Commerce Center Templates

WorkPlace

Design for Dignity, Delight and Worth

WorkPlace is the name of Grand Valley Metro Council's project to study and suggest new approaches to the location and design of the places where our citizens work and invest their time and money. This project includes 1) a study of the potential for increased regional wealth through the purchase of local materials, supplies and services by local industry; 2) this Commerce Center Template study, 3) a regional discussion on the location of such districts; 4) a small charrette using the results of the Template study, 5) an examination of the experience of a developer of a workplace; and 6) publication of the results of this work.

Design for Dignity, Delight and Worth is the motto of this project. The focus is on the physical and public aspects of employment centered neighborhoods – "commerce centers" – thus **design**. But the design is directed by these principles:

- the **dignity** of humanity and of good work;
- the importance of designing places that **delight** those who work, play, visit and reside there;
- and the need to design cities and human places that are economically and environmentally sustainable - **worth**.

This document and this work has been funded by
People and Land,
a project of the
W.K. Kellogg Foundation

Author: Jay Hoekstra, AICP, Senior Planner
With assistance from Gregory Hoogland, Intern

Contents

1 Introduction
2 Guiding Considerations
    Urban Economic Considerations - Creative Class
    Effect of Urban Form on Human Health and Economic Efficiency
3 Regional Form and Extent
4 Industrial Commerce Center Template
    Summary, Commerce Center Size and Context, Blocks, Street Network and Street Types Industrial Building Types and Location Needs, Transit, Parking Space, Storm Water Management. Setbacks, Additional Characteristics
5 Office Commerce Center Template
    Summary, Detailed Description, Office Commerce Center Size and Context, Blocks, Street Network and Street Types, Office Building Types, Transit, Parking Space, Storm Water Management, Setbacks, Contrast With Office Park,
6 Characteristics of Both Commerce Center Templates
    Transportation Efficiency and Equity, Cost of Transportation – Personal and Community, Street Connectivity, Compact Development
7 Making it Happen – Building Cities and Towns
    Setting Quantities at the Region, Develop New Standards, Choosing Locations, Active Planning and Design, Management

Appendix
Bibliography
List of Documents in Accompanying Computer Disk

Introduction

The spatial needs of employment and commerce have changed over the decades and are changing again. Employment spaces fall into a few categories: retail space, office space, light industry spaces for many sorts of uses, and some specialized spaces such as hospitals, colleges, and large, heavy manufacturing complexes.

The goal of this project is to define optimum commercial activity centers which efficiently serve their occupants, communities and governments. These commercial activity centers should be competitive in the global economy, support a just economy, be environmentally healthy and engender a rich social and cultural life.

We believe that there is a physical form which supports all of these goals. Recent research and reflection by smart growth groups, the Congress of New Urbanism, the LEED Neighborhood Design task force and others is converging on common principles and standards. We have gathered much of this work and have used it in this document.

The State of Michigan's Land Use Advisory Council and Grand Valley Metro Council's Blueprint plan for our region both spoke of the importance of "commerce centers" or economic "activity centers". This document is intended to further define commerce centers according to the principles described above and the most recent research and standards.

Guiding Considerations

The design of regions, cities and neighborhoods is connected to economic vitality and sustainability.

Urban Economic Considerations - Creative Class

The idea that creative or at least college educated people are the source of prosperity and that such people are attracted to well designed and culturally vibrant cities is dominating economic development discussions. The economists have observed that creative, young people are moving to places that the economists describe as central city neighborhoods, or cities like Chicago or Boston. The economists have located a crucial factor for economic health, and these are some of the characteristics of that factor:

> *What seems to make central cities attractive places to live for talented individuals is that they offer something different from the suburbs. Many vibrant central city neighborhoods are characterized by an active street life. These neighborhoods are safe, have high densities, a mix of residential and commercial uses, an active arts and entertainment scene, and a walkable environment. These high-activity neighborhoods are largely, but not exclusively, located in and near downtown.*
>
> *These neighborhoods are characterized by lots of young, affluent, and diverse residents on the streets at all hours of the day, including days where there is no big event. By and large, these are not the kind of neighborhoods that are available in Michigan today.*
>
> *For many Michiganians, vibrant central cities are part of the past—no longer relevant, or just something you visit in unique places like Manhattan, Toronto, or Chicago. Think again! They are an important ingredient to future economic success. The pattern across the country is clear: high-prosperity metropolitan areas have central cities with a concentration of knowledge workers.*
>
> *Michigan employers who are recruiting young talent from across the country understand this. Those we talked with for this project told us that the absence of a vibrant central city impedes their ability to attract talent.*
>
> *It is our strong belief that our metropolitan areas need to put on their priority list vibrant central city neighborhoods. (*Page 25, *A New Agenda For A New Michigan* Report by: Michigan Future, Inc., 2005)

Central cities are not the only possible locations for the characteristics listed in the first paragraph of the quote. The fact that they have not been found in suburbs is a result of history, and that is changing. Some vibrant neighborhoods, both in Michigan and throughout North America, have been recently built. What is attractive about these new places is that they have an urban form which allows social life to flourish. The physical parameters of these places are crucial to their success. These parameters include building placement, block size, street design, density, and so on. They can be reproduced in new developments, or redevelopments of suburban shopping centers, suburban office parks, and industrial parks.

To attain the degree of economic health Michigan is seeking we must relearn how to make attractive and efficient cities. We cannot rely only on the few places left over from the pre auto age. That is what this project and document are attempting to facilitate.

There should be more interaction between those who wish to attract the creative class and the new wave of urban design. It is beginning. An example is the 1998 publication by the James Irvine Foundation "**Linking the New Economy to the Livable Community**" written by Collaborative Economics. Some of the salient points of this document are:

- In the “New Economy” firms are smaller: 55% of workers are in 100 or fewer person enterprises, 25% are in 100 to 500 person enterprises. This means smaller buildings are needed. For a manufacturing enterprise at 500 square feet of space per employee, 80 employees would need a 40,000 square foot building, 100 employees – a 50,000 square foot building.
- People have a “portfolio” of skills and move from job to job, to different types of work. There are more “Craft” workers. More women integrate child raising and work. More people work at home.
- There is a need for smaller workplaces, live work situations, work at home situations, but still with the opportunity for third place meeting, within a socially and culturally rich environment.
- Workers experience much change and flexibility in work organizations and alliances.
- Clusters: Regions benefit from having a concentration in certain sectors of the economy as there can be sharing of skilled workers, changing configurations of businesses for new opportunities and ideas. Clusters gain their power through the force of face-to-face creative collaboration. A cluster is a learning network.
- There should be ease of interacting and meeting within the region, both formal and informal – within and without organizations. [Therefore there is a need for third places, and walkable/transit oriented employment centers.]
- Firms and people gain from being in the same place. Proximity reduces transaction costs.
- Companies need to be able reconfigure their work space quickly.

Effect of Urban Form on Human Health and Economic Efficiency

This project is directed by these observations:

- Our region and our nation cannot afford the external costs of conventional employment centers.
- Lower income employees, who we wish to support and on which in a global economy we depend more and more, cannot afford the transportation expenses caused by our conventional employment centers.
- Local government cannot afford to provide the extended infrastructure of conventional employment centers.
- As a society we cannot afford the environmental impacts of conventional employment centers.
- As a society we cannot afford the expenditure of land demanded by conventional employment centers.

Traditional urban form results in better human health and economic efficiency than does recent, conventional development. This is becoming more evident the more it is studied. Recent research is summarized well in *LEED-ND Report on Public Health and the Built Environment* and in the $4.5 million study of sprawl versus traditional development in the Atlanta, Georgia region titled SMARTRAQ. The most discussed impact has been the rise of obesity, and that epidemic has spurred local and national public health initiatives to change urban form.

Public health impacts are closely related to economic inefficiencies of sprawl; or, to put it positively, the potential for economic efficiencies with traditional urban forms.

It is worth recapitulating some of the main points of these studies to emphasize the importance, value and perhaps even necessity of what is being proposed in these commerce center templates.

The health impacts revolve around the extent of auto use versus the ease and extent of walking, bicycling and use of public transit. Extensive auto use causes respiratory disease, auto or pedestrian crash injuries, and some mental health stress. Nationally there have been about 43,000 deaths from auto accidents each year. The severe decrease in walking results in lack of physical fitness. Obesity has become a national epidemic, and is the second highest cause of illness. Social connections of all levels of interaction are higher in traditional urban places; and the lack of these connections in conventional development results in additional stress and lower health overall. The lack of social connections itself is an important drawback, often unnoticed in lives that are still busy with commuting, work and school.

"New Data for a New Era, A Summary of the SMARTRAQ Findings", is the result of a multi year, multidiscipline and extensive study of the Atlanta, Georgia region. It was a study of the relationship of land use, transportation, air quality and health. It found that the "residents of the most walkable areas in greater Atlanta were about 2.4 times more likely to achieve recommended physical activity levels than were residents of the regions' least walkable areas." [*]

The implication of these studies is that our urban form must be redesigned for pedestrian comfort, gracious human interaction, more use of transit, no waste of space, less space for auto movement, streets designed for wider range of uses, a well connected street network, less separation of uses and more attention to environmental impacts.

[*] Description of the study by New Urban News, March, 2007

Commerce Center Context

It is the aim of this study and GVMC to plan in increments of walkable neighborhoods. Although these may vary from 40 acres to 200 acres, for ease of discussion we will use a size of 160 acre squares, which would have a 1800 foot, 7 minute walk to the center from the edge. There are social and environmental reasons for this size which will be explained later in this document. In order to accommodate all the employment and retail needs, neighborhoods are planned to be clustered in groups of about seven. One neighborhood does not usually contain enough retail dollars to support the full range of retail enterprises, whereas a group of them will. The diagrams shown below indicate the proposed pattern of development [1.] The diagram on the left is from a development guide for Western Australia, but the pattern is common in both new and old urban planning practice. It shows a central neighborhood with a larger core surrounded by more residentially dominated neighborhoods. It also shows an industrial district near a freeway. The center diagram shows some variation in this pattern with secondary downtowns and some crossroad centers. The diagram on the right shows a regional pattern of such clusters which gives the metropolis a sustainable form.

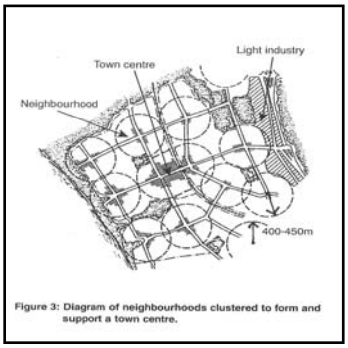


Figure 3: Diagram of neighbourhoods clustered to form and support a town centre.

Graphic by Duany Plater-Zyberk Co.

Graphic by Duany Plater-Zyberk Co.

Proportions of uses, building types, and site types vary by neighborhood. For the sake of clarity, city planners are beginning to classify neighborhoods into three or four levels – from central city downtowns to country hamlets. Some of the most intense neighborhood units would have higher proportions of the land devoted to employment uses, and less to residential use, although the latter might be at a higher density as well.

In July of 2002 a group of professional planners from jurisdictions in the Grand Valley region chose 4 levels of neighborhoods as optimum for the Region. They types were: major downtown, community, neighborhood and hamlet. The radius of all of these would be between 1200 to 1900 feet.

Industrial Areas and Office Districts as Neighborhood Components

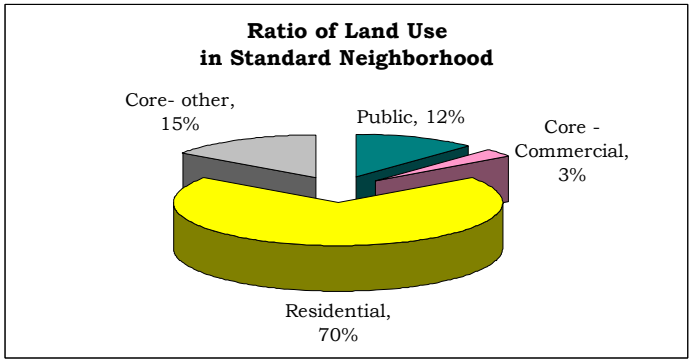
Employment spaces fall into a few basic categories – retail, office, light industry and a few specialized spaces. This project focuses on non retail employment which occurs in office and industrial types of buildings and locations.

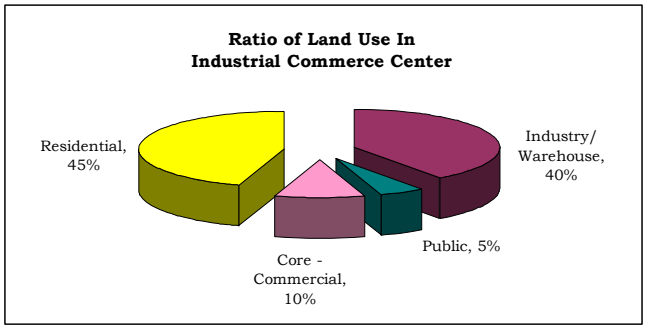
Industrial enterprises have, over the last 50 years or so, been more and more separated into special "parks", even as the unpleasant characteristics which motivated the separation have diminished. At this time the only characteristics incompatible with other uses are truck traffic and the large size of some of the buildings. The industrial park configuration has some negatives: it is not easily accessible by employees especially via public transit, it does not provide many of the daily needs for employees and businesses, the large block configuration leads to traffic congestion; grass and trees in the large, required setbacks do not contribute to storm water management; and there are other negatives.

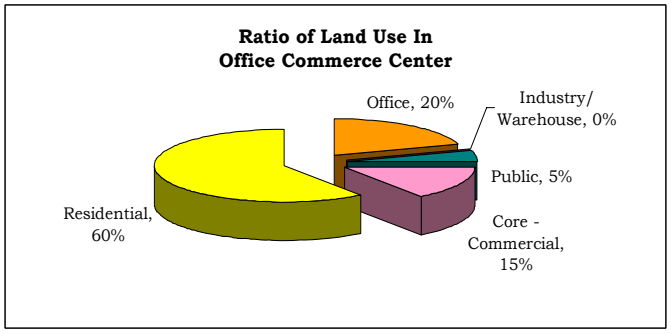
We propose that industrial areas, somewhat redesigned from the previous ideal, should be incorporated as an adjacent sector of an otherwise normal neighborhood. There have been some examples designed and or built already [3], and the industrial areas of the early 1900's exhibited some of these characteristics. The most recent edition of *Business Park and Industrial Development Handbook*, by the Urban Land Institute cites this approach as an emerging trend (Page 297).

Industrial districts would then be part of an industrial commerce center neighborhood. Office commerce center neighborhoods would be the central neighborhoods of a group of more residential neighborhoods, and would also contain a larger amount of retail uses and core commercial uses. There would be more industrial land in the industrial district that is not calculated in the neighborhood totals in the tables and graphs below.

