

#2

AN EVALUATION OF
DEVELOPMENT CONTROLS
AFFECTING THE PRODUCTION
OF SINGLE FAMILY HOUSING
IN EDMONTON, ALBERTA

PRACTICUM
PRESENTED TO

THE FACULTY OF GRADUATE STUDIES
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THE REQUIREMENTS FOR THE DEGREE OF
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BY

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signature*

ABSTRACT

This practicum is an analysis of development controls affecting the production of single-family detached housing in Edmonton, Alberta. These regulations, set down in Edmonton's Zoning Bylaw, Edmonton's Servicing Standards Manual, and the C.M.H.C. Site Planning Handbook are shown to be contributors to both design inflexibility and high housing costs. They are as well shown to be a mixture of rational standards and arbitrary rules whose purposes and implications are not well understood. A historical review shows how the attitudes and assumptions upon which many of our present controls are based have developed over time. Through this review it can be seen how control techniques which were initiated in response to unique situations and problems, have lived on as principles of good design long after their original context had changed. The study concludes by showing that a re-evaluation of current controls is necessary. It recommends a number of policies which would rationalize single-purpose specification standards and which would replace arbitrary multi-purpose controls with performance standards. Finally, it demonstrates how the use of a "revised" system of controls could allow the development of more flexible and less expensive housing forms.

Acknowledgements

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1977

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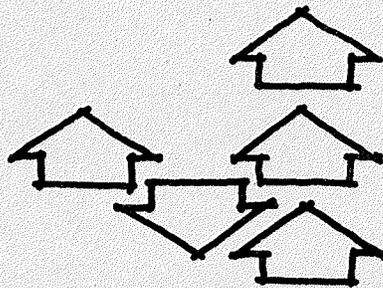
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1

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problem

I-A Problem Statement

The most complex and critical issue in the Canadian built environment today is housing. No other area is controlled by so many external forces or has such a direct effect on the lives and happiness of so many people. Yet with rapidly increasing costs of land, labor and construction materials, the privately owned, single family detached home has become unattainable to all but the most affluent.

Single family detached dwellings, however, have historically represented the most desired form of living environment for Canadian families. This form of housing is perceived as offering the highest levels of privacy, control, and open space; represents a desirable status symbol; and provides a guaranteed investment program.

These perceptions and motivations are being reinforced by government agencies and lending institutions through the enforcement of zoning bylaws, servicing standards, and site planning criteria. The mixture of rational standards and arbitrary rules set down in these documents are attempting to ensure that the desirable qualities and characteristics which we attribute to single family detached housing are not eroded.

The need to meet a growing housing demand and at the same time minimize rising costs has, however, determined the trend today toward houses and lots of minimum standard. The minimum standards set down in existing control documents have thus come to represent basic design criteria. When used in this way, they preclude opportunities for direct responses to natural site features, climatic conditions, or basic human

needs. As well, by dictating the form that single family housing will take, existing controls are precluding potential innovations in planning and technology which could substantially reduce costs.

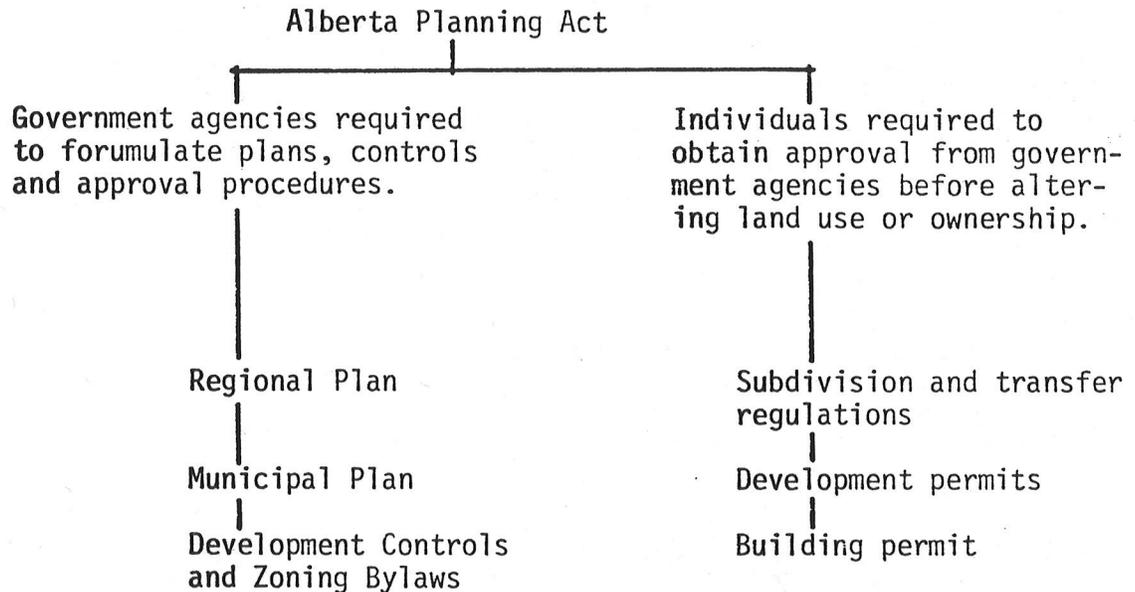
It appears, therefore, that we have reached a bottleneck. While social needs and technological capabilities are changing at an accelerating rate, the form of single family detached housing is unable to keep pace. This is largely due to the application of development controls which prescribe the form this housing must take.

It is in response to this problem that this study has been directed. The specific objectives of the research have been:

1. To identify the specific controls which affect the production of single family detached housing in Edmonton, Alberta.
2. To demonstrate the form and cost implications of these existing controls.
3. To determine the perceived objectives and underlying motivations of existing controls.
4. To determine how well existing controls are fulfilling their objectives.
5. To recommend changes whereby existing controls could better meet their objectives, and as well alleviate problems of form inflexibility and high costs.

I-B Identification of Controls

Planning legislation in Alberta operates on two different groups in our society. Firstly, government agencies who are required to formulate plans and development controls, and secondly, individuals who are required to clear all proposed changes in existing land use (development) or ownership (subdivision) with those agencies beforehand.



The controls which are dealt with in this study are administered by the planning department of the City of Edmonton and are contained in primarily three documents. Each of these is discussed in detail in Part II.

1. City of Edmonton Zoning Bylaw No. 2135
2. City of Edmonton Servicing Standards Manual 1974
3. CMHC Site Planning Handbook

Collectively, the individual requirements contained within these three documents predetermine the form of single family detached housing development in Edmonton. From the layout of streets and the sizes and shape of blocks to the area, height and placement of buildings on minimum sized lots, these controls set the standard.

The individual requirements which apply to the external form of single family housing are listed in the following table.

<u>DESIGN FEATURE</u>	<u>CONTROL DOCUMENT</u>	<u>EXISTING STANDARDS</u>
I. <u>Circulation</u>		
A. Road Form		
1. Pavement width	Servicing Standards	30' minimum
2. Right-of-way	Servicing Standards	60' minimum
3. Intersection spacing	Site Planning Handbook	200' minimum 1200' maximum
4. Emergency exit	Site Planning Handbook	Max. cul de sac 750' with/ 350' without emergency exit
5. Grading	Servicing Standards	Maximum 8.0% Minimum 0.5%
6. Parking	Site Planning Handbook	One offstreet stall per dwelling
B. Walkway Form		
1. Width	Servicing Standards	5' minimum
2. Grading	Servicing Standards	.5% minimum 10% maximum
II. <u>Lot Form</u>		
A. Lot Area	Zoning Bylaw	5,000 sq. ft. minimum
B. Lot Frontage	Zoning Bylaw	45 sq. ft. minimum
C. Building Placement		
1. Front setback		20' minimum
2. Rear setback		25' minimum
3. Side setback		20% of lot width with 4' minimum per side
D. Grading	CMHC Guidelines	2% back to front of lot
III. <u>Building Form</u>		
A. Area	Zoning Bylaw	28% of lot area
B. Height	Zoning Bylaw	25' maximum (35' with further setbacks)

table I-1

I-C Form Implications

Along with high economic costs, one of the most common condemnations of standard single family suburbs relates to their appearance. Abundant in the literature are descriptions such as monotonous, drab, boring, bleak, etc. Humphrey Carver, in condemning the sameness of single family suburbs, comments:

"Sterilized and inviolate under the protective shield of by-laws, the rows of small homes are immaculate in their uniformity, in their infinite repetition. How could this standardized material of the city be made into a work of art? However exquisite the tone, the insistent repetition of one note upon a single instrument is a form of torture. The small single house may be a pleasing and unassertive object, but in quantity it can be deadly. That is the complaint."¹

I-C-I Lot and Building Form

The controls which determine the private lot and exterior building form in the single family detached R-1 district in Edmonton come almost exclusively from Section 21 of the Edmonton Zoning Bylaw (see Table I-1). Minimum lot area and frontage length, building placement in terms of front, rear and side setbacks, and maximum building area and height are all dictated.

If in order to minimize housing costs we use these standards as design criteria, there is only one lot form possible. The minimum frontage requirement of 45 feet and the minimum area requirement of 5000 square feet determines the lot dimensions as 45 feet by 111.12 feet. Once the minimum setback requirements are applied to this lot, we are left with a potential building area of 2345 sq. ft. (see fig.#I-1)

1. Carver, Humphrey, City in the Suburbs, p. 16

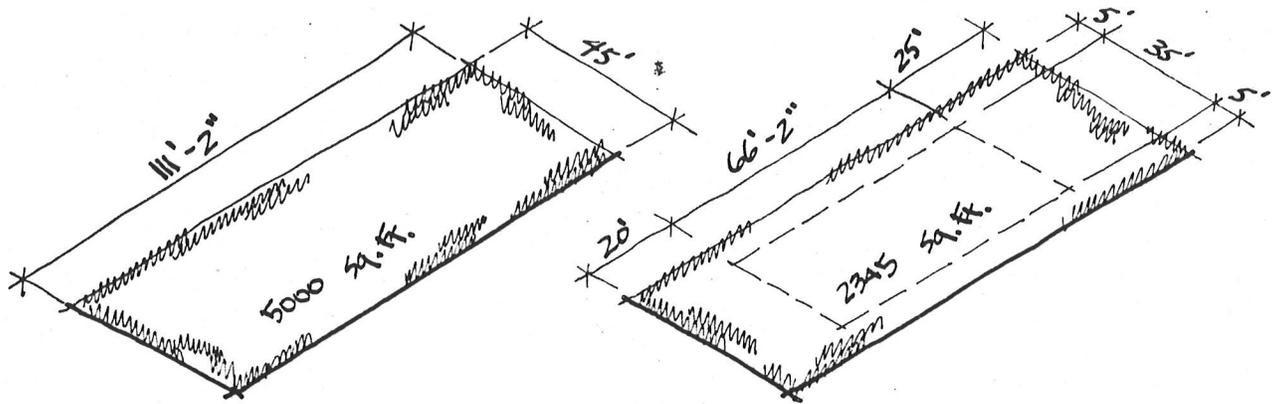


figure I-1

Of this 2345 sq. ft. area, 1400 sq. ft. can be covered with a building up to 25 feet in height in compliance with the maximum site coverage and maximum building height regulations. (see fig. #I-2)

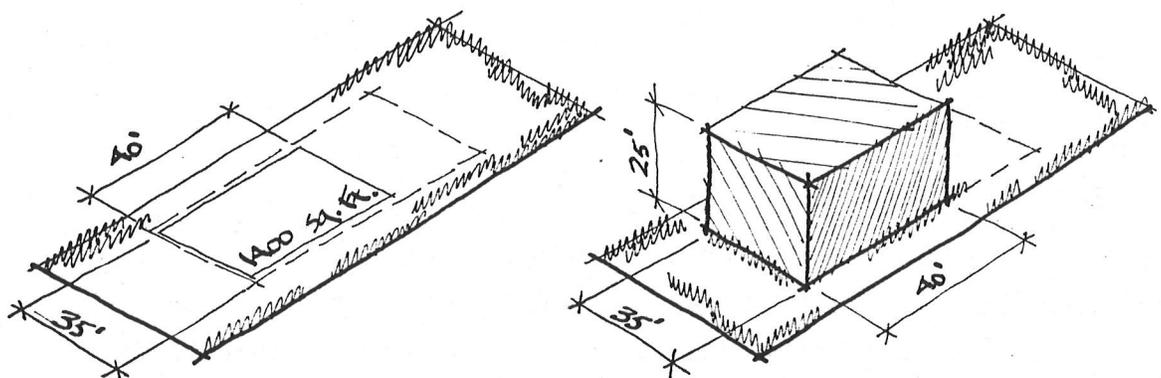


figure I-2

It could be argued at this point that with 2345 sq. ft. of building area, an imaginative architect could still design an exciting home. This to a limited extent is true - if he were given a generous budget. Again, however, in order to minimize

costs, builders today are required to use economical floor and roof spans. Once the joist spans exceed about 24 feet their size and costs go up drastically.² This fact adds another serious constraint to the building form of standard residential housing. If we use 24 feet as the maximum economical width for a 1400 sq.ft. home to be placed on a minimum sized lot with existing setbacks, there are essentially only two possible plans we can employ. One is a simple rectangle and the other is L-shaped. (see fig. #I-3)

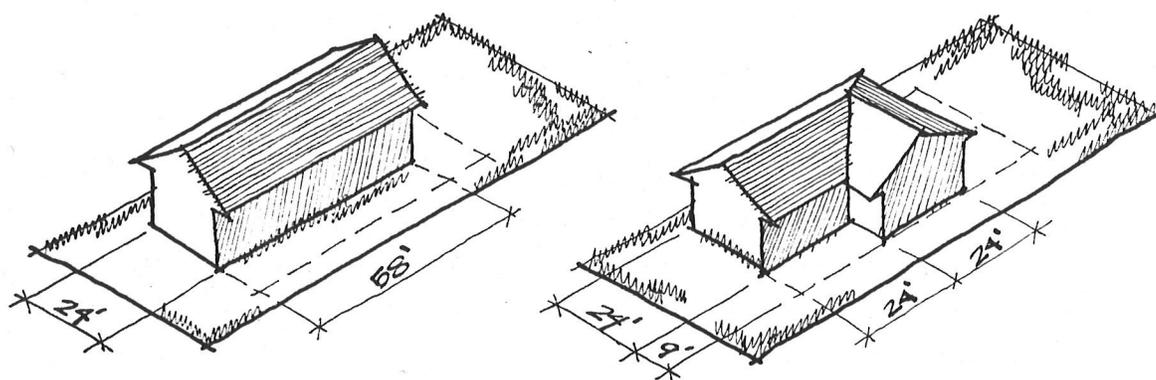


figure I-3

Typical "crackerbox" and L-shaped tract houses, therefore, appear not to have evolved totally by chance. They are responses to the need for economy and compliance with rigid controls.

This analysis clearly indicates that flexibility in responding to other areas of housing design under these conditions is severely constrained. Little consideration can be given to natural features of the site such as existing vegetation or topography, the possibility of orienting the house in response to climatic

² The maximum economical spans are even less than this unless top-grade lumber is used. About 18'-0" would represent the maximum using lower and less expensive grades.

factors such as sun and wind is usually precluded, and direct responses to human needs such as privacy and identity are all but impossible.

I-C-2 Circulation Space

The amount of land required for public circulation in single-family detached residential districts in Edmonton is specified in Section 2 of Edmonton's Servicing Standards Manual. (see Table I-1) The minimum right-of-way requirement is 60'-0" of which 30'-0" in the center must be paved roadway; 10'-0" must be in two 5'-0" walkways, and the remaining 20'-0" must be grassed boulevard. This minimum standard street provides in effect three traffic lanes, one for parking and two for moving vehicles; and two pedestrian walkways, one on each side of the street. (see fig. #I-4)

In light of current land costs this would appear to be a somewhat overgenerous allocation of circulation space considering the relatively light amounts of local traffic it is required to accommodate. Equally disturbing is the fact that when this 60'-0" right-of-way is combined with minimum front setback requirements, we have a 100'-0" space from building front to front. With only one and two story buildings to define this space, chances of providing human scale or visual interest are almost impossible.

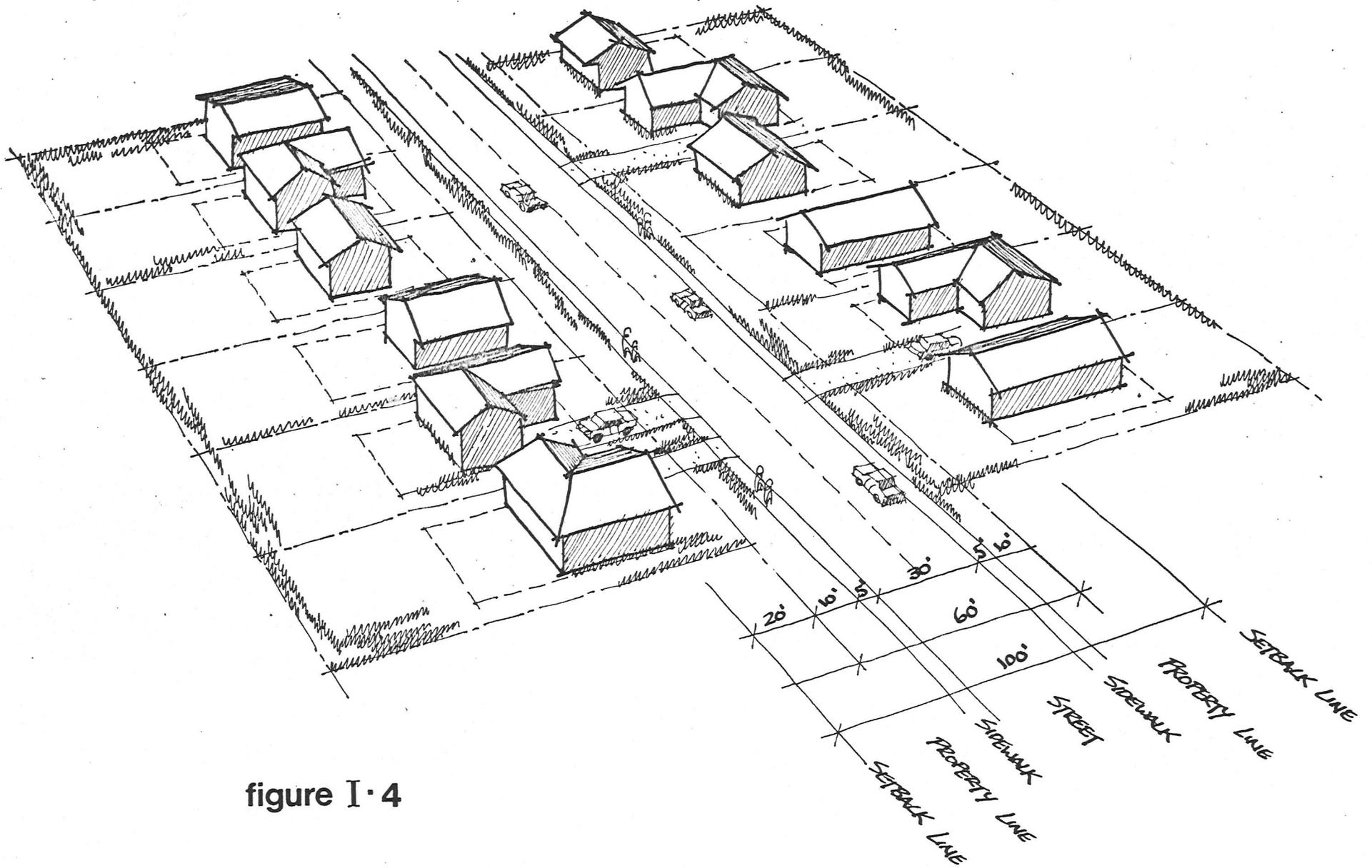


figure I·4

I-C-3 Block Form

When minimum lot and roadway requirements are combined in the development of a R-1 residential subdivision, little imagination is required to explore the alternative layouts. One look at a map of suburban Edmonton tells the story. The subdivision forms which can be created using existing standards fall into four basic patterns - the basic gridiron, modified gridirons, bays, and cul de sacs. (see. fig.# I-5)

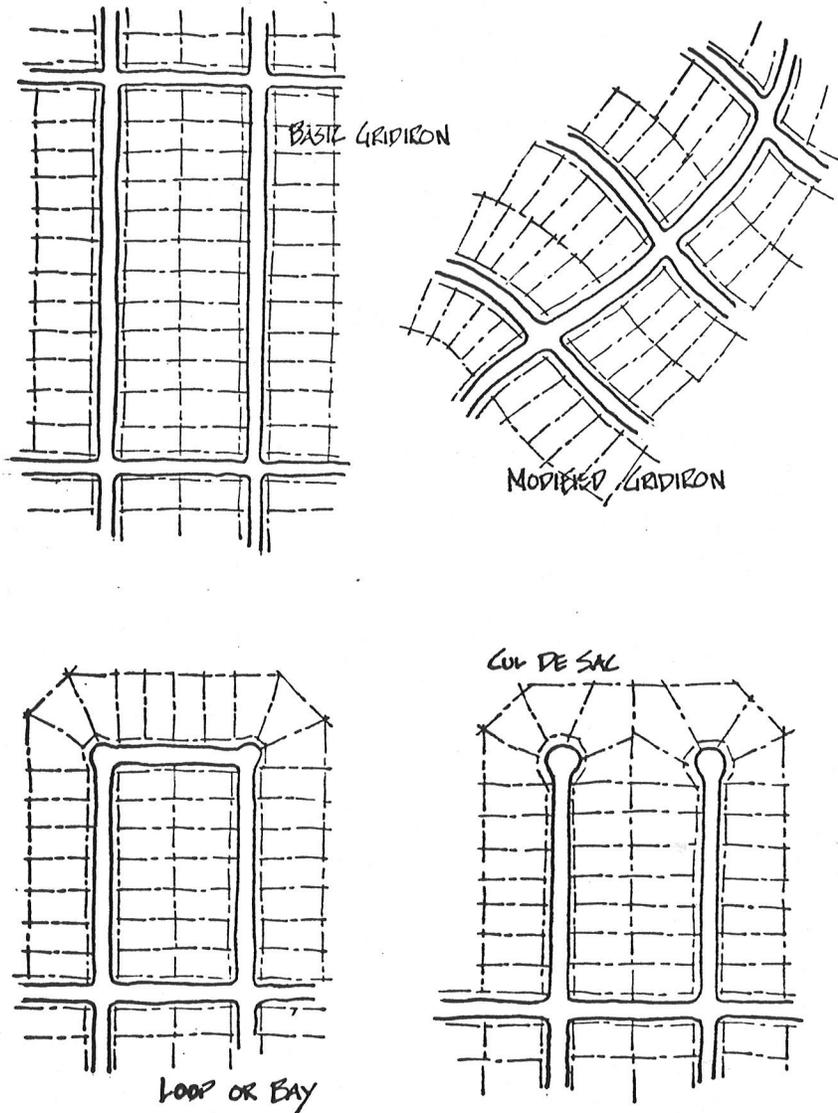


figure I-5

The controls which determine the way these lots and streets are to be assembled are found mainly in the C.M.H.C. Site Planning Handbook. (see Table I-1) Standards established in this document dictate a maximum block length of 1200 ft., a minimum distance between intersections of 22 ft., a maximum cul de sac length of 740 feet with emergency exit and 350 feet without. C.M.H.C. guidelines also establish a minimum lot gradient of two per cent from back to front property lines. This standard has been arbitrarily adopted by the City of Edmonton. Standards for street and walkway gradients are included in Section 2 of the Servicing Standards Manual.

