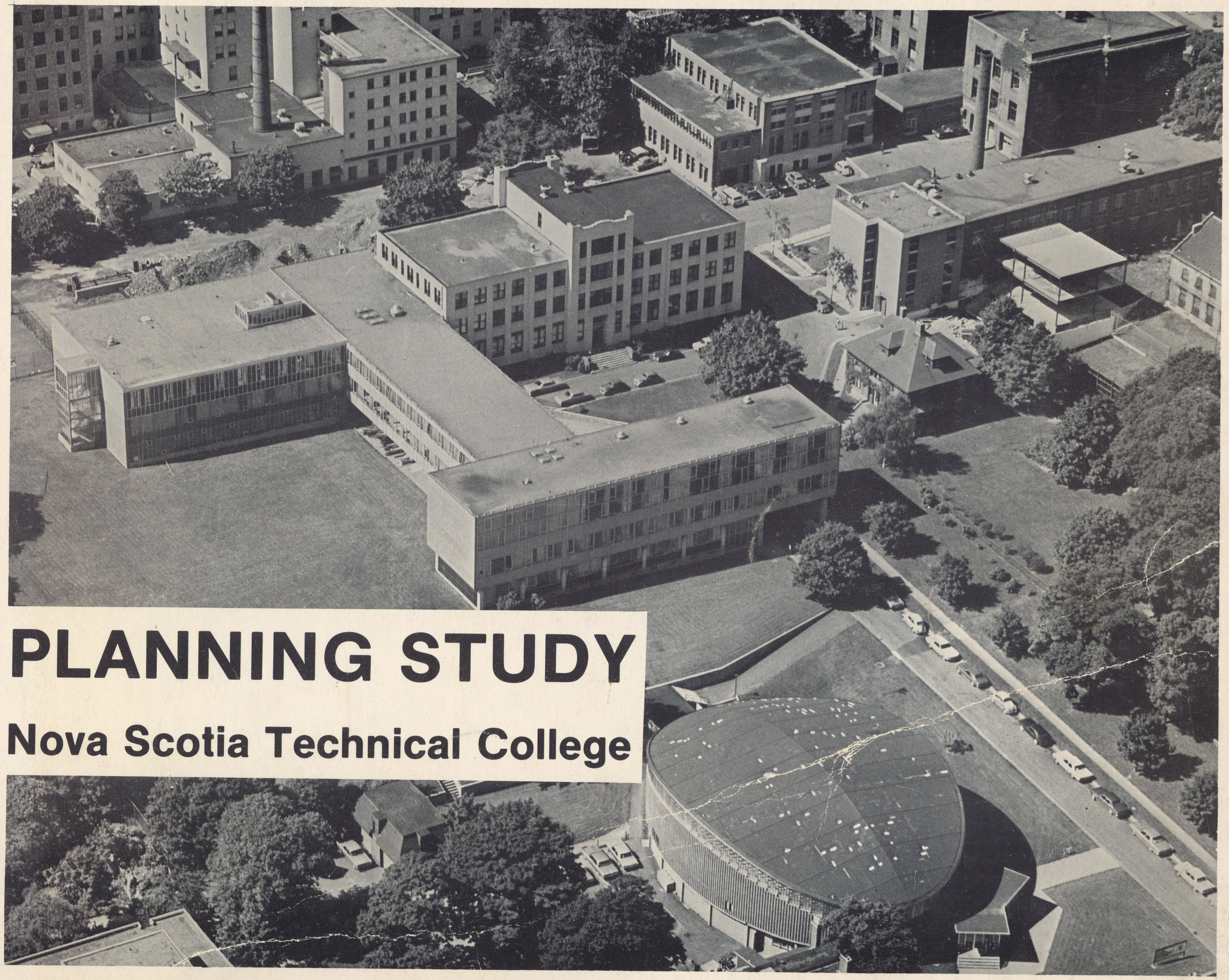
CAMPUS PLANNING STUDY

Nova Scotia Technical College



by: SAFEI HAMED
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for: NOVA SCOTIA TECHNICAL COLLEGE
Halifax · Nova Scotia

OCTOBER '78

CAMPUS PLANNING STUDY

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March 20, 1979

Professor A. E. Creelman, P.Eng.
Director
Physical Plant and Technical Services
Nova Scotia Technical College
HALIFAX, Nova Scotia

Dear Professor Creelman:

I take pleasure in forwarding herewith the final report on our work of "Campus Planning Study" for Nova Scotia Technical College, as authorized July 31, 1978.

The terms of reference for this study specified certain elements in its content:

1. Preparation of a base map of the campus containing information on all elements related to outdoor spaces and urban planning aspects.

2. Preparation and presentation to the President of Nova Scotia Technical College and his assistants, of a preliminary position paper showing conceptual schemes.

3. Evaluation of the alternative concepts and refining of the landscape plan selected for development.

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In order to respond to these specifics we felt that we must look at the area surrounding the campus as a total landscape and as whole urban fabric.

The unique location of Nova Scotia Tech has produced a complex interaction between different users and this campus.

This holistic approach cast the light on some necessary directions to be recommended for the "Campus Development Plan". These directions can be summarized in the following:

-Educational and research uses should continue to dominate the campus. This seems to justify an expansion of the college's boundaries, and to require more carefully structural management. Academic uses must focus on the conservation of the resources they are currently employing.

-Recreational uses, primarily for the campus community, should continue in a hopefully symbiotic relationship with academic uses. Questions of convenience and access, for the non-campus public and problems of security in the campus, remain to be worked out within further studies.

-Educational and research uses cannot expand much beyond their current areas, except in the few infill sites recommended in the "Growth Direction Study".

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However, a careful examination of buildings underutilized should precede any proposal for filling these vacant sites with new building. Most likely, more economical solutions could be obtained through building renovation and recycling.

In any case, anything proposed should be subjected to an intensive environmental design study, in terms of its visual impact on the campus landscape from within and without.

The larger question, which is central in these recommendations, is that whoever uses this campus, for whatever purposes, in whatever part of it, and whoever looks at or into this campus from outside, or passes through it, all are experiencing it as a total urban landscape structure, a total people/environment artifact. Its impact on all of these experiences, visually and through the other senses, is one of its primary functions. Therefore, we have viewed the campus as a potential work of landscape art, including and transcending all of its multiple technical, functional and cultural aspects. We believe that this comprehensive view will enhance relations between all of its component aspects, and improve each one.

I would like to acknowledge substantial help and cooperation in the preparation of this report from yourself, and members of your office. I am also grateful for the response, criticism and comments by many of my students and colleagues on the early outline and drafts.

Last, but not least, I wish to express my appreciation to J. Claire Callaghan, President of Nova Scotia Technical College whose vision and encouragement has made the preparation of this study a pleasure and a possibility.

Yours very truly

SAFY Hamed

Safei Hamed, MRAIC, CSLA

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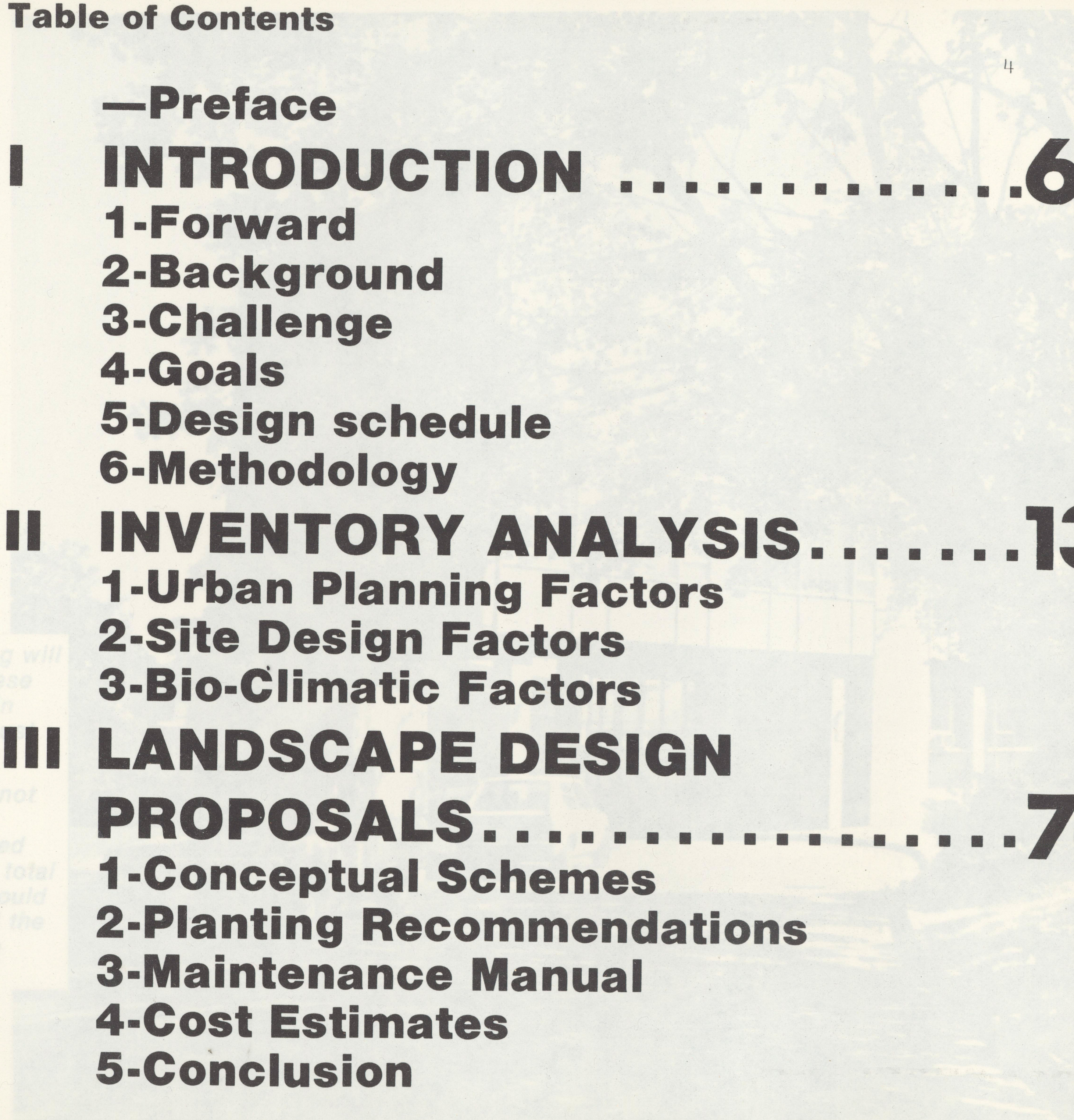

Preface

"Chances are remote that a solution to campus planning will spring totally from insight, intuition and inspiration. These qualities may be present and happily at work, however in most instances considerable preliminary groundwork must be done to gather and evaluate the necessary data.

Landscape planning, one can learn from observation is not achieved problem by problem or side by side. Masterly planning examines each project in the light of an inspired and inspiring vision, solves each problem as a part of a total and compelling concept, which, upon consideration, should be self evident to the planner. Stated simply, the aim of the planner is to create for mankind a better environment, a better way of life."

1-Forward

This study reflects a prototypical planning process for campus development. It deals with a thirteen acre campus, located in the heart of the City of Halifax, the provincial capital of Nova Scotia. The City has a population of approximately 123,000 part of a metropolitan region containing approximately 230,000 people. Nova Scotia Technical College is the only institution within the City's five-college university system offering a final two year program towards a degree in Engineering, providing graduate and undergraduate studies in Architecture, as well as graduate studies in Engineering and Planning.

The downtown location of Nova Scotia Technical College creates a unique, interactive setting for urban studies in what is becoming one of the greatest population centres of Atlantic Canada, and fastest-growing metropolitan areas in the region. Development of this campus within such an urban context should look to the tradition set by great continental universities such as Zurich and Berlin rather than the Oxford-Cambridge concept of rural isolation for a primarily resident student body.

A clear understanding of the problems and potentials of this campus is a necessary prerequisite for future development, therefore, this report includes a complete environmental analysis, criteria for determining development limitations, and a procedure for evolving and selecting a Development Campus Plan. Organization of the report reflects the sequence in which the study was conducted.

1-Forward

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2-Background

Recent studies have shown that university education in North America and Europe has moved away from a more purely academic environment, towards vocationalism serving the needs of industry and bureaucracy. The urban setting of Nova Scotia Tech. facilitates student contacts with commerce and industry on a daily basis, as well as making it possible to those students who do not desire, nor can afford, to "go away" to college, due to job, family or other commitments, to still take advantage of the education services provided.

The strong trend of higher education, developing in response to the growth of professional, managerial, and technical occupations, is in harmony with the origin of the college.

> "At a meeting held in the spring of 1906, attended by representatives of Acadia, Dalhousie, Kings College and Mount Allison Universities, as well as the Halifax Board of Trade and the Mining Society of Nova Scotia, it was agreed that a new institution should be established to provide professional courses leading to the Bachelor's degree in the different departments of engineering. Under the agreement, the established universities would offer a uniform course in engineering science covering the first two years, while the Nova Scotia Technical College would provide the professional courses during the last two years".

3-Challenge

i) MENTAL INTEGRATION:

Surveys of many universities across North America indicate that future campus developments will rely equally upon a state of mind and a school of thought directed towards integration and involvement of the community with the college as upon the physical intermeshing.

ii) FLEXIBILITY:

In the past decade, the reactionary swing from engineering and applied sciences, products of the post-war technological thrust, to the liberal arts has left many establishments with buildings unadaptable to other uses. Education is a reflection of social needs. As society evolves, so must the instructional methods, materials and the buildings in which they are accommodated. Therefore, the key to future campus planning of Nova Scotia Tech should be flexibility.

iii) EDURECREATION:

The construction of building envelopes is a necessity. Of similar importance is the environment as a whole in which students and faculty spend much of their time moving between buildings, eating lunches, and making acquaintances. Social and cultural activities are not separate entities from the educational process. In many parts of the world, the university campus is not only an indoor and outdoor laboratory for intellectual advancement, but a harmonious blend of education, recreation and culture.

Research conducted on several campuses has identified three distinct student groups with varying goals to be fulfilled through education:
1) job preparation;
2) intellectual and cultural advancement; and
3) social, athletic and educational satisfaction.

Provision of physical facilities for each group is a duty of the University. Underestimating any of these needs would be a grave mistake and overestimating it would be wasteful as well.

iv) ENERGY CONSERVATION:

The major challenges confronting the campus designers (i.e. planners, landscape architects, architects and engineers) are twofold:
1) how to design, or participate in designing of environment that maximizes efficient use of energy resources; and
2) how to promote a quality environment for human benefit and ecological balance.

Nova Scotia Tech is leading the way in the field of energy conservation through its newly-established centre for energy studies. The campus plan must reflect successful solutions to energy conservation research in the urban environment. This can only be achieved through a comprehensive design approach based on site characteristics specific to this campus. General patterns of organization, growth and flexibility, external environment, circulation and communication patterns, architectural and open space design, social and psychological considerations, must all be taken into account simultaneously with energy conservation constraints.

4-Goals

For a highly sensitive site like Nova Scotia Technical College campus, all parties involved were in agreement that certain objectives should be set in advance for the preparation of this Campus Planning Study. Those objective are:

a) Development of a long range master plan unique to the site by drawing upon the character of existing buildings and outdoor spaces to remedy an obvious deficiency in the existing campus environment.

b) Preparation of a master plan adaptable to future demands while facilitating an orderly progression of growth within existing budgetary constraints.

c) Provision of sufficient space for the various campus activities and proper activity relationships.

d) Creation of an efficient circulation system to serve the different types of movement required on campus, yet emphasizing a pedestrian oriented concept. This can be enriched through the provision of a sequence of diversified open spaces, intimate arrangements of art work and harmonious outdoor furniture schemes.

e) The development of the campus must be highly practical, functional, and economical in its internal design, yet its external appearance must incorporate the best of traditional heritage of Nova Scotia.

f) Preservation, reinforcement and improvement of existing resources and unique features.

g) Utilization of all existing visual amenities and establishing a structured aesthetic unity.

5-Design schedule

As is to be expected, landscape design solutions reflect the characteristics of inputs analyzed towards solution. Therefore, the campus planning process has been aimed to coordinate land inventory analysis whereby environmental characteristics and unfulfilled needs of the campus can be determined. Consequently, through graphic evaluation, suitable development areas and activity patterns are proposed in the conceptual schemes.

6-Methodology

In the inventory phase, relevant physical data was surveyed and recorded. Specifically, the natural environment, characteristics of the land relating to use, visual and spatial form, outdoor spaces and exact building configurations were identified as being relevant to the site planning process.

The inventory analysis series provides a graphic interpretation of existing campus characteristics. The evaluation of inventory data identifies opportunity and constraint zones in the campus. This series has been prepared in such a manner that the character of the existing campus could be read at a glance, allowing the designer to recognize area suited for certain requirements and others which require modifications and/or development.

1-Urban Planning Factors

i) LAND USE:

In January 1978 the City issued a proposal for the first Municipal Development Plan in the history of Halifax. The proposed document adopted a set of objectives related to the various land uses in the urban fabric. It sets forth a city-wide objective in relation to institutional use and also declares a statement of policies with respect to present and future institutional land use. The fourth objective states:

"The enhancement of employment opportunities by encouraging existing and potential institutional uses in appropriate location".

The achievement of this objective is translated through the adoption of the following policies:

"<u>Policy 4.1</u> - Unless clearly inappropriate for the good development of the City, existing regional and city-wide institutional facilities shall be encouraged to remain in their present locations and efforts shall be made to protect, maintain and upgrade them.

<u>Policy 4.2</u> - Institutional development shall be encouraged within specific areas. The City shall develop standards and boundaries which will protect neighbouring areas, especially residential areas, from encroachment and nuisance effects.

<u>Policy 4.2.1</u> - These standards and boundaries shall be formulated whenever appropriate through the detailed area planning process.

<u>Policy 4.3</u> - The City shall encourage institutional development of a major nature in those areas designated. Pursuant to Policy 4.2.1 where such areas fall within the bounds of a designated area for detailed planning, the City shall resolve the exact nature of the desired land use pattern through the detailed area planning process".

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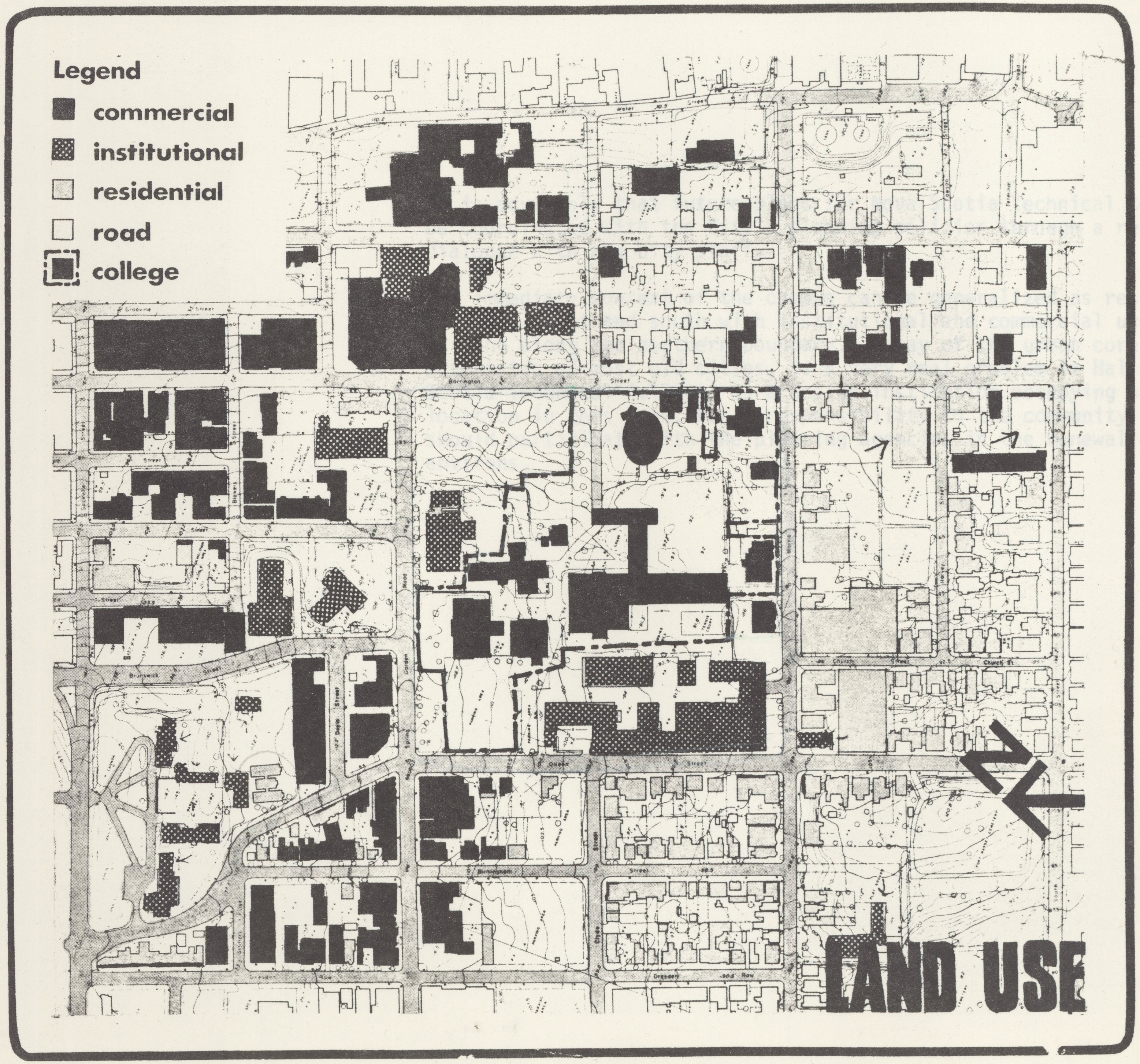

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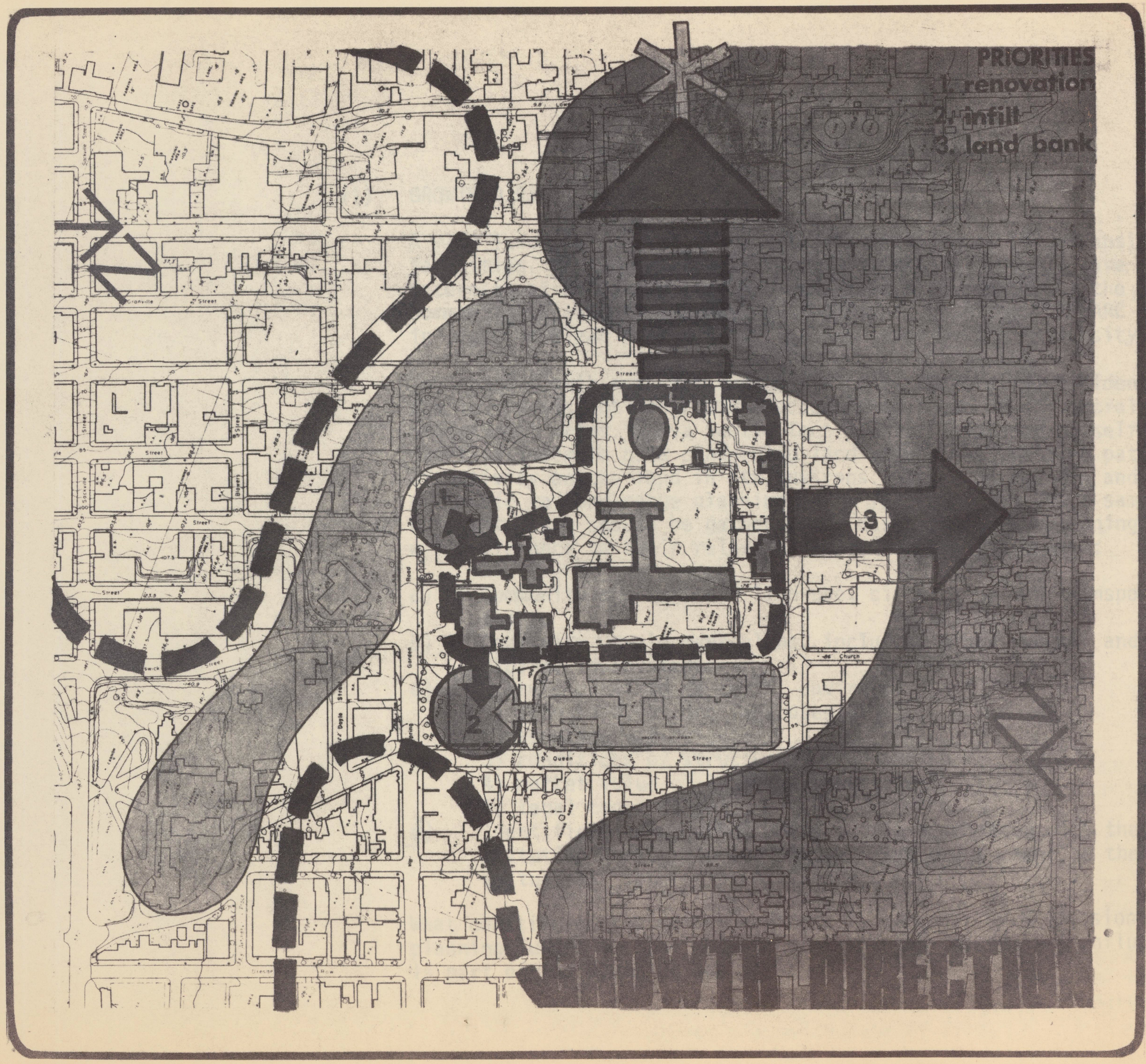
It is advisable that future plans for Nova Scotia Technical College be coordinated with the City's planning policies through a regular dialogue with the City staff.

