

Dementia-Friendly Tulsa

Designing Inclusive Outdoor Spaces



Robi Jones

Master's Candidate - Urban Design

**Professional Project 2017-2018
Urban Design Studio - OU-Tulsa**

The University of Oklahoma Graduate College

Dementia-Friendly Tulsa:
Designing Inclusive Outdoor Spaces

A professional project submitted to the graduate faculty in partial fulfillment of the requirements for the degree of Master of Urban Design

Robi Jones

Tulsa, Oklahoma
2018

Approved for the Urban Design Studio of The College of Architecture by:

Shawn Schaefer, Chair and Director of the OU-Tulsa Urban Design Studio
David Boeck, AIA, Professor of Architecture
Ron Frantz, Director of Small Town Studios

Table of Contents

Introduction

My Story	2
Project Goals.....	4
Methodology	5

Research

Understanding Dementia	11
Definitions	16
Literature Review	
<i>Inclusive Urban Design: Streets for Life</i>	17
Case Studies	
Hogeweyk – Weesp, Netherlands.....	25
Corona, California.....	28

Investigation

Analysis and Interventions of Dementia-friendly Outdoor Spaces	32
Analysis and Interventions of Focus Neighborhood	40

Implementation

Recommendations.....	52
----------------------	----

Bibliography	58
--------------------	----

Introduction

My Story

My interest in age-related diseases began several years ago. In November of 2015, my husband and I were living in Colorado and watching *Sunday Morning* on CBS. The cover story was *Fighting Back Against Parkinson's – In the Ring*¹ by Lesley Stahl. It was an inspiring story about Rock Steady Boxing®, the first **non-contact** boxing gym of its kind in the country dedicated to people with Parkinson's disease. This form of exercise helps improve motor skills, hand-eye coordination, proprioception (awareness of how the body is positioned), agility, balance, flexibility, and mental focus. We decided that getting trained in the program would not only be beneficial to my husband as a personal trainer but to both of us as a unique learning experience. The training is held at their gym in Indianapolis, IN and it would take about nine months before they had a spot available for us. We signed up and waited anxiously!

While waiting, we learned that my step-father had just been diagnosed with Parkinson's disease. The news was both surprising and scary, so I started doing research to better understand the diagnosis. I was even more excited to get to Indianapolis so that I could learn more about the benefits of boxing for people diagnosed with Parkinson's disease.

Again, while waiting for the training, my husband and I moved back to Oklahoma. We both decided to go back to school and that is when I began the Master of Urban Design degree at The University of Oklahoma, Tulsa Campus. From the very beginning, I had an interest in designing for older adults. I was concerned about pattern changes on crosswalks because I knew that the contrast could cause someone with Parkinson's disease to freeze. I started to realize just how many tripping hazards we all face when navigating public spaces. When designing parks, I included a senior playground to make sure that older adults could access the equipment and be encouraged to stay fit.



My stepdad and mother on vacation with my husband and me – Leadville, CO, summer 2017.

¹ News, CBS. CBS News. November 08, 2015. Accessed March 25, 2018. <https://www.cbsnews.com/news/fighting-back-against-parkinsons-in-the-ring/>.

Finally, the wait was over, and we made the trip to Rock Steady Boxing[®] and received our certification as trainers. It was another pivotal point for me because I witnessed the strength and dignity the boxers with Parkinson's had to keep on fighting and to keep on "showing up" even when they were having bad days. The boxers told us how the program had changed their lives. Many of them had felt hopeless and were not comfortable getting out of the house. They said that once they started training, they started seeing improvements in their ability to get around and they started feeling more hopeful. The training program, combined with the social aspect of a support system, were major factors to improved health.



Rock Steady Boxing – Indianapolis, IN

I was interning at Indian Nations Council of Government, INCOG, when I was invited to an event where Mayor Bynum was proclaiming Tulsa to be the first dementia-friendly city in the state of Oklahoma. It was perfect timing because I was trying to decide the topic for my professional project. I knew that I wanted to be a part of helping people with dementia. I decided that I would look at the built environment, which includes buildings, streets, parks, and outdoor spaces, to see how they can be designed to be dementia-friendly. I want people with dementia to continue to get out, socialize, exercise, and be a part of the community. I want places to be accessible and non-threatening for them.

I also read many articles and books about dementia during this stage of my professional project. One of the books I read was, *Still Alice*² by Lisa Genova. I also watched the movie...twice! Both the book and the movie were real tear jerkers, but they helped me understand just how crippling dementia can be not only to the person experiencing it but also for the family and friends that experience it with them. *Memory's Last Breath: Field Notes on my Dementia*³ by Gerda Saunders was a non-fiction book that I read. It helped give me insight into what it is like to receive the diagnosis of dementia and then attempt to continue to live life as normally as possible after the diagnosis.

This was how my interest in working with older adults that are facing age-related diseases began.

² Genova, Lisa. *Still Alice a Novel*. London: Pocket Books, 2010.

³ Saunders, Gerda. *Memory's Last Breath: Field Notes on My Dementia*. Hachette Books, 2017.

Project Goals

The goal of my project is to address key elements that were identified as high action priorities by the Dementia-Friendly Tulsa Steering Committee:

- Ensure that physical environments and public spaces are dementia-friendly.
- Develop policy that fosters complete streets and pedestrian safety and ease.
- Promote easy-to-navigate public spaces that incorporate universal design features.
- Plan and design dementia friendly, safe roads and walking/bicycling environments for drivers and pedestrians.

Through research, conducting case studies, consulting experts in the field, and identifying locations in Tulsa that have high populations of senior citizens and therefore a greater likelihood of people diagnosed with dementia, I will establish best practices for creating physical environments and public spaces that are dementia-friendly. I will present my findings and recommendations to the Dementia Friendly Tulsa Steering Committee.

I will follow the key design principles described in the book, *Inclusive Urban Design: Streets for Life* by Elizabeth Burton and Lynne Mitchell. After identifying a focus area in Tulsa, I will apply the following design principles and make recommendations based on my findings.

Six Key Design Principles:

1. **Familiarity** – refers to the extent to which public spaces are recognizable in appearance and the styles of street furniture, building facades, paving, etc. are recognizable based on a lifetime of experiencing similar design.
2. **Legibility** – refers to the extent to which public spaces can be decoded. It provides orientation cues to help identify ones' location within the space and then guides direction at key decision points.
3. **Distinctiveness** – relates to the extent to which buildings, streets, public spaces, and other architectural features appear visually different.
4. **Accessibility** – refers to the extent to which outdoor environments enable people to reach, enter, use, and walk around the places they visit, regardless of any physical, sensory or mental impairment they may have.
5. **Comfort** – refers to the extent to which outdoor environments enable people to visit places of their choice without physical or mental distress. It allows people to get out of the house and participate in the community. An example of physical comfort is the provision of public restrooms at all public locations.
6. **Safety** – refers to the extent to which outdoor environments enable people to use, enjoy, and move around without fear of tripping, falling, being run-over, or being attacked.

Methodology

This project springs from a unique design challenge. There has been a shift in population shift as the baby boomer generation (those born during the post-World War II period, 1946-1964) ages and changes the demographics. By 2030, about one in five Americans will be older than 65. This creates a new thought process for many planners, designers, and developers. To prepare for the needs of older adults, they must start to create spaces that are designed for an aging population. The most common terms associated with this type of design is “age-friendly.” There was a large amount of research on this topic that I found helpful.

Since my project is based on creating dementia-friendly design in outdoor spaces, I read many articles and books that discussed dementia-friendly cities and neighborhoods. This proved to be a little more difficult than my research on age-friendly design. There was quite a bit of information on creating age-friendly cities but the specific aspect of designing outdoor spaces that were dementia-friendly was sparse. I discovered a book, *Inclusive Urban Design: Streets for Life*⁴ by Elizabeth Burton and Lynne Mitchell and found that almost all the research that I read, referred to the studies that were done by these two authors. They were the pioneers in the field of creating outdoor environments for people affected by dementia.

Each month I attended the stakeholder’s meeting for Dementia-Friendly Tulsa. These meetings were informative and helped keep me knowledgeable about the early planning process of making Tulsa a dementia-friendly city. The stakeholders were beneficial to me as a sounding board for my own research and their contributions were appreciated.

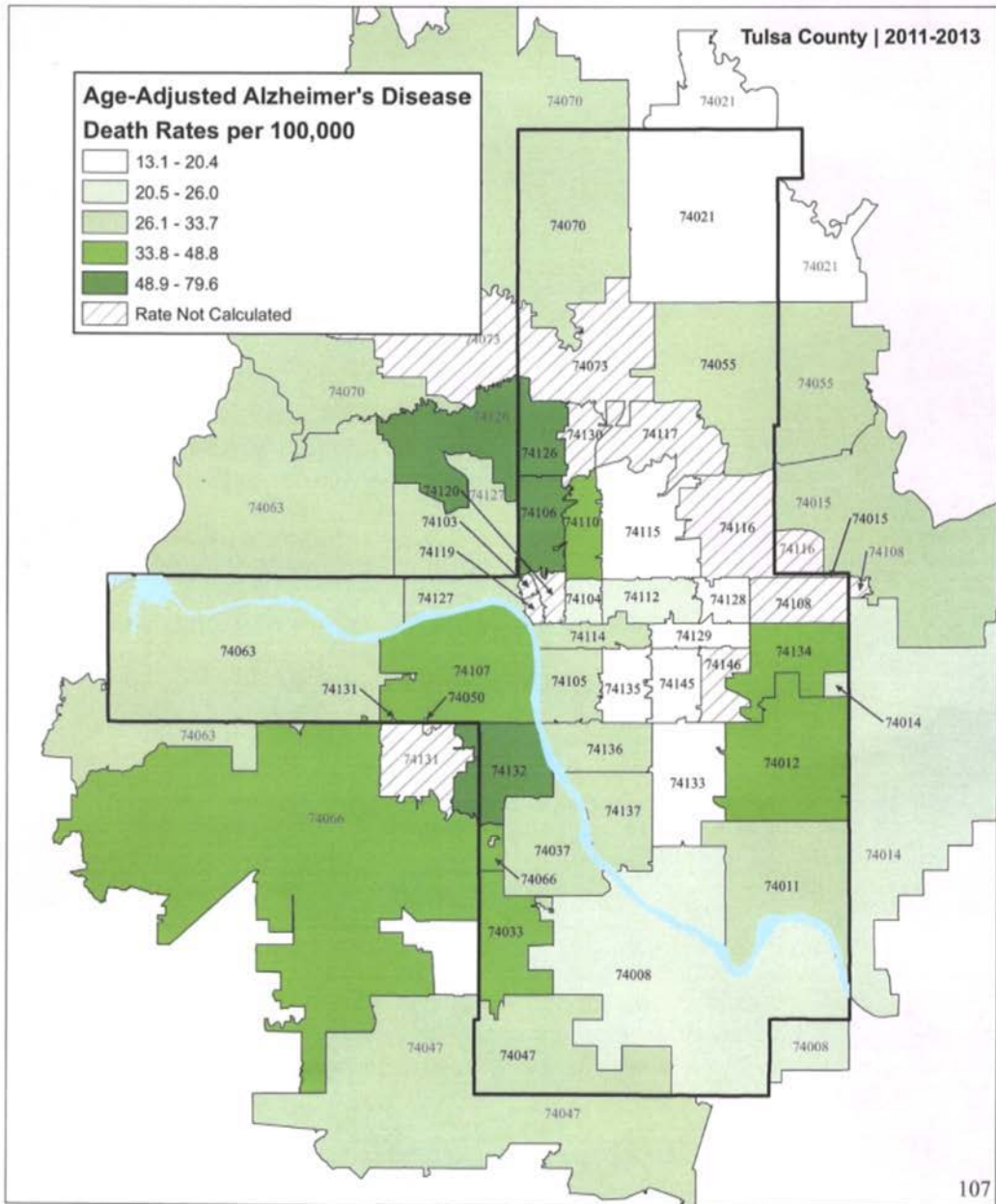
For my professional project, I decided to choose a neighborhood that would provide design challenges for me to solve, while also providing existing examples of good dementia-friendly design. The area also needed to include the following criteria: be near a public park, public transportation, medical center, shopping, and restaurants.

First, I looked at data from Tulsa Health Department⁵ and located zip codes in Tulsa that have a moderate to high population of residents that are age 65 or older. I also looked at the data they had about the number of deaths from Alzheimer’s Disease in Tulsa County. I found the information helpful but the zipcode that demonstrated the best overlap of populations of people age 65 and older and also the highest percentage of deaths from Alzheimer’s Disease (74106) did not meet the criteria that I was hoping to find in the focus neighborhood.

⁴ Burton, Elizabeth, and Lynne Mitchell. *Inclusive Urban Design: Streets for Life*. Oxford: Architectural Press, 2006.

⁵ Krug, Luisa, Kiran Diggirala, and Russell Waldin. "Tulsa County Health Profile 2015." Tulsa Health Department. 2015. Accessed April 6, 2018.

Deaths From Alzheimer's Disease



Tulsa Health Profile 2015, page 107

I narrowed my search to two neighborhood areas, one in zipcode 74135 and the other in zipcode 74120 and 74104. Both were approximately one square mile in size and met most of my criteria. I refer to the areas as neighborhoods although they are a combination of residential and commercial spaces.

Professor Schaefer and I drove around the 74135 neighborhood. This was interesting because we quickly realized that the streets were confusing. It met a lot of my criteria but not all of it. I decided that I would check out the other focus neighborhood to see if it met more of my criteria.

