HONORS THESIS

"THE DEVELOPMENT OF AN ARCHITECTURAL SOLUTION"

Student: James R. Underwood
Advisor: Anthony J. Costello
May 10, 1971
I recommend this thesis for acceptance by the Honors Program of Ball State University for graduation with honors.

May 10, 1971

Thesis Adviser
Department of Architecture
"A FACILITY FOR THE VISUALLY HANDICAPPED"

THESIS PROPOSAL

COLLEGE OF ARCHITECTURE AND PLANNING

BALL STATE UNIVERSITY

James R. Underwood
Sept. 17, 1970
In conjunction with, and using as one of the design parameters, the Indianapolis Inner City Study as proposed by James R. Underwood and Barry F. Smith, it is my desire to enter into a more definitive study of one of the smaller elements of this proposal, this element being an educational facility for the blind and visually handicapped.

This facility would be a regional center for the blind youth of the Indianapolis area, possibly functioning as a home/educational facility for both the youth and the adult citizens of this region.

Under the possible sponsorship of the Eli Lilly Foundation, this facility could become a statewide facility for furthering the educational development of this handicapped segment of our society.

The hope of this project is not to provide an isolated retreat for these individuals, but a facility within a vast urban network which would itself be an educational tool for the use of the students and faculty of the project. Within this urban fabric a handicapped individual could not only learn the basic educational skills necessary to all citizens, but could learn techniques of survival within a non-handicapped society into which he will eventually be thrust regardless of his training.
ABSTRACT:

The project is a purely hypothetical one, but one not without basis of need. Indiana, as well as virtually every other state, has no realistic facility for the training of the adult blind either physical or academic. It is the purpose of this project to fulfill these very demanding needs.

The project in general consists of 6 basic elements:

1. A multi-story classroom element to provide the wide range of re-training and further development of the individual to allow him/her to progress into the somewhat more complex physical training and to provide them with vehicles and techniques of learning and study to make this training more easily fathomed.

2. A full service library with direct physical relationship to the classroom unit to facilitate its use and integration into the day to day activities of the learning environment. The library shall provide both service for the inhouse needs of the facility as well as a service center for the counselor oriented individuals throughout the entire state. Within this program would be the base for a traveling library which could be used in conjunction with libraries based throughout the state for the expansion and extension of the inhouse training facilities.

Administrative services are also contained in this area for the processing (relating to records) and orientation of those coming to the facility.
ABSTRACT: CONTINUED

This unit, being the corner or hub of the complex, has a strong interior-exterior relationship both through landscaping and space to provide a relief to the somewhat static spaces provided in the educational systems. The blind as well as the sighted must be given this relief.

3. A shop facility which could work directly in conjunction with outside industries to train individuals for both general job classifications as well as specific job openings. The shop would consist of 3 basic elements.

1. A highly active physically oriented shop area for training in auto mechanics, carpentry, welding, metal fabricating, etc.

2. A large scale open space (interior) for the development and construction of full scale projects such as housing components.

3. A passive shop area for activities such as computer operation and programming, lab technicians and similar job classifications. This element by virtue of its product oriented training requires a good access to services both for material supply and product dispersal.

4. A medical facility to provide minimal medical services to those enrolled in the program and more generally to provide examination and evaluation services both physically and psychologically. This element can be most beneficial in the re-orientation of the newly blinded student to the techniques of both occupation and mobility. Within this facility would be a community oriented area for the examination of local citizens on a free basis.
ABSTRACT: CONTINUED

Also included in this unit would be the mobility labs for the training of the students in the techniques of physical orientation and mobility.

5. A residential development for the housing of students and their families who are participating in the complete training program which could ultimately be as extensive as one year. This element would consist of both apartment units and small scale dormatory living, along with support facilities relating to everyday living ie. community building, laundry, daycare services, etc.

6. A public/private park space which would provide leisure hour space for both students, families, visitors, as well as an area for fair weather physical training on an organized basis. This green space would be only a portion of a system of interrelating parks which would provide interblock circulation free of all traffic and similar obstacles.

