

ABSTRACT

Title of Thesis: **Incorporating Complete Streets Principles into Main Streets of America's Rural Small -Towns: A Design Case Study in Sleepy Eye, Minnesota**

Matthew G. Rausch
Master of Landscape Architecture 2021

Thesis Directed By: Dr. David Myers
Department of Plant Sciences
and Landscape Architecture

This research thesis suggests that Complete Streets principles, and other related current street design principles and best practices, can complement the National Main Street Center's design approach for use in rural small towns. The addition of these principles would strengthen the design component for the Main Street approach. Since the scope of current street design guidelines and principles are so broad, targeting the key principles of these programs, provides an appropriate level of detail to add to the Main Street design process. The resultant design proposals, using an improved design framework, could be scalable in both cost and implementation to accommodate the needs and the means of rural small towns. Sleepy Eye, Minnesota is used as a case study to demonstrate how the principles and elements of this approach can be scalable and flexible to improve a selected small-town main street. Complete Street principles and related street design best practices are a useful first step for rural small-town Main Street designs.

INCORPORATING COMPLETE STREETS PRINCIPLES INTO MAIN
STREETS OF AMERICA'S RURAL SMALL-TOWNS.
A DESIGN CASE STUDY IN SLEEPY EYE, MINNESOTA

by

Matthew George Rausch

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Advisory Committee:

David Myers, Ph.D., Chair
Byoung-Suk Kweon, Ph.D.
Jeremy Wells, Ph.D.

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Dedication

This thesis is dedicated to the rural small towns across the United States who over the centuries have served as the Heartland for this great nation. While this nation is truly a sum of the parts, one cannot ignore that small towns such as the one referenced in this thesis have contributed mightily to the colorful history of this nation. While changing demographics, and the evolution of the economic engines of this nation have shifted the headline focus to our urban centers and metropolitan areas with the promises and problems they pose, we owe it to the continued strength of our country to keep our rural America a strongly beating heart. May generations to follow continue to call the Main Streets of these communities their favorite place, and these towns, their own Heartland.

Acknowledgments

I would like to thank my Thesis Chair, Dr. David Myers for guiding me through this wide-ranging thesis project. Without his knowledge, organizational inputs, and sage advice, my presentation and thesis would not have accomplished the goals that I had set out for. I would also like to thank Professor Byoung-Suk Kweon and Professor Jeremy Wells for the unique perspectives they brought to the thesis development, and their patience as my protracted degree pursuit, and the intervention of 2020 world events, extended the call for their attention and assistance.

I would also like to recognize the exceptional contribution made by the dozens of town leaders, businessmen, residents, and friends from the rural small town of Sleepy Eye Minnesota who made the concept of revitalized small towns come alive for me. They continue to ensure that this small town, and all of those that I see in my travels over the years, reinforce the hope I hold for the continuing legacy of rural small-towns as one of the critical parts of this county's heritage, and as its enduring heartland.

Lastly, my deepest thanks to friends and family standing side-by-side with me these days, both virtually and in everyday life, who have encouraged, enjoyed, and perhaps sometimes even envied my journey toward this master's degree at the University of Maryland College Park.

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List of Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic (Vehicular)
CS	Complete streets
CSS	Context Sensitive Solutions - FHWA and DOTs, etc.
DOT	Department of Transportation
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
GS	Green Streets (EPA), Livable or Sustainable streets
ITE	Institute of Transportation Engineers
LAB	League of American Bicyclists
LOS	Level of Service
MSA	Main Street Approach
NACTO	National Association of City Transportation Officials
NCSC	National Complete Streets Coalition
NHTSA	National Highway Traffic Safety Administration
NMSC	National Main Street Center (Historic Trust Foundation) _
NMSC	National Main Street Center
NSCEP	National Service Center for Environmental Publications
PPS	Project for Public Spaces
ROW	Right of Way
SGA CS	Smart Growth America - Complete Streets
TCF	Three Component Framework
TRB	Transportation Research Board
TWLTL	Two Way Left Turn Lane (roadway vehicular configuration)
WEF	Water Environment Federation (EPA)

Chapter 1: Introduction

1.1 Purpose and Objective

The thesis is organized into four chapters: The first Chapter provides an introduction, and Chapter 2: Literature Review provides an overview and summary of the relevant information in selected programs that are relevant to current street design practices and standards. Chapter 3: Project Design provides the framework, design, and details of the proposed project work as the result of the application of a design framework. Chapter 4: Summary and Conclusion provides a review of the objectives of the thesis, a conclusion discussing the site design proposal based on the research from the literature review and case study design, and provides an overall summary of the thesis.

This thesis suggests that Complete Streets principles, and other related current street design principles and best practices can complement the National Main Street Center's (NMSC) design approach for use in rural small towns. The addition of these principles would strengthen the design component for the NMSC's Main Street approach. While current street design guidelines and best practices represent safety, environmental, mobility, and multi-user design improvements, they do not always directly align with the historical authenticity of a rural small town. The strong involvement of a community in a design process will result in a balance of contemporary design, including green and sustainability features, and the community's desire to honor its cultural and historical heritage.

Since the scope of current street design guidelines, principles, and best practices is so

broad, targeting here the key principles used in several national and global street design programs provides a manageable starting point for rural small-town Main Street design improvements. The resultant design proposals, using a 3-component street design framework, can be scalable in both cost and implementation to accommodate the needs and the means of rural small towns. These design principles are useful even in the frequent situation where those small-town Main Streets also serve as trunk highways or regional commercial thoroughfares.

Small towns in rural America have suffered from a similar plight that has hit small cities and towns nationwide. In addition to community-specific handicaps to growth, a variety of nationwide social and economic changes have lessened the viability of their “Main Street”. The types of businesses found on America’s main streets have been in constant flux since the development of the first cities in the United States. Profound changes during the 20th Century have sounded the death knell for a large portion of the small, unique commercial districts that those small-town main streets originally relied upon. The interstate and local highway systems have changed the way Americans live and work, and land-use regulations often failed to recognize the value of mixed-use commercial-residential structures in small-town centers and main streets. The almost ten-fold explosion of retail space between 1960 and 2000 flooded the market with more commercial space than small-town spending habits could support. “Big Box” retailers, internet commerce, and the “Lifestyle Centers” of the New Urbanist also provided overwhelming challenges to the smaller independent businesses who were unable to hold their own against this competition (United States Census Bureau, 2016; Dono and Glisson, 2009; Craycroft, 1982).

Current urban planning thought suggests the need for a re-valuation of the cost-benefits of the trends favoring urban sprawl previously accepted over the last half-century. It is relevant for this thesis to look closely at the rural-urban demographic trends in America, and as such, perhaps reconsider the value of a community Main Streets, not just for their historic and social appeal, but also in the role they contribute to the vitality of rural small-towns and cities and the future of America's economic and cultural character (Burayidi, 2018).

The resultant design principles are useful even in the situation where those small-town Main Streets also serve the region as trunk highways or commercial thoroughfares. The value of integrating the current street design programs and guidelines into a design framework that is relevant to rural small-town Main Street design is demonstrated in a case study design that provided Main Street elements for the site location of Sleepy Eye, Minnesota. The resultant master plan and focus areas incorporate features that are scalable in both cost and implementation to acknowledge the needs and the means of rural small towns through phased extensive and moderate upgrade approaches if necessary.

1.2 The Continuing Importance of Rural America

The thesis premise revolves around the hypothesis that rural America is still an integral part of this nation's heritage, its critical infrastructure, and its economic engine. With this premise, the thesis argues that Main Streets are important in keeping rural towns viable

and relevant. Census data illustrates the shift from rural to urban areas from 1910 to 2010 (Figure 1.1). Figure 1.1 also illustrates the migration toward urban areas as the population has increased over the last century. While the population choosing an urban location has expanded five-fold over those choosing rural locations over the last century, the rural-based population itself has remained constant, albeit as an ever-shrinking actual percentage of the total US population (US Census Bureau, 2016).

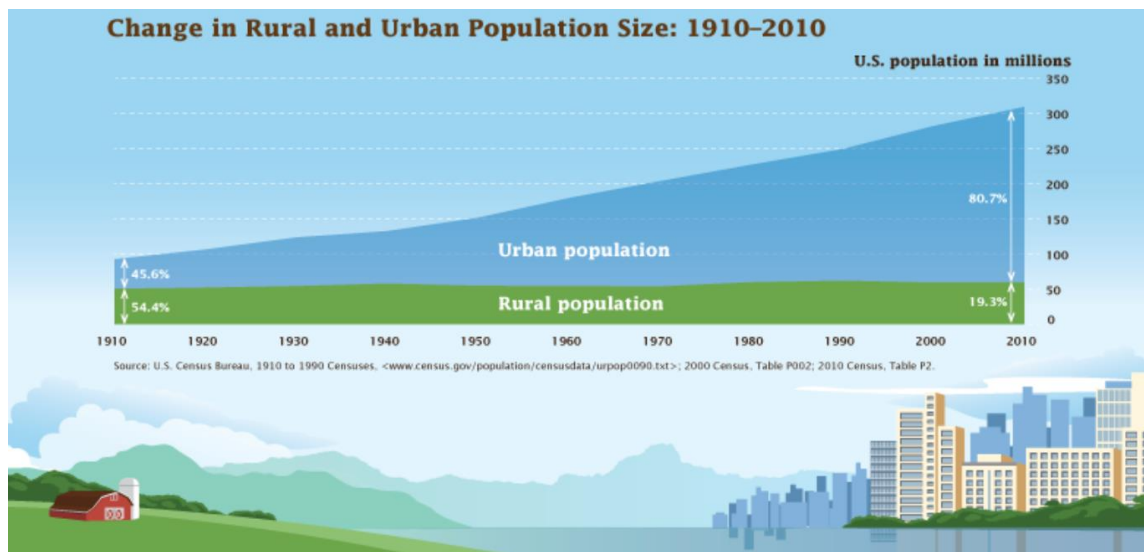


Figure 1.1. Census Portrayal: Shift in US Population from Rural to Urban
(US Census Bureau, 2016)

While the majority of Americans do not live in “Rural” areas, the overwhelming percentage of land in America is “rural”, and regardless of the number of persons living there, this forms a core part of the cultural identity of Americans as a whole. While the percentage of Americans in urban areas versus rural has shifted dramatically over the last century, from roughly 45% urban - 55% rural, to 81% urban – 19% rural, (an over a 4-to-1 majority), the size of the rural population has remained relatively constant at around 50-60 million (Figure 1.2). The urban area population has grown from roughly 50 million to over 240 million people (US Census Bureau, 2016). The Census Bureau defines “Rural”

as any population, housing, or territory not in an urban area (Ratcliffe et al, 2016).

Relationship Between Land Area and Population in the United States: 2010

	Land area (percent)	Population (percent)
Urban areas and urban clusters	3.0	80.7
Rural areas	97.0	19.3

Figure 1.2. Census Portrayal: Shift in US Population from Rural to Urban
(US Census Bureau, 2016)

Figure 1.3 displays the Urban-Rural mix in the United States by county, and by the total population. This displays the number of counties (with their associated rural and total population numbers) in the US that are mostly urban (only 11% rural), those that are mostly rural (66.9% rural), and those that are completely rural (100%).

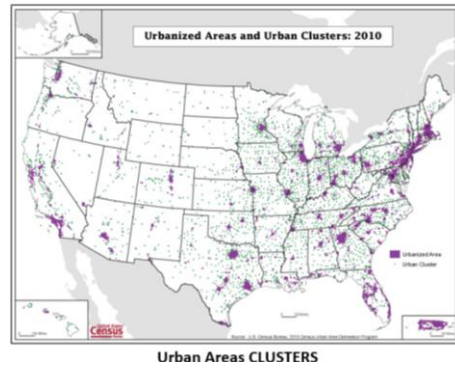
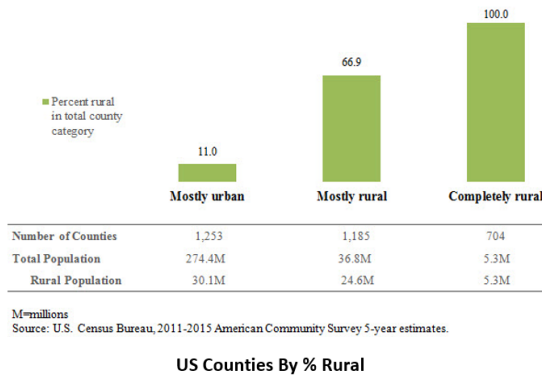
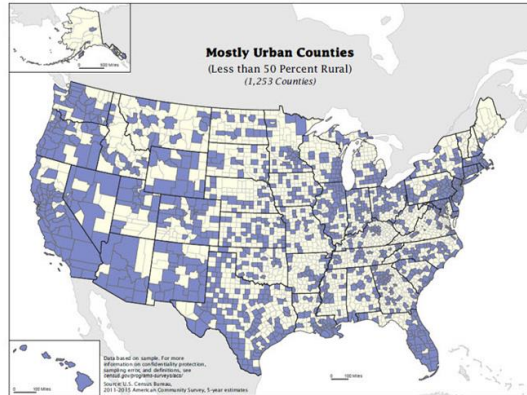


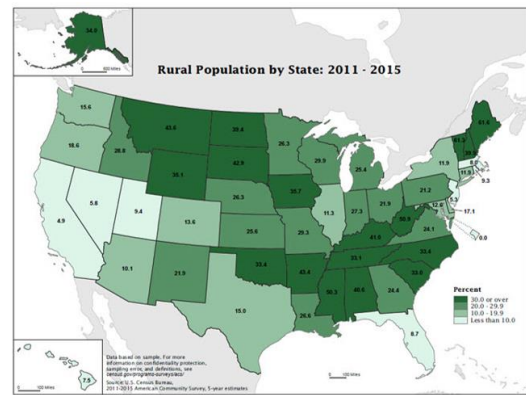
Figure 1.3. U.S. Counties By % Rural

Figure 1.4. Urban Clusters in Minority



Rural COUNTIES (White) Widespread

Figure 1.5. Rural Counties Widespread



Rural STATES (Darker) Predominate

Figure 1.6. Rural States Predominate

(Source: USDA ERS, December 2017)

Figure 1.4 – 1.6 graphically displays the disproportionate Rural over Urban mix by showing the US population first by urban clusters (Figure 1.4), then by the mix of counties in the U.S. classified as “rural” (light-colored) versus “urban” (blue colored) (Figure 1.5), and finally by the corresponding state-level representation (Figure 1.6) of rural versus urban populations by state, with the darker shades of green indicating more rural-centric states (USDA ERS, December 2017).

This shifting balance of rural versus urban population and the corresponding loss in significance and stature by many mid-to-small towns and cities helps illustrate why the National Trust for Historic Preservation in 1980 established the National Main Street Center (NMSC) and the Main Street America program to help communities of all sizes to re-vitalize their commercial districts. As of 2018, there were over 1100 Main Street Programs with 39 States participating in state-level coordination programs (Dono & Glisson, 2009). The NMSC’s Main Street Program provided inspiration for this thesis to further research how the design principles of landscape architecture could contribute to

improved street area design, specifically in the rural small towns. Section 3.2, Site Selection, will illustrate how the Main Street Programs in Maryland and Minnesota contributed to the concept of designing rural small-town main streets, and toward the selection of Sleepy Eye, Minnesota as the thesis design case study.

Chapter 2: Literature Review

The literature review is organized into three sections. The first section explores the five selected programs related to street design best practices and principles pertinent to rural small-town design. The second section discusses a three-component framework (TCF) for street design organization that recommends aligning design elements into either 1) roadway, 2) sidewalk, or 3) building façade or frontage areas. The third section summarizes the principal focus of these five programs and the three-component framework. The third section further provides a condensed set of rural small-town main street design objectives that will inform the design case study in Chapter 3.

The literature review covers street design guidance and recommendations from experts across all levels of government and professional practices such as:

AASHTO: American Association of State Highway and Transportation Officials

NACTO: National Association of City Transportation Officials

EPA: Environmental Protection Agency (Green Streets Programs)

NMSC: National Main Street Center

Federal, State, and Municipal Departments of Transportation (DOT)

FHWA: Federal Highway Administration

NHTSA: National Highway Traffic Safety Administration

The National Complete Streets Program

PPS: Project for Public Spaces

SGA: Smart Growth America

Professional articles from across the spectrum of street design, and organizations such as AARP, LAB (League of American Bicyclists), and others

2.1. Five Main Programs

The five programs explored include 1) the National Main Street Center’s Main Street Approach (MSA), 2) the Smart Growth America’s (SGA) Complete Streets (CS) program, 3) the Green and Sustainable Streets program under the Environmental Protection Agencies’ (EPA) umbrella, 4) the Federal Highway Administration’s (FHWA) Contextually Sensitive Solutions (CSS), and 5) the concept of Placemaking - most associated with the Project for Public Spaces (PPS).

2.1.1. Main Street Approach (MSA): Design Principles Focus

The National Main Street Center was established as a program of the National Trust for Historic Preservation in 1980 to help communities of all sizes revitalize their traditional and historic commercial districts. In 2015, the Center launched a new program brand for its networks of Main Streets - The Main Street Approach™ (MSA) that offered community-based revitalization initiatives with a practical, adaptable framework for a downtown Transformation Strategy that is easily tailored to local conditions (MSA, March 2019; MSA, April 2019).



Figure 2.1. MSA Transformation Strategy
(Source: MSA, March 2019)

The National Main Street Center Program: Design Component of the 4-Point Approach

The MSA Program states that a communities' work of community transformation should be organized around a four-point approach: Economic Vitality, Design, Promotion, and Organization (Figure 2.1). The design component of this four-component approach (Figure 2.2) is the one that is most relevant to the multi-disciplinary expertise of landscape architects and is the aspect of the Main Street America Four Point approach that informs this thesis. The MSA Design "Quadrant" principles are focused on creating an inviting, inclusive atmosphere, celebrating historic character, and fostering accessible people-centered public spaces (Figure 2.2).

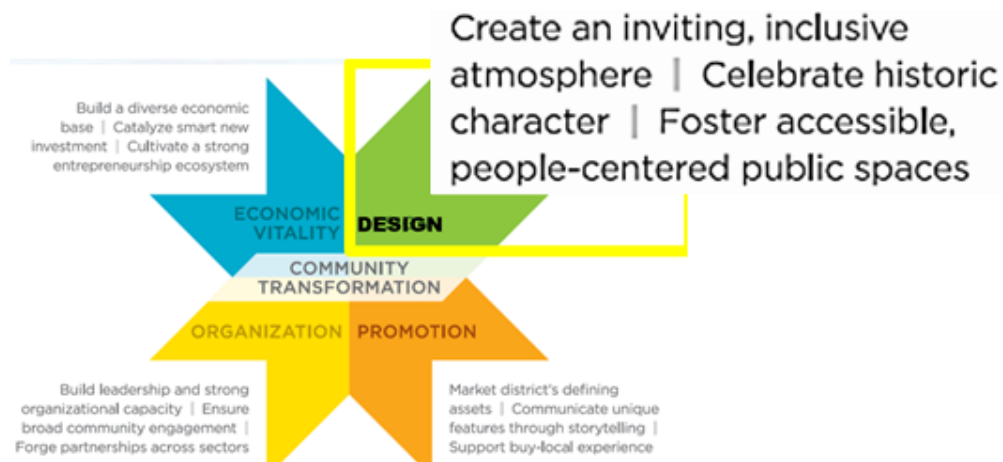


Figure 2.2. MSA 4-Point Approach
(MSA, March 2019)

Design Team make-up recognizes the role of landscape architects.

The design team in an MSA effort is primarily responsible for implementing all the aspects that involve physical and visual components, including items such as building rehabilitation, infill development, public spaces, signs, window displays, logos,

transportation, and parking (MSA, March 2019). Design team members might span a range of fields including people with expertise in architecture, landscape architecture, urban planning, product design, graphics, visual merchandising, historic preservation, and civil engineering (Loescher, Lynch & NMSC, 1996).