Evaluation of Criteria in 74135 Neighborhood

- ✓ Provides design challenges
- ✓ Has a public park
- ✓ Access to shopping (some)
- ✓ Access to medical center
- ✓ High population 65+
- ✗ Outdoor space to gather
- ✗ Access to public transit (limited)
- ✗ Existing dementia-friendly design
- ✗ Deaths from Alzheimer’s Disease (low)

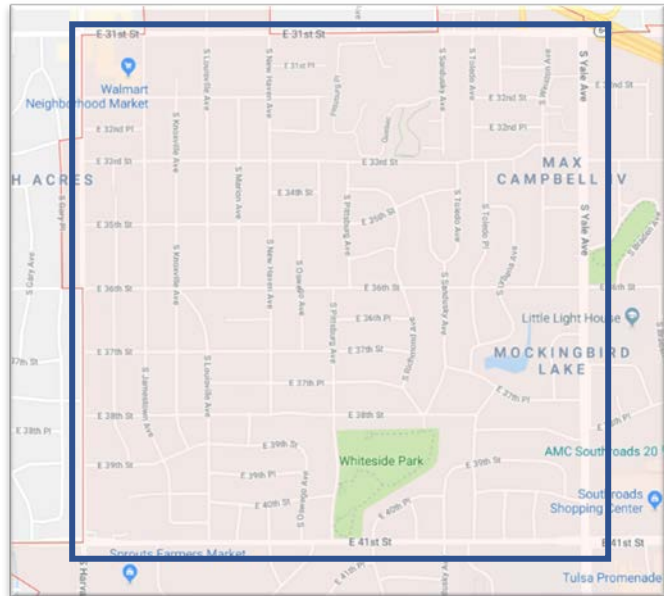


Image: Google Maps

Evaluation of Criteria in 74120/74104 Neighborhood

- ✓ Provides design challenges
- ✓ Has a public park
- ✓ Access to shopping
- ✓ Access to medical center
- ✓ Outdoor space to gather
- ✓ Access to public transit
- ✓ Existing dementia-friendly design
- ✓ Moderate population 65+
- ✗ Deaths from Alzheimer’s Disease (low)

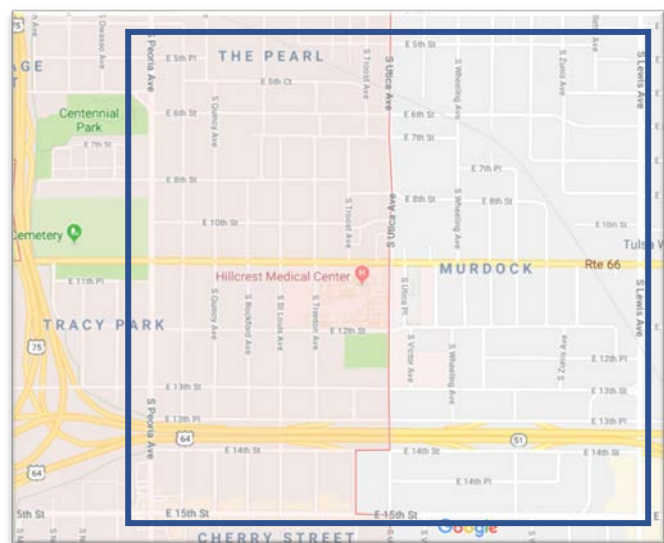
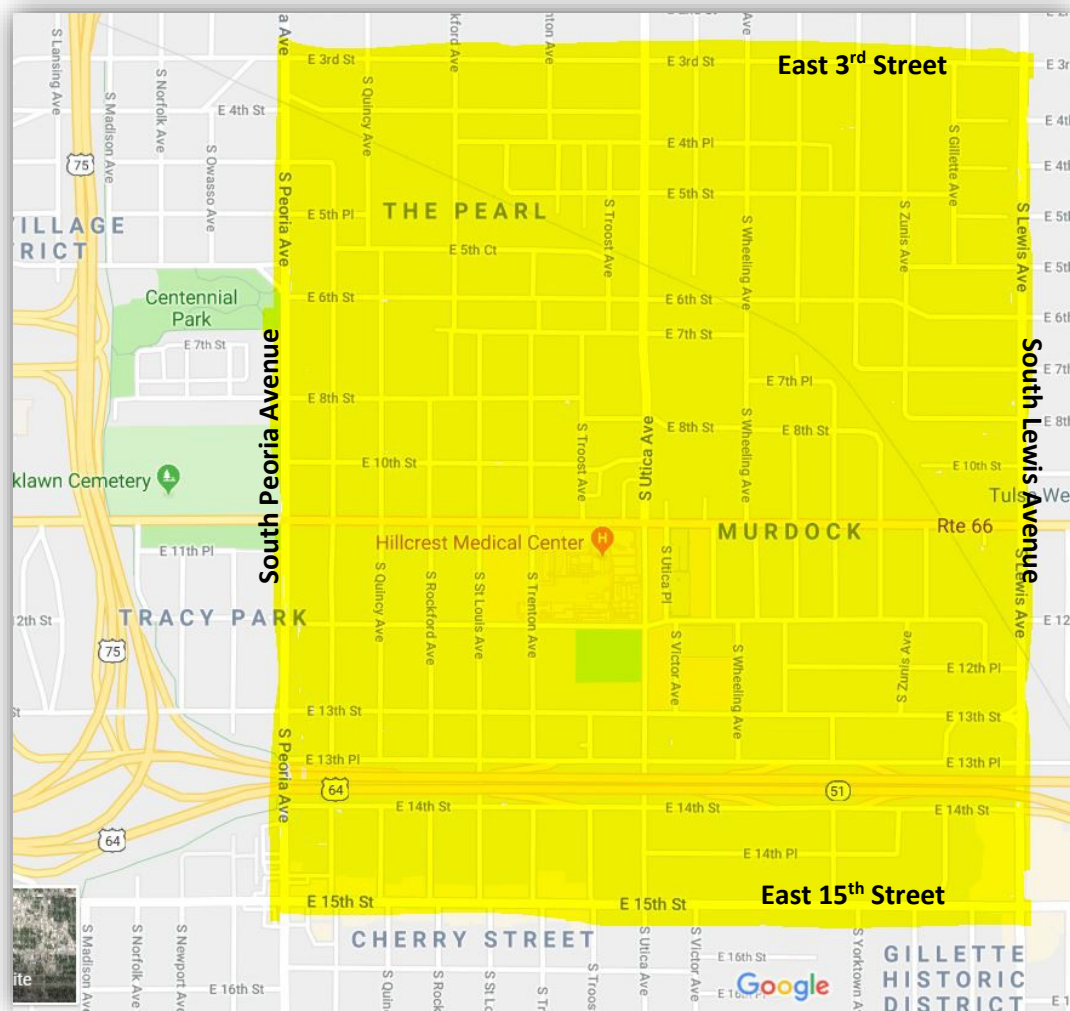


Image: Google Maps

After visiting the neighborhood in 74120/74104, I chose to focus on it. The boundaries are: south of East 3rd Street, north of East 15th Street, west of South Louis Avenue and east of South Peoria Avenue. It is near downtown, public parks, public transportation, restaurants, and shopping.

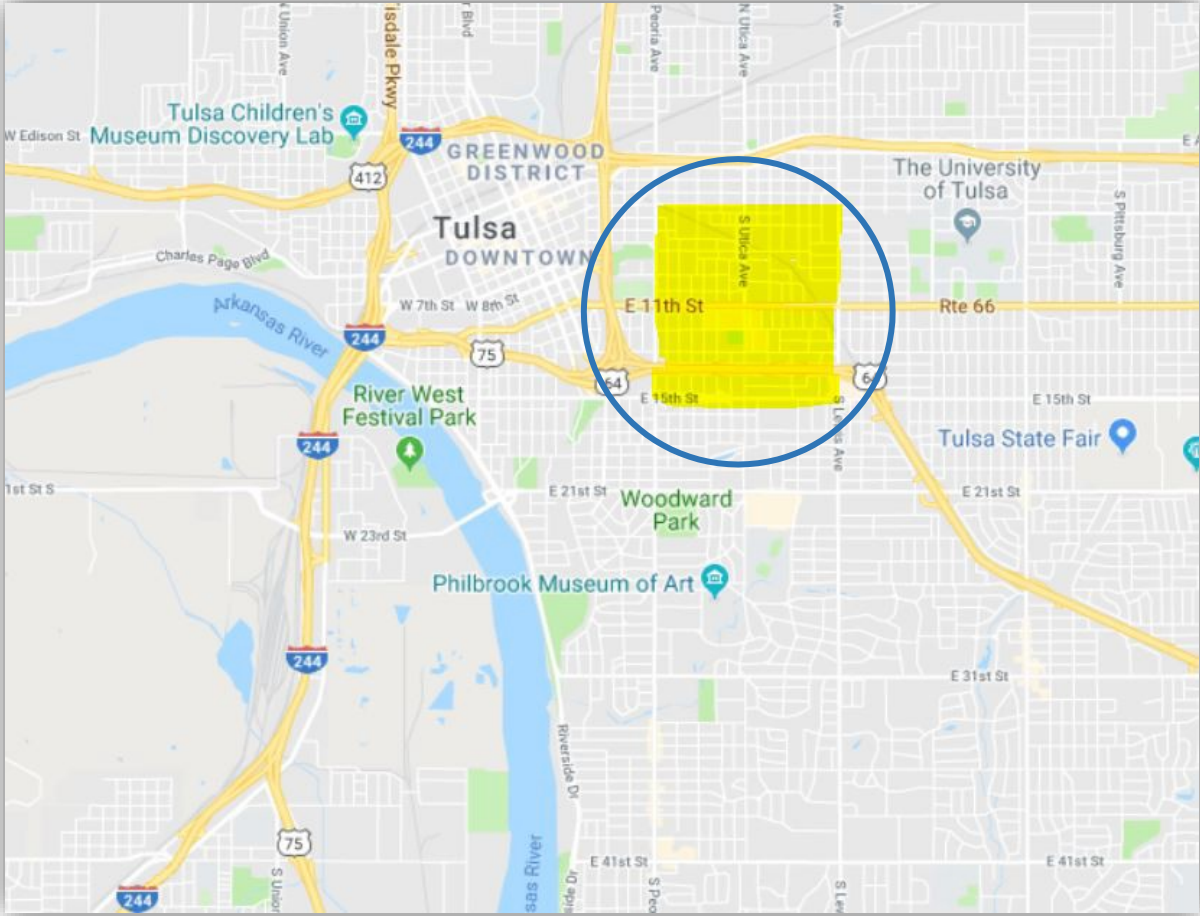
By focusing on this small area of Tulsa, I can analyze it in more depth and make recommendations for creating dementia-friendly outdoor spaces for that area specifically but knowing that those recommendations can be modified to fit other areas in Tulsa. The plans for creating dementia-friendly outdoor environments are based on six key design elements: (familiarity, legibility, distinctiveness, accessibility, comfort, and safety). Environments which are accessible to people with dementia also tend to be easier and more pleasant for everyone else as well.

Focus Neighborhood



Boundary of Focus Neighborhood

Focus Neighborhood – The Big Picture



Photographs from Focus Neighborhood

Research

Understanding Dementia

WHAT IS DEMENTIA?

Dementia is a syndrome, a group of symptoms that has a number of causes. The characteristic symptoms of dementia are difficulties with memory, language, problem solving and other cognitive skills that affect a person's ability to perform everyday activities.⁶

Dementia is an umbrella term used to describe a decline in memory or brain function that impacts an individual's daily life. This is different from the normal decrease in short-term memory most people experience as they age. Dementia is caused by changes in the brain which impact cognitive function, and it can be associated with a number of types of dementia many of us are familiar with such as Alzheimer's, Parkinson's, and Huntington's disease.⁷

There are many types of dementia and the symptoms vary from person to person. However, varied, at least two of the following core mental functions must be significantly impaired to be considered dementia:

- Memory
- Communication and language
- Ability to focus and pay attention
- Reasoning and judgment
- Visual perception

WHAT CAUSES DEMENTIA?

In most cases, dementia is not caused by a person's behavior or actions but rather it is caused by damage to brain cells. This damage interferes with the ability of brain cells to communicate with each other. When brain cells cannot communicate normally, thinking, behavior and feelings can be affected. The following are the five leading origins of dementia.⁸

Neurodegenerative Causes of Dementia

Neurodegeneration is the most common biological cause of dementia and often leads to Alzheimer's disease. Neurodegeneration is the process where brain cells (neurons) break down and die. These dying brain cells cause a permanent and progressive decrease in mental and physical function over time. Types of dementia that result from neurodegeneration include:

- Alzheimer's Disease

6 "2017 Alzheimer's Disease Facts and Figures." *Alzheimer's & Dementia: The Journal of the Alzheimer's Association* 13, no. 4 (2017): 325-73.

7 <https://www.dementia.org/what-is-dementia> (accessed March 8, 2018)

8 <https://www.dementiacarecentral.com/aboutdementia/facts/causes/> (accessed March 8, 2018)

- Dementia with Lewy Bodies
- Frontotemporal Dementias
- Parkinson’s Disease Dementia
- Huntington’s Disease

Cerebrovascular Causes of Dementia

Damage to blood vessels in the brain, or *cerebrovascular damage*, is a common biological cause of dementia. It includes strokes and/or narrowing of the blood vessels supplying the brain. Localized areas of the brain are destroyed (so-called "infarcts") from not getting enough blood supply. Many of the same factors that cause heart disease also cause cerebrovascular disease. The type of dementia that results from cerebrovascular disease is:

- Vascular or Multi-infarct Dementia

Infection-Related Dementia

Infection can also cause dementia. Viruses, bacteria, or parasites can destroy brain cells and dementia can result in some cases — usually in later stages of severe infections. Common types of dementia caused by infection include:

- Creutzfeldt-Jakob Disease and other Prion Diseases
- Dementia associated with HIV/AIDS

Toxic and Metabolic Causes of Dementia

Dementia can also result from a chemical imbalance in the body caused by either a toxin (e.g. drugs), malnutrition, or other biological conditions, such as metabolic disorders. This form of dementia includes:

- Wernicke-Korsakoff syndrome
- Leukodystrophy

Traumatic Causes of Dementia

Serious injuries and concussions to the head and brain can cause dementia. This category includes:

- Traumatic Brain Injury

WHAT ARE THE STAGES OF DEMENTIA?

