

COMPREHENSIVE PRE-DESIGN STUDIES OF WORKPLACES: THE CASE OF THE TWIN CITIES, MINNESOTA

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ABSTRACT

During the last two decades pre-design studies have become an integral part of design phases required for successful creation of built environments. Now, they are taking place as part of contemporary architectural design practices. Pre-design can be regarded as a phase that precedes the detailed architectural programming and space planning stages. It may include tasks and activities that range from defining functional needs and adjacency analyses to establishing design imperatives and prioritizing design recommendations, and from cost analysis and financial modeling to establishing urban design criteria for locating new buildings. This paper reports on a pre-design study conducted over the past three years for the Minnesota Departments of Agriculture (MDA), Health (MDH), and Human Services (DHS), toward developing new office facilities and laboratories. The methodology of the study is based on establishing a rigorous collaborative process that includes five major procedures. The major components of the study are programming the workplace environment, defining functional needs and relationship analyses, establishing principles for urban intervention and developing financial modeling. The paper concludes by outlining how emerging opportunities can be stemmed from pre-design studies, how employees' productivity and comfort can be addressed, and how urban and environmental resources can be preserved and conserved.

KEY WORDS

Pre-design; Workplaces; Productivity; Participation, Programming Workshops; Public Input; Urban Intervention, Sustainability, Twin Cities (MN)

INTRODUCTION: COMPREHENSIVE PRE-DESIGN STUDIES OF WORKPLACES

In recent years, pre-design studies have become an integral part of the design phases required for successful creation of built environments. However, as an emerging field of professional specialization, pre-design is still considered to be a relatively novel part in architecture and planning disciplines. Now, large organizations are increasingly recognizing the need for pre-design studies that result either in new construction or in managerial improvements, changes or reorganization of existing space.

Several efforts were undertaken by several government agencies and professional organizations to make pre-design an integral part of their building delivery process (Preiser, 1985). As a result, pre-design studies are taking place now as part of contemporary architectural design and space planning practices, especially with the current complexities of building functions and activities. Thus, pre-design can be regarded as a phase that precedes the detailed architectural programming and space planning stages. However, a pre-design phase normally includes a strong programming component. It may include tasks and activities that range from defining functional needs and adjacency analyses to establishing design imperatives and prioritizing design recommendations, and from cost analysis and financial modeling to establishing urban design criteria for locating new buildings.

Many municipalities, state governments, and private corporations in North America occupy millions of square feet of work environments. In many cases, however, insufficient care is taken initially to define clearly the specific requirements these work environments must fulfill. Recent literature on work places (Davis, G. et al, 1993; Duffy and Powell, 1997; Worthington, 1998; Tanis and Duffy, 1999) corroborates that the result is a

large capital investment in facilities that do not enhance and often hinder efficient office operations, while also not supporting health, safety, functional performance, and employees' productivity and satisfaction.

Conventional working patterns are changing dramatically and thus new patterns are emerging as the opportunities provided by the new technologies touch on every aspect of workplace environment. Designers, facility managers, and top management in many organizations have already started to investigate whether the conventional work environment helps or hinders opportunities for business development and growth. It is increasingly acknowledged that requirements for workplaces have become very demanding in recent years. Many factors related to information and communication technologies, energy codes, environmental quality, and employees' productivity were of little concern or oversimplified a decade ago, but they have become of vital importance in recent years.

Along the same line of the preceding thoughts, Thomas Peters in his books *Liberation Management* (1992), and *The Circle of Innovation* (1997) argues that space management may well be the most ignored, yet the most powerful tool for inducing cultural change, speeding up innovation projects, and enhancing the learning process in far reaching organizations. In this respect, the authors argue that office buildings and office interiors must be designed to be used in ways that reconcile adding value to the employees' work while simultaneously driving down occupancy cost.

The objective of this paper is to call for a comprehensive pre-design approach toward the development of work environments. The paper reports on a pre-design study conducted over the past three years for the Minnesota Departments of Agriculture (MDA), Health (MDH), and Human Services (DHS), for developing new office facilities and laboratories. The methodology of the study is based on establishing a rigorous collaborative process that includes five major procedures. These are: analyzing the existing condition, problems and needs definition, conceptualizing challenges and opportunities, developing and establishing mechanisms for understanding agency needs while developing consensus in decision making, and envisioning solutions and establishing guidelines. The major components of the study are programming the workplace environment, defining functional needs and relationship analyses, establishing principles for urban intervention, and developing financial modeling. The paper concludes by outlining how emerging opportunities can be stemmed from pre-design studies, how employees' productivity and comfort can be addressed, and how urban and environmental resources can be preserved and conserved.

