EXPLORE. DEVELOP. INNOVATE!
Urban Development for Innovation Economies

by

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B.S., Missouri State University, 2000
Master of Regional and Community Planning (MRCP), Kansas State University, 2012

A REPORT

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture/Regional and Community Planning
College of Architecture, Planning and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2013

Approved by:
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Abstract

Some cities target innovation to bolster their economy, because it drives economic growth. An emerging trend is to use urban regeneration to accomplish this desire. However, lack of understanding about land development effects on innovation is a major concern. Such uncertainty makes it difficult to create visions, plans, and designs for these environments. A major dilemma presents itself. In what way do urban designers develop innovation economies and what confidence can they have in those roles considering the lack of evidence about urban sites within larger innovation systems?

In response to the dilemma, this research documents projects facilitating innovation in local economies. A catalog was the tool for exploring characteristics of these places and their connections to economic systems. The catalog acts as a decision framework by displaying these relationships through a goal, objective, and tactic hierarchy. This format illustrates how site-level decisions impact specific parts of the economy.

By using the catalog, planners and designers may guide innovation through urban development. To accomplish this, developments must draw talented people with creative ideas and organizations willing to invest in those ideas. When synergies form between these groups, new goods and services become available. To build this innovative milieu, planners and designers EXPLORE regional and site-based opportunities to determine the tactics they utilize. Next, they DEVELOP plans for the places desired by and required for people who INNOVATE. These findings collectively instill confidence in the roles of planners and designers in their quest to cultivate innovative environments.

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ABSTRACT

Some cities target innovation to bolster their economy, because it drives economic growth. An emerging trend is to use urban regeneration to accomplish this desire. However, lack of understanding about land development effects on innovation is a major concern. Such uncertainty makes it difficult to create visions, plans, and designs for these environments. A major dilemma presents itself. In what way do urban designers develop innovation economies and what confidence can they have in those roles considering the lack of evidence about urban sites within larger innovation systems?

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Key words: Innovation, Innovation District, Innovation Economy, Knowledge-Based Urban Development, Urban Revitalization, Economic Development, Urban Design

ACKNOWLEDGEMENTS

I would like to thank my committee for their support and dedication. I would also like to thank my peers and faculty for the experiences needed to complete this project. To all those involved, your participation is much appreciated.

DEDICATION

My family has afforded me great opportunities and provided the amazing support in my academic endeavors. For their love, devotion, and encouragement, I have great affinity.

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PREFACE

Degree & Umbrella Requirements

As part of the requisites for completing master's degrees in the Landscape Architecture/Regional and Community Planning department at Kansas State University, all students performing masters projects must participate in an umbrella group. This requires students assemble into clusters focused on similar research interests. My umbrella group, the Urban Development and Design (UDD) group, provided a foundation for project work.

The mission of the Urban Design and Development (UDD) group is to improve the efficacy of producing and sustaining social, economic, and ecological vitality in urban environments (Urban Development And Design Group, 2012).Throughout the course of the academic year, the UDD group functioned as a meshwork, assembling and applying knowledge from group, team, and individual research levels. The individual research topics of the UDD group complemented one another, so UDD members could learn from each other and enrich their own projects (Urban Development

and Design Group, 2012).

Group Work

As required by the Urban Design and Development group, students of the meshwork split into two teams, so as to enter the 2013 ULI - Gerald D. Hines Student Urban Design Competition. The teams included a diverse collection of graduate students, who developed plans for a large-scale site with complex demands and challenges. While the purpose of entering this competition was to win, it was also to explore individual focus areas (Urban Development and Design Group, 2012).

To prepare for this competition and understand the dynamics and logistics of both competing and completing our master's projects/reports, we utilized an urban redevelopment project in Manhattan, Kansas as preparation for the competition and as medium for exploring individual topic areas. With two required projects, there was potential for each project to provide insight to our master's work. Essentially, these sites are our served as our experiments and allowed us to test our hypothesis (Urban Development and Design Group, 2012).

Both the requisite of completing the MHK project and the ULI competition also established fixed times that impacted our individual research agendas. By deciding to use the MHK project as both a test run for the ULI competition and as a stepping point for developing our individual projects, the MHK project targeted for the completion just after Thanksgiving Break. This gave us a month to complete the project development plan. In February, the teams split apart, allowing for deeper exploration of individual project areas.

*The UDD Organization chart on the next page explains the relationships of group work.

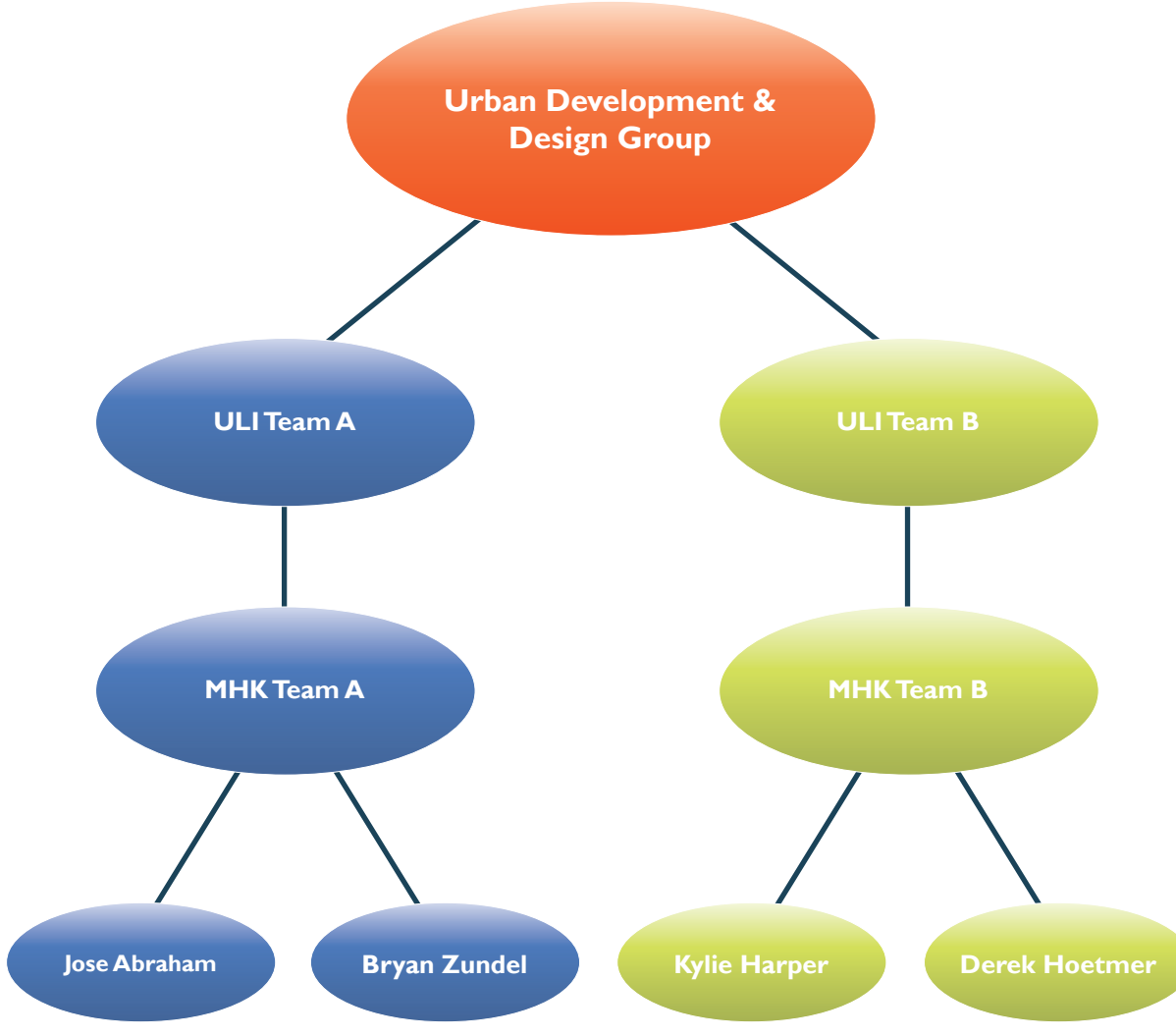

figure 1 - UDD Organization
By Author, 2013

Contributors

MHK team members included Jose Abraham and Michael Bennett. Jose helped determine the appropriate densities for both the MHK and ULI sites, in adherence with team-based decisions. Michael provided a portion of the economic analysis for the MHK site.

Members, outside of the UDD group, participating on the ULI team included Laurel Johnston and Andrew Heermann from the Kansas State Architecture Department and Jonathan Arndt from the Entrepreneurial Real Estate Program at University of Missouri at Kansas City. These teammates played key roles in the analysis and design of the ULI project.

Our projects and reports were also largely reliant on relationships with the City of Manhattan, the Urban Land Institute, our professors, our teams, and our umbrella. This complex web of relationships required strong collaborative thinking and action. To reach our goals on individual, group, team, and meshwork fronts, active and positive engagement in these relationships were critical.

People involved in my master's project development, included:

- Eric Cattell, Assistant Director for Planning at the City of Manhattan, MHK Project Critic
- Lance Evans Senior Planner for the City of Manhattan, MHK Project Critic
- Kevin Credit, Long Range Planner for the City of Manhattan, MHK Project Critic
- Jose Abraham, Kansas State University, MHK & ULI Teammate
- Michael Bennett, Kansas State University, MHK Teammate
- Andrew Heermann, Kansas State University, ULI Teammate
- Jonathan Arndt, University of Missouri – Kansas City, ULI Teammate
- Laurel Johnston, Kansas State University, ULI Teammate
- Derek Hoetmer, Kansas State University, Member of UDD
- Kylie Harper, Kansas State University, Member of UDD
- Torgier Norheim, Professor at Kansas State University, ULI Critic
- Stephanie Rolley, LARCP Department Head, Kansas State University, ULI Critic
- Jason Brody, Major Professor, Kansas State University
- Blake Belanger, Secondary Professor, Kansas State University
- Gary Stith, Tertiary Professor, Kansas State University
- Jeffery Hornsby, Advisor, Kansas State University

INTRODUCTION

PROLOGUE

The UDD umbrella group and the two projects associated with the group provide both limits and opportunities for this master's project, as identified in the Preface. Given the nature of the group's focus and my personal interests, I became fascinated in the ways cities are using urban development to target innovation in their economies. This generated questions about how important innovation is to our economies, what that could mean as we try to dig ourselves out of prolonged recession, and how to avoid severe economic downturns in the future. While delving into literature on this subject, I found discrepancies in our understanding about innovation and urban development. Addressing these concerns became a major project focus.

OVERVIEW

This master's project explores the use of urban redevelopment to foster innovation growth in local economies. It provides a foundation for planners and designers to define their roles in these processes and shows they can successfully make a positive impact on innovation economies. Previously, these roles lacked definition, but this project identifies the way planners and designers can assist in creating successful innovation development. In addition, knowledge about the impacts of land development projects on innovation development received further documentation, thus solidifying its standing as an economic development strategy.

DILEMMA

Understanding the structure and components of the most innovative cities is critical if land planners, urban designers, and landscape architects are to develop sites with evidence-based design foundations. The replication and enhancement of proven design strategies could be paramount in the success of land development projects targeting innovation.

Evidence-based design is growing in importance, as designers seek greater project performance sought by their clients (Brandt, Chong, & Martin, 2010). This is of utmost concern as cities embark on the use of urban redevelopment projects to propel local innovation. As cities and developers call upon planners and designers to develop innovation districts, they too require evidence-based design solutions.

Herein lies a problem, the gap between our understanding on how innovation economies function and the evidence backing innovation districts poses a great challenge when we attempt to use our professional talents to bolster region innovation. The lack of comprehension over the site-based goals, objectives, and tactics that facilitate and support innovation makes it hard to be certain we are or will be making a positive impact on the larger innovation ecosystem. As such, we need to comprehend the potential of landscape architects, land planners, and urban designers in the development of these innovation systems.

So, what roles, if any, can urban designers play in the development of regional innovation economies, when there is a lack of empirical evidence concerning the importance of urban sites within the larger system? What confidence

can we have in our innovation district projects, without empirical evidence backing the level of innovativeness emerging out of these districts?

APPROACH

Through literature review, case study analysis, and in planning and designing two of innovation developments, insights emerged about the significance of land development-based innovation strategies and the abilities of planners and designers to develop them. By communicating the value of innovation in local economies, as identified in the literature review, and showing the benefits of urban development on innovation, as discovered through case studies, this project illustrates why urban revitalization makes sense as an innovation development strategy. The project also documents the roles planners and designers play in developing these projects, and divulges processes required to carry out those roles.

The methods for determining the impact of planners and designers in innovation development include literature review, case study analysis, catalog development, catalog implementation, and reflection on lessons derived from those processes. Goals and objectives targeting innovation developed through literature review. Then, through case study analysis, a list of site based innovation tactics emerged. A catalog showing relationships between the goals, objectives, and tactics developed. The catalog of innovation serves as framework for site/regional analysis and project design. This allows planners and designers to focus their efforts on the critical planning and design elements.

FINDINGS

Collectively, the process described above allowed for several realizations. First, the belief in urban revitalization as a means for innovation development largely stems from the ability of research parks to spur innovation in several communities. Shifting patterns for the creative and entrepreneurial workforce suggests efforts move from a suburban to urban model. To cater to their needs and provide infrastructure vital to the innovation process, pioneer innovation districts integrate urban living with research park-like elements. This is the overarching strategy for cities targeting innovation growth with urban redevelopment.

The second major set of findings came through literature review, catalog development, and catalog implementation. By identifying successful innovation districts and traditional research parks, I was able to formulate a catalog of goals, objectives, and tactics that made these developments flourish. While implementing the catalog over the course of two projects, it became apparent cities have a unified goal when targeting innovation.

Cities want to create innovation ecosystems in their communities by trying to entice synergy between people with ideas and the organizations needed to develop those ideas into innovative goods and services. To do this, the design team must create an environment sought by both the people with ideas and the organizations supporting them. This is where planners and designers play significant roles.

CONCLUSIONS

This project is useful to planners and designers because it helps them comprehend the ways they can carry out work in innovation development. For stakeholders of these projects - for example citizens, politicians, academic and research institutions, non-profit organizations, and corporations – the project delivers an understanding of the people and processes they should engage to develop their local innovation economy. With innovation being a major contributor to economic growth and resiliency, the success of innovation districts and subsequent work is a major step toward economic prosperity.

BACKGROUND

The background provides the driving project forces, conditions, and parameters, while also establishing a base for understanding innovation systems, innovation in the United States, the strive for innovation, and current land development strategies targeting innovation. In this chapter, we see dilemmas arise in the quest for innovation development in American cities and the challenges planners and designers face in the innovation development process.

Definition and Significance of Innovation

This project places great emphasis on the level of innovativeness occurring in a region, city, and urban development. Innovation is a word often used, but people have varying definitions of its meaning and use. The Merriam-Webster Dictionary (n.d.) defines innovation as "the introduction of something new". If we thought of innovation in these terms, a new Burger King franchise could suffice as innovative. Given the way economic development professionals speak about and target innovation, this definition is too general for the assessment and development of innovation economies.

The work of Rosanna Garcia and Roger Calantone in "A critical look at technological innovation typology and innovativeness terminology: a literature review" (2001), rectified this issue by surveying literature on the topic. While this was not the sole focus of the article, their findings were important to this master's project, as it provided a basis for exploring innovation at the regional, city and district level. What Garcia and Calantone concluded is innovation "is an iterative process initiated by the perception of a new market and/or new service opportunity that leads to development, production, and marketing tasks striving for the commercial success of the invention" (2001, p.112). This definition, illustrated in Figure 2.1, allows us understand an idea or invention in itself is not innovative until it has become available for use or consumption (Fagerberg, et al., 2005). In other words, it has to become commercially available. In this definition, there is heavy emphasis on creating something new, thus the idea has to build on an existing idea in a substantial way or it has to original. Marginal updating of a good or service does not constitute an innovation.

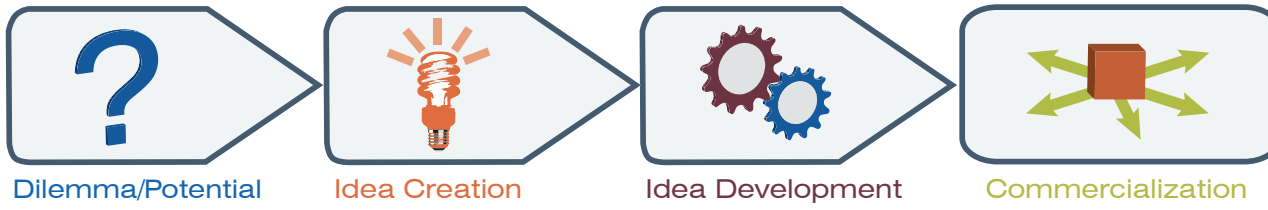

figure 2.1 - Innovation Process
By Author, 2013

Ideas and inventions can manifest into goods, services, or even businesses and industries, which are driving factors in the development of local economies. They are a main cog in the success of the United States economy (Janne Corneil, 2011). The Council for Competitiveness notes innovation accounts for "50% of U.S. annual GDP growth" (2005, p.8). Figure 2.2 depicts this process. Historically, the United States economy has largely relied on innovation as a key driver of our rise to economic power (Janne Corneil, 2011). As other countries push for increased innovation in their economies, pressure for the United States to propel its innovativeness mounts.

To local economies, degree of innovativeness is an important factor. It tells why some cities are able to attract and retain jobs, while others are not (Clark, Huang & Walsh 2009). This is especially important as cities and countries all over the world have and continue to withstand economic challenges and attempt to thwart future turbulent economic situations.

Innovation is also important, because without it we would not have the airplane thanks to the Wright Brothers, the Cotton Gin as developed by Eli Whitney, the printing press created by Johannes Gutenberg, or the computer thanks to Konrad Zuse. These inventions, later turned innovations, further facilitated our technological evolution. Without these inventions, our history, cities, and lives would be quite different. In essence, innovation is one of the ways we push to do things better and enhance our lives (Fagerberg, 2005).

The Regional Innovation Economy

Regional Innovation Systems (RIS), which are "a set of interacting private and public interests, formal institutions, and other organizations that function according to organizational and institutional arrangements and relationships conducive to the generation, use, and dissemination of knowledge" (Doloreux, 2003). In simple terms these are the parts of local economies generating innovation. Researchers have identified these elements wich include regional systems, networks, and components (Nooteboom, 2004; Simme 2004; Asheim & Gertler 2006; Hamdouch 2007; and Clark, Huang & Walsh 2009). Thanks to the research by Bjorn Asheim and Meric Gertler

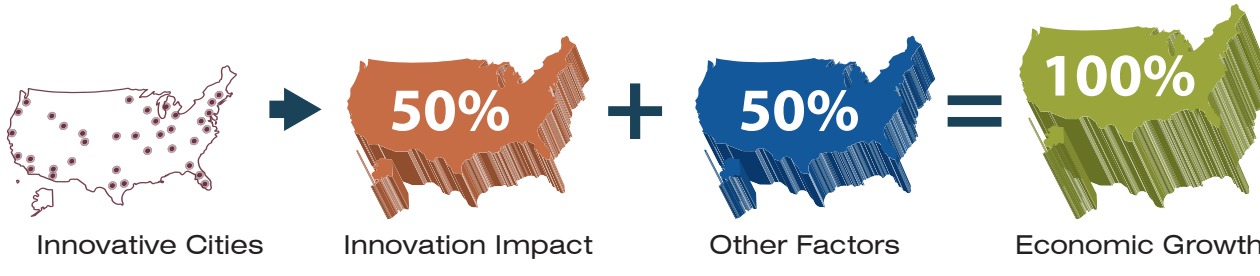

figure 2.2 - Significance of Innovation
By Author, 2013

in “The Geography of Innovation: Regional Innovation Systems” (2006) and Jennifer Clark, Hsin-I Huang and John P. Walsh in “A typology of ‘innovation districts’: what it means for regional resilience” (2009), we have a fundamental understanding about why American cities with the highest rate of innovation tend to fall within a particular taxonomy. These cities tend to fall within the Enterprise Regional Innovation System (ERIS) classification. An ERIS is successful due to access to local venture capital, a propensity for entrepreneurship, a high quality/innovative workforce, market demand for the services and products they produce, and the presence of incubation centers, shown in Figure 2.3 (Asheim & Gertler, 2006). ERIS systems are most common in the United States and the United Kingdom. These systems are primarily learning regions, rather than top down producers, which means there is greater innovation development from SMEs (small to medium sized enterprises) than large firms (Asheim & Gertler, 2006).

A majority of the very top producers of innovation in the United States are cities classified as Marshallian Districts, a sub-type of ERIS, as seen in Figure 2.4. These “districts” essentially produce more patents, primarily developed in Small to Medium-sized Enterprises (SMEs), and have a higher Gross Domestic Product (GDP),than any other type of district (Clark, Huang & Walsh, 2010). Other types of districts include those largely dominated by large firms, and those spread out with few small, inventive firms.

Clark, Huang and Walsh used a methodology

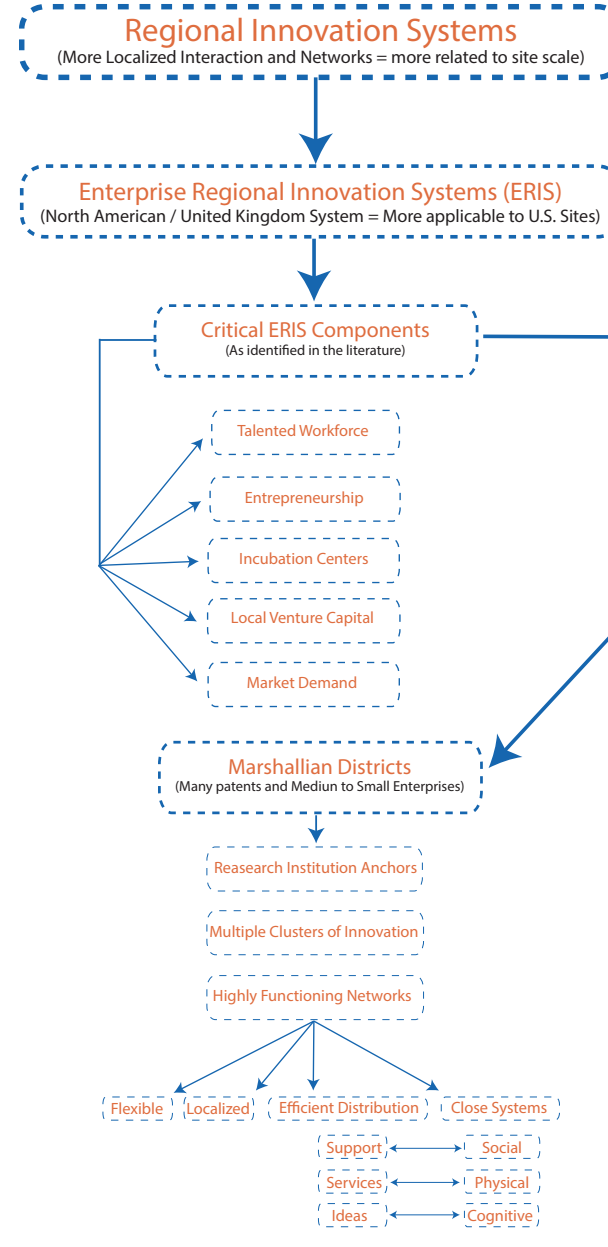

figure 2.3 - Regional Innovation System
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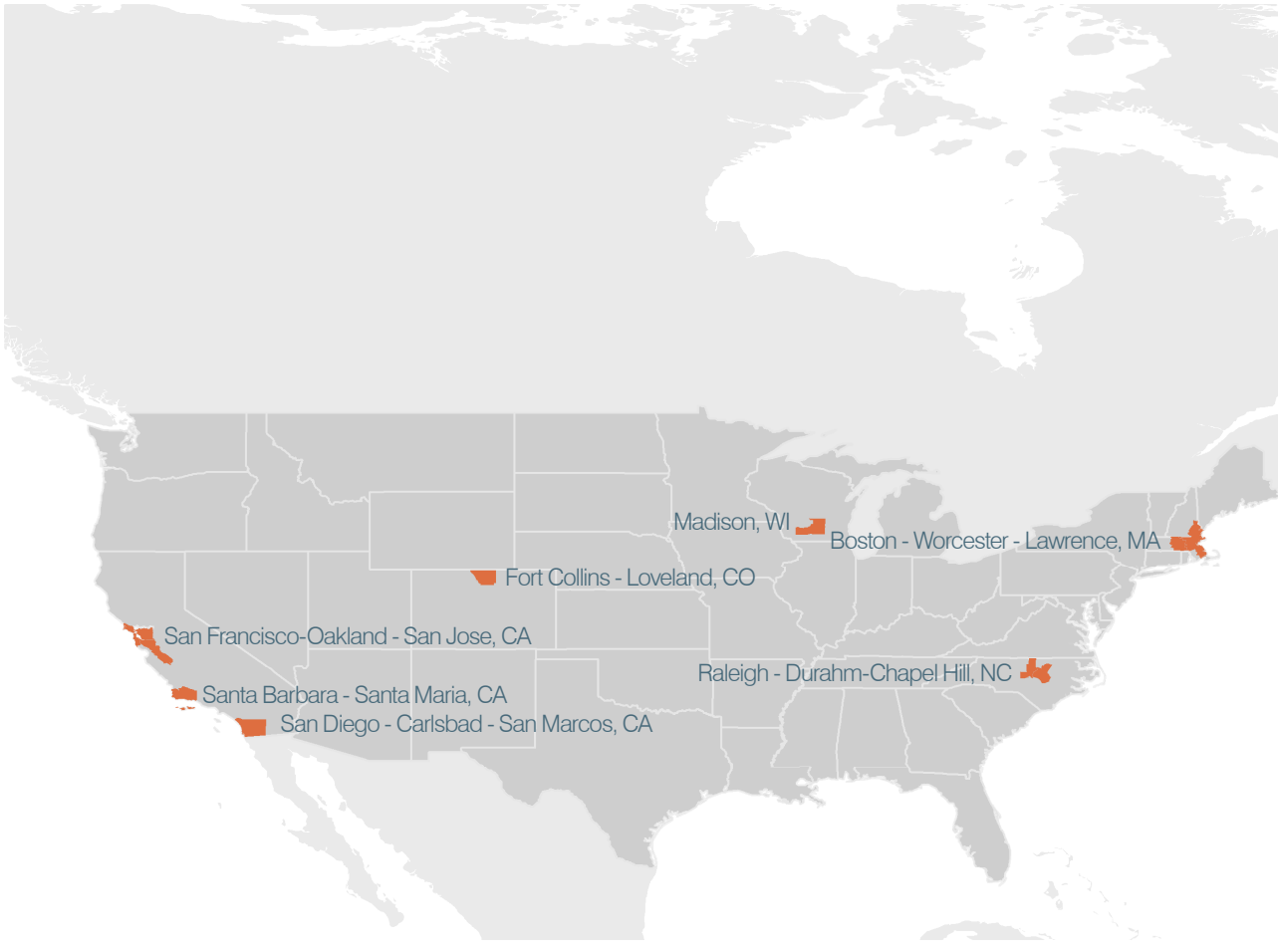


figure 2.4 - Marshallian Districts

Data from Clark, Huang & Walsh, 2010

that documented the number of triadic patents and GDP for cities in the United States. They used statistical analysis to determine which kinds of ERIS districts represented the most innovative cities. Figure 2 is a mapping of this information, providing a graphic summary of their findings. This is critical as cities develop plans to propel innovation in their region. If cities want to become as innovative as possible, they should strive to become more like Marshallian Districts, which are the most innovative and strongest economically (Clark, Huang & Walsh, 2010). Some examples of these districts include Madison, Wisconsin; Raleigh-Durham-Chapel Hill, North Carolina; San Francisco, California; Boston, Massachusetts; San Diego, California; and Fort Collins, Colorado (Clark, Huang & Walsh, 2010).

What we know about Marshallian Districts is they are comprised of three main components, in addition to those of the ERIS system. These include anchor research institutions (often universities), multiple clusters of innovation and highly functioning networks.

Research institutions establish infrastructure for testing innovations and provide positive knowledge-based spillover effects (Clark, Huang & Walsh, 2010). This is a major reason why science parks and innovation districts tend to reside near research institutions.

In addition to research institutions, innovation also requires highly functioning networks. While literature strongly communicates the need for networks, there is no network element that stands apart from the rest. Rather, the evidence suggests these networks rely on multiple facets. Collectively, the closeness of physical, social, financial, and cognitive networks raise efficiency in the distribution of ideas, services, and support, while providing enhanced access to these networks (Boix, 2008). This component is required for a city to obtain, generate and use knowledge effectively for greater economic and social development (van Winden et al., 2010). In summary, Marshallian Districts has a high number of SME's producing patents; they require strong research institutions, highly functioning networks, and clusters of innovative communities.

Dilemma: The Regional-Site Gap

From my investigation into innovation economies, research has yet to identify the site-based elements and their relationship to larger networks needed to create place-based planning and design solutions for use in land development as innovation strategies. Such a divide between regional and local understanding of innovative cities, illustrated in Figure 2.5, makes facilitating the emergence of new ones difficult, especially from the point of view of design professionals.

Urban Development as an Innovation Strategy

Miguel Rivas (2011), through the work "From Creative Industries to the Creative Place", brought attention to the ability of place to serve as grounds for interaction between people and economy. He continues building upon this by providing examples of how public space draw in and aid in the development of the creative class (Rivas, 2011). These people are a main component of ERIS (i.e. talented workforce) (Asheim & Gertler, 2006). This is further supported by Willem van Winden, a leader in the REDIS project, which studied the how European cities could use urban redevelopment to facilitate innovations in the scientific community (REDIS, n.d.). Through this project he learned the ways cities can link innovation hubs - a main component of Marshallian Districts (Clark, Huang & Walsh, 2009) - to create a stronger knowledge economy (van Winden, 2010). The delineation of the areas where we can interject networking strategies for developing a knowledge economy is threefold: economic, social, and physical integration (van Winden, 2010). The physical integration component directly relates to the kind of work which design professionals excel and, as such, guides us to focus on this integral element.

