.

With this in mind, I looked for something that could provide a basis for this character and ironically I found it in the site which I had previously considered a design liability.

As it turned out, the site had a very strong focus to its southwest corner where a very spacious area of large deciduous trees was located.

This "natural" area (the trees) concept...
coupled with the "man-made concept" (the students coming from the ten cities) I felt provided a strong conceptual basis for my design upon which I could build the project.

Taking this "man-made" vs. natural concept I expanded it to encompass many aspects of the design, each of which I will discuss briefly.

The next conceptual step was to develop an image for the actual building envelope in plan as well as three-dimensional form.

I felt as though this facility, with its conglomeration of students from many different areas all coming together in one place to work and learn represented a small community. Much like a small town or village.

In terms of spatial organization I felt this "community image" could be achieved in a number of ways. The image I finally settled on was one where the shared spaces such as the lobby, cafeteria, media center, etc. become the town square where everyone gathers.

I also felt that this grouping of community space at the center of the plan should embody formwise, the conceptual essence of the project. Consequently it evolved into the very geometric, hard-line form of the media-center and very
natural, organic free form of the lobby/administration area and main entrance ramp. It was also important to have evidence of both ideas (man-made/natural) in this main grouping. It is for this reason the organic form seeps out from underneath the man-made solidness of the geometric forms thereby giving equal exposure to each as well as hinting at what happens on the other side of the wall of the front facade.

Expanding these concepts further, the south facade of the building became very transparent, thus allowing the "natural" to be experienced. The circulation radiates out from the central core much like the streets radiate from the square in a small town. At certain points along these "streets" additional conceptual community or "park spaces" occur, which in reality are lounge areas, vertical circulation ramps, rest rooms and stairways. These "park spaces" also serve as "knuckles" connecting the "residential" (classroom) spaces with the shared spaces. They become volumes of space visually separate by the use of reveals.

At the terminus of the circulation paths the specialized activities occur. These include the trade spaces and therapy rooms. In concept these spaces become the very specialized, industrial type activities one would find on the edge of town. They serve as a notice that you have reached the town limits.
As mentioned before, it was important to carry these conceptual ideas to a three-dimensional form as well. This is evident in the organic lines of the south facade and the solid man-made form of the north facade.

The idea of having the natural side "seep" through the front wall is carried through also by the use of light wells which protrude through the north facade, again giving a hint as to what is happening on the other side.

Structural decisions as well as material choices were also made with the original concept in mind. A system of bearing walls (solid, man-made, heavy) on the north side of the circulation path gives way to a system of columns and beams (light, transparent) on the south side.

I chose brick as the main construction material because I felt it also embodied my concept of man-made solidarity and naturalness. The hardness and solidarity of brick is shown in its shape and weight and the naturalness in the materials that are used to manufacture it.

In an overall view I feel that the strong concept of this project contributed greatly to the design and the cohesive- ness of the final product two dimensionally as well as three dimensionally.
Missing Page 10
CONCEPTUAL DESIGN

The following sketches and drawings document some of the major areas of study that were dealt with in the schematic design phase of this problem which provided the link between the conceptual theme and the hard-line design.

The areas that I devoted particular attention were those concepts of natural/man-made, opaque/transparent, solid/open, organic and hard line. Since these were the basis of my conceptual theme, I felt it was important to develop strong images representative of these relationships.
NORTH CENTRAL INDIANA
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DESIGN DEVELOPMENT

The following drawings and sketches represent and document the steps of the design development process in which I attempted to translate the images developed in the conceptual design phase. Out of this came definite plans and building forms which were ultimately altered and refined into the final design product.
LEVEL ONE PLAN

NORTH CENTRAL INDIANA VOCATIONAL & SPECIAL EDUCATION LEARNING CO-OPERATIVE
MODEL PHOTOGRAPHS

NORTH CENTRAL INDIANA Vocational & Special Education Learning Co-operative
CONCLUSION

In reviewing a project that has spanned a years time, many different images come to mind. The different concepts, ideas, drawings, the things that seemed to work well from the very beginning as well as those that never quite seemed to come out the way they fit with everything else.