The immediate context of the campus can be generalized as residential to the east, west and south with institutional and commercial use prevailing along the northern boundary. Decay of the urban core, a characteristic of most old cities, is a very real problem in Halifax. Nova Scotia Technical College, as a design institution occupying a keystone location in this core, has a responsibility to the community. It should participate with the planning agencies in the renewal of these environs.



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1"=200'

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ii) GROWTH DIRECTION:

A main issue facing the College is its requirement for expansion of facilities. It is inevitable that this institution will have legitimate interests at cross-purposes with the articulated needs of the surrounding community as expansion pressures increase. With the TECHMARC project in sight, a clear position must be developed by the University.

The three growth axis are suggestive only. Generally, residential fronts are less resistant to growth pressure than those of commercial or institutional areas. Nova Scotia Tech must at least out of self interest start to assemble data concerning land values and changing patterns of activity on the land in its environs. These barometers and indices are basic to long-range planning. The following list is a sample of materials that should be gathered and assessed in the planning period, with reference to their relationship to campus development:

a) Community and regional land use, circulation and transportation plans;
b) Community development plans, including urban renewal and capital improvements:
c) Matters relating to campus environs:
   1) land holdings and land uses;
   2) assessed valuations;
   3) conditions of structures;
   4) market value of land and structures;
   5) legal codes on land.
d) Identification of areas where people associated with the institution work, shop and live. These areas comprise the institutions "spheres of influence".

What constitutes the campus environs is a matter of professional planning judgment. The determination of the "spheres of influence" is part of the planning analysis.

iii) ZONING:

The whole campus is zoned as "P Zone" which means Park and Institutional Zone. The zoning by-laws of the City of Halifax states under this type:

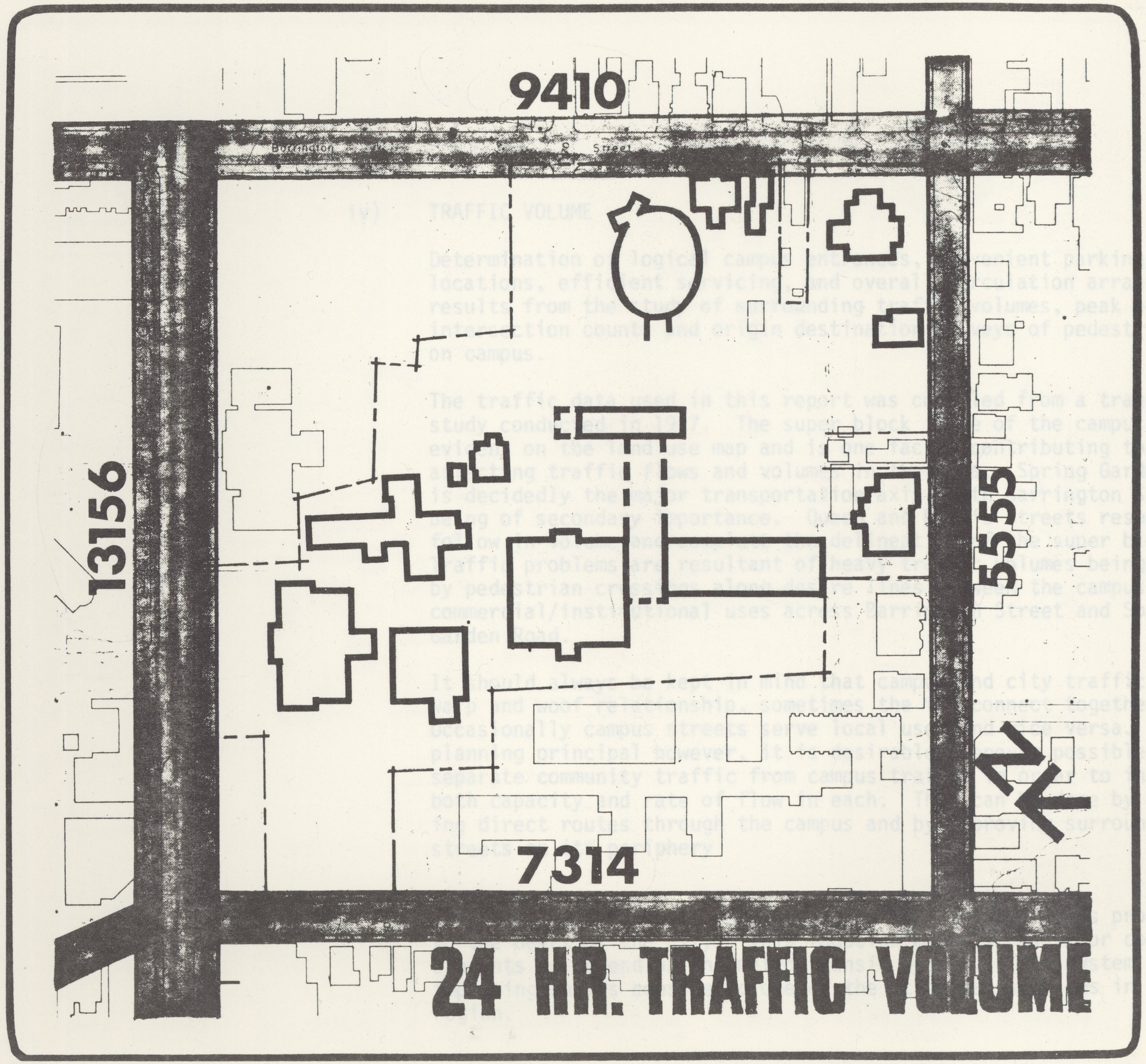
1) No person shall in any P Zone, erect, alter or use any building in whole or in part, or use any land for any purpose other than one or more of the following uses:
   (a) Public Park
   (b) Recreation field, sport club, public hall, and other community purposes.
   (c) Cemetery
   (d) Hospital, school, university, monastery, church, library, or other institution of a similar type, either public or private
   (e) Uses accessory to any of the above uses.
2) Notwithstanding Section 1, one of each of the following uses for each degree granting university may be located on land owned or leased from such degree granting university:
   (a) barber shop
   (b) bank
   (c) news stand
   (d) coin operated vending machines
   (e) dry cleaning distribution station
   (f) beauty parlour
   (g) book store and branch thereof provided that:
      (i) these uses shall be for the exclusive use of the students and staff of such university or their guests,
      (ii) there shall be no advertising or identification of the use on the outside of the building,
      (iii) there shall be no visible indication from the exterior of the building to any of the commercial uses described in this Section are carried on,
      (iv) there shall be no direct access from the exterior of the building to any of the commercial uses described in this Section other than emergency access places in case of fire,

(v) each lease or other document permitting occupancy for any of the uses (a) to (g) shall state the provisions (i) to (iv) hereof, and copies shall be filed with the Building Inspector of the City of Halifax. No occupancy permit shall be issued by the Building Inspector until the provisions of this Section have been compiled with and

(vi) the total net floor area measured in square feet covered the uses (a) to (f) in this Section for each university shall not exceed the number of students registered for degree purposes at such university multiplied by a factor of 1.5.

3) No person shall in any P Zone erect, place or display any bill board of sign except those permitted in an R-1 zone.

4) Basic heights are restricted by the viewplane by-law.



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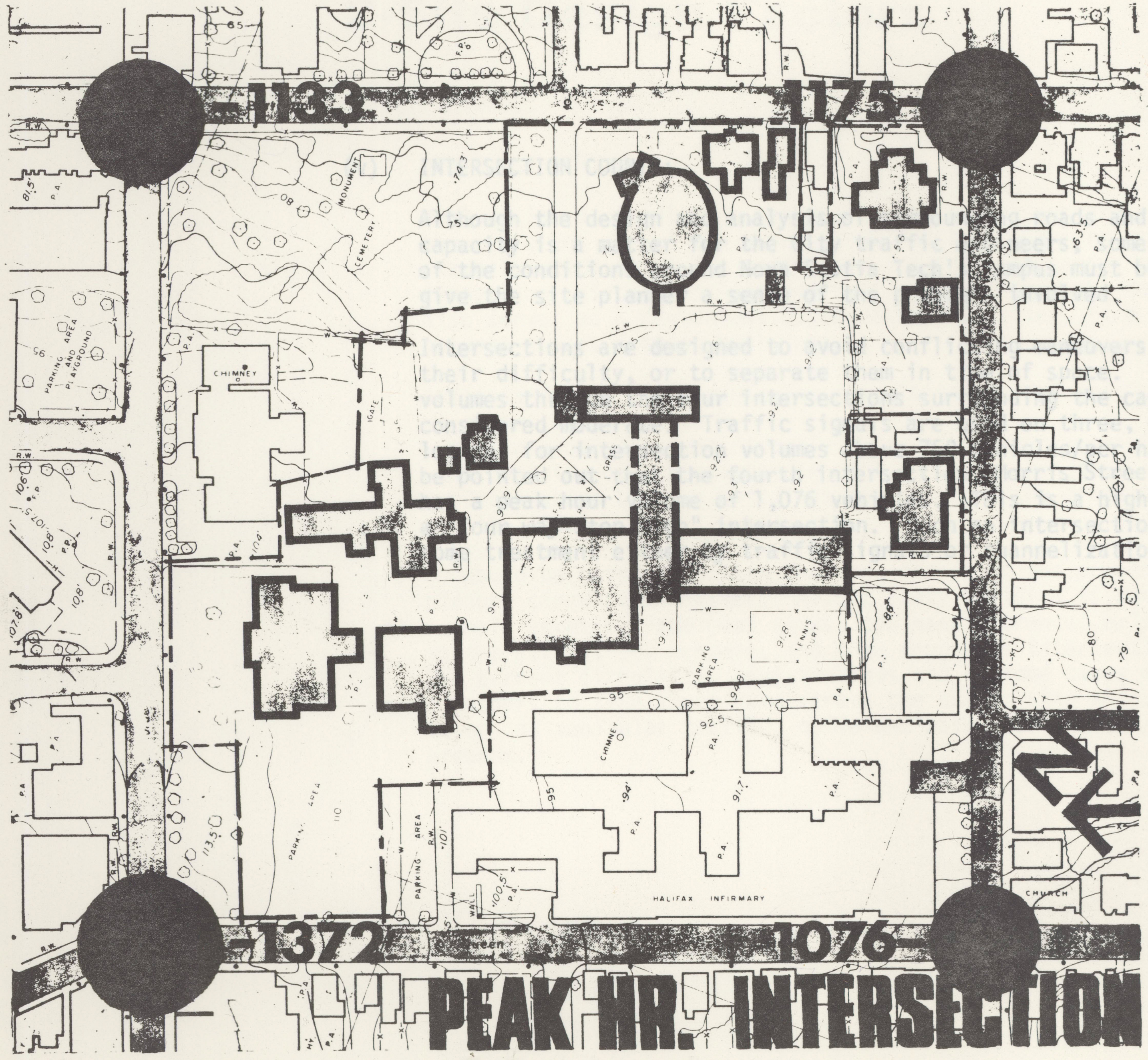
iv) TRAFFIC VOLUME

Determination of logical campus entrances, convenient parking locations, efficient servicing, and overall circulation arrangement results from the study of surrounding traffic volumes, peak hour intersection counts and origin destination surveys of pedestrians on campus.

The traffic data used in this report was compiled from a transportation study conducted in 1977. The super block image of the campus is especially evident on the land use map and is one factor contributing to and affecting traffic flows and volumes in the area. Spring Garden Road is decidedly the major transportation axis, with Barrington Street being of secondary importance. Queen and Morris Streets respectively follow in volume and complete the delineation of the super block. Traffic problems are resultant of heavy traffic volumes being augmented by pedestrian crossings along desire lines between the campus and commercial/institutional uses across Barrington Street and Spring Garden Road.

It should always be kept in mind that campus and city traffic have a warp and woof relationship, sometimes the two connect together. Occasionally campus streets serve local uses and vice versa. As a planning principal however, it is desirable whenever possible to separate community traffic from campus traffic in order to increase both capacity and rate of flow in each. This can be done by eliminating direct routes through the campus and by improving surrounding streets on its periphery

Another important asset of Nova Scotia Tech's site is its proximity to the heart of the city. This location makes it easy for commuting students to depend on the metro transit system. This system is steadily improving and is considered one of the strongest services in this region.



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(v) INTERSECTION COUNTS:

Although the design and analysis of surrounding roads and intersection capacity is a matter for the City traffic engineers, some mention of the conditions around Nova Scotia Tech's campus must be made to give the site planner a sense of the problems involved.

Intersections are designed to avoid conflicting maneuvers, to moderate their difficulty, or to separate them in time of space. The traffic volumes through the four intersections surrounding the campus are considered moderate. Traffic signals are used on three, which seems logical for intersection volumes above 750 vehicles/per hour. It should be pointed out that the fourth intersection, Morris Street and Queen Street has a peak hour volume of 1,076 vehicles. This is a high figure for a "four way stop sign" intersection. Such an intersection will require some treatment either by traffic signals or channelization.

2-Site Design Factors

i) VEHICULAR CIRCULATION

Well designed circulation systems inside the campus are essential to the efficient use of the site. Practically, campus roads are the channels which carry the traffic to and from the campus gateways, connecting points of origin and destination inside the campus. They also serve as a convenient easements for utilties, fire breaks, and as open spaces between buildings.

Criteria for an ideal vehicular circulation system are:
-a clear, simple pattern
-functions being served directly through the most accessible route
-the creation of a hierarchy in pattern that strengthens functional relationships between buildings and enhances the perceptual form of the site.

It would be untrue to claim that the campus at the present time has a planned circulation system. Almost every building is surrounded with asphalt pavement from most sides, too many entrances exist intruding on the city street network, and some dangerous intersections occur. The current circulation layout allows and in some cases encourages, outsiders to take short cuts across the campus site which adds to volume of vehicular traffic, noise and pollution within the college grounds.

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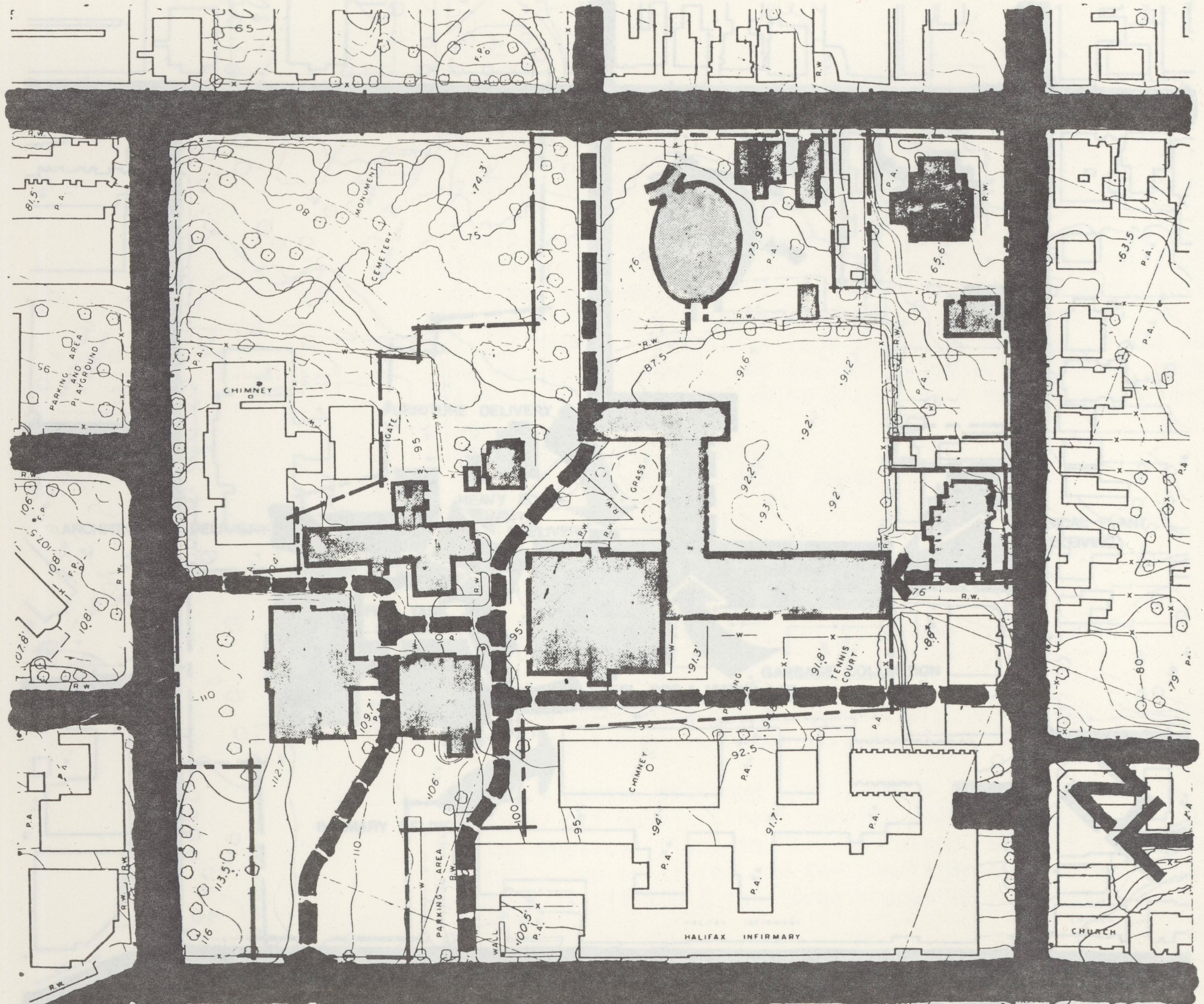
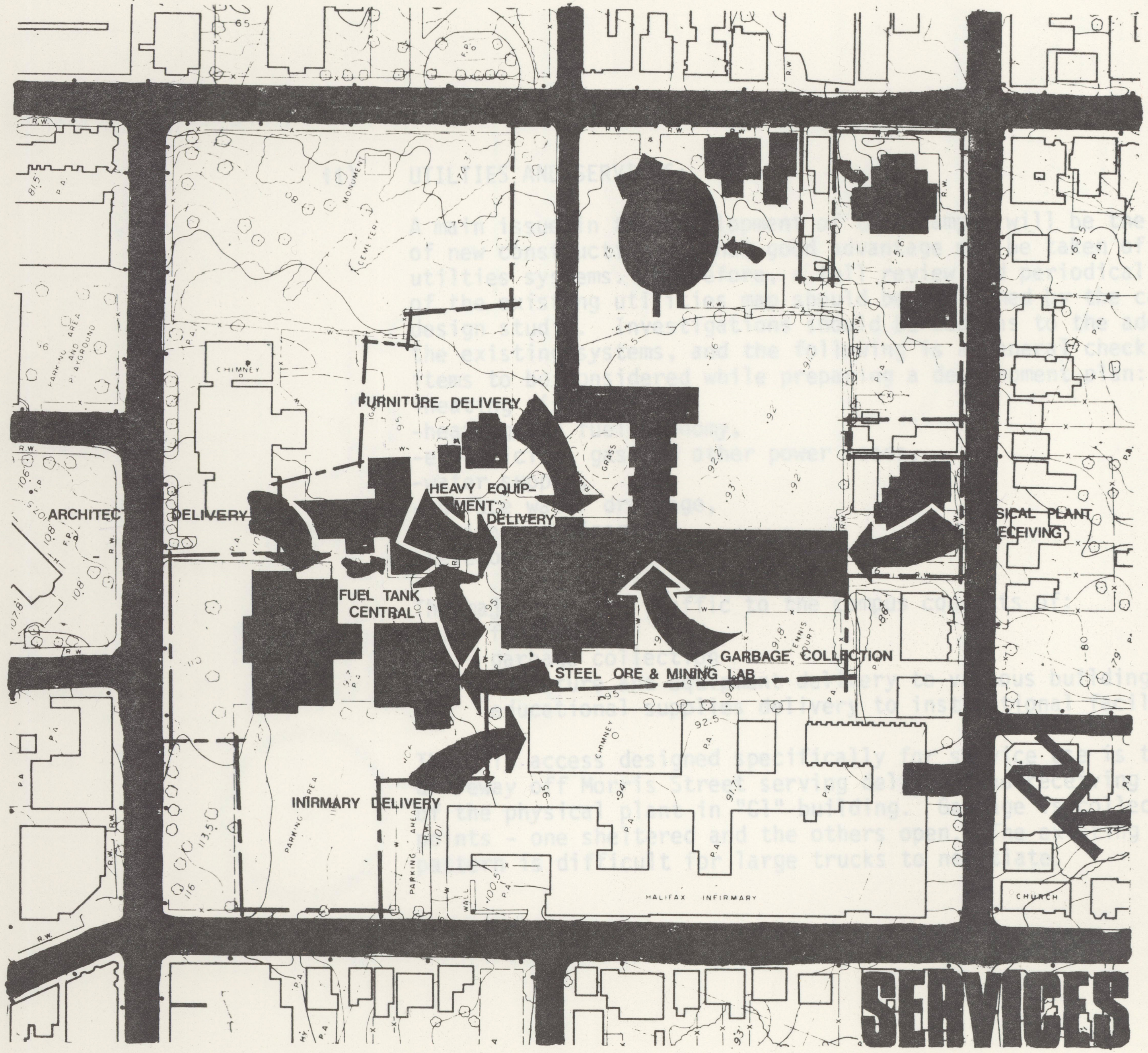


VEHICULAR ROUTES



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ii) UTILTIES AND SERVICES:

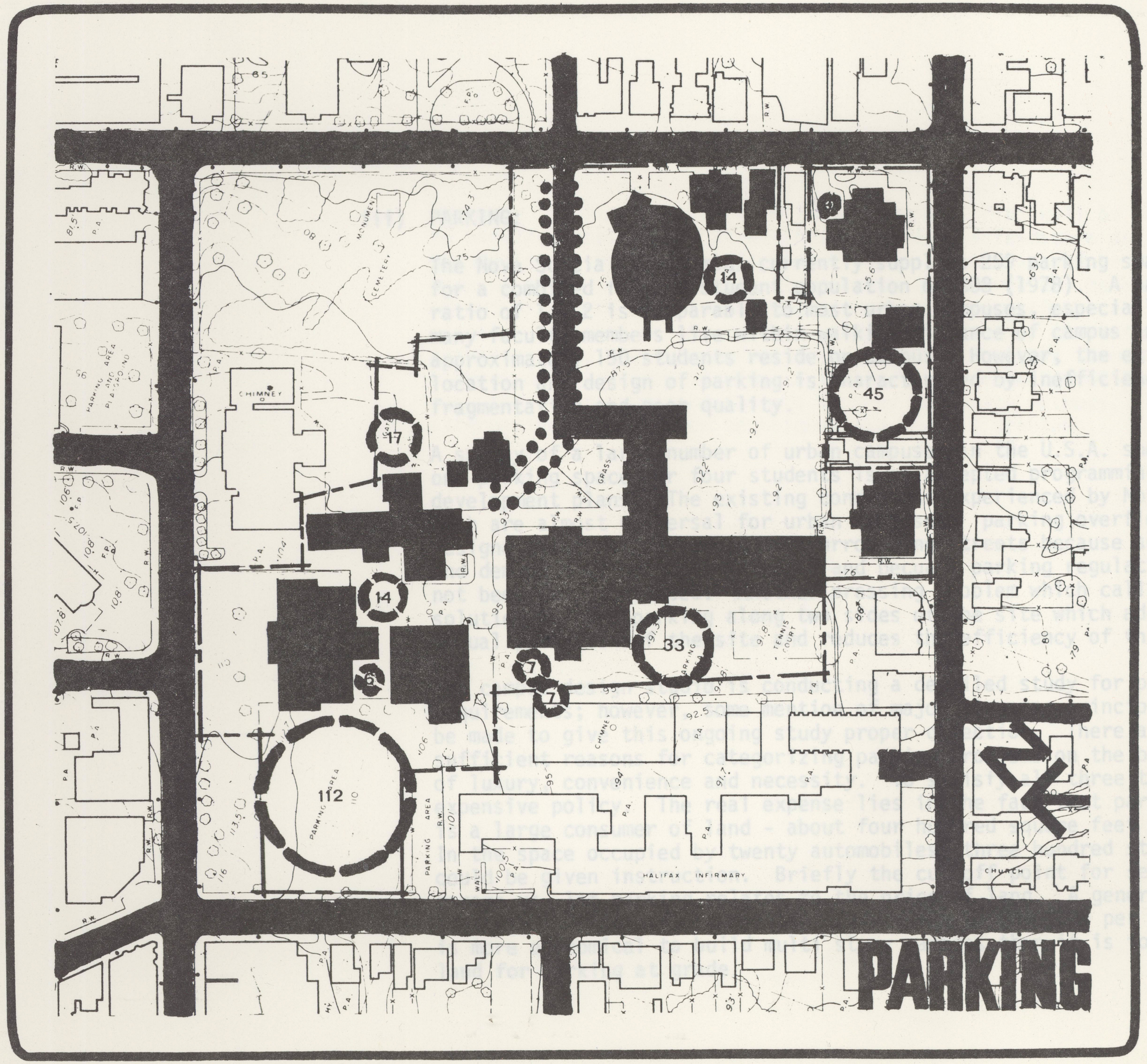
A main issue in the development of this campus will be the coordination of new construction so that good advantage may be taken of existing utilties systems. Therefore, a full review and periodical up-dating of the existing utilities map should be performed by the campus design studio. Investigations should be made as to the adequacy of the existing systems, and the following is a general checklist of items to be considered while preparing a development plan:

-heating distribution,
-heating and fuel economy,
-electricity, gas and other power needs,
-water supply,
-surface water drainage,
-sanitary drainage,
-telecommunication needs.