Ratio's of Land Use by "Neighborhood" Type				
			Commerce Centers	
Land Use Type	Neighborhood	Urban	Office	Industrial
Office			20%	0%
Industry			0%	40%
Public	12%	10%	5%	5%
Core - Commercial	3%	20%	15%	10%
Residential	70%	45%	60%	45%
Core- other	15%	25%	0%	0%
Total	100%	100%	100%	100%



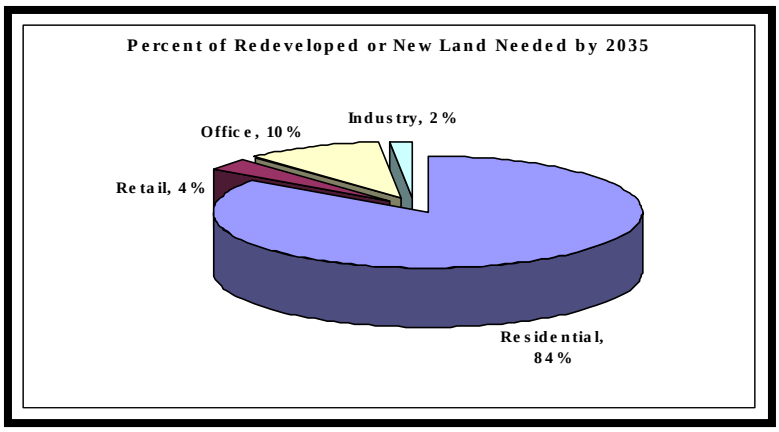




Regional Employment and Number of Commerce Centers

Employment and population projections for Kent County and eastern Ottawa County were used along with a variety of development rates to produce rough estimates of the amount and ratio's of redeveloped or new land needed by 2035.

	Acres	Ratio
Residential	13,000	84%
Retail	500	4%
Office	1,600	10%
Industry	300	2%
Total	15,400	100%



The amounts in the table above could be significantly reduced by increasing density, and has been reduced in the most recent economic and population projections. In fact West Michigan has lost employment in many sectors and has been projected (W. E. Upjohn Institute) to regain 2000 levels possibly in 2012. The employment categories are assigned to land use categories in the following way:

Industrial Classification by Land Use Category		
(North American Industrial Classification, NAIC)		
Industry	**Retail**	**Office**
Utilities	Retail Trade	Information
Manufacturing	Arts, Entertain, Recreation	Finance, Insurance
Wholesale Trade	Accomodations, Food Services	Real Estate, Rental, Leasing
Transportation, Warehousing	Other Services	Professional, Tech Services
Administration, Waste Services		Mngmt of Companies
		Educational Services
		Health Care, Social Asst
		State Gov

The distinction between these land use categories of office, commerce and industry has become less precise. Offices are often included in manufacturing and warehouse buildings. Office and retail uses especially are often housed in the same buildings or in the same block. Nevertheless there are still needs for unique building types and locations.

The Industrial Commerce Center Template

Summary

It is part of a neighborhood of walkable radius, and is itself part of a cluster of neighborhoods. The industrial district could be small and still viable, but a 135 to 170 acre district would be quite sizable and could form half of a neighborhood.

An industrial area would contain more large size blocks than a residential or downtown neighborhood, but still would be in the usual city range. The largest blocks would be 300 feet by 700 feet not including street right of way. The smaller blocks could be 300 feet by 300 feet.

There would be a network of "A" streets devoted to all normal street uses, and "B" streets which function as truck and auto alleys.

Setbacks would be eliminated. Buildings would be required to set up to the "A" streets. The space saved would be used for better management of storm water, for public spaces, or simply making the district more compact, walkable and therefore more transit feasible.

With a more compact form and a location adjacent to a subregion of neighborhoods, the industrial neighborhood can be and is served by high frequency transit. High frequency is every 15 minutes.

With a more compact form, shared parking within walking distance of most worksites becomes physically possible.

Each firm provides less auto parking and charges employees for parking spaces used. Each firm pays employees either a taxable parking payment or a nontaxable transit payment. Other commuting management strategies may be used. (*Parking Spaces/Community Places,* U.S. EPA, January 2006)

Parking spaces are provided on "A" streets, either angle, back in angle, or parallel. Some of these spaces would be rented by the month or day.

Storm water would be managed on a district wide basis, and would incorporate best practices such as green roofs, permeable pavement, and rain gardens. The goal would be to emulate a watershed while accommodating a much more concentrated urban form.

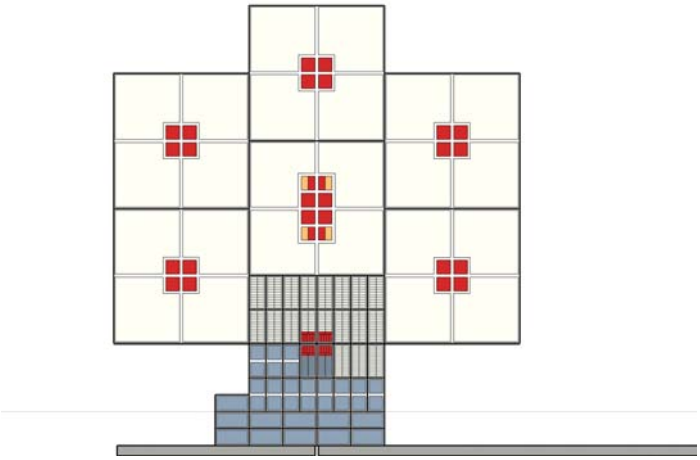
Warehouse and truck terminal uses would be closest to freeway interchanges. Smaller buildings and multi-user buildings would be nearer the center of the neighborhood.

Block size in the sustainable template must be of a limited size to allow pedestrian focused accessibility and density.

Industrial District Size and Context

It is part of a neighborhood of walkable radius which is itself part of a cluster of neighborhoods.

The industrial district can be fairly small, but a 135 to 170 acre district would be quite sizable and could form half of a neighborhood.



Each red centered square in the diagram represents a quarter square mile neighborhood. The dark gray area is the industrial district bordering the freeway (the strip along the bottom). The red represents the commercial and social center of each neighborhood, with the center neighborhood being the subregional, retail center and it may also be a commerce center for office employment.

Early in this project we met with a few industrial realtors. Their opinion was that district size was not very important, but that access to transportation facilities was very important. Our prototype, shown above as the bottom neighborhood in a cluster of seven neighborhoods, is adjacent to a limited access, separated high speed highway. Authoritative sources are vague about a normative district size. Our prototype was purposely limited to be half an ideal neighborhood, so that most employment sites are within a walkable distance of retail center uses, transit and common parking areas. Some enterprises with low employee densities, such as warehouses and truck terminals are placed at the edge, nearer the highway. With these blocks added to the edge, our prototype contains about 3,000,000 square feet of floor area. That would rank as a large cluster of buildings compared to other developments around the United States. The prototype could be reduced by a number of blocks.

This size provides space for many types and numbers of buildings. Enterprises could expand by moving to another building or adding buildings, without changing location.

The total amount of land allocated for industrial use in the template is about 6,000,000 square feet, 137 acres in gross area.

Our calculations of future land use needs for employment growth show that the region would need about 300 acres for “industrial” use. That would mean about two of these industrial neighborhoods on new or redeveloped land. We emphasize that older industrial areas that are already embedded in residential neighborhoods are good candidates for reuse, if they are now under used. Existing industrial “parks’ which have not been fully developed might be converted to complete neighborhoods. For transportation and economic health reasons, it would be best not concentrate these districts in only one part of the regio

Graphic by Duany Plater-Zyberk Co.

Blocks

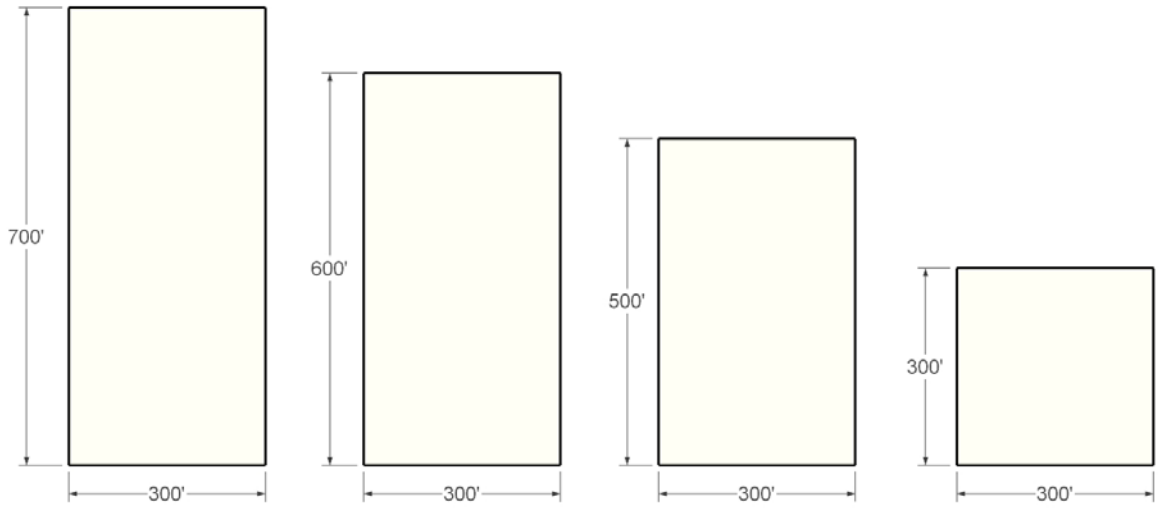
An industrial area would contain more large size blocks than a residential or downtown neighborhood, but still would be in the usual city range. The largest blocks would be 300 feet by 700 feet not including street right of way. The smaller blocks could be 300 feet by 300 feet.

Most industrial buildings are rectangular in order to efficiently accommodate their uses. Some of the buildings are large. The group of block types chosen for the model district accommodate the large, industrial buildings and can be combined at right angles in a variety of patterns. Street type and right of way width are also variables that affect the patterns of blocks. There can be many combinations of both. There are many other possible street and block sizes that would work just as well, however it is of paramount importance that blocks remain near or below a maximum of a quarter mile perimeter. Two of the block types are longer than 1320 feet so as to accommodate the larger industrial building types. However, the average size is less. Mid-block pedestrian passages can increase pedestrian connectivity. It is also important to decrease block size as the context becomes more pedestrian/transit oriented and dense.

.

The block sizes are:

300 feet by 300 feet,
300 feet by 500 feet,
300 feet by 600 feet,
300 feet by 700 feet.



Street Network and Street Types

There would be a network of "A" streets devoted to all normal street uses, and "B" streets which function as truck and auto alleys.

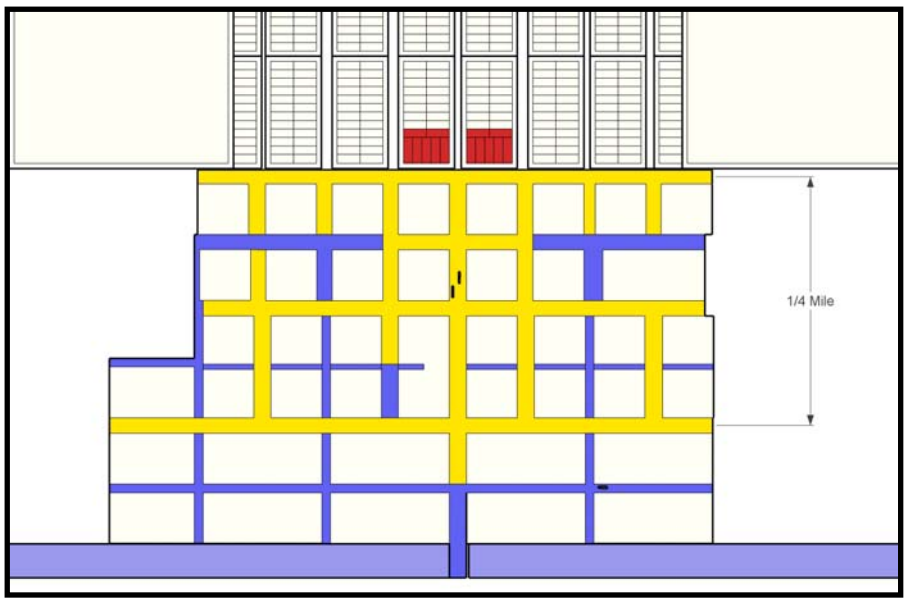
The network of streets include a sub web of "B" streets that are oriented in design more to accommodate trucks and autos than pedestrians, although they would always have sidewalks. These B streets lead from the freeway – first to warehouse and freight forwarding sites, and then to loading dock areas of manufacturing sites and to auto parking sites. These B streets usually do not have on street parking and therefore could have side swales for storm water rather than curbs and storm sewer. Because of the tighter web of streets, they need only be two or three lanes wide.

The prototype is very right angled. Introduction of a few diagonal streets might increase connectivity considerably within the neighborhood, and, if the diagonal was extended to an adjacent neighborhood, might greatly increase the sub-regional connectivity

Buildings front on "A" streets which are pedestrian oriented and support on-street parking. Buildings back onto mid block loading and parking areas or, if they are larger, to B streets.

A streets conform to the cross sections for Context Zone 4 or 5 found in Grand Valley Metro Council's Form Based Code. [See Streets Section of the Form Based Code]

These older factory buildings in Grand Rapids give an idea of what an "A" street could look like.



The yellow streets are "A" streets. The blue streets are "B" Streets. Blocks are light yellow. Red represents the neighborhood center. The broad, light blue band at the bottom represents a freeway. Black spots in center are long, articulated busses added to give a sense of scale. A semi truck is represented at the correct scale, on the blue

Buildings

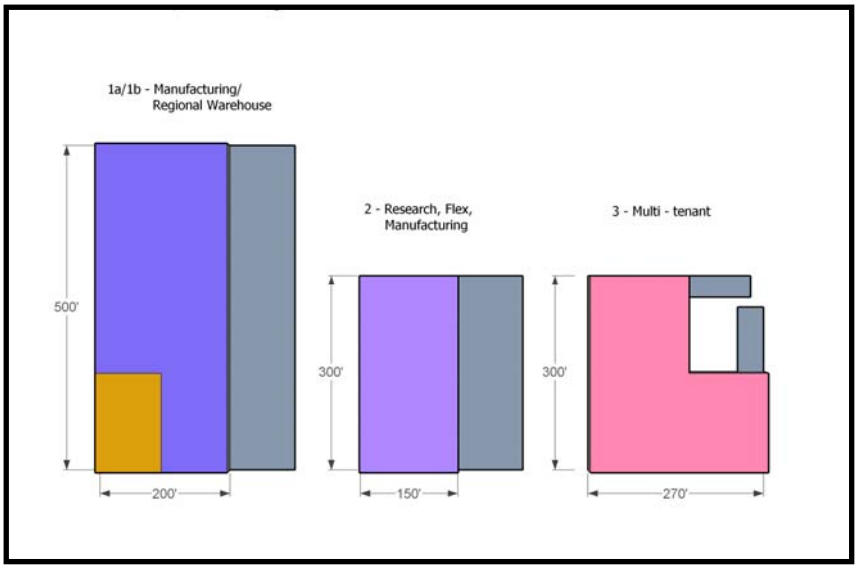
Industrial buildings are different than commercial, office and residential buildings. An assessment of building types and land use needs is essential to composing a useful template for an industrial neighborhood. We used the **Guide to Classifying Industrial Property** by Yap and Circ, published by the Urban Land Institute in 2003, to establish a few common building types.

