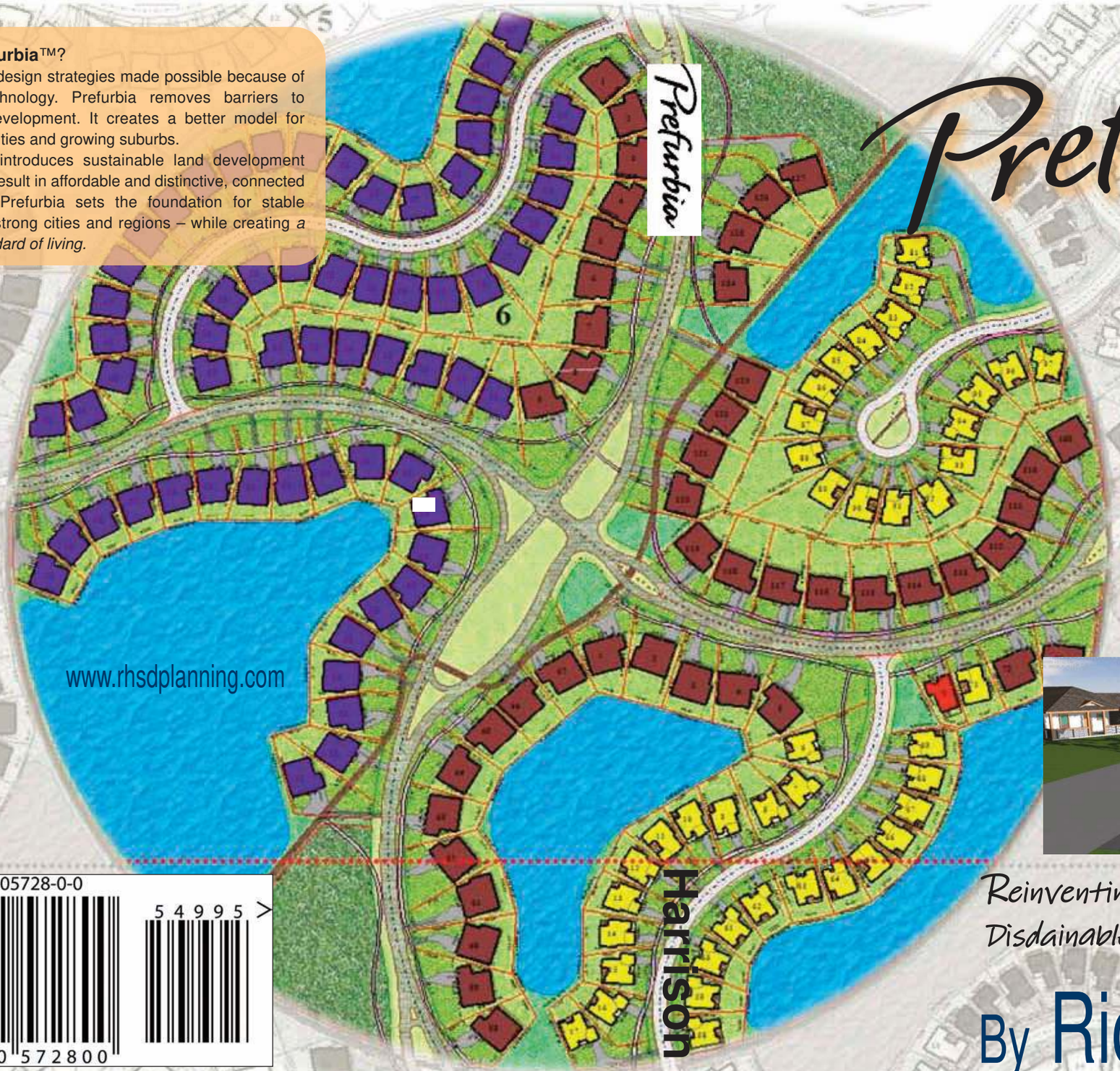
What is Prefurbia™?

A series of design strategies made possible because of advanced technology. Prefurbia removes barriers to sustainable development. It creates a better model for redeveloping cities and growing suburbs.

This book introduces sustainable land development solutions that result in affordable and distinctive, connected communities. Prefurbia sets the foundation for stable economically strong cities and regions – while creating *a preferred standard of living.*



Prefurbia™

Reinventing Land Development from Disdainable to Sustainable

By Rick Harrison

SBN 978-0-9905728-0-0

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Prefurbia™

Reinventing Land Development: From Disdainable to Sustainable 4th Edition

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Adrienne Harrison
Co-Author

Prefurbia: Reinventing Land Development: From Disdainable to Sustainable, by Rick Harrison

ISBN-13: 978-0-9905828-0-0 (perfect)

Project Editor Editions 1 and 2: Greg Yoko

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Forward

In 1997, as the then-owner of a small engineering company focused on working with private developers, I was looking for ways to create an advantage, as well as value, for my customer base. Unfortunately, most of the development work in the region was dominated by those monotonous patterns so prevalent in subdivision design.

But I knew there must be something better – a subdivision design method that broke the mold and instilled a sense of pride in its residents. I set out to try something different. With some success, I discovered that a linear-thinking engineer could, in fact, create something special – something builders, families, and communities all wanted. Shortly after that design experience, I received a newsletter about subdivision design that flipped the industry on its head. I was thrilled with the newsletter's vision – how it laid down a framework for design that focused on the satisfaction of end users. I made it my mission to find and meet the author of this newsletter.

The author's name, as you might have guessed, was Rick Harrison. Upon meeting, Rick and I instantly shared a common perception for the future of subdivision design. We found allies in each other. Until then, Rick's efforts were often thwarted by engineers and surveyors that could not wrap their heads around change. They would ignore Rick's new design concepts. Why? To make their own lives easier, with complete disregard to the lives of residents and their clients. But I saw the difference in what could be accomplished immediately. Rather than complain that it was too difficult or that the design didn't conform to the regulations, my engineering firm stood next to Rick in his quest to create better neighborhoods. Together, Rick and I set out to educate developers, builders, planning commissions, city councils, and city staff, showing them the genius of this new design and helping them to think differently about their communities, residents, and customers.

I've never witnessed anyone as passionate about industry's view of the residential development world as Rick Harrison. I have been honored to be part of the journey and to share his vision. Since 1999 I have been a proud part of nearly 50 trend-setting neighborhoods across the nation as part of the Rick Harrison team. I continue to see Rick's plans move to new levels, focusing on what is important in TODAY's world.

This book, Prefurbia, gives a wider-audience access to something I've been able to witness first-hand over the years: Rick's game-changing insight, creativity, and drive. Prefurbia is a must-read for anyone daring enough to think in new ways. It's a bold guideline for anyone interested in creating meaningful places. In closing, let me simply say, "Thanks, my friend." Thank you for moving the art of land planning and the science of engineering to an entirely new level, benefiting those most important to any community – the people who live there.

Steve Sletner, PE

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About the Authors

Richard "Rick" Harrison

Rick is the founder and president of Rick Harrison Site Design Studio (www.RHSDplanning.com) in Minneapolis, Minnesota and Neighborhood Innovations, LLC (www.neighborhoodinnovations.com) which develops and distributes LandMentor land development technology and training. The design studio was formed in the late 1980's (incorporated in 1993) to improve the quality of life through better neighborhood design. Rick's exceptional project approval record of 100 percent (when he conducts presentations), demonstrate his success with city councils, planning commissions, stakeholders, and citizens. His creation of the *Coving Planning Method* earned him the 1999 Professional Builder's Professional Achievement Award for Innovation in Land Planning. He has since introduced many more design concepts - all introduced in this book. Prior to forming Rick Harrison Site Design Studio, Rick was a land planner, developer, surveying and engineering technician, and a civil engineering/surveying software developer (since 1976) as well. To our knowledge, no one has this unique blend of diverse experiences in the land development industry, and certainly none has fostered as many innovations in design and software technology.

All of the plans Rick designs are to exacting survey accuracy, none are rough sketches all too common in land planning. Rick designed all of the 900+ neighborhoods while he also developed new software for the civil engineering and surveying industry. His patented LandMentor technology is the first system intended specifically for sustainable land development.

A more detailed biography of Rick can be found at the end of the book.

Richard L. Kronick contributed to much of the book including research and is a freelance writer and architectural historian. He has written extensively on Minnesota architecture, with more than 50 articles in publications including *Architecture Minnesota, Old House Journal, Progressive Architecture, the Journal of the Taliesin Fellowship,* and *Minneapolis St. Paul Magazine.* He has lectured on various architecture topics for the Chicago Art Institute, the Minneapolis Institute of Arts, the Minnesota Section of the American Institute of Architects, the Minnesota Society of Architectural Historians, and the Twin Cities Bungalow Club. Dick is a past president of the Minnesota Chapter of the Society of Architectural Historians and founded its newsletter, *With Respect to Architecture.*

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Preface

What is Prefurbia™?

Prefurbia is a collection of pioneering design and regulatory methods for land development that promises to make a sustainable world. That is quite a bold claim, after all, doesn't it seem that everyone claims they too have the sustainable solution?

This book is not another critique of the sprawling American suburbs and blaming them for their auto-centric lifestyles. Nor is this book an attempt to social engineer through design.

Instead, Prefurbia teaches and demonstrates market proven solutions that beautify and enhance both urban and suburban quality of life. It presents refreshing new design innovations that deliver better neighborhoods. Since many of today's land planning design problems stem from the suburbs, that is the focus of this book. Yet Prefurbia can also enhance urban design. Prefurbia cures many of suburbia's ills, while also offering benefits for urban dwellers.

The term suburbia comes from the Latin suburbium, sub, (below) the urbis (city) which, in Roman days described dwellers who lived outside (below) the protection of the city fortress walls.

The modern notion of suburbia, the quiet, unspoiled outskirts as a retreat for the wealthy urbanite is defined by Oxford University Press as "*...communities located at the edge of the city and developed at low rates of housing per hectare. The provision of open space is a characteristic feature*". However, most of today's suburbs are not retreats nor are they sustainable.

Instead of a "sub" or "below" way of life, Prefurbia merges consumer preferences with sound economics and good stewardship of the environment. The resulting communities offer a "preferred" standard. Thus Prefurbia more accurately describes these new concepts.

Another typical problem of the 1950s and '60s neighborhoods were their lack of distinguishing features and that they were designed without walkable destinations to scenic natural areas or convenience retail. The biggest problem is that this 60-year old model still represents today's suburban landscape! *Where is the innovation, research, technology, and affordability?*

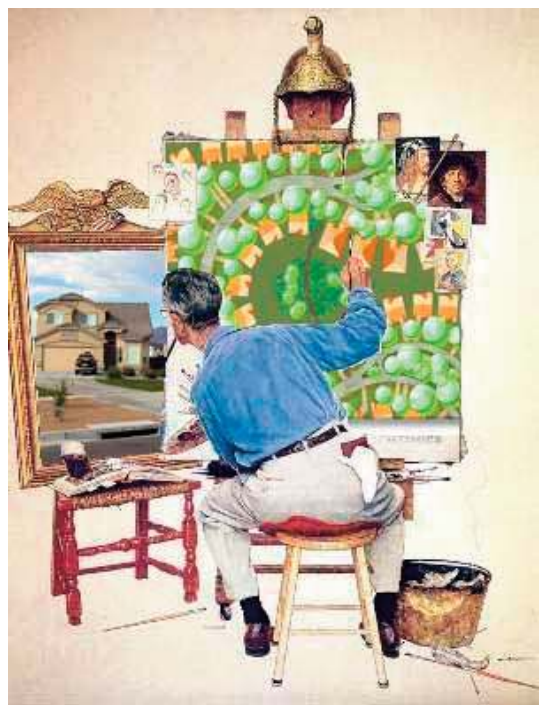
In order to create better neighborhoods, we first need to fully understand the problems of why they are so dysfunctional. This book examines the role of those who design, regulate, approve, and build neighborhoods. You will discover that the current 'Smart Growth' solutions aren't that smart, *and the land developer isn't the problem!*

If you are interested in economically viable solutions that deliver sustainability, we present: *Prefurbia*. Prefurbia neighborhood planning (and regulatory methods) deliver a *Preferred* quality of living: lower environmental impact neighborhoods at densities that provide ample open space for families, safe pedestrian connectivity, and with less cost to construct than conventional, traditional, and New Urban alternatives. Prefurbia consumes less time and energy, is affordable, and reduces the world's infrastructure impacts as much as 30% - *wouldn't you call that 'sustainable'?*

Prefurbia solutions are made possible by today's technology advancements. We include neighborhood models that offer life cycle housing, from the renter and the first-time homebuyer, to extended families, single parents, and senior housing. *Prefurbia* also provides economically successful retail models.

Every neighborhood we design is an opportunity to push the envelope further, attaining higher standards and striving for greater sustainability and affordability. What we have achieved so far is simply a beginning. If everyone becomes more focused on serving future residents goals above that of the municipality and developers, we can truly provide a preferred model of living for future generations - *Prefurbia.*

Like a land surveyor who describes every tract of land from a beginning point as the *Point of Beginning*, (an anchor point that defines the tract of land), think of this book as the Point of Beginning for a new way to design, develop, regulate, to build communities that serve as models for a sustainable future, while also preserving the American dream of home ownership.



Acknowledgements

We hope this book affects positive change in the future building of our cities. Over the years there were times that I was guilty of the majority of the problems wrong within the land development industry as described in this book.

I was born with a pencil in my hand. When others in grade school were drawing stick figures, I was figuring out how shadows and reflections worked. On the other hand, I paid little attention in school, sketching instead of passing exams. In the 1950s and '60s, schools simply passed students like me to the next grade. I was also fluent in trigonometry, the math used in software development.

I'm here in this position because of the following mentors (in order of date):

Don C. Geake

If Don never hired me at 15-years-old, I would never have had the incredible opportunity to design neighborhoods. It would never have crossed my mind. I tell some revealing stories of my planning experience while working with Don, the situations mentioned still too common in the land planning industry.

Calvin P. Hall

Cal took the time to mentor me in land planning while working for Don. Without Cal's guidance, I would have not had the opportunity to grow.

Evelyn Wood Speed Reading

After graduating high school, I was functionally illiterate - again, concentrating only on art and math. Taking the Evelyn Wood Speed Reading course allowed me to read fast and with the comprehension required to educate myself by diving into multiple books as I pursued engineering, surveying, and other interests.

Abe Minowitz

My stepfather was one of the great industrialists (defense industry) of Detroit, Michigan. He gave me the opportunity to develop land and manage the completion of a New York multi-family development. This eye-opening experience gave me the insight that if I were ever to be an effective land planner, I needed to gain a full knowledge of engineering and surveying. He was also instrumental in teaching me the "business" side of business.

Paul Lederer

Paul hired me as a land surveying and civil engineering draftsman in Houston, Texas. Over a four year period he taught me about the industry, from determining boundaries to designing sewers. He was a mentor that gave me the foundation to create precision designs. It was during this period that I developed a hobby of software writing to automate the tedious computations, making my work faster and easier. This was done using programmable calculators in the early 1970's.

Bob Needham

Bob was head of the civil engineering section of Herman Blum Engineers in Dallas, one of Texas' largest consulting firms. I was passing through Dallas looking to get back into planning. Bob told me years later, that J. Stiles, their largest development client, called one day and said: *if they did not get a planner on staff, he'd go elsewhere.* When Bob hung up the phone, it rang – it was me asking if they had any planning positions! I thus became head of planning for one of the largest consulting firms in Texas.

The first week I designed a curvaceous subdivision. I overheard the surveyors in a cubicle say, "*if he thinks we are staking out those curves, he's nuts -we are going to straighten out those streets.*" They did not know I had a full knowledge of engineering and surveying. I stayed the entire weekend – never left the office - using COGO (the standard software of the day) and punch cards, I did all of the geometry. That Monday morning I dumped the drawers of punch cards and hundreds of calculation sheets on the surveyor's desk, and said, "*Here it is – stake it out!*" I took much of my spare time and own income to invest in Hewlett Packard systems creating software to reduce time. Eventually I used a surveying dealer to sell 20 packages. This was in the late 1970s.

Hewlett Packard

One day I received a call from a VP at Hewlett Packard Corporation asking me to write a surveying package for its new desktop computer, the HP-87. Over the next two decades, we sold about $20 million in systems to thousands of engineers and surveyors. The success from partnering with HP allowed me to shift my focus to a new passion – improving the way suburbia was designed, and ultimately, to developing more sustainable land development models.

Adrienne Carriger

In the mid-1990's due to some bad partner business decisions I lost everything. Starting again from scratch with no money, I met Adrienne. Her drive, honesty, and integrety mirrored mine. Since I had little wealth at that moment, she could not have been interested in me for money. When she became Adrienne Harrison my luck began to turn around faster than I had ever imagined. Without her efforts, we could not have built this business. Shortly after that, Adam, my son, began working with me and I was amazed at how fast he took to the business, another blessing.

Land Developers

I am most appreciative of the hundreds of land developers who hired us. We have actually developed nothing – *zero.* It was the hundreds of those developing land who have been the real innovators of this industry. They believed in a better way and believed in us. Considering that a small development represents many millions of dollars, makes me grateful to them all. For every single developer, there have been dozens of others on the municipal side we are grateful for, who have sat through our presentations and allowed us to build a new model for living with their "yes" votes.

Casualties of the Recession

As we ventured into a new era of land development, over the past two decades I have had the pleasure to meet and do business with some very forward thinking engineers, architects, builders and developers. At times they have been inspirational and supportive. Many of these leaders of the industry fell victim to the recession. As the economy returns many have found a way to recover and rebuild their companies and be proactive again in the land development industry.

A resident testimonial (un-edited)

Good morning.

I live in Hunters Pass Estates. I have recently learned that your company was responsible for designing our neighborhood and just reviewed your website.

Speaking on behalf of our entire neighborhood we would like to thank you for the excellent design!
We are a very close knit neighborhood consisting of 39 homes at this time. The coving design provides each home with a view and also allows us to feel connected to each other due to the openness and ability to see other homes in the neighborhood.

Speaking on behalf of myself. My family had just built and were living in a home in a conventional neighborhood in St Michael. We never had the feeling of being part of our neighborhood. Our house was the second from the corner, when we looked out our window we could see 2 houses across the street and 2 on the opposite corner. The neighborhood had standard sidewalks but nobody ever seemed to use them much. Walks always seemed to be a planned event with the intended destination being back home. When encountering neighbors it tended to be a wave and friendly "hello" and you continued on your way around the blocks then back home.

My wife drove through Hunters Pass Estates when only the models existed. She called me right away and spoke not only of the models but of the neighborhood design. Needless to say, we were sold but had a hard time deciding which lot as each was unique but all offered the feeling of openness and the sense of connectivity we were looking for in a neighborhood.

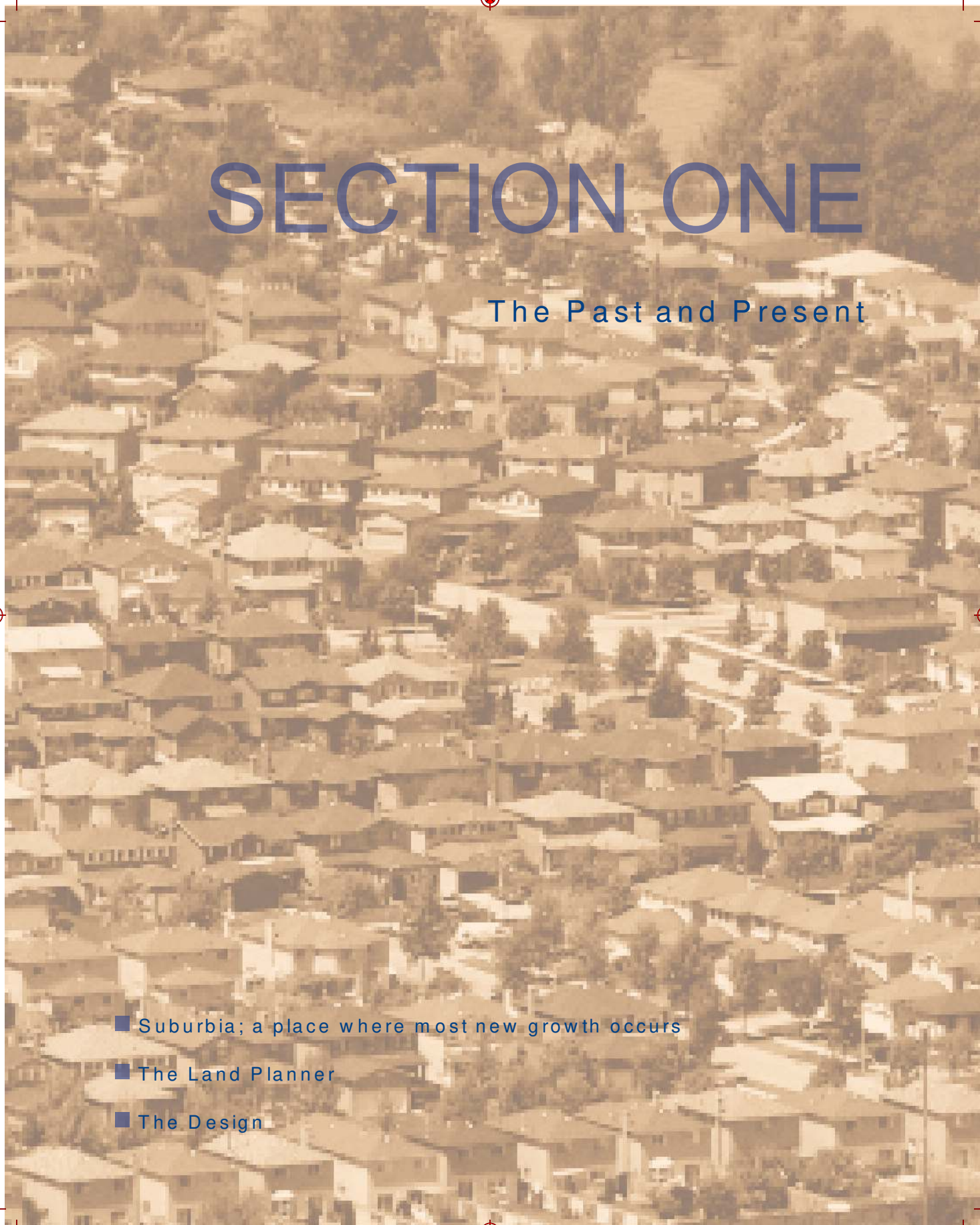
We ultimately decided on a lot in the cul de sac Lydia Circle NE. . We couldn't have asked for more. I look out my front window or sit on my porch and can see the retention pond, lake, and 15 other homes in our neighborhood. The meandering sidewalks allow all neighbors to get to know each other better. Walks now tend to end up with our children playing with others, neighbors talking with neighbors, and more than one impromptu neighborhood get together that involved having pizza delivered to the house all of the neighbors seemed to end at that night.

