# Revisiting To-Morrow

*A Contemporary Interpretation of Ebenezer Howard's Celebrated Garden City Model*

*by*
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## *Author's Declaration*

*I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.*

*I understand that my thesis may be made electronically available to the public.*

*Abstract*

In his essay, "The Garden City Idea and Modern Planning," Lewis Mumford heralds the Garden City as the single most influential planning document of the twentieth century.[1] Rooted in the romantic socialist tradition, the Garden City scheme addressed the overwhelming degradation of the urban environment and the resultant decline in physical health and social morale that had occurred during the rapid industrialization of English cities. The concept was met with overwhelming enthusiasm both at home and abroad, which generated an international planning movement in the early twentieth century. The Garden City provided a template for town planning that ultimately resulted in the building of thirty-two new towns in the United Kingdom and many more around the world. Howard's model was instrumental in establishing the Town and Country Planning Association, which has had a significant influence on planning legislation, elevating the Garden City "from its origins in a cheap book…to the status of an act of parliament."[2]

More than a century has passed since Ebenezer Howard first proposed the Garden City. While the worst of the insalubrious conditions of the industrial city have dissipated, a new and equally formidable environmental crisis has arisen that emphasizes human impact on the environment and the central role humans have assumed in shaping the

1 Lewis Mumford, "The Garden City Idea and Modern Planning," in *Garden Cities of To-morrow*, ed. Frederic J. Osborn (London: Faber and Faber, 1970), 29.

2 Ebenezer Howard, *To-Morrow a Peaceful Path to Real Reform*, Original Ed. with Commentary by Peter Hall, Dennis Hardy & Colin Ward (London; New York: Routledge, 2003), 185.

planet. A critical analysis of the historic Garden City reveals a complex urban form whose guiding principles share an almost surreal affinity with contemporary sustainable planning, perhaps making it more relevant to present day than any other time since its inception. This thesis explores the potential of the celebrated Garden City model to address the unfolding environmental crisis of the twenty-first century. With the aid of contemporary ecological theories, the model is reinterpreted and updated to respond to the current environmental crisis. The result is the twenty-first century Garden City, that demonstrates a new highly adaptable urban framework that structures relationships between the man-made and natural environments.

Through the exploration of the Garden City, a methodology is developed for the study of historic precedents. By challenging the model to respond to the twenty-first century crisis, it is first deconstructed and evaluated, and then reconceptualized toward contemporary interests. This method of approach suggests that an historic model maintains something of value that can be offered in contemporary times. It provides an alternative way to study and learn from historic models, while projecting their values in to the future.

*Acknowledgements*

I would like to thank my supervisor, Val Rynnimeri for his encouragement and advice. As the resident Garden City enthusiast and aficionado, his insight was invaluable in writing this thesis. I am also indebted to Jane Hutton, whose thoughtful comments and suggestions have significantly refined and enriched the content of this work.

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# PART ONE:
# Context and Analysis of Howard's Garden City

# 01 Chapter One: Introduction

## 1.10 Intent of Study

The Garden City concept was a pivotal moment in planning history that has left a lasting impression on the physical configuration of modern cities. The nineteenth century witnessed an imbalance between the agricultural and industrial sectors, between the rural and the urban. Social commentators throughout the nineteenth century were troubled by the growth of industrial cities. They were concerned with the deplorable conditions that had developed in the inner cities as well as the effects of industry on the environment. Many observers felt that the balance between humans and the natural world had been upset.

The developing perturbation was heralded as a call for action that was taken up by philanthropists and social reformers alike. One of the most radical proposals among them was Ebenezer Howard's Garden City. Rooted in the romantic socialist tradition, the Garden City scheme addressed the overwhelming degradation of the urban environment and the resultant decline in physical health and social morale that had occurred during the rapid industrialization of English cities. The concept was met with overwhelming enthusiasm both at home and abroad, which generated an international planning movement in the early twentieth century that influenced both planning policy and built form, the effects of which have continued to present day. The persistence and proliferation of the Garden City concept can be traced throughout the last century, prompting Lewis Mumford to proclaim it as the single most influential planning document of the twentieth century.[1] However, despite its enduring legacy, much of the concept behind the original Garden City has been lost through generations of transformations and permutations. Howard's original message has been distorted and misrepresented, denying a contemporary audience of the true value and potential influence that the original model may hold for society today.

With over fifty percent of the world's population now residing in cities, we are again entering a new and unprecedented era of urban domination, where the extents of human activities have "altered,

domesticated and controlled the world more than any before."[2] While the issues of human health and well being that Howard addressed have improved significantly in the developed world since the nineteenth century, the planet is becoming more polluted and less biodiverse,[3] drawing attention to the present environmental crisis and prompting a renewed call to action.

Even though the Garden City has maintained a presence throughout the last century, there is a reason to revisit the model right now in a more serious way. One of the main planning themes to emerge in the nineteenth century was the balance between the city and nature, a theme that continues to preoccupy sustainability advocates today.[4] Howard embraced this theme when he "raised questions in the early twentieth century about the nature of the industrial city and the fundamental relationship between human development and the natural world."[5] Many aspects of the Garden City that were proposed to combat the insalubrious conditions of the industrial city demonstrate an acute prescience of contemporary environmental challenges. Unsustainable development practices in the present have renewed interest in the balance between the city and nature, especially as the social and ecological implications of global development become better understood. In recent years the Anthropocene has emerged as a powerful new narrative that frames the contemporary debate on the environmental crisis, emphasizing the central role humans have assumed in shaping the planet. As a new call to action is issued, the Anthropocene provides a new lens or perspective on the relationship between humans and nature through which old ideas and historic models can be revaluated.

This thesis revisits the Garden City both as an influential model in its own time but also as an historical precedent that has something valuable to offer in contemporary times. The intent behind this thesis is two-fold: first, the thesis provides a contemporary analysis of an historic model and second, it uses history to inform a present-day re-interpretation of the model that responds to twenty-first century values.

## 1.20 Thesis Methodology

Living in an era of such rapid change and progress, it is easy to dismiss the past as something that is so different that it has nothing to offer in the present, relegating many historic models to the history books as archaic relics of a bygone age. On the contrary, historical views of culture, politics and economics shape the way that we view the present, influencing how we respond to current dilemmas. Studying an historic precedent through design speculation offers a way of thinking about the past, a way of using history speculatively. In doing this, history is not only being written about, but it is being projected forward. Through the exploration of the Garden City, this thesis develops a methodology for the study of historical precedents through design speculation. By evaluating an historic model which has been so influential, and then speculating on its contemporary value and application, design speculation not only revives our sense of the past but also reveals a desire for a better future. By challenging the Garden City to respond to the twenty-first century crisis, the original model is deconstructed and reconceptualized toward contemporary interests. This approach suggests that we can look at this historical precedent in contemporary times and still learn something from it. Revisiting the Garden City is not simply an exercise in understanding history but rather it is a way of developing a means of application in which key principles or ideas can be identified and extracted from an historic model and then applied to contemporary times or crises. Through design speculation, this thesis is exploring the relevance of the Garden City to answer the current call to action.

## 1.30 Thesis Framework and Content

This thesis framework is organized in two parts. Part I of the thesis is a study of the original Garden City model where key principles and ideas are identified and extracted. The historic social and political context surrounding the Garden City is discerned in Chapter Two by identifying the crisis of the late nineteenth century and the relevant theories and ideas that influenced Howard. Chapter Three looks at the legacy of the Garden City as the concept was applied in succeeding generations to various social and political conditions, with desultory adherence to the original concept and with varying levels of success. Chapter Four presents a critical analysis of the original Garden City model that investigates the individual systems and identifies key principles and characteristics. These elements are then extracted to provide a framework for the reinterpretation of the model in the twenty-first century.

In Part II of the thesis, the identified principles and characteristics are translated for contemporary application. Current social conditions help to identify the contemporary crisis in Chapter Five and relevant theories and ideas are discussed in Chapter Six. Chapter Seven brings everything together in a speculative interpretation of what a twenty-first century Garden City may look like. The thesis conclusion reflects on the use of this method for evaluating historic models, commenting on its potential future uses and limitations.

## *Endnotes*

1 Lewis Mumford, "The Garden City Idea and Modern Planning," in *Garden Cities of To-morrow*, ed. Frederic J. Osborn (London: Faber and Faber, 1970), 29.

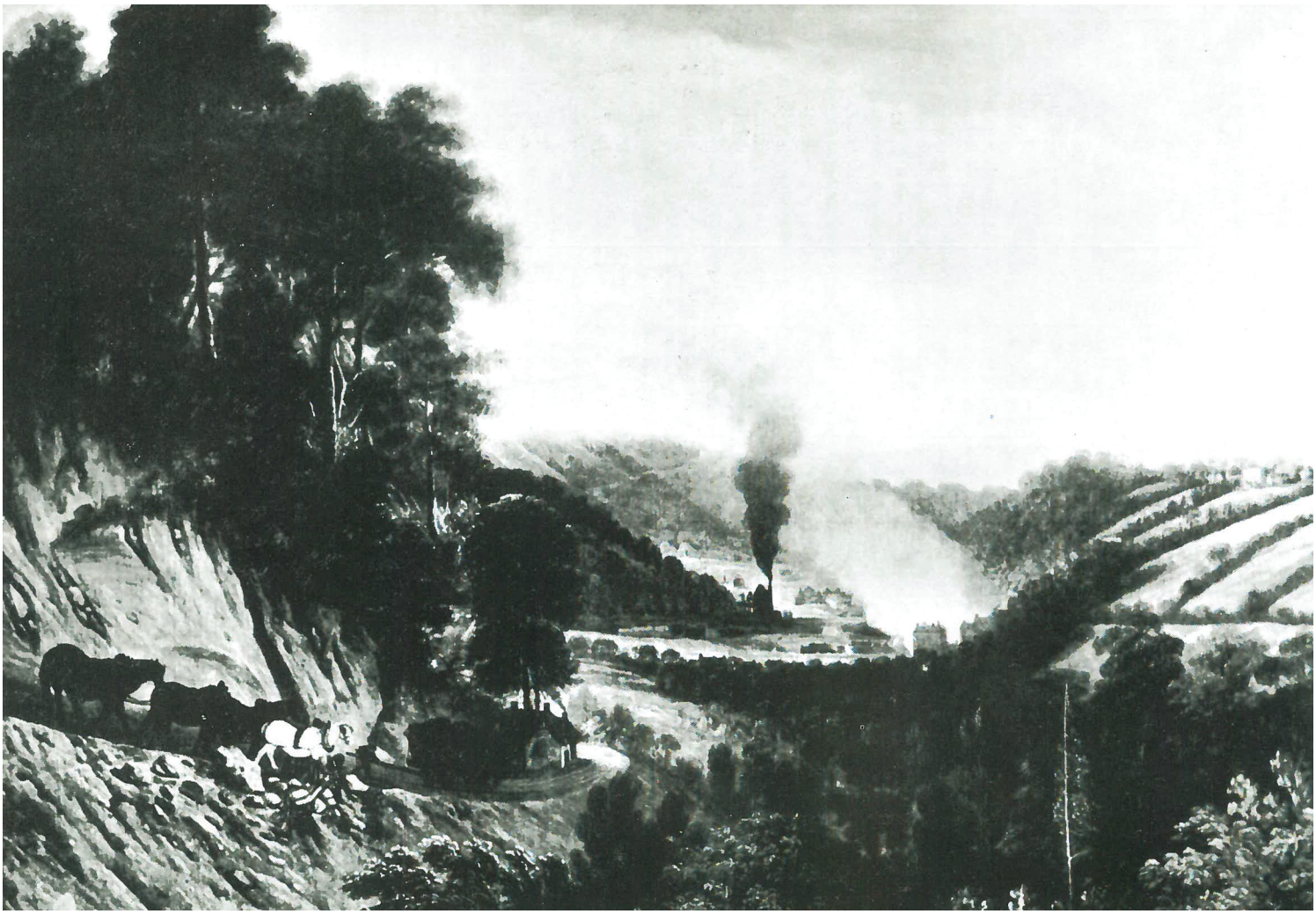
2 Erle C. Ellis, *Anthropocene: A Very Short Introduction* (New York: Oxford University Press, 2018), 14.

3 Ellis, *Anthropocene*, 144.

4 Stephen M. Wheeler and Timothy Beatley, ed., *The Sustainable Urban Development Reader*, 2nd ed. (London; New York: Routledge, 2009), 9.

5 Wheeler and Beatley, *The Sustainable Urban Development Reader*, 2.

# 02 Chapter Two: Introducing Howard's Garden City Model



## 2.10 Introduction to Chapter Two

*Figure 2.01*
Early Industry in the English Countryside

Chapter Two provides a brief description of Ebenezer Howard's Garden City concept to contextualize the thesis. Like many idealistic models, the Garden City is a product of its time; using relevant theories of the day, it addresses the prevalent crisis, resulting in a model that reflects the cultural values of the time. When asking whether the Garden City model still holds relevance today, it is important to understand how and why it was proposed to begin with.

Section 2.20 describes the crisis facing late nineteenth century industrial cities that provoked a call to action, prompting Ebenezer Howard to consider an alternative way to live. Section 2.30 introduces the theories acknowledged as influential on the Garden City concept. And lastly, Section 2.40 introduces the resulting Garden City plan and diagrams. This chapter intends to make clear the process of first identifying the crisis of the time, then engaging in relevant theory and discourse to produce a proposal that answers the call to action. This structure is repeated in the second part of the thesis where the modern-day crisis is identified, and contemporary theories are introduced as a means of evaluating the capability of the Garden City concept to respond to a renewed call to action.

## 2.20 The 19th Century Crisis of Industrial Cities

The nineteenth century saw significant changes in the social and economic structure of both urban and rural settings. The crisis faced by late Victorians was centred around a shift from rural to urban lifestyles and the resulting insalubrious physical and social conditions that emerged in the industrial city. The nineteenth century witnessed unprecedented population growth due to rising fertility and falling mortality rates that represented a general improvement of quality of life. For the first time ever, birth rates exceeded death rates and life expectancy

rose significantly from thirty-five to fifty years of age.[1] In addition, rural communities were experiencing economic depression as a result of poor harvests and overseas competition, triggering a mass migration of rural workers into the city. The city of London was home to approximately one million inhabitants at the beginning of the nineteenth century and had grown to 1.5 million by 1851, a figure that surpassed the levels achieved by any other city up to that time.[2]

The rise of mechanized mass production during the industrial revolution had much to do with the rapid increase in urban populations. The replacement of water with steam power as the dominant energy source is significant in that it enabled the further escalation of factory industry and production as well as the consequent chaotic growth of urban areas. Steam powered trains and ships brought about an era of unparalleled mobility expediting economic globalization. The focus on production methods and increased output ushered in an era of consumerism, where faith and religion were overshadowed by the belief in the power of science and technology and a pursuit of material gain.[3]

The sudden and sizeable increase in urban populations had many physical effects on the industrial city. Capital and wealth created by industry coupled with a lack of government intervention in planning allowed the ruling class to take advantage of the ensuing lawlessness to capitalize on the densification and exploitation of prime real estate throughout the city. City growth was unplanned and unregulated, resulting in intermingled residential and industrial uses. Generally, the poorest districts were located directly adjacent to industrial areas, where the lowest classes endured the worst of the pollution, smoke and noise produced by the factories. Flagrant profiteering by the bourgeoisie was

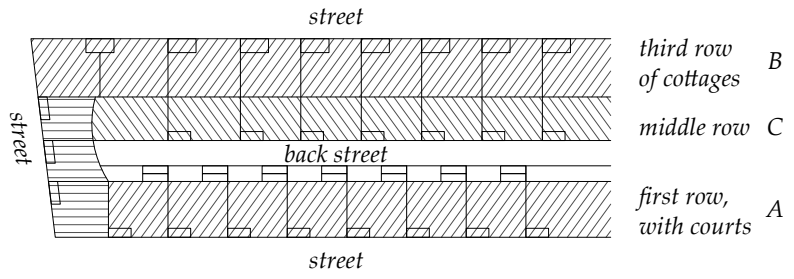
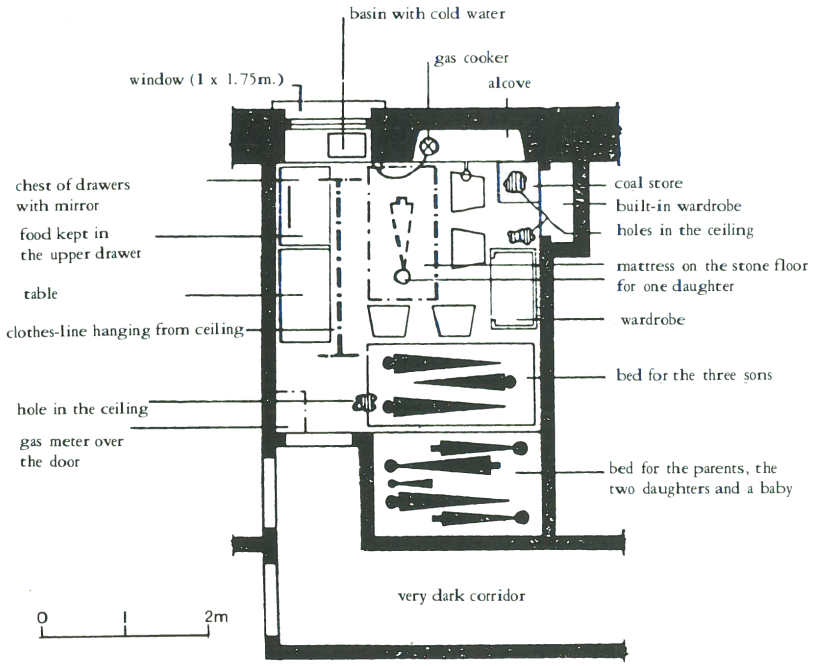



***Figure 2.02***
Working Class Quarters in Manchester During the Industrial Revolution

*Worker's housing was built in large quanities, often an entire street at a time. The layout of Streets A, B and C allowed contractors to further exploit the working class who paid higher rents for cottages that faced the street.*

***Figure 2.03***
Typical Dwelling in Glasgow, Discovered in 1948

*Diagram shows the living and sleeping arrangements of an entire family residing in a one room flat.*




often at the expense of the impoverished and disenfranchised working poor.

In the newly minted industrial slums, housing was poorly constructed and crowded together in small apartment complexes or row houses (*figure 2.02*), often with entire families residing in a one room flat. Positioned on narrow backstreets, the small pinched windows of lower class housing failed to provide adequate daylighting within. Provision of proper infrastructure such as water supply and disposal of sewer and waste, was lacking and open space was limited to the congested narrow streetscapes, where buggies, pedestrians, animals and children at play interfaced in the crowded and chaotic urban environment.

The noxious environment created in industrial cities was a breeding ground for illness and disease. The filth attracted rats and lice carrying bubonic plaque and typhus respectively. Water supplies were infected by waste accumulation, resulting in typhoid fever and cholera epidemics. At this time, industrial cities endured a higher mortality rate than in the countryside. Social and economic inequalities became apparent through the segregation of the working poor in the inner-city slums and the flight of factory owners and other affluent citizens to the emer-

ging suburbs on the periphery of the city.

Those left to endure the living conditions of the slums – as well as the working conditions in the factories – suffered a growing sense of discontent. Intemperance provided a temporary solution to alleviate social ills, but the greater threat, as perceived by the upper class, was that of revolution. Fear of the growing unrest in urban populations led to a general consensus among almost all social and political circles that drastic measures were required to improve the quality of life within industrial cities. Social reformers, Howard among them, perceived it as their moral obligation and social responsibility to answer the call to action. Based on working theories of the time, Howard favoured a more peaceful path to reform, offering "a prospect of radical change yet with a reassuring promise that the means is not one of blood and revolution."[4]

## 2.30 The 19th Century Theory Engaged by Ebenezer Howard

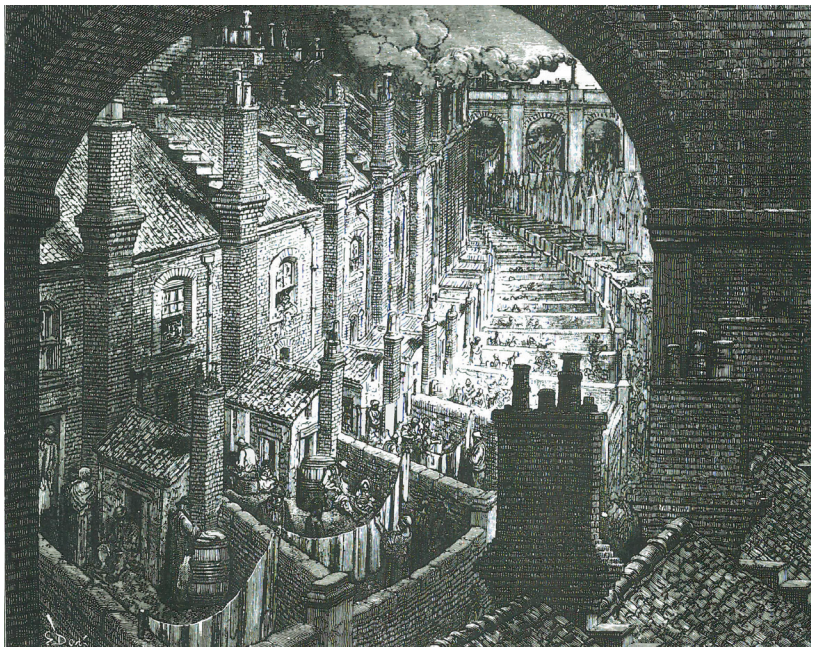
Ebenezer Howard credits three central ideas as influential in the development of the Garden City concept. The first of these theories addresses the urban migration problem and the drastic population increase in industrial cities by proposing the formation of colonies. The second theory concerned strategies for land nationalization, and the third influential concept showed how social and political ideas could be expressed through the creation of a model town. The contribution of these theories to the Garden City concept is explored in more detail in the following sections.

### *2.31 Organized Migratory Movement of Population*

The nineteenth century witnessed a significant influx of rural migrants into industrial cities. Many theorists of the time contemplated ways to return people to the land as a means of alleviating the stresses on industrial cities. Howard was heavily influenced by Edward Gibbon

***Figure 2.04***
Over London by Rail
*Based on an engraving by Gustave Dore*

*The image captures the conditions created by the industrial revolution. The advances made in technology, represented by the railway, are juxtaposed against the degredation of the urban environment.*



Wakefield and Professor Alfred Marshall, whose theories on urban migration and population increases led to proposals for colony formation.

In his 1849 publication, *A View of the Art of Colonization*, Wakefield criticizes Britain's colonial strategy of sending "needy persons, many of them mere paupers, or even criminals,"[5] to colonize new territories. He argues that these new colonials are often unfit to represent the characteristics of the parent country and suggests that it would be preferable to follow the example of ancient civilizations where colonies are assembled from citizens of all classes and ranks of society. In these ancient colonies, princes, noblemen and influential citizens were nominated as founding citizens. The resulting new colony was an exact replica of its parent state in miniature, retaining the same social and political structure as well as cultural values.

Alfred Marshall builds on the concept of colonies but proposes them much closer to home. These home colonies, located "some place well beyond the range of London smoke,"[6] were intended to provide a solution for rehousing the London poor.[7] He argues that there is economic incentive for factory employers to relocate as well, because the rent for work space would be much lower, thereby reducing operating costs. The rents for housing would likewise be reduced in comparison

to London, providing a better quality of life for the working poor, combining the advantages of town and country. Marshall admits that it may be difficult to attract Londoners to these new colonies initially, as they represent the unknown, but predicts that as the colony grows, more and more employers would see the advantages that the colonies have to offer, making them a prosperous alternative to the city. Home colonies in the English countryside would become an integral part to the Garden City scheme. Howard also encouraged the relocation of industry, as he saw the working class as his main demographic. Unlike Marshall, however, he speculated that the advantages would be strong enough to lure people away from the city, benefitting both the new colonists as well as those who remain behind.

## *2.32 Land Assembly and Land Tenure*

Howard had been interested in land values ever since his time in Chicago. Henry George's publication, *Progress and Poverty* (1881), assessed the nature of rent, discussing the concept of the 'unearned increment.' George describes the unearned increment as an increase in rent that is the "product of general economic growth rather than of any initiative on the part of the landlord."[8] George proposed depriving the landlord of this unearned increment which would be diverted to public uses instead. Howard adopted this idea in his model, where the economic success of the Garden City relied completely on the unearned increment. With the municipality as landlord, the unearned increment would be diverted to public uses rather than private uses within the town. Issues of land ownership had been discussed in the United Kingdom since the Enclosure Acts began in the sixteenth century, when many peasants were denied access to formerly common land as it became privatized.

Thomas Spence was a member of the parliamentary Radical Movement in England during the late eighteenth century. He believed that "land and liberty were fundamental rights"[9] and his views on common ownership of land were published first in *The rights of Man, as Exhibited in a Lecture, Read at the Philosophical Society in Newcastle* in November

1775, and again about one hundred years later in *The Nationalisation of the Land in 1775 and 1882*, by H. M. Hyndman, the founder of the Social Democratic Federation.[10] Railing against landlords as "usurpers and tyrants," Spence argued that all individual land ownership should be abolished and replaced by common ownership, where the land would be held in trust by the local parish. The parish would be responsible for collecting taxes from the people and paying the government its share. Any surplus revenue would be redistributed back in to the community via public works such as aiding the poor and building and repairing houses, bridges and highways. One major difference between Spence and Howard's scheme is the method of implementation. Where Spence relies on a form of expropriation to be applied universally and contemporaneously to the whole country, Howard proposes a less radical approach: to purchase the land for implementation of the scheme on a smaller scale and to "trust to the inherent advantages of the system leading to its gradual adoption"[11] across the country.

English philosopher and political theorist Herbert Spencer, looks at issues of societal inequality in his 1851 publication *Social Statistics*. Similar to Spence, he advocates for common ownership of land, assuring his readers that this is not a radical proposition but rather a simple change of landlords.[12] Instead of belonging to the privileged few, "the country would be held by the great corporate body – society."[13] Instead of leasing land from, or paying rent to, a private individual, it would be paid to the nation, effectively making all citizens simultaneously landlords and tenants. Upon later reflection, Spencer became weary of the so called "evils of state ownership" as well as the problem of initially acquiring the land from existing owners.[14] Howard attempts to address both of these issues in his proposal by purchasing agricultural land for the Garden City on the open market. By purchasing land on the open market rather than seizing it as Spencer had originally suggested, it ensures that the seller is paid a fair price. The purchase of sparsely populated agricultural land secures a lower price per acre than that in a more urban area, a savings that can be passed on to the working-class residents. To address the "evils of state ownership," the rents in the

Garden City were not to be paid to a faceless government organization, but rather to the Garden City municipality in which the people dwell. The land is to be held in trust for the municipality by "four gentlemen of responsible position and of undoubted probity and honour."[15] The revenue generated within the Garden City is derived entirely from rents, which are used to pay the mortgage and accumulating interest on the property, and to pay for construction and maintenance of public works. Any value that is added to the land through the unearned increment will be put back into the town by way of benefits such as old age pensions, accident insurance and health insurance.

## *2.33 The Development of A Model Town*

In 1849, James Silk Buckingham describes the layout for a model town in his publication *National Evils and Practical Remedies*, which is considered one of the earliest proposals in English history for the creation of an entirely new city (*figure 2.05*).[16] Buckingham, like Wakefield, saw the advantages of combining agricultural and industrial communities for a complete and self-sufficient ideal city, offering Howard the medium he needed to test his experimental ideas on social reform.

The model town, named Victoria in honour of the "benevolent sovereign," consists of an urban settlement of one square mile (640 acres), that would be home to 10,000 inhabitants, and is surrounded by 10,000 acres of agricultural land (*figure 2.06*). Every inhabitant owns shares in the Model Town Association, which governs Victoria, retaining ownership of all houses, factories and land. The town itself is made up of concentric squares, traversed by eight radial avenues, each one hundred feet wide. The concentric squares alternate between housing, commercial and civic functions. Civic buildings are nestled in an elaborate lawn, providing green spaces throughout the city. The centre of the plan is reserved for academic, public and religious buildings. Any type of facility that is considered unhealthy such as slaughter houses, cattle markets and tanning pits as well as any factories using steam engines such as cotton mills or iron works, are to be removed a sufficient distance from the

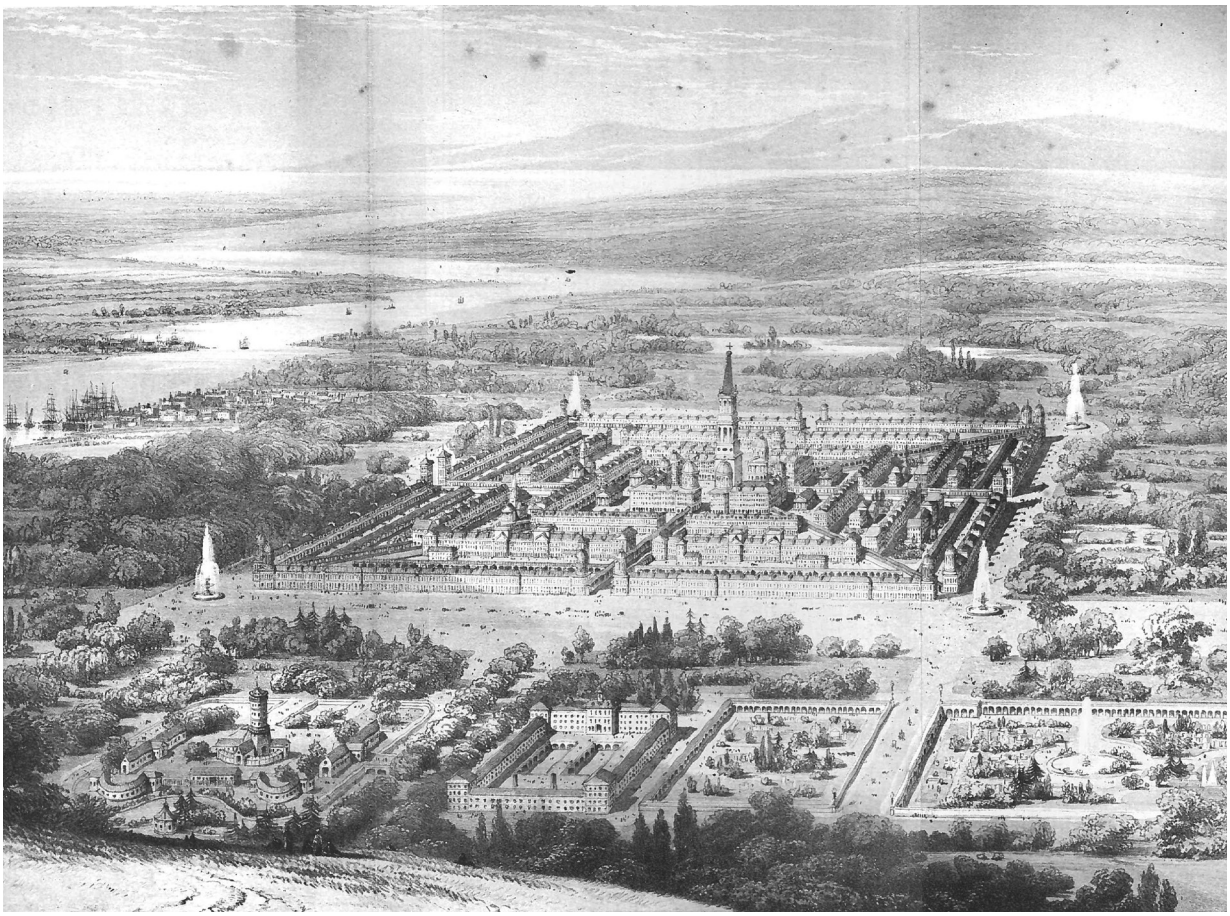


***Figure 2.05***
Proposed Model Town of Victoria

town so as not to put the health or comfort of inhabitants at risk. Similar to More's *Utopia*, the residents of Victoria are proposed to rotate between agricultural and industrial labour wherever possible, to relieve workers of repetitive and tedious tasks, thereby providing a greater variety of employment for the development of mental and physical faculties.[17]

Buckingham addresses population growth by introducing the concept of Home Colonies. Home Colonies would be formed by relegating outstanding citizens from every class of society to a 'Reserved Corps,' which would form a new smaller city of 2,000 to 5,000 inhabitants. In this way, the population and density of the city could remain constant, preventing overcrowding and the negative side effects that come with it.

The physical appearance of Victoria has many similarities to the Garden City. Both appear to feature urban settlements surrounded by a large agricultural estate that combines farming and industrial pursuits in

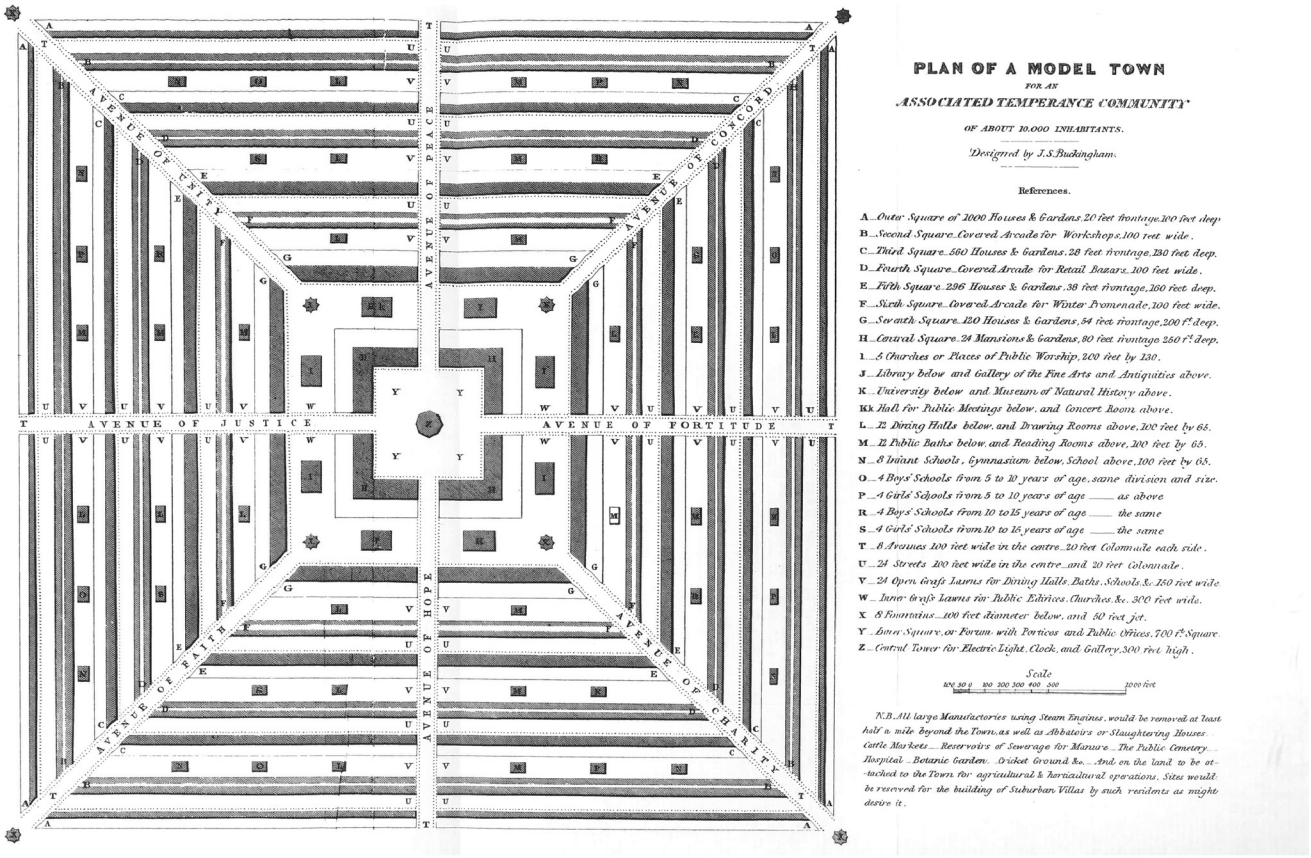



***Figure 2.06***
Proposed Plan of Victoria

a healthy and natural way. However, the interior lifestyle of the towns is quite different: Buckingham believed that the source of the evils of society was rooted in competition, intemperance and war and so he sought, through the formation of the Model Town Association, to exclude competition and to prohibit all intoxicants and gunpowder. While the Garden City would later promote free association through various forms of individual and co-operative work, Buckingham's city was "held together by the bonds of a rigid cast-iron organization, from which there could be no escape but by leaving the association."[18] One significant aspect of Buckingham's model town was its inherently urban character. Where many utopian schemes of the late nineteenth century had a tendency to take on a more rural form, Buckingham's model town remained urban in concept,[19] a distinction that Howard later emulated in the Garden City.

Howard drew on Buckingham for his idea of a model town, which would be held in common ownership according to ideas of Spence and Spencer, and the town would be situated in the English country-

side, populated by planned migration according to ideas from Wakefield and Marshall. Had his concept stopped here, it may well have passed in to neglected obscurity long ago, a mere footnote alongside other utopian schemes of the day in the history of community planning. What sets Howard's model apart is his strive for balance or equilibrium, between opposing sets of values. Howard juxtaposes conflicting extremes, looking for a compromise, a middle ground solution between such opposing forces as the town and country, capitalist and socialist ideologies, and a cultural struggle between tradition and modernity.[20]

## 2.40 The Proposal: Introducing Howard's Garden City Model

### *2.41 Significance of the Model*

The essence of Howard's Garden City model was an economic development scheme coupled with an anomalous vision for housing reform that would relocate portions of industrial infrastructure along with portions of the working population into new settlements in the countryside, providing large cities with a respite from population growth. The Garden City proposed a marriage of town and country that aimed to rebalance England's agricultural and industrial sectors while providing the best benefits of both worlds for its inhabitants. As a self-sufficient settlement, each Garden City would function autonomously, but would also be connected to each other and to larger cities through a vast railway network. The Garden City concept was a strategy that exceeded precedents of the day by going beyond a singular settlement to a larger, regional infrastructure that was designed with the intent of widespread adoption by the entire nation.

Howard's scheme fulfilled a collective desire for a return to a simpler lifestyle that brought its inhabitants into closer commune with nature. The marriage of town and country painted an idyllic image that ascribed to the trope of the traditional English countryside. For sup-

porters of the Garden City movement, it represented a return to more traditional English morals and values, while symbolically restoring the peasants to the land. With the success of the first Garden City at Letchworth came an air of impassioned enthusiasm not only in England, but in many industrialized European countries that were encountering similar problems at the turn of the century. The Garden City inspired the collective imagination of a generation, bringing positive awareness to the current crises and offering an innovative and sustainable solution for real reform. The precedent set by the Garden City also served to promote the development of planning policies for domestic architecture and for a burgeoning new discipline of urban design.

## *2.42 The Three Magnets Diagram*

The city is often viewed as the highest form of human settlement and therefore the model town is routinely appropriated as an apt vehicle for introducing radical new ideologies into the urban consciousness.[21] Ebenezer Howard, like many before and after him, sought to address the physical and social ills of his time through the creation of a new model town. The town and country, the rural and the urban, are two classifications that habitually find themselves in opposition to one another. Through comparing and contrasting the two different conditions, they have in a way come to define one another. The dialectic of town and country forms the basis of Howard's argument; his model is predicated on their marriage, which reconciles the seemingly disparate extremes of the economy of the industrial city and the social and cultural elements of rural life. This argument is laid out in his *Three Magnets Diagram*, where the positive and negative qualities of both the town and the country are described (*figure 2.07*). He posits that both the town and country may be regarded as a magnet and each person as a needle.[22] Each needle will be drawn to the town or country based on the attractive forces of one over the other. At the time he is writing, Howard believes that the attractive forces of the industrial city, the *Town Magnet*, are stronger than those of the country, the *Country Magnet*, which accounts for the rapid growth

and overcrowding of large cities. How then, does one stem the growth of cities, and return people to the land? Howard asserts that in order to draw people to the country, the attractive qualities must be greater or stronger than those of the city. He then introduces a third magnet, known as the *Town-Country Magnet*, which possesses all of the attractive qualities of both the town and the country with none of the undesirable qualities, making it the most attractive of the three magnets. This *Town-Country Magnet* became known as the Garden City.