Today, many cities focus on enhancing their

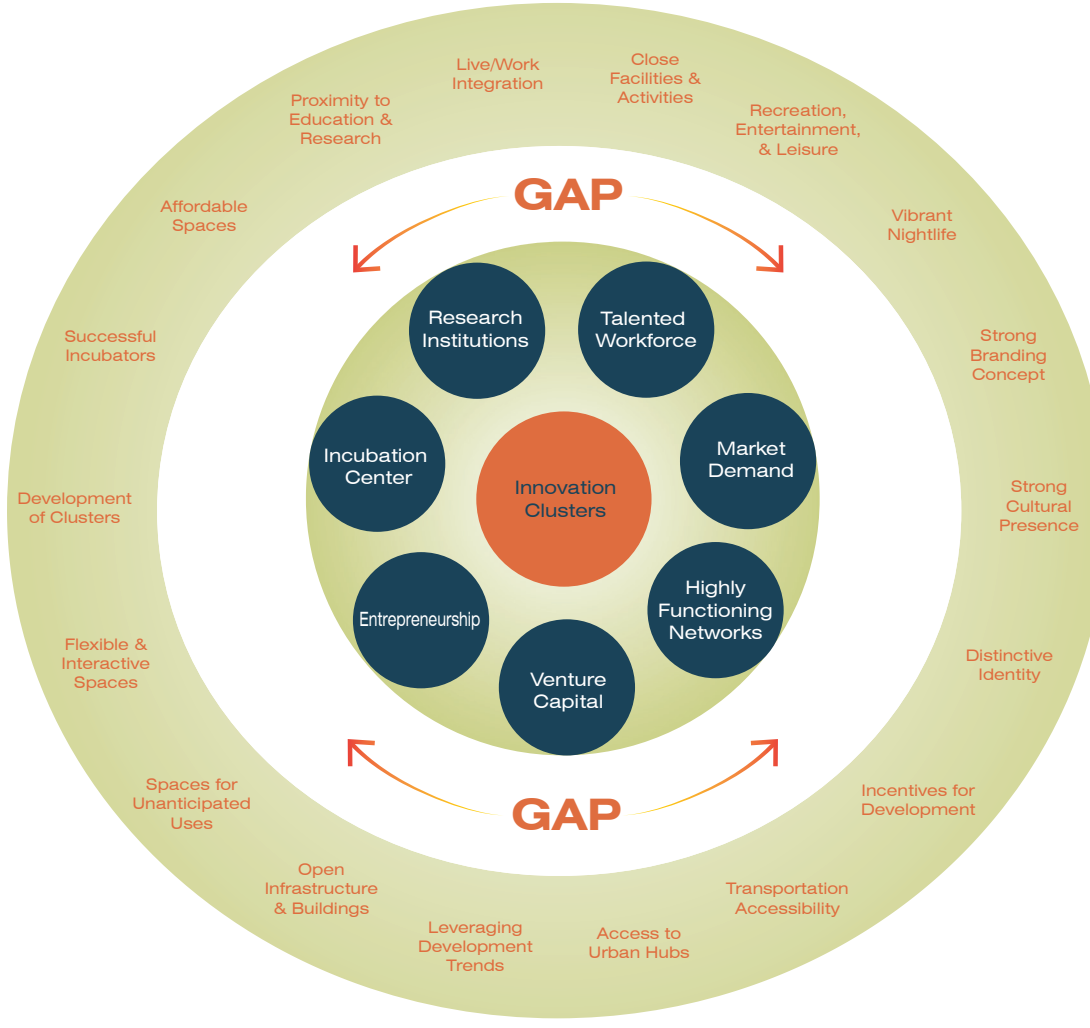


figure 2.5 - Gap in the Literature

By Author, 2012

economies via innovation. Their methods range from tax breaks for innovative businesses and entrepreneurs, creation of facilities serving innovators, implementing support infrastructure, and land development targeting specific people and companies, amongst other strategies. Today, an emergent idea enticed many cities to consider Innovation Districts (a form of KBUD) as an economic development strategy, as indicated by Willem van Winden in his article "Urban Hotspot 2.0: The challenge of integrating knowledge hubs in the city" (2010). Innovation Districts are urban development projects aimed at pairing research institutions,

government, workforces, and businesses in close proximity with hope they will spur innovation and economic development by maximizing knowledge transfer, share infrastructure costs, and benefit from spillover effects (Sharma, 2012). They do this in urban areas, focusing on mixed-use, live/work environments.

The growing implementation of innovation districts is evident by many projects in the works all over the world, including but not limited to:

- 22@ Barcelona, Boston's Innovation District
- Great Northern Way Campus Creative District in Vancouver
- IDEA District in San Diego
- Fuxing Island Innovation District in Shanghai
- West Innovation District in Dublin, Ohio
- The Arts & Innovation District in Palo Alto
- Quartier de l'innovation in Montreal
- Bejing Bohai Innovation City in China

Academics and professionals in the land planning, landscape architecture, and urban design fields play a large role in these pursuits, as their planning and design expertise are critical factors in the creation of Innovation Districts. After all, planners and designers are being called to design these developments, as seen by work done by Fukuji Planning & Design, Hacin & Associates, Sasaki Associates, and Skidmore,

Owings & Merril, amongst others.

Dilemma: Innovation District Success

Even though Innovation District development has shown potential as urban redevelopment projects (Broggi, 2007), it is unclear if these strategies will successfully help cities become more innovative. With many projects in the planning and design phase and even fewer actually implemented, there is little evidence to validate the success of these projects in regards to development of innovation. In other words, no studies –at least none that I have found - looked into how these developments have increased innovation through empirical methods, as seen in the works of Clark, Huang and Walsh. Even the most established and documented Innovation District, 22@ Barcelona has yet to show any ground for improving innovation in the regional and local economy, although it is seen as an economic and urban redevelopment success (Broggi, 2007). Despite this concern, hope for Innovation Districts persists, hinging on knowledge of cities with thriving innovation economies and the District Effect (as discussed in preceding sections), along with prior successes with research parks, (Boix 2008; Muro & Katz, 2010).

The Belief in Innovation Districts: Cluster Theory and Research Parks

Cluster theory (the "District Effect") originally described the agglomeration of industrial businesses (also called Industrial Districts), as they attempted to maximize positive spillover effects and reduce infrastructure, material, transaction and service costs, while improving overall efficiency (Cowan, 2004; Simmie, 2005; Asheim & Gertler 2006; and Clark, Huang & Walsh 2009).

"Clusters are geographic concentrations

of companies, suppliers, support services, financiers, specialized infrastructure, producers of related products, and specialized institutions (such as training programs) whose competitive strengths are improved through the existence of shared advantages."

(Sallet, Paisley, Masterman, 2009).

By locating in these clusters businesses made use of these benefits and thus had a competitive advantage over other companies (Nooteboom, 2004). The identification of phenomenon later acknowledged similar patterns occurring in innovation sectors. In addition to the benefits found in industrial districts, innovation clusters also benefit from technology transfer, knowledge transfer, venture capital, and specialized business services (Cowen, 2004, Asheim & Gertler 2006; and Clark, Huang & Walsh 2010). We eventually used our knowledge of industrial clustering to create science parks, because we believed they would replicate similar district effects on a micro-area scale, which would theoretically improve our innovative capacity.

In the past, our primary land development tactic was the creation of Science, Technology and Research Parks (STPs). These parks can be defined as developments where a research institution works with the local government and private sector through private-public partnerships (PPP's) geared toward efficient and expedited knowledge transfer in order to spur economic development (Link, 2009). Examples of highly successful STPs are Research Triangle Park, Purdue Research Park, NASA Research Park, and Sandia Science and Technology Park (Sallet, Paisley, Masterman, 2009; Wessner, 2009). The success of these developments depends on five essential components as identified by Albert Link (2009) in "Research, Science, and Technology Parks: An Overview of the Academic Literature":

- *"A strong Science and industry base"*
- *"The availability of finance"*
- *"The presence of entrepreneurs"*
- *"The presence of trust networks at an individual level"*
- *"The opportunity for collaboration among universities, businesses, and other organizations"*

Many of these elements tie directly into elements identified in the literature review over Regional Innovation Systems and Marshallian Districts, as indicated later in this chapter. While the above are the requirements for success, the following components of STPs, as ranked on the International Association of Science Parks and Areas of Innovation (IASP) website (2012), are indicated in Figure 2.6.

While we have not abandoned STPs, our approaches have changed since the inception of STPs some 60 years ago (Townsend, Soojung-Kim Pang, & Weddle, 2009). The IASP (2012) indicates STPs are increasingly developing more in urban settings. We are starting to move away from suburban STPs, in part to accommodate population shifts back to the urban core, rising infrastructure costs, an in our push for sustainability and resiliency (Townsend, 2009; Townsend, Soojung-Kim Pang, & Weddle, 2009; Muro & Katz, 2010). We also know many creative and innovative people want to reside in live/work kinds of environments, which is furthering the need for urban

research parks or, in other words, innovation districts (Florida, 2002; Muro & Katz, 2010).

Knowledge-Based Urban Development (KBUD)

Trying to figure out the all of the designable elements figuring into innovation development would be impossible. Even covering half of these elements would take much longer than the deadline for this project. Fortunately, the study of Knowledge-based Urban Development (KBUD) uncovers some of urban conditions effecting knowledge economies (a term closely related to innovation economies) (Yigitcanlar, 2007).

KBUDs are urban development projects targeting economic development by focusing on knowledge, creativity, and innovation. The three pillars of KBUD (Figure 2.6) includes economy, society and environment, as defined by Yigitcanlar, Velibeyoglu, and Martinez-Fernandez (2008), as seen in Figure 6.

In "The Making of Urban Spaces for the Knowledge Economy: Global Practices", Tan Yigitcanlar has documented some of the qualities that particular made of innovation cities successful (2007). Yigitcanlar utilized a case study approach, covering five innovation-based developments, to determine elements of KBUD. His work shows successful KBUD developments include:

- Distinctive architecture and identity
- Strong cultural presence
- Close & high level of facilities, amenities, & events
- Creative facilities focused on flexibility, hybridization, & interaction
- Strong integration of residential & work settings
- High degree of transportation accessibility
- Access to advanced education & research institutions
- Connectivity to the city & its hubs
- Range of recreation & leisure opportunities
- Vibrant night life
- Open architecture & infrastructure
- Spaces allowing for unanticipated programming & activity

This information starts to shrink the gap between broad understandings of innovation economies and starts to flesh out the

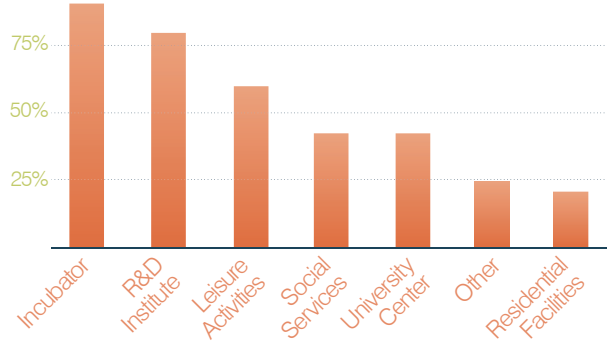


figure 2.5 - Research Park Characteristics

Modified from International Association of Science Parks and Areas of Innovation, 2012

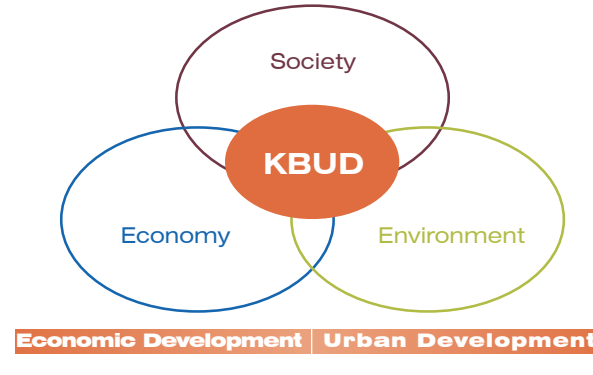


figure 2.7 - Three Pillars of KBUD

Modified from Yigitcanlar, Velibeyoglu, and Martinez-Fernandez, 2008

translation of ERIS and Marshallian Districts components into design-based elements. Yet, these elements only cover some of the regional innovation components, which means the KBUD elements are, as stated before, just a start. While regional information is available in peer reviewed literature and quite comprehensive, the KBUD elements are only partially researched and documented. The further identification of these elements must continue if seek to continue growing our confidence in improving the innovation ecosystem.

Regional Innovation Assessment

To make practical use of the information found in this chapter, we need means for analyzing where our cities flourish and falter in the innovation economy. Cities need to figure out which elements and strategies to use in their quest for innovation development. Determining which elements exist, which are elements are successful, and what elements are lacking/falter in a city is a challenging task. Fortunately, The Council on Competitiveness for the U.S. Department of Commerce developed a guidebook for analyzing local innovation ecosystems.

The Council for Competiveness is a non-for-profit organization seeking to identify challenges faced by the United States in competing economically in a growing international economy. They provide research and publications about assessing and amending our economic practices to become increasingly competitive (Council on Competitiveness, 2012).

In their "Measuring Regional Innovation: A Guidebook for Conducting Regional Innovation Assessments" (2005), the council identifies ways to assess innovation infrastructure and the innovativeness of cities and regions. The guidebook serves as a precedent for the categories and metrics needed to analyze communities where KBUD projects take place. With strong relationships between elements found in the innovation literature covered in the Background and the metrics categories established in the guidebook, it was easy to see how planners and designers can assess the economy of the region where their projects reside and types of land development strategies that improve the innovation economy in a community.

Metrics in the guidebook are in two sections: Inputs and Outputs, which are further divided into categories. Under these categories are sub-categories with accompanying metrics. The Inputs are those elements helping to propel the innovation economy, whereas the outputs seek to determine the level of innovativeness of the economy. Both provide valuable insight.

Output assessment tells about the performance of the innovation economy, identifying economic strengths and weaknesses. Outputs have three categories: Innovation, Productivity, and Prosperity. The Council for Competiveness states innovation is the precursor to productivity. Prosperity is what we get when we are productive. While productivity and prosperity are important end-goals for innovation, this project focuses on the first step: innovation.

The Innovation category further breaks down into Idea Generation, Idea Development, and Commercialization of Ideas. These three subcategories are the components literally

defining the term innovation. Each subcategory is a step in the innovation process. Absence of one stage negates an act of innovation. As such, the metrics associated with each subcategory tell the story of the innovation process. The entrepreneurial story typically plays out with a person or group registering a patent, which leads to creation of a new company, and (with any perseverance) the company becomes a success. This section of the guidebook allows researchers to see the overall unfolding of those stories.

The Innovation Output section of the guidebook provides some strenuous challenges. None of the metric data is easy to obtain or decipher. It would take nearly a month to determine innovation stories of the locality, which is not feasible for this project. Instead of trying to determine the innovativeness of the community in relation to its peers (as the Input section of the guidebook suggests), this project looks to inputs supporting the innovation process. Inputs indicate the specific components of the innovation economy and their degree of functionality. The two main inputs valuable to this study are assets and networks. Another category called culture exists, but requires use of surveys (not feasible given the project timeline) and it generates subjective answers.

The assets and networks further subdivided into these metric areas:

Human Capital & Quality of Life

- ERIS component = Talented Workforce
- Metrics in this category inventory education levels of the workforce and their fields of work. This is important because it indicates the availability of a talented workforce. Depending upon workforce demographics, the project may need to include academic infrastructure to push higher educational obtainment levels or seek to provide live/work/play environments to entice the relocation specific portions of the workforce.

Questions to consider:

- Is the workforce highly educated?
- What fields are they most educated?
- Do these fields correspond to the strongest and fastest growing industries?
- Are living quarters for the talented workforce close enough to the industry cluster where they work?

Data & Sources - Census data can tell about the educational obtainment of the community. Many Chambers of Commerce have this data readily available on their websites. Quick internet searches also show the industries in the community with the highest educated workforce. Census (block group) data can help determine the proximity of these workers to the project location. In order to provide environments where workers want to live, we also need to assess the quality of life in the area.

Questions to consider:
What are the needs of the creative and entrepreneurial demographic?

- Nightlife
- Entertainment
- Recreation
- Affordable Housing
- Walkability/Bikeability

Research & Development Institutions, Incubators, Labs & Business Centers

- Marshallian District component = Research Institution Anchors
- ERIS component = Incubation Centers & Entrepreneurship
- If the project site is close to these institutions, it is pertinent to examine their innovation infrastructure. If the University is not close, analyze the transportation networks connecting them to the site.

Questions to consider:

- What fields are they strongest?
- Is there collaboration between the university(s) R&D institutions, government, or private companies?
- Who do incubators, accelerators, and tech centers target?
- Are they targeting major industry sectors, especially those with many patents?
- Are their facilities sufficient?

Data & Sources - Municipal maps will indicate transportation infrastructure. MapQuest can determine drive times. GoogleEarth can allow the researcher to estimate the geographic distance.

- Universities and Chambers of Commerce will often indicate the strongest areas of research and innovation at their universities. They also note the collaboration between the university and other interested parties and frequently identify business accelerators and incubators.
- After determining the innovation industries in the community, search the internet to see if accelerators and incubators that target them.
- It is important to start by determining location and areas of research excellence, before delving into the connections. This process helps researchers hone their attention on innovation areas of prominence.

Financial Capital

- ERIS component = Venture Capital

This is the hardest area for a land planner or urban designer to make an impact because it is far from our collective expertise. Given the nature of the business, we are best apt to focus our attention on the placement of the organizations and institutions receiving and granting venture capital, rather than directly get involved in the actual business venture. Some of these transactions will occur in the spaces we allocate for and design, specifically accelerator and incubators.

Industrial Base

- Marshallian District component = Multiple Clusters
- Look for economic analysis studies, particularly industry sector analysis to provide insight into the existing and growing industry sectors. These sectors allow for determination of industry clusters and provide a starting point for analyzing the relationship between cluster needs and the potential for those needs to be addressed on the site.

Data & Sources - A quick internet search for Manhattan, KS, yielded industry clusters, the University research relating to those sectors and the companies leading them. The Chamber of Commerce is a great gateway to the sources that contain this information, which typically occurs in the form of economic development studies.

Once those sectors are identified, one should determine which industries to target and what innovation components to develop or bolster. For the purposes of this project, that decision-making process is largely based on time constraints and the researcher's interpretation of other's professional assessment.

Physical Infrastructure

- Marshallian District component = Highly Functioning Networks
- Includes: Transportations & Communications

Questions to consider:

- Does mass transit exist? If yes, does it connect to major employment, residential, and entertainment/recreational hubs?
- Are their readily available ICT networks like fiber optics networks? If so, are they close to the cluster? If not, where is ITC infrastructure planned or where should it go?

Data & Sources - See the Research and Development Institutions for data and sources.

Regulatory Environment & Cost of Doing Business

- ERIS Component = Market Demand & Entrepreneurship
- This aspect is important because start-up cannot afford high cost spaces or infrastructure and research labs prefer cheaper alternatives. Innovative businesses and individuals will avoid areas with such challenges.

Questions to consider:

- Do they have access to affordable work environments?
- Are facilities available that support their companies and innovations?
- Are they located in areas that provide visual accessibility to the community they serve?
- Is site development financially affordable/viable?

As private sector urban designers, we have little influence over regional and local policy. However, developments addressing areas targeted by the local/state public sector often receive public financial incentives. These mechanisms can reduce the challenges of operating within the regulatory environment.

We can also use our understanding of zoning and other regulatory policies to help develop the site to its fullest potential. This may be a means of maximizing FAR (floor-area ratio) or working with the local municipality on PUD guidelines or re-zoning.

We work with the developer to create a plan building on market trends and demand. This demand will increase if we build on market momentum and create demand specific to the project, by producing quality plans/designs.

Data & Sources - Review the comprehensive plan and zoning regulations to maximize and expedite the development planning process.

Find market data indicating the best use for the property. For the ULI competition, this will come from our real estate expert. In the

MHK project, this information was obtained by talking to the planning department, consulting professors, and looking at land use projections.

Look at traffic count data from the city or Google if the city has not made the data publicly available to see if the site will have a high degree of accessibility.

Look at economic development studies to see if the cost of space is too costly for innovation or if the right infrastructure exists.

(Council on Competitiveness, 2012)

** The metrics and questions above derived from reviewing innovation economy literature, the Regional Assessment Manual, and initial case study research.*

The chamber of commerce and the economic development & urban planning departments of most cities will have documents describing the industry sectors of the region, education levels of residents, identification of major research institutions, transportation infrastructure assessments, and the business climate. These departments will be the first place to find information concerning the innovation metrics. Not only will these documents contain multiple of the metrics in one place, but they also will provide professional synthesis and analysis of these areas. This means the planner/designer has less groundwork to lay before establishing an innovation strategy for the project site.

Background Summation

Some of the major areas of research targeting innovation covered in this background include: Regional Innovation Systems (RIS), Marshallian Districts, Knowledge-based Urban Development, and place driven creativity. While the researchers have found the ways that innovation occurs in city economies, there is a gap between that knowledge and our understanding of how to create urban development that engender those elements. Still, cities are trying to create projects at the district and site scales that seek to aid in the development of innovation in their economies.

To answer the challenges identified in this chapter, we must explore the ways planners and designers can develop sites in accordance with empirical knowledge of innovation economies. Specifically honing in on the ERIS, Marshallian District, and KBUD elements allows us to tap into knowledge about the ways that our most innovative cities function. Crafting an approach where strategic foundations rest on scientific research, using identified regional innovation system components, will give us greater confidence and hopefully more innovative projects.

STRATEGY & METHODOLOGY

PROLOGUE: DILEMMA & PROPOSAL

This methodology addresses the two dilemmas posed in the Introduction.

- "What role, if any, can urban designers play in the development of regional innovation economies, especially considering the lack of evidence illustrating the importance of urban sites within the larger system?"
- "What confidence can we have in our innovation district projects, without empirical evidence backing the level of innovativeness emerging from these districts?"

To bridge the gap between regional innovation system understanding and site design strategies, research examines successful innovation developments. From this research develops a catalog of innovative goals, objectives, and tactics. Planners and designers may use this catalog to target specific innovation elements in their projects, seen in Figure 3.1. The catalog shows how innovation districts and similar projects can improve innovation in local economies. It also provides an opportunity to explore planning and design contributions to innovation-based developments.

PHILOSOPHY

We can use evidence-based design to connect empirically backed knowledge about regional innovation systems with elements of established and successful KBUD projects. To develop a foundation for innovation strategies, this project documents implementable tactics, allowing planners and designers to craft developments with known and tested strategies. Using the Knowledge-Based Urban Development (KBUD) research as a foundation, we can target design opportunities relating to the local innovation economy. This approach legitimizes professional roles in developing innovation economies and bolsters confidence in our abilities. To reach these resolutions the project follows a particular course, as identified below.

PATH

- Develop list of innovation supportive goals, objectives, & tactics using literature and case study findings
- Catalogue these elements to provide foundation for catalog implementation
- Use the catalog to develop each project
- Refine Catalog based on implementation lessons
- Draw conclusions from the projects, catalog, case studies, and literature about the roles planners and designers have in innovation development and the confidence they can have in these roles

METHODS

Identifying Innovation Elements through Case Studies

One aim for this project is to expand the KBUD tactics list (found in the Background chapter) by using case studies on KBUD projects, noting their components as they relate to regional innovation goals and objectives. These elements serve as a basis for developing the innovation catalog. The catalog classifies these tactics according to their relationship with ERIS and Marshallian factors. The catalogue makes this knowledge usable by planners and designers, especially as they determine targeted KBUD tactics for their own projects.

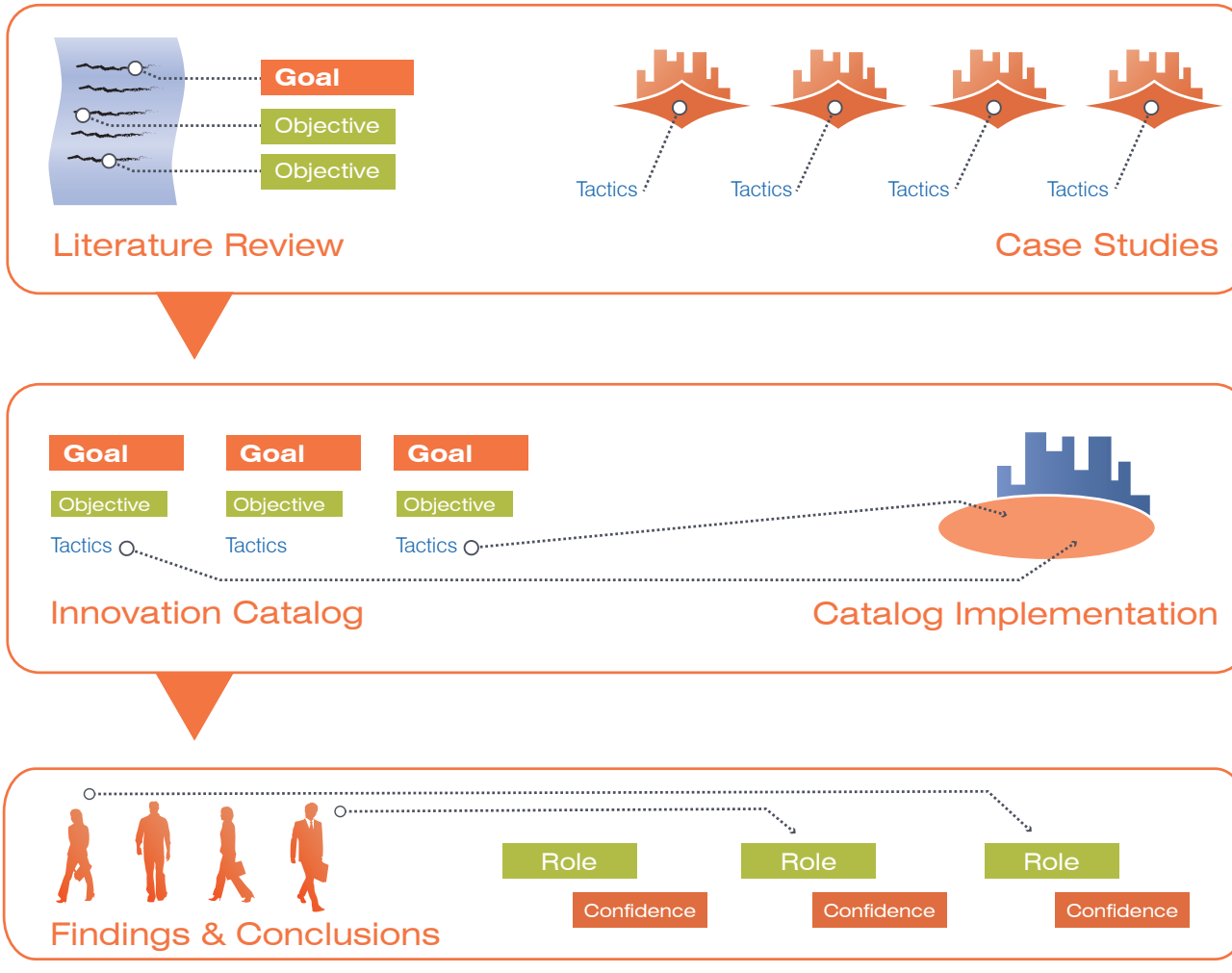


figure 3.1- Methodology Process

By Author, 2013

Each case study illustrates how land development serves as a means for developing innovation economies, by showing the ways project-based innovation strategies can respond to local challenges and potential. Such information not only shows the ways planners and designer can play a multitude of roles in innovation development, but also instill confidence by showing examples of how such strategies can lead to success.

Case studies are an appropriate methodology to use in this instance, because it allows the researcher to cover a breath of topics in a holistic way (Feagin, Orum, & Sjoberg, 1991). Here, we can use a case study approach to identify the a wide array of tactics found in successful research parks and other Knowledge-Based Urban Developments (KBUD).

This approach is similar to the one used by Tan Yigitcanlar (2007) in his work “The Making

of Urban Spaces for the Knowledge Economy: Global Practices". In the article, Yigitcanlar identified KBUD features by assessing successful KBUD projects. The point of this exercise was characterize the elements making these cities successful knowledge economies. Later, Yigitcanlar compared the elements from multiple cities to derive a classification of elements typically found in KUBD. This list resides in the Knowledge-Based Urban Development (KBUD) section of the Background chapter. By delineating these elements, planners and designers could attempt to implement them in their projects and thus replicate their success.

Yigitcanlar's approach was to find KBUD cities all over the world and document their approaches to development. This is where my approach differs. The strategy utilized in this project is to target successful KBUD development projects found in Marshallian Districts, which are indicative of the most innovative cities in America. Thus, each case study falls under the criteria of being a successful KBUD development in a Marshallian District.

To determine successful precedents, only KBUDs with a high frequency of referral in peer-reviewed literature as being a successful knowledge-based development made the list. Choosing these case studies was relatively easy, as the literature reviewed in relation to innovation districts, research parks, ERIS and Marshallian Districts and KBUD frequently referred to the same projects as being successful. The precedents identified are 22@ Barcelona, the Boston Innovation District, Research Triangle Park, and University Park at MIT.

Performing case studies documentation of critical innovation tactics relied on information from peer-reviewed literature, organizational/ city websites, newspaper articles, videos, plans, and aerial imagery.

This collection of data sources indicates both descriptive and secondary descriptive case study approaches. In secondary descriptive case studies, the researcher relies on observations made by other researchers (Deming & Swaffield 2011). The reasons for choosing a descriptive case study approach is to reduce the amount of time required to perform each study and to cross-reference claims and findings.

The delivery of all case studies arrives through a set template. The template allows for easy comparison between the different case studies and catalogues KBUD strategies in relation to innovation ecosystem components (talented workforce, entrepreneurship, incubation centers, local venture capital, market demand, anchor research institutions, multiple clusters, and highly functioning networks). They also contain a brief history to give the project context.

Cataloging Innovation Elements

In order to collect and catalogue innovation components this project relies on a "collection/inventory/catalogue" classification scheme (Deming & Swaffield 2011). According to M. Elen Deming and Simon Swaffield (2011) in "Landscape Architecture Research: Inquiry, Strategy, Design", classification schemes compile information into categories, allowing us to see information in new ways. As such, I will utilize

this research method to denote connections between site and regional innovation systems.

These tactics are classified according to ERIS and Marshallian District components. These systems contain multiple innovation requirements: a talented workforce, strong entrepreneurship communities, presence of successful incubation centers, availability of local venture capital, high market demand, research institution anchors, highly functioning networks, and multiple clusters of innovation. Classifications derived from literature review findings concerning the regional innovation ecosystems found in our most innovative cities. By classifying the elements according to these categories, stakeholders and consultants can survey the community to determine where the innovation ecosystem can improve and what steps address the enhancement of these potentials.

Creating the Innovation Catalog is a vital method in determining the relationships between regional/site innovation factors, and exploring how urban development serves as a means for innovation development. The compilation of innovation goals, objectives, and tactics provides designers with a knowledgebase for establishing design approaches for their projects. The process also connects regional innovation findings to successful site strategies, lessening the gap discussed in the Background. Overall, the catalog is a method, series of findings, and a deliverable serving as a foundation for innovation economy enhancement.

Implementing the Catalog

The innovation strategy simply takes the targeted innovation components identified in the regional and site assessments, then specifies an approach for applying them to the site, see Figure 3.2. This in essence forms a connection between RIS elements and the site design strategy. Some might refer to this as the project framework, which establishes the general direction of the project.

Regional & Site Assessment

To have a positive impact, the catalog of innovation elements requires a process for identifying elements to target in urban development projects. As such, this master's project institutes a strategy for assessing the regional and site factors to provide an understanding of community needs and the potential of the site.

