

A BEHAVIORAL ANALYSIS AND DESIGN FOR KSU'S UNION PLAZA:

Two streets, a Square and People

by

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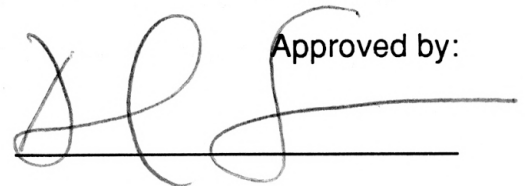
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A Behavioral Analysis and Design for KSU's Union Plaza

Two Streets, a Square and People

Abstract

"Open space" assumes an important role in the people-environment relationship, since space forms the setting for social activities. Therefore, its design is crucial as it has an effect on sociability. This thesis provides a conceptual framework in the form of design implications evolved from behavioral studies of the present social life of a plaza area at the Kansas State University campus.

In evolving these design implications, literature related to the design of urban and campus open spaces was studied. Two important research sources that form the focus of the literature study are The Social Life of Small Urban Spaces (William H. Whyte, 1980) and People Places- Design Guidelines for Urban Open Space (Clare Cooper Marcus and Carolyn Francis, 1990). This literature review was followed by observational behavioral studies, to understand the present social life of the Union Plaza area. The literature study and the behavioral analysis were then integrated to evolve several design implications. Finally, the thesis presents a schematic design for an invigorated Union Plaza.

The study provides a design process for the creation of open spaces that are sociable and responsive to people and their behavioral needs. Also, the design process reinforces the fact that designers of the built environment must understand the behavioral needs of people and address essential behavioral qualities that are more crucial to place making than mere formalistic design considerations.

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Chapter One

Introduction

"Urban open space" assumes a crucial role in the people-environment interaction, since it forms the setting for several collective activities which have a cumulative effect on society as a whole. Studies of various urban plazas (Bentley *et al.*, 1985; Marcus and Francis, 1990; William Whyte, 1980) have revealed a close relation between social response and the built environment of plazas. An ideal urban open space would be one that is pleasing, adaptable and beneficial to the people who use it. An urban space therefore must serve its purpose in recreation of the people while allowing them to indulge in a variety of activities that they associate with such places. Open spaces, by promoting social interaction can play a very positive role in the society.

Aims of the Study

The major aim of this thesis is to design a space that can sustain people and support their activities, using Kansas State University's Student Union plaza area as a case study and design focus. This plaza space is enclosed between four buildings located at the heart of the campus-- the KSU Union building, Seaton Hall, Ahern Field House and Anderson Hall (refer figure 1.3). This space is a major center of pedestrian activities on the campus and is also potentially a focus space for the image of the campus. A major issue that this thesis addresses is "how the plaza can be better designed to foster greater social activity and interaction. For the sake of convenience, the KSU Student Union Plaza area will be referred to as the "Union Plaza", throughout the study. In short, the aims of this thesis are twofold:

1. To understand the activities and behavioral needs of the users by conducting an empirical study of the Union Plaza, using observational methods.

2. To use the understanding gained in step 1 to present a design scheme for the plaza that will generate sociability and interaction while serving as a platform for a variety of student activities. By sociability, I refer to the coming together informally of individuals and groups in the Union Plaza.

The Context

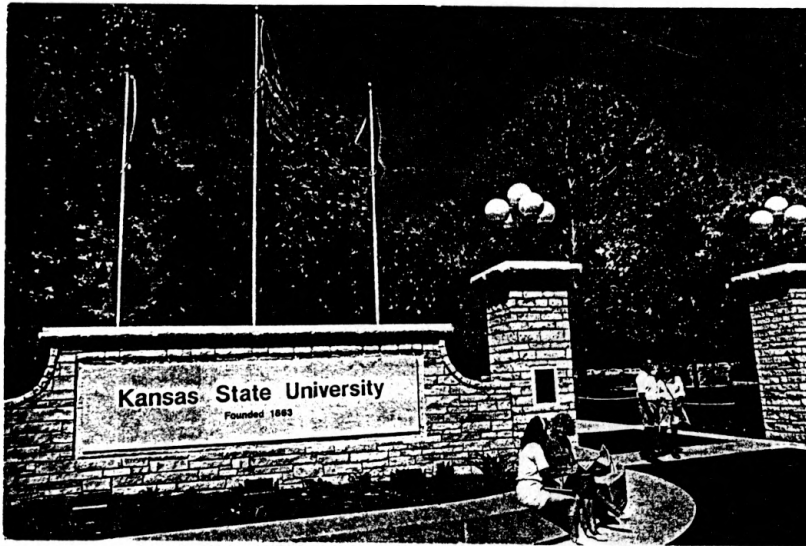


Figure 1.1: The main entrance to the Kansas State University.

Kansas State University is a comprehensive research/educational institution with over twenty thousand students. The sprawling campus set in the city of Manhattan, a university town in north central Kansas. The campus is laid on a 300 acres and most of the buildings are older than 50 years. The open spaces in the campus are a product of organic growth of buildings as the need arose over the years, which were mostly based on the need and the availability of space. As a result, buildings have been proposed more according to availability of space rather than on the basis of a preconceived campus master plan. Therefore, the open spaces in most cases are left over spaces instead of planned spaces for specific activities. However, it must be pointed out that the campus does not

have a dearth of open spaces but it is merely a situation of an incohesive blend of open spaces and buildings (refer figure 1.2).

It has been a general observation that owing to certain spatial and programmatic issues, a great number of open spaces on the campus are not adequately used. Many open spaces could serve as platforms for social interaction, while others could be used for recreation between classes. Some of the common defects in the open spaces on this campus are-- lack of optimum enclosure by the adjoining buildings to encourage activities, improper transition from closed to open space, unstrategic location of open spaces, lack of proper relation with the pedestrian walk ways, and other issues concerning infrastructure.

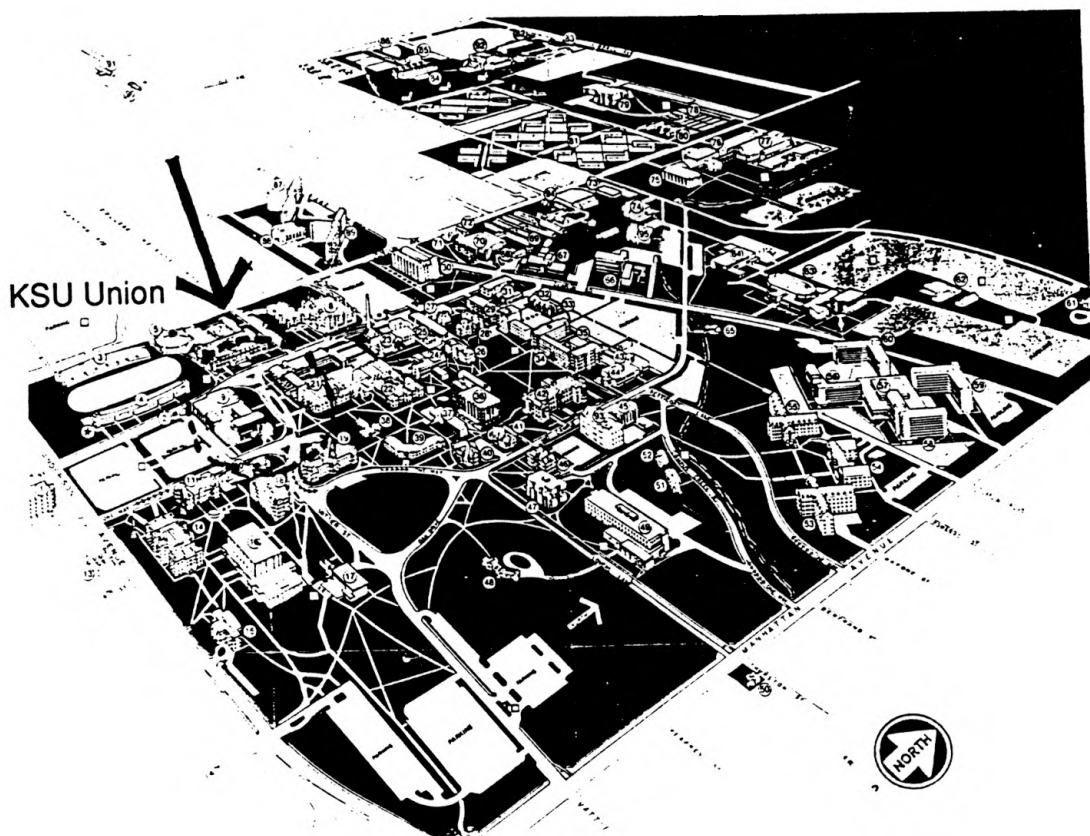


Figure: 1.2 Aerial view of the Kansas State University campus, showing the layout of the buildings and the open spaces (Kansas State University Publications)

Yet, interestingly enough, there are some open spaces that were not planned and despite lacking in infrastructure such as seating, water fountains and other accommodations for activity, attract people and provide a platform for a variety of activities. Probably, the best example of this is the Union Plaza located near KSU's Union building (refer Figure. 1.2). While it is true that the Union Plaza spatially has certain basic qualities to function as an open space, it is its location that attracts most of the people and adds to its potential to be developed as a successful open space. As the Union Plaza will be the context for this thesis, it would be beneficial to gain a thorough understanding of the same. Following is a description of the plaza its activities and its immediate surroundings.

The Union Plaza

The Union Plaza is an outdoor space located in front of the KSU's Union building and enclosed on four sides by buildings (refer Figure 1.3). This space is well-defined owing to strong sense of enclosure provided by the Union on the south, and the Seaton Hall on the north. This longitudinal space is enclosed on the shorter sides by Anderson Hall on the east side and Ahernfield House on the west. This enclosure is one of the favorable spatial aspects that makes this place conducive for student activities.

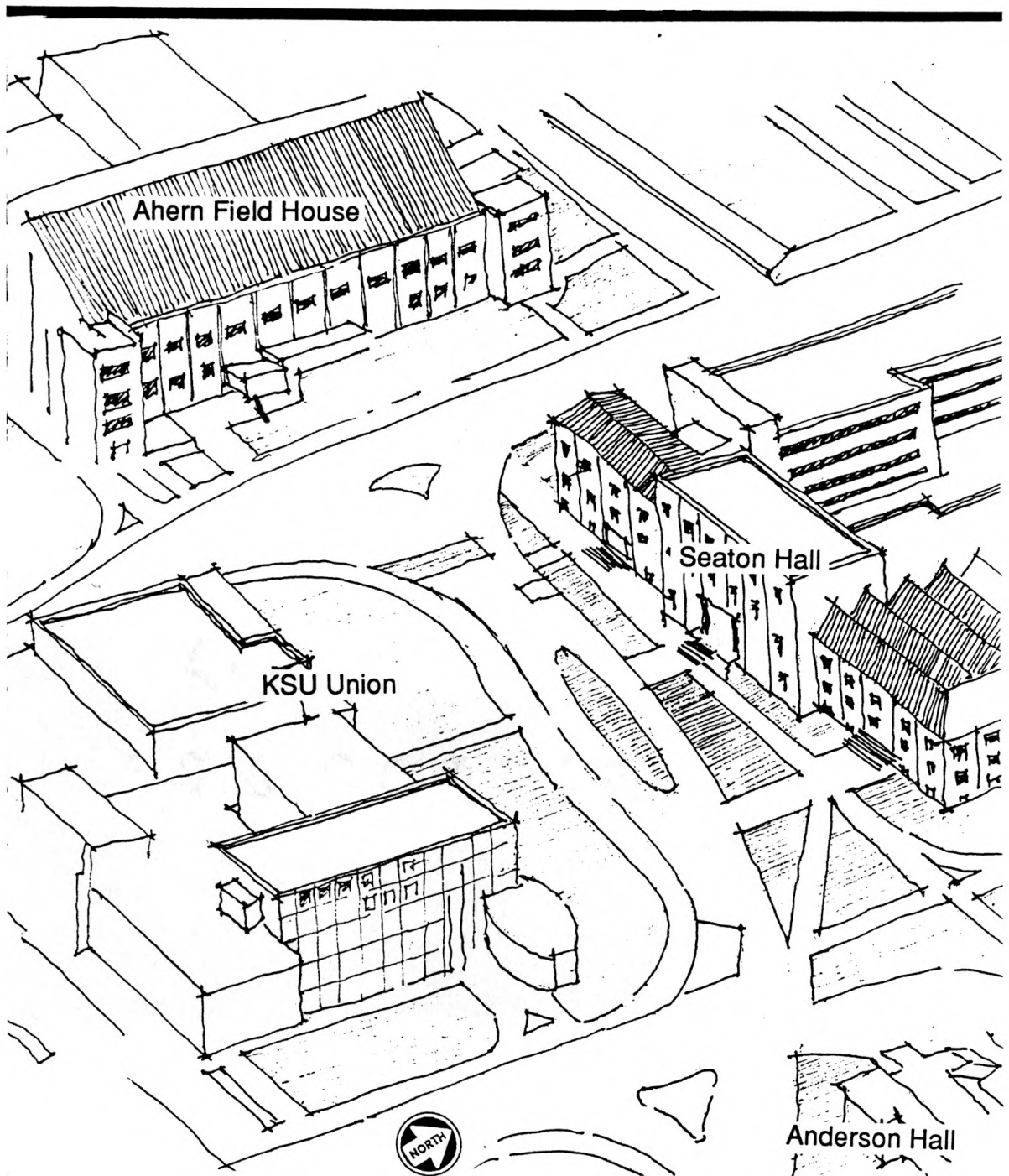


Figure 1.3: View of the Union Plaza area enclosed on four sides

Undoubtedly, the location of the plaza in the campus is the most important reason for its success as an open space. The Union building attracts people from all parts of the campus because of its dining and other recreational facilities. More importantly, it is the meaning attached to the Union as a central place or the heart of the campus and a place to relax between classes, that makes it so important. People pass through the plaza in order to enter the Union which is the reason the plaza experiences a lot of student activity. The plaza is linked to the rest of the campus by two streets that run along the north-south direction on the shorter ends of the plaza. These two streets experience heavy pedestrian traffic throughout the day, these two streets also serve as the major entrances into the Union Plaza.



Figure 1.4: Activities and services of the Student Union building

Another important feature that attracts people to the plaza is its proximity to many important buildings such as Anderson Hall and Fairchild Hall-- the University administrative buildings. Also, the two streets adjoining the plaza link the campus with two of the important pedestrian and vehicular entrances of the campus (refer Figure 1.3).

The K-State Student Union provides a place for all members of the campus community to come together to exchange ideas and interact informally. It also provides an opportunity for the students and faculty to eat together, enjoy films, sign up for a trip, bowl, attend a conference or relax in one of the Union's lounges. Considered the "Hosts of K-State," the Union provides something of interest for everyone on campus with different programs and varied service, all within a single facility.



Figure 1.5: Activities and services of the Student Union building

The five-level multipurpose facility, apart from being symbolic to the heart of the campus, provides important services to the people of the campus. There four major dining facilities, the Stateroom, the Bluemont Buffet, the Union Station and Subway serve thousands of people on campus for their daily meals. The Union also has several vending services providing an assortment of food, drinks and

snacks. A small post-office, Automatic Teller Machines (ATMs), a bank, a copy center, a book store and information center are among the other services that attract people on a daily basis. Another important aspect is that the Union serves as a place for entertainment and co-curricular activities. The Union has film shows, concerts, lectures and exhibitions of art and science that attract a great number of people. Among the recreational facilities that the Union provides are-- bowling, billiards, video and pinball machines and a Television lounge. Finally, the Union also has meeting rooms for conferences to be held with other infra structural support. Therefore, as mentioned earlier, the Union Plaza gains its importance, to a great extent, due to its proximity to the Student Union.

However, while the Union Plaza assumes an important identity as an outdoor space serving as an extension of the Union, it must be noted that it lacks in many aspects of design that are necessary for a successful outdoor space. Thousands of people traverse through the Union Plaza daily as they visit the Union, but the plaza fails to sustain other activities, the predominant activity being that of pedestrian movement. This heavy pedestrian flow through the Union Plaza provides a great potential to develop the plaza as an ideal open space serving as a place for student interaction, a comprehensive symbol of the spirit and ideology of the university.

Methodology

It is this potential of the Union Plaza that becomes the central issue of this thesis. The thesis is broadly sectioned into four parts:

1. Literature review,
2. Behavioral analysis of the Union Plaza,
3. Design implications and
4. The new design.



Figure 1.6: The Union Plaza

The literature review, as pointed out, earlier focuses on the book *The Social Life of Small Urban Spaces* by William H. Whyte, 1980. This review discusses Whyte's ideas about "sociability of a space" and draws forth his major assumptions for the design of a successful urban space. This understanding provides as a base for the next stage-- a behavioral analysis of the Union Plaza. This analysis conducted by methods such as behavior mapping, helps in understanding how the plaza works presently. Using the findings of this analysis in the light of the literature review, design implications are then derived for the redesign of the plaza. Finally, these design implications will be architecturally interpreted in the context of the Union Plaza to arrive at a new design scheme for the plaza.

Sociability is one of the key ingredients that can make an outdoor space such as the Union Plaza successful. It is envisioned that with the plaza would serve as a multi-functional space for both informal and formal student activities. It has the potential to become a place where students can relax between classes or for student exhibitions or larger fairs.

This study hence, would demonstrate the importance of considering behavioral aspects of the users while designing such social places. Also, this study attempts to serve as a model for developing a design process for other similar situations.

Chapter Two

Literature Review

The people-environment relationship is rapidly expanding as a multi-disciplinary area of research and is being labeled by various researchers as environmental psychology, environmental perception, environmental behavior, environics, human ecology, spatial, behavior, man-environment relation, environmental design, behavioral geography, ergonomics and so forth. Most of these studies, such as Peter F. Smith's *Dynamics of Urbanism*, (1973) or Thomas F. Saarinen's *Environmental Planning - Perception and Behavior*, (1976) stress the interrelationship between the environment and people, and provide ways to measure our perception of the environment, effects of individual and cultural differences on environmental perception and ways to determine limiting factors of environmental comfort or stress. All these studies reinforce the idea that the environment influences people's lives and their behavior.

More specific literature related to the physical built environment (architecture) includes discussion of the behavioral aspects of urban open spaces. Standard texts such as Gordon Cullen's *Townscape* (1961), deal with the sculptural arrangement of buildings and space, with almost no reference of their actual day-to-day use except on a visual and aesthetic level. Literature such as *Plazas for People*, by Don C. Miles (1978), deal with plaza issues such as governmental regulations, economic consideration, design factors and alternatives for future actions such as zoning.

What now prevails is an attitude of the designer caught up in discussion of the "solid-void dialectic" and the debate about building and space. The more mundane but essential issues of people's use of, and interaction with the environment such as places to sit and shade from the sun and the more popular

notion of "to see and be seen" in urban spaces are typically overlooked in the formalistic design literature.

Works of Rob and Leon Krier such as *Urban Space and Rational Architecture* (1982) mention the issues of human scale or the desirability of twenty-four hour activity in urban spaces, but mainly dwell on spatial and aesthetic qualities of various built forms and the areas enclosed by the urban spaces. The focus is "a morphological clarification of urban spaces" (Krier and Krier, 1982). The Kriers provides a staggering array of shapes and configurations but does not clearly explain the relationship of these spaces to the activities and experiences they support.

More recent works such as *Responsive Environments* by Bentley and others. (1985) attempt to link ideals through appropriate design ideas to the fabric of the built environment. Bentley and his colleagues advocate a democratic setting, enriching opportunities by maximizing the degree of choice available to people, which are referred to as "responsive environments". The authors describe how design effects choice in their concepts of permeability, legibility, variety, robustness, visual appropriateness, richness and personalization.

It is thus clear that the literature available on the design of urban spaces has been analyzed from various perspectives by various authors, each focussing on a particular aspect. Most of these literature provide analytical information about the spatial and psychological requirements of such spaces. Such literature helps in providing theoretical understanding of the complexities of the various ingredients of social situations such as the urban street or square.

Another type of literature exists with a more pragmatic analysis of the issues relating to design that make the built environment more successful in use.

One practical source, William H. Whyte's *The Social Life of Small Urban Spaces*, directly addresses the issue of "why some city spaces work for people and some don't" (Whyte, 1980, pg. 9). This approach sets aside conventional theories and instead uses a case-by-case study of existing examples of urban plazas to derive design guidelines for urban plazas. A number of other studies deal with pedestrian movement, using many of the same methods formerly applied to traffic movement.

Here it is also important to mention Mark Francis' work (*Urban Open Spaces: Advances in Environment, Behavior and Design*, 1987). Probably, this is the one of the few reviews that comprehensively puts different research strategies on one single platform and allows the reader to perform a comparative study of these. This article review is a collection of works of different researchers and presents theoretical, substantive, methodical, and applied advances in multi-disciplinary field of environment, behavior, and design. In dealing with the advances made in urban open-space research and design practice, Francis briefly examines common approaches to open space research, advances and past research. The chapter also presents specific dimensions essential for creating successful open spaces and concludes with a review of important frontiers for future open-space research.

Two university departments of landscape architecture had their students evaluated plazas in Chicago and San Francisco. Rutledge and his graduate students at University of Illinois at Champaign-Urbana produced in 1975 what probably is still the most detailed study of a single plaza, the First National Bank Plaza, Chicago. Besides interviewing both designer and the users, the students also tracked and mapped the use of the plaza. Their study remains a model of what can be achieved on a small budget and in a very short time (Rutledge, 1975).

Literature on campus outdoor spaces

There is a dearth of literature published on how campus open spaces are used. Some literature such as a volume entitled *Campus Buildings That Work* (Association of University Architects, 1972) and one named *Campus Planning and Design* (Schmertz, 1972) are merely architectural picture books dealing principally with technical innovations and issues of form. Such books speak little concerned with the use and design of spaces between buildings. Some of the deficiencies in the literature on campus outdoor space use are beginning to be filled by studies written by students and faculty such as, *People, Places* (Cooper Marcus and Frances, 1983) where post-occupancy evaluation is part of the curriculum.

This book deals with design principles of open spaces based on behavioral research and performance of several existing examples in the form of case studies similar to that of William Whyte. The authors discuss a variety of urban open spaces with case studies and offer recommendations for design of such spaces. The authors express a deep concern for the lack of outdoor spaces for public and the dominance of commercial agencies over this domain. According to the authors, campus outdoor spaces are one of the seven important types of public outdoor spaces. This book will be discussed in further detail in the following part of the chapter.

To evolve design guidelines for the redesign the Union Plaza, it will be helpful to understand Whyte's major assumption that parks or plazas should be sociable spaces. People attract people, therefore the designer should produce a design which brings people to the space so that yet other people will be attracted (William Whyte, 1980). The book also lists design factors contributing to a sociable urban space. His study is based on observational data.

This study adopts Whyte's notion of measuring the success of an urban space on the basis of its sociability. As stated earlier, this thesis uses a behavioral study of the present use of the K-State Union Plaza to arrive at design guidelines for the proposal of a new sociable scheme. To form a basis both for basis for conducting this behavioral study, this thesis looks primarily at two literary sources that have already been described.

1. *The Social Life of Small Urban Spaces*, by William Whyte, 1980.
2. *People, Places* by Clare, Cooper Marcus, 1990.

Both these works are based on similar behavioral studies of several urban settings and propose design recommendations from such research. The final design guidelines will be based on both the findings that emerge from the behavioral study of the Union Plaza and the design recommendations made in these literary sources.

The Social Life of Small Urban Spaces

The following part of this chapter discusses William Whyte's, *The Social Life of Small Urban Spaces*, highlighting important guidelines for the design of sociable urban spaces. The points discussed in this chapter will at a later stage in the thesis be used along with behavioral studies of the KSU's Union Plaza context to draw forth specific guidelines for its redesign.

The work of sociologist William H. Whyte and the designers and researchers at Project for Public Spaces, Inc., has been of service by helping the citizens of New York to escape temporarily from the crowded streets, sidewalks, and buildings through influence on the city's architecture. By studying the city's public spaces - places where people could relax, enjoy the street life, talk, and eat their lunches or food purchased from street vendors - Whyte and his

colleagues were able to identify the architectural features that made public spaces popular and thus more useful to people. His findings were eventually incorporated into zoning laws that have influenced the forms of many public spaces that have been built by private developers throughout the city, in addition to being incorporated into the design improvement of specific public spaces.

The Street Life Project began to investigate the patterns of use of 18 small urban plazas in New York in 1971. The basic plan of that research was to observe the activities in the plazas and to relate the patterns in those activities - differences in amounts and types of activities among the plazas - to the characteristics of the plazas themselves, such as physical and architectural elements, location, and nearby facilities (Whyte, 1980).

With the use of time-lapse photography, Whyte recorded human activities at each of the 18 plazas. It was possible to determine such summary facts as how many people used a plaza, what types of people they were, how usage varied with time of day and day of week, how long people stayed, what they did, which areas of a plaza were most popular and more.

The greatest variability, Whyte found, was in the degrees to which the plazas were used. For example, in the hour between 12:30 and 1:30 in the afternoon, the peak period of use for every plaza, the average number of users in good weather varied from fewer than 25 to more than 150 across the 18 plazas. This varied use was explained by Whyte as the differences in the physical features of the plazas themselves. The study found several strong physical correlates of the plazas' popularity that were used to fashion a general explanation for the success or failure of small public urban spaces.

Whyte's research revealed that what people think they desire in plaza design is often different from their actual behavior in plazas-- such as, seeking out plazas of sociability (Whyte, 1980). Whyte's major assumption is that, parks and plazas should be sociable places. People attract people, therefore the designer should produce a design that brings people to the park or plaza so that yet other people will be attracted. Whyte argues that "what attracts people most is other people" (p. 19). He asserts that many urban designers and landscape architects design spaces "as though the opposite were true, and that what people liked best (in principle) were the places they stay away from (in practice)" (pg.19).

Interestingly enough, the first physical feature that was found to relate the rates at which plazas were used was the amount of "sittable space" available in a plaza. Benches, wide steps, and low walls or ledges that serves as boundaries for a plaza or for walkways in the plaza gave its users places where they could sit, relax, talk, eat, or people-watch. The more places there were to sit, the more people used a plaza. Whyte contends that the seating should be: (1) physically comfortable; and (2) socially comfortable. Whyte's criteria for physically comfortable seating are the height which he believes should range between twelve to thirty six inches; and width, which he feels should be a minimum of fourteen inches for seats used from both sides. Whyte describes sociably comfortable seating space as that which provides a fair amount of choice to people such as, "sitting up front, in the back, to the side, in the sun, in the shade, in groups, off alone" (pg. 28).

The way in which the boundaries of a plaza were designed and built was also an important determinant of its use. Pedestrians were more likely to enter a plaza if they could easily tell from the sidewalk or paved surface that the space was indeed a public plaza. Whyte says that the relationship between the street and plaza should stimulate "impulse use," by which he means that the quality of a

space to draw people into it without hesitation or conscious attention. If people outside the plaza could see the people and their activities inside, they would feel invited in to use the plaza themselves. Plazas that had narrow entrances, that were not readily visible from the street, and that were too far above or below street level were used less. However, Whyte strongly recommends slight level changes to accommodate a few comfortable steps which work as beckoning devices. Trees and entrance markings, if designed carefully, could stimulate impulse use of the plaza.

In addition to seating, several other amenities were associated with a plaza being a busy place. Plazas that provided more sunny places to sit were more popular, especially when the weather was cool. At the same time, protection from wind or drafts down the sides of tall buildings made plazas more comfortable and more popular. Whyte also found that plazas that were most heavily used often had trees and pools or fountains.

Finally, one of the most important factors was food. Plazas where street vendors were allowed to sell food were more popular. Whyte attributed this, in part, to the increase in activity that passersby saw and visitors to the plaza found there. Contrary to popular beliefs about privacy, it was found that people were more likely to begin conversation in the midst of a dense crowd of other plaza users than when off by themselves in a quiet corner of the plaza. People seemed to enjoy using a busy plaza more than an empty one. Plazas that were located in the areas of heavy pedestrian flow, such as street corners were used more, because busier places are actually more attractive. To maintain a constant flow of people, streets near the plaza should be a link between major activities such as offices, shopping and restaurants. the street corner has its own significance since "a good plaza starts at the street corner. Whyte thinks that a plaza should not be isolated from larger populations of people. Thus, it should be located in a

highly populated area, near heavily used streets or street corners.

Frequently ignored in books on campus planning and design, campus outdoor spaces deserve far greater attention than they have yet received. Their use for circulation, study, relaxation and aesthetic pleasure rarely assumes great importance in such studies. Observations indicate that a great deal of casual interchange, chance meetings, entertainment and study between classes takes place outdoors when the weather permits. As in the city, a good deal of life and learning occurs *between* scheduled events or specific buildings. I argue that this is the very stuff of education.

People, Places

The other important literary source that I would study is *People Places*, Clare Cooper Marcus and Carolyn Francis (1990). In their book about sociable places, the authors devote one chapter to campus out-door spaces. This chapter, based on the studies conducted by Clare Cooper Marcus and Trudy Wischmann puts forth the belief that education does not merely occur within enclosed classrooms. The authors strongly profess the design of outdoor spaces that are conducive to a variety of student activities. They present their ideas in the form of design recommendations based on:

- (1) studies by a fifth-year landscape architecture class of the Berkeley campus,
- (2) the authors' less formal observations at other Bay Area campuses (Stanford University, Merrit College, Laney College, Foothill College) and
- (3) monographs on outdoor space use at the University of New Mexico (Institute for Environmental Education 1982).

The resulting guidelines deal principally with the design of outdoor spaces as areas to be in, rather than just pass through.

The authors start by a discussion of the deferent kinds of campus outdoor spaces providing design recommendations for each. "Home base" is the first kind of space discussed in this chapter. These kind of spaces are described as spaces around which each student, employee, and faculty member has a work or home base around which his or her daily campus activities focus. According to the authors, this space is the users' "home-away from home" and is usually a kind of "front porch," "front yard" or "back yard" of the buildings with which the users identify. The authors emphasize aspects of a clear and smooth transition from outdoor to indoor spaces and provision of comfortable seating.

The next type of outdoor space is the Common Turf: campus spaces used by everyone. This type of space is more specific to my study as it deals with outdoor spaces that have a larger user-group such as campus entrances and major plaza spaces. Here, I will discuss the part of the chapter that deals with what the authors call the major plaza spaces, since the Union Plaza is such a space.

Major plaza spaces

These are described as central gathering places in the campus and are comparable squares in small towns and traditional villages. These are places where friends meet, bands play, displays are placed, rallies are staged, and people come to watch other people or just relax between classes. The authors emphasize the following design recommendations for successful plaza spaces:

Size

According to the authors, most of the plaza-spaces are designed for the large activities such as rallies, speeches, or performances which happen only occasionally. During other times these spaces seem empty and ambiguous. With this argument, the authors suggest that plaza spaces must be designed for both large gatherings as well as for less intense activities that happen on a day-to-day basis such as quiet studying and conversation.

Location

The authors stress the importance of the location of the plaza in the campus. According to their studies, plazas must be located on "common turf", where people from all parts of the campus feel equally comfortable. Other recommendations regarding the location of plazas include the plaza being bounded by places that generate a high degree of use throughout the day and into the evening. These might include student center or student Union, library or theater. Also, the central plaza must be located where major pedestrian flows pass by so many people become familiar with the place, see it in different moods and seasons, and gradually "appropriate" the space cognitively. The central plaza can be an important socio-psychological and perceptual orienting device and therefore pathways should naturally focus on it.

Spatial Attributes

Two basic activities that must be accommodated in the plaza are passing through and stationary behavior (sitting, studying, waiting, eating, watching). These two activities must proceed without impeding on each other. The authors provide the analogy of a flowing river (pedestrian movement), with eddies off their side (for sitting, watching). Also the seating must be provided in both prominent and less prominent positions.

Seating

The authors note that people feel more comfortable sitting on the edge of a space with something at their back. Hence, the campus plaza should allow as articulated an edge as possible and provide many anchor spots (*e.g.* trees, columns, planters). They also observe differences in seating preferences by men and women. While the women seek out edges, corners and physical props in the environment, men on the other hand are predominant users of more exposed positions, such as lawns for sunbathing or a set of steps for obvious people watching. These observations indicate that a variety of seating locations should be provided.

The authors also observe a need for informal and formal seating area to be able to accommodate a great variety of uses, from quiet study to surreptitious people watching, to more blatant people watching, to waiting for a friend in a prominent place. This again reinforces the need to provide a variety of seating options. The authors suggest the use of benches with or without backs, steps, retaining walls, fountain edges and so on.

Among other requirements for the major plaza are bicycle racks, boards for official notices, a cafeteria or restaurant. A restaurant with outdoor seating, according to the authors, should be within view of the plaza, with food-vending kiosks or carts at which students can buy inexpensive snacks. The authors' observations indicate that eating gives people a needed excuse to be in a public space reading, studying or watching the world go by. Women were observed to need such an excuse more than men do. An aesthetic focal point, such as a fountain can be an attractive adult play equipment.

Behavioral Analysis of the Union plaza: Movement

Aims

Besides insights from the literature on plaza design, another major source for deriving guidelines for the redesign of the Union Plaza is a behavioral analysis that will describe "how the Union Plaza currently works." While this study of the space will highlight the day-to-day activities that take place, it also provides important information about the patterns of use that will then be studied in detail. This research can reveal important implications for the redesign of the plaza. Thus, the aims of this behavioral analysis are:

1. To gain a general sense of the plaza's activities,
2. To understand and record user movement patterns,
3. To conduct a detailed analysis of the specific movement patterns within the plaza, and
4. To have aggregate information and other specific data of these movement patterns.

To actualize these aims, the behavior mapping conducted here made use of observational data and involves documenting the various activities on a base map of Union Plaza. The process of mapping involves observation of major flows at different times of the day for five days of one week when the University was in session. These data were then recorded on the base map. Other important activities such as encounters, seating and standing, small informal gatherings were also recorded on the map (this data will be discussed later in chapter four).

The mapping of pedestrian movement involved various steps, including establishing time periods for the mapping, making a layout, selecting

observation points so as to monitor the activities, recording other observations about the present use of the plaza space. This general understanding was then clarified further by detailed behavioral analysis, that looked at each of the flows in detail with respect to the number of people at various parts of the day. Also, a detailed study of the people at rest helps in understanding the conditions favorable for issues such as seating and social comfort. This later topic is discussed in the following chapter.

The following section is a detailed description of the process and methods employed for the mapping conducted during this time. A pilot-study was conducted to understand the important aspects of the Union Plaza. This study consisted of observation and some preliminary mapping. During this phase of mapping, it was observed that the two basic types of activities that occurred in the Union Plaza were activities related to movement and rest. Also, this study enabled establishing major movement and rest observation points. Other information that was gathered during this phase of mapping is presented in the following sections.

Establishing the observation time periods

Kansas State University follows a class schedule that allows for a ten-minute break between the fifty minute classes. The break begins twenty minutes past each hour and end at and thirty minutes past the hour. The highest intensity of activity is thus a ten-minute period from twenty to half past the hour. This forms the basis for making most of the observations during this time period. However, it is also true that the period when classes are held, the plaza does experience some activity that needs to be studied so as to understand a holistic activity pattern for the plaza. For this purpose, mapping was conducted during these so called 'off-periods'. The method of mapping adopted was similar to the rest of the mapping, although the time periods were different.

Behavior mapping was conducted for five working days of the week between Monday, 13th November and Friday, 17th November 1995. A five-day observation was conducted prior to the actual mapping, and the major flows were established. The assumption made in this study is that any five-day period from Monday to Friday would effectively document any variations between the days of the week. Thus, mapping was conducted in the first week of October 1995 from 8:00 am to 6:00 pm. This time period is the part of the day when most of the classes on the campus take place and it is during this time that the plaza is most actively used by the students.