Through the above mentioned facilities, it is proposed that the complex will serve 500 blind adults. This figure would include 150 students in the shop complex and 350 students in the academic unit. The figures do not reflect the possibility of ultimate use through scheduling of evening classes and the persons affected through the traveling library services.
DESCRIPTION OF CONTEXT:

The facility will be located in Indianapolis, Indiana on a site in the immediate vicinity of the Holy Rosary Church between East Street and Virginia Avenue. The site has a direct relationship to the area "natural" park facilities.

Surrounding and adjacent to the site are: (1) new low-rise residential units both private and federally subsidized, (2) a new high-rise structure containing an urban educational program, both primary and secondary, serving students in the immediate community and containing approximately 8,000 students, (3) a large soft edged natural area which is used both for recreation and circulation, (4) Holy Rosary Church and Latin School with dormatory housing for students from various communities within the state.

Traffic in the area is concentrated on Virginia Avenue and East Street with extremely high volumes generated by interchanges with the inner ring route immediately adjacent. Cross traffic through the area is low volume and is limited to residents and service vehicles.

The project area will be served by three fire stations in the immediate area.\(^1\) These facilities could be augmented by additional services as required to meet new and expanding demands as would be generated by the general revitalization and development in the area.

The area lies within a one mile radius of the major police facilities within the city.\(^2\) This factor does not necessarily reduce crime, but it does have a psychological significance by virtue of its ability to be provided with immediate and continued service to the site in question.

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1. Metropolitan Planning Department, Marion County, Indianapolis, Indiana.
2. Ibid.
DESCRIPTION OF CONTEXT: CONTINUED:

Sanitary and ground water facilities are available at the periphery of the site and by virtue of the main sanitary interceptor that passes to the immediate south of the site could easily handle and new facilities that would be imposed on the surrounding area. ³

Water facilities are presently available on the site in the following main sizes: Virginia Avenue - 16", East McCarty Street - 12", Greer Street - 6", Noble Street - 6", Steven Street - 6".⁴

Electrical power is available in the area through Indianapolis Power and Light Company in the following ranges: 120-240 single phase, 120-240 three phase, 120-208, and 277-480. The availability of specific electric power is not a matter of concern in the one mile square around the Indianapolis Circle.⁵

Gas is available from a 10" high pressure line to the north of the proposed development.

Top soil on the site averages 10" in depth and should be removed and stored until the project requires its reuse. Areas within the site could easily be used for such storage.

The site generally lies in an area of water deposited soils which are representative of glacial till. Shallower soils at the site consist of layers of various mixtures of sand, silt, and clay. The condition of these layers ranges from very loose to dense and from soft to very stiff. These erratic layers generally extend to depths of ten feet or less. Underlying this is a deep deposit of dense to very dense outwash sand and grave.

3. Ibid.
4. Ibid.
5. Fulk and Gardener Incorporated, 3925 North College Avenue, Indianapolis, Indiana.
DESCRIPTION OF CONTEXT: CONTINUED:

Some of the borings drilled previously in this general area extend to depths of 100 feet within which bedrock was not encountered. However, references indicate that bedrock in this area should be at about or slightly above elevation 600. (Note that ground elevation in this general area is at elevation 720). This bedrock consists of limestone of the Middle-Devonian Age, possibly capped with a thin layer of New Albany shale.

Perched ground water was noted immediately above the layer of till encountered at about elevation 695. This is as would normally be expected in an area of glacial till due to its erratic character. The water table in general lies at a greater depth, but it should be noted that seasonable variations can be expected to occur.

Based on an analysis of soil conditions as encountered at nearby sites, the following design recommendations were developed. Conditions at the site indicate that footings can be sued with a design pressure of 10,000 pounds per square foot. It should be noted that all footings will be located at least four feet below final grade.

It is estimated that the foundations settlements should be limited to about one inch and probably less. Non-uniform soil conditions may increase such differential movements somewhat.

The climate is continental with warm summers, moderately cold winters, with occasional extremes in temperature, most notably during the winter months.

