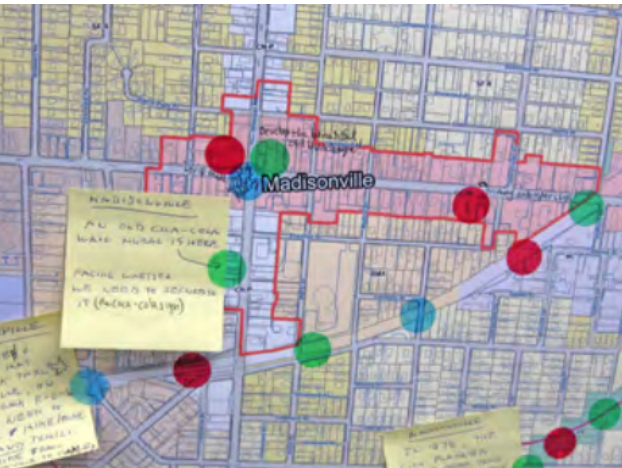


Form-based code:

A road to diverse, mixed use urban environments

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Above: Process boards and drawings from the Cincinnati form-based code charrettes, received from <http://opticosdesign.com/opticos-led-charrette-succeeds-in-cincinnati-city-council-adoption-of-new-form-based-code/>

Key words: Form-based code, urban form, CentrePort, industrial

Abstract

Most of today's cities are plagued by car-oriented sprawl, an urban form that is not only allowed, but encouraged under current development regulations. Made popular in the early 20th century, zoning was meant to reduce overcrowding and protect against the intrusion of heavy industry into areas otherwise characterized by retail, residential, commercial, and civic uses. The progression of zoning combined with increasing suburbanization has scattered suburban development, and resulted in a general loss of community character (Michigan Association of Planning, 2007). Current zoning regulations ensure that the areas where people live remain separate from where they work, shop, eat, and learn. This has resulted in a greater reliance on cars (PlaceMakers, LLC, 2015), further contributing to a sedentary lifestyle and the extensive health problems associated with it (Ekelund, 2012). To address this quandary some practitioners, policy makers, and places have begun to design and implement form based codes (FBCs) in place of traditional zoning. A FBC is a "land development regulation that fosters predictable built results and a high quality public realm by using physical form (rather than separation of uses) as the organizing principle for the code" (Form Based Codes Institute, 2015). Where traditional zoning focuses on the use and development of one single lot, FBC instead focus on the public streetscape, and how individual buildings relate and contribute to the public realm (Michigan Association of Planning, 2007).

While FBC is gaining momentum in the United States, it is less common in Canada, however this is changing. CentrePort Canada, located between the rural municipality of Rosser and the City of Winnipeg, used FBC in their land use by-law. Although some aspects of the FBC and its process could have been strengthened, the use of FBC at CentrePort will help to create a greater sense of identity within the port, and allow for both an active transportation network, and a convenient place for workers to go for services.

Background

While the British North America Act of 1867 established the right of provinces to set land use controls in Canada, separated-use zoning was not heavily used until the early 20th century, after the United States Supreme Court landmark case of the Village of Euclid, Ohio v. Ambler Realty Co., (Euclid v. Ambler), in 1926, argued for the right of local governments to separate land uses. This case established the term “Euclidean zoning” or use-based zoning. Currently, Euclidian zoning systems exist to prevent the collocation of disagreeable land uses and incompatible development scales. While this generally makes sense, there are many different land uses that, in reality, work well together, and forcing their separation can be harmful to communities (Form Based Codes Institute, 2015). Conventional zoning is use-based, and aims to create consistency and stability by regulating things like setbacks, heights, densities, and floor area ratios of buildings. Since traditional zoning prohibits development that is regarded

as inappropriate, and focuses on the use and development of individual lots, its potential to enhance and contribute to community character is restricted (Michigan Association of Planning, 2007). Guided by this zoning system for more than 100 years, communities are now separated into areas for small houses, large houses, apartments, shopping, office, commercial, and industry. The most significant consequence of this is urban sprawl, which Euclidian zoning has enabled as the “path of least resistance” for developers (Form Based Codes Institute, 2015; Perez, 2014). It is becoming increasingly evident that traditional zoning is largely ineffective for regulating diverse, mixed use urban environments, and simply fails to provide communities with the meaningful places they collectively desire (Opticos Design, Inc., 2014; Khoury, 2013). Sprawl costs the U.S. over \$1 trillion a year (Victoria Transport Policy Institute and LSE Cities, 2015).

