Zoning In: Addressing Perceived Design Challenges through Form-Based Zoning

By

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A Thesis submitted to the Faculty of Graduate Studies of
The University of Manitoba
in partial fulfillment of the degree of

MASTER OF CITY PLANNING

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THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

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Abstract

The purpose for zoning is found in the notion that different land uses function more efficiently and with fewer adverse affects when physically separated. However, over the past century, this focus on land use resulted in an urban environment that has been described as fragmented, monotonous and having little regard for aspects such as scale and a building's relationship with the street and the surrounding environment. This Major Degree Project investigates Form-Based Zoning (FBZ), which is an emerging alternative to land use based zoning and inspired by New Urban theory. This research was done in order to find out how FBZ can be used to address physical design concerns within the built form of a particular area in southwest Winnipeg, Manitoba and relies on key informant interviews with professional planners. The study concludes by noting that it may be most appropriate to use FBZ in conjunction with established Euclidian zoning methods.

Acknowledgements

I would like to thanks my committee for their support and time; the G. Clarence Elliott and Fredrik Kristjansson endowment funds for the generous financial support; the Department of City Planning faculty and students; my parents and grandparents for encouragement; and finally, Tara for her consistent guidance and support.

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1.0 Introduction

Zoning is a planning tool used to control development through a set of regulations concerning land use, density, building bulk and other elements of form and function. It is an important legal mechanism necessary to govern urban growth and realize community plans. Originally, zoning was implemented to separate incompatible land uses. This was done by establishing districts in which different land uses were permitted. The first zoning laws originated in Germany and were used to separate noxious industrial land uses from residential areas and allow industry to operate more efficiently (Hodge, 2003). As a result, the city was divided into districts where specific land uses were permitted and restricted.

Aesthetic values began to be expressed through zoning by the time the first Canadian comprehensive zoning by-law was enacted in Kitchener, in 1924 (Hodge, 2003). While restricting the location of different land uses the by-law also stipulated the density, siting and height of buildings. This method of zoning is known as Euclidean zoning, after a landmark legal decision described below, and continues to be widely used across North America.

Euclidean zoning is defined by segregated land uses (typically residential, commercial and industrial are the most prevalent). Within these designations are a variety of different intensities and dimensional standards intended to further regulate land uses and the impact on surrounding parcels. Other aspects such as open space

requirements, parking, subdivision standards, and signage restrictions have also been incorporated into by-law regulations.

Zoning was claimed to embody and exemplify the idea of orderliness in city development, encouraging the erection of "the right building, in the right form, in the right place" (Cullingworth et al., 2000: 62). However, in practice, zoning often creates a segregated built environment. Rigid standards alter the public realm, forcing development to conform to comprehensive district requirements without consideration for the unique identity of the street or neighborhood. Aspects such as the placement of parking lots, building height and siting usurp neighbourhood cohesion and design, producing a predictable and uniform built environment but resulting in a fragmented, disconnected urban form associated with social isolation and class segregation (Leung, 2003).

Form Based Zoning (FBZ) offers an innovative alternative to Euclidean zoning. Developed in the United States to realize New Urban design theory popularized during the late 1990s, FBZ aims to create a harmonized urban structure by setting clear controls focused primarily on building form (rather than land use) in order to shape the built environment. The purpose of New Urbanism (also known as traditional neighbourhood design) is to:

> ...advocate the restructuring of public policy and development practices to support the following principles: neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public

> spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice (Congress for the New Urbanism, 2001).

In doing so, the theory attempts to eliminate urban sprawl, increase urban design quality and create less wasteful communities.

FBZ is a cutting edge planning tool whose implementation in Canada is only beginning to be developed. FBZ regulates land development by setting careful and clear controls on building form (but broad parameters on building use) to shape public space (good streets, neighborhoods and parks) with a healthy mix of uses (FBCI, 2008). With proper urban form, a greater integration of building uses is both natural and comfortable (City of Arlington, 2005). It achieves this through the use of simple and clear graphic prescriptions and parameters for height, siting and building elements to address the basic necessities for forming good public space.

1.1 Statement of Purpose

The purpose of this research is to test the ability of FBZ to address design concerns for development located in a particular study area in Winnipeg, Canada as assessed by professional planners.

1.2 Key Research Questions

1. How do FBZ regulations attempt to shape the physical form of the built environment?
2. What problems exist within the study area's built form?
3. How well can FBZ address the design problems experienced within the study area?

1.3 Significance

This major degree project will investigate Form-Based Zoning (FBZ) in order to find out how it can be used to address physical design concerns within the built form of the study area because doing so will provide an understanding of the benefits and limitations of this planning tool in addressing design concerns in the Winnipeg context.

1.4 Limitations

This project has several limitations. The first of these concerns the fact the study only examines two types of zoning. While there are other types of zoning (Performance, Incentive), Euclidean is the most prevalent across Canada. Since FBZ is designed as an alternative to Euclidean regulations the study limits its focus to these two methods.

A second limitation is that the study is only focused on design issues. It has been well-documented that Euclidean regulations have had a broad range of effects (i.e. social segregation, environmental degradation); yet, this study focuses on the structure and design of the building environment.

The final issue might not be constructed as a limitation, and concerns the generalizability of the case study. While similar cases exist in towns and cities across Canada, the results of this research are not intended to be generalized. Rather, in certain instances, lessons can be taken from this study and applied to another context; however, there will always be differences and similarities between any two cases.

Nevertheless, the methodology adopted here could probably support investigations elsewhere.

1.5 Method

First, literature pertaining to Euclidean zoning and FBZ is reviewed. Next, a FBZ by-law analysis is conducted to determine common elements and methods of FBZ regulations. Following, focused interviews of key informants are conducted with planners to identify perceived design challenges within the study area. Then, the responses are contrasted with the abilities of FBZ, as derived through the by-law analysis, to determine how/if FBZ method can address specific design concerns. A design solution for the issues identified by key informants is then drafted. Finally, in a second set of focused interviews, the FBZ design solution is proposed to interview participants, and any further concerns are noted. The study will conclude with recommendations concerning the benefits and limitation of FBZ within the study context.

2.0 Literature Review

2.1 Evolution of Zoning

Zoning originated from the observation that similar land uses function better and have fewer adverse consequences when congregated in areas which are separate from other land uses (Hodge, 2003: 207). Therefore, the original purpose of zoning was to physically separate non-compatible land uses within different areas of the city. As indicated above, this practice originated in Europe in the 19th century (Hodge, 2003: 208). Conditions of the industrial city necessitated the separation of noxious

industrial uses from residential areas. Where this occurred, life expectancy began to rise significantly as living conditions improved (Duany et al., 2000: 10). In addition, the separation of non-compatible uses allowed industrial areas to operate more efficiently since the roadways were uncongested and they did not have to compete with other uses for adjacent land on which to expand operations.

This practice became known as districting (zoning in North America) and allowed for regulation to be developed to suit the needs of the land use (Hodge, 2003: 208). However, simply regulating land use did not provide the predictability needed to shape a healthy, safe and efficient built environment. For example, parcels which were over-built or contained poorly sited structures often negatively influenced the efficiency (flow of traffic) and health and safety (fire hazards) of the surrounding neighbourhood. Therefore, regulations were established to regulate the density (number of units on a site), the height of buildings, and the distance those buildings had to be from the street and from each other.

The first comprehensive North American zoning by-law was established in New York City in 1916 (Hodge, 2003: 208). It evolved from a citizen-based effort to remove a garment factory from an area by restricting the height. It was believed that if the height of the factory was limited, it would become uneconomical to operate and be forced to relocate (Leung, 2003: 214-215). This eventually resulted in the first comprehensive zoning ordinance in North America. The ordinance divided the city into three land uses: residential, commercial, and uncontrolled use. It contained few

bulk restrictions, but did strictly limit building height based on the width of the street (Leung, 2003: 215).

In Canada, regulations were developed across the nation early in the 20th century to regulate the location of specific land uses: butcher shops, laundries, and factories, in addition to the height of certain buildings (Hodge, 2003: 208-209). However, the first comprehensive zoning by-law was enacted in the Kitchener, Ontario in 1924. It followed the same structure as earlier American regulations, limiting the land uses and basic bulk standards.

In Canada and the United States, early comprehensive regulations (known as ordinances or codes in the United States and by-laws in Canada) faced legal challenges regarding a municipality's right to regulate privately owned property. The United States Constitution asserts personal property rights. Therefore, legal challenges escalated to the Supreme Court where it was decided in the 1926 case of Ambler Realty Co. vs. the Village of Euclid, Ohio, that a municipality does have the right to regulate private property. As a result of this decision, the power of municipalities to prohibit uses that were deemed a nuisance to other adjacent uses was affirmed. For example, uses such as factories and apartment buildings were excluded from single family zones (Cullingworth et al., 2000: 34). Since, comprehensive zoning has been known as Euclidean Zoning.

2.2 Euclidian Zoning

Zoning is a planning tool which is used to control land use, along with the size, type, and placement of a building on a parcel (Hodge, 2003: 207). It does this by specifying which land uses can be conducted on the parcel, and stating dimensional requirements for structures. Hodge (2003) and Leung (2003) outline the key concepts of Euclidian zoning: land use, density/intensity, bulk, subdivision requirements and other regulations.

2.2.1 Land Use

Land uses are designated based on the anticipated, normal operation of a parcel (Leung, 2003: 217). Land uses are predominantly divided into three general categories: residential, commercial and industrial. However, there may also be land use designations such as agricultural or public use. Land use designations are further divided into subcategories designed to describe the parcel's use more specifically. An industrial designation, for example, could mean a wide diversity of actually uses; therefore, the designation is subdivided into categories which appropriately describe the use. An oil refinery and storage warehouse both fall under the industrial designation but are markedly different land uses. As a result, they require different designations (i.e. heavy industrial and light industrial) but still fit within the broad industrial land use designation.

2.2.2 Density/Intensity

Density is applicable to residential land uses and refers to the number of dwelling units or the number of people per hectare/acre. In contrast, *intensity* is used to

describe the concentration of non-residential land uses (Leung, 2003: 217-218). Both are often the basis for dividing land uses into separate categories. A parcel designated for single family dwellings will have a lower density and different requirements than a parcel designed for apartment buildings. This necessitates different residential land use designations. Similarly, an office building will have differing requirements and intensity than a corner store.

Density/Intensity is regulated two ways. The first method is used for residential land uses and regulates the density of a parcel by stipulating the maximum number of dwelling units per hectare/acre (Hodge, 2003: 130). Therefore, a residential land use will be controlled by the permitted density which ranges from under 20 units/hectare (low density) to over 100 units/hectare (high density).

A second method for controlling *density/intensity* is to control the permitted floor area of a structure relative to the size of the parcel. This ratio is used for both residential and non-residential land uses and is commonly known as Floor Area Ratio (FAR) (Leung, 2003: 218). FAR functions by providing a ratio of building area to land area (for example 3:1). Therefore, according to this example, an office building would be able to have a floor area three times the area of the land parcel.

2.2.3 Bulk

Bulk concerns the dimensional standards of a structure relative to the parcel on which it is situated (Hodge, 2003:133-136). This is done through height, setback and lot coverage. *Height* specifies how tall a structure may be as measured vertically from

the ground to the highest point. *Setback* concerns the minimum distance a structure must be from the front, sides and rear of a parcel. Together, these dimensions result in a building envelope, which is a three dimensional rectangle within which the building's outer shell must be fit. *Lot coverage* is a further regulation, which specifies a percentage corresponding to the maximum area of a parcel that may be covered by a building. For example, lot coverage of 40% would mean a building could cover a maximum of 40% of the parcel area.

2.2.4 Other Regulations

Zoning regulations also incorporate other aspects of the physical environment such as parking space limitations, signage, accessory buildings and conditional uses. *Parking requirements* are usually expressed as a minimum number of off-street stalls and are calculated by paralleling the number of stalls with the size of the building or number of employees, users or occupants. For example, a parking requirement might state that one parking stall be provided for every 250 square metres of building area . *Signage regulations* are designed for both safety and aesthetics. Regarding safety, the location of signage relative to roadways could cause a safety hazard by blocking the views of motorists. In addition, the size and materials used for a signs could be viewed as unsightly. Regulation of *accessory buildings* is similar to that for primary structures (height, setbacks, lot coverage) and these may be required to be a minimum distance from the principal structure. Finally, *conditional land uses* are permitted on a parcel if certain conditions are satisfied. For example, a home-based business may only be permitted if the operator provides three off-street parking spaces.

2.2.5 Subdivision Requirements

Subdivision regulations and controls are another important aspect of zoning. Subdivision regulations, as it pertains to zoning, are concerned with minimum lot area and lot dimensions. Concerning lot area, different zones will stipulate the minimum area of a newly permitted lot. For example, if a zone has a minimum lot area of 500 square metres, all newly created lots must be at least that size. Therefore, should a 1.3 hectare parcel be subdivided, it could only be made into two parcels. However, if the lot was 1.5 hectares, then it could be divided into three.

The second important aspect of subdivision control under zoning consists of dimensional requirements such as lot frontage, lot width and lot depth. Depending on the by-law, zoning regulations may stipulate a minimum frontage length, meaning the side of the parcel abutting the public roadway must be a specified length. Similar regulations restrict minimum lot width and depth meaning that, at no point can a lot be less than a specified width or depth.

2.3 Consequences and Criticisms of Euclidean Zoning

Euclidean zoning is successful at separating incompatible land uses, creating an orderly built environment, and controlling the basic elements of building form. However, criticizing zoning, Jacobs states:

> The greatest flaw in city zoning is that it *permits* monotony...Perhaps the next greatest flaw is that it ignores *scale* of use, where this is an important consideration, or confuses it with *kinds* of use, and this leads, on the one hand, to *visual* (and sometimes functional) *disintegration* of streets, or on the other hand, to indiscriminate attempts to sort out and segregate kinds of uses no

> matter what their size or empiric effect. Diversity itself is thus unnecessarily suppressed (Jacobs, 1961: 237).

However unintended, extensive consequences such as the ones Jacobs mentions question the benefits of this method of zoning. Several such consequences have been identified in the literature.

Monotony: One of the most notable adverse effects of standardized Euclidean zoning regulations is that they lead to the systematic duplication of a specific built environment. As a result of Euclidean zoning, regulated becomes predictable becomes monotonous. For example, retail is configured in long, low boxes or small buildings surrounded by large parking lots; landscaping is usually minimal at best, so as not to interfere with parking or signage, and sidewalks are scarce (Gilham 2002). Because zoning regulations are duplicated in similar fashions across North America, the result is a placeless built form.

Scales of Use: A second key fault to Euclidean zoning regulations is their misguided use of scale. Buildings regulated through dimensions designated to a specific parcel fail to consider the context and, therefore, may not blend with the surrounding built environment. "Issues of form and massing usually consider the building as an object unto itself, with little or no regard for the ways in which structures relate to each other in terms of creating meaningful, attractive, and useful public spaces...." (Walters, 2007: 7).

Kinds of Uses: The most notable element of Euclidean zoning is its categorization and subsequent separation of different land uses. While the original purpose of separating incompatible uses has been realized, it has resulted in a segregated urban structure where each land use category is geographically separated from others. While this was necessary for noxious uses, it may not be required for uses with only minor incompatibilities such as residential and

commercial land uses. For example, as a result of this deliberate segregation of uses, single-family homes on individual lots are usually situated great distances from other types of uses (Gillham, 2002).

Visual Disintegration: The final fault of Euclidean zoning mentioned here is the uncoordinated, disorganized built environments it helps create. Commercial strip development provides an example of this, as outlined by Kunstler (1998: 51): "the fry pits, the big-box stores, the office units, the lube joints, the carpet warehouses, the parking lagoons, the jive plastic townhouse clusters, the uproar of signs, [and] the highway itself clogged with cars".

2.4 Form-Based Zoning (FBZ)

2.4.1 Purpose and Definition

FBZ is a method of regulating development to create a specific urban form (FBCI, 2008). Unlike Euclidean zoning, which focuses on land use, FBZ is primarily concerned with the physical form of the neighbourhood and is centred on the belief that the use of buildings naturally changes over time; therefore, zoning should be concerned primarily with form rather than use (Walters, 2007: 97). Katz (2004) provides the example of warehouse conversions to loft apartments: under Euclidean regulations, changing the land use from industrial to residential would be seen as drastic while the actual form of the built environment changes very little.