## *2.43 Diagram No. 7: A Group of Slumless, Smokeless Cities*

The manifestation of the *Town-Country Magnet* is the Garden City. In his article "From Vision to Reality: Victorian Ideal Cities and Model Towns in the Genesis of Ebenezer Howard's Garden City," John Rockey asserts that "models are half-way houses between theory and actuality. They are ideas made suitable for reality and they point the way forward. Often they are designed to further a principle…at least in skeletal form."[29] Howard provided detailed diagrams with his text demonstrating key principles of the *Town-Country Magnet*, taking care to note that these are diagrams only, and that they are "a description which is, however, merely suggestive, and will probably be much departed from."[30] Despite this caveat, the original diagrams are useful in understanding some of the key principles that contributed to the popularity and widespread adoption of Garden City ideology. In essence Howard's scheme is relatively simple: it is the integration of urban and rural characteristics for the combined vitalization of urban life and the intellectual and social improvement of rural life.[31] Each town sits within an agricultural green belt that serves to limit the physical growth of the city as well as to provide food for its inhabitants. With the addition of industry, employment and affordable housing for the working poor, the Garden City would provide a healthier and higher quality of life for its inhabitants.

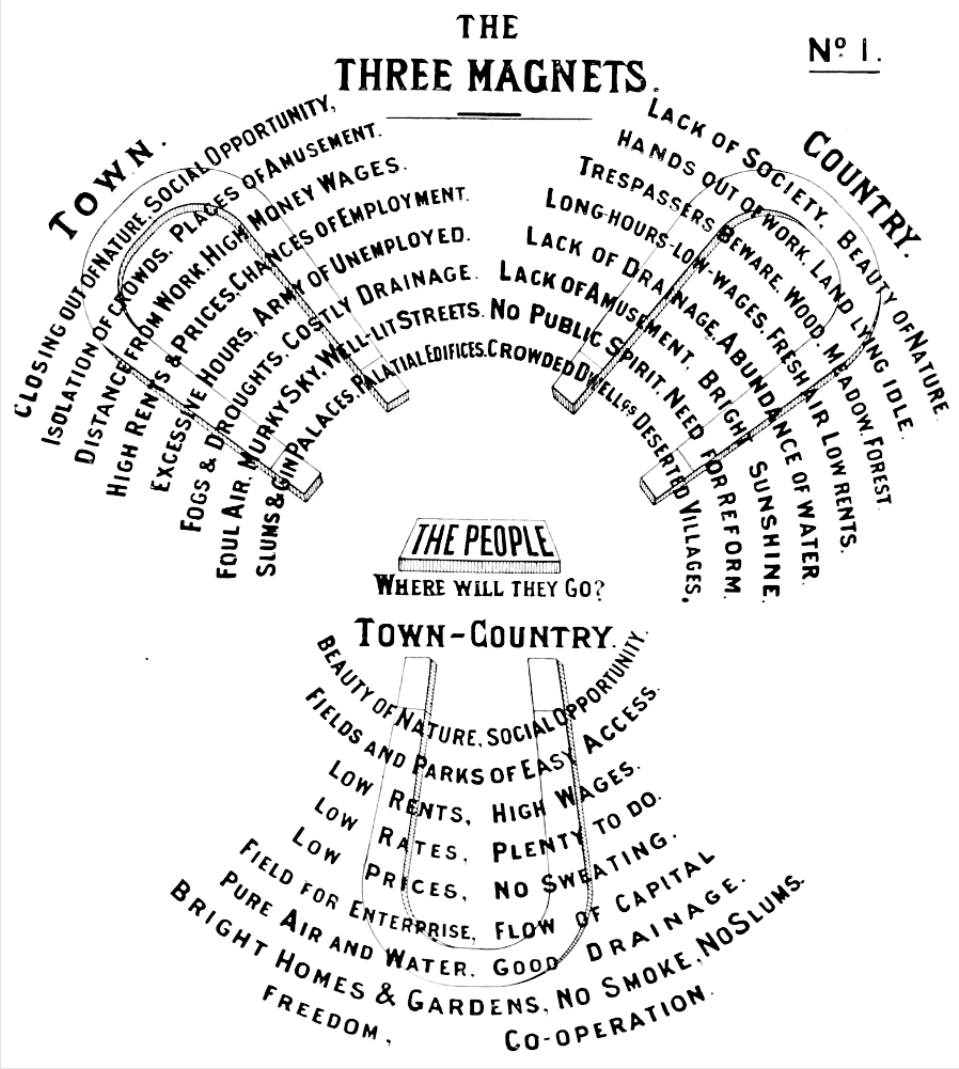



***Figure 2.07*** The Three Magnets

***The Town Magnet***

*Howard believes that the attractive forces of the town are more numerous than those of the country, accounting for the rapid growth of industrial cities in the nineteenth century. One of the most alluring advantages of the town is the promise of employment and higher wages. The industrial revolution triggered a wave of migration to the city. Where the wealth of the Aristocrats was derived from landholdings, factories and manufacturing in the Town Magnet provided an opportunity for the upward mobility of the Bourgeoisie. This luxury unfortunately did not extend to the lower-class citizens who were often forced to work excessive hours in poor conditions. In response to the population increase, the narrow streets of the industrial city quickly became overcrowded. As the population grew, so did the demand for housing, offsetting higher wages with higher rents and prices. The Town Magnet holds many attractions and social opportunities, particularly for the middle and upper class. Toward the end of the nineteenth century, the West End in London had become a popular destination for celebrations and social gatherings. The well-lit streets were lined with theatres and restaurants that offered many places of amusement for Victorians. These palatial edifices, decked out in luxurious Renaissance or Baroque ornamentation, provided extravagant entertainment that was demanded by London's growing middle and upper class.*

*An absence of town planning and public policy resulted in unregulated and chaotic building practices and the development of substandard housing. Buildings were built so close together that two people could not pass each other if they met, casting a dark shadow over public life. The overcrowded inner city quickly deteriorated in to slums that were occupied mainly by the working poor. The environment in poorer districts was almost uninhabitable, lacking proper drainage and sanitation infrastructure, establishing city slums as breeding grounds for illness and disease. Industrial factories contributed to the deterioration of the urban environment through emissions of toxic coal smoke that stained buildings and created a permanent fog over the city. The quality of the air was "so vitiated that the fine public buildings…rapidly [became] covered with soot, and the very statues [were] in despair."[23] Such despair often led the working poor to the Gin Palaces, where the glittering lights, music and the "evils of alcohol"[24] were considered a blight on town living, leading many reformers to view excessive drinking as a main cause of social ills in the town.[25] Anyone with the means to do so, abandoned the filth of the inner city in favour of new developments on the outskirts of the city. Despite some of its less desirable characteristics, the strength of the Town Magnet still outweighed that of the Country Magnet, due mainly to its employment opportunities and the many attractions and luxuries it had to offer the middle and upper class.*

***The Country Magnet***

*The Country Magnet declares herself to be the source of all beauty and wealth.[26] The lush green rolling hills are interspersed with woods, meadows and forests. Agricultural fields blanket the hills like a patch work quilt, the vast openness a direct contradiction of the industrial city. The fresh air and bright sunshine in the country are a welcome respite to the fog and foul air of the town. The smaller, populations of country villages benefit from an abundance of water; fresh water wells provide clean potable water for drinking, while rain water can be collected for other uses contributing to an overall healthier environment that combats disease and illness. Likewise, the reduction in density and absence of factory pollution contribute to the overall health of the Country Magnet. Country Magnet residents enjoy the benefit of low rents since the value of agricultural land is significantly less than that of the town. However, low rents are accompanied by low wages and long hours of hard, physical labour.*

*The industrial revolution brought significant changes to the countryside. Large estates using new machinery replaced smaller, individually run farms, putting many hands out of work. Small cottage industries such as textile weaving, were also threatened by technological advancements during the industrial revolution such as the introduction of factory spinning and power-loom weaving in large scale factory settings, putting more hands in the country out of work.[27] Many rural inhabitants began to abandon the countryside in favour of the town. This mass exodus left behind deserted villages that were completely devoid of public spirit. Those that remained, struggled to make ends meet, often living in small and overcrowded dwellings. The beauty of nature in the countryside makes for an ideal place to live, but suffers a lack of society when compared to the town. Although the Country Magnet is devoid of many of the physical ills of the town, it comes at a price; the Country Magnet concedes a lack of amusement as the decadent architecture of the theatres and the opulence of high end restaurants are noticeably absent. During the nineteenth century, there was an obvious need for reform in the Country Magnet.*

***The Town-Country Magnet***

*Both the town and country have advantages and disadvantages, but according to Howard, neither the town nor the country presents an ideal living condition. With the positive and negative aspects of each clearly laid out, he introduces the third magnet, the Town-Country Magnet, "in which all the advantages of the most energetic and active town life, with all the beauty and delight of the country, may be secured in perfect combination."[28] The Town-Country Magnet is an attempt to merge the conflicting ideologies of an urban industrial economy with rural social and cultural conditions. In the Town-Country Magnet, the beauty of Nature and bright homes and gardens of the country are combined with high wages and the flow of capital of the town. Residents in the Town-Country Magnet have plenty to do with easy access to fields and parks as well as to all the social opportunities that the town has to offer. Residents benefit from the higher wages of the city and the low prices and low rents of a country estate. They can enjoy the healthful benefits of the pure country air and water that is free of the smoke and the slums of the town. The Town-Country Magnet concludes with two final words: freedom and cooperation. These words allude to the moral and social ideology being fostered in the Town-Country Magnet, something that becomes even more apparent in the accompanying diagrams for the Garden City model.*

— Nº 7 —

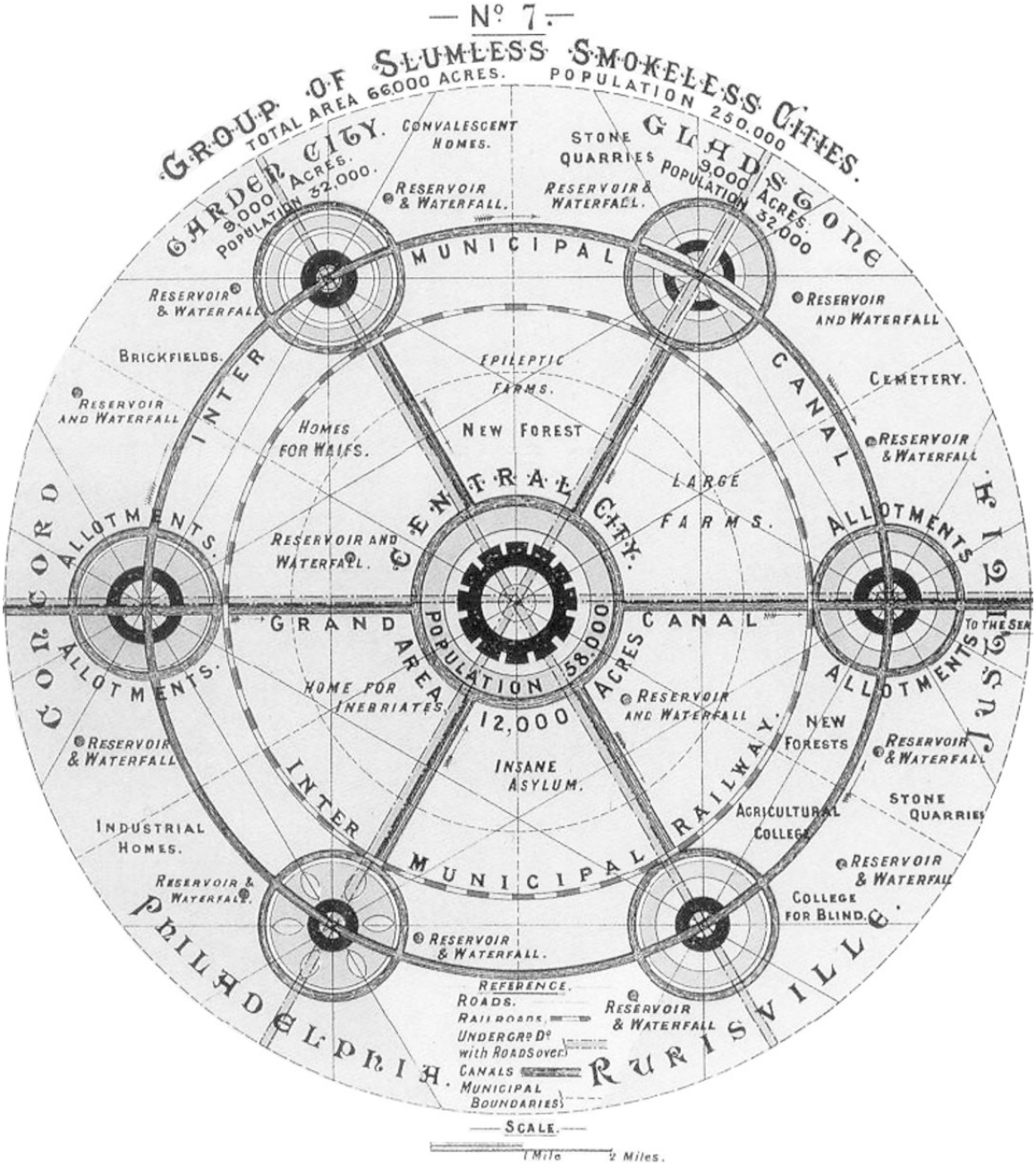

GROUP OF SLUMLESS SMOKELESS CITIES.
TOTAL AREA 66000 ACRES. POPULATION 250.000
GARDEN CITY. 9.000 ACRES. POPULATION 32,000.
GLADSTONE 9,000 ACRES. POPULATION 32,000
CONVALESCENT HOMES.
STONE QUARRIES
RESERVOIR & WATERFALL.
MUNICIPAL
INTER
CANAL
BRICKFIELDS.
EPILEPTIC FARMS.
CEMETERY.
HOMES FOR WAIFS.
NEW FOREST
CENTRAL CITY.
LARGE FARMS.
CONCORD ALLOTMENTS.
GRAND CANAL
POPULATION 58.000
ACRES
TO THE SEA
HOME FOR INEBRIATES.
12,000
INSANE ASYLUM.
NEW FORESTS
AGRICULTURAL COLLEGE
INDUSTRIAL HOMES.
COLLEGE FOR BLIND.
RAILWAY.
PHILADELPHIA.
RURISVILLE.
REFERENCE.
ROADS.
RAILROADS.
UNDERGRD Dº with ROAD Over
CANALS
MUNICIPAL BOUNDARIES
SCALE.
1 Mile
2 Miles.

***Figure 2.08***
Ebenezer Howard's Social Cities Diagram

*Garden Cities are clustered together and linked by railways to form what Howard calls the Social Cities Region. When a Garden City reaches its population limit of 32,000 people, a new one is inaugurated, complete with its own protective agriclutural belt.*

For reasons of simplicity, many early utopian models take on the form of either a square or a circle. The circle represents equality, removing any hierarchical preferences through its regularity. Simultaneously, the circle represents nature; it is at the core of fractal symmetries found in flowers, plants and trees.[32] It is seen as a symbol of unity, its cosmological configuration lending itself well to Howard's idea of satellite communities orbiting around a central city of 58,000 people. Howard's infamous *Social Cities* diagram entitled "Group of Slumless Smokeless Cities" (*figure 2.08*) reveals his intention for widespread adoption of the Garden City idea. The diagram shows a grouping of Garden Cities, each of the same approximate size and with a corresponding agricultural estate, that are well connected through various and efficient means of transportation such as roads, railways and waterways. Howard's scheme is unique in its attempt to embrace this large regional scale, which begins to hint at a modern industrial society that has become dependent on increasingly globalizing networks for communication, transportation and trade. At the regional scale, the *Social Cities* represent a metropolis that is embedded in nature. Howard recognizes the necessity and permanence of the industrial city but also advocates for a renewal of the connection to nature by using landscape to shape the urban form. It offers an alternative to the dense urban forms of industrial cities. The theme of the city and the garden, of the urban and the rural, is persistent throughout the Garden City plans.

## *2.44 Diagram No. 2: The Garden City*

In contrast to the industrial city, the Garden City consists of an urban core and a surrounding agricultural hinterland, presenting an image of a town that is nestled in a garden. The agricultural estate acts as a greenbelt, effectively limiting the growth of the town beyond its designated area, acting as a barrier to town encroachment into the hinterlands and encouraging decentralization. Howard asks the reader to imagine a 6,000 acre plot of land that is in the beginning, purely agricultural. Approximately 1,000 acres will be dedicated to the Garden City, which is to

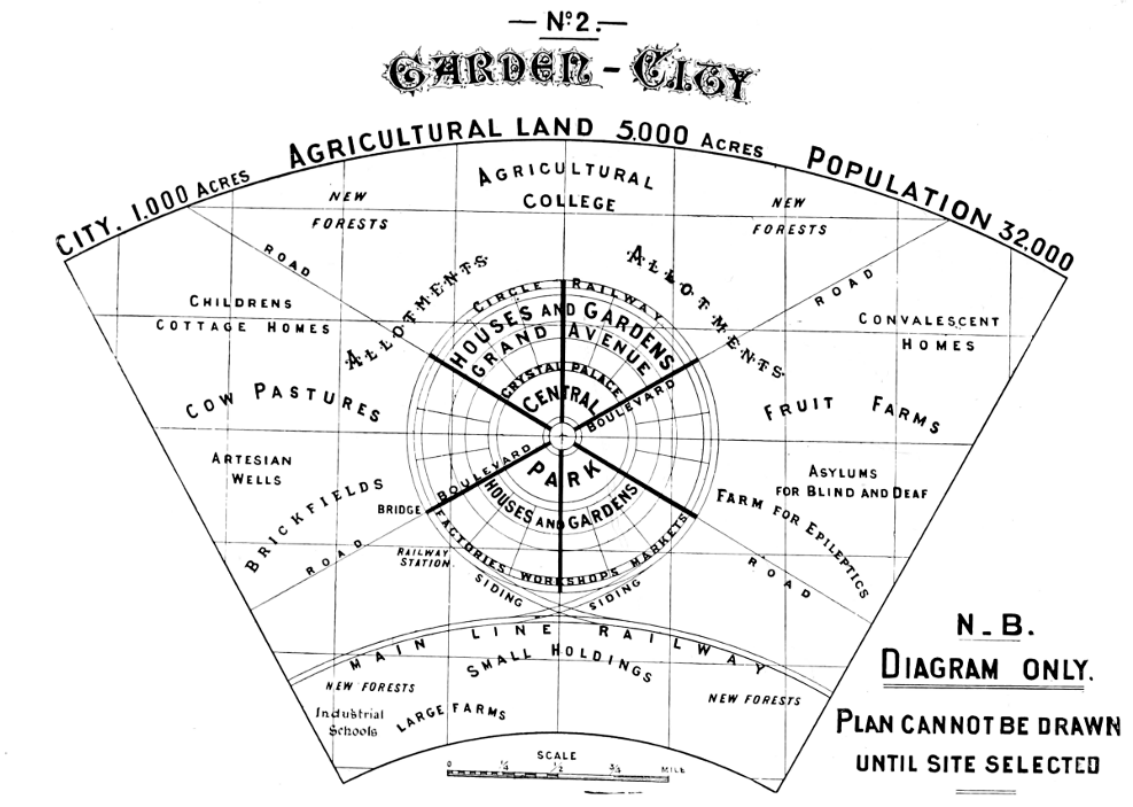



***Figure 2.09***
Ebenezer Howard's Garden City Diagram

*The Garden City consists of a dense urban core that is sitting in an agricultural estate. The town is organized by a circular grid system, where program is arranged in concentric rings according to function. Separation of industrial and commercial uses from residential areas alleviates some of the chaos of the industrial city, displacing much of the noise, fumes and soot that plagued the poorer neighbourhoods of large urban centres, thereby providing a healthier living environment. Industry is pushed to the exterior of the town, providing efficient access to the main railway line which encircles the town and connects it with other neighbouring Garden Cities. This adjacency enables goods from the warehouses, workshops and factories to be loaded directly into rail cars for transport to distant markets, and reciprocally for goods to be taken direct from the rail cars to their respective destinations in the industrial sector of the city. Parks and gardens are prevalent as prominent bands of green infrastructure throughout the Garden City, reinforcing the relationship between man and nature, town and country.*

be centrally located within the agricultural estate (*figure 2.09*). The entire estate is to support a population of 32,000 people; 30,000 people in the Garden City and 2,000 people in the agricultural estate. When the maximum population is reached, a new Garden City with its own agricultural estate is inaugurated. The proportions of the Garden City encourage movement between the town and the country through proximity as well as accessible transportation networks. The town and country exist in a mutualistic relationship where each benefits from the other. Agricultural products and produce support residents of both the town and the country, reducing distances and cost of transportation and enabling each Garden City to be relatively self-sufficient. The scale of the Garden City in combination with the transportation networks make both the town and country accessible, allowing people to live in the town and work in the country and vice versa. In this way, the Garden City experiences the best advantages that both the town and country have to offer.

The Garden City recalls the inherently English imagery of the country village. This image was well represented in the arts at the time and promoted a certain set of values that had been lost in the industrial city. The country village represents a simpler, more traditional lifestyle with a higher standard for social conditions and morals as well as a healthier living environment. There is a sense of tradition that comes from the pastoral history of England. The agricultural estate not only encourages self-sufficiency through food production but also reinforces ties to the land. It fulfills a Victorian era fantasy of returning to a simpler time and life style, but does so with all the conveniences of a modern-day town. Howard reveals his desire for superior social morals through his intention to provide affordable housing to the working class. Benefitting from the lower rate rents of the agricultural estate, a higher quality of housing is provided, each with its own garden. Residents also have access to the many parks and gardens provided throughout the town. The social benevolence continues into the countryside where charitable institutions such as asylums for the blind and deaf, children's cottage homes and farms for epileptics to name a few, exist alongside croplands and pastures. The inclusion of such institutions may strike today's read-

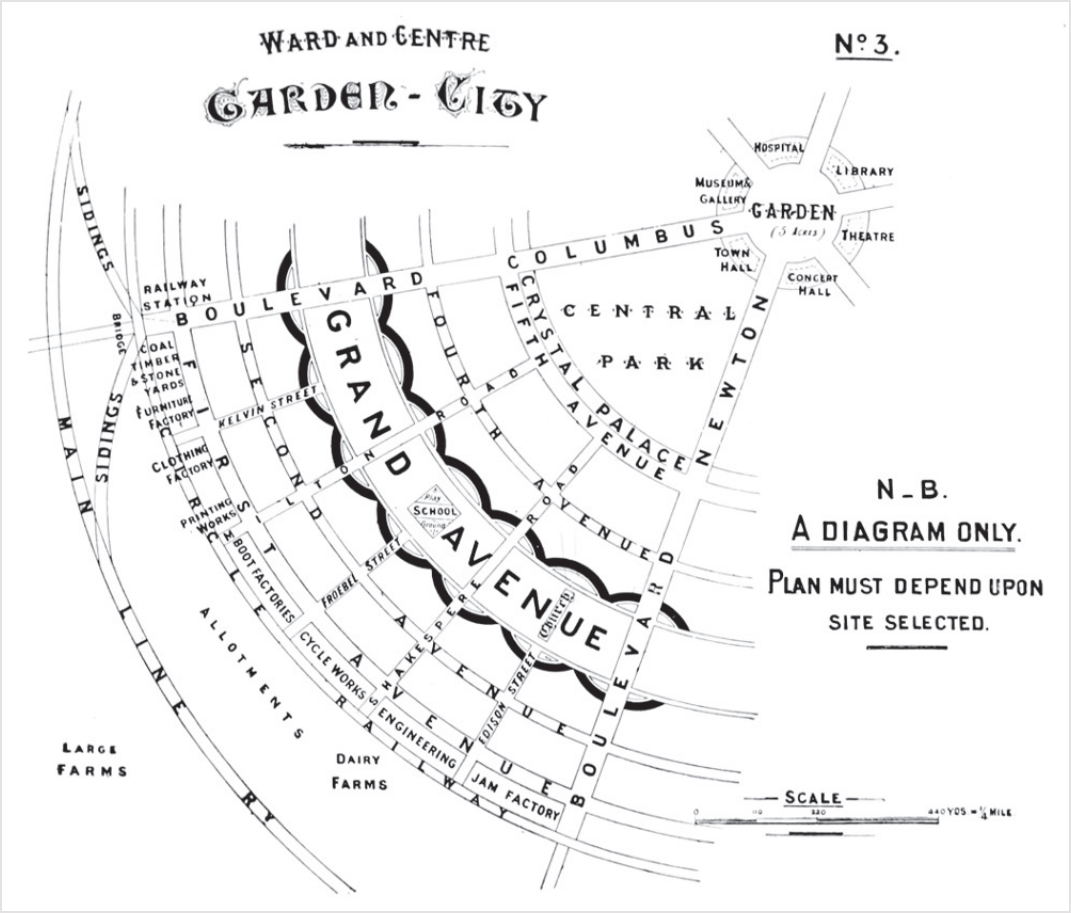



***Figure 2.10***
Ebenezer Howard's Ward and Centre Diagram

*A 5.5 acre garden sits at the centre of the Garden City, surrounded by public amenities such as the Town Hall, Concert Hall, Theatre, Library, Hospital and Museum and Gallery. The garden and public amenities are enveloped by a 145 acre Central Park, designated for recreation. Central Park is the largest band of green infrastructure, providing 145 acres of recreation space. Central Park shows an obvious influence by its New York counterpart, which was the first purpose designed public park in the United States and served as an "antidote to the psychological intensity of daily work life in the commercial city."[33] The same holds true for the Garden City's Central Park, which holds a primary position within the public domain of the Garden City, making it easily accessible for all residents. The Crystal Palace is a glass arcade and winter garden encircling Central Park. The Crystal Palace provides shelter to the flâneur in poor weather and serves as a market place for manufactured goods. Howard's inclusion of this edifice is an ode to the industrial city, recalling the original Crystal Palace which was built to house the Great Exhibition of 1851, an event that aspired to promulgate Britain's expertise in industrial manufacturing. A 420 foot wide boulevard named Grand Avenue provides an additional 115 acres of green infrastructure. Each resident is within 240 yards of Grand Avenue, which is the location of public facilities such as schools, playgrounds and multi-faith churches. The outermost band of the Garden City is reserved for industry, providing a degree of separation between residential and industrial functions. The industrial band is well connected to the surrounding region, interfacing directly with the railroad.*

er as peculiar, but it speaks to the true intentions of Howard's original scheme. His model was addressing the troubling decline in physical health and social morale which had become by-products of the continuous degradation of the urban environment in industrial cities.

## *2.45 Diagram No. 3: The Ward*

Within the town, the plan is transected by six magnificent boulevards, each 120 feet wide, which facilitate movement throughout the Garden City. The boulevards divide the plan into smaller communities called wards, which function at the neighbourhood scale (*figure 2.10*). Each ward operates somewhat autonomously within the Garden City, each containing its own public facilities on Grand Avenue, which is located centrally between the two residential bands. The residences in the Garden City are mostly single detached houses with accompanying backyard gardens that line the avenues and are built of excellent quality. Being elevated from the inner-city slums, the house and garden represent a new found sense of dignity and pride that was previously unknown to the working class. With this elevation of status comes a sense of duty and responsibility to tend to the garden and the home, not only fulfilling the expectation of a higher level of moral virtue in the Garden City, but also providing a healthy source of nourishment for the table. Diversity in the neighbourhoods is encouraged through varying architectural styles and lifestyles. The cooperative nature of the Garden City is reinforced through Howard's suggestion of common gardens and co-operative kitchens which he would later implement in Letchworth.

## 2.50 Conclusion to Chapter Two

Through studying the Garden City, it becomes apparent that this model is very much a product of its time, incorporating reactions to prevailing issues of the late nineteenth century into a reconceptualization of the spatial configuration of the city. It shows a strong influence of existing knowledge concerning model town layouts, landscapes, and influential movements and theories of the time. The influence of both the past and the present is evident in Howard's plans which connect to the agricultural past of Britain but also look ahead to the future with his ideas for fast and efficient transportation and communication, efficient means of drainage and his use of hydro power instead of coal for factories and electricity generation in the town.

It stands to reason that over time any idea, no matter how potent, will have to evolve in order to meet the current conditions and requirements of a community. Today's society is facing new and different challenges in comparison to the Victorian era Garden City, however, they are equally as poignant. In the one hundred and twenty years since the Garden City was introduced, sustainability challenges have shifted from local issues of public health to more global problems of environmental concern such as atmospheric emissions, climate change, and resource management. At the scale of the city, modern day suburbs - a wayward progeny of the Garden City - are the source of urban sprawl and an associated deterioration of inner cities. When comparing sustainability issues of today with issues of late Victorian England, there is an obvious paradigm shift away from social wellbeing and toward environmental concerns. Despite this paradigm shift, there is still an underlying set of core values considered in Howard's model that can be updated to reflect the present-day crisis. Stripped to its core, the Garden City represents a traditional value set. It promotes a connection to and an appreciation of the natural environment that is shown through the spatial construction of Garden Cities and displays a sense of moral enlightenment and social responsibility toward a collective betterment of the lives of its inhabitants.

## *Endnotes*

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9 Beevers, *A Critical Biography*, 21.

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14 Howard, *Garden Cities*, 88.

15 Howard, *Garden Cities*, 13.

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23 Howard, *Garden Cities*, 10.

24 Alastair Service, *London 1900* (New York; Crosby Lockwood Staples: Rizzoli International Publications; Granada Publishing, 1979), 131.

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27 "The Rural Exodus," last modified February 17, 2011, http://www.bbc.co.uk/history/british/victorians/exodus_01.shtml

28 Howard, *Garden Cities*, 8-9.

29 Rockey, "From Vision to Reality," 96.

30 Howard, *Garden Cities*, 14.

31 Lewis Mumford, "The Garden City Idea and Modern Planning," in *Garden Cities of To-morrow*, ed. Frederic J. Osborn (London: Faber and Faber, 1970), 35.

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# 03 Chapter Three:
# Letchworth and its Wayward Progeny

*Figure 3.01*
Aerial View of Letchworth Garden City

## 3.10 Introduction to Chapter Three

The Garden City provides an opportunity to look to the past in order to better understand the present. Conceived in response to the crisis of the time, the Garden City model reflects reactions to social and cultural conditions of the time and reveals aspirations for the future. During the intervening century, many experimental Garden City forms have appeared, demonstrating an inevitable permutation of the concept as it evolves and adapts to suit shifting social and cultural values. The influence of the Garden City throughout the last century is evident in both existing communities and in plans for entirely new settlements. Chapter Three examines the evolution of the Garden City idea from its inception to present day. Some distinct lineages in the Garden City evolution are identified, each corresponding with significant crises or events in history and a subsequent shift in values and in Garden City forms and ideals. Studying historic models shows how architecture is influenced by society and culture, and vice versa. By tracing its evolving lineage, this chapter makes an argument for the continued relevance of the Garden City as an influential text in guiding the modern planning movement.[1]

In an article written to commemorate the one-hundredth anniversary of Howard's publication, Daniel Schaffer distills the physical essence of the Garden City concept, describing it as a settlement that is compact; provides open space; separates residential areas from industrial zones but not from commercial establishments; provides affordable housing; provides opportunities for secure employment; and creates a plan for "real" reform that is flexible and responsive to people's needs.[2] In Section 3.20, the original Garden Cities are analyzed for their adherence or divergence from the above key principles. The following sections document the evolution of the Garden City concept throughout the twentieth century as it responds to changing cultures, value sets and crises. The Garden Suburb is introduced in Section 3.30, followed by the government sponsored Greenbelt Towns and New Towns in Section 3.40. The Corporate Suburb is observed in Section 3.50 as the greatest

departure from the original Garden City principles. A re-emergence of Garden City ideals is seen in Section 3.60 as a part of the sustainable development movement, whose desire to reconcile urban development with the environment has much in common with Howard's marriage of town and country. Lastly, Section 3.70 emphasizes the contemporary relevance of the original Garden City principles, advocating for the Garden City as a valid model for reform in the twenty-first century.

## 3.20 Garden Cities Brought to Life

The first Garden City was built at Letchworth in 1903, followed by a second Garden City built at Welwyn in 1920. These are universally known as the original Garden Cities, adhering most closely to Howard's original model and concept, which can be defined as a human scaled town, embedded in an agricultural estate, that is largely self-sufficient. True to Howard's original concept, the Garden Cities were built on what was formerly agricultural land, which could be purchased at considerably reduced prices in comparison to city land. The savings on the price of the estate were passed on to residents in the form of cheaper rents and public services. The original Garden Cities possessed their own government, industry and residential components, making them unique in comparison to the earlier factory villages and later re-interpretations of the concept. Perhaps most importantly, Howard's original Garden City concept was conceived as a vehicle to affect social change. The model responded to the increasing degradation of the urban environment and the subsequent decline in physical health and social morale in the city. Howard's ideas fit with the growing consensus of social reformers of the time, who felt a moral responsibility toward improving the lives of the working poor. These reformist principles take physical form in the Arts and Crafts style architecture that dominates early Garden Cities, proclaiming the intention of the concept to use physical urban development as a way to affect social change, improving the lives of its inhabitants.

## *3.21 The First Garden City: Letchworth Garden City, 1903*

Soon after the publication of *To-morrow*, the Garden City Association was formed (1899) and instantly began garnering support. Support came from prominent figures in all different factions of society, including business men, factory owners, politicians, members of the aristocracy and literary and religious figures. Among these prominent figures, a few are worth noting here, such as soap maker William Hesketh Lever, chocolate aficionado George Cadbury and his son Edward Cadbury and chocolate maker Joseph Rowntree, who built the factory villages of Port Sunlight (1888), Bournville (1895) and New Earswick (1902) respectively. These particular supporters are some of the earliest examples of capitalists turned social reformers, whose factory villages provided better living conditions for employees. Though not cited specifically by Howard as influences on his work, these settlements show early reformist sentiments in Victorian England and also establish the use of the English country village typology that would later become synonymous with the Garden City.

The Association formed the Pioneer Garden City Company in 1902 for the purpose of finding a suitable site to build the first Garden City. Letchworth Manor estate was identified as a site that was well connected, sitting in between the towns of Hitchin and Baldock, just 34 miles north of London. It met the stipulated requirements, having the appropriate acreage size, a sufficient supply of potable water and was equipped with good transportation, with the Great Northern Railway passing through it on its way from London to Cambridge. In 1903, First Garden City Ltd was established as a trust, charged with financing and overseeing development of a town with surrounding agricultural estate, designed for approximately 30,000 residents. A competition was held in October of 1903 for design of a site plan, which was won by Barry Parker and Raymond Unwin. Parker and Unwin were heavily influenced by the Arts and Crafts movement, their dedication to social reform being pre-

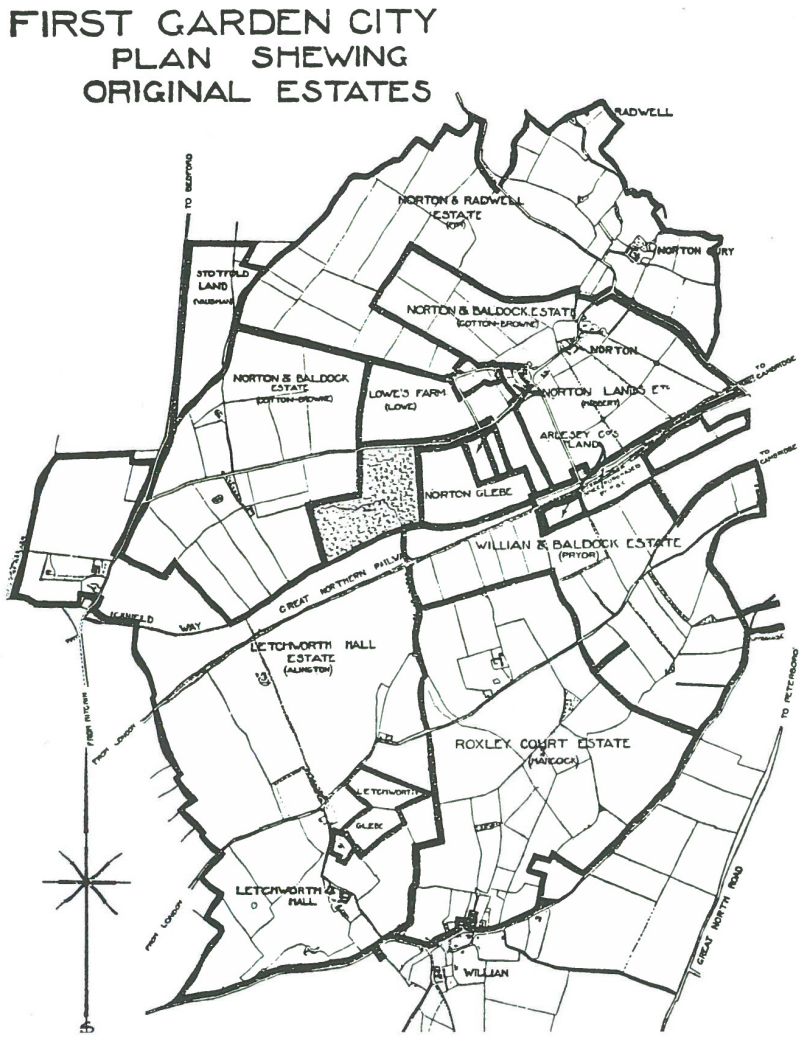



***Figure 3.02***
The Original Estates that make up Letchworth Garden City

*Letchworth Manor in Hertfordshire was identified by the Pioneer Garden City Company as a potential site in the summer of 1903. Letchworth Manor itself was only 1,014 acres, necessitating the consolidation of land from fifteen different owners for a total of 3,818 acres. The new estate became the site of the first Garden City.*

viously demonstrated at the recently completed site of New Earswick. Parker and Unwin believed in the socialist ideology of the Garden City movement, which is reflected in the architecture at Letchworth, featuring a more formal Georgian style in the commercial centre of the town, and relaxing into more curving and natural forms in the surrounding residential neighbourhoods which are populated by Arts and Crafts style houses.

The town portion of Letchworth is located centrally within the estate, as a compact urban settlement. Broadway Avenue cuts on an angle through the centre of the town, connecting to the railway. The avenue is lined with public buildings such as museums, schools, places of

worship, municipal buildings and hotels, which are arranged around a central square. Side streets radiate out from the central axis providing access to surrounding residential areas and open spaces.

The Letchworth plan provides plenty of green space. Norton Common could be considered equivalent to Howard's Central Park, providing 60 acres of woodland and meadow for recreation. The park connects the northern neighbourhoods to the central commercial district and to the railway corridor. Smaller public parks can be found throughout the plan, most notably in the landscaped English gardens of Central Square and the more informal Howard Park to the east of the downtown. As well, many of the housing complexes are grouped around shared open spaces, resembling a traditional English close. In solidarity with Howard's concept, the town is encircled by an agricultural estate.

Letchworth follows Howard's recommendations on zoning, achieving a clear separation of industrial zones from residential areas. Parker and Unwin, who were conscious of wanting to avoid presenting the face of Letchworth as an industrial city, deliberately positioned the industrial zone on the far side of the town. When approaching Letchworth on the Great Northern Railway from London, the industrial area is concealed from the town by a bluff and by the housing community of Birds Hill.[3] The railway also passes through the commercial centre of the town, making it accessible for both goods and pedestrian transport.

Letchworth displays a rich mix of detached and grouped houses at densities ranging from four to twelve houses to the acre.[4] Neighbourhoods are arranged around cul-de-sacs, closes and greens that provide shared open spaces as well as variety throughout the plan. Letchworth is known for experiments in housing typologies such as the Cheap Cottage Exhibitions (1905 and 1907), an exercise in affordable housing that challenged participants to design a cottage for just £150. A co-operative housing experiment was explored with Homesgarth in 1911, promoted by Howard. The co-operative was aimed at the middle class, especially unmarried men and women, who were struggling on small incomes and could not afford domestic help. The community comprised of thirty-two

flats that shared amenities such as a resident's club, a central kitchen and a community dining hall. Howard himself resided here until 1920, when he moved to Welwyn Garden City.

The success of Letchworth as a Garden City was dependent on its ability to attract industry. This was not lost on the Garden City Pioneer Company, who held a conference with manufacturers to define industry parameters such as availability of labour and access to water and transport, which were taken in to consideration during the site selection process. Printing and publishing houses were among the earliest forms of industry in Letchworth, as well as manufacturers connected to the automobile industry. The Spirella Company, producers of the 'modern' corset, moved to Letchworth in 1910, employing as many as 4,500 corsetières during the height of production.[5] Letchworth also became a secret centre for munitions manufacturing during the First World War, employing some 3,000 Belgian refugees.[6] Letchworth Garden City represents the first physical expression of Howard's concept. Despite some deviations from Howard's original scheme, Letchworth Garden City remains one of the most representative forms of Garden City planning.