For this research project, it is important to understand the stages of dementia. Someone in the earlier stages will be more concerned with the outside environment and this is where my studies will be the most beneficial. The following information is provided by Alzheimer's Association.⁹

Mild Alzheimer's disease (early-stage)

In the early stage of Alzheimer's, a person may function independently. He or she may still drive, work and be part of social activities. Despite this, the person may feel as if he or she is having memory lapses, such as forgetting familiar words or the location of everyday objects.

Friends, family or others close to the individual begin to notice difficulties. During a detailed medical interview, doctors may be able to detect problems in memory or concentration. Common difficulties include:

- Problems coming up with the right word or name
- Trouble remembering names when introduced to new people
- Challenges performing tasks in social or work settings.
- Forgetting material that one has just read
- Losing or misplacing a valuable object
- Increasing trouble with planning or organizing

Moderate Alzheimer's disease (middle-stage)

Moderate Alzheimer's is typically the longest stage and can last for many years. As the disease progresses, the person with Alzheimer's will require a greater level of care.

You may notice the person with Alzheimer's confusing words, getting frustrated or angry, or acting in unexpected ways, such as refusing to bathe. Damage to nerve cells in the brain can make it difficult to express thoughts and perform routine tasks.

At this point, symptoms will be noticeable to others and may include:

- Forgetfulness of events or about one's own personal history
- Feeling moody or withdrawn, especially in socially or mentally challenging situations
- Being unable to recall their own address or telephone number or the high school or college from which they graduated
- Confusion about where they are or what day it is
- The need for help choosing proper clothing for the season or the occasion
- Trouble controlling bladder and bowels in some individuals

⁹http://www.alz.org/alzheimers_disease_stages_of_alzheimers.asp (accessed March 8, 2018)

- Changes in sleep patterns, such as sleeping during the day and becoming restless at night
- An increased risk of wandering and becoming lost
- Personality and behavioral changes, including suspiciousness and delusions or compulsive, repetitive behavior like hand-wringing or tissue shredding

Severe Alzheimer's disease (late-stage)

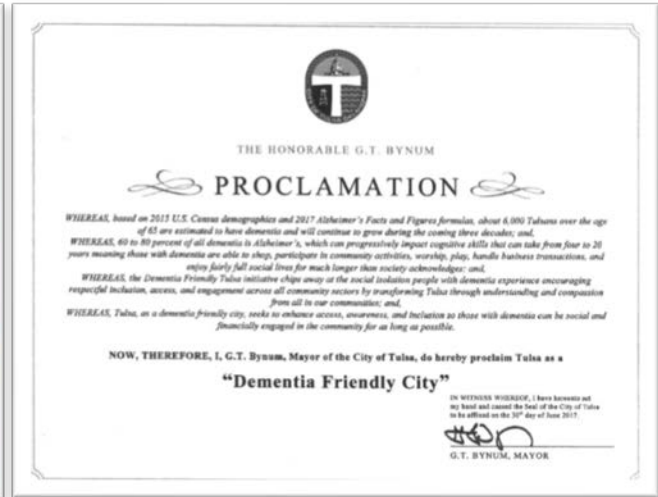
In the final stage of this disease, individuals lose the ability to respond to their environment, to carry on a conversation and, eventually, to control movement. They may still say words or phrases, but communicating pain becomes difficult. As memory and cognitive skills continue to worsen, significant personality changes may take place and individuals need extensive help with daily activities.

At this stage, individuals may:

- Need round-the-clock assistance with daily activities and personal care
- Lose awareness of recent experiences as well as of their surroundings
- Experience changes in physical abilities, including the ability to walk, sit and, eventually, swallow
- Have increasing difficulty communicating
- Become vulnerable to infections, especially pneumonia

HOW DOES DEMENTIA IMPACT TULSA?

Tulsa was designated as a Dementia-Friendly city on June 29, 2017 by Mayor GT Bynum. It was the first city in Oklahoma to join the Dementia-Friendly America Network. A steering committee was formed, and they began the process to create a dementia-friendly city.



“About 6,000 Tulsans over age 65 are estimated to have dementia, based on 2015 U.S. Census demographics and 2017 Alzheimer’s Facts and Figures formulas. Their caregivers – often sandwich-generation family members – are estimated to number 18,000.

The growing number of Baby Boomers in the U.S. – those born between 1946 and 1964 – are prime candidates for dementia. Tulsa expects to see a growth wave in its Boomer generation during the coming three decades. Dementia, however, is not limited to older generations. More than 200,000 people in the U.S. as young as age 30 are diagnosed with Younger Onset Alzheimer’s.

From 60 percent to 80 percent of all dementia is Alzheimer’s, a degenerative and always fatal disease. Yet, Alzheimer’s progressive impact on cognitive skills can take from four to 20 years. That means those with dementia are able to shop, participate in community activities, worship, play, handle business transactions, and enjoy fairly full social lives for much longer than society acknowledges.

The Dementia-Friendly Tulsa initiative chips away at the social isolation people with dementia experience. It encourages respectful inclusion, access, and engagement across all community sectors. It is a means to transform Tulsa through understanding and compassion from all in our community.”¹⁰

Dementia-friendly Tulsa Website

¹⁰Dementia-friendly Tulsa, <http://www.dftulsa.org/about.html> (accessed March 8, 2018)

Definitions

Accessibility: The American’s with Disabilities Act (ADA) definition refers to a site, facility, work environment, service, or program that is easy to approach, enter, operate, participate in, and/or use safely and with dignity by a person with a disability.

Age-friendly Community: Enables people of all ages to actively participate in community activities and treats everyone with respect, regardless of their age.

Aging-in-Place: The Centers for Disease Control and Prevention (CDC) defines aging-in-place as “the ability to live in one’s own home and community safely, independently, and comfortably, regardless of age, income, or ability level.

Dementia: an umbrella term used to describe a decline in memory or brain function that impacts an individual's daily life.

Dementia-friendly: Dementia-friendly communities help people with dementia feel included and supported in the places they work, live and play. A dementia-friendly community focuses on stigma reduction and the inclusion of people with dementia.

Universal Design: Design of products and environments to be usable by all people, to the highest extent possible, without the need for adaptation or specialized design.

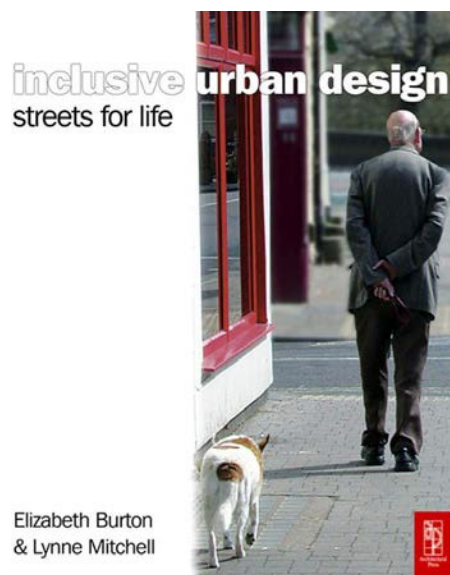
Literature Review

Inclusive Urban Design: Streets for Life by Elizabeth Burton and Lynne Mitchell

The outdoor environment is critical to supporting the needs of people living with dementia. Once someone receives a diagnosis of a dementia related disease, they do not suddenly withdraw from society. It is important that they remain engaged in the community and have the accessibility to do so.

One of the first and most notable studies in the field of creating dementia-friendly environments was done by Professor Elizabeth Burton and Dr. Lynne Mitchell. Both were confounders of the WISE (Wellbeing in Sustainable Environments) research group, formerly at Oxford Brookes University, now at the University of Warwick. Their studies paved the way for others in the field. They co-authored the book *Inclusive Urban Design: Streets for Life*, published in 2006.¹¹ The book was ground breaking and their research has led to many recommendations world-wide for creating dementia-friendly neighborhoods and streets. It was written for those involved in the design and development of urban areas, neighborhoods, streets, and housing. It has been instrumental in my own studies and helping me to better understand the needs of people living with dementia.

The foundation for creating environments that older people and people living with dementia can use effectively is based on the fulfillment of six key design principles: familiarity, legibility, distinctiveness, accessibility, comfort, and safety.



Design Principles



■ Familiarity

■ Legibility

■ Distinctiveness

■ Accessibility

■ Comfort

■ Safety

¹¹ Burton, Elizabeth, and Lynne Mitchell. *Inclusive Urban Design: Streets for Life*. Oxford: Architectural Press, 2006.

FAMILIARITY

It is important that the outdoor environment remain familiar for people with dementia so that they can continue to remain active in the community. Most environments conform to certain design standards that can be anticipated when they are encountered. People with dementia often have difficulty recognizing more modern designs or they misinterpret their usage. Familiarity refers to the extent to which public spaces are recognizable in appearance and the styles of street furniture, building facades, paving, etc. are recognizable based on a lifetime of experiencing similar design.

The environments that someone visited before they were diagnosed with dementia will continue to be the most familiar. Research has shown that people with dementia can be confused by modern design that is not familiar.

The authors explain, “The most important factor here is not just that older people prefer traditional designs because of their familiarity or aesthetic appeal but also that older people with dementia often cannot identify what the modern types actually are and older people without dementia often avoid using more modern features because they fear that they will not understand how to use them.”¹²

Another aspect of familiarity is street design. It is important that change to long-established streets be small-scale and incremental. Large-scale re-development is more likely to cause disorientation, confusion and anxiety in older people, especially those with dementia. It is recommended that there is a hierarchy of familiar types of streets.



Public buildings and main entrances should be clearly visible from the street and in designs that older people can easily recognize.

Architectural features, such as doors and windows, should be designed in a way that assists in making them recognizable.

“...modern buildings often face away from the street so that pedestrians are met by a blank façade with little clue as to what the building is for or how to get into it.”

Inclusive Urban Design: Streets for Life

¹² Burton, Elizabeth, and Lynne Mitchell. *Inclusive Urban Design: Streets for Life*. Oxford: Architectural Press, 2006. 57

LEGIBILITY

Legibility refers to the extent to which streets help older people to understand where they are and to identify which way they need to go. Legible streets have an easy to understand network of routes and junctions with simple, explicit signs and visible, unambiguous features.

When we look at legibility we think about the things that help us find our way from one point to another. Legibility is concerned with wayfinding and orientation. It can help everyone but specifically someone with dementia to create a mental map that assists them in navigation.

Factors of the outdoor environment that help create legibility include street layouts, public and private spaces, signage, and landmarks.

The authors went on accompanied walks with participants in their research group. The group consisted of forty-five ambulant people aged 60 years or over, living at home or in sheltered accommodations and still using the outdoor environment. Twenty of the participants were in mild to moderate stages of dementia.

They found that very few of the participants used maps or written directions because they found them difficult to understand. Instead, many of the participants with and without dementia used mental maps but it was inconclusive if they were accurate. The participants found that clusters of signs were difficult to read because they were too cluttered and complicated. Interestingly, they found that the relatively clear bicycle symbol painted on cycle lanes was not identifiable by those with or without dementia. When symbols are used, they should be as clear and realistic as possible.



Symbols must be as clear and realistic as possible. This is an example of an unclear situation that could cause anxiety and frustration.

*Inclusive Urban Design:
Streets for Life*

The book describes aspects and factors of the outdoor environment that help to create legibility. The most legible street layout for older people, especially those with dementia, are streets laid out on a deformed or irregular grid because:

- they provide a more interesting overall street pattern,
- provides direct and connected routes which are easy to understand,
- gives people a clearer view ahead than streets with 90 degree turns and blind bends created by uniform grids.

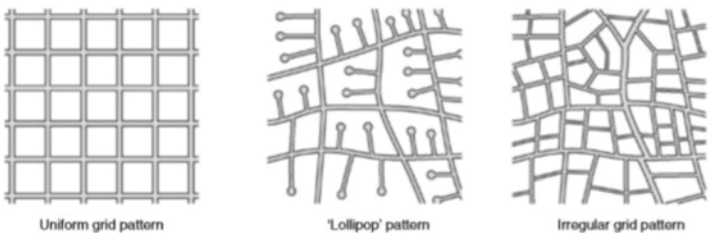
Street blocks should be of varying short lengths to allow for variety. The longer streets should be gently winding to break up the length and to provide slowly emerging views as people walk along. In terms of legibility, buildings facing the street provide a visually interesting street frontage and aid in distinction between public and private spaces. Physical barriers, such as fencing, walls, and hedges, can also help to differentiate public from private spaces.

HOW CAN LEGIBILITY BE ACHIEVED?

ASPECTS AND FACTORS OF THE OUTDOOR ENVIRONMENT THAT HELP TO CREATE LEGIBILITY

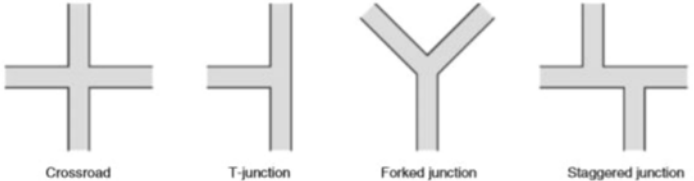
Street Layouts

The most legible street layout for older people, especially those with dementia, are streets laid out on a deformed or irregular grid. The irregular grid creates a more interesting overall street pattern, provides direct, connected routes which are easy to understand and gives people a clearer view ahead than the 90° turns and blind bends created by uniform grids. It also means that forked, staggered and T-junctions can be used, rather than cross-roads,



Uniform grid pattern 'Lollipop' pattern Irregular grid pattern

Figure 5.6 Although the uniform grid provides a pattern of well-connected streets the layout of identical streets and cross-roads can be as confusing as the 'lollipop' pattern. The irregular grid pattern also has small perimeter blocks and connected streets but creates a variety of block and street shapes. (Drawing by Daniel Kozak.)



Crossroad T-junction Forked junction Staggered junction

Figure 5.7 Forked, staggered and T-junctions reduce the number of routes to choose from and provide a focus point at the end of the street. (Drawing by Daniel Kozak.)