The sizes were chosen to match the ranges described in the Guide mentioned above, but also to match the likely size of future enterprises of the New Economy. (See the Urban Economic Guiding Considerations section of this document). Still, we have included some fairly large buildings, and the blocks can support still larger ones. Discussions with commercial realtors suggested a strategy for manufacturers of expanding incrementally into a series of buildings, which also allows them to reduce the size of their businesses, if necessary, and have salable space in separate buildings. Having a variety of building sizes in an industrial area would make it easier for a business to expand or contract to different buildings without moving their location very far, and avoids disrupting spatial arrangements such as deliveries or employee commuting.

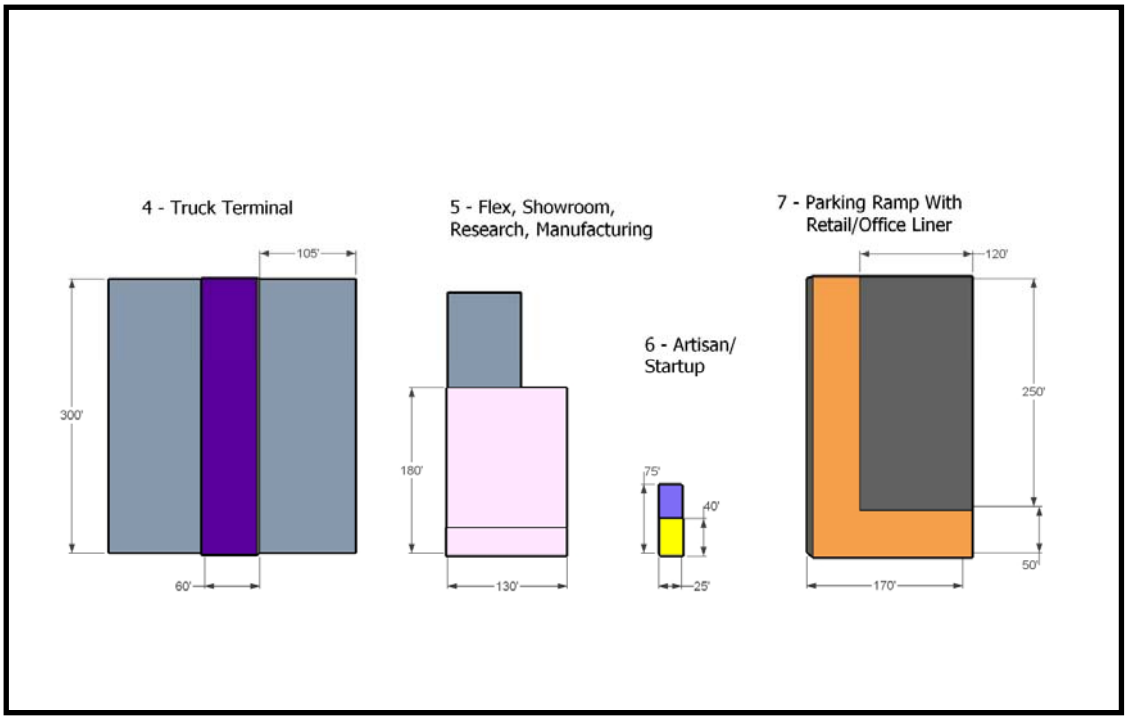
The building types represent those in common use. We added a small artisan or live/work type building as several sources thought this would be important to support entrepreneurs.

Building Types ID Number	Use Includes:	Square Feet of Floor Space	Square Feet Footprint	Docking Area Per Bdg	Number of Employees
1	Light Manufacturing and Regional Warehouse				
1a	Light Manufacturing	100,000	100,000	50000	200
1b	Regional Warehouse	100,000	100,000	50000	100
2	RD, Flex, Light Manufacturing, office showroom	45,000	45,000	30000	90
3	Multitenant	63,000	63,000	9000	126
4	Truck Terminal	18,000	18,000	63000	18
5	Flex, showroom, RD, light manufacturing	27,300	23,400	8000	55
6	Artisan/startup live/work	2,875	1,875	500	6
7	Parking Ramps	150,000	30,000	0	0

Industrial Building Types

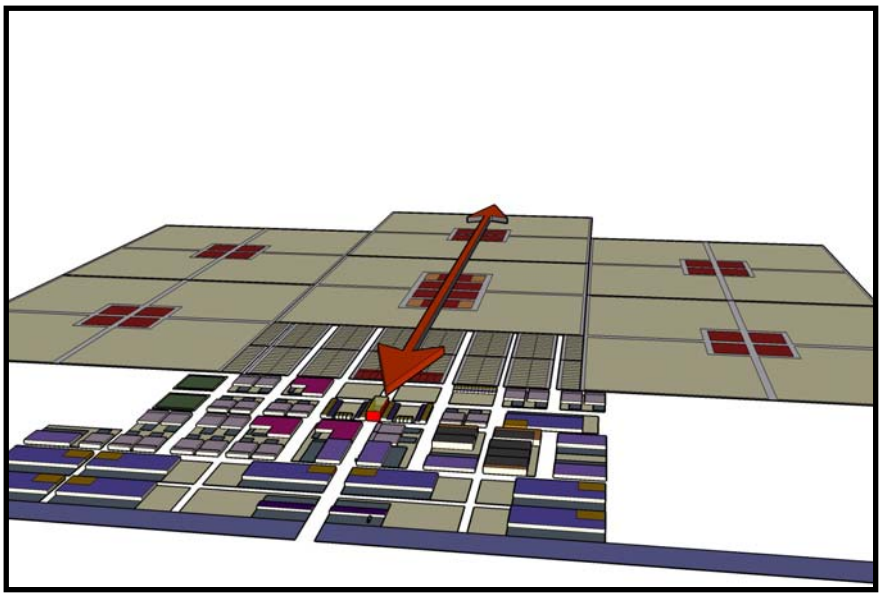


The gray areas in the diagrams represent truck dock paving.



Transit

The prototype contains a stop on fixed route, high frequency transit service – either bus rapid transit, light rail or trolley. The frequency of service on this route should be every 15 minutes, especially during work shift changes. The stop should be a station, with passengers' fares taken before boarding. The route would proceed to the subregional center and further to other subregional and neighborhood centers.



Red Arrow Shows Fixed Route, High Frequency Transit

The transit station in the prototype has over 4000 jobs within a three or four block radius. In addition there are residences in the live work buildings, in the downtown blocks and in the other half of the neighborhood. There are also the retail and office uses in the three or four blocks of downtown. Finally, there are 1250 parking spaces in the ramps one or two blocks away from the station. Commuters might use the ramp as a park and ride option, since it is near the freeway interchange.

The transit "station" is on the street located one block off the center intersection of the neighborhood, thus one block closer to employment sites and concentration of parking.

Light Rail Line, Barcelona

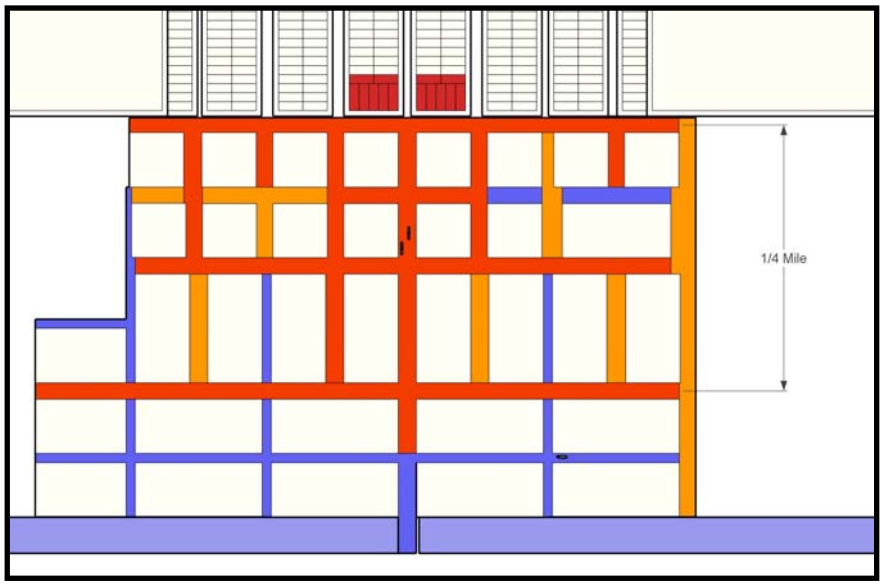
Parking Space and Transit

All aspects of the usual two development formats: separated uses/auto orientation versus mixed uses and traditional urban form, mutually reinforce those formats. Parking is an example. Separated enterprises on setback lots must provide parking for each employee plus extra for variations in demand, which in turn requires more land and spreads development further.

Parking may be as much as 35% of the land area used by enterprises in an industrial area; the rest being for building footprint, docking space and stormwater management. If that could be reduced by one half by making the location accessible by transit and some walking, it would be a considerable savings to private enterprises, to the public (with less utility cost) and to employees (who have lower transportation costs).

If parking is provided in common facilities, either surface or structured, the cost per space is generally less. The number of spaces needed for fluctuations in demand can be shared and therefore fewer, and variations in demand during the day and night can be taken advantage of. The parking structures in the model are located within an acceptable walking distance of the center of the neighborhood, the transit center, and the center of the industrial part of the neighborhood. (However, they are not on the central street of the neighborhood, nor are they adjacent to the freeway interchange.) They would be useful to visitors to the neighborhood center and to those parking and riding the transit, as well as those who are going to work nearby.

In our model a considerable amount of parking is provided on the streets. That has many benefits: it provides a buffer between pedestrians and moving traffic; the travel lanes of the street provide double duty as parking access lanes, thus saving land; and the coming and going of drivers contributes to the pedestrian activity on the street. The on-street spaces must be managed. They should not be free. The payment could be by meter or by monthly fee.



The red streets have angle parking. The orange streets have parallel parking. The blue streets have no parking. The blocks are light yellow. Red represents the neighborhood center. The broad, light blue band at the bottom represents a freeway. Black spots in center are long, articulated busses. A black dash on the blue street on the lower right represents a semi truck at the correct scale.

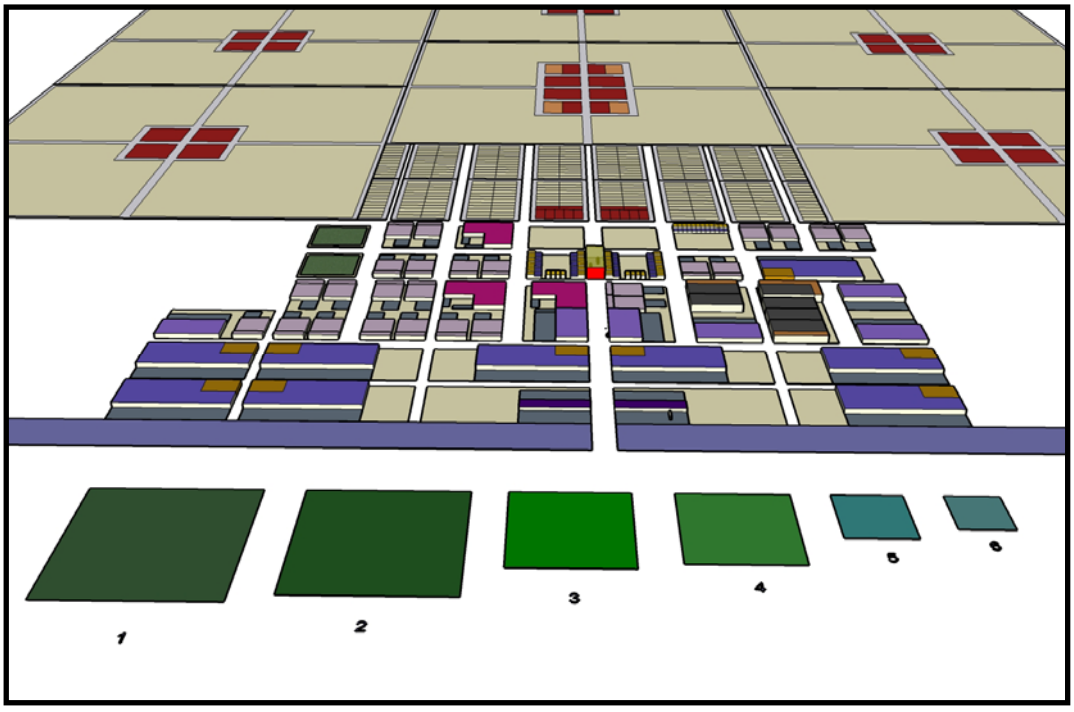
Stormwater Management

Managing stormwater by retaining it in basins on each site would be detrimental to the compactness of the prototype, which in turn would adversely affect walkability and transit worthiness. Stormwater management is best planned on a neighborhood wide basis, although property owners remain responsible for the disposition of rain which falls on their property. The table below shows the area of retention basin needed given variations in transit service and use of other practices. The prototype already benefits from the presence of 5 large parking ramps which reduce by 80% the impermeable surface area of parking spaces exposed to rain.

The three main storm water management practices are "green roofs", permeable pavement, and rain gardens. Another possible practice would be to collect all rain water, treat it and use it in manufacturing processes. Here we only calculate the use of the first three. [Greater density of development resulting in less impermeable surface per job or residence could be considered another best management practice.]

The table and the graphic shows that without the three practices, retention takes up much space in the district. Retention cannot always be shifted to distant locations. Basin storage does not have to be present on each property; however, it can not be completely aggregated in a neighborhood unless the local topography is steeply sloped.