The major service traffic to the campus consists of:

(1) fuel supply
(2) garbage collection
(3) furniture and equipment delivery to various buildings
(4) educational supplies delivery to instructional facilities.

The only access designed specifically for service use is the southern driveway off Morris Street serving delivery and receiving requirements of the physical plant in "C1" building. Garbage is collected at four points - one sheltered and the others open. The existing circulation pattern is difficult for large trucks to negotiate.



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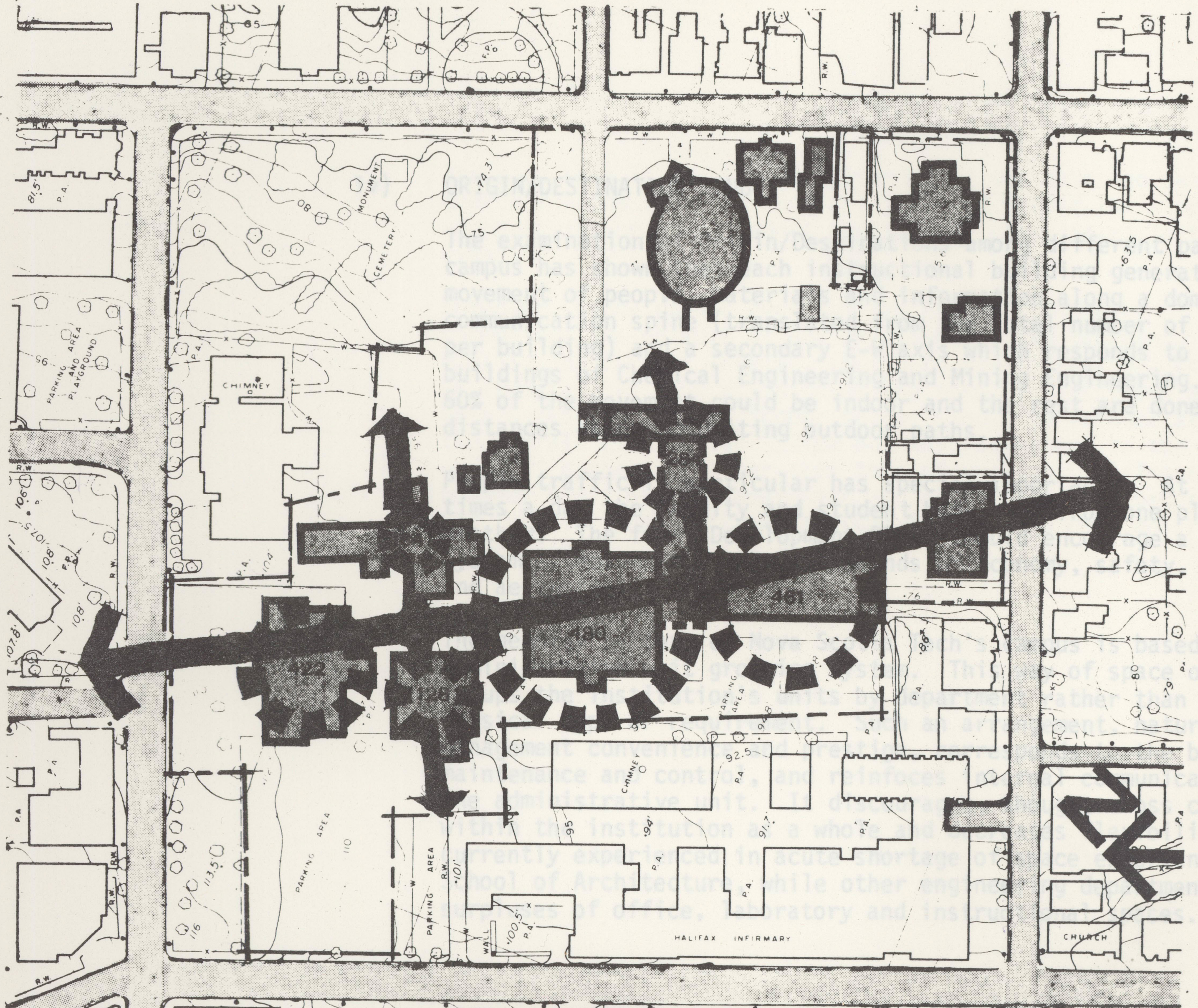
iii) PARKING:

The Nova Scotia Tech campus currently supplies 259 parking spaces for a combined faculty/student population of 808 (1978). A parking ratio of 1:3.2 is comparable to most urban campuses, especially when many faculty members live within walking distance of campus and approximately 150 students reside on campus. However, the existing location and design of parking is characterized by inefficiency, fragmentation and poor quality.

A survey of a large number of urban campuses in the U.S.A. shows that one parking space per four students is an accepted programming norm for development plans. The existing conditions experienced by Nova Scotia Tech are almost universal for urban campuses: parking overflows, designated spaces on campus and surrounding streets because supply and demand have not been balanced and becuase parking regulations have not been fully enforced. Another pressing problem which calls for solution is curb parking along two sides of the site which adds to visual pollution of the site and reduces the efficiency of the street.

The campus design studio is conducting a detailed study for parking requirements; however, some mention of major planning principles must be made to give this ongoing study proper direction. There are sufficient reasons for categorizing parking problems on the basis of luxury, convenience and necessity. To satisfy all three types is an expensive policy. The real expense lies in the fact that parking is a large consumer of land - about four hundred square feet per user. In the space occupied by twenty automobiles, three hundred students could be given instruction. Briefly the cut off point for selecting garage vs. lot parking relates to the price of land. A general rule of thumb is that when land values have risen to $150,000 per acre, it is more economical to build multi story garages than it is to acquire land for parking at grade.



EMPLOYEES & STUDENTS

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iv) ORIGIN/DESTINATION STUDY:

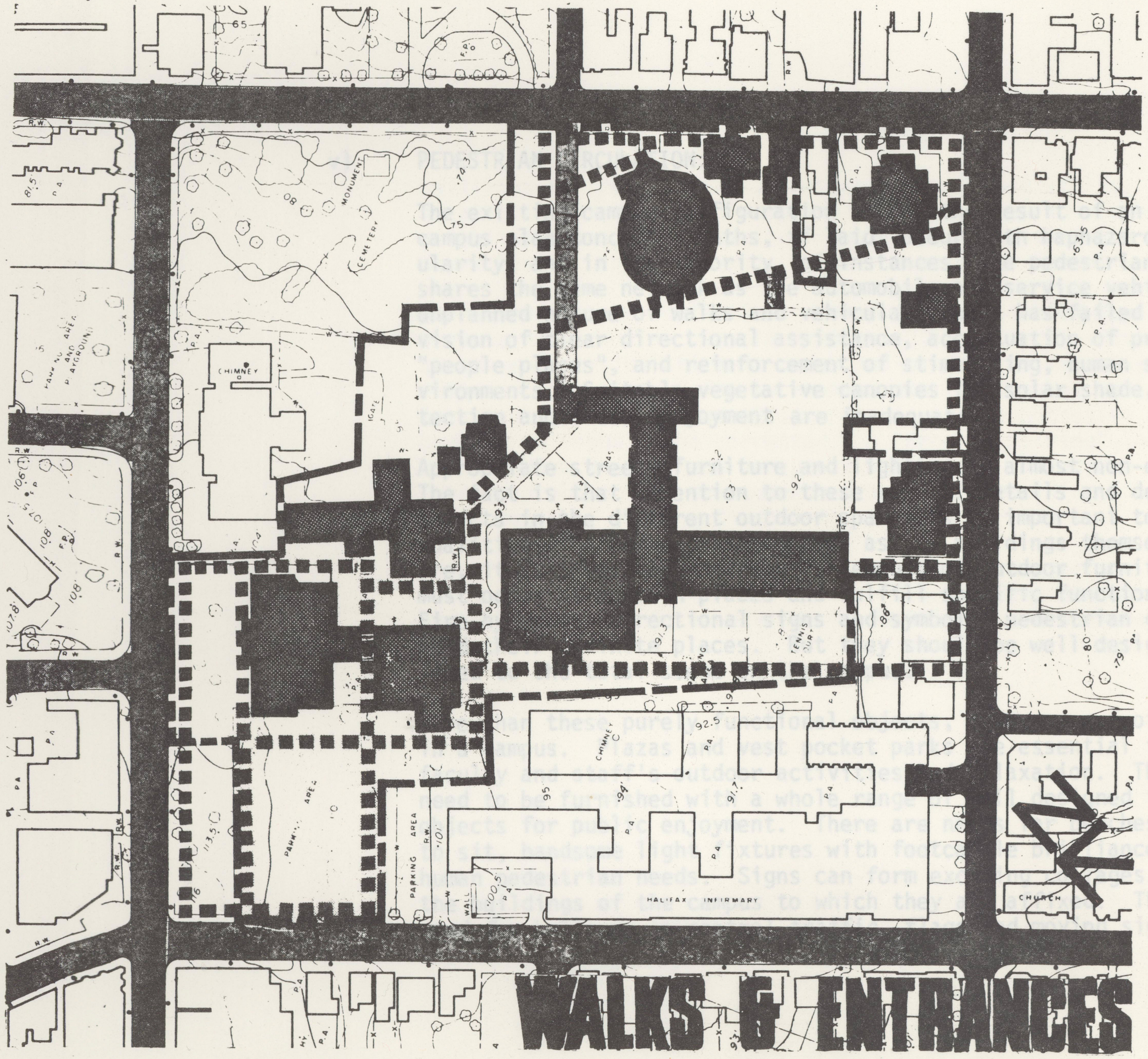
The examination of Origin/Destinations among different parts of the campus has shown that each instructional building generates the movement of people, materials and information along a dominant N-S communication spine (translated from the total number of occupants per building) and a secondary E-W axis which responds to the separate buildings of Chemical Engineering and Mining Engineering. Approximately 60% of the movement could be indoor and the rest are done for short distances along uninviting outdoor paths.

People traffic in particular has special importance. At least six times a day the faculty and student body move from one place to another. The final Development Plan should encourage a balanced system of movement within the bounds of economy, safety, convenience and aesthetics.

The general pattern of Nova Scotia Tech's campus is based on the administrative unit grouping system. This way of space organization groups the institution's units by department rather than by their physical type or requirement. Such an arrangement, naturally, fits management convenience and prestige, corresponds to the boundaries of maintenance and control, and reinfoces internal communications within the administrative unit. It discourages, though, cross connections within the institution as a whole and decreases flexibility. This is currently experienced in acute shortage of space experienced by the School of Architecture, while other engineering departments are enjoying surpluses of office, laboratory and instructional spaces.

The plea here is for a re-examination of the existing pattern, a search for the real interactions that lie behind the simple table of organization, the student and faculty communities that actually exist.

Moreover, since chance meetings are an important part of the communications network of any institution, the location, capacity, quality and form of lobbies, corridors and central spaces is considered as important as unit division or the form of classrooms and laboratory. This network of casual indoor spaces should be treated as a part of the overall circulation system but must be geared to the space-time scale of gathering rather than that of walking. Differentiation between areas of conglomeration and areas of travel become a key to the interior design theme in order to make the path environment really interesting.



WALKS & ENTRANCES

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v) PEDESTRIAN CIRCULATION:

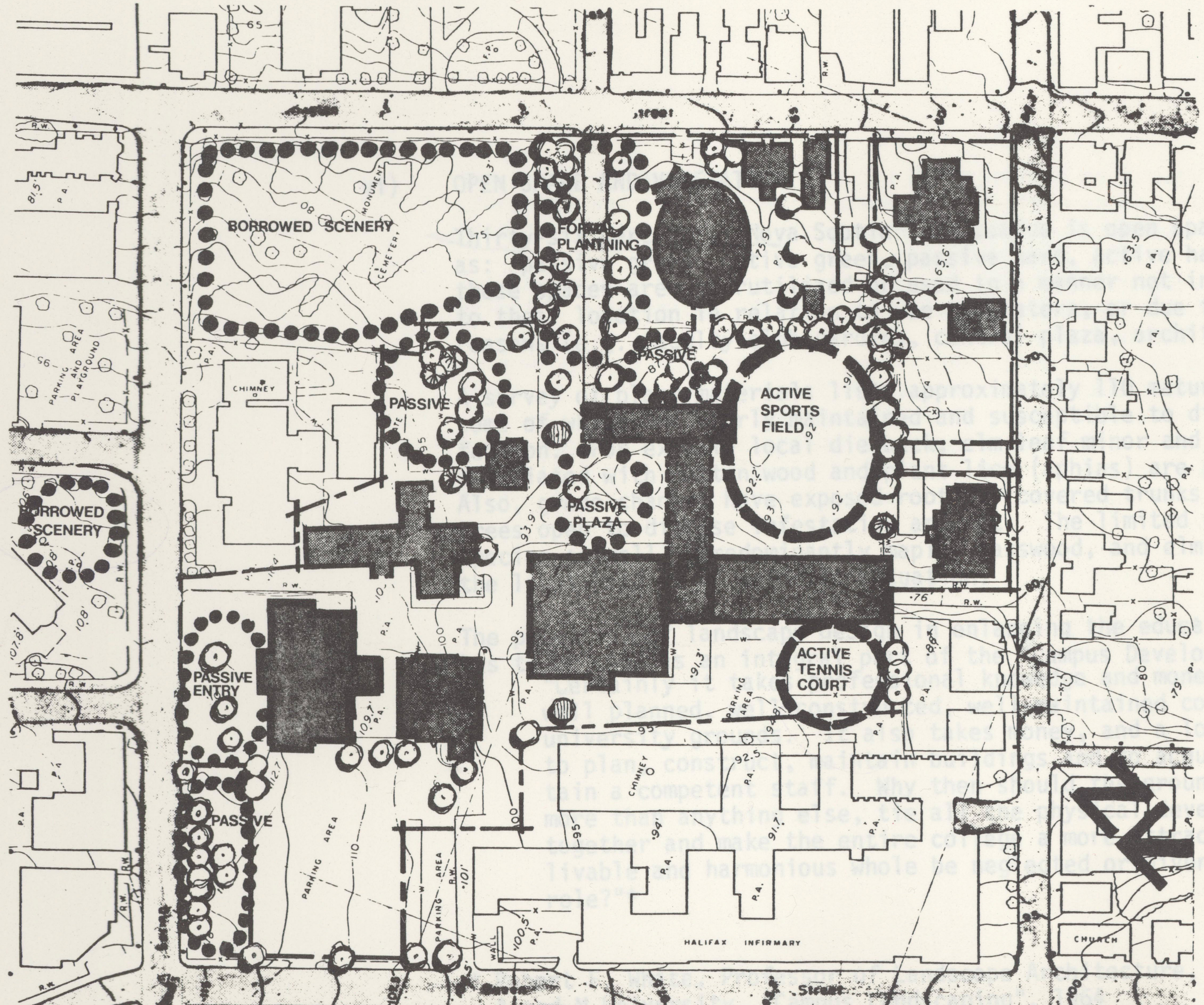
The existing campus configuration is not the result of an overall campus plan concept. Paths, if laid, occur with haphazard irregularity, and in the majority of instances, the pedestrian physically shares the same network as the automobile and service vehicles. The unplanned nature of walks and vehicular routes has failed in its provision of clear directional assistance, accentuation of prominent "people places", and reinforcement of stimulating, human scale environments. Suitable vegetative canopies for solar shade, rain protection and visual enjoyment are inadequate.

Appropriate street furniture and lighting is almost non-existant. The fact is that attention to these kind of details and design of objects in the different outdoor spaces is as important to the qualities of a campus's aesthetics as its buildings themselves. There are, it is true, many necessary elements of outdoor furniture which must occur at certain places and fulfill specific functional needs. Fire hydrants, directional signs and symbols, pedestrian guards, all need their definite places. But they should be well designed and related to the total scene on the campus.

More than these purely functional objects, however, are other needs in a campus. Plazas and vest pocket parks are essential for students, faculty and staff's outdoor activities and relaxation. These spaces need to be furnished with a whole range of well designed incidental objects for public enjoyment. There are needs for benches and places to sit, handsome light fixtures with footcandle brilliances scaled to human pedestrian needs. Signs can form exciting collages related to the buildings of the campus to which they are affixed. There is a need for bollards to control traffic, flags and moving signs, small pavilions for refreshments, newstands and flower stalls. Not, least of all, the existing and proposed outdoor spaces should be re-established once again as the proper domain for art work by the campus community in particular and the city artists at large.

Furthermore, Nova Scotia Tech's campus has a serious need for bicycle holders. The bicycle revolution, associated with the energy crisis and physical fitness boom, has created an increase in the number of bicyclers. The increasing use of bicycles on campus is inevitable, and the lack of secure, visually unobtrusive accomodation becomes an issue to be corrected. A "problem-solving" institution such as Nova Scotia Tech can provide a better "solution" to this parking problem than the current practice of chaining bicycles to stair rails or storing them along building corridors.

Compared to automobiles, bicycles take up less space and require simpler and less costly facilities. A great deal of design, thought, and ingenuity should be devoted to facilitate and encourage such a trend.



OPEN SPACE

A CAMPUS PLANNING STUDY

Nova Scotia Technical College Campus

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vi) OPEN SPACE AND VEGETATION:

Thirty-six percent of Nova Scotia Tech campus is open space categorized as: passive green, active green, passive hard, active hard. Many of these spaces are underutilized or used in a manner not intended due to their location in relation to use generators, or due to climatic reasons (e.g. faculty club gardens, central plaza, architecture lawn).

A survey of plant materials lists approximately 110 mature trees, some of which are poorly maintained and susceptible to disease infection. For example local die back, elm leaf minor and cavities associated with rotten wood and plant lice (aphias) are present. Also, grade changes have exposed roots or covered trunks leaving the trees open to disease infestation and rot. The limited variety of species as well, (predominantly maple, basswood, and elm), increases the likelihood of an epidemic situation.

The potential of landscape design in enlarging the educational process has to be used as an integral part of the "Campus Development Plan".

> "Certainly it takes professional knowedge and money to have well planned, well constructed, well-maintained college and university grounds. It also takes money, and a lot of it, to plan, construct, maintain buildings and to acquire and maintain a competent staff. Why then should the grounds which, more than anything else, tie all the physical development together and make the entire college a more attractive, livable and harmonious whole be neglected or given secondary role?"*

* Robert F. White, Professor of Landscape Architecture, Texas A and M University, "Campus Landscaping", 1964

The existing landscape scheme can be described as spotty hit-and-miss plantings and ill advised treatment of outdoor areas. These conditions, unfortunately, ruin the appearance of a potentially beautiful campus.

Full attention was given in this study, as early as possible, to existing vegetation. A survey of all trees within the campus boundaries is listed in Table #1. During the future expansion and campus development, healthy trees, in particular, should always be preserved where possible. Their position, spread and ground level at their base must be considered on the detailed area plans. Usually the level over their root area may determine the shaping and levelling of the land. Any existing tree which is to be kept must be protected by fencing before the first construction machinery reaches the site.

TABLE #1

EXISTING TREES WITHIN THE SITE

NUMBER	BOTONICAL NAME	COMMON NAME
1.	Ulmus Americana	American Elm
2.	Tilia Americana	Basswood
3.	Tilia Americana	Basswood
4.	Ulmus Americana	American Elm
5.	Tilia Americana	Basswood
6.	Tilia Americana	Basswood
7.	Tilia Americana	Basswood
8.	Tilia Americana	Basswood
9.	Tilia Americana	Basswood
10.	Tilia Americana	Basswood
11.	Tilia Americana	Basswood
12.	Ulmus Americana	American Elm
13.	Tilia Americana	Basswood
14.	Tilia Americana	Basswood
15.	Tilia Americana	Basswood
16.	Tilia Americana	Basswood
17.	Ulmus Glabra 'Camperdownii'	Camperdown Elm
18.	Ulmus Glabra 'Camperdownii'	Camperdown Elm
19.	Ulmus Americana	American Elm
20.	Ulmus Americana	American Elm
21.	Ulmus Americana	American Elm
22.	Ulmus Americana	American Elm
23.	Ulmus Americana	American Elm
24.	Ulmus Americana	American Elm
25.	Ulmus Americana	American Elm

NUMBER	BOTANICAL NAME	COMMON NAME
26.	Ulmus Americana	American Elm
27.	Acer Platanoides	Norway Maple
28.	Has been removed	
29.	Ulmus Americana	American Elm
30.	Acer Platanoides	Norway Maple
31.	Has been removed	
32.	Has been removed	
33.	Has been removed	
34.	Has been removed	
35.	Has been removed	
36.	Has been removed	
37.	Has been removed	
38.	Has been removed	
39.	Tilia Americana	Basswood
40.	Tilia Americana	Basswood
40A.	Aesculus Hippocastanum	Horse Chestnut
41.	Non existant	
42.	Betula Papyrifera	White Birch
43.	Acer Platanoides	Norway Maple
44.	Betula Pendula Dalecarlica	Cutleaf Weeping Birch
45.	Acer Platanoides	Norway Maple
46.	Acer Plata	Norway Maple
47.	Acer Plata	Norway Maple
48.	Ulmus Americana	American Elm
49.	Tilia Americana	Basswood
50.	Ulmus Americana	American Elm

NUMBER	BOTANICAL NAME	COMMON NAME
51.	Acer Platanoides	Norway Maple
52.	Tilia Europaea	European Lindėn
53.	Acer Platanoides	Norway Maple
54.	Acer Platanoides	Norway Maple
55.	Tilia Americana	Basswood
56.	Tilia Americana	Basswood
57.	Tilia Azericana	Basswood
58.	Tilia Americana	Basswood
59.	Acer Platanoides	Norway Maple
60.	Ulmus Americana	American Elm
61.	Elmus Americana	American Elm
62.	Ulmus Americana	American Elm
63.	Acer Platanoides	Norway Maple
64.	Tilia Americana	Basswood
65.	Acer Platanoides	Norway Maple
66.	Tilia Americana	Basswood
67.	Acer Platanoides	Norway Maple
68.	Acer Platanoides Schwedlerii	Schwedlers' Maple
69.	Acer Platanoides	Norway Maple
70.	Acer Platanoides	Norway Maple
71.	Acer Platanoides	Norway Maple
72.	Acer Platanoides	Norway Maple
73.	Ulmus Pumila	Chinese Elm
74.	Acer Platanoides	Norway Maple
74A.	Ulmus Pumila	Chinese Elm
74B.	Acer Platanoides	Norway Maple
74C.	Acer Platanoides Schwedlerii	Schwedler's Maple
75.	Tilia Americana	Basswood

NUMBER	BOTANICAL NAME	COMMON NAME
76.	Tilia Americana	Basswood
77.	Acer Platanoides Schwedlerii	Schwedler's Maple
77A.	Acer Platanoides Schwedlerii	Schwedler's Maple
77B.	Acer Platanoides Schwedlerii	Schwedler's Maple
77C.	Acer Platanoides Schwedlerii	Schwedler's Maple
78.	Acer Platanoides	Norway Maple
79.	Quercus Rubra	Red Oak
79A.	Quercus Rubra	Red Oak
79B.	Acer Platanoides	Norway Maple
80.	Tilia Americana	Basswood
80A.	Acer Platanoides	Norway Maple
80B.	Ulmus Pumila	Chinese Elm
81.	Acer Platanoides	Norway Maple
82.	Tilia Americana	Basswood
83.	Sorbus Auc Uparia	European Mountain Ash
84.	Acer Platanoides Schwedlerii	Schwedler's Maple
85.	Sorbus Aucuparia	European Mountain Ash
86.	Acer Platanoides	Norway Maple
87.	Acer Platanoides	Norway Maple
88.	Acer Platanoides	Norway Maple
89.	Malus Sp.	Apple Tree
90.	Acer Platanoides	Norway Maple
91.	Acer Platanoides	Norway Maple
92.	Acer Platanoides	Norway Mpale
93.	Tilia Americana	Basswood
94.	Tilia Americana	Basswood
94A.	Tilia Americana	Basswood
95.	Acer Platanoides	Norway Maple
96.	Acer Platanoides	Norway Maple
97.	Acer Platanoides	Norway Maple
98.	Acer Platanoides	Norway Maple
99.	Acer Platanoides	Norway Mpale
100.	Acer Platanoides	Norway Maple

NUMBER	BOTANICAL NAME	COMMON NAME
101.	Pinus Strobus	White Pine
102.	Non Existant	
103.	Non Existant	
104.	Non Existant	
105.	Acer Platanoides	Norway Maple
106.	Acer Platanoides	Norway Maple
107.	Acer Platanoides	Norway Maple
108.	Acer Platanoides	Norway Mpale
109.	Acer Platanoides	Norway Maple

In addition to preserving and maintaining existing plant materials on campus, there is a serious need for reinforcing the planting design scheme as part of the campus development process.

