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AN INTERIOR SIGNAGE SYSTEM FOR THE  
USAF ACADEMY HOSPITAL

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A Problem Solving Project  
Submitted to the Faculty of  
Baylor University  
In Partial Fulfillment of the  
Requirements for the Degree  
of  
Master of Health Administration

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By

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Signs throughout hospitals are often inadequate and quite confusing to the patients and visitors who must find their way. Such was the case at the USAF Academy Hospital in the late 1970s when a graphic consultant prepared a proposal for the design and fabrication of an interior signage system for the facility. The estimated cost of the project was \$12,500, exceeding available funds. In this study, the author designs an interior directional signage system for the hospital.			
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## CHAPTER I

### INTRODUCTION

Signing is a unique language. While the architect and the interior designer must think in three dimensions, the graphic designer must think in two. In sign design, visual perception is keyed to legibility. Legibility is not defined by letter height or size alone; it is defined by environment and background clutter, lighting and colors, and above all the emotional state of the viewer.<sup>1</sup>

It takes very little observation to see that most people do not function normally under stress. They cannot readily absorb or comprehend visual information. Stress is a way of life at a hospital; accidents, injuries, and illness are the rule rather than the exception. In the absence of adequate and easily read signs, hospital staff and employees will be interrupted from their regular duties to direct people to and from destinations.

The need for an effective sign system is not only a matter of efficiency, it is a matter of necessity. The hospital complex is foreign to the layman, traffic is confusing, emergencies are frequent, and emotional stress is high. There are three distinct types of traffic, (staff, patient, and visitor), which must overlap with minimum confusion if the hospital is to perform its public service function.<sup>2</sup>

When it comes to directing people through their institutions, Klumb states that most hospitals fail in one of two ways. They have either too few, and makeshift signs; or too many and misleading, signs.<sup>3</sup>

In the first instance, staff members resort to making their own signs with shirt cardboards and marking pens, and these temporary techniques become permanent, with the result that wording is inconsistent and there is often no indication that one has arrived at the spot he's been directed to.<sup>4</sup>

With the purchase of engraving machines, the second type of problem can arise. In most cases, the system is not planned and a sign is put up each time someone thinks one is needed until there are so many that it is easier for a visitor to ask a staff member for directions than to make sense of the signage.<sup>5</sup>

The sign problem really doesn't begin in X-ray or the Lab where the latest crises hit. It begins the moment the patient comes through the hospital doors. From that point forward, you are telling the patient something. You do it with color, size, and shape of letter, size of sign, location of sign, and consistency.<sup>6</sup>

Signage systems should be planned. Instead, many hospitals make last-minute decisions that restrict selection of signs to ones that are readily available rather than allowing selection

of signs to meet exact requirements. In addition, signs are ordered and installed as needed for various departments without coordination with the rest of the hospital's signage system.<sup>7</sup>

A coordinated system of interior and exterior signage elements consisting of signs, directories, maps, color coding, and other visual devices must be developed to move people efficiently throughout the hospital and its surrounding site. Such a system must clearly provide information that will direct, identify, and control.<sup>8</sup>

The standards for a good sign system can be used to determine whether an existing system is sufficiently clear in concept to provide good control of the flow of people inside any hospital, whether it is an old facility or a new one.<sup>9</sup>

The over-all signage system must fulfill numerous requirements for a variety of end users. In addition to visitors and staff, the system must consider the needs of outpatients, volunteers, deliverymen, salesmen, and others. A successful system will provide this diversified group with the directions and space identification required to find specific departments, laboratories, or offices and the controls needed to prevent their movement into and through restricted areas.<sup>10</sup>

Without such a system, the public must interrupt the nearest staff member for information; this becomes too time-consuming for individuals whose duties are more important than directing people to the cashier's office, outpatient

clinics, pharmacy, and other facilities frequently sought by the public. The magnitude of this problem can be understood only if one realizes that many staff members will be interrupted numerous times a day by the public. As a result, staff time lost can be measured in hours not minutes.<sup>11</sup>

The purpose of a successful hospital signage system, then, is to act as a guide for the visitor, whether an outpatient or a person visiting an inpatient. It answers the questions of where each of the major hospital outpatient or visitor activities are located. The system silently and effectively informs, directs, and guides the visitor to his destination, giving assurance along the way that he is on the right path. This project is being undertaken to develop and design an interior signage system for the USAF Academy Hospital.

#### Conditions Prompting the Study

A survey of the interior signage system for the USAF Academy Hospital was conducted in September, 1977. The results of the survey reflected that the architectural signs within the hospital are inadequate and often quite confusing to the patients and visitors who must find their way. A graphic design consultant was acquired to prepare a proposal for the design and fabrication of an interior signage system for the hospital. The estimate made by the graphic design consultant for the

proposed project was \$12,500.00 (Appendix B).

The Hospital Administrator discussed the results of the survey and the project proposal with the resident. The Hospital Administrator stated that the graphic design consultant's estimate for the project exceeds the available funds for design and fabrication of a hospital interior signage system (Appendix C). The resident was asked to develop and design a signage system for the interior of the hospital.

#### Statement of the Problem

The problem is to develop and design an interior signage system for the USAF Academy Hospital.

#### Research Methodology

The research methodology to be utilized in collecting, evaluating and analyzing the data is as follows:

1. An on-site analysis to determine the existing interior signage system for the hospital.
2. An extensive review of the literature to obtain a comprehensive understanding of current state-of-the-art position concerning hospital signage systems.
3. The development of traffic patterns of patients, visitors, and staff through the hospital.
4. An analysis of hospital signage systems currently utilized by other military and civilian hospitals in the local area

to aid in developing an effective system.

5. A collection of informational material on the currently available interior signage from commercial sources to aid in design.

6. An evaluation of the physical and financial constraints of the hospital for expenditures on a signage system.

### Objectives

The following objectives were to be achieved in developing and designing an interior signage system for the USAF Academy Hospital.

1. Analyze the hospital's existing interior signage system.
2. Analyze the current staff, patient, and visitor traffic patterns within the hospital for determining proper locations of signs.
3. Develop a signage system that will increase visibility and directional guidance within the hospital.
4. Develop a signage system that is flexible, functional, and easy to maintain.

### Criteria

The following criteria must be met by the proposed hospital interior signage system.

1. The interior signage system must be economically and

physically feasible for the hospital to accomplish.

2. The interior signage system must be capable of providing flexibility for future change in departmental location without requiring extensive additional signs.

3. The interior signage system must be consistent within the hospital and not consist of a mixture of different signs.

4. The interior signage system must be compatible with the exterior signage system to assure smooth flowing traffic patterns.

#### Limitations

Implementation of the interior signage system will be affected by the following limitations.

1. This project is limited to only the interior hospital signage system and not the exterior hospital signage system.

2. A professional graphics design consultant will not be utilized in developing a design for the interior signage system.

3. The interior signage system must be implemented utilizing existing funds which have been budgeted for a proposed system.

#### Assumptions

The following assumptions were made in developing the interior signage system.

1. The USAF Academy Hospital will not undergo any sub-

stantial physical layout modifications in the near future.

2. The USAF Academy Hospital will not create or delete any departmental areas during the project.

3. The existing departmental areas will not be physically changed during the project.

4. The present message schedule utilized by hospital departments will remain constant.

FOOTNOTES

<sup>1</sup> Charles N. Smith, "Sign Systems", Interior Design 46 (October, 1975): 148.

<sup>2</sup> Ibid.

<sup>3</sup> Eugene C. Klumb, "Hospital Signs That Everyone Can Understand", Modern Hospital 120 (May 1973): 96.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> Donald R. Olson, "What We Need Is Another Sign", Medical Group Management 20 (March - April, 1973): 18.

<sup>7</sup> "Planning, Flexibility, and Growth Enable Hospitals' Signage Systems To Meet Many Needs", Hospitals 51 (July 16, 1977): 54.

<sup>8</sup> Carol Lipper, "Good Signs Can Help Control Visitor and Staff Traffic", Modern Hospital 115 (July 1970): 83.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

## CHAPTER II

### DISCUSSION

An efficient public information system has four key elements:<sup>1</sup>

1. Printed orientation material.
2. Public signage with coordinated directional and informational signs.
3. Information bureau and personal guidance services, by staff or volunteers.
4. Public address procedures.

These modes of communication are interdependent and the system designer must be aware of the totality of the problem. The designer must also recognize the average hospital user is subject to stress in the hospital environment and confused by the multiplicity of departments and procedures in modern hospitals.<sup>2</sup>

Surveys have shown a high percentage of hospital user complaints related not to medical care but lack of directional and procedural information within the hospital, which in turn lead to similar complaints from staff about demands on their time for user information.<sup>3</sup>

The signage system, to be an effective mode of communication, must clearly indicate the circulation patterns of the hospital, without recourse to verbal directions. The system

must direct, identify and control, and it must do this visually.

Martin states that the essential point of a hospital signage system is that it should be simple and effective.<sup>4</sup> The system will be different in unit hospitals that have all functions in one building to that of pavilion hospitals which have functions in multiple buildings. Acute general hospitals usually have a high volume of traffic including visitors and outpatients who have easy access to the hospital. Special hospitals may have less traffic because they have limited visiting and fewer outpatients. They can thus use fewer signs than acute general facilities and may possibly rely entirely on receptionists and guides.<sup>5</sup>

Although there are many methods of signage all fall under one of two basic classifications. They are either overall or general as distinct from individual or specific. Overall signs give a generalized picture at the first contact and then more detailed information in selected areas; individual signs give full directions on each board or map. By the use of the former method, large and expensive signs can be avoided on extensive sites, the necessary detail being added in areas as required. The latter system is probably fairly automatic in small hospitals and their grounds.<sup>6</sup>

### Characteristics of a Sign

Halbert discusses five characteristics that an effective hospital sign must possess.<sup>7</sup>

1. A sign must have eye appeal. It should be both seen and pleasing to see. Therefore, a sign must contrast, but not clash with its surroundings.