This particular period in October was chosen because this part of the year does not experience extreme weather conditions which would not provide results that would be too specific to a particular part of the year, weather being a major factor that influences outdoor activity. October, in Kansas is when the weather is moderate to encourage outdoor activity, thus the findings of this behavioral analysis will be based on moderate climatic conditions.

The Base Map

The base map was a layout of the Union-plaza space including the buildings that enclose it-- the Union building, Seaton Hall and the Ahernfield House. The existing roads, sidewalks, steps, entrances and important landscape features were all identified in the base map. The original base map is shown in Figure 3.1. A grid was laid over this base map to enable easy locating and recording of observational data. A ten-feet grid was selected for this purpose because it can be conveniently used to mark individuals and small groups. For the sake of convenience, an appropriate scale of one inch equals 70 feet was used for the map. Several copies of this base map were made on legal size paper. When the map was used for observational counts, it was placed on a clipboard and thus readily available for recording behavioral data.

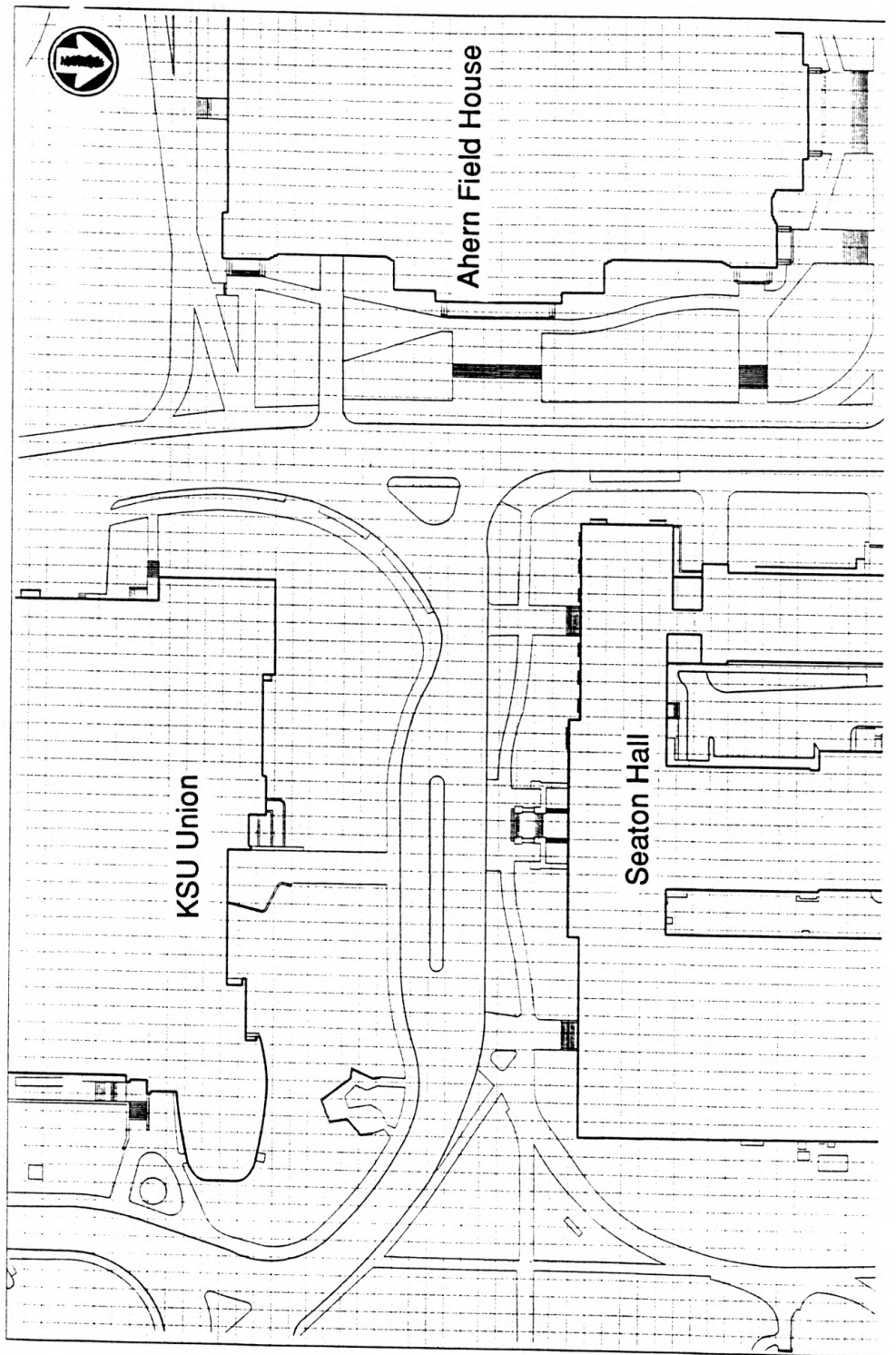


Figure 3.1: The base map used for mapping the movement patterns

Selecting observation points for pedestrian movement

When mapping major pedestrian traffic flows and other movement patterns, it became important to preselect a specific observation point to monitor all access ways in and out of the plaza space. After some preliminary trials from high points such as the main and west entrances of Seaton Hall, it was found that these places, although they provide a good view of the plaza, did not enable for the view of all access ways due to trees that restricted the view.

In order to count the people on the different flows identified, it is necessary to choose observation positions which provide unobstructed views. Most of the flows are along the concrete walkways and a convenient location for observation was the side of the walkway. It was helpful to have a reference point in the spot to count the people as they walk across it. The expansion gaps in the concrete walks were useful for this purpose. It is important while selecting the observation point to consider the possibility of quickly shifting to the next location for observation. Also, the point where a certain flow enters the plaza space is an important since in many cases here others smaller flows converge into the main flow. In other cases, it is important to locate the point of observation at other points in the plaza for instance when two flows converge at a certain spot in the plaza (the Union entrance where several flows converge).

With these criteria, one spot was selected on each flow and these were named alphabetically as A,B,C,D,E,F,G,H,I and J, according to the order of the proposed movement from one location to the next. These observation points are illustrated in Figure 3.2. Note that point B is close to point A and so is D to B and all the other spots follow this order.

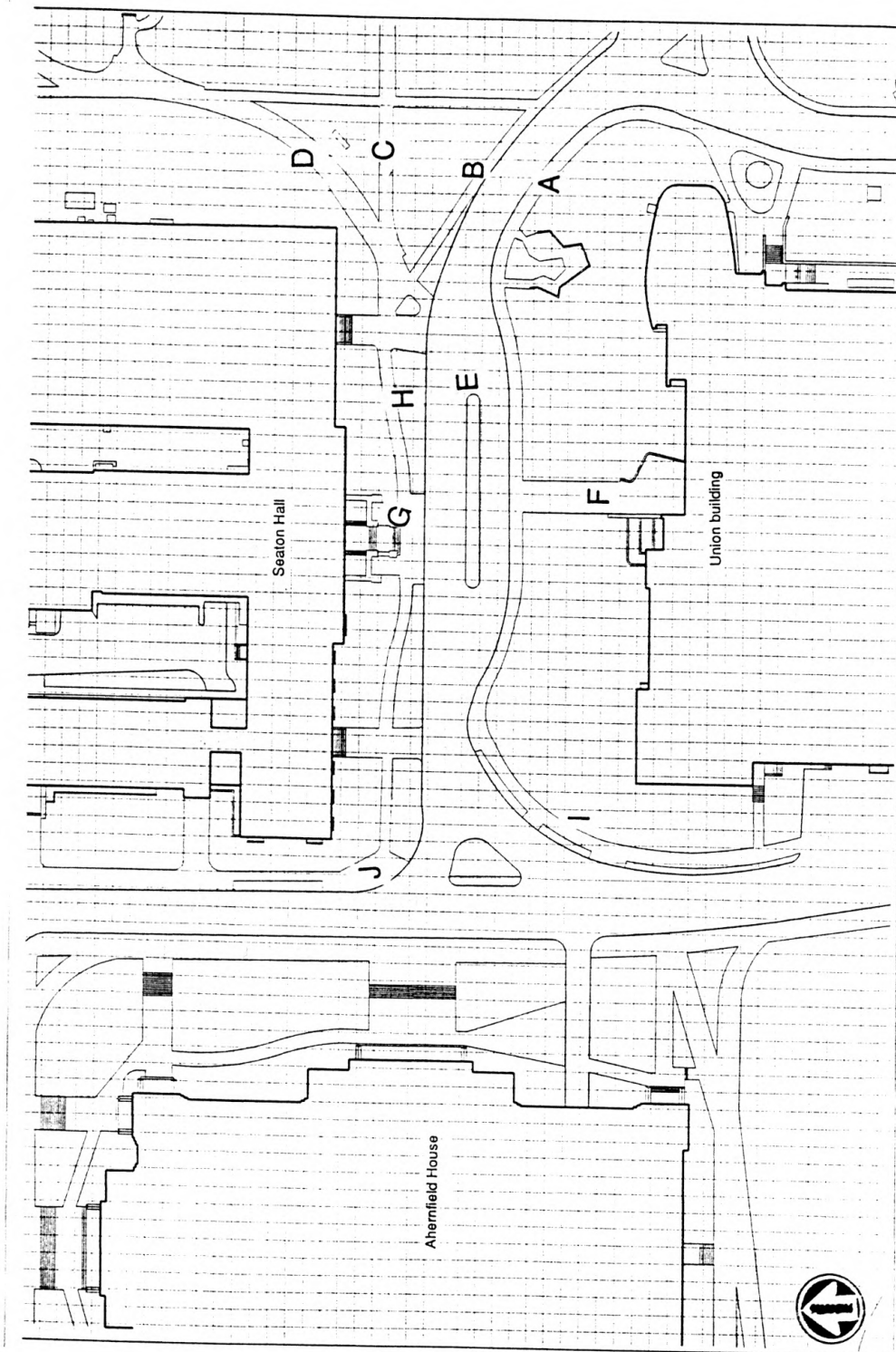


Figure 3.2: Base map showing the observation points for pedestrian movement

The mapping process

An important part of the behavioral mapping was establishing the major flows. A pilot study was conducted to establish the major flows for five days before the actual mapping process began. As was said before, the five-day mapping was conducted from Monday to Friday, October, (refer Figure 3.3). The ten-minute time periods between twenty minutes and thirty minutes past an hour were mapped. Each of the five days was mapped during this time period using one base map for each time period. Between 8:00 am and 6:00 pm, ten time periods of ten-minute duration were mapped. Some of the time periods such as 12:20 pm to 12:30 pm experience high pedestrian activity therefore these time periods were mapped using two separate base plans to accommodate all the information (refer Figure 3.4). Other exceptions were mapping of extended time periods other than the established time periods, for instance between 12:15 pm and 12:35 pm, four different base maps were used for mapping, since during this lunch time period, the plaza experiences by far the most activity in a typical weekday.

This type of observational mapping records major flows. This is done by establishing major access ways into the plaza and major flows by observation. Then each of these is observed to record the intensity. Each flow is represented by lines of different colored pens, also the thickness of the lines represents the intensity of the flows. Another important kind of information that was recorded in the behavior mapping was people at rest. Major seating and standing locations are mapped on the base map using dots of different colors. Some instances of triangulation, or other interesting information was recorded as notes along with the mapping.

These results will be discussed in the following chapter. The whole process of mapping was accompanied with photographic documentation. Rough estimates

measure of the intensity of the various flows and helped in establishing the major flow lines, which were then counted from each of the ten observation positions.

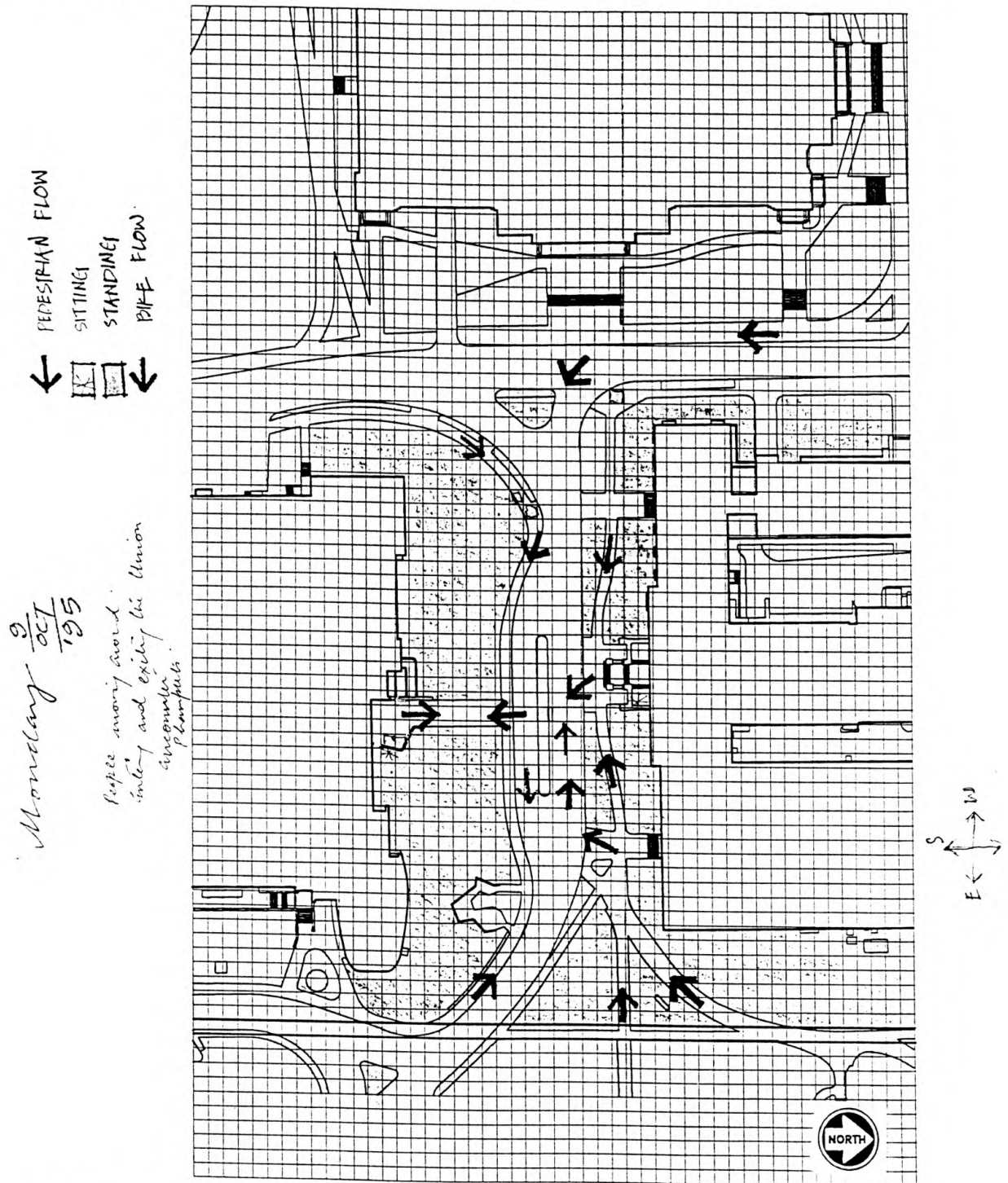


Figure 3.3: Sample of the mapping done to study major pedestrian flows.

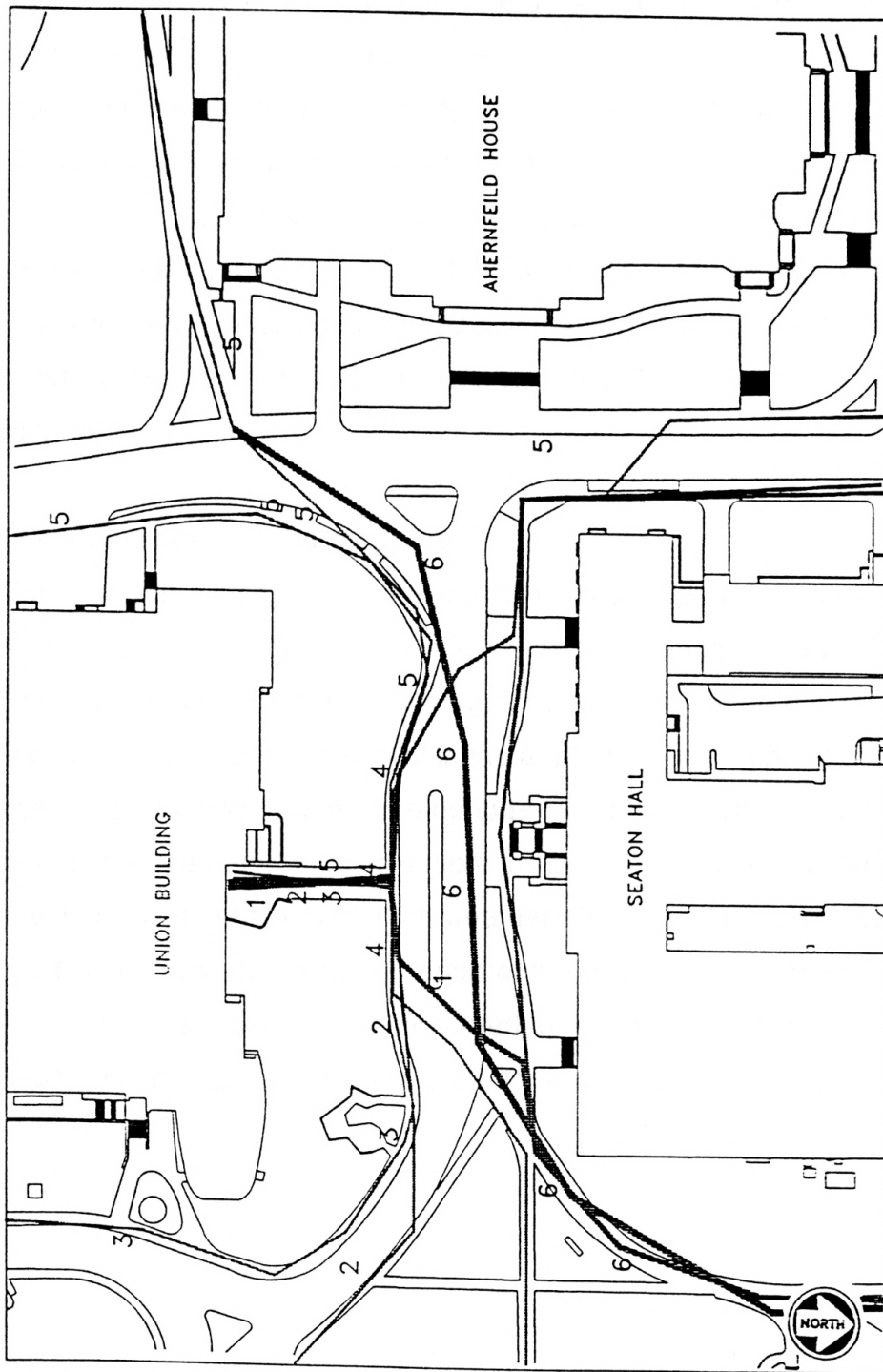


Figure 3.4: The map showing the major pedestrian flows.

Time span for the mapping

Most of the earliest classes begin at 8:30 am and this is when the earliest significant activity begins in the Union plaza. At this time typically students just reach the campus and are rushing to their class, or going to the Union for their first cup of coffee. Similarly, most of the departments end their last class by 5:20 pm. and the plaza does not experience significant activity after that time. This is the reason for conducting most of the mapping between 8:20 am and 5:30 pm. The ten minute period between 20 mins and 30 mins past each hour is used to conduct the counting. This results in ten sets of mapping at each spot for the 9 hour span.

Documentation of the mapping

The data pertaining to the counting for each time period is documented in the form of a table. A separate table is prepared for each of the ten-minute periods. The table is a matrix of the counting for each time period (horizontal axis) and the observation point as shown in table 3.1, refer the appendix for complete mapping information of all time periods of the five days. The data from the counting were recorded in this table on the spot. Also, it was observed in the preliminary observation that the weather affects the use of the plaza and so, to study this factor, the weather report of the day published in the *Collegian*, the campus newspaper, is also presented for each of the days (table 3.2). This is to study any impact on the plaza use by the weather conditions.

Behavior Mapping of Movement Patterns

Monday, 10 November, 1995.

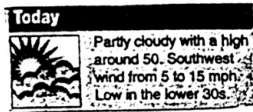
Spot	8:20-8:21	8:21-8:22	8:22-8:23	8:23-8:24	8:24-8:25	8:25-8:26	8:26-8:27	8:27-8:28	8:28-8:29	8:29-8:30
A	77									
B		63								
C			72							
D				148						
E					80					
F						177				
G							58			
H								62		
I									22	
J										41

Spot	9:20-9:21	9:21-9:22	9:22-9:23	9:23-9:24	9:24-9:25	9:25-9:26	9:26-9:27	9:27-9:28	9:28-9:29	9:29-9:30
A	121									
B		90								
C			84							
D				202						
E					9					
F						241				
G							66			
H								99		
I									80	
J										70

Table 3.1: Sample table showing the documentation of the counting of pedestrian flows.

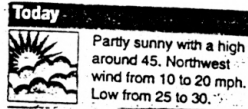
Field notes Climate conditions

Mon



HIGH	LOW
50	32

Tue



HIGH	LOW
45	27

Wed

High - 48 - Low - 32

Thursday

High - 57 - 38

Friday

HIGH	LOW
65	40

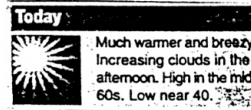


Table 3.2: The climatic conditions of the of the five days.

The findings of the behavior mapping are entered into tabular format, with the count of the number of people using the plaza at different time periods, for the five days of the week. While the tables clearly show the variations among flows for a certain time period, it was important to compare overall plaza use between different time periods or between different days of the week. For this purpose the data collected during for each time period was compiled into more comprehensive formats comparing plaza use on different days of the week, different flows and so forth.

With this description of observation procedure in place, I next provide an analysis of the resulting observations and data.

Findings of the Movement Analysis

The results of the flow analysis provide a clear sense of the present functioning of the Union Plaza. Along with this information, the study also reveals patterns relevant to the design of a sociable plaza in the present space-- a topic to be discussed in chapter five.

The information recorded in the base maps directly suggests that the movement pattern within the plaza follows certain fixed flow lines. Comparisons between the flows at different parts of the day and on different days reveals certain patterns that these flows follow. Also, one of the remarkable patterns that is quite consistent is the fluctuation of intensity of plaza use during various time periods.

Flows

The mapping of the movement patterns clearly indicates that the pedestrian traffic has several access ways into the plaza. The major flow lines, as illustrated in Figure 3.5, show that there are six accesses ways into the plaza, all of which converge at the Union. Of these six approaches, three flows are from the east side of the Plaza and the other three are from the West side of the plaza. Each of these flows is a culmination of smaller flows that originate at different parts of the campus. Therefore, there is a noteworthy difference in the qualities of the flows. These prominent differences are in the intensity of the flows, the direction, the time period and other features, as the destination of the users.

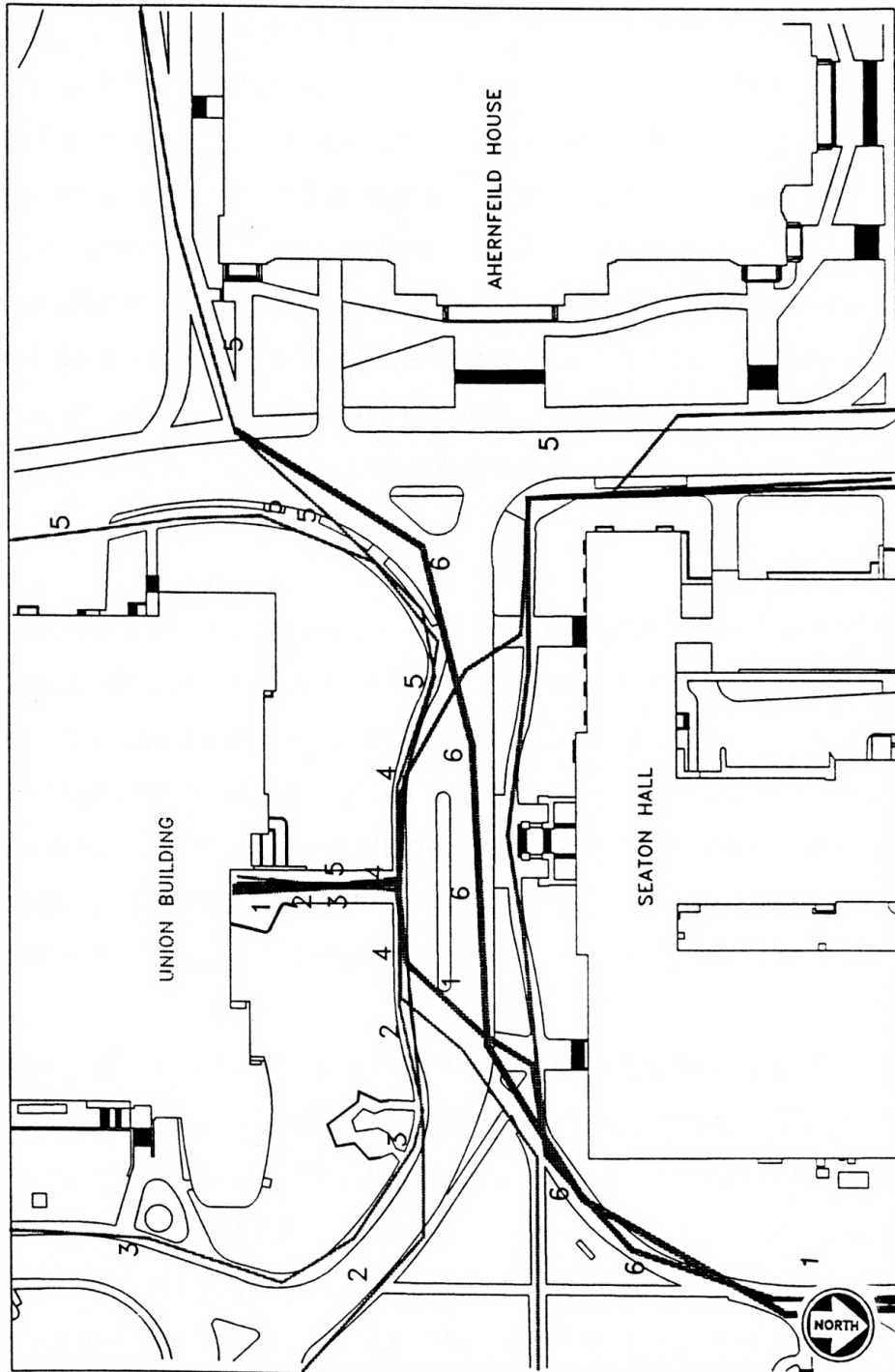


Figure 3.5: Map showing the major flows.

It can be clearly noted from the behavior mapping that some flows are more intense than others, a situation which could be due to the presence of important buildings (offices or classrooms) in the particular location and direction. The intensity of the flows sometimes depends on the time of the day, for instance some flows are very intense in the morning when the students are entering the campus. Several times the occurrence of a special event in a certain part of the campus can alter the patterns of these flows. One key factor that influences these flows is the weather. Unfavorable weather can discourage activity in the plaza space as fewer people visit the Union building while good weather can cause people to linger, especially outside the Union and Seaton Hall main entrance.

To further clarify how these flows are different from each other, it would be beneficial to briefly describe each of the major flows. In the following discussion, each of the flows are described in order of their intensities, as illustrated in Figure 3.5. These flows named 1,2,3,4,5 and 6, all flow from the either sides of the plaza. However, it must be noted that apart from the following flows, there are other smaller flows that are either branches of these major flows or independent flows of lesser intensity.

Flow 6 begins as many small flows from the north-east side of the campus where many buildings that house a variety of departments are located. This by far, is the most intense of the flows. The small flows culminate into one flow on the sidewalk between the Library and the Laffene Health Center (refer Figure 3.5). This flow is most intense at the point where it enters the Union Plaza and often branches out into 3 or 4 smaller flows. The main flow continues across the plaza into the Union building. One of the other flows moves to the West side of the plaza which further branches into two, one moving towards the north-west side and the other moving towards the West Stadium (refer Figure 3.5). The other

branches move towards the exits away from the campus, one along the side of the Union building and the other to Vattier street.



Figure: 3.6: Photograph showing flow 1



Figure: 3.7: Photograph showing flow 2

Flow 2 is one of the less intense flows entering the plaza from the East side through the sidewalks from a major administrative buildings (Anderson Hall). People in this flow are those entering the campus from the East entrances and the people from the administrative offices located there. Sometimes this serves as a path for people moving from the north-eastern side of the campus.

Flow 3 is a more intense flow that enters from the south-eastern side of the plaza. This flow is different from the above two since its intensity varies greatly during the day, since it is a converging point for two of the important access ways into the campus. In the mornings this flow is very intense with pedestrian traffic entering the campus and heading towards the Union or to the other side of the campus. Later, between noon and 1:30 pm, it gets intense with people leaving for lunch or returning to the campus after lunch. The flow is again intense during later afternoon when people are leaving the campus.

Flow 4 is the one emerging out of the Union and branching out in different directions. This flow line although very intense, is too short since people exiting from the Union move in this flow briefly and thereafter, diverge into many other existing flows leading to various parts of the campus. A noteworthy feature about this flow is its consistent high intensity through the day as people continuously move in and out of the Union.

Flow 5 is similar to flow 3 in its periodic fluctuations in intensity and in being an access way into the campus. It flows from the side opposite to flow 3 into the Union Plaza. Majority of the people on this flow are pedestrians entering the campus from the South entrances, or motorists who use the parking facility by the west stadium or the one behind the Union building. Like flow 3 this flow is intense during periods when people are moving in and out of the campus.

Finally, flow 6 is a moderately intense flow, moving into the plaza from the north-western side of the plaza. It follows the pattern of the other flows that consist of people moving towards the Union between classes. Also, this flow is used by people crossing the plaza to move to the east side of the campus.



Figure: 3.8: Photograph showing flow 4



Figure: 3.9: Photograph showing flow 6

Typical daily flow pattern of the plaza

Drama of Activity

One of the most striking findings of the mapping is the great fluctuations in the intensity of plaza use. This phenomenon discovered during preliminary observation of the plaza is what I refer to as the *drama of activity*, which is a periodic modulation of the number of people using the plaza, in turn affecting the intensity of activity within the space. During the ten-minute break that occurs between classes (between 20 minutes and 30 minutes past an hour), the activity in the plaza is heightened but it quickly fades away in a few minutes after 30 minutes past an hour. This is due to the fact that students usually use this time period to move from one class to another, which some times requires them to move between different buildings. Another reason is that students tend to use this time to quickly come to the Union for a snack or a drink. This phenomenon is illustrated in Table 3.3.

Marked differences can also be observed in the flows that originate from the entrances of the campus. These approach flows are more intense during the morning hours when people are entering the campus and choose to visit the Union for their first cup of coffee, pop or breakfast. These flows originate at the parking lot behind the Union and at the Vattier street entrance. The latter especially serves as a major entrance for pedestrian and vehicular traffic alike. Another pattern during this time is that some of the flows originate from the Union and move away from it. This is due to the fact that students quickly leave the Union and move towards their classes.

As the day progresses, there is a strong shift in the patterns of these flows. During the later part of the day more students visit the Union between classes and hence most of the flows originate from the South side of the Union Plaza since most of the classes are located in that part of the campus.

**Comparison of intensity of flows for different time periods of the week
10-14 November, 1995**

Time period	No. of people
8:20-8:30	3553
9:20-9:30	4271
10:20-10:30	2842
11:20-11:30	4250
12:20-12:30	3953
1:20-1:30	3936
2:20-2:30	2732
3:20-3:30	2300
4:20-4:30	2040
5:20-5:30	186

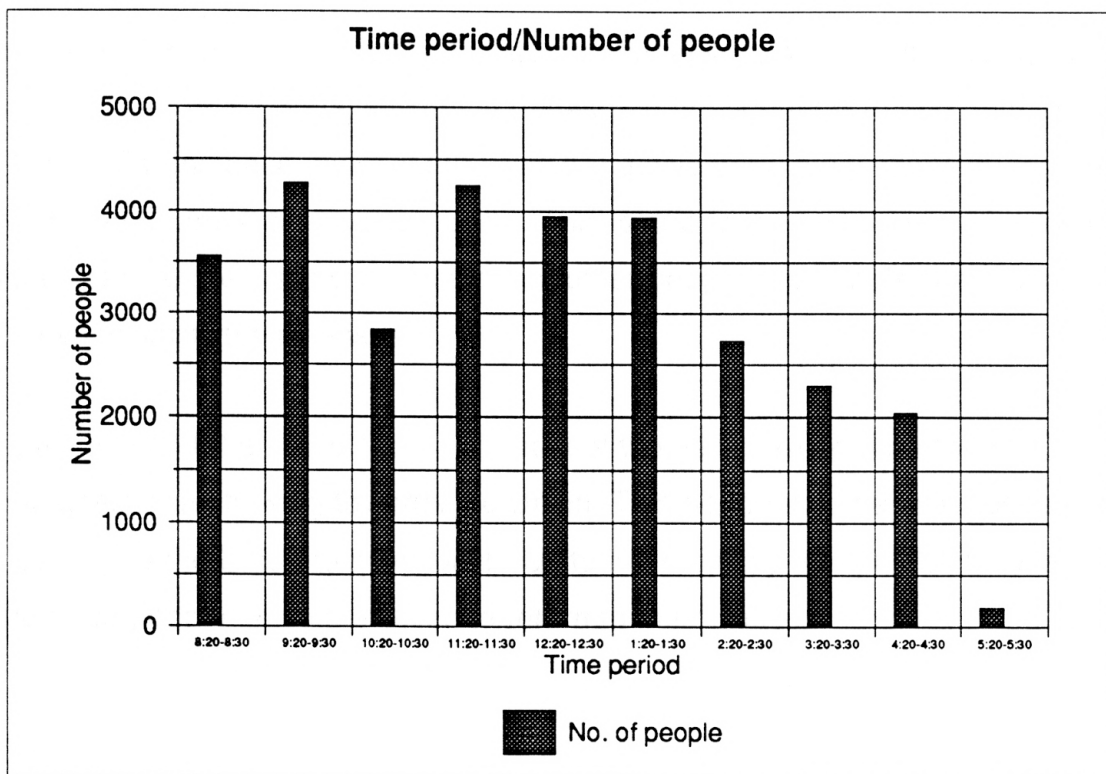


Table 3.3

Strong fluctuations can be observed in these flows since they are affected by class schedule and become more intense during the break period between classes. This fluctuating pattern exists during late mornings and late afternoons.

During mid-day, the plaza experiences the most activity since the Union is a popular place to have lunch as shown in Figure 3.10. People from all parts of the campus visit the Union between 11:30 am and 2:30 pm to have lunch. At this time, the flows are intense in both directions, since people are moving in and out of the Union.

As was discussed earlier, the direction of the flows is greatly affected by the time of the day since the majority of the pedestrian movement is to and from the Union. For instance, most of the flows are active in both directions during the morning hours, (observational data). This is due to the fact that at this time of the day, people are visiting the Union and other people are leaving the Union to move towards their classes.

Between 11:00 am and 12:30 am, most of the flows are predominantly unidirectional, flowing towards the Union. This happens to be when people are coming to the Union to have lunch. Quite interestingly, the pattern is reversed later as people leave the Union to return to their classes.

Weekly differences in flow

Table 3.4 shows a comparison of the plaza use in terms of the number of people (Y-axis), on different days of the week (X-axis). Of the five days of the week that were used to collect the data, Monday (10 November 1995) with 7,500 users was the day the plaza was most used, followed by Thursday (13 November 1995) with 7,208 users. The other three days, Tuesday (11 Nov '95)- 6201, Wednesday (12 November 1995)- 5847, and Friday (14 November 1995)- 5,646, the plaza is used less. It must be noted that this data does not reflect the total number of users on a particular day but the total number of people counted during the different time periods. Also, on some days the presence of a vendor or other special events can intensify the plaza use for that day.