When we consider the design constraints imposed on subdivision planning by adherence to these limited options, we are again faced with an inability to respond sensitively to climate, topography, or unique landscape features. The visual implications have already been served up by Carver:

"...however exquisite the tone, the insistent repetition of one note upon a single instrument is a form of torture."³

3. Carver, Humphrey, City in the Suburbs, p.16



I-D Cost Implications

The costs of developing single family detached housing are the result of many complex factors, and for that reason cost analyses and comparisons are difficult to arrive at and seldom meaningful. Raw land costs vary with location, size of parcels, and the law of supply and demand; servicing costs vary with type and density of development and physical characteristics of the site; and building costs vary seasonably and with the availability of materials and labor.

The cost implications of the controls listed in Table I-1 which dictate the external form of single family housing in Edmonton are most clearly illustrated through the way land is allocated to separate uses. As shown previously, these controls specify minimum amounts of land for circulation, minimum yard space around dwellings, and maximum building area.

To determine realistic costs for developing a single family subdivision to the prescribed minimum standards, a theoretical block of R-1 houses was analyzed for this study. Because of straight streets and perfectly uniform minimum lot dimensions, the rectangular gridiron form was found to be more efficient than either cul de sacs or bays. The latter require curved streets and some larger pie-shaped lots consequently "wasting" more land. A land use and cost analysis for this minimum standard gridiron block is illustrated in Table I-2.

MINIMUM STANDARD R-1 GRIDIRON SUBDIVISION

Total Development Area	=	4.0090 acres
Total Number of Units	=	26
Development Density	=	6.49 dwelling units/acre

1. Private Land:

<u>Use</u>		<u>Area</u>	<u>Value</u>	<u>Percentage Private Land</u>	<u>Total</u>
a. Bldg. area	=	.8356 ac.	\$16,712.00	27.78%	20.84%
b. Front yard	=	.5372 ac.	\$10,744.00	17.86%	13.39%
c. Side yard	=	.6304 ac.	\$12,608.00	28.96%	15.72%
d. Back yard	=	1.0050 ac.	\$20,100.00	33.41%	25.07%
Totals	=	3.0080 ac.	\$60,164.00	100.00%	75.02%

2. Public Land

a. Road	=	.5110 ac.	\$10,220.00	51.05%	12.75%
b. Sidewalk	=	.1650 ac.	\$ 3,300.00	16.48%	4.12%
c. Boulevard	=	.3250 ac.	\$ 6,500.00	32.46%	8.11%
Totals	=	1.0010 ac.	\$20,020.00	100.00%	24.98%
Overall	=	4.0090 ac.	\$80,184.00 (or \$3,084.00 per lot)	100.00%	100.00%

table I-2

From the standpoint of this study two important observations can be made from Table I-2. Firstly, we can see that 25% of the land in a standard R-1 subdivision must be allocated to circulation space. As pointed out earlier this appears rather excessive considering the light volumes of traffic it is required to carry. Some of this circulation space is in fact totally redundant - double sidewalks and boulevards, for example. The second observation relates to the usability of both the public and private land required. If we accept that the day to day living activities of residents of a single family district are almost exclusively restricted to the interior of the homes and the more private back yards, it

could be argued that 37.22% of the most land-efficient single family development is, from the resident's standpoint, functionally useless. This "wasted space" is made up of side yards, front yards and boulevards.

What is indicated from this analysis is that by a more efficient use of the land alone, substantial cost savings could be made in single family developments. By the elimination of waste space and reduction of overgenerous allocations of circulation space, this reduction in raw land cost could possibly approach 50 per cent.

I-E Implementation of Controls

Central to the implementation of controls identified in this section is a system of permits and approvals which anyone wishing to develop property must obtain. Applications for development of single family housing must first receive a development permit and then a building permit before construction may begin.

The purpose of the development permit according to H. Holfield⁴ is to ensure that proposals conform to zoning requirements, site planning criteria and servicing standards, and do not conflict with developments in the same area. Application for a development permit must include:

1. A legal description of the property and zoning designation of th area;
2. A conceptual site plan with the location and dimensions of all proposed buildings and services;
3. A description of the proposed development indicating all proposed uses for the land and buildings and explaining how the applicant intends to conform to existing bylaws.

Applications to develop are presented to the city planning department and if found in order are circulated to 24 separate individuals in 15 different city departments and pricate agencies. (see Table I-3 following)

4. Personal Interview with Mr. H. Holfield, City Planner

Mr. J. R. Rutberg
 Mr. W. H. Dubik
 Mr. R. Domingo
 Mr. F. Bereczky
 Mr. A. Munro
 Mr. J. Woychuk
 Mr. J. Magee
 Mr. D. Cole
 Mr. J. H. Clarke
 Mr. D. A. McCullagh
 Mr. M. Welykochy
 Mr. D. Cull
 Mr. M. Kowton
 Mr. S. Maslo
 Dr. C. Smith
 Mr. W. Pasternak
 Dr. L. C. Allan
 Mr. H. Coffin
 Ms. A. Wingfield
 Mr. H. G. Van Brederode
 Mr. H. Tipler
 Mr. J. Deeley
 Mr. L. C. Day
 Mr. H. Holfield
 Ms. N. Diettrich

*Edmonton Power
 *Edmonton Telephones
 *Edmonton Water and Sanitation - Water Engineering
 *Edmonton Water and Sanitation - Drainage Engineering
 Edmonton Water and Sanitation - Customer Services
 *Engineering and Transportation - Transportation Planning
 Engineering and Transportation
 *Realty Development Office
 *Real Estate and Housing Department
 Real Estate and Housing Department
 *Edmonton Parks and Recreation
 Edmonton Public School Board
 Edmonton Separate School Board
 *Health Department
 *Northwestern Utilities Limited
 *Central Mortgage and Housing Corporation
 *Central Mortgage and Housing Corporation
 *Industrial Development - C.N.R.
 Industrial Development - C.P.R.
 *Fire Department
 *Planning Department
 Planning Department

* indicates those individuals personally interviewed (see Section I-F)

table I-3

Each of these individuals reviews the application, makes whatever comments and/or suggestions he sees fit and returns them to the City Planning Department. Here the application and attached comments are studied and barring any major complaints, it is forwarded to a technical planning committee comprised of members of

the same departments. The application is collectively reviewed at this stage primarily with respect to the compatibility of services. Further comments are forwarded to City Planning where the application is reviewed once more and a decision to either award or refuse a building permit is made. If at any stage the application is refused, the applicant is so advised and can review the reasons for refusal. He may then either let the application drop or appeal to the development appeal board within fourteen days.

If the application is approved, a development permit is issued. When granted, this permit may be subject to a condition that it will not become effective until a specified number of days after its issuance. If the permit is appealed by an aggrieved party within a 14 day period, it is usually considered to be inoperative pending the outcome of the appeal.

Assuming that proposed buildings conform to building code standards, the issuance of a development permit usually means the almost automatic granting of a building permit. The successful development permit application is forwarded from City Planning to the city building inspector's office along with detailed working drawings supplied by the applicant. These drawings are then reviewed to ensure that they conform to building code standards. If not, revisions are requested. If the proposal satisfies the standards, a building permit is issued.

The time required to complete this procedure according to Mr. H. Holfield, can be as little as six weeks if no problems arise. With revisions or bottlenecks, however, it can take as long as three to four months or end in rejection of the application. The net results of this lengthy process are easily predicted. According to Tony Druid⁵, the only smart way to handle land development

5. Personal Interview with Tony Druid, Integrated Engineering, November 18, 1975.

applications in Edmonton is "strictly by the book", or in this case, books! The possibility of having any one of the many reviewers of development plans find something he doesn't like, is too much of a risk for developers to consider "innovative" housing schemes. As well, when developers are paying high interest on borrowed money or are sitting on expensive land they have purchased for development, delays in getting approval will almost always be reflected in higher costs to ultimate purchasers.

I-F Perceived Objectives of Controls

Fundamental to an evaluation of the performance of the controls identified here is an understanding of the objectives they are supposed to be meeting. In order to gain this understanding, representatives of each of the departments to whom development applications are circulated, were interviewed. The interviews were informally conducted and along with general discussions regarding the role of that department in the administration of controls, the individuals were questioned regarding their understanding of the purpose of the specific requirements within current control documents. Specifically they were asked:

What in your view is the purpose of:

1. Requiring a minimum road width of 30';
2. Requiring a minimum right-of-way of 60';
3. Requiring a maximum intersection spacing of 1200';
4. Requiring a minimum intersection spacing of 22';
5. Requiring lots to be graded at 2% back to front;
6. Requiring minimum street gradients of .5%;
7. Requiring maximum street gradients of 8.0%;
8. Requiring minimum sidewalk widths of 5';
9. Requiring minimum lot areas of 5000 sq. ft.;
10. Requiring minimum lot frontage lengths of 45';
11. Requiring minimum front setbacks of 20';
12. Requiring minimum rear setbacks of 25';
13. Requiring minimum side setbacks of 4';
14. Requiring maximum site coverage of 28%;
15. Requiring maximum building height of 25'.

Whereas this survey in no way pretends to provide statistical validation for any conclusions, an analysis of the combined responses and general discussions surrounding them does provide

some interesting insights and observations. In Table I-4 following, the responses to specific questions regarding the purposes of current controls are categorized.

Question: What in your opinion is the purpose of:	Responses:										Total Responses	Responses per person	
	Fire safety	Traffic circulation	Privacy	Light and air	Open space	Aesthetics	Drainage	Snow removal	Density	Pedestrian Circulation			Property value
1. Minimum road width 30'	9	13	5	3		7		2				39	2.6
2. Minimum right-of-way 60'	12	7	7	3	4	7		5				45	3.0
3. Intersection spacing Min. 200'	4	15										19	1.3
Max. 1200'	10	12								3		25	1.6
4. Max. Cul de sac length 750'	5	15						2		4		26	1.7
Without emergency exit 350'	5	15						2		4		26	1.7
5. Lot grading 2%							15					15	1.0
6. Road grading Min. .5%							15					15	1.0
Max. 8.0%		15										15	1.0
7. Off street parking 1.0		15				6						21	1.4
8. Minimum walkway width 5'							6		15			21	1.4
9. Minimum lot area 5000 sq. ft.	11		8	10	8	3		8	3	2		53	3.5
10. Minimum lot frontage 45'	4		6	1		8				3		22	1.5
11. Minimum front set back 20'	10		12	6	8	9		1	4			54	3.6
12. Minimum rear set back 25'	8		10	8	15	2		4	4			47	3.1
13. Minimum side set back 4'	13		10	11	6	3		4	7			54	3.6
14. Maximum site coverage 28%	10		8	6	8	5		3	2	2		44	2.9
15. Maximum building height 25'	10		2	7		8						27	1.8
Total responses:	111	107	68	55	49	58	30	18	23	38	7		

table I-4

In the table above, horizontal lines represent specific questions and vertical columns represent categories of responses. The number in the column indicates that of the 15 administrators questioned, "x" number of them gave a response falling under that category. For example, when asked about the reason for minimum lot area requirements, (question 9), 11 people mentioned fire safety, 8 mentioned privacy, 10 mentioned allowance of light and air, 8 mentioned open space, 3 mentioned aesthetics, 8 mentioned control of density, 3 mentioned to allow pedestrian circulation around dwellings, and 3 mentioned property value. From 15 administrators then, came 53 responses falling into 8 separate categories of purpose for one specific regulation.

From these responses, a number of useful observations can be made:

1. Questions illiciting the greatest number of responses per person and with answers falling under the most categories, appear to represent the most multi-purpose controls and as well, indicate control on which there is no strong consensus of agreement regarding purpose. Controls in this category are:
 - a. street right-of-way requirements
 - b. lot area requirements
 - c. all three lot setback requirements

All of these illicited above three responses per person falling in at least seven categories of purpose.

2. Questions illiciting the fewest responses per person and falling in the fewest categories represent single purpose controls on which there appears to be a strong consensus concerning purpose. Controls in this category are:
 - a. lot grading requirements
 - b. road grading requirements
 - c. intersection spacing requirements
 - d. off street parking
 - e. walkway width requirements

These illicited under 1.5 responses per person and fall in only one or two categories of purpose.

3. Categories of response mentioned the most times such as concern for fire safety, traffic flow, and privacy appear to represent characteristics most sought after through the application of current controls. They are listed in their order of perceived importance from left to right in Table I-4.

I-G Summary

It has been shown in Part I of this study that the controls which affect single family housing in Edmonton are set down in three separate documents and dictate either directly or indirectly through rigid specifications, the form that this housing must take. When existing standards are used as design criteria, little or no opportunity exists for direct responses to natural site features, climate, or many basic human needs.

It was further demonstrated that compliance with existing controls forces us to allocate a large percentage of available land to what appear to be extravagant circulation systems and areas of "open space" which appear to have no real functional value.

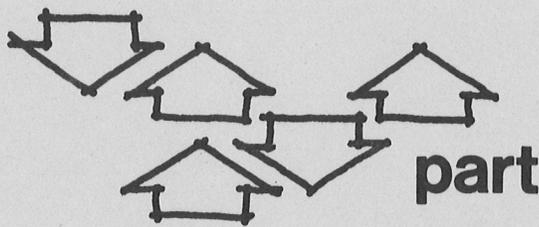
It was also shown that the administration of existing controls has resulted in a lengthy and complex development approval process in which 24 individuals in 15 separate city departments are directly involved. This process, taking a minimum of six weeks to complete, understandably makes potential developers reluctant to cause further delays through the proposal of innovative housing schemes.

Finally, it was shown through discussions with the administrators currently involved in the application of existing controls as well as people required to comply with them, that there is no universal understanding of the purpose or implications of these controls.

What appears to be lacking is a general philosophic view of what controls on building and land development should be, and what overall objectives they should be expected to meet. The absence of this view makes it very difficult for people involved with existing controls to understand or communicate effectively with one another.

Architects, engineers, planners, city officials, and other recognized experts in the field have for the most part gained their knowledge through a direct and pragmatic involvement in drafting, administering, or complying with existing controls, and most suffer from a rather myopic view of the topic. The working knowledge acquired by these people enables them to cope with the everyday problems directly related to their position. It does not, however, equip them for dealing with changing or unforeseen conditions and needs. Due to insecurity associated with the lack of a more comprehensive understanding, they have usually assumed a very single purpose stance on the topic and this has led to misunderstandings, hostilities, and bottlenecks.

What seem to be required are fundamental changes to the type of controls we use rather than simply "tinkering" with existing requirements. If we are to create more sensitively designed housing environments, we must make more direct and rational responses to the qualities that existing controls are supposed to be providing. Furthermore, if we are to create a more realistic and responsive system of development controls, there is no better way of beginning than with an understanding of the real purposes and motivations behind our existing ones. The intention of Part II in this study is to put current controls in their historical perspective.



part

2

**historical
review**

II-A Historical Introduction

The earliest evidence available in the literature of man's official regulation of building, dates from about 1700 B.C. when King Hammurabi attempted to codify the development laws of the lands he controlled. In Article 229 of the code he states:

"If a builder has built a house for a man and his work is not strong, and if the house he has built falls in and kills the householder, that builder shall be slain."¹

While this ancient "code" gives testimony to an early consciousness of the need to ensure safety in buildings, it should not be compared with modern building regulations. Hammurabi's code, like most ancient laws, was punitive in nature. Because it was an "after the fact" code rather than a preventative regulation such as modern building codes, it would be better compared to modern criminal law. It could as well perhaps be viewed as the earliest performance standard in building.

Another form of early law which carried over into the building process can be seen in a Polynesian example cited by Sanderson.² These early islanders, it appears, stipulated that a live slave should be placed under each corner post of a new building to ensure it was properly supported. This grisly example was a superstitious response to a lack of knowledge.

In ancient Greece knowledge and philosophy reached an unprecedented height. In this period the hippocratic emphasis on clean air, water and sanitation in town planning had its origin. For the most part, however, the knowledge of Greece was not translated into technology and the cities, following ancient traditions remained small, tight and dirty.

It was in Rome that the first recorded controls comparable to our own had their origin. These early controls were limited to three simplistic primary concerns:

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1. Ancient Rome, cited by R. C. Collings and Hal Collining, Modern Building Inspection, Los Angeles: Building Standards Monthly Publishing Co., 1950, p. 12.
 2. Sanderson, R. L., Codes and Administration, p. 73

1. insuring structural firmness in large public buildings,
2. prevention of fires in the private quarters of the city,
and
3. alleviating congestion on narrow streets.³

In all cases though it is important to note that controls were initiated by and aimed at protecting the environment of the wealthy and powerful of Roman society. The knowledge of this period was maintained exclusively by and for the ruling classes. It was translated into technology and used to provide this class with an unprecedented living standard.

Lack of controls for the protection of the average citizen was also due in large part to the power of aristocratic land speculators. The fortunes of some of the most famous Roman citizens were dependent on overcharging the public for rental of 'sub-standard' dangerous accommodations.⁴ Ordinary city dwellers were forced to live in ten-

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3. The most outwardly noticeable problem resulting from the crowding which occurred in Rome's poorer quarters was that of traffic congestion. Perhaps because the resulting congestion affected the nobility to a greater extent than the tenement crowding, the control of street widths was the focus of a series of municipal regulations. Julius Caesar banned wheeled traffic from Rome's streets during daylight hours. This was extended by both Claudius and then Marcus Aurelius to include all the municipalities in Italy and then to every Roman town in the empire. Finally in 117 A.D. Hadrian imposed a limit to the amount of wheeled traffic to be permitted in a Roman town even during night hours.
 4. Two of the best known of these ancient entrepreneurs were Crassus and the famous statesman, Cicero. Crassus is reported by Mumford as having boasted that he never spent money for construction - he simply purchased damaged property at fire sales and with minimum repairs, re-rented them. In this manner he amassed a vast fortune.

In order to avoid facing tenants personally, these landlords usually leased their property to agents who in turn were allowed to squeeze any price they could from the tenants. Schneider reports that even these agents hired sub-agents to do their dirty work for them. The tenants were in fact protected in no way from the unscrupulous actions of their landlords. They could be evicted without notice or have rents raised, and had virtually no recourse if injured due to the collapse of faulty structures.

Municipal response to these conditions in the way of development regulations, even when well-intentioned appear to have been weak and ineffectual. In 133 B.C. Tiberius Gracchus, a tribune of the people, was assassinated on the instigation of big landowners for his efforts to effect land reforms in favor of smaller farmers. When his brother Gaius repeated the attempt, a civil war broke out in 121 B.C. The cause was defeated and Gaius Gracchus took his own life while three thousand of his followers were executed without a trial.

ements, (insulae) from six to twelve stories in height, so tightly packed that the lower floors got virtually no sunlight at all. Individual "apartments" usually consisted of one 100 square foot room, twenty-five of these to a single-floor and 150 to a tenement. This meant that up to 500 people were under a single roof.⁵ Dampness, stench, and darkness as well as frequent fatal fires were the "penalty" for living in this kind of accommodation. These tenements were owned by a few wealthy landowners. In speaking of the "insulae", Mumford says:

"The building of these insulae, like the building of the tenements of New York was a speculative enterprise in which the greatest profits were made by both the dishonest contractors, putting together flimsy structures that would barely hold up, and profiteering landlords, who learned how to subdivide old quarters into narrower cells to accommodate even poorer artisans at a higher return of rent per unit."⁶

The only positive steps toward municipal development or planning control appears to have been enacted by Augustus who did impose a seven story limit on tenement buildings, and later, Nero, who attempted to restrict tenement heights to only twice street width. However, no standards were established to control:

1. congestion of living conditions in public tenements,
2. the soundness of construction in tenements,
3. city sanitation in terms of water and air purity or waste disposal.

With the decline of the Roman Empire, Western Europe reverted once more to a primitive, dispersed and traditional society. Building methods followed suit and all artificial controls disappeared. By the end of the dark ages about 1000 A.D., pressures from northern invaders (Vikings) initiated the reestablishment of urban communities.⁷ Walled cities

5. Schneider, W., Babylon is Everywhere, p. 138

6. Mumford, L., City in History, p. 219

7. "In terror of the invaders, the inhabitants of Mainz for example, at last restored their broken Roman walls. And under commissions from the German Emperor, Henry I, walls were built even around monasteries and nunneries to guard them from pagan attack. Twice in the ninth century, in 860 and 878, the monastery of St. Omer had been devastated by the Norsemen. But when these Vikings returned in 891, they found that the Abbey had at last erected walls and could defy them. So successful indeed was this renewed mode of achieving security that, by the tenth century, the monastery of St. Omer had become a town." from: Mumford, L. City in History, p. 250.

were rebuilt on Roman ruins and problems of congestion, fire, and changing building forms were felt again.

It was not until 1189 A.D. in London, however, that the first modern building regulations were established, coming in response to recurring fires in the traditional wood and straw construction of that period. The "written agreement" was known as the "Fitz Ailwyn Assize of Buildings" and encouraged such measures as building sixteen foot stone party walls around property.

The Industrial Revolution in Europe saw the birth of modern technology through the large scale application of knowledge. Along with it came the invention of machinery, the introduction of the factory system, and the transition of tradesmen into professionals. Those implications of the Revolution which were important to the later establishment of more formal building controls were:

1. Knowledge began to filter down from upper classes to average people.
2. Professional standards were established by architects, engineers and tradesmen,
3. There was a mass exodus from rural to urban areas as people sought employment in new manufacturing centres,
4. Congestion and overcrowding spread with the uncontrolled development of cheap, unsanitary dwellings.

It was in response to the problems brought about by the above changes, that the more sophisticated building controls and professional standards governing public welfare were introduced out of necessity in many European cities. However, North America was so preoccupied with rapid growth and the settlement of the wilderness that these precedents were to have had no substantial influence on its development until the birth of the 20th century.