The design also provides a sense of security. Our neighborhood has nearly 70 children with the majority being under 12. The coving design and narrow streets slows traffic, the wide meandering sidewalks provide a safe space for children to get back and forth, the openness allows you to see your children playing at other neighbors homes along with keeping an eye on each others property.

Your website, newsletters, and documents show your passion and commitment to the coving design. I Just wanted to thank you again and let you know the Hunters Pass neighbors are sold on the coving design. I'm sure I speak for many when I say we wouldn't move back to a neighborhood with conventional designs.

Please feel free to share any additional information that you think would be of interest to us on our neighborhood.

Brent Turner



SECTION ONE

The Past and Present

- Suburbia; a place where most new growth occurs
- The Land Planner
- The Design

CHAPTER ONE

Typical Suburbia

"A great city is not to be confused with a populous one."

— Aristotle circa 300 BC.

The design (land planning) of the neighborhoods we live within impact the success or failure (sustainability) of a region . Cities are comprised of a mosaic of 'profit driven' individual land developments intertwined haphazardly together. They are rarely cohesive or fully functional.

Land developments designed in just a few hours serve as a foundation that will exist for many decades, or more likely centuries. Homes may deteriorate, but they typically get remodeled, updated, or rebuilt upon the same block, lot, and street pattern that was originally designed.

There are few forms of design as permanent as the neighborhoods in which we live.

One size does not fit all

The approach most cities take in writing their land use regulations is summed up as "one size fits all." In this chapter we show how the people in charge of developing America's suburbs – city officials, civil engineers, planners, and land developers – start out with good intentions but end up instead with projects that increase housing and maintenance costs while diminishing the quality of life for residents, *while also harming the environment*.

Minimums that become standards

The typical suburban zoning ordinance begins with a purpose and intent statement. For example, here's one from a city near the Minneapolis-St. Paul, Minnesota, metropolitan area:

Purpose and intent

This ordinance is adopted for the purpose of:

- Implementing the approved comprehensive plan.
- Protecting the public health, safety, morals, comfort, convenience and general welfare.
- Facilitating adequate provisions for transportation, water, sewage, schools, parks and other public requirements.
- Balancing residential, commercial and industrial development and population to provide a tax base that can adequately supply the necessary level of services within the city.
- Providing convenient retail sales and service centers for residents.
- Facilitating continuation of commercial agriculture within the city.
- Minimizing conflicts between land used for agricultural production and land demanded for development.
- Conserving natural resources and maintaining a high standard of environmental quality.
- Conserving the natural, scenic beauty, rural character and attractiveness of the countryside.
- Providing for the administration of this ordinance.
- Defining the powers and duties of the administrative officers and bodies.
- Prescribing penalties for the violation of the provisions of this ordinance.

You will find similar verbiage in land-use ordinances throughout America. These are principles that any thoughtful person would agree with.

The problem is that in city after city, ordinance after ordinance, the thousands of words that follow those glowing purpose statements do little to achieve the intent goals. In fact, most land use ordinances consist of nothing more than minimum lot dimensions and setbacks for single-family houses, multiple-family buildings, and commercial structures. For example, in the same ordinance quoted above there exists a set of requirements for single-family housing as illustrated in Figure 1.1.

Area Requirements. The following minimum requirements shall be met for single-family residential development:

Minimum lot size	20,000 sq. ft.
Minimum lot width	100 feet
From arterial streets	100 feet
Front, from all other streets	30 feet
Side	15 feet
Rear	30 feet
Maximum building height	35 feet

Figure 1.1

Figure 1.2: No sense of space on the cluttered street in an upscale development in suburban St. Paul, Minnesota.

Suburban ordinances provide the most minimal of guidelines to control density (intensity) of development. These regulations are intended to provide a certain provision or sense of 'space'.

But, as shown in Figure 1.2, there's little actual sense of space along most suburban residential streets. Why? Because those who are charged with implementing ordinances – elected officials, civil engineers, and even the city planners have little education in innovative methods and technologies specific to achieving an increased sense or preception of space. This is one of the reasons this book was written - to provide both awareness of design problems while introducing market proven solutions.

Those that see the word: *minimum* interpret it as: *requirement.* This encourages the land planner (designer) to line up houses like barracks: parallel to the street exactly at the stated regulatory 'minimum' setback distance.

There are three reasons why this situation happens:

- To maximize their client's (the developer) income it makes common sense for the *land planner* to place every home at the minimum allowable dimensions. They are striving for the greatest possible 'density' to maximize the number of housing units or commercial square footage that can be squeezed into a given parcel of land in an attempt to provide their clients more profit.
- City officials often agree because more homes increase tax income to support the city and fund operating expenses, as well as finance that new city hall, schools, library, and fire stations.
- Planning commission and council members assume that the dimensions allowed in the regulations will deliver a reasonable sense of space and result in more desirable developments.

The result of designing to the minimums can only result in the regimentation that most people associate with today's cookie-cutter, monotonous, and mind-numbing American suburbs.

Land developers get the blame for our dysfunctional suburbia. However, the problem is caused by the confluence of the above conditions: ordinances that state only minimum requirements, the developer's goal of maximizing density as profit criteria, and the city's goal of increasing tax base. The fact is the developer (almost) never actually designs their subdivision - it is those acting as the 'land planner' to blame. This problem is not unique to America, but in every country on earth.

No requirement for creating neighborhoods with character

With these forces driving development, how can we assure attractive habitats will be built that add character and value to our cities as well as a great quality of life? The answer is: *we can't*.

Some municipalities have been successful in enforcing design elements that beautify. The city of Woodbury, Minnesota, enforces architectural controls for commercial construction. When driving along their arterial streets, passing the shops and stores, Woodbury appears more impressive than neighboring towns that have no such controls. Woodbury becomes 'the place to live' driving up both home and land values (and tax base). It is the rare city that has both the city staff talent and the will of Woodbury. Conversely many North Dakota cities during today's oil driven construction boom fear that design controls will scare away builders. It will - *but only the shoddy and cheap cut-rate builders*.

Who actually designs most of America's new neighborhoods?

Much of our developed suburban landscape is laid out by civil engineering and land surveying firms, a breed that is notorious for their conservative approach.

When engineers and surveyors lay out developments, they think in numeric and linear terms: simple straight sewer systems, making that 10,000 square feet (minimum) lot exactly 10,000 square feet, not 10,006 square feet, and so on.

The typical engineer or surveyor rarely if ever considers homeowner's views when looking out their living room window onto a yard, or taking a safe and convenient stroll. They rarely if ever consider vehicular 'flow' or walking 'connectivity', or how to create a feeling of 'neighborliness'.

Why would they be concerned with such things? Even if the ordinance hints at these goals in the purpose and intent, it leaves no specific ways to achieve them. To make matters much worse, CAD (Computer Aided Design) software for laying out developments has always been focused on productivity, producing a plan as fast as possible. The term LPM, or lots per minute, is how many software vendors proudly market their products. One vendor boasts 250 LPM on their website! How much efficiency, function, and neighborhood character will those planning a development achieve at 4 lots per second? Meanwhile, the developer assumes that the people designing the subdivision will add character and livability into the project, and do so within budget. Speaking of budget - many engineers charge a percentage of construction cost, thus being rewarded by creating the most possible infrastructure and the least profitable development - *i.e. unsustainable growth!*

Just bulldoze everything in sight

The three main groups that design suburban neighborhoods: the civil engineer, the land surveyor, and the architect act as the 'land planner'. It is rare that anyone only does 'land planning' and nothing else for their income. Yet, land planning is what controls the success or failure of growth!

An 'architect' or a dedicated 'land planner' does not possess knowledge of civil engineering or land surveying. As illustrated in Figure 1.3, the easiest strategy for this type of land planner is to lay out a development with no thought about existing topography – the physical restrictions of the land itself. If the ground slopes the wrong way, no problem, the civil engineer will have to figure it out. What has been wrought by millions of years of geological evolution is quickly bulldozed.

First drafts of layouts for suburban developments, or 'conceptual plans', are created either just before or just after the purchase of the site. In a matter of a few hours – or in some cases minutes – the land planner sets lots and streets that will define millions of dollars of construction that are likely to exist for centuries. These quick 'sketch plans' are typically based on nothing more than a rough estimate of the outer perimeter of the tract along with regulatory minimum dimensional requirements for streets and lots. The term developers often ask: can you give me just a 'quick and dirty' layout? Often 'quick and dity' plans become what is eventually built - *quick but permenant*.

Rarely does anyone consider *precise* existing topographic and vegetation conditions on the initial concept. Why? Because in many cases no such *precise information* is readily available and few developers spend the time and money required to obtain it. Those who think obtaining this data from an on-line 'interactive mapping' is accurate enough to design neighborhoods are fooling themselves. No design can be accurate without a proper precise site survey and topography.

However, it's expensive to accurately locate the site boundary, every grade change, and significant tree. Thus, the land planners quick sketch based on little 'real data' becomes the basis for a series of important economic decisions that directly impacts the success of the developer. Can we afford the land? Can we achieve a profit? How many linear feet of street must be built?

Developers may abandon projects at this point because, after relying on poorly thought-out land plans they conclude that the cost of developing will be unprofitable. Or if the developer decides to go ahead and buy the land based on the quick sketch, they often discover too late that earth movement or that the density had been wildly overestimated. The result is an unprofitable project with no "character building" traits because there was no money left to build them. Before the recession, land and housing values skyrocketed beyond reason. Essentially the developer could make all kinds of mistakes and still be profitable because of rising values. Those days are over.

No street smarts

Because of the large lots and low density, Figure 1.4 appears to induce sprawl. However, this development is in a city without a sewer treatment plant, thus on-site septic systems and the associated land area required for the wastewater septic fields are unaviodable requirements.

Figure 1.3: A flat, boring, development in suburban Cincinnati, Ohio that destroyed the native habitat.

Figure 1.4: Large lot development creates longer streets per home as seen in this Minnesota development.

There are many reasons that justify what some consider to be sprawl. But less efficient infrastructure is not one of them. As you will learn in this book, suburban infrastructure design is more efficient than gridded cities of the past. The design methods of Prefurbia increases suburban efficiency a demonstrated average of 25%. Less infrastructure (street and utility mains) equates to more available greenspace and less construction cost, and more 'design' opportunity.

When experts speak or write about how older cities did not sprawl like those being built today, they are correct. However, these experts leave out some key points had those same cities be built today:

- The cities of yesteryear did not have today's restrictions and regulations that were formed after environmental awareness began half a century ago.

- There were no 'wetland' laws, no slope restrictions, nor were there requirements to contain storm water on-site as is the case with most of todays developments.
-
- Older cities did not have the (absurdly large) setbacks typically required when transitioning land uses (zoning) abut each other on adjacent developments - simply to appease existing residents.

- Had the cities of the past been built with today's regulatory demands, they would have consumed more land - they would have *sprawled*. With the abundance of wetlands (previously termed as 'swamps'), slopes, and required detention and retention ponding, the City of Minneapolis as an example, if built today, might have consumed twice the land area!

One contributing factor to sprawl that can be dramatically improved through Prefurbia design methods is the design of local residential streets.

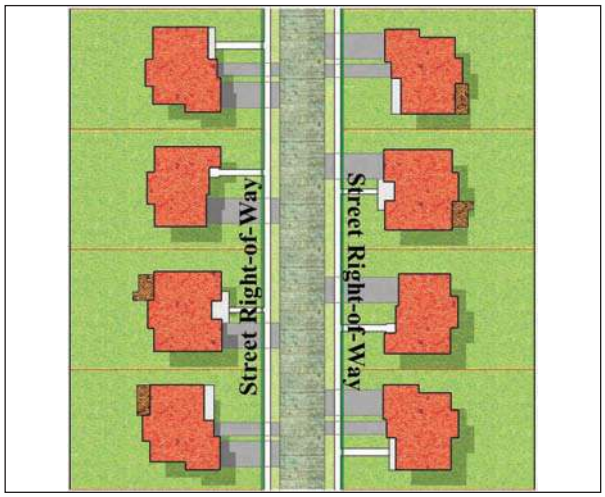


Figure 1.5: "Right of way" on a typical residential street.

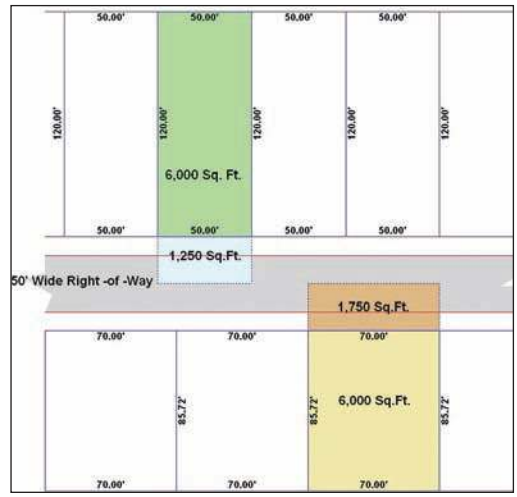


Figure 1.6: Typical suburban lots and their right of way segments.

Excessive streets are bad for (at least) three reasons:

- The most expensive item of a development is the public street. One mile of typical residential street costs about $1.6 million to build and much more for a city to maintain over its life span. This price varies around the nation, but the $1.6 million is close to a national average.
- A paved surface cannot absorb rain water increasing runoff (rainfall 'runs off' hard surfaces), contributing to flooding and the pollution of streams, lakes and watersheds.
- Homeowners pay for this excess. To explain why, you must understand 'right of way'.

Right of way defined

Most people think 'street = pavement.' However, the pavement is within a 'right of way', which is a corridor that envelopes the curbs, sidewalks, and utilitiy lines that contain sewer, water, gas, electric, and fiber optics. In American suburbs, the right of way dedicated to the municipality is from 50 to 66 feet wide. A privately owned lot extends to the right-of-way, not the curb or street centerline.

Figures 1.5 and 1.6 show typical suburban lots. The homeowners of the green lot in figure 1.6 may think of their lot as 50 x 120 feet = 6,000 square feet. But they ultimately paid for half of the 50-foot-wide right of way (the people across the street pay for the other half). This is because the developer 'dedicated' the street right-of-way to the city factoring that land cost into the original lot price, thus cost of the home. So the actual land 'paid for' is 7,250 square feet. This cost continues as the home sells and resells.

If the town council prefers a more 'spacious look' from the street and therefore requires that 6,000-square foot lots be 70 feet wide, as with the tan lot in Figure 1.6, the homeowners' usable space remains the same, however, the added right of way length increases the total land consumed to 7,750 square feet. In other words, a 20-foot increase in lot width adds the cost of 500 additional square feet that the homeowner can't use or enjoy, yet they pay for it anyway!

Figure 1.7: The "garage grove" effect in a single family development in Fargo, North Dakota

Increasing lot width also increases street length. The town council may have had the best of intentions, but by increasing lot width, they increase the costs of paving, utilities, street maintenance and run-off. Increased costs go directly to the house price which increases taxes.

Land planners exacerbate this problem because they place structures (houses) parallel to and as close as possible to streets, which result in the longest possible street construction to achieve density. Later in this book will be introduced more efficient and creative approach to design that reduces street length without sacrificing density and without reducing existing regulatory 'minimums'!

The "garage grove" effect

Developers and builders must cater to today's multi-vehicle families who desire 2-, 3-, or 4-car garages with convenient access. A common way to provide extra car storage is to increase lot width and add garage stalls, which adds to driveway surface volume. Driveways are expensive - extra width increases costs and creates environmental havoc. Driveway costs are the responsibility of the home builder. More recently as suburban lots become narrower to achieve higher density, garages dominate the primary facade of a home. Combined, these factors create the "garage grove" effect. Driving down a typical development built in the past decade, less home and more garage doors are visible which becomes become the major (if not the only) architectural feature! Making matters worse is that garages seem to use the same white or sandstone steel door home after home (Figure 1.7).

It is the American love of freedom and luxury conveniences that today's cars provide – that influences much of our neighborhood designs.

It has become far too simple for cars to become the target for attacks on suburban sprawl.

One of the best-known commentators on automobile-driven planning is writer James Howard Kunstler. In *The Geography of Nowhere*, he says, "The amount of driving necessary to exist [in the current system] is stupendous and fantastically expensive…. The cost…in terms of pollution…is beyond calculation…The least understood cost – although probably the most keenly felt – has been

Figure 1.8: New Urbanist development in I'On, a suburb of Charleston, S.C., that squeezes everything together in an effort to reduce automobile use.

the sacrifice of a sense of place: the idea that people and things exist in some sort of continuity… that we know where we are."[1]

We agree with Kunstler that the automobile fosters a negative influence. However, the book's arguments written two decades ago, are different today as the cars we now drive are less polluting and far more efficient - as they will be decades from now. Future neighborhoods will still house families who will rely on personal transportation and the freedom it provides.

Overdosing on cars has been made so exhaustively by Kunstler (and many others), we will not drag our readers through a recitation of statistics to confirm the obvious: America is addicted to the modern automobile. Prefurbia embraces the automobile while softening its negative impacts.

The New Urbanists have responded to the automobile problem by suggesting that if they drastically shrink the scale of development it would reduce our dependence on cars and generate significant savings. For example, Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck, in "*Suburban Nation*" say, "…there has been no shortage of ideas designed to make the single-family house more affordable. The building industry and generations of architects have dedicated themselves to the task. The results – plastic plumbing, hollow doors, flimsy walls, vinyl cladding – are very clever, but all of them put together do not generate half the savings that can be achieved by allowing a family to own one car fewer."[2]

If that were actually the case – take for example the "I'On" New Urban development (a similar home to that on Figure 1.8). May 9, 2013: I'On Realty (www.ionrealty.com/find_home) shows the lowest priced home in the entire development as $448,500 . For this price the buyer gets only 1515 square feet, three bedrooms, 2 1/2 baths and apparently no garage at all. The same day – in the same region to I'On, is a development where you would find a DR Horton home and purchase the "Cedar" advertised for $373,900 with five bedrooms, three and a half baths, a huge usable front porch and a two car garage with 3,450 sqaure feet of living space - over twice that of the I'On home.

The purpose of cars (Hint: not just transportation)

An affinity for convenient, personalized transport is nothing new. When European metalworkers learned to make spring steel in the second half of the 16th century, an important result was the development of reasonably comfortable carriages, as the preferred means of transport for wealthy people.[5] As with cars today, carriages instantly became status symbols. In Rome in the 1570s, it was said that two things were necessary for success: to love God and to own a carriage.[6]

And, as with cars today, 16th century carriages were not used solely to get from point A to point B. In fact, the availability of carriages almost immediately led to the popular practice of promenading: that is, driving up and down in a particular place at a particular time solely in order to see and be seen. By the early 17th century, every major European city had developed a purpose-built promenading street.

But the 16th and 17th century promenaders did not just see each other while coursing back and forth on the boulevard. They also communicated by voice and by passing notes to each other. In fact, the most important result of promenading was the arrangement of meetings – to conduct both business and pleasure.[7] Many of these meetings took place in the carriages.

Today, only two things have changed: the technology is more complicated and more levels of society participate in promenading. Americans want cars for the same reason people always have wanted personal transportation: because we conduct important parts of our lives in cars. Cars are part of our social fabric and we will have them or we will have something else that does what cars do for us. Public transport is not the same.

In other words, to understand why Americans tenaciously defend and protect their "love affair with the automobile," it may be more instructive to focus on the part about the love affair rather than on the part about the automobile.

Figure 1.9: Vehicle clutter.

The price difference is $74,600. Essentially, you have saved for your children's college fund by purchasing the D.R. Horton home vs. the I'On home - and doubled the living area!

This suggests that the scale of development is not the only issue that needs to be addressed.

If you prefer a more apocalyptic tinge to your theories, here is Kunstler's death knell for cars: "The Auto Age, as we have known it, will shortly come to an end…. We will almost surely have proportionately [fewer vehicles] per capita…. Possibly only the rich will be able to own cars."[3]

Yet in the worst recession in modern history, car sales did quite well, and are only projected to increase! The New Urbanism provides two ways we reduce our reliance on cars. First, make suburbs look like inner cities by giving them drastically increased density to the point where daily destinations to the supermarket and the school are within walking distance of every home. Second, greatly beef up our emaciated public transport system so that vehicular trips don't require cars. Peter Calthorpe, a co-founder of New Urbanism, sums up these principles as follows: "…urbanism – defined by its diversity, pedestrian scale, public space and structure of

Figure 1.10: Boring, monotonous backs of houses exposed to the street.

bounded neighborhoods – should be applied throughout a metropolitan region regardless of location: in suburbs and new growth areas as well as within the city."[4]

This squeeze-the-cars-out attitude is where Prefurbia parts company with the New Urbanists. It is a fantasy to assume that Americans will give up their vehicluar freedom - the ability to move at will in return for walking - or exposure to weather conditions that rarely provide days perfect for a stroll.

Whether or not they admit it, potential homebuyers base their evaluation of a neighborhood partly on the vehicles they see. A neighborhood of Mercedes and Cadillac cars signifies wealth, conversely a neighborhood of older rusted cars along the streets signifies blight. In larger suburban lot areas, where everyone is likely to have multiple stall garages, the impact of car clutter is reduced – but not eliminated. People protect their most expensive vehicles from weather and vandalism by sheltering them in garages. They tend to leave the least beautiful vehicles – older cars or teenagers' rust buckets, in their driveways, where everyone is forced look at them (Figure 1.9). Alleys and side - or rear access garages reduce the visual impact, but they can't solve the problem.

Showcasing bland rears of houses

Few houses have architectural detail on all four sides – not even those typically found in the New Urban developments. As a shortcut to affordability, builders typically provide ornamental detail only on the front side of a house. The back and sides are typically left blank and unsightly (Figure 1.10).