Initially the following landscape design strategies should be adopted and followed as closely as possible in every detailed area planning:

a) Tree planting should only occur to fulfill a specific purpose based on a predetermined plan. Such uses include but are not limited to:
   - -relating buildings to the site and to each other, and linking external spaces.
   - -protecting against wind, noise, or fumes
   - -screening undesirable views into or out from the site
   - -giving privacy, screening and visual barrier
   - -framing views or forming focal points
   - -demarcating boundaries and areas
   - -directing and complementing pedestrian circulation

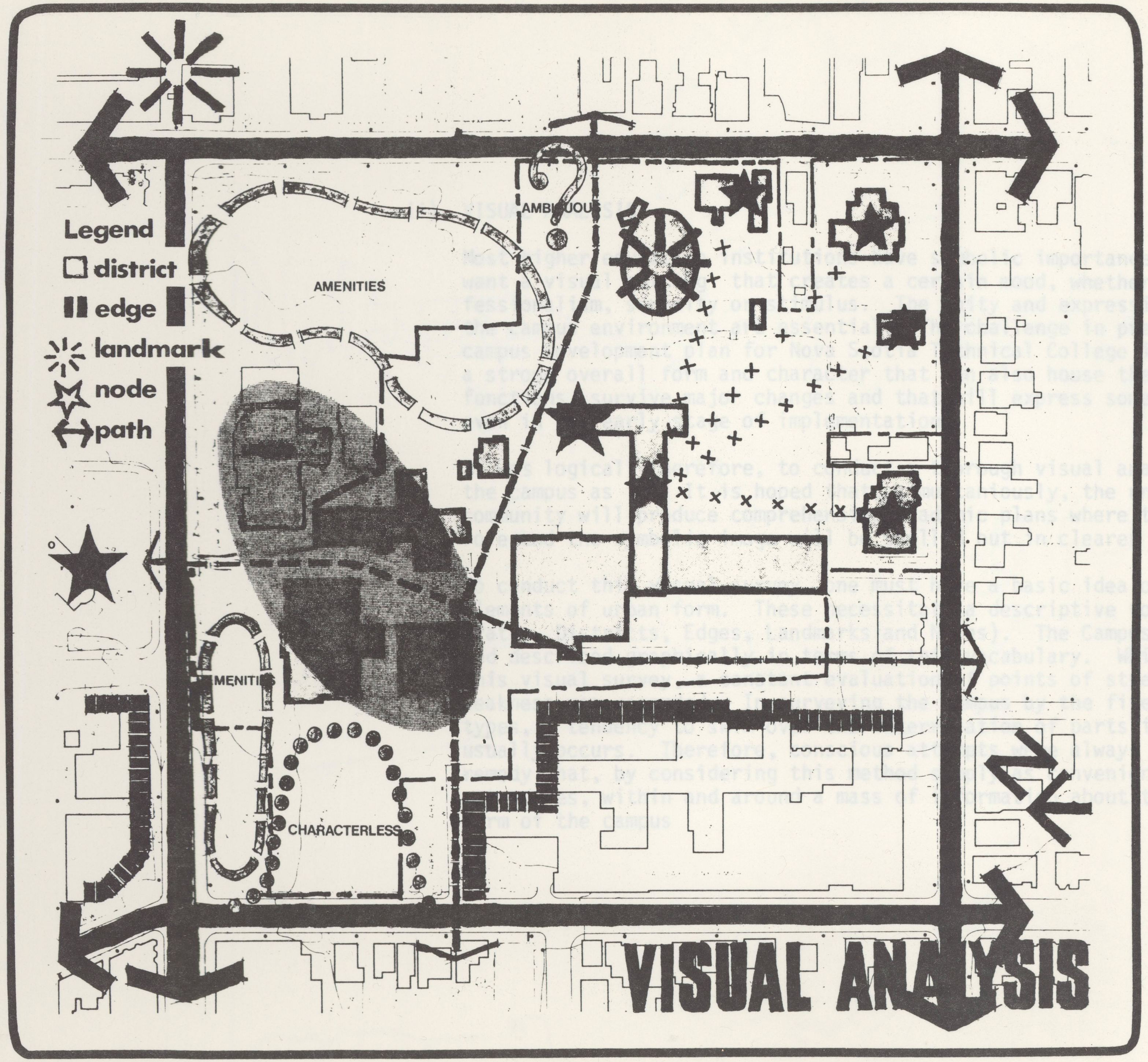
b) New Major plantings should be limited as much as possible to native plants of Nova Scotia.

c) Flower beds should be limited in extent and used for small scale purposes. Due to the urban characters of Nova Scotia Tech Campus they should be used to brighten and complement, not to dominate the landscape scheme. This criteria will be of prime importance if finance is going to be a serious factor for the campus grounds development and maintenance.

d) Vines, groundcover and lawns are all part of the campus landscape. The decision regarding each one of them requires extensive investigation. The selection of method of installation and the choice of specific species should all be done by a qualified landscape architect within the detailed area planning progress. Such factors as texture, growth habit, color, length of growing season, adaptability to the Maritime climate and campus micro-climate, should all be considered.

e) Indoor plants of suitable types should be used around stairways, reception areas, and public areas wherever possible. Due to the inhibiting cold weather during the academic year, outdoor spaces are of limited use. Tropicals and semihardy plants of many kinds, though, grow well indoors with proper care, and they can do much to add freshness and interest to the interior of the campus buildings. A greenhouse is almost a necessity if much of this kind of work is to be done. The campus architect and the landscape architect should colaborate in selecting places for indoor plants and exploit the opportunities for using them creatively in the design.

f) A skilled group headed by a professional landscape architect should be assembled as a division of the Physical Plant. The group will include grounds foreman and a limited crew. He and his crew should be responsible for maintenance, and they should be highly skilled in all the many requirements necessary to keep a campus landscape flourishing. Decisions of how and where landscape features are to be built or where landscape plantings are to be made should be the responsibility of the landscape architect in co-ordination with the campus architect.



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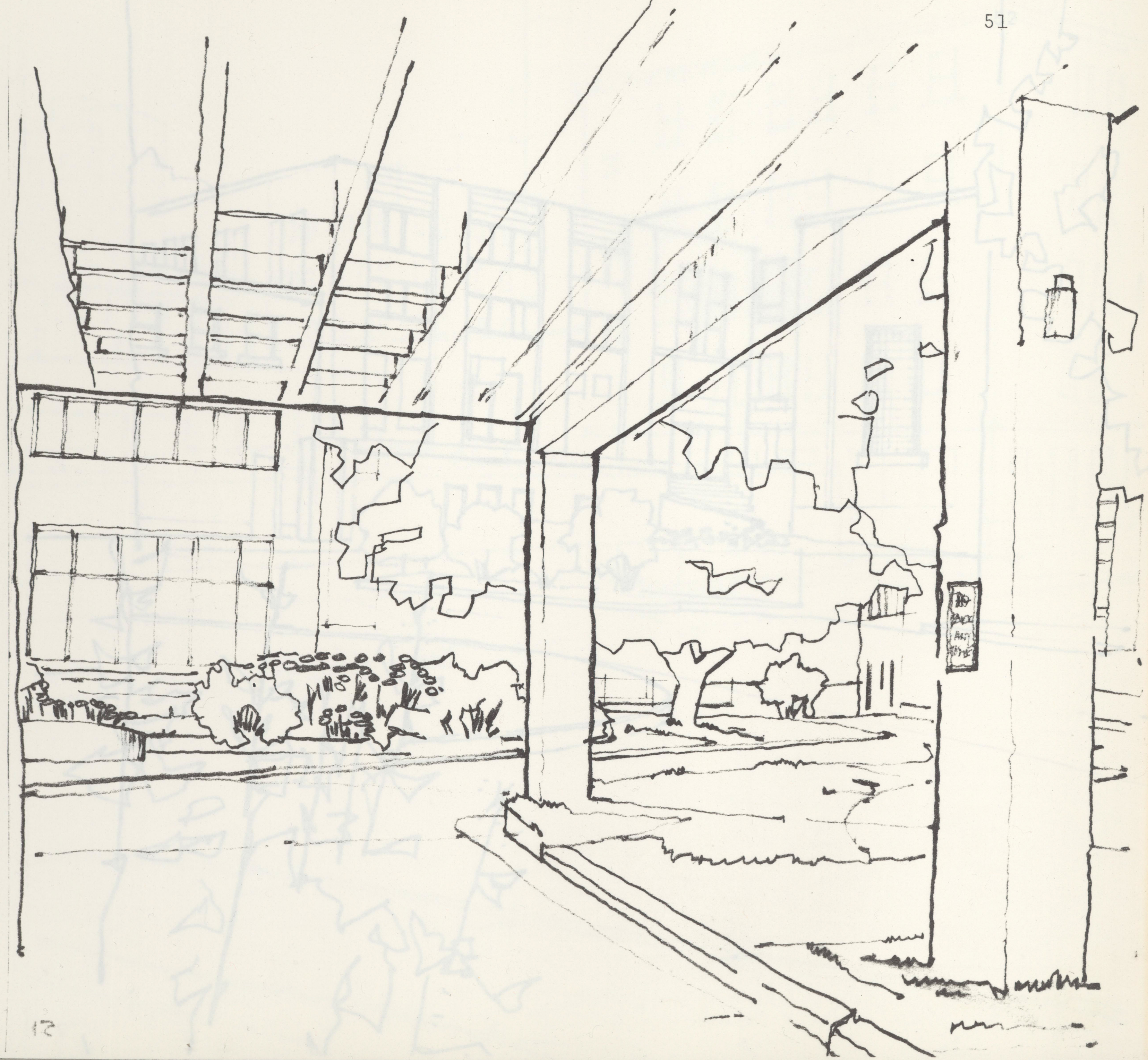
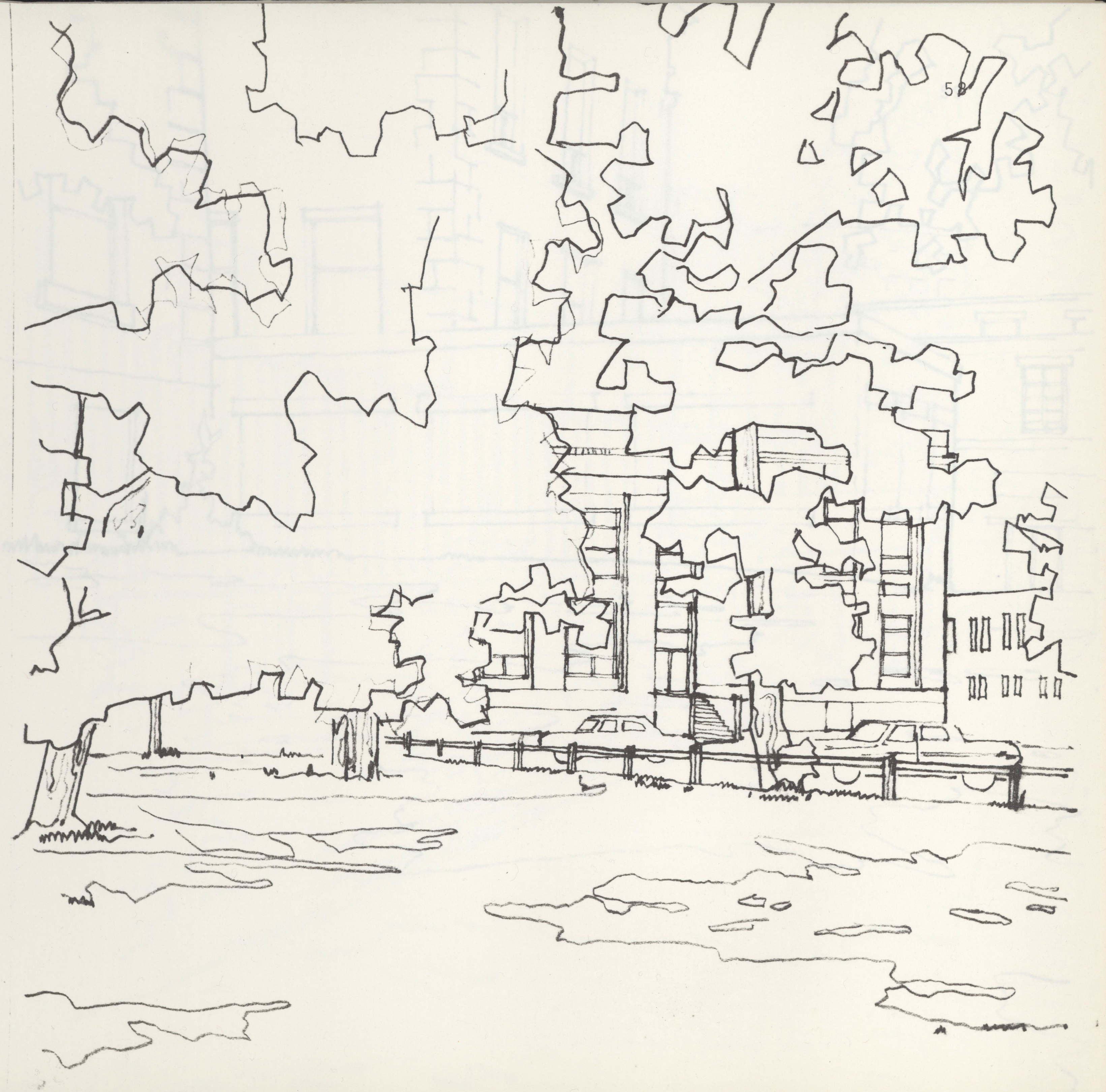
vii) VISUAL ANALYSIS:

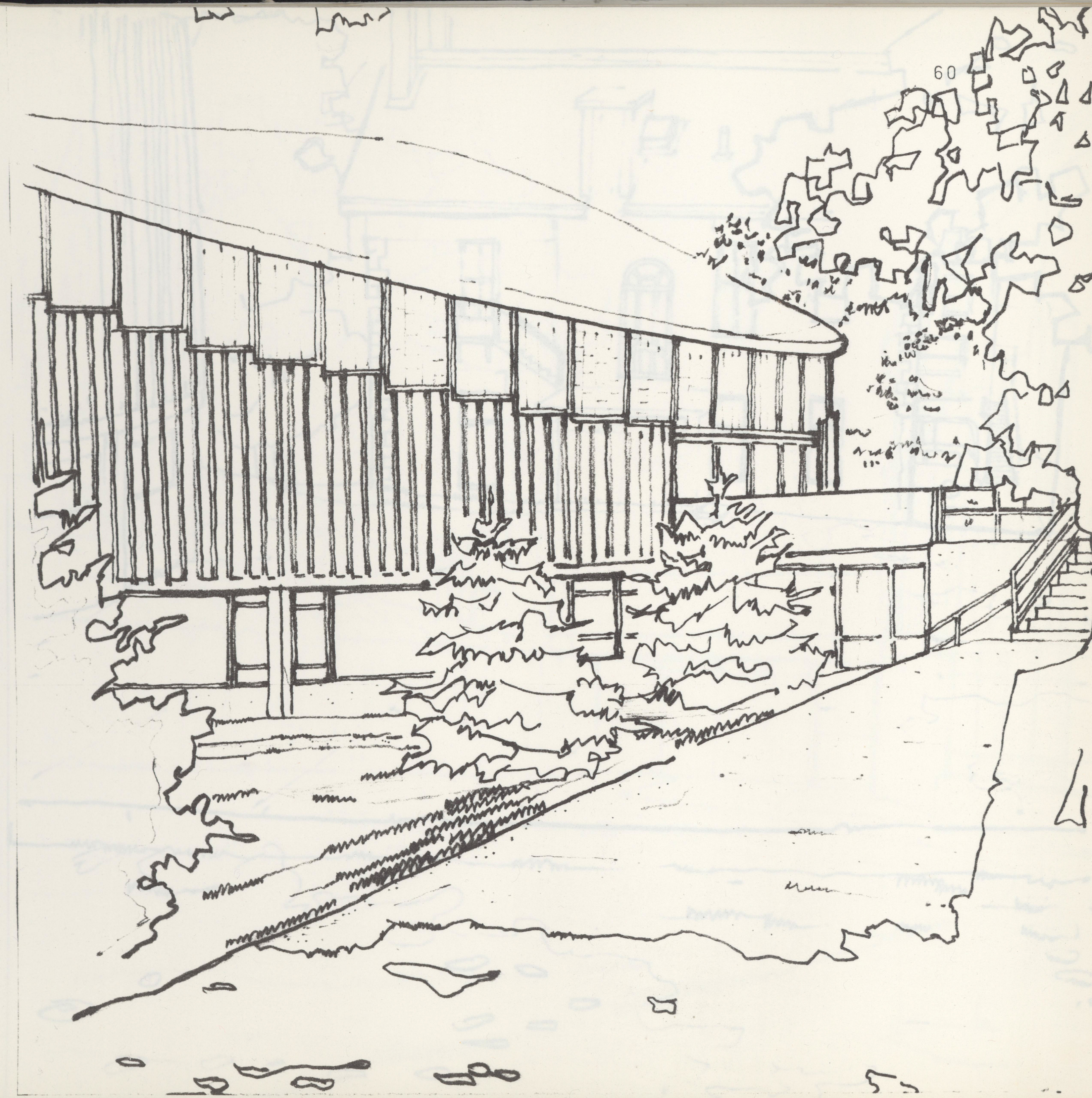
Most higher education institutions have symbolic importance and will want a visual setting that creates a certain mood, whether of professionalism, serenity or stimulus. The unity and expressiveness of the campus environment are essential. The challenge in preparing a campus development plan for Nova Scotia Technical College is to produce a strong overall form and character that can also house the complex functions, survive major changes and that will express some quality even in the early stage of implementation.

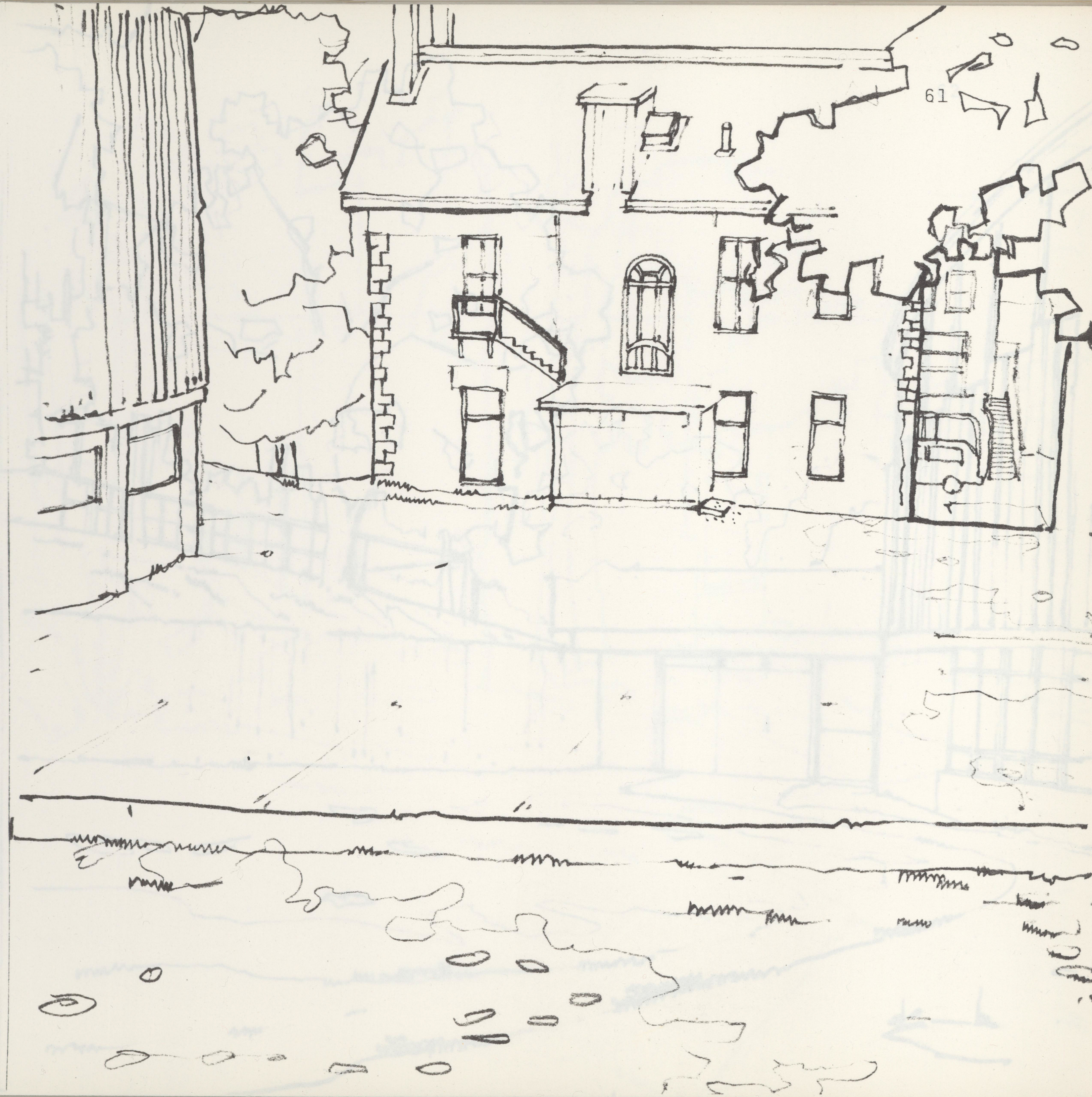
It was logical, therefore, to conduct a thorough visual analysis of the campus as is. It is hoped that, simultaniously, the university community will produce comprehensive academic plans where the major role and the symbolic image will be spelled out in clearer fashion.