FBZ functions by prescriptively describing the desired built form for a given parcel and its relationship to the surrounding area. This can be done in established

neighbourhoods to guide infill development, and in new developments. Attributes such as height and the building's location on the site are clearly specified - resulting in a predictable urban form (Walters, 2007: 97). In contrast, Euclidean zoning is largely silent on the issue of form other than basic floor area, height and setback standards which limit development but result in an unpredictable urban form (Katz, 2004: 36). As a result, FBZ is viewed as an alternative to Euclidean zoning regulations and is defined by the following characteristics as outlined by the Form Based Codes Institute (FBCI, 2008):

a) Form First, Use Second: FBZ is concerned primarily with the form of the built environment. Secondarily, it states how the buildings should be used. This is often done by listing what land uses can be carried out on a given floor or area of a building. For example, buildings located on a commercial corridor may be required to be three stories in height, abutting the sidewalk, and have retail uses on the bottom floor and residential or office uses on the top floors.

b) Regulatory and Not Advisory: FBZ regulations are mandatory and should not be confused with design guidelines, which are often subjective and open to interpretation.

c) Predictable Development: Predictability is achieved through regulations such as "build-to lines" and story restrictions which describe exactly what is expected of the development's form and siting on the parcel. In contrast, Euclidean zoning relies on

numerical parameters, such as FAR and lot coverage, which have unpredictable outcomes and could result in many different forms of development.

d) Defined Public Space: By establishing minimum setbacks and frontages, FBZ is able to use private buildings to shape public space. For example, "build-to line" and "minimum frontage" requirements could be used to create a consistent street wall. As a result, the public space is more interesting and inviting to pedestrians.

e) Pedestrian Access and Scale: FBZ is concerned with accommodating pedestrians, cyclists and public transportation first, and the automobile second. As a result, streets are designed where pedestrians feel welcomed, comfortable and can readily connect with surrounding neighbourhoods.

f) Sensitivity to the Location: FBZ is concerned with the development's relationship to its place in the urban system: development far from the city centre should have a certain form; whereas, development within the city centre should have another.

g) Easily Interpreted: Through the use of diagrams and easy-to-understand notations, FBZ documents are easily interpreted by professionals and members of the general public.

2.4.2 History and Theory

FBZ was first developed for the master planned community of Seaside, Florida in 1981 (Walters & Brown, 2004:115). The vision for the development was based on

the traditional urban design of communities in the American South. To shape this vision, the developers originally intended to design all of the town's buildings themselves; however, given the size of the development, this task became impossible (Katz, 2003: 66). Instead, they opted for design control through a restrictive covenant which specified the desired form of structures relative to their location within the town, now known as the "Seaside Code".

Seaside's design is based on a study of traditional towns and includes notable commonalities: storefronts on the main town square; row houses on surrounding side streets; mansions flanking the main roadway just outside the downtown area; and variety in the design of buildings (Katz, 2003: 45). It also specifically designates eight different classes of building types which are based the traditional composition of southern communities. For each class, specific standards regulate the siting of a building on a parcel, building height and elements such as the location of porches, accessory buildings and parking (Katz, 2003: 67).

New Urbanism was developed by architects Andres Duany and Elizabeth Plater-Zyberk. Also known as Traditional Neighbourhood Development (TND), the model generally promotes mixed use, pedestrian friendly environments, with a diversity of housing types and clearly articulated public space (Walters & Brown, 2004). Such development is also reminiscent of traditional (pre-automobile) small towns and is summarized by the checklist described in the following section (Duany et al. 2000: 245-252).

2.4.3 The Traditional Neighbourhood Checklist

a) Regional Context: Development is consistent with a regional plan; preserves open space and promotes regional public transportation; bypassed by highways; balanced mix of housing, shopping, recreational and institutional use.

b) Site Context: Protection and celebration of natural watercourse and high quality trees and the natural topography; locates neighbourhood centres and sub-centres (squares, parks).

c) Plan Structure: The plan is divided into neighborhoods with the following characteristics: five minute walk from the edge to the centre; housing density increases from the edge to the centre; the neighbourhood centre is the location for most retail and commercial uses located in mixed use buildings; comfortable and dignified public transportation waiting areas; civic space located at the neighbourhood centre and parks throughout the neighbourhood; prominent sites for civic buildings; elementary schools evenly distributed and accessible by foot; buildings zoned not by use but by compatibility of building types; and the neighbourhood is surrounded by defined open space corridors.

d) Thoroughfare Network: Streets are organized in an understandable hierarchical network which corresponds to the structure of the neighbourhood; short blocks with limited cul-de-sacs; traffic calming design; streets terminating in vistas or curvature.

e) Streetscape: Streets are divided into a hierarchy with differing widths; all neighbourhood streets have sidewalks and indigenous tree lined boulevards; parking is located at the centre of blocks; utilities strictly confined to alleys.

f) Buildings: Diversity and equal distribution of housing types; ancillary dwelling permitted for houses; residential buildings located near the front of the property with a porch, or stoop; parking and garages are accessed from the back lane or hidden from the street view; all commercial buildings front onto sidewalks; parking requirements calculated from on and offsite spaces; all commercial buildings have a second (or more) story for other uses.

2.4.4 Organization of FBZ Methods

To realize New Urban theory FBZ has developed methods similar to those found in Euclidean zoning but with notable differences in their intent. These methods are categories into different concepts which form the composition of FBZ by-law. Parolek, Parolek & Crawford (2008) outline these key concepts:

a) Regulating Plan: The regulating plan has both administrative and planning functions. Administratively, regulating plans organize the geographic location of different districts or zones - establishing boundaries where different development regulations apply. In terms of planning, regulating plans have an integral role in shaping the form and character and interaction of development within a geographic context. In doing so, a regulating plan organizes districts to give the urban

environment a cohesive and predictable form and structure (Parolek, Parolek & Crawford, 2008).

b) Building Form: Building form regulations are intended to help prescribe good public spaces and urban form (Parolek, Parolek & Crawford, 2008). In doing so, these regulations are concerned with guiding the physical elements of the building to achieve a specific form. Therefore, building form regulations deal with dimensional and building bulk controls.

c) Building Placement: Building Placement is very important in regulating the structure of the built environment to achieve a specific urban form. Essentially, building placement refers to the siting of a building on a parcel; however, it also takes into account the overall structure of the built environment and the relationship between adjacent buildings. In doing so, prescriptive regulations are employed to guide the specific placement of buildings and the overall structure of the built environment.

d) Land Use: While FBZ theoretically places a secondary emphasis on land use, it is still heavily regulated and controlled. However, as will be discussed in the by-law analysis, there is emphasis on mixed use development.

e) Density: Density is used by FBZ in the same manner, and using the same methods as Euclidean zoning.

f) Parking Location: Much like building placement, parking location is concerned with the placement of parking on a parcel. This is an important aspect of FBZ as parking lots have the ability to severely erode the pedestrian scale built environment that FBZ and traditional neighbourhood design theory attempt to create.

g) Open/Green Space: Open space is usually green space (gardens, turf) and is simply an area of a property which must remain unbuilt.

h) Building Elements: Building elements regulate design elements desired as part of a building. These are used primarily to create a more pedestrian friendly and interesting building form. However, in certain cases they create strict prescriptive controls over the built environment (material usage, colours, and textures).

i) Signage: Signage regulates the form and character of signs used throughout the built environment.

3.0 FBZ By-law Analysis

3.1 Approach

An analysis of FBZ bylaws was conducted in order to determine how FBZ regulations attempt to shape the physical form of the built environment (research question one). As discussed in the literature review, there are several different categories which organize FBZ methods. These categories were applied to

established FBZ by-laws to determine the precise regulating methods used to shape the built environment. The method used for by-law selection was purposive case sampling, which is frequently used in social research when a specific need is identified and the researcher wants to identify features that can be tested in other cases that can be applied to other cases (Kuzel, 1999). The analysis was extended until no new regulating methods were revealed. In total, ten by-laws were analyzed and 26 regulating methods were noted, as shown in Table One below.

3.2 Results

Table One (below) provides an overview of the results FBZ by-law analysis:

Table One: By-law Analysis Summary (Part One). Note: All terms explained in the text.

Leander, TX	Peoria, IL	St. Lucia County, FL	Ventura, CA	Montgomery, AL	Summary
Transect	Frontage	Building Type	Transect	Transect	Frontage Transect Building Type
Story Height, Density, Lot Coverage	Stories	Story Height, Lot Coverage, Frontage	Stories, Upper Story Setbacks	Story Height, Lot Coverage	Building Height Number of Stories Lot Coverage Upper Story Setbacks
Setbacks	Façade Length, Buildable Area, Setbacks	BTL, Façade Length, Setbacks	BTL, Façade Length, Setbacks	Setbacks	BTL Façade Length Buildable Area Setbacks
By Parcel	By Floor	By Parcel	By Parcel	By Parcel	By Floor By Parcel
					Units per acre
N/A	Parking Setbacks	Parking Area	Parking Area, Setbacks	N/A	Parking Setbacks Parking Area
Location	Percent of lot Area, Location	Percent of lot Area	N/A	N/A	Percent of lot Area Location
N/A	Architectual Standards	Architectual Standards	Architectual Standards	N/A	Fenestration Architectual Standards
N/A	N/A	N/A	N/A	N/A	Location Dimensions Material Height

Table One: By-law Analysis Summary (Part Two). Note: All terms explained in the text.

		Arlington, VA	Santa Ana, CA	Benicia, CA	Miami, FL	Grass Valley, CA
FBZ Methods	Regulating Plan	Frontage	Frontage	Transect	Transect	Transect
	Building Form	Building Height, Number of Stories	Number of Stories	Stories, Building Height, Lot Coverage	Number of Stories , Lot Coverage, Upper Story Setbacks,	Number of Stories
	Building Placement	BTL, Façade Length, Buildable Area, Setbacks	BTL, Façade Length, Buildable Area, Setbacks	BTL, Façade Length, Buildable, Area, Setbacks	Façade Length, Buildable Area, Setbacks	BTL, Façade Length
	Land Use	By Floor	By Parcel	By Floor	By Parcel	By Floor
	Density					
	Parking Location	Parking Area	Parking Area	Parking Setbacks	N/A	Parking Area, Parking Setbacks
	Open Space	Percent of lot Area	Percent of lot Area	N/A	Percent of lot Area	N/A
	Building Elements	Fenestration	Architectual Standards	N/A	Architectual Standards	Architectual Standards
	Signage	Material, Dimensions, Height	Location, Material, Dimensions, Height	Dimensions, Height	N/A	N/A

3.2.1 Regulating Plan

As discussed in the literature review, the regulating plan is an organizing principle that provides both administrative and planning functions. Three methods of organizing and governing the spatial distribution of different districts/zones emerged from the by-law analysis: frontage, transect, and building.

a) Frontage: Frontage based regulating plans organize districts/zones based on street frontage. The boundaries for different districts are determined by the type of street the district fronts onto. As a result, street frontage allows the built environment to reflect the design and hierarchy present in transportation systems. For example, a two lane side street would have regulations reflective of a single family house whereas a four lane "collector roadway" might have medium/high density residential mixed with commercial and office and retail.

The Arlington and Peoria form based codes provide examples of frontage based FBZ regulating plans. Arlington, for example, has districts such as: main street frontage, avenue frontage, and neighbourhood frontage. Neighbourhood frontage is established on side streets and has development restriction consistent with low scale residential development. In contrast, the arterial frontage district has regulations intended for high intensity commercial and residential development. Peoria provides a similar example but, given the small area the regulating plan governs, provides regulation for each street. As a result, districts such as "West Main St." have specific development standards based on a specific street.

b) Transect: Transect based regulating plans are the most popular method for organizing different districts. The method relies on a diagram – the transect – which illustrates a spectrum of development forms, usually from the most intense (urban centre, urban core) to the least intense forms of development (rural, suburban). This corresponds to a profile and plan view illustrating the scale and intensity of each

district. Therefore, districts are organized based on their location in the urban system – providing a legible flowing built environment where development is reflective of its geographic location.

The Grass Valley and Ventura FBZ regulations provide examples of transect based regulating plans. The Grass Valley plan has transect districts such as "Neigbourhood Centre" with regulations consistent with high intensity development. Geographically, this district is located in the centre of the urban system. In contrast, the "Suburban Neighbourhood" transect district has corresponding regulations Ventura repeats this example but has districts more descriptive and appropriate for development associated with a small city's form and scale.

c) Building Type: Building type is the final and least common organizing principle. It is used primarily in small geographic areas and relies on a predetermined menu of frontage design items for each district. Each building type is intended for different locations in the urban system and assigned to geographic areas accordingly. Examples of frontage types are provided in the Grass Valley FBZ and include awnings, stoops, forecorts, and porches. However, this principle may also dictate architectural style such as Spanish or Georgian. The St. Lucia County code provides an example of this: zones are given bulk regulations and also provided with illustrations of building facades to serve as examples or precedents of what buildings should look like.

3.2.2 Building Form

Building form regulations are centered on height and lot coverage with other methods such as upper story setbacks used for additional control over the form of the building.

a) Height: As in Euclidean zoning, height is regulated through dimensional limits. The Montgomery FBZ provides dimensional regulations for height. The "Urban Centre" zone has a principal building height limit of 50 feet. However, other regulations control height by stating the minimum and maximum number of stories a building is permitted. The Leander document, for example, provides a two story maximum height for its "Rural" zone and eight story maximum for its "Urban Core" zone. Likewise, the Miami FBZ provides a maximum number of stories permitted but also a minimum. The "Urban Core" zone has a minimum height of two stories and a maximum height of 48 stories. Other codes provide both dimensional standards and stories limits. Benicia FBZ's "Neighbourhood General" zone has both a dimensional limit and limits the number of stories: 2.5 stories and 30 foot maximum.

b) Lot Coverage: Lot coverage is another method borrowed from Euclidean zoning and expressed as a percentage of the lot area covered by buildings. The Miami FBZ provides an 80% maximum building lot coverage in its "Urban General" zone. Likewise, the Leander FBZ provides lot coverage restrictions ranging from 60% in the "Suburban" zone to 100% in its "Urban Core" zone.

c) Upper Story Setback: Upper story setback refers to setback distances which only apply to certain upper stories. Setback distances can be regulated from the front, rear or side property lines and are used either to reduce the shadows associated with taller buildings or to create a more pedestrian scale built environment. The Miami FBZ provides an example whereby setback increases with building height: there are no required side yard setbacks for the first eight stories. However, there is a 30 foot setback for anything higher than eight stories.

3.2.3 Building Placement

FBZ Building placement methods use Euclidean-like setback limits to generally guide the placement of buildings. However, unlike Euclidean regulations which typically focus just on minimum setback distances, FBZ states the exact setback distance where a building must locate (right in front or behind). In addition, this is supplemented by other regulations which further prescribe the shape and location of buildings.

a) Build-to Line (BTL): BTL is a line parallel to the front property line where a building is required to locate. In the case of Arlington's "Main Street" zone, the build-to line is the front property line, where the building façade must be located. In other Arlington zones, the BTL is established up to ten feet from the front property line, demonstrating the ability of this method to shape urban form.

b) Façade Length: Façade length is closely linked with the BTL. Essentially the façade length specified a proportion of the building façade which must be located at

the BTL. The Peoria FBZ provides an example whereby 80% of the building façade must be located at the BTL.

c) Buildable Area: Buildable area is similar to lot coverage (discussed above) in that it specifies a proportion of the parcel which may be covered by building. However, this takes it one step further and specifies where on the lot this may be located. Again, the Peoria FBZ provides an example where buildable area on the parcel is specified, along with parking areas (to be discussed).

d) Setbacks: Borrowed from Euclidean zoning, setbacks are extensively used in FBZ documents. However, they differ somewhat in that they often use a minimum and maximum setback distance. Ventura FBZ, for example, has side yard setbacks for the "Urban General" zone of minimum of 10 feet to a maximum of 15 feet.

3.2.4 Land Use

Euclidean zoning regulates land use by permitting and restricting different categories which are typically residential, commercial, industrial and institutional. FBZ uses a similar system of assigning land uses to parcels but also assigns land uses to floors of a building.

a) By Parcel: Designating land uses by parcel is a method borrowed from Euclidean zoning and simply defines a parcel as residential, commercial, industrial etc., with each category having its own list of permitted uses. This is commonly used in FBZ: the St. Lucia, and Ventura FBZ provide examples of land use assigned by parcel.

b) By Floor: Assigning land uses by floor is a method used by FBZ which designates a land use to each floor of a building. The helps promote mixed use development and is used by the Peoria FBZ to designate permitted uses for the ground story and upper stories.

3.2.5 Density

Density is regulated exclusively through ratios stipulating the number of units or dwelling units (du) per acre. This is a Euclidean zoning method. For example, Miami FBZ has a regulation restricting the density to 150 du/acre (60 du/hectare) maximum. Likewise, Leander FBZ "Suburban" zone has a restricted density of 4 units/acre (1 du/hectare).

3.2.6 Parking Location

FBZ attempts to provide a balance between the parking required for a site to be functional and its vision of a pedestrian scale built environment. As a result, methods used to regulate parking and vehicular access attempt to hide them behind buildings and shield parking from public view. This is accomplished through regulating parking setbacks and parking area.

a) Parking Setbacks: Parking setback refers to the distance parking must be from the lot line. It is typically used to keep parking away from the front lot line in order to shield the parking stalls from pedestrian view. Grass Valley FBZ has a setback of 20 feet from the front lot line for all parking stalls.

b) Parking Area: Similar to parking setbacks is parking area; however, this method is less prescriptive. Instead it simply states where on a parcel parking can be located. The Benicia FBZ provides an example where the parking area is shown as the rear half of the property.

3.2.7 Open/Green Space

Open space is usually green space (gardens, turf) and is simply an area of a property which must remain open.

a) Percent of lot area: This is a method used by Euclidean zoning and simply states that a certain percentage of a parcel's area must be open space. This method is employed in the Arlington FBZ and simple states that 5% of the lot must be continuous open space.

b) Location: The location of open space is similar to building and parking placement mentioned earlier in that it simply states the amount and location of open space on a parcel. Peoria provides an example of the two types of open space regulations by specifying 10% of the parcel must remain continuous open space and locates this space at the rear of the property. This encourages useful green spaces and discourages fragmented spaces that have limited use and benefits.