The findings of Table 3.4 can be explained based on certain general observations and known facts (since I am a student and belong to the user-group). Monday, the first day of the week, is a time when people like to finish small chores such as mailing a letter, buying a book, ATM transactions, so forth. All these activities are associated with the Union. Another important reason for Monday's heavier use is that many classes on the campus are scheduled on this day and a new week is beginning.

Friday is the last day before the weekend and it has been observed that people like to start their weekends early and most often people leave the campus early on Fridays. This explains the fewer number of people using the plaza on this day.

Thursdays can in this context be described as the weekend (assuming that Fridays are short and that people are already in the weekend mood), and hence people like to complete the week's tasks on this day and therefore the plaza use is more intense on this day.

Tuesdays and Wednesdays experience moderate plaza use and this is due to the fact that they are mid-week periods with similar activity patterns on both days.

Pattern of flow for the specific observation points

The mapping aided in establishing a clear hierarchy among the various flows based on the intensity of use over the week. The results from the counting presented in Table 3.5 point at certain important design considerations, such as the orientation of the plaza and the orientation of the entrances into the plaza. It must be noted that this data is restricted to the counting done in the allotted time periods of one minute per observation point. Also, other vital cues leading to design guidelines for the plaza can be inferred at a later stage in the research, when analyzing other findings in the light of the literature review.

Table 3.5 indicates that the flows E, followed by B, D and F are the most intense flows overall for the week as a whole. The flow lines A,C,J and G are moderate and flow lines H and I are least intense. While flow E, the most intense has 5,204 people moving along it, the flow I being the least intense has 2,106 people moving in this flow line.

A closer look at the base map, indicates that spot E is a point on the street bisecting the plaza, where 5 flow lines intersect. These flow lines originate from the east side of the plaza indicating that the pedestrian traffic from this side of the campus is heavier than those originating from the west side of the plaza. This can be easily explained by the fact that the East side of the campus has more classrooms and more departments. Spot F, which is at the entrance of the Union, shows a high count of 3,947 people, reinforcing the idea that the Union is a major destination for most people who come to the plaza.

Likewise the intensity of other flows are based on other aspects such as the location of pedestrian entrances into the campus, presence of parking lots and so forth.

Daily movement patterns

Tables 3.6 through 3.16 demonstrate the variation of the plaza use among the different time periods of the day based on the counting done during 10th to 14th Nov. '95. The table has been prepared by calculating the aggregate number of people counted in the allotted time periods for the five days of the week.

The time period between 11:20 and 11:30 am is the time when the plaza space is most used. Also, the time period between 9:20 and 9:30 am sees a lot of activity in the plaza. One of the important features of the Union building is its dining facilities and its restaurants, thus people come from all parts of the campus to have lunch here. This explains the high intensity of activity during the lunch hour, which usually extends between 11:20 am. and 1:30 pm.

The time period between 9:20 and 9:30 am is when many people arrive on the campus and are moving towards respective buildings on the campus. It has been observed that the Union and the plaza is a place where people meet and depart . Also, as stated earlier, many people come to the Union at this part of the day for their first cup of coffee or pop or breakfast. The tables also indicate that there is a steady decline in the plaza use after 1:30 pm. In fact, it reduces to a minimum of 186 people between the time period 5:20 and 5:30 pm. (note that these numbers are based on the one-minute counting conducted at the different observation points). This phenomenon can be attributed to the fact that fewer classes are scheduled in the afternoons and people tend to leave the campus during this time. (if they do not have any commitments for the day).

Comparison of intensity of flows for the week
10-14 November, 1995

Day	No. of people
Monday	7474
Tuesday	6201
Wednesday	5847
Thursday	7208
Friday	5646

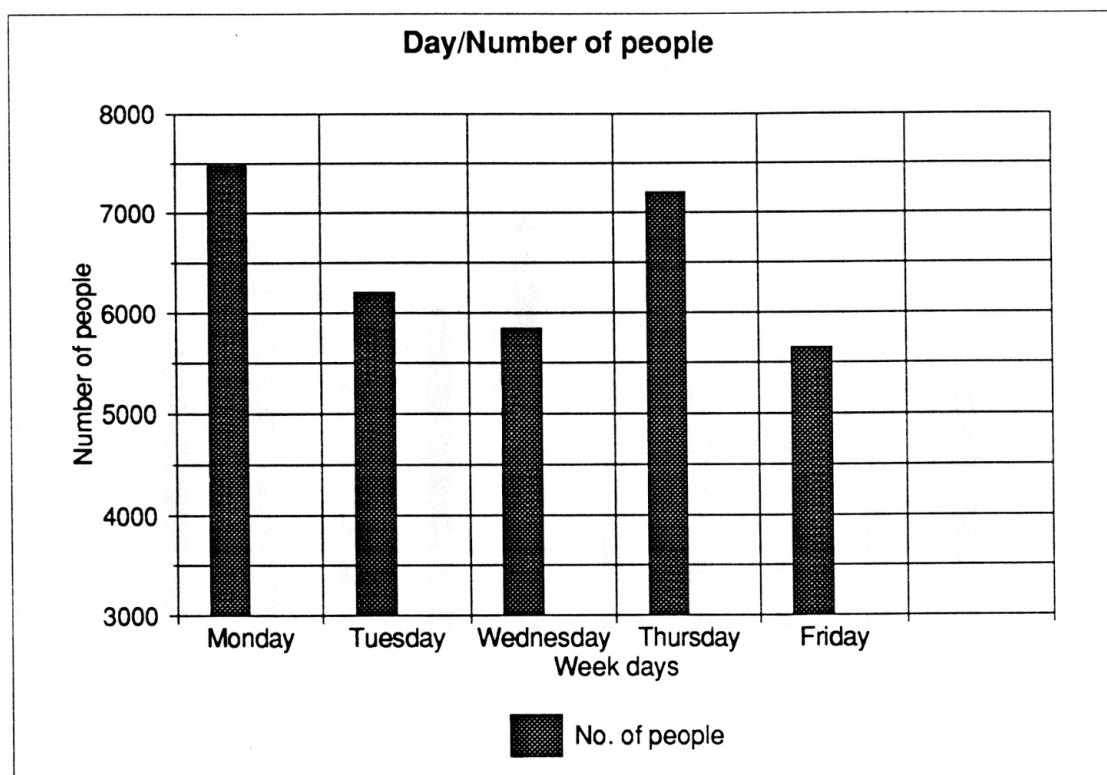


Table 3.4

**Comparison of intensity of flows at major observation points
10-14 November, 1995**

Point on flow	No. of people
A	3392
B	4740
C	2996
D	3938
E	5204
F	3947
G	2904
H	2270
I	2106
J	2985

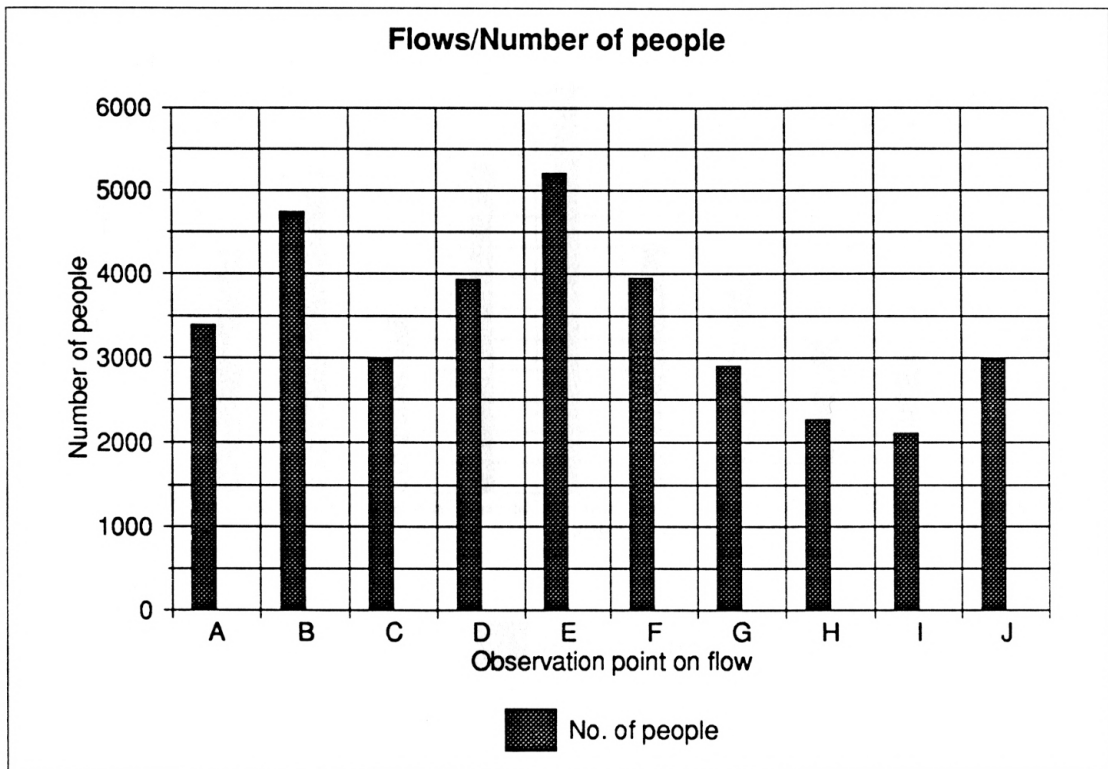


Table 3.5

Comparisons of intensity of Plaza use between various time periods on Monday, 10 November, 1995

Time period	Number of people
8:20-8:30	800
9:20-9:30	1062
10:20-10:30	575
11:20-11:30	1072
12:20-12:30	1335
1:20-1:30	808
2:20-2:30	714
3:20-3:30	496
4:20-4:30	448
5:20-5:30	164

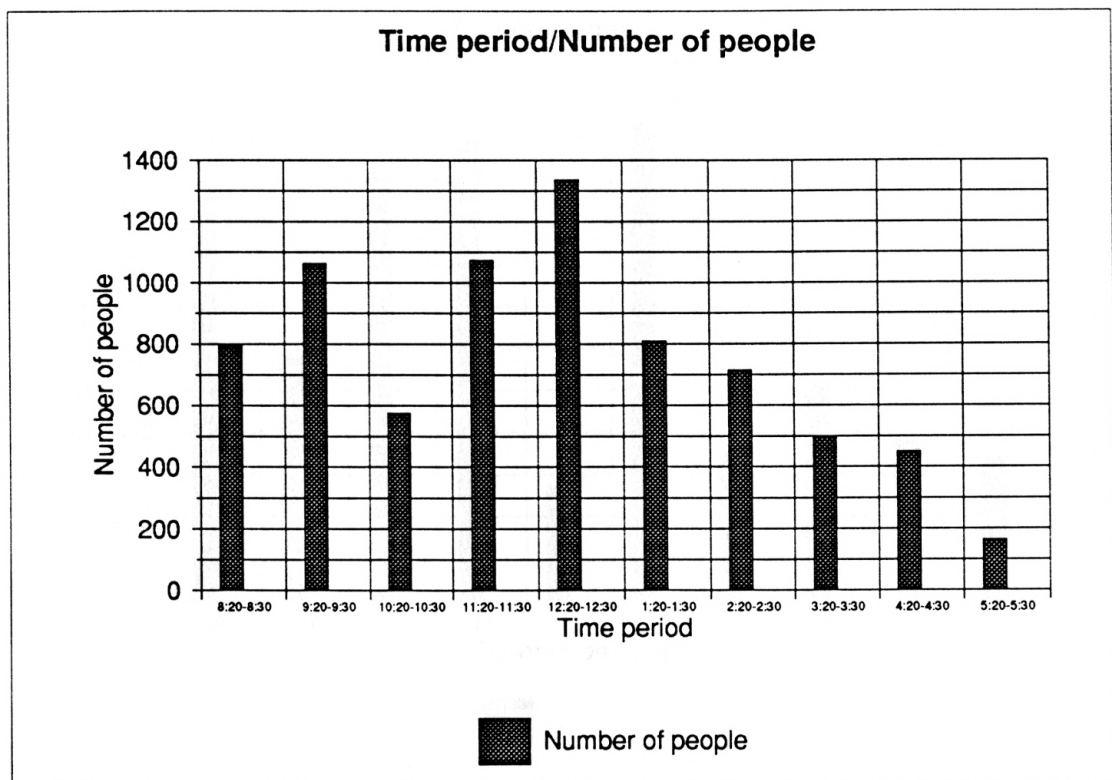


Table 3.6

Total number of people on major flows on Monday, 10 November, 1995

Point on flow	Number of people
A	961
B	587
C	1008
D	1124
E	275
F	1144
G	355
H	516
I	382
J	340

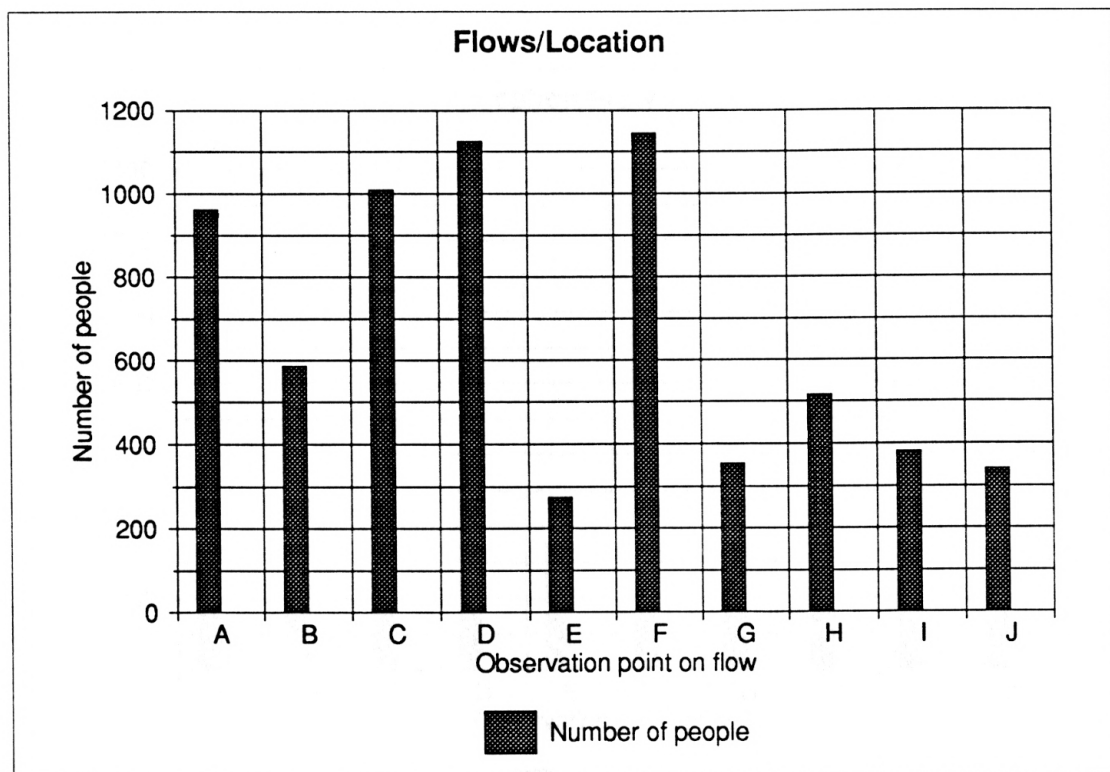


Table 3.7

Comparison of aggregate number of people on major flows on Tuesday, 11 November, 1995

Point on flow	No. of people
A	886
B	514
C	470
D	470
E	355
F	1395
G	377
H	443
I	321
J	314

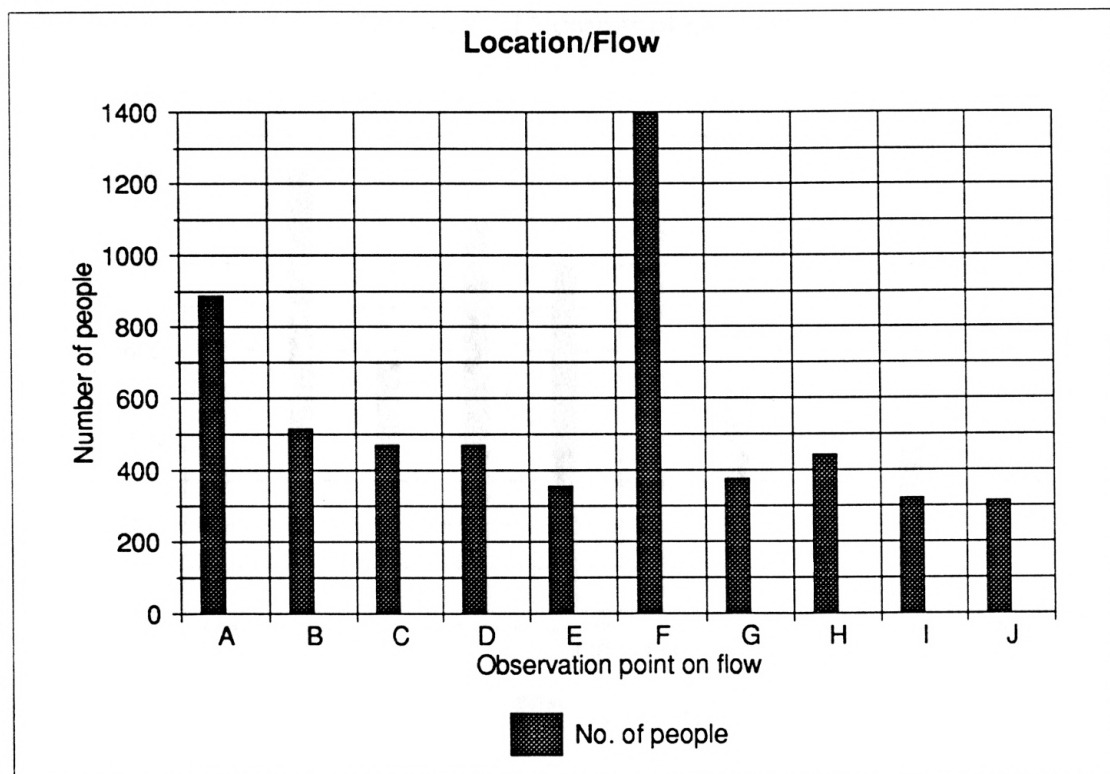


Table 3.8

Comparison of intensity of plaza use between various time periods on Tuesday, 11 November, 1995

Time period	No. of people
8:20-8:30	631
9:20-9:30	1021
10:20-10:30	575
11:20-11:30	895
12:20-12:30	806
1:20-1:30	890
2:20-2:30	515
3:20-3:30	311
4:20-4:30	378
5:20-5:30	179

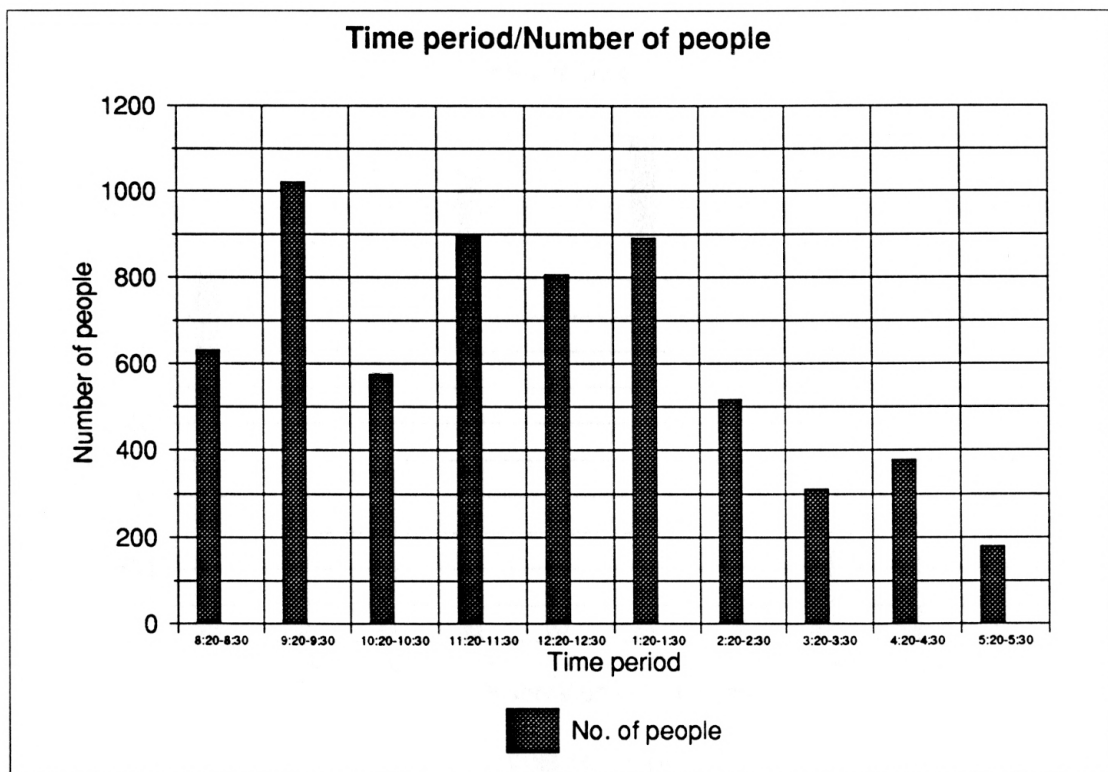


Table 3.9

**Comparison of aggregate number of people on major flows on
Wednesday, 12 November, 1995**

Point on flow	No. of people
A	1018
B	430
C	472
D	1311
E	219
F	1398
G	310
H	256
I	237
J	218

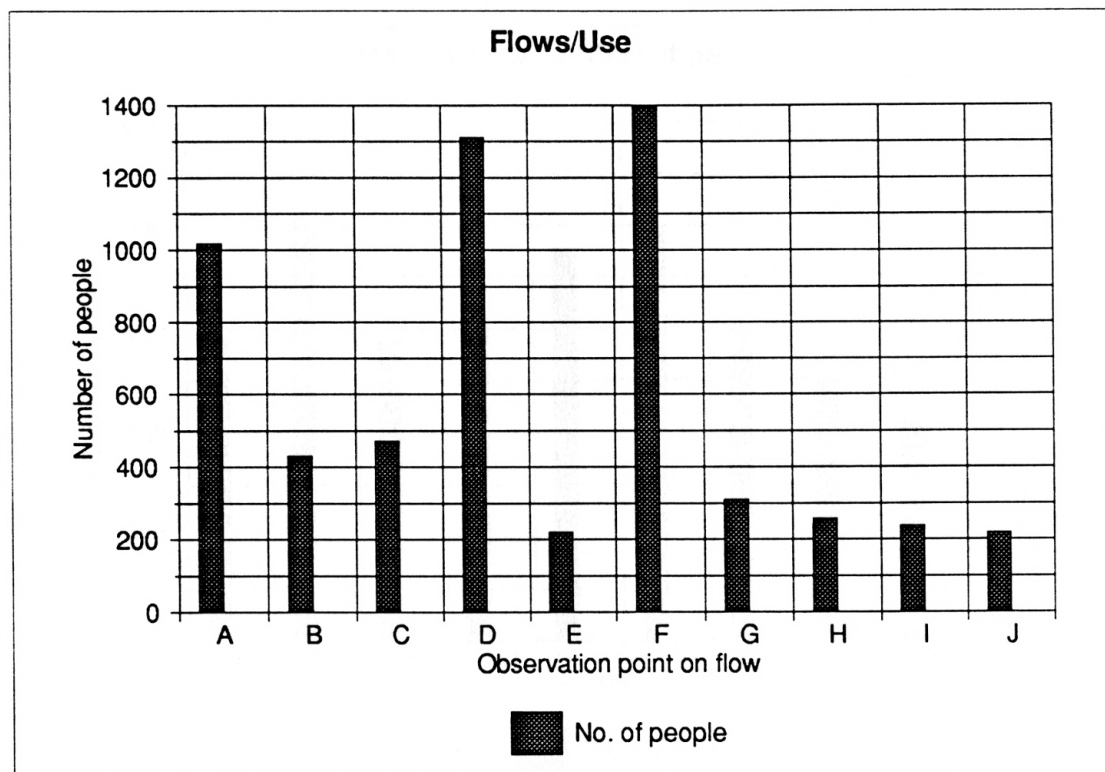


Table 3.10

Comparison of intensity of plaza use between various time periods on Wednesday, 12 November, 1995

Time period	No. of people
8:20-8:30	578
9:20-9:30	806
10:20-10:30	583
11:20-11:30	620
12:20-12:30	757
1:20-1:30	799
2:20-2:30	604
3:20-3:30	498
4:20-4:30	416
5:20-5:30	186

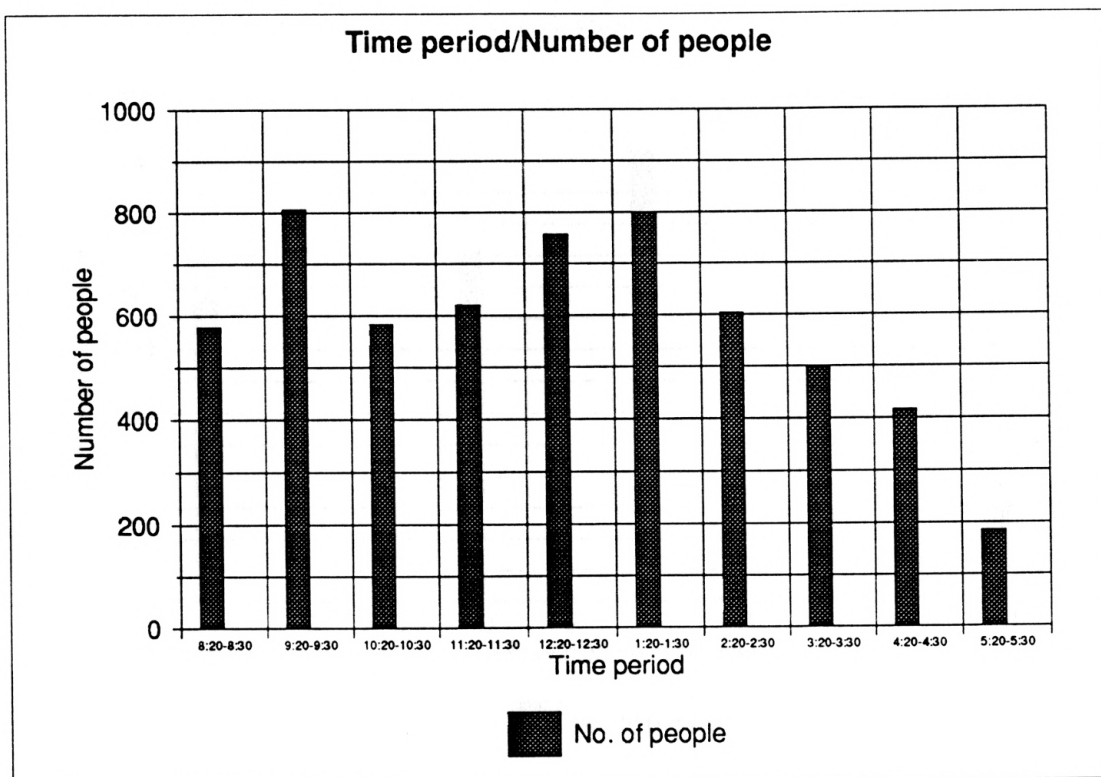


Table 3.11

Comparison of aggregate number of people on major flows on Thursday, 13 November, 1995

Point on flow	No. of people
A	961
B	593
C	421
D	1124
E	275
F	1439
G	355
H	516
I	382
J	330

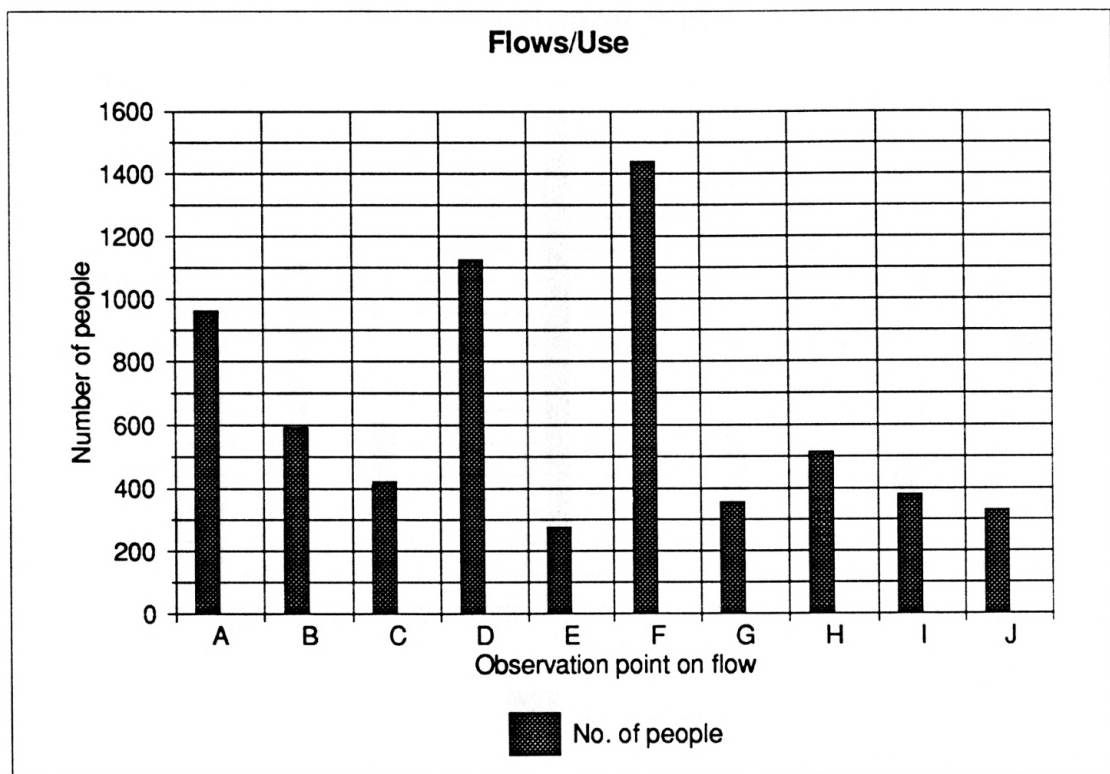


Table 3.12

Comparison of intensity of plaza use between various time periods on Thursday, 13 November, 1995

Time period	No. of people
8:20-8:30	800
9:20-9:30	1062
10:20-10:30	575
11:20-11:30	812
12:20-12:30	1526
1:20-1:30	808
2:20-2:30	527
3:20-3:30	486
4:20-4:30	448
5:20-5:30	164

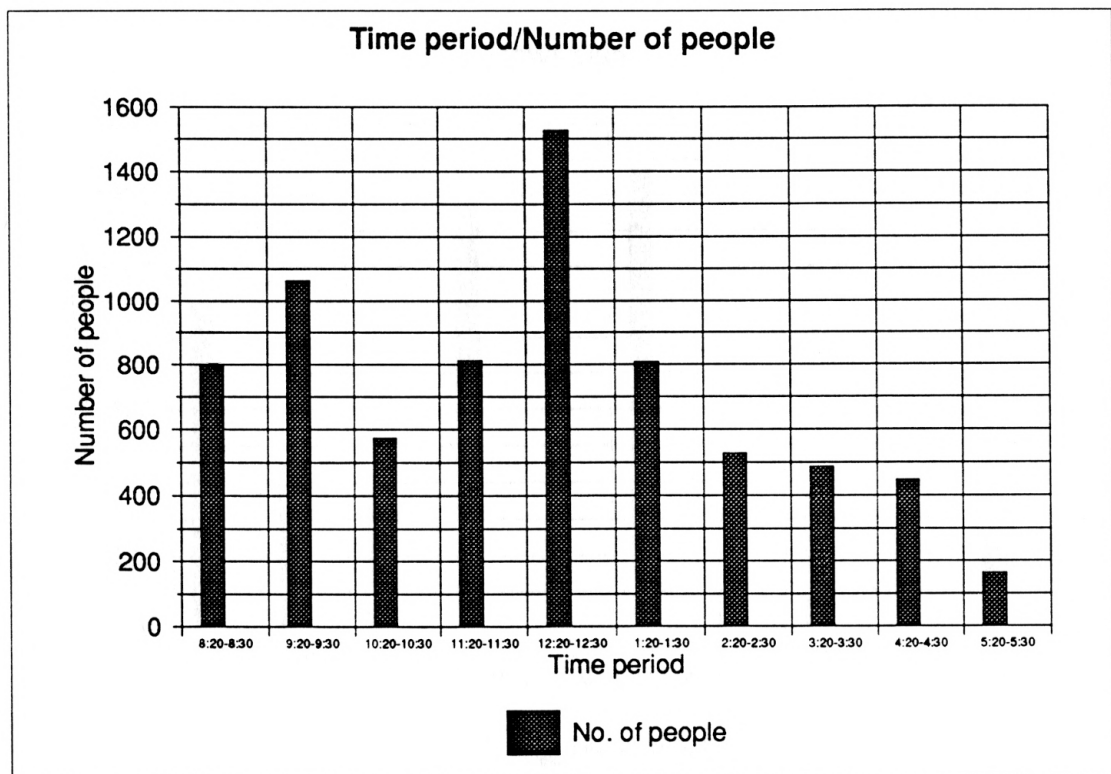


Table 3.13

**Comparison of aggregate number of people on major flows on
Friday, 14 November, 1995**

Point on flow	No. of people
A	899
B	453
C	393
D	1166
E	289
F	1272
G	320
H	375
I	283
J	268

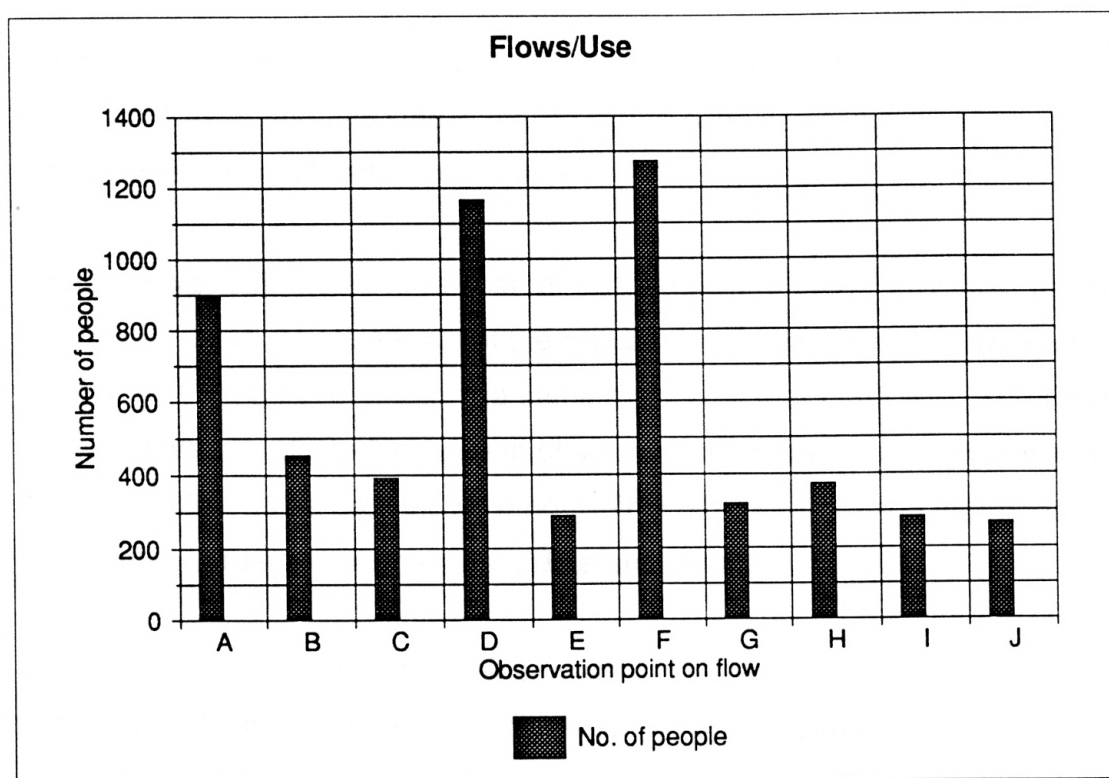


Table 3.14

Mapping of off-periods

Most of the mapping done both in the preliminary and detailed behavioral stages was conducted during the pre-allotted ten minute time period, since this is when the plaza is active. But it does become essential to understand how the plaza works in the other time periods (off-periods).