In addition to work I completed on this project, I feel that if I were to further the design to the next level of detail, I would concentrate on developing the outdoor spaces within the central green-space created by the building form. Often times these spaces are neglected and the opportunities for creating an environment to compliment the activities and spaces contained within the building.

It goes without saying that a project of this size and duration offers many learning opportunities. I feel that I have taken advantage of many of these opportunities and have become a better designer which is good, but I think more importantly, this project not only taught me about designing an educational facility and all its related disciplines, but I learned how to think more as a designer much more so than I ever had in the past.

This thinking process is most important and the part of the design process which will prove to be the most valuable to me in all my future work.

NORTH CENTRAL INDIANA
VOCATIONAL & SPECIAL EDUCATION
LEARNING CO-OPERATIVE
1. PROGRAM
PROGRAM

NORTH CENTRAL INDIANA VOCATIONAL AND SPECIAL EDUCATION LEARNING COOPERATIVE

Prepared for: Joint Educational Services in Special Education
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Plymouth, IN

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Mr. T. Dulle
Dir: Joint Educational Services in Special Ed.
Plymouth, IN
PROGRAM

Fifteen years ago the Congress of the United States passed the Vocational Education Act of 1963. This piece of legislation focused on the predicament of out of school and out of work youths. It was designed to update and expand similar programs out of the past that were beginning to become increasingly inadequate due to the rapid technological advances taking place at that time. Obviously since this trend of technological advancement has continued since then, it comes as no surprise that the North Central Indiana Area has experienced this same trend. As it stands now the State of Indiana has a number of vocational education facilities. The problem common to all of these facilities particularly in the Indianapolis area is that they are limited not only in the educational programs they offer but in the actual physical facilities themselves. I feel that it is possible for a facility that not only encompasses the programs of the existing centers but also expands them, to be supported by the North Central Indiana Community.

In 1969 a feasibility study was conducted and submitted to the State Board of Vocational and
technical Education. The study describes the needs of vocational education in an area including Fulton, Marshall, St. Joseph, and Starke Counties. On completion of the study further implementation of programs was not completed. In 1971, a follow-up report on District II was conducted by the regional state vocational consultant by Stephen C. Rusnak, a vocational education consultant. It involved 10 school districts in the North Central Indiana area. Listed below are a few statements that summarize the findings of the project.

1. The need for comprehensive vocational-education programs can best be served by an area concept program. (A facility shared by all 10 districts.)

2. There are not sufficient numbers of students in some of the smaller school corporations to support much needed, in-house vocational programs.

3. An analysis of the vocational education programs in this four-county area indicates that there are basically programs in Home Economics Education and Agribusiness.

In addition to the vocational education programs, a special education co-operate is now operating in the Marshall-Starke County Area. The school superintendents represented...
in Region II Vocational programs are the same superintendents working cooperatively with the special education programs in each respective school corporation. This joint effort in special education has broken the ice in demonstrating the possibilities of school corporations working together for the benefit of a more efficient and quality educational program.

In conclusion, the majority of the information obtained from the aforementioned studies and interviews with the respective superintendents seem to indicate the formation of a co-operative vocational/special educational learning facility that would serve the 10 school districts involved. It would provide the necessary vocational and special education facilities and learning programs that are needed by the 10 school districts as well as freeing the space in the schools for expansion of existing programs in other areas. Programs will be offered in Home Economics, Automotive Trades, Welding, Health Occupations, General Office Laboratory and possibly data processing. Also included will be facilities to meet the needs of the special education students in North Central Indiana Vocational & Special Education Learning Co-operative.
PROGRAM
the 10-district area.
II. Similar Projects and Critical Issues

1. Kenosha Technical Institute
Kenosha, WI

   a. Offers programs of liberal arts &
      vocational courses.
   b. Original Size: 190,000 sf
   c. Site Size: 50 acres
   d. Enrollment: 2500

   e. Theme: An inward looking,
      television linked break with the
      concept of clustered teacher
      oriented classrooms adjoinning
      their own shops and laboratories.