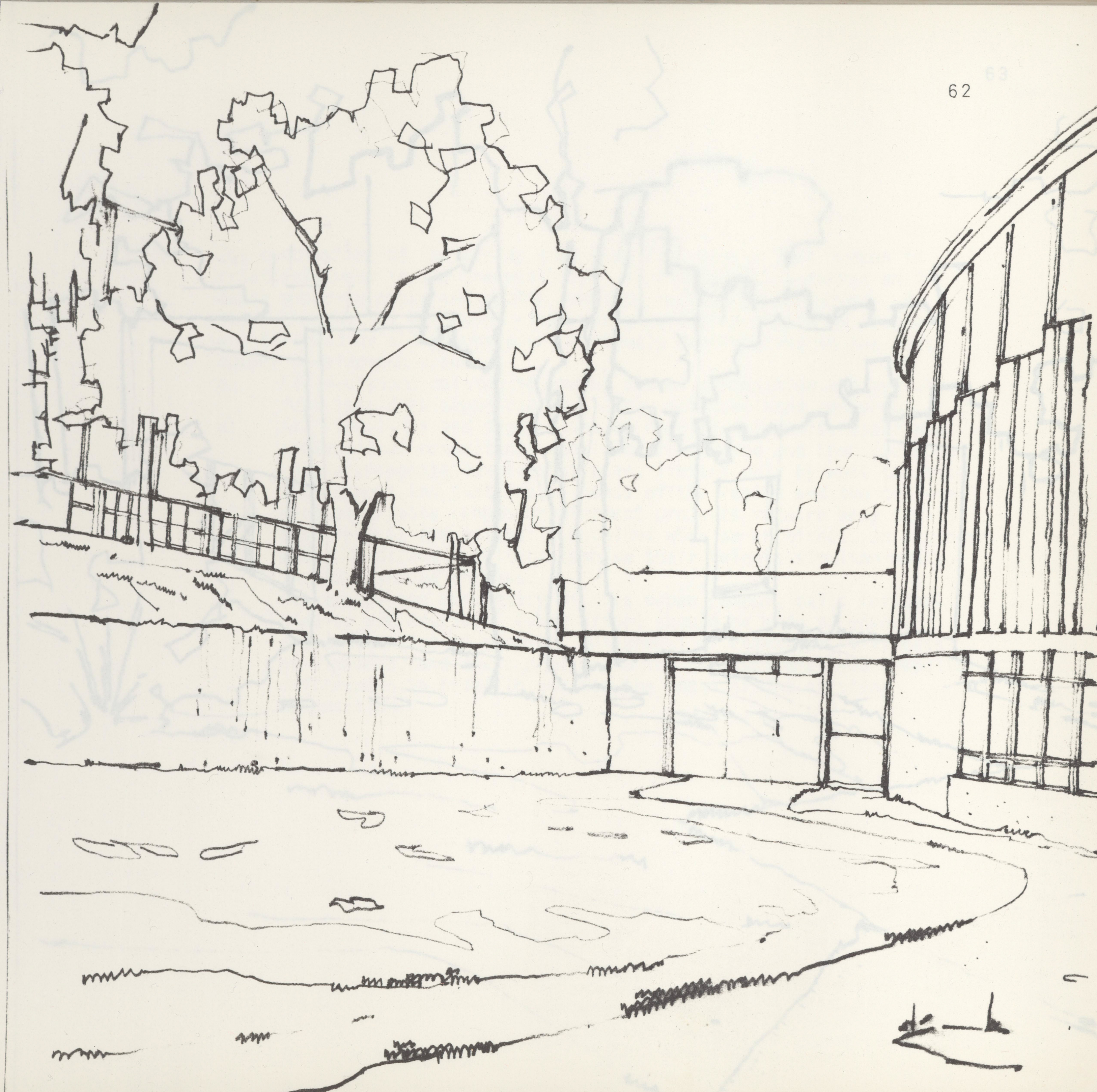
To conduct this visual survey, one must have a basic idea of the elements of urban form. These necessitate a descriptive vocabulary (Paths, Districts, Edges, Landmarks and Nodes). The Campus was examined and described graphically in terms of this vacabulary. While preparing this visual survey, a constant evaluation of points of strength and weakness was recorded. In surveying the campus by the five element types, a tendency to skim over the interrelation of parts into a whole usually occurs. Therefore, conscious attempts were always made to remedy that, by considering this method simply as convenient empirical categories, within and around a mass of information about the sensuous form of the campus

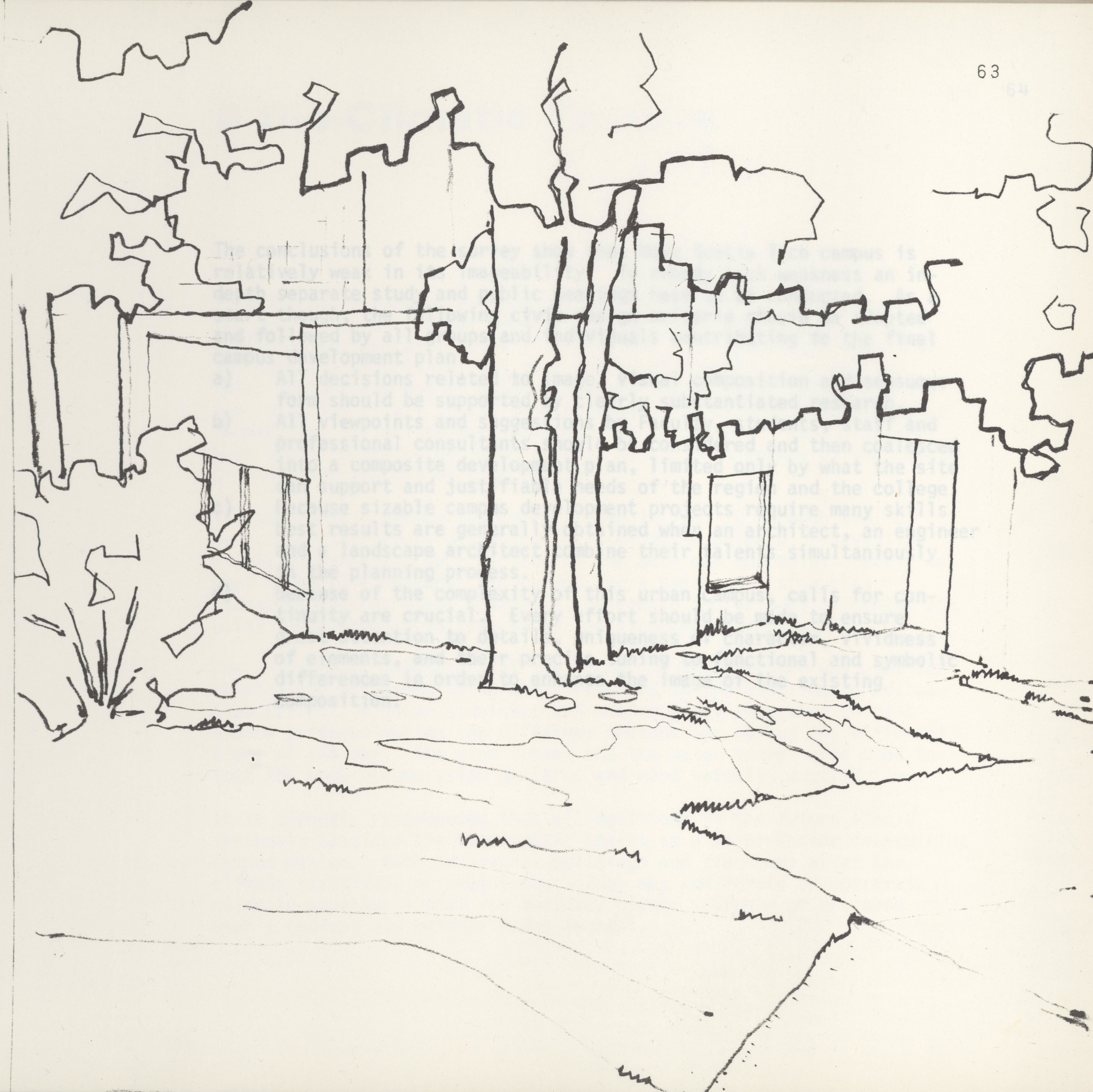












The conclusions of the survey show that Nova Scotia Tech campus is relatively weak in its imageability. To remedy such weakness an in-depth separate study and public hearings have to be conducted. As a start though, the following civic design criteria should be adopted and followed by all groups and individuals contributing to the final campus development plan:

a) All decisions related to image, visual composition and sensuous form should be supported by clearly substantiated research.

b) All viewpoints and suggestions by Faculty, students, staff and professional consultants should be considered and then coalesced into a composite development plan, limited only by what the site can support and justifiable needs of the region and the college.

c) Because sizable campus development projects require many skills, best results are generally obtained when an architect, an engineer and a landscape architect combine their talents simultaniously in the planning process.

d) Because of the complexity of this urban campus, calls for continuity are crucial. Every effort should be made to ensure great attention to details, uniqueness of character, vividness of elements, and their precise tuning to functional and symbolic differences in order to enhance the image of the existing composition.

3-Bio-Climatic Factors

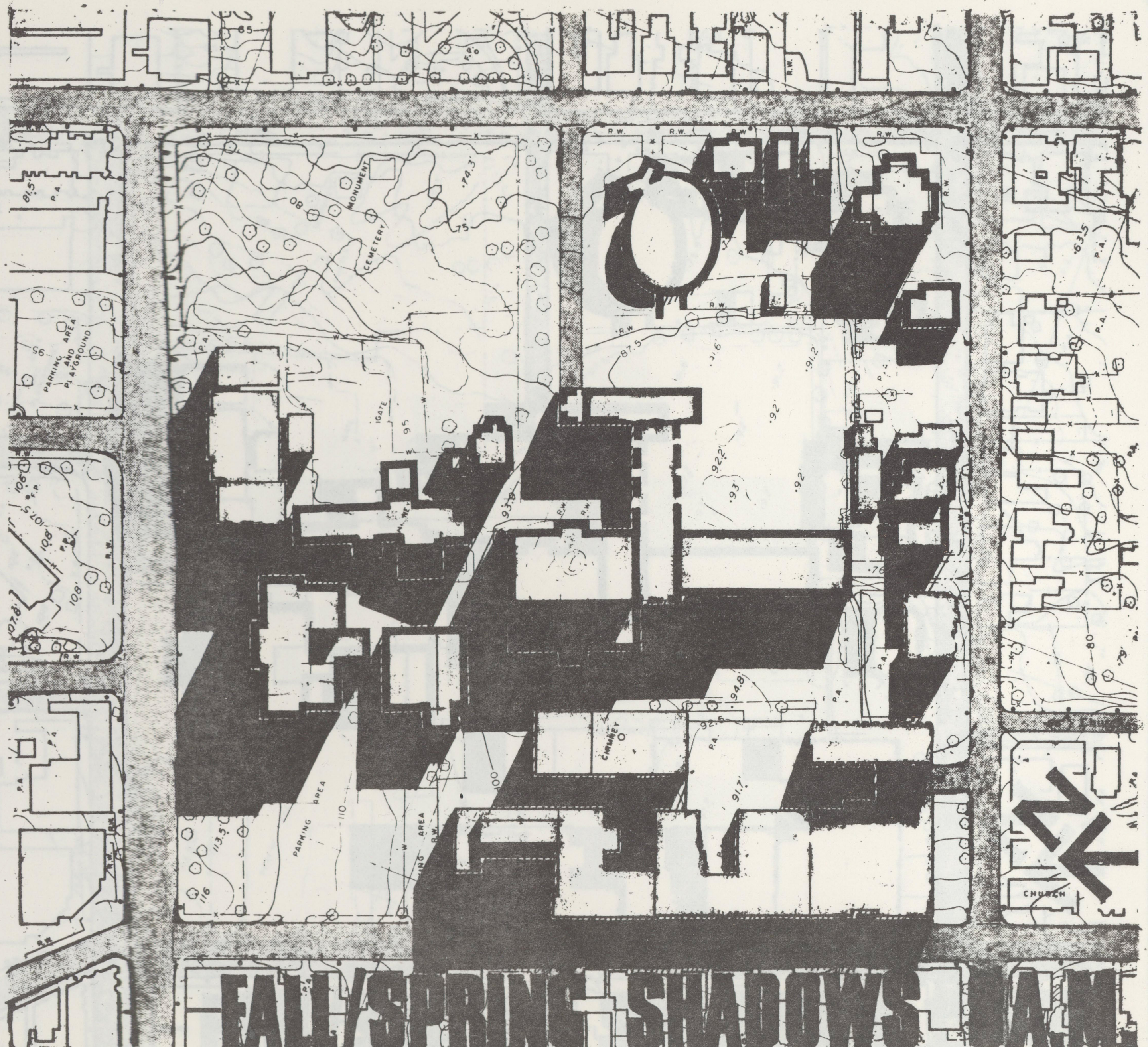
Interior microclimates are controlled. A comfortable microclimate for building users can be created interiorly by use of heat, air conditioning, and artificial illumination. Such positive control is not possible exteriorly, yet some degree of control is needed for human comfort and use of outdoor spaces. Wind, solar radiation, precipitation of all types, snow accumulation patterns, and excessive temperature variations are factors to be considered. They affect both the site design decision as well as the maintenance of the campus grounds, and process of snow removal.

The bioclimatic evaluation series shown in fig. 12 through fig. 23 were essential before designing for a climatic balance. Prevailing climatic conditions were plotted on the base map and point clearly to what corrective measures are needed for a successful site plan. Decisions such as plant materials, pavements and walkway alignment are going to be greatly influenced by the findings of this series.

The environment laboratory of the School of Architecture was used for running the different tests which resulted in the bioclimatic evaluation series. A solar simulator and sealed model were used to plot shadow patterns during the different seasons and during the different times of the day. The wind tunnel and the water tunnel were used to test the snow accumulation patterns and wind velocity distribution.

It is strongly recommended that all decisions in the future should seriously consider the bioclimatic charts as a major factor determining campus design. Both additional buildings and trees may alter the climate positively or negatively. They may ameliorate or aggravate climatic problems - that is, they may either increase or decrease user's comfort and outdoor space success.

Furthermore, in this time of energy crisis, it is the responsibility of designers (planners, landscape architects, and architects) to decrease the dependence on mechanical systems by making the best possible use of the location and form of each element of the campus. This study concentrates on location which includes all elements of the natural site as well as the potential modifications of these elements. By using them sensitively, energy can be saved and the whole living environment of the campus can be enhanced. Basic elements of the campus site which should be considered are topographic variations, earth form, pavement and plant material.



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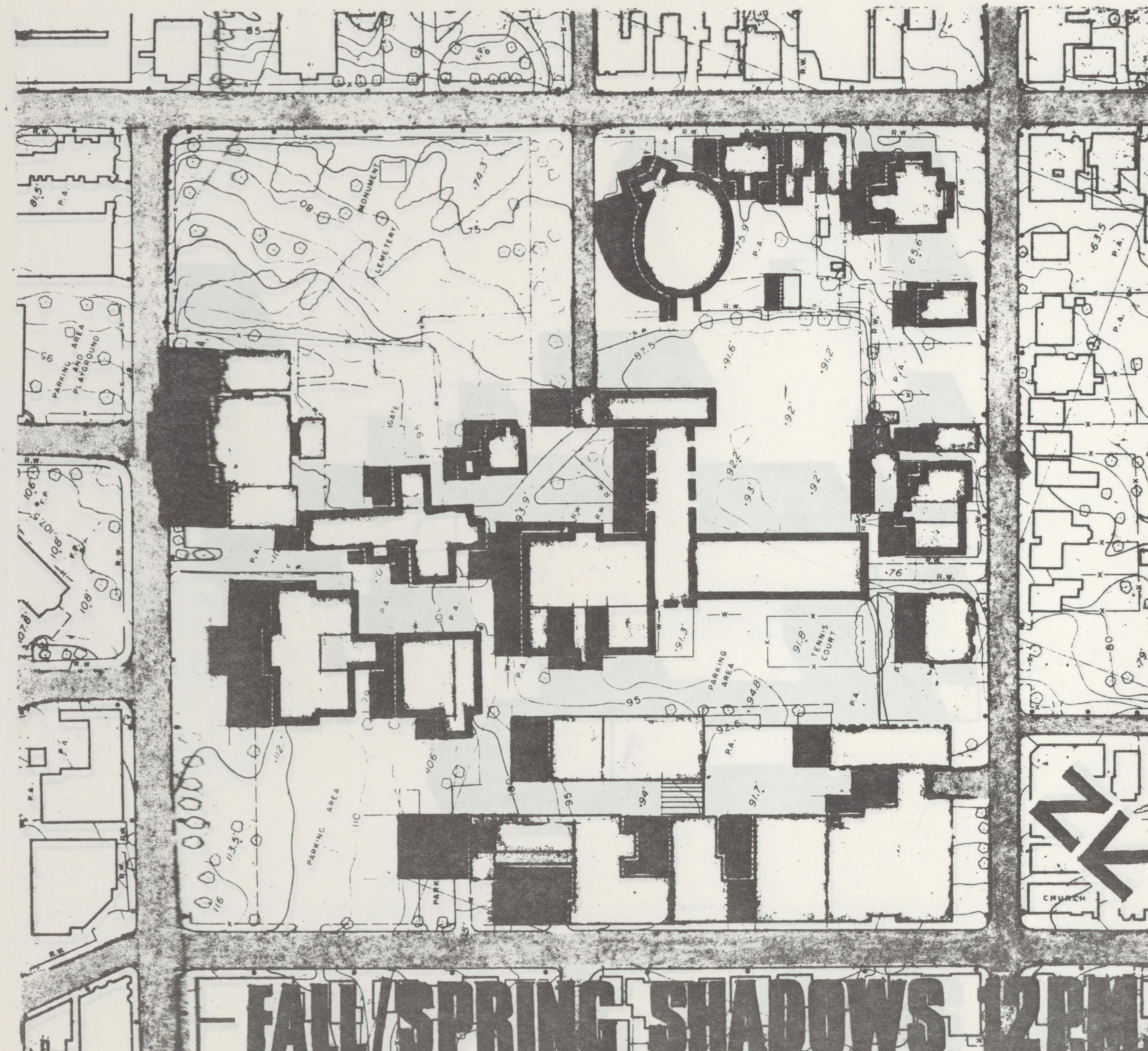

FALL/SPRING SHADOWS 12P.M.

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FALL/SPRING SHADOWS 3P.M.

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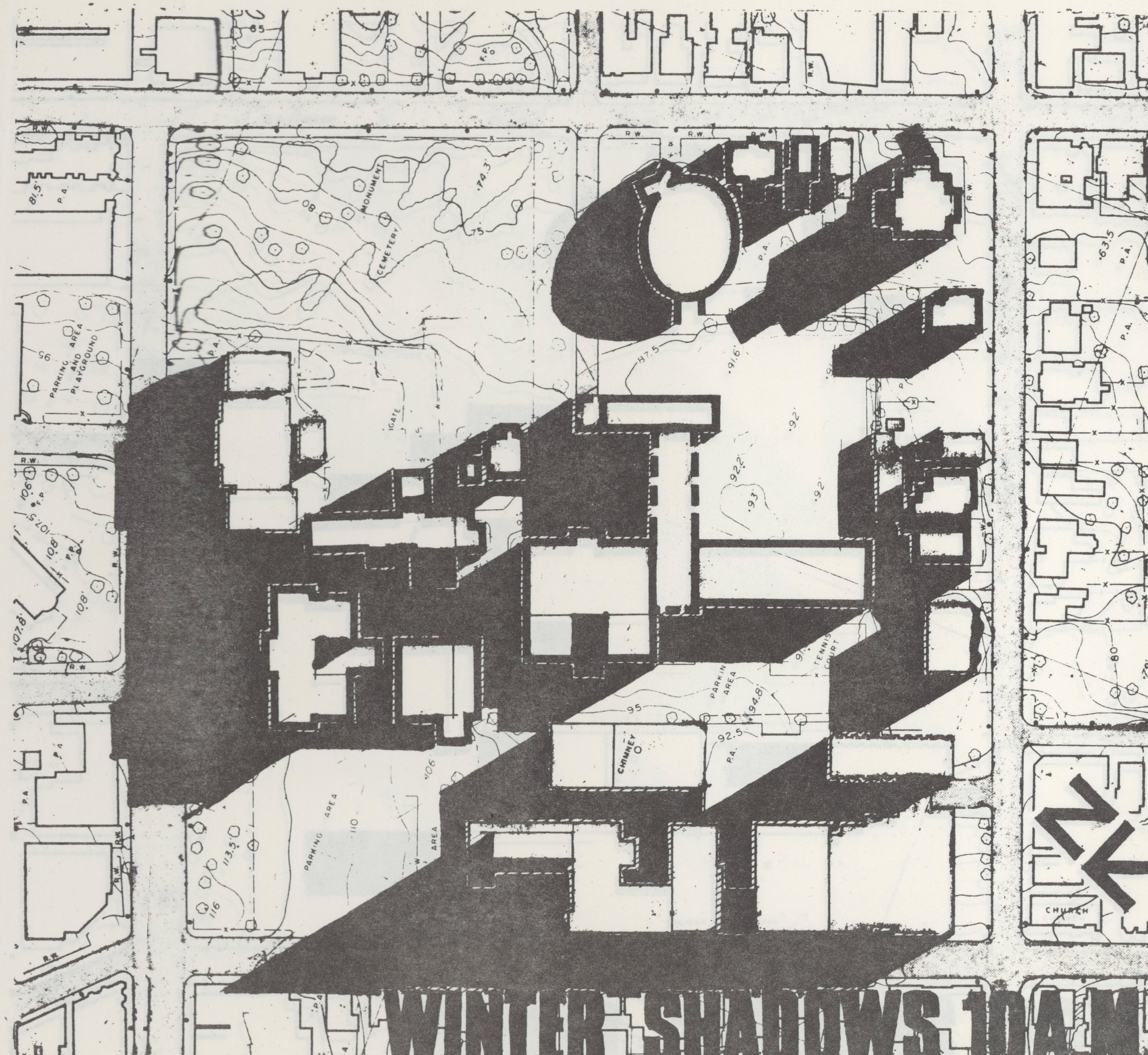

WINTER SHADOWS 10A.M.

