

THE DEVELOPMENT OF
PLANNED INDUSTRIAL DISTRICTS IN THE
BOSTON METROPOLITAN AREA

by

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B.S., Yale University (1950)

Submitted in partial fulfillment of the
requirements for the degree of
Master in City Planning
at the
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Author

↓

Graduate House
Massachusetts Institute of Technology
Cambridge 39, Massachusetts
December 30, 1953

Professor Frederick J. Adams, Head
Department of City and Regional Planning
School of Architecture and Planning
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

Dear Professor Adams:

I respectfully submit The Development of
Planned Industrial Districts in the Boston Metropoli-
tan Area as my thesis in partial fulfillment of the
requirements for the degree of Master in City Planning.

Very truly yours,

William F. Lipman

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ABSTRACT

This thesis examines the desirable characteristics which should guide the establishment of planned industrial districts, sometimes called "estates" or "centers", in the Boston Metropolitan Area. It is especially concerned with the factors influencing the location and design of such districts.

The study analyzes factors affecting the location of 40 new plants established in the study area between January 1946 and July 1953. The analysis attempts to show what the controlling or important factors are, and how they may influence the development of districts in the metropolitan area. The analysis is developed by examining the concrete physical facts surrounding these 40 locations as well as by examining the opinions of the firms with regard to a set of questions on various aspects of districts development.

The following findings are suggested by the study:

1. The development of planned industrial districts in the BMA is entirely feasible. The tenants of such districts will generally be plants requiring sites less than 10 acres in area. However, almost all types of industry and sizes of individual plants may be accommodated in these districts.
2. New districts appear likely to be located at least 5 miles distant from the central area. The character of the location reasons and opinion replies given by the majority of the firms indicates that there are obstacles to the utilization of urban redevelopment procedures for establishing districts in the central area.
3. Factors associated with labor, transportation, and site design are accorded most weight in location decisions. The most important financial consideration has to do with the advantages of leasing site and buildings.
4. Where planned districts have been established, greater attention has been paid to harmonizing such development with the existing and proposed development of the community immediately concerned than in the cases of individual location of new plants.
5. The study appears to indicate that new districts need not be intimately related to residential areas or localized labor pools in the usual case. It further indicates that very much more precise knowledge of transportation and labor requirements as well as the controlling factors for different types of industry must be obtained for the successful achievement of the plans of district developers and community planners.

Thesis Adviser

Louis B. Wetmore,
Visiting Professor
of City Planning

PREFACE

I wish to thank personally the following persons for the direction, encouragement, and assistance given me in the preparation of this study:

Professor Louis Wetmore, Department of City and Regional Planning.

Mr. Alexander C. Forbes, Jr., and Mr. Daniel Wheeler, Cabot, Cabot and Forbes, Industrial Realtors, Boston.

The overseas officials who generously helped an unknown American student:

Mr. M. D. Methven, Northeast Trading Estates, Ltd.
Mr. V. D. H. Elkington, Treforest Trading Estate
The Honorable Secretary, Slough Estates, Ltd.
Mr. J. Ilett and Mr. E. A. Wolfe, HM Board of Trade
Mr. Frederick Gibberd, Harlow New Town

Mr. William Wainwright, Cambridge, Massachusetts

Miss Catharine Shillaber, Rotch Library

Miss Phyllis Brown

W.F.I.

INTRODUCTION

A. Purpose of the Study

The development of land for industrial purposes has evolved from piecemeal parcelling to the acquisition, planned design and unified control of extensive tracts upon which a number of industrial enterprises (and perhaps a few commercial uses) may operate efficiently under modern conditions. This study concerns itself with the location, design and control of such planned industrial districts.

The basic purpose of the study is to determine, drawing upon the location experience of a particular group of plants, the desirable characteristics of the districts that might be established in the Boston Metropolitan Area.

The supporting purposes are to examine the nature of the locations made by plants in the area in order to find how the physical facts of their location might condition the development of planned districts, and to determine, on the basis of their stated opinions, what criteria the plants themselves consider to be controlling in the location, design and control of such districts, and what weight they assign to these several factors.

B. Scope of the Study

The study deals with 40 plants which occupied new sites in the Boston Metropolitan Area between January 1946 and July 1953. The great majority of these plants are located on individual, unrelated sites throughout the area. A few are located in the Newton Industrial Center, near Route 9 at the Newton-Needham line.

Based on a previous thesis, plants were selected on the basis of a minimum investment of \$250,000. These \$250,000 plants constitute virtually 75% of the 40 study plants. Seven of the 10 remaining distributive plants are located in a district developed in a unified manner by a single developer.

It is believed, on the basis of field investigation, interrogation of officials in public and private agencies, and current information generally available that these plants represent substantially all new plant development, of significant size, in the study area.

For the purposes of this study, the study area is considered to be that bounded by a 20-mile radius from the State House.

Primary emphasis is on physical aspects of district development. Only very limited financial information was solicited -- for two reasons. First, the detailed economic background of industrial location and development is beyond the scope of this thesis, and secondly, it was felt that such questions would prejudice informants against cooperating.

The study is essentially analytical in nature and restricts itself to an examination of a relatively small group of plants in the Boston area. It is neither meant to be nor is it felt that it should serve as basis for comparison with other metropolitan areas except in the most general sense.

C. Method

Two sets of data were collected. One represents basic factual information about the companies and their plants and the reasons they

stated for locating at their new sites. The other set presents their opinions and/or replies with regard to questions concerning the location, design and establishment of planned industrial districts in the area (BMA).

A supplementary source of information resulted from the informal comments, suggestions and experiences gathered informally in the course of the interviews.

The material was gathered by personal interview according to a mimeographed questionnaire. The formal questions and answers were supplemented, as noted above, by informal conversation where other information was volunteered, usually on matters peculiar to the plant or industry at hand.

A final source of material consists, of course, of related information from the literature, from planning practice, and with their very kind cooperation, from the experience of several British industrial estates.

D. Limitations

While the questionnaire was considered rather straightforward and simple in nature, a limitation certainly exists with respect to the degree of skill and manner in which the questions were formulated and in the way that they were asked at the interview. Certain "opinion" questions required amplification. In some cases, management did not answer readily and required a little "probing" or a few "leading" remarks. In some few cases, answers were not obtained from all plants in the study or the answers were meaningless for the purposes of the study.

An important question naturally occurs as to the validity of the replies received -- particularly the opinion replies. It is appropriate to state here that in most cases the author spoke to responsible top officials (in a number of cases the top official) and in almost all cases received frank and extended replies and assistance.

The validity of the generalizations contained in the conclusions and elsewhere in the body of the study is, of course, related to the very limited size and to the character of the sample as well as to the local circumstances operating in the area to influence industrial development.

PLANT CHARACTERISTICS

A. Selection and Classification

Initial selection came from the M.C.P. Thesis of James Gardner¹ which dealt with many of the same plants in this study. The common source for these plants was a local industry publication.² Other plants were found through conversations with plant officials, faculty members and a few by chance observation in the field.

Table 1, following, indicates the composition of the group according to the Standard Industrial Classification Code³ of the U.S. Census. Plants engaged in manufacturing are denoted in this thesis as

¹James R. Gardner, An Analysis of Postwar Industrial Building Location in the Boston Metropolitan Area, M.C.P. Thesis, M.I.T., January 1953.

²Industry, Associated Industries of Massachusetts.

³Census of Manufacturers, Volume 1, Appendix C (1947).

M plants; warehouse and warehouse-sales-service plants are denoted as D plants. These D plants are included because they are an essential part of the industrial scene, constitute a significant portion of new construction in the area and because they are especially well suited to planned districts.

B. Location

Map 1 and Table 2, following, give the individual location of each plant in the study, and the table gives the former locations in the case of relocated firms.

Table 3 shows both the generalized areal location and the radial distribution of all plants as they are either: principal or branch, new or relocated.

Table 4 relates their new location (by generalized areas) to their former sites.

In Tables 3 and 4, the word "area" denotes a group of industrial sites developed approximately at the same time along a common street or streets and/or rail facilities, i.e., an "industrial neighborhood". The word "town" indicates merely the geographical location of one or more individual plant sites.

Only one bona fide "district" occurs in the study area. It is the Newton Industrial Center, developed by Cabot, Cabot and Forbes of Boston. The Cambridge Parkway Area consists of a group of plants, all warehouses, which were developed along a portion of Memorial Drive, immediately after the war, by Cabot, Cabot and Forbes with the cooperation of the City of Cambridge which made available land previously held as a recreation reserve known as the Cambridge Parkway Trust. For con-

venience, several plants closely adjacent to this development along the Drive are included with the warehouse firms in locational designations and other tabular treatment.

The West Cambridge Area includes a number of sites developed along, and with the cooperation of, the Boston and Main Railroad. The Soldiers Field Road Area comprises a group of individual plants which located over a period of several years along a strip of available land between the Charles River and Western Avenue.

The radial distribution of plants by industry type is given in the following tabulations:

<u>RADIAL DISTANCE</u>	<u>NON-DURABLE*</u>	<u>DURABLE**</u>
0-5 miles	6	5
6-10	2	2
11-15	2	4
16-up	-	2

*Omits three research firms in the 0-5 ring.
 **Omits two research firms in the 0-5 and 6-10 rings.

- - - - -

	<u>STANDARD INDUSTRIAL CLASSIFICATION</u>										
	<u>20</u>	<u>22</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38*</u>	<u>W</u>
0-5 (22)	2	1	2	1	1	1	2	1		2	9
6-10 (6)	1	1					2			1	1
11-15 (6)					2		1	2	1		
16-up (2)								1	1		

*Omits two research firms

TABLE 1. Classification of Interviewed Plants

<u>SIC</u>	<u>CLASSIFICATION</u>	<u>NUMBER</u>
20	Food and Kindred Products	3
22	Textile Mill Products	2
26	Paper and Allied Products	2
27	Printing and Publishing	1
28	Chemical and Allied Industries*	3
34	Fabricated Metal Products	2
35	Machinery (except electrical)	3
36	Electrical Machinery	6
37	Transportation Equipment	1
38	Instruments and Related Products**	6
		<u>30</u>

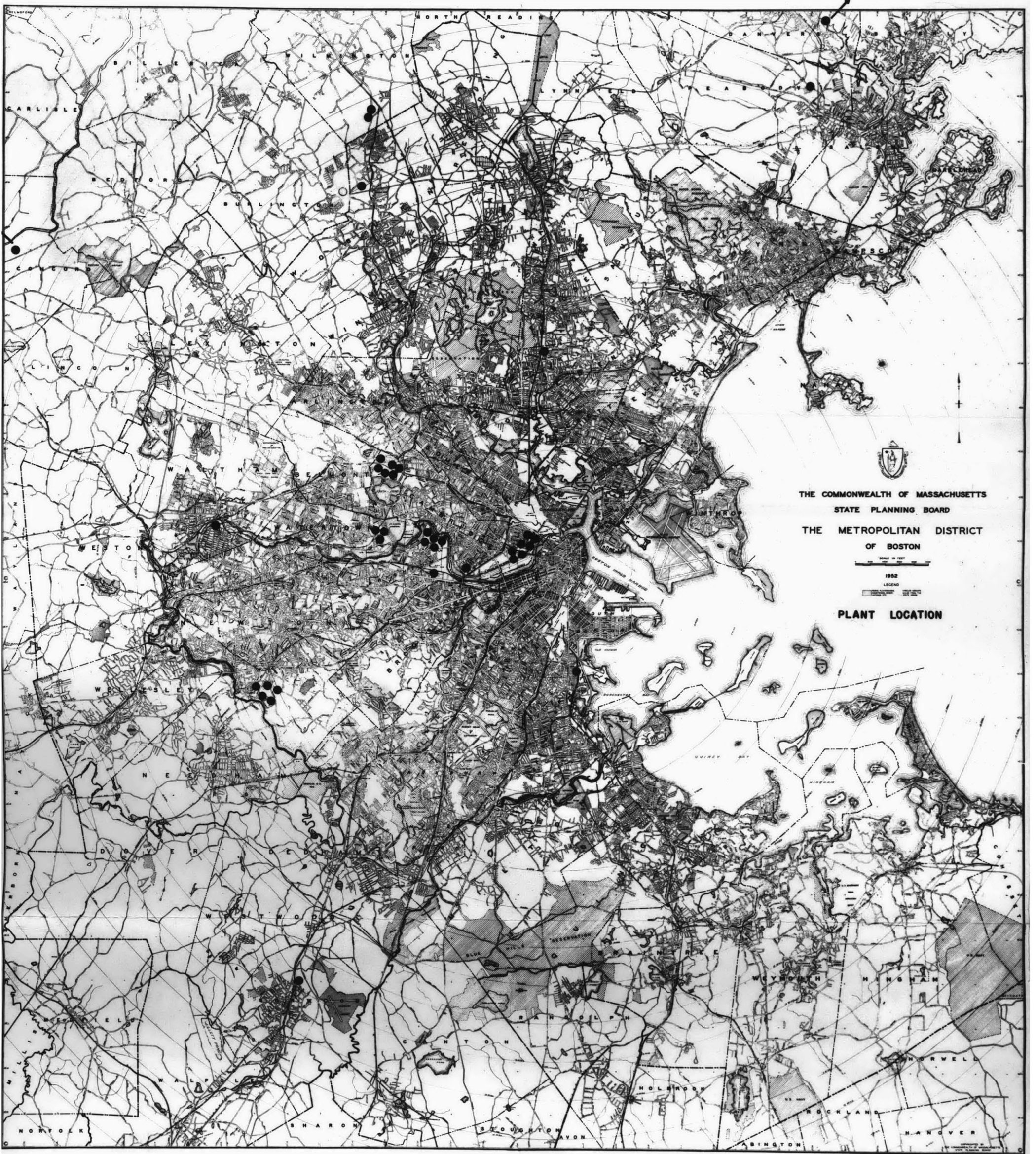
Ten plants primarily engaged in warehousing are classified as to parent industry as follows:

20	Food and Kindred Products	1
23	Apparel and Related Products	1
26	Paper and Allied Products	1
28	Chemical and Allied Products	2
33	Primary Metal Industries	2
35	Machinery (except electrical)	2
36	Electrical Machinery	<u>1</u>
		<u>10</u>

Source: Volume 1, Appendix C, U.S. Census of Manufacturers (1947).