2. Martingrove Collegiate Institute
Ontario, Canada

   a. Offers industrial physics, indus-
      trial biology, electronics, electri-
      city, machine shop, auto shop,
      architectural drafting.
   b. Size: 131,500 sf
   c. Enrollment: 1700
   d. Theme: To centralize all general,
      commonly used facilities at the
      core of the school and allow
      specialized facilities to radiate
      from them.

3. Portland Community College, Portland,
Oregon

   a. Offers liberal arts, vocational
      and technical courses, community
      and continuing education.
   b. Size: 216,000 sf
   c. Enrollment: 4000
   d. Theme: An educational shopping
center in which open corridors and promenades surround observable learning spaces.

4. Quincy Vocational Technical School, Quincy, Mass.
   a. Offers power mechanics, metals and machines, home economics, health occupations, graphic and commercial arts, general woodworking, plumbing, foods preparation, electronics, and business education.
   b. Size: 200,000 sf
   c. Enrollment: 1,100
   d. Theme: A flexible contemporary structure linked to and integrated with an existing academic high school.

5. Southern Nevada Vocational-Training Center, Las Vegas, Nevada.
   a. Offers air frame and power plant, auto mechanics, auto body repair, carpentry, culinary arts, electronics, home economics, data processing, secretarial science, bookkeeping, graphic arts, and refrigeration.
   b. Size: 151,000 sf
   c. Enrollment: 12-1600
   d. Theme: A modular structure that provides aesthetic satisfaction as well as functional opportunities for change.

A. Critical Issues of the Building Type

1. To develop a logical relationship
between classroom instruction areas and shop or laboratory space.

2. An overall plan that emphasizes the comprehensive nature of the school and encourages a mixture of students in widely diverse programs.

3. Attention to aesthetic considerations in an effort to create an environment that dignifies occupational education.

4. The design should anticipate frequent physical changes as new career opportunities evolve and educational approaches shift.

B. Trends in the Field

1. The federal government has started to back a program of comprehensive education.

2. A heavy emphasis has taken place on electronic media for teaching.

3. Many facilities are moving toward active programs in adult education.

4. Funding agencies will continue to seek alternatives to reduce the large capital outlays that vocational schools require.

5. Private enterprise will become involved in education for profit.

6. Vocational curriculum has began to
place increased emphasis on preparation of new types of careers.

7. Enrollment in trades and industry will be expected to level off while health sciences and service industry are gaining in enrollments.

III. General Building Criteria

A. Function

1. The function of this type of facility is to provide a building envelope that fulfills the following general requirements:
   a. Conserves energy
   b. Provides a pleasing addition to the existing environment
   c. Provides a flexible combination of spaces around a central supportive core.
   d. Provides interior spaces that are conducive to the type of activity within them.
   e. Provides barrier free facilities throughout the entire complex.

B. Flexibility of the Building:

   a. As with any educational facility, thought must be given to expansion of the physical facilities to keep up with the expansion of the educational programs and the respective trades that are dealt within the curriculum.
   b. Locate areas that are likely
PROGRAM

to need additional area close to open areas.

c. Areas likely to expand should be made of non-load-bearing partitions.

d. Locate areas likely to expand adjacent to utility hookups.

C. Interior Flexibility

a. As far as interior flexibility is concerned, as mentioned earlier some of the laboratory spaces may double for some activities but due to the specialized of some spaces and the heavy machinery they require, it would be impractical to make them flexible.

D. Building Cores

1. As far as building cores are concerned, the core of the building will be comprised of those spaces that are "community" type spaces and activities such as the administration area, the library, bookstore and cafeteria.

2. An outer core may be comprised of an area combining the loading and delivery needs of the heavier trades, such as metal working, graphic arts, automotive trades, etc.

E. Storage Rooms

1. Should not extend into shop area.

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PROGRAM

2. Storage spaces for large and bulky materials need an outside door.

3. Provide movable shelving.

F. Heating and Ventilation

1. Power exhaust systems for dusty, gaseous, or odorous lab areas.

G. Walls

1. Partitions between some shops should be removable to convert two shops into one larger one if necessary.

2. Partitions in areas with high noise levels should be of acoustical minimizing material.

H. Flooring

1. All flooring should be of aesthetically material, easy to clean, needing minimal upkeep and repair and slip resistant where needed.