A NEW ZONING FRAMEWORK

FBC represents a response to the years of development that have been primarily concerned

with regulating land uses, and unconcerned with determining the physical form of communities (Form Based Codes Institute, 2015). They symbolize a change in the way built environments are thought about and regulated (Opticos Design, Inc., 2014). The essential rationale behind a FBC is to yield a legal zoning framework that better supports, and more consistently results in walkable, mixed-use communities of lasting value (Khoury, 2013). This is possible because FBCs are place based, and primarily concerned with regulating physical form, and only secondarily concerned with land use. They surpass conventional zoning frameworks because they deal with the relationship between the building and streetscape, as well as the spaces in between (Michigan Association of Planning, 2007). FBCs are informed by community needs and goals (Form Based Codes Institute, 2015), and involve documenting sought-after development forms and establishing building form requirements that help a community realize their own, unique vision (Michigan Association of Planning, 2007).

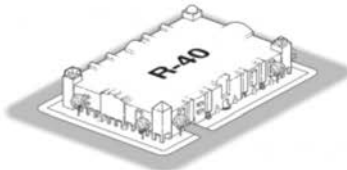
Conventional Zoning

Density use, FAR (floor area ratio), setbacks, parking requirements, maximum building heights specified



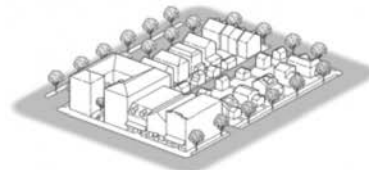
Zoning Design Guidelines

Conventional zoning requirements, plus frequency of openings and surface articulation specified



Form-Based Codes

Street and building types (or mix of types), build-to lines, number of floors, and percentage of built site frontage specified.



Above: Differences between conventional zoning and FBC, received from <http://formbasedcodes.org/definition>

CREATING A FBC

The process of determining appropriate FBC for a community takes longer and is more detailed than conventional zoning. It begins with asking a community to envision their future; usually an open, participatory process that includes studying the physical context and character of a place as well as current market pressures (Rangwala, 2013; Form Based Codes Institute, 2015). One of the fundamental organizing concepts in FBC is the rural to urban transect (Center for Applied Transect Studies, n/d). The transect is based on a prototypical American rural to urban transect, divided into 6 Transect Zones (T-zones) for use in zoning maps. Each T-zone differs in intensity of natural, built, and social components (Centre for Applied Transect Studies, n/d). The Transect Zones need to be adjusted to reflect the community, and are then used to delineate a hierarchy of places

Nearly 90% of all projects involving form-based code have been implemented since 2003

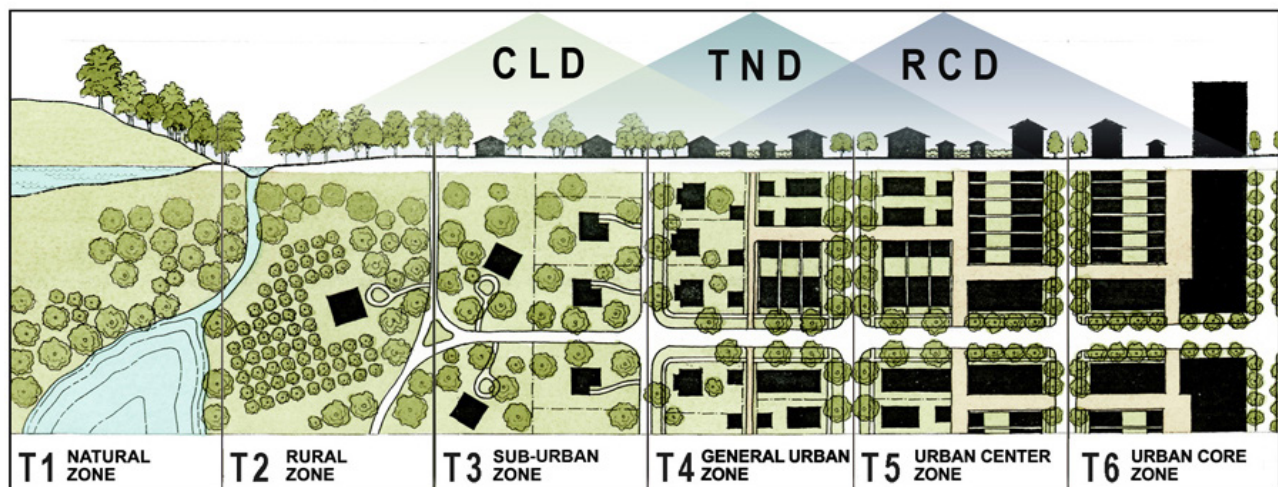
- Placemakers, LLC, 2015

within it. This hierarchy often becomes the framework for the entire FBC (Opticos Design, Inc, 2014). There are three major outcomes that are required from this process: building form standards, public use standards, and a regulating plan. Building form standards address things like the building setback from the sidewalk, the height of the building in relation to the street, and how welcoming and accessible the front entrances are. It is important to determine these features because they can ensure that buildings contribute to life on the street. Through the building form standards, the building type guides the use of the buildings. The public use standards are used to determine the form of squares and streets, ensuring that public spaces are usable, appropriate in scale to the neighbourhood, and benefit