Land planners too often think it's a good idea to turn the backs of houses

Figure 1.11: Transitional zoning: townhomes placed as a buffer between detached houses and a shopping mall.

toward arterial roads. Thus, passing motorists get the worst view of a neighborhood. Noticing this, most officials choose one of two paths: Either they allow their towns to be ugly, or they require expensive buffers such as fences, walls, and berms between home and street.

Buffers themselves become problems. Fences are not often maintained and age poorly. Homeowners may construct ragged, uncoordinated rickrack of fencing between their lots in a variety of materials, colors, and stages of decay. Earth berms with plantings may be better looking, but they consume expensive and excessive land and require costly long term maintenance. If the cost of screening devices went into architectural detailing, there may be no need for screening in the first place!

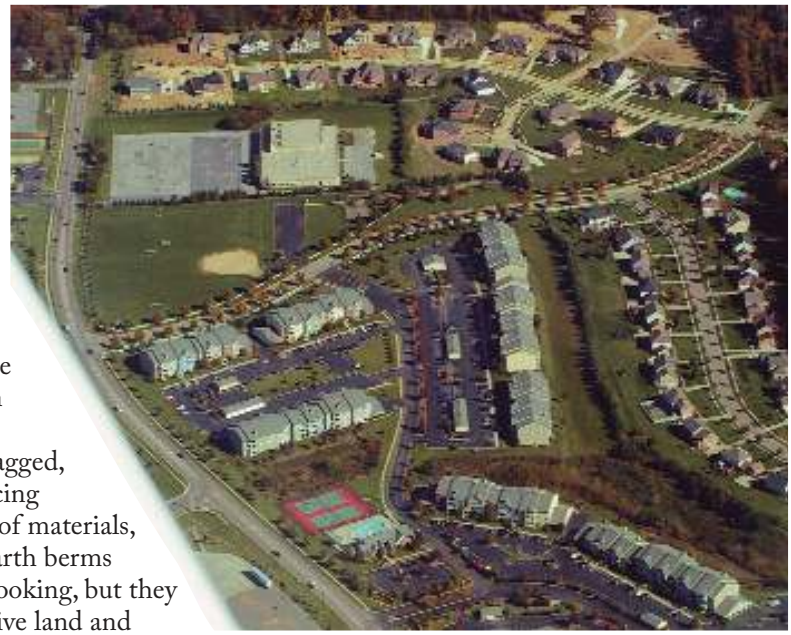


Figure 1.12: Transitional zoning, Multi-family units are at the entrance of this development in Cincinnati, Ohio, virtually hiding the higher-valued single-family homes.

Transitional zoning: hiding the expensive houses

In Europe throughout the Middle Ages and Renaissance, work was carried out in very small shops. But during the Industrial Revolution, from the end of the 18th century through the beginning of the 20th century, mechanization made it possible and economically advantageous to build large factories and thus employ more and more workers. As a result, work places became progressively bigger, noisier and smellier. In response, planners and city administrators came up with the concept of zoning. They divided cities into separate zones restricted to heavy industry, light industry, retail, residences, and so on (Figure 1.11). They used multiple dwelling, light industrial and

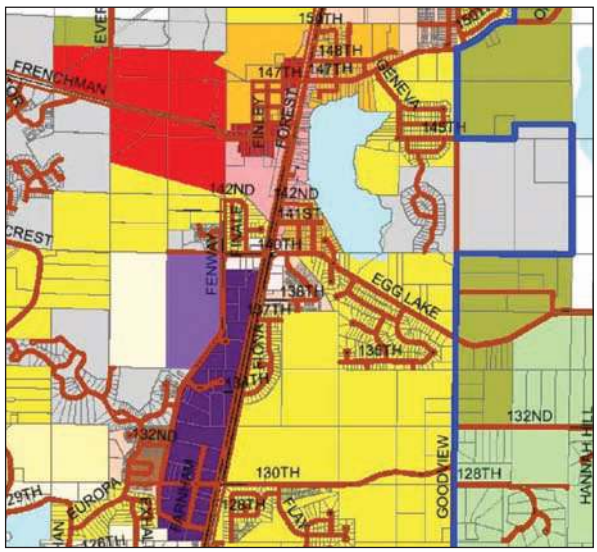


Figure 1.13: Zoning indicated by color in a Minnesota town. Most of the recent development has been based on the original mid-19th century government-mandated plat. For example, at right-center, the residential area (yellow) between Egg Lake [Road] and 136th Street has been shoe-horned into a half-mile square area, irrespective of topography and other factors.

retail zones as buffers between upper-class residential neighborhoods and the most offensive industrial activities. The lowest-ranking members of society were usually stuck in close proximity to noxious factories. Thus, higher-ups insulated themselves not only from industry but also from "those people," whom they preferred not to see in their neighborhoods.

This practice – "transitional zoning"[8] – is still used and often for the same reasons (Figure 1.13). Citizens want to insulate and isolate their more upscale single-family houses from "those people" or "those functions." The usual excuse is to maintain property values, which there is often some truth.

So how do those in control decide where to place the various zones? Usually, it is on the basis of previously existing land ownership boundaries. When Farmer Jones and Farmer Smith finally sell out to developers, the town council votes to designate the Jones farm as a block of multi-family units and the Smith farm as a block of single-family housing. They often make such decisions even though a given configuration of land might not be the right size or in the best dimension for the use they have in mind.

They often decide to use the lowest-priced, highest-density housing as a buffer between the highest-priced homes and the most noxious land use. And since there is no noisy, smelly industry in most suburbs today, the most noxious land use is a high-traffic arterial highway at the edge of the development, or loading and waste disposal areas at the rear of commercial strip malls.

This common transitional zoning pattern has several negative effects:

- Passersby see only the lowest priced housing, thus cheapening public opinion of the entire community.
- Passersby get the sense that the community is more crowded (dense) than it actually is.
- The majority of citizens are constantly exposed to most of the higher traffic and noise.
- Lower income families must worry about their children in proximity of high-speed roads.
- The view from apartment windows is either the highway, parking lots, loading docks, or trash bins of the retail zone.
- Only the rich have the feeling and luxury of spaciousness.

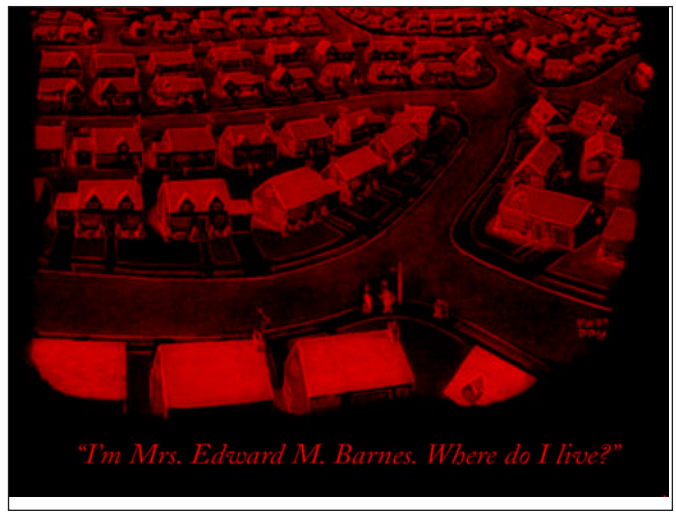
Figure 1.14: These sidewalks (bright white strips), that even when houses are put in, will be of little use becaue they connect to no other walks.

All of this has an ironic boomerang effect that developers and community officials rarely consider: Potential home buyers never get to the hidden, higher-priced homes they seek because they are turned off by the lower-priced housing. This transition is especially common in "master-planned communities" – a marketing term intended to make very large subdivisions desirable.

Sidewalks to nowhere

In the southern United States, most subdivisions have sidewalks. But in the north, officials wrestle with whether or not to require them because citizens complain about increased maintenance of snow and ice-removal. Some cities require that developers install sidewalks when the streets are constructed. Then, when the houses are built, construction traffic may destroy the sidewalks, essentially the sidewalks are then rebuilt and the cost is passed to homebuyers.

The cartoon below appeared in The New Yorker, 1954 and illustrates that suburban design has not been changed in almost six decades!



City officials often miss the most fundamental question:

Where can you walk to? With the typical suburban pattern of large blocks, as shown in Figure 1.14, long winding residential streets that lead only to other residential streets, and zoning that places retail and work miles away, people are forced to drive wherever they need to go. Therefore, sidewalks may have little purpose! In the end, the cost of sidewalks – which must include the cost of initial construction, ongoing maintenance, and stormwater management from increased water runoff – adds little real value, if the design had sidewalks as an afterthought!

Later in this book you will learn about entirely new ways to look at the design and implementation of both vehicular and pedestrian systems that add fuction, connectivity, safety, and efficiency while decreasing construction costs and environmental damage.

A more preferred way to develop (and redevelop) cities - Prefurbia.

References

[1] James Howard Kunstler: "*The Geography of Nowhere: The Rise and Decline of America's Man-made Landscape*," Touchstone, 1993, page 118.

[2] Duany, Plater-Zyberk, and Speck; Ibid., page 57.

[3] Kunstler; Ibid., page 124.

[4] Calthorpe in "*The New Urbanism*," Peter Katz, ed., McGraw-Hill, Inc., 1994, page xi.

[5] Cyril Stanley Smith and R.J. Forbes: *"Metallurgy and Assaying,"* in *"A History of Technology*," edited by Charles Singer, E.J. Holmyard, A.R. Hall and Trevor I. Williams, Vol. III, 1957, Oxford University Press, pp. 34-37.

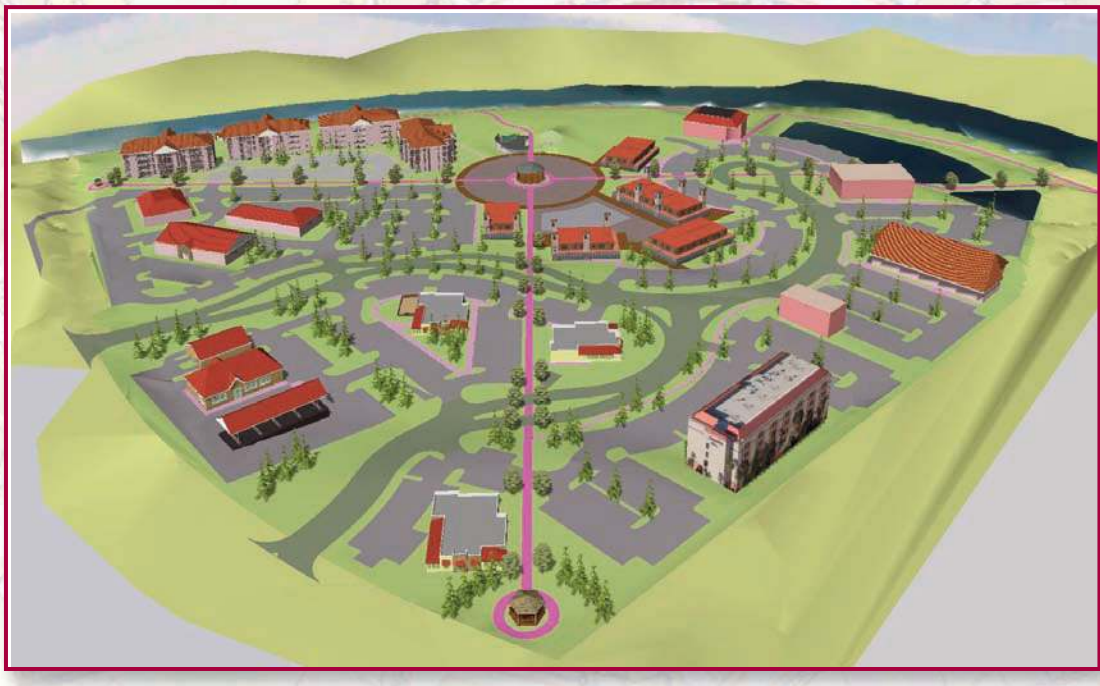
[6] Cardinal Charles Borromeo, in Jean Delumeau: "*Vie Economique et Sociale de Rome dans la Seconde Moitie du XVIe Siecle*," who in turn is quoted in Mark Girouard's "*Cities & People*," Yale University Press, 1985, pp. 118-124.

[7] Mark Girouard "*Cities & People*," Yale University Press, 1985, pp. 118-124.

[8] In *The Language of Zoning*, *Planning Advisory Service Report No. 322*, the American Planning Association defines transitional zoning: "A permitted use or structure that by nature or level and scale of activity acts as a transition or buffer between two or more incompatible uses."

CHAPTER TWO

The Land Planner



"Form follows function – that has been misunderstood. Form and function should be one, joined in a spiritual union."

— Frank Lloyd Wright

Land planning can be a deeply rewarding profession. It feels wonderful to drive through a neighborhood that you have designed. And it's a good thing there are intangible rewards because, according to the U.S. Bureau of Labor Statistics, salaries for city planners (the closest reference) are far from the top of the earning heap. In 2004, the median annual pay for urban planners (who, as explained earlier, may or may not also be land planners) was between $41,950 and $67,530. The highest-paid 10 percent earned more than $82,610 — about the same as an entry-level attorney. Of course a Civil Engineers or Architects salary can be much greater, 'land planning' is a small fraction of a their income, if it is a factor at all.

Our firm Rick Harrison Site Design Studio only offers land planning, not architecture, engineering or surveying. However for the past 36 years we developed software technologies used by thousands of surveyors and civil engineers for public, private, and military applications.

Although the 'typical' land planning income is not much, it results in great responsibility. For instance, the average new neighborhood our firm designs contains 250 homes.[1] The U.S. national average home price then (in pre recession 2006), was $264,000. In other words, the average land development we design , not including mega-sites, represents $66 million dollars of 'product'.

Using today's CAD systems that encourage cookie-cutter planning methods, the average 250-lot subdivision can easily be planned in less than a day If the land planner is charging $80 per hour, that translates to $640.00 for the initial site layout - or about $2.50 per lot for the entire neighborhood. A real estate agent who sells one $264,000 home will earn a $18,000 commission.

What is a land planner?

Interestingly, the title "land planner" is not listed as a career option by the U.S. Bureau of Labor Statistics. In most U.S. states, there are no laws – or even rules of thumb – mandating particular levels of training, credentials, or expertise for anyone who 'plans the land'. Thus, the people who lay out lots, shopping centers, parks, public lands, streets, trails, and sidewalks need no qualifications.

Land planning is unique in this respect. By law in almost all 50 U.S. states, if a city is creating as little as a park plan (let alone an entire housing subdivision), the city must retain:

- A licensed land surveyor to determine the park boundary.
- A licensed civil engineer to create a drainage plan.
- A licensed landscape architect to choose plantings.

But the person who designs the *city* in which the park is located needs no license or registration whatsoever! Just put "Land Planner" on a business card to convince a developer or the city council that he or she is qualified to create a land development plan. A plan once implemented, is likely to impact the lives of thousands of people over the centuries the development is likely to exist. A city requires dogs to be licensed but land planners - not.

Again, most of the people who design suburban developments today do so as part-time adjuncts to their primary lines of work. They are typically civil engineers, land surveyors, architects, landscape architects, landscaping contractors, builders, developers, environmentalists, or attorneys. We know of instances when the land planning was passed off to a junior drafter in an engineering or a surveying office because the firm's principal members couldn't be bothered with the task.

The initial problem with land planning

Vague "concept" plans

The prevailing attitude in city government (and academia) is that deciding the precise locations of buildings, landscape elements, and infrastructure is best left to surveyors and civil engineers *after* an initial "concept" site plan has been accepted. As a result, planners are rarely held accountable for the accuracy of their concept drawings. And as a result of that, most planners feel no remorse about taking liberties in those concept drawings. This also fosters an adverse relationship between those who create vague plans and those that have to make the designs work in the 'real world'.

One of the more common ways some planners reduce the visual impact of large areas of pavement is by falsely representing dense landscaping - the 'tree stamp'. At the initial concept stage there is no guarantee that the developer will install the landscaping the planner represents.

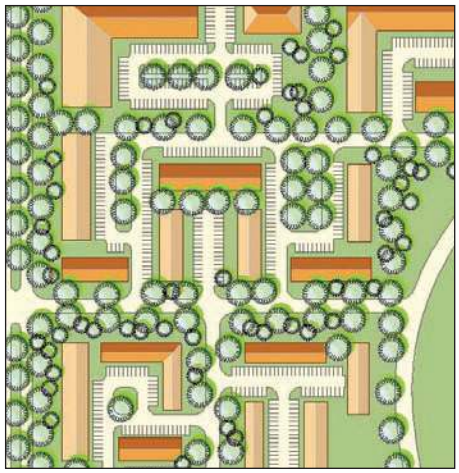


Figure 2.1: Drawing of a portion of a town center development in suburban Minneapolis, Minn.

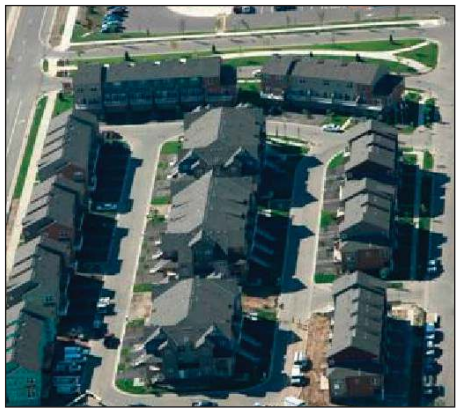


Figure 2.2: Townhomes in Ramsey, Minn.

The 'tree stamp'[2] is the common tool of this deception. For example, it is common to see hundreds of beautiful green trees hiding a large percentage of a massive paved area for a parking lot. If the parking lot does actually have trees, everyone who uses the lot will stand at ground level *under* the tree canopy where they will be assaulted by acres of asphalt and parked vehicles.

Figure 2.1 is a typical example. It is a concept drawing for a new town center in Minnesota.

Notice the profusion of tree stamps lining all streets. These tree stamps obscure much of the visual impact of paving and replaces it with an impression of a lush, organic environment. In particular, note the many trees indicated around the townhomes in a northern corner of the drawing. Figure 2.2 is a photo of a group of these townhomes as actually built — with very little green space and few of the trees promised on the initial plan.

Figures 2.3 and 2.4 show another way that some planners stretch the truth in concept drawings. Figure 2.3 is part of a presentation drawing for a Minneapolis suburb. The architect drew a picture from a vantage point that has a very long view through open space toward the housing. Figure 2.4 is a photo of the claustrophobic housing that was actually built. In reality, the artist's open space view only exists in one or two spots within the site.

Instead of searching for more efficient design options that would increase space and livability, such as reducing the amount of pavement -it is easier to artistically de-emphasize it.

Figure 2.3: A rendering provided by Doug DeHaan for illustration purposes, for this book.

Figure 2.4: The same development as actually built.

Members of the city council or planning commission who approve such plans are not aware of this visual sleight of hand and are tricked to vote YES on approval.

Unfortunately, these practices are the norm, not the exception. Every week, city councils and planning commissions approve plans on the basis of vague and often willfully misleading concept drawings. This leads city officials and citizens to distrust developers, though the finger should be pointed at the land planner who knowingly duped both the city and the developer.

Cities and developers should demand that planners create accurate representations of what they expect to be built. In all presentation drawings, tree stamps should be limited to the actual trees that are likely to be saved, or represented semi-transparent as to not hide paving underneath. Details such as driveways, patios, porches, and sidewalks should always be shown.

City councils and planning boards must make decisions based on reality rather than fantasy. And if citizens don't like the as-built look of a development that was presented honestly and approved by town leaders, those citizens will know that they should bring their grievances to the town leaders — not the developer. We developed the LandMentor virtual technology specifically to accurately represent the physical realities of a site plan without miss-representation. It would be difficult to create virtualizations within LandMentor that can stretch the truth, because the information used for 3D is the exact same used for surveying and civil engineering construction.

Leave it for the next guy

When council or planning board members approve a vague concept drawing, they are passing on a pile of problems to the surveyor or civil engineer. If the planner has simply transferred hand-sketched boundary lines from a presentation drawing into a CAD system, none of the linework will be accurate. Garbage-in = garbage-out. Therefore, the surveyor or engineer will need to re-create and compute everything all over again, typically losing density along the way. Yet it is always the engineer or surveyor that gets the blame for density loss. Typically, surveyors and engineers do not confer with the land planner, who they are already upset with for having to redo all of the work, and instead make revisions on their own, often to the detriment of the design. Dysfunctional? You bet!

This means the job of re-designing a neighborhood is being thrown into the lap of someone who may not understand the original design goals and therefore not likely to maintain its integrety. Yet this person makes revisions that will directly affect the bottom line of the developer and builders, the city's maintenance costs, and the living quality of thousands of people who will eventually live in, work in, and visit the community.

Where the buck stops

Often mapping data that city staff provides to developers and planners don't contain enough precision for boundaries, flood limits, wetlands, and conflicts arising from easements -all of which are needed to correctly and accurately place lots, buildings, and streets. This is especially important with wetlands. Wetland boundaries are often drawn in city maps by draftsmen who trace vague information to create the map. As a result, wetland boundaries shown on city maps are often quite different from what would be obvious to a wetland specialist standing on the site.

Another part of the problem is that the developer pressures the planner to begin designing when the developer has been unwilling to spend the money needed to obtain an accurate site land survey and associated data. Later, in this book we provide specific solutions to these problems.

Who should do the planning

It seems sensible that a lot of land planning is done by civil engineers. After all, the civil engineers understand the technical aspects of development, such as how to grade a site and how to lay out

utilities. But that's just the problem; the typical engineer focuses only on technical details. Few engineers think about maximizing views, increasing curb appeal, or how to maximize lot space or eliminate waste in design.

Within both conventional planning and traditional neighborhoods, where structures and streets parallel each other to achieve density, the planner must fill the site with streets in order to maximize the number of lots. But this scenario leaves less usable living space.

If the consultant who engineers the development is being paid on a percentage of construction costs, (a common way to contract their work), they are being rewarded for creating the most infrastructure. *Should they reduce waste in the design, their income plummets!*

Some 'land planners' see themselves as social engineers. To name just two prominent historical examples, Sir Ebenezer Howard, the "father" of the Garden City movement in late 19th century England, and Robert Moses, often cited as the most powerful person in New York City during the mid-20th century, both felt they were improving society through planning. Neither completely achieved his goal.