*Includes one Research and Development Plant

**Includes two Research and Development Plants.



THE COMMONWEALTH OF MASSACHUSETTS
STATE PLANNING BOARD

THE METROPOLITAN DISTRICT
OF BOSTON

SCALE IN FEET

1952

LEGEND

PLANT LOCATION

TABLE 2. Geographical Data

<u>PRESENT LOCATION</u>	<u>M</u>	<u>D</u>
Beverly	1	-
Boston	1	-
Brighton-Allston	6	-
Cambridge	-	1
Cambridge Parkway	2	5
West Cambridge	3	3
Concord	1	-
Danvers	1	-
Framingham	1	-
Melrose	1	-
Norwood	1	-
Newton	4	1
Waltham	2	-
Watertown	3	-
Woburn	1	-
- - - - -		
<u>PRIOR LOCATION</u>		
Beverly	1	-
Boston	13	10
Brighton-Allston	2	-
Cambridge	2	-
Newton	2	-
Waltham	1	-

TABLE 3

<u>RADIAL DISTANCE</u>	<u>M</u>	<u>BRANCH</u>	<u>PRINCIPAL</u>	<u>NEW</u>	<u>RELOCATED</u>	<u>D</u>	<u>BRANCH</u>	<u>PRINCIPAL</u>	<u>NEW</u>	<u>RELOCATED</u>
0-5 miles	15	6	9	4	11	9	5	4	-	9
6-10	6	2	4	1	5	1	-	1	-	1
11-15	6	3	3	2	4	-	-	-	-	-
16-up	2	1	1	1	1	-	-	-	-	-
	<u>29</u>	<u>12</u>	<u>17</u>	<u>8</u>	<u>21</u>	<u>10</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>10</u>
<u>AREA</u>										
Cambridge Parkway	2	-	2	1	1	6	4	2	-	6
West Cambridge	3	2	1	1	2	3	-	3	-	3
Soldiers Field Rd.	5	1	4	-	5	-	-	-	-	-
Newton Ind. Ctr.	4	3	1	2	2	1	1	-	-	1
	<u>14</u>	<u>6</u>	<u>8</u>	<u>4</u>	<u>10</u>	<u>10</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>10</u>
<u>TOWN</u>										
Watertown	3	2	1	1	2	-	-	-	-	-
Wilmington	2	1	1	-	2	-	-	-	-	-
Route 128	3	1	2	1	2	-	-	-	-	-
Boston	2	1	1	-	2	-	-	-	-	-
Other	3	2	1	2	1	-	-	-	-	-
	<u>13</u>	<u>7</u>	<u>6</u>	<u>4</u>	<u>9</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

TABLE 4

<u>AREA</u>	<u>PLANT</u>	<u>BRANCH-PRINCIPAL</u>	<u>OLD SITE</u>
Cambridge Parkway	M-1	P	Beech Street, Boston
	D-1	P	Kingston and Essex Streets, Boston
	D-2	B	Commonwealth Avenue, Brookline
	D-3	P	Kingston Street, Boston
	D-4	B	Causeway Street (North Station), Boston
	D-5	B	Commonwealth Avenue, Boston
	D-6	B	Commonwealth Avenue, Boston
West Cambridge	M-1	B	Newton
	M-2	P	Boston
	D-1	P	Boston
	D-2	P	Boston
	D-3	P	Boston
			(South Station District)
Soldiers Field Road	M-1	B	Boylston Street, Brookline
	M-2	P	Waltham
	M-3	P	Boston
	M-4	P	Brighton
	M-5	P	Newton
Watertown (vicinity Mt. Auburn Cem.)	M-1	B	Boston
	M-2	B	Allston
Newton Center	M-1	B	Boston (South Station District)
	M-2	P	Boston (South Station District)
	D-1	B	Boston (North Station)
Wilmington	M-1	P	Cambridge
	M-2	B	Chelsea
Route 128	M-1	P	Beverly
	M-2	B	Boston
	M-3	B	Boston
Boston (Dorchester) (Brighton)	M-1	B	Boston (South Station District)
	M-2	P	Boston (South Station District)

C. Study Group Characteristics

The following tabulation shows the number of principal, branch, new and relocated plants and their respective market areas.

	<u>M</u>	<u>D</u>
Principal	16	5
Branch	14	5
	<u>30</u>	<u>10</u>
Relocation	26	10
New	4	-
	<u>30</u>	<u>10</u>
National and International	17	1
New England Region	11	7
Metropolitan Area	2	2
	<u>30</u>	<u>10</u>

The four new plants include two research firms, a machine shop and an instrument manufacturer.

Market areas for manufacturing plants are wider, as might be expected, than for warehouses; some warehouses have their regional market centered in Massachusetts. The two manufacturers serving the metropolitan area are food and beverage firms.

The majority (67%) of M plants moving to new locations were formerly in the industrial-commercial area between or adjacent to North and South Stations as were 70% of the D firms.

M plants are distributed evenly between the inner 5 mile ring and the 3 outer rings -- the M plants in the inner ring, however, being mainly near the periphery of the 5 mile ring.

All but one D plant were located in the inner ring. The majority of those located at the Cambridge Parkway site did so under somewhat

special circumstances. (The City of Cambridge made available a portion of the frontage of Memorial Drive, a recreation reserve known as the Cambridge Parkway Trust, following the end of World War II as an anti-unemployment measure.)

ANALYSIS OF STATED LOCATION REASONS

This section analyzes the answers to the question, "What were the pertinent reasons for the location of this plant?" Table 5 gives the distribution of answers ranked according to the number of times they were cited by M firms.

TABLE 5. Distribution of Location Reasons

<u>ITEM</u>	<u>M</u>	<u>D</u>
Site Advantages	25	4
Employment Factors	19	2
Conversion to One-Story Operation or other layout leading to improved production	17	7
Improved Transportation	16	8
Intangibles	15	4
Character of Operation	14	4
Nuisance Factors	6	1
Management Factors	4	1
Zoning	1	-
	<u>117</u>	<u>31</u>
Above Criteria Outweigh Financial Considerations?		
Yes	16	6
No	6	4

A. Site Advantages

This reply customarily referred to adequate space for production, loading and parking. It also meant, at the Newton Center, availability of suitable premises. In some other cases, it meant complete utility facilities. These included proper drainage, satisfactory power supply, specialized voltages, water of assured purity and in sufficient supply to permit extensive air conditioning.

The table below partially indicates the site characteristics of the study plants. It was not possible to get detailed map information for many plants, but assessment maps provided the basis for the three layouts shown on Maps 2, 3, 4. Maps 5, 6, and 7, furnished by the developers, illustrate the two planned centers.

Per Cent Coverage

	<u>M</u>	<u>D</u>
0-25	13	-
26-50	4	2
51-75	8	3
76-100	4	5

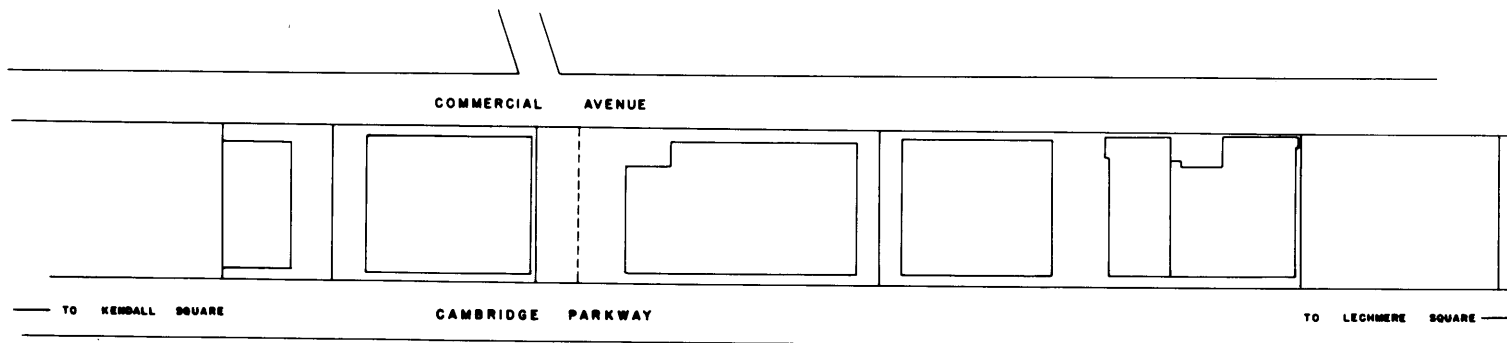
Gross Acreage of Parcel

0-5	17	10
6-10	3	-
11-15	2	-
16-up	7	-

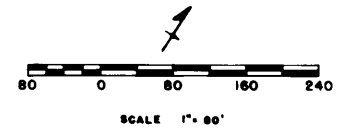
Parking and Loading

Adequate	22	3
Adequate for existing conditions	5	7
Inadequate	1	-

This appraisal of parking and loading areas was based on a brief field inspection. It does not seem unfair to state that, on the basis of this sample, both education and enforcement are required to provide