3.2.8 Building Elements

Building Elements are used to regulate the built environment so that it is more interesting and attractive to pedestrian.

a) Fenestration: Fenestration refers to translucency or the proportion of a building façade which is window. The Arlington plan provide and example of this in its Main Street District where the ground floor is required to have between 60 and 90 per cent fenestration.

b) Architectural Standards: Frontage types are usually associated with the Frontage organizing principle; however, other FBZ regulations have frontage type regulations. As mentioned above, Grass Valley FBZ provides a good example with awnings, stoops, forecourts, and porches frontage types.

Expanding upon building elements is a series of regulations which are provided, in varying detail, as to the materials and other architectural details permitted. The Peoria FBZ provides an example with architectural regulations specifying the precise requirements for: windows, doors, building projections, entryways, and street wall. One regulation stipulates that "[b]lank lengths of wall exceeding 20 linear feet are prohibited on all required building lines" while another states that "[e]ach ground story residential unit shall have direct access to the street-space" (City of Peoria, 2007).

3.2.9 Signage

Signage regulation methods are concerned with creating an aesthetically pleasing environment by regulating the material and dimensions of signs. This is often includes as part of architectural standards. Regulations are typically concerned with the material and dimensions of signs. The Santa Ana FBZ provides an example of regulations on the materials, dimensions and even the location of signs.

4.0 Case Study

4.1 Case Study Selection

The study area was selected for this project because of its disjointed, fragmented design, consistent with Euclidean zoning regulations. Therefore, the potential use of FBZ will be tested as a means of addressing design concerns within this area.

4.2 Analysis of the Existing Built Environment

The study area is located in the southern Winnipeg. This area of the City is commonly referred to as Fort Garry. Based on the author's familiarity with this area of Winnipeg, this environment is characterized as suburban with a diversity of land uses including sizable institutional (University of Manitoba), industrial and commercial areas.

The site is triangular in shape and has an area of 7.87 hectares (19.46 acres). (See Figure 2.) The 2006 population was recorded at 1,371 people living in 809 dwelling units (Stats Canada 2006).

The study area has the following boundaries:

- Northeast: University Crescent – an arterial collector roadway which connects Pembina Highway to the University of Manitoba.
- Southeast: Thatcher Drive – a neighbourhood side street connecting Pembina Highway with University Crescent.
- West: Pembina Highway - a regional highway running north/south and connecting the site with Winnipeg's central business district.

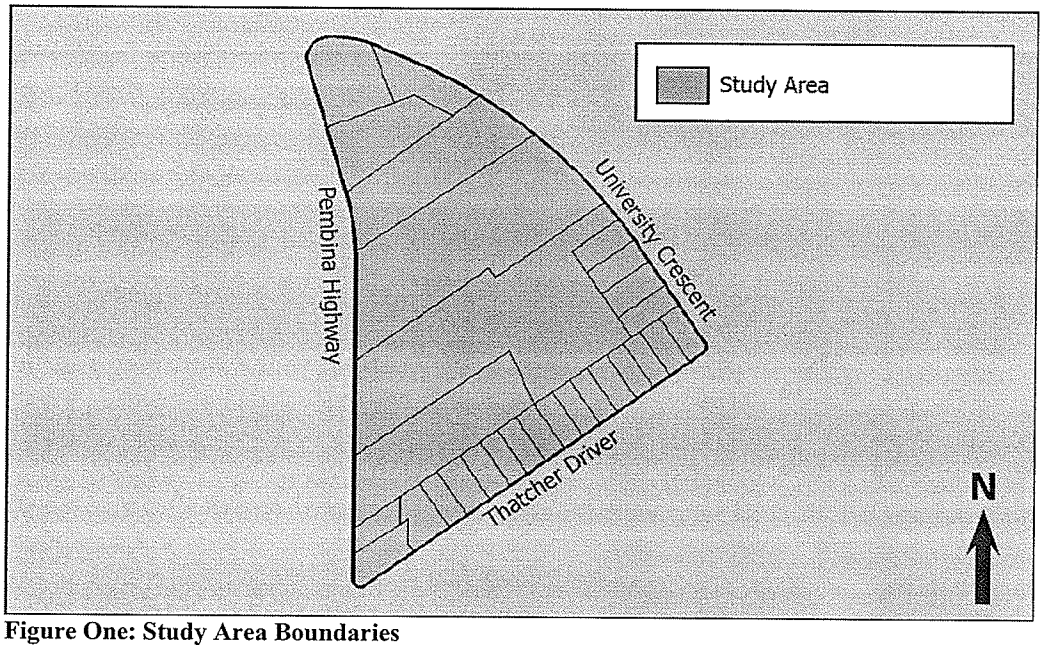

Figure One: Study Area Boundaries

4.2.1 Land Uses

The study area is composed of residential and commercial land uses. The former are the most predominant and include a variety of apartment and townhouses. Commercial land uses are collected on the northern tip of the study and include a mix of commercial services.

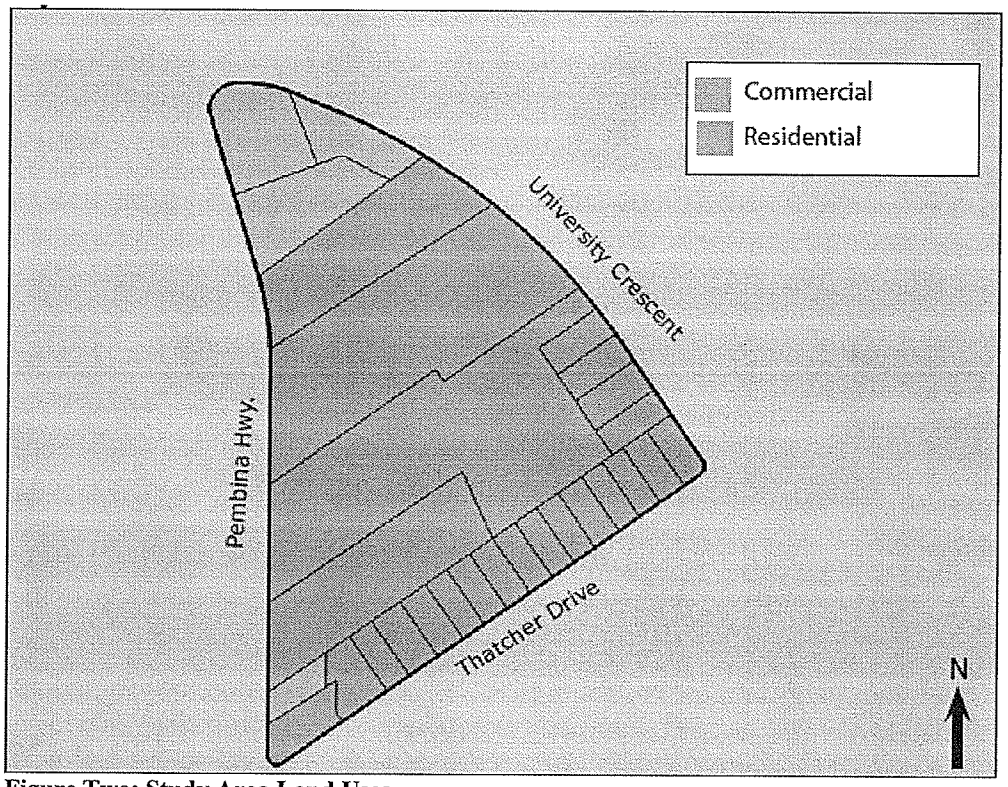

Figure Two: Study Area Land Uses

Table Two: Study Area Land Use

Parcel	Land Use	Actual Use
A	Commercial	Gas Station, Convenience Store, Car Wash
B	Commercial	Oil Change Facility, Mechanic
C	Commercial	Three Restaurants, Two Offices
D	Residential	Three Apartment Buildings
E	Residential	Apartment Tower
F	Residential	Apartment Tower
G	Residential	Townhouse Apartments, Apartment Tower
H	Commercial	Hair Salon, Tanning Studio
I	Residential	Single-Family Houses

4.2.2 Density

The average density for the study area is 103 units per hectare (42 units per acre).

According the Hodge (2003), density levels are defined as follows:

- High Density is defined as levels ranging from 96 to 960 units per hectare (39 to 389 units per acre)
- Medium Density is defined as levels ranging from 29 to 96 units per hectare (12 to 39 units per acre)
- Low Density is defined as levels ranging from 12 to 29 units per hectare (1 to 12 units per acre)

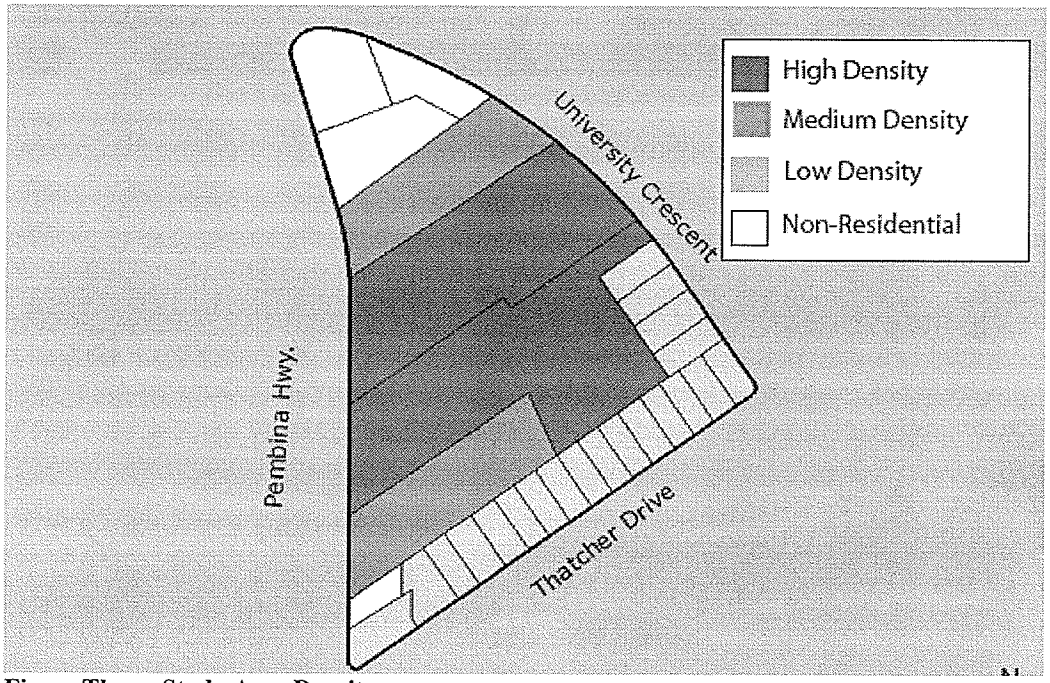

Figure Three: Study Area Density

Table Three: Study Area Density

Parcel	Units/Hectare	Units/Acre	Density Level
A	95	39	Medium
B	216	87	High
C	264	107	High
D	80	32	Medium
E	14	9	Low
Average	103	42	High

4.2.3 Lot Coverage, Parking and Greenspace

The lot coverage is defined as the area of a building's foot print relative to the area of the parcel. The remainder of the land area is covered by parking and greenspace (gardens/turf). Approximately 19% of the total site area is covered by buildings, 39% is covered by greenspace and 42% is covered by parking lots/paved areas/garages.

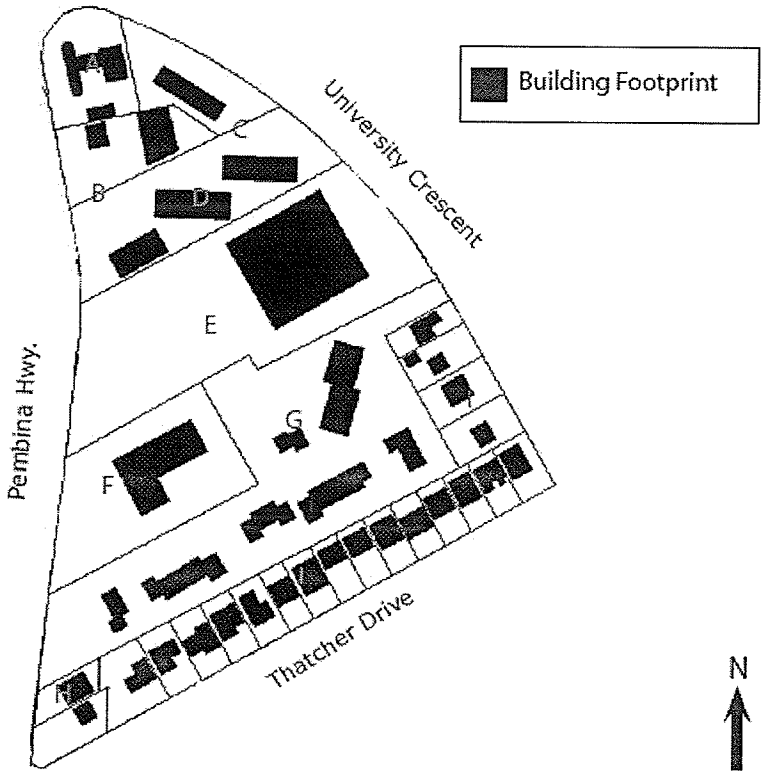

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Figure Four: Study Area Lot Coverage (Building Footprint)

Table Four: Study Area Lot Coverage

Parcel	Lot Coverage
A	11%
B	15%
C	26%
D	21%
E	19%
F	29%
G	19%
H	16%
I	8-28%

5.0 Research Methods and Analysis

5.1 Methodology

Utilizing an interpretive social sciences perspective (Newman, 1997), this case study employed interviews as a qualitative research method to assess the potential use of FBZ within the study area. Focused interviews were conducted with key informants to determine what they view as weaknesses in the physical design and structure of the study area. The results of the interviews were analyzed to reveal common themes and categories within the responses. Follow up interviews were then conducted to further assess the participants' reactions to a potential design solution utilizing FBZ as a remedy to the design concerns they had identified.

5.2 Method

Focused interviews with key informants were used for the research. This method was selected because it is useful to "find out in depth how people define concrete situations, what they consider important about them, what effects they intended their actions to have in the situation, and how they feel about it" (Zeisel, 2006: 227).

Since the research is concerned with the perceived design problems with the study area, professionals who are involved in planning in Winnipeg were selected as key informants. Key informants included planners who worked in public practice (City of Winnipeg and Government of Manitoba) and private practice (consultant planners) and had direct experience and expertise working with zoning.

Prior to participant recruitment, a letter of introduction was sent to a wide network of planners by Veronica Hicks (MDP Committee member), to solicit potential interest. Planners who responded to this initial email were sent a second email outlining the study, providing them with the interview guide, and supplying them with background information on the study areas for participants to use should they decide to participate in the study. Of the 12 planners initially contacted, eight interviews were arranged. The other four were not interviewed because of unavailability.

The interviews were conducted at a mutually convenient time and location. Each participant signed an informed consent form prior to the interview. The interviews lasted approximately one hour. The interviews were semi-structured, meaning that they relied on an interview guide to direct the discussion but did not have a predetermined set of questions. Rather, the interview relied on key topics which were covered but allowed the participant freedom to explore the questions however s(he) wished. This allowed the interview to take unanticipated turns that might not otherwise have been realized using standardized questions.

The interview guide (included as Appendix A) used open ended questions designed to induce dialogue, and the participants were asked to comment on the topics presented. If the open ended questions failed to induce the desired type of information, probes were used to prompt elaboration on the participant's response, to clarify a point, explain what was meant, continue talking, or shift the topic (Zeisel, 2006: 233).

Follow up interviews were conducted with initial interview participants. All initial participants were invited to participate in the follow-up interview; however, given the two week time frame, only two were available to participate. Follow-up interview participants were provided with a FBZ design solution booklet prepared for the study (included as Appendix C). The follow-up interviews were open ended and focused primarily on any problems participants identified with the FBZ design solution.

5.2.1 Analysis of Interviews

The first set of interviews were analyzed in a literal reading (Mason, 2000) with the objective of identifying what participants identify as design weaknesses in the study area[1]. These responses illustrate the basic meaning but do not consider, or examine, anything else, for example, why any participants identify any particular issues.

5.2.2 Coding

Data was analyzed through a coding and sorting process. Coding requires the researcher to carefully read the transcribed interview to identify any major themes. Coding was done to begin condensing the data collected and break it down into general categories, which allowed the researcher to organize categories and concepts within the data which cluster together into themes (Newman, 1997). In this study, the interview responses were grouped according to the nine FBZ concepts; then, distinct themes were identified based on each of these areas.

[1] Research question two asks, "what problems exist within the study area's built form"?