***Figure 3.03***

Plan for Letchworth Garden City, 1905

*The Letchworth plan takes into account existing infrastructure and natural elements, to establish a major and minor grid system that worked with the contours of the land. Unwin credits three old Oak trees with assisting him in locating the main axis. He says, "I often remember, with a feeling of gratitude to them, the day when, after tramping over the land for about a week and having the general scheme of layout largely developed in my mind, they suggested to me the exact position in which to stake out the axial line, and Mr. Bennett and I were able from this definite line to begin to lay the plan down on paper."[7] The centre of the town is oriented around Broadway Avenue, which is distinguished by a more formal geometry. From the centre of the town, the side streets provide sightlines to the open countryside beyond, and from the opposite perspective, visitors and residents are afforded a glimpse of the public buildings in town square as they approach.[8] Outside of the town centre, the grid relaxes into a more organic, winding English country lane. The civic centre is surrounded by medium density residential areas and to the southeast of the town centre, lower density residential areas predominate. All residential areas are shown grouped around shared open space. The combination of natural features and geometrical framework allowed for the organization of program by land use and density zoning that defined a distinct town centre, commercial and industrial areas, and various residential districts in Letchworth, surrounded by an agricultural greenbelt.[9] The town represents the "transition from Howard's diagrammatic idealism to twentieth century town planning."[10]*

## *3.22 Welwyn Garden City, 1920*

The second and last Garden City to be developed with Howard's involvement is Welwyn Garden City, established in 1920. Welwyn was developed by the Second Garden City Company (later renamed Welwyn Garden City Limited). Rural land in the amount of 2,378 acres was purchased at a location just twenty-one miles north from Kings Cross, for development of a new town which was initially intended for a population of 50,000 residents. Also designed by Parker and Unwin, Welwyn Garden City exhibits similar characteristics to Letchworth, with a formal Georgian style downtown that gives way to a more curving residential road system and Arts and Crafts inspired housing, with the entire settlement surrounded by an agricultural belt. The settlement is compact and relatively self-sufficient, providing industry, commercial and a variety of residential options.

Much of the open space in Welwyn is provided on the outskirts of the town. Forested and recreational parks are in close adjacency to Welwyn's agricultural estate, but Welwyn lacks the convenience of any centrally located park space.

The Great Northern Railway runs through the centre of the town, separating the industrial zone to the east and the commercial sector to the west. The commercial sector opens up directly from the railway station on to Howardsgate, a 200-foot-wide boulevard lined with a combination of street level shops and apartments above.

Welwyn is predominantly single detached homes and duplexes, backing on to greenswards, and row houses arranged in groups around a shared open space. There is a physical and social division evident in Welwyn, with the middle and upper-class housing provided to the west of the railway, where it is arranged close to the commercial centre and the recreational parks, and the lower class worker's housing being provided on the opposite side of the railway, beyond the industrial zone.

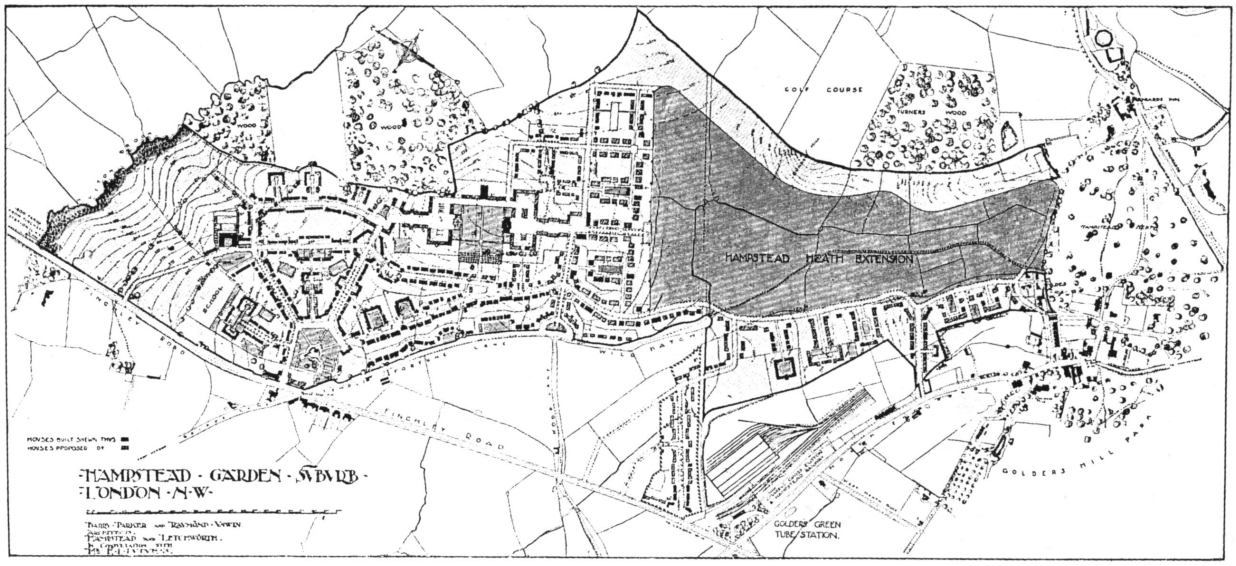
*Figure 3.04*
Plan for Welwyn Garden City, 1921


Despite being even closer in proximity to London, the industrial economy of Welwyn surpassed that of Letchworth. Welwyn became the home to the American Shredded Wheat Company in 1925 and to the Swiss pharmaceutical company, Hoffman-La Roche, in 1936. Welwyn has been relatively successful in meeting the industry and employment aspect of Howard's vision for reform.

With just 18,000 residents in 1948, Welwyn fell short of its original population goal, but still offers a well-rounded Garden City experience, meeting all of the Garden City criteria set out by Howard in his original scheme.

## 3.30 Garden Suburbs as the First Permutation

Not long after the success at Letchworth, the first variation of the Garden City emerged in the form of the Garden Suburb. The Garden Suburb represents the first major split in the Garden City lineage. The Garden Suburb is responding to the overcrowded conditions of large cities but, while still retaining many Garden City principles and physical characteristics of the town, the Garden Suburb lacks any significant industrial component, making it dependent on a larger city for employment. The Garden Suburb is an experimentation in healthy living that takes place at a city's edge, as opposed to in a new settlement. Early Garden Suburbs, such as the Hampstead Garden Suburb, still retained an element of social reform, offering affordable housing for industrial workers. In later years, this element of the Garden Suburb seems to have diminished, distorting the concept to more of an aesthetic principle, rather than as a tool for real reform. Although Garden Suburbs may prove useful in providing planned growth for existing cities, they fail to address rural depopulation and they contribute to urban sprawl in already oversized cities.[11]



## *3.31 Hampstead Garden Suburb, 1907*

Hampstead Garden Suburb was the first of its kind, initiated by Henrietta Barnett (1851-1936) in 1907. The expansion of the underground railway from Charing Cross in London to Goders Green Crossroads near Hampstead Heath opened the area up for development. Due to its close proximity to London, Mrs. Barnett feared further suburban overcrowding that would threaten the cottage neighbourhood of her weekend home. She immediately launched a campaign to preserve a portion of the land as open space as an extension of nearby Hampstead Heath and proposed the development of a Garden Suburb on the remainder of the 240 acres of the estate. The Hampstead Garden Suburb Trust, a limited-profit trust company, was established to develop the suburb for a population of 8,000 people and Parker and Unwin were once again engaged to design it. Hampstead Garden Suburb attempts to address housing shortages in London by providing land and rents at a reasonable price and within a 2d rail fare of central London. Henrietta was aware of the shortcomings of existing London suburbs and saw how Howard's scheme responded to human needs that had remained largely unfulfilled in London slums.[12]

***Figure 3.05***
Plan for Hampstead Garden Suburb, 1905

The master plan at Hampstead shares the same traditional English village character as Letchworth and Welwyn. As a suburb, Hampstead is a relatively compact and walkable community, even though its density is slightly less than that of Letchworth and Welwyn, at eight houses per acre. However, in a larger context, the new suburb is contributing to the phenomenon of suburban sprawl in London.

The suburban quality of the community is further enhanced by the abundance of open space. Hampstead borders two large public parks in the southeast, Hampstead Heath and Golders Hill Park, also encompassing the formerly agricultural land of the Hampstead Heath Extension that Mrs. Barnett fought so valiantly to preserve.

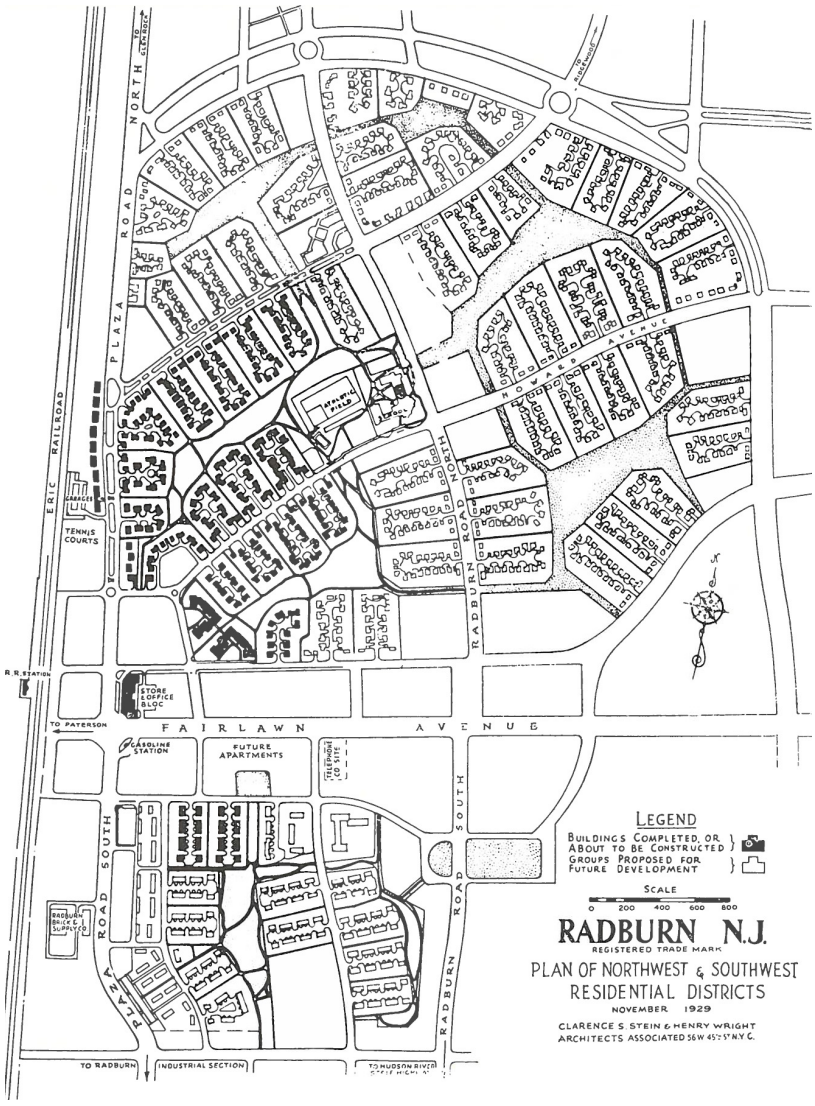
As a suburb, Hampstead does not possess any industrial activity of its own, but it is well connected to the city of London via the tube station. The station itself has a strange relationship to the suburb, being somewhat isolated from the commercial and civic centres. While the commercial area at Finchley Road and Hampstead Way enjoys a close relationship with the surrounding residential areas, the Central Square, which includes civic, cultural and religious facilities, is also somewhat aloof in the plan, lacking a connection to any major axis. The separation of civic and commercial areas is reflective of the American City Beautiful movement, showing the crossover of different bodies of thought during this time.[13]

Mrs. Barnett endeavored to provide affordable housing for both the middle and lower classes who were commuting to London for work. Middle class housing is grouped in two, four and sometimes even longer groups with open courtyards or around cul-de-sacs and greenswards. Housing for industrial workers is provided in the Artisan's Quarter, considered to be Unwin's masterpiece of site layout and housing design.[14] With a slight increase in density (ten houses per acre), the Artisan's Quarter is arranged around a cul-de-sac, featuring a bowling green, children's playgrounds and allotment gardens. There was a desire at Hampstead to promote a better understanding between different classes.[15] To this end, a club house in the Artisan's Quarter provides common ground meant to break through class barriers. In the spirit of reform, plans for Hampstead also included housing and facilities for the elderly, for single working women and for the blind.

## *3.32 Radburn, New Jersey, 1928*

Garden City principles were brought to North America by influential figures such as Thomas Adams, who served as secretary of the Garden City Association and also as the first manager of Letchworth (1903-1906) before being recruited by the Canadian government in 1914

*Figure 3.06*
Plan for Radburn, New Jersey, 1929




to assist in creating new town planning legislation for Canadian provinces. Adams established himself as a leading figure in planning, influencing the development of many Canadian cities, such as Halifax, Kitchener and London, and later as the director of the regional plan for New York City in the nineteen-twenties. Around this same time, Clarence Stein, an American planner and architect, was also influential in promoting Garden City values in America. Of particular note is Stein's Garden Suburb of Radburn, New Jersey, located just sixteen miles from New York City. In 1928, the City Housing Corporation, a limited dividend company, secured two square miles of land, for the purpose of building the first Gar-

den City in America, to accommodate 25,000 people. Radburn benefitted from Stein's previous experience in large scale community planning at Sunnyside Gardens, a development of 1,202 dwellings. However, just as with Sunnyside, it immediately became clear that the Radburn site was not large enough to support an agricultural belt and due to the advent of the Great Depression in 1929, the site was also unable to attract any industry. After conceding two of the basic components of a true Garden City, Radburn was forced to accept its role as a Garden Suburb. Radburn is perhaps best known for its innovations that upgraded a plan from the early nineteen-hundreds to embrace the crises of the time, in particular, the dramatic increase in automobile traffic. The plan at Radburn introduces the superblock, a large neighbourhood block of approximately thirty to fifty acres. The increase in block size, when compared to those of Letchworth, Welwyn and Hampstead, was justified by the increase in automobile traffic in America. The superblock consists of residential cul-de-sacs that enclose an interior park space. Automobiles are confined to the main roads and cul-de-sacs, while foot paths wind through the interior park space, effectively separating pedestrian and automobile traffic. Radburn followed the economic structure of its predecessors, establishing the Radburn Association as a non-profit, non-stock corporation for the purpose of fixing, collecting and disbursing annual fees, as well as maintaining community services and parks and recreation facilities. As a privately owned and operated enterprise, the City Housing Corporation was subject to ups and downs in the market, and eventually went bankrupt during the Great Depression, prompting Stein to speculate on the necessity of government involvement in new town planning, particularly for financing the purchase of the required land and for installing essential roads and utilities, a notion that is seen in the next evolutionary stage of the Garden City. As a result, the plan at Radburn was never completed, but the Radburn idea of superblocks and traffic separation has been incorporated into many successive iterations of Garden Cities such as the English New Towns.

## 3.40 New Towns and New Deals

Another distinct descendant of the Garden City emerged during the 1930's and 1940's, characterized by government endorsement of the Garden City philosophy, first with the New Deal in the United States and then with the New Towns Act in England.[16] During this time, a new set of crises had arisen; both the economically devastating events of the Great Depression and the physical destruction of the Second World War resulted in a monumental housing crisis, prompting government intervention for reform. As a result of the Second World War, many aspects of every day life had come under state control, eliciting a shift from the philanthropic private investor to larger scale, government funded endeavors. The success of the Garden City movement had made it an attractive model for town planning, leading to its adoption for new government funded projects. While the government initiated and funded the building of new towns, they were not as dedicated to the Garden City movement as the social reformers of the early twentieth century. While many of the physical characteristics were retained, some of the philanthropic principles were not, leading to a watering down of the concept. Where Howard had been using physical urban development as a means of affecting socio-economic change and land reform, the New Towns movement embraced urban development as its main goal.[17]

### *3.41 The New Deal and Greenbelt Towns*

Implemented by President Roosevelt, the New Deal was an attempt to stimulate the economy during the Great Depression. Under the New Deal, the Resettlement Administration was created in 1934, initiating a series of Greenbelt Towns, with the goal of providing low rent housing that promoted both social and physical health for families in the low-income bracket. Greenbelt Towns reflect influential planning theory of the time, demonstrating influence by Garden City principles,

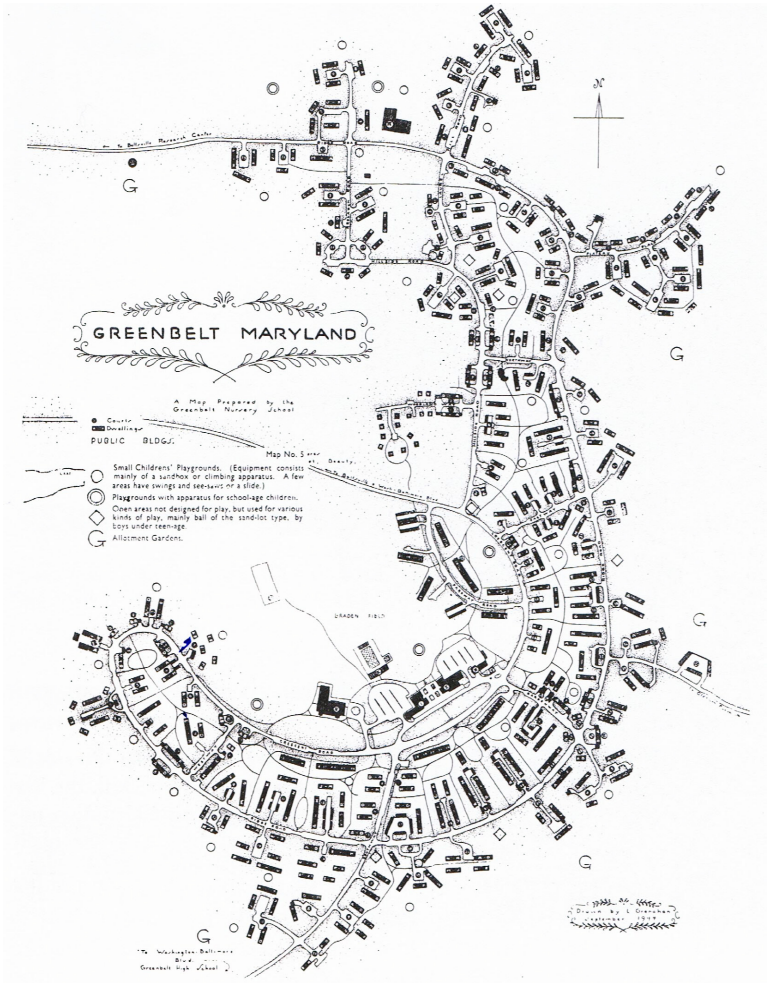
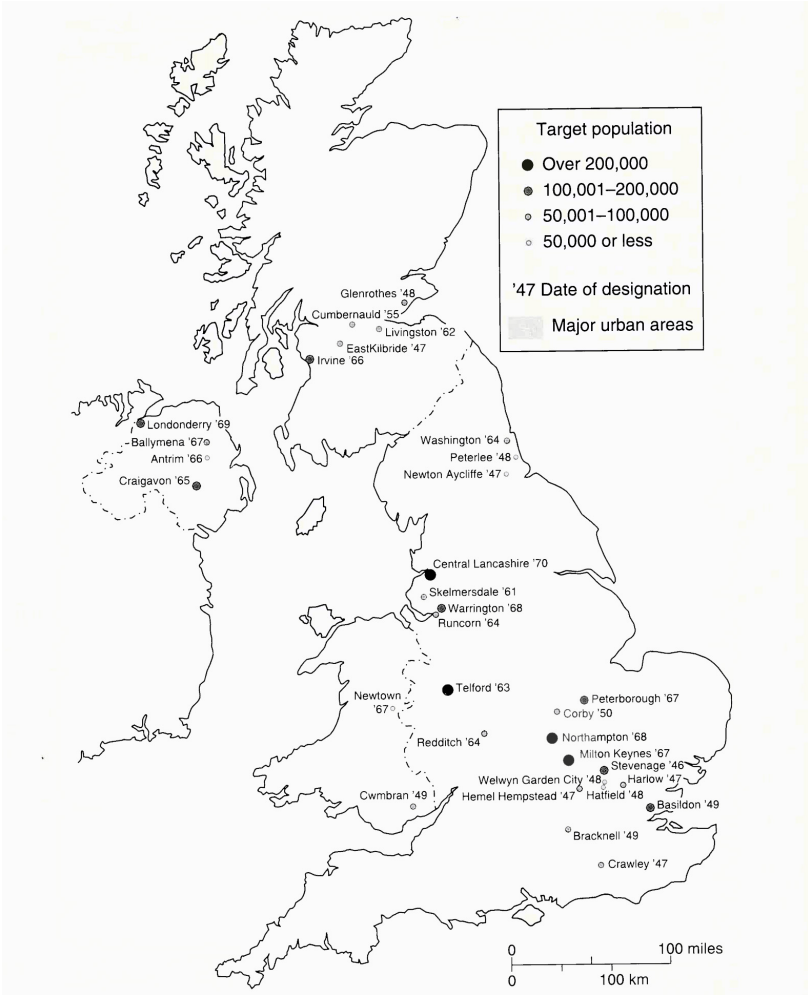



*Figure 3.07*
Plan for Greenbelt, Maryland, 1944

the Radburn Idea as well as Clarence Perry's Neighbourhood Unit. Only three Greenbelt Towns were ever built, the first being Greenbelt, Maryland, thirteen miles from Washington DC; followed by Greendale, Wisconsin, seven miles from Milwaukee; and Greenhills, Ohio, five miles north of Cincinnati. The Greenbelt Towns were built under mounting political pressures, and as a result, opportunities for agricultural and industrial components were largely missed. *Figure 3.07* shows the plan for the Greenbelt Town of Greenbelt Maryland, built on a formerly agricultural estate, for a population of 7,500 residents. The agricultural land had been previously overworked, mostly by tobacco farms, and has never contributed to the economy of the town. Industry is likewise absent from the town, relegating it to that of a suburb with the majority of its residents commuting into Washington for work.

***Figure 3.08***
Location and Population of British New Towns




## *3.42 British New Towns*

The New Towns Act of 1946 completed the ascent of Howard's idea from an obscure, self-published book by an unknown author to an Act of Parliament, which began a government initiated building programme that designated areas of land for the planning and development of new settlements in Britain. The New Towns were built by public development corporations, requiring large upfront investments but expected to yield significant commercial returns to the government over time.[18] In all, there are thirty-two developments that resulted from the New Towns programme (*Figure 3.08*), varying in size from 11,500 people in Newtown, Mid-Wales to 271,000 people in Central Lancashire.[19] The

New Towns programme was most active in during the years of 1946-1950 and again in 1961-1970. The early New Towns adhere most closely to Garden City principles, such as at the first New Town, Stevenage (1946), where neighbourhood units are developed around schools and public amenities and connected via landscaped roads to the pedestrianized town centre (*Figure 3.09*). The town provides plenty of park space with walking and cycling paths separated from motor traffic. Stevenage has a functioning industrial zone, which is segregated from the residential areas and located close to transportation routes. Later New Towns, such as Milton Keynes (1967), tended to be larger in population and area, and farther out in to the countryside. The distance from large urban centres gave these later New Towns more autonomy, causing them to function more independently as cities rather than satellite towns.

The New Towns programme has since come to an end but offers many lessons in town planning and building. New Towns were

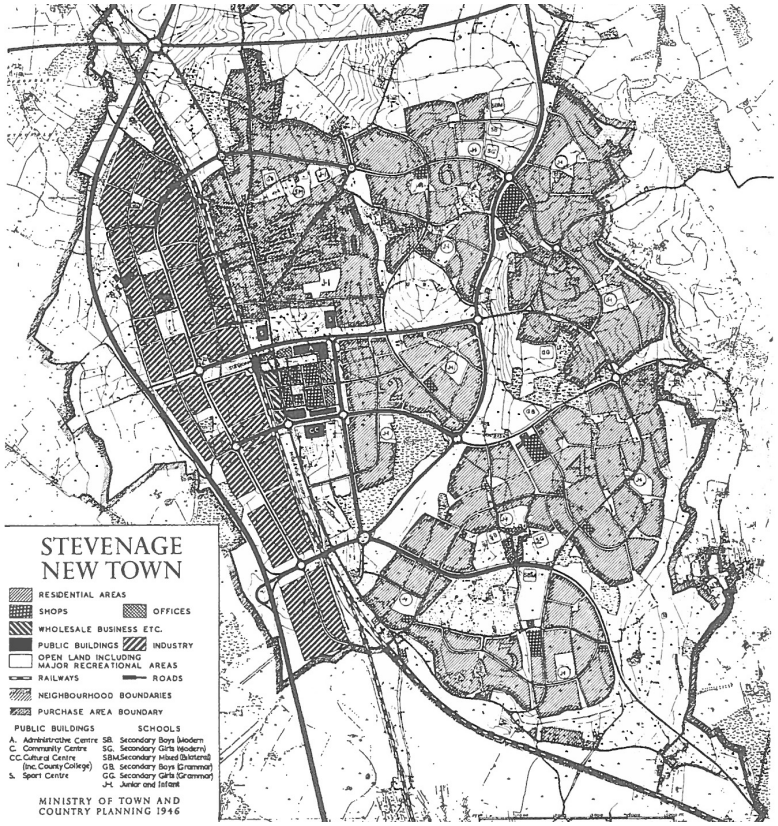



***Figure 3.09***
Plan for Stevenage New Town

successful in alleviating some of the population pressures from large urban centres through the decentralization of people and jobs. They were also instrumental in establishing greenbelts around major metropolitan areas, realizing Howard's vision of cities sitting in a garden. The New Towns also proved the efficacy of Howard's financial scheme. The New Town development corporations were able to buy land at low prices and through the collection of rents, eventually built up significant surpluses.[20] However, the surpluses were generally being returned to the Treasury, the branch of the government that was funding the New Towns programme, rather than benefitting the residents. Despite some of these differences, the New Towns programme remains highly regarded as one of the purest embodiments of the Garden City tradition.[21]

## 3.50 The Corporate Suburb

The Corporate Suburb represents the greatest departure from the original Garden City ideals. This branch of the Garden City family tree represents the corporatization of the concept, shifting the focus away from social wellbeing and toward privatization and personal profit. This attitude toward town building is the polar opposite approach to the government funded New Towns that date to the same period. Not surprisingly, many of the corporate suburbs are located in North America, where Howard's philanthropic views on common ownership and land reform faced greater opposition. The Garden City concept promotes a certain lifestyle that provides an alternative to the rigid grid system of subdivision that exists in most inner-city neighbourhoods. Despite the change in underlying motives, Corporate Suburbs reflect many physical qualities of the original, proving the efficacy of Garden City planning principles as well as the public's demand for them. The Corporate Suburb represents yet another cultural shift, where "the question of good planning became intricately intertwined with corporate success rather than public goals and objectives."[22]

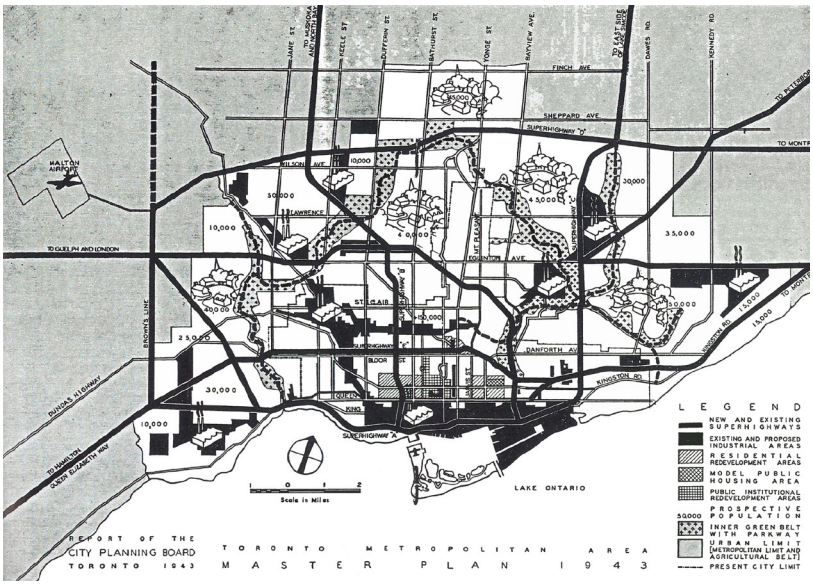



***Figure 3.10***
Toronto Metropolitan Area Masterplan of 1943

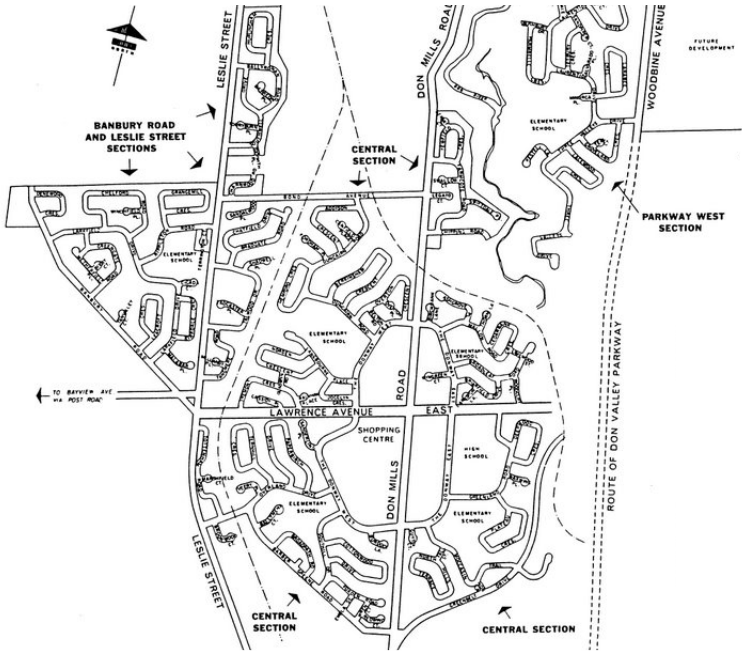
*The new master plan for Toronto resembles Howard's Social Cities diagram with a dense urban core surrounded by smaller new communities toward the periphery. Residential areas are segregated from industrial zones, but not from commercial components, with each neighbourhood "providing all the essentials for satisfactory living, employment and recreation."*[23] *An inner greenbelt provides open space throughout the plan, with the entire city surrounded by an agricultural greenbelt. The towns are linked together through a strong transportation network, similar to Howard's scheme but with one noticeable difference: where Howard promoted the railway as a fast and efficient mode of transportation, this 1943 plan has been taken over by superhighways, following a precedent set by expressway plans for New York and LA in 1929 and 1939 respectively.*
*One particular area of interest on the map is a town of 45,000 people, nestled between the inner greenbelt and superhighway "C," next to a proposed industrial area. This location is a nexus point that creates a confluence of residential, industrial and greenbelt elements presenting an opportunity for the new self-sufficient community of Don Mills, developed along Garden City lines.*

## *3.51 Don Mills, Ontario*

A well-known example of a corporate suburb is Don Mills, located in Toronto's metropolitan region. In response to the somewhat haphazard growth of the city, the Toronto Metropolitan Area Master Plan was created in 1943 (*Figure 3.10*). This master plan shows palpable Garden City influence, with a dense metropolitan core surrounded by smaller communities of 10,000 to 50,000 residents. The master plan shows a clear separation of residential and industrial components, as well as an inner greenbelt and an agricultural belt that surrounds and limits the urban growth of Toronto. Capitalizing on the 1943 master plan, Canadian businessman E.P. Taylor began purchasing farm land in 1947, initially intending to establish a new plant for his company, O'Keefe Breweries, with accompanying housing for his workers. With the collapse of the brewery concept, Taylor assigned his executive assistant, Kane Fraser, with the task of finding a new residential concept for the site.

Designed by Machlin Hancock, Don Mills was intended to be a self-sufficient community with residential, commercial, institutional and industrial services for a total population of 29,000 people. Inspired by Howard's Garden City model and Stein's Radburn plan, Hancock's Don

*Figure 3.11*
Plan for Don Mills, Ontario




*Similar to the Garden City, Don Mills takes on a roughly circular form that is transected by two major roadways, splitting the town into four quadrants. A ring road separates the outer band of residential housing from the central commercial and business land uses. Industrial land uses are segregated from residential areas and relegated to the periphery of the plan. Each of the four quadrants functions as an independent neighbourhood unit, organized around services such as elementary schools, churches and a local corner store. Shared facilities such as a shopping centre, high school, post office, community and recreation centre, and library are located at the centre of the plan inside the ring road, where they are easily accessible to each of the four quadrants. Don Mills fits into Toronto's traditional concession grid system but breaks away from this morphology within the communities, implementing curving crescents and cul-de-sacs. These curving streets work with the topography of the site, preserving ravines and mature trees while also introducing a traffic calming effect on the neighbourhoods. The emphasis on green space and pedestrian friendly streets encourages outdoor activities within the neighbourhoods.*

Mills has a commercial core, surrounded by residential areas. The entire plan is divided in to four neighbourhood units, and borders an industrial zone. Despite the similarities, Don Mills is missing one critical element; although it is built on what was formerly agricultural land, it does not have an agricultural belt. Instead, it is hemmed in on all sides by Toronto's concession grid system. Another crucial difference is that Don Mills has shed the benevolent skin of its ancestors. The Corporate Suburb is less interested in social harmony and moral responsibility, satisfied with providing the mere image of a Garden City lifestyle which proved to be both desirable and profitable. The shift away from reformist principles is seen in the architecture of Don Mills as well, where the traditional Georgian and Arts and Crafts styles of the Garden City are replaced with a more modern, Miesian style of architecture. The positive response to the physical urban development of Don Mills was recognized as a successful business model and, just like the Garden City, the model was quickly replicated across the country with varying degrees of success. For E.P. Taylor, his venture at Don Mills had been so successful that in 1955, he purchased another estate on the west side of Toronto to try it again, this time at an even larger scale. This newest development would come to be known as Erin Mills.

## *3.52 Erin Mills, Ontario*

Erin Mills can be viewed as a second-generation version of Don Mills. Embracing the same Corporate Suburb ideals, Erin Mills increases the scale, as a planned development on 6,000 acres of land for a population of 170,000 people. Erin Mills uses the Don Mills typology of a commercial nucleus surrounded by residential areas that are divided into smaller, walkable neighbourhoods and bordered by segregated industrial zones. The Don Mills typology is repeated across the landscape four times to collectively make up Erin Mills. The four quadrants are intersected by major highways, conforming to Toronto's concession grid system. The large scale is designed for cars, but within each neighbourhood, it is still a walkable community, complete with crescents, cul-de-sacs and green open spaces. Like its predecessor, Erin Mills lacks an agricultural component and is securely embedded within Toronto's suburban fabric. As a development driven project, Erin Mills is conducive to market pressures. The latter part of the twentieth century has seen an increase in demand for single family homes, encouraged by increased accessibility to private vehicles. The Corporate Suburb, as a wayward progeny of the Garden City, aids in the misrepresentation of the Garden City as a low density suburb. The distortion of the concept is partially responsible for the current crises of urban sprawl as both Don Mills and Erin Mills endeavor to meet the cultural demand for single family homes, portraying an image of the Garden City that is bereft of its original context.

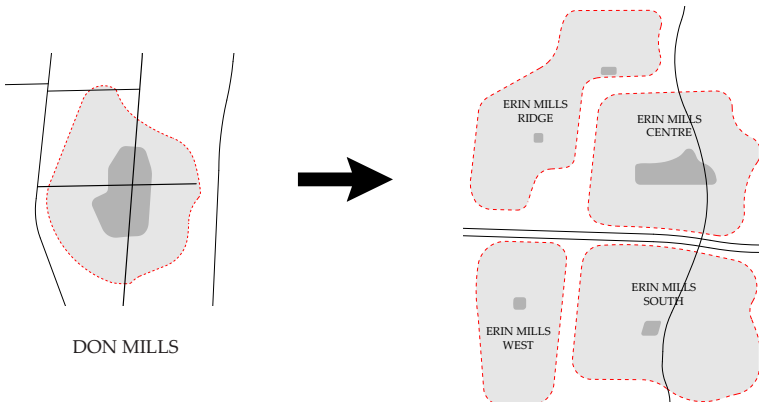



***Figure 3.12***
The Don Mills Typology

*Don Mills is made up of a central commercial area with surrounding residential areas, divided into four quadrants by the road system. Erin Mills uses the same typology, repeating the scheme four times throughout the development.*

Commercial Areas
Residential

*Figure 3.13*
Plan for Erin Mills, Ontario


## 3.60 The Emergence of Green Cities

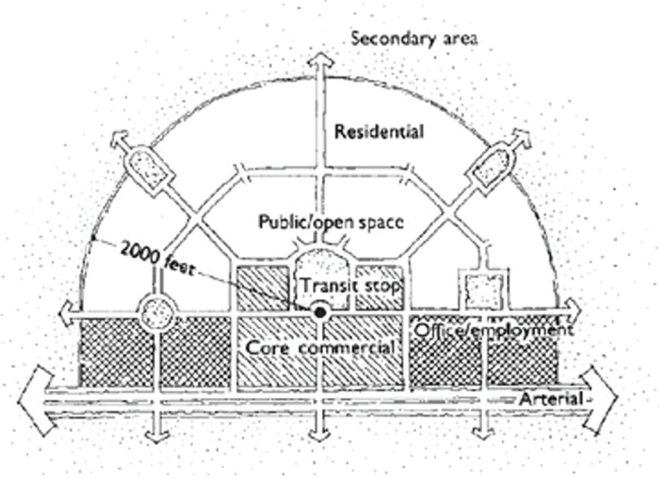
As support for centrally planned New Towns dissipated and Corporate Suburb permutations continued to diverge, the Garden City ideals - so valued by early twentieth century social reformers - seemed to be lost. Howard's original vision was tainted by its association with more recently established planning approaches which were being challenged and rejected. Curiously, the anti-planning sentiments that arose shared many similarities with Howard's forgotten Garden City principles, such as cooperation, community and the reconciliation of nature and humanity.[24] The re-emergence of the Garden City idea came largely through the work of planning historians in the nineteen-seventies and

nineteen-eighties, who distilled the concept back down to its original content and in doing so, found that "Howard's original ideas, stripped of later accretions, had a powerful contemporary resonance."[25] Also at this time came the emergence of a new paradigm shift centred on environmental reform. The nineteen-eighties witnessed the launching of sustainable development as a means of minimizing the negative impacts of cities on the environment. There is much that Howard would find familiar about the modern-day sustainability movement; just as the Garden City aimed to marry town and country, sustainable development looks to reconcile urban development with the environment.[26] Environmental challenges spawned a new generation of Garden City that share a striking resemblance to the original in their call for compact settlements, open green space and walkable neighbourhoods. Movements that dominate this generation share collective values of community and environmental conservation. One of the more prominent movements of this time is New Urbanism, whose work expresses Howardian ideals more completely than any other group from this period.[27]

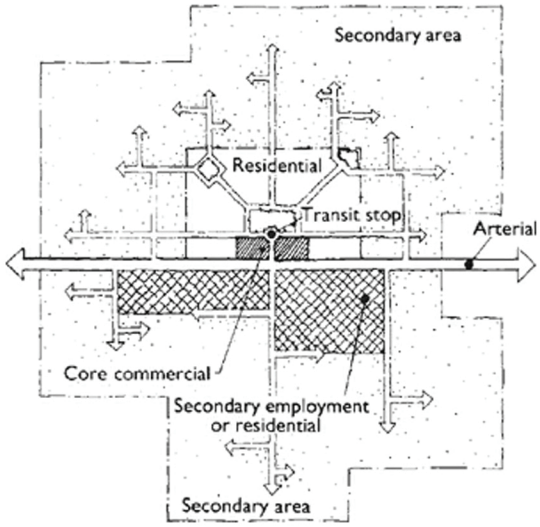
### *3.61 Transit Oriented Development*

Perturbed by the rise of automobile dependent developments, the ideas behind New Urbanism began to take shape in the nineteen-eighties, championing community-oriented design in the form of compact, walkable neighbourhoods with a diverse mix of activities and open space and a well connected public transit network. Peter Calthorpe, a leading New Urbanist figure, advocates for coordinated physical planning models at neighborhood, city, and regional scales, prompting a comparison to Howard and his town and country balance.[28] His proposal for Transit Oriented Development (TOD) promotes communities of mixed residential, commercial, office and open space in a walkable environment, centred around a commercial core (*Figure 3.14a*). All residents are within walking distance of a central transit stop, with the furthest re-

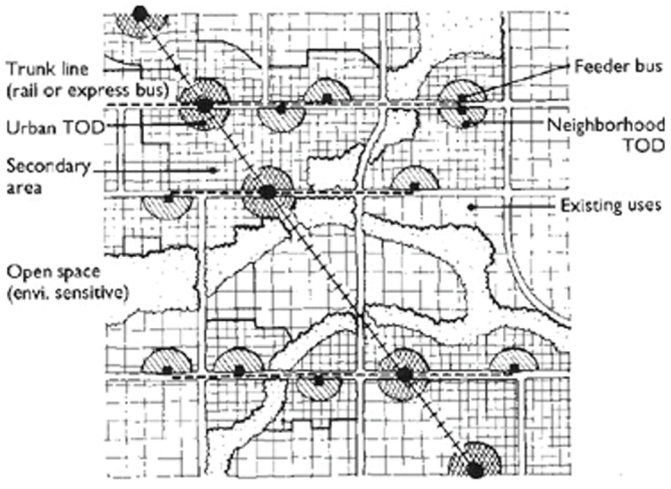
*Figure 3.14*
Transit Oriented Development




a) Transit Oriented Development




b) Secondary Areas

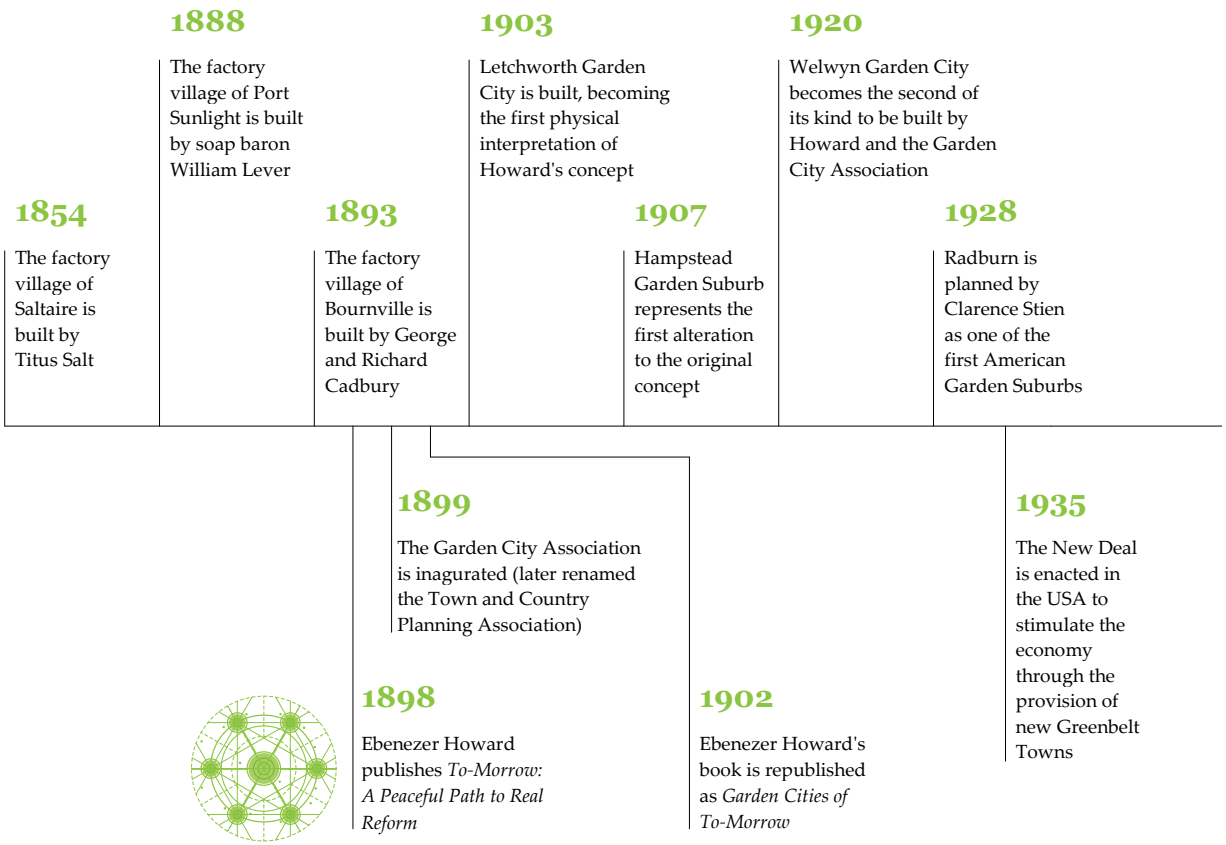



c) Relationship to Regional Transit Lines

moved resident at a distance of 2,000 feet (600 metres) away. The human scaled community of the TOD supports alternative methods of travel to the automobile, such as public transit, bicycle and foot.