The book discusses street layouts and says that the most legible streets are laid out in an irregular grid pattern.

DISTINCTIVENESS

Distinctiveness relates to the extent to which streets give a clear image of where they are, what their uses are and where they lead. Distinctive streets reflect the local character of the area and have a variety of uses, built form, features, colors, and materials that give the streets and buildings their own identity within the overall character of the neighborhood.

The participants in the study were influenced by how interesting or dull a particular route was rather than the quickest route to their destination. The distinctiveness of the route helped the participants maintain concentration. Most of them, particularly those with dementia, chose uncomplicated routes with more variety of land use, building form and architectural features. Streets that are identical to each other in terms of shape and layout or are lined with identical buildings with few distinguishing features can cause anyone to experience disorientation and confusion.

The authors found that those with dementia preferred to visit smaller, more informal or natural green open spaces, such as wooded areas, rather than formal settings, such as botanical or historic gardens. The participants with dementia also tended to prefer parks full of areas of activity, such as tennis courts, children’s play areas, interesting or pleasant features, public art, and greenery.



Distinctive structures catch the eye and help people to identify which way they need to go.

Inclusive Urban Design: Streets for Life

Many of the participants in the mild stage of dementia have the insight to realize that their memory and orientation capabilities are deteriorating and are making a conscious effort to remember environmental wayfinding cues to ensure they are able to continue to go out into their local neighborhoods.

Landmarks and environmental features provide visual distinction. Landmarks are identified as historic buildings and structures, civic buildings, distinctive structures, places of interest and activity, and unusual places, buildings, or usages. Environmental features are defined as aesthetic features, such as fountains, village greens, ponds, attractive front gardens, trees, hanging baskets, and flower tubs, and practical features, like street furniture and bus shelters.

Many of the participants in the mild stage of dementia have the

ACCESSIBILITY

Accessibility refers to the extent to which streets enable older people to reach, enter, use, and walk around places they need or wish to visit, regardless of any physical, sensory, or mental impairment. Accessible streets have local services and facilities, are connected to each other, have wide, flat footways, and ground level signal-controlled pedestrian crossings.

Most of the participants in the research group, those with and without dementia, go out alone and over half of them go out daily. All of them talked about places they have ceased to visit because they no longer feel able to cope with heavy traffic, crowded streets or there is a lack of essential public facilities, such as toilets and seating. In order to make the outdoor spaces accessible, focus must be in creating neighborhoods where the design of buildings, streets, and spaces meet the needs of all users at a human scale rather than a vehicular scale.

A street layout with a number of culs-de sac, is not only confusing in terms of legibility but it also limits everyone's ability to move around on foot. The book recommends that an accessible street layout is one where the streets are physically connected to each other, have clear views along them, and simple junctions.

Any level change on pavement can create barriers for people who are frail, have an unsteady gait, or a visual impairment. Having both steps and ramps is the ideal arrangement. Steps should have clearly marked short, straight runs with a minimum of three and a maximum of twelve steps per run. Risers should be of uniform height. Risers and treads should be in contrasting colors to help people with poor vision and patterns should be avoided because they can cause dizziness.



Ideally, even slight changes in level should have both a ramp and steps.

Inclusive Urban Design: Streets for Life

COMFORT

Comfort allows people to visit places of their choice without physical or mental uneasiness. It makes it possible for everyone to have access to the outdoors regardless of any disability. “Comfortable streets are calm, welcoming and pedestrian-friendly with the services and facilities required by older people and people experiencing temporary or permanent incapacity.”¹³

Comfort is essential because it allows people with dementia to get out of the house and maintain a level of independence which in turn, builds self-esteem and confidence. Many of the participants in the research stated that a lack of seating, shelter, and public toilets limited their activities.

Seating is essential as it allows one to stop and rest along the way. Dementia-friendly designed seating should be recognizable, protected from the elements, and comfortable.



This bench provides comfortable seating however, trashcans should have swing lids to protect against odors, bees and other pests.



This bench is not comfortable due to its modern design. It does not include back, or arm rests and the material is not comfortable. The pavement is not dementia-friendly because of the pattern.



Public toilets should be within walking distance of open spaces. They need to be at ground level, easily recognizable, and within view of passers-by and neighboring buildings. This makes them easy to locate and increases the likelihood of safety since they are within public view.

¹³ Burton, Elizabeth, and Lynne Mitchell. *Inclusive Urban Design: Streets for Life*. Oxford: Architectural Press, 2006. 104

SAFETY

“Safety refers to the extent to which streets enable people to use, enjoy, and move around the outside environment without fear of tripping or falling, being run-over, or being attacked. Safe streets have buildings facing onto them, separate bicycle lanes and wide, well-lit, plain, smooth footways.”¹⁴

Creating a safe environment is important for everyone. It encourages people to get outdoors when they are not afraid or getting hurt due to the physical environment or being harmed by an attacker. As people age, they are more likely to have a decline in their eyesight and a less steady gait. These factors need to be considered with designing things like paving surfaces, street furniture, obstacles along the sidewalks, stairs, ramps, and so much more.



Crumbling sidewalks are particularly hazardous. “Hazards that are potentially dangerous to any user pose even more of a threat to people who are confused and/or experiencing orientation problems.”

Inclusive Urban Design: Streets for Life

The fear of being attacked while out in public is a concern. When buildings, windows and doors face the street, they provide a level of safety because people feel reassured that the occupants can see them and help if they are attacked. Streets with corners greater than 90 degrees and gently winding layouts help people feel safer than streets with blind bends.

¹⁴Burton, Elizabeth, and Lynne Mitchell. *Inclusive Urban Design: Streets for Life*. Oxford: Architectural Press, 2006. 115

Case Studies

Case Study 1: Hogeweyk

In the outskirts of Amsterdam lies a small Dutch village called Hoegweyk¹⁵. By taking the only entrance into the village, you will discover a radical idea that has the potential to revolutionize dementia care worldwide. It is important to include this self-contained “Dementia Village” as a case study because of its significance as an innovative approach to caring for people with dementia. We are already seeing a similar villages spring up in the United States. **Glennner Town Square**¹⁶ will open in San Diego, California this year.

Households

Hogeweyk is a specially designed village with 23 houses for 152 people living with dementia. The residents live in houses that are differentiated by lifestyle. Every Hogeweyk home houses six to eight people with the same lifestyle. This lifestyle can be seen in the decor and layout of the house. Hogeweyk offers seven different design genres: Urban, Goois (upper class), Homey, Christian, Artisan, Indonesian and Cultural.

Examples of Lifestyles:



The Artisan Lifestyle

The residents in this lifestyle are all proud of their trade. They are plumbers, carpenters, etc. The atmosphere is homey and cozy. The layout of the house is solid and traditional. There is every opportunity for residents to help with the cooking. The meals are traditionally Dutch, serving many old-time favorites.



The Christian Lifestyle

Religion is central to this lifestyle. Praying, saying grace and listening to religious music form a central part. Many of the residents visit church services regularly. The Christian lifestyle is restrained. The cooked meals served are simple Dutch dishes.



The Urban Lifestyle

Social interaction is encouraged, and the atmosphere is vibrant. Residents take trips to the zoo, amusement parks, theatre, and swimming pool on a regular basis. Dinner is served in a group atmosphere with the other residents to encourage social interaction.

¹⁵ "Hogeweyk." Hogeweyk. Accessed April 08, 2018. <https://hogeweyk.dementiavillage.com/en/kenniscentrum/>.

¹⁶ Snelling, Shelly. "First U.S. 'Dementia Village' Recreates A Happier Time." Forbes. April 26, 2017. Accessed April 08, 2018. <https://www.forbes.com/sites/nextavenue/2017/04/26/first-u-s-dementia-village-recreates-a-happier-time/#91a337174332>.

The residents manage their own households together with a team of staff members. By all appearances, the residents continue to live in a community that mirrors a something like the neighborhoods and communities they were accustomed to before coming to Hogeweyk.

Public Spaces

Daily grocery shopping can be done in the Hogeweyk Supermarket. The village has streets, squares, gardens and a park where the residents can safely roam free. Just like any other village, Hogeweyk offers a selection of facilities, like a restaurant, bar, and a theatre. These facilities can be used by Hogeweyk residents AND residents from the surrounding neighborhoods. Everybody is welcome to come in! All retail shops are open to the public as well as to patients. This concept helps fund the project and increases the “real world” quotient of the facility.



Photograph: KopArt, Amstelveen

Public Spaces are a complete experience which is appropriate for the collective memory of the residents. Hogeweyk’s design makes it possible for the residents living with dementia to roam freely throughout the complex. The residents can go outside and explore the community environment while still remaining inside the protected environment.

The Hogeweyk plan is diverse and contains many outdoor spaces. All the spaces have a different purpose. The theatre square is highly suitable for street theatre. Along the boulevard, there is retail shopping and a center for physical therapy. The exchange of money can be an



An outdoor chess board provides entertainment and encourages socialization.

Photo Credit: Hans Erkelens

issue for people with dementia, so currency is completely taken out of the picture at Hogeweyk. The residents shop and enjoy all activities without having to exchange money. The green areas stimulate the wellbeing of the residents. Hogeweyk has several of parks and gardens for the residents to enjoy. There is even a hair salon in the village.

Neighbors from the surrounding neighborhood get a glimpse into the village. This also works to give the residents a view into the community outside of Hogeweyk.



Photographs: Madeleine Sars, Eindhoven

Case Study 2: Corona, California

Corona, California is located about 45 miles southeast of Los Angeles. It is about 39 square miles and has a population just over 160,000 people. It is an ethnically diverse community and the median age is 34 years old. It is part of the Purple City Alliance, an initiative to create dementia-friendly cities around the United States.

Corona is presented as a case study because I felt like their residential development design guidelines seem to have a natural fit with many recommendations for creating dementia-friendly neighborhoods. Their guidelines were not established to be dementia-friendly, but they are worth studying as Tulsa and other cities begin planning for an aging population.



People with dementia may have difficulty recognizing familiar surroundings but the task becomes increasingly difficult when neighborhoods plan for similarity instead of individuality. Corona developed residential guidelines that encourage individuality which in turn, creates neighborhoods that are more distinctive.

“An important goal of the single-family site planning guidelines is to create functional and visual variety along local streets. It is the intent of the guidelines to discourage subdivisions that propose identical homes side by side, uninterrupted linear streets and similar front, side and rear yard setbacks.”

Residential Development Design Guidelines – page 6

The following are excerpts from the residential guidelines from Corona:

4.1 SINGLE FAMILY SITE DESIGN:

VARIED FRONT SETBACKS

The setbacks of structures shall comply with the appropriate zoning regulation where the structure is located; however, strict adherence to the minimum required front setback for all homes within a tract is not recommended. **Placement of homes and garages at varying distances from a street creates different patterns of visible open space. As a result, front yard setbacks shall be varied to create a different and unique streetscape.**

Homes should be designed to have varying entry locations with front doors designed to generally face the street and articulation of mass to provide a more attractive street scene. **In addition, the incorporation of courtyards and porches is encouraged to achieve variety in the streetscape.**

VARIED GARAGE PLACEMENT AND ORIENTATION

When lot size permits, **the orientation of a garage at the front of a house shall be varied so that it can be entered from the front, side or at an angle. Garages can also vary in size, be detached or connected to the home by a breezeway.** Garages are also encouraged to be located further back toward the rear yard area of a lot to accommodate a more traditional design.

VARIED SIDE YARD SETBACKS

Distances between adjoining homes, or between homes and fences, shall be varied when possible **to provide for differing types of yards and unique private patio areas.**

LOT ORIENTATION

On curves or at corners, lots can often be oriented in a different direction than those at midblock. In these cases, some **lots can be non-rectangular and oriented at varying angles toward a street.**

VARIED LOT WIDTHS

1. Making some lots wider and some narrower than the average can provide varying amounts of open area between structures. **Different sized lots allow for the placement of varying shapes and sizes of homes.** On narrow lots, a variation of only 3 or 4 feet can make a perceptible difference and, therefore, **rows of lots with the same widths shall be avoided.**

2. Single-family residential **subdivisions should incorporate lots of varying widths and dimensions in order to create diversity in the street scene,** to provide varying side-yard separation between units for enhanced privacy and openness, allow sufficient width for single-story product, to accommodate innovative product designs, and to avoid repetitious product placement.

STREET LAYOUT

While straight streets are the most efficient, occasional curves can provide changing street scenes. **Gradual curves interrupt line-of-sight thereby creating visual variety.** The utilization of curvilinear streets is necessary to breakup monotonous streetscapes. **Limiting the length of straight streets aids in providing a more interesting street scape.** It is required that developers incorporate the natural grade of a property into the site design and consider property configuration in order to add interest and variation in a street scene.

Corona, California

These design guidelines create neighborhoods that have variety and add interest. It is common for someone with dementia to get lost or feel confused, so the distinctiveness of the neighborhood is one way of making the built environment more dementia-friendly.



Image from Google Maps

This image of Corona highlights many of the residential guidelines: varied front set-backs, lot widths, and street layout. The neighborhood has sidewalks, a linear park with a walking trail, and a sidewalk connecting culs-de-sac.

Investigation

Analysis and Interventions of Dementia-friendly Outdoor Spaces

Dementia-friendly Tulsa

Recommendations for Designing Inclusive Outdoor Spaces

Recommendations are based on Six Key Design Principles:

1. **Familiarity** – refers to the extent to which public spaces are recognizable in appearance and the styles of street furniture, building facades, paving, etc. are recognizable based on a lifetime of experiencing similar design.
2. **Legibility** – refers to the extent to which public spaces can be decoded. It provides orientation cues to help identify ones' location within the space and then guides direction at key decision points.
3. **Distinctiveness** – relates to the extent to which buildings, streets, public spaces, and other architectural features appear visually different.
4. **Accessibility** – refers to the extent to which outdoor environments enable people to reach, enter, use, and walk around the places they visit, regardless of any physical, sensory or mental impairment they may have.
5. **Comfort** – refers to the extent to which outdoor environments enable people to visit places of their choice without physical or mental distress. It allows people to get out of the house and participate in the community. An example of physical comfort is the provision of public restrooms at all public locations.
6. **Safety** – refers to the extent to which outdoor environments enable people to use, enjoy, and move around without fear of tripping, falling, being run-over, or being attacked.