Modification to the MSA Design-component Approach

Design-component MSA documents provide high-level key themes, basic design introductions, and advocacy recommendations for non-specific size communities rather than more detailed design level specifics. This thesis provides an expanded design approach recognizing all the design principles of the MSA ideas, adding in more specific street design efforts emerging from reviews of current street design programs' principles and best practices, tailored to the need's rural small-towns.

2.1.2 Complete Streets and associated Best Practice street design principles.

Complete Streets, formalized in 2005, evolved over the years under the Smart Growth America (SGA) umbrella and now has a support organization called the National Complete Streets Coalition (NCSC). (NCSC, 2018)



Figure 2.3 SGA and NCSC Programs
(Source: NCSC, 2018)

Complete Streets Concept

Complete Streets are designed and operated to provide safe, convenient access and mobility for all roadway users, regardless of age, ability, or mode of transportation. This

includes pedestrians, cyclists, transit users, motorists, emergency responders, and commercial users. Complete Streets principles consider the needs of children, the elderly, and persons with disabilities and are intended to be used in a manner that is sensitive to the local context recognizing the needs that vary in urban, suburban, and rural settings (NCSC, 2018; Porter, 2016; McCann, 2010).

The National Complete Streets Coalition was founded in 2005 by a coalition of advocacy and trade groups, including AARP, the American Planning Association, and the American Society of Landscape Architects. It now also includes partners such as America Walks, American Public Health Association, American Public Transportation Association, Association of Pedestrian and Bicycle Professionals, Institute of Transportation Engineers, National Association of City Transportation Officials, and the Smart Growth America. As of 2017, over 1325 agencies at the local, regional, and state levels have adopted Complete Streets policies, totaling more than 1400 policies nationwide (NCSC, 2018). Table 2.1 lists the ten policy elements of Complete Streets (NCSC, 2017).

Table 2.1 The Ten Policy Elements of Complete Streets

Vision: A motivating vision for why the community wants Complete Streets

All users and modes: Specify “all modes” (walking, bicycling, public transit, all other vehicular), and “all users” (all ages and abilities)

All projects and phases: All types of transportation projects are subject to the policy; proposed, new, and existing

Clear, accountable exceptions: Any exceptions to the policy are specified and approved by a high-level official

Network: Recognizes the need to create a comprehensive, integrated, and connected network for all modes

Jurisdiction: All other agencies that govern transportation activities understand and are involved in the policy

Design: Recommends use of the latest and best design criteria and guidelines, and the need for flexibility for user needs

Context sensitivity: The current and planned context—buildings, land use, transportation, and community needs—is considered when planning and designing transportation solutions

Performance measures: Policy includes performance standards with measurable outcomes

Implementation steps: Specific next steps for implementing the policy are described

2.1.3. Best Practices: Green Streets Concept

One of the related best-practice street design principles that have evolved into a specific approach with guidelines and principles is the concept of Green Streets. Green streets should both meet transportation needs and apply environmental stewardship to improve the natural, built, and social environments (EPA, May 2019). They are also referred to in street design literature and practice as Livable Streets or Sustainable Streets.

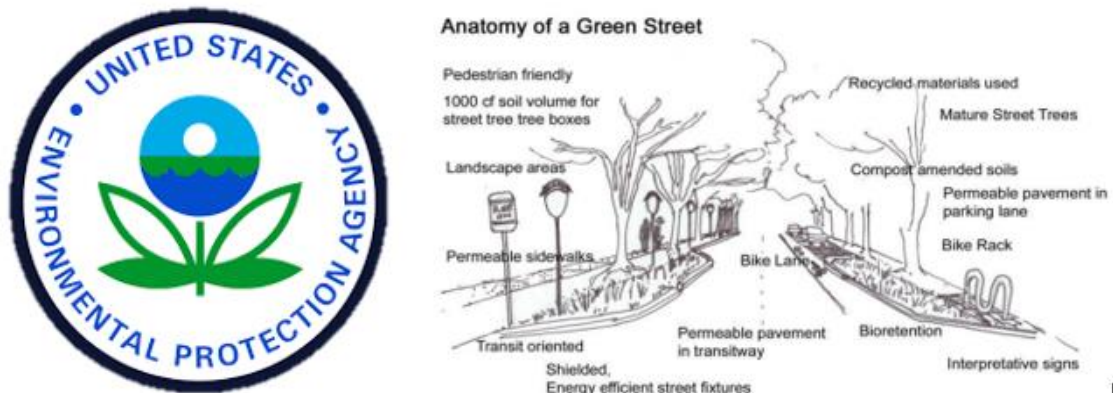


Figure 2.4. EPA Logo and Green Streets Report Graphic

(Source: EPA, May 2019)

The Green Street design principles target several goals (EPA NSCEP, 2009):

Reduces storm water flow, improves water quality, reduces urban heating, enhances pedestrian safety, reduces carbon footprints, and beautifies neighborhoods

Includes noise abatement, air and light pollution, and lighting energy-efficiency

Street landscaping is incorporated, and sustainability via materials and

rehabilitation/restoration employed, all hopefully also contributing to beautifying neighborhoods

Transforms streets from significant storm water and pollutant source into innovative treatment systems optimizing transportation and water infrastructure

In 2002, the Federal Highway Administration (FHWA) named environmental stewardship and streamlining one of three “vital few” goals. The Green Highways concept was then initiated by Region 3 of the Environmental Protection Agency (EPA) in 2005 and produced the Green Highway Partnership in June of 2006 involving key EPA headquarters programs and the Federal Highway Administration, as well as trade organizations, the Transportation Research Board (TRB), the American Association of State Highway and Transportation Officials (AASHTO), and private transportation consultants. In October 2010, EPA launched the Green Streets, Green Jobs, Green Towns (G3) Initiative to provide support for small to medium-sized communities using green infrastructure practices and the Green Streets program. (EPA, April 2019). Green Street design elements and principles may include the items listed in Table 2.2 (NACTO, 2017).

Table 2.2 Green Street design elements and principles

Storm water Pollutant Measures: Vegetated Swales, Bio retention, Rain Gardens, Controlled Drainage

Permeable Pavement and Pavers, Porous Concrete

Noise Abatement, Air and Light Pollution and Lighting energy-efficiency

Heat Island Abatement: Street and Sidewalk surface coloring, Shade from vegetation or awnings

Carbon Emissions: Traffic management, Road Diets, Traffic Calming, Bicycle, and Pedestrian designs

Street Landscaping: Trees, Planters, Light Post Hanging Plants

Sustainability via local sourced or recycled or reused material, rehabilitation-and-restoration vs demolition

2.1.4. Best Practices: Context Sensitive Solutions (CSS)

Contextually Sensitive Solutions (CSS) concept employs a collaborative, interdisciplinary approach involving all stakeholders to develop a transportation facility/project (FHWA, June 2017). Since there are a great number of expert organizations that provide policy and guidance on street design, over the decades, public policy objectives dealing with resource preservation and community values have also resulted in a range of national and state legislation as well as an array of science or operations analysis-based street design recommendations. As a result, Departments of Transportation at all levels often defaulted to adhering to somewhat rigid guidelines partly to minimize possible litigation and legal liability issues. Eventually, practitioners realized it was important to consider options to modify those rigid structures of guidelines to better fit specific needs and localities. The following list demonstrates some of the governmental and non-governmental organizations that have contributed to the subject of street design.

Federal, State, and Municipal Highway/Street Design Manuals

Federal Highway Administration-FHWA,
National Highway Traffic Safety Administration-NTSA
U.S. Access Board – ADA: Streets and Sidewalks Guidance
Environmental Protection Agency-EPA
State, County, and Municipal Departments of Transportation-DOTs

Industry Design Manuals and References

American Association of State Highway and Transportation Officials-AASHTO
National Association of City Transportation Officials-NACTO
Institute of Transportation Engineers-ITE,
Transportation Research Board-TRB

National Complete Streets Coalition (Smart Growth America)

Context Sensitive Solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility/project that fits its physical setting and preserves and enhances scenic, aesthetic, historic, and environmental resources while improving or maintaining safety, mobility, and infrastructure. This approach seeks to integrate four areas of interest: stakeholders, site context, the shape, and preservation of the site where possible, and employ collaboration and consensus in all steps (FHWA, June 2017). Figure 2.5 provides a simplistic graphic representation of the approach taken by CSS.

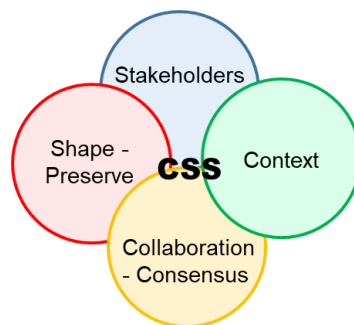


Figure 2.5 Graphic representation of CSS Collaboration

(Source: FHWA, June 2017, Graphic by Author)

Public policy objectives dealing with cultural resource preservation and community values (context-sensitivity) were highlighted in federal legislation such as the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, the National Highway System (NHS) Designation Act of 1995, and the Transportation Equity Act for the 21st Century (TEA-21) of 1998 (FHWA, 2019). This legislation demonstrated federal commitments toward the preservation of historic, scenic, and cultural resources in the development and implementation of transportation projects. Flexibility in Highway Design was adopted by the Federal Highway Administration (FHWA) in their groundbreaking publication

(FHWA, June 2017) that demonstrated how agencies could accomplish the objective of CSS within accepted design processes and criteria. The acceptance of CSS considerations at the federal level opened the regulatory door for other levels of government to work toward better solutions that had been restrained by former guidelines (AASHTO, 2004; AASHTO, 2011). CSS Design Principles are as listed in Table 2.3 (FHWA, June 2017).

Table 2.3 CSS Design Principles

- Seek proactive stakeholder involvement and interdisciplinary teams
- Seek broad public involvement with the full range of communication strategies
- Seek consensus in determining purpose and need
- Address Multi-modal transportation options and alternatives
- Address aesthetic concerns, community, and social issues
- Create streets that are safe, active, accessible, and livable
- Preserve and enhance community and natural environments
- Humanize the street; transform into a destination
- Develop unique, lasting solutions, publicly accepted
- Utilize flexibility and creativity, and a full range of design choices
- Document project decisions, track and meet commitments

2.1.5. Best Practices: Placemaking

Placemaking is broadly defined as the planning, design, and management of public spaces, and for informal spaces such as the temporary use of street space for events, for open streets, or play streets (PPS, 2017). A widely used set of ideas and practices used in the design professions, it is also a principle that incorporates the cultural and historical preservation placemaking aspects of the Main Street approach that the Main Street America program addresses (MSA State of Main, 2019). Much of the literature regarding

placemaking is promoted by an organization called the Project for Public Spaces (PPS).

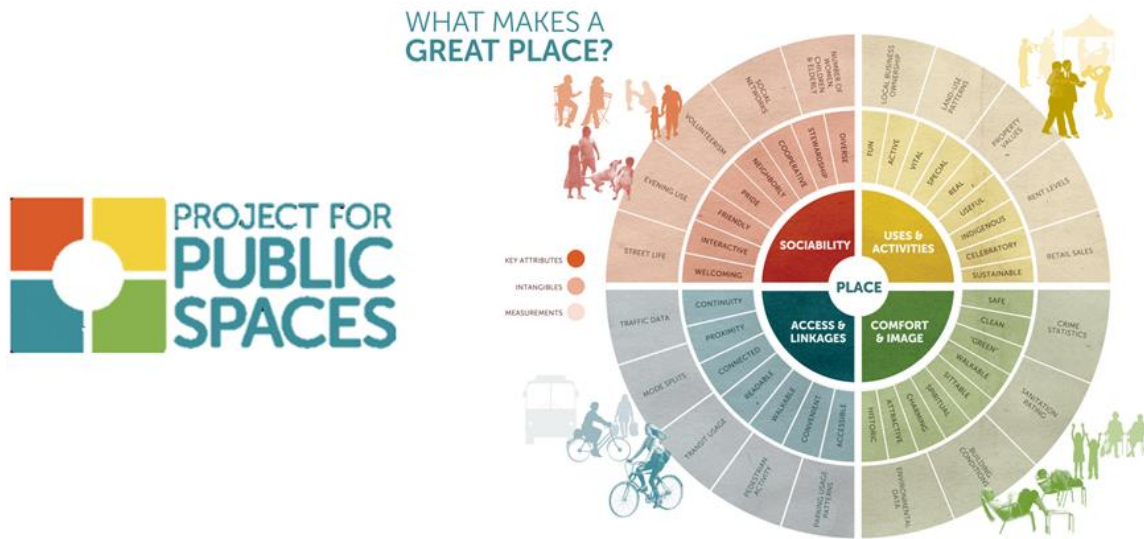


Figure 2.6. PPS Great Place graphic.
(Source: PPS, 2017)

The placemaking concept originated in the 1960s with writers like Jane Jacobs and William H. Whyte. Placemaking addressed ideas about designing cities that addressed pedestrians’ needs and not just those of cars and expanding car-centric shopping centers (Jacobs, 1993; Whyte, 1988). The term came into use in the 1970s by landscape architects, architects, and urban planners to describe the process of creating squares, plazas, parks, streets, and waterfronts that will attract people and create a memorable and recognizable place. PPS defines place-making as the planning, design, and management of public spaces, and for informal spaces such as temporary use of street space for events, for open streets, or play streets, (PPS, 2017). The eleven Placemaking design principles defined by the PPS are listed in Table 2.4 (PPS, 2015).

Table 2.4 Eleven Placemaking design principles

The Community knows best
Create a place, not just a design

Placemaking is a group effort, look for partners
Make and Act on Observations
Have a vision
Requires Patience
Triangulate: strategic placement of amenities
Ignore Naysayers
Form Supports Function, Integrate them
Money is not the issue (If networking/team building is done right)
Placemaking is never finished

According to PPS (PPS, 2019), the eleven design principles for placemaking can be translated to streets as places. Table 2.5 provides the Eight principles that apply to streets as quality places.

Table 2.5 Eight principles that apply to streets as quality places.

Great activities and destinations
Safe (From crime, vehicle speeds, etc.)
Inviting and rich in detail (Landscape, sidewalks, street layout)
Designed for “lingering” (Stay, not just go through)
Interactive and social (Build a sense of community and attachment)
Unique (Identity of its own)
Accessible (All modes of movement, all ages, ethnicities, and income)
Flexible (Needs to evolve over time: To the time of day/week, seasonally)

2.2. Applying Street Design Best Practices & Lessons Learned to a 3-Components framework.

Given the complexities and wide range of approaches that address elements of street design the question arises: How to present this complexity in a format that would be understandable and useful to the target audience, someone involved in planning the design of a Main Street in their small rural town?

2.2.1 Sources and logic for the 3-Component street design framework

An Oregon DOT document references a framework that is utilized in several state-level DOT manuals, particularly in those that address a Complete Street approach to street and highway design. The Oregon DOT document is titled: *Main Street- When a Highway Runs Through It* (ODOT TGMP, 1999). The framework it proposes, adopted here and throughout this thesis, addresses street design elements as they align to three component areas of a street design: 1) Roadway Components, 2) Sidewalk Components, and 3) Building façade or frontage Components (Figure 2.7).

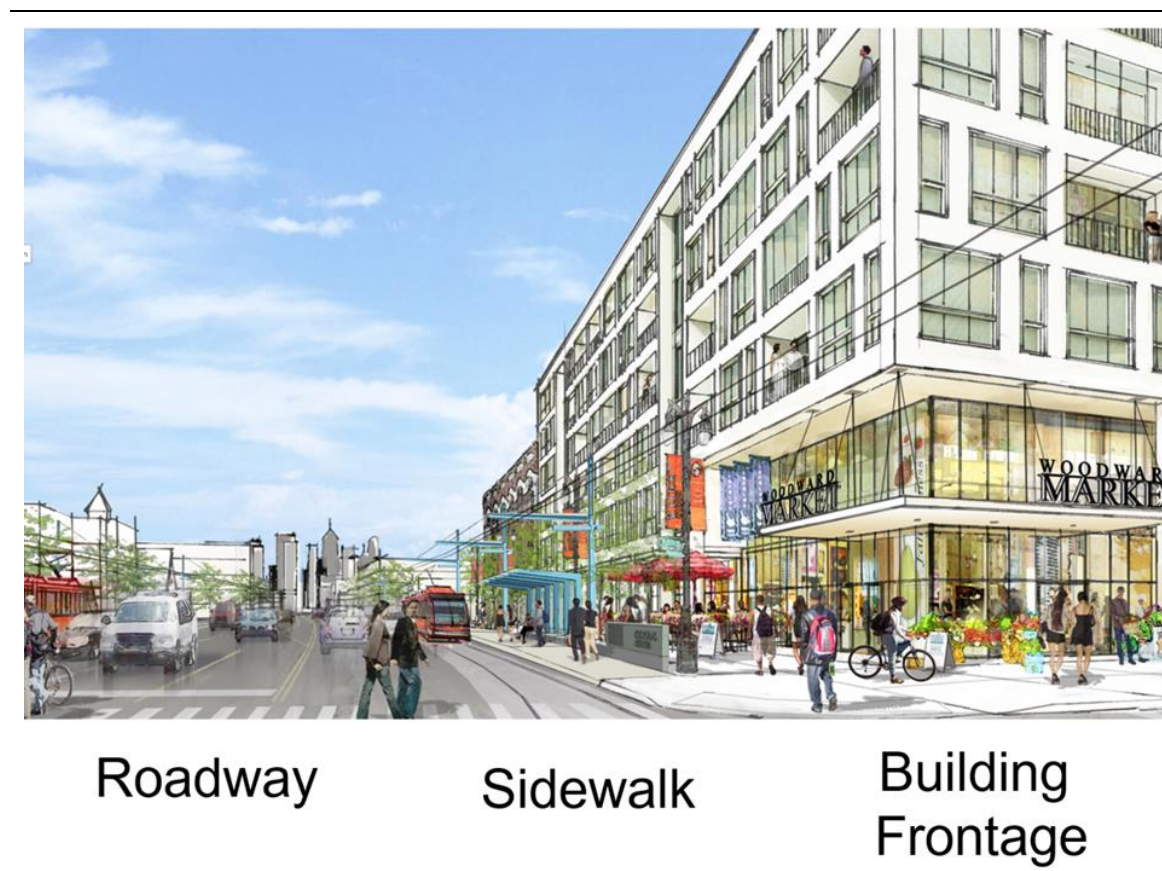


Figure 2.7. Three-Component Framework View of a Street Design

(Source: https://commons.wikimedia.org/wiki/File:M-1_Street_Rendering_12x6.jpg, Modified by Author)

The abbreviated lists of street elements in Figure 2.8 below in red, green, and blue text

provide a few examples of the related street design elements as they relate to the Three-Component Framework (TCF). The next sections in the thesis will elaborate on the broader sets of design elements from research that are commonly associated with each of these three components of a TCF and provide some visual examples that serve as precedents for the case study design (Gilpin 2015; Goodman 2016; NACTO 2013; NJ Penn DOT 2008; FHWA 2010; CA DOT, 2013; CALTRANS, 2010; Gilpin 2015; Goodman 2016; NACTO 2013; NJ Penn DOT 2008; FHWA 2010; CA DOT 2013;Re:Streets 2019; GA DOT 2019; LA CTY 2019; Access Board, 2013; FHWA, October 2017).

Cost considerations are a practical issue, especially for small towns, influencing practical or phased implementation of design elements. . Several references exist that help provide an introduction to ballpark cost-benefit considerations of design elements (SGA 2020; FHWA 2013; NCSC 2016; Shapard & Cole 2013).



Sidewalk Component Example Elements	Roadway Component Example Elements	Building Component Example Elements
ADA Curbs	Bicycle Lanes	Awnings/Toppers
Corner Bump-outs	Parking	ADA Entrances
Informational Signage	Parklettes	Window Treatments
Sidewalk Furniture	Road/Highway Signage	Storefront Detailing
Landscaping	Traffic Circulation Markings	Door Treatments
Merchant Seating/Amenities	Medians	Historical Preservation
	Traffic Signals	
	Crosswalk Markings	
	Sewers/Gutters	

Figure 2.8. Overview of Three-Component Framework Street Design Elements

(Source: NACTO, 2013; Modified by Author)

2.2.2. Roadway Components: Elements related to the vehicular surface area.

Design elements related to the vehicular surface area of a Main Street are ones found in multiple sources that are best related to the roadway component of a street design (Gilpin, 2015; Goodman, 2016; NACTO, 2013; NJ Penn DOT, 2008; FHWA, 2010). The design elements under each of these groupings are the ones I have drawn from considering a generic Main Street design program for a small rural town. The case study design provides more specificity for the selection of the elements that were incorporated into the

final design. A simplified hierarchy of these elements can be made by grouping them into the following categories (Table 2.6).