2. Uniformity is essential. Individual signs are part of a communications system. They should be identifiable as part of the system in order that people can easily find the next messenger they need.

3. Flexibility is a must. A sign must be easily adaptable to the continuing changes taking place in the hospital. It also needs to be versatile for it must convey a variety of messages and be suitable to differing purposes and locations.

4. Economy is required. The need for a sign must adequately meet at least the expense. The sign must perform its task within an affordable cost.

5. A sign must be promptly procurable. Through purchase or production a sign must be procurable quickly enough to forestall amateur sign making. Prompt delivery and installation is the best way to curb wasted effort and unsightly postings.

### Sign Making Materials

Signs in use today are produced chiefly in metal or in

plastic. Both types can be exceedingly strong and durable for either internal or external use, need little maintenance, and they can be obtained at a reasonable cost.

Metal signs are recommended for external use. The most popular material is aluminum and similar non-ferrous metals or alloys. Letters are either die-pressed or stamped, and occasionally cast. They are produced in low relief with finishes of heat-bonded enamel which being slightly pliable does not easily chip or peel. Almost the whole range of basic colors is available and lettering is done in contrasting shades if required. Covering letters with additional finishes such as plastic seems to have been abandoned as unnecessary. These signs are easily repainted by hospital staff if required.<sup>8</sup>

Various types of treated steel or iron sheets, the original vitreous enameled method, is exceedingly weatherproof but brittle if the surface is damaged, when rusting takes place. There are now patent processes in imitation of true vitreous enamel which appear to be durable and provide a good color range. With this type of sign letters have to be flush finished.<sup>9</sup>

Hand engraved metal plates usually in brass or bronze can also be given chemical dips or treatments to provide a non-oxidizing finish, such as chromium or bronzing. Plates of this nature are costly and the extent of their use is rather limited.<sup>10</sup>

Probably the oldest type of metal signs are cast-iron mouldings in low relief. They are inexpensive and durable if kept in condition by frequent repainting.<sup>11</sup>

Plastic signs are more suitable for internal use. This type of sign can be obtained either self-colored or laminated in a varied range of shades. Almost any form of relief is possible, from deeply recessed to high relief, by welding on separate characters. Reverse engraving from the rear leaves a smooth finish for easy cleaning. Signs of this nature easily collect and reflect available light, and will clean by simple sponging. The range is large enough to cover any decorative scheme.<sup>12</sup>

Apart from true plastics there are several quasi-plastic materials which would serve usefully for indoor signs.<sup>13</sup> These include:

(1) A system of glazing notices with a clear finish like liquid glass which then sets hard.

(2) Special printing of a sign which is then heat sealed in laminated plastic with resinous adhesive.

(3) Silk-screen printing where a printed card is backed with metal sheet and faced with a washable transparency, an economical system for repetitive work.

(4) Many synthetic imitations to resemble wood, metal, rubber, etc. usually patents of the larger firms.

Various lettering processes are utilized, and because plastic is the material that is most widely used in signmaking the

following processes are primarily applicable to the manufacture of plastic signs. In silk-screen printing, pigment is forced through a mesh directly onto the plastic. Hot-stamping involves the use of a die to mold the letters; lettering is done by bringing the plastic plate into contact with the precast die. Hot-stamping is relatively expensive, but if a large quantity of one type of sign is ordered, then the unit price is considerably lower.<sup>14</sup>

For the purposes of permanence and legibility, engraved lettering is preferred to any other type. Engraving is achieved with a machine that cuts letters into a two-or-more-ply plastic consisting of different-colored layers. The resulting underlayer of letters contrasts with the surface layer.<sup>15</sup>

#### A Hospital Signage System

A signage system is an assemblage of graphic devices designed, fabricated and installed for the express purpose of providing directions, instructions, and information in a logical and concise manner.

There are generally two approaches to the development of a signage system. One involves the design of the system and its typical components only. The designer produces a manual which outlines design standards for typical situations and turns this over to the hospital, obtaining and installing the

individual signs then becomes the hospital's responsibility. The hospital representative then often delegates the required work to a signage contractor. This may result in substitutions, which usually benefit the contractor, and design changes that weaken the continuity of the over-all system.<sup>16</sup>

A second approach has been found by many hospitals, to be more effective. In this method the system is carried through to the completion of the initial installation by the designer. By this point the contractor and the owner both understand the system and a design standards manual, based on the installed system, can be prepared for additions to and continuation of the system by the owner. A signage system based on this approach is usually executed in four phases: project requirements; design; contract documents, and project completion.<sup>17</sup>

#### Signage System Design

One factor of primary importance in designing a hospital signage system is direction for patients and visitors to major areas or patient-oriented services. Those areas that are primarily utilized by the staff are of secondary importance. Comprehensive directions for patients and visitors should be located at intersections or any position where a directional decision must be made. At these intersections, it is important that auxillary lighting be adequate to permit better visibility.

A signage system should be designed with special attention to the appropriate location at decision points.<sup>18</sup>

There are two types of directional signs within an effective signage system; long distance and local signs. Long distance signs are more permanent and direct an individual to a building, wing, or functional area. These signs can be permanently attached to the ceiling and should be readable at 50-100 feet. Local signs should be posted at eye level and contain more detail than permanent signs.<sup>19</sup>

Another important component of a signage system is the message schedule. The sign message should be consistent from one sign to the next and the message on each sign should be understandable to the public.

There are three major methods of achieving uniformity of signs and communicating to the public between long distance and local areas. These methods are pictograms, numbers, and colors which augment the sign message. Although these methods can be combined, a single identifying system is usually employed.<sup>20</sup>

Pictograms are difficult to use, in a hospital setting, for achieving uniformity because there has not been complete agreement for national or international standards for symbols used to represent hospital functional activities.

Numbering systems to augment the message schedule can be used to designate rooms. These systems involve numbering a wing, building, or area as well as giving a room a number. For

example, Building 2, Wing 4, and Room 32. This system usually works well in buildings where the singular destination is a room. The destination in a hospital could be sequentially a wing, an open area for reception or a window, waiting area, and eventually a room. A numbering system would seem to be confusing in a hospital with numerous stops between entering the hospital and reaching a destination.

Color coding has been identified by many experts as a sign system that transcends language barriers and high anxiety levels.<sup>21</sup> This method can be used to provide continuity from one directional sign to the next and differentiate functional areas and/or wings. Color stimulates the senses more rapidly than any other form of communication. Color can serve to bind the signs together into an integrated system.

#### Signage System Development

Charles Smith, a designer, has developed a "Sign System Lexicon" for hospitals to provide an organized, systematic method for developing a signage project.

The "Sign System Lexicon" is divided into five phases (Appendix D).<sup>22</sup> Phase 1 - Project Requirements; Phase 2 - Conceptual Design; Phase 3 - Design Development; Phase 4 - Contract Documents, and Phase 5 - Contract Administration.

In Phase 1, the medical facility should be reviewed, on

site, if possible. The architecture (the vertical and horizontal plans of the building), by the interior design (the color schedule as it relates to color coding concepts), and by the hospital (the security policies, preference for overhead or wall signs, a need for a bi- or tri-lingual signage system) are a few of the important considerations. The hospital must define the message schedule. For example, is the radiology department "X-Ray" or "Radiology?" Another important consideration during Phase 1 is the time frame for installation. Sometimes installation of the system will be phased, and priorities should be established.<sup>23</sup>

During Phase 2, the designer will closely define the system of circulation, the location identifications (from the hospital's message schedule), the sign types and numbers of signs needed, and a preliminary budget estimate. At the end of this phase the designer will usually make a conceptual design presentation to the hospital for approval.<sup>24</sup>

In Phase 3, the final determination of sign types, letter style, color and fabrication methods is made. The designer completes plans and elevations showing exact sign locations. These location drawings will then become a part of the contract documents. Cost estimates are obtained from manufacturers based on sign types, quantity and installation methods. The designer will prepare working drawings of sign types which will show construction materials, details, letter placement and fabrica-

tion instructions. A final design concepts presentation for hospital approval will usually be made in this phase. This presentation will include typical location sketches, samples of actual sign types, showing materials and colors. A complete cost estimate is also determined in this phase.<sup>25</sup>

Contract documents are prepared in Phase 4. These documents include all location drawings, working drawings, elevations, specifications, and instructions for fabrication and installation. When the documents have been approved by the hospital, they are then issued to preferred manufacturers for competitive bids or negotiated proposals. The designer will usually act as a consultant for the hospital to assist in the analysis of bids or proposals, and provide advice in the awarding of contracts.<sup>26</sup>

The designer would perform as a contract administrator in Phase 5. Contract administration will include a review of the signage manufacturer's shop drawings and observation of sign fabrication to assure adherence to design intent. As the contract administrator, the designer will prepare and issue to the contractor a list of items to be completed or corrected, if any, before the project is finalized. The designer will provide a statement to the hospital that the project has been satisfactorily completed, and payment for the completed project is made to the appropriate agencies.<sup>27</sup>

### Problem Resolution

Charles Smith's "Sign Lexicon", Appendix D, as mentioned earlier, is a very comprehensive phases plan of developing and installing a signage system in a medical facility. Although the complete lexicon is beyond the scope of this project, Phases 1, 2, and 3 provide excellent guidance for the problem resolution. Information required in Phases 1 and 2 was acquired by an on-site analysis of the current USAF Academy Hospital Interior Signage System. Phase 3, the interior signage system design is concentrated on development of directional signage in accordance with the objectives and criteria of the project.