everyone. The final regulating key is crucial. It includes numerous, straightforward diagrams and illustrations that make it quick and easy for property owners to figure out what they are allowed to do (Form Based Codes Institute, 2015).

Although the concept of FBC was established more than 35 years ago, many consider them a new and innovative alternative to conventional zoning (The Cecil Group, 2010). This can be attributed to the fact that nearly 90% of all projects involving form-based code have been implemented since 2003 (PlaceMakers, LLC, 2015). Over the last few years, numerous large cities like Calgary, Miami, Nashville, Dallas, Ft. Worth, Denver, Albuquerque, El Paso, Memphis, Baltimore,

THE TRANSECT AND COMMUNITY UNITS



Above: One of the fundamental organizing concepts of FBC, the rural to urban transect, received from <http://www.placemakers.com/2013/05/02/ways-to-fail-at-form-based-codes-03/>

Tulsa, Portland, Cincinnati, Philadelphia, Los Angeles, San Diego, Austin, Chattanooga, Atlanta, Jacksonville, Abu Dhabi, and Dammam have begun adopting FBC, raising its profile and giving the movement increased momentum (PlaceMakers, LLC, 2015).

Facts & Outcomes

CENTREPORT CANADA

While FBC is gaining momentum in the United States, it is less common in Canada, especially in the prairie provinces, however this is changing. CentrePort Canada, located between the rural municipality of Rosser and the City of Winnipeg, used FBC as a part of their land use by-law. CentrePort is North America's newest inland port and foreign trade zone, offering businesses unique access to road, rail, and air transportation (CentrePort Canada, 2012). In 2010 the CentrePort Proposed Policies and Land Use plan was developed for consideration

by the Province of Manitoba, which still provides guidance for development in the area today (The Rural Municipality of Rosser, 2013). In 2013, under the guidance of representatives from the Municipality of Rosser, the Government of Manitoba, and the City of Winnipeg, a group of planning consultants from PlaceMakers and MMM began the process for designing a zoning framework for the area.

CONSULTATION PROCESS

The consultation process began in June 2013, with interviews intended to identify potential opportunities and constraints. In July 2013 the team facilitated a number of design workshops with planning officials, members of the business community, and residents of the county. The workshops were used to gather and refine ideas about things like subdivision design, connectivity, parcel sizes and uses, and the ultimate form and function of the area once developed. In August and September 2013 planning consultants from MMM Group and PlaceMakers began drafting the zoning framework under the

council of a steering committee made up of individuals from Rosser, Manitoba Local Government, and Winnipeg's Planning Department. Once the initial draft was completed in November 2013, an open house was held where the by-law draft was shared with the community for additional feedback. Finally in January 2014 the by-law report was presented to Rosser council for its first reading (The Rural Municipality of Rosser, 2014).

The overall goal for CentrePort is to allow for flexible responses to the market, while still providing higher return on investment categories that will supply worker village services to the surrounding industrial, manufacturing, and distribution users. The development is occurring against the backdrop of significant changes. These changes include: escalating global production and shipping demand for transcontinental rail transportation; further development of Canada's natural resources; intense competition for manufactured goods and services; technological change in production of goods and



Above: Consultation timeline, information received from Hazel Borys, diagram created by author

services and increased demand for credentialed individuals; demographic shift towards more millennial workers who want amenity rich, permeable work spaces; and a shift in public policies towards sustainability and resilience. One of their key responses to these tensions is the implementation of a FBC that structures a range of land use types that align with market demand (The Rural Municipality of Rosser, 2014).

CENTREPORT'S FBC

Within the wider CentrePort by-law, the CentrePort Zones are form based, placing higher focus on the built form and its relationship to the public realm. There are 5 zones: I1 or Industrial Centre Zone, I2 or Industrial General Zone, I3 or Industrial Heavy Zone, Open Space Zone, and CentrePort Rural Zone. The zoning by-law also includes 3 overlay zones: Walkable Streets Overlay Zone, Active Transportation Overlay Zone, and Industrial Corridor Overlay Zone (The Rural Municipality of Rosser, 2015).