To use the catalogue, we have to perform regional and site based assessments to understand the potential of our projects and their role in the local innovation economy. This is especially important as we consider that the future of innovation ecosystems depends on multi-faceted strategies and developments, as noted in the Background chapter. Innovation economy literature indicates projects primarily focused on one element of innovation do not have the power to propel the innovation economy. This means we should assess multiple components of the innovation ecosystem to create projects playing a role in innovation development. Simply targeting a few elements dilutes the potential for a development fostering innovation given the

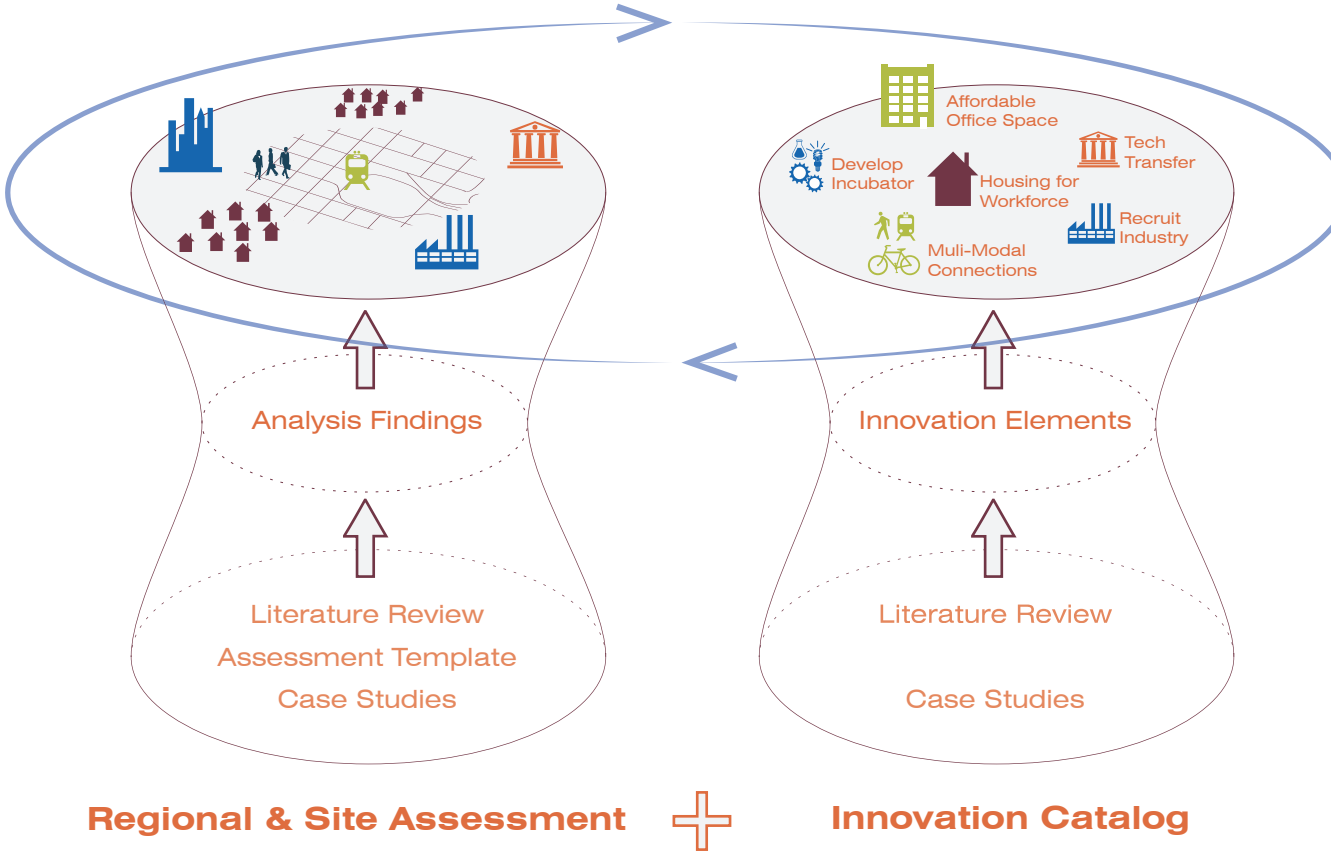


figure 3.2 - Catalog Implementation
By Author, 2012

complex web of networks and components that make up innovation economies. This is why we need a comprehensive solution and thus a comprehensive assessment.

A comprehensive assessment and plan is particularly the needed for communities with underdeveloped innovation economies. In communities with little innovation, as is the case of Manhattan, Kansas, there is less ability to build off an existing innovation system base, because the innovative infrastructure lacks establishment. In the case of Manhattan, the engine is Kansas State University. While the university provides a foundation, there are many missing private sector innovation components (more on these finding in the Catalog Implementation chapter).

Innovation Strategy

Communities with few pieces in place are less likely to succeed in the venture toward establishing an innovation economy unless they develop a comprehensive innovation economy strategy. This hypothesis gleaned from the work of Jonathan Sallet, Ed Paisley, and Justin Masterman in “The Geography of Innovation: The Federal Government and the Growth of Regional Innovation Clusters” (2009). Yet, this does not mean there is no hope for these communities, as innovation clusters like the CONNECT cluster in San Diego, California and Research Triangle Park in Raleigh-Durham-Chapel Hill, North Carolina emerged from economies struggling (before the development of the clusters) to be innovative – because these projects overcame great odds, they make good case studies.

Such projects can take multiple decades to generate intended results targeting a range of elements (Sallet, Paisley, & Masterman, 2009). With this in mind, we need to assess cities comprehensively in order to construct a plan to bolster their innovation economy. This can also be said for communities that already have a strong base from which to enhance their innovation ecosystem. High levels of innovation support infrastructure can further push a community's innovation system. The constant strive for improvement and development of innovation support systems in Boston (Sallet, Paisley, & Masterman, 2009), one of the United States most successful innovation economies, typifies this occurrence (Clark, Huang & Walsh, 2010). Regardless of the situation, regional and site assessment is critical for utilization of the KBUD catalogue of elements.

Site Assessment

The site assessment includes two parts: development capacity and innovation potential. The development capacity portion tells about the limitations and the potential of the site. The innovation assessment utilizes the information found in the site analysis and regional innovation system assessment to determine the limitations and potential of the site as a KBUD.

A series of questions and required knowledge cover the information necessary for determining the development capacity of the site. Gaining an understanding of site potential as it relates to market, physical and regulatory contexts provides a foundation from which planners and designers can begin to formulate development plans addressing innovation development. Questions and focus areas best illustrate these factors. Familiarity with these factors emerged from academic pursuits in urban planning and landscape architecture masters programs, as well as professional internships. They are as follows:

What restrictions limit the developable area of the site?

- Natural and topological limitations
- Adjacent infrastructure and urban fabric
- Tenets to remain
- Parking requirements
- Soils
- Hydrology
- Easements
- Other limitations
- What densities & land uses do the market and regulations allow?
- Demand for development types
- Land use demand
- Tenet vacancies
- Population growth trends
- Zoning regulations
- Community vision for area/comprehensive plan
- Neighboring land uses and densities
- What is worth saving on site?
- Natural features
- Man-made amenities
- Existing tenets
- Existing structures
- History of the site
- Views
- Infrastructure

The innovation potential sections focus on regional innovation system components. To reiterate, those components include the categories: talented workforce,

entrepreneurship, incubation centers, local venture capital, market demand, anchor research institutions, multiple clusters of innovation, and highly functioning networks.

Where are innovation economy components in relation to and how do they interact with the site? (map the locations and document the relationships)

- Talented Workforce
- Entrepreneurship Hubs & Services
- Incubation Centers
- Research Institutions
- Innovation Clusters
- Networks

Because many of the site and regional assessment components often rely on the same or similar data, site innovation potential assessment occurs in congruence with the regional assessment. It also provides an opportunity to develop innovation strategy ideas, because the planner/designer can interpret needs of the innovation community and potential for the site to address those needs. Therefore, while the Site Assessment portion of this section is separate from the Regional Assessment, they are not separate when carried out. Collectively the regional and site-based assessments allow planners and designers to create site design strategies targeting innovation.

The ULI – The innovation assessment for the ULI competition was substantially complete after the sixth day of the competition, thus showcasing the speed of the process and the ability of planners and designers to develop a basic overview of the innovation economy in a quick time frame. This is not to suggest the process should always be so quick or basic. Rather, to address the research questions presented in this report, the process should be adequate. If these projects were real then the process would be much more involved.

The availability of innovation assessment data outlined in the innovation assessment methodology was easier to obtain for the ULI – Minneapolis site than the MHK site. It is likely that the difference in availability of information was due to the size disparities of the two cities and the stage of innovation development for each city. Minneapolis is not only significantly larger and more developed, but it is a major leader of medical innovations in the United States. It also has a blossoming technology economy, whereas Manhattan is little known for its innovation economy.

Development Plan

The innovation strategies evolve from goals and objectives to a tangible product. The development plan displays the innovation strategies in physical form. The development plan includes many of the elements typically required by planning and building departments for building permits, in addition to innovation component information. For the purposes of this project, these elements include:

- Project vision – written & graphic
- Schematic master plan
- Circulation patterns & distances
- Phasing strategy
- Innovation support networks
- Innovation activity zones
- Industry Interaction
- Innovation Programs & Services
- Viewsheds

- Stormwater management
- Amenities – recreational & entertainment
- Organizational/tenet relationships
- Sections/Elevations
- Land use / zoning
- Density/massing

Summation

Overall, the innovation assessment, innovation catalog, and catalog implementation sections illustrate the roles planners and designers can play in building innovation economies, especially when considering the relationships connecting the RIS and KBUD components in the case study section.

Stopping Procedure

By the end of this project there was more thorough and informed responses to the lack of understanding about the roles of site designers in developing innovation economies and the gaps between site and regional elements of innovation systems. Close adherence to the work plan, figure 3.3, was critical to ensuring completion.

Schedule & Time Management

Time was a highly deciding factor in this project. It took of time to carry out the case studies, cataloguing, regional and site assessments, catalog implementation, and evaluation process. However, my engagement in the ULI - Gerald D. Hines Student Urban Design Competition forced an accelerated pace for parts of the project and was a main determinant of the work plan, indicated in Figure 3.3.

End Products

Overall, the project contains four case studies with accompanying innovation tactics, a catalog categorizing those tactics according to Innovation Ecosystem elements found in the reviewed literature. This information displays ways to develop the innovation economy using tested methods. These methods can guide planning and design decisions for urban redevelopment projects.

The project also includes two site designs, which include innovation strategies and development plans based on site and innovation assessments.

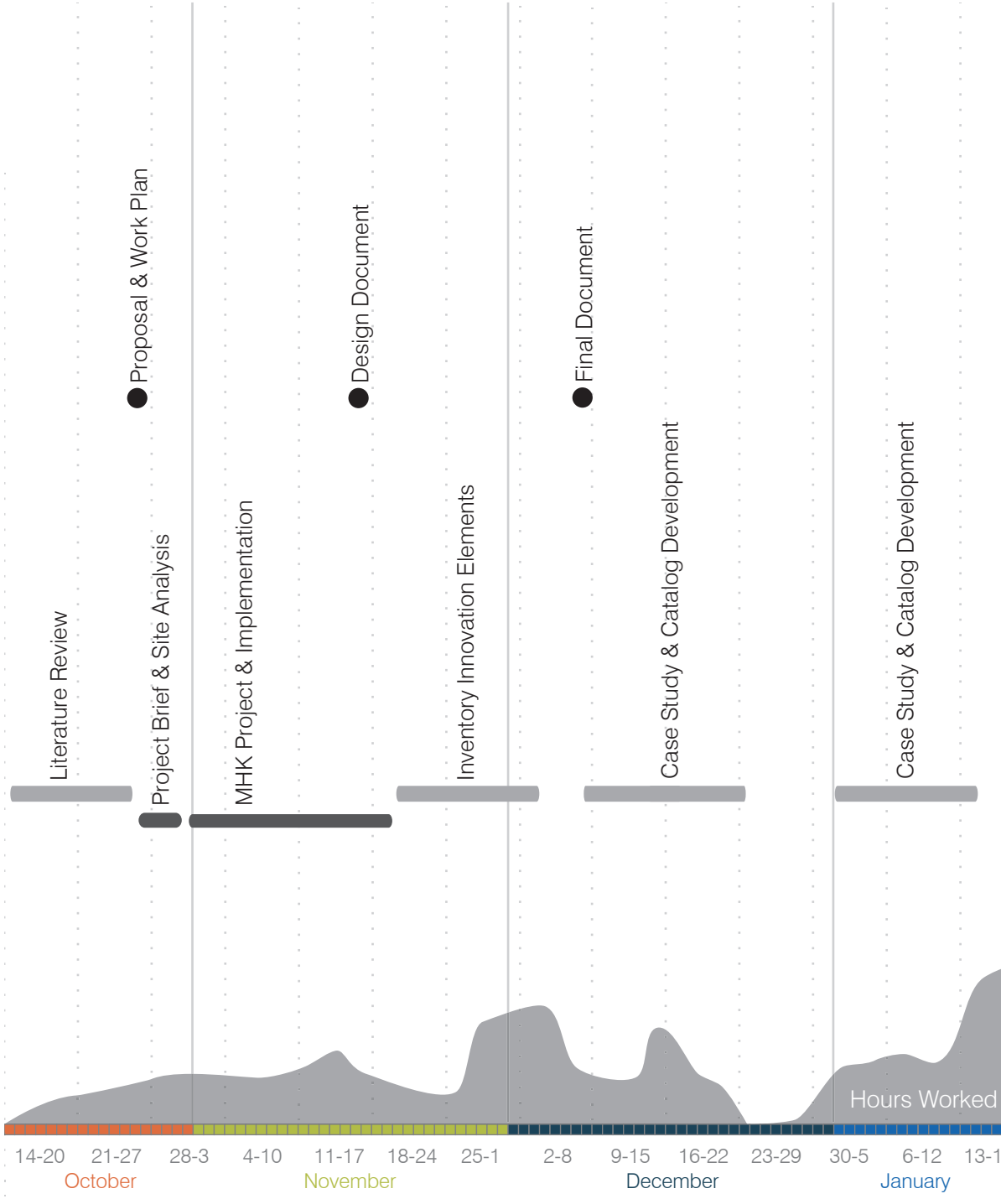


figure 3.3 - Project Timeline

By Author, 2012

ULI Project & Implement Strategy
Document Development
Mid Crit
MHK Design Development
Findings & Conclusions
Document Development
Substantial Completion
Review & Final Edits
Approval To Schedule Final Exam
Defense
Ballot and ETDR Submission
20-26
27-2
3-9
10-16
17-23
24-2
3-9
10-16
17-23
24-30
31-6
7-13
14-20
February
March
April

CASE STUDIES

INTRODUCTION

The case studies in this section help planners and designers understand the elements used in successful urban development projects targeting innovation. The selection of these sites stems from their success, as identified in in peer-reviewed literature. In selecting the precedents, there was need to document places with a history of generating innovation. With evidence that urban development projects can aid in the development of innovation, planning and design professionals can glean confidence from their successes and begin to understand why their abilities are useful for such projects. As such, Research Triangle Park in North Carolina and University Park @ MIT in Cambridge, Massachusetts were chosen.

Another need was to find recent examples of innovation-based urban redevelopments. While neither of these projects has empirical evidence showing they engender a more innovative atmosphere, they do illustrate current strategies and their creation, in part,occurred due to the successes of previous knowledge-based developments, notably Research Triangle Park. These projects show expanding roles for planners and designers in the development of innovation districts. The two selected projects include 22@Barcelona, Spain and Boston's Innovation District, Massachusetts.

These four precedents serve as the basis for substantiating the success of land development projects in enhancing innovation ecosystems, the roles that planners and designers play in the process, and creating the proceeding innovation catalog. Because the catalog derives from case study findings over successful innovation tactics from KBUD's, this chapter serves as a place to inventory this information.

RESEARCH TRIANGLE PARK

The Most Successful Research Park?

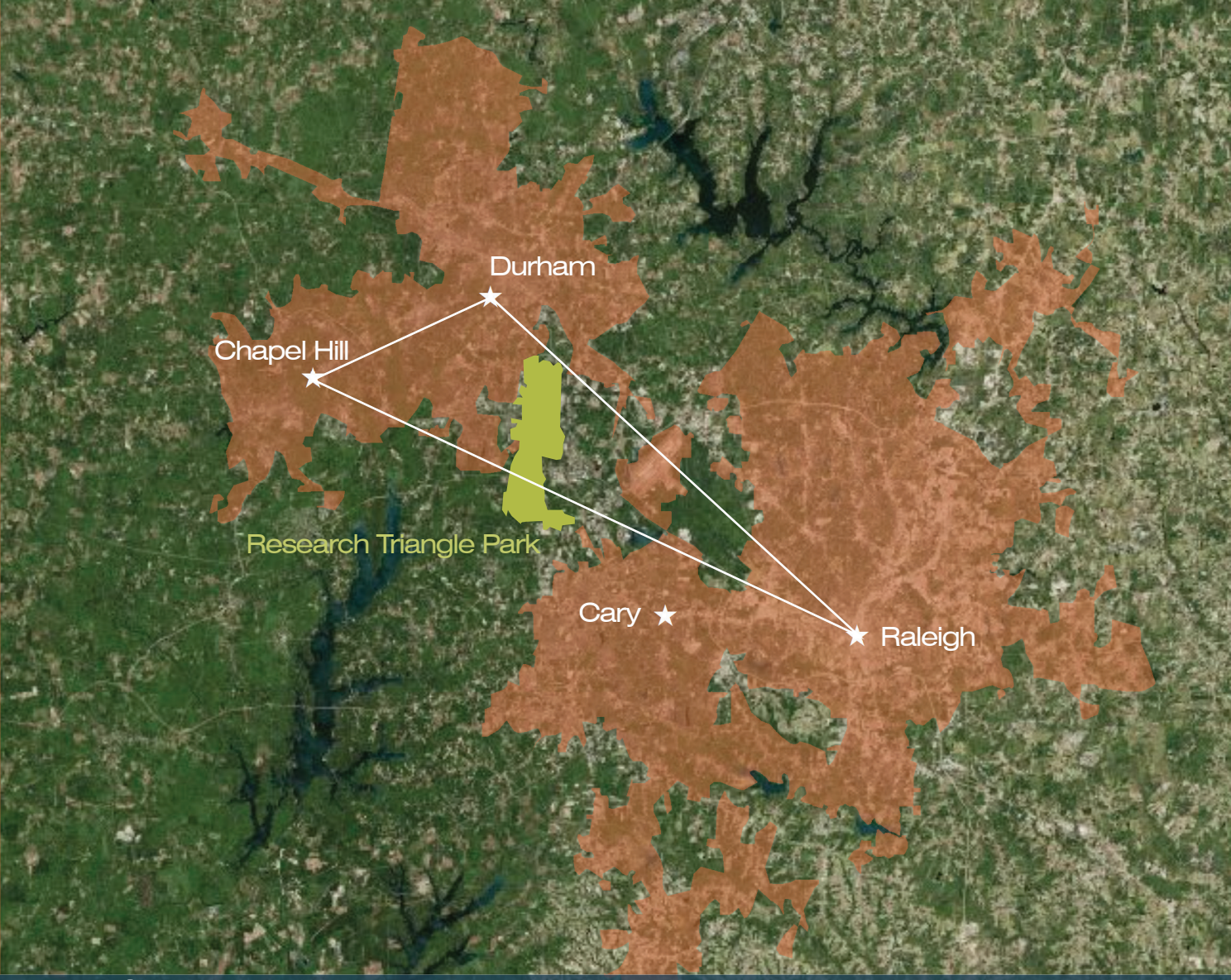


figure 4:1 - Research Triangle Park

Data From Bing Maps Aerial - Microsoft, 2013 Corporation & ESRI, n.d.

RESEARCH TRIANGLE PARK

Research Triangle Park, North Carolina

Research Triangle Park is one of, if not the most successful, research park in the United States. Once known for its weak economy, the area is now one of the main drivers of innovation in the country (Brown, 2009). The success of this KBUD largely hinged on the collaboration of three cities and the universities within them.

CONTEXT & HISTORY

During the 1950s, the North Carolina economy was in bad standing. The state felt effects of "brain drain" (the continual moving away of recent university graduates) and some of the lowest wage earnings in the country. In 1956, a group of public, private, and university leaders came together to form the Research Triangle Development Council (Weddle, Rooks & Valdecanas, 2009). The council wanted to find ways to develop and attract knowledge-based businesses to the state, especially industrial research laboratories. To do this they established a research park between Duke University, University of North Carolina at Chapel Hill, and Carolina State College. These three centers of advanced education formed the geographic triangle that is focus of the park name.

The driving idea behind the park was to establish synergy between researchers and industry professionals. Thus, the park would provide innovation and economic growth via research and development (R&D) collaboration. To run the park, the council created the Research Triangle Foundation of North Carolina. This non-profit organization would oversee park development, management, and maintenance (Weddle, Rooks & Valdecanas, 2009).

DEVELOPMENT OBJECTIVES

- Create higher paying jobs
- Change North Carolina economy from manufacturing to science driven
- Provide quality jobs for recent university graduates to stop brain drain

INNOVATION STRATEGIES

- Create a research park with connections to three research universities
- Provide a large-scale, research park (7,000 acres) to facilitate a large economic impact See Figure 4.1. The park boasts 23 million square feet of office space (National Research Council, 2009).
- Not only provide quality jobs, but an environment where researchers would want to work. They did this by keeping a large portion of the park naturalized, as seen below. The council found researchers in the region preferred this type of environment. Therefore, the park developed a set of guiding development regulations protecting the natural park setting, illustrated in Figure 4.2.
- They also established an architecture review board to ensure the quality of building design in the park (Weddle, Rooks & Valdecanas, 2009).
- They drew in large research firms and government labs (Sallet, Paisley & Masterman, 2009).
- The region had a low cost of living and doing business, which made the project even more successful (Brown, 2009).
- The park offers low-cost office space for entrepreneurs and SME's.

figure 4.2 - Nature Meets Research @ RTP

Courtesy of Ildar Sagdejev

- Created the North Carolina Biotechnology Center and the Triangle Universities Center for Advanced Studies (TUCASI) to develop programs and relationships necessary for creating “non-profit research and educational programs” (Weddle, Rooks & Valdecanas, p. 5, 2009)
- Research Triangle Institute (RTI International) was one of the first research facilities in the park. It focuses on providing research for businesses and government on a contract basis (Weddle, Rooks & Valdecanas, 2009).
- The foundation created network and communications infrastructure as foundation for future development.
- The park invested major funds to “connect Duke University, (Chapel Hill) and downtown Durham to the park”, via new highways, while also investing in the regional airport (Weddle, Rooks & Valdecanas, p. 4, 2009). See Figure 4.3.

SUMMARY

RTP gained its strength by bringing in large research companies and government labs, some of the biggest in the country. The large amount of space, proximity to research universities, establishment of physical R&D infrastructure, and low cost space drew in these tenets. The tenets then produced many spin-off companies, building the entrepreneurial environment that exists in RTP. Today, the region is one of the top innovation clusters for life sciences (Sallet, Paisley & Masterman, 2009).

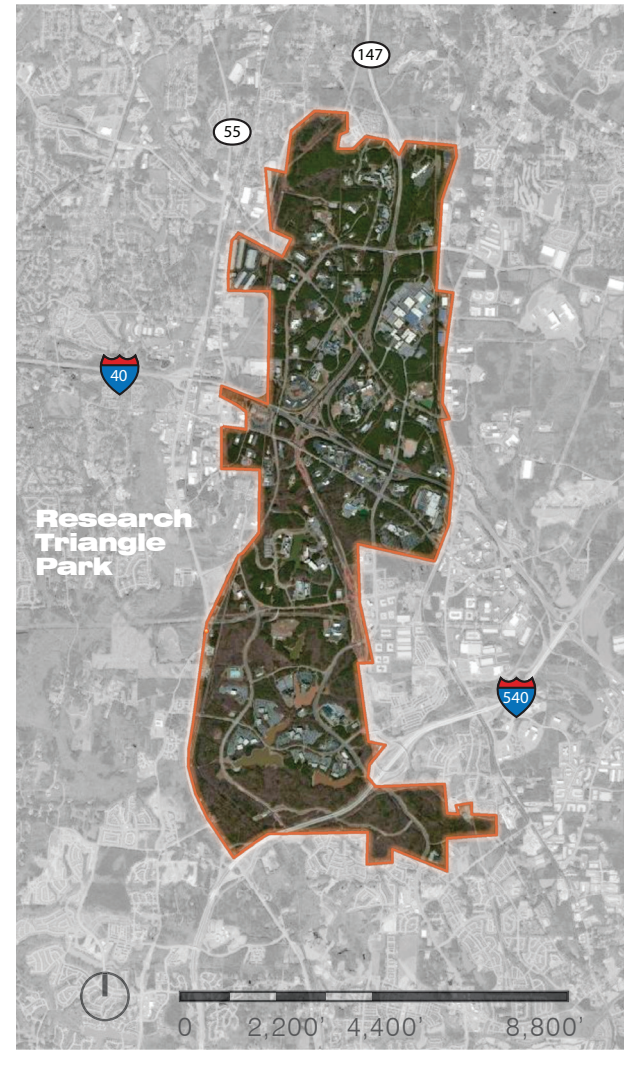


figure 4.3 - A Look at RTP Development

Data From Bing Maps Aerial - Microsoft Corporation, 2013

UNIVERSITY PARK @ MIT

An Original Innovation District?

figure 4.4 - University Park Master Plan

By Author, 2013

UNIVERSITY PARK @ MIT

Cambridge, Massachusetts

This development is very comparable in size to the Village Plaza project site. It is a mixed-use project near MIT that provides a high-tech, live/ work atmosphere (Forest City, n.d.). Started in 1983 and fully build out in 2005, this site has become a main cog in Boston's innovation economy. It is also one of the first mixed-use urban research parks, making it a pioneer innovation district.

CONTEXT & HISTORY

This development is an urban technology-oriented business park focusing on biotechnology and biomedical industries. Adjacent to downtown Boston and MIT, the development became a major component of the Boston/Cambridge innovation economy. (ULI, 2003)

The project started with an Request for Proposal (RFP) by MIT in 1982. MIT awarded the awarded to Forest City Enterprises. The developer agreed to a 20-year development lease, with a requirement to focus on research and development. The University and the developer, rather than the city (as typical of most innovation districts) funded the project.

Development Facts

- Site area = 27 acres
- Office = 1,400,000 Sf
- Retail = 75, 000 Sf
- Residential = 460 units
- FAR = 7.4
- Density = 66 du/acre

DEVELOPMENT OBJECTIVES

- Push tech transfer opportunities
- Foster continued growth and expansion of MIT campus
- Use the project to generate funds for their endowment and a high return on investment
- Serve as a future place of employment and living for MIT graduates
- Create a mixed-use campus-like environment
- Create a development flexible enough to respond to changing tenet needs and conditions
- Job creation for entry-level positions
- Affordable housing
- Non-competing retail uses
- Office is the primary focus

INNOVATION STRATEGIES

- Re-used an existing industrial warehouse building to affordable housing and R&D space (ULI, 2003)
- Used axial relationships of parks and open spaces to engage the surrounding community and MIT campus, as seen in Figure 4.4 (ULI, 2003)
- The main park space, University Park common, illustrated in Figure 4.5, was used to attract businesses and residential tents.
- Created a new planning district to enable the development of mixed uses (ULI, 2003)
- Created a master plan for the project to ensure development of a quality environment attractive to researchers, Figure 4.4.
- Developed a hotel to serve entrepreneurial and R&D events
- Created a leasing structure to ensure low-income and moderate-income units, which must exist on site for 30 years (ULI, 2003)
- Used art symbolic of the periodic table and the site's science focus to help establish research park identity (ULI, 2003)
- Created buildings with flexible spaces for adaptation to tenet needs and improved building design to include laboratory grade infrastructure and utilities.
- Created a phasing strategy that included discounting rental rates unt il the development became more established (ULI, 2003)
- Used the hotel as a marketing tool to help drive the development.
- Created amenities needed for residence and workers like cafes, grocery stores, banks, recreational facilities, and a day care.

figure 4.5 - The Urban Feel of University Park Commons

Courtesy of Dr. Frog

22@ BARCELONA
The Ideal Innovation District?

figure 4.6 - 22@Barcelona

City of Barcelona, 2007

22@ BARCELONA

Barcelona, Spain

This development is one of the most established and referenced Innovation Districts in the world. This project is one of the first formally developed innovation districts in the word. This project will help visualize potential for new development, especially given its early redevelopment success and high praise by many in the urban innovation research community (Broggi, 2007).

CONTEXT & HISTORY

The 22@Barcelona innovation district sits in the old industrial neighborhood of Poblenou. The city of Barcelona targeted this site for urban redevelopment, as the once prosperous district had fallen from its once prominent economic position in the Catalonia region of Barcelona, Italy (22@ Barcelona, 2006). The relocation of companies caused deindustrialization of the district in the 1960's (22@ Barcelona, 2006). What followed was urban blight. As the building stock, streets, and public infrastructure degraded, the area became desolate.

The 1992 Summer Olympics facilitated building and rebuilding of roads, connecting the district to Barcelona. With renewed activity traversing the site, the City of Barcelona targeted the district for redevelopment (22@ Barcelona, 2006). In 2000, the 22 ARROBA BCN governmental entity formed to implement a through and comprehensive district plan. The resultant project has become an urban redevelopment success story. Today cities all over the world reference 22@Barcelona to learn about advanced zoning practices, innovation districts, and urban redevelopment.

DEVELOPMENT OBJECTIVES

- Specifically focused on boosting the local knowledge-economy
- Wanted synergy between research and business communities (22@ Barcelona, 2006)
- Sought to reinvigorate the once prosperous industrial, Poblenou Quarter
- Drawing the most innovative firms, institutions and workforce to the area was a main focus

INNOVATION STRATEGIES

- Create a diverse, dense, and close mixture of uses, activities and amenities
- Clustering and centralizing people, industries, infrastructure, and services
- Develop a hierarchy of public space types including wide promenades, large to small squares, large to small parks and alleyways, seen in Figure 4.7.
- Live/ work atmosphere, 50% of the space is residential (22@Barcelona Urban Planning Management, 2012)
- Provides extended stay housing for temporary workers
- Iconic buildings in each of the clusters
- Restoration of and emphasis on the industrial past of the district by identifying and protecting 144 heritage buildings and sites (22@ Barcelona Urban Planning Management, 2012)
- Living labs / citizen laboratories – social and digital innovation spaces where citizens learn the value of knowledge and technology and how to use it to enhance their lives/ businesses (Lopez, 2011)
- Innovative architectural elements creating an innovative ambiance
- Focus on retaining university students by placing residential within the cluster of their sector
- Heavily dependent on a top-down approach
- "Urban Lab is a tool to provide a space in the 22@Barcelona district to carry out tests and pilots on products and services that have an urban impact and are in a pre-commercial phase…The idea is to use of the city as an urban laboratory ." (Bartolomé, 2012)
- Leverage the planning and success of surrounding urban redevelopments (22@ Barcelona Urban Planning Management, 2012)
- Tie into emerging and existing city centers,

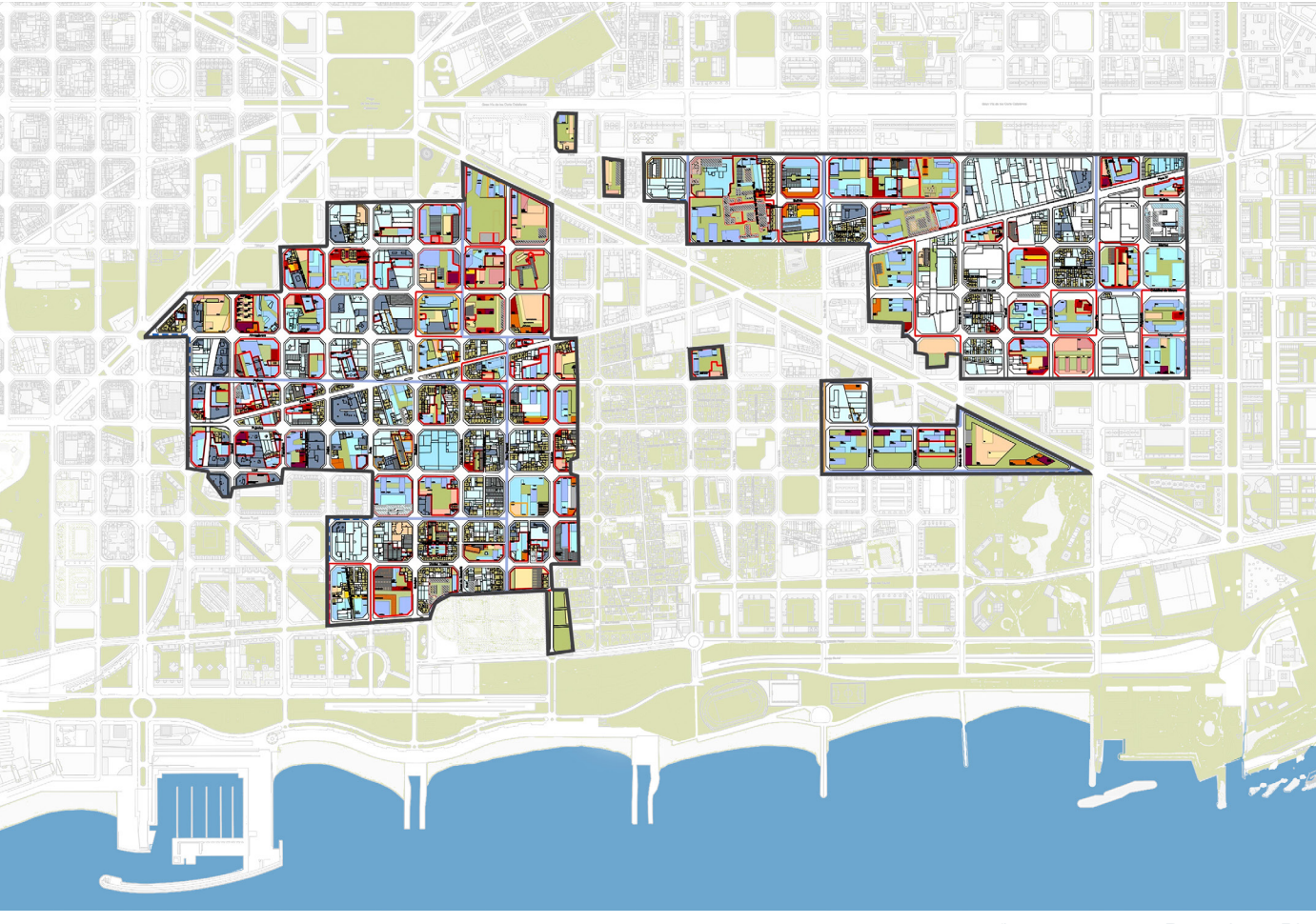


figure 4.7- 22@ Barcelona Plan

Modified from City of Barcelona, 2012

specifically the cultural/administrative hub of the city (Plaça de les Glòries)and the convention center (22@Barcelona Urban Planning Management, 2012)

- Utilize and expand on multi-modal transit infrastructure (22@Barcelona Urban Planning Management, 2012), especially:
    - The new multi-modal transit station in Plaça de les Glòries.
    - La Ronda del Litoral – a highway connecting the district with all of metropolitan Barcelona
    - The local mass transit network of light rail, trams and buses
    - Make uses of close proximity to regional and international systems like the airport, regional railway, and the future international high speed rail connections

    - Continue to develop the bicycling infrastructure by providing bike lanes, amenities, and parking facilities
- Form two major axes serving as the backbones of the district (22@Barcelona Urban Planning Management, 2012).
    - The Bolivia Axis connects many of the cultural and academic components of the district
    - The Llacua Axis ties economic engines with residences and integrates public spaces to serve both domains
- Created a "Special Infrastructure Plan" to develop and redevelop infrastructures needed for district vitality(22@Barcelona Urban Planning Management, 2012), including:
    - Improved streetscapes to establish network hierarchies and improve multi-modal capabilities
    - Create central heating/cooling and refuse systems for the district to ensure efficient use of resources (over 40% reduction in energy consumption)
    - Increased the power, WiFi, and fiber optic supply to the district to meet innovation demands
    - Created "service galleries", allowing to infrastructure adjustments without interfering with productive daily activities

Key Strategy: Market Demand via Density Bonuses

Land-use density bonuses for developments/ businesses contributing to the innovation economy, plus transfer of development rights, drive the urban redevelopment of Poblenou. Zoning changed from 22a zoning (industrial) to 22@ zoning (services), which allows for any land-use type, "so long as it does not negatively impact" adjacent properties (Corneil, 2011). Barcelona incentivized development by allowing higher density development. With this zoning change came a requirement that "30 percent of the total land to be transferred to the City for uses such as affordable housing and open spaces" (Brookings Institute, 2011) and a financial levy for land developed so the city could provide and pay for infrastructure developed (ULI, 2010).

