THE SURVEY AND EVALUATION OF THE VISUAL EXPERIENCE AS PART OF THE PLANNING PROCESS

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ABSTRACT

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SUBMITTED TO THE DEPARTMENT OF CITY AND REGIONAL PLANNING ON MAY 21st, 1965, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF CITY PLANNING.

This thesis evaluates the visual form of an existing environment, as it is likely to be experienced and remembered by those who come in contact with it, and suggests several ways in which the results of such an evaluation may be used within the planning process to achieve more successful visual design.

Within the evaluative section, the visual form is examined for its ability to satisfy three important criteria:

A. **Identity.** Firstly, the major visual elements are required to have identifiable or legible form, vivid and well-differentiated, able to be recognized as separate entities, distinguishable from all others.

B. **Structure.** Secondly, the visual elements are required to be well-structured, both statically and sequentially, possessing both visual coherence and continuity.

C. **Meaning.** Lastly, the visual elements are required to be meaningful, related to the type, intensity, structure, and value of the uses and functions which are found or anticipated.

In a concluding section, two uses for the evaluative material within the planning process are discussed: as a visual checklist for evaluating planning proposals; and as generators of visual form alternatives.

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I. INTRODUCTION AND SCOPE
This thesis examines the visual form of an existing environment: Watertown Square, Massachusetts. It surveys and evaluates the visual content of the Square, as that content is likely to be experienced and remembered by those who use or come in contact with it. The thesis points out the visual problems and assets which exist and suggests ways in which those problems and assets may be employed within the planning process to achieve more successful visual, as well as comprehensive planning, design.

Within the body of the thesis, three important criteria are used to judge the Square's visual form.

A. **Identity.** Firstly, the Square's visual elements are required to have identifiable or legible form, vivid and well-differentiated, able to be recognized as separate entities, distinguishable from others.

B. **Structure.** Secondly, the visual elements are required to be well-structured, both as sequential experiences and as a static mental image. All sequential experiences must have **continuity** of form - a dynamic patterning of visual elements which, while possessing individual instances of contrast,
differentiation, and emphasis are, at the same time, rhythmically organized and connected relative to the human being and to his scale of movement. The developed mental image, on the other hand, must have coherence of form - a static patterning of visual elements so shaped and integrated that the whole (in this case the general area of the Square) and the parts which comprise it are related clearly and consistently to each other and to the larger areas which lie adjacent to them.

G. Meaning. Finally, the visual elements are required to be meaningful, related to the type, intensity, structure, and value of the uses and functions which are found or may be expected to occur. Specifically, it is essential that (1) important visual experiences, both static and sequential, also be important functionally or symbolically; (2) a formal fit exists between the visual differentiation and structure, and the activity and circulation differentiation and structure; and (3) there is an apparent symbolic and functional adequacy of form - well-coded and expressive of the uses and functions which exist or are contemplated.
When these criteria are met, the resulting visual environment is capable of raising the level of human experience in at least three ways: By providing a heightened sense of visual satisfaction and fulfillment; by increasing the confidence of the individual to move within and through the environment, strengthening his sense of position and enabling him to make decisions with greater sureness; and by deepening and broadening the range and quality of meaning, allowing individual growth and exploration to occur, increasing the emotional security which comes from a well-structured, distinctive setting, and generally providing the potential for vivid meanings and memories to occur.

Ideally, this examination of Watertown Square's visual form would be one of several concurrent studies dealing with the environment's assets, problems, and possibilities, whose findings would directly influence the development of objectives, policies and proposals for physical change. In this way, important design and planning problems which arise in these early stages could be mutually explored and tested before programs are developed and major form decisions made. Practically, however, it has not been possible to develop this thesis within the context of a real planning program. Thus, the work which follows should not be
considered as a final comprehensive statement of the Square's visual problems and possibilities, but rather as a working document whose conclusions regarding the visual experience would be amplified and expanded as more visual as well as general planning information became available.
II. THE SURVEY METHOD AND THE PROCESS OF ANALYSIS
The method which has been developed for surveying and describing the visual form of Watertown Square has been guided by three primary objectives.

One of the thesis' main purposes - to evaluate the Square's visual form as that form might actually be experienced by those using it at different times for a wide range of purposes - accounts for the first two:

A. That the method be representative, related to the actual sequences by which people experience the Square.

B. That the method be comprehensive, in order to cover fully the Square's main experiences, avoiding major omissions.

Another main purpose of the thesis - that it be developed with the capability of being a useful part of a real planning program - accounts for the third:

C. That the method be economical - simple and efficient, costly neither in terms of time nor money - in order that it may be applied easily to a real planning situation.
In meeting these objectives, the survey method has evolved from methods now being used and investigated by Professors Lynch and Appleyard in the Department of City Planning at MIT, but with some modifications. These modifications are due to the practical, rather than research, orientation which has been assumed in this thesis, and to the need of surveying all aspects of a small environment instead of one aspect of a much larger one, as the View From the Road studies and the sequence problems conducted in the department's studio courses have done. Presented chronologically, then, in the paragraphs that follow, are the main details of the method used in this thesis to survey and describe the Square's visual form.

**Vehicular Sequences**

Initially a set of eleven vehicular sequences which passed through all major areas of the Square were established and recorded. These sequences were based on flow patterns derived from traffic surveys conducted by the Massachusetts Department of Public Works in 1955. The first five sequences, in order, correspond to those having the greatest intensities of traffic flow through the Square. The remaining sequences, due to the nature of the Square's flow patterns, could not correspond to major flows and were therefore organized mostly to cover all
remaining inbound and outbound movements.

Prior to beginning the survey of these eleven sequences, a graphic language for describing and recording their visual content was established. The details of this language are presented on page D-I.