		Best Management Practices	Acres of Retention
Example	**Transit Provided**	**Green Roofs, Permeable Pavement, Rain Gardens**	**Basins Required**
1	No	None	9.93
2	Yes	None	8.92
3	No	One Half	4.82
4	Yes	One Half	4.3
5	No	All	1.67
6	Yes	All	1



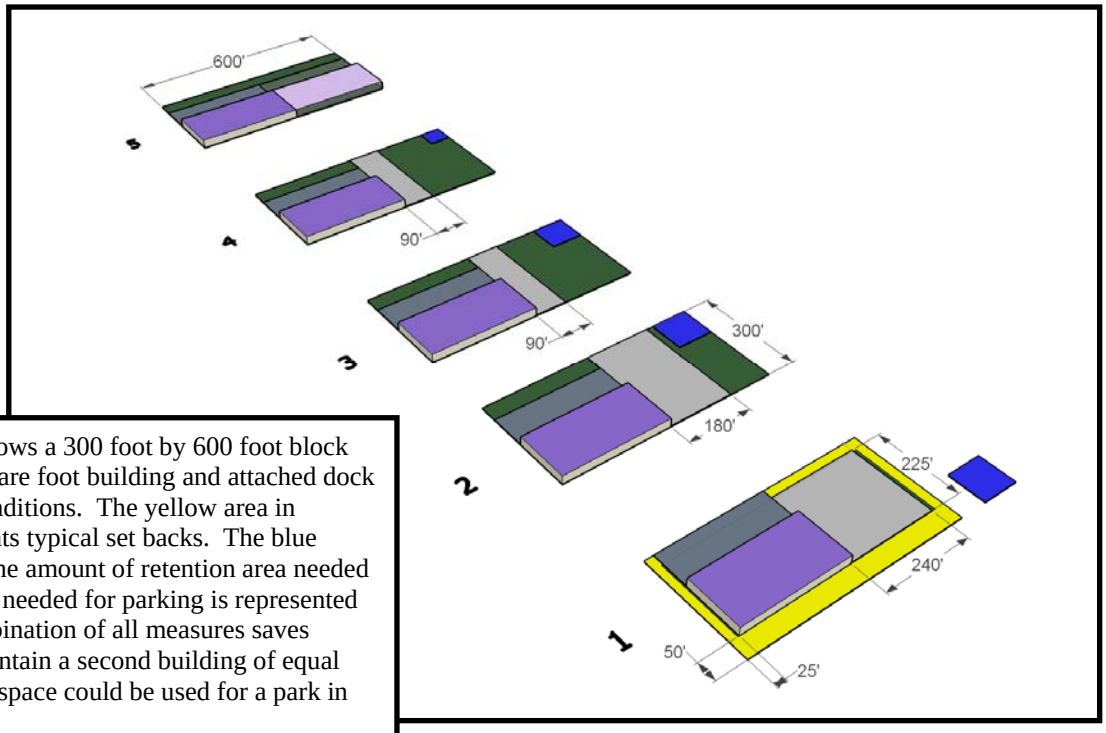
Setbacks

Most recent industrial zoning districts require buildings to be set back from property lines. A sampling of standards from five local governments in the Metro region showed the following averages -- Front: 50 feet, Side: 20 feet, Rear: 25 feet. These setbacks take up approximately 30% of the net buildable area, a large ratio. (A spreadsheet for testing setbacks for space usage is available with this document) Typically these areas are covered with mown grass which does not significantly reduce storm water run off.

A study of development standards for industrial parks, both old and new, revealed no reason for these setbacks, except as way to create a "park like" setting.

This template eliminates those setbacks in exchange for a more compact, pedestrian friendly space and the aggregation of open space into genuine, natural areas. The illustration and table below shows the cumulative effect of the measures described above.

Saving Land Alternatives					
Example	Setbacks	Transit	Green Roof	Permeable Parking Surface	On Street and Ramp Parking
1	Yes	No	No	No	No
2	No	No	No	No	No
3	No	Yes	No	No	No
4	No	Yes	Yes	Yes	No
5	No	Yes	Yes	Yes	Yes



This illustration shows a 300 foot by 600 foot block with a 100,000 square foot building and attached dock area, in various conditions. The yellow area in example 1 represents typical set backs. The blue squares represent the amount of retention area needed in each case. Area needed for parking is represented by gray. The combination of all measures saves enough space to contain a second building of equal size. Or the saved space could be used for a park in another location.

Additional Characteristics of the Industrial Template

The other half of the industrial neighborhood would be a traditional neighborhood, with a mix of housing types and a fairly high average density. LEED-ND recommends a minimum of 7 dwelling units per net acre, and transit use increases greatly at 12 to 16 units per acre.

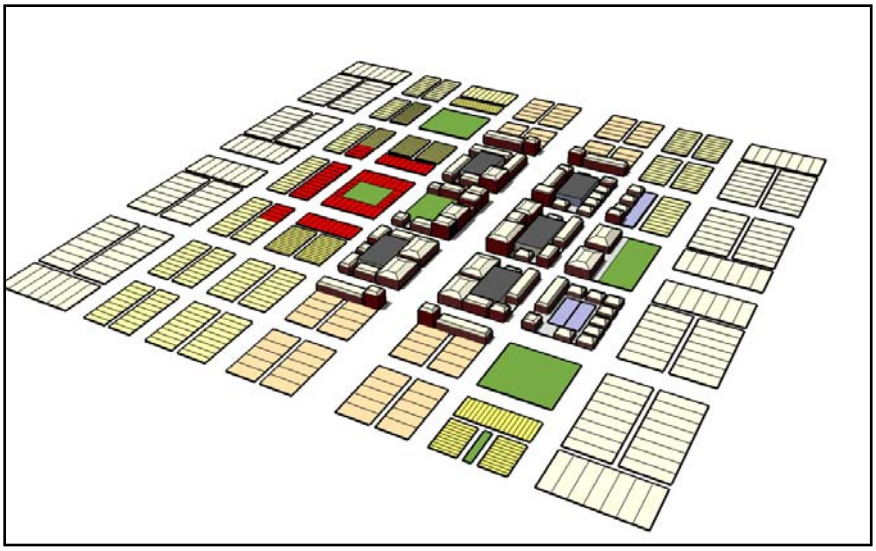
By structuring the employment area as transit dependent and stormwater efficient, the average employment density is high, approaching 30 employees per acre. This is a density that can support transit. (See the LEED_ND Health Document included with this document.)

Industrial Commerce Center Template				
		With Transit	Without Transit	Units
Land Area		7,346,200	7,346,200	Square Feet
Total Building Footprint		2,308,950	2,308,950	Square Feet
Docking Area		1,028,500	1,028,500	Square Feet
Street ROW		2,336,200	2,336,200	Square Feet
Offstreet Parking Area		-	659,190	Square Feet
Total "Impervious" Area		5,673,650	6,332,840	Square Feet
Remaining, Uncovered Area		1,672,550	1,013,360	Square Feet
Total Parking Spaces				
	Onstreet	2,385	2,385	Car Spaces
	Offstreet	-	1,250	Car Spaces
	Demand	2,675	5,832	Car Spaces
Number of Jobs		4,106	4,106	Jobs
Floor Area Ratio		0.42	0.42	
Total Street Length		5.9	5.9	Miles
	A streets	2.4	2.4	Miles
	B streets	2.1	2.1	Miles
	undefined	1	1	Miles
Jobs Per Acre		24	24	

The Office Commerce Center Template

Summary

The office commerce center is part of a neighborhood of walkable radius, and is itself part of a cluster of neighborhoods.



The office district would be smaller than an industrial district because it can more easily be housed in multi-story buildings and there are more employees in a given unit of space. In this template the employment area is thirty-six acres. With the 4 acres of parks, it makes up one quarter of the neighborhood.

An office employment area would contain more small blocks than the industrial neighborhood or even a residential neighborhood, but the blocks still would be in the usual city range. The largest blocks would be 270 feet by 360 feet not including street right of way. The smaller blocks could be 260 feet by 260 feet. These block sizes can contain parking lots or structures on their interiors.

There would be a network of many street types, appropriate for their context and role within the network. The central street of the office district would be a multi-lane boulevard.

Setbacks would be eliminated on the main streets, or limited to ten feet where smaller office buildings faced residential uses. Buildings would be required to set up to the "A" streets. The space saved, compared to office park with usual setbacks, would be used for public spaces and making the district more compact, walkable and therefore more transit feasible.

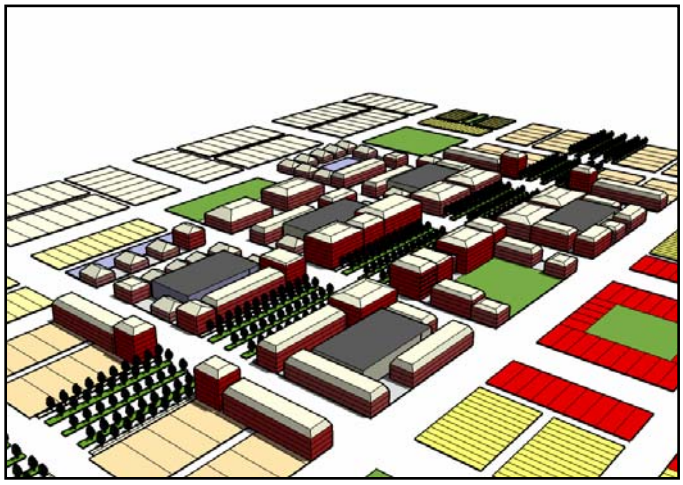
With a more compact form and a location adjacent to a subregion of neighborhoods, the office neighborhood can be and is served by high frequency transit.

With a more compact form, shared parking within walking distance of all worksites becomes physically possible. Each firm provides less auto parking and charges employees for parking spaces used. Each firm pays employees either a taxable parking payment or a nontaxable transit payment. Other commuting management strategies may be used. (*Parking Spaces/Community Places*, U.S. EPA, January 2006) Parking spaces are provided on all streets, either angle, back in angle, or parallel. Some of these spaces would be rented by the month or day.

Storm water would be managed on a district wide basis, and use best practices such as green roofs, permeable pavement, and use of collected rain water for sewage flushing. The goal would be to eliminate destructive stormwater runoff while accommodating a much more concentrated urban form.

Detailed Description

Site, building and use types are depicted on these illustrations by color and lot size. The office employment buildings and parking ramps are depicted in three dimensions. Those with red roofs have retail uses on the first floor. Along with the red retail sites, they form the central retail and social core of the neighborhood.



Red lots represent "Main Street" or "Storefront" building types. These are between two and six stories and may have retail, office or residential uses on the upper floors. Gray represents parking structures, blue represents surface parking.

The narrowest lots of deepest yellow represent townhouses. The tan colored, outer blocks on the central boulevard are apartment buildings or courtyard buildings with residential uses.

The blocks on the sides of the neighborhood which are the lightest yellow contain large lot, single family residences – the "Manor House" of our Form Based Code Study (FBCD). See the accompanying compact disk.

The somewhat darker yellow and smaller lots represent single family houses – the "Cottage" building of the FBCS.

The green areas are parks or greens when adjacent to residential uses, plazas when adjacent to commercial buildings.

There are 176 large houses, 193 medium houses, 135 Townhouses and 72 Courtyard apartment buildings, which contain 2664 dwelling units and accommodate about 6000 people. There likely would be some housing units above retail space. The six neighborhoods around this central place might contain around 24,000 people or more, giving regional retailers 30,000 customers.

We have added design details to the template beyond what was needed to convey the basic concepts. The purpose is to hint at the extensive potential for creating comfortable but intriguing places. For example, pairs of buildings frame the beginning of the office employment area on both ends on the

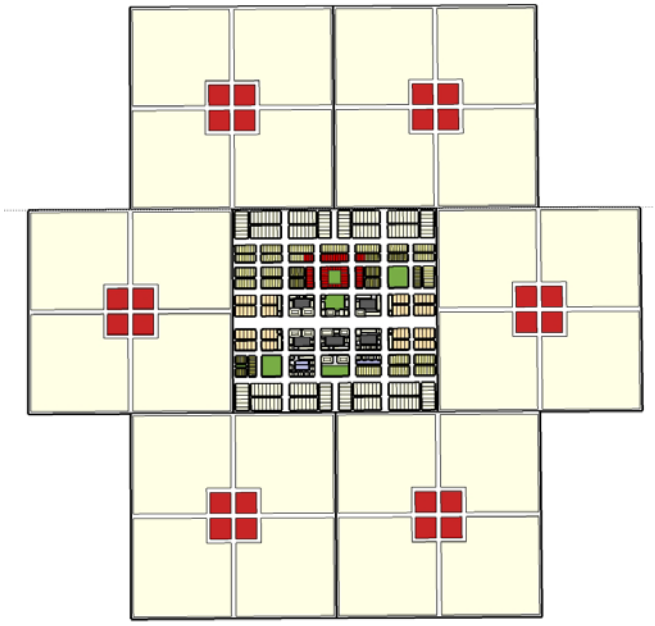
boulevard. A townhouse block includes a central green. A central office block includes a plaza facing a street. This gives only a hint of the potential for building commerce centers with much greater beauty and usefulness than we have in the last 50 years. Urban design is a craft that is being rediscovered.

There are 4 acres of retail or institutional uses plus 26,000 square feet of floor area on the ground floor of some of the office buildings. The retail buildings should be mostly 2 or more stories, and there could be offices or residential uses on the upper stories.

Office Commerce Center Template			
Within Commerce Center District			Units
Land Area		1,570,812	Square Feet
Total Building Footprint		603,600	Square Feet
Street ROW		711,348	Square Feet
Offstreet Parking Area		60,000	Square Feet
Total "Impervious" Area		1,374,948	Square Feet
Remaining, Uncovered Area		195,864	Square Feet
Total Parking Spaces		2,982	Car Spaces
	Onstreet	1,094	Car Spaces
	Offstreet	1,888	Car Spaces
	Demand	3,160	Car Spaces
Number of Jobs		5,151	Jobs
Floor Area Ratio		1.08	
Total Street Length (in miles)		1.4	Miles
Jobs Per Acre		143	
Within Complete Neighborhood			
Number of Residences		2664 or more	
Population		6,000	
Acres of Retail Land		4	Acres
Acres of Parks		7.3	Acres
Acres of Squares		2	Acres

Office Commerce Center Size and Context

It is part of a neighborhood of walkable radius which is itself part of a cluster of neighborhoods.
The office district can contain 25% of future, office-based employment growth of the region and still be only 40 acres - one quarter of a neighborhood.



Each red-centered square in the diagram represents a quarter square mile neighborhood. The red represents the commercial and social center of each neighborhood, and the central neighborhood is a center for office employment. The central neighborhood may also be a subregional, retail center.

Office buildings are in three types of locations in the Grand Rapids area: the original downtown of Grand Rapids, office parks and along high traffic, suburban corridors. The placement along corridors may be seen by local government as a way to stave off commercial development from lining the entire length of these corridors. The high traffic volume of these corridors is caused in part by the few street connections and the low density, separate use character of conventional, suburban development. In the future, new buildings could be placed and function more efficiently in new downtown types of setting rather than on separate lots and office "parks". Or possibly existing office parks could be redesigned along with adjacent uses into more complete town centers.