5.3 Interview One Analysis

Once all interviews were analyzed, similar responses were grouped into themes based on the FBZ concepts. In total, 21 themes were established that commented on the design problems with the study area's built environment. The following themes emerged as design concerns:

Table Five: Interview One Themes

Concepts	Interview One Themes
Building Form	the height of building was too tall and that the shadows cast were creating problems
	lot coverage throughout the study area is too low, particularly on the University Crescent frontage
Building Placement	buildings are varying distances from University Crescent
	commercial uses are too close to Pembina Highway
	buildings are designed independently and do not interact well
	buildings are not orientated for passive solar benefits
	commercial areas are not pedestrian friendly
Land Use	residential uses are inappropriate along Pembina Highway
	highway oriented commercial development should be concentrated along Pembina Highway frontage
	commercial services do not meet the needs of those living in the study area
Density	abrupt transition between density levels
	high density development is too close to roadways
Parking Location	parking dominates the site
	not enough parking along Pembina Highway
	too much parking in front of buildings on University Crescent
Open/Green Space	open/green space does not link to the surrounding neighbourhoods.
	green/open space in the study area is not connected with the surrounding area
	no gather place or neighbourhood node within the study area
Building Elements	buildings are uninteresting
	buildings are not pedestrian friendly
Signage	signage is cluttered and ugly along Pembina Highway

a) Building Form: Participants were most concerned with the height and scale of some buildings when asked about building bulk in the study area. One participant noted that the buildings were out of scale and had no consideration for the surrounding neighbourhood. In reference to the Summerland apartment, one participant commented: "Summerland lacks any reference to the surrounding built form". Another participant stated that the shadows cast by buildings in the study area were a nuisance that severely impacts both the study are and the surrounding neighbourhood. These shadows were described as, "intrusive" and "a nuisance to surrounding properties – especially the houses across the road". Still another participant mentioned that there seemed to be no thought put into the design, location and height of most buildings within the study area. Because of the emphasis on height, building height was noted as a theme in that participants were strongly convinced that **the height of buildings was too tall and that the shadows cast were creating problems.**

Another popular topic of discussion regarding a problematic feature of building bulk was lot coverage. Generally, participants felt that the buildings did not cover enough of the site. This discussion often emerged as a continuation of comments regarding building height. As one participant noted "the height of buildings could easily be reduced if they were designed horizontally rather than vertically…and this would increase lot coverage which is quite low". Other participants felt that increasing lot coverage would create a more pedestrian friendly building form. Specifically, two

participants stated that increasing lot coverage along University Crescent would help create a more pedestrian friendly environment. They continued that walking by a solid street wall (like in Osborne Village/Provencher Boulevard) can be a better experience than walking next to parking lots. Consequently, a second building bulk theme is that **lot coverage throughout the study area is too low, particularly on the University Crescent frontage.**

b) Building Placement: Building placement was the most discussed topic within the interviews. Participants noted many problems with the placement of buildings within the study area. The first topic to emerge was the distance of buildings from University Crescent. Generally, participants did not like the setback distances of building from the front lot line, describing it as, "a little fragmented" and "clearly a one lot at a time approach". One participant noted that varying setback distances created a disorganized appearance with no cohesion. As a result, the first theme concerning building placement was that **buildings are varying distances from University Crescent**.

Concerning building placement along Pembina Highway, participants disliked how close commercial uses were to the highway. Multiple participants noted the development on the west side of Pembina Highway is an example of how commercial development should be planned along the Pembina Highway frontage. One participant stated, "this type of site design is appropriate for car-oriented development where there is hundreds of cars coming and going from the site on a daily or, in some

cases, hourly basis – it's about functionality". Another participant noted that it would be nice to have a pedestrian oriented street – but that this just is not realistic given, "the regional use of Pembina Highway as a transport corridor". They continued that, given the role of Pembina Highway, all development along the frontage should be highway oriented. This means that it should be oriented for vehicular use with lots of parking and easy access points from the roadway. As noted by another participant, this also means that the buildings would be pushed to the back of the site because, despite the desires of planners, people like to see available parking stalls from the roadway. If parking is located behind the building people may not drive onto the site. Therefore, a second theme related to building placement was that **commercial uses are too close to Pembina Highway.**

Linked to the aforementioned theme was discussion regarding the interaction of individual buildings with surrounding buildings. All but one participant mentioned in some way that the site seemed like a collection of individual projects – with what appeared to be no consideration for the surroundings when they were initially designed and developed. One participant called the site a "mishmash of poorly designed buildings". Another participant described the study area as being "just like a dog's breakfast". The cohesion of buildings with each other emerged as a further theme, as participants felt strongly that **buildings are designed independently and do not interact well**.

A relatively surprising topic of discussion was the solar orientation of buildings. Participants felt that the placement of buildings within the study area may not have been done with the objective of capitalizing on the natural energy and heat provided by the sun. This was mentioned specifically by four participants, usually referencing that if this were to be developed today there would be no doubt that the developer would make solar orientation a design parameter. Consequently, the theme that **buildings are not orientated for passive solar benefits** emerged.

A common criticism of the study area was that commercial areas, regardless of their location on the site, were not pedestrian friendly. Participants commented that buildings are sited for automobiles first, with a secondary consideration of pedestrians, if any at all. When participants were questioned whether a pedestrian friendly design should be continued into highway oriented commercial areas, the results were unanimously that it should. One participant commented that just because there is a parking lot does not mean that pedestrians should be restricted from this area. Instead there should be a balance between the pedestrian and automobile use of parking areas. A participant noted, "the site seems to reflect the importance of cars in southern Winnipeg with a secondary emphasis on pedestrians, if any at all". Tying this back to building placement, another participant noted that the commercial areas could be more pedestrian friendly if they were simply sited with pedestrian use in mind rather than solely automobiles, describing it as "an ideal place for cars to live". The theme which emerged from this discussion was that **commercial areas are not pedestrian friendly**.

c) Land Use: A concern among most participants was that the residential land uses along Pembina Highway are inappropriate. Participants noted that, despite the fact the buildings were high and medium density, Pembina Highway was not the best location within the study area for residential land uses. One participant stated, "living next to a busy highway is not an ideal situation". Connected to this was further discussion regarding using Pembina Highway frontage for commercial land uses. One participant said that residential land uses should be pushed towards Thatcher Drive and University Crescent while commercial land uses should be concentrated on the Pembina frontage. Two other participants supported this by stating that University Crescent would be a more pleasant environment for residential land uses. Therefore, two themes emerged: **residential uses are inappropriate along Pembina Highway** and **highway oriented commercial development should be concentrated along Pembina Highway frontage**.

Further discussion surrounding land use revealed concerns regarding the variety of services on the site. While participants were relatively convinced that the regional highway oriented development should be located along the Pembina frontage, there was discussion regarding the availability of low order, everyday services for people living within the study area. One participant noted that a store like Future Shop would be an appropriate commercial use but this does not meet the needs of the "resident who just wants some milk and eggs". Other participants pointed out that, despite the fact there are grocery stores on the west side of Pembina Highway, this

would be difficult for residents of the study area to use given the distance and the barrier created by traffic on the highway. Therefore, participants were strongly convinced of a need for more everyday services for residents of the site. As a result, the final criticism to emerge from discussions concerning land use is that **pedestrian oriented commercial services do not meet the needs of those living in the study area**.

d) Density: Issues with the density of the study area were only noted for residential land uses. There were no noted problems with commercial intensity. Participants were convinced that the transition between different densities was extreme in some cases. However, a few participants made the point that there does seem to have been some effort to transition the density levels; however, particularly near the low density area on Thatcher the "high density development has a negative impact of the nearby low density areas". This sentiment was repeated for areas surrounding the study area – that the abrupt transition between density levels was too great. Therefore, the **abrupt transition between density levels** was the first theme to emerge concerning density.

Further discussion concerning density expanded on the location of high density development. Participants noted the need to push the highest density levels towards the centre of the study area so that the density gradient increased with distance from the surrounding roadways. Another participant noted that this will, in essence, hide

the density and scale of the buildings. Thus, **high density development is too close to roadways** is the final theme to emerged from discussions concerning density.

e) Parking Location: Given the large amount of surface parking and parking garages located within the study area, parking location was a heavily discussed topic. Participants noted the large amount of parking on the site, describing it as "typical of the study area's location in Winnipeg" and "necessary to make the site viable". However, nearly all participants noted that, despite the functional aspects of the parking, it dominates too much of the site. As a result, the criticism that **parking dominates the site** was the first theme to emerge from the discussion of parking location.

Additional discussion connected to aforementioned criticisms is that the study area should contain more highway oriented development along the Pembina Highway frontage. One participant suggested that parking should be located in front of buildings along Pembina Highway, "customers want to see an available parking space and the entrance they will walk in all in one glance". Another suggested that parking is essential to the viability of any commercial development along Pembina Highway, as demonstrated on sites west of the highway. In contrast, participants were nearly unanimous in noting that there should be no parking in front of pedestrian oriented buildings. Instead, pedestrian oriented areas should locate parking behind the building, or, alternatively, beside it. One participant noted that parking in front of a building automatically creates an environment where pedestrians do not feel

welcome. A participant compared the study area to Corydon and noted, "too much parking seems to be a barrier to pedestrian use". Therefore, two themes were that there is **not enough easily accessible parking along Pembina Highway** and that there is **too much parking in front of buildings on University Crescent.**

f) Open Space: Although the site contains green space/open space, this was described by participants as "fragmented" and "not functional". One participant described these areas as "whatever was left over after the building and parking was laid out". Concerns were focused on the fragmentation of the open space on the site. Several participants noted that space on two neighbouring parcels did not link together. Therefore, the first theme was that **green/open space is fragmented.** It was also noted that the green/open space does not link to the surrounding neighbourhoods. Two participants stated that there was an opportunity to create a green/open space network but that it had not been realized. The second theme was that **green/open space in the study area is not connected with the surrounding area**.

In addition to linkages, one participant focused on a need for a neighbourhood gathering places and how this could be achieved by optimally utilizing green/open space. Two other participants agreed that the open/green space needed to play a more important role for the neighbourhood. As a result, the criticism was that there is **no gathering place or neighbourhood node within the study area.**

g) Building Elements: A common response throughout the interviews was that buildings were boring and uninteresting in their design and configuration. One participant described the design of the buildings as "ugly". Another defended the design, stating that it was a product of their time. However, most participants agreed that the study area was uninteresting. Therefore, the theme that the **buildings are uninteresting** was noted. A second theme has been repeated throughout the interview is that **buildings are not pedestrian friendly**. One participant noted that no one would want to walk past any of these buildings. Another stated that, "these designs discourage walking".

h) Signage: Signage was the final concept discussed in the interview. There was limited discussion directly on this topic; however, participants did note a need to reduce "visual pollution" along Pembina Highway. There were also two statements concerning a need to create a more aesthetically pleasing environment. Therefore, the theme which emerged was **that signage is cluttered and visually displeasing along Pembina Highway**.

5.4 Addressing Design Concerns through FBZ Methods

A design solution was created as part of this project (see Appendix C) utilizing the form-based zoning methods discussed in the bylaw analysis to address participant concerns regarding the existing design and planning of the study area. Integral to the FBZ design solution was the organizing principle used to designate regulations for different areas. Given the plentiful participant references to street frontages throughout the first set of interviews, it was decided that the street frontage method

would be used as the organizing principle for the design solution. The study area was accordingly divided into three street frontage districts: University Frontage District, Pembina Frontage District, and Thatcher Frontage District (Figure Six).

In comparison to the existing built environment, the proposed FBZ design solution provides a mixed-use, walkable community, while also maintaining highway oriented commercial and single-family residential areas established in this area. In terms of land-uses, the composition is similar but has a more direct impetus on mixed uses. In addition, the location of parking throughout the study area increases pedestrian friendliness and helps create a more walkable environment. Other aspects, such as density and lot-coverage, may develop in a similar manner; however, the most profound difference is building layout and how buildings interact with the adjacent streets, surrounding buildings, and neighborhood.

The University Frontage District is a pedestrian oriented environment with a mix of residential and some retail uses. In the FBZ solution, buildings will be located at the front of the property with parking located behind or beside buildings, with amenity space located in front of buildings.

The Pembina Frontage District is intended in the solution to have a mix of low intensity, automobile oriented, commercial (office and retail) uses with a regional focus. Buildings will be uniformly located near the back of the property (or district boundaries). The rest of the site is intended for parking and public amenity space. Pedestrians will be

accommodated on the site through parking lot walkways and sidewalks connecting to neighboring sites.

The Thatcher Frontage District is intended to be a low density, residential neighborhood. Buildings will be placed away from the street and building height and form requirements are intended to limit the scale and size.

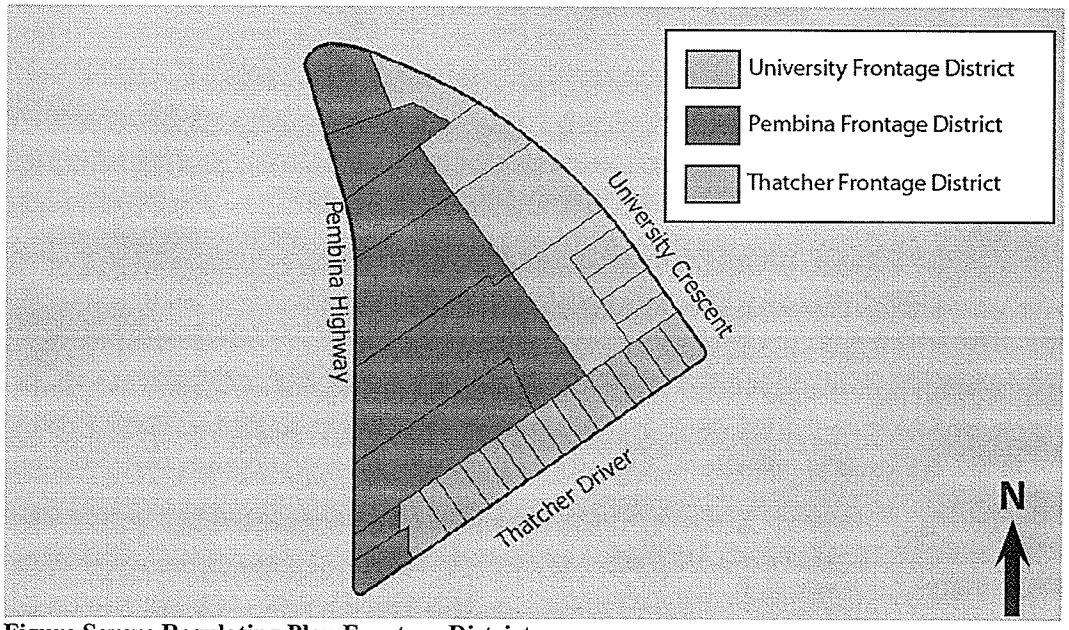

Figure Seven: Regulating Plan Frontage Districts

The following section will outline the FBZ design solution formulated to address the design concerns outlined in the preceding subsection.

Table Six: Interview One Themes and FBZ Methods used in the Design Solution

Concepts	Interview One Themes	FBZ Methods to be used in the Design Solution
Building Form	the height of building was too tall and that the shadows cast were creating problems	Height, Lot Coverage, Upper Story Setbacks
	lot coverage throughout the study area is too low, particularly on the University Crescent frontage	
Building Placement	buildings are varying distances from University Crescent	Build-to Line, Façade Length, Buildable Area, Setbacks
	commercial uses are too close to Pembina Highway	
	buildings are design independently and do not interact well	
	buildings are not orientated for passive solar benefits emerged.	
	commercial areas are not pedestrian friendly	
Land Use	residential uses are inappropriate along Pembina Highway	By Parcel, By Floor
	highway oriented commercial development should be concentrated along Pembina Highway frontage	
	no pedestrian oriented commercial services do not meet the needs of those living in the study area.	
Density	abrupt transition between density levels	Units per hectare
	high density development is too close to roadways	
Parking Location	parking dominates the site	Parking Setbacks, Parking Area,
	not enough parking along Pembina Highway	
	too much parking in front of buildings on University Crescent	
Open Space	green/open space is fragmented	Percent of Lot Area, Location

	green/open space in the study area is not connected with the surrounding area	
	no gather place or neighbourhood node within the study area	
Building Elements	buildings are uninteresting	Fenestration, Architectural Standards
	buildings are not pedestrian friendly	
Signage	that signage is cluttered and ugly along Pembina Highway	Dimensions/Height

5.4.1 Building Form

Themes which emerged within the interviews when discussing building form concerned buildings being too tall and casting shadows on surrounding properties. This concern was addressed through FBZ methods of height controls and upper story setbacks.

Within the University Frontage District, where taller buildings are permitted, an eight story height restriction was instituted. In addition, to further reduce the impact of shadows, an upper story setback of ten metres was established. Similar height restrictions were instituted in the Pembina and Thatcher Frontage Districts to achieve the desired form outlined by the interview participants.

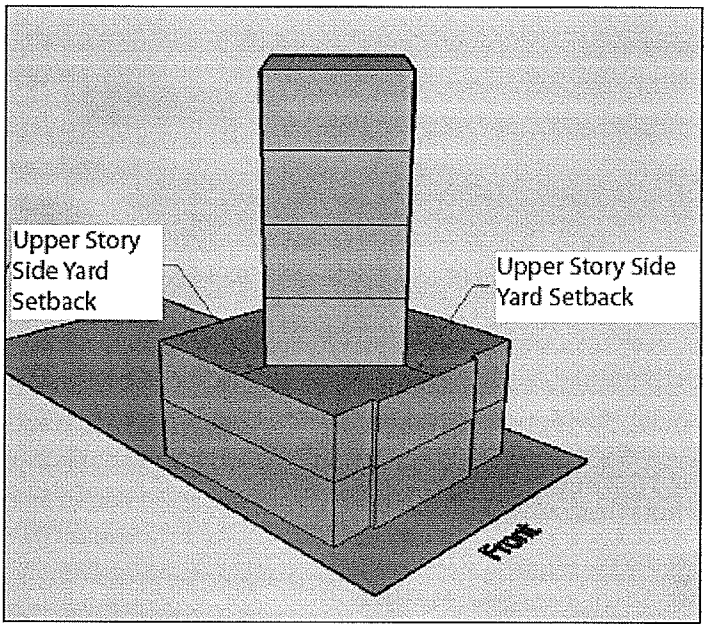

Figure Six: Upper Story Setbacks

Although lot coverage was a noted theme it was decided that, due to the odd shape of many of the lots, lot coverage restrictions would not satisfy their intended purpose of creating a more pedestrian friendly environment. Instead, this theme will be satisfied through other methods as discussed below.