With the aid of this language, the sequences were experienced and recorded in the following way: (1) Initially, the road was traversed at normal driving speed and the content of the visual experience absorbed. On this first trip, the content was not recorded instantaneously but was described as a memory sketch as soon as the end of the sequence was reached. This enabled the observer to sense completely the experience of the road, uninterrupted by the visual lapses which recording the visual events as they occur usually demand; (2) Subsequently, the road was traversed over and over again, each time at the same normal speed, the visual content now being recorded instantaneously, until all additional information needed to completely describe the road's visual content had been obtained. This usually required two to four additional trips. The total time needed to completely describe one sequence by this method was approximately thirty minutes.
Detailed Surveys of the Square

After the sequences had been completed, another series of periodic and more detailed surveys of the Square were undertaken, each attempting to widen the evaluator's range of experience with the environment and to become more intimately familiar with its central area. These trips were taken:

A. At different times of the day and week;
B. Under different weather conditions; and
C. For different purposes: shopping, visiting the library, mailing a letter, and so forth.

Approximately ten to fifteen trips were made during the survey stage. Each trip took, depending on its purpose, from thirty minutes to an hour.

These trips resulted in (1) a number of verbal and graphic notes which described and in some cases made preliminary evaluations of certain aspects of the areas form and also in (2) a systematic survey and description of the Square's visual character in greater detail, including:

A. The major types and concentrations of visible activity.
B. The pattern of surface textures.
C. The general static spatial pattern.
Development of an Image Map

Once the two surveys of sequences and detailed visual form had been completed, a general image map of the Square was prepared in which the major visual elements (paths, districts, nodes, and important visual objects) were recorded and delineated. This resulting image map represented accurately the conceptual form of the evaluator's experiences.

Photographs

As the final step in the descriptive process, the Square's most important visual elements, as determined by the previous surveys and descriptive drawings of its visual content, were photographed. These photographs meant to supplement the more abstract drawings developed earlier, represent a more concrete record of the Square's visually important qualities.
Near the end of the survey stage, the actual process of analysis began. Five main elements were involved.

A. Criteria. The three criteria of identity, structure, and meaning, used as definitive yardsticks, provided an initial and continuing basis for evaluating the strengths and weaknesses of the Square's visual content.

B. Hypotheses. Throughout the evaluative stage, a number of suppositions about the Square's visual form developed: from the criteria, the survey material, and from past experience. These suppositions provided points of departure for investigating and coming to grips with the Square's major problems and assets.

C. Survey Data. The major components of the survey stage - the sequence drawings, the detailed visual character of the central area, the conceptual image, and the photographs of the Square's most important visual elements - were used in the process in two ways: (1) as a check on the validity of existing hypotheses; and (2) as a
generator of others as well, some of which might have been overlooked or else weakly formulated had the information not been available.¹

D. Field Checks. After a hypothesis had been developed and tested against the survey data, it was further examined in the real context of the Square. In this way, problems of identity, structure and meaning were exposed to the real experience once again, as yet another check on their validity.

E. Design. As the final link in the evaluative process, the design element was incorporated as a means of further testing likely problems and assets. By attempting to create reasonable solutions to suggested problems and by testing the extent to which apparent possibilities could be exploited, this step often gave added weight and new meaning to each decision.

¹. Thus, on the one hand, the premise that a particular structure is visually important is substantiated by the fact that it is shown on the survey drawings to be experienced at strategic points along all the roads passing by it. On the other hand, the awareness that a unique system of highly varied views may be possible is first observed when the sequences are recorded and their patterns viewed.
THE PROCESS OF ANALYSIS
Although the process began with one or more of the first three elements - a criterion, a hypothesis, or an aspect of the survey data - it soon grew to embrace the final two elements as well. During this process of analyzing a potential problem or asset for its validity, these five elements became part of a continuous process of assertion, testing, feedback, and re-assertion. Thus, the process could be dramatized graphically not so much as a line or circle, but as a lattice or net in which each element eventually affected all others, producing in the end a clearly stated and well-supported evaluation of the Square's visual form.
III. THE EVALUATION OF WATERTOWN SQUARE'S VISUAL FORM
This section contains the written and graphic evaluation of Watertown Square's visual form. It begins with a short background of the Square's physical and visual characteristics, followed by the major findings of the analysis stage, organized within the three main visual categories of identity, structure, and meaning. The section concludes with a summary statement of the Square's main visual assets and problems.
THE PHYSICAL AND VISUAL CHARACTERISTICS OF WATERTOWN SQUARE

PHYSICAL CHARACTERISTICS : LAND USE AND CIRCULATION

Watertown Square's physical location in relation to the Boston Region is shown in Drawing 1. Its general land use and circulation patterns are shown on Drawings 2 and 3.

The Square is Watertown's CBD. It contains the Town's major commercial area, devoted primarily to banking, professional and business offices but with substantial retail business as well, including a few junior department stores, a furniture store, some small apparel shops, a large food market, and a complement of taverns, drugstores and other service facilities. It also contains the Town's major civic activities, including the administration building, the central library, the fire, police, and postal departments, and a large park; a large automotive supply and service area; and several industrial and residential areas.

At the center of this wide range of activities lies a complicated traffic center which serves as a focus for Watertown's transportation network and as a major regional

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circulation junction. Eleven separate roads, including Routes 20 and 16, pass through or skirt the edge of the Square. The largest traffic volumes, the heaviest concentration of trucks and the major conflicts between local and thru traffic occur here. The 50,000 cars per day (1955 figures of the DPW) that travel through the Square are predominantly thru traffic with neither origin or destination in the Square itself. In addition to its auto and truck function, the Square is also a terminal for radial lines of the MBTA System which serves downtown Boston and Harvard and Central Squares, and is a depot for the Middlesex and Boston Street Railway Company, which provides service to Waltham, Needham, and Arlington.

VISUAL CHARACTERISTICS

The visual characteristics of Watertown Square are illustrated on the following pages. Developed from the visual surveys, they describe (1) the important visual elements of the major vehicular sequences; (2) the visual character of the Square itself; and (3) the conceptual image. These drawings vary from those prepared in the early stages of survey and evaluation in two ways.