The following is the mapping conducted during this off-periods. The off-period is the time when most of the classes on the campus are conducted. This period extends between 30 minutes past an hour and 20 minutes past the next hour. For instance the time period between 8:30 am and 9:20 am is the off-period which is followed by the activity time period from 9:20 am to 9:30 am.

Predominantly, during the off-period the plaza experiences minimal activity. The major activity during this time is movement of pedestrian traffic. Other activities are people sitting or visiting the Union.

Mapping was conducted for a span of one week from 20th November to 25th November 1995. The methods of the mapping were similar to the detailed mapping of the peak periods. The same base map was used and intermittent mapping was conducted for a span of ten-minutes between 30 minutes past an hour and 20 minutes past the next hour. This ten minute period was chosen randomly in order to accommodate different situations.

Counting was conducted from the same ten observation positions. A similar procedure of counting was as for high-use periods employed for the sake of consistency.

Findings of the mapping

The Tables 3.6 to 3.16 show the mapping of the different days of the week. It must be noted here that the ten-minute period varies for each hour. For instance, the off periods for the Monday morning are 7:10 am to 7:20 am, 8:50 am to 9:00 am, 10:40 am to 10:50 am.

Although there is not much variation in the activities in the plaza during this time from the peak period, there is a marked difference in the intensity of the activities. Also, it was found that activities of triangulation were not active during this period-- in fact salesmen of a certain credit card company used this time as a break to freshen up and gear up for the peak period.

Summary of findings of the behavioral analysis.

Based on the above discussions, the figures and the maps, there are certain general findings and observations that can be made regarding the Union Plaza's activities and the user patterns. Again, these are observations having relevance for the plaza redesign and based on the recorded information during the mapping.

It must be noted that these observations, along with the other findings highlighted earlier in the literature review will form the basis for a comprehensive analysis to derive clear design guidelines for the proposed redesign of the Union plaza.

1. The Union plaza is extensively used on all days of the week, although some days are slightly less active than other days.
2. On an average 6,475.2 people use the Union plaza per day (number reflects people counted only during the allotted ten minute time period). This figure clearly indicates the importance and potential the plaza space assumes in the out-door life of the campus. Also, this information reflects the infra-structural requirements that need to be considered for the redesign.
3. There is not significant variation in the plaza use on different days of the week, though special activities can greatly effect the intensity of plaza use. (these special activities' effect in the plaza will be decided in Chapter 4.)
4. More people enter the plaza from the East side than the West entrance.
5. The Union is the most important destination in the plaza and a major proportion of people who use the plaza visit the Union.

6. It is clear that the Union plaza is most active during mid-day and predominantly used for activities associated with this time of the day.
7. The major activities performed in the Union Plaza can be grouped into different categories such as people at rest, special events, movement, and so forth. (these major activities will be analyzed in further detail in the following chapter.)
8. Movement of pedestrian traffic is the predominant activity in the plaza during the morning hours.
9. Location of campus entrances, parking lots, important buildings and other factors effect the intensity of plaza use.

The mapping and the analysis so far, of the movement patterns in the Union Plaza lead to a clearer understanding of the life of the Union Plaza. The need for a more focussed analysis of other activities performed in the plaza has been highlighted during several discussions in this chapter. The following chapter will with the help of mapping and observational data, analyze people at rest and two special events. With analysis of these two issues it is expected to gain a complete understanding of all the major activities performed in the plaza.

Behavioral Analysis of Union Plaza: Rest Patterns

The major activity that occurs in the Union Plaza is the movement of people through it either to or from the Union building or to other parts of the campus. These movement patterns have been studied in the previous chapter. Other important activities that occur in the plaza space are people at rest and activities that result due to the occurrence of special events. Therefore, in order to gain a complete understanding of the activities and present functioning of the Union Plaza and to arrive at guidelines for its redesign, it becomes imperative to study people at rest and the plaza activities during special events.

This activity of people at rest in many cases can actually be interpreted as a pause in the movement of people as they stop in the plaza space. Although most of these stops are brief pauses often due to the encounter with a friend resulting in an exchange of a few words or even friendly gestures, some of these encounters end up as prolonged conversations requiring a place for the people involved to sit. While on a day-to-day basis, social encounters bring moving people to a pause, another important factor is triangulation, which involves special events such as commercial fairs, student exhibitions or for that matter the presence of a vendor in the plaza, can cause people to stop briefly. Some large-scale commercial fairs held in the Union Plaza can attract huge gatherings for long durations of time.

Aims

This chapter deals with the mapping process and analysis of the various activities in the plaza associated with people at rest and two special events. Hence, apart from gaining a complete understanding of the life of the plaza, the specific aims of this chapter are:

1. Locating the existing important seating and standing points,
2. Mapping and analyzing the phenomenon of seating in the plaza context,
3. Gathering information on other features such as places of encounter, islands, major activities of the plaza, and
4. Mapping and analyzing activities during the occurrence of special events.

The first part of the chapter will deal with "people at rest" followed by a section about "two special events" that took place in the plaza.

People at Rest

During the pilot observational study of the plaza space, along with establishing the major flows, seating and standing spots were also identified and mapped. People at rest in the Union Plaza were studied for a span of five days when school was in session between ---- October and ---- October. This mapping was conducted a week after the mapping of the movement patterns was conducted. As described in the previous chapter, the reasons for selecting this part of the year are due to the fact that October is a mid-semester time, therefore, any unusual patterns that might occur very early or too late in the semester can be avoided. Another important reason is the moderate weather conditions of this month that provide findings that might otherwise be influenced by extreme weather conditions. Three major areas where rest in the plaza area was most frequent were identified during the pilot-observational study. These areas include the seating area at the Union entrance, steps at the main entrance of Seaton Hall, and the flight of steps at the east entrance of Seaton Hall. Other places that are less popular and sparingly used for seating purposes are the landscaped space in front of the Union and the landscaped seating alcove within it.

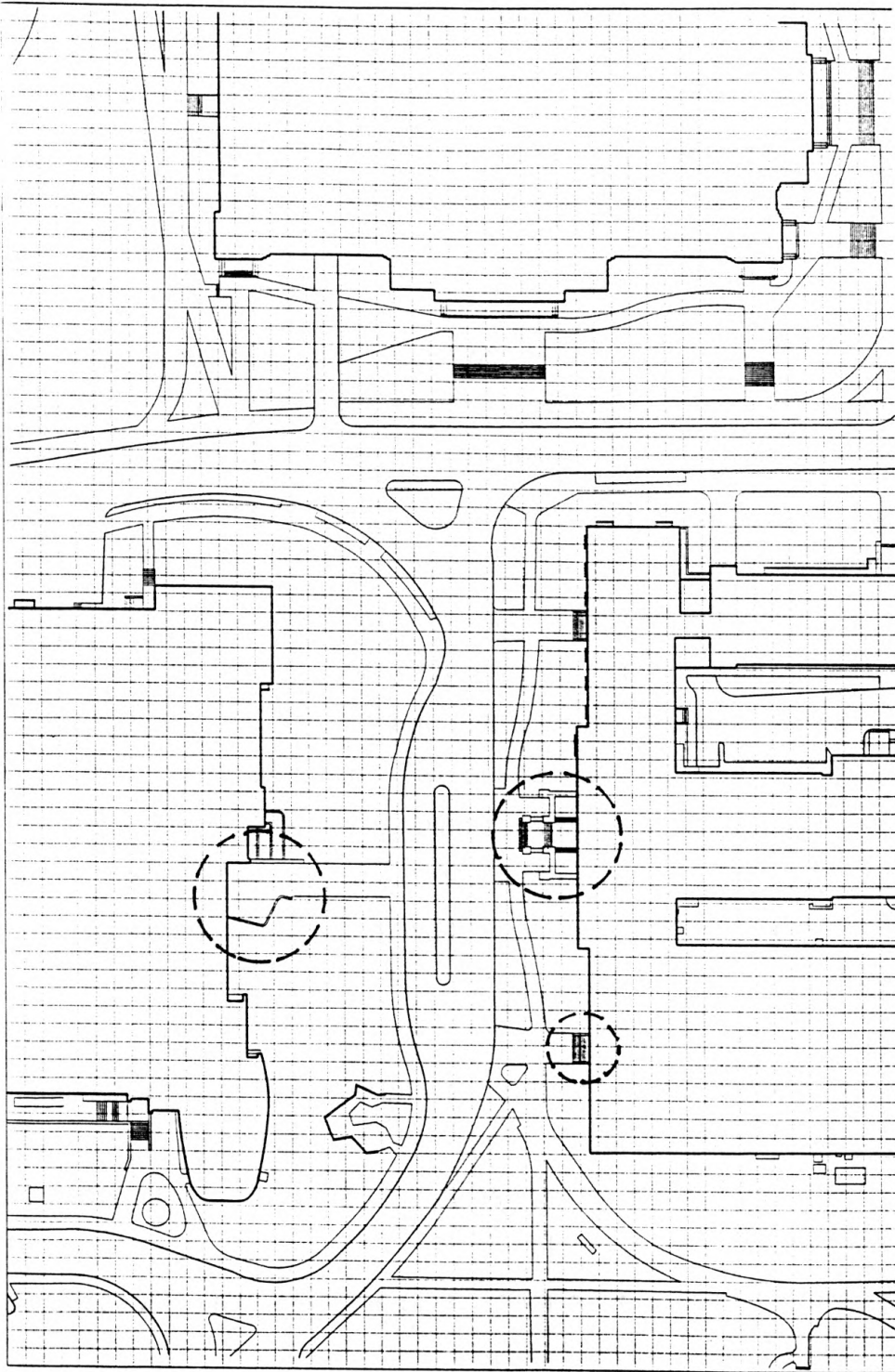


Figure: 4.1 Plan showing the seating locations

The following is a description of the procedure used to map people at rest.

The Mapping Process

The mapping procedure is similar to that used to record movement patterns, though there are certain differences in techniques as required by the specifics of mapping people at rest.

Establishing the observation time periods:

As explained in the previous chapter, the Union Plaza experiences greater activity during the ten-minute break between classes, therefore most of the mapping was concentrated during this period. Some off-periods were also studied in order to get a complete picture of the people at rest at different parts of the day. All mapping is restricted to the time between 8:00 am and 5:00 pm, due to reasons discussed before. However, the mapping was divided into three time sessions, morning, mid-day and afternoon and mapping was conducted to understand each of these spans. Two periods, 8:22-8:28 am and 10:22- 10:28 am. were mapped to study the morning session. This was followed by mapping of the lunch or the mid-day session, 12:22- 12:28 pm, finally the afternoon session was studied by mapping two time periods, 2:22- 2:28 pm and 4:22- 4:28 pm.

The time periods were selected between twenty-two minutes and twenty- eight minutes past an hour since this time falls in the peak period. It was observed that although the peak period extends between twenty minutes and thirty minutes past an hour, it usually takes two minutes before people come rest. It must be noted that people often enter the plaza space after twenty minutes past an hour and tend to leave a little before thirty minutes past an hour.

The base map:

The same layout map of the plaza space was used but at a larger scale. This larger scale was used to facilitate specific location and mapping of each individual who rested in the plaza. Separate maps of the three major seating spots were made and a grid was laid in order to locate users precisely. The three maps were drawn on one A-4 size sheet and copies of these were used to record mapping at different times. While mapping, these maps were placed on a clip-board for ease in handling. These base maps are shown in Figure 4.2.

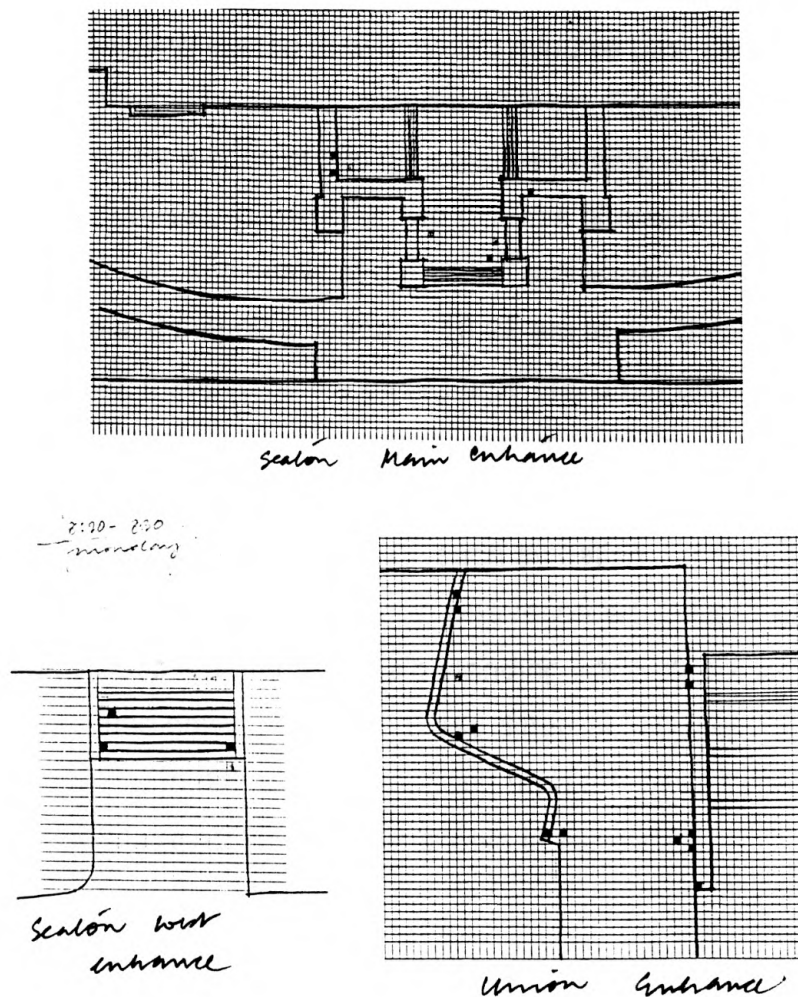


Figure 4.2 The three base maps of resting places in the plaza

Selecting observation locations for the mapping:

In order to accurately count and map users at rest, it was important to be able to have clear visual access into each of the seating spots so as to be able to count and record any other information that might be noticeable. After several attempts from different high points, it was felt that being present within the seating spot provided the best view and allowed observation of other important information such as seating posture, size of the group, and so forth.

The Mapping

The mapping started at twenty-two minutes past each hour when students came out of their classes and visited the Union. Each of the three seating spots were mapped for a span of two minutes, beginning with the steps at the east entrance of Seaton Hall, followed by two minutes of mapping at the main entrance of Seaton Hall and finally at the Union entrance for the same duration. For example, if mapping began at 10:22 am at the Union entrance, people were counted, mapped on the base maps and other details recorded, for two minutes, and the same process was repeated at the other two spots. Among the important information recorded during this mapping was the number of people, the type of activity they were involved in, such as eating, reading, talking, smoking, and so on. Also, the size of the group was recorded. Several times within one group, some people prefer to remain standing while others sat, and such information was noted down. To record these different activities, people were marked on the base-map in different colors, each representing a certain type of activity. The key to these activity types is shown in Figure 3-3.

Behavioral mapping of People at Rest

Monday, 27 October, 1995

Location Time Period	A 8:22-8:24	B 8:24-8:26	C 8:26-8:28
Activity			
Sitting-Smoking	3	3	2
Sitting-Reading	1	0	0
Sitting-Observing	2	0	0
Sitting-Conversing	3	0	1
Sitting-Eating	0	0	0
Sitting-Total	9	3	3
Standing-Smoking	2	3	1
Standing-Conversing	1	1	1
Standing-Observing	1	0	0
Standing-Total	4	4	2
People at Rest	13	7	5

Location Time Period	A 10:22-10:24	B 10:24-10:26	C 10:26-10:28
Activity			
Sitting-Smoking	5	3	2
Sitting-Reading	0	2	0
Sitting-Observing	2	2	2
Sitting-Conversing	3	1	1
Sitting-Eating	1	0	1
Sitting-Total	11	8	6
Standing-Smoking	8	3	2
Standing-Conversing	1	3	2
Standing-Observing	0	1	0
Standing-Total	9	7	4
People at Rest	20	15	10

Table 4.1 Sample of mapping of resting patterns

Findings from the Mapping of People at Rest

The mapping of people at rest clearly indicates certain strong patterns that are followed by users of the Union Plaza. The information from the mapping highlights these patterns. Other important findings are the various activities that bring people to rest and the different patterns of seating itself. It is interesting to note that, in most of the cases, people do not come to the plaza with a preconceived idea to pause or sit for a while in the plaza. Most of the times it is the encounter with a friend, triangulation, or a mere impulse to enjoy the life of the plaza or the good weather. Therefore it is felt that a brief discussion of these issues related to the actual process of seating would be helpful for the future analysis of the findings of the mapping. Following is a brief discussion of the four activities that combine to bring people to rest. These activities are:

1. Encounter,
2. People standing,
3. People sitting, and
4. Triangulation.

1. The Encounter

It is a common sight to find a person walking out of the Union building encountering an acquaintance at the entrance of the Union. Depending on various factors such as the type of encounter, the weather, the intensity of the flows, their directions, or the level of acquaintance, this encounter can end in a friendly gesture, a brief pause to exchange a few words or a long conference. It should be noted that this kind of encounters are mostly unplanned and are a major cause for bringing people to rest. In most cases it is necessary for both the people involved in the encounter to have visual access in order for the encounter to occur. Also, the physical distance between the people can sometimes decide the kind of encounter.



Figure 4.3: A typical social encounter in the Union Plaza

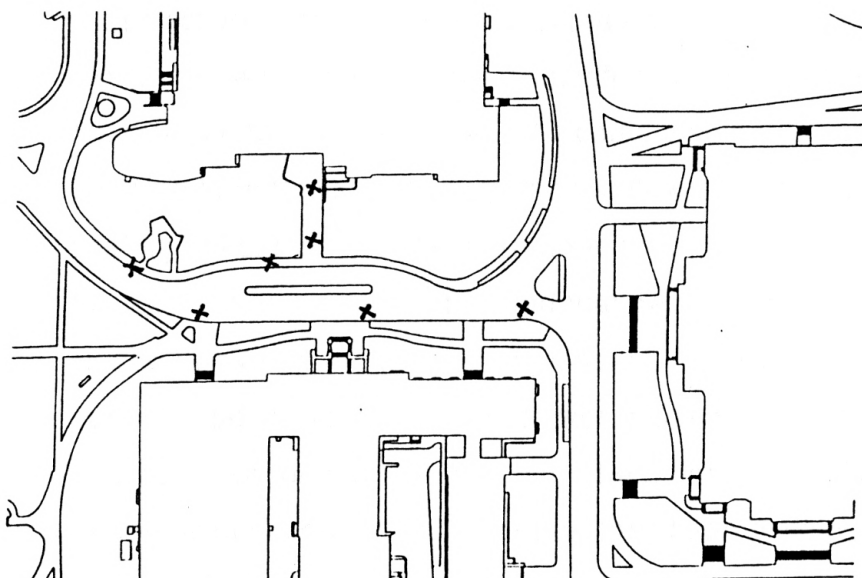


Figure 4.4: Mapping of social encounters in the Union Plaza

Owing to these facts, most of the encounters have been observed to occur at points where two flow lines intersect. Flows moving in the opposite directions provide a better scope for visual contact and hence an encounter. Some popular places for encounters are the entrance of the Union building, when a person is entering and encounters a friend who is exiting the building, at the points where the flows enter the plaza space both from the east and west sides. A mapping of these and other spots is presented in Figure 4.4.

2. People Standing

The situation of people standing results when users, after an encounter with a friend, move away from their lines of flow to stop and face each other to exchange a few words. Although this is a possibility with any of the flows, the visual access, physical distance and directions of flows, create some important standing points in the plaza, (refer Figure 4.5). It is interesting to note that contrary to expectations based on social comfort, that people would drift away to a less active space to talk, most of the people tend to stand amidst the movement without any visible discomfort. While this reinforces the concept of "people like to see and be seen," it could also be due to the fact that people do not wish to drift too far away from their flow or also due to non-availability of seating options at that place. Another important reason for people standing is the weather, it has been observed that people tend to prolong an encounter to sit and talk when the weather is pleasant. However, the availability of a seating option close to the place of encounter in several cases was an incentive for settling down for a longer duration. The other cause of people standing is when people who encounter friends inside the Union building, move out into the plaza space. It has been observed that these people tend to walk up to a point where they have to take different directions and pause briefly to exchange parting dialogues. Sometimes these can extend for longer durations. The mapped information about this type of 'people at rest' is presented in Figure 4.1.

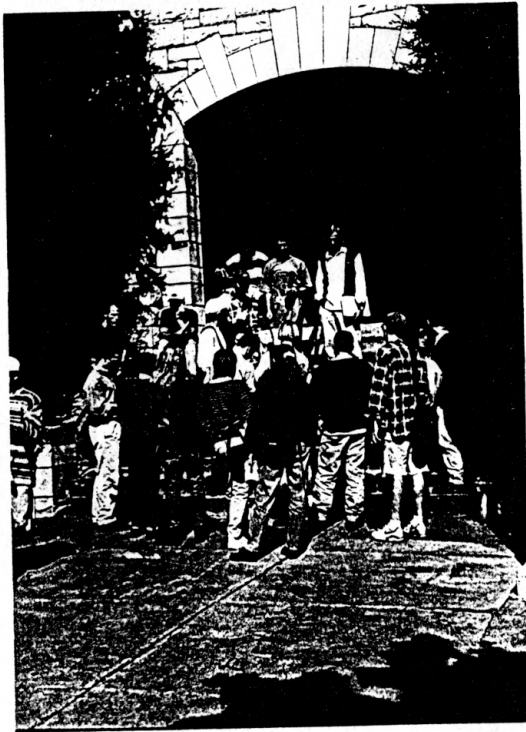


Figure 4.5: People standing in the Union Plaza near the southeast entry to Seaton Hall.

Smoking is another activity that causes people in the plaza to stop briefly. Depending on several factors such as the weather, the location within the plaza or the personal preference smokers tend to stand or sit while smoking. It has been observed that the people who stand while smoking, are often those who are entering the Union building with an unfinished cigarette and hence they move into the small alcove by the entrance and quickly finish their cigarettes and move into the Union building. Others are smokers who upon exiting the Union light up a cigarette and drift into the alcove to smoke and then move out of the plaza. Some of the other popular smoking spots are the main and the east entrance of Seaton Hall.



Figure 4.6 People standing in the Union Plaza

Smokers at the two entrances of Seaton Hall, are mostly people who like to take a break, smoke and return to their commitments, and usually prefer to stand. They are mostly students or staff who return to Seaton Hall for their duties. Again, it has been observed that when the weather is pleasant, people sit on the steps or the side walls.

3. People Sitting

It is less common for an encounter to result in the people involved to move to a sittable place. Most of the people sitting are people who come with a predetermination to sit down. Often these people are smokers, people reading or people gazers. Other people who sit here are those who are waiting to meet a friend, or those who wish to enjoy the weather on a pleasant day. Although weather conditions effect the overall use of the out-door space, it is the activity of sitting that is directly related to it. The number of people can greatly vary between a day with pleasant weather, than otherwise.

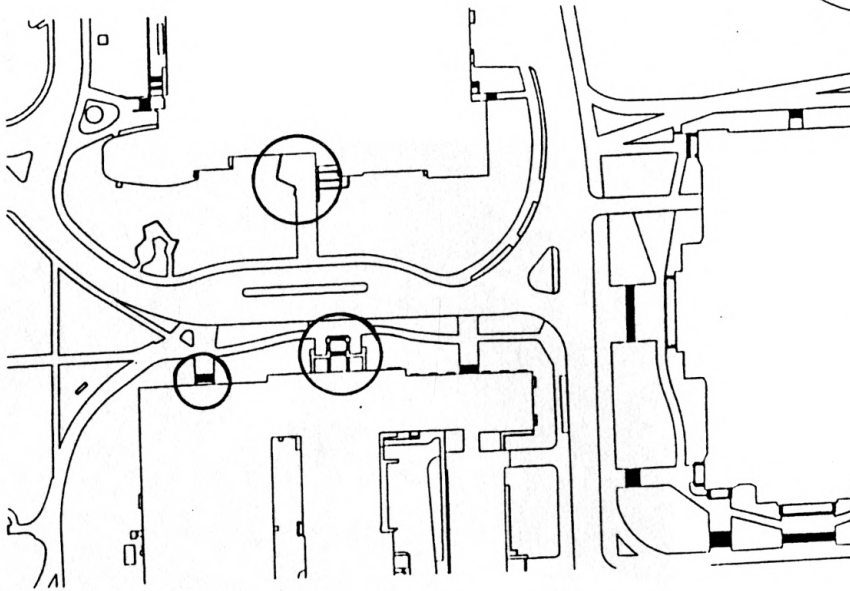


Figure 4.7 Mapping of seating points in the Union Plaza

The minimal sitting options restrict some parts of the plaza as popular sitting spots, (refer figure 4.7). Each of these spots vary in quality and are chosen by people for their varying seating arrangements, levels of privacy, visual contact with the rest of the plaza, visual access into the plaza, accessibility to parts of the plaza, such as sidewalks, the Union, or other buildings.

The number of people sitting is very small compared to the total number of people who visit the plaza. Also, the seating is restricted to the same three major standing spots namely, the Union entrance, the main and the east entrance of Seaton Hall. The side walls along the Union entrance and along the alcove serve the function of seats at this location. Majority of the people who use this spot are smokers either entering or exiting the Union, another sizeable proportion of people who sit here are people-gazers. The Union, being the hub

of activity and visited by many people during all times of the day, proves to be an excellent place for this purpose.



Figure 4.8: People sitting at the Union entrance

The other two major locations-- the main and east entrance of Seaton Hall, also function as active seating spots though their use is usually restricted to the users of Seaton Hall. It is interesting to note that these two places have different qualities and cater to different types of users. Yet, both these places are similar in the facts such as they provide a good view into the plaza, have adequate seating and provide sunshine.

The east entrance, being a smaller flight of steps, and a space that blends into the plaza, is more informal in character. Also, the location of classrooms and studios close to this entrance, mainly makes this the domain of the students. Another important aspect of this space is its visual and physical proximity to the rest of the plaza, people sitting on these steps are visible from most parts of the

plaza. The seating is provided by the steps that add to this purpose of informal student activity. While the most popular activity students indulge in here is smoking, many students use this spot to simply sit for a while between classes or sit here and read or sometimes even to have their lunch.

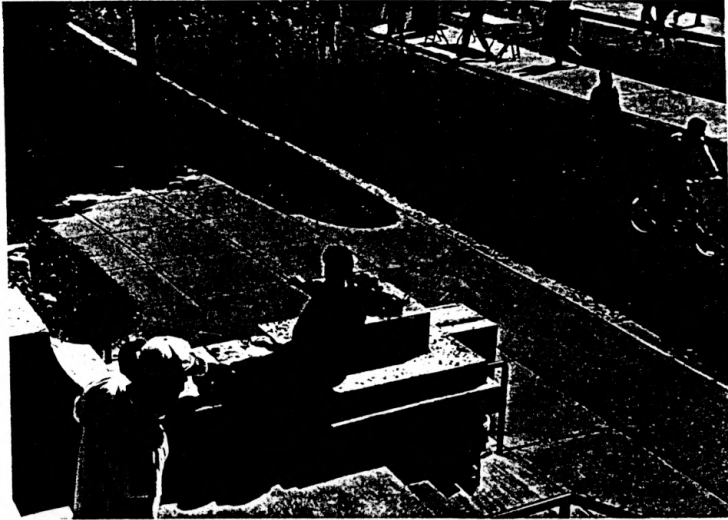


Figure 4.9: People sitting at Seaton Hall entrance

The main entrance of Seaton Hall is an elevated platform with a larger flight of steps, this restricts the visual access from the plaza into the space. Therefore, people using this space although can see the activities of the plaza, do not actively blend into the plaza as they become mainly spectators. Being the main entrance, it is much grander in scale and more formal in quality. The rooms adjoining this entrance are mostly offices and therefore this entrance caters less to the students, and more to the staff who use the space in a more formal manner. Smoking is again a major activity among the users of this space, other prominent activities are relaxing under the sunshine. It must be noted that this steps directly face the Union entrance and many times the first few steps are used by people visiting the Union for seating purpose. Also, this place offers more variety in seating options since at the landing at the entrance, there are two alcoves that have small built-in seating.

4. Triangulation

Among the other activities that bring people to rest in the plaza space is triangulation. This term as defined earlier refers to people coming together in a social situation due to a special event that attracts them. During the occurrence of special events such as commercial fairs or student activities, the Union Plaza functions differently from the way it does on a regular days. The movement of people and other regular activities are greatly effected due to these special events. Due to this changed role that the plaza performs during the occurrence of special events, special events are discussed later in this chapter.



Figure 4.11: Triangulation in the Union Plaza.

Analysis of People at Rest.

The findings of the behavior mapping of people at rest in the Union Plaza allow ample scope for analysis. The mapping provided information about the three major seating locations and common standing locations of people in the plaza. Information such as the number of people using different seating locations and

the activities they indulge in when they are at rest, have been recorded during the mapping. This information was primarily recorded on the base map during the mapping process. Later, it was entered into a tabular format for ease in handling the figures (refer table 4.2) These tables have in turn been interpreted as bar graphs each focussing on one aspect of people at rest, under different parameters. For instance, a comparative study of the number of users for each of the seating locations can be conducted by plotting a graph of the total users counted at each of the three seating locations over the week.

Location Time Period	A 8:22-8:24	B 8:24-8:26	C 8:26-8:28
Activity			
Sitting-Smoking	2	1	2
Sitting-Reading	2	0	1
Sitting-Observing	1	1	1
Sitting-Conversing	0	0	1
Sitting-Eating	2	0	0
Sitting-Total	7	2	5
Standing-Smoking	2	2	1
Standing-Conversing	2	1	0
Standing-Observing	2	1	0
Standing-Total	6	4	1
People at Rest	13	6	6

Table 4.2: Documentation of resting patterns in the Union Plaza

It is expected through the interpretations of the various mapping information and the graphs that follow to point to some important aspects of people at rest. This would then add to the knowledge gained so far in the previous chapters regarding the life and activities of the Union Plaza. It is important to note that the graphs plotted here are based entirely on the information recorded during the week-long mapping process. Also, the numerical information about the users

does not reflect the overall number of users, but only the number of users counted during the pre-allotted time periods.

The Three Seating Locations

This analysis is based on counting of the total number of users at each of the three locations for the full five days of observation. The mapping provided information about the number of people at each of the locations during the different time periods as a whole. This information is plotted as a bar-graph with the three locations on the x-axis and the corresponding number of users on the y-axis, refer Table 4.3.

It is evident from the graph in Table 4.3 that for the entire observation period, the location A is the most used among the three with 352 users, while B had 242 users and location C had 194 users. Again, it must be noted that these figures reflect only the users counted during the pre-allotted time periods. This finding confirms that location A, the Union entrance is most used as a resting spot, followed by the Seaton main entrance and finally, the west entrance of Seaton Hall. This can be explained by the findings of the movement patterns discussed in the previous chapter, most of the people visiting the plaza go to the Union. It can also be stated that despite being a smaller space with fewer seating options, the west entrance of the Seaton Hall has almost as many users as the building's main entrance. This is true since the west entrance is used frequently by the students as a place to rest between classes for activities such as smoking.

Other information that can be drawn from this graph is the moderate use of the Seaton main entrance. Being a large space, and quite accessible to the people visiting the Union as it directly faces the Union, people often use this as a resting place. It is extensively used during the occurrence of special events or on a pleasant day.

People at Rest : Locations A, B & C

Location	Users
A	352
B	242
C	194

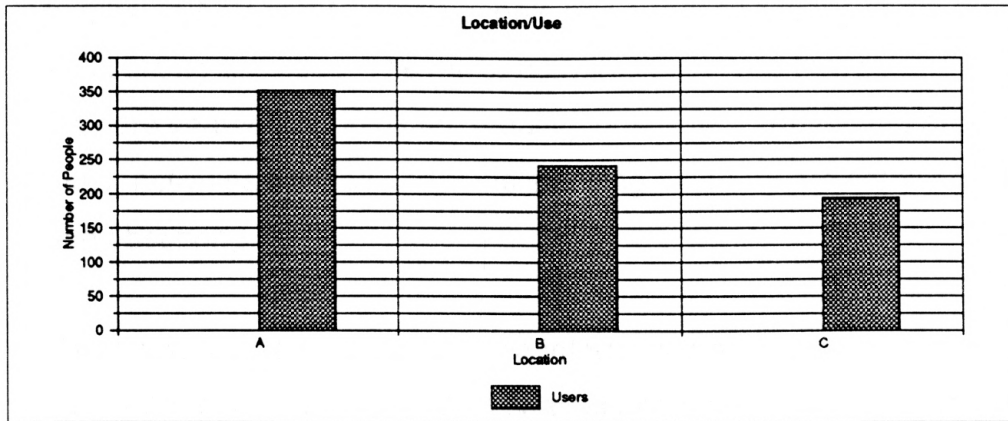


Table 4.3

Comparison of Sitting and Standing : Locations A,B & C

Location	Sitting	Standing
A	196	155
B	118	124
C	98	96

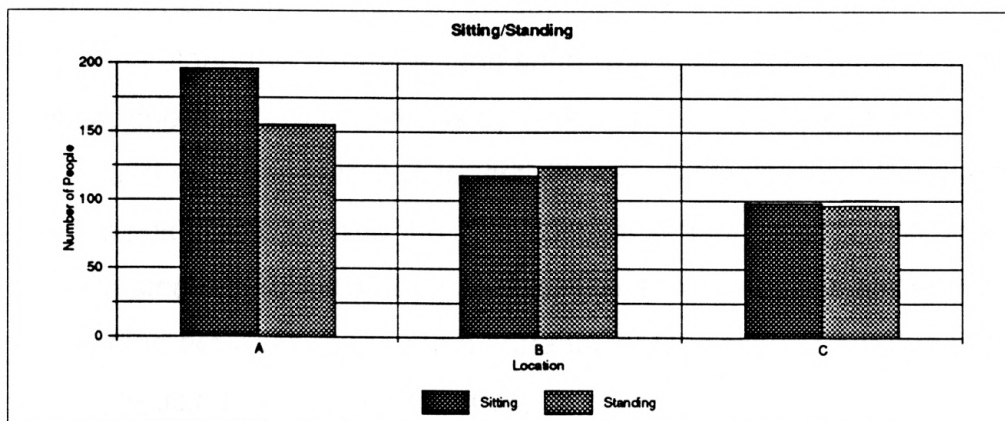


Table 4.4

Comparison of Seating and Standing Activities at the Three Locations.

The three locations of rest in the Union Plaza, the Union entrance, the Seaton main entrance and the west entrance of the Seaton Hall, referred to in the graphs as A, B and C attract people and serve as resting spots for both standing and seating activities. The major activities observed that people indulge in while they are seated are smoking, reading, observing, conversing and eating. The major activities that fall under the standing category are smoking, conversing and observing.

Table 4.4, a graph is plotted using information about the total number of users of all the three locations based on seating and standing activities for the full five days of observation. It can be clearly seen from the graph that the Union entrance is used more for sitting activities (196 users) than standing activities (155 users). The Seaton main entrance has a slight difference in the seating activities (118 users) and standing activities (124 users). Finally, the west entrance of Seaton Hall, shows almost an equal number of seating (98 users) and standing (96 users).