II-3 Canadian Colonial Development

The origin of what are now site planning criteria for housing and much that is implied in zoning bylaws and servicing standards can be traced back to the surveying and subdivision methods established in North America in the 18th century. Lacking any other control or standard the "gridiron tradition" in land subdivision has served as the model and has, both in urban and rural development, had a profound influence on our attitudes toward land use and land use control right up to the present day. Understanding the assumptions and justifications which have perpetuated the use of this system is therefore fundamental to identifying the objectives of current land use controls. In many ways the same justifications have simply been reinforced by the extension and fuller expression of the gridiron system in more detailed site planning criteria, servicing standards and zoning bylaws.

Until the middle of the 18th century settlements in the Atlantic region had been organized haphazardly on the basis of their original functions as pioneer posts, seaport towns, or military forts. The layout of these towns was in direct response to the functions which they served.

The early French settlers of this period had land apportioned to them by the seigniorial system. Under this feudal arrangement real ownership remained with the King. The "seigniors" were a privileged class who had the responsibility for settling the land for which the settlers or "censitaires" were obliged to pay a rent in the form of cash or a portion of the harvest.¹ The shape of these allotments was that of a long, narrow rectangle with one short side of about 300 feet facing onto a navigable waterway.

Considering the conditions of early French colonial life this was a very practical system of land subdivision. Roads were practically non-existent and access to navigable water became a prime concern. Another advantage of the system which allowed farmsteads to be close together

1. In early French Canada these "seignioriy" ranged in size from 100 to 1000 acres and were subdivided in the old French system of land measurement in which the unit was the arpend, approximately five-sixths of an English acre.

was that of mutual protection from frequent Iroquois raids, fires, accidents, or illness. As well, this close proximity to neighbors promoted a spirit of cooperation not dissimilar to mediaeval village life, while still permitting conventional farming. It was the eventual development of artisans and tradesmen establishments at strategic locations on the frontages of these holdings which fostered the legal creation of villages.²

As these linear communities developed, construction changed from wood to more substantial brick and stone and the narrow streets were cobbled and lined with two and three story buildings. Generally speaking early French town planning in Canada showed a good deal of urban design consciousness. The linear towns were punctuated with churches, convents and civic buildings; topographic features were maximized for not only defence but also aesthetic reasons; and industrial uses such as blacksmiths, carpenters, upholsterers, wagon makers and ship builders were concentrated in areas of brick and heavy timber buildings and away from residential districts. This natural system of "zoning" resulted in considerably fewer fires than occurred in later British settlements.³ The planning tradition which was begun in these early French towns, and to which present day Quebec and Montreal owe much of their present charm, was however to have little influence on the later development of western cities.⁴

By the middle of the 18th century in the British colonial towns south of the St. Lawrence and in the newly forming American settlements, the arbitrary rectangular block or "gridiron" plan was being introduced to North America. This system which had primarily been used successfully in the Irish Elizabethan settlements and the West Indian plantations was an early pseudo-planning response to commercial concerns. It was a

2. Russell, L., Early Life in Colonial Canada

3. Hugo-Brunt, The History of City Planning, p. 258.

4. The seigniorial system during the French regime was extended into the Atlantic region, notably the Annapolis Valley and then along the St. John River. In 1763 when British rule was established, the system was allowed to continue until 1854 when it was abolished in favor of the British freehold system.

method of subdividing "in advance of use and with no reference to use."⁵

The dependence of these early gridiron towns on water transportation, like their earlier French counterparts played a strong role in determining their form. Two streets usually developed parallel to the water, one along the shore and usually called "Water" or "Front" street and one developed further back. On the basis of its use it was generally called "Market" street. The towns were of a rectangular grid form, with other streets dividing the area into blocks. Two or more squares were reserved for church, civic, or military uses. The administration of these early British towns was handled by appointed officials of the government.

In the latter part of the 18th century some of these British colonies began to revolt, and as one of the results, the well known "Loyalists" settled in Upper Canada. Surveying of their townships in 1783 was done by the British gridiron method.⁶ The basic British land unit was the township of 36 square miles. It had been used in many parts of the American colonies and was familiar to both the Loyalists and other American immigrants.

Urban settlement in the new territory was slow in developing with the small hamlet of Kingston being the only center of any importance. Despite the significance of any other urban growth, the government, following the American example and bent on rapid development went ahead with ambitious gridiron surveying. In each township a settlement site was selected and a town plan was drawn up. The plan for these towns consisted of one acre lots, parks of 24 acres and generous streets and town squares. Sites were as well located for future public buildings and defence works. Each gridiron plan occupied one "section" of land one square mile in area.

5. Report of the Committee of Community Planning

6. Spelt, Dr. J., The Urban Development in South Central Ontario, p. 13

All interior townships were ten miles square with the townsite located in the middle. Townships fronting on navigable water were twelve miles deep and nine miles wide, with the townsite "designed" in the traditional form located on the water side.⁷ Settlement developed on so few of these sites, however, that in 1794 the idea of a settlement in every township was abandoned.⁸

During the final part of the 18th century the settlement pattern of Upper Canada underwent some fundamental changes.⁹ Under the direction of Simcoe, a veteran officer of the American Revolution, planning became a more positive force.¹⁰ His plans for settlement and road building profoundly influenced the future development of Ontario.

At the time when Simcoe took over the government of Upper Canada, he chose to move the capital from Newark (apparently too close to the American border) to York, which later became Toronto. Subsequently the new town plan, a gridiron system, was approved in July, 1794.¹¹

7. Patterson, G. C., Land Settlement in Upper Canada 1783-1840

8. The period of early optimism on the part of the government was followed in later years by private settlers attempting to establish their own townsites. Many "paper towns" were laid out with space reserved for wide streets, private lots, schools, churches, and even universities. These "towns" were advertised as having unlimited potential for growth and lots were offered for sale. Simcoe County in Ontario had eleven such towns, none of which ever materialized. Another "paper town", Romulus, in the township of Beverly, Ontario was advertised by its founder as the future site of a "great Canadian city", located on the "great highway between the Atlantic and Pacific Oceans." He even provided a gristmill and sawmill for potential buyers, but this settlement failed to develop as well. Due to the general lack of success of this practice, it was discontinued by the mid 1850's.
from: Illustrated Historical Atlas of the County of Wentworth, Ontario, Toronto, 1906.

9. During this early period of settlement, Upper Canada still formed part of the Province of Quebec and the level of influence these new settlers could exact on the Quebec administration was minimal. Largely for this reason, the new settlers, in 1791, caused the formation of Upper Canada as a separate province. This in turn resulted in a considerable change in the planning of settlement in the new province.

Hunter, A. F., A History of Simcoe County, p. 299.

10. Spelt, p. 20.

11. Bauchette, J., The British Dominions in North America - Vol. II

In order to speed development of the new capital, purchasers of lots were required to build houses on them within three years. Also to encourage road development around the city, Simcoe laid out 200 acre rectangular lots on either side of future roads and to discourage the present speculation allowed only legitimate settlers to occupy them. Settlers on what is now Yonge Street were required to build a minimum 16 by 20 foot dwelling within one year of getting permission to settle, and within five years had to clear and fence five acres on the front of the lot.¹²

At this time in history no settlement existed between York and Port Hope, and in fact the entire territory was very sparsely populated. This scarcity of population, lack of urban development and the associated isolation of settlers was due largely to the method of land subdivision and dispersal. The gridiron method of planning and associated speculation during this early period in fact had a much more devastating effect on the thousands of square miles of rural Ontario than it did on urban settlements.

According to the Constitutional Act of 1791, one seventh of each township had to be set aside for crown reserves and an additional one seventh for the Anglican church. In order to ensure that these reserve lots would be of the same general quality as the surrounding land they were not consolidated into single blocks, but were distributed regularly in small lots of 200 acres each around every township. It was hoped that as the legitimately settled land was developed and gained in value these reserves would appreciate as well and yield handsome returns. When added to the many undeveloped land grants given Loyalists

12. Descriptions of Toronto and Kingston during the early 19th century paint a rather dismal picture. Talbot is reported in 1828 to have said of Toronto:

"The streets of York are regularly laid out, intersecting each other at right angles. Only one of them however is yet completely built; and in wet weather the unfinished streets are if possible muddier and dirtier than those of Kingston."

Dent, J.C. and Scadding, H., Toronto Memorial Volume, Toronto Past and Present, p. 93.

and special privileged groups, these scattered reserves amounted to a substantial percentage of each township.¹³

Most of those who received large land grants, using the same speculative rationale as the government, chose to have them scattered so they would increase in value through the efforts of other settlers. Very few ever improved their holdings.¹⁴

The implications of gridiron planning, land grabbing and speculation were very serious for the legitimate settler. The difficulties in fencing with only one side of the fence on developed land, the problems of developing and maintaining the miles of road past the ubiquitous undeveloped wilderness lots and the enforced isolation due to the absence of neighbors or settlements, made the life of the early pioneer a hard one indeed.

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13. Chief Justice Powell, for example, through government favoritism received 3000 acres, three town lots in Newark and a farm lot in York; his wife who was a Loyalist received 1200 acres and each of their seven children received an additional 1200 acres, for a total of more than 12,800 acres in free grants.
From: Patterson, G. C., Land Settlement in Upper Canada, p. 63
 14. In addition to these grants thousands of acres were acquired by people making use of loopholes in the settlement regulations or obtaining grants through the sponsorship of influential persons. It is estimated that over 50% of the available surveyed land was granted to privileged groups while the remainder went to serious settlers.
From: Patterson, p. 153

II-B Settlement of Western Canada

Prior to 1812 settlement of the prairies had been restricted to posts established through activities of the fur trade. The only subdivision of land was into 100 acre plots sold to destitute Scottish immigrants, who were expected to produce food for the H.B.C. post.

Before immigration could be actively encouraged in western Canada several prerequisites had to be satisfied. In terms of the physical settlement of the land these consisted mainly of satisfying the land claims of Indians and the original settlers, and surveying the land so as to allow for its legal disposition.

It was the surveying of the land which was the most important prerequisite to the settlement of the west.¹ The original plan was to create square townships divided into 800 acres and subdivided into quarter sections of 200 acres as had been previously done in "Ontario". In 1871, however, it was decided that the United States system which used townships of 36 square miles and sections of 640 acres would be more familiar to potential settlers.²

At first the road allowances were one and one-half chains (99 feet) between sections, but in 1881 this was reduced to one chain (66 feet) and three of the east-west roads were done away with. The result was more land for cultivation and easier (and cheaper) surveying.

The first occupied river lots were retained and by 1876, 10,574,915 acres of land had been divided into townships, sections and quarter sections.

The Dominion Government formulated its land policy in Orders in Council of April 25th and May 26th, 1871, followed by the Land Act assented to on April 14, 1872.³ Section 33 of the Act provided that any person who was the head of a family or was 21 years old could enter a free homestead

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1. Morton, Arthur S., History of Prairie Settlement, p. 107
 2. The history of the survey is given in a report by Col. J. S. Dennis, published in a Report of the Department of the Interior, 1891, Part VI, p. 1 - 31.
 3. Statutes of Canada, 35 Vict. c23

on the even numbered sections, "no patent to be issued on the land until the expiration of three years".⁴ Other lands which were not "reserved" were to be sold at \$1.00 per acre.

To further accelerate the settlement of the west, Section 14 and 15 of the Dominion Lands Act of 1874 gave the government power to reserve lands for individual promoters of immigration. Land was sold to these promoters from the "reserves" at a lower rate than the normal \$1.00 per acre.

This practice of reserving large blocks of land for special groups, however, did not speed settlement⁵ and so in 1878 an Order in Council to further increase settlement offered further incentive to promoters of immigration. Anyone who established a settler on a homestead was to receive half of the adjoining section. This proved more successful in terms of attracting settlers.

In 1882, a census taken in Manitoba indicated that while the population of that province had increased from 18,995 in 1871 to 65,954 (about three times), the population of Winnipeg had increased about 53 times. The town was growing much more rapidly than the rural areas. Many of the new immigrants were thus finding their place as employees (or employers) of the town rather than as farmers.

4. Statutes of Canada, 35 Vict. c23

5. James Trow, in 1877 commented in speaking of Manitoba:

"A very large part of this province is set apart by reservations of various kinds which retard its progress and development seriously. I am persuaded that hundreds of intended settlers will not remain in the province on account of these reserves. Leaving the settled portions and passing through the reserves for miles to new settlements without roads cannot but be discouraging. Many of these reservations are not in the interest of the province and must and will retard legitimate colonization unless thrown open for settlement"

from: Trow, J., Manitoba and the North West Territories,
Ottawa Dept. of Agriculture, 1878, p. 17

Not the least of these new urbanites were the land speculators. The possibilities of buying cheap "script"⁶ and selling it at inflated rates attracted many from farming or other more productive activities.

With the arrival of the railroad the "boom" in Winnipeg reached unprecedented proportions. As John Macoun reported:

"The excitement during the fall of 1881 amongst real estate owners was intense. Nothing to equal it had ever before occurred on Canadian or British soil. Thousands of dollars were made by operators in a few minutes. Vast fortunes were secured in a day. The excitement spread like wild fire all over the country. Cool-headed professional and business men, clerical as well as lay, left their callings in other parts of the country for the scene of the modern Canadian El Dorado. Real estate agents became as numerous as the sands on the shore."⁷

The decade from 1871 to 1881 was the day of Manitoba. During the following years with the opening of the railroad, the Northwest Territories began to draw people further west. This attraction westward was unforeseen by many of the speculators and many were left holding property which they were lucky to get rid of at cost. The temptation of much cheaper and often better land in the now accessible North West had a disastrous effect on land prices and caused a massive exodus from Manitoba. It was at the same time as the peak of this land boom in

6. "Script" was a paper entitling Indians or other legitimate claimants to a specified allotment of land.

7. Macoun, John, Manitoba and the Great North West, p. 494.

Also Mr. Levi Thompson, Governor of the University of Saskatchewan, reported in "Reminiscences" for the University Archives:

"In Winnipeg in April, 1882 almost every day you could hear eloquent auctioneers trying to sell lots in some place real or imaginary in some part of Manitoba or the north west. One morning at the breakfast table there was some discussion as to an offer said to have been made for one of the best corner lots in the city of \$1,000 per front foot. Some thought the price unreasonably high, others held a contrary opinion. I ventured to suggest that in my opinion it was too high and gave as my reason that a short time before it became necessary in connection with a certain transaction in Toronto to put a price on the unimproved land value of a corner lot at the intersection of King and Yonge Street and it was placed at the price of \$1,000 per front foot. 'Oh', said someone, 'that is no criterion. That is only Toronto; this is Winnipeg.'

From: Morton, A.S., History of Prairie Settlement, p. 60.

Winnipeg, 1881, that the railroad finally arrived. Further settlement and development in Western Canada was destined hereafter to follow the tracks of the C.P.R.

II-C-1 The Railway Towns

The "haste" with which the prairies west of Manitoba were settled occurred in response to a number of factors. Firstly, and perhaps most importantly, was the Dominion Government's policy of settling the prairies as quickly as possible. This policy was based on the desire to stimulate demand for the tariff-protected manufactured products of Ontario and Quebec; to support the Canadian Pacific Railroad which was being built across the country;⁸ and to guarantee the continued existence of a united Canada, including British Columbia.

This consuming desire for instant development resulted in the granting of enormous amounts of land to the railroad as well as almost a free license to locate, plan and develop future urban centers.

The C.P.R. exerted almost total control over the location and layout of towns along its line. In describing the tactics used in developing Grand Valley and also Brandon, Manitoba, Pierre Berton remarks:

"The company arbitrarily determined its location in the interests of real estate profits, and the company totally controlled it."⁹

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8. British Columbia had threatened to leave the confederation if the rail line was not built.
 9. Berton, Pierre, The National Dream

And further:

"With a scratch of a pen the company could and did decide which communities would grow and which would stagnate; the placing of divisional points made all the difference."¹⁰

Land speculation in the early development of Western Canada because of the rail line had a very strong urban emphasis. As the railroad moved westward, settlers took up land directly along the line and around the settlements which were regularly located along it. In the spring of 1882, the C.P.R. was in Moosomin and in August, 1883 it reached Calgary.

The physical plan for the railway towns was again the gridiron. Generous streets and blocks were laid out and the blocks were subdivided into

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10. One of the first and perhaps most significant actions taken by the C.P.R. in looking after its own financial interests came when it was decided by the directors of the company to change the route to a southerly one through Regina and Calgary. While it was rationalized at the time that this change would prevent American encroachment into the border regions, a much more believable explanation is given by Pierre Berton who suggests that the real reason for the change of route was because of the advantages to the railroad of establishing new urban centers on land which the C.P.R. had been granted by the Dominion Government. The situation as seen by the railroad company is described by Berton:

"On the other hand, that line (the northern one) ran through country where some settlement already existed and where real estate speculators - at Battleford and Prince Albert for example - expected to make profits out of land adjacent to the right-of-way. It undoubtedly occurred to the railway company that it would be easier to control an area that had never known a settler and where there were no established business interests of any kind."

The C.P.R., therefore, took agricultural land in grants from the richer areas to the north, and took urban land to which it was entitled from the dry land along the southerly route.

From: Berton, Pierre, The Last Spike, p. 23 - 30,

rectangular lots. This typical town plan is typified by Wetaskiwan, Camrose, and Ponoka, Alberta (typical of Figure II-1). The intimate relationship to the railroad is obvious by the arrangement of the main street containing all the major buildings - hotel, bank, stores, and grain elevators. This main street ran parallel to the rail line and as close to the station as possible.

Land values were correspondingly highest near the intersection of the main street which crossed the tracks. As one moved away from this intersection and the train station land values dropped accordingly.

The major concern of all these prairie towns as it still is today, was growth and the appreciation of land value. Thorstern Veblen in 1923 described the rationale on which these towns were established:

"The location of a given town has commonly been determined by collusion between interested parties with a view to speculation in real estate, and it continues through its life history to be managed as a real estate proposition. Its municipal affairs, its civic pride, its community interest converge upon its real estate values, which are invariably of a speculative character and which all its loyal citizens are intent on "booming" or "boosting".¹¹

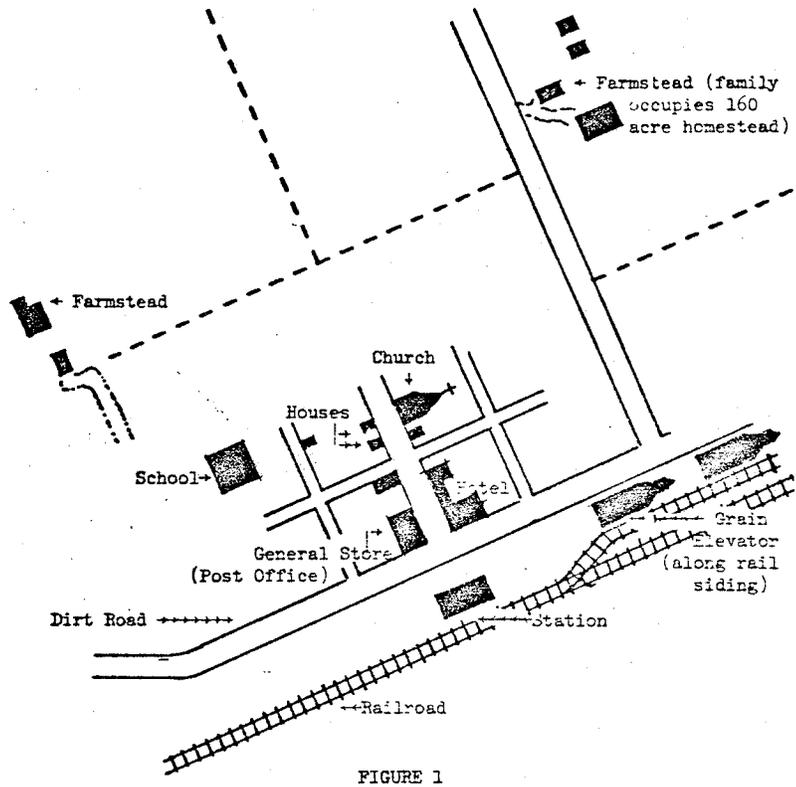
This "boom town" story can be seen in the history of nearly all the urban centers of the west. On the basis of secret "inside" information, or perhaps just rumor, concerning the location of major rail centers, speculators stampeded ahead to squat on every available piece of property.

Acting on special information gained through his position as Lieutenant-Governor of the N.W.T., Edgar Dewdney in 1881 purchased 480 acres of prime land from the Hudson's Bay Company on Wascana Creek, 230 miles west of Brandon. This location, on which the C.P.R. had intended to establish its next divisional point was then declared by Dewdney the site of the new territorial capital.

The stories of land speculation by directors of the C.P.R. are equally enlightening. In 1882, 47 western townsites comprising some five million acres were sold by the C.P.R. for 13.5 million dollars to the Canada

11. Veglen, Thorstein, Absentee Ownership and Business Enterprise in Recent Times taken from Robertson, H., Grass Roots, p. 62.

[Small (160-acre) homesteads are scattered throughout the surrounding open country, the farthest 8 or 10 miles distance from the trading center.]



*taken from:
Zimmerman & Moneo,
The Prairie Community
System,

FIGURE 1
 THE FIRST FORM OF THE PRAIRIE COMMUNITY WITH ITS SIMPLE
 (UTILITARIAN) TRADE CENTER AND ISOLATED
 160-ACRE HOMESTEADS

[These trade center communities developed along the railroads during the settlement period 1897-1930.]

figure II-1

North West Land Company, the major shareholder of which was Sir Donald Smith.¹² He in turn was in association with a group of wealthy eastern families headed by E. B. Osler, a member of one of Canada's leading real estate families. Profits for sale of this land to incoming settlers for as much as \$30 per acre in two townsites, represented only a part of the benefits accruing to this association. As the Canadian Government still owned half of the land in every townsite, it as well retained the North West Land Company to act as their agent, thereby giving the association total control of all the land within 47 developing townsites. A three percent commission was paid to the company for the sale of all this land as well as giving company directors the opportunity to buy unlimited quantities of the choicest crown land at prices they set for themselves.¹³

12. Robertson, Heather, Grass Roots, p. 63
 13. Ibid, p. 64

II-E Early Development in Edmonton

Early town planning in Alberta is aptly described by Bettison:

"The decisions of the C.P.R. and other railway companies in relation to stopover and collection points and the distribution of land settlement determined the sites of urban centers in the early years. The delineation of lot size by surveyors in order to register land with what was called the Land Titles Office - thereby making land a legally saleable commodity, and the subject of intense speculation - was the sum total of early planning efforts in Alberta. The rectangular grid is part of the early surveyor's legacy to the prairies."¹⁵

Unlike most other Alberta centers, Edmonton did not originate as a railway town. Due to its strategic location on the North Saskatchewan

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14. One Alberta example which illustrates the spirit of the times comes from Medicine Hat. The editor of the Medicine Hat Times it appears was opposed to giving large land concessions to a group proposing a street car system. The resentment of local residents over this negative stand caused him to be thrown into the South Saskatchewan River - fortunately in effigy!
From: Bettison, Urban Affairs in Alberta, p. 8.