A. The level of detail shown on these drawings corresponds closely to the level of criticism contained in the evaluative section. Thus, some
elements originally recorded, such as eye movement, have been omitted because of their irrelevance; others not originally recorded, such as detailed textures, have been added later because of their pertinence.

B. The particular groupings of information by sheet have evolved as a result of their usefulness in illustrating various visual problems and assets which are discussed in the evaluative section. Thus, the sequence drawings, for example, do not combine all the perceptual elements which are part of a sequence on one drawing, since to do so would have made the resulting drawing unreadable but, more importantly, would have served no useful purpose in terms of the evaluative text. On the other hand, each sequence passing through the Square is described separately, as well as in combination with all others, in order to show more clearly the spatial changes which take place at the Square—changes which are relevant to the development of key visual problems.

The numbers affixed to the drawings which follow will be referred to again in the evaluative section when the drawing so numbered is relevant to the asset or problem being discussed.
DESCRIPTIVE DRAWINGS : LEGEND

SPACE

hard spatial boundary

visually prominent spatial boundary or object

soft spatial boundary

visually prominent soft boundary or object

VIEW

prominent view: area

prominent view, extended: area

prominent view: object

prominent view, extended: object

panorama: unfocused

panorama: focused

Line weight:

prominent view

distinctive view

MOTION

curve

down

up

direction of sequence
MOTION
IDENTITY

The first important measure of Watertown Square's visual form is identity: that its parts be identifiable or legible, vivid and well-differentiated.

Visual Elements of the Square

The Square possesses a large number of distinctive form elements. These include (1) the MDC Park Area along the Charles River, notable for its continuity and simplicity of form as well as for the contrast that the water, grass, and trees, and the change in intensity and type of activity make with the rest of the Square; (2) several landmarks, including the Unitarian, Catholic, Congregational and Methodist churches, and the Perkins School tower, whose strengths lie in their strong silhouette, completeness of detail, and visual prominence; (3) the traffic circle, identified by its relative openness in contrast to adjacent areas, its dominant visible activity of traffic movement and interchange, and its strategic location at the termination and/or intersection of numerous vehicular paths; (4) the Town Civic Center, identified by its characteristic building types,
consistency of materials, and location within a heavily treed area; (5) the Charles River, legible because of its contrast of form and surface; and (6) several vehicular paths, including Nonantum and Charles River Roads and Main and Mt. Auburn Streets identified by the activity found along them, their proximity to special features, their alignment and curvature, and their own spatial qualities.

In contrast to these elements, which possess strong identity, many of the Square's remaining elements, although they can be organized and differentiated from each other, are less vivid. These include (1) the shopping and automotive areas, imageable for their heavy concentrations of signs and detail; (2) Saltonstall Park, legible for its openness, texture, and activity; (3) the Municipal Parking Area, identified by its openness and visible use; (4) Lewando's, Bachrach's, the MBTA Yards, and a red building on Main Street, important because of their strategic location at focal points along the vehicular paths; (5) the Pleasant Street industrial area, identified by its mill-type buildings, visible activity of loading and delivery, and roof line details; (6) a mixed commercial area along Galen and Watertown Streets, identified by its signs, activity, and spatial location; and (7) the remaining vehicular paths which enter and leave the Square.
Photographs of the Square's visual elements are found on the following pages.
DISTINCTIVE ELEMENTS
MDC PARK AREA
AND THE
CHARLES RIVER

TOWN
CIVIC CENTER

TRAFFIC CIRCLE
IDENTIFIABLE ELEMENTS
INDUSTRIAL AREA

PLEASANT STREET
SPRING STREET
AREAS WHICH LACK IDENTITY
Problems of Identity

The problems of visual identity within the Square are of two kinds, and are discussed separately below.

Lack of Identity

Several areas of the Square lack form qualities which would allow them to become readily identifiable and vivid in their own right. The residential areas which lie within and immediately adjacent to the center, the industrial area between Nonantum Road and Galen Street, and the office areas within the major commercial areas are all so diverse within themselves that they fail to generate distinctive visual character. As a result, the residential and industrial areas are often unrecognizable as the same areas when approached from different directions, and the office areas are generally lost within the dominant visual form of the shopping street. The lack of identity within these areas is compounded by their location, generally within, behind, or above the more identifiable areas of the Square, which denies them visibility from the major paths.

Two pairs of vehicular paths also lack clear identity at several points and thus tend to be visually confused. These include North Beacon and Arsenal Streets which both descend into the Square, pass through the same automotive
VISUAL INCOHERENCE OF THE CNIC CENTER
area, and have the Lewando's building as their major focus (D-1, D-10); and Charles River and Nonantum Roads, which, although different in form, nevertheless move along the edge of the Charles River, through similarly landscaped boundaries, along gracefully curving paths. (D-2, D-6)

Weakness of Form

Many of the Square's visual elements, although identifiable, possess weaknesses of form which prevent them from becoming even more vivid. Some of the more important examples include:

A. The Town Civic Center, which lacks internal visual organization at the site scale, due to the diffuse pattern of buildings, parking areas and entrances which exist; lacks external visual coherence when seen from the areas around it, due to the very different visual impressions it gives from these points; and lacks visual accessibility of its main parts from up close and at a distance.

B. The shopping area, which has wandering boundaries and weak terminations, is visually obscured from many approaches (as that along Galen Street where its one and two story forms are hidden or truncated by the plane of the road), and lacks strong spatial definition. Its form is further weakened by its
convex face, which wraps around the opening at the traffic circle, by the dispersion of several elements behind the main shopping street, by the lack of detailed form continuity (signs, paving, lighting, etc.), and by an overall lack of a pedestrian sense of place.