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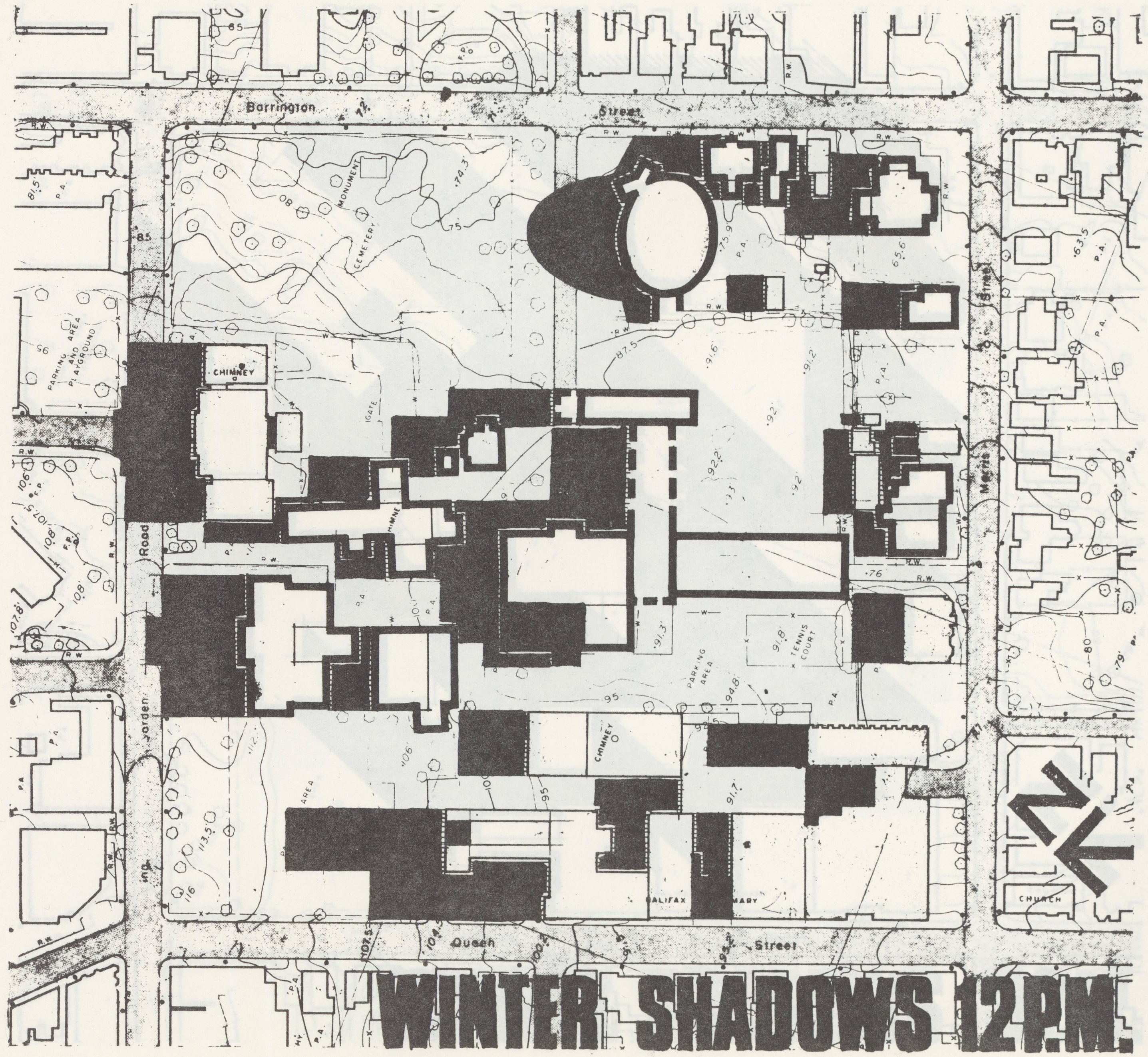

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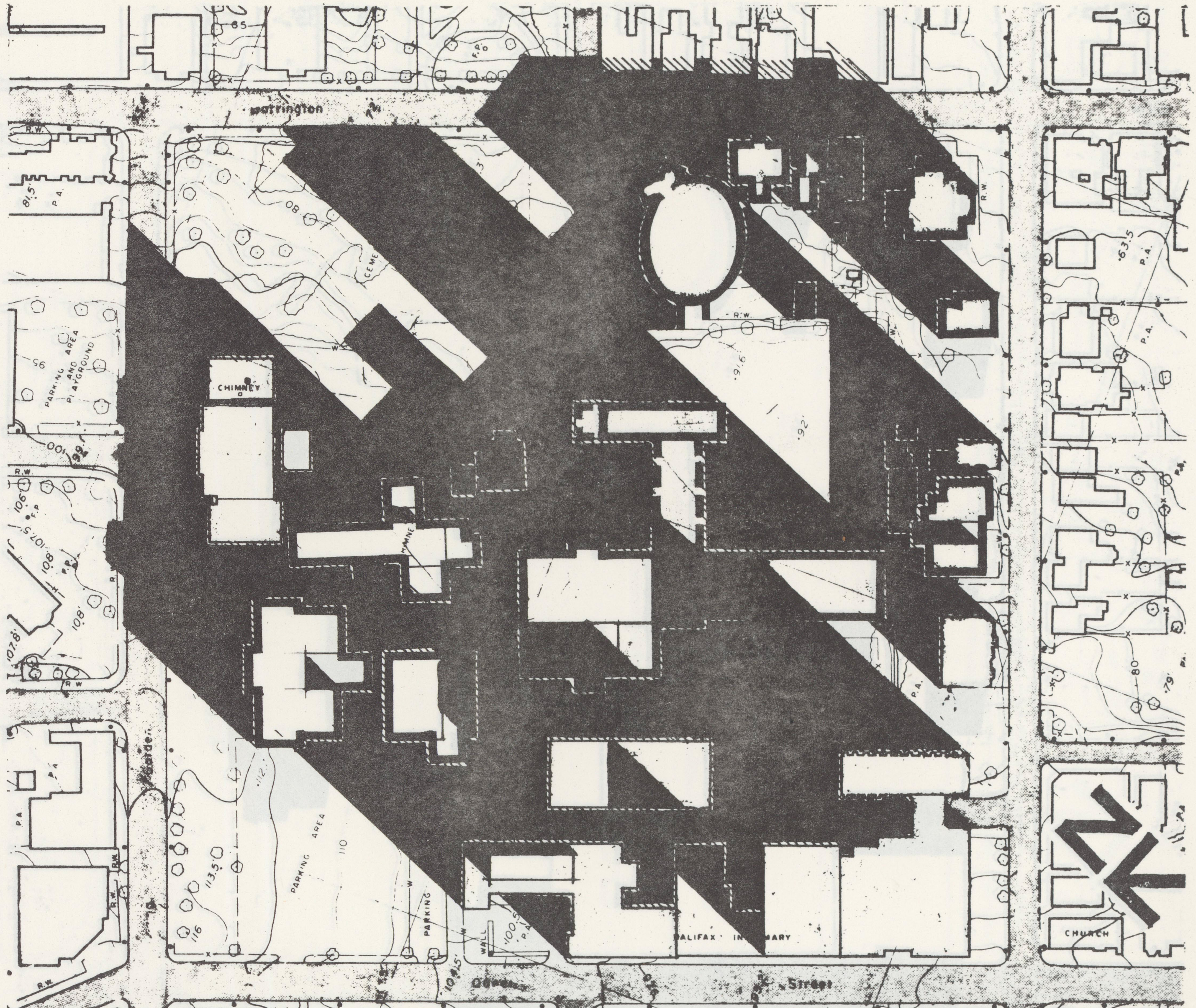

WINTER SHADOWS 3P.M.

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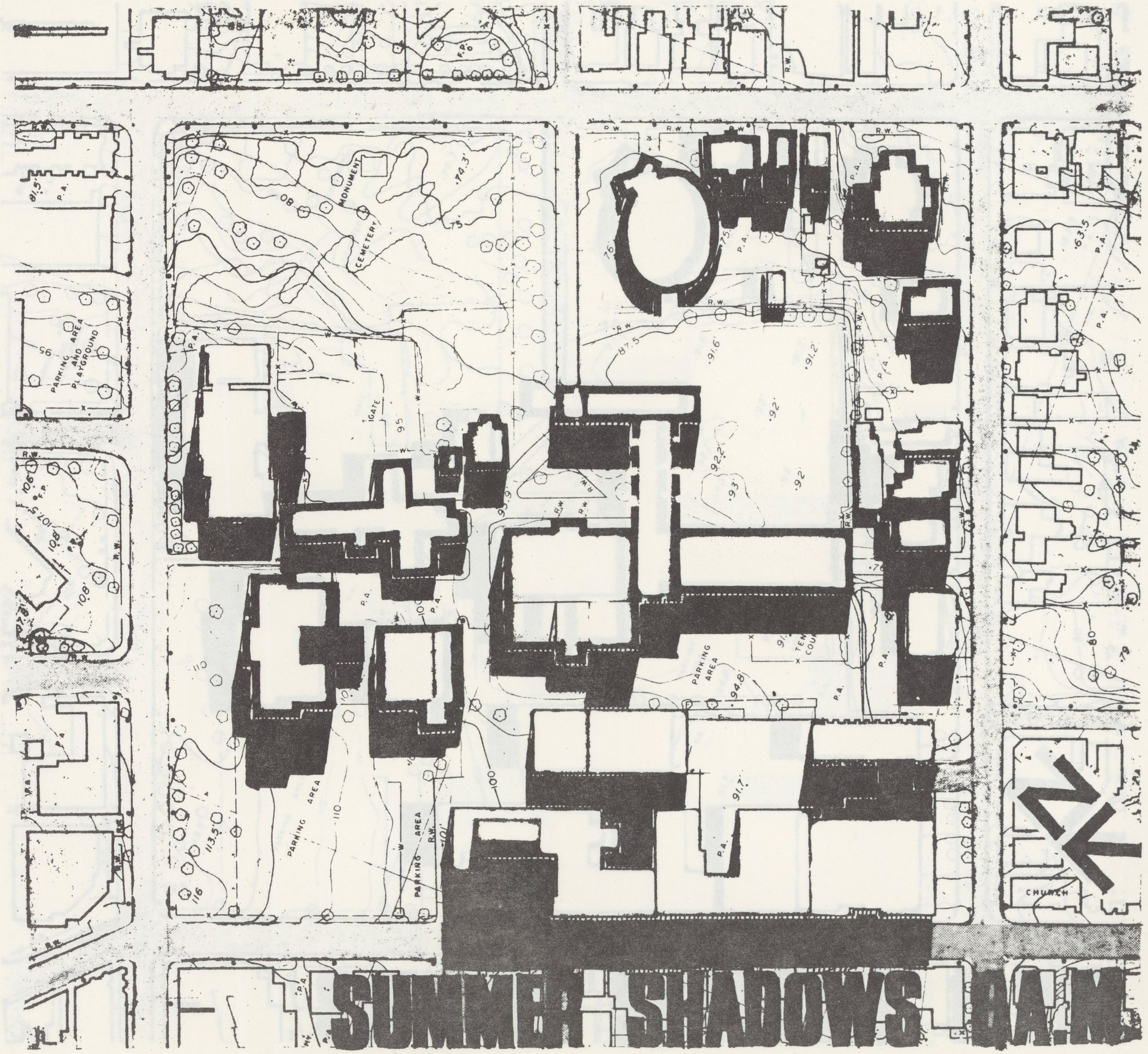

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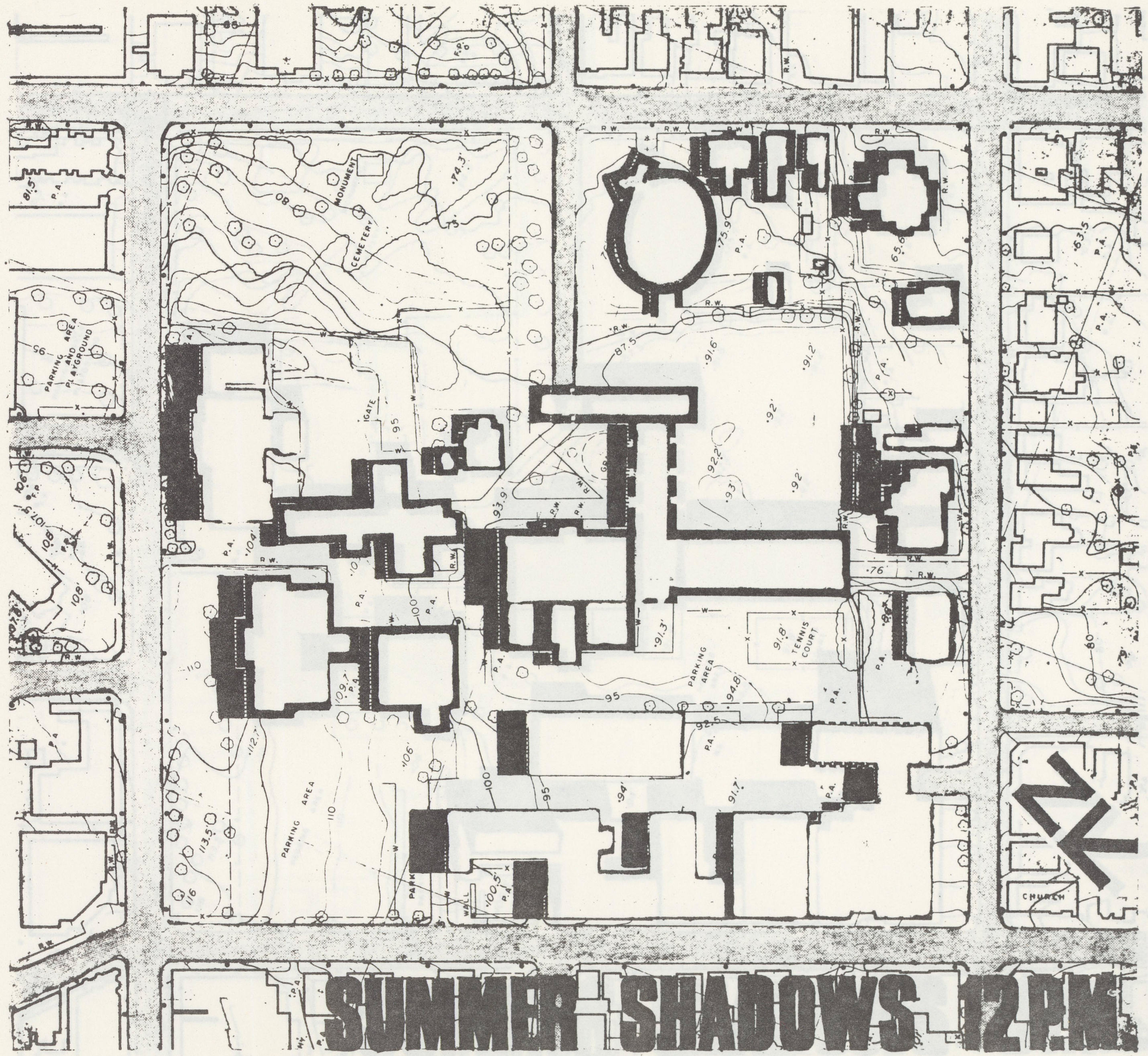

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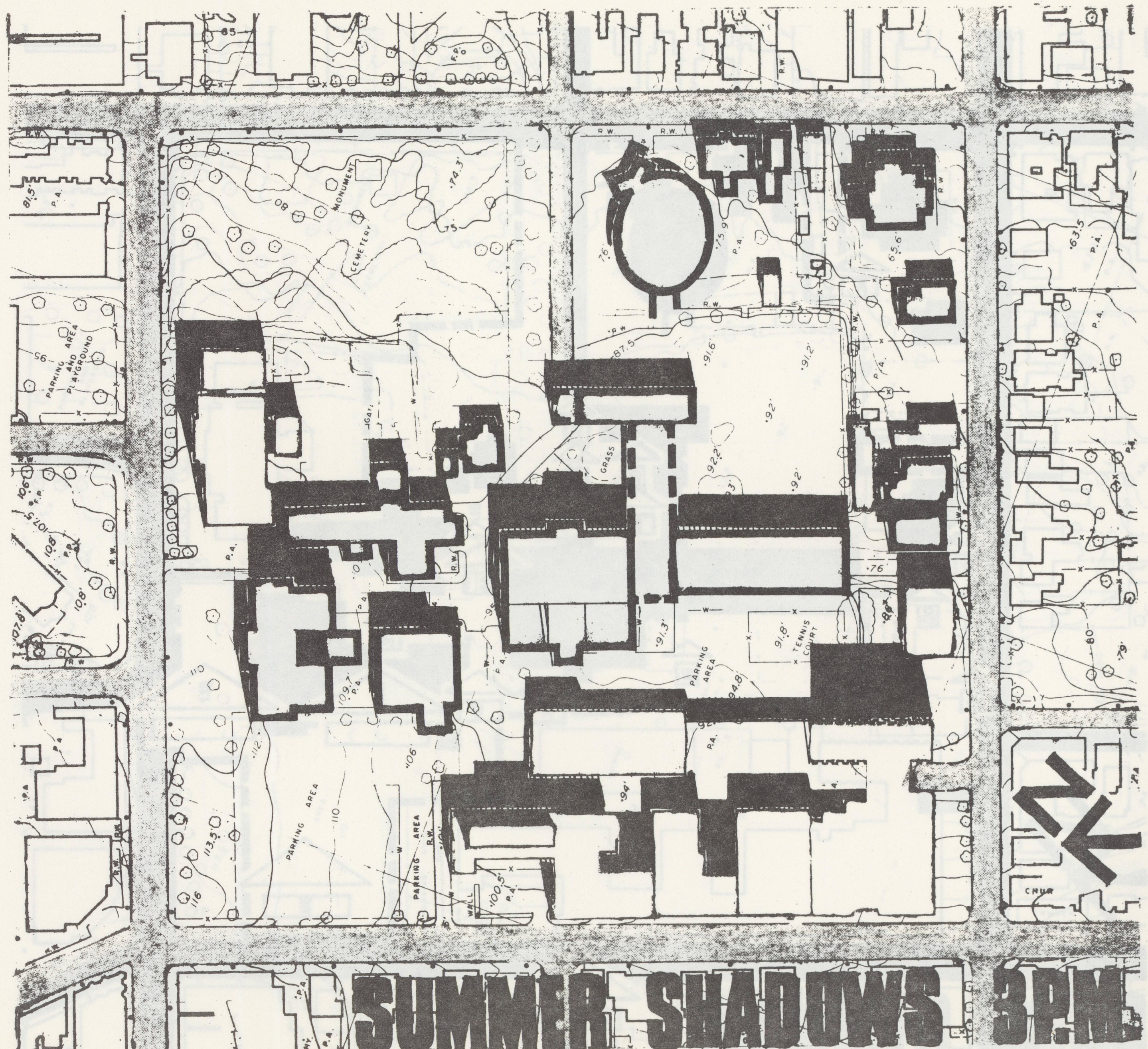

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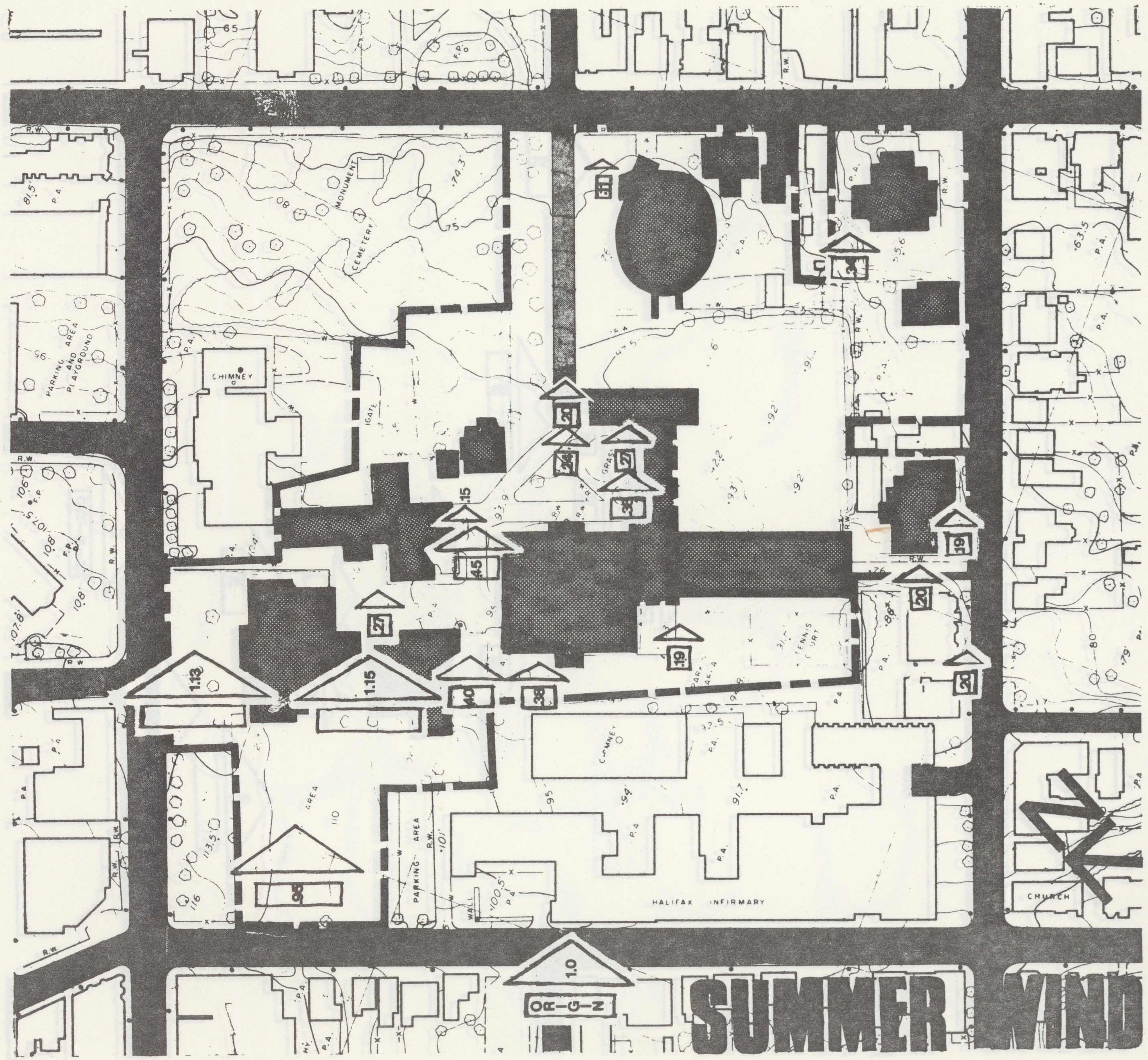

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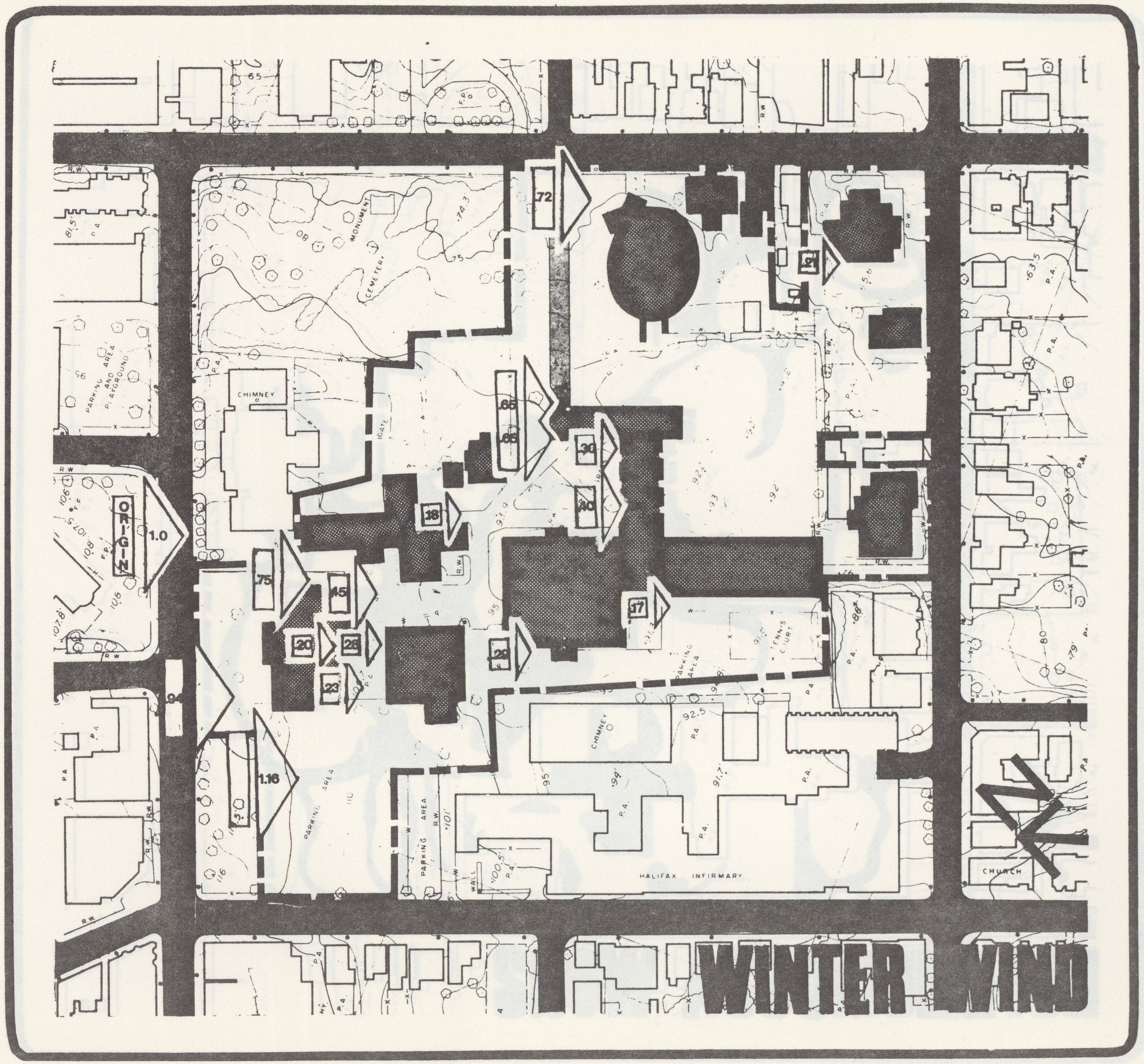

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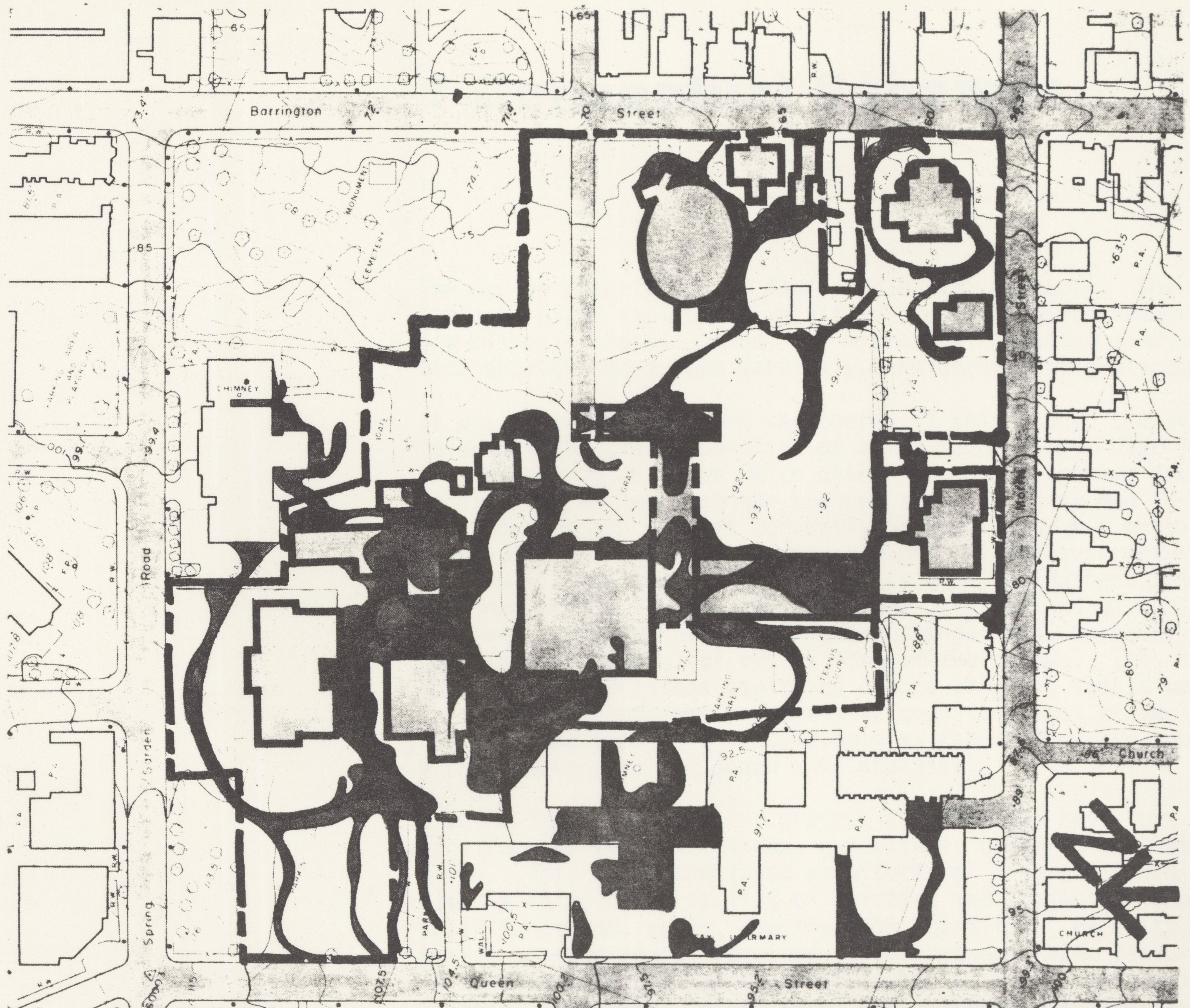

SNOW ACCUMULATION

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III LANDSCAPE DESIGN PROPOSALS

1-Conceptual Schemes

The design phase produced four development concepts. These preliminary plans evolved by adjusting the site design factors to the bio-climatic charts. Thus, the micro-environmental conditions for each outdoor space were carefully considered during placement.