An on-site analysis of the current USAF Academy Hospital Signage System was accomplished to determine the vertical and horizontal building plan, circulation patterns, types of signs in use, sign messages, interior design, lighting and color.

The vertical and horizontal plan of the hospital reveals five building levels including a basement. The main source of vertical transportation within the facility is two sets of elevators and adjoining stairways. One set includes two elevators which service levels one through four, but does not service the basement. These elevators function primarily as passenger elevators. The second set of elevators includes a single elevator that services all levels including the basement. This elevator is utilized as a service elevator for

supplies, equipment, linen, food carts, etc., as well as a passenger elevator. The adjoining stairways service the same levels that their respective elevators do.

Horizontal traffic emanates from entrances, elevators, and stairways. Horizontal traffic patterns for each level are described at Appendix E. Basement level traffic (Appendix E, Fig. 5), emanates from the Medical Supply Loading Dock Entrance, the service elevator and the stairways. First level traffic (Appendix E, Fig. 1), emanates from the Main Hospital Entrance, Emergency/Clinic Entrance, Staff Entrance, elevators, and stairways. The traffic on the second level (Appendix E, Fig. 2), emanates from the second level entrance, elevators and stairways. Third and fourth level traffic (Appendix E, Figs. 3 & 4), emanates from elevators and stairways.

There are three general types of directional sign placement in the hospital; directory, perpendicular to the wall, and flat on a surface. The hospital has only one main directory ( a framed vinyl-covered board with changeable letters) located at the Emergency/Clinic Entrance to the hospital. Most of the perpendicular signs are two-way (can be read from two directions), however, a few are one-sided. The signs are mounted on aluminum frames and are placed above door entrances to offices, clinics, stations, etc. The signs that are placed flat on a surface are usually placed on a door or on the wall adjacent to a door.

The internal direction and location signs are constructed of metal or plastic. The color scheme is white lettering on a blue background or white lettering on a black background. The internal corridor walls are beige or gray in color. The sign colors have a good contrast to the corridor colors and corridor lighting is good. However, some of the signs are small, therefore visibility is not always good.

The physical layout of the first level (Appendix E, Fig. 1) reveals many corridor directional changes and therefore a need for signs at these directional decision points is required. The current signage system does not provide complete directional signage at some of the decision points, partial directional signage at others, and some decision points have no directional signage. This is found to be true on all five levels.

The current signage system provides for some flexibility in future changes. The perpendicular signs may be mounted on a frame in another area, if there is a frame at the location the sign is to be moved to; if not, one would have to be provided. The directory provides for change in that the letters can be rearranged for different message schedules. The signs on doors are placed in frames and can be easily removed. Summarily, the on-site review revealed a lack of uniformity in the interior signage. Some areas have adequate signs and other areas' signage is inadequate. Some area location signs were on the wall adjacent to the door and others were on the door of an office with the

door open during normal duty hours. The signage does have flexibility, but additional frames and other hardware may be required to make a sign flexible.

The current procedure for procuring a new sign or a replacement sign is for the requestor to submit a request through the Plant Manager to the Associate Administrator for approval. If approved the sign will be constructed by civil engineering and installed by the requestor or plant management.

The interior signage system design will consist of directional signage at decision points on all floor levels and locational signage at offices, clinics, nursing units, and ancillary departments.

The directional signs may be wall-mounted on a wall at the decision point or mounted from the corridor ceiling. These decision directories will consist of a frame that will permit directional sign panels to be inserted or removed to provide flexibility. The number of panels in the unit will depend on the signage required at the decision point. The decision point directory signs are described at Appendix F.

All locational signs will be wall mounted at the entrance to the clinic, office, nursing unit, etc. The location signage is described at Appendix G.

Arthur has stated that color coding with a message schedule has two advantages: the color code helps you identify where you are in the hospital, and it is also used to direct you to other areas.<sup>28</sup> It is interesting to note that people have

problems with color. Luss has found that almost one out of three persons is color blind, and despite that hindrance, all must complete a two-step process before understanding color-coding: identify the significant color and process its message.<sup>29</sup> Color-coding is not required to augment the sign message for the reasons mentioned above and because the size of the hospital is not large enough on any floor level to need additional directional aid.

All signs will have a blue background with white lettering. This will provide uniformity not only in the interior signage as well as being compatible with the exterior signage. All corridor wall colors are compatible with the blue sign color, and the corridor lighting is sufficient to provide good visibility of the signs.

The lettering for all signage will be Helvetica Medium Point lettering in capital and lower case letters. All sign background panels and plaques will be made of plastic.

Pictograms, as mentioned earlier, are difficult to use in a hospital because there has not been complete agreement for national or international standards for symbols used for hospital functions. Therefore, pictograms will not be utilized in the internal signage design.

The physical layout of the USAF Academy Hospital (single unit facility) does not require a numbering system to augment the message schedule. A numbering system will, therefore, not be

utilized in the interior signage system design.

A number of commercial signage companies can provide the necessary signs and mounting hardware required by the interior signage system. The current signage procedure will be utilized to make the original purchase and any future additions. The Plant Manager will make the request with approval by the Associate Administrator for the procurement of the signs through a commercial signage company.

Installation may be accomplished by the company supplying the signs and mounting equipment or may be performed with hospital personnel.

FOOTNOTES

<sup>1</sup> Alan S. Porritt, "Signposting and Decor as Adjuncts to User Acceptance," National Hospital and Health Care (Australia) 1 (January, 1976): 19.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

<sup>4</sup> K. C. Martin, "Signposting In Hospitals", The Hospital (London) 56 (November, 1960): 935.

<sup>5</sup> Larry K. Lott, "A Sign System For the Main Building of Wilford Hall Medical Center", Unpublished M.S. Thesis, Trinity University, May, 1975, pp. 7-8.

<sup>6</sup> Martin, p. 935.

<sup>7</sup> Virgil A. Halbert, "The Sign You Need Where You Need It", Modern Hospital 79 (September, 1952): 128.

<sup>8</sup> Martin, p. 936.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> Ibid.

<sup>14</sup> Nicholas P. Lardas, "And Now a Few Words About Signs", Administrative Management 28 (August, 1967): 49.

<sup>15</sup> Ibid.

<sup>16</sup> Carol Lipper, "Good Signs Can Help Control Visitor and Staff Traffic", Modern Hospital 115 (July, 1970): 85.

<sup>17</sup> Ibid.

<sup>18</sup> Patricia L. Williams, "Sign System Design at USAF Medical Center Wright-Patterson: Phase I", Unpublished, Baylor University, January 26, 1979, p. 4 (Typewritten).

<sup>19</sup>"Signage System Eases Frustration" Hospitals  
48 (April 16, 1974): 50.

<sup>20</sup>Williams, p. 9.

<sup>21</sup>Lott, p. 13.

<sup>22</sup>Charles N. Smith. "Sign Systems" Interior Design  
46 (October, 1975): 148.

<sup>23</sup>Ibid, p. 149.

<sup>24</sup>Ibid.

<sup>25</sup>Ibid.

<sup>26</sup>Ibid, p. 150

<sup>27</sup>Ibid.

<sup>28</sup>Paul Arthur, "Sunnybrook Hospital's New Information  
System" Canadian Hospital 43 (February, 1968): 41.

<sup>29</sup>Gerald Luss, "Complex Hospital Calls For Simple Signage  
System" Contract 19 (August, 1977): 72.

## CHAPTER III

### CONCLUSION AND RECOMMENDATIONS

#### Conclusion

A signage system is an assemblage of graphic devices designed, fabricated and installed for the express purpose of providing directions, instructions, and information in a logical and concise manner.

A factor of primary importance in designing a hospital signage system is direction for patients and visitors to major areas or patient-oriented services. Comprehensive directions for patients and visitors should be located at intersections or any position where a directional decision must be made.

Another important factor is the message schedule. The sign message should be consistent from one sign to the next sign, and the message on each sign should be understandable to the public.

A third important factor in designing a hospital signage system is flexibility. The system should be flexible to accommodate the physical changes of departments and the change of services in the hospital.

The interior signage system for the USAF Academy Hospital was developed and designed for directional signage only. Any informational and instructional signage was recommended as future consideration to be uniform with the directional signage.

The project research methodologies provided a background information and a developmental basis for the problem resolution.

The interior hospital signage system recommended will meet the project criteria of being economical and physically feasible, provide flexibility and uniformity within the hospital, and be compatible with the exterior hospital signage system.

#### Recommendations

Recommendation: The development of an interior signage system at the USAF Academy Hospital that provides comprehensive directions for patients, visitors, and staff.

Recommendation: The interior signage system consist of the directional decision points and message schedules described at Appendix F.

Recommendation: The interior signage system consist of the locational signage dexcribed at Appendix G.

Recommendation: All signs utilized in the interior signage system be manufactured of plastic with a blue background and white lettering in Helvetica Medium Point capital and lower case letters.

Recommendation: All signage hardware provide for inserting or removing sign panels or plaques for system flexibility.

Recommendation: Signs and mounting hardware be procured from a commercial signage company.

Recommendation: The installation of the interior signage system be provided by the commercial signage company that provides the signs.

APPENDIX A  
DEFINITIONS

## DEFINITIONS

Terms for which a common understanding is essential in development and design of a signage system.

Public Information System - A public information system consists of four elements:

- (1) Printed orientation material.
- (2) Public signage with coordinated directional and information signs.
- (3) Information bureau and personal guidance services, by staff or volunteers.
- (4) Public address procedures.

Sign - A sign consists of two basic parts - the lettering and the background surface.

Signage System - A signage system is an assemblage of graphic devices designed, fabricated and installed for the express purpose of providing directions, instructions, and information in a logical and concise manner.

Graphic Design - Graphic design is a design for visual communication.