C. The traffic circle, weakened by the complexity and multiplicity of paths, activities, and surfaces which exist, and by its lack of simple, well-defined boundaries. (D-15 and all sequences)

D. The water, which lacks visual and physical connection to the other major areas of the Square, is not seen well or often from the major paths (except along Charles River and Nonantum Roads) and is not continuous in itself, due to the changes in character it and its boundaries undergo as they pass through the Square. (D-15 and photos of roads which pass along its boundaries)
STRUCTURE

The second important requirement of Watertown Square's visual experience is that it be well-structured, both statically and sequentially. Statically, the essential form quality is coherence, that integration of visual elements which makes the whole and its parts clear and manifest. Sequentially the desired form quality is continuity, whereby the visual elements are rhythmically connected and organized, possessing contrast, differentiation, and emphasis, while being scaled to the human being and to his speed of movement.

Coherence

Description of the Basic Structure

The Square is visualized most easily as a series of radial, or nearly radial, paths which intersect at a major traffic circle. This structure is reinforced by (1) the topographic location of the Square, in the lowland or basin, which emphasizes its centrality; and (2) the consistent general relationship of the paths which connect to it, allowing them to be structured more easily. Extending from the traffic circle are the major activity areas which either fit between the paths or straddle them. This generalized structure seems simple and comprehensive enough to serve as a basic orientational reference for the individual,
A GENERALIZED IMAGE OF THE TRAFFIC CIRCLE

STRUCTURAL INADEQUACIES OF THE IMAGE
organized strongly enough so that paths and areas stand in clear relation to one another and are not likely to be forgotten or misplaced.

Problems of Coherence

What appears as an adequate structure in general, however, is less clear in detail for several reasons.

Inadequacies of structure at the traffic circle

The various formal elements which combine at the traffic circle possess inadequacies which prevent them from being structured clearly without distortion. These inadequacies include:

A. Structural irregularities in the path system, such as where North Beacon and Arsenal Streets connect outside the circle before entering, or where Watertown Street and Nonantum Road meet Galen Street at the Circle's perimeter but never enter, both of which weaken the clarity of the dominant radial system; and

B. The failure of the areas between paths to communicate their shapes and the failure of subtle changes in path alignment near the circle to be perceived, both of which lessen one's ability to give precise directional relationship to the parts.
C. The lack of visual dominance, due to the convergence and visual similarity of both important and unimportant paths, and to the general difficulties of structuring a joint of more than four paths.

Inadequacies of structure at other points

A number of other visual elements, including the Town civic center, the shopping area, the water, and the major landmarks lack positive relationship to the elements which they adjoin. This results from:

A. A lack of proper visual transition between parts, as where the shopping area meets the traffic circle or the parking lot and where the civic center and the shopping area connect. In the first case the problem seems to be caused by extreme changes in scale, while in the second it seems to be a lack of contrast and emphasis.

B. A lack of visual linkage, as between the river and the Square, which allows the river to slide by virtually unnoticed.

C. A lack of physical connection, which is the situation for the major landmarks which stand in isolation outside the heart of the Square unattached to any important visual elements. (D-16)
DISORGANIZATION WITHIN THE SECONDARY ROAD SYSTEM.
Lack of smaller scale organization

The absence of smaller scale visual organizations also weaken the visual structure by forcing coherence to be dependent on only one set of elements (the vehicular paths), by making the sense of position more difficult to judge, and by preventing the visual experience from becoming richer and more varied. This absence is most evident in:

A. The secondary vehicular path system, which has no internal order of its own and lacks clear connections to the major path structure.
B. The pedestrian path network, which is only effective in small areas and is constantly fragmented by elements like the traffic square, the major streets and the parking areas.
C. Many other important visual elements, including the shopping area, the civic center, Saltonstall Park and the municipal parking area, which lack internal foci, points of emphasis, or a clear division into major and minor parts.

Lack of external structural relationship

Lastly, Watertown Square relates very poorly to adjacent areas and thus provides little basis for the
establishment of a strong orientational sense. Although this condition cannot be separated from the orientational problems of the metropolitan area as a whole, it is still compounded and possibly intensified by the confusion of paths within the Square and by the fact that no one path is related precisely to a point of the compass. Also important are the characteristics of the nodal points to which the Square connects: being so weak as to be non-existent, as along California Street; lacking identity and clarity, as at the intersections of Arsenal Street and Soldiers Field Road and North Beacon Street and Nonantum Road; or lacking positive spatial position, as is the case with Waltham Center.

Finally, the Square lacks good connections to the immediate residential neighborhoods and lacks good visibility from or to the outside, except in a few cases.

Continuity

The second important requirement of the visual structure is that it have continuity of form when experienced in sequence, its parts being rhythmically organized, clearly connected, and well-differentiated.
Favorable Aspects of Continuity

At present, the sequential structure of the Square is adequate in two respects. Firstly, almost all vehicular paths which enter the Square possess a simple path continuity. The exceptions occur along California, Watertown, and Spring Streets, where the form disintegrates before the Square is reached, and at one point along Nonantum Road, where a form ambiguity exists because of an unclear fork in the road. Secondly, the vehicular paths are highly differentiated, possessing a wide range of sequential rhythms, due to the variations in space, motion, and view which exist. (D-12, D-13, D-14)

Problems of Continuity

The problems of continuity which weaken the visual structure fall into two categories.

Vehicular

A. Sequential discontinuity at the traffic circle.

The character of the uses, spatial quality, and details of a path and the way in which these elements are patterned or organized as a visual experience affect its continuity. In this respect, one of the most serious visual problems occurs at and adjacent to the traffic circle,
affecting all the paths which pass through it. Because each path which enters (or leaves) has a significantly different visual character, because in most cases the paths' visual organizations collapse before the circle is reached, and because the circle itself is weak visually, lacking a well-bounded, clearly organized form and positive connections to the paths which enter, there exists at this point a complete break in visual continuity. (D-1 thru D-11, D-15)

B. Inadequacies of sequential scale. If the positions along a road can be distinguished in some measurable way, providing clear reference points for the person as he travels along it, the road, or sequence, is said to be sequentially scaled. In the Square, inadequacies of sequential scale occur due to (1) the absence of identifiable check points, as along Charles River and Nonantum Roads; (2) the weakness or invisibility of minor path intersections, as along Arsenal and North Beacon Streets; and (3) the lack of any perceivable indication of gradient, as along Galen and Pleasant Streets. These inadequacies prevent a person's sense of position from being clear.
ROADS WHICH POSSESS THE BASIC PATTERN OF VISUAL ORGANIZATION
C. Inadequate joining of major and minor parts of the sequence system. Along most sequences, the connections of major with minor paths are often not visualized clearly or organized rhythmically. This results in sequential experiences characterized by a visual isolation and rigidity, which prevents the visual form from operating at a richer and perhaps more meaningful level along the major paths and also results in discontinuity when the major sequences are left.