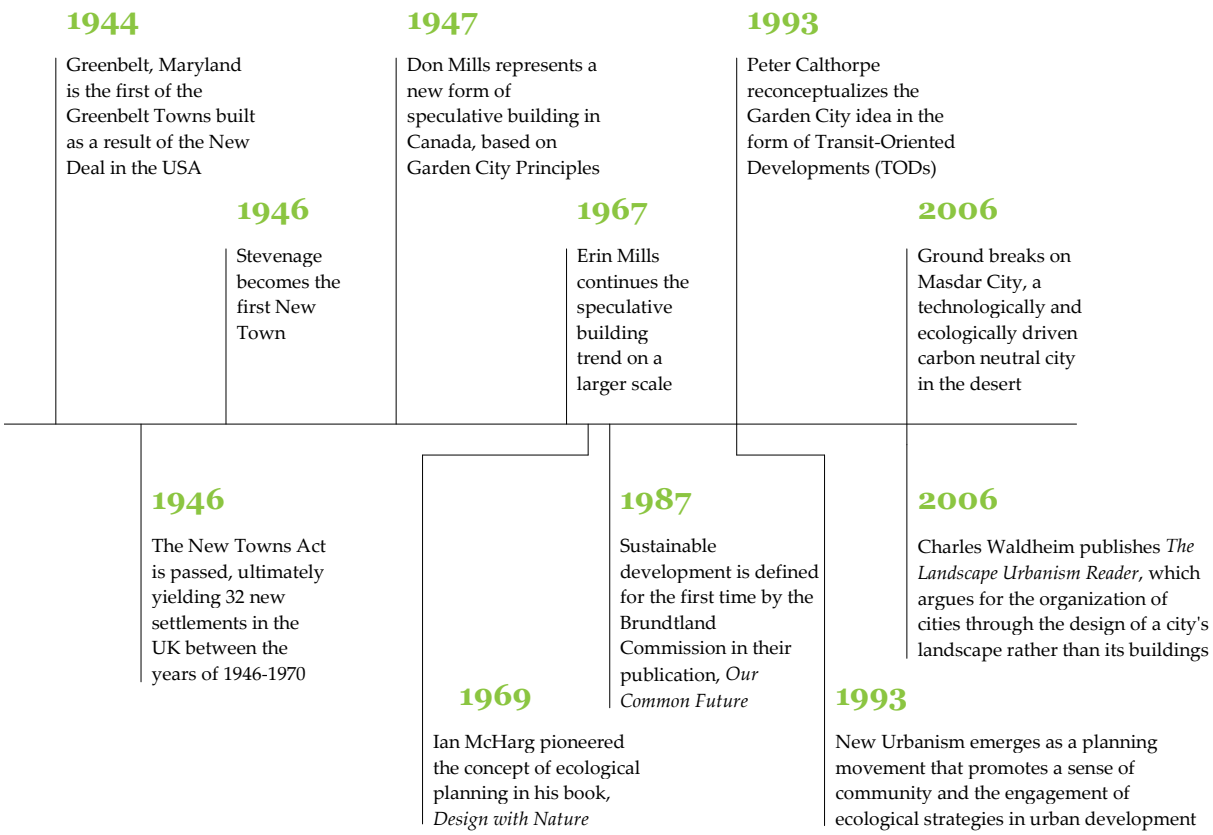
The TOD may include a secondary area, which is characterized by lower densities, fewer employment uses and large community parks (*Figure 3.14b*). Secondary areas are those that are separated from the central commercial core either by an arterial road or by increased distance, but they still must provide accessible street and bicycle connections to the transit stop. Urban residential TODs have an average of 15 units per acre, making them comparable to the density of Letchworth, but below that originally proposed by Howard. Calthorpe introduces an urban

***Figure 3.15***
Evolution of the Garden City Concept



growth boundary to limit horizontal expansion and to provide separation between existing communities. Communities within a region are connected via a central transit line, bearing some resemblance to Howard's network oriented Social City region (*Figure 3.14c*).

In addition, TODs fulfill an environmental component, respecting environmentally sensitive lands and engaging in sustainable forms of wastewater treatment, water reclamation, the use of natural drainage systems, and energy conservation through the use of renewable sources.[29] In conjunction, Calthorpe believes the TOD strategy provides a planning approach that can improve the lives of its inhabitants through the reestablishment of the pedestrian in a mixed use, liveable community.[30]



## 3.70 Conclusion to Chapter Three

The experimental characteristic of the Garden City concept has been enthusiastically interpreted over the past one hundred and twenty years. As an avid inventor himself, one can speculate that Howard would be pleased with the extent of innovation and experimentation inspired by his model. In his seminal work, Howard makes clear the caveat that the drawings he provides are "useful in following the description of the town itself – *a description that is, however, merely suggestive, and will probably be much departed from*."[31] In this way, Howard's model can be viewed as a template that laid the groundwork, establishing a baseline for the Garden City idea, with the understanding that the concept would evolve to suit changing ideals over time. With the presentation of each successive crisis, the model demonstrates resiliency and flexibility in its ability to adapt to evolving cultural values and societal demands, proliferating a number of unique Garden City lineages as summarized in this chapter and in *Figure 3.15*. Garden City principles have permeated the modern planning movement, with variations of the original ideas appearing in almost all western planning doctrines.[32] While self-contained New Towns set within a greenbelt estate remain the most faithful to Howard's ideas, many other methods of accommodating metropolitan growth owe at least something to Howard, such as the rail-based satellite cities of Stockholm, and the development fingers of Copenhagen.[33]

Through the many permutations, much of Howard's original message has been lost. Variations on Garden City typology have obscured the term itself which has been increasingly generalized within the wider planning discourse. During the era of New Towns, the term came to signify an approach that was "more statist and more influenced by modernist architectural thinking than the Garden City original."[34] The reformist principles that were at the heart of the original movement, such as cooperation and community, were marginalized almost to the point of extinction.[35] More recently, the term "Garden City" has become errone-

ously synonymous with suburban sprawl - perhaps the most notorious wayward progeny of the Garden City - losing much of its conviction as a viable alternative urban form. Paradoxically, much of what the Garden City is criticized for are ideas and urban forms that did not actually come from Howard. In a strange twist, the rejection of these spurious Garden City principles has actually led to a resurrection of many of Howard's original ideas, such as community spirit, cooperation and a reconciliation of urban and rural environments. Distilled to its essence, the central principles of the Garden City are discovered to have a compelling contemporary resonance. With the burgeoning environmental crisis of the twenty-first century, a model intent upon the marriage of town and country may be more relevant today than at any other point in the Garden City history since its inception. Perhaps the time is right for yet another re-imagining of the Garden City that, while holding true to original principles, responds to the ecological crisis of the twenty-first century.

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# 04 Chapter Four:
# A Critical Analysis of Howard's Garden City

## 4.10 Introduction to Chapter Four

In answering a call to action at the turn of the century, Howard's model encompasses many different aspects of both urban and rural life. He believed that the marriage of town and country would offer the best attributes of both lifestyles, providing a better, alternative way to live and a peaceful path to real reform. In his desire to improve the lives of the working poor, Howard was using the physical urban development of the Garden City as a means of positively affecting social change. This differs from later interpretations of the concept, such as the New Towns, where physical development was embraced as the main objective. This chapter presents an analysis of the Garden City that explores the individual layers that make up the model. Howard's standard disclaimer should be noted here, acknowledging that the circular, geometric form of his diagrams was never intended to be interpreted literally, but rather they are merely suggestive of the underlying systems that would be present in a Garden City. The symmetrical geometry offers an idealistic way to convey his ideas in a pure form, but it is the concepts behind the systems that should be focused on, not necessarily their exact physical configuration. Each system constitutes its own layer that shows interactions between the town and country, whether through the flow of materials, resources, labour, recreation or capital. Land uses within the Garden City are approximated in Section 4.20 and referred to throughout the analysis. Sections 4.30, 4.40 and 4.50 make up the core of the analysis, investigating individual systems within the Garden City that are broken down into the abiotic, biotic and cultural elements respectively. The physical components of each system are examined, as well as their resulting social implications. Each layer is assessed for its ability to answer the crisis of the time at the turn of the century, namely the poor sanitation, overcrowded living conditions and pollution from factories, all of which contributed to the decline in physical health and social morale in the industrial city.

The insalubrious conditions of the industrial revolution threatened the viability of urban life and therefore its sustainability. Sustainability is most famously defined by the Brundtland Commission as "de-

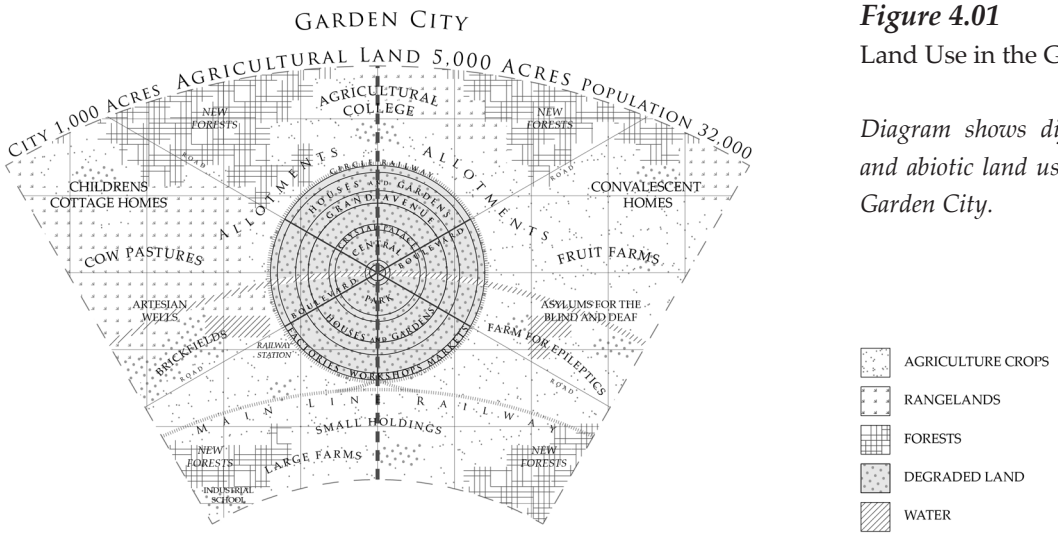



***Figure 4.01***
Land Use in the Garden City

*Diagram shows different biotic and abiotic land uses within the Garden City.*

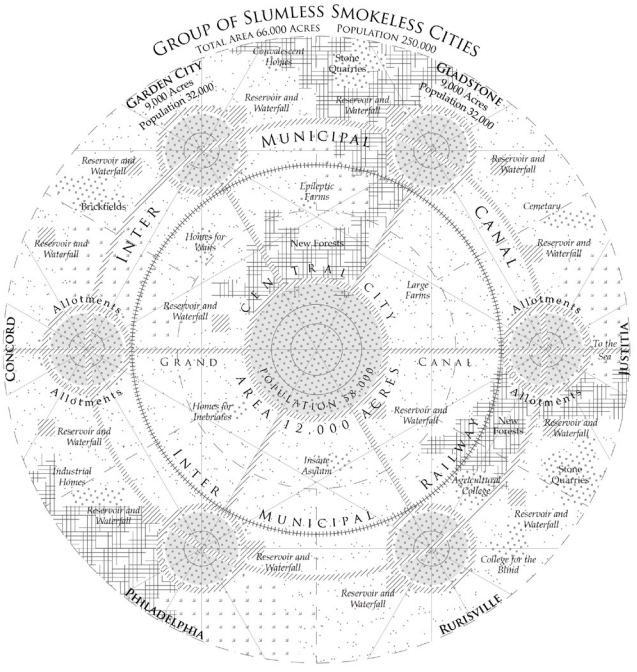



***Figure 4.02***
Land Use in the Social City Region

*Diagram shows different biotic and abiotic land uses within the Social City Region.*

velopment which meets the needs of the present without compromising the ability of future generations to meet their needs."[1] While Howard's model may be considered sustainable by the standards of the late nineteenth century, evolving societies have encountered new crises that require a rethinking of what constitutes sustainable living and how it can be achieved through physical urban development. This analysis also speculates on how well the original Garden City model stands up to today's sustainability standards. The ecological footprint is introduced in Section 4.60 as a contemporary analysis of this historic model. Key findings of the analysis are summarized in Section 4.70, with speculation on the model's ability to offer a valid approach to the contemporary crisis moving forward.

## 4.20 Land Use in the Garden City

In his book, *To-morrow*, Howard provides a detailed description of the Garden City. His description, complete with diagrams, gives the area and population of the town and its estate. He includes measurements for many of the components within the town such as the widths and locations of boulevards and canals, and the areas of Central Park and Grand Avenue. He establishes the size and abundance of building lots as well as distances and travel times between different locations for residents. This information provides quantifiable data that can be used to evaluate land use within the Garden City. *Figure 4.01* and *Figure 4.02* show the land use designation in the Garden City and the Social Cities Region respectively. For instances where areas are not specified by Howard – such as rangelands and new forests – the area is estimated using a grid system of 0.05 square kilometre increments that is allocated to land uses based on the descriptive text provided in his diagrams. *Figure 4.01* and *Figure 4.02* provide an overview of land use distribution within the Garden City, and are referred to throughout the analysis.

# 4.30 Abiotic Elements of the Garden City

## *4.31 Water*

As a theoretical model, many abiotic factors are absent in the Garden City, but one that is discussed at length by Howard is the water system. The Garden City has an elaborate man-made water system that contributes to water storage and distribution as well as transportation and recreation. Based on the annual precipitation rate in Great Britain, Howard speculates that there are approximately 4,456 gallons of water per person per day that poured "as a free gift from the clouds."[2] Based on the size of the estate and the annual rainfall in Britain, Howard estimates that the Garden City to have approximately 3,269 million gallons of water available every year for use (6,000 acres x 2 ft rainfall annually). He believes this natural supply of water to be sufficient and the most economical for supplying the Garden City with water for drinking, do-

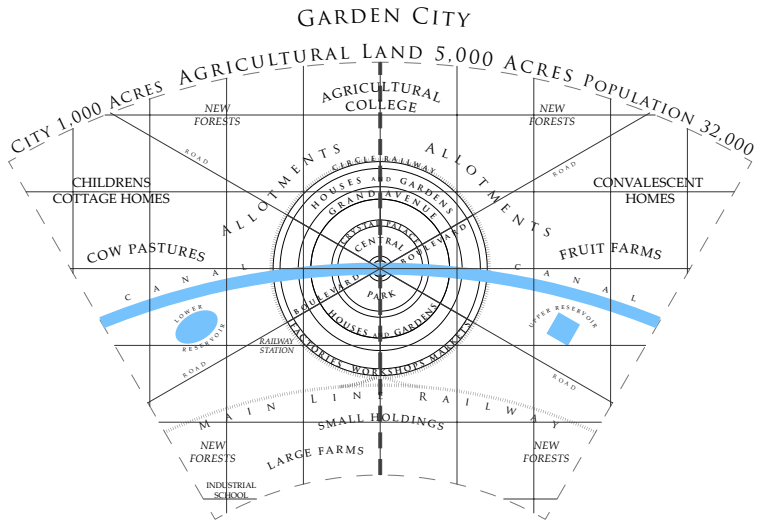



***Figure 4.03***
The New System of Water Supply in the Garden City

mestic and trade purposes, for transportation, and as a source of power for driving machinery and generating electric light.[3] Municipal engineers would be responsible for the water system, which would "effectively drain and irrigate the whole estate, and…beautify the town in the most remarkable manner."[4] A drainage system is proposed that would divert rain water from the land in to a series of reservoirs and canals, as shown in Howard's "Diagram No. 6," (*Figure 4.03*). The amount of water available is more than twenty-three times the amount required to fill the reservoirs to capacity.[5] The reservoirs are not a potable source of water but would be used instead for crop irrigation, watering gardens, flushing sewers and drains, producing hydropower, and also for ornamental purposes such as fountains. The implementation of the drainage system has the added advantage of draining excess water off the land that would otherwise be damaging crops or going to waste. By using this 'gift from the heavens,' the water of the Garden City would be pure, abundant and local, providing superior quality than that of other British cities at the time who were importing water from vast distances and at great expense. The canals interlink neighboring Garden Cities and serve

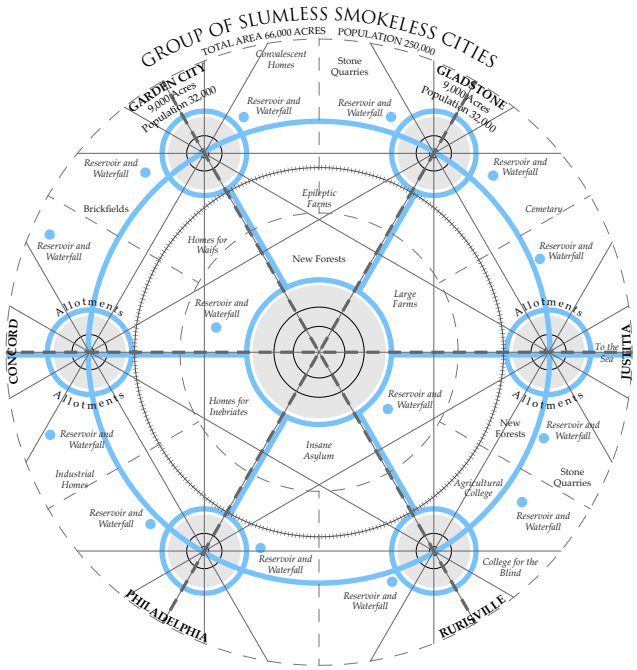
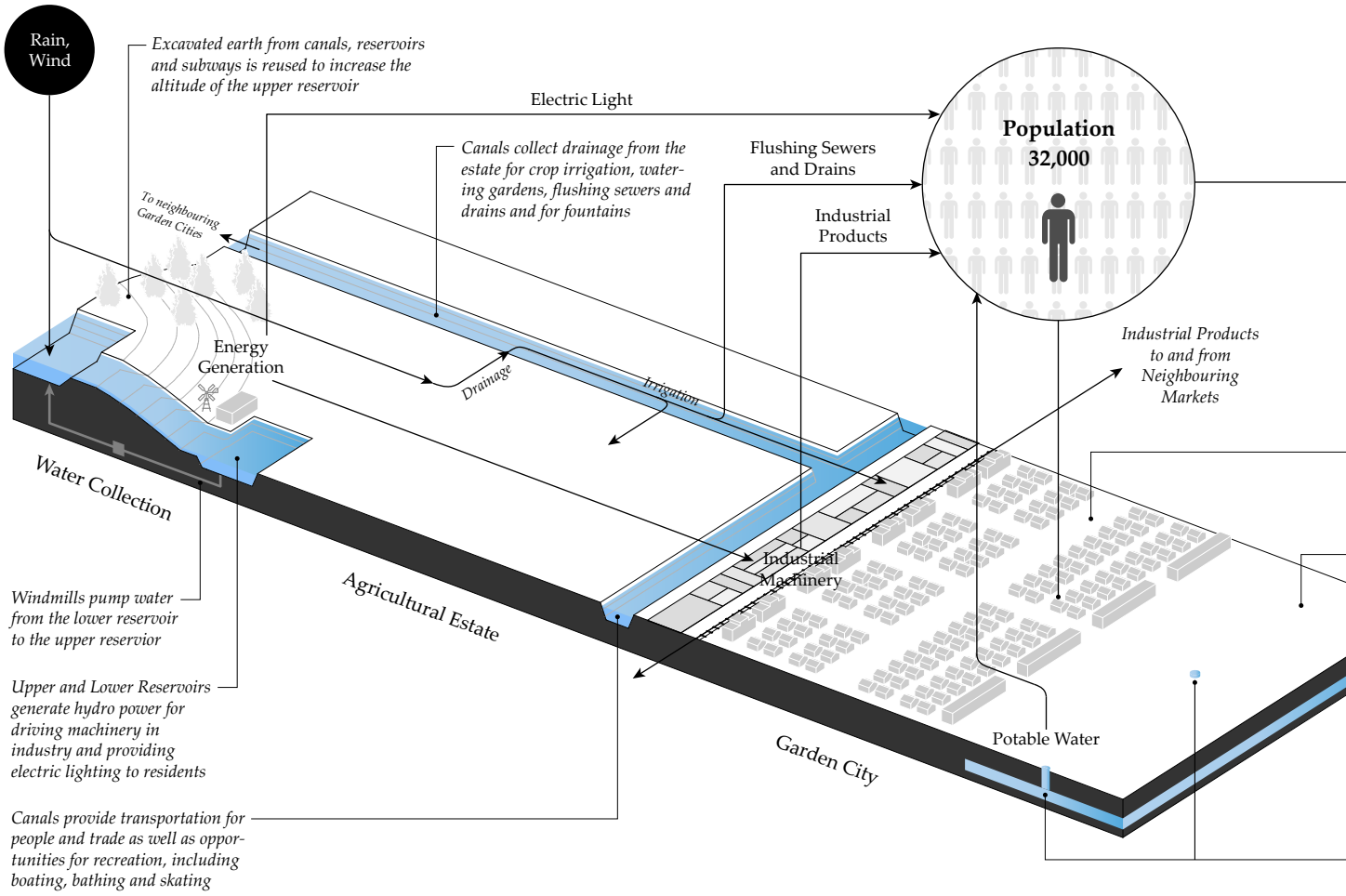



***Figure 4.04***
The New System of Water Supply in the Social Cities


Rain,
Wind
Excavated earth from canals, reservoirs and subways is reused to increase the altitude of the upper reservoir
Electric Light
Canals collect drainage from the estate for crop irrigation, watering gardens, flushing sewers and drains and for fountains
Flushing Sewers and Drains
Population
32,000
Industrial Products
To neighbouring Garden Cities
Energy Generation
Drainage
Irrigation
Industrial Products to and from Neighbouring Markets
Water Collection
Industrial Machinery
Windmills pump water from the lower reservoir to the upper reservior
Agricultural Estate
Upper and Lower Reservoirs generate hydro power for driving machinery in industry and providing electric lighting to residents
Potable Water
Garden City
Canals provide transportation for people and trade as well as opportunities for recreation, including boating, bathing and skating

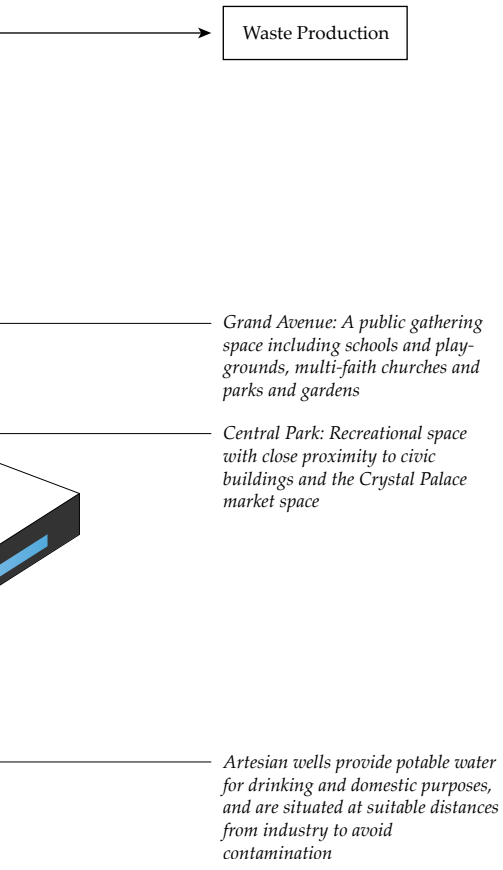



***Figure 4.05***
Water and Energy Infrastructure in the Garden City

the dual purposes of a transportation network as well as a recreation area for activities such as boating and bathing in the summer and skating in the winter months (*Figure 4.04*). Drinking water in the Garden City would be supplied from deep wells situated at suitable distances from industry so as to avoid contamination. Howard proposes the Central Park in his diagram as an example of a suitable location for deep wells and suggests that this water would be purer than much of the water that was being supplied to large industrial cities at the time.

## *4.32 Energy*

Electricity was a driving force of the industrial revolution toward the end of the nineteenth century. Between 1870 and 1914, electricity made possible the invention of motorized streetcars, subways and electric lighting for streets and residences. At this time, electricity was largely generated from burning coal, contributing to the black, smoke filled skies that have become a symbol of the industrial revolution. Howard's proposal for the Garden City is predicated on the improvement of the lives of the working poor, including minimalizing or even eliminating smoke from the city. Howard is interested in new and efficient technologies and proposes the use of hydropower in the Garden City as a way of achieving a smokeless city. In the Garden City, water is collected from rainfall across the estate through a drainage system which diverts the water into a series of canals and reservoirs. Windmills and pumps are used to fill reservoirs at an elevated altitude so that the falling water will generate energy. The reservoirs are to be placed on the highest ground obtainable to maximize the energy that can be generated. Howard also proposes using the excavated earth from digging the canals, storage reservoirs and subways to provide increased altitude for the upper reservoirs. The hydropower produced is used to drive machinery in factories and generate electric light in the town. For Howard, waterfalls have the added appeal of being extremely beautiful and he proposes that "at night they could be cheaply illuminated with electricity generated by the falling water."[6]

Hydropower was introduced as early as 1771 to drive machinery at a cotton factory in Cromford Mill in England.[7] The first demonstration of hydroelectricity came in 1878, in Northumberland, England, where it was used to power a single lamp.[8] When Howard proposed the use of hydropower within the Garden City two decades later, hundreds of hydropower plants were already in operation, supplying power to industrial mills as well as lighting for commercial buildings and private residences. He aptly points out one of the biggest flaws with windmills in their lack of efficiency on calm days but provides a series of calculations to demonstrate that this would have minimal effect on the operation of the water system in the Garden City, due to the size of the reservoirs and the infrequency of calm days.[9] He also concedes that steam power could be used as a back up to pump water to the upper reservoirs on calm days. Howard foreshadows current sustainability rhetoric with his thoughts on windmill technology, however, he also correctly acknowledges the inevitable replacement of windmills with steam as a power source because "windmills are necessarily intermittent in their action, and it would never do for the expensive plant of a modern factory and its large number of work-people to be waiting for the wind."[10] Over a century later, we have come full circle; there has been renewed interest in sustainable energy production as an alternative to fossil fuels. Howard quotes Lord Kelvin in his text who says: "Even now it is not utterly chimerical to think of wind superseding coal in some places for a very important part of its present duty – that of giving light."[11] Lord Kelvin's prediction is now coming true as renewable energy technology continues to improve, becoming increasingly more efficient and therefore more attractive as an alternative form of energy.

# 4.40 Biotic Elements of the Garden City

## *4.41 Agriculture*

Agriculture is one of the distinguishing characteristics of the Garden City. The presence of a defined hinterland for agricultural production sets Howard's model apart from the majority of idealized architectural schemes whose concepts and ambitions often end abruptly at the city limits. Howard's model depicts a town sitting within a large agricultural estate, representing the marriage of town and country. The agricultural component serves a number of purposes within the Garden City. Firstly, it holds an important economic role that is vital to the success of the Howard's model. The value of agricultural land is much lower than that of city land (£4 per acre versus £30,000 per acre respectively in Howard's time[12]). Lower land values translate into lower rent rates for residents and businesses, which constitutes the backbone of Howard's proposal to offer a higher quality, yet more affordable lifestyle for the working class. The low value of agricultural land is what makes the rest of Howard's Garden City possible. Aside from land prices, the primary function of agriculture in the Garden City is to act as a greenbelt that effectively limits the growth of the town.[13] To discredit a common Garden City myth, the model "as conceived by Howard, is not a loose indefinite sprawl of individual houses with immense open spaces over the whole landscape: it is rather a compact, rigorously confined urban grouping."[14] The Garden City uses Marshall's idea of home colonies to decentralize populations from large cities. Capping the population of the Garden City is a response to the overcrowded conditions of industrial cities at the time. The agricultural estate provides a physical barrier that contains the town, therefore keeping the population and density constant. Once the population of the Garden City reaches its capacity, a new town with its own agricultural hinterland is inaugurated.

Although Howard never intended the Garden City to be entire-

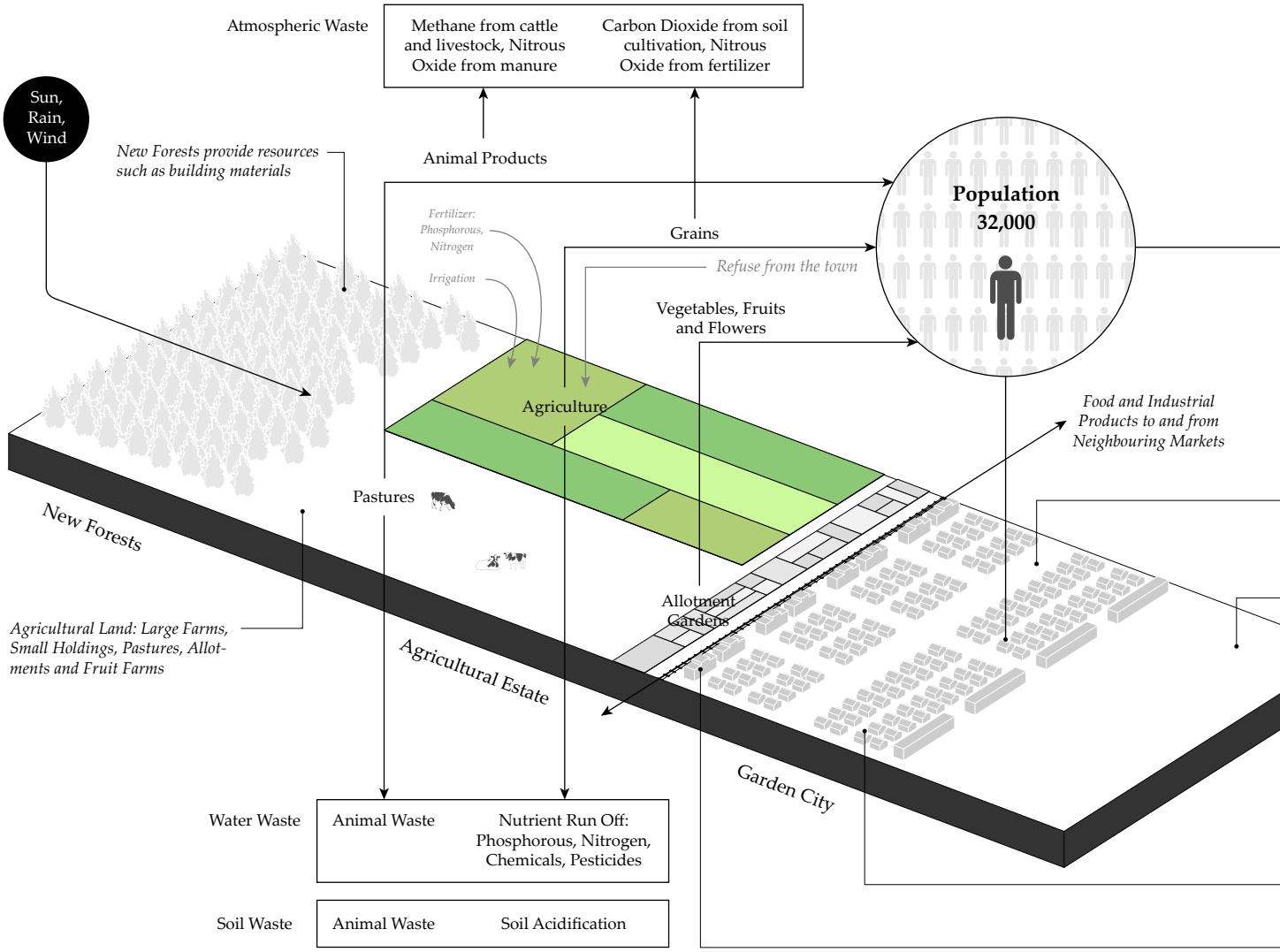
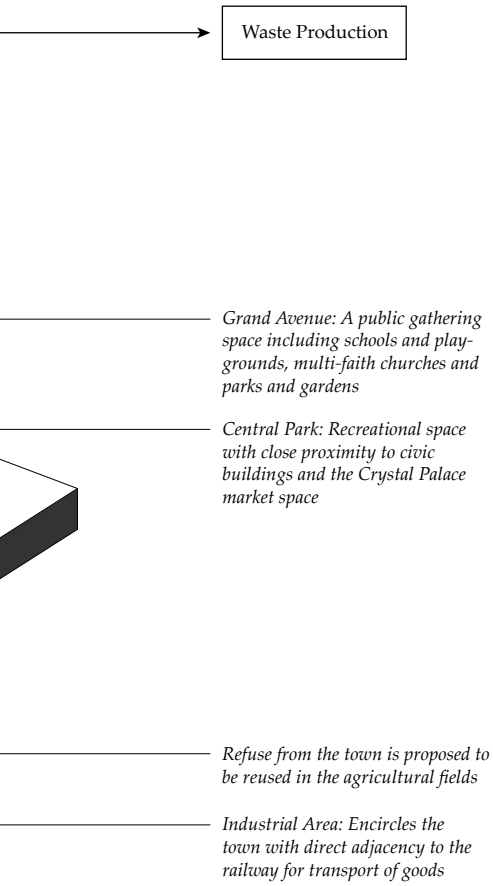

Atmospheric Waste
Methane from cattle and livestock, Nitrous Oxide from manure
Carbon Dioxide from soil cultivation, Nitrous Oxide from fertilizer
Sun, Rain, Wind
New Forests provide resources such as building materials
Animal Products
Fertilizer: Phosphorous, Nitrogen
Irrigation
Grains
Refuse from the town
Population 32,000
Vegetables, Fruits and Flowers
Agriculture
Food and Industrial Products to and from Neighbouring Markets
Pastures
New Forests
Allotment Gardens
Agricultural Land: Large Farms, Small Holdings, Pastures, Allotments and Fruit Farms
Agricultural Estate
Garden City
Water Waste
Animal Waste
Nutrient Run Off: Phosphorous, Nitrogen, Chemicals, Pesticides
Soil Waste
Animal Waste
Soil Acidification

*Figure 4.06*
Agricultural Infrastructure in the Garden City




ly self-sufficient, the presence of a large agricultural estate provides an opportunity for local food production. The greenbelt, or agricultural estate, accounts for five sixths of the area in the Garden City. It is sparsely populated but densely programmed with agricultural land uses. The Garden City supports many different types of agriculture. Howard speculated that large farms would be most advantageous for growing crops such as wheat or other grains, which could be undertaken by capitalist enterprise or by a group of co-operators. Smaller holdings would prove better suited to cultivation that requires closer, more attentive care, such as growing vegetables, fruits and flowers.[15] Cow pastures are indicated on the plan for dairy and livestock production. For green-thumbed residents, allotment gardens are located close to the town, providing an opportunity for community engagement, relaxation and closer contact with nature, while enabling the supplementation of incomes or diets with fresh produce. As well, plenty of park and garden space is distributed throughout the town, contributing to the vitality of the Garden City lifestyle and eliciting comparisons to an English country village.

The agricultural estate is well connected to the town through proximity and transportation networks, making it possible for residents to live in the town and work in the country or vice versa. The nineteenth century saw a mass exodus from the countryside due in part to cheaper agricultural imports from abroad. Similar to the locavore movement of today, Howard's scheme seems to promote a return to local food production and consumption. He argues that the proximity of town and country present a reciprocal relationship between producer and consumer, where every farmer in the Garden City estate has access to a market of 30,000 townspeople practically on his doorstep. The ready made local market of the Garden City could revitalize the agricultural industry within the estate, putting hands back to work in the countryside. Close proximity means reduced transportation cost and time, which translates into cheaper and fresher products for the townspeople. This is especially advantageous for vegetables and fruits, which tend not to keep as long. The reduced transportation costs would give local farmers an economic advantage over foreign interests, with the convenience of the

railway providing the added option of selling surplus goods to more distant markets. The Garden City provides an opportunity for local production and consumption of goods, however, the railway also allows for the import of specialty items that are not grown locally such as tea and coffee. Finally, agriculture in the Garden City also holds symbolic value, representing not only a physical return to the land, but also a return to traditional English values and morals as an alternative to industrial urbanism.