Of Interest

To further excite speculation, the Canada North West Co. awarded free corner lots to the first newspaper publishers who would in turn paint favorable pictures of the pioneer settlement. In 1883 the Moose Jaw News described Moose Jaw as "The prettiest townsite on the Canadian Pacific Railway" and "The future great city of the North West". These exaggerations by the local press were supplemented with similar advertisements taken out in eastern newspapers in order to entice would-be settlers to invest in land at inflated costs. This tactic, which netted the speculators vast fortunes, as Heather Robertson points out in her vivid description of Moose Jaw's development, ultimately resulted in the bankruptcy of the city.

From: Robertson, Heather, Grass Roots, p. 66

15. Bettison, Urban Affairs in Alberta, p. 43

River, it had its origin, like Winnipeg, as a fort in the fur trade.¹⁶ Edmonton did however, enjoy a series of boom periods and its later planning, as with all its contemporaries, was based on the traditional gridiron.

The first land boom began in 1880 when the anticipation of a northern rail line through the Yellowhead directed speculators' attention to Edmonton. The most remarkable thing about this first real estate boom is that it didn't really happen in Edmonton; it happened in Winnipeg.

Tony Cashman includes an account of an unsuspecting Edmonton trader's (Donald McCleod) experience when visiting Winnipeg in 1881:

"On Portage Avenue he could see his home village of Edmonton being bought and sold piecemeal in every excited group of men. He could see a huge painted map of Edmonton in front of one building, a map full of valuable lots which were to become even more valuable. And he could see a public auction of less valuable lots for which people were still clamoring to bid a thousand dollars."¹⁷

The unsuspecting trader was understandably surprised (and perhaps delighted). Prior to this new interest, lots in Edmonton had been worth only a small fraction of the new costs. Frank Oliver, the future publisher of Edmonton's first newspaper, is reported by MacGregor to have purchased a lot for \$25.00 in 1880 just prior to the land boom.¹⁸

16. In 1808 both the North West and the Hudson's Bay Co. moved to the site of Edmonton when Edmonton House (now Fort Saskatchewan) was destroyed by Indians. In 1821 when the two companies merged, the fort which they occupied became the central point of future settlement. It was located just east of the present City Power Plant in the river valley. The nucleus of the population which developed in the vicinity were former employees of the fur companies who had taken native women for wives. Up until the middle of the 19th century the fort remained one of the central Hudson's Bay posts providing employment for many occupants of the fort and a market for neighboring farmers. By 1857 the population of the settlement was estimated at 150.

Suski, Edmonton, p. 11

17. Cashman, T., The Edmonton Story, p. 52

18. MacGregor, J. G., A History of Alberta, p. 118

A typical deal during this boom is further described by Cashman. John A. McDougall got an option on a block of lots for five hundred dollars (the full price being ten thousand). He then wired Winnipeg offering them for sale at twenty thousand and had them grabbed up instantly. McDougall paid off the remainder of the ten thousand he owed and coolly pocketed the profit without even seeing the land - except on paper.

By 1882, however, the knowledge that the railroad was going through Calgary via the southern route brought the boom to an abrupt halt. For the next fifteen years, Edmonton's physical growth was slow. In 1891 the Canadian Pacific Railway reached the rival town of Strathcona, a mile to the south to establish a terminus and in 1892 Edmonton was incorporated as a town. The first mayor, Mathern McCauly, and a town council was elected.

The second period of rapid growth occurred in 1896 when gold was discovered in the Yukon. This brought an influx of miners who needed outfitting on their way north. Many of these were to remain or return to settle in the community.¹⁹

Growth continued steadily until 1904 when Edmonton was incorporated as a city and 1905 when it was made Provincial Capital.

The guaranteed growth which followed the establishment of Edmonton as a Capital brought a steady influx of settlers, increased the demand for all manner of goods and services, and perhaps most significantly from the point of view of this study, caused a rapid increase in construction activities. The need for more stores, warehouses and office space, and above all residential development put a serious strain on local

19. While this increased business brought much new money into the community, perhaps the greatest benefit Edmonton got from the Klondike was publicity. As MacGregor points out:

"But aside from the money, which really was not much even for those days, the Edmonton area received publicity such as mere advertising could not have bought. The Klondike Rush put it on the map. Moreover with their own eyes hundreds of newcomers had seen how arable the soil was. Even Klondikers returning disappointed remembered Edmonton and spread its fame. Many fell back upon the town or took a nearby homestead."

From: MacGregor, J. G., Edmonton, A History, p. 125

administrative powers. It was in response to these strains that the first municipal bylaw was passed to control subdivision. This bylaw was introduced in 1906. According to Dale, the main concern was to facilitate the installation of water mains, sewers, and telephone poles. It was also aimed at ensuring access to fire fighting equipment.²⁰

In order to accomplish these objectives, streets were arbitrarily required to be a minimum of 60 feet in width and rear access to every lot had to be provided by a 20 foot lane. Each subdivision had to be approved by the city engineer. It was in 1906 then, that the requirements for circulation space as discussed in Part I had their origin. The 60 ft. minimum road width requirement was to endure and ultimately be set down in Edmonton's Servicing Standards Manual.

This period of rapid growth and development saw the building of hospitals, libraries, public buildings and many other amenities. MacGregor reports that by 1912, Edmonton's all time boom year subdivisions were growing in all directions.²¹

The Hudson's Bay Company were not above taking advantage of this boom. MacGregor goes on:

"Edmontonians hungered for lots and by merely marking them off and advertising them the Hudson's Bay. Co. could sell them in a flash. Before putting them up for sale the Company paved a magnificent broad thoroughfare about two miles long diagonally through its reserve, laid in it the rails for street cars and called it Portage Ave. As it turned out street cars never ran on those rails and for at least thirty years few indeed were the buildings that fronted on it."²²

20. Dale, E., The Role of Successive Town and City Councils in the Evolution of Edmonton, Alta., p. 113

21. MacGregor, J.G., Edmonton, A History, p. 189-195.

22. Ibid., p.194.

This street which for several decades lay obsolete, acting as a drag strip for youthful drivers or a midnight parking place for young lovers' romantic interludes, today is Kingsway Avenue.²³

By 1912, the tradition of uncontrolled land speculation, exploitation and gridiron planning in Western Canada had reached the end of its usefulness. The speculative urge and the gridiron had largely made the hasty development of the pioneer west possible. With the 20th century trend to urbanization and the demand for a higher order of physical services, however, the negative effects of this haste began to be felt. Sprawling subdivisions with only sporadic taxable development caused municipalities like Edmonton to consider limiting and controlling future growth.

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23. The functional failure of Portage (or Kingsway) Avenue, however, is no indication of the way the Bay fared financially. When Portage Avenue had been paved and the land subdivided, a public land sale was advertised for May 13th. As soon as the location of this auction was discovered on May 11th, the excitement began. Tony Cashman describes what took place:

"In a flash there was a lineup of thirty people. Inside an hour they were lined up, down to 102 Avenue. And through the night the rumor flew and the line grew. It grew right around the block and back to the church again. And as we said, the most unobservant of men could not be aware on that night of May 11, that all the gentlemen rushing along with boxes and camp stools, and chairs were up to something important. It was a gay, good-natured crowd. People who felt they've put something over are generally gay and good-natured. When the official announcement of the location appeared in the Bulletin at 6:00 o'clock that morning, there were 1285 men in line. By that time, some were cooking breakfast over open bonfires. One party had played cards all night by the light of their car head lamps. By nine o'clock there were 1500 in line."

From: Cashman, Tony, The Edmonton Story, p. 162

II-F Planning Legislation in Alberta

Alberta has since its earliest days been a stronghold of free enterprise. This in part is understandable as a response to the way Alberta's pioneer development was ruthlessly exploited by the Dominion government, the railroads, the Hudson's Bay Co., and by wealthy Eastern financiers. Due to the traditional laissez faire attitude which developed, the founding of local governments and municipal development controls was an early problem in Alberta. Even more pronounced was the problem of coordinating the policies of the provincial and federal governments with the independent aspirations of local authorities.¹

It was not until the negative effects of large scale land speculation and uncontrolled gridiron subdivision became blatantly apparent that the provincial government of Alberta, through the powers of the British North America Act, took the first steps toward the regulation of municipal growth. The real estate boom of 1911 - 1913 had caused vast areas of virgin wilderness to be subdivided and sold. The development which should have followed this, however, as in countless other North American "boom towns", did not occur. The thinly spread inhabitants of these new "subdivisions" never-the-less required and demanded services for which the municipalities had no tax base to support. Dale reports that in the "slow" period which followed the 1912 boom some 70,000 lots reverted to the City of Edmonton for tax arrears.²

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1. A good illustration of this local independence described by Hanson occurred when local authorities were confronted with the obligation to help finance public education. When the first school ordinance was passed in 1884 providing for both public and private schools, a local tax levy was passed to support them. Local authorities and major land holders were reported to have taken drastic measures to oppose the ordinance. The C.P.R. and Hudson's Bay Company are said to have transferred employees to vote in opposition, while a local hotel keeper, perhaps with a large family, is reported to have brought along all his guests to vote for the measure.
From: Hanson, Local Government in Alberta, p. 9-12
 2. Dale, Successive Town Councils, p. 158

In 1912 then, the Department of Municipal Affairs was established in Alberta "to promote municipal organization and superintend municipal administration."³ This legislation provided for a Town Act, a Rural Municipal Districts Act, a Village Act, and an Improvement Districts Act. The primary concern of the department, however, was to promote a "systematic and uniform conduct of the affairs of local authorities."⁴

Following the establishment of the Department of Municipal Affairs there came in 1913 the passing of the Town Planning Act, and this was Alberta's first attempt to put public controls on the speculative use of land. The 1913 Planning Act was to be administered by the Minister of Municipal Affairs and in essence gave the right to separate municipalities to prepare their own town planning scheme.⁵

Section 6.2 of this Town Planning Act (see footnote) contains two essential points of interest.

3. Blue, Alberta Past and Present, p. 168

4. Ibid. p. 152

5. The Act reserved the right, however, for the minister to intervene after a public hearing and without the town being involved, if the municipality failed to prepare, enforce or adopt "suitable" proposals by private owners.

The approval of the minister was required in fact on any proposed scheme before it could be put into effect. The minister also had the power to require modifications to any part of a scheme proposed by either local authorities or private developers. One of the most interesting, and from our standpoint, the most significant, aspects of the 1913 Act is to be found in Section 6.2 It reads:

"Property shall not be deemed to be injuriously affected by reason of the making of any provisions inserted in a town planning scheme, which with a view to securing the amenity of the area included in the scheme or any part thereof prescribe the space about the buildings to be erected or prescribe the height or character of buildings or the amount of vacant land to be taken for parks or open spaces not to exceed five (5) percent of the total area and which the Minister having regard to the nature and situation of the land affected by the provisions considers reasonable for the purpose."

From: An Act Relating to Town Planning, Chapter 18, 1913, Statutes of the Province of Alberta, Section I.

Firstly, this section would appear to be setting the stage for future zoning regulation. Secondly, it makes the development of private land a privilege and not a right of ownership, so that public restriction should not be considered as "injurious" to the land and no compensation could therefore be claimed by an owner who was denied permission to develop.⁶

The Town Planning Act of 1913 was not changed significantly until 1928. This was due mostly to the timing of the legislation. It came at the end of Edmonton and Alberta's biggest boom period. Following this, urban development, especially in Edmonton, was oriented almost totally toward consolidation rather than expansion. The need for the relatively sophisticated legislation embodied in the 1913 Act appears therefore not to have been as great as its draftsmen had anticipated.

By the mid 1920's growth was again gradually picking up, and a new public interest in planning and beautification was beginning. In 1927 Edmonton's local Council of Women petitioned the City Council to appoint a Civic Plan Committee. According to Dale,⁷ it was partially in response to this new interest that Edmonton's City Council moved to request a revision of the 1913 Town Planning Act. Something to "preserve the beauty of the Province" was needed. The women's organizations in particular were concerned with "the urban onslaught of the symbols of commercialism - billboards and hoarding".⁸

In 1928 and 1929 two pieces of legislation directly concerned with town planning were introduced. The first was the 1928 Town Planning and Preservation of Natural Beauty Act which was to be administered by the Department of Public Works,⁹ and the second was the 1929 Town Planning Act.¹⁰ This new Town Planning Act was again to be administered by the Department of Municipal Affairs and repealed the 1913 Act.

6. This particular feature appears to have been maintained in subsequent legislation and is a major difference over American examples where many law suits have ensued over contention as to the amount of compensation due to restriction on development.

7. Dale, Successive Town Councils, p. 212

8. Ibid. p. 215

9. Statutes of Alberta, 1928, Chapter 48.

10. Ibid. Chapter 49.

Up until the passing of the 1929 legislation, the 1913 Act appears not to have been greatly used. Edmonton had employed only a few bylaws to control matters of immediate interest. In 1923 Edmonton passed a bylaw requiring minimum space around buildings to "provide light and ventilation directly from the outside." Certain parts of the city had restrictions on the number of buildings allowed on one lot and certain streets were classified as "residential". Following this in 1925, a bylaw identified certain areas north and south of the city for "industrial use."^{11*}

The passing of the 1929 Town Planning Act led to the appointment of Edmonton's first Planning Commission in August of the same year. The City Council did not hire a professional planner, however, to coordinate an overall Plan, but appointed a draftsman as City town Planning Assistant.¹² The instructions to the commission were to prepare an overall street plan and a zoning bylaw.

The City of Edmonton, following an almost continental trend, passed its first zoning bylaw in 1933. This bylaw covered the height and bulk of

11. Dale, Successive Town Councils, p. 210-211.

* As in 1913, provincial legislation concerning municipal control of development came at the end of a growth cycle. It was in 1929 that the Great Depression of the 1930's began. The start of the depression, however, appears not to have discouraged many towns and cities in Alberta from appointing planning commissions. Horace L. Seymour notes that some twenty planning commissions had been established under the 1929 Planning Act. Calgary, Drumheller, Wetaskiwin and Edmonton were the cities with commissions. The basic functions of these commissions was the production of contour maps, plans indicating street grades and surfaces and areas served with water and sewers. Zoning bylaws were as well being prepared in five cities and eleven towns, and building bylaws had been passed in one city (Edmonton) and three towns. Mr. Seymour's final comment concerning this early development was:

"In general, it may be stated that the work of town planning is proceeding at a rate that may be entirely unexpected in a year of financial depression."

From: Seymour, Horace L., Notes on Town Planning Progress in Alberta up to December 31, 1931.

12. Ibid. p. 217

buildings, land use and population densities. The introduction of planning controls in Edmonton from this beginning in 1933 has not been a smooth process. This first zoning bylaw was a cut and paste version of its American predecessors and was not based on a previously prepared general plan. It led therefore to many difficulties in the years which followed. By 1938 about 75 appeals had been made to the zoning appeal board and most were granted. By 1945 it had been amended 27 times.¹³

Since the establishment of planning in Edmonton in the early 1930's, then legislation and control mechanisms have accumulated sporadically in response to specific planning problems. Noteworthy among these are the following:

- a) In response to the continuing problem of speculative subdivisions which were never occupied, the 1929 Town Planning Act was amended in 1937 requiring only subdivisions containing over 10 lots to have approval of the provincial planning board prior to registration with land titles.¹⁴
- b) In 1946 the TPA was amended again so that the size of a subdivision requiring approval was raised from 10 lots to 50 lots. This was in anticipation of increased demand by ex-servicemen returning from W.W.II.
- c) A 1948 amendment coming in response to a post W.W.II rapid growth period gave the provincial planning administration temporary power to impose "zoning caveats" on subdivisions pending the development of "control devices". Using this device the Minister of Municipal Affairs could impose "zones" on any areas where subdivision was anticipated.¹⁵
- d) In 1950, the 1948 amendment above was revised and power was returned to local authorities.¹⁶ The new act allowed municipalities to negotiate with developers through development agreements.

13. Dale, Successive Town Councils, p. 217

14. This approval was forthcoming only if the owner could prove "that such land will be or may reasonably be expected to be required for building purposes within a reasonable period of time." The indirect effect of this amendment was of course to give the Planning Board a good deal of control over future urban expansion. From: Statutes of Alberta, 1937, Chapter 61, Section 43-7

15. Bettison, Urban Affairs in Alberta, p. 92

16. Statutes of Alberta, 1950, Chapter 71.

- e) In 1951, the City Act was passed. This legislation, which established the basis for our current approval process covered every aspect of city administration. One term of this gave cities the power to require every tentative subdivision plan to be approved by the City Engineer.¹⁷
- f) In 1953, the Town and Rural Planning Act was passed in response to 'low quality' development outside city limits. It established a District Planning Commission to coordinate development outside cities with that within.¹⁸
- g) Between 1953 and 1963 Provincial government amendments to the Planning Act were concerned primarily with clarifications of existing processes.¹⁹ However, in 1963 the entire Act was rewritten, overhauled and simplified. Although this 1963 version has been amended many times since, it remains the legal basis for current municipal land development and building controls within the City of Edmonton.

II-G THE INTRODUCTION OF ZONING

In early settlements of Canada and the United States before pioneer towns began to experience the "problems of the city", the inhabitants evolved a natural system of values concerning the arrangement of their physical environment. People who could afford to would not live next to the type of activity which generated noise, odors, or noxious materials. They wanted as well to live at a convenient distance from their work, far enough to remove it from their home life but close enough for easy access, and they wanted to live in a community where their neighbors shared their own economic and social class.

The first legal methods of reinforcing these values were nuisance law and restrictive covenants. The first of these allowed legal action to be taken against anyone who established an "objectionable" activity next to a residence; and the second put limited use requirements on land sold to insure the future quality of one's surroundings.

The chaos introduced into the rural settlement system during the 19th century through the application of gridiron planning had infiltrated urban areas as well by the first part of the 20th century. The subdivision and sale of "universal cookie cutter" lots with no reference to ultimate use, exerted increasing pressure on the rapidly developing communities. These pressures presented problems with which the private land use controls were totally unable to cope.

Of greatest concern was the encroachment of multi-family structures and commercial and industrial uses into what had previously been homogeneous single family residential districts.²⁰ As densities in

17. Statutes of Alberta, 1951, Chapter 9, Section 318
18. Bettison, Urban Affairs in Alberta, p. 113
19. Ibid. p. 185
20. Babcock, The Zoning Game, p. 3, and p. 115.

these districts rose and automobiles became the primary method of travel, the influx of "undesirable" residents and the danger, noise and congestion of associated traffic generated increasing concern on the part of those who had their "roots" in the community. The worst aspect of this "erosion of residential quality" from the speculators' standpoint was the threat it posed to property values.

The recognized "father" of modern zoning was Bassett, who headed a committee to look into the urban problems of New York in 1916.²¹ In the report prepared by this committee he states:

"For the greater safety and security of investment that the process of 'districting' be adopted".²²

Note how social concern in typical North American fashion expresses itself through attention to property value and the "greater safety and security of investment". John Delafons in speaking of the introduction of zoning in America points out:

"It was a means of strengthening the institutions of private property in the face of rapid and unsettling changes in the urban scene that zoning won such remarkable acceptance in American communities."²³

In discussing the "Purposes of Zoning", Babcock proposes a "Property Value Theory".

21. The first recorded attempt to introduce zoning appears to be in Germany in 1884. A man named Herr Almeister, in a town called Altona, is reported by Woodsworth of having advocated a simple zoning process.

In North America a simple "two zone" method was attempted in Boston and Los Angeles in 1909 and Seattle in 1913. The only differentiation in uses were between urban and suburban development.

From: Woodsworth, K. C., Land Use Controls, p. 3.

22. Woodsworth, K. C., Land Use Controls, p. 3.

23. Delafons, J., from Babcock, The Zoning Game, p. 3.

"The basic axiom of this theory is that each piece of property should be used in a manner that will insure that the sum of all pieces of property will have a maximum value, as determined by market forces. In other words, every piece of property should be used in the manner that will give it the greatest value without causing a corresponding decrease in the value of other property."

The assumption is that for every piece of land there is an ideal zoning classification and "above every town there exists a platonic ideal zoning map waiting to be dropped into place".²⁴

Professor William Doeble has further suggested that perhaps zoning is not a control at all, "but a thermometer that measures the amount of heat on a piece of property at a given moment. As the heat goes up, sooner or later the zoning will respond."²⁵

Zoning ordinances which are purported to be safeguards of public welfare, when seen from this perspective become simply reinforcements to the rationale of the gridiron. The enthusiastic introduction and

lasting acceptance of the zoning ordinance in the free market system is easily understood with the realization that the "zones" are primarily determined by market forces. This "property value theory", as Babcock explains, "requires only ordinary arithmetic and has the appeal of all simple solutions to complex problems."²⁶ The same statement has been made about the gridiron system of land subdivision.

24. Ibid, p. 117

25. Doeble, Wm. A. Jr., "Key Issues in land Use Control - Planning", 1963 (Chicago:American Society of Planning Officials, 1963), p. 12

26. Babcock, The Zoning Game, p. 117

Like the gridiron, zoning did not achieve its popularity because of its sophistication. Its acceptance in the United States and Canada was due rather to its simplicity of application. Zoning ordinances of the 1920's distinguished only three zones - single family, commercial, and industrial. The method by which the zoning ordinance of one municipality served as a model and was "cut and pasted" to fit other municipalities is described by Professor J. Dukenminier:

"What often happened when zoning first swept the country was this: The city fathers called in an outside expert who made a swift survey of the city and then prepared a zoning map. If any master plan or surveys of physical, economic and sociological conditions in the city were prepared, as likely as not they were filed away in a bottom drawer. The zoning map stabilized property values and that was what the city fathers were interested in."²⁷

It was not until the 1920's that the popularity of zoning reached Canada. In the course of a continental enthusiasm, Canadian cities adopted "right down to the last tack"²⁸, the zoning bylaw technique which originated in American cities. As Woodsworth points out:

"It was great in Chicago, so it had to be adopted in Toronto was the popular feeling. And that I might say has been the story of zoning ordinances in Canada until fairly recently."²⁹

27. Ibid. p. 5

28. Woodsworth, K. C., Land Use Control, p. 5

29. Ibid.

III-H-1 Zoning Bylaw #2135

The constitutional basis for the zoning power in Edmonton, Alberta, and Canada generally, rests mainly in subsections(8) Municipal Institutions; (10) Local Works and Undertakings; and (14) Property and Civil Rights; of section 92 of the British North America Act. Under that power the Province of Alberta as has been shown enacted a number of statutes directly related to land use control beginning with the Planning Act of 1913 and culminating with the Planning Act of 1963. The power to enforce zoning is in this act expressly delegated to municipal councils.