D. Inadequacies in the rhythmic structure. Sequential experiences may also possess a rhythmic structure, analogous to that of a musical melody organized around a basic theme. Although no rhythmic visual organization was planned formally, one nevertheless exists, due to the present organization of visual form. Its structure is a simple one of introduction, development, conclusion with the conclusion occurring at the Square. This theme, while developed well initially along most paths, unfortunately to a final visual disappointment at the Square not only because of the Square's general formlessness, but also because
the major elements within the Square, such as Lewando's, the commercial center or the landscaped square in the center of the rotary lack the necessary dominance and strength of form needed to provide the anticipated visual climax. (See photographs of roads leading to the Square)

Pedestrian and mixed-mode sequences

Not only must visual continuity be maintained for the major vehicular paths which pass through the Square, it must be maintained for other important sequences as well. These include: (1) the pedestrian sequences to and through the Square from surrounding residential areas as well as other activity areas; and (2) the sequences which involve changes in the mode of movement, such as arriving by auto or public transportation and then transferring to a pedestrian mode for the purpose of shopping, paying bills, and so forth. The major problems for each of these sequences result from a lack of visual and physical continuity in the Square's larger formal structure. The confused relationship between autos and people, the poorly defined relationships of the Square's major parts, and the lack of any detailed textural, spatial, and
rhythmic patterns provide many examples of discon-
tinuity.

A. Along virtually every path leading into the
Square, the sidewalks, a primitive but import-
ant aspect of continuity for a pedestrian, are
interrupted by frequent cross streets and curb
cuts. Further, no devices are used (colors,
textures, etc) which might lessen the severity
of these breaks.

B. Along many sequences, major and numerous
changes in spatial enclosure, texture, or
character destroy continuity. Entering the
Square along Church Street, for example, the
sudden change from a fairly enclosed street,
heavily treed and well-landscaped with limited
views of the Square beyond, to a fast hard
open space porous and undefined at the edges,
filled with the movement and sound of auto-
mobiles is more than sufficient to break
continuity. Entering the Square from the
river, on the other hand, results in an equally
severe break due to the termination of the path,
coupled with a sudden change in spatial
texture, from trees, grass, and water to the
hard surface of pavement and automobiles, an
increase in the intensity of movement and activity, and the multiplicity of views which open along Mt. Auburn, Arsenal, and North Beacon Streets.

C. In the major parking area and along the Main Street shopping frontage, continuity is lost because of the conflicts of scale which exist in spaces dominated by the automobile and weakly organized for the pedestrian.
MEANING

The last measure of the Square's visual experience is that it be meaningful, related to the type, intensity, structure, and value of the uses and functions of the Square. Within the scope of this report, it has not been possible to formulate or acquire the more detailed and comprehensive data needed to fully understand the Square's existing functional structure or its many symbolic roles. Thus, the evaluation of meaning here is, in general, exploratory, intended to point out some of the more obvious or probable strengths and weaknesses while noting several conditions which should be investigated more thoroughly when more complete data becomes available.

Importance

Assets

The first requirement of meaningful form is that its most important visual elements or experiences be important functionally or symbolically as well. For the most part, this requirement is satisfied in the Square. The most identifiable paths, and especially the vehicular paths, the distinguishable districts, including the shopping area, the civic center, and the automotive area, the major traffic
AN UNIMPORTANT ELEMENT VISUALLY PROMINENT

AN IMPORTANT VISUAL EVENT OF NO FUNCTIONAL SIGNIFICANCE
square, and the major landmarks, are all important functionally and/or symbolically.

Problems

Three problems related to importance seem to exist.

Unimportant elements which are visually prominent.

The visual importance of three major elements seems questionable: Lewando's, an ordinary service facility; the MBTA yards, a minor depot and service area for the Authority's rolling stock; and the Perkins School tower, functionally important but not actually located within the Square, and difficult to locate except from a distance.

Major visual elements which are unimportant.

On the other hand, a number of important visual events occur along the vehicular approaches to the Square which could play important parts in strengthening the meaning of the Square: to signal entry, emphasize arrival, or mark important points along the path. At present, however, they seem to be merely a collection of interesting visual happenings, unrelated to any larger organization of functional or symbolic significance.
Visual and functional hierarchies which are unrelated

The level of meaning is often increased if important visual and functional events not only relate horizontally, but also relate vertically as well, so that the most vivid visual elements or events are also those which are intended to be functionally and symbolically most important. Although a complete judgement cannot be made here, it should be noted that while a number of form elements are now grouped together at approximately the same level of visual importance, including the civic center, the shopping area, the river, the traffic node and the automotive area, it seems clear that some possess higher functional and symbolic potential than others. The recently completed comprehensive plan for the Town, for example, has stated as two of its proposals to (1) strengthen Watertown Square as the focus of commercial office activity serving the Town, and (2) enlarge and improve the Town's civic center. If these are accurate statements of the Town's intentions, they then give clear direction for modifying the Square's visual hierarchy: for, instead of merely solving the visual problems which these two elements now have, it seems evident that special effort be made to give them truly vivid and remarkable form, through the use of dominance,
continuity, singularity, simplicity or other means, in order to emphasize their stated and implied functional and symbolic importance.

Formal Fit

The second requirement of meaningful form is that its own patterns of differentiation and structure fit formally with those of activity and circulation.