Many of today's best-known New Urbanists have similar aspirations. Peter Calthorpe, for example, declares that diversity is one of the basic principles of urban design.[3] He believes that his efforts can create an environment that will bring together people of all incomes, ethnicities, and races at community focal points where everyone will exist in harmony.

Yet, the CNU web site Cathorpe founded, they boast of 'gentrification' which translates to weathy, upper crust only projects.

Always ask the planner to detail their goals for the development, to determine if your visions are shared and to discover any unverbalized agenda.

Life Experience

Rick gracefully declines

In 2005, a developer asked me to attend a meeting to discuss the creation of a major new 640-acre community in North Dakota. Arriving at the meeting, I found myself at a table with the developer, a two-person architectural team, and a market survey specialist hired to determine the types of commercial and residential buildings to be included. When the task of laying out the site came up, the architects said they wanted to take it on. They said that, in 1997, (with no prior planning experience) they had been hired to re-plan a downtown area that had been flooded. It had been so much fun that they now wanted to try planning this new development. The market surveyor said she likewise had never designed a plan before, but that she also wanted to be the land planner.

I was the only person at the table qualified and experienced to design the development. With everyone else's cards face-up on the table, I could see that my continued presence would only have led to a series of turf battles — literal and figurative. So I withdrew from the project and allowed the developer's "design team" to make decisions that would be critical to the success of his development.

I often encounter this situation: Developers step aside, allowing consultants of unsuitable expertise to run the show. It happens because, although the developer has been cast in the role of Moses to lead his people through the desert, the developer fails to take control of his team.

Fast forward to winter of 2013. The market survey woman employee told a North Dakota Mayor (for whom we were designing over 4,000 homes in his city) that 'coving', a design method explained in this book, would result in a development that could never be changed or redeveloped. We demanded what study or proof there was of this claim, and instead we and the Mayor recieved a written retraction of this damaging 'whim based' statement.

About design 'charrettes'[4]

Another common strategy used by land planners is the 'charrette'. A charrette is an intense period of public invited activity wherein designers work over a short period of time to develop concept plans with input solicited from neighboring residents and city staff. Often, this is done to gain support from constituents for a proposal that differs from the existing ordinance. For example, the developer may want to build at a greater housing density than is currently allowed.

Many planners recommend a charrette as the mechanism to design a neighborhood. This form of design is inherently problematic for the developer because it allows development opponents, typically neighboring residents, to have an inappropriate level of input (power). The charrette can sometimes solve critical issues before submission, but that is highly unlikely, because the charrette process causes the following:

- The developer does not know who to blame for design changes that can easily destroy project feasibility. The intent of the charrette is to guide all those concerned to agree to a certain form of design – almost always New Urbanism. The developer assumes they have hired the planning firm for *their* expertise to design the development. Conversely, when the charrette is not used, a planner or team of planners, sits down and starts sketching based upon the desires of the developer, while trying to work within the regulations of the municipality. The non-charrette planner/designer is thus more accountable to the developer!
- The charrette places many parties, all with their own agenda, in charge of design decisions. None of them are likely to have the same goal(s) as the developer. Since the reason for the charrette is to obtain consensus by working through plans, the charrette may result in the developer catering more to neighbor concerns than that of the actual marketplace.
- A charrette is often a psychological motivational tool designed to get people to agree to situations they may otherwise oppose. There is actually a certification for training at the National Charrette Institute (NCI) to learn how to influence a crowd through mechanisms that, if unchecked, may stretch or obliterate the truth. Keep in mind also that the developers profitability might be sacrificed. And always follow the mightly dollar - the real reason for the charrette as a planner using the charrette process is likely to make hundreds of thousands in dollars in 'extra fees' throughout the charrette process!

Life Experience

On the job training

During my six formative years in Don Geake's planning office, it was never suggested that I or anyone else in the firm should factor into our plans the cost of constructing the streets, sewers, and drainage systems we proposed. Furthermore, not once did we look at a topographic map to determine the best position for a street or home to minimize the impact of earthwork — either from an environmental or economic standpoint. That was seen as the job of the engineers and surveyors who would come after us.

Unfortunately, little has changed in the land planning field in the four decades since I worked for Don. Developers still assume that a planner takes engineering and surveying issues into account, but in most cases this is simply not the case.

Life Experience

My first and last charrette

A few years ago I was asked to work as a planning consultant for Seminole County, Florida. It was decided that I and several other experts would hold a charrette with the goal of convincing residents in an outlying area to hook up to existing sewer services and thereby allow an increase in housing density. When I arrived at the offices of the engineering firm who had subcontracted me, I met another design consultant (an expert on cluster planning flown in from Houston, Texas) who was just finishing his layouts on tracing paper over an aerial photograph of the area. I asked him what the scale of the aerial photo was so I could begin work on a site plan. He said he had no idea what the photo's scale was — yet he had used it as the basis for designing the entire area to be developed. It turned out that the squares he had drawn as homes were 300 feet by 300 feet!

Representatives from the county informed me that there were no mechanisms in place to guarantee what we proposed would actually be used, except to sway opinions.

In my presentation to locals the next morning, I prefaced my remarks with a statement that there was no guarantee that what we were proposing would actually be built — whether they approved it or not. After that, I promised myself that I would never again be a party to a misrepresentation in the planning process. It was the first and last time I took part in a charrette.

Overreaching

With the combination of a winning personality and a talent for persuasion, a planner can be very successful.

Planners may accept assignments to design or consult beyond the scope of their knowledge and capabilities. Just because a planner is good at creating small subdivision plans does not mean he or she can plan a large mixed-use development. An expert golf course designer is not usually the right person to design the adjacent housing development around the golf course, yet this is how it often works. Layouts for multi-family and single-family housing should grow from different strategies. If a plan shows attached housing laid out in a similar pattern to the single-family housing, it's an indication that the planner is over-extended.

Most elected and appointed officials responsible for the approval of new development; council members and planning board, have little or no experience in land planning. And yet, their role is combined judge and jury in what often looks just like a court trial.

The city planner responsible for defining and enforcing regulations acts as a kind of prosecuting attorney. Since the city planner owes allegiance to the city, his or her emphasis will depend on which way the winds of power blow through city hall. Today, one of three major themes are environmental protection, social issues, or economic growth.

Meanwhile, whether justified or not, most developers petitioning to build in the city are viewed by the "judge and jury" as "the accused." Accordingly, the developer hires a land planner as "council for the defense." The land planner/defense attorney is beholden to the developer and therefore works toward the goal of increasing the developer's profit by maximizing the number of housing and commercial units on the site. Diametrically opposed to this, the city planner is charged with upholding the city's rules and regulations, which demand certain minimums for lot sizes, right of way dimensions, sanitation requirements, etc. Developer-defendants often choose not to speak at such "trials," preferring to send their "mouthpieces" -the land planners - instead. Since land planners must function as defense attorneys, they need to have strong personalities and presentation skills to convince the "judge and jury." Unfortunately, some planners just sit and watch as good plans are shot down because they cannot deal with

confrontation. And unfortunately, the developer also loses time and money which is ultimately passed on to the consumer in higher lot and home prices. The engineer who represents the developer will almost always relent to the city to avoid any conflict because that engineer must cooperate with the city on all sorts of future jobs. Thus they remain silent as opposing neighbors, staff, and council members slowly destroy the developers dreams. This is why using a dedicated land planner is often a better choice than contracting with a consultant who offers land planning with many other services.

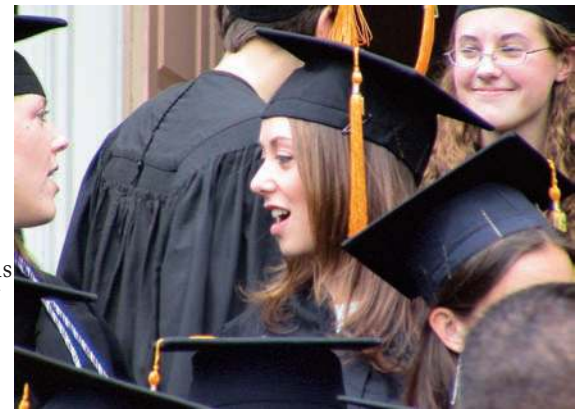
Master plans

A master plan is a layout for a huge area. Master plans typically show major land uses, defines densities and suggests general traffic patterns. Methods of design for creating and displaying such plans have changed little since the 1960s. Often what passes for a "master plan" is nothing more than a very large subdivision. Unending miles of nothing but housing may have been expedient during the post-World War II housing crisis. However, we can no longer afford to develop bedroom communities that lack connectivity, efficiency, and the functionality explained later in this book.

A master plan is often represented as a "bubble map," in which oblong circles and odd shapes indicate major land uses - housing, commercial, open space, etc. The scale is so large that no one can see what the final development will look like. We created LandMentor technlogy to enable detailed and accurate plans to be developed in reasonable time frames, eliminating the use of vague bubble maps. The vague maps have some value but only to begin the design process.

Essential technical knowledge that anyone planning land development needs to know

As of the writing of this book, in the USA, there appears to be no university degree in 'sustainable land planning' (we are working on changing that). Of course, many schools offer 'urban planning' degrees, yet none offer 'suburban planning' which historically constitutes 80% of our nations growth! An 'urban planner' is taught how to formulate plans for the short and long-term growth strategy of a city. They study land use compatability, economic, environmental, and social trends.



When developing their plan for a community, urban planners consider a wide array of issues such as air pollution, traffic congestion, crime, land values, legislation and zoning codes. They focus on macro issues in planning. Many students have opportunities to experience design on perhaps one or two small planning projects. But no program that we are aware of includes training in either the technical knowledge needed to transform a square mile of farmland into a functional neighborhood that will work in the real world without having to be extensively reworked by surveyors and engineers, or more important - economically feasible!

Essential *technical* knowledge is needed by planners for successful sustainable land development planning. (This knowledge is taught within the LandMentor system):

- Determining precision boundaries (most on-line maps are not accurate)
- Drainage (storm sewer) system design
- Sanitary sewer system design
- Earth moving and it's related problems
- Construction costs

Determining precision boundaries

Land planning subdivides land, defining its new legal ownership. Land Surveyors must first precisely determine the locations of all boundaries including those of wetlands and easements where building restrictions must be imposed. CAD based software used to draw and simultaneously compute the precise coordinate geometry are tedious and require a background in civil engineering or land surveying. Land planners and Architects can quickly learn the basics of surveying and civil engineering in order to produce precise initial plans with LandMentor, a dedicated system for land development. LandMentor is a sustainable development technology system including an education to solve the industry problems. This begins with a new attitude towards precision in design.

Drainage system design

Per code, every plan must include systems for handling precipitation that falls on rooftops and streets. If a planner chooses to change natural or existing drainage characteristics, expensive culverts, pipes, and other drainage structures become necessary to carry away the runoff. This burdens a city with the cost of maintaining and eventually replacing all that infrastructure as it ages - infrastructure that might not have been needed if they simply used the site's natural drainage characteristics. The long-term costs to cities, developers, and homeowners are tremendous. Since rainfall cannot be precisely predicted , planners need to consider flood control into their designs. In some cases, it may be appropriate to base drainage calculations on a standard formula.[5] In other situations, modern computer modeling may be needed. In desert areas, planners must carefully consider "washes" - natural gullies that conduct floods.

Life Experience

On the job training — NOT!

In Don C. Geake's office, we often kept developers temporarily happy by exaggerating the housing density that would fit in a given area. One way was to trace a site survey with a larger than normal scale. Another was to simply put fake dimensions on plans for streets and lots. While this made it appear that a large number of houses would fit on the site, the represented housing density was always lost when the engineer or surveyor tried to make the site plan work in the real world. The biggest problem was that, given an unworkable plan, the engineers and surveyors changed the plans to the point that they no longer functioned as originally planned.

Nearly half a century later, I still see plans that have been done this way.

And as we all should have learned during hurricane Katrina in 2005 and Sandy in 2012, planners working in tidal areas must consider hurricanes.[6] So why is it that engineers continue to construct millions of dollars in sewer pipes instead of using natural (cheap) surface flow? One reason is that a pipe-based network can be automatically designed with a few keystrokes and with little liability using software A design utilizing surface flow would require more skill and effort and potentially increase liability. Compound that with the fact that engineering fees are often charged by percentage of construction costs, there is little incentive for a civil engineer to use surface flow.

Planners also should consider whether wetlands can be disturbed, and, if so, how much? Can wetlands be restored, maintained or upgraded and used as part of the drainage system? How much detention or retention of surface water is enough? Just another reason that planners must collaborate with engineers at the initial stages of design.

Sanitary system design

Traditional urban and suburban sanitary sewer systems rely on gravity to maintain flow. For a gravity flow system to work, each successive pipe must go deeper than the pipe that feeds it. Deep pipes require deep, expensive trenches. Yet there is a limit to how deep trenches can reasonably be dug. When that limit is reached, a costly 'lift station' is needed to mechanically elevate sewage. Expensive manholes are required wherever the piping changes direction. And when any of this equipment needs repair or replacement, the cost of tearing up streets and private property will surely exceed any initial construction costs.

However, newer and proven technology is fostering the development of innovative wastewater systems. Often, since many community centralized systems are already at capacity, these provide a sustainable alternative because they offer environmental and cost benefits. For instance, low-pressure sanitary systems are beginning to become an important alternative to gravity flow. In many cases, low-pressure systems cost less to install and maintain because they can be laid in shallower trenches and eliminate manholes and lift stations. However, these systems rely on individual pumps for homes and businesses, shifting the cost to home builders. That's why the decision to install such a system should be considered collaboratively by all stakeholders during the planning stage.

Earth-moving

Planners must also understand the costs of moving earth and should factor these costs into their designs. If a plan requires that large amounts of the surface be reshaped, the cost of every structure built on that site will increase. Often with some forethought, the existing topography can be retained with benefits in terms of natural beauty and reducing cost of the drainage system. In later chapters, we present design strategies for managing topography and earth-moving. Earthwork, and its related knowledge is introduced in far more detail and taught in the LandMentor system.

Construction costs

Planners should know the economic ramifications of what they are proposing. Construction costs vary widely from region to region. In fact, two adjacent cities may have varying construction costs often due to differences in ordinances or perhaps even union vs. non-union labor. It is impossible for a land planner to be an expert on everything, but it is possible to begin a new era of collaboration between engineering, planning, architecture and landscape artchitecture at the initial stages of design by enacting a general knowldge basis for the land development industry.

References

[1] *The figure relating to an average development consisting of 250 homes is based upon Rick Harrison's personal business experience in 2006.*

[2] *Originally, tree stamps were actually rubber stamps that planners used to place images of large diameter tree-tops in hand-drawn birds-eye-view presentation drawings. Today the "tree stamps" are computer-generated, but the name has stuck.*

[3] *Peter Calthorpe: "The New Urbanism;" ed: Peter Katz, New York, 1994, p. xi.*

[4] *The process and the name charrette are legacies of the Ecole de Beaux Arts, the acclaimed 19th century Parisian architecture school. In the Ecole, professors regularly assigned design projects to their students with pressure-packed 24-hour or 48-hour deadlines. As a result, students often put finishing touches on their drawings as they were being driven to the final presentations in horse-drawn carts or, in French, charrettes.*

[5] *The standard formula was created by Robert Manning in the 19th century.*

[6] *In 2006, the Federal Emergency Management Agency (FEMA) and the Congress for the New Urbanism (CNU) were at loggerheads over the future of Biloxi, Miss., which had been devastated by Hurricane Katrina in 2005. FEMA had issued new regulations stating the height above sea level that buildings must be constructed in various parts of Biloxi. According to the regulations, in some areas near the ocean residents would need to place their rebuilt houses on 12-foot stilts. The CNU countered with the idea of "submersible" houses. Jim Barskdale, chairman of Mississippi's redevelopment commission, said the CNU plan was "just dead wrong" and a FEMA spokesman said, "Every time we get a big flood, we get people who say, 'We can build a flood-resistant house, which can get submersed and come out relatively damage free.' But the economic damage to that building may not be lessened very much, because the contents are damaged, the drywall has to come out, the electric's gone." "Battle for Biloxi," by Jim Lewis: New York Times Magazine, May 21, 2006.*

Las Villas de San Buenas in Costa Rica by Rick Harrison Site Design Studio

"The subdivisions of suburbia are conceived as shopping centers for housing and only later (if at all) as communities."

— Andres Duany

Designing a grid (or variations of a grid) is the most common pattern for a subdivision. It is technically easy. Simply use the "offset" command in a CAD package. Free-form 'organic' design can be tedious when all components of the design, such as streets, setbacks, sidewalks, form their own pattern. CAD based technology can produce development plans with hundreds of lots in minutes – by relying on these automated features, entire sites can be accurately designed to surveying standards in short order. But are these quickly produced subdivisions desirable?

Prefurbia based methods introduced later in this book can be technically challenging (if using CAD). There is no simple 'software button' to press that automates Prefurbia.

When it comes to creating a neighborhood that contains well balanced elements, there are no short-cuts. Design professionals cannot rely on software features to design for them. They instead use extra effort to create exciting, efficient, affordable, and functional neighborhoods that build character that can last for centuries. *There is no automatic software function for sustainable growth!*

The 'real' price of simplistic land planning

As explained in Chapter 2, an average new suburban development of 250 homes represents approximately $66 million dollars investment for home buyers.

And yet, as explained, using automation to produce conventional cookie-cutter planning methods, the gridded 250-lot subdivision can easily be laid out for about $640 in fees.

Statistically a family will live in each home only six years. The average family size is 3.14 according to the 2000 U.S. Census. Over a century, the 250-lot neighborhood will house roughly 13,083 people (100 years divided by 6 years for each family multiplied by 3.14 [for the average family size] multiplied by 250 homes = 13,083 people).

This means during the next century this neighborhood will cost just under 5 cents per person to design in today's dollars ($640 for CAD design divided by the 13,083 residents = $0.049)

A minimums-based process

Typical suburban ordinances are written with the "minimum" dimensional control looking like this:

R1 Zoning	Minimums
Lot Size	10,000 sq.ft.
Width at Front Setback	80 feet
Front Yard	30 feet
Side Yard	10 feet
Rear Yard	30 feet

Land development is a business – and like any business there is a wide variation on the personalities of those that own and manage that particular business.

Take a look at how two very different developers would utilize a minimums based system on a single family suburban development:

A tale of two developers (using the minimums-based ordinance)

In this story, both developers use the same engineering firm who designed most of the developments in town. The engineers in the firm always follow the minimum standards – they never question any regulations, nor do they ever 'rock the boat'. These engineers are 'numbers people,' thus, a 10 percent park dedication will be exactly 10 percent, no less and no more. The 80-foot minimum width of lots will all be exactly 80.000 feet along the front setback, which will always be 25.000 feet from the right of way.

Developer "A" (Mike) is known for shoddy cut rate neighborhoods. Mike has been an embarrassment to the community for years. Those on the city council shudder every time they see one of his plans, knowing the homes will be built with the minimum of landscaping and architecture. Mike is frugal. His accounting background works well with the engineering firm – they are all 'numbers guys'. Mike has a sign behind his desk: "A penny saved is a penny earned."

Figure 3.1: Developer A's grid subdivision (bottom half) vs. Developer B's more creative approach (top half) – Coachella, California.

Mike never gets in front of the planning board and he never approaches the neighbors before meetings to gain support, so the neighbors assume what will be built will negatively affect their home values. As a result, the neighbors organize and show up in full force to fight his subdivisions. When the engineer gets up to present the plan – only the mathematics are discussed:

"Uh, as you can see our plan – Lost Oaks - has uh 240 single-family lots as per ordinance 2.1.5 as per subdivision land regulation 3.6.10, subsection 5-A. Uh, of the 240 single-family lots, all meet the minimum 10,200 square-foot minimum…"

This mundane presentation goes on for 20 minutes, boring the council members who may daydream and drift off elsewhere. The city council asks if anyone is there to comment. After six grueling hours of neighbors attacking the "project" on how it will ruin their home values, the council

Developer A's unsightly rear yards look best the day they are built and will clutter up with 'stuff' over time.

votes. They ultimately yet reluctantly vote "yes" because Mikes development meets all of the citys regulatory minimums. They all make comments on how they wish the plan could be better. And, of course, they all blame Mike the developer for the layout done by his engineer!

The reality is, the blame should be on the planning commission, the city council, the city planning consultants, the mayor, and the administrator. They accepted and adopted a system that does not in any way or form promote the best possible development submittals.

Ironically Mike really does want to do a good job. He wants to be appreciated but does not understand why he is always seen in such a negative light for providing the much needed affordable housing. His engineering firm works by the ordinance numbers. In all likelihood, Mike hired them because they get the approvals and (like most consultants) tout 'sustainability' on their website. They take direction from their client and do not offer methods to make designs better. Mike's engineers feel it is not their job to change Mike's opinion and not worth the risk to introduce new concepts. What if new ideas don't work? Then, they will likely receive the blame and lose clients.

Mike thinks he must be doing something right, because his revenues will be several million dollars. Anyway, why give Mike such a hard time? He is the only one supplying affordable housing in town and does not see anyone else stepping up to the plate to provide affordable homes.

Developer "B" (let's call him Joe) is a member of the Chamber of Commerce and heads up the local Sierra Club chapter. Joe looks at every development as part of his legacy of making a positive impact on the growth of the town he was raised in, and yes, he does still live in. The homes that Joe builds have great curb appeal because of extra architectural elements and landscaping details. Joe makes sure that his neighborhoods contain walks and social gathering places, even though it is not in any ordinance to require them.

Developer A's garage-front homes that lack curb appeal.

Joe works under the same ordinance with the same regulations as Mike, but he feels that he must direct the engineers to be sure that the 10 percent open space is actually useable, with walks that lead to open space. He also advises the engineers that perhaps the density is a bit too high, explaining that dropping a few of the allowed homes can make the neighborhood a bit more attractive. His neighborhood will look and feel better than others - more inviting.