2. Floor areas in greasy, oily or flammable areas or where heavy machinery is located should be concrete.

3. Floors that will be washed down must be sloped for drainage.

I. Lighting

1. Where possible, natural lighting should be utilized.

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2. General lighting can be supplemented by work lights at each machine or work station.

J. Safety Considerations

1. Floors around power machines to be coated with non-slip surface.

2. Definite circulation paths should be established between all areas and common points.

3. Full visibility by the instructor is necessary at all times.

4. For fire prevention employ step-up, step down structures between corridors and shops where gasoline and other flammables will be used.

IV. User and User Activities Vocational Spaces

A. User Organization (General)

1. Reaction learning: (teacher oriented)
   a. Central focus on instruction
   b. Student activities: listening, observing, writing
   c. Group size: varies, size makes little difference
   d. Time span: relatively short due to student passiveness

2. Interaction learning: (Teacher-Student interaction)
   a. Learning occurs at the individual level
   b. Group Size: relatively small to
PROGRAM

c. Time Span: requires more time than reaction learning.

3. Action Learning: (student learns by doing)
   a. Students and teacher both participate
   b. Group Size: Optimum size 8-15
   c. Time Span: Requires longest time

B. User Activities Reaction Learning Areas

   a. Instructor
      1. Class lecture
      2. Writing on Board
      3. Film projection

   b. Students
      1. Note taking
      2. Desk Work
      3. Mostly visual activities

C. User Activities Interaction Spaces

   a. Instructor-Students
      1. Class Lecture
      2. Small Demonstration
      3. Mostly Group discussion

D. User Activities Reaction Spaces

   a. Instructor-Students
      1. Individual work
      2. Large demonstration
      3. Group lecture
E. Activities for Major Non-Trade Spaces

1. Bookstore
   a. storage
   b. Checkout procedures
   c. office activities
   d. sale of materials
   e. delivery of merchandise
   f. book resale
   g. student storage

2. Cafeteria
   a. eating
   b. food preparation
   c. food serving
   d. tray return
   e. dishwashing
   f. delivery
   g. storage
   h. trash removal

3. Library
   a. material checkout
   b. reading
   c. writing
   d. office work area
   e. lounge activity
   f. conferences
   g. demonstrations
   h. storage
   i. inventory control

4. Administration Areas
   a. secretarial work
   b. conferences
   c. storage
   d. lounge activities
   e. filing
   f. interoffice communication

NORTH CENTRAL INDIANA
VOCATIONAL & SPECIAL EDUCATION LEARNING CO-OPERATIVE
V. Space Requirements Vocational Areas

A. Space Classifications for General Space Requirements

1. Learning Spaces
   a. Lecture/Demonstration
   b. Seminar
   c. Laboratory
   d. Multi-use

2. Auxiliary/Support Spaces
   a. Auditorium
   b. Informal Student Areas
   c. Learning Materials Center
   d. Bookstore
   e. Cafeteria
   f. Storage & Offices

3. Service Spaces
   a. General Public Use
   b. Building Services (HVAC)
   c. Utility Spaces
   d. Food Preparation Area
   e. Waste Removal

B. Approximate Areas Required Vocational Spaces

- Automotive Trades: 4500-5000 sq.ft
- Business & Office Trades: 1500-2000
- Electrical Trades: 2500-3000
- Graphic Arts Trades: 3000-4000
- H.V.A.C. Trades: 3000-3500
- Medical Trades: 1500-2000
- Dental Trades: 1500-2000
- Metal Trades: 3500-4000
- Home Economics: 1500-2000
- Library Center: 2000-2500

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C. Approximate Areas Required Special Education Services

1. Physical therapy - 3000 s.f.
2. Occupation therapy - 3000 s.f.
3. Speech & hearing - 432 s.f.
4. Audiology room - 320 s.f.
5. Activity room - 3000 s.f.
6. Home arts training - 800 s.f.
7. Cafeteria - 800 s.f.
8. 10 classrooms - 4500 s.f.
9. 10 offices - 1000 s.f.