The zoning changed from 22a, and industrial use with a 2 FAR to 22@, which focuses on productive urban activities. 22@ allows for a 2.2 FAR, plus density bonuses for other targeted uses. Those include a 2.7 FAR for @7 Activities (innovation/R&D) and a 3 FAR for Subsidized Housing, see Figure 4.8. In return the city gets:

- 10 percent of the land for 7@ Facilities
- 10 percent of the land for subsidized housing
- 10 percent of the land for green space

The 30 percent land transfer to the city seems like a lot, but because of the density

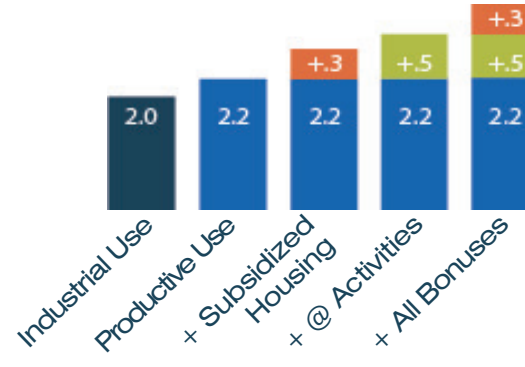


figure 4.8 - Density Bonuses
Data from 22@ Barcelona, 2012

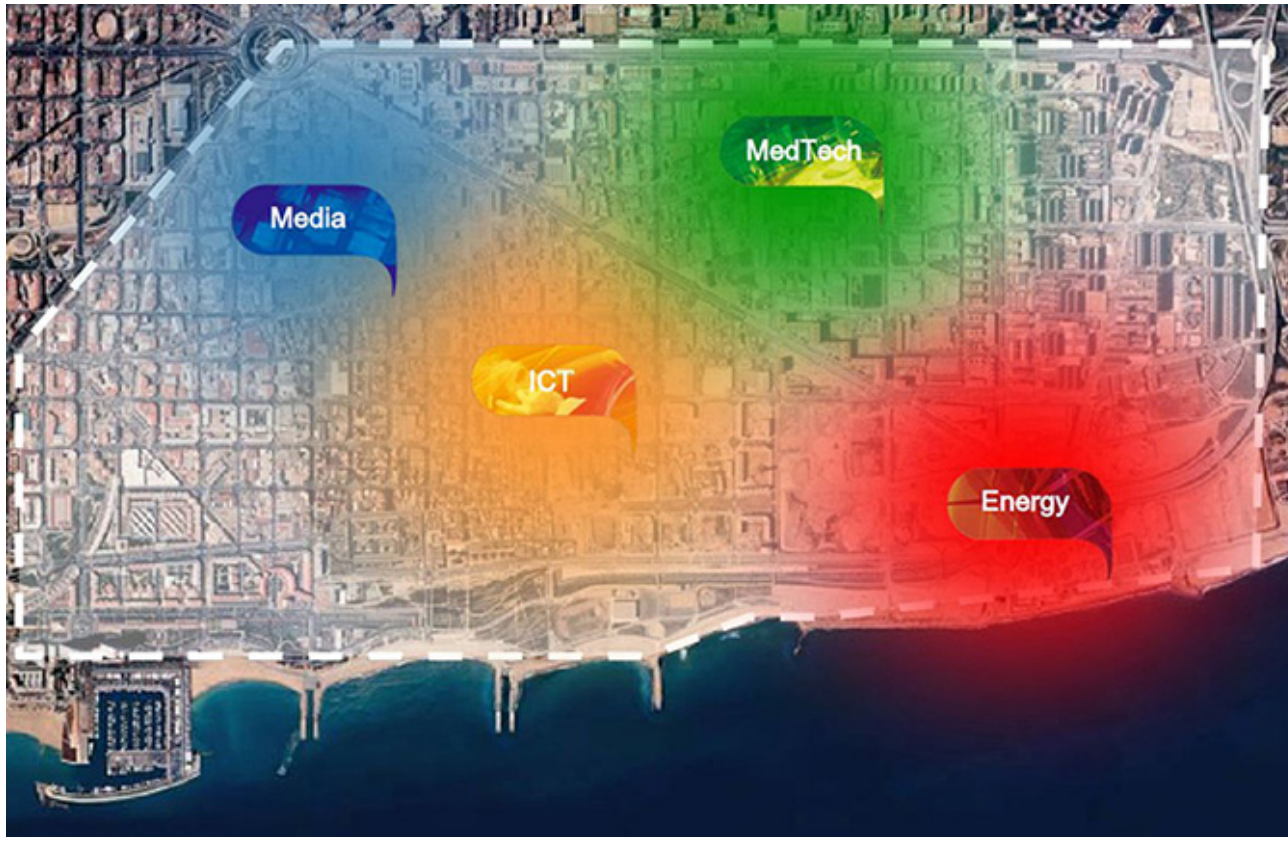


figure 4.9 - Innovation Clusters

City of Barcelona, 2012

bonuses, landowners still see a significant rise in their land value.

Key Strategy: Multiple Clusters

The City of Barcelona spent considerable time focusing on developing and branding of clusters, Figure 4.9. They specifically attempted to magnify effects of clustering found in innovation economies. While clusters typically occur at a regional scale, Barcelona seeks to create synergy by developing clusters in an urban district. By tightly agglomerating the clusters, Barcelona is hoping to facilitate collaboration, and knowledge spillover, in addition to attraction of talented workers and innovative businesses. With a tighter grain of clustering, Barcelona can maximize their innovation ecosystem infrastructure and services

by serving a greater density of workers and companies (22@ Barcelona, 2006).

While the cluster scheme targets a greater number of innovators, it does not neglect specific needs required by innovators in different sectors. 22@ Barcelona has multiple clusters targeting industries including (22@ Barcelona, 2006):

- Media
- Information & Communications Technologies (ICT)
- Medical Technologies (MedTech)
- Energy
- Design

In each cluster, there are components that specifically address industry needs for innovation. These components include:

- Institutions and universities leading research in the sector.
- Business incubators to help launch emergent companies with innovative ideas,
- Technology centers / business parks for research and development collaboration (except for the energy cluster),
- Residential areas providing affordable living for students and workers of each cluster via subsidized housing,
- Public/private partnerships driving the innovative services and infrastructure found in 22@ Barcelona
- Affordable space available for SME's to establish in each cluster

(Battaglia & Tremblay, 2011)

To establish the location of these clusters, Barcelona determined the location of existing organizations and institutions that best serve each industry and located the clusters based on those relationships (Brookings Institute, n.d.). Each cluster is connected by public space, parks, ITC (including fiber optic networks) and mass transit systems. They also include areas for exhibition and explanation of their work, collaboration spaces, and social/ professional activities furthering research, funding, and networking. Finally, the district has interconnected, shared, and state-of-the-art energy, waste, heating, and cooling systems.

BOSTON'S INNOVATION DISTRICT

The Ideal Innovation District?

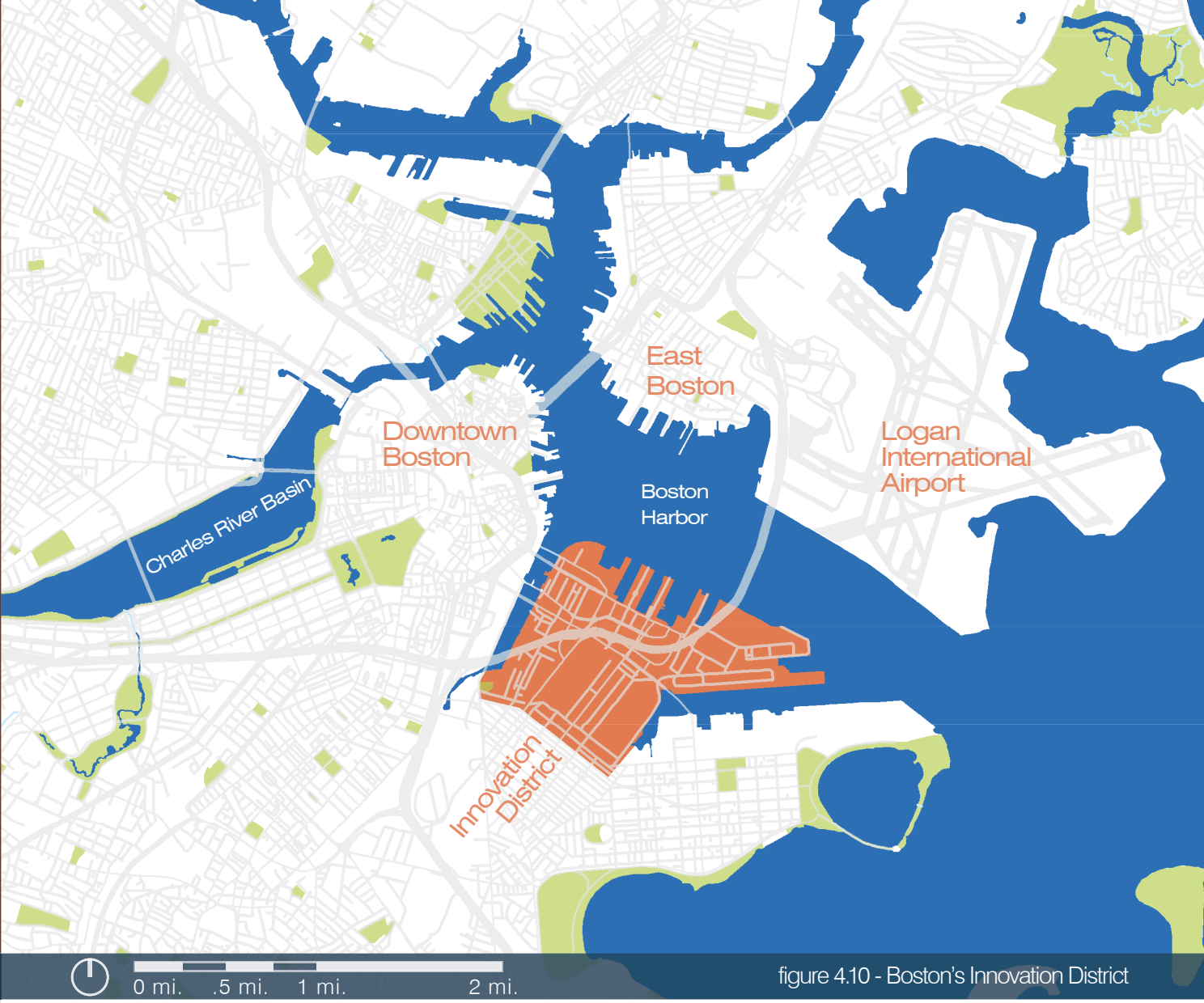


figure 4.10 - Boston's Innovation District

Data From ESRI, n.d.

BOSTON'S INNOVATION DISTRICT

Boston, Massachusetts

Interest in the district in-part developed from the urban redevelopment success found in 22@ Barcelona. The mayor of Boston, Thomas Menino, saw the potential of the emerging are to become Boston's version of 22@Barcelona and thus established the Boston Innovation District.

CONTEXT & HISTORY

Started in 2010, this Innovation District is beginning to draw in many businesses and residents by redeveloping its old seaport district. The Mayor coins the 1,000 acre district as a live, work and play environment desired by many creative-minded individuals (Koven & Roeth, 2011).

With a scaled back harbor, the area Pre-Innovation District development started after the city made transportation investments in the area. After that, the city realized the growing research and innovation trends in the area and decided to bolster this trend by titling the area the Innovation District.

INNOVATION STRATEGIES

- More ground up than 22@
- Clusters not dictated, but rather naturally occur
- Flexible floor plans
- Focus on interdisciplinary development
- The city provides social infrastructure, planning, vision and financing…this is much more of a guiding/supportive role rather than a implementation role
- Established incubators, Figure 4.11.
- Below-market to no rent spaces for innovative companies and institutions
- MassChallenge targeted as their initial business accelerator
- Boston built off an already trending redevelopment of the area, particularly creative and inventive companies in the South Boston Harbor District (Brookings Institution, 2011).
- Creating an Innovation Center to house events and conferences
- Social and media communications played a large role in both branding the district and facilitating collaboration between firms, start-ups and research institutions. The city also hosts event to further these interests.
- Mixed-use development
- Boston is particularly strong in life-sciences and high-tech industry, the district focuses on these industries in particular
- “Live, Work, and Play” is the theme and Urban Lab is the concept (a concept found in the 22@Barcelona strategy) (Sharma, 2012).

figure 4.11 - Innovative Facilities

Modified from: City of Boston, 2011

SUMMARY

FINDINGS & CONCLUSIONS

Overall, the case studies represent two well-established and successful research parks and two emerging innovation districts. By analyzing established developments, we see how urban regeneration projects can be useful to innovation economies. In the case of Research Triangle Park (RTP), the success of the development drove the resuscitation and rise of the Chapel Hill-Raleigh-Durham economy. It did so by uniting academic, governmental, and private institutions in a high-tech setting to form the synergistic environment needed to produce innovative products and services. This broad scale project is one of the most successful and well-documented research parks in the United States.

University Park @ MIT did not have near the momentous impact of RTP, but neither the Boston metropolitan economy, nor the scope of the development presented the same opportunities capitalized by RTP. Rather, University Park built on Boston's sterling reputation as an elite innovation economy. Through the development, Forest City Enterprises and MIT tapped into unmet demand for a science-grade, mixed-use environment. This spurred expansion of Boston's innovation capacity. In strong contrast to RTP and other previous research parks, University Park unofficially became one of the first innovation districts in the United States. The urban live-work district with a strong R&D+I agenda speaks to kind of environments desired by those drawn to innovation districts.

Both research park examples illustrate how land development projects can either repair an economy or enhance it. This finding is critical in supporting the use of land development as a means for improving the innovation ecosystem and the professionals needed to make them successful. If cities want to replicate the successes of RTP or University Park @ MIT, they need professionals to create visions for the development, develop master plans, design facilities, and program spaces. These abilities were critical to success of the established projects and emerging districts.

In the two recent innovation district examples, professional roles expanded. These two cases demonstrate ways we envision and carry out development of innovation districts. They help us see changing trends in KBUD and comprehend the roles of land planners, urban designers, and landscape architects as they evolved from the suburban research park model. The Boston Innovation District focused largely on planning, incentives, and marketing rather than the substantial planning and design implementation strategies seen in 22@ Barcelona. Regardless, planners and designers played significant roles in both projects, though Barcelona required more of these professions.

Some of the functions carried out by planners and designers in the precedents include:

- Locate programs, activities, & industry clusters
- Design public space networks & natural areas
- Create development identity through design, art, & branding
- Plan transportation networks
- Design buildings & facilities
- Allocate space for ITC & other infrastructures

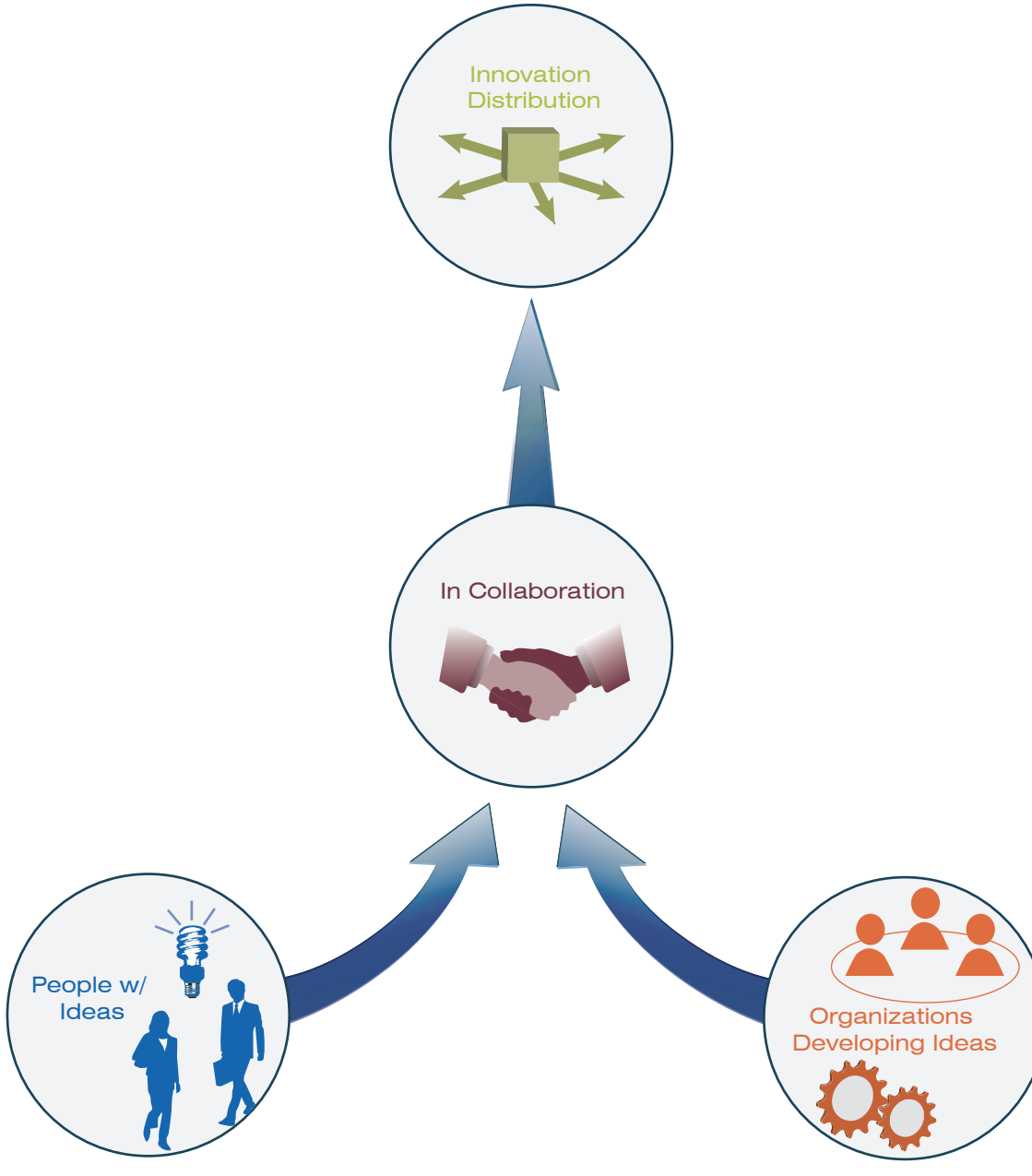
- Determine densities, urban form, & land uses
- Devise Phasing Plans
- Enhance synergy opportunities through tenet & resident placement
- Propose appropriate development amenities
- Develop creative ways to spur innovation (i.e. Barcelona's Urban Lab concept)

These services indicate the roles planning and design professionals play in KBUD.

An unintended finding arose in the search for innovation tactics. In thinking about the regional innovation requirements, it became apparent KBUD projects build the innovation economy by attracting people and organizations, Figure 4.12. They do this because they want the communication and collaboration accelerating innovation.

In returning to the definition of innovation and the process for achieving it, people, organizations, and the innovation process exude a particular synergy. This in effect is the innovation system. If we add people, organizations, and synergy to the already formed innovation process diagram, we can see where they fit into the process. This system is what cities seek to cultivate with KBUD.

*Going forward, the innovation tactics documented in this chapter and the findings derived from this research method provide the information needed to compile the Innovation Catalog described in the next chapter.



The Innovation System

figure 4.12 - The Innovation System
By Author, 2013

INNOVATION CATALOG

INTRODUCTION

The Innovation Catalog organizes information into a classification scheme, allowing for analysis, dissemination, and implementation of innovation tactics found in successful KBUDs. The catalog developed through a process including case study analysis, post review of literature findings, and through development of two design projects. The creation of the catalog included an iterative process and multiple stages of refinement. What emerged is a mechanism planners and designers may utilize to assess innovation communities and devise strategies geared toward improving the local innovation system. In the catalog, planners and designers find ingredients of successful urban innovation developments. This information bolsters our confidence in urban developments as a tool for innovation development and helps identify the roles of planners and designers in the process.

INNOVATION CATALOG

The catalog has three tiers of hierarchy: goals, objectives, and tactics, as shown in Figure 5.1. The goals and objectives used in the catalog come from literature review findings, while the innovation tactics derive case studies analysis. The goals are components of the regional innovation system, which are characteristics of ERIS and Marshallian Districts. The seven categories (regional requirements) are a talented workforce, market demand, a strong entrepreneurial community, successful incubation centers, advanced research institution anchors, multiple clusters of innovation, and highly functioning networks. These are the domains required for a successful innovation economy.

The objectives stem from KBUD literature findings. Generalized components found in the second tier of the classification, tie site and district level development objectives to regional innovation system goals. The process of connecting regional goals to KBUD tactics through KBUD objectives, bridges the knowledge gap discussed in the Background.

The KBUD objectives are means for attracting people and organizations, while providing systems needed for a successful innovation system. The people, organizations, and synergies between them are critical to the innovation economy, as realized in the findings section of the Case Study chapter.

The documentation of KBUD tactics is the final tier of the catalog hierarchy. These serve as the ways planners and designers execute the goals and objects. Tactics from the catalog show the roles professionals play in innovation projects and therefore innovation development.

APPLYING THE CATALOG

Planners and designers can use information from the catalog to outfit urban developments with innovation driven components. The catalog allows for assessment of local innovation economies and implementation of innovation strategies in a direct and easy to follow format. By assessing the regional and site based innovation components of a locale according to the catalog, planners and designers can identify the strengths and opportunities that exist in each of the targeted goals.

If, for example, there is indication of a lack of talented workforce in an area due to absence of live work integration, professionals can select from the relevant tactics in the “Live/work integration category”. The strategy developed

from that tactic allows the community overcome the live/work integration challenge and thus entice the presence of a talented workforce in the area.

In congruence with strategies addressing other areas of potential, KBUD projects should facilitate innovation in the local economy by providing and facilitating the needed innovation components. A comprehensive solution is the best way to to ensure a successful innovation development project, as all of the components of innovation economies are critical to generation of innovation.

* The graphic on the next page is the Innovation Catalog.

INNOVATION DEVELOPMENT

Attracting a Talented Workforce

Strong Cultural Presence

- Avoidance of exclusionary zones & gentrification
- Develop socio-economically diverse districts

Live / Work Integration

- Affordable/Subsidized Housing
- Extended Stay Hotels
- Mixed-Use Buildings / Blocks

Vibrant Nightlife

- Cultural Activities & Venues
- Entertainment Activities & Venues

Range of Leisure & Recreation Activities

- Hierarchy of Open Spaces
- Natural Settings

Generating Market Demand

Distinctive Identity

- Iconic Landscapes & Buildings
- Urban Lab Concept
- R&D Focused
- High Quality Facilities

Unique Branding

- Naming development
- Create logo
- Develop mantra
- Utilize social media

Leveraging Trends in Development

- Build on emerging development trends
- Emphasize adjacent cultural / civic districts

Development Incentives

- Density Bonuses for sought activities / uses
- Transfer of Development Rights
- Innovation-Based Tax Credits

Providing for Entrepreneurship

Space for Unanticipated Uses

- Flexible & varying building layouts
- Innovation Center for events & activities
- Room for future growth

Affordable Space for Businesses

- Below-market to no rent spaces for innovative companies / institutions
- Low cost of living
- Low-income / moderate income living units

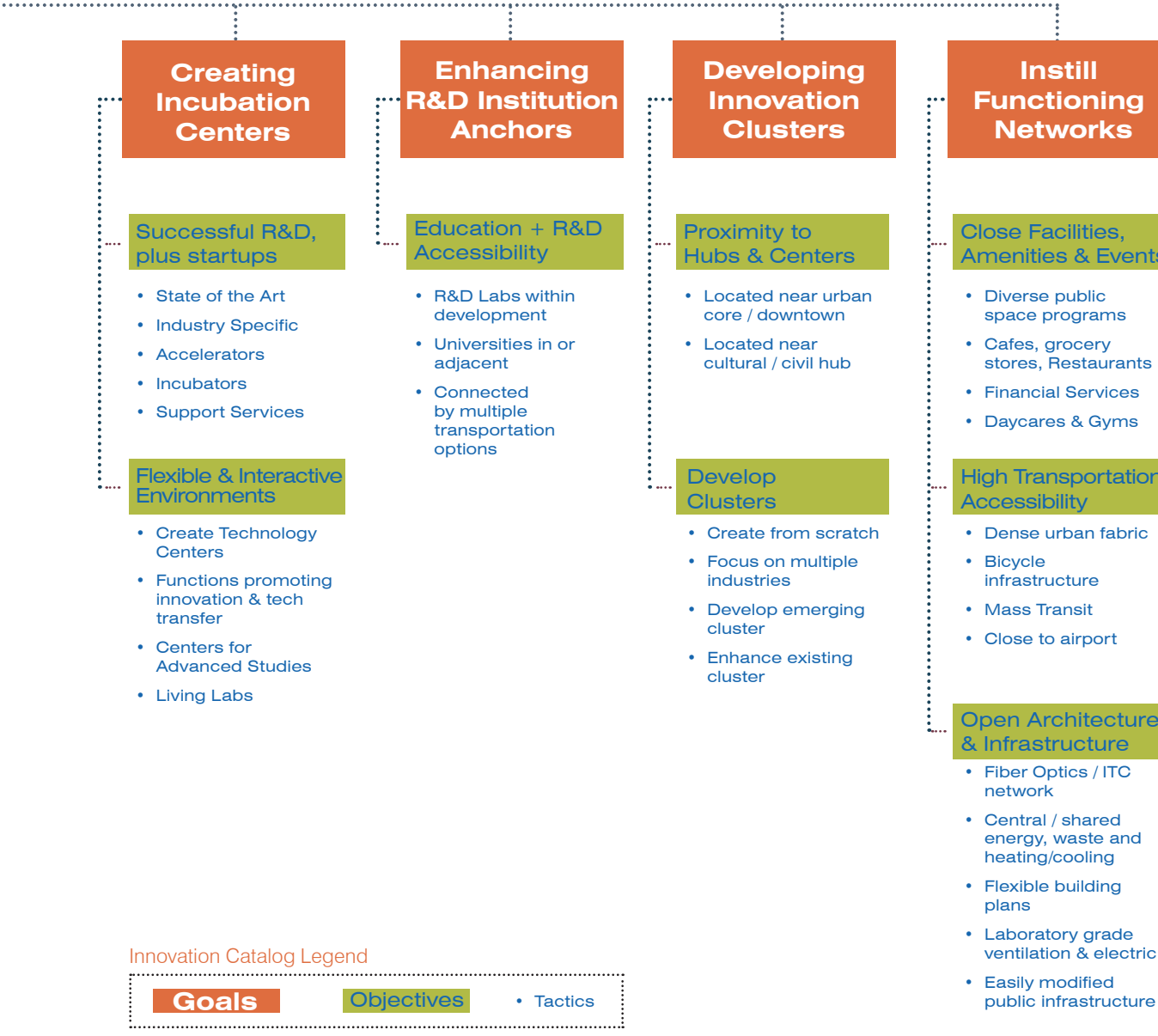


figure 5.1 - The Innovation Catalog

By Author, 2013

SUMMARY & FINDINGS

One finding from case study analysis and Innovation Catalog development was distillation of frameworks used to develop these projects. Commonly, each case study employed a similar framework strategy composed of related elements. Major components identified in these frameworks are people, organizations, synergy, facilities, infrastructure, activities/programs, incentives, and marketing, as seen in Figure 5.2.

- *People* refer to the workers and residents needed to build innovation development communities. Many communities look for a highly trained, creative, and entrepreneurial workforce. Components under this category entice targeted groups to live and work in these developments.
- *Organizations* are the groups, institutions, agencies, and corporations needed to structure and support innovation environments. They provide the facilities, infrastructure, and resources required for innovators to prosper.
- *Synergy* speaks about the way people and organizations interact. Some of this includes marketing and programming of spaces in the development, which promote communication and collaboration between these groups.
- *Facilities* are the places where people and organizations live, work, and play.
- *Infrastructure* refers to the networks connecting people, organizations, communication, and facilities.
- *Activities & Programs* are components required by people and organizations needing specific social/networking capabilities. These components activate facilities and infrastructure in ways promoting communication and collaboration.
- *Incentives* are mechanisms to entice people and organizations to locate in innovation districts/developments. They make moving there enticing by either reducing operational costs, or by maximizing land development potential.
- *Marketing* is the last factor. It simply serves as a means for communicating the development exists and that it has a beneficial and unique environment. This is yet another means of enticing people and organizations.