FAMILIARITY

- Provide comfortable seating that looks like seating, such as wooden benches instead of benches in abstract designs.
- Building design should reflect purpose. Look for ways to explain what a person does when they enter the building for example, putting fruit and vegetable bins near the entrance of a grocery store or installing a bell tower on a church.



This park bench is a familiar design and it provides comfort because it provides back and arm rests.



This bench is not a familiar design. Do you wipe your feet on it or sit on it?



This building will be recognizable as a church to most people because of its familiar design.



The purpose of this building is not easy to recognize. It is an architectural roofing and sheet metal shop.



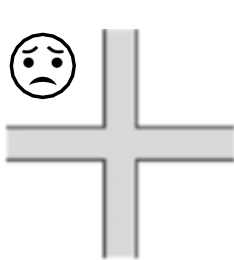
This bus stop is familiar to Tulsans and it provides comfort with shade and seating.



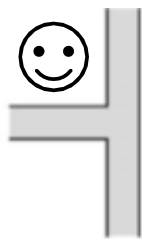
The purpose of this building is not easy to recognize, and the entry is hidden.

LEGIBILITY

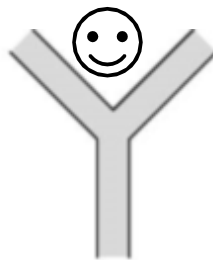
- Small blocks laid out on an irregular grid with minimal crossroads are recommended.
- Block lengths between 200 – 400 feet are the ideal length
- Staggered, forked, and T-junctions are preferred over crossroads
- The irregular grid pattern is recommended. It creates a more interesting street pattern, provides direct, connected routes which are easy to understand and gives people a clearer view ahead than the 90° turns and blind bends created by uniform grids.
- Install interesting/distinctive features at junctions. This will make the intersection more legible and aid in wayfinding at key decision points. These features can be things like street furniture, public art, or unique landscaping.



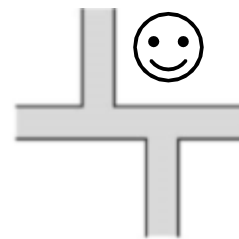
Crossroad



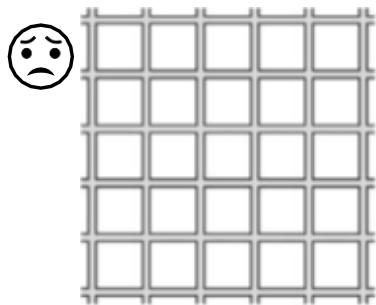
T-junction



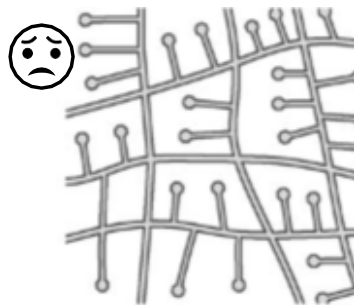
Forked Junction



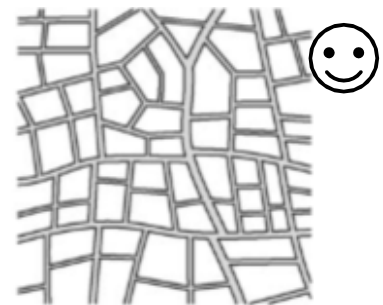
Staggered Junction



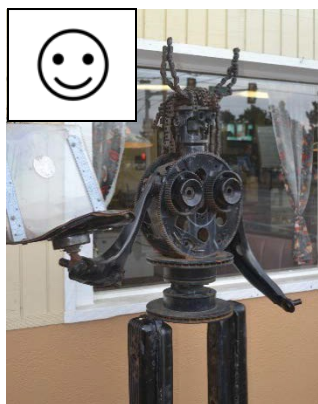
Uniform Grid Pattern



Lollipop Pattern



Irregular Grid Pattern



Public Art is distinctive.



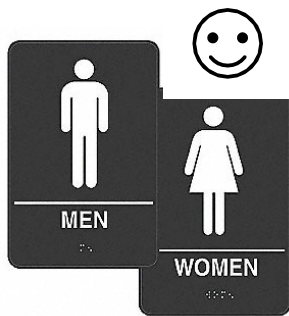
Landscaping can make an intersection legible.



Unique design feature discovered downtown...interesting although not practical on public property but it could be helpful on private property to identify key destinations.

LEGIBILITY (CONTINUED)

- Provide clear signage that is easy to interpret.
 - Keep signage to a minimum but it needs to be provided at key decision points.
 - Locational signs for primary services should be mounted perpendicular to the wall.
 - Realistic graphics are easier to comprehend than words alone.
 - Provide color contrast between words and background, preferably dark lettering on a light background.
 - Ensure that entry and exit signs are clear and obvious.
 - Sign lighting should be non-glare and non-reflective.
 - Use clear, large signage for toilets and other public spaces.



Traditional bathroom signs are preferred. In addition, all public restrooms should provide unisex stalls so that opposite sex caregivers can assist if needed.

Non-traditional bathroom signs can be confusing to everyone and should be avoided. On a positive note, the door handle is easy to find and operate. Why would anyone be dropping off mail in the bathroom? This is confusing.



This is the traditional bike path sign used in Tulsa. It is familiar and provides a realistic image.



This bike path sign is not easy to interpret. To make it easier to understand, do not put the images side-by-side.



It is very difficult to interpret this sign. By using a realistic picture or providing arrows only, this sign could be much easier for everyone to understand.



DISTINCTIVENESS

- Preserve landmarks and other architectural features that are distinct to your neighborhood.
- Encourage development that is unique. Each building should look distinct and be recognizable by its difference from the neighboring properties.
- Cultivate new landmarks that are unique.



Murals are distinct and should be encouraged but not to the extent that they are on every street corner.



The penguins we see around Tulsa are distinct.



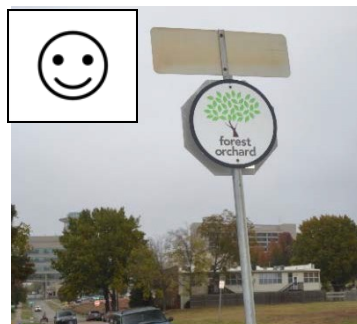
The Meadow Gold Landmark is easily identifiable.



It is easy to distinguish the traditional house from the modern house. In this instance, modern design contributes to legibility.



Neighborhoods that restrict individuality should be discouraged.



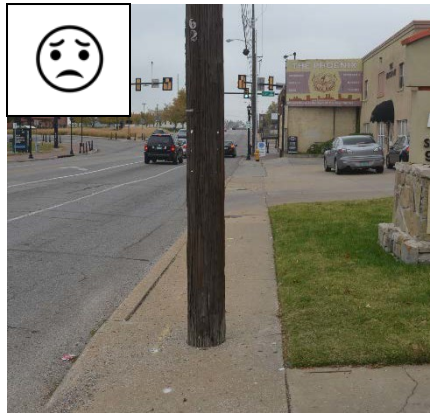
The neighborhood signs that are mounted on the back of stop signs are helpful to everyone.



Why not? This yarn bomb is distinct and could also be used as a therapeutic tool to connect generations through crochet.

ACCESSIBILITY

- Sidewalks should be smooth, flat, wide, and non-slip.
- Walking paths should be separate from bike lanes.
- Ensure that sidewalks are wide enough for two users to walk or use wheelchairs that are side-by-side.
- Public transportation stops should be accessible from all directions.
- Well-marked pedestrian crossings with an audible pedestrian signal should be installed at EVERY bus stop.
- Ensure that sidewalks are free of clutter and obstacles including utility poles.
- When level changes are unavoidable:
 - provide gentle slopes rather than steps for slight level changes
 - provide both steps and ramps for significant level changes



Examples like these can be found throughout Tulsa. Accessibility needs to be a priority so that change can happen.



This sidewalk is wide enough for two wheelchairs and it has a smooth surface. The strip of grass and trees provides a buffer zone from traffic.



Give users a choice by providing both steps and ramps.

COMFORT

- Provide buffer zones such as trees and landscaping between busy roads and sidewalks.
- Public seating should be provided along walking paths and made of soft materials such as wood. Benches in a traditional design with both back and arm rests are preferable.
- Bus shelters should be enclosed with seating and transparent walls.
- Install and maintain public restrooms at all public parks and gathering places.
- Provide acoustic barriers, such as planting and fencing, to reduce background noise.



These benches are accessible and located in a shady area which provides comfort.



This bench is made in a modern design that is not easy to recognize as a bench. It does not have arm or back rests.



This bus shelter is comfortable and accessible.



This bus shelter at the Tulsa Health Department offers some comfort but it does not offer easy access to the health department.

SAFETY

- Ensure that ground level changes are clearly marked and well-lit, with handrails and non-slip, non-glare surfaces.
- Pedestrian crossings should be well marked and equipped with audible and visual signals.
- Mid-block crossings should be well marked.
- Avoid bright lights and deep shadows.
- Walking paths must be free of clutter and the surface needs to be smooth.
- Avoid patterns on walkways.



Ensure that all crosswalks are well marked, and pedestrians are visible in the crosswalk both day and night.



Sidewalks should be accessible to everyone.



Patterns are not recommended for inclusive design.

Analysis and Interventions of Focus Neighborhood

The neighborhood and its surrounding public spaces are especially important to people living with dementia. They contribute to one's ability to remain independent in a familiar environment while staying engaged in outdoor activities. They can also provide the means for people diagnosed with dementia to stay connected in their community and participate in social activities.

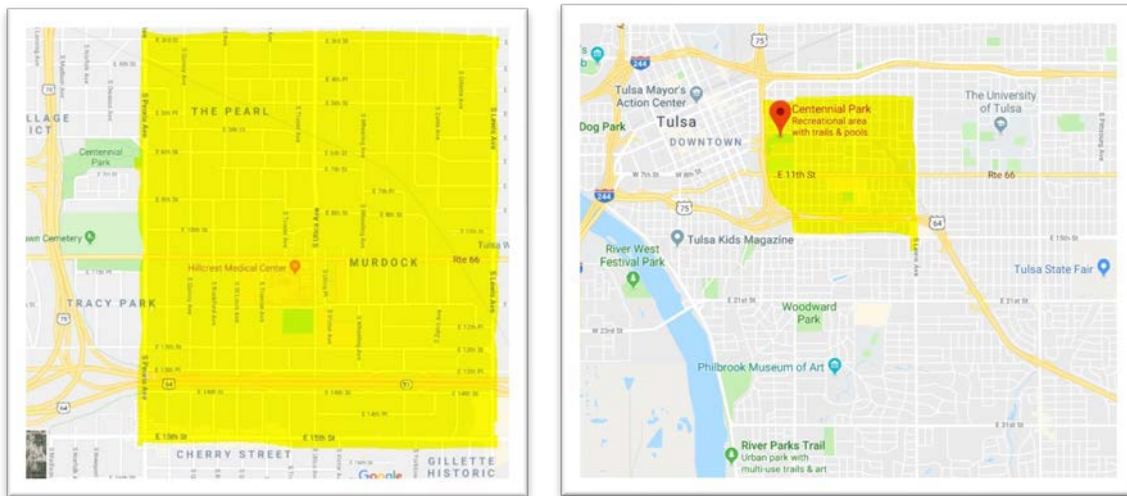
Design can help provide a safe and comfortable outdoor environment in which people with dementia can maintain a good quality of life and a sense of independence. For this study, I selected an area of Tulsa to investigate more thoroughly and then identify changes that could make the area, focus neighborhood, more dementia-friendly.

Recommendations are based on Six Key Design Principles:

1. **Familiarity** – refers to the extent to which public spaces are recognizable in appearance and the styles of street furniture, building facades, paving, etc. are recognizable based on a lifetime of experiencing similar design.
2. **Legibility** – refers to the extent to which public spaces can be decoded. It provides orientation cues to help identify ones' location within the space and then guides direction at key decision points.
3. **Distinctiveness** – relates to the extent to which buildings, streets, public spaces, and other architectural features appear visually different.
4. **Accessibility** – refers to the extent to which outdoor environments enable people to reach, enter, use, and walk around the places they visit, regardless of any physical, sensory or mental impairment they may have.
5. **Comfort** – refers to the extent to which outdoor environments enable people to visit places of their choice without physical or mental distress. It allows people to get out of the house and participate in the community. An example of physical comfort is the provision of public restrooms at all public locations.
6. **Safety** – refers to the extent to which outdoor environments enable people to use, enjoy, and move around without fear of tripping, falling, being run-over, or being attacked.

Focus Neighborhood

When designing for dementia, we are also designing spaces that are more accessible to everyone. Due to the nature of dementia, driving a car may not be possible as symptoms progress so many people choose to travel by foot. Many people diagnosed with dementia live at home and not in care facilities. They may or may not have a caregiver especially in the early stages. The ability to stay independent and connected to society is an important factor to wellbeing. People do not stop living once they get a diagnosis. The recommendations for creating a dementia-friendly Tulsa are designed give as much autonomy as possible to the person with dementia regardless of whether they are assisted by a caregiver or not.



General Analysis

- The focus neighborhood is a typical historic Tulsa neighborhood that is laid out in a uniform grid pattern for the most part.
- Many houses were built between 1910 and 1940.
- Historic Route 66 crosses the neighborhood on 11th Street.
- The southern part of the neighborhood was divided when Highway 51, the Broken Arrow Expressway, was constructed in the 1960's.
- There are three parks located near or in the area, Benedict Park, Tracy Park, and Centennial Park.
- The Mid-Land Valley Trail connects the neighborhood to the Arkansas River and downtown Tulsa.
- Hillcrest Hospital and all its medical facilities are located within the plan area.
- Tulsa Health Department is located at the northern edge of the area.
- There are many sidewalks in the neighborhood although they are not all connected maintained or accessible for everyone.