5.4.2 Building Placement

Two themes concerning building placement focused on the distance of buildings on University Crescent and Pembina Highway from the roadways. In the case of University Crescent, the interview respondents wanted buildings closer to the street with a relatively uniform street frontage to make the environment more appealing to pedestrians. This was solved though the use of a **Build-to-Line (BTL)** for University Crescent Frontage. Notably, the employment of a BTL also helped solve another concern that buildings do not interact well and are not pedestrian friendly. Forcing

buildings to align creates a consistent street wall which helps creates a more interesting, and pedestrian friendly building environment.

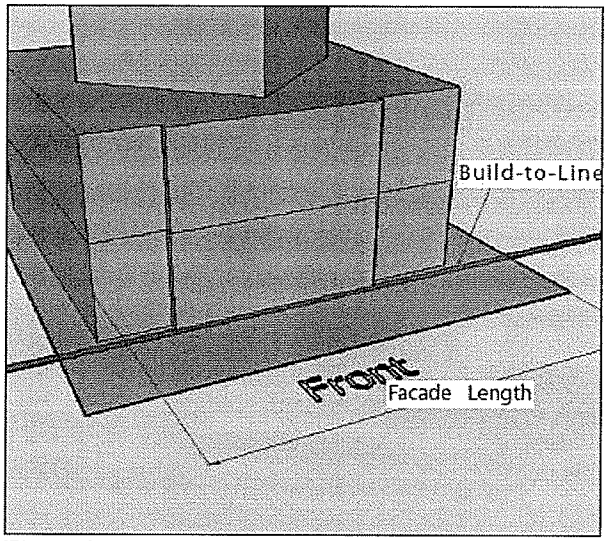

Figure Seven: Build-to Line (BTL)

For the Pembina Highway Frontage, participants wanted buildings to be further from the street. Therefore, **building placement** was used to designate the area of the parcel where a building could locate in the Pembina Frontage District.

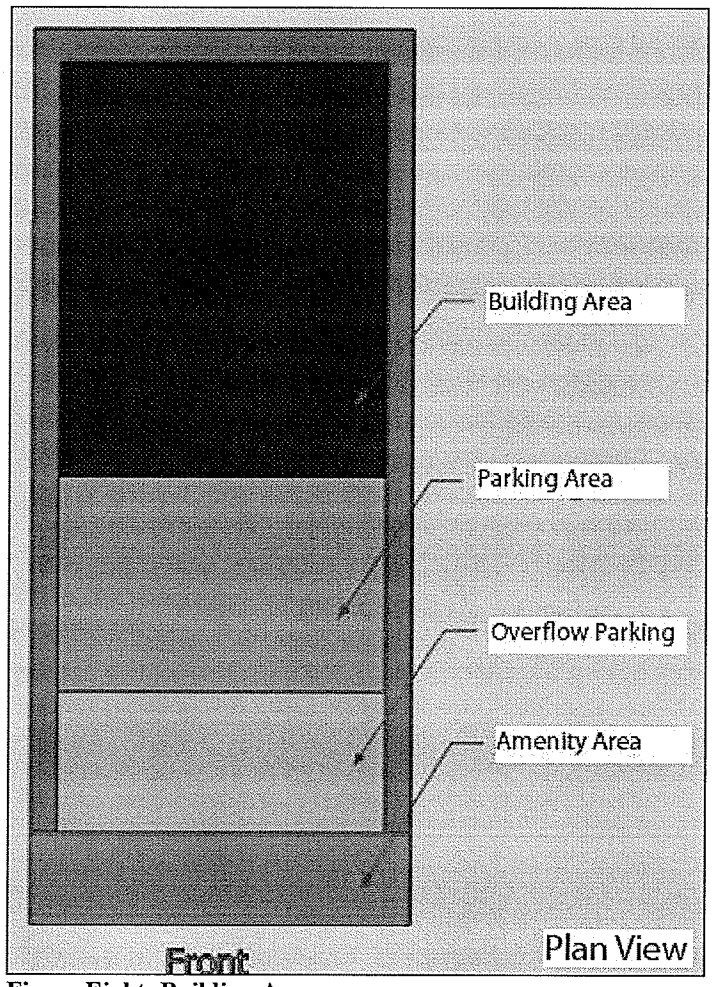

Figure Eight: Building Area

5.4.3 Land Use

Land use themes were primarily concerned with where particular uses (residential and commercial) were located in the study area. As a result, the concern that "residential uses are inappropriate along Pembina Highway" and "highway oriented commercial development should be concentrated along Pembina Highway frontage" were dealt with first through the regulating plan (outlining the general purpose of each district) and second through permitted uses. The third theme that there was "no pedestrian oriented commercial services do not meet the needs of those living in the study area"

was easily address through the FBZ methods. **Floor use** was assigned to the university Frontage District which permitted commercial uses on the bottom floor of buildings in that district.

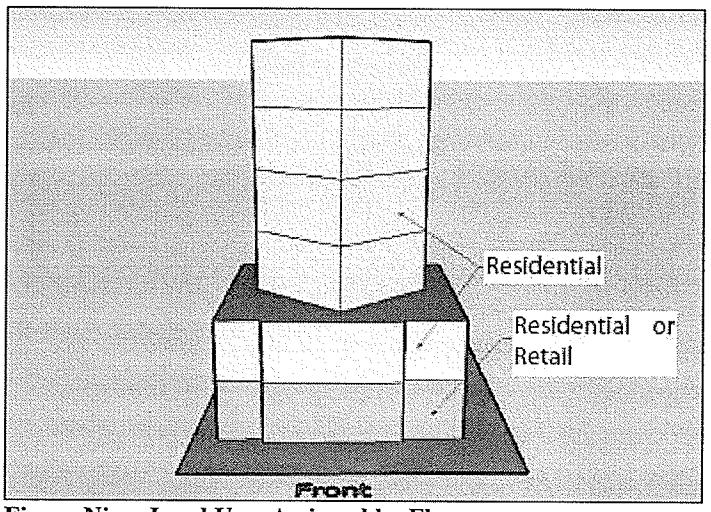

Figure Nine: Land Uses Assigned by Floor

5.4.4 Density

Density was not directly addressed through the FBZ design solution. Rather, the criticism regarding the transition between density levels was handled through upper story setback (forcing units away from the street and towards the centre of the site). Likewise, upper story setbacks also help to alleviate the concern that high density development is too close to roadways. Moreover, restricting residential land uses from the Pembina Frontage District further addresses this concern.

5.4.5 Parking Location

Themes which emerged from discussions of parking were focused on the abundance of parking in some areas and scarcity in others. In the University Frontage District,

concerns that there is "too much parking in front of buildings on University Crescent" were addressed by designating **parking area** behind or beside buildings. In addition, to help promote a pedestrian friendly atmosphere, parking located on the side of buildings was forced to have a **parking setback** of five metres behind the building façade. In contrast, the Pembina Frontage District had the opposite concern that there was not enough parking for commercial uses in this area. Therefore, a large **parking area** was established in front of buildings in this district.

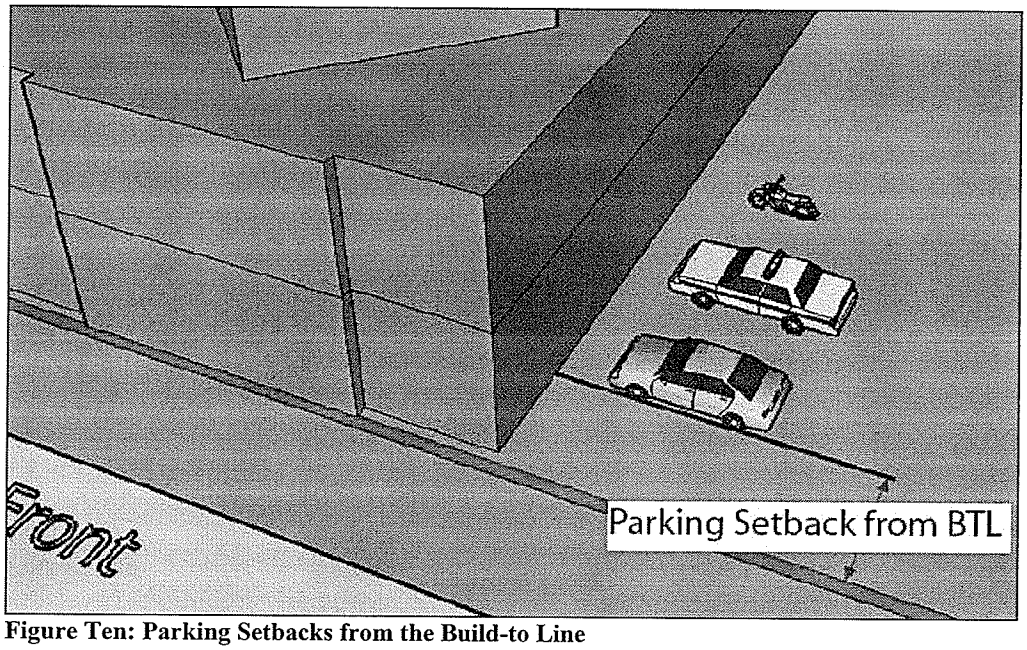

Figure Ten: Parking Setbacks from the Build-to Line

5.4.6 Open Space

Open/Green Space is handled in a similar manner to parking. Concerns regarding open/green space were that it was fragmented and that it did not connect with the surrounding neighbourhood. It was also noted that there was no neighbourhood gathering place. These concerns were addressed in the University Frontage District by establishing an area (dubbed "amenity area") at the front of the property between

the property line and the building façade. This provided a space for public use and helped create an open space network (although this concern could not be entirely addressed at a zoning level). Within the Pembina Frontage District open/green space network development was addressed by using a percentage of the lot area (5%) which must be green space, and then requiring these spaces to be located at the front of the property.

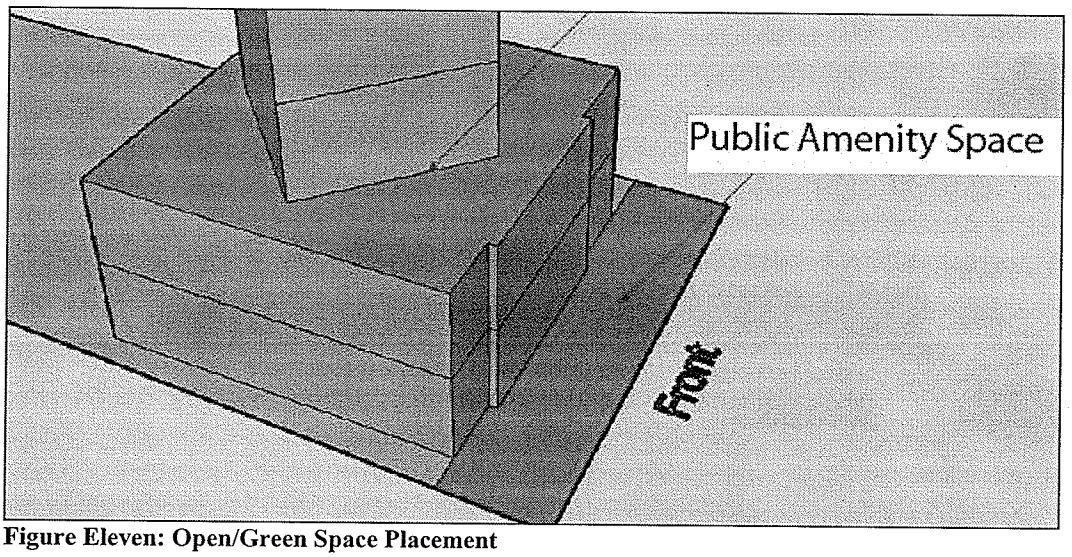

Figure Eleven: Open/Green Space Placement

5.4.7 Building Elements

Concerns regarding building elements were that they were that the existing buildings were boring and not pedestrian friendly. The latter was largely handled through building placement methods (pulling buildings towards the front of the property and parking methods (locating parking behind/beside buildings and parking setbacks). However, other methods were used in the University Frontage District to make

buildings more interesting. Façade Articulation was used to create minor interruptions in the street wall. In the Pembina Frontage District, regulations stipulated both façade articulation and a minimum 10% translucent material to help reduce the "big box store" look of buildings.

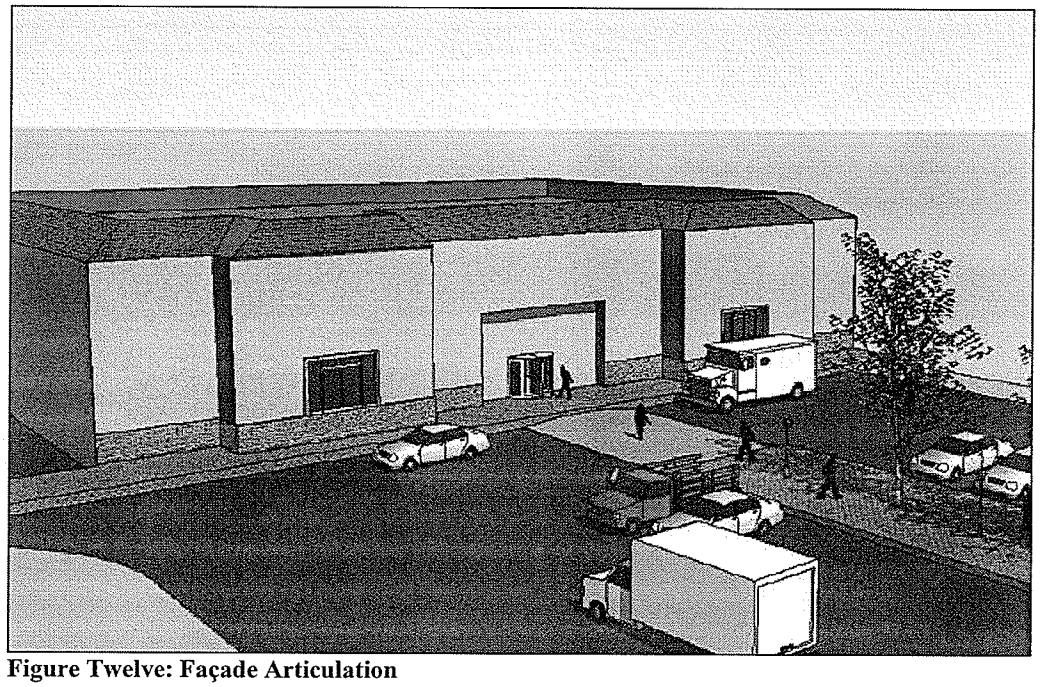

Figure Twelve: Façade Articulation

5.4.8 Signage

Concerns regarding signage were limited and focused on reducing clutter within the Pembina Frontage District. Participants describee the signing along the Pembina frontage as "clustered" and "typical of highway commercial". As a result, the solution was to regulation sign dimension, material and location.

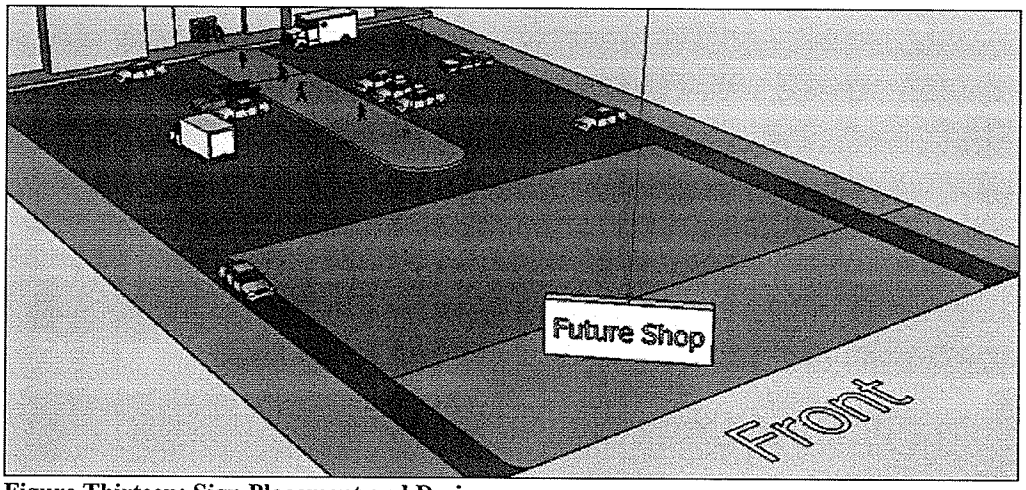

Figure Thirteen: Sign Placement and Design

5.5 Interview Two Analysis

In response to research question three, "how well can FBZ address the design problems experienced within the study area", a sub-sample of original participants were re-interviewed and asked to review the aforementioned design solution. As discussed, the follow-up interviews were conducted with a smaller sample. Two local planners were interviewed – the sample contained professionals working in public and private practice and was restricted because of limited participant availability within the timeframe allotted for interview completion. The participants were asked to review the proposed design solution (Appendix C) and comment on its potential to address the design concerns expressed in the first set of interviews.