Before any meetings, Joe personally visits with the residents by holding two catered workshops at different times of the day so that most can attend, convenient to their schedule. The presentation explains all the benefits, the architectural control and the value that this neighborhood will add to the city as well as the neighbors property values. He makes sure the neighbors are aware that his proposal has fewer units than allowed by ordinance. Many still are not in favor of having those homes in their back yards, but know it could be far worse - *Mike could have been the developer!*

At the public meeting, the engineer sits in the back and Joe gets up to the podium…

"Tonight we will present Preservation Oaks, a new neighborhood that will be a place that residents of our town will enjoy, not just today, but for decades and, hopefully, centuries to come. Our landmark community provides generous spaces where neighbors will congregate in harmony, as you can see on the screen, with our three dimensional interactive animation…"

This goes on for 20 minutes. At no time did Joe mention a single dimension, volume, or any other defining number – nor did the engineer speak about, well, engineering stuff.

After 20 minutes of comments from the opposing neighbors, the city council votes an enthusiastic "YES!" No one really cared that the housing Joe built due to the extra architectural control and site amenities, would no longer be offered at prices the average family could afford.

An aesthetically pleasing site plan, with meandering centrally located open spaces and great walking connectivity.

From an actual "plat" and numbers standpoint, the engineering varies little between the two developers… they have the similar density, same expenses, same regulations, and in the end the engineer makes the same amount of money.

There is generally no incentive for any developer to go beyond the absolute minimums. Developer "A", Mike, wants to do better, but cannot see a profitable reason, given the city's codes.

The minimums-based system

As explained in the previous two scenarios, zoning regulations and design ordinances are based upon minimums. Therefore, they are guidelines that can be improved upon and modified. However, improvements and modifications must also be clearly explained. A land planer must know and acknowledge their personal strengths and weaknesses for public speaking before volunteering to present options that go above and beyond the minimums, or against them.

Understanding the approval process

The first rule of public speaking is to be prepared. The second rule is to know your audience. Does your development approval hinge on the vote of a planning commission or city council?

The system unique to the United States is one where local citizens can decide the fate of the development being proposed, even if it meets all regulations. These citizens are people who serve on boards like the planning commission and council for a variety of reasons, mostly because they are concerned with the growth and management of the town their families live within. Some may serve

because the power of the position is enticing. Some will have a personal agenda. Assuming the people serving are good people, overall, this somewhat flawed system works somewhat well.

Meetings at planning and zoning are directly concerned with the developer's designs. The city council, however, deals with all issues concerning the town, police, schools, sewers, the "Potato Day Parade," etc. And, they often have the final vote on the developer's plan, yet have so little time to grasp the benefits (if any) of the development.

By contrast, the Planning Commission is advisory and they typically cannot give the final "yes" or "no." vote. If the developer loses the Planning Commission's vote, they can still get the City Council to vote yes. If the Council gives a "yes" vote, the development will be built.

Developers, land surveyors, architects, planners, etc., usually concentrate their meeting efforts on the city planner. The city planner may be employed by the town – or an outside consultant that is hired to represent the town's interest. The city planner may have his own agenda. As an example, they may favor only New Urbanism and only promote it as a personal agenda and nothing else.

It is essential that the developer and his design team focus on those that have the authority to vote for or against the project. This means the teacher, accountant, retiree, banker, and other common folk serving on the City Council. Do they want to hear engineering data? No! They want to learn how and why the development will be good for their community. Thus, the developer and designer should make sure that their neighborhood will actually be good for the community, and then know how to sell it! The council must feel as if they could live in the proposed neighborhood.

Why PUDs may not be the answer

A PUD (Planned Unit Development) ordinance is written to give developers and planners flexibility in design, specifically to be creative. PUD presentations are often infomercials on the exciting new development, complete with earth-tone renderings and pictures of the utopian living.

As stated in Chapter 2, the rendering may misrepresent what the actual development will look like on the ground. After the PUD is constructed, the council members may visit a jungle of concrete and rooftop (in areas they thought were to be green) and start to question the desirability of having a PUD ordinance.

PUD ordinances that frequently get left up to interpretation. For example, the PUD could promote 'architectural character', a non-specific term that is left to interpretation. Another problem of PUD is that a great presenter can get a mediocre plan approved more easily than a great plan introduced by a mediocre presenter. A clear set of rules based upon rewarding density for going the extra effort above and beyong regulation minimums would solve many problems.

Why "points system" or "forms based" ordinances are not a desired solution

In many towns where PUDs have been misused, planners may offer a new form of ordinance where the developer earns "points" based upon the design and features of the plan. At first this seems like a much better choice, but in fact it may be a step in the wrong direction.

Like a "minimums" based system, "points" are set by a round table discussion. George, a banker, insists that 10 points should be awarded for having speed bumps – Beth, a florist, insists on eight points for a playground with three swing sets, etc. The points system can sometimes become so complicated that people lose focus of their goals. While well-intentioned, these numeric based ordinances are likely to be worse than a PUD.

This brings us to the latest entry in the attempt to solve regulatory problems, the "forms-based ordinance" often also known as "smart code" which replaces minimums with strict relationships such as how far buildings must be positioned to other buildings or infrastructure.

A minimums-based ordinance pretty much guarantees monotony, but isn't a regulatory system that controls a rigid relationship between structures and streets just another form of assuring monotony? And again, the forms based code introduces complexity to the process that could cause confusion to those that must vote YES for that development to become a reality. Keep in mind, the more complex the regulations, the more reliance on the planning consultant, assuring their job security as they will be continually relied upon to solve arguements and interpret their own code.

The forms based planning consultant who convinces the city to adopt their ideas will have continued economic security - again follow the dollars.

Breaking the minimums

The minimums-based system, for all of its faults, actually works. It's pretty cut and dried – build this size or you are not likely to get approved.

The only case where the planner can *easily* justify breaking the rules is when the *intent* of the ordinance is exceeded. If the proposed development is an outstanding plan that assures a high standard of living and will become an asset to the community, that development has a good chance of being approved *even if some of the minimums are not met*. For example, if the minimum lot size is 10,000 square feet, and the developer offers an alternate plan that is far superior in design to that which the ordinance minimums would allow, but is asking instead for a *minimum* of 7,000 square feet, with an *average* of 11,000 square feet, it is likely to get a "yes" vote. By holding and exceeding the "intent of the ordinance", the reasonable citizens that serve on planning commissions and city councils will likely go against a minimum regulation for the good of its citizens. The problem here is that the planner may not possess the necessary skills or experience to convey this idea. New rules are needed that can make everyone better stewards of our growth.

A look at the spacious inviting park-like front yard setting in Sundance Village in Dickinson, North Dakota.

A "win-win" ordinance

The modern ordinance should be written to assure a minimum design standard, but even more importantly, one that would reward those going beyond the stated minimums. With a good set of rules that is easily understood, Developer "A" types can be transformed into Developer "B" types.

Reducing barriers to good design is an important goal. As an example, there is an ordinance that pertains specifically to the design method of coving. (Coving is explained in Chapter 8 and a sample ordinance is found in Chapter 11.) The principles in this ordinance rewarding better development could be applied to all forms of regulations.

Coved design is about the efficienct use of a site. Designing a development that creates less environmental impact and is the same or less cost to develop than conventional land planning, yet looks and feels far more spacious and luxurious is a very good goal. Reduced costs could go directly into the developer's pocket, but a well written ordinance will encourage that developer to use the money saved in construction towards character building features which should make the developer more profit through increased premiums and expedited sales.

Holding the *original intent* of the municipality is critical. Where do the physical "numbers" for the minimums come from? Some municipalities (or consultants) simply mimic regulations of other towns, while others start from scratch with workshops. At the end of the day, many of the dimensions boil down to emotions. For example, council members Tom, Carol, and Angie may agree that a 70-feet-wide lot is too small, but they would accept 80-feet as a minimum.

One size does not fit all

The perception of a 'small' lot size is regional. A 6,000 square feet lot would be considered far too small in many areas of the Midwest, yet that same 6,000 square feet might be considered a large lot in the south. One size cannot and does not fit all. Our examples in the back of this book have very different lot sizes based upon regional acceptance of what is marketable.

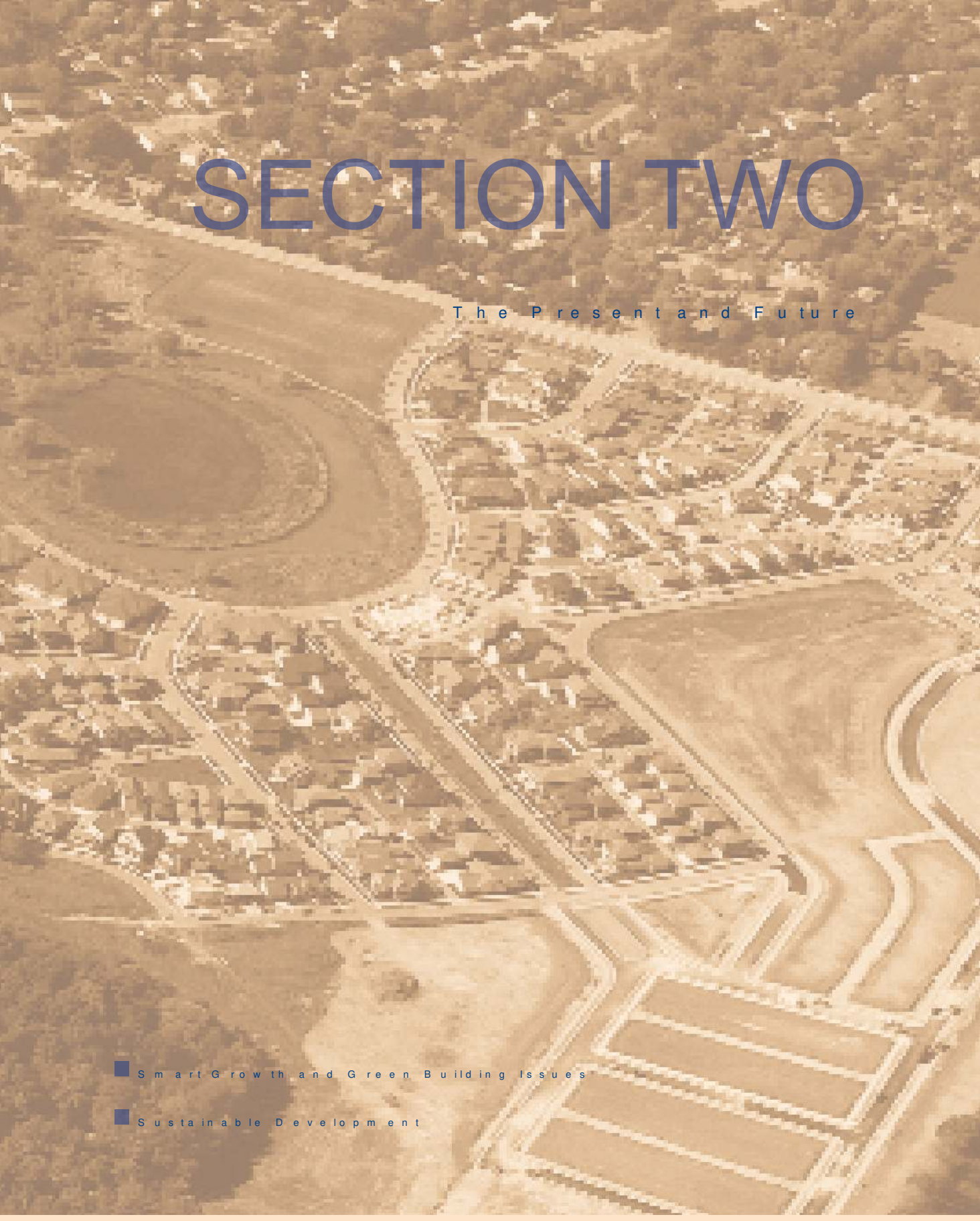
A side benefit of coved design (if properly executed) is a significant increase in average lot size. If the local minimum is 10,000 square feet, it would not be unusual for a properly designed coved neighborhood to have a 14,000 square foot average. Yet the street length to achieve similar density could easily be 30% less. The benefit to both developer and municipality would be a large reduction of public street length at densities similar to a conventional plan following the same rules. However, for the developer, there is likely to be an offset by other expenses like increased manholes, sod surface, more driveway surface (about 30% additional), and if there is rear yard screening, increased fences or walls due to the larger average rear yard space may also increase costs.

Unless the larger average lot is used to build a correspondingly larger home (unlikely), it may result in excessive space. This is counter to Smart Growth principles. It makes more sense to use the minimum lot size as an *average*, allowing for a minimum *coved* lot to be less than the current ordinance minimum. The exception to this rule is if the original minimum lot size is already small.

From subdivision to sustainable land development

The solution is to write a rewards-based ordinance, not a minimums-based one, encouraging developers to create functional neighborhoods with character. As a municipality, the staff, administration, councils, and public should determine the qualities that they preceive will build their community's character.

A front porch, fountains, picket fences, and tree lined streets may make sense in Boston, but in Santa Fe with the Adobe architecture and shortage of water, it may not be a proper fit.



SECTION TWO

The Present and Future

- Smart Growth and Green Building Issues
- Sustainable Development

"Future economic prosperity depends on building a new, stronger foundation and recapturing the spirit of innovation. Innovation has been essential to our prosperity in the past, and it will be essential to our prosperity in the future."

— U.S. President Barak Obama

Smart Growth

Smart Growth as defined by the Environmental Protection Agency:

EPA: Smart Growth Principles

Based on the experience of communities around the nation that have used smart growth approaches to create and maintain great neighborhoods, the Smart Growth Network developed a set of ten basic principles:

- *Mix land uses*
- *Take advantage of compact building design*
- *Create a range of housing opportunities and choices*
- *Create walkable neighborhoods*
- *Foster distinctive, attractive communities with a strong sense of place*
- *Preserve open space, farmland, natural beauty, and critical environmental areas*
- *Strengthen and direct development towards existing communities*
- *Provide a variety of transportation choices*
- *Make development decisions predictable, fair, and cost effective*
- *Encourage community & stakeholder collaboration in development decisions*

All of the above are honorable goals, but, are they sustainable? If only a few of the above principles are applied to a project, is it still considered 'Smart Growth'? A typical development or redevelopment project cannot always satisfy all of the 10 principles. For example, not every urban redevelopment would contain multiple housing choices which implies housing price point variation, or have ready access to mass transit.

Take a look how strategies in Prefurbia satisfies (or not) the 10 principles of Smart Growth:

Mix Land Uses - *inclusive or exclusive?*

In dense urban environments, intermixing commercial and residential uses (often within the same building) is not unusual. Do all urban residents enjoy the extra crowds and noise of adjacent restaurants and shops? Gentrified (upscale) urban neighborhoods are often popular destination places for a larger regional population. For example, suburban Chicago residents often drive into the city core to enjoy the vibrant (and relatively safe) urban night life, then return to their quaint, quiet space in the suburbs. It is doubtful that the same suburbanites would flock to downtrodden high density areas in Chicago that would also provide 'walkable' restaurants and shopping.

Intermixing uses is a desirable goal, but businesses must also attract enough customers to be profitable. Few developers have the diverse experience or knowledge to successfully implement a mixed-use development in the suburbs.

A developer's 'comfort zone' is either in residential or commercial uses. These are two very different markets. Many developers are also builders, especially in the commercial market. A home builder will often view adjacent commercial as a negative factor to selling their suburban homes. The residential builder buying 100 acres for lower density suburban housing is not likely to see how placing a high density mixed-use adjacent to their spacious lots as something that will lead to increased home values and faster sales. However, intermixing residential and commercial such as the Neighborhood Market Place (chapter 9), provides a viable suburban solution for both residential and commercial developers.

Individuals sitting on suburban planning commissions and councils are not likely to be easily sold on approving high density mixed-use development in their quiet little haven. After all, they did not move out 'there' to live in a crowded and noisy city.

Suburban councils and planning commission members are savvy enough to know that 'Smart Growth' presentations showing well-dressed people within dense urban spaces are certainly are not the residents of 'Mapleville', an area of casual dwellers. The urban 'image' they likely relate to are of

An architecturally attractive TND Town Square — Liberty on the Lake, Stillwater, Minnesota.

decaying areas that followed the same tight grid design model of 'Smart Growth', but failed. A Smart Growth 'sales pitch' must overcome the urban stereotype imbedded in suburban minds.

Prefurbia design techniques make it possible to deliver a suburban sense of space at more aggressive densities, with strategically placed retail and professional services. With Prefurbia a balance can be created that supports a successful business atmosphere within a stroll of homes.

Chapter 9 explains how this can be accomplished.

Compact Building Design

A common 'Smart Growth' solution is to squeeze smaller homes in compact spaces. The average home size according to the NAHB (National Association of Home Builders) varies each year, but it typically hovers around 2,500 square feet. This creates 2,500 square feet to heat and cool. If home size is reduced, it will reduce energy consumption. A 20 percent reduction in size would have a direct 20 percent reduction of energy use. A good architect can design a home with better 'curb appeal'; however, a great architect can make a 2,000-square foot-home 'feel' like 2,500 square feet

Prefurbia techniques position homes compact enough to be marketable in a manner that also delivers a "feeling" of less density - thus, increased space.

Ask 100 home owners how many square feet their home is, and most will give a close answer. Ask the same group how many square feet their lot size is and few are likely to know. This is an advantage for Prefurbia planning, because a 5,000 square foot lot can be designed to 'feel' as if it were 9,000-square feet. With an increased perception of space, higher density is easily justified.

A 'Smart Growth' lot is limited to a narrow yet deep rectangular shape with the home being correspondingly narrow and deep. With this configuration window locations with quality views is limited compared to a home on a wider lot of lesser density. The majority of the exposed exterior wall surface parallels the neighboring side yard - viewing directly into their house. 'Smart growth' homes are positioned close to each other. Side yard windows are placed to let light in and perhaps emergency access, but they cannot open up views from within the home unless it is on a corner lot.

A narrow home in Prefurbia will either be angled to the next home or staggered, allowing panoramic views from within the home even if placed within interior lots. A Prefurbia home can be

Typical urban older neighborhood in Minneapolis, Minnesota (note: the 'wetlands' were bulldozed over back then).

"shaped" to fit an irregular lot providing a market advantage for the builder that would be impossible to replicate on a rectangular lot (as shown in Chapter 10).

In theory, compact buildings reduce energy consumption. If an architectural floor plan is compact yet has excessive waste in terms of space (large percentage of floor area in halls, stairways, utility corridors, all visual blocks to sense space, that must also be cooled and heated), then efficiency suffers. Again, skilled architects can create space with less waste, making a well designed 2,000-sqaure foot home function just as well as a poorly designed 2,500 square foot home. If a large percentage of the home is being consumed by wasted space, it is time to seek out better design.

With Prefurbia, window placement, room functions and floor plan are often coordinated components of the overall neighborhood design, improving the quality of life and the all important 'market edge'. Only when both architectural space and neighborhood design are integrated can a development offer compact design where the resident will not 'feel' compressed space. Interior space becomes a major component of the overall neighborhood function in Prefurbia advanced planning.

Create a Range of Choices

Most developments designed at our studio provide a wide range of housing choices. Still, quite a few of our neighborhoods have similar-sized homes, on similar-sized lots, at similar price points. 'Smart Growth' developers often desire a similar range of home choices. However, most developers prefer to concentrate on a singular price point.

Both Prefurbia and Smart Growth developers are more likely to offer more diverse housing choices than the typical conventional subdivision-oriented developer.

A major difference from Smart Growth (i.e. New Urbanism) in actual implementation vs. theory, is few (if any) Smart Growth neighborhoods are affordable. Most Prefurbia neighborhoods are in the lower to middle income range, serving the mass market, thus the 'greater good'.

More detailed information about range of choices can be found in Chapter 9.

Create Walkable Neighborhoods

Smart Growth and Prefurbia neighborhoods design pedestrian systems in very different ways.

Most Smart Growth neighborhood walks parallel the street curb for walking connectivity, and most place homes front closer to the street edge (curb) than typical suburban development - much

closer. Pedestrians walk very close to street traffic. The street 'system' is the walk 'system'. Streets, thus walks, lead to the open spaces and commercial areas. The New Urbanist planner place open spaces (parks) within a 5-10 minute walk from every home. Right-of-ways of streets are typically between 40- and 60-feet wide. There is not much room between the street curb and the walk, the location where trees are often placed - with little room for roots to grow, thus eventually destroying curbs and walks. This creates a major headache to the public works departments who must repair curbs and walks displaced by the roots of the trees as they mature.

Sidewalks close to the curb also have another major problem – parked cars. Residents will always park their best cars in the garage or covered parking, while the less valuable vehicles are likely to get parked along the street, curb side. Strolling along a view of older vehicles detracts from the neighborhood ambiance. Urban blight often begins with decaying car cluttered streets.

Due to emphasis on reduced vehicle usage, 'Smart Growth' proposals include renderings of beautiful streetscapes with few, if any parked cars, which will look worse when the streets get obstructed by parked cars, especially after work hours when residents are home. Parked vehicles also tend to create safety issues because they create a visual block to the pedestrians as they stroll along and cross the street. This is an issue with all residential development, even those in Prefurbia. However, in Prefurbia, there is a much greater opportunity for 'off-street' parking.

Prefurbia separates the walks from traffic lanes as much as possible, thus creating safer and more serene settings that invite a stroll. During LandMentor trainings, planners are taught to design the pedestrian system first, even before streets, lots, or homes are set in place, guaranteeing connectivity.

As explained in more detail later, Prefurbia utilizes meandering walks that are set in public easements, providing ample space for street trees, without damage the public works department would otherwise contend with. The Prefurbia streetscape takes on a park-like setting. Prefurbia walks widths typically exceed the regulatory minimums (which are usually too narrow for a couple to walk comfortably side by side).

Prefurbia home and lot orientations can easily accomodate multiple vehicular storage when needed. Vehicles are placed out of sight, creating a less cluttered look, and allowing for narrower streets without sacrificing safety compared to 'Smart Growth' where cars are typically parked both sides of a street

When narrow sidewalks are close to the street, many pedestrians will choose to use the street.

In Prefurbia walks are a 'separate system'. In 'Smart Growth' the street and walking system is combined, as is the case with most suburban planning.

Distinctive, attractive communities foster a strong sense of place

Smart Growth and Prefurbia promote designs that create a sense of place. Distinctive, interesting places are essential to motivate residents to get off the couch and into the neighborhood.