Graphic Design Tools - There are four basic graphic design tools available for the development of definitive graphic standards. First, an alphabet; secondly, a system of letter spacing; thirdly, a modular series of sign backgrounds; and fourthly, a vocabulary of "preferred words".

Graphic Designer - A professional designer who specializes in the design of two dimensional visual communication components. The graphic designer utilizes the four graphic design tools in developing a project.

APPENDIX B

DESIGN SOURCE, INC. PROPOSAL

Design Source Incorporated  
300 Logan  
Denver, Colorado 80203  
Phone (303) 832-1148  
Telex 45-757  
Answer Back: Dessor Inc. DVR



6 September, 1977

Captain Fred Ortmann  
U.S.A.F. Academy Hospital  
Resource Management Office  
United States Air Force Academy  
Colorado 80840

Dear Captain Ortmann:

Design Source is pleased to submit our proposal outlining work as graphic design consultants for the anticipated graphic design program for the academy hospital. The areas involved will include complete coordination of the design effort for the entire graphic signage program from blueprint stages through installation, including all plot plans and directories.

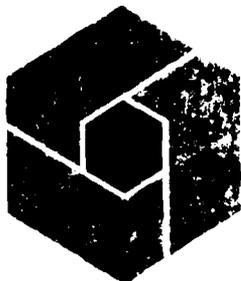
The services to be rendered by Design Source are outlined as follows:

1. The preliminary studies and walk throughs of the hospital will be made with drawings, floor plans, and visualization sketches for coordination of our concepts with those of the appropriate authorities at the academy.
2. Preparation of preliminary budgets and estimates as required for cost determinations.
3. Preparation of detailed layouts of the areas involved showing all signs, directories, graphics, and indicating all information required for the development of the total program.
4. We will provide samples of the specific signage programs recommended for bid and purchase. Color samples will be provided to complete the graphic design. A finish schedule will also be provided for the signage specifications and delivery.

Additionally, we will expedite all orders, supervise installation, and attend any necessary conferences that may be required for the proper development of our work. We will unconditionally warrant our workmanship and products to be free from manufacturing defects for a period of one year from the completion of the project.

Fee schedules will be based on an hourly charge for the time expended by our personnel to achieve the above articles. We estimate the project, up to bid documents, would require approximately 200 hours of design and drafting time. Our fee would be based on a \$25.00 per hour rate for all design work, which we estimate will not exceed 40 hours, and \$15.00 per

page two  
Captain Fred Ortmann  
6 September, 1977



hour for drafting time, which we estimate will not exceed 160 hours. In any case, if either of our estimates are less than we anticipated, for either phase of the preliminary work, we would credit the academy back.

In addition to the above fees, we would bill you for authorized travel from denver to the U.S. Air Force Academy and return, at the rate of \$.15 per mile, and any out of pocket expenses such as meals, blueprints, long distance telephone charges, and related costs will be billed at the actual net expense to the academy.

A retainer fee is normally requested on all design projects, however, with the various requirements the Federal Government has, we would be willing to waive receiving a retainer fee, however, we must insist on a twice monthly billing for our time as work on the project proceeds.

For your budgetary purposes, my preliminary investigation and analysis indicates that the total amount of signage required to completely re-sign the entire hospital interior should not exceed \$12,500.00.

Should you have any further questions, or wish to discuss our proposal in depth, please feel free to call.

Sincerely yours,

*David H. Green*  
David H. Green 26C  
President  
DESIGN SOURCE, INC.

DHG/zgc

APPENDIX C  
DESIGN ASSISTANCE

20  
6  
A

SEP 1 1977

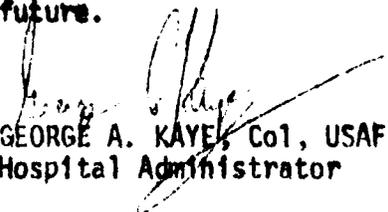
SGA/5101

Request for Design Assistance

DFIT/Col Endsley

1. A recent survey of the hospital has shown that the architectural signs within the hospital are inadequate and often quite confusing to the patients and visitors who must find their way through the facility. We reviewed existing GSA sources of supply and found a number of companies that had GSA schedules to provide architectural signs to the Government. We then contacted a firm in Denver that represents one of these firms and asked them to prepare a proposal to do the necessary design of fabrication work (Atch 1). As you can see, the costs associated with the design and actual fabrication of the signs far exceed the amount of money we can devote to this effort. We will, therefore, have to design our own signage and rely on the vendor for only the fabrication of the products.

2. I have recently been working with Mr. Ron Hall and Mr. Colosimo of your department on a project to upgrade the audio-visual capabilities of our conference room, and to develop a video tape hospital orientation program. I have been most impressed by their creative efforts and their sincere interest in assisting us on these projects. Because of the situation I have described above, we will soon be starting work on a program to design the signs for the hospital. While we can do the basic directional and location signs, we do need some assistance in designing basic layout type signs, for the various hospital entrances and major hallway intersections. I do not know if you have anyone on your staff that has experience or capabilities in this area. If you do and believe you might be able to assist us, I would appreciate a call at extension 5101 and arranging a meeting to discuss the matter. I appreciate your continuing support and look forward to hearing from you in the near future.

  
GEORGE A. KAYE, Col, USAF, MSC  
Hospital Administrator

1 Atch  
Proposal

APPENDIX D  
SIGN SYSTEM LEXICON

## SIGN SYSTEM LEXICON

### Phase 1 - Project Requirements

#### Project Time Schedule:

Computerized critical path printout visualizing time allotted to each work phase and function.

#### Client Input:

Information gathered directly from the Client which relates to his concept of the project.

#### Architectural Requirements:

Physical requirements of the project site.

#### Circulation Analysis:

Analysis conducted to determine the best possible vehicle and/or pedestrian traffic routes.

#### System Requirements:

Requirements established through Client input, architecture and traffic circulation analysis that will determine the architectural numbering system, number and type of signs and preliminary budget.

### Phase 2 - Conceptual Design

#### Establish Preliminary Budget:

Base figure allotted for fabrication and installation of the sign system.

#### Preliminary Message Schedule:

Sign schedule and message terminology developed through Client input.

#### Develop Circulation System:

Circulation plans showing type of traffic and direction based on analysis conducted in Phase 1.

#### Develop Numbering System:

Design the architectural space numbering system in conformity with the circulation plans.

#### Preliminary Location Drawings:

Sign Location drawings used to visually organize the interior and/or exterior directional systems.

Design Sign System Concept:

The abstract thought process which produces the visual materialization of sign types, letter style and color coding.

Unit Cost Estimate:

Preliminary costs based on sign type, fabrication materials and methods and locations.

Client Concept Presentation:

Presentation outlining circulation system, numbering system, sign types and preliminary location selections. Client response will determine direction of design development.

Phase 3 - Design Development

Develop Sign System Design:

Final determination of sign types, letter style, color and fabrication methods.

Final Location Drawings:

Complete plans and elevations showing exact sign locations. Location drawings become part of the contract documents, Phase 4.

Fabrication and Installation Cost Estimate:

Complete cost estimate obtained from selected manufacturers based on sign types, quantity and installation methods.

Begin Working Drawings:

To scale dimensioned drawings of sign types showing construction materials, details, letter placement and fabrication instructions.

Client Design Presentation:

Final Design Concepts presented for Client approval. This presentation will include typical location sketches, to scale samples of actual sign types or actual samples of materials and colors together with a complete system rationale and cost estimate.

Phase 4 - Contract Documents

Final Message Schedule:

Establishment of terminology and sign copy as supplied by the Client to be used as part of the bid documents.

Compile Fabrication and Installation Specification:

Exact instructions to the manufacturer specifying materials, sizes, fabrication processes and message schedule.

Complete Working Drawings:

Scale drawings and elevations necessary to accurately convey design intent to the manufacturer.

Client Review of Contract Documents:

All location drawings, working drawings, elevations, specifications and instructions for fabrication and installation presented for Client approval.

Issue Documents for Bid:

Acting as Client's agent, issue documents to preferred manufacturers for competitive bids or negotiated proposals.

Award Contract:

Consult with the Client to assist in the analysis of bids or proposals, and advise in the awarding of contracts.

Phase 5 - Contract Administration

Review and Approve Shop Drawings:

Review manufacturer's shop drawings to guard design intent and check size, copy placement and color. Approved shop drawings become a part of the bid documents.

Observe Fabrication:

As agent for the Client, observe actual fabrication to assure strict adherence to the bid documents. Make on-site decisions in procedures at variance to the bid documents that would affect the finished product.

Observe Installation:

As agent for the Client observe installation to insure compliance with the bid documents.

Issue List of Items for Completion:

Prepare and issue to the contractor a list of items to be finished or corrected, if any, before project is complete.

Photograph Installation:

Provide on site photography of the basic sign types as required.