The I1 zone buildings have the smallest footprint in all of CentrePort, are located at or near the lot line abutting the sidewalks, and can be up to 10 stories high. This zone is oriented towards light industrial uses and medium scale retail, service, office, and accommodation uses with generally higher employment counts. Main floors can contain commercial and office uses, and single mass upper stories can

contain flexible light industrial, civic, and additional commercial and office uses. The I1 zone must have streetscapes that are pedestrian friendly, which means pleasant sidewalks, street furniture, attractive landscaping, and commercial activity along the Walkable Streets and Active Transportation Corridors (Rural Municipality of Rosser, 2014). This zone is the most customer intense, and includes services for neighboring industrial users. It is also the only zone with traditional urban form, such as small blocks, density at intersections, and pedestrian friendly streets (Brown, Wells, Winter, 2014).

The I2 zone buildings have the second largest footprint, must be entirely or mostly located at or near the front lot line abutting the sidewalk if within an Active Transportation Corridor, and can be up to 3 stories high. This zone is comprised of industrial uses like manufacturing and distribution, and includes substantial large cargo truck activity and high cube warehouses. Ground levels can include industrial, manufacturing, office, and storage. Ground floors might also include outdoor assembly and retail sales in addition to the primary industrial use. Upper stories can consist of industrial, manufacturing, and office use. Streetscapes in the I2 zone are made up of practical and functional frontages, for example loading docks and other accommodation for the movement of large trucks and other service delivery vehicles.

This zone's streetscapes might also include some tree plantings for shade (Rural Municipality of Rosser, 2014). This zone is comprised of mostly large, assorted building sizes, considerable activity from large trucks, and although it is accessible and interconnected, it is not oriented towards pedestrians (Brown, et al., 2014).

The I3 zone buildings have the largest footprint in CentrePort, can be located anywhere on the lot (in accordance with Bulk requirements), and are as high as 3 stories. This zone is oriented towards heavy industrial use like manufacturing and distribution activity. In these buildings ground floor use can span from industrial, manufacturing, and distribution uses to office uses. Upper stories can include industrial, manufacturing, and office use. The streetscape in I3 zone are made up of industrial frontages, like loading docks and other accommodation for large trucks and service delivery vehicles. Streetscape might also include non-obstructive trees for shade (Rural Municipality of Rosser, 2014). This zone is designated for the most industrial, manufacturing, and distribution uses, with large buildings, and significant activity from large trucks and rail. It is also accessible and interconnected, but not oriented towards pedestrians (Brown, et al., 2014).

The Open Space Zone will be addressed in zoning maps with an Open Space Plan in the

future. This zone will be used to protect environmentally sensitive lands, and to provide areas for parks and recreation. It may also be used to separate specific land uses inside the I1, I2, and I3 zones (Rural Municipality of Rosser, 2014).

Based on feedback received from a public hearing in September 2014, an additional zone was introduced. The CentrePort Rural Zone is meant to preserve and protect lands for future industrial and commercial uses. It also allows existing uses to continue until the areas are needed for commercial or industrial development (Rural Municipality of Rosser, 2014; The Rural Municipality of Rosser, 2013).

The overlay zones can be placed over the existing I1, I2, I3, Open Space, and Rural zones, and may or may not align with their boundaries. They are intended to identify provisions or incentives to guide development in a specific area (Rural Municipality

of Rosser, 2014). The Walkable Streets Overlay Zone is the most pedestrian friendly, as it requires pedestrian friendly streetscaping and allows walking between uses. This includes elements that support pedestrian comfort and commercial activity, like pleasant sidewalks, street furniture, public art, and landscaping. The Active Transportation Overlay Zone necessitates pedestrian, cyclist, and public transit infrastructure that is separated from trucks and automobiles by 20 feet of grass or ditch. Such infrastructure includes sidewalks, multi use paths, and bike lanes with buffers and landscaping. Finally, the Industrial Corridor Overlay Zone may include most of public road network, and is meant to prioritize rapid movement of industrial traffic. In this overlay zone there is minimal buffering and landscaping, and the infrastructure is designed for large trucks (Rural Municipality of Rosser, 2014).

Lessons Learned

Essentially, FBC allows a mixture of compatible uses in a walkable neighborhood pattern. It creates character zones and predictability, and should be of interest to all planners because it offers the easiest route to enabling livability. CentrePort is unique in its use of FBC in an industrial area. Although it is not very common, some other examples can be found in El Paso, Texas, and Dona Ana County, New Mexico. While most sources praise FBC for contributing to walkability and livability in more established and/or historical districts that usually include residential, applying it in an industrial area provides some important benefits as well.