The above findings can be substantiated by some of the observations made while conducting the behavior mapping. The Union entrance has adequate seating along the entrance-- the short wall and the smoking alcove, refer fig. 88. Also, due to its extensive use by moving pedestrian traffic, it is often impossible to stand near the entrance for activities such as smoking. People often drift into the smoking alcove and the availability of seating usually encourages them to sit while smoking or for other activities. The almost equal number of seating and standing activities at the main entrance of Seaton Hall are due to the fact that people using this place are mostly from Seaton Hall who come out to take a brief break to smoke or for other activities. Such users usually prefer to stand since they use the place for a short duration.

Total sitting & standing for various time periods

Time Period	Sitting	Standing
8:22 - 8:28	65	66
10:22 - 10:28	105	89
12:22 - 12:28	127	104
2:22 - 2:28	79	79
4:22 - 4:28	30	41

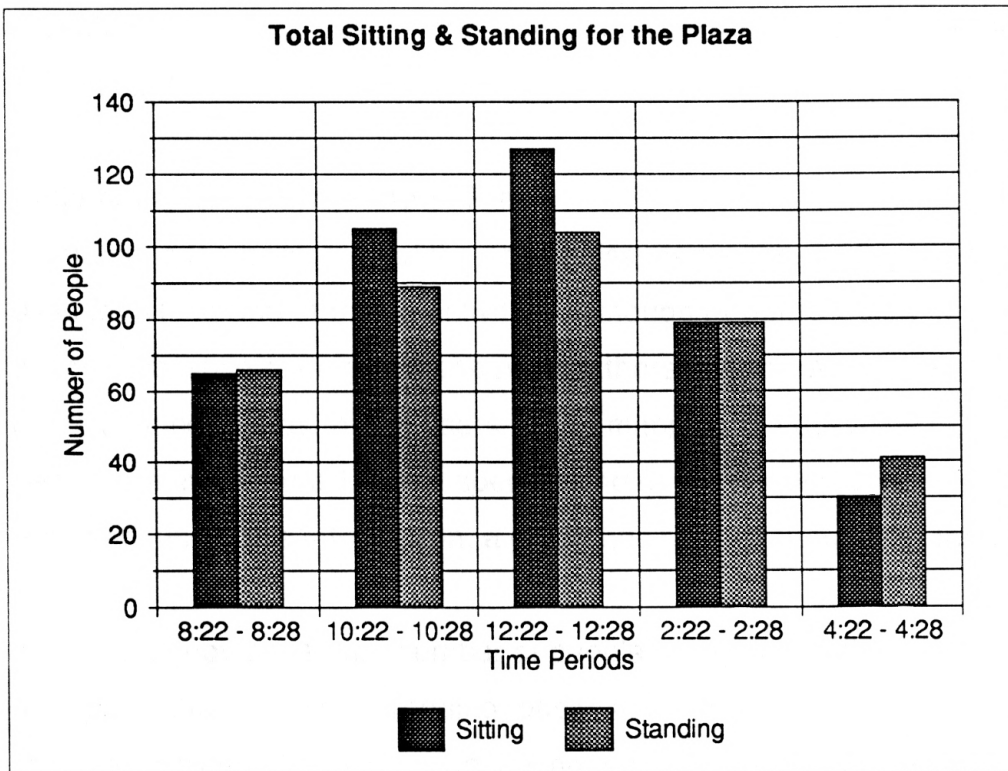


Table 4.5

Also, the Seaton entrance is used as a resting spot, by people visiting the plaza or those waiting for a friend or for a brief conversation after an encounter with a friend in the plaza. Most of these activities are performed while sitting and therefore this place serves actively as a seating spot too.

The west entrance of the Seaton Hall being mainly a domain of the architecture students tends to be used as a place to take a break from classes. Students like to quickly smoke a cigarette and return for their classes while others who are not in such hurry tend to relax on the steps chatting with friends or just observing the plaza activity.

Activity Patterns in the Union Plaza

As stated in the beginning of the above discussion, the resting locations are used for sitting and standing activities. Although people indulge in a wide variety of activities while resting at these places, there are some activities that are common among most of the users. While mapping the activities of the people at rest, information regarding the specific kind of activity users indulged in was also recorded. using this information, a graph has been plotted, refer table 4.6.

The graph shows the total number of people using the resting places for different sitting activities (smoking, reading, observing, conversing and eating) and standing activities (smoking, conversing and observing) over the full five days of observation. The number of users is based on the counting conducted during the mapping process. it must be noted therefore that these numbers merely reflect the users for the time periods that the mapping was conducted. Among both the seating and standing activities, smoking is clearly the predominant activity people standing perform (149 users). This is followed by activities of smoking (149 users) and conversing (151 users) by sitting people. The other less popular activities people use these places of rest are, standing-

Activity Pattern

Activity **No. of People**

Smoking 149
 Reading 35
 Observing 56
 Conversing 151
 Eating 42

Smoking 204
 Conversing 114
 Observing 61

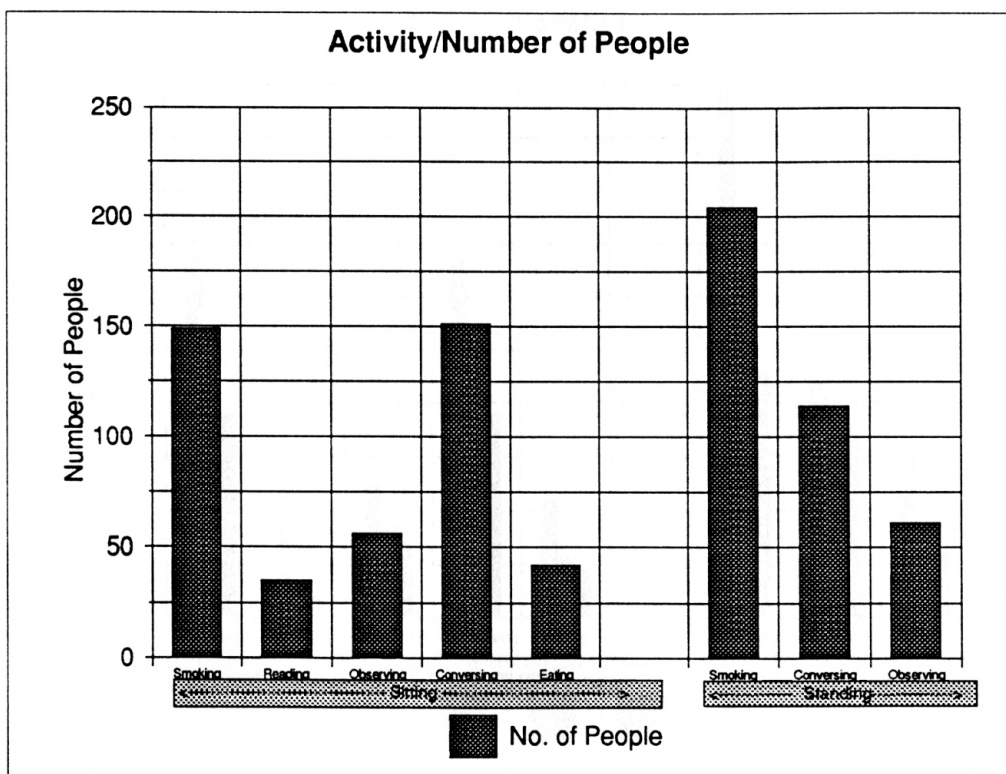


Table 4.6

Activity Pattern at different locations

Activity	A	B	C
Smoking	73	37	38
Reading	18	13	4
Observing	25	17	14
Conversing	67	46	38
Eating	22	11	9
Smoking	100	58	46
Conversing	44	35	36
Observing	30	18	12

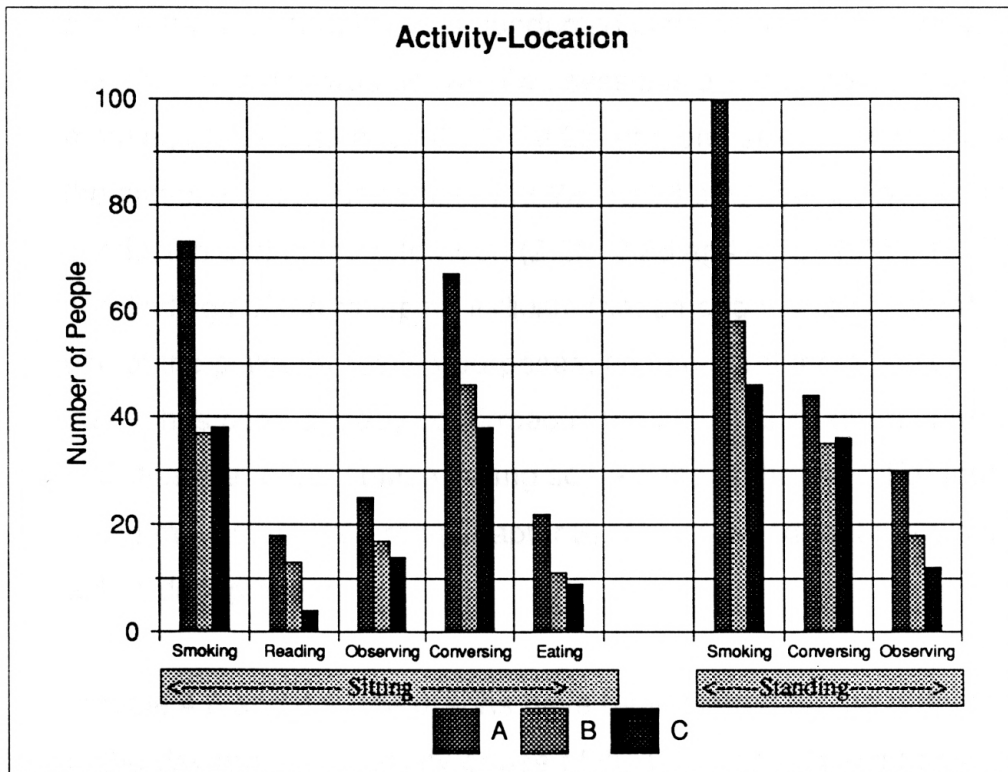


Table 4.7

observing (61 users), followed by sitting-observing (56 users), and finally eating (42 users) and reading (35 users).

Table 4.7 is a graph showing the distribution of these different activities among the three different resting locations. It can be noticed that the location A-- the Union entrance is usually the most active, followed by the Seaton main entrance and finally, Seaton Hall's west entrance.

Daily Rest Patterns

In order to understand the patterns of activities of people at rest at different parts of the day, the mapping was conducted in three sessions, evenly distributed over the time the plaza was active. Two sessions of mapping were conducted in the morning (8:22- 8:28 and 10:22- 10:28 am), one session was conducted during the mid-day or the lunch-hour (12:22- 12:28 pm) and two sessions were conducted during the afternoon (2:22- 2:28 and 4:22- 4:28 pm). Observations and findings of the mapping indicate that among the factors that influence the use of the plaza for resting purposes, an important factor was the-- time of the day. It has been already confirmed in the previous chapters that the plaza activities are more intense during some parts of the day. For instance, mapping of the movement patterns (Chapter 3), has asserted that the plaza was most active during mid-day.

In table 4.8 and 4.9, the graphs have been plotted for the different time-periods of the day and the intensity of use of the three resting locations. The graph in Figure 3-3, provides information about the intensity of activity by the mapping recordings of the number of users at rest during the time periods. Also, evident from the graph is the comparison of intensity of activities at each of the three resting locations during each time period. The graph in Table 4.9 indicates the distribution of the users among the three different resting locations.

People at Rest at Different Time Periods

Time Period	No. of People
8:22-8:28	124
10:22-10:28	195
12:22-12:28	239
2:22-2:28	158
4:22-4:28	71

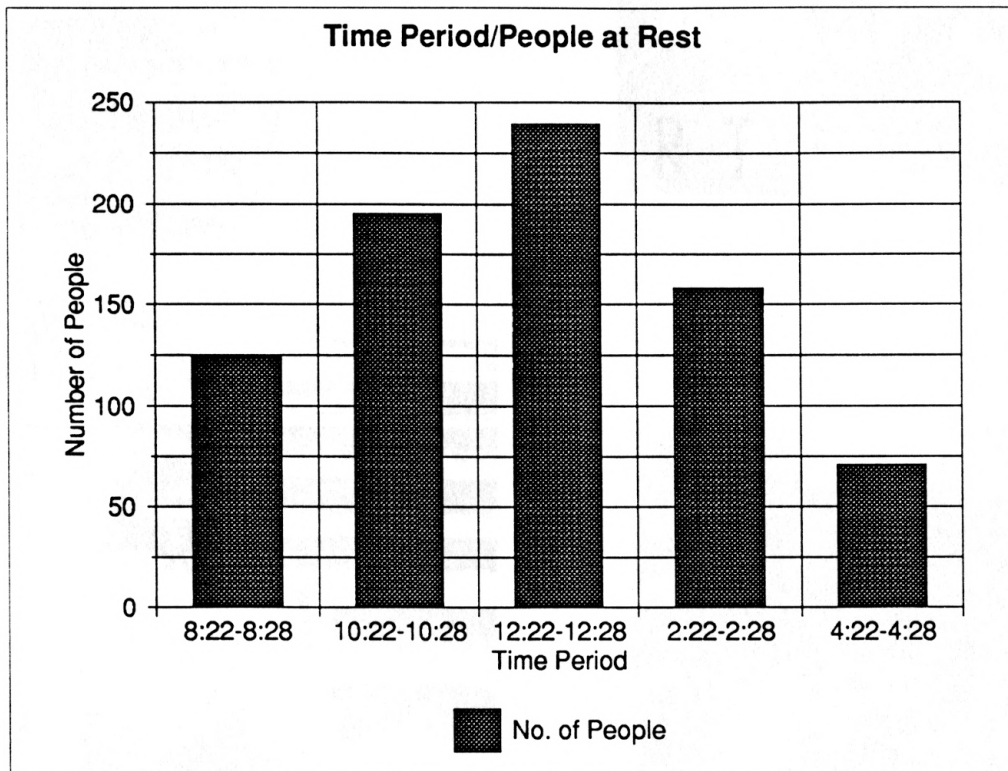


Table 4.8



Figure 4.12: Resting patterns in the Union Plaza

It is clear from the graphs that the Union Plaza is most actively used by people at rest during the lunch-hour. This finding reinforces the conception made on the basis of the findings of the movement patterns that the plaza is predominantly active during the mid-day. The plaza is visited by more people during the lunch hour than any other time, (findings of movement patterns, Chapter 3). Apart from having lunch, people tend to use this time for relaxing or meeting a friend, which often take place in the plaza space. It has also been observed that most smokers prefer to smoke immediately after lunch. Along with these factors that make the lunch-hour the most active period for activities of people at rest, another important factor is the fewer classes being scheduled during this time. This allows the students to visit the Union to have lunch or attend to other chores and to relax in the plaza space. It is also be inferred from the graph (Table 4.9) that all the three locations are active during this time.

As Table 4.8 shows, the next time periods following the lunch hour in the intensity of activities associated with people at rest. are the late morning time period (10:22- 10:28 am) and the early afternoon period (2:22- 2:28 pm). The high activity during the late morning time period (10:22- 10:28) am is due to the fact that it is during this time of the morning when many people enter the campus, and when the people who come early take their first coffee or pop-break. It is also a favorite time for smokers from nearby buildings to visit the Union Plaza to smoke. The early afternoon period also experiences high activity of people at rest as this is a time when many people who work during the lunch hour or students who have classes during the lunch hour visit the Union for lunch. This also explains the high activity at the Union entrance and low activity at the two entrances of the Seaton Hall. Also, this is a time for people to take a afternoon break.

People at Rest - Location - Time Period

Time Period	A	B	C
8:22-8:28	66	38	20
10:22-10:28	88	64	43
12:22-12:28	92	84	63
2:22-2:28	80	38	40
4:22-4:28	25	18	33

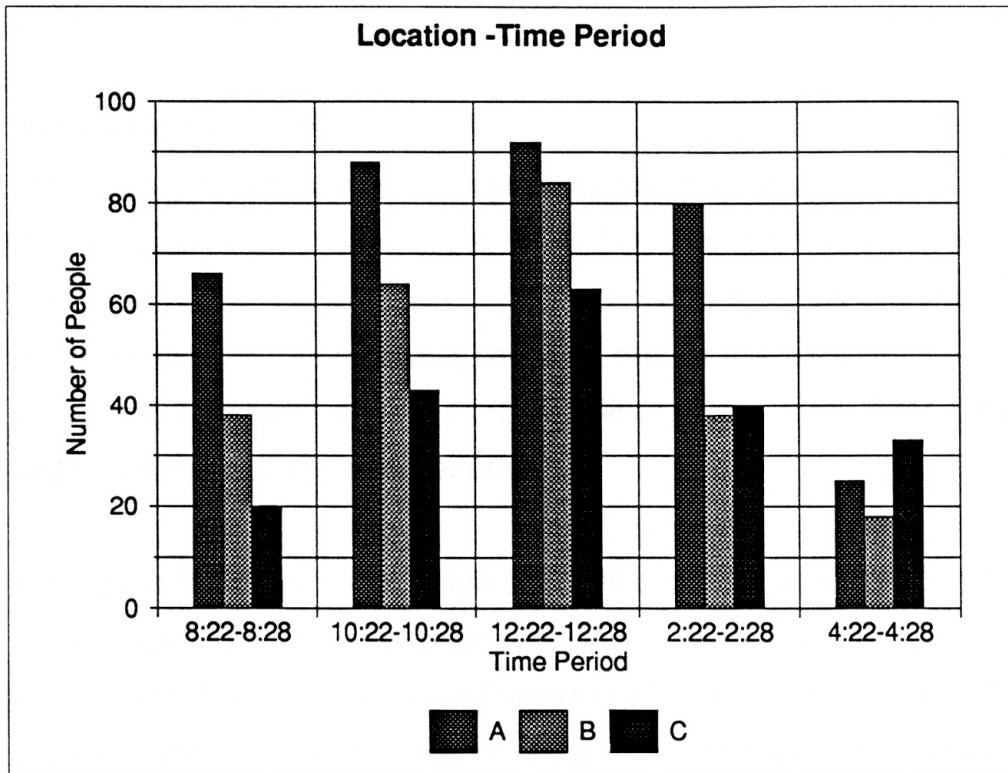


Table 4.9

The early morning is the next intense period as it is a time when the people who work in offices on campus and students attending early classes, enter the campus. Many of them visit the plaza for breakfast or for a cup of coffee. Again, this is a time for activities such as smoking or reading the *Collegian*.

Finally, the least intense period is the late afternoon (4:22- 4:28 pm) since most of the students would have already left the campus for the day and those visiting the Union often prefer to quickly leave the building and move out of the campus or towards the parking lots.

Weekly Rest Patterns

The intensity of activities and the general use of Union Plaza have been found to vary between different days of the week. This was also evident in the mapping of movement patterns in the previous chapter. Table 4.10 is a graph showing the plaza use for activities involving people at rest for the five days the mapping was conducted. This graph compares the activities at rest at the three locations of rest during the specific time periods.

Among the five days mapped, the activities of people at rest are more intense on Wednesday (191 users), followed closely by Tuesday (173 users) and Monday (165 users). The two other days Fridays (147 users) and Thursday (111 users) are less intense in the use of activities at rest. These patterns can be explained by some general observations related to the plaza-use. The University follows a Monday-Wednesday-Friday and Tuesday-Thursday schedule. It has been observed that Mondays, Wednesdays and Fridays are generally more hectic and therefore the Union Plaza experiences more activity on these days. Fridays afternoons, it must be noted are often the last part of the week and many students leave the campus to start their weekends. This explains the low use on Friday.

It must be noted that while all outdoor activities are effected by the weather conditions, it is activities related with people at rest that are most effected.

Comparison of intensity of use on different days

Day	No. of People
Monday	165
Tuesday	173
Wednesday	191
Thursday	111
Friday	147

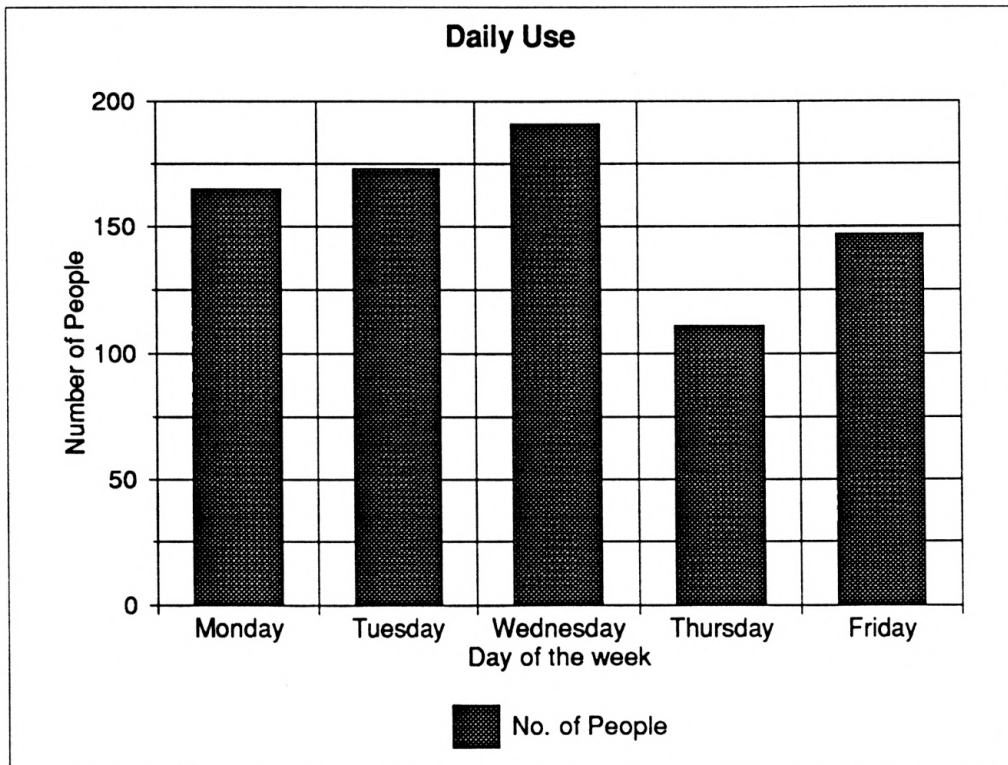


Table 4.10

Therefore although the activities of people at rest do follow certain patterns through the week, they can be altered by changes in weather conditions. Another condition that can effect the activities at rest are special events.

The graph in table 4.11 shows a distribution of relative use of the three resting locations on the five days mapped. On all days, clearly location A experiences maximum use for resting activities followed by Location B and C. It was mentioned in previous findings that the Union entrance (Location A) attracts more people followed by the Seaton entrance (location B) and the west entrance of Seaton Hall (location C).

Comparison of intensity of use on different days

Day	A	B	C
Monday	66	56	33
Tuesday	86	52	35
Wednesday	72	59	60
Thursday	49	34	28
Friday	68	41	38

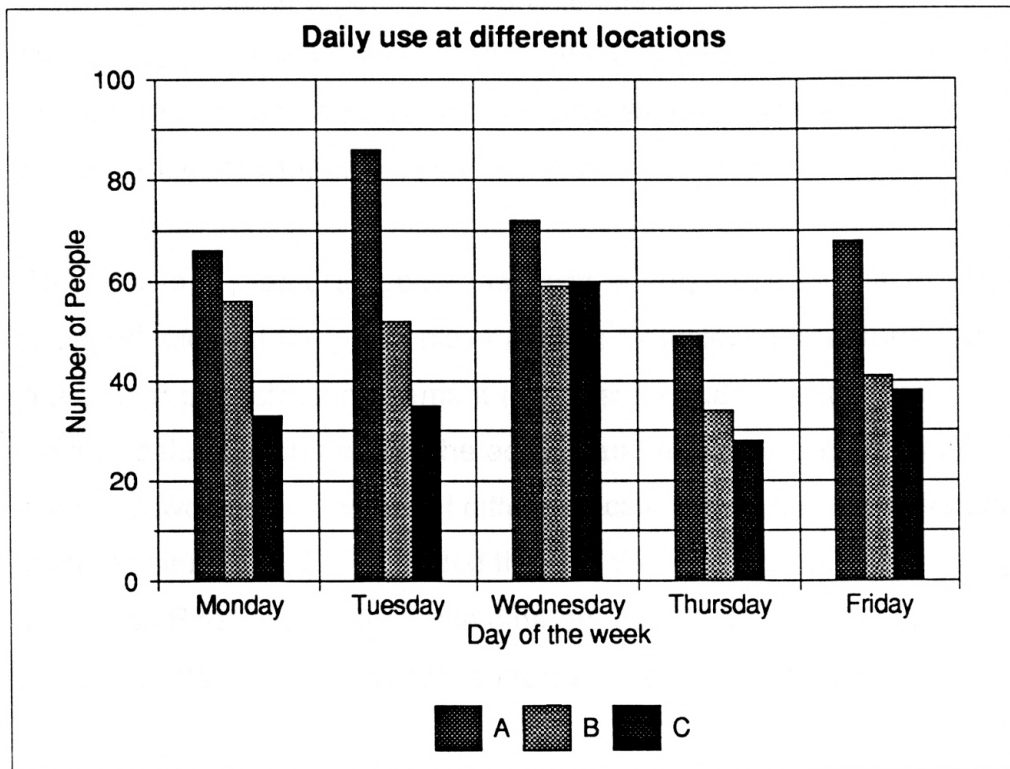


Table 4.11

Behavior Patterns of Special Events.

An important feature of the Union Plaza is that it plays host to several special events, most of them resulting in triangulation and thus bringing people to the plaza. Even a group of students distributing hand-outs can become a special event, as people are attracted by this activity. Small commercial events such as credit card promotion are quite common. Credit card companies set up small stalls in the plaza and encourage people to apply for a credit card and offer incentives such as free T-shirts. Larger occasions are when many commercial organizations come together to promote their products offering free samples of their products. These often comprise of many temporary structures that are spread over the entire plaza, with colorful banners, posters, music, or performances to attract peoples' attention.

The noteworthy features about the plaza during these special events are the changed role that the plaza plays and the flexibility to transform from the role of a plaza for pedestrian movement to a host for such events. Therefore depending on the scale of such events, the activity and behavior pattern of the users differs. I studied two special events of different scales, in order to understand the extreme situations. It is intended through these two discussions to highlight how the Union Plaza assumes a role different from its day-to-day functioning and the various shifts in the behavioral patterns. The two events are:

1. A credit card promotion event-- a small event extending for one day and fairly common event in the plaza.
2. A commercial fair-- This is a large scale event for two days, involves the setting up of temporary structures and takes place just once each semester.

A credit Card Promotion Event

It is a common sight to find a few tables set on the free speech zone in the plaza, where two people would be handing out credit card applications, calling people to apply and distributing free T-Shirts or similar premiums as incentives for applying. These type of small events usually take place when the weather is favorable and such small-scale events require no preparations or infra-structural support. Usually, a couple of sales persons set up a few tables with their paraphernalia and solicit passers-by to fill out a credit card application and receive free gifts.



Figure 4.13(a): A credit card promotion event.

It must be noted that, although these kinds of events are not large-scale activities, they greatly effect the life of the Union Plaza. The movement patterns of pedestrian traffic are effected as people move away from the usual flows. Also, there is a change in the mood of the plaza during such occasions as it becomes festive. The following description of one such small event provides a better understanding of the changes in movement patterns, people at rest and other activities of the Union Plaza.

Mapping of the Event

The procedure of mapping of this event was similar to the mapping of regular plaza-activity discussed in Chapter 3. The same base map was used to map the shift in the flows, and people at rest were located using the larger scaled maps. The mapping of the movement patterns were focussed within the plaza as it was found that the flow lines shifted mainly after they entered the Union Plaza. Also, during such events apart from the usual seating and standing spots, other locations are used by people at rest. Base maps of these places were made to map people at rest.

This event occurred in mid August of 1995. Two representatives of a certain credit card company had set up a small stall which constituted of two tables and few chairs on the free speech zone and were inviting students passing by to apply for credit cards. The tables were faced with few posters announcing the free gifts and advertising the credit-cards. This event began at 8:30 am when many people enter the campus and either visit the Union or traverse through the plaza to reach their destinations. The plaza activity during this time as mentioned in previous chapters, is predominantly pedestrian movement, students are usually rushing through the plaza at this time. Though very few people stopped to fill out applications, most of the people passing by glanced at the stall while some of them paused to find out what the stall was about. This, according to me served as advertisement as students would stop by when they visit the plaza later when they are not in as much a hurry.

As the plaza activity is heightened during the ten-minute break between classes, more people stop by during this period. By 9:20, people started stopping by the stall, some of them just looked at the free gifts on the table and proceeded towards the Union, while many others filled out applications and picked up free gifts. People walking with such gifts tend to attract the attention of others

entering the plaza, this therefore serves as advertisement for the stall. By 9:30, the activity in the plaza slowly faded and the two salesmen were using this off-period to prepare for the next peak period between 10:20 and 10:30 am. They were sorting out the application forms and rearranging the gifts on the table during this time. As lunch-time approached more people visited the plaza, and the people crowded around the stall. An important observation is the changed flow lines of people as they move away from their regular flow line towards the stall.

During lunch-hour, people are more at leisure and therefore more people stopped by the stall. When such an event takes place in the plaza, people tend to sit around in the plaza, some waiting for their friends who stopped by the stall, others observing the activity.

Similar activities prevailed for the next few peak-periods, and the activity gradually decreased during later afternoon. By 4:30 pm when the activity in the plaza was greatly reduced, the two salesmen, started packing their stuff and cleared the tables out of the plaza.

Flows

Figure 4.13 shows the major flow lines mapped during some of the off-periods while the credit-card promotion event took place. It is clearly evident from this map that all the flow lines after entering the Union Plaza, curve towards the free-speech zone where the stall was located. This as discussed earlier, is due to the movement of people towards the stall. It can also be noticed each of these flows splits into smaller flows at this curve which flow towards the stall. This can be explained by the moving away of people from their flow to stop by the stall. Further, the map indicates several small flows moving away from the stall and merging with other major flows and some moving towards the Union. This is

because people who stopped at the stall, after a brief period proceed towards their original flow line, and others move towards the Union.

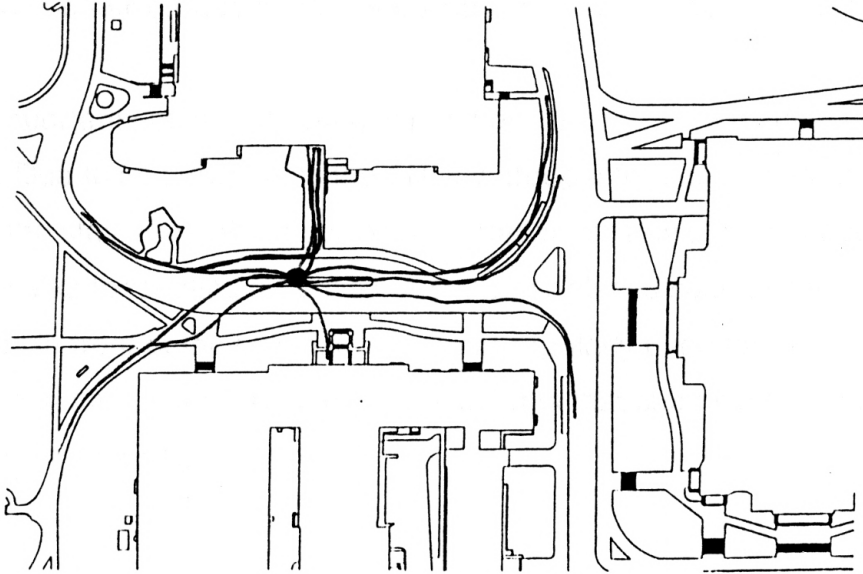


Figure 4.13(b): Mapping of the credit card promotion event.

From the above discussion it is evident that there is a major shift in the movement pattern of pedestrian traffic due to this special event. It was also observed that such special events bring more people into the Union Plaza, as many people passing by the plaza enter it to join the activity.

People at Rest

The occurrence of small special events such as the credit card promotion described above brings people to rest in many ways. Apart from the usual spots where people rest in the Union plaza, a major place of rest is around the stall. It can be seen that many people various crowd around the stall, some people stand in small groups nearby while others sit along the pavements.

An important place for seating in such occasions is the main entrance of Seaton Hall. Due to its proximity to the activity, people tend to sit here briefly after they visit the stall. From the mapping information, it is evident that people use the sidewalks for seating purposes. Also, other places such as the landscaped space in front of the Union, that are not regularly used for seating, become active seating spots. This feature highlights that such special occasions demand extensive seating.

A Commercial Fair

Larger special events that occur in the Union plaza bring more people and create a platform for a variety of activities. Some such events are commercial fairs, the university's open house program, and other student activities. The major shifts in the movement and activity patterns in such occasions are similar to that of small events as the one discussed above. But, often these large events bring about more variety both in the movement and activity patterns in the plaza as more people are involved in such occasions.

Following is a description of one such special event that took place in the Union plaza in July, 1995 for two days. It is intended that the description of the event would bring to light the variety of activities and the shifts in pedestrian movement in the plaza. This would be followed by analysis of behavioral mapping conducted during these two days, thereby highlighting the different role the Union Plaza assumes in such situations.

Mapping of the event

The movement patterns and people at rest were mapped during the commercial fair using the same mapping procedures that were used in other behavioral mapping. The base map of the plaza space was used for this purpose. It was important to map flows as they entered the plaza since it was observed that people moved in different directions after entering the plaza. People at rest were mapped on the same base map, majority of the people at rest were people visiting the stalls, though several people were sitting at different places in the plaza.

An important observation is that these special events bring about a new pattern of use that is a combination of movement, people at rest and people involved in activities. This phenomenon is because of the movement of people from one

stall to another, pausing briefly at each and some times indulging in certain activities such as talking or playing some game. Therefore while studying each of these patterns separately, one must remember that they all occur as one continuous process.



Figure 4.14: The commercial fair

Every semester, several commercial companies dealing with products related to students organize a large commercial fair in the Union Plaza trying to promote their products. In order to attract students and for product promotion, they give away free samples. This particular fair had companies promoting products such as electronic gadgets, cosmetics, soda, credit cards and magazines. Many tents and other temporary structures were set up in the plaza space, serving as stalls, (refer Figure 4.16) for the layout of these structures. Some of the companies had their stalls in the open. As part of this fair some games and contests were conducted to attract more people. A wooden stage was set in the center of the plaza around which the tents were erected. Colorful posters, signs and huge play equipment were placed at different places in the plaza. One company had erected a mammoth model of a soda bottle that they were promoting. Loud music and announcements added to the festive atmosphere of the plaza.

Most of the tents and other structures were set up the previous day, this activity served as an indication to the students about the forth coming event. The fair began as early as 8:00 am, as the students passed through the plaza. The music attracted people passing by the plaza. By 8:20, the plaza was full of activity, people crowded around the stalls, listening to the salespeople and taking free samples. One beverage company had set up a few chairs on the free speech zone and were distributing free coffee, this became a small open restaurant. People seemed relaxed as they moved from stall to stall. The plaza was full of activity at all times, though the ten-minute peak periods between classes brought in more people.