Our prototype was designed to be a central component of a neighborhood, so that all employment sites are within a walkable distance of retail center uses, transit and common parking areas. About 22% of the 160 acre neighborhood would be devoted to office use – 36 acres. Part of the space saved by not having large, landscaped setbacks, could be devoted to parks, which are a much more useful type of greenspace.

According to forecasts of employment for 2035, our Metro area will need an additional 18,000,000 square feet of building floor space for office based jobs. If this was built in the form of office parks, 1600 acres of land would be used. If we are able to increase the floor area ratio above the conventional ratio of 25% to the LEED ND minimum of 50%, we could reduce that amount to 800 acres. Our template hits a ratio above 100%, so eleven centers would be needed, using about 400 acres for the employment area and creating that many sustainable and lively town centers.

In constructing this model, we used two to six story buildings to frame pedestrian friendly, multi modal streets - a space that is conducive for healthy social and economic interaction.* This resulted in a considerable employment density and in fact during configuration, we had to decrease the area used for office employment to keep parking to a manageable amount.

* See *Life Between Buildings*, Jan Gehl, Van Nostrand Reinhold, July 1987

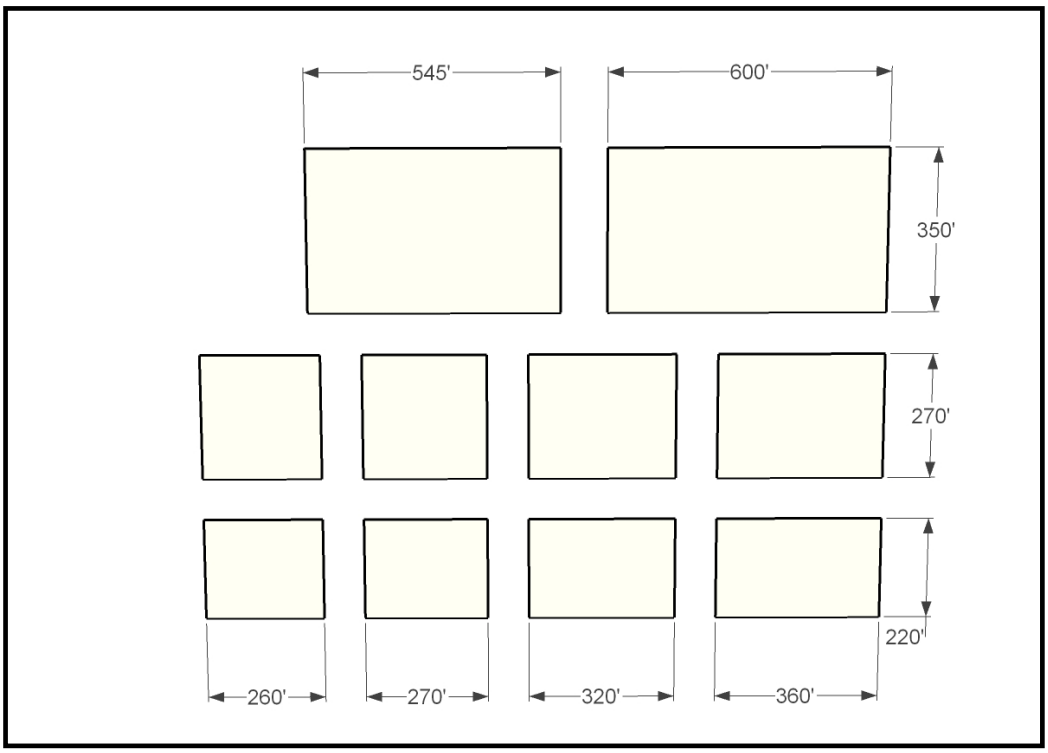
Parking is the main constraint on increasing floor area ratio. In order to keep this employment center/neighborhood walkable, parking would need to be minimized and provided in structures. At least one third of the access to jobsites must be by transit, walking, bicycling or motorbikes. This can be achieved by provision of transit service, a complete transportation management program and the presence of residences nearby. (See Parking and Transit sections)

For transportation efficiency and for the economic health of the region, it would be best not concentrate these districts in one part of the region.

Blocks

An office employment area would contain more small size blocks than a residential or industrial neighborhood, but still would be in the usual city range.

Office buildings can easily be accommodated on small blocks. Some of the block sizes chosen in the prototype can accommodate inner block parking in one or two bays that are sixty feet wide.* Central town blocks can be small, such as Portland (Oregon) downtown blocks of 200 feet square, or occasionally extremely small, containing perhaps only a small building. The blocks of this prototype are not as small as that, but are still fairly small (less than a quarter mile perimeter) which would facilitate easy pedestrian movement around the district. They are artificially constrained to fit exactly in a quarter square mile space. Street type and right of way width are also variables that affect the patterns of blocks. There can be many combinations of both. There are many other possible street and block sizes that would work just as well; however, what is of paramount importance is that blocks remain near or below a maximum of about a quarter mile around the perimeter. Two larger block types are not in the commerce center - they are residential blocks on edge of the neighborhood. Mid-block pedestrian passages can increase pedestrian connectivity. It is important to decrease block size as the context becomes more pedestrian friendly, transit oriented and dense.



Block Sizes

* The Technical Page, New Urban News, April-May, 2007; "Blocks and Boxes", www.newurbanguild.com

Street Network and Street Types

There would be a network of many street types, appropriate for their context and role within the network.

This center is arrayed along a multilane boulevard which would give corporate offices a visible and prestigious location. The boulevard would move traffic well through the district, but still provide a strong pedestrian space.

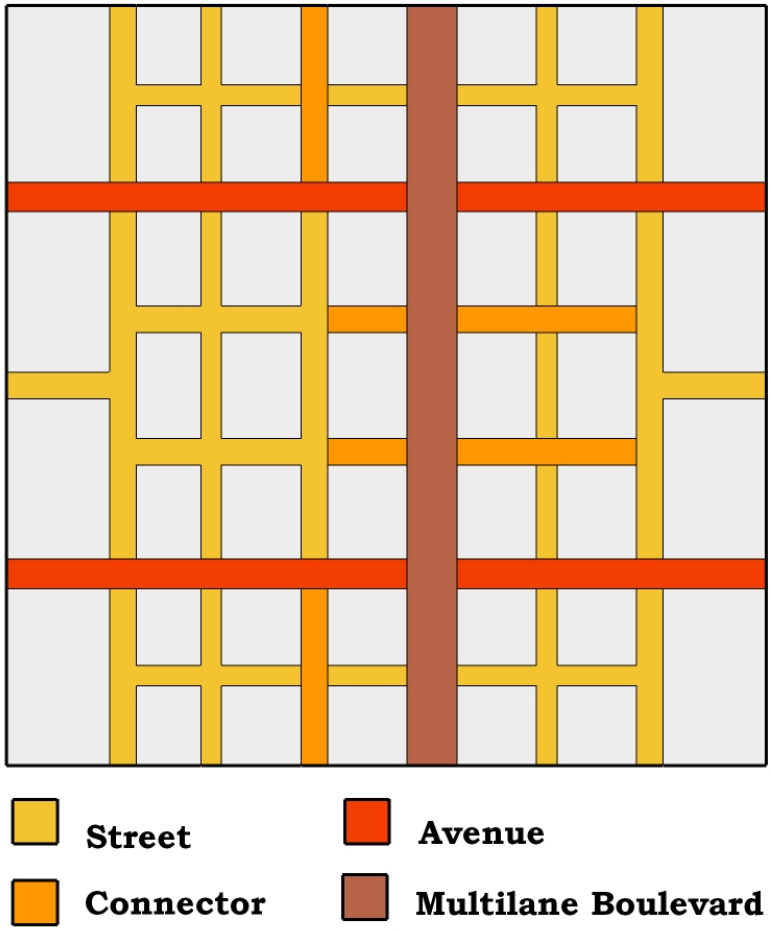
The connectedness of the streets is determined by the block size. Thus block size determines both the sizes of units of developable land and also the ease of circulation for vehicles and pedestrians.

The graphic below shows the entire street right-of-way, not the curb-to-curb pavement. So within the drawn spaces are: sidewalks, parkways, tree plantings, medians, parking lanes, bicycle lanes, transit stops, access lanes and perhaps even public parks in the case of the boulevard.

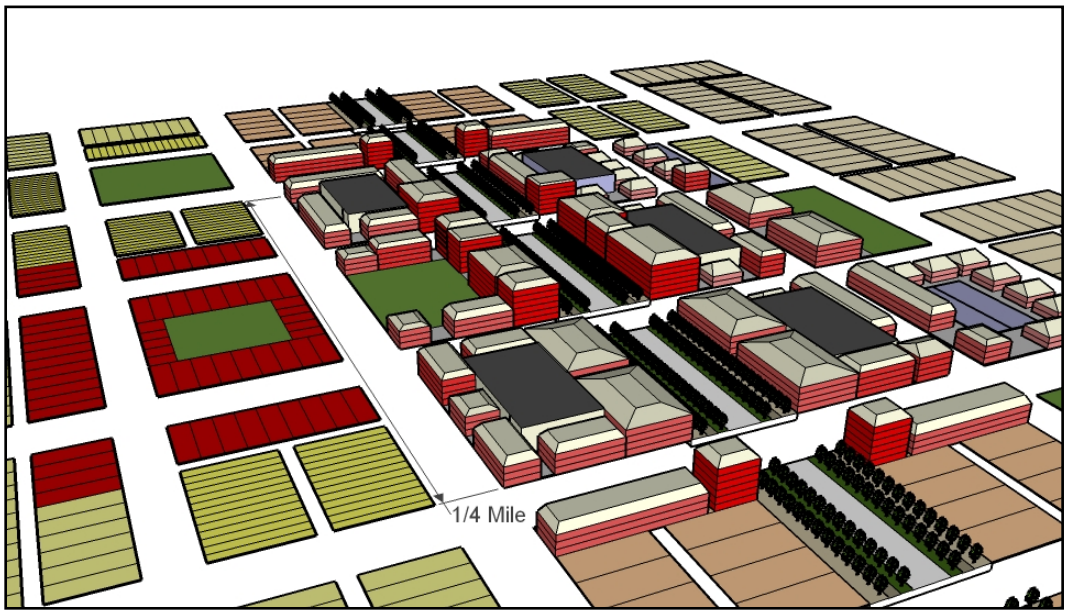
The network of streets is made up of street types from the Grand Valley Metro Council's Form Based Code Study. These are similar to street types in the Institute of Traffic Engineers' Context Sensitive Solutions Report. All of the streets have on street parking. The street characteristics vary by whether the context is residential or commercial. The avenues connect the district with the rest of the urban area as well as being local access streets. The connectors link the office area with the retail/social center. The "street" types include main streets and residential streets. Both are local network and access streets.

This prototype is designed to fit exactly into a square mile grid, in order to portray differences from conventional office development and to be graphically easy to comprehend. The right-of-way widths are on the wider side of parameters; they could easily be narrower. Other street types like the "yield street" or a "mews" could have been included.

The prototype is very right angled. Introduction of a few diagonal streets would increase connectivity considerably within the neighborhood, and, if the diagonal was extended to an adjacent neighborhood, might greatly increase the sub-regional connectivity. In realty, specific sites will have physical characteristics that make a less rectangular arrangement necessary.



A multilane boulevard



Detail of the Multi Lane Boulevard
(for a thorough exposition see the Boulevard Book by Allen Jacobs)

Buildings

To acquire a realistic selection of buildings we examined recent urban design standards, the existing stock of buildings in the metro area and the guiding economic trends. (See the detailed discussion in the appendix.)

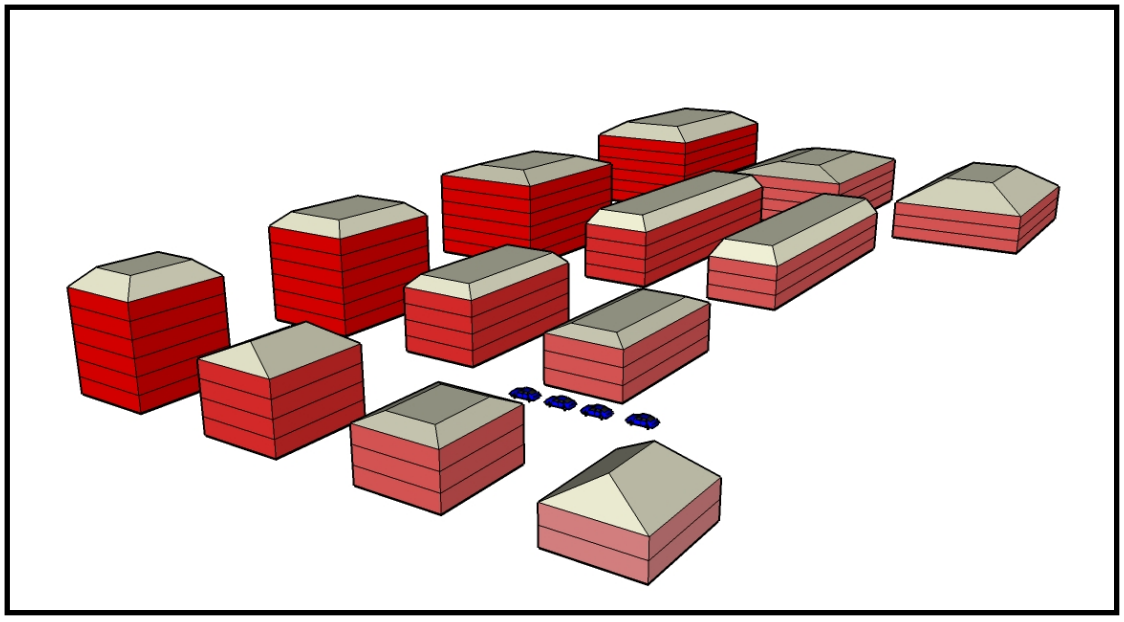
Office Building Types Used, Showing Floor Area				
Foot Print	3000	5000	10000	15000
Stories				
2	6000	x	x	x
3	9000	15000	30000	45000
4	12000	20000	40000	60000
6	18000	30000	60000	90000
	Floor area and Footprint are in square feet			

In the present market there is a considerable proportion of small, low office buildings. These are difficult to place in much quantity in a concentrated employment center. Therefore we made the assumption that employers were choosing small buildings so they could have the benefits of building ownership. An alternative is the office condominium. The Grand Valley region happens to be a leader in this type of office development. There are benefits to this type of ownership/building arrangement. (See "Office Condos – Here to stay or gone tomorrow?", Grubb & Ellis, PNC Real Estate Finance, November, 2005)

Operating under this assumption we decreased the number of two story buildings by 12 and shifted that space into four story buildings which could subdivided into office condos.