Table 2.6 Hierarchy of Roadway Design Elements

Roadway Cross walks / intersections:

- Texture-Physical shaping
- Intersection Markings
- ADA
- Pedestrian protection
- Bicycle protection
- Excess vehicular lane elimination (Road Diet)

Roadway Signage:

- Place signs
- Parking signs
- Informational signage: toilets, etc.
- City Brand for MSA
- Traffic flow signs
- Walking App Signage

Roadway Features:

- Parklettes
- Gateways
- Landscape hardware
- Rain Gardens
- Storm water features

Roadway Surface Configuration:

- Surface material
- Traffic Calming features (speed humps/tables)
- LOS Level of Service
- Speed Management (Chicanes, pinch points)
- Lane width/use
- Parking
- Medians, refuge islands
- Bike lanes
- Markings-striping surface
- Bus Stops
- ADA features
- Utilities
- Side-street access



Figure 2.9. Roadway Components: Design Elements

(Source: <https://commons.wikimedia.org/wiki/>)

2.2.3. Sidewalk Component: Elements related to the pedestrian surface area

Design elements related to the pedestrian surface area of the main street are listed below (Table 2.7). The individual elements under the first three of the sidewalk categories below are straightforward, but there are several additional items in the “Other Functional Items” that should be deliberately evaluated for inclusion based on the specific nature of the street, its users, and the desired placemaking outcomes.

Table 2.7 Hierarchy of Sidewalk Design Elements

Sidewalk Form:

ADA curbs/thresholds
Corner Bump outs
Material-Textured/painted
Crossing assists/warnings

Sidewalk Furniture:

Tables
Benches, chairs
Umbrellas – Canopies
Shelters

Sidewalk Softscape:

Street Trees/Shrubs
Hanging plants
Planters/Flowerpots

Other Sidewalk Functional Items:

ATM's
Trash cans
Newspaper boxes
Parking meters
Mail USPS boxes
Bike racks, rental stations
Fountains/Water Features
Street Art/Sculptures
Graffiti Boards
Bollards
Hydrants
Flags
Signage Informational, Maps
Signage: Historical, Interpretive
Banners/Fold-Sandwich Signs
Merchandise stands
Street vendor space
Lampposts pedestrian-scale
Wi-Fi and Charging Stations



Figure 2.10. Sidewalk Component: Design Elements
 (Source: <https://commons.wikimedia.org/wiki/>)

2.2.4. Building/Frontage Component: Elements related to the private surface.

Design elements related to the vertical/private surface area of a Main Street.

The elements associated with this design component are addressed here, independent for the moment, from all the associated ownership, cultural, historical, and commercial considerations that will be involved in final design decisions implementing this particular aspect of the TCF (Table 2.8). Rather than showing all the possible individual elements in precedent pictures here, Figure 2.11 illustrates examples that incorporate groupings of

these elements and the overall picture they can present. This complex design aspect of the Three-Component Framework will usually be more likely influenced by the needs of individual property or business owners in combination with guidance or ordinances governed by the community planners. The building frontage is essential to the overall street design of the main street.

Table 2.8 Hierarchy of Building/Frontage Design Elements

Building Doors/Windows/Facades:

- Doors, ADA Considerations
- Windows and contents
- Display Cases
- Window Treatments
- Facades/Walls
- Public Murals
- Advertising
- Preservation-restoration
- Reconstruction Transoms Fillers (vacancy “masks”)

Building Signage:

- Canopies-awnings: Flat, Curved, domed
- Signage design: Flush, Blade, etc.
- Shade Protection
- Advertising
- Lighting
- Projecting Signs
- Neon Signs

Vacant Building or Lots:

- Pocket Parks
- Skateboard Park
- Rest/Sitting Areas
- Restrooms
- Visitor Kiosks
- Play Areas

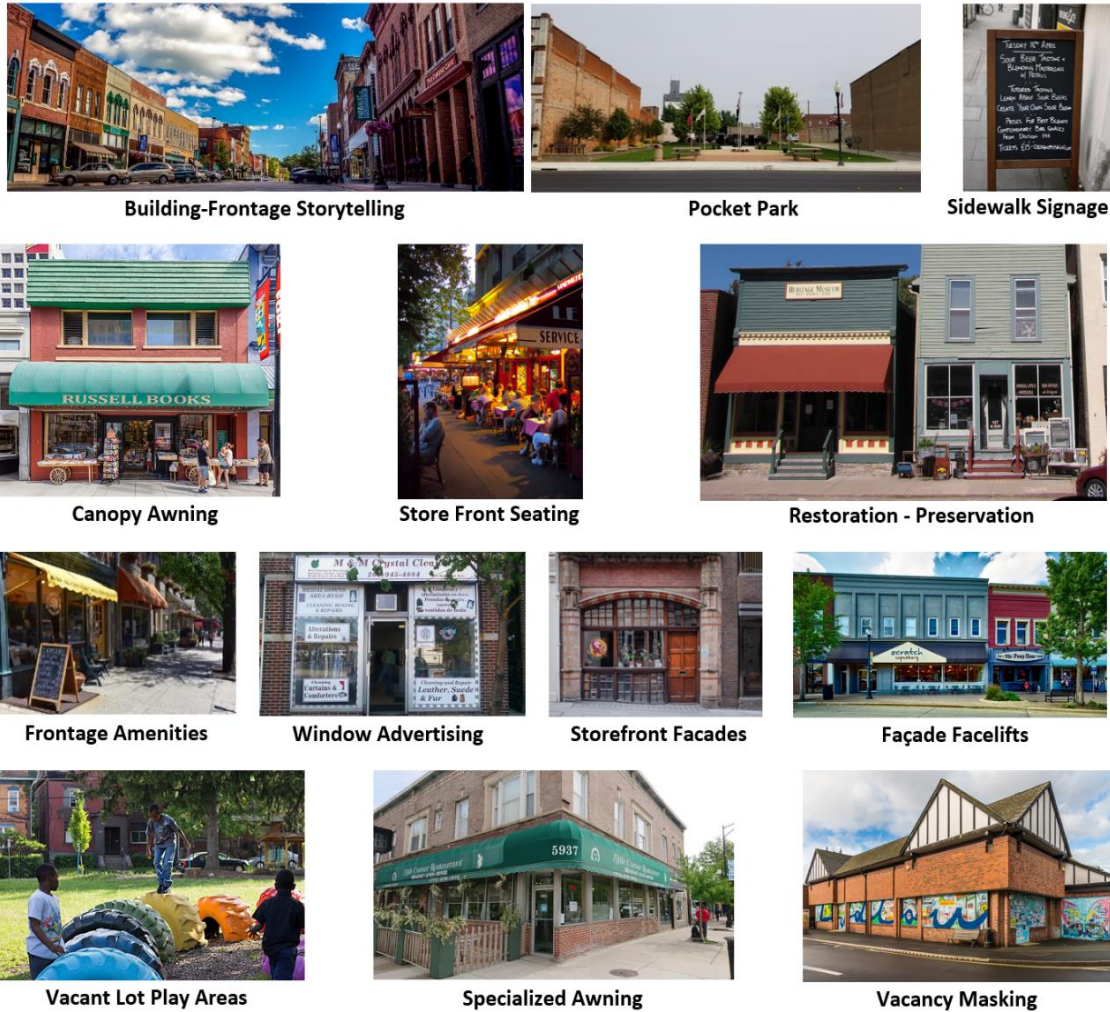


Figure 2.11. Building/Frontage Component: Design Elements
 (Source: <https://commons.wikimedia.org/wiki>)

2.3. Literature Review Summary: Rural Small-Town Main Street Design

A summary of principles and best practices of the street design programs reviewed in the literature review is helpful to apply a set of specific design principles to the case study design. This section will summarize the information gathered in the literature review by condensing them into a set of street design principles to summarize how those programs expand on the NMSC’s design approach (Table 2.9). Those principles then generate a

condensed set of eleven street design objectives that can apply more specifically to rural small-towns and guide the proposed site design.

Table 2.9 Summarized principles of street design programs from Literature Review.

Use an Expanded Complete Streets design to provide safe, convenient access and mobility for all users.

Design Green Streets elements to align transportation design with environmental stewardship elements.

Apply Context Sensitive Solutions to match regulated design guidelines with site-specific needs and requirements.

Utilize Placemaking practices to incorporate features reflecting cultural, historic, and other stakeholder needs.

Utilize a Three-Component Framework to organize design elements for street design.

The proposed transition from Literature Review findings to proposed design methodology, progressing from generic rural small-town design objectives to site-specific case study design is outlined in Figure 2.12. Figure 2.12 illustrates the process developed from the research: 1) Going from the high-level aspirations of the Main Street America's Design component, 2) To expanding on the MSA Design Approach by taking the Complete Streets Program Principles as well as best practice street design improvements across the spectrum of government and industry participants to refine proposals for generic rural small-town Main Streets, and then, 3) Applying those design considerations to specific design case study site – Sleepy Eye, MN.

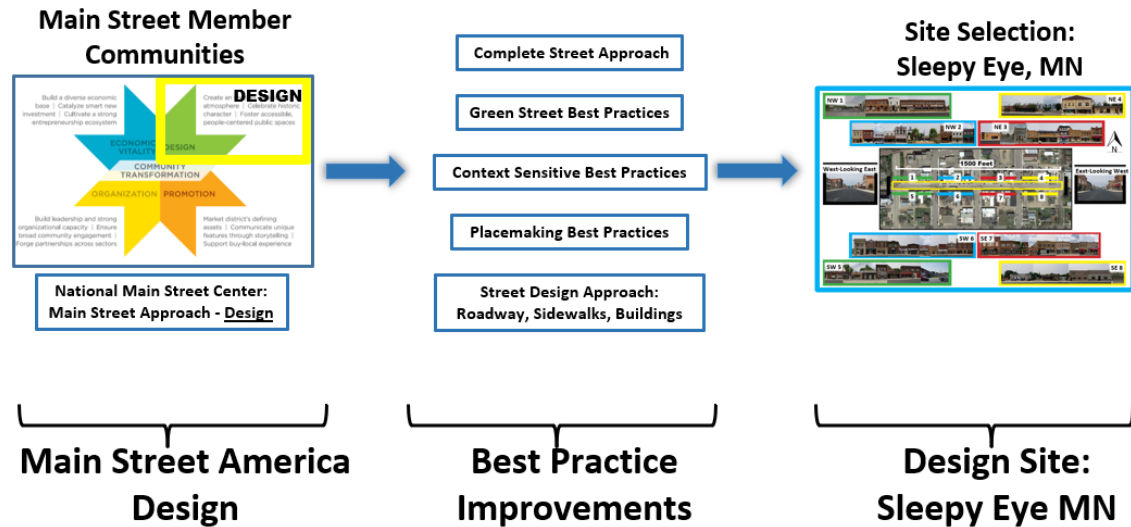


Figure 2.12. Thesis Design Approach derived from Literature Review Research
 (Source: Author)

2.3.2 Literature Review Street Design Program Objectives.

Literature Review street design principles and best practices are condensed in Table 2.10 to the design program objectives relevant to the Main Street Design of a small rural town.

Table 2.10 Street design objectives derived from Literature Review design principles

- Acknowledge Roadway Classification multi-hierarchy: Main Street / County-State Road (Recognizing that many Main Streets are also commercial arteries)
- Multi-modal: Vehicular / Bicycle / Pedestrian (access, mobility & safety)
- Complete Street - Green Infrastructure planning and implementation
- Infrastructure and services: Utilities (including Internet) / Parking / Lighting
- Economy – Amenity Mix: City/Town Viability and Design Supportability
- Historical / Cultural / Recreational Contributions
- Placemaking Amenities: Sidewalk and Street Furniture/Elements
- Street Design Investment: Timeline / Planning / Phasing
- Community Needs: Research values & priorities, vision-direction, plans & strategies, and practicalities of implementation.
- Individual Stakeholder Needs: All Users (Residents / Visitors / Customers)
- Economic Vitality: Balance with likely resultant Commercial / Retail / Residential revenues and taxes

Chapter 3: Case Study Design

3.1. Project Design: Process Introduction

This chapter outlines the process undertaken in the case study which applies information from the literature review to the rural small town of Sleepy Eye, Minnesota. The process was as follows:

Site Selection: Candidate site inspiration and drivers

Site Inventory and Analysis: Abiotic, Biotic, Cultural, Visual

Site Design Program: Projected Users and Objectives

Process Sketches and Concept Diagrams

Street-Component Precedents and Existing Conditions for Site

Site Master Plan, Perspective, and Section/Elevation Views

3.2 Site Selection

Site selection evolved from a mix of factors. An aspect of the Landscape Architecture degree program involves exposure to enhancing City Centers, developing community and recreational gateways or entrances, and enhancing access and mobility for all modes of transportation. The work of the National Main Street Center in these areas became apparent while developing town center designs. Due to my life experience with smaller rural communities, and the fact that the city centers of many rural small-towns, especially in Minnesota and Maryland, were products of collaboration with that program, the main street programs of those two states became part of my focus. This section elaborates on the final selection of Sleepy Eye Minnesota as the design case study site for this thesis work.

3.2.1. The Inspiration: NMSC Main Street Approach

The National Main Street Center’s efforts became obvious during the last ten to twenty years living in Maryland traveling to various communities that have been Main Street Maryland sites. The University of Maryland’s Urban Planning program, and the Landscape Architecture program subsequently provided an academic, and a design appreciation for the complexities of revitalizing town centers and street areas. Additionally, trips back to Minnesota over the last 4 years made me realize many of the unique communities back there were also involved in the National Main Street Center’s Main Street Approach (MSA) program (MSA, 2017). Research into the history, evolution, and execution of the NMSC program made the choice of a site in either Maryland or Minnesota practical and a personal challenge (Smith K., 2005; Smith C., 2002; Walker, 2008). Figure 3.1 provides a view of a few existing communities in Maryland and Minnesota that are associated with the MSA’s Main Street efforts.



Figure 3.1. Preliminary to Site Selection: Maryland and Minnesota Main Streets.

(Source: MD HCD 2018, PAM 2018)

3.2.2. Examples of MD & MN communities participating in NMSC’s program.

Three examples from both Minnesota and Maryland were documented in the design process as representative of existing rural small-town communities that use the Main Street America approach. These six examples demonstrate varying degrees of the street designs related to the MSA 4-Point Approach.



Figure 3.2. Representative Minnesota and Maryland Main Street Program Communities
(Source: Google Street View)

3.2.3. Sleepy Eye Minnesota as Case Study Design

Sleepy Eye, Minnesota is representative of the rural small-towns of interest and was selected as the case study design for this thesis. Sleepy Eye is located mid-way across southern Minnesota and is 45 miles north of Interstate 90 and 85 miles southwest of Minneapolis Minnesota (Figure 3.3).

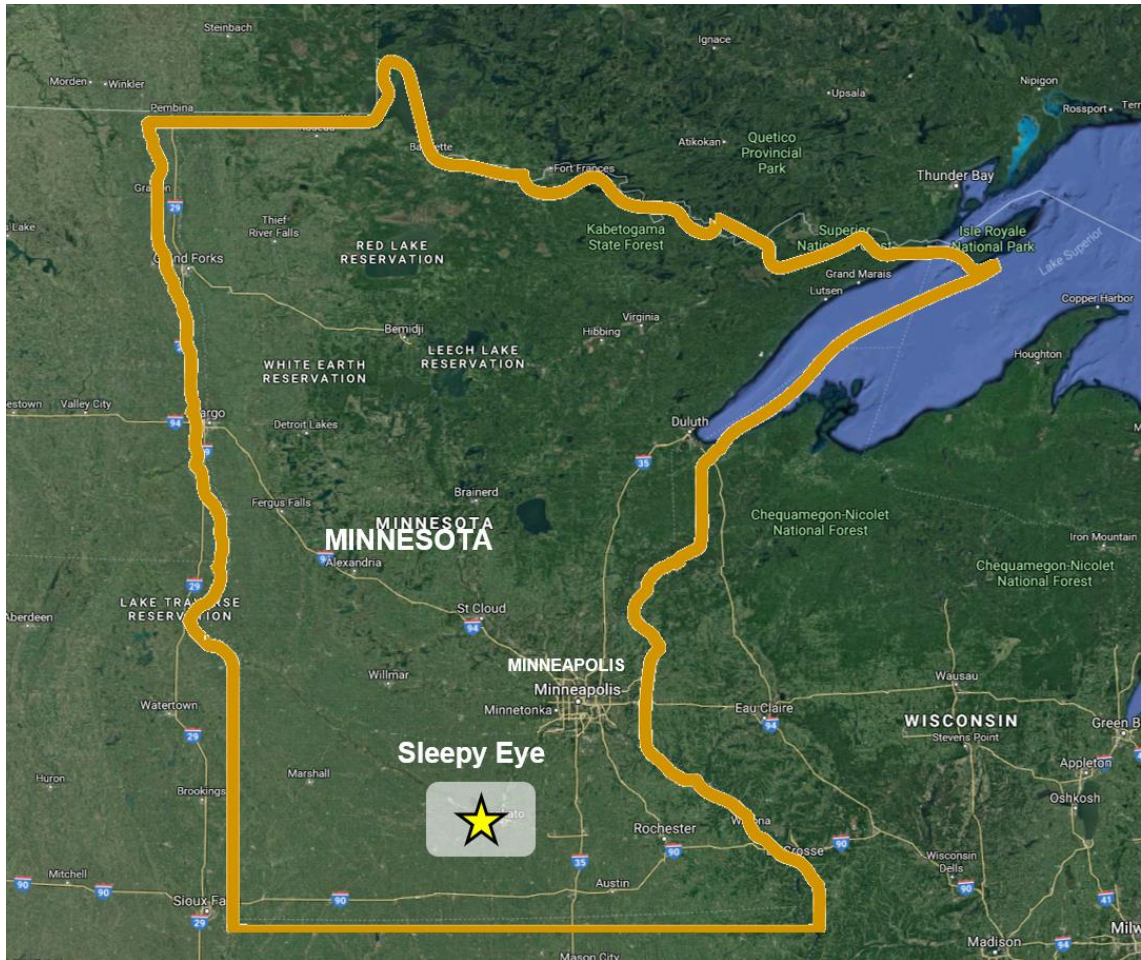


Figure 3.3. Location and Regional Context of Sleepy Eye, Minnesota
 (Source: Author modified Google Earth)

There were several reasons why Sleepy Eye, Minnesota was selected as the case study design site rather than a community closer by in Maryland. Sleepy Eye, Minnesota is representative of the rural small towns in Minnesota. In addition to the multi-decade familiarity I have with Sleepy Eye having been raised there, I have recently built working relationships there with city leaders as a result of research done there for UMD course projects. In the routine trips back to Sleepy Eye and the Southern Minnesota area over the last 10-15 years, I have discovered that the community itself has an emerging drive for revitalization that also is starting to leverage the Minnesota affiliate of the NMSC

through the Preservation Alliance of Minnesota (PAM) program. In contrast to the six selected examples, present-day Sleepy Eye, Minnesota's four-block Main Street area does not have a significant number of trees that contribute to the visual character of the town (Figure 3.4). Sleepy Eye provides an appropriate case study in which the application of green street principles to create design proposals would complement the overall quality of life and contribute to the current revitalization goals of the citizens of Sleepy Eye. The existence of a wide main street and sidewalks lends themselves to many of the best practice improvements called for in the street design. The building frontages are representative of many rural small towns in America and are relatively intact and well maintained.