Smart Growth developments require a high level of architectural and landscaping elements in order to create an attractive neighborhood. This is because a 'grid land plan' with all homes at the same setback provides no opportunity to create uniqueness. To create a 'sense of place', Smart Growth relies upon a much higher level of architectural detail, not planning, to create unique areas. This higher level of architecture (and/or extreme density) and increased attention to landscape architecture is not cheap, thus the reason there are few (if any) affordable 'Smart Growth' neighborhoods. This is also the reason both Architects and Landscape Architects promote Smart Growth aggressively (follow the money). Architectural detail is also the reason Smart Growth neighborhoods are so inviting, however there is nothing to prevent the same level of detail in a Prefurbia neighborhood. The largest difference is that a 'Smart Growth' design greatly increases infrastructure compared to similar density suburban design, while properly planned Prefurbia design greatly decreases infrastructure - thus, more funds are available to both architecture and landscape architecture without a cooresponding increase in price to the consumer!

Prefurbia also demands a consistent standard of architecture and landscaping to foster a sense of place and community. Prefurbia's economic (and environmental) advantages would be impossible for grid-based 'Smart Growth' patterns to achieve. This is because Prefurbia methods reduce street length (and utility routing) by (typically) 25 percent, compared to conventional suburban curved designs, and upwards of 50% compared to 'Smart Growth' design of similar densities. Prefurbia creates additional open space to handle stormwater surface flow instead of relying on expensive storm pipes, inlets, and manholes. This cost savings would release even more funds for character-building aspects of the neighborhood - and to build more energy efficient structures.

Usable open space in a suburb.

Preserve Open Space, farm land, and critical environmental areas

Smart Growth development in suburbias might result in some open space nearby being preserved, but only if the developer purchased surrounding acreage of natural area and dedicated it as a permanent preserve as part of the development process. An environmentally sensitive natural area would rarely be used for development. If a suburban or outlying area is 'preserved' via a conservation initiative, it is often part of some large tract the developer purchased at a nominal price because the area was not likely suitable for development, farming, or much of anything else. The point is, just because someone builds a high density 500 unit building as part of a development, does not alone, ensure the preservation of open spaces or protecting the environment in general.

Often when a developer touts large open spaces it's because they could not develop it in the first place. For example, Hennipen Village in Eden Prairie had large areas of land within the restricted 'landing zone' of nearby Flying Cloud Airport. The marketing material made it appear as if the developer dedicated the undevelopable land as open space. Had the landing zone not existed, there would surely be more paving and rooftop, not park land.

Prefurbia's designs can increase density without reducing space - justifying increased density; thus, if the municipality allows a density increase, they are essentially reducing sprawl. Most Prefurbia neighborhoods create parks and open spaces, and in some cases, permanent preserves.

Strengthen existing communities during transitions

While this book concentrates on suburban settings, the methods can be applied to urban settings or transitional areas of development and redevelopment as explained in later chapters.

Using Prefurbia methods, a design team can create an urban neighborhood, at urban densities, with a suburban sense of space, thus increasing their market potential and possibly influencing more suburbanites to return closer to urban centers.

Open space made of berm, renders the space unusable for residents.

Provide a wide variety of transportation choices

There is no difference between Smart Growth design and Prefurbia as far as encouraging multi-modal forms of transportation choices. In both, it is the combined effort of both municipality and developer (but mostly the government) to come up with solutions to serve the new neighborhood.

Many TND planners tend to promote walking and public transportation by inconveniencing drivers. It often results in permanently destroying the overall functionality of the community. For example, in Minneapolis, when light-rail was built, the planners thought it was a good idea to limit the number of parking spaces at the train stations to force people out of their cars. Bear in mind that in Minneapolis gets 20 below zero for months at a time, so walking, while an option, would be unpleasant. The result was hundreds of cars parked in front of very angry adjacent single-family homeowners near the train stops. This design strategy also assumes everyone is healthy and young enough to walk longer distances, often on icy or wet surfaces.

Conventional subdivision with wide streets in Omaha, Neb.

Transportation planning errors are usually very big ones. They are either very costly to correct or can destroy the livability of a city. Prefurbia strategies work within any traffic systems that are in place or proposed.

Prefurbia directives do nothing to inhibit the use of the car; instead they make it easier and safer to utilize transportation options. Buses or rail is no problem, but those systems are beyond the scope of a single developer, unless that developer is building something on the scale of a city.

As far as new cities (or extremely large developments) being designed by our firm, we are always open to integrating multi-modal forms of transportation that make sense for the climate and needs of the entire population - and which can conform to sustainable policies. Most large scale Prefurbia developments offer a 'plug and play' approach to Personal Rapid Transit (PRT) to provide additional options when PRT becomes more mainstream. This advanaced transportation system promised to

This unnecessarily wide suburban street in Las Vegas, Nevada is an example of why new strategies are needed.

be a viable solution, but has had a rough start, taking over a quarter century before it's first large scale installations soon to be constructed in South Korea, Israel, and India.

Make development decisions predictable, fair and cost effective

New Urbanism requires a high level of architectural and landscape elements to succeed. Because of the reliance on strictly defined patterns and dimensional controls, when some elements are deleted or not delivered as promised, the house of cards often falls down, as seen in Figure 4.1.

Elements built incorrectly in Prefurbia also have negative results, but Prefurbia does not require the same strict architectural standards, thus it is rare for the design to fail on architecture alone.

Figure 4.1 is an example of an affordable Smart Growth development. Take out the front porch to save money, and a near-future redevelopment situation will occur.

Figure 4.2 is an example of Smart Growth where every unit is placed precisely the same. How is this style of planning any more or less monotonous than the typical suburban subdivision?

Figure 4.3 depicts a New Town Center in a Smart Growth development. Porches (stoops) hover above the street, lacking "human scale". How "smart" is this 'growth'?

A strict set of rules inhibits innovation. This chapter's opening quote by Mr. Obama during his first term claimed innovation as a key component of the U.S. economic recovery. "*Future economic prosperity depends on building a new, stronger foundation and recapturing the spirit of innovation. Innovation has been essential to our prosperity in the past, and it will be essential to our prosperity in the future*," said President Obama. Prefurbia is innovative and its potential is yet untapped. It does not follow a finite set of 'dimensional' rules. Its design principles foster innovation.

Encourage community and stakeholder collaboration

Throughout this book we bring this issue up. In our own design practice, we place the homeowners and local business owners' needs above all. Only then can we serve both developer and municipality

Figure 4.1 The results of Smart Growth with a few key design elements missing during implementation.

Figure 4.2: White Gables — a New Urban Development in South Carolina.

best. The residents' and business owners' stability is the municipalitys' stability. The citizens' desire to invest in the homes and businesses that the developer created, over other options (i.e. moving out of the city), assures the financial success of the developer and the economic development interests of the municipality. As we painfully felt in the housing crash, when housing fails, it hurts everyone.

Avoiding the term "Green"

We intentionally avoid using the term "green" throughout this book. We do this because green is such a generic term (recycling trash as an example), or a service (such as eco-friendly child care), or a product (geothermal). Land development is simply one of a thousand platforms to be 'green.'

But mostly, we avoid the word green because not everything represented as 'green' delivers on its promise. This 'green-wash' was one of the main reasons the previous "Carter Administration Green Era" failed. Therefore, we use the term "sustainable," thus inferring that it is also green.

Every new development gives us an opportunity to exhibit sound environmental stewardship. Every land development will affect the environment. Conventional subdivisions, New Urbanism, and Prefurbia will all have a negative impact on the environment compared to undeveloped ground. The question is, how much 'negative' impact will each of these design options have?

Green by definition is vague, and certainly in the eye of the beholder. If you fertilize your 'sod' lawn with a product that pollutes less, it could be considered green, but someone who uses low-impact landscaping requiring no fertilizer, might not consider any form of sod as being green.

Green can also be unsustainable. For example, a civil engineer on one of our developments decided that we could use the area below 26-foot-wide private drives as drainage basins instead of using natural surface detention ponds (there was plenty of area set aside for this purpose). To cut

out the earth five-feet deep (below all of the private drives) and then fill it in with rock as a base for the streets and conduit for drainage, was absurdly expensive - adding an estimated $70,000 per home! The project was no longer economically viable, thus, this 'green' solution was unsustainable. The city refused to approve this solution and the development became economically viable again.

Personal green experiences

Back in the first 'green era' during the Carter presidency, I built a 1980's state-of-the-art home (Fig. 4.4): Passive solar, earth-bermed, with a 10kW Bergey wind generator.

With 'passive' solar, the sun heats up a dark brick floor in the home, which in turn heats the home on sunny frigid winter days. The bricks were built upon a thick concrete base which stored heat overnight. This is known as the 'battery'. No complex systems were needed as the home itself became the solar collector. It proved to work well. The City of Maple Grove, Minnesota, where the home was located, had recently passed a wind generator ordinance (1983) allowing a 100-foot tall wind system to be built on a small city lot with just a permit! Likely the first city with such a ruling.

So, in 1983, we constructed a 100' tall tower with a 10kW Bergey Wind System having 23-foot diameter blades. A quarter century before today's current green movement, we had built a 'Net-Zero' home (it produced more energy than it used).

The neighbors however, were not so excited and waged a war against the city (this was very much in the news) resulting in Maple Grove being the nation's first city to repeal a wind generator ordinance!

Our region (Minneapolis-St. Paul) is known for being both liberal and environmental. Ironically, not a single environmental group or foundation came out to a public meeting to defend

Figure 4.3 Porches hover above a street (lacking walks) in this development marketed as Smart Growth

the wind generator ordinance. If they had, perhaps the nation's energy policy might look different today.

Years after it was constructed, the city made an enticing offer and purchased the generator from me.

In 1983, the home cost about $121,000 to build. Twelve years later, it was appraised at $186,000. It is an earth-berm home, which in 1983 was promoted as the future, yet just a few years later it became an architectural oddity, reducing it's resale value. As the housing market recovered in the 1990's the neighborhood's overall home appreciation rate (had it been a conventionally built home) should have resulted in the 4,000-square-foot lake front home being worth a minimum $350,000. I had lost nearly $200,000 by going green, *a hard lesson well learned*.

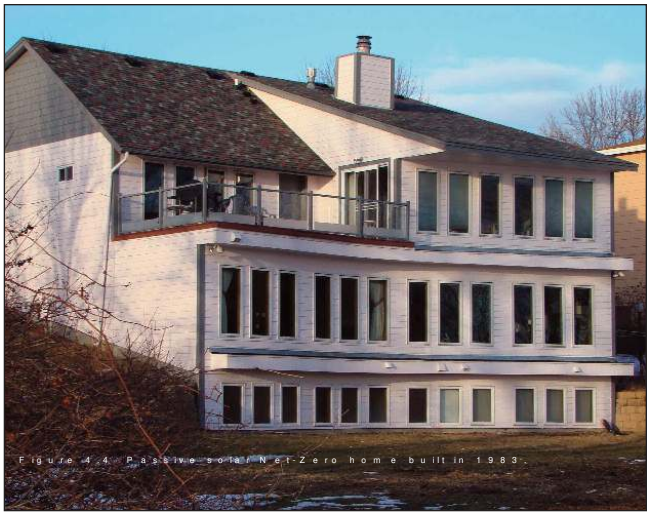


Figure 4.4 Passive solar Net-Zero home built in 1983.

In late 2008, I chose to build green again. This time, as a mandate because of a land purchase from the City of St. Louis Park, Minnesota requiring MNGreenStar certification, a derivitive of the USGBC's LEED program (a version modified for severe cold climates).

The similarity of my two home-building situations is that the housing market downturn coincided with an increase in energy awareness. There were no new green solutions (since I built my last green home 25 years prior), that we found, which offered both reduced construction costs and energy consumption. It seemed that the higher an Energy rating was on an item, the more expensive it became. The choice today still remains, to pay more now for reduced costs later.

With most green ratings, there is a list of requirements the builder must contend with to earn 'points.' There are many 'social engineering' items to comply with. For example, I earned "points" because there was a nearby bus stop and was within a prescribed walking distance to a coffee shop.

A Green Prefurbia Model

The design of the new home demonstrates an expanded feeling of space. The home serves as a model proving that it is possible to provide a large feel in a smaller, more efficient space. Ironically, being near a bus route earned us points, but there is no provision to earn credit for our space efficient design which reduced the building footprint, reducing environmental impact.

Our 3,600 square foot home with a four-car stacked (upper and lower) garage consumed 10 percent less land area (reducing run-off) than our previous home which was a 1936 Cape Cod with a two car garage (2,200-sf). No points for that but points for being able to walk to a coffee shop!

My green certification comes with a Home Energy Rating System (HERS) of 59. This means it is 41% more efficient than a home built to national building code.

Our experience the first winter in our new well-insulated green home resulted in a monthly utility bill being a small fraction (about 2/3rds less) of what it was in our previously updated 1936 home down the street, yet the livable square footage had increased over 50 percent.

This all relates to the beginning of this chapter – item two of the Smart Growth principles: creating compact housing. Housing needs to be well designed - not just compact.

The difference between the 1936 home and the new one is efficient design techniques. We did not do anything excessive or unusual to obtain the low utility bills. Instead of expensive geothermal systems that receives frequent media attention, we simply paid a few thousand dollars extra for a highly efficient (96%) heating and cooling system with a three phase air exchanger.

In the 26 years that passed between building our first 'passive solar' designed home and the current 'passive solar' designed home, an interesting thing happened. The laws governing windows (demanding Low - e) prevented the sun's uv rays from heating the home! While the window manufacturer did reinstall modified windows in an effort to let more of the sun's energy in, there is still not enough solar gain to provide extra heat. Ironically, the Minnesota State Laws that are designed to prevent energy loss and the sun's rays from destroying furniture, also prevents the sun from providing passive solar heat! We understand that today there may be more 'glass' options than in 2008 to achieve solar gain.

In addition to the 96% HVAC, a few thousand dollars extra provided a one-inch structural foam seal to supplement the conventional six-inch wide fiberglass batting inside the home. The standard window my builder (CreekHill Custom Homes) used was Anderson 400-series insulated glass, it did not cost any extra, but we did install Hunter Douglas thermal shades which added another few thousand dollars, but offers a short payback period in energy reduction.

As of the writing of this edition, we are entering the 5th year of our 'no-mow' lawn. In general we, and more important, the neighbors are very pleased and it looks fantastic except when it seeds itself which entails about a month of tall (unsightly) stalks near the beginning of the summer. Like most landscaped alternatives, there are hidden costs involved, but still less than mowing services.

Prefurbia addresses 'green' by providing enhanced efficiency to develop land at a lower cost, releasing funds that can be applied to more efficient systems during home construction. For more detailed information, there is a more complete report of our green home building experience downloadable from www.rhsdplanning.com.

Being both affordable and energy efficient - how 'green' is that?!

CHAPTER FIVE

Sustainable Development: A Practical Approach

"There are no such things as limits to growth, because there are no limits to the human capacity for intelligence, imagination, and wonder"

— President Ronald Reagan

Previous chapters concentrated on what has gone wrong with suburbia, while also addresssing Smart Growth issues, the planning and consulting professions, as well as the overall land development industry. From this point on, this book focus is on innovations that have proven market success. *Solutions that create a more preferred living standard - Prefurbia.*

We use the term 'sustainable' in the title of this book, yet that can mean many different things to many different people or organizations. According to a UN's report, 'It is generally accepted that sustainable development calls for a convergence between social equity, environmental protection, and economic development (the Three Pillars- People, Planet, Profit), yet the concept remains elusive and implementation has proven difficult', because sustainable development has often been reduced to only environmental issues. Environmental goals often conflict with the developers ultimate goal for profitability.

Defining sustainability

The **Environment** is the first thing that comes to mind when most people think of 'sustainability'. This is because it is the most commonly discussed component, especially with 'global warming'. The 'greening' of our society through innovative products is constantly debated by politicians and the press who has brought environmental concerns to the forefront. The land development industry is primarily focused on reducing storm water run-off, improving water quality, and increasing energy efficiency in building construction. Prefurbia environmental advantages include both auto and pedestrian centric connectivity while reducing energy and time in transit (*flow*), and less maintenance using natural landscaping solutions; reducing site grading, etc.

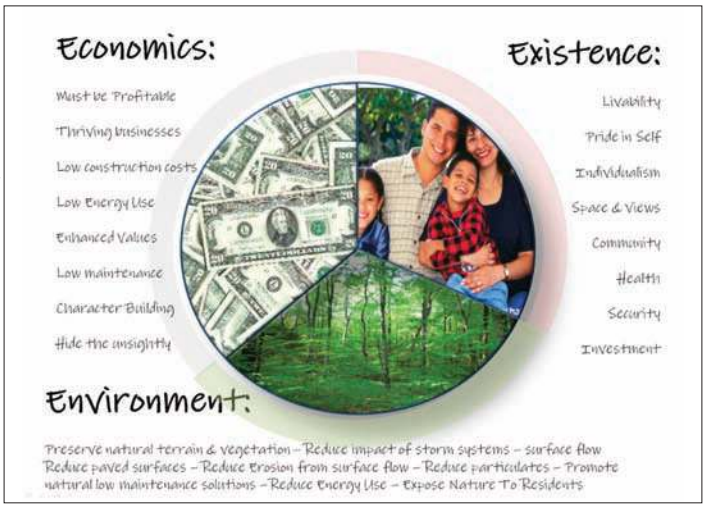
The 'profit' term is the bottom line shared by all commerce. We address more than just the goals of a developer. For the purposes of Prefurbia we prefer to use the term **Economics** because there is more to the financial aspects of sustainability than for the development to make an initial profit. *One can develop a perfectly profitable slum*. If the developer (or municipality) profits but it costs excessively in perpetually to maintain, then the development is unsustainable. If the development was both profitable and impacted the city minimally on maintenance costs, but sacrificed vehicular energy while traveling in the development, or placed a larger maintenence burden on the residents, then it too would be unsustainable. If overall property values could not keep up with inflation, that too would be unsustainable. A good neighborhood design represents a significant economic benefit in a wide variety of circumstances.

We use the term '**Existence**' to replace the term 'People' in Prefurbia terminology, because all neighborhoods should create a sense of pride and accomplishment at any income level, not just for gentrified development as boasted by the Smart Growth movement. A front porch and tree-lined streets are simply not enough. Prefurbia enhances human dignity, no matter what income strata the resident may fall in. Prefurbia reinvents - not only the suburbs, but also urban development. Cities, environmental activists, planners, architects, etc., do not build communities – land developers and home builders do. Sustainable development cannot happen by itself, it takes a collaborative effort for all stakeholders in the land development process.

Achieving Sustainability

There are many *layers* to design a sustainable neighborhood that fall within the responsibility of those hired by the developer to plan the site.

It should by now become clear why the land planner needs to do more than weigh just the one or two 'minimal' design factors that are traditionally considered. Without an understanding of all the aspects of the development and construction process, how can the land planner possibly achieve sustainability if they do not even possess an awareness of the problems?



The land planner who concentrates only on minimums to achieve a density goal cannot possibly achieve sustainable results.

Sustainable layers

A development cannot be sustainable if it is not approved by the municipality. And following approval, a project would not be successful, nor sustainable, if no one wants to live there, or locate their business in the new project. By including the following 'sustainable layers' into a development design, expedited approvals are more likely.

Safety layer

A primary human need is to feel safe. While the land planner may have limited ability on safety as it relates to crime, he/she can have a significant improvement in other areas of concern by design.

There are various graphs, surveys, and research that support a variety of studies regarding vehicular and pedestrian safety. Unfortunately much of the research conflicts when looking at planning-related issues. It is not difficult to find some expert offering an opposite opinion on something as routine as street and sidewalk patterns - *depending who financed the study*.

According to www.globalroadsafety.org the loss of wages, property damage and other factors from traffic related accidents in 1994 represented 4.6 percent of the Gross National Product (GNP) of the United States. That's right - five cents out of every US dollar went to accidents that could have been avoided or reduced in severity had land planners designed the systems better. According to the World Heath Organization (WHO) book, 'World Report on Road Traffic Injury Prevention', an estimated 1.2 million people are killed in roadside crashes each year worldwide, and as many as 50 million are injured. Of these, one thing stands out clearly. In areas where pedestrians and bicyclists intermingle with cars and trucks, accidents are higher. The answer for reducing pedestrian/auto related injuries is also clear: separate the vehicular and pedestrian systems as much as is practical. In complex traffic situations which include 4-way intersections and traffic circles, drivers are looking to avoid other vehicles and may be less aware of the pedestrians crossing the same intersections. Prefurbia design methods reduce these multi-modal conflicts.

Environmental and economic concerns should never take priority to safety in design. In particular, reducing potential impact points and high speeds that cause serious injury and death must be stressed. Proper design requires a balance of all elements. It's virtually impossible to design a completely safe neighborhood that serves both cars and pedestrians. Thus, the land planner can only reduce the number of dangerous situations within a development - not eliminate all of them.

Environmental layer

No doubt developers in the past bulldozed their way to profits, clear cutting the natural terrain. This had a terrible impact on both the environment and developer reputations. Regulations, including the Clean Water Act, reduced some environmental damage, but not enough. There are proven design methods that enhance home values through environmentally responsible design without increasing development costs.

Smart Growth strategy for reducing environmental impact includes leaving large open natural areas while preferring to compress homes in tighter spaces, to mitigate the effects of growth. While a noble goal, the resulting dense developments have very little organic surface area to absorb rainfall.

Even if higher density were placed in suburbia to preserve open space, it will at best only soften the environmental impacts of growth. The reason is that land set aside, unless regulated to permanent open space or preserve, may eventually be filled up with even more rooftops and paving.

The residents of individual clusters of development will still need to get to and from work, services, schools, and conveniences. In other words, 2,000 suburban residents will wait in line on the highway to travel 30 miles to work regardless if they live on 10,000 square foot lots or 4,000 square

foot lots on the same 600 acres, even if 300 acres of that land is preserved in a conservation easement.

The environmental layer must address low impact storm water management. Later we will discuss specific methods to incorporate (or avoid) trendy solutions such as pervious pavements and bioswales, that can meet environmental concerns, but be unprofitable. It is possible to reduce fuel consumption through smarter design of local streets to improve traffic flow, as it is possible to design neighborhoods that will encourage walking or biking over driving. Designing with a balance is the key.

This picture of suburban Albuquerque is very typical of the development pattern in the southern sections of the USA. Compact lots appear to maximize density and adhere to ordinance minimums, while increasing environmental impact.