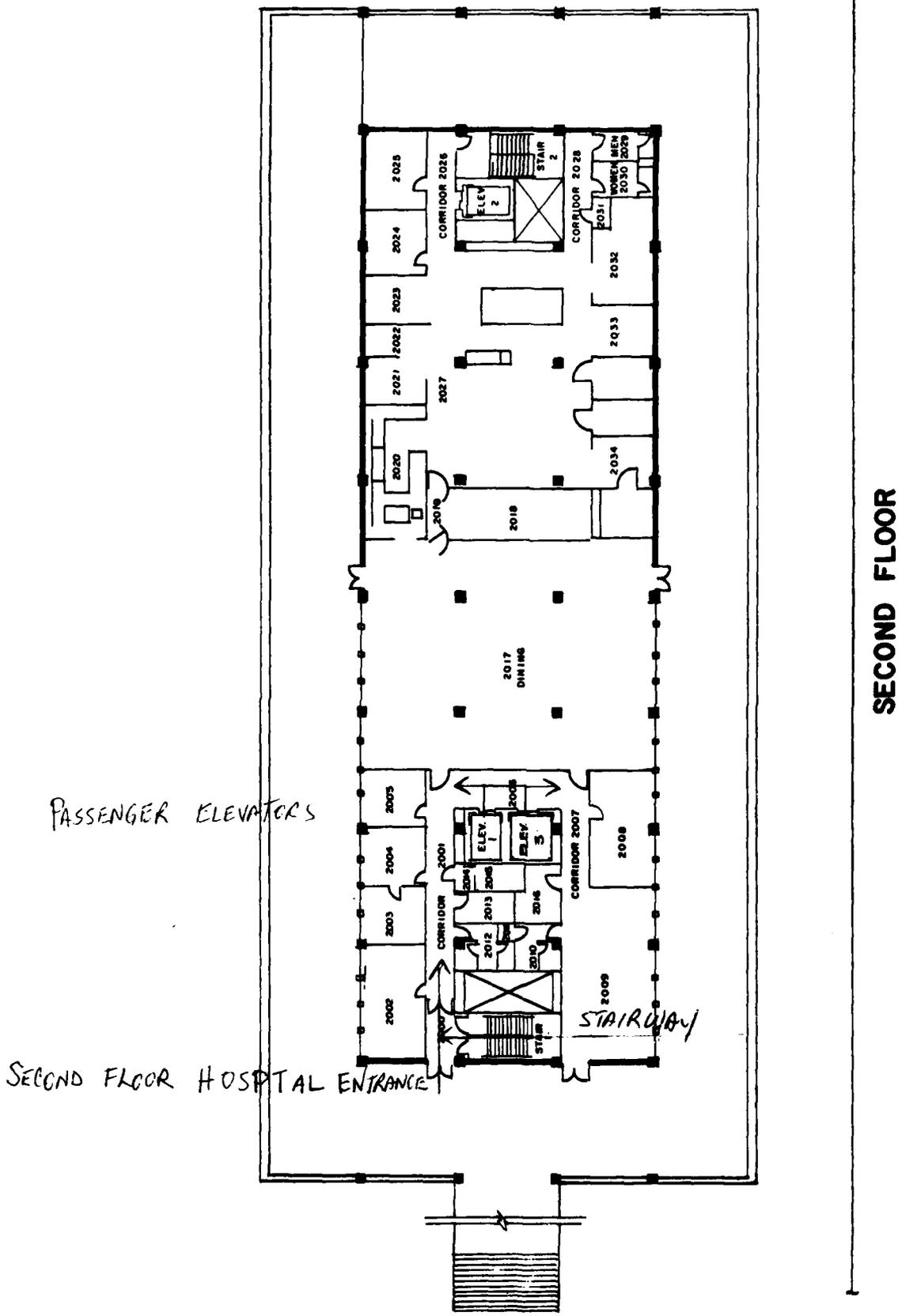
Issue Certificates of Payment:

As agent for the Client, issue a statement to the Client authorizing payment upon satisfactory completion of the project.