Number of Buildings in One Center at 1.1 FAR				
Foot Print	3000	5000	10000	15000
Stories				
2	20			
3	5	4	7	1
4	4	5	4	5
6	4	5	3	1

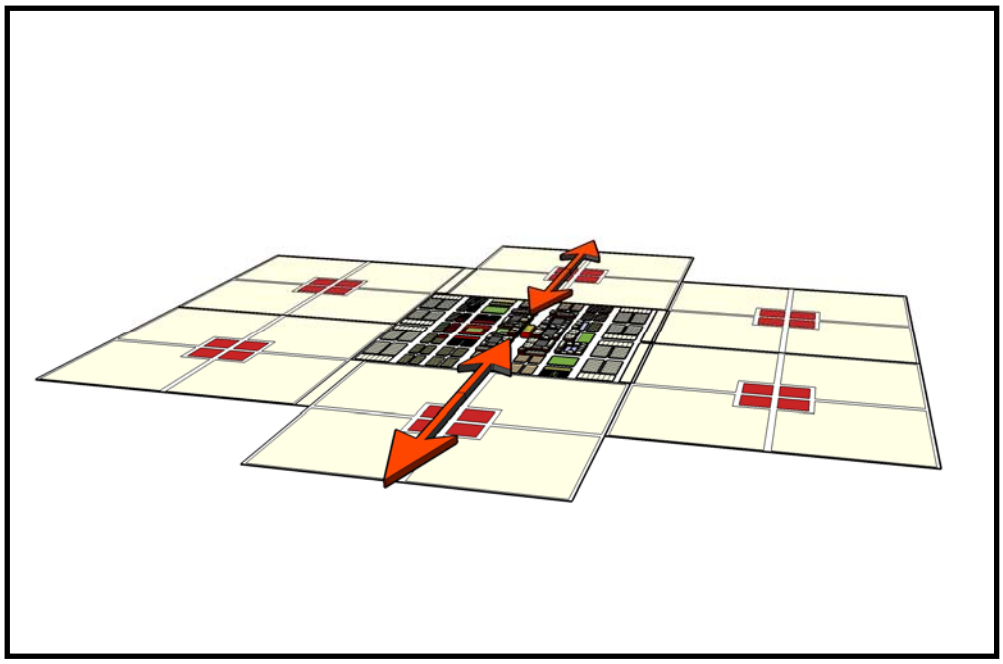
Office Building Sizes Used in the Template



Transit

The prototype contains a stop on a fixed route, high frequency transit route – either bus rapid transit, light rail or trolley. The frequency of service on this route should be every 15 minutes or less, especially during work shift changes. The stop should be a station, with passengers' fares taken before boarding. This stop would be a subregional center and the route would extend to other subregional and neighborhood centers.

Curitiba Bus Rapid Transit Station



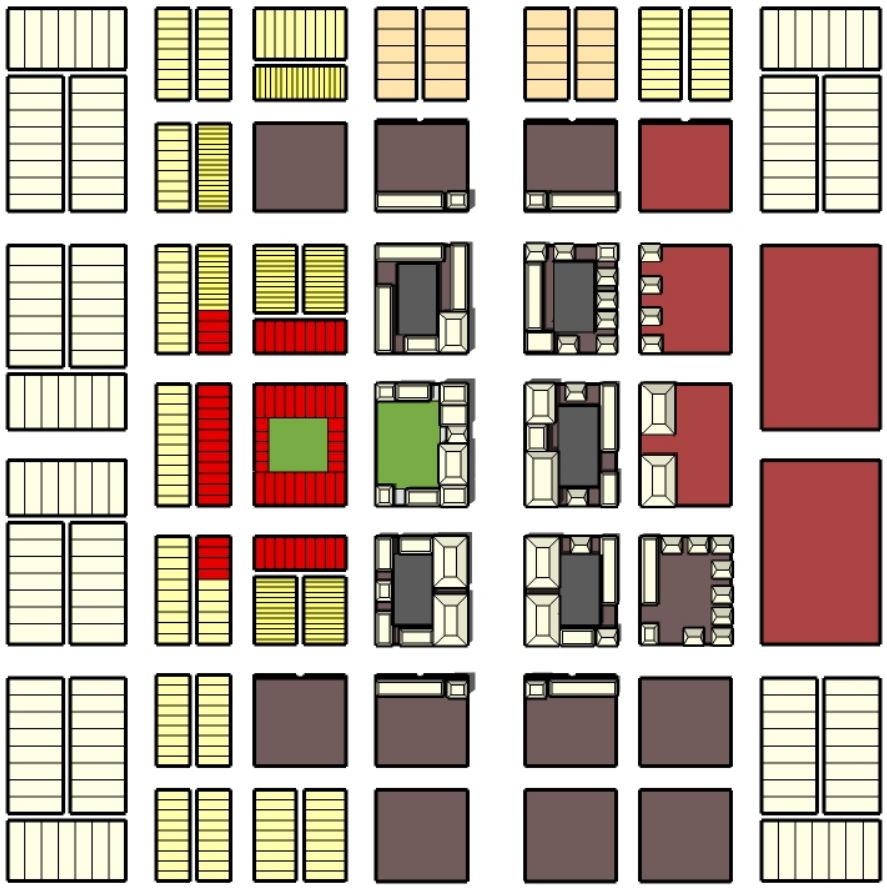
Red Arrow Shows Fixed Route, High Frequency Transit

The transit station in the prototype has over 5000 jobs within a three or four block radius. In addition there are residences in the live/work buildings, in the downtown blocks and in the other half of the neighborhood. There are also the retail jobs in the three or four blocks of downtown.

The transit "station" is on the central boulevard located at the center of the office district and one block from the downtown retail and social center.

Parking Space and Transit

The template provides 1680 parking spaces in parking structures, 208 in off-street surface parking and 1094 spaces on-street. This amounts to two parking spaces per 1000 square feet of building space. This rate is based on the assumption that the residual employees will take transit or live close enough to walk to work. The illustration below illustrates how much additional land would be needed for surface parking if all employees would commute by car. The brown area shows how much surface area would be needed for parking if all parking were at ground level. The additional red blocks show how much additional land would be used if there was parking at the typical rate of 3 per 1000 square feet of floor space.



The most effective way to achieve lower rates of auto use is to establish a commute trip reduction (CTR) program. A CTR program includes measures such as subsidies for transit use, elimination of free parking or making it an option along with transit passes, preferential parking for rideshare vehicles, vanpool programs and others. The presence of frequent transit service and location in a central business district are strong sources of auto trip reduction. Such practices reduce auto trips an average of 18%, and up to as much as 50%. *

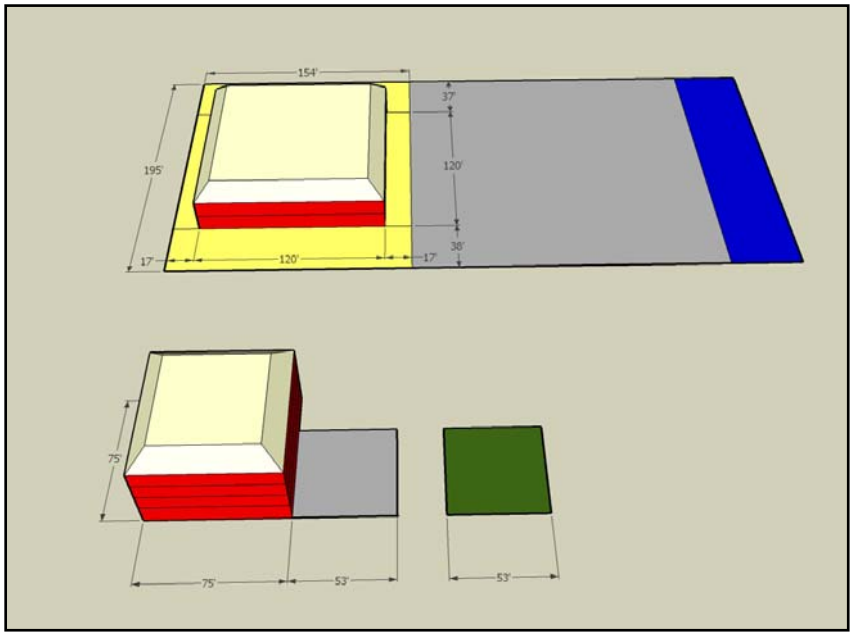
* *Online TDM Encyclopedia,* The Victoria Transport Policy Institute, www.vtpi.org

Stormwater Management
Historic downtowns are made up of almost 100 per cent impervious surfaces and all stormwater goes to storm sewers. New standards require that storm water be handled in a way that emulates a natural watershed. If the management practice is retention and storage in basins, the downtown urban form becomes impossible to reproduce even though the run off per employee or per square foot of building may be much lower than conventional office parks. Alternative measures such as rain gardens may not work very well in an intensely developed new downtown.

However, some new techniques may help solve this dilemma. Along with pervious pavement and green roofs, some new buildings have built in storage for rooftop rain which is then used for sewage flushing. This technique has been used already in a school building in our region and in buildings around the U.S. and Canada. A considerable amount of energy is used to treat and move the water which is used for flushing toilets. To see a study of the benefits and costs see *A Resource Guide for Sustainable Development* , page 91, www.mithun.com/expertise/resourceguide.pdf .

Setbacks
A sampling of setback standards from three typical local governments in the Metro region showed the following averages: Front: 37 feet, Side: 17 feet, Rear: 38 feet. These setbacks take up approximately 50% of the area of the building footprint and the setbacks. The average office building in Metro Grand Rapids has about a 14,000 square feet footprint, the average height is 2.4 stories, and floor area is about 34,000 square feet. Given usual parking rates and stormwater retention practices, this would result about 80,000 square feet of land used, not including streets. See top of graphic in this section.

In contrast, the average building in the template is four stories, 23,000 square feet with about a 5800 square feet footprint. Since parking is mostly in ramps, and some is on street, the land for parking ends up being only about 12% of the building floor space. There is no unusable, landscaped setback area, but there is usable parkland, and usable by everyone. The amount of parkland can vary; the amount we arbitrarily designated in the template is equal to about 12% of the building floorspace. Since rainwater is used for sewage flushing, no land is needed for retention.



Top: conventional development Bottom: Template type of setting
In the illustration the required setback areas are yellow, parking is gray, stormwater retention is blue, and park land is green.

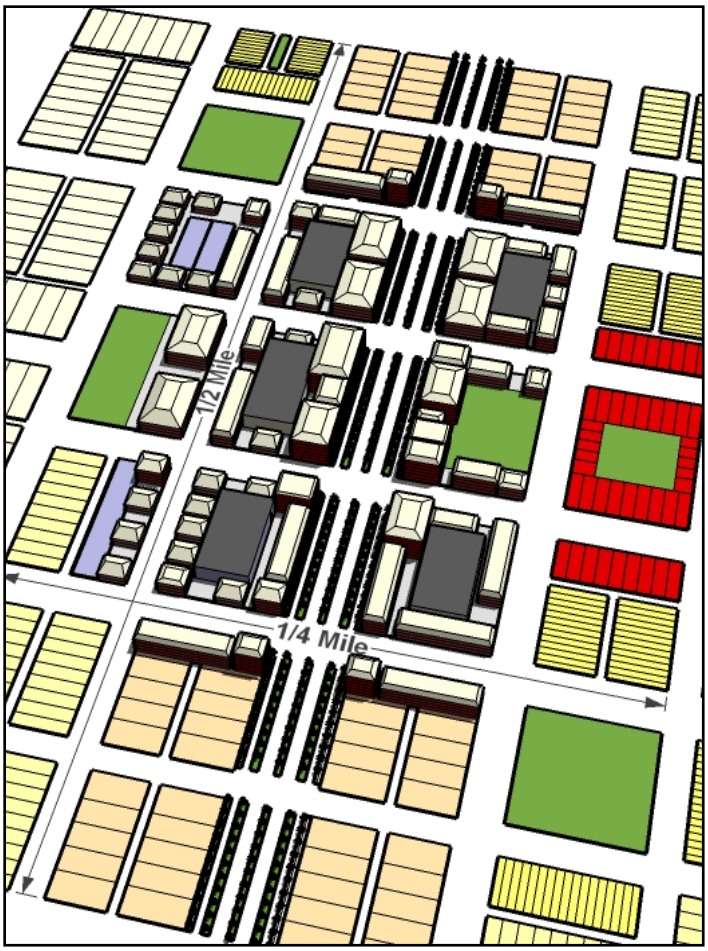
If the template building in this example was increased to the same floor area as the existing average, it would still take up less than one quarter of the land, even including the public park land. A good example of the space taken up by setbacks is the office park described in the next section. About 50%

of the lot area in this park is unbuilt. That is 21 acres of land that could have been parkland somewhere in the community.

Contrast with a conventional office park

It may help to understand our proposed template by contrasting it to a conventional office development. Below is a depiction of an existing office "park" in the Grand Rapids metropolitan area. It is a very attractive group of buildings, well landscaped, with a gracious, tree lined street. It lies between a freeway and a residential area. It is not accessible from the adjacent residential area; it is only accessible by car. Although it is efficiently laid out for a conventional office park, it uses much land, given the amount of building floor space – the floor area ratio is 0.23. There is a high ratio of parking spaces – approaching 4 spaces per 1000 square feet of building. Actual use of parking was very low when counted one afternoon in summer – less than 2 spaces per 1000 square feet. Parking and driveway space amounted to 400 square feet per parking space. This office park takes up 49 acres.

In contrast, the area a block on either side of the central boulevard of the template is 47 acres. Note the comparable distances indicated in the graphics below.



Characteristics of Both Commerce Center Templates

Transportation Efficiency and Equity

Conventional Urban Design (separated uses, auto oriented) increases the burden on low and moderate income households. By isolating employment centers in suburban locations, we increase the transportation costs for workers. This in turn reduces the amount of income available for housing. In some urban areas the transportation costs of owning and operating an automobile have exceeded the cost of housing. In fact, the costs of housing and of transportation have been rising faster than average income. During times of high employment, manufacturers in suburban Grand Rapids area industrial parks had difficulty attracting employees even at average wage rates, because workers couldn't afford the transportation costs.

There are three solutions for this problem.

Increase the intensity of development and change the design of development. These cannot be separated. Higher intensity will not function without a connected street network and more urban oriented site layout.

Place employment sites within neighborhoods with centers, residential uses, and other services. Here also the right design is crucial.

Both of the above make transit use more efficient, but public funding must be shifted to this mode. The reciprocal is that the first two solutions depend on high volume public transit service.