Approx. - 17,000 s.f.

D. Contingency Space Requirements

1. Net Floor Area: 61,000 s.f.
2. Walls: 1830 s.f.

E. Total Space Requirements

1. 76,250 s.f.

VI. Financial

A. Building Cost

1. Net Area + Efficiency = Gross Area
   a. 52,500 + .60 = 87,500
2. Gross Area x Unit Cost = Building Cost

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a. \( 87,500 \times 35.00 \text{ ft}^2 = 3,062,500 \)

B. Fixed Equipment Cost

Note: Since this facility is between heavy industrial (30%) and Secondary school (12%) a figure of 20% will be used.

1. 20% building cost = fixed equipment cost
   \( 3,062,500 \times .20 = 612,500 \)

C. Site Development

1. Site development = 20% of building cost
   \( 3,062,500 \times .20 = 612,500 \)

D. Total Construction Cost

1. Total cost = A + B + C
   \( = 3,062,500 + 612,500 + 612,500 \)
   \( = 4,287,500 \)

E. Movable Equipment Cost

1. Movable equipment cost = 20% of building cost = \( 3,062,500 \times .20 \)
   \( = 612,500 \)

F. Professional Fees

Professional Fees = 15% of Total Construction Cost = \( 4,287,500 \times .15 \)
   \( = 643,125 \)

G. Contingency Cost
Program

Contingency Cost = 15% of Total
Construction Cost = \$4,287,500 \times 15
= \$643,125

H. Administrative Cost = 2% of Total
Construction Cost
= \$4,287,500 \times 0.02 = \$85,700

I. Total Cost = \[
\begin{align*}
4,287,500 \\
612,500 \\
643,125 \\
643,125 \\
85,700
\end{align*}
\]
Total: \$10,559,450
V. Space relationships

Diagram:
- Main Structure
- Short Term Parking
- Long Term Parking
- Site Circulation
- Delivery Areas
- Outdoor Work Areas
- Green Spaces
PROGRAM

V. Space relationships

- Classroom
- Faculty Storage
- Equipment Storage
- Lab Area
- External Access
- Library Storage

NORTH CENTRAL INDIANA
VOCATIONAL & SPECIAL EDUCATION
LEARNING CO-OPERATIVE
V. Space relationships
2. SITE ANALYSIS
SITE ANALYSIS

- SITE LOCATION:
  PLYMOUTH, IN

NORTH CENTRAL INDIANA
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# SITE ANALYSIS

I. Site Selection: Before examining the actual site for this project it is necessary to look at some relevant facts that were used as criteria for selecting the site. Since this school will be in use by 10 school districts it was important to take into account school populations, traveling time from school to school and highway routes to possible sites. Surprisingly enough the data shows, with a few exceptions, that the number of vocational and special education students are fairly evenly distributed throughout the user area. Since the Plymouth area is fairly centrally located within the user area, and is accessible by many major highways, it was decided to locate the site close to the Plymouth area.

### SCHOOL POPULATION

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- Eleventh Graders
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NORTH CENTRAL INDIANA
VOCATIONAL & SPECIAL EDUCATION LEARNING CO-OPERATIVE
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**Special Education Students**

| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 |

**Site Analysis**

North Central Indiana Vocational & Special Education Learning Co-Operative
II. Site Location: The site finally selected for this project is located at the intersection of state highways 17 and 8 in Marshall County Indiana. Plymouth, Indiana lies approximately 5 miles to the northwest of the site and is closest major populated area in the vicinity.