It was agreed that during the course of this study, the terms of reference for the preparation of a landscape campus plan for Nova Scotia Tech is an issue which cannot reach its optimum and final conclusion, at least at the present time. This is due to the fact that Nova Scotia Tech is currently passing through a critical process of re-organizing both academic and administrative structure. A process of soul searching to identify what is the best future role for Nova Scotia Tech in the region has started and has not yet been resolved. The outcome of all these changes will certainly influence and direct the physical visual form of the campus. This is not to say that all decisions regarding campus planning should wait. On the contrary, judgment and creative decisions must be employed and many alternatives must be developed as far as they are supported by a solid data base and sound site analysis.

With no final architecture program at hand, the best this study can provide will be: directions, guidelines, criteria and conceptual plans. This above mentioned architectural program should state clearly things such as list of existing and projected rooms and spaces, their functions, areas, construction, condition, capacity and structures needed, indication of required access between these features, statement of maximum provided budget, description of aimed behaviorial settings, desired character, intensity of use, expected management and service support, staging of capital improvement and above all the quality of each element in terms of lighting, accoustics, furniture, equipment and services.

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The campus development plan should not be just a pretty picture. It should also be a working tool. To be of any use, it must be prepared to serve the present and, so far as possible, the future mission of Nova Scotia Technical College. This essential goal, i.e. workability, can not be achieved at any time without stating an Academic Plan for this institute.

In the last five decades, considerable strides have been made in curricula and in the physical development of technical universities in particular. It is quite probable that the next decade will see even more changes in the way students are taught as well as in what they are taught, and in the required teaching facilities, than has been the case in these last five decades.

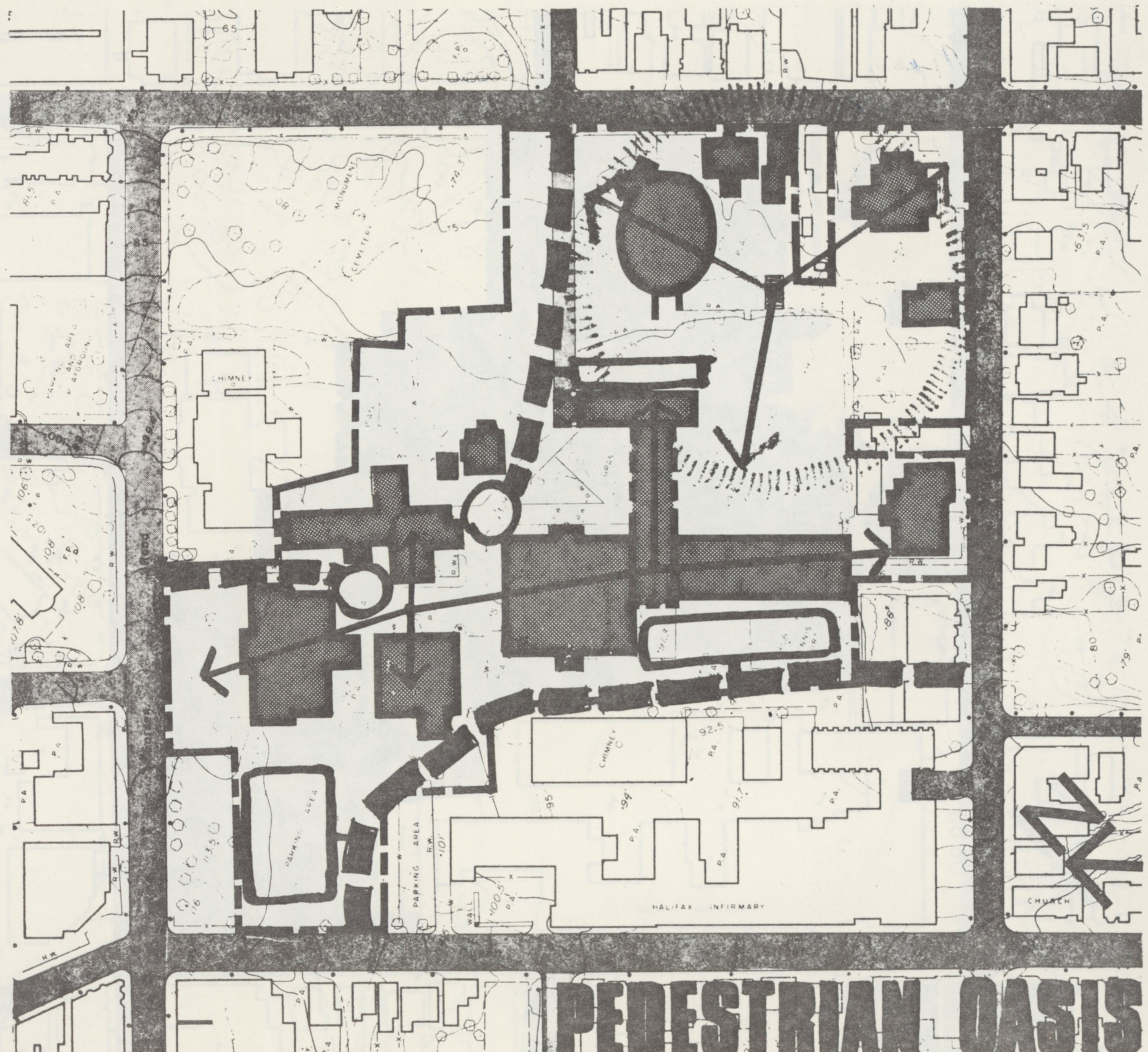
It has been shown clearly during the course of this study that a major problem in producing a campus plan for Nova Scotia Tech is that long-range educational planning has not preceded campus planning studies. This situation is not unique to Nova Scotia Tech. It has been experienced in many other universities.

Apparently, educators are usually reluctant to provide a definite statement of educational philosophy and objectives, partly because the educational program is changing to rapidly that they cannot foresee the future with a great degree of clarity. On the other hand, a campus plan should be based upon these stated educational philosophy and objectives of the college in order to fulfill its purpose. It is inconceivable that in campus planning, the solution would be sought before the problem is defined

The four development concepts produced in the end of the design phase were titled by different names according to their optimum goal. These concepts are: Pedestrian oasis, shown in fig. 24 and 25, Megastructure Central Campus, shown in fig. 26 and 27, Edurecreation, shown in fig. 28 and 29, and Superblock, shown in fig. 30 and 31. The design technique of optimizing a particular objective which has been used to generate these four alternatives is an extremely useful method. In this early stage of campus planning, one can learn about the requirements of a particular function or specific design objective by optimizing for it, while holding other requirements subordinate. By doing this in turn for each of the major functions, the landscape planner gained insight into the complexity of the problem and its hidden conflicts. This method was proven to be a powerful way of getting at the heart of the complex problem of Nova Scotia Tech campus. The site has some obvious dominant functions and objectives whose requirements were identified rather clearly.

None of the four concepts is likely to be more than a directive caricature, but among these designs, and particularly among combinations of them, will be the seeds of a viable preliminary campus development plan. All the proposed four concepts leave some aspects unresolved, and there will be many details to consider in later studies.

Of course, shapes of site features shown on the four design concepts are indicative of location and relationships, they are not intended to be interpreted as final design solutions. Final design forms will be determined as detailed areas studies are funded and larger scale plans executed. Only then, adjustments for a preliminary campus development plan can be completed.



PEDESTRIAN OASIS

A CAMPUS PLANNING STUDY

Nova Scotia Technical College Campus

24

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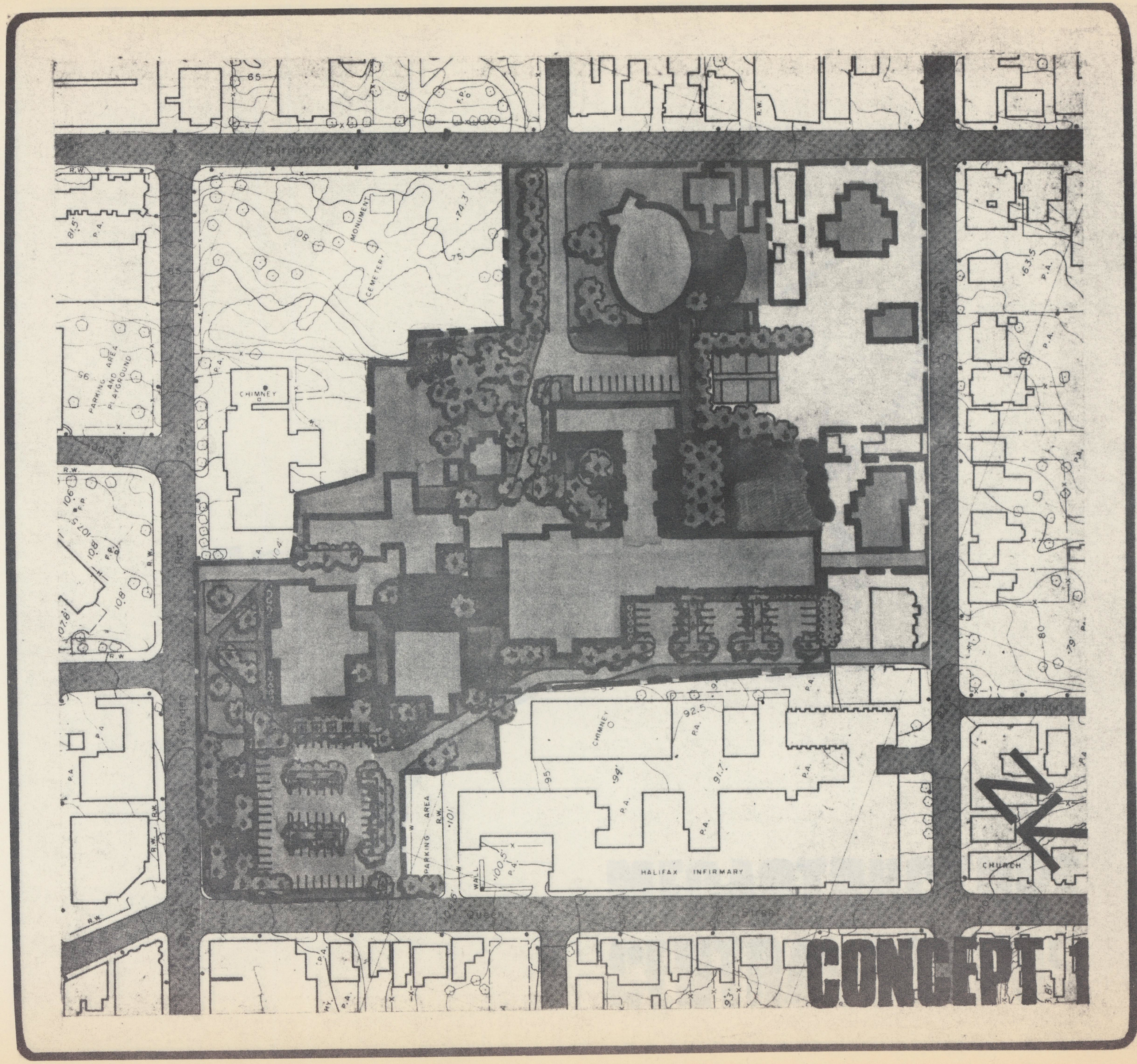
SAFEI HAMED
ARCHITECTURE
PLUS



A CAMPUS PLANNING STUDY

Nova Scotia Technical College Campus

25

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1" = 100'

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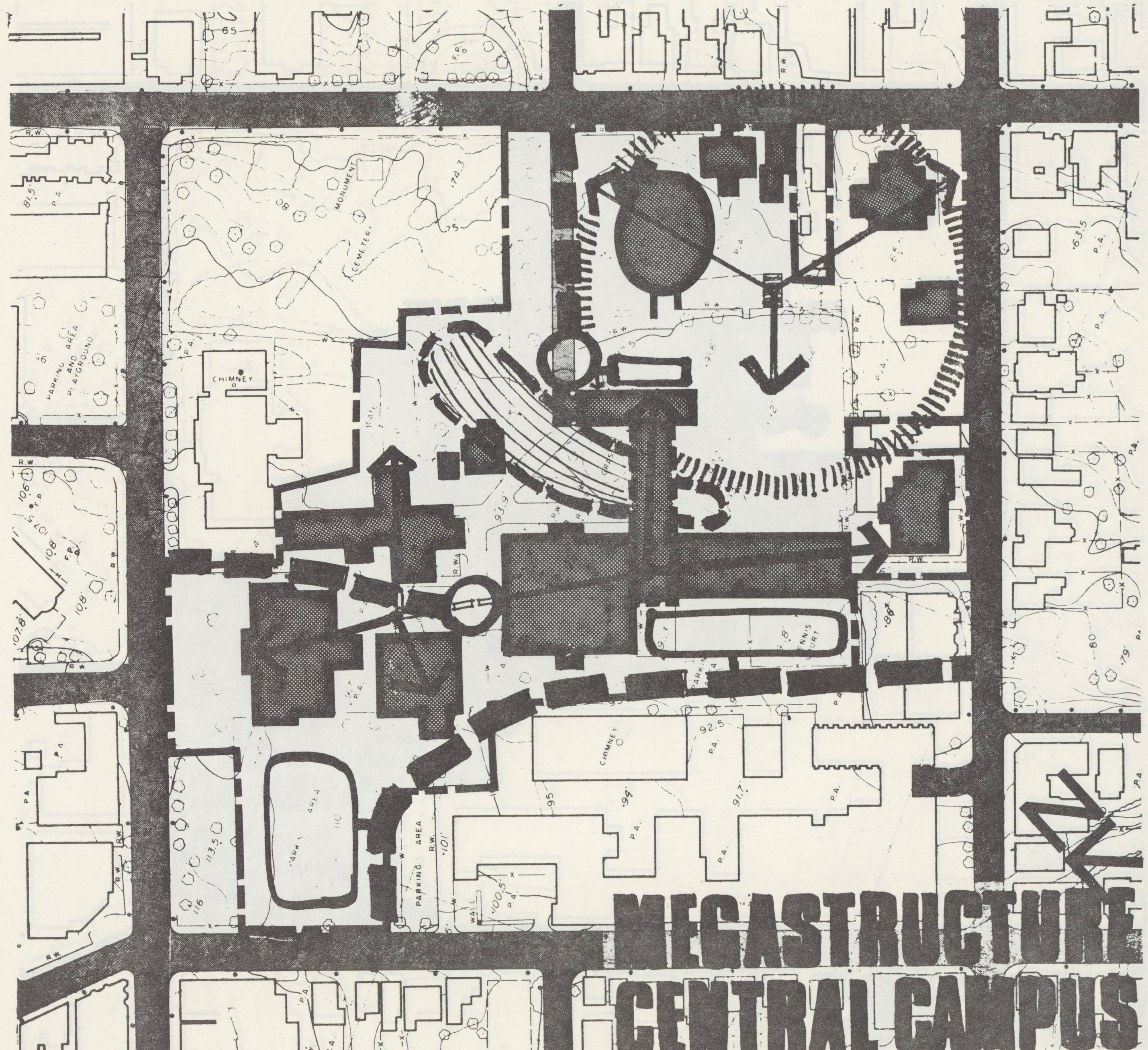

A CAMPUS PLANNING STUDY

Nova Scotia Technical College Campus

26

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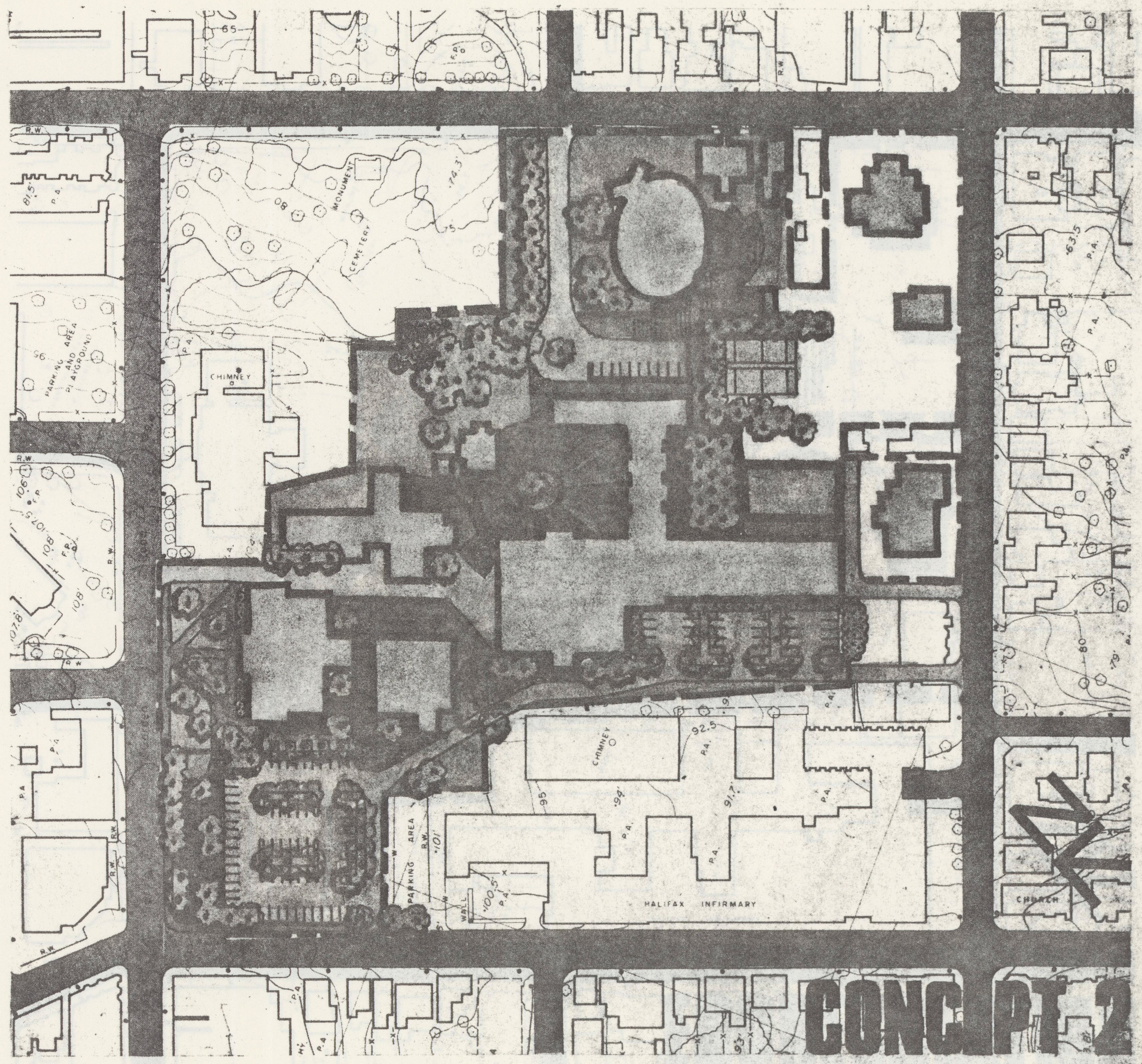

A CAMPUS PLANNING STUDY

Nova Scotia Technical College Campus

27

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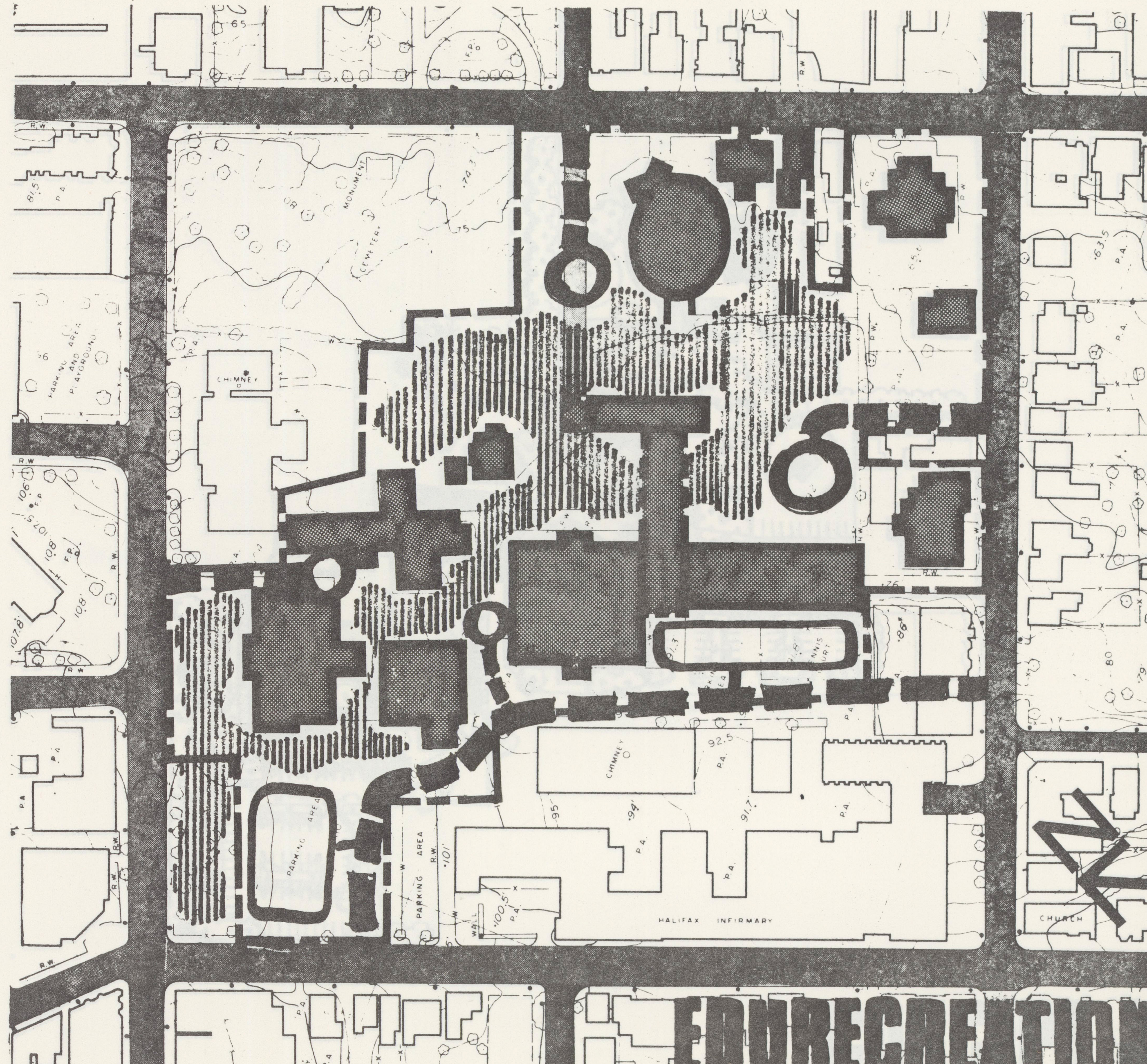