This is a very short summary of the equity and efficiency issues. For a full description see *A Heavy Load: the Combined Housing and Transportation Burdens of Working Families*, Center for Housing Policy, October, 2006, http://www.nhc.org/pdf/pub_heavy_load_10_06.pdf

Cost of auto transportation versus public transportation

Auto transportation is very expensive for the public and the individual. Even a used car will cost about double the cash purchase price over five years. For both new and used cars, the annual cost varies from $5000 to $8000 per year. If someone is working at $10 an hour, annual income is $20,000 and transportation would eat up 40% of that income. If one was able to commute by transit and a monthly pass was $50, this individual could sell the car, saving $4400 each year and increasing their effective pay to $12 an hour. *

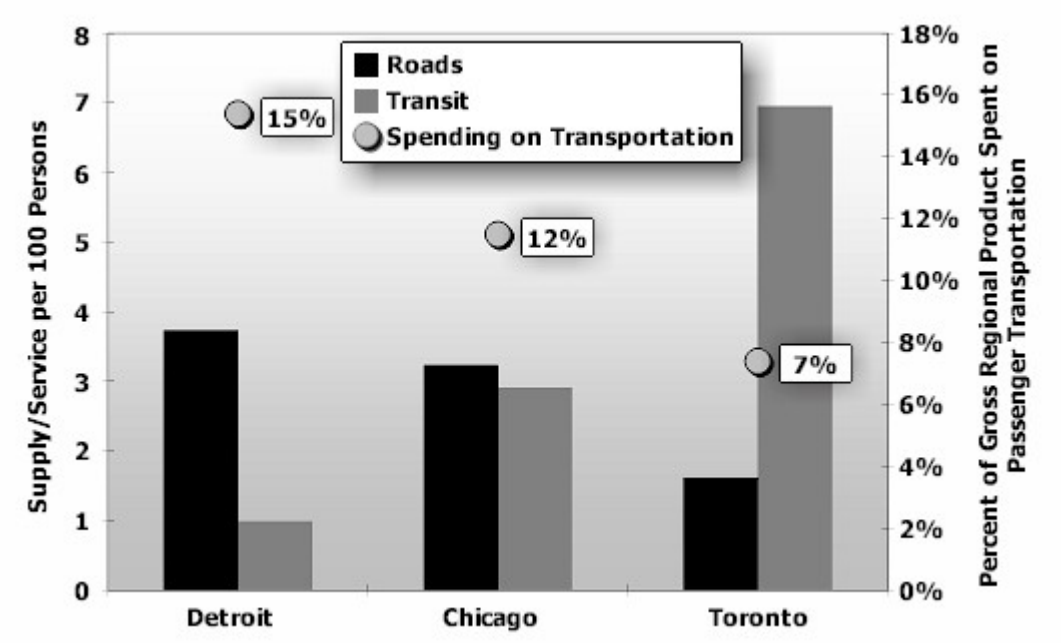
If employers save money on parking spaces, they could give employees a nontaxable transit pass.

* How to Live Well Without Owning a Car: Save Money, Breathe Easier, and Get More Mileage Out of Life by Chris Ballish, Ten Speed Press (August 5, 2006) Chapter 2 on attached CD.

Community Cost of transportation

A community that travels by transit will generally spend less personal and public funds on transportation. Such communities will be more competitive in the world and national economy. There will be more funds available for other aspects of public and private life.

Transportation Balance and Spending: A Regional Comparison



In the same region, transportation spending drops as ratio of transit service to roads rises.

[Source: An International Sourcebook of Automobile Dependency in Cities, 1960-1990.]

This graph from a report by the Surface Transportation Policy Project* shows that Toronto government and citizens spend half as much on transportation as Detroit's, because Toronto citizens travel by transit and there is a high ratio of transit service. If the Grand Valley metro area would invest a greater proportion of its transportation expenditures on transit, and arrange its land use and buildings to make use of transit, perhaps we too could switch 7% of our gross regional product to schools, health care, art, the environment and greater competitiveness.

* *Driven to Spend*, Surface Transportation Policy Project, 2000, www.transact.org

……..

Importance and impact of connectivity

The street network of the two templates are highly interconnected for the movement of pedestrians, bicycles, autos, trucks and transit. Connectivity refers to the number of direct ways to get from one place to another. By interconnecting streets in a web (whether they are straight or curved doesn't matter), the number of routes is increased. By adding more intervening streets (thus making smaller blocks), even more routes are added. Laurence Auerbach has collected and described much of the thought and research on street connectivity in a series of web articles. Here are a few quotes from those articles which describe the effects of connectivity.

Thoroughfare network connectivity is the single most important element of sustainably-built cities and towns. That may sound like an odd statement, particularly if you've never even heard of it.

*Connectivity has so many interrelated effects on so many urban functions, and more people should recognize how truly essential it is……..A large and growing collection of research is finding that street connectivity is associated with more walking, less driving, greater safety, less crime, better physical fitness, and fewer per capita emissions.**

Land use policies required to reduce auto dependence need to encourage both proximity (density and mixed use) and connectivity. The consolidation and intermixing of land use combined with increased street connectivity offers an important part of the solution to improve air quality. However, increasing the levels of density and land use mix alone will not yield effective changes in travel patterns without increased connectivity for local access on foot and by bike, and without a regional transit system that is competitive, in terms of time and/or out of pocket cost, with the private vehicle.
– SMARTRAQ Final Technical Report, p. 290

*The initial round of studies has found that livable, walkable neighborhoods with well-connected streets are no less safe, and in some respects are safer, than the standard suburban template.**

**Connectivity*, The Ped Shed, www.pedshed.net, Laurence Aurbach, August, 2007

Compact Development

Efficient and friendly neighborhoods and cities cannot exist without adequate density. Even hamlets surrounded by farmland and woods need a minimal density. The number of dwelling units and square feet of nonresidential buildings per unit of ground surface are the usual rates for assessing the feasibility of many aspects of community. Transit works well with at least seven dwelling units per acre and a ratio of floor area to land of 0.5. Auto trips decrease with an increase in density.

These minimal densities, along with a mixture of uses, and placement of buildings make urban street cross sections appropriate. For example, neighborhood businesses may need 10,000 people to survive.

Making It Happen – Building Cities and Towns

If a city or town decides to pursue the paradigms suggested in this document, it will need new standards and will need to take on a few new roles.

Step One – Setting the Quantities at the Region

The first step is regional. Cities and towns need to gather within their region to determine how much employment change will occur within their planning horizon. In Michigan, reliable employment forecasts are provided by the State for each County. As was done in this study, these forecasts can be aggregated into numbers and types of employment centers. They may be more or less intense than described above, but they should be served by transit.

Collaborating municipalities should reach a consensus about where the employment neighborhoods should be located. Units of government will have to come to the table with at least some idea of how much growth (or reduction) they wish to accommodate. Ideally, they would have thoughts about where employment neighborhoods could be located or intensified. Some communities may wish or need to keep using the office and industrial park form of employment centers. They would need to estimate how much employment they could and would like to accommodate.

This regional consultation is an iterative process. Communities will have to go back to their constituencies with tentative conclusions to see if they are workable. The regional consensus will also be revisited as the regional and local plans are revised every five years or thereabouts.

This regional consensus would result in a more efficient use of public and private resources. There will not be excessive amounts of land set aside, nor excessive public funds spent to service those lands. Nor conversely would there be inadequate lands set aside, or inadequately serviced lands.

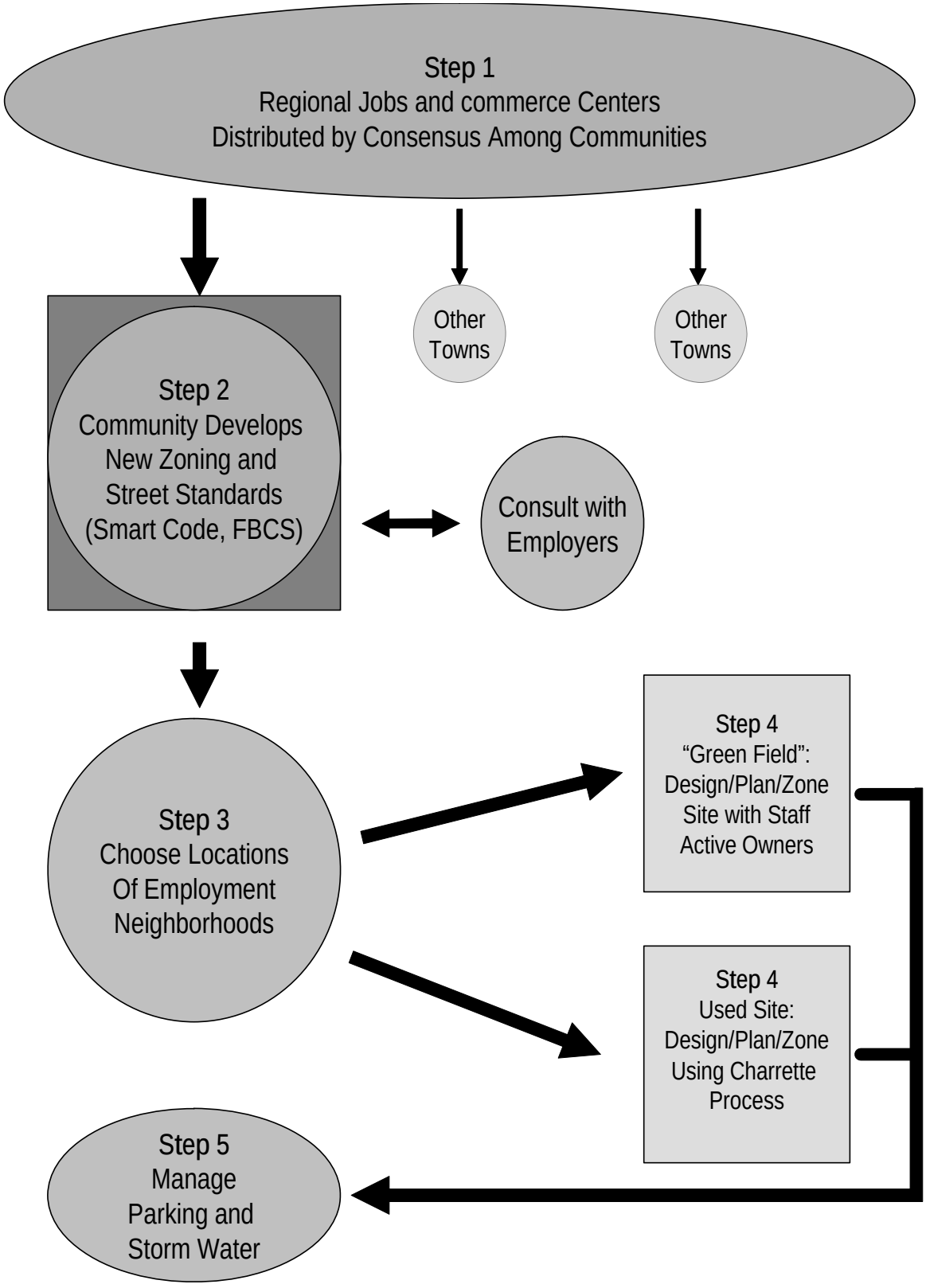
Step Two - Develop New Standards

A community would develop a new set of standards which would be used to guide development of employment centers. These would be zoning standards, block size/street connectivity standards and street cross section standards. The streets need to be urban types. A palette of types can be found in the GVMC Form Based Code or in the ITE Context Sensitive Design Guidelines.

The zoning standards for the district must be changed to eliminate setbacks, and require buildings to come up to the property lines on multi use streets. Communities may set standards for minimum spacing of doors and minimum window space especially on the retail streets that form part of the social center of the neighborhood. Zoning would emphasize building form and location on the site more than use. Use specifications would be general. There are some good models for these “form based codes”. The most thorough is the “Smart Code” which is available through Placemakers.com or Smartcodecomplete.org. There are workshops, a model code, services to calibrate the code to particular places, and email listservs for practitioners. Grand Valley Metro Council’s Form Based Code Study includes detailed standards for block size, zoning standards and street types.

The community should consult with potential employers, both office and industrial types, to determine specific transportation, space and employment needs.

Five Steps to Sustainable Commerce Centers



Step Three – Choosing Locations

Communities may have tentatively chosen locations for employment centers before they entered regional consultation. If not they, would now do so. This would normally be part of the community comprehensive planning process. Community planning is not a revolutionary process, it is an reforming process. The previous plan is taken up and amended in line with new goals, principles, conditions and regional consensus.

Since the design of this paradigm and the needs of workers depend a great deal on transit service, coordination of the centers' location with transit service is very important.

Step Four – Active Planning and Design

The local government needs to take on a greater role in the design of employment neighborhoods and the location of streets. No other entity is able to do this. Rarely is all the property that is needed under one owner. If the site is relatively undeveloped, the public planning staff, planning commission and active developers would lay out the site using the standards previously adopted. (In most Midwestern regions there is likely not a need for green field locations. There is likely an adequate amount of land for employment growth in locations that have been lightly developed, that should be redeveloped from the separate use/"park" pattern, or that have been abandoned.)

If the site is a redevelopment and owners and residents would be affected, the city or town should follow the consensus building charrette process of the National Charrette Institute. This process has been refined through years of practice into a highly successful procedure, especially for design projects.

Step Five – Management

The community or an industrial association should manage the storm water for the entire district. Each property owner would be ultimately responsible for managing its stormwater, but the community or the association would be obliged to maintain the stormwater management services it had initially provided.

The community should manage parking for the entire district including the neighborhood center. The community, in partnership with the transit authority, should establish a commute trip reduction program. Parking management would be part of this program.

Conclusion

In this document are recommendations for sweeping changes in how we arrange our working places. The changes are, especially in design, dependent on each other, so that they cannot be made partially or separately, with any success. They are holistic changes.

But these recommendations have been already been tried and found true. The recommended land use patterns are those of our towns and cities of decades ago. The arrangements of our original downtowns and neighborhood factories were practical in past decades and are proving practical again today. And, as the bibliography and attached documents show, many others are trying and succeeding in these patterns of town planning.

There of course will be much more to adjust and add when these recommendations begin to be put into practice. More improvements will be found. The exigencies of environmental impacts, energy shortages, and global economics are driving us toward greater efficiencies. Fortunately more efficient urban forms can be more comfortable and fair.