While distinct innovation system components exist, it is important to note that spillover effects and overlap exist between each category. For example, the people and organizations targeted for a project need to engage in collaboration. Collaboration happens in various facilities and via certain infrastructures. Thus, simply targeting particular demographics or research institutions is not enough. These developments need the facilities and infrastructure where people and organizations operate and collaborate. Understanding and assessing the relationships of these categories in specific situations will help planners, designers, and stakeholders develop thorough and cohesive development strategies.

The process for using or targeting these components tends to happen is similar ways throughout the case studies. Planners and designers cannot simply say people and organizations will exist on the site. Rather, we entice them to locate in the development by catering to their needs and desires. Given

people and organizations are the largest drivers of innovation, bringing them into the development is a critical step.

Just as important is getting people and organizations into the development is getting them to communicate and collaborate. Planners and designers cannot force this to happen. Having organizations and people in one setting is a step towards synergy, but not an end mean. While we cannot make synergy happen, we can design potential for it to exist and entice it to happen. This is where the remaining components come into play.

In order to draw people and organizations to the site and participate in synergy, planners and designers need to develop facilities, infrastructure, activities, programs, incentives, and marketing that fit the needs of their target tenets. In doing so, professionals provide strong opportunities for innovation development. This process/framework shows how vital the planning and design professions are in KBUD and their roles in developing innovation economies.

NEXT STEPS

The use of the catalog occurs through two KBUD projects in the next chapter. These projects illustrate how to use the catalog, show how the framework finding works in the process, and serves as another method for determining the roles of planners and designers in innovation development strategies.

figure 5.2 - The Innovation Framework
By Author, 2013

CATALOG IMPLEMENTATION

INTRODUCTION

Overview & Process

This chapter contains two urban redevelopment projects, which are means for testing and implementing the Innovation Catalog. The process includes performing regional and site assessments to analyze the potential of a site to facilitate innovation in the local economy. During this process, the assessment focuses on the seven required components of innovation economies, as identified through literature review and found in the catalog. These include:

- Talented Workforce
- Market Demand
- Entrepreneurship
- Incubation Centers
- Research Institutions
- Multiple Centers of Innovation
- Highly Functioning Networks

After identifying site-based opportunities to improve the local economy in these areas, select tactics from the Innovation Catalog come together to form a design/development strategy. These tactics derive from caste studies, validating their importance in successful land development projects targeting innovation.

The first project was the Gerald D. Hines - ULI Student Urban Design Competition located in Minneapolis, Minnesota. It serves as the first attempt at implementing the catalog. This occurred during early stages of catalog development. Because of the lack of refinement of the catalog, in addition to a two week time line for implementation, this project was not as polished as the MHK project in terms of assessment. Yet, despite this circumstance, the project managed to contain many of the tactics identified in the catalog, making it a useful part of catalog assessment.

The second project was the Village Plaza - Manhattan, KS site. The first round of this project occurred during the later phase of case study research. This helped identify tactics missed during the first round of case study research. After completing the case studies and innovation catalog, the Village Plaza project evolved. The design process improved as the designer became more comfortable with the process and refined the framework for project development.

Value

This method serves as grounds for assessing implementation of the catalog and allows for further identification of the roles of land planners and urban designers in the development of KBUD's. This effort moves us closer to resolution of the research dilemma.

KINETIC MINNEAPOLIS

Intellectually Driven | Socially Vibrant | Physically Active

http://www.crunchbase.com/assets/images/original/0007/7797/77797v2.

figure 6.1 - Urban Market

Johnston, 2013

DOWNTOWN EAST
Minneapolis, MN

Kinetic Minneapolis is driven by the city's potential for economic and social sustainability through livable innovation-driven communities. The concept represents an understanding that the regional socio-economic climate makes the Downtown East redevelopment site highly conducive for a high-density, mixed-use district characterized by synergy through a bio-tech business incubator with supporting residential, retail, and recreational uses.

LOCATION

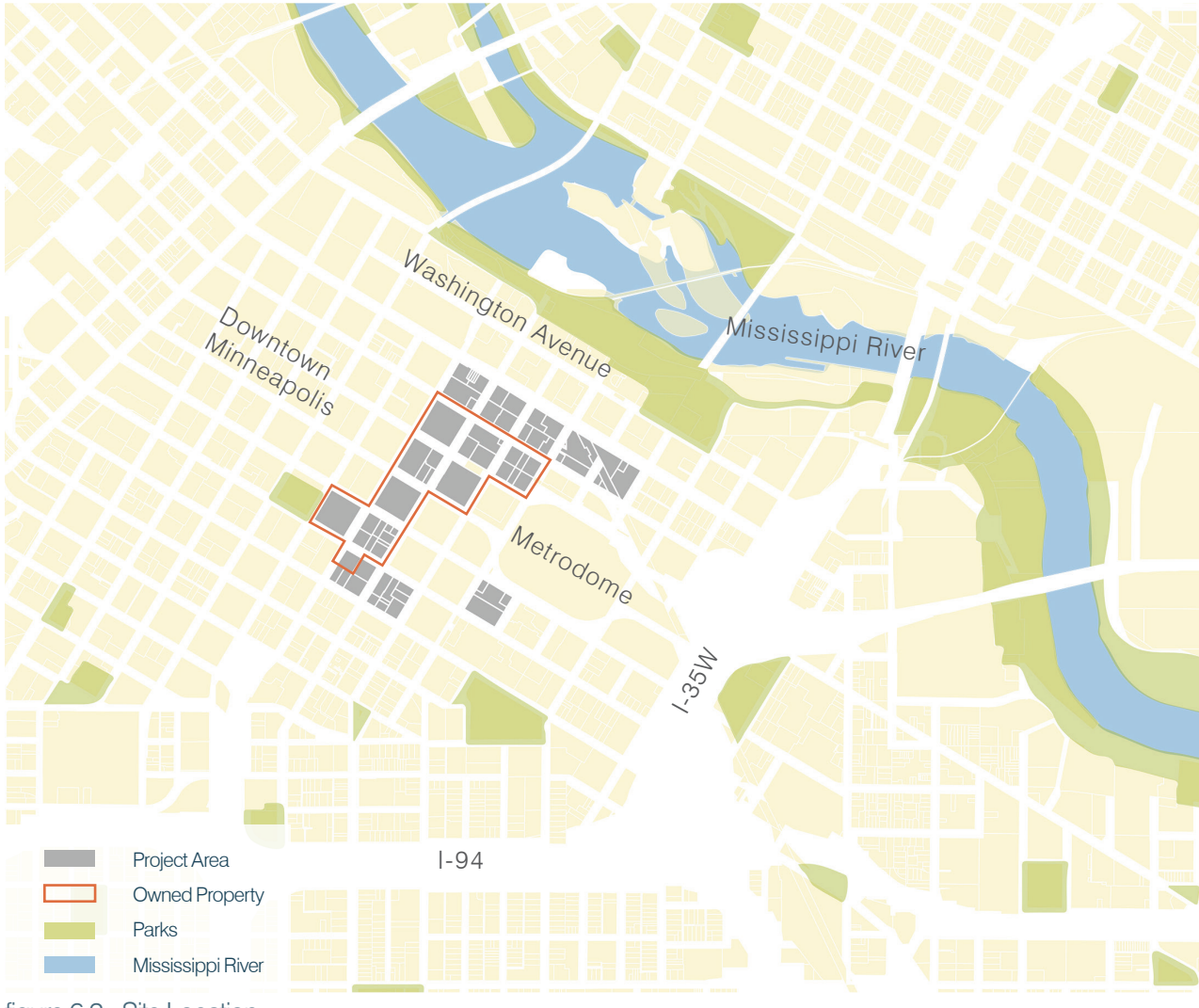


figure 6.2 - Site Location

Data from Twin Cities Metropolitan Council, 2005; 2009 & ESRI, n.d.

NTS

- The site is in the Downtown East Neighborhood, Figure 6.2, and is block away from the downtown core.
- Major thoroughfares include Washington Avenue to the north and I-35 to the east.
- The site is in close proximity to the Mississippi River and multiple parks, including: Elliot Park, Goal Medal Park, Excel Energy Water Power Park, and Mill Ruins Park.
- To the east is the Metrodome, home to the Minnesota Vikings of the NFL.

BACKGROUND/CONTEXT

The background and context derives from the Gerald D. Hines - ULI Student Urban Design Competition brief. This document outlines many existing conditions and project requirements. A summary of these elements are as follows:

Requirements

- The study area must act as a crucial piece in the city's model for urban living.
- The development must create value for property owners, city residents, and region as a whole.
- The design must contain neighborhood and regional destinations.
- Typological, architectural, and sustainability design elements need communication.
- The study area bleeds into adjacent neighborhoods and districts, so integrating redevelopment with surrounding context is critical.
- No extension of the skyway system into the study area is permitted.
- The design must incorporate the vision for the new Vikings stadium and development.

Trends

- There is much interest in redeveloping the area as a regional center supporting mixed-use opportunities
- In the past decade, the region has invested heavily on transit and plans on continuing its efforts.
- The city emphasizes biking and continues to invest in a high-quality bicycling environment.
- Current residential opportunities located in downtown east are minimal, but expanding.
- Residential units in the Mill District and Elliot Park neighborhood are nearly full.
- The economy in Minneapolis is stronger than many American cities and has room for expansion in residential and retail markets.

Site-Regional Context

- On the site is The Armory, a historic building to remain, but allowed for adaptive use and renovation.
- The site is primarily composed of surface parking lots with advertising billboards. While these parcels are income producing, they are not aesthetically desirable.
- The parcels identified in orange on the Site Location map on the left are parcels owned by the developer. The grey ones outside that boundary are those available for purchase.

* The next pages describe other, important contextual situations.

PROXIMITY TO HUBS & CENTERS

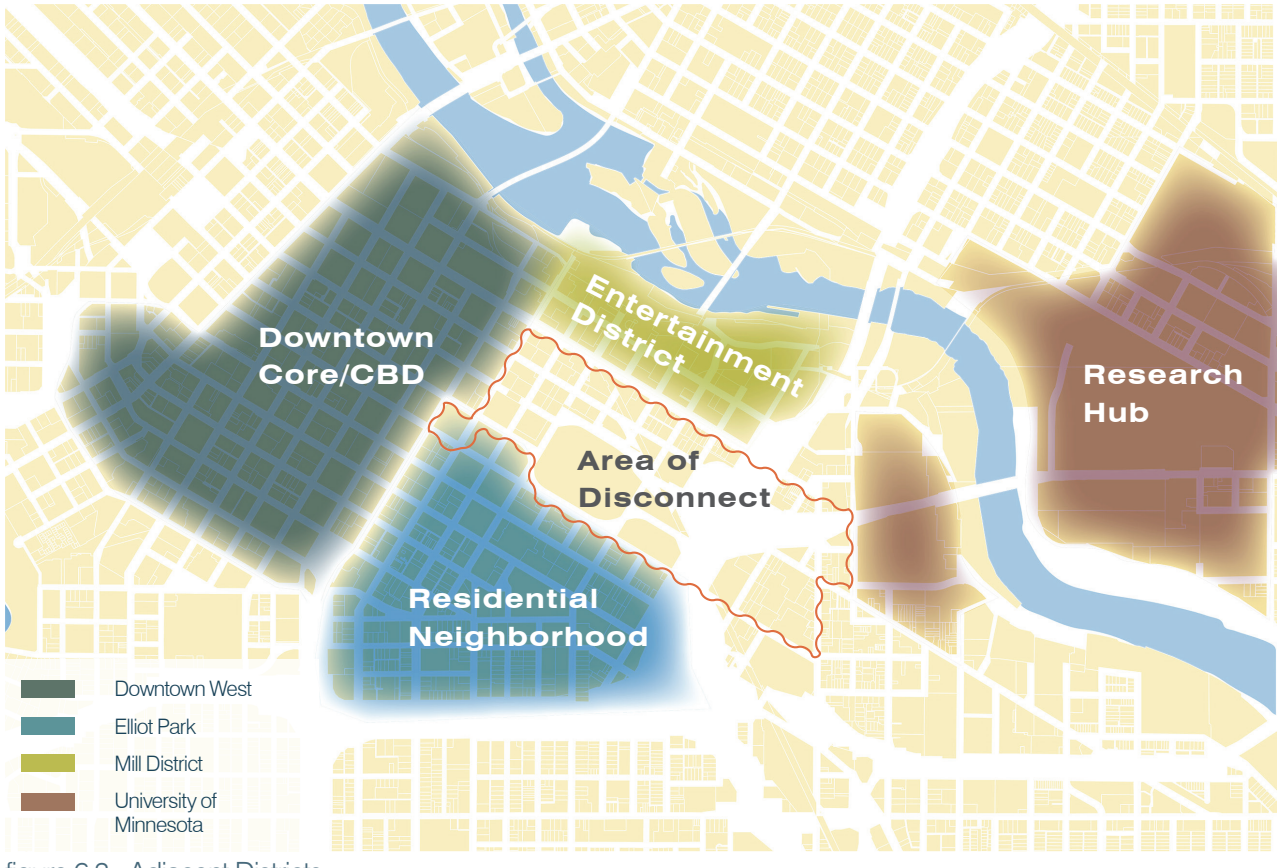


figure 6.3 - Adjacent Districts

Data from Twin Cities Metropolitan Council, 2005; 2009

NTS

Presently there is a lack of connectivity between the four districts identified in the above image. With the site being devoid of activities and uses that attract people, there is little reason for people to visit the site. There are however positives to this situation.

The close proximity of the Minneapolis financial center (downtown), entertainment found in the Mill District, residents of the Elliot Park neighborhood, recreation in adjacent parks, and academic prospects of the University of Minnesota, make the central location of the site ideal for a mixed-use development.

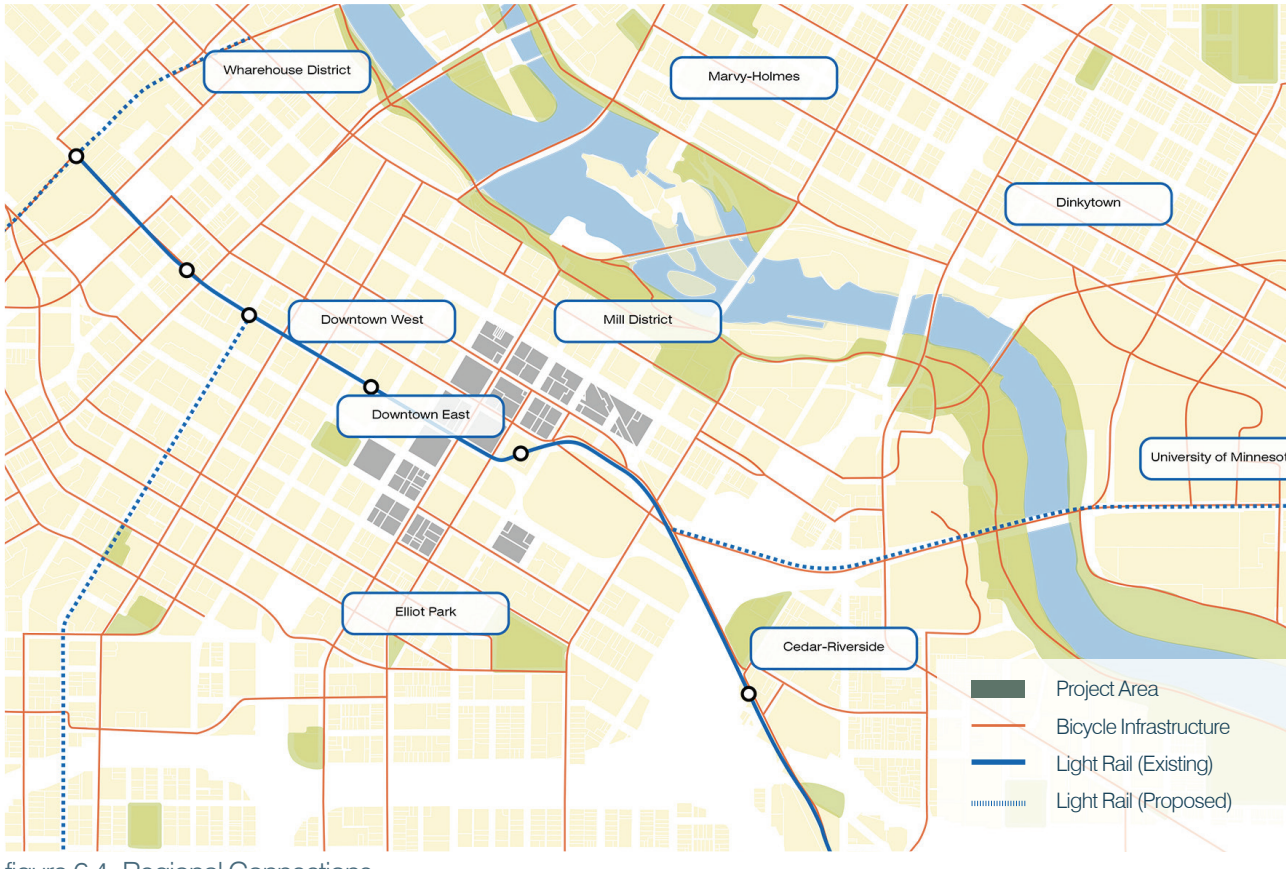


figure 6.4 -Regional Connections

Data from Twin Cities Metropolitan Council, 2005; 2009 & ESRI, n.d.

NTS

With current and proposed bicycle and transit infrastructure traversing the site (see image above) and connections to many cultural, recreational, entertainment, civic, commercial, academic, and residential hubs, the site is well positioned for success when it redevelops.

Finally, the location of the site provides excellent opportunity to develop a unique and quality identity, with strong branding opportunities. With the Downtown West and Metrodome being adjacent to the site, visibility is high. Developing a quality district environment and maximizing use of the site visibility will undoubtedly increase the presence and desirability of the area.

Kinetic MINNEAPOLIS

figure 6.5 -Kinetic Plaza
Heerman, 2013

Kinetic Minneapolis envisions a conceptual framework for social and economic sustainability. The word 'kinetic' in this context relates to activity, dynamic movement, human friction, and progress. Kinetic places have an inherent ability to trigger and channelize intellectual productivity, social vibrancy, and physical activity. The regional socio-economic forces strongly suggest the potential of Downtown Minneapolis to become such a place; with the East Downtown Redevelopment Site as an important center. This concept transforms the site into a hub for intellectual, social, and physical kinetics by designing a high-density mixed-use district. The project includes an anchor biotech business incubator along with supporting residential, retail, and recreational uses.

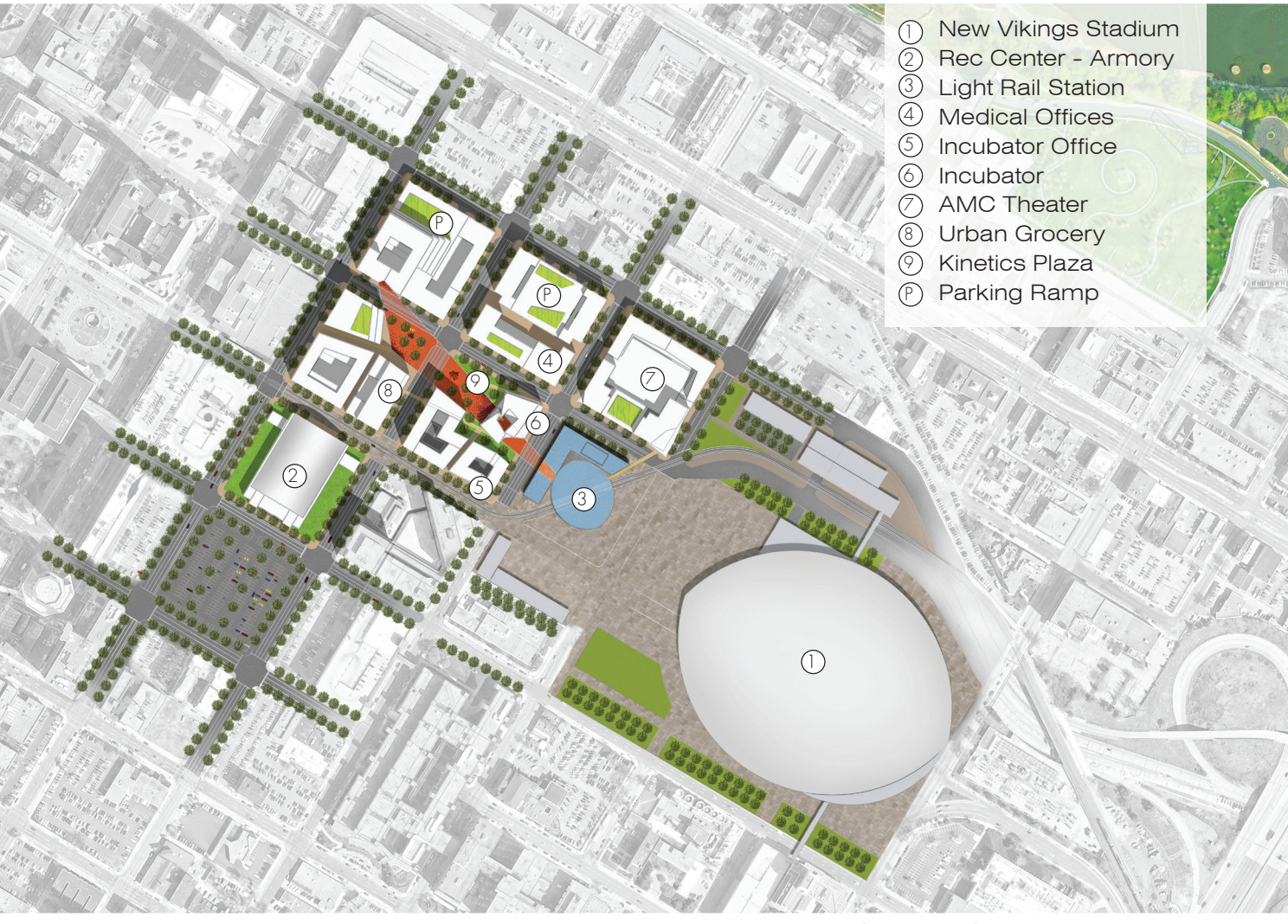


figure 6.6 - Kinetic Minneapolis Master Plan
By Author, 2013

This fine grain mix of uses activates a lively public realm. The central plaza, framed by street-level retail and the incubator, enhances the district's communal feel. The plaza acts as a node of friction between residents, regional commuters, and the creative-class. Kinetic Minneapolis, a synergy of residential, employment, and commercial destinations, connects surrounding districts through an experiential continuum and therefore, maximizes the use of existing transit, bike routes, and pedestrian connections.

A TALENTED WORKFORCE & DIVERSE RESIDENTS

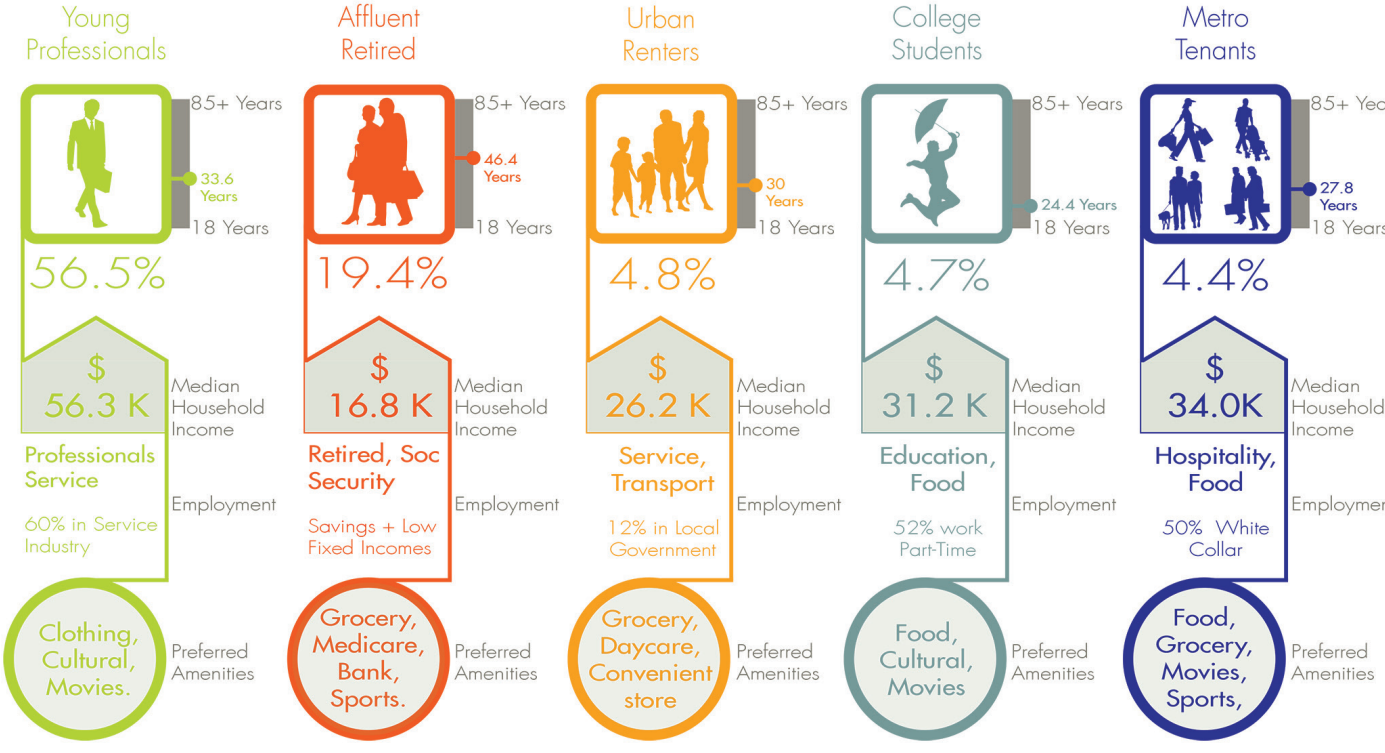


figure 6.7 - Target Demographics
Abraham, 2013

The selection of other supporting land uses is based on regional demographic factors such as mixed-income population, high percentage of young adults, growing affluent retired population, and a high percentage of urban renters compared to national average (as shown above). The residential component of the district includes market-rate & affordable housing units, luxury condos, and senior living to cater to dominant demographic market segments. A large portion of the targeted demographic include the creative workforce needed for innovation economies.

The commercial components of the district include a boutique hotel, a movie theatre, a community grocery store, retail spaces, and

figure 6.8 - Land Use & Massing
Heerman, 2013

medical offices. This variety of commercial uses makes the district a destination for regional commuters and residents of neighboring districts as well.

The adaptive reuse of the Minneapolis Armory into a neighborhood recreation center serves to be an important amenity for residents. These uses (shown above) are strategically located to maximize influx of regional transit commuters; pedestrians from neighboring districts; real estate value; and meaningful vistas.

CREATING HIGHLY FUNCTIONING NETWORKS

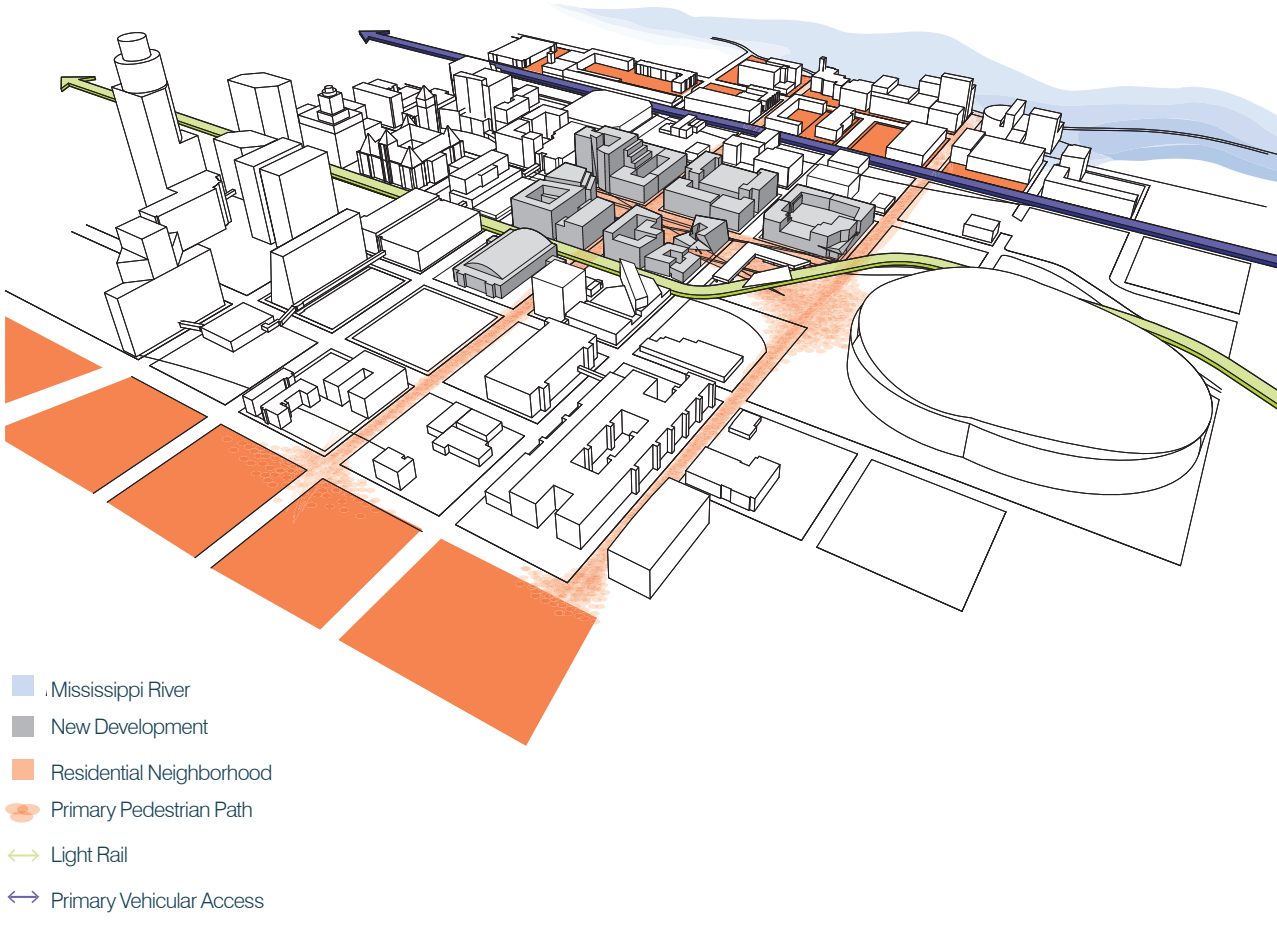


figure 6.9 - Connectivity & Flows
Johnston, 2013

Regional influx (movement) to the site happens along Washington Avenue and 5th Avenue, which facilitate vehicular traffic, and the light rail public transit line. The local influx occurs through Portland Avenue and Chicago Avenue, which link the Mill District and Elliot Park neighborhoods.

Kinetic Minneapolis maximizes both the local and regional influx by creating an experiential continuum along these key corridors.