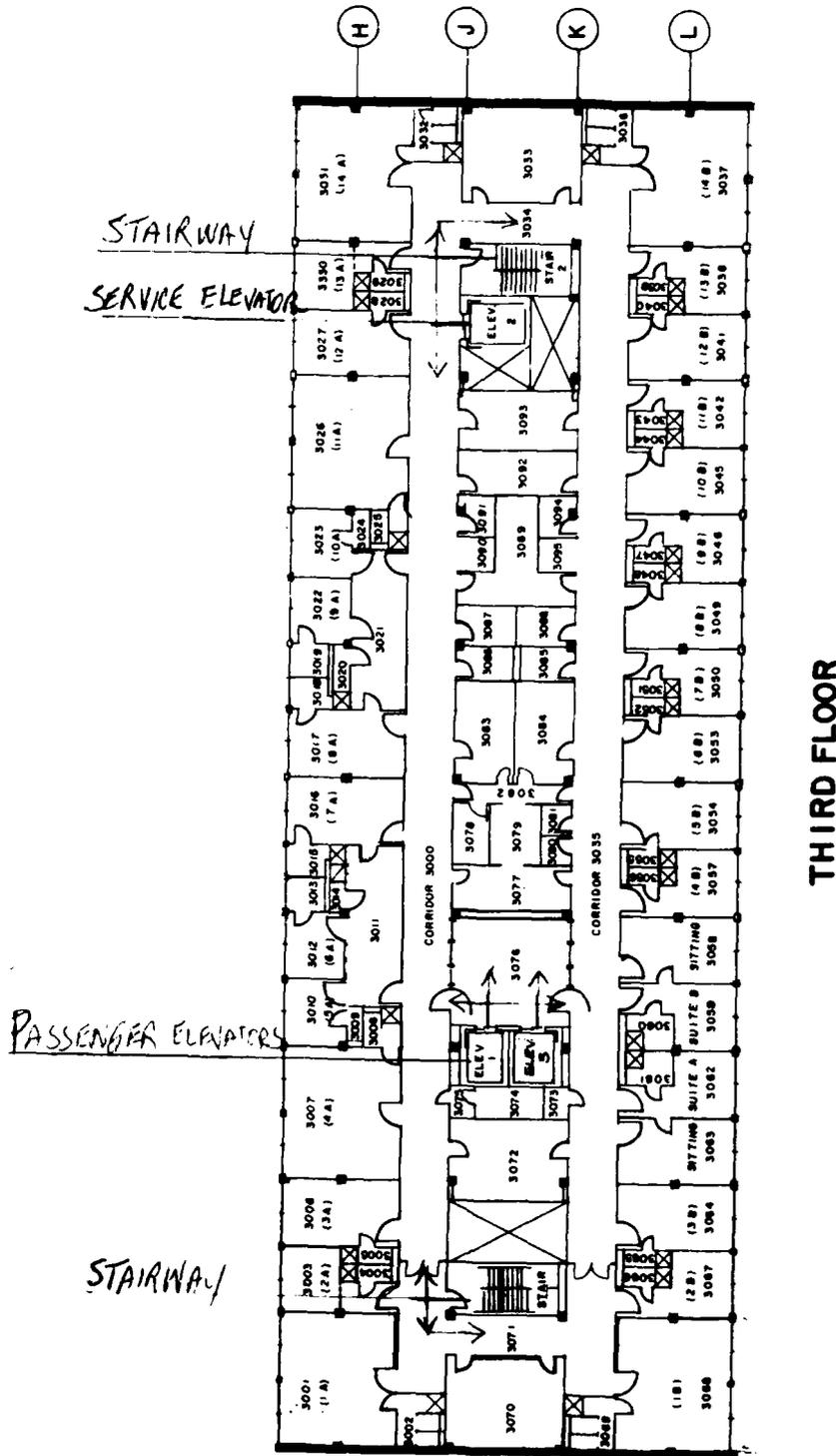
APPENDIX E

TRAFFIC PATTERNS WITHIN THE HOSPITAL



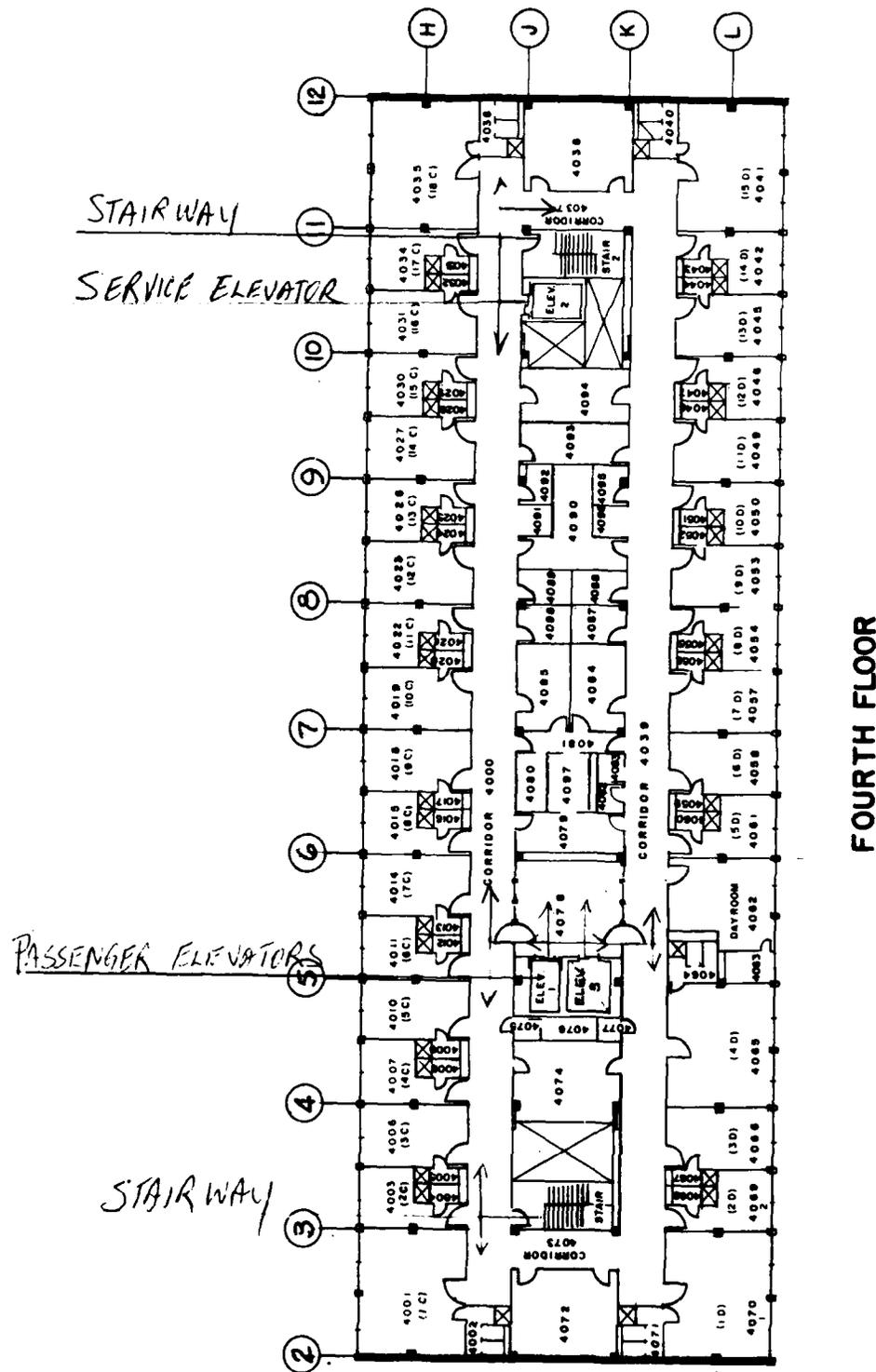


Appendix E; Figure 2: Second Floor Traffic Patterns



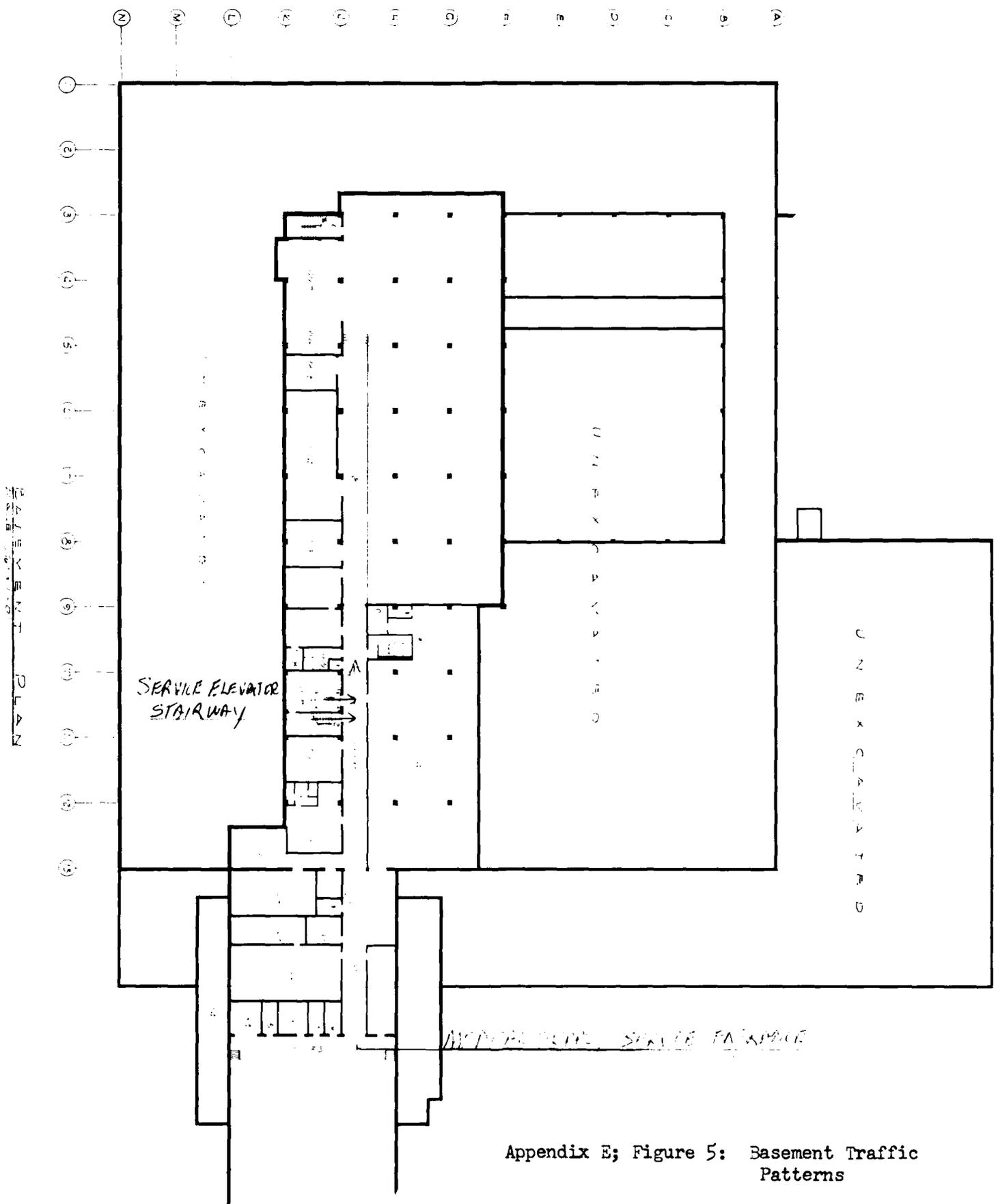
THIRD FLOOR

Appendix E; Figure 3: Third Floor Traffic Patterns



**FOURTH FLOOR**

Appendix E; Figure 4: Fourth Floor Traffic Patterns



Appendix E; Figure 5: Basement Traffic Patterns

APPENDIX F  
DIRECTORY SIGNAGE

APPENDIX F

TABLE 1

Directory for First Floor

KEY #	DIRECTORY FRAME SIZE	LOCATION	PANEL SIZE	PANEL/LETTER COLOR	MESSAGE
1.	22" X 14"	Flat	2" X 14"	Blue/White	← Emergency Room <--- Outpatient Records <--- Family Practice Clinic <--- Immunizations <--- Health Education <--- OB-Gyn Clinic <--- Internal Medicine Clinic <--- Orthopedic Clinic <--- Podiatry <--- Brace Shop <--- Dermatology
2.	16" X 14"	Flat	2" X 14"	Blue/White	Information ---> Admissions and Disposition ---> Pharmacy ---> Acute Care Clinic ---> Surgery Clinic ---> Eye Clinic ---> ENT Clinic ---> Physical Therapy --->
3.	10" X 14"	Flat	2" X 14"	Blue/White	X-Ray ---> Laboratory ---> Dental Clinic ---> Cardiopulmonary Lab ---> Nuclear Medicine --->

\*Refer to Figure 1

APPENDIX F

TABLE 1 (Cont.)

KEY *	DIRECTORY FRAME SIZE	LOCATION	PANEL SIZE	PANEL/LETTER COLOR	MESSAGE
4.	14" X 14"	Flat	2" X 14"	Blue/White	Internal Medicine Clinic → Orthopedic Clinic → Podiatry →→ Brace Shop →→ Dermatology →→ Cardiopulmonary Lab →→ Nuclear Medicine →→
5.	16" X 14"	Overhead	2" X 14"	Blue/White	Dermatology →→ X-Ray ↑ Laboratory ↑ Urology Clinic ↑ Surgery Suite ↑ Central Supply ↑ Maternity ↑ Elevators ↑
6.	16" X 14"	Flat	2" X 14"	Blue/White	Registrar ↑ Champus ↑ Elevators ↑ Maternity ↑ Surgery Suite ↑ Central Supply ↑ Urology Clinic ↑ Mental Health Clinic ↑ EEG Lab ↑

\*Refer to Figure 1

APPENDIX F

TABLE 1 (Cont.)

KEY *	DIRECTORY FRAME SIZE	LOCATION	PANEL SIZE	PANEL/LETTER COLOR	MESSAGE
7.	20" X 14"	Flat	2" X 14"	Blue/White	Command Section → Administration → Patient Advocate → Plant Management → Housekeeping Officer → Conference Room → Medical Resource Management → Cashier → Clinical Record Library → Medical Squadron Section →
8.	12" X 14"	Flat	2" X 14"	Blue/White	← Command Section ← Conference Room ← Medical Resource Management ← Cashier ← Clinical Record Library ← Medical Squadron Section