Edmonton city's current zoning bylaw number 2135, passed in 1973, primarily aims at regulating the type and method of use of land and buildings. This is accomplished by dividing the area of land falling within the city into districts or zones and prescribing in detail the uses and methods of use permitted or prohibited in each zone.

The object of segregating the different uses is explained by Goodman referring to zoning bylaws generally:

1. "to prevent the mixing of incompatible uses which may otherwise have such deleterious effects on one another as to depreciate property values and desirable environmental features; and
2. to ensure that uses requiring expensive public service facilities such as major utility lines and heavily paved streets are restricted to those areas where these facilities exist or are planned to be installed."³⁰

Edmonton's zoning bylaw 2135 defines fifteen different residential zones ranging from R-1, RRA, RRB, and RRC in which the major permitted use is single family detached dwellings, to R6 and R7 in which the major permitted use is multi-story, high density apartments. The remaining residential zones are comprised of variations on the seven primary zones. These are RC-1, R-2A, R-3A and two districts designed to accommodate mobile home developments, one in parts, the other in mobile home subdivisions.³¹

30. Goodman, and Freund, Principals and Practice of Urban Planning, 1968, p. 424.

31. City of Edmonton Zoning Bylaw 2135 Section 18-24.

The segregation of different densities and types of residential use has been advocated for a number of reasons. The proponents of this strict segregation support their position primarily, however, by contending that multiple-family developments in single-family neighborhoods tend to diminish property values. In addition to this argument they fear that high density developments will tend to cut off light and air from neighboring single-family homes, generate traffic congestion and parking problems, overtax utility systems and community services such as schools, parks, and playgrounds, and are generally aesthetically unappealing.

Another reason which is less often expressed but is certainly a major force in perpetuating the segregation of residential densities is the fear of many homeowners in R-1 districts that the encroachment of multi-family developments would attract persons of lower classes and transients who would have little interest in the neighborhood. This is the view expressed by Babcock and Bassellman.³² The economic fears inherent to this view are obvious. If the neighborhood is not maintained it will gradually lose its attractiveness to future buyers and property values in direct proportion to demand will fall.

Another feature of the Edmonton zoning bylaw which gives evidence to a primary if not exclusive concern for protecting property values in the suburban enclaves of single-family detached housing, is the cumulative nature of the zones. In this system the uses in any residential zone automatically include all uses permitted in the preceding classifications. R-1 uses are permitted in R-2 zones, R-1 and R-2 uses are permitted in R-3 zones and so on. It would appear that Edmonton city council is determined to stop the encroachment of more intense residential uses in the districts zoned for less intense uses, but they do not have an equal concern for protecting more intense uses from the encroachment of less intense ones.

32. Babcock and Bassellman, Suburban Zoning and the Apartment Boom, 1963.

Even within the single-family classifications there are four subclassifications, RRA, RRB, RRC, and R-1, which in a descending order describes the degree of exclusiveness of each district. The quality of housing in these districts is maintained by more generous requirements in ground floor area of buildings, front and side yard setbacks, and site coverage requirements.³³

A still further mechanism for restricting the development of poorer quality homes in the "exclusive" classification is through the issue of building permits. Permits in these zones are issued only for homes which will maintain the "character and quality of the district."³⁴

While the primary object of zoning is to regulate the type of uses to which land is subjected, nearly all zoning bylaws contain important provisions relating to how a particular use is to be developed. The provisions of the Edmonton zoning bylaw which are most directly responsible for determining the site design and building form of housing are those containing site and structural regulations.

Regulations falling within this category are those pertaining to the height of buildings, size of buildings, the percentage of the lot which may be covered by a building, the area of lots, the minimum frontage of lots, and the location of the building on the lot. The objectives of these requirements generally are stated as being to prevent the overcrowding of the land, to provide ample air and light, to reduce fire hazard, to afford sufficient and safe play areas for children and to provide privacy both within and outside the dwelling.³⁵

The way these regulations are expressed in the Edmonton bylaw is quantitatively on the basis of measurement in feet and where appropriate in percentages. In the R-1 zone the maximum building height is to be 35 feet (two and one half storeys). Total site area is to be a maximum of 5,000 square feet with a minimum frontage length of 45 feet.

33. Edmonton Zoning Bylaw, Section 21 - 3 - K

34. Personal Interviews

35. Personal Interviews

Maximum site coverage is 35 percent. Front setback is to be a minimum of 20 feet in depth, the side yard setbacks must be at least 10 percent of the lot width or seven feet, whichever is lesser, and the rear yard is to be no less than 25 feet in depth. This form of regulation applies as well to other residential, industrial, and commercial zones.

Development density is perhaps the next most important feature determined by zoning bylaw regulations. While this must be explicitly stated in multi-family districts in the form of maximum numbers of dwelling units per acre, in the R-1 and other single-family zones, it is automatically determined by the minimum lot size required. The maximum possible in an R-1 district is stated in the bylaw as nine dwelling units per acre (9 D.U.S.).³⁶ In reality, however, if one considers the local residential streets as well as the lots themselves in the density calculations, the maximum possible density in an R-1 district is about 6.5 D.U.'s per acre.³⁷

The expressed object of density controls is to insure that the population of a district is compatible with the level of public facilities available in the way of roads, utilities, schools, playgrounds, etc.

The final and most illusive objective of the zoning bylaw is to preserve the "aesthetic quality" of urban neighborhoods. In some way almost every aspect of the zoning bylaw relates to aesthetics. The height, size, and location of buildings and the size and shape of the spaces between them are all based to some extent on aesthetic values. In addition, the concern for size, form and placement of signs, and the activities which occur in open areas of the different zones are direct responses to aesthetic concern.

The best evidence of this aesthetic orientation is found in Section 7 - (1) of Edmonton's bylaw:

36. Edmonton Zoning Bylaw Section 21

37. This figure is based on a calculation for this study

"An Architectural Panel is hereby established to consider and advise on any matters relating to architectural design of buildings, structures, or signs, and in particular, the relationship of such design to the surrounding district, provided however the Director may approve, approve subject to conditions or refuse, stating reasons, any building, structure or sign in any district if in his opinion it is unsatisfactory by reason of design, character, or appearance."³⁸

Also Section 12 - (4) which governs "Objects Prohibited in Restricted Areas":

"No person shall keep in any part of the yard in any residential district:

- (a) a commercial vehicle loaded or unloaded of a maximum weight in excess of 9,000 pounds; or
- (b) more than one commercial vehicle of a maximum weight not in excess of 9,000 pounds for longer than is reasonably necessary to load or unload such vehicle; or
- (c) any dismantled or wrecked vehicle for more than seven successive days; or
- (d) any object or chattel which, in the opinion of the Director, is unsightly or tends to adversely affect the amenities of the district."³⁹

The system of control devices within the Edmonton City Zoning Bylaw which have strong physical design implications in R-1 residential districts may all be traced back to the fundamental objective of maintaining land value. This preoccupation for the market value of a given piece of property when coupled with the strongly associated necessity of facilitating its use as a speculative commodity results in controls which are grossly over simplistic. While outwardly they appear to be concerned with insuring high levels of privacy, safety, etc., a closer inspection reveals that appearances are in fact often all there is. It is primarily these appearances that are required to sell homes.

38. Edmonton Zoning Bylaw, Section 7 - (1), page 37

39. City of Edmonton Zoning Bylaw, Section 12 - (4), p. 51

The specific control techniques and their underlying objectives are perhaps best illustrated in chart form. The following Figure II-2 attempts to trace these techniques back through the general principles to an underlying speculative motive.

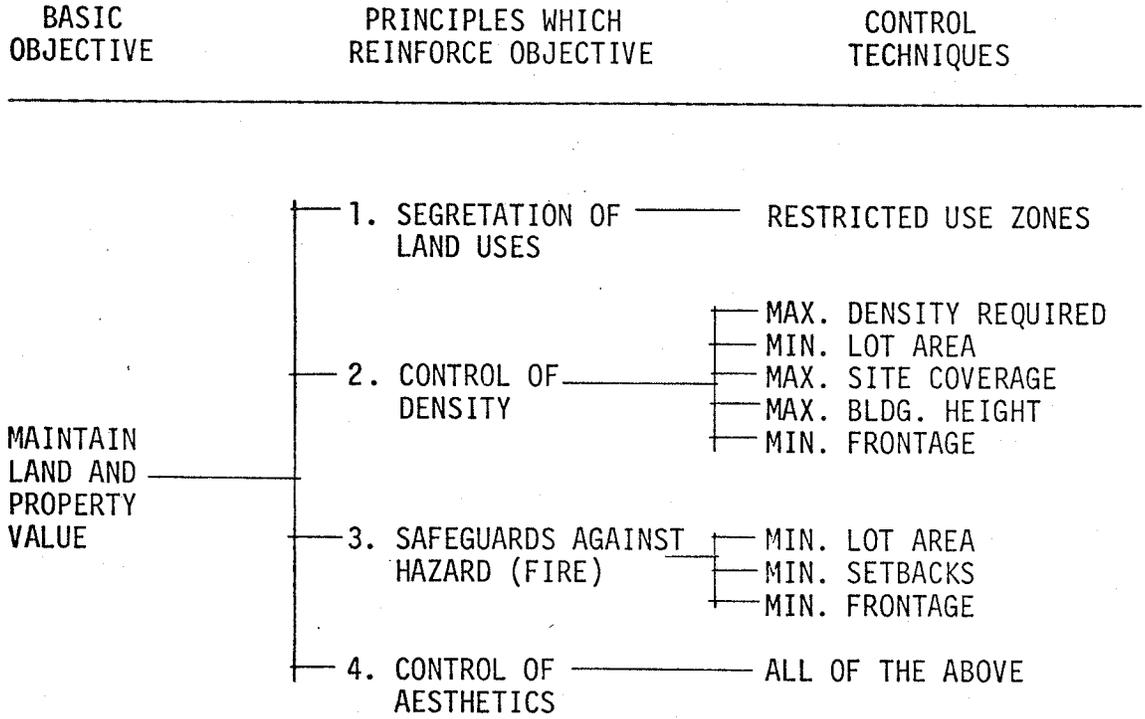


table II-1

II-H-2 Site Planning Handbook

Central Mortgage and Housing Corporation, a crown Corporation, was established in 1946 to administer federal housing programs and was authorized to make residential construction loans out of public funds when private financing was unavailable. C.M.H.C. initially used this direct lending power sparingly. Since 1957 however, when it began using large scale lending to stimulate building activity it has played an increasingly important role in Canadian residential development.⁴⁰ Approximately 20% of dwelling unit construction in Canada was financed through C.M.H.C. lending programs between 1957 and 1969.⁴¹

While the statutory control of planning and building is vested with the Provinces, C.M.H.C. is required by its lending regulations to prescribe standards for housing financed under the National Housing Act. These standards are set down in the Canadian Code of Residential Construction and the Site Planning Handbook. It is the latter of these documents which contains the requirements examined in this study. The present Site Planning Handbook which contains both mandatory requirements and design guidelines has been in effect since it was last revised in 1970. This 1970 Handbook supercedes the previous Site Planning Requirements contained under "Administrative and Site Planning Requirements" in a supplement of the National Building Code of 1965 and the 1966 Site Planning Handbook.

The expressed purpose of the document under the terms of the National Housing Act is to:

"Cause generally such steps to be taken as it may deem necessary or advisable to promote construction of housing accommodation that in its opinion is sound and economical and to encourage the development of better housing and sound community planning."⁴²

40. Personal Interview with A. G. Von Brederode, C.M.H.C., Edmonton

41. L. B. Smith, P. 78.

42. C.M.H.C. - Site Planning Handbook - P. 1

In addition to its primary purpose of providing direction to developers and professionals in design and to C.M.H.C. in reviewing project proposals it has become a reference document for both Provincial and Municipal officials. The City of Edmonton, like many other Canadian cities, has adopted many of the requirements within the handbook as design criteria.

The thirteen separate sections in the Site Planning Handbook make recommendations and set down specific requirements covering the following aspects of community planning and housing design:

- Section B Community planning
- Section C Pedestrian and vehicular movement
- Section D Project design
- Section E Distance of housing from non-residential land uses
- Section F Garages, carports and parking areas
- Section G Driveways and walkways
- Section H Planting and public open space
- Section I Detached and conventional small multiple housing
- Section J Project amenity area for horizontal multiple housing units and apartments
- Section K Yard dimensions - horizontal multiple housing
- Section L Yard dimensions - apartments
- Section M Housing in special areas

It is section C and F which contain the requirements examined in this study. As shown in Table I-1, regulations concerning intersection spacing, cul de sac lengths, parking requirements and lot grading requirements have become form determinants to single family housing form.

Regarding intersection spacing the handbook requires that "continuous street frontage should not exceed 1200 feet" and that "no residential street intersections on the same or opposite sides of the street should be closer than 200 feet". The stated reasons for these requirements are the promotion of more efficient circulation of vehicular and pedestrian traffic.⁴³

43. Personal Interview, A. Wingfield, CMHC, Edmonton, Nov. 27/75

Requirements for emergency access from cul de sacs over 350 feet and maximum cul de sac lengths of 750 feet are also related to accommodating efficient pedestrian circulation and providing alternative vehicle access.

The final C.M.H.C. standard examined in this study is the 2% lot grading requirement. This requirement is obviously intended to ensure surface drainage away from dwellings, thereby avoiding puddling around dwellings or leaking basements.

II-H-3 Servicing Standards Manual

Prior to 1968 the City of Edmonton had installed all new subdivision services and the costs had been amortized against the property for a period of twenty-five years. On February 12, 1968, however, a new policy was adopted requiring developers to install the utilities in their own development.⁴⁰ Subsequent to this policy, developers were required to pay for the installation of "on site" services while the City was responsible for trunk lines and water mains.⁴¹ In 1972, to further save on the costs of new subdivision servicing, the City adopted a policy whereby 100 per cent of the cost of storm trunk systems were to be charged directly to residential development areas. Developers were further required to provide the initial costs of water and sanitary trunk extensions, for which they were to be reimbursed on completion of the project. They were, however, expected to absorb the interest charges on these expenditures.⁴²

This policy, as might be expected, was not warmly received by developers. It has according to Tony Druid, contributed substantially to the increase of serviced lot costs.⁴³

From the standpoint of this study, the most significant aspect of these requirements were that they necessitated the production of a set of servicing standards and specifications for the use of developers. The expressed purpose of these standards is to maintain continuity of design, ensure quality, and facilitate easy maintenance by the City.

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44. Bettison, Urban Affairs in Alberta, p. 221
45. City Council minutes, Feb. 12, 1968, Organization Committee Report #5.
46. Personal Interview with Tony Druid, Municipal Engineer, Integrated Building Industries, August, 1975.
47. Ibid.

The 1974 copy of Servicing Standards Manual is the design guide which affects current residential subdivision in Edmonton and which will be considered here.

The City of Edmonton Servicing Standards Manual (1974) is a very straight forward document. According to the Forward:

"This manual is intended to provide information to developers regarding standards governing design, preparation and submission of plans and specifications for municipal improvements in connection with the 1974 standard Residential Servicing Agreement."⁴⁴

This is the second edition of the manual and incorporates all up-to-date revisions. It is "issued and administered" by the Realty Development Office of the City of Edmonton.

The manual is made up of six sections"

1. Plan Standards (for the preparation of drawings and specifications)
2. Roads and Walks - Classification and geometric design standards
3. Specifications for the construction of roads, lanes, sidewalks, curbs, and gutters and boulevards.
4. Specifications for design and installation of A.C. water pipe and accessories.
5. Specifications for design and installation of concrete and tile sewer mains.
6. Specifications for installation of sewer and water services.

It is Section 2 which is most significant to this study. This section dictates the design for roadways and walks in single-family detached R-1 residential districts.

48. City Of Edmonton Servicing Standards Manual, 1974, page 1.

The roadway classification and designation has been established generally on the basis of the classification system detailed in Chapter "A" of Geometric Design Standards for Canadian Roads and Streets, Road and Transportation Association of Canada, 1973.⁴⁵ As shown earlier, the original right-of-way requirement of 60 feet, established in a 1906 bylaw, has been maintained.

The following classifications are "recommended" for residential areas"

A. Minor Roads

30' Residential
 Service Road Residential
 38' Industrial
 Service Road Industrial

B. Collector Roads

38' Minor collector - Residential
 44' Collector - Residential
 48' Collector - Residential
 52' Collector - Residential
 44' Collector - Industrial
 52' - 70' Collector - Residential

The other area covered in Section 2 is the design of walkways and sidewalks. The walkway classification included in this manual has been "established on the basis of the guidelines as set forth in the "Walkway in Residential Areas - City of Edmonton Planning Department, 1970."⁴⁶ Four classes of walkway are "recommended":

"A. Major walkway - 6' sloped
 B. Major walkway - 6' crowned
 C. Minor walkway - 5' crowned
 D. Minor walkway - 5' sloped"⁴⁷

The minimum walkway requirement in an R-1 residential area is a 5'-0" sloped walk. (see. fig. I-4)

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49. City of Edmonton Servicing Standards Manual, Sec. 2.1.1
 50. City of Edmonton Servicing Standards Manual, Sec. 2.1.2
 51. Ibid.

SUMMARY

In an attempt to gain a broader perspective and better understanding of existing land development controls, Part II of this study has sketched the history of controls on building and land development from the earliest records of their use. It has shown how some of these earliest controls were based on simple superstitions and others were enforced as "after the fact" punitive laws similar to current criminal law. It has shown how the first restrictive codes, developed in Ancient Rome, were initiated by, and aimed at protecting the welfare and property of wealthy speculators. As well, it discusses the establishment of the first modern building regulations in London in 1189 in response to the continual problem of devastating fires.

Current practices in land subdivision in western Canada however, are shown to be based on the traditional gridiron which can be traced back to the middle of the 18th century. It is this aspect of the historical review which is most important to understanding the controls examined in this study. While some precedents for the formal rectangular layout of land may be found in antiquity, ⁵² its real justification lay in the conditions which were creating the commercial town. The most important of these conditions was the dominance of traffic and trade. It was for this reason that the main streets ran parallel to the waterfront in early settlements of upper Canada and parallel to the railroad tracks in later prairie towns. ⁵³

52. Mumford, L., *The City in History*, p. 301-302

53. An early American example which illustrates the importance of traffic and trade in the developing pioneer city comes from a decision of the commissioners of New York in 1811. Without paying attention to topographic features or natural trade routes, they assumed that maximum traffic would be across town and placed their rectangular parcels lengthwise from river to river. There were twelve north-south avenues of 100 feet in width and perpendicular to these every 200 feet were 155 streets, 60 feet in width running east-west between the two rivers. By this layout they ignored the fact that houses in this system would receive direct sunlight on only one side, whereas if the blocks had been laid out north and south all the houses would have had (cont.)

The second justification for the gridiron scheme lay in the parceling out of lots. The deep, narrow, rectangular lot was adopted because it "wasted" less land than irregular plots and because curves, diagonals, and ovals were considered frivolous and impractical. With rectangular plots land could be sold easily by the front foot, sales and transferences were possible without legal complications, and lots could be laid out long before anyone knew what was to be built on them. Both in street layout and land subdivisions no attention was paid to the final use to which the land was to be put, whereas great effort was given to safeguarding its immediate purpose, namely speculation. In order to further this end, hills were graded, swamps were filled and streets were laid out long before the expenditures for these "improvements" could be borne by those who in the end were to profit or suffer from them.⁵⁵

a double exposure. The chief interest was in developing a
53. system for selling both goods and land. In an 1811 report
(cont.) concerning the commissioner's decisions, William Bridges says:

"That one of the first objectives which claimed their attention was the form and manner in which business should be conducted; that is to say whether they should confine themselves to rectilinear and rectangular streets or whether they should adopt some of those supposed improvements, by circles, ovals, and stars which certainly embellish a plan, whatever may be their effects as to convenience and utility."⁵⁴

In the gridiron scheme adopted by the commissioners, housing and recreation were left to take their chances and the amount of park space was deliberately minimized in order to put as much land on the market as possible.

54. Bridges, Williams, Maps of the City of New York and Island of Manhattan, p. 24-25

55. Mumford aptly points out:

"On steep, hilly sites like that of San Francisco, the rectangular plan, by failing to respect the contours placed a constant tax upon the time and energy of the inhabitants, and inflicted on them daily economic losses, measurable in tons of coal and gallons of gasoline wasted, to day nothing of undoing the major esthetic possibilities of a hillside that is intelligently plotted."

From: Mumford, L., City in History, p. 423

As has been shown, the gridiron plan was so successful from a commercial standpoint that it quickly became the mold into which nearly every American and Canadian city was squeezed. The ease with which the rectangular grid plan could be laid out by the least imaginative of surveyors and the equal ease with which each block could be subdivided lent itself to the haste inherent to pioneer settlement. Once the location of Canadian prairie town-sites were established at convenient watering intervals along the rail line, a few hours at the drawing board yielded the finished town plans.

There is one other aspect of the gridiron plan which is worthy of note. With its broad streets and avenues which were extended into swamps and wilderness and with its future growth thereby forecast for hundreds of years to come, it gave the promise of unlimited prosperity. It captured the imagination of the pioneer and further enhanced the value of the land as a speculative commodity. No Canadian town or city during the 19th century or even today does not aspire to grow faster and bigger than its neighbors. The traditional rivalry between Calgary and Edmonton, which originated with the dispute over capital city status in 1905 and has lasted until the present day, is based largely on this competitive growth attitude.

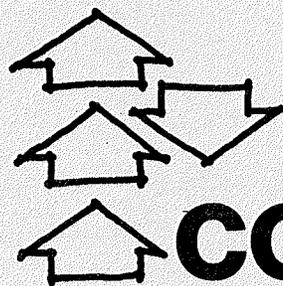
While earlier cities in history struggled with the problem of trying to grow into metropolis with downtown streets which had been originally designed for villages, the new pioneer towns of the west had just the opposite handicap - they had been given the framework of cities before they had passed the village stage. The gridiron plan was the framework which they were expected to grow into and fill. The prime purpose of these developing towns was to attract trade, to increase land values, and to expand. With its standardized block and lot system, aesthetics, architecture and the more subtle aspects of community development were simply not taken into account. The rules for land subdivision in communities whose only object was growth, had to be made sufficiently broad to cover all possibilities. As a result, street widths,

lot dimensions and building setback requirements were in many cases wasteful and out of all proportion to the small buildings which originally occupied them. Yet they have proved equally inadequate in accommodating larger building complexes which followed at a later date. As Mumford points out, once the land had been broken into separate lots whose size was determined on the basis of single family homes, the assemblage of these lots into parcels which could be occupied by larger public buildings became a major stumbling block to rational urban development. The possibility of forstalling the sale of these small holdings opened the door to further unscrupulous speculation.