When reviewing the proposed design solution, participants noted that they agreed with the street frontage district organizing principle. They described it as being an appropriate tool to accommodate three differing streets with varied forms, functions, and demands. In reference to the University Crescent Frontage District, participants

appreciated the upper story setback and assigning uses to different floors because it encourages mixed uses. However, participants were concerned about the access to parking behind buildings suggesting that there was an inherent conflict between a solid street-wall and parking at the rear of buildings - "how does going to create this great mixed-use environment when there is no parking to support the retail?" They also commented on the continued presence of shadows – "the upper story setback doesn't do anything that different" and noted that the parking setbacks were too close to pedestrian areas suggesting and that that there should be further restrictions describing how the setback area is used.

Interview participants were pleased with the pedestrian linkages and green space utilization in the Pembina District. They commented that the pedestrian linkages not only welcomed pedestrian access but also provided notable safety features in that they provided a separation between pedestrian and vehicular traffic. This was continued noting the need to coordinate the overall design of the site as it "was all one form and function". The interview participants commented further on the building articulation and one noted that this would be a "more pleasant environment to walk through". The signage, which was blended into the overall design, enhanced the sense of cohesion in the area. However, one participant noted that overflow parking may not be maintained and would, possibly, become an eyesore stating "from my experience working with commercial tenants they know exactly how much parking they need" and the overflow parking is "just a large void area".

Regarding the overall sign design, participants reviewed this concept positively, however, commenting that this was "more of the same" and may work well on this particular site but may not work well on other sites because of dramatic differences in lot size. One participant stated that such a tight control on the layout of the site would "be problematic and create many problems when site a development was proposed for one of these sites."

Regarding Thatcher District, one participant noted that setback distances may be a bit far and that they did not promote a New Urban ideal citing that the design presented "created a typical single-family, suburban orientation". Further it was stated that the build-to line may be necessary in a urban setting such as Waterfront Drive, where "you want to create that pedestrian experience", but in this situation there may not be a need such uniformity and "certainly don't need houses to be so far from the street". Participants commented that the form blended well with the buildings across the street and provided a smooth transition and that it was "appropriate to maintain a similar form and scale".

Participants in the follow-up interview also commented on the proposed design solution and the ability of FBZ to address the design problems experienced within the study area. Participants discussed the challenges associated with implementing such a design solution. Participants noted that challenges associated with FBZ include: it is difficult to convince professionals to embrace a paradigm shift, the political will may

be lacking to spearhead such an initiative, and that Euclidian zoning is easy to control – making it an attractive regulatory tool.

Participants further discussed that FBZ is too closely entrenched with the ideals of New Urban theory and may not be able to accommodate other styles of architecture (i.e. Modernist); thus, while FBZ purports to be prescriptive rather than proscriptive, it inherently prohibits architectural expression unless it is congruent with New Urbanism. One participant described this situation

Through the second interview, which included in-depth discussions with planners working in the public and private sector, it became clear that zoning (the tool) was not the problem. Rather, the problem is rooted in the application of zoning. For example, FBZ offers creative strategies to address the design concerns noted in interview one. One participant described this situation as an "on-going battle where city bureaucrats, who know nothing about development, try to implement an idea without fully understanding the implications",
pointing out that these design concerns could also be addressed within the confines of Euclidian zoning.

5.5.1 Summary of Changes

Table Seven: Interview Two Suggested Changes to the FBZ Design Solution

Concepts	Interview Two Suggested Changes to FBZ Design Solution
Building Form	University - commented on the continued presence of shadows
Building Placement	Pembina - may work well on this particular site but may not work well on other sites because of dramatic differences in lot size. Thatcher - setback distances may be a bit far and too uniform
Land Use	n/a
Density	n/a
Parking Location	University - concerned about the access to parking behind buildings suggesting that there was an inherent conflict between a solid street-wall and parking at the rear of buildings University - parking setbacks were too close to pedestrian areas suggesting that there should be further restrictions describing how the setback area is used Pembina - overflow parking would not be maintained and, possibly, become an eyesore
Open Space	n/a
Building Elements	n/a
Signage	n/a

6.0 Summary and Conclusion

Within this project, professional planners discussed problems within the study area's built form. As noted in the analysis section, these concerns focused on building form, building placement, land use, density, parking placement, open space, building

elements, and signage. These concerns were then addressed utilizing a FBZ design solution which used FBZ methods. For example, in the interviews, planners noted that buildings were too far from University Crescent and, in the design solution, this was addressed using Build-to Line (a FBZ method) which forces a building's façade to locate at a specific distance from the street.

As stated above, the second interview identified the application of zoning as a potential issue. FBZ's prescriptive methods are a positive contribution to zoning and serve as a valuable tool in the planner's toolbox. However, the success of this tool is dependent on creative application and implementation by planners. Zoning is a "means to an end" (pers. comm. I Wight) and, regardless of the style or theory, it is *how* it is used that is most important. Therefore, it is planners who need to be more practiced, educated and, most of all, creative in their application of zoning regulations.

One such creative application is the concept of "hybrid zoning"; this concept is explored in the book A Better Way to Zone by Donald Elliott (2008)[2]. Elliot explores the idea of "hybrid zoning" in which various concepts from different zoning methods are combined. On the topic of FBZ, Elliott describes "Form-based tools as still in their adolescence, but [he] believe[s] that in the end they are likely to supplement rather than replace Euclidean regulation" (Elliott, 2008: 35). As such, he argues for an integrated approach to zoning regulations.

[22] This book was published during the final phases of this project.

Elliot (2008) continues citing two reasons why FBZ will not replace its Euclidean predecessor: the first is that FBZ misses the small, seemingly insignificant, aspects of the built environment handled comprehensively by Euclidean zoning. Characteristics "like swimming pools, satellite dishes, telecommunications antennae" (36) are missed by FBZ while, in reality, are among the practical challenges facing planners and communities.

The second reason is that not every place needs detailed FBZ regulation shaping the built environment. Industrial areas, for example are more concerned with efficiency than aesthetics or how the warehouse interacts with the street – simply put not all places need to be "memorable, notable, beautiful" (36).

In summary, FBZ offers an interesting method of regulating the form and scale of development. However, it is questionable whether the outcomes could have been duplicated using Euclidean zoning. While aspects such as the regulating plan are creative and connect the built form to its context in the urban system, many of the FBZ methods are simply repackaged Euclidean tools.

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Appendix A: Interview Guide One

INTRODUCTION:

The purpose of this study is to first assess the ability of form-based zoning in addressing problems with the build form of the study area (defined on page two of the Major Degree Project Case Study Background Report). This will be done by interviewing planning professionals in Winnipeg to determine their perceptions of weaknesses in the form and scale of the study area. Second, the study will formulate a solution, based on form-base zoning theory to address the identified issues and determine barriers and opportunities for implementation in Winnipeg. This will be done by creating a form-based zoning code for the study area and obtaining feedback from the original study participants concerning the opportunities and barriers for implementation.

INTERVIEW QUESTIONS:

Part One:

1. Plan Winnipeg designates the study area as "neighbourhood", how would you further describe/designate it? Are there other more specific designations you would use?
2. What is the purpose/function of the study area?
3. Are there functions the study area does not perform that you feel it should?
4. Using the Transect diagram (provided on page nine of the Major Degree Project Case Study Background Report) which Transect do you feel best describes the study area and its relationship to the rest of the city?
5. What factors do you feel were the most influential in shaping the current form of the study area's built form?

Part Two:

1. What are your thoughts on the following attributes of the study area's built environment:
2. Land Uses
3. Building use (how the building or different floors of the building are used)
4. Scale (Intensity/density)
5. Building Height/number of stories
6. Building Bulk/setbacks /frontage length
7. Building Layout/Configuration/Interaction with other buildings
8. Lot Coverage
9. Neighbourhood Form (interaction with the neighbourhood outside of the study area)
10. Green Space
11. Parking
12. Do you have anything else to add?
13. Can you recommend anyone else to talk to?

Appendix B: Interview Guide Two

1. Please comment on the following aspects of the proposed design:
    a. organizing the three Districts based on the roadway they front onto?
    b. the Pembina Frontage District?
    c. the University Frontage District?
    d. the Thatcher Frontage District?
2. Is there anything else the Districts do not do which you feel they should?
3. Do you feel the three Districts address you initial concerns with the built environment's design?
4. What obstacles do you foresee implementing this method of zoning in the Winnipeg context?
5. Are there any problems you can see with this method of zoning?

Appendix C: FBZ Design Solution

Form-Based Zoning Design Solution Booklet

Provided to Interview Participants in Preparation for the Follow-up Interview

By Matthew Fitzgerald, Master of City Planning Candidate
Department of City Planning, University of Manotiba

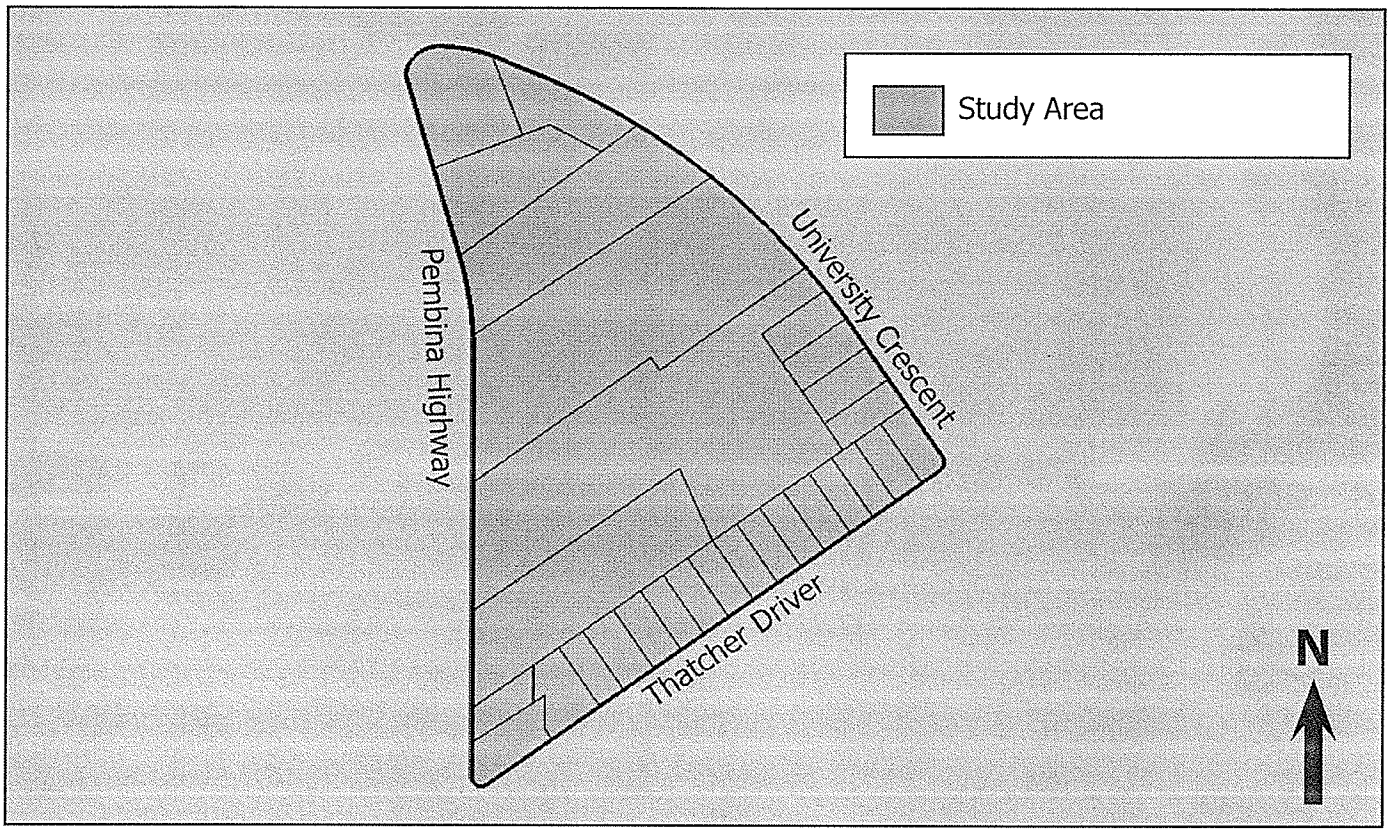
September, 2008

Contents

Statement of Purpose

The first interview explored the opinions of professional planners regarding the physical form and design of the Study Area (defined on page three). Based on the results of the interviews, a form-based zoning (FBZ) design solution was created utilizing known FBZ techniques. The purpose of this report is to provide background information for the follow-up interview (interview two) which looks for affirmation and discussion regarding how well FBZ is able to address the design problems experienced within the study area.

1.1 Study Area



1.2 Interview One Summary

Attribute	Interview One Summarized Responses	Recommendations	FBZ Design Solution
Building Bulk	Buildings are uninteresting	1. Design features should be integrated onto building facades	Façade Articulation Translucent Materials
	Buildings are varying distances from University Crescent	2. Buildings be setback uniform distances from the street	Build-to-line Building Placement
	Lot coverage is too low	3. Buildings should have higher lot coverage	Unable to Solve
	Commercial uses on Pembina are too close to the street	4. Commercial uses along Pembina Highway should be setback from the roadway	Building Placement
Building Height	Buildings are too tall and create too many shadows	5. Buildings should be sited to avoid shadowing neighboring sites	Upper Story Setbacks
Parking	Surface parking dominates the site	6. Design parking lots to be less visible	Parking Setbacks Parking Area
	Parking is not easily accessible from Pembina Highway	7. Locate parking in front of buildings on Pembina Highway	Parking Area Building Placement
	Too much parking in front of buildings on University Crescent	8. Parking should be located behind/beside the buildings on University Crescent	Parking Setbacks Parking Area
Land Use	Residential uses are inappropriate along Pembina Highway	9. Avoid locating residential uses on Pembina Highway	Building Use
	More room for highway oriented commercial along Pembina Highway	10. Locate highway oriented commercial uses along Pembina Highway	Building Use Building Placement Parking Area Signage
	Commercial does not meet the needs of the local area	11. There should be more neighborhood oriented commercial	Building Use (University)
Density	Abrupt transition between different scale buildings	12. Density should be terraced	Upper Story Setbacks
	Density is too high near the edge of the study area	13. Higher density should be sited towards the middle of the study area	Upper Story Setbacks
Building Interaction	Buildings are designed independently and do not interact	14. Buildings should be designed as part of a cohesive built environment	Building Placement Build-to-line
	Buildings are not oriented for passive solar benefits	15. Passive solar use should be integrated into building design	Solar Orientation Upper Story Setback
	Commercial area is not pedestrian friendly	16. Design commercial areas for pedestrian friendly access	Amenity Space Parking Area Pathway
Neighborhood Interaction	Study area is isolated, with no connections	17. Connect study area to the surrounding neighborhood	Unable to Solve
	Study area is not pedestrian or bike friendly	18. Create a built environment which is interesting and encourages walking and biking	Amenity Space Parking Area Pathway
Green Space	Not enough trees	19. More trees	Amenity Space
	Greenspace is fragmented	20. Greenspace should be designed as a network and interacts with the neighborhood	Amenity Space
	No gathering place or neighborhood node within the study area	21. Greenspace network should have a gathering place or focal point which is integrated with the built environment	Amenity Space