## *4.42 Waste*

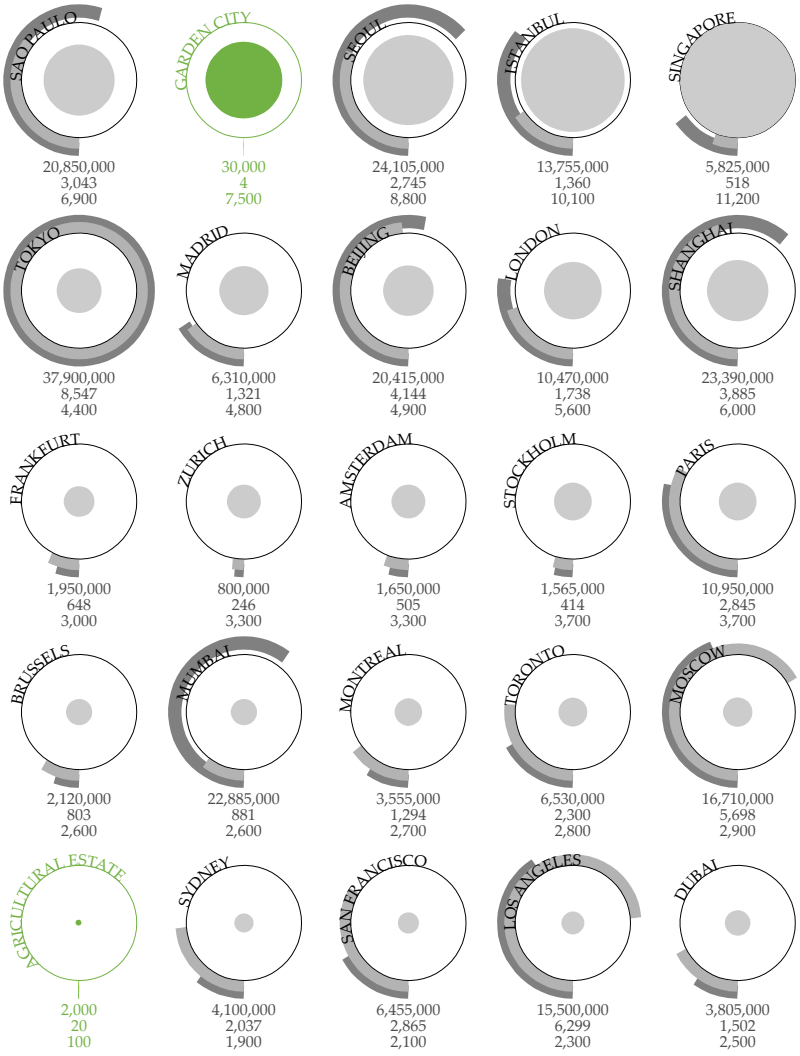
The disposal of waste was a big problem that plagued industrial cities. An increase in production and consumption of goods meant a general increase in accumulation of waste products. Pollution from factories and cities made its way into rivers, which became receptacles for both human and industrial waste. The contamination of the water supply had dire consequences for public health, such as the cholera epidemics in the mid-nineteenth century. As early as 1842 waste recycling had been proposed for the city of London, where waste from the city would be returned to the country as fertilizer for agricultural fields. Due to advances in soil chemistry, it was known that nitrogen, phosphorous and potassium were necessary nutrients for plant growth. Returning these nutrients to the soil solved the problem of waste accumulation in the city and also completed a metabolic cycle, allowing the process to begin again with new agricultural crops. Though this plan was never implemented in London, Howard adopts the concept for the Garden City, where the waste products of the town would "be readily brought back to the soil, thus increasing its fertility."[16]

Production of commercial fertilizer consumes valuable raw materials and energy. Nitrogen found in artificial fertilizers is extracted from the atmosphere by a process that uses steam and natural gas.[17] Phosphorous is mined from phosphate rock, a limited resource that could run out in as little as 150 years.[18] Approximately 130 million tonnes of fertilizers are sold annually, which equates to 78 million tonnes of

nitrogen and 13.7 million tonnes of phosphorous. The amount of human waste produced on a global scale could supply approximately 33% and 22% of the nitrogen and phosphorous respectively that is currently being consumed in agricultural practice.[19] Intensive livestock production is another prominent source of environmental pollution. Although some animal waste is used in agriculture, it is also dumped on land or in water courses. Similarly, these animal waste products could be repurposed to agricultural fields. One concern with the reuse of waste products in agriculture is contamination. Waste products can contain heavy metals, pathogens and pharmaceuticals that can be taken up by crops. Contaminants can enter local food chains and accumulate in the soil, water or air. Currently, the use of human waste in agriculture is a practice that takes place predominantly in poorer countries that are faced with water scarcity and insufficient resources to purchase commercial fertilizers. The use of animal manure in agriculture is very common worldwide. Proper treatment of waste products before use, as described by the WHO, can reduce this risk, increasing the viability of waste products as agricultural fertilizers.

### *4.43 Forests and Natural Ecosystems*

Forests shown in the Garden City would be examples of ecosystems embedded within lands, altered by land use and by human populations.[20] Howard labels them as "New Forests" on his diagram, suggesting that they are not pristine and untouched but may have been recently altered in some way. It is rare today to find extensive areas of untouched vegetation; most wildlands that remain are located in areas that are remote and not conducive to human habitation. What are commonly referred to as "natural" ecosystems are areas of remnant, recovering, or less intensely used lands.[21] These fragmented areas of land that are embedded in anthromes represent novel ecosystems. Found most frequently in the most intensely used and most densely populated anthromes, novel ecosystems can still retain essential habitats for plants and animals and can maintain ecological functions similar to those of



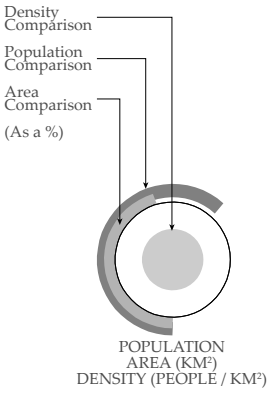




***Figure 4.07***

Comparison of Population, Area and Density of Prominant World Cities to the Garden City

*Comparisons are based on a percentage, where 100% equals the highest value shown for each category.*

natural ecosystems.[22] Forests in the Garden City would contribute to biodiversity by providing habitat for native species. The forests could be harvested for construction materials or other uses in local industries. What remains of the forests ecosystem would act as carbon sink, aiding in the sequestration of carbon dioxide from the atmosphere, contributing to the clean air and healthy environment of the Garden City.

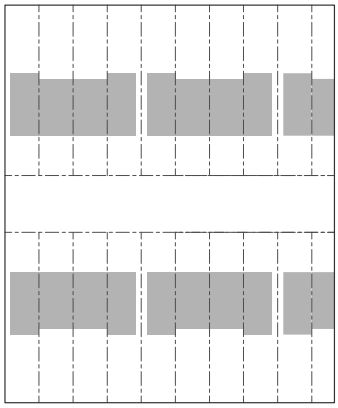
## 4.50 The Cultural Framework of the Garden City

### *4.51 Population and Density*

The size of a city and its density are dependent on many variables. Decentralization was favoured in Howard's plan for the Garden City as a solution to the overcrowded and polluted inner city of London at the turn of the nineteenth century. Decentralization would alleviate some of the pressure on big cities, benefitting both those who move to Garden Cities and those who remain behind. However, it is important to note that "the Garden City, as conceived by Howard, is not a loose indefinite sprawl of individual houses with immense open spaces over the whole landscape: it is rather a compact, rigorously confined urban grouping."[23] Density is perhaps the most contentious issue that is raised in connection with the Garden City. The Garden City is often regarded as the low-density precursor to modern day suburbs, with the erroneous assertion that the singular purpose of the model was to decrease densities to twelve houses to the acre.[24] The notion of twelve houses to the acre was in fact a concept developed by Sir Raymond Unwin, one of the planners of Letchworth, not Howard himself. Residential density planning was just one of many ideas to emerge from Unwin's practical experience in housing design and documented in his 1912 pamphlet, "Nothing Gained by Overcrowding." When compared to modern day cities, the proposed density of the Garden City is reasonably high. The town portion of the Garden City has a proposed population of 30,000 people, in an area of

1,000 acres (4 $km^2$), giving a density of 7,500 pple/$km^2$. The density of the agricultural estate is much lower with a population of only 2,000 people in an area of 5,000 acres (20 $km^2$), giving a density of 100 pple/$km^2$. *Figure 4.07* shows the population, area and density of prominent world cities in comparison to the Garden City. These values are compared between cities using a percentage, with actual values shown below each diagram. The density of the town portion of the Garden City is favourably high, ranking less dense than only three of the represented cities. The Garden City's density is most similar to that of Sao Paulo, demonstrating a much higher density than what is commonly acknowledged. As expected, the Garden City's agricultural estate appears to be the least dense, with a density well below the other represented cities.

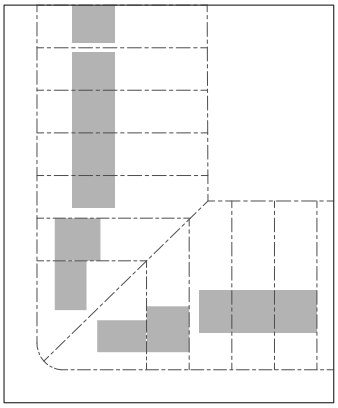
The above comparison is based on an average density applied to the entire area of the city. In reality, populations would be confined to residential areas, making the densities even higher. Howard specifies the average building lot in the Garden City to be 20ft x 130ft (6m x 40m), and no less than 20ft x 100ft (6m x 30m), describing a typical New York City lot size before overbuilding took place.[25] According to these specifications, the density of the Garden City is estimated to be approximately nineteen houses to the acre, well above Unwin's twelve houses to the acre, and well above a modern day suburb where houses are typically about seven houses to the acre (*Figure 4.08*). According to Statistics Canada, the average number of people per household in 1901 was five, giving the Garden City a residential density of 95 people/acre. Over the last century, as suburbs have become less dense, the average family size has decreased as well. Statistics Canada estimates the number of people per household in 2011 to be two-and-a-half, giving a residential density of approximately 18 people/acre. In his introductory essay to the 1970 edition of *Garden Cities of To-morrow*, Lewis Mumford argues that Howard's density is actually greater than what would be generally acceptable, and therefore he cannot be accused of being an advocate for urban sprawl.[26] In the nineteenth century, decentralization and decreasing densities was a response to the insalubrious conditions of the industrial city. In modern societies, the problem of basic sanitation is generally no longer an



**Garden City**
Ebenezer Howard

19 Houses / Acre
Avg. Family Size: 5

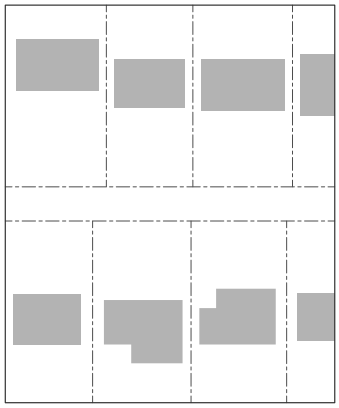
95 People / Acre



**Nothing Gained by Overcrowding**
Raymond Unwin

12 Houses / Acre
Avg. Family Size: 5

60 People / Acre



**Don Mills**
Macklin Hancock

7 Houses / Acre
Avg. Family Size: 2.5

18 People / Acre

***Figure 4.08***
Number of Houses Per Acre

*Compares the number of houses per acre specified in the Garden City to Raymond Unwin's famous 12 houses per acre proclamation and to modern day suburbs such as Don Mills.*

issue, meaning that a modern city is much better equipped to handle increased density. In his *Three Magnets* diagram, Howard acknowledges the value of a certain sized population in order to provide a high quality of social life, something that is still true today. In addition, increased densities in modern cities can elicit benefits that are directly related to modern crises, such as reducing travel distances between destinations and thereby reducing carbon emissions from vehicles. Shorter travel distances also promote walking and biking, which can have a positive influence on public health. The United Nations projects a world population of 9.7 billion by the year 2050, with two thirds of the population living in urban regions.[27] In light of this, an increase in population and density in cities may be necessary in order to accommodate a growing urban population. Contrary to popular belief, the Garden City offers a reasonable density to aspire to.

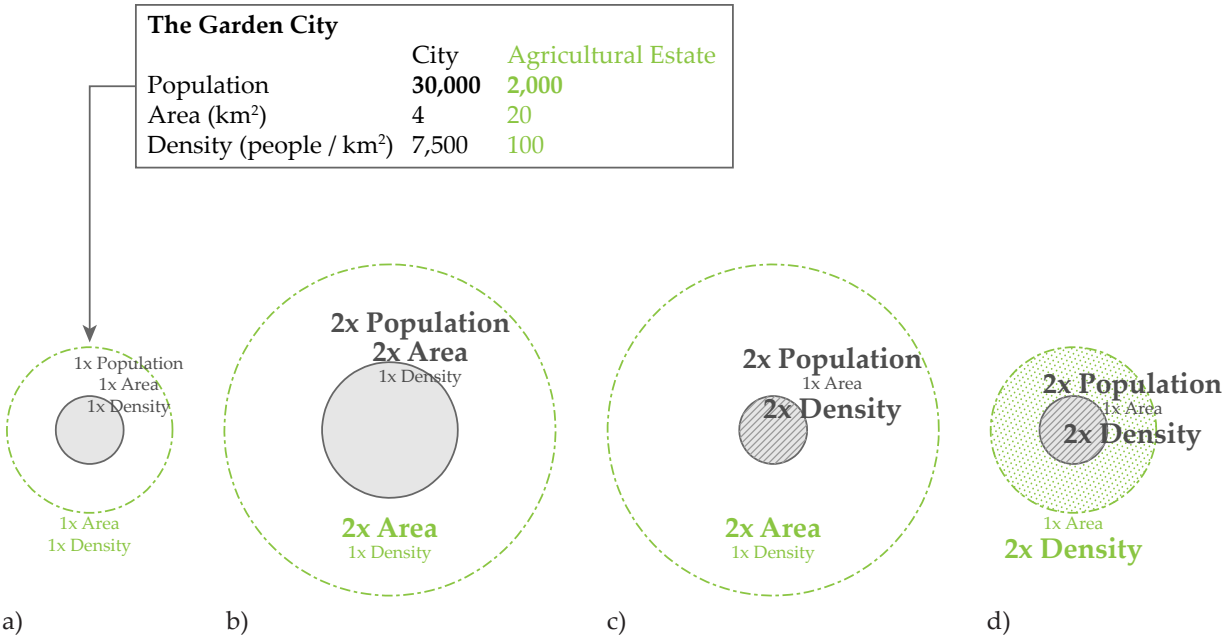



***Figure 4.09***
Proportional Relationship of Agriculture and Population

If the population of the Garden City were to increase, the results would be an increase in area or an increase in density. Assuming that the Garden City is relatively self-sufficient, if the population of the city increases, then the agricultural estate must increase its yield proportionately. *Figure 4.09* shows the potential outcomes of doubling the population in the Garden City. To maintain the same density and yields, the area of both the city and the estate must double (*Figure 4.09b*). If the city retains its area, the density would increase instead, and the agricultural estate would still need to increase to support the population (*Figure 4.09c*). If both the town and agricultural estate stayed the same size, the town's density would double, and the estate's yield would have to double as well (*Figure 4.09d*). Methods for achieving an increase in yields may include using greenhouses and hydroponics or even big data. Big data and technology such as monitoring equipment for soil conditions are currently being tested for efficacy in advancing production rates.

## *4.52 Cultural Program*

Howard's model attempts to bring order back to the planning process, something that had been lost in the industrial city. In the Ward diagram, elements of town planning are evident in the clear separation between different land uses (*Figure 4.10*). Civic and municipal functions dominate the centre of the town. Residential areas occupy the middle rings of the plan, providing the best access to both the municipal centre and the industrial edge. The location of industry on the periphery of the town provides the best access to rail for transportation of goods. The entire plan is interspersed with parks and gardens bringing the beauty of nature into the town and providing healthy open spaces for leisure activities. The physical layout is meant to fulfill the ideal conditions that Howard laid out in his *Three Magnets* diagram.

Additionally, there is a moral quality to the Garden City which is most evident at the Social City scale and the Garden City scale (*Figures 2.08* and *2.09* respectively). Industrialization presented many social challenges for Victorian urbanites; men, women and children worked long hours at repetitive tasks, sometimes with dangerous machinery and in less than ideal conditions. Coal smoke from the factories and unsanitary conditions in the overcrowded slums were precursors to poor physical and mental health. The Garden City embraces these social ills with its program, which includes a number of charitable and philanthropic institutions.[28] Convalescent Homes dot the countryside, to aid in the recovery of health and strength after illness. Homes for Waifs provide refuges for the homeless and the orphaned. Homes for Inebriates attempt to address alcohol abuse, one of the biggest perceived causes of social ills in the town. Howard's sense of moral responsibility extends to caring for the blind and deaf as well as for the insane. Recovery opportunities connect people to the land on the Epileptic Farms and the Children's Cottage Farms. The quality of country air and country environments has long been espoused as beneficial to one's health. With its philanthropic program, the Garden City embraces not only the most energetic and resourceful members of society who migrate to the town, but also their

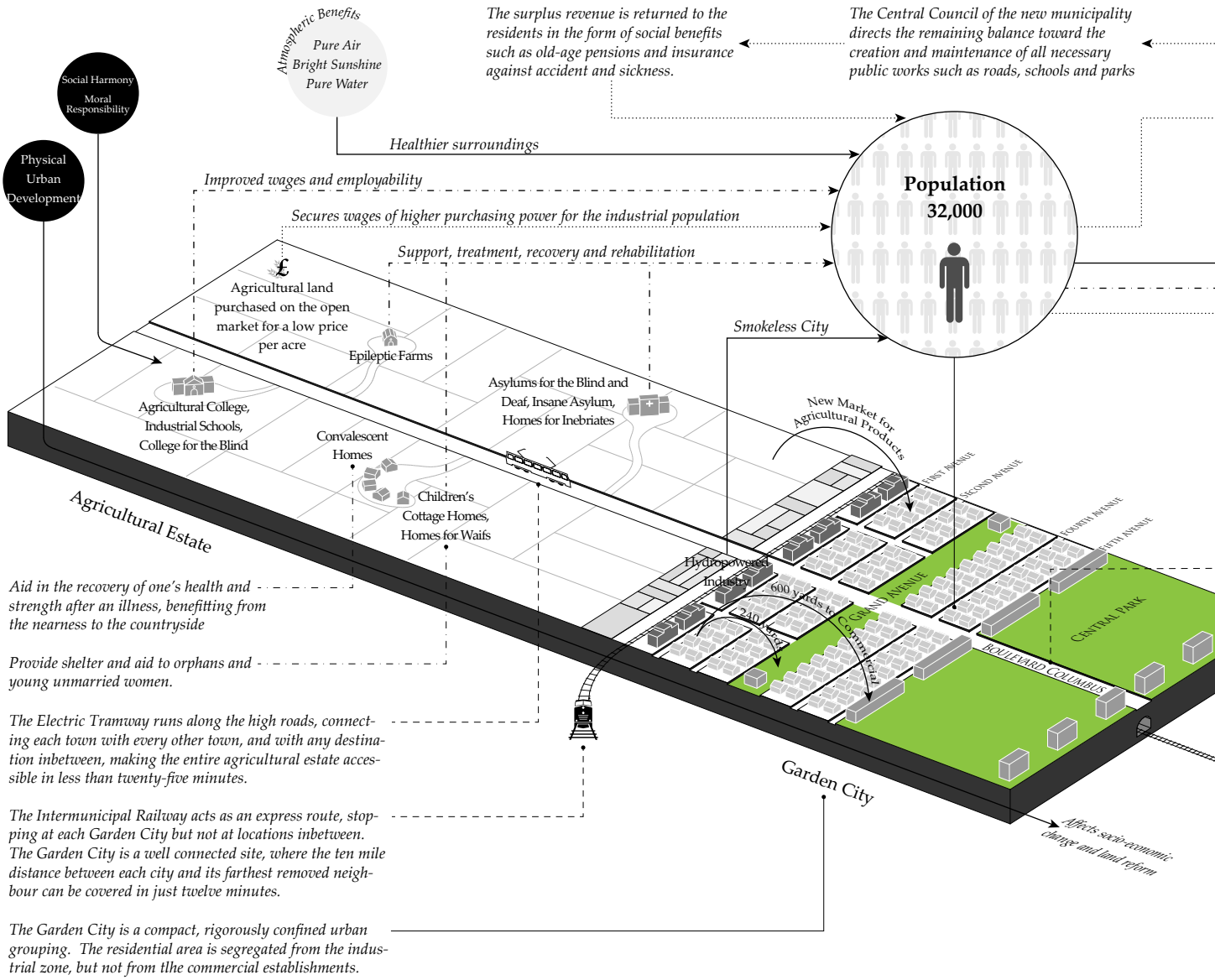
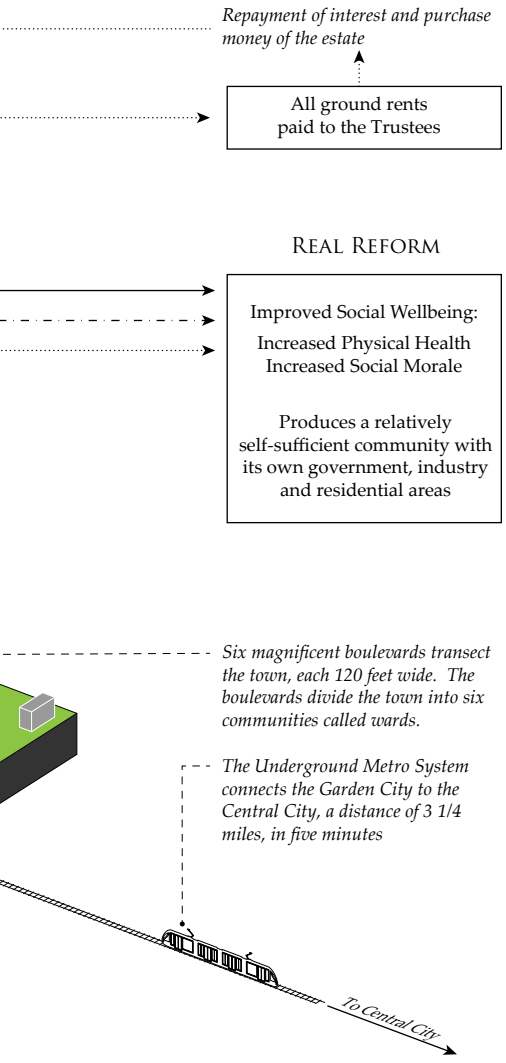

Atmospheric Benefits
Pure Air
Bright Sunshine
Pure Water
Social Harmony
Moral Responsibility
Physical Urban Development
The surplus revenue is returned to the residents in the form of social benefits such as old-age pensions and insurance against accident and sickness.
The Central Council of the new municipality directs the remaining balance toward the creation and maintenance of all necessary public works such as roads, schools and parks
Healthier surroundings
Improved wages and employability
Secures wages of higher purchasing power for the industrial population
Support, treatment, recovery and rehabilitation
Population
32,000
£
Agricultural land purchased on the open market for a low price per acre
Epileptic Farms
Agricultural College, Industrial Schools, College for the Blind
Convalescent Homes
Children's Cottage Homes, Homes for Waifs
Asylums for the Blind and Deaf, Insane Asylum, Homes for Inebriates
Smokeless City
New Market for Agricultural Products
Agricultural Estate
Hydropowered Industry
600 yards to Commercial
240 yards
FIRST AVENUE
SECOND AVENUE
FOURTH AVENUE
FIFTH AVENUE
GRAND AVENUE
BOULEVARD COLUMBUS
CENTRAL PARK
Garden City
Affects socio-economic change and land reform
Aid in the recovery of one's health and strength after an illness, benefitting from the nearness to the countryside
Provide shelter and aid to orphans and young unmarried women.
The Electric Tramway runs along the high roads, connecting each town with every other town, and with any destination inbetween, making the entire agricultural estate accessible in less than twenty-five minutes.
The Intermunicipal Railway acts as an express route, stopping at each Garden City but not at locations inbetween. The Garden City is a well connected site, where the ten mile distance between each city and its farthest removed neighbour can be covered in just twelve minutes.
The Garden City is a compact, rigorously confined urban grouping. The residential area is segregated from the industrial zone, but not from tlhe commercial establishments.
LEGEND
Land Use
Industrial
Civic & Municipal
Residential
Open Space
Transportation Infrastructure
Economic Infrastructure
Social Infrastructure

*Figure 4.10*
Physical and Social Infrastructure in the Garden City



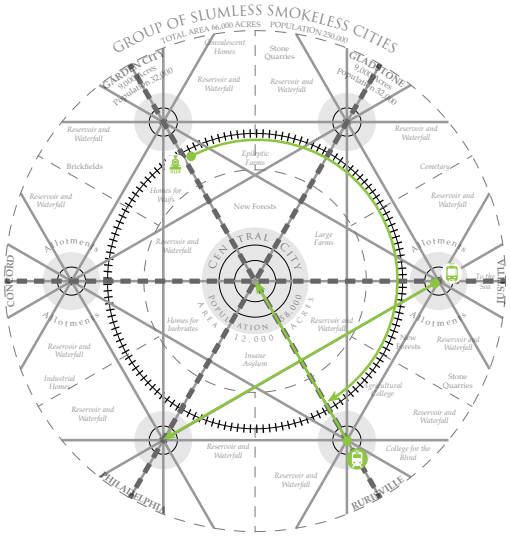

more helpless brethren whom Howard believes should also be able to enjoy the benefits of the Garden City which is, in his mind, designed for humanity at large.[29] Howard's dedication to addressing social ills of the industrial city reinforces his ambition to improve the overall quality of life for the working class. He sees the Garden City and its intermingling of town and country as the answer to real reform in the urban environment.

## *4.53 Transportation*

Howard's desire to provide the advantages of both town and country plays directly into a discussion about scale. The problem of unscrupulous morals and behaviour in the big city had been discussed for centuries, leaving some philosophers to question the value of urban civilization.[30] As a supporter of progress and technology, Howard generally accepted the town as a good thing, but wanted to humanize it.[31] The relative scale of the Garden City is large enough to provide the benefits of the city, but small enough that residents still have access to the country. Transportation in the Garden City operates on many scales. At the smallest and most intimate scale, it is a walkable, community oriented plan, but the Garden City was also born in the era of the railway, which is reflected in its larger networks connecting individual Garden Cities to each other and to the Central City in a regional framework.

The human scale achieved by Howard exists at the scale of the Ward. The Ward operates as a community, each providing basic amenities to its residents. The organization of the Ward provides the most convenient adjacencies for a walkable community. Residential areas are in the centre rings of the plan, equidistant to civic amenities in the centre of town and industrial purposes on the outskirts of town. Commercial amenities and green spaces alternate with residential areas. Grand Avenue is made up of a mixture of commercial and garden spaces and is within 240 yards (220m) of even the furthest removed inhabitant.[32] The Wards are connected by large boulevards that transect the town, increasing mobility within the city. While there is ample park and garden space

## *Transportation Networks in the Garden City...*




### *...Between Cities*

**Intermunicipal Railway**

*Provides an express route, stopping at each Garden City but not at locations in between.*

*Trip from Garden City to Rurisville:*
*16 km (10 miles) at 80 km/h = 12 minutes*

**Electric Tramway**

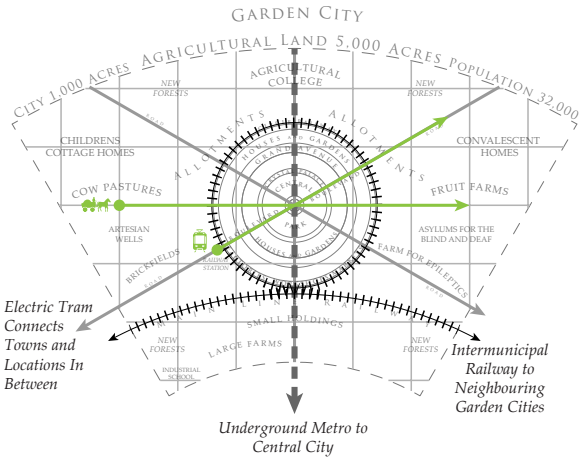
*Runs along the high roads, connecting each town with every other town, and with any destination inbetween.*

*Trip from Justitia to Philadelphia:*
*9.1 km at 30 km/h = 18 minutes*

**Underground Metro**

*Provides a fast and efficient connection between each Garden City and Central City, a distance of 3 1/4 miles.*

*Trip from Rurisville to Central City:*
*5.2 km (3 1/4 miles) at 63 km/h = 5 minutes*




### *...Between Town and Country*

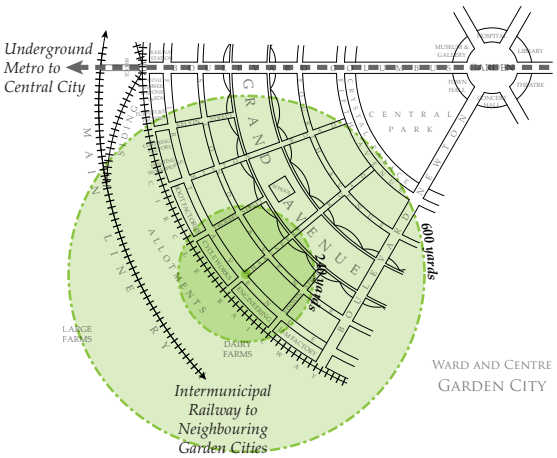
**Electric Tramway**

*Trip from Railway Station to Convalescent Homes:*
*3.5 km at 30 km/h = 7 minutes*

**Road Network**

*In addition to the high streets, a network of roads runs through the Garden City estate for increased travel and accessibility.*

*Trip from Cow Pastures to Fruit Farms:*
*4.9 km at 8 km/h = 37 minutes*




### *...Within the Ward*

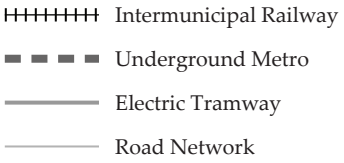
**Walkable Community**

*Each ward represents a walkable community where even the farthest removed inhabitant is within 240 yards of the public amenities on Grand Avenue and within 600 yards of the commercial area in the Crystal Palace.*

*Trip from Farthest Removed Inhabitant to Grand Avenue:*
*240 yards at 5 km/h = 3 minutes*

*Trip from Farthest Removed Inhabitant to Crystal Palace:*
*600 yards at 5 km/h = 7 minutes*

*Figure 4.11*
Transportation Networks in the Garden City




within each Ward, the Garden City's transportation system connects residents to the countryside as well. A number of electric tramways provide a direct route connecting each town with every other town. The tramways run along the high roads connecting each Garden City and any destination in between, making the entire agricultural estate accessible in less than twenty-five minutes. Because of the scale of the Garden City, as well as its dilatant transit system, it is possible to live in the town and work in the country and vice versa.

Although each Garden City functions somewhat autonomously, they also operate on a larger, regional scale. Inspired by the rail mania of the nineteenth century, each Garden City is connected by an inter-municipal railway which acts as an express route, stopping in each town but not at locations in between. The inter-municipal railway is shown in Howard's diagram running on the interior edge of each town, with a circumference of twenty miles. The railway ensures that the distance of any town to its farthest removed neighbour is a distance of only ten miles, which Howard estimates could be covered in about twelve minutes.[33] The cluster of Garden Cities are also connected directly to the Central City by an underground metro system. The distance of three and a quarter miles between the Garden City and the Central City can be covered in about five minutes, completing the transportation network throughout the region.

In practice, Garden City descendants such as New Towns were criticized for promoting "bedroom communities" that encouraged residents to live in the New Towns but to commute to a larger neighbouring city for work. This problem was exacerbated by faster and more convenient modes of transportation, most notably in the form of personal vehicles and cheap oil prices, which made commuting to the city an accessible and attractive option for many. It is important to note that many New Towns were lacking industry and economy, two vital components of the original Garden City. Despite its advanced transportation system, Howard always intended for at least some of the residents to be living and working in the Garden City. In light of modern transportation methods and speeds, one could argue for the increased validity

of the Garden City transportation strategy. If the Garden City pattern of development is followed, faster and more advanced transportation systems have the potential to bring points of interest that are fifty miles apart as close together as points that were five miles apart in the congested metropolis of yesterday.[34]

## 4.60 Exploring the Ecological Footprint of the Garden City

An Ecological Footprint can be used to quantify land use in a given region. Wackernagel and Rees study sustainability through an analysis of ecological footprints, defined as "the total ecosystem area that is essential to the continued existence of the city."[35] An ecological footprint can measure the rate of consumption of a population, and is indicative of future deficiencies. At the beginning of the twentieth century, when the Garden City was first proposed, there was approximately 5-6 hectares of ecologically productive land available per person.[36] Currently, there is approximately 1.5 hectares of ecologically productive land per person at the global scale and this number is continuously decreasing as the population rises. Wackernagel and Rees postulate that with a projected population of approximately ten billion people by the year 2040, there will be less than 0.9 hectares of ecologically productive land per person.[37] The average North American has a footprint of 4-5 hectares, roughly three times that of their "fair share."[38] Large footprints in developed countries are offset by smaller footprints in under developed countries. Globalization and uneven development are in part responsible for overconsumption in developed countries. If the entire global population were to live like North Americans, we would require an additional land mass equivalent to two more earths. Based on this statistic, the current level of consumption by North America is not sustainable. This method can be applied to investigate the ecological footprint of the Garden City. With a population of 32,000 people on 6,000 hectares of land, the Garden City

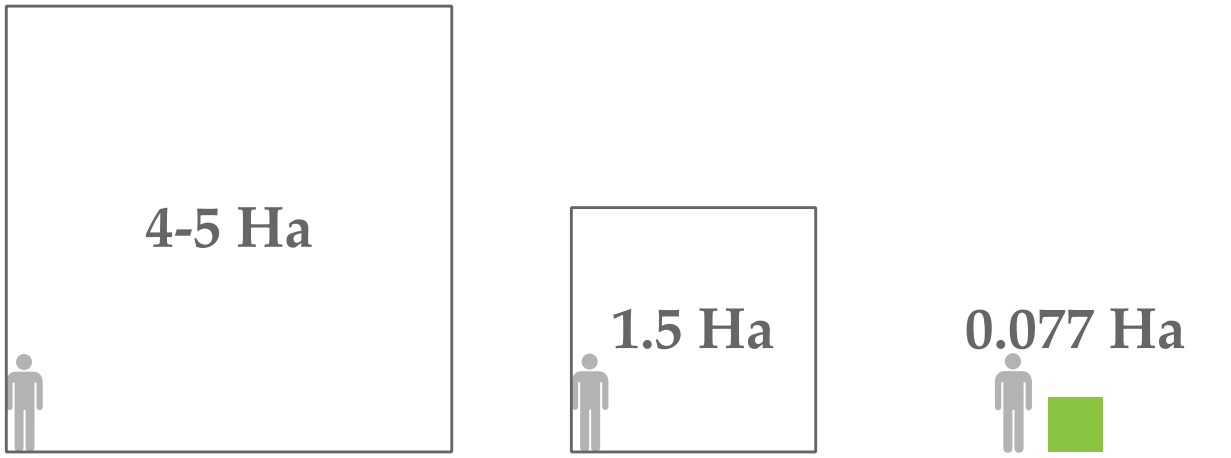



***Figure 4.12***
Comparison of Ecological Footprints

has the potential for an ecological footprint of 0.077 hectares of ecologically productive land per person (*Figure 4.12*). This footprint is broken down and analyzed in the following sections.

Wackernagel and Rees have identified eight major land use categories, shown in *Figure 4.13*, which are used to provide an estimate of an ecological footprint for the Garden City. Data pertaining to the Garden City, was collected in the categories of Energy Land, Cropland and Pastures, Managed Forests and Degraded Land. Estimates use Howard's numbers wherever given. If no number is given by Howard, then area is estimated using a grid system of 0.05 square kilometre increments that is allocated to land uses based on the text provided in his diagrams. The resulting land use diagram is shown in *Figure 4.01* and *Figure 4.02*. Calculations were performed to determine an associated land area for each land use category. When added together, the result is a value for the ecological footprint in hectares per capita for the Garden City. This analysis provides an estimate for ecological productivity; however, it relies on broad data categories that may belie the complexity of such a calculation. As a result, it may seem overly simplistic but nevertheless provides a means to quantify and compare ecologically productive land across different regions. The major land use categories are discussed in more detail below.

**Eight Major Land Use Categories for Ecological Footprint Analysis**

| | | |
|---|---|---|
| I) Energy Land: | a. land "appropriated" by fossil energy use | Energy or CO2 Land |
| II) Consumed Land: | b. built environment | Degraded Land |
| III) Currently Used Land: | c. gardens<br>d. crop land<br>e. pasture<br>f. managed forest | Reversibly Built Environment<br>Cultivated Systems<br>Modified Systems |
| IV) Land of Limited Availability: | g. untouched forests<br>h. non-productive areas | Productive Natural Ecosystems<br>Deserts, Icecaps |

*Figure 4.13*
Eight Major Land Use Categories for Ecological Footpirnt Analysis

**Productivity of Various Energy Sources**

The energy Footprint varies inversely as the productivity of an energy source: the higher the productivity, the smaller the Footprint.

| Energy Source | Productivity (in Gigajoules per hectare per year) | Footprint for 100 Gigajoules per year (in hectares) |
|---|---|---|
| Fossil Fuel | | |
| ethanol approach | 80 | 1.25 |
| CO2 absorption approach | 100 | 1.0 |
| Biomass replacement approach | 80 | 1.25 |
| Hydro-electricity (avg) | 1,000 | 0.1 |
| lower course | 150-500 | 0.2-0.67 |
| high altitude | 15,000 | 0.0067 |
| Solar hot water | up to 40,000 | 0.0025 |
| Photovoltaics | 1,000 | 0.1 |
| Wind energy | 12,500 | 0.008 |

*Figure 4.14*
Productivity of Various Energy Sources

## *4.61 Ecological Footprint of Energy Land in the Garden City*

In an ecological footprint, energy can be accounted for in different ways. Where fossil fuels are being used, an area of land can be designated for $CO_2$ absorption to offset consumption.[39] Forest ecosystems are known to accumulate $CO_2$ and can act as a carbon sink, offsetting carbon emissions from fossil fuels. Ecological footprints for renewable energy sources can be calculated in much the same way. The footprint is based on the area that the energy source occupies in order to produce a given amount of energy. As seen in *Figure 4.14*, the productivity of different energy sources varies, with ethanol having the largest footprint and wind energy demonstrating the lowest footprint. While these calculations can provide a rough estimate for energy footprints, it is important to view them with caution as the productivity of different renewable energy sources varies greatly in the literature and can depend on other factors such as geography, climate and weather. Certain energy types are better suited to different regions, but nevertheless, it provides a simple means of comparison.

Howard proposes the use of hydropower in the Garden City as an alternative to coal, eliminating the smoke and pollution typically associated with factories in the industrial city. Productivity of hydroelectricity varies in the literature, with higher altitude dams having higher productivities than lower altitude dams. For this calculation, a productivity of 500 GJ/ha/yr will be used, representing the most optimistic assumption for a lower course hydroelectricity reservoir. The upper reservoir and storage reservoirs are calculated by Howard to be 4 hectares in area while the lower reservoir is approximately 8 hectares. The canals and their adjacent banks are estimated to have an area of 10 hectares, giving the entire water system an area of 26 hectares that can be attributed to energy production. This produces a value of 0.001 hectares per capita for electricity production in the Garden City. Using this data, the amount of energy available for consumption is found to be 0.50 GJ/cap/yr for

## Ecological Footprint of the Garden City

**Energy Ecological Footprint**

Hydroelectricity Area: 26 ha

26 ha / 32,000 pple = **0.001 ha/cap** in the Garden City

Productivity for a lower course hydro dam = 500 GJ/ha/yr

(0.001 ha/cap) (500 GJ/ha/yr) = **0.50 GJ/cap/yr** of energy available for consumption

**Cropland & Rangeland Ecological Footprint**

Crop Area: 1,134 ha

Rangeland Area: 390 ha

1,134 ha / 32,000 pple = **0.035 ha/cap** of Cropland in the Garden City

390 ha / 32,000 pple = **0.012 ha/cap of** Rangeland in the Garden City

**Managed Forest Ecological Footprint**

New Forest Area: 440 ha

440 ha / 32,000 pple = **0.014 ha/cap** in the Garden City

Temperate Forest Productivity: 3.3 $m^3$/ha/yr

(0.014 ha/cap) (3.3 $m^3$/ha/yr) = **0.045 $m^3$/cap/yr** of forest available for consumption

**Degraded Land Ecological Footprint**

Degraded Land Area: 476 ha

476 ha / 32,000 pple = **0.015 ha/cap** of Degraded Land in the Garden City

**Garden City Ecological Footprint = 0.077 ha/cap**

*Figure 4.15*
Ecological Footprint Calculations for the Garden City

residents in the Garden City. As a comparison, Wackernagel and Rees estimate the average energy use in the Netherlands to be 210 GJ/cap/yr, approximately 420 times more than what is available in the Garden City.