Figure 3.4. Present-Day Sleepy Eye Minnesota Main Street- East looking West
(Source: Author photo)

3.3 Abiotic, Biotic, and Cultural Site Inventory and Analysis

Several of the street design programs, (primarily NMSC's Main Street America, and in

the principles of Placemaking), emphasize that revitalizing a main street is part of a complex effort that ties the social, economic, and cultural aspects of a community to the changes necessary to make them successful. In this regard, the site inventory in the case of a town center to be represented by a proposed main street design must not only acknowledge the abiotic and biotic aspects of the site inventory. The site inventory must also investigate the cultural and existing visual or photometric aspects of the site inventory and analysis that are critical to defining the users, usage, and design objectives that the case study design will encompass.

Abiotic, biotic, and cultural patterns were documented at a variety of scales to understand the case study site and the overall broader context. Broad street and road patterns, overall slope and topography, and zoning were documented for the Sleepy Eye area. For the design case study, a four-block area was selected along an East-West transect on Main Street, Sleepy Eye Minnesota. The location of the four-block area is noted in Figure 3.5.

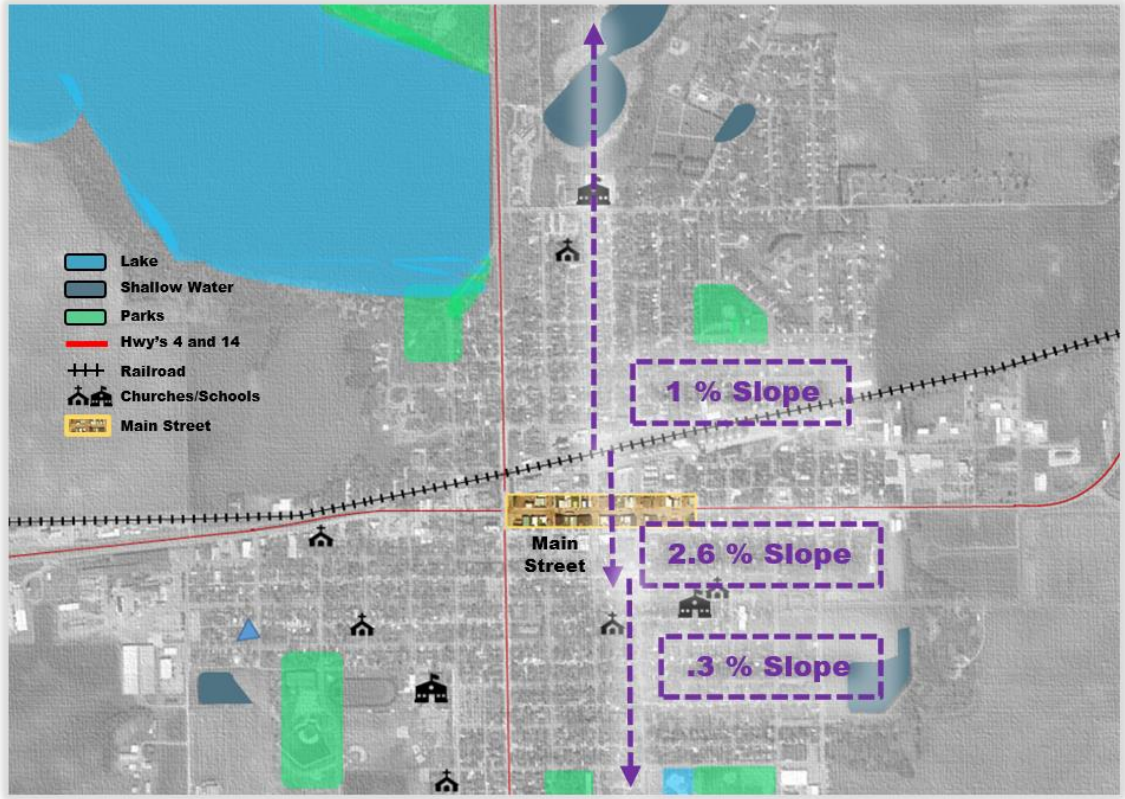


Figure 3.5. Local Context: Main Street Sleepy Eye Area
 (Source: Author enhanced Google Earth overhead view)

3.3.1 Site Inventory – Abiotic and Biotic

Topography and geography represent the norm in much of the upper Midwest of flat, post-glacial soil farmland. As seen in Figure 3.6 there is only a moderate slope (1% or less) across the Sleepy Eye city limits from North to South, with a higher percent north to the south slope (approximately 2.5 %) for a block on either side going the length of Main Street. Other than for stormwater considerations, the topography does not introduce significant design considerations.

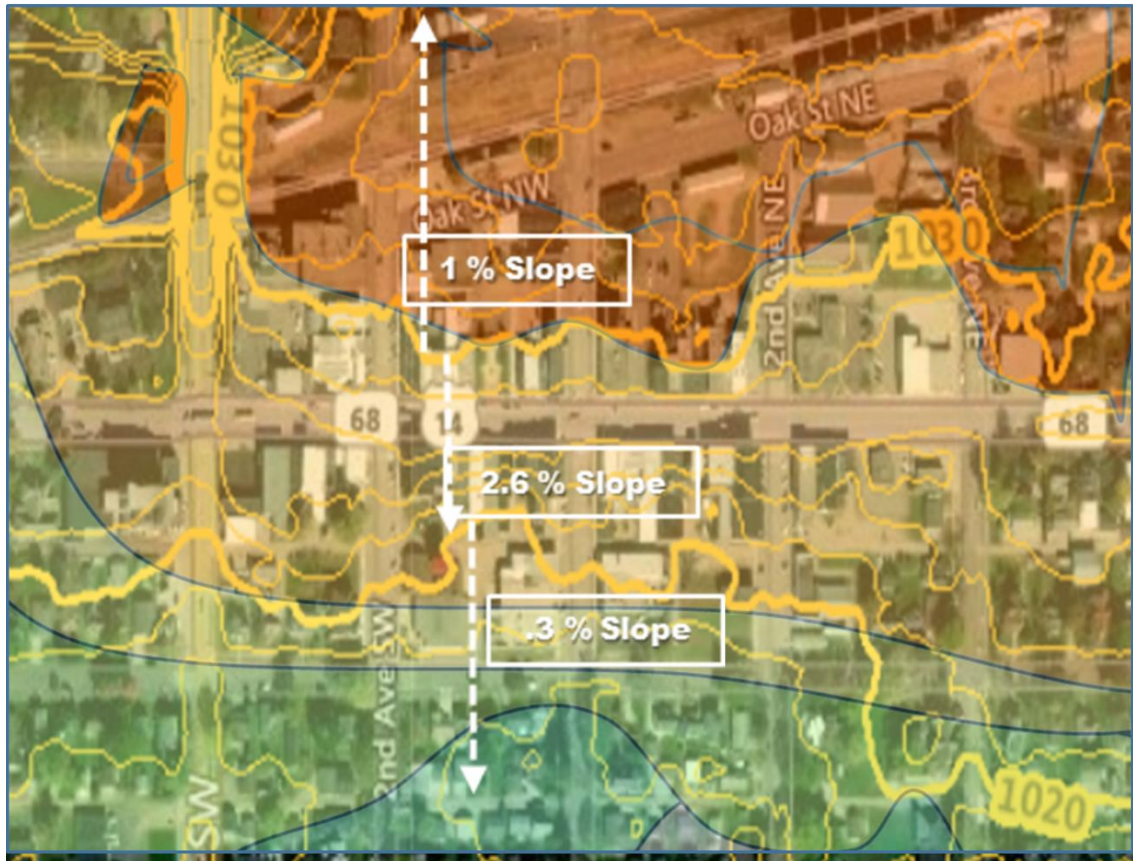


Figure 3.6. Site Inventory: Abiotic
 (Source: <http://arcgis.dnr.state.mn.us/maps/mntopo/>)

In the Biotic context (Figure 3.7) for Sleepy eye, as in most of Minnesota, water and watersheds are everything. The hydrological environment provides a context in the form of commercial, tourist, and cultural drivers for Southern Minnesota (MN DNR, 2013). These factors help shape economic drivers, “local branding”, and define the character of the various regions and rural small-towns in Minnesota “Land of 10,000 Lakes”. The strong agricultural roots in mid and southern Minnesota from the lakes, river basins, and watersheds structure are as much a part of the tourism base as they are the economic base of the cities and small towns.

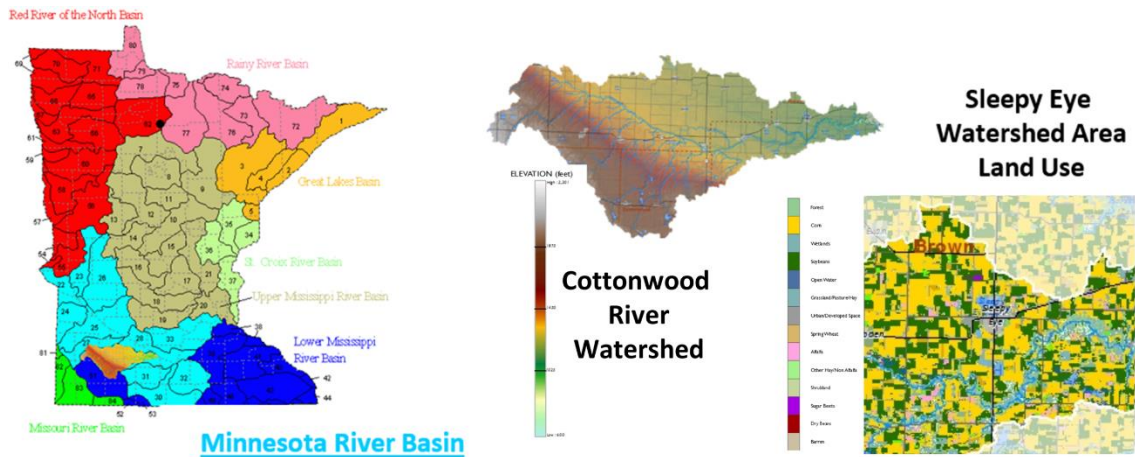
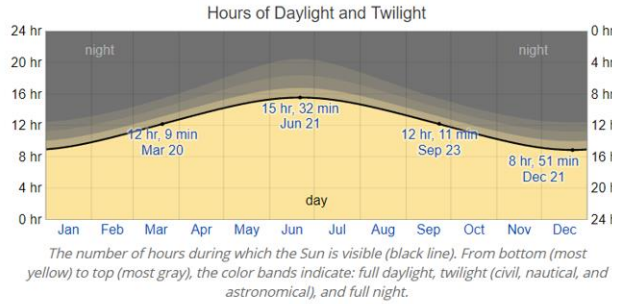


Figure 3.7. Site Inventory: Abiotic and Biotic - Watersheds

(Source <https://www.dnr.state.mn.us/watersheds/map.html>, <https://mrbdc.mnsu.edu/mnnutrients/watersheds/cottonwood-river-watershed>)

The climate in Minnesota, with its sharply defined annual seasons, is a pivotal consideration in most all aspects of life, more specifically also shapes the use of Green and Sustainable Street elements. Figure 3.8 illustrates rainfall, sunlight, and wind direction/speed considerations that demonstrate the cold, dry nature of the Southern Minnesota winters, and the wet and warm, if somewhat abbreviated nature of the late spring, summer, and early fall growing seasons. These climate factors are also important to the commercial and recreational use by all stakeholders of a rural small-town main street, as well as the design aspects of any soft landscape elements and storm water treatment considerations. Soft landscape elements must be chosen to survive long, cold, dry winter months and street design must consider any street surface protrusions during routine snow removal operations.

Climate Averages: Jan 1980 – Dec 2016



KULM: New Ulm, New Ulm Municipal Airport

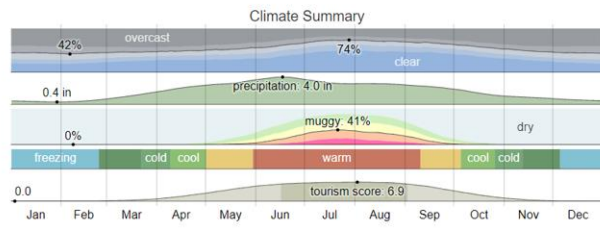
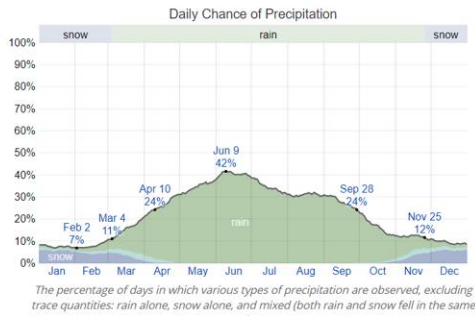
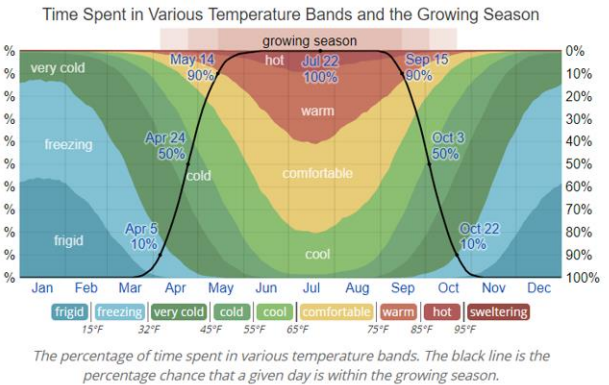
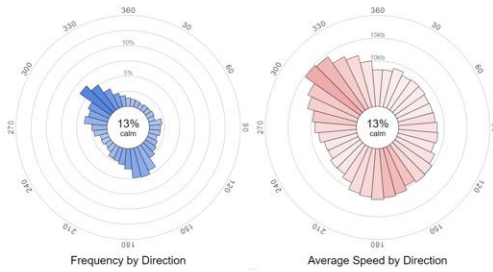


Figure 3.8. Site Inventory: Abiotic and Biotic - Climate

(Source: <http://windhistory.com/station.html?KULM>, <https://weatherspark.com/y/9926/Average-Weather-in-New-Ulm-Minnesota-United-States-Year-Round>)

3.3.1 Site Inventory – Cultural: Land Use

Zoning/land use and circulation reflect a common small-town pattern – a mixed-use traditional-style main street also serving as an arterial highway surrounded by grid layout city-wide streets (Figure 3.9). The three North-South streets in red are the main cross-roads that form the three central intersections of the case study site. As in many rural small towns, there is also a set of railroad tracks that serve the region, sufficiently offset

from the main street (by a block to a block and a half to the north) in this case to preclude posing an impact on the design.

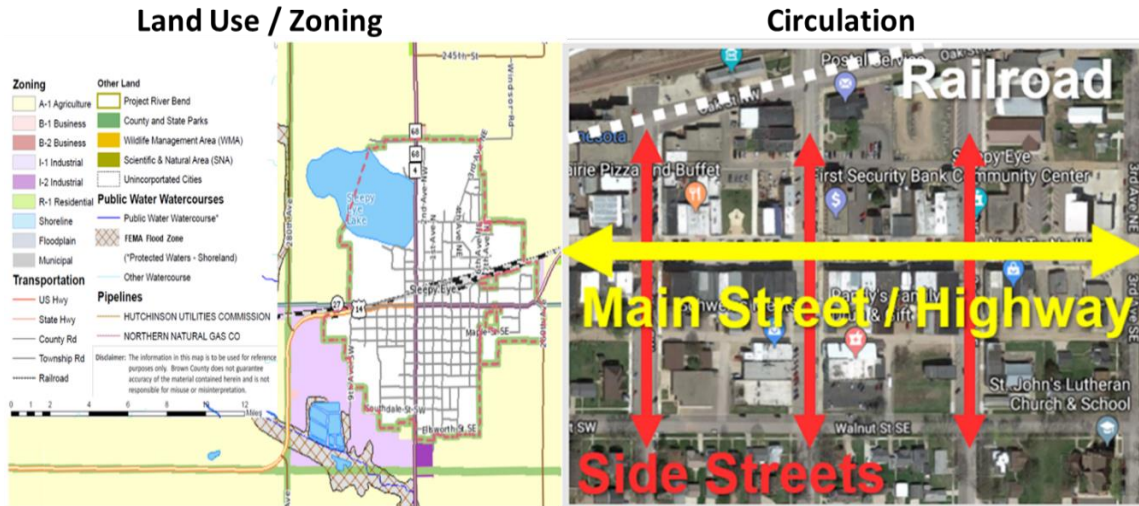


Figure 3.9. Site Inventory: Cultural - Land Use

(Source: <https://www.co.brown.mn.us/images/Department/Maps/zonemap2.pdf>, Google Maps modified by Author)

3.3.2 Site Inventory – Cultural: Demographics and Stakeholders.

Site Inventory and analysis related to demographics and stakeholders’ desires provided a useful cross-section of the factors contributing to the makeup of this rural small-town. Of note, the town has done work within the last couple of years to reinvigorate efforts to revitalize the visual and economic aspects of the main street area of town as well as actions to implement broader improvements across the towns’ recreational, educational, and business areas. The city leaders have gathered valuable input on stakeholder needs and desires by charettes, and regular meetings of the City Council, the Chamber of Commerce, a Downtown Revitalization Committee, and a Chamber of Commerce-sponsored group of motivated business members and citizens called the Young Professionals. As part of the Cultural analysis, several years’ worth of meeting minutes

and records have been reviewed for the town's City Council, the Economic Development Authority, and the Downtown Revitalization Committee in addition to personal interviews as mentioned later in Section 3.4 of this thesis. These insights, along with the demographic and census related data presented here, informal results from a town visioning charettes (July 2018) and informal interviews have all helped define the site design objectives, and the design programs' "representative users" that helped guide the nature of the design proposal for this site.

Demographics and Census Data


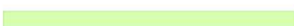
Conclusions drawn from demographic and census data for the town of Sleepy Eye are shown compared to the values for the state of Minnesota to keep the analysis relevant to the region in which Sleepy Eye competes as a population center. The median resident age in Sleepy Eye is 37.9 years and closely matches that of Minnesota's median age of 38.0 years (Figure 3.10). Sleepy Eye's median household income is significantly lower than the state's median household income (by roughly 28%), and over the period from 2000-2016, that gap widened compared to Minnesota as a whole by another 10%. This disparity in median household income is perhaps mitigated for some by at least a significantly lower cost of home ownership in the community. The demographics show an increase in the population diversity over 10 years for Sleepy Eye, and a comparison to county data shows that Sleepy Eye has a five times larger percent Hispanic population than the county as a whole. Anecdotal discussions and informal interviews over the years indicate this diversity is viewed as a positive factor by city leaders and most of the population. There is a sense of mutual pride in the diversity of the town and its school systems. Income distribution by total population is bimodal with peaks in 30K and 100K

in Sleepy Eye (Figure 3.11).