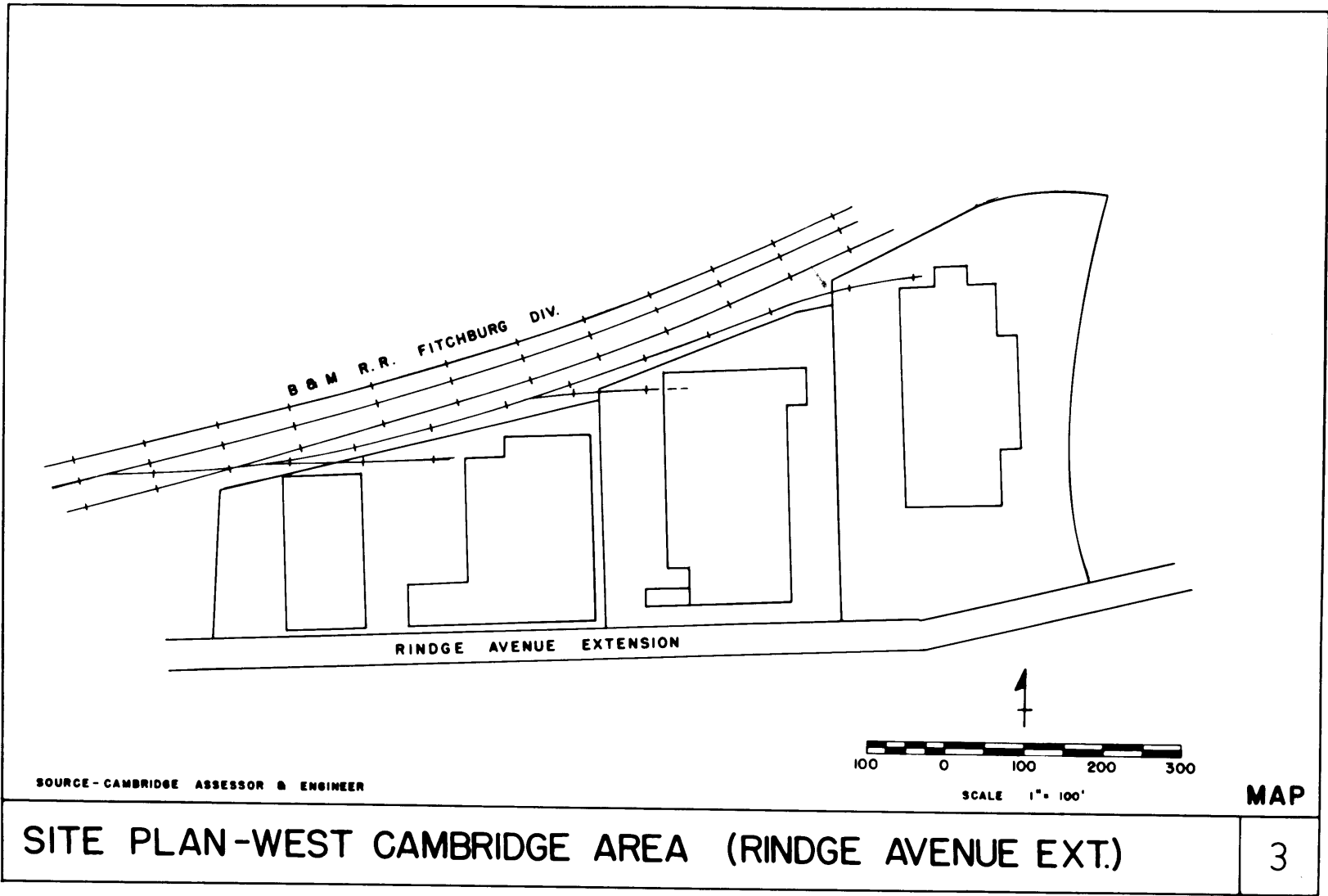


SOURCE - CAMBRIDGE ASSESSOR & ENGINEER

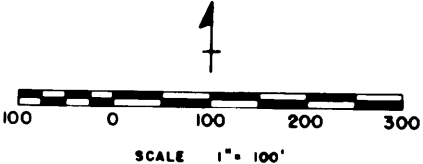


MAP

SITE PLAN — CAMBRIDGE PARKWAY AREA



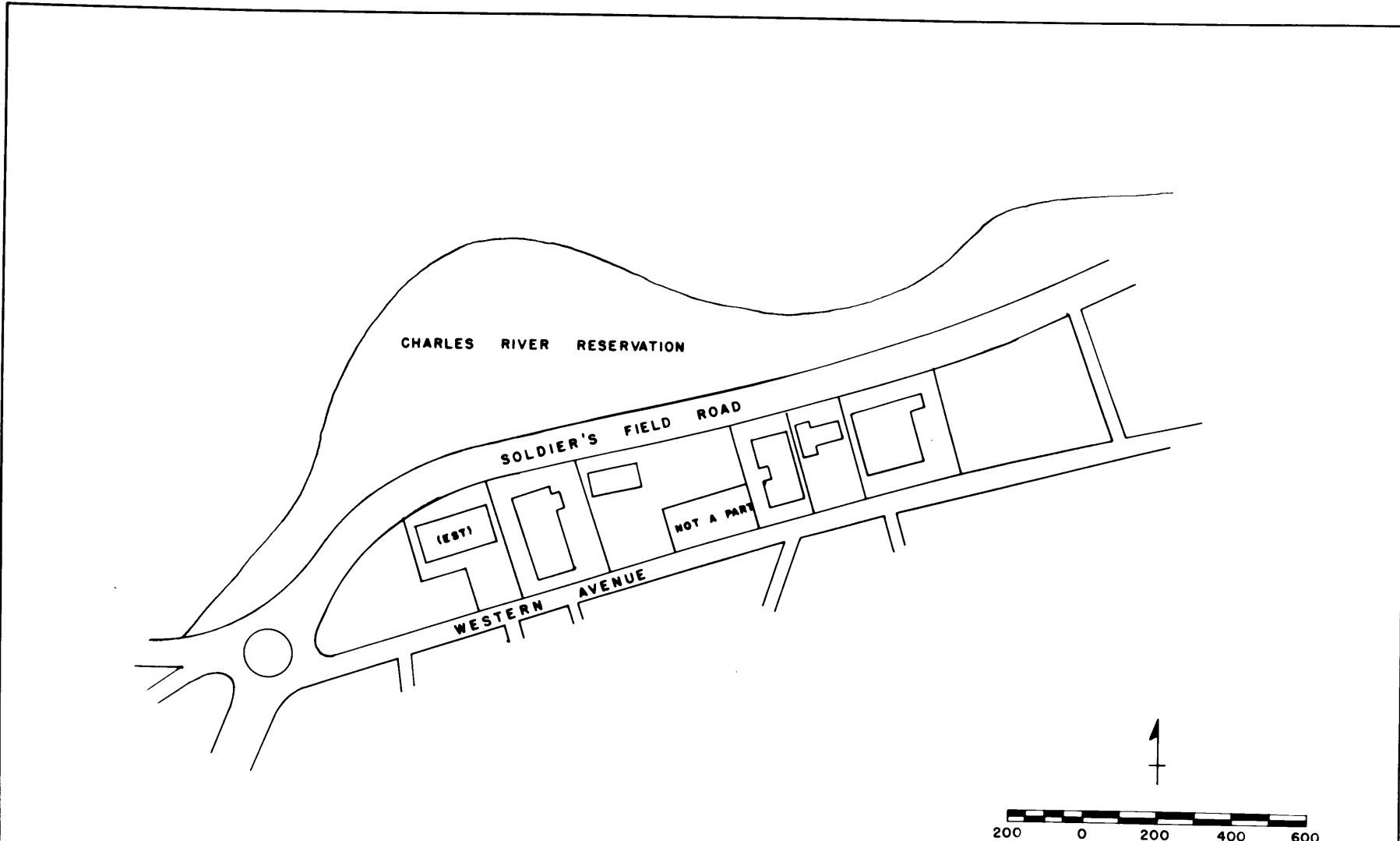
SOURCE - CAMBRIDGE ASSESSOR & ENGINEER



MAP

SITE PLAN - WEST CAMBRIDGE AREA (RINDGE AVENUE EXT.)

3



SOURCE-BOSTON CITY PLANNING BOARD (AERIAL PHOTO)

200 0 200 400 600

SCALE 1" = 200'

MAP

SITE PLAN — BRIGHTON AREA (SOLDIER'S FIELD ROAD)

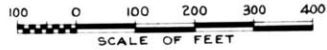
NEWTON INDUSTRIAL CENTER

NEWTON, MASS.

CABOT, CABOT & FORBES, INC.

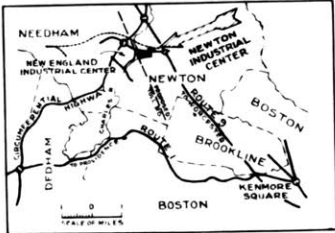
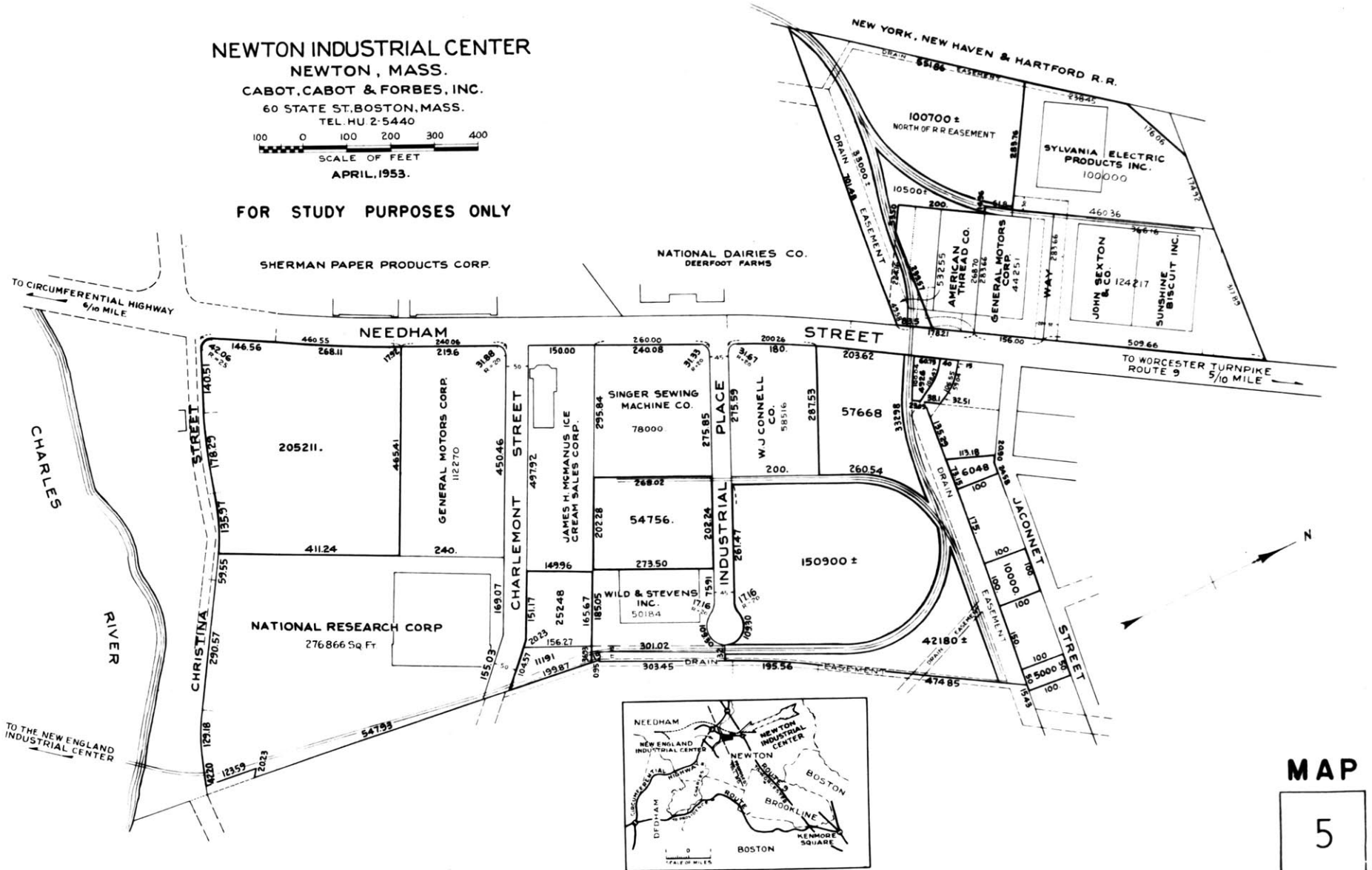
60 STATE ST. BOSTON, MASS.

TEL. HU 2-5440



APRIL, 1953.