IIA. Site Size: Total site area: 28 acres
Shape: Rectangular

III. Site Environment: The environment of the site typical of this area of the state. Since it is located in a rural area the general atmosphere is very quiet and subdued. The social environment is much the same since most of the residents of the area are farmers. The combination of these two factors make the site emotionally a very relaxed type of atmosphere which in turn makes it very conducive to learning type activities.
VI. A soil analysis of this particular site also presents some interesting situations. The soils are composed of three main associations: Plainfield Riddles, and Gilford. All three are very deep (over 36") and well drained because all three are very sandy. The advantage of this is that runoff and erosion will not be any problem but these soils are very hard to stabilize as far as construction is concerned. Another advantage is that they will provide a good area for a septic disposal system which is a definite necessity since the site is located so far away from any city sewage facilities.
III. View Analysis: At first glance it doesn't look as though the area surrounding site has much to offer as far as views are concerned. Granted there aren't any exciting cityscapes or the like but this area has its own unique character. As mentioned earlier, quite a bit of the site is bordered by tall dense trees so that really blocks any views either way. Also, the large hill by the highway blocks a lot of the views. There is a vision corridor between the hill and the line of trees to the west. In light of this information the site may be exciting in that a person may enter a completely different environment as soon as he enters the site that is not readily apparent when approaching the site.
V. Vegetation Analysis: As can be expected by being situated in a rural/farming area this site is bordered almost all the way around the perimeter by many well developed deciduous trees. The majority of the trees are either maple, birch, or elm. Approximately 80% of these trees are 40 to 60 feet in height with a 20-30 foot spread. They are all very close together consequently a very thick, dense forest type condition is formed. At the base of the trees and along the highway is a heavy underbrush growth approximately 1-3 feet high. This shrubbery and sparse ground cover is also found on the rest of the site but is not as thick as in these areas.
SITE ANALYSIS

III. Climatic Conditions: As if to balance the heavy winters this particular site enjoys a fairly good amount of sunshine with the high point occurring in August when it is sunny 70% of the time. This coupled with an average wind speed ranging from 8 m.p.h. to 12 m.p.h. annually make the site a very pleasant place to be in from spring to fall.

III. Climatic Summary: In light of all of the previously mentioned data, one can see that the site experiences a variety of climatic moods which on the whole are fairly pleasant. Consequently no particular climatic item stands out as needing special design consideration except maybe the fact that if the severe winter pattern continues more careful consideration may be given to energy conservation.
III. Climatic Conditions: As mentioned earlier, this area has been experiencing a trend of more severe winters lately. This does not show up in the current available data which shows a peak of almost 5 inches of rain in July. This mark has stayed fairly consistent over the past 10 years. As shown in the graphs the mean snowfall peak of 6.5 inches occurs in January, February, and December. This amount of snowfall is not too significant in itself but in a rural context it may present transportation problems if there is a heavy snowfall.
III. Climatic Conditions: Being located in the midwest area of the United States, this particular site has fairly consistent climatic patterns without any obvious extremes. The mean temperature for the area ranges from $75^\circ$ in July to a low of $25^\circ$ in January. It may be well to mention that the mean low seems to be on a downhill pattern in light of recent winters. As far as heating degree days are concerned, this location also enjoys a fairly consistent pattern with the peak of 1150 occurring in January and the low in July of 0.
SITE ANALYSIS

VII. Utility Analysis: As mentioned in the soil analysis, this site is lacking as far as sewage and water facilities are concerned due to its rural location. Outside of these two everything else is fairly accessible. Nipsco's 3 phase power lines run from a substation at the intersection north and south on 17 then west on 8. REMC also has 3 phase power running both ways on 8. When the power is taken off the Nipsco pole lines the load center must be within 750 ft. of the line or they will not be able to provide any service at all. Gas service is also provided by Nipsco by means of a 4" line running north and south on 17.
SITE ANALYSIS

Site Conclusions: In coming to any conclusions about this site, it is important not only to look at each individual aspect but all the aspects in one context. On the surface this site presents some unique situations that if handled properly could be manipulated to produce a very pleasing and exciting as well as functional environment. The rural setting of the site has its own unique implications. This type of environment lends itself to a quiet, low-key type atmosphere, a blending of the man-made and natural landscapes. This feeling is accentuated by the soft rolling contours of the site and the abundance of shade trees.

The contours of the site seem to point to a definite circulation path with the built environment following the somewhat semi-circular shape toward the rear that has the possibility of becoming a community/shared outdoor space.

Another issue that becomes a challenge is that since the site is bordered by trees and hilly areas it tends to get a feeling of isolation as if bordered by walls. If some of the same landscape features can be drawn to the
SITE ANALYSIS

interior of the site it won't be as evident.