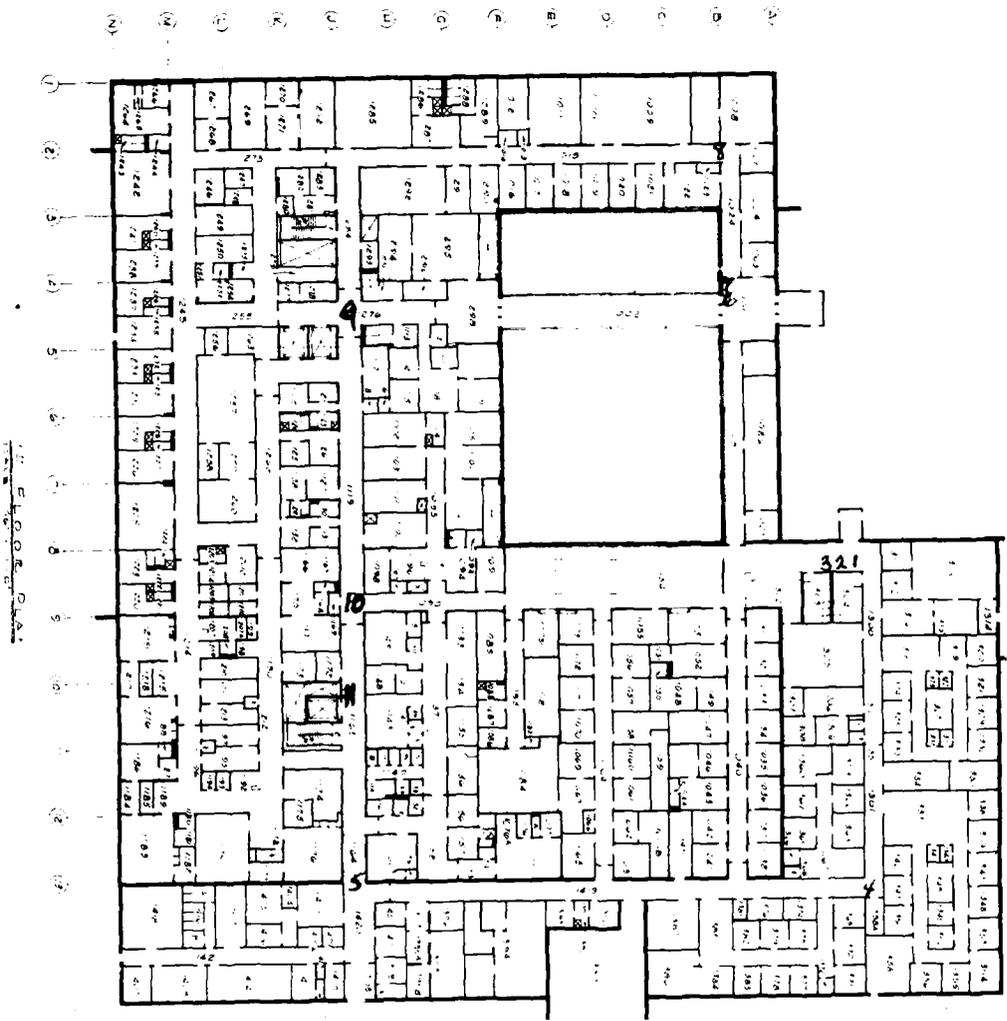
\*Refer to Figure 1

APPENDIX F

TABLE 1 (Cont.)

KEY *	DIRECTORY FRAME SIZE	LOCATION	PANEL SIZE	PANEL/LETTER COLOR	MESSAGE
9.	16" X 14"	Overhead	2" X 14"	Blue/White	<-- Urology Clinic <-- X-Ray <-- Laboratory <-- Mental Health <-- EEG Lab <-- Dental Clinic <-- Cardiopulmonary Lab <-- Nuclear Medicine
10.	4" X 14"	Overhead	2" X 14"	Blue/White	<-- X-Ray <-- Laboratory
11.	8" X 14"	Flat	2" X 14"	Blue/White	THIRD FLOOR Mental Health Clinic ↑ EEG Lab ↑

\*Refer to Figure 1



DEPARTMENT OF THE AIR FORCE	
HEADQUARTERS, AIR FORCE	
1100 GLENN BLVD, WASHINGTON, D.C.	
DATE:	11/1/50
BY:	W. J. BROWN
CHECKED BY:	
APPROVED BY:	
REVISIONS:	
NO.	DESCRIPTION
1	REVISED TO SHOW SIGN DIRECTORIES

Appendix F; Figure 1: First Floor Sign Directories

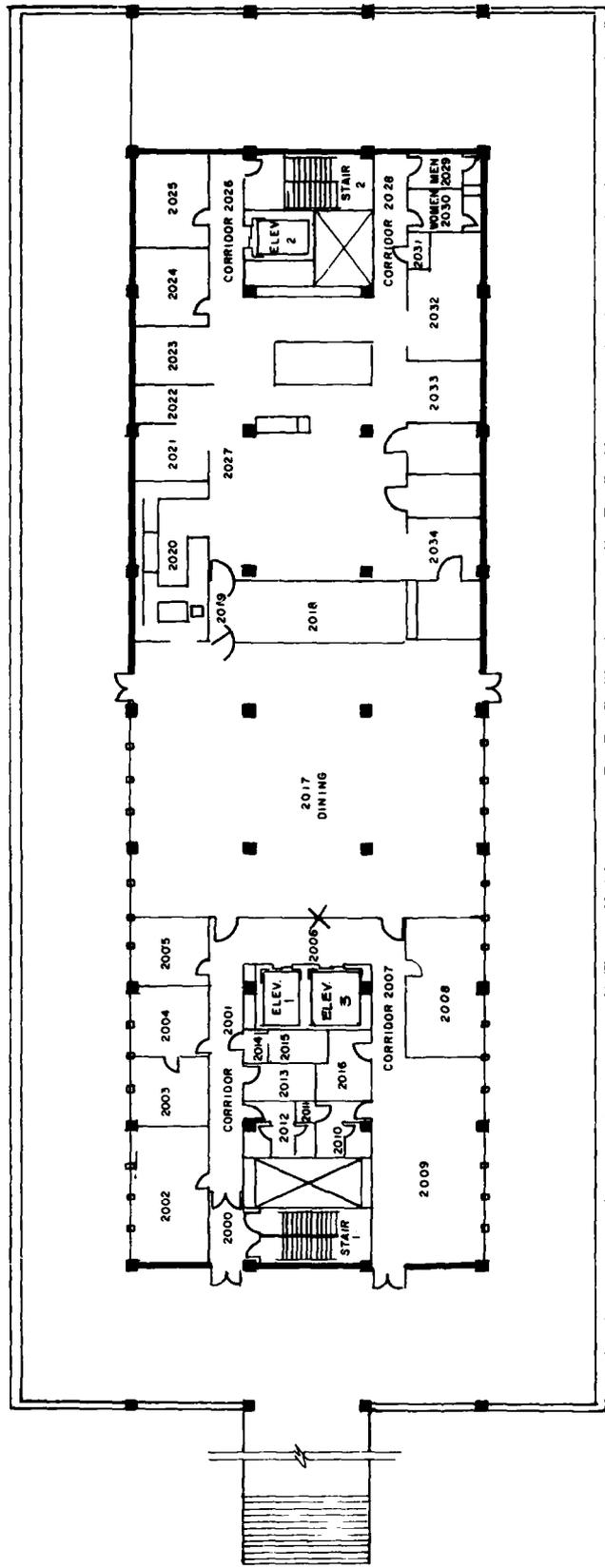
APPENDIX F

TABLE 2

Directory for Second Floor

KEY *	DIRECTORY FRAME SIZE	LOCATION	PANEL SIZE	PANEL/LETTER COLOR	MESSAGE
1.	12" X 14"	Flat	2" X 14"	Blue/White	←Nursing Education
"	"	"	"	"	←Dietician
"	"	"	"	"	←Chapel
"	"	"	"	"	Hospital BX →
"	"	"	"	"	Medical Library →