## *4.62 Ecological Footprint of Cropland and Pasture in the Garden City*

Agriculture represents a significant alteration to land use. Cultivation requires the clearing of land and loss of natural habitat. The productivity of agriculture is dependent on many factors such as climate, rainfall and soil quality and therefore can vary greatly. Food production can be further broken down into land that is used for growing food such as crops and gardens, and land that is used for raising animals such as rangelands and pastures. Cropland includes crops that are grown for human consumption as well as those grown for animal feed. Rangelands and pastures, required for meat and dairy production, represent a slightly less modified landscape, but still contribute toward the overall ecological footprint of a region. The amount of cultivated land and rangeland in a region can both be expressed as a part of the ecological footprint, in hectares per capita. Based on Howard's diagrams, the area of land allocated for Cropland and Rangeland in the Garden City is estimated to be 1,160 hectares and 390 hectares respectively. This produces a Cropland footprint of 0.036 hectares per capita and a Rangeland footprint of 0.012 hectares per capita.

## *4.63 Ecological Footprint of Managed Forests in the Garden City*

Managed forests are consumed as resources for many different products such as building material, furniture, books and magazines. They can also act as carbon sinks for offsetting carbon dioxide emissions. The forest consumption of a region can be calculated based on the annual amount of biomass that is used for production of products for a given

region. The productivity of a forest can be seen as the rate at which it is able to produce or replenish itself. This rate can vary depending on factors such as the type of tree species, climate, rainfall and soil type. Wackernagel and Rees quote boreal forest productivities of 2.3 $m^3$/ha/yr, temperate forest productivities of 3.3 $m^3$/ha/yr, and tropical forest productivities of 6 $m^3$/ha/yr.[40] Forest productivity is quantified as the amount of biomass that can be harvested from one hectare of forest over a given period of time. The time frame changes with the growth rate or efficiency of a species, for example, if a tree species requires 70 years to grow to a desirable size, then the forest productivity will be the amount of biomass in metres cubed per hectare divided by a growing period of 70 years. Consumption of forest biomass also varies greatly, tending to be higher in more developed areas of the world. Dividing the region's consumption by the forest's productivity will yield the forest ecological footprint, in hectares per capita.

The 'New Forests' of the Garden City can be equated with managed forests, assuming that they are used as resources and contribute to the self-sufficiency and ecological footprint of the region. An area was approximated for New Forests based on Howard's Garden City diagram. The area is approximately 440 hectares, or 0.014 hectares per capita. Assuming a temperate biome, the productivity rate of 3.3 $m^3$/ha/yr can be applied, for a value of 0.045 $m^3$/cap/yr of forest available for consumption in the Garden City.

## *4.64 Ecological Footprint of Degraded Land in the Garden City*

When land becomes a part of the built environment, it loses its capacity for biological productivity. Degraded land refers to the built up environment, including roads, transportation systems and buildings, as well as any other type of alteration that depletes the productivity of the land. The ecological footprint for degraded land can be calculated by adding together the area of the built up environment plus the area dedicated to roads and transit and dividing this number by the total popula-

tion, to get a value in hectares per capita.

In the Garden City, degraded land is found in the form of roads, transportation systems, buildings and parks. Howard specifies 5,500 building lots within the Garden City with an average lot size of 240 square metres. Areas for Brickfields and Quarries in the agricultural estate are also estimated and added to the calculation for a total of 561 hectares of degraded land, or 0.018 hectares per capita.

## *4.65 Ecological Footprint Summary*

Using Wackernagel and Rees' method, the ecological footprint calculated for each land use category in the Garden City is considerably lower than present day estimates (*Figure 4.15*). Wackernagel and Rees calculate the ecological footprint of the Netherlands to be 3.32 hectares per capita, which is approximately forty-three times larger than the 0.077 hectares per capita calculated for the Garden City. It is understandable that an individual's ecological footprint would be smaller in the late nineteenth century compared to present day, which may account for some of the difference. Changes in technology and an increased quality of life are responsible for many increases in consumption. One of the most drastic increases is in energy consumption, which makes up the majority of the ecological footprint in most contemporary calculations, though only accounts for 0.001 hectares per capita in the Garden City. The establishment of electrical grids for supplying power to individual homes was in its infancy at the turn of the century. The same can be said of energy use for powering automobiles. These changes in lifestyle could in part account for the intensification of energy use. Likewise, the introduction of home appliances has increased water consumption and trends in the built environment such as larger single family homes would affect the built environment.

Based on current data, an ecological footprint is calculated to estimate the minimum areas that would be required to sustain one person for one year. Data for annual consumption rates was gathered in the relevant categories and the required area for production was calculated.

The calculation yields an estimate of 1.4 hectares per capita to support one person for one year by today's living standards. This modern-day estimate is eighteen times that of the available land in the Garden City. In order to retain its relative autonomy and self-sufficiency, the updated version of the Garden City must contend with this deficiency. Some potential solutions include increasing the size of the agricultural hinterland, or increasing the productivity of existing land, also known as socio-ecological upscaling. Some examples of increasing productivity include introducing greenhouses for agricultural production or combining land uses to double the efficiency such as adding photovoltaics on rooftops to produce energy in the built environment or incorporating windmills for energy production in agricultural fields. The ecological footprint provides a method of comparison for land use and levels of consumption in different regions, however, it should be stipulated that the ecological footprint of any given population may vary greatly depending on many factors, such as geography, climate and culture, and therefore should be viewed as an estimate only.

## 4.70 Conclusion to Chapter Four

The analysis of the Garden City reveals a model that is deceivingly complex. True to Howard's intentions, the Garden City systems communicate a fully integrated town and country that share many reciprocal relationships, that benefit the inhabitants. Many of the ideas presented in the Garden City would not be out of place in a proposal for sustainable living today. Howard advocated for a close relationship between production and consumption with the inclusion of local agriculture and neighbouring markets. His model was attuned to issues of water management and showed the beginnings of a waste materials recycling scheme. His use of hydro power as an energy source to replace coal is anticipatory of modern renewable energy trends – even though his reasons for doing so are slightly different than those of today. The analysis also highlights some often-overlooked traits of the Garden City,

most notably dispelling a common Garden City myth regarding density. The model is shown not to be the simplistic, low density suburban housing model that many have assumed it to be, but rather it is a rigorous and compact urban form. The reassertion of Garden City densities gives further credence to the Garden City as a viable model in the twenty-first century.

Despite sharing traits praised by contemporary sustainable practices, Howard's model is also a product of its time. Howard's model reflects the industrial society in which it was conceived, where everything – including nature – is man-made. Nature is shaped, harnessed and produced - as if a part of an assembly line - for consumption within the town. Howard's proposal assumes an entirely man-made landscape from the built city form to the manicured agricultural fields. Canals are dug by engineers to control water, and the displaced earth from the canals is piled up, altering existing terrain to create points of higher altitude for more efficient generation of hydro energy. Even the forests demarcated on Howard's plans are referred to as "new," suggesting that they too have been altered by human intervention in some way. In this industrial landscape, natural wilderness has ceased to exist. Howard's idea of nature is a manicured English landscape of agricultural fields, an image that is perpetuated in nineteenth century literature and culture. With each new crisis presented, our perception of the world is altered. As a response, acuity and priorities change as well, bringing about a new set of cultural values. Today's world is still very much man-made, but with the emergence of the present day environmental crisis, emphasis has been placed on the preservation and protection of the natural environment and its ecosystems. Addressing the modern day environmental crisis presents an opportunity to once again embrace the moral component of the Garden City, which is another element of the original model that is often overlooked. The second part to this thesis explores the application of the Garden City concept to the new crisis of the time. The ability of the Garden City model to adapt and respond to each new crisis of the time, while still retaining its core values, could conceivably continue the relevance of the model well into the future.

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# PART TWO:

## Contemporary Ecological Theory and A Proposal for the Future

# 05 Chapter Five:
# A Renewed Call to Action

# 5.10 Introduction to Chapter Five

The second part of this thesis looks at reinterpreting an old model for a new time. In order to retain its relevance, the Garden City must be able to respond to the current crisis and embrace current theories. Section 5.20 introduces the modern-day environmental crisis as a renewed call to action that emphasizes the importance of agriculture and natural ecosystems in an increasingly urbanized world.

The emergence of a new crisis requires a re-evaluation of inherited assumptions in existing theories and practices. This thesis embraces ecological theory aimed at reconciling perceived differences between human culture and nature, between town and country. This shift in perspective is explored first though the concept of the Anthropocene in Section 5.30, which acknowledges an increasingly human curated world. The impact that humans have on the environment is considered in Erle C. Ellis' proposal to include human influences in the biome classification system. Section 5.40 introduces the theories of Timothy Morton, who believes that our perception of nature is getting in the way of our ability to think ecologically. He argues that there is no such thing as 'nature,' rather, everything, both living and non-living, is connected in a vast and sprawling mesh. Both the Anthropocene and mesh theory support the integration of human culture and nature. Within this newly established framework, new principles are required for the evaluation of current and future proposals for land use patterns. Section 5.50 introduces the ecological principles of Richard Forman as tools for the evaluation and creation of sustainable landscapes. Based on the contemporary crisis and theory, Howard's Three Magnets diagram is redrawn in Section 5.60 to reflect contemporary values. Section 5.70 discusses the use of contemporary crisis and theory as a theoretical framework for a twenty-first century Garden City.

# 5.20 Addressing the Environmental Crisis of the Twenty-First Century

Howard's Garden City publication, in which he identified a critical link between human activities and the environment, has been suggested as the origin of the sustainable urban design movement that has developed in the twentieth century.[1] The world has changed significantly over the last one hundred and twenty years since the Garden City was proposed. However, the relationship between human development and the natural world that Howard addressed is still key to creating sustainable, liveable communities. While Howard's plan responded to a mass migration from the countryside into the extremely dense and insalubrious industrial city, today's cities are suffering from a reverse effect. Low density suburbs have appeared in many parts of the world, encouraged by personal transport and a higher quality of infrastructure. Urban sprawl is often expanding in to agricultural and ecological areas. It is made possible by the dominance of the automobile, by government investments in highway systems and by an equally detrimental neglect of public transportation systems.[2] Many of the inefficient and wasteful tendencies of modern planning have contributed globally to larger ecological problems whose impact will be felt for generations to come. Massive amounts of waste and pollution from human activities have affected rivers, lakes and oceans as well as the atmosphere, on a scale that has never been seen before. Forests and habitats are being cleared and natural resources depleted at an alarming rate. The resulting environmental degradation and climate change threaten both natural and man-made ecosystems. Although many of these issues are not new, the massive scale that they are occurring on is. It has only been in the last fifty years or so that many of the ecological and social implications of global development have begun to be widely understood.[3]

For cities of the twenty-first century, the relationship between the town and country has become much more complex. Many environmentalists and theorists today are advocating for the integration

of natural ecosystems in man-made developments in ways that were not thought of a century ago. The extent of human impact on the environment has become a relevant subject of discussion in many fields, and has inspired concepts such as the Anthropocene, which highlights the interconnectedness of natural and man-made environments as well as the growing influence of humans in shaping the planet. Similar to the crisis of Howard's time, the emerging environmental crisis requires a revaluation of the balance between town and country. However, in place of the overcrowded industrial city, it is low density sprawl that must be contained in conjunction with the protection and preservation of natural ecosystems. Addressing the environmental crisis returns a sense of moral responsibility to the twenty-first century reinterpretation of the Garden City. It presents an opportunity to once again affect social change through responsible planning of both the urban and rural physical environments. To this end, this thesis focuses on the interaction of built form and the environment as the crisis of the time. As an agricultural model, the Garden City provides an apt vehicle for addressing the interactions of settlements, agriculture and natural ecosystems.

## *5.21 Agriculture as a Part of the Twenty-First Century Environmental Crisis*

The presence of agriculture has shaped cities since the beginning. Cultivation is what made the first settlements possible, and early versions of civic administrations were dedicated almost exclusively to managing a city's agricultural hinterland.[4] Over time, growing cities required more food, necessitating more intensive forms of agriculture, which translated into larger territories and more technology. The industrial revolution answered this challenge through the development of new agricultural machinery which significantly increased the rate and scale of production. During this time, global exchange of goods increased and agriculture, which was once a limiting factor for population growth, became decoupled from the city.

Where historically, a city or town may have experienced a more local or regional interdependence on its immediate surroundings for resources, today's cities adhere to a larger global system of production and exchange.[5] With the disassociation of population growth from food production, city size and density are no longer dependent on an agricultural estate. Large metropolises are fed by a continuously expanding global food network that takes advantage of a cheap and efficient global transportation network. Global food networks have removed the constraints of geography, making it possible to build and sustain cities and metropolitan areas of increasingly larger scales and in increasingly unlikely locations such as the Dubai desert or above the Arctic Circle.[6] Global food networks have expanded the range of inhabitable geographies to include these hostile climates where traditional agriculture is not an option.

The globalization of the food economy has changed the way that agriculture is produced. Industrial agriculture has replaced traditional family farms, operating on a much larger scale and producing higher yields. By necessity, large scale agriculture is located further away from populated urban centres, increasing the distance that products must travel to reach consumers. Industrial agriculture often produces monocultures in an effort to further increase efficiency in planting and harvesting. Monocultures are criticized for a greater susceptibility to pests and disease than polycultures, which puts the entire food chain at risk, with the potential to cause food scarcities. Industrial agriculture has also introduced factory farming - large scale, intensive livestock operations that are intended to maximize production output while minimizing production costs – which are often criticized as an inhumane approach to raising livestock.

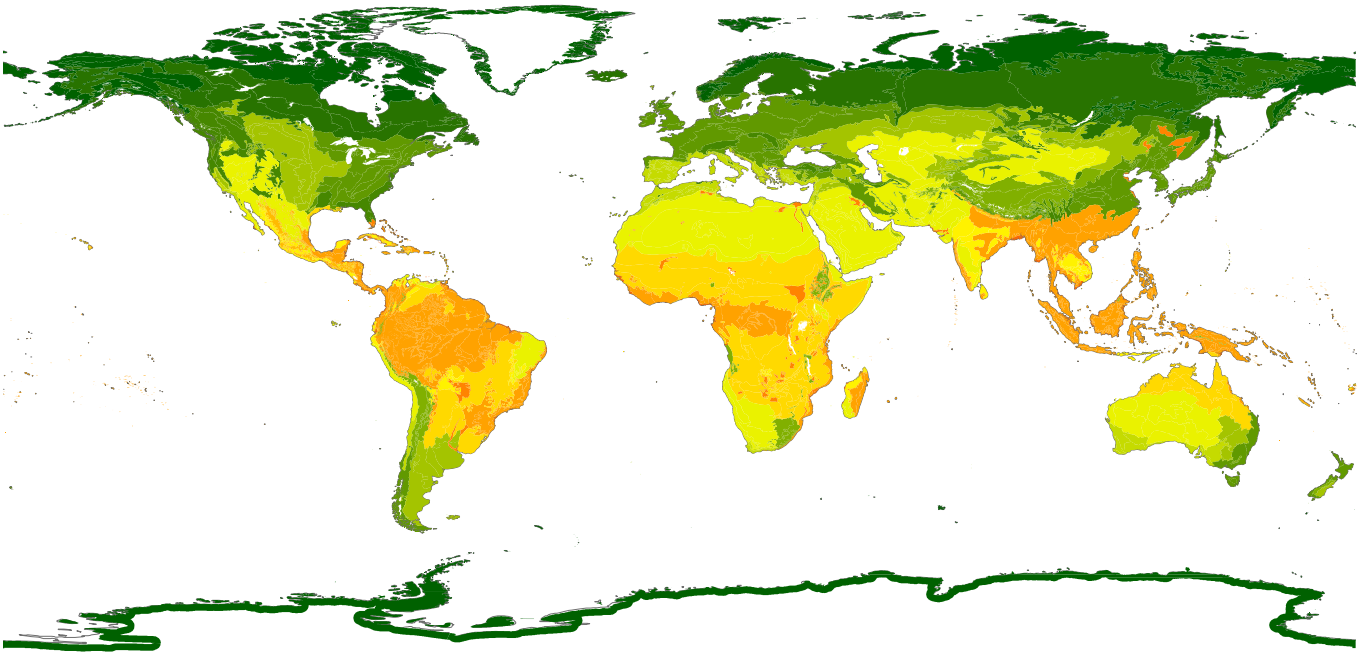
Industrial agriculture is largely a linear based system, where resources are extracted, consumed and the resultant waste is dumped back into the environment. The global food network presents a looming crisis because materials do not return to their place of origin, but instead accumulate in other parts of the biosphere.[7] Long distance trade has long been associated with the separation of town from country and also

the separation of agricultural producer from consumer. It has also been identified as a major factor in the net loss of nutrients from the soil, as products containing these elements could be transported hundreds and even thousands of miles to market.[8]

Agriculture alters land use patterns through the destruction of forest biomes to enlarge production areas. Spatially, the expanding territories of agricultural and farming production are the largest driver of deforestation, and subsequent loss of habitat and biodiversity. These actions contribute to atmospheric emissions, which threaten to raise temperatures affecting the viable geographical locations for agriculture as well as their growing seasons. Intensive production can reduce the quality of the soil, which has the potential to suppress yields. The use of fertilizer is essential to increase agricultural yields, but overuse can lead to soil acidification and eutrophication of aquatic systems. Water scarcity is another serious concern that may limit the widespread use of irrigated agriculture in the future. Agriculture has shown itself to have a great impact on both the environment and on human settlements. Recently, organic and local food production has been encouraged by sustainability advocates, who echo many of the concepts first proposed by Howard in the Garden City.

## 5.30 Living in the Age of the Anthropocene

The Anthropocene has been proposed as a new epoch that is characterized by significant human impact on Earth's geology and ecology, emphasizing the central role of mankind in shaping the environment.[9] The Anthropocene presents a more scientific view of the world, supported by large amounts of evidentiary data, implicating humanity as a guiding force that has permanently altered natural ecosystems. The Anthropocene introduces the perspective of a human mediated world and as a cross-disciplinary concept, it is a nexus point where architecture, culture and nature collide. The Anthropocene



0 1 2 4 6

Scale in 1,000 Km

**LEGEND**

- Tundra
- Boreal Forest / Taiga
- Temperate Conifer Forests
- Temperate Broadleaf and Mixed Forests
- Montane Grasslands and Shrublands
- Temperate Grasslands, Savannas and Shrublands
- Mediterranean Forests, Woodlands and Scrub
- Desert and Xeric Shrublands
- Tropical and Subtropical Dry Broadleaf Forests
- Tropical and Subtropical Grasslands, Savannas and Shrublands
- Tropical and Subtropical Coniferous Forests
- Tropical and Subtropical Moist Broadleaf Forest
- Flooded Grasslands and Savannas
- Mangroves
- Snow, Ice, Glaciers

breaks with the inherited assumption of an ontological distinction between human culture and nature, challenging contemporary thinkers to re-evaluate inherited theory and practices from a new perspective.[10] Support for a re-evaluation of inherited epistemologies is seen in the environmental call to action. The Anthropocene begins to address the crisis of the time by providing a perspective that allows us to view culture and nature both as causative and reactionary elements belonging to one interactive eco-system. This epistemological shift questions former definitions of nature. In the late nineteenth century, the accepted view of nature was somewhat akin to an Arcadian fantasy; in the age of the Anthropocene, this view must be updated to reflect a new set of cultural values and scientific understanding.

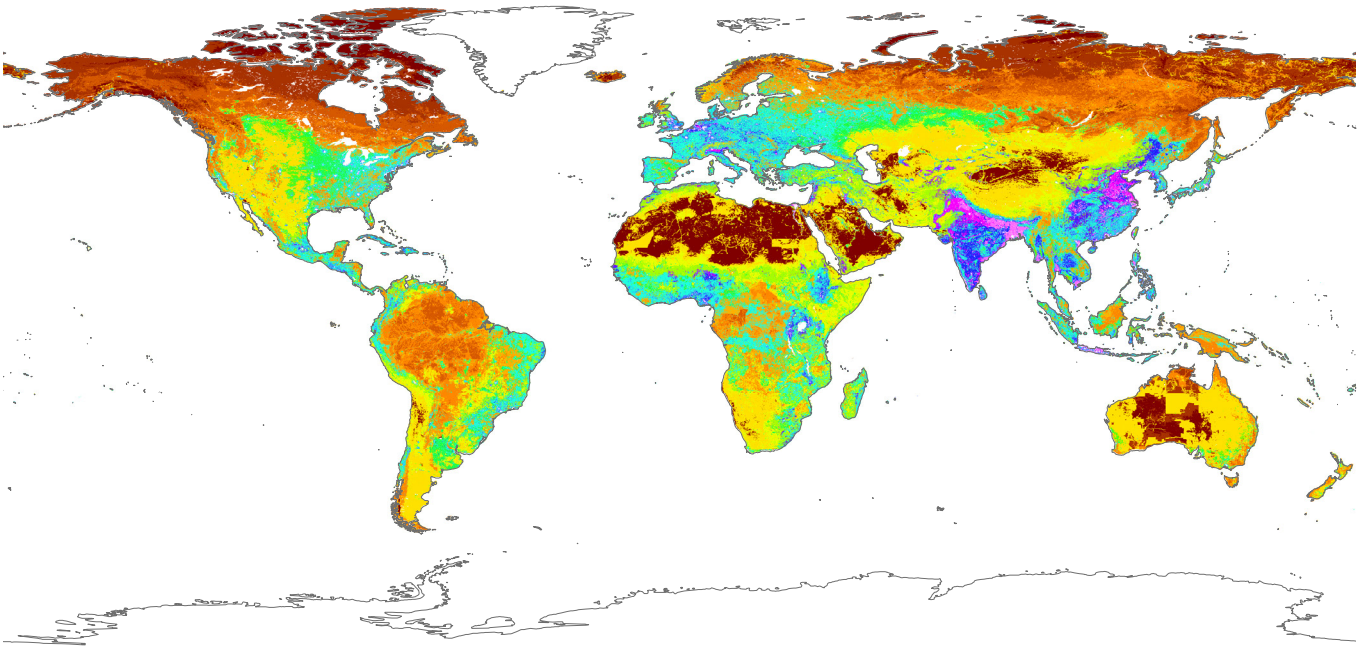
***Figure 5.01***
Existing Terrestrial Biomes

*A form of classification that distinguishes different terrestrial habitats base on climate, terrain, geology and the dominant form of vegetation*

## *5.31 A Re-Interpretation of Nature and the Countryside*

One attempt at re-defining nature is the work of Erle C. Ellis who is interested in the ecology of human landscapes operating on both local and global scales, and the implications that this has for informing sustainable stewardship of the biosphere.[11] The existing terrestrial biomes are a form of classification that distinguish different terrestrial habitats based on climate, terrain, geology and the dominant form of vegetation (*Figure 5.01*). Presently, terrestrial biomes do not take into account any form of human impact or interaction. Ellis argues that the unassailing impact that humans have had on the environment has rendered current definitions of terrestrial biomes inadequate. While climate, terrain and geology have shaped ecosystems in the past, there is increasing evidence that human interactions play an equally vital role in shaping ecosystems today. Ellis provides a new framework that incorporates human impact into the existing model, creating novel land use patterns that he calls anthropogenic biomes, or anthromes (*Figure 5.02*).

Only a small percentage of the Earth's land surface remains untouched, meaning that the future of most terrestrial biomes is



0 1 2 4 6

Scale in 1,000 Km

## LEGEND

**DENSE SETTLEMENTS**
- Urban
- Dense Settlements

**VILLAGES**
- Rice Villages
- Irrigated Villages
- Cropped & Pastoral Villages
- Pastoral Villages
- Rainfed Villages
- Rainfed Mosaic Villages

**CROPLANDS**
- Residential Irrigated Cropland
- Residential Rainfed Mosaic
- Populated Irrigated Cropland
- Populated Rainfed Cropland
- Remote Croplands

**RANGELANDS**
- Residential Rangelands
- Populated Rangelands
- Remote Rangelands

**FORESTED**
- Populated Forests
- Remote Forests

**WILDLANDS**
- Wild Forests
- Sparse Trees
- Barren

intertwined with human systems. The inclusion of human interactions in the biome classification system creates what Ellis describes as a landscape mosaic, which is "composed both of lands used directly for agriculture and settlements and the ecosystems left embedded within them as remnant, recovering, and less directly used novel ecosystems."[12] To date, humans have "transformed more than three quarters of the terrestrial biosphere into anthropogenic biomes, yielding a host of novel ecologies characterized by their sustained direct interactions with human populations and infrastructures in the forms of crops, pastures, built structures, and other used lands."[13] In an increasingly human curated world, the landscape mosaic has become the 'new normal' (*Figure 5.03*). Agricultural activities dominate the anthropogenic biomes, reinforcing the necessity of food production for sustaining large human populations but at the same time cautioning against the loss of novel ecosystems.

***Figure 5.02***
Anthropogenic Biomes

*Ellis identifies eighteen different anthropogenic biomes based on an analysis of global population, land use, and land cover. Populations are categorized as dense (> 100 people/km$^2$), residential (10-100 people/km$^2$), populated (1-10 people/km$^2$), or remote (< 1 person/km$^2$). Land use is categorized according to dominant use as pasture, crop, irrigated, rice or urban land. Land cover refers to the percentage of forested area versus bare earth.*

Ellis' anthropogenic biomes offer a new way of thinking about humans and nature by bringing them together into one classification model. They encourage a more complex understanding of human-ecosystem interactions within biomes, with the hope that this will promote better management and integration of both in the future. The challenge for land use systems going forward will be to continue to increase productivity while at the same time becoming more mindful of existing natural systems.

## 5.40 The Interconnectedness of All Things: Mesh Theory

Environmental philosopher and theorist Timothy Morton also challenges the bifurcation of human culture and nature in his work. His early work examines the influence of foodscapes on social practices and cultural ideology in the late eighteenth and early nineteenth centuries, as well as the disconnect between food producers and consumers. These sentiments can be extended to address industrial agriculture in the later part of the nineteenth century and the continued dissonance between

***Figure 5.03***
Example of a Landscape Mosaic

*A Landscape Mosaic is an area composed of lands used for agriculture and settlements as well as the ecosystems left embedded within them.*

culture and nature today. Just as Ellis' anthropogenic biomes attempt to reconcile this culturally inherited alienation between culture and nature, so does Morton's treatise on the ecological thought and mesh theory. Morton's ecological theories highlight the interconnectedness of both natural and man-made infrastructures, presenting a challenge for community building that must now encompass not only the man-made settlement and the agricultural estate of the town and country, but also the embedded natural ecosystems in between.

The conditions created during the industrial revolution gave rise to a longing for a return to a pre-industrial era, which encouraged an aesthetic framing of nature as something idealistic and picturesque, untainted by the hand of man. The Garden City, proposed at the tail end of the nineteenth century, embraces this traditional Arcadian view of nature, painting an idyllic image of the English countryside. Timothy Morton argues that this Romantic attitude is the beginnings of the environmental framework that we are still struggling with today.[14] Morton purports that "the idea of nature is getting in the way of properly ecological forms of culture, philosophy, politics and art."[15] He addresses this paradox in his book, *Ecology Without Nature*, arguing that there is no such thing as 'nature,' that this term has been conjured to procure certain ideologies and attitudes within a culture, and that one of the problems of environmental thinking is the image of nature itself.

In his exploration of current attitudes toward nature, Morton engages Hegelian philosophy which argues that ideas come bundled with certain attitudes, which in turn will influence new ideas in a dialectical progression that Hegel refers to as the phenomenology of spirit.[16] To apply this concept to environmental thinking, terms such as 'nature' and the 'environment' become problematic because they come pre-loaded with certain attitudes. Morton argues that in order to obtain a critically ecological view, we must relinquish the idealized concept of 'nature' as something that is pure, pristine, and untouched. The attitude that 'nature' enables is that of Cartesian dualism. Morton again turns to Hegel and his concept of the beautiful soul, the "Romantic subject who aesthetically yearns for an impossible reconciliation with the alienated object (Nature)."[17] Building on this concept, Morton introduces the Beautiful Soul Syndrome, which is a split between the self and nature, it is an attitude that views ourselves as something separate from 'over there.' This attitude is detrimental to environmental thinking because it allows us to distance ourselves from the reality of our surroundings. Nature can continue to be thought of as a pure and pristine environment that exists 'over there' and at the same time, environmental degradation can be thought of as an unfortunate condition that is also existing somewhere 'over there.' Beautiful Soul Syndrome allows the illusion of being able to wash one's hands of the corrupt world and to retreat to a safe distance, thus relinquishing any responsibility for the corruption.[18]

The only way to rectify Beautiful Soul Syndrome, Morton theorizes, is by taking responsibility for our attitudes, by practicing Dark Ecology. Dark Ecology requires the recognition that all things are hopelessly entangled in a vast and interconnected framework, or mesh, without any possibility of extraction. It requires us to bridge the gap between man and nature, and in doing so, to regain responsibility for our actions. Dark Ecology acknowledges nature and man as belonging to one system, and in doing so, recognizes our complicity in the current ecological crisis. The spurious Arcadian view of nature is no longer placed on its pedestal but rather the existing state of nature can be seen and accepted for what it is. The recognition of our complicity in creating

the current state of nature, degradation and all, dissolves the beautiful soul. This is the dark side of ecological thinking; the "necessarily queer idea that we want to stay with a dying world."[19] Dark Ecology does not glorify the existence of nature as something separate from ourselves, nor does it despair in its end. It is a melancholic approach to ecocriticism that "preserves the dark, depressive qualities of life in the shadow of ecological catastrophe."[20] Dark Ecology has moved beyond the utopian imagery that is commonly found in ecological rhetoric, and instead it acknowledges the darker side of nature as an integral part of the mesh.

Ecological thought requires humans to become aware of how we are connected to other beings – whether animal, vegetable, or mineral.[21] It requires removing the barriers between 'over there' and 'over here,' between inside and outside.[22] The interconnectedness of all living and non-living things, demonstrated through Morton's concept of mesh theory, creates a vast and sprawling framework, with no definite edge or centre, penetrating all dimensions of existence.[23] Everything exists within the mesh, not distal or proximal to it, and therefore everything is interconnected. The mesh can be identified in every facet of the natural world. Charles Darwin eludes to the mesh when describing evolution and adaptation. Darwin is in awe of trees that rely on birds and animals to spread their seeds, and flowers that rely on insects for pollination. He asks: "How have all those exquisite adaptations of one part of the organization to the other part, and the conditions of life, and of one distinct organic being to another being, been perfected?"[24] In this question he is demonstrating ecological thinking. The interdependence of one species on another begins to show a complex, entangled mesh.

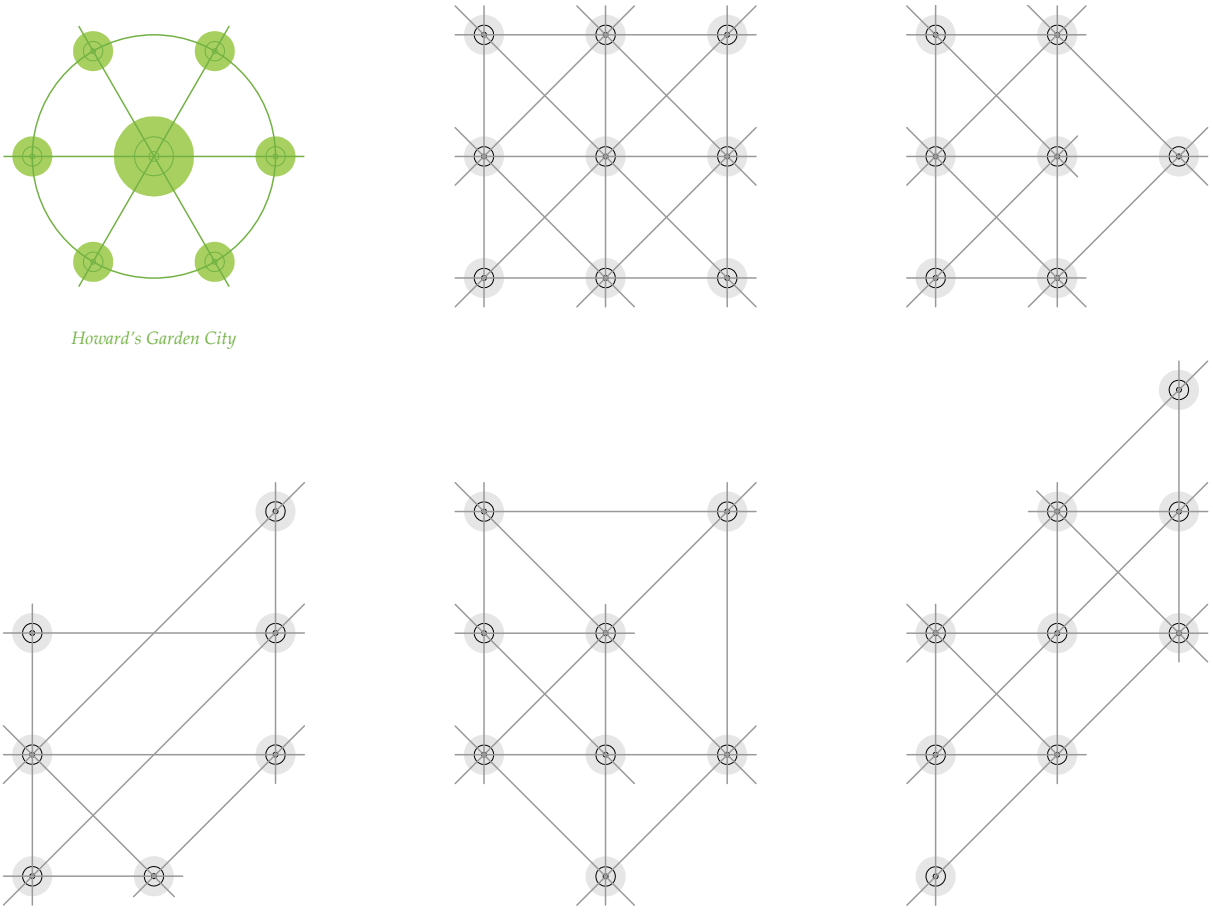
***Figure 5.04***
Mesh Theory as Regional Framework

*Mesh is described by Timothy Morton as the "interconnectedness of all living and non-living things...Each point of the mesh is both the centre and edge of a system of points, so there is no absolute centre or edge."*

## *5.41 Garden Cities in the Mesh*

This thesis embraces mesh theory as a framework for the Garden City in the twenty-first century (*Figure 5.04*). Mesh theory contrasts with the physical organization of Howard's Garden City where his Social Region diagram establishes an implied hierarchy between

the Central City and the smaller, orbital Garden Cities. The preceding centric model gives an aura of order, but also limits growth of the Social Region both in population and in area. To invoke Morton's mesh theory, where each point in the mesh is both a centre and an edge, the twenty-first century Garden City would not be a centralized circle, but instead would be a dendritic web which begins to show the interconnection of Garden City systems and their surroundings, as well as their connections to each other. Within this web-like framework, one can imagine a network of new Garden Cities that has the potential to extend infinitely in an immeasurable number of configurations. The mesh framework provides flexibility, depending on man-made and geological features. For example, the size and population of the town may vary depending on local geology, availability of resources, and employment options. Garden Cities may also share resources within the mesh, removing



*Howard's Garden City*

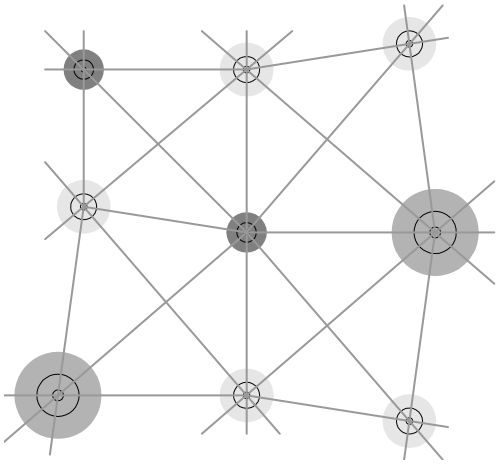


***Figure 5.05***
Flexibility in the Mesh

*Ideal populations and densities in the mesh may vary depending on availability of resources or access to employment. The flexibility of the mesh framework allows for these variations.*

some of the autonomy of the original Garden City, but reinforcing the interconnectedness of the mesh. The flexibility of the mesh framework augments the rigid structure of the original centric model, allowing it to accommodate these differences (*Figure 5.05*).

## 5.50 Evaluating and Informing Land Use in the Landscape Mosaic

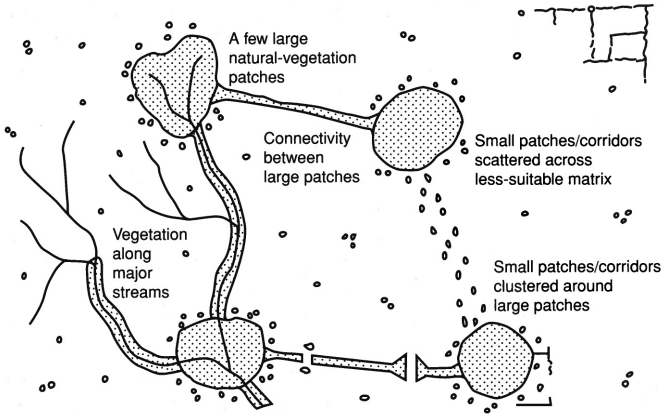
In the newly established mesh of the Anthropocene, a new set of principles are required to evaluate current land use and to provide guidelines for future land use. Landscape ecologist Richard Forman uses a scientific approach to devise a set of principles for the evaluation of landscapes. The principles may be useful for apprising land use allocation, locating houses and roads, protecting species and water sources, providing recreation, and creating sustainable environments.[25] Similar to Ellis, Forman embraces the landscape mosaic, comparing the heterogeneity of a landscape to the mosaics of Saint Mark's Basilica in Venice.[26] In these beautiful mosaics, small pieces of colored stone are arranged in patches, strips and matrixes to form patterns and images. In a landscape, individual trees, rocks, and houses act in the same way as the pieces of colored stone, aggregating together to form the patches,

corridors and matrix of landscapes. Forman describes landscapes as a mix of local ecosystem or land use types that are repeated over the land.[27] Landscapes are the basic element, or building block, that make up a region. A region may cover a broad geographical area but shares a "common macroclimate and sphere of human activity."[28]

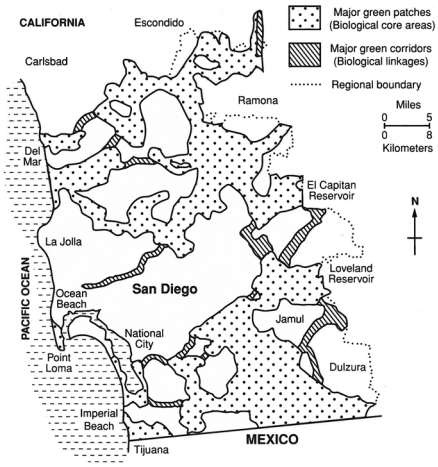
With a Morton-like rhetoric, Forman describes every point in a landscape as being within a patch, a corridor, or a background matrix (*Figure 5.06*).[29,30] Patches are categorized as large or small, each serving different functions. Large natural-vegetation patches provide habitats for species, while small natural-vegetation patches function like stepping stones between habitats and contribute to heterogeneity within species as well as recolonization. Patch size contributes to the overall grain of the landscape mosaic. The grain is measured by calculating the average diameter or area of all patches in the mosaic. A course grained landscape indicates many large patches which are ideal for interior species but less suited for edge species. A course grained mosaic also requires multi-habitat species to travel long distances between locations to satisfy their needs. On the other end of the scale are fine grained landscapes, which contain mostly small patches. In a fine-grained mosaic, edge species dominate the landscape and multi-habitat species don't have to travel as far to meet their needs. Fine grained mosaics tend to become monotonous because the same elements are repeated over and over throughout the

***Figure 5.06***
The Patch and Corridor System of Natural Vegetation

*Forman's patch-corridor-matrix model illustrates valuable areas for nature conservation. Patches and corridors are natural or semi-natural vegetation that exist within a background matrix of less ecologically productive land.*




The Patch-Corridor-Matrix Model




The Model Applied to the San Diego Region

landscape. Forman hypothesizes that the optimum landscape is an assembly of large and small patches of natural vegetation scattered through the matrix, which would provide a variety of course and fine grain size. Patch shape and orientation also play a role in the vitality of the landscape. When planning new developments, Forman's principles can be taken into consideration to find the most optimal arrangement of road networks and settlements as well as to protect existing habitats, natural resources and water sources.