All these factors should not only be considered in an aesthetic context but a functional one as well because one of the most important issues to resolve in a learning environment is the way the spaces contribute to the learning process.

Community Outdoor spaces have great potential here because of the varied landscape features and the nature oriented context. Since the site is fairly removed from any influential built environment it will be important to create a structure and a site environment that has its own character.

As mentioned earlier, the climatic conditions of the site do not really present any major implications although careful planning must be done to assure ease of circulation and access in severe winter weather.

Even though the site is large, its size is necessary due to the fact that future expansion is a definite possibility. Also since regulations are such that the total package must be accessible to the handicapped, everything may end up being on one level for ease
SITE ANALYSIS

of circulation and access. A challenge lies in the fact that the large site must be dealt with in such a way that it becomes a friendly place to go to and experience as opposed to a vast expanse of space with no feeling.
3. BUILDING TYPES ANALYSIS
BUILDING TYPES ANALYSIS

DE VRY INSTITUTE OF TECHNOLOGY
PHOENIX, ARIZONA

A. Use: Vocational/Technical school operated as a commercial venture.

B. Space:
1. Square floor plan
2. Monumental stairway create large atrium space in the middle of the building
3. Classrooms and labs clustered around the atrium space.
4. Service facility cores located adjacent to atrium space.
5. More flexible spaces located on the upper levels

C. Circulation
1. Entry: From parking lot through one whole structural bay to the courtyard which functions as a central lobby and student assembly place.
2. Main circulation: Main circulation occurs in the corridor which forms a perimeter space around the atrium space.
3. Vertical circulation: Elevators in the service cores on either side of the atrium space.

D. Structure/Construction
1. Free-standing stuccoed masonry walls

NORTH CENTRAL INDIANA
VOCATIONAL & SPECIAL EDUCATION LEARNING CO-OPERATIVE
BUILDING TYPES ANALYSIS
DE VRY INSTITUTE OF TECHNOLOGY - continued -

2. Light steel structural frame
3. Precast concrete lintels at the window openings, sandblasted to emphasize them as a separate system.
4. Recessed balconies that serve as circulation space also provide sun protection for floor to ceiling glass walls.

E. Character

1. Low-cost, efficient, well detailed that meets the need of a narrow program yet provides a pleasing learning environment.
BUILDING TYPES ANALYSIS

WM. M. DAWES HIGH SCHOOL
LINCOLN, RHODE ISLAND

A. Use: Coeducational, 10th thru 12th grade vocational and technical training.

B. Space:
   1. Has complete operational flexibility.
   2. Grouped similar facilities.
   3. Utilizes modules within the building which with minor modifications could serve unexpected future uses.
   4. Heavy labs are grouped on the lower level and classrooms, commercial labs which are more likely to change are on the upper levels.
   5. Major areas are tied together with circulation ramps.

C. Circulation:
   1. Entry: On the main spine of circulation, easily noticed and easy to orient.
   2. Main circulation: A series of ramps set diagonally into the building grid that connect major areas.
   3. Vertical circulation: Elevators located near entry and near the corners of the plan.

D. Structure/Construction
   1. Poured concrete walls and structure.
   2. Exposed mechanical systems and lighting systems.

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LEARNING CO-OPERATIVE
3. 25 foot structural grid
4. Generous use of clerestories and glazed interior partitions.

E. Character: By the use of the clerestories and glazed partitions coupled with the diagonal ramps people moving along the ramps and other passages are able to see what is going on in the labs and workshops. Consequently in a school where classes change relatively infrequently, a sense of livelihood is imparted to otherwise empty corridors by the activities taking place in the room they serve. This facility gives vocational education a dynamic image.
BUILDING TYPES
ANALYSIS

OHIO INSTITUTE OF TECHNOLOGY
COLUMBUS, OHIO

A. Use: Vocational-Technical School operated as a commercial venture.

B. Space:

1. Rectangular floor plan except at corners where large entry spaces occur.
2. Total flexibility was sacrificed by putting the student lounge, vending machines, library, reading areas with one central space.
3. Spatial variety was gained by lowering floors, using clerestory windows, and light steel structural frame.
4. Classrooms clustered around the central core.