THE TWIN CITIES PROJECT: CONTEXT, PROCESS, AND METHODOLOGY

In 2000, the Departments of Agriculture (MDA), Health (MDH), and Human Services (DHS) received funding to develop a pre-design study and investigate the feasibility of restructuring the workplace of their agencies and divisions and of collocating the Departments of Health and Human Services program offices, and the Departments of Health and Agriculture laboratories. The broad goal of the Minnesota State Administration was to minimize long-term costs of government facilities, and to increase access, and most importantly, to consider ways in which agencies can best serve their customers.

The concerned departments viewed the project as an opportunity to look carefully at the relationships between their programs to provide better customer service. Currently, those departments allocate their program facilities and staff between the twin cities: St. Paul and Minneapolis. Current facilities are inadequate to meet the needs of the agencies, and in fact threaten their ability to accomplish their mission and to maintain skilled and experienced staff.

Acting as principal investigators, Adams Group Consultants from Charlotte, North Carolina and Hokanson/Lunning/Wende from St. Paul, Minnesota, have developed the pre-design study of the three agencies. At an advanced stage of the project the Departments of Correction and Public Safety requested similar studies. Several researchers and consultants were involved in the study under the principal investigators. The project team included specialists in architectural programming, participatory and strategic planning and urban design, financial analysis, and sustainable design, namely Henry Sanoff of North Carolina State University, Art Pearce of Idea Works, Teresa Sterns of Sterns & Associates, John Carmody of the Center for Sustainable Building Research of the University of Minnesota, and Lisa Wilson of Design Collaboration.

Through a collaborative team approach a rigorous process was established and included two major procedures that have been conceptualized toward achieving solutions and establishing imperatives and guidelines. The first procedure was to analyze the existing condition leading to problems definition; while envisaging challenges and opportunities. The second procedure was to develop and establish mechanisms for understanding agency needs while developing consensus in the decision making process (AGA & HLW, 2001 a).

The methodology that was adopted throughout the process was participatory, intensive, and comprehensive in nature and employed several techniques. It was developed based on the belief that the first step for developing an employee responsive work environment is to determine the best technique or combination of techniques for collecting and gathering information from Minnesota State employees. In fact, one of the main reasons for the continuing debate concerning ways to improve personnel productivity and satisfaction of their work environment is the lack of simple, reliable, and comprehensive methods. Concomitantly, a number of methods and techniques were conceived. These include visioning sessions, workshops, working meetings, survey questionnaires, interviews, and web-based surveys. Since the project has included several components, the detailed description of the process and methodology might go beyond the scope of this paper. However, a brief outline of the major procedures and their findings is framed within the analysis of the project development process.

EXISTING CONDITION AND NEEDS DEFINITION

Work meetings have been conducted as exploratory and discovery events to identify the needs of the agencies and state the challenges that the project consultants together with the client would face throughout the process. With the Minnesota Department of Administration leadership, and the guidance of the Minnesota Department of Finance, the existing condition was conceptualized. The results of this procedure have been clearly stated and framed as representative problems as follows:

- The existing facilities of the agencies do not meet current and future needs.
- The agencies operate from multiple metro locations within the twin cities and this hinders their ability to effectively carry out their business and service plans.
- The agencies continue to grow in terms of staff and services in response to mandated programs. As a result, they have expanded into available leased spaces.
- The agencies have not always been successful to strategically locate programs having close functional relationships or similar service programs.
- Many spaces pose critical environmental issues that pertain to life safety and space deficiencies.

In this phase of the project major critical issues have been identified and classified into four categories. These are: functional, psychological and organizational, utility and service, and technological issues. In order to address the preceding issues a set of challenges has been devised as driving forces and objectives for the overall process. These are:

- Community partnership and participation are a necessity to accomplish a project of this magnitude.
- The larger community needs to be engaged in an open process leading to shared- solutions, thereby sensing its ownership of the project.
- Non-traditional financing methods need to be explored.
- Use of state-owned sites need to be considered and surveyed.
- Setting priorities and developing a phasing plan for meeting the agencies space needs requires involvement and assistance from the Department of Administration.