Population in 2014: 3,460 (97% urban, 3% rural). Population change since 2000: -1.6%

Median resident age:  38.0 years
 Minnesota median age:  37.9 years

Median household income in Sleepy Eye in 2016:
 Sleepy Eye:  \$47,344
 State:  \$65,599

Change in median household income between 2000 and 2016:
 Sleepy Eye, Minnesota:  +27.5%
 State:  +39.2%

Estimated median house or condo value in 2016: \$124,536 (it was \$79,400 in 2000)
 Sleepy Eye:  \$124,536
 MN:  \$211,800

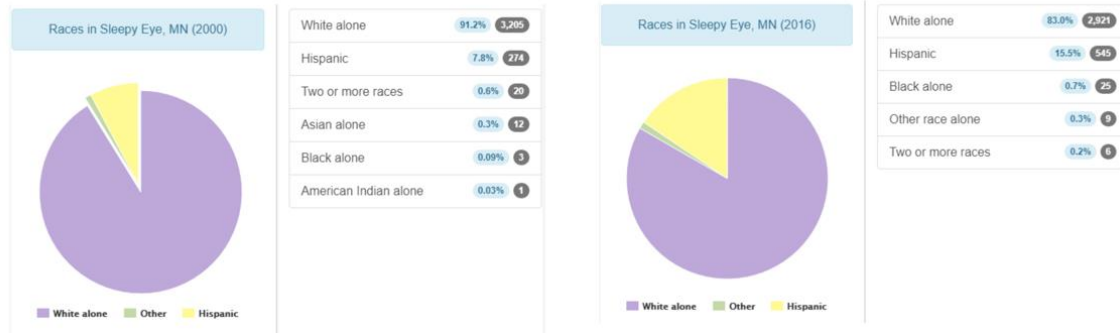
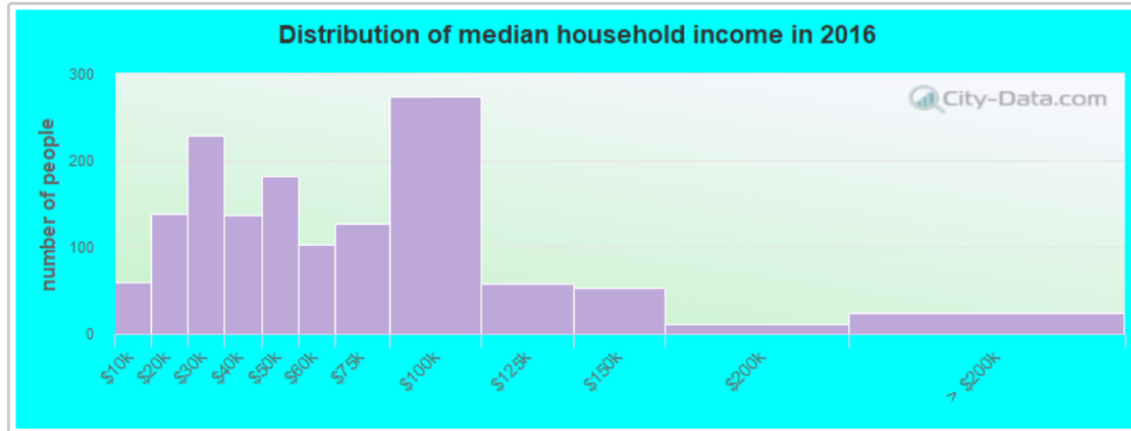


Figure 3.10. Site Inventory: Cultural - Census Data: Household Statistics

(Source: <http://www.city-data.com/city/Sleepy-Eye-Minnesota.html>)



Town demographics shape Main Street day-to-day users. Median age of 37.9 matches closely to that of Minnesota Household income is lower and widening.
 Lower cost of housing
 Population also shows an increasing diversity
 Population compared to County averages, has a 5 times larger Hispanic population.

Figure 3.11. Site Inventory: Cultural - Census Data: Income Distribution
 (Data Source: <http://www.city-data.com/city/Sleepy-Eye-Minnesota.html>)

Sleepy Eye: Design Consideration Extracts from Town-Generated Visioning Charrettes

The Director of the Sleepy Eye’s Chamber of Commerce provided summaries of charrette results from two meetings that town members held concerning their vision for Sleepy Eye. One was from a downtown revisioning meeting by a group called the Sleepy Eye Young Professionals, sponsored by the Chamber of Commerce in May of 2018. The second set of charette notes were from a town visioning session sponsored by the Economic Development Authority (EDA) for Sleepy Eye. This second charette in July of 2018 followed a three-day consulting visit by Ron Drake, an author whose profession is

the make-over of towns and communities (Drake, 2013). The items listed in Table 3.1 are the items from the charette summaries that are relevant to the street design proposal for the case study site (Sleepy Eye, 2018; Sleepy Eye, November 2020; Sleepy Eye, December 2020).

Table 3.1 Town Charette-Generated Main Street Design Improvements

Streets: Large-marked crossings, Green and Sustainability considerations, vehicle-slowing designs, street as a destination, designs for potential alternative street uses (Festival, Dances, Fairs), well-marked parking

Sidewalk: Bicycle stands/rental racks, Sidewalk furniture/seating, Maps/Information, ADA friendly, Pocket Libraries, shade/greenery

Buildings-Facades: Vacant facades utilized, Residence-friendly entrances, Mixed-use fronts, Pop-up store fronts, Historical preservation, and restoration

Signage: Off-Street Parking, Marked-short term parking, Vibrant pedestrian markings, Traffic control guidance, Town- “brand” and heritage signage

5. Pocket Park & City entrance/Gateway: Farmer’s market, Movies, Music, Art, Food-Beverage-Popcorn truck, improve the landscaping at entrance/gateway

3.3.3 Site Inventory – Cultural: Context and Historic Imagery/Photos.

The documentation of cultural aspects of the site including its history helps portrays some of the cultural and historical flavors that most small towns have in one way or another that make them unique, a flavor that often forms the basis for some beneficial “name-branding” and placemaking that can be incorporated into the design. The literature review provides several strong arguments for the value of establishing a desired character for a place. This concept is sometimes referred to as place or name branding for marketing purposes (Nichols, Jackson, & NMSC 2004; Place Branding 2019; NMSC 2018; Preservation Green Lab 2016).

The aerial views in Figure 3.12 provide some regional context and a view of the

progression from old platted-surveyed farmland into what became a booming regional agricultural center in the early 19th century. Sleepy Eye evolved into a normal rural Minnesota small-town over the latter part of the 19th Century and joined many small towns in the Midwest whose economic fate rested on the evolving viability of prevailing agricultural fortunes and medium-sized industries that may have been present. The center column of photos shows the historical heritage of the town's Sioux Indian Chief namesake, the legacy of its trademark grain mill, and the lake that forms the hub of its current recreational and tourism draw. The timestamped Main Street photos show the commercial progression of its main street, similar to what you would see across our county in many of the small towns that were at the crossroads of economic, recreational, and commercial roadways and railways. (MN DOT April 2019)



Figure 3.12. Site Inventory: Context, Cultural and Historical

(Sources: As annotated individually)

3.3.4 Site Inventory: Visual-Photometric Views.

This set of photometric views in Figure 3.13 surround overhead imagery of the 1500-foot, four-block-long section of the downtown area that most clearly comprises a main Street for the site. The color-coded collages show unobstructed views of each of the buildings and lots along this main street taken during several site visits. These views of each building and frontage were then cleaned up, restored as necessary, and modified with photoshop to present a consistent set of building façade images.

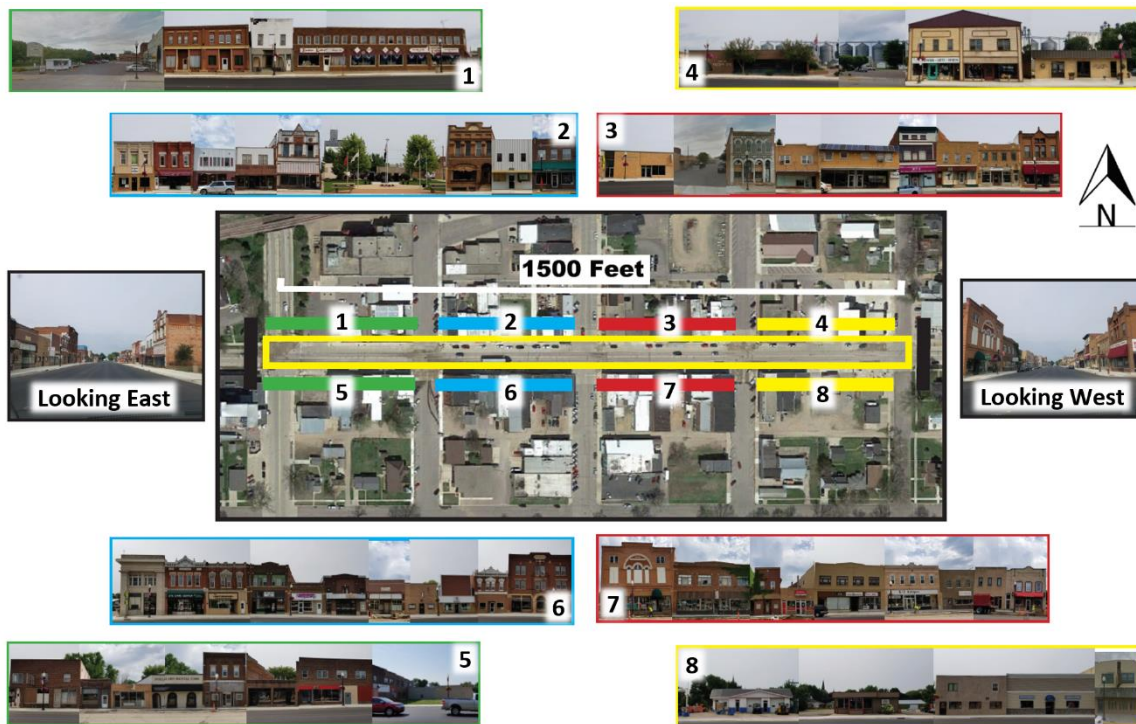


Figure 3.13. Site Inventory: Visual-Photometric Views

(Source: Author photos & Google Earth Overhead View)

3.4. Site Design Program: Projected Users and Objectives.

In order to ensure the designed Main Street incorporates design elements that are appropriate to the needs of the stakeholders, it was necessary to envision the range of users and objectives that the design needs to accommodate. A summary of the Main Street design objectives for rural small towns from the literature review is also presented. Some user parameters were drawn from the literature review census demographics of the community, insights into the vision and mission of the town from community-run charettes, review of several years' worth of city management meeting minutes, and interviews over half a dozen site visits and numerous phone calls or person-to-person interviews with city management staff, chamber of commerce staff, and numerous individual residents and business owners.

3.4.1 Projected Users/Usage.

The following factors in Table 3.2 capture the user groups and relevant stakeholder parameters that this case study site's main street design should accommodate.

Table 3.2 Case Study Site Stakeholder/User Group Parameters

Singles, Couples, Families

Elder, Middle-aged, Youth

Retired, High/low salary workers

Business owners, patrons

Residents, Visitors, Tourists

Urban and Rural Expectations

Racial, Ethnic, Cultural Diversity

Active lifestyle, ADA friendly



Type of visit: drop-in, shopping, workplace, etc.

Periodicity: Quarterly/infrequent, Weekly, Daily, etc.

Accommodations should be considered to support current or possible special events: Festivals, Commercial events, Street Events/Parades, etc.

Figure 3.14 provides several sets of user groups that were generated to help visualize the design needs and elements that were considered for the case study site in Sleepy Eye.

One of the towns biggest community events “Corn Days” was also analyzed since it poses the greatest range of annual requirements on the Main Street area with a main street parade, sidewalk dining and shopping, and an evening street dance on 1st Avenue South, a side street right off Main.

- **Young Professional Couple: Married, No Kids, Business co-Owners, College, Returned to Town, Husband grew up farmer. Racial-Ethnic Diversity**  - Live in town, residential
 - 8hrs/day Main Street
 - 3 nights/week in-town activities
- **Family: Parents-One from Farm/One from Metro. Son and Daughter Parochial Elementary School. Wife blue collar town, Husband skilled farmhand**  - Live in house just outside town
 - 8hrs/day Commercial-off Main(wife)
 - 2 nights/week in-town activities
- **Regional Travelers from larger city, repeat visitors to Southern Minnesota, kids grown, both white collar, Racial-Ethnic Diversity**  - Live in house in nearby Urban area
 - 8hrs/day Commercial-off Main(wife)
 - 2 nights/week in-town activities
- **Retired Farm Couple and Spouses' Widowed Town Friend, Their Racial-Ethnic Diverse Families visit 2x Month**  - Share house 1 Block off Main
 - 2hrs/day on Main
 - 3 nights/week in-town activities
- **Group of 4 High School Friends, 2 boys, 2 girls, 2 from farm, 2 from town. Play school sports, 2 also job shadow, Racial-Ethnic Diversity**  - 2 live on Farms, 2 live in Town
 - 1 hr./day on Main
 - 2 nights/week in-town activities

Design Example Annual Street Event: “Corn Days” Annual 3rd Fri/Sat of August. Food festival and contests, Park and Main Street events, Parade, Evening Street Dance, Fitness Runs, Historical displays



Figure 3.14. Site Design Program: Projected Users/Usage

(Source: Author and <http://sleepyeyechamber.chambermaster.com/events/calendar/>)

3.4.2 Proposed Sleepy Eye Site Design Program Objectives.

This set of Design Objectives differs from the generic rural small-town objectives laid out in the Literature Review section only in that it highlights in the first objective that Sleepy Eye is one of those small towns whose main street is also a major US commercial

artery. (East-West U.S. Route 14, one of the original United States highways of 1926 with a length of 1,398 miles. It runs roughly parallel to Interstate 90 with its eastern terminus in Chicago, Illinois, and its western terminus at the east entrance of Yellowstone National Park in Wyoming.) Several State DOT references elaborate on necessary considerations in the cases where Main Street is also a state or national highway (MD DOT SHA 2001; ODOT TGMP 1999; Ohlms, Roy & VDOT 2016; WA DOT 2009; WA DOT 2019; MI DOT 2016; CALTRANS 2012). In these cases, in particular, coordination with governmental Departments of Transportation is also critical since there will be many areas where competing interests such as mobility and access by all users are influenced by external actors and factors, and extensive collaboration is necessary to ensure long term plans are coordinated at all levels.

The Main Street design objectives derived from the Literature Review are aligned here roughly with the Street Design programs that they most closely exemplify.

Complete Streets related

1. Acknowledge Roadway Classification multi-hierarchy: Note that Main Street in Sleepy Eye is also a regional highway.
2. Reflect Multi-modal usage: Vehicular / Bicycle / Pedestrian loading & safety.

Green Streets related

3. Green Infrastructure planning: Stormwater, softscape, sustainability, pollutions

Placemaking related

4. Placemaking considerations: Amenities-Sidewalk and Street Furniture, Building Frontages, Signage, designs for safety and socializing, accessibility.
5. Historical / Cultural / Recreational Contribution

Context Sensitive Solutions related

6. Reflect Community Needs: Research values & priorities, vision direction, plans & strategies.
7. Reflect Individual Stakeholder Needs: Residents / Visitors / Customers
8. Align with town Economy – Amenity Mix: Enhances town Commercial-Retail-Resident long-term viability and supportability.
9. Accommodate current and future infrastructure and services: Utilities / Parking / Lighting/maintenance
10. Balance Street Design Investment: Timeline / Costs / Planning / Phasing
11. Economic Vitality: Revenue and tax base supported by Main Street design – Commercial / Retail / Residential components

Programming Objectives-to-Design for Sleepy Eye Main Street will then take the design program objectives and incorporate the street design elements that are categorized into the three-component framework of Roadway / Sidewalk / Building façade. Rural small-town three-component design elements summarized from section 2.2 are shown in Figure 3.15 to illustrate the elements that are specifically relevant to the Sleepy Eye site. (Highlighted items are the only ones that do not apply to the Sleepy Eye design).

Roadway Design Elements:

Elements related to the vehicular surface area of a Main Street

CROSS WALKS / INTERSECTIONS

- Texture-Physical shaping
- Markings
- ADA
- Pedestrian protection
- Bicycle protection

ROADWAY SIGNAGE

- Place signs
- Parking signs
- Traffic flow signs
- Informational: rest rooms, etc.
- City Brand for MSA
- Walking Signage

ROADWAY FEATURES

- Parklettes
- Gateways
- Landscape hardware
- Rain Gardens**
- Storm water

CONFIGURATION

- Surface material
- LOS Level of Service
- Traffic Calming
- Speed Management
- Lane width/use
- Parking
- Medians, refuge islands
- Bike lanes
- Markings-striping surface
- Bus Stops**
- ADA features
- Utilities
- Side-street access**

Sidewalk Design Elements:

Elements related to the pedestrian surface areas of a Main Street

FORM:

- ADA curbs/thresholds
- Corner Bump outs
- Material-Textured/painted
- Crossing assists/warnings

FURNITURE:

- Tables
- Benches, chairs
- Umbrellas – Canopies
- Shelters**

SOFTSCAPE:

- Street Trees/Shrubs
- Hanging plants
- Planters/Flowerpots

OTHER FUNCTIONAL ITEMS

- ATM's**
- Signage Informational, Maps
- Signage: Historical, Interpretive
- Parking meters
- Trash cans
- Newspaper boxes
- Mail USPS boxes
- Bike racks, rental stations
- Fountains/Water Features
- Street Art/Sculptures
- Graffiti Boards
- Bollards**
- Hydrants
- Flags
- Banners/Fold-Sandwich Signs
- Merchandise stands
- Street vendor space
- Lampposts pedestrian-scale
- Wi-Fi and Charging Stations

Building Design Elements:

Elements related to the vertical side faces of a Main Street

DOORS/WINDOWS/FACADES

- Doors, ADA Considerations
- Windows and contents
- Fillers (vacancy "masks")
- Treatments
- Transoms
- Display Cases
- Facades/Walls
- Public Murals
- Advertising
- Preservation-restoration

Reconstruction

BUILDING SIGNAGE

- Canopies-awnings:
 - Flat, Curved, domed
- Shade
- Advertising
- Lighting
- Projecting Signs
- Neon Signs
- Sign design: Flush, Blade, etc.**

VACANT BUILDING or LOTS

- Pocket Parks
- Skateboard Park**
- Rest/Sitting Areas
- Restrooms
- Visitor Kiosks

Figure 3.15. Proposed Three-Component Framework Design Elements for Sleepy Eye

(Source: Author)

3.5 Process Sketches and Concept Diagrams.

Using the knowledge from the Literature Review, the site inventory information, as well as the site design program objectives and projected users, it was then appropriate to drill down on the site itself to establish the process for the design of the site itself. This progression roughly took shape in the process you see here.

3.5.1 Functional Diagrams.

A visual representation of the functional layout of the city of Sleepy Eye and then the 4-block area that logically projects itself as the Main Street area (Figure 3.16).

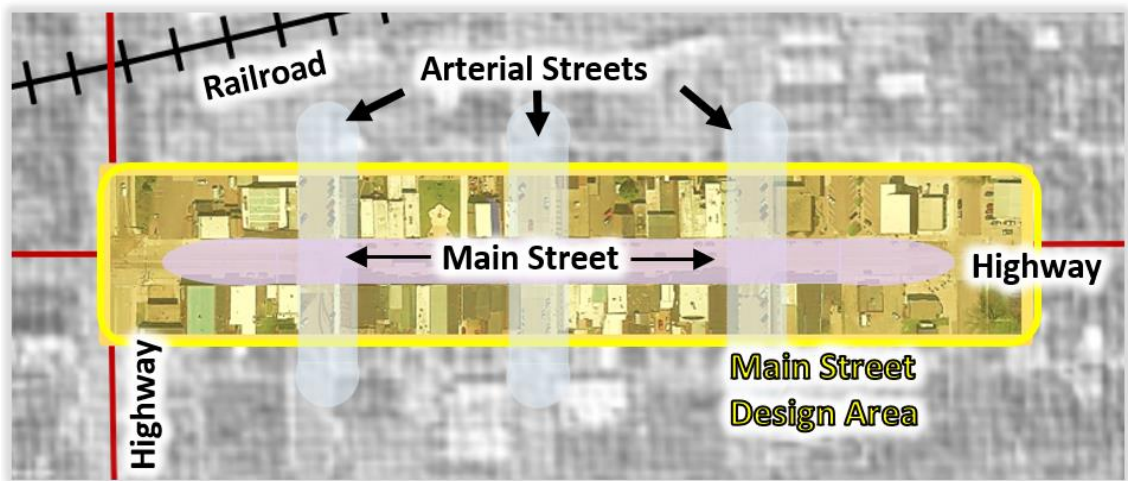


Figure 3.16. Functional Diagram-Main Street
 (Source: Author enhanced Google Earth overhead view)

3.5.2 Concept Diagrams

Current Use

A concept view of current use for the four-block main street area is characterized by mixed-use arrangements of commercial and retail buildings and three pocket parks (Figure 3.17). Two of the pocket parks are located on each end of the study area and one is located on the northern side of one of the interior blocks (Figure 3.17) Approximately 75% of the commercial and retail buildings are two-story retail structures that have apartment residential accommodations on the second floor. Some buildings have access to Main Street via stairwell doorways and others access back entrance alleyways.