As has been shown, the gridiron plan, by trying to accommodate every emergency, had in many cases met none. Mumford summarizes the problem of gridiron planning well:

"In the gridiron plan as applied in the commercial city, no section or precinct was suitably planned for its specific function. Instead the only function considered was the progressive intensification of use, for the purpose of meeting expanding business needs and raising land values."⁵⁶

56. Mumford, L., City in History, P. 424



part

3

**conclusions
and
recommendations**

III-A Summary and Conclusions

In Part I of this study it has been shown that existing controls in Edmonton impose severe restrictions on the development of single family housing at the building, lot, and block level. It was demonstrated how compliance with these controls results in high building cost and minimal design flexibility, and how in a lengthy and complex development approval process, the people involved do not share a common understanding of the purposes or implications of the controls they enforce.

It appeared from Part I that the substitution of simply new arbitrary requirements for existing controls would provide no significant or long-term solutions to the problems identified at the outset of this study. What was required was a more comprehensive understanding of the underlying motivations behind existing controls.

In order to facilitate a better understanding of the purposes and attitudes behind existing controls, Part II traces their development historically. The section begins with an overview of a few formal responses to perceived development and building problems in antiquity from King Hammarabi's code (1700 B.C.), through the classical period of Rome, and then to the Industrial Revolution in Europe, when the first real building codes and professional standards were initiated.

The bulk of Part 2 traces land development in Canada from its colonial origins to the present day. It discusses the beginnings and justifications for gridiron subdivision, the development of the first planning controls in Alberta, and ends with an analysis of the current documents containing the specific regulations studied in this practicum.

As shown in Part II, it was during the pioneer development of Canada that the attitudes and philosophies toward land use, which were to influence the later form of controls, had their origin. Early gridiron planning, because of its simplicity and universal applicability, allowed efficient buying and selling of land with no reference to ultimate use. Also, by encouraging the rapid settlement of neighboring land it ensured

the appreciation of land values. It was the confinement of the growing city, however, which awakened people to the fact that their land values were contingent not only on the development of neighboring property, but also on how that development took place.

Evidence of this can be seen in the 1928 and 1929 amendments to Alberta's first planning act and the passage of Edmonton's initial zoning bylaw in 1933. These came in response to a surge in urban growth and a growing public interest in planning and beautification. While there appears to have been concern for qualities of health, safety, and attractiveness in new development, there remained a simultaneous concern for the maintenance of property values. Following the rationale of the gridiron, then, controls devised to ensure health, safety, and civic beauty in new subdivisions were understandably simple, easily enforced, and universally applicable.

In discussing the "Purposes of Zoning" Babcock takes an even more cynical view toward the "legal fictions" created to validate zoning during the 1920's. He states:

"The early proponents of zoning claimed that the single family district was insulated to prevent the spread of fires. Minimum house size requirements were supposedly related to public health. Billboards were said to endanger public morals because of the promiscuous activities which took place behind them. No one really believed these fictions in 1920 and no one believes them today."¹

He goes on to state, as was shown in Part II, that the real reasons for the widespread popularity of zoning concerned the maintenance of property value.

So while the widespread adoption of gridiron planning was due to its facilitation of the marketing of land, the later popularity of zoning bylaws were that they safeguarded investment in the land. Edmonton's first zoning bylaw, therefore, following a continent-wide trend, prescribed building bulk requirements and setback regulations. These

1. Babcock, The Zoning Game, p. 116

overly-simplistic, multi-purpose controls were justified like today, on the basis of minimizing fire hazard, allowing light and air circulation and improving civic beauty. As has been shown in Table II-2, Edmonton's current zoning bylaw #2135 contains simply a larger accumulation of the same type of control techniques reinforcing the same economic concerns.

If we examine the controls which have originated since the adoption of zoning in the Site Planning Handbooks and Servicing Standards Manuals, we find that they have become increasingly rational. They are for the most part single-purpose responses to primarily technical problems. They ensure that specific services, when installed, will work efficiently, present minimum hazard to public health and safety, and be economically maintained by the City of Edmonton.

As shown in Part II the 1970 edition of the CMHC Site Planning Handbook, as required under regulations in the 1946 National Housing Act, was produced to promote the development of "better housing" and "sound community planning". Requirements within this document which have become form determinants of single family housing developments in Edmonton and which are studied here, are those governing intersection spacing, cul de sac lengths and lot grading (see Table I-1).

The handbook requires that "continuous street frontage should not exceed 1200 feet"² and that "no residential street intersections on the same or opposite sides of the street should be closer than 200 feet."³ The text of the handbook, as well as comments by A. Wingfield of CMHC, Edmonton,⁴ and the consensus of those interviewed in Part I all indicate that the purpose of these requirements are to promote efficient and safe vehicular and pedestrian circulation. The 1200 feet maximum requirement is to allow vehicles and pedestrians to travel through a

2. CMHC Site Planning Handbook, p. 9

3. Ibid, p. 11

4. A. Wingfield, CMHC, personal interview, Nov. 27, 1975

district without unnecessarily long, circuitous routes and the 200 foot minimum requirement is to minimize potential conflict points for vehicular traffic.

Requirements of 750 feet maximum cul de sac length with emergency access, and 350 feet without, are intended to again allow efficient pedestrian movement as well as providing alternative emergency access to local and emergency vehicles. The final CMHC guideline adopted by the City of Edmonton is the 2% back to front lot grading requirement. This is the most rational of the CMHC controls examined in this study and is based on the identifiable minimum gradient over which water will flow on a grassed area.

While these specific requirements, like all those in the handbook, range from arbitrary rules based on "sound practice"⁵ to rational standards based on technical knowledge, they are all oriented towards fulfilling a single objective and appear to be well-understood by those currently applying them.

The most recently adopted control document examined in the study is Edmonton's Servicing Standards Manual, revised last in 1974. As seen in Part II, this document, originating in response to a 1968 City of Edmonton policy requiring developers to install their own utilities, is oriented toward ensuring through specification standards that services in new residential developments are consistent with those in other parts of the city and will therefore present minimum maintenance problems. As they are primarily single purpose technical concerns these servicing standards are perhaps the most rational of the controls examined in this study. One of the major exceptions to this rule is the 30 foot pavement area and the 60 foot right-of-way requirement. The adoption of these arbitrary dimensions originated with gridiron planning which used the length of a surveyor's chain as a convenient standard.

5. CMHC Site Planning Handbook, p. 10

In light of the historical insights gained in Part II, we can conclude that existing controls contained in the zoning bylaw, Site Planning Handbook, and Servicing Standards Manual, are a complex collection of rational standards and arbitrary rules. They have been accumulated over time in response to the growth needs of a rapidly developing frontier society, and a growing concern for the provision of safe, high quality, urban living environments.

When we consider then this mixture of rational specification standards and arbitrary rules which dictate the form of SFD housing in Edmonton today, it is not difficult to see why there is both ignorance and misconception regarding their purposes and implications. As shown in Part I there is no strong consensus regarding the objectives of many of the controls examined here, especially those in the zoning bylaw. Comparing the range of objectives of current controls as perceived by those directly involved with their application, to insights gained through a review of the historical evolution of those controls, we are faced with some obvious inconsistencies. For example, nearly everyone interviewed in Section I, cited fire safety, efficient circulation, and privacy as being primary reasons for enforcing specific requirements within the zoning bylaw. Only two however, mentioned the facilitation of land marketing or protection of property values.

It appears as well that part of the confusion shared by nearly everyone involved, lies in the assumption that the requirements in question represent general principles of good housing design rather than simply a collection of individual responses to specific problems.

Speaking of building regulations generally, Ferguson notes:

"In the broadest sense, building regulations develop from contingency to contingency. Each one represents an emergency measure taken with very little or no study. As the emergency recedes, the regulation tends to form part of traditional practice. It is added to the pile, which grows and grows."⁶

6. Ferguson, R. S., Building Regulations - Problems of Tradition and Knowledge, p. 51.

Babcock, speaking more specifically about zoning, notes:

"Much of the confusion in land use regulation stems from our repeated inclination to canonize short range devices and techniques. One of the major obstacles to a sensible analysis of zoning policy and practice has been the failure of most commentators and judges to distinguish between principles on the one hand and techniques on the other."⁷

The "principles" which Babcock alludes to should deal with timeless, universally applicable standards of good housing design. Development and building controls based on principles, therefore, would require that housing provide characteristics which respond to the most basic human needs - shelter from the elements, shelter from the eyes and ears of strangers, safety from fire, and so on. These controls should deal with the qualities of good housing which do not and will not change with the technological, cultural, or economic environment.

"Techniques", on the other hand, are simply devices which originate in response to specific planning problems at any given point in time. They identify and prescribe specific, fixed solutions which will deal with those problems. It is important to note that aside from restricting design flexibility, there is nothing fundamentally wrong with "techniques". This is true so long as they do not become outdated and we do not elevate them to the status of principles. The problem as identified in Part I is that everyone interviewed is using currently outdated control techniques as though they were principles. Not only does this make administrators reluctant to consider change, it leads to the misconception that by the application of these controls, they are ensuring the optimum housing form.

If we had controls based on principles, they would never have to be altered or changed. The form of housing could change totally, as long as it still provided the required qualities. Controls based on a system of techniques, however, will only be valid for as long as the context in which those techniques were created remains the same. They should then, as Babcock points out:

7. Babcock, R. F., The Zoning Game, p. 126.

"be continuously reexamined in the light of changes in social needs and in technology. Unfortunately, too many zoning techniques have been elevated to the status of principles."⁸

If we examine the objectives of current controls as stated by those interviewed in Part I, we see that they respond to essentially two types of concern, quantitative and qualitative.

Quantitative concerns such as accessibility to fire trucks are the easiest to satisfy. So long as the size and maneuverability of these trucks do not change the use of a control technique such as minimum road widths will provide this necessary feature.

Qualitative concerns on the other hand, such as ensuring privacy or aesthetic quality, do not lend themselves to the use of quantitative techniques. Not only do standards of privacy and aesthetics change very rapidly, they vary dramatically at any given point in time. It is obvious, therefore, that concerns of a qualitative nature should be controlled by flexible regulations which ensure that the principle of privacy, for example, is being satisfied without dictating exactly how it is achieved.

One method of legislating development control while still accommodating innovation and change is through the establishment of performance criteria. This type of control was advocated as early as the 1950's by the American Society of Planning Officials as a method of controlling industrial uses in urban areas. Performance criteria for such measurable factors as air pollution, noise, vibrations, and glare were proposed.⁹

There are many inherent advantages in using performance criteria rather than specification standards in all levels of building and develop-

8. Babcock, R. F., The Zoning Game, p. 126.

9. American Society of Planning Officials - Performance Controls for sensitive lands.

ment control. Building codes, for example, which dictate the type and thickness of walls severely restrict innovation. Codes based on performance criteria, however, will dictate how a wall should perform relative to fire resistance, noise absorption, and so on. While the specification technique tends to stifle technological innovation, the performance standard tends to encourage it. The performance standard as well eliminates the need for its administrators to have specific knowledge of every available material and technique. It puts the responsibility on manufacturers and designers to prove that their system will perform up to the standard.

Recognizing the even greater need for flexibility in controls which ensure such qualitative features as privacy and aesthetics, the use of performance criteria seems even more appropriate. The introduction of performance standards would as well allow us to move in the direction of a control system based on "principles" of good housing, exploring design options which respond directly to current user preferences, technological potentials and cost constraints.

The question "what is privacy?" is one which at any given point in time will elicit many different responses. It is therefore hopelessly naive to assume that we can ensure it through as simple a technique as a setback regulation. When asked how long a man's legs should be, Abraham Lincoln is reported to have replied "long enough to reach the ground".¹⁰ The question is the same; it has to do with performance.

10. Jacobs, Jane, Death & Life of Great American Cities, p. 208.

III-B Reevaluation & Recommendations

The controls examined in this study are specification techniques. They prescribe fixed, quantitative methods of achieving a complex set of both quantitative and qualitative objectives. As Babcock has said, controls of this kind should be "continually reexamined in the light of social needs and technology."¹¹ Considering the foregoing argument and the problems identified in Part I, the specific controls identified in this study have therefore been reexamined on the basis of:

1. Type - identifying the regulations as either rational or arbitrary.
2. Scope - identifying the regulations as being single or multi-purpose.
3. Form Constraint - judging the contribution of the regulation to inflexibility of form.
4. Cost contribution - judging the contribution of the regulation to high housing costs.

The following Table III-1 illustrates the outcome of that reevaluation. As may be seen in Table III-1 the controls identified may be divided into three categories:

1. Single purpose, rational
 - a) grading requirements for streets, walkways, and lots
 - b) walkway width requirements
 - c) parking requirements
2. Single purpose, arbitrary
 - a) intersection spacing requirements
 - b) emergency exit and cul de sac length requirements
3. Multi-Purpose, arbitrary
 - a) road and right-of-way width requirements
 - b) lot area requirements
 - c) lot frontage requirements
 - d) building placement requirements
 - e) building bulk requirements

11. Babcock, R. F., The Zoning Game, p. 126.

<u>DESIGN FEATURE</u>	<u>CONTROL DOCUMENT</u>	<u>EXISTING STANDARD</u>	<u>FORM CONSTRAINT</u>	<u>COST CONTRIBUTION</u>	<u>SCOPE</u>	<u>TYPE</u>	<u>COMMENTS</u>
<u>I. Circulation</u>							
<u>A. Road Form</u>							
1. Pavement Width	Servicing Standards	30' minimum	medium	high	multi-purpose	arbitrary	To provide light, air, aesthetics parking, fire access As above - based on old survey system (one chain)
2. Right-of-way	Servicing Standards	60' minimum	medium	high	multi-purpose	arbitrary	
3. Intersection Spacing	Site Planning Handbook	200' minimum 1200' maximum	low	low	single-purpose	arbitrary	
4. Emergency Exit	Site Planning Handbook	Max. cul de sac 750' with/350' without	low	low	single-purpose	arbitrary	To provide emergency exit
5. Grading	Servicing Standards	Maximum 8.0% Minimum 0.5%	low	low	single-purpose	rational	rationally determined to prevent winter driving problems and to allow for drainage
6. Parking	Site Planning Handbook	One offstreet stall per dwelling	low	low	single-purpose	rational	
<u>B. Walkway Form</u>							
1. Width	Servicing Standards	5' minimum	low	low	single-purpose	rational	based on knowledge of pedestrian requirements
2. Grading	Servicing Standards	.5% minimum 10% maximum	low	low	single-purpose	rational	
<u>II. Lot Form</u>							
A. Lot Area	Zoning Bylaw	5000 sq. ft. minimum	medium	high	multi-purpose	arbitrary	to provide fire safety, privacy, light and air, open space, circulation, outdoor light, etc.
B. Lot Frontage	Zoning Bylaw	45 sq. ft. minimum	medium	high	multi-purpose	arbitrary	
<u>C. Building Placement</u>							
1. Front Setback	Zoning Bylaw	20' minimum	high	high	multi-purpose	arbitrary	" " "
2. Rear Setback	Zoning Bylaw	25' minimum	high	high	multi-purpose	arbitrary	
3. Side Setback	Zoning Bylaw	20% of lot width with 4' minimum per side	high	high	multi-purpose	arbitrary	
D. Grading	CMHC Guidelines	2% back to front of lot	low	low	single-purpose	rational	to avoid basement leaks and puddling around units
<u>III. Building Form</u>							
A. Area	Zoning Bylaw	28% of lot area	medium	high	multi-purpose	arbitrary	to provide light and air, aesthetics, fire protection
B. Height	Zoning Bylaw	25' maximum (35' with further setbacks)	medium	low	multi-purpose	arbitrary	to provide light and air, aesthetics

table III-1

In addition to the stated criteria these categories have been determined on the basis of the following observations. Controls in category one (single purpose rational) have well understood objectives, create few problems of design inflexibility and contribute minimally to overall housing costs.

Controls in category 2 (single purpose arbitrary) also have well understood objectives and do not contribute unreasonably to design inflexibility or housing costs.

Controls in category 3, however, (multi-purpose arbitrary) create problems in all three respects. Because they are multi-purpose and ill-defined, there is no strong consensus about what their specific objectives are or should be. Because they dictate precisely the size and spacing of individual dwellings, and the placement of these dwellings on individual predetermined lots, they severely constrain form alternatives. Lastly, because they prescribe exactly the minimum amount of land that must be allocated to specific areas around individual dwellings, with no reference to actual use, they determine to a large extent the cost of minimum standard housing.

The other characteristic common to nearly all the requirements in category 3 is that they are contained in Edmonton's Zoning Bylaw #2135. The only exceptions among controls in category 3 are the road width and right-of-way requirement which are found in the Servicing Standards Manual.

It is obvious, therefore, that the problems identified in Part I are being created primarily by requirements in Edmonton's zoning bylaw, and the reason for this is that these requirements are simplistic, arbitrary responses to a complex range of outdated problems. Considering the fact that as simple a device as a building setback is being employed to ensure the quantitative and qualitative concerns expressed in Part I, this conclusion is not surprising.

Currently, as shown in Part I, the techniques being employed to ensure fire safety, efficient circulation, privacy, access of light and air and so on, are of three simple types.

1. restrictions to lot form
 - a) minimum area
 - b) minimum frontage
2. restrictions on building placement
 - a) front setbacks
 - b) side setbacks
 - c) rear setbacks
3. restrictions on building form
 - a) maximum site coverage
 - b) maximum building height

As has been demonstrated, these controls are products of the past when land and transportation were cheap, a major concern was for rapid growth and the acts of land subdivision and building were separate. None of these conditions exists today. The perpetuation of our current wasteful forms of development dictated by existing controls, would be bad enough if they were in fact providing us with the qualities we expect in single family detached housing. When we examine the performance of existing controls relative to the objectives expressed by their administrators, we find that they are not even doing an adequate job of meeting these.

III-B-1 Fire Safety

The most commonly expressed objective of current controls among those interviewed for Part I of this study concerned minimizing fire hazard. This was given as the justification for street width and right-of-way requirements, setback regulations and building height restrictions.

Unlike the other more qualitative objectives for these regulations, however, accessibility to emergency vehicles like fire trucks is a

quantifiable requirement. It has to do with width, length, weight and turning radius of trucks; length of hoses, placement of fire hydrants and so on. The assumption that existing setback and road width requirements, in addition to providing for privacy, sunlight and air circulation also ensures safety from fire, is both naive and wasteful.

Unlike other individuals in the development approval process, Edmonton fire chief, L. C. Day¹² saw little utility in setback requirements in themselves. From the standpoint of fire prevention alone, his concerns were primarily for legibility in street layout, accessibility to and maneuverability around individual dwellings and access to ample water.

While current setback requirements in single family developments do ensure a minimum distance between dwellings thus preventing the rapid spread of fires, and while existing road right-of-way requirements do allow good accessibility to individual dwellings, they relate in no way directly to the constraints of our present fire fighting technology. The most useful of the current regulations from the fire department's standpoint are the side setback requirements which allow front to rear ground access. Front and rear yard setbacks, according to Chief Day, in fact are "good for circulation space but are not necessary in preventing the spread of fire or fighting fire."¹³

According to Chief Day, the primary concerns of the fire department regarding any form of residential development are:

1. that access roads be a minimum of 20 feet in width to allow two vehicles to pass.
2. that access roads be designed to carry 30,000 lb. vehicles.
3. Rights-of-way free of obstacles be a minimum of 35 feet in width - the turning radius of a fire truck
4. that convenient ground access be possible from front to rear of dwellings (eight feet is minimum space for men to maneuver with hoses and ladders)
5. that no building should be over 300 feet from a fire hydrant

12. Personal interviews with L. C. Day, December 8, 1975.

13. Ibid.

6. that fire hydrants be no more than 400 feet apart
7. that fire trucks be able to get to within 150 feet of any building

One recommendation of this study is, therefore, that concern for the provision of fire safety in single family detached districts be expressed directly through rational specification standards. These standards should be single purpose and based on the existing constraints in fire fighting technology as just outlined.

The logical document for containing these regulations would be the Edmonton Servicing Standards Manual.

III-B-2 Traffic Circulation

The next most commonly mentioned justification for street widths and right-of-way requirements among those interviewed in Part I concerned ensuring the efficient flow of traffic. Secondary reasons were to allow snow removal and storage and to provide on street parking (see Figure I-2).

There is no question that the current requirements of 30 feet of pavement in a 60 foot right-of-way very comfortably satisfy all these concerns. As demonstrated in Part II, however, these dimensions are a remnant of 18th century gridiron planning where land was cheap and the length of a surveyor's chain set a convenient standard. In view of the current cost of land it is time we examined more closely the specific requirements of traffic flow so as to establish rational standards for street and right-of-way widths.

The present 30 foot residential street required by the Servicing Standards Manual comfortably accommodates three ten foot traffic and/or parking lanes and is located in a 60 foot right-of-way. As demonstrated in Part I, this constitutes 25% of the land area in an R-1 subdivision designed to existing standards. Yet, a residential

street is required to handle relatively low volumes of local traffic. Also, as illustrated in Part I, these streets are aesthetically unattractive. When combined with existing setback requirements the distance from building front to front is 100 feet. With only one and two story buildings to define this space the chances of creating visual interest are minimal.

If we accept that minimum standards for local residential traffic should be to provide two way circulation to all dwellings, we could decrease pavement widths to as little as 16 feet. This would allow for two eight foot driving lanes and require 100% off street parking. Allowing another four feet for pedestrian flow and ten feet for a service corridor and snow piling, we could conceivably provide adequate circulation space for local traffic in a 30 foot right-of-way. As illustrated in the previous discussion, however, accessibility to fire trucks requires minimum pavement widths of 20 feet and 35 feet rights-of-way free of obstacles. As fire trucks and perhaps buses will be the largest vehicles requiring access on residential streets, these requirements should set the standard.

If we use 20 feet of pavement in a 40 foot right-of-way as the minimum rational design standard for residential streets, we can now provide two ten foot traffic lanes with 100% off street parking or one 12 foot driving lane and one eight foot parking lane. The latter may require designated parking zones to allow two way traffic to pass (see Figure III-1).

We now have efficient traffic flow, provisions for fire vehicle access, room for snow piling and convenient pedestrian access on a five foot walk. What is more important, the standards are rationally defensible and we have reduced the land cost for roadways by exactly 50%. We have, as well, through better definition of this circulation space, made the road more interesting and attractive.