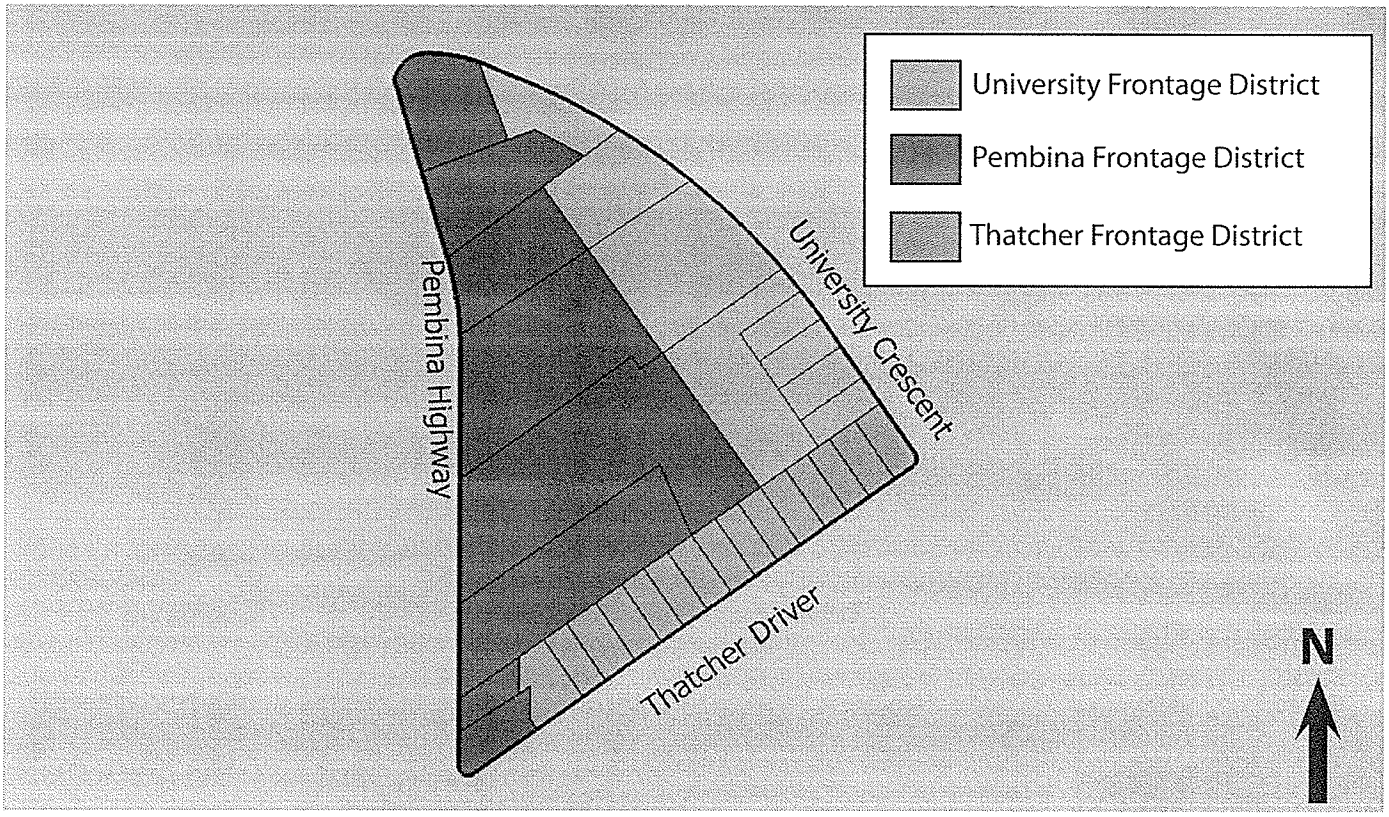
Impacted Area

University

Pembina

All Areas

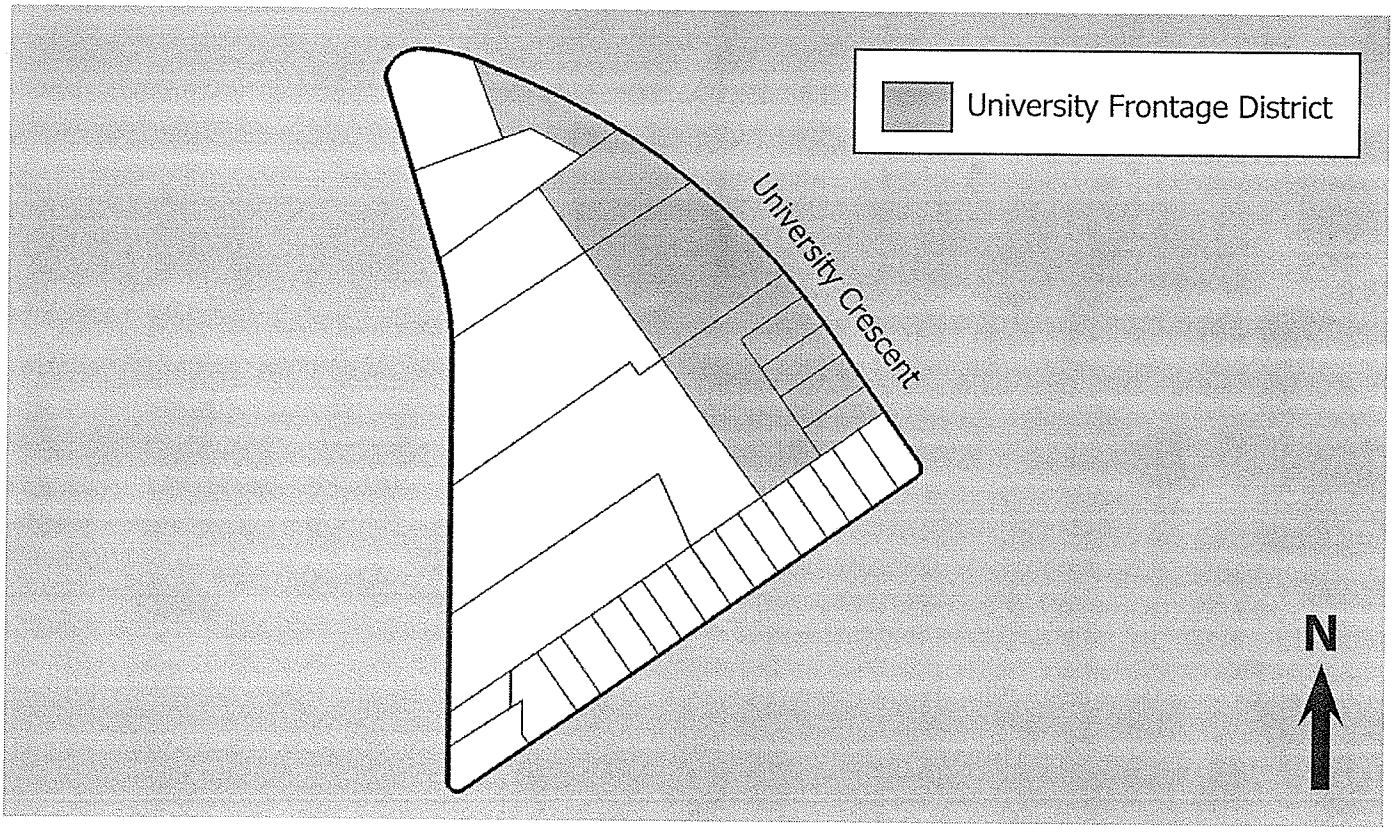
2.1 Regulating Plan



FBZ, like conventional zoning, is divided into different districts or zones. FBZ spatially organizes these districts using a Regulating Plan. One method of establishing the location of districts is by street frontage. Generally, the idea is that different street types (highway, arterial, collector, neighborhood) within an urban area, equate to unique built environments.

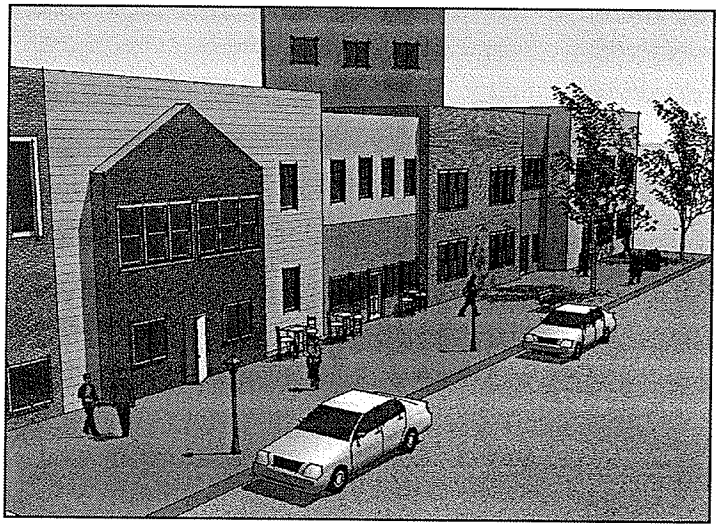
This FBZ design has been organized by street frontage: University Frontage District, Pembina Frontage District, and Thatcher Frontage District. Each district has been given a set of stipulation or regulations which have been utilized and designed to address the design problems experienced within the Study Area.

2.2 University Frontage District



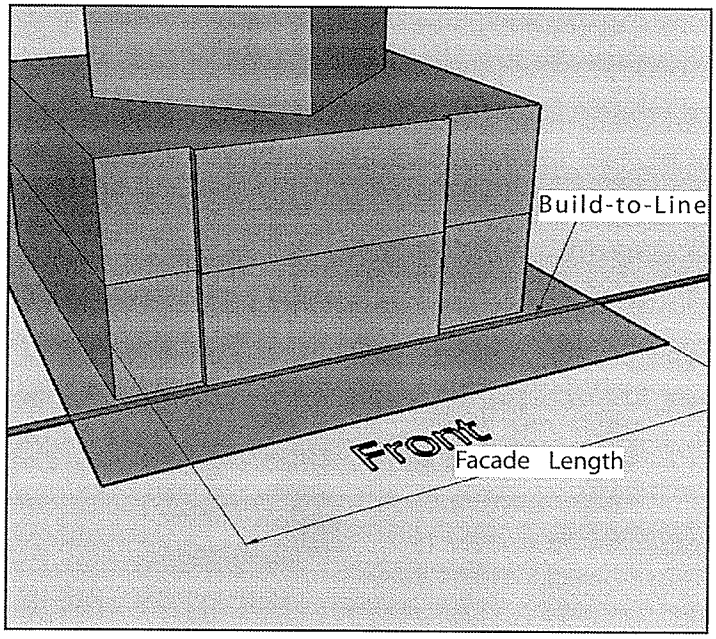
2.2.1 Regulating Plan

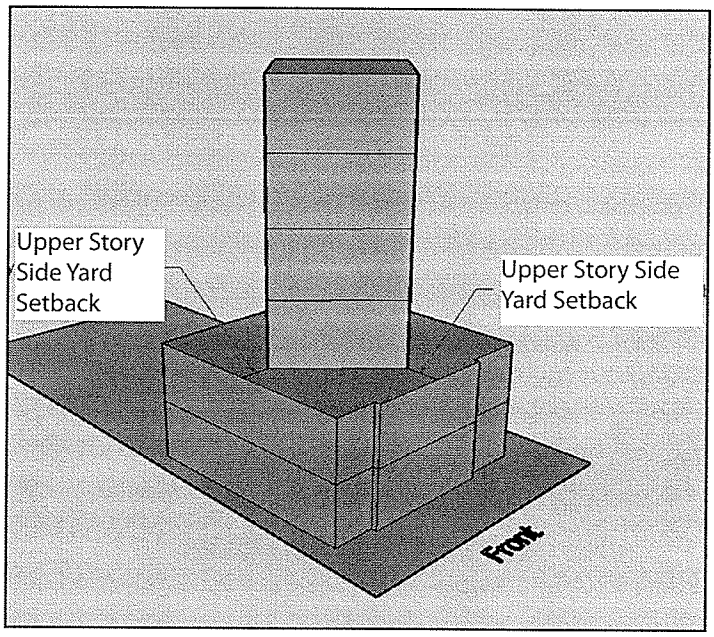
Description: the University Frontage District is a pedestrian oriented environment with a mix of residential and some retail uses. Buildings will be located at the front of the property with parking located behind or beside buildings and amenity space located in front of buildings.



Boundaries: the University Frontage District includes all properties which front onto University Crescent (shown above). This area is subject to the regulations listed on the subsequent two pages.

2.2 University Frontage District





2.2.2 Building Requirements

Build-to-Line (BTL)
Definition: a line parallel to the front property line where the facade of a building is required to locate.

Regulation: *BTL* is established 2.0 metres from the front property line.

Building Facade
Definition: the face (front) of the building (regulations only apply to bottom two floors)

Regulations: the *Building Facade* must be a minimum of 80% of the length of the front property line;

The *Building Facade* must be composed of a minimum 70% translucent materials;

The *Building Facade* must have at least one interruption in the surface which may be a maximum of 0.5 metres in front/behind the *BTL*.

Height
Definition: the vertical measurement of a building as measured in stories.

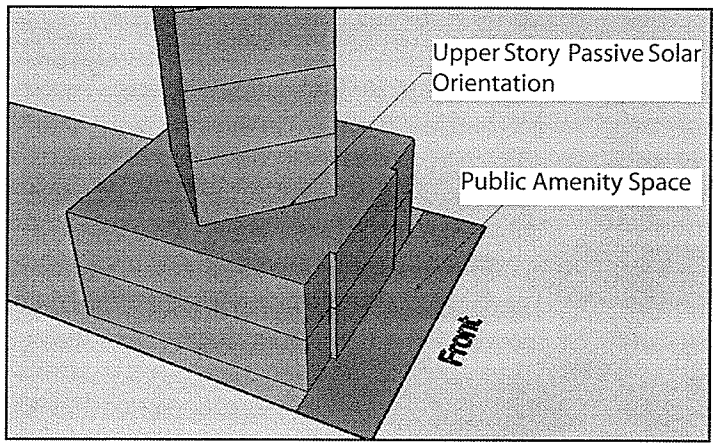
Regulations: buildings are restricted to ten stories in *Height*.

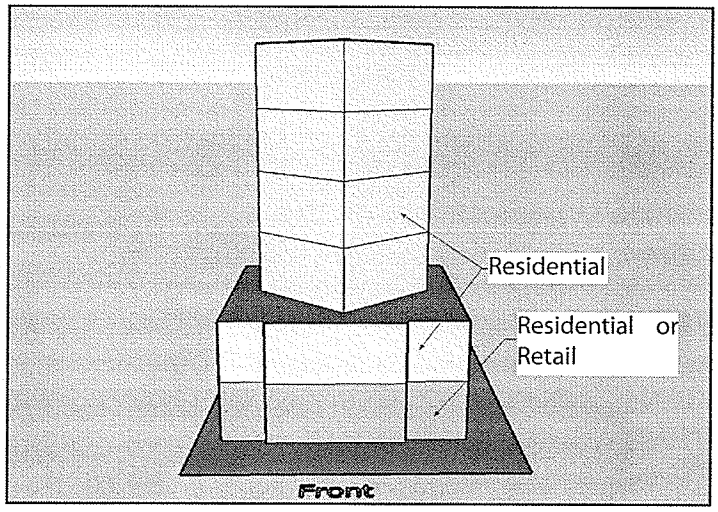
Setbacks
Definition: the distance from property line, or the *BTL*, to the building.

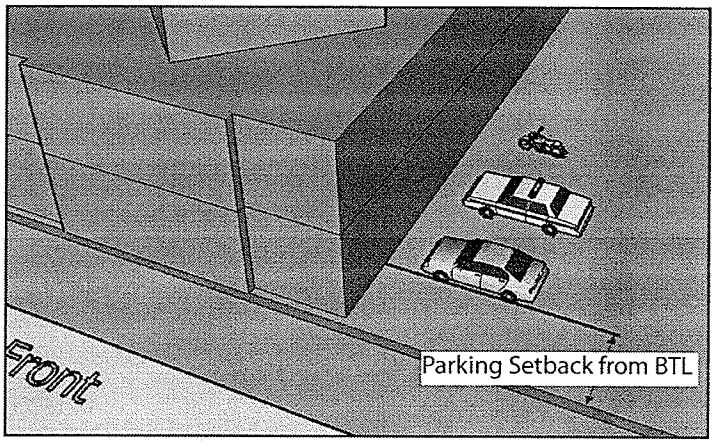
Regulations: one and two stories:
Front - At the *BTL*
Side/Rear - Not required

Greater than two stories:
Front - 10.0 metres from the *BTL*
Side/Rear - 10.0 metres

2.2 University Frontage District







Amenity Space
Definition: privately owned and maintained property which is intended for the use and enjoyment of the general public.

Regulation: the space between the *BTL* and front property line is designated *Amenity Space*. This should take the form of a plaza or garden.

Solar Orientation
Definition: location or positioning relative to the natural movement of the sun.

Regulation: the upper stories (story 3 to 10) must be angled to take advantage of solar light/ heating.

Building Uses
Definition: use (residential, office, retail, industrial, institutional) of the building. Uses are assigned to individual stories of the building.

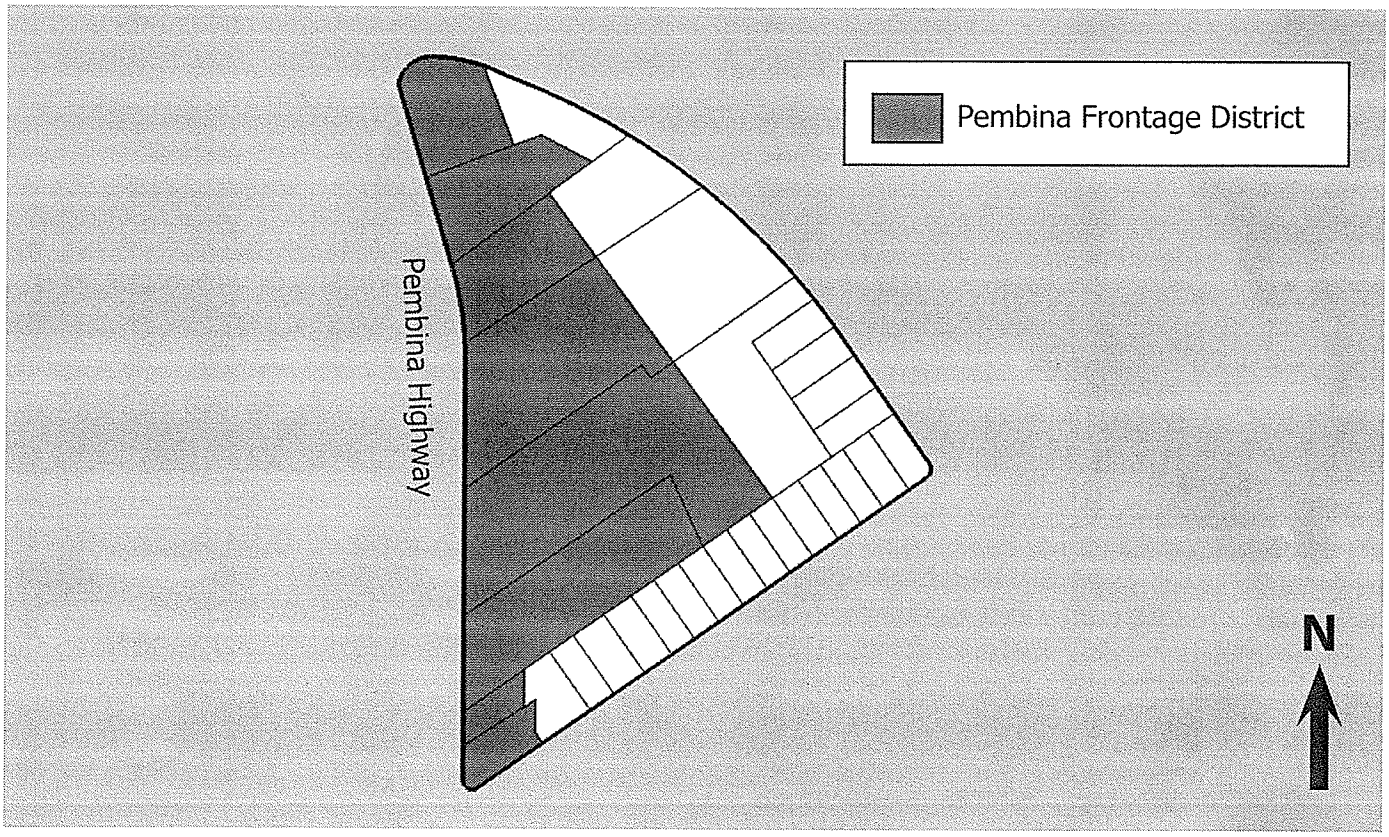
Regulation: the first story of the building may be used for residential or retail purposes. All other stories are to be used for residential purposes.