Precipitation in general is well distributed throughout the year. Rainfall exceeding one inch in any 24 hour period is found to occur on the average of once a month, with lesser amounts occurring on the average of every week and one half. During the winter months, snowfalls in excess of three inches

DESCRIPTION OF CONTEXT: CONTINUED:
can be expected to occur on the average of two to three
times per winter. Precipitation and temperatures can be
found on a monthly basis in the following table. 7

Average annual rainfall: 39.69"   Wind speed: 8 MPH
Wind direction: Summer------Northwest
                  Winter------Southwest

TEMPERATURE AND PRECIPITATION:

<table>
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<th>Month</th>
<th>Normal temperature</th>
<th>Normal precipitation</th>
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<tr>
<td>January</td>
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<tr>
<td>February</td>
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<td>40°</td>
<td>3.9&quot;</td>
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<tr>
<td>April</td>
<td>51°</td>
<td>3.7&quot;</td>
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<td>May</td>
<td>61°</td>
<td>3.8&quot;</td>
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<td>June</td>
<td>71°</td>
<td>4.2&quot;</td>
</tr>
<tr>
<td>July</td>
<td>76°</td>
<td>3.2&quot;</td>
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<tr>
<td>August</td>
<td>74°</td>
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<tr>
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<tr>
<td>December</td>
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40° NORTH LATITUDE SUN ANGLES: 8

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<th>ALTITUDE</th>
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<td></td>
<td>7:30</td>
<td>121°-0'</td>
<td>0°-0'</td>
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<tr>
<td>SPRING</td>
<td>Noon</td>
<td>180°-30'</td>
<td>50°-0'</td>
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<tr>
<td>AUTUMN</td>
<td>10:00</td>
<td>138°-0'</td>
<td>41°-30'</td>
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<td></td>
<td>8:00</td>
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<td></td>
<td>6:00</td>
<td>90°-0'</td>
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<td>SUMMER</td>
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<td></td>
<td>4:30</td>
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</tbody>
</table>

7. 1960 World Almanac, New York World-Telegram, 125 Barclay
   Street, New York 15, New York.
BUILDING PROGRAM: FUNCTIONAL REQUIREMENTS

Administrative area:

Reception area: Space should be provided for a receptionist, secretary, and waiting space for visitors. The area should be easily accessible from the major areas of the facility; (1) Shop, (2) Library, (3) Medical unit, (4) Class spaces, and (4) Main administration and display. A close proximity to the private offices of the administrative staff should be maintained to help reduce the duplication of staff members.

Superintendent's Office: Space should be provided to accommodate meetings with groups: Community, educational, parents or relatives, and social support staff.

Assistant Superintendent's or Principal's Office: To be provided with similar facilities as would be required for the Superintendent's office.

Support Staff Offices: Bookkeeper, Senior staff, and general records office staff, in each case space should be provided for storage and work areas.

Storage/Work Space: Mimeograph and reproduction equipment with the possibility of use as a file room is quantities require. Mail could be distributed from this point and mail could be sorted and distributed to its respective areas. The use of microfilm in record keeping should be investigated as a substantial space savings could be realized through its use.
BUILDING PROGRAM: FUNCTIONAL REQUIREMENTS: CONTINUED

Administrative area: continued

Conference area: Space should be provided for a conference room to accommodate staff meetings and general conference space. Audio-visual equipment should be provided for in this space.

Rest Rooms: Public and private rest rooms should be provided with consideration being given to a space for relaxation during times of mild illness.
Library: 20,000 volumes

Space should be provided for the storage of large braille copies of texts as well as the standard large type copies. Note once again that these copies are not standard book size and shelving to compensate for this fact should be provided. An area should be provided for the use of tape recorders for prerecorded lessons and classwork. A soundproof area is required with separate compartments is most desirable, although earphones could be used. Study areas should be provided as well as large tables for student lesson preparation and study. A periodical reading area for short term library visits would be advisable near the entrance to this area to facilitate easy entry and exit without disturbing typical library use. Storage areas should be provided for the safe storage and retrieval of prerecorded materials.

Librarian's Office: Office space should be provided with storage for library records and a private space where library administrative business can be conducted. This area could also be used for cataloging and updating of materials. A small book repair space would be desirable. Braille typewriters should be available in the general library space to facilitate student lesson preparation.
BUILDING PROGRAM: FUNCTIONAL REQUIREMENTS: CONTINUED

Infirmary:

Administrative areas: Administrative areas should include consultation areas and Medical staff offices. Records storage and secretarial staff would be located in this area also.

Medical treatment rooms: Both single and ward rooms should be provided due to the possibility of communicable diseases.

Speech and Hearing Clinic: Provisions should be made for a permanent staff member for speech and hearing examinations.