Based on investigating the existing condition major concerns have been defined to replace previous conventional approaches adopted by the State. The traditional approach to meeting the state agency facilities' needs has been to build or lease space to accommodate an agency's staff growth. The concern here was to allow the agencies to operate in a functional, productive, and healthy environment with minimal growth. The major critical concept introduced was collocation that provides opportunities for shared spaces and facilities

between the agencies, while improving customer service delivery. As a result, the concern was to utilize technology in well-situated facilities that permit inter-agency and intra-agency cooperation and sharing of common spaces. These facilities need to be energy efficient, cost effective, and flexible to serve as an integral part of broad based community re-development efforts. With these new facilities, additional opportunities emerge to forge and enhance partnership between state agencies, federal institutions, and different county departments.

PROGRAMMING AGENCY WORKPLACE: A USER CENTERED PROCESS

Programming is intended to facilitate communication among the designers, clients, and eventual users. According to Sanoff (1977), it is a process of problem identification, information collection, and information organization resulting in a communicable statement of design intent. One of the important purposes of programming is to integrate human activities into space and time. Its aim is to tap the building occupants for information on what it is they need in a building, a source that was largely ignored in the past. In this regard, the authors argue that the process of involving those most affected by design decisions and thus the built environment in the programming process promises better need definition, morale, responsibility, and foster the development of a sense of belonging and ownership on the part of users after building occupancy.

A typical approach to workplace programming and design is to define and then analyze tasks and requirements of the individual and workgroups. However, the most ideal situation to assure a good fit between the workplace and the nature of work being performed is to have each workplace custom designed for the tasks of each individual employee. It has been generally assumed that this would create large number of workplace designs, often referred to as “footprints”, that are categorized by shape and floor area they occupy. These in many cases appear too as not cost effective and may result in higher initial costs. Therefore, designers used to identify a limited number of workplace types.

The current workplace of the three concerned departments is characterized by limited technological capacity, poor environmental quality, and inflexibility. The approach undertaken in the programming process recognizes the fact that there are misfits between the current workplace and the nature of work. It is believed that a larger number of workplace types are available than presently utilized. In order to resolve these misfits, and develop new workstations responsive to agencies’ needs, a participatory strategy was devised to allow all employees to identify the workplace types best suited for their tasks. An extensive research process resulted in the identification of square footage, visual character, and work types of fourteen workplace variations found in recent literature and in the marketplace. A major part of this process was to analyze these types in terms of flexibility, common areas, shared spaces, teaming areas, and other factors. Three-dimensional modeling for each type was developed to facilitate employees understanding of the key issues.

A visioning workshop with the management representatives engaged over 80 participants in an exploratory process while familiarizing themselves with the survey tasks. Each participant served as a liaison to his or her administrative units. The objective of the survey was to gather information and record the divisions’ responses to desired workplace types. Major results were: From the Department of Health’s 1268 respondents, 232 required private offices, 1036 required variety of workplaces. The open plan type “D” was preferred by 50%, while type “C” was preferred by 25%. From the Department of Human Services 2113 respondents, 390 required private offices and 1723 required variety of workplaces. Notably, workplace preference percentages were similar in the agencies. A summary survey sheets were developed showing area requirements of each division, and concluded with comprehensive agency requirements including circulation and shared spaces. Fig 1. and 2.

The development of the architectural program was based on the workshop and survey results. It included identification of activities, description of the spatial environment that accommodates these activities, and a statement of design intent. Program data sheets were developed to record the requirements for the primary office activities. The information contained includes: user information, range of activities, workplace objectives, spatial requirements, workplace type, design requirements, and equipment needs.