C. Circulation:

1. Entry: 2 corners of the rectangular plan.
2. Main Circulation: Main circulation occurs around the central core and large laboratory spaces.
3. Vertical Circulation: None required since the building is all on one level.

D. Structure/Construction

1. Facade of reflective glass combined with aluminum faced, foam core panels.
2. Masonry Walls
3. Light steel structural frame.

NORTH CENTRAL INDIANA
VOCATIONAL & SPECIAL EDUCATION LEARNING CO-OPERATIVE
4. Glass set back from outside walls.

E. Character

1. An integral but contrasting part of the topography. A long, low, reflective building parallel to the freeway with the earth bermed up to the sills to emphasize the small hill.
BUILDING TYPES
ANALYSIS

GREENWOOD SECONDARY SCHOOL
TORONTO, ONTARIO

A. Use: This school is designed primarily for girls many of whom may have either learning difficulties or physical handicaps.

B. Space:
1. Rectangular plan
2. Cafeteria and gymnasium for a central core
3. Perimeter corridor surrounding central core
4. Classrooms radiate from central core along perimeter corridor.
5. Similar disciplines are clustered
6. Library immediately inside main entry, quickly establishes an education character.

C. Circulation:
1. Entry: From the corners of the rectangular plan
2. Main circulation: main circulation takes place around the central core in a perimeter core.
3. Vertical circulation: vertical circulation is located in the corners of the rectangular plan.

D. Structure/Construction
1. 12" x 12" concrete block with cham-
2. Ceilings: Drywall or acoustical tile except where waffle slab is exposed.

E. Character

1. The bold use of color gives the school a cheerful character and the broad masonry surfaces and careful detailing give it an appealing architectural simplicity.
BUILDING TYPES ANALYSIS

SPECIAL EDUCATION FACILITY
VALPARAISO, INDIANA

A. Use: A single comprehensive facility for severely and moderately retarded children and adults that meets their particular educational, vocational and physical needs.

B. Space:

1. Central core of cafeteria, gymnasium, and outdoor courtyard.
2. Mechanical, service, deliveries, clustered at one end of the building.
3. Similar activities grouped together in modules.
4. Modules grouped around the central support core.
5. Play areas located close to all outdoor exits.
6. Centrally located faculty facilities.

C. Circulation:

1. Entry: Main entry located at one corner of rectangular plan. Opens to faculty/administration area.
2. Main circulation: Perimeter corridor around the central core.
3. Vertical circulation: None required since the building is one level.

D. Structure/Construction (Info. not available at this time)

NORTH CENTRAL INDIANA
VOCATIONAL & SPECIAL EDUCATION LEARNING CO-OPERATIVE
E. Character: A aesthetically low-key structure that provides the spaces needed for the existing and future programs that, in appearance, does not differentiate between the handicapped and the non-handicapped student.
BUILDING TYPES ANALYSIS

ANDREWS SENIOR HIGH SCHOOL
ANDREWS, TEXAS

A. Use: Standard educational programs for the high school level student.

B. Space:
   1. Great enclosed space as free from columns and other fixed elements as possible.
   2. Ceiling heights are varied to fit particular needs.
   3. Other than "specialized" spaces the building lends themselves to almost universal interchangeability.
   4. Almost no doors.
   5. Domed area serves as an open concourse that unifies the building and is a symbol of its freedom of concept.

C. Circulation:
   1. Entry: Off the main driveway opens into library and establishes educational character of the building.
   2. Main circulation: Main circulation occurs around dining/library core. Secondary circulation branches off main spines into each secondary area.
   3. Vertical circulation: None is required since the building is all on one level.

NORTH CENTRAL INDIANA VOCATIONAL & SPECIAL EDUCATION LEARNING CO-OPERATIVE
D. Structure/Construction

1. 4½' space under the floor for all utilizes
2. Movable partitions of hollow core wood
3. Made as airtight as possible against heat and dust.
4. Prestressed concrete frame
5. Frame is highly fire resistant

E. Character: A flexible facility for learning that provides a growing changing improving educational employment.