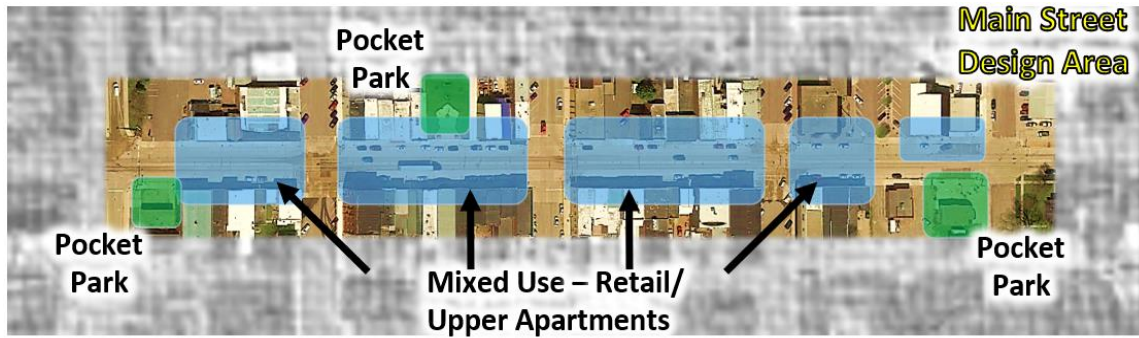


Figure 3.17. Concept Diagram: Zoning Usage
 (Source: Author enhanced Google Earth overhead view)

Multi-Modal Use Concept Diagram

The four-block case study area has five intersections that comprise the length of the Main Street (Figure 3.18). An analysis of the vehicular, bicycle, and pedestrian traffic of these five intersections is useful from a multi-modal aspect. This analysis was supplemented with information from interviews discussing the relative usage of arterial streets and functional points of interest in the Sleepy Eye.

Figure 3.18 shows a hierarchy that defines the prioritization of intersection and crosswalk design and the potential impact of design elements for the roadway and sidewalks. This analysis illustrated the value of having a more heavily modified primary intersection that would promote the pedestrian use of the entire 4-block area by creating a safe and accessible intersection (median extends East-West across the intersection) that is protected from some of the vehicular complexities posed by the two way left turn lane (TWLTL) on a commercial highway that comprises the main street area. The Secondary intersections will enhance the main street feel through moderate best practice street design interventions yet still allow the North-South vehicular cross-traffic and the TWLTL that residents and visitors will require to support routine usage. The Tertiary

intersections' focus will be to provide a gateway or entrance appearance to the main street focus area as well as incorporating appropriate modest street design upgrades.

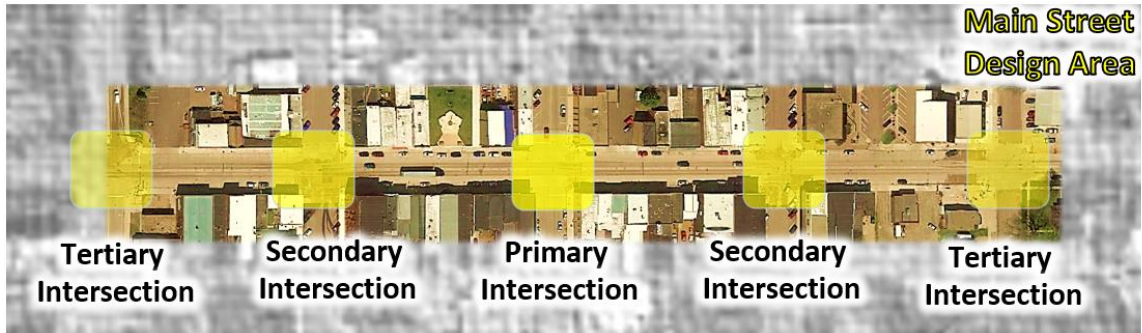


Figure 3.18. Concept Diagram: Multi-Modal Usage
 (Source: Author enhanced Google Earth overhead view)

Three-Component Framework

Concept Diagram: Project Design with the three-component framework (TCF). Figure 3.19 concept diagram illustrates the concept proposed of how to categorize the roadway, sidewalk, and building components for the Main Street master plan combined with the Figure 3.18 approach of scaled modifications for the primary, secondary, and tertiary multi-modal intersections.

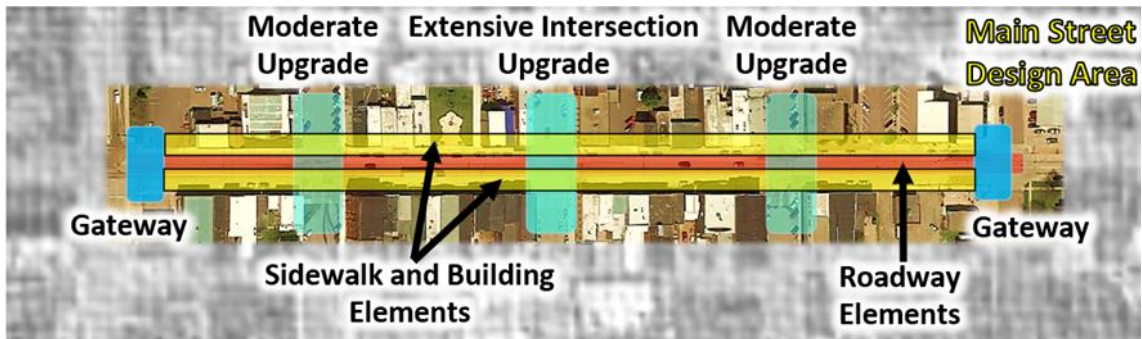


Figure 3.19. Concept Diagram: Project Site with Three-Component Framework
 (Source: Author enhanced Google Earth overhead view)

3.6. Street-3 Component Visual Examples, Existing Conditions, Issues

The next step in the design process was to take the objectives for a rural small-town Main Street design, the street element possibilities gathered through the research for roadway, sidewalk, and building component areas, and then determine which ones applied to the specific site design for Sleepy Eye. This list of relevant design elements is also influenced by the site inventory, the site analysis, and the projected users/stakeholders and events as covered earlier. As in the case of Sleepy Eye, each Main Street site will be unique, with almost all the design elements having relevance to varying degrees. The extent and range of improvements made would obviously revolve a great deal around cost, priorities, and timing/phasing. As part of the design process for the site, the next couple of slides will examine some of the issues and existing conditions on the site for each of the three-component framework areas, roadway, sidewalks, and buildings. For each of the components, there will also be a table that identifies some potential design improvements that can be made based on the literature review of street design principles and best practices. It should be noted that the Main Street in the Sleepy Eye site has great potential for design improvements since it already has wide sidewalks and a wide roadway.

3.6.1. Roadway Components Visual Examples, Existing Conditions, Issues

Roadway Components: Figure 3.20 provides numerically tagged views of the roadway at twelve different locations along the four-block main street site. Here you see photographic examples of the existing roadway element of the site. While the roadway does look blank here, that is partly because the state Highway Department was in the process of re-paving the Main Street in conjunction with city utility work along the street.



Figure 3.20. Roadway Components Visual Examples
 (Source: Author photos & enhanced Google Earth view)

Roadway Component Visual Examples, Existing Conditions, Issues:

Table 3.3 addresses existing conditions and issues for the Sleepy Eye case study site roadway component.

Table 3.3 Roadway Component Existing Conditions, Issues

- Main Street also serves as a major National East-West Highway
- High volume, high tonnage commercial, and agricultural traffic
- No traffic calming/slowing designs
- Over-wide driving lanes (encourages speed)
- No existing bicycle accommodations
- No corner curb extensions
- Few pedestrian considerations given road width and usage
- Low visibility crosswalk street markings
- Outdated environmental stormwater considerations
- Sterile appearance due to absence of street greenery
- Main Street recently re-surfaced with lane restrictions
- Pedestrian request-warning lights installed where stoplight removed

Roadway Component Design Proposals:

Table 3.4 addresses design proposals based on street design principles and best practices for the Sleepy Eye case study site roadway component.

Table 3.4 Roadway Component Design Proposals

Legal and signage guidance on speed limits

Modifying the number of traffic lanes such as, from four lanes to three (two travel lanes plus a center turn lane)

Installing medians (to eliminate left-hand turns or cross-traffic left-hand turns from mid-block driveways or parking spots)

Eliminating left-hand turns at corners in the pedestrian-traffic-heavy central main street blocks

Reducing corner-curb ratios (forces vehicles to slow down more to accommodate tight corners)

Provide pedestrian safe havens such as at medians or at curb extensions (in order to facilitate crossing traffic and to make pedestrians more visible to drivers)

Emphasizing the location of crosswalks and bike lanes through visual clues (painting, surface texture, enhanced lighting, etc.)

On-street parking (often highly desired anyway, but not only slows traffic but also buffers the roadway-sidewalk-building interface)

3.6.2. Sidewalk Component Visual Examples, Existing Conditions, Issues

Figure 3.21 provides numerically tagged views of the existing four-block main street sidewalk at twelve different locations along the four-block main street site. The photographic examples of the sidewalk component march first from west to east on the north side of the main street and then return from east to west along the south side. Note the sidewalks are wide but are relatively barren and uninviting. The notes here are for existing conditions and issues, highlighting pertinent aspects for design interpretation.

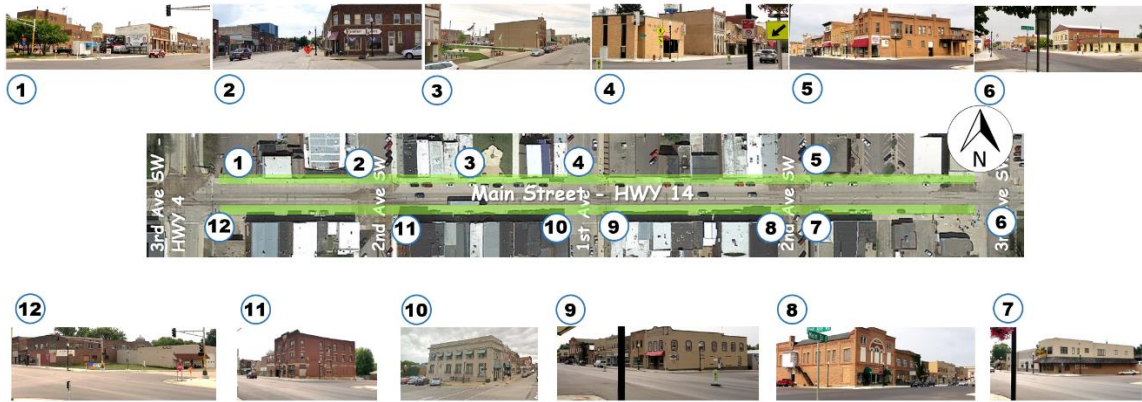


Figure 3.21. Sidewalk Components Visual Examples

(Source: Author photos & enhanced Google Earth view)

Sidewalk Component Visual Examples, Existing Conditions, Issues:

Table 3.5 addresses existing conditions and issues for the Sleepy Eye case study site Sidewalk component.

Table 3.5 Sidewalk Component Existing Conditions, Issues

- Wide sidewalks, but little relationship to adjacent businesses
- No heat abatement from street greenery/structures/shelters
- Few areas or furniture for rest or retreat
- No pedestrian amenities such as drinking fountain/restroom
- Little signage: Informational, Historical, or Interpretive
- No mid-block pedestrian crossings
- Little incentive or support for strolling or window-shopping
- Barren sidewalks devoid of art/advertisement / visual appeal
- No vegetation other than streetlamp hanging baskets
- Recent DOT work provided sidewalk surface renewals
- No sidewalk amenities such as trash cans, safety bollards, mailboxes
- No clear entrance marking/Gateway branding of Main Street area

Sidewalk Component Design Proposals:

Table 3.6 addresses design proposals based on street design principles and best practices for the Sleepy Eye case study site sidewalk component.

Table 3.6 Sidewalk Component Design Proposals

Addition of Signage for informational, historical, and recreational items

Street benches at strategic locations to promote lingering

Installing Items to promote use: PO Boxes, Newspaper Dispensers, water fountains, trash bins, etc.

Foliage to break up the bare sidewalk: Planter Boxes, etc.

3.6.3. Building Components Visual Examples, Existing Conditions, Issues

Figure 3.22 provides numerically tagged building façade views of the existing four-block main street sidewalk at eleven different locations along the four-block main street site.

The photos here represent some of the predominant variations in existing building facades and serve to demonstrate some of the variations present in reuse efforts and restoration attempts that the town has seen over the decades.

There are many classic facades in this town, indicative of its faded past as a booming agricultural hub for the area. Interviews with the city manager and business owners indicate that most buildings are structurally sound, even if they frequently are out of date with respect to utilities inside or would require investment to bring them up to modern codes. This would obviously pose challenges here, as in many older rural small-towns when it comes to anything more in-depth than just restoring the facades. Building the economic base that encourages the investment of new businesses or property management will also be necessary in order to make the Main Street improvements more than just a facelift.



Figure 3.22. Building Components Visual Examples

(Source: Author photos & enhanced Google Earth view)

Building/Facade Component Visual Examples, Existing Conditions, Issues:

Table 3.7 addresses existing conditions and issues for the Sleepy Eye case study site-building component.

Table 3.7 Building Component Existing Conditions, Issues

Vacant, blighted buildings

Inappropriately restored frontage (brick painted, doors/window not in concert)

Worn or in-disrepair entrances, neglected advertising

Outdated, worn, or non-existent canopy or awnings

Frontages replaced with discordant period style

No use of sidewalks by businesses or for amenities

Poor lighting: signage, exterior, and window

Many classic brick frontages remain

Several historic frontages restored

Blight committee recently implemented

One current, one future Pocket Park(s) on vacant lots

Building Component Design Proposals:

Table 3.8 addresses design proposals based on street design principles and best practices for the Sleepy Eye case study site-building/facade component.

Table 3.8 Building/Facade Component Design Proposals

Canopies, Awnings to provide shade, heat abatement, and character
Lease of vacant storefront displays for 3rd party advertisement/decoration
Blight regulations and enforcement to motivate delinquent owners
Pursuit of historical preservation grants for façade restoration
Community engagement on vacant lot use and Gateway implementation
Business owners encouraged to utilize a building-sidewalk buffer area
Interior lighting and facades to lessen the appearance of blighted interiors

3.7. Proposed Site Master Plan: Roadway/Sidewalk/Building Elements

3.7.1. The site Master Plan design: Applying concept diagram ideas to site plan

The site Master Plan design reflects the areas discussed in the concept diagrams and illustrates the locations of some of the more dominant design elements (Figure 3.23).

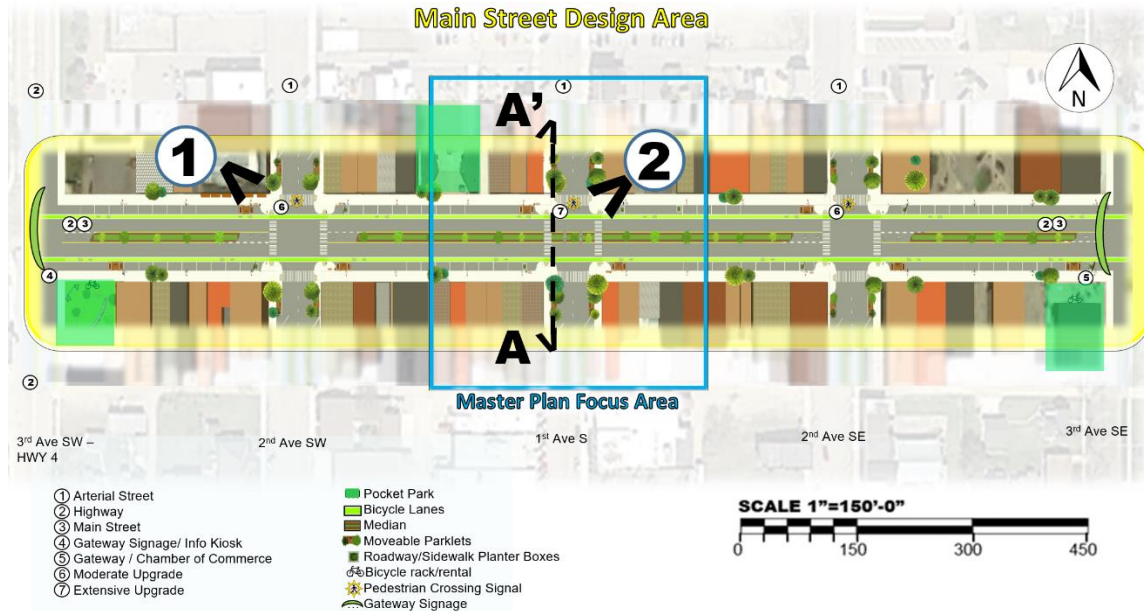


Figure 3.23. Site Master Plan Design
 (Source: Author & enhanced Google Earth overhead view)

The Master Plan and subsequent section-elevation and perspective views will implement street design principles and design elements from the five programs discussed in the Literature Review: Complete Streets, Placemaking, Green Streets, Context Sensitive Solutions, and from NMSC’s Main Street Approach. Table 3.9 provides a cross-reference of the design elements implemented versus the principles and recommendations of the program(s) they most closely are drawn from.

Table 3.9 Street Design Program Versus Site Design Elements

Main Street Roadway/Sidewalk/Buildings	Complete Streets	Placemaking	Green Streets	Context-Sensitive Solutions	Main Street America
Parklettes / parking	X	X		X	X
Roadway texture-physical shaping/markings	X			X	
Lane width/use	X			X	X
Traffic Calming/Speed Management	X			X	
Medians, refuge islands	X			X	
Corner Bump outs	X			X	
Landscape (roadway/West & East Gateways)	X	X	X	X	X
Street Trees/Shrubs Planters/ Hanging plants		X	X		
Stormwater	X		X	X	X
Retention Ponds (off-main street)			X		
Median (landscape infiltration, curb cuts)			X		
Pedestrian protection	X	X	X	X	X
Medians and Corner Bump outs refuge	X	X		X	
Crossing assists/warnings	X	X		X	
ADA curbs/features	X	X		X	
Bicycle features(roadway/West & East Gateways)	X	X	X	X	X
Bike lanes	X	X		X	
Bike racks, rental stations	X	X			
City Brand flags/Arch on Main (and at Gateway)		X			X
Hydrants/Trash cans/Benches/chairs		X			X
Fountains/Water Features		X	X		X
Streetlights/lampposts/banners		X	X	X	X
Newspaper/USPS Mailboxes		X			X
ATM's/Wi-Fi and Charging Stations		X			X
Building preservation/restoration/reconstruction		X	X	X	X
Doors/thresholds/ADA considerations		X		X	X
Windows treatments and Fillers (vacancy "masks")		X			X
Canopies-awnings Lighting		X	X		X
Public Murals		X			
Pocket Parks	X	X	X	X	X
West End Gateway Park	X			X	X
Play Areas		X	X		X
West & East Gateway		X			
Rest/Sitting Areas	X	X	X	X	
Signage Informational, Maps	X	X			X
Signage: Historical, Interpretive	X	X			X
Street Art/Sculptures		X			
East End Gateway Park	X			X	X
Chamber of Commerce		X			X

Visitor Kiosks		X			X
Restrooms		X			X

The following Section-Elevation cutaway and the two focus area perspective views will give a better idea of how the placement of design elements on the 3-component Road-Sidewalk-Building areas can provide flexibility in applying an expanded Complete Street design program to rural small-town Main Streets. The first perspective proposes moderate intersection upgrades that are included in all three Main Street intersections, and Perspective 2 will add in the view of the more intensive modifications made to make the center-of-town intersection area more pedestrian and bicycle focused and enhance its usefulness as a hub for the center of the town.