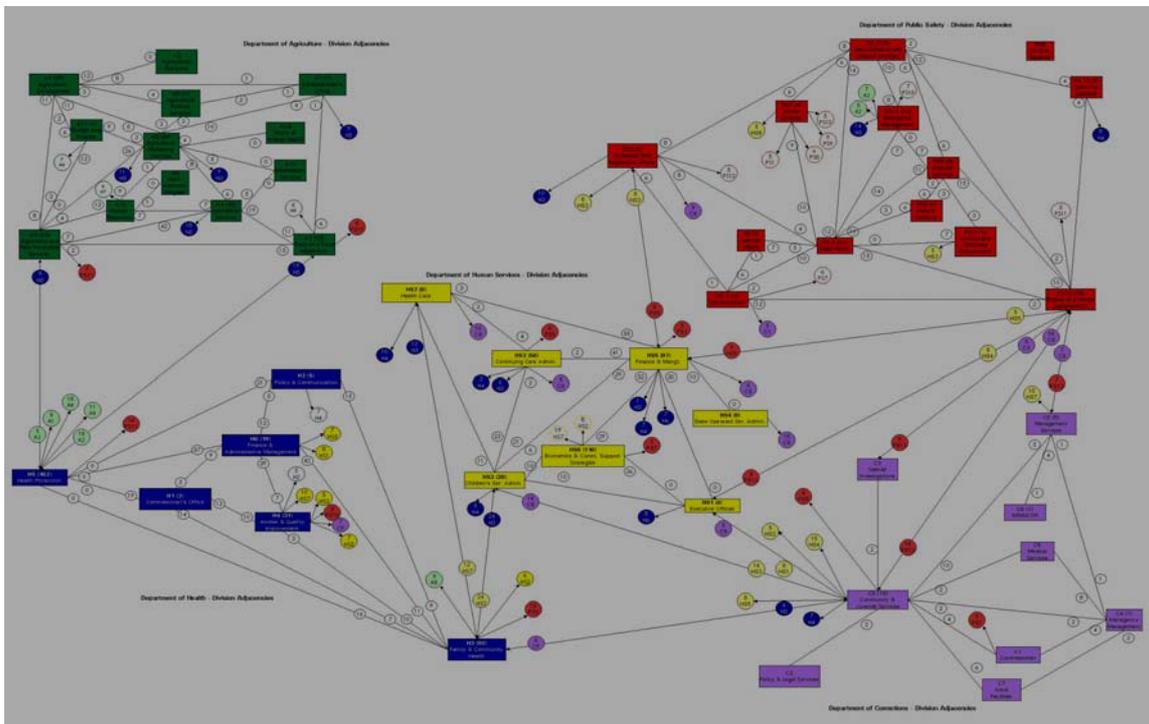


Figure (3) Intradepartmental Interactions of the five departments.

The analysis of the survey results indicated that certain divisions identified a one-way communication while others were characterized as having two-way or reciprocal connections. Decisions regarding proximity importance between divisions were based on those identifying the highest number of reciprocal connections. Establishing a frequency procedure of reciprocal connections was necessary to establish a threshold of importance.

From the connections identified in the survey, the Department of Human Services is the most centrally located department within the five departments due to the number of reciprocal interactions it has with the Departments of Corrections, Health, and Public Safety. With one hundred and thirty-one interactions, the connection between DHS and DOC represents the highest need for proximity followed by the link between MDH and DHS (Figure 4).

Significant results included high reciprocal divisional links between the DHS “*Children’s Service Administration*” and the MDH “*Family and Community Health Division*”, and recorded 48 exchanges. Results also revealed that “*Health Protection Division*” with MDH noted minimal departmental frequencies, but illustrated numerous frequencies within its own division and with MDA labs.

CUSTOMER CONTACT

An important aspect of the pre-design study was the identification of the customer contacts of the five agencies. Customer contact in the context of this project was defined as the “face to face contact or interaction on a weekly basis” between an agency or department and any other state agency not included in the communication analysis, county governments, any public or private group or private individual. With this understanding, each agency was requested to identify the groups and personnel along with the associated program area that has contact outside the agency (AGE and HLW, 2001 b).

The nature of customer contact for the state agencies includes a network of services that in many cases provide customer service across agency divisions. The interactions also require the travel of county and private administrative personnel to meet and discuss service delivery within an agency in the form of consulting and work meetings as well as in training sessions. These mandate identification of a range of workstations types that includes typical workstations, meeting areas, and teleconference rooms. The results of the customer contact analysis reveal that contact ranges from 15% (AG) to 28% (DHS) of the personnel, in contact with customers, and the area occupied in this activity ranges from 6% (AG) to 26% (MDH).