DEVELOPING SUCCESSFUL R&D+I CENTERS

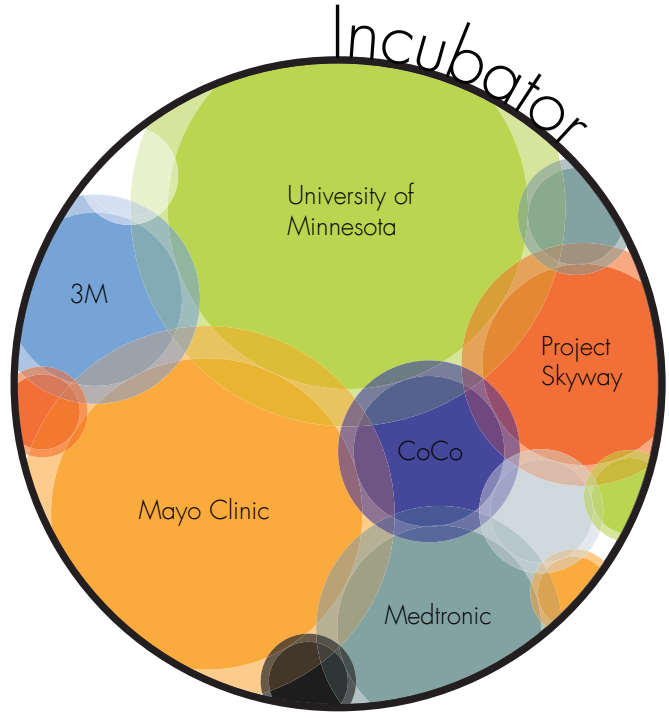


figure 6.10 - Target Organizations for Incubator
Johnston, 2013

The Minneapolis St. Paul region has emerged as a global hub for research and innovation in medical devices and bioscience. Home to establishments like St. Jude Medical, Medtronic, University of Minneapolis, and Mayo Clinic, Minneapolis is a leader in medical innovations. Growing collaborative innovation efforts between the medical device industry and emerging bio-pharmaceutical industries creates great opportunities for innovation and entrepreneurship. With only two small-scale support centers for small businesses, downtown Minneapolis lacks sufficient entrepreneurial infrastructure to capitalize these opportunities. Thus, the introduction of an advanced biotech business incubator would consolidate existing entrepreneurial infrastructures and channelize regional innovative forces towards achieving business vitality. Given the socio-economic climate, the incubator advances the downtown core and attracts the creative class who drive innovation.

GENERATING MARKET DEMAND THROUGH PHASING

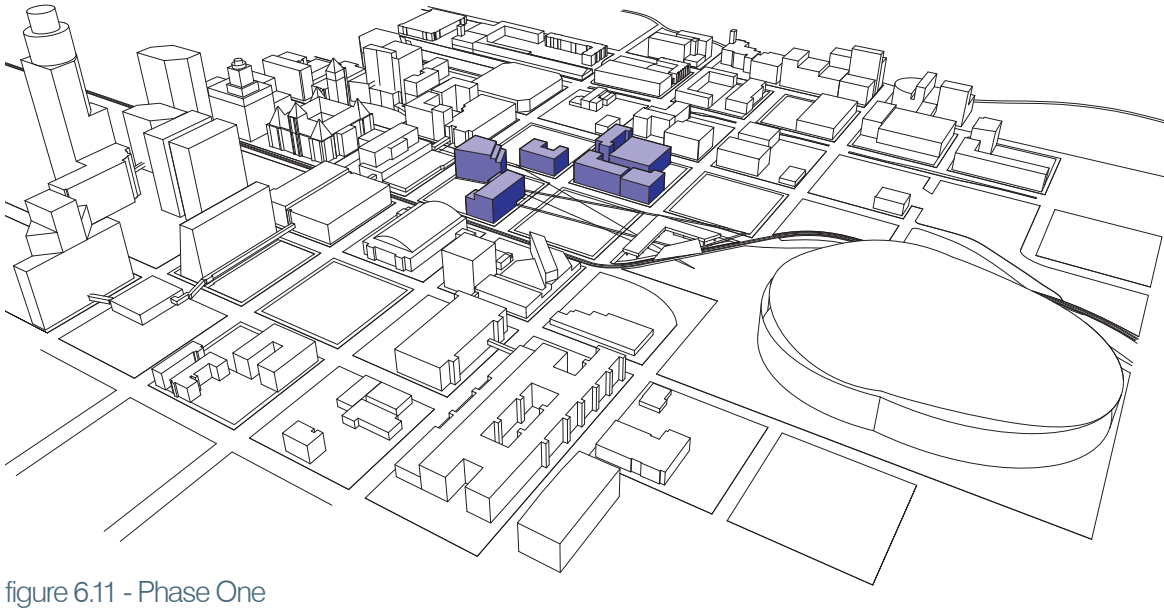


figure 6.11 - Phase One
Heerman, 2013

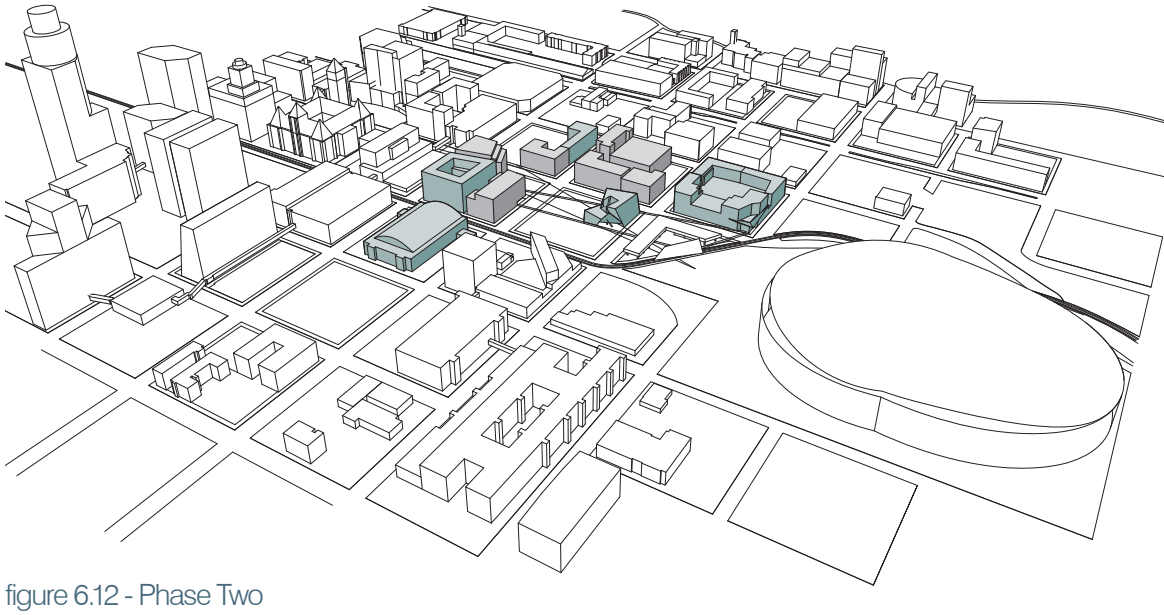


figure 6.12 - Phase Two
Heerman, 2013

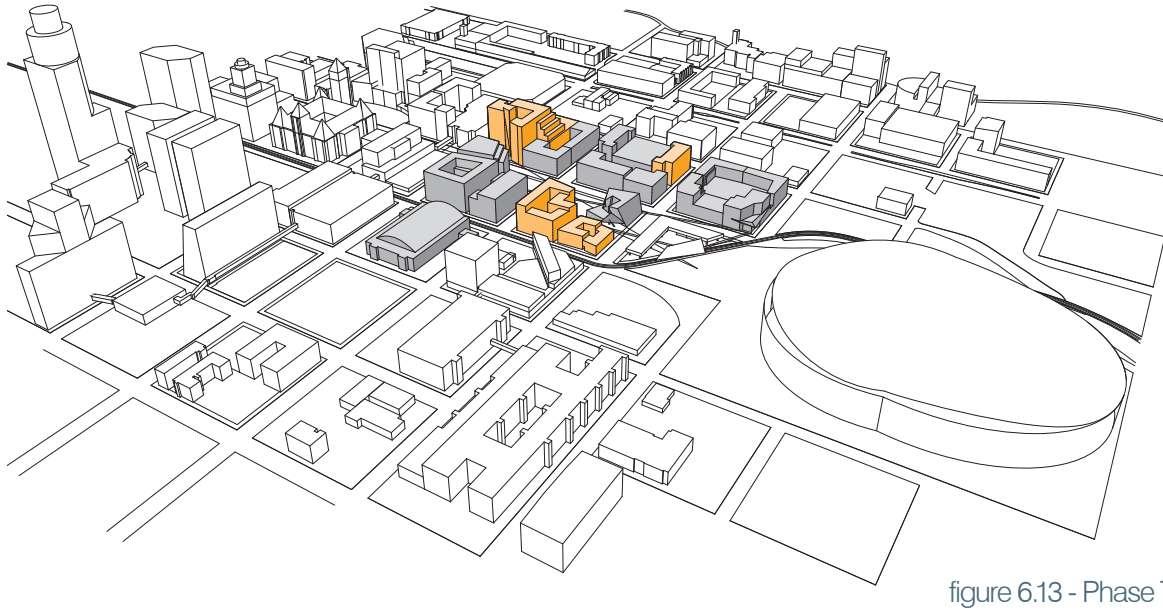


figure 6.13 - Phase Three
Heerman, 2013

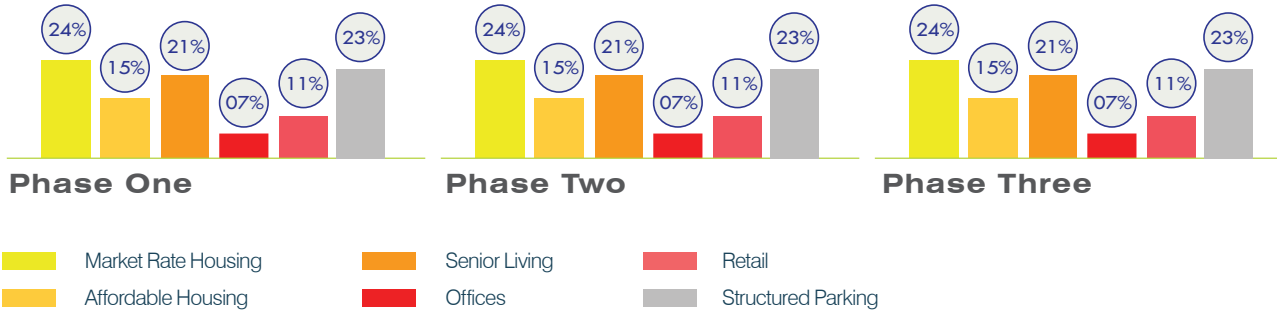


figure 6.14 - Phasing Build-Out
Abraham, 2013

Our vision of Kinetic Minneapolis is achievable through carefully planned private, public, and organizational investment/ partnerships that reap financial, intellectual, economic, and social rewards for all involved. The district emerges over the course of three separate phases. The phasing strategy synchronizes seamlessly with forecasted demand based on market analysis of the defined trade area, surrounding areas, and correlations with key national trends. Pahsing also acts as a generator of site demand by creating catalytic market effects. To create this effect we tap into the most significant trends includeing: expansion of the residential market and a perpetual influx in senior housing.

ENSURING PARKING CLOSE TO FACILITIES, AMENITIES & EVENTS

figure 6.15 - Parking Strategy

Abraham, 2013

Strategic positioning of parking in the district provides a high level of access to living and working quarters. It also facilitates walking throughout the district, because parking structures and lots are on the periphery of the development, whereas the activities fall within the core of the site.

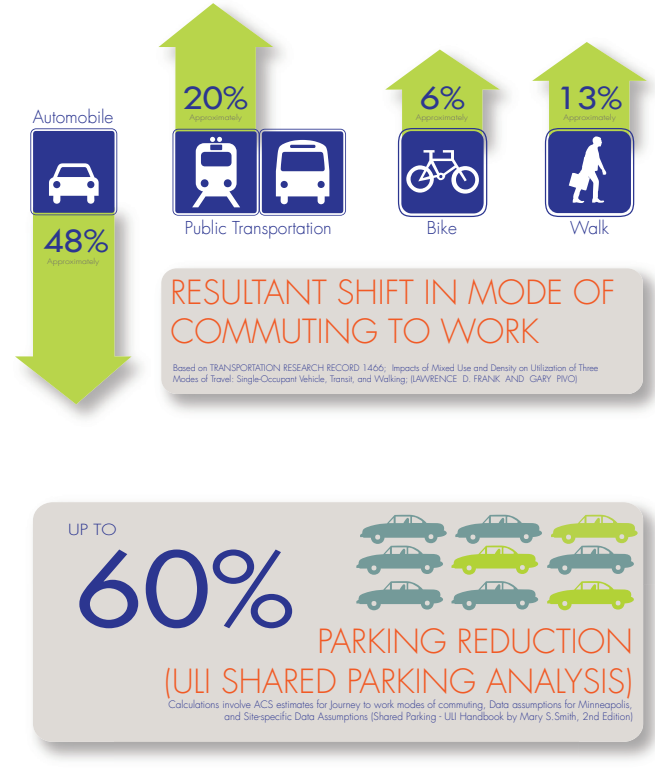


figure 6.16 - Multi-Modal Transportation Shift

Abraham, 2013

The reduction of parking spaces per person in the district also has a profound effect, shifting the distribution of transportation modes. This shift is in line with desired alternative transportation options required by the talented workforce needed for innovation development.

CATALOG IMPLEMENTATION SUMMARY

INNOVATION DEVELOPMENT

Attracting a Talented Workforce

Strong Cultural Presence

- Avoidance of exclusionary zones & gentrification
- Develop socio-economically diverse districts

Live / Work Integration

- Affordable/Subsidized Housing
- Extended Stay Hotels
- Mixed-Use Buildings / Blocks

Vibrant Nightlife

- Cultural Activities & Venues
- Entertainment Activities & Venues

Range of Leisure & Recreation Activities

- Hierarchy of Open Spaces
- Natural Settings

Generating Market Demand

Distinctive Identity

- Iconic Landscapes & Buildings
- Urban Lab Concept
- R&D Focused
- High Quality Facilities

Unique Branding

- Naming development
- Create logo
- Develop mantra
- Utilize social media

Leveraging Trends in Development

- Build on emerging development trends
- Emphasize adjacent cultural / civic districts

Development Incentives

- Density Bonuses for sought activities / uses
- Transfer of Development Rights
- Innovation-Based Tax Credits

Providing for Entrepreneurship

Space for Unanticipated Uses

- Flexible & varying building layouts
- Innovation Center for events & activities
- Room for future growth

Affordable Space for Businesses

- Below-market to no rent spaces for innovative companies / institutions
- Low cost of living
- Low-income / moderate income living units

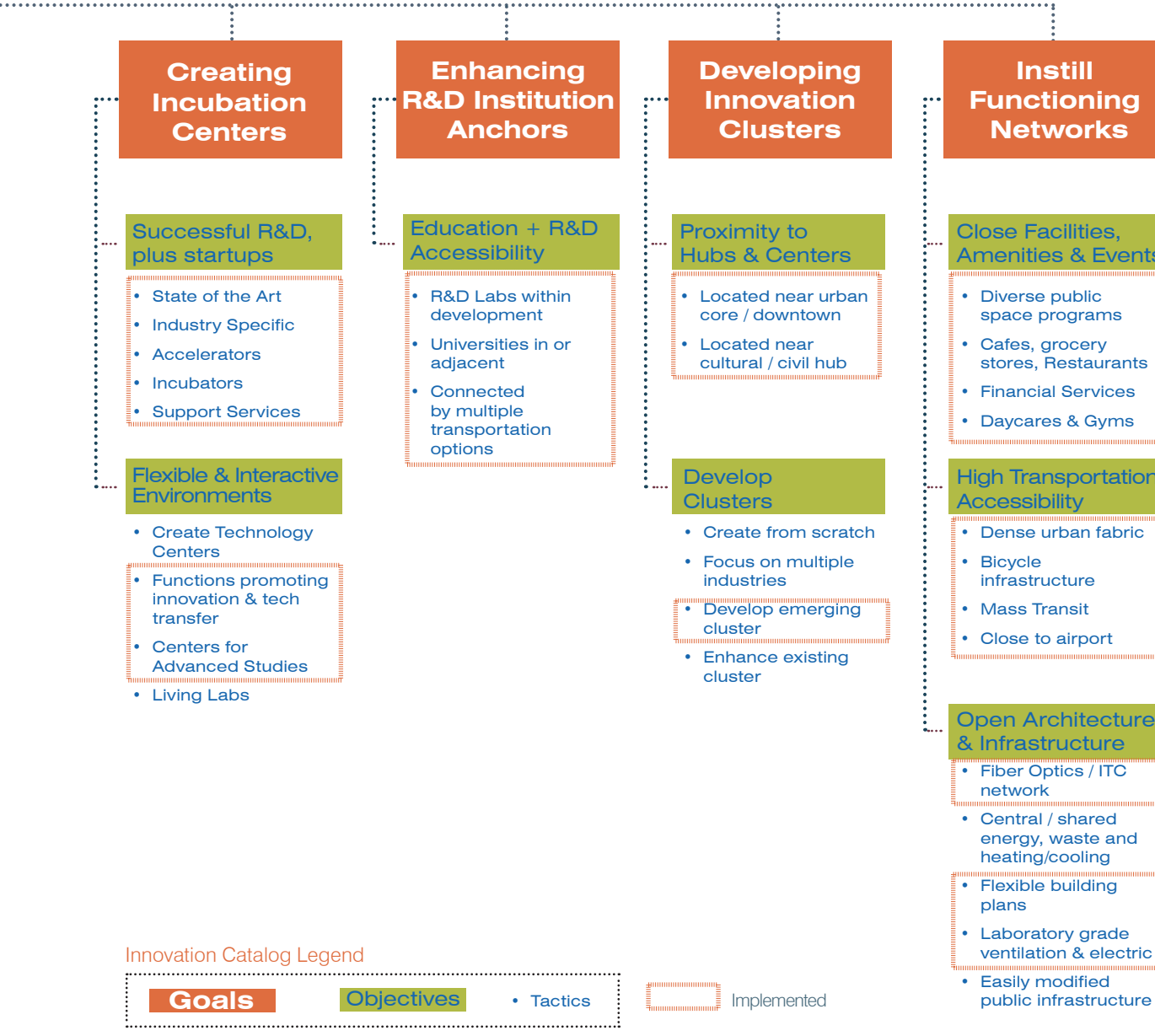


figure 6.17 - Kinetic Minneapolis Catalog Implementation

By Author, 2013

STARTUP VILLAGE

An entrepreneurial Community

http://www.crunchbase.com/assets/images/original/0007/7797/77797v2.

figure 6.18 - StartUP Village Entrance

By Author, 2013

FORMERLY VILLAGE PLAZA

Manhattan, KS

Imagine a place where you could build an idea into a company and make innovative goods or services unforeseen by the world. Then envision a tight knit community, with interesting people, fun activities, and plenty of close amenities. If only a place like that could exist. Well it can and it will at StartUP Village in Manhattan!

LOCATION

The Village Plaza development is located in Manhattan, Kansas on the southwest side of the intersection of Seth Child Road and Anderson Avenue. The site is bound by Seth Child Road to the east, Anderson Avenue to the north, Village Drive to the west, and Wildcat Creek to the south.

Although the actual Village Plaza property does not extend to Wildcat Creek, the city has asked for the designer to examine it in order to address flooding issues and see if the area can be used to create recreational opportunities.

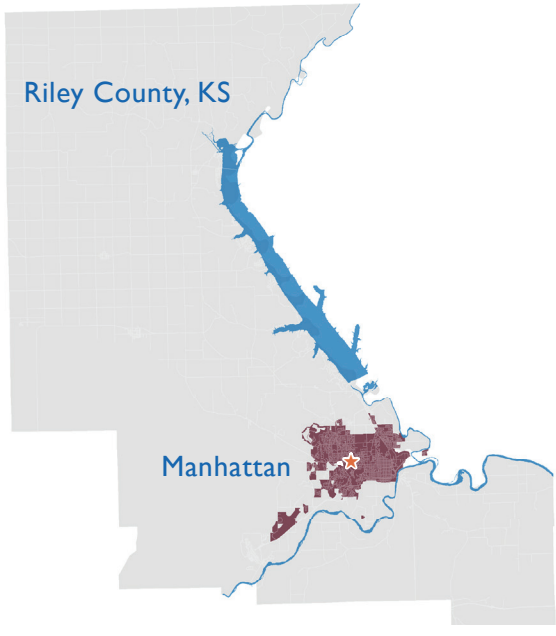


figure 6.19 - Regional Context

Data from ESRI, n.d.; Surdex Corp. 2010 & USGS, 1999

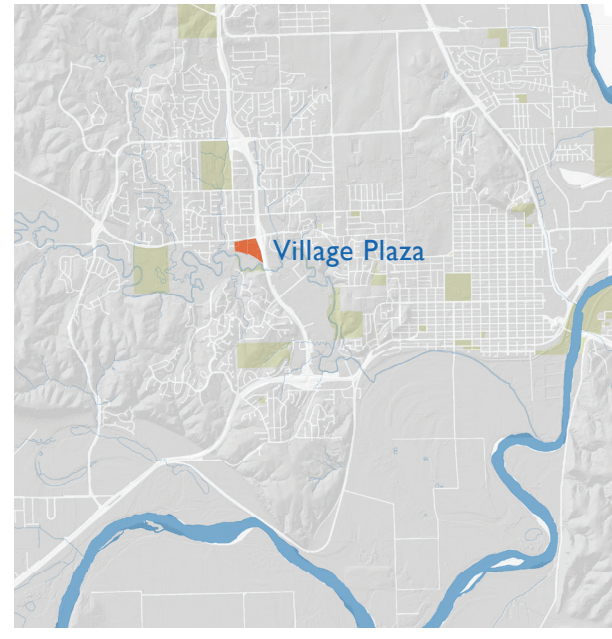


figure 6.20 - City Context

Data from ESRI, n.d.; Surdex Corp. 2010 & USGS, 1999

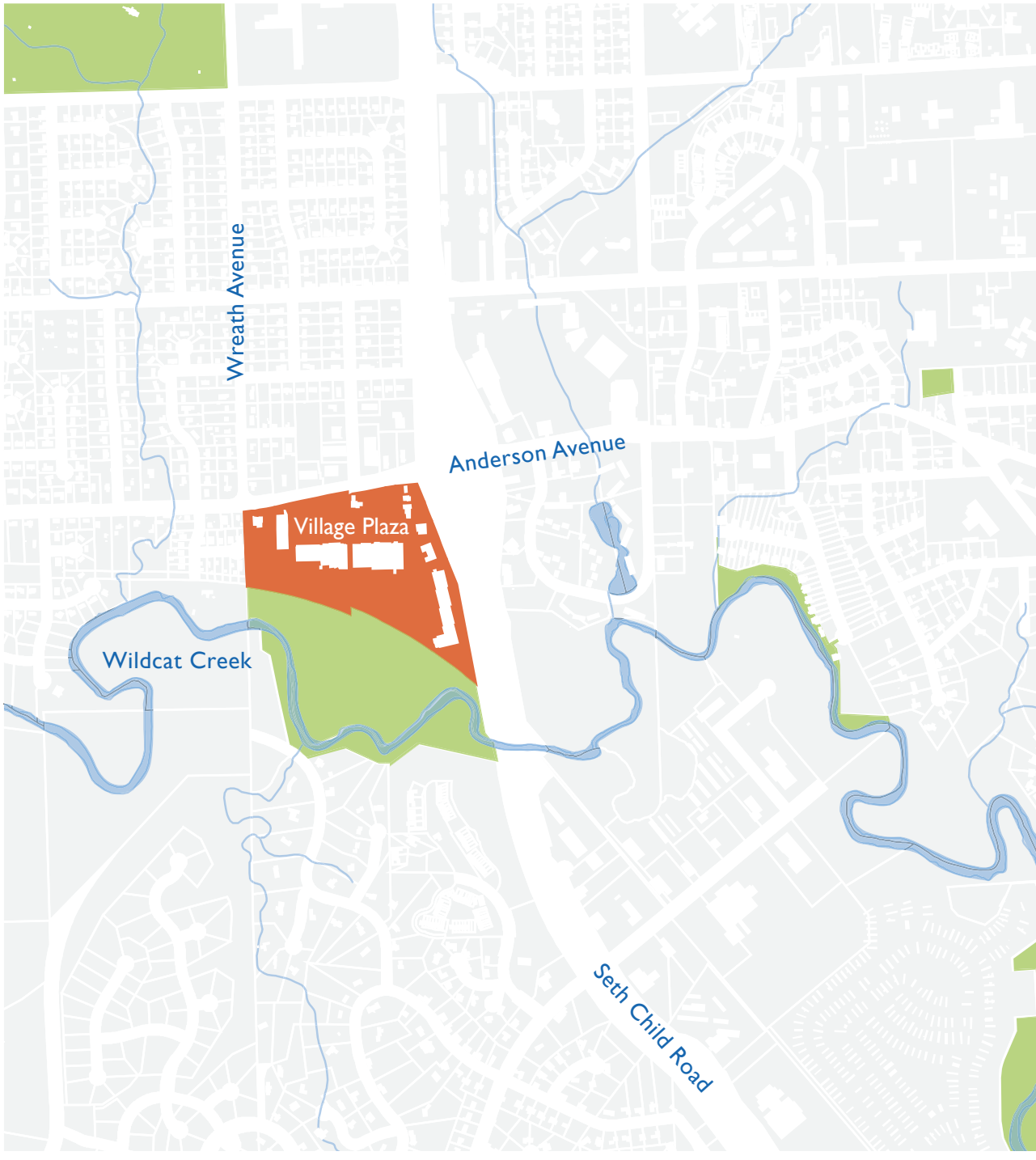


figure 6.21 - Site Surroundings

Data from City of Manhattan, 2010; ESRI, n.d. & USGS, 1999

figure 6.23 - Village Plaza Today
Harper, 2012

BACKGROUND

Manhattan, KS

Manhattan, Kansas is a rapidly growing college town seeking to redefine its communities through new sustainable development practices. With population projected to increase significantly due to student enrollment at Kansas State University, recent influx to Fort Riley military base, and establishment of the National Bio and Agro-Defense Facility (NBAF), Manhattan faces potential housing demand issues.

In addition to housing demand, Manhattan faces environmental issues involving flooding of development within the Wildcat Creek floodplain. Given the strain growth places upon Manhattan's housing supply and the recurring flooding happening adjacent to Wildcat Creek, the City of Manhattan has recognized the need for more sustainable development models. (UDD Group, 2012)

Regional Assessment Summary

- Overall, Manhattan has a strong growing economy and pent up building demand.
- While Kansas State University, the City of Manhattan, and other entities have begun exploring innovation/entrepreneurial development, there is yet to be significant investment in an innovation district.
- The city maintains a highly educated workforce, but one with high turnover.
- The city does not adequately cater to creative class lifestyle, despite many positives in that direction.
- Manhattan ranks high on the list of small towns

  with a high quality of life and low cost of living.

Village Plaza

Village Plaza has for many years been a development with a constant transition of tenets. The retail areas have under performed financially for decades, yet they survive as forms of stagnant real estate. The city suspects there are better uses for the site and want to move away from high tenant turnover.

The site currently has many retail and food establishments, as well as a gas station, bank, and abandoned fire station. Recent Investments include updating of Ray's Little Apple Mart, Max Fitness, and Local (a restaurant) show that the

site owners, at times, put forth renovation efforts.

Site Assessment Summary

- Overall, physical barriers and flooding constitute significant market demand challenges, thus limiting the potential of the Village Plaza site.
- The area currently suffers from poor design, programming, vehicular circulation, pedestrian access, and lack of positive identity.
- Yet, with the location near a major arterial intersection and because of the proposed future population growth of Manhattan, Village Plaza has economic growth and land use intensity opportunities.

DEVELOPMENT TRENDS = OPPORTUNITIES

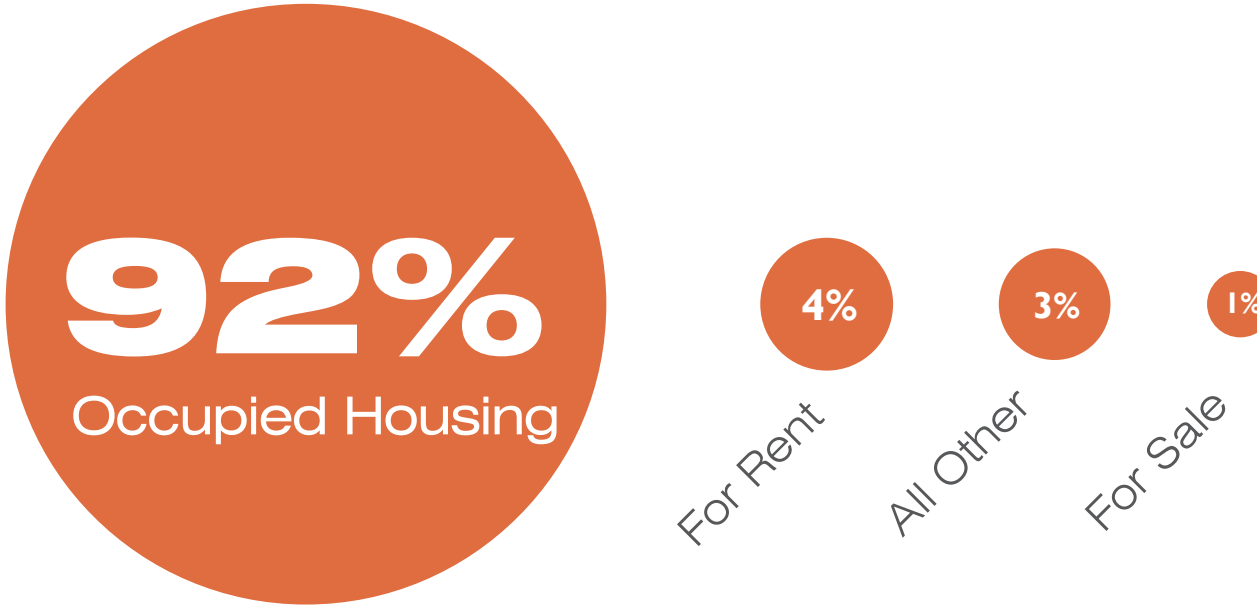


figure 6.24 - Housing Units by Occupancy
Data from Sperling, n.d.

Economy

- Manhattan experienced a 14% net job gain from 2002 to 2012. The city currently ranks 3rd in the state for job growth. Additionally, Manhattan ranks 17th nationally for economic job growth in 2012 for MSAs (Area Development Online, 2012).

Housing

- Trends show decline in husband-wife families, households with individuals under 18, and households with individuals over 65.
- The proportion of vacant housing units grew from 7.5% in 2010 to 4.2% in 2000, while renter-occupied housing increased from 57.1% to 60.8%.
- Current housing demand in the area is increasing by 386 units per year.

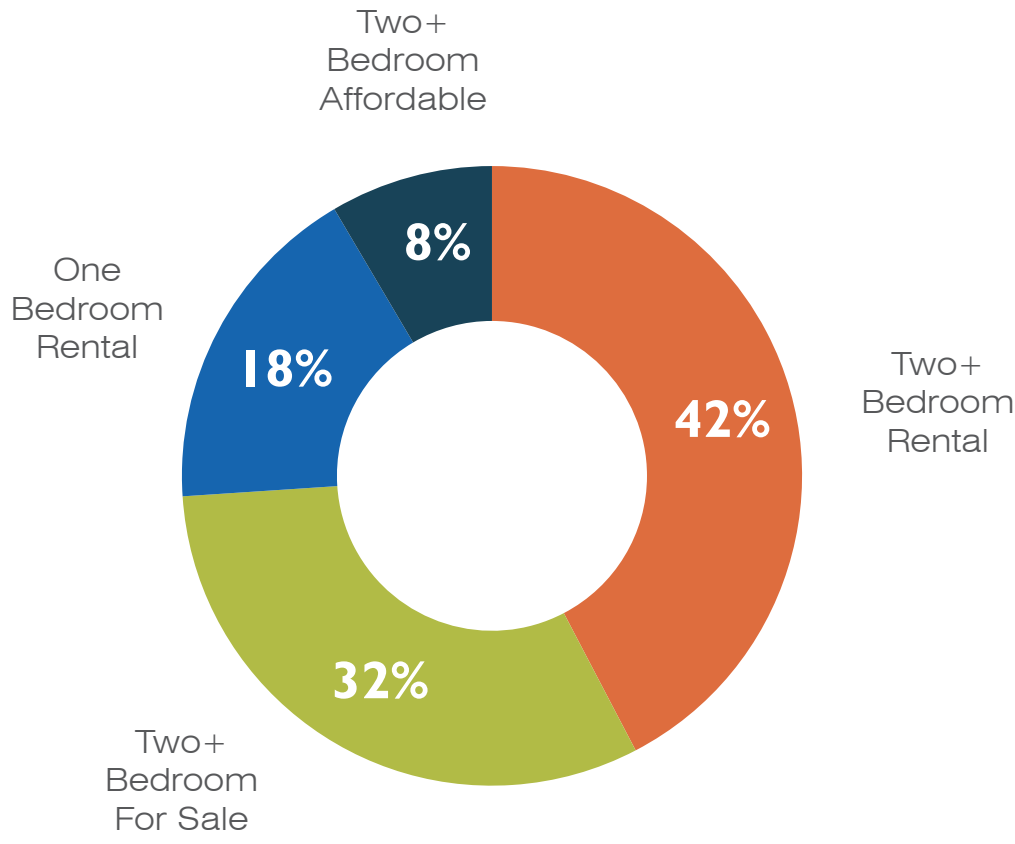


figure 6.25 - Housing Demand

Data from Sperling, n.d.