Eye Clinic: Space should be provided for a permanent staff for the examination and treatment of visual problems. This would include testing for glasses and examinations through the use of new equipment as it became available through the Indiana University Medical School and local hospitals.
Class Areas: 350 Students

Seminar Rooms/Class Rooms: Provision should be made for audio equipment in all class-seminar rooms. Provision should be made for visual equipment in selected rooms as it must be remembered that not all individuals will be totally blind. (20/200 would be best vision) Large quantities of shelving should be provided in all class rooms due to the large volumes, both in size and number, that must necessarily be kept in each room. Note also that shelving must be spaced at wide intervals to accommodate oversized books. Approximately eight students per instructor will be the average load and a liberal amount of room should be provided due to the obvious movement problems within the space.

Observation Rooms: Provision should be made for observation rooms in conjunction with designated class rooms so faculty may observe new techniques in teaching without disrupting normal class room procedures.
BUILDING PROGRAM: FUNCTIONAL REQUIREMENTS: CONTINUED

Shop Areas: 150 Students

- Metal working shop: 70-90 sq.ft./student
- Wood working shop: 80-100 sq.ft./student
- Electrical shop: 35-50 sq.ft./student
- Automobile mechanics: 100-150 sq.ft./student

Shop Support Areas:

- Custodial Units: Provide janitorial service areas in easy access to shop areas with equipments storage and wet area (slop sink).
- Access: Access should be provided to all shop areas to facilitate the delivery and pick-up of materials and goods produced.
- Note: Special attention should be given to the area allocated to the automobile service area to allow the entry of automobiles and possibly small trucks. Hoisting equipment should also be provided in this area to facilitate the moving of engines and other heavy mechanical equipment.
- Special Training Rooms: Space should be provided near the shop areas for use in training slow or problem students or for the instruction of groups on a quiet atmosphere.
- Lounge areas: Areas should be provided throughout the training centers where students may gather in small groups to discuss personal or class problems. These areas would also provide a more congenial area for student-faculty interchange.
- Rest Rooms: Both male and female rest rooms should be provided within easy access to all shop areas.
BUILDING PROGRAM: FUNCTIONAL REQUIREMENTS: CONTINUED

Shop Areas: Continued

Photographic Labs: Should be provided with provisions for small group classes within the immediate area of the lab. The lab would be used for educational purposes and for small contract work that could be used to the advantage of the trainee.
SPECIAL DESIGN FACTORS FOR THE BLIND:

All drinking fountains, fire hose cabinets, thermostatic controls, and electrical panels should be completely recessed to eliminate possible injury both to the equipment and to individuals using the circulation spaces. Drinking fountains or concession areas should be recessed to the extent of removing both the equipment and the user from the lines of circulation.

Circulation and class spaces should be free from any imposing structural elements which would provide a similar traffic hazard.

Due to the increased use of the sense of hearing as an orientation device for the blind, it is desirable that carpeting not be used in circulation spaces in particular. The possible use of carpeting on the wall surfaces while retaining conventional hard surfaced materials on the floor and ceiling could help in the use of sound as a directional device due to the partial elimination of lateral reverberation.

Highly textured surfaces on walls is specifically not recommended due to the use of the back of the hand as an orientation device on these surfaces. Note please that soft surfaces with differential textures could be used to great advantage.

All objects, ends of walls, turns in walls and circulation spaces should have rounded or softened treatment to reduce the possibility of injury in the occurrence of a fall.
SPECIAL DESIGN FACTORS FOR THE BLIND: Continued

Trees and branches should be removed to an adequate height and distance from circulation paths.

All walks should be straight or sharply turned to eliminate the possibility of disorientation on the part of the blind individual.

The use of ramps is highly recommended, but not to the total exclusion of stairs in as much as the individual will eventually be placed in society and will be forced to use this means of vertical circulation.

Curbs at drives and parking lots should be low and rounded to prevent the sharp unexpected drop.
The large majority of the adult blind in Indiana are presently being sent to facilities located at various remote areas in Indiana, as well as in many other states. Facilities are often used outside the State of Indiana due to the lack of a similar facility nearby.

These individuals are given training in personal adjustment, activities of daily living, work potential evaluation, training in the mobility skills, i.e., use of the cane, dog, and the remaining senses, communication skills, i.e., reading of braille and the use of the typewriter, psychological training, and manual dexterity.