- Cherry Street, East 15th Street, is a hub of activity and has lots of restaurants and a Farmer’s Market during the warmer months.
- There is not a grocery store in the neighborhood.
- Bus transportation is available, and some stations have covered shelters.

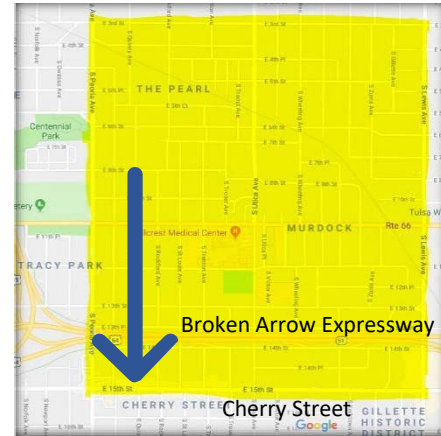


Photographs of Focus Neighborhood

Problem - How can residents access locations south of the expressway?

The most abundant choices of restaurants and retail shopping are located along Cherry Street. This is also where the Farmer's Market is held on Sundays from April until October. The problem is that Cherry Street, also known as 15th Street, is not easily accessible by foot.

Dementia-friendly design should be familiar, legible, distinctive, ACCESSIBLE, comfortable, and SAFE.



Analysis: St. Louis Avenue & Broken Arrow Expressway

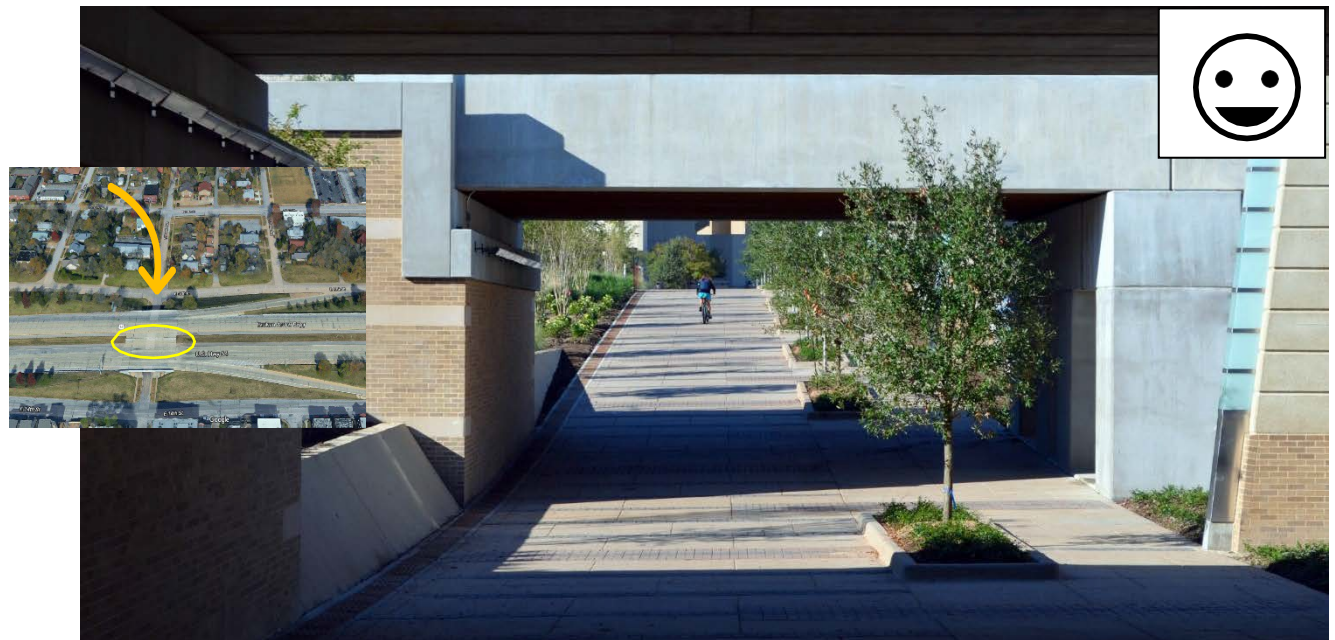
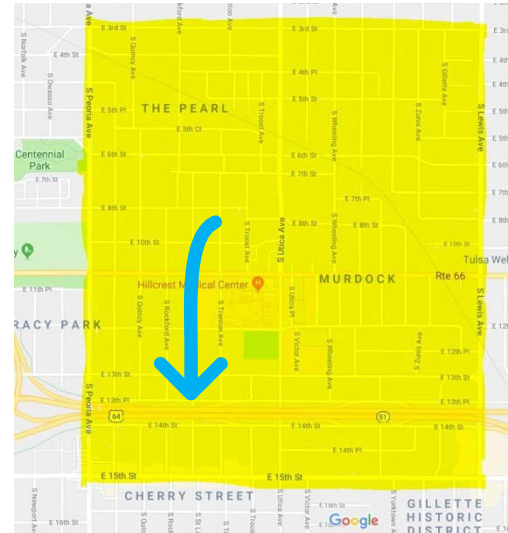
This is the underpass on St. Louis Avenue that can be used to access Cherry Street from areas north of the expressway. Notice the lack of sidewalks leading to the underpass.



This picture is taken looking north under the bridge. The darkness and lack of activity make it appear unsafe.

Recommendations: St. Louis Avenue & Broken Arrow Expressway

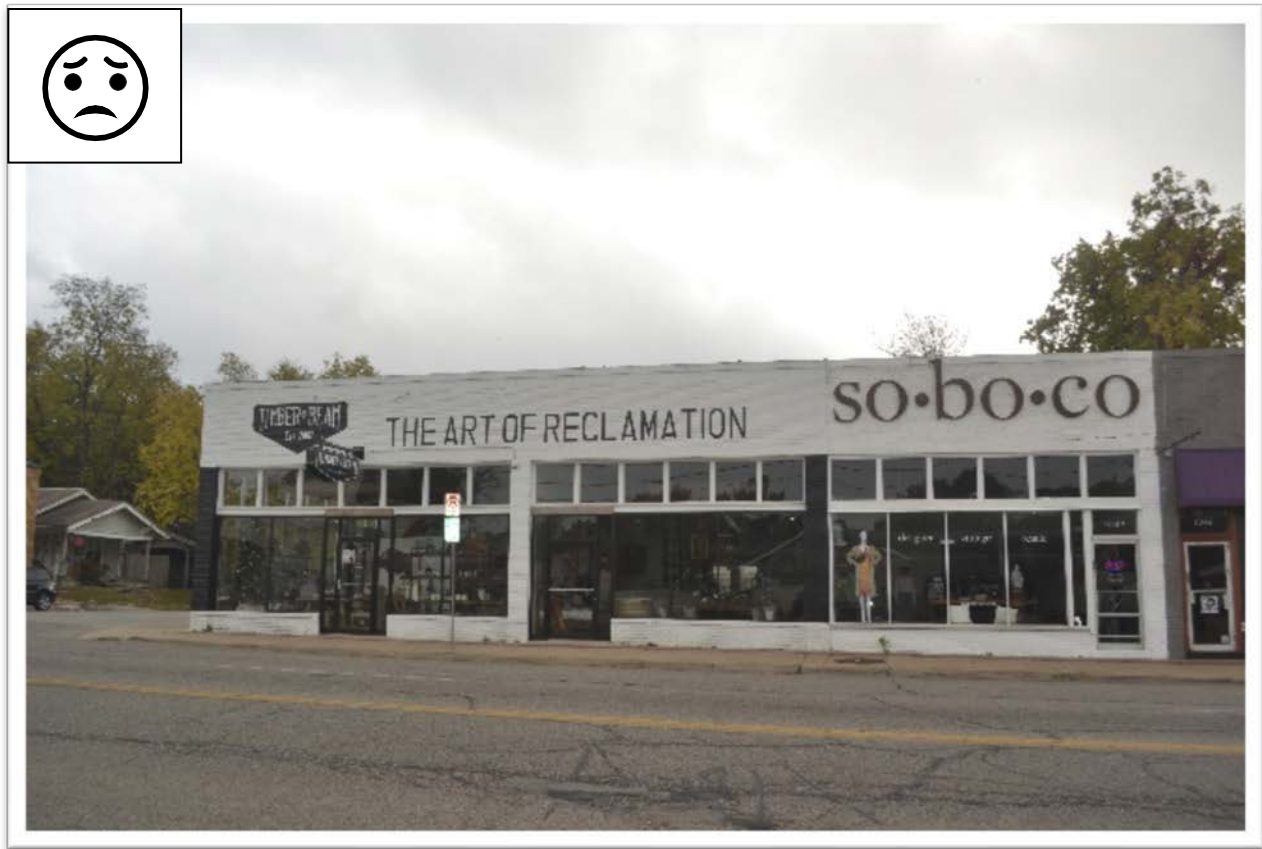
- Increase sunlight by redesigning the bridge and opening the center between lanes.
- Close St. Louis Avenue to through traffic from East 13th Street to East 14th Street (under the bridge) and create a crossing for cyclists and pedestrians only.
- Create a walking path that is separated from the bike path with a tree buffer and landscaping.
- Construct accessible sidewalks throughout the neighborhood. This would make the area more walkable for everyone.
- Install lighting under the bridge.



By closing off automobile traffic, the passageway under the bridge can safely connect pedestrians north and south of the Broken Arrow Expressway.

Photograph: Google Images

Analysis: Retail Strip Building



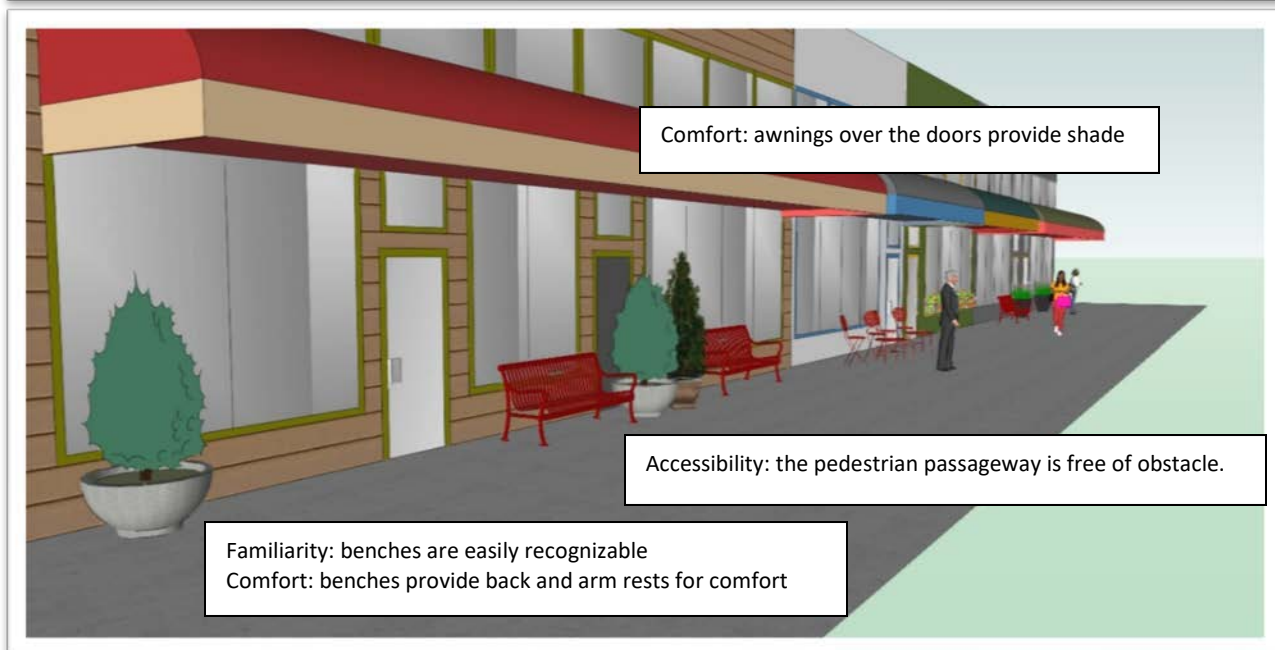
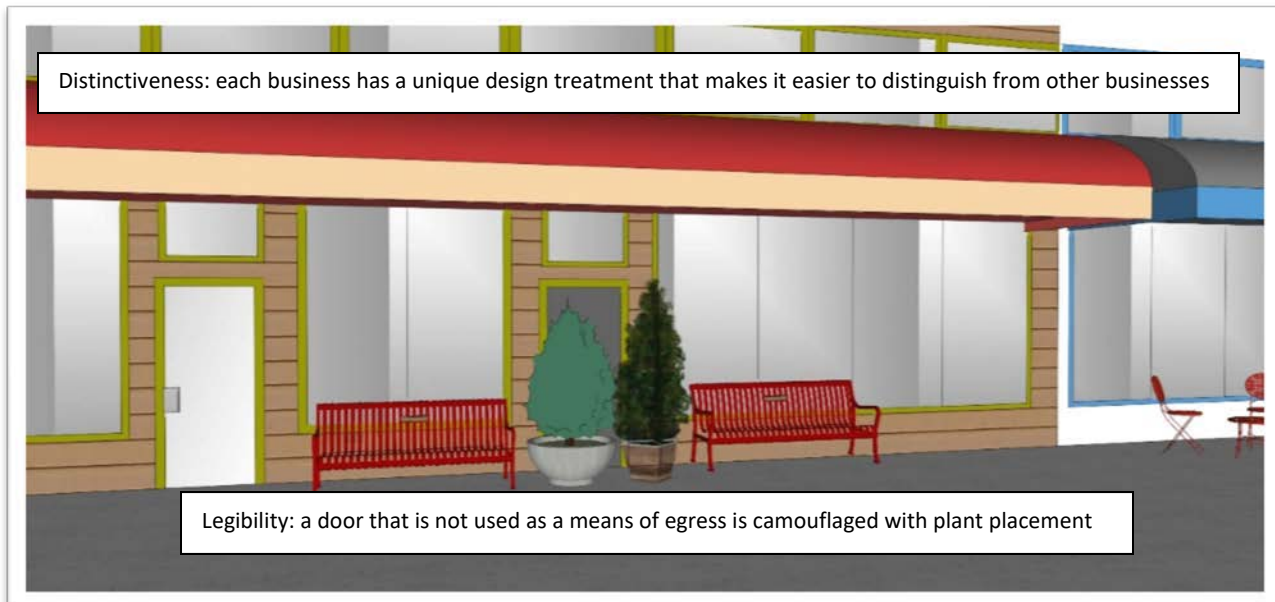
This building is a combination of retail businesses located in a shared building and divided by tenant walls. The building could easily be updated to give it a dementia-friendly design. Right now, it is difficult to tell where one business ends and the next one begins. The entrances are not well marked and there is a locked door that is not operable but appears to be an entrance into the building which causes confusion.