- Rental housing in greatest demand is 2- and 3-bedroom units with a monthly rent of $625 and above (723 units). These are closely followed by 1-bedroom units with same rent (300).
- Greatest demand for owner occupied units are 2- and 3-bedroom units with a purchase cost of $186,000+ (540 units).
- Demand also exists for owner occupied units from $85,000 and lower (145 total units for 2- and 3-bedroom).
- Affordable / quality multi-family housing needed because the market is lacking residential stock.
- As Manhattan continues to expand its population and with extremely high vacancy rates for residential units in the area, demand for residential living is high.

(Sperling, n.d.)

FLOODING CAUSES NEGATIVE IDENTITY

figure 6.26 - Village Plaza Flooding

Data From City of Manhattan, 2010; ESRI, n.d.; Surdex Corp. 2010 & USGS, 1999

Flooding Issues

- Wildcat Creek currently serves as both an asset and hazard.
- During times of intense rainfall, the creek floods onto the site.
- It also proves to be a buffer to the adjacent neighborhood to the south.
- Village Plaza site has experienced problems with flooding in low-lying areas near Wildcat Creek. The flooding during these instances has mainly occurred in the southeast corner of the site.
- Property damage is a significant concern, presently and with future development.

BARRIERS LIMIT ACCESSIBILITY

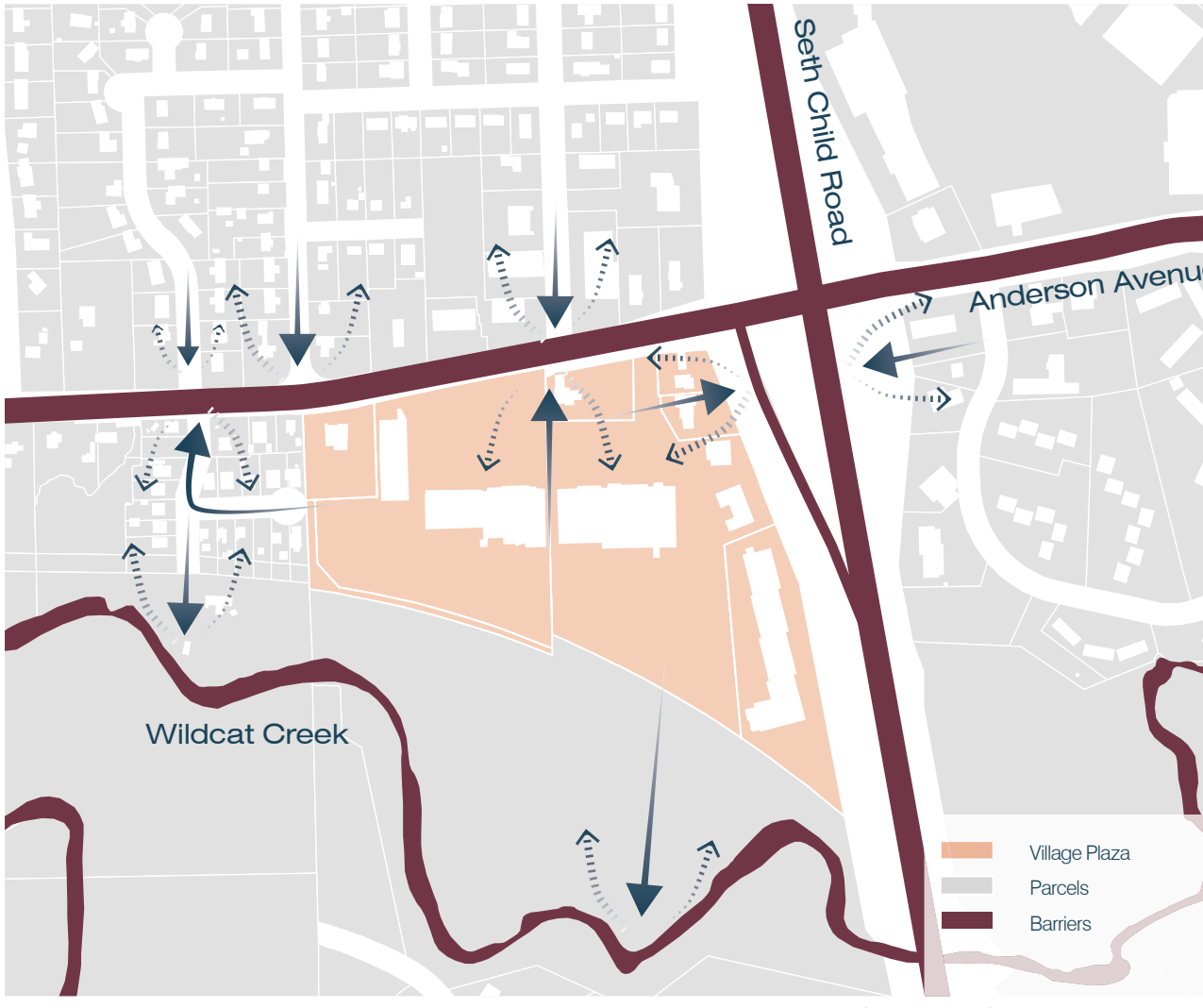


figure 6.27 - Village Plaza Barriers

Data From City of Manhattan, 2010 & ESRI, n.d.

Physical Barriers

- Seth Childs Road is elevated above the site and causes a barrier condition, as the only places to transpose it are underneath the Anderson overpass and via the linear trail to the south.
- Anderson Avenue, in its current state, is a barrier to pedestrians due to high speed traffic, lack of crosswalks, and a wide right-of-way.
- The elevated, vacated railroad right-of-way and Wildcat Creek limit connections to the residential neighborhoods south of the site.
- If the site is ever to become highly connected and desirable, the design must respond to these issues.

TRANSPORTATION & VISIBILITY

figure 6.28 - Village Plaza Traffic Counts

Data From City of Manhattan, 2010; ESRI, n.d.; & USGS, 1999

Visibility & Competition

- Village Plaza has regional and neighboring retail competition. Westloop has many retailers who directly challenge the viability of retailers in Village Plaza.
- There are also retailers on site lacking necessary visibility, because of their distance from the road and typographic barriers.
- Because Westloop has a greater number of passing cars, it is a more prosperous location for retailers.
- Despite competition, Village Plaza still has a strong number of passing vehicles. This may entice businesses in need of greater visibility, but not necessarily in competition with Westloop tenets.

FRAGMENTED URBAN FABRIC & ACCESSIBILITY

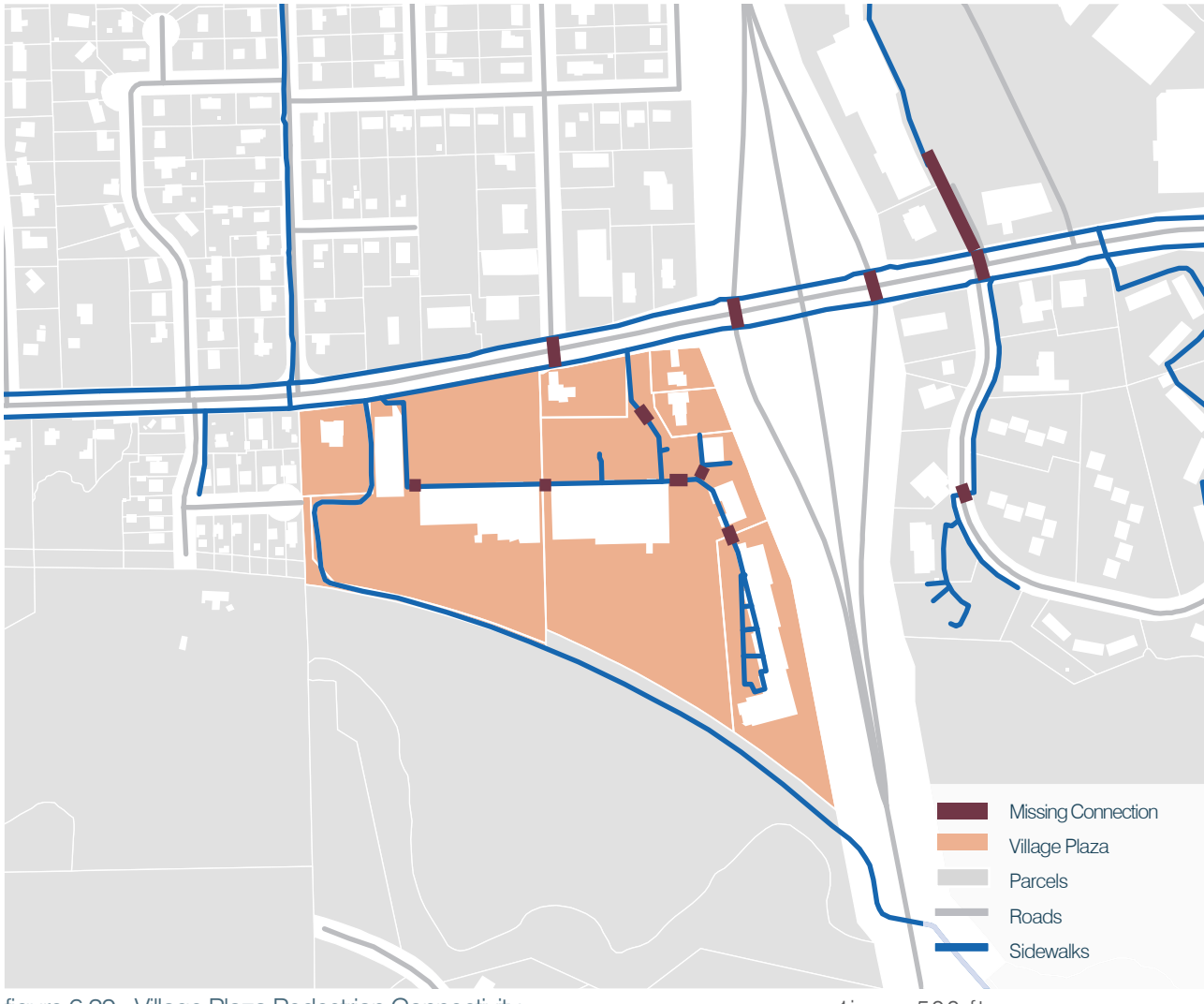


figure 6.29 - Village Plaza Pedestrian Connectivity
Data From City of Manhattan, 2010 & ESRI, n.d.

Pedestrian & Bike Network

- Lack of sidewalks and a highly connected movement system, in addition to physical barriers, limit mobility of those using alternative transportation modes.
- Anderson Avenue creates a divide between the site and its adjacencies. There are only a few crossings made available to pedestrians, which make transitioning from one side of the street to the other suboptimal.
- Since a talented workforce looks for easily navigable communities, Village Plaza leaves a lot to be desired.

TRANSPORTATION ACCESSIBILITY

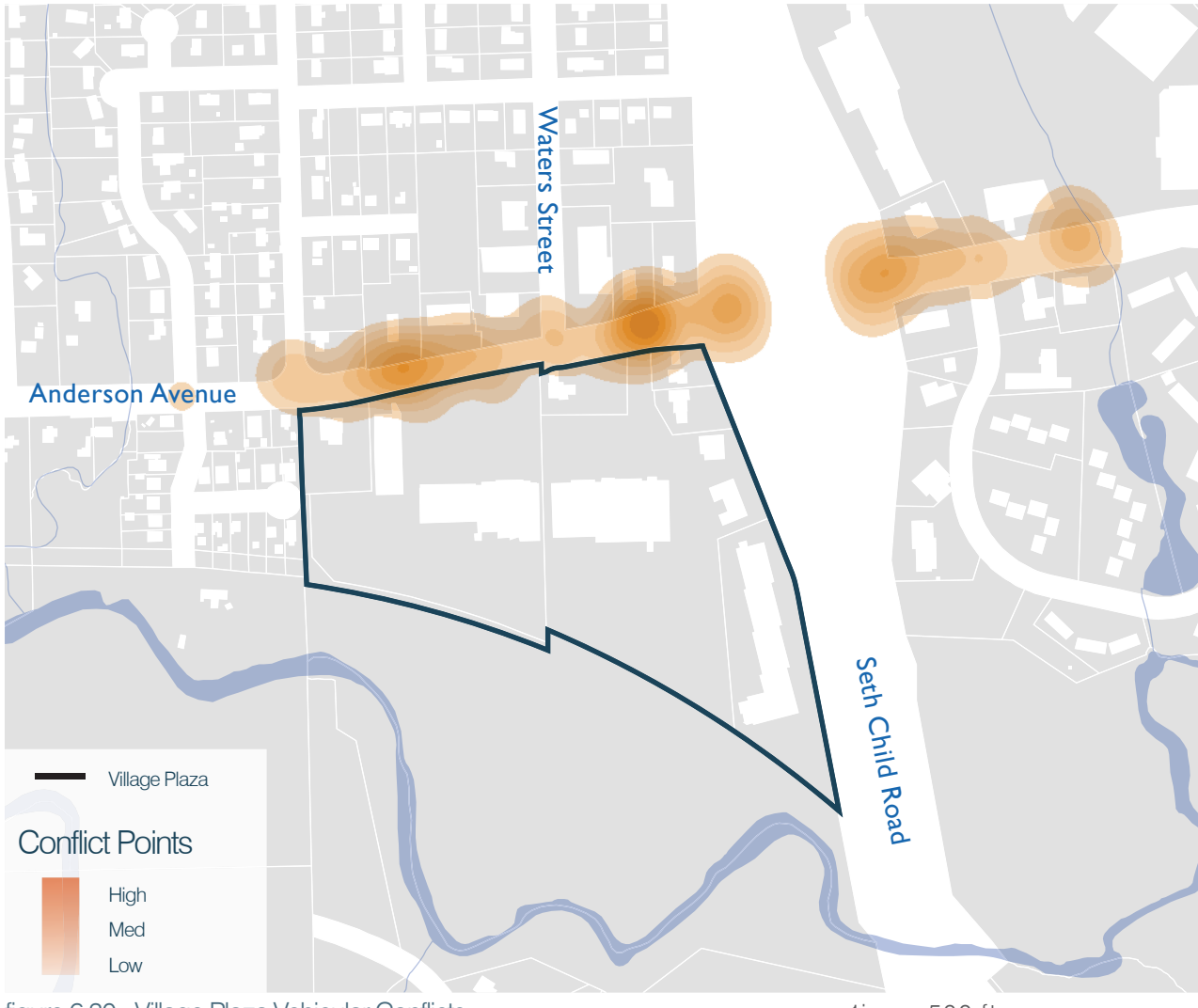


figure 6.30 - Village Plaza Vehicular Conflicts

Data From City of Manhattan, 2010; ESRI, n.d.; & USGS, 1999

Vehicular Confrontation

- With multiple curb cuts and intersecting traffic flows, Anderson Avenue has a high rate of vehicular conflict.
- There are also problems with queuing, as people wait at stoplights near the Seth Child Road on and off ramps.
- Not only is this bad for vehicular flow, but it also diminishes the character and desirability of the site.
- Targeted tenets dislike these conditions, making Village Plaza a less than ideal location.
- A simple reduction of curb cuts and alignment of a new street with Waters Street should mitigate many of these problems.

PROXIMITY & ACCESSIBILITY TO HUBS & DISTRICTS

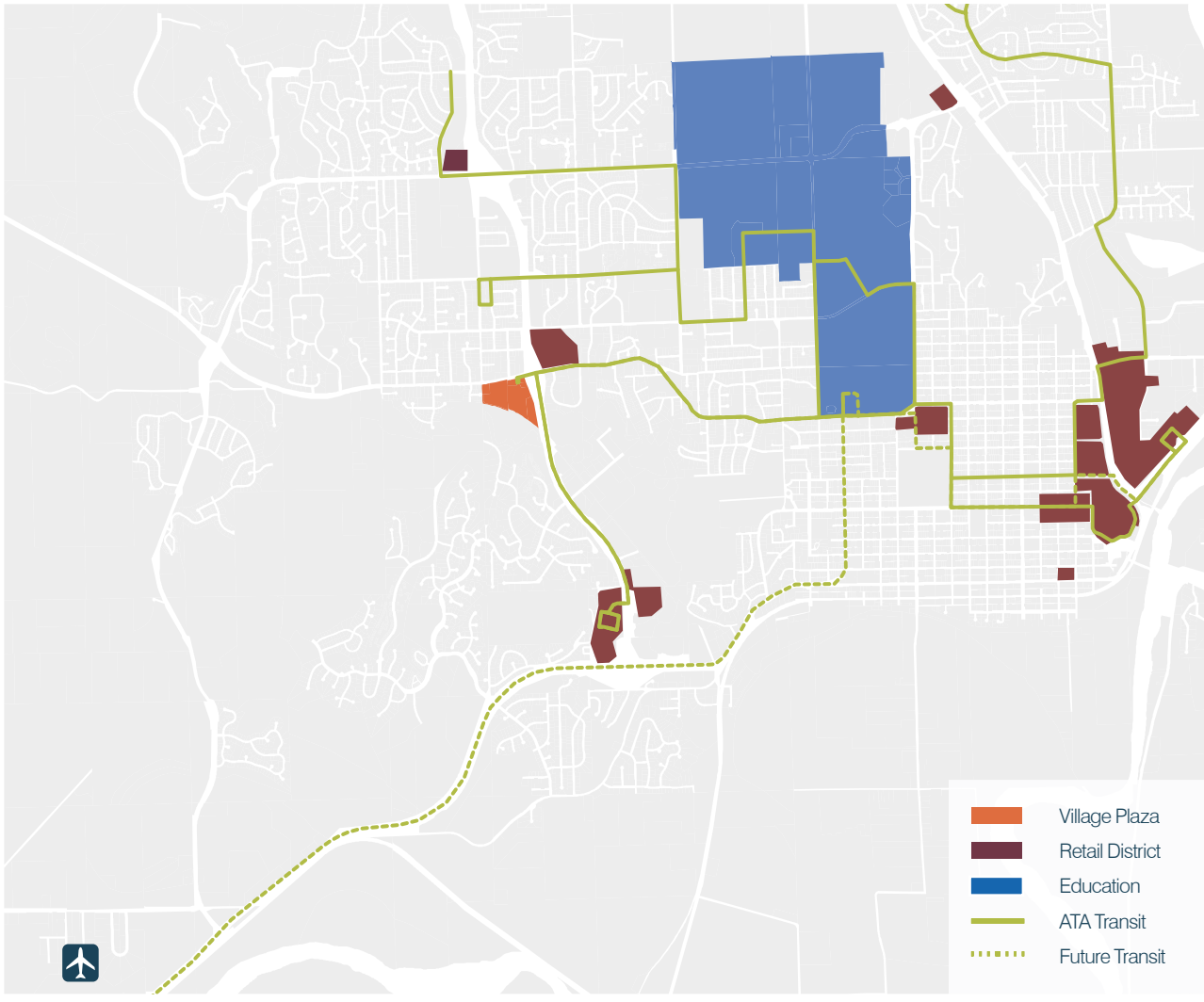


figure 6.31 - Manhattan Connections

Data From City of Manhattan, 2006, 2010; ESRI, n.d.; & USGS, 1999

1in. = 4000 ft.

0 2000 4000 8000

Transportation Potential

- Currently, ATA provides a fixed transit route terminating at Ray's Apple Market and circulates through the west side of Manhattan.
- The City of Manhattan also has a future mass transit route specified for future mass transit development. This could enhance connections to surrounding areas.
- With the current ATA service and proposed mass transit expansion, tenets of the Village Plaza site will have access to research facilities, commercial districts, and the airport.

NEGATIVE IDENTITY

figure 6.32 - Village Plaza Parking Lot
Harper, 2012

Site Character

- Presently the site does not have a desirable character, especially not one desired by the creative class.
- The auto-centric development places high value on surface parking and low emphasis on pedestrian mobility or comfort.
- There is also a lack of landscaping and urban form.

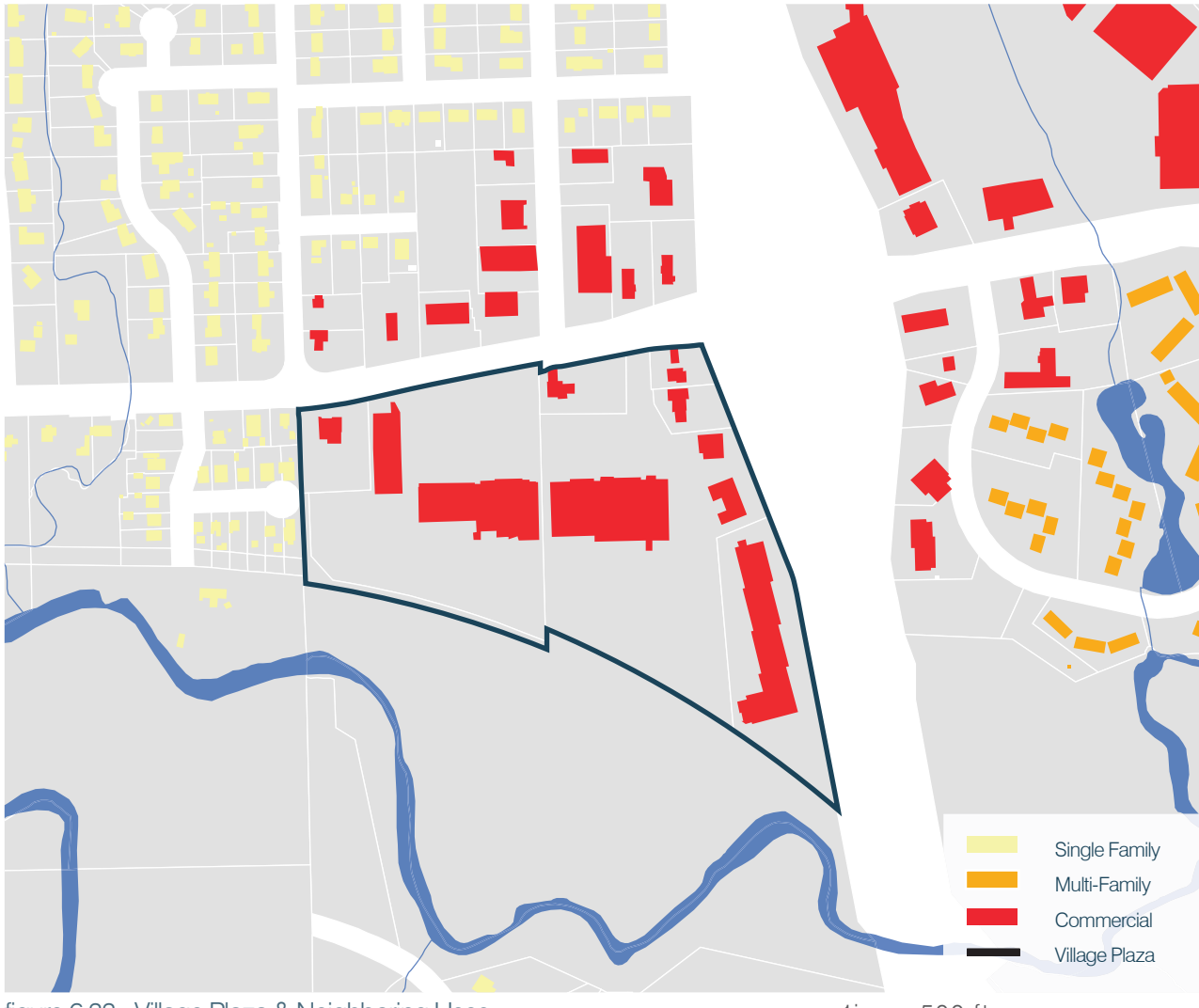


figure 6.33 - Village Plaza & Neighboring Uses

Data From City of Manhattan, 2006, 2010; ESRI, n.d.; & USGS, 1999

Neighboring Character

- Adjacent to the site is a mosaic of single-family residential, multi-family residential, retail, and commercial uses.
- Most of these uses are not easily accessible to bicyclists and pedestrians.
- Village Plaza is a single use, auto-centric development and has no mixed-use nor live/work components.
- Close proximity to multiple uses is an opportunity, as the create workforce seeks a diversity of housing, work, and play options.

RECREATION, ENTERTAINMENT, SHOPPING & AMENITIES

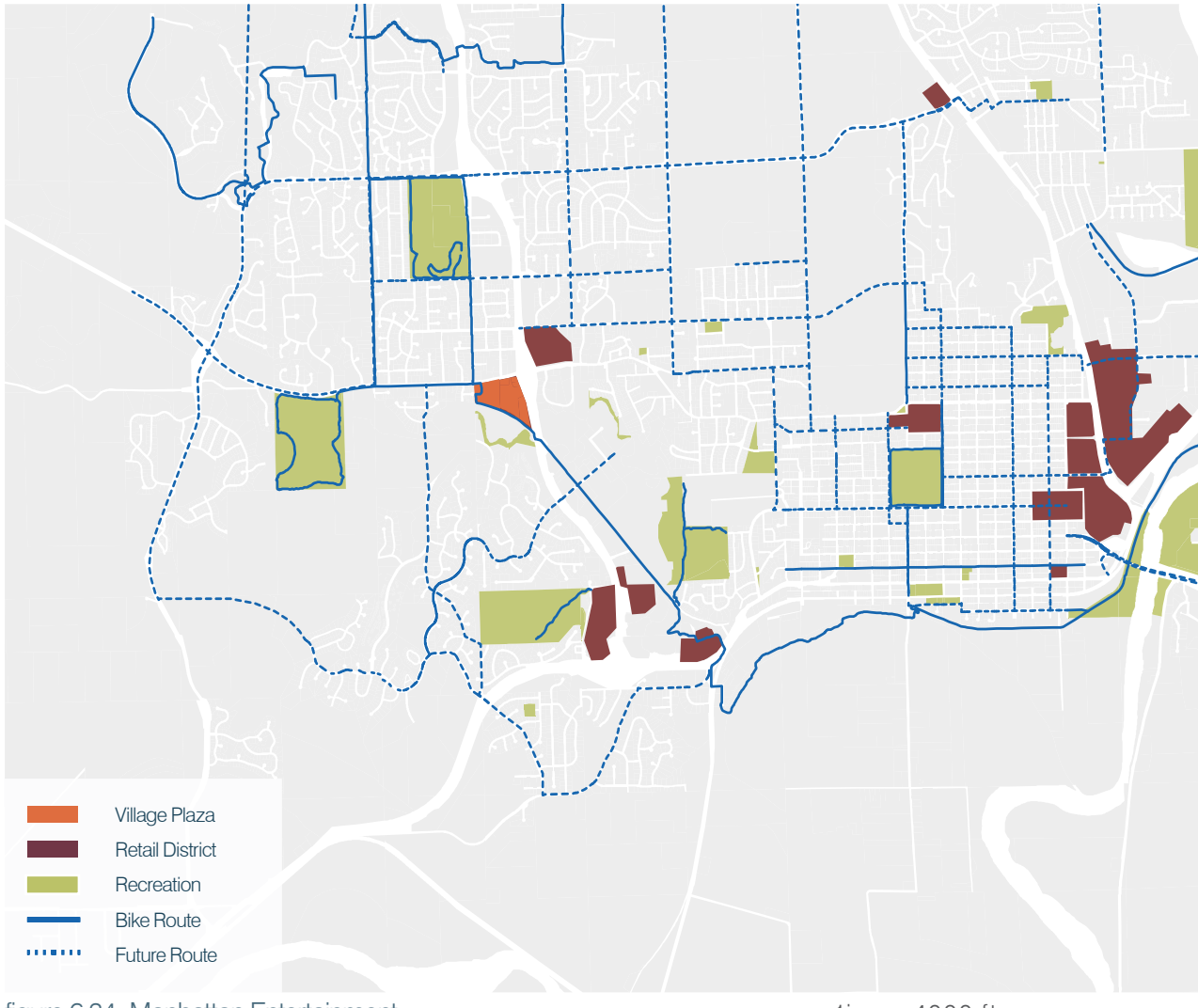


figure 6.34- Manhattan Entertainment

Data From City of Manhattan, 2006, 2010; & ESRI, n.d.

Recreation & Entertainment

- The existing linear trail on site and future bike lane expansion will make the site more accessible to parks, entertainment, & shopping.
- While the site is not in the downtown or Aggieville, it does have shopping, recreation, and entertainment activities nearby.
- With the creation of a new mixed-use development on site, a talented workforce will have a place providing many amenities they desire.

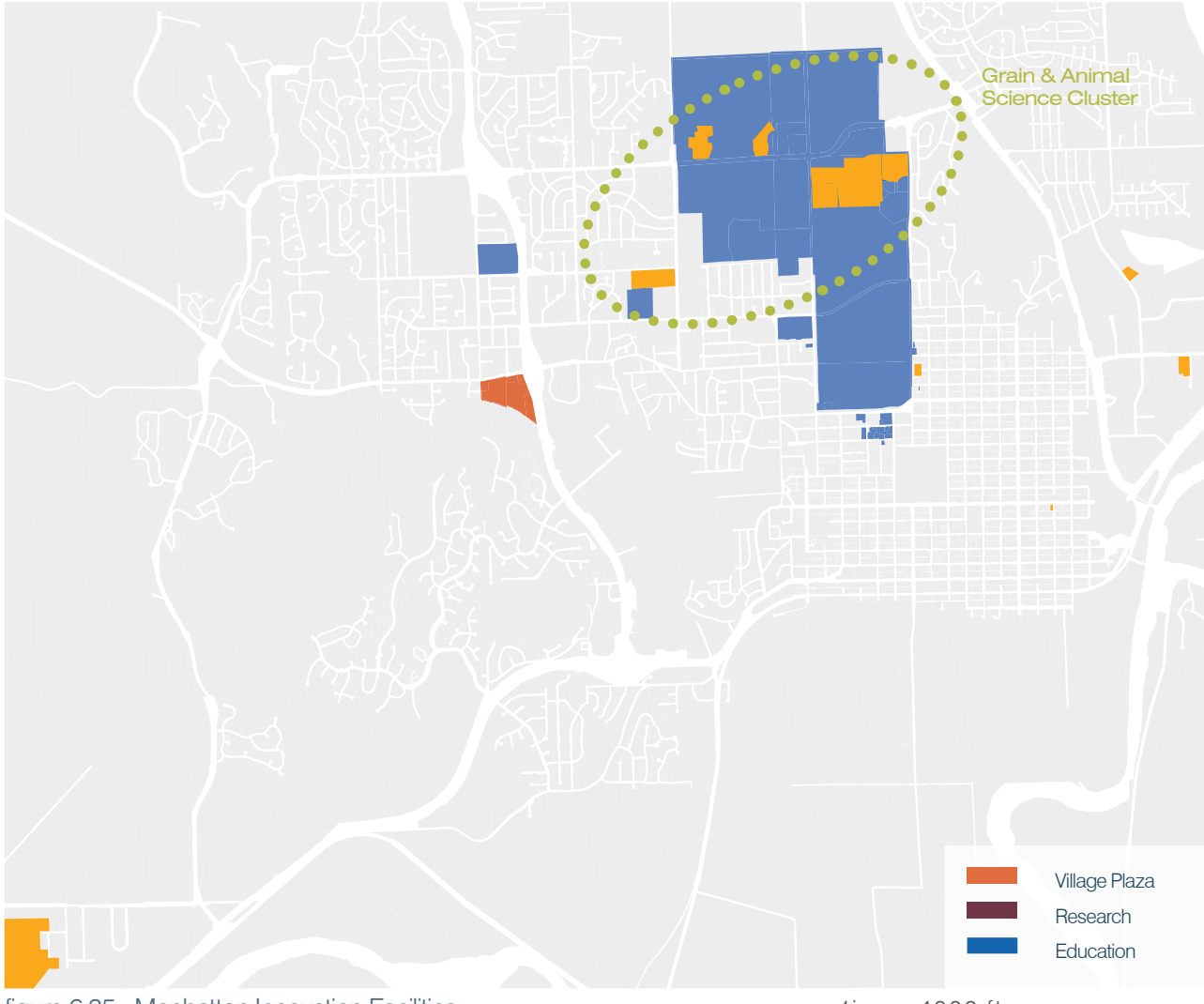


figure 6.35 - Manhattan Innovation Facilities

Data From City of Manhattan, 2006, 2010; & ESRI, n.d.