Differentiation

Activity

The fit of visual form to activity in the Square can be evaluated in terms of three kinds of measurement: activity unit, relative size, and intensity. Some problems of the first two are discussed below.

A. Visual unit and activity unit unrelated. This problem is apparent in two places: the shopping area, where the fine grain division of establishments which exists is not reflected in the almost unbroken facade which faces the parking lot; and in the Pleasant Street industrial area, visibly divided into no more than five large units but serving functionally as a container for about fifteen highly diversified firms.2

B. Visual size and actual size unrelated. In terms of one measure of activity size, square feet of floor space, three of the Square's major activities rank in the following order:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail and Commercial (including banks)</td>
<td>183,800</td>
</tr>
<tr>
<td>Offices</td>
<td>66,900</td>
</tr>
<tr>
<td>Automotive</td>
<td>26,500</td>
</tr>
</tbody>
</table>

There is very little connection between these figures and their apparent visual sizes relative to each other. The automotive area, for example, appears at least as large as the retail center, because of the huge and intensely colorful signs which are scattered throughout it, and because of a spatial form which straddles two major streets and is visually impenetrable, making the actual spatial depth seem larger than it is. At the same time, the commercial center seems much smaller, because of its one-story height, its less visually intense signs, and its linearity, while the office area, lacking identity and visual connection, is hardly noticeable.
VISUAL AND ACTUAL DIFFERENTIATION OF ROADS BY TYPE
Circulation

The fit of visual form to circulation can be evaluated in terms of both type and intensity. The problems which seem apparent are discussed below.

A. Lack of fit between visual and functional differentiation by type.

The vehicular paths which cross the Square carry three types of traffic - automobile, truck, and public transportation - in various mixes. Visually, they appear to be differentiated as shown on the diagram. Actually, the differentiation is a little more complex, resulting in a loss of individual awareness.

B. Lack of fit between visual and functional differentiation by intensity.

Visually, the roads appear to be differentiated by intensity as shown on the facing diagram judged in terms of road width, alignment and character, as well as linkages to other areas. The actual flows along these paths, as shown, are much different, the greatest incongruities occurring along Main and Watertown Streets, which carry up to twice
VISUAL AND ACTUAL DIFFERENTIATION OF ROADS BY INTENSITY
as much traffic as other apparently equally heavily travelled routes.

Structure

The other aspect of formal fit which may be evaluated is that between the visual structure of the Square and its functional structure, in terms of activity and circulation. Three main problems of visual and functional incongruence were found to exist.

A. Visually, the shopping area is organized around and related to Main and Mt. Auburn Streets, but functionally, the major approaches to it are from the municipal parking lot as well as from the residential areas to the east, resulting in a center which turns its back visually on its main entrances.

B. Within the Town civic center, the visual arrival to the Town hall occurs on Main Street, but the arrival by automobile is at the rear, and the visual connections from there are inadequate. Further, the main vehicular entrance is visually weak, appearing rather as the service entrance or perhaps a small off-street parking strip.

C. Throughout the Square in general, major points of arrival or departure, and of transfer, transition,
and decision lack complementing visual form. Thus, at entrances to the main parking areas and to the shopping and Town civic center, at intersections of major and minor vehicular paths, at points of transfer, and at points of arrival to the Square by foot or in the automobile, there is a lack of visual emphasis or controlled change.

Adequacy

The last requirement of meaningful form is that it be functionally and symbolically adequate, well-coded and expressive of the Square's uses and functions. In this report, no judgement of the Square's visual adequacy is made, but it is suggested, rather, that at least the following four elements be investigated for their functional and symbolic significance.

A. The Town civic center, to determine if it is merely a concentration of public buildings or if more significance, perhaps as a true community center, is or can be attached to it.

B. The shopping area, to determine if it is actually only a local shopping center, or is instead a place of greater functional significance, perhaps equal to Arlington Center or Harvard Square.

C. The major paths, to determine if some are likely to be more important as historic paths, pleasure
roads, or gateways to the Square.

D. The Square itself, to determine whether it is really as it appears visually, as just another activity center, perhaps larger than others and with a slightly greater variety of goods and services placed at the rim of a major traffic interchange, or whether it does or may hold more significance, as a place of culture or celebration; as a meeting place or historic center, or as a major regional center of commerce.
A SUMMARY OF THE SQUARE'S VISUAL ASSETS AND PROBLEMS

IDENTITY

Assets
The Square has a number of form elements upon which to build, including the MDC Park Area, the Charles River, the Town Civic Center, several landmarks and a number of vehicular paths.

Problems
A. Several areas of the Square lack identity which would allow them to become readily identifiable in their own right.
B. Two pairs of vehicular paths lack identity at several points and thus tend to be confused.
C. Many elements possess form weaknesses which prevent them from becoming more vivid.

STRUCTURE

Coherence

Assets
The Square possesses a basic structure which can serve as a primitive orientational reference system.
Problems
A. The basic form of the traffic circle possesses inadequacies which prevent it from being structured clearly without distortion.
B. Other elements of the Square's structure lack positive relationship to the elements which they adjoin.
C. The visual structure is weakened by an absence of smaller scale visual organization.
D. The structure of the Square relates poorly to the areas which lie outside it.

Continuity

Assets
A. The major vehicular paths which enter the Square possess a simple path continuity.
B. The vehicular paths are highly differentiated with a wide range of sequential rhythms.

Problems
A. There is form discontinuity at the traffic circle along every path which passes through it.
B. There is inadequacy of sequential scale.
C. There is a lack of visual connection between major and secondary paths.
D. There are inadequacies in the rhythmic structure.
E. There is a lack of continuity for the pedestrian sequences and those sequences which require transfer from one mode of travel to another.

MEANING

Importance

Assets

There is, in general, a correspondence between the most important visual elements and the most important functional and symbolic elements of the Square.

Problems

A. Unimportant functional elements are visually prominent.
B. Major visual elements are unimportant functionally or symbolically.
C. Visual and functional hierarchies are unrelated.