Economic layer

A builder who provides higher value will sell more homes than the competition down the street trying to sell a similar sized product with less *perceived* value. A home buyer who cares about safety and the environment is willing to pay a little extra for it. That same home buyer will pay even more if their home is in a neighborhood that has views and direct access to open space - *premiums*.

When affordability is a primary concern, it is important to consider how price will influence a home buyer to make more responsible choices and, more importantly, how that decision could determine whether the buyer will prefer your neighborhood over another down the street.

Middleton Hills, a well known New Urban Village in Middleton, Wisconsin. Note the intensity (compression) of space and clustering to leave natural areas. Those living along the natural areas (the premium lots) benefit, but those internal to the development lack a sense of space. The intensity of the developed area leaves little pervious surface area.

Aesthetic layer

While beauty may be in the eye of the beholder, a developer and home builder will want to cater to as many potential buyers as possible.

Does a family actually need the US average home of 2,500 square feet? Do they really need to move 10 more miles away from work? Is the emotional need to move up in status more important than the pain of debt, increased commute time and fuel costs, etc?

Historically for the most part, the answers reflect the fact that home sales are often based upon emotions. The exception being in the decade before the recession, where people bought homes because they increased in value beyond inflation, were too easy to finance, and that home equity was used as a source of additional income. People bought homes not because they loved the home but because it was an additional net worth generator.

This courtyard of a successful starter home TND delivers homes with architectural elements and character not often associated with affordability. The landscaped courtyard (similar to the 'Bays' of BayHome development in Chapter 10) is a refreshing departure from the typical TND.

After the recession began in December 2007, home sales stalled. In places like Minneapolis, Las Vegas, Phoenix, etc. where home prices rose faster than inflation, the values plummeted. But even with compounding foreclosure problems, the over-inflated home values simply went down to the NAHB national average of $264,000 in most cases. In other words, that 2,500 square foot home in Minneapolis that sold for $400,000 deflated to the national average home price - *where it should have been all along*. The real estate crash in Dubai (see picture below) was far more reaching, destroying the economics of growth in the entire Middle East.

Lessons should have been learned from the housing crash, but we have seen no evidence of design change since the markets began to recover in 2012. What will it take for developers, builders, and cities to change? Without change there can be no progress - without progress we cannot achieve sustainability. If today's consumer is shown an energy efficient 2,000 square foot home that felt much bigger than the 2,500 square foot homes they saw in the past -t*hey would buy it*. If the neighborhood *felt* far more spacious and open yet was *higher density* than the one they currently live in - *they will move*.

If consumers were provided an inviting, safe and convenient walk system with actual destinations to walk to - t*hat would encourage a sale*.

2012: Mostly vacant buildings west of Dubai.

If they felt moving meant less depreciation over time compared to the subdivision they currently live within - *they would purchase*.

As the housing market recovers, it is critical that developers and builders deliver superior products that competes not only on price, but the wishes and dreams of the consumer.

This is a cul-de-sac island in Roseheart (San Antonio, Texas) at dawn when residents along the cul-de-sac wake up to leave for work. It certainly provides a pleasant way to begin the day.

Aesthetic layer

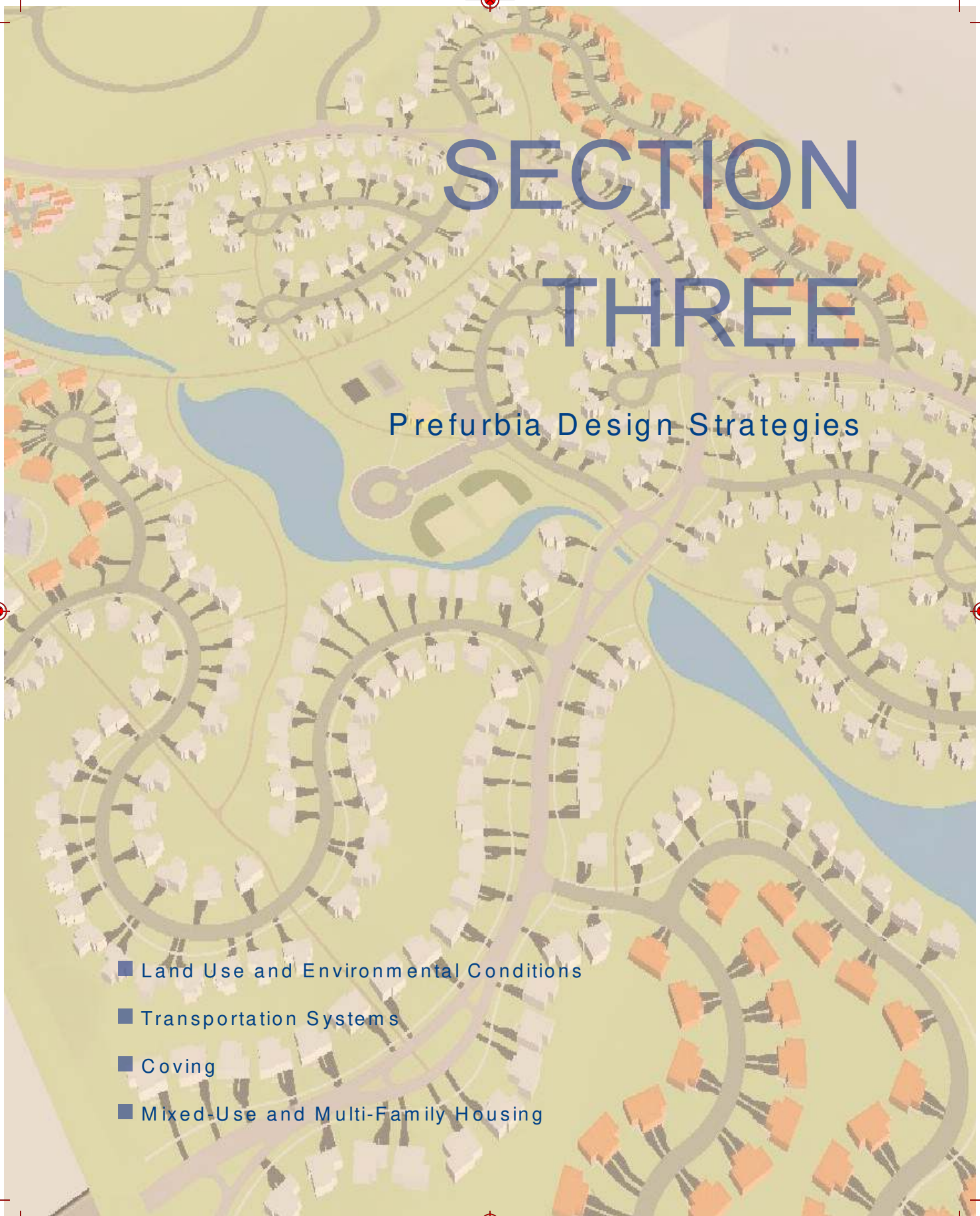
Successful development includes two other elements essential to neighborhood character: architecture and landscaping. For long-term sustainability, architectural elements should lean towards timeless qualities. Avoid trendy designs - the Mansard roof desirable in the 1960's seem downright ugly today.

Architecture and landscaping provide that all too critical 'first impression'. This is why many national developers spend enormous sums on entrance gates. Most of the time when people comment that it is 'a well-planned development', it has nothing to do with 'planning' - it usually has everything to do with architecture and landscaping. Conversely, a well *planned* neighborhood that lacks architecture and landscaping is often thought of as a poorly planned place.

Realistic approach

To help readers understand the innovative proven solutions within this book, we touch on many aspects that make up sustainable neighborhoods. This will include some basic knowledge of engineering and surveying discussed in simplistic terms which are easy to learn and understand. A more in-depth foundation for planning, architecture, engineering and surveying is provided within the LandMentor system, its trainings, and mentoring.

Instead of broad-brush planning where general street patterns and land uses are designated, we prefer taking a more intimate approach – getting into specific highly detailed planning immediately - at begining design stages of design to eliminate situations that can compromise a neighborhood. With technological breakthroughs in planning and general site design it takes very little extra effort to create highly detailed plans and presentations as seen here.



SECTION THREE

Prefurbia Design Strategies

- Land Use and Environmental Conditions
- Transportation Systems
- Coving
- Mixed-Use and Multi-Family Housing

CHAPTER SIX

Land Use and Environmental Considerations

"Suburbia is where the developer bulldozes out the trees, then names the streets after them."

— Bill Vaughan

Critical data such as site boundary with topography (contours), along with water, sewer, and transportation systems, all fall into the required physical elements of a neighborhood design.

These elements have a direct impact on economics, environment, and the people who choose to dwell on the land.

This chapter will explain many of the surveying and civil engineering criteria important to understand for the development of sustainable cities. This book is not meant to be the end all, but to introduce the information needed to create a sustainable development.

The base material: land

This fictional tale is a conglomeration of actual experiences we encountered in the past.

Ralph Dogood, the town doctor, decided to develop land. After looking at quite a few sites that seemed too expensive, he hears of 40-acres marketed for only $30,000 an acre, a price at least $10,000 less an acre than other sites he had been researching.

He knew others were looking at the same property so he offered $22,000 an acre in cash and could not believe it when the land owner quickly took the offer! After all, 40 acres is, well, 40 acres - isn't it?

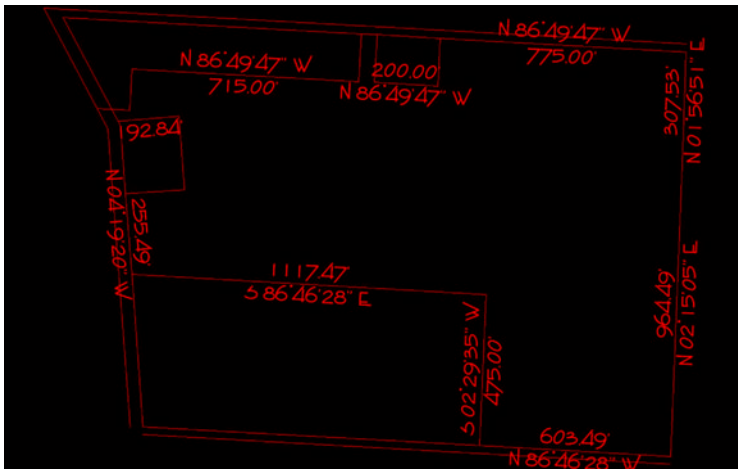


Figure 6.1

From court records he obtained a copy of basic site information (Figure 6.1). Not knowing much about surveying, it looked good to Ralph.

Unbeknownst to Ralph, it is not unusual that city derived boundary information is accurate. Mapping may be traced by hand by someone in the city or by an outside vendor – typically the lowest bidder. The dimensions were hand keyed from existing drawings, increasing the chance of human error. The area was based upon old tax information and was never verified by a land surveyor.

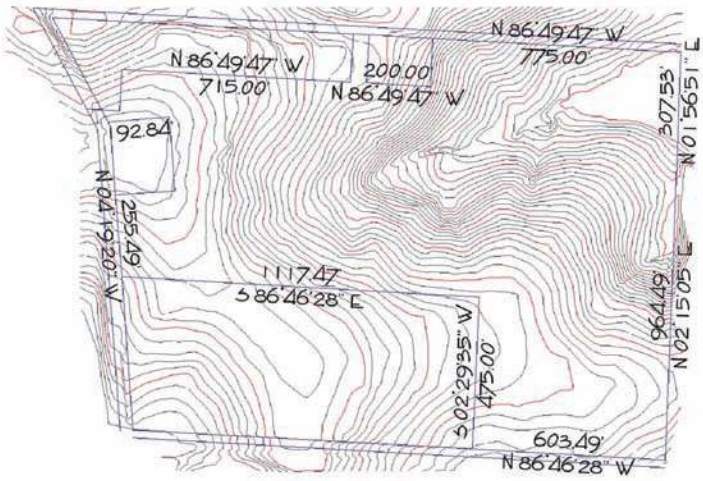


Figure 6.2

The site includes an odd, yet unusable shape at the northwest portion and an unusable narrow access to a street reducing Ralph's utilization of the land by a third of an acre – still, not a big deal.

The city also had some rough topographic information that Ralph was able to obtain (Figure 6.2).

It all looked good as he figured it's better to have some hills than a boring flat site. He particularly loved this site because it was heavily wooded and not the featureless flat farm fields he was originally considering.

After Ralph signed a 'quit claim' deed (no guarantee) for the property, he asked the local surveyor to sketch some layouts. A professional land surveyor investigates the legal aspects of a site, and discovered problems.

Although the city map did not indicate any easements, it was discovered that the local utility company reserved the rights for a gas line 20 years ago when they did their long range planning. They had not yet reached the site, so nothing 'physical' on the ground indicated such an easement, but it was there nonetheless.

This easement bisected the site, as shown in red on Figure 6.3. Sometimes easements may not be seen as limitations, however, they can have a dramatic effect on the layout and development of the land. Undoubtedly, the utility company asking for an easement does not consider the impact on the future land development when they construct their underground pipes or overhead powerlines.

Still Ralph was not upset – he paid almost half of what the other land in the area cost. The surveyor said that they needed to do a wetland survey. Ralph assured them that the site was not wet other than a small spot at the northeast corner. Ralph did not understand that a "wetland" is based upon soil types and plant materials, and can appear quite dry. To Ralph's shock the surveyed wetlands wiped out a third of the site.

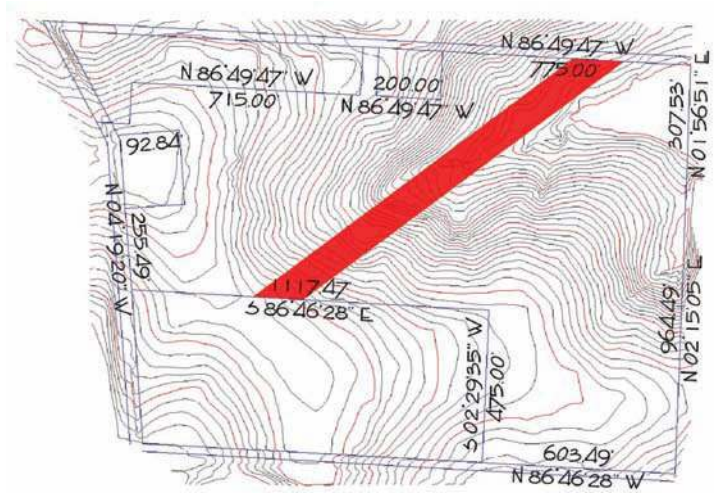


Figure 6.3

The county regulations required a 40-foot buffer around wetlands, which took out another three acres of useable land (indicated in yellow on Figure 6.4). Finally, the engineer's estimate of $400,000 to grade the site for development because of the steep slopes, (which would also wipe out every tree in the buildable area) destroyed any chance of developing within a reasonable budget.

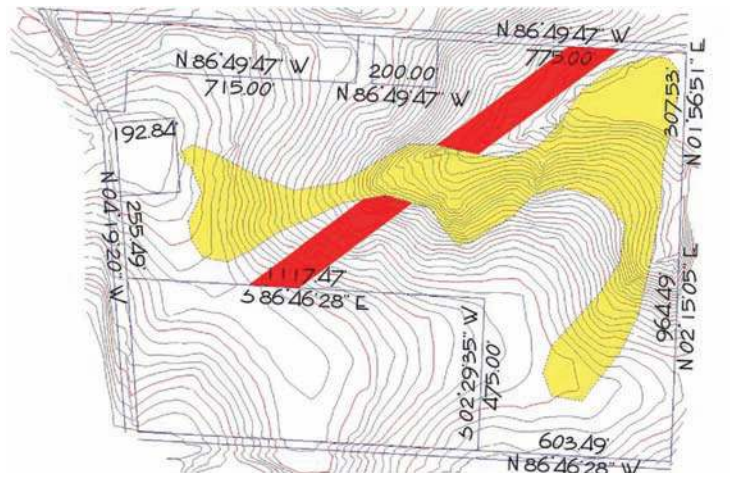


Figure 6.4

Looking at the drawing of the easement and wetland, it would be extremely difficult to make any economically feasible layout of the land. Ralph was lucky that his surveyor had insisted that the site be investigated before any concept plans be done, and an engineer gave an honest opinion as to the cost of grading. All too often a consultant will continue billing, suggesting to the developer that perhaps all is not too bad, since preliminary site analysis work can generate significant billable hours. Luckily Ralph was able to sell the site for $20,000 an acre, reducing his losses.

If a developer begins with an initial project that starts going wrong, they should not be convinced that it can succed. While there are many successful development stories (before the recession), there are also many developers who have gone broke knowing about problems at the beginning, but who forged ahead away. In aviation there are many stories of pilots who made a collection of small mistakes resulting in the plane spiraling to the ground. similar to land developers small but bad decisions leading to unprofitable development or bankruptcy.

Figure 6.5 Saddle Creek in Carmel, Indiana by Pulte Homes - one of the first Coved neighborhood designs.

The property

It is also rare that a site has the exact dimensions that will allow lots to be placed at the precise allowed minimum lot width and depth using conventional design methods. The shape of the land determines the efficiency of the site.

A large rectangular site is more ideal for conventional and TND planning. As soon as a site boundary takes on an odd shape, the various designs options in Prefurbia become more efficient for both residential and commercial solutions. However, site shape is not the only constraint.

Not too long ago, developers filled in the abundant swamps on their land. Today, these swamps are called 'protected wetlands' and cannot be filled in - legally.

Wetlands should be considered as a physical boundary. No matter how they initially look or are drawn on a city map, the only wetland boundary that should be relied on is one that has been delineated by a professional and then surveyed to locate it exactly on the site. Wetlands and shore lines are unlikely to be the best shape to conform to the rigid dimensions of conventional or TND designs. Shorelines often come with additional restrictions and setbacks.

Until environmental restrictions became ever more restrictive, developers simply built over sensitive areas.

Easements

A pipe line may only be a few inches wide, but the easement required for it can wipe out several acres. While some utility companies are reasonable, others may request you not use the easement areas for any type of development. Thus, the easement acts more of like a right-of-way, reducing

propery use and its value. If the utility company has an easement, it is just that, a swath of land to maintain the utility within that easement, not full ownership rights, otherwise the utility company should pay for full price for the land, not just 'easement' rights.

The problem for site design is how to create a plan that hides the easement as an obvious element within the neighborhood. As an example, residents living in Saddle Creek (Figure 6.5) are never aware of the sanitary main easement that runs diagonally through the site.

Wastewater - Sanitary sewer systems

Wastewater travels downhill using gravity as its 'power' source. Waste leaves a home in a small pipe and joins larger pipe that also handles the neighbors' waste. Since gravity moves the waste, the pipe needs to be set at an angle steep enough for flow, but not too steep as to create an abrasive action that can prematurely wear out the pipe.

In a perfect development, there just so happens to be an existing city sewer pipe located adjacent to the site at the correct elevation and location to connect to. In northern climates, the pipe needs to be deep enough to be insulated against freezing and accomodate basements.

If basements are the norm, the pipe journey will begin about 10 feet deep and get deeper as pipes continue along their path. It is not uncommon to reach depths of 20 feet or much more.

What if that pipe breaks or needs repair? How can a service man reach it? Enter the "manhole." The repair man steps down into a manhole to access the pipe. This means there is a limit to the distances that cities will allow between manholes because of the need to access the pipes as well as a limit to how deep that manhole can become. Today, it is possible to repair most pipes without digging them up through robotic devices that can crawl through the pipes that remotely seal the leaks and breakage. Most cities do not allow bends in sewer mains (some do), so any change in direction means another very expensive manhole needs to be constructed.

If the pipe that is needed for a new development to connect to is at a higher elevation than the point it needs for gravity to work, then sewage must be lifted to a higher elevation to begin its downhill journey again. This sewage 'elevator' is called a lift station. To handle a large quantity of waste without failure (you don't want these to fail), the lift station isn't a cheap item.

Eventually the waste leads to a treatment system where, in simple terms, microbes break it down. Waste is cleaned enough to enter the natural drainage system. This "traditional" centralized system has existed for many years.

Today, *decentralized* systems are becoming a viable alternative. These compact systems can provide collection and treatment for a group of units, or even for an entire neighborhood. What makes them decentralized is that the waste is not collected and conveyed to one centralized treatment facility for the entire city.

If an engineer does not want to try anything new (they either error on the caution side or are simply too complacent to care about their client needs), they will make up stories (i.e. lie) to sway developers to conventional subdividing. In 2012, we got a call from a Canadian developer client saying they needed to straighten out all our streets because the city engineer (an employee of one of the largest consulting firms in Canada) told them curved sanitary sewer pipe costs $51 a foot! *If only there was such a thing as curved sanitary sewer pipes!* In San Antonio, one of the largest engineering firms lied to our client telling them our design with 27% less street was too expensive to build. When confronted with the truth, the developer ultimately made the right choice and went with our more sustainable design.

Decentralized waste treatment

Here are three basic options:

1) Septic field:

Waste flows into a holding tank where the large solids are separated and the sewer water continues into a series of pipes with small holes along the bottom. This allows slow seepage into the ground which was layered with different materials that filter the seepage.

The septic field is designed so that if some holes become plugged up, the sewage is redirected to unplugged areas. In theory the plugged up areas eventually become useable and the field can work indefinitely. However, if the entire field gets plugged up a new field must be built. This is why most towns require large lots for septic fields. When opponents to sprawl see these large septic lots they often assume these people are wasting land when, in fact, they simply are complying with the physical reality it takes to service these widely used septic fields.

2) Conventional treatment plants and de-centralized systems:

When development is large enough, it becomes feasible to build a facility that serves a large community. This option requires a treatment plant to be built which costs millions of dollars and is typically built by the city. In most instances the management of the facility is turned over to the community. Technological innovations continue to refine the various options. Smaller decentralized systems have one major advantage: the developer can achieve higher densities in rural areas. This can mean a reduction in the initial purchase price of the land compared to land with urban services, offering more affordable housing.

3) Low-pressure, vacuum, and pumps:

Gravity flow systems rely on soils that are easily trenched which have slopes that lead downwards to an existing sewer line to tie into. A viable alternative, especially when the connection point is located above the proposed development and the soils are difficult to trench (such as rock), is the pressure sewer. With this system, a grinder pump at each home or business sends the sewage away under pressure in a flexible small diameter pipe that also eliminates the need for manholes. Pressure sewers sound like a perfect solution, but the grinder systems are not cheap, so the overall costs between gravity flow and pressurized systems are not that far apart. Placing two or three homes per grinder is a great way to make the economics of pressurized alternatives far more attractive compared to gravity systems.