\*Refer to Figure 2



**SECOND FLOOR**

Appendix F; Figure 2: Second Floor Sign Directory

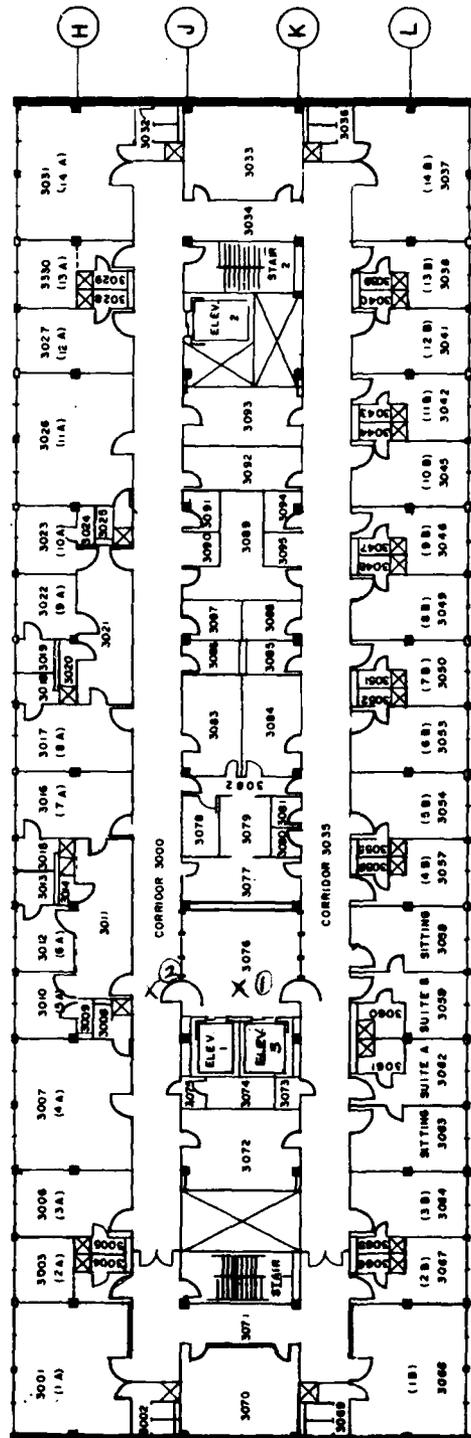
APPENDIX F

TABLE 3

Directory for Third Floor

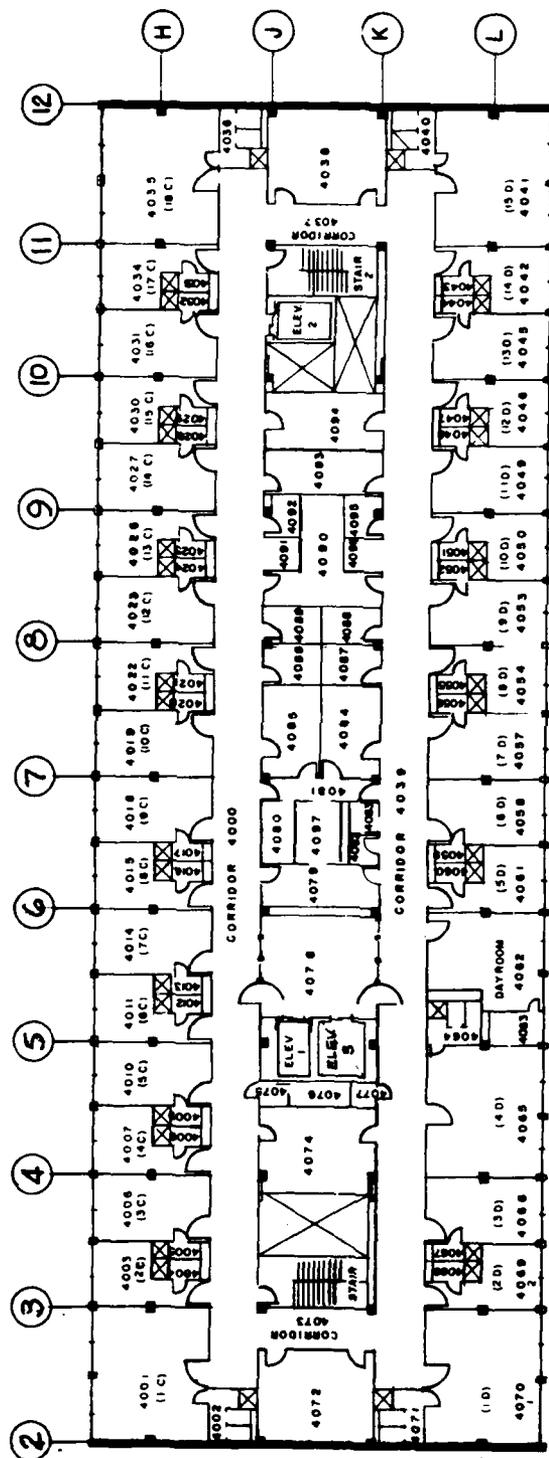
KEY *	DIRECTORY FRAME SIZE	LOCATION	PANEL SIZE	PANEL/LETTER COLOR	MESSAGE
1.	8" X 14"	Overhead	2" X 14"	Blue/White	<-- Mental Health <-- EEG Lab <-- Inhalation Therapy <-- ICU
2.	8" X 14"	Overhead	2" X 14"	Blue/White	Mental Health --> EEG Lab --> <-- Inhalation Therapy <-- ICU

\*Refer to Figure 3



THIRD FLOOR

Appendix F; Figure 3: Third Floor Sign Directories



**FOURTH FLOOR**

Appendix F; Figure 4:  
 No Sign Directories  
 on Fourth Floor

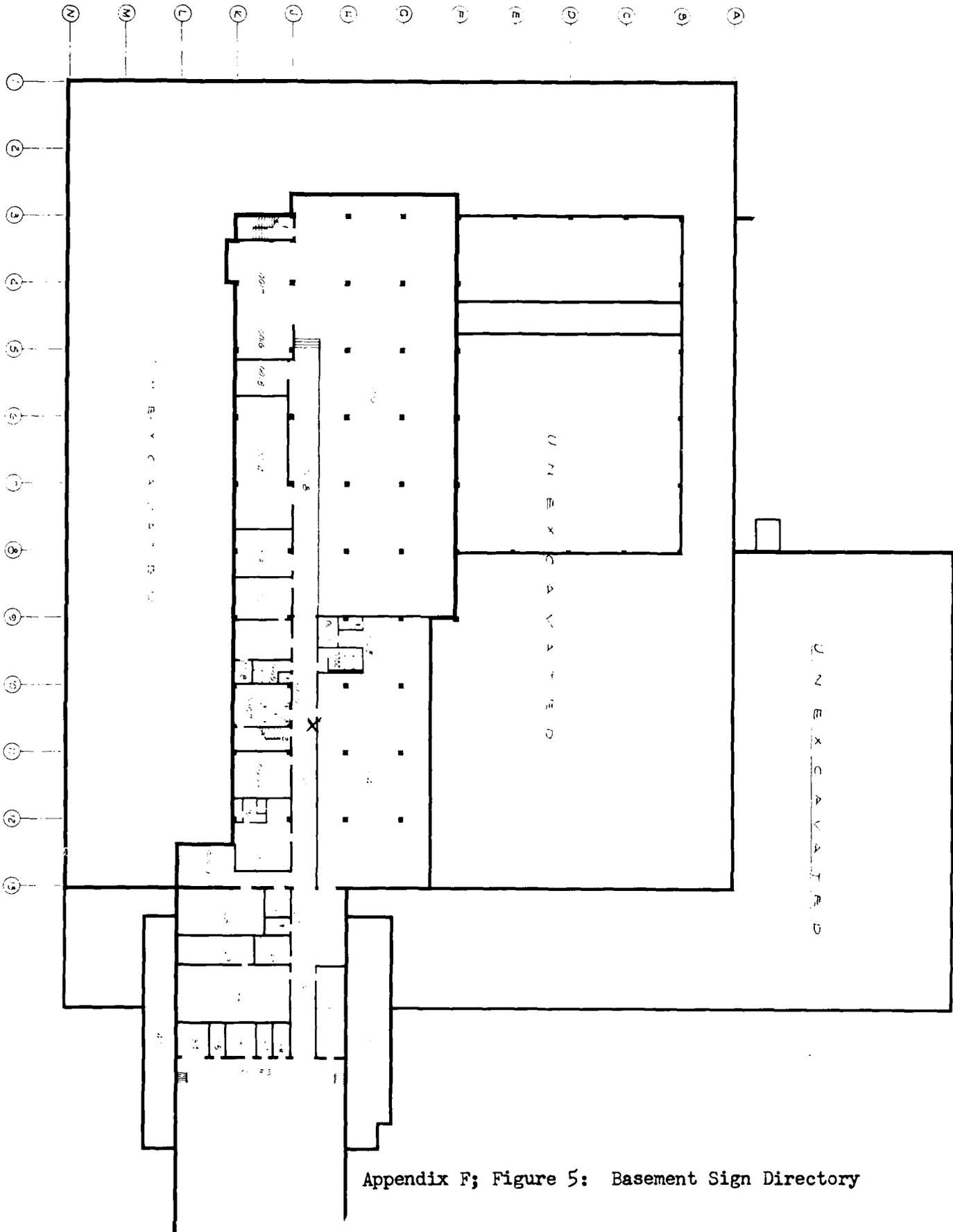
APPENDIX F

TABLE 4

Directory for Basement

KEY *	DIRECTORY FRAME SIZE	LOCATION	PANEL SIZE	PANEL/LETTER COLOR	MESSAGE
1.	8" X 14"	Flat	2" X 14"	Blue/White	Coffee Shop →
			"	"	Medical Materiel and Services →
			"	"	Medical Maintenance →
			"	"	Housekeeping →

\*Refer to Figure 5



Appendix F; Figure 5: Basement Sign Directory

APPENDIX G  
LOCATION SIGNAGE

APPENDIX G

TABLE 1

Administration Location Signage Listing

Sign Dimension for this listing is 3 5/8" X 18" each.

1. COMMANDER
2. HOSPITAL ADMINISTRATOR
3. ASSOCIATE ADMINISTRATOR
4. ADMINISTRATIVE RESIDENT
5. CHIEF, HOSPITAL SERVICES
6. CHIEF, NURSING SERVICES
7. CLINIC ADMINISTRATION
8. PATIENT ADVOCATE
9. PLANT MANAGEMENT
10. HOUSEKEEPING OFFICER
11. ADMINISTRATIVE SERVICES
12. MEDICAL RESOURCE MANAGEMENT
13. CASHIER
14. MEDICAL SQUADRON SECTION
15. COMMANDER, MEDICAL SQUADRON SECTION
16. MEDICAL SQUADRON SECTION FIRST SERGEANT
17. MEDICAL SQUADRON TRAINING
18. REGISTRAR
19. CHAMPUS
20. ADMISSIONS AND DISPOSITION
21. INFORMATION
22. OUTPATIENT RECORDS
23. HEALTH EDUCATION
24. NURSING EDUCATION
25. HOSPITAL BX
26. MEDICAL LIBRARY
27. MEDICAL MATERIEL AND SERVICES
28. MEDICAL SUPPLY
29. STOCK RECORDS
30. LOCAL PURCHASE
31. MEMO
32. MEDICAL SUPPLY WAREHOUSE
33. MEDICAL MAINTENANCE
34. HOUSEKEEPING
35. LINEN
36. RED CROSS
37. COFFEE SHOP

APPENDIX G

TABLE 2

Clinic Location Signage Listing

Sign Dimension for this listing is 3 5/8" X 18" each.

1. EMERGENCY ROOM
2. FAMILY PRACTICE CLINIC
3. OB-GYN CLINIC
4. INTERNAL MEDICINE CLINIC
5. ORTHOPEDIC CLINIC
6. PODIATRY
7. DERMATOLOGY
8. DENTAL CLINIC
9. ACUTE CARE CLINIC
10. SURGERY CLINIC
11. EYE CLINIC
12. ENT CLINIC
13. UROLOGY CLINIC
14. MENTAL HEALTH CLINIC
15. MINOR SURGERY

APPENDIX G

TABLE 3

Ancillary Services Location Signage Listing

Sign Dimension for this listing is 3 5/8" X 18" each.

1. PHARMACY
2. LABORATORY
3. X-RAY
4. IMMUNIZATIONS
5. NUCLEAR MEDICINE
6. CARDIOPULMONARY LAB
7. PHYSICAL THERAPY
8. BRACE SHOP
9. FOOD SERVICE
10. DIETICIAN
11. EEG LAB
12. CENTRAL SUPPLY
13. INHALATION THERAPY
14. SURGERY SUITE

APPENDIX G

TABLE 4

Nursing Unit Location Signage Listing

Sign Dimension for this listing is 18" X 18" each.

1. MATERNITY
2. INTENSIVE CARE UNIT
3. MEDICAL
4. ORTHOPEDICS
5. OPHTHALMOLOGY
6. GENERAL SURGERY
7. UROLOGY

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## SELECTED BIBLIOGRAPHY

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