Appendix

Industrial Building Details

Type Number	Use of Building	Docking Walls	Shape	Access to Freeway	Access to Transit	Square Feet of Floor Space	Square Feet of Footprint	Docking Area Per Bdg
1	Light Manufacturing and Regional Warehouse							
1a	Light Manufacturing	1	rectangle	Medium	High	100,000	100,000	50000
1b	Regional Warehouse	1	rectangle	High	Low	100,000	100,000	50000
2	RD, Flex, Light Manufacturing, office showroom	1	rectangle	Medium to Low	High	45,000	45,000	30000
3	Multi Tenant	Some	L or U	Low	Medium	63,000	63,000	9000
4	Truck Terminal	2	long rectangle	Very High	Low	18,000	18,000	63000
5	Flex, showroom, RD, light manufacturing	1	rectangle	Medium to Low	High	27,300	23,400	8000
6	Artisan/startup/live-work	1		Low	Medium	2,875	1,875	500
7	Parking Ramp Buildings			Medium				
	Ramp-50 parking spaces per floor	NA	120 foot cross section	Medium	High	150,000	30,000	0
	Long Side Liner Building	NA	50 feet deep, two stories	Low	Medium	30,000	15,000	0
	Short Side Liner Building	NA	50 feet deep, two stories	Low	Medium	12,000	6,000	0

				Without Transit Service		With Transit Service	
Type Number	Use of Building	Workers per 1000 sq. ft.	Number of Workers	Rate of Car Parking	Number of Parking Spaces	Rate of Car Parking	Number of Parking Spaces
1	Light Manufacturing and Regional Warehouse						
1a	Light Manufacturing	2	200	3	300	2	200
1b	Regional Warehouse	1	100	1	100	1	100
2	RD, Flex, Light Manufacturing, office showroom	2	90	4	180	2	90
3	Multitenant	2	126	2	126	1	63
4	Truck Terminal	1	18	1	18	1	18
5	Flex, showroom, RD, light manufacturing	2	55	4	109	2	55
6	Artisan/startup/live-work	2	6	2	6	2	6
7	Parking Ramp Buildings						
	Ramp-50 parking spaces per floor			250	250	250	250
	Long Side Liner Building	2	60	4	120	2	60
	Short Side Liner Building	2	24	4	48	2	24
	Car Parking Rate is Spaces per thousand Square Feet of Floor Space						

Office Buildings

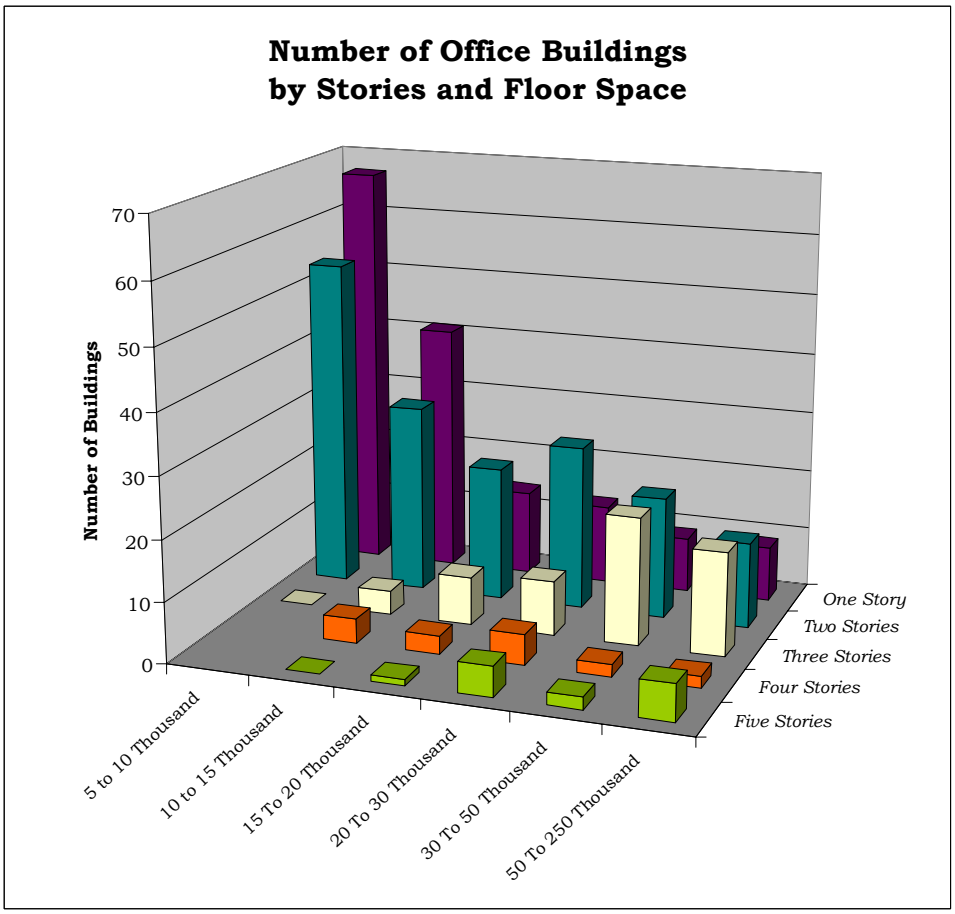
To acquire a realistic selection of buildings we examined: recent urban design standards, the existing stock of buildings in the metro area and the guiding economic trends.

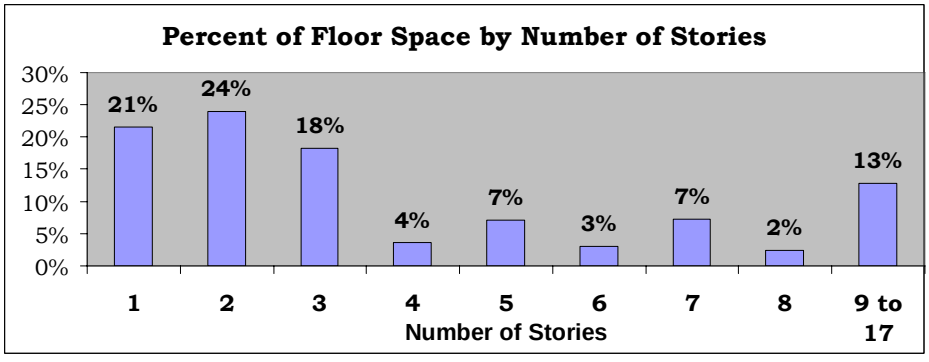
The Smart Code and our own Form Based Code Study (FBCD) provide some parameters for office buildings. We looked at building sizes as allowed or recommended by Smartcode and our Form Based Code Study for city downtowns or town centers. The number of stories recommended for context zones T5 to T4 are 2 to 6. The footprints are 28,000 to 2,500 square feet in Smartcode, 8000 to 3000 in the FBCS. Floor space is 172,000 sq ft to 5000 square feet in smart code; 46,000 square feet to 5000 square feet in the FBCS.

The Building Owners and Managers Association West Michigan has collected data on office buildings in the Grand Rapids area. This information is available on their website and is based on a voluntary survey of office buildings in the downtown central business district, as well as in 13 suburban sub-markets. After deleting records without data on number of stories and amount of floor space, there were 433 buildings listed. In evaluating this information it should be remembered that many local governments have limits on building height. This limit is often at about 3 stories. Therefore, there may be a non market bias towards buildings of 3 stories or less. Zoning regulations on floor area ratio's may preclude greater height also.

The average of building height is 2.4 stories with a great deal of variation. While much of the existing floor space is in one or two story buildings, there is a great deal of space in higher buildings and there is a good market for space in the nine to seventeen story buildings in downtown Grand Rapids.

Office Buildings in Greater Grand Rapids			
			Calculated
	Stories	Floor Space	Foot Print
Mean	2.4	31,514	14,124
Standard deviation	2.09	42,300	19,184





Given all of the data on existing buildings and documents describing practical norms, we selected the building sizes described by height in stories and footprint size, as described in the table below.

Office Building Types Used, Showing Floor Area				
Foot Print	3000	5000	10000	15000
Stories				
2	6000	x	x	x
3	9000	15000	30000	45000
4	12000	20000	40000	60000
6	18000	30000	60000	90000
	Floor area and Footprint are in square feet			

As mentioned in the guiding economic considerations, 55% of enterprises will be under 100 employees, and 25% between 100 and 500. As shown in the table below, the selected office building types can accommodate 75% of likely future enterprises, and groups of them could accommodate most enterprises. Larger companies are not always housed in the same building.

Number of Employees				
Foot Print	3000	5000	10000	15000
Stories				
2	18	x	x	x
3	28	46	92	138
4	37	61	123	184
6	55	92	184	276

Proportion of future space per building size

Being sensitive to the amount of office construction by building size, but with a shift toward taller buildings, we apportioned future office space by building type in the following way:

10% of space in 5000 to 10,000 square foot buildings
15% of space in 10, 000 to 20,000 square foot buildings
25% in 20,000 to 40,000 square foot buildings
25% in 40,000 to 60,000 square foot buildings
25% in 90,000 square foot buildings representing 100,000 or greater square foot buildings

Number of buildings in region

With an estimated 29,000 more workers in offices by 2030, and an average of 326 square feet per worker, there would be a need for about 9.5 million more square feet of office floor space. When distributed among the chosen office building sizes, the following number of buildings would be needed for the region:

Number of Buildings in all centers

Foot Print / Stories	3000	5000	10000	15000
2	158			
3	19	19	24	14
4	19	19	24	14
6	19	24	14	26

Number of buildings by type in each center

In the region and ratios section of this report, it was determined that in an office commerce center/neighborhood around 35% of the land area would be in that use. That would be 56 acres in a 160 acre neighborhood or town center, using a floor area ratio of .5 or 50%,

Number of Buildings in One Center at .5 FAR

Foot Print / Stories	3000	5000	10000	15000
2	23			
3	3	3	3	2
4	3	3	3	2
6	3	3	2	4

Adjustments

In the present market there is a considerable proportion of small, low office buildings. These are difficult to place in much quantity in a concentrated employment center. Therefore, we made the assumption that employers were choosing small buildings so they could have the benefits of building ownership. An alternative is the office condominium. The Grand Valley region happens to be a leader in this type of office development. There are benefits to this type of ownership/building arrangement. (See “Office Condos – Here to stay or gone tomorrow?”, Grubb & Ellis, PNC Real Estate Finance, November, 2005)

Operating under this assumption we decreased the number of two story buildings by 12 and shifted that space into four story buildings which could subdivided into office condos..

Number of Buildings in One Center at 1.1 FAR

Foot Print / Stories	3000	5000	10000	15000
2	20			
3	5	4	7	1
4	4	5	4	5
6	4	5	3	1

List of Documents on Accompanying Computer Disk

See the Bibliography on the Disk for Description of Documents and Web Sites

On the disk:

A Heavy Load.pdf

Affordability Index Brief.pdf

Back In Parking by J.A. Nawn.pdf

Bibliography.doc

Close Encounters With Buildings.pdf

Commerce Center Templates.pdf (this document)

Context Directed Streets.pdf

Definition of Walkable Neighborhood.pdf

DesMoinesMPCSE Data.pdf

EPA Parking Spaces 06.pdf

Form Based Code Study.pdf

Frameworkmap.pdf

GVMC Framework.pdf

Industrial District Stormwater Calculator.xls

LEED ND Pilot.pdf

LEED Public Health.pdf

LinkingEconomyCommunity.pdf

LiveCarFree Chapter 1n2pdf

MarketGapAnalysis.pdf

NewAgendaFINAL.pdf

Prosperity.pdf

Public Spaces Public Life.pdf

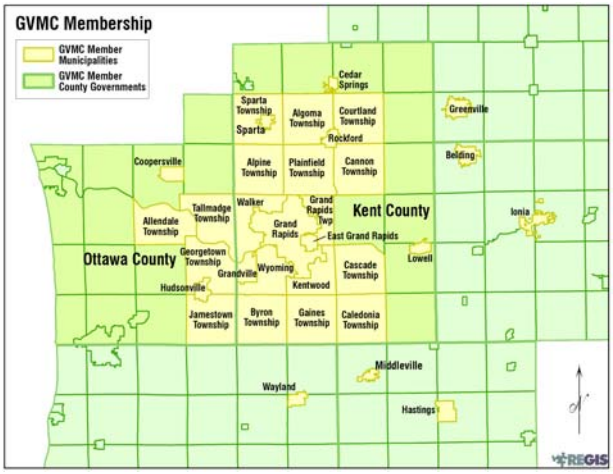
Roofwater.doc

Setback Calculator.xls

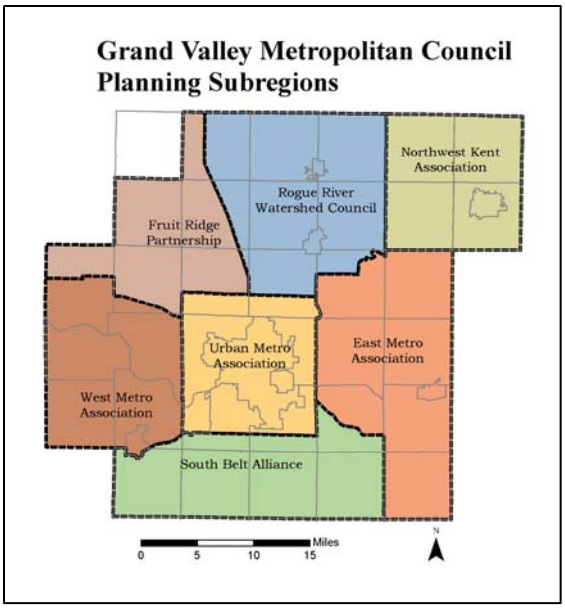
SketchUp Files of Templates

SmartraqSummary.pdf

Grand Valley Metropolitan Council



Grand Valley Metropolitan Council (GVMC) is an alliance of 35 governmental units in the Grand Rapids, Michigan metropolitan area. See map. The Council is an authority under Section 6 of article IX of the 1963 Michigan Constitution.



Our Mission

The mission of the Grand Valley Metropolitan Council is to advance the current and future well-being of our metropolitan area by bringing together public and private sectors to cooperatively advocate, plan for, and coordinate the provision of services and investments which have environmental, economic and social impact.

- GVMC carries out regional land use and transportation planning in Kent and Eastern Ottawa County. (*All federally funded transportation projects are carried out in furtherance of the transportation and development plans adopted by the Council.)*
- Watershed planning is carried out for the the Lower Grand River Watershed Council.
- GVMC is the host of one of the nation's largest cooperative geographic information systems (REGIS).
- The Council presents a united voice for West Michigan communities to the Michigan Legislature and the U.S. Congress.

Metropolitan Framework

Grand Valley Metro Council plans regionally for Kent and eastern Ottawa County through subregional collaboration. See map below.

The first result of this collaboration is the Interim Metropolitan Framework. The Framework consensus is for a large proportion of growth to be in form of walkable neighborhoods and towns; and preservation of the best natural lands and farmland. There was a region wide agreement that most growth should occur in the already urbanized areas. At this time the Metropolitan Framework is in a phase of refinement, completion and coordination.

GVMC

Grand Valley Metro Council
Suite 410, 40 Pearl NW
Grand Rapids, Michigan 49503
www.gvmc.org