This door is not utilized or used as a means of egress.

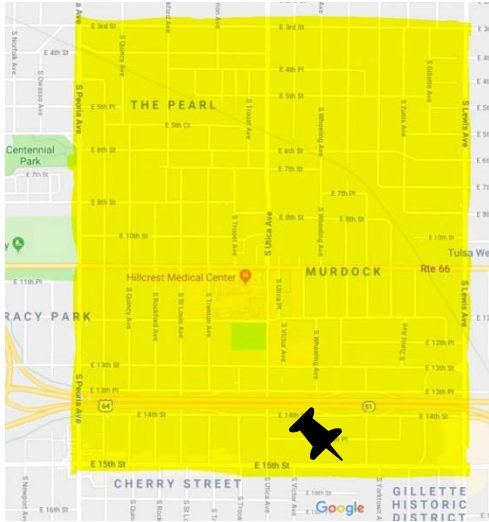


Recommendations: Retail Strip Building

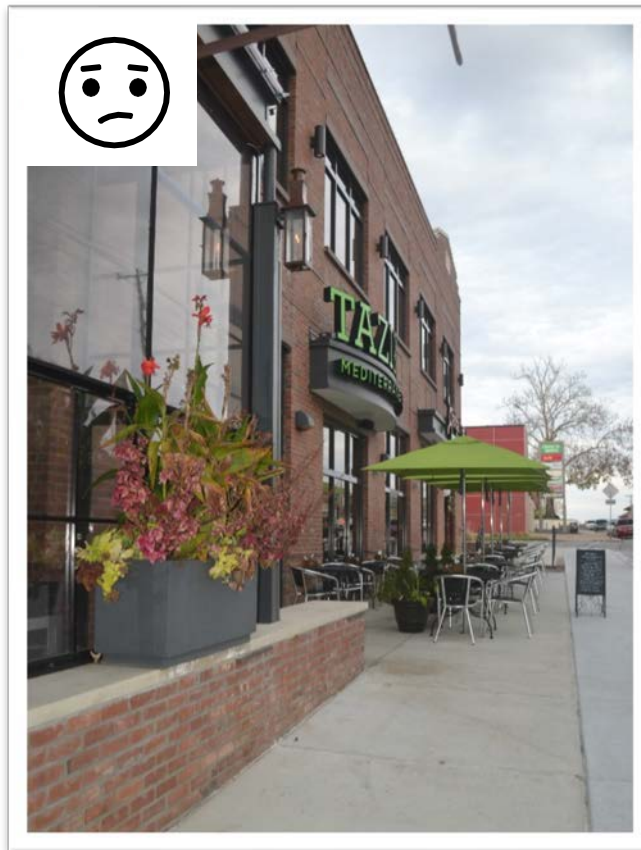
- Visually create separate spaces using a variety of façade treatments to make each business **distinct** and recognizable.
- Install benches in a traditional design.
- Aid **accessibility** by making doors easier to identify and operate.
- Provide **comfort** through seating and shade structures Provide **safety** by eliminating uneven surfaces and clutter on the sidewalks.



Analysis: Restaurant



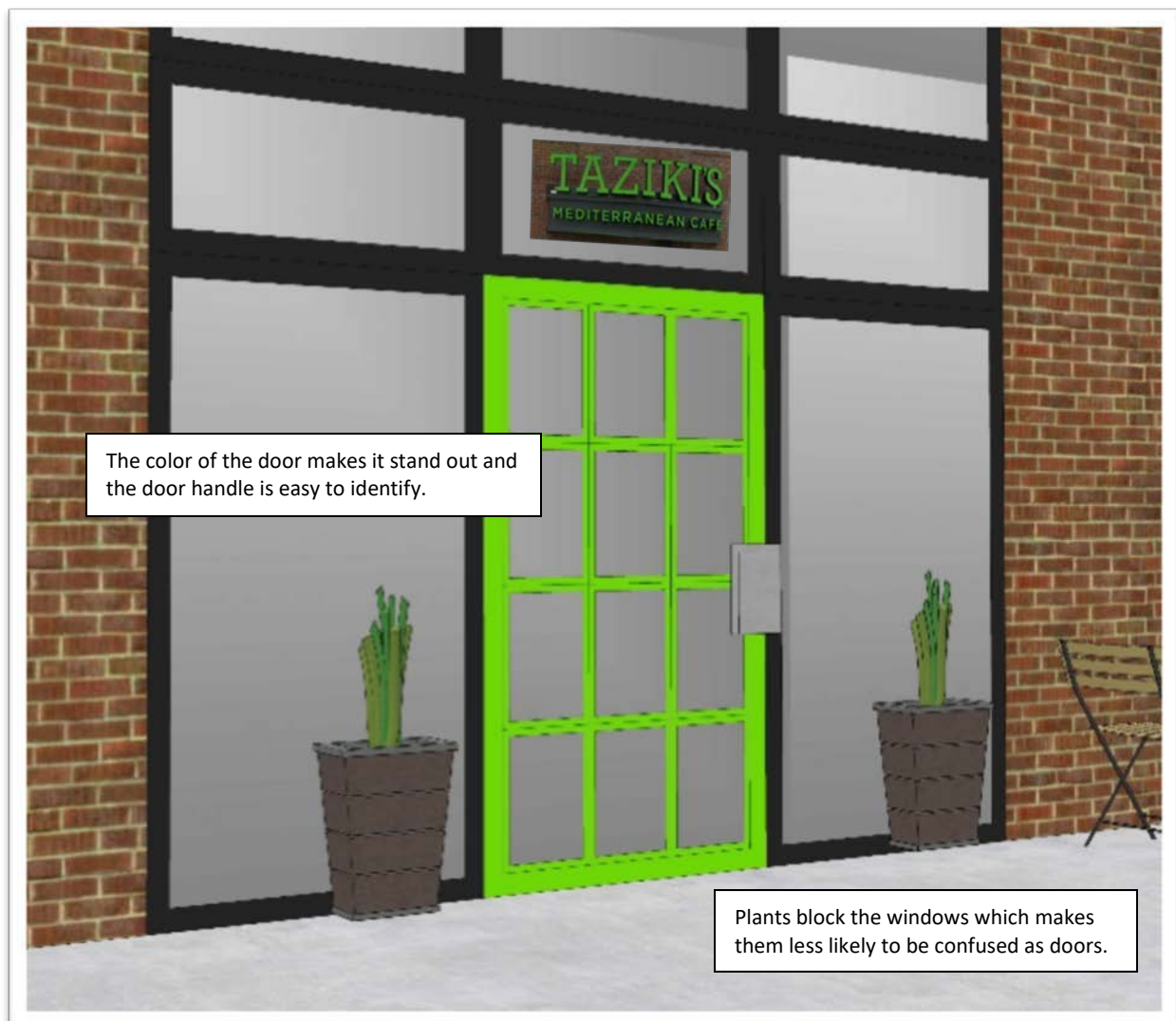
This Tulsa restaurant already has some great design features for creating a dementia-friendly space. It has good lighting which provides **safety** and outdoor seating which provides **comfort**. The name of the restaurant is directly above the door which makes the entrance easy to locate from a distance. The most significant issue with this building is the actual design of the entrance. It is unclear how to enter the building because it is not easy to distinguish the door from the windows. There is not any visual to let someone know that this is a restaurant or what type of food they serve. The sandwich board in the middle of the sidewalk blocks the path and could be a tripping hazard.



Taziki's Mediterranean Café on Cherry Street

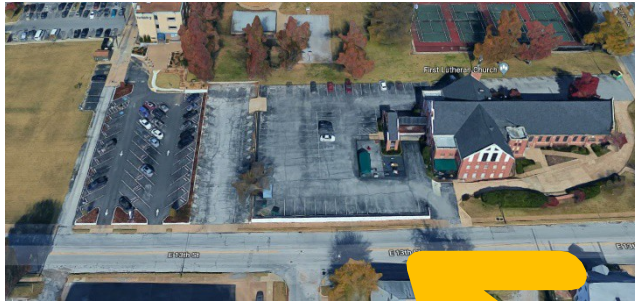
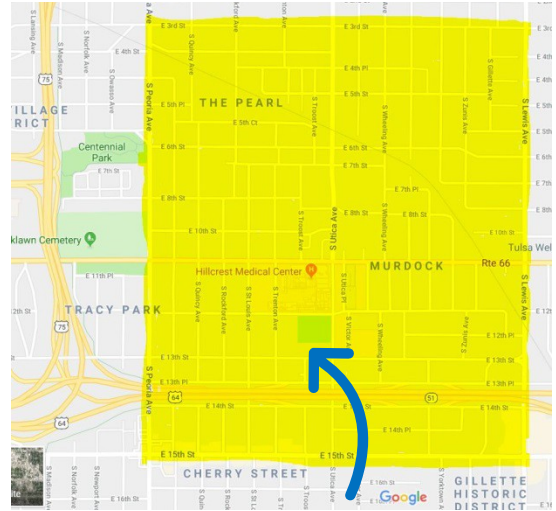
Recommendations: Restaurant

- The door needs to stand out from the windows so it clearly recognizable. For an even better fix, move the muttons from the door to the windows.
- Door handle should be easy to locate and operate. The large door handle is easy to locate and aids in **accessibility**.
- Putting plants in front of the windows makes them less likely to be confused as doors.
- The sandwich board should be removed from the sidewalk.



Analysis: Benedict Park

Benedict Park is City Park located across the street from Hillcrest Hospital. It could be a good place to gather if it had better accessibility and provided more amenities. The public restroom was closed during my site visit in the middle of the day. The park needs to be cleaned up and maintained.



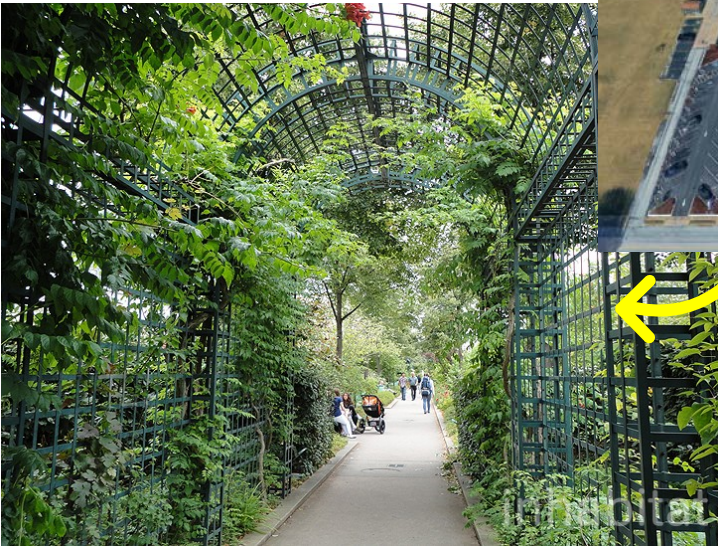
Currently, there is not an entrance to the park from East 13th Street.



Photographs of Benedict Park

Recommendations: Benedict Park

- Create a connection from E. 13th Street into the park.
- Replace existing benches with benches in a more comfortable and traditional style.
- Provide well maintained public restrooms and water fountains.
- Install an accessible senior playground. Provide instructions on signs that have legible direction and include visual cues.
- Ensure that the park is well lit at night.
- Crosswalks with audible signals should be installed at intersections near the park.
- Sidewalks need to connect the park to the surrounding neighborhood.
- A safe route to the park must reflect various levels of mobility.



Create a clear entry into the park from East 13th Street by removing a parking lot and replacing it with a well landscaped sidewalk.



Wooden benches with back and arm rests provide comfort.



Public restrooms should be well maintained and available at all parks and along the Tulsa Trail System.

Implementation

Focus Neighborhood - Implementation

These recommendations propose the means for creating outdoor spaces in Tulsa that are dementia-friendly. Recommendations are based on the focus neighborhood in this research project, but they will be beneficial for creating additional dementia-friendly spaces.

Priority 1: Streets and Public Buildings

Adopt Universal Design guidelines to improve the usability of buildings, outdoor spaces, and connectivity for everyone regardless of their intellectual, functional and sensory abilities. A physical environment that supports the needs of people living with dementia allows them to continue to be engaged and active in the community.

Goal 1 – Improve connections for pedestrian traffic through neighborhoods to improve walkability to nearby shopping, restaurants, medical facilities, and parks.

(Key Design Principles: #4 – Accessibility and #6 - Safety)

1.1 Work with City of Tulsa Traffic and Engineering services to ensure that sidewalks are installed and maintained throughout the focus neighborhood and that they connect to outside development including retail and restaurants along East 6th Street, East 15th Street, Centennial Park, Benedict Park, and Hillcrest Hospital. Seek funding through the Capital Improvements Plan.