FOR STUDY PURPOSES ONLY



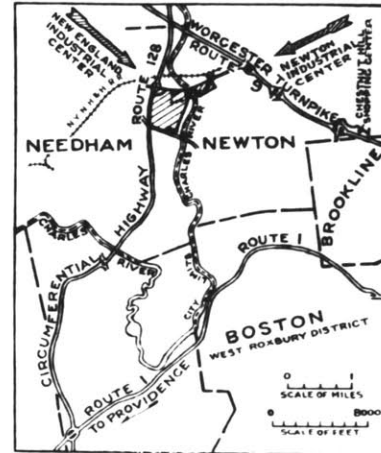
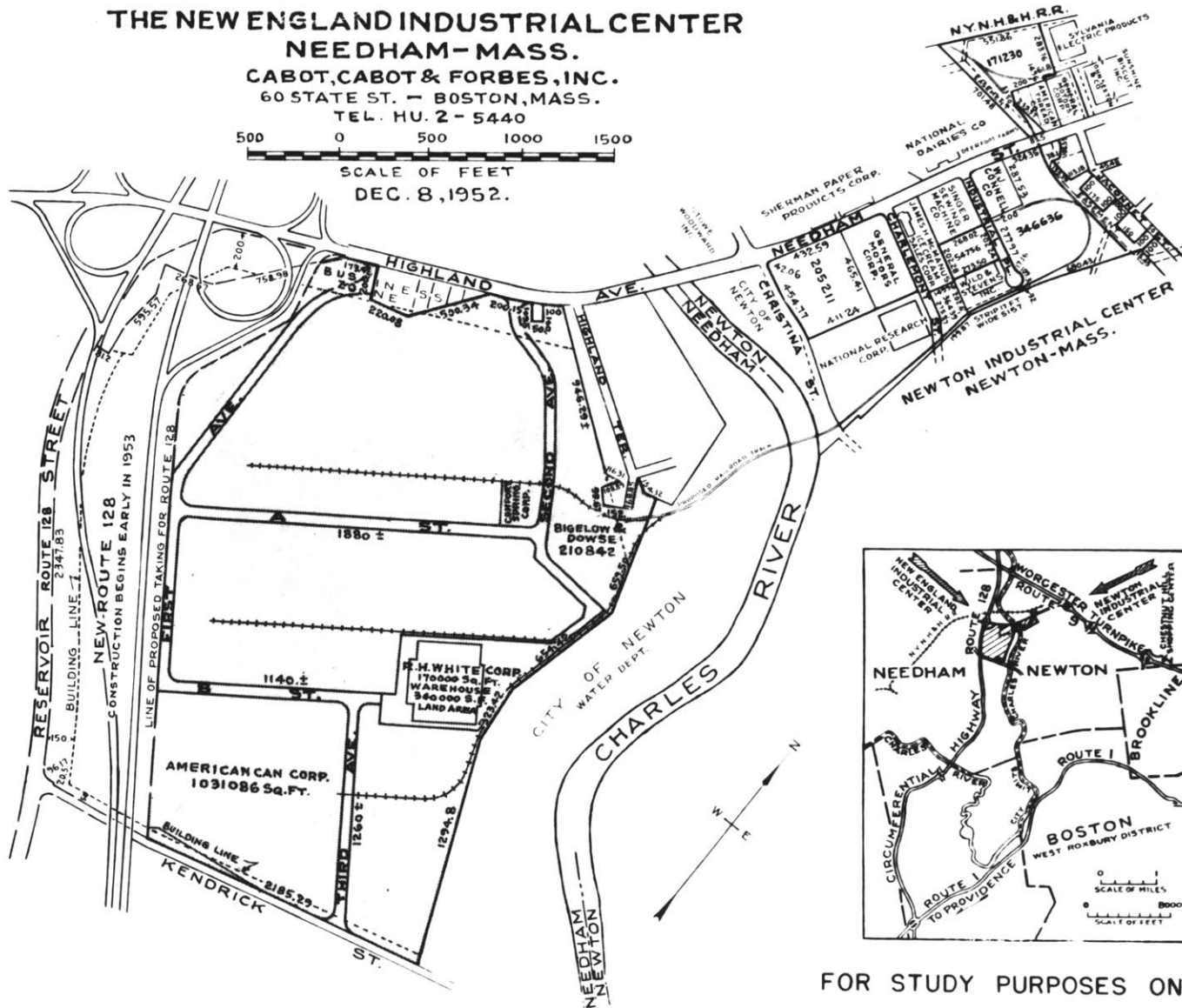
MAP

5

**THE NEW ENGLAND INDUSTRIAL CENTER
NEEDHAM-MASS.**

CABOT, CABOT & FORBES, INC.
60 STATE ST. - BOSTON, MASS.
TEL. HU. 2-5440

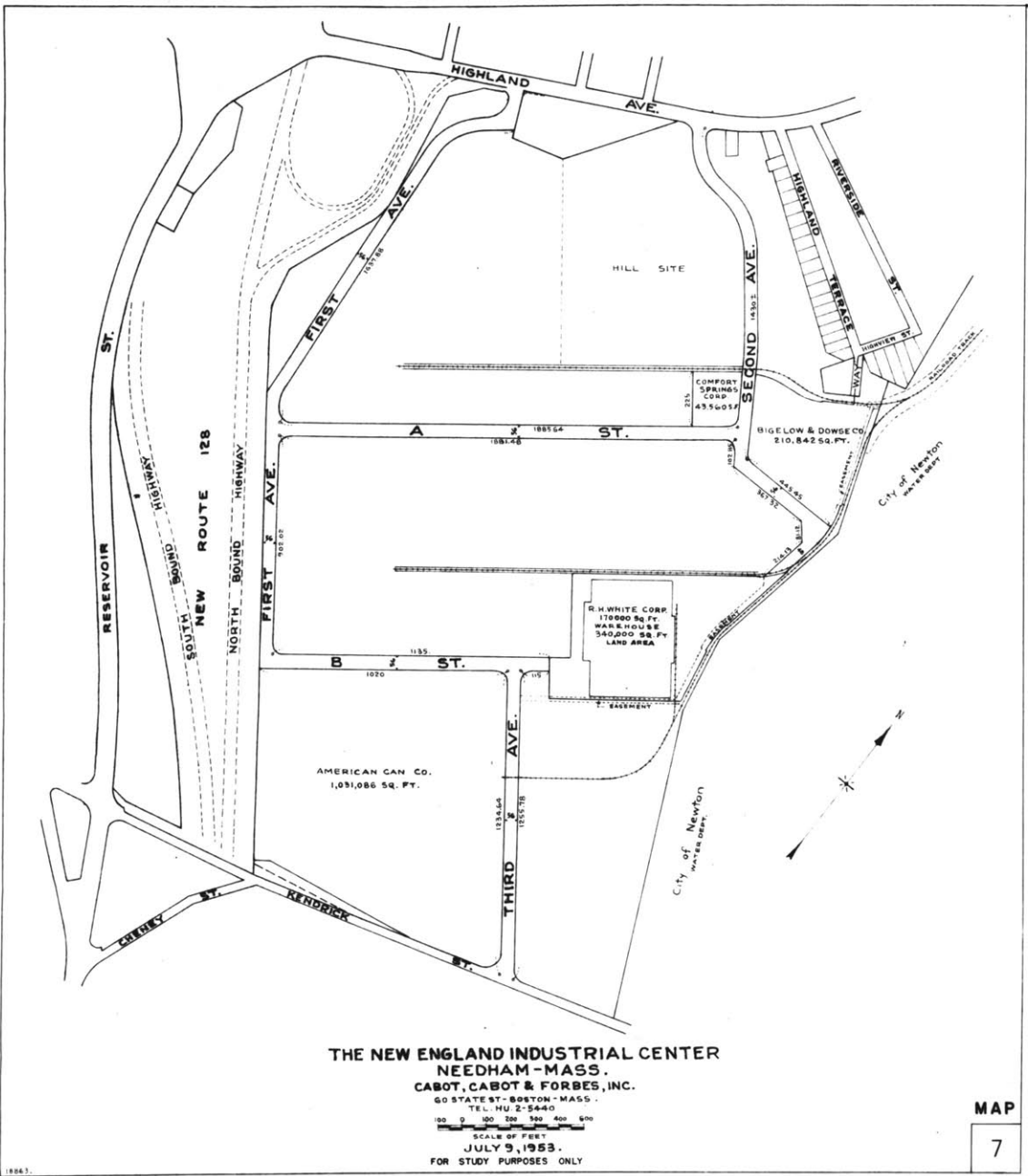
500 0 500 1000 1500
SCALE OF FEET
DEC. 8, 1952.



FOR STUDY PURPOSES ONLY

MAP

6



THE NEW ENGLAND INDUSTRIAL CENTER
NEEDHAM - MASS.
CABOT, CABOT & FORBES, INC.
 60 STATE ST. - BOSTON - MASS.
 TEL. HU 2-5440
 SCALE OF FEET
 0 100 200 300 400 500
JULY 9, 1953.
 FOR STUDY PURPOSES ONLY

MAP
7

18863.

satisfactory parking and loading areas. A number of "adequate" facilities are rather poorly designed, and the total is bolstered by plants in the Cabot, Cabot and Forbes development where private arrangements improve the showing. When the coverage ratios are examined in terms of adequate parking and loading, it can be shown that in only 4 of 39 cases (including both M and D) where the ratio exceeds 50% are parking and loading facilities adequate.

The geographic distribution of site coverage and site size is given in the following two tables:

	<u>0-5 Acres</u>	<u>6-10</u>	<u>11-15</u>	<u>16-up</u>
0-5 Miles	15	-	-	-
6-10	2	3	1	1
11-15	-	-	1	5
16-up	-	-	-	1

	<u>0-25% Coverage</u>	<u>26-50</u>	<u>51-75</u>	<u>75-100</u>
0-5 Miles	3	1	7	4
6-10	3	3	1	-
11-15	5	-	-	-
16-up	2	-	-	-

(The two distributions above are for M plants. All D plants used less than 5 acre parcels and all but one were located in the 0-5 mile zone. Their coverage ranged from 30-80%.)

Data on size is inconclusive. The sample indicates that 13 of 22 M plants were under 10 acres in size and that all D plants were below 5 acres. Studies by the Federal Reserve Bank of Boston⁴ and the Department of Commerce⁵ reveal the small size of New England manufacturing

⁴Monthly Review of The Federal Reserve Bank of Boston, September 1949, page 3.

⁵Theodore K. Pasma, Planning an Organized Industrial District. Area Development Division, U.S. Department of Commerce, September 16, 1952, page 6.

establishments, and the general experience throughout the United States has been that smaller plants are more likely tenants in most instances. The ULI study of 10 districts in detail revealed that sites ranged from 3 to 25 acres generally, with provision for larger sites contained in major developments. It also showed that nearly half the sites were less than 10 acres in area. Twenty-eight of 137 were 3 acres or less.⁶ The NIZC study⁷ found that with regard to building size 112 of 137 plants were between 10,000 and 250,000 square feet with nearly half between 50,000 and 250,000 square feet. Including a number of large employers, the NIZC data gave 150 persons per plant for slightly more than half of the 137 firms.⁸

One plant in the sample could fairly claim that the scope of its operations precluded location in a district. Of the 8 plants with sites in excess of 15 acres, 6 favored the district concept while not uniformly approving of the package approach. Several of the largest admitted buying land far in excess of their anticipated needs, and it is fair to say that no more than one plant required a site in excess of 25-30 acres. This is approximately the size of the largest site occupied by a tenant in the New England Industrial Center.

British experience is described in Exhibits D, E, F, and G. Exhibit G, a statement by officials of the Board of Trade (roughly analogous to the U.S. Department of Commerce) describes the size of the

⁶ Harold V. Miller, Characteristics of Modern Industrial Plants and Their Relationship to Industrial Zoning, page 7. A Paper presented before the Association of State Planning and Development Agencies at Hartford, Connecticut, April 20, 1953.

⁷ Miller, op. cit., page 12.

⁸ Miller, op. cit., page 16.

TREFOREST TRADING ESTATE

- 2 -

WALES & MONMOUTHSHIRE INDUSTRIAL ESTATES LIMITED.

The Treforest Trading Estate forms part of the Wales & Monmouthshire Industrial Estate Co. Ltd., and is controlled on all matters of policy by the Board of the Estate Co.

The Treforest Estate was the original Estate of the Company and was formed in June, 1936 being sponsored at that time by the Government through the department of the Commissioner for Special Areas, a department set up to enquire into and alleviate the unemployment in certain areas of the country, which came as a result either directly or indirectly of the general strike in 1926 and the subsequent recessions which followed.

The Company, originally known as The South Wales and Monmouthshire Trading Estates Ltd., was financed by the Treasury Department of the Government for the erection of factories but the supervision of their erection and the subsequent administration was looked after entirely by the Estate Co. who in their turn, were responsible to the Commissioner for Special Areas as the Government representative and were accountable to him for all expenditure in connection with the set-up of new Estates.

Since the Second World War, Treforest Estate has become a part of the larger concern now administering a number of similar Estates throughout Wales and who now act as agents for the Board of Trade which Government Department has now taken over the responsibility for all duties formerly vested in the Commissioner for Special Areas, which department has now ceased to exist.

Each individual factory has been designed to allow for as much clear floor space as possible, thus making them suitable for any light industrial use. Every factory is a complete self-contained unit with all services and each containing its own offices. These are in proportion of approximately 15% of the production space. Every factory is also provided with its own means of heating (normally coal fire boilers) and has electricity for lighting installed, and power for plant and machinery brought into a distribution panel within the factory. The tenant firm then being responsible for taking it from that point to wherever it may be used in the factory production area. Steam, gas and electricity are purchased in bulk by the Estate and re-sold to the tenants, thus in the case of smaller consumers passing on to them the advantage of bulk buying tariffs which are welcomed by the small users. Water for all purposes is supplied by the Estate Company which has its own reservoir and settling tanks. Some of the larger factories have their own staff canteens but to cater for the smaller ones and the senior executives, two large industrial canteens and a restaurant have been built on the Estate. Facilities have also been provided for banking and several branches of the big banks operate on the Estate. Also provided is a Post Office and a service garage for petrol and repairs. This covers in broad outline the set-up of the Estate and the information asked for in your letter is as follows:-

1. All firms on the Estate are engaged in manufacturing with the exception of the Ministry of Labour which deals with all unemployment and provides any new or additional labour which may be required. The various types of production covered include Zipp Fasteners; clothing; Aircraft engines; Chocolates and sweets; Typewriter ribbons, carbons and inks; glassware; cycle lamps and torches; aircraft components; radio and television; leather goods; paints and varnish; aeronautical accessories; gelatine; printed textiles; fibre board; gloves and general engineering.
2. The sizes of factories vary from 2,000 sq. ft. to 180,000 sq. ft. and the numbers employed by individual firms range from 20 to 1,500. The total average employment on the Estate for the past 3 years has been 10,000 people, there are at present 74 tenant firms on this Estate.