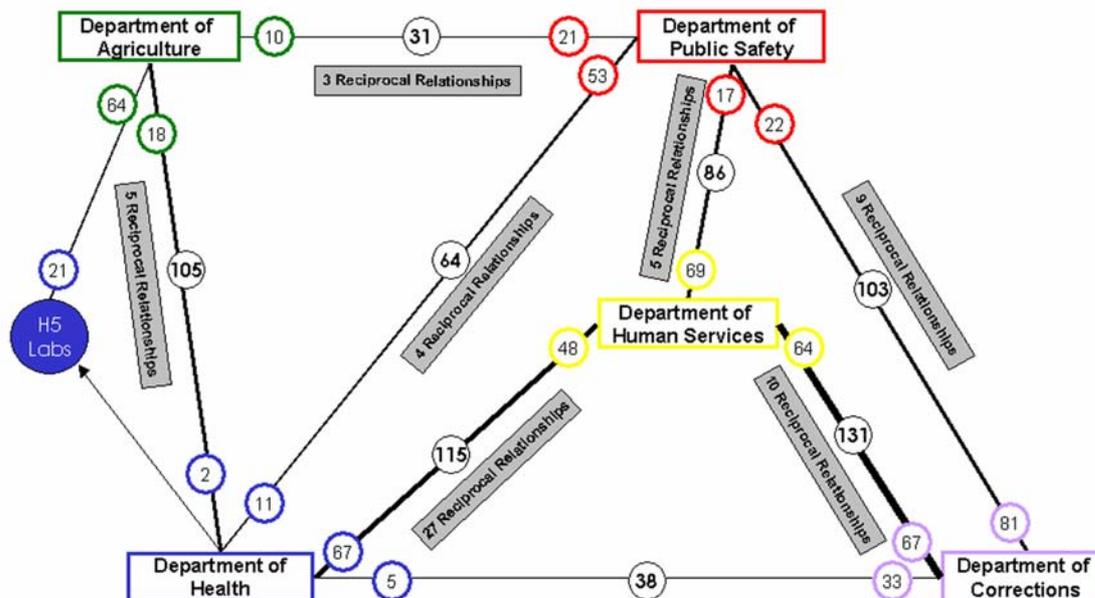


Figure (4) Frequency of interaction between the five departments

SITE SELECTION AND THE PUBLIC INPUT PROCESS

Site selection was one of the key components of the study. The process of selecting sites for locating the new facilities of the state departments involved literature reviews, information gathering and collection of a number of planning documents. The purpose of this procedure was to assess current thinking about urban planning and design from the state's perspective and to help establish criteria for site selection.

Based on a request for information survey (RFI) agency employees forwarded six sites expressing their wishes and preferences. The proposed sites were analytically compared based on basic agency needs, and geographical constraints and opportunities. In a site selection workshop, agency managers were asked to evaluate the six possible sites located within the metropolitan area. The objective was to assess how they felt each site would contribute positively to an employee's daily experience. They were also asked to rate the sites based on the employee's stage of life (Figure 5). In addition to the workshop with the managers, an electronic web-based survey of agency staff was conducted to gather information on site attributes, adjacencies, and location.

Not surprisingly, staff concerns did not echo concerns of the managers. However, transit, transportation, and parking were clearly critical issues across the board. Major results revealed that 80% drive to work, and most of them commute less than 20 miles. Strikingly, 70% expressed interest in telecommuting. As a result of this process, the consulting team together with the state administration representatives selected three sites. In order

to investigate environmental issues and the impact of development on the natural environment a comparative analysis of the three preferred sites was conducted by rating each site according to a specific set of criteria that included site-biodiversity, watershed preservation, potable water consumption, energy, air pollution, indoor environmental quality, and waste. The results revealed varied degrees of environmental eco friendliness, and provided insights toward the final selection of the sites.

Health, Human Services, and Agriculture Pre-design
Site Selection Workshop One

The purpose of this survey is to better understand how workplace location affects employees' lives.

Instructions
1) Stages of Life
Place a check in each box for Site Types/Locations that would offer positive environments for an employee at a particular Stage of Life.

2a) Daily Experiences
Rate each Site Type based on whether it has a "High", "Medium", or "Low" positive impact on an employee's daily experiences.