Clustering

- Kansas State University is the main driver of innovation in Manhattan
- The university is particularly strong in research focusing on: animal health, food & science safety, grain science, mechanical & nuclear engineering, nanoscience, and plant science (Manhattan KBED, 2011).
- The Grain & Animal Science Cluster is the only innovation cluster in existence.
- Currently entrepreneurial and innovation support facilities are scattered thorough Manhattan. The lack of concentration of these facilities is a cause for concern.
- While the facilities are not close, they are primarily located on Manhattan Avenue, Kimball Avenue, adjacent to the airport, and near downtown Manhattan.

ENTREPRENEURSHIP, INCUBATION, & RESEARCH

figure 6.36 - K-State Research Park

figure 6.37 - USDA: Center for Grain & Animal Health Research

figure 6.38 - K-State Venture Accelerator

All Photos By Author, 2013

Research Environment

- Currently entrepreneurial support is found in suburban style and single use developments at opposing ends of Manhattan.
- While the K-State Venture Accelerator is one of the few live/work environments and located in a prominent spot for university and entertainment amenities, it like many of the other startup spaces lacks room for expansion.
- The two research parks in Manhattan lack the infrastructure and areas for collaboration.
- Many of these programs lack accessibility by means other vehicular.
- This does not fit with the desired lifestyle sought by today's creative professionals.

figure 6.39 - Kansas Wheat Innovation Center & K-State Grain Science and Industry

figure 6.40 - NBAF: National Bio and Agro-Defense Facility

figure 6.41 - Kansas Entrepreneurial Center

STARTUP VILLAGE

figure 6.42 - StartUP Village Master Plan
By Author, 2013

Innovation Strategy

- StartUP Village focuses on creating a live, work, and play environment, particularly focused on entrepreneurship. It is anchored by a business incubator and venture accelerator, catering to start-up and developing companies.
- Much of the project vision caters to the need for a community centered on the entrepreneurial, creative class.
- Manhattan currently does not provide the environment sought by this demographic.

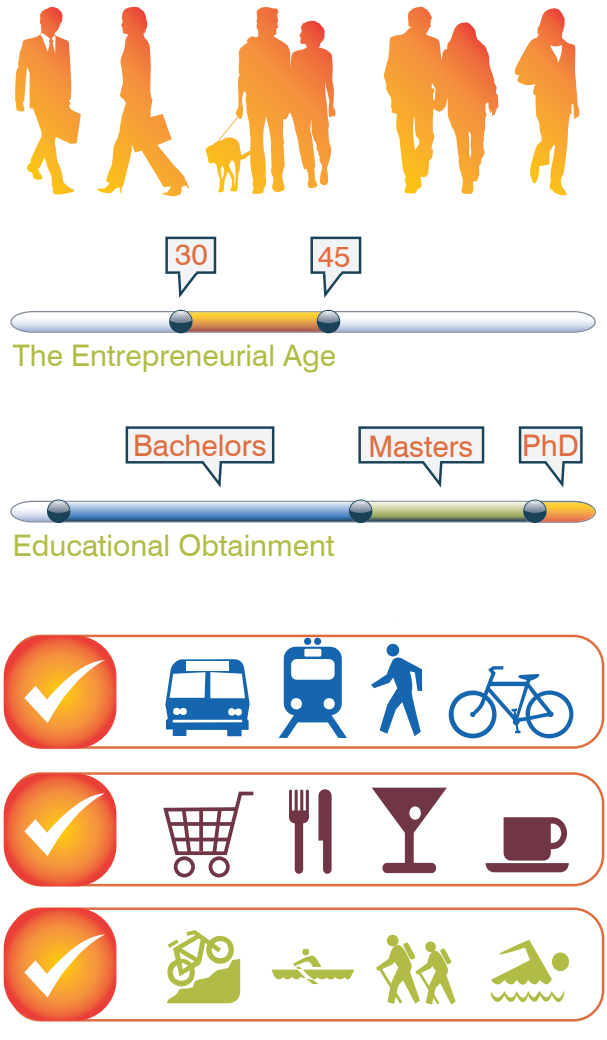


figure 6.43 - The Creative Class Checklist
By Author, 2013

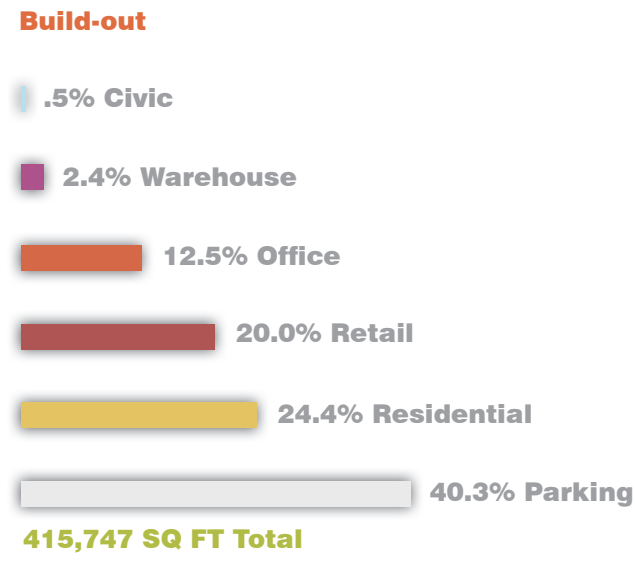


figure 6.44 - Development Build-Out
By Author, 2013

Rather, it does well to cater to college students, sports fans, and families. As such, the development promotes creative class attraction, high-tech facilities, and affordable spaces.

Development Facts

- 26% Lot Coverage
- 86 Dwelling Units
- 669 Parking Spaces
- 48% Open Space

LIVE, WORK, & PLAY ENVIRONMENT

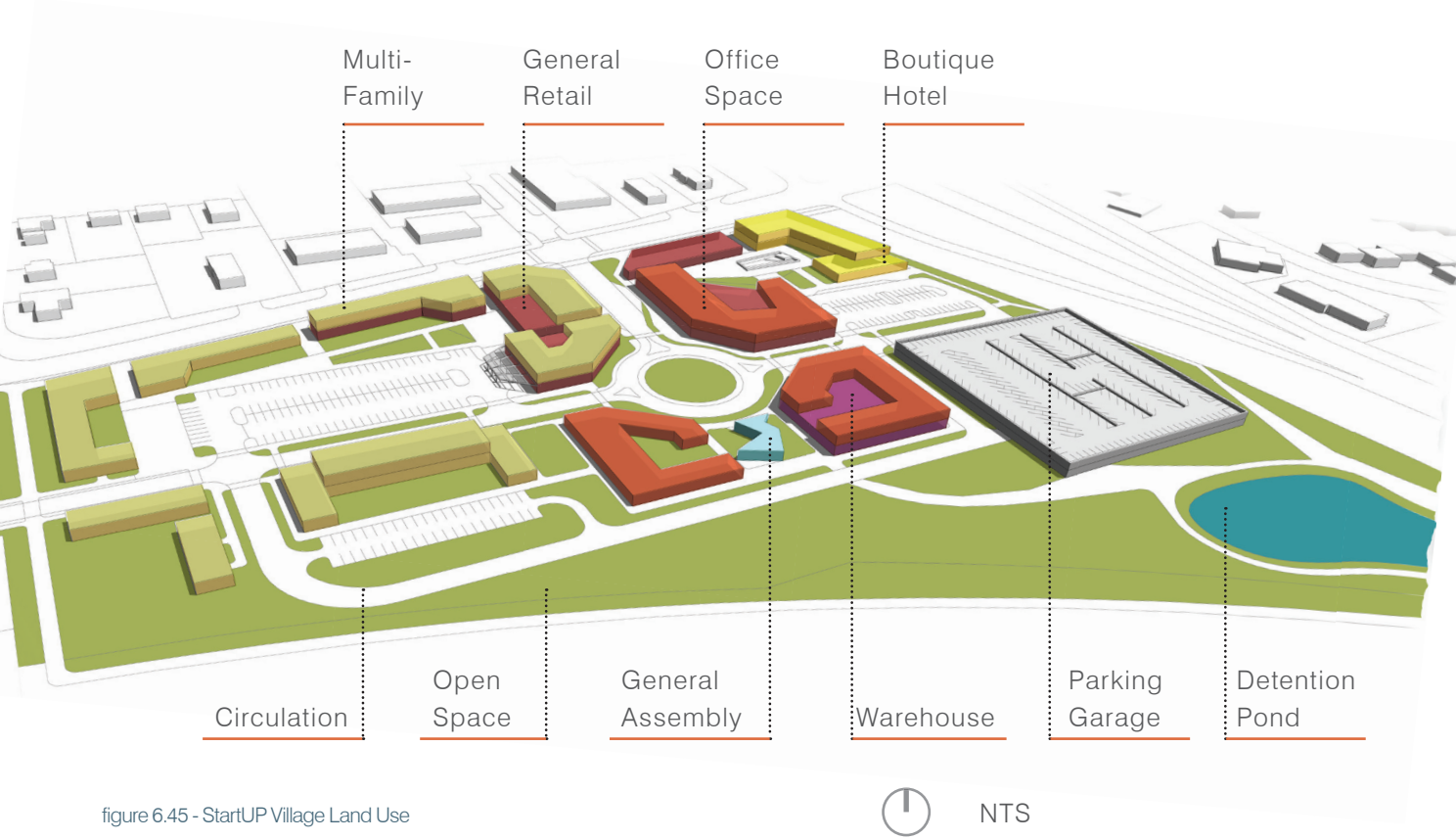


figure 6.45 - StartUP Village Land Use
By Author, 2013

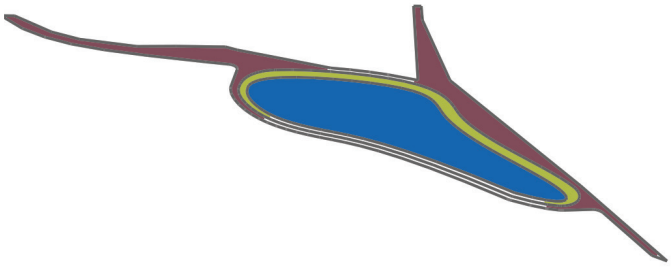


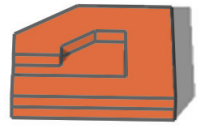
figure 6.46 - Development Elements
By Author, 2013

Idea Lake

- Paddle Boats
- Swimming
- Fishing
- Boat Races
- Aquatic Research
- Bird Watching

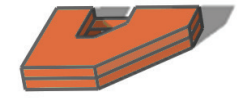
In response to findings from the regional-site assessment, StartUP Village builds on the potential to become a thriving live, work, & play environment. It does so by providing entertainment, recreation, social gathering spaces, an entrepreneurial center, affordable housing, flexible business spaces, and improved transportation options. The land use and development elements (illustrated in figures 6.45 & 6.46) show how the design deploys these through strategic placement.

ENTREPRENEURSHIP, INCUBATION, & RESEARCH



Incubator

- K-State & Manhattan
- For Bio-Ag & Tech
- Warehouse
- Office Services
- Wet Labs
- Affordable Space

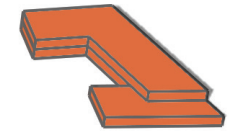


Financial Plaza

- Start Up Assistance
- Venture Capital
- Angle Networks
- Business Loans
- Landmark Bank
- Rising Stars Program

Accelerator

- Run by K-State, Manhattan, Garmin & CivicPlus
- For Bio-Ag & Tech
- Networking
- Mentorship
- Co-working space



Boutique Hotel

- 40 Rooms
- Meeting Spaces
- Conference Room
- Extended Stay Living
- Spa Retreat

Tech Corner

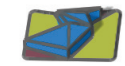
- Fiber Optic Water Feature
- 4 Olives Wine Bar
- Outdoor Cafe
- Public Forums
- Micro-Festivals

Sculpture Circle

- Public Art
- Market New Start-ups
- Product Displays
- Garden Tour

Collaborator's Plaza

- Wildflower Garden
- Hub for Residents
- Community Gardens
- Little Innovators Daycare
- Media Wall



Innovator's Square

- Think Tank for:
- Co-working
- Work Exhibition
- Performances
- Electronic Displays

HIGHLY FUNCTIONING NETWORKS

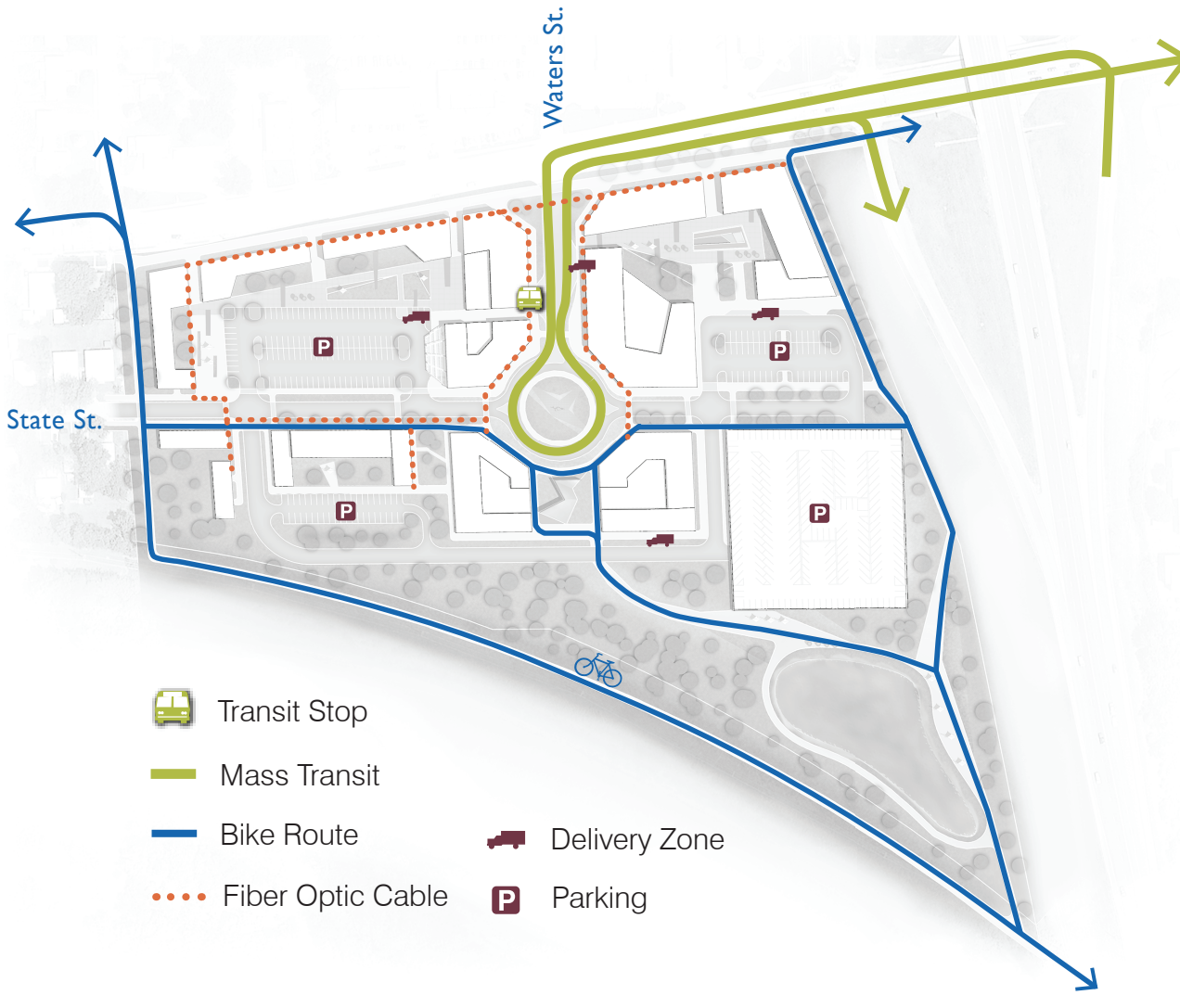


figure 6.47 - StartUP Village Circulation & ITC Network
By Author, 2013

NTS

- By tying new streets into the existing fabric of Waters St. and State St., the development embraces adjacent activities and enhances local connectivity.
- It also reduces vehicular conflicts created by excessive curb cuts on Anderson Avenue, by providing safe crossing for pedestrians via newly created crosswalks and stoplights at the intersection of Waters and Anderson.
- The creation of a transit stop within the development further connects the district with other community hubs.
- The integration and expansion of the linear trail onto the site provides pedestrians and bicyclists with greater opportunities.
- Collectively these design moves ensure a highly functioning transit network.
- In addition, the design boasts fiber optic infrastructure to cater to technology demands.

CATALOG IMPLEMENTATION SUMMARY

INNOVATION DEVELOPMENT

Attracting a Talented Workforce

Strong Cultural Presence

- Avoidance of exclusionary zones & gentrification
- Develop socio-economically diverse districts

Live / Work Integration

- Affordable/Subsidized Housing
- Extended Stay Hotels
- Mixed-Use Buildings / Blocks

Vibrant Nightlife

- Cultural Activities & Venues
- Entertainment Activities & Venues

Range of Leisure & Recreation Activities

- Hierarchy of Open Spaces
- Natural Settings

Generating Market Demand

Distinctive Identity

- Iconic Landscapes & Buildings
- Urban Lab Concept
- R&D Focused
- High Quality Facilities

Unique Branding

- Naming development
- Create logo
- Develop mantra
- Utilize social media

Leveraging Trends in Development

- Build on emerging development trends
- Emphasize adjacent cultural / civic districts

Development Incentives

- Density Bonuses for sought activities / uses
- Transfer of Development Rights
- Innovation-Based Tax Credits

Providing for Entrepreneurship

Space for Unanticipated Uses

- Flexible & varying building layouts
- Innovation Center for events & activities
- Room for future growth

Affordable Space for Businesses

- Below-market to no rent spaces for innovative companies / institutions
- Low cost of living
- Low-income / moderate income living units

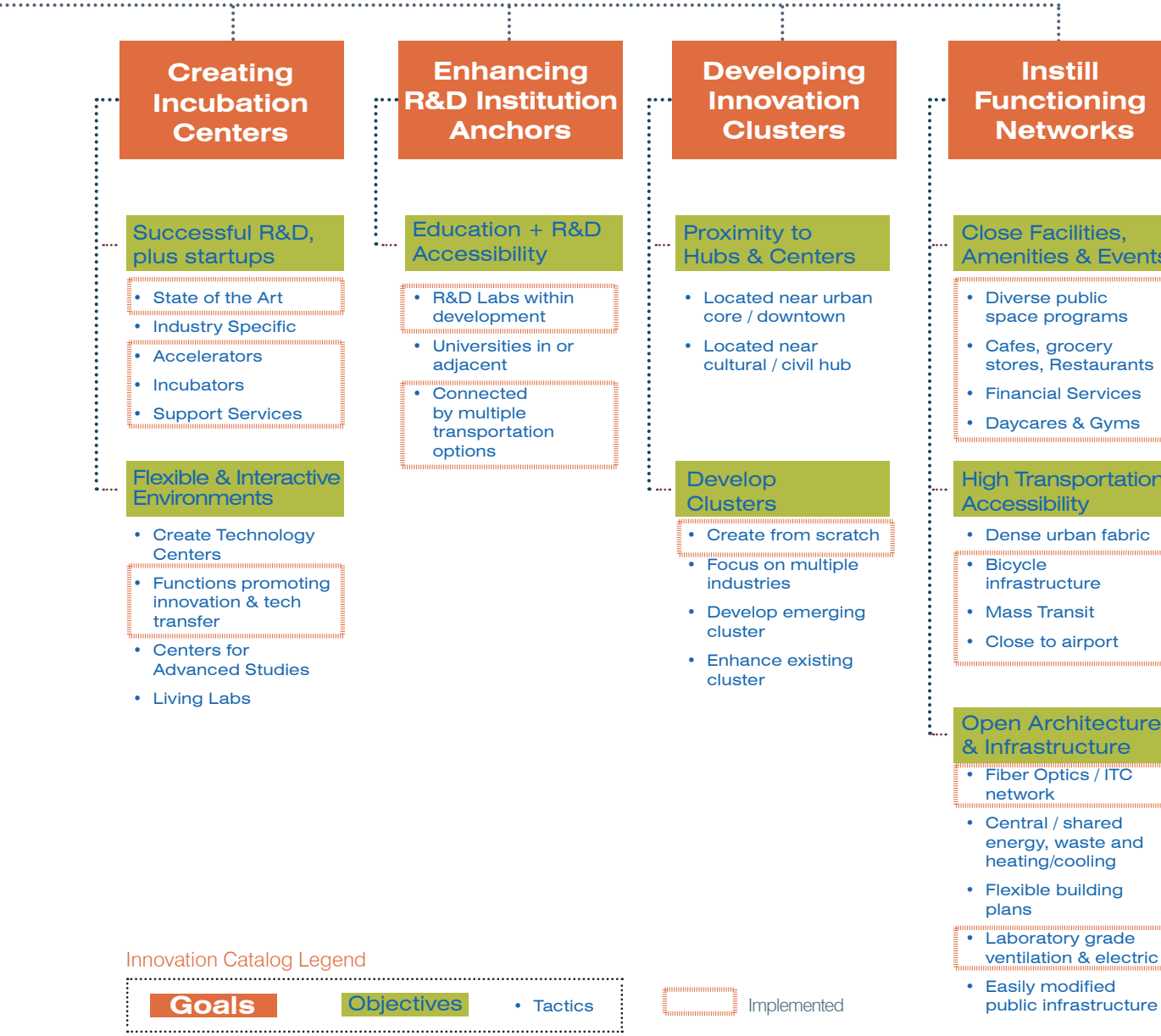


figure 6.48 - StartUP Village Catalog Implementation

By Author, 2013

FINDINGS & CONCLUSIONS

PROJECT SUMMARY

Dilemma

Cities all over the world are in the process of using urban regeneration projects as a means to boost innovation in their economies. Through exploration of innovation system literature it became apparent our knowledge of land development project effects on innovation systems was largely undocumented. This in turn led to questions about whether land planners, urban designers, and landscape architects should have confidence in their work as it relates to innovation ecosystem improvement. If there were evidence-supporting use of urban revitalization projects, then we might ask what roles do planners and designers play in designing for innovation development. These dilemmas lead to the research question:

"What role(s) and degree of confidence can planning and design professionals play in the development of regional innovation economies, especially considering the lack of evidence tying urban sites to the larger system?"

Methodology

A methodology developed to explore and respond to the research question. This included using literature review to establish regional innovation system components and observations about the urban conditions of innovative cities in the United States. Information from this process created a base of knowledge used to explore relationships of urban developments and innovation system components.

Through use of case studies concerning successful Knowledge-Based Urban Developments (KBUD), a list of tactics targeting innovation through land planning and urban design emerged. To illustrate the relationships between these tactics and the overarching innovation system, an "Innovation Catalog" developed. This catalog classified information into a goal, objective, and tactic progression, which provides a framework for assessing and developing innovation-based design strategies.

Implementing the catalog occurred through two separate urban design and development projects. In congruence with literature, case studies, and the innovation catalog, these projects rationalize use of the catalog. They also provided insights to the roles planners and designers play in urban revitalization projects for innovation development. Collectively, this process provided answers to the research question.

The following section provides a detailed discussion about the answers to the regional-site dilemma, the significance of development projects in innovation economy enhancement, and the roles planners and designers play in creating these projects.

FINDINGS

During efforts to address the professional dilemma through the methodology, there were both anticipated and unanticipated findings. While multiple findings emerged, the most significant ones determined the role of sites in innovation systems, how we use urban redevelopment to foster innovation, and the roles planning/design professionals play in the process.

Regional –Site Gap

A major requirement of this project was to establish connection between innovation in the local economy and the ability of land development strategies to generate innovation. Without this information, questions about the validity of using such projects as a form of innovation development could manifest. The cataloging of land development tactics - identified through case study analysis – in relation to regional innovation system components helps bridge the gap between understanding of regional innovation systems and the value of land development projects in improving those systems. Seeing how successful developments increased innovation in their local economy via urban planning and design tactics, we know land development can be a viable innovation system investment. Given the examples provided in the Case Study section, strong evidence supporting land development as an economic development strategy exists. This finding also serves to boost confidence in planning and design professionals involved in the innovation development process. With planning and design being critical elements of the land development process, the impacts of these professions on innovation has great potential.

Targeting the Innovation System

Simply having confidence in KBUD/innovation district projects is not enough to address concerns over roles planners and designers play in innovation development. Case studies analysis did not directly communicate those activities. The next stage in determining where professionals fit in the process stems from understanding the innovation system and how cites target it through KBUD/innovation districts.

In performing the literature review, research indicated there is a known innovation process. Innovation starts when someone responding to a market demand or potential with a new idea. Through a development process of testing and refining the idea, the person eventually ends up with a new good or service. The final stage of the process is making the good or service available to the public (commercially or through other means). The process typically requires talented people with ideas in synergy with organizations developing those ideas.

While a city cannot mandate or force this process, they try to entice it instead. To do so they target a talented workforce and supportive organizations in hope that these groups will engage in collaboration and yield innovation. One approach for drawing these groups together is through urban redevelopment projects. By creating environments desired by innovative citizens and institutions, cities create places where these groups can locate and be successful. Through this strategy, cities provide potential for a self-sustaining innovation community.

Professional Roles

When cities attempt to lure in creative professionals and research/innovation institutions with urban development, they tend to put forth effort in five areas: creation of facilities, infrastructure, programs/services, marketing, and incentives. Each of these strategies is represented in the Innovation Catalog and are developed in collaboration with planning and design professionals. As seen in the case studies and the two design projects found in this

document, land planners, urban designers, and landscape architects can take on roles in any of these areas. To do this they must uses their skills to perform site and regional assessment, use evidence-based planning/design strategies, and participate in multi-disciplinary work.

Regional and site assessment provides information critical to proper application of targeted innovation strategies. Planning and design professional can participate in and should probably lead this process because of their professional expertise using these methods. Regional and site analysis are typical operations for these professionals. The success of this portion of the process is vital. If cities are to improve their innovation environment, they must first understand how the system works in its current state. This assessment has to be objective and thorough if cities want to formulate a solid innovation development framework.

Acknowledging opportunities to improve the innovation economy is a first step, but site assessment is also important. It shows the potential of a given site to respond to the regional innovation opportunities. Since planners and designers are some of the best at performing regional and site analysis, cities can be confident in the assessments they make. Since the assessment sets a foundation for the design strategy and development plan, any assessment should include the professionals best equipped to perform these assessments.

Planners and designers are also effective at using regional and site assessment to create quality and productive urban environments. These are the environments sought by organizations in need of high-tech, specialized, yet adaptive, facilities and infrastructure. They also bring a level of creativity to projects that allow the developments to provide unique settings and amenities desired by a creative and talented workforce. Finally, by creating a unique and high quality environment, planners and designers allow for easy and effective marketing of the environment due to its high level of desirability.

THESIS

By utilizing known urban development strategies targeting regional innovation systems, planners and designers can engage in local innovation development. The documentation of successful innovation components and corresponding strategies define mechanisms planners and designers employ in innovation system developments. In tandem with regional and site assessment, planners and designers can confidently guide innovation through urban development.

GLOSSARY

Business Incubator – "A business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services." (NBIA, 2009)

Cluster Theory – Theory used to the district in effect of industry as companies strive to gain competitive advantage.

Competitive Advantage – Providing products or services cheaper than the competition by reducing the costs of providing the offering, or by creating offerings that are differentiated and demand a premium price in the marketplace (Council on Competitiveness, 2005).

Entrepreneurship – The act of establishing and operating a business, based on venture capital, while assuming a high degree of risk (Shim & Siegel, 1995).

Enterprise Regional Innovation Systems (ERIS) – This is the same as RIS, except it places greater emphasis on entrepreneurial led innovations.

Gross Domestic Product (GDP) – This is an indicator of economic health and is based on the value of goods and services developed within a nation's economy.

Information and Communications Technology (ITC) – This is the infrastructure that networks telecommunications and computers.

Innovation – Creating and incubating a new idea into a commercialized good or service (Bannock, Baxter & Davis, 2003).

Innovation Cluster or District - urban development projects aimed at pairing research institutions, government, workforces, and businesses in close proximity with hopes that they spur innovation and economic development by maximizing knowledge transfer, share infrastructure costs, and benefiting from spillover effects (Sharma, 2012).

Innovation Strategy – This is the targeting of specific KBUD elements to develop the local innovation economy by using urban development approaches, policies, practices, and/or schemes, fitting the context of the locale.

Knowledge-Based Urban Development (KBUD) – urban development projects targeting economic development by focusing on knowledge, creativity, and innovation.

KBUD Elements – These are the developmental practices and policies of cities with a strong knowledge-based economy.

KBUD Strategies – These are the innovation strategies identified in the case studies.

Knowledge Transfer – Taking ideas or knowledge developed in one company, governmental entity or institution and transferring to another entity. (Macmillan Dictionary, 2012)

Marshallian Districts – These districts produce a high level of triadic patents that primarily develop in Small to Medium-sized Enterprises (SMEs) and have a high Gross Domestic Product. (Clark, Huang & Walsh, 2009)

Patent – “A government license that gives the holder exclusive rights to a process, design or new invention for a designated period of time.” (Investopedia, n.d.)

Regional Innovation Systems (RIS) – “set of economic, political, and institutional relationships within a given geographical area that generates a collective learning process, leading to the rapid diffusion of knowledge and best practice” (ONRIS, 2006)

Science, Technology, and Research Parks (STPs) – A development that seeks to maximize the growth of knowledge-based businesses, research and industries, buy locating them within clusters and providing them with services. These are often private-public partnerships. (Link, 2009)

Small and Medium Sized Enterprises – These are typically viewed as any business smaller than a large corporation. The number of employees is often the determining factor, but that range is not generally agreed upon.

Spillover Effects - An effect resulting from another effect.

Technology Transfer – This is the same as knowledge transfer, except that the thing transferred is technology.

Triadic Patents –This is the same as the traditional patent except that they are patents protected in the United States, Europe, and Japan (Clark, Huang & Walsh, 2009).

Venture Capital – This is a high-risk investment, often associated with start-up businesses. The payoff for this investment is typically long term.

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