NOTE:
 CAR 'A' MAY HAVE TO WAIT
 FOR CAR 'B' TO PASS IF ON-STREET
 PARKING IS ALLOWED

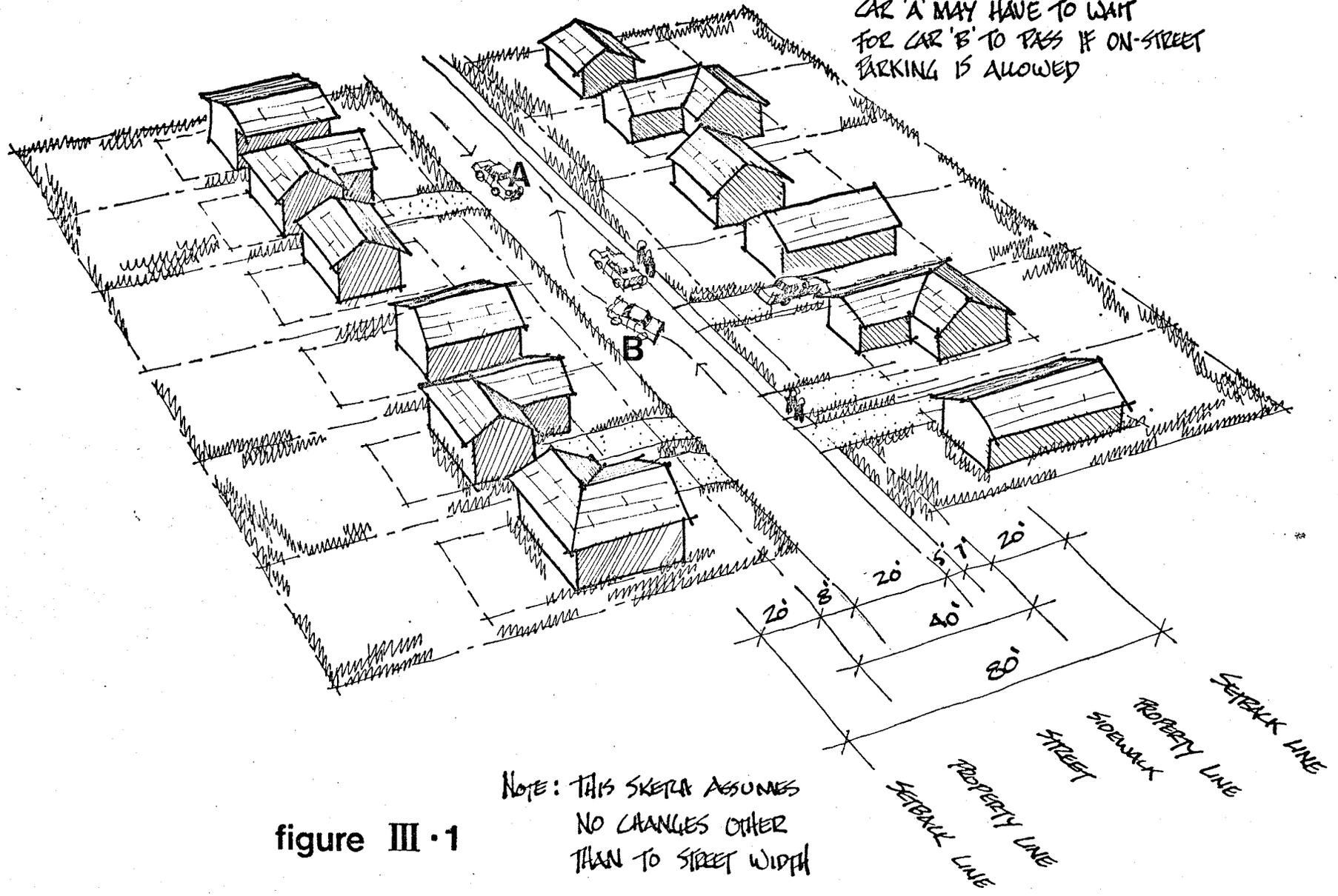


figure III-1

NOTE: THIS SKETCH ASSUMES
 NO CHANGES OTHER
 THAN TO STREET WIDTH

III-B-3 Privacy

Next to concern for fire safety and traffic flow the most commonly expressed justification of road widths, right-of-way widths, and especially building setbacks was the provision of privacy (see Figure I-2).

The obvious assumption which supports this notion, shared by current administrators is that through distance or remoteness we can ensure privacy. This is of course quite true. In rural areas or on very large lots distance alone is an ideal device for ensuring all levels of privacy. The assumption, however, falls apart when we examine a minimum standard single family subdivision. Because of limited distances between dwellings, most residents have clear views into neighbors' bedrooms, living rooms and gardens. The only hope of getting real visual privacy then in a situation where it is supposedly insured automatically, is through the introduction of curtains, costly fences and planting.

- RESIDENTS HAVE CLEAR VIEWS INTO NEIGHBORS' LIVING AREAS

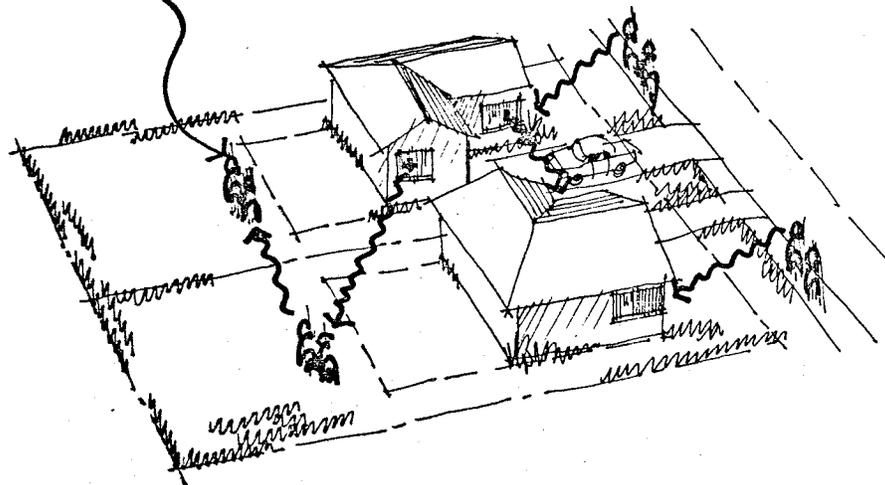
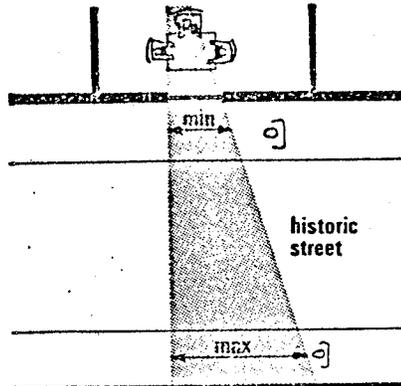


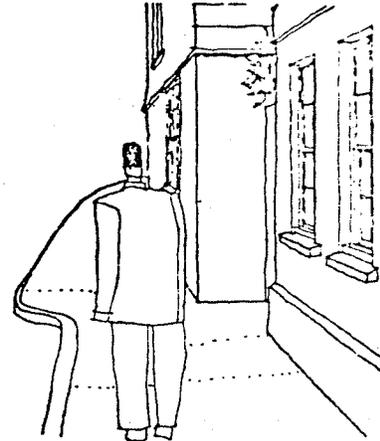
figure III-2

In the standard single family subdivision then, remoteness as a means of insuring privacy does not work. This misconception is further illustrated in: Design Guidelines for Residential Areas.¹⁴

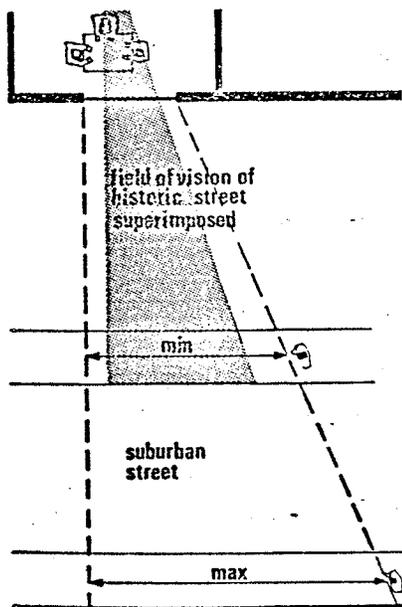


The narrow field of vision of the historic street

The restricted field of vision presented by small windows and set forward buildings.



Buildings that were set back had the walls or planting to provide a physical barrier to people looking in.



Recent housing has less privacy than either of these traditional systems. Setting back houses from the footpath, with 'open plan' frontages and larger windows, does not provide privacy either by a restricted field of vision or by a physical barrier.

The wider field of vision of the 'set back' suburban street.

Privacy lost through set-back houses giving a wider field of vision.

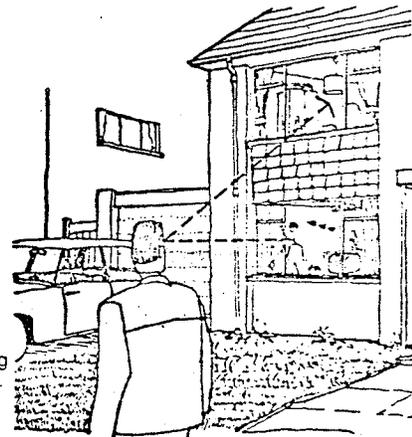


figure III · 3

14. County Council of Essex, A Design Guide For Residential Areas, December, 1973, p. 29.

It is clear then that in minimum standard single family developments we cannot depend on the remoteness provided through street width requirements or setbacks to provide privacy. The only alternative is to ensure privacy through design.

The biggest problem in developing a control specifically to ensure privacy, however, is that unlike the width of a fire truck, privacy cannot be measured. It is a qualitative feature and represents a general principle of good housing. The best approach therefore to ensure privacy through legislation is, as discussed earlier, in the form of performance criteria. If we can agree that the most fundamental requirement of privacy is visual inaccessibility, we can require that all housing provide visual inaccessibility in areas requiring privacy.

It is therefore a further recommendation of this study that concern for privacy be expressed through a specific single-purpose performance standard designed to ensure visual inaccessibility to critical areas in and around single family dwellings. This performance standard could read as follows:

"no direct visual access will be possible from the public side or from the major living areas of adjacent dwellings into the living rooms or outdoor living area of any dwelling."

Having substituted a performance standard specifically oriented at ensuring privacy for setback and road width requirements, we can now allow road widths to respond to rational circulation needs as discussed earlier and provide for privacy through a wide variety of design manipulations. One possibility would be to push dwellings to one side of the lot and orient them onto the yard created on the other. Another possibility would be to push dwelling towards the back of the lot and orient it into a large, well-screened front yard. (see fig. III-4) Still a further alternative would be to put the dwelling on the front of the lot and orient it into the rear yard.

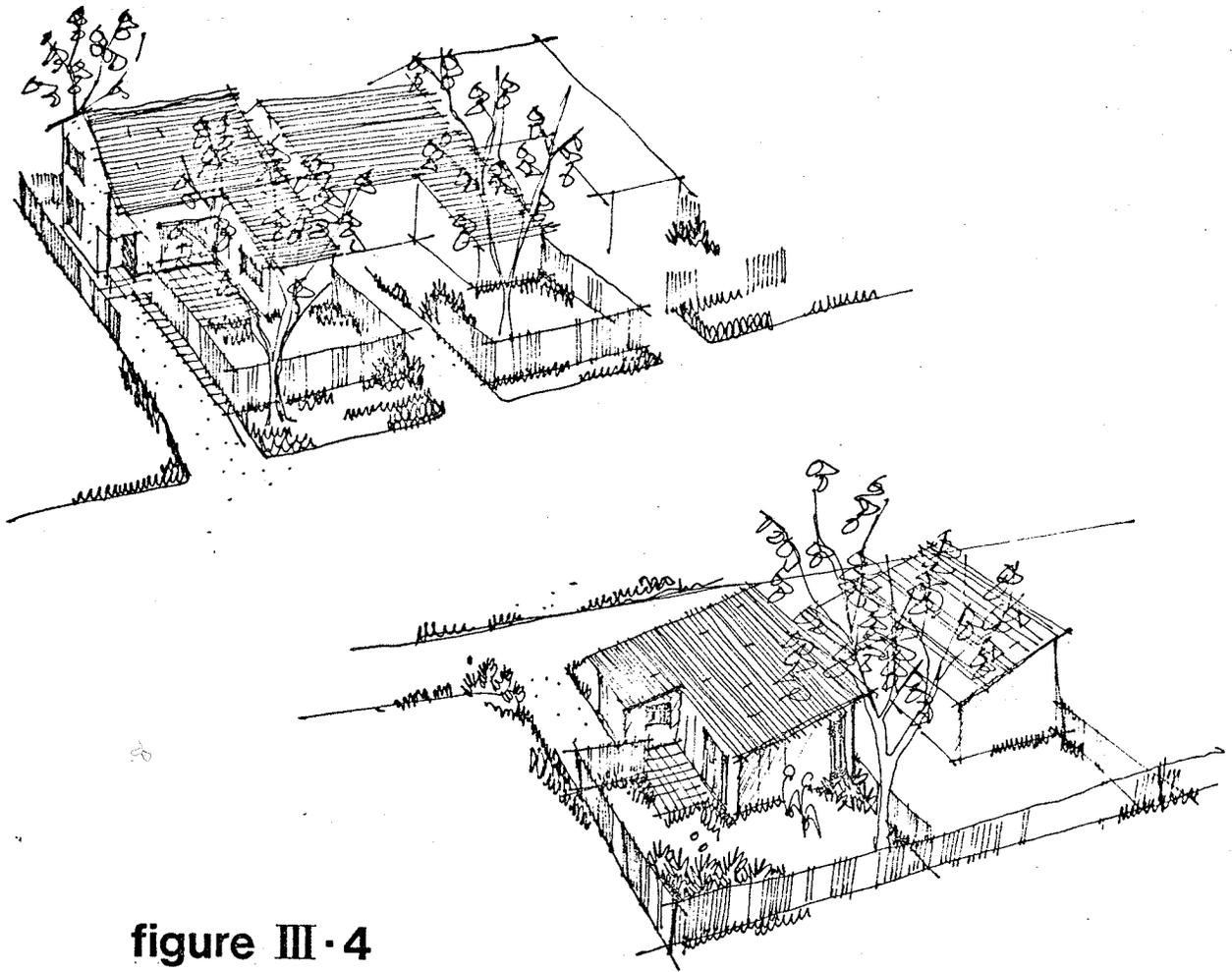


figure III-4

It is clear then that the opportunities for creating truly private internal and external living apaces through careful design are greatly increased by the use of specific performance criteria rather than existing arbitrary, multi-purpose, fixed solution controls.

III-B-4 Light and Air Penetration

Still a further justification for existing road width, setback and building bulk restrictions expressed by those interviewed, was that they ensured light and air penetration into and around dwellings.

While it would appear that by requiring wide streets and generous setbacks we are ensuring good sun and air penetration, closer examination of minimum standard developments has shown that there is very little

opportunity to respond to the most basic climatic concerns. Form constraints are well illustrated in Part I. The inability of orienting the dwelling toward the sun means then that at best we are missing the opportunity of utilizing solar energy in warming both interior and exterior living areas, and at worst, we are requiring that large quantities of potential outdoor living area be relegated to perpetual shade. On both northerly and southerly oriented dwellings in existing residential areas a substantial portion of the most usable yard space is almost permanently shaded and therefore, less attractive as outdoor living or garden areas.

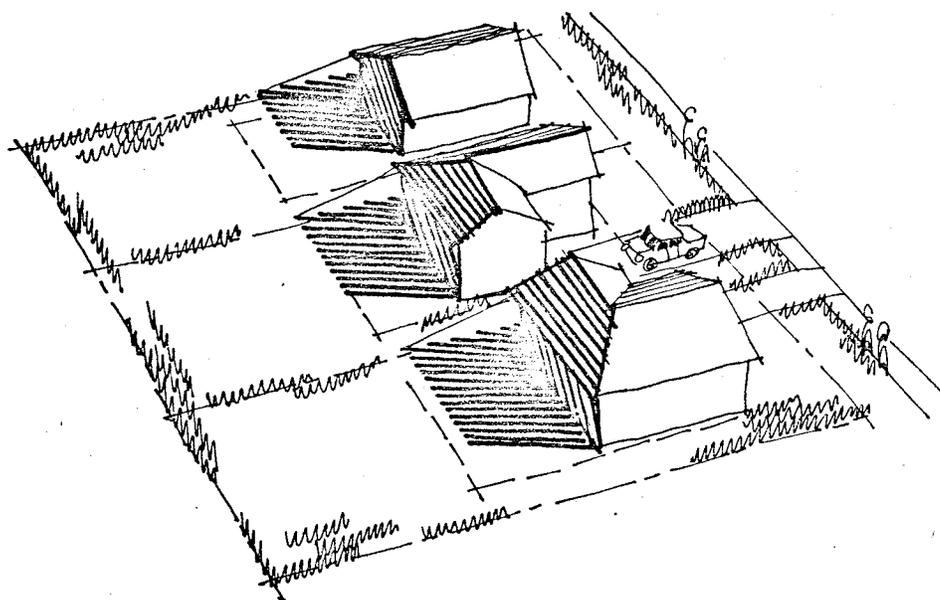


figure III-5

In Edmonton's northern climate, it seems obvious that houses should be designed to take maximum advantage of solar energy through proper orientation at least. With the rising costs of energy for home heating this concern will become increasingly critical in the future. Again, by the elimination or rationalization of existing setback, building bulk and road width requirements and the substitution of performance criteria, the opportunities to respond directly to climatic concerns are greatly enhanced. One of the most obvious possibilities would be the development of atrium style houses pushed to the rear or front of lots with the sheltered areas oriented in a southerly direction. The

micro climate created in these sheltered areas could substantially lengthen the outdoor living season and reduce home heating costs.

The protection of outdoor living areas and entry ways from icy winter winds is the other aspect of climatic control which is almost impossible under existing regulations. With more flexible performance criteria this concern would be handled in a similar fashion to responses to sun angles. Possible performance standards to ensure not only adequate light and air penetration but also appropriate responses to sun and wind could be:

"Outdoor living areas in all units will be open to direct sunlight for at least four hours every day. Outdoor living areas and main entries to dwelling units will be oriented in such a way or screened so as to give protection from prevailing winds."

III-B-5 Open Space

The next most commonly cited objective of building setbacks, minimum lot areas and maximum site coverage mentioned by those interviewed related to concern for ensuring adequate "private open space". This was generally advocated for outdoor sitting areas, children's play, gardening, or simply to look at. There is no question that one of the primary appeals of single family detached housing on a free hold lot is related to the generous amounts of open space which surround it.

The problem with guaranteeing ample open space through setback regulations, minimum lot area requirements, and maximum site coverage regulations is that a large percentage of the space provided is either functionally useless or at best, simply decorative.

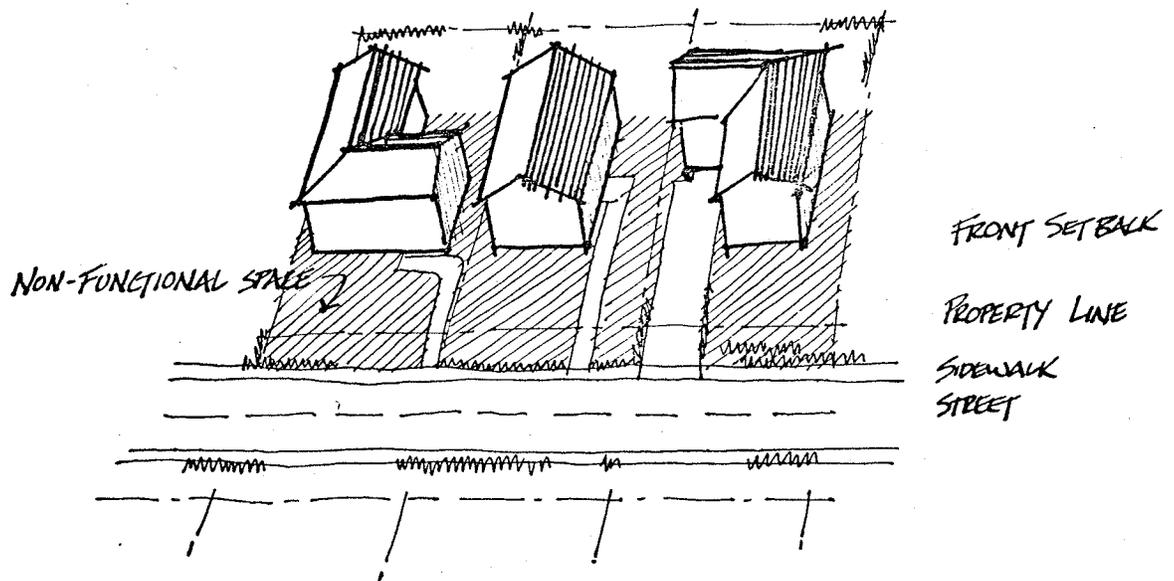


figure III - 6

Again with the current high cost of land, we should be considering not only the quantity of open space we provide, but the quality as well. The orientation, relationship to actual need, intimacy and human scale of outdoor areas around housing are factors which are almost impossible to consider when complying with current arbitrary standards. Private open space for its own sake and with no functional purpose is money wasted for everyone concerned. While it is true that to many people a

front yard intended only for display, with flower beds and lawn ornaments is of fundamental importance, it is equally true to say that for many of us it is not. This is especially true at \$20,000.00 per acre.

Flexible standards should, therefore, ensure a minimum of usable private open space next to every dwelling. These standards should, however, be rationally determined and the open space provided should be a response to the functional needs of potential users. The following represents an example of how an open space performance standard could be worded:

"Each dwelling will have open space or spaces directly accessible from interior living areas of suitable size to allow outdoor eating, lounging and gardening activities. The total area of this open space to be no less than 800 square feet."

The minimum area specified should be rationally based on required space for supporting these activities. Concerns for orientation and privacy are of course satisfied in single purpose performance standards concerned specifically with those issues.

III-C Recommendations

On the basis of arguments presented in this study, the five following policies are recommended as guidelines for the revision of existing controls affecting single family detached housing in Edmonton. They should as well provide direction for the evolution of more rational, socially responsive controls in the future.

1. All specification techniques based on arbitrary traditional standards should be rationalized so that they meet their objectives in the most efficient possible way.
2. All specification techniques which prescribe fixed solutions should be subjected to continual re-examination in light of changing technological possibilities and social needs.
3. All multi-purpose controls should be replaced by single purpose controls.
4. All attempts to ensure qualitative features should employ performance criteria.
5. Whenever possible building and land development controls at all levels should be replaced by performance criteria.