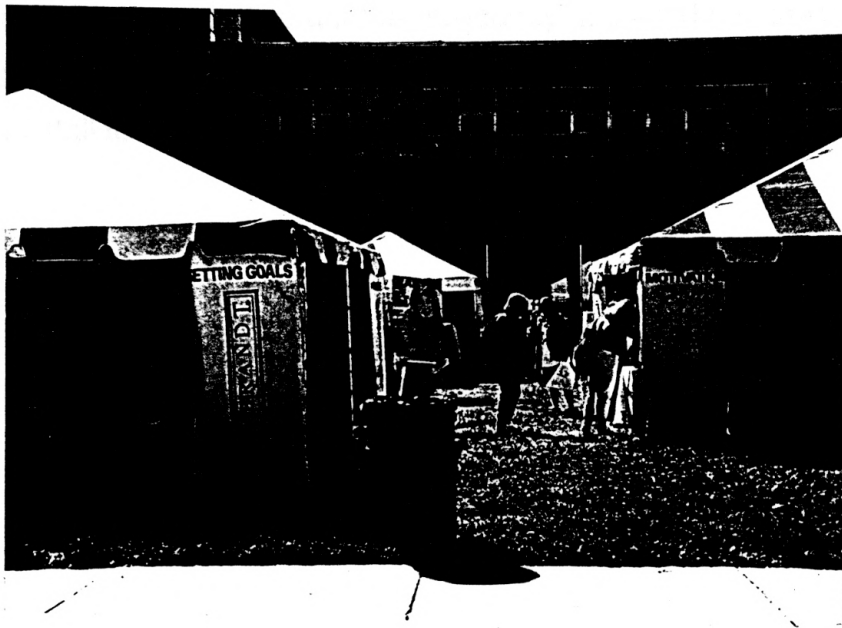


Figure 4.15 The commercial fair.

People entering from all sides, walked towards the nearest stall and slowly moved towards the others. It was observed that most people spent half an hour to one hour in the plaza. During the ten-minute peak period, students indulged in fun-games, quizzes and other such events. The activities continued till 4:30 pm, and then as the stalls were closed for the day the activity gradually died. The fair continued the next day and plaza experienced similar activity even on that day.

Flows

Figure 4.16 shows the major flow lines mapped during the commercial fair. It can be seen that most of the flow lines branched out into small tributaries as they entered the plaza, and each of these tributaries moved in different directions. This phenomenon is due to the fact that as people entering the plaza come in visual contact with the activity, they tend to be selective about where they go first to. Also, the map indicates that these flows move around the stalls in different combinations which can again be explained by the movement of people from one stall to another randomly. It should be noted that the movement of people is not continuous since they pause at different places as they move from stall to stall.

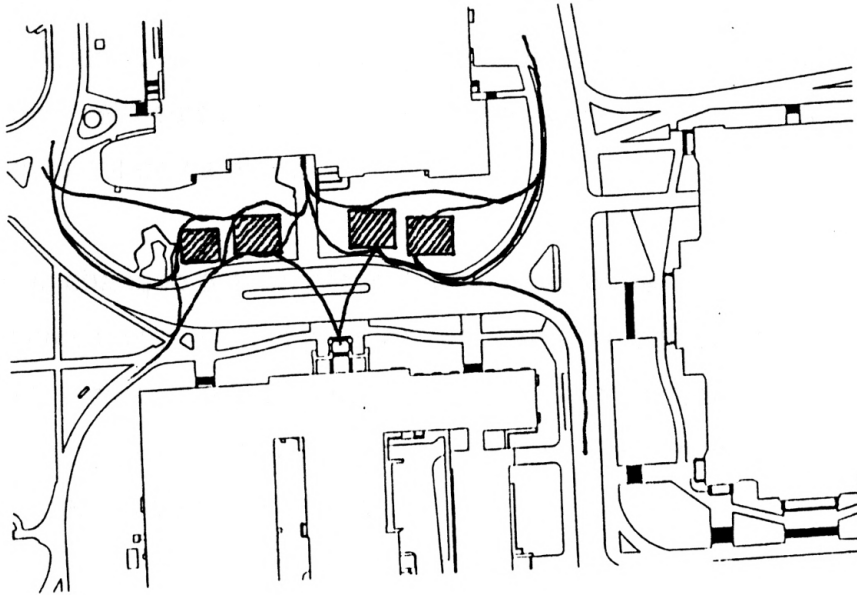


Figure 4.16: Mapping of the commercial event.

Several of the small flows flow back towards the major flows at the edge of the plaza. Other flow lines from different parts converge at the entrance of the Union indicating that some people move into the Union after visiting the plaza. Still other flows culminate at seating spots such as the Union entrance, Seaton entrance, the landscaped space in front of the Union building, and some even by the sidewalks. This happens as people tend to settle down at different places to rest for a while and see the activity of the plaza. But more importantly, these stalls pull people from their route towards them (refer Figure 4.16). Almost all the flows follow this trend where they move away from their usual path, towards the

stalls and then move towards other stalls and then finally towards the Union. Each of the flows breaks into several tributaries that flow towards each of the stalls, and some that remain in the usual route. Thus, overall it can be said that the all the flows branch out into smaller flows, each flowing towards the different stalls and then new flows originate from these stalls most of which move into one flow that meets at the Union entrance. Other flows originating from the stalls, move out of the plaza.

This changed pattern of the flows is due to the fact that people enter the plaza from various sides of the plaza (as usual) but on seeing the stalls, tend to drift away towards a stall of their choice. Then they tend to spend some time and then move towards other stalls and later towards the Union or out of the campus to their respective buildings.

Resting Patterns

Apart from shifts in movement patterns such special events greatly effect the patterns and number of people at rest. Here it must be observed that "people at rest" refers not merely to people stopping to sit down or rest in the plaza, but also to the intermittent pauses in the movement of people as they stop at the stalls. This therefore introduces a new activity of people at rest.

Figure 4.16 also shows the major places of people at rest and the type of activity they are involved in. This is a comprehensive map prepared by collecting information from several mapping information at different parts of the two days. The mapping was done by locating the people at rest in the base map during different times of the day, along with information about the kind of activity they were involved in. This was done by marking dots of different colors, each color representing a certain activity. For example, the red dots in the map indicate people visiting the stalls. Another important aspect that comes to light are the

different places that people use for seating purposes. The map shows places in the landscaped area in front of the Union, the sidewalks, the main entrance of Seaton Hall, the chairs set up on the free-speech zone and the west entrance of Seaton Hall as the major seating spots.

Chapter Five

Design Implications

This chapter brings together the findings from the literature study of chapter 2 and the empirical analysis of chapters 3 and 4. Here these findings will be presented in the form of comprehensive design implications which form the basis for the proposed design of the KSU's Union plaza. This design will be presented in Chapter 6.

At this point, it is important to state that, although the literature review and the behavior mapping aid in formulating design guidelines that are specific to the context and the behavior patterns of the users, it is not possible to list all of the understanding developed in the research process. The more subtle issues such as a general sense of the mood and quality of the desired space are easier to express graphically than verbally. Other aspects, such as the architectural vocabulary that would be apt for this context, developed during the course of this study and are based on the fact that I have been a user of the Union plaza for over two years and this understanding is an intuitive process that evolved through my experiences with the life of the plaza.

It should be acknowledged that the Union plaza is an example of an open space that was never intentionally designed to be used for social interaction, yet some of the existing features of the plaza make it suitable to be developed as a successful open space. When proposing design guidelines, the positive features of the existing space, such as the multiple entrances into the plaza and scope for large gatherings, need to be retained, hence it is crucial that the proposed design guidelines do not disrupt these qualities. While the above discussion suggests that the redesign is an easier task, as some of the basic qualities necessary for a successful plaza are already there, at the same time, the

existence of these qualities brings up the delicate issue of retaining the positive features while adding more in this context.

The two major literary sources, *Social Life of Small Urban Spaces* by William Whyte (1980) and *People Places* by Clare Cooper Marcus (1990), along with other sources, and the behavioral study form the basis for these design implications. The design implications will be discussed in the broader design implications that influence the design at a macro-level will be listed, first, followed by more specific micro-level issues.

1. Mid-day activities

From the behavioral mapping conducted, it has been found that the Union plaza is predominantly used by people on the campus during the lunch hour. This observation reinforces Whyte's findings from his case-studies of several urban plazas. This suggests that the design of the plaza must accommodate lunch-time activities such as eating, conversations, encounters and smoking (these activities are based on the mapping information of mid-day plaza activities). As discussed in previous chapters, the intensity of activities fluctuates throughout the day and therefore the plaza must also accommodate for activities at other times of the day.

2. People attracting people

One of Whyte's major assumptions is that public spaces should be places such that the presence of people attracts more people. This was found true in most of the observations made in the Union plaza, especially during special events. To integrate this assumption into the design, it is important to have visual contact with the plaza activities from both inside and outside the plaza. This can be incorporated in the design by allowing passers-by to see the activities inside the plaza, which could encourage them to join the activities actively or as observers.

Also, it is important that the people in the plaza be able to see outside the plaza and other parts of the plaza: this aids in incorporating a sense of orientation and is a means of reinforcing a feeling of being inside the plaza.

3. Sittable space

According to Whyte's research, plaza success was related directly to the amount of sittable space available. It has been evident in several occasions during the course of the behavioral study that some of the major activities in the Union plaza were seating activities such as smoking, people gazing, eating, conversing, reading and so on. It is also true that although the Union plaza attracts people from different parts of the campus, and most of the people only traverse the plaza to enter the Union building. This confirms that the Union plaza, due to the presence of the Union building, attracts people but fails to sustain activity: this can be attributed largely to the lack of seating space. Most of the mapping conducted for the people at rest in the plaza revealed that the minimal seating options were always occupied.

The above discussion strongly suggests that the proposed design for the plaza must provide for seating. It is also crucial to provide seating in appropriate places and the seating system must be physically and socially comfortable. For this, the mapping information about the major nodes of the movement flows and major points of social encounter will be very useful. More specific information mapped in the behavioral study, such as the existing seating patterns and people at rest can provide directions to locate and design the new seating proposed.

4. Social Comfort

The theme of social comfort has been the core of many of the studies on public places. This refers to the various preferences people have and the role they

assume in public places. Behavioral studies conducted by both William Whyte and Clare Cooper Marcus and Carolyn Francis, present interesting aspects of behavioral preferences of people in public settings. These studies are in compliance with the theme of "people want to see and be seen" discussed earlier in this chapter. Broadly, there are two types of behaviors among the users of public places-- some people like to be actively involved in the activities of the plaza and seek attention, others prefer to be silent observers of the activities. Social comfort in most cases deals with the range of seating possibilities available in the public place to accommodate the two types of people. While some people prefer sitting in prominent places where there is lot of activity, others prefer to be distanced physically from the activities yet wish to have visual access to the activities of the place.

Behavioral studies of the Union Plaza reinforced this phenomenon further. It was observed that even activities such as movement demonstrated these patterns of social comfort. Some people walked right in the middle of the sidewalks, others preferred to walk along the edges of the sidewalks. Another activity that showed such behavior was social encounters. It was observed that when some people meet their acquaintances, they either tend to drift away from the main flow into a less active place to converse, others prefer to stay right in the middle of the flows and begin to converse.

From the above discussion it is clear that the design of the plaza must provide a wide range of social comfort levels. Most often, this can be accomplished by provide a variety of seating options. The plaza must have places with different privacy levels, ranging from the very private to the very public places. Seating must be provided close to the active parts of the plaza and the less active parts of the plaza. Also, the seating provided must be appropriately designed ranging from formal seating options to more informal seating such as stairs.

5. Relationship with major pedestrian flows.

Whyte's findings from the Street Life Project revealed that the way in which the boundaries of the plaza were designed and built was also an important determinant of its use. One of the positive features of the Union plaza is the strong relationship it has with two important streets that bring people into it-- the pedestrian flow from the campus entrance on Vattier street and the street adjacent to Nichols Hall. It must be noted that there is a need to provide a more distinct entrance based on the major flows that could stimulate impulse use of the plaza. For instance, the mapping showed that more people entered the plaza from the east side than the west side, and the design must reflect this aspect.

The mapping of the movement patterns in chapter three shows the specific directions and the specific paths of the pedestrian flows in the plaza and its immediate surroundings. This is an important design consideration, as disrupting the existing path of these flows might affect the plaza use. Some of the flows that move towards the Union building are less direct, thus the provision of more variety and ease in entering the Union building would be helpful in making the plaza more sociable. It is also necessary to design seating in the plaza with respect to the flows.

6. Enclosure

Most successful urban plazas studied by Whyte were enclosed distinctly by buildings and are clearly demarcated for their use. Enclosure can be provided on a larger scale by the surrounding buildings and physical elements such as trees, steps, seating, light poles or bollards can provide enclosure for the plaza and define the space from the surroundings. Among the positive aspects of the existing Union plaza space, is the enclosure provided by the Union building, Seaton Hall, Anderson Hall and Ahern Field House. While these buildings provide a much needed enclosure for a social space such as the Union plaza,

there is still a need for containment that defines the plaza from the surrounding spaces that are used for activities different from that of the plaza. The streets that link the plaza to the rest of the campus are predominantly used for pedestrian movement and hence, the plaza space needs a permeable enclosure that can allow people to flow into the plaza at the same time separate it from the streets for other activities.

Also, it is important to define the boundaries of the plaza, as it has been found that people feel more comfortable sitting at an articulated edge with something at their backs. This also helps in creating many anchor spots which can provide settings for activities such as sun-bathing or people-watching.

7. Range of activities

A major finding from the behavior mapping of the Union Plaza is the wide variety of activities people indulge in. Several times although the plaza did not provide the required infrastructure for a certain activity, it was found that the users still would find a way to use the space for that activity. Hence, the design of the plaza while accommodating the existing range of activities, needs to be flexible so that spaces in the plaza become multi-functional.

The mapping of the people at rest revealed that among the popular activities are smoking, eating, conversation, reading, studying, people-gazing and so on. It is important not to create different spaces for different spaces segregated for each other. In fact, the spaces designed must function as one huge space with a smooth transition from one space to another. While the design must be flexible enough to allow different activities, it is important that there be spaces for people who need more privacy.

Both the literary study and the behavior mapping reinforce the fact that some

people prefer to actively participate in the plaza activities, while others prefer to be more passive observers. The plaza design must take this into consideration and provide appropriate spaces.

8. Special events

The behavior mapping documented two special events that occurred in the Union Plaza which require space for large gatherings and in some cases for setting up of temporary structures such as tents. The design of the plaza must provide better infrastructure for these kind of activities to occur in a more organized manner without disrupting the other activities that happen on a day-to-day basis such as the movement of people in and out of the Union building. There is need for a central space around which the temporary structures are set up for special events such as commercial fairs, therefore, the design of the plaza must be flexible for this need.

9. Food

Both Whyte and Clare Cooper observed in their studies of open spaces that food is one of the major factors that attracts people to use open spaces. Although the Union building does have restaurants where people can buy food, they are inside the building and inaccessible directly from the plaza space. Also, the Union Plaza does not have proper seating for people to bring their food and eat there. The above discussion clearly suggests that the design must include a food stall which people can access from the plaza. This must be accompanied with appropriate seating facilities so that people can eat comfortably.

Accessibility for disabled people

During the behavioral studies conducted in the Union Plaza, it was observed that there were at least half a dozen disabled people on the campus who use the plaza space. Some of them are wheel-chair bound mostly move from different parts of the campus, into the Union building. This is one issue that has been neglected in behavioral studies conducted before the ADA (American Disabilities Act) was passed. However, it is strongly felt that the design of the plaza must be accessible for people with disabilities. Although it would be impossible to provide access to all parts of the plaza, the design must avoid extensive level differences, or provide ramps where ever necessary. The design must strive to provide appropriate seating for disabled people in almost all parts of the plaza.

Other design considerations

It must be noted that the design implications discussed so far are focussed towards providing an outdoor environment in response to the behavioral needs of the people who use the plaza. Though not implicitly stated in this chapter, there are several other design issues that need to be an integral part of the proposed design. Many of the design implications do not make direct suggestions for their conception in the physical environment. At the same time there is no one way to interpret these implication architecturally, I use my design vocabulary to architecturally interpret these implications. As a designer of the physical environment many of these come to me subconsciously during the design process and are a part of my design vocabulary.

Also, this chapter does not attempt to provide a step-by-step analysis of the design process for the Union plaza since this will be presented in the next chapter. Several elements that are a part of the natural course of a design process will come out of that discussion.

Chapter Six

The Design

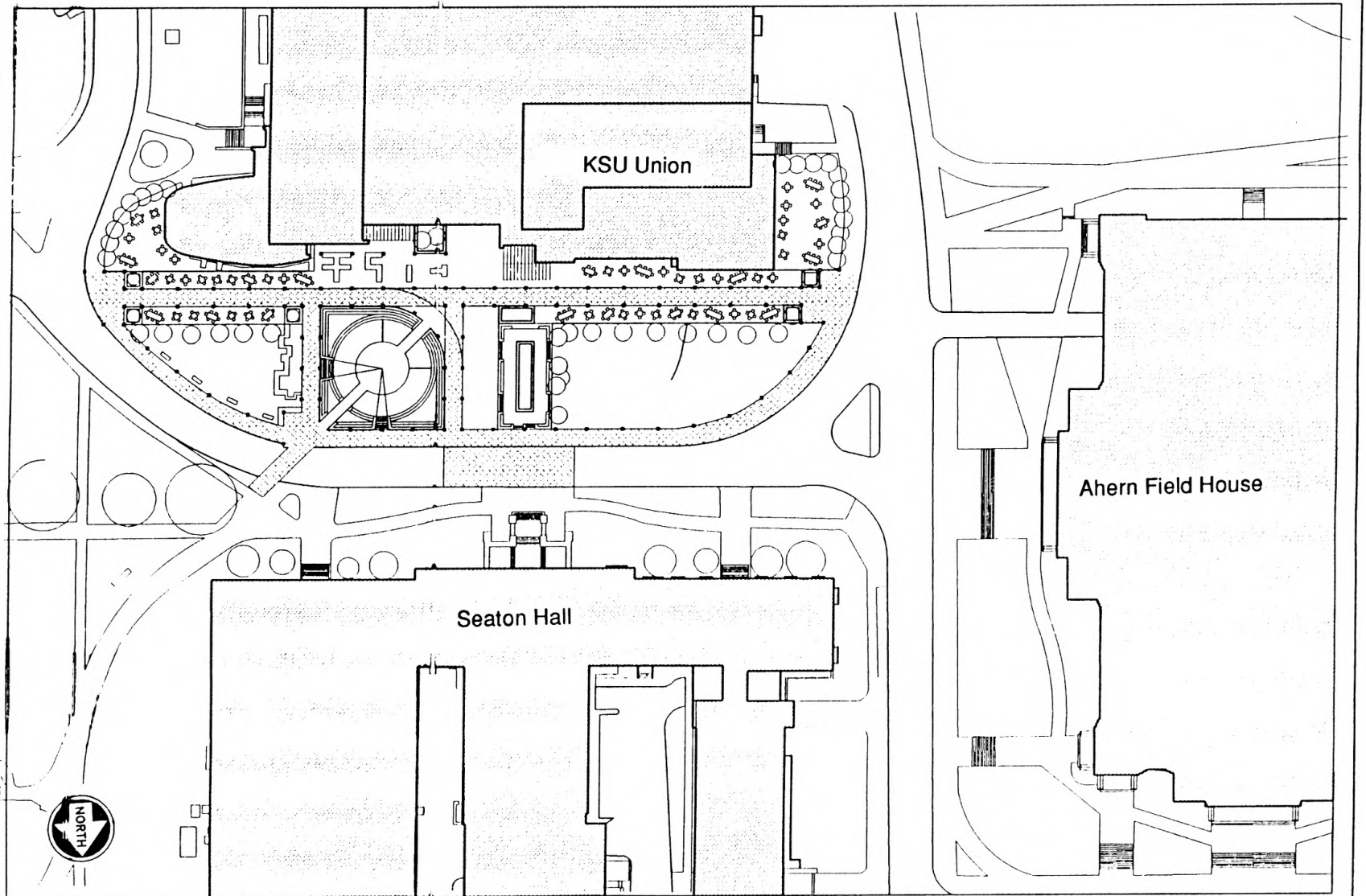
This chapter presents the design, relating it to the design implications discussed in the previous chapter and the other aspects of the study so far that have a bearing on the design of the Union plaza. Here, I will discuss the salient features of the design and relate them to the literature and behavior studies conducted earlier. This chapter is not intended to be a justification of the design and how it directly reflects the design implications, but a summary of the understanding that I have developed during the course of this study about the behavioral needs of the Union Plaza. However, it is expected that through my interpretation of the design, there would be reference to the design implications. The design will be explained under certain themes which are my architectural interpretations of the design considerations.

Initially, it was my endeavor to provide two design schemes for the Union plaza, one adopting a minimalist approach of design and another a much more elaborate scheme. This initial idea was an attempt to provide design schemes that suited a low or high budget for the plaza design. On further thought, I decided that it would be a much more challenging design exercise to design a minimalist design that incorporates the best features of the more elaborate approach. The design that I present here is a product of many stages of refinement that attempted to evolve a more comprehensive design that addressed almost all the behavioral needs of the users.

About The Design

The design for the Union Plaza encompasses the space enclosed by the Union building and Seaton Hall. The redesign for the Union Plaza is essentially a blend of hard-landscaped and soft landscaped spaces. The design is a juxtapositioning of pedestrian flows and places of rest. The design focuses on creating a new axis that runs along the front of the Union building and a square adjoining this axis, (refer Figure 6.1). This axis is interpreted as a pedestrian street, much like the streets that run along many urban plazas. Also, the creation of this street, creates a much needed pedestrian flow for students entering the campus to access the Union building directly. This pedestrian street and the plaza space encompass many qualities of most successful urban plazas by providing for a variety of activities.

As discussed earlier, the main reason people come to the Union Plaza presently, is the Union building. The design attempts to use this aspect to promote activity in the plaza and interprets it as an extension of the Union building. It is intended that the activities flow out of the Union building into the plaza space, thereby developing a strong relationship between the two places. The major theme of this design is "sociability" and the design attempts to create spaces of different social comforts. The pedestrian street and the plaza space form the core of the design around which other spaces are designed. Another important axis in the design is the existing pedestrian flow that leads to the entrance of the Union building (refer Figure 6.1). While the plaza space and the two pedestrian movement axes form the active parts of the plaza, other kinds of spaces are designed around them. Different seating options are provided at various places in the design. The different spaces that comprise the design will be discussed in much detail in the following part of the chapter.



SITE PLAN OF THE PROPOSED UNION PLAZA
SCALE: 1 INCH = 70 FEET

Figure 6.1: Site plan

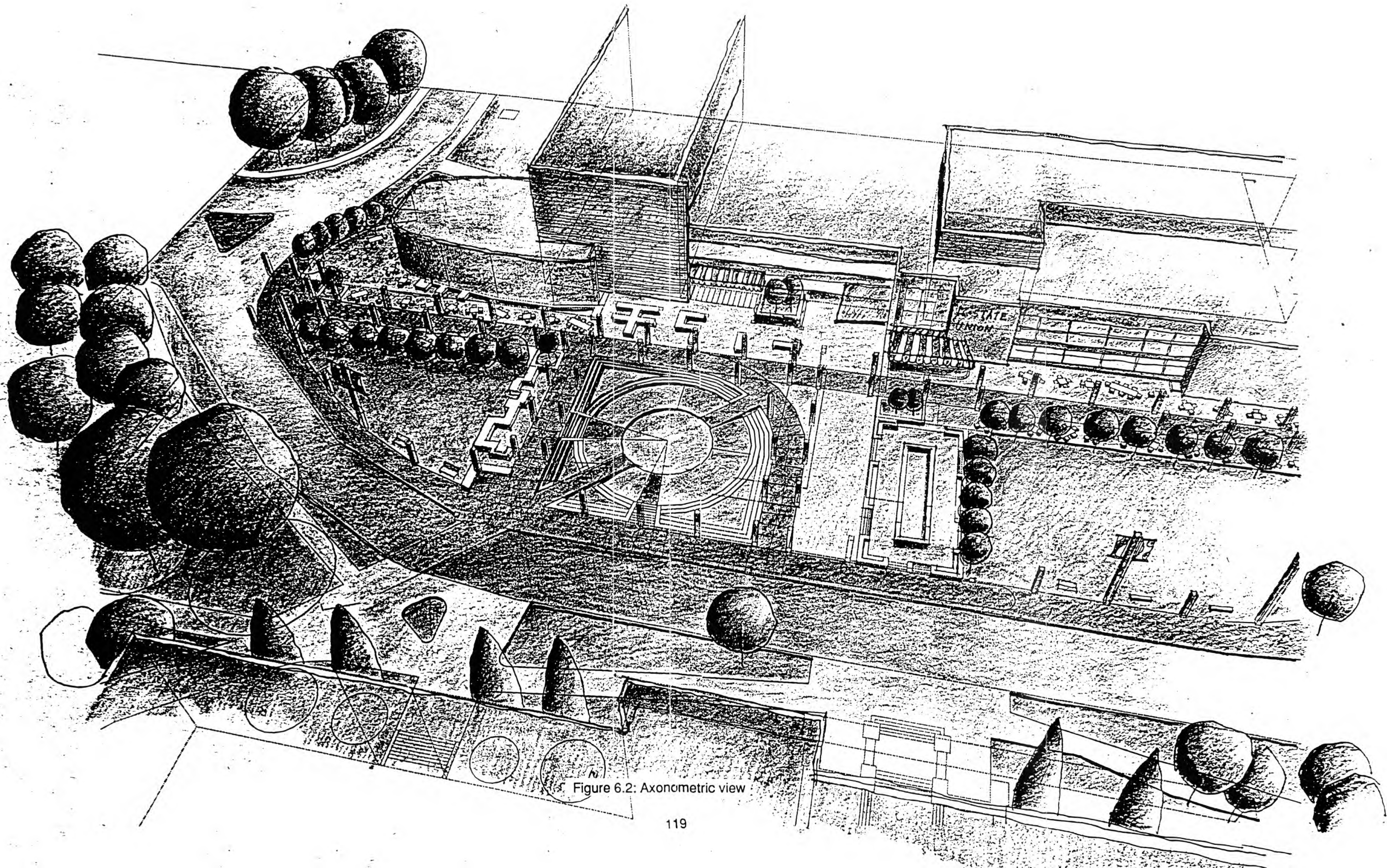


Figure 6.2: Axonometric view

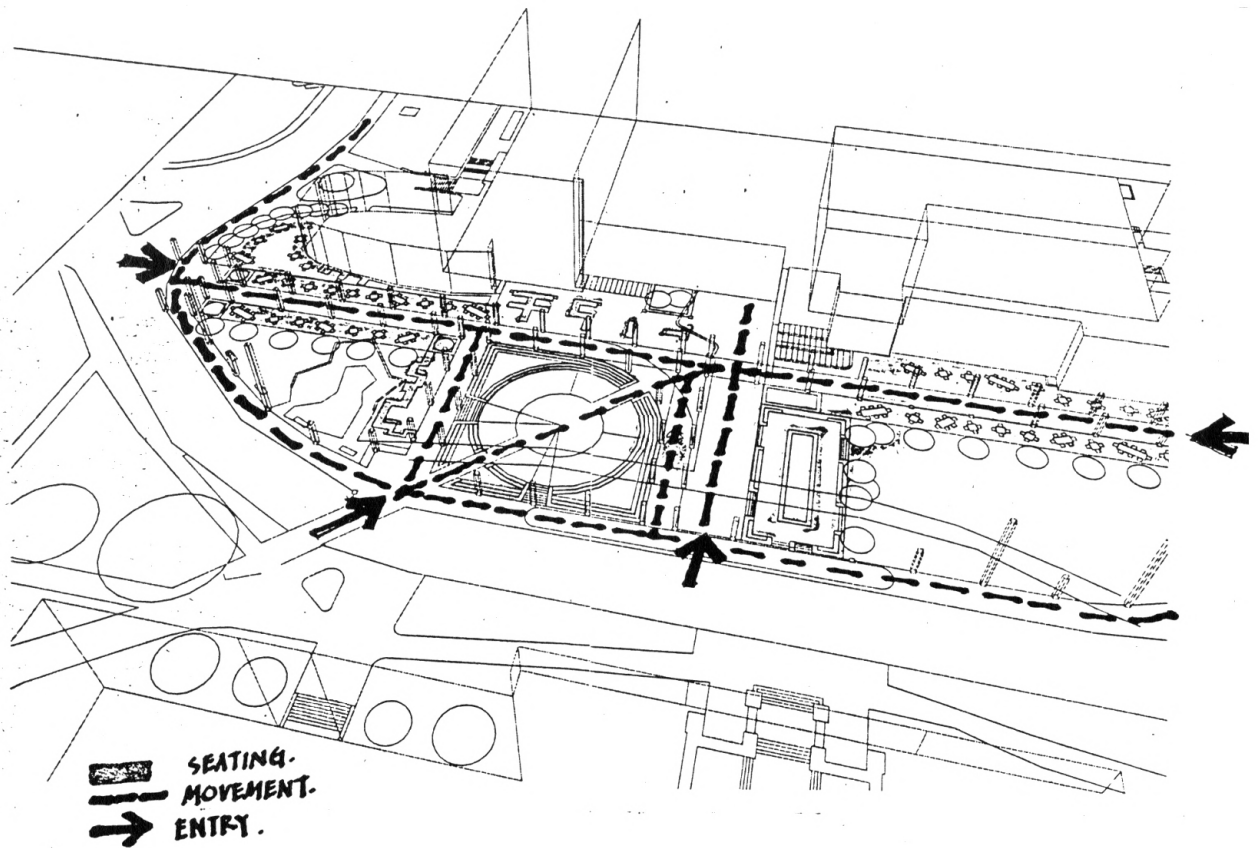


Figure 6.3: Flows, seating and entries

The elements of the design

The Square

The central square-shaped space in the Union Plaza is referred by me as the “Square”. This space is intended to be the center of all activities and is very public in nature. Four major flow lines abut this space and another major flow cuts this space diagonally (refer Figure 6.1). This space is very flexible and can be a host to a variety of activities. This hard-landscaped space can accommodate small to very large gatherings. It can function as an outdoor sculpture court, an exhibition space, street side shops, an amphitheater for concerts, a place for commercial fairs and other special events such as credit card promotions and so on (refer Figure 6.4). An important feature of this space, as mentioned above, is its accessibility to many major pedestrian flows.

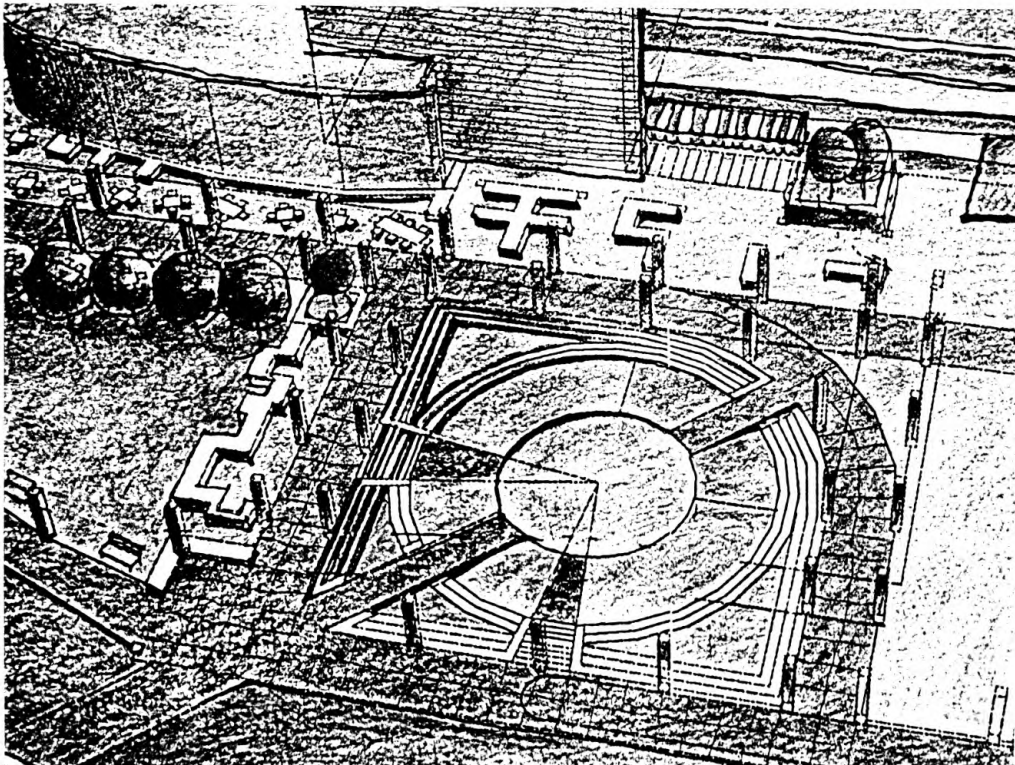


Figure 6.4: The Square

The Food Street

The linear pedestrian flow line along the edge of the Union building-- is referred to as the Food Street. This street forms a major axis of the design, its qualities will be discussed in later parts of this chapter. The creation of this street provides a much needed flow line for people to access the Union building. This street again, allows a wide range of activities and encourages impulsive use. Activities such as eating, reading, conversations and so on can be done here. The seating provided is mostly movable furniture with some immovable furniture.

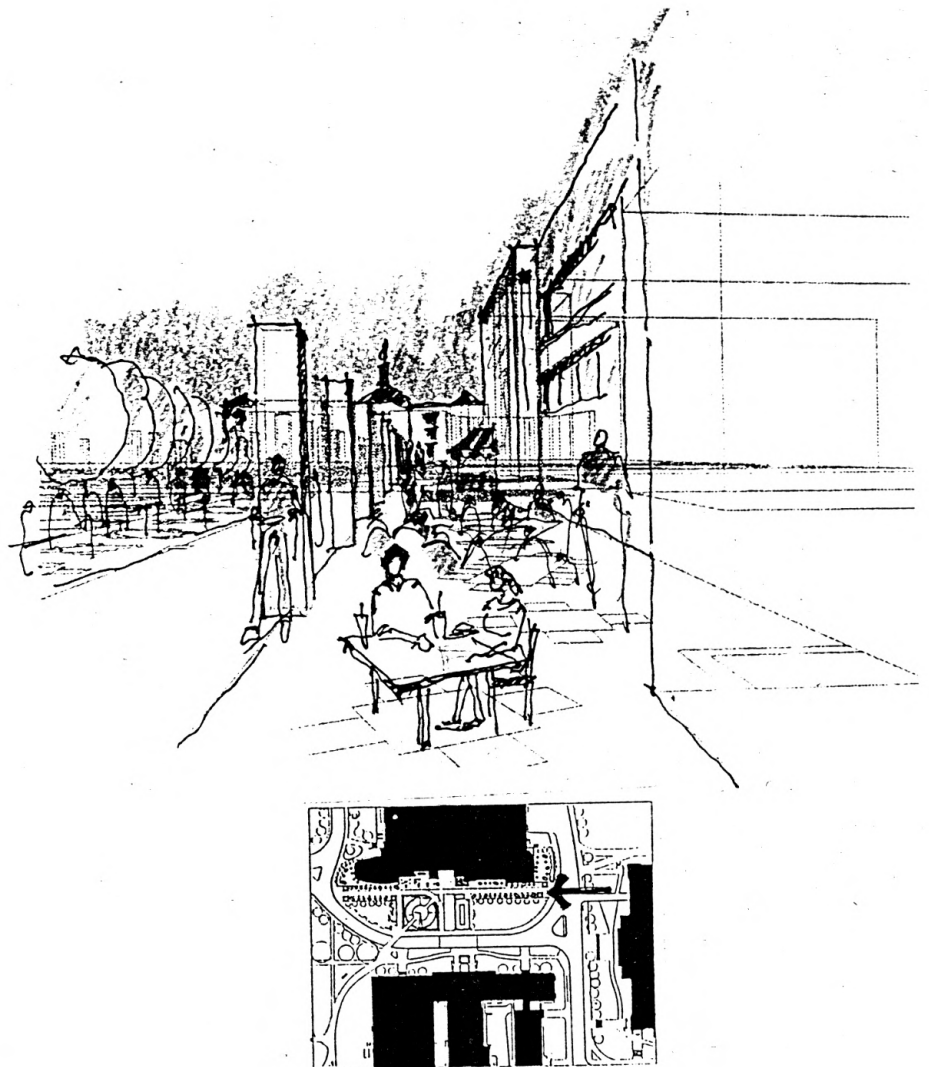


Figure 6.5: The Food Street

The Entrance Axis

This is the most intense flow in the existing Union Plaza, which is the flow leading in and out of the Union building as shown in chapter three, this pedestrian flow presently connects the Union entrance to the rest of the flows in the Union. Although the proposed design provides for other alternative entrances into the Union building, this flow line will still remain quite intense. This wide pedestrian walkway, is provided with seating on both sides. Some of the seating faces the walkway while some allows people to look into other parts of the plaza. Smoking is presently the predominant activity of this space.