3. There are a number of reasons for siting the Estate at Treforest, but undoubtedly the principal one at the time it was commenced was the considerable number of unemployed living within a few miles radius of the site, making a very ready labour market for prospective employers. Other factors governing the choice of site were rail, road and sea facilities. The site is 8 miles from Cardiff which is the largest city in Wales and which has excellent dock and railway facilities. The Estate is also situated 4 miles from Pontypridd which is a good sized town at the point where the Rhondda Valleys (which were hardest hit by unemployment) converge, and it was from these valleys that the main labour force was intended to be drawn. The site itself was fairly easy to lay out and it was bounded by the River Taff, from which water was readily available and a main line railway easily accessible for goods traffic. The main Cardiff/Pontypridd road runs through the centre of the site and the South Wales Power Co.'s main generating plant was situated at one corner of the site, thus making electrical supplies an easy matter.

Tenants in the first instance were offered financial assistance from the Government to set-up factories on the Estate, either by way of a direct loan for the purchase of plant etc., or by means of a greatly reduced rental for the first 2 years of their lease to enable them to tide over the settling-in period.

4. As has been stated, factories were designed to suit all types of general light industry, but where a specific case has arisen of a firm requiring something out of the ordinary the Company, in conjunction with the firm has designed a special type factory but this has only been done in exceptional circumstances. In all other cases, the factories have been designed to allow for extension by the installation at the time of erection of a temporary end which is easily removable and can be taken down as and when required. The bays of each factory are of a standard size and all factories have been sited so as to allow additional bays to be added when required, up to 100% of the original size.

The Estate as such is administered by an Estate Manager, who holds complete authority as regards the Estate and is answerable only to the General Manager of the Company. He has under him an Accountant with an Accounts Section, an Assistant Manager and an Engineer with an Engineering Department between them they are able to solve all the normal day to day difficulties and overcome any troubles which may arise. Although the Company is a Government financed concern, it carries on completely normal relationships with the tenant in the ordinary manner as between landlord and tenant.

VDHE/JM.
13.8.53.

(continued)

EXHIBIT

D

DIRECTORS
 S. A. SADLER FORSTER (CHAIRMAN)
 SIR R. CHAPMAN | A. ROSS
 N. B. MASCALL | G. H. WALTON
 J. W. MITCHELL | S. WATSON
 N. F. NATTRASS | P. M. WILLIAMS

NORTH EASTERN TRADING ESTATES LTD

Team Valley
 Gateshead-on-Tyne 11

TELEPHONE
 LOWFELL 76071
 TELEGRAMS
 NESTATES GATESHEAD



Secretary
 R. M. PERCIVAL

YOUR REF

OUR REF

DATE

G.M. 1st July, 1953.

William F. Lipman, Esq.,
 Graduate House - M.I.T.
 CAMBRIDGE 39,
 MASSACHUSETTS. U. S. A.

Dear Mr. Lipman,

In reply to your letter of the 26th June 1953.

You will find the answer to several of your questions in the enclosed book, which was published within the past 12 months, dealing with the various Estates in the North East of England which are administered by our Company on behalf of the British Government. From this booklet you will be able to determine much better than I can describe, the very varied types of plant located on our various Estates and Sites.

The size of plants vary also from quite large factories of 7 or 8 acres in extent, down to 1,500 or 2,000 square feet. The reason for this is that our activities over the years have not been confined to accommodating industries which have moved into the Area but we have also fostered local development by enterprising individuals. These latter tend to start in a small way and some of them have developed in a very gratifying manner.

With

With regard to your third question, our experience has been that before the war there were a number of refugee industries from Nazi controlled Europe anxious to set up in Great Britain and to take advantage of the facilities which we offered of providing premises on a rental basis to those refugees who were short of capital with which to erect their own factories. Since the war, the fact that a licence to build was necessary, has influenced manufacturers to examine the Development Areas where licences for the right types of industry were more easily obtainable. In addition, there has been a great shortage of available labour in several areas of Great Britain, whilst the Development Areas, of which the North East is one, have had a pool of labour which could be drawn upon. Quite apart from this the developments which have taken place over the years in the North East of England have made it an attractive area because of the success which has attended many of the industries which have established themselves in this part of England.

With reference to your fourth question, I think it would be fair to say that our success in planning the lay-out of our Estates and Sites has been absolute and based on a pre-determined plan. No great difficulty has ever been experienced in siting individual plants and providing for them their requirements with regard to expansion and the availability of public utility services, such as gas, water, electricity, etc.

I hope the foregoing information will be helpful and remain,

Yours very truly,

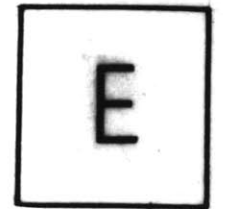
ENCL.

General Manager.
 (M.D. Methven)

P.S. Would you kindly note that the book referred to at the beginning of this letter has been sent under H/G.M. separate cover.

M.D. Methven

EXHIBIT



SLOUGH ESTATES LIMITED.

HONORARY PRESIDENT:
RT. HON. LORD PERRY, K.B.E., LL.D.

DIRECTORS:
SIR NOEL MOBSB, K.C.V.O., O.B.E.
(CHAIRMAN)
COMR. R. W. MCGRATH, (DEPUTY CHAIRMAN)
E. H. DULLEY, J.P.
G. A. MOBSB.
LT. COL. W. H. KINGSMILL, D.S.O., M.C.
C. W. FAIRALL.
SIR OWEN MORSEHEAD, K.C.V.O., D.S.O., M.C.

HEAD OFFICE:
TRADING ESTATE
SLOUGH
BUCKS.

LONDON'S INDUSTRIAL CENTRE

TELEPHONE: SLOUGH 20303 (5 LINES)
TELEGRAMS: SLOUDEPLIM, SLOUGH

OUR REFERENCE RASAP.
YOUR REFERENCE

1st July 1953.

William F. Lipman, Esq.,
Graduate House,
M.I.T.,
Cambridge 39,
Massachusetts.

Dear Sir,

In reply to your letter of the 26th ultimo, we have pleasure in enclosing herewith some pamphlets from which we think you will glean some information upon the development of our Trading Estate here.

We think that the information content in these pamphlets will answer the greater part of your questions, and from the list of Tenants also enclosed you will observe the purpose for which these premises are utilised.

The standard types of the factories on this Estate vary from 1,500 sq.ft. to 30,000 sq.ft. and we find that the most popular unit is something in the region of 10,000 sq.ft.

The main advantage of this Estate as regards location is that whilst it is outside the London area and therefore more congenial for working conditions, the facilities for transport to the Capital are excellent.

With regard to your last question, the Estate was originally laid out to accommodate factory units of similar size together, and that when expansion took place within these small units, manufacturers would have the opportunity of moving their location to another part of the Estate where the larger units were situate.

We trust that the above information will be of some assistance to you in your studies.

Yours faithfully,
for and on behalf of
SLOUGH ESTATES LIMITED.

Secretary.

PROPRIETORS OF THE BIRMINGHAM FACTORY CENTRE & SLOUGH ESTATES (LONDON) LTD.

EXHIBIT

F



Board of Trade

Industries & Manufactures Division,
Thames House North,
Millbank,
London, S.W.1.

Tel VIC 9040 Extn 2227 Our Ref IM6/4/53 Your Ref

25 August, 1953.

Dear Mr. Lipman,

You wrote on 26th June making a number of enquiries about industrial estates and I acknowledged your letter on 9th July. I have now assembled some evidence on the points you raise, but first of all I would like it to be clear that I am only discussing the industrial estates for which the Board of Trade is responsible. These are estates set up in what we call "Development Areas", where the Government has made special attempts to foster industrial expansion in order to increase and stabilise employment.

Here are the answers to your questions:-

1. The plants on our industrial estates are all manufacturing, except of course for the warehousing facilities required in connection with each factory. The great majority of the factories are devoted to what is commonly called "light" industry. Two of the most prominent industrial groups are light engineering (e.g. instruments, radio, small machinery, domestic electric goods, etc.), and clothing.
2. The very great majority of the plants are within the range 10,000 sq. ft. to 100,000 sq. ft. The average, for what that is worth, is about 40,000 sq. ft.
3. Certainly the biggest single attraction has been the building by the Government of a factory to let to the manufacturer at a less than economic rent, thus relieving

W. N. Lipman, Esq.,
Graduate House,
Massachusetts Institute of Technology,
Cambridge 39,
Massachusetts. U.S.A.

/him

him of the capital charge and reducing his current overhead expenses. There are however many details in the layout of the estates designed to make them attractive and you may care to write to individual estate companies for their literature. The attached leaflet lists the five estate companies, which are, incidentally, in effect agents of the Board of Trade. The Scottish Industrial Estates Ltd. and North Eastern Trading Estates Ltd., have recently produced comprehensive brochures which would give you a good description of their estates.

In connection with attraction to estates you may not be aware that since the war there has been a Government control on the location of new factory building. The control enables the Board Of Trade to refuse to approve the location of a new factory or extension if it is not thought to be in accordance with "the proper distribution of industry". This control gives the Board a certain negative power in its efforts to steer firms to the Development Areas and to other places with an unemployment problem.

4. The estate companies have generally laid out the main framework of roads etc., in each estate in advance. A number of factories of standard type have also been built many in advance of specific demand for them but most -- and in fact all built in the last two or three years -- have been built to the requirements of the individual firm which is going to occupy them. The arrangement then made with the firm is that it will pay a rent for the main structure or cash for any special features which are unlikely to be of use to any other

/tenant

(This is a Copy of original letter)

tenant should he leave the factory. One of the individual needs to which attention is paid is the scope for expansion which the firm wants, but only where space for expansion has been required. It has generally been provided by leaving an area of land vacant adjacent to the factory, but a means has to be found, and in some cases it has been found that insufficient spare space has been provided for some very successful firms, so that they have had either to establish a separate unit, or else move complete to a larger site.

Yours sincerely,

E. A. Ilett
for (J. Ilett).
Research Officer.

EXHIBIT

G

great majority of parcels on estates for which the British government has primary responsibility as lying between $\frac{1}{4}$ acre and $2\frac{1}{2}$ acres with the average about 1 acre.

Other British statements generally describe parcel sizes as varying from small standard units of 1,500-2,000 square feet to about 10 acres. Much attention has been given to the small "unit" factory which may be utilized by the new, small firm and can then be expanded in modules of several thousand square feet as the firm requires. Size of parcels also varies with the purposes for which the estates were developed. Many very small parcels were developed in the effort to provide sites for new, small entrepreneurs. Different methods and systems of providing heat, light, and power may account for some differences in average size. As is well known, the parking requirements of British factories are negligible as compared with U.S. space needs for this purpose.

B. Employment

The nature of the range of number of employees and parcel sizes of the study plants gives somewhat inconclusive results. Shown below are the distribution of plant employment and worker density per gross acre.

	<u>M</u>	<u>D</u>
0-50 workers	7	3
51-250	12 (2 under 100)	5 (3 under 100)
251-500	6	-
501-1000	-	-
1001-up	3	-

	<u>0-50</u>	<u>51-250</u>	<u>251-500</u>	<u>1001-up</u>
0-5	4*	8	3	-
6-10	2	3	1	-
11-15	1	-	1	3
16-up	-	1	1	-

*All D plants reporting are in the 0-5 zone.

	<u>M</u>	<u>D</u>
0-25 workers/acre	11	3
26-50	8	5
51-100	4	-
101-200	5	-

	<u>0-25</u>	<u>26-50</u>	<u>51-100</u>	<u>101-200</u>
0-5 miles	8	8	2	5
6-10	2	4	-	-
11-15	3	-	2	-
16-up	1	1	-	-

Examination of replies to source of labor supply shows that only 5 plants drew upon local labor pools for the bulk of their employment. Four of these were more than 10 miles from the center -- one was in the 6-10 mile zone. All other plants, both M and D drew upon the entire metropolitan area.