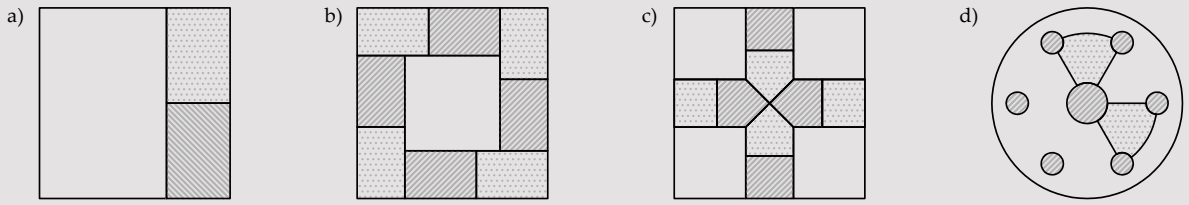
Forman's approach to the spatial arrangement, grain size and network connectivity can be applied to Howard's Social City. Forman analyzes spatial arrangements within a region using three different landscape types: native vegetation, agriculture and built area (*Figure 5.07*). Forman assesses the suitability of each landscape according to the assumptions that are listed in the figure. The highest level of suitability comes from areas of unfragmented agriculture and native vegetation and areas with smaller built landscapes that are located down wind of the native vegetation landscapes.

When applying this analysis to the Social City, agriculture appears as the background matrix, making settlements and new forests the dominant forms of land use, which appear as patches within the landscape mosaic (*Figure 5.07d*). When comparing the Social City to Forman's landscapes, the Social City demonstrates a reasonable level of suitability with large agriculture and native vegetation areas showing only a small degree of fragmentation, and also with small built areas scattered throughout the region. This analysis is being conducted at a fairly large grain size and may therefore seem relatively basic, however, it still provides a high level overview of simple interactions between the basic components – settlements, agriculture and ecosystems (or new forests in Howard's case) – that have also been identified by both Morton and Ellis as instrumental in contemporary theory and community planning respectively.

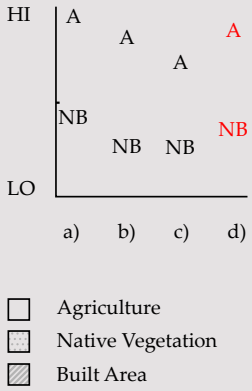
The spatial arrangement leads in to a study of network connectivity. The connectivity within a region is assessed through nodes and linkages between landscapes. Nodes define areas of species sources,

***Figure 5.07***

Comparison of Spatial Arrangements of Four Landscape Types




*Each diagram represents a region composed of three to twelve landscapes. The HI-LO graph shows an overall measure of suitability for maintaining natural ecosystems (N), agricultural productivity (A), and the built community (B). Forman assesses suitability with the following assumptions: (1) the key variables examined are sensitive at the scale of these landscapes; (2) wind blows from the west, and upwind air is the same as that along the western edge; (3) native vegetation produces the cleanest air; (4) for the built area, only large landscapes produce air pollution; (5) for native vegetation, fragmentation into small landscapes is detrimental.*




*According to the established assumptions, the most suitable agricultural and native vegetation environments are the largest and least fragmented areas, which are receiving the least pollution from neighboring built environments (Figure 5.07a). Howard's Social City region is diagrammed in Figure 5.07d. When applying this analysis to the Social City region, the fragmentation of the natural vegetation areas and the isolation of built areas within the agricultural matrix are most similar to the arrangement of Figure 5.07c. Since native vegetation produces the cleanest air, the more vegetation there is, the higher the suitability. Fragmentation of native vegetation lowers the suitability of a landscape so the less fragmented the higher the suitability. The native vegetation in the Social City is approximately equal in size to that of Figure 5.07c, but it is less fragmented and therefore slightly more suitable. Following the outlined assumptions, wind is always blowing from the west, therefore pollution from the Garden Cities is travelling across the agricultural land as well as the natural vegetation, thus lowering the agricultural and native vegetation suitability of the plan. However, because large built areas produce more pollution than small built areas, the impact of pollution from the smaller sized Garden Cities would be less, which increases the suitability of the built environment in comparison to Figure 5.07c. Results for the Social Region's suitability are shown in red on the chart. Based on Forman's analysis, the Social City is more suitable than Figure 5.07b and Figure 5.07c, but less suitable than Figure 5.07a.*

namely large patches or habitats, as well as other forms of vegetation such as small patches that connect habitats and junctions which denote areas where three or more land use types converge. Linkage between patches is assessed as being either a strong or weak connection, or as disconnected (*Figure 5.08*). In Howard's Garden City, new forests provide the largest natural vegetation patches. Smaller patches may exist in the pastures and fruit farms, however, something that is missing from Howard's man-made landscape is any type of vegetation corridors to connect the large and small patches. Large expanses of agricultural fields as well as built elements such as road networks and railway corridors could act as barriers to species movement. The lack of ecological features in the Garden City place the model in a period of time predating the ecological crisis. A twenty-first century Garden City model must consider interactions between man-made and natural landscapes as an integral part of its ecosystem, creating a mixture of both course and fine grain landscapes, which would present a diverse landscape mosaic.

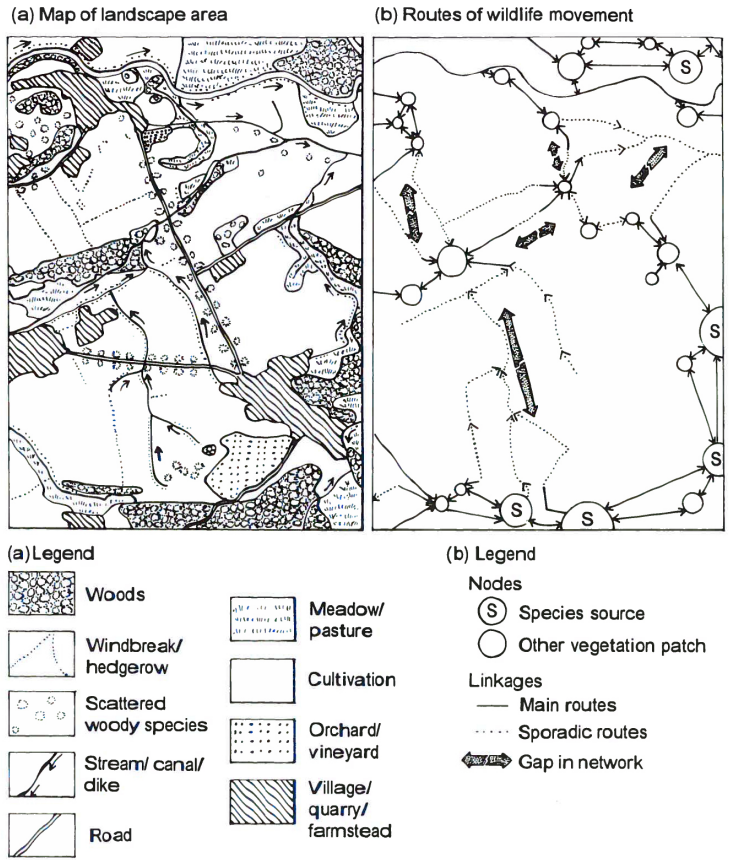



***Figure 5.08***
Forman's Evaluation of Nodes and Linkages Within a Landscape

## 5.60 The Three Magnets Diagram in the Twenty-First Century

The introduction of the twenty-first century crisis and its attempt to balance the interests of the town and the country recalls Howard's Three Magnets diagram. Based on the new environmental crisis and contemporary theories, the Three Magnets diagram can be redrawn to reflect contemporary values (*Figure 5.09*). Howard's diagram assessed the advantages and disadvantages of the Town and Country Magnets and presented the Town-Country Magnet as the result of combining the most desirable traits of each. Both the town and the country have changed significantly since Howard's time, but the challenge remains to unite the two in such a way that is advantageous for both the inhabitants and the environment.

The twenty-first century town has seen a strange reversal, where the formerly overcrowded inner cities are emptying out as residents move further toward the sprawling suburban periphery. High wages and employment opportunities remain staples of the town but are offset by high rents and long commutes. The coal smoke of the industrial city is long gone but has been replaced by carbon emissions and other atmospheric pollutants from personal vehicles and traffic congestion. The inequalities found in the Victorian era are perhaps even more prevalent today, as the economy shifts away from heavy industry and toward information-based services. Many of the high paying jobs are only available to university graduates, leading to a noticeable gap of income inequality throughout the town. The town offers a wide range of social opportunities, but they are offset by high levels of crime that are found in the large scaled sprawling metropolises. Urban populations have grown rapidly in response to the global economy and markets which has uncoupled the town from its surrounding hinterland.

While the country of the late nineteenth century experienced abandonment, today's countryside is threatened by expanding urban areas and infrastructure. Ecosystems are being altered or destroyed as a result of increased human influence in the form of both settlements

and agricultural pursuits. Modern communication networks have removed the feelings of isolation formerly associated with the country. Personal transportation and improvements to infrastructure have made the countryside highly accessible. As well, basic services such as central heating and electricity are now standard, greatly increasing the comforts of living in the countryside. As the Country Magnet becomes more desirable, an effort needs to be made to balance the interests of both humans and natural ecosystems.

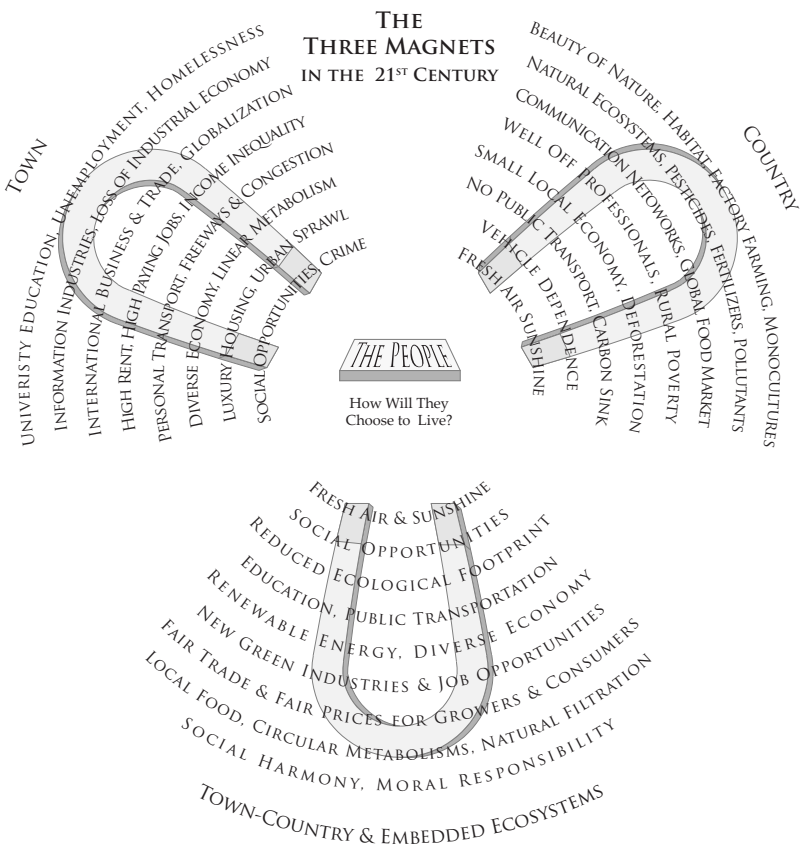
When the best attributes of both the twenty-first century town and country are combined, the landscape mosaic emerges as a fully integrated town and country with ecosystems embedded in between. The Town-Country-Embedded Ecosystem Magnet combines human activities such as social opportunities and employment with the fresh air, sunshine and beauty of nature. Local food supplies strengthen the local economy as well as the relationship between the town and the country and reduce transportation needs. Reciprocal relationships are formed at a local level when recycling of water, nutrients and materials are encouraged in a circular metabolic cycle. The twenty-first century Three Magnets diagram demonstrates how the balance of the town and the country can develop an equitable form of urban development that can reduce the impact of human activities on the environment.

## 5.70 Conclusion to Chapter Five

In his text, Howard declares that "human society and the beauty of nature are meant to be enjoyed together."[31] He identifies the separation of society and nature as "unholy" and "unnatural."[32] The globalized economies that have been adopted by contemporary society have distorted the relationship of the town and country, upsetting the balance of natural ecosystems and linearizing the process of material exchange. After over a century of increasingly globalized food production, self-sufficiency has again been garnering attention. The ability to produce one's own food, energy and other goods at a local scale is again becoming

***Figure 5.09***
The Three Magnets Diagram in the Twenty-First Century

*Howard's iconic Three Magnets diagram is redrawn to reflect contemporary advantages and disadvantages of the town and the country.*




advantageous. A degree of self-sufficiency offers independence to communities, empowering them to make their own decisions, and also provides security in the face of potential global conflicts.[33]

More recently, prudent consumers have taken an interest in the environmental, social and economic impacts of their food consumption patterns. Movements that favour the purchase and consumption of local foods help to support local economies while reducing the environmental costs associated with transportation. These initiatives begin to show a shift in cultural standards that are sympathetic to the environmental crisis, making a case for more local food options and the continued relevance of Howard's Garden City and its agricultural estate.

Howard's marriage of town and country is in alignment with the attempted reconciliation of human culture and nature in contemporary theory. However, contemporary theories presented in this chapter take it one step further by challenging the inherited views of human culture and nature. They call for a re-defining of the concept of nature itself

and in doing so, bring about a more complex understanding of human and ecosystem interactions. In addition to the town and country, contemporary theory argues for the inclusion of embedded ecosystems as an integral part of any modern-day planning concept. Each element of the landscape mosaic – settlements, agriculture, and embedded ecosystems – can be understood to have spatial, infrastructural and ecological implications for community planning. Each has the ability to assert influence, becoming formative elements of a community's structure, that exist in a vast, sprawling and interconnected mesh. Unbeknownst to him, Howard is thinking the ecological thought when he proposes the marriage of town and country as the most harmonious option. With the addition of embedded ecosystems, the latest epistemological shift hopes to promote better management and integration of both human and natural infrastructures in the twenty-first century Garden City.

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# 06 Chapter 6: The Twenty-First Century Garden City

## 6.10 Introduction to Chapter Six

Chapter Six documents a proposal for a twenty-first century Garden City, bringing together the principles, or axioms, of Howard's original scheme as discussed in Part I of the thesis, with the modern crisis and contemporary theory of Part II. Rooted in historical precedent, Chapter Seven first defines the Garden City axioms – principles that must be upheld in order to qualify the proposal as a Garden City descendant. Section 6.20 speculates on how these axioms must evolve to continue to satisfy the original aim of the model in present day and Section 6.30 establishes design parameters for the proposal. Section 6.40 details the systems found in the twenty-first century Garden City. Section 6.50 introduces updated diagrams for the twenty-first century Garden City based on the established parameters and axioms. A Social Cities region is established in Section 6.60, which explores the relationships between twenty-first century Garden Cities within a regional mesh framework. Section 6.70 concludes the chapter with a discussion of the value and limitations of the twenty-first century Garden City framework.

The purpose of the proposal presented here is not to produce a definitive design, but rather it is a culmination of ideas brought forth throughout the thesis to demonstrate how an old concept and model can be re-interpreted to address a new crisis and changing cultural values. To quote Howard, the diagrams produced are "useful in following the description of the town itself - *a description that is, however, merely suggestive, and will probably be much departed from*."[1]

## 6.20 Garden City Axioms

In updating the Garden City model, there are some key principles that must be retained in order to preserve the Garden City character. These principles, or axioms, lie at the heart of the Garden City concept

and so are presented here as universally accepted truths. By retaining these axioms, the updated model can be considered a Garden City descendent that fulfills the ultimate ambition of the original plan; to provide a better, alternative way to live.

As discussed in Chapter Three, the Garden City is a compact urban settlement, surrounded by an agricultural belt, that represents a reconciliation of town and country. The Garden City is autonomous and relatively self-sufficient, providing both affordable housing and employment opportunities within the settlement, and showing a clear separation of residential areas from industrial zones, but not from commercial establishments. Perhaps most importantly, the Garden City is an attempt to affect social change through physical urban development. The original model was a physical response to the crisis of the time that addressed the overcrowding and insalubrious conditions of the industrial city and generated a plan that prioritized a healthy environment. When contemplating a Garden City for the twenty-first century, three main axioms are identified to be retained in the updated model: the first is the reconciliation of town and country, second is a relatively self-sufficient model demonstrating autonomy within the mesh, and the third is the ability of the model to positively affect social change. In the updated twenty-first century Garden City, these axioms must be addressed in a way that responds to the current crisis and current cultural values.

## *6.21 The Reconciliation of Town and Country*

The disconnect between town and country that Howard identified persists to this day, justifying the continued advocation for the Garden City typology of compact, smaller settlements surrounded by an agricultural estate. This historic typology still holds relevance when addressing contemporary issues such as containing urban sprawl. However, there is one difference that must be addressed: based on the contemporary theory presented, the definition of "countryside" has

changed. The town and country of Howard's model represent a completely man-made landscape, indicative of the nineteenth century cultural perspective, where even landscape was viewed as a productive part of the industrial economy. When Howard exclaimed that "human society and the beauty of nature are meant to be enjoyed together,"[2] he is perhaps unaware of the impact that human society – settlements and agriculture included – has had on the environment. Today's landscape is still man-made, but the necessity of maintaining the health of natural ecosystems has been recognized as essential in order for human society to continue to "enjoy the beauty of nature." To this end, the twenty-first century Garden City proposes an addition to the marriage of town and country in the form of embedded ecosystems. The twenty-first century Garden City attempts to balance the needs of settlements, agriculture and embedded ecosystems in a new Town-Country Landscape Mosaic for the most harmonious outcome.

## *6.22 A Self-Sufficient Model: Autonomy Within the Mesh*

Howard's Garden City was relatively self-sufficient; it had its own municipal government and it provided affordable housing as well as employment opportunities for its residents. The agricultural estate also provided a portion of the food consumed within the town. In addition, Howard's model addressed water collection and distribution, energy production and waste recycling. The model, although relatively self-sufficient, was connected to surrounding Garden Cities via a fast and efficient transportation system.

None of the above elements would be out of place in modern day proposals for sustainable living, where emerging concerns over issues such as carbon emissions have produced a renewed interest in locally sourced food and resources. In today's globalized and interconnected mesh, it may be difficult if not impossible to achieve complete autonomy. The twenty-first century Garden City promotes self-sufficiency wherever

possible such as with local food and energy production but realizes that it may also be dependent on connections within the mesh for some of its resources.

The provision of local employment is a defining characteristic of the original Garden City that is often overlooked in later interpretations of the concept. With today's market shifting away from the industrial based economies of the nineteen-hundreds and towards technology and communications based economies, decentralised employment may actually be easier to fulfill today than in Howard's time. The rise of new sustainable industries presents the prospect of new job opportunities within the twenty-first century Garden City as well.

## *6.23 Affecting Social Change*

In response to the current crisis, the twenty-first century Garden City attempts to affect social change in an ecological capacity. The twenty-first century Garden City focuses on the development of systems that highlight the interconnectedness of settlements, agriculture and embedded ecosystems, previously established as the updated version of the town and country.

The systems laid out in Howard's model demonstrate a more linear, or mechanical, way of thinking which reflects the industrial society within which it was conceived. The industrial city, much like one of its factories, addressed resource extraction, the production and consumption of goods and production of wastes which were expelled into the environment. In light of the ecological paradigm shift, the contemporary crisis demands an alternate approach. The contemporary approach requires an understanding of the interconnectedness of both ecological and man-made systems. The expulsion of waste into the environment is no longer understood as something that is "over there" to borrow a phrase from Morton, but rather as an integral part of a larger system. An ecosystem is described as the interaction between biotic

and abiotic components that are linked together through nutrient cycles and energy flows. An urban settlement can be seen as operating like an ecosystem, with interactions between the natural and built environments. The result is a complex web of interactions rather than the linear assembly lines of the industrial past. Ecosystem thinking and circular metabolisms promote awareness of the interactions between man-made and natural systems, with an aspiration to reduce the impact of human mediated activities on the environment.

## 6.30 Design Parameters for the Twenty-First Century Garden City

In establishing an updated model of the Garden City, it is necessary to identify some fundamental assumptions that will guide the development. Principles that are characteristic of existing regions are used to inform the updated diagrams. The diagrams represent a fictitious region that has been designed to demonstrate as many different conditions as possible. When considering the new model, the following principles are assumed:

**One:** The model assumes a cultural paradigm shift where social harmony and moral enlightenment have given residents cause for concern over the degradation of the environment. The development of key features within the region such as renewable energy sources and waste reduction and reuse are predicated on the willingness of inhabitants to participate in reducing their ecological footprints on the land. In this way, the model retains a fundamental characteristic of the original Garden City, which is to provide a better, alternative way to live that responds to and addresses the modern-day crisis.

**Two:** A temperate climate that is conducive to agriculture is assumed. Warm summers and cold winters mandate one growing season per year, with an average temperature of ten degrees Celsius. Moderate precipitation is expected in all four seasons.

**Three:** The region is surrounded by similar regions, encouraging self-sufficiency to the extents possible within the mesh. Similar to Howard's Garden City, the updated version consists of a town and a supporting hinterland. As a part of its self-sufficiency, each twenty-first century Garden City aims to provide the majority of its own food, energy and water. It aims to dispose of its own waste and offset its own carbon emissions as well. In order to meet this requirement, the twenty-first century Garden City may be limited geographically to regions that fulfill all of the necessary conditions.

**Four:** The productivity of the region's territory is assumed to be operating at full capacity. The entire landscape is contributing to the sustainability of the region in the form of surface water, energy production, agriculture, waste disposal, forest, habitat and built environment.

**Five:** The twenty-first century Garden City will emulate the often overlooked population densities of the original Garden City. As discussed in Chapter Four, the population density of the town is quite high (7,500 people per $km^2$), with a lower density in the agricultural estate (100 people per $km^2$), and an overall density of 1,333 people per $km^2$.

**Six:** Unlike the original Garden City, the population of the twenty-first century Garden City is not fixed. Populations may vary in response to surrounding conditions. For example, high quality soils may be capable of supporting larger yields and therefore larger populations, while lower quality soils would be capable of supporting smaller yields and therefore smaller populations.

# 6.40 Twenty-First Century Garden City Systems

## *6.41 Water*

The twenty-first century Garden City assumes a steady supply of rain water and existing water tables that would be sufficient to support all agricultural and residential purposes of the estate. A drainage system will divert excess water away from agricultural fields to existing lakes and rivers or to storage reservoirs. This water can be used for irrigation in agriculture and within the town as well as for other non-potable uses. A treatment facility will provide potable water for residential use. Natural ecosystems are integrated into the drainage system to aid the process. Within the town, bioswales provide a low-impact method for managing storm water. Bioswales absorb water from nearby paved surfaces, slowing down the flow of the water and filtering it through plant roots and deep layers of soil. The plants and soil remove sediments, contaminants and nutrients, improving the water quality before it is returned to the water system of lakes and rivers. Wetland ecosystems can perform many of these same functions, but at a larger scale. Wetlands are land areas that are saturated with water and are often found adjacent to lakes and rivers. They are among the most productive habitats, supporting high concentrations of animals and many different species of flora. Both bioswales and wetlands perform functions naturally that benefit human settlements such as reducing water flow during storms effectively controlling flood water, removing pollutants from water runoff and providing recreation spaces for inhabitants.

## *6.42 Energy*

Energy in the twenty-first century Garden City is derived entirely from renewable resources. The effectiveness of different forms of renewable energy is dependent on geography. High altitude water sources can take advantage of the high productivity of hydro-electricity dams. The level of productivity drops with the altitude, making this form of energy more suitable to water rich regions with varying terrain. Flatter areas may benefit most from wind power, which also has a high productivity rate, but requires a certain minimum average wind speed to be a reliable and effective energy source. Photovoltaics are best suited to climates that receive maximum amounts of direct sunlight with minimum amounts of rain and clouds. Geothermal energy can be extracted almost anywhere on earth at low levels, due to the solar energy that is stored in the ground in warmer months. Enough heat can be extracted from shallow ground to heat individual homes, but higher temperatures and productivity rates are required for industrial applications. Productivity is highest near tectonic plate boundaries where the crust is thinner, making those regions ideal locations for geothermal energy production. Lastly, biofuels may be used in the twenty-first century Garden City. Some biofuels can be made from the waste materials of agricultural products. Biofuels from plant waste tend to have lower productivity rates but could be suited for predominantly agricultural areas where biomass may accumulate anyway and would otherwise be going to waste. Renewable energy production has an advantage in that it can take place on less productive soil. While soils that are rich in nutrients are best suited to agricultural purposes, energy production can be carried out in areas that have little to no ecological or agricultural value such as poor soil types or recovering landscapes. In addition, it can be carried out in combination with other land uses, such as photovoltaics on rooftops in the built environment, and biofuels that are recycling agricultural waste products, thus increasing the overall productivity of the region.

## *6.43 Agriculture*

In today's extensively urbanized world, an agriculturally centered model might seem archaic; however, the agricultural estate contains many attributes that can benefit the newly defined environmental crisis. The agricultural belt, as defined by Howard, enriched the lives of inhabitants through beauty, fresh air and recreation. It also provided work opportunities and food for the town. The estate was made up of a mixture of large and small holdings that accommodated many different types of farming. The beginnings of a circular metabolism can be seen in Howard's proposal to return waste from the town to the agricultural fields in the countryside. The present-day relationship between the town and country is not the one that Howard envisioned. Large industrial farms have replaced many of the small holdings. Food travels farther distances to reach global market places, creating an unsustainable, linear process of production that completely disconnects the town from the country. Recent trends concerning food production are strangely reminiscent of Howard's original ideas, favouring organic and local food production as a sustainable alternative to industrial farming.

Just as in Howard's Garden City, the agricultural belt of the twenty-first century Garden City provides a barrier to growth and a buffer of green space for the benefit of the inhabitants. In order to be self-sufficient, the agricultural estate must be able to feed the entire population. If the population of the town increases, the agricultural estate must increase proportionally to maintain the ratio of agricultural productivity to residents. Switzerland has adopted a policy similar to this, where the ratio between the population and surface area of land devoted to agriculture must remain constant.[3] In order to expand urban areas, new areas of agricultural land must be added as well. The population of the town then becomes dependent on the area and productivity of the land. Diets in different regions would be dependent on local variety, as different crops are better suited to different growing conditions.

With landscape mosaics becoming the new normal, questions are raised concerning how to continue farming in an increasingly dense and populated world. In areas with poorer yields or with significantly growing populations, greenhouses may be used to increase production. Greenhouses add flexibility to food provision because they can be placed on poor or recovering soils outside of the town, or they can be placed directly within communities as a further connection between town and country. Also, greenhouses are not subservient to weather and typical growing seasons, so they are able to produce food all year round.

### *6.44 Waste*

Contemporary cultures are accustomed to a large supply of product choice and availability, resulting in high amounts of waste being produced on a per capita basis. In the twenty-first century Garden City, efforts are made to reduce the amount of waste being produced. The proximity of agriculture to urban areas ensures faster transport to markets, reducing transportation costs and emissions. Shorter transport times coupled with improved storage capabilities reduces food waste in the updated Garden City. Compost and recycling facilities divert as much waste from landfills as possible. Organic waste is composted and retuned to agricultural fields as a source of high nutrient soil. The composting process releases methane gas which can be captured and used as a source of green electricity. An aggressive recycling plan similar to that of San Francisco is in place in the twenty-first century Garden City. Currently in San Francisco, approximately fifty-five percent of their waste is recycled or reused, with a goal of producing zero waste by the year 2020.[4] The recycling and reuse of waste products encourages circular metabolisms and ecosystem thinking as new products are being created from what would otherwise be considered waste materials.

## *6.45 Forests and Natural Ecosystems*

In the anthropogenic landscape, natural habitat and biodiversity are shrinking in response to development pressures. In recent years, the greatest threat to natural ecosystems has been the inefficient and wasteful nature of land usage.[5] Population increases, subsidies for home-ownership and the dominance of the automobile have contributed to the sprawling, land intensive patterns of development.[6] The ecological crisis identified for the twenty-first century expresses a desire for a more sophisticated view of nature than in Howard's time. The twenty-first century Garden City attempts to reconcile the needs of settlements, agriculture and embedded ecosystems. The dense and compact town is contained by an urban growth boundary that prevents inefficient, sprawling land use. The preservation of vegetation and river corridors, of species migration routes and existing forests and wetlands are taken in to consideration when planning the town. Healthy natural ecosystems provide benefits for human settlements as well. For example, existing mature forests are important for species habitat, but they also serve as carbon sinks that offset emissions from the twenty-first century Garden City town. Similarly, bioswales and wetlands act as natural drainage systems in the updated Garden City that filter water runoff and delay its release into streams and rivers. Methods for restoring ecosystem health are also important in the twenty-first century Garden City. Remediated landscapes encourage rehabilitation of contaminated landscapes that can then be transformed in to parks for recreation.

## *6.46 Population and Density*

There is much debate over ideal city size amongst architects. Smaller settlements provide a walkable, human scaled community, but may not be adequate for providing a stable and diverse job market and economy. Larger settlements can support more diverse employment oppor-

tunities but have other disadvantages such as increased travel distances, traffic congestion and pollution. Likewise, cities with low densities may offer an abundance of open space but limited public services, while cities with exceedingly high densities may have lots of public services but are overcrowded and congested. Howard seemed to think that a population of 30,000 people was ideal to offer all of the social and employment advantages of the city while still retaining the healthful benefits of the country. The twenty-first century Garden City emulates both the size and density of Howard's original model as a method of comparison between the two, but with the added caveat that the population may vary if resources allow for it. For example, in areas of particularly fertile soil, an increased agricultural yield may be capable of supporting a larger population. In the quest for a sustainable urban form, Howard's preferred population of 30,000 people is unknowingly reproduced quite often as a population that provides a sufficient threshold for many public facilities.[7] This assertion is generally followed with a proposal for a region that contains a cluster of small settlements around a larger settlement of between 150,000 to 250,000 people that are connected and well served through a transportation corridor. This regional structure, favored by many sustainable initiatives, is remarkably similar to Howard's Social Cities region and as such, functions as the basic regional structure for the twenty-first century Garden City as well.

## *6.47 Cultural Program*

The twenty-first century Garden City town demonstrates sustainable practices in its planning. The town is centred around a dense urban node of commercial and mixed uses with a fast and efficient transportation network. Parks and gardens are located throughout the town in each community, providing open space for recreation. The sustainable principles of the twenty-first century Garden City are in response to heightened environmental awareness and the current environmental

crisis.

There is a distinct program shift in the twenty-first century Garden City that coincides with the ecological crisis of the time. Public transportation as well as bicycling and walking are encouraged over private automobiles to reduce emissions and promote better health respectively. Sustainable options such as renewable energy and waste and water recycling reduce the impact of the twenty-first century Garden City on the environment. Residents are reconnected with the country through proximity for recreational purposes and also through local food opportunities such as farmer's markets in town and participation in CSA's, both of which support a local economy. Primary and secondary industries have shrunk considerably since Howard's time, with many more people now employed in tertiary industries. However, new forms of light industry are emerging in relation to green technology. The town solicits investment by sustainable enterprises, such as green technology firms who will become leaders in research and development for environmentally friendly solutions. The agricultural estate of the twenty-first century Garden City encourages protection and conservation of sensitive areas as well as remediation of contaminated sites. The shift in program is indicative of changing cultural values, however, the response to the updated crisis of the time retains the strong connection between town and country that was so valued by Howard.

## *6.48 Transportation*

At the end of the nineteenth century, transportation was most commonly achieved by foot or by rail. Howard's model did not anticipate the widespread adoption of the automobile in the coming century. Advances in high speed rail and private transportation have contributed to the sprawl of existing cities rather than to the development of new ones.[8] Traffic congestion caused by rising car ownership has in the past encouraged further federal investment in highway infrastructure, at the

expense of public transit options, which often only exacerbated the problem.[9,10] The growing car culture has made accessibility for pedestrians and public transport more difficult and is a large contributor to polluting emissions. Additionally, it is now appreciated that car ownership can be socially divisive, with adult license holders making up only forty percent of the population.[11] The issues raised by growing car ownership vindicate many of Howard's ideas on transportation, giving them a renewed relevance.

The twenty-first century Garden City encourages public transportation over private vehicles. The compact nature of the development puts residents within walking distance of most destinations, and the community is supported by a fast and efficient public transportation network. A central transportation hub connects each twenty-first century Garden City to its neighbours in the mesh. To encourage self-sufficiency within the twenty-first century Garden City as much as possible, it must retain a certain degree of physical separation from its closest neighbours to discourage frequent commuting. This was a criticism of many New Towns that were too close to major metropolitan centres, and as a result, developed in to 'bedroom communities' with little to no industry or economy within the town itself. In Howard's time, a separation of 56 km between Letchworth Garden City and London was sufficient to ensure relative autonomy of the first Garden City, however, with the introduction of motor vehicles and more recently, high speed trains, the separation distance needs to increase. A part of the twenty-first century Garden City's transportation network includes high speed trains travelling at 160 km/h, and maybe even faster[12], that connect neighbouring Garden Cities in the mesh. The agricultural estate of the twenty-first century Garden City accommodates the entire ecological footprint of the its population and therefore is larger than the original. The increase in speed of modern rail networks is advantageous for covering these longer distances in a relatively short amount of time, allowing each twenty-first century Garden City to retain its relative autonomy while still being connected within the mesh.

# 6.50 The Twenty-First Century Garden City Model

## *6.51 A Unique Combination of Contemporary Proposals*

The innovation in Howard's Garden City was the unique way in which he combined existing ideas of thinkers from his time. In proposing the Garden City, Howard drew on Buckingham's plan for a model town, the Home Colonies of Wakefield and Marshall, and the land nationalization strategies of Spence and Spencer. In much the same way, the following proposal for an updated version of the Garden City is drawing on contemporary references and theories, relating to modern town planning and the previously established environmental crisis of the time. The town planning ideas presented here are heavily influenced by Peter Calthorpe's Transit Oriented Developments. As a Garden City descendant, Calthorpe's TODs demonstrate many qualities that are characteristic of Howard's original scheme, such as greenbelts and growth limits and compact urban settlements, with walkable communities and good access to public transit. These town planning ideas are complimented by the ecological theories that are addressing the current crisis of the time. A series of diagrams are generated to demonstrate the integration of town, country and embedded ecosystem elements to produce a twenty-first century Garden City model. The diagrams are presented as triptychs, showing first the ideal town, then the existing countryside including its embedded ecosystems, and lastly the harmonious integration of the man-made and natural landscapes.

## *6.52 The Anthropogenic Town and Country*

The reader is asked to imagine a landscape mosaic containing settlements, agricultural components and embedded ecosystems. The

settlement is both agriculturally and commerce based, providing a mixed and diverse economy, making it attractive to all positions of the social scale who desire to lessen their ecological footprint on the land and to reconnect with nature. At present the settlement shown is a compact town of approximately 30,000 people, with another 2,000 people living in the agricultural estate. The population espouses Howard's chosen town size, which is often utilized in idealized town planning schemes. The population is large enough to provide a sufficient threshold for efficient operation of many facilities within the town without resorting to extremely high densities,[13] but is also small enough to function as a walkable scaled community. It also provides a relatively close proximity to both the urban town centre and the countryside, making it a suitable population for demonstrating the twenty-first century Garden City principles.

The town itself is a compact settlement of approximately 4 $km^2$ (1,000 acres), emulating Howard's town density of 7,500 people per square kilometre. The town sits in an estate of approximately 450 $km^2$, much larger than Howard's proposal, that is a mixture of large and small agricultural holdings, small villages and embedded ecosystems. The size of the updated Garden City estate is equal to the ecological footprint of its inhabitants, as discussed in Chapter Four, making the twenty-first century Garden City relatively self-sufficient in producing its own food and energy, in providing its own water, recycling its own waste and offsetting its own carbon footprint.

*Figure 6.01* shows the idealized twenty-first century town, sitting in its estate. The town is shown to have a dense mixed-use commercial, office and residential core, surrounded by lower density homes and gardens. The centre is marked by a transportation hub as well as the larger public buildings such as the town hall, concert hall, theatre, hospital and library. Also in the centre of the town is a recreation space for residents in the form of a large central park. All residents are within a 750 metre distance, or a ten minute's walk, from the park, making it easily accessible for all. The differing densities within the town provide a variety of

residential options such as apartments, townhouses and single-family homes, to suit the growing diversity of modern lifestyles. The town is limited by an urban growth boundary that protects the open countryside by encouraging densification within the town. Large boulevards divide the town into smaller communities and provide direct access from the lower density residential areas to the town centre, where many of the commercial and employment opportunities are centered, as well as to the main transit hub. While walking and cycling are encouraged within the communities of the town, public transportation is provided for longer journeys. Public transportation runs along the boulevards, creating nodes within each community for public amenities such as schools and small commercial enterprises, and converging on the main transit hub in the town's centre. Public transport lines are also extended out into the countryside to increase accessibility for both employment and leisure activities. While many residents are employed within the town and its estate, the centrally located transit hub also provides fast and efficient connections to neighbouring twenty-first century Garden Cities. The rail lines and the regional highway facilitate transport of both goods and people throughout the region. They also separate the industrial zone of the town in the north from the residential and commercial areas in the south. The new industries found in the industrial zone differ from those found in Howard's drawings. The industrial activities of the twenty-first century Garden City support the crisis of the time with recycling, composting and water treatment facilities. Light industry fosters innovations in sustainable technology which are supported by research and development initiatives that may range from clean energy to agricultural innovations.

The agricultural estate is a key component of the Garden City concept that is often overlooked in its descendants. The estate acts as a greenbelt that provides a buffer between neighbouring Garden Cities, encouraging environmental protection and agricultural uses while also defining a defensible urban limit to discourage suburban sprawl. The region shown complies with the required temperate climate, experien-

cing one growing season and adequate precipitation. The nutrient rich soil of the plains in the region are conducive to growing grains, fruits and vegetables, while the undulating, hilly terrain is better suited to livestock rearing pastures. Consistent with Howard's diagram, these agricultural elements are shown on the plan as large and small holdings, cow pastures and fruit farms. Greenhouses are a new program addition that supplement the agricultural industry and have the added benefit of producing food all year long as well as being able to grow foods that are not endemic to the region, making the twenty-first century Garden City relatively self-sufficient.

The twenty-first century Garden City shows a distinct change in program from the original. In response to the crisis of the time, the elements of social harmony and moral responsibility are no longer shown through the philanthropic institutions of Howard's model, but manifest instead as sustainable and ecological paradigms such as vegetation corridors, remediated landscapes and conservation areas. In the twenty-first century Garden City, the agricultural estate provides not only food security for the town but has been enlarged to satisfy all the aspects of the ecological footprint for each of its inhabitants as well. Similar to Howard's hydro powered Garden City, this agricultural estate supports renewable energy production, referred to in the diagram as energy farms, for cleaner and greener energy use within the town. All of the energy consumed in the twenty-first century Garden City is produced by renewable resources, reducing the ecological footprint of the town. The type of renewable energy produced is dependent on geological factors of the site. Wind turbines are shown in the diagram as best suited to the relatively flat terrain. Both water and waste management systems reduce the anthropogenic impact of the town by contributing to treatment and reuse of nutrients, materials and resources within the estate, promoting a circular metabolism within the twenty-first century Garden City.