The major fault with these facilities lies in the fact that in general they have no live-in accommodations at a time when the sense of security is most needed. Y.M.C.A.'s and Y.W.C.A.'s are often used as well as hotels etc.

In many cases blind individuals who are slow in adjusting to their new role, or for some reason or the other are no longer able to participate in the training program are sent to State Mental Hospitals due to the lack of a better place. Needless to say this is often the end of the road for these individuals, for often a better place to lodge them is never found.

Indiana provides a small, highly inadequate terminal workshop in Indianapolis for individuals who cannot find employment elsewhere. These jobs consist primarily of assembly type jobs provided by local industry.
THESIS LOG

Signatures of Faculty or Consultants  Mr. Merle Tiffany
Date:  Sept. 17, 1970  Chief of Rehabilitation
Consultation Time  2  hrs.  Indiana State Agency for

the Blind

Notes:  (continued)

Many small jobs, i.e. sewing etc., are done in the home of the
individual and then send back to the rehabilitation center.

Locations of Facilities within Indiana

Allen County League for the Blind
Community Coordination Center
227 E. Washington Boulevard
Ft. Wayne, Indiana 46802

Evansville Association for the Blind
500 Second Avenue
Evansville, Indiana 47710  812-422-1181
College Prep. Program

Elkhart Rehabilitation Center
Crippled Childrens Association
702 Williams St.
Elkhart, Indiana 46514  219-523-0128
Workshop facility  Mary E. Workman

Contributing Industries:

Lear-Siegler Institute
440 N. Meridan Street
Indianapolis, Indiana
THESIS LOG

Signatures of Faculty or Consultants

Date: Sept. 24, 1970

Consultation Time 2\frac{1}{2} hrs.

Notes:

Enrollment: 200 students, male and female, K-12
Program: typical high school program with facilities and teaching aids relating to the blind,
  Physical education is taught every day to every student,
  both male and female.
  Typing is initiated in the seventh grade (due to the necessary use of the braille typewriters)
  One year of home education is required for each female student, (A homemaking program, cooking, cleaning, and other necessary household skills.)

Physical condition: 60% of all students are partial seeing, i.e. 80% sight loss corrected, expressed as 20/200.
  40% of all students are totally blind, using braille books as provided by the school. Large print books are also provided by the school for those partial seeing students.

Staff: 41 staff members are used with the largest class being 9 students and an average of 7.
  Classes are ungraded, with special classes for those who might require special attention, (these classes may number as few as 2 students)

Equipment: Special size desks are provided 24"x36" to accommodate the use of the braille typewriter and an oversized book.
  Special shelving 16" deep is provided and larger than normal quantities are provided due to the oversized braille and large print books.
THESIS LOG

Signatures of Faculty or Consultants

Mr. Moe Haralson
Superintendent: Indiana State School for the Blind

Date: Sept. 24, 1970
Consultation Time 2½ hrs.

Notes: Continued

General Information: 50% of all students go home on weekends
50% of the blind in Indiana are over 60 years old,
27% of all blind are premature babies, with one of the
major causes for blindness being rubella, "German Measels".
This particular disease is also responsible for much of
the brain damage in premature children, consequently we
often find brain damage associated with blindness in these
particular individuals.

Social activities are encouraged with the school having,
Boy/Girl Scouts, Y-Teens, 4-H, Student Government, etc.

Recreation programs are emphasized to increase coordination
and self confidence in these young children.

Psychometrist, Consulting Psychologist, and Medical
attention is given to all students at the school.

Funding for rehabilitation training: Federal 80%,
State 20%

GREATEST SINGLE PROBLEM FOR THE ADULT BLIND: LACK OF MOBILITY....
Telephone conversation: 405-372-6211 Extension 7567

Mr. Salmon did a study sponsored by the Social and Rehabilitation services for the purpose of developing architectural criteria for the design of a comprehensive rehabilitation center for the blind and visually handicapped.

Upon contacting Mr. Salmon, he indicated that this particular publication is now out of print, but indicated that he would send me a photostatic copy of the material. At this time he also indicated that the Brooklyn Institute for the Blind and Pauls Rehabilitation center for the Blind in Boston are both good facilities to visit and observe their programs.