Stormwater – at the macro level

Stormwater and natural drainage are well documented concerns in land development.

Have you ever noticed how America's older cities rarely flood? They do a great job of handling stormwater! Were the engineers 100 years ago smarter than today who let their 'Storm Master' software design for them? Years ago engineers had a secret. They did not know how to precisely size systems, so they just oversized everything – tremendously! A refreshing rain from a passing cloud was not the problem. It was the massive storms that create the angst.

First, we must understand the 'big' picture. With natural ground, untouched by man, a storm drops the exact same amout of water as developed land, however, nature's undeveloped land soaks up much of it. Plants absorb quite a bit, and most soils can handle a decent amount of infiltration. Some of the moisture evaporates back into the air. This natural stormwater management system feeds our ponds, creeks, streams, and rivers that, over a period of years, have *naturally* sized themselves to handle the volume that comes their way.

When we develop land, everything changes – drastically. A developer takes some of the ground (say 100 acres in the suburbs) and converts 40 (or more) percent of the land surface to paving and rooftops. Solid surfaces do a poor job of absorbing water. The remaining land cannot absorb the extra 40 percent of water and sends it downstream - faster. This is similar to turning on your faucet just a little more than your sink drain can handle. One development after another opens up that faucet until it can be opened no further. Our streams and rivers were designed by nature to handle only so much water. Animals, (including humans), and plant life depend on these natural systems. This is why on-site storm water management is the norm.

Stormwater – at the micro level

Streets typically also serve as a conduit for rain water. Residential streets trap rain along the curb directing it to inlets which are connected by pipes to manholes (yes, the same very expensive type of manhole a sanitary sewer system uses), which contains a larger (extremely expensive) pipe that is connected to similar storm water systems in adjacent developments. Each system contributes more volume, requiring a larger pipe or increased slope to handle the volume. These are big pipes, some so large you can drive a bus through them. Large expensive pipes get rid of the rain quickly to avoid street flooding. The enormous force of this fast running massive volume of water often outfalls into our lazy, slow running streams with awful consequences.

Detention – retention

Today there are many federal, state, and local laws that mandate the management of stormwater. In many instances this requires maintaining the same rate and volume of run-off onto the neighboring drainage systems as if the site had remained in its natural state.

For the developer, these detaining systems reduce useable land and can be expensive to build and maintain. This cost is *always* passed along to the home buyer.

Like innovations made in wastewater, many have been, and continue to be, made in the management of stormwater – too many to go into in this book. However, the typical detention or retention pond to regulate stormwater discharge has become 'old-school.' In addition to consuming developable land, it often destroys the aesthetics of a development and typically wastes great opportunities to create a passive amenity for residents to enjoy. Most of the traditional detention ponds reduce useable green space – and they can be seen as an added insurance risk (children drowning in unattended ponds) requiring fencing and constant upkeep.

Figure 6.6 Westridge Hills rendering - a Prefurbia neighborhood with natural surface flow.

Figure 6.7 A manmade prairie

Surface flow

It is best to use surface drainage instead of expensive pipes when possible. This means that the *initial planning stage* must take into consideration the natural drainage patterns of the site to determine where the open spaces will flow to. Westridge Village (Figure 6.6) is a great example.

Most residents will never be aware the site's drainage is handled through the meandering open spaces, absorbing rain-fall as it makes the journey to a central lake. A land planner without basic civil engineering knowledge is of little use to design such a system.

Prairie instead of lawn

A man made prairie can help absorb rainwater and cost less than laying sod. A properly planned prairie can attract birds and wild life that can transform a subdivision atmosphere to a more rural-like setting like Creekside Village of Sauk Rapids, Minn. (Figure 6.7).

Rain gardens

Rain gardens can filter out small particles of pollutants that are normally picked up by the flowing stormwater and led down stream. For much of the world, this means the ocean.

When there is no filtration, the Sierra Club web page on water quality tells about the effects of these small particles where the Mississippi River flows into the Gulf of Mexico:

"Every summer in the Gulf of Mexico an area becomes void of life due to severely depleted levels of oxygen in the gulf's water, a state known as hypoxia. This condition kills every oxygen-dependent sea creature within its zone. The 'Dead Zone' varies in size from year to year, but generally it has been growing since 1993. In 2005, researchers mapping the Dead Zone found that it covered 4,564 square miles, an area slightly smaller than the state of Connecticut. In some years it has covered up to roughly 7,000 square miles."

You can see what these rain gardens look like at The Fields of St. Croix (Figure 6.8).

Figure 6.8 Rain gardens can destroy curb appeal and hide good architectural detail, and close space.

Properly designed *and maintained*, they can be quite attractive and add both character and value to the neighborhood. Plants in rain gardens are deep rooted. They live, die and then regenerate. The dead roots deteriorate, leaving a sponge-like quality to the soil that filters out pollutants. That's the simple explanation on how it works. Unfortuanately many potential home buyers see these areas as 'weed-gardens' which may scare builders and home buyers away.

You will notice in Figure 6.8 that there is no curbing. Rain falls from the street to surface systems which pass through the rain gardens. It is likely that if all land development had

Life Experience

Oops!

As a pilot I did my usual 'fly over' of the many local sites we planned to see how they were progressing. On flying over Summit Hills in Dassel, Minnesota, I saw what appeared to be a pile of dirt about the size of a Wal-Mart Store. Thinking that was odd, I took pictures of it. The very next day I got a call from the developer saying I needed to come out to the site. He needed to show me something. He specifically asked me why the pile of dirt was there. My first thought was, "had the plan I designed not balanced?" I knew of some stories where the engineering firm's software was misread (user error) and no one catches the mistake till it's too late – but in this case I was really worried for my friend, Steve Sletner, the engineer. I immediately got on the phone and asked Steve to get out to the site. Steve arrived with his technician, who had calculated the grading design. They brought copies of emails from the developer asking if the site could be redesigned to clear 250,000 cubic yards from the site as the city needed it for some purpose. The developer was trying to help out the city. The developer forgot about the emails that the city had deteremined that it only needed 12,000 cubic yards of dirt, an expensive 238,000 cubic yard error! An attempt to help out backfired! Lesson; keep track of commitments!

Figure 6.9

Figure 6.10

mechanisms to filter pollutants from the run-off leaving our land developments, the gulf 'Dead Zone' would have never occurred.

Bearing in mind the way our past subdivisions were designed, it would not be practical to consider raingardens being retrofitted, but they can be used on the ones we are planning today.

Moving dirt

Re-sculpting our land (site grading) to conform to development does not at first seem like such a big deal.

If a developer buys a few hundred acres of flat open farm field and then moves the earth enough to create an interesting site that functions from a drainage standpoint and offers more premium lots that pays for the earth moving, what could be wrong?

In some cases moving dirt is a wise choice, but in others is not - especially if the site is wooded.

Why move dirt at all? It is often done to allow individual home lots to drain properly, not into the neighbor's yard but into an engineered system explained earlier. In many cases, a site can be designed in a way to provide drainage with a minimum of grading.

"Dirt" is expensive to bring into or remove from, a site – *extremely expensive*. Ideally a development design *balances* the dirt to be moved. That means for every cubic yard of dirt removed or *cut* from one area of the site, the design should be able to use that yard of earth as *fill* to another area on the site.

Much of the land we develop in the suburbs is comprised of farm fields that have few, if any, trees. However, we still must be aware of the consequences of grading. Often development plans that contain wooded areas appear to save most of the trees from a bird's eye view. However, if the site grading requires most of the ground to be reshaped, those trees will be killed off. A half foot change in grade is likely to kill a tree. Other factors such as soil type should factor heavily when deciding how much grading should be done. In areas with rocky soil, grading is extremely costly.

An example is the site that Roseheart is built upon. It contained rock and was very wooded. Sitterle Homes, the San Antonio developer, desired to save as many trees as possible and eliminate as much of the grading because of rocks. Figure 6.9 is an aerial photograph of Roseheart that shows how construction does not always require clear cutting and grading.

However, it is more shocking when you see that just a few minutes down the road (Figure 6.10) how many trees were destroyed on a nearby subdivision built by a large national home builder.

Debunking land-use myths

Only a decade after suburbia began (when the soldiers of World War II came home) planners knew that there were some major problems on the horizon for the growth of the nation's cities.

The 1959 Movie, "Community Growth – Crisis and Challenge" by the National Home Builders Association and the Urban Land Institute, discusses the issues of those days – and their *new* solutions. The movie explains many of the problems that we still have today (but without an environmental emphasis) and tells viewers about new ideas, cluster planning and planned unit development, that will help solve these problems.

Cluster planning

The concept of cluster planning is simple. Instead of larger lots spread throughout the site, smaller, more compact lots are designed for homes and the area saved can be used as common open spaces. It is a great idea, but there are a few problems in that theory.

Developers often use the clusters to simply fill the open space with more housing (Figure 6.11), thus no green space for anyone – just larger profits and environmental destruction.

Commonly, when there is actually useable open space in these 'cluster designs', the only residents aware of the extra space in their daily lives are those that could afford the premium

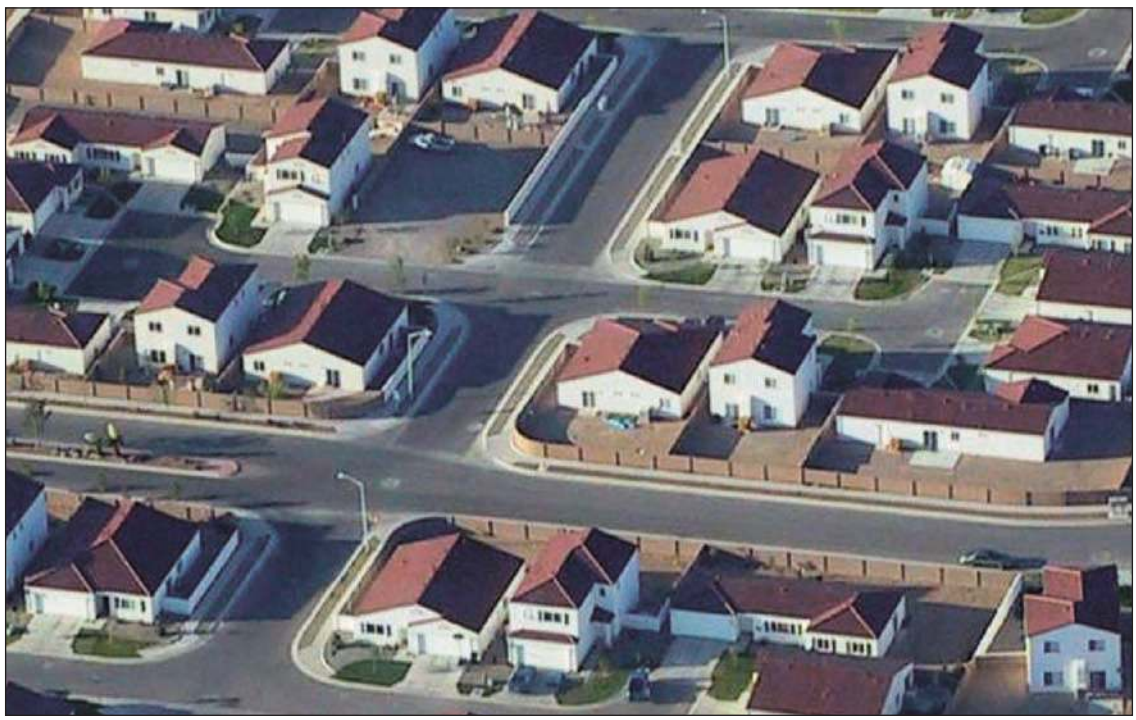


Figure 6.11 Cluster planning in the suburbs - where's the open space being preserved?

price to be located adjacent to the open space. Thus, the majority of residents do not gain any benefit.

Rural clusters

As a recognized conservationist and founder of the Natural Lands Trust, Randall Arndt promotes a concept for "Conservation Development" that takes the cluster theory of dedicated open space one step further - to dedicate that space for conservancy. While a noble goal, in reality, the vast majority of these developments are filled with luxury homes, out of financial reach to the mass market.

Figure 6.12: Rural Randall Arndt Style Conservation Planning

Conservation easements are typically purchased by trusts which may be funded indirectly by tax dollars or contributions. Rural clusters can have huge tax break benefits for the developer, or it can create the possibility of selling the land to a land trust for even greater profits. It would be nice if more of these developments catered to the average income group of the mass market.

Figure 6.12 is an example of a well planned and executed development using this type of design: The Fields of St. Croix in Lino Lakes, Minnesota.

All Prefurbia methods can easily conform with the concept of conservation dedication.

Solar orientation site constraints

Homes themselves can be positioned to reduce energy used to heat and cool them. While there has been a small effort to create home designs that can be oriented for solar advantages, for the most part architects only concentrate on north-south home relationships. A multi-directional effort which includes east-west orientations should be made available to yield more home placement flexibility. Today's more efficient materials and methods of construction make solar orientation less critical. As you read earlier, Rick's new passive solar home does not even work because of changes in the state construction laws rendering passive solar, in Minnesota at least in 2008-09 construction period, not possible!

Life Experience

Lessons learned by the recession

Here in Minnesota our housing crash began many months before the national crash. Our market stalled the day that gas price exceeded $3 a gallon. It was not actually the price of gas that triggered the change, but the steady skyrocketing of housing prices, the increasing commute, and homes that were not much better than those built in the 1990's. The homes simply were no longer a 'value' proposition to the family owning gas guzzling SUV's. In addition to the long commute, suburban densities provided less space in an effort to make economics work because of the absurdly increasing land costs. This all combined to the early crash of the Minneapolis - St. Paul housing market

There were some unique aspects of the Twin Cities compared to other major US Cities. The Metropolitan Council in the early 1990's set an urban boundary to curb sprawl. However, cities outside their control welcomed new development creating excessively long driving distances - *their efforts to curb sprawl made it far worse*. Next, we had every one of the top 10 builders competing for land - bidding up prices which in turn increased home prices far above the rate of inflation. When home prices increase faster than the homeowners incomes, there will eventually be a crash... the question was not if, but when?

When housing markets began to slow down in other cities, our planning business significantly increased because developers and builders began to recognize the same old product they were trying to sell was not going to cut it. *We thought our future was set*.

In the months leading to the national recession we had over 100 active large land developments in the planning and approval stages, with an ever increasing demand for the designs of Prefurbia...

... *then President Bush announced the "700 billion dollar problem"* and bailed out the banks, who immediately shut down every land development we had under contract - *in less than a week*. It was decision time, do we take our savings and shut down both planning and software business to ride out the recession or use the down time to concentrate on increasing both innovation and technology investment - risking everything. We thought, how long could a recession last? Maybe one year, perhaps two? Banks and investors were not interested in a company serving the land development industry, we would have to survive on our own savings and use equity in our personal property to liquidate everything.

While we still had foreign planning work, it was nowhere near enough to fund software development and pay overhead. The risk ultimately paid off as the housing market started an upward momentum and developers and builders began seeking better ways to improve value. The downtime allowed us to develop new technological breakthroughs, refine methods in both design and presentation while also creating new educational materials for others to learn and benefit from.

This 4th Edition of Prefurbia was updated in 2014 to include new changes and inform you about newer methods and technology that help overcome the roadblocks to progress.

The risk to invest at the beginning of the recession was justified. We hope to help all involved in the land development industry to bring about a new era of innovation and progress as well as foster collaboration between the professionals that design and produce the neighborhoods.

The recession helped expedite the goals to create a more sustainable world.

CHAPTER SEVEN

Transportation Systems

"Everywhere is within walking distance if you have the time."

— Steven Wright

In the typical planning scenario, the transportation layout (street system) is designed first, before anything else. This is actually not the ideal way to design a sustainable neighborhood. However, because internal streets are thought to control the site plan layout, this is where we begin this chapter.

The transportation system is commonly thought as the glue that holds much of a land development design together.

A greater depth explanation on how transportation design can enhance a neighborhood is in Chapter 8, but lets introduce the basics.

From an aerial view (horizontal), street design seems easy, but this is a three dimensional world (horizontal and vertical) demanding engineering considerations. Most likely the street will be a conduit for stormwater. Thus, the land planner should also think about utilizing a street for drainage.

Figure 7.1 Excessive paving features increase environmental impacts.

It is possible to make streets overly level without enough grade (such as in 'flat' regions like Houston). With little slope to allow gravity to do its work, flooding can occur. On the other hand, if a slope is too steep surface drainage may move too fast, bypassing curbside inlets, or causing vehicles to slide down an icy street or through intersections in winter.

While street intersections can be designed at somewhat steep grade changes, they are best located where there is flat ground. Acceptable standards vary around the country and around the world. This book does not suggest design standards - that is up to the local regulators.

Sanitary and storm sewers (pipe) typically follow the street, thus, it would be *essential* that the person who plans the site consider that storm water flows downhill, not uphill. Unfortunately that is rarely the case with initial design by many 'non-engineer land planners', thus, more storm pipe and easements through lots are required to make drainage work, and/or more earth movement needed.

Traffic pattern

The shortest path thought to be between two points is a straight line, however, we do not travel in a single straight direction from our homes, employment, recreation, shopping and educational services – all in the proper order. The reality is that we need to travel in many different directions and distances during the day.

In the past, most cities were designed using a simple grid pattern as residents walked or used horses and carts to get around dispersing very slow traffic. To work 10 to 30 miles from where you lived was unthinkable. To travel at speeds greater than 10 miles an hour within city streets was unimaginable in the 1800's when the grid neighborhood was the norm. Today we travel many times that speed. However, the numerous four way intersections, frequency of conflict points, and excessive speeds from straight streets tend to negate advantages of the grid. A good reference is the book *Gridlock* by Randall O'Toole, which details some of these issues.

Where am I?

Typical suburban street patterns indirectly either lead to the end of the development (aka nowhere) or have a haphazard maze-like pattern creating confusion (Figure 7.2).

If it is easy for drivers to get lost, it will also be difficult to walk through, especially when cities require sidewalks to be built on both sides of the street and no other design criteria. This is one of

the reasons people drive in the suburbs instead of using the multi-millions of dollars of walks built for pedestrians.

Have you ever tried to comfortably walk with a friend or spouse side by side on a narrow four-foot wide sidewalk? Add more neighbors walking and biking in the opposite direction, what happens? Most end up walking and biking in the street instead of using the sidewalks or they simply use the car to visit the neighbor just a block away.

Figure 7.2 Meandering streets that lead to nowhere in particular.

Streets leading to nowhere

Enter this development (Figure 7.2) and you will think it's just a long cul-de-sac. It leads to a dead end. The curved street segments lack 'flow'. There is no connectivity to traverse from areas on the left to areas seen above on the right. It would require a drive, a long drive. Walks are provided but with no direct cross connectivity to shorten the distance.

Figure 7.3 Streets looping into themselves cause confusion on the ground.

Loop-de-loops (streets that loop back into themselves) are to be avoided at all costs as seen in this conventional subdivision (Figure 7.3), it may look cool on a plan, but on the ground it only adds to spatial confusion. We have seen planners think these are a good idea when designing 'coved' plans -they are not! The curves in conventional planning rarely ever reach 180 degrees as shown in (Figure 7.3). With coving , however, exceeding 180 degree curves is routine.

Cul-de-sacs to nowhere and segmented block sections are to be avoided. A neighborhood should be about connectivity, flow and spatial expansion. Cul-de-sacs do not need to be avoided as

long as emergency and pedestrian connectivity is not restricted. Unique ways cul-de-sacs can be utilized will be illustrated in a few more pages.

Flow and traffic patterns

All of the previous examples in this chapter lack continuous vehicular systems of a cohesive "neighborhood". This is best explained by 'flow', which can be defined as the ability to enter and safely traverse the neighborhood with a minimum number of stops and turns. The example photographs shown on the prior pages have a significant number of conflict points and little connectivity. All of the built examples have sidewalks with little function except that they adhere to local regulations. Design priority was not given to pedestrian systems, nor are the systems convenient to use. 'Flow' is taught within LandMentor and it's related trainings.

Furthermore, none of the examples previously shown have open space visible from the street. All have the same walk and street widths, no matter how much or how little traffic volume the individual street sections were intended to be used for. This "one size fits all" for streets and walks makes no sense, and is wasteful, yet in city after city that is exactly what is required - worldwide.

Design elements to be avoided

To achieve less environmental impact, there are several design elements typical of conventional and traditional neighborhood design (TND) planning that should be avoided.

Brows (the small loops off of a street serving just a few lots), or landscaped medians that consume huge areas of land yet are separated from homes should be avoided. Insignificant landscaped islands significantly increase paved (impervious) surfaces. The continued maintenance expense (especially in snow country) of these never go away. If a planner must include brow-like elements in neighborhoods, they should use narrow one-way lanes and be more organically shaped to avoid monotony while maintaining flow of traffic - critical to reducing energy consumption.

Sizing the street and walks

In some suburban cites local paved street widths are still 40-feet wide or more, especially in North Dakota where excessive paving adds to their flooding problems! Why? Because the fire and police departments convince the council that any smaller dimension is unsafe. Where do the rules of thumb for these absurdly wide streets come from? Perhaps they are a throwback from the days when homes had no garages and residents typically parked on the streets. Today with three car garages and large driveways this is no longer true.

Fortunately, most cities have become smarter and have adopted, or are adopting, much narrower widths. It just makes one wonder why the police and firemen in the vast majority of U.S. cities can maneuver easily within 28 feet of street paving and others need much more space? Even with sensible widths – why not adopt a ***variable width system?*** For example, if a city adopts a single minimum-width street, then that is used even in areas of extremely low traffic. The City of Woodbury, Minnesota, adopted a minimum 28-foot standard for local streets and a 26-foot width for cul-de-sacs. The width of streets and walks should be determined by the volume they will actually handle. A foot in width here and there may not seem like such a big deal, but in an entire neighborhood it could have a noticeable impact on home pricing and environmental impact.

Caution should also be taken as to not create a situation where streets are too narrow as can be seen in many 'Smart Growth' developments where in order to encourage a stroll, planners intentionally make it a headache to drive. People will drive anyway, only now, consuming more time and energy with more traffic gridlock! Smart Growth or Dumb Growth?