2b) Daily Experiences
On the list below, check the Daily Experiences that are most important to you in terms of workplace location:
 Parking
 Mass Transit
 Shopping
 Recreation
 Entertainment
 Convenience to Capital
 Commuting

1) Stages of Life	Site Types/Locations	2a) Daily Experience																
		Parking		Mass Transit		Shopping		Recreation		Entertainment		Convenience to Capital		Commuting				
		High	Medium	Low	High	Medium	Low	High	Medium	Low	High	Medium	Low	High	Medium	Low		
Single, Young Adult Married Retired w/Children Single Retiree	Capitol Area																	
	Single, Young Adult Married Retired w/Children Single Retiree	Capitol City																
		Single, Young Adult Married Retired w/Children Single Retiree	Urban Core															
			Single, Young Adult Married Retired w/Children Single Retiree	Inner Ring														
Single, Young Adult Married Retired w/Children Single Retiree				Beltway														
	Single, Young Adult Married Retired w/Children Single Retiree			Outside the Beltway														

Figure (5) Survey sheet to get feedback on how the location of the workplace affects on employees life

ESTABLISHING FUNDING MECHANISMS

The objective of this procedure was to establish a financial model with multiple scenarios so that it can be used in the future with minimal modifications. This took place by building modules within the model so that they can be turned on and off, thereby making it flexible for evaluating current and future state projects. The major concern was to establish possibilities for comparing leasing, state built, or privately built facilities at various sites with a variety of funding techniques.

The recommended approach improves the prospects of continuing to lease space at current locations. On a discounted basis, the continue to lease scenario has a cost to the state of \$344 million, while building new facilities adopting the collocation concept would cost \$337 million. An alternative approach to the state's traditional General Obligation Bonds (GOB) was the public/private partnership alternative where funding would be designating about 25% through General Obligation Bonds (GOB) and about 75% through Certificates of Participation (COP).

CONCLUSION

State governments today require professional pre-design services as part of every capital improvement project they undertake. When a state agency is seeking funding from the legislature, pre-design is the planning tool to identify the logic, need, key issues, scope, and costs. Therefore, pre-design should be regarded as an integral part of a state's capital budget process.

By and large, the intent of this paper was to analytically describe the process and results of the pre-design study for the workplace of the Minnesota Departments of Agriculture, Health, Human Services, Correction, and Public Safety. The paper discussed the critical components of the project by illustrating how the existing condition can be investigated and how needs can be defined. A user centered participatory process for

programming the workplace resulted in defining area requirements of each individual division together with the square footage, visual character of different types of workstations. Comprehensive agency requirements including circulation and shared spaces were developed as a result of this process. To improve the delivery of services to customers, inter and intra-departmental agencies one-way and reciprocal connections were investigated and diagrammed. Customer contact between a state agency or other agency groups or individuals was also analyzed.

A public input process for site selection was devised and resulted in defining three sites preferred by agency employees that were analytically compared against a set of environmental goals. The comparison provided a knowledge base for final site selection. Establishing a funding mechanism for implementing the projects was envisioned through a public/private partnership alternative. Concomitantly, this has replaced the state's traditional funding approach.

The research process and findings of all project components have been classified and categorized in a final pre-design document. It serves both the Minnesota Department of Administration, and the concerned agencies to speak with knowledge about the project and to have the project scope and parameters identified so that agencies would move forward with subsequent design and construction. Recently, the project funding was approved and the state designer selection board has requested design proposals then selected the design teams for providing design services for the offices, lab facilities, and parking facilities of the Departments of Agriculture and Health, and for the offices of the Department of Human Services.

The paper asserts that comprehensive pre-design is a systematic and systemic planning process intended to improve decision making process, adopting the premise that its results communicate essential project objectives with factual information before the actual design process commences. The paper corroborates that the multifaceted techniques involved in the pre-design process are crucial for getting reliable, valid, and applicable information.

Involving different groups of the state employees in a variety of settings such as visioning sessions, work meetings, and workshops is effective for influencing future design decisions. Providing sufficient opportunities for the employees recognizes the value of their contribution to the knowledge base needed for design decision-making, and fosters the development of a work environment responsive to their needs, health and productivity, and cultural aspirations.

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