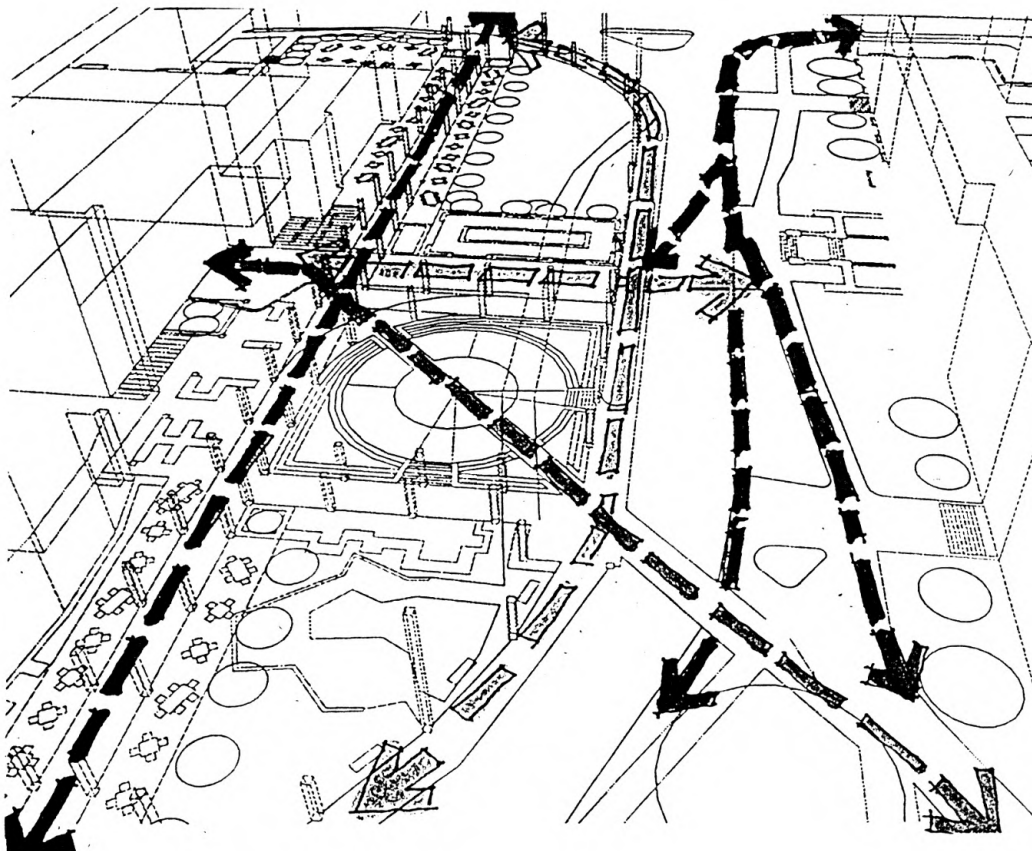


Figure 6.6: The Entrance Axes

The Water Body

This small water body is designed to form a pleasing element near the entrance of the Union building. A variety of seating is provided here. People can either sit on the steps adjoining the water body or can sit on the immovable furniture facing the water body.

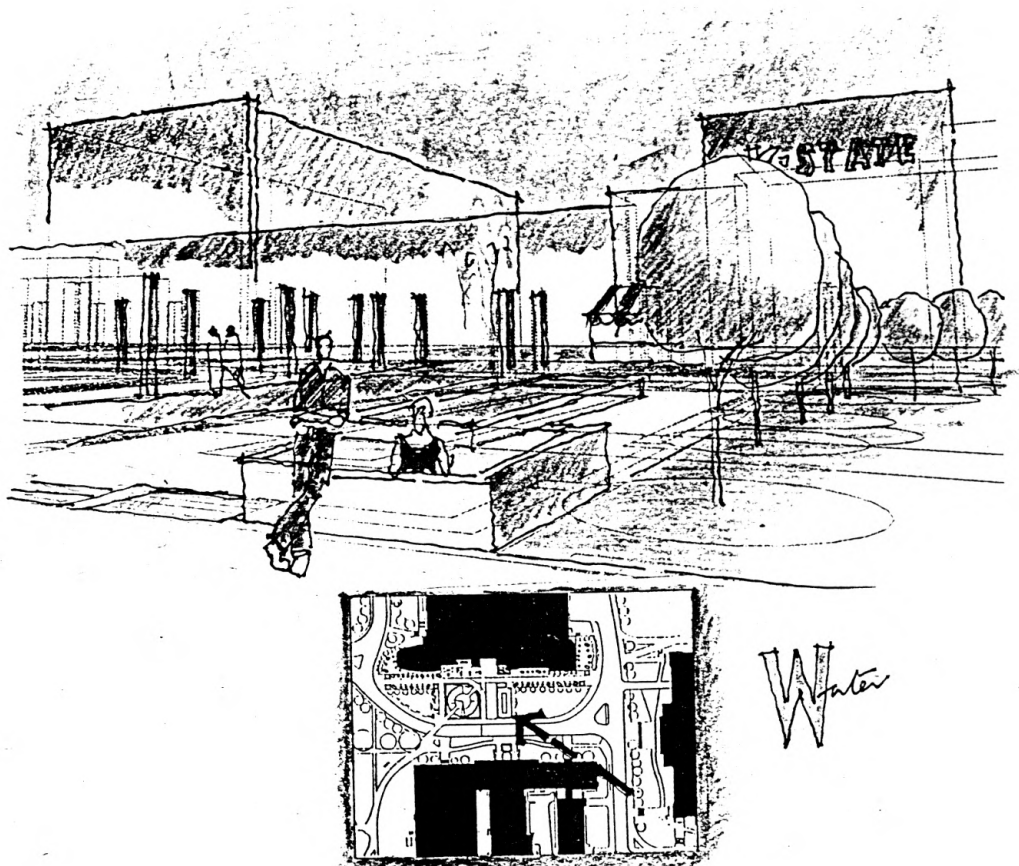


Figure 6.7: The water body

Entrances

All the major points of entry of pedestrian flows into the plaza are designed to serve as subtle entrances to give people a sense of entering a new social domain. These entrances use the same architectural vocabulary as the rest of the Union plaza. They are small semi-enclosed spaces, gradually blending into other spaces.

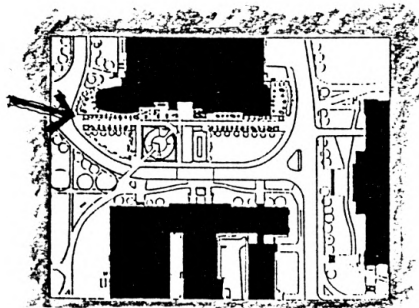
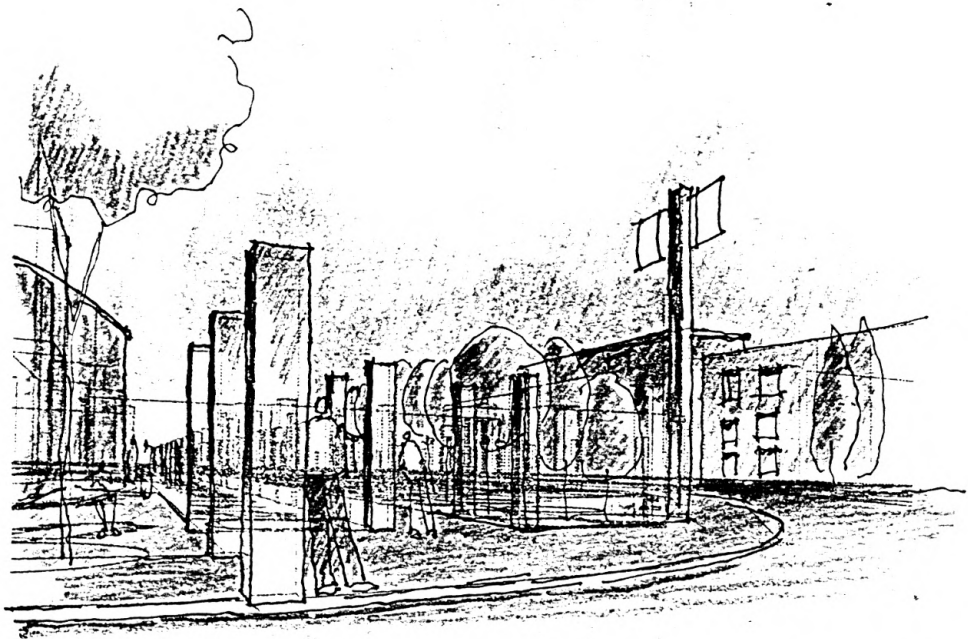


Figure 6.8: Entrances

The Quiet Spaces:

The two spaces wrapping around the east and west corners of the Union building are called the Quiet Spaces. These spaces are designed with the intention of making them cut-off visually from the rest of the plaza. This would be appropriate for people who need some quiet when there is a major event taking place in the plaza. Also, this space is physically linked to the rest of the plaza so there is a sense of being in the plaza. This place can be used by students

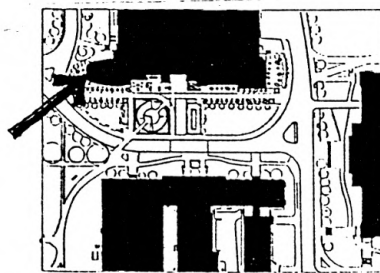
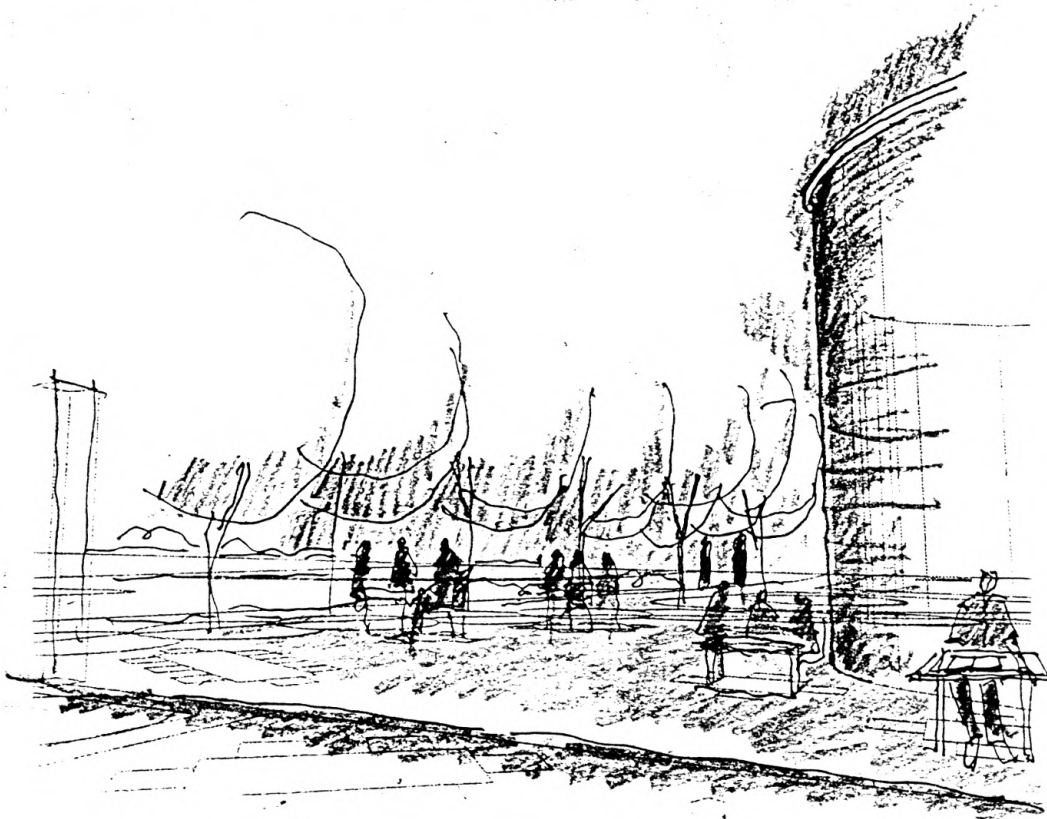


Figure 6.9: The Quiet Spaces

The Kiosk

Along the east edge of the Union building, is a small counter that operates from inside the Union building. This would serve as the small kiosk existing in the entrance lobby of the Union building presently. This will allow students to buy small commodities such as stamps, drinks, chewing gum, drop-off photographs, and so on without having to enter the Union building.

The Location

The plaza is essentially a blend of hard landscape and soft landscape in the space between the Union building and Seaton Hall. Since most of the activities in the plaza are related to the Union building, the plaza is designed to interact with the Union more actively than the other surrounding buildings. Another consideration that determines the location of the plaza is the need for the existing fire lane, which hence is retained as part of the new scheme. Presently, the fire lane runs through the plaza area and provides access for vehicular traffic in the case of an emergency. After exploring different possibilities, it was decided that the existing fire lane was the most appropriate option in this context. Also, this road is used to transport temporary structures and other equipment for special events. The plaza space interfaces the entire facade of the Union building and uses it as a backdrop for various activities occurring within it.

It was important that, while the design provided more options for pedestrian movement into the Union building, it must not interfere with the existing flows. Also, the design is intended to provide direct access into the Union. At the same time, some of the spaces with seating are designed to promote impulsive use. Spaces such as the plaza space and the food street are two such spaces that adjoin the pedestrian flows, provided with a variety of seating options (refer

Figure 6.10). However, the location different parts of the plaza are interdependent and aid in providing a sense of cohesion and make the plaza more sociable.

Flows

While retaining the existing movement patterns was an important consideration, it was also vital to provide the users of the plaza many options to enter the plaza and the Union building. It must be noted that the behavioral studies found that the majority of the users of the plaza spaces visited the Union building. The design does not disrupt the existing flow lines, and at the same time, two new flows have been introduced. This is done by the creation of a pedestrian street that runs along the front of the Union building (refer Figure 6.1). This linear street provides a direct access for people coming from the two major entrances for the campus: the entrance by the Nichols Hall and the entrance on Vattier street. Also, this street functions as an entrance into the plaza. It must be noted that these two flows are intense during morning hours when people are entering the campus and make their first visit to the Union building.

The flows are interpreted as pedestrian streets like in many urban situations and therefore cease to be mere movement paths. All the major flows are directly connected to places of activity and seating is provided along the edge of the flow lines. Also, the flow lines in the design function as transition spaces linking all the spaces.

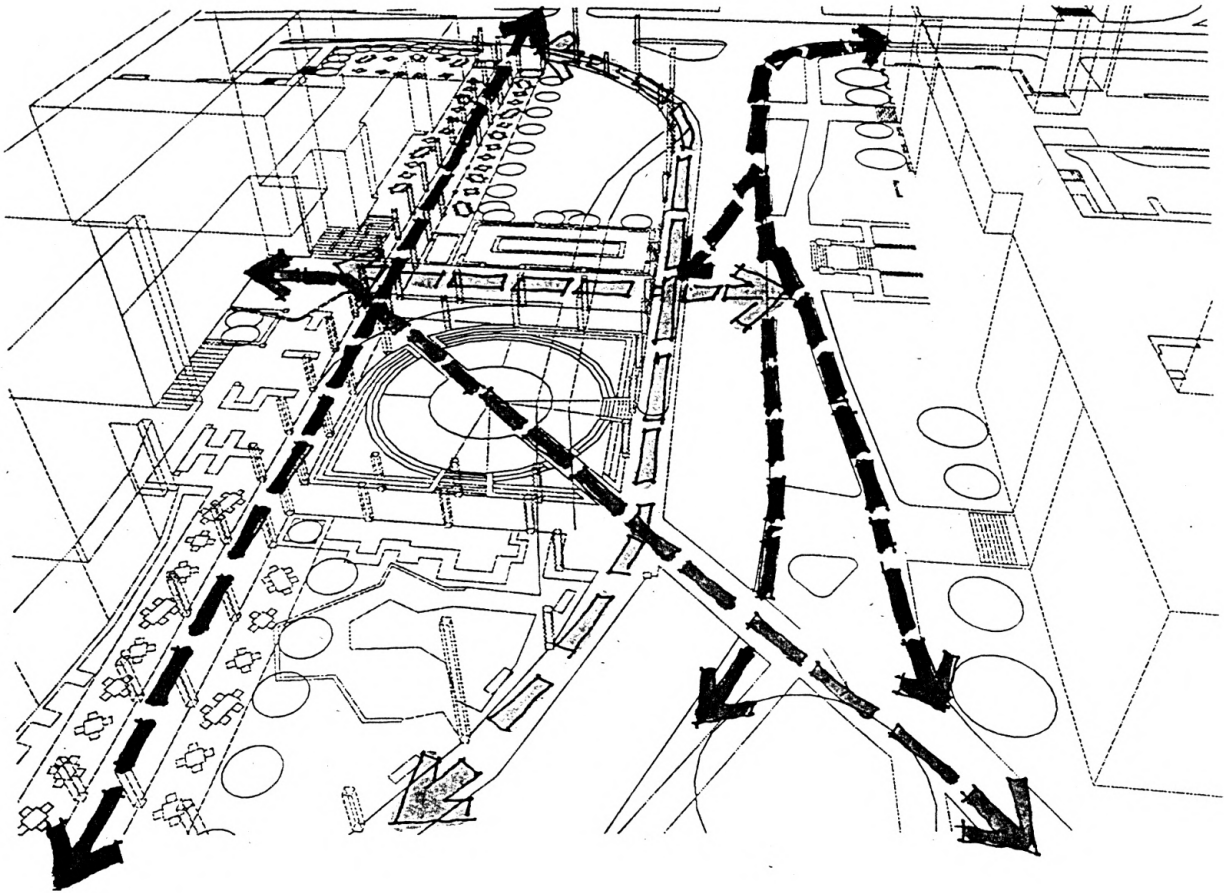


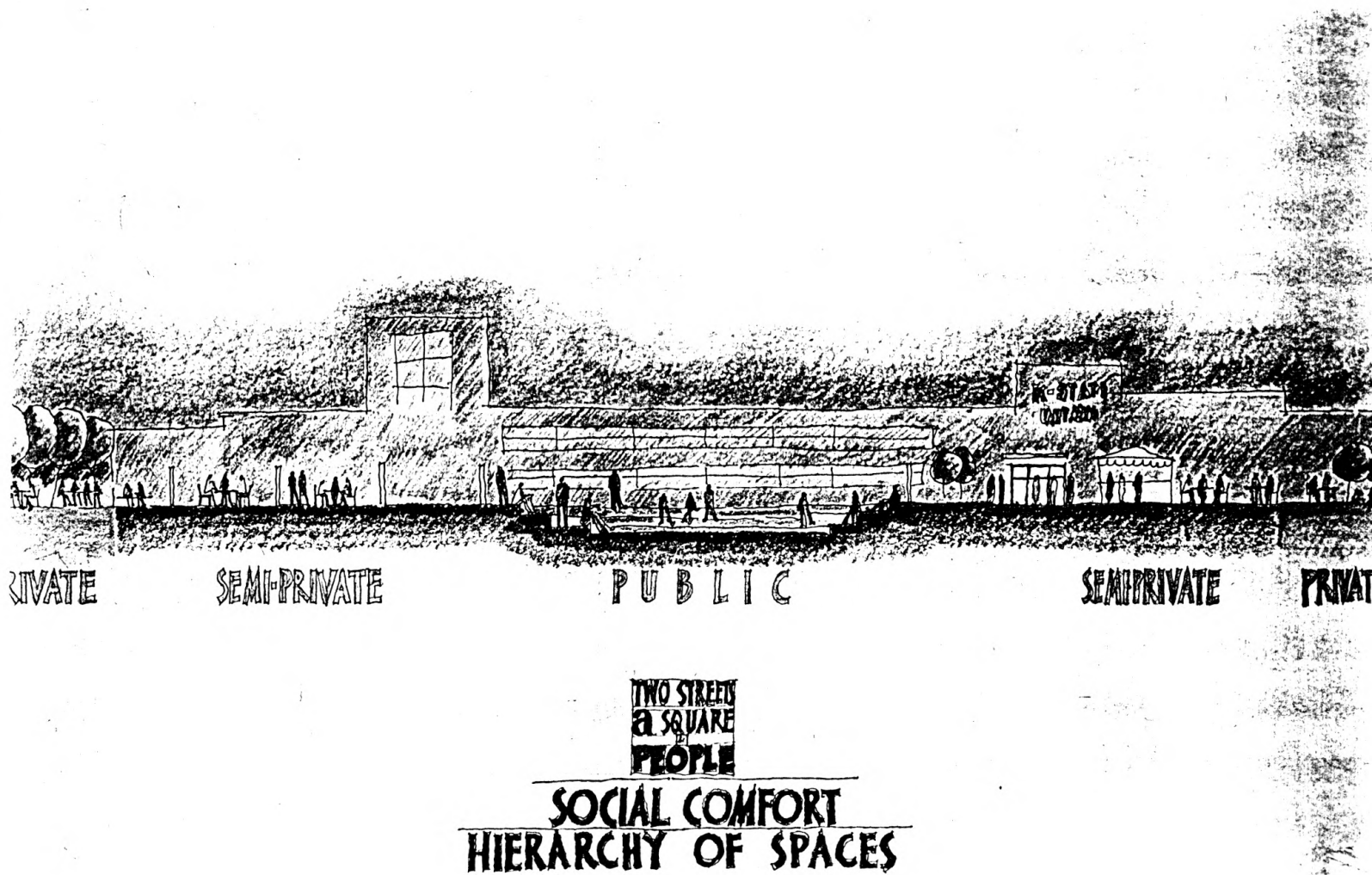
Figure 6.10: Location and flows

Hierarchy of Spaces

The issue of social comfort is a major design consideration, and the design addresses this issue in many ways. Social comfort is a relative concept, being different for different kinds of people. The design for the Union Plaza, provides a wide variety of spaces, ranging from the very private to semi-private to the very public spaces. For instance, as one moves along the pedestrian street along the edge of the Union building, (refer Figure 6.11), the levels of there is a hierarchy of spaces with respect to the privacy levels. Figure 6.11 shows a schematic section along the pedestrian street and the varying levels of privacy. The east entrance of the street provides seating enclosed by a grove of trees, creating a very private space suitable for activities such as discussions among academic groups. As one moves towards the entrance of the Union building, movable and immovable seating is provided on either sides of the street for activities such as studying, reading, conversation and so on. It must be noted that this part of the street is semi-private as the seating is accessible directly from the street, yet it allows people to stay away from the main flow of pedestrian traffic.

Further along this street close to the entrance of the Union building are two very public spaces the open seating provided next to the entrance of the Union building and the plaza space. Both these spaces are designed to have maximum visual contact from all parts of the plaza. they are more open and are closest to heavy pedestrian traffic. These spaces provide a setting for the more public activities such as smoking, people gazing, newspaper reading and triangulation. The Square is an inward-looking space designed for informal gatherings and triangulation. As one moves away from the Union entrance along the street, the privacy levels of the spaces gradually increase. A food kiosk is provided with a variety of seating for many people. this space again is a semi-private space as it allows pedestrian movement, at the same time provides for seating and activities such as eating. Finally the west part of this street is a more private

Figure 6.11: Hierarchy of spaces



space provided with seating in a partially enclosed space for small group activities such as group-studies that require more privacy.

Other spaces in the plaza are designed for varying levels of social comfort, such as the seating provided along the north edge of the plaza adjoining the fire lane. This space is a very public space as it is visually accessible from many parts of the plaza and is located with no enclosure.

Activity Patterns

Based on the discussion in the above section about the hierarchy of spaces, the plaza spaces are designed to support a variety of activities. The activities documented in the behavioral study of the Union Plaza such as smoking, eating, reading, conversation, people gazing, sunbathing, small informal gatherings, large gatherings, triangulation, small and large scale special events. Sketches, in Figure 6.12, graphically illustrate how parts of the design accommodate some major activities.

While designing the plaza, it was important to provide appropriate settings for all the activities that the users presently use it for. Also, the design aims at promoting plaza-use for other activities that the plaza does not presently support. Though the design provides specific places for specific functions, it is not implied that the design does not allow other activities in those spaces. For instance, the food street is called so, since it is probably the most favorable place for eating purposes, primarily due to its proximity to the food kiosk (refer Figure 6.1). However, the space is just as supportive to other activities such as reading or conversation. Most of the spaces allow for a variety of seating options for groups of different sizes.

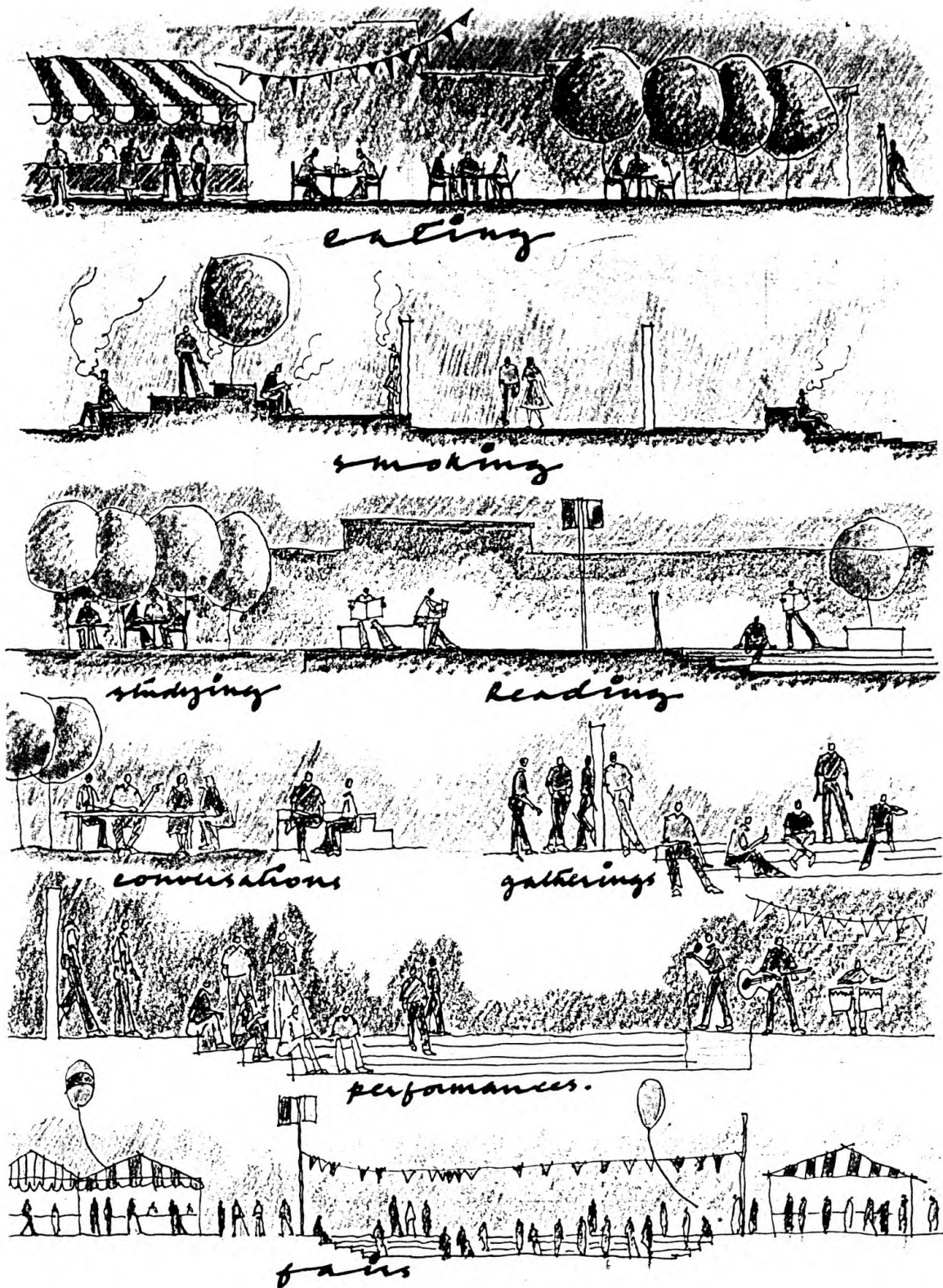


Figure 6.12: Activity patterns

Seating options and flexibility of the design

One of the major deficiencies of the existing Union Plaza is the lack of seating. The design provides seating for hundreds of people in the plaza accommodating different levels of social comfort. The seating options range from very informal seating such as steps to more formal seating as the movable chairs. The plan of the plaza shows that different kinds of seating is provided to suit the different activities. Some of the major seating options are shown in the sketches in Figure 6.13.

The design of the plaza suggests certain activities for certain parts of the plaza, however, this is merely based on the observation of different activities. For example, it was found that the area around the Union entrance is a popular spot for smokers, this has been explained in previous discussions. Therefore, the design for the Union Plaza attempts to provide a place appropriate for smoking near the Union entrance, which at the same time can be used for other activities such as people waiting to meet their friends, people gazing, newspaper reading and so on. Among other spaces of the design that reflect its flexibility of use is the plaza space. This space is very flexible and is interpreted as a multi-functional space which can quickly adapt itself for a wide range of activities. The following sketches demonstrate the different uses that the plaza space can be used for.

The plaza space can be used for informal conversations that result from social encounters along the edge of the plaza, the seating provided around the plaza or the steps can be used for this purpose. A corner of the plaza space can accommodate for interaction among a much larger gathering, with people sitting on the different levels of the steps at the right angle corner. The plaza space can accommodate huge gatherings such as concerts, exhibitions and so on.

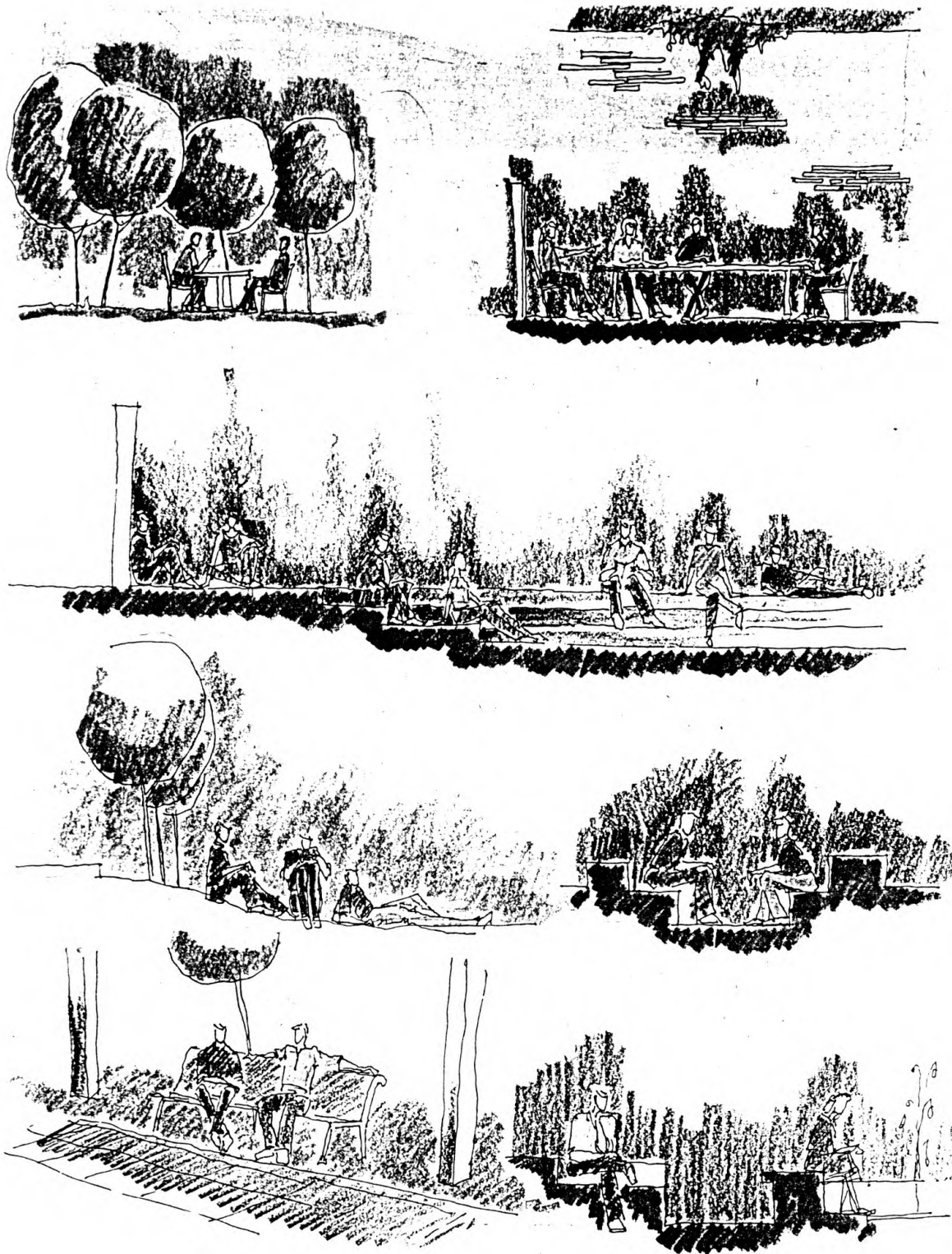


Figure 6.13: Seating options

Triangulation

A major activity that occurs presently in the Union Plaza is triangulation. The proposed design for the Union Plaza is appropriately designed for triangulation of all scales. Small events such as credit card promotions can happen along the corners of the plaza space and larger events such as student rallies or sales events can be centered in the plaza space. The plaza space can also function as an amphitheater to accommodate concerts student performances, lectures, rallies, and so on. Ample seating is provided in the form of steps along the edge of the plaza space for such activities.

Another major type of triangulations that occur in the Union Plaza is the commercial fairs. The plaza is designed with large landscaped open spaces on either sides of the plaza space, which can be used to set up tents. This kind of a setting creates a strongly defined enclosure around the plaza space, (refer Figure 6.14). In such occasions the plaza space becomes the central element with the stalls looking into it, this space can be used for activities such as fun sports.