Formal Fit

Problems

A. There is a lack of fit between visual units and sizes and activity units and sizes.
B. There is a lack of fit between visual type and intensity and circulation type and intensity.

C. There are problems of fit between the visual structure and the activity and circulation structure.
IV. THE RELATION OF THE VISUAL SURVEY AND ANALYSIS TO THE PLANNING PROCESS
The results of the visual survey and evaluation of Watertown Square discussed in the preceding sections are intended not only to be useful as records of the Square's visual strengths and weaknesses but are also intended, more importantly, to be incorporated into the very heart of the planning program as working elements of the planning process, in order to more nearly insure the development of a plan for the square which is not only functionally, economically, or socially successful, but visually successful as well.

The following sections discuss two means of incorporating the visual survey results into the planning process.

THE PROBLEMS OF THE SQUARE USED AS A VISUAL CHECKLIST

The problems of the Square's visual form, as summarized in the preceding section, are those which must be solved if the Square is to be visually successful. Because of their significance, they may be used as a basic checklist for evaluating the visual implications of planning proposals for the Square based on other objectives.
Thus, a preliminary circulation plan being tested for its ability to solve problems of access, traffic flow, or safety, may at the same time be evaluated for its success in solving pertinent visual problems, such as whether smaller scale visual organization is provided for or is possible, or whether the problem of visual discontinuity at the traffic circle is eliminated, lessened, or increased. At the same time, of course, the plan may also be examined for the new visual problems it may have created in attempting to solve other objectives.

As a result of this early exposure to visual form and its problems, it is more likely that the preliminary proposals developed to solve specific planning objectives, prior to the preparation of comprehensive design alternatives, will also be acceptable as solutions serving the interests of visual form as well.

THE PROBLEMS OF THE SQUARE USED TO GENERATE VISUAL FORM PROPOSALS

The visual problems of the Square may also be used to generate preliminary visual design proposals which solve the problems of visual form in the best sense, and are then evaluated for their impact on other parts of the planning program. Based upon their merits, in terms of visual as
well as general planning criteria, the solutions may be either discarded, for any number of reasons, or may be incorporated into the fabric of the development plan: as policies; as solutions to particular problems; and, in some cases, as major concepts upon which the development plan will be organized.

Of course, not all visual problems will be investigated at the outset, since the changes required to gain an adequate solution will be more extensive for some problems than for others. The problem of differentiating North Beacon and Arsenal Streets, for example, can seemingly be solved successfully without major change or impact on the other planning elements, while the problem of visual discontinuity at the Square seems more likely to require basic circulation changes, extensive activity redistribution and greater financial commitment. In Watertown Square, those problems which seem likely to generate the greatest change or require the greatest effort to achieve include:

A. Weak identity of the Charles River, the Commercial area, and the Town Civic Center.
B. Lack of visual structure at the traffic circle.
C. Inadequacies of structure at key points and within key areas.
D. Lack of smaller scale visual organization.
VISIBILITY: CHANGING THE CHARACTER OF THE BOUNDARIES ALONG PLEASANT AND CALIFORNIA STREETS MAKES THE RIVER VISUALLY PROMINENT.
E. Sequential discontinuity at the traffic circle.
F. Lack of overall sequential and visual connection.
G. Lack of continuity for pedestrian and mixed-mode sequences.
H. Lack of fit between visual and functional hierarchies.
I. Lack of fit between visual and functional structure.

These should be considered as first priority problems to be solved in the next stage of the process.

The way in which the development of solutions to the major visual problems of the Square may affect the course of the ultimate design plan can be illustrated by using one problem, that of the Charles Rivers' weak identity as an example. As pointed out in the evaluation, the water has weak identity for three reasons: (1) because it lacks physical and visual connection to the major areas of the Square and therefore does not participate in many major experiences; (2) because it is not seen well or often from the major paths; and (3) because it lacks internal continuity, due to the changes in character it and its boundaries undergo as they pass through the Square.

There are a number of changes which can be made to increase the water's visual importance.
CONTINUITY: EXTENDING THE MDC CHARACTER ALONG CALIFORNIA STREET REINFORCES THE RIVER'S IDENTITY.
A. **Visibility.** It is possible, along Galen, Pleasant, and California Streets, and along Nonantum and Charles River Roads to increase the importance of the water by modifying the roads' embankments and boundary conditions, thus providing visual channels and settings where the water would be highly visible. These actions would require minor changes in the physical environment and would affect the other planning elements very little.

B. **Continuity.** The water's visual importance may also be increased by reinforcing its continuity as it passes through the Square. Here, the two alternatives described, of continuing the MDC park character to the other side of the river and of providing a path of movement which parallels the river consistently, would have broader planning implications. Its acceptance by the MDC, which owns much of the land involved, as well as its effect on the circulation system and on the industrial properties along Pleasant Street would certainly have to be evaluated.

C. **Connection.** A Third possibility for increasing the water's vividness lies in connecting it more strongly to the major activity area and allowing it to participate more fully in the Square's function
Connection: Connecting the activity of the square to the river increases the water's visual and functional importance.
and meaning. An alternative such as the one shown here would have major implications for the Square's physical framework, since it forces important changes on the circulation system and requires extensive relocation of industrial and commercial facilities.

Based on their feasibility, in terms of their actual success in increasing the water's legibility as well as their practicality regarding other planning objectives, the visual alternatives may be used as elements of the design plan in various ways. It is possible, for example, that the proposal to increase visibility may be used directly in the comprehensive plan alternatives as a solution. On the other hand, proposals for increasing the water's connection to the Square may be reformulated as a primary visual objective (i.e., to develop the Charles River as an integral visual and functional part of the Square's major activity areas) to be used in preparing and evaluating subsequent comprehensive plan alternatives.
V. CONCLUSIONS
The purpose of this thesis has been to survey and evaluate the visual form of an existing environment as it is likely to be experienced and remembered by those who use it, and to suggest ways in which the results of such a study might be of use in a real planning program. The direction of the thesis, both during survey and evaluation, has been guided by three aspects of visual form which are believed crucial: that the visual elements be identifiable; that they be well-structured, both as a mental picture and as a sequential pattern of experience; and that they be meaningful, related to the realities, as well as the goals and aspirations, of the community.