The specific recommendations for revisions of existing controls listed in Part I, Table I-1, have been made through the application of these policies. They assume that no immediate changes will be made in the existing context of control documents or administrative procedures. (See Table III-2 following)

<u>DESIGN FEATURE</u>	<u>CONTROL DOCUMENT</u>	<u>EXISTING STANDARD</u>	<u>REVISION</u>	<u>COMMENTS</u>
I. Circulation				
A. Road Form				
1. Pavement Width	Servicing Standards	30' minimum	20' minimum	Rationally determined to allow access to fire trucks
2. Right-of-way	Servicing Standards	60' minimum	40' minimum	" " "
3. Intersection spacing	Site Planning Handbook	200' minimum 1200' maximum	As is As is	
4. Emergency Exit	Site Planning Handbook	Max. cul de sac 750' with/350' without emergency exit	As is	
5. Grading	Servicing Standards	Maximum 8.0% Minimum 0.5%	As is As is	
6. Parking	Site Planning Handbook	One off street stall per dwelling	Two off street stalls unless parking lane is provided on street	Rationally determined by knowledge of parking require- ments in single family dwelling district
B. Walkway Form				
1. Width	Servicing Standards	5' minimum	As is	
2. Grading	Servicing Standards	.5% minimum 10% maximum	As is As is	
II. Lot Form				
A. Lot Area	Zoning Bylaw	5,000 sq. ft. minimum	Flexible	*Determined by size of building and satisfaction of site per- formance standards
B. Lot Frontage	Zoning Bylaw	45 sq. ft. minimum	Flexible	" " "
C. Building Placement	Zoning Bylaw			
1. Front Setback		20' minimum	Flexible	*Determined by satisfying site performance standards and com- pliance with rational fire regulations
2. Rear Setback		25' minimum	Flexible	" " "
3. Side Setback		20% of lot width with 4' minimum per side	Flexible	" " "
D. Grading	CMHC Guidelines	2% back to front of lot	2% away from building to storm sewer system or holding pond	Determined by rational grading requirements but could accommo- date drainage innovations like holding ponds, etc.
III. Building Form				
A. Area	Zoning Bylaw	28% of lot	Flexible	*Determined by size of lot and satisfaction of site perfor- mance standards
B. Height	Zoning Bylaw	25' max. (35' with further setbacks)	Flexible	* " " " "

table III-2

*see possible performance standards on following page

Possible performance standards to ensure"

1. Privacy

No direct visual access will be possible from the public side or from the major living areas of adjacent dwellings into the living rooms or outdoor living areas of any dwellings.

2. Climatic Control

Outdoor living areas in all units will be open to direct sunlight for at least four hours every day. Outdoor living areas and main entries will be oriented in such a way or screened so as to give protection from prevailing winds.

3. Open Space

Each dwelling will have open space or spaces directly accessible from interior living areas of suitable size and shape to allow outdoor eating, lounging, and gardening activities. The total area of this open space to be no less than 800 sq. ft.

These standards should replace lot area, lot frontage, setback and building bulk requirements in Edmonton's Zoning Bylaw.

Recommended Rational Specification Standards to Ensure Fire Safety

1. minimum pavement width of 20 feet
2. minimum right-of-way 40 feet
3. pavement to be designed to carry 30,000 lb. vehicles
4. no building to be over 300 feet from a fire hydrant
5. maximum fire hydrant spacing to be 400 feet
6. minimum distance between buildings to be 8'-0"

These standards should be incorporated into Edmonton's Servicing Standards Manual.

III-D Demonstration

If for purposes of demonstration we utilize the system of controls described in Table III-2 to design a group of single-family detached dwellings, we can see that the problems of inflexibility of form and unavoidably high land costs identified in Part I can be substantially alleviated.

Assume for example that we have a street running east and west. To accommodate emergency vehicle access as well as the efficient movement of local traffic, we will provide a 20 ft. paved area in a 40 ft. right-of-way. We will as well allow 100% off street parking or two stalls per dwelling. The single 5 ft. sidewalk will be placed on the north side of the street to ensure its being in sunlight at all times.

If there are no restrictive or valuable site features to help determine the location of dwellings we may choose to utilize patio style dwellings on the north side of the street set on the rear of the lots. In this way we can utilize solar energy to lengthen the outdoor living season and protect entrances from cold winter winds.

Privacy and a sense of enclosure will be enhanced by the extension of one wing of each dwelling, and a 6 ft. high visual screen designed along with the house will extend across the front of the lots. Windows will be located so as to avoid views into neighboring privacy zones.

Fire safety will be further ensured by a minimum of 8 feet of clearance between all buildings. One example of this form of dwelling is illustrated in fig. III-7.

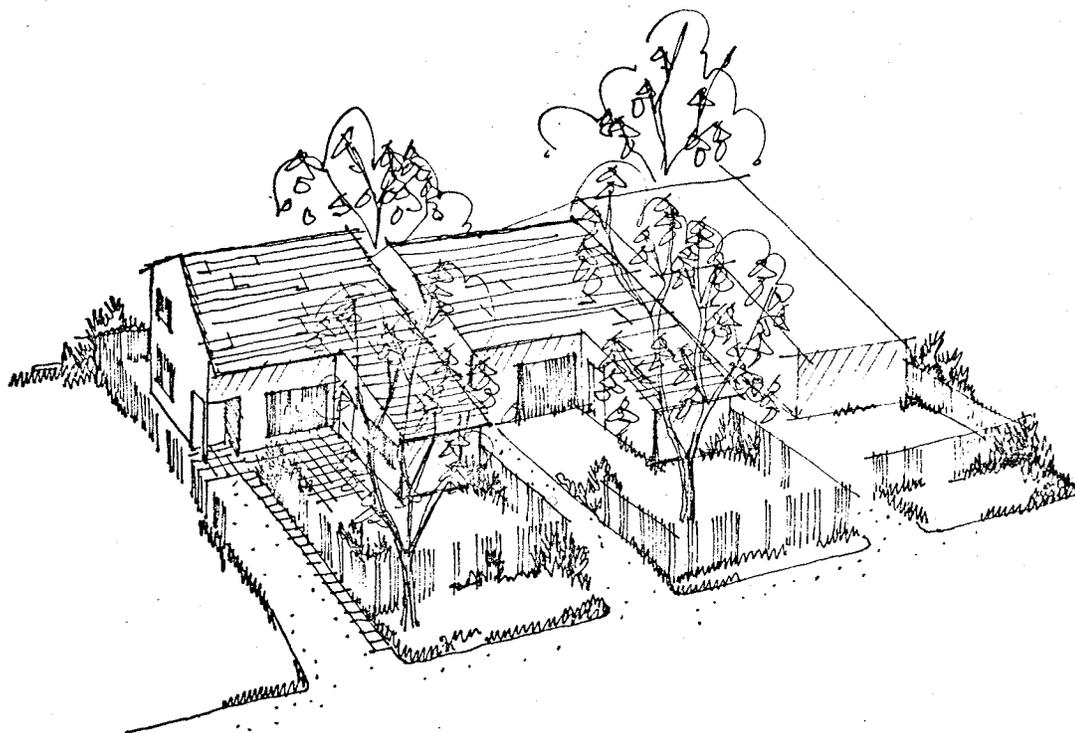


figure III-7

On the south side of the street we may choose to place dwellings on the northerly side of the lots, again to optimize solar energy and give protection from winds in outdoor living areas. Privacy will be ensured by locating the required outdoor living areas in the rear and to the sides of the dwellings with windows of all dwellings avoiding views into neighboring privacy zones. (see fig. III-8)

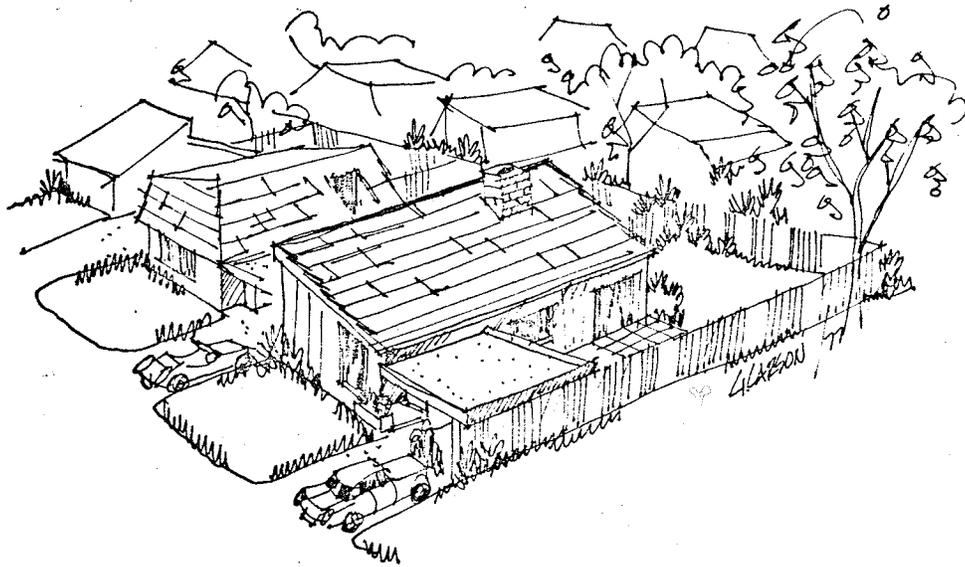


figure III-8

In order to minimize high land costs and still provide 1400 sq. ft. dwellings as is possible in the existing minimum standard R-1 subdivision analyzed in Part I, we will use two-story dwellings with 800 sq. feet of ground area and place them on property lines. (Zero lot line dwellings) Lots then could be reduced in both length and width. For this demonstration we will use 36' x 80' ft. or 2880 sq. ft. (see. fig. III-9)

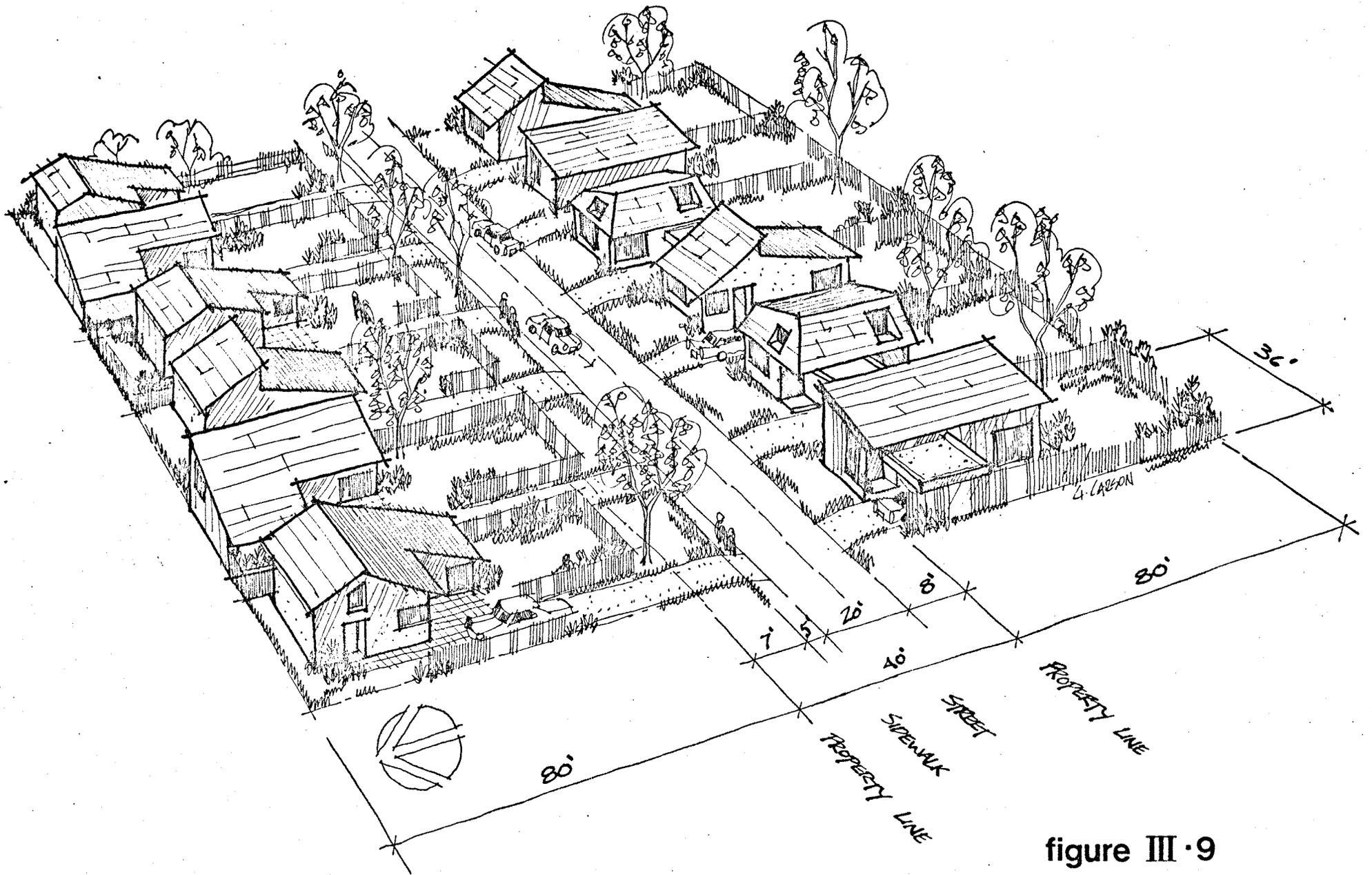


figure III-9

It is important to point out that this prototype single-family housing group represents only one possible alternative and is not advocated as an optimum housing form. For purposes of comparison it is based on regular uniform lots fronting on a regular minimum standard street. The revised controls shown in Table III-2 could as well accommodate more innovative and less traditional housing which still provides the qualities desired in single family detached dwellings. Direct responses to specific site features, social needs, and technical capabilities would undoubtedly ensure a wide range of housing and development forms.

For purposes of comparison then, the prototype housing group shown in fig. III-9 has been analyzed on the basis of land use and costs. See Table III-3 on the following page.

Total Development Area	=	2.15 acres
Total Number of Units	=	26
Development Density (net)	=	12.1- dwelling units/acre

1. Private Land:

<u>Use</u>		<u>Area</u>	<u>Value</u>	<u>Percentage Private Land</u>	<u>Total</u>
a. Bldg. area	=	.4775 ac.	\$ 9550.00	27.76%	22.2%
b. Yard area	=	1.0500 ac.	\$ 2100.00	61.04%	48.8%
c. Driveway	=	.1910 ac.	\$ 3820.00	11.20%	8.9%
Totals	=	1.7200 ac.	\$34370.00	100.00%	79.88%

2. Public Land:

a. Road	=	.2150 ac.	\$ 4300.00	50.00%	10.0%
b. Sidewalk	=	.0540 ac.	\$ 1080.00	12.50%	2.5%
c. Boulevard	=	.1610 ac.	\$ 3220.00	37.50%	7.5%
Totals	=	.4300 ac.	\$ 8600.00	100.00%	20.2%
Overall	=	2.1500 ac.	\$43000.00 (or \$1653.84 per lot)	100.00%	100.0%

table III-3

Comparing the prototype development shown in fig. III-9 with the minimum standard subdivision analyzed in Part I (Table I-2, page I-13), the following observations are possible. Firstly and most obviously we have reduced the amount of land required

and thereby land value by almost one half. (46.48%) Secondly, by making a more rational response to circulation needs, we have reduced the proportion of public land allocated to roads, sidewalks, and boulevards from 24.98% to 20.2%. Thirdly and perhaps most significantly, through a conscious effort to satisfy expressed objectives of fire safety, privacy, and sun and air penetration, land use generally bears a more direct and rational relationship to functional need.

III-E

Summing Up

This study has demonstrated that we are not only the products of our history and traditions, we are as well their prisoners. As R.S. Ferguson points out:

"History is a tyrant sharply circumscribing our capacity to view with a fresh eye."¹⁵

Perhaps the most dangerous aspect of this limitation is its subtlety, and in few areas is this more evident than that of housing, land use, and building controls. In a society of affluence such as we enjoy in Western Canada the function of housing as shelter is often overshadowed by its symbol as a status form, a means of joining our peer group, or a guaranteed investment program. When we envision the future of housing, building controls, and development procedures, these historical constraints are all the more powerful for being built into our preconceptions.

It has been demonstrated in this study how much of the legislation covering the production of single family housing in Edmonton today is the victim of this limitation. This legislation is based on outdated assumptions, which in view of the dramatic economic changes of the past decade have become increasingly unfeasible. It assumes relatively cheap transportation and house heating costs, which with increasingly high costs of fossil fuels are already a thing of the past. It

15. Ferguson. R.S., Building Regulations - Problems of Tradition and Knowledge, p.

assumes a continuation of the historical cheapness of land, which as a function of socio-economic desirability has come to represent a major component of housing cost. Lastly, it assumes with traditional gridiron subdivision practices, an unlimited capacity of the natural environment to absorb urban sprawl.

As is shown in Part II, the preponderance of these notions are tied directly to the basic premises of classical capitalistic theory. Canadian development over the past two centuries has been directed toward optimizing the use of land as a capital commodity. It has been used by governments as a source of revenue, for paying debts, and as gifts to encourage growth; and it has been used by speculators to amass private fortunes.

The implications of these traditional attitudes toward land and land use have left their mark on both our physical environment and the controls we devise for its use. As a heritage of the 18th and 19th century need for rapid growth and efficient land marketing, we have a system of land tenure which divides rural and urban land alike into simple squares ignoring all natural site features. As a later heritage of the need to secure investment in urban land, we have many overly simplistic, arbitrary, multi-purpose development controls which further preclude the possibility of responding to natural site features or changes in the social, economic, and technological contexts in which we exist.

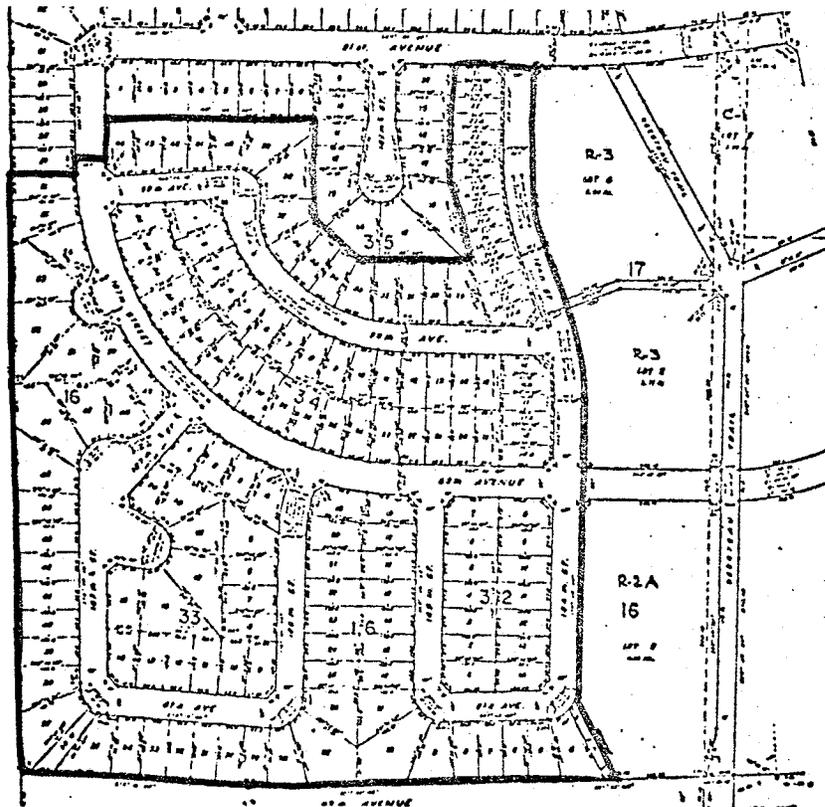
In Part III it is shown that if we are to exercise good judgement in developing more rational and socially responsive development controls, it is time we began to recognize the real motivations and shortcomings of our existing ones. It is

demonstrated how the substitution of rational specification requirements and performance standards could increase design flexibility and allow the development of more economical single family detached housing which better fulfills the expressed objectives of existing controls. Using these revised standards, costs could be reduced, appearance could be improved and the qualitative features which make single family housing the goal of nearly every Canadian family, could be better achieved.

APPENDIX ONE - BELMEAD

The subdivision of Belmead which has been analyzed in detail for this practicum forms a portion of the Parkland Area, "a proposed urban community of 93,500 persons located immediately west of the western boundary of the city of Edmonton."¹

The portion studied here prerepresents the second stage of a three-stage development being carried out by Integrated Building Industries of Edmonton.



study area

1. Stanley Associates Engineers Ltd. - Parkland Development Plan, Edmonton, November, 1974.

The following data derived from information obtained from the developers has provided the cost data used in this practicum.

Belmead - Physical Analysis

1.	Development Area	38.32 acres
2.	Private Lots	28.36 acres (74.01%)
3.	Circulation Space	9.96 acres (25.99%)
4.	Total Number of Lots	146
5.	Average Lot Area	8461.38 sq. ft.
6.	Average Frontage	
	a. Interior Lots	56.64 ft. (124 lots)
	b. Corner Lots	171.53 ft. (22 lots)
	c. Overall Average	73.11 ft.
7.	Development Density	3.82 D.U.'d/acre (net)

Belmead Cost Analysis

1. Raw land cost to developer	=	\$20,000.00/acre
x38.32/ac.	=	\$766,400.00 total
or		\$5,249.32/lot ₁
2. Total Servicing Cost to Developer	=	\$2,490,803.72
or		\$233.36/physical front foot
or		\$17,060.30/lot
3. Total Expenditure by Developer	=	\$3,257,203.72
or		\$22,309.61/lot
4. Selling Price to Builders	=	\$3,558,620.00
--@\$400.00/front foot	or	\$24,374.11/lot
(1975 costs now \$450.00)		
5. Total Profits to Developer	=	\$301,416.28
or		8.47% on investment
6. Serviced Lot Costs to Builder (average)	=	\$24,374.11/lot
7. Cost of Building	=	\$47,600.00/unit
--@\$34.00 sq. ft.		
(for 1400 sq. ft. buildings)		
8. Total Expenditure to Builder	=	\$71,974.11/home
9. Average Cost to Consumer	=	\$85,000.00
10. Profit to Builder	=	\$13,025.89
		18.10% on investment

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1. Land for this project was purchased by the developer in three separate blocks of approximately the same size. The first purchase was @ \$17,000.00/acre, the second @ \$20,500.00/acre, and the third for \$22,000.00/acre. For this project the cost has been averaged out at \$20,000.00/acre.

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