3.7.2. Elements and features as illustrated in Master Plan Legend

The Legend (Figure 3.23) indicates which roads are the arterial roads, and the two highways that cross both at the west end of Main Street, and the highway that runs through the town (US Route 14) and coincides with the town’s Main Street. It is worth noting that the intersection marked for a more extensive upgrade is one of the three north-south arterials for the town and its residential streets that cross the Main Street. Although the main street width of 58Ft (plus one-foot curb on both sides) could support four lanes of traffic and parallel parking by NACTO and AASHTO Design Guidelines, by limiting the vehicular traffic to two lanes you now provide design room to accommodate medians, marked turning lanes and dedicated bicycle lanes (AASHTO, 2011; NACTO, 2013). Studies have shown that the reduction from 4 lanes to two lanes only moderately affects throughput as the Average Daily Traffic that small towns usually fall below, and the resulting “road diet” provides significant safety improvements for vehicles as well as the

bicycles sharing the roads and for pedestrians crossing. Studies also show dramatic reductions in pedestrian fatalities or serious injuries for example from 45% to 5% when slowing from 30 to 20 mph or twice as likely to die from a vehicle traveling at 35 mph vs only 5 mph slower at 30mph (Pless, 2000; Tranter, 2010; MN DOT March 2019; FHWA, 2020).

3.7.3. Pocket park area usage

The three pocket park areas provide good examples of how vacated or dormant lots can be used. One vacated lot (north, center-left on Master Plan) is the site of a demolished building and has already been converted into a pleasant Veterans memorial and presents a nice venue for appropriate community small events or outdoor movies (on the 2-story painted building sidewalk). The other two lots at either end of the Main Street design area (one vacant, one dormant) lend themselves to a street design where they can be used to serve as gateways to Main Street. The lot at the eastern end is being acquired by the city with potential plans as a new home for the Chamber of Commerce. This would dovetail well with the Gateway entrance concept to both ends of a Main Street area with rest/visitor/informational kiosks or facilities such as public restrooms or additional bike rental stands for the community.

3.7.4. Bicycle lanes, trails, racks, and rental element

Dedicated Bicycle lanes on the main Street and bike sharrow markings on arterial streets will enhance the multi-user nature of Main Street. The introduction of marked bicycle lanes, as well as bike racks and rental stations, will dovetail nicely with the towns existing bike trails to and from a bike trail that circles the medium-sized lake located within city limits and called simply Sleepy Eye Lake. Sleepy Eye Lake is integral to the

character of the town and forms one of the town's major tourist and recreational sites, providing swimming beach areas, campgrounds, and boat launch areas with associated picnic areas and shelters in two adjoining city parks. Connecting the Main Street area to Sleepy Eye lake by bike paths and with informational signage provides a valuable extension of the communities' town center to other amenities. The town is also connected by bicycle-friendly wide-shoulder state and county roads to bicycle trails in nearby towns, state, and county parks, as well as on Minnesota DNR-sponsored trails (MN DOT, 2016; MN DOT, 2021). The bicycle-friendly design incorporates multiple street-furniture bike stands to complement rental bike stands that the community already sponsors. It also extends highly visible bicycle lanes across the main street to provide a connection to outlying community paths and regional attractions (FHWA 2015).

3.7.5. Green Street elements

The Perspective views and the site Sketchup model highlight the use of foliage that will contribute to several aspects of Green Street design as well as soften the somewhat austere current nature of the treeless Main Street area. Trees, shrubs and bushes, and flowers are incorporated into the design of the Parkettes, the street and sidewalk planters, the main street median, and vacant or dormant lots. Stormwater considerations should be incorporated into any renovations associated with the medians, and street runoff can be directed to vegetated swales or side street/alleyway bio-retention installations. Building renovations can be focused on rehabilitation-and-restoration vs demolition with roadway, street, and building modifications utilizing sustainability-oriented local or recycled materials. An additional feature explored in the model, but not portrayed within the Master Plan 4-block area is the location of stormwater retention ponds one-half block off

each of the Main Street intersections. Each of those intersections has vacant alley sites directly behind main street buildings that provide at least 180 ft. sq. potential catch areas that could be utilized to provide stormwater run-off and pollution remediation from the main street hard surfaces. The Minnesota Pollution Control Agency website offers extensive links and guidance on stormwater BMPs, addressing locality-specific references to include cold climate suitability guidance (MN PCA 2018; MN PCA 2020). This would be a valuable addition to a main street's green street investment.

3.7.6. Pedestrian crossing signals, street, and sidewalk amenities

Pedestrian crossing signals, as well as informational signage for traffic, cultural and recreational purposes, provide a valuable contribution to the Main Street buffer area between sidewalk and roadway. Items such as foliage, bike trail, and racks or rental racks, as well as street/sidewalk furniture, are better seen in the subsequent detailed focus area and perspective views.

3.7.7. Building frontages/façade: historical, economic, cultural considerations

Building frontages as seen in perspectives serve to highlight the value of historical and culturally significant buildings found along many rural small-town main streets. Main Street America and many state Historical Preservation Societies or Agencies focus on the need to use care in restoration and renovation efforts to try if possible, to preserve the nature of the original architecture and appearance of these structures. As discussed in the Building and Façade component of the 3-component street design discussed earlier, there are still a great number of improvements such as awnings, doorways, window displays, and sidewalk-building face elements that can be used to boost the value of the building frontages toward a main street design as well as contribute to mitigating heat-

island effects and tempering the appearance of vacant building interiors.

In order to enhance the historical name-branding or placemaking already implemented in building frontages and facades, roadway and sidewalk elements could be specifically sculpted or modified to reflect the town's heritage or reflect regional environmental or cultural influences. This could take the form of planters, parklettes, or median structural material coming from the local region, or where applicable, from materials re-purposed from former structures or buildings. This could also involve using sidewalk furniture with a vintage design such as benches, bicycle stands, or water fountains. In this way, roadway and sidewalk components also enhance historical authenticity while operating within the bounds of modern street design principles.

3.8 Main Street Current and Proposed Dimension Allotment

Existing dimensions of the Sleepy Eye Main Street are generous, with a 60-foot-wide roadway and 10-foot-wide sidewalks. This street is wide, but not unusual given its collateral status as a regional highway with an Average Daily Traffic of approximately 8,000 (MN DOT March 2019). Figures 3.24 and 3.25 provide cross-sectional characterizations of the Main Street dimensions using the Streetscape free software.

3.8.1 Current main street dimension usage: roadway and sidewalk

The ample width of the Main Street of approximately 60 feet provides volume to support the 8000 Average Daily Traffic (ADT) (FHWA, 2010; MN DOT March 2019) using it as a major east-west regional highway (Highway 14). In several stretches of Highway 14 across southern Minnesota, traffic loading has prompted the construction of limited access 4-lane highways and stretches where it has bypassed the business districts of

towns themselves. Studies show that a downtown bypass as a solution often has the undesirable side-effect of turning previously vibrant main streets into economic orphans.

Figure 3.24 illustrates the existing apportionment of that roadway width. While this width supports vehicular traffic, having four lanes of potential traffic to cross as a pedestrian creates safety issues unless directly mitigated by measures such as traffic and pedestrian stoplights or by a number of less obtrusive street design elements proposed in this thesis. The lack of any dedicated roadway for bicycle traffic not only compounds the distractions to vehicles if bicycles occupy part of the vehicle lanes, but also creates safety concerns for the cyclists and discourages the use of the roadway. All these are major concerns in the design of a multi-modal, accessible Main Street venue. The existing sidewalk width of 10 feet is in line with Central Business District (CBD) guidelines even allowing for buffers for sidewalk items such as street lighting or fire hydrants.

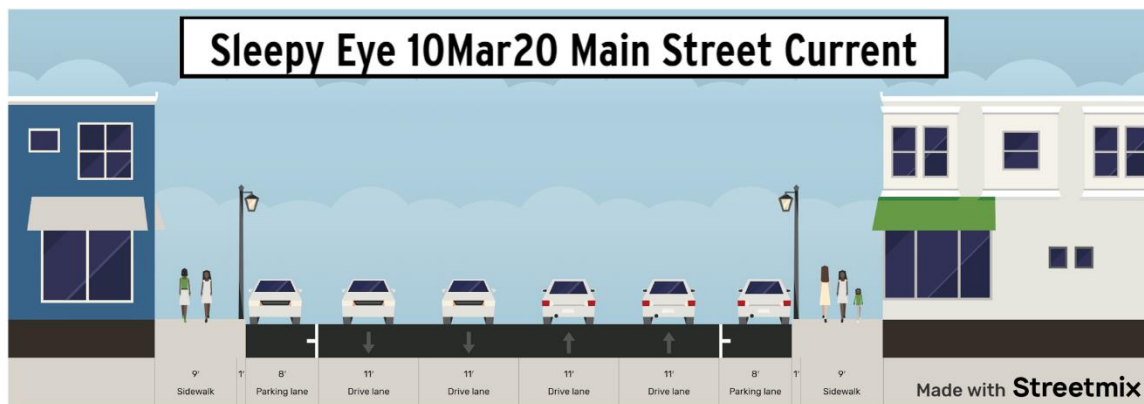


Figure 3.24. Sleepy Eye Site: Existing Dimension - Roadway, Sidewalk
(Source: Author modified Streetscape)

3.8.2 Proposed dimension usage: Roadway, Sidewalk

The introduction of a “road diet” to limit vehicular width to measures to limit the complexities of the vehicular traffic, as well as the Complete Street and Context Sensitive

Solutions and design manuals, provide several prominent solutions for multi-modal improvements within the existing overall dimensions (Figure 3.25).

The most beneficial improvements are those that reduce the vehicular traffic to two-way left turn lane (TWLTL) flows. In this configuration, through traffic is constrained to one lane in each direction, using the freed-up width to create a dedicated set of left-turn lanes (shown here as combined with a median structure that also enhances crosswalk safety islands) and providing dedicated, marked bicycle alongside on-street street parallel parking. Studies show that the reduction in vehicular throughput is minimal for roads up to approximately 18,000 ADT (FHWA, 2010). Studies state that even though through traffic is channeled into two dedicated lanes, the reduction in distractions from the vehicular, bicycle, and pedestrian interactions enhances smooth traffic flow. Safety and accessibility for multi-modal users are also enhanced by drivers slowing, and more likely adherence to posted speed limits by virtue of the sense of a narrower dedicated vehicular space.

In the proposed design, the 10-foot sidewalk still supports a 6 to 7-foot walk space with as much as a 3 to 4 -foot buffer for sidewalk furniture, amenities, or utilities (Figure 3.25).

The dimensions for the through lanes, along with the turn-lane/median, bike lanes, and on-street parking all satisfy recommended design guidance widths.

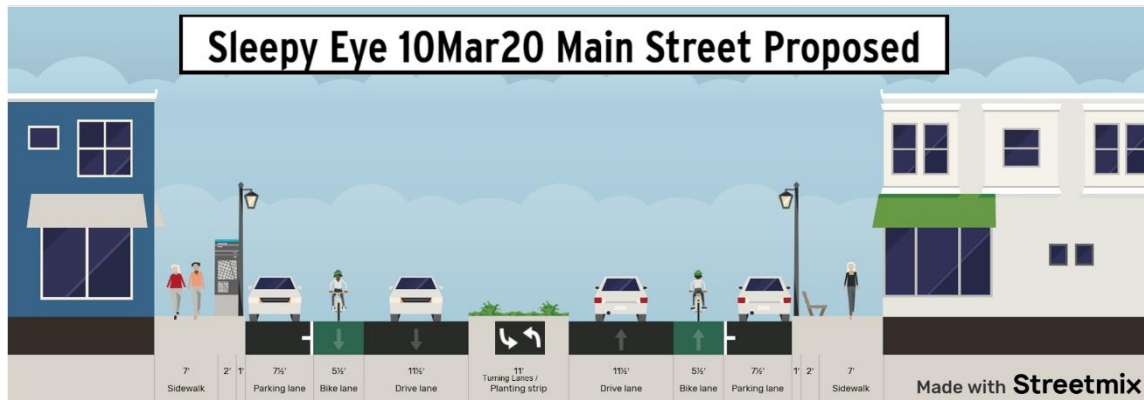


Figure 3.25. Sleepy Eye Site: Proposed Dimension Usage - Roadway, Sidewalk
 (Source: Author modified Streetscape)

3.9. Master Plan Focus Area and Section-Elevation Views

This section provides close-ups of the Master Plan that illustrate in better detail the proposed design and elements for the focus area indicated on the Master Plan. That focus area encompasses the more intensively upgraded intersection of the Main Street along with a section-elevation view of that same intersection looking west.

3.9.1. Master Plan Focus Area: Extensively Upgraded Intersection

The primary design intervention for the focus area (Figure 3.26) was the removal of North-South cross-traffic in this central intersection by extending the median across the intersection in the East-West direction, thereby removing main street center turning lanes for that intersection.

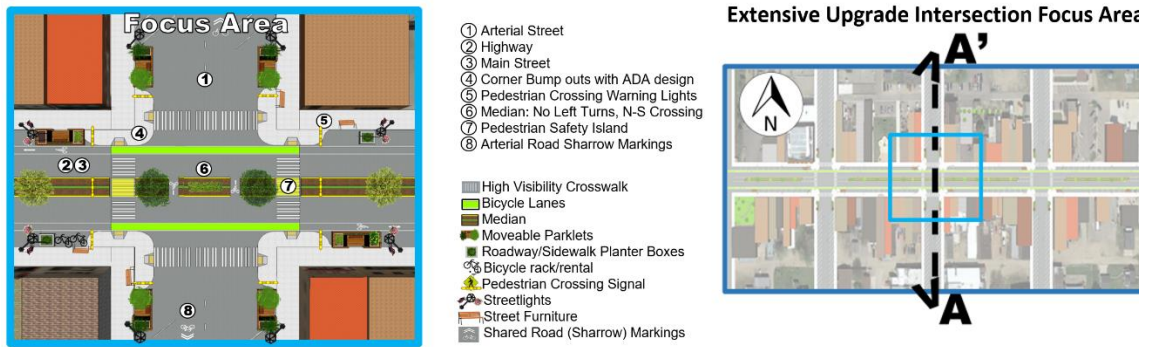


Figure 3.26. Master Plan Focus Area: Extensively Upgraded Intersection
 (Source: Author)

This intersection is called a more extensive intersection design is because pedestrian and bicycle traffic is elevated in priority relative to vehicular traffic by creating additional considerations for multi-modal access and safety. By restricting vehicular travel to two-directions with no-left-turn, the center median area creates a physical safe zone mid- roadway where the pedestrian traffic can cross the intersection in segments, crossing time is shorter for each of the two-roadway segments, and drivers are less distracted by crossing vehicular maneuvers allowing them to focus instead on pedestrian and bicycle movements. This modification does move traffic normally turning or crossing north-south at this intersection to shift one block further to the east or west where there are left-turn lanes and where north-south through traffic is allowed. This creation of a pedestrian and bicycle-friendly extensively modified intersection could also be considered for either of the other three intersections of main street. This central location was proposed because it goes further to promote a safer, walkable city center hub, and provides an evenly distributed crossing area for the 2 main street blocks in either direction even if it does disrupt the flow of local traffic to the north-south ends of town. This design, as in many other significant modifications will be ones that the community will weigh as they

balance complete streets and placemaking against historical authenticity and economics.

Each rural small-town will have to weigh the pros-cons of this modification since it shifts the balance of mobility, access, and safety in favor of pedestrians over that of cross-intersection vehicular traffic at that location. While the design in this site plan proposes a hard median, landscape plantings, and crossings cuts for pedestrian safety islands as well as for north-south bicycle traffic, less permanent or expensive alternatives could also be substituted using bollards, pavement markings, and surface modifications.

Master Plan Focus Area: Extensively Upgraded Intersection – Design Elements

Table 3.10 addressed design elements that are shown in Figure 3.26 as a Master Plan Focus area. The Section-Elevation view (Figure 3.27) and the Perspective view (Figure 3.29) later in the thesis will also provide ground-level views of the modifications to this central intersection.

Table 3.10 Design Elements for Extensively Upgraded Intersection

Reduces the left/right vehicle crossing distractions for vehicular traffic

Provides space for pedestrian safety islands in the middle of the Main Street, which for this site is also a major commercial highway

Provides space mid-street for additional pedestrian crossing signals and warning lights

Provides dedicated median cuts for bicycles to avoid using crosswalks

Includes sidewalk corner bump-outs, as well as safety island in the median to minimize the distance foot traffic, must travel to reach a safe zone

Reduces the corner turn radius, and thereby vehicular speed, for vehicles turning onto the main street

Integrates the proven visual speed calming effect by giving the perception of a narrower roadway by virtue of the medians and curb bump-outs

Promotes the concept of a pedestrian-friendly town-center area and strong visual reminders of an intersection where pedestrian traffic is prioritized

3.9.2. Section Elevation View

The Section Elevation View (Figure 3.27) illustrates the warmer, more pedestrian, and bicycle-friendly nature of the Main Street area and the Master Plan Focus Area in particular. The addition of trees and shrubs or flowers in the median center strip by use of tree trenches or silva cells, as well as in planters along the street and sidewalk areas provide the benefits from the green street concepts to this section of the town such as:

Noise abatement,

Reducing heat island effects and weathering of surfaces,

Carbon sequestration and pollution mitigation,

Integration into the stormwater reclamation efforts, and for

Calculating stormwater credits under Minnesota's Pollution Control Agency Stormwater Manual.



Figure 3.27. Section Elevation View 1st Street and Main Street
(Source: Author)

Placing parklettes also containing small trees or shrubs on the arterial streets near the main street intersections enhances the sense of a Green Street without extensive costs and modifications necessary to convert parts of the sidewalks and substructure to landscaping. By incorporating native species and a mix of deciduous and evergreen plantings, the green street effect can be maintained year-round even in northern climates. Corner

setbacks should be observed to avoid impacting the field of view for all users at the intersections. Parklettes are a valuable way of controlling traffic flow and safety at intersections with minimal impact to on-street parking or access. The Section Elevation also illustrates the use of parallel parking on Main Street with ample diagonal parking retained on each arterial street. Extensive references are available detailing recommended designs, uses, policy considerations, and cost considerations.

3.10. Site Plan Details: Perspective Views of Intersections

This section on plan details will provide perspective views from three approaches to main street upgrades. The first two perspectives provide views of interventions at the three main intersections in the Master Plan. The first perspective, Moderate Upgrade, will discuss the two intersections that also have the street design upgrades recommended for all three main street intersections. The second perspective, Extensive Upgrade, will elaborate on the specific modifications to the central intersection of the Master Plan, where a more significant consideration is made to pedestrian and cyclist traffic access and safety by eliminating the left-turn option for vehicular traffic. The third set of perspectives provide an insight into a less dramatic, less costly intervention to the main street upgrade by providing an option that does not require the extensive roadway demolition necessary to support construction and landscaping necessary for center median trees or shrubs. This option would be of utility to rural small-towns that anticipate doing Main Street make-overs in a phased or longer-term investment approach (FHWA 2013; NCSC 2016; SGA 2020; Shapard & Cole 2013).

3.10.1. Perspective 1: Moderate Upgrade - SE Corner of Main and 2nd Ave W

Perspective 1 (Figure 3.28) illustrates the modifications that can be made at an

intersection that more equally honors the multi-modal transportation usage that most Main Streets must support. This intersection varies from the design in the Master Plan Focus area as seen in Perspective 2 in that traffic can cross this moderate-upgrade intersection in all directions. Left turns are allowed, and Main Street/highway East-West traffic is given preference over access from the North-South arterial by virtue of stop signs at the corner entry points. Pedestrian traffic at the intersection is aided by flashing pedestrian-activated signals, and although the main street left turn lane prevents installation of raised surface pedestrian safety islands, pavement markings and the road diet reduction from 4 to 2 lanes of through traffic in itself helps improve the safety of pedestrian and bicycle crossing traffic.

This first perspective will address intersection improvements proposed at all main street intersections. The discussion later accompanying Perspective 2 will address visually the additional changes of a more intensive upgrade as touched on in the discussion of the Master Plan Focus area.



Figure 3.28. Perspective 1 Moderately Upgraded Intersection

(Source: Author)

At all street intersections, corner curb bump-outs serve several purposes. They extend the sidewalk safe area and thereby shorten the distance and time necessary for pedestrians to cross the roadway, they enhance the visibility of foot or bicycle traffic about to enter the crosswalks, and they slow traffic entering/exiting the main street by reducing the effective corner-turn-radius. Placement of parkettes and/or street/sidewalk furniture into the immediately adjacent pre-existing on-street parking spots further enhance the built-up nature of the intersection areas. Pedestrian activated flashing crossing warning lights help call attention to foot traffic when necessary, to pause vehicular through traffic.