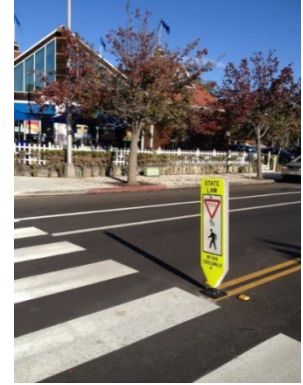
1.2 Connect the focus neighborhood to the Midland Valley Trail by installing signalized



Looking south at the intersection of South Peoria Avenue and East 13th Street.

crosswalks with audio cues at South Peoria Avenue and East 13th Street. Seek funding through a grant or the Capital Improvement Plan.

1.3 Create a pedestrian route to connect areas north and south of the Broken Arrow Expressway by closing St. Louis Avenue between East 13th Street and East 14th Street to automobile traffic and developing a safe pedestrian crossing. The pedestrian crossing should include landscaping, benches, and water fountains to give pedestrians a place to rest.



1.4 Work with ODOT to enhance pedestrian crossings at busy roadways. Place well-marked signalized pedestrian crossings with audible cues at all major intersections. Midblock crossings should be well-marked and laws regarding pedestrian right-of-way should be enforced.

Goal 2 – Ensure that signs used for wayfinding are clear and easy to understand.

(Key Design Principles: #1 – Familiarity and #2 - Legibility)

21 Identify public restrooms with signage that is easy to understand. Signs with both graphics and words are easiest to comprehend.



22 Work with The Arts Commission of the City of Tulsa to ensure that eligible neighborhoods have a Neighborhood Sign installed on the back of their stop sign along arterial streets. Visit this website for more information:



<https://www.cityoftulsa.org/media/1226/artscommissionsigndesignbrochure4-2006pdf.pdf>

23 The signage used to identify businesses should be easy to locate on the building. Contrasting colors are easier to read and signs that also include realistic graphics are preferred.

Goal 3 – Be proactive in providing benches along residential and commercial settings.

(Key Design Principles: #4 – Accessibility and #5 - Comfort)

3.1 Work with public and private agencies to provide comfortable and sturdy seating at more locations throughout the focus area as well as Tulsa as a whole. Installing benches and having landscaped areas with shade allows everyone an opportunity to rest and ultimately makes our neighborhoods and city more walkable. Amend the Subdivision Regulations in the Tulsa Zoning Code to require “comfort” areas in new neighborhoods.

3.2 Initiate an “Adopt a Bench” program in Tulsa. Private donations are used to pay for the bench, installation costs, and the maintenance fees. The bench would then have a personalized plaque with either the donor’s name or the recipient that the bench was purchased in honor of attached to it.



A SUMMARY OF THE CAPITAL BUDGET AND FIVE-YEAR CAPITAL PLAN – The following is from the five-year capital Improvements Plan 2015 – 2019.

Facilities \$12.0 million: ADA improvements at public facilities are top priority. Additionally, sources of maintenance capital need to be identified as an inventory backlog of over \$100 million in roofing and facility maintenance needs exists.

Priority 2: Assist Private Businesses become Dementia-Friendly

To create inclusive spaces, there must be a focus to educate all sectors of the community about the characteristics of dementia-friendly design.

Goal 4 – Support design that is dementia-friendly at sites with public access such as restaurants, retail businesses, banks, and medical facilities.

(Key Design Principles: #1 – Familiarity, #2 – Legibility, #3 – Distinctiveness, #4 – Accessibility, and #5 - Safety)

4.1 Make commercial businesses aware of their role in creating a dementia-friendly city. This can be done through a media campaign and educational opportunities involving public and private agencies, aging and dementia professionals, older adults, people with

dementia, care partners, and the leadership of the Dementia-friendly Tulsa Steering Committee.

4.2 Commercial businesses should be required to install traditional style benches at every new development site. They would not receive a building permit without them. Amend the Landscaping Ordinance in the Tulsa Zoning Guide to include required installation of benches in new developments.

4.3 The pedestrian zone of the sidewalk should be clear of all obstacles.

Priority 3: Public Transportation

It is important to have transportation options to allow individuals with dementia, with or without caregivers, to have inclusive access to the community. Using public transportation is often the only available option for transportation and it can help an individual with dementia continue to be an active participant in society.

Goal 5 – Create awareness of the role public transportation plays in making Tulsa dementia-friendly

(Key Design Principles: #4 – Accessibility and #6 - Safety)

5.1 Work with Tulsa Transit and Dementia-friendly Tulsa Steering Committee to provide training to public transportation drivers so that they are aware of the symptoms of dementia and how to handle potential situations that could arise.

5.2 Tulsa Transit is currently conducting a study which seeks to make the transit system more user-friendly and easier to understand. Collaborate with Tulsa Transit in this study.

Goal 6 – Ensure that everyone has access to bus transportation by providing appropriate infrastructure

(Key Design Principle: #4 – Accessibility)

6.1 Work with the City of Tulsa to ensure complete access to any new or existing transit facility via sidewalks and other pedestrian connections within site.

6.2 Work with Tulsa Transit to install new or improve existing bus transit stops with protected shelters that provide seating, scheduling information, and pedestrian connections to public sidewalks and nearby land uses.



6.3 Work with City of Tulsa Traffic Department to install well-marked crosswalks near all bus stops to assist with pedestrian crossing.

6.3 Seek local and federal funding opportunities to improve public transportation for older and disabled citizens.

A SUMMARY OF THE CAPITAL BUDGET AND FIVE-YEAR CAPITAL PLAN – The following is from the five-year capital Improvements Plan 2015 – 2019.

Metropolitan Tulsa Transit Authority Projects (MTTA) \$1.6 million: MTTA’s highest priorities are the continued replacement of its fleet, the construction of additional passenger shelters, and to improve and expand its service.

Priority 4: Parks and Trails

The benefits of exercise are well documented, and they have a significant impact on people living with dementia. The neighborhood park is often the most accessible natural environment that provides a space to exercise and a space to relax. Parks should be a top priority when creating dementia-friendly neighborhoods.

Goal 7 – Revitalize City Parks and Make the Tulsa Trail System accessible to all by proving key infrastructure

(Key Design Principles: #4 – Accessibility and #5 - Comfort)

7.1 Work with Tulsa Parks and Recreation Department to install and maintain park amenities at neighborhood parks: good lighting, traditional style benches, pavilions, exercise equipment, playgrounds, open lawn space, wide walkways, trails, trees, and landscaping.

7.2 Seek funding through the Capital Improvement Fund to install clean and accessible public restrooms in all city parks and along the Tulsa Trail System.



7.3 Work with city planners and engineers to make the necessary improvements that will ensure safe pedestrian access to parks and recreation facilities.

A SUMMARY OF THE CAPITAL BUDGET AND FIVE-YEAR CAPITAL PLAN – The following is from the five-year capital Improvements Plan 2015 – 2019.

Park and Recreation Department: \$2.5 million The maintenance of the Park systems aging facilities is the Department’s highest priority. Park system projects have been prioritized in the Park’s Master Plan and funding has been allocated toward its implementation in previous capital programs.

River Parks \$2.6 million: The Authority’s highest priorities continue to be an expansion of the trail system further south to serve the rapidly growing south Tulsa area, as well as expanded parking and riverbank stabilization along the Arkansas River.

Funding Sources

Transportation:

Pathways to Health Grant – <http://pathwaystohealthtulsa.org>

Transportation Alternatives Program – <http://www.fhwa.dot.gov/map21/tap.cfm>

Transit Planning 4 All -

<http://web1.ctaa.org/webmodules/webarticles/anmviewer.asp?a=3265>

Bibliography

American Institute of Architects, Aging American Association of Homes for the, Architects American Institute of and Community Design for Aging Knowledge. *Design for Aging Review : 25th Anniversary*, 2016.

Austin, C. D., E. Des Camp, D. Flux, R. W. McClelland and J. Sieppert. "Community Development with Older Adults in Their Neighborhoods: The Elder Friendly Communities Program." *Families in Society-the Journal of Contemporary Social Services* 86, no. 3 (2005): 401-409.

Baillie, J. "Dementia-Friendly Design Resource." *Health estate* 68, no. 2 (2014): 49-53.

Burton, Elizabeth and Lynne Mitchell. *Inclusive Urban Design : Streets for Life*. Oxford: Architectural Press, 2006.

Cooper Marcus, C. "No Ordinary Garden. Alzheimer's and Other Patients Find Refuge in a Michigan Dementia-Care Facility." *Landscape Architecture* 95, no. 3 (2005): 26-39.

Coyle, Maureen and Peter John Whitehouse. "Kind Streets: Urban Re-Design and Ageing in Place with Cognitive Impairment." *Alzheimer's & Dementia* 12, no. 7 (2016): P1012.

Feddersen, Eckhard and Insa Lüdtkke, "Lost in Space Architecture and Dementia", Birkhäuser.

Lawton, M. P. "The Physical Environment of the Person with Alzheimer's Disease." *Aging & Mental Health* 5, (2001): S56-S64.

Lee, Kyung Hee, Marie Boltz, Hana Lee and Donna L. Algase. "Is an Engaging or Soothing Environment Associated with the Psychological Well-Being of People with Dementia in Long-Term Care?" *Journal of Nursing Scholarship* 49, no. 2 (2017): 135-142.

Lin, S. Y. "'Dementia-Friendly Communities' and Being Dementia Friendly in Healthcare Settings." *Current Opinion in Psychiatry* 30, no. 2 (2017): 145-150.

Mahendiran, Suraba and Karen Dodd. "Dementia-Friendly Care Homes." *Learning Disability Practice* 12, no. 2 (2009): 14-17.

Mahendiran, Suraba and Karen Dodd. "Investigation of Eligible Picture Categories for Use as Environmental Cues in Dementia-Sensitive Environments." *HERD*. 10, no. 4 (2017): 64.

- Marquardt, G., "Dementia-Friendly Architecture: Integrating Evidence in Architectural Design"
http://iaps.architecturez.net//doc/oai-iaps.id-iaps_22_2012_2381671_227.
- Marquardt, Gesine and Peter Schmiege. "Dementia-Friendly Architecture: Environments That Facilitate Wayfinding in Nursing Homes." *American Journal of Alzheimer's Disease and Other Dementias*® 24, no. 4 (2009): 333-340.
- McCabe, Louise and Duncan Sim. "Working in a 'Dementia-Friendly' Office: Stirling University's Iris Murdoch Building." *Design Studies* 27, no. 5 (2006): 615-632.
- Mitchell, Lynne. "Making the Outside World Dementia-Friendly: Design Issues and Considerations." *Sage Urban Studies Abstracts* 32, no. 3 (2004).
- Mitchell, Lynne, Elizabeth Burton, Shibu Raman, Tim Blackman, Mike Jenks and Katie Williams. "Making the Outside World Dementia-Friendly: Design Issues and Considerations." *Environment and Planning B: Planning and Design* 30, no. 4 (2003): 605-632.
- Motzek, T., K. Buter and G. Marquardt. "Dementia Friendly Architecture in Inpatient Care: The Influence Basic Architectural Features." *Zeitschrift Fur Gerontologie Und Geriatrie* 47, (2014): 141-141.
- O'Malley, M., A. Innes and J. Wiener. "Reducing Spatial Disorientation for Older Adults with Memory Difficulties: Towards Dementia-Friendly Architecture." *Cognitive Processing* 16, (2015): S40-S40.
- Page, S. J., A. Innes and C. Cutler. "Developing Dementia-Friendly Tourism Destinations: An Exploratory Analysis." *Journal of Travel Research* 54, no. 4 (2015): 467-481.
- Passini, Romedi, Constant Rainville, Nicolas Marchand and Yves Joannette. "Wayfinding and Dementia: Some Research Findings and a New Look at Design." *Journal of Architectural and Planning Research* 15, no. 2 (1998): 133-151.
- Philpot, T. "No Shadows." *Nursing Standard* 20, no. 23 (2006): 24-25.
- Przydatek, Maria, Neena L. Chappell, Sharon Joan Wharf Higgins, Victoria University of, Health Program: Social Dimensions of and Victoria University of, "Remembering Community Settings : Exploring Dementia-Friendly Urban Design in British Columbian Municipalities"
<http://hdl.handle.net/1828/5540>.
- Ritchie, L., "Reviewing the Evidence for Dementia-Friendly Environments: What Does and Doesn't Work"
http://iaps.architecturez.net//doc/oai-iaps.id-iaps_20_2008_137.

- Smith, K., S. Gee, T. Sharrock and M. Croucher. "Developing a Dementia-Friendly Christchurch: Perspectives of People with Dementia." *Australasian Journal on Ageing* 35, no. 3 (2016): 188-192.
- Stewart, S. and A. Page. "Just Another Disability: Making Dementia Design Friendly." *Gerontologist* 44, (2004): 281-281.
- Swaffer, K. "Dementia: Stigma, Language, and Dementia-Friendly." *Dementia-International Journal of Social Research and Practice* 13, no. 6 (2014): 709-716.
- Torrington, Judith. "What Has Architecture Got to Do with Dementia Care?: Explorations of the Relationship between Quality of Life and Building Design in Two Equal Projects." *Quality in Ageing and Older Adults* 7, no. 1 (2006): 34-48.
- Waller, S., A. Masterson and S. C. Evans. "The Development of Environmental Assessment Tools to Support the Creation of Dementia Friendly Care Environments: Innovative Practice." *Dementia-International Journal of Social Research and Practice* 16, no. 2 (2017): 226-232.
- Weir, E. and D. Seitz. "Dementia-Friendly Communities: Where Home Care and Mental Health Intersect." *Canadian Medical Association Journal* 189, no. 16 (2017): E581-E582.
- Zamfir, M. V. and M. Zamfir Grigorescu. "A Checklist for Assessing Dementia-Friendly Design: Architecture as Non-Pharmacological Mean in Assistance of Patients with Dementia." *EURPSY European Psychiatry: Supplement* 41, (2017): S667-S667.