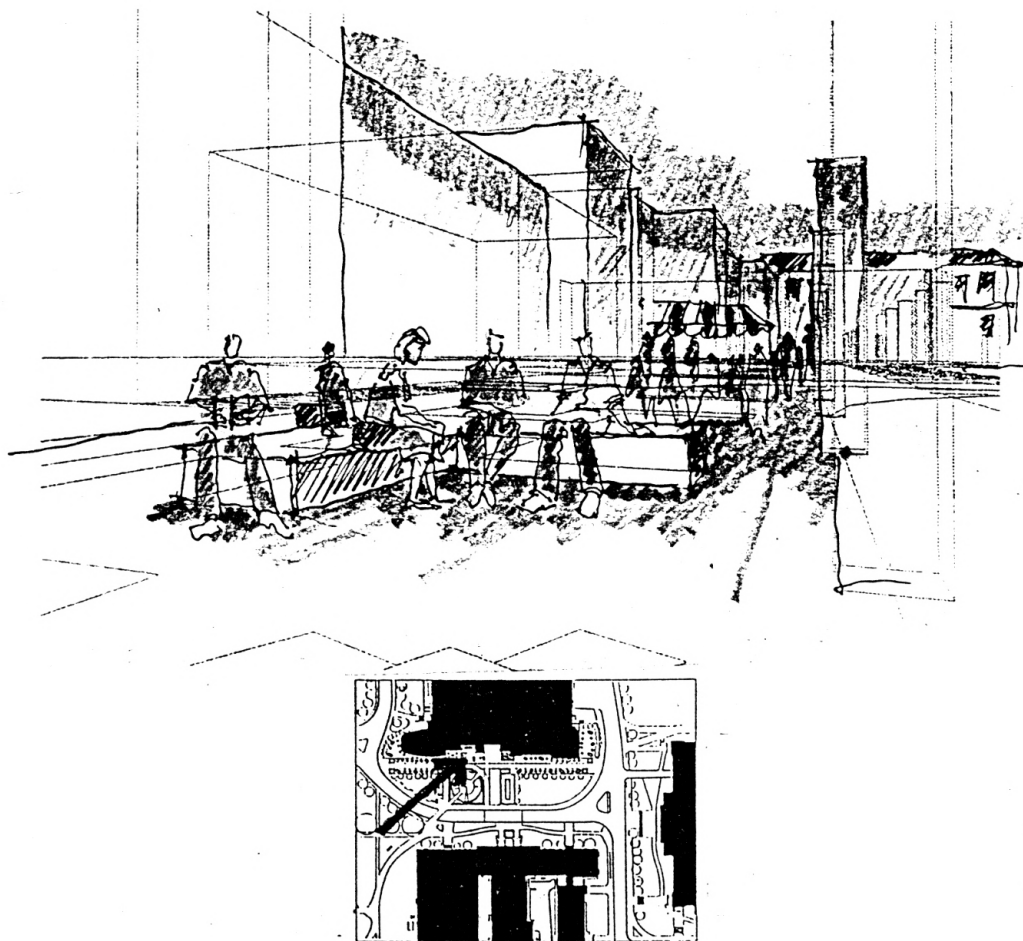


Figure 6.14 Seating

Conclusions

This study was a way to reinforce the fact that architecture and the built environment needs to be responsive to the environmental and behavioral needs of users. Also, the design process evolved in this study, can serve as a model for future similar studies. Each of my explorations into the realm of behavioral study of the Union Plaza space revealed how the plaza could be better designed to be transformed from a place that experiences heavy pedestrian traffic to a place that can sustain people and their activities.

At this point in my thesis, it is important to articulate here the assumption that the plaza design is not an exercise of my own architectural ideas and vocabulary but an interpretation of the behavioral needs of the people who use the Union Plaza. As most designers typically do, I started this thesis with pre-conceptions about “what the design of the space should be,” to make the plaza more successful. During the course of my literature and behavioral studies, I found that many of my design ideas were actually in conflict with the behavioral needs of the users. This realization demanded me to strip myself of my pre-conceptions and be responsive to the design implications of this study. It has now become clear to me that the needs of people are not necessarily what designers perceive, and many times a proper behavioral investigation would reveal many crucial issues that would be otherwise forgotten. I must admit that the process of shedding my pre-conceptions and starting the design with an open attitude to the findings of my research was certainly tough yet satisfying. In this sense, this design process was different than my earlier designs in my undergraduate architectural education, where design decisions were based entirely on my own assumptions and convictions. With this process of behavioral study, I have gained a new respect for the needs of people, which I think is a primary design consideration.

The designer's skills play a major role in this whole exercise of behavioral study, since the learning gained would be beneficial to people only when it is translated into actual design. The literature study of several existing plaza spaces documented in by William Whyte in *The Social Life of Small Urban Spaces*, (Whyte, 1980) and by Marcus and Frances in *People Places*, (Marcus and Francis, 1990) was very helpful in converting the implications into the design. Another aspect that greatly aided me in the design was the fact that I am myself a user of the Union plaza space and my acquaintance with the space for two years was a great asset.

However, at various points in my design process there have been situations where the interpretation of one design implication hampered the provision of another design requirement. Again, my acquaintance with the space as a user helped me in prioritize the needs of other users. In some other occasions, such an overlap of the design implications called for some creative design decisions.

This study also demonstrates the role of the built environment in the social life of people. The preceding design could transform the Union Plaza into a place that sustains activity and become a center of activity for the campus. The design also validates and reinforces the studies discussed in the literature review.

I envision the plaza becoming a campus landmark, serving as the heart of the campus. The plaza would be the center of all activity and be a symbol of energy, youth and vigor. The plaza would serve in the promotion of many a student artist or music performer, be a place to meet people, get information, debate a social issue, start a rally and so on. The plaza could serve as a place for many social gatherings such as commercial fairs, open houses and graduation ceremonies. It could represent the spirit of the students and faculty of the campus and become a symbol of the quality of education of the University. Among other roles, the plaza could play in the life of the campus are as an outdoor classroom, a place

for learning or a platform for exchange of ideas.

A typical mid-day at the plaza would be filled with activities in all parts of the plaza. People drinking coffee and eating in the food street, some people watching a musical performance by the students of the music school in the square, a group of students buying sculptures being sold in one corner of the square by the students of the sculpture department. Mid-day would include other activities such as people buying drinks at the kiosk or others just enjoying at the water body, with their feet in the water, splashing water around. The quiet spaces would be full of people studying or interactions between study-groups and so on. It is such activities that represent the true spirit of a university campus, which in turn creates a sense of belonging and cohesion among the people of the campus.

Recommendations and Notes

This thesis is intended to serve as a model for similar studies in the future. There are several recommendations that I wish to make for such studies based on my experiences. It is important to document a variety of aspects of the life of a place while studying the behavior patterns, such as detailed studies of activities and exploring the possibilities for activities other than those that occur in the place. Planning is a key aspect of such studies; it is crucial to conduct behavior studies at different times of the year since factors such as the weather can influence the use of such outdoor spaces. It would be very beneficial to document the observations photographically along with other modes of documentation.

One important aspect of such behavioral studies is to ensure that a thorough observational study of the place is made prior to starting processes such as mapping, since such studies highlight important features that need to be studied.

For instance the pilot study conducted before I started the actual process of behavior mapping enabled me to understand that the mapping could be divided into two realms-- movement and rest patterns. This, in turn, made the process of mapping less complicated and enabled me to map the activities easily. The same principle holds true with the literature study. It would be wise to start reviewing a wide range of literature and eventually focussing on the most appropriate literature for the type of study. One issue relating documentation of information that must be noted is the proper organization of information. Due to the wide variety and large quantity of information collected during the mapping process, it would be helpful to organize the information in separate files.

Finally, I conclude that based on my understanding of the life of the Union Plaza, the design I provided would sustain and support the kind of activities that are a part of the life of the Union Plaza and the activities that are envisioned to occur. The plaza can become a strong element in the life of the campus, playing numerous roles in reinforcing the spirit of sociability and aiding in the learning process of the students. This potential of the built environment to influence the users in a positive way, was my motivation to conduct this study.

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Appendix

Behavior Mapping of Movement Patterns

Monday, 10 November, 1995.

Spot	8:20-8:21	8:21-8:22	8:22-8:23	8:23-8:24	8:24-8:25	8:25-8:26	8:26-8:27	8:27-8:28	8:28-8:29	8:29-8:30
A	77									
B		63								
C			72							
D				148						
E					80					
F						177				
G							58			
H								62		
I									22	
J										41

Spot	9:20-9:21	9:21-9:22	9:22-9:23	9:23-9:24	9:24-9:25	9:25-9:26	9:26-9:27	9:27-9:28	9:28-9:29	9:29-9:30
A	121									
B		90								
C			84							
D				202						
E					9					
F						241				
G							66			
H								99		
I									80	
J										70

Spot	10:20-10:21	10:21-10:22	10:22-10:23	10:23-10:24	10:24-10:25	10:25-10:26	10:26-10:27	10:27-10:28	10:28-10:29	10:29-10:30
A	94									
B		58								
C			32							
D				116						
E					46					
F						118				
G							19			
H								41		
I									39	
J										12

Spot	11:20-11:21	11:21-11:22	11:22-11:23	11:23-11:24	11:24-11:25	11:25-11:26	11:26-11:27	11:27-11:28	11:28-11:29	11:29-11:30
A	136									
B		73								
C			44							
D				122						
E					59					
F						201				
G							35			
H								69		
I									45	
J										28

Spot	12:20-12:21	12:21-12:22	12:22-12:23	12:23-12:24	12:24-12:25	12:25-12:26	12:26-12:27	12:27-12:28	12:28-12:29	12:29-12:30
A	144									
B		68								
C			33							
D				31						
E					18					
F						182				
G							66			
H								73		
I									60	
J										39

Spot	1:20-1:21	1:21-1:22	1:22-1:23	1:23-1:24	1:24-1:25	1:25-1:26	1:26-1:27	1:27-1:28	1:28-1:29	1:29-1:30
A	102									
B		66								
C			44							
D				136						
E					18					
F						206				
G							49			
H								77		
I									46	
J										64

Spot	2:20-2:21	2:21-2:22	2:22-2:23	2:23-2:24	2:24-2:25	2:25-2:26	2:26-2:27	2:27-2:28	2:28-2:29	2:29-2:30
A	110									
B		73								
C			33							
D				109						
E					6					
F						88				
G							12			
H								38		
I									36	
J										22

Spot	3:20-3:21	3:21-3:22	3:22-3:23	3:23-3:24	3:24-3:25	3:25-3:26	3:26-3:27	3:27-3:28	3:28-3:29	3:29-3:30
A	95									
B		58								
C			30							
D				101						
E					19					
F						79				
G							11			
H								41		
I									33	
J										18

Spot	4:20-4:21	4:21-4:22	4:22-4:23	4:23-4:24	4:24-4:25	4:25-4:26	4:26-4:27	4:27-4:28	4:28-4:29	4:29-4:30
A	51									
B		25								
C			26							
D				115						
E					17					
F						133				
G							26			
H								10		
I									14	
J										31

Spot	5:20-5:21	5:21-5:22	5:22-5:23	5:23-5:24	5:24-5:25	5:25-5:26	5:26-5:27	5:27-5:28	5:28-5:29	5:29-5:30
A	31									
B		19								
C			23							
D				44						
E					3					
F						14				
G							13			
H								6		
I									7	
J										4

Behavior Mapping of Movement Patterns

Tuesday, 14 November, 1995.

Spot	8:20-8:21	8:21-8:22	8:22-8:23	8:23-8:24	8:24-8:25	8:25-8:26	8:26-8:27	8:27-8:28	8:28-8:29	8:29-8:30
A	69									
B		51								
C			72							
D				108						
E					18					
F						196				
G							41			
H								33		
I									19	
J										24

Spot	9:20-9:21	9:21-9:22	9:22-9:23	9:23-9:24	9:24-9:25	9:25-9:26	9:26-9:27	9:27-9:28	9:28-9:29	9:29-9:30
A	129									
B		88								
C			91							
D				188						
E					14					
F						211				
G							71			
H								84		
I									66	
J										79

Spot	10:20-10:21	10:21-10:22	10:22-10:23	10:23-10:24	10:24-10:25	10:25-10:26	10:26-10:27	10:27-10:28	10:28-10:29	10:29-10:30
A	94									
B		58								
C			32							
D				116						
E					46					
F						118				
G							19			
H								41		
I									39	
J										12

Spot	11:20-11:21	11:21-11:22	11:22-11:23	11:23-11:24	11:24-11:25	11:25-11:26	11:26-11:27	11:27-11:28	11:28-11:29	11:29-11:30
A	154									
B		89								
C			49							
D				129						
E					75					
F						222				
G							43			
H								71		
I									39	
J										24

Spot	12:20-12:21	12:21-12:22	12:22-12:23	12:23-12:24	12:24-12:25	12:25-12:26	12:26-12:27	12:27-12:28	12:28-12:29	12:29-12:30
A	73									
B		28								
C			36							
D				22						
E					48					
F						73				
G							21			
H								40		
I									17	
J										13

Spot	1:20-1:21	1:21-1:22	1:22-1:23	1:23-1:24	1:24-1:25	1:25-1:26	1:26-1:27	1:27-1:28	1:28-1:29	1:29-1:30
A	116									
B		74								
C			51							
D				122						
E					19					
F						191				
G							44			
H								68		
I									51	
J										54

Spot	2:20-2:21	2:21-2:22	2:22-2:23	2:23-2:24	2:24-2:25	2:25-2:26	2:26-2:27	2:27-2:28	2:28-2:29	2:29-2:30
A	33									
B		17								
C			15							
D				99						
E					21					
F						166				
G							33			
H								43		
I									26	
J										22

Spot	3:20-3:21	3:21-3:22	3:22-3:23	3:23-3:24	3:24-3:25	3:25-3:26	3:26-3:27	3:27-3:28	3:28-3:29	3:29-3:30
A	46									
B		48								
C			21							
D				58						
E					9					
F						69				
G							17			
H								11		
I									4	
J										8

Spot	4:20-4:21	4:21-4:22	4:22-4:23	4:23-4:24	4:24-4:25	4:25-4:26	4:26-4:27	4:27-4:28	4:28-4:29	4:29-4:30
A	36									
B		22								
C			26							
D				105						
E					12					
F						98				
G							26			
H								11		
I									26	
J										46

Spot	5:20-5:21	5:21-5:22	5:22-5:23	5:23-5:24	5:24-5:25	5:25-5:26	5:26-5:27	5:27-5:28	5:28-5:29	5:29-5:30
A	26									
B		11								
C			17							
D				36						
E					1					
F						41				
G							12			
H								9		
I									14	
J										12

Behavior Mapping of Movement Patterns

Wednesday, 15 November, 1995.

Spot	8:20-8:21	8:21-8:22	8:22-8:23	8:23-8:24	8:24-8:25	8:25-8:26	8:26-8:27	8:27-8:28	8:28-8:29	8:29-8:30
A	58									
B		48								
C			59							
D				126						
E					44					
F						133				
G							39			
H								30		
I									18	
J										23

Spot	9:20-9:21	9:21-9:22	9:22-9:23	9:23-9:24	9:24-9:25	9:25-9:26	9:26-9:27	9:27-9:28	9:28-9:29	9:29-9:30
A	136									
B		66								
C			69							
D				170						
E					27					
F						169				
G							36			
H								46		
I									38	
J										49

Spot	10:20-10:21	10:21-10:22	10:22-10:23	10:23-10:24	10:24-10:25	10:25-10:26	10:26-10:27	10:27-10:28	10:28-10:29	10:29-10:30
A	122									
B		28								
C			59							
D				149						
E					12					
F						188				
G							19			
H								14		
I									21	
J										8

Spot	11:20-11:21	11:21-11:22	11:22-11:23	11:23-11:24	11:24-11:25	11:25-11:26	11:26-11:27	11:27-11:28	11:28-11:29	11:29-11:30
A	122									
B		28								
C			59							
D				149						
E					12					
F						188				
G							19			
H								14		
I									21	
J										8

Spot	12:20-12:21	12:21-12:22	12:22-12:23	12:23-12:24	12:24-12:25	12:25-12:26	12:26-12:27	12:27-12:28	12:28-12:29	12:29-12:30
A	128									
B		66								
C			40							
D				222						
E					29					
F						130				
G							35			
H								46		
I									22	
J										39

Spot	1:20-1:21	1:21-1:22	1:22-1:23	1:23-1:24	1:24-1:25	1:25-1:26	1:26-1:27	1:27-1:28	1:28-1:29	1:29-1:30
A	108									
B		54								
C			51							
D				125						
E					22					
F						133				
G							38			
H								26		
I									30	
J										12

Spot	2:20-2:21	2:21-2:22	2:22-2:23	2:23-2:24	2:24-2:25	2:25-2:26	2:26-2:27	2:27-2:28	2:28-2:29	2:29-2:30
A	108									
B		54								
C			51							
D				125						
E					22					
F						138				
G							38			
H								26		
I									30	
J										12

Spot	3:20-3:21	3:21-3:22	3:22-3:23	3:23-3:24	3:24-3:25	3:25-3:26	3:26-3:27	3:27-3:28	3:28-3:29	3:29-3:30
A	89									
B		50								
C			33							
D				111						
E					19					
F						121				
G							26			
H								20		
I									14	
J										15

Spot	4:20-4:21	4:21-4:22	4:22-4:23	4:23-4:24	4:24-4:25	4:25-4:26	4:26-4:27	4:27-4:28	4:28-4:29	4:29-4:30
A	48									
B		31								
C			22							
D				106						
E					21					
F						126				
G							20			
H								14		
I									6	
J										22

Spot	5:20-5:21	5:21-5:22	5:22-5:23	5:23-5:24	5:24-5:25	5:25-5:26	5:26-5:27	5:27-5:28	5:28-5:29	5:29-5:30
A	33									
B		14								
C			16							
D				36						
E					4					
F						39				
G							6			
H								12		
I									12	
J										14

Behavior Mapping of Movement Patterns

Thursday, 16 November, 1995.

Spot	8:20-8:21	8:21-8:22	8:22-8:23	8:23-8:24	8:24-8:25	8:25-8:26	8:26-8:27	8:27-8:28	8:28-8:29	8:29-8:30
A	77									
B		63								
C			72							
D				148						
E					80					
F						177				
G							58			
H								62		
I									22	
J										41

Spot	9:20-9:21	9:21-9:22	9:22-9:23	9:23-9:24	9:24-9:25	9:25-9:26	9:26-9:27	9:27-9:28	9:28-9:29	9:29-9:30
A	121									
B		90								
C			84							
D				202						
E					9					
F						241				
G							66			
H								99		
I									80	
J										70

Spot	10:20-10:21	10:21-10:22	10:22-10:23	10:23-10:24	10:24-10:25	10:25-10:26	10:26-10:27	10:27-10:28	10:28-10:29	10:29-10:30
A	94									
B		58								
C			32							
D				116						
E					46					
F						118				
G							19			
H								41		
I									39	
J										12

Spot	11:20-11:21	11:21-11:22	11:22-11:23	11:23-11:24	11:24-11:25	11:25-11:26	11:26-11:27	11:27-11:28	11:28-11:29	11:29-11:30
A	136									
B		73								
C			44							
D				122						
E					59					
F						201				
G							35			
H								69		
I									45	
J										28

Spot	12:20-12:21	12:21-12:22	12:22-12:23	12:23-12:24	12:24-12:25	12:25-12:26	12:26-12:27	12:27-12:28	12:28-12:29	12:29-12:30
A	144									
B		68								
C			33							
D				31						
E					18					
F						182				
G							66			
H								73		
I									60	
J										39

Spot	1:20-1:21	1:21-1:22	1:22-1:23	1:23-1:24	1:24-1:25	1:25-1:26	1:26-1:27	1:27-1:28	1:28-1:29	1:29-1:30
A	102									
B		66								
C			44							
D				136						
E					18					
F						206				
G							49			
H								77		
I									46	
J										64

Spot	2:20-2:21	2:21-2:22	2:22-2:23	2:23-2:24	2:24-2:25	2:25-2:26	2:26-2:27	2:27-2:28	2:28-2:29	2:29-2:30
A	110									
B		73								
C			33							
D				109						
E					6					
F						88				
G							12			
H								38		
I									36	
J										22

Spot	3:20-3:21	3:21-3:22	3:22-3:23	3:23-3:24	3:24-3:25	3:25-3:26	3:26-3:27	3:27-3:28	3:28-3:29	3:29-3:30
A	95									
B		56								
C			30							
D				101						
E					19					
F						79				
G							11			
H								41		
I									33	
J										

Spot	4:20- 4:21	4:21- 4:22	4:22- 4:23	4:23- 4:24	4:24- 4:25	4:25- 4:26	4:26- 4:27	4:27- 4:28	4:28- 4:29	4:29- 4:30
A	51									
B		25								
C			26							
D				115						
E					17					
F						133				
G							26			
H								10		
I									14	
J										31

Spot	5:20- 5:21	5:21- 5:22	5:22- 5:23	5:23- 5:24	5:24- 5:25	5:25- 5:26	5:26- 5:27	5:27- 5:28	5:28- 5:29	5:29- 5:30
A	31									
B		19								
C			23							
D				44						
E					3					
F						14				
G							13			
H								6		
I									7	
J										4

Behavior Mapping of Movement Patterns

Friday, 15 November, 1995.

Spot	8:20-8:21	8:21-8:22	8:22-8:23	8:23-8:24	8:24-8:25	8:25-8:26	8:26-8:27	8:27-8:28	8:28-8:29	8:29-8:30
A	96									
B		52								
C			61							
D				111						
E					43					
F						122				
G							36			
H								50		
I									33	
J										40

Spot	9:20-9:21	9:21-9:22	9:22-9:23	9:23-9:24	9:24-9:25	9:25-9:26	9:26-9:27	9:27-9:28	9:28-9:29	9:29-9:30
A	129									
B		66								
C			72							
D				146						
E					58					
F						172				
G							41			
H								32		
I									37	
J										36

Spot	10:20-10:21	10:21-10:22	10:22-10:23	10:23-10:24	10:24-10:25	10:25-10:26	10:26-10:27	10:27-10:28	10:28-10:29	10:29-10:30
A	108									
B		44								
C			49							
D				138						
E					36					
F						143				
G							42			
H								59		
I									41	
J										28

Spot	11:20-11:21	11:21-11:22	11:22-11:23	11:23-11:24	11:24-11:25	11:25-11:26	11:26-11:27	11:27-11:28	11:28-11:29	11:29-11:30
A	73									
B		32								
C			18							
D				119						
E					23					
F						129				
G							46			
H								49		
I									37	
J										13

Spot	12:20-12:21	12:21-12:22	12:22-12:23	12:23-12:24	12:24-12:25	12:25-12:26	12:26-12:27	12:27-12:28	12:28-12:29	12:29-12:30
A	118									
B		46								
C			40							
D				205						
E					33					
F						122				
G							26			
H								31		
I									41	
J										28

Spot	1:20-1:21	1:21-1:22	1:22-1:23	1:23-1:24	1:24-1:25	1:25-1:26	1:26-1:27	1:27-1:28	1:28-1:29	1:29-1:30
A	92									
B		48								
C			26							
D				92						
E					11					
F						139				
G							33			
H								44		
I									26	
J										31

Spot	2:20-2:21	2:21-2:22	2:22-2:23	2:23-2:24	2:24-2:25	2:25-2:26	2:26-2:27	2:27-2:28	2:28-2:29	2:29-2:30
A	92									
B		40								
C			26							
D				92						
E					11					
F						149				
G							33			
H								44		
I									26	
J										31

Spot	3:20-3:21	3:21-3:22	3:22-3:23	3:23-3:24	3:24-3:25	3:25-3:26	3:26-3:27	3:27-3:28	3:28-3:29	3:29-3:30
A	89									
B		50								
C			33							
D				111						
E					19					
F						121				
G							26			
H								20		
I									14	
J										15

Spot	4:20- 4:21	4:21- 4:22	4:22- 4:23	4:23- 4:24	4:24- 4:25	4:25- 4:26	4:26- 4:27	4:27- 4:28	4:28- 4:29	4:29- 4:30
A	48									
B		31								
C			22							
D				106						
E					21					
F						126				
G							20			
H								14		
I									6	
J										22

Spot	5:20- 5:21	5:21- 5:22	5:22- 5:23	5:23- 5:24	5:24- 5:25	5:25- 5:26	5:26- 5:27	5:27- 5:28	5:28- 5:29	5:29- 5:30
A	33									
B		14								
C			16							
D				36						
E					4					
F						39				
G							6			
H								12		
I									12	
J										14

Behavioral mapping of People at Rest

Monday, 27 October, 1995

Location Time Period	A 8:22-8:24	B 8:24-8:26	C 8:26-8:28
Activity			
Sitting-Smoking	3	3	2
Sitting-Reading	1	0	0
Sitting-Observing	2	0	0
Sitting-Conversing	3	0	1
Sitting-Eating	0	0	0
Sitting-Total	9	3	3
Standing-Smoking	2	3	1
Standing-Conversing	1	1	1
Standing-Observing	1	0	0
Standing-Total	4	4	2
People at Rest	13	7	5

Location Time Period	A 10:22-10:24	B 10:24-10:26	C 10:26-10:28
Activity			
Sitting-Smoking	5	3	2
Sitting-Reading	0	2	0
Sitting-Observing	2	2	2
Sitting-Conversing	3	1	1
Sitting-Eating	1	0	1
Sitting-Total	11	8	6
Standing-Smoking	8	3	2
Standing-Conversing	1	3	2
Standing-Observing	0	1	0
Standing-Total	9	7	4
People at Rest	20	15	10

Location Time Period	A 12:22-12:24	B 12:24-12:26	C 12:26-12:28
Activity			
Sitting-Smoking	4	3	3
Sitting-Reading	1	2	0
Sitting-Observing	4	2	1
Sitting-Conversing	3	4	3
Sitting-Eating	0	3	2
Sitting-Total	12	14	9
Standing-Smoking	7	3	4
Standing-Conversing	2	2	0
Standing-Observing	1	1	0
Standing-Total	10	6	4
People at Rest	22	20	13

Location Time Period	A 2:22-2:24	B 2:24-2:26	C 2:26-2:28
Activity			
Sitting-Smoking	4	3	1
Sitting-Reading	0	1	0
Sitting-Observing	0	1	0
Sitting-Conversing	2	0	1
Sitting-Eating	0	0	0
Sitting-Total	6	5	2
Standing-Smoking	2	3	1
Standing-Conversing	1	1	1
Standing-Observing	1	0	0
Standing-Total	4	4	2
People at Rest	10	9	4

Location Time Period	A 4:22-4:24	B 4:24-4:26	C 4:26-4:28
Activity			
Sitting-Smoking	3	1	0
Sitting-Reading	1	0	0
Sitting-Observing	2	0	0
Sitting-Conversing	3	0	0
Sitting-Eating	0	0	0
Sitting-Total	9	1	0
Standing-Smoking	3	1	1
Standing-Conversing	0	0	1
Standing-Observing	1	1	0
Standing-Total	4	2	2
People at Rest	13	3	2

Behavioral mapping of People at Rest

Tuesday, 28 October, 1995

Location Time Period	A 8:22-8:24	B 8:24-8:26	C 8:26-8:28
Activity			
Sitting-Smoking	2	1	2
Sitting-Reading	2	0	1
Sitting-Observing	1	1	1
Sitting-Conversing	0	0	1
Sitting-Eating	2	0	0
Sitting-Total	7	2	5
Standing-Smoking	2	2	1
Standing-Conversing	2	1	0
Standing-Observing	2	1	0
Standing-Total	6	4	1
People at Rest	13	6	6

Location Time Period	A 10:22-10:24	B 10:24-10:26	C 10:26-10:28
Activity			
Sitting-Smoking	2	3	1
Sitting-Reading	0	0	0
Sitting-Observing	1	2	1
Sitting-Conversing	4	2	1
Sitting-Eating	2	1	1
Sitting-Total	9	8	4
Standing-Smoking	8	4	3
Standing-Conversing	1	0	2
Standing-Observing	0	0	2
Standing-Total	9	4	7
People at Rest	18	12	11

Location	A	B	C
Time Period	12:22-12:24	12:24-12:26	12:26-12:28
Activity			
Sitting-Smoking	4	2	4
Sitting-Reading	0	2	0
Sitting-Observing	1	0	1
Sitting-Conversing	2	5	1
Sitting-Eating	0	2	0
Sitting-Total	7	11	6
Standing-Smoking	8	5	5
Standing-Conversing	3	2	1
Standing-Observing	1	3	0
Standing-Total	12	10	6
People at Rest	19	21	12

Location	A	B	C
Time Period	2:22-2:24	2:24-2:26	2:26-2:28
Activity			
Sitting-Smoking	4	1	1
Sitting-Reading	1	1	0
Sitting-Observing	1	0	1
Sitting-Conversing	7	0	2
Sitting-Eating	2	0	0
Sitting-Total	15	2	4
Standing-Smoking	5	2	1
Standing-Conversing	8	1	1
Standing-Observing	5	1	0
Standing-Total	18	4	2
People at Rest	33	6	6

Location	A	B	C
Time Period	4:22-4:24	4:24-4:26	4:26-4:28
Activity			
Sitting-Smoking	3	1	0
Sitting-Reading	1	0	0
Sitting-Observing	2	1	0
Sitting-Conversing	3	1	2
Sitting-Eating	0	0	0
Sitting-Total	9	3	2
Standing-Smoking	1	2	1
Standing-Conversing	0	0	0
Standing-Observing	1	2	1
Standing-Total	2	4	2
People at Rest	11	7	4

Behavioral mapping of People at Rest

Wednesday, 29 October, 1995

Location Time Period	A 8:22-8:24	B 8:24-8:26	C 8:26-8:28
Activity			
Sitting-Smoking	3	1	1
Sitting-Reading	2	0	0
Sitting-Observing	0	1	0
Sitting-Conversing	3	2	1
Sitting-Eating	0	0	0
Sitting-Total	8	4	2
Standing-Smoking	2	2	0
Standing-Conversing	2	1	1
Standing-Observing	2	1	0
Standing-Total	6	4	1
People at Rest	14	8	3

Location Time Period	A 10:22-10:24	B 10:24-10:26	C 10:26-10:28
Activity			
Sitting-Smoking	2	2	3
Sitting-Reading	1	0	0
Sitting-Observing	0	3	1
Sitting-Conversing	2	4	0
Sitting-Eating	2	2	1
Sitting-Total	7	11	5
Standing-Smoking	8	4	3
Standing-Conversing	1	0	0
Standing-Observing	0	0	0
Standing-Total	9	4	3
People at Rest	16	15	8

Location	A	B	C
Time Period	12:22-12:24	12:24-12:26	12:26-12:28
Activity			
Sitting-Smoking	4	2	4
Sitting-Reading	0	2	0
Sitting-Observing	1	0	0
Sitting-Conversing	2	5	8
Sitting-Eating	0	2	0
Sitting-Total	7	11	12
Standing-Smoking	8	5	3
Standing-Conversing	3	2	7
Standing-Observing	1	3	1
Standing-Total	12	10	11
People at Rest	19	21	23

Location	A	B	C
Time Period	2:22-2:24	2:24-2:26	2:26-2:28
Activity			
Sitting-Smoking	4	0	1
Sitting-Reading	1	0	1
Sitting-Observing	1	1	1
Sitting-Conversing	7	2	2
Sitting-Eating	2	0	1
Sitting-Total	15	3	6
Standing-Smoking	5	1	3
Standing-Conversing	8	4	5
Standing-Observing	5	1	1
Standing-Total	18	6	9
People at Rest	33	9	15

Location	A	B	C
Time Period	4:22-4:24	4:24-4:26	4:26-4:28
Activity			
Sitting-Smoking	2	0	1
Sitting-Reading	1	0	0
Sitting-Observing	1	0	1
Sitting-Conversing	2	0	5
Sitting-Eating	0	0	1
Sitting-Total	6	0	8
Standing-Smoking	1	2	0
Standing-Conversing	0	0	2
Standing-Observing	1	0	2
Standing-Total	2	2	4
People at Rest	8	2	12

Behavioral mapping of People at Rest

Thursday, 30 October, 1995

Location Time Period	A 8:22-8:24	B 8:24-8:26	C 8:26-8:28
Activity			
Sitting-Smoking	3	1	0
Sitting-Reading	2	0	0
Sitting-Observing	0	0	0
Sitting-Conversing	3	2	0
Sitting-Eating	0	0	0
Sitting-Total	8	3	0
Standing-Smoking	2	1	0
Standing-Conversing	2	1	1
Standing-Observing	2	1	0
Standing-Total	6	3	1
People at Rest	14	6	1

Location Time Period	A 10:22-10:24	B 10:24-10:26	C 10:26-10:28
Activity			
Sitting-Smoking	2	1	1
Sitting-Reading	1	0	0
Sitting-Observing	0	1	1
Sitting-Conversing	2	2	2
Sitting-Eating	2	0	0
Sitting-Total	7	4	4
Standing-Smoking	8	2	1
Standing-Conversing	1	2	0
Standing-Observing	0	1	0
Standing-Total	9	5	1
People at Rest	16	9	5

Location	A	B	C
Time Period	12:22-12:24	12:24-12:26	12:26-12:28
Activity			
Sitting-Smoking	3	2	4
Sitting-Reading	1	1	0
Sitting-Observing	1	0	0
Sitting-Conversing	2	4	0
Sitting-Eating	1	0	0
Sitting-Total	8	7	4
Standing-Smoking	3	1	2
Standing-Conversing	1	2	2
Standing-Observing	1	0	0
Standing-Total	5	3	4
People at Rest	13	10	8

Location	A	B	C
Time Period	2:22-2:24	2:24-2:26	2:26-2:28
Activity			
Sitting-Smoking	2	0	1
Sitting-Reading	0	0	1
Sitting-Observing	0	1	1
Sitting-Conversing	2	2	2
Sitting-Eating	0	0	1
Sitting-Total	4	3	6
Standing-Smoking	1	1	1
Standing-Conversing	0	1	1
Standing-Observing	1	0	0
Standing-Total	2	2	2
People at Rest	6	5	8

Location	A	B	C
Time Period	4:22-4:24	4:24-4:26	4:26-4:28
Activity			
Sitting-Smoking	1	0	2
Sitting-Reading	0	0	0
Sitting-Observing	0	0	0
Sitting-Conversing	0	2	0
Sitting-Eating	0	0	0
Sitting-Total	1	2	2
Standing-Smoking	1	2	4
Standing-Conversing	0	0	1
Standing-Observing	1	0	0
Standing-Total	2	2	5
People at Rest	3	4	7

Behavioral mapping of People at Rest

Friday, 31 October, 1995

Location Time Period	A 8:22-8:24	B 8:24-8:26	C 8:26-8:28
Activity			
Sitting-Smoking	4	1	0
Sitting-Reading	0	0	0
Sitting-Observing	1	0	0
Sitting-Conversing	2	2	0
Sitting-Eating	7	1	1
Sitting-Total	14	4	1
Standing-Smoking	2	3	0
Standing-Conversing	2	3	1
Standing-Observing	1	0	2
Standing-Total	5	6	3
People at Rest	19	10	4

Location Time Period	A 10:22-10:24	B 10:24-10:26	C 10:26-10:28
Activity			
Sitting-Smoking	4	2	1
Sitting-Reading	1	0	0
Sitting-Observing	2	0	1
Sitting-Conversing	5	2	2
Sitting-Eating	0	0	0
Sitting-Total	12	4	4
Standing-Smoking	8	5	3
Standing-Conversing	1	3	4
Standing-Observing	0	1	0
Standing-Total	9	9	7
People at Rest	21	13	11

Location	A	B	C
Time Period	12:22-12:24	12:24-12:26	12:26-12:28
Activity			
Sitting-Smoking	3	2	2
Sitting-Reading	1	1	1
Sitting-Observing	1	0	0
Sitting-Conversing	2	4	1
Sitting-Eating	1	0	0
Sitting-Total	8	7	4
Standing-Smoking	3	1	2
Standing-Conversing	1	2	0
Standing-Observing	1	0	2
Standing-Total	5	3	4
People at Rest	13	10	8

Location	A	B	C
Time Period	2:22-2:24	2:24-2:26	2:26-2:28
Activity			
Sitting-Smoking	2	2	2
Sitting-Reading	0	1	0
Sitting-Observing	1	1	1
Sitting-Conversing	2	0	2
Sitting-Eating	0	0	0
Sitting-Total	5	4	5
Standing-Smoking	2	1	2
Standing-Conversing	1	1	1
Standing-Observing	1	0	1
Standing-Total	4	2	4
People at Rest	9	6	9

Location Time Period	A 4:22-4:24	B 4:24-4:26	C 4:26-4:28
Activity			
Sitting-Smoking	0	0	0
Sitting-Reading	0	0	0
Sitting-Observing	0	0	0
Sitting-Conversing	1	0	0
Sitting-Eating	0	0	0
Sitting-Total	1	0	0
Standing-Smoking	0	0	2
Standing-Conversing	1	2	1
Standing-Observing	0	0	0
Standing-Total	1	2	3
People at Rest	2	2	3