Parking Area
Definition: the area on a parcel where parking can be located.

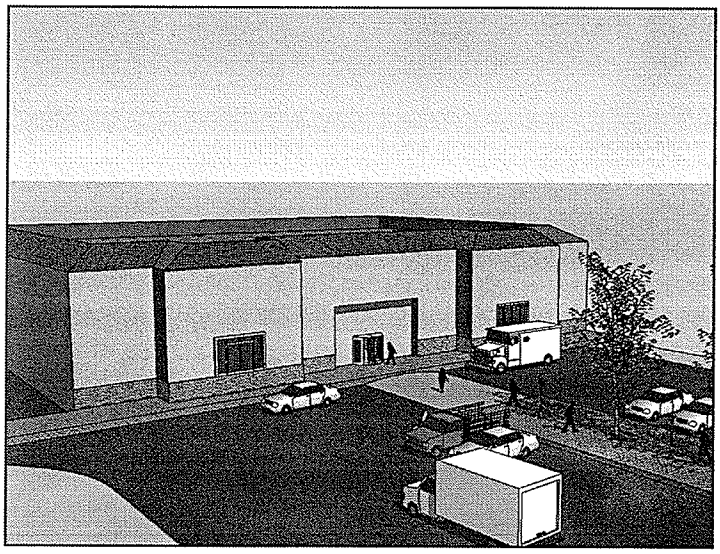
Regulations: the *Parking Area* must be located behind, under, or beside the building.

Parking Area located on the side of a property must be setback 5.0 metres from the *BTL.*

2.3 Pembina Frontage District



2.3.1 Regulating Plan



Description: the Pembina Frontage District is intended for a mix of low intensity, automobile oriented, commercial (office and retail) uses with a regional focus. Buildings will be uniformly located near the back of the property (or district boundaries). The rest of the site is intended for parking and public amenity space. Pedestrians will be accommodated on the site through parking lot walkways and sidewalks connecting to neighboring sites.

Boundaries: the Pembina Frontage District includes all properties which front onto Pembina Highway (shown above). This area is subject to the regulations listed on the subsequent two pages.

2.3 Pembina Frontage District

2.3.2 Building Requirement

Building Area
Definition: the area of the lot where buildings are required to located.

Regulation: the *Building Area* is established as the rear 50% of the lot.

Parking Area
Definition: the area on a lot where parking can be located.

Regulations: *Parking Area* must be setback 2.0 metres from the side/rear property lines and must be setback 5.0 metres from the front property line;

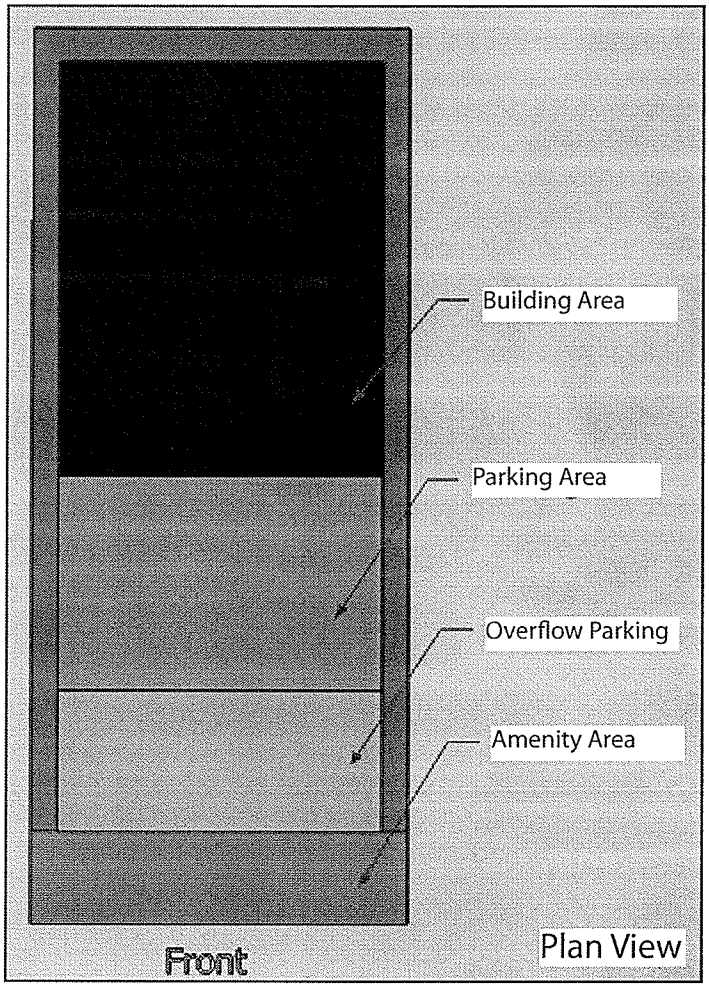
The *Parking Area* must contain a pedestrian walkway, running through the parking lot, which separates pedestrians from vehicular traffic.

Overflow Parking
Definition: permeable *Parking Area* which is intended to be used for parking during peak parking periods. This area should reflect the difference between the average daily parking requirements and the maximum annual parking requirements.

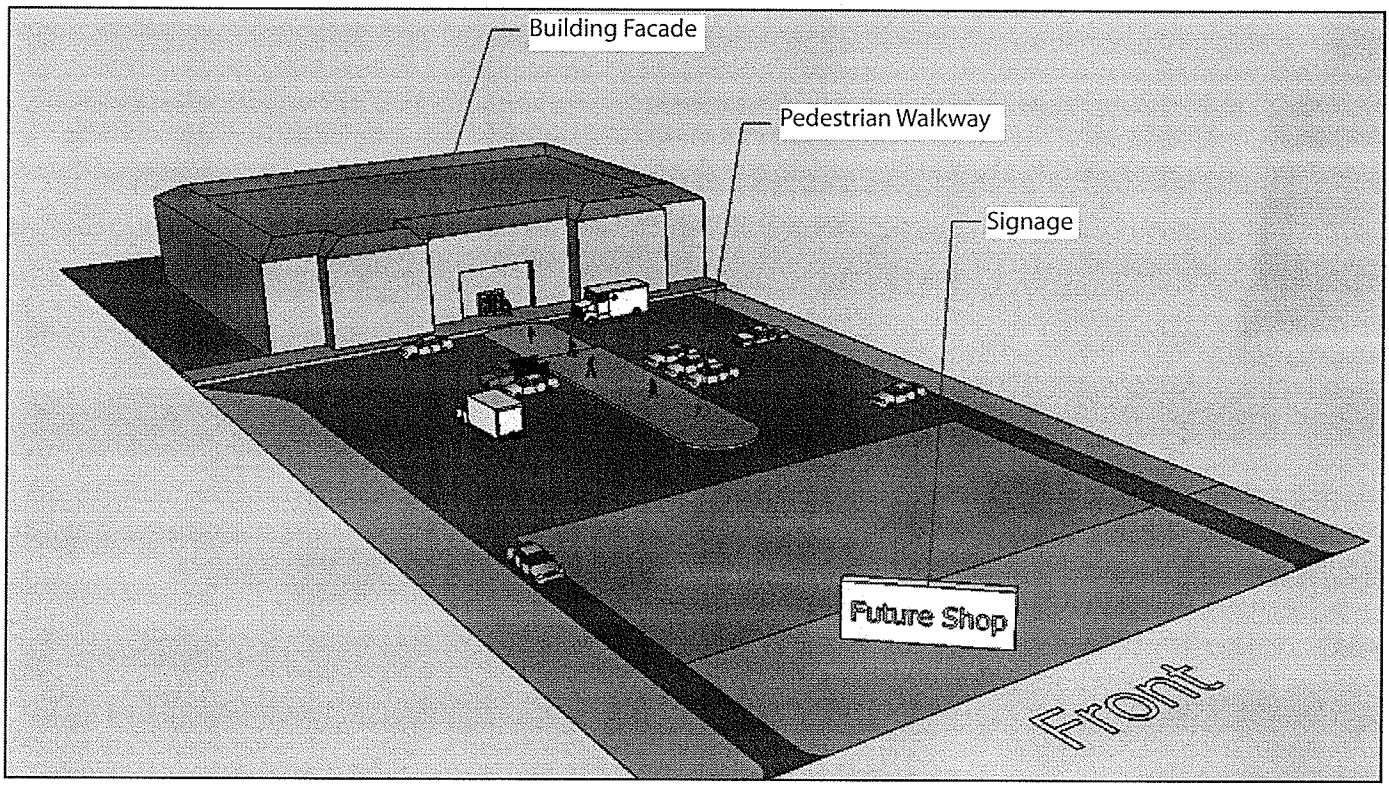
Regulations: *Overflow Parking* should be located adjacent to the *Parking Area*, farthest from the building.

Amenity Space
Definition**:** privately owned and maintained property which is intended for the use and enjoyment of the general public.

Regulation: 5% of the lot area which must abut the front property line.



2.3 Pembina Frontage District



Building Facade
Definition: the face (front) of the building.

Regulations: the *Building Facade* must be composed of a minimum 10% translucent materials;

The *Building Facade* must have at least one interruption in the surface which must be a minimum of 1.0 metre.

Height
Definition: the vertical measurement of a building as measured in stories.

Regulations: buildings are restricted to two stories in height.

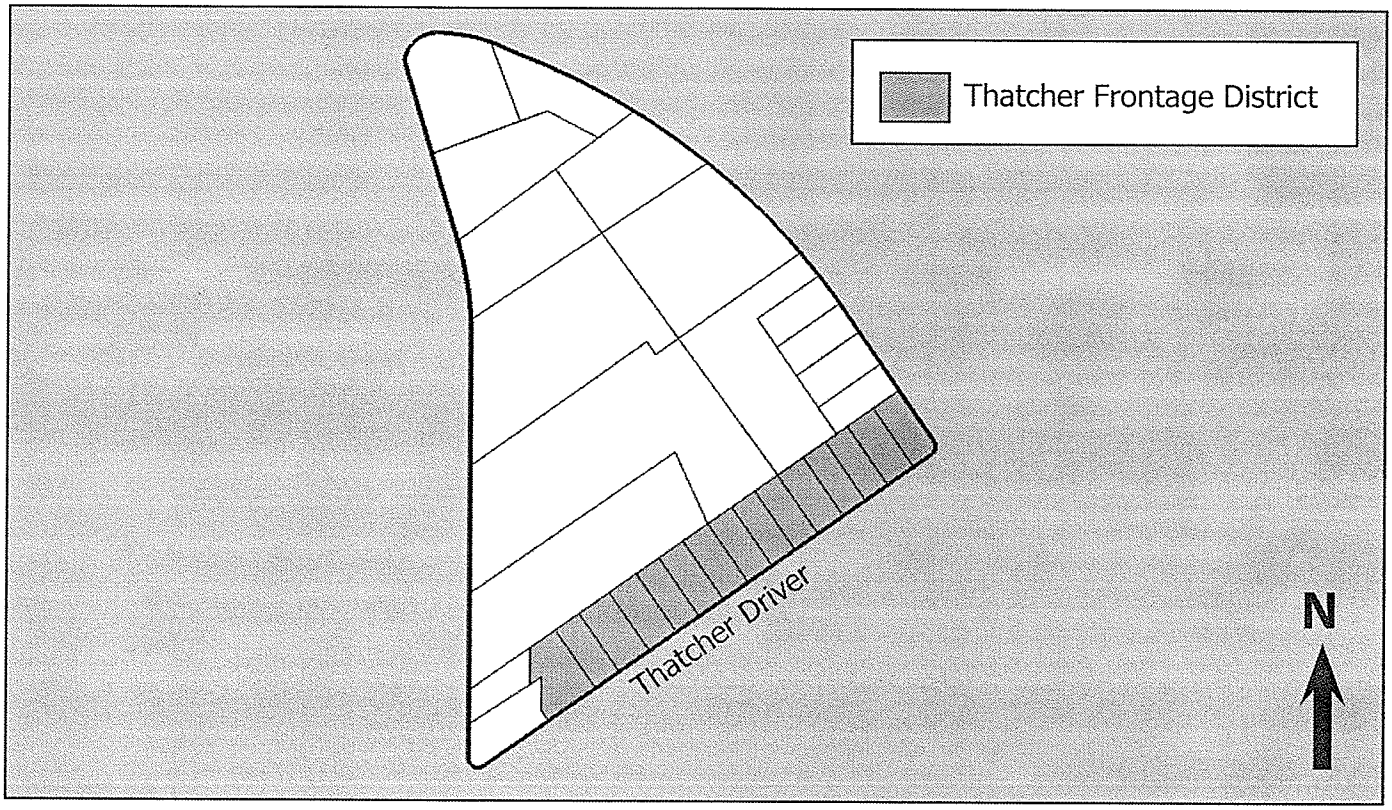
Building Uses
Definition**:** generally how a building will be used (residential, commercial, industrial, institutional). Uses are assigned to individual stories of the building.

Regulation: Uses are restricted to retail or office uses.

Signage Design
Definition: the location and design of signs advertising businesses located on the same property.

Regulations: signs must be located in the amenity space at the front of the property and may be no more than 1.5 metres high and 4.0 metres wide. Signage materials are restricted to brick, rock or stucco.

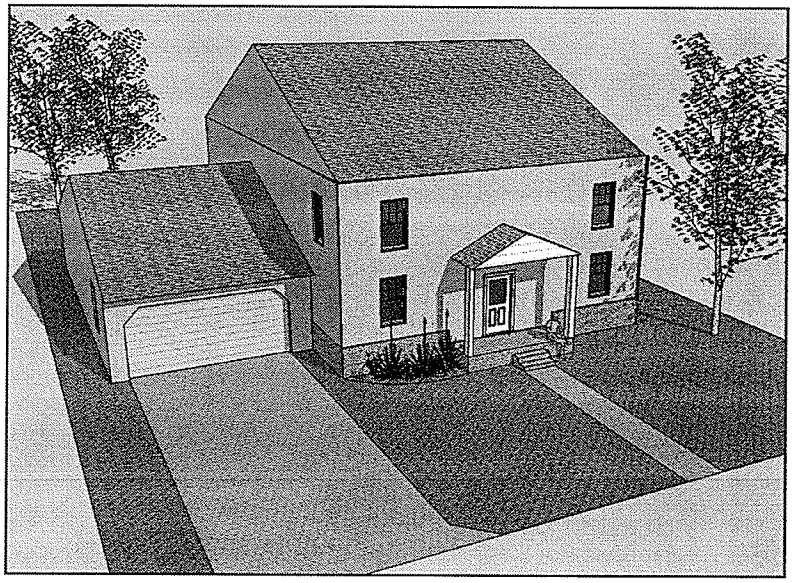
2.4 Thatcher Frontage District



2.4.1 Regulating Plan

Description: the Thatcher Frontage District is intended to be a low density, residential neighborhood. Buildings will be placed away from the street and building height and form requirements are intended to limit the scale and size.

Boundaries: the Thatcher Frontage District includes all properties which front onto Thatcher Drive (shown above). This area is subject to the regulations listed on the subsequent page.



2.4 Thatcher Frontage District

2.2.2 Building Requirements

Build-to-Line (BTL)
Definition: a line parallel to the front property line where the facade of a building is required to locate.

Regulation: *BTL* is established 4.0 metres from the front property line.

Setbacks
Definition: the distance from property line, or the *BTL*, to the building.

Regulations:
Front - At the *BTL*
Side - 2.0 metres
Rear - 6.0 metres
Garage front - 1.0 metre behind *BTL*

Height
Definition: the vertical measurement of a building as measured in stories.

Regulations: buildings are restricted to two stories in height.