Detailed analysis of employment figures shows that the average number of workers per factory for the entire sample is approximately 140, excluding the 4 largest employers. If we consider the likely preponderance of smaller plants in future districts and the increasing space to employment ratio, a range of from 75-100 workers per plant agrees fairly well with the tabulation of Brown and Sherrard⁹ for the

⁹Modern Town and Country Planning, page 341, A. J. Brown and H. M. Sherrard, Melbourne University Press, 1951.

4 major industrial estates in Great Britain, where the number ranged from 64 to 200 with the higher belonging to Trafford Park, the oldest, begun in 1896. The other two had 80 and 82 workers per plant, respectively. In like manner, 19 of 29 plants had a density of less than 100 workers per industrial acre, with the majority below 50. Again considering the probable nature of new development, this figure also compares favorably with the 4 estates cited above whose densities ranged from 34 to 110 workers per acre with 3 below 50. (It may be added that two-thirds of all New England manufacturing is carried on in plants with less than 20 workers.)¹⁰

C. Conversion to One-Story Operation

This factor was especially stressed by D plants. In the few instances where new structures were multi-story, they were built to specification.

D. Improved Transportation

Fourth for M plants and first for D plants, this reply indicated an overwhelming desire to flee the congestion of the central area. Beyond that it reflected shifting markets, rate differentials, and adaptation to new highway routes.

The table below shows the transportation characteristics of the study plants.

	<u>M</u>	<u>D</u>
Inbound		
Rail*	8	2
Truck	23	5
Both	5	3

¹⁰ Monthly Review of The Federal Reserve Bank of Boston, September 1949, page 3.

	<u>M</u>	<u>D</u>
Outbound		
Rail**	5	-
Truck	26	10
Both	5	-
Rail Essential	12	6
*Rail only inbound -- 3		
**Rail only outbound -- 0		

The dominant role of highway transport is clearly evident. Exclusive shipment by rail is confined to 3 plants inbound and to no plants outbound. Some plants indicating non-rail use stated that they required rail access as insurance against contingencies such as strikes affecting trucking service. In other cases, the scale of operations was still too small to justify rail shipment. Almost all plants utilized common carriers, the exceptions being food processors and distributors of nationally advertised consumer goods (appliances, etc.). The continuing importance of rail service is indicated by the 45% response stating that it was essential to the site.

A study¹¹ for the National Industrial Zoning Committee of 137 plants showed the following characteristics:

	<u>Inbound</u>	<u>Outbound</u>
Rail	70	33
Truck*	59	98

*Actual handling at the plant whether eventually over-the-road or merely to railroad station.

This study indicates the continuing reliance upon rail facilities as well as the conclusive switchover to truck shipment of outbound commodities.

¹¹Miller, op. cit., page 5.

Whether considered as an employment or a transportation reason, worker transport was an important factor, especially with regard to the initial district ventures.

Of the 30 M plants, 11 consider transit a significant factor -- even if the absolute number of employees using it is relatively small. All but 2 of these 11 are within the 0-5 mile zone. Six of the 11 (5 within the 0-5 zone) had 40% or more female employees. The two largest female employers in the study group, employing 60% and 80% respectively, made special concession to their travel needs.

D plants which employ very few female workers nevertheless stressed transit as an inducement for retaining competent clerical help as well as for their force as a whole, and, where other functions are combined with distribution, for customers.

As a location factor, transit is related to the character of the labor force. Of the 11 firms indicating transit as a major factor, all but one commenting on the difficulty of obtaining skilled male help were within the inner zone. Four depended on the service emanating from Harvard Square, 4 more on the service in the Brighton-Allston area. Five warehouses were served by Lechmere and Kendall Stations.

A number of these plants, including the third largest employer of females in the study group, categorically stated that they could not approach Cabot, Cabot, and Forbes because of poor transit service in the area. While existing headways and options for reaching the area seemed inadequate to the author, a further aspect, not broached in this investigation, concerns the relationship of wage levels, particularly of female help, to transit fares.

At least one plant had moved back to the 0-5 mile zone from the Newton area (but not from the Center) because of inadequate transit. Two plants on the periphery of the inner zone stated that their operations would be aided by MTA cooperation in providing shuttle service; lack of an adequate shuttle was also felt by plants along Memorial Drive. One plant in the Center said that it had to adjust its working hours to bus schedules, but other Center plants had experienced no difficulty. Tenants expected service to improve as the two Centers develop.

Plants at greater distances, including a number of the larger employers, felt that lack of public transportation was of little or no importance. Some conceded that better facilities would widen employment opportunities and would aid, if not accelerate, outward movement for other plants. Plants at inner locations strongly felt that better service would aid outward movement both with respect to female employment and certain highly specialized male skills, i.e., broaden the labor market.

Based upon this limited response, it appears that public transportation will play an important but not dominant part in future plant location and movement. Its role will increase as the quality of service improves, but it cannot reasonably be expected to challenge the widespread use of private vehicles, at least at a distance from the central area, under any but special circumstances.

E. Character of Operation

This category projects reasons of a unique nature which certain plants thought carried considerable weight. For example, one plant relocated in the inner ring, from an outer location, because of large-scale electroplating needs which could not be obtained in the 6-10 mile

zone; satisfactory trucking service with the subcontracting plating firms was not available. Another firm felt it required a Boston mailing address for prestige reasons. One firm required an extraordinary water supply for bleaching and other purposes. Besides proximity to professional and financial centers, research firms were faced with special circumstances surrounding their pilot plant and material storage operations.

F. Intangibles

This answer indicates awareness of the effects of esthetic treatment of the site, architectural control, etc. About half of the plants in each category named this; it is, however, an insignificant factor compared to others.

G. Management Factors

Construed as meaning communication or other operational contact between plants or between plants and customers or dealers, etc., this was another rather minor factor. While only two cases were revealed in this study, the Ellis study,¹² indicates that personal reasons on the part of top management may exert considerable influence on plant location.

H. Importance of Financial Considerations

Of 22 M plants answering, 16, or 73%, replied that these were secondary to the reasons developed above. Of those answering the reverse, several were the result of unique financial circumstances such as special lease arrangements, settlement of estates, etc.

¹²Monthly Review of The Federal Reserve Bank of Boston, April 1949, page 5 et seq.

Warehouses were split 60-40 reflecting their increased sensitiveness to site prices since they are essentially space buyers.

I. Comparative Analysis

Exhibit A reproduces a tabulation from the Ellis Study cited above in which the dominant reasons for the location of 106 plants in New England are shown.¹³ With the exception of "personal reasons", the ranking of location reasons is essentially the same as that obtained from the study questionnaire.

A second study¹⁴ by the Federal Reserve Bank of Boston, Exhibit B, in which 663 New England manufacturers appraised their location, shows those industries with the highest "advantage ratios" in both durable and non-durable industries to be well correlated with the firms in the sample who demonstrated their confidence in the area's future by investing in new sites and plant.

A third investigation¹⁵ discussing 36 relocations within a group of 137 plants found that 22 indicated the principal reason to be a larger site, 4 indicated "better relation to transportation" and 6 moved in order to convert to single-story operation. Miscellaneous reasons included market orientation, better labor supply, and avoidance of nuisances.

¹³Monthly Review of The Federal Reserve Bank of Boston, April 1949, page 6.

¹⁴Monthly Review of The Federal Reserve Bank of Boston, September 1949, page 7.

¹⁵Miller, op. cit., page 14.

Table 4
WHY DID NEW ESTABLISHMENTS
SELECT SPECIFIC COMMUNITIES IN NEW ENGLAND?¹



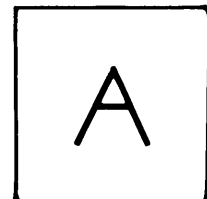
<i>Principal Reason for Selecting Community</i>	<i>All Firms</i>	<i>New Firms</i>	<i>Branch Plants</i>	<i>Relocations</i>
Suitable building	62	19	27	16
Labor supply	50	14	27	9
Personal reasons	27	23	1	3
Suitable site	12	4	4	4
Transportation consideration	11	3	5	3
Production relationships	8	2	6	—
Market advantages	6	2	3	1
Material availability	6	5	—	1
Management relationships	3	—	3	—
Community action	3	1	2	—
Tax considerations	3	1	1	1
Machinery availability	2	2	—	—
Water supply	2	—	1	1
Waste disposal	1	—	1	—
Capital availability	1	—	—	1
Development commission action	1	—	1	—
Total reasons cited²	198	76	82	40
Number of companies	106	42	44	20

¹Reasons cited by executives of 106 firms which set up new establishments in New England from August 1945 to June 1948.

²Most executives offered more than one principal reason for establishment in the selected community.

MONTHLY REVIEW
FED. RES. BANK OF BOSTON
VOL. 31, NO. 4 APRIL 1949

EXHIBIT



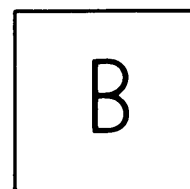
HOW 663 NEW ENGLAND MANUFACTURERS APPRAISE THEIR LOCATIONS, BY INDUSTRIES

Industry	Average Number of Items Listed as				
	Advantage Ratio*	Important Advantages	Important Disadvantages	Of Little Importance	No Answer
ALL INDUSTRIES	2.0	5.9	3.0	10.0	2.0
DURABLES	2.2	6.3	2.8	10.0	1.8
Instruments and Clocks.....	3.1	6.7	2.2	10.7	1.4
Furniture.....	2.9	7.6	2.6	8.8	2.0
Fabricated Metals.....	2.5	6.3	2.5	10.2	2.0
Machinery (nonelectrical).....	2.2	6.0	2.7	10.9	1.4
Lumber.....	2.2	8.3	3.8	7.8	1.1
Stone, Clay, and Glass.....	1.8	6.0	3.4	8.7	2.9
Electrical Machinery.....	1.7	5.6	3.2	10.3	1.9
Primary Metals.....	1.7	5.1	3.1	10.5	2.3
Transportation Equipment.....	1.3	5.6	4.4	10.7	0.3
NONDURABLES	1.7	5.4	3.2	10.0	2.3
Food.....	2.6	6.8	2.7	9.7	1.8
Chemicals.....	2.3	5.5	2.5	12.2	0.8
Miscellaneous.....	2.3	6.2	2.7	10.8	1.3
Paper.....	2.1	5.7	2.8	9.7	2.8
Printing and Publishing.....	2.0	4.9	2.4	9.5	4.2
Leather and Products.....	1.5	5.0	3.3	9.6	3.1
Textiles.....	1.3	5.4	4.3	9.7	1.7
Apparel.....	1.2	2.7	2.4	10.9	5.0
Rubber.....	1.1	4.6	4.3	9.8	2.3

*Number of advantages cited by firms in the industry divided by number of disadvantages.
 Note: Detail may not add to 21.0 because of rounding.

MONTHLY REVIEW - FED. RES. BANK OF BOSTON
VOL. 31, NO. 9 SEPTEMBER 1949

EXHIBIT



ANALYSIS OF OPINION REPLIES

This section deals with the opinion-answers to questions pertaining to the concept, location and characteristics of planned industrial districts, with particular reference to the Metropolitan Area.

QUESTION ONE: "Assuming your willingness to locate in a planned district, what would be your criteria in evaluating the district?"

The distribution of answers to this question follows.

<u>ITEM</u>	<u>M</u>	<u>D</u>
Location - General	10	1
Location - Labor	9	2
Location - Transportation	7	4
Location and Finance Equally	3	4
Financial - Key	2	1
Financial	2	2
Environment	2	-
Planning, Layout and Services	7	2
	<u>42</u>	<u>16</u>

This distribution shows that location is a congeries of transportation, labor, market and financial factors whose weights vary with the nature of the industry, the individual plant and even with processes within the plant.

Transportation-wise, 5 of the 6 largest plants in the study are plainly oriented toward Route 128 while the sixth depends upon Route 9. All interviewed plants at the Newton Center stated that the dual proximity of Routes 128 and 9 was a key factor.

Members of the electronics industry, including three of the largest plants in all respects, relied exclusively on highway facilities for both their labor force and shipping. The dominant influence of trucking has been indicated previously where no plant relied exclusively on rail for shipment

of finished goods and 26 or 30 plants utilized trucking solely for out-bound shipment. Warehousing is clearly highway oriented at present, and the further development of the major highway net in the Metropolitan Area will accentuate this locational influence.