The perspective highlights the use of a road diet that shifts vehicular through traffic from 4 lanes down to 2 lanes of traffic and allows the resultant width to support the installation of an eight-foot-wide median that supports stormwater and foliage elements as well as

providing room for dedicated, marked left-turn lanes. The road diet also allows space for dedicated bicycle lanes on both sides of the main street.

Parklettes set back from the corners provide foliage, seating, and pedestrian amenities as well as supporting safety and Green Street considerations without obstructing fields of view. With the proper design, parklettes can be made portable or temporary for those communities in northern climates where winter street cleaning and snow removal are a significant consideration during several months of the year.

Sidewalk areas near the intersection can also provide areas for street or sidewalk planters as well as street furniture, signage, and amenities that are readily accessible and enhance the pedestrian experience. Section 2.2.4 lists a wide range of sidewalk design elements that are valuable to the design of even a rural small-town main street.

Building frontages in Perspectives 1 and 2 serve to visually highlight the value of historical and culturally significant buildings found along many rural small-town main streets. The National Main Street Center and many state Historical Preservation Societies or Agencies focus on the need to use care in restoration and renovation efforts on these buildings to try if possible, to preserve the nature of the original architecture and appearance of these structures. As discussed in Section 2.2.5, design elements for the Building and Façade area of the 3-component street design discussed earlier provide a wide assortment of improvements such as awnings, doorways, window displays, and sidewalk elements that can be used to boost the value and appearance of the building frontages in a main street design.

3.10.2. Perspective 2: Extensive Upgrade - SW Corner of Main and 1st Ave

As mentioned previously, Perspective 2 from the Master Plan shown here is intended to illustrate the more extensive modifications that can be made at an intersection where north-south cross-intersection vehicular traffic is prevented by removing left-turn capabilities. This is accomplished by taking the proposed main street Two Way Left Turn Lane (TWLTL), and further modified it at this central intersection by extending the median across it along the main street with cuts present only to allow pedestrian or bicycle passage (Figure 3.29 below). By directing vehicles that need left-hand turns to make those turns either one block further east or west, the main street design at this central intersection greatly enhances safety and accessibility for non-vehicular traffic.

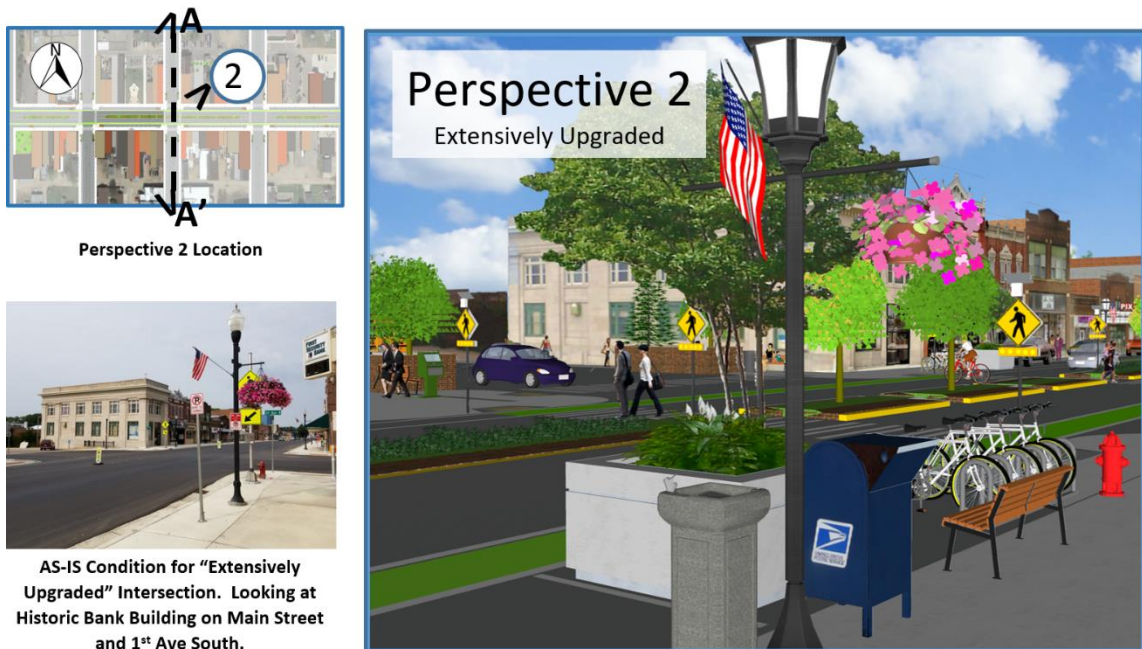


Figure 3.29. Perspective 2 Extensively Upgraded Intersection
(Source: Author)

Giving higher priority to pedestrian and bicycle mobility and safety at this intersection by eliminating left turns requires more extensive design upgrades for this central area. The perspective provided from the model visually illustrates the additional benefits of

extending the median across the intersection. The median provides more square footage for green street landscaping, provides greater pedestrian safety, channels bicycle traffic away from the crosswalk itself, and enhances the perception of a walkable town center.

3.11. Additional Perspectives of Main Street – A Design with Less Complicated Median Strip

These perspectives provide views from the model that looks down the length of the Main Street looking east from the west end (Figure 3.30) and then down the main street from the east end (Figure 3.32). Directly below each view of a “Greener” main street is shown the existing main street appearance for those views (Figures 3.31 and 3.33). This version of the model has the median trees removed to show what the street design would look like without the more extensive street construction and sculpting necessary to provide tree soil boxes, trenches, or Silva Cell arrangements for street tree growth. The medians shown here represent raised surface material but could also be material or structures that do not require modification of the underlying roadway surface. Note that in Figure 3.30 and Figure 3.32 below, both views demonstrate how landscaped parklets at side-street corners housing larger foliage items as well as parklets and plant or tree boxes along the main street still go a long way toward providing a green street appearance even with median strip landscaping postponed. An even less costly median implementation could be accomplished with basic pavement markings, striping, or with the use of flexible or semi-permanent bollards vice raised concrete, or permanent median materials.



Figure 3.30. Main Street from West Gateway looking East
 (Source: Author)

The model illustrates very clearly not only how the addition of street landscaping with a less extensive roadway median construction can still enhance a green street appearance, but also demonstrates how a well-designed main street Gateway area can help to establish a welcoming brand to the town’s entrance. The Gateway area as designed provides not only the benefits of green landscaping but a protected place for resting and socializing. It also provides an opportunity for familiarization with the town from well-designed informational signage along the sides and in the back corner rest area. Bicycle stands and rental stations promote further exploration of the town, and the street parklet with table and seating provides additional respite as well as the benefits of a distinct road diet narrowing of the Main Street entrance. Figure 3.31 illustrates the existing state of that intersection and main street approach.



Figure 3.31. Existing Main Street from west Gateway area looking East

(Source: Author)

At the eastern end of Main Street, the presence of landscaping along the sides of the four-block main street is apparent even without the extensive intervention and cost associated with extensive median strip landscaping (Figure 3.32). The presence of parklets with greenery on the side street corner areas, as well as intermittently along the main street interspersed with planter boxes, greatly enhances the warmth of the street appearance as well as delivering the multitude of benefits obtained from a green street approach. The presence of highly visible bicycle lanes and sidewalk furniture promotes the main street branding as a walkable, rideable, welcoming multi-modal enclave.



Figure 3.32. Eastern end of Main Street looking West

(Source: Author)

Figure 3.33 shows the same view, illustrating the existing wide vehicular-oriented nature of this main street that doubles as a major east-west regional highway.



Figure 3.33. Existing eastern end of Main Street looking West

(Source: Google Street View)

For rural small-towns with limited discretionary funds, a phased to more extensive main street upgrades approach as seen in Figures 3.30 and 3.32 may be the only way to make expensive long-term street design upgrades economically feasible. The added benefit is that in this stepped approach to modifications small town stakeholders could be gradually acclimated to new traffic flows, multi-modal usage patterns, and design modifications and costs.

Chapter 4: Summary, Limitations, and Conclusion

4.1. Overview of Thesis Goal and Objectives

The objective of this thesis was to take the principles and best practices of current street design and adapt them to the unique requirements of rural small-town Main Streets.

Since the scope presented here of current street design guidelines, principles, and best practices is so broad, targeting the key principles used in several national and global street design programs provides a manageable starting point for rural small-town Main Street design improvements. These design principles lend themselves very well to rural small towns, even in the situation where those small towns Main Streets also serve the region as trunk highways or heavy commercial thoroughfares.

4.2. Summary

This research thesis demonstrated that Complete Streets principles, and other related current street design principles and best practices, can complement the National Main Street Center's design approach for use in rural small towns. The addition of these principles and best practices strengthens the design component for the Main Street approach. The value of integrating the current street design programs and guidelines into a design framework that is relevant to rural small-town Main Street design was shown through a site design that provided street elements for Sleepy Eye Minnesota's Main Street. The proposal encompassed an organization of design elements into a three-component framework of roadway, sidewalk, and building frontage areas. The resultant master plan and intersection focus areas incorporated features that were scalable in both

cost and implementation to accommodate the needs and the means of rural small towns, if necessary, through phased extensive and moderate upgrade approaches.

This summary chapter also addresses some of the limitations in applying current street design guidelines and best practices to rural small-town main street revitalizations. One limitation discussed will be that contemporary street design represents safety, environmental, mobility, and multi-user design improvements that do not always directly align with the historical authenticity of a rural small town and will be a balance that reflects community input. One other limitation discussed will be the fact that the design component is only one of the four components that the National Main Street Center states are necessary for successful community transformation (the four components being Economic Vitality, Design, Promotion, and Organization). Ultimately it is the strong involvement of a community in a design process that will result in a balance of contemporary design, including green and sustainability features, and the community's desire to honor its cultural and historical heritage, and its ability to implement these in a fashion that fits its economy.

Given the wide-ranging design inputs from the five street design programs researched, and the complexities of implementing the hundreds of potential design elements that could be implemented, the practitioner for main street design in a rural small town would be best served by concentrating on several sets of tables presented through the course of the thesis. Tables 2.1 through 2.5 focus on the principles from the five design programs, with tables 2.6 through 2.10 summarizing possible design elements and how to translate design principles and elements into workable main street design objectives. A review of

the site's potential users and usages, and of the sites existing conditions, as seen in Table 3.2 through 3.8 will then allow the practitioner to evaluate their existing site as a starting point for their design process. This is a simplification of the process used in this thesis, but it is a useful review of the work ahead for a rural main street design practitioner.

The thesis was broadly organized into four sections: Chapter 1: Introduction, Chapter 2: Literature Review, Chapter 3: Project Design, and Chapter 4: Summary and Conclusion. The Literature Review in Chapter 2 covered current best practices, and design guidance and principles associated with street design under the National Main Street Center's Main Street Approach program, Complete Streets under the Smart Growth America organization, Green Streets effort led by the EPA, Context Sensitive Solutions sponsored by the Federal Highway Administration, and Placemaking as led by the Project for Public Spaces. The Literature Review also discussed the street design organizational format that uses a 3-component framework, breaking the analysis and implementation of design principles and elements into the three street component areas of roadway, sidewalk, and building frontage/facades. The principles and best practices that emerge were then summarized in eleven thesis design objectives in order to provide governing principles when developing the project site design. In summary, the literature review contributed to the thesis objectives by providing the principles and elements associated with the major street design programs being used at the Federal, State, and municipal levels. It also guided the designer on how to categorize and integrate the design elements of these areas, and it provided extensive references to existing design guidance outlined by industry and government organizations. By illustrating the role of the FHWA-approved

concept of Context Sensitive Solutions in street design, the Literature Review presented a workable way forward into adapting all these programs and standards to fit designs that can meet the specific needs and context of main streets, especially those unique to rural small towns.

Project Design in Chapter 3 introduces the design methodology, discusses, and analyzes the site inventory components (abiotic, biotic, cultural, visual, photometric), discusses proposed users and program objectives, and then provides functional and concept diagrams as well as a site master plan, a section-elevation view of the main intersection, and perspective views of several focus areas in the final design. Several key design features of the Main Street plan are as noted in Table 4.1.

Table 4.1 Key Site Design Elements

Placement of parklettes that contain larger vegetation (ornamental trees and evergreens) as well as tables and seats at all four corners on the side streets of the three main street intersections to enhance Green Street appearance without requiring subsurface modifications to streets.

Parklettes on Main Street itself for social and commercial usage, and cross-section safety considerations at the four corners of each of the three intersections

Pocket Parks serving as city center Gateways are proposed at both ends of Main Street with recreational, social, and city informational elements. Gateway Park's design also includes bike rental and parking facilities and extensive landscaping and Green Street enhancements.

Green Street additions are proposed to the existing vacant-lot pocket park midway down Main Street that currently serves as a Veteran's Memorial site.

Dedicated bicycle lanes on both sides of the main street, and bicycle rental and parking stands along the main street promote multi-modal use of the main street as well as connect this area to existing city and regional bike trails.

Improved pedestrian-friendly city center appearance proposed by conversion of 4-lane thoroughfare to TWLTL (two-way left turn lane) roadway with a vegetated raised median. One advantage of this feature is to create pedestrian crossing safety islands and dedicated left-turn lanes. All three intersections also feature high-visibility, user-activated flashing pedestrian crossing signals.

Intersection sidewalk corner bump-outs enhance safety by reducing pedestrian crossing distances and by reducing vehicular turning speeds at smaller radii corners. The primary

intersection at the city center has its median extending east-west across the intersection to remove the left turn lane altogether. This further improves pedestrian protection from distracted drivers and promotes a walkable city center appearance with minimal impact on vehicular through-traffic. This extended median has cross-cuts for bicycle crossings in addition to those for pedestrian crossings.

Green Street considerations such as planters and hanging baskets are expanded to reduce heat island effects and enhance visual experiences. Low energy usage and dark sky-compliant street lighting are also implemented.

The design implements a proven visual vehicular speed calming effect by virtue of well-defined center medians, the reduction from four through lanes to two, and curb bump-outs at main street intersections. As noted by the Literature Review, studies show these elements slow traffic and improve driver peripheral vision by giving the perception of a narrower roadway.

Numerous building and building facade interventions are proposed to promote cultural and historical heritage preservation, reduce the negative impact of vacant storefronts, and promote commercial, recreational, and business-friendly atmospheres along the sidewalk component of the main street.

Sidewalk interventions include street furniture, signage, and amenities that are readily accessible to pedestrians and enhance the placemaking experience.

The case study does support integrating complete street and green street elements with historical rural small town considerations and then demonstrates the use of a 3-component framework to organize these design elements. Since there are many principles and design elements involved in current street design, a street design framework using three areas of roadway, sidewalk, and building frontage to organize improvements around makes the process more understandable and manageable. In the completed design, the three components then need to be reviewed as a whole to ensure they are context-sensitive and match the needs and environment desired by the stakeholders. In this regard, the site inventory of a town center Main Street must necessarily also closely incorporate the existing cultural and visual or photometric aspect of the site inventory and analysis that are critical to defining the users, usage, and design objectives that the project design will encompass. It is essential that there is strong and continued community involvement in the design process. As discussed in the project

design section, a strong acknowledgment of historical significance and preservation may in fact be a significant part of the design program for rural small-towns, especially where they may benefit from placemaking or brand labeling components that are enhanced by well-thought-out restoration or renovation efforts. As mentioned in the project design section, some roadway and sidewalk element designs may be specifically tailored or sculpted, in conjunction with the building façade component of the 3-component framework, to promote references to the town's historical heritage or regional environment.

4.3 Limitations

It should be noted that several of the street design programs, primarily NMSC's Main Street America, and the principles of Placemaking, emphasize that Main Streets are not just a design exercise, but rather are part of a more complex effort that ties the social, economic, and cultural aspects of a community to the changes necessary to make them successful. The implementation of current street design principles and best practices are often likely to be incongruent with the precise historical authenticity and the traditional style of most rural small-town main streets. The author recognizes the challenge of balancing historical preservation and authenticity with contemporary safety and greening principles and with the many best practices of current street design.

Interviews with Sleepy Eye stakeholders have demonstrated that the concern for historical heritage in Sleepy Eye was predominantly focused on maintaining the appeal of classic frontages still present on many of the building facades. Recognizing the value of placemaking and "name-branding", they also desired the integration of design efforts that

honor the legacy of the Sioux Indian chief Ish-Ta-Haba (with his vision impaired in one eye, the English translation is “Sleepy Eye”) for whom the town was named, along with historical design features that highlight the town’s strong past legacy as a nationally recognized regional grain mill integral to southern Minnesota’s agricultural past.

The project design chapter of the thesis demonstrated the role site inventory and analysis play to ensure the final design recognizes the values, context, and constraints of the existing conditions. Early and continued community involvement in the design process will help ensure a balance that fits the requirements and revitalization capacity that accommodates the desires of the stakeholders involved in a small-town main street revision. The author recognizes that the resources of small towns to undertake major revisions may be limited, even under a phased implementation, so the site design approach addresses elements in the roadway, sidewalk and frontage components that could be implemented in a time-phased fashion, or initially on a non-permanent trial basis until the modification is widely accepted. Several of the perspective views show the Main Street design without the more intensive construction necessary to support in-ground street trees or the major street hard surface overhaul to install raised medians.

Further research for each site will be necessary in every application of this thesis design approach in order to ensure the implementation of a major main street upgrade closely matches the community’s existing urban planning factors such as economic development and financial resources. Additionally, street design improvements are only one part of the revitalization programs encouraged by the National Main Street Center and urban planners. Design changes in themselves are not a cure-all. The NMSC’s Main Street

America program emphasizes that a collaboration of all aspects of economic development, organization, promotion, and design are essential to have a successful main street revitalization.

In cases where the rural Main Street is also a state or national highway, coordination with governmental Departments of Transportation are also critical since there will be many areas where the competing interests such as mobility and access by all users are shaped by external actors and factors, thereby requiring extensive collaboration to ensure long term plans are coordinated at all levels.

4.4. Conclusion

In Summary, current street design best practices and principles can and certainly should be applied to the design of Main Streets in rural small towns. The application of these wide-ranging street design program elements through a 3-component street design framework of roadway, sidewalk, and building areas helps bring order to the task of matching design elements to the site-specific objectives of the Main Street design. The resultant design proposals can be scalable in both cost and implementation to accommodate the needs and the means of rural small towns. Sleepy Eye, Minnesota provided an appropriate case study to demonstrate how the principles and elements of this approach can be scalable and flexible to improve a selected small-town main street. Complete Street principles and related street design best practices are clearly a useful step in designing rural small-town Main Streets. Rural small towns are essential to the breadth of our nation's demographics and are part of its economic foundation. The investment in an appropriate Main Street design is an essential step in maintaining the

viability of these critical components in our nation's rural communities.

Appendices

Appendices

Appendix 1 provides a compilation of references cited and consulted during thesis research that provided core information to the topic of this thesis and would be of use to anyone pursuing this main street topic further. While seventy-nine of these were used as references throughout the thesis, within this table are a further forty-seven of the most valuable additional references that were consulted during the research for the thesis. The references are annotated as to which of the five street design programs from the Literature Review that they pertain to, or to other relevant rural small-town main street topics such: as bike-walk street design, rural-urban design topics, street design elements, or governmental and industry street design guidelines. This is not an exhaustive list of all possible references but rather represents ones retrieved that may be of greatest utility for a landscape architect or an urban planner who is interested in going deeper into this particular aspect of street design. The table lists in priority order the references providing the most comprehensive view of related information. The first thirty-three references listed represent strong reference material in three or more subjects. These items were generally the ones that were of greatest value to the core understanding of this topic of Main Street design for rural small-towns. The others are valuable references to the topics noted.

App1: Additional References Consulted

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X	X			X	X				WA DOT Washington’s Complete Streets and Main Street Highways Program. Retrieved 10 March 2019 from https://www.wsdot.wa.gov/research/reports/fullreports/780.1.pdf
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