A CAMPUS PLANNING STUDY

Nova Scotia Technical College Campus

28

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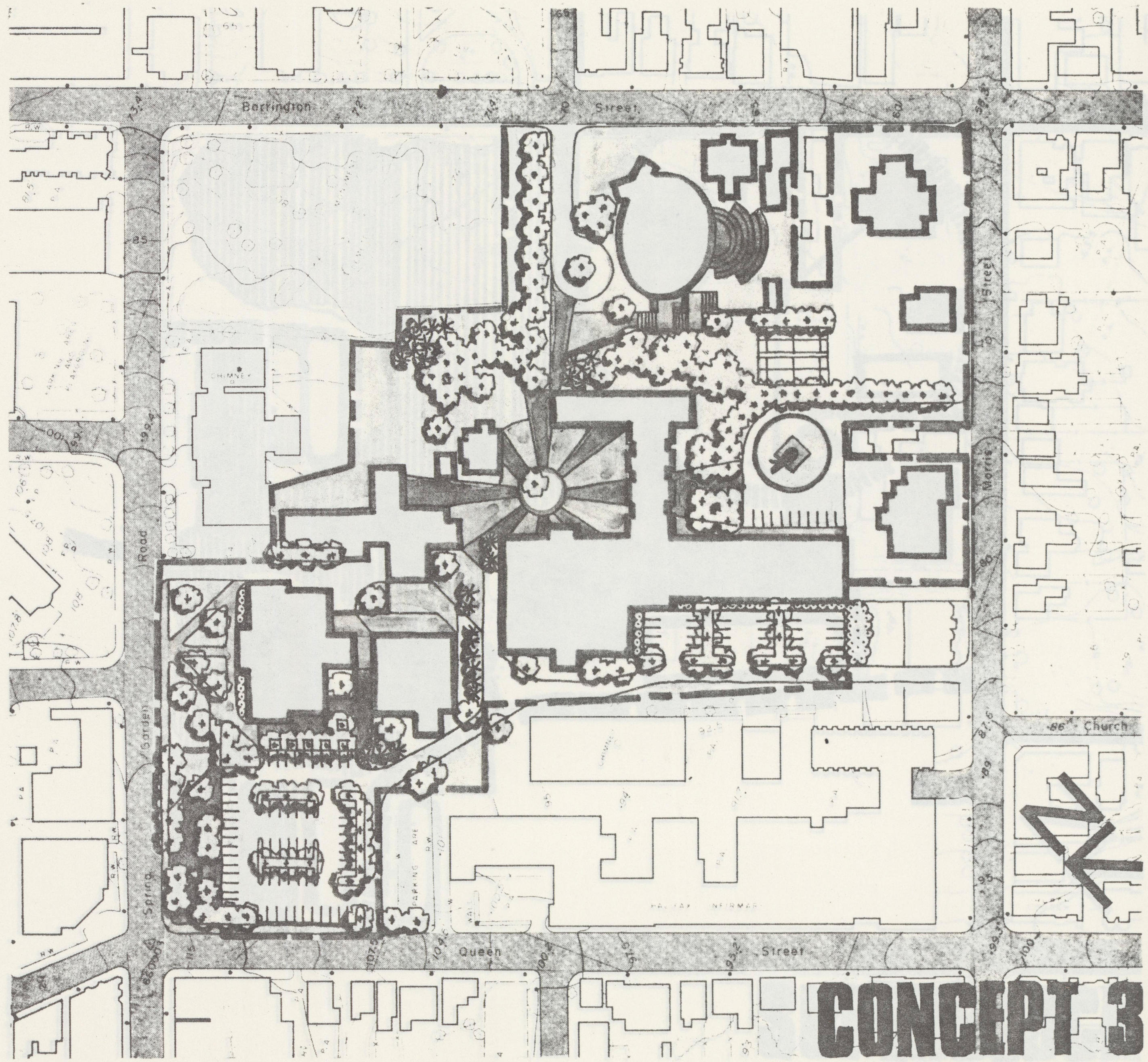

CONCEPT 3

A CAMPUS PLANNING STUDY

Nova Scotia Technical College Campus

29

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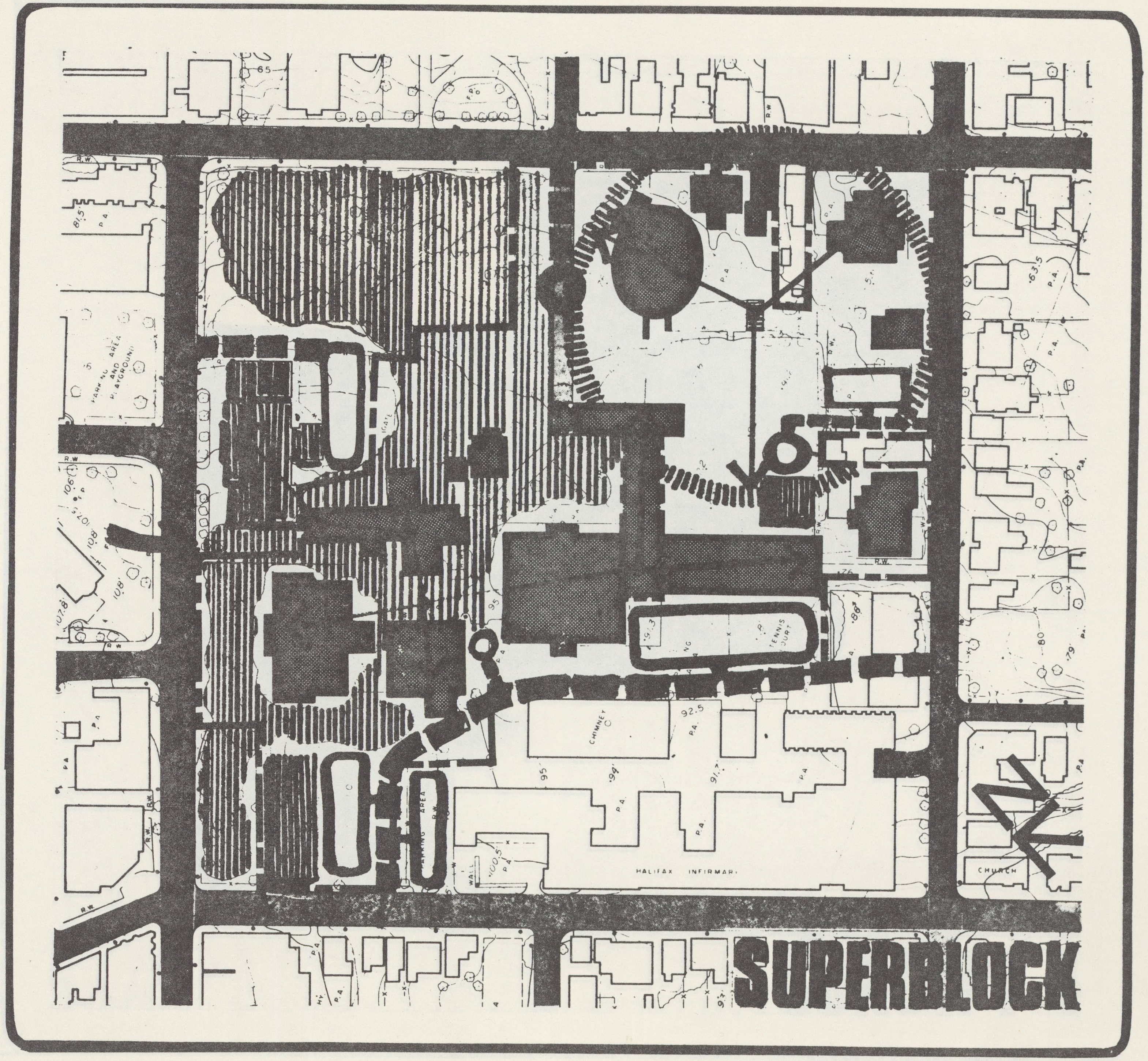


A CAMPUS PLANNING STUDY

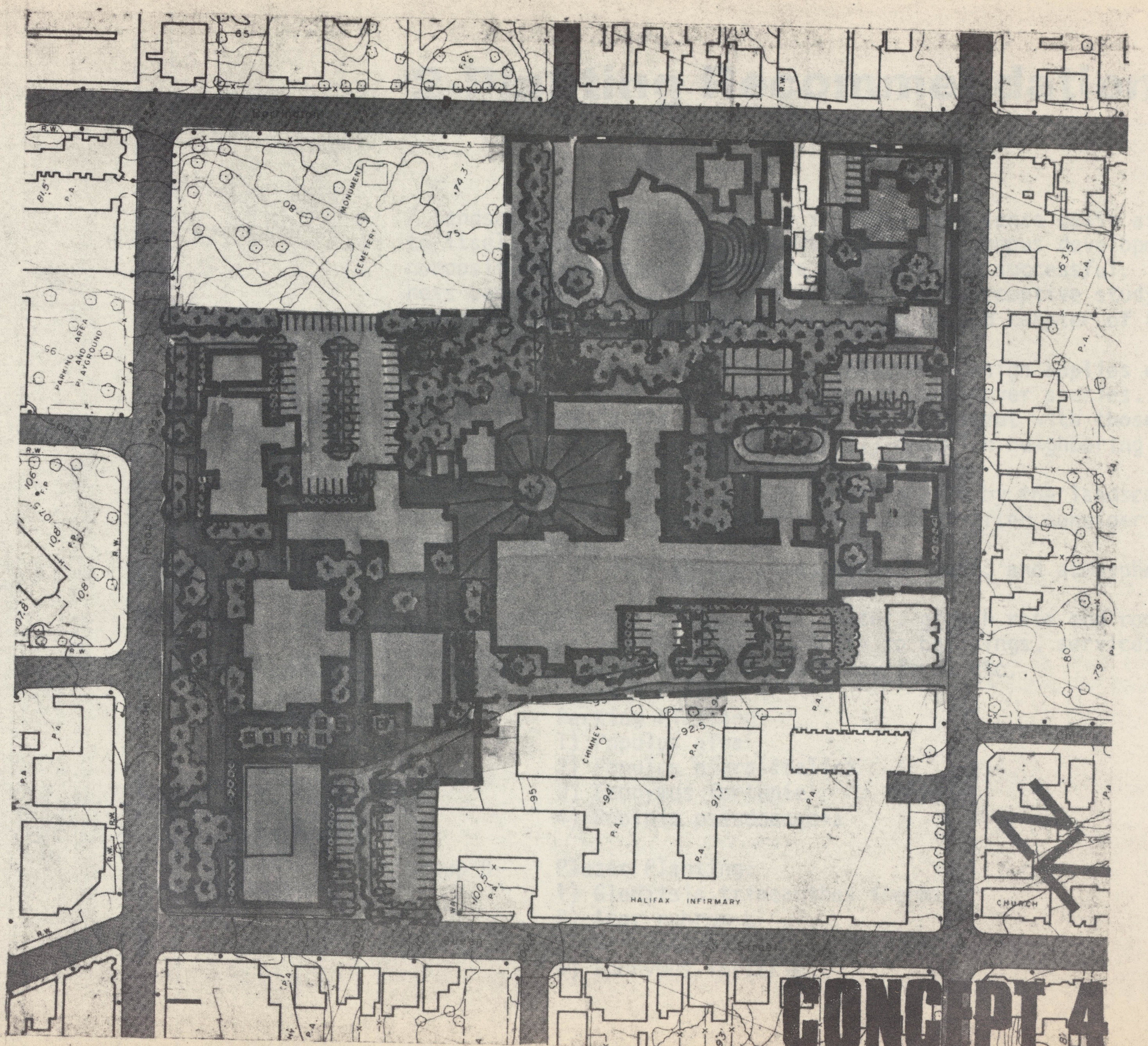
Nova Scotia Technical College Campus

30

October'78

1" = 100'

SAFEI HAMED
ARCHITECTURE
PLUS



A CAMPUS PLANNING STUDY

Nova Scotia Technical College Campus

31

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1" = 100'

SAFEI HAMED
ARCHITECTURE
PLUS

2-Planting Recommendations

A landscape development that by its very excellence calls attention to itself can never be an integral part of a campus development composition and cannot therefore be considered successful. Appropriateness can be attained only by a thorough and perceptive study of all the inventory analysis data described in the second cahpter of this study.

The concept of appropriateness of landscape design applies especially to the selection of trees, shrubs and ground cover species. Plant materials used in the campus should be consistent with those existing on the site (see Table #1, Chapter II) and with neighboring areas.

The following proposed list has been prepared by the landscape architect. These selected trees were chosen after considering many factors such as:

-climatic conditions: wind, frost, shade, and atmospheric pollution,
-natural conditions: soil, water, growth rate and root system,
-physical conditions: proximity to buildings, services and roads,
-design factors: color, texture, form, etc.

Group A   Parking Planting:
1) Populus alba
2) Populus nigra italica
3) Euonymus fortunie
4) Robinia pseudoacacia

Group B   Plazas Planting:
1) Gleditsia triacanthos inermis
2) Acer rubrum L
3) Acer saccharinum L
4) Euonymus fortunie

Group C Natural Areas Planting:
1) Rhus typhina
2) Laburnum vassi
3) Pinus banksiana Lamb
4) Crataegus macrosperma Ashe
5) Betula papyrifera Marsh

Group D Streets and Driveway Planting:
1) Tilia americana
2) Aesculus hippocastanum
3) Pinus divaricata Dumont
4) Tsuga canadensis L

In the four proposed design concepts, three planting design objectives were set forth. The first is to soften the impact of the streets and parking lots on the users of the campus both indoor and outdoor. The second objective is to unify the different architectural elements and outdoor spaces by a harmonious palette of plant materials. The third objective is to reduce the landscape maintenance required by each proposal. Careful thought has been given to assure that the planting scheme does not complicate periodic maintenance such as mowing, pruning and fertilizing.

3-Maintenance Manual

More people see the grounds and the open spaces of the campus than ever see inside its buildings. The condition of these open spaces makes lasting impressions on students, staff, faculty and visitors. It is strongly recommended that adequate money should be budgeted for site development at the same time it is budgeted for a building or a campus facility.

i) BUDGET:

It is advisable to request the landscape maintenance supervisor to examine the financial records of the past 5 - 10 years. By doing so, he should be able not only to compute the total costs for the campus grounds maintenance, but also to extract the costs of each individual operation. This will help the Physical Plant Director and the Landscape Architect to determine which maintenance practices should be continued and at what level, on the basis of the cost of each. The typical maintenance budget will be comprised of the following items:

-Supervisor Salary	13%
-Maintenance crews wages	45%
-Equipment operation	2%
-Supplies and equipment	5%
-Equipment repairs	2%
-Lost Time	2%
-Equipment rental	1%
-Overhead (Itemized)	30%

The percentages shown above indicate a typical maintenance operation. Of course, Nova Scotia Tech operation would be somewhat different, but this breakdown illustrates the many items that must be included in budgeting for the campus landscape.

ii) STAFF:

The most important part of the landscape maintenance operation is the employees actually doing the work. Only qualified and well-trained personnel can complete the necessary maintenance of the plant materials on campus.

There is obviously a great deal of merit in Nova Scotia Tech having a landscape section capable of doing landscape construction and maintenance such as grading, drainage, irrigation, fertilizing, sodding, seeding, and the planting of trees, shrubs, and all other plant material. Additional construction work, such as walks, paving, retaining walls, patios, steps, and painting can be done by other sections of the Physical Plant. The key employee in such a section is the crew chief or the head gardner. He will control to a large extent the quality and the quantity of work completed in the landscape section by a well-trained crew. However, he should not be the one to determine how and where landscape features are to be built or where landscape plantings are to be made. These should be the responsibility of the landscape architect.

Because well-trained landscape crew members are extremely difficult to find, especially in the Atlantic region, too often an untrained person may be hired. It is recommended then to arrange a short training course in some of the basic principles of landscape maintenance. This will repay dividends in better workmanship, more enthusiasm for the job and possibly improved efficiency.

Because efficiency is a prime concern in the operation of any campus, maintenance schedule should be evaluated on a weekly or biweekly basis, and each operation should be recorded, to ascertain if it was successfully completed within the allocated time. A yearly assessment should develop a more realistic schedule for the following year. In the following table is a list of the time required to complete some of the typical landscape maintenance operations:

	OPERATION	MINUTES
1)	Mowing 1,000 square feet area with hand-maneuvered 20 inch mower	15
2)	Edging 100 feet by hand or mechanically	45
3)	Fertlizing 1,000 square feet area with rotary spreader	5
4)	Spraying 1,000 square feet with a back-carried tank	10
5)	Spraying three-inch caliper tree	25
6)	Spraying eight-inch caliper tree	16
7)	Pruning heavily three-inch caliper tree	15
8)	Pruning heavily eight-inch caliper tree	60
9)	Spraying 1,000 square feet of ground cover	10
10)	Watering	Variable

From the above mentioned average time, the clear saving achieved to Nova Scotia Tech by retaining a specialized landscape section appears obvious.

iii) EQUIPMENT:

Proper equipment for construction and maintenance is a necessity. Without the right equipment, it would be next to impossible to develop and maintain an adequately landscaped campus. The following are pieces of equipment that previous studies have shown to be extremely useful in developing and maintaining college grounds of similar size: a combination front-end loader and back hoe, a motor patrol, a water wagon for watering hard-to-reach trees, shrubs, and sections of lawn, a power sprayer that will reach to the top of tallest tree, a tractor equipped with a pressurized tank and a sizable boom to keep weeds under control, a flail mower, motorized auger that digs holes for signs, fences, shrubs, and tree plantings, a sod cutter, two lawn rollers, and an aerator. The final list can only be drawn after most of the uncertain factors regarding the campus development plan and the academic/administrative plan for the college are announced. Whether to buy this equipment or to lease it occasionally is a decision that must be made but after close examination of all the points mentioned above such as budget, staff and future plans.

iv) TREES MAINTENANCE:

The development of a maintenance schedule for all existing and new trees is essential if the campus is to be cared for properly:

a) Inspection

All trees should be subject to an annual inspection to insure proper tieing, adequate staking, fertilizer application, and weed clearance.

b) Pruning

For needed trees, pruning should be considered separately. Each tree should be pruned in relation to its age, shape, size, character and condition.

c) Surgery

When necessary, tree surgery should only be given by a trained and experienced person. Such surgery, if successful can often extend the useful life of a tree.

d) Watering

Regular watering is essential for all plant materials, however, newly planted trees need lots of watering during their first few seasons, and more so during periods of drought.

e) Feeding

Established trees usually need little feeding, however, careful cultivation should be carried out and followed by a good mulch if any construction occured around the tree trunk.

f) Fertilizing

Fertilizing should be done regularly, preferably in early Spring.

The amount required for fertilizing is a 10-6-4 fertilizer at the rate of 50 g/mm of caliber per tree, 0.5 kg. per individual shrub, and 12 kg./100M^2 surface of flower beds.

The recommended method of applying fertilizer is by drilling holes approximately 30 cm. deep, starting at the dripline of branches and working towards the trunk. There should be one hole every 1/10 M^2. Required fertilizer should be evenly divided over holes and watered in well.

v) GRASS MAINTENANCE:
Good turf depends on a realistic maintenance program based on availability of labour, materials, machinery and their economic deployment.

a) Mowing:
Mowing should be done weekly to a height of not less than 1 1/2" during the growing season. It should not be allowed to grow any higher than 3", this will help to promote dense growth and avoid the necessity of removing large quantities of clippings. It is recommended that grassed areas in campus should be cut when it is completely dry.

b) Watering:
Watering of sodded, plugged, or sprigged areas is extremely important. It should be ensured, however, that it is done only when required. Enough water should be applied to penetrate the soil at least five inches at every watering.

c) Weed Control:
Weeds always represent a serious problem which needs more attention in urban sites because of many adverse conditions. It is recommended to use a kind of herbicide that will not injure the young grass or damage the surrounding trees, shrubs and flowers. The quickest way to eliminate broad leaf weeds such as dandelion, and plantain, is to use 2,4D. The latter, with the additive "Silvex" may be successfully used in the control of clover and chickweed.

d) Fertilizing:
Fertilizer should be applied by a mechanical spreader in late August to early September every year and also in early Spring. It should be applied only when the grass is dry and be washed well with water. This can be done by means of a hose or sprinkler to obtain moisture penetration of at least two inches.

The amount required is about 7 kg./100M^2. It should be a balanced turf fertilizer, either a non-burning chemical or organic type with an analysis of 10-6-4 or 7-77.

4-Cost Estimates

It is too premature to provide detailed cost implications of landscape campus development, without finalizing the contents of the future academic plan and development plan. However, from previous experience in similar projects, it will not be too ambitious to allocate between 0.50% to 1% of the total capital cost to new landscape projects.

In general site construction costs are typically minimized by a regularity of form, by compact arrangements, by reducing expensive features such as driveways and roads, or, of course, by lowering standards. For an urban campus such as Nova Scotia Tech, lower standards would mean increased maintenance cost. Other universities are already suffering from these discounted maintenance costs which run greater than initial construction costs. Therefore, allowable maintenance cost, as well as initial cost, should always be part of final development program.

To provide a basis for making rough first cost comparisons between alternative design concepts, the following list of some landscape items are given:

- a) Hydroseeding of secondary areas
- b) Playfield, seeding and fine grading
- c) New trees, in place, including two year maintenace
- d) Sodded swales
- e) Concrete gutters
- f) Concrete culvert
- g) Concrete retaining wall
- h) Freestanding brick screen walls
- i) Chain link fences
- j) All-weather tennis courts
- k) All-weather basketball courts
- l) Wood benches

m) Concrete steps
n) Brick or asphalt block pavement
o) Snow melting systems
p) Lighting roads, walks and park areas
q) Signage system (outdoor only)
r) Sculpture (outdoor only)
s) Plant materials (indoor plantscaping)
t) Professional fees
u) Contractor's profit and overhead

5-Conclusion

During the initial phases of this study, intensive efforts were made by the Landscape Architect and the Physical Plant Director to examine the impact of future implementation of the four design concepts on the day-to-day operation of the campus. These efforts were primarily aimed at making the best use of the base data and the inventory analysis phase. It also explored future directions needed for policy making for the site planning process within this campus. This study points clearly to the need for further and more in-depth studies of several issues and it marks the beginning of a long and challenging task facing all parties involved.

Several conclusions and recommendations have been drawn regarding major issues of Nova Scotia Technical College campus. They were listed within the different chapters of this study under the proper heading. It is necessary, however, to summarize the highlights of these conclusions in the following points.

- Nova Scotia Tech campus provides a great opportunity for planners, landscape architects, and architects to reverse the deterioration of our urban environment. The campus because of its nature and scale, can and should be a model for the whole community in achieving both environmental quality and efficient use of energy. However, a design approach is needed in this respect especially in the area of Site Planning.
- There should be immediate and definite design solutions to the growth of the campus and the flexibility in the use of its spaces both indoors and outdoors.

-The landscape architect should participate in every stage of the campus design process. This is justifiable because the nature of campus life in which open spaces are usually extensively used. Also, because careful site planning can contribute considerably to the efficiency of the campus operation.
-Any planning or design work should begin by considering the patterns of pedestrians, traffic, and communication.
-Because the creation of a learning environment is the basic objective of Nova Scotia Tech, the four proposed concepts have reflected this as basic determinants of each scheme. The good learning environment means a lot of things far beyond the obvious requirements for shelter and access. Therefore, each concept raises one or more issues as intended behavior, privacy, staff interaction, students requirement, campus image, stimulus, and community relations.

The real challenge now facing the administration of Nova Scotia Tech is to ensure that these implicit goals of education will be translated into explicit physical forms that are both efficient and enjoyable.