The survey method developed in the course of this study was meant to be a representative, comprehensive, and economical way of experiencing, recording, and describing the Square's visual form. It was not meant to be a completely detailed study of the Square's existing form but rather one which included those elements most useful to an evaluation of the environment at a general level.

The survey method was conceived originally as being most useful when applied to an existing environment in which rehabilitation and modification, rather than clearance
and redevelopment, was anticipated. In this kind of situation, description of all major roads and existing development was justified and appropriate. Professional experience with this method, however, done within the time span of this thesis, has also shown its usefulness in an area where substantial clearance and redevelopment does take place.

In this particular situation, an urban renewal project in a small Maine community, the method was modified so as to concentrate on surveying and recording those visual problems and opportunities of all roads and development adjacent to the site, while confining surveys of the site itself to only those features which might represent opportunities, such as proximity to the water or prominent visual location. Although much more limited in scope than the study of Watertown Square, this method still provided a quick and efficient way of gaining an understanding of the existing environment, and was clearly instrumental in achieving a more well-structured, meaningful fit between old and new in the proposed urban renewal plan.

An important limitation of the survey has been its parochialism. Although professing to be a survey of the environment as it is likely to be experienced and remembered by those who use it, the study so far reflects only the
way in which the Square is experienced and remembered by a very special observer, trained in the art of seeing the visual environment in a highly sensitive, but nevertheless biased, way. This limitation could be overcome to a great extent by the use of an interview technique, which would supply the designer with valuable information about the public's interpretation of the environment's visual form. This limitation could also be lessened to some extent through greater understanding by the designer of the ways in which the elements of the perceptual world are organized and the ways in which they affect human behavior. This knowledge could then be used by the designer in the process as an enlightened clairvoyance related to the public's probable reactions to proposed development plans.

Even with this limitation, and perhaps others, a study which surveys, records, analyzes and makes conclusions about an environment's visual form, when carried out in the context of a real planning program serves a number of valuable purposes.

For the designer, the process enables him to gain a better understanding of the visual environment in an efficient, systematic way. The process of surveying and recording information and the intellectual effort required to analyze this data immediately raises his level of
criticism to a higher plane, and helps him come to grips with the major problems of design without that loss in complexity which so often accompanies designers' assessments of the environment. Beyond this, the text serves as a checklist of the environment's main visual problems and assets, which can be used to review and keep in mind the important visual considerations as design progresses.

For the client, the study has two purposes. On the one hand, it serves as a general survey document similar to other planning studies of land use, circulation, etc., that describes and evaluates a particularly important aspect of the environment. On the other hand, it acts as an educational tool which involves the client in thinking about visual form at an early stage of the planning process, develops his awareness of, and sensitivity towards, the visual environment as the planning progresses, and leads finally to his acceptance of only those plans which possess successful visual form and his rejection of those which do not.

For the general planner, finally, this study serves to explain and illustrate the more important aspects of the visual environment, beyond the overworked notion of visual form as nothing more than aesthetics; serves to illustrate the way in which the visual form of a place may
be described and evaluated and the conclusions made use of in a real planning situation; and, hopefully, emphasizes the necessity of conducting visual studies with at least this level of completeness, in every planning program which deals directly with changing the physical structure of the environment, as a prerequisite to achieving more successful visual, as well as general planning, designs.
VI. POSTSCRIPT
As a result of discussing the content of this study with the jury members as well as with others interested in the work presented here, a few final comments about the nature of the thesis and the ways in which it might be improved are in order.

Firstly, it should be emphasized that this study does represent a comprehensive survey and evaluation of the Square's visual form judged in terms of three criteria: identity, structure, and meaning. It does not, however, represent a comprehensive survey of the way in which people conceive of the Square and its parts, since such conceptions are a combination of visual form and developed meanings. Thus while the survey drawings and much of the evaluation represents a comprehensive picture of the Square based on perceptual data, more studies and research would be needed in order to understand more completely the meanings which the Square possesses for those who use it, developed through association, familiarity, and personal experience.
Secondly, there is the strong desire that this study be understandable to the widest possible audience, since it is intended not only as a technical study but as a useful tool and an educational aid. Throughout the writing of the thesis, constant effort was made to simplify language and to present material clearly. While this final version is considerably better than earlier drafts, improvements could still be made. These include: (a) the use of sketches and diagrams to illustrate points of criticism, since these graphic aids seem to make the criticism more meaningful; (b) the elimination of those drawings which do not tell very much of a story, such as the spatial summary drawing (D-12) and the increased use of those drawings which do provide significant information, such as the drawing of visual character (D-15); (C) the introduction of an improved method of keying all drawings and photographs to the Square itself, in order to improve their usefulness.

Thirdly, design, mentioned earlier (p. 13) as a part of the evaluative process should be re-emphasized here because of its importance in allowing deeper and more telling criticism to be made. The importance of design was made particularly vivid in my experience since I was involved with the design of a project similar in program and size to Watertown Square concurrently with the development of the thesis. This involvement with the process of
design gave me new insights into the problems of visual form which already existed in the Square, and enabled me to define the criteria more clearly and perceive the Square's problems more perceptively.

Lastly mention was made in the thesis of those visual problems which might be reasonably investigated first, based upon the extent of change they might be expected to create (p. 53). It is also possible that one might choose to tackle those problems which are most acute from a visual standpoint alone. In the case of Watertown Square these would include the weak identity of the river, the inadequacies of form at the traffic circle, the lack of smaller scale visual organization, and the lack of continuity for pedestrian and mixed-mode sequences. In reality, an approach to solving the Square's visual problems might include both alternatives.
BIBLIOGRAPHY