In one area, and for a certain group of plants, employment as related to location meant the availability of non-union labor. A few plants also spoke of a "better class" of labor in a context which indicated an anti-union bias. These were in the minority.

In a different context, plants with excellent labor relations did find superior qualifications in rural labor for some skill levels. They also indicated that modern training methods minimized their supposed unfamiliarity with technology.

Larger plants seek isolation or insist upon diversification to insure a non-competitive labor situation. Detailed examination of the individual replies reveals that several of the plants making this comment later contradicted themselves by answering other questions in a way which indicated that they would not insist upon such isolation. One official stated that "planners must have concrete knowledge of labor supplies and population trends if they are to overcome management objections on labor questions affecting establishment and location of such districts." Exhibit C is a statement on the question of labor and similar competitive problems among like firms by Mr. Frederick Pruter, President of Apparel City, a textile manufacturing-jobbing center developed in San Francisco after the war.

Based on this group of plants, dependence on local labor pools does not become critical inside a distance of 10 miles from the center.

Telephone ATwater 8-0522

APPAREL CITY

(INCORPORATED)

San Francisco 24, California

August 4, 1953

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LESTER LOBE,

Fernbacher-Lobe Co.

GEORGE SAKS,

Key-Saks of California

E. G. SCHROEDER,

The American Thread Co.

A. J. SIMMONDS,

Town Craft of California

MELVILLE STERN,

Lenora Dress Co.

Mr. W. F. Lipman
Graduate House -M.I.T.
Cambridge 38, Mass.

Dear Mr. Lipman:

Your letter of August 3rd at hand, and I am indeed sorry that there is no published material on hand which would give you any help or assistance in evaluating the history or character of Apparel City.

The objections you have heard voiced by management perhaps is in line with the many statements that one hears from people who have had no experience with the subjects under discussion.

For your information, as far as labor dissatisfaction is concerned - although we have here in the apparel industry, from the very lowest paid work clothing to the highest paid coats and suits - we have had nothing but the very finest of relations. There has been no instance in the five years that we've been here that any dissatisfaction has been voiced, in fact, we've had one of the finest labor situation here that has existed anywhere.

As far as other competition is concerned, the proximity of similar houses helps rather than deters competition. If the average management would realize that as far as the apparel field is concerned, that the more manufacturers of similar or like goods there are within reasonable close proximity, the greater number of buyers are attracted to that market - and that makes the market.

I'm glad to hear that you were one of those in the original construction, and of course you will remember the difficulties we had due to the material freeze and inexperience on all of our parts. Since you have been here we have built two more large units.

Although it was the general opinion that this project was a wild dream - that it would never be successful - for your information it has been a very successful venture; had it not been for the freeze, and other firms who had signed up at that time for leases had come out, it would have been even more successful as far as the apparel market of San Francisco is concerned. But unfortunately the general conditions were detrimental to our getting the firms who had signed up out here.

If there is any further information that we can give you do not hesitate to call on us.

Sincerely, Fred Fruter

EXHIBIT



The experience of certain plants, notably electronics manufacturers, reveals that processes and functions may be separately located to take advantage of differing labor, production and market requirements, as well as to avoid zoning and nuisance problems.

The employment of female labor as it impinges upon the location of districts appears to rest on questions of skill, accessibility and provision of amenities. (The relationship between amenities and labor is treated subsequently.)

Transit, by reducing the localization of different skill levels and in effect providing a wider labor market, can be an influence in overcoming objections based on character, composition, skill level or size of the labor force.

Several of the larger manufacturers pointed out that the prevailing types of manufacturing employment in the area lend themselves to modern training methods which minimize supposed differences between rural and urban workers. They further stated that labor supply is more a question of number and accessibility since New England is well favored in terms of factory skills.

The distribution shows the relatively low position accorded financial considerations. Leasing is discussed under the "package plan". Tax purposes and company policy accounted for other answers.

Environment was stressed for both production and morale purposes by several plants. Planning, layout and services was accorded more weight by M firms reflecting the more complex "package" required by manufacturing operations.

QUESTION TWO: "Do you feel that the so-called 'package plan' type of development would offer significant inducement to you and your management?"

	<u>M</u>	<u>D</u>
Yes	16	8
No	13	2
No Comment	1	-

The following table measures the willingness to utilize the package plan by industry classification.

Percent of Each Industry Type Potentially
Willing to Utilize Package Plan

<u>SIC</u>	<u>NUMBER WILLING</u>	<u>TOTAL IN CLASS</u>	<u>%</u>
20	3	3	100
22	2	2	100
26	1	2	50
27	0	1	0
28	2	3	67
34	0	1	0
35	3	5	60
36	3	6	50
37	0	1	0
38	3	5	60
W	8	10	80

Negative answers came almost uniformly from the larger M plants although there were some exceptions. Their answers took these main forms: First, they did not think the package would work for them -- they wished "to do it themselves"; they feared labor problems if associated with other manufacturing firms; or, in a few cases, they wished to deal directly with the community concerned in order to build "better community relations". While almost 50% of the answers were negative, many plants did like the district idea and only balked at the developer-managed package concept.

Positive answers came from smaller firms who felt that they did not have the specialized personnel or resources to meet the problems of choosing, developing and moving onto a new site. They also stressed the advantages of conserving working capital by leasing methods and possible tax savings. All tenants interviewed at the Newton Center denoted these as the prime reasons for relocating at the Center. The 80% affirmative response by D firms indicates the special attractiveness of this type of arrangement for warehousing.

Slightly more than 50% of the manufacturing firms said that the package plan held inducements for them. Of the 13 replying negatively, as noted, some favored the districts but with more autonomy than might be offered by a privately sponsored development. This suggests that where local planning can achieve, through zoning and other planning tools, essentially the same conditions as are offered by the superior private or quasi-public organizations, such areas will become attractive to industries seeking supposedly closer ties with the community.

The nature of the positive answers confirms the much more extensive British experience. Informational literature of the Slough Trading Estate, Ltd.¹⁶ and North Eastern Trading Estates, Ltd.¹⁷ is quite illuminating on this question. The Slough Estate is a single development of 640 acres employing some 22,000 persons in more than 225 firms. North Eastern Trading Estates comprise 34 different estates of all sizes employing more

¹⁶London's Industrial Centre. Slough Trading Estate, Ltd., Slough, Bucks, England.

¹⁷Industrial Estates. North Eastern Trading Estates, Ltd., Gateshead-on-Tyne, England.

than 44,000 people in over 300 firms occupying 10 million square feet of floor space. Both of these organizations, one private, the other state-owned, attribute their growth particularly to the leasing and provision of production space, not only custom-built but readymade in standard sizes (for British needs). Mr. S. A. Sadler Forster, Chairman of the North Eastern Trading Estates, Ltd., discussing the history of the company, pointed out that the provision of factory space rather than sites was the key factor in combatting unemployment in the '30's, the original mission of the company, meeting war needs and in influencing the postwar location of industry.¹⁸

Financial implications are necessarily slight since they are outside the scope of the study. The data for both the distributive and smaller manufacturing plants shows the attractiveness of leasing which was undertaken by at least 8 of the sample plants. Although outweighed for the most part by other factors, financial considerations must not be unduly minimized. Tax and assessment practices will certainly continue to influence location in the study area.

With respect to contents of the package, a preliminary disclosure of results of a study¹⁹ by the Area Development Division, U.S. Department of Commerce, shows that there are three types.

The first offers not only site improvement according to a comprehensive and predetermined plan together with partial installation of

¹⁸Industrial Estates, op. cit., pages 20-22.

¹⁹Pasma, op. cit., page 4.

utilities, roads, and rail facilities, but also "architectural, construction and financial assistance, fire and police protection, warehousing and other special services." These are classified as "full service" districts. Those not offering all of the above but utilizing restrictions are known as "limited service" districts, while those following a general plan but with neither services nor restrictions are called "limited control" districts.

The implications for both the public interest and private venture are obvious. The consensus of informal comments indicates that the sample plants would go along with stringent restrictions. The Urban Land Institute bulletin describes the practice of the developers of the 256 acre Airlawn Industrial District of Dallas. "Seeking ultimates in convenience and attractiveness, the developer established standards much more restrictive than industries might have found at competing locations; the very severity of the requirements is proving an advantage in disposition, because manufacturers have come to realize that they secure a desirable end result." According to the Department of Commerce report, "Airlawn thrived on restrictions."²¹

The principal implications for physical design concern coverage, parking and loading space, and satisfactory access adjacent to major trafficways. Little formal data was available, and comment in this portion is based on field observation for the most part.

²⁰Urban Land Institute, Planned Industrial Districts, Technical Bulletin No. 19, Washington, 1952.

²¹Pasma, op. cit., page 9.

We have seen that 70% of the sample M plants had at least fairly adequate parking and loading facilities. This agrees very closely with the survey conducted by the National Industrial Zoning Committee²² in which 93 of 137 plants reported offstreet facilities which, in the opinion of the author, Harold Miller, seemed generally adequate.

It is the opinion of the author of this study that most manufacturers were overcautious in forecasting future needs and that zoning regulations and covenants are essential to assure sufficient space for offstreet facilities.

Cabot, Cabot and Forbes found that in their original venture, the sale of sites did not afford them the opportunity to prevent overbuilding or inadequate provision for parking, and consequently, the larger New England Center will lease exclusively in order to maintain adequate space. Typical provisions are shown in the ULI Technical Bulletin.²³

In connection with offstreet loading, space was sometimes adequate while setbacks from the street were not. This often forced trailer combinations to spend excessive time maneuvering on the street although they ultimately parked well inside the curb line, in some cases within the building itself.

The relationship of access roads to major trafficways is of critical importance. At least two major plants have poorly designed access to Route 128 and locations along both Routes 9 and 2 are open to criticism.

²²Miller, op. cit., page 15.

²³Urban Land Institute, op. cit., pages 7, 15, 31, 32, 38, 43, 44.

Detailed analysis of the New England Center is omitted from this study, but, as an example, it is apparent from Map 7 that the westerly intersection of First Avenue with Highland Avenue is exceedingly close to the proposed off-ramp of Route 128. Portions of Highland Avenue (Needham Street in Newton) further east are also inadequate for future needs with little opportunity for remedial work along the newly developed frontage because of insufficient setback.

The design and control of access along major thoroughfares is a broad problem of which industrial district design is only a part. The intimate relationship between new plant location and new highway development in the study area makes it an especially significant problem.

Basic design of industrial districts is a subject for another study. An important question is the degree to which layouts may be preplanned in terms of parcels, roads, and rail spurs. The local developers felt that only major skeletal subdivision could be accomplished prior to individual commitment. American and British experience reveals both complete and incomplete layout. The general methods used to parcel a district include irregular spacing of main roads to create differently proportioned blocks, location of rail spurs at varying depths from access roads and modular frontages based on freight car dimensions, among others. (See Exhibits D, E, F, and G.)

Scant data in the literature on planned districts imply that layout is conditioned by the size of the development since a small tract must necessarily serve only small users of space. The type of package made available is another criterion.

Viewed against the background of the sample, it appears that decisions on layout and design, other than those based on regulatory considerations, such as parking, setbacks, etc., require individual design decisions based on character of tenant, scale of the development and other factors which preclude generalization.

QUESTION THREE: "If urban redevelopment were to make additional industrial areas available in the central portions of the metropolitan area, would you consider such a location?"

	<u>M</u>	<u>D</u>
Yes	8	4
No	16	5
No Comment	6	1

The 8 YES replies comprised 3 non-durable producers oriented centrally by their labor and market characteristics, 3 producers of high value-added small units whose trucking needs are secondary to production space, and two plants which were strictly market-oriented. The 4 D firms favoring a central location mentioned convenience to jobbers and dealers as well as market orientation.

The negative replies in both instances stressed traffic congestion, space problems, unfavorable environment, unsatisfactory labor relations, and, of course, excessive taxes.

A number of plants on the periphery of the 5 mile zone stated that they considered this an "ideal" or "best" location since it struck a good balance between space and site needs, trucking facilities, labor accessibility and relationships with suppliers, jobbers, etc.

Such answers suggest that in the Boston Metropolitan Area only specialized industrial activity of limited scale could be provided for by urban redevelopment in central areas. Such activity would be limited to plants needing concentrated production space together with low transportation requirements, those who were overwhelmingly oriented toward the central market, or who had unique circumstances attaching to their operations.