***Figure 6.01***
The 21st Century Garden City: The Anthropogenic Town and Country

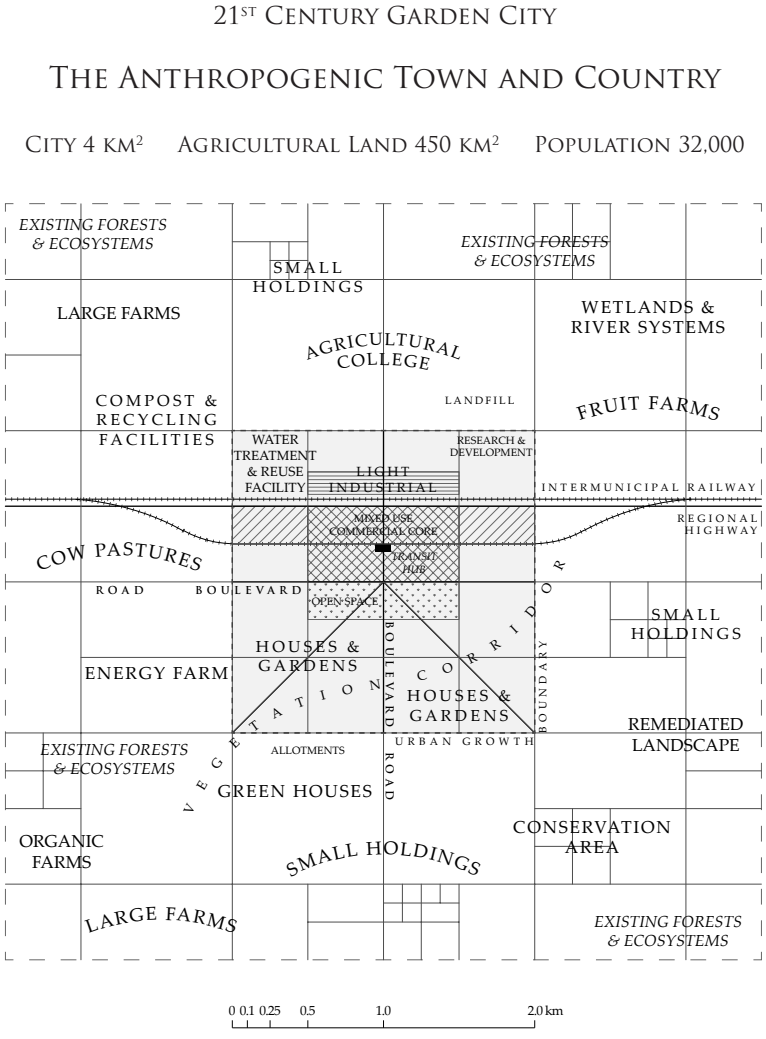


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***Figure 6.02***
The 21st Century Garden City:
Embedded Ecosystems

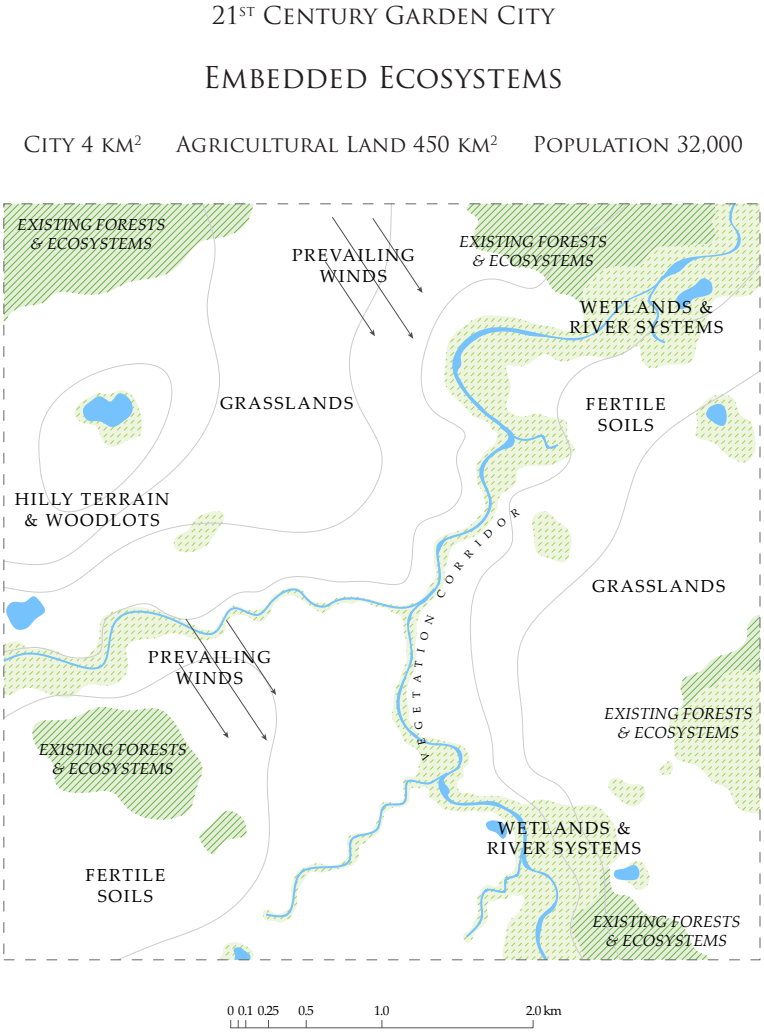


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***Figure 6.03***
The 21st Century Garden City:
The Town-Country Landscape
Mosaic

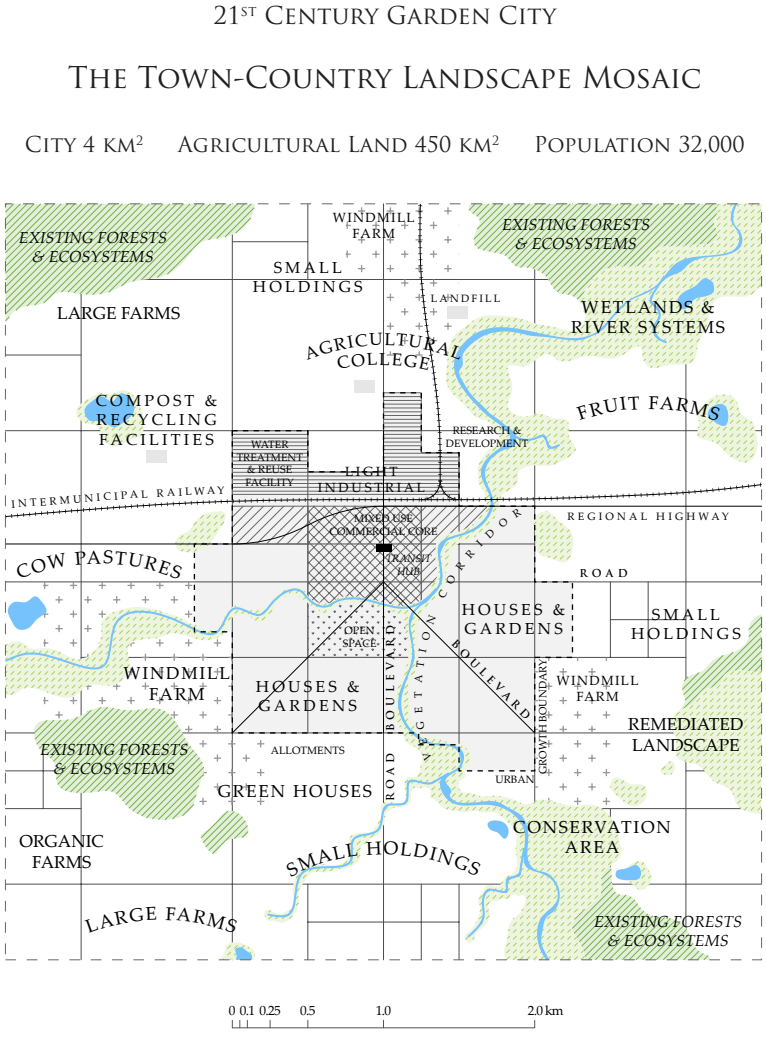


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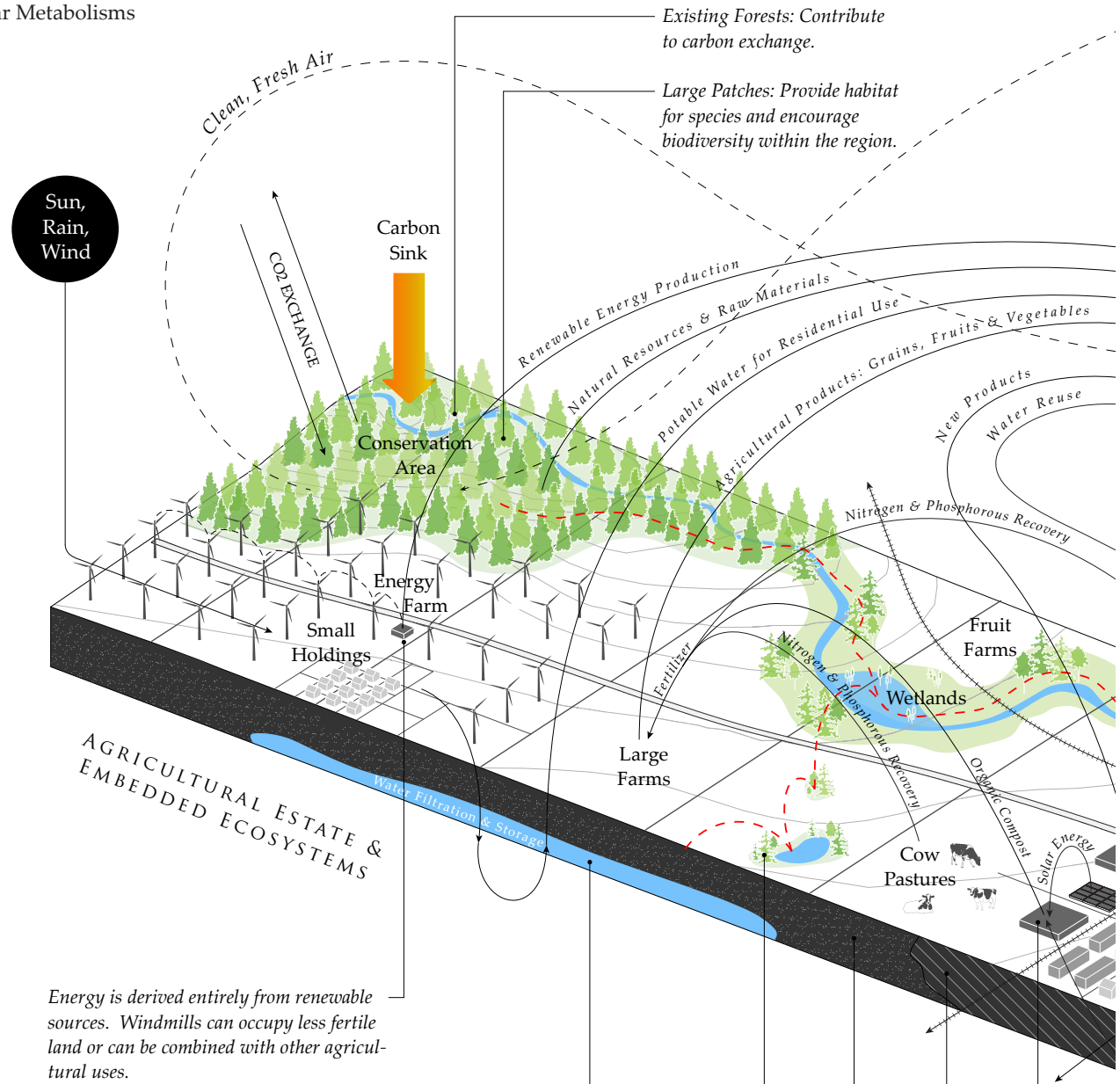
***Figure 6.04***

The 21st Century Garden City: Circular Metabolisms



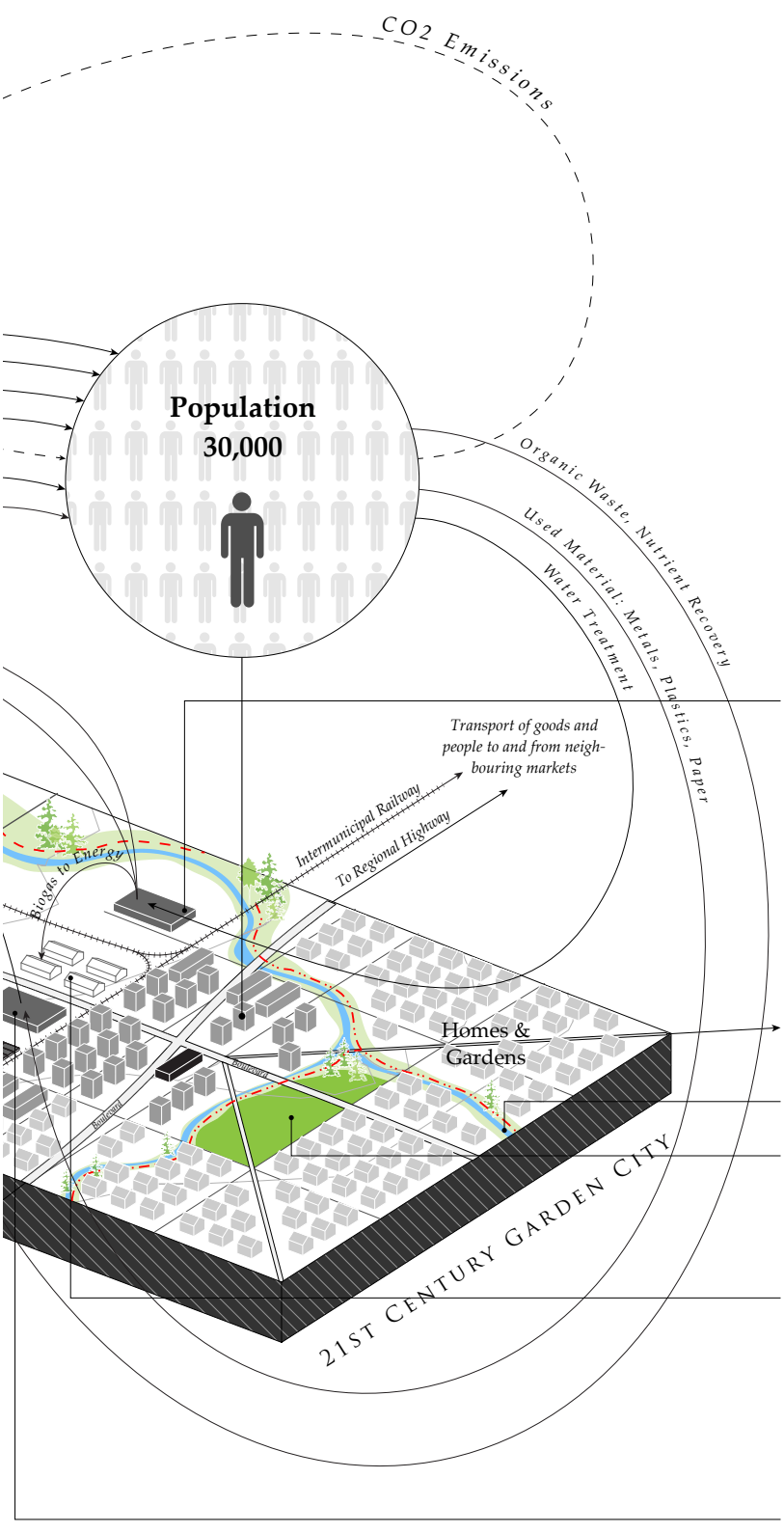

*Energy is derived entirely from renewable sources. Windmills can occupy less fertile land or can be combined with other agricultural uses.*

*Water Filtration and Storage: Aquifers provide potable water for drinking and domestic purposes.*

*Small Patches: Act as stepping stones between habitats, contributing to heterogeneity within species and recolonization.*

*Productive, nutrient rich soil is conducive to agriculture.*

*Lower quality, less fertile soil used for industrial and urban uses.*




## Legend

Land Use

- Industrial
- Mixed Use
- Office
- Residential
- Transit Hub
- Greenhouses
- Open Space
- Recreation Trails
- Species Migration

*Water Treatment and Reservoir: Water from the town is treated and stored for reuse. Valuable nutrients are recovered for reuse in other industries. Methane, a by-product of the process, is used as biogas to heat nearby greenhouses.*

*Public Transit lines extend out into the countryside to increase accessibility for both employment and liesure activities.*

*Vegetation Corridors permeate the town.*

*Central Park: Recreation space connects to the vegetation corridors. All residents from both the high and low density areas are within 750 m (10 minute walk) of the park.*

*Greenhouses: Exonerated from typical growing seasons, greenhouses suppliment the agricultural industry by producing both local and exotic foods all year long. Greenhouses can take advantage of poor or recovering soil to increase yields and overall productivity of the region.*

*Recycling Facilities create new products out of waste materials.*

*Compost Facilities recycle organic waste, recovering valuable nutrients.*

## *6.53 Embedded Ecosystems*

Thus far, it is predominantly the anthropogenic aspects of town planning that have been discussed. This is essentially as far as Howard's industrial era model goes. Many of his ideas resonate with contemporary sustainability agendas such as his use of hydro power, recycling of waste materials, local agriculture and walkable communities. However, the systems that he describes are entirely man-made, from the drainage system with its freshly dug canals and reservoirs to alterations in topography that use the excavated canal soil, to the labelling of "new" forests on his diagrams. The desire to design and shape natural systems is consistent with the industrial era viewpoint toward nature as a vast, resilient and limitless cache of resources, but is out of sync with the modern day ecological crisis. With reference to Morton's mesh theory, the twenty-first century Garden City addresses embedded ecosystems as a valuable part of the landscape mosaic. *Figure 6.02* shows a hypothetical landscape made up of large and small patches and vegetation corridors. Using Forman's principles for land use analysis, existing land uses such as forests, wetlands and river systems are evaluated and incorporated into future land use planning and allocation. Large and small patches of forest, lakes and wetlands provide habitat for species and encourage biodiversity within the region, while the river system and vegetation corridors facilitate movement between them. In addition, these patches of existing vegetation act as carbon sinks that offset human impact from the town. Likewise, lush vegetation such as existing wetlands contribute to drainage and storm water management as well as to the cleaning of water courses in the region, all the while providing a diverse and productive ecosystem.

### *6.54 The Town-Country Landscape Mosaic*

The existence of these embedded ecosystems is taken into consideration when planning the twenty-first century Garden City in order to find the most favourable configuration of road networks and settlements while protecting existing habitats, natural resources and water sources. This optimal arrangement is shown in *Figure 6.03*, where the idealized town and the country with its embedded ecosystems are merged, to create the Town-Country Landscape Mosaic. The complex and entangled mesh of the Town-Country Landscape Mosaic is shown in *Figure 6.04*, demonstrating the interconnectedness of urban and ecological processes. The circular metabolisms that are established help to restore the harmonious relationship between a fully integrated town and country that Howard sought in his original model.

## 6.60 Social Cities in the Mesh

The mesh operates on many different systems and on many different scales. To extend the mesh beyond the scope of one twenty-first century Garden City is to further increase the complexity and interconnectedness of natural and man-made systems. Just as Howard imagined each Garden City as a part of a larger, Social Cities Region, the twenty-first century Garden City is connected to its neighbours in the mesh. There is no hierarchy in the mesh; each point acts as both a centre and an edge. The mesh creates a web where each point represents a meeting between strange strangers. According to the established design parameters, the twenty-first century Garden City is surrounded by similar regions, each taking advantage of local conditions to produce unique versions of the Garden City. Each twenty-first century Garden City fulfills the core Garden City ideals of a compact settlement with surrounding agricultural hinterland that provides a high degree of self-sufficiency for inhabitants while responding to the crisis of the time. An ideal arrangement of nine

twenty-first century Garden Cities is shown in *Figure 6.05*, where each twenty-first century Garden City is shown as a compact settlement with its corresponding agricultural estate. Although intended to be largely self-sufficient, the diagram shows many physical and intangible connections, both man-made and natural, that link the twenty-first century Garden City to its neighbours in the mesh.

Roads and public transportation networks exist within the region. While bus and metro systems operate on a local level, high speed trains connect the region, providing fast and efficient transportation between town centres. Although local employment is encouraged in the twenty-first century Garden Cities, rapid transit opens up the region while still allowing the twenty-first century Garden Cities to retain the area required for their agricultural estates. Based on high speed travel times of 160 km/h[14], the twenty-first century Garden City's high speed inter-municipal railway allows residents to reach a neighbouring Garden City in just under twelve minutes. Rapid transit affords residents the luxury of living in a community with a small town feeling but with all the conveniences of a large city. Communication capabilities represent an intangible connection that is new to the twenty-first century Garden City when compared to Howard's model. Never before has society as a whole been as connected through telecommunications and various platforms of media, diminishing old feelings of isolation in the countryside as well as opening up new possibilities for remote employment.

In addition to man-made networks, the self-sustaining region is connected through its ecology and embedded ecosystems. A theoretical landscape is introduced in *Figure 6.06* to demonstrate the influence of the crisis of the time on the arrangement of twenty-first century Garden City towns. Patches and corridors of rivers, lakes, forests and wetlands combine to provide habitat and migration routes for species as well as provide natural resources for the twenty-first century Garden City towns. Forests and wooded areas are harvested as materials for use in the towns and reciprocally act as carbon sinks for carbon emissions from the towns. These resources are shared among all twenty-first century

***Figure 6.05***
The Sustainable Cities Region:
The Mesh

21ST CENTURY GROUP OF BIODIVERSE SUSTAINABLE CITIES

THE MESH

TOTAL AREA 4,050 KM² POPULATION 288,000

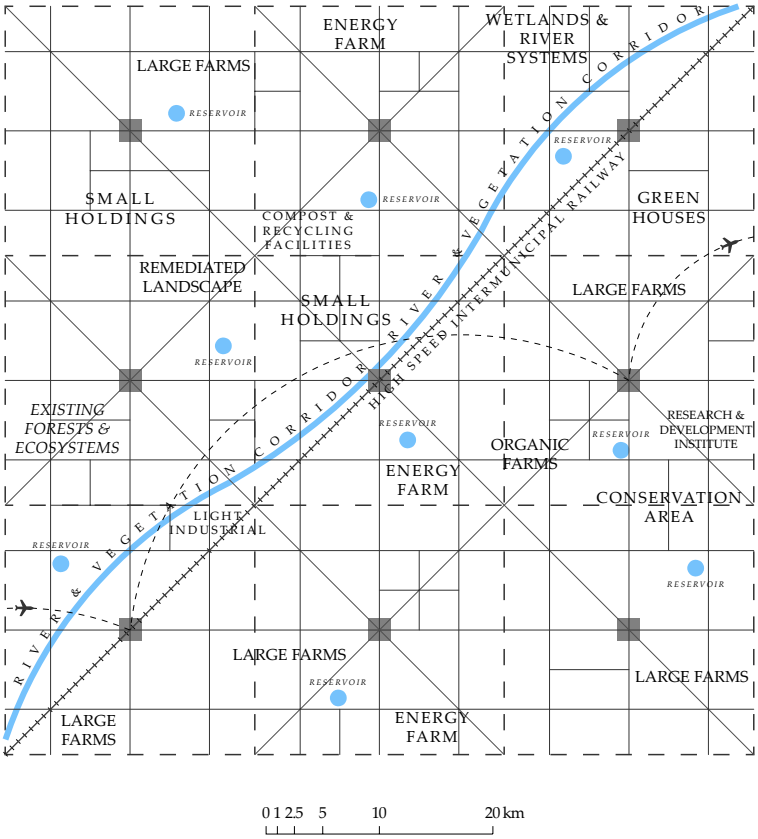



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*Figure 6.06*
The Sustainable Cities Region:
Embedded Ecosystems

21ST CENTURY GROUP OF BIODIVERSE SUSTAINABLE CITIES

## EMBEDDED ECOSYSTEMS

TOTAL AREA 4,050 KM² POPULATION 288,000

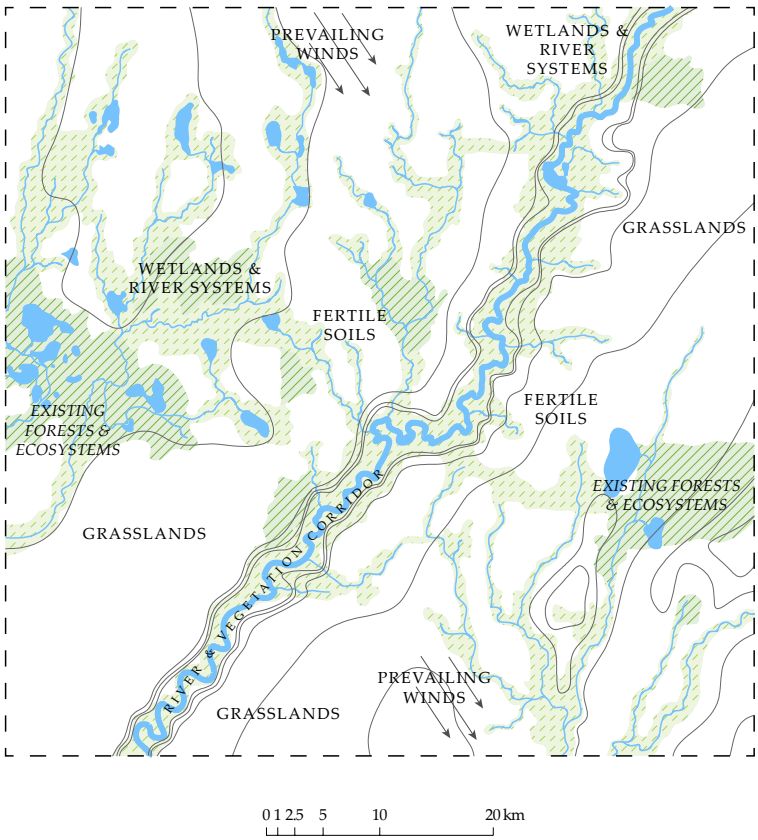


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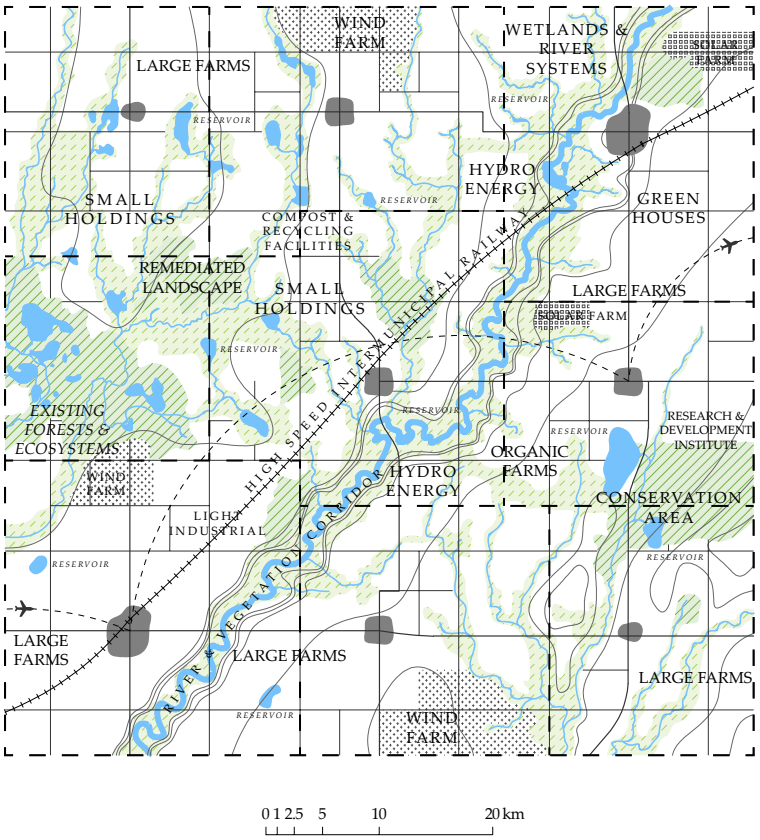
*Figure 6.07*
The Sustainable Cities Region: The Town-Country Landscape Mosaic

21ST CENTURY GROUP OF BIODIVERSE SUSTAINABLE CITIES

## THE TOWN-COUNTRY LANDSCAPE MOSAIC

TOTAL AREA 4,050 KM² POPULATION 288,000

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Garden Cities and beyond. The geography of flowing rivers, the fluidity of the atmosphere and the wide-ranging habitats of local species demonstrate the interconnectedness of the mesh and is incentive for each twenty-first century Garden City to reduce its environmental impact and its ecological footprint.

Existing patches and corridors as well as existing forests and ecosystems are evaluated according to Forman's principles and used to inform land use planning and potential locations for twenty-first century Garden Cities. Elements of the ideal town and the ecological components of the mesh are combined in *Figure 6.07* to show a group of biodiverse and sustainable cities. Within this anthropogenic landscape mosaic, town size varies proportionately with the agricultural estate, depending on the carrying capacity of the land. Larger towns mean larger estates and therefore access to more resources. Activities within the agricultural estates correspond with the most optimal use of the land. For example, large flat plains are best suited to large farms and agriculture. Smaller operations such as small holdings and organic farms are located on smaller plots of land. Areas with poorer soil and direct access to the railway are suitable for light industrial uses. Towns are generally located within proximity of bodies of water to act as reservoirs and are supplied electricity from various sources of renewable energy, which are dependent on geography and climate. Large areas of forest, wetlands and river systems are protected to preserve the vitality of existing ecosystems. Forests and wetlands aid in the purification of air and water respectively after it is metabolized in the town. Remediation of contaminated landscapes is also encouraged to repair them as much to their original state as is possible within an anthropogenic landscape. In conjunction, the above systems have the potential to create a complex, interconnected mesh of both natural and man-made systems. A landscape mosaic begins to emerge in the twenty-first century Garden City, showing both large and fine-grained regions dedicated to the sustainability of both the urban and natural interests in one all encompassing ecosystem.

## 6.70 Conclusion to Chapter Six

Throughout this thesis the original Garden City model is deconstructed, evaluated and then reconceptualized to reflect contemporary values. This chapter demonstrates a rigorous application of the original Garden City principles to the present-day ecological crisis. The twenty-first century Garden City systems explored in Section 6.40 show nothing that is unusual or revolutionary, but when they are combined, each system relates to and supports the others, making the whole greater than the sum of its parts. The updated model answers a demand for a multi-factorial approach to urban development and environmental management that addresses land uses, public transportation planning, greater energy efficiency, water treatment and distribution, reduction in waste and pollution, and ecological conservation. The result is a model for the twenty-first century that mixes both agricultural and urban functions in the marriage of town and country while also respecting local ecosystems. Addressing growing environmental concerns has implications for a renewed call for sustainable stewardship of the biosphere, returning the virtues of social harmony and moral responsibility to the twenty-first century Garden City.

When addressing the crisis of the time, contemporary theory invoked in this thesis reveals a desire for a more sophisticated view of nature. In the present human curated world of the Anthropocene, contemporary theory invites a new perspective, where nature is viewed as systemic in its own right, resulting in the marriage of the town, the country and its embedded ecosystems which together make up the landscape mosaic. The linear metabolisms of the industrial era have been replaced with circular metabolisms whose components interact to create a healthy, diverse and sustainable environment, where human interests are balanced with the protection and preservation of natural systems. Through the systems introduced in the twenty-first century Garden City, the emerging mesh-like framework presents a more fluid view of the

town and country that acknowledges their interactions and interdependencies. The systems also extend the usefulness of greenbelts to include ecological and ecosystem value in addition to agricultural production. Increasingly, greenbelts have become important ecological zones because they provide protection from development pressures for nature reserves, conservation areas, high grade agricultural land and special ecological habitats.[15]

A functioning agricultural estate was a vital component in Howard's original model but was one of the first elements to be lost during the many transformations and reinterpretations of the concept. The twenty-first century Garden City restores the agricultural component to the model and proposes a degree of self-sufficiency that would offset the ecological footprint of the town. It is recognized that this presents a challenge for western developments whose impact on the environment often extends well beyond any locally defined notion of a rural hinterland. While the idea of self-sufficiency may seem anachronistic in today's increasingly globalized world, it is a concept being revisited by sustainable thinkers. Communities that produce their own basic services can significantly reduce transportation needs thereby lowering pollution emissions. Contiguous production translates in to more local businesses and jobs which support the local economy and retain capital within the community. The twenty-first century Garden City attempts to balance the extremes of idealized self-containment and complete global dispersal by promoting self-sufficiency wherever possible, but still recognizing the advantages of being connected in the mesh.

The agricultural component is also limiting in that the updated Garden City would be constrained geographically to regions that can support it. Within such regions, the physical appearance of the Garden City may vary depending on other geological features, such as climate, humidity, and precipitation. For example, a twenty-first century Garden City on the prairies of the Midwest that specialized in grain production

and livestock rearing would look very different from a twenty-first century Garden City in the temperate climate of the Mediterranean, where prominent forms of agriculture include fruit orchards, olives and figs.

This proposal imagines an alternative to present day metropolises, where smaller communities operate somewhat independently, but remain connected to the region through the multifaceted mesh. The model is depicted as a new settlement for simplicity, but in application the concept could also be extended to existing communities. The inherent complexity of the original Garden City model lends itself well to new interpretations. The model presented here does not offer a singular solution but instead provides a framework to guide regional and community development. It promotes a sustainable urban form, consisting of communities with moderate densities and mixed uses, that are well connected in the mesh through public transportation and whose needs are balanced with those of local ecosystems. The holistic approach of the twenty-first century Garden City resonates with the aspiration of Howard's Garden City. The framework introduced here presents a vision for the twenty-first century that projects Howard's model and his ideas in to the future. This reinterpretation of the Garden City for the twenty-first century continues its influence on urban settlements by fulfilling an objective to inspire the collective imagination of society, by bringing positive awareness to the current crisis and offering an innovative solution.

## *Endnotes*

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12 Hall and Ward, *Sociable Cities*, 162.

13 Hall and Ward, *Sociable Cities*, 145.

14 Hall and Ward, *Sociable Cities*, 162.

15 Robert Freestone, "Greenbelts in City Planning and Regional Planning," in *From Garden City to Green City*, ed. Kermit C. Parsons and David Schuyler (Baltimore; London: The Johns Hopkins University Press, 2002), 94,97.

# Thesis Conclusion

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In summary, this thesis looks at the viability of updating the historic model of the Garden City to address the contemporary environmental crisis and current social values. Modern town planning evolved out of an attempt to deal with the insalubrious conditions created in industrial towns during the nineteenth century. The Garden City was a comprehensive model that embraced the two antithetical schools of thought which had developed to address conditions of industrial towns. The first of these methods was utopian, with subscribers such as Owen and Fourier, who believed that planning must begin again from scratch to achieve the desired social outcome.[1] In contrast, the second method was utilitarian, appealing to specialists and officials who introduced legislation regarding new health regulations and services as a means of best practice.[2] Howard's Garden City is a rich resource for study because it uniquely combined these two approaches to produce a model of urbanism that brings together both the social aspects of utopian style models with the common sense of best practices. In doing so, it was one of the few models of urbanism, if not the only one, that brought together all of the disparate aspects of the industrial world, and potentially the post-industrial world as well. Through analysis, the Garden City is revealed to be an inherently complex model. Similarly, the twenty-first century Garden City presented in this thesis is utopian in its description as a new town, as well as in its approach to social aspects of human inhabitation of public space such as density, proximity to green space and town organization. The model also demonstrates principles of best practice when addressing agriculture and its relationship to the town, the infrastructure of energy, water, waste, and transportation, as well as the presence of industry and economy within the town.

Peter Hall asserts that the Town-Country Magnet has been overwhelmingly attractive, causing people to flock to the outskirts of large cities by the millions.[3] The real problem, he continues, is that the planning system which emerged in the early twentieth century

failed to provide for it as Howard suggested, leaving the inhabitants with the worst attributes of both the Town Magnet and the Country Magnet instead of the best.[4] In revisiting Howard's *To-Morrow*, the twenty-first century Garden City draws attention back to the original values and concepts promoted by both the Garden City and the Social Cities region. The concepts displayed in the twenty-first century Garden City model provide a highly adaptable urban framework that combines systems of social, agricultural, infrastructural, industrial and ecological elements. Similar to Howard's proposal, the diagrams produced for the twenty-first century Garden City are not intended as a singular solution, but should be interpreted instead as a critical framework that structures relationships between the constituent parts. The intent of the twenty-first century Garden City is to provide a more effective planning mechanism at the regional and municipal scales. Naturally, if the twenty-first century Garden City were to be built, it would look very different from the diagrams, but the general structure of the framework and the relationships established within it would remain the same. The model of the twenty-first century Garden City presents a framework that supports the formulation of a new ecologically specific settlement, but it also allows for a serious critical evaluation of how one might retrofit existing communities.

There are some new challenges faced by the twenty-first century Garden City that would not have been encountered by Howard's model. Perhaps the most pressing issue to overcome is that of car ownership. No matter how efficient or well designed a public transportation system is, there will always be a certain percentage of the population that prefers to commute by car. Another major challenge is the provision of employment within the town; this is a key principle that was often overlooked by Garden City progeny. A population of approximately 32,000 people is preferable for creating a walking scaled community, but it has proved itself less sufficient in providing an adequate range of jobs and services.[5] The size of the twenty-first century Garden City in itself is questionable. It can be argued that advances in building standards and sanitation are amenable to larger populations and maybe even greater densities. The challenge here will be to accommodate population increases

without losing the quality of the walking scaled community or the agricultural and ecological characters of the surrounding hinterland that define the new Town-Country Landscape Mosaic. Lastly, something that was not discussed in this thesis is an economic strategy and a method for implementation. Howard's Garden City was self-financed and self-governed. It promoted wholesome values of participation and co-operation but ultimately, its implementation was limited. Howard distrusted government in town planning,[6] however, it is recognized that this would be necessary to establish a standard as well as for widespread adoption and implementation. Most likely an effective implementation strategy would require input at both the national and municipal levels.

Despite being designed for a specific cultural milieu, the complex nature of Howard's Garden City lends itself well to reinterpretation. While the world has changed almost beyond recognition since Howard's time, his message still contains a startling relevance.[7] Howard's model primarily addressed issues of human health, but it is remarkable how many of his solutions resonate with contemporary sustainable planning practices over a century later, such as compact walking scaled settlements with moderate densities, the provision of green space and the integration of town and country. The commonly accepted definition of sustainability refers to the ability to create and manage cities in such a way that they can meet the needs of the present day without harming the interests of those who will live in them in the future. Howard's model predates this modern definition; however, this is precisely the intent of the Garden City concept.[8] With contemporary interests shifting toward environmental and sustainable planning, the Garden City has again proved itself to be a fertile reference in approaching this new but not entirely unfamiliar crisis.

Studying historic models such as the Garden City provides an opportunity to pause and reflect on "the wisdom of the past and ask ourselves how the great planning figures of history managed similar challenges."[9] We can learn from what they got wrong and analyze concepts that worked back then but have become problematic today.[10] The deconstruction and reconceptualization of the Garden City to

respond to the twenty-first century crisis demonstrates the potential of design speculation as a method for evaluating historic models. This unique perspective provides an alternative way to study and learn from historic models, while projecting their values and influence into the future. It is utopian in that it encourages a critical assessment of contemporary methods, while also imagining alternative futures. For example, Howard viewed his Garden City experiment as a "stepping stone to a higher and better form of industrial life generally throughout the country."[11] He believed that the success of the initial experiment would create widespread demand for Garden Cities, thus emptying out large cities like London.[12] This came true in part with the introduction of suburbs - a wayward progeny of the Garden City - although admittedly not in the way that Howard would have liked. And so, we can ask ourselves what if Howard's model had received the full attention that he expected? Would we presently be living in Garden Cities instead of metropolises? How would our world be different? Would we still be facing the same ecological challenges today, or would we be facing some new, currently unanticipated problem? Design speculation provides a method to explore these questions as alternative realities.

To extend the relevance of this thesis beyond the Garden City, the developed methodology could also potentially be applied to other historic models. The Garden City offers a rich panacea of ideas that made possible its exploration and reinterpretation through design speculation. The almost surreal resonance of Garden City ideas with sustainable thinking makes it especially relevant to contemporary society and well suited to this particular method of investigation. However, other models that are similarly rich in content may also hold potential value which could be elicited through design speculation. The actual relevance of any given model would depend on how fertile of a reference it is to begin with, as well as on the question it is being asked to answer. Design speculation takes an idea that is rooted in history and through reconceptualization, encourages the imagination of a different future. The methodology developed here is interesting from a design perspective because it offers a new way of learning and thinking about history. History does not always have to

be studied from a text book; on the contrary, much can be learned in a design framework from the practical application of historic concepts to a new setting. In this way, the methodology developed in this thesis has the potential to make a valid contribution to the discipline of architecture.

The Garden City could be seen as the architectural equivalent to classic literature in its ability to be renewed and reinterpreted by successive generations. Even though it was designed in a specific time period to answer a specific problem, each successive generation has been able to identify with key characteristics and has found a way to extract value from the model in a way that holds new meaning for the current time. This is especially true in the present day, where Garden City ideals have demonstrated an acute prescience with the contemporary crisis and sustainable development. The persisting relevance of the Garden City indicates that it contains a powerful message, one that has allowed it to endure.

## *Endnotes*

1 Leonardo Benevolo, *The Origins of Modern Town Planning*, trans. Judith Landry (London: Routledge & Kegan Paul, 1967), xii.

2 Benevolo, *The Origins of Modern Town Planning*, xii.

3 Peter Hall and Colin Ward, *Sociable Cities: The Legacy of Ebenezer Howard* (Chichester; New York: John Wiley & Sons, 1998), 143.

4 Hall and Ward, *Sociable Cities*, 143.

5 Hall and Ward, *Sociable Cities*, 143.

6 Hall and Ward, *Sociable Cities*, 110.

7 Hall and Ward, *Sociable Cities*, 142.

8 Ebenezer Howard, *To-Morrow a Peaceful Path to Real Reform*, Original Ed. with Commentary by Peter Hall, Dennis Hardy & Colin Ward (London; New York: Routledge, 2003), 190.

9 Hall and Ward, *Sociable Cities*, 142.

10 Hall and Ward, *Sociable Cities*, 142.

11 Ebenezer Howard, *Garden Cities of Tomorrow* New rev. ed. (Eastbourne, East Sussex: Attic Books, 1985), 101.

12 Howard, *Garden Cities*, 117-118.

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