According to Hazel Borys, the PlaceMakers, LLC Project Principal who led the CentrePort FBC, "The use of FBC at CentrePort will help to create a greater sense of identity within the port. It also allows for both an active transportation network, and a convenient place for workers to go for services. However some aspects could have been strengthened. This FBC project was much less holistic in scope than most others, as it incorporates very little main street, and no residential use at all within the R.M. of Rosser, due to airport proximity." Borys goes on to say, "The process of creating the FBC included in the CentrePort by-law involved numerous interviews, design workshops, open houses, and

WS: Walkable Streets

ATC: Active Transportation Corridors

IS: Industrial Streets



Above: CentrePort overlay zones, received from the CentrePort Zoning Bylaw 10-14.

“The use of FBC at CentrePort will help to create a greater sense of identity within the port”

- Hazel Borys

public hearings. Throughout the process, some collaborative efforts worked better than others. The Rural Municipality of Rosser is the closest to actually adopting the FBC, but it was more difficult for Winnipeg. This is likely due to a more politically charged environment in the city. Ultimately, taking small steps towards walkability within a car-centric environment worked really well for all parties involved. Each entity was open to incorporating FBC in the by-law, and showed growing interest in how to encourage more I1 development. Of particular interest to the City of Winnipeg were the Sustainability Standards, that require new development choose from a menu of resilient development options, and achieve a passing score before construction can begin. For this project, the code was the first component to be drafted, then the policy followed. This process is actually most effective when reversed, so that the policy is determined initially, and the plan and code follow. It is important for projects such as this, where numerous parties have a stake in the process and outcome, that edits of the documents are consolidated. Many players looking for different outcomes can become quite challenging.”

Borys concludes, “Perhaps the most consequential lesson to be taken out of this project is the importance of education,

outreach, and political will. Providing educational opportunities for all parties involved about the basics of FBC, its potential, and how it can be implemented feasibly, is key to ensuring its success. Outreach is critical as sharing information with all involved can help ensure that the FBC is supported and meets the needs of the community. And finally political will is essential because not only do politicians represent the interest of the public but they also influence their thinking and willingness to try new approaches. Success often hinges on an incremental implementation strategy, with one step at a time. The Codes Study, a FBC analysis in process for the last decade authored by Dr. Emily Talen and me, shows that most FBC is implemented at the neighbourhood scale. While a few, like Miami, have adopted FBC city-wide, most opt for taking a step at a time. This usually involves small area plans and mandatory FBC for one neighbourhood at a time, plus floating zones city-wide for developers who want to opt-in to the FBC or else for mapped Transit Oriented Developments (TOD). This usually requires a mandatory acreage of 40, 80, or 160 acres in greenfield or suburban retrofit sites, or otherwise an interconnected street grid surrounding the new development. This floating overlay lets developers nimbly respond

to market forces while the local government planning department can go about an orderly specific planning process in a transparent way that engages the community to help articulate local character.”

Conclusion

Perez (2014) asserts that FBC is a necessary zoning reform, but one that will likely be difficult to set in motion as it will require replacing a deep-rooted system in a slow economy (Rangwala, 2013). Although FBCs only make up a small portion of zoning frameworks across North America, there is evidence that it is gaining momentum as a method. Of the many FBCs now in existence, the majority have been adopted within the last decade (PlaceMakers, LLC, 2015).

Much like CentrePort’s zoning by-law, most of these FBCs are successful (or at least partially successfully) hybrids – a combination of FBC and Euclidian zoning. However, it is important that practitioners avoid exaggerating the merits of, or providing misinformation about FBC. It is still zoning, and requires proper priorities and parameters to be set. It is not an all-embracing cure for the woes of communities, nor a replacement for good planning; rather it is a tool that has the potential to help create and enhance urbanism by removing impediments in contemporary zoning codes (Perez, 2014; Rangwala, 2013; Khoury, 2013).

T5 Neighborhood Large Setback (T5N.LS)



T3 Neighborhood (T3N)



T5 Neighborhood Small Setback (T5N.SS)



T6 Core (T6C)



Above: T-Zones from the Cincinnati FBC received from [http://www.cincinnati-oh.gov/planning/assets/File/CFBC_1703_FBC_FinalDraft_021513_web\(1\).pdf](http://www.cincinnati-oh.gov/planning/assets/File/CFBC_1703_FBC_FinalDraft_021513_web(1).pdf).

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