The Chicago Truck Terminal Area, described in a publication²⁴ of the Urban Land Institute, is a possible example of an inner use of this type. "Through the Mayor's Truck Terminal Committee, a 35 acre tract [was] located within 4 miles of the Loop after careful study of the traffic pattern of over-the-road trucks. A special zoning provision restricts the use of the tract to truck terminals, repair facilities, lodging and restaurant accommodations for the drivers."²⁵

Since adequate space and improved circulation are the main basis for outward movement, it is apparent that private developers are more likely to take the initiative in outer areas where land is more readily and more reasonably obtainable, where satisfactory design may be more easily achieved, and where the costly and knotty problems of demolition, clearance, and rehousing, for example, are non-existent. It seems equally apparent that, in the absence of any overriding locational deterrent, most firms would prefer the advantages conferred by a well-designed outer location.

²⁴Urban Land Institute, op. cit.

²⁵Op cit., page 52.

Some of the opposition to centrally located districts is based on lack of good "models" of inner area redevelopment projects (for industrial uses) and to prejudices stemming from traditional differences of opinion on tax and assessment procedures as well as other aspects of municipal administration. Executives often stated that although they could visualize an isolated area cleared and made available, they could neither visualize a redevelopment program sufficiently large enough to guarantee good trucking access nor could they see how other difficulties which they associate with central areas would be eliminated by urban redevelopment.

A more justifiable question that was and may be raised is whether Boston actually has enough land within the inner 5 mile ring to carry out any but limited industrial redevelopment schemes.

QUESTION FOUR: "Would a satisfactory planned development in an out-lying location prove attractive?"

	<u>M</u>	<u>D</u>
Yes	15	6
No	9	3
No Comment	6	1

YES replies stressed, as in Question One above, locational and transportation qualifications. Negative answers came from plants who cited difficulties in securing labor at a distance from the central area.

Plants 10 miles and beyond stressed space, open environment, regional or larger market orientation in terms of transport, and utilization of local labor. It would appear that the type of tenants for a district would differ on the basis of distance from the central area.

The experience of the Newton Center, though limited, tends to confirm this. One manufacturer serves both Boston and Providence areas. One plant stated that certain of its operations, for administrative and physical reasons, could be located within 10 miles of Logan Airport while the main offices were centrally located.

Distributive plants especially favored outer location on the basis of improved trucking and lower taxes. NO replies cited links to the central market. The table below gives location preference by industry classification. It should be noted that this preference is generally the reverse of the actual location distribution.

District Location Preference by Industry Type

<u>SIC</u>	<u>INNER</u>	<u>OUTER</u>	<u>EITHER</u>
20	-	2	-
22	2	-	-
26	-	3	-
27	1	-	-
28	1	2	1
34	-	1	-
35	1	2	-
36	1	4	1
37	-	-	-
38	2	3	-
	-	-	-
	8	17	2
W	5	5	-
	-	-	-
Total	13	22	2

What are the reasons for the disparity between actual location and stated location preference?

Most plants had little or no opportunity to locate in a district; some rejected the opportunity, where it was a possibility, because of real objections, as transit, or for imaginary ones, as supposed labor difficulties. Others, as in the Cambridge Parkway Area, took advantage of a special

opportunity or of special circumstances attaching to their operations. Almost every one of the 13 M plants located in the inner ring had a special reason for its location. A number, however, admitted that they could satisfactorily locate farther out under proper conditions.

QUESTION FIVE: "Did you have difficulty in locating on an individual basis?"

	<u>M</u>	<u>D</u>
Yes	6	3
No	23	7
No Comment	1	-

Ninety per cent of the study group had no difficulty in finding a suitable location. Those recording difficulties indicated that they were unique problems. A number of plants mentioned alternate locations and the general consensus was that sites were plentiful. In this connection, advance planning of major thoroughfare systems in areas such as the Neponset Valley would insure an even greater supply since there are literally miles of railroad frontage available. The ease with which alternate sites may be secured indicates that districts must clearly offer superior advantages to the industrial client in order to compete with cheaper individual locations.

QUESTION SIX: "Do you feel that such districts would make smaller towns more favorably disposed toward industrial development?"

	<u>M</u>	<u>D</u>
Yes	19	7
No	3	-
No Comment	8	3

Those answering YES in both categories emphasized the restrictions put upon individual tenants by the developers, the obvious land use advantages of concentrating industry under optimum conditions in a given portion of the town, and the advantage of having a single voice in town-industry affairs.

Firms opposed mentioned the fact that such an arrangement precluded closer ties between the plant and townspeople and "prevented understanding". Several firms advanced the idea that the advantage depended upon the space-employment ratio. A plant occupying a large site but making few demands upon the town in the way of services for employees was thought superior to one which forced the town to make considerable expenditures for public facilities in relation to tax receipts.

QUESTION SEVEN: "Assuming further development of such districts, would they, in your opinion, hold special advantages for particular types of operations or sizes of plants?"

These answers were distributed in the following manner:

	<u>M</u>	<u>D</u>
Advantages accruing from planning, layout and services	5	-
Linkage	2	1
Grouping	3	1
Contingent on other variables	3	2
Smaller plants	8	-
Light manufacturing and assembly operations	4	1
No Comment	5	6

This question seemed peculiarly hard to answer which perhaps accounts for the form the replies took. These were of three types. One (possibly misunderstanding the question) stressed advantages or qualities for themselves -- in effect, reanswering "criteria" questions. Thus, planning and

design was cited five times. Linkage, in the economist's sense of complementary industries and activities was mentioned twice. "Grouping" was meant to be the advantage resulting from a given concentration of plants where improved services, rates, etc., could be secured that no individual plant could command alone.

Light manufacturing and assembly operations were cited by four plants as suitable uses. Contingent variables were a catch-all of comments on plant, product, design, etc., offering no meaningful information.

The only direct comments as to size emphasized the attractiveness for smaller plants in terms of the answers given to the question on the "package plan".

The limited sample prevents accurate prediction. Leaving aside questions of location, it is very difficult to forecast the exact kind of industry or plant most likely to locate within a district.

On the other hand, both domestic and foreign experience demonstrate that practically any activity may be accommodated in a well-designed, well-regulated development. The ULI Bulletin states that, "... the diversity of industrial activity carried on in many districts proves that, under controlled conditions, most products can be processed without adversely affecting the adjacent industry."²⁶ The ULI survey showed about the same kind of occupancy as would be demonstrated by the sample firms, i.e., metal working, electronics, chemical and food processing, warehousing of many types. The range contained in the British Estates cited includes

²⁶Urban Land Institute, op. cit., page 8.

notions, toys, cosmetics as well as automobile assembly, aircraft engine manufacture, and mining machinery.

Representatives of all industry groups within the sample felt that they could locate in a district. It is safe to say that almost any manufacturing activity carried on in New England may locate in a properly conceived district without prejudice.

QUESTION EIGHT: "Do you feel that the intangible benefits of such developments, i.e., prestige, architectural control, landscaping, etc., are significant factors or inducement in a location decision?"

	<u>M</u>	<u>D</u>
Yes	27	8
No	3	2
No Comment	-	-

There was virtual unanimity on this question -- at least conversationally. Testimony and performance were conflicting in most cases. Negative answers came from plants whose products were remote from the consumer -- "the man in the street doesn't buy it" -- other plants with products equally remote laid the strongest emphasis on these advantages. YES plants felt that intangibles as indicated above contributed to better morale, maintenance and community relations. Aside from the effects to be achieved by regulation (setbacks and the like), architects and landscape architects have a great opportunity to exploit in developing three-dimensional public relations.

QUESTION NINE: "What, if you care to comment, have been the disadvantages arising from your new location?"

The purpose of this question was to seek indirectly the adverse factors that planning and planned development could avoid. Most of the difficulties shown below plainly stem from lack of planning at some point in the location or development process.

	<u>M</u>	<u>D</u>
Physical problems	6	-
Inadequate utilities	4	-
Labor supply	3	-
Difficult access for employees	3	2
Tax and assessment practices	3	-
Lack of amenities and services	1	2
Nuisances	1	-

QUESTION TEN: "Having made an independent location decision, what suggestions would you give to public and private developers as to how they might promote and encourage well-conceived industrial districts?"

Suggestions fell under the following heads:

	<u>M</u>	<u>D</u>
Transportation-accessibility	19	8
Amenities and Services	12	4
Labor supply	10	3
Utilities	8	1
Planning	7	4
Market orientation	4	5
Environmental factors	4	-
Community relations	3	1
Financial Factors	3	2

Many of these suggestions were interlocked as would be expected. Together with their counterparts to be avoided, as shown in Question Nine, they have been discussed elsewhere for the most part. One category, that

of amenities and services, requires a short elaboration inasmuch as it is second ranked among the suggestions in Question Ten.

Amenities and services ranked second in responses to suggestions that should be incorporated in future developments. Most officials answered that it was a measure of increased female employment, most of which was previously accustomed to the downtown eating and shopping environment. Other plants with a male orientation said that recreation areas should be provided for lunch-time and late afternoon athletic activity.

Most plants agreed that in addition to satisfactory eating and sundry shopping facilities, there should be banking, motor repair, and like services in the immediate vicinity. The ULI Technical Bulletin²⁷ calls attention to these facilities thusly, "... several developers of large industrial districts have incorporated into their land use plan provision for limited commercial facilities like banks, restaurants, and gas stations."

A number of plants agreed, at least in principle, with the British idea of pooling resources and providing a common center where many services could be provided for tenants and their employees. Presumably, this would be one way for smaller plants to offer these services and to provide attractive conditions for workers that they could not afford to offer individually.

²⁷Urban Land Institute, op. cit., page 9.

Whether our conditions of factory employment and the social attitudes of American workers demand the same provision of amenities and services as those described in British material is debatable. It was the consensus of those mentioning amenities, nevertheless, that it is a necessary cost, apart from its inherent social justification, of attracting and retaining suitable employees at outlying locations.

CONCLUSIONS

The following conclusions, within the limits of the study, summarize briefly the main findings of this thesis.

1. The broad basis for successful establishment of planned industrial districts in the Boston Metropolitan Area lies in meeting a related group of location criteria. Beyond underlying labor and transportation requirements, these districts should include comprehensive utility systems, desirable physical layout, and the assurance that investments in new plant will be protected by public and private regulations. Having met these paramount location and design needs, districts should offer flexible financial conditions to satisfy the needs and policies of different industries and of both large and small tenants.

2. Most planned districts appear likely to be located at least 5 miles from the center of the metropolitan area. The opportunities for the establishment of districts in central areas through urban redevelopment appear limited by the amount of available land, the stated location preferences of the study plants, the attitudes expressed on urban redevelopment possibilities, and the obviously greater opportunities for private real estate interests to carry out planned developments on open land.

3. Transportation will be highway-oriented for both freight shipment and labor accessibility. Transit will have an important influence according to the degree to which expanded and improved service is provided.

4. Labor will ordinarily be drawn from a wide area. Reliance on local pools will take place only in areas relatively distant from the central area or where there may be special employment problems as in the depressed textile areas. The employment of female labor depends upon satisfactory transportation and upon the presence of suitable amenities. On the basis of existing transportation and work habits and patterns, there appears little reason to expect the development of new closely knit industrial-residential areas.

5. The majority of tenants in new industrial districts will be smaller firms taking advantage of "package plans". Larger plants will require special inducements or concessions, and it may be necessary to develop separate districts containing only larger plants. The individual parcels within a district will seldom exceed 10 acres and the greater number may not exceed 5 acres.

6. Some elements associated with the development of planned districts that require the careful attention of planners are: the relation of a district's circulation pattern to major highways and local streets; the proper regulation of coverage, parking, loading, etc.; the prevention of nuisance conditions; the coordination of the development with the general development of the area; and, according to the desires of all parties concerned, the degree to which esthetic aspects of the district's design should be considered.

7. The concept of the planned industrial district is acceptable to almost all plants. There appears to be no reasonable restriction on the type or size of plant that may be accommodated. Objections to location within a district were based on administrative and technical grounds arising, for the most part, from natural conservatism and from unfamiliarity with successful prototypes or models.

8. Tenants at the Newton Center were uniformly pleased with their experience in the Center. (Several said they had been approached by fellow-industry members for an evaluation of their outward move.) Questions to the writer from inner area plants revealed that the development of the two Cabot, Cabot and Forbes Centers is being watched with keen interest.

9. Perhaps the firmest conclusion to be drawn as to the possibility of establishment of such districts resides in the current status of the two Cabot, Cabot and Forbes Centers being developed. The developers frankly state that they learned several important lessons from the initial development in Newton, and that they expect to create an even more satisfactory Center in Needham. Despite the various shortcomings noted previously, the evident success of this progressive policy may be found in the growing number of commitments at both Centers. These include both local and national organizations, firms of varied types and sizes, and of both a manufacturing and distributive character.

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